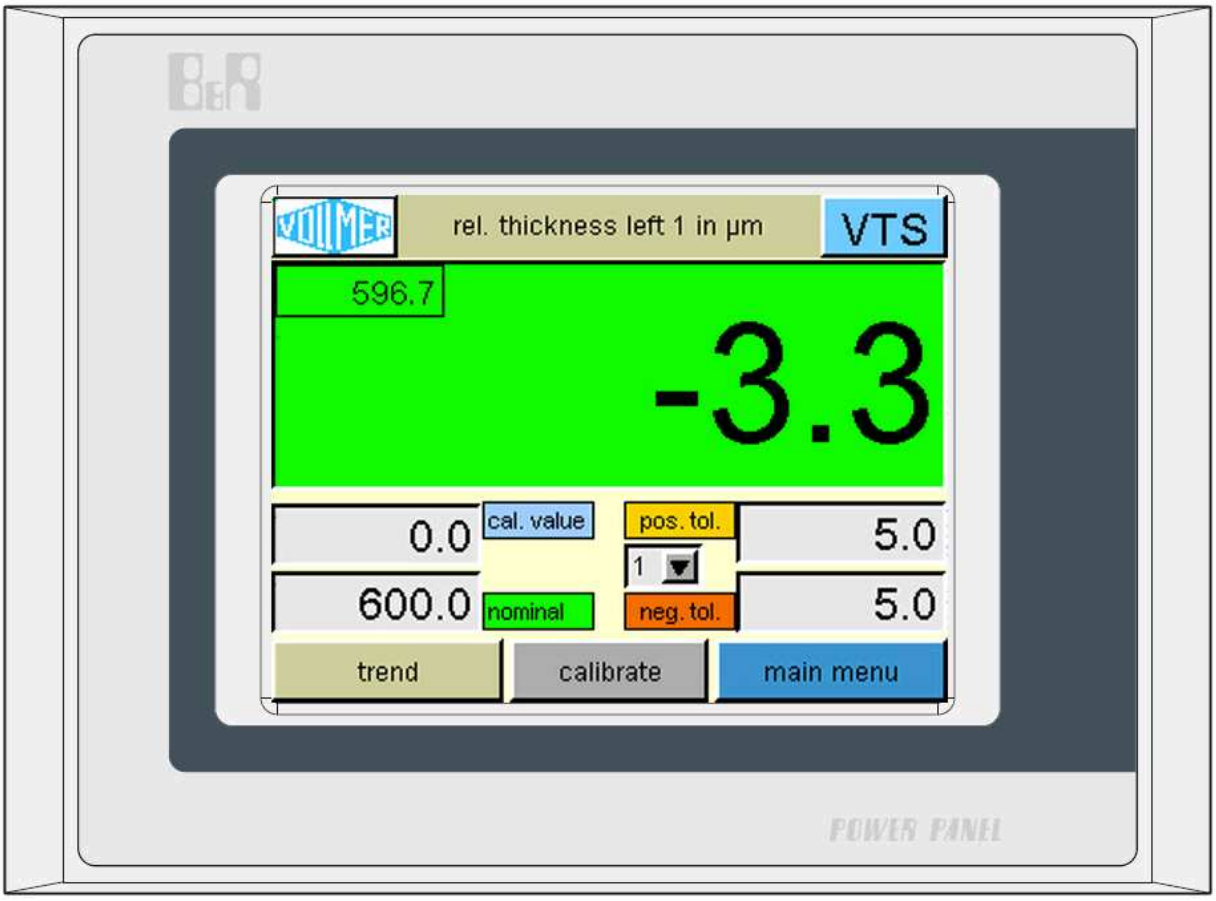
Feinmessgerätebau GmbH

Description

VTS4DG

Vollmer Touch Screen for (4) Digital Gauges



Vollmer Feinmessgerätebau GmbH

Software Revision 2.0.3
(original manual)

Feinmessgerätebau GmbH

Verbandsstraße 60b
D-58093 Hagen

☎ 0049 (0) 2334 507 -
Fax 0049 (0) 2334 507 - 199
💻 support@vollmergmbh.de

W:\VTS\Projekte\VTS Beschreibung\Man VTS4DG 2.0.0\Man VTS4DG 2.0.0 englisch\VTS4DG_Manual_203_e_rev_00.doc

Changes 1.6.5 to 2.0.0:

Complete configuration of system possible
Profibus structure changed

Changes 2.0.0 to 2.0.1:

Profibus input data
Bit "PLC ready" was on bit1 instead of bit0
W96 byte 0, byte 1 was indicated
Instead of calibration value 4, value 3 was indicated

Removed trend_completion = 4 from VitualKey "back"
When retrieving the trend page via "page back", the trend is restarted by a flag set in visu.c

Changing the unit in window Settings/Visualization will also change the default tolerances (unit and value) right away, not only after storing

With new tolerances via the Profibus, the tolerances are saved as before but the number of the default tolerance display is also hidden now

Default tolerance set 1 is set to the visualization when the system is switched on

Japanese translation inserted

Temperature limits increased to 65°C und 85°C – referenced by B&R

National flags right beside the language selection

Changes 2.0.1 to 2.0.2:

Various small changes in the visualization

Life clock transfer between PLC and VTS4DG

Changes 2.0.2 to 2.0.3:

Various small changes in the visualization

Default tolerance set 1 is activated when the system is switched on

Use TAD in PLC for double words

Description of the error messages completed

Contents

1. General

„Vollmer Touch Screen for (4) Digital Gauges“ (VTS4DG) is based on a panel PC with a 5.7“ touch screen. It is applied for Vollmer gauges with digital transducers.
It is used for the display and control of measurement values of up to 4 gauges.

The recorded measurement values are not stored in the VTS – i.e. the VTS is not a data recorder.

The VTS is characterized by easy, intuitive operation.

1.1 Measurement data display

The VTS4DG measurement program runs on a power panel with colour TFT on which interface modules are connected via a bus connection. These interface modules are for the connection of digital transducers and pulse sensors, for the input of digital signals and for the output of analog and digital signals.

Digital transducer values can also be read in via an interface module that is connected via Ethernet.

By using a Profibus interface module, the control signals, nominal values and tolerances can be preset and digital output signals, the deviation and nominal and actual values can be passed.

VTS4DG must be parameterized with the installation or start-up in accordance with the measurement task.

It can be used for the thickness measurement for gauges with single digital transducers or digital transducers in sum measurement. It can also be used for the width measurement or for the thickness and width measurement.

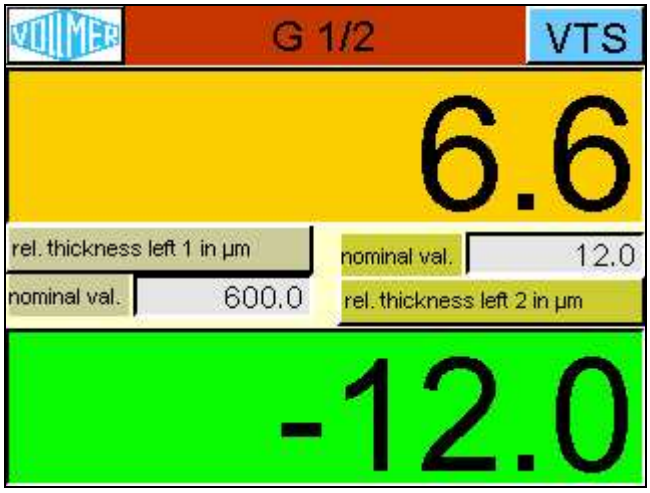
According to the customer’s requirements, the measurement values can be displayed in absolute form or as deviation from the nominal. The measurement value displays can also be changed from metric to inch.

1.2 Program start

After booting the VTS4DG, the homepage with the Vollmer logo is retrieved for 15 seconds. The periphery of the system is initialized during this time. The visualization is continued automatically with the start page that is set in the system parameters.

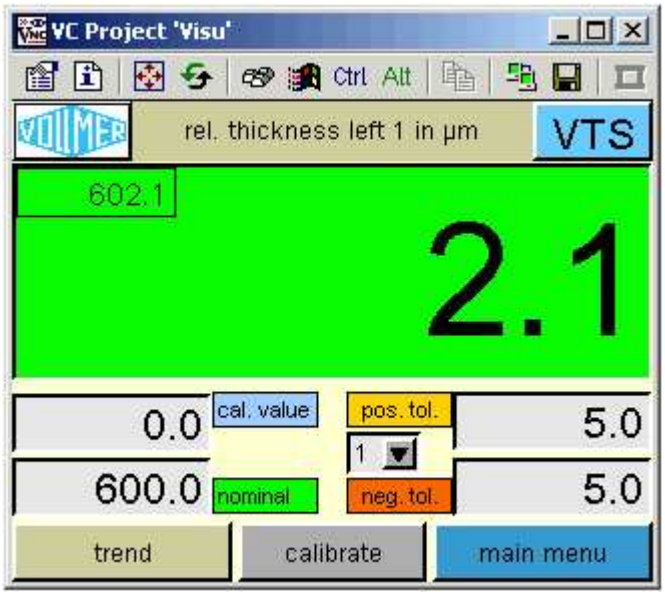
The logos in the headers of all pages signal program states and also have the function of keys. The service menu is retrieved via the **Vollmer logo**. When the setting functions are active, the logo background is red.

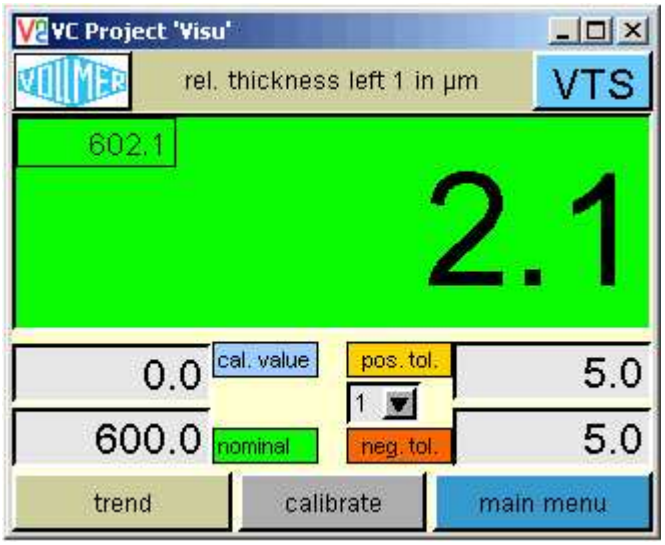
The **VTS symbol** also serves as a „Page back“ key. If it is red instead of light blue, a fault is still present.



1.3 Remote control

The visualization of the VTS4DG is shown on the monitor of a PC and operated via a **VNC connection**. VNC viewers, such as the TightVNC Viewer or the RealVNC Viewer, are free programs that can be connected with the VNC server, which is integrated in the VTS4DG, via a network.

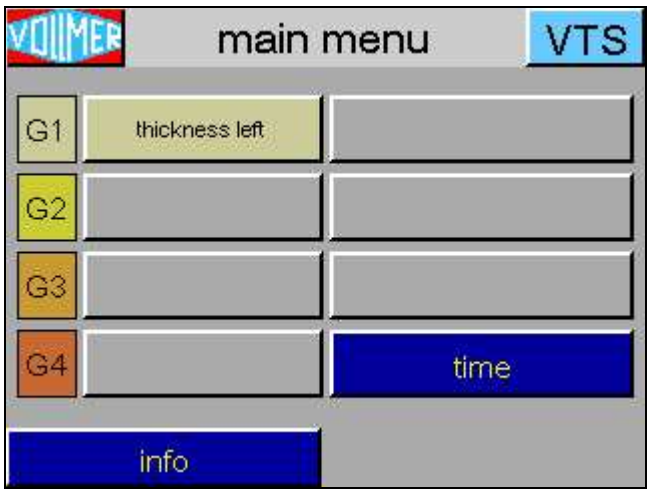




Since the VTS4DG can read in digital transducer values via an Ethernet interface, it should work in a network circuit that is separate from the in-house network, if possible. The default **network address** of the VTS4DG is **192.168.1.246**. A PC that wants to show the VTS4DG visualization via VNC, must have an IP address that belongs to the same circuit, i.e. 192.168.1.XXX. If necessary, the IP address of the VTS can be changed in the system parameters.

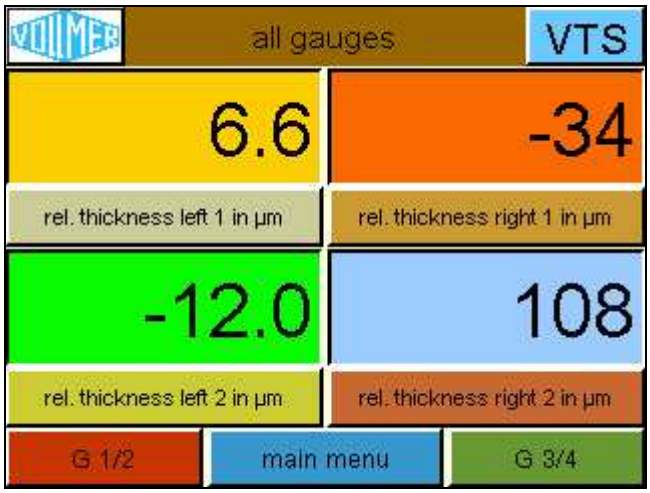
The password to activate the connection is **vollmer**.

2. Main menu



The display of the individual gauges and the common display of the measurement values can be reached from here. Which keys are enabled and active depends on the system configuration.

Keys **G1/2**, **G3/4** and **all gauges** are only activated when the respective gauges are active (all gauges, if there are 3 or 4 gauges).



The **info** window includes further information on the current program.

The **time** window also shows the current date. The time page must be retrieved via the service menu to set the date or time.

2.1 Info

The info window shows which **program version** is currently used.

The normally permanently changing **cycle counter** shows the user that the measurement program is still working.

2.2 Time (indicate)

A *red field* with error type and error number is shown in case of an error.

Setting the date and time is only possible by retrieving this window via the service menu.

3. Measurement value displays

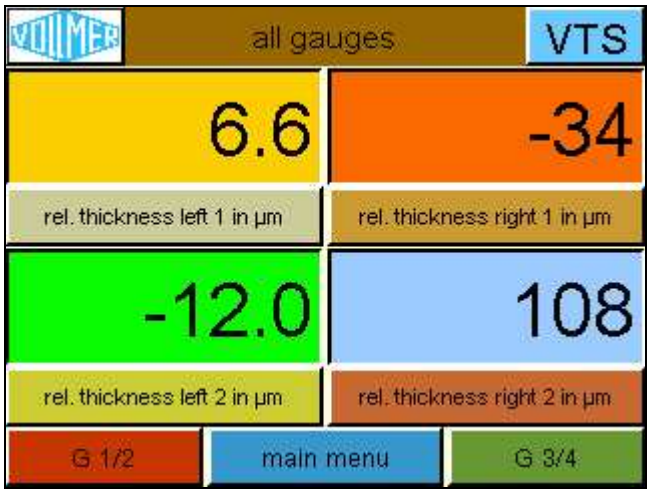
There are two types of measurement displays, the digital displays and the trend display.

Depending on the system configuration, the **abs.**olute thickness of the material or the **rel.**ative deviation from the nominal thickness is indicated in the measurement value displays. The number of digits and the unit of the displays also depend on the selected settings.

In systems with more than one gauge displays for 2 or 4 gauges are available. From these multi displays the large displays of the individual gauges could be opened.

The notation of the gauges set in the system configuration is the base for the titles of the measurement value displays and the key configuration.

The trend display shows the last two minutes of the deviation as a graph.



The values of the displays have varying background colours, indicating the status of the gauge (of the measuring unit or measurement insert).

Gauge not in position:

Gauge not yet calibrated **(dark gray)**

Zero alignment of gauge active **(light blue)**

Gauge calibrated **(light gray)**

Gauge in position:

Gauge not yet calibrated **(dark red)**

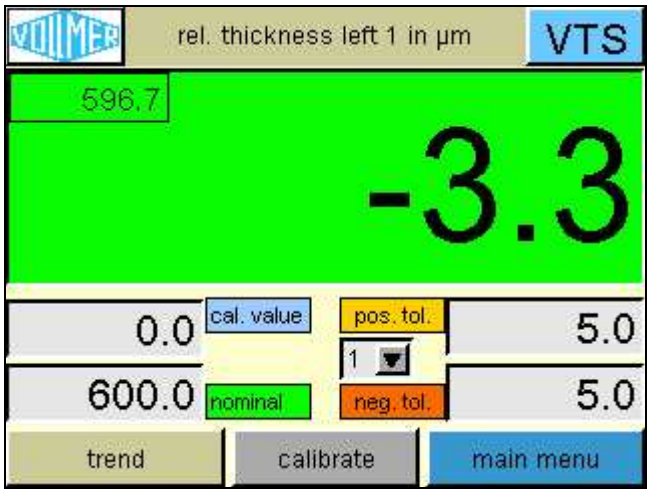
Measurement value within preset tolerance limits **(green**)

Negative tolerance limit below minimum - minus, too thin **(orange)**

Positive tolerance limit exceeded - plus, too thick **(yellow)**

3.1 Measurement value display – 1 gauge

If the large measurement value display shows the deviation from the nominal, the relative measurement value, the absolutely measured value is indicated in the left upper corner of the display. If the large display shows the absolute value, the relative value is shown in the small display.



With systems with more than one gauge, the header of the large display is also used for the *selection of the gauge to be indicated.*

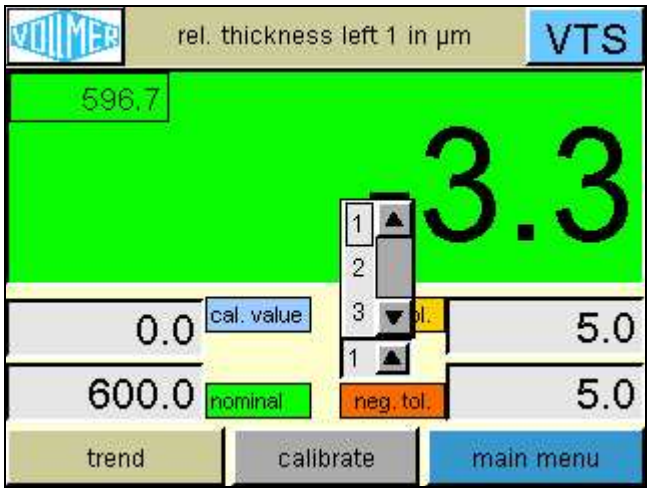
The **cal.**iber **value** (see 3.1.2), the **nominal value** and the **pos.**itive and **neg.**ative **tol.**erance limits are shown in four small displays below the large display.

These values can be set via a **number input field** (see 3.1.1) that is opened by clicking on the values.

The *nominal input function is disabled* if the gauge is equipped with a *fine adjustment* (background colour dark grey).

In cases the values are presetted by a PLC, they will be change in the displays if new values are set to Profibus interface.

In the settings 3 default tolerance sets could be entered, which here could be selected. The tolerance set number is faded out, if the tolerances are presetted via Profibus or inserted by the number field.



The **trend** key opens a page which could show two minutes of the measurement as a graph.

After a restart of the PowerPanel the key calibrate colour changes between light blue and red until the gauge is calibrated the first time. This flashing only comes back if the gauge lost its calibration by a fault of the counter module.

Is the gauge „In position“ the colour of the **calibrate** key changes to light grey (disabled), because in this position it is not possible to calibrate the gauge..

3.1.1 Number input field

The buttons of the number input field have the following functions:

- Terminate entry and close input field

- Delete entry display, backspace resp.

- Enter and return to entry window

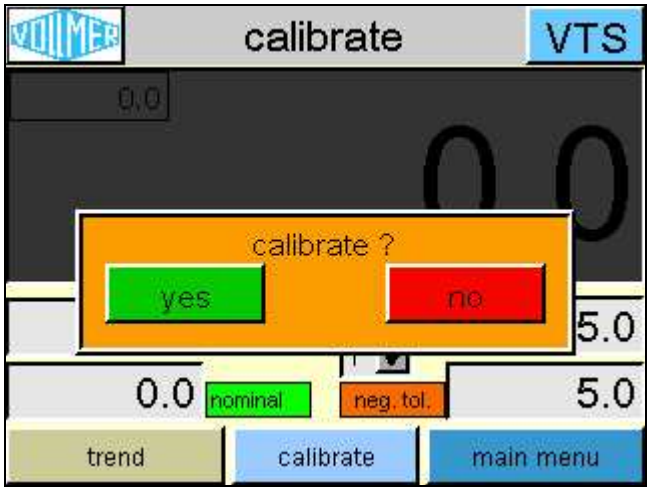
0 … 9 - Enter digits

- Change sign

- Set decimal point

3.1.2 Calibrate

The calibrations for the gauge is started by pushing key **calibrate**.

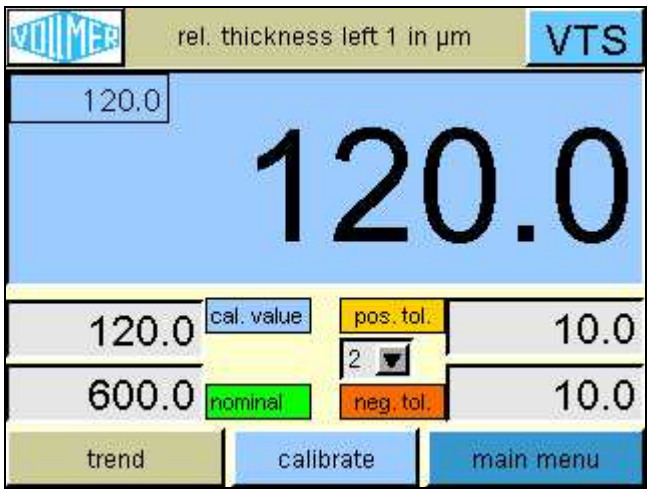


A „yes/no“ window is shown and the calibration is initiated by touching the **yes** key.

The transducers are generally calibrated to „0“, i.e. they are in contact.

Calibration with a calibration standard is also possible. The value is entered as the **cal.**iber **value**.

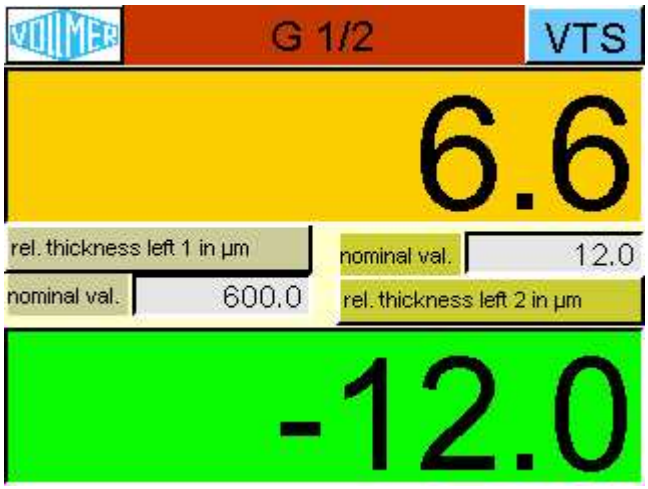
The light blue background colour of the digital display signals that the „calibrate“ function is active.



Without preset, the calibration is completed so quickly after pushing the key that the colour change can hardly be seen. With a „calibration“ via the digital inputs or the Profibus, the colour change lasts as long as the respective signal is active.

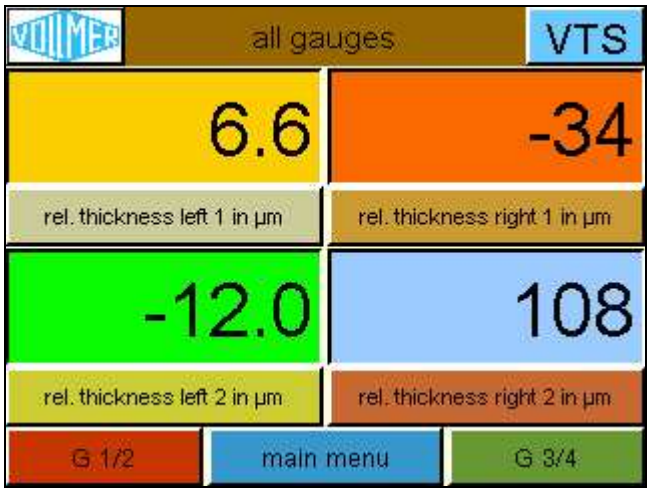
If the transducers are set to the nominal value via a mechanical offset, the calibration process is more extensive. Before the calibration is started, the mechanical offset must be opened so much that the transducers are no longer in contact. With the start of calibration, recognized by a colour change to light blue, the transducer values are set to half the available stroke. When the mechanical offset is closed again, the display value will not change until the transducers are in contact again. The mechanical offset is closed until the transducer values reach zero. At this time, the nominal value is set to zero and the background colour change to light blue is cancelled. The value that is presetted via the mechanical offset is considered as the nominal value for the gauge as from now.

3.2 Measurement value display - 2/4 gauges



The measurement value display for two gauges shows the either the gauges G1 – top - and G2 – bottom - (**G1/2**) or the gauges G3 – top - and G4 – bottom- (**G3/4**).

3.3 Measurement value display - 4 gauges



The measurement value display for **all gauges** will be activated if the system is configured with 3 or 4 gauges. On the left side on top the gauge G1 is shown and on the bottom G2. Accordingly on the right side the gauge G3 on top and G4 on the bottom.

3.4 Measurement value display - trend

The trend display shows the last **2 minutes** of the deviation from the nominal (the **rel.**ative value). When the right end of the screen has been reached, the recording moves to the left out of the screen, while the new values are added on the right.

The trend graph is **not stored** and it is not possible to print the display.

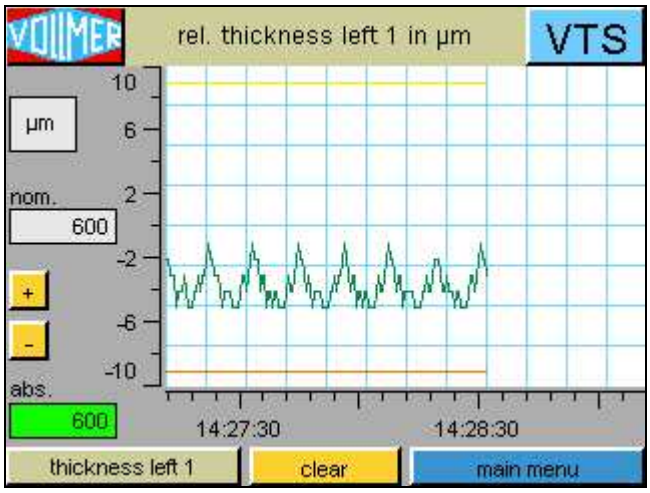
Attention !!!

Switching between the recordings of various gauges is not possible.

If another display is switched (e.g. via the gauge selection in the page title), the recording is restarted from the beginning.

If the trend page is retrieved with the reverse navigation of pages (VTS symbol), the scaling and box pattern may not fit.

The graph starts with the input signal „Gauge **(Gx) in position“**. When the signal goes out, the measurement is stopped and the display is maintained until the input signal comes on again, but it is restarted from the beginning.



As long as the input signal *in position* is available, the graph can be restarted by pushing the **clear** key.

The *measurement range* of the trend can be set with the **+/-** keys. The start value of the scaling is defined in the trend settings of the program. The measurement range is changed by factor 3 (1µm, 3µm, 10µm, 30µm, ...) with each operation of the keys. The limits of the adjustable measurement range are +/-1µm and +/-10000µm. As a consequence of the measurement range change, the graph is restarted.

The current **nominal value** of the gauge is indicated at zero line level since the trend always indicates the nominal deviation. The **absolute measurement value** of the gauge is indicated in the bottom left. The colour change of the absolute value display background corresponds to that of the digital displays.

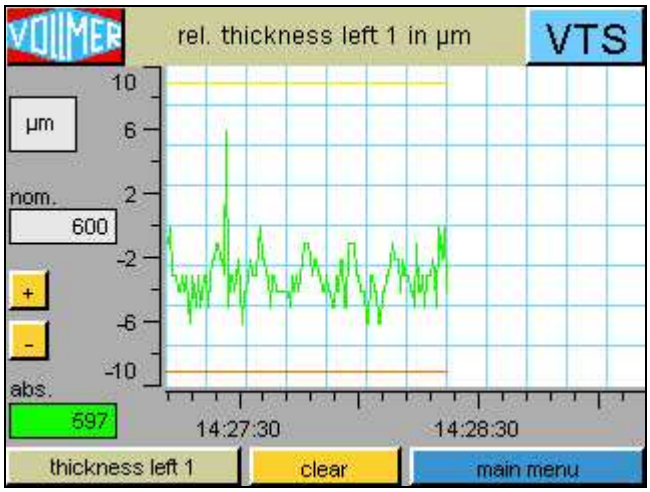
The unit of the trend display is always **µm (1/100mil)**, even if the measurement value is indicated in **mm (inch)** in the large digital displays.

Because of a display resolution of 320 * 240 points, the trend display is shown by relatively few points (240 points in the time axis). Because of a recording length of 2 minutes, a measurement point is recorded only **every 500ms**.

How the measurement values of the gauge should be shown is defined in *Settings* on the **trend** page. Lines for the **current measurement value**, the **average value**, the **minimum and maximum value** and the **tolerances** can be activated.

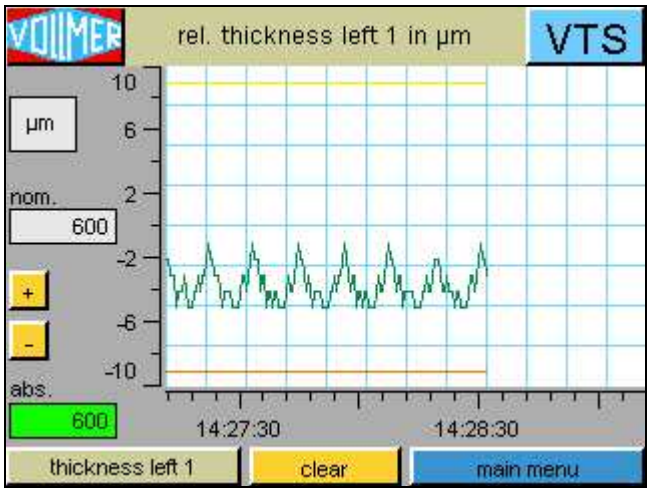
The tolerance lines are shown in the same colours in which the tolerance exceeding is visualized in the digital displays (positive tolerance limit = yellow and negative tolerance limit = orange).

3.4.1 Current measurement value



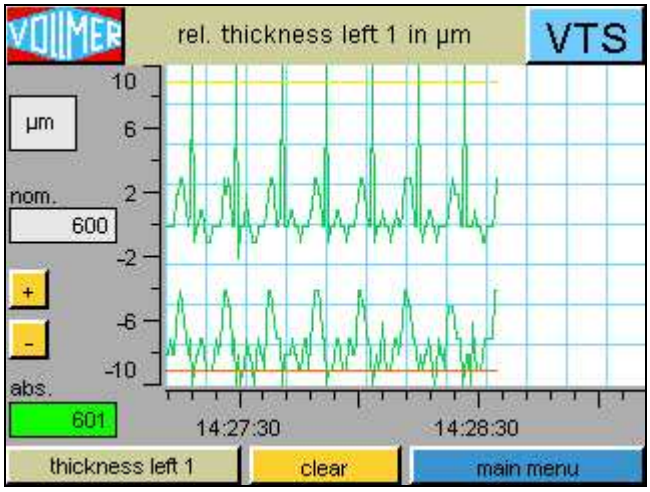
The current measurement value is indicated by a light green curve. Only the value that is present at the time of recording is indicated, i.e. **one measurement value** after **every 500ms** (only reasonable with very slow strip speed).

3.4.2 Average value



When the average value display is activated, each indicated point of the dark green curve displays the **average of recorded measurement values** since the last point, i.e. the average of the measurement values collected in the last 500ms is formed and indicated.

3.4.3 Min. / max. value

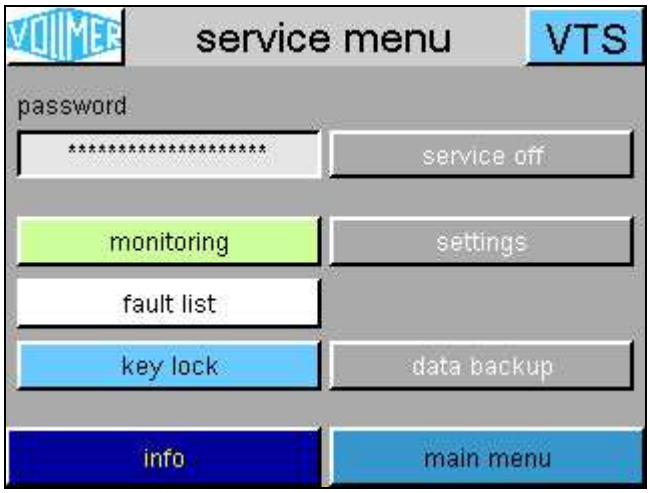


Two trend lines are generated for a gauge to display the minimum and maximum value. The smallest measured value of the measurement signal within the recording cycle of 500ms is detected for the curve of the minimum value. The same applies to the maximum value curve, except that the largest measurement value is searched and indicated here. All measurement value peaks can be detected in this display even with high strip speeds.

4. Service menu

The window with the selection of service functions is shown by clicking on the **Vollmer logo**.

The **settings**, **data saving** and **service off** keys are locked without a password entry – shown by white letters on gray background. The **monitoring** functions, the **fault list** and the **key lock** are accessible without password.



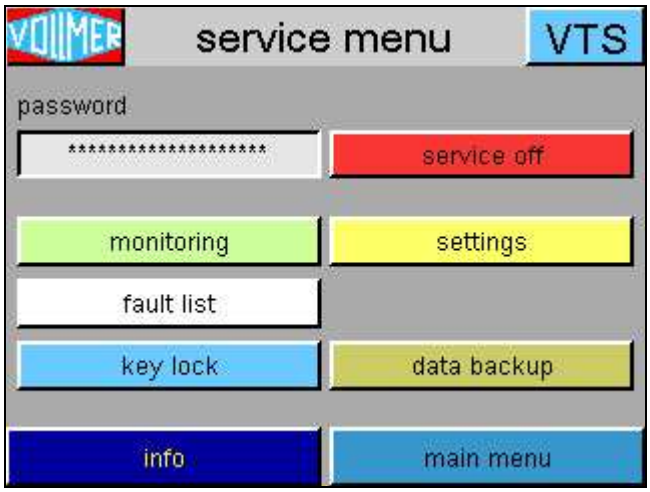
The activation of the service function is visible in all windows by the **Vollmer logo** framed in red.

Relocking is possible by pushing the **service off** key with the red background.

4.1 Password (entry)

The password is entered via an alphanumerical input field that is opened as soon as the password field is touched. The **default password** is: *abc* or *vollmer*.

The locked buttons change their colour when the correct password has been entered, showing that they are active.



4.1.1 Alphanumerical input field

The functions of this input field basically correspond to those of the number input field, except that there are various selectable keys here: Numbers and special characters, the letters A-P and the letters Q-Z.

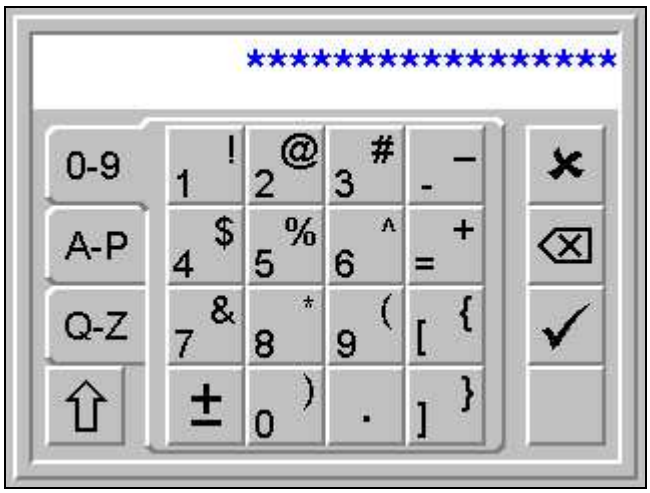
There is also a shift key  (^) to reach the second level of the keyboard (characters !@+* etc. in the picture), it must be pushed before the required character is entered.

The display of the input field will not change when the shift key is pushed. Small letters are entered without shift (despite the display of capital letters in the input field), capital letters with shift.

Spaces are entered with the empty keypad.

Example: **VollmeR VTS**

Q-Z, ^, V, A-P, O, L, L, M, E, Q-Z, ^, R, , ^, V, ^, T, ^, S



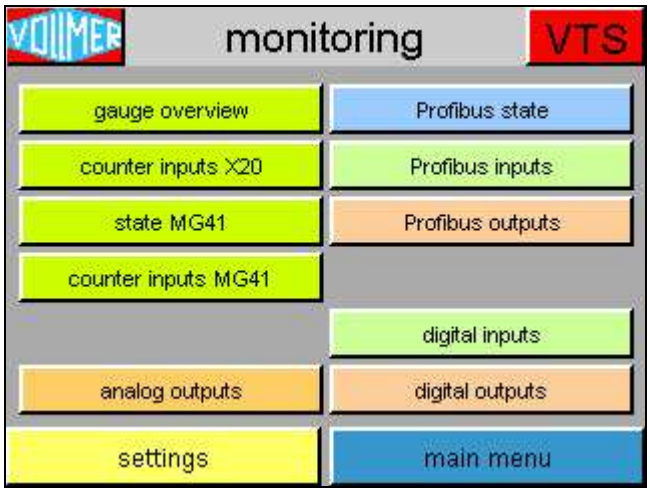
4.2 Monitoring

Pages with helpful values for the start-up and service of the system can be reached via the **monitoring** page of the service menu.

Some keys to reach the following pages of the monitoring menu are only shown if required by the system configuration.

!!! Attention !!!

Since the data indicated in *monitoring* are mere service signals, the values are indicated in **µm** (metric) even if the gauges are operated in the English **inch** unit.



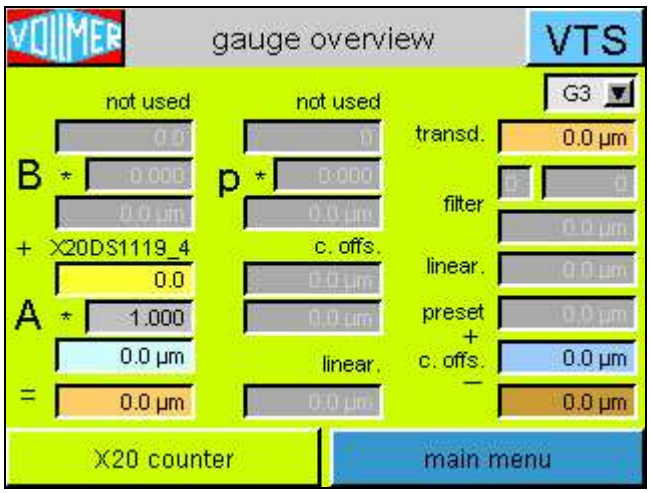
When the service functions are active, the **settings** key leads directly to the service menu page of the same name from where the individual pages for the configuration of the system can be reached.

4.2.1 Gauge overview

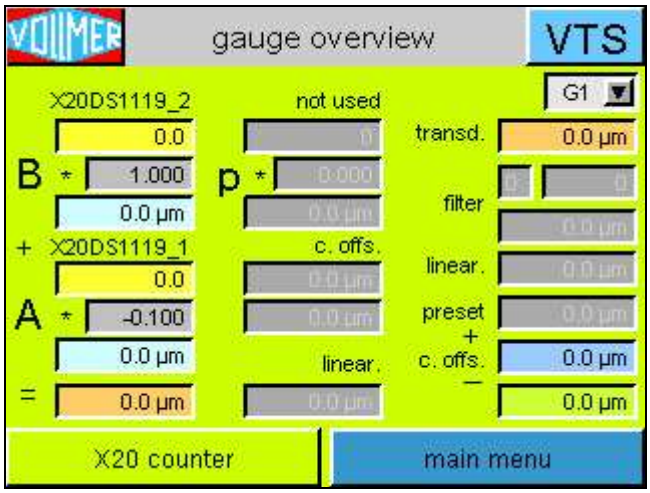
The raw values of the transducer/pulse sensor, the matching coefficients, the active filter settings and the current calibration offsets for the selected gauge (G1 … G3) and the calculated measurement results from these values are indicated in these windows.

All inactive values are marked by white letters on light gray background.

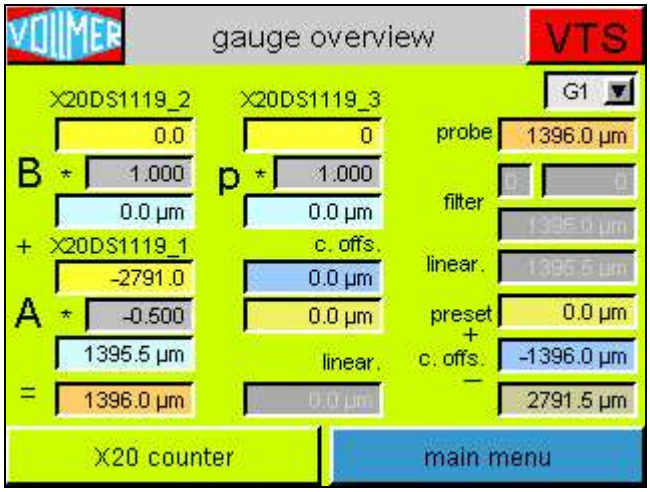
Single measurement (transducer **A** only) – the current **calibration offset** is only be viewed here.



Sum measurement (transducers **A + B**) – the individual transducer values can only be checked here.

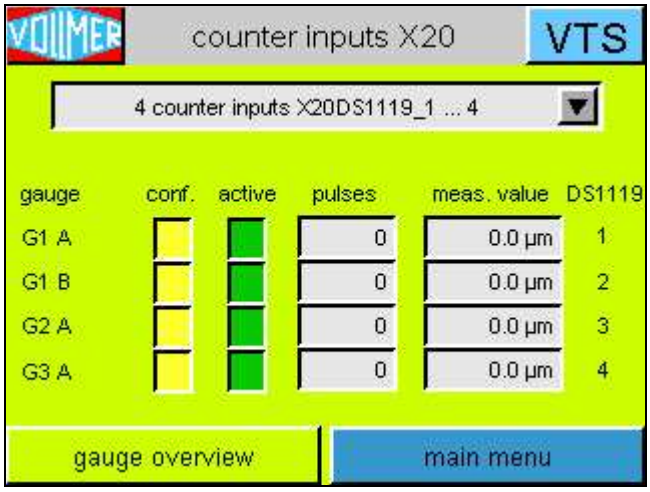


If a mechanical offset (**p**reset) is added to the measurement range of a gauge (transducers **A + B + p**), these data can be viewed here.



4.2.2 Counter inputs X20

Digital transducers or pulse sensors for the nominal presetter can be connected to the counter modules of the X20 bus.

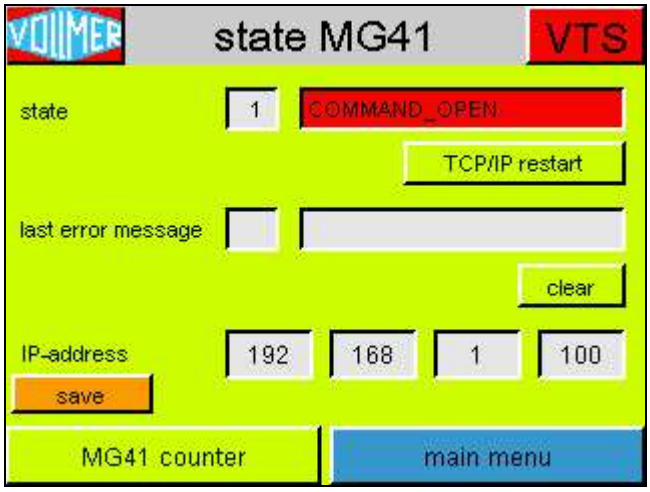


A **conf**.igured and an **active** field are assigned to each transducer. A transducer assembled in the system is marked in yellow, a connected active transducer is marked in green.

The values in the column **meas**.uring **value** are calculated by multiplying the counted **pulses** with the *correction factor counter* saved in the settings.

Pushing key **gauge overview** takes you to the window with the current data of the active gauges.

4.2.3 State MG41

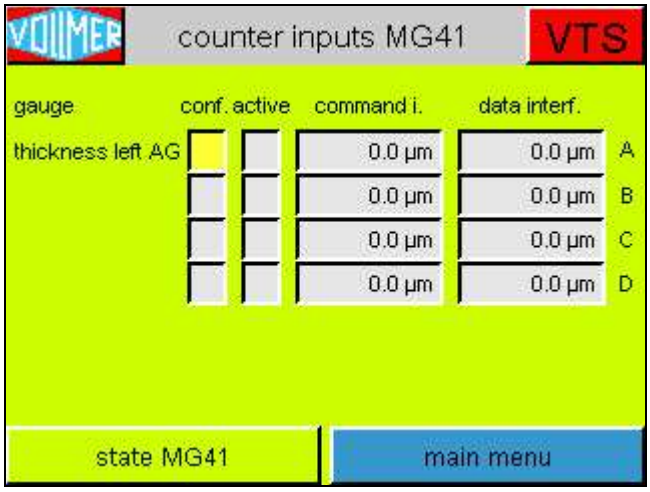


The top line of the page indicates the state of the MG41 module. The transfer of the transducer data via the data interface is not started before state 32 - DATA_RECV has been reached. By pushing the **TCP/IP restart** key, you can try to reestablish an interrupted data connection. If it is not possible, i.e. state 32 is not reached, the system, MG41 and VTS, must be restarted.

The last error message from the transducer interface is shown with an error number in the second line of the page until it is quit by pushing the **clear** key.

If the **IP address** must be changed due to the network structure on site, the system must be restarted after **save**.

4.2.4 Counter inputs MG41



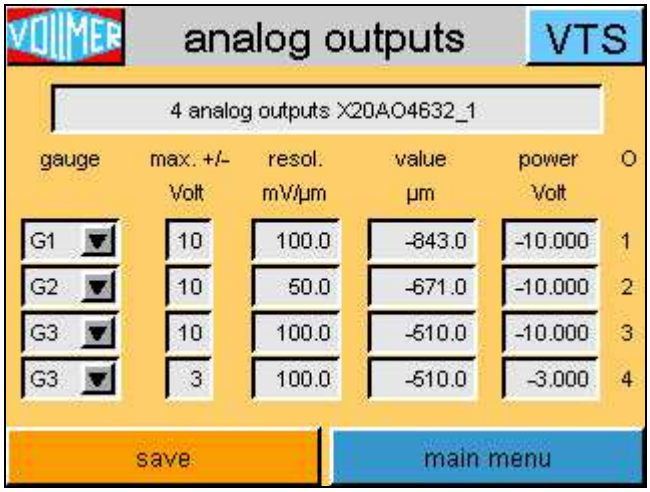
The **counter values** of the transducer inputs, retrieved from counter module MG41 via the network connection, are shown *(in µm)* here.

A **conf**.igured and an **active** field are assigned to each transducer. A transducer assembled in the system is marked in yellow, a connected active transducer is marked in green.

The values, processed in the VTS, are read in via the **data interf**.ace. The transducer values are also retrieved via the **command i**.nterface about every 500ms for checking purposes.

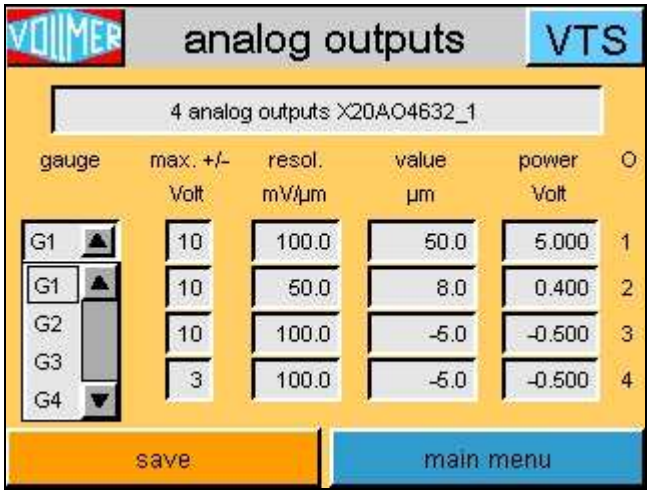
4.2.5 Analog outputs

The *nominal deviations* (**value**) of the assembled gauges and the resulting output **voltage**s are indicated.



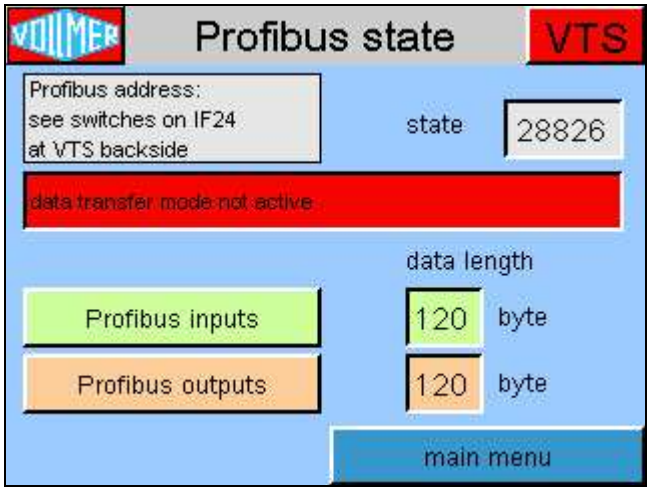
The gauge allocation for all 4 analog outputs is freely selectable. All outputs could be used for one **gauge** or could be assigned to the 4 different gauges.

The assignment to the gauges, the output voltage (**max. +-**10 **Volt**) and the resolution of the analog outputs (in **mV/µm**) could only be adjusted, if the service mode is enabled.



4.2.6 Profibus state

The state of the Profibus connection is indicated.



Possible Profibus state messages / errors:

0: data transfer active = Profibus connection without problems

28825: *No L2DP slave module* = no Profibus module installed in the VTS or Profibus module defective

28826: data transfer mode not active = no Profibus connection

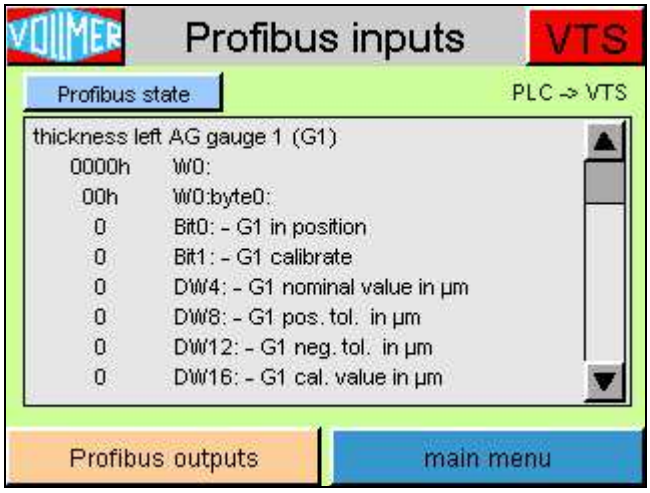
28829: node number not correct = Profibus address not justified or wrong

The pages with the signals/data transferred to or from the VTS can be indicated via keys **Profibus inputs** and **Profibus outputs**.

4.2.7 Profibus inputs

The data received from the VTS4DG are shown on the Profibus input page. The digital PLC control signals are shown completely in hexadecimal notation, in hex bytes and in bits with function explanations.

The values, read from the Profibus interface, nominals, calibration value and tolerances are used in the program as floating points. The utilised unit depends on the unit, set in the parameters for the HMI-screen. If the values of the gauge are displayed in in µm or mm, the Profibus interface works with the unit µm. Otherwise, if the display parameter for the gauge is set to the American unit inch or mil, the Profibus interface works with mil. Though the unit in the parameters belongs to the gauge, it is possible that there could be a mixture of µm and mil in the Profibus interface.



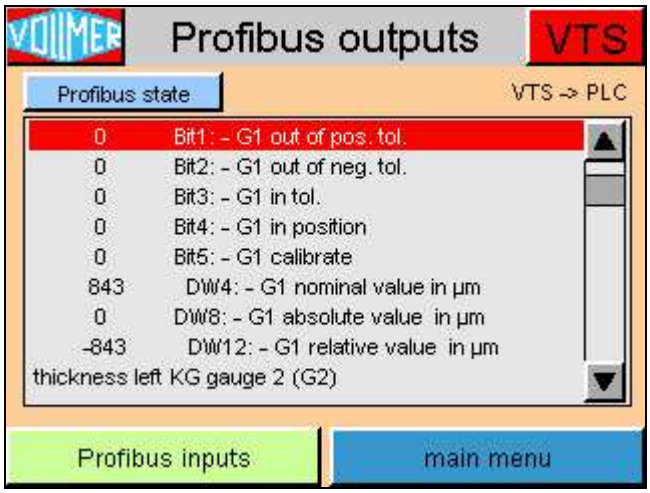
To hold the position in the Profibus data list touch one of the displayed rows. Changing to another page (e.g. Profibus outputs), no longer leads to the result that the display jumps back to the start line, if you are coming back to the page *Profibus inputs*.

4.2.7.1 Profibus inputs – signal list

Byte	Format	Function
Gauge 1:		
0.0	Bool	in meas. position / front limit position
0.1	Bool	calibrate / rear limit position
0.2 … 3.7	Bool	res.
4 ... 7	Real	nominal value
8 ... 11	Real	pos. (up.) tolerance
12 ... 15	Real	neg. (low.) tolerance
16 ... 19	Real	calibration value
20 ... 23	Real	res.
Gauge 2:		
24.0	Bool	in meas. position / front limit position
24.1	Bool	calibrate / rear limit position
24.2 … 27.7	Bool	res.
28 ... 31	Real	nominal value
32 ... 35	Real	pos. (up.) tolerance
36 ... 39	Real	neg. (low.) tolerance
40 ... 43	Real	calibration value
44 ... 47	Real	res.
Gauge 3:		
48.0	Bool	in meas. position / front limit position
48.1	Bool	calibrate / rear limit position
48.2 …51.7	Bool	res.
52 ... 55	Real	nominal value
56 ... 59	Real	pos. (up.) tolerance
60 ... 63	Real	neg. (low.) tolerance
64 ... 67	Real	calibration value
68 ... 71	Real	res.
Gauge 4:		
72.0	Bool	in meas. position / front limit position
72.1	Bool	calibrate / rear limit position
72.2 … 75.7	Bool	res.
76 ... 79	Real	nominal value
80 ... 83	Real	pos. (up.) tolerance
84 ... 87	Real	neg. (low.) tolerance
88 ... 91	Real	calibration value
92 ... 95	Real	res.
VTS general:		
96.0	Bool	PLC ready
96.1	Bool	delete fault
96.2	Bool	gauge control fault
96.3 … 99.6	Bool	res.
99.7	Bool	life clock
100 ... 119	Byte	res.

4.2.8 Profibus outputs

The Profibus output page shows the values provided by the VTS4DG for the Profibus transfer. The data presentation and the display functions are the same as at Profibus input page.



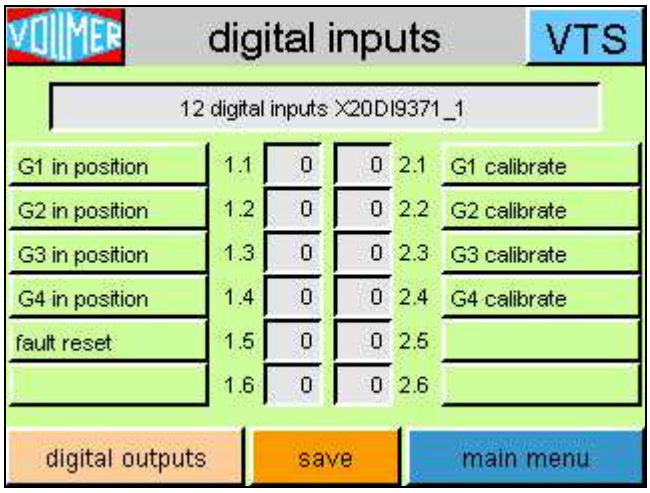
4.2.8.1 Profibus outputs – signal list

Byte	Format	Function
Gauge 1:		
0.0	Bool	ready for measurement
0.1	Bool	out of positive (upper) tolerance
0.2	Bool	out of negative (lower) tolerance
0.3	Bool	in tolerance
0.4	Bool	in meas. position / front limit position
0.5	Bool	calibrate / rear limit position
0.6 … 3.7	Bool	res.
4 ... 7	Real	nominal value
8 ... 11	Real	absolute value
12 ... 15	Real	deviation
16 ... 19	Real	res.
20 ... 23	Real	res.
Gauge 2:		
24.0	Bool	ready for measurement
24.1	Bool	out of positive (upper) tolerance
24.2	Bool	out of negative (lower) tolerance
24.3	Bool	in tolerance
24.4	Bool	in meas. position / front limit position
24.5	Bool	calibrate / rear limit position
24.6 … 27.7	Bool	res.
28 ... 31	Real	nominal value
32 ... 35	Real	absolute value
36 ... 39	Real	deviation
40 ... 43	Real	res.
44 ... 47	Real	res.
Gauge 3:		
48.0	Bool	ready for measurement
48.1	Bool	out of positive (upper) tolerance
48.2	Bool	out of negative (lower) tolerance
48.3	Bool	in tolerance
48.4	Bool	in meas. position / front limit position
48.5	Bool	calibrate / rear limit position
48.6 … 51.7	Bool	res.
52 ... 55	Real	nominal value
56 ... 57	Real	absolute value
60 ... 61	Real	deviation
64 … 67	Real	res.
68 ... 71	Real	res.

Gauge 4:		
72.0	Bool	ready for measurement
72.1	Bool	out of positive (upper) tolerance
72.2	Bool	out of negative (lower) tolerance
72.3	Bool	in tolerance
72.4	Bool	in meas. position / front limit position
72.5	Bool	calibrate / rear limit position
72.6 … 75.7	Bool	res.
76 ... 79	Real	nominal value
80 ... 83	Real	absolute value
84 ... 87	Real	deviation
88 ... 91	Real	res.
92 ... 95	Real	res.
VTS general:		
96.0	Bool	VTS system ready
96.1	Bool	new VTS fault
96.2 ..96.7	Bool	res.
97.0	Bool	X20 module error
97.1	Bool	fuse error potential module
97.2	Bool	configuration error
97.3	Bool	VTS battery empty
97.4	Bool	VTS temperature too high
97.5	Bool	VTS fault 5
97.6	Bool	VTS fault 6
97.7	Bool	VTS fault 7
98.0 … 99.7	Bool	res.
99.7	Bool	life clock
100 ... 119	Byte	res.

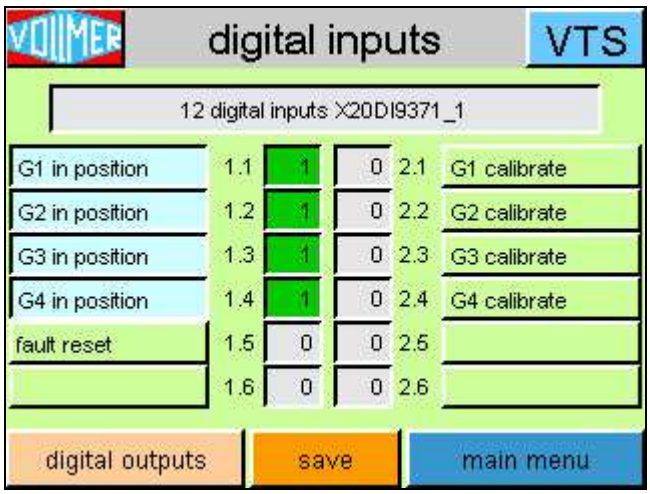
4.2.9 Digital inputs

The display of the digital input modules is similar to the appearance of the X20 periphery modules. An active input signal is displayed by „**1**“ on a **green** background.



4.2.9.1 Input inverter

The names of the digital inputs also have the function of a switch. While service mode is enabled, with these switches **inverter** can be set here for all inputs of the digital input module. The activation is directly shown at the signal indicators. The inverter state could be stored in the parameters by the **save** key.



4.2.9.2 Calibrate - G1 … G4

The *rear limit position* switch of the gauge can directly be connected to the **calibrate** input. As long as the gauge is in the rear limit, the counter value is stored as an offset.

4.2.9.3 In position - G1 … G4

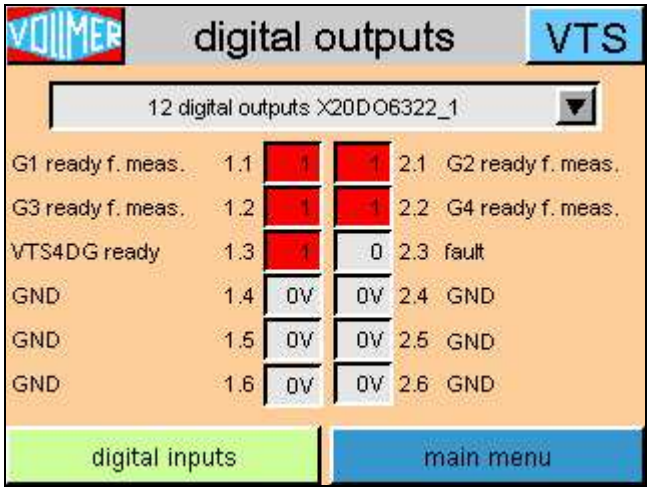
Input **in position** will get the gauge signal *front limit position*. The function *calibration* is locked as long as this input is set.

4.2.9.4 Fault reset

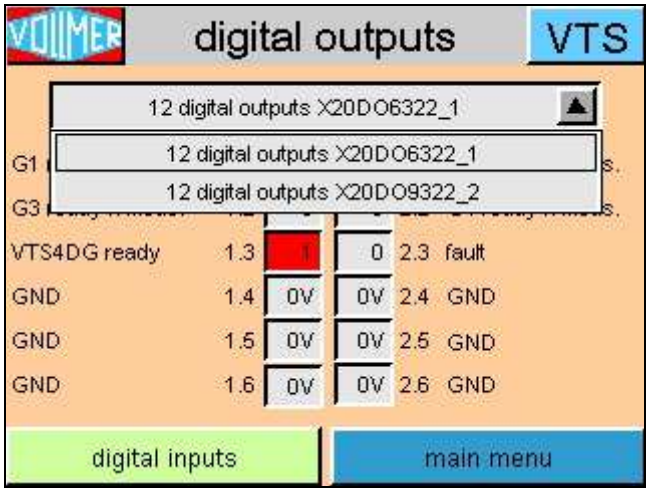
A current fault can be acknowledged by the input **fault reset**.

4.3.10 Digital outputs

The display of the digital output modules is similar to the appearance of the X20 periphery modules. An active output signal is displayed by „**1**“ on a **red** background.



The first digital output module provides the signals *ready for measuring* of all gauges, *VTS4DG ready* and *fault*. Through the module selection the second output module could be displayed, which shows the *tolerance output* signals of the 4 gauges.



4.2.10.1 Ready for measurement - G1 … G4

The signal gauge *ready for measurement* is always set by the measurement program when the calibration was executed and the gauge is in measuring position.

Attention:

It is only allowed to use the measured deviation from the nominal value as an input in a control, if the signal ***Gx ready f****or* ***meas****urement is high.*

4.2.10.2 VTS ready

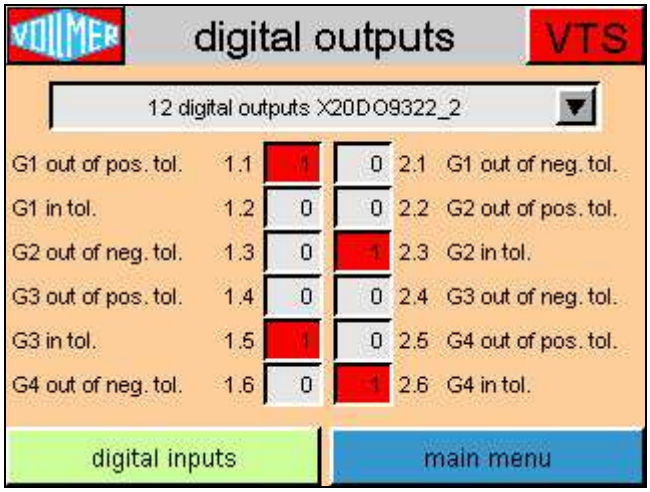
After a complete program cycle including processing of the current input signals, the **VTS4DG** system is reported **ready**. It stays always high while the VTS is active.

4.3.10.3 Fault

This output is set in case of a **fault**.

4.2.10.4 In/out of (pos./neg.) tolerance – G1... G4

If the measurement value deviation exceeds the actual tolerance limits (positive tolerance = upper tolerance and negative tolerance = lower tolerance), the respective output is set.



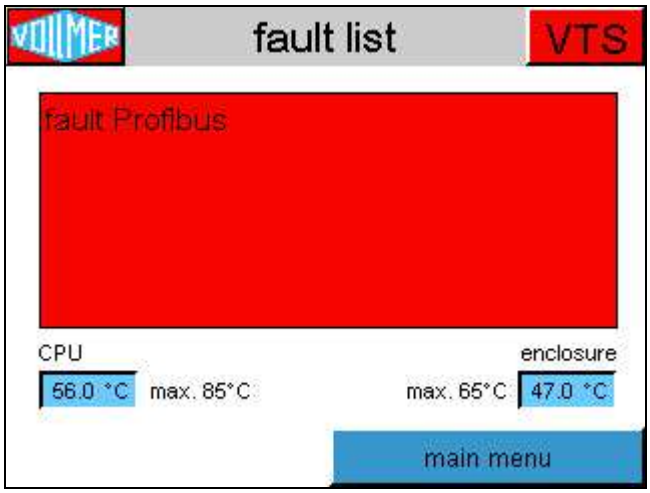
Example:

Nominal thickness:	2.000 mm
Positive tolerance limit:	0.010 mm
Negative tolerance limit:	0.010 mm
Current meas. value:	2.015 mm
Out of positive tolerance:	Terminal 1.1 = **1**
Out of negative tolerance:	Terminal 2.1 = **0**
In tolerance:	Terminal 1.2 = **0**

4.3 Fault list

As long as a fault is present, the background of the VTS symbol in the right upper corner of the screen is red. Not yet eliminated faults are listed in the **fault list** (in plain text).

The **temperatures** of the **CPU** and the **enclosure** are also shown on this page. If the temperatures reach the maximum values, indicated in the displays, the respective fault message is activated.



4.3.1 Fault

Possible cause of a fault:

Profibus - more information on page *Profibus state* – the data, received at last will be maintain

Double transducer configuration – actually only possible when the parameters of the system are set

X20 module error – check LED displays of the X20 modules

Fuse error in X20 potential distributor modules – check LED displays of the X20 modules

PLC Gauge control – the VTS4DG only shows the error message

Battery – about 500 hours before the minimum voltage has been reached

Temperature error – one of the maximum temperatures, CPU or housing, has been reached

Attention *– the following faults, initiated by the counter modules of the system, leads to the calibration annulling of the according probe. The gauge is no longer ready for measuring. The according output signal will be reset.*

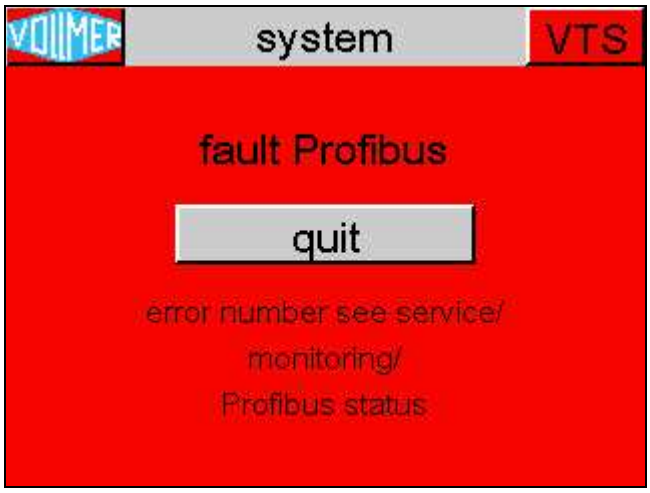
MG41 fault – more information on page *MG41 state*

MG41 configuration error – not all assembled MG41 inputs are connected to active probes

X20-counter module fault – check LED displays of the X20DS1119 modules

4.3.2 Fault message

If a fault is recognized with the program start or during operation, it is indicated by retrieving the **fault** page. The digital output signal „fault“ and the equivalent Profibus bit are set to signal the fault.



As soon as the fault acknowledgement has been confirmed with the **quit** key, the fault output is cancelled and the VTS display changes to the last active page.

A fault changes the background colour of the **VTS symbol** in the top line of the screen. The red background is maintained when a fault has been quit but not yet eliminated.

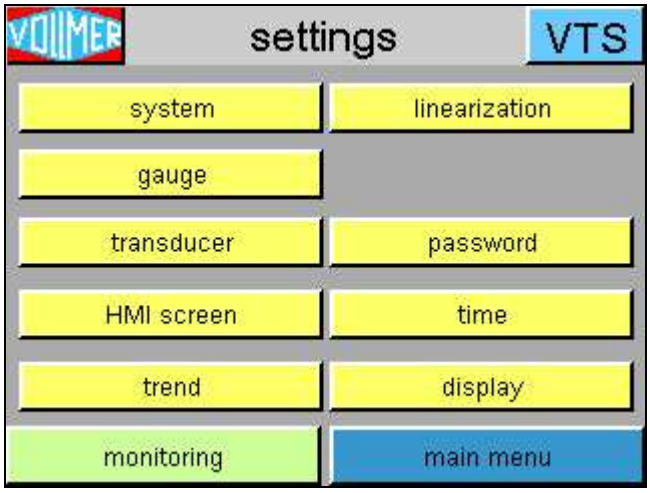
If, for example, the Profibus connection is interrupted as in the example above, it does not mean that the measuring units can no longer work. The nominal values can still be preset directly on the VTS. The background of the VTS symbol is red as long as the Profibus connection is interrupted but the VTS can still be used.

4.4 Key lock

The VTS4DG homepage is retrieved for 15 seconds by pushing **key lock** to **clean the display** of systems working in 24-hour operation. Since this page includes no keys or switches, an unwanted function cannot be retrieved by mistake.

4.5 Settings

The individual pages for the configuration of the system can be reached via the service menu page **settings**.



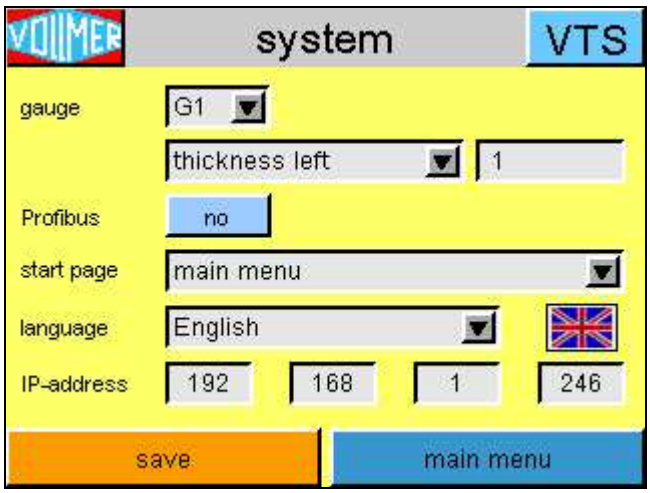
All pages that can be reached via this menu have a **save** button by which the current values of all parameters are saved.

*The **linearization** key is only shown if the linearization in the system configuration is enabled for at least one gauge.*

Pushing the **monitoring** button retrieves the menu of the same name with the pages for the start-up and service of the system.

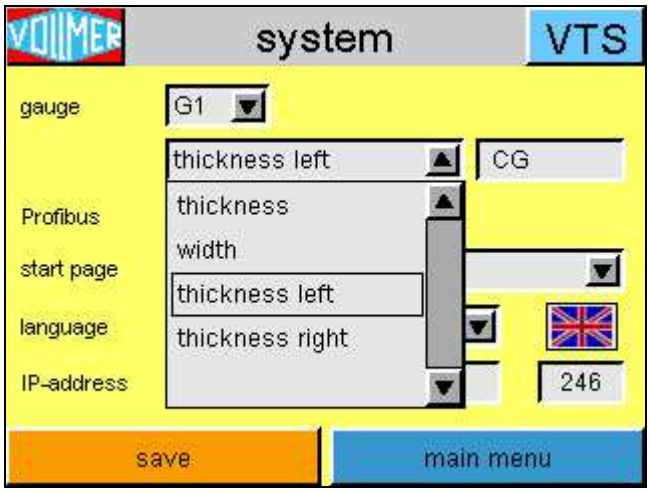
4.5.1 System

The number and name of **gauges**, the **Profibus** activation, the **start page** of the VTS program, the **language** for the touch screen surface and the **IP address** of the VTS are set in the **system** window.



4.5.1.1 Gauge

By defining the number of gauges and their names, the system is basically set here. The gauges can only be activated or deactivated in numerical order. Only when a name (type) has been defined for gauge G2, gauge G3 can be selected. Deactivating follows the same way, only if for gauge 4 the item **not used** is selected in the selection list for gauge G3 the *not used* item is faded in.

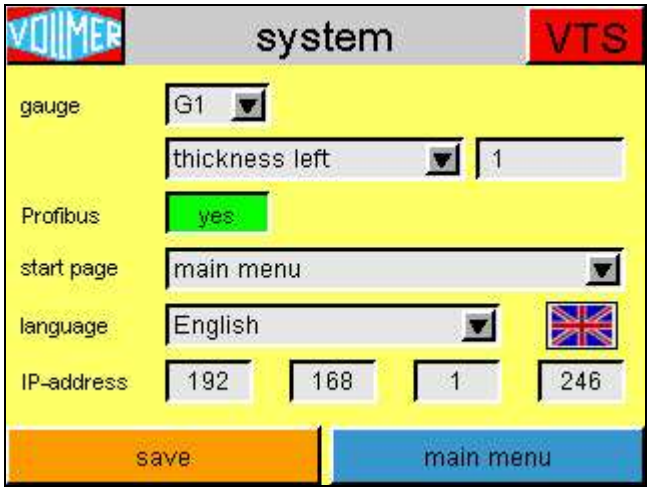


The name of the gauge (*the gauge type*) consists of a predefined text and a freely entered text. A *blank line* is also available as a fixed text so that the complete name can be selected at liberty. If a combination is selected, e.g. **thickness left CG**, as in the picture, the freely entered part (here " CG" = **C**ontrol **G**auge) must start with a *space*.

For the text edition the same alphanumerical input field is used as for the password entry (chapter 4.1.1).

4.5.1.2 Profibus activation

The Profibus operation is monitored directly after the **Profibus** activation. I.e. if the Profibus is not yet connected and the opposite side is in operation, an error message comes on right after enable.



When a Profibus connection is used, the values that are transferred via the Profibus can be found on the pages **Profibus inputs** and **Profibus outputs**.

The package size of the data transfer in both directions is:

120 bytes = 60 words = 30 double words (DW)

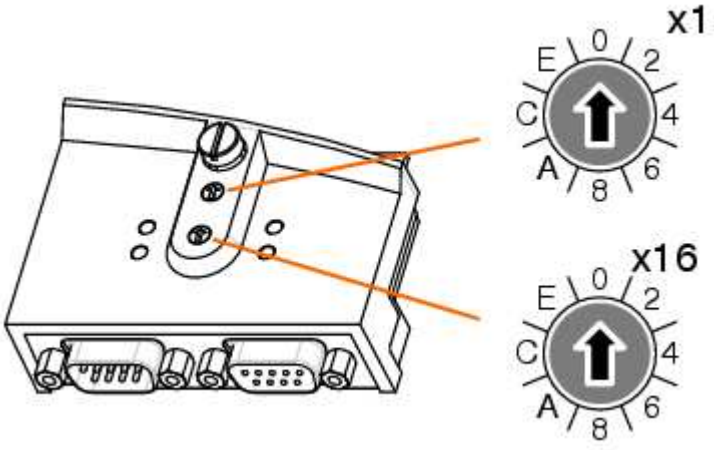
Both with writing and with reading the data, the bytes of each double word must be exchanged in the PLC via the **TAD** command (Step7 AWL). Byte order 0,1,2,3 will become 3,2,1,0.

The **Profibus address** is set on the two node dials (rotary switches x1 and x16) as a hexadecimal value.

Example: Profibus address = **10** = hexadecimal **A**

Rotary switch x1 in position A

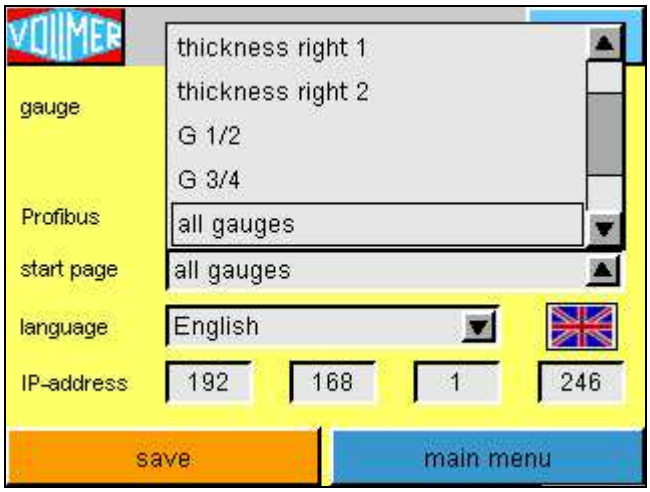
Rotary switch x16 in position 0



The GSD file **B&R_3762.gsd** is for the integration of the B&R Profibus module, used in the VTS, into the PLC hardware configuration. Start with the inputs when configuring the inputs and outputs (block length 32/64 bytes).

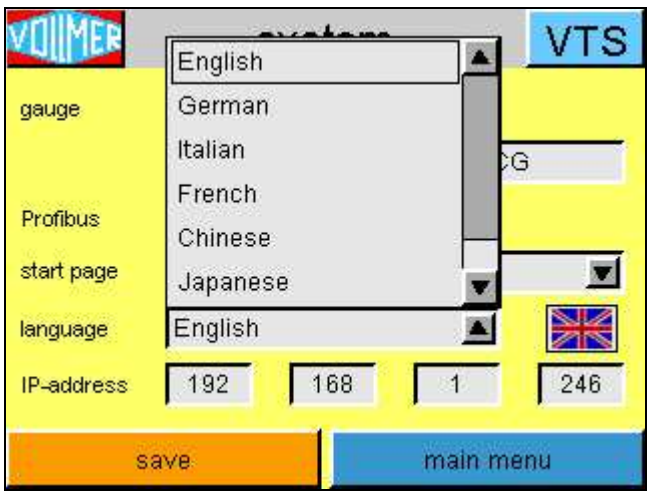
4.5.1.3 Start page

The required **start page** of the program can be chosen from the pages that are available as a result of the system configuration.



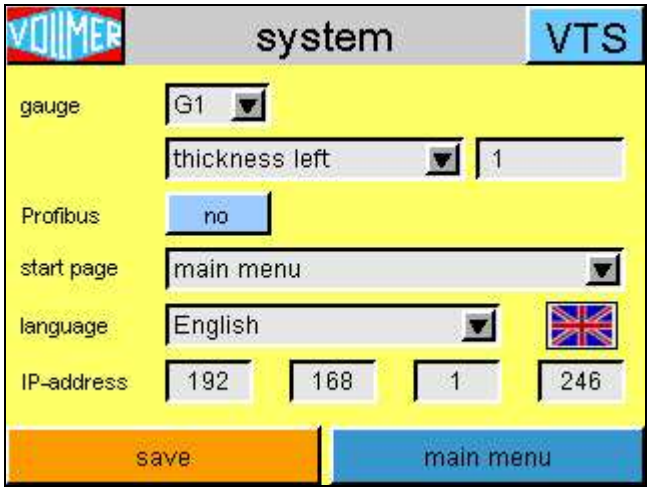
4.5.1.4 Language

The language to be used for the program surface can be converted on-line.



4.4.1.5 IP address

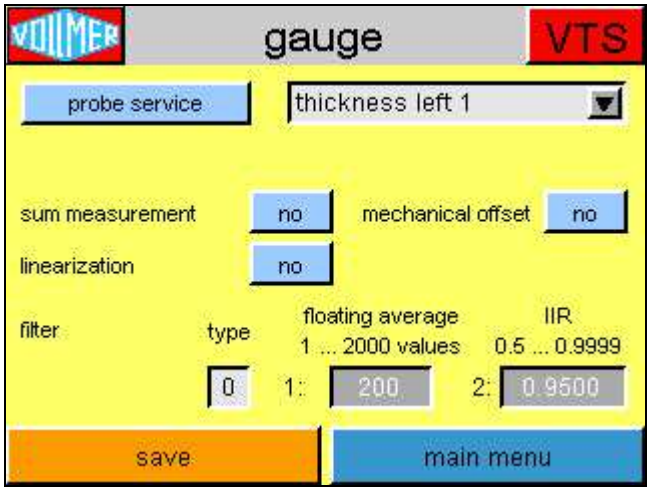
The default VTS **net address** is **192.168.1.246**. An address change takes effect directly after saving the new address, i.e. an active network connection is closed immediately.



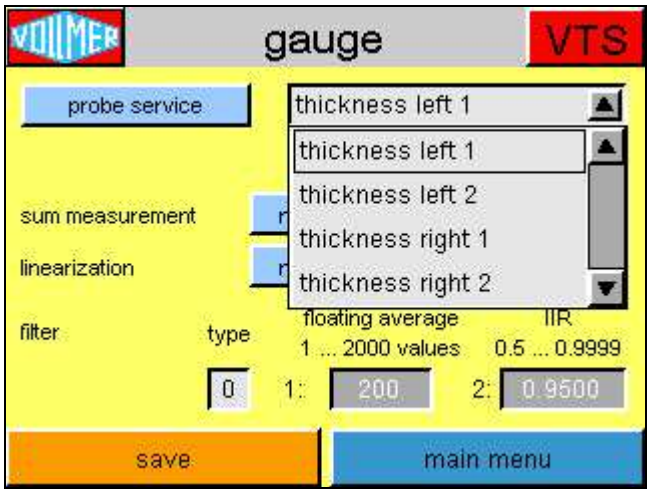
4.5.2 Gauge

The operating mode, single or **sum measurement**, the connection of **preset** and the activation of the **linearization** can individually be set for each **gauge** on this display page.

A **filter** can also be defined and set for each gauge and the automatic calibration in rear limit position can be deactivated for the **transducer service**.

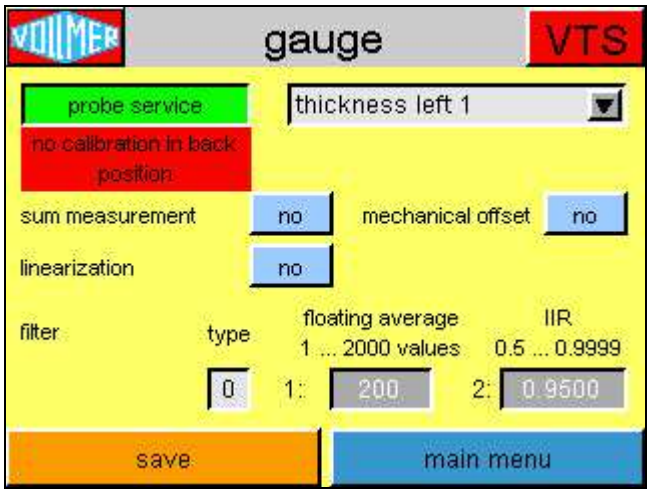


The gauges with the names per the *System* page are listed in the *selection list*.



4.5.2.1 Transducer service

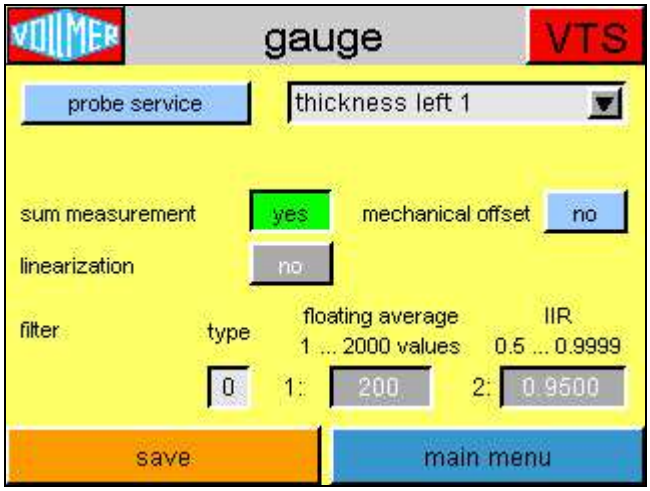
To be able to work without restrictions with the service of the transducers, the automatic calibration in rear limit position can be deactivated via switch **transducer service**. The digital input *rear limit position (calibrate)* of the gauge and the respective input of the *Profibus* will no longer be considered.



4.5.2.2 Activation of sum measurement

If the measurement signal of a gauge consists of the addition of two transducers, it is referred to as **sum measurement**. Since there is no transducer linearization with sum measurement, this key is deactivated as soon as the sum measurement is activated.

If a gauge with sum measurement also has a presetter for the measurement range extension, the presetter can be linearized.



4.5.2.3 Activation of mechanical offset

If a gauge has a presetter for measurement range extension, the respective program components are enabled via switch **mechanical offset**.

4.5.2.4 Activation of linearization

The measurement values for each gauge can be corrected via a **linearization** table, if necessary. If a linearization is not necessary for any gauge, the linearization transducer is hidden in the menu Settings.

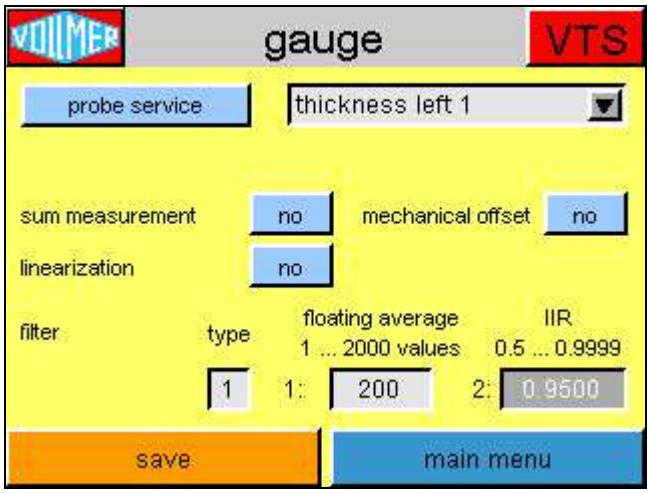
4.5.2.5 Filter

Two filter types can be chosen to filter the measurement results.

0 = off = no filter

1 = floating average

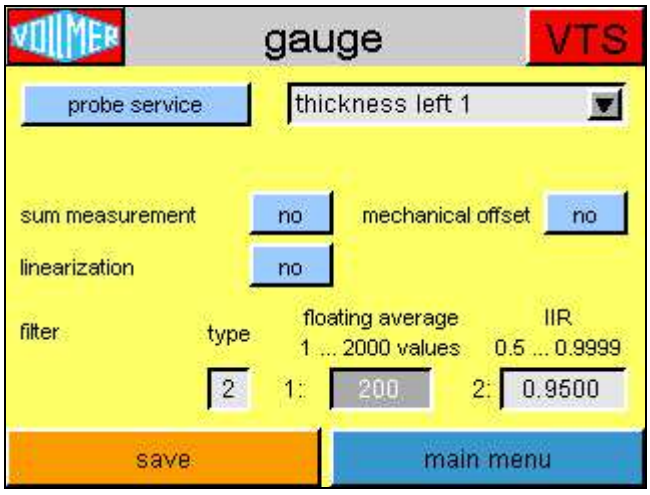
2 = capacitive filter



4.5.2.5.1 Floating average (1)

The floating average is formed of the number of measurement values that are parameterized in the second input field. The input is limited to values between 1 and 2000. When a floating average is calculated, the oldest measurement value is overwritten in the value memory by the new value with each new measurement and the average is calculated.

The transducer values are added and the output signal is calculated in 1ms cycles, i.e. a floating average of 50 values represents the average of the last 50ms of the measurement signal.



4.5.2.5.2 IIR filter (2)

The result of the filter is proportionately composed of the last output value and the new input value of the filter.

$$dh^{n} = [dh^{n-1} * k] + [dh * (1-k)]$$

dh = current deviation (**d**elta **h**eight) from nominal

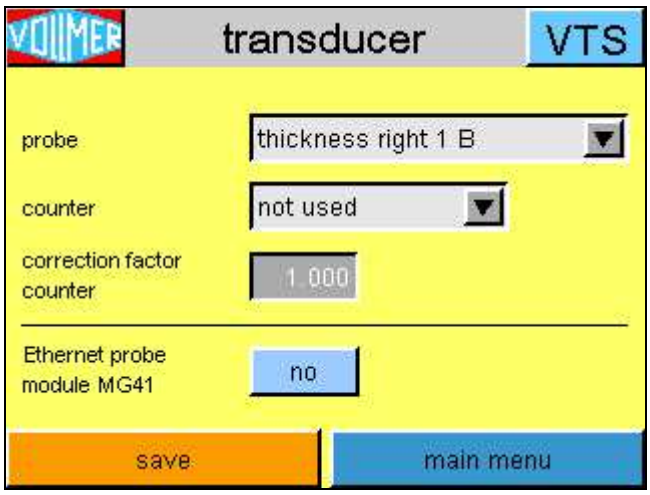
$\mathbf{dh^{n}}$ = deviation from nominal after filter at time of **n**

$\mathbf{dh^{n-1}}$ = deviation from nominal after filter at time of **n-1**

k = defined factor in filter settings

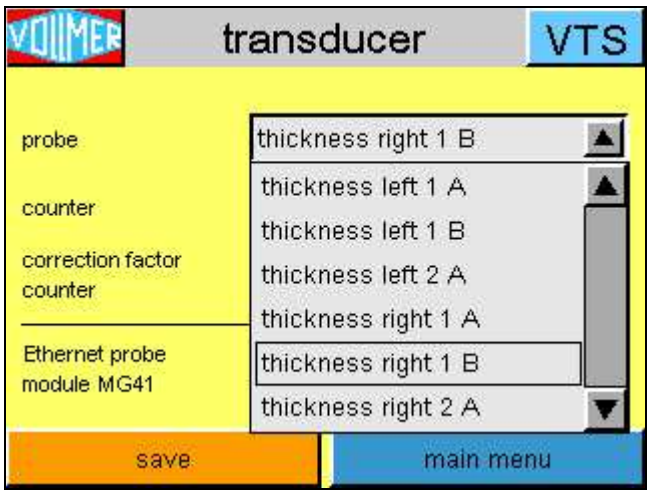
4.5.3 Transducer

A **counter** input is assigned to the **probe**s of each configured gauge, to the pulse sensors of the mechanical offset resp. and a **correction factor** is set on this page.



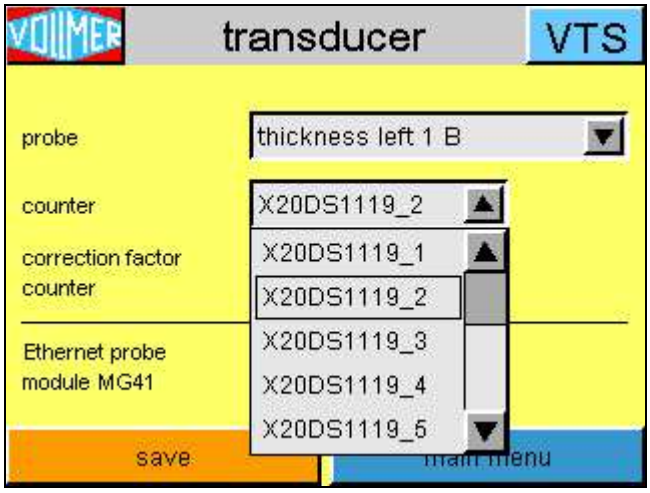
4.5.3.1 Probe

The probes are listed in the *selection list* with the gauge names as composed on the *system* page. Suitable abbreviations are behind the names of the upper transducer (**A**), the lower transducer (**B**) or the pulse sensor of the presetter (**V**).



4.5.3.2 Counter

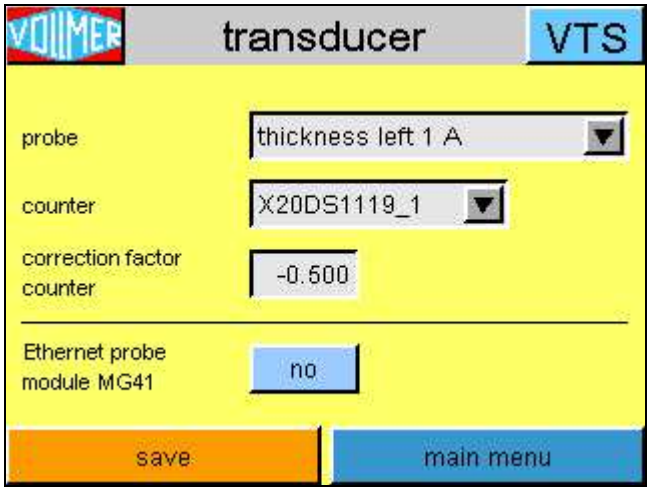
If no counter input has been assigned to a transducer in the **counter** selection yet, it is indicated by the text *not used* (see picture above).



4.5.3.3. Correction factor counter

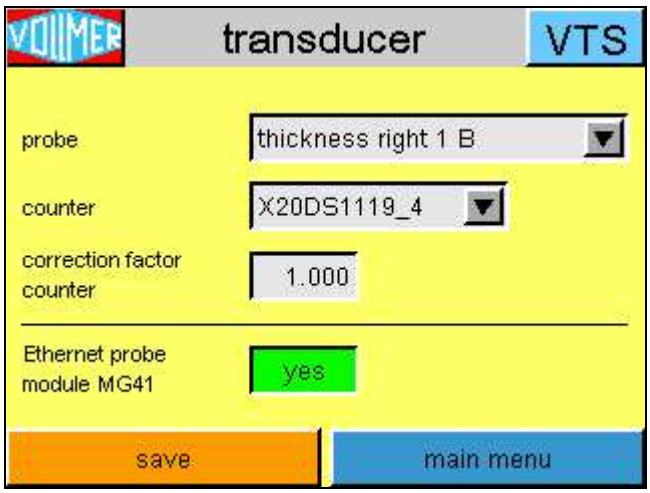
The ratio of the counted pulses, the digital transducers or the pulse sensors of the presetter to the covered distance is set by this **correction factor** for the **counter** result.

For a digital transducer with 0.5µm step width, connected to an X20 counter module, factor 0.5 must be set here. 2 counted pulses correspond to 1µm.



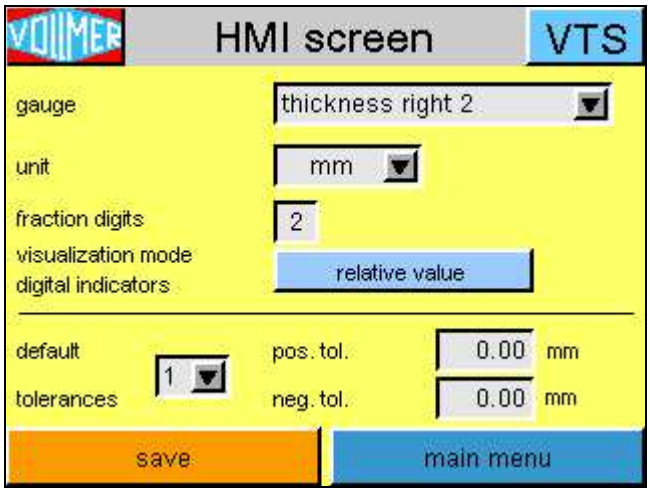
4.5.3.4. Ethernet transducer module MG41

In addition to the X20 counter modules, the positions of the digital transducers can also be read in via the **Ethernet transducer module MG41**. If the system is equipped with this module, the program component for the MG41 is activated here. The *counter selection* is extended by the counter inputs of the MG41 by this activation and the *status page* and the page with the data of the *counter inputs* are indicated in *monitoring*.



4.5.4 HMI screen

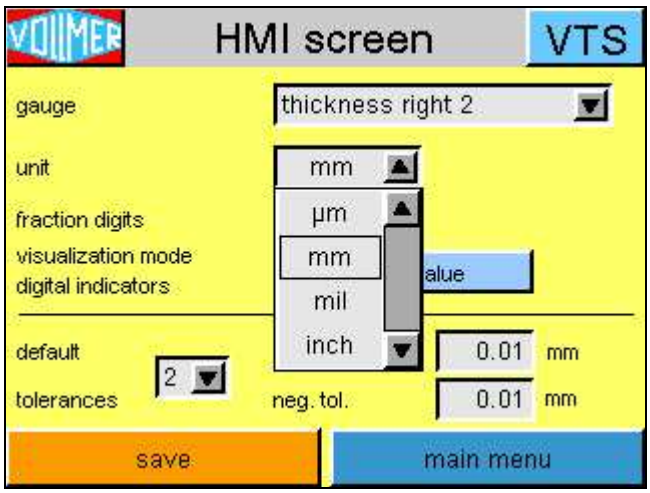
The unit, the display accuracy and the display mode are set in the **HMI screen** window. 3 sets of **standard tolerances** can also be preset here.



4.5.4.1 Unit

The **unit** for the large digital displays of the measurement system can separately be set for all existing **gauge**s.

The thickness can, for example, be indicated in µm while the width is indicated in mm, if required.



4.5.4.2 Fraction digits

The **fraction digits** of the measurement values in the digital displays depend on the selected **unit**.

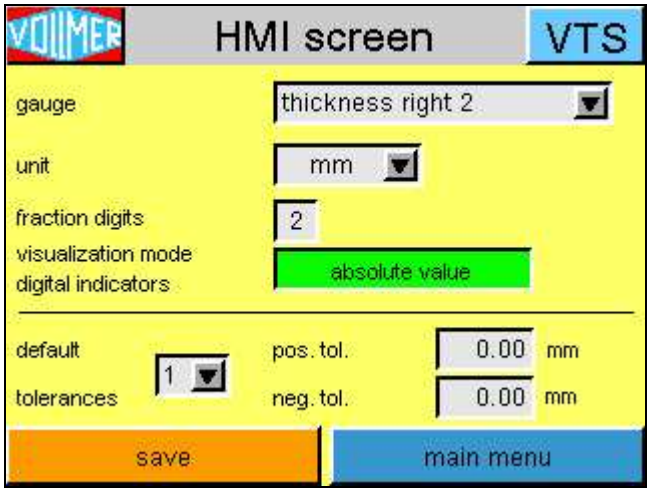
Unit	*Fraction*
µm	0 … 1
mm	2 … 4
mil	1 … 3
inch	3 … 5

These fraction digits are also used to display and set the nominal values and tolerances.

4.5.4.3 Visualization mode

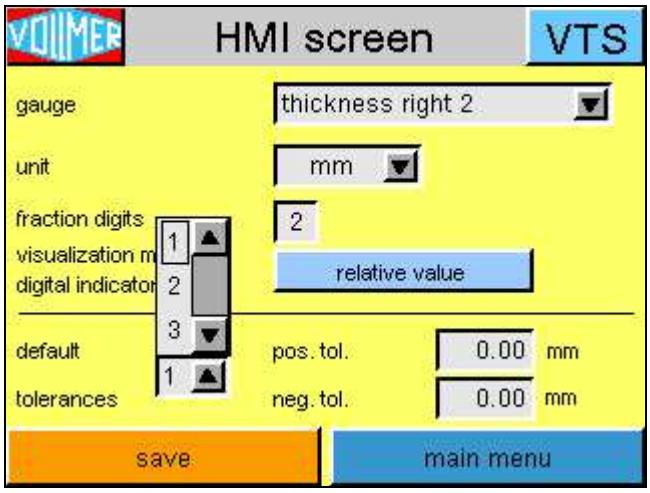
The **visualization mode** of the **digital indicators** can be selected between indicating the **absolute value** to showing the deviation from the nominal value, the **relative value**.

The chosen selection is not only used for the single value display, it is also used for indicating 2 or 4 gauges.

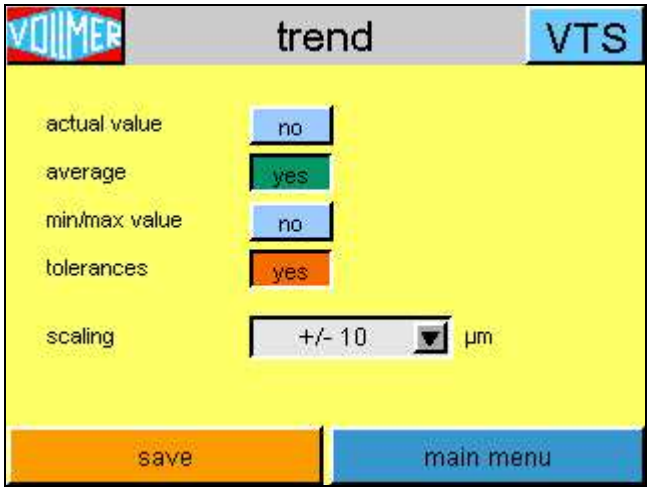


4.5.4.4 Standard tolerances

3 sets of **standard tolerances**, the positive (upper) tolerance limit of the deviation from the nominal and the negative (lower) tolerance limit can individually be preset *for each gauge* here. Set 1 is automatically activated for the gauges after a restart.



4.5.5 Trend



The measurement values of the gauge can be visualized differently in the trend graph display. It is possible to activate graphs for the **current value**, the **average**, the **minimum** and **maximum value** and the **tolerances**

4.5.5.1 Activation trend signal – current value

The description of the trend signal **current value** is located in chapter Trend – 3.4.1.

4.5.5.2 Activation trend signal – average

The description of the trend signal **average** is located in chapter Trend – 3.4.2.

4.5.5.3 Activation trend signal – min/max value

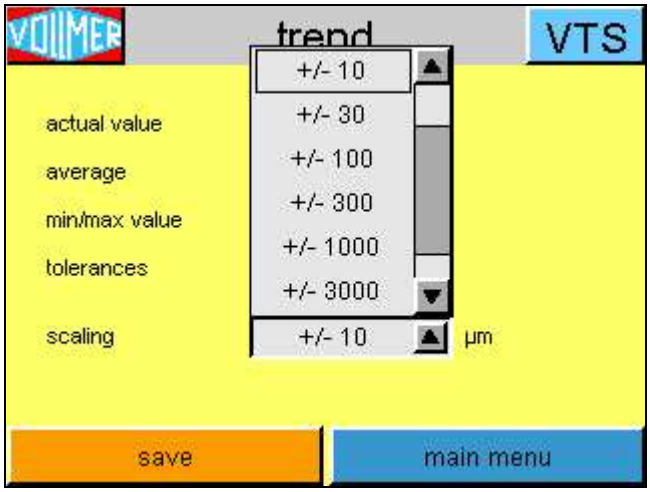
The description of the trend signal **min/max value** is located in chapter Trend – 3.4.3.

4.5.5.4 Activation trend signal – tolerances

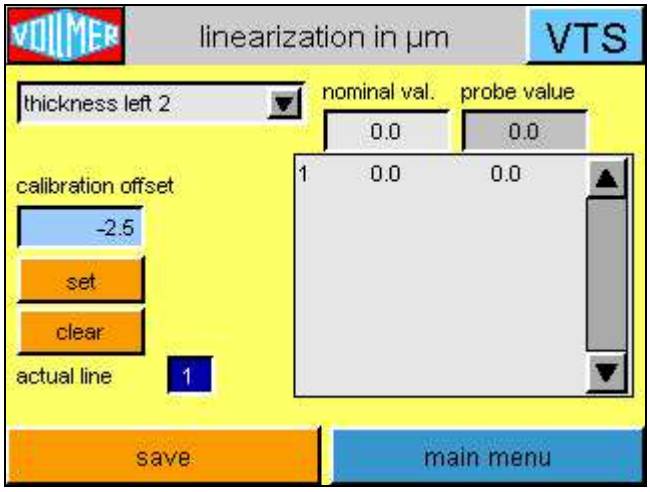
The colours of the **tolerance** line**s** are the same as in the digital displays (positive tolerance limit = **yellow**, negative tolerance limit = **red**).

4.5.5.5 Scaling

The start value of the trend signal **scaling** is defined here.



4.5.6 Linearization



If necessary, the measurement values for each gauge can be corrected via a linearization table. A linearization is reasonable if the transducer does not contact the material directly. Example: mechanical offset or a lever mechanics (indirect measurement). To linearize the gauge calibration standards are inserted between the probes. The values of these standards are stored in a table with the actually measured values. In measurement operation, the current values are replaced by the nominal values. For all values that are not listed in the table, there will be an interpolation from the table values above and below.

The maximum length of the linearization table includes 20 values, the order of the value addition is optional. New values are integrated between already listed values. If a stored value should be changed, it can just be added again. Redundant entries can be deleted via key **clear**.

Only the first added value has a special function. With the linearization active, the **calibration offset** is reset with the addition of the first value.

During the linearization the gauge hasn't to be „in position". The automatic calibration in back position could be disabled by the key **probe service** (settings/gauge).

Attention:

The current line with a blue background will be **cleare**d.

Key **save** must be pushed to store the table with the new linearization data in the flash memory.

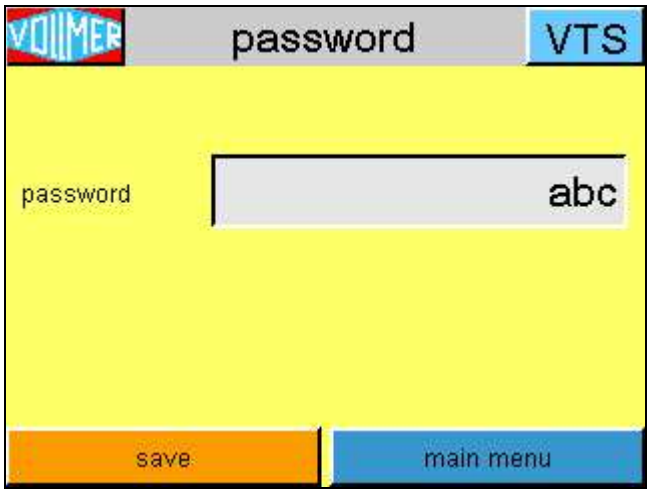
The linearization unit is always **µm (mil)**, even if the large digital displays show the values in **mm (inch)**.

When values are added for the linearization table, there is a difference between the linearization for a preadjustment or mechanical offset and a lever mechanics. The necessary procedure is defined by the system configuration. With a mechanical offset, the linearization to the counter value of the pulse sensor on the spindle is used; with a lever mechanics, directly to the values of the transducer.

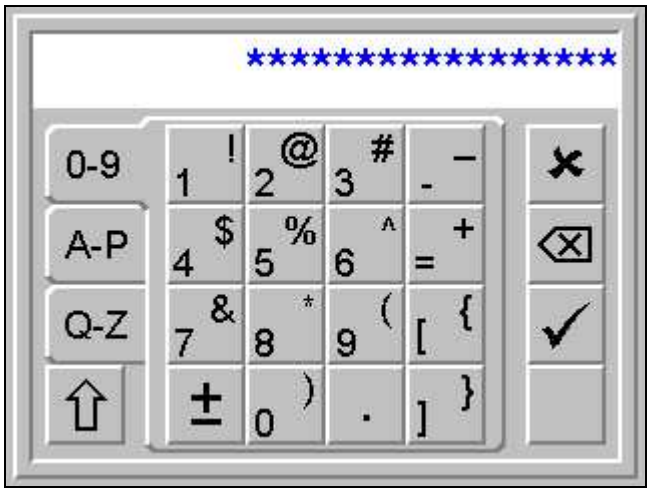
With a *mechanical offset*, the **nominal val.**ue is generated by turning the spindle (background of preset field dark gray - no entry possible), i.e. the preadjustment is turned to the required nominal value, the standard measure is inserted and key **set** is pushed to include the nominal and **probe value**s into the linearization table.

For the linearization of a *lever mechanics*, the thickness of the standard measure that is inserted in the measurement jaw must be entered into the **nominal val.**ue manually. If an existing value should be replaced, the respective line must only be touched, the entered nominal value will then be included in the preset. The linearization table is updated by the **set** key.

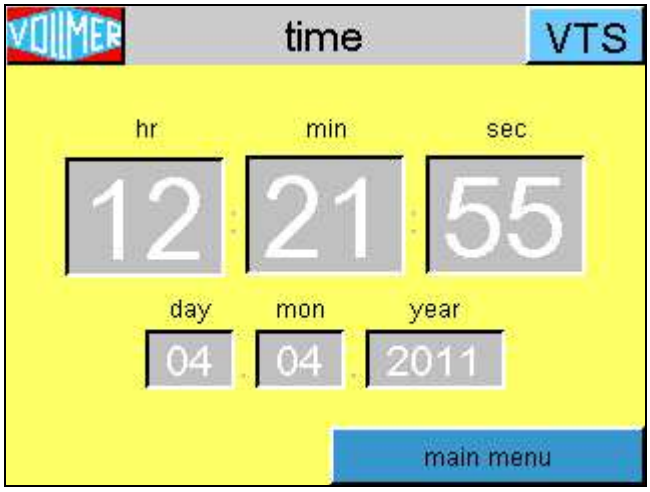
4.5.7 Password (change)



The current **password** is changed via the same alphanumerical input field that is used for the password entry.

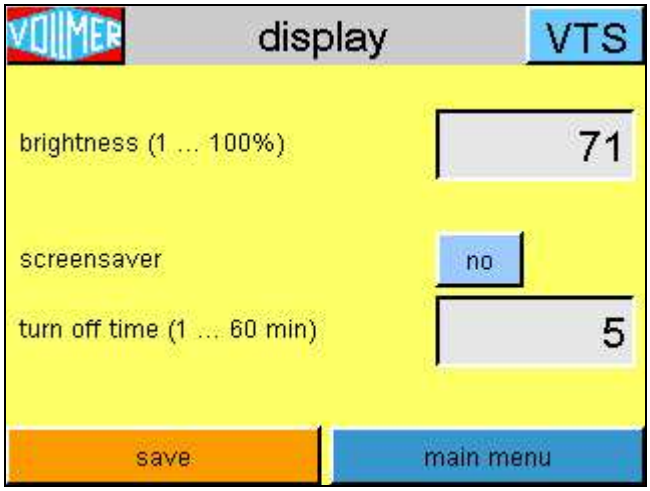


4.5.8 Time (set)



To change the time or date display, just click the respective figure. A **number input field** is opened whose input is limited in accordance with the selected figure.

If an error occurs when reading or writing the clock, a *red field* with error type and error number is indicated (as with parameter storing).



4.5.9.1 Brightness

The **brightness** of the display can be set and saved here to adapt it to the ambient conditions of the site.

4.5.9.2 Screen saver

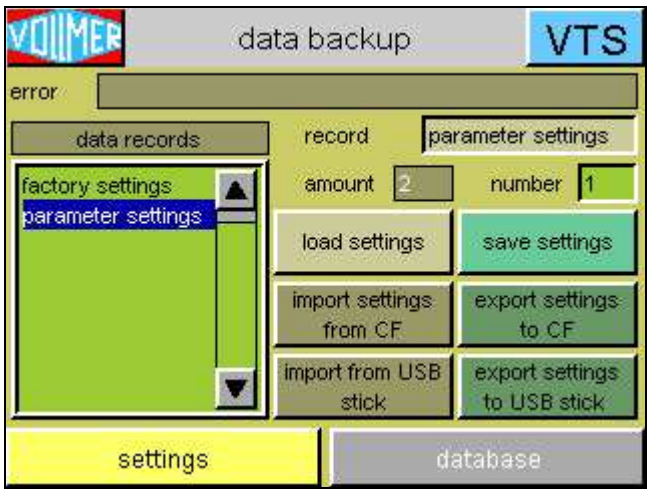
It is possible to use the display **screen save**r if the visualization is only used for service.

4.5.9.3 Turn off time

The **turn off time**, the time that has to pass by after the last touch until the screen is switched off, can be set between 1 minute and 60 minutes.

4.6 Data backup

In this menu, data sets with the VTS4DG settings can be saved on the program **CF card** in the power panel or a **USB stick**.



If a fault occurs during a data saving function, a message in plain text is shown in the **error** line.

When the settings are stored in the active service mode, the current parameters and, where necessary, the linearization data are filed in the data set **parameter settings**.

The data set *factory settings* includes the parameters for the basic setting of the VTS4DG with only one gauge, all special functions are reset.

Number indicates the selected data set in the list of the **data records, amount** indicates the total number of data sets (max. 200).

The field **record** shows the currently selected data set, it can be included in the system with **load settings**. The name for a new data set, described with the current parameters by **save settings**, can also be entered here.

With **export settings to CF,** all data sets are written into the **parameter.csv** file, readable in *Excel* (>= Excel2007), on the CF card.

With **import settings from CF,** the data sets that are found in the *parameter.csv* file on the CF card are included in the system. To use a specific data set, it must be selected and included in the system with **load settings**.

With **export settings to USB stick**, all data sets are written into the **parameter.csv** file, readable in *Excel* (>= Excel2007), on the **USB stick** in **USB Port 1**.

With **import settings from USB stick**, the data sets that are found in the *parameter.csv* file on the USB stick are included in the system. To use a specific data set, it must be selected and included in the system with **load settings**.

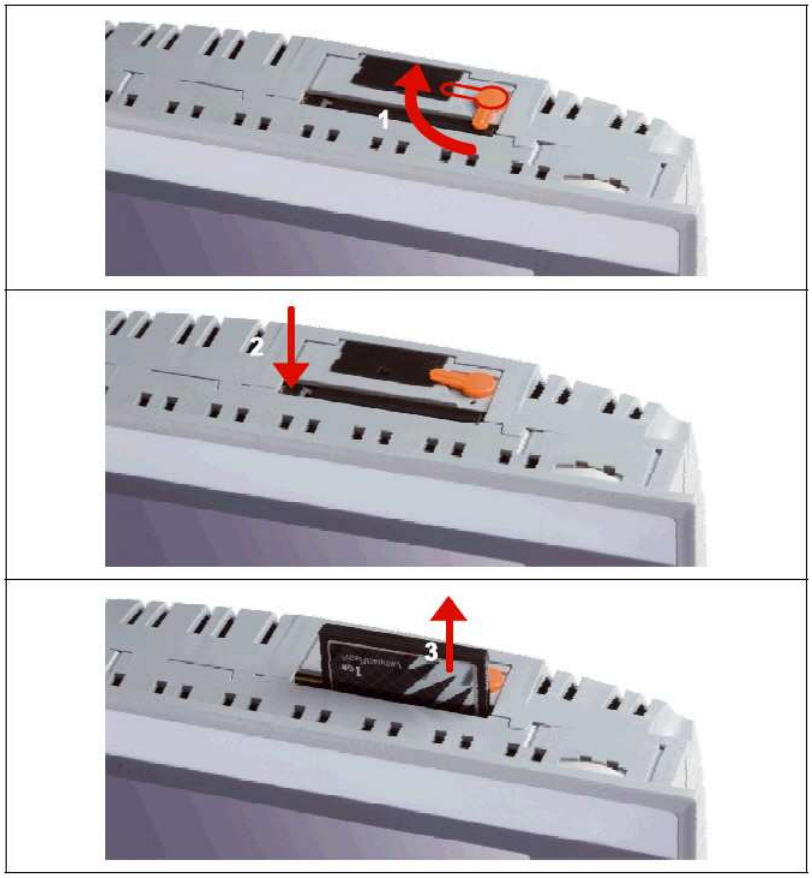
5. Program Update

A VTS program update can be done via a network connection by a PC that is equipped with the development program of the VTS program, the B&R Automation Studio, or via exchanging the compact flash card.

5.1 Compact flash card exchange

The compact flash (CF) card with the VTS program is inserted into the **top** of the power panel.

The CF card may, of course, only be exchanged with the power supply switched off.



5.2 Compact flash card programming

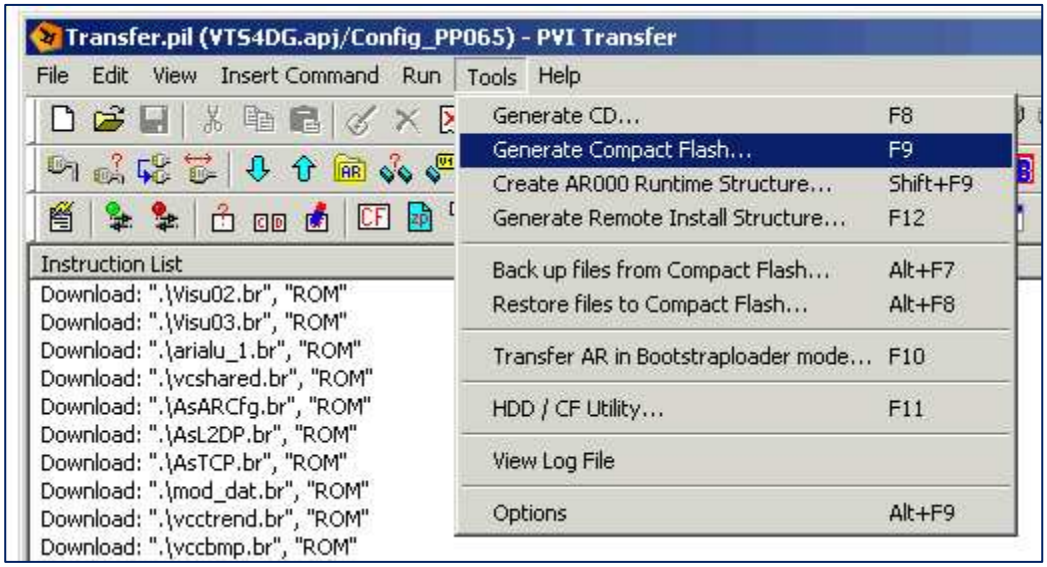
In addition to sending a compact flash card with a new program version, a program update by means of a PC with a CF card reader will also be possible on site. The compact flash card will be programmed with the PVI transfer tool that can be shipped with the new program version via CD or email.

The programming of a compact flash card by means of the PVI transfer tool is described briefly below.

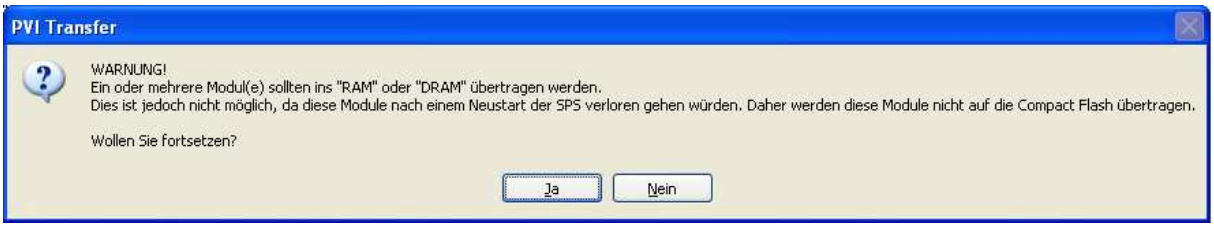
A. Unpack ZIP file (e.g. CD_VTS4DG_rev_202) with the program package

B. Start program PVITransfer with a click on the transfer file list *transfer.pil*

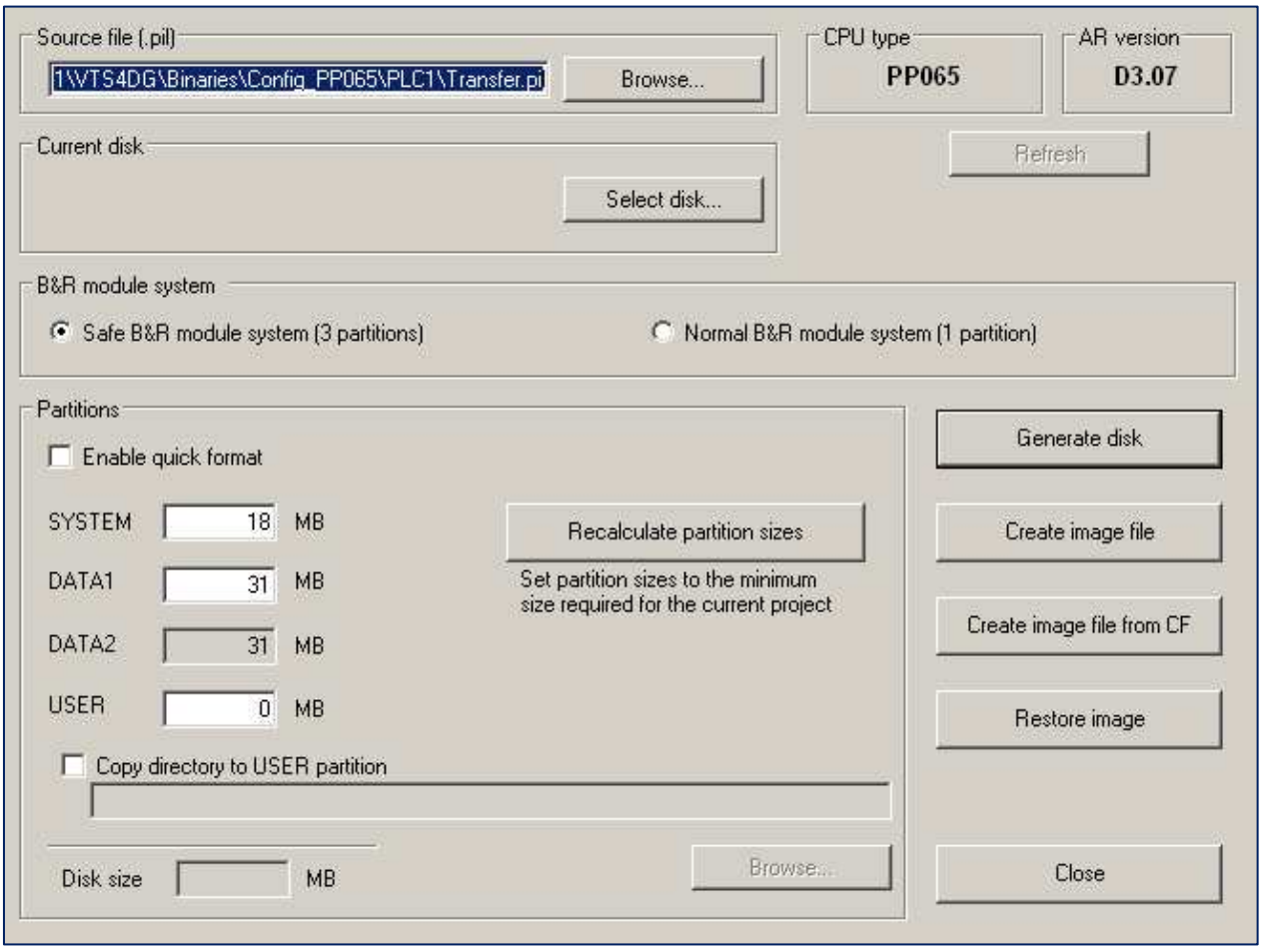
C. Select point *Generate compact flash* (F9) in menu Extras



D. Confirm possibly indicated warning with *Yes / Ja*

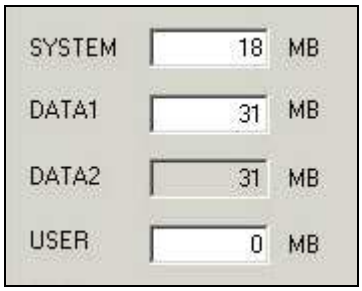


E. Check the path of the source file in the open window *Generate compact flash.*



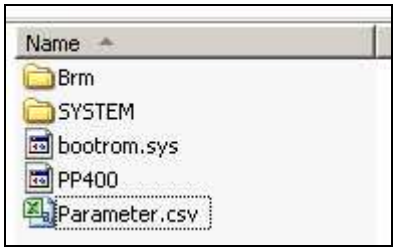
F. If the path to the *Transfer.pil* file should not be correct, a window to set the path can be opened via the key *Browse*.

G. The size of the necessary compact flash card can be calculated by adding the values SYSTEM, DATA1 and DATA2. A CF with at least 128MB will be necessary in the shown example since the addition of the necessary memory areas results in 80MB so that a 64MB card would not be sufficient.



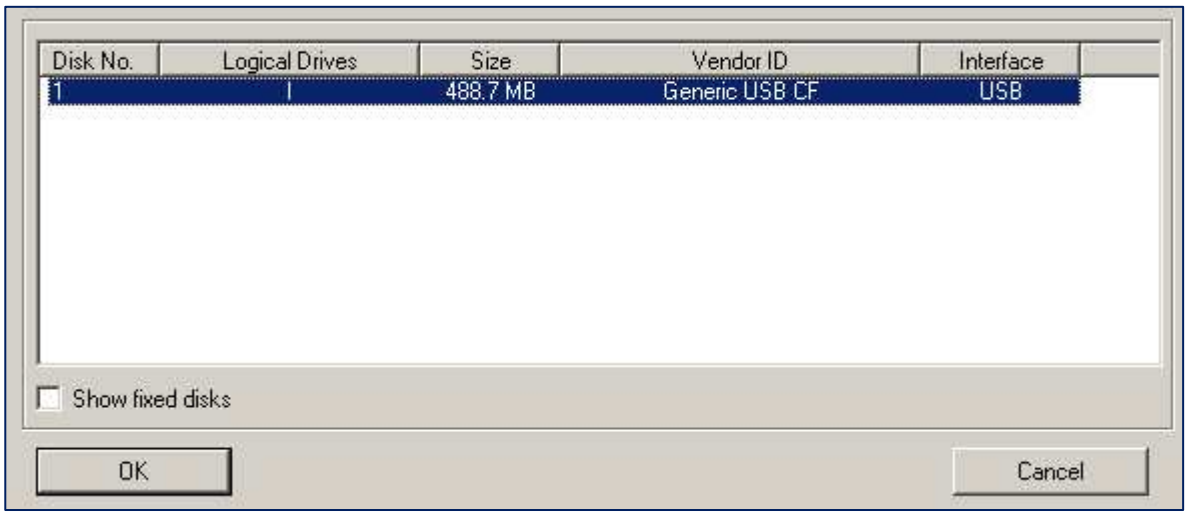
H. Insert c*ompact flash* into the card reader. The volume of an already with VTS4DG written CF card looks like this.

The Parameter.csv file is written to the card by saving the Parameter to the CF in the VTS4DG.



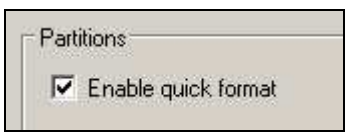
I. Close the possibly automatically opening window, showing the card contents.

J. Push key *Select disk* in window Generate compact flash

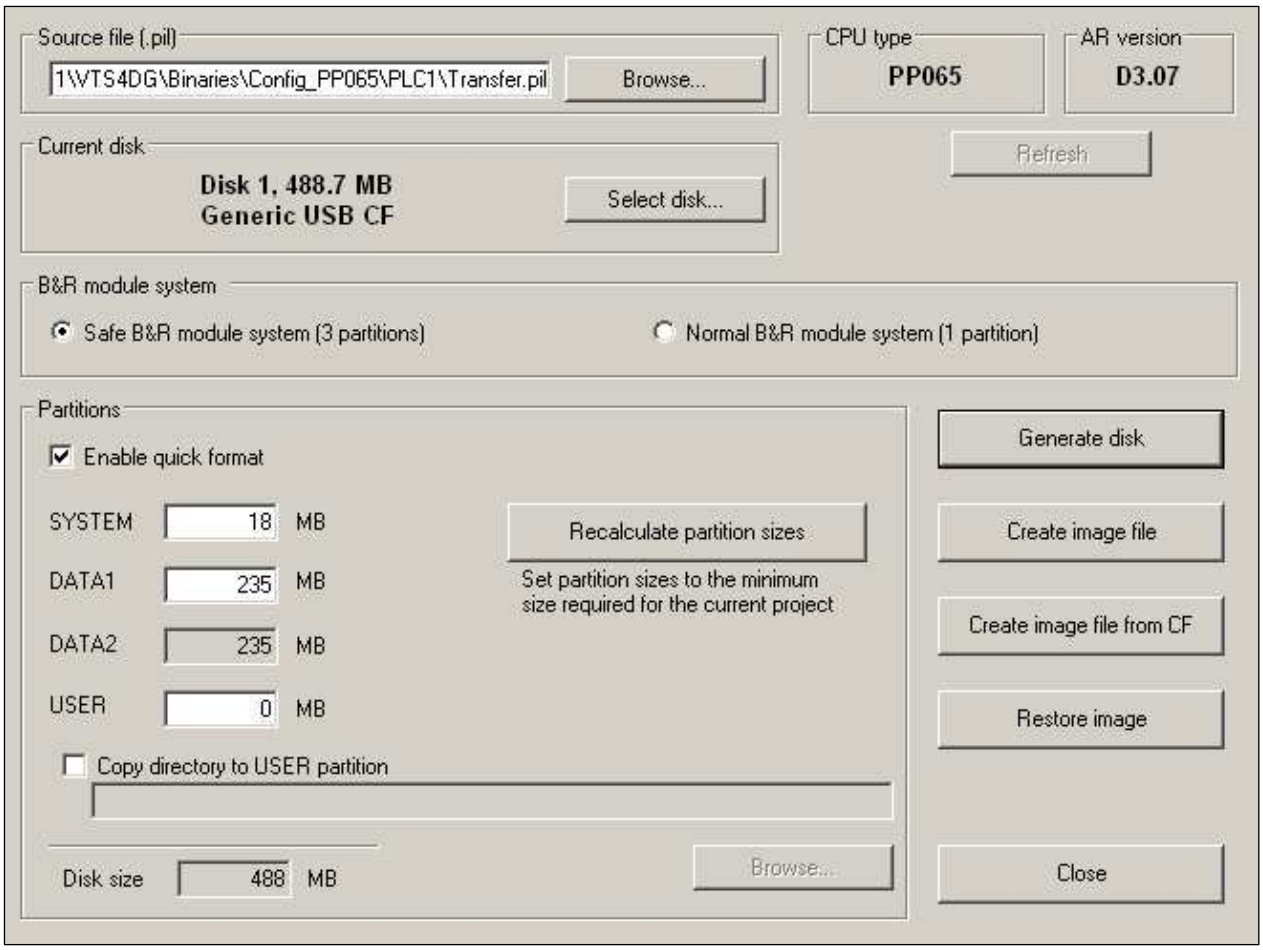


K. Select disk and confirm with *OK*

L. Set the check mark beside *Enable quick format*



M. Start programming of CF with key *Generate disk*



N. Confirm the warning that everything is overwritten on the CF with *Yes.*

O. The progress bar appears while the CF is written.

P. Confirm the message appearing with the end of programming.

or

Q. Close the PVI transfer tool

R. Insert the compact flash card into the switched off power panel

S. Switch power panel / cabinet on again

T. Booting a new VTS program takes much longer than normal booting. There is also an automatic restart of the program in between.

6. Hardware Notes

The **24 volt power supply** for all components of the VTS system must use **one** common power switch. The power panel and all peripheral elements belonging to the system, the X20 control modules and the MG41 transducer module must **switched on and off together**. The faultless initialization of the VTS periphery is only guaranteed if it is started together with the PowerPanel.

Space saving wiring is possible for actors or sensors via the X20 bus potential modules X20PD0011 and X20PD0012. The modules offer 12 x GND - PD0011 or 12 x 24 VDC - PD0012 connections to the internal I/O supply on the clamping points. The potential that is available on the clamping block is fused in the module via an **exchangeable micro fuse** for the I/O supply of the X20 system. The function of the fuse is controlled and indicated via a status LED. The fuse is in the side of the modules, unfortunately requiring the removal of the module in case of a defective fuse.