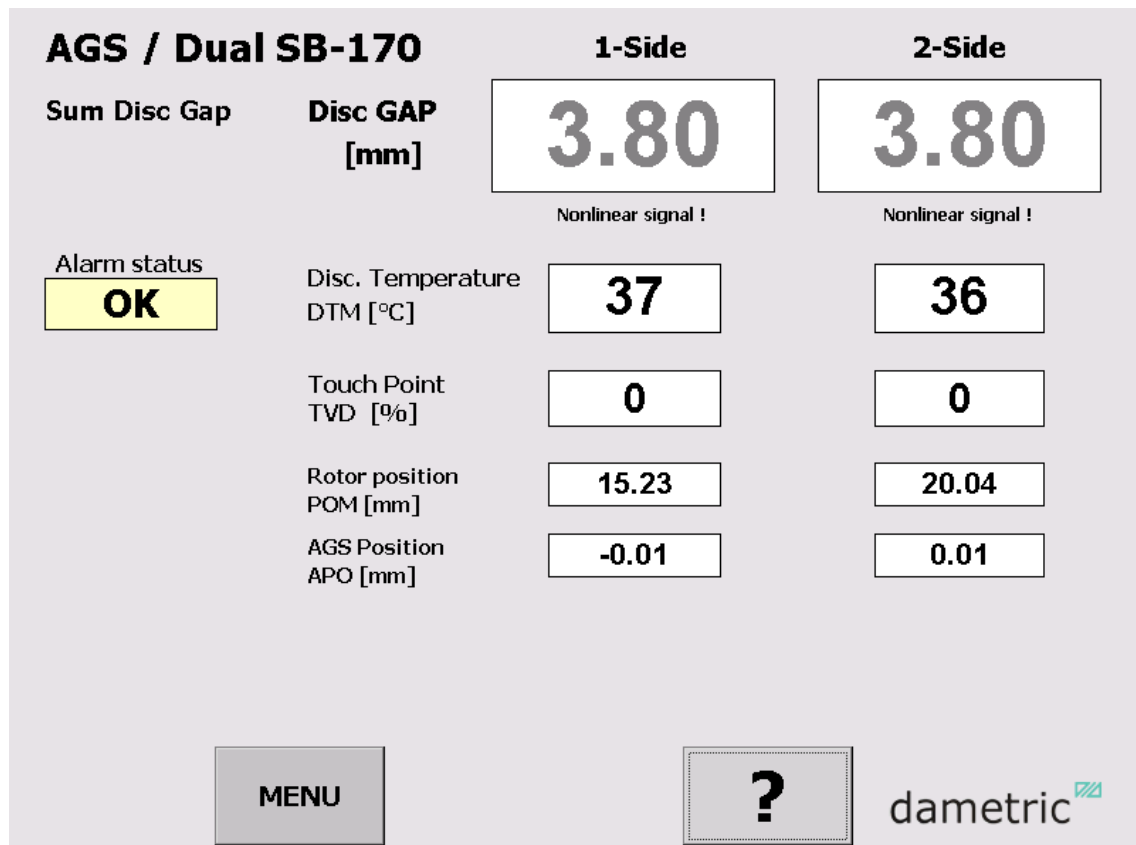


GMS - AGS



GMS CE Panel-PC

Manual

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1 Overview

The GmsCE program shows signals and parameters from units in the measurement system for measurement and control of the AGS sensor in a pulp refiner. An AGS sensor consists of a Disc Clearance sensor (TDC sensor), vibration sensor and a measure- and adjustment mechanism for moving of the measurement tip relative to Stator segments. The purpose with an AGS sensor is to simplify the calibration and make it possible to do so during production without disturbing the process. Recurring calibrations of the sensor is necessary after a certain operation time due to the wear of the sensor and the segments.

The program consists of steering logic for accomplishing an automatic calibration of the AGS sensor. The program is a GUI application which consists of buttons and text boxes and all commands are triggered through pressing of buttons on the touch screen.

The operator navigates from a normal top view window down through the program structure according to the menu choices that are presented to finally reach the searched function.

The Program runs on a Panel-PC which is based on the Windows CE™ operating system version 6.0 from Microsoft.

The program GMS CE is included in a measurement system which is called GMS, Gap Measuring System, which is built up around the AGS-sensor's two measurement modules (hardware units) and a Panel-PC.

DCM-DM1 (Disc Clearance Monitor), is a measurement module for Disc Clearance and Disc temperature. See the DCM-DM1 manual for more information.

ACM-DM1 (AGS Control Module), acts as a link between the AGS (Adjustable Gap Sensor) and the CAN-interface. See the ACM-DM1 manual for more information about the unit.

The units use a CAN-bus to communicate between each other. The Panel-PC uses UDP (IP based protocol) to communicate with the hardware units through a CEC-DM1, a CAN Ethernet converter module.

A GMS system can consist of two sets of units and two AGS sensors and by that handle refiners with double disc clearances.

The outputs from the system consist of analogue isolated current signals and changing relay contacts.

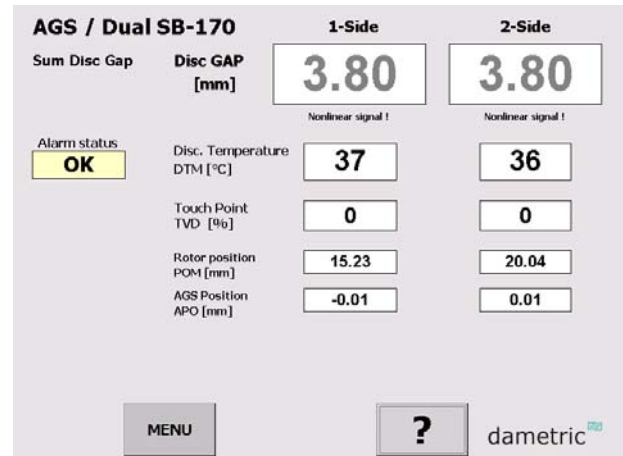
See the abbreviation chapter at the end of this document for descriptions for the abbreviations in the text. The example in this manual is showing an application for dual Andritz SB-170 refiners but the program does also apply to a Twin-60, Twin-66 or a HXD-refiner from Andritz.

2 Security

It can be pointed out that all security regarding the measurement signals and logic are as before placed in the measurement modules which are suited for its purpose. The Panel PC and its software have as its task to show measured values, alter parameters and to provide sequences for example AGS calibration. This means that the Panel PC can be closed off without that no measure signals fail to come or get changed which would affect the refiner mode of operation.

3 Normal View

In the normal view, the plate gap, plate gap temperature, touch point signal and AGS position. Depending on the refiner type, either the hydraulic pressure or the rotor position is shown. The signals are present for both measure systems to give an overview over the refiner condition.



MENU

By pressing the MENU button the other program functions can be reached, e.g. calibration of the AGS sensor.

?

By first pressing the "?" and then one measure value or button a help text is shown. Under "System Settings" other languages can be selected for the help texts.

Show alarms

This button is shown only if an alarm is active and when activating the Show alarms function, the alarms are shown in a separate window.

4 Program Functions

The program functions are divided into the following main groups.

Menu Window

AGS Service

This function includes services for the auto calibration of the AGS sensors and for to change the measuring tip.

Service

The functions in the Service menu are for altering parameters and to be able to calibrate the system's measurement functions.

The program gives you a good overview over the functions and what settings possibilities there are for each function.

All settings and adjustments are stored in a permanent memory for respective measurement module for a safe function even if there is a power failure.

The parameter settings that are under the Service menu are placed in a table format for respective function for fast and simple handling.

Trend

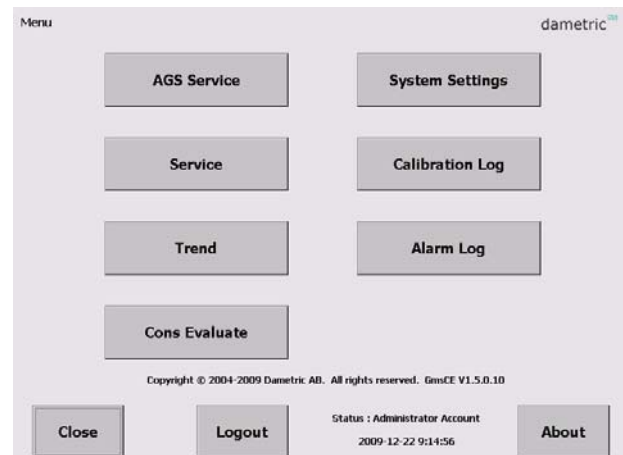
The Trend tool shows a trend over the most common signals in the system.

Cons Evaluate

The Cons evaluate button is only showed if the impedance measurement is enabled. This function allows you to evaluate the impedance measurement.

System Settings

In this part are settings that control the GMS-CE program logic. E.g. every measurement system can be given a suffix to make it easier of the identification when double measurement system is used. The settings can be stored in a file on an external memory (Compact Flash) connected to the Panel PC.



Calibration Log

Performed calibrations are stored to make it easier to do service and diagnostics when something unpredicted occur. These logs can be read by this function.

Alarm Log

Possible alarms are stored to make it easier to do service and diagnostics when something unpredicted occur. These logs can be read by this function.

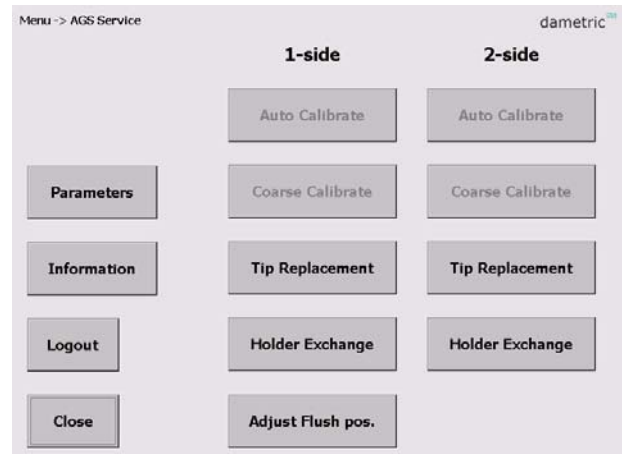
Login/Logout

Use the Login (or Logout depending of the login status) makes it possible to login to the different authorization levels which give more or less access to the different settings and functions within the system.

AGS Service

In this menu the following functions can be reached:

- **Auto Calibrate**
The AGS sensors must be calibrated when they are mounted in the refiner and running in production mode to achieve an accurate plate gap. The calibration sequence is described in a separate document.
The user must be logged in as operator.
- **Coarse Calibrate**
This calibration function is used when a new tip has been mounted.
- **Tip Replacement**
The function for tip replacement is reached here.
- **Holder Exchange**
Use this function to exchange the holder or the AGS house.
- **Show alarms**
The actual alarms are displayed.
- **Parameters**
Edit the calibration parameters.
- **Information**
Press for information of the buttons in this window.
- **Login/Logout**
Login (or Logout depending of the login status) to access protected parameters and functions.



The user must be logged in as operator to be able to use the *Auto Calibrate* function.

The *Coarse Calibrate*, *Tip Replacement*, *Holder Exchange* and *Parameters* functions are available first when you have logged in using the service code.

The *Coarse Calibrate* button is disabled after the sensor is calibrated to prevent the calibration to be destroyed unintentionally.

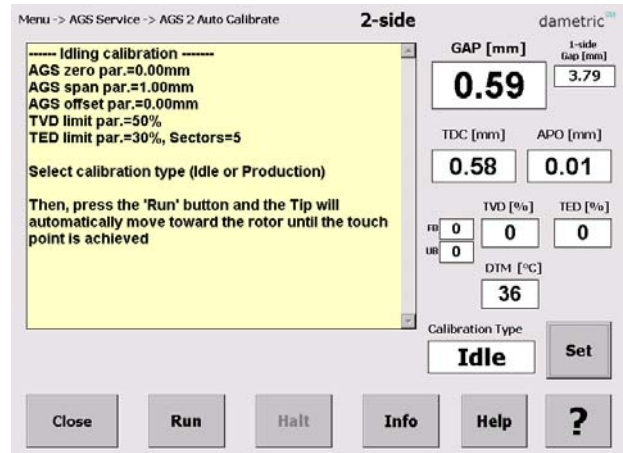
AGS Auto Calibrate

Here you can calibrate the AGS sensors which are done with automation.

Press the **Run** button to start the calibration sequence.

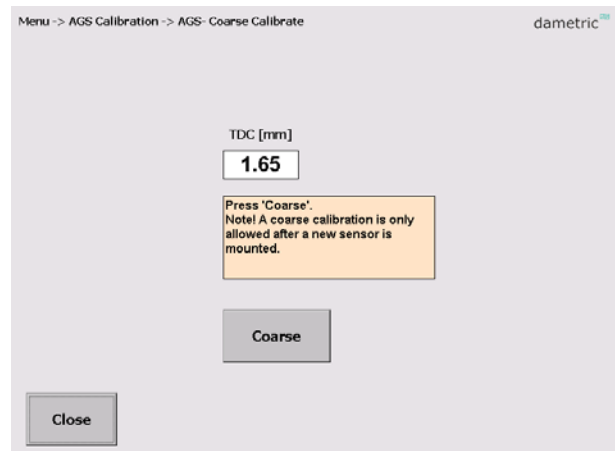
The progress of the sequence is shown in the yellow window. During the sequence it may happen that you will be prompted to accept certain sequence states.

If something should go wrong it is possible to stop the sequence at any time by pressing the **Stop** button.



Coarse Calibrate

Coarse calibration is performed when a new tip is mounted. The plate gap must be > 5 mm. This is normally done in the sequence when the tip, holder or house is changed. This button is therefore dimmed to indicate that the calibration is done. Note that a coarse calibration will ruin the active calibration and will force that the refiner cannot operate in production. If the manual coarse calibration is needed, note that the plate gap in front of the tip must be more than 5 mm. For safety, the calibration can also be interlocked by the position of the rotor which must be higher than a set limit.

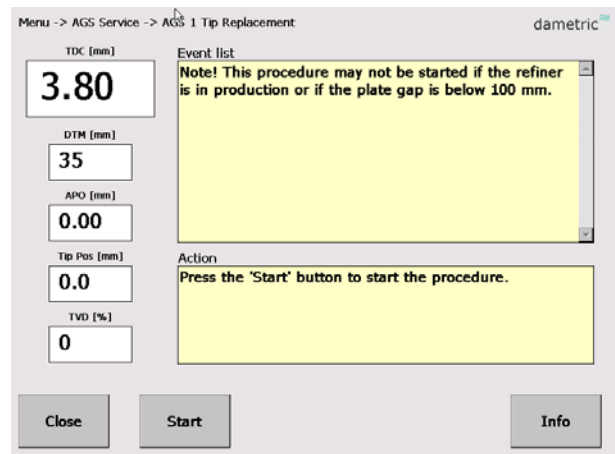


Tip Replacement

When the tip is worn out you use this sequence driven function to change to a new tip. Press the **Start** button to start the sequence. The progress of the sequence is shown in the yellow window.

During the sequence you will be prompted to pull out the tip and then put in a new one. Please note the id number of the new tip, this shall be entered after that the old tip is pulled out.

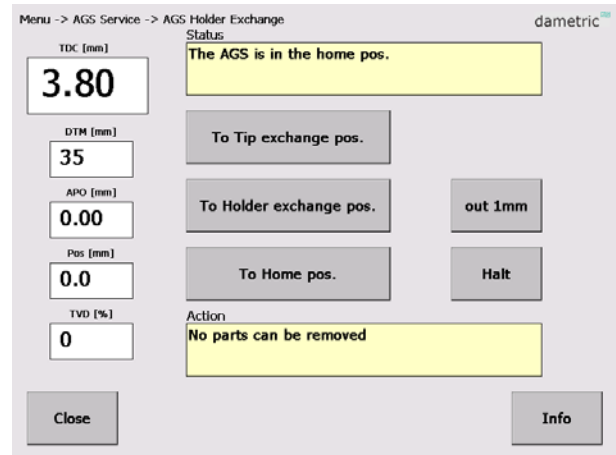
If something should go wrong it is possible to stop the sequence at any time by pressing the **Halt** button.



Holder Exchange

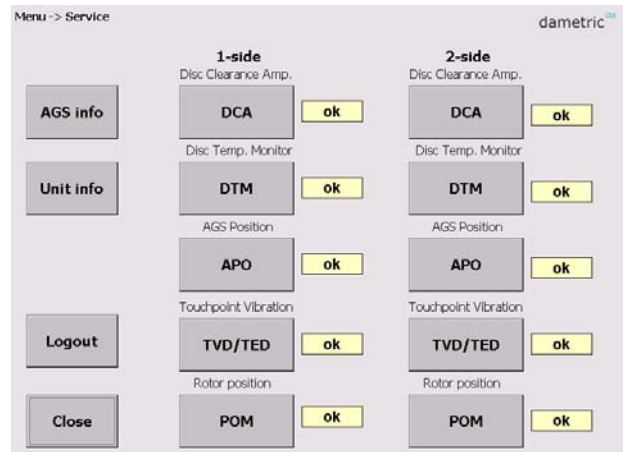
This procedure is used to replace the holder of the AGS sensor. Do NOT under any circumstances start the procedure when the refiner is in production or if the plate gap is lower than 100 mm. It is however required that the free space in front of the sensor tip is at least 200-500 mm depending of the refiner type and the AGS sensor type. The tip has to be removed before the holder can be dismantled from the house.

- * Run the AGS to the 'Tip exchange pos.'. Wait until the position is reached (takes app. 20s).
- * Remove the tip by pulling it STRAIGHT out. Never turn the sensor tip!
- * When the tip is removed, run the AGS to the 'Holder exchange pos.'.
- * Remove the holder.
- * Mount the new holder and check the placement of the disc springs inside the locking nut. Check the AGS sensor house manual for the proper assembly.
- * Fasten the locking nut with the special tool, pull tight.
- * Run the AGS to the 'Tip exchange pos.'.
- * Mount the new tip by gently pushing it in until the connector reaches the socket. Then continue to push gently while turning the tip until the flange positioning of the connectors meets. Then push another 5 mm. Wait until the TDC measurement starts and the alarm goes off which indicates that the tip is properly mounted
- * Run the AGS to the 'Home pos.' again (takes app. 20 s).
- * Press the 'Coarse' for a coarse calibration.



Service

The Service menu shows the units that part of the GMS-system. By pressing on one of the measurement functions, the underlying parameters and calibration can be reached. Some of the functions, e.g. the calibrations, are protected against unintentional harm to the system and can be done only after that the calibration code has been entered.



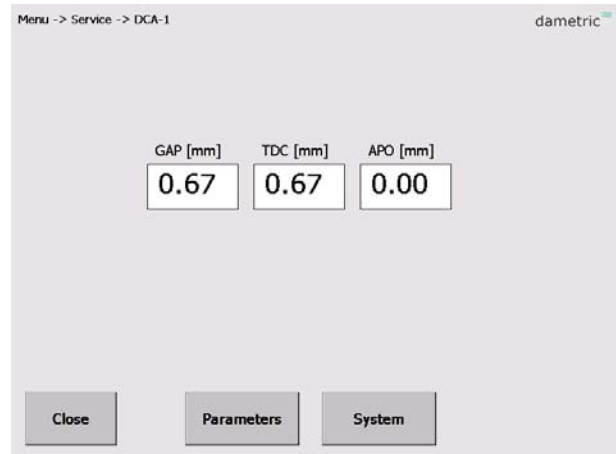
DCA – Disc Clearance Amp.

Parameters (logged in as service)

Here you can alter parameters that belong to the DCA measurement function.

System (logged in as administrator)

Here you can alter hardware related parameters that belong to the DCA measurement function.



DTM – Disc Temp. Monitor

Span Cal (logged in as service)

Function for span calibration.

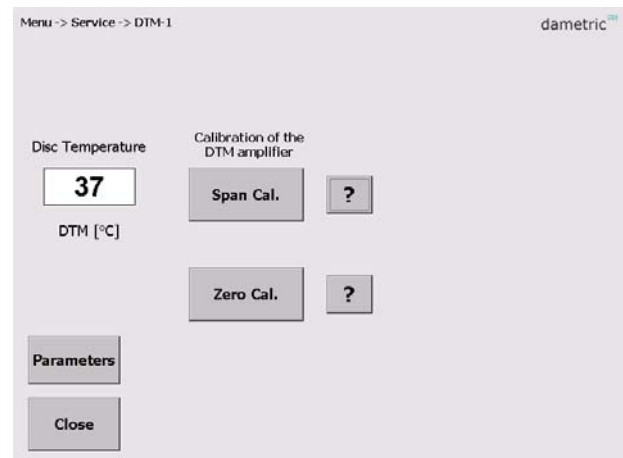
Zero Cal (logged in as service)

Function for zero calibration.

?

A help text for the calibration sequence is presented on the screen.

The DTM measurement are calibrated at installation and then only if the DCM unit, the KB-AGS1R connection box or the K-TDC25 cable is changed.



APO – AGS Position

The AGS position and the absolute position of the dip are shown together with the actual temperature inside the AGS head. The temperature should be below 70°C (160°F) to maintain expected life time of the AGS head.

Move to home

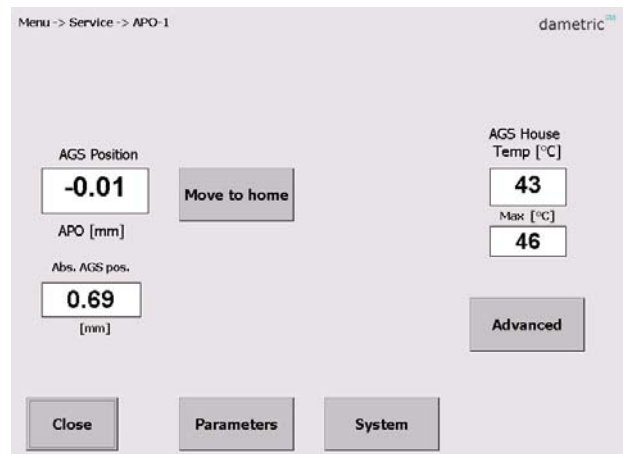
The tip can be moved to the home position (APO=0.00) by pushing the button. Note that there will be a corresponding change in the gap value.

Parameters (logged in as service)

Here you can alter parameters that belong to the APO measurement function.

System (logged in as administrator)

Here you can alter hardware related parameters that belong to the DCA measurement function.



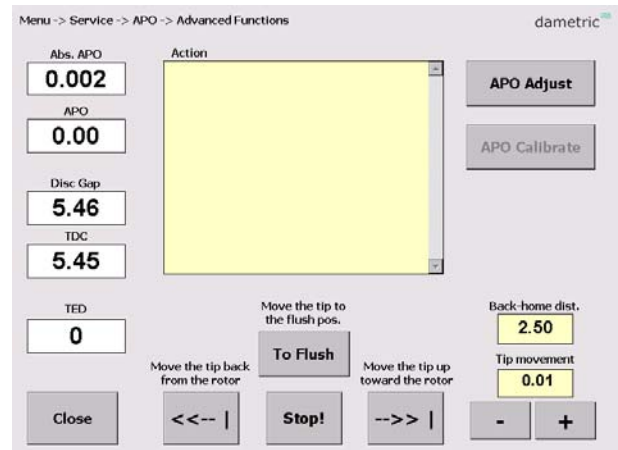
Advanced Functions (logged in as service)

This function makes it possible to manually move the tip which is used for maintenance/development of the measurement system.

Auto Adjust

With this command the positioning system of the AGS sensor is calibrated against the amplifier inside the AGS sensor. This is done by moving backwards towards a mechanical stop which is normally 2.50 mm behind the sensors home position (in level with the stator segment) and then move forward the same distance.

- First control that the distance (Back-home-distance) is set ok.
- Press the 'Auto Calibrate APO' button
The calibration sequence can be followed in the text window



If logged in as administrator:

APO Calibrate The operator can calibrate the APO measurement circuit. Note that the sensor tip must not be mounted during this calibration.

To Flush Command for moving the tip to the home position.

<<--| Command for moving the tip a chosen distance apart from the rotor.

-->>| Command for moving the tip a chosen distance towards the rotor.

Stop! Stop the movement.

+/- Chose a distance between 0.01 and 1.00 mm.

TVD / TED – Touchpoint Detector

In this menu there are functions for measurement of the touch point signal. The parameters for limits and sensitivity can be edited.

TVD (Touchpoint Vibration Detector) measures the vibration caused when the tip hits the rotor while the TED (Touchpoint Electric Detection) measures the resistance between the tip and the rotor. The TED signals are only displayed if the TED function is enabled.

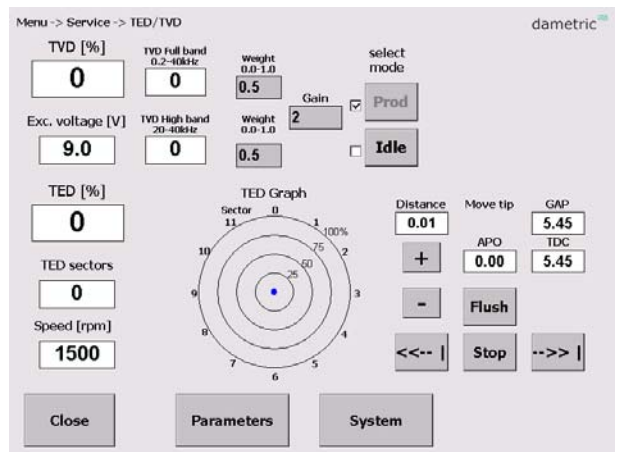
TVD-signals (logged in as service)
The settings and results are displayed.

TED Graph (logged in as service)
A graph with values divided in 12 sectors of the rotor is displayed if the TED function is enabled.

Move tip (logged in as administrator)
A number of functions is shown to move the tip to be able to investigate how the tip position will affect the TVD and TED measurement.

Parameters (logged in as service)
Here you can alter parameters that belong to the TVD and the TED measurement functions.

System (logged in as administrator)
Here you can alter hardware related parameters that belong to the TVD measurement function.



HPM Alt. RPO

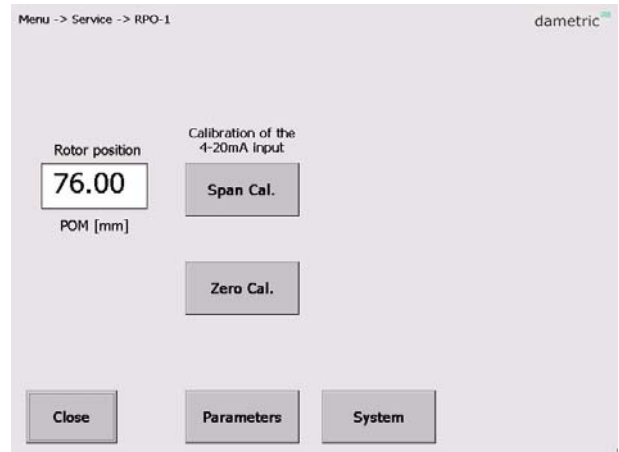
General

This measurement function that the refiner system provides, either relates to a measured rotor/stator position or a force or pressure that is applied to the stator.

RPO – Rotor Position

HXD, Twin-66 and SB170 refiners

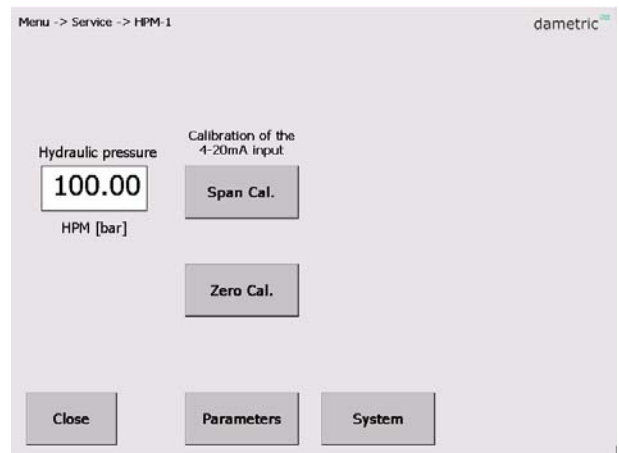
If the program is used for any of this refiners, the parameters are shown for calibration of an analog input for external rotor position measurement.



HPM – Hydraulic Pressure

Twin-60 refiner

If the program is used for an Andritz Twin-60 refiner, the parameters are shown for calibration of an analog input for external hydraulic pressure measurement.



Span Cal.

Calibration of maximum input signal (20.00mA). The calibration requires an external current generator.

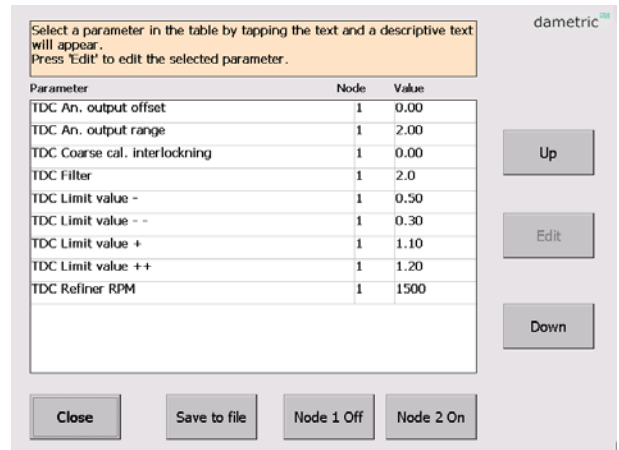
Zero Cal.

Calibration of minimum input signal (4.00mA). The calibration requires an external current generator.

Parameters

This is an example of the parameters for the DCA function is shown. Every parameter is shown with a short description and the allowed max- and min values. Furthermore, the node from where the parameter belongs to is also shown. There is also a possibility to copy the parameter settings to a XML file for printing or archiving.

As the list can be rather long, the parameters from respective node can easily be unselected from the list by a single press on a button.



To alter a parameter, do like this:

- Select the parameter by marking its name (a description of the parameter is shown at the top of the screen).
- Press the **EDIT** button and a new window with a key pad is shown.
- Enter the new value by using the key pad on the screen.
- Press the **SAVE** button. The program will give a warning if the entered value is outside its allowed range.

The parameter values are stored into a XML file when the **Save to file** button is pressed.

System settings

Some of the functions are protected with a password and are thereby not available when one doesn't have the right authorization.

Login

Makes it possible to login to different authorization levels which give more or less access to the different settings and functions within the system.

System Tab

Service info

Address, phone and email contact data for service and maintenance.

Program log

Shows the program related errors and events.

Help text language

Select language for the help texts.

Refiner ID

Defines a unique id for the installation which is used when transferring files to the external memory stick. This makes it possible to handle several installations. Press the 'Edit Refiner ID' button to change the id.

Refiner type (only logged in as administrator)

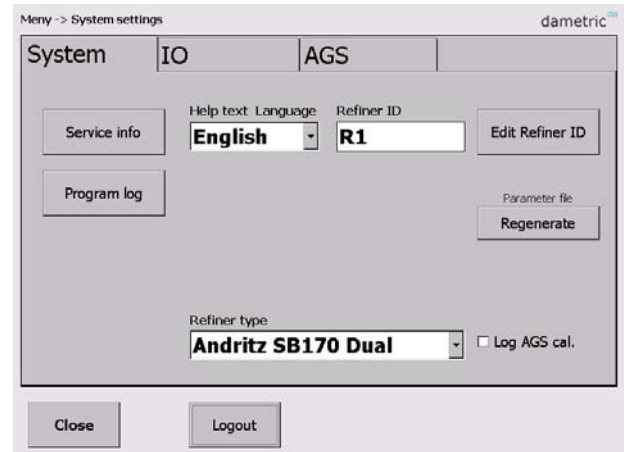
Selects the refiner type. Note – the GMS program will restart if a different type is selected.

Regenerate

Use this button read new parameters from the hardware units. This is only used if the hardware is updated or changed and new signals have been added. The parameters are stored in a XML-file which is used each time the program is started.

Log AGS cal.

When this function is activated, the measure data regarding the AGS calibration are logged.



IO Tab

CEC Serial no. / Select CEC

Function for selecting the CEC-DM1 that is used in the system.

File Browser

Function for copying of XML and log files to a USB stick.

Password (if logged in as administrator)

Here one can change the password of the different login accounts.

Upgrade System (if logged in as administrator)

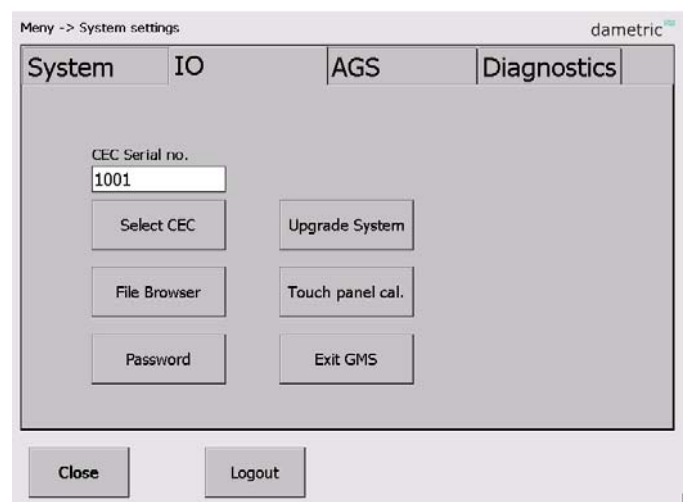
Used to upgrade the GMS program, see section 5.

Touch panel cal.

Calibrate the touch screen, press the button and follow the instructions.

Exit GMS (if logged in as administrator)

This will end the GMS program.



Diagnostics Tab

This tab is only available for Dametric.

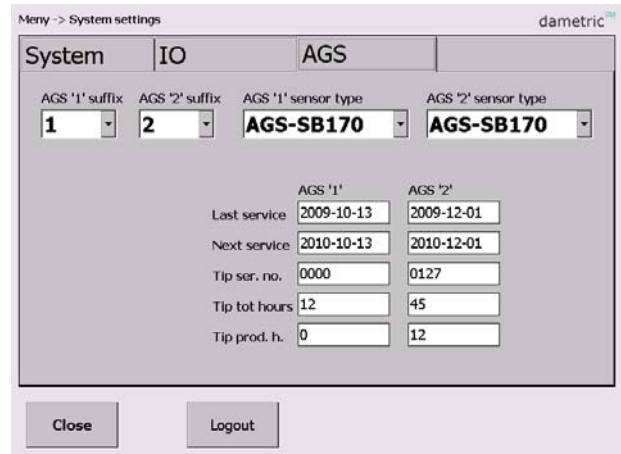
AGS Tab

AGS 1 Suffix, AGS 2 Suffix.

Set a suffix for each AGS sensor depending on the location in the refiner. E.g. "C" for a sensor in the CD zone. This will not affect the functionality but it is only used in the notation of the presented measurement signals and logged functions.

AGS sensor type

Select the sensor used in this refiner.



Calibration log

In the calibration log calibration events can be shown.

Home – Up – Down

Used to scroll in the list.

Row content

Tap a row to present the content in a larger view.

Clear log (if logged in as administrator)

Clear the log content.



Alarm log

To make it easier for trouble shooting all alarms that has occurred are listed here.

Home – Up – Down

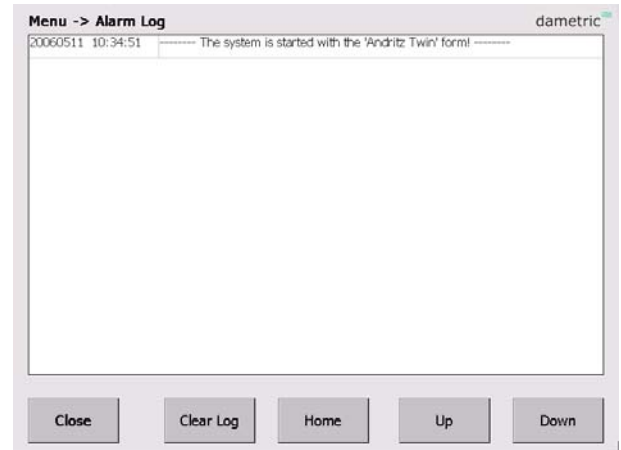
Used to scroll in the list.

Row content

Tap a row to present the content in a larger view.

Clear log (if logged in as administrator)

Clear the log content.



Trend

A trend picture shows the plate gap, the touch point and the rotor position /hydraulic pressure.

Time Scale

Press the Time Scale button to change between three different time scales, ca 7 – 14- 66 s.

Settings

Use this function to set the scale ranges and the offsets.

Trend Logger

It is possible to log the parameters to a log file. The function is started and stopped with the **Start/Stop** button.

Trend settings

Parameter Up/Down

Use the Up/Down buttons to scroll selected parameter in the parameter list. Selected parameter is shown with the Parameter and Unit boxes.

Range, Up/Down

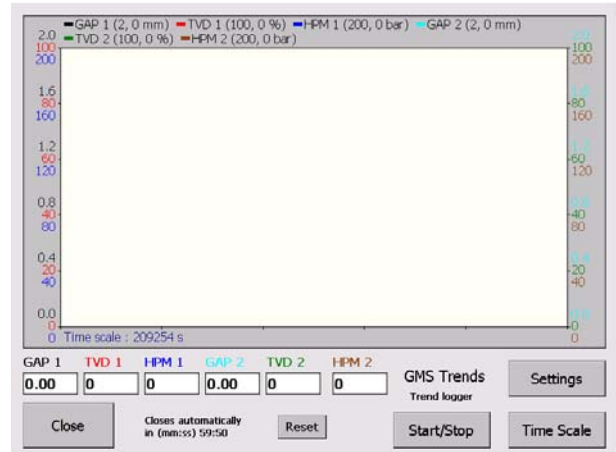
Step between five pre-set ranges for the actual parameter.

Offset, Up/Down

Increase/decrease the offset with a pre-set value.

Center

Press the Center button to adjust the offset so that the measure value comes in the middle of the scale.

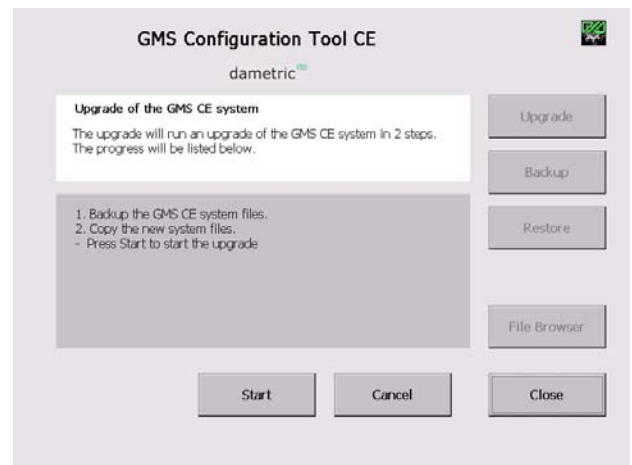


5 Upgrade of the system

Upgrade

This function is used when one is about to upgrade the system files.

- Connect the memory stick to the USB port.
- The new files must be placed in the following directory on the memory stick, GMS\Upgrade.
- Press Upgrade and then Start to start the upgrade.
- When the upgrade is finished, press Close to go back to the GMS CE program.

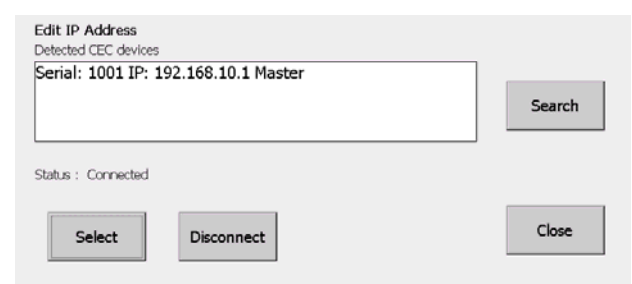
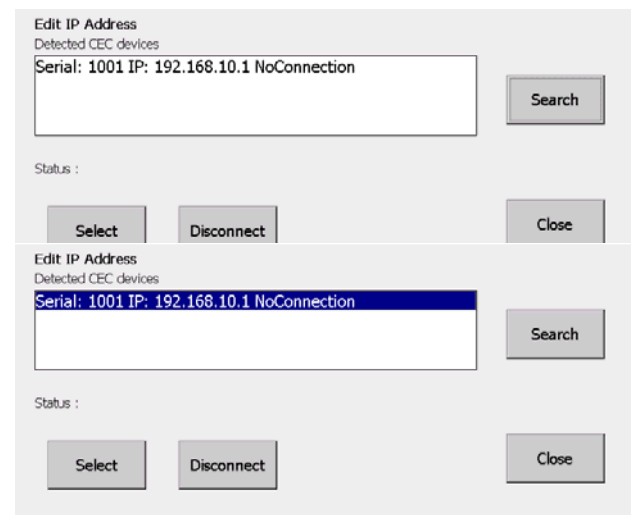


6 Select CEC unit

The Panel-PC must establish a network connection with the CEC-DM1 unit. The CEC (Can to Ethernet Converter) is the interface between the Ethernet (UDP) on the Panel-PC and the CAN bus from the hardware units.

The CEC selection is stored in an XML-file in the computer and is read automatically when the system starts. The connection has to be manually done if the computer or the CEC is changed.

- Press 'Menu' and log in as Service.
- Press the 'System Settings' button, select the 'IO' tab.
- Press the 'Select CEC' button.
- Press the 'Search' button. At least one CEC unit should be shown. If more than one CEC, check the serial number for identification.
- Tap the CEC unit in use and then press the 'Select' button. The Status should then read "Connected".
- Press 'Close'.



7 Abbreviations

CE TM. Operating system from Microsoft.

UDP – User Datagram Protocol. A connection less protocol for transferring of individual packets over IP.

TDC - True Disc Clearance. Plate gap measured with a sensor placed in level with the stator segment.

AGS - Adjustable Gap Sensor. A TDC sensor with moveable tip which can be moved forward and backwards for calibration.

GMS – Gap Monitoring System. A measurement system for measure and presentation of the signals in a refiner, e.g. the plate gap and plate gap temperature.

DTM – Disc Temperature Monitor. The plate gap temperature measured inside in the plate gap with a TDC- or AGS sensor.

TVD – Touch point Vibration Detector. A measure on the touch point signal between the disc plates. The signal is used to define the zero position (plate gap = 0) and is the basis of the zero calibration of a TDC- or AGS sensor.

APO – AGS Position. A signal for the position of the tip in an AGS sensor. It is zero when the tip is in level with the stator segment. The signal is increased when the tip is moved towards the rotor and decreased when it is behind the segment edge.

RPO – Rotor Position. A signal for the rotor axial position (for LC refiners).

HPM – Hydraulic Pressure. A signal for hydraulic pressure for positioning of the stator in a Twin-60 refiner.

DCM – Disc Clearance Module. Measurement module for the plate gap and plate gap temperature.

ACM – AGS Control Module. Acts as a link between the AGS (Adjustable Gap Sensor) and the CAN-interface.

CAN – Control Area Network. CAN is a standard field bus.

CEC - CAN to Ethernet Converter. A unit than converts the Ethernet data to the CAN-bus connecting the RMS units.

8 Documentation revisions

2006-06-21	GmsCE version 1.3.0.5
2006-10-20	GmsCE version 1.3.0.8
2008-10-01	GmsCE version 1.3.2.5
2009-12-01	GmsCE version 1.5.0.10

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