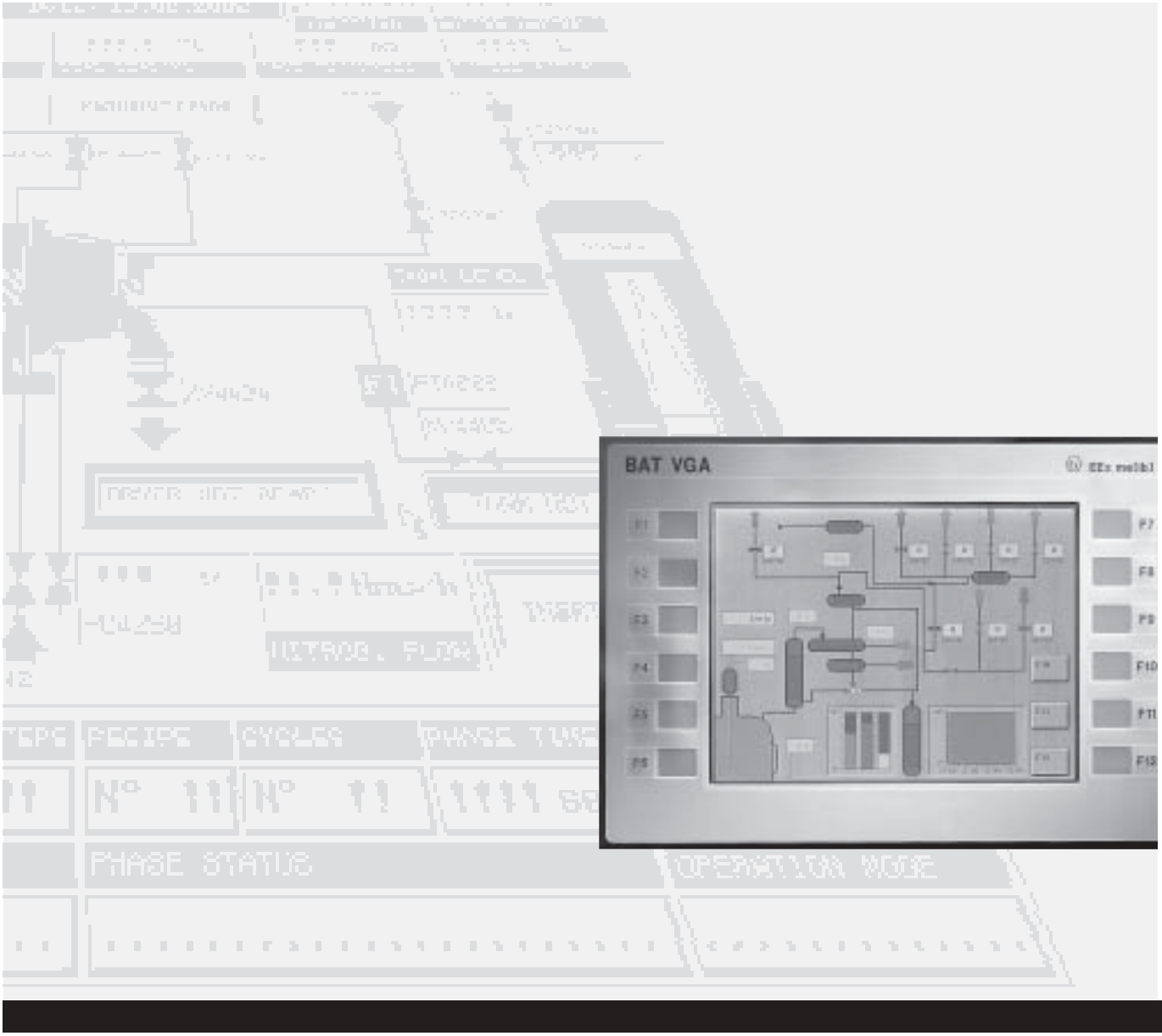
BARTEC



Software

BMS Graf pro

User Manual

BARTEC

User manual

for BMS Graf pro Version 5.0.x.x

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Much care has been taken in producing this manual. However, BARTEC GmbH does not assume responsibility for errors in this manual nor any resulting consequences. Likewise any liability is rejected, should the product be used incorrectly.

We have taken care to include correctly and completely all the necessary information for the successful installation, configuration and operation of the display is in this manual. Should you require further information or find errors in this manual, please contact us.

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1 Installation of BMS Graf pro

1.1 Requirements

1.1.1 Minimum hardware requirements

- Pentium II processor, 233 MHz or higher
- 128 MB memory
- 40 MB free hard-disk space
- CD-ROM for installation
- Mouse
- Graphics resolution 1024 x 768 pixels, 16-bit colour depth
- 1 serial interface (COM1 or COM2) for transfer of project data to the BAT terminal
- Printer (local or network)

1.1.2 Recommended

- 256 MB memory
- 60 MB free hard-disk space
- Graphics resolution 1280 x 1024 pixels, 32-bit colour depth

1.1.3 Software requirements

- Operating system: Microsoft Windows 95, 98, ME, NT4, NT5, 2000 or XP

1.1.4 Copyright

IMPORTANT

This software is protected by copyright. By opening the package, you automatically accept the conditions of the license agreement. You may make only one single copy of the original data-bearers for safety reasons and for archiving purposes.

1.1.5 Completion of the registration card

Not planned at present.

1.2 Installation of BMS Graf pro

A sub-directory into which all BMS Graf pro files will be written is created during the installation process.

(1) Before installing, make a back-up copy of any already existing version of BMS Graf pro.

(2) Check that one of the following operating systems is installed:

- Microsoft Windows 95
- Microsoft Windows 98
- Microsoft Windows ME
- Microsoft Windows NT4
- Microsoft Windows NT5
- Microsoft Windows 2000
- Microsoft Windows XP

(3) Ensure that you possess the necessary rights to install the software.

(4) Insert the BMS Graf pro CD in your CD-ROM drive.

(5) Open the main directory of your CD-ROM drive using Explorer.

(6) Start installation by selecting the "SETUP.EXE" file.

(7) Follow the instructions in the installation software.

(8) After installation, remove the BMS Graf pro CD from the drive and keep it in a safe place. The CD is not needed during operation of the software.

(9) BMS Graf pro can be started via the start menu, "Programs"

Please see the Windows documentation for more details on Windows.

2 Description of software

The "**BMS Graf pro**" package permits the simple drafting of process visualizations. Individual images and projects are drafted on a Windows computer and stored in the display terminal. The program is optimized in such a way that the individual images have a minimal memory requirement in the target system. This makes it possible to store a large number of images in the display terminals. Selection of the appropriate protocol driver makes links to the most diverse range of control systems possible. BARTEC is continuously expanding the range of available protocols.

2.1 Project modules / definitions

A project contains all the information necessary for execution in the terminal.

A project is drafted on a Windows-compatible computer using the **BMS Graf pro** package, and then transferred to the terminal.

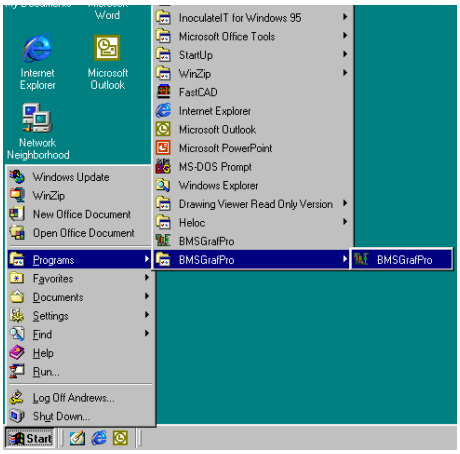
A project contains:

- Link ➡ The connected controller, the transmission protocol.
- Transfer block ➡ Basic data interchange between the controller and the terminal.
  Address range with freely selectable position in the controller.
  The transfer block is independent of the variable.
- Alarms ➡ Text messages which react to a bit in the controller.
  The alarms are transmitted, inter alia, in the transfer block.
- Process links ➡ Linking of objects with values in the controller
- Text lists ➡ Text/value links
- Images ➡ Each image consists of individual objects

An interpreter works through the project in the terminal. This interpreter depends on the selection of the link. It constitutes the connection to the controller, with the corresponding protocol. The interpreter is transferred to the terminal together with the project.

3 Using BMS Graf pro

3.1 Program selection



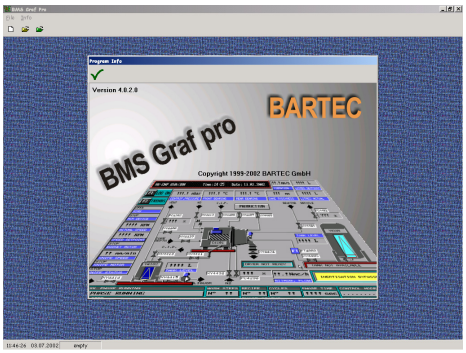
Start the program using the "BMSGrafpro" Icon in the start menu

➡ Programs

➡ BARTEC

➡ BMSGrafpro

3.2 The start screen



The BMS Graf pro entry screen appears after the start;
the Welcome window closes after a few seconds.

The status line contains the following information:

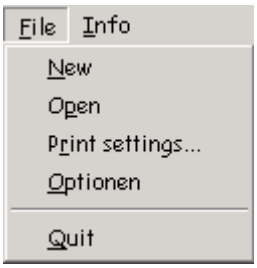
- Current time
- Current data
- Project status

A screen resolution of 1024 x 768 pixels is assumed. A resolution of 1280 x 1024 pixels facilitates software operation significantly, since it is then possible to see and edit the complete image in the image editor.

3.3 Menus and symbol bars

3.3.1 For closed projects

Menu



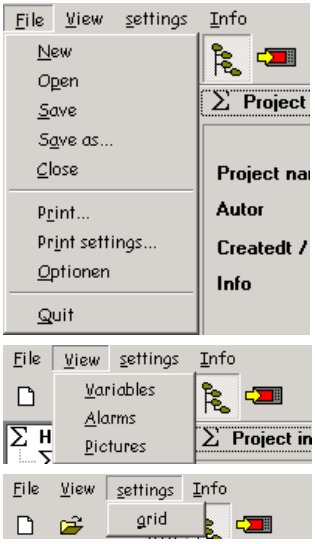
File ➡	New	Opens a new project
	Open	Opens an existing project
	Printer set-up...	Opens Standard Printer Dialogue
	Options	Selection of language
	Close	Closes the program
Info ➡		Information dialogue

Symbol bar

		Opens a new project
1.		Opens an existing project
2.		Importation of a project generated using BMS-Graf (DOS version)

3.3.2 For opened projects

Menu



File ➡	New	Opens a new project
	Open	Opens an existing project
	Save	Saves the project to a data-bearer
	Save as...	Save under a new name
	Close	Close project
	Print	Print all or part of the project
	Printer set-up...	Opens Standard Printer Dialogue
	Options	Selection of language
	Close	Closes the program
View ➡	Variables	Open the Variables – Overview
	Alarms	Opens alarm-signal overview
	Images	Opens image overview
Settings ➡	Grid	Opens grid-setting dialogue
Info ➡		Information dialogue

Symbol bar

 Opens a new project

 Opens an existing project

 Saves the project to a data-bearer

 Save under a new name

 Activation/deactivation of the project tree on the left

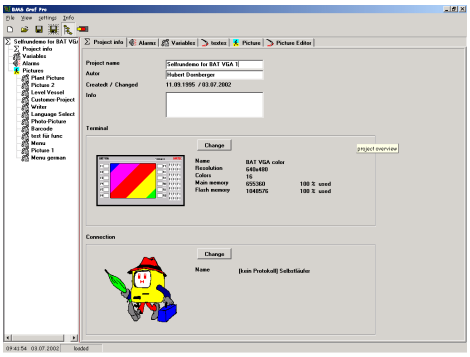
 Transfer of the project to the display terminal

 Printing a pact or the whole project

 (can be seen only if image editor is visible) . Makes a copy of the pictures into the clipboard

3.4 Drafting of a project

3.4.1 The project overview

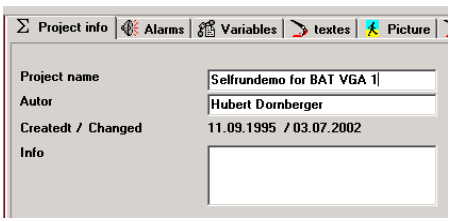


Information	Data and information on the project Designation of the current project Depiction of the selected controller and coupling interface Depiction of the terminal selected Information on number of images and number of alarms for the project
Terminal	Selection of the display terminal used
Coupling interface	Selection of the controller and the protocol used Statement of the transfer block addresses in the controller
Variables	Assignment of variable-names to addresses in the controller
Images	Drafting or editing of individual images
Alarms	Input of alarm texts and statement of their reaction
Print	Print-out of alarms, assignments and information
Transfer	Download of the entire project to the terminal connected

Note:

- Default values are used (BAT 2 as terminal and SELFRUN as coupling interface) for the drafting of a new project, these can be changed at any time
- Detailed information on the individual items is available on the following pages

3.4.2 The project information field

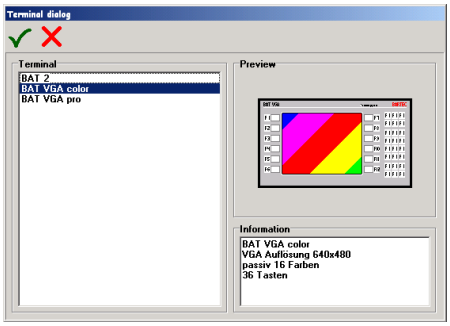


Information:

General information on the project.

This information can be changed at any time.

3.4.3 Terminal selection



Terminal:

A terminal can be selected using the cursor keys and/or the mouse

Confirm settings

Reject settings

3.4.3.1 Display terminals

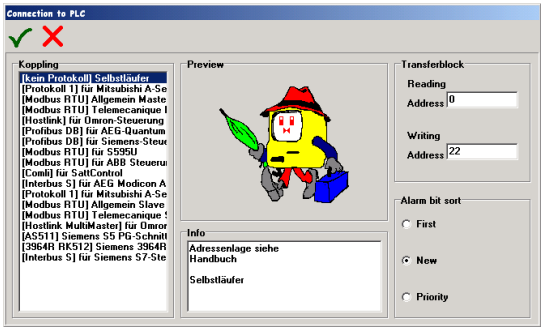
The display terminals are available in five housing variants. The **BAT 2** (monochrome), the follow-up model **BAT 300,** the **BAT VGA** (color) and the follow-up model **BAT VGA Pro** (color TFT) and the new **BAT 800**.

Characteristic features

The display terminals are notable, in particular, for the following performance features:

	BAT 2	BAT VGA	BAT VGA pro	BAT 300	BAT 800
Display resolution	¼ VGA 320 x 240 pixels	VGA 640 x 480 pixels	VGA 640 x 480 pixels	¼ VGA 320 x 240 pixels	SVGA 800 x 600 pixels
Display mode	monochrome (16 grey-levels)	Colour (16 colors)	Colour 262144 colors	Colour 262144 colors	Colour 262144 colors
Display size	5.7 “ approx. 115 x 86 mm	10.4 “ approx. 212 x 159 mm	10.4 “ approx. 212 x 159 mm	5.5 “ approx. 111,4 x 83,5 mm	12 “ approx. 247,5 x 186 mm
Keyboard	numeric pad 10 function keys (can be labeled)	numeric pad 12 function keys (can be labeled)	numeric pad 12 functions key (can be labeled)	numeric pad 10 functions key (can be labeled) 6 special keys	numeric pad 16 functions key (can be labeled) 12 special keys
Systems keys	Com1: TTY or RS232 or RS422/RS485 Com2: RS232 or TTY or RS232 or RS422/RS485 or PROFIBUS-DP		Ethernet: 10BaseT (is not supported by BMS Graf Pro) Com1: RS232 Com2: RS232 Insertable module RS232 to TTY RS232 to RS 422 RS232 to PROFIBUS-DP RS232 to intrinsic safety with supply for hand scanner		
Illumination	CFL illumination separately replaceable				
Dimensions & Wall cut-out	336 x 194 x 130 mm 322 x 180 + 0,5 mm	400 x 240 x 150 mm 386 x 226 + 0,5 mm	400 x 240 x 170 mm 386 x 226 + 0,5 mm	335 x 194 x 170 mm 321 x 179 + 0,5 mm	440 x 270 x 170 mm 425 x 255 + 0,5 mm
Degree of protection	IP 65 (front)				
Explosion safety	EEx me [ib] IIC T4		II 2G EEx me [ib] IIC T4	II 2G EEx me [ib] IIC T4 II 2D T80°C IP6X	
Supply	DC 24 V / 1 A		DC 24 V / 1 A	DC 24 V / 1 A	DC 24V / 1,5 A
Test certificate	PTB Nr. Ex-95.D.2205		PTB 01 ATEX 2109	IBExU 03 ATEX 1096 X	

3.4.4 Selection of coupling interface



Coupling interface:

A coupling interface can be selected using the cursor buttons or the mouse. The appearance of the entry boxes for the transfer block is changed depending on the type of interface.

The distance between the „Reading" and the „Writing" Address must be more as 22 data words.

Fault bit orientation: Type of message display in the display terminal

Initial value: ➡ The message which occurs first is at the top of the Alarm list

New value: ➡ The latest message is at the top

Priority: ➡ The message with the lowest alarm number is at the top

✓ Confirm settings

✗ Reject settings

Designation of "master" and "slave" from the terminal point of view

3.4.4.1 Available interpreters

Description	PLC
AS511	Siemens S5 90u to 115u programing interface
3964R mit RK 512	S5 with CP524 to CP544, S7-300 with CP341, S7-400 with CP441-2
Modbus RTU für S5	S5 95u via CP521SI and Modbus driver
Modbus RTU Master	Address range 40001 to 49999 for Telemechanique TSX series with TSXSCG1131, etc.
Modbus RTU Master	Address range 0 to 65535 , General Definition
Modbus RTU Slave	Address range 40001 to 42000 for Telemechanique TSX series with TSXSCG1131, etc.
Modbus RTU Slave	Address range 0 to 1999 , General Definition
Modbus RTU Slave	Address range 0 to 1999 , specially for ABB control system
Mitsubishi Protokoll 1	Mitsubishi A with CP ASJ71C24 or Mitsubishi FX on left-hand side of CPU
COMLI Master	For Sattcontrol ,Alfa Laval
Hostlink Master	OMRON SYSMAC CQM1
Profibus DP Siemens Controllers	S5-135U via IM308C, S7-300 CPU 31x-2 DP, S7-400 CPU 41x-2 DP, PCS 7, Freelance 2000 with field controller
Profibus DP Quantum	For AEG Quantum, interface via Profibus
Interbus	For AEG Modikon A120 via BKF102 or BKF112
Interbus Siemens	to S7 control unit via Phoenix activation module

Further special customer-specific protocols and interpreters on request

3.4.4.2 The transfer block

The transfer block contains only the data ranges which are necessary for maintenance of communication between the display terminal and control system. This block consists of two parts. One part is the block for transfer from the display terminal to the control system, the other block is for transfer from the control system to the display terminal. For these data ranges the following memory space should be reserved in the control system. The location of the transfer block is freely selectable.

The actual variables of the control system can be located in practically any other desired storage areas, data words or registers. It should be ensured that there is no overlapping with variables or with each other.

Definition of direction:

Transfer Controller	⇨	Display terminal	⇨	21 Data words (Register)	⇨	"Read"
Transfer display terminal	⇨	Controller	⇨	20 Data words (Register)	⇨	"Write"

Note:

- The address entries for the transfer block relate to the start addresses. All the addresses stated on the following pages must be added as an offset to these start addresses
- All address data are word addresses, i.e., in the case of byte-oriented controllers:
  - Byte address 0 and Byte address 1 in the memory is Word address 0
  - Byte address 2 and Byte address 3 in the memory is Word address 1
  - etc.
- In the case of Siemens controllers, the information relates to data words (DW)
- Data words can be read or written in data modules (DB 2 to DB 255)
- In the case of other manufacturers, the information relates to 16-bit-wide memory registers
- The write and read ranges are controller-dependent

Example:

If the start addresses of the transfer block are stated as follows

- Read from data module 10 data word 0
- Write from data module 20 data word 30

the following addresses thus result:

- Image specification (start address "Reading"+ 0000) ➡ DB 10 DW 0
- Function keys (start address "Writing"+ 0002) ➡ DB 20 DW 32

3.4.4.2.1 Transfer block, Transfer display terminal ⇨ Controller ("Writing")

Overview

Address offset	Description
+ 0000	Image number "ACTUAL", image shown on display terminal
+ 0001	Message bits from terminal
+ 0002	Function keys
+ 0003	Numerical keys
+0004	Control keys
+0005	Acknowledgements from terminal
+0006 to +0020	Acknowledgement bit for 240 alarm messages

Detail

Offset\Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+0000	Image number "ACTUAL", image shown on display terminal															
+0001									BL State	IN 4	IN 3	IN 2	IN 1		HV	WD
+0002		Alt	Ctrl	Shift	F12	F11	F10	F9	F8	F7	F6	F5	F4	F3	F2	F1
+0003		'i'	Del	Ins	-	.	9	8	7	6	5	4	3	2	1	0
+0004				Home	Win2	Win1	F16	F15	F14	F13	Links	Rechts	Ab	Auf	CR	ESC
+0005	S12	S11	S10	S09	S08	S07	S06	S05	S04	S03	S02	S01	Time	Alarm		Hist.
+0006	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+0007	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
+0008	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
+0009	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
+0010	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
+0011	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
+0012	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
+0013	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
+0014	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128
+0015	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144
+0016	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160
+0017	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176
+0018	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192
+0019	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208
+0020	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224

HV = History full
Hist. = History deleted
Time = Time/Date confirmed

WD = Watchdog Terminal
Alarm = Alarm-message buffer deleted

= not assigned, must be allocated "0"

Note:

The inputs and outputs are not present in BAT 300, BAT VGA pro and BAT 800, and therefore have no function !

This allocation is used only in BAT 300 and BAT 800.

Further explanations on the transfer block transmission from PC display terminal to control system ("Writing")

Address offset	Bit number	Description
+ 0000	Bit 4	*Image number „ACTUAL", image represented on PC display terminal* The PC display terminal enters the number of the image, which is on the display of the terminal, in this register. The control system can compare whether there have been changes in the image by means of the function keys.
+ 0001	Bit 0	*(WD) Watchdog terminal* This bit is transferred in every cycle as 1 (set). The control system can reset this bit to 0, in order to check after a certain time (time out in master systems, e.g. 10 secs) whether the bit has been reset from the PC display terminal. If this is the case communication has proceeded correctly.
+ 0001	Bit 1	*(HV) Histogram fulll* This bit is set from the PC display terminal when there are 500 entries in the histogram.
+ 0005	Bit 0	*(Hist) Histogram deleted* This bit is set from the PC display terminal after the histogram has been successfully deleted. The bit remains set as long as the bit delete histogram is set to bit 0 in the field "Read" address offset +0021.
+ 0005	Bit 2	*(Alarm) Alarm indication buffer deleted* This bit is set from the PC display terminal after the alarm indication buffer has been successfully deleted. The bit remains set as long as the bit delete alarm indication buffer is set to bit 2 in the field "Record" address offset +0021.
+ 0005	Bit 3	*(Time) time / date taken over* This bit is set from the terminal after the time/date has been taken over from the PC display terminal. The bit remains set as long as bit 3 time/date applicable in the field "Record" address offset +0021 is set.

3.4.4.2.2 Transfer block, transfer controller ⇨ Display terminal ("Reading")

Overview

Address offset	Description
+ 0000	Image number "TARGET", specification of image number for controller
+ 0001	Value <> 0 ⇒ all entry boxes disabled
+ 0002	Control bits terminal
+ 0003 to + 0017	Alarm bits for 240 alarm messages
+ 0018	BCD Month/Year
+ 0019	BCD Hour/Day
+ 0020	BCD Minute/Second
+ 0021	Job bits from controller

Detail

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+0000	Image number "TARGET", image to be displayed on the display terminal															
+0001	Disable input boxes															
+0002			BL Off	Led4Fl	Led3Fl	Led2Fl	Led1Fl	Led4On	Led3On	Led2On	Led1On	Alarm		Out3	Out2	Out1
+0003	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
+0004	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
+0005	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
+0006	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
+0007	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
+0008	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
+0009	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
+0010	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
+0011	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128
+0012	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144
+0013	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160
+0014	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176
+0015	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192
+0016	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208
+0017	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
+0018	BCD Year tens				BCD Year units				BCD Month tens				BCD Month units			
+0019	BCD Day tens				BCD Day units				BCD Hour tens				BCD Hour units			
+0020	BCD Minute tens				BCD Minute units				BCD Second tens				BCD Second units			
+0021												WS	ZDG	AL		HL

Alarm = Display "ALARM"
ZDG = Time and date valid
HL = Delete history

WS = Watchdog controller (not used)
AL = Delete alarm-message buffer

= not assigned, must be allocated "0"

Note:

The inputs and outputs are not present in BAT 300, BAT VGA pro and BAT 800, and therefore have no function !

This allocation is used only in BAT 300 and BAT 800.

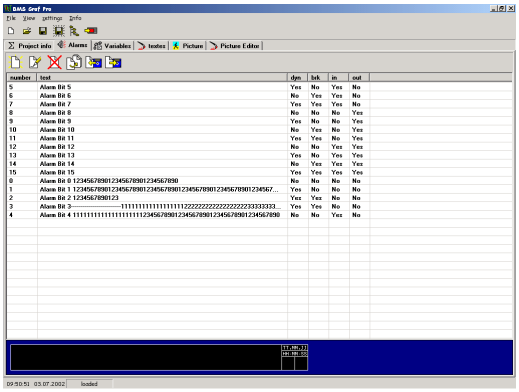
Further explanations on the transfer block transmission from PC display terminal to control system ("Reading")

Address offset	Bit number	Description
+ 0000		*Image number „SETPOINT“, image number specification of the control system* The control system enters the number of the image which should appear on the display of the terminal in this register. If there is a **change** in this register the PC display terminal shows the corresponding new image.
+ 0002	Bit 4	*(Alarm) Message bit for „ALARM“ 0 = display 1 = do not display* For non-interruptable alarm signals the message „ALARM“ is outputted in the top left corner of the display. This message can be suppressed by setting this bit. The operator should be informed by means of another object (rectangle, circle, text, …) with the aid of a variable.
+ 0021	Bit 0	*(HL) Delete histogram* The histogram memory (flash) in the PC display terminal is deleted. This process can take several seconds. The bit should remain set until the bit 0 („Histogram deleted”) in the field “Record” address offset +0005 has been set from the terminal.No further processing of messages etc takes place. Communication with the control system is interrupted for this period.
+ 0021	Bit 2	*(AL) Delete alarm indication buffer* Non-dynamic alarm messages remain stored in the PC display terminal until they have been acknowledged by the operator with the ENTER key. If this bit is set, all alarm messages in the PC display terminal are deleted. Alarm messages which are still applied from the control system are taken over again. This bit may be set for only one cycle.
+ 0021	Bit 3	*(ZDG) Time / date valid* If this bit is set the values for time and date which are located in the address offset +0018 to +0020 of the control system are taken over in the PC display terminal. This bit may be set for only one cycle.
+ 0021	Bit 4	*(WD) Watchdog control* Has no function in the currently available protocols.

4 Alarm messages

4.1 Alarm overview

In order to access the alarm overview, click on the "Alarms" registration card or on the "Alarms" mode with the tree overview activated:



All alarms are listed in the alarm overview. The alarm number is issued automatically when the alarm is drafted and can be changed in the alarm dialogue. A single click on the title line of the appropriate column is sufficient to sort the alarms.

A number of alarms can be marked simultaneously by keeping the left-hand mouse button pressed.

4.1.1 The alarm overview menu

Generation of a new alarm and opening of the dialogue for modification of the alarm

Opening of the alarm dialogue for modification of the alarm

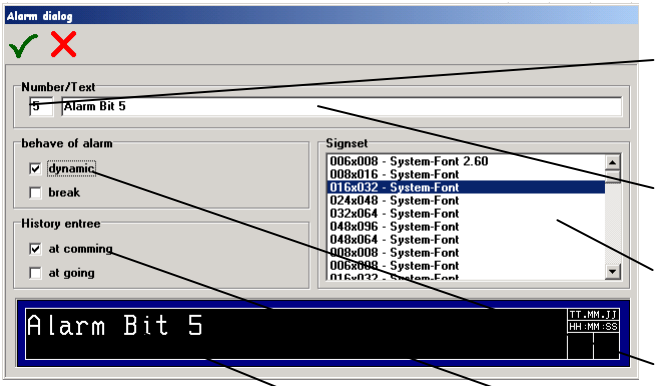
Delete all alarms marked after a confirmation

Copy one or more alarms

Import previously exported alarms, transfer of alarms from an older project to a new project is thus very easy

Export all marked alarms

4.2 Modification of alarms



Alarm number. This number is used as the reference to the alarm bits stated in the transfer block

Alarm entry box

Text size is determined via the character set

Alarm behaviour

Storage of "History"

Presentation of the alarm in original size with statement of date and time

Confirm settings

Reject settings

Notes:

Dynamic behaviour

- Dynamic "Yes": The alarm is stored in the RAM of the PC display terminal until the corresponding bit has been set in the controller.
- Dynamic "No": The alarm is stored in the alarm buffer of the terminal until it is cancelled by the user using the "Enter" key in the Information window.

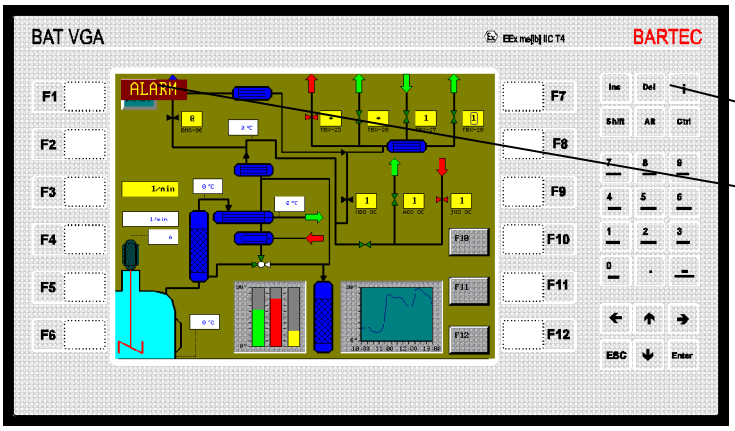
Interruptive behaviour

- Interruptive "Yes": The alarm is entered in the alarm buffer of the terminal when it occurs and is immediately displayed in the Information window.
- Interruptive "No": The alarm is entered in the alarm buffer of the terminal when it occurs. The display "Message" appears in the top left corner of the display if the message bit is fed in the transfer block. The user can use the "i" key to open the Information window, and read and cancel the messages.

Histogram entry

- History: The alarm is additionally stored in the non-volatile memory (flash-file) of the PC display terminal, complete with date and time. This memory can be deleted in the Information window or using the controller (see transfer block), but only by authorized users.
- Coming: Date and time are stored with the message upon its occurrence.
- Going: Date and time are stored upon deletion of the respective bits of the message. In the case of non-dynamic messages, when it has been acknowledged/cancelled by the user and is no longer "on" from the controller.

Alarm display on the PC display terminal

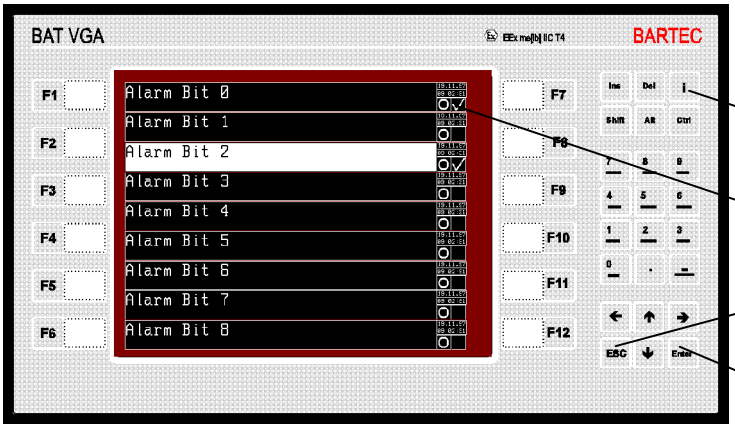


Alarm "non-interruptive"

"i" key for selection of the Information window

Display: Alarms present

See "Interruptive alarms" for further procedure



Alarm "interruptive"

Display of all active alarms

"i" key for selection of messages

Date, Time and acknowledgement mark

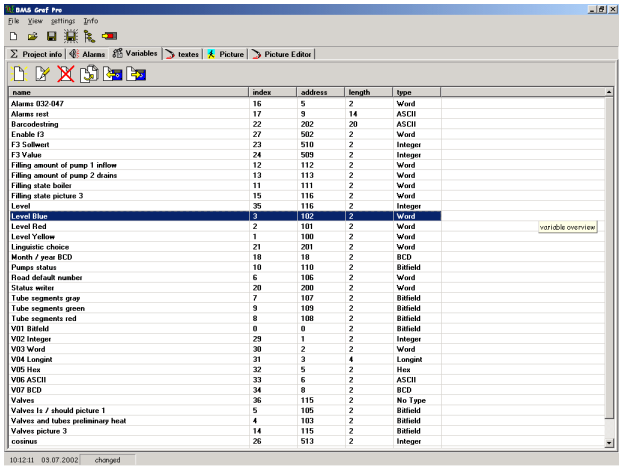
Use "ESC" key to close the alarm window

Use "Enter" key to acknowledge messages

5 Variables

5.1 Overview

Click on the "Variables" registration card or on the "Variables" mode on the activated tree overview in order to access the Variables overview.



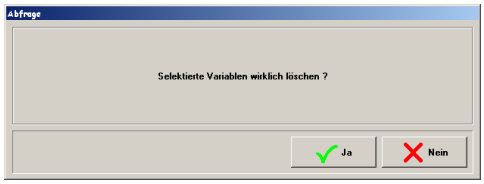
All the variables used are listed by Index (Idx), name, address, type and length in the Variable overview. The Index number is issued automatically when the variables are generated. The name, address and type can be changed at any time. A simple click on the title bar of the corresponding column is sufficient for sorting of the variables by index, name, address, type or length. A number of variables can be marked simultaneously by keeping the left-hand mouse button depressed.

5.1.1 The Variables-overview menu

Generates a new variable and opens the dialogue for editing of the variable

Opens the Variable dialogue for editing of a variable

Deletes all marked variables after confirmation

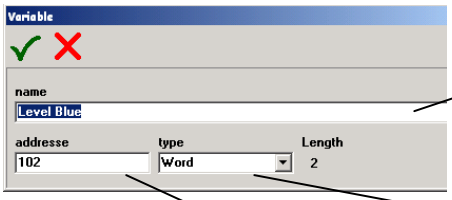


Copy one or more variables

Imports a previously exported variable list; transfer of variables from an older project to a new project can therefore be accomplished extremely easily

Exports all marked variables

5.2 Modification of variables



Name of process link. The name may occur multiply, but this is not recommendable, since it will then not be unequivocally clear during subsequent use, which variable is selected.

Data-type entry, specifies how the value is to be interpreted by the display terminal. The data length in bytes derives on the basis of type.

The variable is linked to an address in the controller, by means of which the display terminal will find the value to be processed.

Confirm settings

Reject settings

Definition:

All address data are word addresses, i.e., in the case of byte-orientated controllers:

Byte 0 and Byte 1 in the memory is the Word address 0
Byte 2 and Byte 3 in the memory is the Word address 1
etc.

In the case of Siemens controllers, the data relate to data words (DW). Data words can be read and written in data modules (DB 2 to DB 255).

In the case of other manufacturers, the data relates to 16-bit-wide memory registers.

Data types:

Siemens	other	PC data types	Value range
KC	16-bit register	Char+Char	#0 to #255 ; #0 to #255
KF	16-bit register	Integer	-32768 to +32767
KH	16-bit register	Word	+0 to +65535 (0000H to FFFFH)
KM	16-bit register	Word	00000000 00000000B to 11111111 11111111B
KT	16-bit register	BCD with point	0.0 to 999.3 in BCD-Code (4-bit = Number from 0 to 9)
KD or 2KH	32-bit register	Long Integer	- 2147483648 to 2147483647
KZ	16-bit register	BCD only 3 places	000 to 999 in BCD-Code (4-bit = Number from 0 to 9)
	16-bit register	BCD	0000 to 9999

Notes:

The Siemens-format KG (floating point and fixed-point number), and other floating-point formats are not supported.

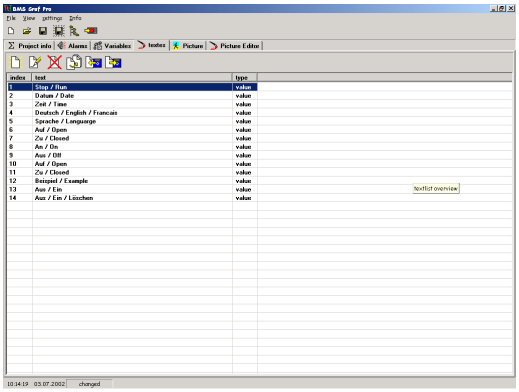
All information in the BMS Graf pro software relates to variable-names. Once-only assignment of addresses in the controller to a name is performed in the dialogue previously displayed. Only this assigned name is used in the subsequent course of planning. The address and name data can be changed or expanded at any time.

- ⇨ It is recommendable to create the required variables at the start of a planning project
- ⇨ The time-basis one second is set automatically in the case of the timer variables for the Siemens S5 controller

6 Texts

6.1 Text-list overview

In order to reach the text list survey click on the registration card „Texts“, or click on the tree knots “Texts” with the tree survey switched on.



In the text list survey all text lists are listed, according to index,name and type. The index number is automatically allocated when the text list is prepared. The name and type can be changed at any time. In order to sort the text lists according to index, name or type it is only necessary to click on the heading of the corresponding column.

By holding the left mouse key depressed several text lists can be marked at once.

6.1.1 The text-list overview menu

Generates a new text list and opens the dialogue for editing of the texts

Opens the text-list dialogue for editing of the texts

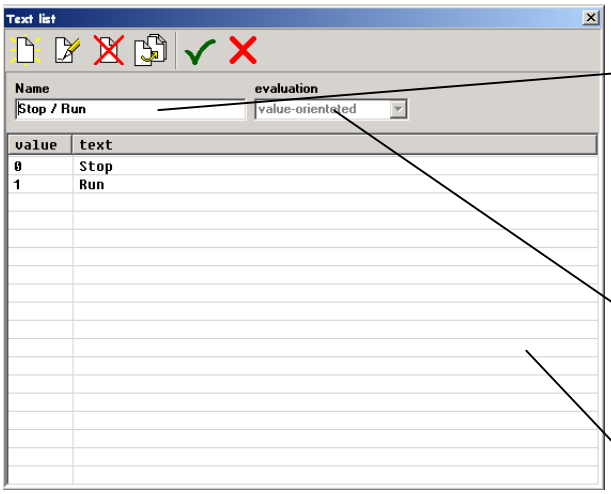
Deletes all marked text lists after confirmation

Copy one or more text lists

Imports a previously exported text list; transfer of texts from an older project to a new project can thus be accomplished extremely easily

Exports all marked text lists

6.2 Editing of text lists



- Name of text list. The name may occur multiply, this is not recommendable, however, since it will not be unequivocally clear which text list has been selected in subsequent use.
- Specifies whether text selection occurs on a bit or on a value basis.
- List of texts contained, with appurtenant reference values.

Note: The Evaluation box can be changed only if there is no text present. The box is deactivated as soon as a text has been generated.


Generation of a new text and opening of the input dialogue


Edit existing text. See the following pages for more detailed information


Delete text

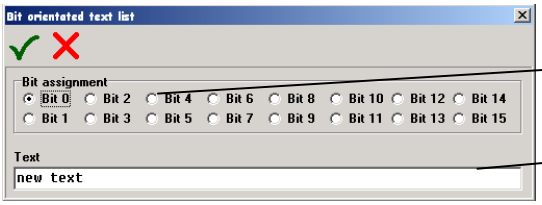
CAUTION! Text cannot be undeleted!


Copy texts


Confirm settings


Reject settings

6.2.1 Bit–oriented list text



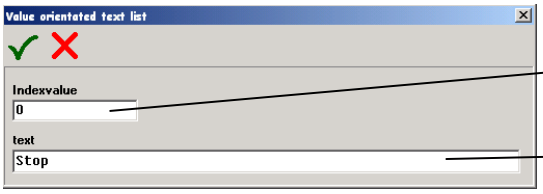
State here the bit to which the text is to be linked

The text which is to be shown subsequently

Confirm settings

Reject settings

6.2.2 Value-oriented list text



State here the value which the text is to be linked

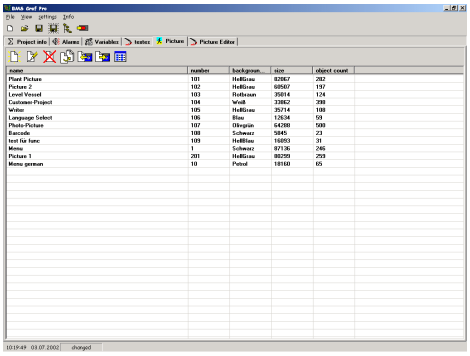
The text which is to be shown subsequently

Confirm settings

Reject settings

7 Drafting and editing images

7.1 Images overview



All the images available for a project are listed by number, name, background colour, image size and number of objects used in the images overview.

the image number is issued automatically when an image is generated.

The image name can be selected without restriction and can be changed at any time.

A single click on the title bar of the corresponding column suffices to sort the images by number, name, background colour, size or number of objects.

Since the function keys are assigned via the image names, it should be ensured that each image is given an individual name.

7.1.1 The images overview menu

Generate new image and switch to image editor

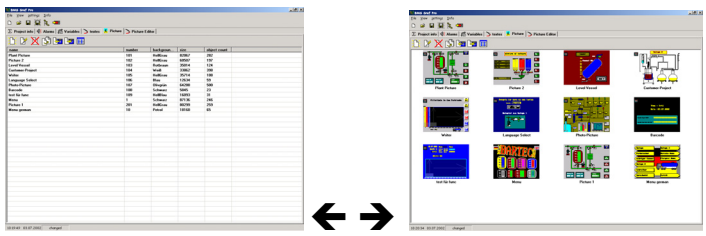
Edit marked image (open in image editor)

Delete marked images after confirmation **CAUTION! Items deleted cannot be undeleted!**

Import images previously exported using BMS Graf pro. Transfer of images from other projects is child's play, since all embedded text lists and all variables used can be co-exported and co-imported

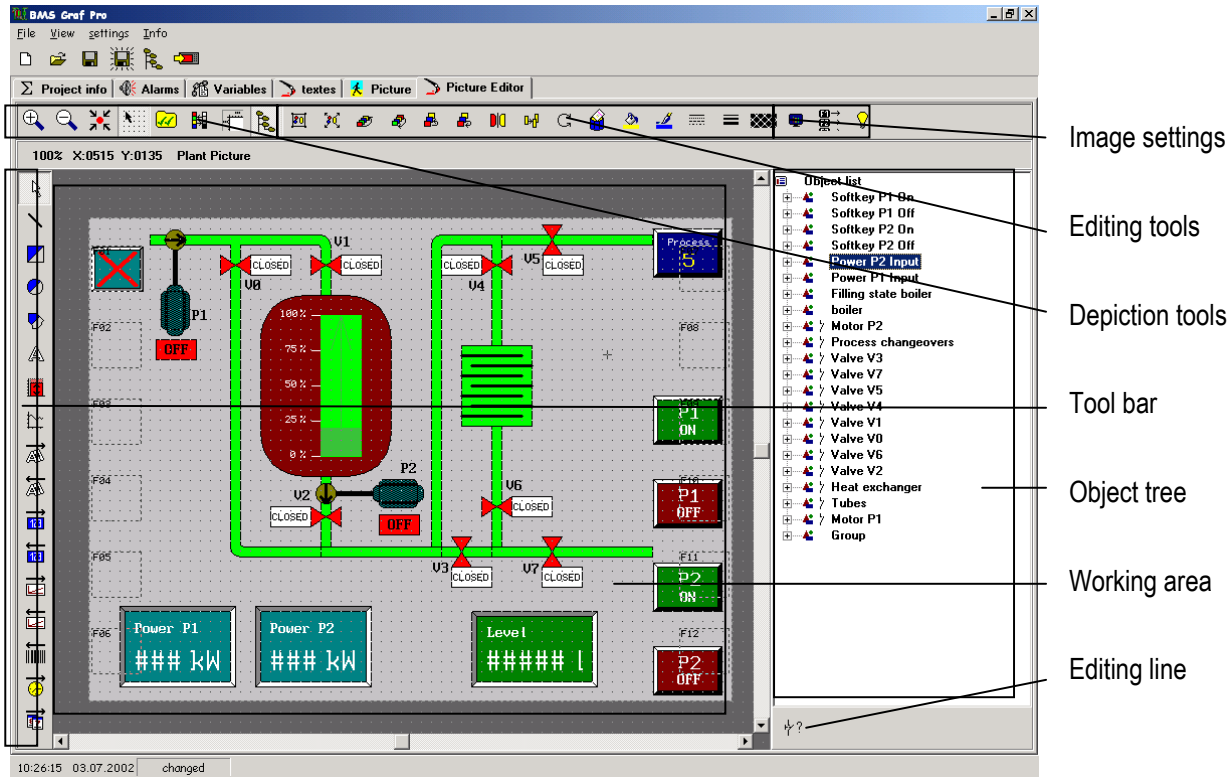
Export pictures

Change view



7.2 The image editor

7.2.1 Overview



With a resolution of 1280 x 1024 image points the complete SVGA display of the BAT 800 can be represented and processed in the editor field.

7.2.2 Tool bar

7.2.2.1 The selection arrow

Individual objects can be selected using a mouse click. Objects can be moved and/or made larger/smaller. A number of objects can be selected by dragging a window. The mouse cursor changes depending on the function selected.

7.2.2.2 The symbol functions

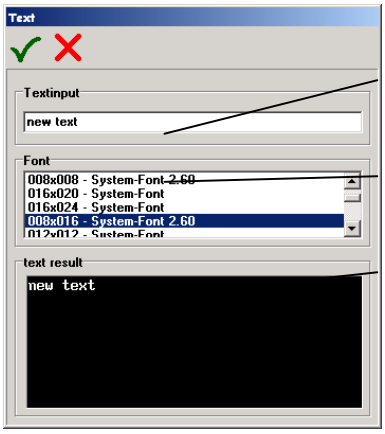
Draw a line from the first mouse click to the second mouse click

Generates a rectangle

Generates a circle with the first mouse click as its center point

Draws a polygon. The second mouse click at the same point or at the starting point closes the polygon

7.2.2.3 Editing texts



Entry line: Enter the text to be displayed here

Select here the character set in which the text is to be displayed

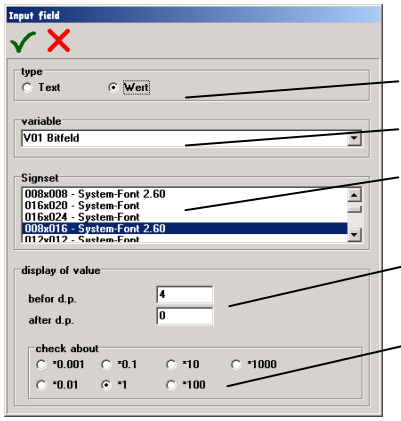
The text will be displayed in original size in the Preview window

Confirm settings

Reject settings

The position in the image can be selected by means of a further mouse click on the working area

7.2.2.4 Entry boxes



Only numerical values, or text box

Statement of the variable-name in the controller

Select here the character set in which the text is to be displayed (setting of character size)

Statement of places before and after the decimal point. From which point on is the value to be shown as "after decimal point"

State correction factor

Confirm settings

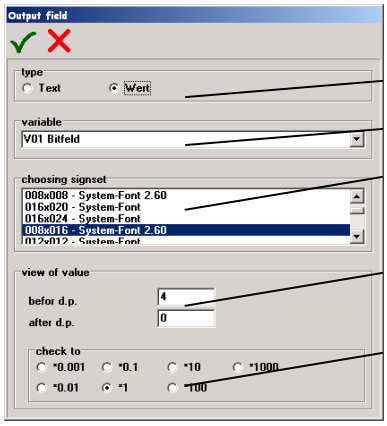
Reject settings

The position in the image can be specified by means of a further mouse click on the working surface

Notes:

- Changeover between entry boxes on the display terminal is accomplished using the "↑↓" keys
- The original value remains when you leave an entry box using the "↑↓" keys
- The current value is displayed in the controller if no action has yet taken place in an entry box
- Entry boxes can be disabled individually
- "Password function" possible in the controller. The password is entered in the entry box, compared against the value stored in the controller, and the corresponding entry boxes are enabled provided accordance is established. Otherwise, output boxes, for example, will be shown at these points (entry and output boxes are located one above the other)
- After the "ENTER" key is pressed on the terminal, the value entered is transferred to the controller and a jump to the next entry box occurs

7.2.2.5 Output boxes



Only numerical values or text box

Statement of the variable-name in the controller

Select here the character set in which the text is to be shown (setting of character size)

Statement of places for and after the decimal point. From what place is the value to be shown as "after decimal point"

Statement of a correction factor

Confirm settings

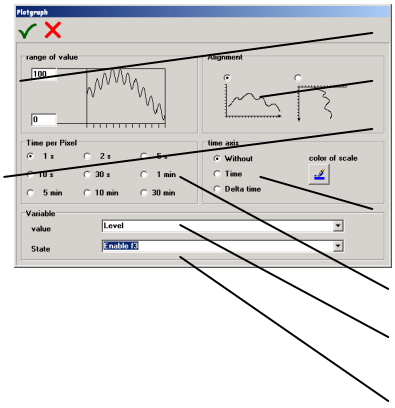
Reject settings

A position in the image can be specified by means of a further mouse click on the working area

Notes:

- In the case of Master coupling interface, the current value in the controller is displayed
- In the case of Slave coupling interface, the value is updated after every reception

7.2.2.6 Line writer



Input of the value range which can be depicted

Setting of running direction

Statement of when a new value is to be adopted from the controller to the line writer

Colour of time-axis labeling. Line and background colors via the general colour settings

Time-axis labeling

Statement of variables for the value range (Y axis)

Statement of status variables, e.g. Start curve, Stop curve

Bit number	value	Action
0	1	Start
	0	Stop
1	1	Delete
	0	Non

Confirm settings

Reject settings

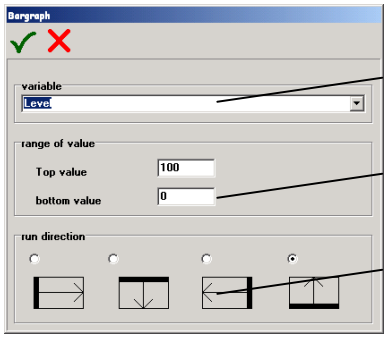
The position in the image can be specified by means of a further mouse click on the working area

Notes :

- The line-writers are positioned by the first mouse click and their size changed by dragging up to the second mouse click
- Statement of a fixed labeling for the Y axis has been omitted, in order to permit individual utilization of line-writers. The labeling must be drafted using text input for each specific application
- A number of line-writers can be positioned on top of one another at the same point
- All the line-writers contained in the project are also written in the background, i.e., even if the image is not visible
- A maximum of ten line-writers can be entered per project, for storage capacity and speed reasons
- Colour changes can be implemented by means of line-writers located vertically above one another

  Example: First line-writer, in green, from value range 0 to 50, second line-writer with the same variables in red, from 50 to 100

7.2.2.7 Bar graphs



Statement of variables for the value range

Input of the depictable value range

Setting of running direction

Confirm settings

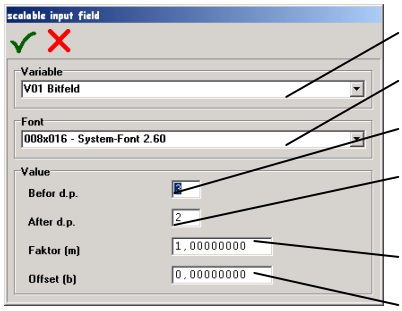
Reject settings

Notes:

- Statement of a fixed scaling labeling has been omitted here, in order to permit individual utilization of the bar graphs. The bar graph labeling must be created using text input for each application
- The bar graphs can be positioned using the first mouse click and their size changed by dragging up to the second mouse click
- Colour changes can be implemented by means of bar graphs located vertically one on top of the other

  Example: First bar graph, in green, from value range 0 to 50, second bar graph with the same variables in red from 50 to 100

7.2.2.9 Scaleable entry boxes



Statement of variable-name in the controller

Setting of character size

Statement of number of places before the decimal point

Statement of number of places after the decimal point (from which place on is the value to be shown as "after decimal point")

Statement of a correction factor

Statement of zero-point shift

Confirm settings

Reject settings

The position in the image can be specified with a further mouse click on the working area

Notes:

- Only numerical entries are possible for scaleable entry boxes
- They are used to perform adaptations of values in the display terminal, in order to relieve the load on the controller
- The correction factor can be calculated using the formula y = mx + b (gradient of a straight line)

Example:

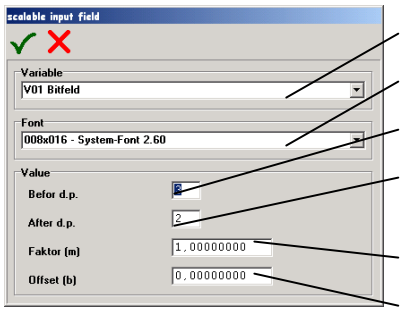
Before decimal point	= 3
After decimal point	= 2
Factor (m)	= 2.1555
Offset (b)	= 20

There results from this a value of 10 in the controller:

The display terminal indicates the value (2.1555 * 10 +20) 41.56

An input of, for example, 83.12 would, vice versa, then cause a value of 20 in the PLC.

7.2.2.9 Scaleable entry boxes



Statement of variable-name in the controller

Setting of character size

Statement of number of places before the decimal point

Statement of number of places after the decimal point (from which place on is the value to be shown as "after decimal point")

Statement of a correction factor

Statement of zero-point shift

Confirm settings

Reject settings

The position in the image can be specified with a further mouse click on the working area

Notes:

- Only numerical entries are possible for scaleable entry boxes
- They are used to perform adaptations of values in the display terminal, in order to relieve the load on the controller
- The correction factor can be calculated using the formula y = mx + b (gradient of a straight line)

Example:

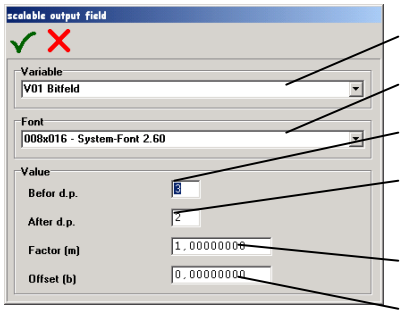
Before decimal point	= 3
After decimal point	= 2
Factor (m)	= 2.1555
Offset (b)	= 20

There results from this a value of 10 in the controller:

The display terminal indicates the value (2.1555 * 10 +20) 41.56

An input of, for example, 83.12 would, vice versa, then cause a value of 20 in the PLC.

7.2.2.10 Scalable output boxes



Statement of the variable-name in the controller

Setting of character size

Statement of number of places before the decimal point

Statement of number of places after decimal point (from which place on is the value to be shown as "after decimal point"?)

Statement of correction factor

Statement of zero point shift

Confirm settings

Reject settings

The position in the image can be specified by means of a further mouse-click on the working area

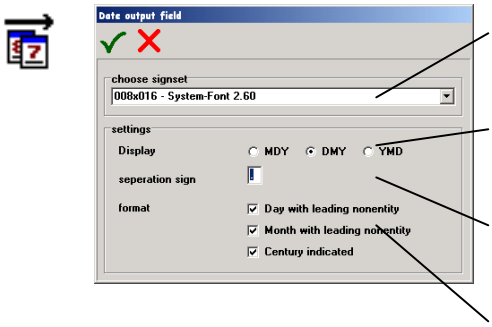
Notes:

- Only numerical entries are possible in the case of scalable output boxes.
- They serve the purpose of effecting adaptation of values in the display terminal in order to relieve the load on the controller.
- The correction factor can be calculated using the following formula: y = mx + b (gradient of a straight line).
- In the case of Master coupling interfaces, the value currently in the controller is displayed cyclically in each case.
- In the case of Slave coupling interfaces, the value is updated after each reception.

Example: Before decimal point = 3
After decimal point = 2
Factor (m) = 2.1555
Offset (b) = 20

There results from this a value of 10 in the controller:
The display terminal displays the value (2.1555 * 10 +20) 41.56.
The entry, vice versa, of 83.12, for example, would produce a value of 20 in the PLC.

7.2.2.11 Date output box



Setting of character size

Setting of depiction type

State decimal dividing character ("point" is the default setting)

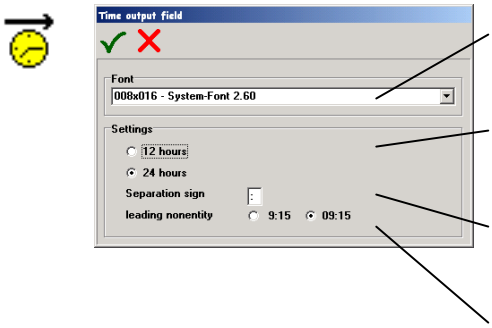
Formatting of output string

Confirm settings

Reject settings

The position in the image can be specified by means of a further mouse click of the working area

7.2.2.12 Time output box



Setting of character size

Setting of depiction type

State decimal dividing character ("point" is the default character)

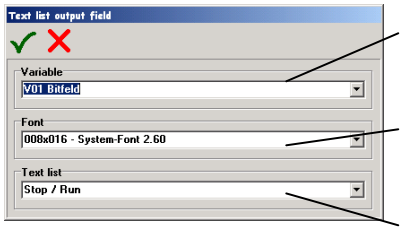
Formatting of output string

Confirm settings

Reject settings

The position in the image can be specified by means of a further mouse click on the working area

7.2.2.13 Text-lists output



Statement of variable-name in the controller

Setting of depiction type

Selection of the text list previously generated

Confirm settings

Reject settings

The position can be specified by means of a further mouse click on the working area

Notes:

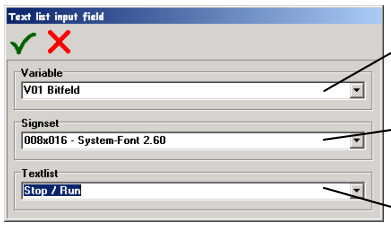
- The text-lists output is used for depiction of various texts at the same point
- The length of the text box depends on the longest text used. The "No background" background colour should not be selected
- Where the variable contains a value which is not contained in the list (no text), an empty box of the length of the longest text and with the selected background colour will be depicted
- A text-list box may contain a maximum of 200 texts
- Toggling between value and bit oriented is no longer possible if texts are already present

  Example:

  The variable in the controller contains the value 2, the display terminal depicts the "AUTO" text
  The variable in the controller contains the value 0, the display terminal depicts the "OFF" text
  The variable in the controller contains the value 5, the display terminal depicts the empty text " ".

7.2.2.14 Text-lists entry

Selection of a range of pre-defined texts at entry. See Text-lists Output for settings.



Statement of the variable-name in the controller

Setting of depiction type

Selection of the text list previously generated

Confirm settings

Reject settings

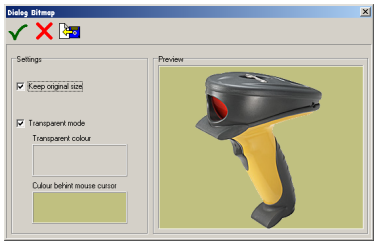
The position in the image can be specified by means of a further mouse click on the working area

Notes:

- The Text List Entry is used for depiction of various texts at the same entry point
- The length of the text box depends on the longest text present. The "No background" background colour should not be selected
- Changeover between all entry boxes on the terminal is accomplished using the "↑↓" keys
- One of the pre-defined texts should be selected using the "←→" keys
- After actuation of the "ENTER" key on the terminal, the value corresponding to the text is transferred to the controller and a jump to the next entry box occurs
- The original value is retained if you leave an entry box in the"↑↓" keys
- Where the variable contains a value which is not contained in the list (no text present), an empty box with the length of the longest text and the selected background colour is shown (non-selected entry boxes represent the current value in the controller)
- A text-list box may contain a maximum of 200 texts

7.2.2.15 Embed bit map

Integration of a standard BMP file.



Keep the original size. After integration the size of the object can no longer be changed.

Activate transparent representation

Preview of BMP file

Selected colour, which is to be represented as transparent

For easier selection the colour under the mouse cursor

Settings have been taken over

Settings have not been taken over

Open BMP file

With a further mouse click on the working area you establish the position in the image.

Comments:

- The object can embed BMP files in itself. JPG, TIF, GIF and other formats cannot be integrated. However, with commonly commercially available image processing programmes it is easily possible to store other graphics formats as Windows BMP.
- For minimum storage requirements BMSs should be used several times in the same size and alignment, instead of in different sizes and/or alignments, since then only one copy is loaded in the terminal.
- Embedded BMSs with less than 16 bit depth of colour cause a false colour image with some graphics drivers of individual graphics cards under Windows 2000 and Windows XP. Remedy: Convert the image into the 16 bit or 24 bit colour mode and safeguard this with a commercially available programme (e.g. paintbrush).
- When embedding BMSs please bear in mind the maximum memory space of the terminal.

7.2.3 Depiction tools

7.2.3.1 Zoom functions

Enlarge view of the editor area for more precise positioning and improved overview

Reduce view of the editor area for more precise positioning and improved overview

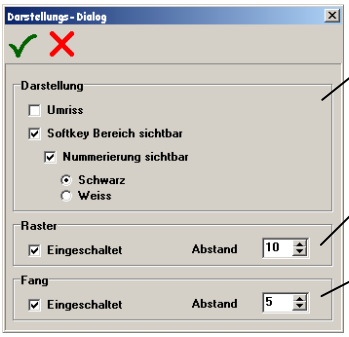
7.2.3.2 Pan function

Center the image in the editor area

7.2.3.3 Settings/grids

Left mouse key ➡ Switch grid on or off

Right mouse key ➡ open dialogue



Representation – For better finding of objects situated in the background

Type and spacing of grid

Trapping distance for drawing elements and displacements

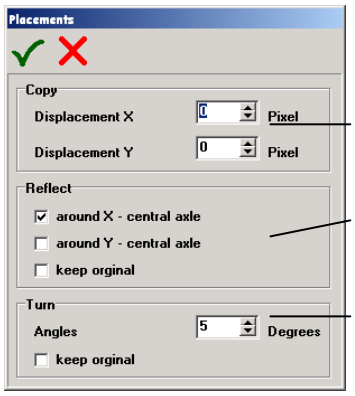
Settings have been taken over

Settings have not been taken over

7.2.3.4 Grey-scale view

Grey-scale view for "colour checking" on monochrome displays

7.2.3.5 Settings/copying/mirror-imaging/rotating



Where is a copy to be positioned?

How is mirror-imaging to take place?

How is rotation to take place?

Confirm settings

Reject settings

7.2.3.6 Scale view

Activate/deactivate scales

7.2.3.7 Object tree

Activate/deactivate window for the object tree
The object tree is described a few pages further on

7.2.4 Editing tools

7.2.4.1 Grouping/separating


An area should be created using the mouse. The objects selected in this way are assembled to form a group


Separates an existing group

7.2.4.2 Foreground/background


The object selected is moved one position forward


The object selected is moved one position backward


The object selected is moved to the front


The object selected is moved to the back

7.2.4.3 Copying


The object or group selected is copied in accordance with the settings

7.2.4.4 Mirror-imaging

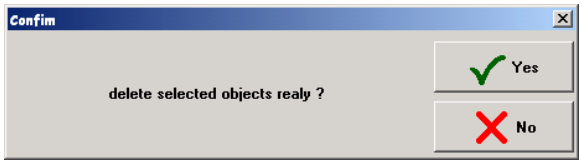

The object or group selected is mirror-imaged in accordance with the settings

7.2.4.5 Rotate


The object or group is rotated in accordance with the settings

7.2.4.6 Delete

The objects or groups selected are deleted after confirmation



Caution! The "undo" function is not implemented in this version of the software

7.2.4.7 Assign filling color and background color

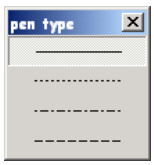
Assigns the selected filler colour to the objects or groups selected

7.2.4.8 Assign pencil colour/margin colour

The selected margin colour is assigned to the selected objects or groups

7.2.4.9 Assign pencil pattern

The selected pencil pattern is assigned to the selected objects or groups



7.2.4.10 Assign pencil width

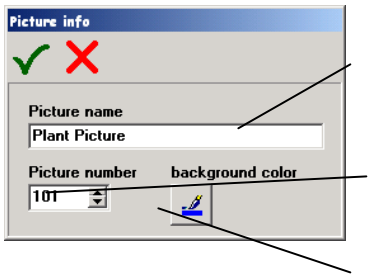
The selected pencil width is assigned to the selected objects or groups

7.2.4.11 Assign filling pattern

The selected filling pattern is assigned to the selected objects or groups

7.2.5 Image settings

7.2.5.1 Assign basic image data



The image name is used for identification of the image during project development

The PLC will select the images in the terminal using the image number

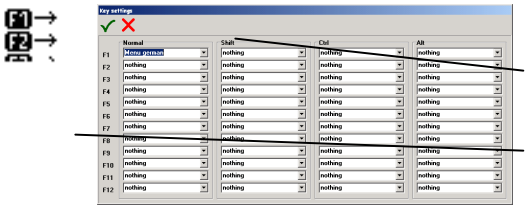
The background for the image can be selected here

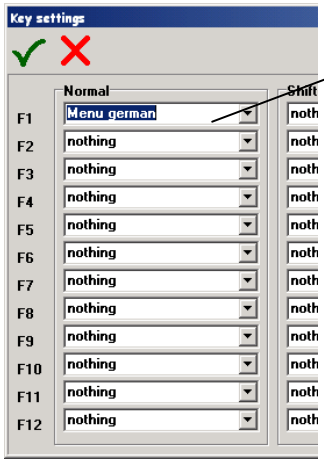
Confirm settings

Reject settings

7.2.5.2 Key assignments

7.2.5.2.1 Function keys





Each column represents one keyboard level

Each line is assigned to a function key

Select image assignment using a selection box

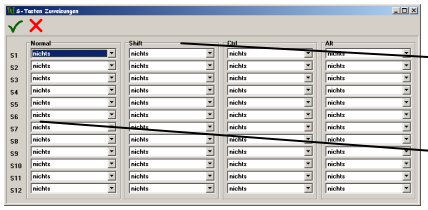
Confirm settings

Reject settings

Notes:

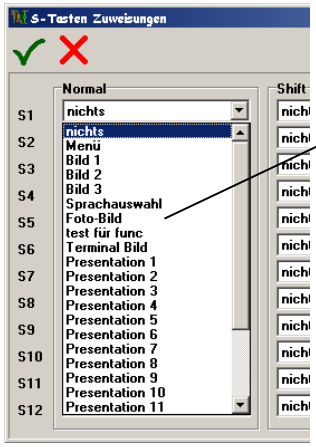
- Separate assignment to function keys is possible in every image
- Where softkeys are to be used, the function keys must be defined as with "nothing" in the image. The key pressed in each case is communicated to the controller by the transfer block. The controller must include the image number in the comparison and initiates a corresponding action.

7.2.5.2.2 Special keys



Each column represents one level of the keyboard

Each line is allocated to a special key



Select image allocation with a selector box

Settings have been taken over

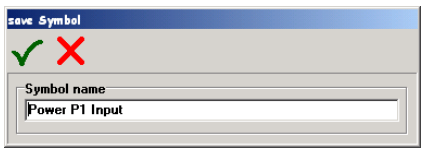
Settings have not been taken over

Comments:

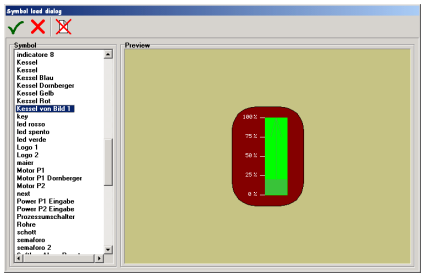
- In each image separate allocation to special keys is possible.
- If soft keys are used, the function keys must be defined as **„nothing"** in the image. The control system is informed via the transfer block of the particular key which has been depressed. The control system must include the image number in the comparison and triggers a corresponding action.

7.2.5.3 Symbol library

A symbol library, containing elements needed repeatedly, can be created here



Objects selected will be saved. Where a number of objects are to be saved, they must be grouped prior to saving



Where no element is selected, a selection of the symbols already stored is loaded. The object selected here is positioned on the screen and can then be moved to any position required

Confirm settings

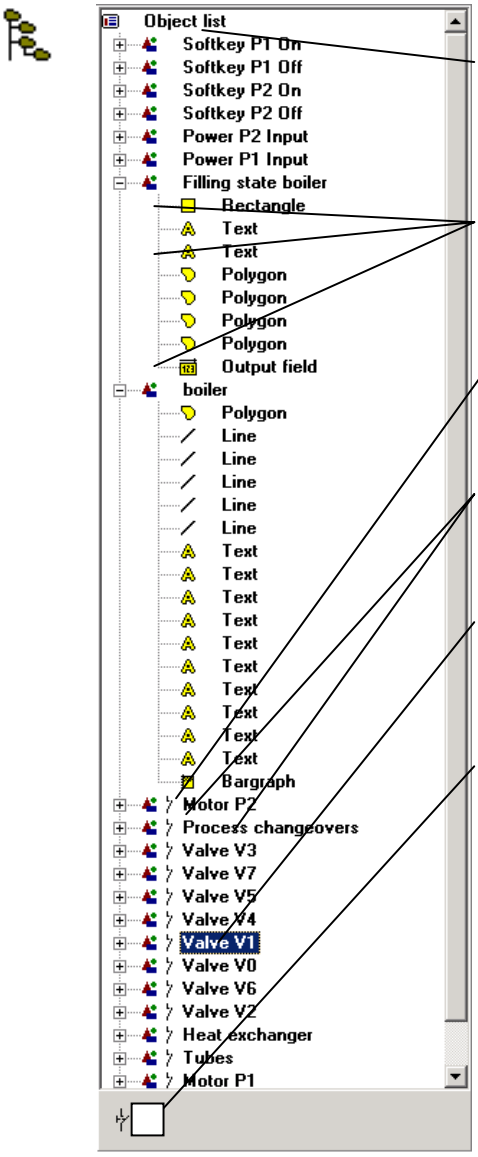
Reject settings

Deletes a symbol from the library after confirmation

Notes:

- Where symbols of an old type have been inserted, the variables must be redefined. Any references necessary may be open or contain incorrect assignments
- New-type symbols incorporate the necessary variables. Where corresponding variables are available, they will be used. Where no corresponding variables are available, the incorporated variables will be generated in the project
- New-type symbols incorporate the necessary text lists. Where corresponding text lists are available, they will be used. Where no corresponding text lists are available, the imported text lists will be generated in the project

7.3 Object tree



List of all objects used in an image. The object located at the first place in the list is also the first object which will be drawn, and is therefore at the very back in the image

Every object is depicted with a small symbol

The button symbol indicates whether a switching property has been incorporated. Where a switching property is incorporated in an object, the switching property will be displayed in all higher-level group objects

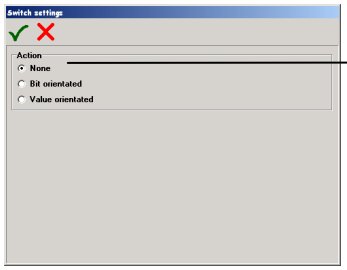
Each object can be assigned a name. This permits an easily comprehensible object tree

The corresponding line in the object tree is marked when an object is selected in the working area

A corresponding other symbol is displayed in the lower section adjacent to the switching properties Button depending on the type of object. The specific property can be changed using this button

Select dialogue for setting of switching properties. More detailed description on next page

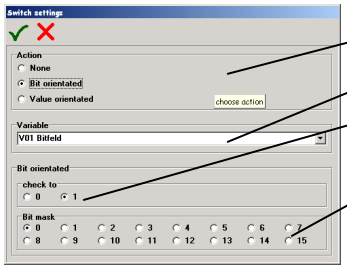
7.4 Assignment of actions to objects



Every object can be activated with a switching property

No action. Actions assigned can be deleted.

CAUTION! All the objects contained will be reset (to "None") if this function is used on group objects

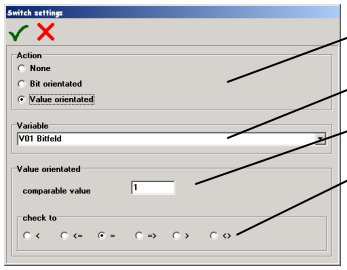


Bit-orientated action

State process link

Check for 0 or 1

Select bit. Selection of a number of bits simultaneously is not possible



Value-orientated action

State process link

Reference value

Type of check

Confirm settings

Reject settings

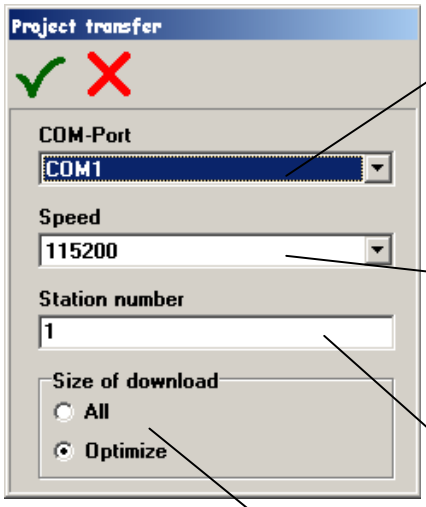
Notes:

- If the switching condition is not fulfilled, objects are not deleted. Another object must be positioned over it for deletion of objects (e.g. a rectangle in screen colour)
- Where a switching function is assigned to a group, the switching function is assigned to all of the objects in the group. Switching functions and assignments already existing in the group are overwritten

Example

- Colour changes on pipes:
- Draw pipe in red from polygon elements
- Copy pipe without moving it, colour it green
- Reaction to the value "0" is allocated to the red pipe in a variable in Bit 0
- The value "1" is assigned to the green pipe in the same bit
- A switching function can be assigned to every object
- The object is shown if the switching function is fulfilled

8 Transfer project to the display terminal



Select the COM interface on the PC. Only those interfaces which are indicated as enabled by the operating system can be selected

Set the Baud rate. A Baud rate of above 57600 bps is not recommendable on the BAT2 and BAT VGA, since the total time for project transfer will increase as a result of greater incidence of transmission errors

Enter terminal number. Each terminal features a number, by means of which it can be unequivocally addressed in a network. The number "1" is the default value set at delivery, but can be changed at any time

There is an increase in volume of the data which have to be transferred to the terminal, caused through the bit maps. For this reason a variant of the download is included with this version, which transfers only the changes in the project.

Start transfer

Abort transfer

Notes:

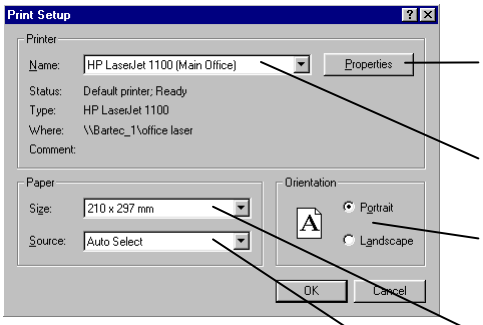
- For transfers via a TTY interface a baud rate of less than 19200 bps can be necessary, since the transfer quality is impaired partly through some interface converters and partly through the line length.

- For reasons connected with Windows conditions, access to the control line is no longer possible. Thus it is imporssible to operate interface converters, which require selection via RTS/CTS or DTR/DSR. This means that when interface converters (RS232 to RS485), without automatic transmission or receiving changeover, are used, **NO** download can be carried out.

9 Print project

9.1 Printer settings

A standard printer selection dialogue can be opened using the Data/Printer settings menu. All printers provided by the Windows operating system are supported.



Use this button to access print-specific settings

Select printer

Set paper orientation

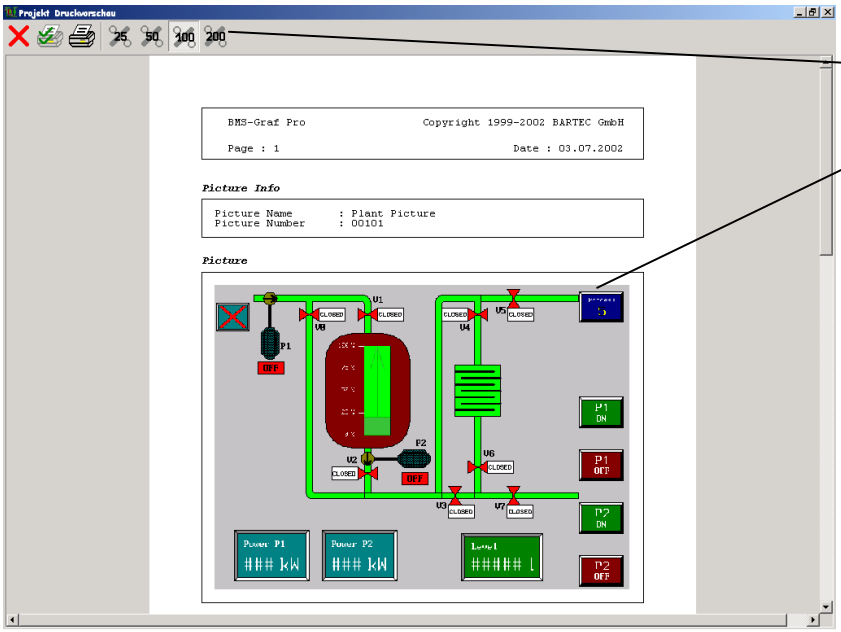
Set paper format

Set paper feed

OK Confirm settings

Cancel Reject settings

9.2 Print preview



Symbol bar

Preview area

Set print scope

Start print-out

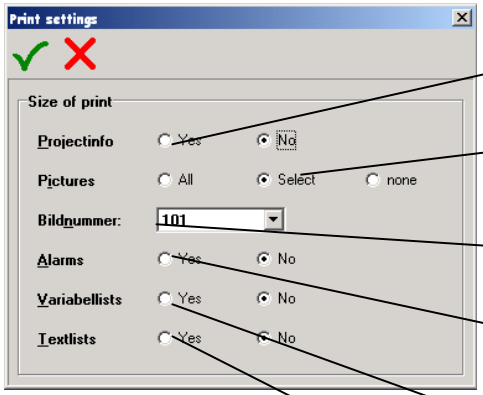
Reduce preview to 25 %

Reduce preview to 50 %

Original-size preview

Enlarge preview to 200 %

9.3 Print scope



Print project information
(project name, author, protocol, ...)

Select scope of images

State image number for image selection

Print alarms

Print variables list

Print text lists

Notice:

Appendix A

Appendix A

Appendix A

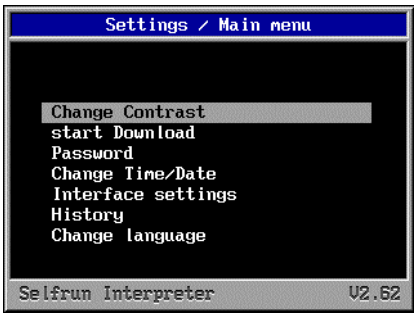
A1. Configuration “SETUP” of the PC Terminal

Please look at the installations manual.

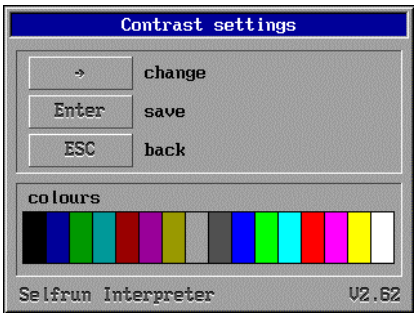
A2. Configuration during operation

To set up the system during operation, press “i”. It is similar to the previous setup. If error messages are available, then these are displayed first. Press “i” again to proceed with the setup.

The purpose of this setup is to adapt the interpreter to the relevant control unit.



A2.1 Menu item >> Set Contrast <<



Press ➡ to change the contrast. While ➡ is being pressed, the PC display terminal will get darker at first, and then brighter again. As soon as you have reached the desired contrast, either press ENTER to save the current contrast value or ESC to revert to the original contrast settings.

Important:

Keep ➡ down until the all the details on the screen are visible again, otherwise you will be saving a contrast that is too dark.

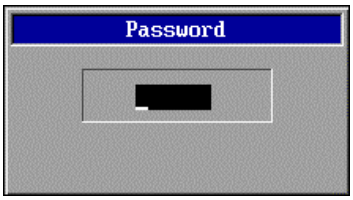
A2.2 Menu item >> Start Download <<

Choose this menu item to manually start the download program of the PC display terminal.

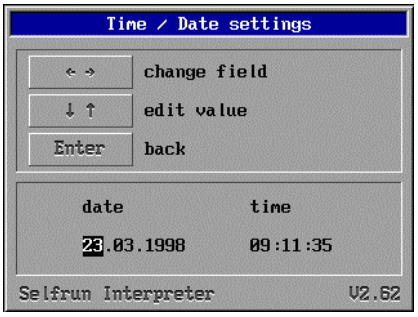
After a password query the interpreter is closed and the main setup is started. In the main setup, choose “Start Download” again. (The main setup closes after 5 seconds, and the interpreter starts again).

A2.3 Menu item >> Password <<

All menu items, apart from the contrast settings, are protected against unauthorised use by a password. This is where you can change the password.

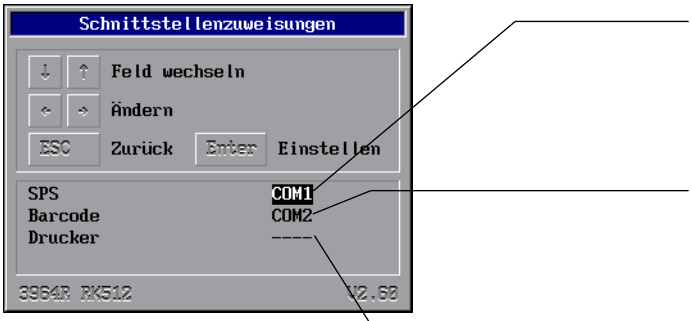


A2.4 Menu item >> Set Time/Date <<



This is where you can change the system time and date of the PC display terminal.

A2.5 Menu item >> COM Port Settings <<



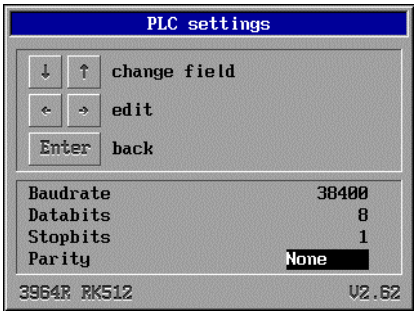
Select the port for the control unit and the download.

Select the port for a bar code scanner.

Select the port for a serial printer.

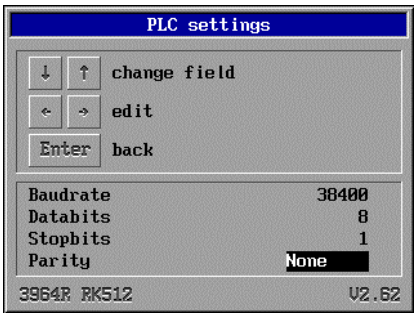
From version 2.60, the COM ports are allocated to certain devices. Press ENTER to change the settings for each port.

A2.5.1 PLC settings



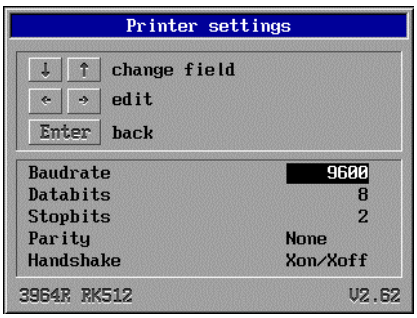
Some of these settings are dependent on the interpreter that is in use. If you use the S5-PG Mode interpreter, for instance, you cannot change the COM port settings, because they have been fixed by Siemens.

A2.5.2 Barcode Parameter



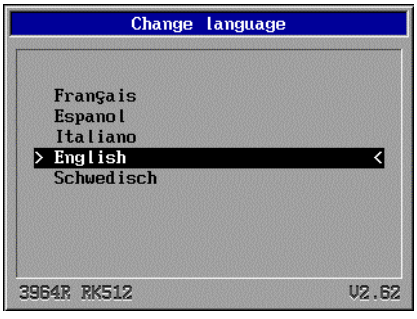
Enter here the COM port settings for a bar code scanner or a similar device (ASCII characters).

A2.5.3 Printer settings



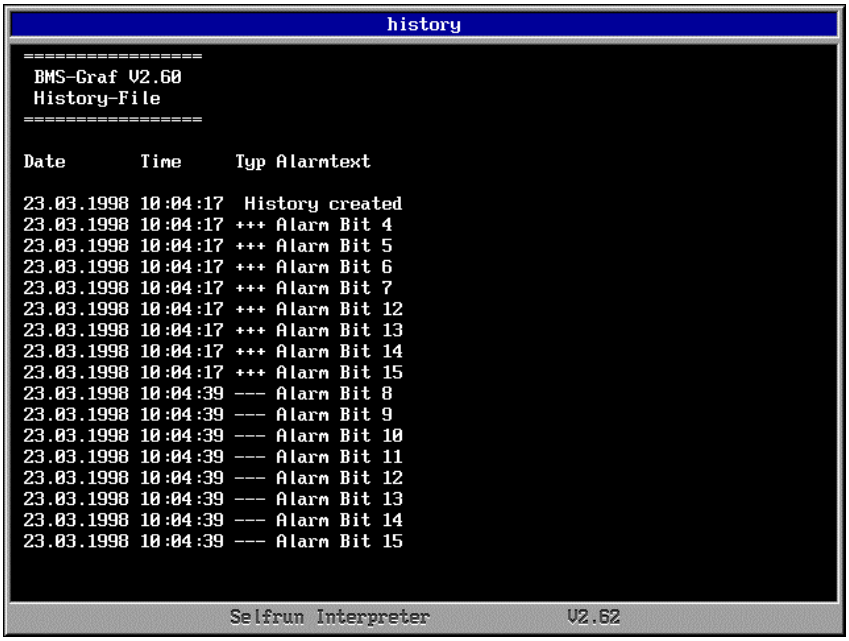
Enter here the COM port settings for a serial printer. If required, this serial printer can be used for printing the content of the Histogram as a text file.

A2.6 Menu item >> Language <<

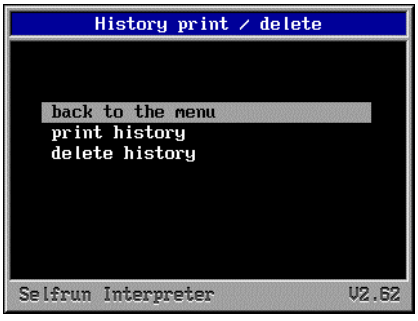


This is where you specify the setup language.

A2.7 Menu item >> History <<



- To scroll up and down the display, press ↑↓.
- Press ENTER to obtain the following menu.



Back to the main menu of the setup

Print the Histogram to the serial printer

Delete the Histogram. Note, however, that frequent writing and deleting of the Histogram reduces the speed of the Histogram Flash Drive. It is in the nature of the system that new entries may take up to one second. To remedy this, re-format drive “E”. (Go to the Terminal Configuration Setup, System Programs, and choose “Format Drive E”).

A3. Siemens 3964R Interpreter with RK512

The following Simatic systems are supported:

- S5 115U with CP 544
- S5 115U or 135U with CPU 928B or CPU 943B on 2nd PG port.
- S7-300 with CP340
- S7-400 with CP441-2

A3.1 Settings and configuration of control unit S5 with CP 544

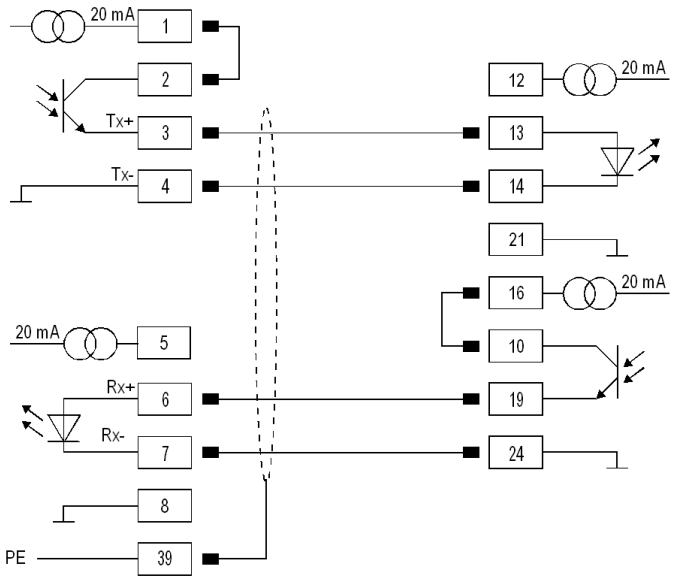
Using Siemens' setup software "COM PP", set the CP 544 in such a way that the Baud rate, data bits, stop bits and parity match the terminal settings. Adust the CP to the 3964R with RK512 protocol. Set "low" priority.

In the SPC program insert an SYNCRON function call into each start-up organisation module.

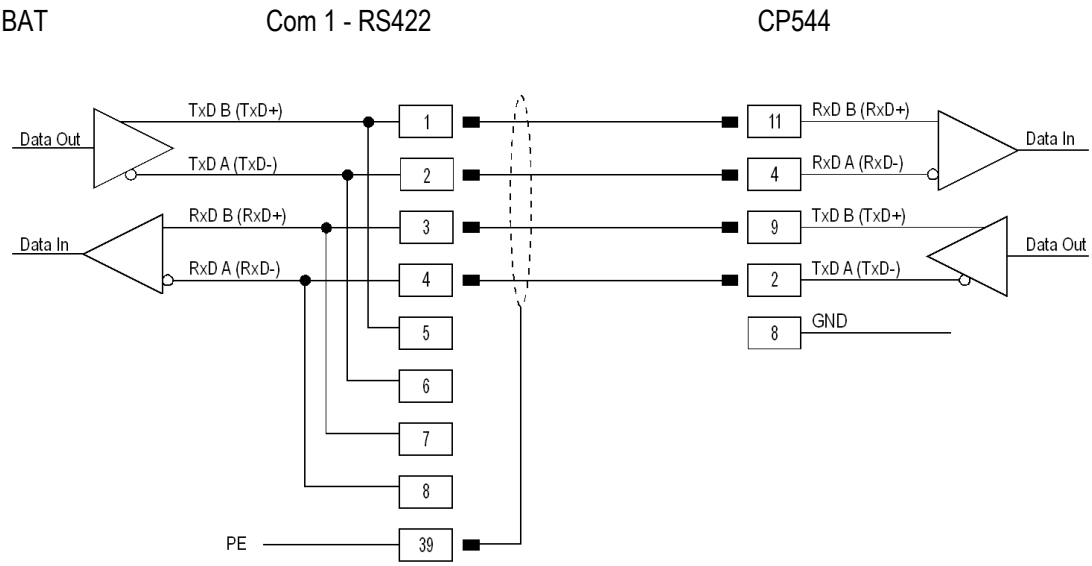
Make sure the functions "SEND ALL" and "RECEIVE ALL" are called at least once in a program cycle. If SPC programs are very long, we recommend calling them several times.

A3.1.1 CP544 connection diagram with TTY plug-in card (6ES5752-0AA12)

BAT COM1 - TTY CP 544



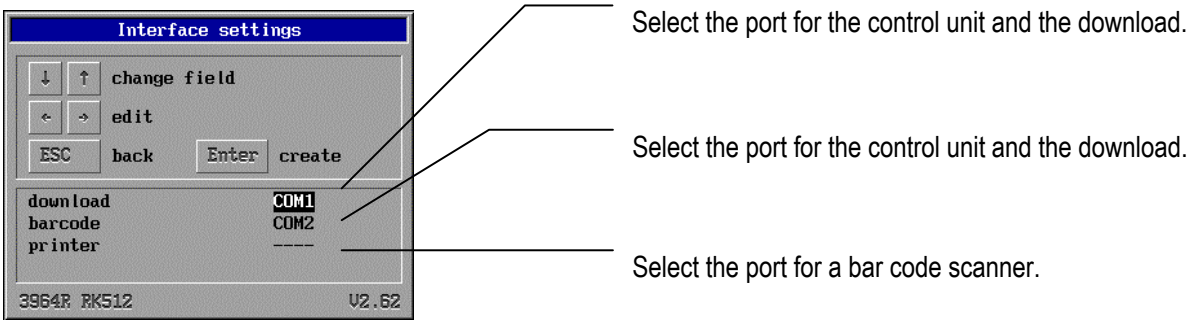
A3.1.2 CP544 connection diagram with RS422/485 plug-in card (6ES5752-0AA43)



A3.2 Special notes

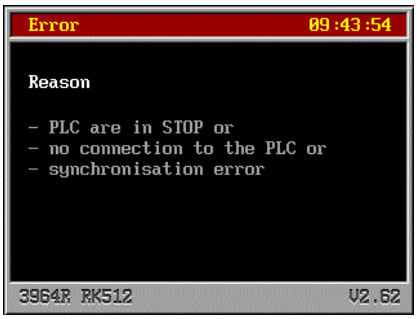
The BMS Graf pro software is independent of the SPC. This means that Siemens' special "KG" format is not supported.

A3.3 COM port settings



A3.4 Error messages

Example of an error message display:



A3.4.1 Possible error messages

Message	Cause	Possible remedy
Address DB DW or length (number) of words not permitted	CP error code [$0A]	See Siemens Manual
DB not available or DB too short or DB not permitted	The data module has not been created in the SPC. The data module is available in the SPC, but does not have the required length.	Extend the data module until it has the required length. Check variables in the project.
General collective error	CP error code [$0C] or [$10]	See Siemens Manual
DB blocked in SPC	CP error code [$32]	See Siemens Manual
Error in telegram header	CP error code [$16]	See Siemens Manual
Wrong telegram length	CP error code [$34]	See Siemens Manual
CP in STOP	CP error code [$2A]	Set CP to RUN mode
Job not permitted	CP error code [$12]	See Siemens Manual
SPC in STOP or no connection to SPC or synchronisation error	SPC connection has failed.	Check connection cable (may not be plugged in). Check cables (note connection diagram). Check synchronous FB call in SPC program. Set SPC to RUN. Check COM port settings (Baud rate etc.)
No project available	The interpreter did not find any project file in the terminal. The last download was faulty.	Repeat download.
Project faulty	The interpreter has found faults in the project file. The last download was faulty.	Repeat download.

A4. Interpreter: Siemens S5 PG port

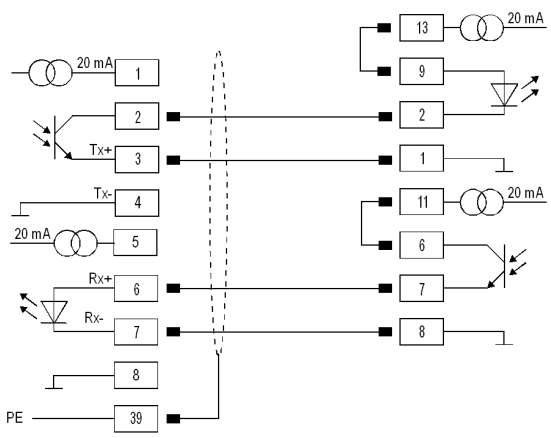
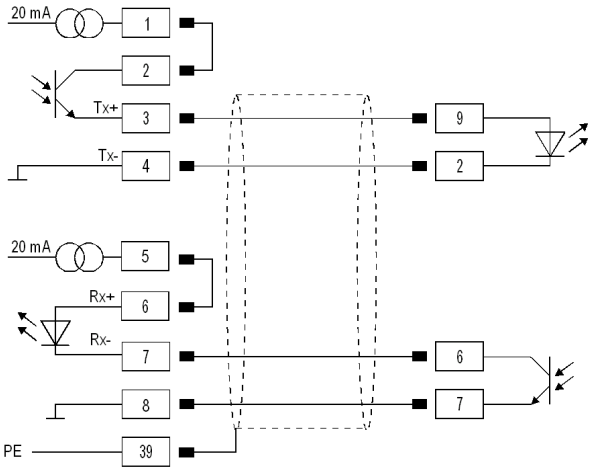
The following Simatic systems are supported:

- S5 90U
- S5 95U
- S5 115U CPU types 941, 942, 943 and 944

A4.1 SPC configuration settings

No settings are required on the S5 to connect the terminal via the PG port.

A4.1.1 Connection diagrams

Installation to the PG port of the Simatic S5 in general:	Installation on the PG port of the Simatic S5 90U:
BAT COM1 - TTY S5 PG –15 Pins	BAT COM1 - TTY S5 PG – 15 Pins
	

A4.2 Special notes

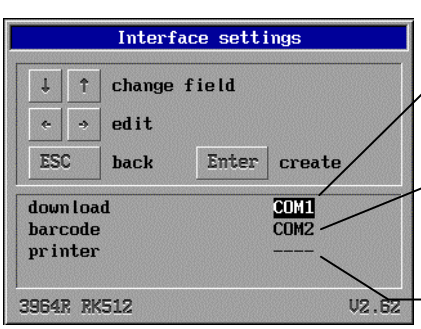
When booting up and when plugging in the connection to the PC display terminal, the system reads the address location of variables in the memory of the Siemens SPC system once. Variables are then accessed at the identified addresses. If the memory area of the SPC system is changed (e.g. program change, archiving, etc.), then the addresses no longer match the ones that have been identified, and the variables can no longer be interpreted correctly. Writing operations can even lead to the destruction of the SPC program.

If the memory area of the SPC system has to be manipulated, make sure you first separate the PC display terminal from the control unit.

The BMS Graf pro software is independent of the SPC. This means that Siemens' special "KG" format is not supported.

A4.3 COM port settings

The interpreter for S5-PG mode does not demand COM port settings, as these settings are fixed and need not and cannot be changed.



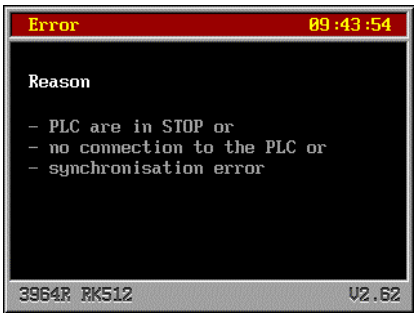
Select the port for the control unit and the download.

Select the port for a bar code scanner.

Select the port for a serial printer.

A4.4 Error messages

Example of an error message display:



A4.4.1 Possible error messages

Message	Cause	Possible remedy
DB not available	The data module has not been created in the SPC.	Create the data module in the SPC.
DB too short Available as far as DW Required as far as DW	The data module is available in the SPC, but does not have the required length.	Extend the data module until it has the required length. Check variables in the project.
Access to DB header data refused or faulty.	Fault in connection. SPC type not known.	Check if cable screen has been set up correctly. Check if there are cables under electric power near the interface line.
Access to DB Accountant refused or faulty	Fault in connection. SPC type not known.	Check if cable screen has been set up correctly. Check if there are cables under electric power near the interface line.
No communication with control unit.	SPC connection has failed.	Check connection cable (may not be plugged in). Wiring (note TTY connection diagram).
No project available	The interpreter did not find any project file in the terminal.	Repeat download.
Project faulty	The interpreter has found faults in the project file. The last download was faulty.	Repeat download.

A5. MODBUS RTU connection

The following connections have already been implemented:

- Telemechique TSX series with communications processor TSXSCQ1131
- APRIL
- AEG A-series with MODBUS module
- AEG Modicon with Modbus Plus to Modbus RTU bridge
- AEG Quantum
- Allen Bradley SLCC500 with Pro Soft module (3150MCM)
- Allen Bradley PLC5/40 or PLC5/60 with communications board/module 17-71-DBMM
- HIMA H51
- HIMA H41
- HIMA H11
- Yokogawa SMCC Micro XL with communications processor PX1
- GE-FANUC with communications processor CMM311E

A5.1 Modbus function codes in use

A5.1.1 Function code 3: "READ HOLDING REGISTERS"

Request:

SLAVE ADDR	FUNC. CODE	DATA START HI	DATA START LO	LEN HI	LEN LO	ERROR CHECK CRC16	ERROR CHECK CRC16
1	3	00	00	00	02	xx	xx

Reply:

SLAVE ADDR	FUNC. CODE	BYTE COUNT	HI DATA	LO DATA	HI DATA	LO DATA	ERROR CHECK CRC16	ERROR CHECK CRC16
1	3	04	01	02	03	04	xx	xx

A5.1.2 Function code 16: “PRESET MULTIPLE REGISTERS”

Request:

SLAVE ADDR	FUNC. CODE	DATA START HI	DATA START LO	LEN HI	LEN LO	BYTE CNT	HI DATA	LO DADA	HI DATA	LO DATA	ERROR CHECK CRC16	ERROR CHECK CRC16
1	10	00	00	00	02	04	01	02	03	04	xx	xx

Reply:

SLAVE ADDR	FUNC. CODE	DATA START HI	DATA START LO	LEN HI	LEN LO	ERROR CHECK CRC16	ERROR CHECK CRC16
1	10	00	00	00	02	xx	xx

A5.2 Special notes

The MODBUS RTU protocol is very intolerant of errors. If an error occurs due to

- the wrong Baud rate, data bit length, parity or stop bits,
- the checksum,
- the slave or station number,

then the query is not answered. Make sure, therefore, that you check all settings very carefully.

As the settings in the control unit vary widely, depending on the type, we must refer you to the various manufacturers’ manuals at this point.

Do not use the RS 485 port (2-wire technology) for slave systems. As all bus subscribers would be listening at the same time, there may be delays to the timing. If you have a slave system, we therefore recommend RS 422 (with 4-wire technology).

A5.3 Description of the MODBUS RTU interpreters (masters)

The BMS GRAFpro software has two MODBUS RTU interpreters (masters).

A5.3.1 MODBUS RTU interpreter (master) at the address “40001”

The first MODBUS RTU interpreter (master) has been kept for historical reasons. The address “40001” in BMS Graf pro corresponds to the address “0” in the MODBUS protocol. The address range is defined from “40001” to “49999”. All address range violations are intercepted in the terminal as faulty. Make sure you use the correct address location in the control unit, i.e. consult the relevant control unit manual for the subsequent allocation of a MODBUS address to an address in the control unit.

We recommend that you do not use this interpreter for new projects.

A5.3.2 MODBUS RTU interpreter (master) at the address “0”

This MODBUS RTU interpreter (master) has been developed for better address allocation. The address “00000” in BMS Graf pro, corresponds to “0” in the MODBUS protocol. The address range is defined from “00000” to “65535”. Make sure you use the correct address location in the control unit, i.e. consult the relevant control unit manual for the subsequent allocation of a MODBUS address to an address in the control unit. You also need to ensure that the addresses of your variables are within a narrow range, to avoid too many time-consuming read/write operations.

A5.4 Description of the MODBUS RTU interpreters (slaves)

The BMS Graf pro software has two MODBUS RTU interpreters (slaves).

A5.4.1 MODBUS RTU interpreter (slave) at the address “40001”

The first MODBUS RTU interpreter (slave) has been kept for historical reasons. The address “40001” in BMSGRAF corresponds to the address “0” in the MODBUS protocol. The address range is defined from “40001” to “42000”. All address range violations are intercepted in the terminal as faulty, and no reply is given to the control unit. Make sure you use the correct address location in the control unit, i.e. consult the relevant control unit manual for the subsequent allocation of a MODBUS address to an address in the control unit.

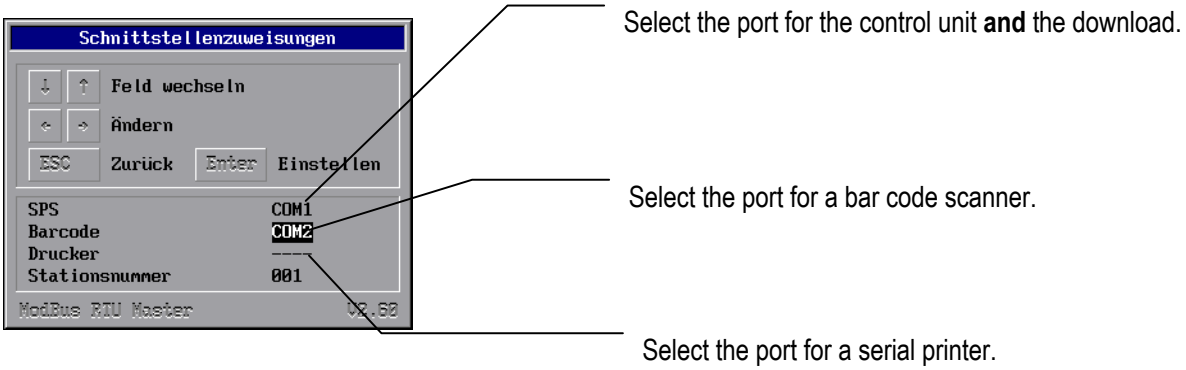
We recommend that you do not use this interpreter for new projects.

A5.4.2 MODBUS RTU interpreter (slave) with the address “0”

This MODBUS RTU interpreter (master) has been developed for better address allocation. The address “00000” in BMSGRAF, corresponds to “0” in the MODBUS protocol. The address range is defined from “00000” to “01999”. The available address range has a maximum of 2,000 registers. All address range violations are intercepted in the terminal as faulty, and no reply is given to the control unit. Make sure you use the correct address location in the control unit, i.e. consult the relevant control unit manual for the subsequent allocation of a MODBUS address to an address in the control unit. You also need to ensure that the addresses of your variables are within a narrow range, to avoid too many time-consuming read/write operations.

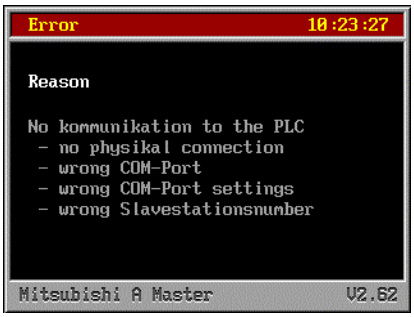
To obtain an adequate processing speed with slave coupling, make sure you do not connect more than 4 to 6 PC display terminals in series.

A5.5 COM port settings



A5.6 Error messages

Example of an error message display:



A5.6.1 Possible error messages:

Message	Cause	Possible remedy
No communication with control unit	SPC connection has failed.	Check connection cable: may not be plugged in or faulty. Check COM port settings. Check slave number. Check if function codes in SPC have been parametricised.
No project available	The interpreter did not find any project file in the terminal.	Repeat download.
Project faulty	The interpreter has found faults in the project file. The last download was faulty.	Repeat download.

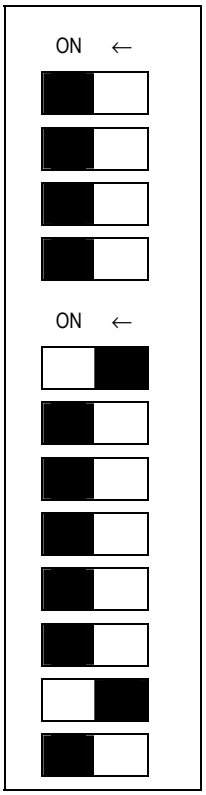
A6. Interpreter of the Mitsubishi MELSEC A series

Interpreter of the Mitsubishi MELSEC A

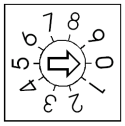
- A-series with interface module ASJ71C24
- FX-series with coupling module on the left-hand side of the CPU.

A6.1 Settings and configurations on the ASJ71C24 interface module

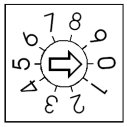
No software settings are required. As for the hardware, you need to set the DIP switches on the interface module as follows. In this example we have chosen a Baud rate of 19,200 Baud. Other Baud rates are also possible. Make sure the Baud rates of the interface module and the PC display terminal are the same.



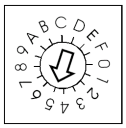
unused
Computer link
unused
Write during RUN enabled
19 200 Baud
19 200 Baud
19 200 Baud
8 Data Bit
Parity bit setting ON
Even Parity
1 Stop bit
Sum checksetting ON



Station number setting 0

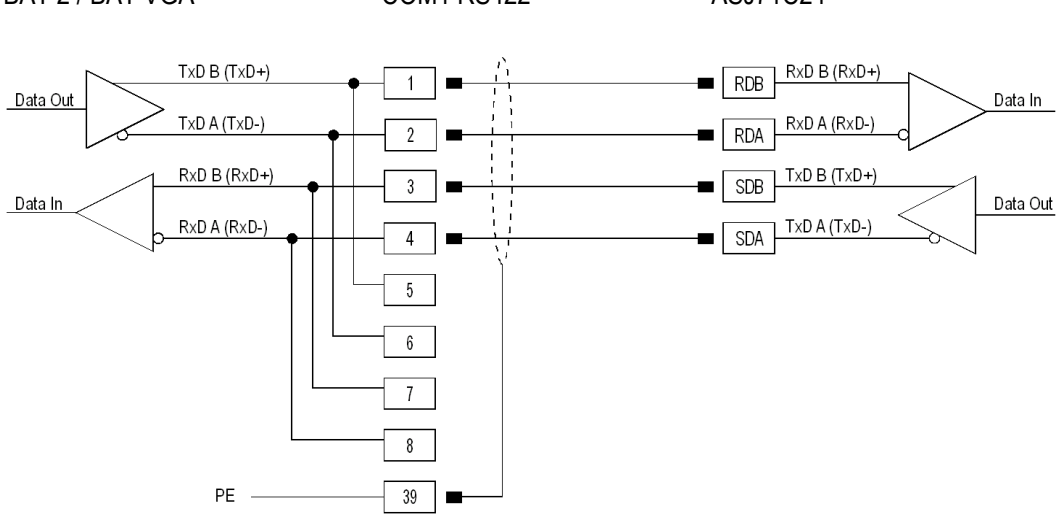


Station number setting 0



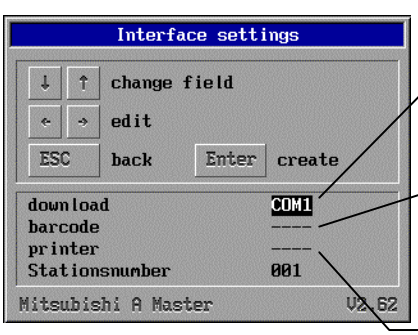
„5“ ⇨ Mode Protokol 1

A6.1.1 Connection diagram of the interface module ASJ71C24



Make sure you use double-stranded cables only. The connections to the interface module must be given two terminating resistors.

A6.2 COM port settings



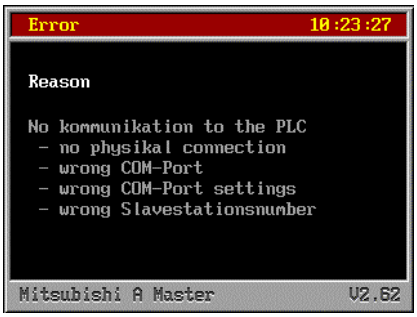
Select the port for the control unit and the download.

Select the port for a bar code scanner.

Select the port for a serial printer.

A6.3 Error messages

Example of an error message display:



A6.3.1 Possible error messages

Message	Cause	Possible remedy
No communication with control unit	SPC connection has failed.	Check connection cable: may be unplugged or faulty. Check COM port settings. Check slave number.
No project available	The interpreter did not find any project file in the terminal.	Repeat download.
Project faulty	The interpreter has found faults in the project file. The last download was faulty.	Repeat download.

A7. Auto-run interpreter

This is a demo interpreter for running projects at trade fairs, exhibitions and demonstrations without an SPC system. The addresses are for simulation purposes, and a description can be found in the appendix.

A7.1 Special notes

The interpreter uses the addresses “0” to “4000”. If a project contains range violations, then an error message is returned.

A7.2 Error messages

Message	Cause	Possible remedy
No project available	The interpreter did not find any project file in the terminal.	Repeat download.
Project faulty	The interpreter has found faults in the project file. The last download was faulty.	Repeat download.

A7.3 Address allocations of the auto-run interpreter

Address	Type	Description
0 to 21	Read transfer block	
22 to 43	Write transfer block	
100	Word	Picture 2: yellow level
101	Word	Picture 2: red level
102	Word	Picture 2: blue level
103	Bit field	Picture 2: valves and pipes
105	Bit field	Picture 1: valves – actual/target
106	Word	Picture 1: set distance
107	Bit field	Picture 1: grey pipe segments
108	Bit field	Picture 1: red pipe segments
109	Bit field	Picture 1: green pipe segments
110	Bit field	Picture 1: pump status
111	Word	Picture 1: level in boiler
112	Word	Picture 1: flow rate of pump 1 (inlet)
113	Word	Picture 1: flow rate of pump 2 (outlet)
115	Bit field	Picture 3: valves
116	Word	Picture 3: level in oblique boiler
200	Word	Status of recorder
201	Word	Language selection
202	ASCII (20 characters)	Bar code text
500	Word	On/off function 1
501	Word	On/off function 2
502	Word	On/off function 3
503	Integer	Function 1: counter up from MIN to MAX, value register
504	Integer	Function 1: MIN set target
505	Integer	Function 1: MAX set target
506	Integer	Function 2: counter down from MAX to MIN, value register
507	Integer	Function: MIN set target
508	Integer	Function 2: MAX set target
509	Integer	Function 3: RANDOM value around target value, value register
510	Integer	Function 3: target value
511	Integer	Angle 0-360° (per program cycle 0.1°)
512	Integer	Sine (angle) in degrees, range: -1000 to 1000
513	Integer	Cosine (angle) in degrees, range: -1000 to 1000
514	Word	Counter per second +1
515	Word	Counter per 10 seconds +1

The variables described here are partly from demo projects. The address range between “100” and “300” must not be used for your own projects.

A8. Connection of the OMRON host link protocol

Supported PLC systems:

- OMRON SYSMAC CPM1/CPM1A
- OMRON SYSMAC SRM1
- OMRON SYSMAC CQM1
- OMRON SYSMAC C200HE/-HG/-HX
- OMRON SYSMAC CV/CVM1

A8.1 Special notes

The required settings in the PLC for transmitting data via the RS 232 (not the programming interface) are:

Word	Bit(s)	Function
DM6645	00..07	Interface settings 00 : standard (1 start bit, 7 data bits, even parity , 2 stop bits, 9600 baud) 01 : settings in DM6646
	08..11	Connection words for 1:1 communication 0 : LR00 for LR63 1 : LR00 for LR31 2 : LR00 for LR15
	12..15	Communication mode **0 : host link protocol** 1 : RS 232C (freely defined protocol) 2 : 1:1 communication slave 3 : 1:1 communication master
DM6646	00..07	baud-rate 00 : 1200 baud; 01 : 2400 baud; 02 : 4800 baud; 03 : 9600 baud; 04 : 19200 baud
	08..15	Frame format (start / data / stop / parity) 00 : 1 / 7 / 1 / even 01 : 1 / 7 / 1 / odd 02 : 1 / 7 / 1 / none 03 : 1 / 7 / 2 / even 04 : 1 / 7 / 2 / odd 05 : 1 / 7 / 2 / none 06 : 1 / 8 / 1 / even 07 : 1 / 8 / 1 / odd 08 : 1 / 8 / 1 / none 09 : 1 / 8 / 2 / even 10 : 1 / 8 / 2 / odd 11 : 1 / 8 / 2 / none

Word	Bit(s)	function
DM6647	00..15	Transmission delay (host link protocol) 0000-9999 (BCD): settings in units of 10 ms, e.g.: a setting of 0001 is equivalent to 10 ms
DM6648	00..07	Node no. (host link protocol) also see „PLC station number“ in the interpreter set up 00 to 31 (BCD)
	08..11	Start code activated (RS-232C) 0 : deactivated 1 : activated
	12..15	End code activated (RS-232C) 0 : deactivated (number of bytes received) 1 : setting of specific end codes 2 : CR, LF
DM6649	00..07	Start code (RS-232C) 00 to FF (binary)
	08..15	bits 12 to 15 of the data word DM6648 are set to 0: number of bytes received 00 : default setting (256 bytes) 01 to FF: 1 to 255 bytes bits 12 to 15 of the data word DM6648 are set to 1: end code (RS-232C) 01 to FF (binary)

All necessary settings are marked in bold.

Warning:

The pin assignment of the RS232 interface of the PLC does not conform to the standard pin assignment. The PLC or PC terminal can become damaged if connected with an RS232 pin assignment!

Note:

- Some addresses (e.g.: interface settings) only allow write access by the terminal when the DIL switch (for CQM1 CPU21 number 1) MEMORY PROTECT is set accordingly. Other areas only allow write access when the PLC is operated in a particular mode (RUN / MONITOR / PROGRAM).

A8.2 Description of the OMRON interpreter (master)

Because of the 16 bit addressing (equivalent to 5 digits) in the BMS-Graf, it is not possible to enter direct OMRON addresses. For this reason a special address coding is used. The 5 digit address is divided into 2 parts, the 4 digits on the right-hand side are equivalent to the OMRON address, and the OMRON sector is defined by the 1st digit.

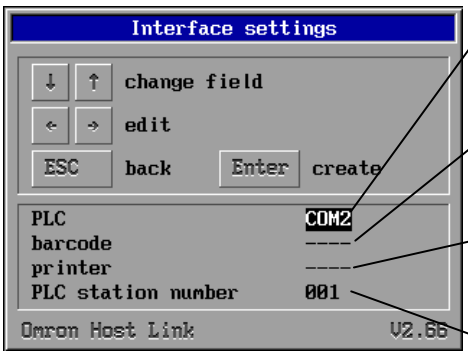
The following table shows how and which parts of the OMRON address are supported:

OMRON sector	Description	1st digit	Address part	BMS-Graf address
DM	Data flag words	0	0-6655	00000-06655
IR/SR	Input/Output words	1	0-255	10000-10255
AR	Auxiliary flag words	2	0-27	20000-20027
HR	Lock flag words	3	0-99	30000-30099
LR	Interface flag words	4	0-63	40000-40063

Sector damage is acknowledged using an error message in the interpreter.

In larger PLC systems, the DM sector is larger than that specified here (e.g.: C200HE 102 kwords), BMS-Graf uses only the sectors specified here.

A8.3 Interface settings



Selection of the interface to which the control is connected **and** where the download is executed

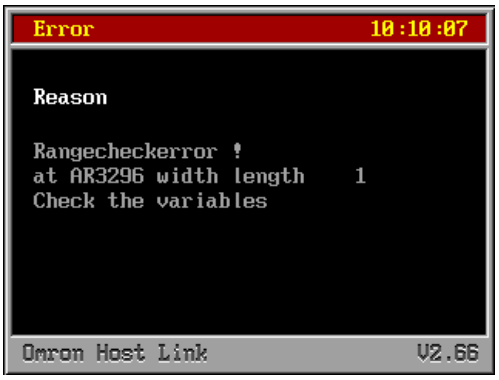
Selection of the interface to which a barcode scanner is connected

Selection of the interface to which a serial printer is connected

Station number of the PLC (node)

A8.4 Error messages

Example of an error message:



A8.4.1 Possible error messages:

Message	Cause	Possible rectification
No communication with the control	Establishment of connection with the PLC failed	Check connecting cable, it may not be connected or it may be faulty Check interface parameters Check node/station number Are the function codes in the PLC parameterised
No project available	The interpreter has found no project file in the terminal.	Repeat download
Project has errors	The interpreter has found errors in the project file, the last download has errors	Repeat download

Message	Cause	Possible rectification
Access error at address xxxx	Omron error code $01 Cannot be executed in the RUN operating mode!	Set PLC to Monitor Mode.
	Omron error code $02 Cannot be executed in the MONITOR mode!	Check variables. Check PLC sectors.
	Omron error code $0B Cannot be executed in the PROGRAM mode!	Set PLC to Monitor Mode
	Omron error code $23 Application memory is write protected!	e.g.: DIP switch 1 of CQM1 is ON. Check variables.
Checksum error indicated by the PLC!	Omron error code $13/$A3	Check interface parameters!
Format error	Omron error code $14/$A4	Check interface parameters!
Error on data input to address	Omron error code $15/$A5	Check variables
Command is not supported!	Omron error code $16	Should never appear, mentioned only for completeness.
Frame length exceeded! Block start : xxxx Block length : xxxx	Omron error code $18/$A8 Data block too large.	
Access cannot be executed! Block start : xxxx Block length : xxxx	Omron error code $19	
Sector damage!	Error discovered in the variable declaration	Check variables

A9. Connecting Profibus DP

PLC´s supported:

- S5 95U with DP master interface
- S7 300
- S7 400
- Freelands 2000
- Quantum
- Premium

A9.1 Connection

A9.1.1 Special notes regarding S5 connection

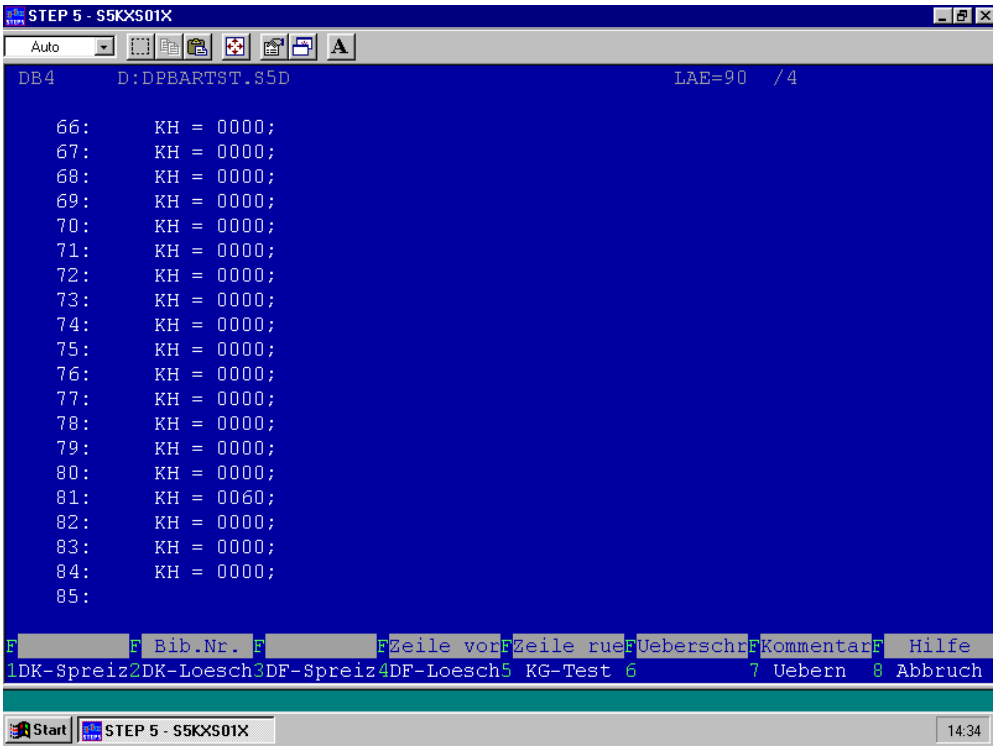
In order to be able to use function block S5 95U with DP-Master interface the DP interface must be parametered. This is possible with the help of the software packet by Siemens **Com Profibus version V3.3**

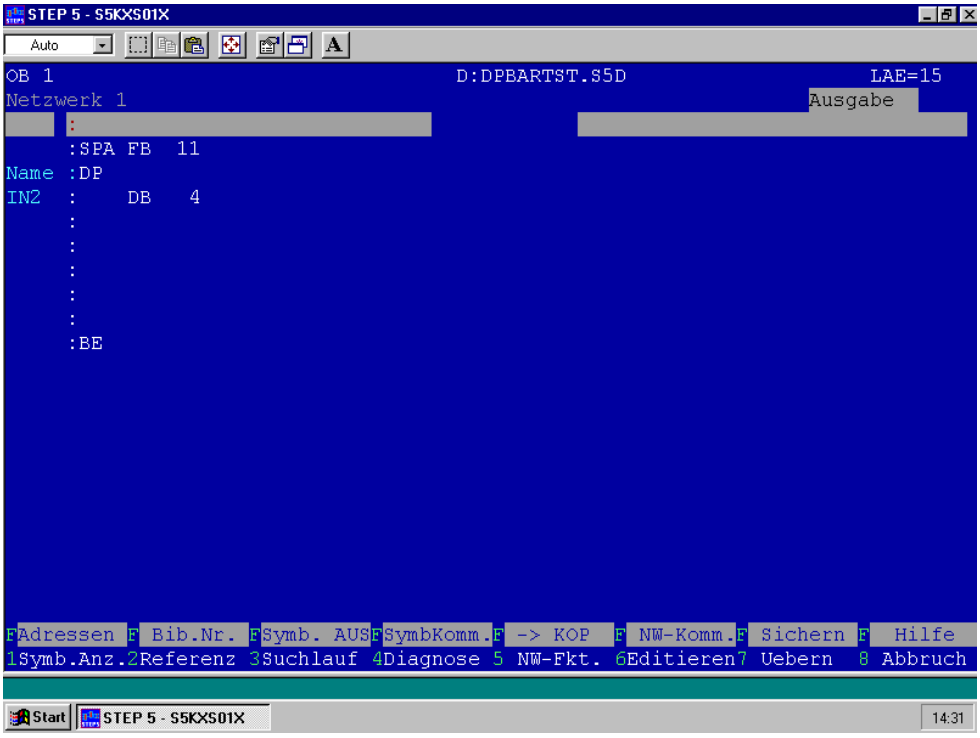
Necessary steps:

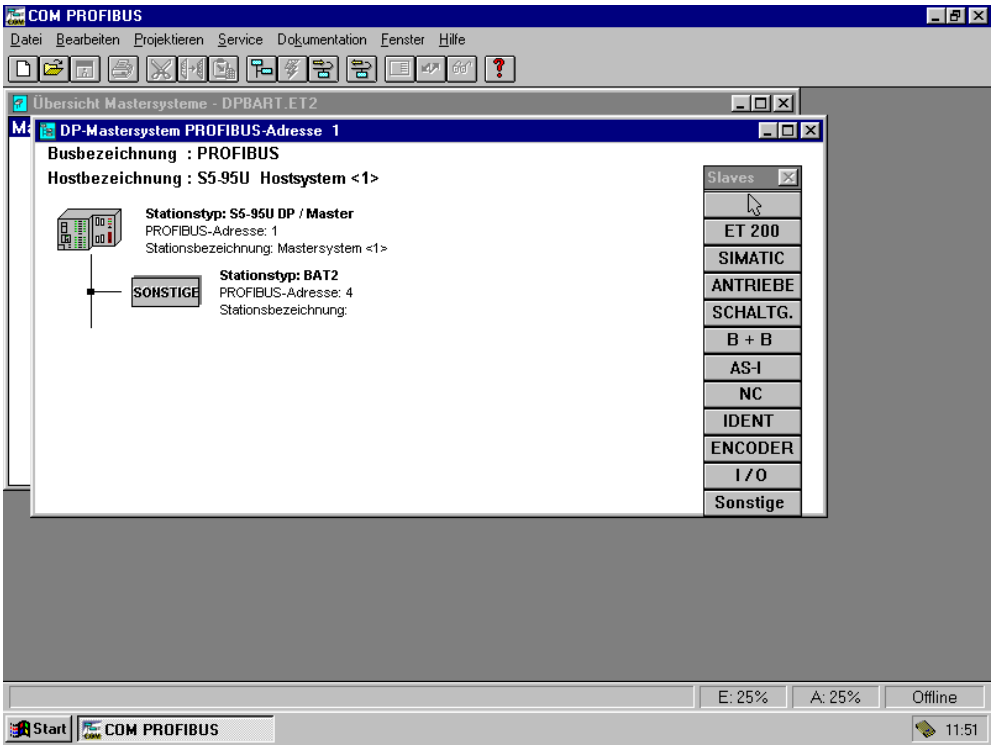
- The GSD data for the terminal is to be entered into the register/compb33/GSD
- Activate „file/GSD-file read“ in the **Com Profibus**
- Create a master system with „S5-95U with DP-master interface in the **Com Profibus**
- For slaves insert „miscellaneous“ into the system
- Assign Profibus address
- Select BAT2
- Configure entry and exit (These must be the same, each time 32 bytes address space is used)
- Put configuration info memory via file/export/DP-master transmit to CPU after defaulting
- Include function blocks FB11 and FB10 into the project (FB10 is called up by FB11)
- Call up function block FB11 in the OB1 with SPA
- Enter the reserved data block for the relevant slave the start-up variable
- Set up data block with 82 words for each slave. This is required as a data buffer
- Enter the E/A address of the configuration in hexadecimal form into affiliated data building block of the slave in data word 81

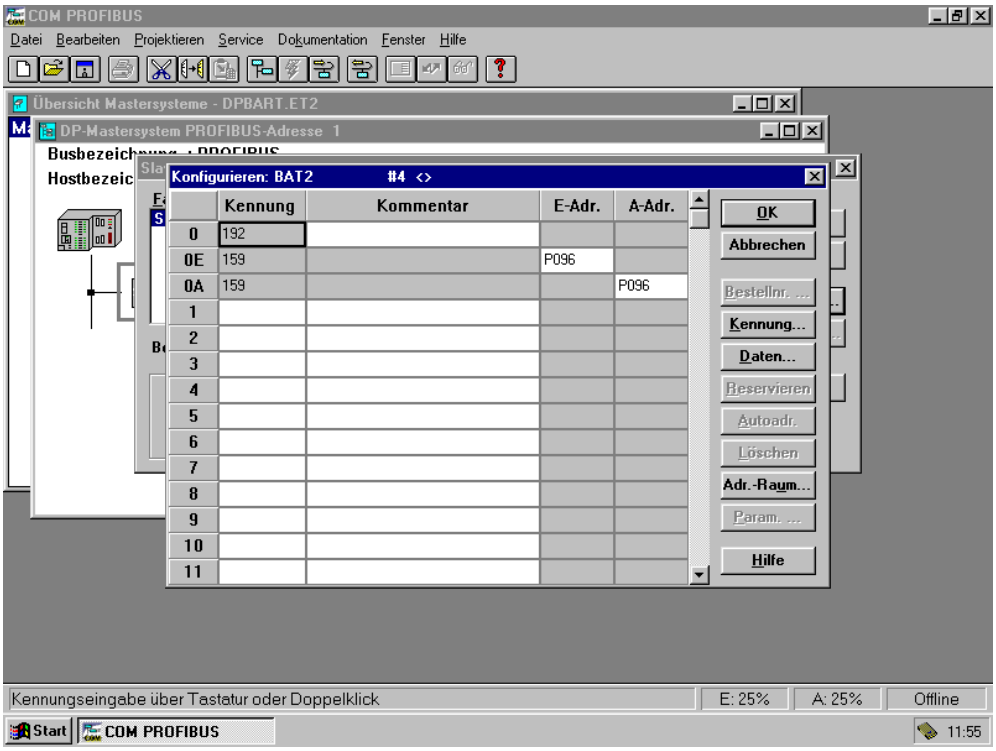
Notes:

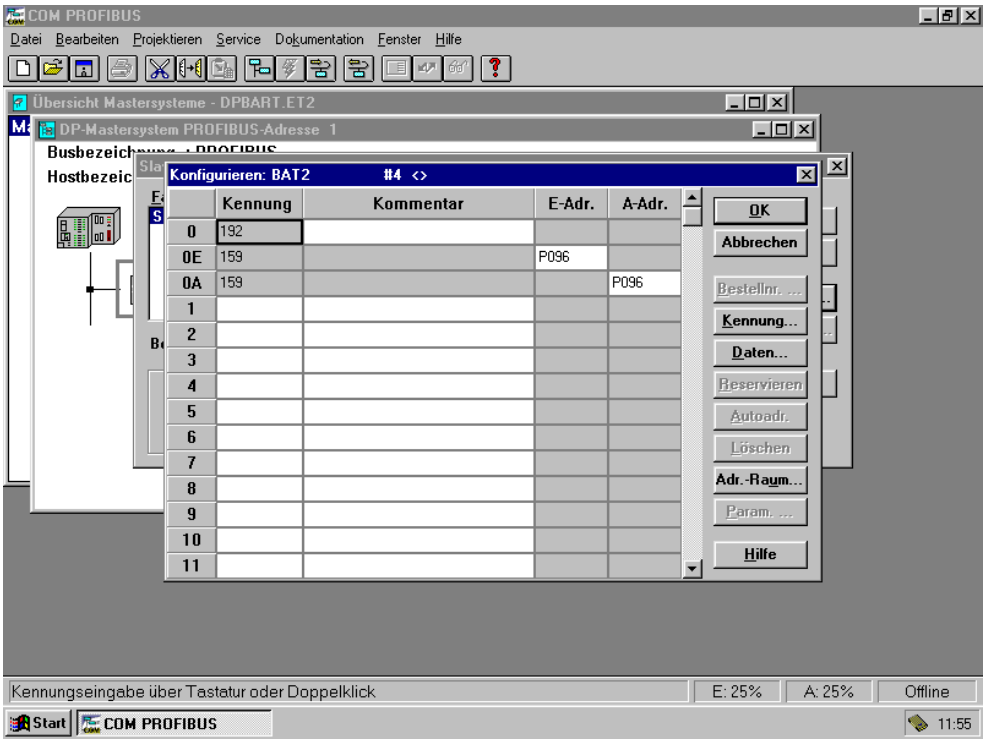
- The blocks were provided via the software „**Simatic S5 step 5/ST version 6.6**“


STEP 5 - S5KXS01X
Auto
DB4 D:DPBARTST.S5D LAE=90 /4
66: KH = 0000;
67: KH = 0000;
68: KH = 0000;
69: KH = 0000;
70: KH = 0000;
71: KH = 0000;
72: KH = 0000;
73: KH = 0000;
74: KH = 0000;
75: KH = 0000;
76: KH = 0000;
77: KH = 0000;
78: KH = 0000;
79: KH = 0000;
80: KH = 0000;
81: KH = 0060;
82: KH = 0000;
83: KH = 0000;
84: KH = 0000;
85:
F F Bib.Nr. F FZeile vorFZeile rueFUeberschrFKommentarF Hilfe
1DK-Spreiz2DK-Loesch3DF-Spreiz4DF-Loesch5 KG-Test 6 7 Uebern 8 Abbruch
Start
STEP 5 - S5KXS01X
14:34


STEP 5 - S5KXS01X
Auto
OB 1 D:DPBARTST.S5D LAE=15
Netzwerk 1 Ausgabe
:
:SPA FB 11
Name :DP
IN2 : DB 4
:
:
:
:
:
:BE
FAdressen F Bib.Nr. FSymb. AUSFSymbKomm.F -> KOP F NW-Komm.F Sichern F Hilfe
1Symb.Anz.2Referenz 3Suchlauf 4Diagnose 5 NW-Fkt. 6Editieren7 Uebern 8 Abbruch
Start
STEP 5 - S5KXS01X
14:31


COM PROFIBUS
Datei Bearbeiten Projektieren Service Dokumentation Fenster Hilfe
Übersicht Mastersysteme - DPBART.ET2
DP-Mastersystem PROFIBUS-Adresse 1
Busbezeichnung : PROFIBUS
Hostbezeichnung : S5-95U Hostsystem <1>
Stationstyp: S5-95U DP / Master
PROFIBUS-Adresse: 1
Stationsbezeichnung: Mastersystem <1>
SONSTIGE
Stationstyp: BAT2
PROFIBUS-Adresse: 4
Stationsbezeichnung:
Slaves
ET 200
SIMATIC
ANTRIEBE
SCHALTG.
B + B
AS-I
NC
IDENT
ENCODER
I / O
Sonstige
E: 25%
A: 25%
Offline
Start
COM PROFIBUS
11:51


COM PROFIBUS
Datei Bearbeiten Projektieren Service Dokumentation Fenster Hilfe
Übersicht Mastersysteme - DPBART.ET2
DP-Mastersystem PROFIBUS-Adresse 1
Konfigurieren: BAT2 #4 <>
Kennung
Kommentar
E-Adr.
A-Adr.
0 192
0E 159 P096
0A 159 P096
1
2
3
4
5
6
7
8
9
10
11
OK
Abbrechen
Bestellnr. ...
Kennung...
Daten...
Reservieren
Autoadr.
Löschen
Adr.-Raum...
Param. ...
Hilfe
Kennungseingabe über Tastatur oder Doppelklick
E: 25%
A: 25%
Offline
Start
COM PROFIBUS
11:55


COM PROFIBUS
Datei Bearbeiten Projektieren Service Dokumentation Fenster Hilfe
Übersicht Mastersysteme - DPBART.ET2
DP-Mastersystem PROFIBUS-Adresse 1
Konfigurieren: BAT2 #4 <>
Kennung
Kommentar
E-Adr.
A-Adr.
0 192
0E 159 P096
0A 159 P096
1
2
3
4
5
6
7
8
9
10
11
OK
Abbrechen
Bestellnr. ...
Kennung...
Daten...
Reservieren
Autoadr.
Löschen
Adr.-Raum...
Param. ...
Hilfe
Kennungseingabe über Tastatur oder Doppelklick
E: 25%
A: 25%
Offline
Start
COM PROFIBUS
11:55

A9.1.2 Special notes for S7 connection

For any data transfer between PLC & PC display terminal it is necessary to input into the PLC a function block and to call it up in the PLC operating cycle.

FB10 is a building block for S7 without SFC 24.

This FB can be called up on the terminal with the help of the slave address. The slave address is not the Profibus address. It is the physical address in „Step 7 manager“ of the hardware configuration. Input must be in hexadecimal form (please see example). The entry and exit address must be the same, because one address is transferred when called up.

For FB to function the following is necessary.

- Read SFC 14 data from slave in PLC.
- Write SFC 15 data for the slave in PLC
- The issued function FCI (CRC 16 test sum)

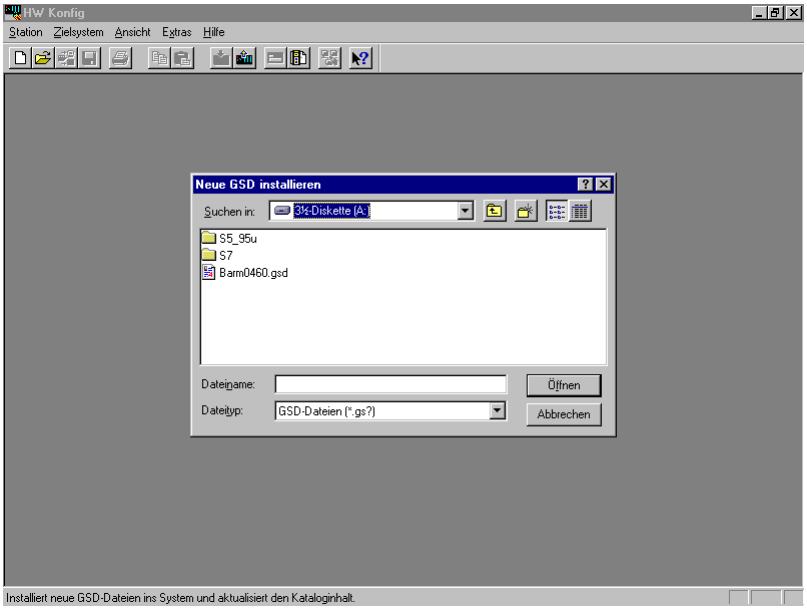
Correct working of the FB10 is ensured only if SFC 14 & SFC 15 are present in the PLC and FCI is loading into the PLC.

The data building blocks for the terminal must be entered and the length must be the same as the length required by the terminal, otherwise the PLC will display an error message. When calling up the FB10, a designated building block must be named. Each terminal requires its own specific DB. The OB 121 prevents the PLC going into STOP mode if DB is missing or wrong. Therefore it is essential that OB 121 is entered within the PLC.

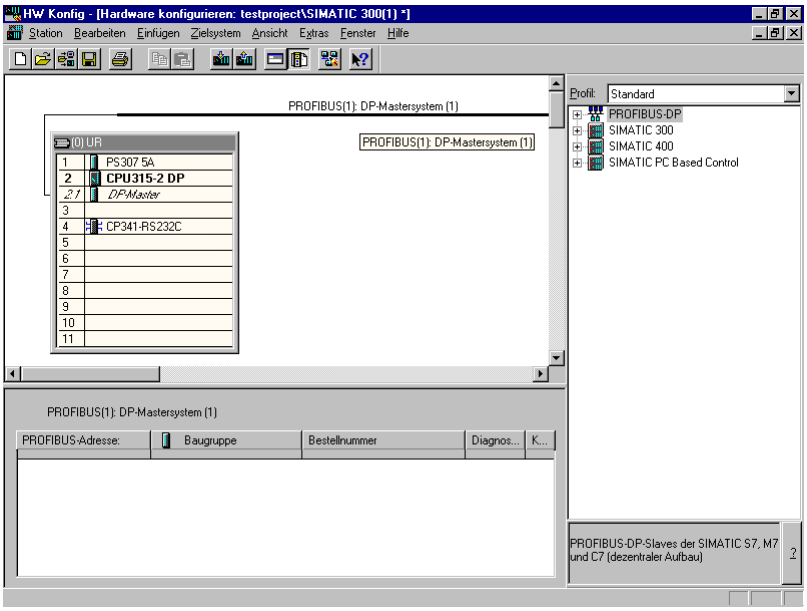
Sample:	Call up FB10		Data exchange with terminal
	Call up FB10, DB1		Call up FB10 with data instance 1
	Slave Address:	W#16#0	DP slave projected from address 0
			Data exchange with terminal 2
	Call FB10, DB2		Call up of FB10 with data instance 2
	Slave Address:	W#16#20	DP slave projected from address 32.

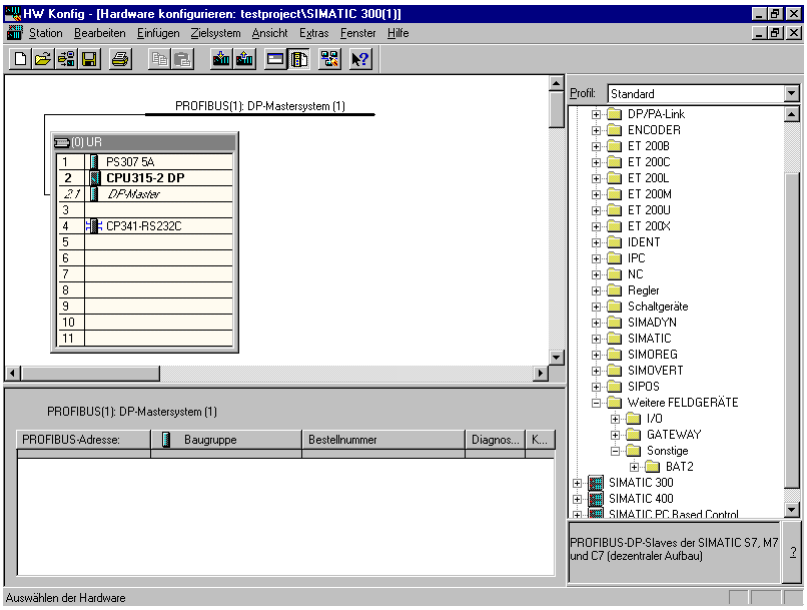
A9.1.2.1 GSD - File

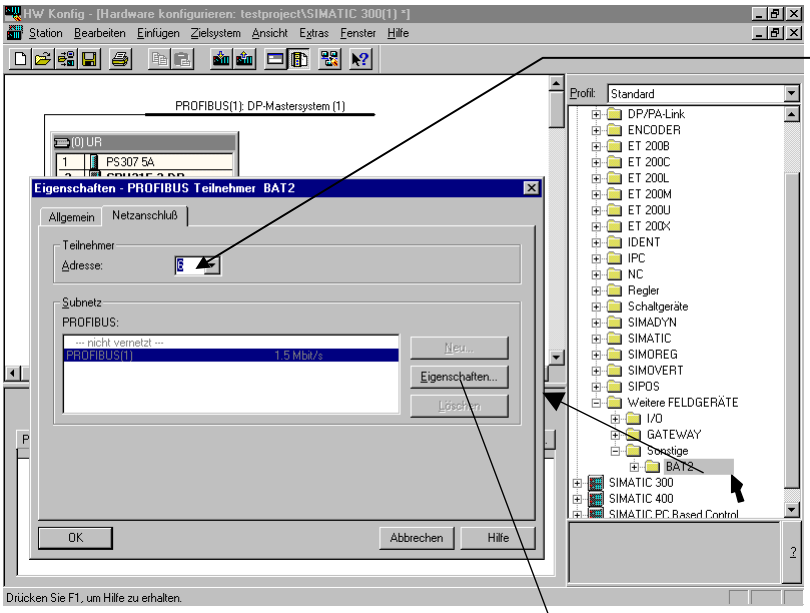
GSD-file for BAT 2 / BAT VGA with Profibus from “C:\programs\BARTEC\BMSGrafpro\PLC_PRG\” into Step 7.



A9.1.2.2 Select terminal as hardware configuration



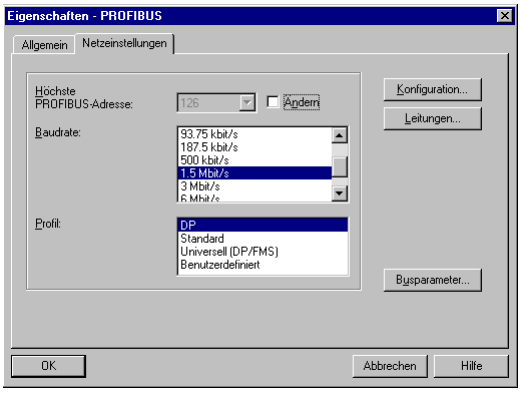




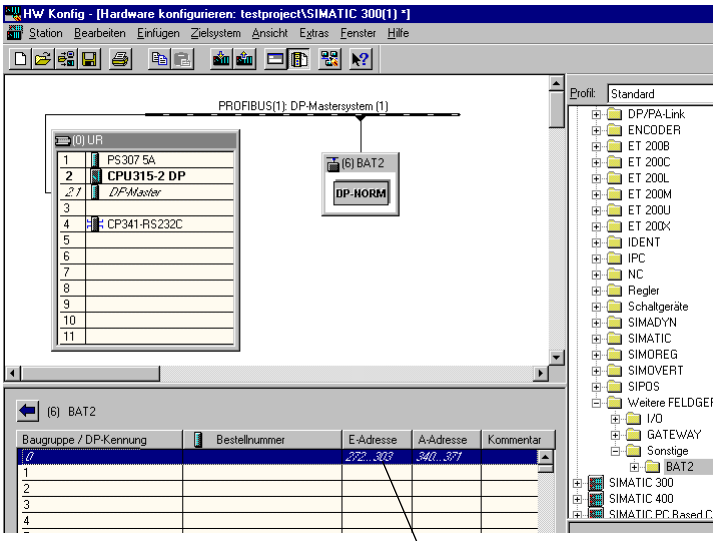
Profibus DP Slave number

Also to be set at the terminal.

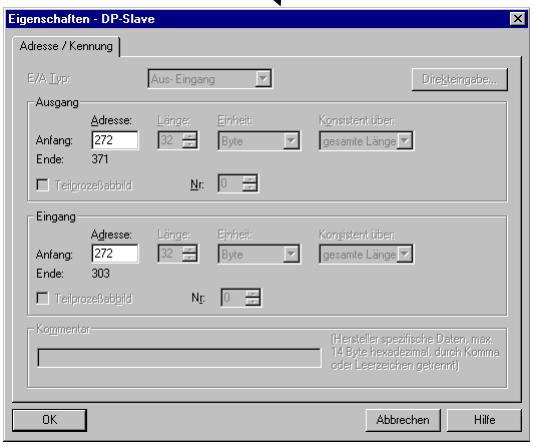
A double click on „BAT 2“ or „BAT 2 / BAT VGA“ opens the dialogue window.



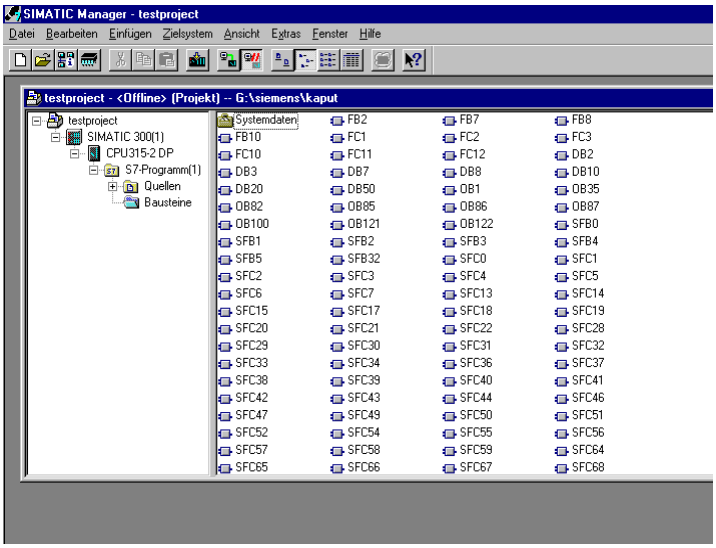
By pressing the [OK] button the input data is accepted / stored and the BAT terminal is integrated as Profibus-slave.



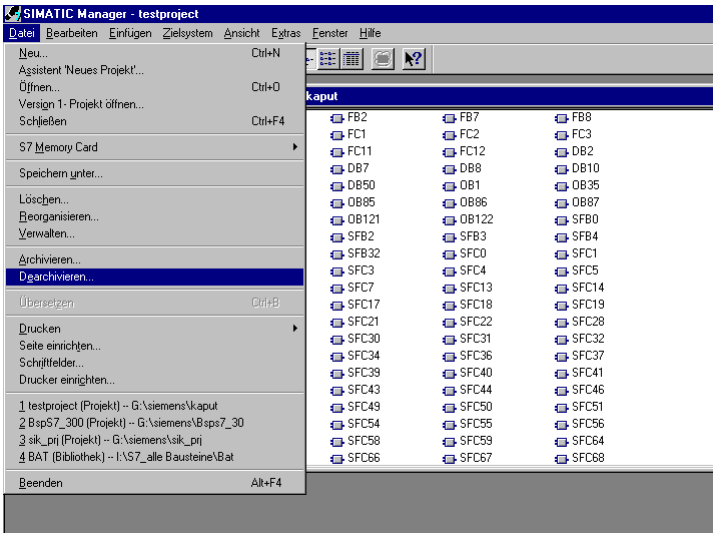
After double clicking the highlighted row, the following dialogue window can be used for the starting address from the address range of the Profibus. Both addresses (input - output address **must** be the same !).



A9.1.2.3 Copy the handling units into the PLC program.

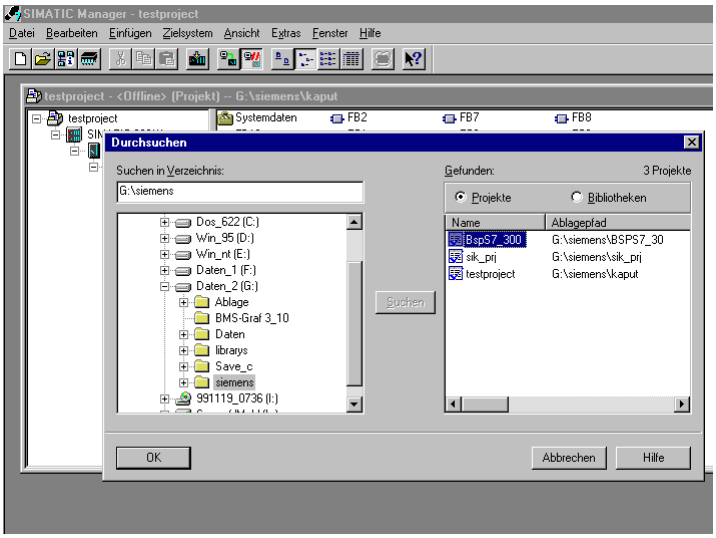


Example for an existing project...

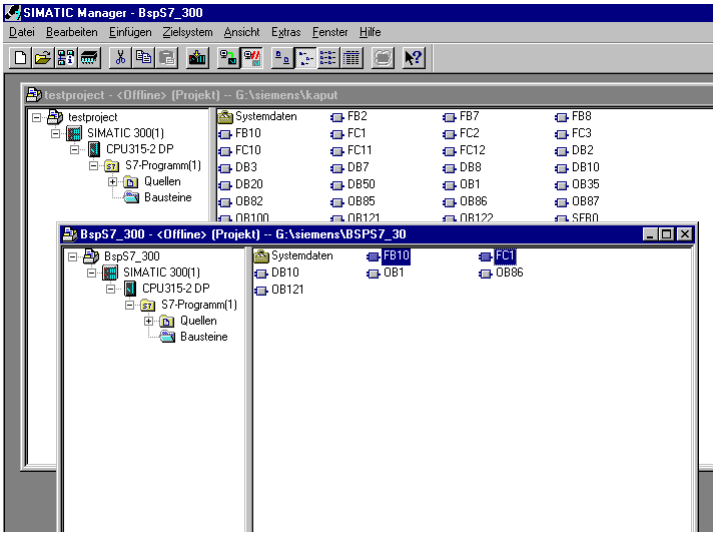


Library open from “C:\programs\BARTEC\BMSGrafpro\PLC_PRG\”

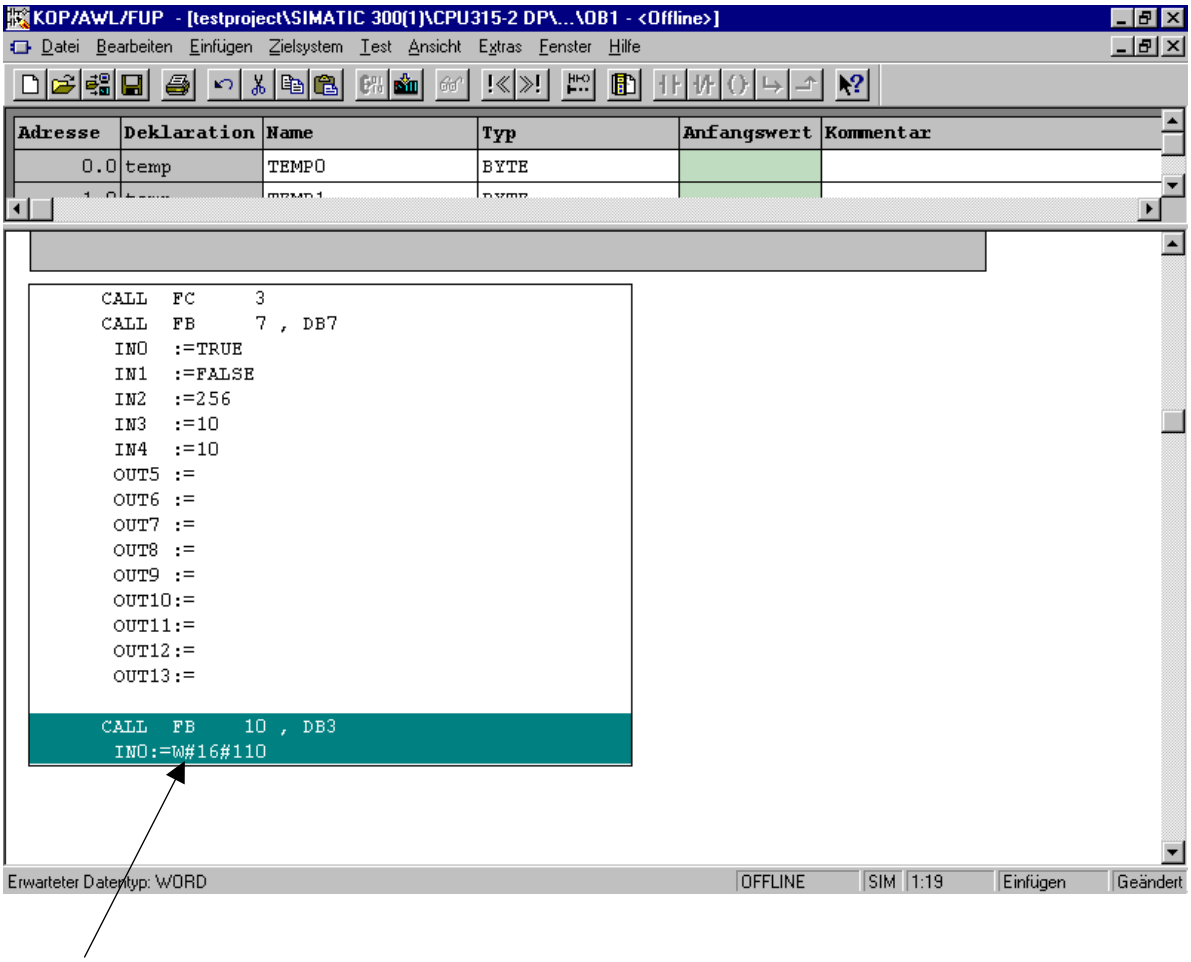
After opening the project „BspS7_300“...



... the building units „FB10“ and „FC1“ can be copied into the project.



A9.1.2.4 Copying into the PLC program (OB1)



Call up the handling unit in OB1, which is described in the appendix A to the handbook BMS-Graf.

A9.1.3 Special notes for Freelands 2000

see separate documentation

A9.1.4 Quantum

see separate documentation

A9.1.5 Premium

see separate documentation

A9.1.6 Other controls not listed

The necessary handling unit for the particular control can be developed from the following diagram:

A9.1.6.1 Programming of a handling unit for the BAT terminal with PROFIBUS DP interface

The programme in the control system should react to events in the PROFIBUS EA range of the BAT terminal, of size 32 bytes, in the following way. Two commands are defined. If the function code (FC) equals „1“ the terminal transmits data to the control system. If FC equals “2” the terminal requests data from the control system.

Note: The CRC test sum is not required and not used, but is defined in the protocol.

Transmission event:

In the transmission event a response includes only error code and cycle counter.

Set up of data buffer:

Transmission request

Cycle counter	FC = 1	Address 1	Address 2	Length	Data byte 1	...	Data byte N	CRC Low	CRC High

Transmission response

Error code	Cycle counter	CRC Low	CRC High

Fetch event:

In the fetch command a distinction is made between an error-free and faulty request.

In the case of a faulty request the address and length are overwritten with zero. The error code and cycle counter are transferred correctly.

In the case of a faulty request the useful data are attached according to their length.

Set up of the data buffer:

Fetch request

Cycle counter	FC = 2	Address 1	Address 2	Length	CRC Low	CRC High

Fetch response (error-free)

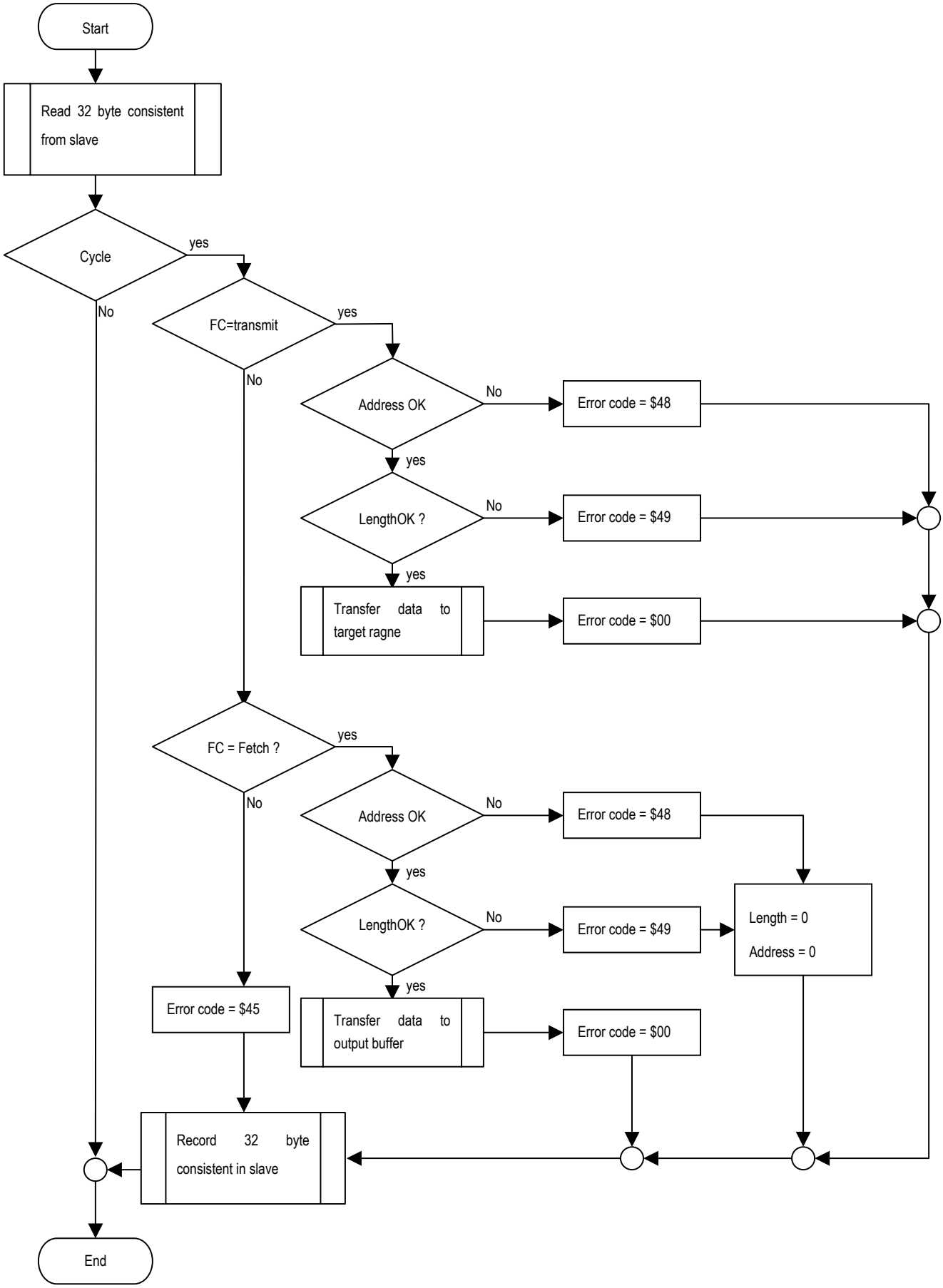
Error code	Cycle counter	Address 1	Address 2	Length	Data byte 1	...	Data byte N	CRC Low	CRC High

Fetch response (faulty)

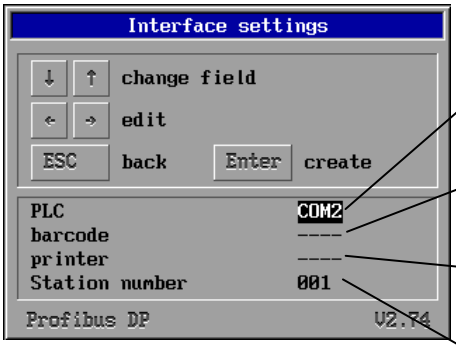
Error code	Cycle counter	Address 1 = 0	Address 2 = 0	Length = 0	CRC Low	CRC High

Note: One block stands for one byte.

Flow chart


Start
Read 32 byte consistent from slave
Cycle
yes
No
FC=transmit
yes
No
Address OK
No
Error code = $48
yes
LengthOK ?
No
Error code = $49
yes
Transfer data to target ragne
Error code = $00
FC = Fetch ?
yes
No
Address OK
No
Error code = $48
yes
LengthOK ?
No
Error code = $49
Length = 0
Address = 0
yes
Error code = $45
Transfer data to output buffer
Error code = $00
Record 32 byte consistent in slave
End

A9.2 Interface settings

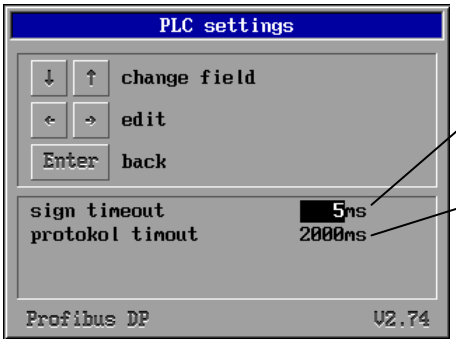


Selector for interface to which the control is to be connected

Interface selector to which a barcode scanner is connected

Interface selector to which a serial printer is connected

Profibus slave numbers of the terminal

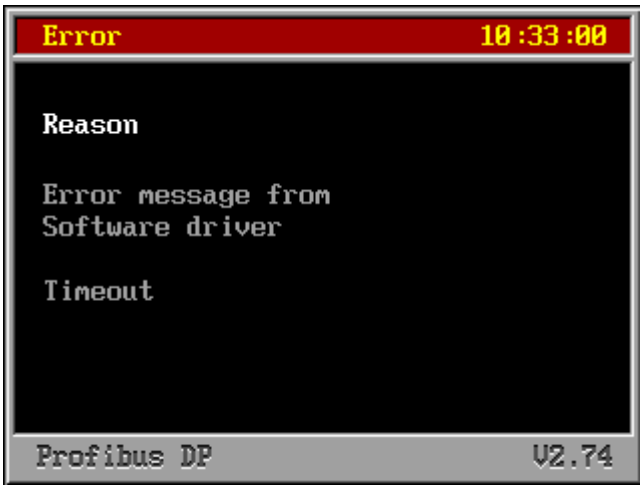


Max time interval between 2 signs until protocol end is recognised

Max waiting duration for an answer for time out

A9.3 Error Reporting

Sample of a screen error:



A9.3.1 Possible sources of error

Source	Description
PLC programme	Errors found in the PLC programme (function blocks)
Profibus DP line	Errors found during transmission via profibus DP
Interface card	Errors found during communication with internal
BMS-Graf driver	Errors found in the driver software

A9.3.2 Possible fault messages

Message	Reason	Possible correction
No project	The interpreter has found no project file in the terminal.	Repeat downloading
Project faulty	The interpreter has found faults in the project file, last download was faulty.	Repeat downloading
CRC test sum error	Check sum error found in protocol	
Wrong length details	Buffer overflow found	
Range Check Error	Found area offence	
Slave number faulty		Check slave number
Wrong function code	Command is not supported	
Initialisation faulty	The PROFIBUS module could not be initialised	
Time out	Violated waiting time	May be tall protocol delay time in the set up
Address invalid	Demands outside the valid area	Check DB and length of DB
Details about length invalid	Length demands outside the valid area	Check DB and length of DB

A10. Linking of Interbus S to A250 with BKF102-113

A10.1 Special notes

- The PLC system supported is A250 with BKF 102 to BKF 113
- For the data transfer between the PLC and the PC terminal, it is necessary to load a function block in the PLC and to call it up in the work cycle of the PLC.

A10.1.1 Screenshots of the AKF 8.0 PLC project software

A10.1.1.1 List of equipment for the PLC A250

BES-Editor

SP	Baugruppe	Variante	Z	A	Datentyp	TN-Nr.
0	ALU 151-1					
1	DNP116					1
2	BKF102		zyk		BKFI,BKFS	1
3	ADU116		zyk		EW	3
4						
5						
6						
7						
8						
9						

Kommentar: Modnet-1/IS Koppler « SubMag : 20
Baugrtrg.: DTA112 / PAB lokal

BARTEC<OFFLINE>PUTE

A10.1.1.2 List of equipment for the BKF Unit

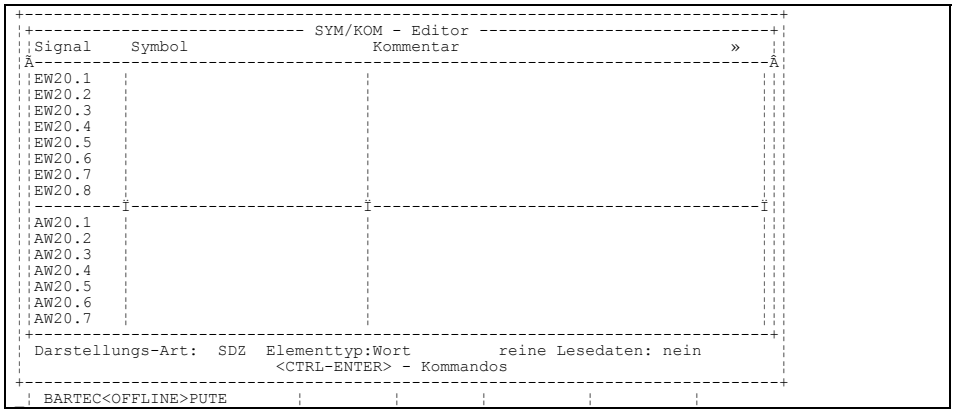
BES-Editor

SP	Baugruppe	Variante	G	A	Datentyp	TN-Nr.
20	AM8 03		000	1	EW,AW	20
21						
22						
23						
24						
25						
26						
27						
28						
29						

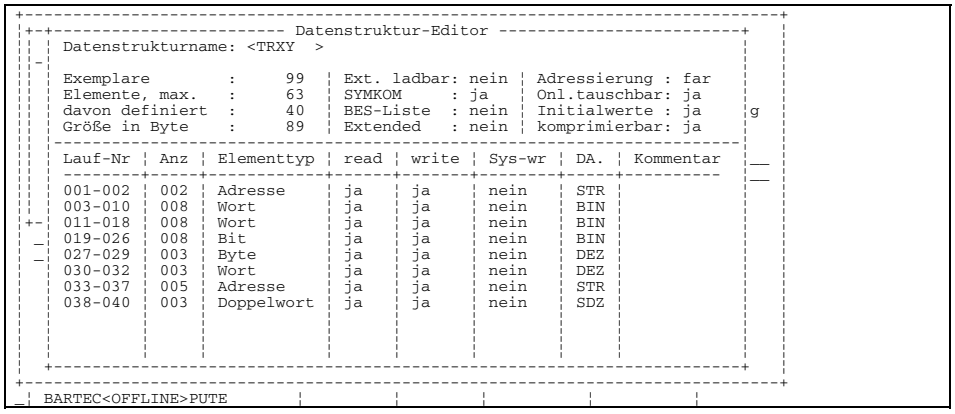
Kommentar: «
Baugrtrg.: DTA-IBS-F / BKF 2 AUTO Bereich: 20- 27

BARTEC<OFFLINE>PUTE

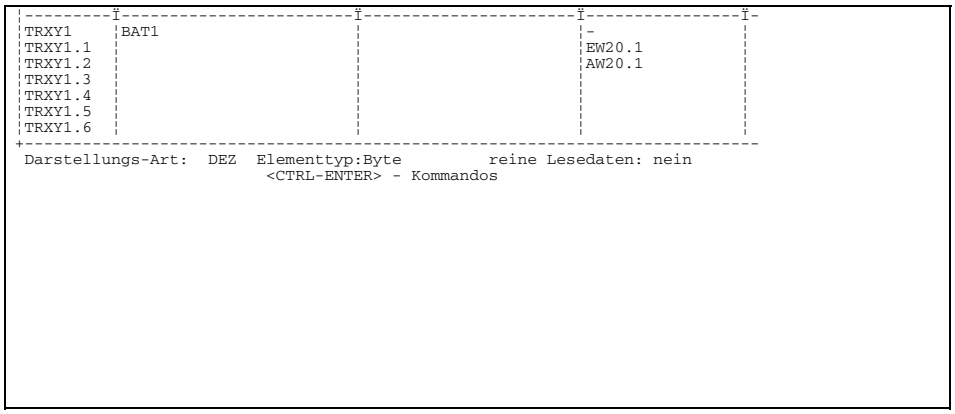
A10.1.1.3 Signal definitions



A10.1.1.4 Data structure for the link



A10.1.1.5 Definitions table



A10.1.1.6 Integration of the function block into the OB1

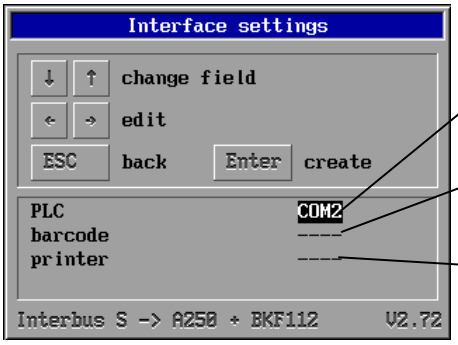
```
Baustein Editor
      :BA   FB999
NAME  :BATIBS
DATE  :     BAT1
      :
      :L    MW1020
      :INC
      :=    MW1020
      :***
```

```
Baustein: OB1       Netzwerk: 1
_¦ BARTEC<OFFLINE>PUTE       ¦         ¦         ¦          ¦          ¦
```

A10.1.2 Short explanation for integrating the function block

- The function block FB999 must be called separately for each terminal
- Each terminal has to have its own data module of the type „TRXY“.
- The input address of the terminal is to be entered with Awx in the first word of the assigned data module.
- The output address of the terminal is to be entered with Awx in the second word of the assigned data module.
- The terminal data is written to the sector of the flag and read from the same.
- Permissible address statements go from 0 to 30000 (pay attention the upper limit of the PLC)
- The following pointers are used in the FB999: P1, P2, P3.

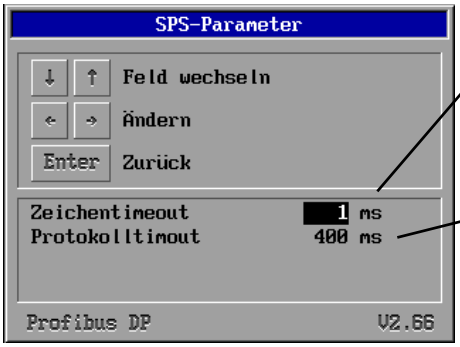
A10.2 Interface settings



Selection of the interface to which the control is connected.

Selection of the interface to which the barcode scanner is connected.

Selection of the interface to which a serial printer is connected.



Maximum time between two characters until end of protocol is recognised.

Maximum waiting time for a response. For time out.

A10.3 Error Reporting

Sample of a screen error:

A10.3.1 Possible

Message	Reason	**Possible correction**
No project	The interpreter has found no project file in the terminal.	Repeat downloading
Project faulty	The interpreter has found faults in the project file, last download was faulty.	Repeat downloading
Unknown function code	Interpreter error	
Wrong CRC16	Part error to bridge	
Timeout on Interbus line	Timeout for responce	Switch PLC into 'Run' mode, check call of function block
Interbus line not aktive	Interbus line not aktive	Check Interbus, check BKF
Bridge not initialized	Interpreter error	
Wrong CRC16 by bridge	Wrong responce by bridge	
Bridge without responce	Timeout	Change the protocol time out by setup
Break on data stream	Need more datas	
Details about length invalid	Length demands outside the valid area	Check DB an length of DB

A11. Siemens S7 via MPI

A coupling cable, type 17-28TZ-0007, is available for coupling to the MPI bus.

This device is an interface converter which converts the MPI protocol into the 3964R/RK512 protocol (physically RS422).

For the BAT terminals this means that these require the 3964R driver as protocol driver.
Addressing is then carried out to S7 according to the 3964R/RK 512.

Caution:

This means that the address of the data word projected in BMS-Graf is doubled in S7.
Example:

Address in BMS-Graf	Address in S7
DB 30 DW 0	DB 30 DW 0
DB 30 DW 10	DB 30 DW 20
DB 20 DW 100	DB 20 DW 200

Caution:

The address range which is used in the terminal must be present completely in S7, otherwise an error message "communication error" is given in the terminal.

Presettings of the MPI addresses are

S7	2
BAT	5

Caution:

This means that only one operating system can be connected to the MPI interface with the MPI cable.

The interface parameters of the terminal must be permanently set to

8 data bits
1 stop bit
parity even
baud rate19200

The baud rate of the S7 must be set to 187.5 Kbaud.

A11.1 MPI box

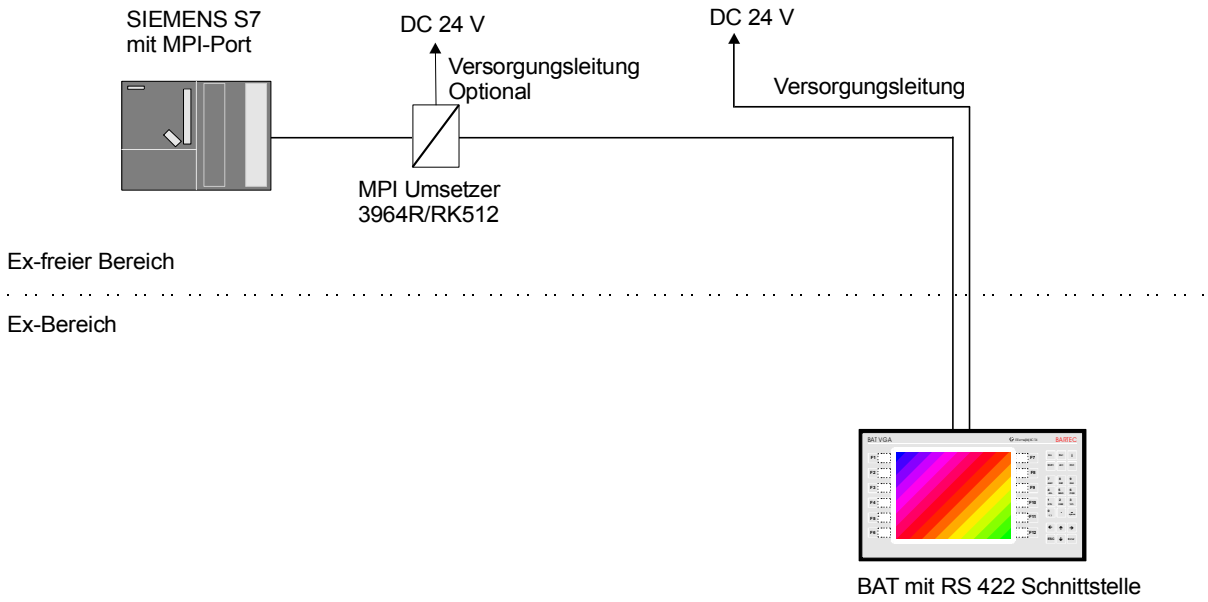
Only **one** MPI cable may be connected to the Siemens MPI interface, since the electrical power is supplied to the MPI cable through the S7 MPI interface.

A11.2 Coupling of PG and MPI box

A Profibus connection from Siemens is required.

- For MPI cable coupling the PG must have its own voltage supply.
- The MPI cable is directly coupled to the MPI interface of S7 via the Profibus connection; the PG coupling is effected via the bus cable.

A11.3 Installation instructions and installation of MPI box



A11.4 Installation of BAT 2 / BAT VGA to SSW7-RK512/RS422

A11.4.1 Installation to BAT Terminal

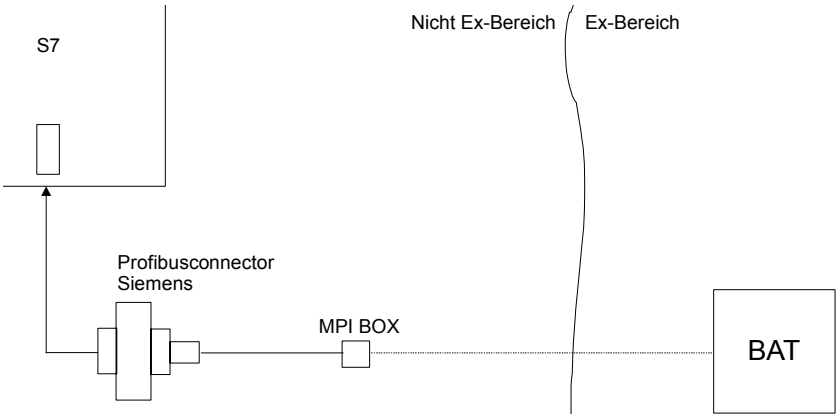
For installation you require the following components:

- MPI box
- Self-made cable adapter between MPI box and BAT terminal

Proceed as follows:

- Plug the 9-pole plug of the MPI box to the S7 MPI interface
- Connect the 9-pole socket of the MPI box with the self-made cable adapter.
- Connect the open conductors of the cable adapter in the BAT terminal.
- After downloading the BMS-Graf project, the interface paramters should be set.

A11.5 Cable connection plan – MPI box



A11.6 Cable adapter between MPI box and BAT terminal E compartment

Note: This cable adapter is not included in the supply schedule and must be made by the customer.

Pin connections:

SUB-D-plug (to MPI box) 9-pole		Terminals in E compartment - BAT		
Enclosure	Shield	Shield	BAT 2 & BAT VGA	BAT 300, 800 & VGA pro
	separate sw 2.5 mm²		RS422 to COM1 / COM2	to module 422 terminal
1	Rx A	TxD +	1 / 9	1
2	Rx B	TxD -	2 / 10	2
3	Tx A	RxD +	3 / 11	3
4	Tx B	RxD -	4 / 12	4
5	GND			
6	n.c.			
7	n.c.			
8	n.c.			
9	n.c.			

Appendix B

Appendix B – Addition to Runtime version 3.0

B1. Configuration in regular operation

B1.1 Special comments

The special Siemens format „KG“ and other float or real types are not supported in the run time interpreter.

B1.2 Error messages

Error messages are represented in the lower region of the terminal as text lines. The images are also represented for errors in coupling.

The displayed values are NOT updated !

Scrolling in the images using function keys or special keys, previously defined in the project, is possible with delays caused through the protocol.

Owing to standardisation of the error messages from the individual protocol drives, the error messages have changed to version 2.xx. Error messages are always represented as **“Source I recognised error”.**

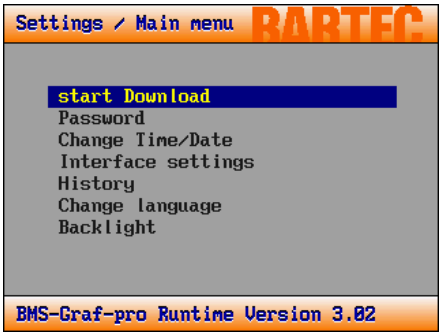
Source (signalled from)

General	No exact resolution of the source
Run time	Errors which do not affect coupling in particular
Driver	Communication errors which are recognised in the protocol driver
Control system	Check back errors of control system

Type of error

Error-free	Is not displayed
Address information xxx too small	Requested address to the SPS is under the permitted range
Address information xxx too large	Requested address to the SPS is above the permitted range
Waiting time expired	SPS has not responded after the set waiting time
Data buffer overflow	More data have arrived than can be processed
No connection to control system	SPS has not been found – comparable with waiting time expired
Block length error xx words	Requested data range too large
Address information DBxxx too large	Requested DB not present or DB request address larger than 255
Address information DWxxx too large	Requested DW in control system not present or DW request address is larger than 255
Error when accessing head data	S5-PG: Error when accessing DB head data in the SPS
Error when accessing bookkeeper	S5-PG: Error when accessing DB list in the SPS
SPS momentarily occupied	SPS indicates that it is occupied – analysis of the SPS time framework is necessary if this message appears frequently
CRC test sum error	Test sum error found in the transferred data packet. Reason is often EMC disturbances
Exit value range	Exit specified value range
Wrong slave address	Slave address not allowed or invalid
Wrong function code	Protocol unterfunction not known
Initialisation error	Communication module could not be initialised
Wrong address information	Address information could not be evaluated
Profibus faulty	PROFIBUS-DP not found or faulty or control system (master) is not active.
Project faulty	Error found in project data – new download necessary
No project present	Project not found – new download necessary

B2. Menu



Settings during regular operation are achieved by pressing the „i" key. This is similar to the previous set up. If alarms are present these are first displayed. By repeated depression of the „i" key the set up is reached.

This set up serves the purpose of adapting the interpreter to the respective control system.

B2.1 Menu point

```
>>  Start download                    <<
```

This menu point serves the purpose of manually starting the download programme of the display terminal.

Following password interrogation the run time interpreter is ended and the main set up started.

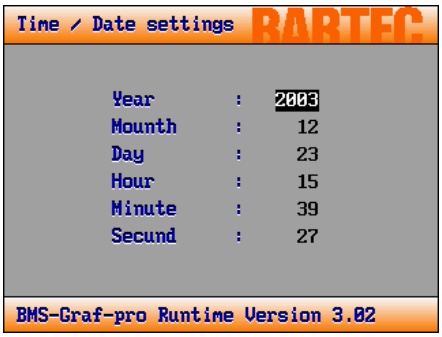
Here the menu point „Start download" must be reselected (the main set up is ended after 5 secs, the run time interpreter restarts)

B2.2 Menu point

```
>>  Password                          <<
```

All menu points are protected agains unallowed use by a password. The password can be changed here.

B2.3 Menu point >> Set time/date <<



The system time and system date of the display terminal can be changed here.

Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

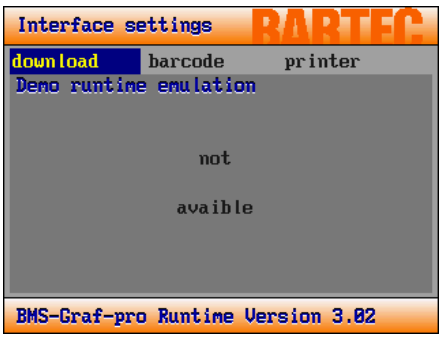
B2.4 Menu point >> Interface parameters <<

B2.4.1 SPS parameters

These settings depend to some extent on the particular interpreter. For example, the interpreter for the S5-PG mode does not provide for any settings for the interface since these settings are fixed by Siemens and cannot be changed. The settings are explained below.

The configuration „wiring side and control side" is explained in appendix A.

Demo run time emulation



The run time emulation is used for starting up projects at exhibitions, trade fairs and demonstrations without SPS system. Addresses for a simulation are specified. These addresses are described in appendix A.

No interface settings are necessary for run time emulation.

AS511 Siemens S5 PG interface

The S5 programming interface has fixed defined parameters, which cannot be changed. It is only necessary to inform the software which interface on the terminal is connected to the control system.

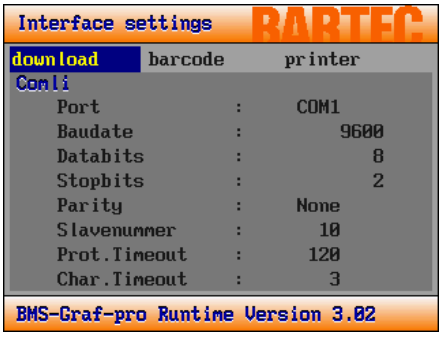
Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

Siemens 3964R/RK512

- Select the interface to which the control system is connected.
- Select the baud rate, data bits, stop bits and parity.
- Set time outs for protocol and characters

Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

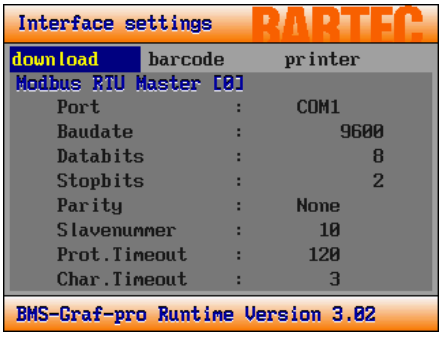
Comli Master



- Select the interface to which the control system is connected.
- Select the baud rate, data bits, stop bits and parity.
- Set time outs for protocol and characters
- Set the slave number of the control system

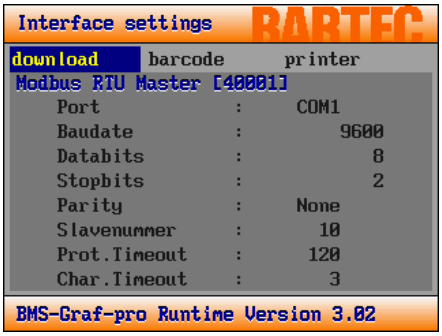
Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

Modbus RTU Master [0-65535]



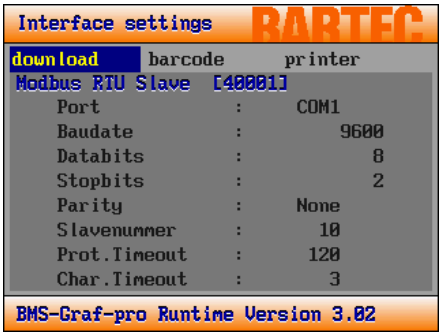
- Select the interface to which the control system is connected.
- Select the baud rate, data bits, stop bits and parity.
- Set time outs for protocol and characters.
- Set the slave number of the control system (master mode)
- Set own slave number (slave mode)

Modbus RTU Master [40001-49999]

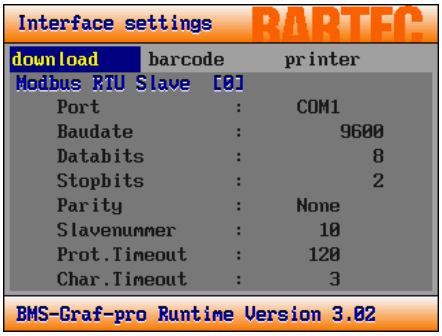


Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

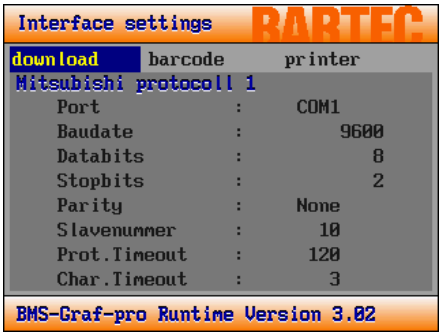
Modbus RTU Slave [40001-42000]



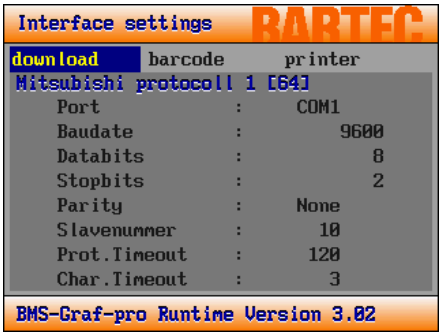
Modbus RTU Slave [0-1999]



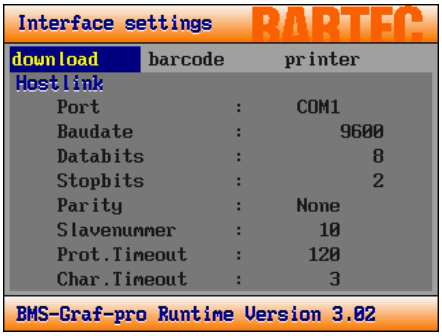
Mitsubishi Protokoll 1



Mitsubishi Protokoll 1 / Block size 64 words



Host link



- Select the interface to which the control system is connected
- Select the baud rate, data bits, stop bits and parity.
- Set time outs for protocol and characters
- Set the slave number of the control system

Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

PROFIBUS-DP for Siemens and Moeller

- Select the interface to which the control system is connected.
- Set the protocol time out
- Set the Profibus slave address

Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

PROFIBUS-DP for Premium and Quantum

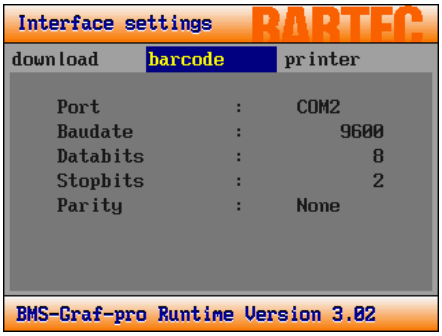
Interbus for S7-300 and S7-400

- Select the interface to which the control system is connected.
- Set the time outs for protocol and characters

Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

Interbus for A250

B2.4.2 Scanner parameters



The interface parameters for a barcode scanner or a corresponding device (ASCII characters) should be entered here.

- Select the interface to which the scanner is connected.
- Select the baud rate, data bits, stop bits and parity.

Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

B2.4.3 Printer parameters

The interface parameters for a serial printer should be entered here. The contents of the histogram can be printed out as a text file by means of this serial printer.

- Select the interface to which the printer is connected.
- Select the baud rate, data bits, stop bits and parity.
- Set the data flow control

Key	Effect
←	Reduce value
→	Increase value
↑	Select field above
↓	Select field below
ESC	Truncate process
Enter	Take over settings

B2.5 Menu point >> History <<

Key	Effect
←	Scroll half a page to the left
→	Scroll half a page to the right
↑	Scroll half a page upwards
↓	Scroll half a page downwards
Del	Delete histogram without request
Ins	Transmit histogram to serial printer
ESC	Return to menu
Enter	Return to menu

B2.6 Menu point >> Set national language <<

The national language of the set up can be set here.

Key	Effect
↑	Scroll half a page upwards
↓	Scroll half a page downwards
ESC	Return to menu
Enter	Return to menu

B2.7 Menu point >> Background lighting <<

This dialogue is used for setting the type of the background lighting (HB)

The switch-off time can be set to 15, 30 and 60 minutes. This setting is effective only if the HG manager is set to time or SPS.

SPS means that the SPS has the possibility of switching off the HB by means of a bit in the transfer block. The time is counted from the last key depression. When the HB is switched off the next key depression activates the HB. This key depression is not transferred to the SPS. While the HB is switched off the red LED at the “i” key flashes.

Key	Effect
←	Scroll half a page to the left
→	Scroll half a page to the right
↑	Scroll half a page upwards
↓	Scroll half a page downwards
Del	Delete histogram without request
Ins	Transmit histogram to serial printer
ESC	Return to menu
Enter	Return to menu