SIEMENS

SIMATIC S5

PMCPRO

Manual

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Introduction

What you ought to know!

This manual is part of a user documentation organized in modules. The PMC system consists of several partial functions which can be used together or separately. The functions of the PMC system are described in separate manuals which, in some cases, build on each other.

The manuals listed in the table below describe the PMC system from the point of view of the programmable controller.

Manual Title	Required Manuals	Purpose and Contents
PMC/LS-B: Communications System (corresponds to KOM-OS)	None	Basic description of the PMC software in the programmable controller Communication for operating and monitoring
PMC/LS-B: Message Function	PMC Communications System	Description of the PMC message system
PMC/LS-B: Status, Standard Displays and Objects	PMC/LS-B: Communications System PMC/LS-B: Message Function	Description of the PMC objects, object types, displays and status processing; reference of the standard displays and object types
PMCPRO or KOMOSPRO	PMC/LS-B: Communications System	Programming the data structure in the PLC using the PMCPRO software
PMC_581	PMC/LS-B: Communications System	Description of the PMC user interface for higher level languages

Setup of the Manual

The individual sections of the manual are self-contained and contain as few cross references to other sections as possible. To the extent possible, each section builds on the material contained in preceding sections and does not cover material contained in later sections.

Section1 Integration into the system and tasks

Section 2 Installation

Section 3 User environment
- Organization of the monitor display
- Screen selection via the palette
- Key assignments

Section 4 Service functions
- Description of the drop down menu with the functions required (open working file, save, edit, etc.)

Section 5 Programming and Testing Tools
- Description of all functions for programming and for calling information from the programmable controller
- Call structure of the monitor screens

Understood Stipulations

Emphasis of Important Notes

In this manual, the pictogram shown below is used to indicate precautions which, when not adhered to, can cause damage.

Caution

Indicates that property damage can result if appropriate measures are not taken.

☞ Indicates important information requiring particular attention.

Abbreviations Abbreviations which are not part of everyday usage are written out in full the first time they appear.

Cross references Cross references to parts of other sections are not made unless the repetition of facts would require too much space and it can be assumed that the description at another location is sufficient. Only the section number (e.g., → section 4.2.1) is provided for cross references to parts of other sections.

1 Integration into the System and Tasks

PMCPRO is a tool for programming the PMC software in the programmable controller.

The following are programmed with PMCPRO:

- Communication for operating and monitoring (O+M)
- Message system
- Status processing
- Real time archives
- Time functions

PMCPRO generates loadable machine code in the form of function blocks and data blocks parameterized to individual user applications.

☞ After PMC blocks parameterized with PMCPRO are loaded in the PLC, they must be integrated into the automation program with a call structure. For more details, see section 4 of the PMC Communications System Manual.

Features of PMCPRO:

- Extensive help functions which simplify working with PMCPRO
- Menu-prompted and mouse-supported user environment
- Powerful ONLINE operating mode via AS 511 interface or SINEC H1/L2 bus system for test and transmission functions
- Capability of exchanging programming data with BIPRO
- Interface free for individual PMC user objects

2 Installation

2.1 Installation under FlexOS

The PMC programming software can be run on the following systems:

- SIMATIC PG under S5 DOS/MT
- COROS LS-B operating and monitoring system

FlexOS with the XGEM graphics system is required as the operating system.

The PMCPRO package is installed by copying the files of the included floppy disk into a catalog on the hard disk.

The floppy disk contains the following files:

PMCPRO.286
PMCHLP1.HLP
PMCHLP2.HLP
PMCMELD.HLP
PMCPRINT.HLP
PMCTXT1.HLP
PMCTXT2.HLP
PMCTXT3.HLP
PMCTXT4.HLP
PMCPRO.RSC
PMCPRO2.RSC
PMCPRO3.RSC
PMCPRO4.RSC
OBJEKTE.PMC
INSTALL.BAT

Notes concerning utility program INSTALL.BAT

The utility program INSTALL.BAT checks if the system environment contains all required drivers and copies them (if existing) into the respective directories. An error message occurs if the required drivers are not existing. The utility program INSTALL.BAT does not support the installation of software.

Installation of the PMCPRO program package can be performed with the PlantTop graphics user environment as shown below.

Use the "New.catalog" PlantTop function to set up a catalog. Any catalog name can be used.

Copy the files by selecting the floppy disk symbol and pressing the mouse key while sliding the mouse over the symbol of the new catalog.

All files of the floppy disk in drive A are copied to the specified catalog on the hard disk.

There are two ways to start the PMCPRO program.

1st method	Change the directory by entering the CD catalog name RETURN .
	Enter the command XGEM PMCPRO RETURN .
2nd method	Start from the PlantTop graphics user environment with a double click on the PMCPRO.286 icon.

2.2 Installation under Windows

The PMC projecting software under Windows is executable on:

- SIMATIC PGs equipped with MS-DOS/MS-WINDOWS
- Personal computers equipped with MS-DOS/MS-WINDOWS
- COROS LS-B under MS-Windows

\PMCPRO.WIN\PMCPRO.EXE
\PMCPRO.WIN\PMCHLP1.HLP
\PMCPRO.WIN\PMCHLP2.HLP
\PMCPRO.WIN\PMCMELD.HLP
\PMCPRO.WIN\PMCPRINT.HLP
\PMCPRO.WIN\PMCTXT1.HLP
\PMCPRO.WIN\PMCTXT2.HLP
\PMCPRO.WIN\PMCTXT3.HLP
\PMCPRO.WIN\PMCTXT4.HLP
\PMCPRO.WIN\PMCPRO_1.RSC
\PMCPRO.WIN\PMCPRO_2.RSC
\PMCPRO.WIN\PMCPRO_3.RSC
\PMCPRO.WIN\PMCPRO_4.RSC
\PMCPRO.WIN\OBJEKTE.PMC
\PMCPRO.WIN\AES.DLL
\PMCPRO.WIN\CONSOLE.DLL
\PMCPRO.WIN\VDI.DLL
\PMCPRO.WIN\WBTRCALL.DLL
\PMCPRO.WIN\WIN511.DLL
\PMCPRO.WIN\WINFLEX.DLL
\PMCPRO.WIN\WINGEM.INI
\PRODAVE\TOOL.BOX
\PRODAVE\TOOLBOX.COM

MS-DOS is required as operating system, MS-WINDOWS as graphic user interface.

Installation of the PMCPRO package is executed by copying the files of the provided diskette onto the hard disk.

The diskette contains directories PMCPRO.WIN and PRODAVE with the files listed below :

With the help of the graphic user interface WINDOWS installation of the program package PMCPRO can easily be executed by only copying the directories and files located on the diskette onto the hard disk of your computer.

The ONLINE function of PMCPRO under WINDOWS becomes operable by loading the communication driver under MS-DOS before starting WINDOWS:

For that purpose call the program TOOLBOX.COM under MS-DOS. The toolbox is then installed as resident driver in the PC memory.

While calling TOOLBOX.COM the parameters listed below can be indicated:

toolbox /d	The toolbox is installed with default values COM 1, toolbox-interrupt = 68H
toolbox /cx/iyy	x = 1 or 2 (COM1 or COM2) yy = toolbox interrupt number (in hexadecimal code)
toolbox /cx /iyy /qz	x = 3 or 4 (COM 3 or COM 4) yy = toolbox interrupt number (in hexadecimal code) z = Harware interrupt number (5, 6, 7)
toolbox /iyy /s	yy = toolbox interrupt number (in hexadecimal code) s = deinstall toolbox

The possibilities listed below help you to start PMCPRO under WINDOWS:

1. A double click on the file PMCPRO.EXE under the WINDOWS file manager.
2. Adding an icon to the program manager of WINDOWS and double click on it.

3 User Environment

This section provides an introduction to the user environment of PMCPRO. Special attention is given to the specific meaning of the elements in PMCPRO.

Refer to the manuals listed below (among others) for information on the general handling of graphic user environments.

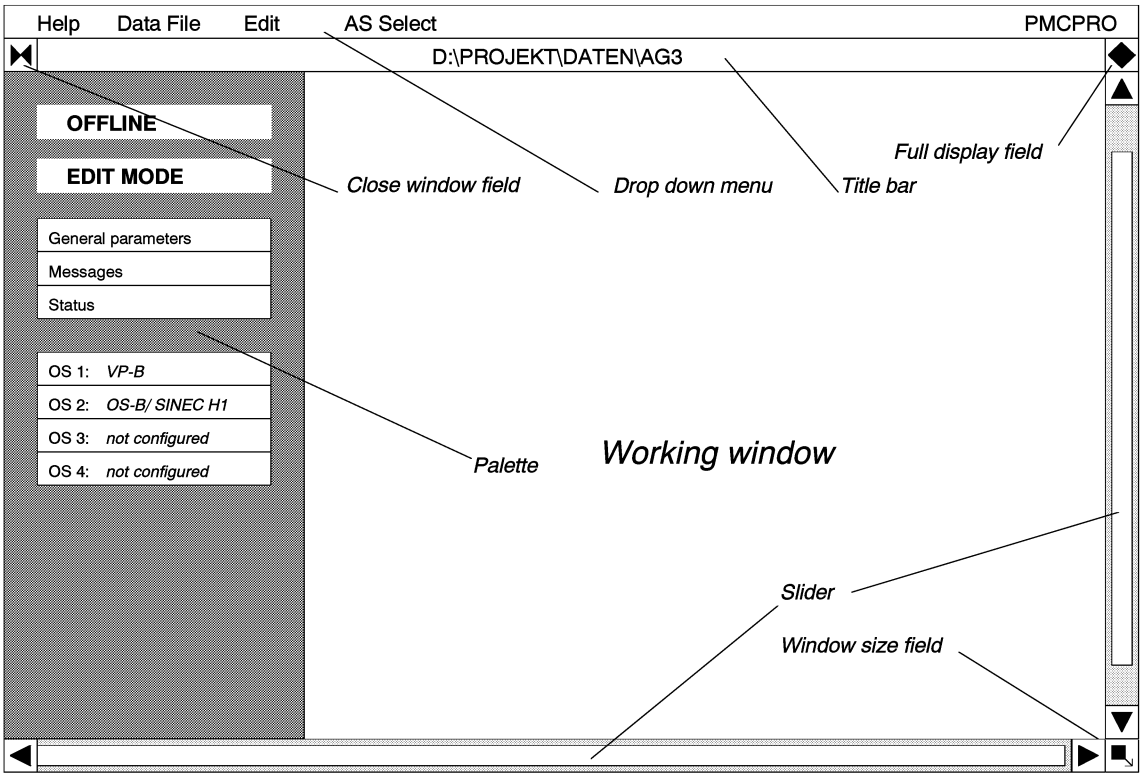
FlexOS manuals:

- PG Manual (description of the PlantTop graphics user environment)
- X/GEM Manual
- BIPRO Manual

WINDOWS manuals:

- WINDOW MANUAL (Microsoft)
- BIPRO MANUAL

3.1 Organization of the Display



Working window

The various forms which are used for programming are shown in the working window.

The forms contain input fields and output fields. Input fields are supplied with a frame. The meaning of an output field is self-explanatory.

Close window field

PMCPRO is concluded by clicking the close window field. If the data has not yet been saved, this is performed after an inquiry.

Drop down menu

The drop down menu contains all service functions in PMCPRO which are required in addition to programming and test.

Title bar

The title bar indicates the name and path of the file currently being processed.

Full display field

The full display field can be used to switch the window between current window size and full display size.

Palette The various PMCPRO masks are selected via palette.

Slider The slider can be used to shift the visible area of the window when the contents of the window are larger than the current window size.

Window size field Changes the window size (The lower righthand corner of the window is redetermined.)

To shift a window, position the mouse pointer on the title bar. (Shift with mouse key pressed.)

3.2 Screen Selection via the Palette

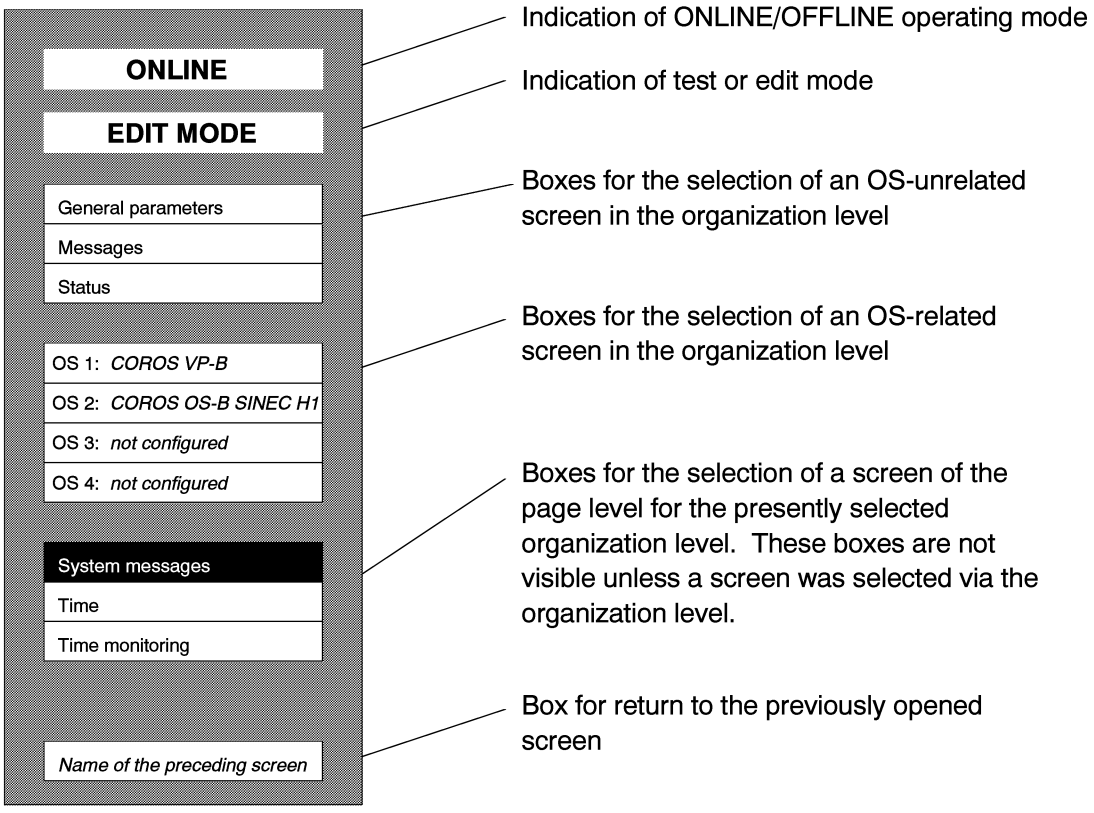
The PMCPRO screens are divided into the screens of the page level and the screens of the organization level.

Page level — Screens in the page level are subordinate to a screen of the organization level.

Organization level — A certain group of screens of the page level can be selected from the screens of the organization level.

The palette contains boxes for selecting the screens with a mouse.

The boxes are arranged on the display in several groups.

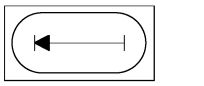


The palette is shown in all screens. The box indicating the currently selected screen is represented inversely.

All screens of the organization level can be selected at any time.

3.3 Key Assignments

The following list shows the meaning of some of the important keys in PMCPRO.



Deletes the character in front of the cursor

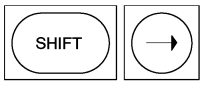
Deletes the current field on which the cursor is positioned (not under FlexOS V 2.3)

Moves the cursor one field up

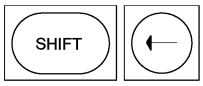
Moves the cursor one field down

Moves the cursor one character to the right

Moves the cursor one character to the left

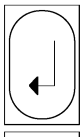


Moves the cursor one field to the right



Moves the cursor one field to the left

ENTER key or
RETURN key
Accept an entry



Concludes PMCPRO

☞ Each function in the menu bar can be selected with a key combination or the mouse. The appropriate key combination is indicated next to the applicable menu entry.

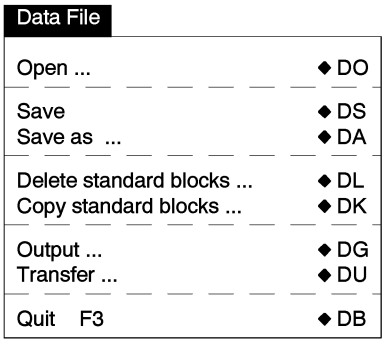
Example: The "save ◆DS" menu item can be selected with Alt DS.

4 Service Functions

All functions not included in programming and test are grouped together under the service functions.

All service functions can be accessed with the drop down menu.

4.1 Data File

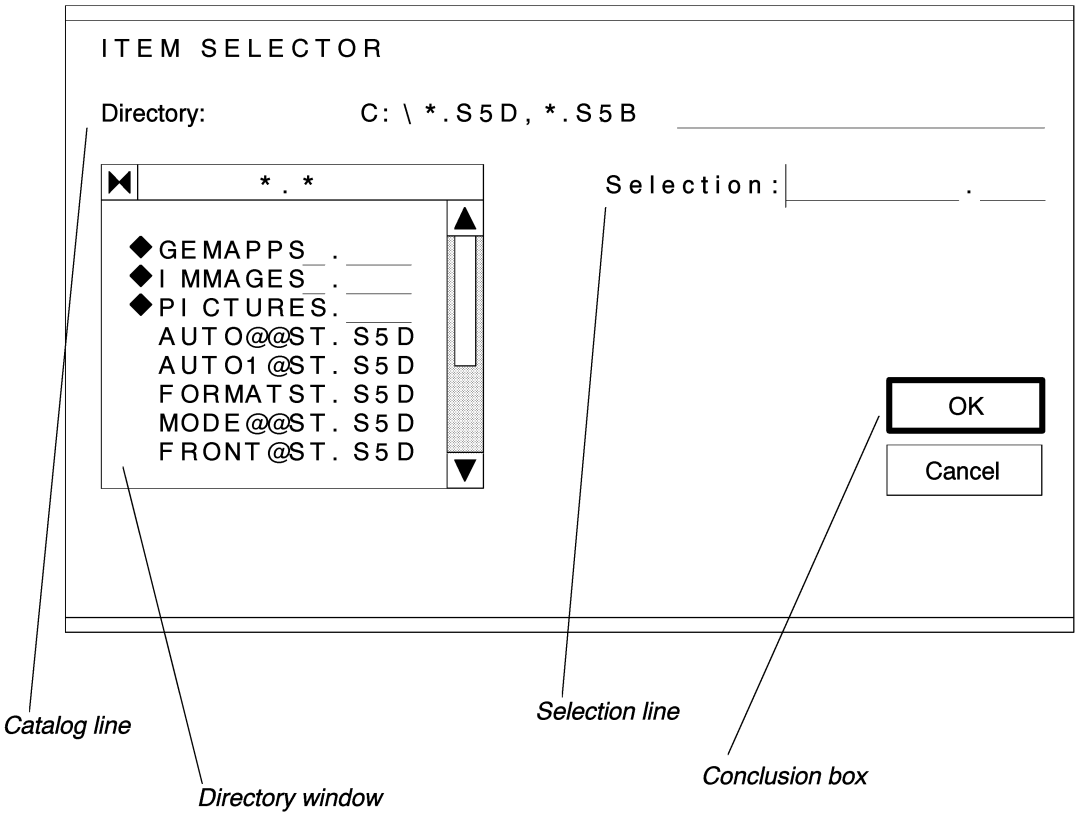


The "open", "save" and "save as" functions refer to S5 program files.

4.1.1 Open

The "open" function is used to select a file to be processed with PMCPRO or to set up a new file.

The following window appears when the "open" function is selected.



A file is set up by entering the desired file name in the selection line. Entry of the name of the file is sufficient since the ST.S5D suffix is automatically added by the system.

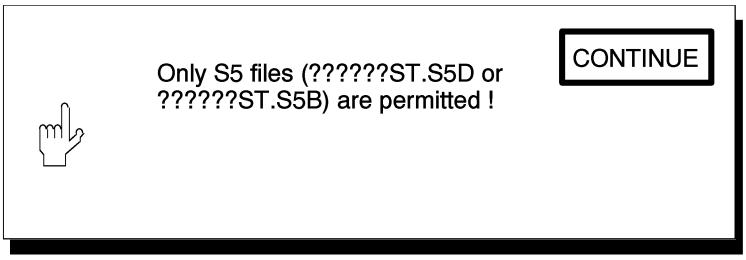
After confirmation with a mouse click on the OK box, PMCPRO indicates that the specified file is a new file. Acknowledge this with OK.

The directory window can be used as an aid when opening an already existing file. Search for the file name by changing the directory path and shifting the roll bar.

There are two ways to select the file after the desired file name appears in the directory.

- Two clicks on the file name in the directory window
- One click on the file name in the directory window. (The file name is transferred to the selection line.) Confirm with OK.

☞ Only S5 files with the ST.S5D or ST.S5B suffix can be processed. The following message window appears when an invalid file has been selected.



4.1.2 Save, Save as ...

PMCPRO generates

- ??????*ST.S5D, ?????*ST.S5B (S5 data loadable)
- ??????*OB. PMC Object data (CPU specific)
- ??????*OB.TXT Importing tool for COROS LS-B
- OBJEKTE.PMC Definitions for objects

There are two ways to save a file.

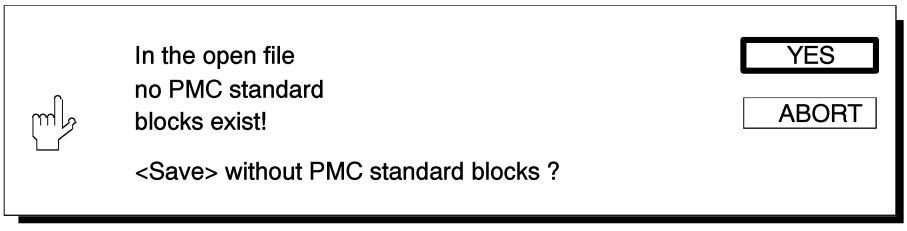
Save Stores the changes under the current file name

Save as ... Saves the PMC projecting data (except user program file) under a new name. The file can be renamed in a file dialog window. Only PMCPRO projecting data are stored user data are ignored.

If the current catalog contains an already existing file with the same name, this older file version is stored as a backup copy with the suffix ST.BAK. (The file name is retained except for the suffix.)

The "save as ..." function allows a copy of the file to be made in another directory or on a floppy disk without exiting PMCPRO. Only the catalog line in the file selection window has to be changed.

During saving, the working file is checked to determine whether it contains standard function blocks. The following note is displayed when the working file does not contain standard function blocks.



YES Saves the working file without standard function blocks

ABORT No data is saved. The "copy standard blocks" function can be used to transfer the standard blocks to the current working file.

4.1.3 Delete Standard Blocks

The "delete standard blocks" deletes the standard PMC blocks in the current working file.

4.1.4 Copy Standard Blocks

The "copy standard blocks" function copies the PMCPRO standard function blocks in the opened file.

During transfer of the standard blocks, the blocks are checked at both source and destination of the transmission.

Source Checks for:

- Completeness
- PMC blocks (BIB no.)
- CPU type

Destination Check of PMC blocks (BIB no.)

Transmission is not performed when an error is detected during the checks. The user is informed of the transmission error with a message window.

4.1.5 Output

The "output" function prepares the specified data for the printer and stores the prepared data in the current catalog under the name of the file being worked on. The suffix of the file name is replaced with ST.DOC.

In order to print out completed documents call the function "Output" under FlexOS X/GEM-Output or the utility program MS WRITE under WINDOWS.

The output contains the following protocols:

Function scope Selected function scope of PMC

- Operating and monitoring
- Messages
- Status

CPU type Type of CPU used in the SIMATIC PLC

OS parameters Parameterization data for the programmed operator stations

Block lists Lists of blocks used, organized by:

- Communication blocks
- Message blocks
- Status blocks
- Blocks for operating and monitoring

Messages Programming data for messages

- Encoder fields
- Message parameters

Status Programming data for status

- PMC objects
- PMC object types

4.1.6 Transfer

The "transfer" function copies all blocks of the opened file to a connected programmable controller.

Prior to the transfer, all blocks of the opened file and the PLC are compared. No transfer is made if an error is detected during the comparison.

After performance of the comparison, PMCPRO displays a dialog window showing all blocks present in both the file and the programmable controller. A transfer status can be specified in the dialog window for each block.

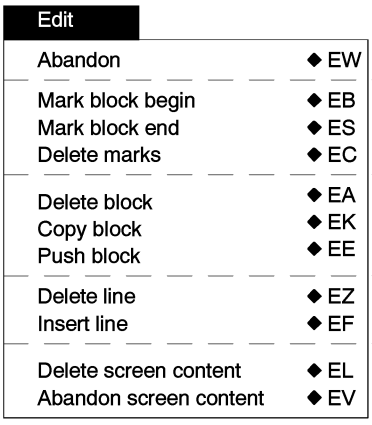
Overwrite The block from the file overwrite the block in the programmable controller.

Choice of When a block has "choice of" transfer status, it can be decided during the transfer whether this block from the file is to overwrite the block in the PLC.

4.1.7 Quit

The "Quit" command is used to exit PMCPRO. When the data has not yet been saved, a dialog box appears with an inquiry asking whether the data is to be saved.

4.2 Edit



All edit functions refer to the contents of the screens. A portion of the screen must be selected before the edit function can be used.

Block functions are particularly useful for table-type screens (e.g., copy one or more lines).

Abandon Undoes the last entry

Mark block begin/end To mark a block, position the cursor on the beginning of the desired block and call the "Mark block begin" command. Shift the cursor to the desired end of the block and call the "Mark block end" command.

Start of block and end of block can be changed separately by moving the cursor to the desired position and calling the appropriate command.

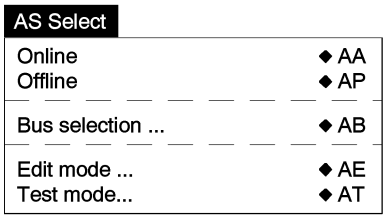
Delete marks Deletes a block marking

Delete block Deletes the entire marked block

Copy block A copy of the presently marked block is inserted behind the current position of the cursor.

Push block	The presently marked block is shifted behind the current cursor position.
Delete line	The line in which the cursor is presently located is deleted.
Insert line	A line is inserted at the present position of the cursor. The inserted line has the same contents as the previous line.
Delete screen content	Deletes the entire contents of the screen of the presently indicated screen
Abandon screen content	The contents of the current screen are overwritten with the values present before the screen was called.

4.3 AS Select



ONLINE

Selection of ONLINE operating mode

ONLINE operating mode requires that the PG be connected to a CPU interface with a cable. Data can be read out of the programmable controller during ONLINE operating mode.

OFFLINE

Selection of OFFLINE operating mode (in connection with AS 511)

A connection to a CPU interface does not exist when the PG is in OFFLINE operating mode. Only floppy disk and hard disk can be used as source and destination devices.

Bus selection

Use of the "remote PG functions" service program which is a standard part of the S5DOS/MT operating system allows PG functions (e.g., edit, transfer, testing programs and parameter sets) to be performed via SINEC networks. This offers the same range of functions as the ONLINE-AS 511-connection.

So-called paths to the module are edited in a path file for the modules to be selected. This path can be activated from the PG either with the bus selection program or with a selected S5-DOS/MT program package (PMCPRO, LAD, CSF, STL, ...).

The "bus selection" function can be used to select and set up an existing path in a path file.

PMCPRO first displays a file selection box for selection of the path file (??????AP.INI). After the path file has been selected, a path selection box is displayed for selection of the path. This function is only valid under FlexOS/XGEM.

Edit mode

Parameterization data (programming) can be entered in edit mode. Data from the set working file on the floppy disk or hard disk are processed.

Edit mode can be accessed in both ONLINE and OFFLINE operating modes.

Only the screens of OFFLINE operating mode can be selected in edit mode (marked with a ■ in the screen overview in section 5).

Test mode

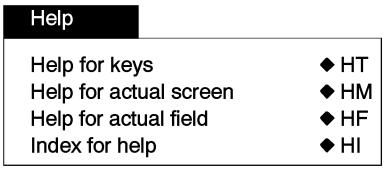
Data from the programmable controller can be looked at in test mode.

All screens can be selected. In test mode, the screens show the data and parameters of the user program in the PLC. Since entries cannot be made in the screens, entries can also not be made in the programmable controller.

Test mode can only be accessed in ONLINE operating mode.

☞ The "PMC objects" screen cannot be selected unless the data in the set file coincide with the data in the programmable controller.

4.4 Help



All help functions cause PMCPRO to fade in a window with the appropriate help texts.

Help for keys

Information about the function of the keys (cursor right, cursor left, back-space, return, etc.)

Activate a CONTINUE field to obtain information about the key codes of the menu function. The key codes can be used to operate PMCPRO without a mouse.

Help for actual screen

Information about the function of the presently opened screen

Help for actual field

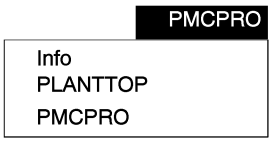
Information about the input field in which the cursor is presently located

Index for help

The "help text index" function causes a list of all PMCPRO help texts to be displayed. Click one of the listed titles to display the appropriate help text window.

The help text index allows all help texts to be accessed from any point in the PMCPRO program.

4.5 PMCPRO

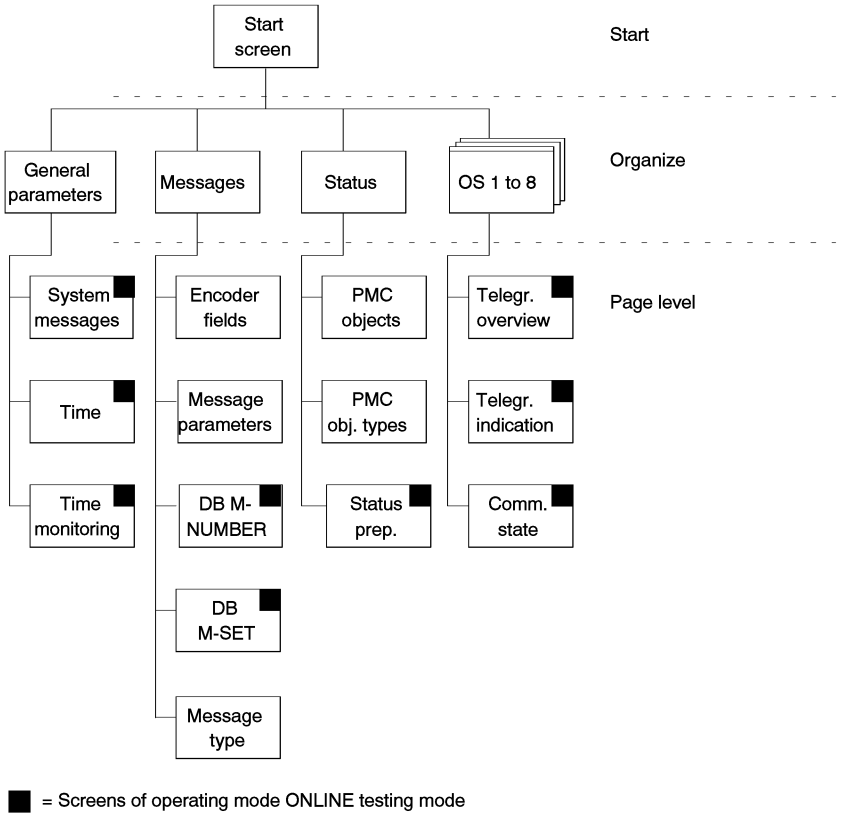


The PMCPRO system menu is used to supply information about the program and to select PlantTop and other programs under FlexOS (only under FlexOS/XGEM).

5 Programming and Testing Tools

All entry and indication screens of the programming and test functions can be selected in PMCPRO via the palette.

The call structure of the various screens is shown in the flow chart below.



The OS-unrelated and the OS-related screens of the organization level can be called from the start screen.

OS-unrelated
- General parameters
- Messages
- Status

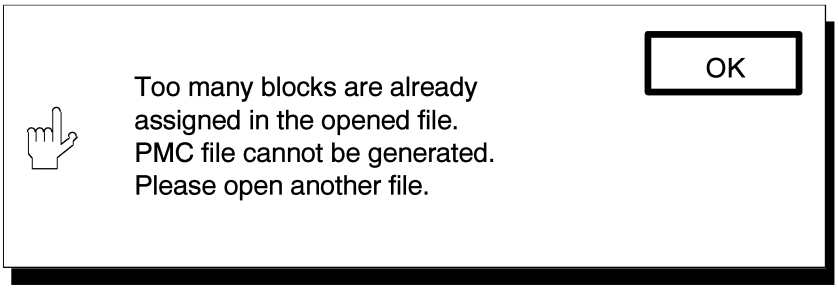
OS-related
- OS 1
- OS 2
- OS 3
- OS 4
- OS 5
- OS 6
- OS 7
- OS 8

Additional screens (i.e., screens of the page level) can be selected from every screen of the organization level.

All screens marked with a black square in the preceding flow chart (call structure) can only be selected in the operating mode ONLINE testing mode (i.e., a cable connection to a programmable controller is required).

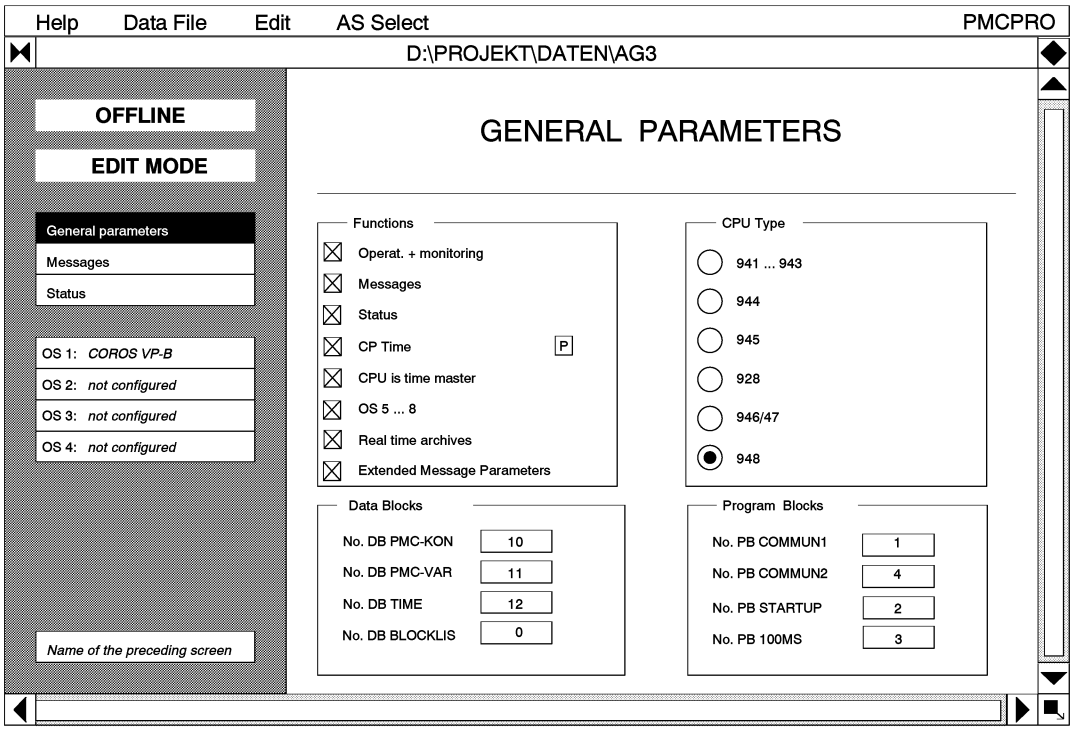
When a screen is selected in which block numbers are to be parameterized, PMCPRO searches the selected file for free block numbers (starting with no. 10 for data blocks and no. 1 for program blocks). The block numbers found by PMCPRO are entered in the screen as default values.

If no more free blocks can be found, PMCPRO outputs an error message on the monitor screen.



5.1 General Parameters

The basic configuration of the PMC system is specified in the "general parameters" screen.



Functions

The program setup and the function scope of PMC is specified in the "functions" area.

The following combinations are available.

- Operating and monitoring
- Operating and monitoring/messages
- Operating and monitoring/messages/status
- Messages
- Messages/status

Additional functions can be archived by selection under PMC:

- Real time archives (only for CPU 945, 946/47, 948)
- OS 5... 8 existing (only for CPU 945, 946/47, 948)
- Extended Message Parameters
  By selecting the field "Extended Message Parameters" you can activate their functionality which is required to program message structures and to integrate them into message parameters.
- CP Time (the time is received by the LAN-CP; register the interface number of the LAN-CP)

- CPU as time master (time has to be set and entered in the PMC system by the user)

☞ CP Time and CPU as time master cannot be selected simultaneously.

CPU type

Definition of the SIMATIC S5 CPU type fpr the traget device of the PMC program. The list below shows you the CPU identification entered by PMCPRO into the DB KON (DW6):.

CPU 941 to CPU 943	: KY 0,0
CPU 944	: KY 0,1
CPU 928	: KY 0,2
CPU 946/947	: KY 0,3
CPU 948	: KY 0,4
CPU 945	: KY 0,5

CPU name

Enter the CPU identification into this field. The CPU name is only relevant for the import of PMCPRO projecting data into COROS LS-B (KOMED)

Data blocks

Indication of data block numbers for the data blocks with numbers that can be projected.

DB PMC-KON:	Definite parameters of the PMC system
DB PMC-VAR:	General, variable parameters of the PMC system
DB TIME:	Scan cycle times for monitoring telegrams
DB BlocLis:	Organization data block for real time archives (Creating and editing is by the user).

Program blocks

Indication of block numbers for the program blocks which are created by PMCPRO

PB COMMUN1:	coordination of the call of PMC blocks (demands at least one user call single scan cycle)
PB COMMUN2:	coordination of the call of PMC blocks (additionally function that can be several times by the user or by a Timeduring scan cycle in order to increase the data transmission rate).
PB STARTUP:	Call of the different Startup blocks
PB 100MS:	Call the FB Time with a clock frequency of 100ms

☞ During scan cycle the call of PB COMMUN1 must occur before the call of PB COMMUN2.

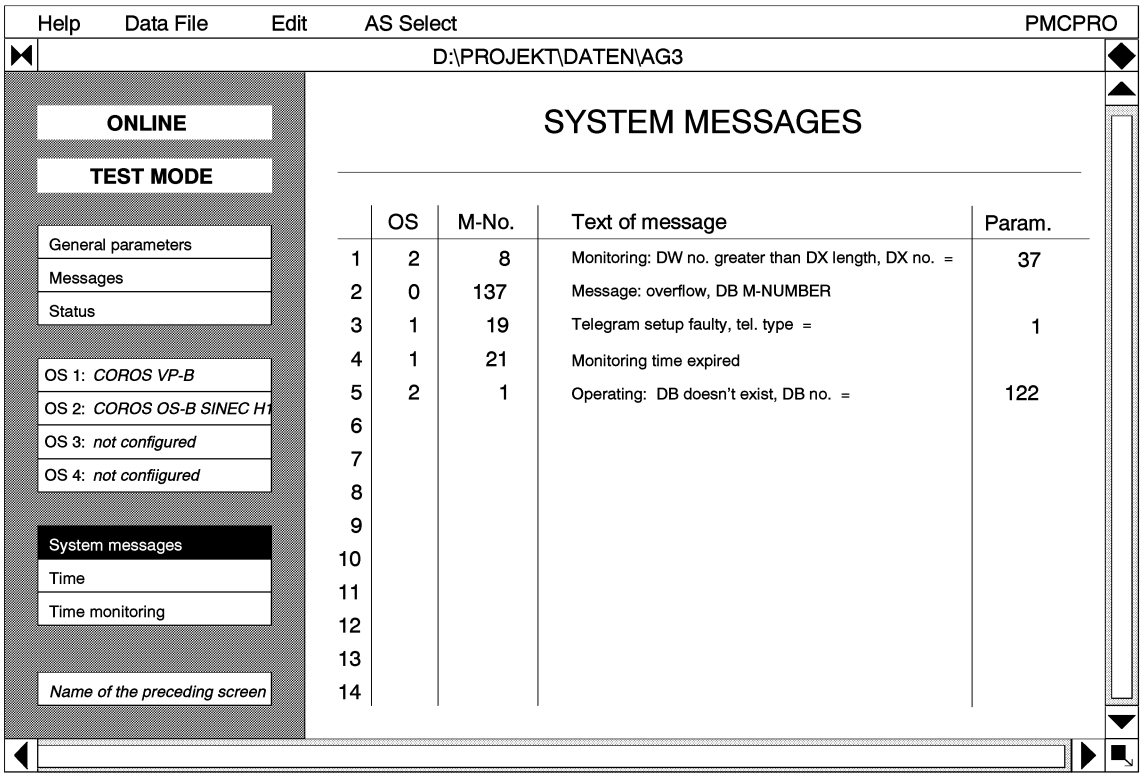
5.1.1 System Messages

The system message buffer of DB PMC-VAR is shown in the "system messages" screen.

The "system messages" screen can only be accessed in ONLINE testing mode. The system message buffer must be read out cyclically while the screen is open.

Depending on the size of the system message buffer, up to 14 system messages are displayed simultaneously.

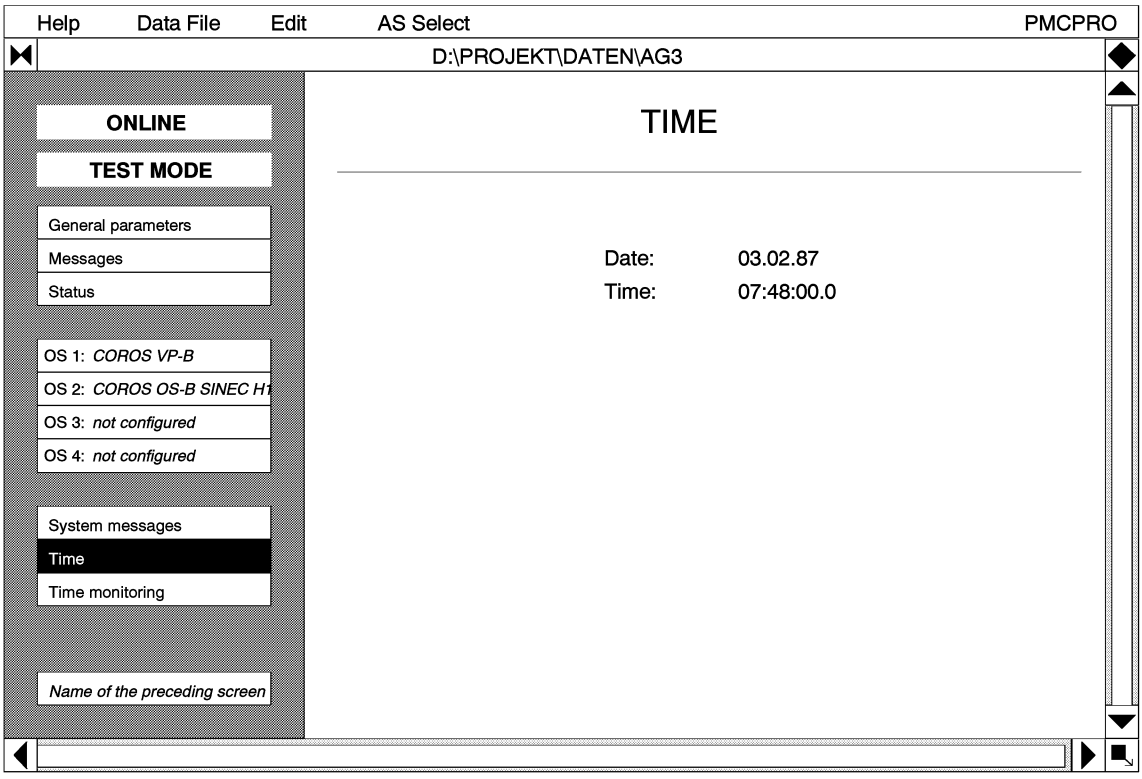
The contents of the system message buffer cannot be changed with PMCPRO.



5.1.2 Time

The "time" screen is used to indicate the time and date currently entered in DB PMC-VAR to be used for the messages.

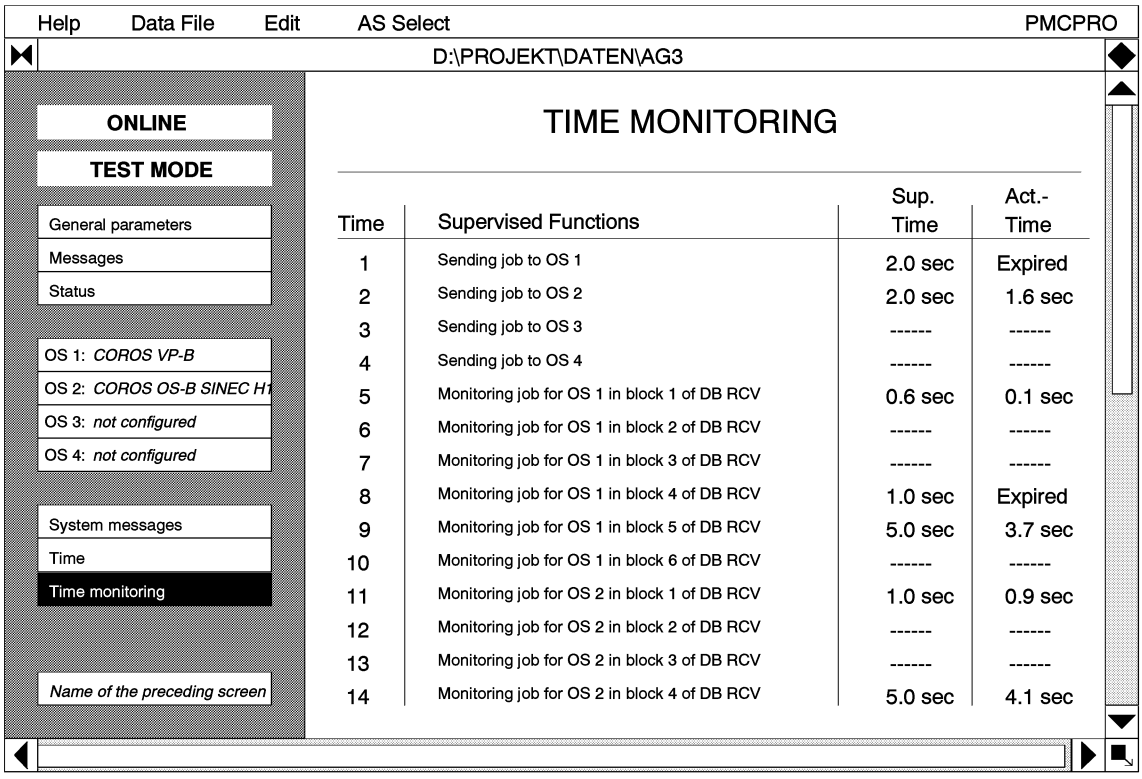
The "time" screen can only be accessed in ONLINE testing mode.



5.1.3 Time Monitoring

Indication of the monitoring times for sending jobs and indication of the cycle times for queued monitoring jobs

The "time monitoring" screen can only be accessed in ONLINE testing mode.

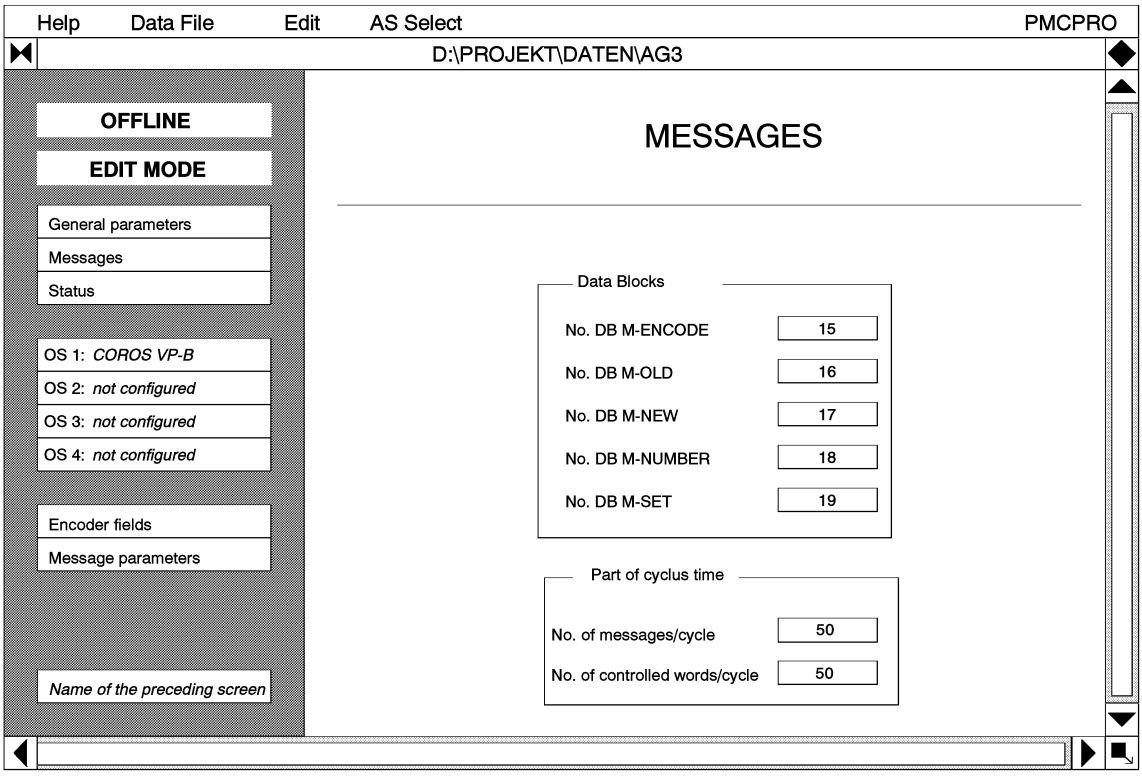


Monitoring time Specifies the monitoring time for the sending or monitoring request

Current time Remaining time before next sending or monitoring job is executed

5.2 Messages

The data blocks required for messages are set up in the "messages" screen.



Data blocks

Numbering assignment for the required data blocks from the PMC message system

DB M-ENCODER:	Addresses of the encoder fields. DB M-ENCODER is generated and assigned with default values by PMCPRO.
DB M-OLD:	Copy of the message bits for the comparison for changes in edge
DB M-NEW:	Copy of the message bits for the comparison for changes in edge
DB M-NUMBER:	Message state and type of messages
DB M-SET:	Two telegram buffers for the message system

Part of cyclus time

Specifies the number of messages to be processed per cycle. The default value is 50 messages per cycle.

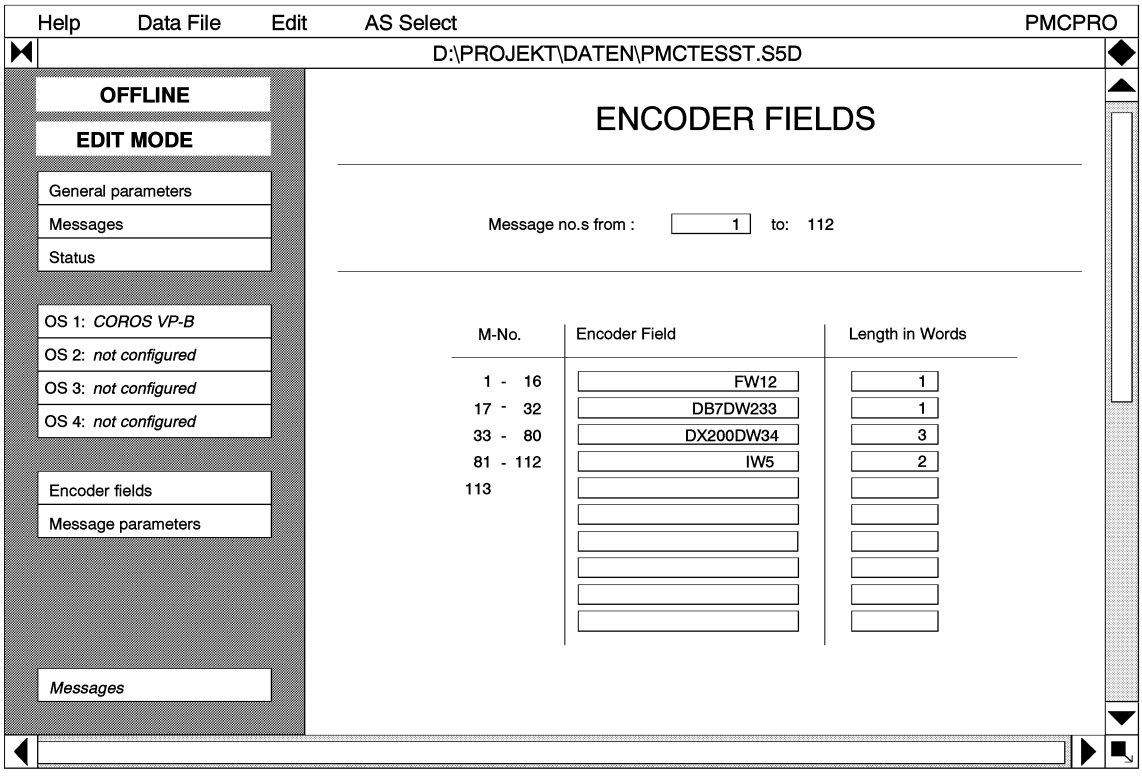
Specifies the number of words to be checked for edge per cycle

The values for Part of cyclus time are stored in DB CON.

5.2.1 Encoder Fields

The encoder fields contain the bits which trigger the messages. Message numbers are assigned to the bits which trigger the messages, by specifying the message number area.

Since one encoder field is always one or more words long, the total number of messages is always a multiple of 16.



Message number, from/to

The message number area is determined by specifying the smallest message number.

Since the encoder fields are word-oriented, the smallest message number can only be a multiple of 16 + 1 (1, 17, 33, ...).

The number of bits in the programmed encoder fields determines the upper limit of the message number area.

Message no. PMCPRO automatically calculates the message numbers based on the message number area and the programmed encoder fields.

Encoder field Specifies type and number of the first word in an encoder field. The following types can be used.

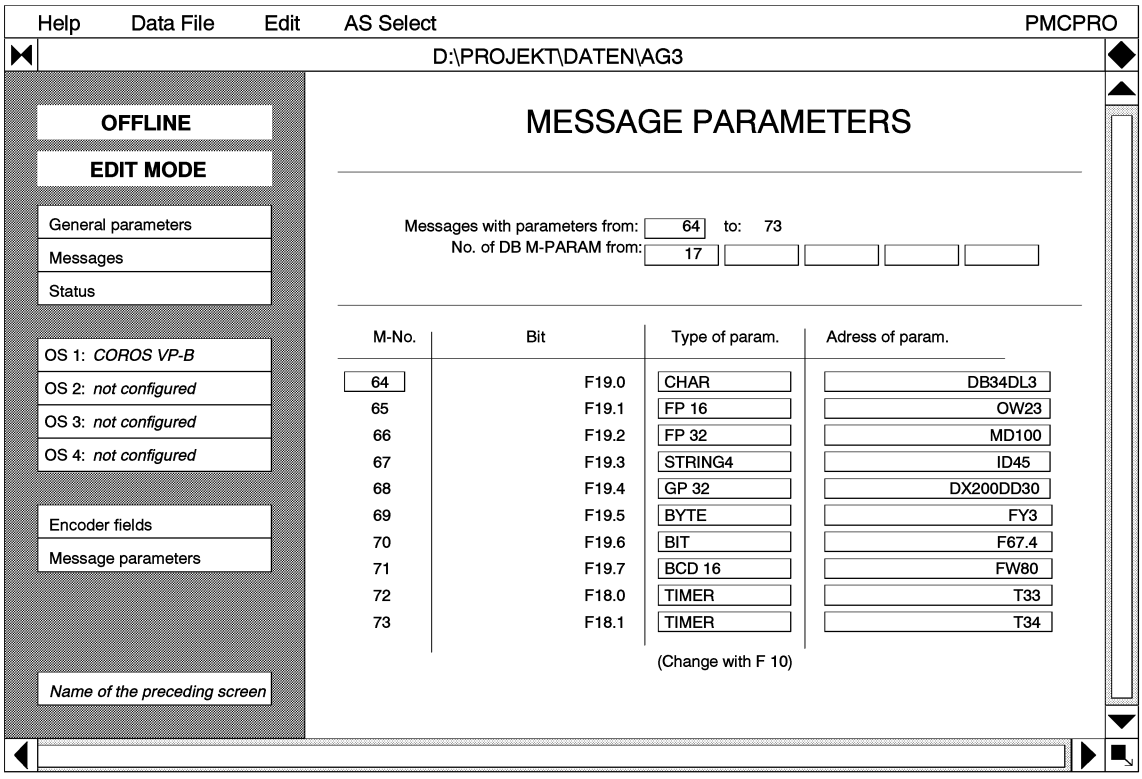
- Input word IW
- Output word OW
- Flag word FW
- Data word DW
- Peripheral word PW
- Peripheral word (expansion) QW

Length in words PMCPRO enters the default value "1" as the number of words for the applicable encoder field. The value can be edited.

5.2.2 Message Parameters

For messages with parameters, a parameter value is added to the message set (for arriving, departing or acknowledged messages) which is sent to the operator station.

The address and type of message parameters are specified in the screen below.



Messages with parameters, from/to

Specifies the message number area in which the messages with parameters are located

Numbers DB M-PARAM

Programs the data block number of the DB M-PARAM

Additional numbers must be programmed for DB M-PARAM when more than 2000 messages with parameters exist.

Up to 5 DB M-PARAM data blocks can be assigned. Each DB M-PARAM can store parameter addresses for 2000 messages.

M-no. Message number for the message parameter indicated in this line

The message parameters can be indicated starting at a desired message number by entering a message number in the uppermost field of M-no. The applicable message parameters are then indicated when the entry field is exited.

Bit Output fields for the message bits

Type of param. Data type of the message parameter

Adress of param. Address of the message parameter

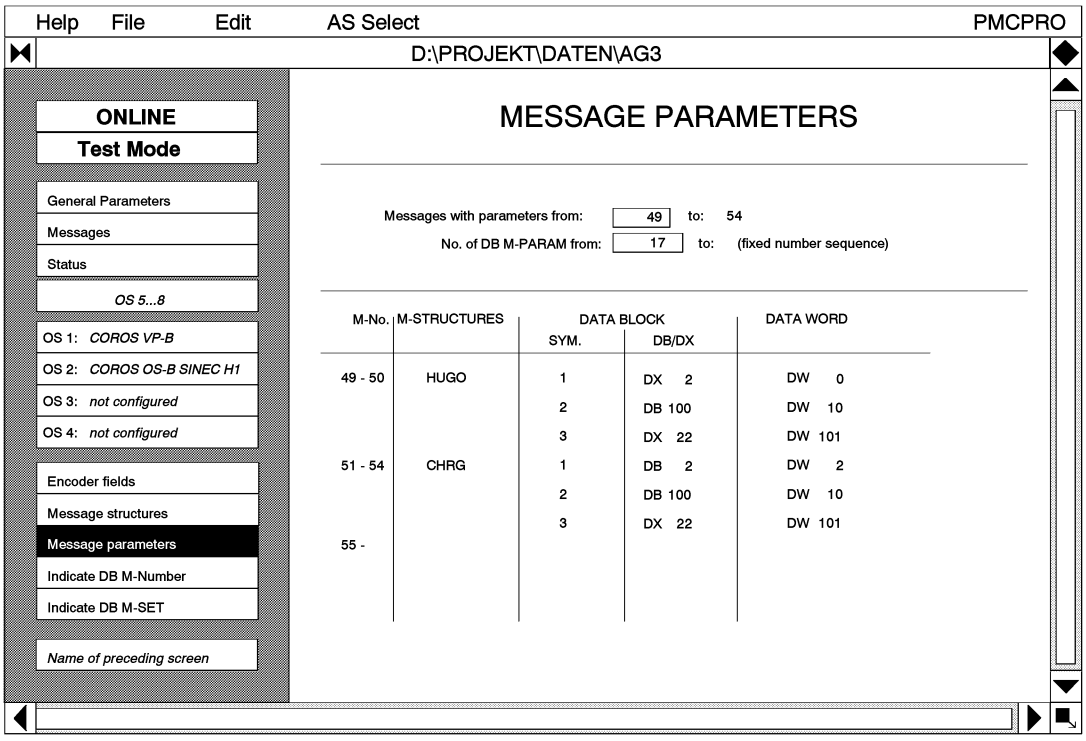
Message parameters can be taken from the various data areas of the PLC.

In addition to entering a number in the M-no. field, the desired section of the message parameter table can also be selected with the vertical slider.

Extended message parameters By the function "Extended Message Parameters" the assignment of up to 10 parameters to a single message number is made possible. Message structures allow the user to efficiently program a higher number of messages by using structured data in the PLC. During programming the PLC defines data structures which are provided by multiple function blocks with message relevant data. These data structures can be located in one or several data blocks at different addresses. You can program encoder fields structures and the corresponding process values of the messages to be generated under a so called "message structure" of PMCPRO.

After the required numbers of the corresponding data blocks for the message parameters have been indicated the message structures are assigned to actual addresses in the screen "Message Parameters". The individual addresses for the max. 10 message parameters are not cearly specified because they have already been stored under versatile message structures. The necessary assignment of theses addresses under PMC in the S5 PLC is therefore automatically executed.

If extended message parameters have been selected the screen "Message Parameters" is structured as shown in the figure below:



You can program the first message number and parameter. Then PMCPRO automatically numbers the messages (M-No.) in a continuous order starting with the lowest number.

Messages with parameters from/to

Range of values 1.....10000

Before programming the message parameters you have to indicate a "starting message number" in this field.

No. DB M-PARAM

Range of values 10...255

The DB M-PARAM-X are assigned to a fixed and continuous number sequence ranging from 1 to max. 65 DB. The first DB number is defined by the user.

M-No.

Message number

Range of values 1....10000

This field is reserved for outputs only i.e. inputs cannot be performed by the user but are indicated automatically.

M-STRUCTURE Message structure

Range of values max. of 5 ASCII characters

First program the message structure in the corresponding screen "Message Structures".

DATA BLOCK SYM.

Symbolic data block

Range of values 1....5

The values are defined by PMCPRO (according to programming of the screen <Message Structures>) and cannot be modified by the user.

DATA BLOCK DB/DX

Range of values DB/DX 1...255

PMCPRO does not check whether this data block already exists or its number has already been assigned to another block.

DATA WORD Range of values 0.....4090

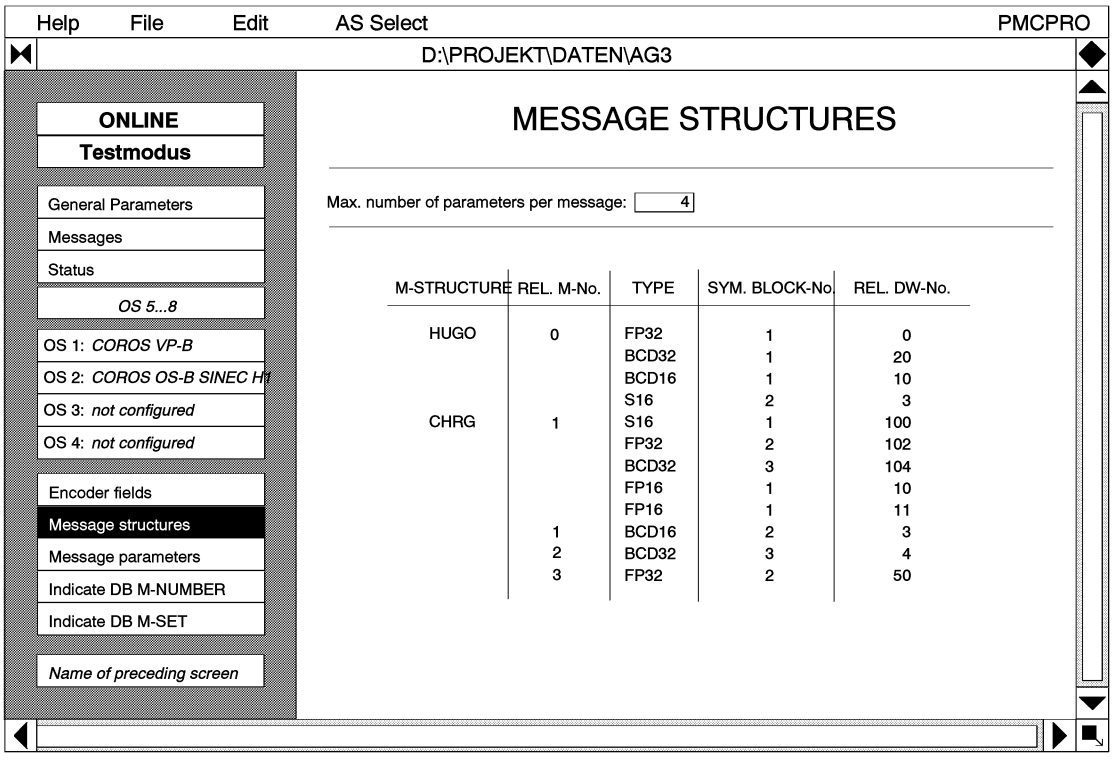
PMCPRO checks if the sum of data word (screen <Message Parameters>) and the rel. DW-No. (relative data word number in the screen <Message Structures>) is higher than the value 4095 and rejects its input if this applies.

☞ Question marks (???) serve as dummies for empty data entry fields in the screen.
When you select <SAVE> or <SAVE AS> and before you quit the screen PMCPRO checks whether programming has been completed or not. If necessary it locks the corresponding function and makes exit impossible.

5.2.3 Screen Message Structures

This screen is only activated when "Extended Message Parameters" has been selected.

Structure of the screen:



Number of parameters per message

Range of values 1.....10

The programming file for message structures (?????MT.PMC) provides for the value "number of parameters per message". If message structures (including also the number of parameters per message) have been programmed in this file PMCPRO sets the number of parameters per message in the screen message structures. If not PMCPRO sets the default value 1 as number of parameters.

The number of parameters per message can also be edited in retrospect:

- As long as message structures have not been programmed editing of the number of parameters per message is still possible for the entire range of values from 1 to 10.
- If message structures have already been programmed editing of the number of parameters per message is possible in the range of the highest existing number of parameters per message and the value 10.

M-STRUCTURE

Name of the message structure

Range of values max. of 5 ASCII characters

REL. M-No. Relative message number

Range of values 0....99, starting with 0, counting up continuously

The relative message number helps to program multiple messages starting with an absolute message number in the screen <Message Parameters>.

TYPE Data type of the message parameter

SYM. BLOCK No. Symbolic block number

Range of values 1....5

Symbolic block numbers specify message types (not relative message numbers within message types).
In the screen <Message Parameters> symbolic block numbers are assigned to absolute data block numbers (DBaaa, DXaaa).

Rel. DW-No. Relative data word number

Range of values 0.....4090

While generating the DB(s) M-PARAM-X the relative data word number is added to the programmed data word number in the screen <Message Parameters>.

Listing of max. values

- max. 200 message types
- max. 100 relative message numbers per message type
- max. 10 parameters per message

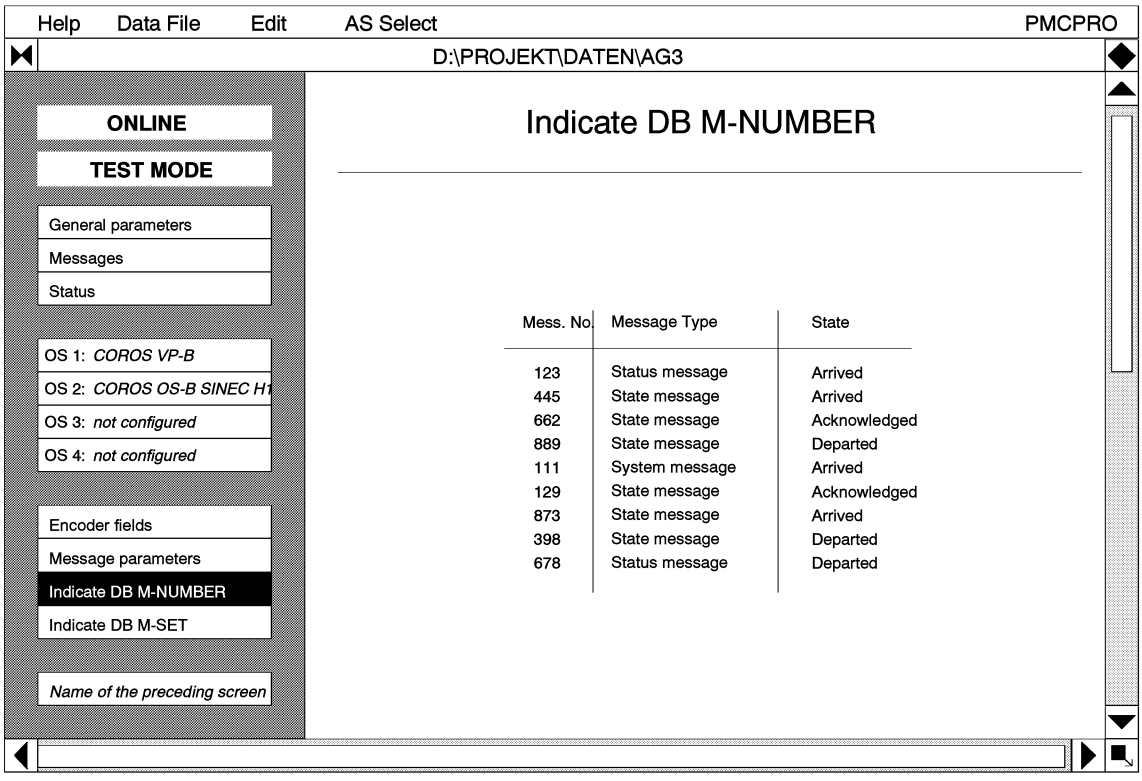
☞ Question marks (???) serve as dummies for empty data entry fields in the screen.
When you select <SAVE> or <SAVE AS> and before you quit the screen PMCPRO checks whether programming has been completed or not. If necessary it locks the corresponding function and makes exit impossible.

5.2.4 Indicate DB M-NUMBER

DB M-NUMBER contains all detected messages. DB M-NUMBER acts as a buffer between bit fields DB-OLD or DB-NEW, and the complete set of messages in DB-SET.

DB M-NUMBER is processed and cleared at regular intervals as long as DB M-SET has not overflowed. DB M-NUMBER contains data only briefly during one PLC cycle.

The "indicate DB M-NUMBER" screen can only be accessed in ONLINE testing mode.



5.2.5 Indicate DB M-SET

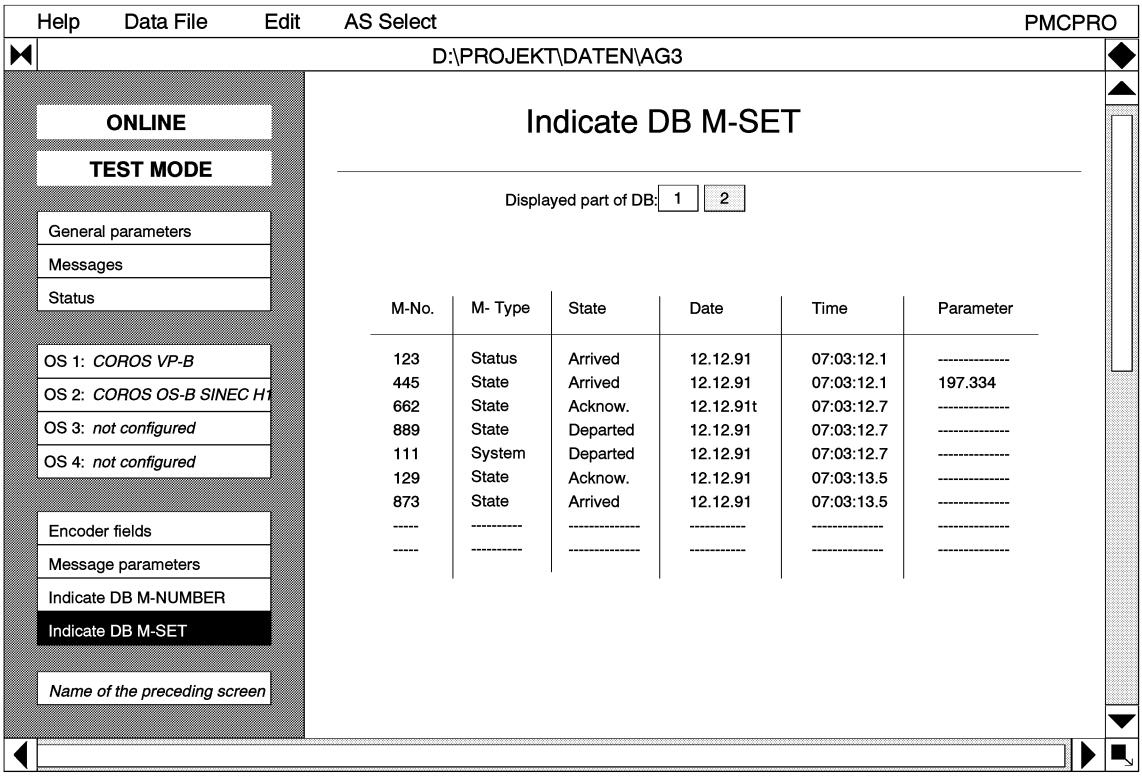
DB M-SET contains all message sets as they will be sent to the logged on operator station.

DB M-SET consists of two parts.

Part 1 Entries of the message sets

Part 2 The message telegram currently being transferred

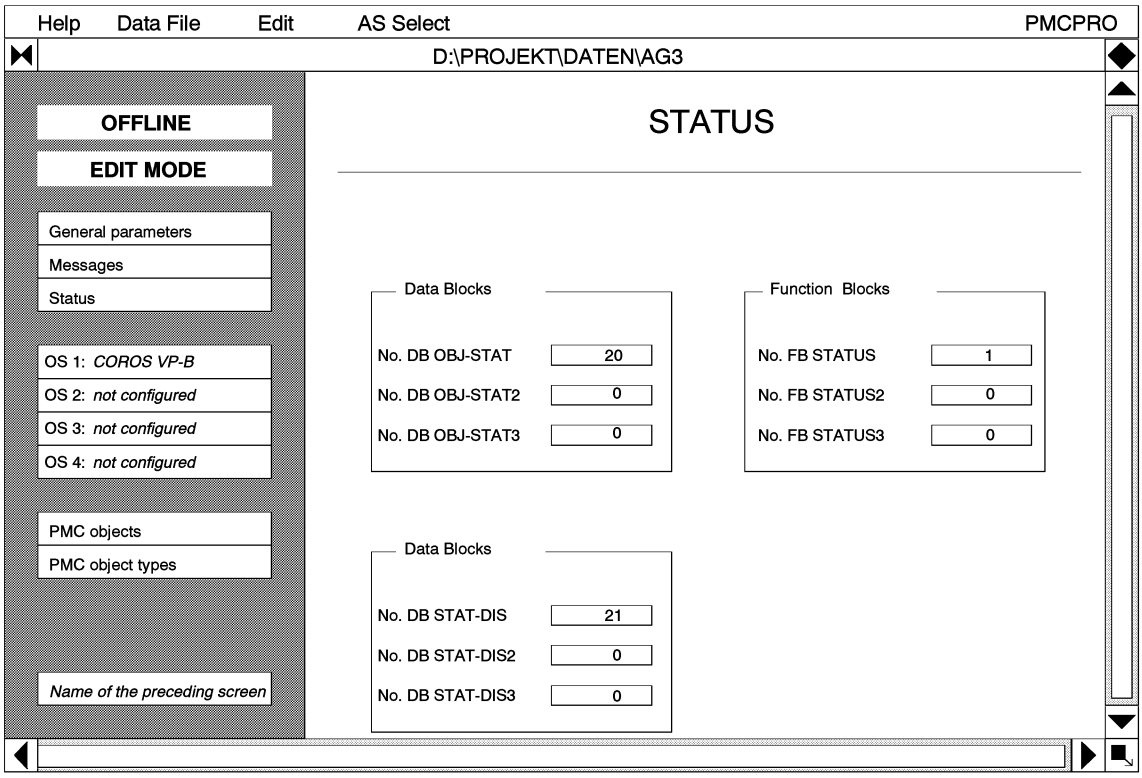
The "indicate DB M-SET" screen can only be accessed in ONLINE testing mode.



Indicated part of the DB Switchover fields for alternating the indication between part 1 and part 2 of DB M-SET

5.3 Status

The blocks required for status are set up in the "status" screen.



Data blocks

Numbering assignment for the required data blocks from PMC status processing

DB OBJ-STAT: Status of the PMC objects

DB STAT-DIS: Status indication of the PMC objects in the form of the status telegram

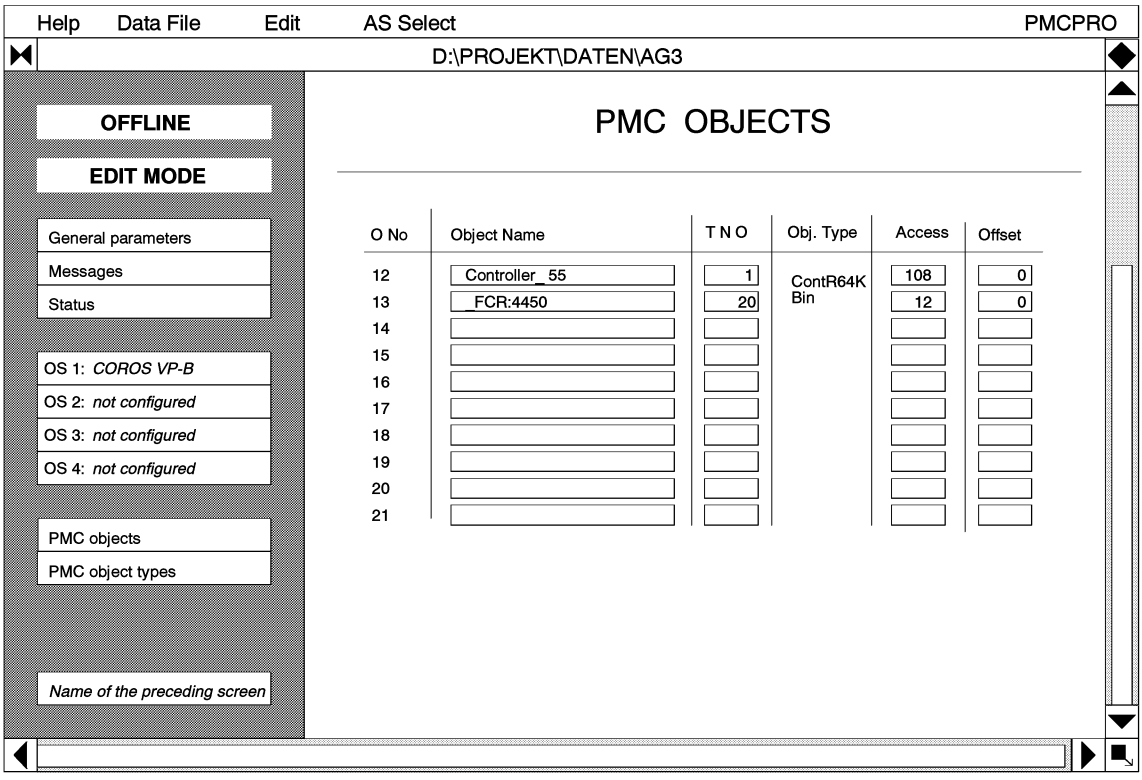
Program blocks

Programs the number of the FB STATUS program block (FB STATUS transfers the status words of the PMC objects to DB OBJ-STAT)

5.3.1 PMC Objects

The PMC objects to be used during status processing are specified in the "PMC objects" screen.

PMC objects are always a data block (DB or DX).



O no. Consecutive number of the PMC object

Object name Name of the PMC object

TNO Number of the object type

Obj. type Designation of the PMC object type

Access Data block number of the applicable PMC object (DB,DX)

Offset The offset marks the beginning of the object structure in the applicable data block. The offset is specified as a data word number.

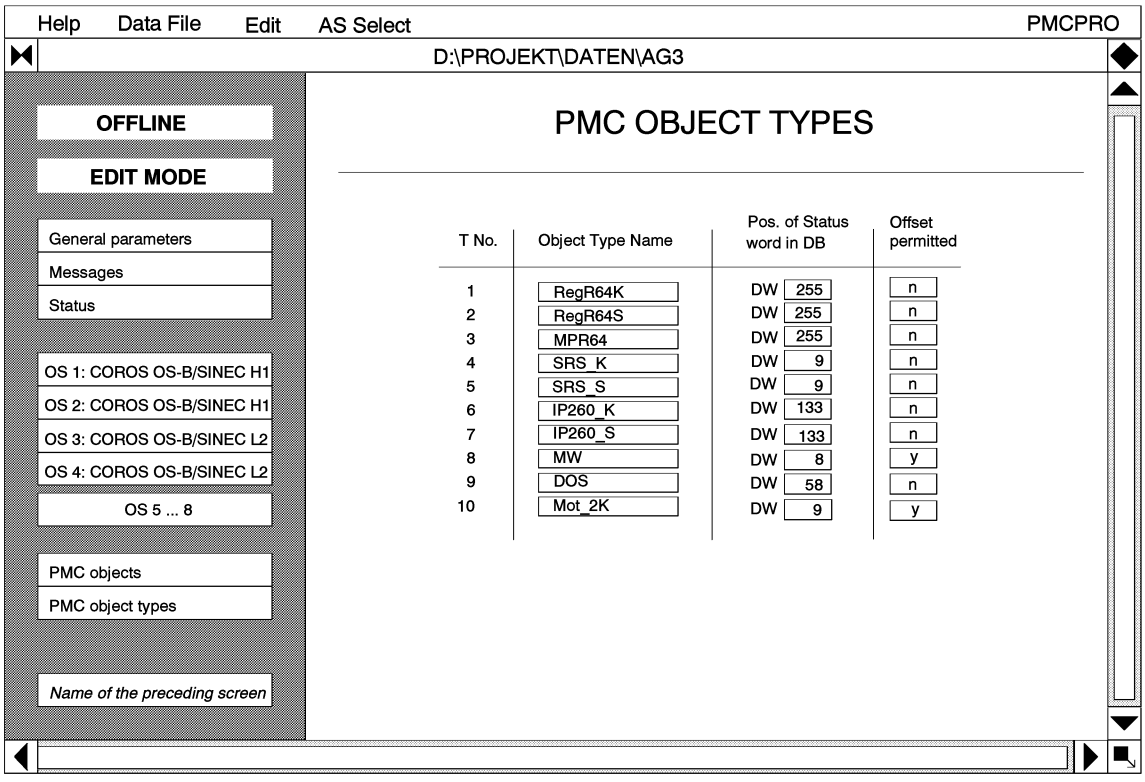
☞ Status objects are stored in a user file having the same name *OB.PMC.

5.3.2 PMC Object Types

Object types describe the setup of the objects for the various types of measuring, and open-loop and closed-loop control functions.

Up to 50 different object types can be defined for status processing in the "PMC object types" screen.

The predefined object types in PMC are stored in the file OBJECTS.PMC.



TNo Consecutive numbering of the object types

Object type name Names of the predefined and/or newly programmed PMC object types

Pos. of Status word in DB The location of the status word can be adjusted to changes in the predefined PMC object types.

Newly defined PMC object types are made available for PMC status processing by specifying the status word.

Offset permitted Several PMC objects can be stored in a DB and the initial address can be indicated by an offset.

☞ Object types with type no. 1 and 2 are preassigned by R64 control structures and may not be replaced by your own types.

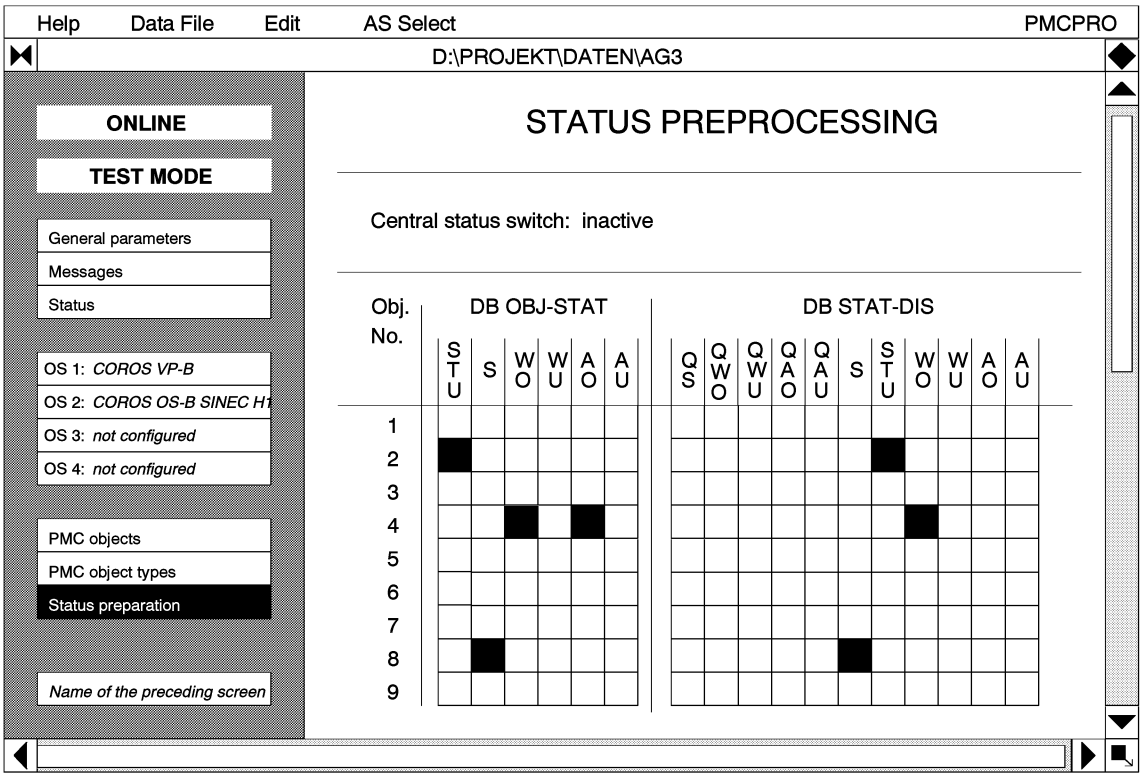
☞ It is not mandatory that all object types defined in this screen also be used as PMC objects.

☞ Modifications of object types are stored in the file OBJEKTE.PMC. This applies to all files.

5.3.3 Status Preprocessing

The "status preprocessing" screen shows the bits set in data blocks DB OBJ-STAT and DB STAT-DIS.

The "status preprocessing" screen can only be accessed in ONLINE testing mode.



DB OBJ-STAT Status of the PMC objects

DB STAT-DIS Status indication of the PMC objects

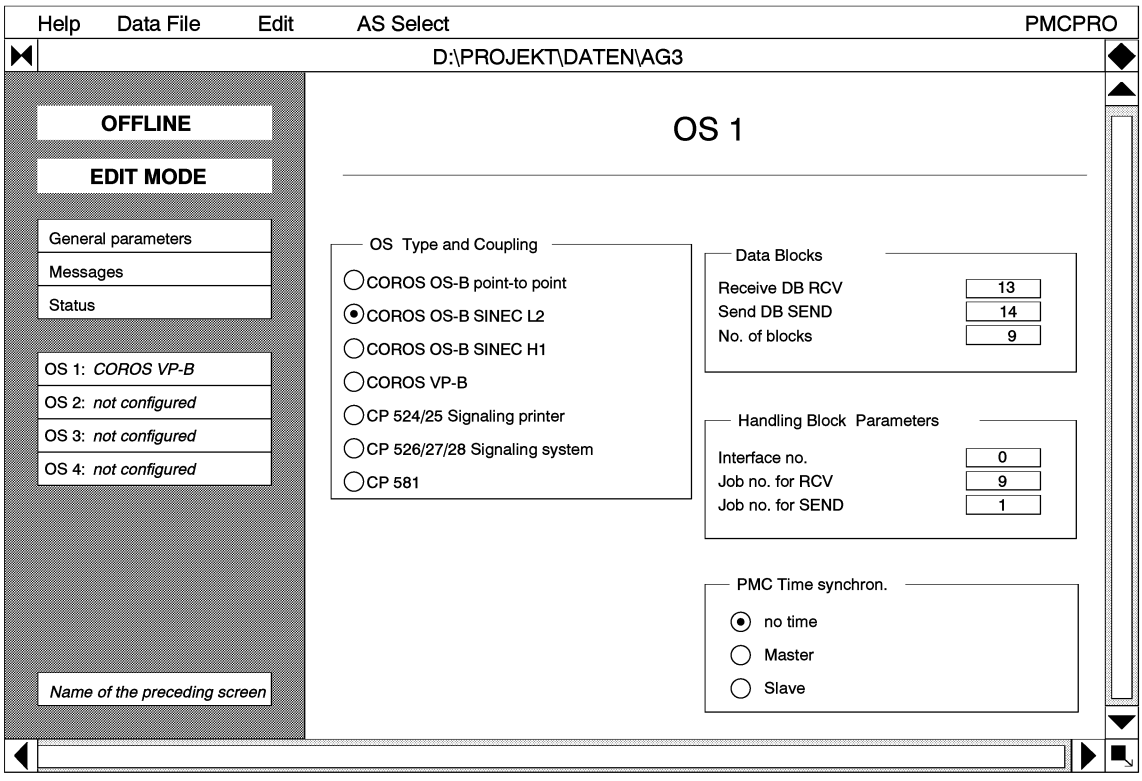
In addition to the status, DB STAT-DIS also contains the acknowledgement signals.

5.4 OS-Related Parameters

The following screens and functions are available separately for each of the 4 programmable operator stations.

- OS (screen of the organization level)
- Telegram overview
- Telegram indication
- Communication

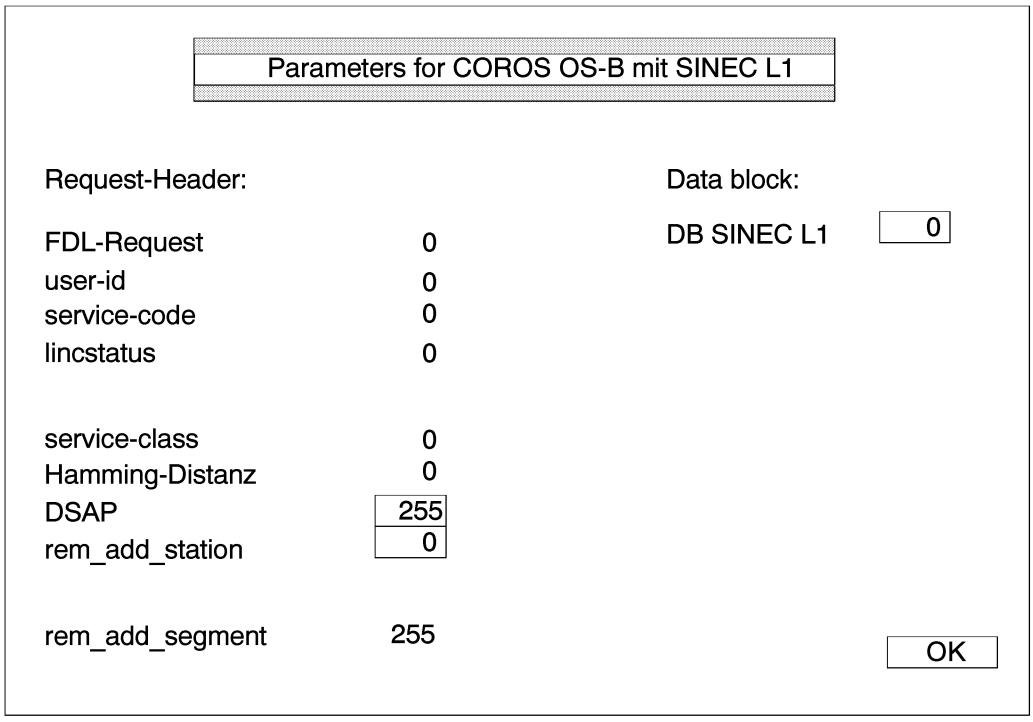
The operator stations configured in the PMC are defined in the "OS" screen (OS 1 to OS 4) and the corresponding parameters programmed.



OS type and coupling Specifies the device to be connected as operator station and the coupling mode

Projecting of SINEC L1

If "OS-B via SINEC L1" has been entered as OS Type a box containing character P appears at the end of the text. After clicking on this box the following screen form which helps you to enter parameters for SINEC L1 is displayed:



Enter the following data:

Service class	(has to be always set 0, no changes permitted)
DSAP	Connecting parameter (Corresponds to the data entered under SAP OS VC2 in the KOMED/PLC list.)
rem_add_station	Address of the OS in the L1 network
DB L2	Intermediate storage for messages and status during the sending procedure via SINEC L1

By clicking on OK you go back to the screen form OS.

Data blocks

Numbers and size of the communication data blocks

DB RCV: Receiving buffer for telegrams
DB SEND: Sending buffer for telegrams

The size of the communication data blocks is determined by the number of blocks. Although a greater number of blocks provides better communication, this can also create a greater load for the PLC since more telegrams must be processed in parallel.

Handling block parameters

The interface number addresses the communications processor (CP) or the visualization processor (VP) via the PLC frame bus. The interface number must be assigned as follows when several CPUs are used.

Interface number = n * 4 + CPU number - 1
(n = 0, 1, 2, ...)

Depending on the type of operator station, the job numbers for SEND and RECEIVE can be selected as desired or are fixed.

See the applicable equipment manuals for information on the assignment of job numbers (SEND/RECEIVE).

Time master

The parameters are stored in DB CON for time management.

- OS serves as master
  The OS sends time telegrams and thus sets the "PMC Clock" in the CPU.
- OS serves as slave
  The PMC system sends time telegrams and thus sets the "OS Clock".
- None
  No time telegrams are sent.

The following default values are available for the "OS" screen.

Data blocks:	The next free data block numbers
Number of blocks:	Two blocks for DB RCV and DB SEND
Interface number:	Number 0
Job number:	The next free job numbers

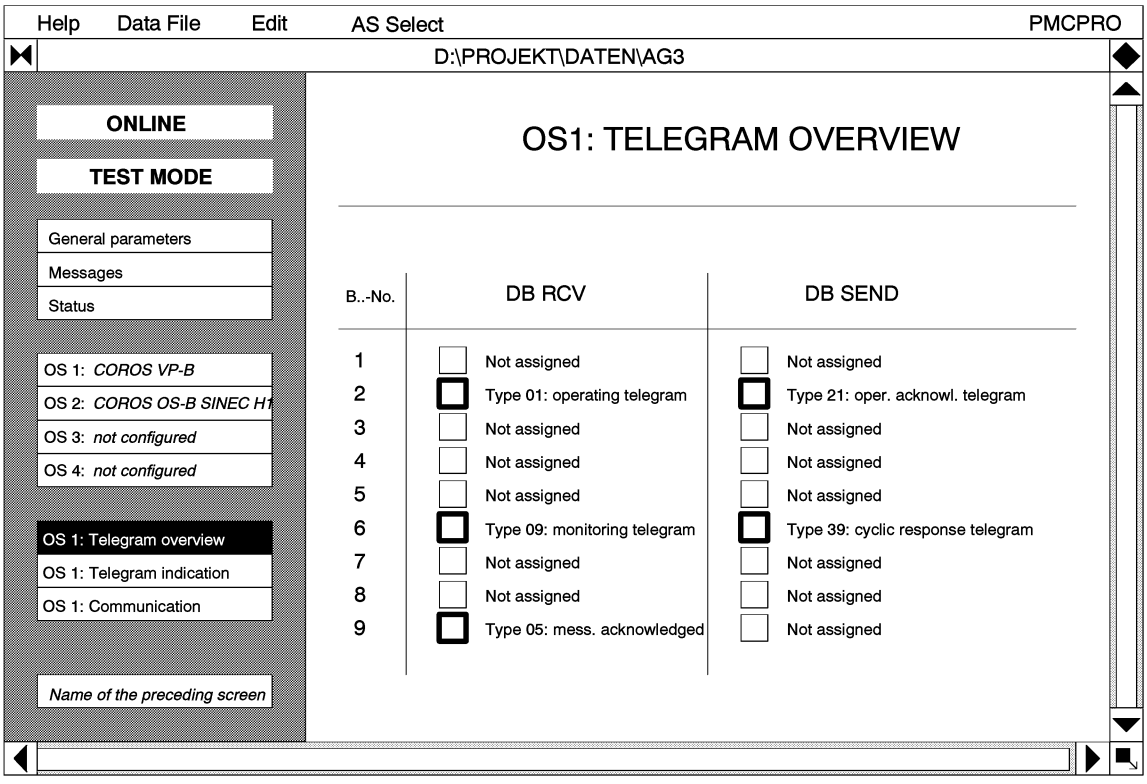
The operator stations must be parameterized consecutively with no gaps in the order of OS 1 to OS 4. OS no. 4 cannot be parameterized until OS nos. 1 to 3 have been parameterized. An OS cannot be deleted until all operator stations with higher numbers have been deleted.

The "delete screen" function in the "edit" menu is used to delete an operator station.

5.4.1 Telegram Overview

The "telegram overview" screen gives an overview of the assignment of the DB RCV and DB SEND blocks.

The screen can only be accessed in ONLINE testing mode.



One click on the squares preceding the texts in the DB RCV and DB SEND table causes a jump to the "telegram indication" screen under the following conditions.

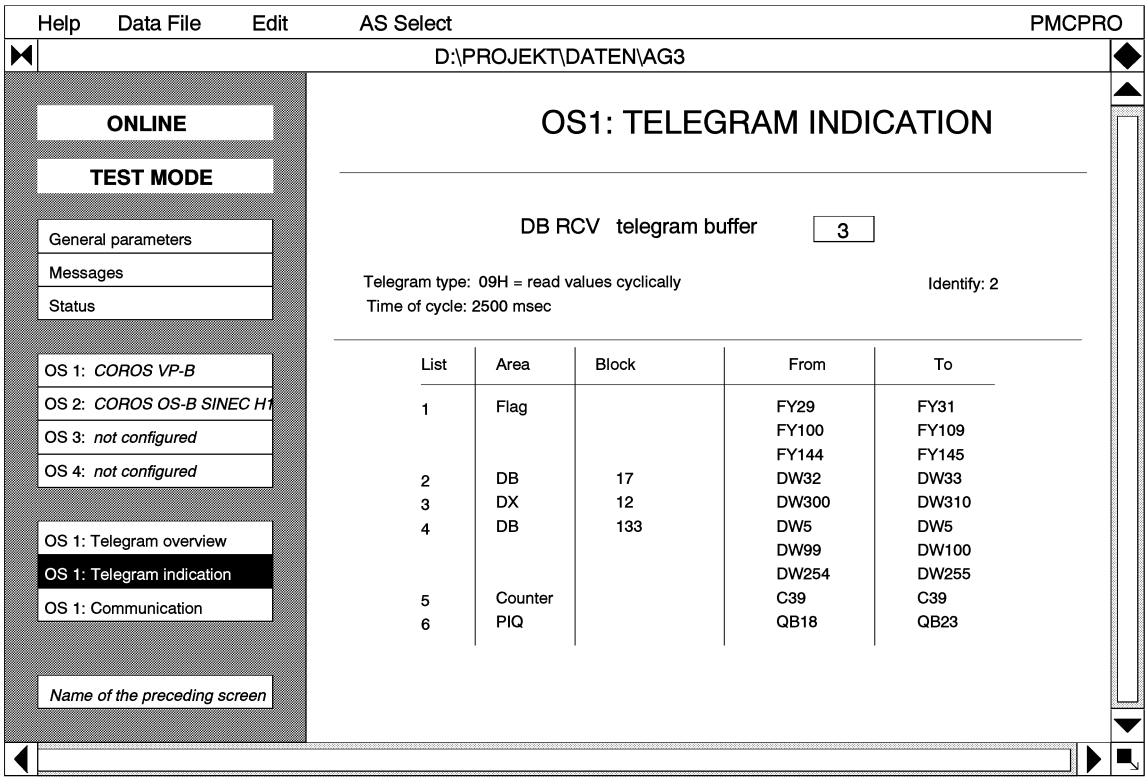
- The telegram must be a monitoring telegram (type 09).
- The telegram must be located in one of the blocks 2 to 9 of DB RCV.

The applicable telegram is immediately indicated as soon as a direct jump to the "telegram indication" screen occurs.

5.4.2 Telegram Indication

Monitoring telegrams (type 09) from blocks 2 to 9 of DB RCV can be indicated in the "telegram indication" screen.

The "telegram indication" screen can only be accessed in ONLINE testing mode.



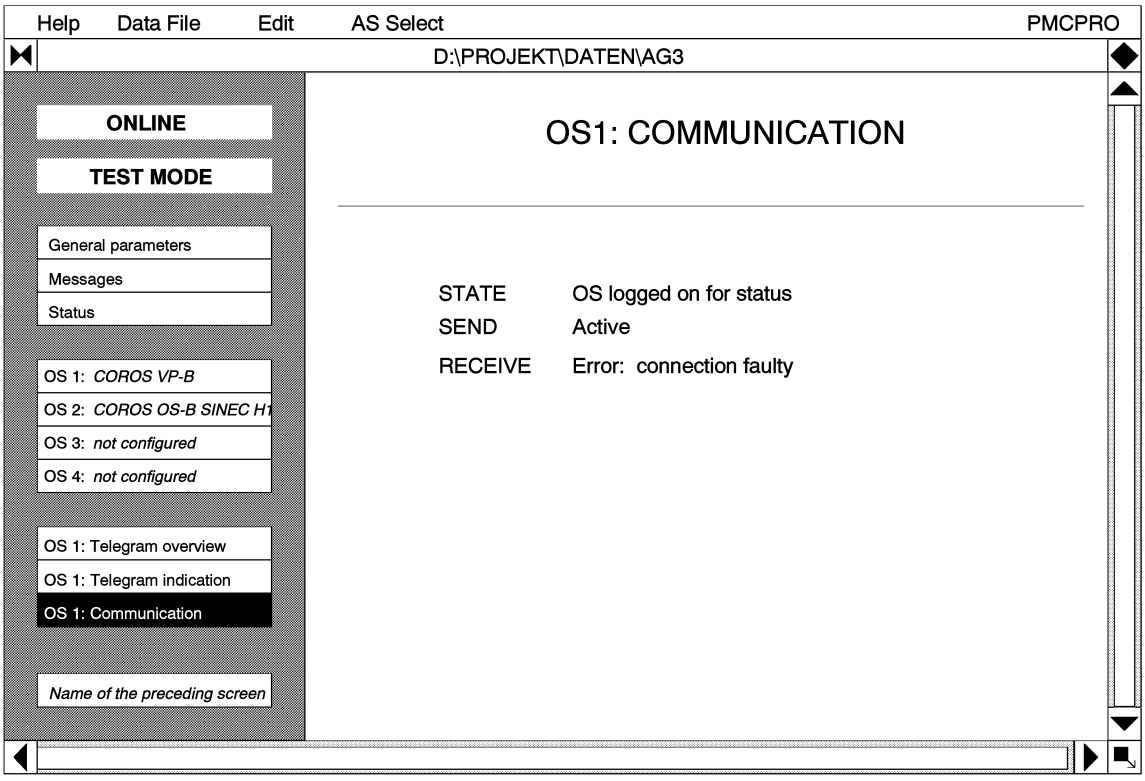
DB RCV telegram buffer

The desired block number can be entered in the field behind the text "DB RCV telegram buffer". The telegram from the specified block is then indicated in the form of a table.

5.4.3 Communication State

The "communication" screen shows information concerning the state of communication with the respective operator station. The indications from the handling blocks are evaluated and indicated in plain text.

The "communication" screen can only be accessed in ONLINE testing mode.



STATE The following messages can be indicated.

- OS logged on for operating and monitoring
- OS logged on for messages
- OS logged on for status
- Communication to the OS faulty
- Log-on required

SEND/RECEIVE The indications for SEND and RECEIVE are invalid when the message "Communication to the OS faulty" is indicated for STATE.

6 Programming Example

6.1 Tasks

The process is automated with a SIMATIC S5-115U (CPU 944) programmable controller. A COROS VP-B visualization processor is to handle the operating and monitoring of the process.

An optimal operator prompting system with the following tasks is to be implemented on the visualization processor.

- Outputting messages
- Indication of process values in standardized representation
- Indication of alarms, warnings and interferences

6.2 Requirements on the PLC Program

Processing the messages requires that the signals to be monitored must be combined at least by word (e.g., 16 message bits in one flag/data word, or binary response messages in one digital input module).

The appropriate object data blocks must be set up and supplied as described under "PMC Objects", "Status Processing" and "Standard Displays".

Inclusion of the PMC Program

Program blocks PB COMMUN, PB 100MS and PB STARTUP must be called in the applicable system OBs (1/13/21/22) so that the PMC blocks can be executed after programming and loading in the PLC.

6.3 Setting the Interfaces

The visualization processor must be set to an interface number for addressing via the backplane bus.

6.4 Programming the PMC Functions

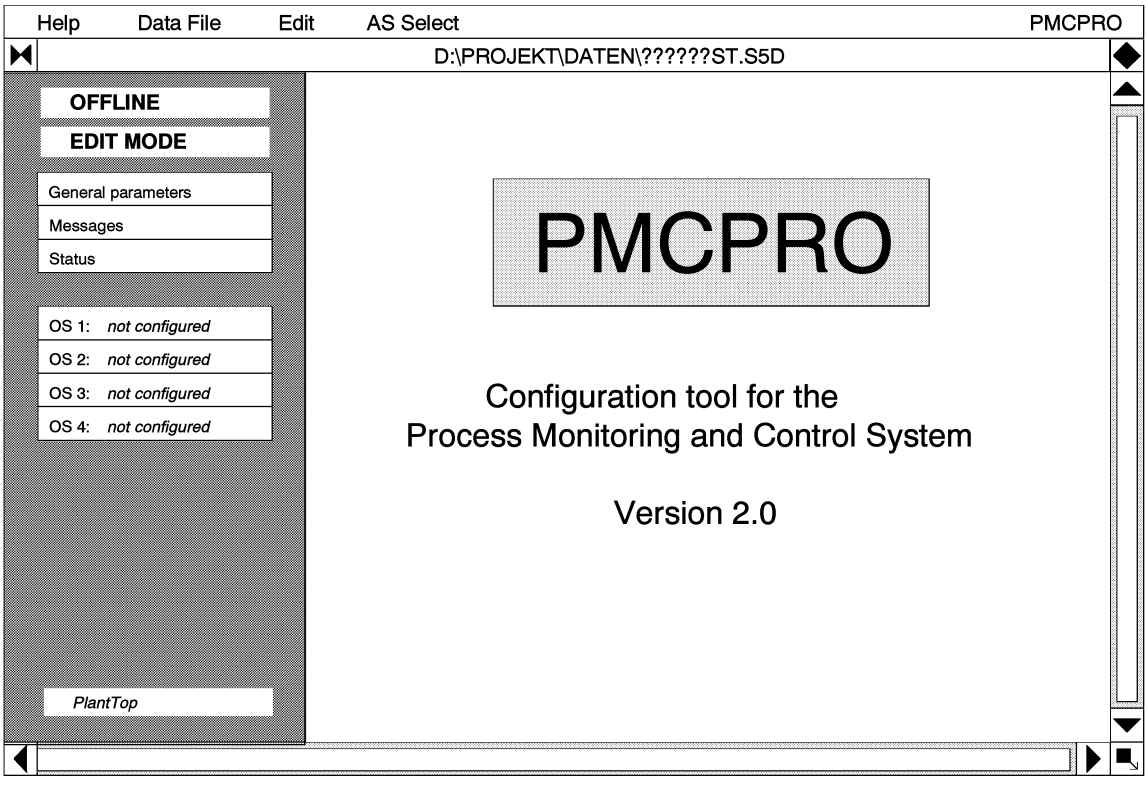
The following functions can be projected by means of PMCPRO:

- Communication for operating and monitoring with PMCPRO
- Message functions
- Status processing
- Real time archives
- Time functions

Starting the PMCPRO Programming Package

PMCPRO is called by a double click either on the icon PMCPRO.286 under FlexOS or on the file PMCPRO.EXE under the WINDOWS file manager. Before inputs can be performed with PCMPRO, an exisiting file must be opened or a new file set up. The default name of this file is @@@@@@ST.S5D

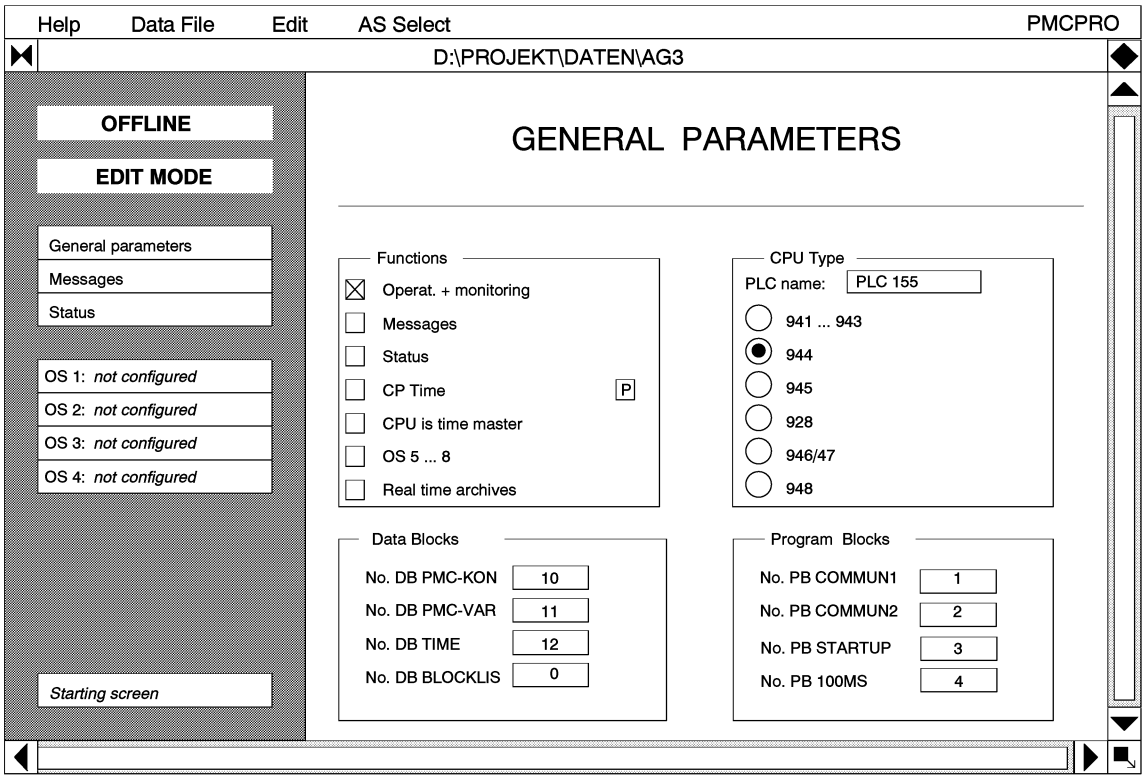
The initial screen appears after the file has been opened.



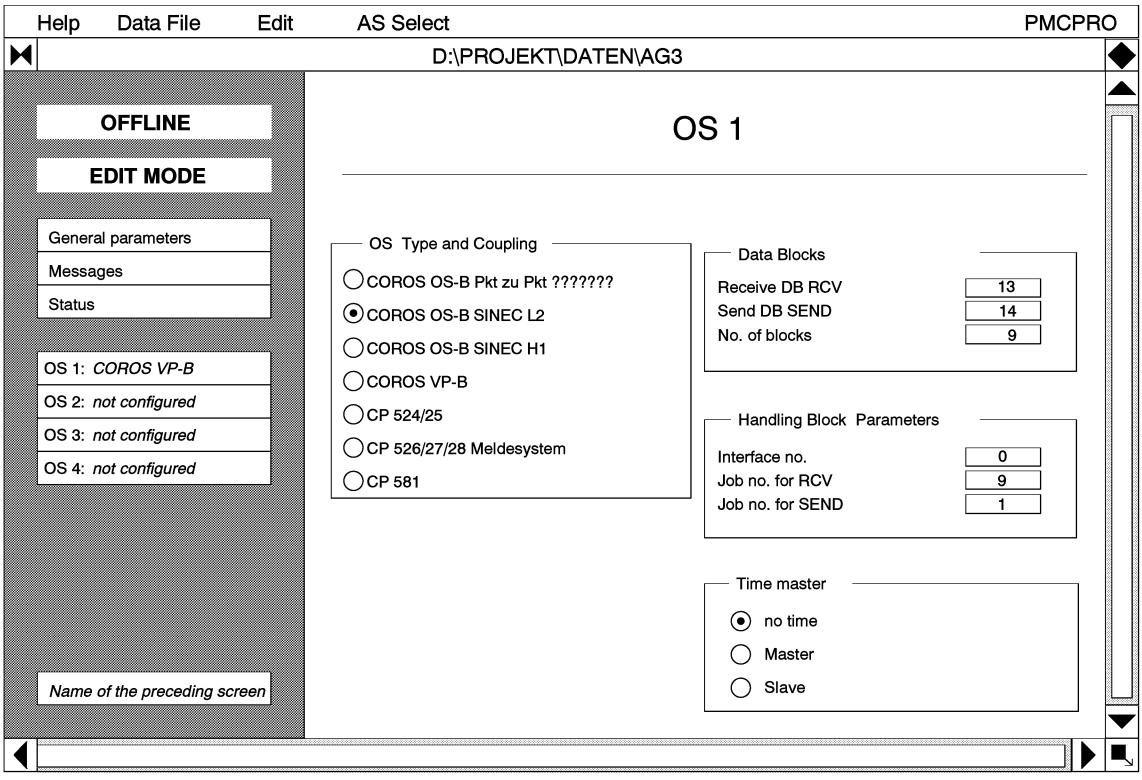
6.4.1 Communication for Operating and Monitoring

Programming begins by entering the general parameters. To enter the general parameters, the "general parameters" field in the "screen selection" is clicked on with the mouse in the initial screen. The "general parameters" screen is opened.

Perform the settings in the screen by clicking on the desired functions:



Now click on the "OS1" field in the screen selection. The following screen is indicated:



OS type and coupling Click on the OS type "COROS VP-B".

Data blocks Specify the appropriate buffer blocks for SEND and RECEIVE. (Any DB numbers can be used.)

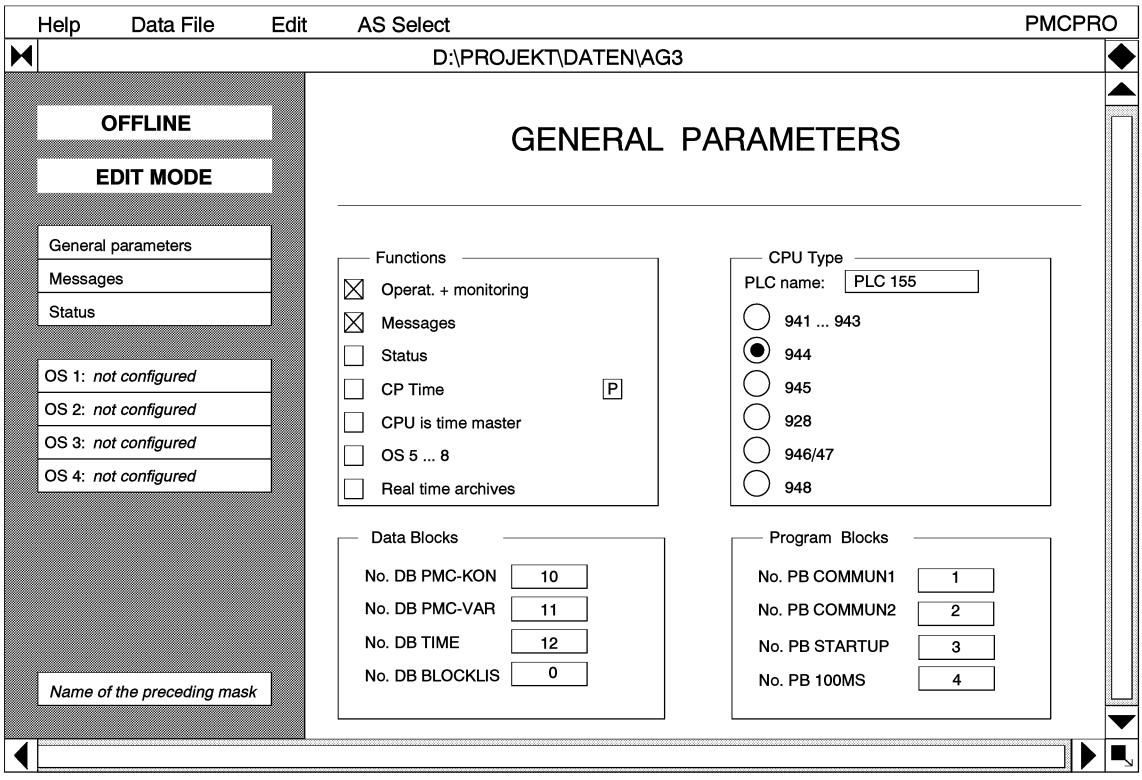
The number of blocks specifies how many buffer segments will be available. Fewer buffer segments mean that fewer cyclic jobs are managed in the PLC.

Handling block parameters The interface number and the job numbers for SEND and RECEIVE must correspond to the settings on the VP-B20. The default values for the setting of theVP are 9 and 1.

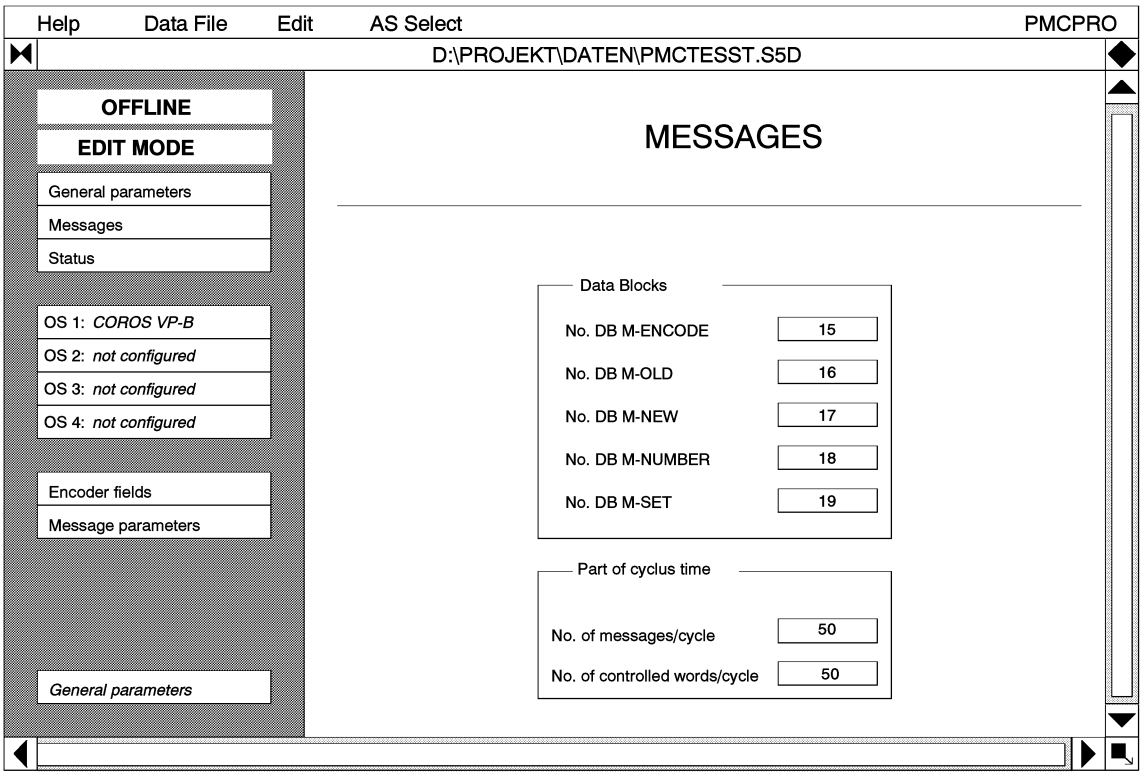
Time master One O+M station can be declared as time master in the system. This station then specifies the time to be entered in the messages.

6.4.2 Messages

Select the "general parameters" mask. Use a single mouse click to select the "messages" function.

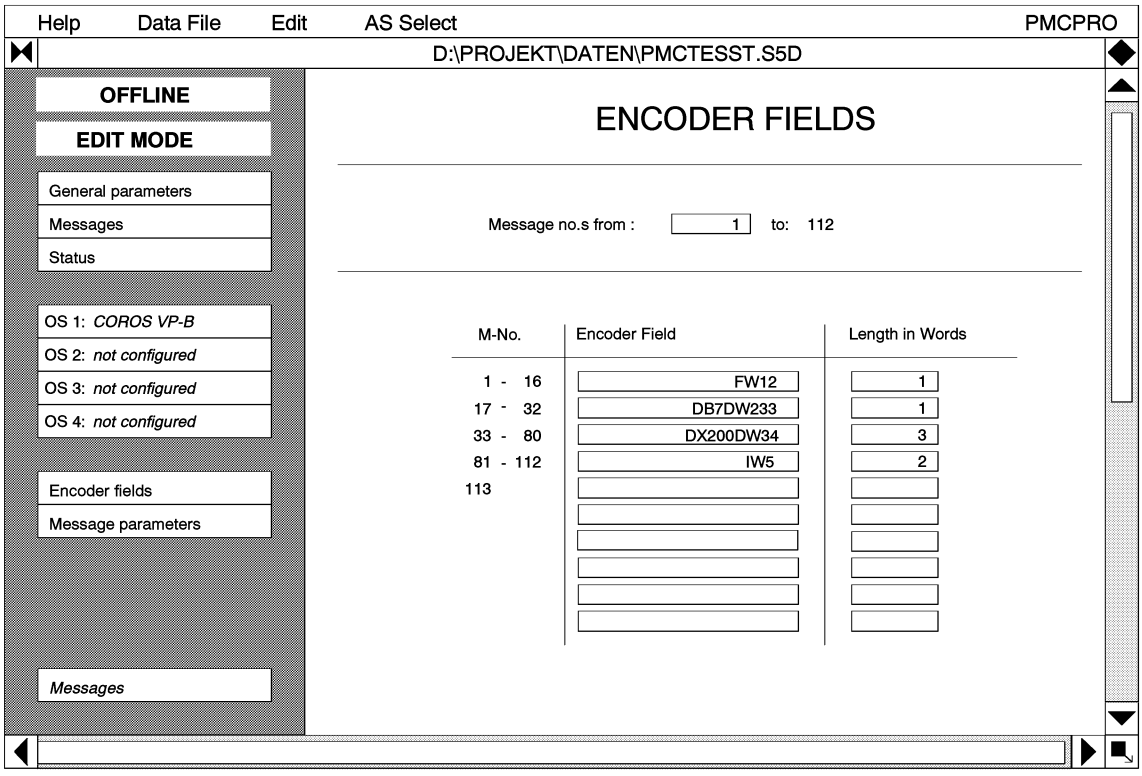


Click on "messages" in the screen selection. The "messages" screen is opened.



Specify the appropriate data block numbers and the cycle time load for the PMC message system.

Click on the "encoder fields" field in the screen selection to open the "encoder fields" screen.

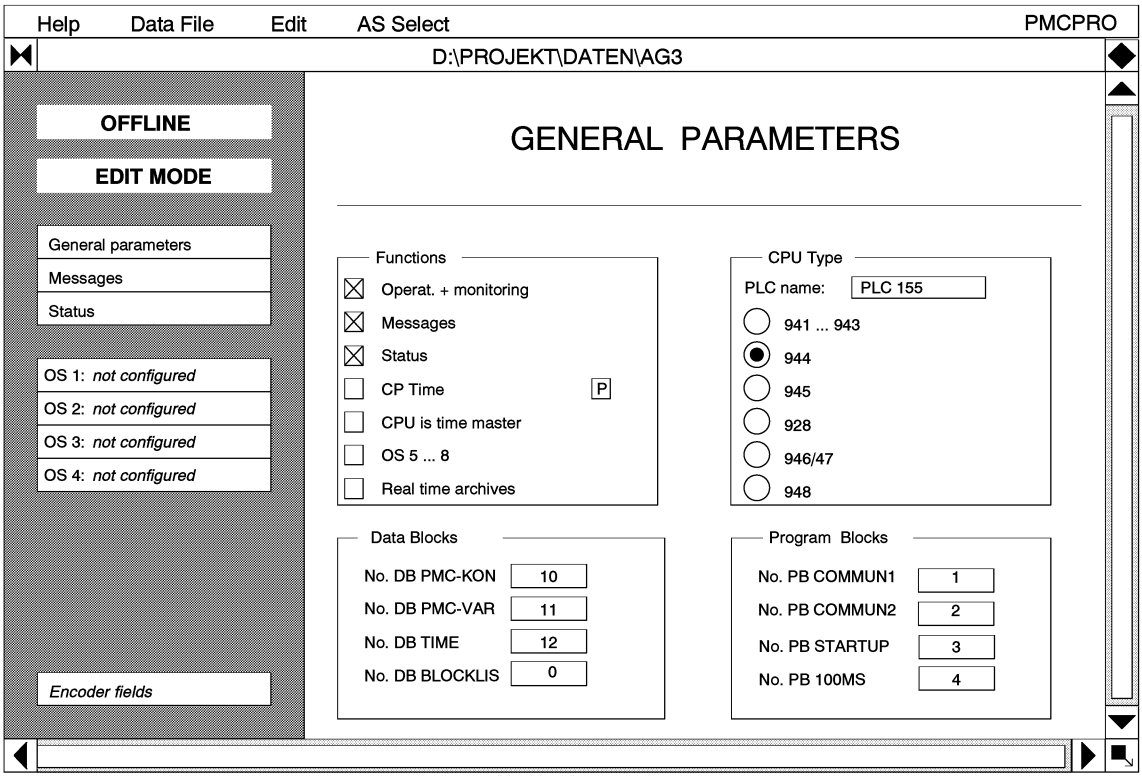


The addresses of the input, output, flag and data words whose conents are to be monitored for a change in edge are entered in the "encoder fields" field. The length in words specifies how many data words are to be monitored. The message number represents the allocation for the programming on the operating and monitoring system.

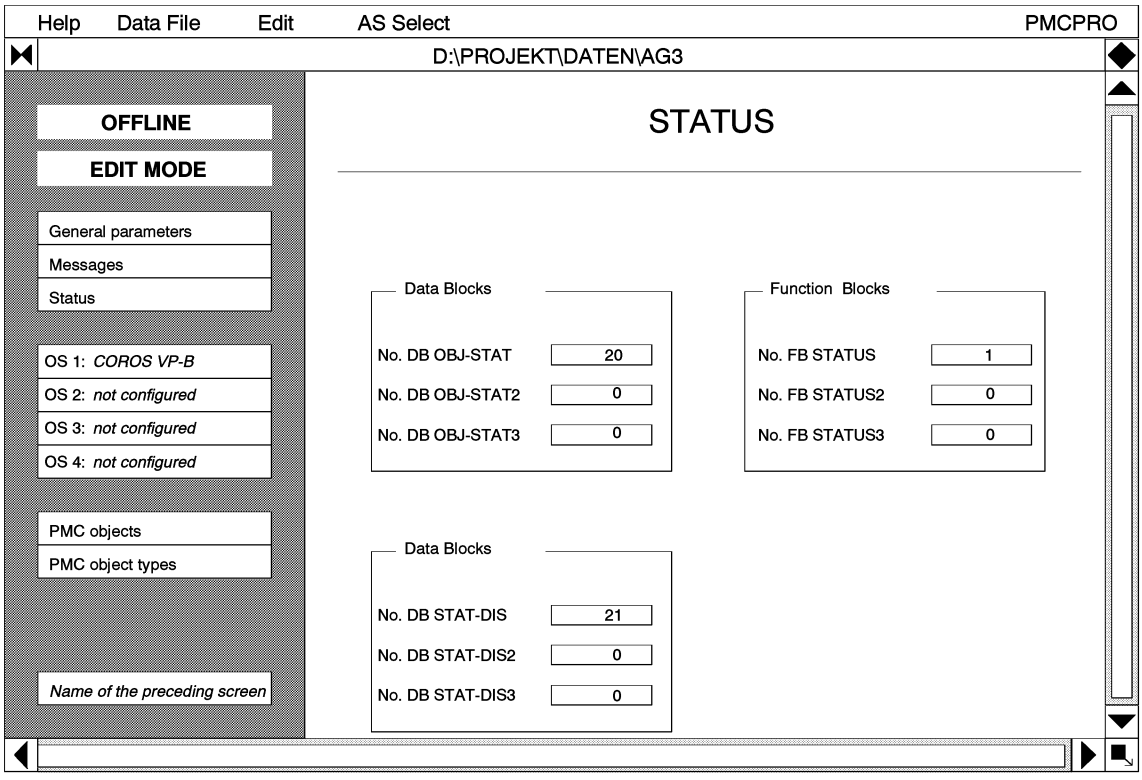
In addition to purely message programming, a process value which is added when a messge occurs can be programmed for each message in the "parameters" mask (selected via the screen).

6.4.3 Status Processing

Open the "general parameters" screen and click on the "status" field.

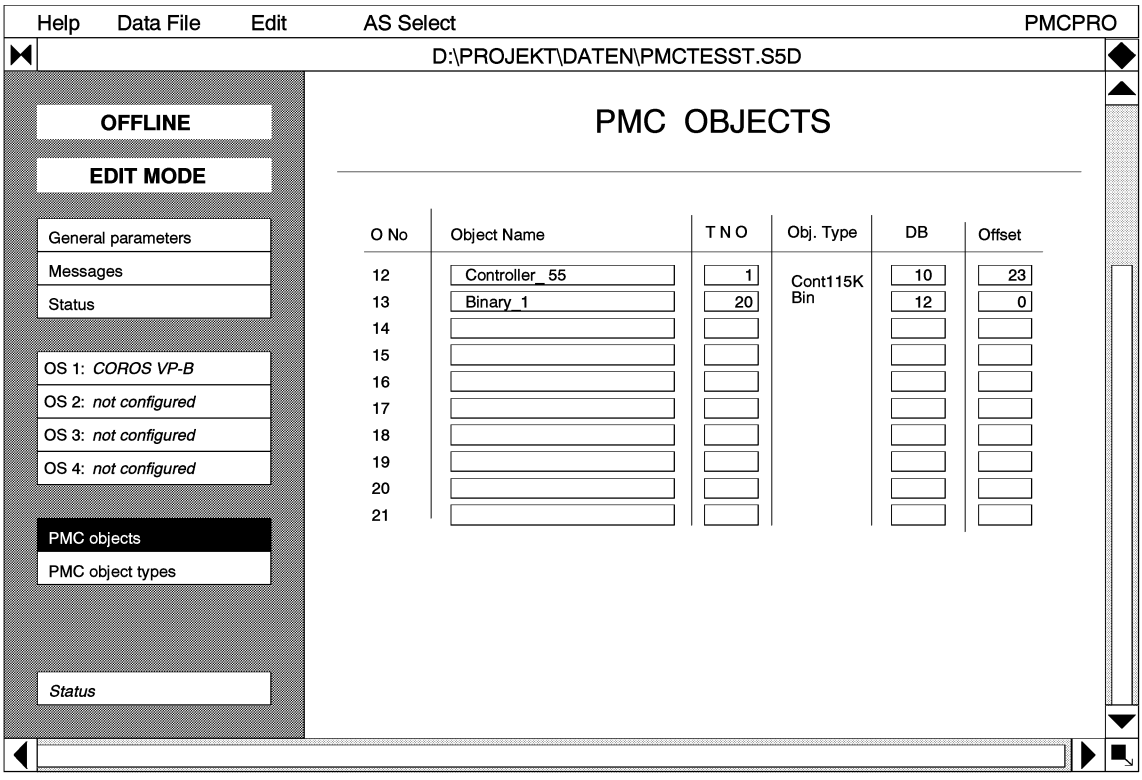


Click on "status" in the screen selection to open the "status" screen.



Specify the numbers for the data blocks and program blocks of the PMC status processing.

Click on the "PMC objects" field in the screen selection to open the "PMC objects" screen.



Specify the PMC objects for status monitoring here. Your own objects can be defined in the "PMC objects types" screen.

Storing the Data

The <file>, <copy standard blocks> option can be used to read the PMC standard function blocks into the working file. Specify the appropriate PMC944ST.S5D file (for the CPU 944) as the source file. Before the blocks are read in you are asked to save the data entered.

☞ The PMC944ST.S5D file is not generated by the system. You have to perform the generation under S5-DOS by copying the contents of the program files MEL944ST.S5D and STA944ST.S5D by means of the option ***Transfer*** to the PMC944ST.S5D file.

Then store the working file using the <file>, <save> menu.

6.4.4 Transfer and Test

After programming has been completed, switch PMCPRO to ONLINE operating mode with the <selection> menu and transfer the blocks to the PLC.

Switch to test mode in PMCPRO for the test and, if necessary, for trouble-shooting, and use the test functions to monitor the PMC functions in the PLC.

7 Planning forms

The following pages provide you with the projecting forms which help you to settle the main settings of your communications job while using SIMATIC S5, PMC/LS-B and COROS LS-B. The forms also help you to avoid projecting errors.
Please fill in an individual form for each PMC communication partner.

The following pages provide you with:

1. A projecting form for PMC/LS-B for an OS-B via SINEC H1.
2. A projecting form for PMC/LS-B for an OS-B via SINEC L1.
3. A projecting form for PMC/LS-B for an OS-B via serial connection.
4. A projecting form for PMC/LS-B for a VP-B via backplane bus.
5. A projecting form for PMC/LS-B for a CP 524/5/6/7/8

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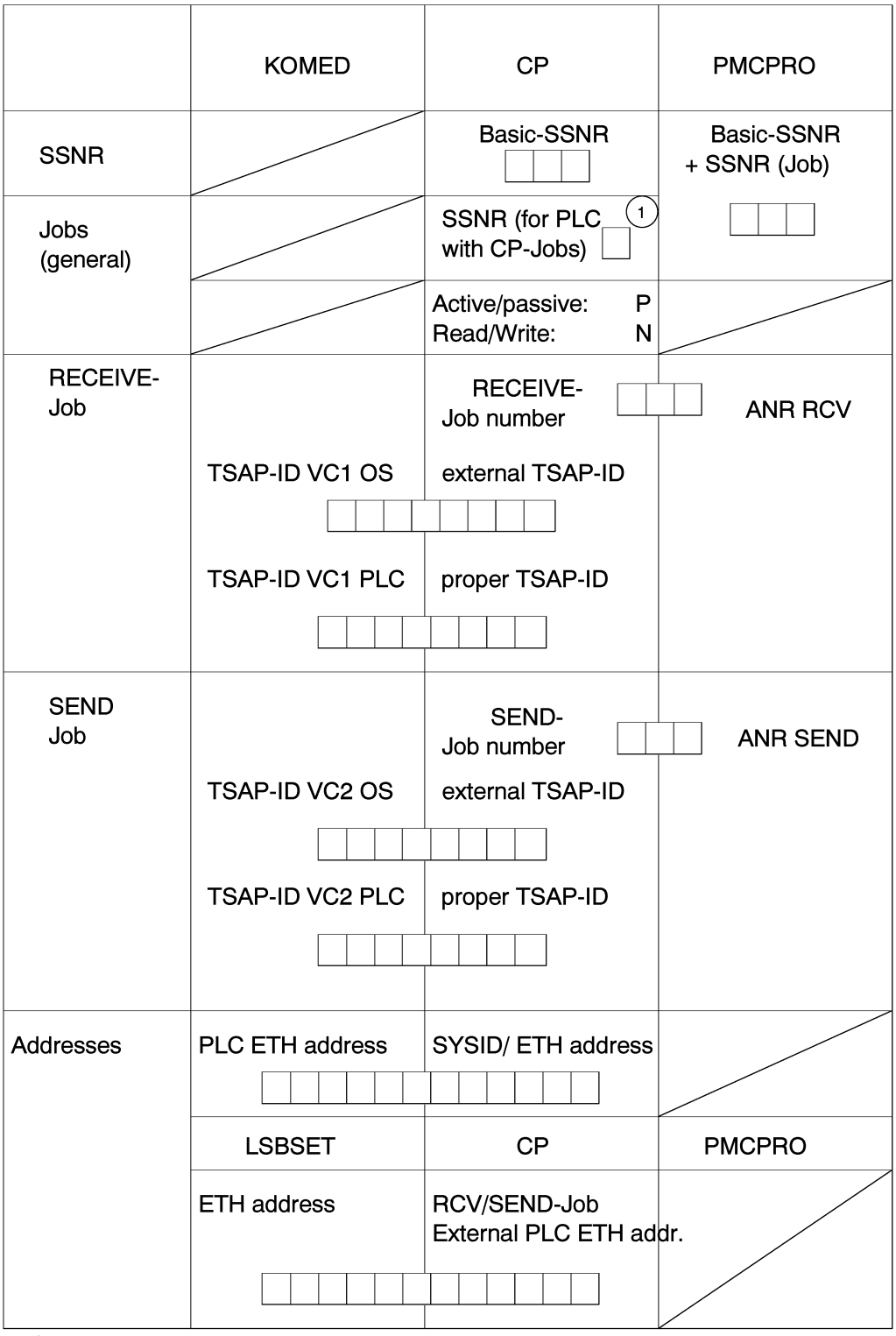
Projecting form PMC <--> LS-B via SINEC H1



(1) SSNR (for PLC with CP-Jobs):
for single processor operation = 0 (CPU 1)
for multiprocessor operation = 1 ... 3 (CPU 2 ... CPU 4)

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Projecting form PMC <--> LS-B via SINEC L1

	KOMED	CP	PMCPRO
SSNR		Basic-SSNR	Basic-SSNR ① + SSNR (CP-Job)
Jobs		SSNR ①	
Priority		PRIO: L	ServiceClass: 0
SAPs/ANR	SAP PLC VC1	Job Parameters RCV/SEND	ANR RCV
	SAP PLC VC2	Job Parameters RCV/SEND	ANR SEND
	KOMED	PMCPRO	
	SAP OS VC2	DSAP	
Baudrate	LSBSET	CP	
Addresses	LSBSET	PMCPRO	
	OS-L1-addresse	remote_add_station	
	KOMED	CP	
	L1-station number	L1addresse	

General CP settings:
As number of interfaces fill in the number of CPUs assembled on the PLC rack (1 to 4)
Active/passive: ACTIVE
Connections : free Layer1
① CP settings: for single processor operation = 0 (CPU 1)
for multiprocessor operation = 1 ... 3 (CPU 2 ... CPU 4)

Projecting form PMC <--> LS-B via serial connection

LSBSET	Assignment COM 1: serial connection										
	Channel no.	CPU no..	PLC address of dest.	Access							
KOMED (OS specific)	1	1	DB No.:	DW 0							
PMCPRO (OS specific)			DB RCV		DB SEND	ANR SEND	ANR RCV	SSNR			
CP one Job Type: SEND		2			DB No.	ANR Send-Job		SSNR	A-Type Data block	Target word address	0

Interpreter: RK 512

Procedure: P 3964R

Procedur-parameter:		
	Baudrate	9600
	Stop bits	1
	Parity	even
	Priority	low

(1) Setting to hardware

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Projecting form PMC <--> LS-B via backplane bus

	KOMED	PMCPRO	VP/CP 581
SSNR	CPU-No. □	(CPU-No. -1) + Basic-SSNR (VP/CP) □□□	Basic-SSNR (under BIOS setup) □□□
Job numbers		ANR RCV 9 ANR SEND 1	

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Projecting form PMC <--> LS-B with CP 524/5 or CP 526/7/8

	PMCPRO	CP 52x
SSNR	SSNR	Basic-SSNR
Jobs	ANR SEND	ANR for signalling (CPU 1...4)
	DB RCV	DB No. for messages (only for CP 5267//8)
	ANR RCV can be selected at will DB SEND can be selected at will	

Time function has to be projected separately by means of SEND 218
(see CP Manual)

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