

QAM Modulator – 8 Controller

Software

SW-4268

Instruction manual

Contents

1. Introduction.....	3
2. The first step: querying the settings.....	5
3. Modifying the channel settings.....	7
4. Setting the transport stream input.....	9
5. Explanation of the Error Code.....	11
6. Changing the device IP address.....	12
7. Using the web interface.....	13
8. Using SNMP control.....	14
9. Saving and loading possibilities.....	15
10. User support.....	16
11. Frequently Asked Questions.....	17
12. Supplements, developments.....	18

1. Introduction

The CW-4268 QAM modulator-8 of CableWorld is a common product with our Dutch partner STN B.V., so its control system differs from the system used in our former products. The controlling and programming possibilities of the CW-4268 QAM Modulator-8 are as follows:

- Extensive setting and controlling possibilities of the parameters with the SW-4268 software of CableWorld. This software operates with SNMP messages, covers 90% of the parameter settings and provides a “user friendly” interface.
- 100% of the device parameters can be controlled at the device IP address (factory setting 10.123.13.103) with a popular web browser (Internet Explorer V7.0 or later version).
- Controlling with SNMP messages, by MIB browser, even by building it in device control systems of other manufacturers.

Installing the SW-4268, gives way for using all the three versions. The SW-4268 software can be installed by running the exe file downloaded from the www.cableworld.eu web site. Unless the user specifies otherwise, the software installs in the directory

C:\Program Files\CableWorld\SW_4268

The development has happened in Windows XP environment, performing the tasks puts no special requirements on the computer.

After installing the software can be started by clicking the icon appearing on the desktop. The software starts with the introductory screen as shown in Figure 1.1. If the settings are saved on exit, the next running starts with the settings saved in the \Settings\SW4268a.ini file. The software can be removed easily, so it can be installed for learning and testing, too.

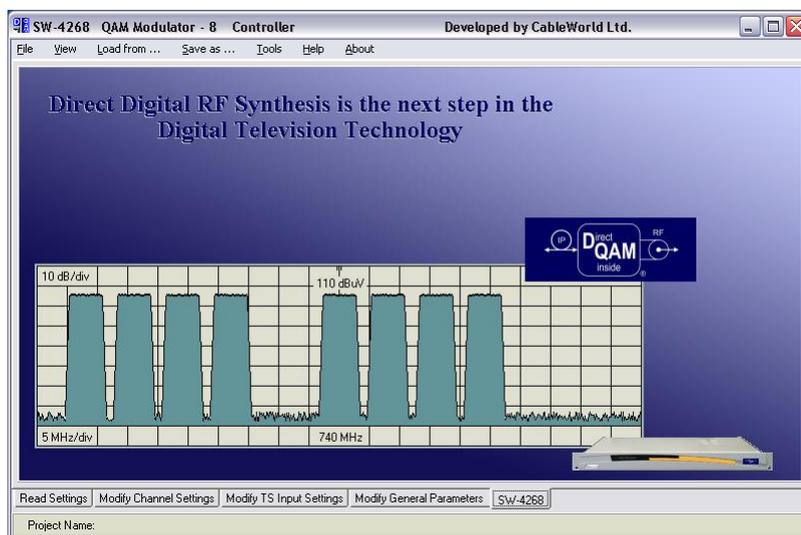


Figure 1.1
SW-4268 QAM Modulator-8 Controller introductory screen

For using the software interconnect the CW-4268 device and the PC by a UTP crossover cable or via switch by straight cable. On starting the SW-4268 software, and setting the device IP address in the software, the parameters can be queried and modified.

Important note: The CW-4268 QAM Modulator-8 sends no replies to the query commands of the CW-Net system, it will not appear in the user interface of the SW-4800 CW-Net Principal system software.

We appreciate receiving all remarks and comments with our products and software at the cableworld@cableworld.hu e-mail address; we pay respect to your suggestions and ideas at our further developments. Further information on applying the devices can be asked for at the same address.

2. The first step: querying the settings

On starting the SW-4268 software the most important step is checking the connection between the device and the computer. For performing the task click the 'Read Settings' tab and set the IP address of the device.

In the first step at setting the IP address, the user should decide whether he/she wants to work in the CableWorld 10.123.13.xx range CW-Net system, or other. According to this, check the 'Use CW-Net' box. The IP address can be set by clicking the item in the pull-down address list or stepping up-down to the required address. Unlike the CW-Net system, it is practical to use text editor for writing the IP addresses into the SW4268a.ini file. In a user defined system the software always starts with the address of the first item in the list. The format of the pull-down list in the ini file is as follows:

```
[IP Address List]
Number of Items=10
IP Address 1=192.168.200.20
IP Address 2=10.123.13.105
IP Address 3=10.123.13.10
IP Address 4=10.123.13.101
IP Address 5=10.123.13.200
IP Address 6=192.168.1.10
IP Address 7=192.168.1.101
IP Address 8=192.168.1.200
IP Address 9=172.29.1.103
IP Address 10=255.255.255.255
```

The GUI for setting the IP address is shown in Figure 2.1, with the ten items of the pull-down list loaded from the ini file. When the value of the IP address is not sure (e.g. after manual modification), step the IP address up and down. In this case the software corrects the incidental typing errors and writes the correct values in the box.

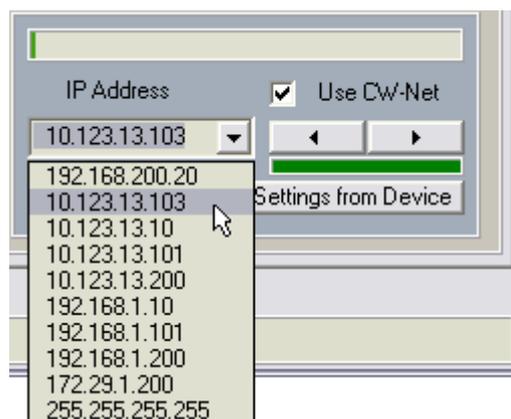


Figure 2.1
GUI for setting the IP address

When the device IP address is not known, interconnect the PC and the device directly and use the query command of the IP address modifying software. Important: In this procedure only one device will get the query command at a time!

After setting the IP address, query the current settings of the device by clicking the '**Read Settings from Device**' button. The GUI (Graphical User Interface) shows the settings in groups of different aspects. The query of the settings starts with SNMP messages, so it takes a few seconds. In default setting after the query command the software waits one second for the reply, and this is not enough for the distant devices in large IP networks. In this case the waiting time can be modified in the SW4268a.ini file. In case of wrong setting or large network the long query process can be broken with the stop button. The GUI appearing after query is shown in figure 2.2.

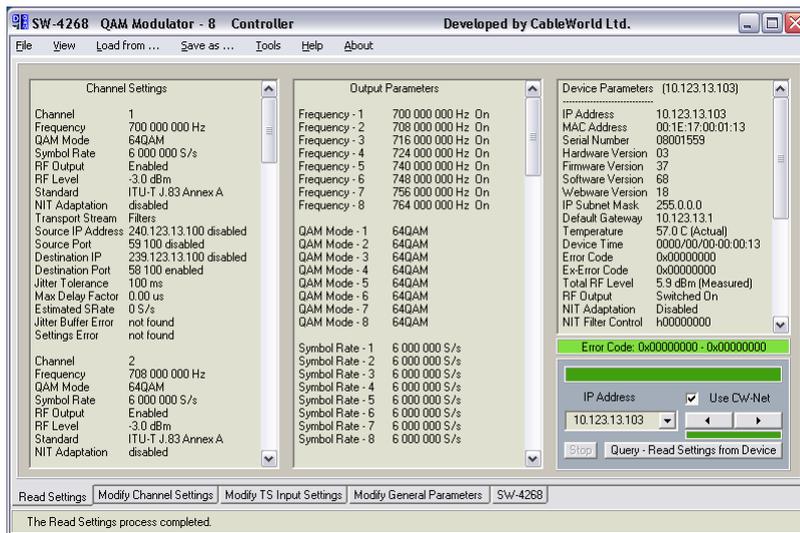


Figure 2.2
GUI for querying the settings

The software shows the channel settings graphically on the display of the 'Modify Channel Settings' page, too. Here the effect of the '**Read Settings**' button is the same as the query button on the previous page. The explanation of data is detailed in the following chapters.

3. Modifying the channel settings

The SW-4268 works with two databases of same size and structure. The first data base (**Read back Database**) comprises the data read back from the device. The second database (**New Database**) comprises the data composed by the user and prepared for loading. The contents of the two databases can be displayed on the screen with the commands of the **'View'** menu item any time.

On starting the software the contents of the two databases are the same; both comprise the data stored in the SW4268a.ini file. After reading back the device settings, the contents of the two databases are the same again, both comprise the read back data. The user's modifications always get into the 'New Database' storage. The content of this can be saved with the **'Save Channel Settings as ...'** command to file of optional name, and the content of the file can be loaded with the **'Load Channel Settings from ...'** command.

On clicking the **'Modify Channel Settings'** tab the channel settings will be displayed with the related spectrum by means of mathematical calculation. The graphical spectrum analyser can represent the whole operational range. The center frequency of the spectrum can be set in 10 MHz steps. The spectrum appearing on the screen is shown in Figure 3.1.

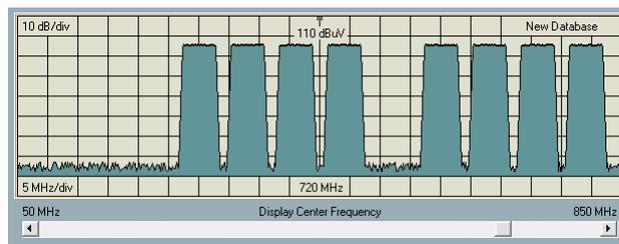


Figure 3.1
Graphic spectrum analyser display

On modifying the channel settings the display shows the results immediately. The channels switched-off are represented with outlines as shown in Figure 3.2.

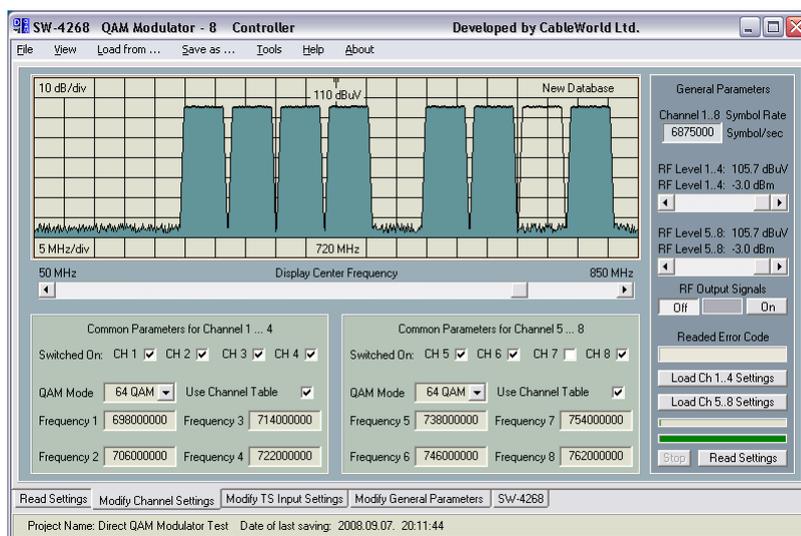


Figure 3.2
GUI for setting channel parameters

The feature of the Direct Digital RF Signal Synthesis is, that the produced QAM channels are in connection with each other, so at setting their parameters the following restrictions must be considered:

- The output signals of the CW-4268 QAM Modulator-8 are produced by two 12-bit D/A converters, so both 4-channel groups carry adjacent channels.
- Within the group of four the raster of the channels, the output levels and the QAM modes are equal.
- The Symbol Rates of the 8 channels must be equal.
- The margin between the RF output levels of the two groups of four cannot be set greater than ± 3 dB.

The GUI shown in Figure 3.2 allows modifications according to the restrictions listed above. For special settings we suggest using the web interface.

The settings of channel groups Ch1 to Ch4 and Ch5 to Ch8 can be loaded to the device separately by clicking the '**Load Ch1..4 Settings**' and '**Load Ch5..8 Settings**' buttons. The RF output signal can be switched on/off with a separate command without modifying the channel settings.

Important note: In case of incorrect settings the QAM Modulator-8 will not execute the command, nevertheless the new data can be read back. In case of correct setting combination the value of the read back Error Code is zero. The setting errors are detailed on the 'Modify General Settings' page. After switching off and on the line power, the programming steps having been started will be deleted, and the device will send back the actual working parameters.

4. Setting the transport stream input

The input signals of the eight QAM modulators in the CW-4268 type, can be fed into the device via gigabit IP network. In lack of input signal the device substitutes null packets for the data.

The IP input signal can be unicast and multicast data stream. The UDP packets can comprise 1 to 7 188-byte transport stream packets. For eliminating the irregular transmission of the IP network the input data stream gets into a temporary TS buffer. The delay of the TS buffer, the quantity of the temporarily stored data can be set from 0 to 100 ms, in 10-ms steps. The PCR errors from the IP transmission are diminished by a PCR corrector.

The settings of the IP Receiver modules in the 8 QAM channels are shown on the '**Modify TS Input Settings**' page together. Every IP Receiver can filter the input signal according to the following four parameters:

- Source IP Address
- Source Port Number
- Destination IP Address
- Destination Port Number

The user can enable or disable the operation of every filter. Generally the operation of the Destination Port Number filter and the use of multicast input signals are suggested. The GUI is shown in Figure 4.1.

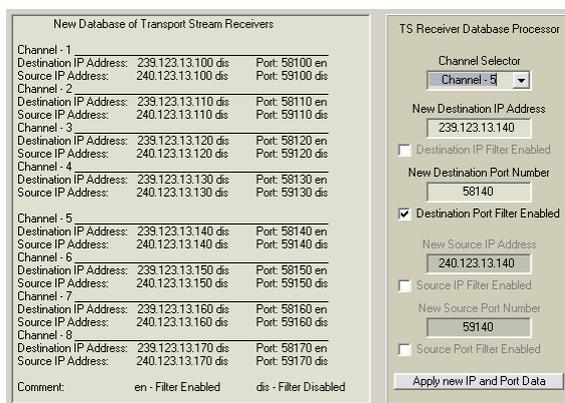


Figure 4.1
GUI of the input transport stream parameters

For modifying the data, first set the number of the channel to be modified with the **Channel Selector**, and then execute the modifications. The modifications get into the database by clicking the '**Apply new IP and Port Data**' button. The data of the 8 channels can be loaded to the device together, by clicking the '**Load TS Receiver 1 .. 8 Database**' button.

The delay of the temporary buffer used for eliminating the IP jitter, can be set independently of the input parameters. The preset value is the same for the eight channels.

The CW-4268 QAM Modulator-8 has a built-in NIT inserter, that allows of changing the NIT table in transmodulation applications. In this case the NIT table must be fed from PC or CW-4881 TS Generator to the device like the input transport streams.

The internal NIT Receiver can receive one NIT data stream, and this can be built in each of the eight QAM channels. The NIT data stream can arrive at the device with the user defined PID value. After removing the old NIT, the device inserts the new NIT data stream, with automatic Continuity Counter at PID 16.

The NIT Inserter can be configured with web interface. The SW-4268 software V1.0 version has not yet the platform for configuring the NIT Inserter.

Configuring the source side of the input TS and determining the symbol rate

The unit expects the input transport stream in UDP packets, that comprise 1 to 7 188-byte TS packets. For general use we suggest UDP packets with $7 \times 188 = 1316$ byte data content.

The error correcting capability of the PCR corrector is limited, so the transport stream must be fed in the device with null packets, according to the required QAM output packet sequence (transparent transfer). Important note: The null packets must not be removed. In this case the input and the QAM output packet sequence are nearly the same, to avoid overflows, set the output data rate a little bit (1 to 10 kbit/s) higher than the input data rate. From time to time the QAM modulator equalises the difference of the two by inserting a null packet. The PCR corrector corrects this error.

At transmodulation applications the input data stream cannot be affected, so overflows can be avoided by a slight enhancement of the output data rate. Remember, the symbol rate range of the QAM demodulators (set-top box) is very small, 10-20 kS/s.

At remultiplexer applications in the QAM modulator, setting the nominal value (e.g. 6.875 MS/s) is practical, by a slight reduction of the remultiplexer output data rate.

5. Explanation of the Error Code

The DDS (Direct Digital Synthesis) technology requires the strong control of the parameters to be set. The device controller informs the user about the results by the values of the variables '**Error Code**' and '**Extended Error Code**'. In case of correct settings the values of these variables are zero.

The read back value of the Error Code and the Extended Error Code is shown on several GUIs. Detailed information can be obtained about the data interpretation on the **Modify General Parameters** page. The Error Code Platform in Figure 5.1, beyond explaining the present codes gives a detailed information about every code and allows the separate read back of these two codes, too.

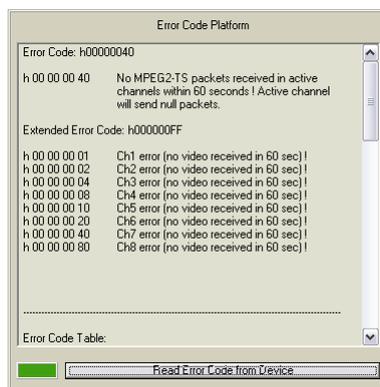


Figure 5.1
GUI of the Error Code Platform

In the course of configuring the device, after setting the correct channel data, probably most of the error messages will show the lack of the transport stream.

6. Changing the device IP address

The CW-4268 QAM Modulator-8 devices are delivered with factory setting 10.123.13.103 IP address. In the IP network every device must have a separate IP address, so in case of several devices different IP addresses must be set.

The course of changing the IP address:

- Interconnect the QAM modulator and the PC, so that other QAM modulators could not get the message.
- Start the SW-4268 software and use the **Tools\Change Device IP Address** menu item.
- The software queries the present IP address of the device by sending an UDP packet to the 239.255.255.250 (Port=3702) IP address, and then modifies it according to the user's demand.

The GUI of the software for modifying the IP address is shown in Figure 6.1. (For configuration the DQAMIPconfig.exe file is available in the Tools directory and it can run independently, too.)

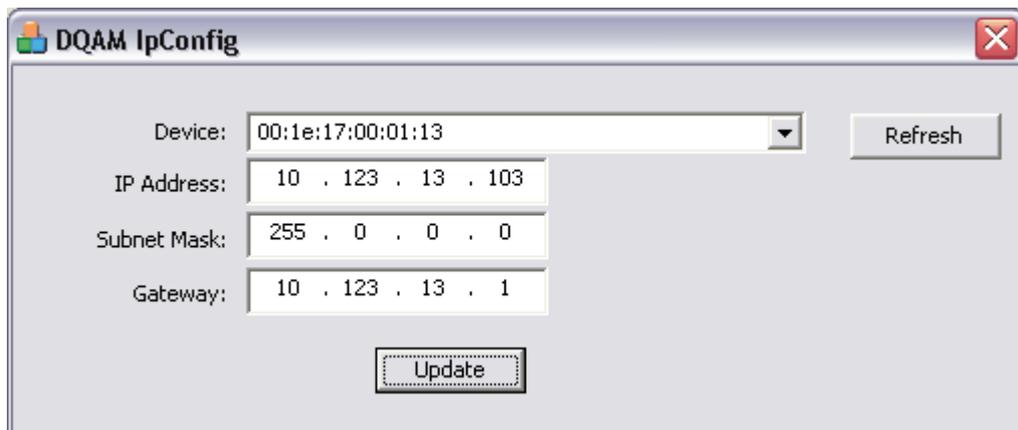


Figure 6.1
GUI for modifying the device IP address

7. Using the web interface

The CW-4286 QAM Modulator-8 allows a number of possibilities for the user at setting the device parameters and monitoring the operation. For new and not practised users first we offer using the SW-4268 software, which simplifies the programming of the device by applying a number of automatic functions.

On clicking the **Tools/Web browser Platform** menu item, the PC default web browser starts searching the device at the IP address preset in the SW-4268 software. For using the web browser the Microsoft Internet Explorer 7 or later version must be installed. Other software can be used as well.

The web browser allows of setting and querying every parameter, but its use requires thorough technical knowledge. We suggest using it for setting the NIT replacement and the special parameters not managed by the SW-4268. Some part of the web interface is shown in Figure 7.1.

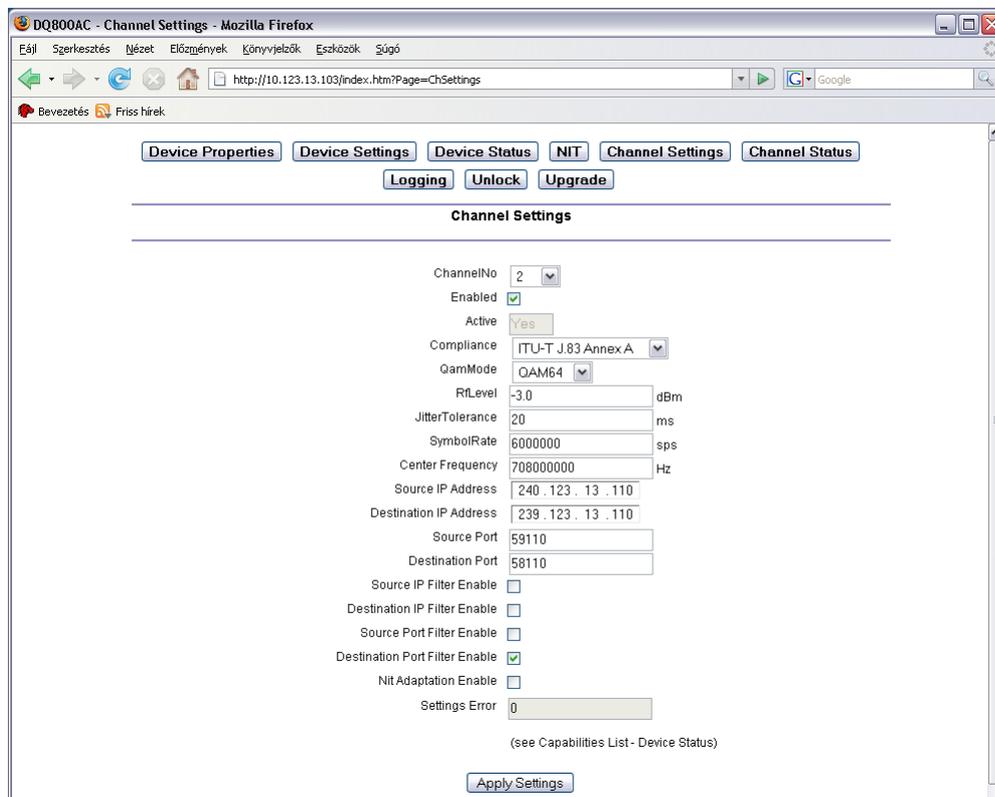


Figure 7.1
Part of the web interface

8. Using SNMP control

First, install a MIB Browser software in your PC for using conventional SNMP control. Add the **SW_4268\Tools\DQAMMIB.MIB** file for the software. Then the parameters can be queried and set one by one.

Note: The SW-4268 software queries and modifies the parameters with SNMP messages but without using the MIB browser. At SNMP control may occur, that the answers return after several seconds (in large IP networks), so the ensured SNMP waiting time for the answer return is very important. At the SW-4268, the SNMP waiting time is set to 1200 ms, where the device uses up 600 to 700 ms during setting the IP addresses, so 500 to 600 ms remain for the delay of the IP network. In large systems when the answers arrive late, the value of the SNMP Waiting Time must be set higher in the SW4268a.ini file. The usual value is 5000 ms.

9. Saving and loading possibilities

The SW-4268 software starts with the settings stored in the SW4268a.ini file. The file comprises the software and channel settings as well. Save settings when exit so the software and the channel settings will be saved.

In large systems, when several QAM modulator-8 are used, it is practical to prepare the channel settings and call them in from file with the installation. The channel settings can be saved with the **'Save Channel Settings as ...'** command to the file assigned by the user. The **'Load Channel Settings from ...'** command is used for loading.

The commands 'Save Software Settings as...' and 'Load Software Settings from ...' are used for saving and loading the IP address and a few software parameters only, so they are used in special applications.

10. User support

The detailed technical data sheet of the CW-4268 QAM Modulator-8 is contained in the 4268p_m.pdf and can be downloaded from the www.cableworld.eu web site.

The instruction manual of the SW-4268 software is contained in the 4268Help_m.pdf file. The installer exe installs the file in the directory SW_4268\Help, but the file can be downloaded independently from the software page of the www.cableworld.eu web site.

For using the SNMP control the DQAMMIB.MIB file can be found in the directory SW_4268\Tools.

The technical specification of the 'Eight_Channel DVB-C Direct VHF/UHF QAM Modulator' module used in the CW-4268 device can be found in the directory SW_4268\Help in the Specification_V12.pdf file. The instruction manual for using the web browser can be found in the DQAMmanual_V07.pdf file.

11. Frequently Asked Questions

1. By the measurements the device operates with no fed or read back data. What can be wrong?

Answer: The entry of the parameters was incorrect, the modifications could not be executed, the device is waiting for correction. The Error Code informs about the kind of the error. Restart the device for reading the actual parameters again.

2. The web interface is not working. What can be wrong?

Answer: It really does not work with the Internet Explorer 6.0 or former versions. Install the Internet Explorer 7.0 or Firefox 2.0.0.1 or similar software!

3. How to make special settings and avoid the automatic functions of the SW-4268?

Answer: The software examines the values loaded from the ini file briefly. For making special settings, use data entry through the ini file, or web interface.

12. Supplements, developments