Measurement and Control Technology

VKT*rs* software *

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This document is a short manual for operating the standard Verhulst VKTrs software.
For more information, please refer to the original English manual. References to the English manual are placed between [ ].

References to the numbered menu screens of the operating display are placed between < >.

Contents

1. Operation

1.1. Graphical operating display

The built-in or external PGD1 operating display includes 6 control buttons and a graphic display. This can be used for reading out, configuring and setting up the control.

1.1.1. External display

BUTTON	DESCRIPTION
	- Display list of active alarms - Reset alarms by manual reset (press 2x)
PRG	- Access the main menu
ESC	- Go back to previous screen
	- Scroll down the screen - Increase/decrease value
	- Switch from view to change parameter - Confirm changed parameter and return to the parameters

1.1.2. Internal display

BUTTON	DESCRIPTION
	- Display list of active alarms - Reset alarms by manual reset (press 2x)
	- Access the main menu
	- Go back to previous screen
	- Scroll down the screen - Increase/decrease value
	- Switch from view to change parameter - Confirm changed parameter and return to the parameters

1.2. Display and operating buttons

In normal conditions, the display shows an overview of the current time and date, 2 parameters, the active components and the operating state of the unit. This is called the home screen.

No.	
1	Time and date and unit number
2	Variable 1 large display
3	Variable 2 small display
4	Active component icons
5	Operating mode

Note: An external PGD1 graphic display can be shared with up to 8 controllers via a pLAN network. [See F.Board switch]
The variables shown on the display can be set in the menu <Gfc01>

ICON	DESCRIPTION
	Fan(s) active
	No humidification or dehumidification active (not used in the Basic model)
	Cooling active (temperature control)
	Active cooling (dehumidification control)
	Heating active (from temperature control or frost protection)
	Active humidification
	Frost protection active
	Heat recovery active (plate heat exchanger)
	Heat recovery active (thermal wheel)
	Free cooling or heating active

Note: If free cooling or heating is active in the unit, the  and  icons are visible to indicate that no cooling, heating, humidification or dehumidification is active.

OPERATING MODE

	Text in display	*Unit status*
OFF	ALR OFF	Off by alarm
	BMS OFF	Off by BMS (Building Management System)
	OFF CLOCK	Off by timer programme
	OFF DIN	Off by digital input
	OFF BUTTON	Off via operating display
	Wait...	Software control active
ON	ON	Unit on
	MANUAL	Manual operation [see menu Gg]
	Comfort (Auto-Comfort)	Comfort mode
	Pre-Comf (Auto-PreC)	Pre-comfort mode
	Economy (Auto-Econ)	Economy mode via
	Protect	Security mode
	Startup	Starting up
	Shutdown	Switching off
	Frost...	Frost mode active
	Summer fan	Summer ventilation active
	Recircul.	Recirculation active
	Purging	Manual flush active
	Manual	Manual operation active

1.3. Programming mode

Parameters can be changed via the operating display. Various access levels are available for the various parameters. User parameters can be accessed without a PIN code. For service (PW1) and manufacturer (PW2), 2 password-protected levels are available. To access the programming menu, use the **Prg** button on the operating display.

1.3.1. Main menu icons and names

A.	On/off AHU	E.	Alarm history
B.	Set point	F.	pLAN network
C.	Clock programme	G.	Service
D.	Input/output	H.	Manufacturer

Note: The controller "remembers" the last parameter category accessed and automatically goes to this category the next time it accesses the same menu.

1.3.2. User parameters

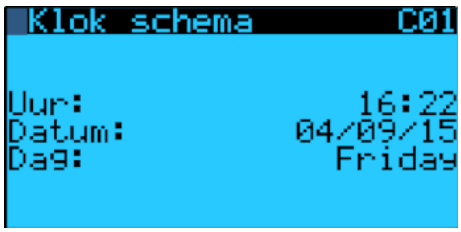
The user parameters (A to F) are all accessible without a PIN code and contain the following categories:
A: On/off AHU: Determines how and whether the unit is switched on or off
B: Set point: Displays the current temperature and humidity settings <B01>, temperature and humidity settings are adjustable for heating and cooling mode (summer and winter).
C: Clock programme: Set the current time and date in <C01>, the daily switching times <C02> of the clock programme including weekly programme, holiday periods <C03>, special days <C04>, summer/winter time change-over <C05>
D: Input/output: Overview of the controller inputs and outputs
E: Alarm history: Displays up to 50 saved alarms with time and date when they occurred
F: pLAN network: The display can control up to 8 controllers

1.3.3. Operation

2. press **Esc** one or more times to go back one menu
3. Press **Prg** to access the main menu tree
4. select the desired category (A to H) via the **Up/Down** buttons
5. Press **Enter** to open the category/menu, the cursor flashes in the top left corner of the opened screen press **Down** to go to the next screen (for example <B01> →<B02>)
6. Press **Enter** to set the first parameter, the cursor flashes at the respective setting value;
7. Press **Up/Down** to change the value, confirm with **Enter**. After entering, the cursor automatically moves to the next parameter.
8. Press **Up/Down** and **Enter** to adjust the parameter or press **Enter** to go to the next parameter
9. If the parameters are visible in the menu, press **Enter** to access the parameters or **Esc** to go back one menu, follow steps 3 to 7

Note: Adjustable parameter values are shown on the display in CAPITALS

EXAMPLE 1: Setting the current time/date

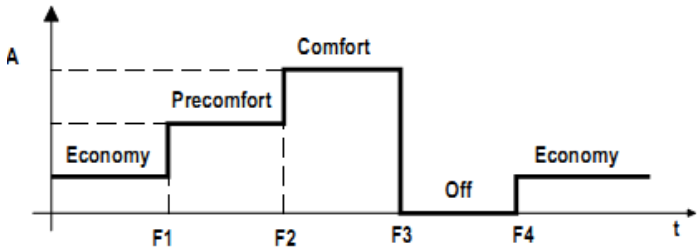


1. Press **Esc** one or more times until the start screen is visible in the display
2. Press **Prg**: the main menu is now visible
3. Press **Up/Down** until the cursor is on category C **Clock/scheduler**
4. Press **Enter** to open the first screen <C01>
5. Press **Enter** to adjust the current time in hours via **Up/Down**
6. Confirm by pressing **Enter** and adjust the minutes
7. Repeat steps 5 and 6 three times to adjust the date (day/month/year)
8. Press **Esc** to leave the menu

Note: The clock must be enabled via the menu <Hc20>

EXAMPLE 2: Setting the timer programme

1. Press **Esc** one or more times until the start screen is visible in the display
2. Press **Prg**: the main menu is now visible
3. Press **Up/Down** until the cursor is on category C **Clock/scheduler**
4. Press **Enter** and **Up**/Down to open the second screen <C02>: Select "Enable band" (active switch-over time) and select "YES"
5. Select the day of the week, the time at which each switch-over time occurs (F1, F2, F3, F4) and the desired operation mode (Comfort, Precomfort, Economy, Off)
6. If necessary, copy the settings to other weekdays



Note: The set points for Comfort, Precomfort and Economy can be set via the menus <B02>, <B03> and <B04>.

1.3.4. Setting the Service parameters

The service parameters letter <G> in the menu codes consist of:

1)parameters that can be set without a PIN code
a. Change language: change the language, choose between English and Dutch (default)
b. Information: information about the software, bios and boot versions in the controller
c. Summer/winter: switch between summer and winter control/strategy, set as default to automatic selection
d. Working hours: here the existing working hour counters can be read out

2)Parameters that can be set after entering the **PW1 password** PIN code
e. BMS configuration: Choose the communication protocol with which to communicate with a BMS (Modbus), communication speed (baud rate), network address or activate commissioning mode <Ge3>

f. Service settings: Set e.g. the operating hour counters or sensor calibration here
g. Manual management: Switch on certain parts of the control system manually, for example for commissioning purposes

Note: Settings that can only be accessed after entering a PIN must be changed with care, as an incorrect setting can adversely affect the operation of the unit. The supplier is not responsible for incorrect settings and/or the consequences thereof.

Note:
If no buttons are pressed for 5 minutes, the controller automatically returns to the start screen

1.3.5. Setting the Manufacturer parameters

The manufacturer parameters, recognisable by the code <H> in the menus, can only be accessed by entering the **password PW2** PIN code and contain:
Configuration: Select and configure the components of the unit
IO configuration: Configure the inputs and outputs of the controller. In other words, assign sensor positions, digital inputs, digital outputs and analogue outputs.
Factory settings: Define factory settings such as control strategy, maximum and minimum settings, time delays, and PID controller settings. See [English manual]
Procedure:
The setting procedure is identical to the previously described controls, the only difference is that a PIN code must be entered before the screens with the code <H> become visible.

⚠**Important:** The factory settings can only be changed if the unit is switched off in the menu **On/Off AHU**.
Settings that can only be accessed after entering a PIN must be changed with care, as an incorrect setting can have a negative impact on the operation of the unit. The supplier is not responsible for incorrect settings and/or the consequences thereof.

Note:
Entering the PIN code PW2 also provides access to the menus that are restricted in the service menu by PIN code PW1.

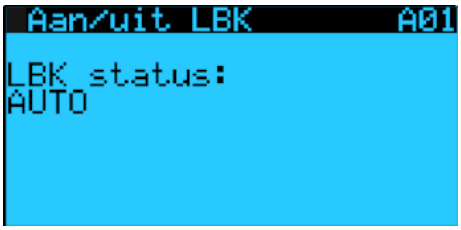
2. Description of menu operation

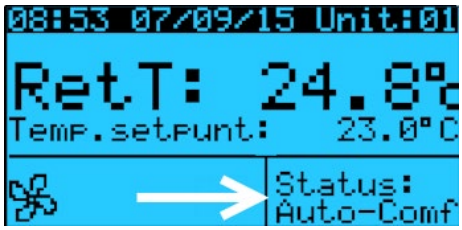
Press the **Prg** button to open the main menu. Select the desired parameter category using the **Up/Down** button and confirm with **Enter.** If a PIN code is required, enter it using the **Up/Down** buttons and confirm with **Enter**. After some time, it may be necessary to enter the PIN code again.

2.3. (A.) On/Off AHU

There are two options:
If the timer programmes are activated, the unit can follow the switch-over times of the timer programme if the setting is "Auto" in menu <A01>. The current operating status can be seen at the bottom right of the start screen. This state is determined by the timer programme settings in the menu <C02> and is preceded by the text "Auto". If any other setting is chosen, the unit will enter a "manual" mode.

Note: See [Functions chapter] for the complete description of the **on/off** function.



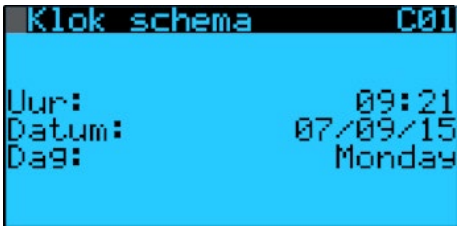


Manual mode
If the timer programmes are activated in the menu <C02> and the unit is started via the menu <A01>, the following choices are possible:
Auto: see previous paragraph
Manual mode: manual control, the unit is forced to an available operating mode (OFF, Economy, Precomfort, Comfort) for an adjustable time between 30 minutes and 8 hours. Whether the unit should start up again automatically or it should be switched off after this period can also be set. This is done via the auto-resume function. Manual operation only works if the appropriate settings have been made in the relevant mode menu (<B02>comfort, <B03>precomfort, <B04>economy). On the start screen, the current operating mode is visible at the bottom left, e.g. comfort

2.4. (B.) Set point

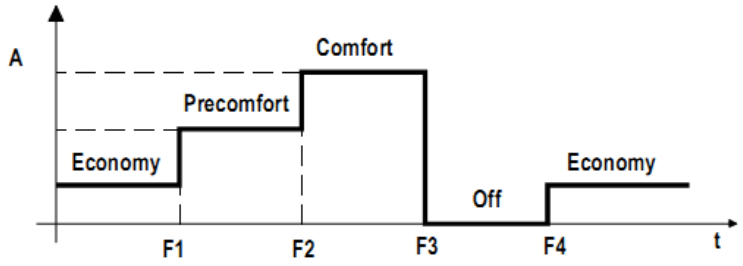
The first screen <B01> contains the current temperature and humidity set points. The temperature set point contains all set point compensations, see [Functions section]. If the timer programme is activated in the menu <C02>, different set points can be entered for economy, precomfort and comfort operating mode depending on the season (summer/winter operating mode). A total of 6 temperature and 6 humidity set points can be set in the menu <B02>, B03 and B04>. Economy mode provides energy-saving settings during night operation, for example. Comfort indicates settings for daytime operation and pre-comfort is usually in between.

2.5. (C.) Clock programme



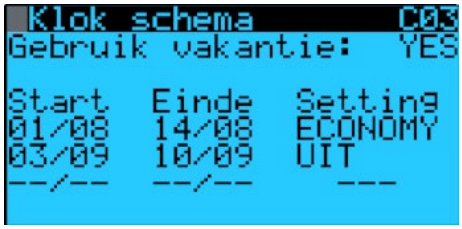
The following values can be set:
Current time and date;

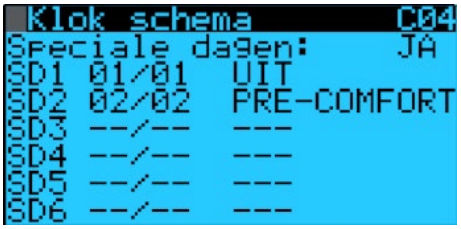
Switching on and setting the timer programme. The switch-over times are programmed according to a weekly programme with 4 switching moments per weekday with the starting times F1, F2, F3 and F4. Each switching moment is assigned an operating mode (Off, economy, precomfort or comfort). The settings can be copied to other weekdays.



Note: Independent set points can be set for each operation mode.

Holiday periods: 3 holiday periods can be set by selecting a start and end date alongside the desired operating mode for the period. The normal clock programme is ignored during this period.





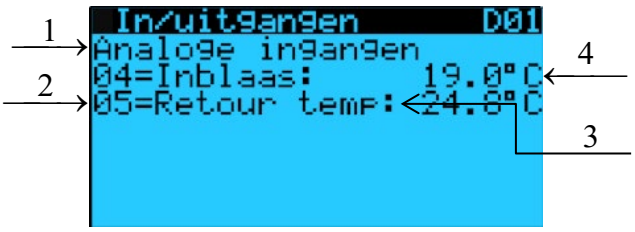
Exception days: Up to 6 special days can be entered with similar functionality to the holiday period as described above.

Summer/winter time change-over: Here the automatic summer/winter time change-over is set, including a possible transition period between 0 and 240 minutes.

Note: If the setting in the menu <Ha18> is that the set point is switched between comfort and economy mode via a digital input, the screens <C02>, <C03> and <C04> are not visible during programming of the timer programme, holiday periods and exception days.

2.6. (D.) Input/output

The first line on the screen in menu D shows the type (input/output, analogue/digital) so that it is clear whether they are inputs or outputs and whether they are analogue or digital.



1	Type input/output	3	Description of input/output
2	Terminal number or controller	4	Current value/status

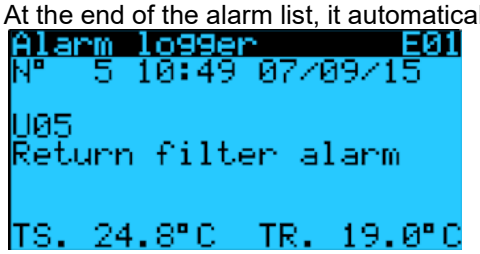
Analogue inputs : temperature, humidity, pressure differential and air quality
Digital inputs : status of pressure and flow switches, safety thermostats, fault messages from pumps, heaters and fans, external release, etc.
Digital outputs : Activation of fans, pumps, heaters, faults, etc.
Analogue outputs: Control signals for modulating control dampers, fan controls and air damper controls.

Note: The digital input status (ON/OFF) also depends on whether the configuration is normally open or normally closed in the menu <Hb>

⚠ **Important:** In menu D, only the inputs and outputs that are activated in the software are visible in the menu <Hb> [see section 6.3].

2.7. (E.) Alarm history

From this menu all saved alarms/faults can be viewed in order. The alarm is saved with time, date, code, and description of the supply and return temperature at the time of the alarm. The logger memory can be erased via the service menu.
The **Alarm** button deactivates the potentially activated buzzer and resets the existing fault (if resolved). The fault remains in the logger. At the end of the alarm list, it automatically switches to the Data logger.



Note: see also [alarms chapter]

2.8. (F.) pLAN network

The menu (F) displays a graphic of the controllers present in a pLAN network. To switch the control to another controller in the network, scroll to "go to unit" and enter the corresponding network address. As soon as the connection has been established, the current controller address is displayed under "unit address" and in the graphical display.

2.9. (G.) Service

The menu (G) gives access to a submenu that is divided into a first (a,b,c,d) part that is not protected by a PIN code. This part of the menu gives access to the following settings:
<Ga> Change language: Select the desired language in the control screens. There is a choice of English or Dutch. On the following screen, the default controller start-up language after a power failure can be set.
<Gb> Information: Here you will find information about the software application used, version numbers and the hardware used.

<Gc> Summer/winter: The season can be selected here
Keypad: manual selection via the operating display to determine whether summer or winter controls are to be used
BMS: The switch-over is written via the BMS
Keypad/BMS: The switch-over can be set both via the operating display and the BMS. The latest amendment is followed
AUTO: With this setting, the switch-over is controlled automatically via the controller. Two settings are possible here. When set to "FIX DAYS", the controller switches from summer to winter controls and vice versa on the set days. With "AUTO", full automatic switch-over, the switch-over is handled fully automatically according to the outside temperature settings, see [paragraph 8.7].
<Gd> Working hours: Here the operating hours of all main components are displayed for periodic maintenance works.

Note: From this point onwards the PIN code for PW1 should be entered

⚠ **Important:** Settings that can only be accessed after entering a PIN must be changed with care, as an incorrect setting can adversely affect the unit's operation. The supplier is not responsible for incorrect settings and/or the consequences thereof.

<Ge> BMS configuration: These menus contain all the parameters necessary for setting up communication with a BMS. For example, protocol, communication speed and address. In addition, a BMS communication alarm can be activated and the commissioning mode can be activated.
<Gfa> Working hour set: If required, maintenance messages can be set here according to operating hours. If the set hours are exceeded, a maintenance message is triggered which must be reset via the <Gfa> menu. [alarms chapter]
<Gfb> Probe adjustment: Used to enter a possible offset for a sensor measurement, e.g. to compensate for a small deviation.
<Gfc> Thermoregulation: This menu contains all the parameters necessary for setting the temperature control during installation or service. Certain control settings are located in the menu <Hc>
The 2 parameters which are to be visible in the start screen can be selected
The limits for the temperature and humidity settings (minimum and maximum) can be set here. This is done per operating mode and per summer and winter operation.
For an explanation of the following screens regarding the control strategy, see [functions chapter].
Loading of any saved factory settings saved at the end of the procedure described in [chapter 6].

Note: When loading the factory settings, all existing settings are deleted/overwritten! This cannot be undone.

<Gg> Manual management: Used to switch all individual components from automatic control to manual control. For digital outputs they can be switched from on to off, for analogue outputs the value can be adjusted between 0% and 100% control. Manual control deactivates the automatic control, but all safety devices and fault systems remain functional. This function is normally used for testing the components in the unit for proper functioning. [see chapter 7]

Note: If a component is controlled manually, the "manual" status is visible on the display.

2.10. (H.) Manufacturer

This menu (H) allows access to the factory settings after entering the correct PIN code (PW2).

<Ha>: Configuration
Configuration is the first step in setting the air handling control appropriate to the unit. Configuration requires the following procedure:
Drawing of the AHU (functional diagram, scale drawing and/or control box diagram)
Selection of the unit control components

Note: Below is a brief description of the menu, for more details about the software configuration see [chapter 6]. Changing settings in this menu is normally not necessary, as they are set at the factory.

<Ha01>:
fan type: supply fan only or supply and return fan; it is also possible to specify a delay to the start of the return fan after the supply fan <Hc06>
heat exchangers: choice of none, cooling, pre-heater, post-heater and change-over in various combinations
heat recovery and/or humidifier present or not

<Ha02>:
air damper type: choice of just external air damper(s) modulating on/off, external air+mixing dampers, external air+mixing dampers+return air damper, modulating external air damper+return air damper
free cooling and heating activation according to temperature on enthalpy
air quality control activation
<Ha03>:
fan control type selection, see [paragraph 8.14]
<Ha04>: fan alarm type selection, see [paragraph 8.14]
<Ha05>: pre-heater selection
- modulation: via a 0 to 10V signal, minimum and maximum signal can be set
The running time of the servomotor should be set in the menu <Hc08> between 1 and 3200 seconds
- electric heater: see [paragraph 8.13]
- humidifier control sensor selection, see [paragraph 8.13]

<Ha06>: cooler selection
- modulating
In the cooling cascade control menu <Gfc20> the percentage can be divided between free cooling and mechanical cooling
- Select dehumidification type, see [paragraph 8.4]

<Ha07>: change-over type
- Modulating
- Step control, similar to the menu expansion <Ha06>
<Ha08>:
Reheater type selection, see preheater description
Reheater function selection:
compensation: the reheater is used to reheat the air to the desired temperature after dehumidification or adiabatic humidification
integration: the heater works in cascade with the pre-heater for increased capacity. The pre-heater and reheater control actions may overlap, see the menu <Gfc22>
compensation+integration: both the functions above are active
<Ha09>: pump activation and flow monitoring of the water circuits, see [paragraph 8.12]
<Ha10/Ha11/Ha12>: cooling, pre-heating and reheating pumps, see [paragraph 8.12]
<Ha13>: humidifier type, see [paragraph 8.4]
<Ha14>: select and activate the type of heat recovery, see [paragraph 8.10]

Note: assign analogue/digital outputs for the control components in the IO configuration menu. Also determine the minimum and maximum controls for the modulating bypass damper

<Ha15>: air quality and flush function, see [paragraph 8.2]
<Ha16>: frost protection, see [paragraph 8.17]
<Ha17>: external release via digital input and BMS, see [paragraph 8.1]
<Ha18>: set point switching via digital input, see [paragraph 8.1]
<Ha19>: set point shift via analogue input, see [paragraph 8.2].
<Ha20, Ha21, Ha22, Ha23>: freely usable control circuits, see [paragraph 8.18]

<Ha24>: Protocols
The following communication protocols can be set:
for the BMS communication port:
BMS: BMS communication, select a communication card, see [chapter 1]
Modbus master: via the optional RS485 communication card (article no. PCO100FD10)

<Ha25>: Modbus master settings
Set the mobus master parameter:
Baud rate for communication: 1200/2400/4800/9600/19200 bit/s
Stop bits: 1 or 2
Parity: even or no
Timeout: 100 to 500 ms; this is the delay time from the communication failure until the communication alarm occurs

<Ha26>: Modbus master settings
Number of pCOe expansion modules or serial sensors

<Ha30>: switch on BMS sensors
See [paragraph 6.9]

<Ha39..Ha56>: Screens for serially coupled variable frequency drives
See [Commissioning chapter]

<Hb>: I/O configuration
See [paragraph 6.3]
<Hc>: Factory settings
See [Software configuration] and [Functions] chapters