MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

NAUTIBUS

VME-PROF-M

VMEBUS PROFIBUS DP MASTER INTERFACE

Used with the applicable VMEbus PROFIBUS DP configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Nautibus VME-PROF-M

Nautibus electronic GmbH

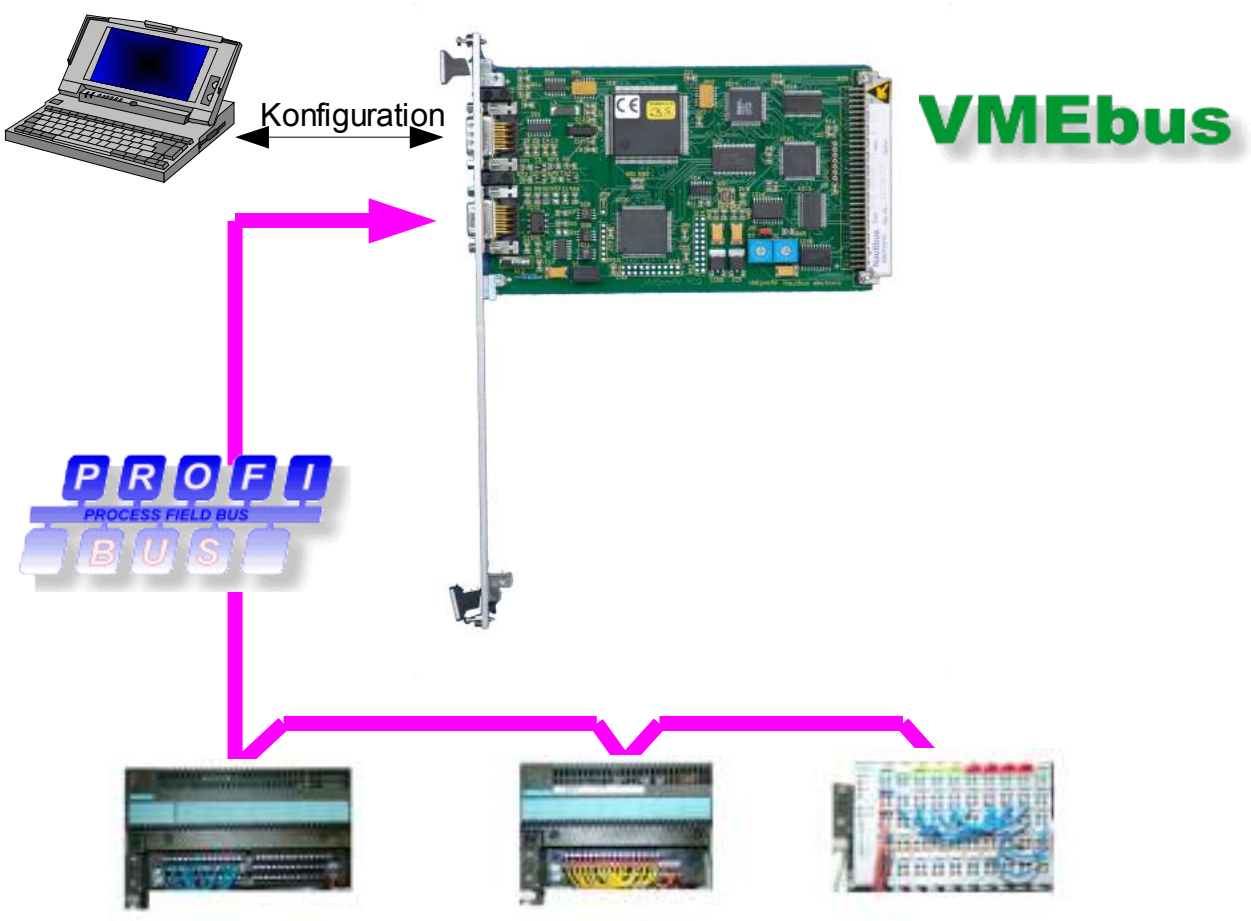


VME-PROF-M

Technical Manual - Date 2.4.2008

1 System configuration

The following pictures show a typical system configuration with the VME-PROF-M in a VMEbus system to connect Profibus I/O modules. A PC is connected via RS 232 com port for configuration purpose.



Using the VME-PROF-M enables you to use cost-saving Profibus I/O modules to replace expensive VMEbus I/O boards. A further advance is the easier installation in the rack and in the factory floor, also service and storage of replacement parts is easier.

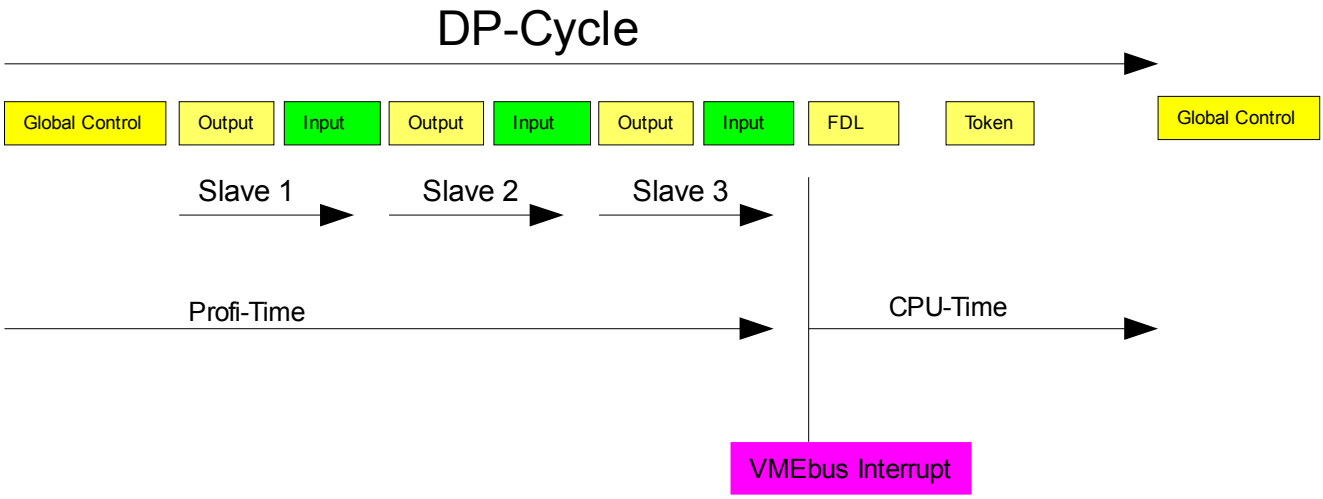
Because of the time synchronous DP-V2 data transfer the VME-PROF-M is also an ideal solution for connecting drives.

2 Profibus basic concepts

The Profibus is an European standard field bus system specified in EN 50170. The VME-PROF-M works with the Profibus DP protocol. Profibus-DP is a communication protocol for a controller connected with a group of decentral I/O devices.

2.1 DP-Cycle

The PLC controller (the Profibus Master) exchanges data with the I/O devices in a cycle way. Data are send to all slaves one after the other. The master sends output data to the slave and the slave responds with its input data. After this it is going on to the next slave. When all slaves have been used the cycle begins from the start. This whole cycle is called DP-cycle.



The VME-PROF-M starts every DP-cycle with a „Global Control Telegram“. This can be used for synchronization the slaves. At the end of the slave data exchange a VMEbus interrupt could be generated. From this time on the VMEbus CPU can use the Dualport-RAM of the VME-PROF-M for reading and writing new data. The VME-PROF-M uses this time slot for management services on the Profibus (GAP Update and Token passing to other masters).

The DP cycle can run free (DP-V0) or can run in a fixed timing (DP-V2). We recommend to use always a fixed cycle time. The VME-PROF-M controls the cycle in this case with a hardware timer at microseconds precision.

2.2 Slave user data and configuration

The Masters sends an output data telegram with a maximum length of 244 Bytes. The slave responds with an input data telegram also with a maximum length of 244 Bytes. The actual data length depends on the slave requirements. Profibus-DP supports modular slave stations. This includes a buscoupler and more different I/O modules. The actual slave configuration is described in configuration bytes. The master checks the agreement of the actual configuration and the configuration bytes at start-up. Only when the agreement is O.K. The slave goes in working mode.

A simple slave for example could have the following configuration:

1 analog input module with 4 channels each 16 Bits = 4 input words = 8 Byte

1 digital input module with 8 channels each 1 Bit = 1 Byte input

1 digital output module with 8 channels each 1 Bit = 1 Byte output

Together we have 1 Byte output and 9 Byte input what is totally 10 Byte user data.

2.3 Baudrate and length of bus cables

The Profibus works with a fixed baud rate controlled by the master. The slaves automatically switch to this baudrate. The Baudrate can be selected for matching to the slowest slave and the length of the bus cable.

The following table shows the possible cable length on different baud rates for a standard confirm bus cable Type A:

Baudrate kbit/sec	19.2	93.75	187.5	500	1500	3000	6000	12000
Max Length m	1200	1200	1000	400	200	100	100	100
Stub lines m	6	6	6	6	0	0	0	0
Bit time ysec	52	10,6	5,3	2	0,66	0,33	0,167	0,083
Byte time ysec	572	116,6	58,3	22	7,3	3,6	1,8	0,9

2.4 Profibus data transfer times

With the sum of all user data from the slave devices and the baud rate you can calculate the Profibus data transfer time.

The Global Control Telegram contains 13 Bytes data and 3 Idle Bytes.

For the protocol frame and the timing each slave requires 25 Bytes.

→ Profi_time = Byte_time * (15 + 25 * Number_of_slaves + Sum_Number_of_User_bytes)

Example : 1,5 MB/sec → Byte_time = 7,3 ysec

5 Slaves each 10 Byte User_data

Profi_time = 7,3 * (15 + 25 * 5 + 5 * 10)

= 7,3 * 190 = 1387 ysec

For the setup of the DP cycle you should add 30% for safety.

So 2 ms is a useful value. Then you have 0,6 ms for the CPU time.

If the CPU time is not enough or other masters (diagnostic equipment) use the bus, the time has to be increased for reaching a robust operation.

3 Set-up of VME-PROF-M

For setting up a VME-PROF-M you need

a PC with Windows XP and the DPKonfig software

1 free com Port (RS-232)

1 Zero-Modem RS 232 cable with Dsub connectors (Pin 2 and 3 crossed over)

the GSD files of all installed Slave devices

and of course the VMEbus system.

For start-up the VME-PROF-M you don't need any software on the VMEbus CPU at this time.

3.1 Installation of the VME-Prof-M

The VME-PROF-M needs a 64 kByte address space in the VME standard address room. The start address is set by HEX switches S1 and S2.

S2 is the MSD (A23..A20) and S 1 the LSD (A19..A16).

Example: address 0x85000 set S2 on 8 and S1 on 5

Please set the run jumper, so VME-PROF-M starts immediately after the Reset. Please switch the VMEbus system off before you start mounting the VME-PROF-M. Please use both screws on the front panel to make sure the grounding.

3.2 Connecting the PC

Please install the DPKonfig software on your PC. You have to start Setup.exe in the directory Disk1 of the installation CD by double clicking. At the end of the installation procedure you have to copy the DPKonfig.exe from the CD in your directory C:\DMS\CMDS.

Now connect the COM1 or the COM2 port of your PC with the cable to the X1 connector of the VME-PROF-M. Please do not connect the Profibus at this time.

Switch on the VMEbus system.

Start the DPKonfig on your PC and select the point “VME-Profi” on COM1 or COM2 from the menu.

In the message line you should see now; “VMEprofi on COM firmware version 8.0”

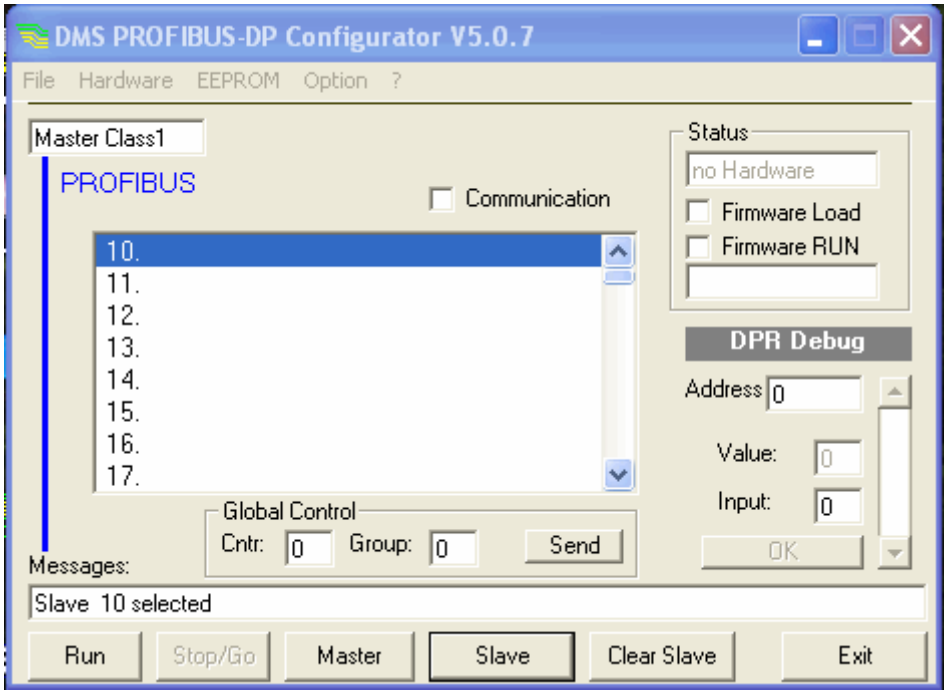
3.3 GSD files

For each slave device the manufacturer supplies a GSD file. For use with DPKonfig you should copy this file in the directory C:\DMS\GSD. The name conventions are also required. A GSD name starts with 4 letters – they came from the manufacturer name (SIEM for Siemens). Then follow 4 hex digits for the ident number of the slave. The file suffix has always to be GSD. Please rename the GSD file if its required.

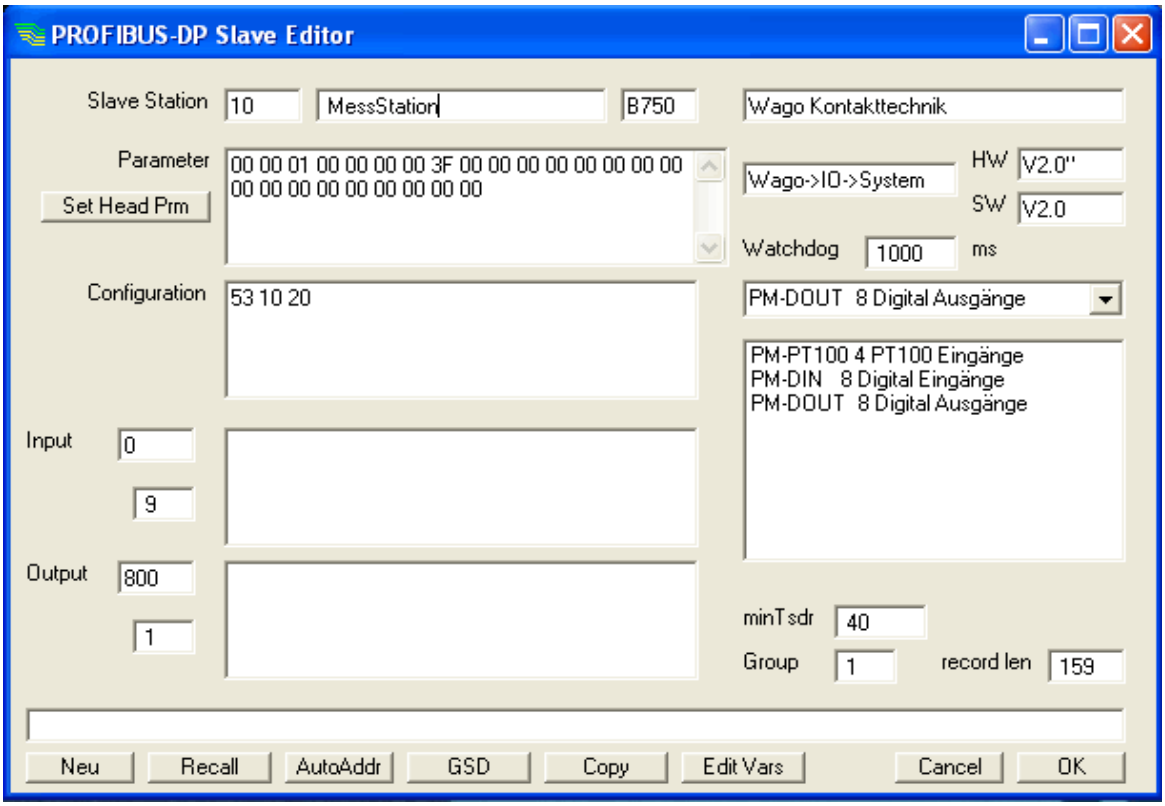
For example: SIEM000E.GSD

3.4 Setting up of Slave Parameters

Select in the main screen of DPKonfig a slave address – for example number 10.



Now click the “Slave” Button to open the Slave editor screen:



Please press the “New” button and then the “GSD” button. Now you can select the GSD file. For example WAGOB750.GSD.

The main data from the GSD file will be displayed now. On the top of the screen between station address and ID-number you can add a name for your station, for instance “MessStation).

By using the select box on the right side of the screen you get the installed modules, for example a 4 channel PT 100 input, a 8 channel digital input and a 8 channel digital output. Be sure to add the modules in the correct order. Your selection and the hardware has to be the same. It is useful to put modules with word data (16 Bit) first , so they have even addresses assigned in the Dual-Port-RAM.

For each module one configuration byte is generated.

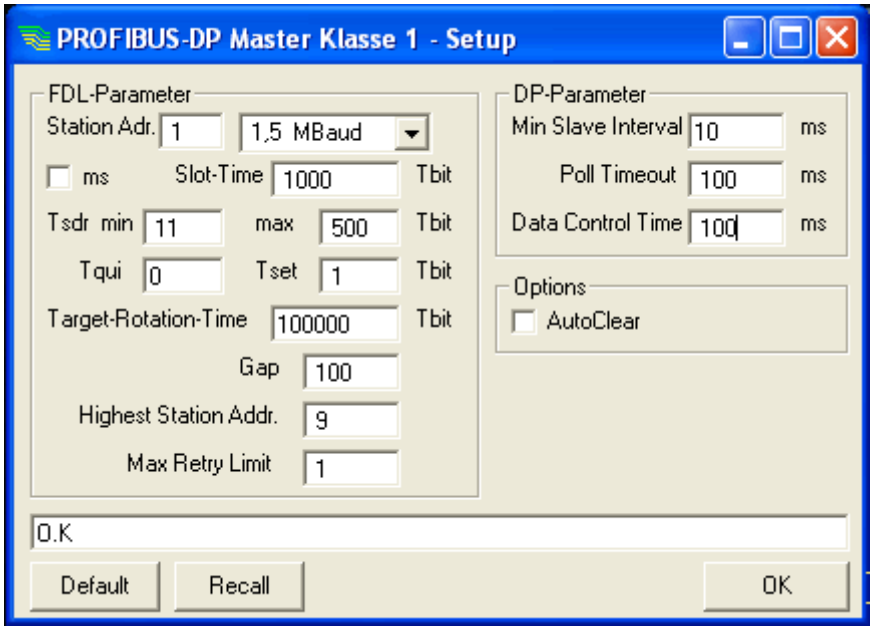
If you have entered all modules please press the Auto address button to generate the DP run address offsets. As a result you see on the left side in the example 9 Byte input data at DPR offset 0 and 1 Byte output data at DPR offset 0x800. Those are your 10 user bytes.

For each slave you can set a watchdog time. In case of a bus or master failure the slave switches all ouputs to 0 – if this time is elapsed.

Press o.k. now and continue this process for all slaves.

3.5 Set up of the Master Parameter

Please press the “Master” button now to open the Master Window.



First set up the Baud rate. See capt. 1.3 (for instance 1,5 Mbaud).

With the DP parameter “MinSlaveInterval” you set up the DP cycle time (for example 10 ms).

It is recommended to take a big value on start and optimize it later. If you would take a too small value , the Profibus runs free without a fixed timing.

The Slot time is the time window for a slave which sends no answers. This time should be set with the same time as a correct answering slave is using. The time could be entered in bit times and could be displayed in milliseconds by clicking the check box “ms”.

With the parameter data control time the monitoring time for the slave communication can be set. The value should be greater than 2 * DP cycle and less than 0,5 * Watchdog time of the slave.

If a slave does not receive data within this time window it is reported as a failure. The life bit of this slave in the Dual-Port-RAM is cleared to report the failure to the main CPU in the VMEbus system.

When the option “Autoclear” is selected the VME-PROF-M also sets the outputs of all other slaves to Zero and goes in the operating mode “clear”.

For all other parameters you can use the default values – changing is only required in multi-master-systems or if you are using repeaters.

Close the master window with the OK button.

3.6 Save the set-up

Save your configuration by using the File menu and the command “Store” on the hard disk in a DP1 file. With the command “Print” you can print out a documentation of your configuration.

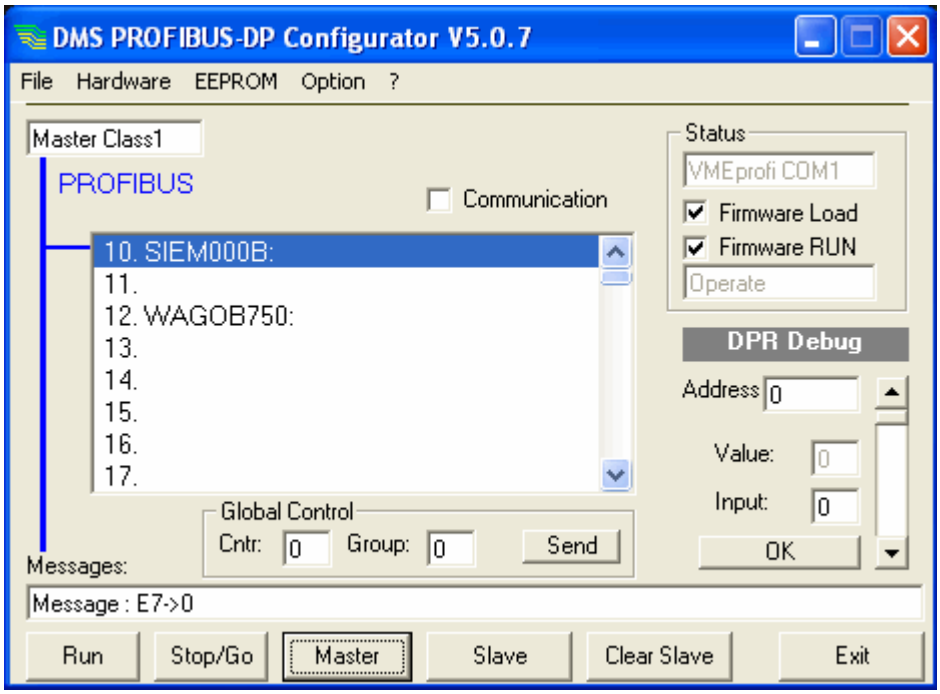
3.7 Test of the Configuration

By Pressing the button “Run” you can transfer your configuration into the VME-PROF-M. After the transfer the VME-PROF-M starts operating. The red LED over the Profibus connector switches off and the yellow LED starts lighting.

Attention: Danger!

Before you can connect the Profibus cable be sure that your plant cannot be damaged through false output data.

Is the Profibus connected now, the green LED shows the “receive data”. The slaves now will be initialized and when the configuration is correct and equal to the real hardware the slave enters the data exchange phase. The DPKonfig now shows you a bus connection line.



5 Tables and additional information

5.1 Technical Specifications

VMEbus:	A24, D16 Slave
Memory:	64KB Dualport-RAM 128 KB RAM 512 KB Bootblock Flash EPROM
Interface:	1 * RS485 PROFIBUS, galvanic separated, 12 MBit/sec with PROFIBUS-FPGA 1 * serial RS232
Processor:	32-Bit
Protocol:	PROFIBUS DP-Master 1 (EN 50170)
Dimension:	VME-PROF-M 6HE-4TE (3HE board with 6HE frontplate) VME-PROF-M3 3HE-4TE (single euro format, 160 x 100 mm)
Power:	+5V: typ. 700 mA +5V Standby not needed +12V and -12V not needed
Temperature	
Operating:	0 ... +50 °C
Storage:	-25 ... +70 °C

5.2 Known errors of the VME-PROF-M Firmware

Limitation for all versions:
Configuration with a Profibus Class 2 master is not possible

Errors in version 7.2
Only Single-Master operation possible.
DP-Variable ProfiCtime is not valid

Errors in version 8.0
No errors known