

Greenkeeper Feedback

2-wire Decoder Control System with Software

for Windows 95/98/2000/NT/XP and Windows7®



User Manual

Phone: +49 (0) 7051 162-0
E-Mail: technik@perrot.de
Web: <http://www.perrot.de>

Perrot - Regnerbau Calw GmbH
Industriestrasse 19-29
Germany- 75382 Althengstett

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1. Foreword

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Industriestrasse 19 - 29
D- 75382 Althengstett

Telephone: +49 (07051) 162-0
E-mail: Perrot@perrot.de
Internet: <http://www.perrot.de>



2. Introduction

2.1 What is Greenkeeper Win?

Greenkeeper Win is a PC-computer control system with a sophisticated third generation decoder system. By clicking a button, the programs created on a PC are sent within a matter of seconds to the Valve Control Unit. From there, electric pulses are transmitted via a single 2-wire cable to as many as 250 decoders that energize/deenergize the solenoids. This enables you to avoid expensive installations, difficult modifications or disruptive earth works during extensions as well as all costs incurred thereby.

Assisted by your PC and the Greenkeeper Win software you create an irrigation program according to your wishes. The program is then downloaded via the serial port to the VCU.

2.2 Functional description

The Greenkeeper Control System consists of the following components (minimum configuration):

1. Valve Control Unit (VCU)
2. Windows 98/NT/2000/XP or Windows 7 - compatible PC with a modem (optional)
3. 2-wire decoder cable
4. Decoder

The system can control a maximum of 245 decoders.

The VCU feeds the decoder with modulated direct current via a 2-wire decoder cable. The modulated direct current carries signals that contain information for the decoder.

The information consists of:

1. Decoder address
2. Open or close command.

The brain of the Greenkeeper Control System is the PC.

The Greenkeeper Win program runs on the PC.

The master data for the complete irrigation equipment are entered during the installation.

These include:

1. Rated flow rate of the pump(s) in m^3/h
2. Water consumption of a single sprinkler in m^3/h
3. Area watered by a single sprinkler in m^2



The different valves or solenoids are given a unique name in Greenkeeper Win and are assigned to a decoder number.

Greenkeeper Win will use the above data to calculate the duration if you enter the required precipitation or the precipitation if you enter the duration.

The irrigation programs that you create will be downloaded to the VCU via a serial port.

The VCU will then independently control the irrigation according to the data you entered while the PC can be used to serve other purposes.

During irrigation the VCU stores data from the executed programs, e.g. the valve opening and closing time, precipitation density, etc.

You can retrieve the data stored in the PC and print it.

The Windows based program interface requires no special computer skills.

On the other hand, familiarity with the Windows environment can make your work with Greenkeeper Win much easier.

Data is entered by clicking with the mouse in a Data Entry or Option/Selection field. You then either type the values or select one of the proposed values in an Option/Selection field.

Greenkeeper is the only program on the market offering a realistic graphic representation of the areas irrigated. In the graphic you can place valve symbols in the actual locations where the solenoids are situated. By clicking the symbol you can open and close the valve.

It is also possible to energize individual valves using a hand terminal connected to a field connector.

Moreover, you can control the VCU by mobile telephone* or by a PC over a telephone line. To use this function you only need a modem and a terminal program, such as the one included in the Windows installation package.

The VCU has additional connection options for external sensors, e.g. precipitation meter, anemometer, flow meter, and pressure gauge. The sensors send the values measured to the VCU. The data can be retrieved in the Greenkeeper program. You then decide whether the data will only be recorded or fed into the Irrigation Control System to modify the program operation.

A flow-check device built directly into the supply pipe allows the user to carry out decoder and valve tests.

2.3 Functional description / Decoder with Feedback

Greenkeeper Win supports the bidirectional decoders (PD/F-1). Of course the standard decoders from Greenkeeper Win can also be used with Greenkeeper FB. But if you want to use the new features it is necessary to install the bidirectional decoders. It's possible to mix both kinds of decoders in one system, too.

2.3.1 *What means bidirectional decoder?*

The bidirectional decoder **PD/F-1** sends its status information back to the VCU. This information will be processed by the software. VCU and decoder are in permanent communication. All bidirectional decoders will be periodically interrogated.

Due to the use of the new decoders, in combination with Greenkeeper Win, a check of the decoder, solenoids, electrical valves and the pump relays is feasible. This makes it easy to check all important parts of your system permanently. The user gets quick and specific information. At an early stage problems can be identified and be logged in a report. Depending's on the settings of the software the system can be automatically switched off and sending additionally a message by telephone.

The status information of the bidirectional decoders will be periodically integrated. Depending on this status information (combination) the VCU reacts according to the software settings.

2.3.2 Which signals can be transferred?

at Greenkeeper / conventional

- ⇒ decoder number
- ⇒ run times

at Greenkeeper / bidirectional

- ⇒ decoder number
- ⇒ run times
- ⇒ valve off – no pressure
- ⇒ valve on – no pressure
- ⇒ valve off – with pressure
- ⇒ valve on – with pressure
- ⇒ short-circuit solenoid
- ⇒ no solenoid connection
- ⇒ voltage < 30V

2.3.3 PC requirement profile

Checklist

In the case that you provide the PC following points must be strictly adhered.
If one point can't be adhered, the software can't be installed

Usually the requirement profile of the PC will be achieved by all PC's in the market.



Operating system (OS):	Microsoft Windows 98 / 2000 / NT / XP / Windows7 complete installed and configured	
CPL/CPU:	Intel Pentium od AMD 500 MHz or higher.	
Random Access memory: RAM	min. 64 MB RAM at Windows 98 min. 128 MB RAM at Windows 2000 / NT min. 512 MB RAM at Windows XP	
Interface/Port:	2 x serial port (COM1 and COM2)	
Hard disc storage:	min. 15MB free disc space at the hard disc.	
Modem: extern	Hayes-compatible, min. 19200 baud extended AT-strings, Interface: V.24/RS-232	
Printer:	A Windows supported DIN A4-Printer (USB od parallel). Ink jet or laser printer	

The operating system (OS) has to be completely installed and configured.

Ask your PC supplier to confirm the PC requirement profile.

COM 1 for VCU (Valve Control Unit)

COM 2 for modem. *optional



Never use Com 1 and Com 3 or Com 2 and Com 4 together.

This leads inadvertently to problems with conflicting settings resulting in system instability.

Further, a modem (if possible, external) is required for remote control via a telephone.

The program takes up about 15 MB of your hard disk space.

The interface follows the familiar Windows standard.

The PC can be used for processing multiple tasks simultaneously.

All Windows compliant printers are supported.

Please make sure that your Windows runs reliably. Incorrect installation of Windows may cause the system to crash unforeseeably.

If you have questions concerning Windows problems, contact directly Microsoft support.

3. Hardware Installation

3.1 On-site preparations for the installation of the Valve Control Unit (VCU)

- ✓ A “Schuko” socket is needed for the power supply.
Disconnect the green-yellow earth conductor from the socket.
Grounding will be facilitated via the VCU.
- ✓ Plug the supplied surge protector in the socket.
- ✓ Mount the Valve Control Unit (VCU) to its location on the wall.
Connect the available decoder cable to terminal 34/35.
If you need to run multiple decoder cables (up to 3 units) use terminals 36/37 and 38/39 next. (See also User Manual Page chapter10, Wiring schematic)
Connect the external interfaces such as Rain gauge Type Mini Click to their corresponding terminals.



IMPORTANT: Please check the VCU version on the inside and outside label on the door!!

If it does not show Greenkeeper Win, follow the instructions for a chipset update.

Without the new chipset the VCU is not compatible with Greenkeeper Win.

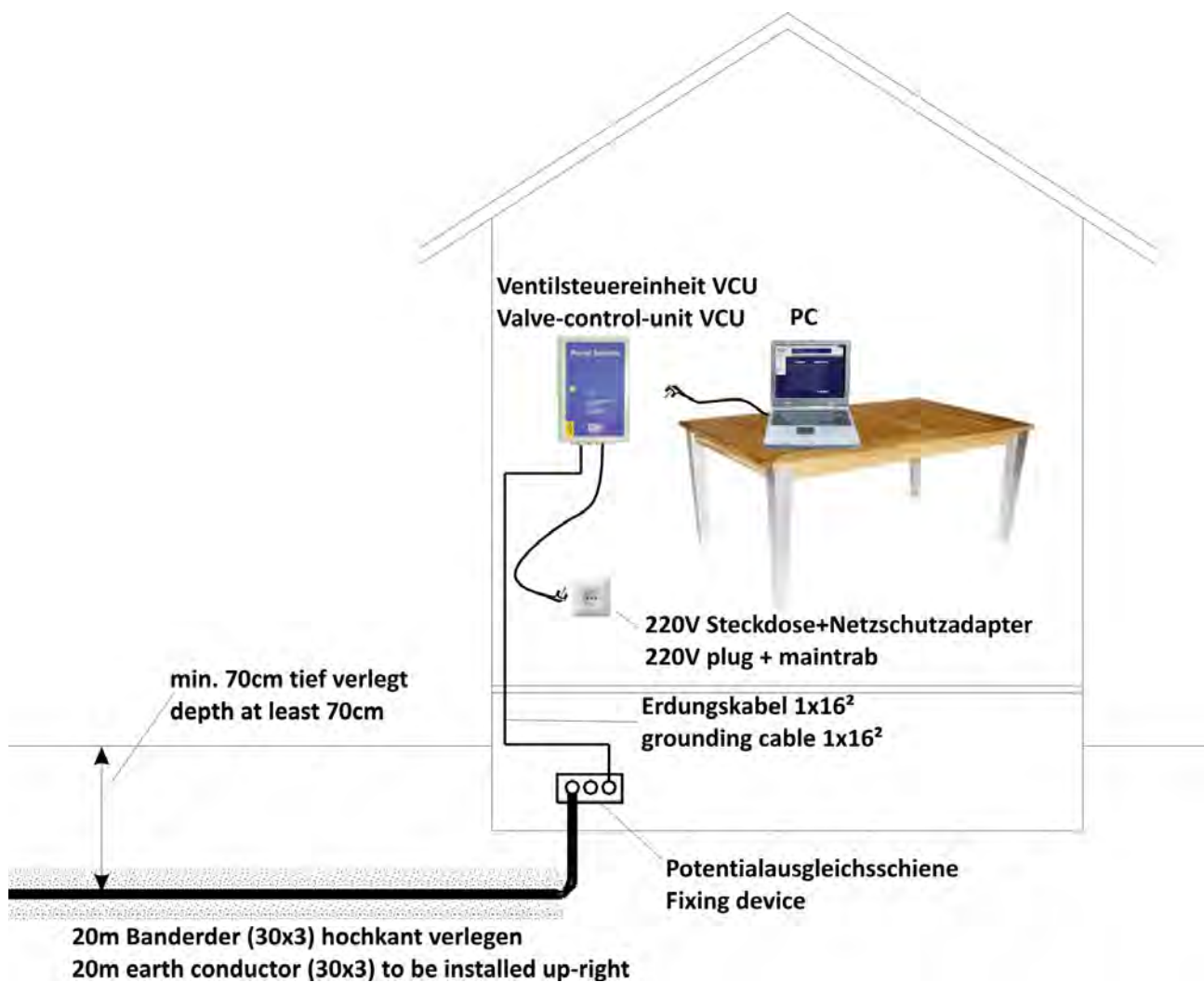
- ✓ Grounding with an earth conductor to BA 10119.
An earth conductor at least 20 m long shall be buried in a ditch at least 70 cm deep, in accordance with BA 10119. The earth resistance should be less than 10 Ohm.
In poor conductivity areas (gravel or sand) 2 x 20 m earth conductors should be used.
Mount a potential equalizing bar on a wall inside the building.
Connect the earth conductor to the equalizing bar.
The potential equalizing bar is connected to the VCU with a (green-yellow) earth cable 1 x 16 mm². The earth cable connects the earth bar of the VCU to the potential equalizing bar.
Order number for the grounding equipment: SB50001.
- ✓ On the right-hand side of the VCU you will find 2 “Schuko” sockets.
Plug the cord of your computer into one of the sockets.
Should your monitor use a separate “Schuko” plug use the second socket for this. For the modem you can use any socket that you choose.
- ✓ Now plug the VCU mains cord in the mains surge suppression unit connected to the mains outlet.
Connect the VCU to the COM 1 serial port of your computer.
Should there be two identical sockets on your computer, use the one marked Port 1, COM 1, Ser. 1, A or similar.
- ✓ Now switch on the power supply.
The VCU will acknowledge this by emitting a tone signal.
The **green LED** on the VCU is lit up continuously.
The **yellow LED flashes** (with long intervals between the flashes).
Should the yellow LED not flash, there is no software downloaded in the VCU.

This will be dealt with in greater detail later.
The **red LED** must **not** be lit up.



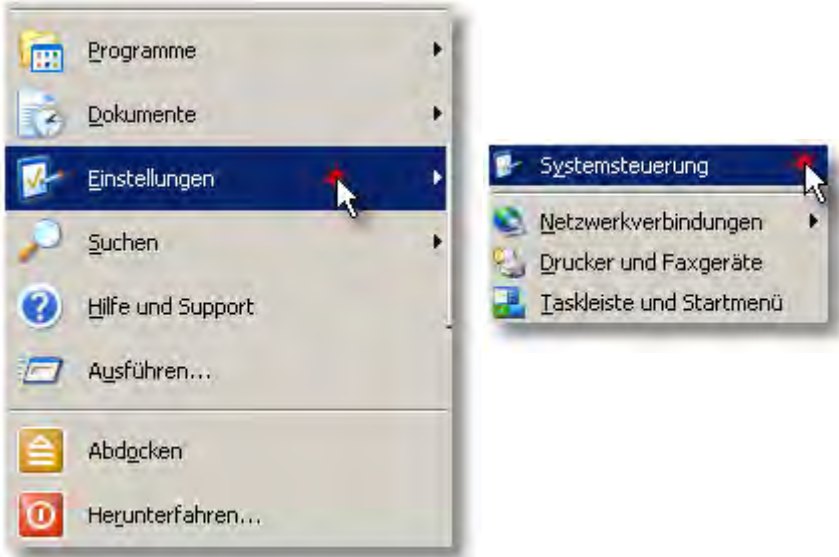
If the red LED lights up a faulty decoder cable is indicated.
Please double check all cable and decoder connections.

3.2 Grounding System for Greenkeeper and TWT



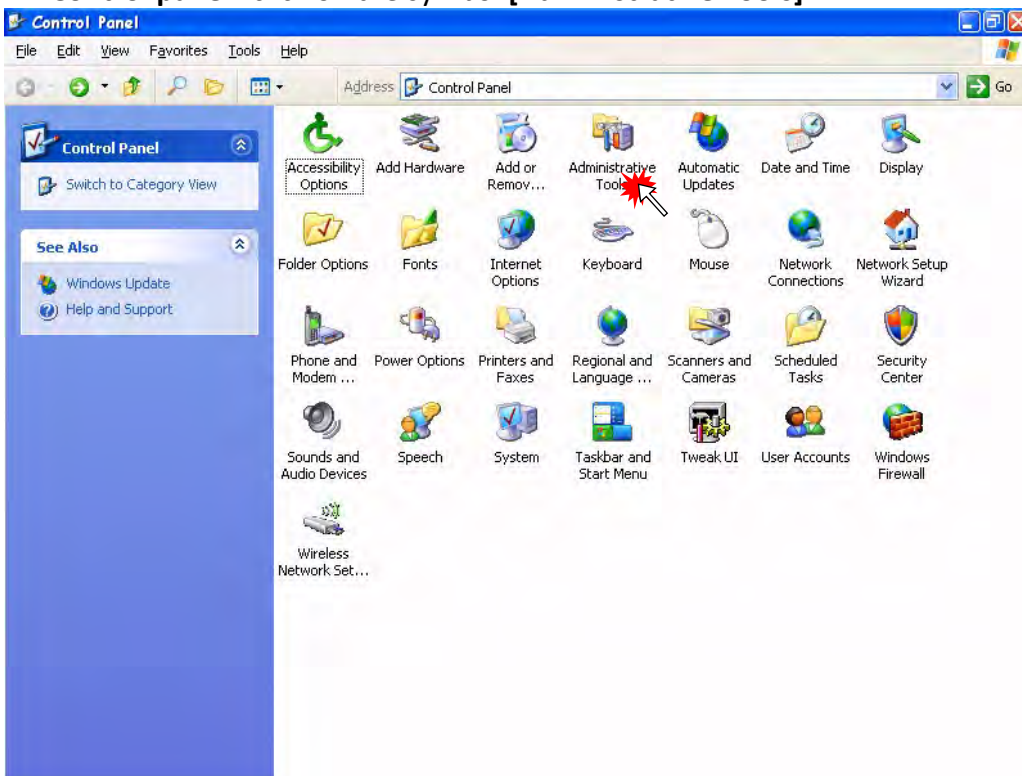
4. Getting the Computer Ready for Installation

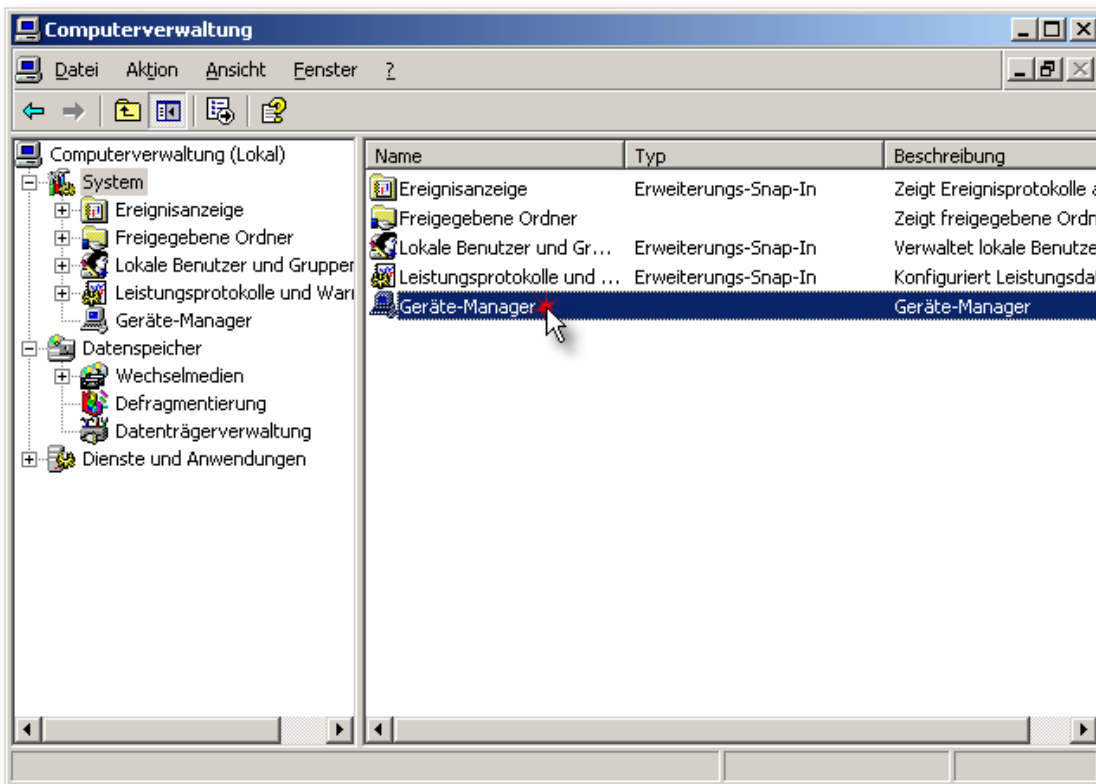
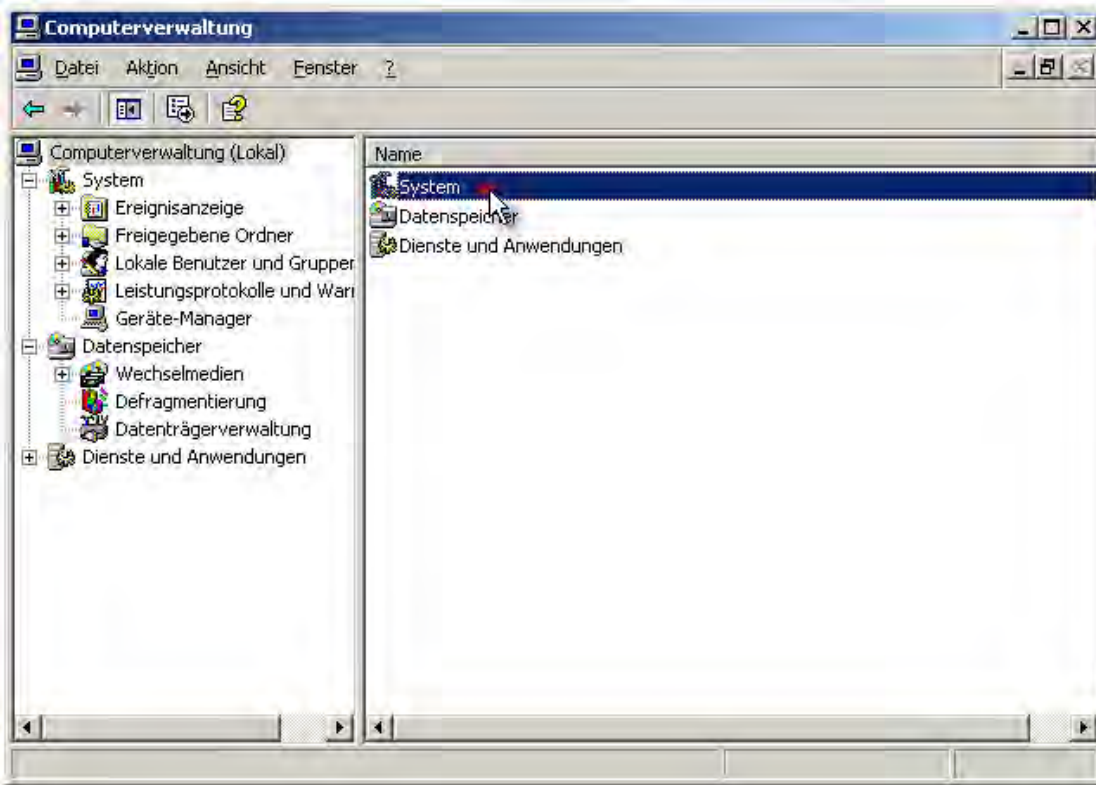
Check first which interfaces are available by Windows XP. Do that like described as following:
Click **“Start -> Customize -> Control Panel”**



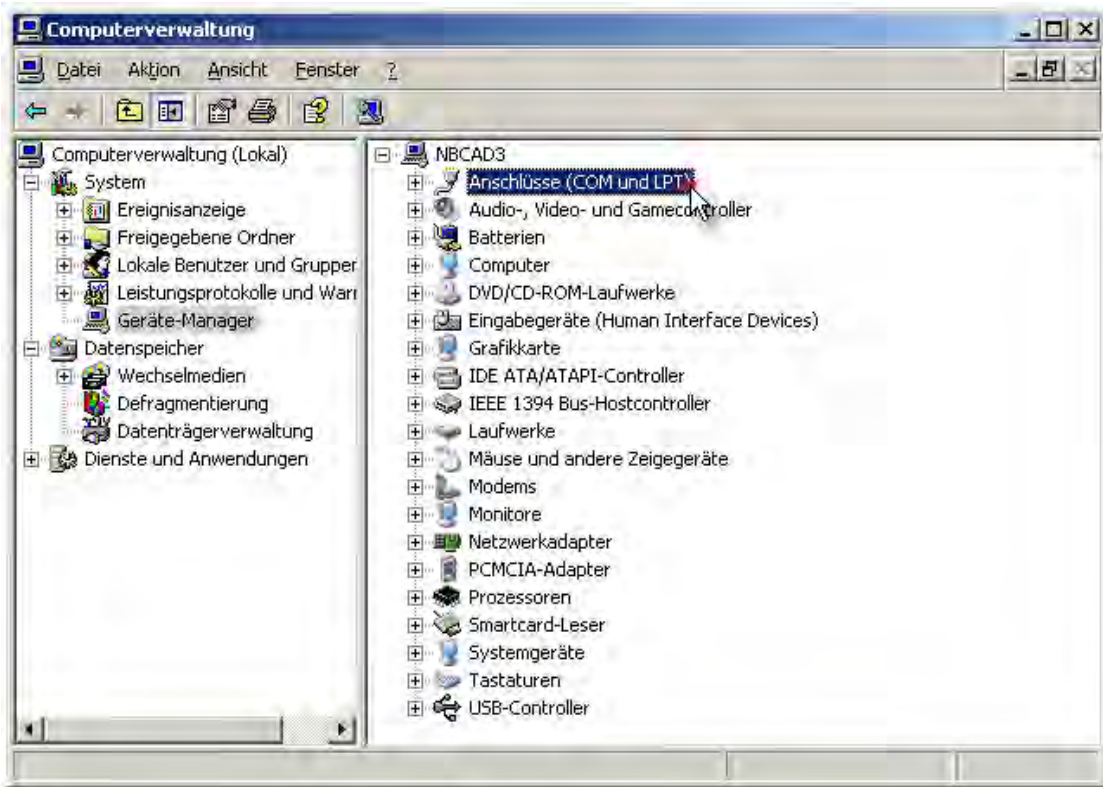
Left mouse click on the symbol  [Control Panel].

In "Control panel" click on the symbol [Administrative Tools]



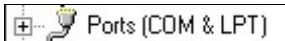


Left mouse click at  **[System]** and **[device manager]**.

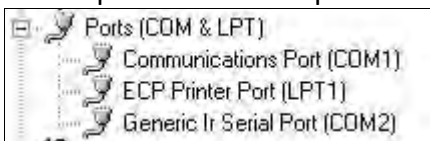


Left mouse click at **[Ports (Com&LPT)]**.

Here are all devices are listed.
Please choose the icon below.



Thereupon all available ports will be shown.



The VCU is connected via a serial port (RS 232).
A standard PC computer has two serial ports available.

The first I/O port is marked **COM1**. (Communication Port 1)
The second I/O port is marked **COM2** (Communication Port 2).

To each I/O port a particular IRQ (interrupt request line) is assigned.
The IRQ can only be used once for a device.
It is not possible to assign two devices to one IRQ.
This would inadvertently lead to a conflicting IRQ's problem.

4.1 Modem Installation (ONLY FOR COMMUNICATOR OPERATION)



Two serial ports must be free! The COM2 part is only needed for the use of the Nokia Communicator.

Connect the modem to the telephone outlet using the supplied cable.
(Only for Germany)

Please pay attention to the coding in telephone outlets with 3 sockets.

The central socket is an F-coded socket (long distance).

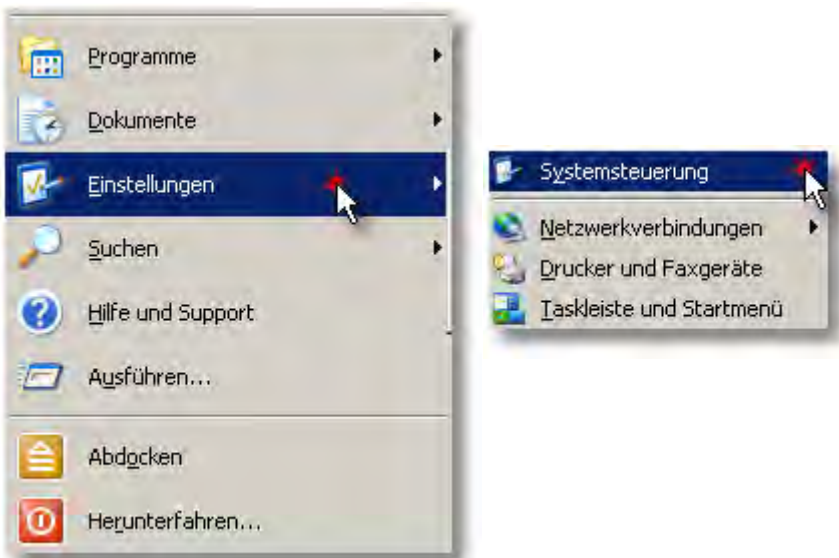
The modem also has an N-coded (non-long distance) plug that fits only in an N-coded socket.

Therefore use the left-hand side socket.

Do not use the right hand side socket, which may be disconnected.

For other countries consult your telephone company.

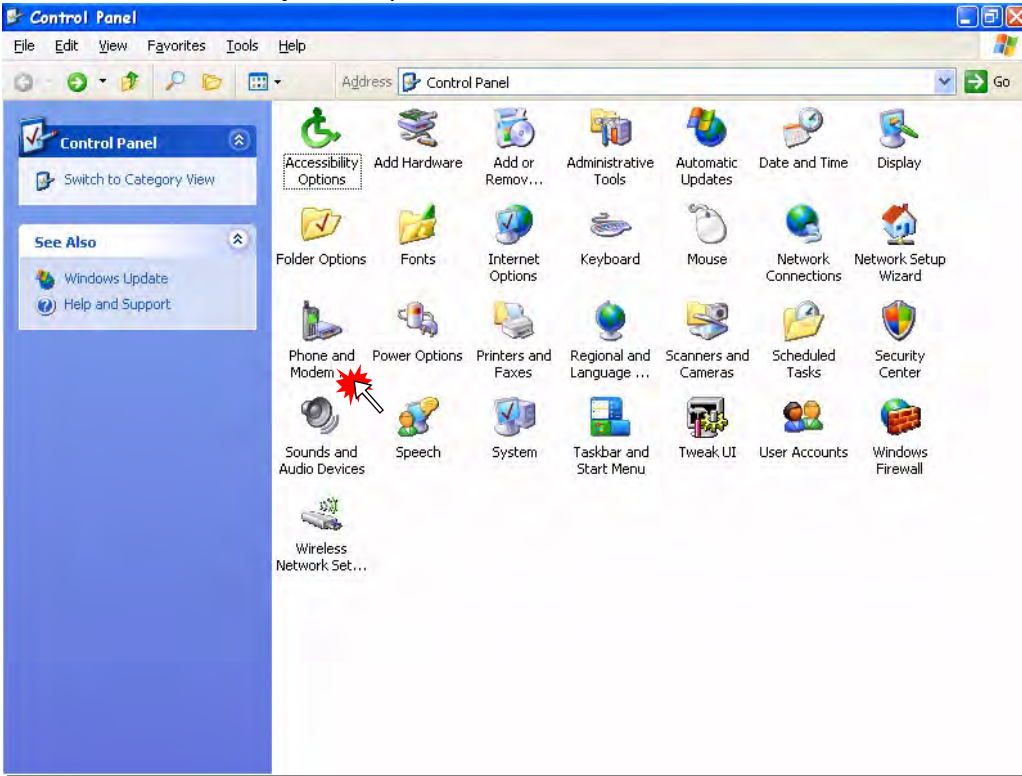
- ✓ Using the cable, connect now the modem to the **COM 2** serial port.
- ✓ Please make sure that you actually use the **COM 2** port.
- ✓ Now connect the modem to the power supply using the adapter supplied.
- ✓ Switch the modem on.
- ✓ Switch the computer and monitor on.
- ✓ Windows now automatically detects the new modem and installs the appropriate driver.
- ✓ Windows now automatically detects the new modem and installs the appropriate driver.
- ✓ After a successful installation, check whether the modem has been correctly installed.



Click on [control panel]



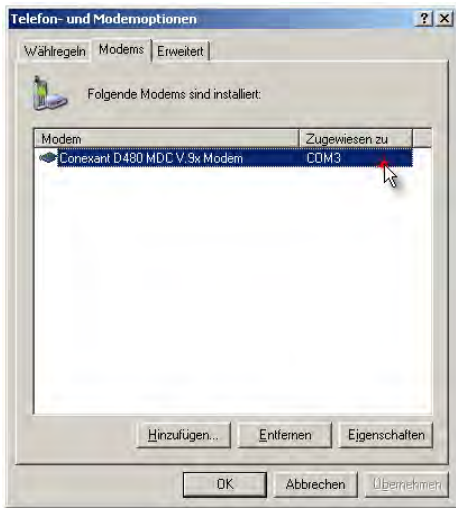
The window [control panel] opens:



In this window click on:

[Phone and Modem...]

All the modems installed will be listed in this window.



You can view the modem properties in this window.



Note the **[Port:]** field in the Properties window. It must display the correct COM port COM2.

Click Ok if it is correct.



4.2 Installation of Greenkeeper Software under Windows

Installation – Step by step

It is assumed that a modem and a printer are installed and ready to operate.

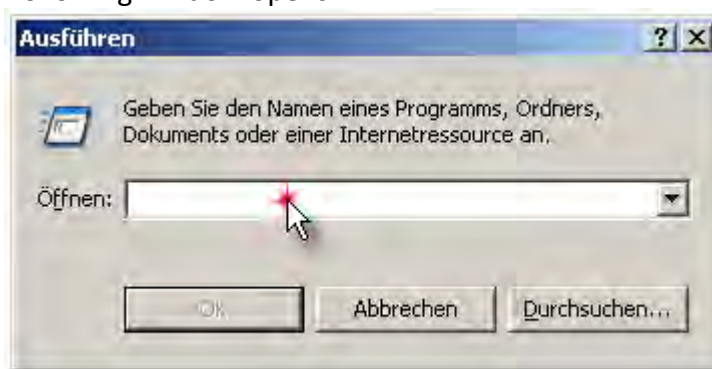
- ✓ If your computer is not running, switch on the devices you will need in the following order:
 - ⇒ Monitor
 - ⇒ Modem (if available)
 - ⇒ Printer (if available)
 - ⇒ Computer
- ✓ When Windows are up and running you can start with the installation of the **Greenkeeper** software.
Proceed as follows:

- ⇒ Take the „Greenkeeper“ CD into the CD-ROM drive and click on:



- ⇒ Move the mouse on this button and click it

- ⇒ Choose in the start menu - **Run** -
Following window opens:



Type the following in the white Command Line:

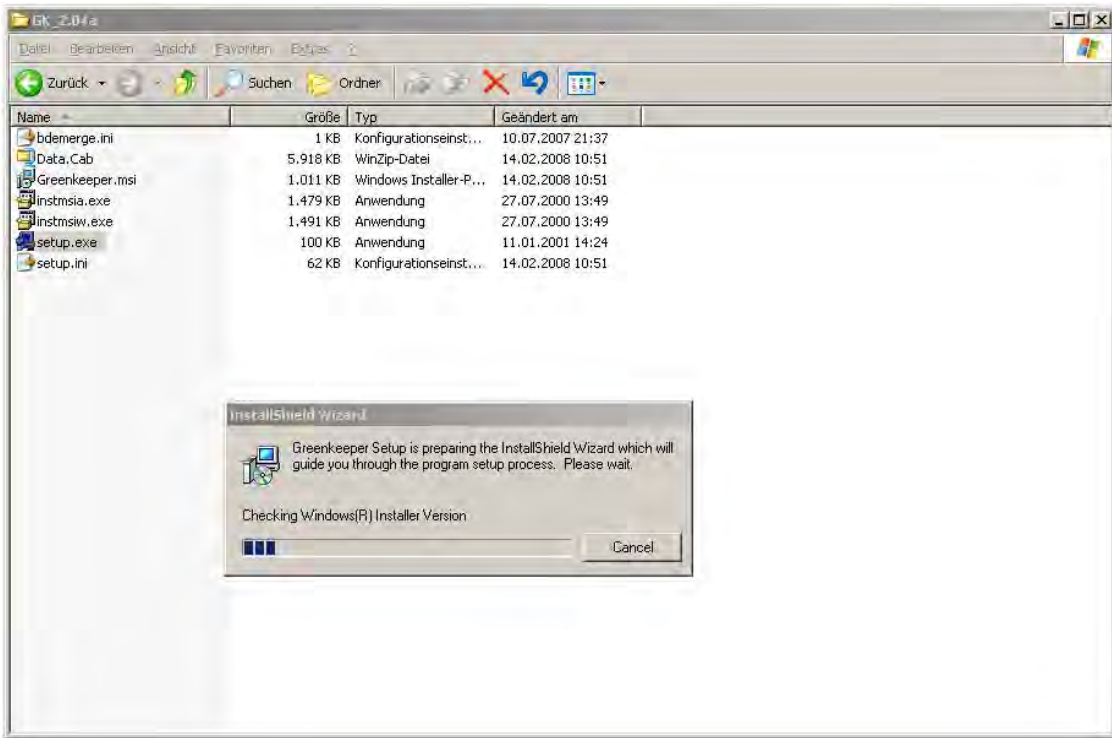
D:\Setup.exe (from a CD-ROM) or

E:\Setup.exe (from a CD-ROM)



Finally left-click the OK button.

The Setup Wizard will start.



The Setup Wizard is preparing the installation.



This is the Welcome screen.

Should you want to terminate the installation, click **[Cancel]**

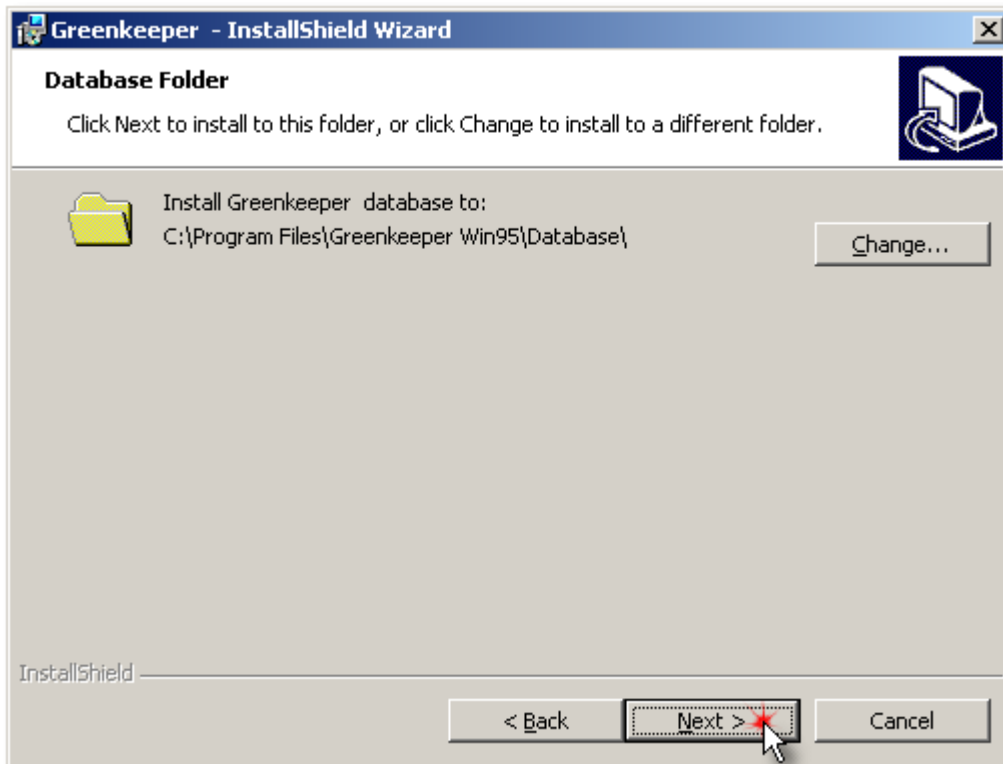
Click **[Next]** to continue with the installation.



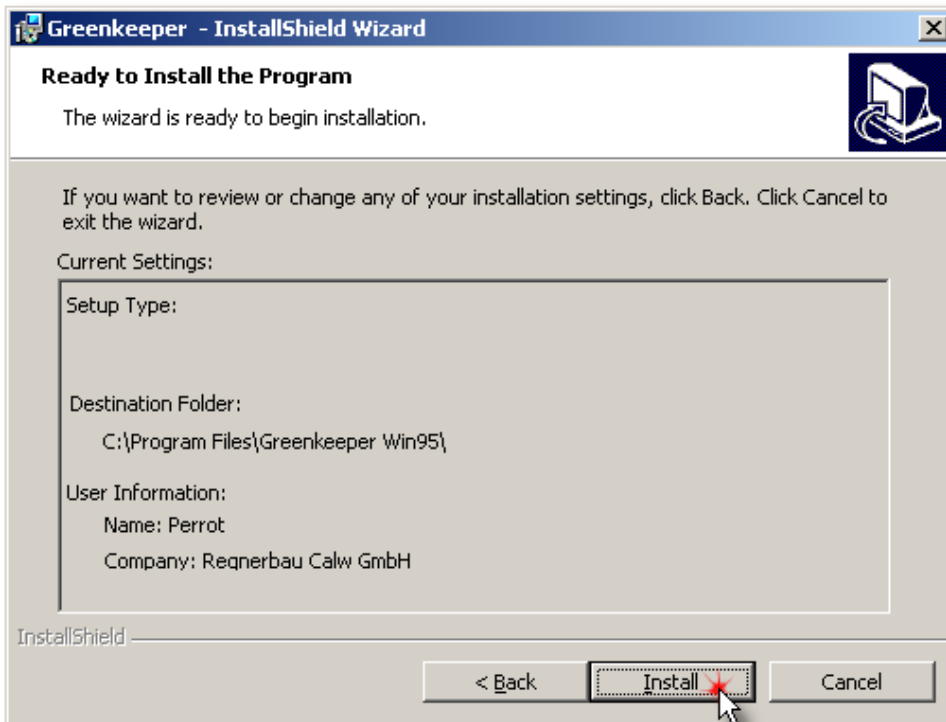


The Setup program proposes a directory for the installation.

Confirm the directory by clicking **[Next]** once.



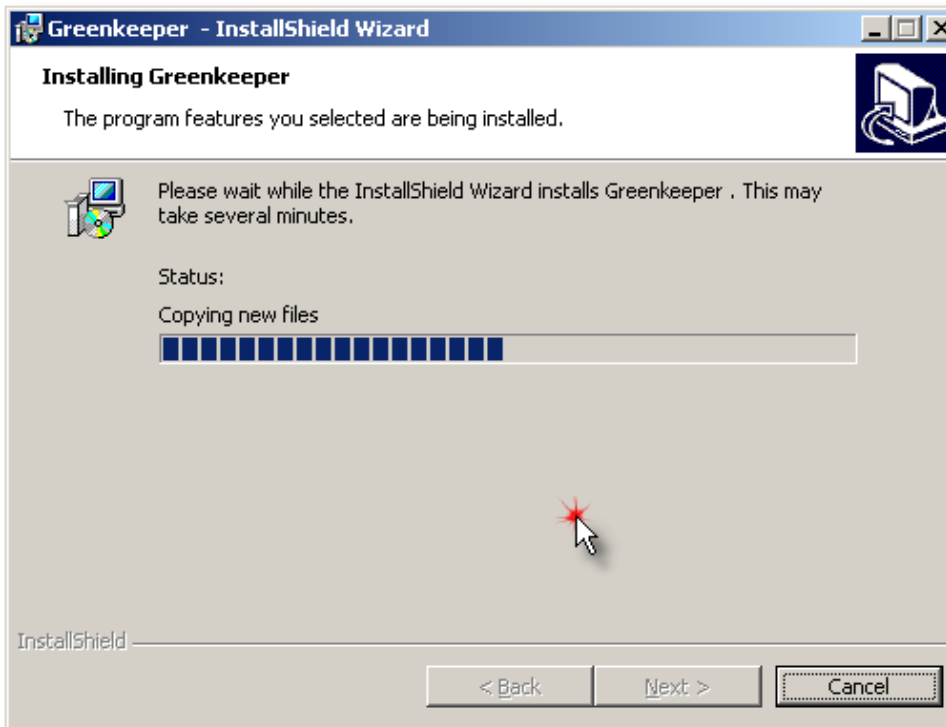
Click on „Next“ to continue with the installation



Here you can review all information once again.



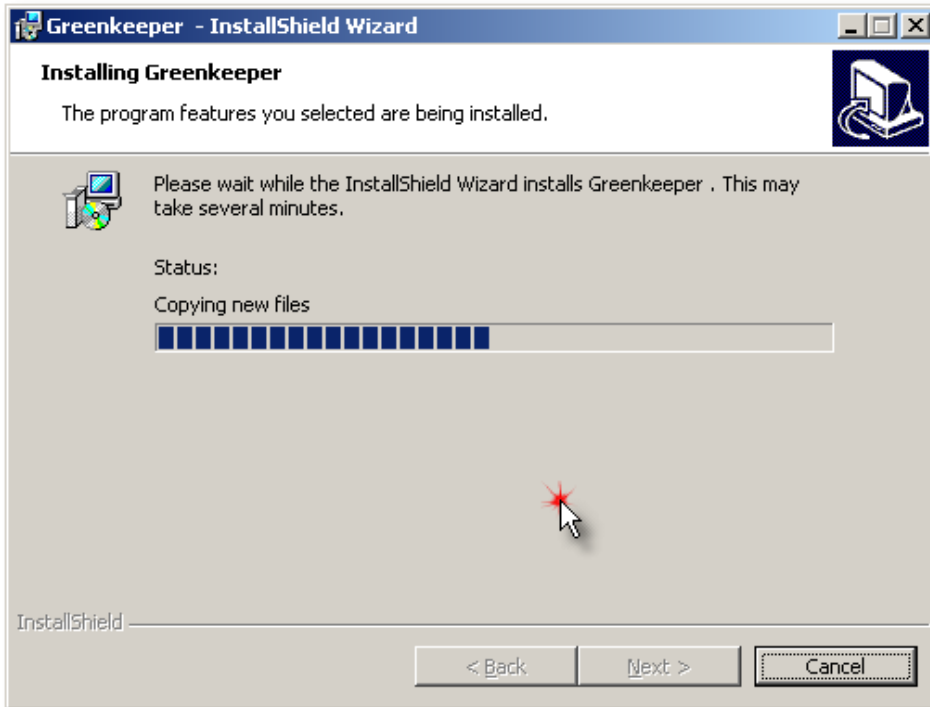
Should you want to make changes, just click **[Back]**.



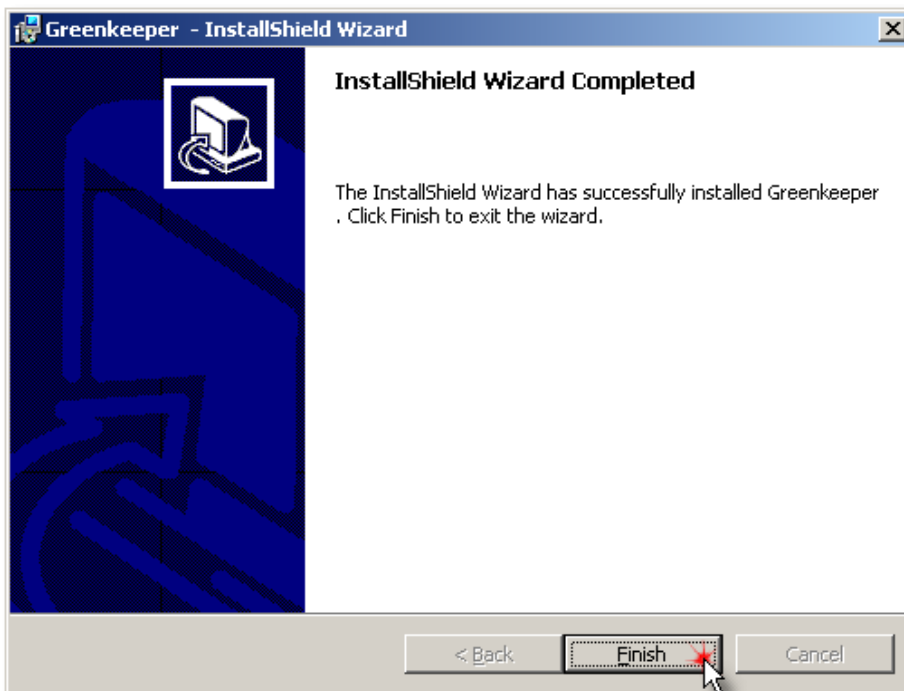
By clicking **[Cancel]** you have the option of exiting the installation.



To confirm the settings as they are click **[Next]**  and the installation will continue.




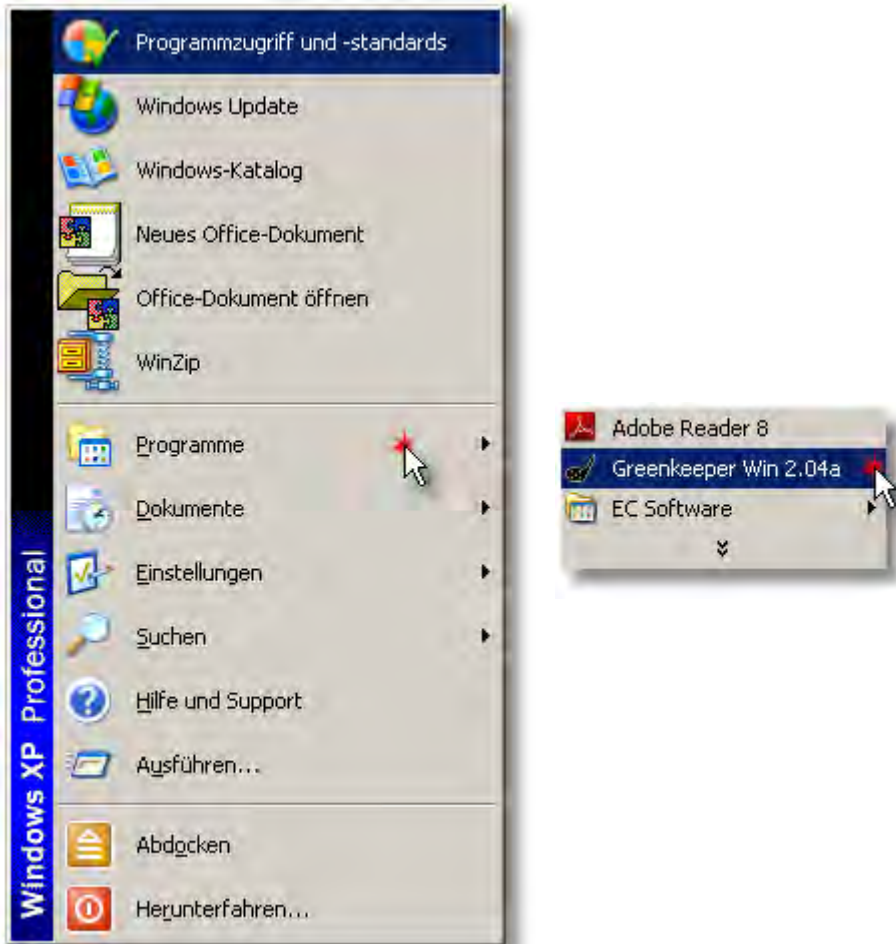
After all the installation disks have been copied the Setup Wizard arranges the data in folders.



Click **[Finish]**  to complete the installation.

4.3 Creating a Shortcut on Desktop

To start „Greenkeeper Win“ by a double-click  an icon on the desktop was generated.
If this is not the case:



Click on the „Start“ button. 
Choose in the menu **[programs]**. Click on GK-Win and move it to the desktop. 
The icon is generated.

4.4 Graphics Installation

You can use up to 10 graphic files (*.bmp). Copy the files in the
C:\Program Files\Greenkeeper Win95\bmp directory.
You can select the file you need in the Greenkeeper program later.

5. Starting Greenkeeper Win

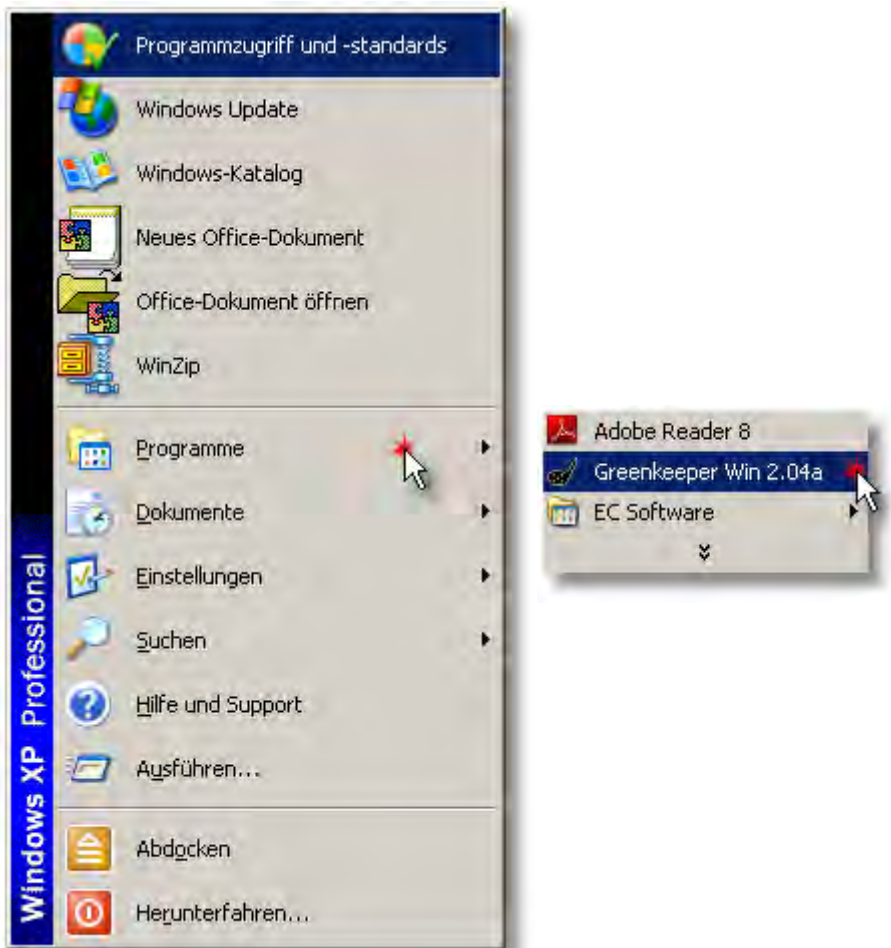
You can start the Greenkeeper Win in 2 different ways:

- ⇒ By double-click on the icon at the desktop:



Move the mouse pointer on the „Greenkeeper Win“ icon and double-click.

- ⇒ By the Windows program list:



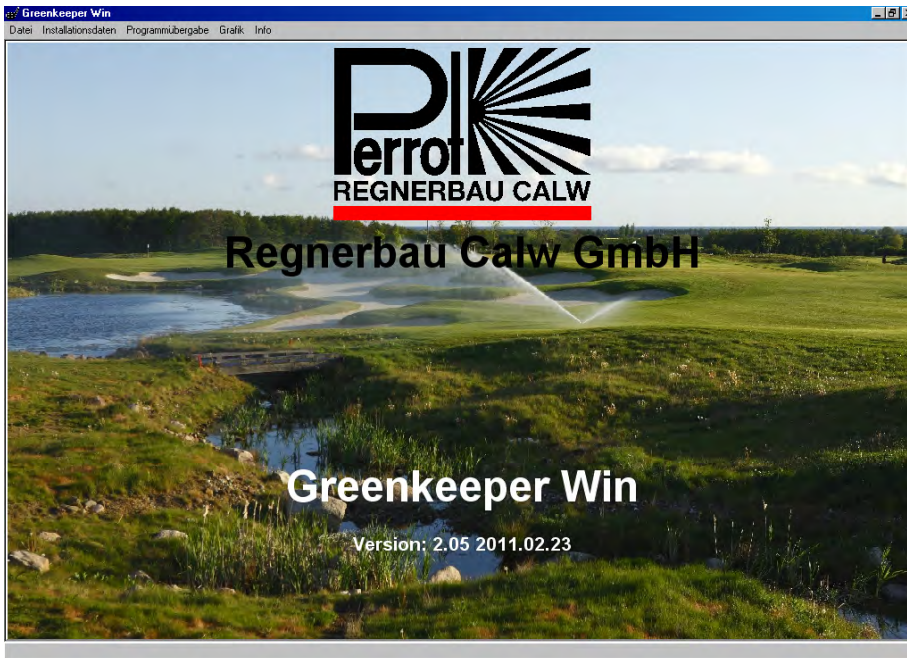
START - Programs – Greenkeeper Win

One click on **[Greenkeeper Win]** is enough.



The opening screen.

Position the mouse pointer on Ok and click it once with the left mouse button



This is the menu bar. From here you can control Greenkeeper Win



**The menus that are available to you depend on the Password Level.
After starting the software the password level 0 is default level.**

6. Password Level

Greenkeeper employs 4 different Password Levels.
Password Level 0 is the default level when you start the program.
It is the only level accessible without a password.
Consequently, its functions are limited.

In Password Level 0 you have access to the following menus:

File	System configuration	Downloading	Surveillance	About
Password	Communication setup (limited)	Change active programs		

This Password Level provides you with everything you need for the control of Change Active Programs.

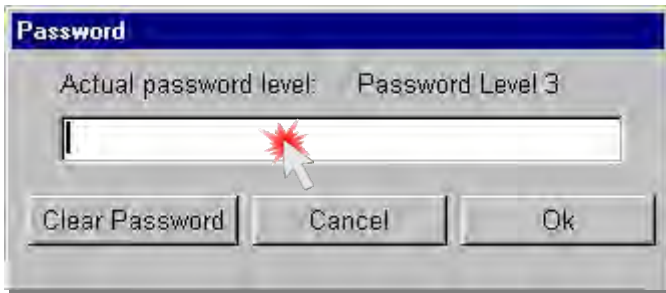
To change the Password Level, position the mouse pointer over the **File** menu on the top of the screen.

After clicking it with the left mouse button, the menu opens.
Now position the mouse pointer over Password and click it with the left mouse button.



Whenever you come across **Click ...** in the following pages it always means position the mouse pointer over a particular spot and clicks the left mouse button.

Double-click means **2 quick clicks** with the left mouse button.



Enter your password for the level you want and press [ENTER].
The selected Password Level will appear in the top right-hand corner.



Click **OK** to display the selected Password Level.
If you enter an invalid password Password Level **0** is selected.
You can use the **Clear Password** button to delete your entry.
The following Password Levels are available:

6.1 Password Level 1 (medium security)

Password:..... (you will receive it from the System Administrator)
Can be changed by the System Administrator.

Access to menus: **All**

Except:

- Pump data hydraulic groups and sectors
- Valve data
- General
- External VCU interface
- Backup/Restore
- System setup
- Service (without submenus)

6.2 Password Level 2 (low security)

Password:..... (you will receive it from the System Administrator)
Can be changed by the System Administrator.

Access to menus: **All**

Except:

- Backup/Restore
- System setup
- Service (without submenus)

6.3 Password Level 3 (no security)

The password cannot be changed and will be given to the System Administrator during installation.

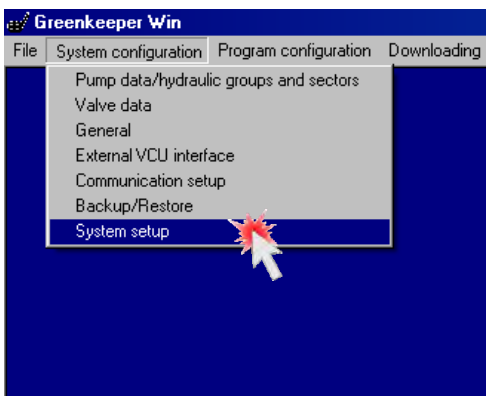
Access to menus: All

With this password you can change or delete all relevant data in Greenkeeper Win.



Please, be careful when you log on under this password.

Passwords for Level 1 and 2 can be changed using the System configuration – System Setup menu option.



7. The Installation Data's

The master data is divided into two subgroups:

Pump data / hydraulic groups and sectors

- ⇒ Pump designation and pump capacity
- ⇒ Pump status
- ⇒ Pump forerunning, last running, and interval time
- ⇒ Division of the pipe network in hydraulic groups
- ⇒ Division of hydraulic groups in hydraulic sectors

Valve data

- ⇒ The decoder number assigned to a valve number
- ⇒ For each valve number, the area to be irrigated
- ⇒ Valve numbers assigned to a particular hydraulic group and a hydraulic sector
- ⇒ Water consumption of a valve

The above data is specified during installation by the installer of the irrigation system and is duly recorded.



Do not change any data without discussing it first with the installer of the irrigation system.

Greenkeeper uses the above data to calculate how the program will run.

After an update **all** programs must be deleted from Change active programs **and** from the VCU. All program configurations must be updated with the new master data and retested. (Program test)

Only then can the program configurations be downloaded to the VCU and entered in Change Active Programs.

Master data entry or update is only possible in Password Level 3.

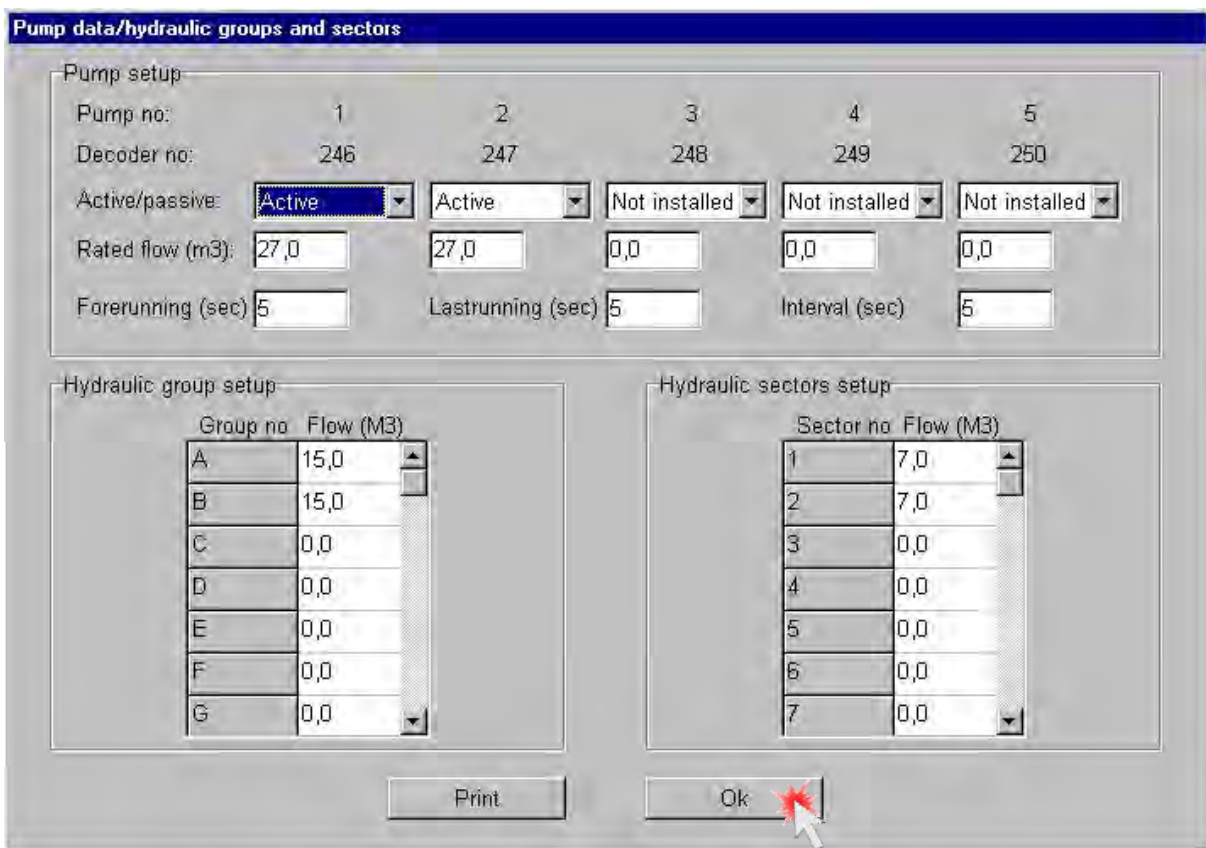
7.1 Pump data / hydraulic groups and sectors

Use the password to go to **Password Level 3**.



In the **System Configuration** menu click **Pump data/hydraulic groups and sectors**.

The data entry window opens:



Pump setup					
Pump no:	1	2	3	4	5
Decoder no:	246	247	248	249	250
Active/passive:	Active	Active	Not installed	Not installed	Not installed
Rated flow (m3):	27,0	27,0	0,0	0,0	0,0
Forerunning (sec)	5	Lastrunning (sec)	5	Interval (sec)	5

Hydraulic group setup	
Group no	Flow (M3)
A	15,0
B	15,0
C	0,0
D	0,0
E	0,0
F	0,0
G	0,0

Hydraulic sectors setup	
Sector no	Flow (M3)
1	7,0
2	7,0
3	0,0
4	0,0
5	0,0
6	0,0
7	0,0

Use this window to enter pump as well as hydraulic group and hydraulic sector specific data. As a rule the values are specified during installation.

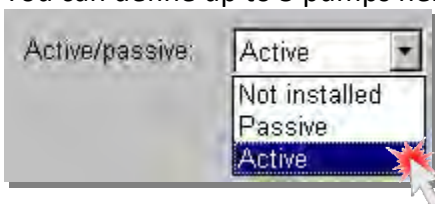
The window is divided into three areas:

- ⇒ **Pump setup**
- ⇒ **Hydraulic group setup**
- ⇒ **Hydraulic sector setup**

7.2 Pump Setup

Pump setup					
Pump no:	1	2	3	4	5
Decoder no:	246	247	248	249	250
Active/passive:	Active	Active	Not installed	Not installed	Not installed
Rated flow (m3):	27,0	27,0	0,0	0,0	0,0
Forerunning (sec)	5	Lastrunning (sec)	5	Interval (sec)	5

You can define up to 5 pumps here. A different decoder number is assigned to each pump.

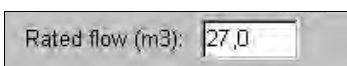


Define the status of each pump here.
Select a status option from the selection list.

Not installed: The pump is not installed and will be not considered by the system.

Passive: The pump is installed but used for different purposes, e.g. as a service pump. It will **not** be considered by the system.

Active: The pump is installed and will be considered by the system.



Enter the pump capacity for each pump in this field.

Values: 0,0 - 999,9 m³/h

The capacity entered will only be taken into consideration for pumps with **Active** status.



Enter **forerunning** here. In the broadest sense also the delay.

Values: **0 - 250 seconds.**

After the start of the last pump the opening of the first valve is delayed by the Forerunning entered.

Example: Pump 1 starts.....5 s forerunningfirst valve opens.

Interval (sec)	<input type="text" value="5"/>
----------------	--------------------------------

Enter the pump interval here.

Values: **0 - 30 seconds**

Only possible when more than one pump is used.

The **Interval** is a pause in seconds between the activation / deactivation of two pumps.

When the system is under full load (5 pumps) the **Interval** will be employed 4 times.

Lastrunning (sec)	<input type="text" value="5"/>
-------------------	--------------------------------

Enter **last running** of the last pump here.

Values: **0 - 100 seconds.**

Last running is a period of time during which the pump continues running after the valve is closed.



NOTE: Depending on Forerunning and Interval in extreme cases it can take up to 370 seconds before the first valve opens!

7.2.1 Example of Pump Start with Forerunning and Interval

Pumps 1, 3, and 5 are installed and active.

Forerunning: 50 seconds

Interval: 20 seconds

Program start, Pump 5 starts at the same time

The pump with the **highest** number starts always **first**.

The interval entered runs next.

Pump 3 starts after the interval expires.

The interval runs again.

Pump 1 starts after the interval expires.

Now Forerunning runs.

The first valve opens after Forerunning expires.

Second	Operation
0	Program starts, Pump 5 starts
20 (Interval)	20 seconds later Pump 3 starts
40 (Interval)	20 seconds later Pump 1 starts (Relay 1 is energised)
90 (Forerunning)	50 seconds later the first valve opens

In this case it takes 90 seconds before the first valve opens.



The Relay 1 and 2 outputs are only energised after Pump 1 and 2 has been started. In this example the Relay 1 output will be energised after 40 seconds!

7.2.2 Example of Program End with Last running and Interval

Pumps 1, 3, and 5 are installed and active.

Last running: 50 seconds

Interval: 20 seconds

Program ends, all valves are closed, all pumps continue to run.

Last running runs next.

Pump 1 stop after Last running expires.

The pump with the **lowest** number is always switched off **first**.

The interval runs now.

Pump 3 stops after the interval expires.

The interval runs again.

Pump 5 stops after the interval expires.

Seconds	Operation
0	Last valve closes
30 (Last running)	Pump 1 stop (Relay 1 is deenergised.)
50 (Interval)	Pump 3 stops
70 (Interval)	Pump 5 stops

In this case the last pump stops 70 seconds after the last valve has closed.



**The Relay 1 and 2 outputs are deenergised on the stopping of Pump 1 and 2.
In this example Relay 1 output will be deenergised after 30 seconds.**



7.3 Hydraulic Groups

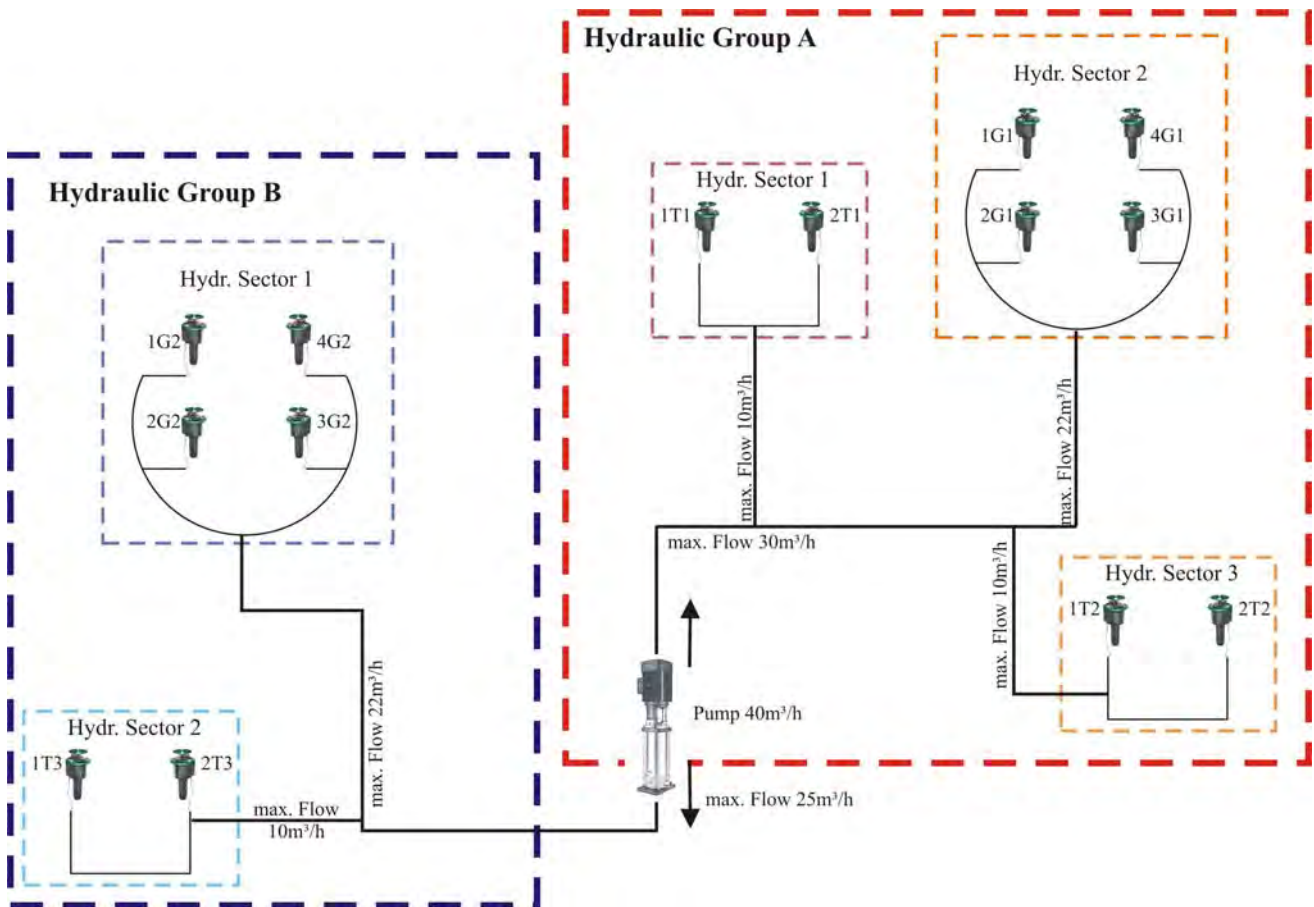
During irrigation "Greenkeeper" tries to open as many valves as the pump capacity allows.

When the valves are not assigned to a hydraulic group/sector the way the program runs is controlled by an algorithm which takes into consideration the flow of the different valves but disregards the pipe network arrangement and pipe dimensions.

While in terms of irrigation efficiency it would be bad practice to supply the valves that are in operation simultaneously from the same pipe branch (pressure drop) it is essential to give Greenkeeper the information about which valves are supplied from which pipe branch and what the permitted maximum flow of the pipe branch is.

By subdividing the pipe network into hydraulic groups and hydraulic sectors Greenkeeper is capable of making optimum use of the pipe network resources. Consequently, the irrigation time can be reduced to a minimum.

7.3.1 Example of a Pipe System



In the example on the previous page each independently controlled sprinkler on the green has a water consumption of approx. $10 \text{ m}^3/\text{h}$ and the manifolds on the tee have consumption of $6 \text{ m}^3/\text{h}$ or $8 \text{ m}^3/\text{h}$.

The pump capacity of $40 \text{ m}^3/\text{h}$ would make it possible for all the 4 sprinklers on the green to be in operation simultaneously.

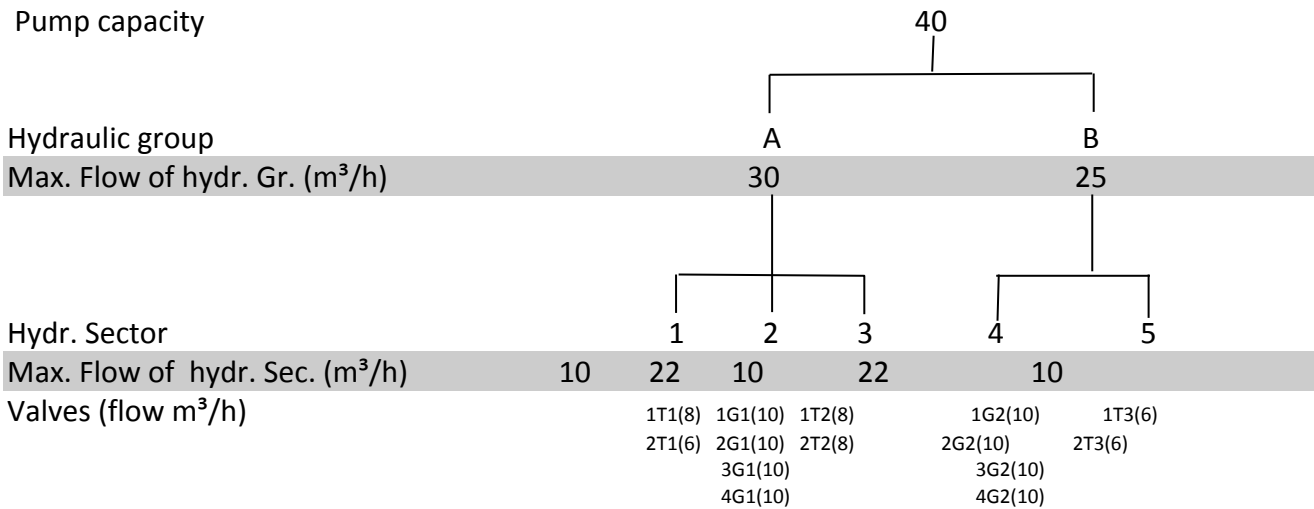
However, as the pipe supplying Green 1 would be overloaded while the other lines remain unused, the resulting pressure drops would be excessively high.

For this reason it would be beneficial to arrange the valves from the example by dividing them in hydraulic groups and hydraulic sectors.

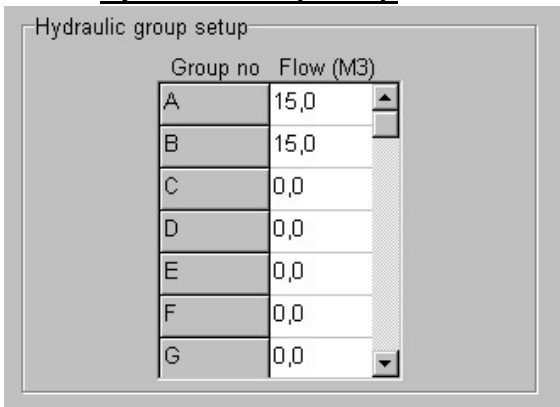
When the flow for the hydraulic groups / sectors from the example is then entered, a maximum of 2 sprinklers can be in operation on the green simultaneously.

The following flow diagram illustrates the example once again.

7.3.2 Flow diagram




7.3.3 Hydraulic Group Setup



Here you can define hydraulic groups. Each group is assigned a letter from A to I. This means you can define a maximum of 9 hydraulic groups.

Calculate the maximum flow, taking into account the pipe dimension and pipe length.

Now click  in the white field (Flow). Type the permitted flow. Later you will only need to refer to a particular Sector A – I.



Value range: **0 - 999 m³/h**

**No hydraulic group is assigned / created when 0 is entered.
(The group is deleted!)**



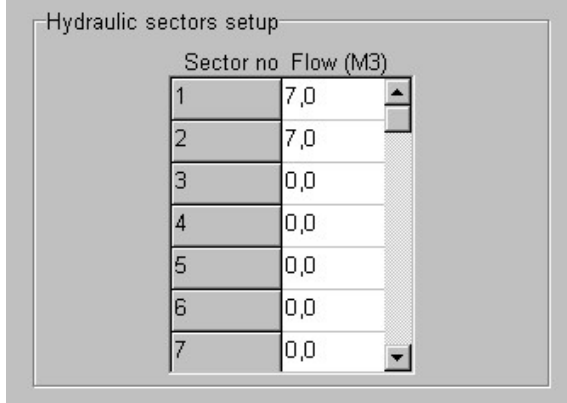
The water consumption of a hydraulic group can never exceed the pump capacity.

7.4 Hydraulic Sectors

Hydraulic Sectors are a subdivision of hydraulic groups.
A hydraulic sector is **always assigned** to a hydraulic group.

You cannot define hydraulic sectors without defining hydraulic groups first.

A maximum of **40 sectors** may be defined.



Sector no	Flow (M3)
1	7,0
2	7,0
3	0,0
4	0,0
5	0,0
6	0,0
7	0,0

Define hydraulic sectors here. Each sector is assigned a number from 1 – 40. Later you will only refer to a particular number.

Click in the [**Flow m³**] field and type the required flow in m³. After clicking in another field the values entered will be saved.

The flow of a sector depends on the flow of a hydraulic group and can never exceed the total pump capacity.

Value range: **0 - 999 m³**

**No hydraulic sector is assigned / created when 0 is entered.
(The sector is deleted!)**

It is possible to assign multiple hydraulic sectors to a hydraulic group.
The actual assignment does not take place until the valve data is entered.

When entering data pay attention to the following notes:

The maximum flow rate is given by the pump capacity.

When more than one pump is used the sum of all pumps is valid.

If a value is higher than the maximum flow rate given you will receive an error message:

Code:003 - xx above limit The value entered is too high.

The flow rate of the hydraulic groups and sectors must be higher than (or identical with) the flow rate of the valves assigned to them. If a value is entered that is lower you will receive an error message:

Code:023 - xxxx invalid flow

The value entered is invalid.

xxxx represents the valve in question.

If the value entered is below the valid value range the following error message is sent:

Code:002 - xx below limit

Enter a higher value.



By changes all simulated programs will be deleted.

Programs stay on the hard disk.

All programs on the VCU have to be deleted.

Repeat a new simulation and transfer the program again at the VCU.

7.5 Valve Data

Valve number	Position	Name	Area	Hydr Grp	Hydr Sec.	Flow (m3/h)
1	1	G01-1	2500,0	A	1	6,0
2	2	G01-2	2500,0	A	1	6,0
3	3	G01-3	2500,0	A	2	6,0
4	4	G01-4	2500,0	A	2	6,0
5	5		0,0		0	0,0
6	6		0,0		0	0,0
7	7		0,0		0	0,0
8	8		0,0		0	0,0
9	9		0,0		0	0,0
10	10		0,0		0	0,0
11	11		0,0		0	0,0
12	12		0,0		0	0,0



In the **System Configuration** menu click the Valve Data option.
 All valve data is entered and stored here.

Valve number
1
2

Here the serial number of the valve is shown which is identical with the actual decoder number.

Position
1
2
3

Here you can change the order in which the individual valves are displayed. Normally, they are displayed according to the decoder number in ascending order.

Value range: **1 - 240**

Default: Decoder number

Name
G1
G2
G3

Here enter a unique valve name assigned to a decoder number.
Only one valve can be referred to under this designation.



Value range: **1 - 8 characters**

All letters will be automatically capitalised.

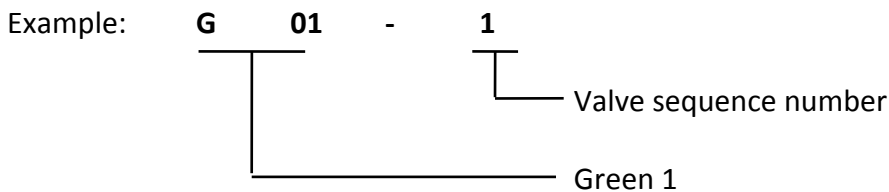
Error messages:

Code:008 - xxx is already used (the valve name has already been used)

Code:006 - xxx exceed valid length (the valve name is too long, max. 8 characters)

When entering valve names always start with the name of the area to be irrigated.

There are sorting functions in Greenkeeper Win that always sort by the first letter.



Proposed valve designations

- T - Tees
- B - Bunker
- D - Driving Range
- F - Fairway
- G - Green
- P - Pitch Green
- R - Practice Area
- 0-9 - Numbering

Area
2500,0
2500,0

Areas to be irrigated by sprinklers located downstream from the valve.

Value range: **0 - 99999 m²**

The area, along with the water consumption and duration data, will be used to calculate precipitation.

Hydr Grp
A
A
B

Assign the valve to a hydraulic group here. There are a maximum of 9 hydraulic groups available.

Value range: **A - I**

No assignment: **Empty field**

Hydr Sec.
1
1
2

Assign the valve to a hydraulic sector here. The sector will then be assigned to a hydraulic group.

Value range: **1 - 40**

No assignment: **0**



NOTE:

A hydraulic sector can only be used with a hydraulic group.

The hydraulic groups and sectors must be predefined in the Pump Data menu.

The maximum number of valves assigned to a sector may not exceed the sector capacity. (see the Pump data / hydraulic groups and sectors menu)

The maximum number of sectors assigned to a group may not exceed the hydraulic group capacity. (See the Pump data / hydraulic groups and sectors menu)

The maximum group capacity depends on the pump capacities.

Flow (m ³ /h)
6,0
6,0

The theoretical flow based on the number and size of the jets of a valve.

Value range: **0 - 999 m³/h**

The program uses the flow rate to calculate the required duration or precipitation.



NOTE:

The flow must be identical or lower than the capacity (volume delivered) of the pump(s).

The flow must be identical or lower than the flow of the hydraulic group or sector assigned to the valve.

Bi-Direct.
X

Here it will be defined if it is a „normal“ or a „bi-direction“ decoder. A x represents a bi-directional decoder.

X = bi-directional decoder
Empty = „normal“ decoder


Druck Sensor
X

This field is just valid if in the field „bi-direct“ a bi-directional decoder was chosen. With this the pressure sensor can be activated or deactivated.

X = pressure sensor connected
Empty = no pressure sensor connected

Print: Here you can print the data on a printer.



Ok: By clicking the  button you end data entering. Confirm the **Save?** Question by clicking yes.

The data will be saved.

When data is updated

By changing the valve data all simulated programs are deleted.

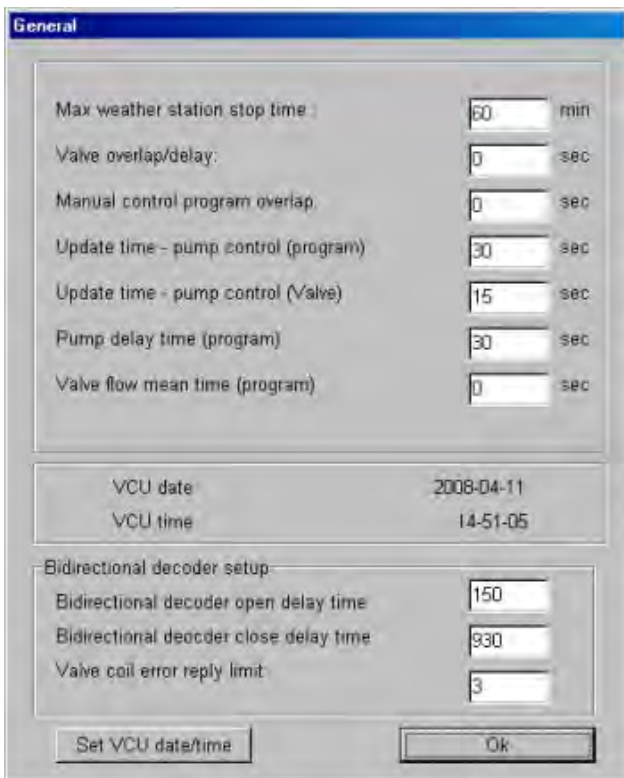
The program stays on the PC.

The program configurations must be removed from the VCU.

All existing programs must be updated and retested.

Finally all retested programs can be downloaded to the VCU.

7.6 System Data



Max. weather station stop time

Should the irrigation be stopped by the weather station, the station will check within the time entered here, whether irrigation can be resumed.

Unless the weather station restarts irrigation within the time entered, the program will end and will not start again automatically.

Value range: 0 - 999 min.

Default: 60 min.

Valve overlap / delay

This field shows the valid overlap/delay values for Single Valve and Sectors programs.

+ indicates a delay between valve closing and valve opening.

- indicates an overlap between valve closing and valve opening

Value range: -30 to + 30 seconds

Default: 0 seconds

Manual control program overlap

Enter in this field the overlap/delay value for Manual programs.

Value range: 0 - 30 seconds. The values are incremented by 3 seconds.

7.6.1 Update time – pump control (program)

This and the next input field is only required, when more than one pump is controlled by the pump-decoder. The pump manager, which is a part of this program, adapts the pump capacity to the water consumption of the irrigation system.

The update time, which is entered in this field, determines the sequence, in which the pumps are started / stopped.

The update time is valid for all irrigation programs without the Manual programs.

Input range: 0 – 30 sec. (step of 3 sec.)

Default: 0 sec.



NOTE: If „0“ is entered, the optimal pump-function is turned off, and all the installed pumps are running during the irrigation program.

7.6.2 Update time – pump control (Valve)

The input in this field is valid for valves which are activated by:

- ⇒ Surveillance
- ⇒ Transmitter
- ⇒ Communicator

Input range: 15 – 120 sec. (step of 3 sec.)

Default: 15 sec.



7.6.3 Minimum pump run time: (SPECIAL FUNCTION)

The minimum pump run time will be entered in this field.
This avoids a permanent start/stop (in short intervals) of the pumps.
This function is just active if irrigation programs (automatic or manual start) are active.

Input range: 15 – 60 sec. (only 3 sec. Steps allowed)
Standard: 15 sec.

7.6.4 Interval time to calculate the flow: (SPECIAL FUNCTION)

During an irrigation program the optimum pump sequence will be determined depending on the current calculated flow. Through this the influences of a variable flow will be reduced. It creates an optimal pump sequence, determined by the integrated average flow calculation.
This represents the time how often in the irrigation cycle the average should be calculated, depending on the current flow of the valve. The 60 sec. flow of the valve is the decisive factor for an optimal pump sequence, depending of the average value in the last 60 sec.

Standard: 0 sec.

7.6.5 Maximum retention time to open the valves (ONLY FOR BI-DIR-DECODER)

This time represents how many seconds the system accepts the status „**valve closed**“ until an error message will be created, if a decoder will be activated. This function asked for the status of the flow sensor, if a decoder will be activated.

7.6.6 Maximum retention time to close the valves (ONLY FOR BI-DIR-DECODER)

This time represents how many seconds the system accepts the status „**valve closed**“ until an error message will be created, if a decoder will be activated.
This function asked for the status of the flow sensor, if a decoder will be activated.

7.6.7 Accepted number of error messages for solenoid short circuits (ONLY FOR BI-DIR-DECODER)

With these parameters will be defined how many solenoid errors per decoder are accepted until the VCU stops.

With the standard settings 3 the decoder has to report and to record **3 times** a solenoid error, not till then the VCU has the status „**ALARM**“

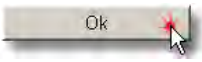

Input range: 1 – 9

Standard: 3

Uhrzeit/Datum VCU

VCU time / date

You can download your computer time and date to the VCU.

Click  to save the data and exit the dialog box. 

7.6.8 Possible Error Messages

Code: 002-% too low

Code: 003-% too high

Code: 005-% invalid input

Code: 014- no connection to the VCU

7.6.9 The Pump manager

In case that more than one pump has to be controlled by the pump decoder, the pump manager of the Greenkeeper is acting in that way, that the flow capacity of the activated pumps meets the required flow of the irrigation system as good as possible.

7.6.9.1 The Pump management of irrigation programs

When an irrigation program is running, the pump manager adapts the flow capacity of the activated pumps to the required flow of the irrigation system as good as possible.

By switching the pumps on and off, the pump manager establishes the best possible configuration.

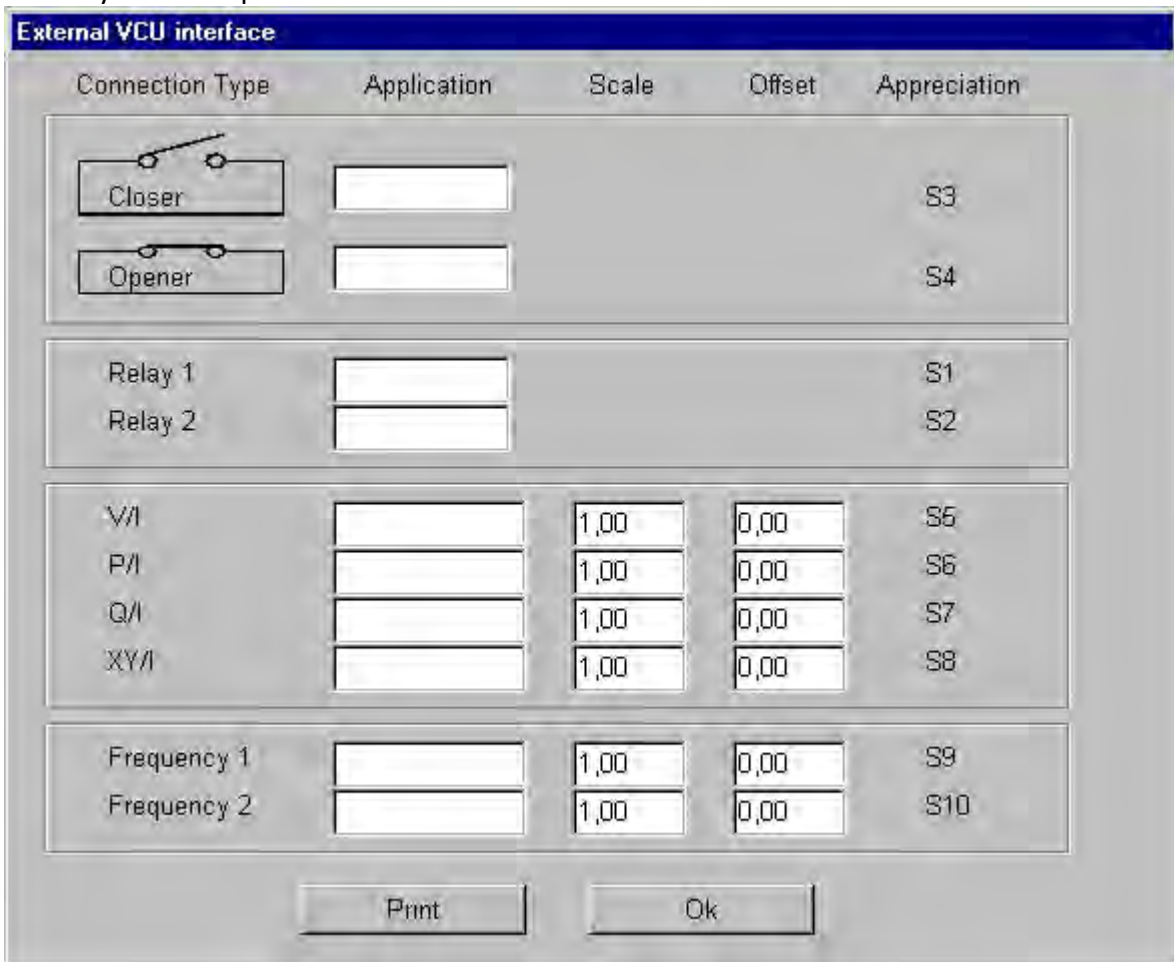
Only one pump is switched on/off at the time. Switching „on“ of a pump has priority before switching „off“.

7.6.9.2 The Function of the Pump management when valves are opened by Surveillance, Transmitter or Communicator.

The switching on/off of the pump is done as described above. This interval time should be short, in order to achieve a good pressure, soon after the valve is opened.

7.7 External VCU interface

Go to System setup – External VCU interface



In this window you can configure external VCU interfaces.
The following interfaces can be connected to the VCU.

Closer (digital input 1) VCU terminal 11 + 12

These terminals are used for inputs from the weather station.

Opener (digital input 2) VCU terminal 13 + 14

These terminals are used for inputs from the weather station.
E.g. MiniClik Rain stop

Relay 1 (output 1 VCU terminal 27 + 28)

This output becomes energised when Pump 1 is running.
The voltage on Terminals 27 + 28 is then 24 V AC.
The maximum load may not exceed 0.5 A.

Relay 2 (output 2 VCU terminal 29 + 30)

This output becomes energised when Pump 2 is running.
The voltage on Terminals 29 + 30 is then 24 V AC.
The maximum load may not exceed 0.5 A.

V/I (analogue input VCU terminal 19 + 20)

This input is used for a flow meter.
Range: 0 -20 mA

P/I (analogue input VCU terminal 21 + 22)

This input is used for a pressure gauge.
Range: 0 - 20 mA

Q/I (analogue input VCU terminal 23 + 24)

This input is used for an anemometer.
Range: 0 - 20 mA

Frequency 1 + 2 VCU terminal 15 + 16 / 17 + 18

These are two additional inputs designed as frequency inputs.
The frequency applied should be higher than 5-10 Hz.
Value range: 0 - 1000 Hz.

Application

Type a name for the external VCU interface.
A max. of 8 characters is allowed.

Scale

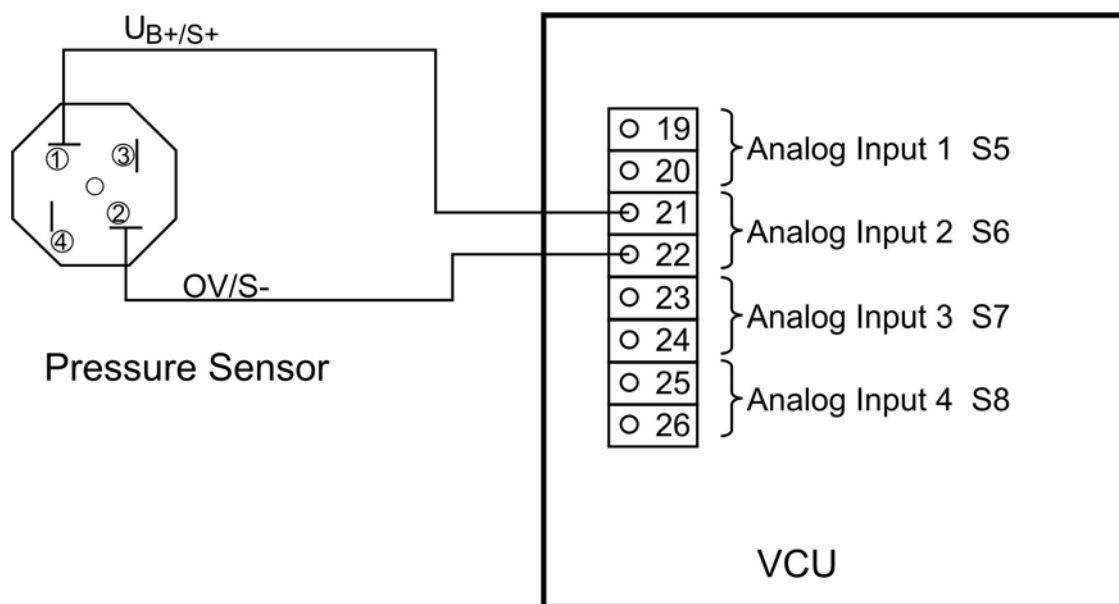
Since the VCU only provides values in mA or Hz and we want the reported values to be expressed in appropriate measuring units, the values in mA or Hz must be scaled. This is made possible by using the *Scale* field.

Example 1: Connection of Pressure Sensor with Analogue Output

A. Suggested pressure sensor

Kobolt Typ 3373.078.092
 0 ... 25bar
 4 20ma
 (Price: ca. .230.- €)

B. Wiring schematic



Hints and tips:

After the connection of the pressure sensor, it will be best, to open the menu „VCU- Status“. In the column on the left side of the menu you will find the current values for the analogue inputs 1 to 4. When the sensor is connected according the above sketch, the measured current value is shown under “Analogue 2”.

If there is no pressure applied to the pressure sensor, the correct reading is: 4ma

If there is no reading, please check whether the polarity of the wiring is exchanged. Please check furthermore, whether a change of pressure will lead to a change of the readings. If yes, the sensor is wired in the right way.

C. Readings

The specified range of the pressure sensor is 0 – 25 bar and are linear covered by the current value of 4 – 20 ma.

D. Greenkeeper

Hereby you can calculate the scale value, which has to be entered in the menu: „External VCU interface“ at S6.

$$\text{Scale: } \frac{25\text{bar}}{(20-4)\text{ma}} = 1,56 \frac{\text{bar}}{\text{ma}}$$

Hereby you can calculate the Offset, which has to be also entered to the menu: “ External VCU interface” at S6.

$$\text{Offset: } 4\text{ma} \times 1,56 \frac{\text{bar}}{\text{ma}} = 6,24$$

The Offset value has to be subtracted from the total amount. Therefore it is necessary to put a (-) sign in front of the figure

$$\Rightarrow \text{Offset: } - 6,24$$

Now we have done all necessary inputs. Greenkeeper is currently measuring the actual pressure. These values are reported in the menu: “ actual irrigation report” and ”weather station”

Example 2: Frequency input 1 (Anemometer)

During one rotation an anemometer generates 4.4 pulses per second (4.4 Hz).
One rotation corresponds to a wind speed of 1 m/s.
The total measuring range is 0.5 - 35 m/s

Then: 1 m/s : 4.4 Hz. = 0.22 m/s at 1 Hz.

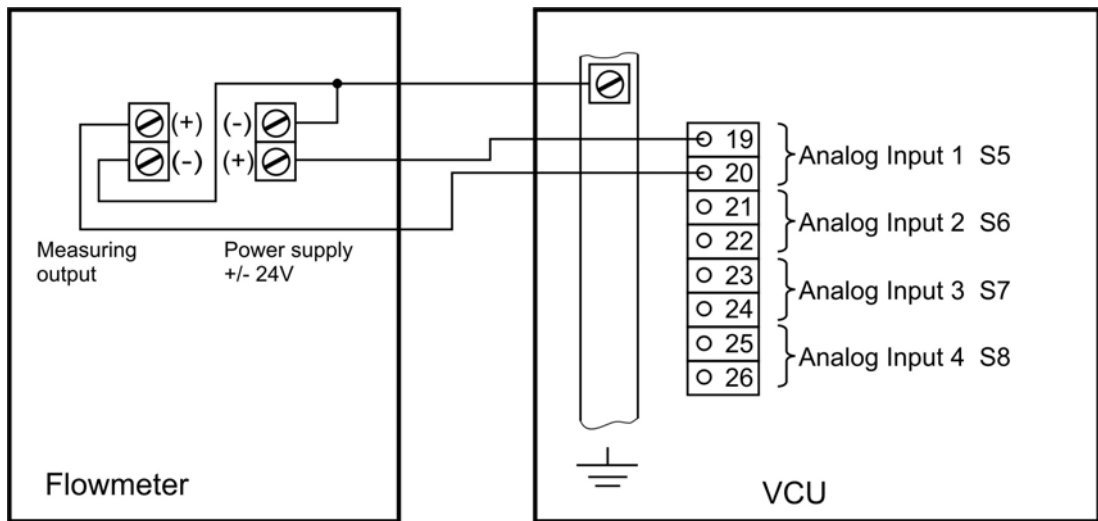
We enter a scale factor of 0.22 in the scale field.

Example 3: Flow meter connection

A. Flow meter type:

Kobolt turbine-wheel flow meter with integrated transducer Type TUR 2... .
Option A, Output 0-20 mA.

B. Wiring diagram:



C. Measuring values:

The rated measuring range of the flow meter, e.g. 2-80 m³/h will be measured by linear measuring signal 0-20 mA. This means: 1 mA = 4 m³/h.

The correct function of the transducer can be checked by measuring the voltage across Pin 19 and 20 of the VCU.

During maximum flow, in this example 80 m³/h, the voltage drops from 24 V to approx. 17 V. At the same time the voltage between earth and Pin 20 goes up by the same amount.

D. Greenkeeper

The value arrived at in C. above, in this example 4m³/h per mA, will be typed in the "Scale" entry field for S5 in the "External VCU interface" dialog box.

Offset -999.9 to 999.9

This is a correction value affecting only the **Scale** factor for the analogue and frequency inputs. The correction value will be either deducted from or added to the **Scale factor** entered.

The corrected scale factor is then used for the calculations.

The following error messages can be encountered with:

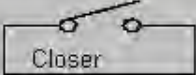
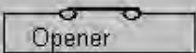
- Code: 002-xxx below limit (the value is too low)
- Code: 003-xxx above limit (the value is too high)
- Code: 005-xxx is not valid input (invalid value entered)



The above data is specified during installation. Do not change any data without discussing it first with the installer of the irrigation system.

7.8 Weather Station

The weather station can stop (suspend) automatic irrigation program execution. This is done by using the values from System Setup – External VCU interface.

Connection Type	Application	Limit	Selected	Appreciation	Actual value
 Closers			<input type="checkbox"/>	S3	INACTIVE
 Opener			<input type="checkbox"/>	S4	ACTIVE
V/I		<input type="text" value="0,0"/>	<input type="checkbox"/>	S5	0,0
P/I		<input type="text" value="0,0"/>	<input type="checkbox"/>	S6	0,0
Q/I		<input type="text" value="0,0"/>	<input type="checkbox"/>	S7	0,0
XY/I		<input type="text" value="0,0"/>	<input type="checkbox"/>	S8	0,0
Frequency 1		<input type="text" value="0,0"/>	<input type="checkbox"/>	S9	0,0
Frequency 2		<input type="text" value="0,0"/>	<input type="checkbox"/>	Special	0,0

By clicking in the box you can select here which interfaces Greenkeeper should take into consideration. A checked box indicates that Greenkeeper Win will consider this interface.

To give Greenkeeper the threshold value for the interface to respond, type the required value in the Limit field. Should these values be exceeded irrigation will be stopped (suspended).

As soon as the values get within the limit again irrigation will be resumed provided the following conditions are met:

- ⇒ The actual weather station stop time is no longer than the max. weather station stop time specified in the General dialog box.
- ⇒ Resuming the irrigation program will not lead to two programs overlapping.



Note: The weather station does not take into consideration manually open valves and manually started programs! Do not activate interfaces for sensors that have not been installed!

The limit range is calculated using the scale factor and the offset value in **System configuration – General**.

$$\text{Max. input value} \times \text{Scale} + \text{Offset} = \text{Limit range}$$

The max. input value is:

In analogue inputs:	20 mA
In frequency inputs:	1000 Hz

Example: Analogue connection 1

Scale factor = 5,0
Offset value = -1,0

$$\text{Limit range} = 20 \times 5,0 + 1,0 = 101,0$$

The limit range is then 0,0 – 101,0

Example: Frequency connection 1

Scale factor = 0,6
Offset value = 1,0

$$\text{Limit range} = 1000 \times 0,6 - 1,0 = 559,0$$

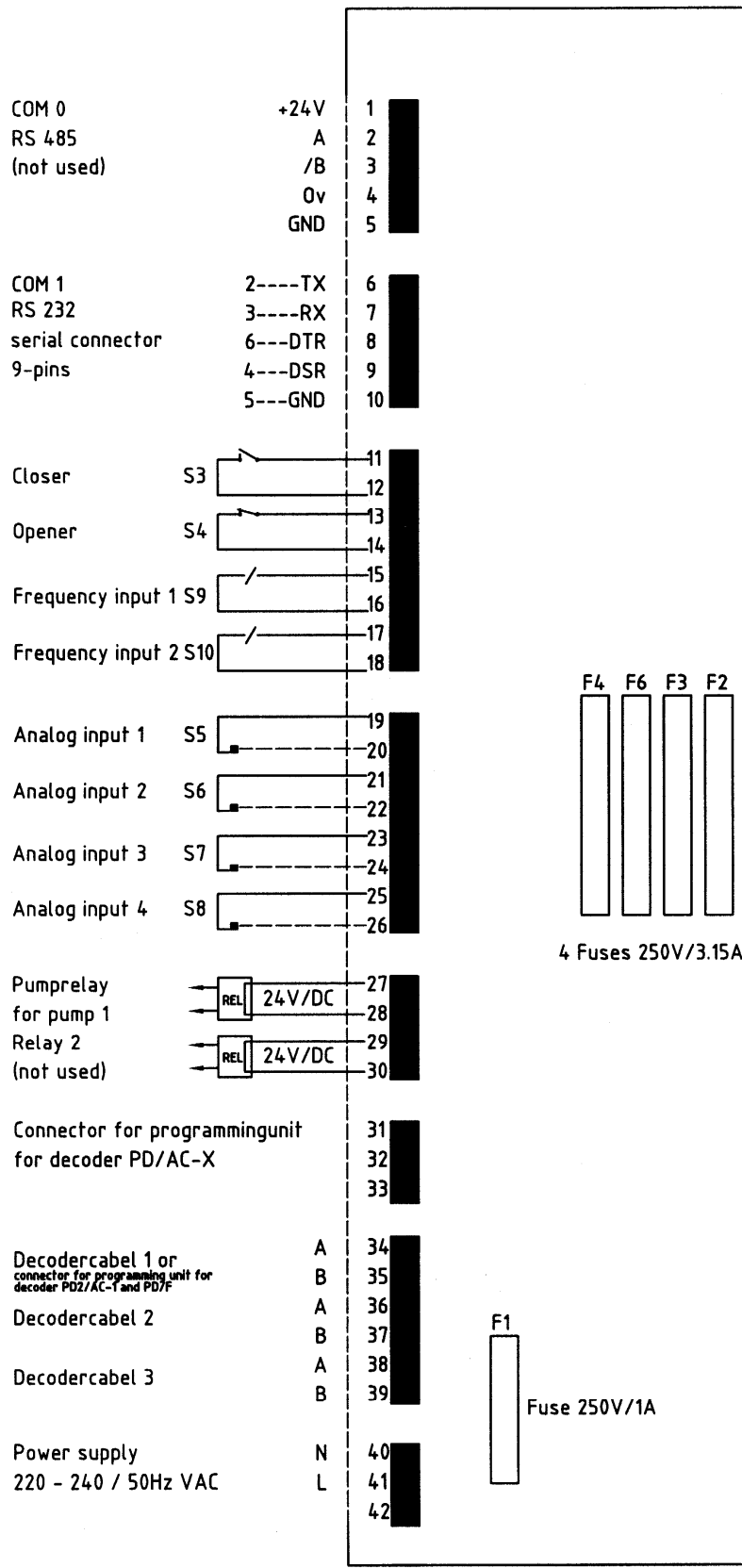
The limit range is then 0,0 – 559,0

A negative offset value must be added.
A positive offset value must be deducted.



NOTE: Never enter the offset value as the limit value. The smallest changes would then cause the irrigation program to be stopped by the weather station.

7.9 Wiring Schematic for VCU



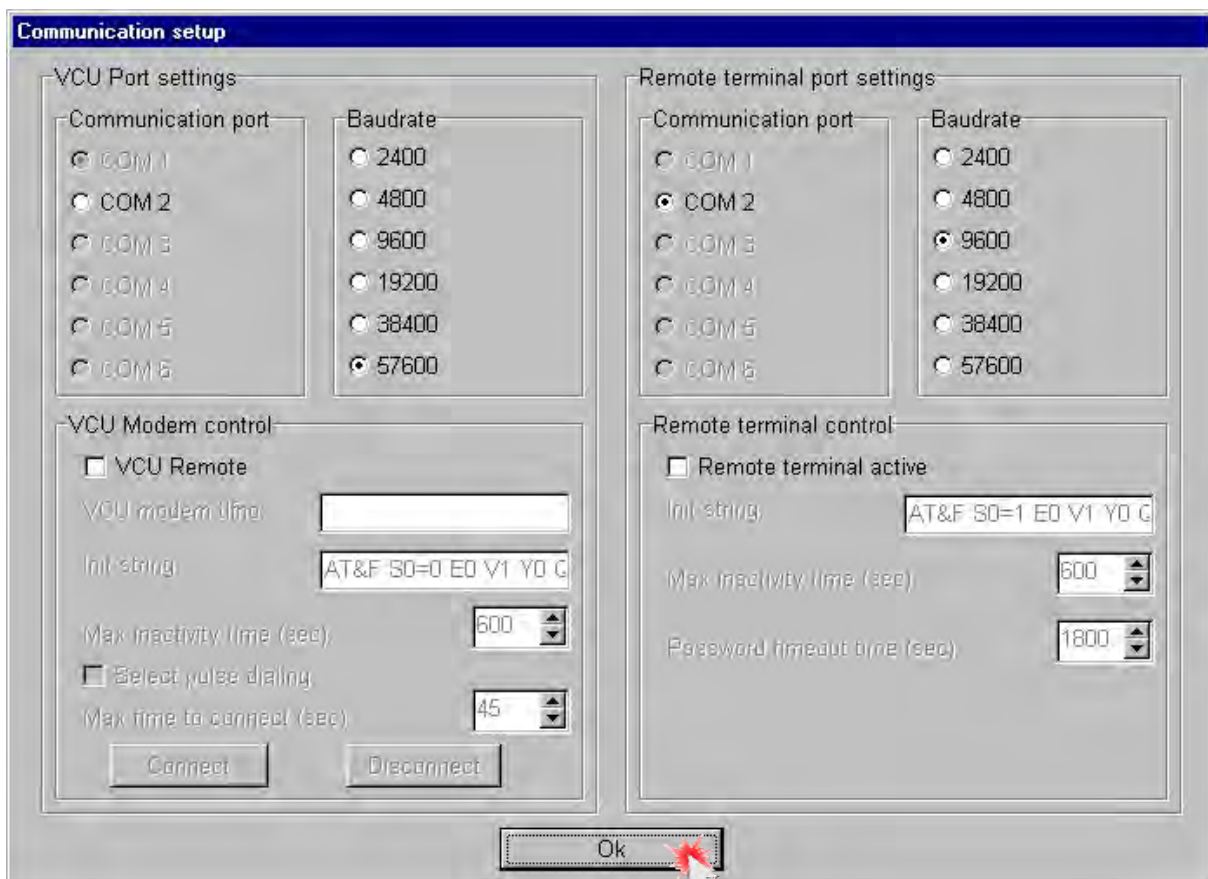
7.10 Port Settings

In this dialog box you can set up communication via the serial port as well as enable/disable the Remote Control (Modem Control).

There are two Remote Control options.

1. **✓ VCU Remote**
This function allows you to control a remote VCU from your computer. To facilitate the VCU and the PC must be connected with a modem.
2. **✓ Remote Terminal Active**
This function allows you to control the VCU from a mobile phone* or from another computer (Greenkeeper not required).

If the telephone is off the hook, Modem Control is disabled.



7.10.1 VCU Port Settings

Serial port: Select the serial port for connection with the VCU.
COM ports that are not available appear grey.
Setting options: COM 1 - 6
Default: COM 1

When using the **VCU Modem control** you must select the COM port of the modem. Otherwise the modem will not dial! Change the VCU COM port accordingly.

Baud rate: A baud is the unit of signalling rate (1 Bd=1 s) i.e. a measure of signal changes that take place in a transmission channel during one second.
Default setting: 57600 baud

7.10.2 Remote Terminal Port Settings

Serial port: The second serial port is used for remote control through Nokia Communicator or another PC. A modem must be connected to this port!
Value range: COM 1 - 6
Default: COM 2

Baud rate: A baud is the unit of signalling rate (1 Bd=1 s), i.e. a measure of signal changes that take place in a transmission channel during one second. Nokia 9300i Communicator supports only a single baud rate, i.e. 9600 baud.
Baud rate options: 2400, 4800, 9600, 19200, 38400, 57600
Default setting: 9600 baud

7.10.3 Remote Terminal Control

Remote terminal active: When this function is enabled, Greenkeeper picks up calls from Nokia 9300i Communicator or another PC. Remote Control through Nokia Communicator is only possible when this function has been enabled.

Init string: This is used to send commands to the modem.
Do not change these settings.

Max inactivity time (s): If Greenkeeper does not receive any data from Remote Control within the period of time entered, the connection will be terminated.
Value range: 100 - 1200 seconds
Default: 600 seconds

Password timeout time: The log-on password remains valid for the period of time entered. After the time expires the password must be re-entered.
Value range: 100 - 3600 seconds
Default: 1800 sec.

Example:

1. The password was entered in Remote Control.
2. The connection was terminated.
3. If the connection is not re-established within the given period of time the password must be re-entered.



Exit the entry mode by clicking **Ok**.
To save the updated data, press yes to confirm it.



For details on incoming information please refer to the Remote Terminal Control chapter 14 in the User Manual.

7.10.4 Modem Commands

Initialization String Description

AT- Attention, Modem control command

The AT prefix tells the modem that AT commands are sent to the modem.

&F- Recall factory default configuration

This is used to load the default configuration stored in the firmware. The modem will be restored to factory settings. If the modem is connected the command will not be executed.

S0=n Number of rings to Auto-Answer

Register S0 sets the number of rings to auto-answer. If S0 > 0, then every incoming call will be automatically answered. The value in S0 sets the number of rings that must occur before the modem automatically answers the incoming call.

Values valid for Germany:	0...5 rings (S0=1)
Values valid for Austria:	0...5 rings (S0=1)
Values valid for Switzerland:	0, 2...10 rings (S0=2)
Default values:	0= No auto-answer
Default values:	1= Auto-answer on (1 ring)

En- Command Echo to Host

With this command you can select whether your modem will return commands as echo or not.

E0 = Echo off (Default)

E1 = Echo on

Vn- Word or Digit Response

This command allows you to determine whether the response sent by the modem to the connected computer will be sent as digits or words.

V0= Response as digits

V1= Response as words (Default)

Yn- Configuration Profile Selection

This command determines which of the two stored configuration profiles will be loaded on modem power-on.

&Y0= Profile 0 will be loaded (Default)

&Y1= Profile 1 will be loaded

Qn- Enable/Disable Modem Responses

Using this command you can disable the responses that the modem sends to the connected computer, either completely (Q1) or in the Answering Mode (Q2).

Q0= Responses on (Default)

Q1= Responses off

Q2= Responses in Answering Mode off

&Dn- Data Terminal Ready Signal

This command determines how the modem reacts following an ON to OFF transition.

&D0= The modem ignores an ON to OFF transition.

&D1= The modem returns to command mode following an ON to OFF transition.

&D2= Following an ON to OFF transition the modem ends the connection and hangs up.

&D3= The modem is reset following an ON to OFF transition. The connection is terminated. (Default).

&D0 and &D1 are not allowed in Austria and will be ignored.

&W- Store Profile Settings

Use this command to store the configuration profile in the modem.

The default initialization string that allows Greenkeeper to answer incoming calls is the following:

AT &F S0=1 E0 V1 Y0 Q0 &D3 &W

This initialization string allows the modem to establish a connection to a remote VCU:

AT &F S0=0 E0 V1 Y0 Q0 &D3 &W

The only difference is in the S0= command!

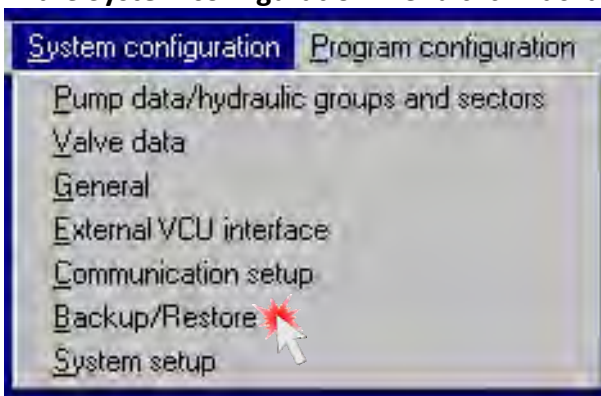
7.11 Backup / Restore Data

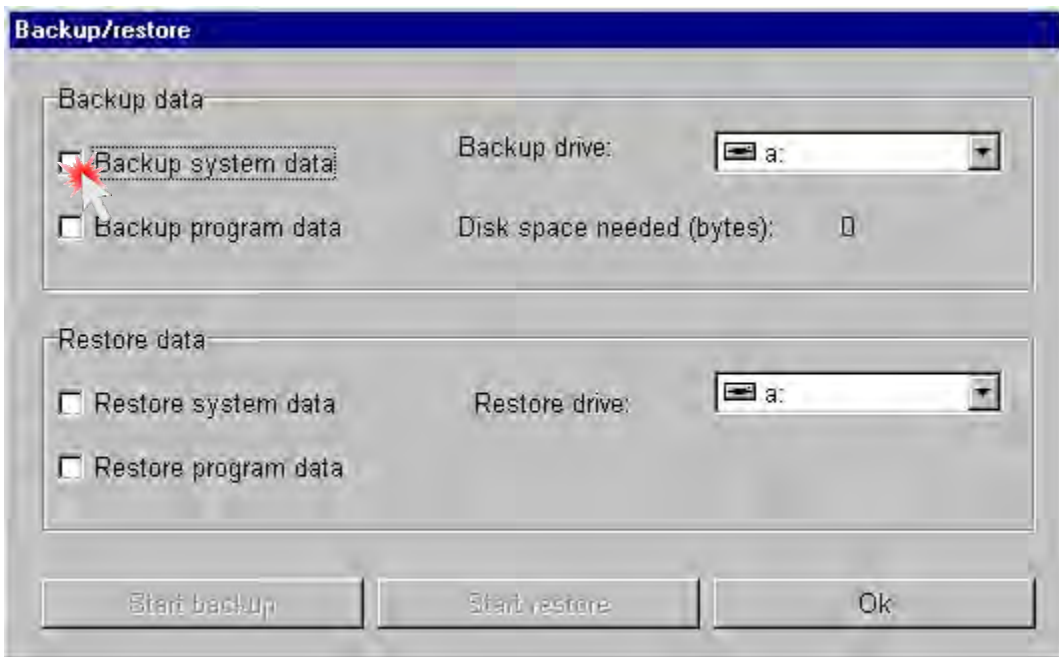
BACKUP YOUR DATA REGULARLY!

This includes both system data, that is all system related data such as pump flow, valve names, irrigated area, etc. and program data, which is all settings, etc.

To backup / restore data proceed as follows:

In the **System configuration** menu click **Backup/Restore**



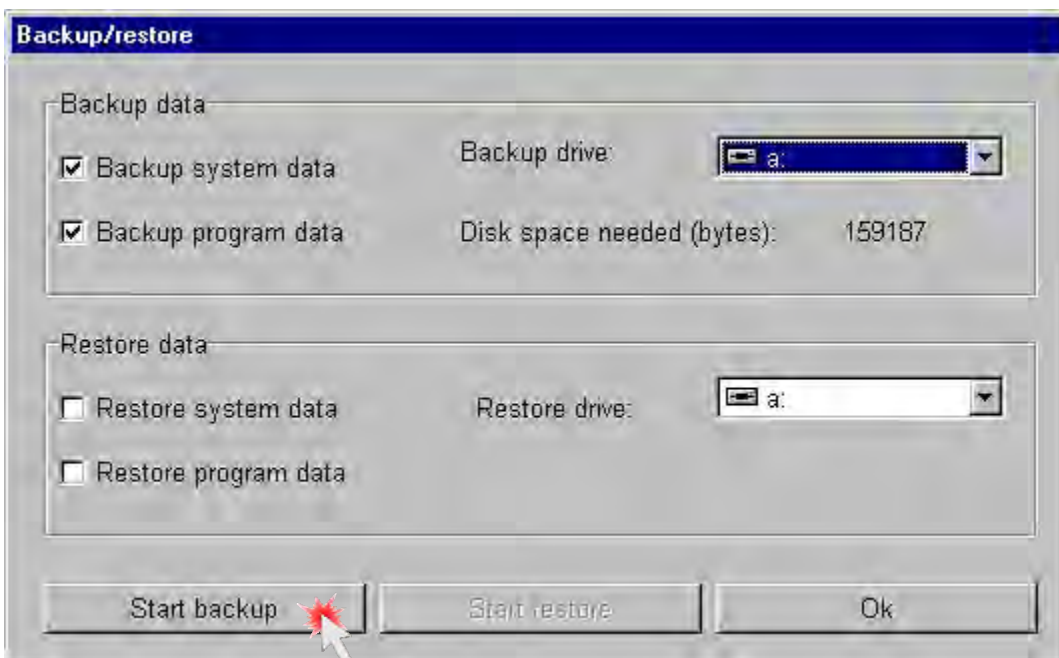


The Backup / restore dialog box will pop up.

First of all select which type of data you want to backup. As a rule it may be system data and program data.



Click **Backup system data** and **Backup program data**.



The selected data is marked with a tick (✓).

Select the backup drive where the data will be stored.

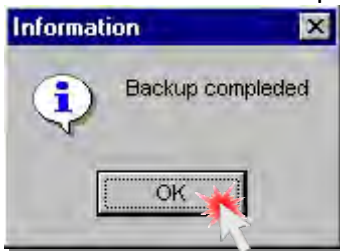
As a rule the diskette drive in the computer case is marked [A:].

Insert an empty and formatted 3,5" floppy disk in drive A: or plug an USB-stick into the PC.

Click **Start Backup**.

The backup program begins to back up the system and program data.

After a successful backup you will receive the following information:

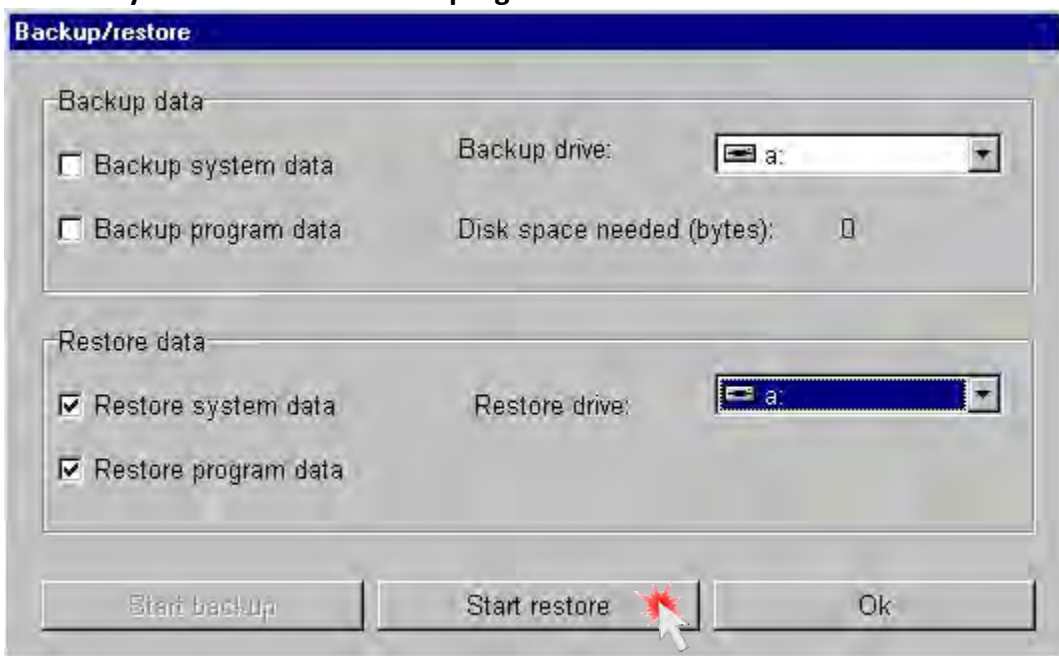


Acknowledge the message by clicking OK.

Your data has been stored on the data storage medium you have selected.

Exit the Backup dialog box by clicking **OK**.

To restore data on your computer click **Restore system data** and **Restore program data**.



The options you have selected will be marked with a tick (✓).

Select the drive with the data storage medium on which your data is stored.

Insert the floppy or plug the USB-stick into the PC.

Now click **Start Restore**. 

The backup data will be copied back in the Greenkeeper directory.

After the data has been successfully restored you will receive the following message:



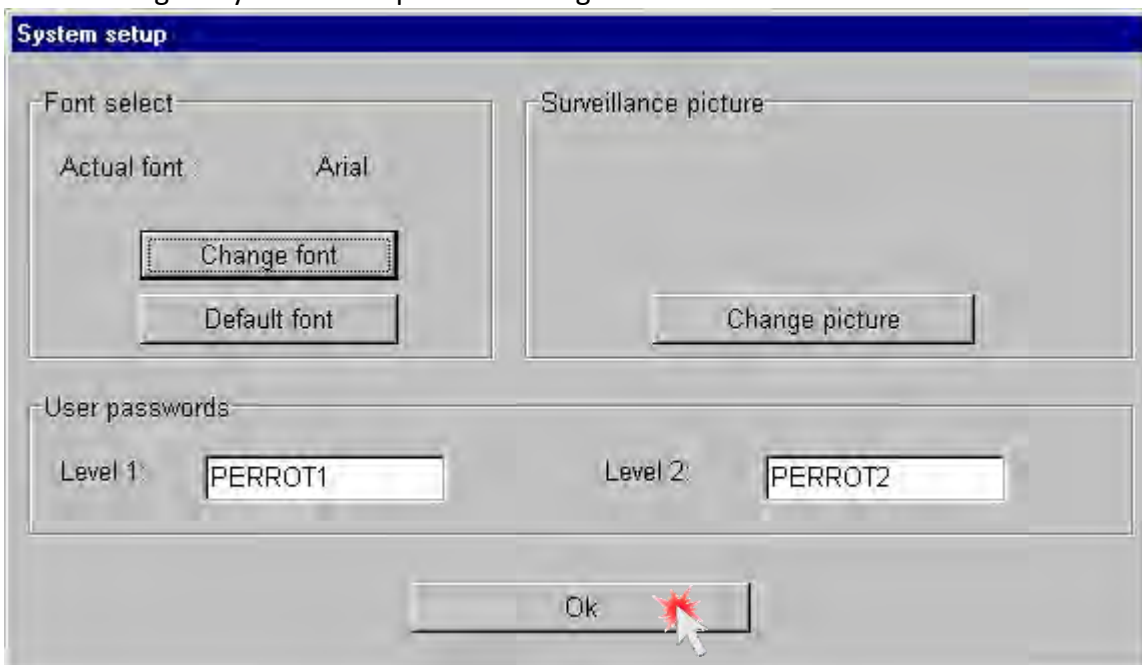
Acknowledge the message by clicking **OK**. 

Your data has been successfully restored.

You can now exit the Backup/restore dialog box by clicking **OK**. 

7.12 System Setup

In this dialog box you can setup the following functions:



7.12.1 Font Select

Actual font: The name of the current font is displayed here.

Change font: Here you can change the current font.

Default font: This button restores the current font to the default font settings.

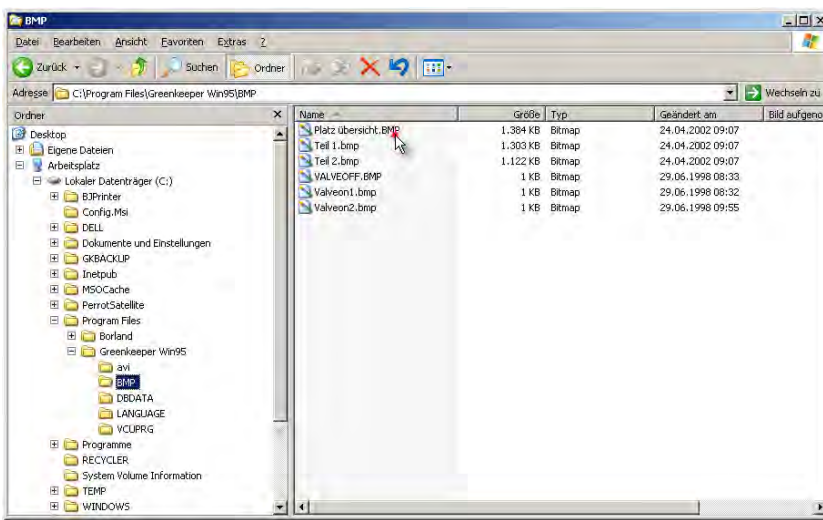
The default font is **[Arial]**

Greenkeeper only supports changing the font itself.

You cannot change the font size or colour.

It is recommended to use the default font - Arial!

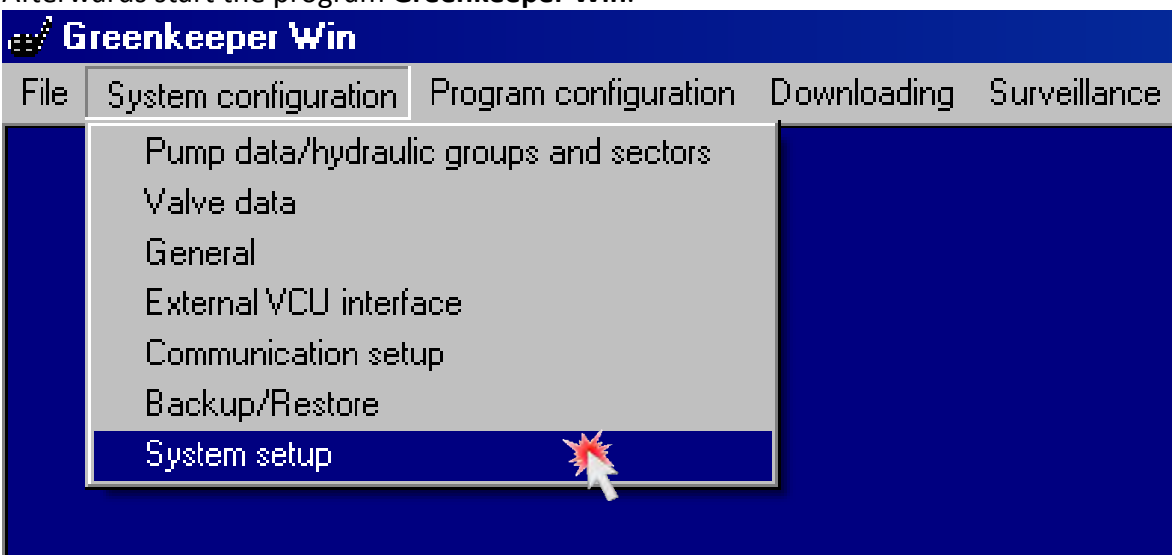
7.12.2 Copying the graphic from the data medium on the hard disc:



Open windows-explorer.

Copy your graphic in folder
**Programm Files/
GreenkeeperWin/
bmp.**

Afterwards start the program **Greenkeeper Win.**



After insert the password (Level 3) choose the menu:

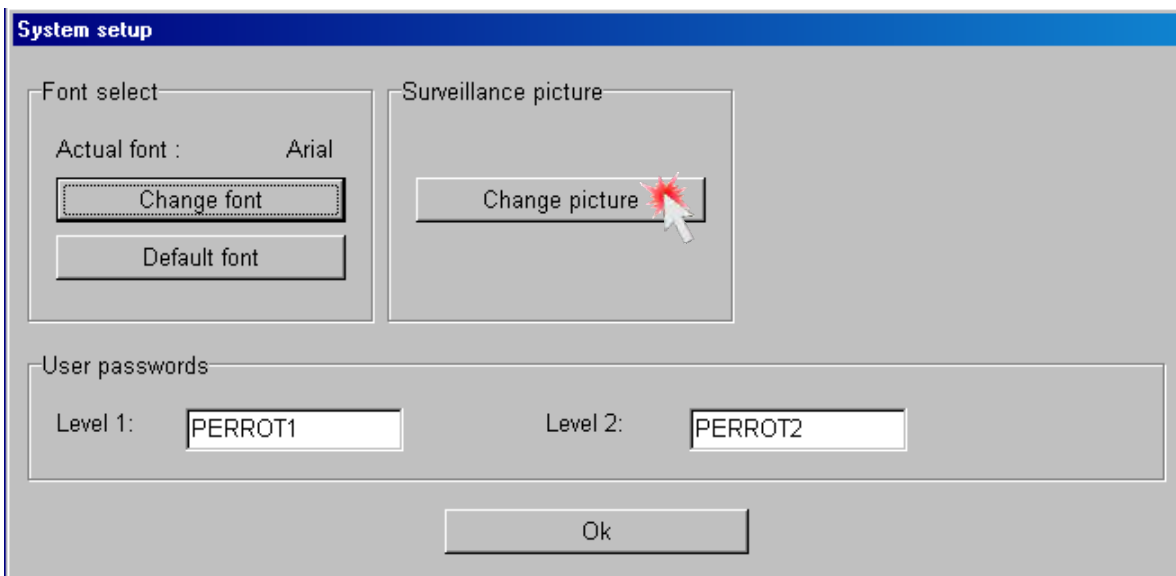
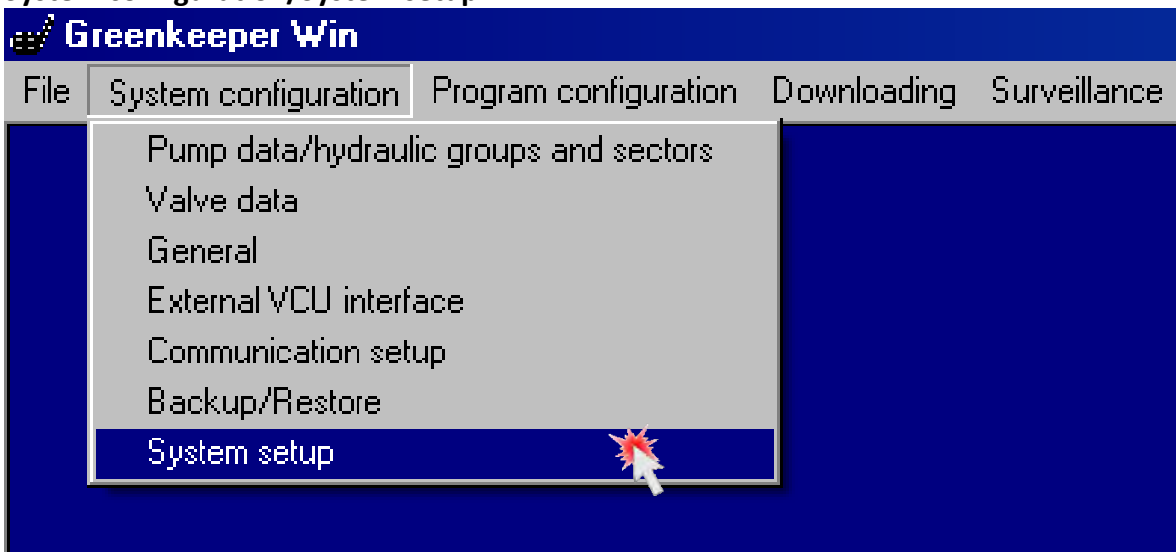
System configuration/System setup.

7.12.3 Surveillance picture

Change picture: You can change the graphic file here. The graphic files are used as the background picture in the Surveillance menu. The graphic depicts the irrigated area (a golf course, etc.). It must be stored in the bitmap format (*.bmp).

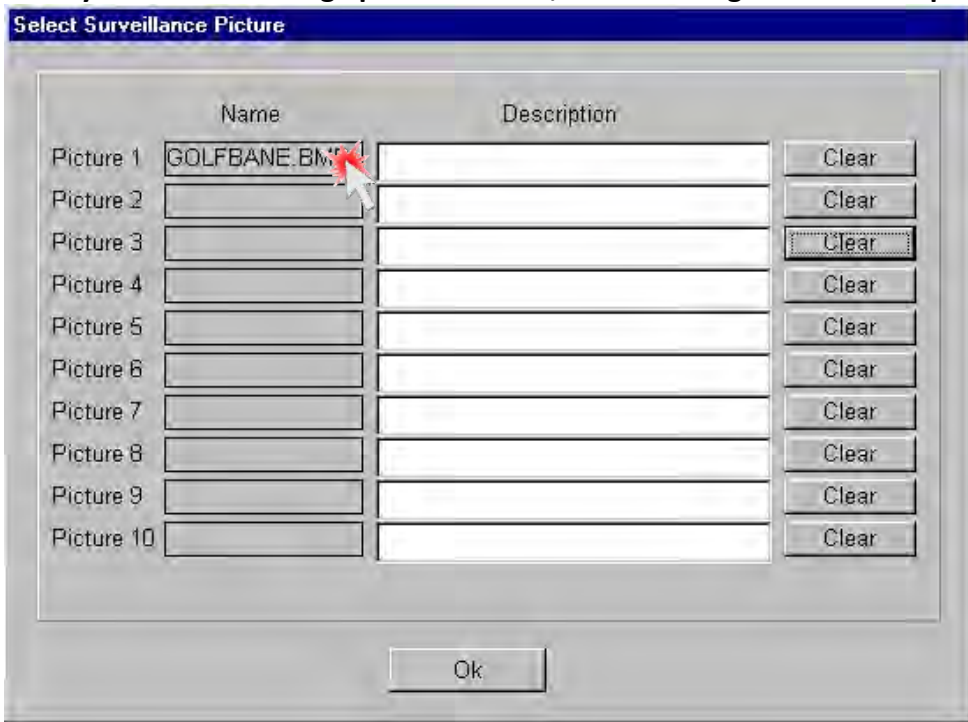
After entering the password (Level 3) choose the menu item

System configuration/System setup




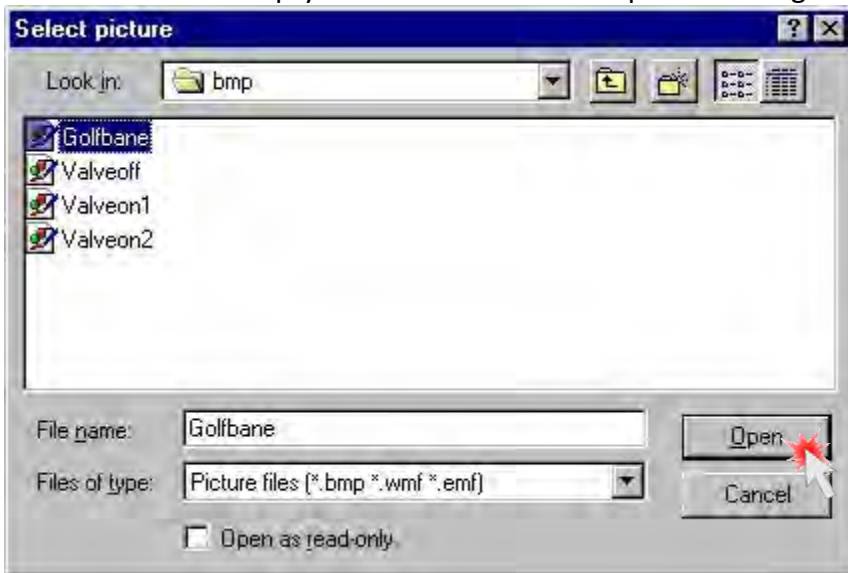
 click „change picture“

Once you click the Change picture button, the following window is displayed:



You have the option of selecting up to 10 different graphic files (bitmap).

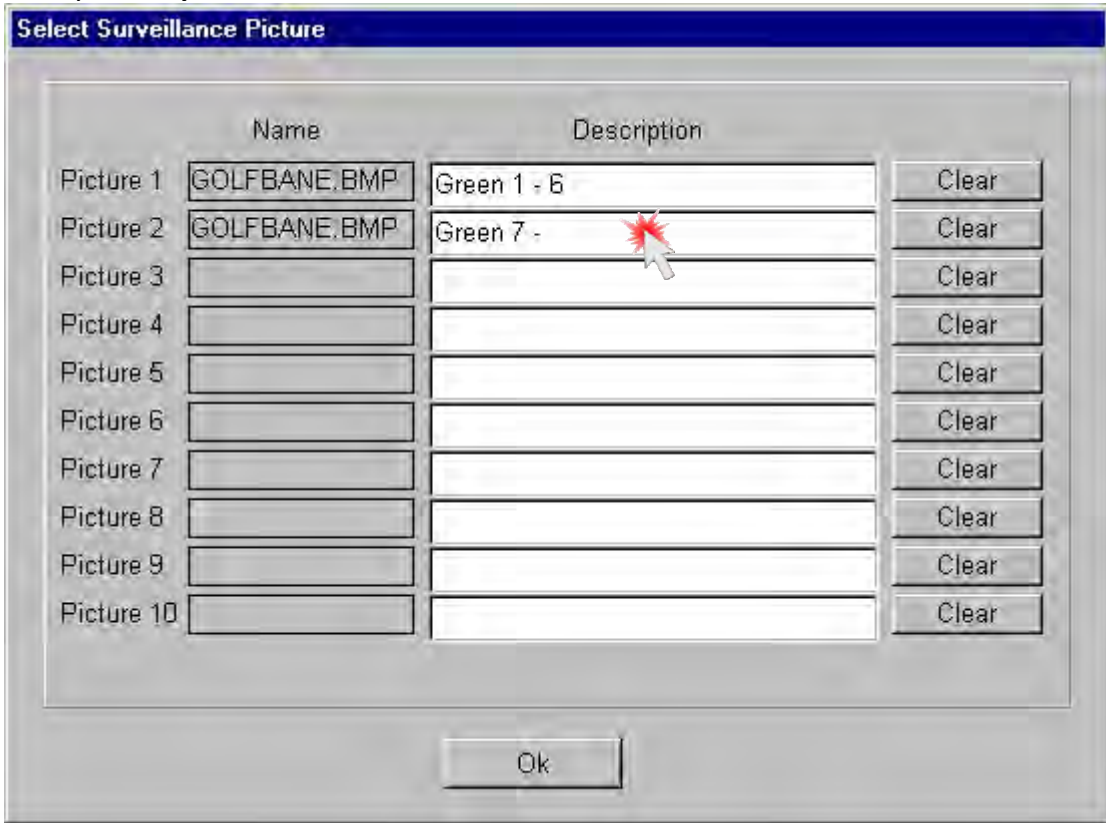
Click  in the empty NAME field. The Select picture dialog box with the graphic files will open.



Select the bitmap file(s) from the **C:\Programm Files\Greenkeeper Win\bmp** directory.

The complete graphic can be divided in up to **10 files**. It is required that the graphic files be stored in the above described directory on the hard disk.

Finally click **Open**.



The file name will be automatically inserted in the **Name** field. Type a description of the graphic. For example Green1-6, etc.



To delete a graphic file from the list click **Clear**.

The file name and the description will be removed from the list. They remain to be stored on the hard disk.



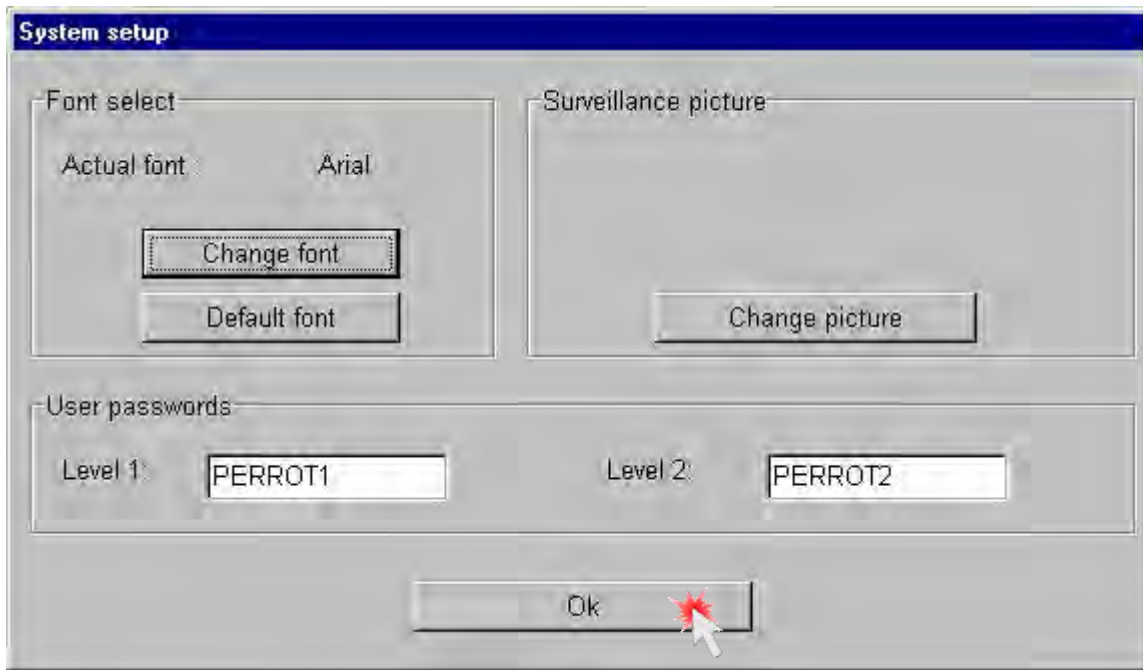
After all the files have been entered and a description added, click Ok.



Confirm the **Save data ?** message

By clicking **OK**





7.12.4 User Passwords

- Level 1:** You can change the existing password for Level 1 and Level 2 here.
- Level 2:** Changes can only be made if you are currently in **Password level 3**.
- Ok:** Save the changes and exit.

8. Program Configuration

In Greenkeeper Win you create various irrigation program configurations. These are then tested using an internal program test. During the test the Pump Flow Manager which is integrated in Greenkeeper uses the master data to calculate an optimum way of how the program will run. Finally the resulting data is, within a matter of seconds, downloaded to the VCU.

Greenkeeper supports 3 different program types.

Description of program types

1. Single valves

All the valves, for which Precipitation Volume or Duration have been entered in the program, taking into consideration the pump data and the values for the valves entered, until the optimum pump capacities are achieved.

The sequence of valve opening is determined by the program. It is, however, possible to change the sequence.

2. Sectors

In this program all the valves within a pre-defined sector open, taking into consideration the pump data. Only the optimum flow rate within a sector is calculated. The sequence of the sectors is determined by the program. However, in the sectors program it is possible to enter the sequence you require.

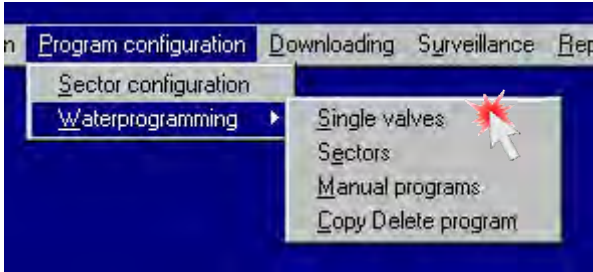
3. Manual programs

This program is not supervised by the Flow Manager. You explicitly define which valves are to open in a particular step. You also determine which pump(s) will start. The program operates in steps. This means that one step is executed after the other. A maximum of 8 valves can be assigned to each step. All valves in a step open simultaneously. It is, however, possible to set a delay for the individual valves. See Chapter 7.6 (**General**)

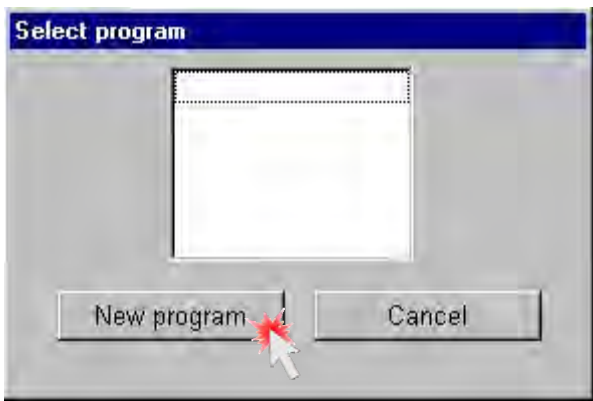
Please check the pump capacity. Incorrect data may cause pump overloading.

8.1 Single Valves

In this type of program all the defined single valves open, taking into consideration the maximum pump capacity, in the sequence of decoder numbers or in an ascending order should the sequence be explicitly entered. The Flow Manager provides for the optimum pump loading.



Select the Single valves option by clicking it with the left mouse button.



To create a **new** program, click the **New program** button.

8.1.1 Creating a New Program



Type the new program name in the field.
Give your new program a unique name.
The maximum length is 8 alphanumeric characters.

Confirm the entry by left-clicking the OK button.

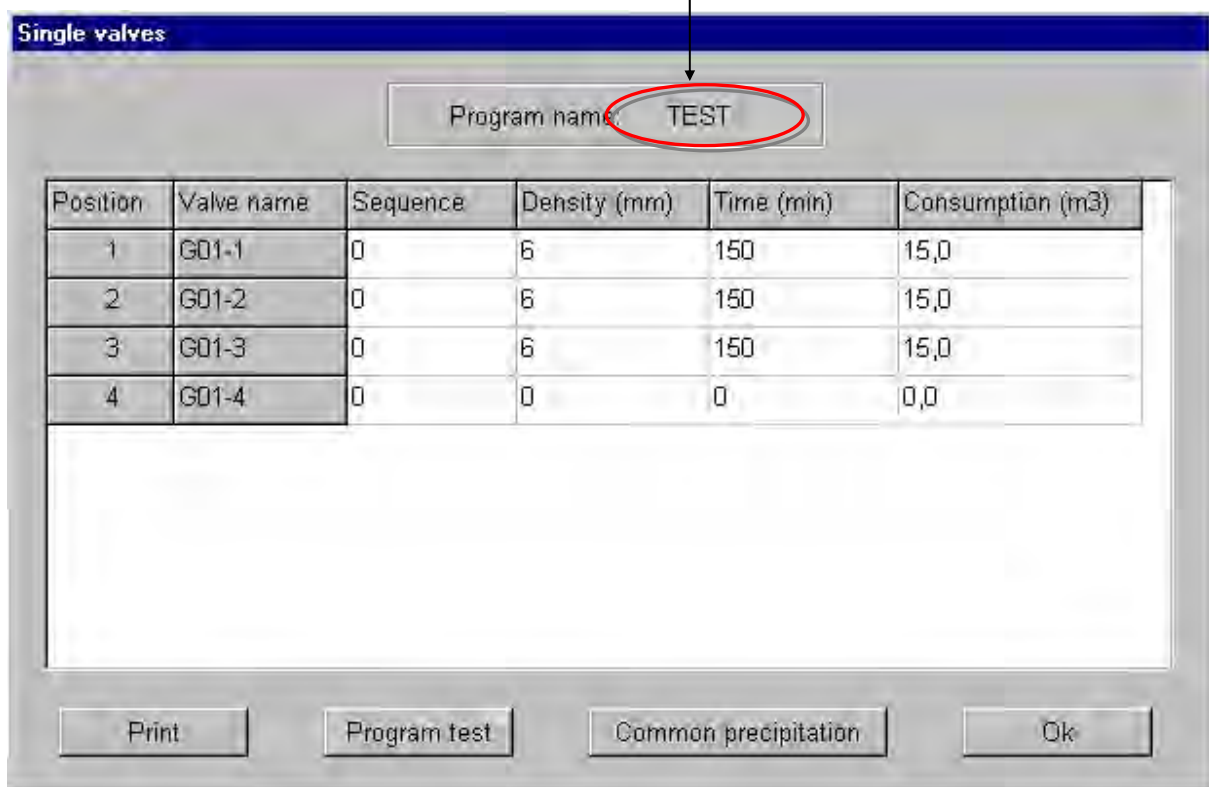
A program name is always unique. Each program, regardless of whether it is a Sectors or a Manual program, must be given a unique name. Should the program name already exist you will receive the following error message:

Code: 008 - xxx already exists

Please type a name which has not been used.

After you have entered a unique name for the new program the following window opens:

Your program name is displayed her



Position: For information only, sequence numbers, defined in the Valve data dialog box.

Valve name: For information only, valve name

Sequence: Defining the sequence
 Values: 0 - max. number of valves
 For the default value (0) the Flow Manager calculates the sequence **automatically**.
 You can change the sequence by entering, in an ascending order, the numbers from 1 to nn (nn being the number of installed valves). The valve with the lowest number, from 1, will open first. You must enter the sequence for all valves. Either all valves **0 or 1 - nn**.

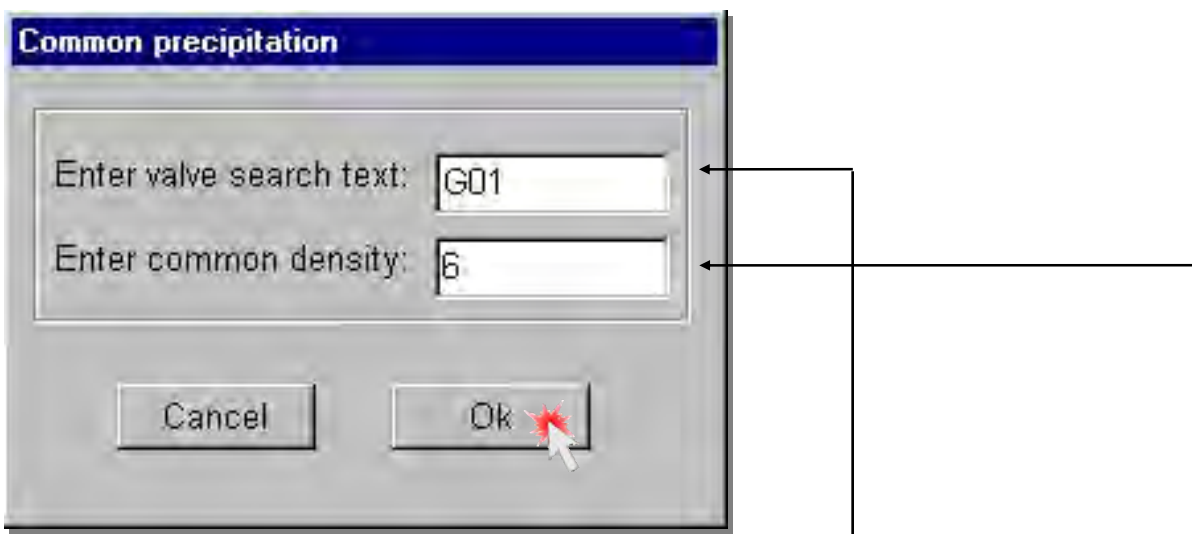
Density: Type the required precipitation. **0 - 999 mm**
The required precipitation in mm is entered here.
Based on your entry and taking into consideration the master data, the Flow Manager calculates the necessary open time as well as the water consumption in m³/h and inserts the values automatically in their respective fields.

Time: Enter the required valve open time. **0 - 479 minutes**
The duration entered is used to automatically calculate precipitation.

Consumption: For information only, the calculated water consumption (m³/h)

Print: Print the program data 

Common precipitation: Copy the same precipitation value to multiple valves.



In the **Enter valve search text** field, type the initial characters of a valve name. If you want the same precipitation for all G01-1, G01-2, etc. valves, type G01, click in the empty **Enter common density** field and type the required density.

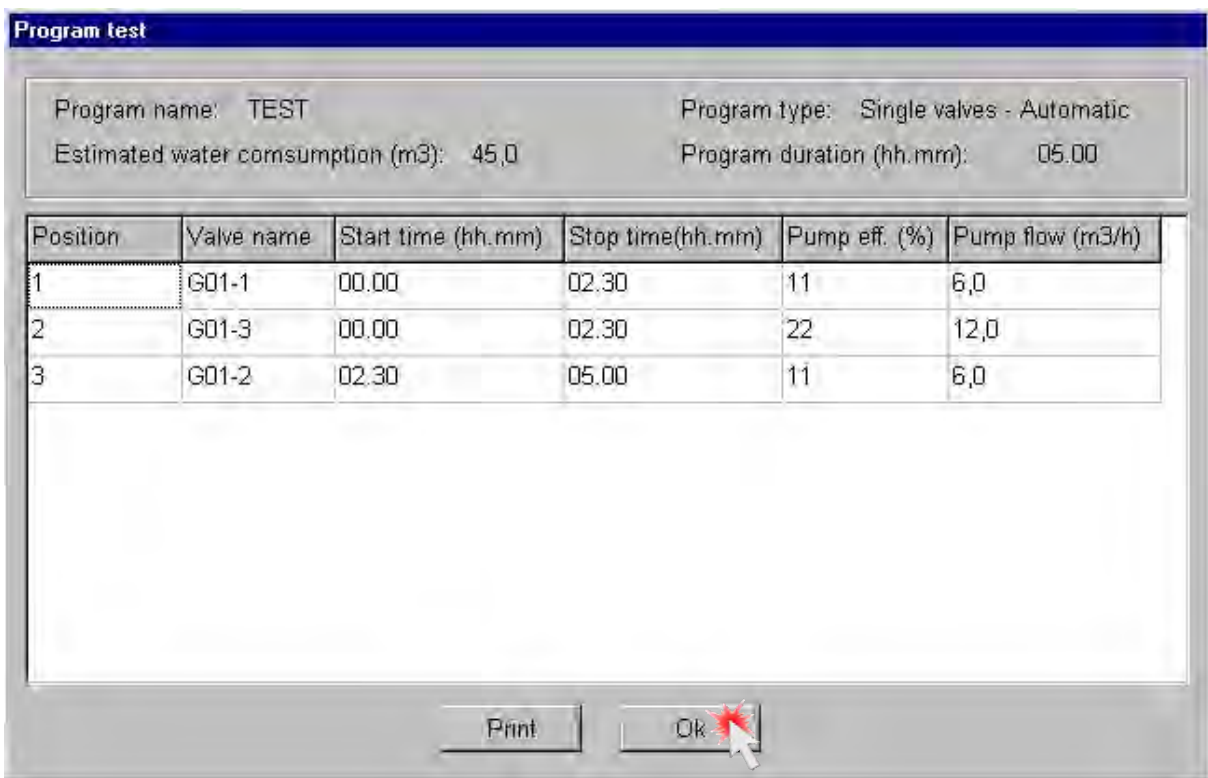
Then click **OK**. 

All valves, whose name begins with G01, will have the same precipitation value.

During installation, select the valve names so that the first letter designates the area that will be irrigated.

G01-1 Green 1 Sprinkler 1 G01-2 Green 1 Sprinkler 2 etc.

8.1.2 Program Test






The program test feature is a tool for checking program configurations.

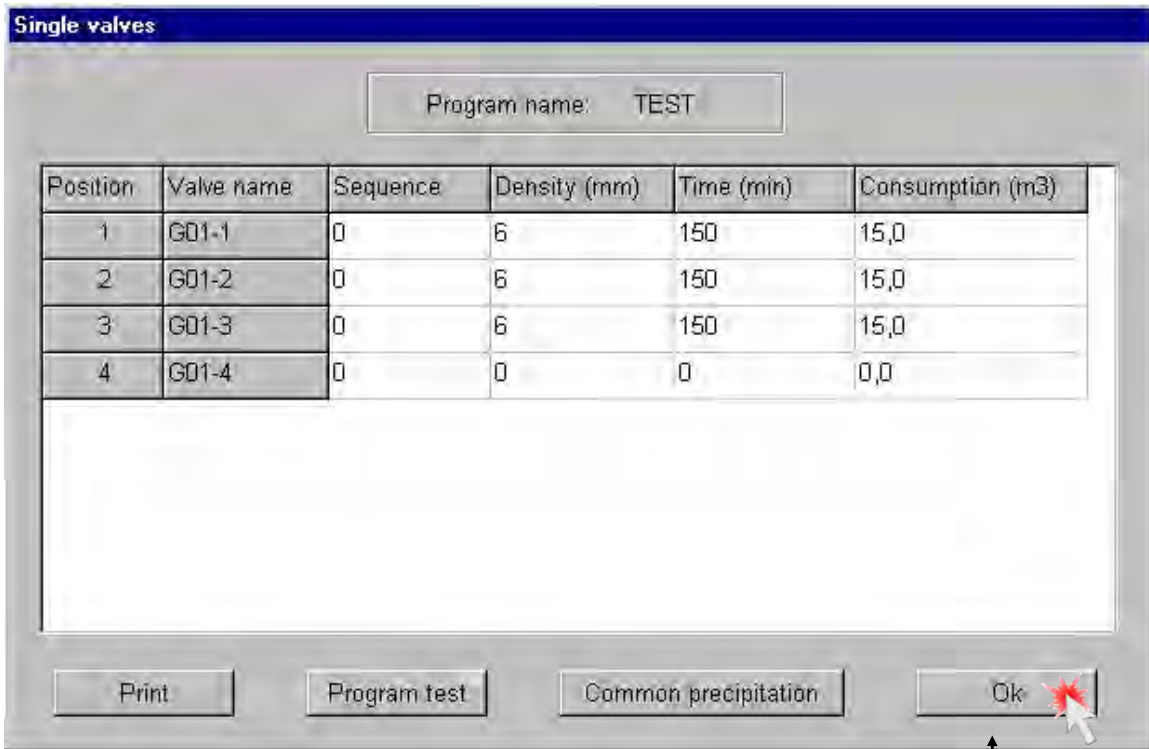
Click **Program test**. 


A program configuration that you created will be checked and made ready for a download to the VCU. Without going through the test a program cannot be downloaded to the VCU and therefore cannot be used.

You can see in the window the detailed timing of the program operations as calculated by the Flow Manager. This is how the program will be executed by the VCU.

By clicking  the  button you can print the program data to have an overview of the program operation.

To end the Program test click OK. 
You will return to the Single Valves window.



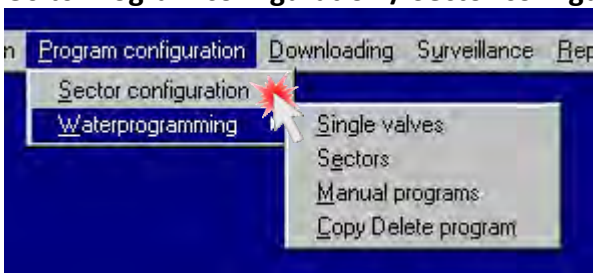
Now click the **Ok** button to save the program on the hard disk. 


To make the program executable you must download it to the VCU.
Refer to Chapter 9 - Downloading

8.2 Sectors


For this program type it is necessary that you pre-define the sectors.


Go to **Program configuration / Sector configuration** where you can define the sectors.



Click Sector configuration. 

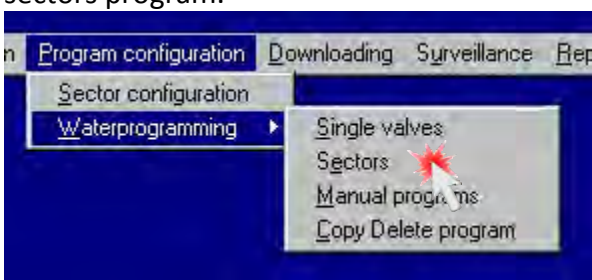


Give each sector a unique name and assign the valves to the sectors. 
 A valve can only be assigned to one sector.

Confirm the entry by clicking Ok. 

8.2.1 Creating a Sectors Program

Go to **Program configuration / Water programming / Sectors** where you can configure a sectors program.

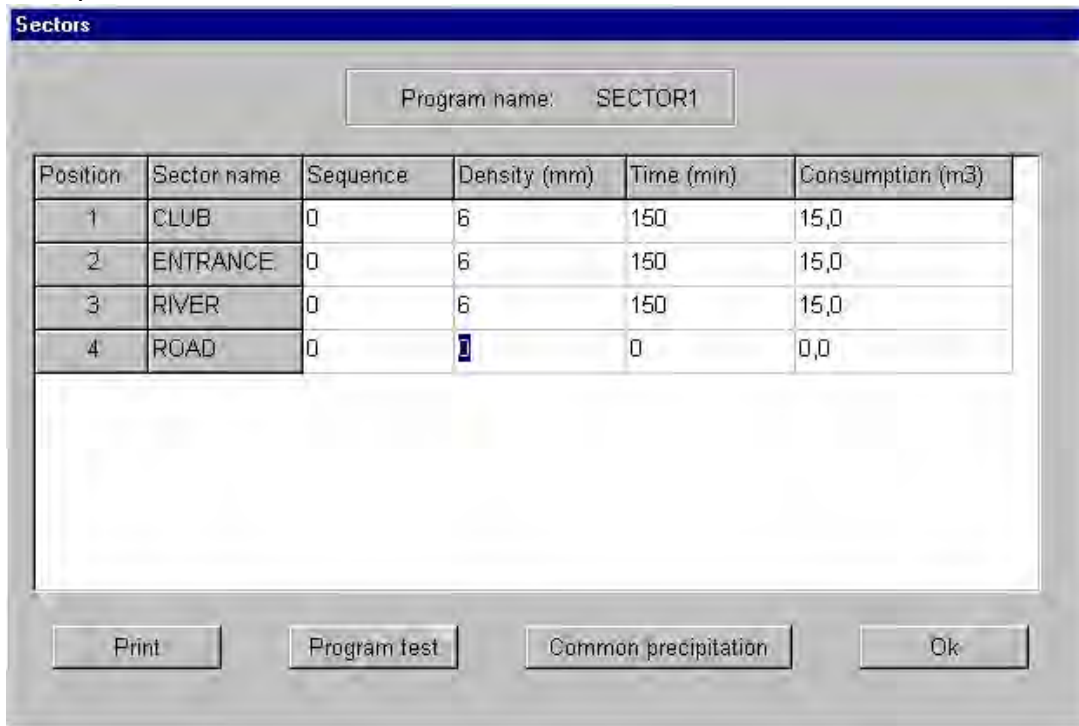


Click **Sectors**. 



Type a unique program name.

Finally click **Ok**.



Position	Sector name	Sequence	Density (mm)	Time (min)	Consumption (m3)
1	CLUB	0	6	150	15,0
2	ENTRANCE	0	6	150	15,0
3	RIVER	0	6	150	15,0
4	ROAD	0	1	0	0,0

The Sector name field shows your pre-defined sector. You can now enter the required precipitation in the **Density** field. The Flow Manager will automatically calculate the valve open time. The water consumption of the whole sector is displayed in the Consumption field.

The Flow Manager takes into consideration one sector only. After the first sector has finished, the next sector starts. You can enter the sequence in which the sectors will run.

Print:  Printing program data

Program test: Program test to check the program configuration. The program configuration you created will be tested and made ready for a download to the VCU.

Without going through the test run the program cannot be downloaded to the VCU and executed.

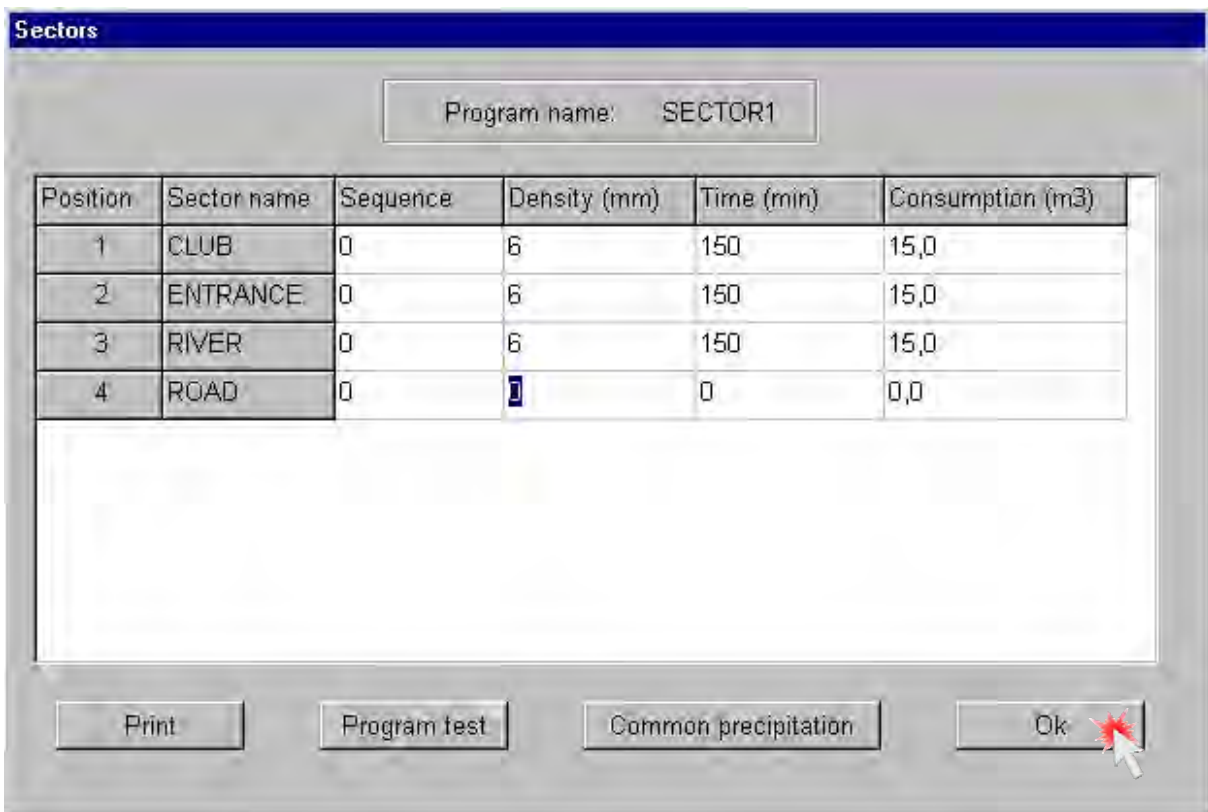
8.2.2 Common Precipitation:



Here you can assign the same precipitation to multiple sectors. For example, if you enter G in the Enter valve search text field all sectors that start with G will be assigned the same precipitation.



Click Ok to exit the dialog box.



Ok: Save the program and exit



You must run the **Program test**. Otherwise the program cannot be downloaded to the VCU and executed.

8.3 Manual Programs

This program type allows you to specify how the program will run.

This means, you define which valves open at what time and for how long.

Normally this data is determined by the Flow Manager.

If you want to avoid using the Flow Manager you can do this by creating a manual program.

Programming procedure:

- ⇒ Select pump(s)
- ⇒ Select and assign valves to program steps
- ⇒ Specify duration of each step
- ⇒ Run program test
- ⇒ Exit programming window
- ⇒ Download the program to the VCU
- ⇒ Start the program using Change Active Program



**Important: If you do not select any pumps, only valves will open.
The system will not send you a warning message!**

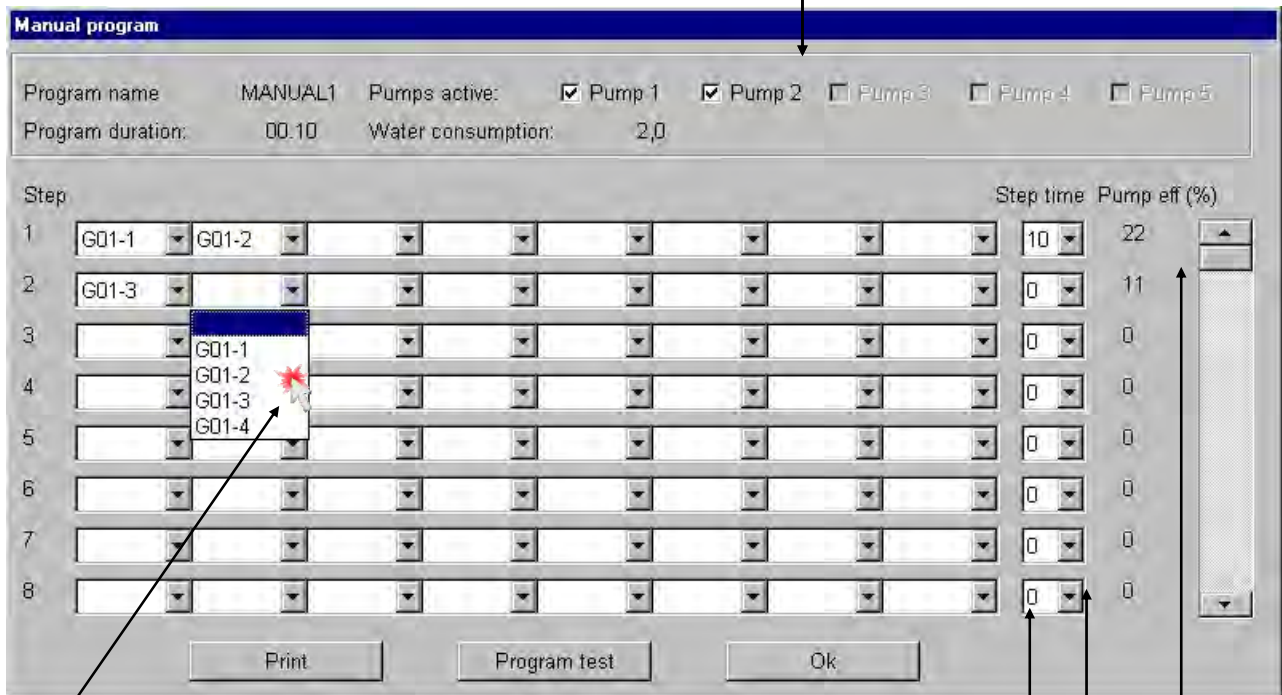


Please check the pump capacity!

Do not open more valves than the pump capacity permits!

Greenkeeper does not monitor the flow!

Select the pump(s) here.



Step	Valves	Step time	Pump eff (%)
1	G01-1, G01-2	10	22
2	G01-3	0	11
3		0	0
4		0	0
5		0	0
6		0	0
7		0	0
8		0	0

From the list box select the valve.

You can assign up to 8 different valves to one step.

An error message will be returned if you attempt to assign a valve twice within one step.

You can define a maximum of 100 steps, each with 8 valves.

Select the duration of a step from the Step time list box.

The step time options are incremented by 5 minutes.

The pump efficiency is displayed here. Make sure the pumps are used effectively. Incorrect data can lead to pump damage.

There are always 8 steps displayed in the Manual program window. Scroll this bar to display the next 8 steps (place the mouse pointer over the bar, hold down the left mouse button and pull the bar downwards).

Now click **Program test** to check the program.

Acknowledge the **Program test completed** message by clicking **OK**.

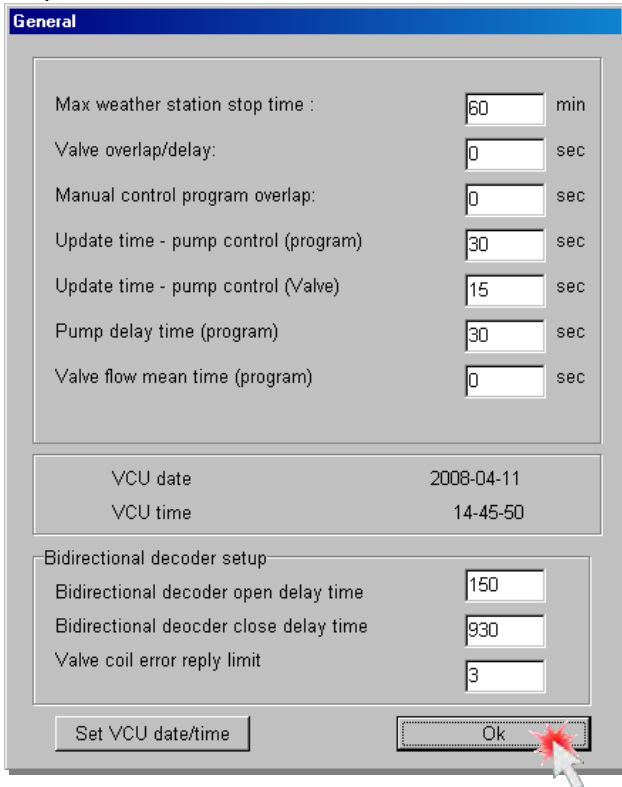
Exit programming by clicking **OK**.

The program will be saved on your hard disk.

You must now **download** the program to the **VCU** and enter it in Change Active Programs or start it manually. Refer to Chapter 9.

Manual programs operation is governed by the following rules:

If no delay has been entered in System configuration / General, the steps will start one after the other. Once the first step finishes (or the first valve within the step closes) the first valve of the next step starts.



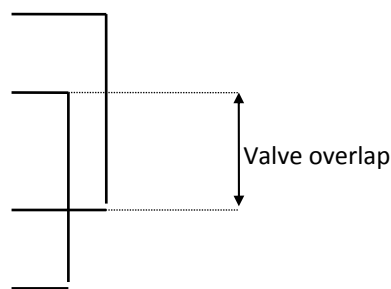
Should a delay have been defined in **System configuration / General**, the valves within a step will start in intervals equal to the delay entered. Once the first valve within a step closes, the first valve within the next step opens. When the second valve within a step closes, the second valve within the next step opens, etc.

This means that, between the individual steps, the valves overlap.

However, this is only possible if a value (max. 30 seconds) has been entered in System configuration / General / **Manual Control Program Overlap. (See Chapter 7.6)**

Example:

Pos.	Status	Valve	Time	m ³ /h
1	On	G1	12.08	21,0
2	On	G2	12.08	42,0
3	On	G3	12.09	63,0
4	Off	G1	12.13	42,0
5	On	T1	12.13	48,0
6	Off	G2	12.13	27,0
7	On	T2	12.13	33,0
8	Off	G3	12.13	12,0
9	On	T3	12.14	18,0
10	Off	T1	12.18	12,0
11	On	F1	12.18	39,0
12	Off	T2	12.18	33,0
13	On	F2	12.18	60,0
14	Off	T3	12.19	54,0
15	On	F3	12.19	81,0
16	Off	F1	12.23	54,0
17	Off	F2	12.23	27,0
18	Off	F3	12.24	0,0



G = Green step 1;

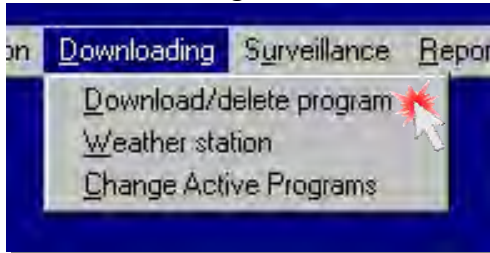
T = Tee step 2

F = Fairway step 3

9. Downloading Programs

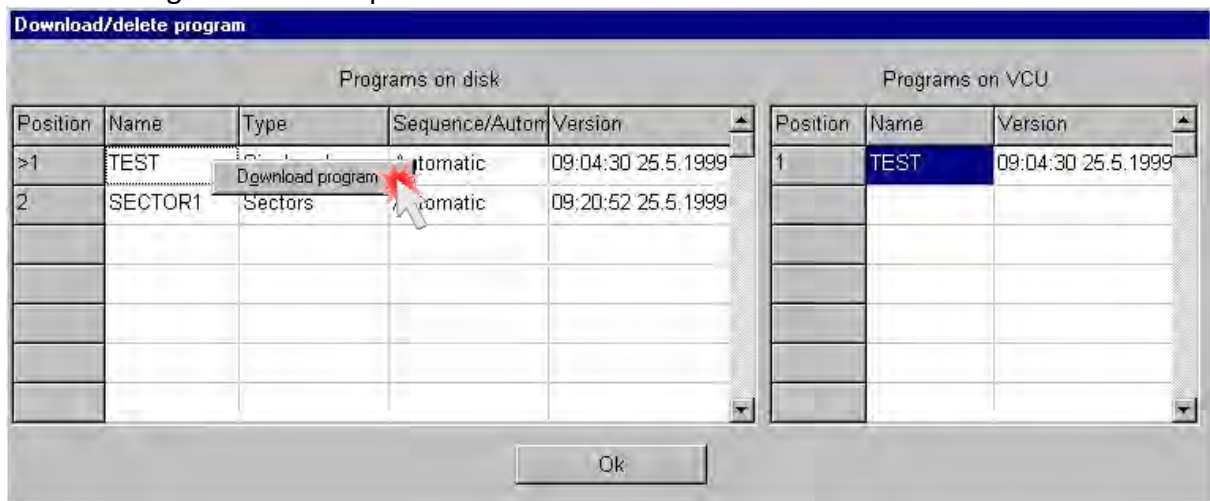
Before program configurations can be used they must be downloaded to the VCU.

Click Downloading: 



And then **Download/delete program**


The following window will open:



The following window will open:

The window is divided into two areas. The left-hand side area shows the currently available and **tested** programs stored on your hard disk. An arrow sign (>) in the Position column indicates that the program has already been downloaded to the VCU.

The right-hand side area shows the programs that are currently available on the VCU. In the example above, only the Test program is stored on the VCU.

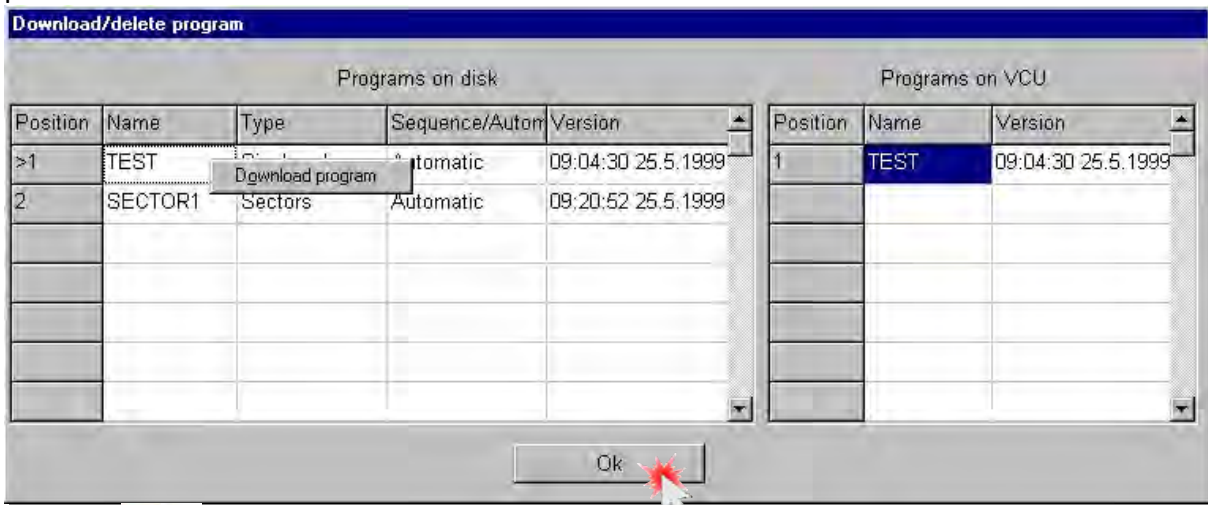
Click a program name in the left-hand side area. The box with the name will now be bordered with a light grey line. Press the right mouse button. The **Download program** box will pop up to the right from underneath the mouse pointer. Click the box. 

The program will be downloaded within a matter of seconds to the VCU.

During downloading you will receive the following message:



After a successful download the program will also be displayed on the right-hand side and the position number will be marked with an arrow.

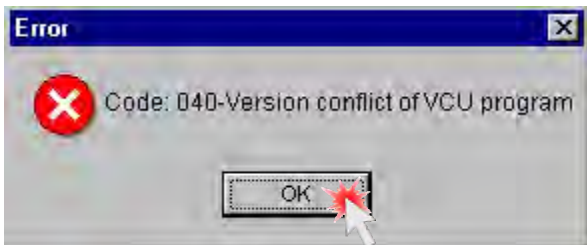


Click Ok. 

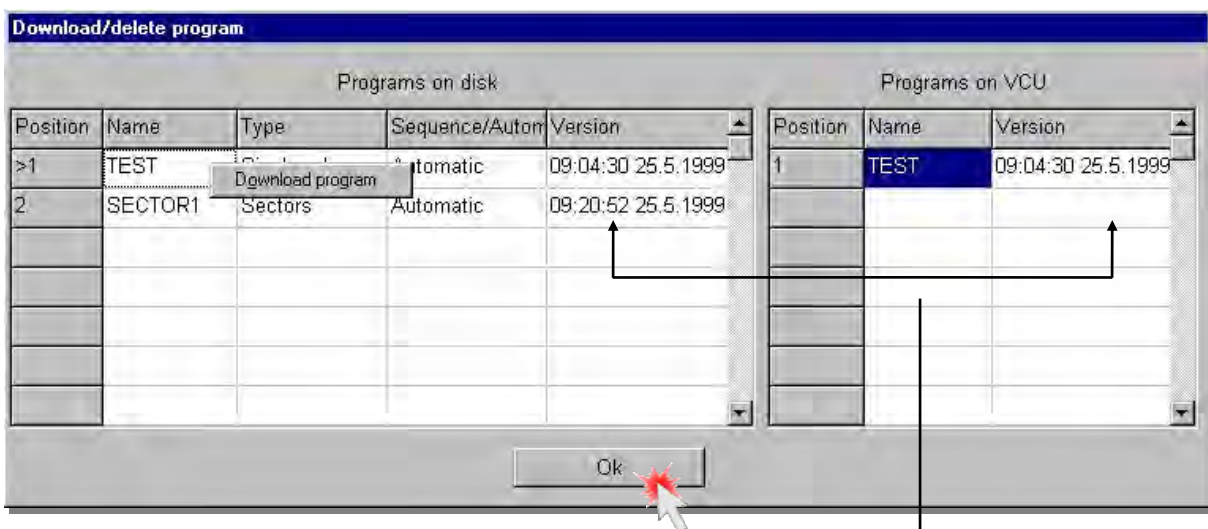
The program is now available in the VCU and ready for activation.

Both versions of the program must be identical.

A change in the program is followed by an error message:

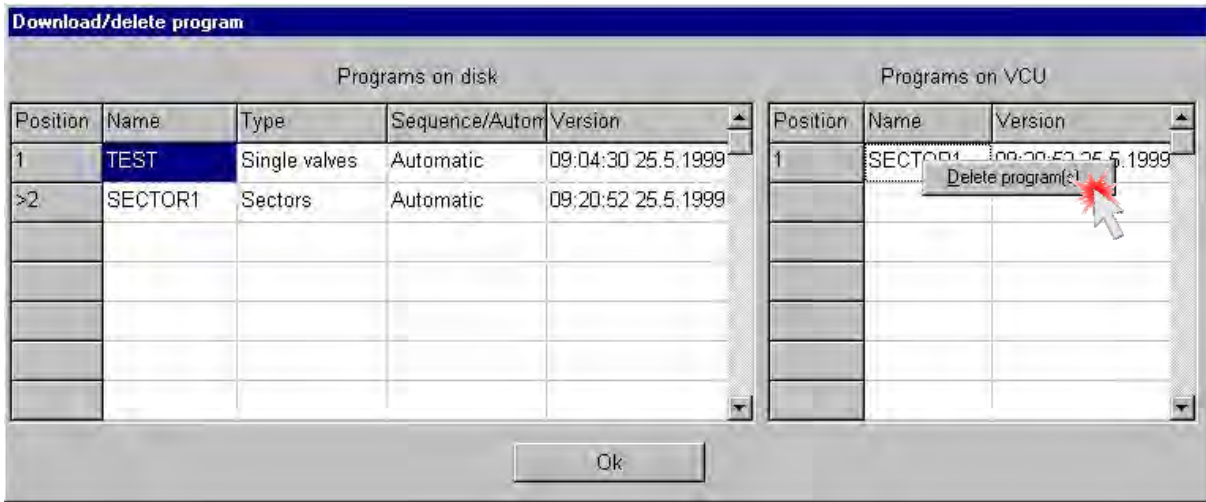


Should this happen delete the program in the VCU and download the updated version.



Versions must be identical!!

9.1 Removing Programs from the VCU



To remove a program from the VCU clicks the program name in the right-hand side area. The box with the name will now be bordered with a light grey line.
 Press the right mouse button. The **Delete program** box will pop up to the right from underneath the mouse pointer. Click the box.
 The program will be removed from the VCU.
However, it remains stored on your hard disk.



Once a program has been removed from the VCU it cannot be invoked from Change Active Programs. But as the program remains stored on the hard disk it can be, at any time, downloaded to the VCU again.

Before you update or delete any program always end all control programs in Change Active Programs.

A maximum of 20 programs can be stored in the VCU.
 These include a maximum of 12 single valves / sectors programs and a maximum of 8 manual programs.

Should the limits be exceeded the limits you will receive the following error messages:



Code:042-Max number of manual programs in VCU exceeded

Code:043-Max number of programs in VCU exceeded

10. Change Active Programs

Change Active Programs serves as an independent control function.

Here you specify which program on which day, in which week and at which time will automatically start.

You can either start the programs immediately by manual start or automatically at a predefined time.

An automatic program execution can be programmed up to two weeks in advance. After the second week has passed Change Active Programs automatically begins with the first week. Each day within the two week period can hold up to seven programs, each with a maximum of 3 start times.

Also you can globally change, with a mouse click, Precipitation or Duration for each program separately.



Irrigation status shows the current status of the VCU.

The following status information is displayed:

Active: A program is currently running.

(Do not make any changes when in the active status)

Stopped: A control program has been stopped.
However, the program continues to run internally.

Waiting: Change Active Programs has been activated through Start irrigation. The VCU is waiting for the Start time entered.

Inactive: Neither automatic nor manual program has been started. The VCU cannot start a program automatically when in this status. The status is invoked by clicking Reset.

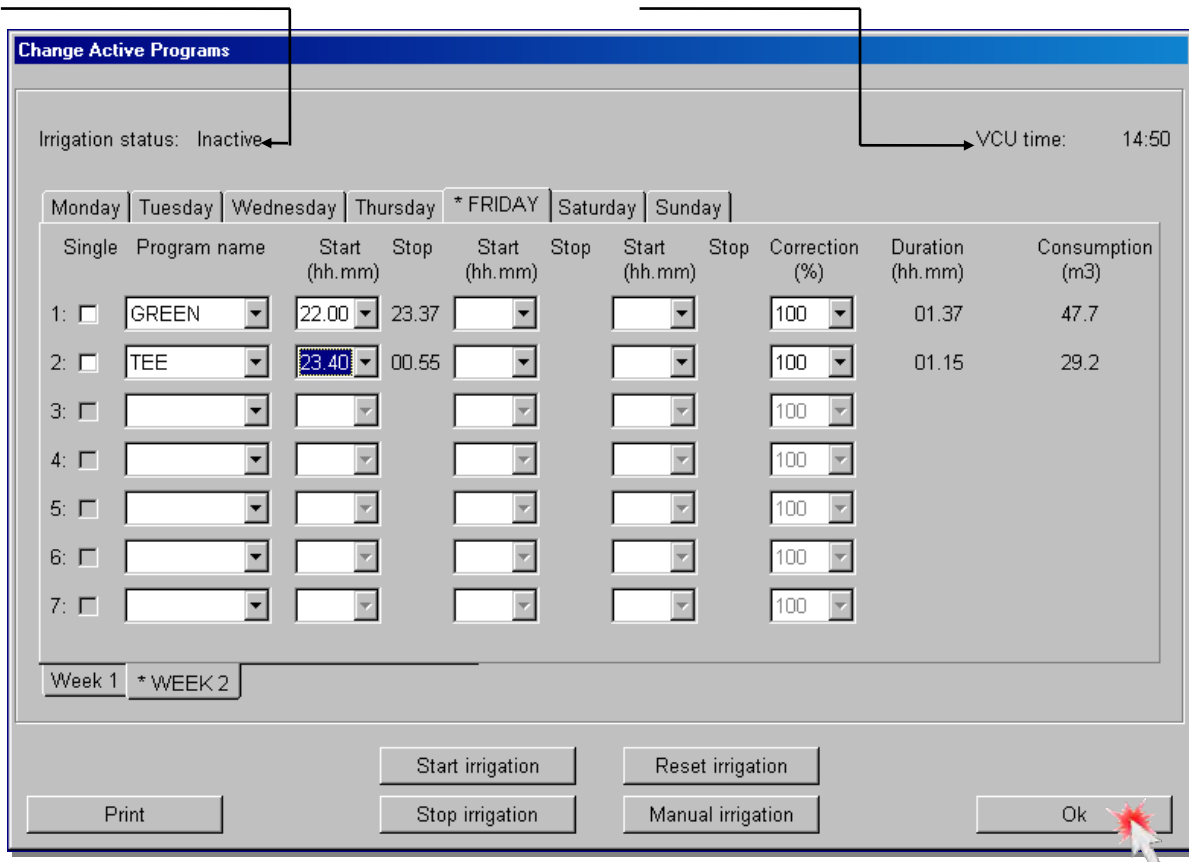
Weather: The irrigation process has been stopped by the weather station. You can define the Max. weather station stop time in the General dialog box. The program continues to run internally.

Man. Stop. A manual program has been stopped. The irrigation has been interrupted. However, the program continues to run internally. To completely cancel the program click Reset.

Manual: A program has been started manually.

Fault: A fault has occurred in the VCU. Identify the fault cause in the Service menu. No irrigation can be performed when in this status.

Irrigation status is displayed in the top left corner. VCU time is shown here.



The current day and week are always marked with an asterisk and capitalized.

If you want to select another day, click on the day of your choice. The programming is valid for the selected day only. Should the program run every day it must be entered (along with the start times) for each day in Change Active Programs.

The same procedure applies to the first and second week.

Single: If you want a program to be removed from Change Active Programs after it has been invoked for the first time, click the Single field to check it. After the first start, the marked program will be removed from the irrigation schedule (Change Active Programs) for the particular day and week. However, it remains stored on the VCU and can be reactivated at any time.

Progr. name: Select a program in the Program name field. Only programs downloaded to the VCU are available for selection. If a program you created is not listed it has not been downloaded to the VCU.

Refer to Chapter 9.

Start times: You have the option of selecting three start times. Click the first start time selection field, from left to right. Select a start time. The times are incremented by 5 min.

End: Shows the time when the irrigation program will be finished.



NOTE: Regardless of the program type a delay of at least 10 minutes must be maintained between the Stop time of one program and the Start time of another. Otherwise you will receive the following error message:
Code: 048-"xxx" Overlap time

Example: Start time 19:00 Duration: 2 hrs. = Stop time 21:00
The second Start time or the first Start time of the next program may start no sooner than 21:10.

Correction: Here you have the option of increasing or reducing the percentage of Duration or Precipitation.
Default: 100 % min. 10% max. 300 %.

Duration: This column lists for each program Duration per start time.
You can change Duration using the Correction field.

Consumption: The calculated consumption for each program is shown here. You can change Consumption using the Correction field.

Start irrigation: This will bring the VCU to the waiting status. The VCU waits until the start time entered in Change Active Programs arrives and then starts the programs.
Do not exit Change Active Programs without activating Start irrigation first. Otherwise the VCU status remains inactive and automatic irrigation is out of operation.

Stop irrigation: This allows you to temporarily stop (suspend) control programs. However, the program and the duration continue to run internally.

Reset irrigation: This command is used to completely cancel the execution of an irrigation program. The currently running program will be cancelled and the VCU will attain Inactive status.

Manual irrigation: To manually start a program already stored in the VCU. The selected program will start immediately. To end the program before its calculated end click **Reset irrigation**.

Print: The complete irrigation schedule (Change Active Programs) for both weeks and each day will be printed on a printer.



NOTE: Make changes in Change Active Programs only when the VCU is in the inactive status.

To invoke the inactive status click Reset irrigation.



10.1 Manual program start

Each program that you created can be started independently of the actual time. By clicking **Reset irrigation** end all programs that started automatically. Then click **Manual irrigation**.

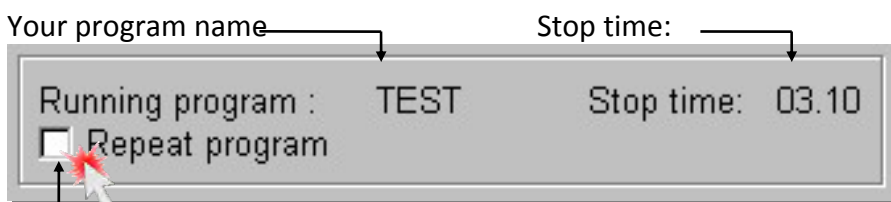
The following dialog box will be brought up.



Select your program and confirm your choice by clicking **Ok**.

The selected program will start immediately.

The following box will appear in the top section of the screen:

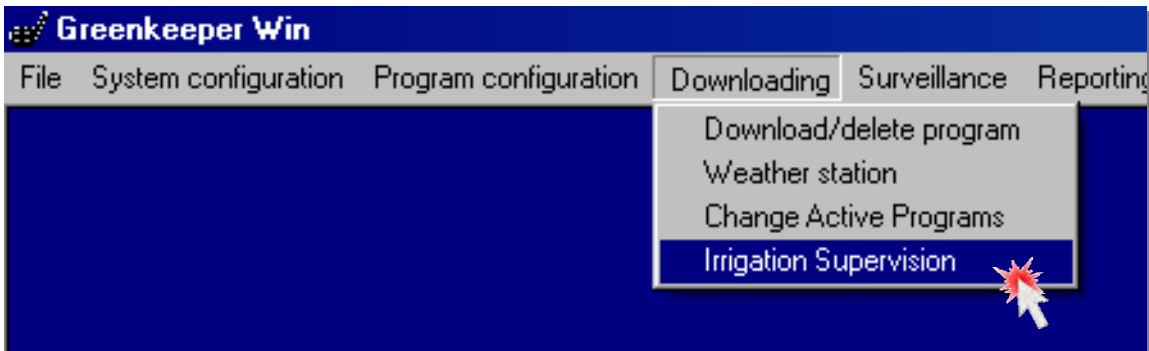


Click here to check the Repeat program option to automatically repeat the program after it has been executed. It will be rerun until you click **Reset irrigation** or remove the check by clicking again the Repeat program field.



Do not exit Change Active Programs once you have selected Repeat program. The process can only be controlled in this menu.

10.2 Irrigation Supervision



Irrigation Supervision

Supervision setup

Max no. of faulty opened valves permitted

Pump Supervision Decoder Active

Phone alarm setup

Faulty Opened Valves failure indication

Pump system failure indication

Connection name

Phone number

Select pulse dialing

10.2.1 Maximum number of faulty opened valves permitted

If the number of the alarms e.g. “valve open fault” exceeded the entered limit the entire irrigation will be stopped. (Every active program will be stopped; all manual opened valves will be closed). The corresponding alarms are display on the right below side of the screen/monitor.

Input range: 0 - 9
Standard adjustment: 0 (not activated)

10.2.2 Monitoring of pump alarm active

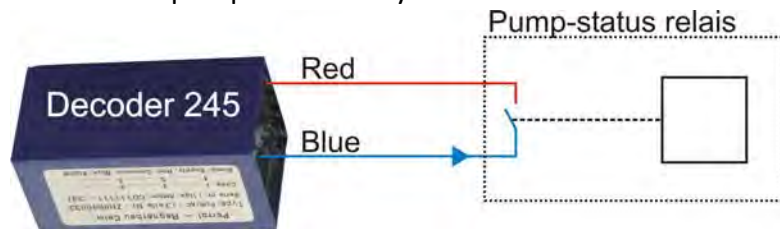
This will activate the pump control.

Decoder no. 245 has to be connected with the pump-status-relays.

Status:

Relays open: no error

Relays closed: error



Continuation

The decoder solenoid cables have to be connected with the pump-status-relays.

2 different statuses will be reported from the decoder to the VCU.

No error in the pump system

In this case the pump-status-relays are open and the decoder reports following status: „Coil shortcut >xx Ohm“. This means the pump system is Ok.

Error in the pump system

In this case the pump-status-relays is closed and the decoder reports following status „Coil shortcut <xx Ohm“. This means the pump system has an error.

If decoder 245 reports an error the entire irrigation stops (each active program stops, all manual opened valves will be closed.) The corresponding alarms are displayed on the right below side of the screen/monitor. And, if active, the alarm will be sent additionally by telephone.

Standard adjustment: no activated

10.2.3 Emergency call in case of too much faulty opened valves

Activation of the alarm function by telephone if the limit of “max. number of faulty open valves permitted”

Standard adjustment: not activated

10.2.4 Emergency call in case of pump error

Activation of the alarm function by telephone if the field „pump supervision active“ is activated.

Standard adjustment: not activated

10.2.5 Name

Just for information about the phone number

Standard adjustment: **empty**

10.2.6 Phone number

Phone number, which should be called from Greenkeeper Win in the case of alarm.

Check the phone number! Greenkeeper Win will not check any phone number!

If you call from an extension line it's necessary to add a 0 in front of the phone number.
Ask your telephone administrator.

10.2.7 Puls dial

Here the dialling method will be determined.

Deactivated: tone dialling (standard)

Activated: puls dialling

Here the input is just possible if the field "phone number" is filled.



IMPORTANT: To use the alarm messages by telephone, the
„dialled terminal“ in the menu
„System configuration/Communication setup“ has to be activated.

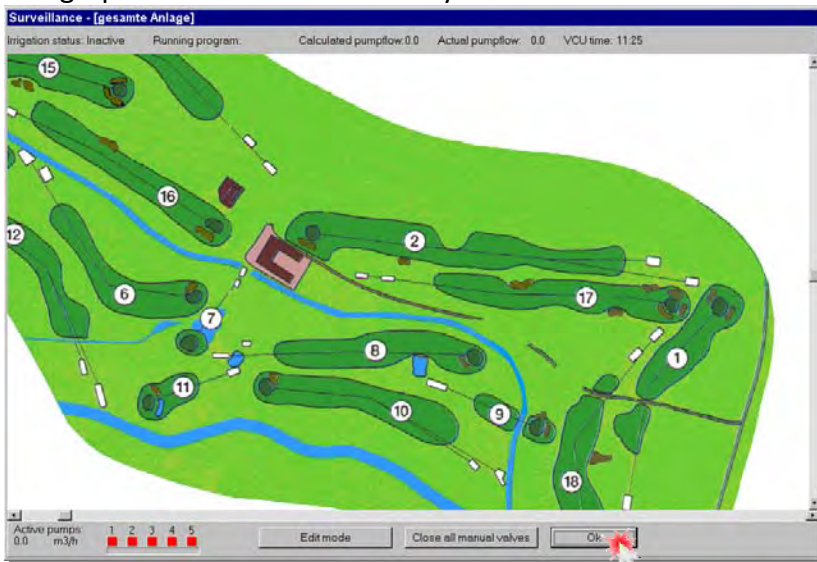
11. Surveillance

11.1 Open graphic

Greenkeeper is the only program on the market offering a realistic graphic representation of the areas irrigated. In the graphic you can place valve symbols in the actual locations where the solenoids are situated. By clicking the symbol you can open and close the valve. In the menu bar click Surveillance – Surveillance picture.



The graphic will load automatically.



The top bar of the screen displays the following information:

- ⇒ **Irrigation status**
- ⇒ **Running program**
- ⇒ **Calculated pump flow**
The calculated pump flow is shown in this field. If the calculated pump flow exceeds the pump capacity, the fields is **blinking in red colours**.
- ⇒ **Actual pump flow (a flow meter is required for this)**
- ⇒ **VCU time**
- ⇒ **Active Pumps**
In the left down corner of the screen the status of the pumps is shown.
Red: Pump stopped
Green: Pump is running
The indicated pump flow is based on the running pumps.

In the **Edit mode** you can place valve symbols in their actual locations in the graphic. **This is only possible in Password level 3!**

Close all manual valves will close all valves that have been opened manually.

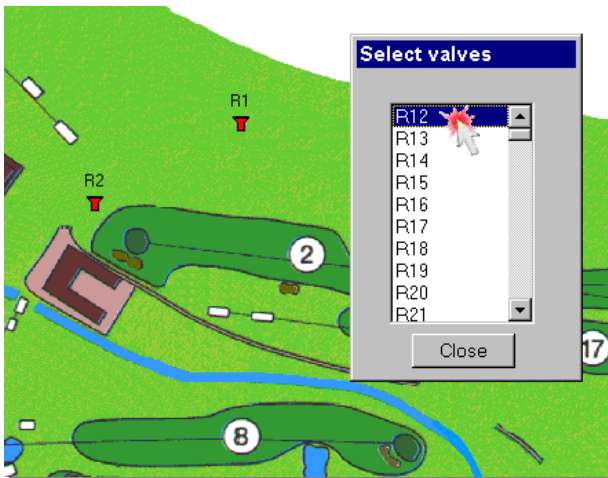
Exit the graphic by clicking Ok.

11.2 Edit Mode

The Edit mode is used for placing valve symbols.



Click the Edit mode button. The Select valves window will pop up.



The window lists all valves that have not been placed.

To place a valve, position the mouse pointer over the valve name. Hold down the left mouse button. Now drag slowly the valve name out of the window into the graphic. Release the mouse button. The valve symbol is now in the graphic. The valve name has disappeared from the list.

After all valve symbols have been placed, close the window by clicking the **Close** button. You will exit the Edit mode.



11.3 Graphic map selection

You have the option to select from as many as 10 different Graphics, or 10 different areas. To do this, right-click in the graphic. The selection window will open. Now select the graphic or area that you want.

Should the graphic be larger than the screen you can move the graphic up and down or sideways using the scroll bars on the right and at the bottom edge of the screen.

You can now open a valve by clicking the valve symbol.



Enter the valve open time from 1 - 99 minutes.
The default value is 15 minutes.
Click **OK** to open the valve selected.

11.4 Pump management

The system will then start a pump (pumps) with the required capacity.

Example:

2 pumps are installed	Pump 1:	20 m ³ /h
	Pump 2:	10 m ³ /h

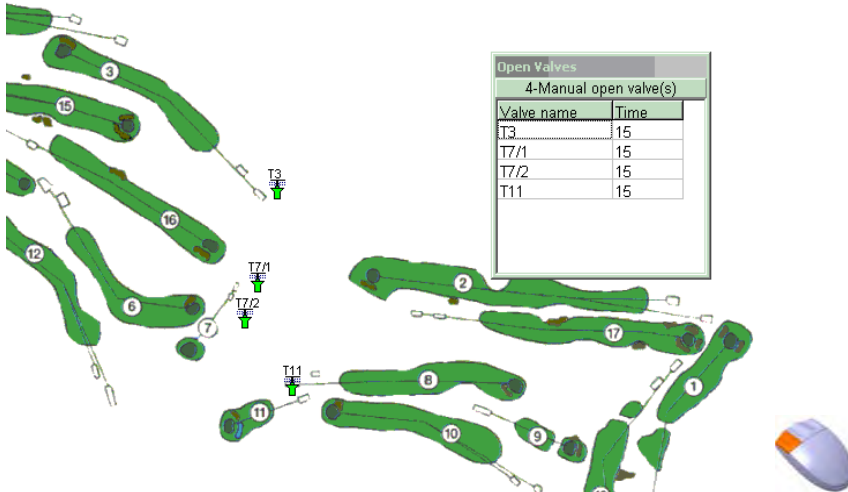
3 Valves are opened	Valve 1:	5 m ³ /h
	Valve 2:	5 m ³ /h
	Valve 3:	8 m ³ /h

- Execution:
- Valve 1 opens (5m³/h)
The system starts Pump 2 (10 m³/h)
 - Valve 2 opens (5 m³/h)
The system does not start another pump as the capacity of Pump 2 (10 m³/h) is sufficient.
 - Valve 3 opens (8 m³/h)
The system starts a **boost** pump – Pump 2 (20 m³/h) – and switches pump 1 off after the next interval time (see chapter 7)



NOTE: The system only starts pumps when no other programs are currently running. Should another program be in operation only the valves will open.

After the system opens the first valve the following dialog box is displayed.



All manually open valves are displayed in the list. To close a valve again, click the valve symbol. The valve will close and it will be removed from the list.

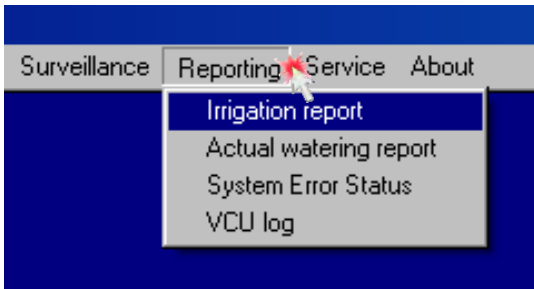
The **Close all manual valves** button can be used to close all manually open valves in one go.

Click **OK** to exit the graphic.



WARNING: Manually open valves which have been opened using the graphic will not close automatically after exiting the graphic!

12. Reports



Greenkeeper stores all irrigation processes in the VCU. These can be then summarised and presented in the form of reports.

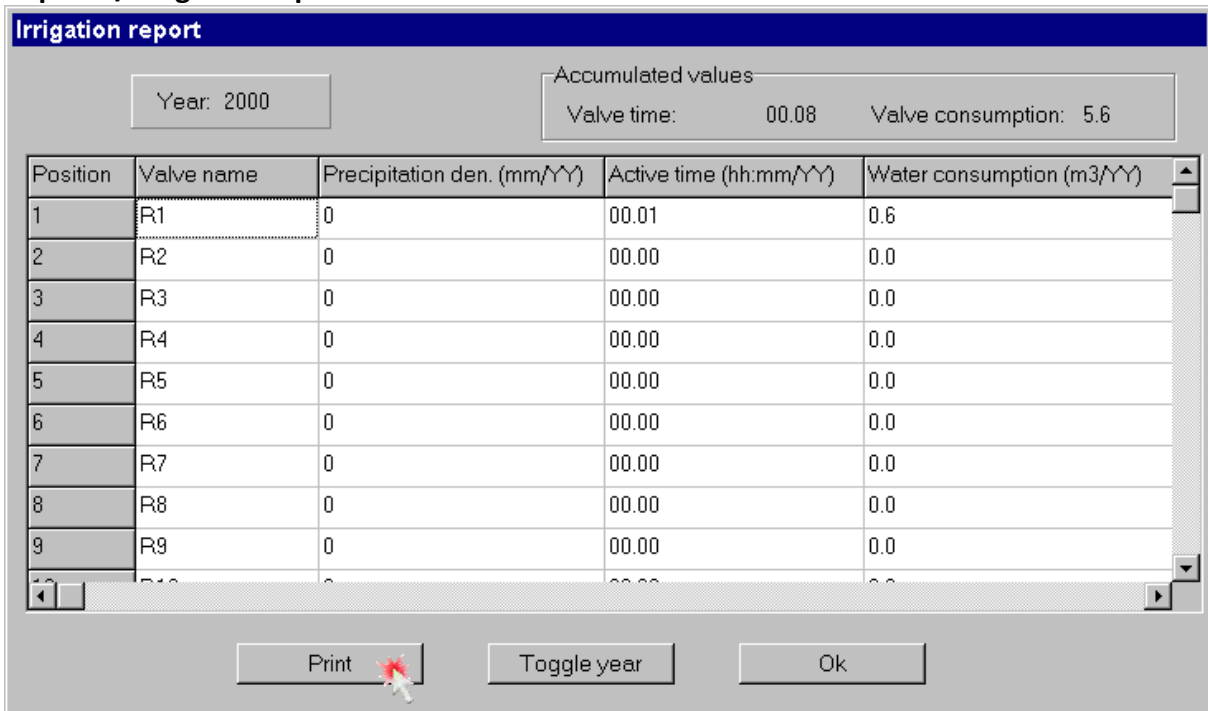
Two different reports are available:

1. **Irrigation report**
This report shows the total precipitation and water consumption for each valve for the current and previous year.
2. **Actual watering report**
This report shows all valve activities from the recent irrigation programs.

12.1 Irrigation Report

To view the Irrigation report click:

Reports / Irrigation report



Position	Valve name	Precipitation den. (mm/YY)	Active time (hh:mm/YY)	Water consumption (m3/YY)
1	R1	0	00.01	0.6
2	R2	0	00.00	0.0
3	R3	0	00.00	0.0
4	R4	0	00.00	0.0
5	R5	0	00.00	0.0
6	R6	0	00.00	0.0
7	R7	0	00.00	0.0
8	R8	0	00.00	0.0
9	R9	0	00.00	0.0

Year: 2000 Accumulated values: Valve time: 00.08 Valve consumption: 5.6

Print Toggle year Ok

This report lists the total precipitation, active time, and water consumption per year for each valve.



Click **Print** to print a hard copy of the list on your printer.
 Click **Toggle Year** to change between the previous / current year. To exit the report click Ok.
 In the head line the accumulated values for the corresponding year are shown.

12.2 Actual Watering Report



To view the Actual watering report click:
Reports / Actual watering report

Actual watering report

Report name: XXXXXXXX	Start time : YYYY-MM-DD HH:MM:SS	Report number: XX
S9 - XXXX.X	S10 - XXXX.X	Stop time : HH:MM

Position	Status	Valve name	Time	Valve Status	S5-	Esitimated Flow	S6-

This report shows valve activation data from the last 15 irrigation programs.

As only a total of 15 reports can be stored the oldest report (with the highest Report No.) is always deleted. The remaining reports then move down one number and the latest report becomes Report No. 1.

Report name: Name of the irrigation program.

Start time: Start time of the irrigation program.

Report number: Sequential number of the report
 1 -15 (the latest report is always No. 1).

S 9: Name and value of Frequency input 1.

S 10: Name and value of Frequency input 2.



- Stop time:** Stop time (program stopped by the weather station or manually).
- Position:** Sequential number
1 - 1600 (480 for Single valves / Sectors program).
- State:** Valve state. 2 states per valve.
ON / OFF.
- Time:** Start time of the irrigation program.
- Status valve:** Status message from the decoder **(ONLY FOR BI-DIR-DECODER)**
OK (green) no error
Error (red) Error (see status report)
NA (grey) no FB- Decoder installed
- S 5:** Readout of the V/I flow meter.
If a flow meter is connected
the actual flow is displayed here.
- Estimated flow:** Flow calculated from the data entered.
- S 6:** Readout of the P/I pressure gauge.
If a pressure gauge is connected
the actual pressure in bars is displayed here.
- Print:** Hardcopy of the report displayed on the printer.
- Previous report:** Previous report (only when more than 1 report is stored).
- Next report:** Next (older) report.

A maximum of 4000 valve activities can be stored in the VCU.
For a maximum of 133 valves this means 15 reports. If more valves are used in a program the maximum number of reports is reduced accordingly.


For 180 valves per program only 11 reports are generated.
The calculation is made as follows:

$$4000/180 = 11,1 - 11 \text{ reports}$$

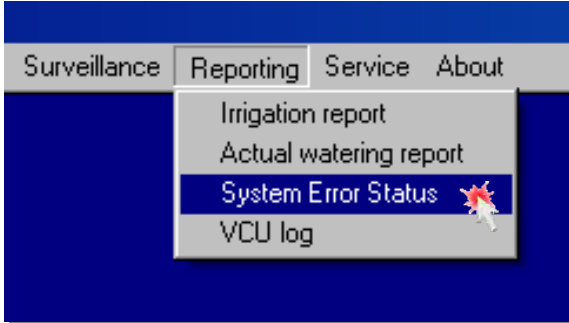
Whenever the capacity is exceeded, the oldest report is deleted.
All reports then move down one position. The latest report is given No. 1.

Each valve generates two types of status information. One when it is opened and one when it is closed.

12.3 System Error Status (ONLY FOR BI-DIR-DECODER)

To see the status of the decoder feedbacks please click: 

Reporting / System error status



Following status can be displayed:

- OK** (green) no error
- FEHLER** (red) error
- NA** (grey) no FB- decoder installed

System Error Status

Decoder Error Status

Valve number	Name	Valve Open fault	Valve Close fault	No reply	Coil shortcut	No coil connection
1	G1	Ok	Ok	Ok	Ok	Ok
2	G2	Ok	Ok	Ok	Ok	Ok
3	G3	Ok	Ok	Ok	Ok	Ok
4	G4	Ok	Ok	Ok	Ok	Ok
5	G5	Ok	Ok	Ok	Ok	Ok
6	G6	Ok	Ok	Ok	Ok	Ok
7	G7	Ok	Ok	Ok	Ok	Ok
8	G8	Ok	Ok	Ok	Ok	Ok
9	G9	N.A.	N.A.	N.A.	N.A.	N.A.
10	G10	N.A.	N.A.	N.A.	N.A.	N.A.

VCU Error Status
Status: 100-No Error

Reset VCU Error Reset Decoder log Print Decoder log Ok

If there is an error in the irrigation system, it will be documented and displayed.



Important: Eliminate primary always the reason for the alarm message, otherwise it appears immediately after the delete!

System Error Status

Decoder Error Status

Valve number	Name	Valve Open fault	Valve Close fault	No reply	Coil shortcut	No coil connection
1	G1	Ok	Ok	Error	Ok	Ok
2	G2	Ok	Ok	Error	Ok	Ok
3	G3	Ok	Ok	Error	Ok	Ok
4	G4	Ok	Ok	Error	Ok	Ok
5	G5	Ok	Ok	Error	Ok	Ok
6	G6	Ok	Ok	Error	Ok	Ok
7	G7	Ok	Ok	Error	Ok	Ok
8	G8	Ok	Ok	Error	Ok	Ok
9	G9	N.A.	N.A.	N.A.	N.A.	N.A.
10	G10	N.A.	N.A.	N.A.	N.A.	N.A.

VCU Error Status
Status: 108-Decoder warn.

Reset VCU Error Reset Decoder log Print Decoder log Ok

To delete a single error click with the left mouse button on the red marked error message. Afterwards click in the new window on the RESET button.



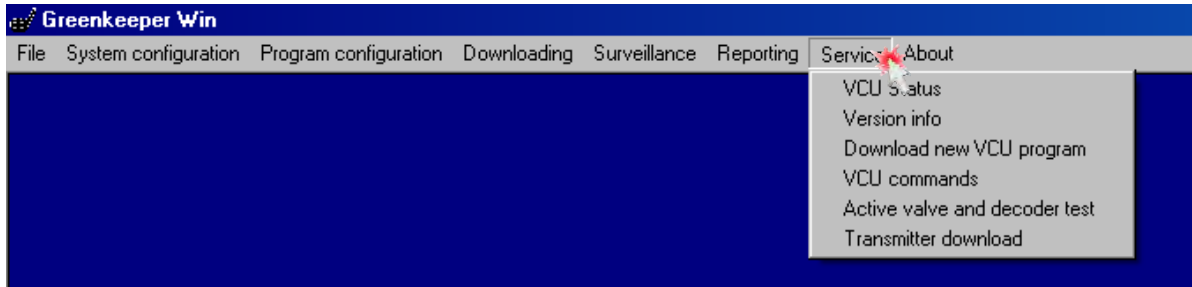
If you want to delete several error messages in one step click with the left mouse button at RESET DECODER LOG and confirm this afterwards in the new window with OK.



To delete the VCU Error click with the left mouse button on RESET VCU ERROR. If all errors are resolved the status must be: 100-OK!

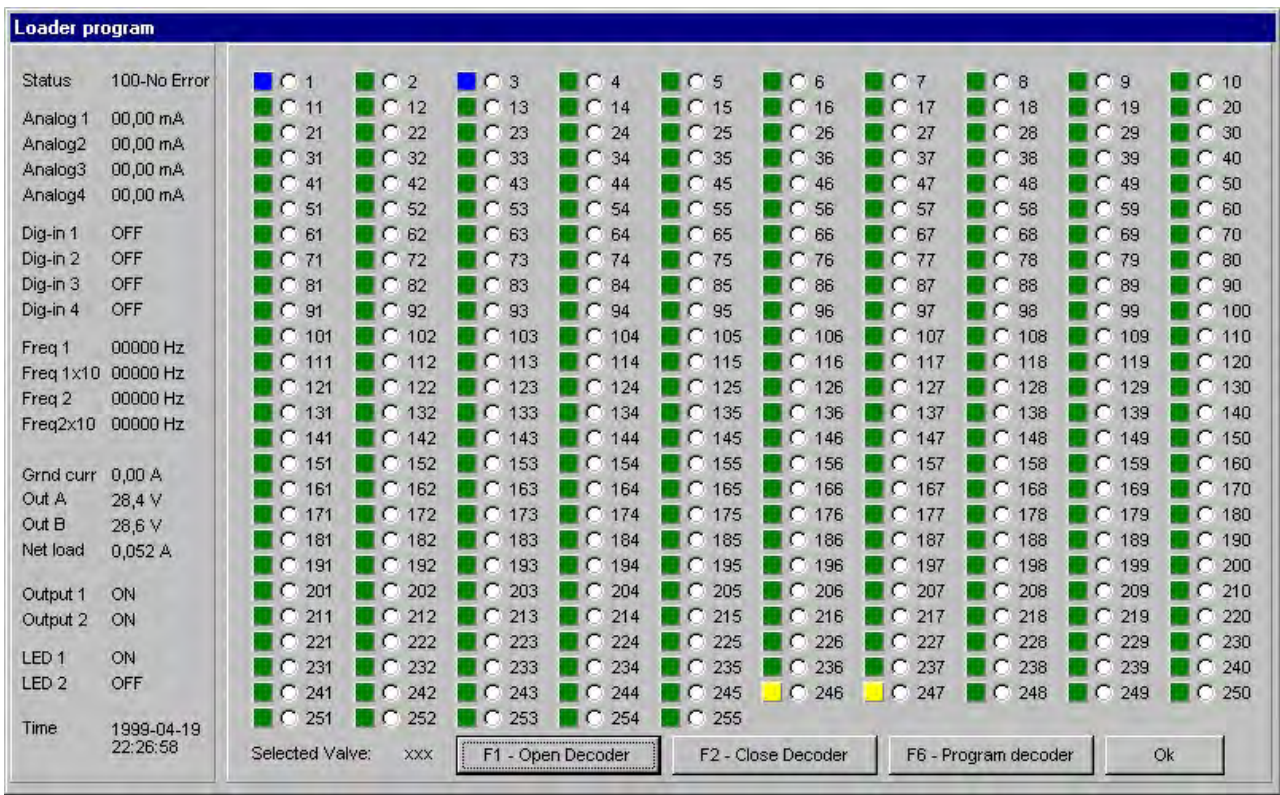
13. Service Menu

The menu is only accessible in Password level 3 !



- ⇒ **VCU status**
Actual VCU input and output values
Actual decoder status
Functions to open and close all decoders by a mouse click
Decoder programming functions
- ⇒ **VCU version information**
The current VCU software version is displayed here
- ⇒ **VCU version update**
For downloading a new software version to the VCU
- ⇒ **Reset VCU error**
To send commands to the VCU.
After an error message the VCU error must be reset in this menu option.
- ⇒ **Active decoder and valve check**
You can check the functioning of all valves and decoders here.
- ⇒ **Transmitter download**
To download all valve names with their respective decoder numbers to the transmitter.

13.1 VCU Status



Loader program

Status: 100-No Error

Analog 1: 00,00 mA
 Analog 2: 00,00 mA
 Analog 3: 00,00 mA
 Analog 4: 00,00 mA

Dig-in 1: OFF
 Dig-in 2: OFF
 Dig-in 3: OFF
 Dig-in 4: OFF

Freq 1: 00000 Hz
 Freq 1x10: 00000 Hz
 Freq 2: 00000 Hz
 Freq 2x10: 00000 Hz

Grnd curr: 0,00 A
 Out A: 28,4 V
 Out B: 28,6 V
 Net load: 0,052 A

Output 1: ON
 Output 2: ON

LED 1: ON
 LED 2: OFF

Time: 1999-04-19 22:26:58

Selected Valve: xxx

F1 - Open Decoder F2 - Close Decoder F6 - Program decoder Ok

Status: Shows the current VCU status

100-No error No error, the desired VCU condition

101-Line init: VCU is establishing a connection to decoders

102-Sync error: VCU 50 Hz power supply is not synchronised.

103-Ground error: Leakage current limit value exceeded
 The leakage current may not exceed the following values.
 More than 0.7 A for 8 seconds
 More than 1.0 A for 4 seconds
 More than 1.4 A for 2 seconds
 More than 2.0 A for 1 second

104-Load error: Current consumption of decoder line is too high.
 The following limit values may not be exceeded:
 More than 2.8 A for 32 seconds
 More than 4.0 A for 16 seconds



105-Volt error:	Voltage limit value exceeded. Less than 20.0 V for 32 seconds
Analogue 1-4:	Value in mA of analogue inputs 1 - 4
Dig-in 1-4:	Status of digital inputs 1 - 4
Freq 1-2:	Frequency in Hz
Grnd curr:	Leakage current of decoder line
Out A:	Output voltage (V) of decoder line A
Out B:	Output voltage (V) of decoder line B
Net load:	Load current (A) of decoder line
Output 1:	Relay output 1 energised/ deenergised
Output 2:	Relay output 2 energised/ deenergised
<u>LED 1 (yellow):</u>	<u>Irrigation program status</u>
ON:	Irrigation program running
BLINK:	Program stopped by weather station.
SHORT BLINK:	Running program stopped.
LONG BLINK:	VCU in waiting loop.
OFF:	VCU error.
<u>LED 2 (red):</u>	<u>2-wire cable status</u>
ON:	Error in 2-wire cable (see VCU status)
BLINK:	No error, or the ground current exceeds 0,25 A. Operation will be continued.
SHORT BLINK:	Initialising 2-wire cable, establishing a connection to decoders.
OFF:	The desired condition. No error.
Time:	Current VCU time and date
Selected valve:	Shows the selected decoder number or the valve to be opened, closed or programmed.

The square boxes to the left of each decoder number show the current status of the decoder. The status is indicated by different colours.

The square boxes to the left of each decoder number show the current status of the decoder. The status is indicated by different colours.

Green:	Decoder is closed
Yellow:	For decoders up to No. 240: just received an open command from VCU For decoders from No. 241 upwards: decoder open
Red:	Decoder activated manually
Blue:	Decoder activated by irrigation program
White:	Decoder activated automatically and manually
F1 – Open Decoder:	Activate decoder / open valve
F2 – Close Decoder:	Deactivate decoder / Close valve
F6 – Program decoder:	(A decoder number must be selected first) See Chapter 15
Ok:	Exit the Service menu.



Note: On activating a decoder in the VCU status menu the pumps will not start automatically. First start the pumps through their respective decoders.

On exiting the menu all activated decoders continue to run.
To deactivate a decoder use the F2 Close Decoder switch for each open (active) decoder !

13.2 VCU Version Update

This menu option is used for downloading new control software to the VCU. When the new software is downloaded all programs and reports in the VCU will be deleted.

The function is to be executed only when a new version of the software is available.

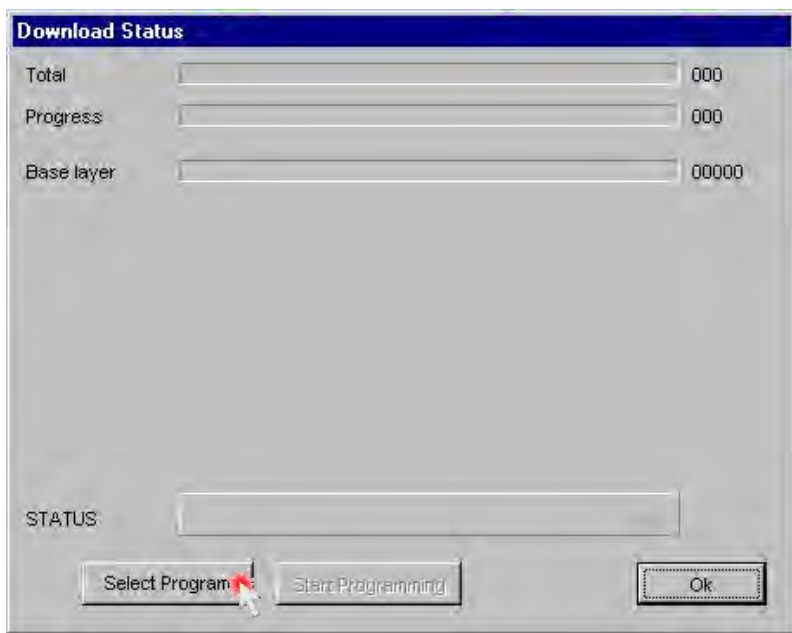
The VCU contains special software stored in Flash PROM memory.

It can happen that, for example when you are updating the program, you will also need to update the software.

After the chipset update the yellow LED of the VCU may not be flashing. In this case you must download the VCU software to the VCU.

The software is included as a program file on the installation CD.

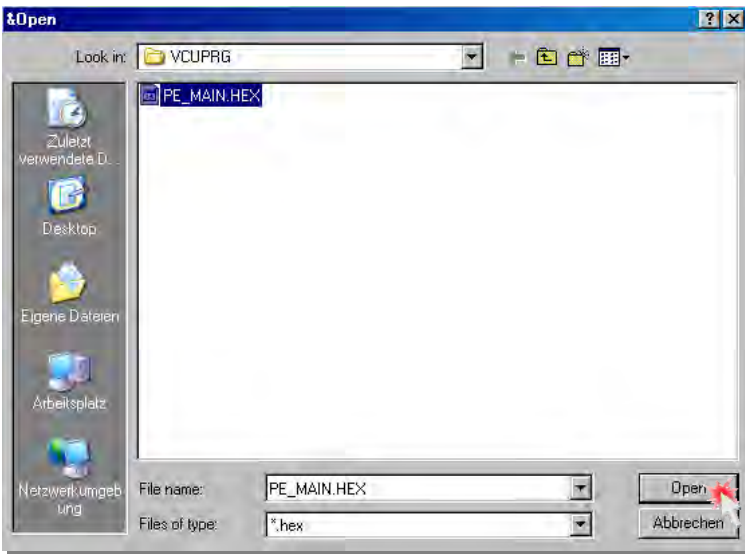
Go to Password Level 3. Click Service –download new VCU program.



Single click on **[Select Program]**.

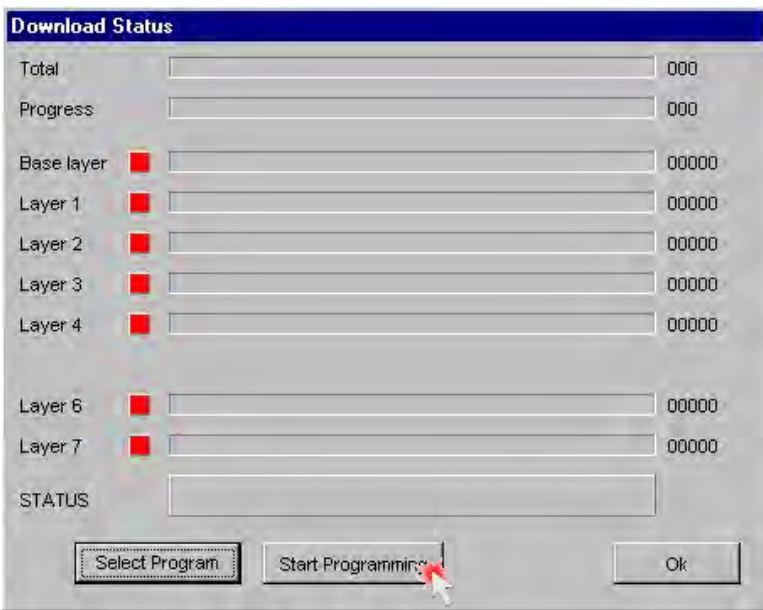
Look for **[Programm Files / Greenkeeper Win / VCUPRG]** or insert the CD (D: oder E:) **GREENKEEPER WIN** in drive **D: / E:**

And click on **[Select Program]**.

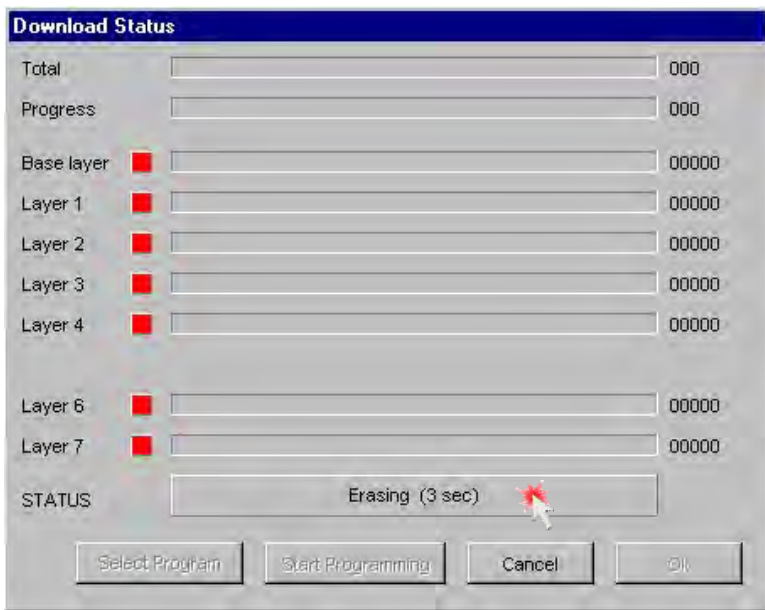


Click the **Pe_main.hex** file. The file name will automatically appear in the File name field.

Click **Open**.

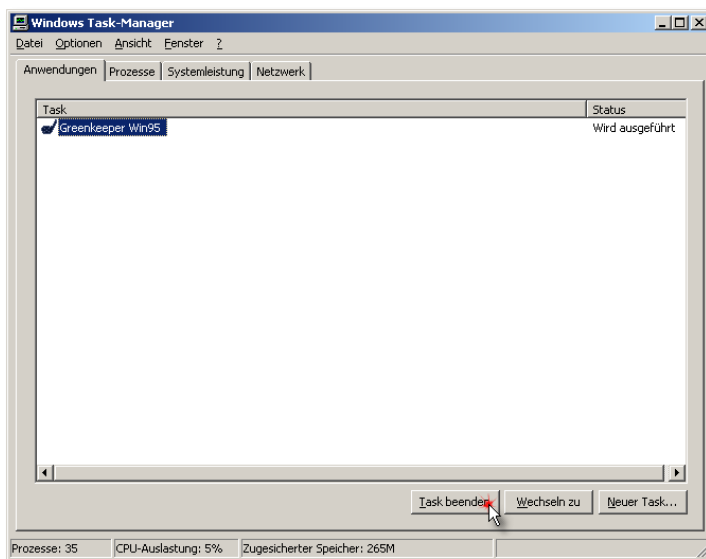


Here you can watch the download status. To download the VCU program click **[Start Programming]**



First the software that may still be stored in the VCU is deleted. All VCU information, e.g. the Irrigation Programs and Report Schedule, is lost.

As a rule, it takes about **25 seconds** to delete the information.



Should the deleting process last an extremely long time (approx. 50 s), the computer has been disconnected from the VCU. Click Cancel to abort the downloading.

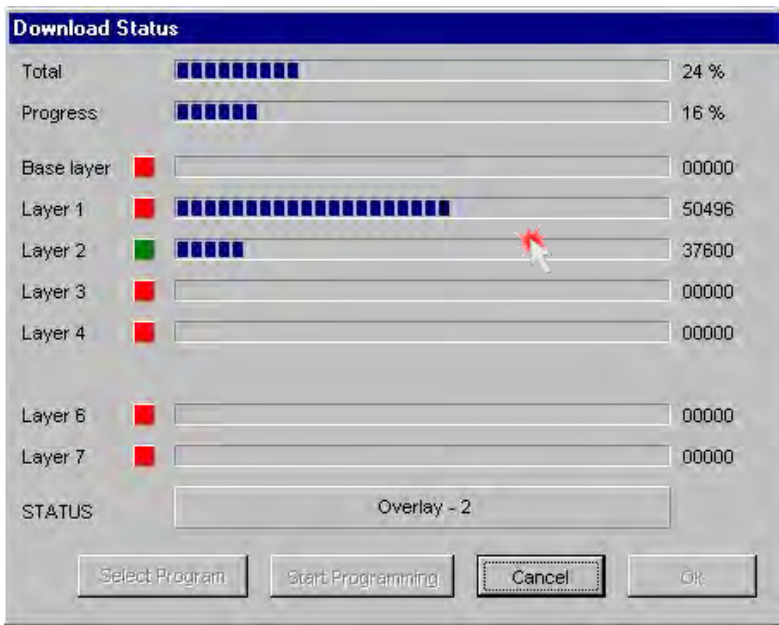
Refer to troubleshooting!

Should this not be possible with the Cancel button you can end the complete Greenkeeper program in the Task Manager. To start the Task Manager hold down the [Ctrl] / [Alt] key combination and then press [Del].

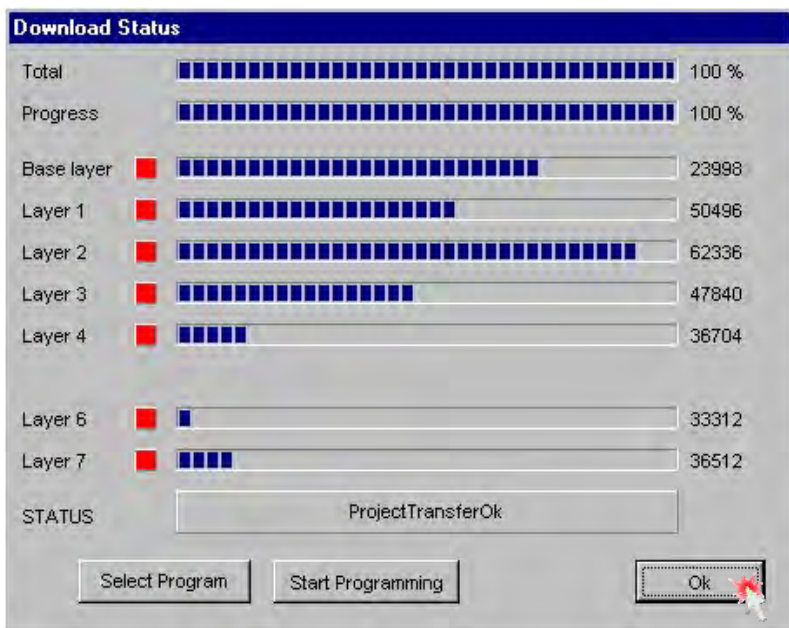
Select the Greenkeeper program and click **[End Task]**.

DO NOT CLICK

THE SHUT DOWN BUTTON !



After the deleting has finished Greenkeeper begins to download the new VCU program. In the top line you can follow the overall progress. One after the other, Layers 1 – 7 and then the Base Layer will be transferred.



After the Base Layer has been transferred the complete VCU program is stored in the VCU. The Status has now changed to **Project Transfer Ok**.

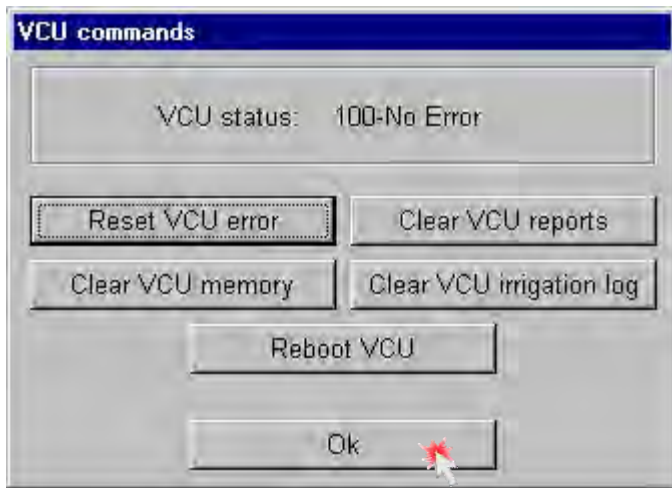
Click **Ok** to close the window.

The "**Program configuration**" LED should then flash.



13.3 VCU Commands

You can use this menu option to send commands to the VCU.



VCU commands:

Reset VCU error:

You must use this button to reset the VCU after an error has occurred (red LED is on).
 All programs remain to be stored in the VCU.
 All reports remain to be stored in the VCU.
 The decoder line will be initialised.
 Should the error reappear, check the decoder and the decoder line for a short-circuit.

Clear VCU memory:

The VCU memory is completely deleted. All the VCU values are reset to default values. All reports are deleted. All programs are deleted.

Clear VCU reports:

The current reports are all deleted.
 The irrigation programs remain to be stored in the VCU.

Clear VCU irrigation log:

All the reported irrigation data is deleted.
 The irrigation programs remain to be stored in the VCU.

Reboot VCU:

Identical to switching the VCU off and on.
 Afterwards the following message is displayed:
Code 014-VCU – Communication error.
 This is a standard response.
 Press the **[Esc]** key to remove the message.

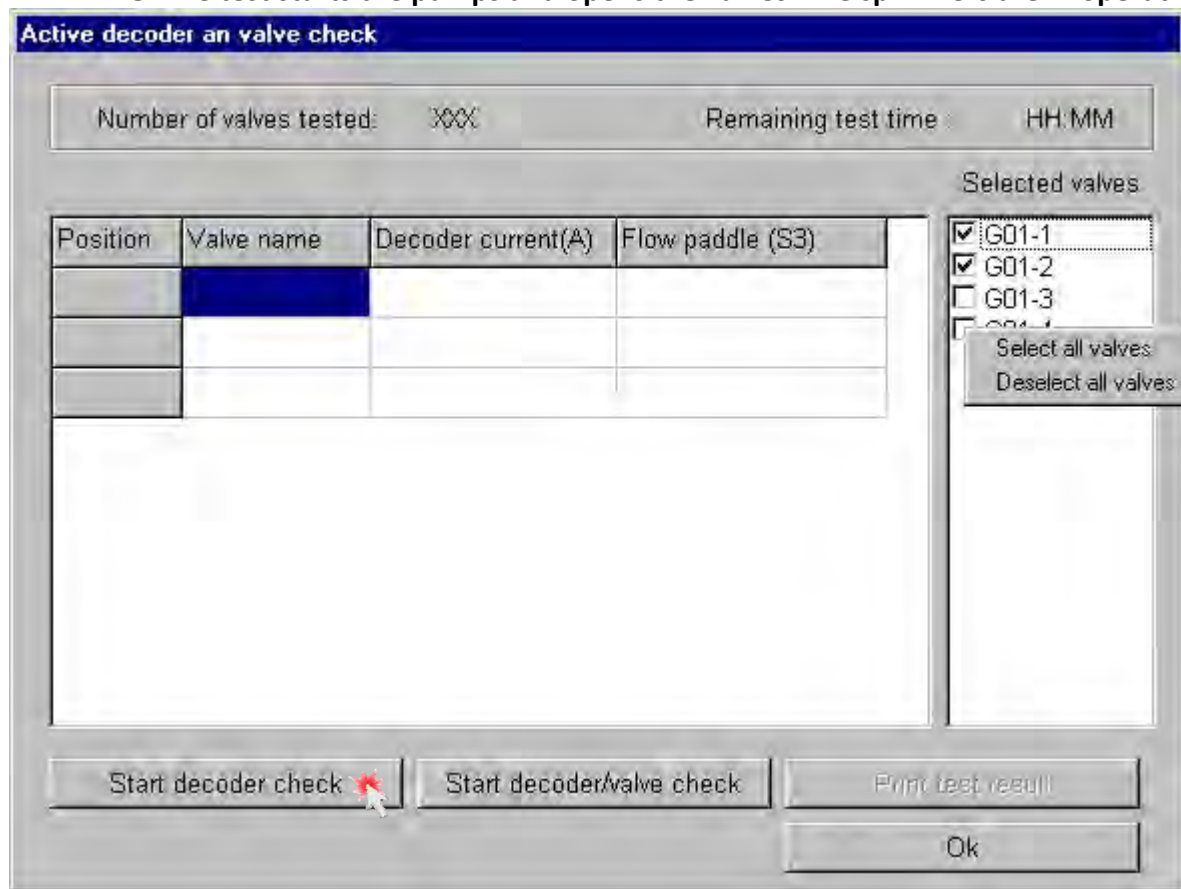
13.4 Active Decoder and Valve Check

This menu option allows you to check the function of decoders and valves.

As the test gives you only a quantitative overview of the function of the decoders and valves it is necessary to check their perfect function on the spot.



WARNING: The test starts the pumps and opens the valves. The sprinklers are in operation!



Before you can carry out a decoder or decoder/valve test you must first select the decoders/valves in the **Selected valves** box.

Position the mouse pointer over the valve name and click it with the left mouse button. A tick (✓) will appear in front of the valve name indicating that the valve has been selected for the test.

Proceed in the same way to select multiple valves.

If you want to check all the valves click in the box with the right mouse button.

An option/selection box will pop up with two options.

Select all valves: To mark all the valves for the test.

Deselect all valves: To remove all marks.
No valve is selected for the test.

Start decoder check:

This test checks the function of the decoder.

First the decoder line is initialised.

Then the pump decoder is started.

30 seconds after the pump decoder has been activated the current consumption of the decoder line is measured.

This value is then used as a reference value and is recorded in the decoder current (A) field.

Now the decoders marked for the test will be activated one after the other.

30 seconds after a decoder has been activated the current consumption of the decoder line is measured and compared with the reference value. The difference is recorded in the decoder current (A) field.

Should the value displayed be equal to **0,000** the decoder must be checked on the spot.

Start decoder/valve check:

Same as the decoder check



but including an additional flow paddle (S3) check.

Print test result:



After the test has finished you can print out all test results.

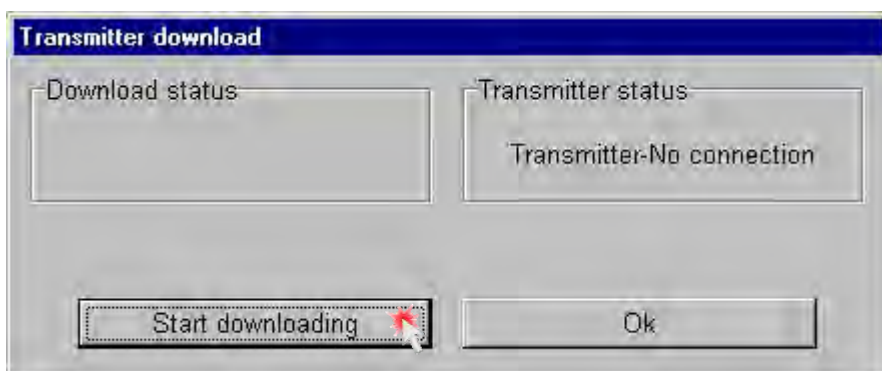
13.5 Transmitter Download

To facilitate this transmitter must be connected to the field connector.

Start the Greenkeeper software and enter a password for **Level 3**.



Click the **[Service / Transmitter download]** menu.



Click the **Start Downloading** button.
The data will be downloaded to the transmitter.

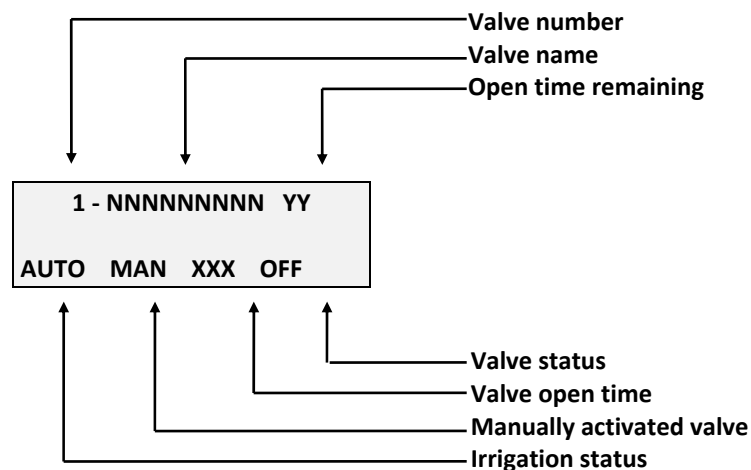


After a successful download click **OK**.

The data remains stored in the Transmitter even when it is disconnected from the decoder control system.

On energising a valve through the transmitter only Pump 1 (Decoder No. 246) is started automatically. The remaining pumps must be activated manually through a separate decoder no.

LCD-Display





13.6 Transmitter Status

13.6.1 Download Status

Clearing terminal

The valve names in the transmitter are deleted

XX - Downloading - YY

XX indicates the current position. YY represents a valve name.

Downloading completed

All data has been successfully downloaded to the transmitter.

13.6.2 Transmitter Status

Transmitter-Ready

The transmitter is properly connected and is ready to download data.

Transmitter-Busy

The transmitter is receiving data or data is being deleted.

Transmitter-Timeout

This message is displayed when connecting to the transmitter for the first time.
The last command has not been completely executed.

Transmitter-No connection

The transmitter has not been connected with the decoder line.

14. Remote Control

14.1 Kinds of remote control

The VCU can be controlled using different control modes.

- ⇒ Remote control via a Transmitter TM1
- ⇒ Remote control via a Wireless Transmitter
- ⇒ Remote control via a Mobile Phone (Nokia® Communicator)
Your PC must be connected to a modem.

14.2 Remote control via the transmitter TM1

The hand terminal consists of a 2 x 16-stelligen digital display and 7 function keys. The communication as well the power supply occurs by the 2-wire decoder cable. The plug has to be connected with the field connector.

The transmitter provides following functions:

- ⇒ Valve open
- ⇒ Valve immediately close
- ⇒ All valves immediately close

The transmitter will be connected with the 2-wire cable system via the field connector.

After the transfer of the station names the Transmitter can be used at all field connectors.

Clear identification of the valve names by text indicator
e.g. 18 – Green 9

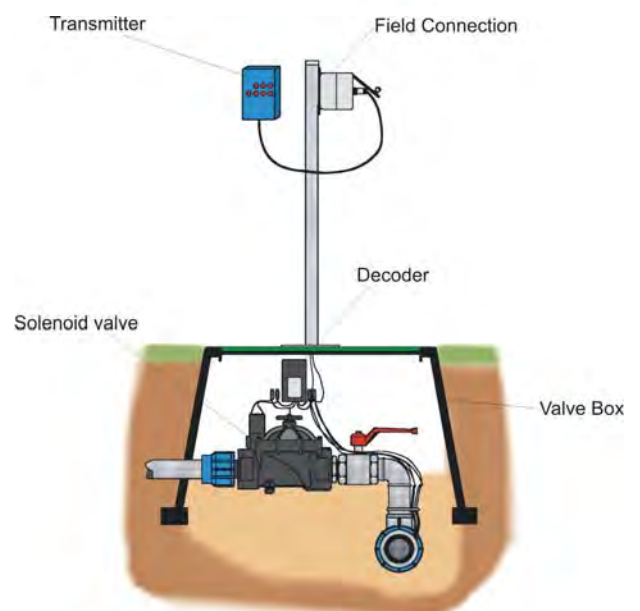
After setting the valve opening time the Transmitter can be disconnect from the field connector.

Information call informs you about:

- ⇒ Irrigation status
- ⇒ Condition of each decoder (open/close)
- ⇒ Emergency stop function – to switch off all irrigation activities

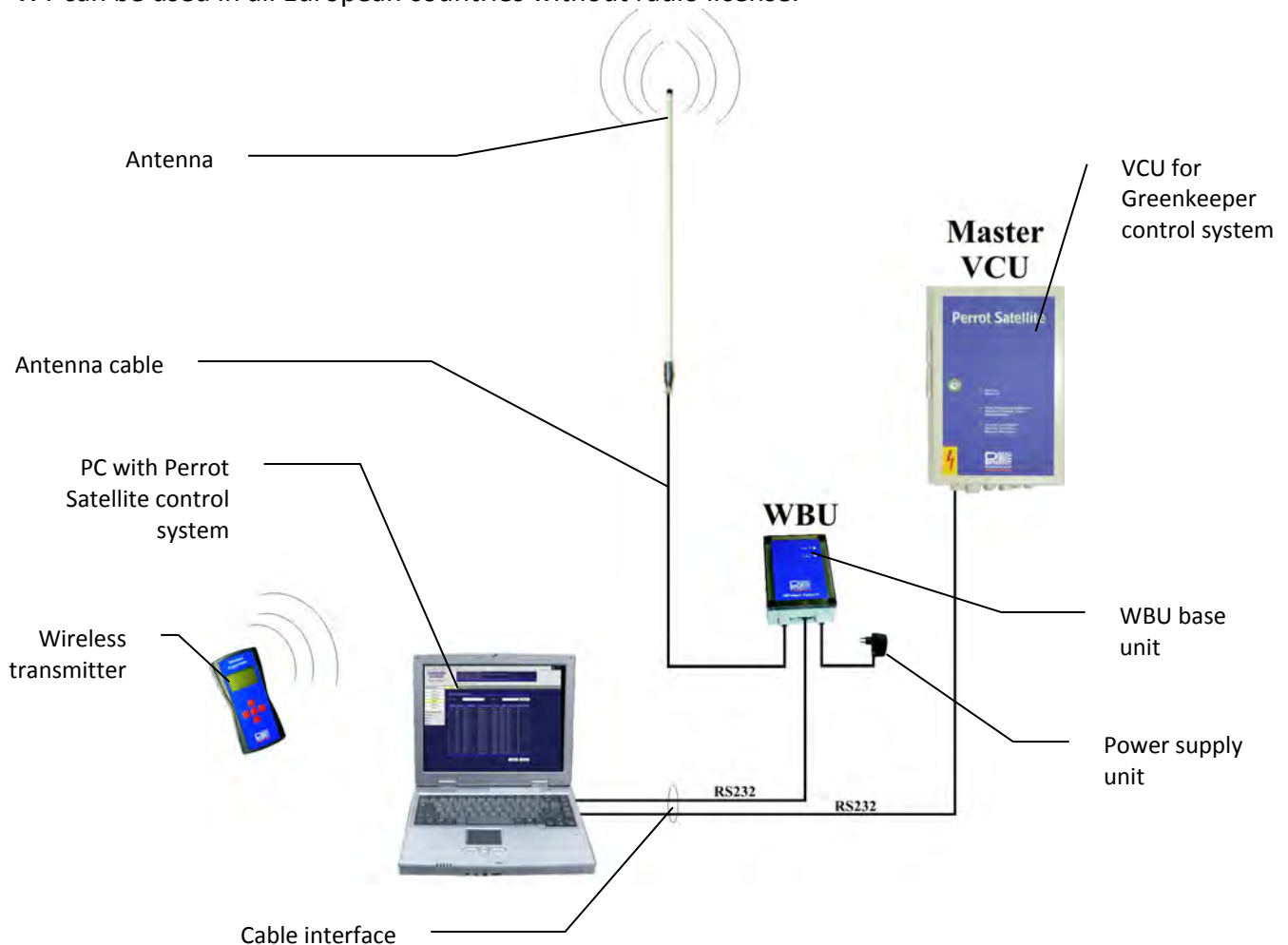


You can find further details in the user manual TDP063e (Transmitter TM1).



14.3 Remote control via Wireless Transmitter

The WT allows the communication with the control system about an autarkic radio network. The radio network will be installed at site (see picture – scheme drawing). With a free view to the antenna a coverage up to 2km is possible. If there is any obstacle due to the area, buildings or trees you can expand to the requested coverage with the installation of additional repeater stations. The WT can be used in all European countries without radio license.



Application

The WT is very robust and easy to use with just 5 buttons. Ideal for manual watering and for function tests of the system.

Functions

Open and close the valves with adjustable time standards. Start and stop the irrigation programs. Easy valve searching by choosing different criteria. Automatic synchronisation of the valve- and program data, 3-digit LCD display for menu navigation and super support.



You can find further details in the user manual TDP058e (Wireless Transmitter GK).

14.4 Remote via Mobile Phone

The **Remote terminal active** function in "Communication setup" dialog box must be checked!

You can control a variety of functions of the Greenkeeper system via a mobile phone.

14.4.1 Communicator Specification

The Mobile Phone must support VT 100/ANSI Emulation. Currently, only Nokia Communicator complies with this requirement. For operating Nokia Communicator please refer to the product's instruction manual.

There must be installed a licensed „newDIALin“ software in the Nokia Communicator. Therefore you can send the device to Regnerbau Calw GmbH

Configuring Greenkeeper Win for Remote Control

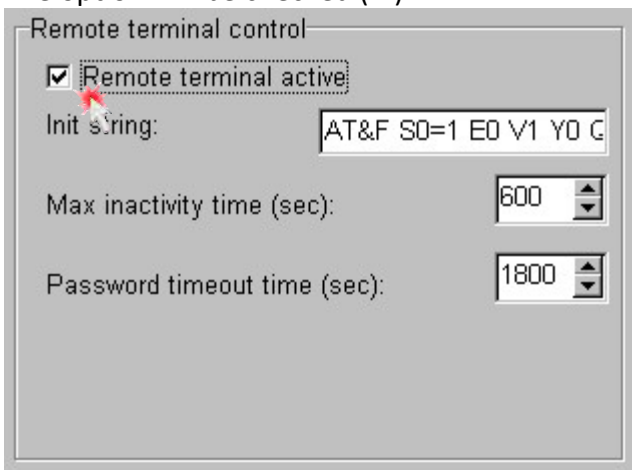
Click **System configuration / Communication setup:**



Click in the **Remote terminal active** box to enable remote control

Make sure that the VCU Remote option is disabled!!

The option will be checked (✓).



Remote terminal control

Remote terminal active

Init string: AT&F S0=1 E0 V1 Y0 G

Max inactivity time (sec): 600

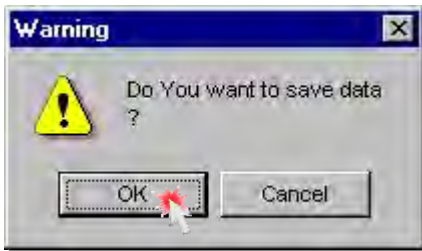
Password timeout time (sec): 1800

Finally click **OK.**



Confirm the Save data? Message by clicking OK.





!!!! Do not exit the program!!!



!!!! Switch the monitor off !!!!

The computer is now in the **Waiting mode**.

When an incoming call is detected the modem picks up the call and establishes a connection. Make sure that this telephone line is not used for normal voice telephone calls.

Take your Nokia Communicator and dial the number of the telephone line on which the computer with Greenkeeper has been installed.

If the connection is to be made from a remote computer you must start a terminal program on the computer first.



For configuration details please refer to Chapter 4.

The menus and commands are identical with the Communicator environment.

14.4.2 Initiation of Communicator

Before initial operation you must assure that the “newDIALin” Software is installed.



Press control key **Extras** (topside right) after open the Communicator. Move cursor with help of the arrow key to the right to the menu “newDIALin”



Open menu „newDIALin“ with function keys




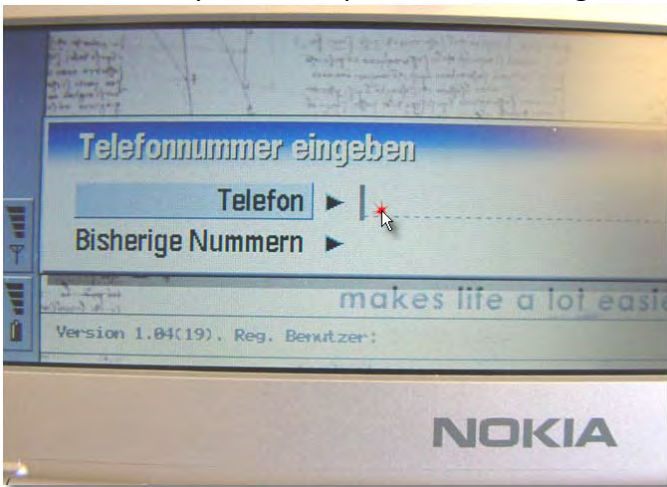
Choose with the same key “connection”



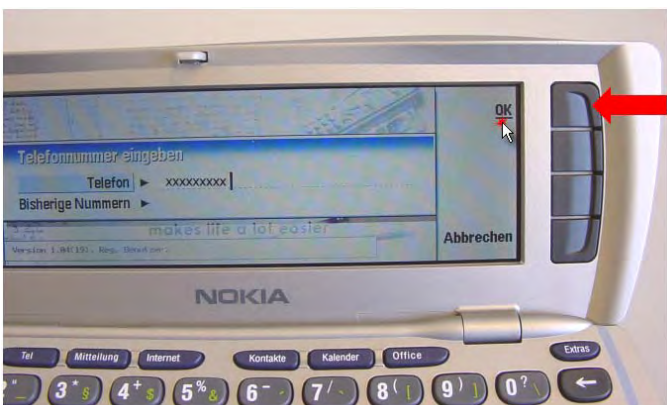
In the file/line telephone you can now put in the connecting number, with that number the modem will be connected, for example to 07051-162100



Note: There is the possibility to reset wrong input with help of the key backspace . You only have to input the connecting number once.



The connection will be activated through pressing **OK**



Once Greenkeeper acknowledges the connection, type your password.

```
PERROT REGNERBAU REMOTE TERMINAL-PASSWORD MENU      16.01.12 12:22:15

Enter new password: _____
```

After you have typed the password press the [ENTER] key.

You will be now in the Password menu.

```
PERROT REGNERBAU REMOTE TERMINAL-PASSWORD MENU      16.01.12 12:22:17

Remote password level:   Password Level 3

Change remote password level by pressing [Enter]
```

Using the ← key select the Main menu.

```
PERROT REGNERBAU REMOTE TERMINAL-MAIN MENU          16.01.12 12:22:48

1 Password
2 Manual open valves
3 Download
4 Change Active Programs
5 Service
```

Navigate your way in the menu by pressing the arrow keys.

Use the ↑↓ keys to select a menu.

Use the → key to expand the menu selected.

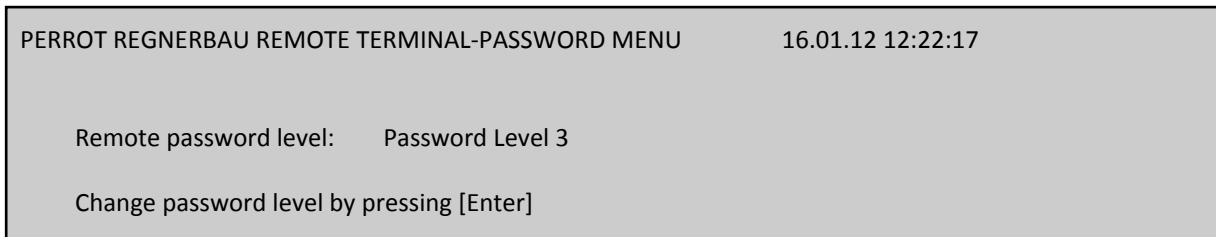
The ← key brings you back to the previous menu. (It does not work in the Main menu)

The **Backspace** key, above the Enter key, terminates the Edit mode.

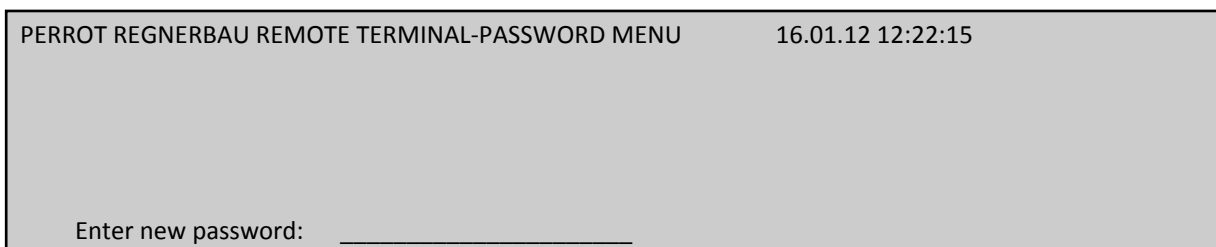


14.4.3 Password Menu 01

Enter the password in this menu according to access type.



The display shows the current password level. Press **[Enter]** to enter a new password.



Type the password and press the [ENTER] key.

Password level 0 allows you to access the Password menu only.

Password level 1 allows you to access Menus 1 – 4.

Password level 2 or higher allows you to access all menus.

You can set up the password validity period. The period of time (30 minutes by default) is defined in Communication setup.

After the 30-minute period, counted from the time of connection, has expired the display is automatically converted to the Main menu.

You must then reenter the password.

Press the **←** key to return to the Main menu.

14.4.4 Manual Open Valves – Menu 02

In this menu you can manually open and close valves.

PERROT REGNERBAU REMOTE TERMINAL-MANUAL OPEN VALVES					16.01.12 13:05:32
T1-0 T5-0	T8-0	T12-0	T17-0	G2-0	
T2-0 T6-0	T9-0	T13-0	T15-0	G3-0	
T3-0 T7/1-0	T10-0	T14-0	T18-0	G4-0	
T4-0 T7/2-0	T11-0	T16-0	G1-0	G5-0	
Line status	Inactive	Program:			
Out A	27,7	Out B	27,3	Manual open valves: N	
Line load:	0,049	Grnd curr.:	0,00		

Press the **[ENTER]** key to enter the Edit mode. If you are not in the Edit mode, use the **↑↓** keys to move to the next / previous valve.

Opening a valve: Press the **[ENTER]** key.
Using the **↑↓** keys move the cursor to the required valve and press the **[ENTER]** key.
Type the valve open time. Then press again the **[ENTER]** key.

The system automatically starts a pump with a capacity best suited to the valve water consumption. (Refer to manual valves graphic).

Closing a valve: Press the **[ENTER]** key.
Using the **↑↓** keys move the cursor to the required valve and press the **[ENTER]** key.
Type **0** in the valve open time field.
Then press again the **[ENTER]** key.

Information fields: Next to the valve name the valve open time of the manually open valves is displayed.
Should **0** be displayed, the valve is closed.

Decoder line status: Irrigation status

Program: Program name of the currently running program. No name displayed indicates that no program is active.

14.4.5 Download Menu 03

In this menu you can download programs from the PC to the VCU and remove programs from the VCU.

PERROT REGNERBAU REMOTE TERMINAL- DOWNLOAD		16.01.12 13:06:02
Program in Pc		Program in VCU
1-TEST1	4-AGRIC	1-TEST1
2-FLIK		2-FLIK
3-SECTEST		
[1]-Download program to VCU	[2]-Next PC programs	[3]-Prev. PC programs
[4]-Delete program on VCU	[5]-Next VCU programs	[6]-Prev. VCU programs

On invoking the menu a program version check is performed.

The following error messages can result:

Code:041 – VCU program "xxx" do not exist on PC

The "xxx" program is no longer available on the PC.
In this case please delete the program on the VCU.

Code:040 - Version conflict of VCU program "xxx"

After downloading to the VCU, the "xxxx" program has been updated. Delete the "xxxx" program on the VCU and repeat the download from the PC to the VCU.
See **Downloading programs**.

Download program

Press the **[1]** key

The system prompts you: **Select a program to download: __**

Type the program number of the downloaded program and press the **[ENTER]** key.

The program will be, within a matter of seconds, downloaded to the VCU.

When downloading the following error messages can appear:

- ⇒ **Code:039 – Program "xxx" exists in VCU**
The program has already been stored on the VCU.
- ⇒ **Code:042 - Max number of manual programs in VCU.**
You have reached the limit of a maximum of 8 manual programs on the VCU.
If this happens remove the manual programs that will no more be needed from the VCU.
- ⇒ **Code:043 - Max number of programs in VCU**
You have reached the limit of a maximum of 12 Single valve or Sectors programs on the VCU. If this happens remove the programs that will no more be needed from the



VCU.

Delete program

Press the **[4]** key.

The system prompts you: **Select a program to delete: __**

Type the program number and press **[ENTER]**.

The program will be, within a matter of seconds, removed from the VCU.

However, as the program remains to be stored on the hard disk it can be, at any time, downloaded to the VCU again.

Programs on disk

Here you can see all the currently available and tested programs stored on your hard disk. A maximum of 6 programs are displayed at a time. To view the next 6 programs press the **[2]** key. For the 6 previous programs press **[3]**. You can store as many as 99 programs on your hard disk.

Programs on VCU

Here you can view all the programs that are currently available on the VCU. You can delete only programs that are listed here. A maximum of 6 programs are displayed at a time. To view the next 6 programs press the **[5]** key. For the 6 previous programs press **[6]**. You can store a maximum of 8 manual programs and 12 single valves and sectors programs on the VCU.



Important: Never use the Remote control and PC functions simultaneously. This could lead to unforeseeable faults. When using Remote control the "Terminal active" message will show at the bottom left of the screen.

14.4.6 Change Active Programs - Menu 04

In this menu you can change the program schedule for a selected day.

PERROT REGNERBAU REMOTE TERMINAL-CHANGE ACTIVE PROGRAMS					16.01.12 16:31:19
Program	Start time	Corr.	Dur. Consump.	VCU Programs	
1:				1-FLIK	
2:					
3:					
4:					
Irrig. St.-Inactive VCU time -16:29					
[1]-Start [2]-Stop [3]-Reset [7]-Next VCU Prg [9]- Prev. VCU Prg					

Single: Select here, whether the program should be removed from Change Active Programs after it has been invoked for the first time.

Enter [0] if: The program is not to be removed.

Enter [1] if: The program is to be removed after it has been invoked for the first time !

Progr. Name: Type the program name for your program. For a selected day you can enter a maximum of 4 different programs with 3 start times each. On entering a program that already exists the following error message will be issued:

Code:008 - xxxxx is already used.

Should this happen either remove one of the programs from Change Active Programs or select another program.

To delete a program simply remove the program name from Change Active Programs.

Start times: You have the option of selecting up to 3 start times. You can select times from 00:00 - 23:59 in increments of 5 minutes. Should the stop time and the next start time overlap you will receive an error message: **Code:048 - xx:xx Overlap time**

In this case select another start time.

To delete a start time, simply enter 0 in the start time field.

Correction: Here you can change the percentage of Precipitation or Duration. The range is from 10% - 300% in increments of 5%. If you enter 200% the program will start twice with 100%. Default value: 100%

The following error messages can be displayed:

Code:049 - xxx Overlap correction

Your entry causes program overlapping.
Select another value.

Code:037 – Max program water consumption

Your entry causes excessively high Water consumption.
Select a lower value.

Code:036 – Max program duration

Your entry causes excessively long Duration.
Select another value.
Max. Duration = 23 hrs. and 55 min.

Duration: The duration of the complete program in hours and minutes.
After modifying the value through Correction it will be recalculated.

W. consumption: Water consumption in m³/h
After modifying the value through Correction the water consumption will be recalculated.

Status: Irrigation status shows the current status of the VCU.
The following status information is displayed:

Active: A program is currently running.
(Do not make any changes when in the active status)

Stopped: A control program has been stopped.
However, the program continues to run internally.

Waiting: Change Active Programs has been activated through Start irrigation. The VCU is waiting for the Start time entered.

Inactive: Neither automatic nor manual program has been started. The VCU cannot start a program automatically when in this status. The status is invoked by clicking Reset.

Weather: The irrigation process has been stopped by the weather station. You can define the Max. weather station stop time in the General dialog box. The program continues to run internally.

Man. Stop. A manual program has been stopped. The irrigation has been interrupted. However, the program continues to run internally. To completely cancel the program click Reset.

Manual: A program has been started manually.

Fault: A fault has occurred in the VCU. Identify the fault cause in the Service menu.
No irrigation can be performed when in this status.

Programs on VCU

This shows you all the programs stored in the VCU. The VCU can only execute programs that are displayed here. You can store a maximum of 8 manual programs and 12 single valves and sectors programs in the VCU.

Functions: (not available in the Edit mode)

[1] Start

This will bring the VCU to the ready state. The VCU is waiting for the first start time entered in Change Active Programs to arrive so that the program can be started provided the weather station does not inhibit irrigation.

[2] Stop

This will stop (suspend) the program. However, the program and the duration continue to run internally.

After the program has been restarted it resumes exactly from the point that has been calculated provided it will not lead to overlapping with the program that is scheduled next.

[3] Reset

This function completely cancels the execution of a program. The VCU will immediately attain Inactive status. No programs will be started automatically.

[7] Displays the next 4 programs stored in the VCU

[8] Displays the previous 4 programs stored in the VCU.

← Back to Main menu



Important: Never use the Remote control and PC functions simultaneously.
This could lead to unforeseeable faults.
When using Remote control the "Terminal active" message will show at the bottom left of the screen.

14.4.7 Service Menu 05

Two different service functions are available in this menu.

```
PERROT REGNERBAU REMOTE TERMINAL - SERVICE                               16.01.12 13:02:19
VCU Status :100-No error

[1]-Reset VCU error
[2]-Close all manual open valves

Last command: [2]-close all manual open valves
```

The VCU Status field indicates the current status of the decoder line.

The following messages can be displayed:

100-No Error

No error has been detected.

101-Line init

If this message shows up the decoder line is being initialised.

Once the initialization is finished a message follows.

100 to 105.

102-Sync error

The decoder line cannot be synchronised.

Contact a Perrot representative near you.

103-Ground error

The earth current in the decoder cable is too high.

Check the decoder cable for defects. (Cable connections, etc.)

104-Load error

The current consumption of the decoder line is too high.

Check the decoder line for short-circuits and check the decoder itself.

105-Volt error

The output voltage of the decoder line is too low.

Contact a Perrot representative near you.

Options:

[1] Reset VCU error

Use this function to resets the VCU after an error has occurred.
The decoder line will be initialised.
This function must be executed after an error has occurred.
Otherwise irrigation is impossible.

[2] Close all manual open valves

Use this function to close all manually open valves.

Last command

Your last command is always shown here.

15. Decoder

15.1 Programming of Decoder



Attention: Only in Password level 3 !

Before a new decoder is installed an address (number) must be programmed into it.
Decoder numbers 1 - 240 are reserved for valves. Only these numbers can be activated by an irrigation program.

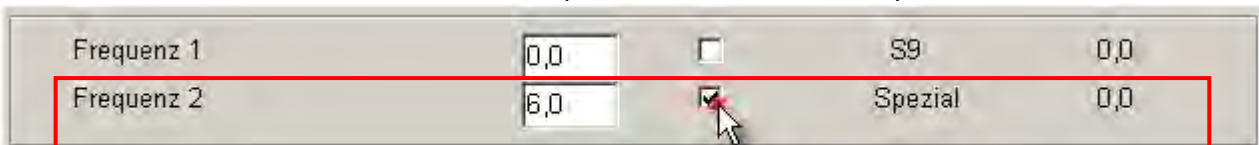
The pump decoders have the following numbers:

- 246 - Pump 1
- 247 - Pump 2
- 248 - Pump 3
- 249 - Pump 4
- 250 - Pump 5

Decoder no. 245 is only for the supervising of the pump station.

Please be aware, that the pump manger always starts the pump decoder with the highest number first.

Decoder 251 and 252 are reserved for the special function of the frequenz 2 [weather station].



If frequenz 2 will be activated, decoder 251 will be simultaneously activated to start an irrigation program. Decoder 252 will only be activated, if the recorded value is exceeded.
In all other situations both decoders are inactive.

Programming of Decoder

The only external difference of the FB decoder is the rectangular housing
(Standard decoder ⇒ square housing)

Description of FB decoder: Type PD/F-1 part-no. ZH90384

The description of the new standard decoder: Type PD5/AC-X (X is for number of stations)

All decoders are infinitely programmable.

15.1.1 To program a decoder you need the following components:

- ⇒ PC with Greenkeeper program installed and VCU
- ⇒ Programming unit -FB (part no. ZH90022) or
Programming cable. (Part no. SG50032)
- ⇒ Decoder

15.1.2 Preparation for programming the Decoder

Open the door of the VCU case.

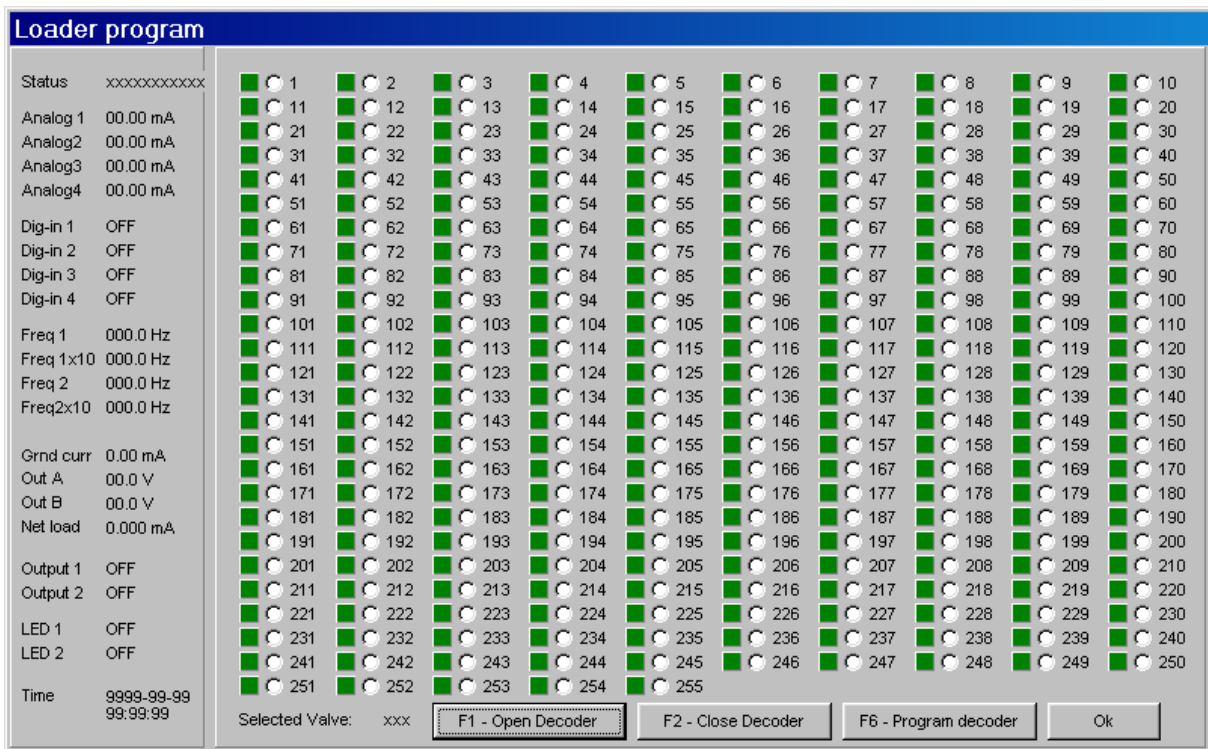
Connect the cable of the programming unit, to the terminals **34/35** on the VCU terminal strip. Therefore you have to disconnect the connector from the decoder cable.

Start the Greenkeeper program using the appropriate password. Go to **Password level 3**

Click [Service –VCU status] 

The VCU status window opens. **(Loader program)**

VCU-STATUS



Parameter	Value
Status	xxxxxxxxxx
Analog 1	00.00 mA
Analog 2	00.00 mA
Analog 3	00.00 mA
Analog 4	00.00 mA
Dig-in 1	OFF
Dig-in 2	OFF
Dig-in 3	OFF
Dig-in 4	OFF
Freq 1	000.0 Hz
Freq 1x10	000.0 Hz
Freq 2	000.0 Hz
Freq 2x10	000.0 Hz
Grnd curr	0.00 mA
Out A	00.0 V
Out B	00.0 V
Net load	0.000 mA
Output 1	OFF
Output 2	OFF
LED 1	OFF
LED 2	OFF
Time	9999-99-99 99:99:99

Selected Valve: xxx

F1 - Open Decoder F2 - Close Decoder F6 - Program decoder Ok

15.1.3 Programming with DPG Programming unit (part no. ZH90022)

- ⇒ **Connect the new decoder to the programming unit.**
Red cable to red terminal
Blue cable to blue terminal
Black cables always to black terminals
- ⇒ **Adjust the switch on the programming unit to position „0“**
- ⇒ **Click with the mouse to the required decoder number to select it.**
The white circle will be marked with a black point inside.
- ⇒ **Now press the F6 key or click the [F6 – program decoder] button.**

The LED of the decoder should be on steadily.



Ready to program

- ⇒ **Press the switch into position „program“ on the programming unit earliest after 2 seconds to confirm the address**

Now the decoder should give 5 short flashes.



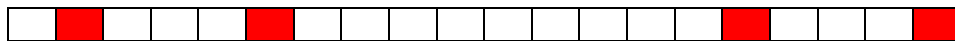
Address accepted

Should this not be the case, repeat the procedure starting with item 4.

In order to test the decoder, adjust the switch to position “test”.

Activate the decoder by clicking to **[F1 – open decoder]**

Now the decoder is activated, if the LED at the programming unit is on, and the LED on the Decoder is flashing in following sequence:



Decoder activ- valve on- no pressure

Because there is no pressure sensor connected, the decoder gives the signal – no pressure.

For deactivation of the decoder click **[F2 – close decoder]**

Write down the decoder number on the name plate of the decoder!!

The decoder is now ready for installation.

In order to program further decoders, please repeat the whole procedure

15.1.4 Programming with DPK Programming cable (part no. SG50032)

Start with the steps described in item B

- ⇒ **Connect both black cables of the decoder, one to each clamp, of the programming cable.**
- ⇒ **Click with the mouse to the required decoder number to select it.**
The white circle will be marked with a black point inside
- ⇒ **Now press the F6 key or click the [F6 – program decoder] button.**

The LED of the decoder should be on steadily



Ready to program

- ⇒ **Do a short cut between the red and the blue cable of the decoder earliest after 2 seconds, in order to confirm the address**

Now the decoder should give 5 short flashes.



Address accepted

Should this not be the case, repeat the procedure starting with item 3



Note:

With the programming cable it is not possible to check the function of the decoder. If you want to do that, please connect a solenoid to the red and the blue cable and activate the decoder.

For deactivation of the decoder click **[F2 – close decoder]**

Write down the decoder number on the name plate of the decoder!!

The decoder is now ready for installation.

In order to program further decoders, please repeat the whole procedure.

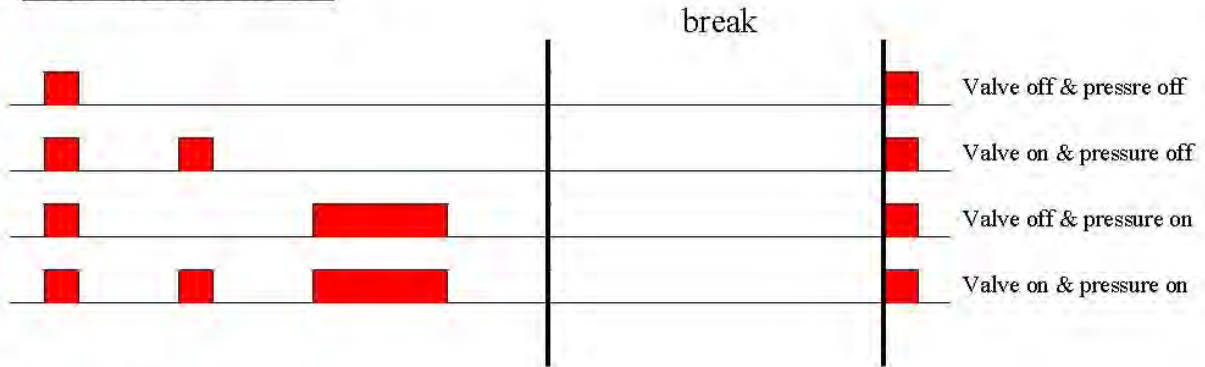


Important:

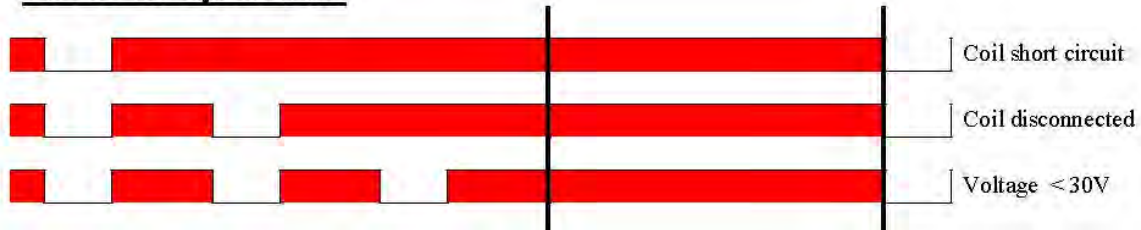
The standard decoder
type: PD5/AC-X (incl. multi- station- decoder)
part no.: ZH90033+ ZH90377+ ZH90378
produced later than: week 12-04
has to be programmed in the same way.
These decoders are infinitely programmable also

15.1.5 FB-Decoder Indication Light

Normal operation



Error in operation





15.1.6 Decoder List

Decoder No.	Area Name	Number and type of the rotors	Flow m ³ /h	Irrigated Area m ²	Hydr. Sector



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16. Error Codes

Code:000-No Error The system operation is error-free.
Code:001-Database Error The system data is corrupted. Restore the data using the Restore function.
Code:002-%s below limit The value entered is too low. Enter a higher value.
Code:003-%s above limit The value entered is too high. Enter a lower value.
Code:004-"%s" is outside valid range The value entered is invalid. Enter a valid value.
Code:005-%s is not valid input Your entry is incorrect. Enter only numeric characters in numeric fields. Enter only alphabetic characters in alphabetic fields.
Code:006-"%s" exceed valid length Your entry has too many characters. Reduce the number of characters.
Code:007-length of the name is too short The name you selected is too short. Enter a name that is longer.
Code:008-"%s" is already used The name you entered (valve name, sector, etc.) already exists. Choose another name that is not in use
Code:009-"%s" is represented in other groups The sector you selected is assigned to another group. Choose another sector or cancel the assignment.
Code:010-Sector flow exceeded The total water consumption of valves assigned to the sector is too high. Reassign some valves to another sector.
Code:011-Group flow exceeded The water consumption of the sector assigned is higher than the capacity of the hydraulic group. Assign a different sector.



Code:012- Selected comport is not available select new port in "Communication Setup" and end program The COM-Port you setup on your PC is not available. It is either not installed or is being used by another program.
Code:013- Illegal telegram size Call the service engineer.
Code:014- VCU-Communication error Press the [Esc] key once. Should the message reappear check whether the power LED (green) on the VCU is on. Check COM-port settings.
Code:015- Wrong telegram format Call the service engineer.
Code:016- VCU-Storage limit exceeded The VCU program memory is full. Remove programs and/or reports you no longer need from the VCU.
Code:017- VCU-Unknown program name The program selected is not stored in the VCU. You have to download the program. (see Downloading programs)
Code:018-VCU-Wrong telegram bytes Call the service engineer.
Code:019-VCU-Illegal command Call the service engineer.
Code:020- Max number of stored programs The VCU program memory is full. Remove programs you no longer need from the VCU (See Removing programs from the VCU)
Code:021-"%s" exceed max time The time entered is too long. (Over 24 hrs.) Enter shorter time.
Code:022-"%s" below min time The time entered is too short. Make the time longer.
Code:023-"%s" invalid flow Enter valid flow.



Code:024-"%s" exceed max density Your entry caused high water consumption / time. Enter lower precipitation density.
Code:025- "%s" invalid area Enter a valid area unit.
Code:026-"%s" exceed max consumption The value entered is too high. Enter a lower value.
Code:027-"%s" do not exist The selected name / sector do not exist.
Code:028-Date conflict
Code:029- No valves No valve names have been selected. Choose the valve names.
Code:030- No valves in sector "%s" No valves have been assigned to the sector.
Code:031-"%s" not present in program
Code:032- Pump flow below limit
Code:033- Closing valve
Code:034- Program test system
Code:035- Valve min time
Code:036- Max program duration
Code:037- Max program water consumption
Code:038- Pump "%s" is not installed The pump selected does not have an "Active" status. Set the pump status in the Pump data menu to active.
Code:039- Program "%s" exists in VCU The program you want to download already exists on the VCU.

<p>Code:040- Version conflict of VCU program "%s" The PC program does not match the program in the VCU. Remove the program from the VCU and run Program test. Then download the program to the VCU.</p>
<p>Code:041- VCU program "%s" do not exist on PC The PC program has been deleted. Remove the program from the VCU. Check whether Program test was run.</p>
<p>Code:042- Max number of manual programs in VCU The limit of max. 8 manual programs have been exceed. Delete the manual programs you no longer need from the VCU. Max. 12 single valves-sectors programs and max. 8 manual programs.</p>
<p>Code:043- Max number of programs in VCU The limit of max. 20 programs in the VCU have been exceed. Delete the programs you no longer need from the VCU. Max. 12 single valves-sectors programs and max. 8 manual programs.</p>
<p>Code:044-"%s" invalid program</p>
<p>Code:045-"%s" invalid start time</p>
<p>Code:046-"%s" invalid correction</p>
<p>Code:047- Program is running</p>
<p>Code:048-"%s" Overlap time The start time entered causes overlapping. As a rule a delay of 10 minutes must be maintained between the stop time and start time of two programs.</p>
<p>Code:049-"%s" Overlap correction Correction causes overlapping. Change the correction setting.</p>
<p>Code:050- The irrigation state is not inactive, reset irrigation</p>
<p>Code:051- Downloading is active For your information only</p>
<p>Code:052- Loading image error The graphic file you setup is no more available on your PC. Either copy the graphic file into the directory or select another graphic file.</p>
<p>Code:053- No report For your information only. No reports are available.</p>



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Code:054- Pump flow leak The message appears only when a flow meter has been installed. Check the pressure pipes and all valves for leaks.
Code:055- Decoder test is running, stop test For your information only.
Code:056- Download active, stop download
Code:057-Not enough free disk space There is not enough free storage space on your disk. Delete the programs or files you no longer need.
Code:058- Error during backup sequence
Code:059-file "%s" is missing on restore disk Call the service engineer.
Code:060- Port not available to remote transmitter, change settings
Code:061-Step"%s" No step time You have not entered step time for a step in the Manual program menu.
Code:062-Printer not installed You want to print but there is no printer installed. Install a printer under Windows.
100- No error Decoder line status.
101- Line init Decoder line is being initialised. Connection to decoders is being established.
102- Sync error The power supply of 230 V / 50 Hz is not synchronised. Restart the VCU.
103- Ground error The earth current is too high. Check the decoder cable for damaged insulation, valve boxes for water flooding, etc.

104- Load error

The current consumption of the decoder line is too high. Check all decoders and the decoder line for short-circuits, etc.

When the load current exceeds a given value the VCU is switched into error mode. You must reset the VCU using the Service menu – Reset VCU error option.

Check the surroundings for earthwork being carried out. Decoder line fault.

105- Volt error

Decoder line voltage is too low. Check the decoder line.

Call the service engineer.

106-Pump alarm (ONLY FOR BI-DIR-DECODER)

Decoder no. 245 reported a pump alarm.

Eliminate the error in the pump system and delete the error.

See chapter 12

107-Decoder failure (ONLY FOR BI-DIR-DECODER)

The accepted number of errors exceeded.

Check the decoder, solenoids, etc. and delete afterwards the error messages.

See chapter 12

108-Decoder check (ONLY FOR BI-DIR-DECODER)

The accepted number of errors from the FB-decoder is not exceeded.

Check the decoder, solenoids, etc. and delete afterwards the error messages.

See chapter 12

Subject to change without prior notice.

We remain at your full disposal for any further information you may require!

REGNERBAU CALW GmbH
Industriestrasse 19-29
75382 Althengstett / Germany
Tel. +49 / 7051 / 162-0
technik@perrot.de
<http://www.perrot.de>

