



# GMS - AGS

**AGS / SB170 Single**

Disc GAP [mm]	<b>0.194</b>
Alarm status	<b>alarm</b>
Disc. Temperature DTM [°C]	<b>32</b>
Touch Point TVD [%]	<b>0</b>
Rotor position POM [mm]	<b>1.29</b>
AGS Position APO [mm]	<b>0</b>

MENU Show Alarms ? Auth.: None dametric

**AGS / SB170 Dual**

Sum Disc Gap	<b>2.25</b>	1-side	2-side
Disc GAP [mm]	<b>0.62</b>	<b>1.63</b>	
Alarm status	<b>OK</b>		
Disc. Temperature DTM [°C]	<b>31</b>	<b>31</b>	
Touch Point TVD [%]	<b>0</b>	<b>0</b>	
Rotor position POM [mm]	<b>4.12</b>	<b>10.87</b>	
AGS Position APO [mm]	<b>0</b>	<b>0</b>	

MENU ? Auth.: None dametric

**AGS / Hxd**

Sum Disc Gap	<b>2.07</b>	A-side	B-side
Disc GAP [mm]	<b>0.38</b>	<b>1.68</b>	
Alarm status	<b>alarm</b>		
Disc. Temperature DTM [°C]	<b>32</b>	<b>37</b>	
Touch Point TVD [%]	<b>0</b>	<b>0</b>	
Rotor position POM [mm]	<b>2.54</b>	<b>11.20</b>	
AGS Position APO [mm]	<b>0</b>	<b>0</b>	

MENU Show Alarms ? Auth.: None dametric

**AGS / Twin-60**

Sum Disc Gap	<b>2.24</b>	1-side	2-side
Disc GAP [mm]	<b>0.62</b>	<b>1.63</b>	
Alarm status	<b>OK</b>		
Disc. Temperature DTM [°C]	<b>31</b>	<b>32</b>	
Touch Point TVD [%]	<b>0</b>	<b>0</b>	
Hydraulic pressure HPM [bar]	<b>4.1</b>	<b>10.8</b>	
AGS Position APO [mm]	<b>0</b>	<b>0</b>	

MENU ? Auth.: None dametric

## GMS CE Panel-PC Ver 2.0 Manual for the SB-170, Twin-60, Twin-66 and HXD refiners

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## 1 Overview

The GmsCE program displays signals and parameters from units in the measurement system for measuring and controlling 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 the measurement tip relative to stator segments. The purpose with an AGS sensor is to increase the measuring accuracy, simplify the calibration procedure and make it possible to do so during production without interfering with the process. Recurring calibrations of the sensor is necessary after some operational time because of the wear of the sensor and the segments.

This manual covers GMS-systems designed for the SB170, Twin-60, Twin-66 and the HXD refiners from Andritz. These systems are all handled by the same program and the required system is chosen when the program is installed.

The program consists of controlling 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 by pressing buttons on the touch screen.

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

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

The program GMS CE is included in a measurement system which is called GMS, Gap Measuring System, communicating with the measuring modules for the AGS sensor.

The DCM-DM1 (Disc Clearance Monitor) is a measurement module for the plate gap and the gap temperature.

The ACM-DM1 (AGS Control Module) communicates with the AGS sensor head and includes digital in- and outputs for communication with the PLC/DCS. The unit also uses an analogue input to monitor the rotor position (SB-170), stator position (Twin-66 and HXD) or the stator pressure (Twin-60) for the Panel-PC functions.

The AGS-sensor (Adjustable Gap Sensor) is mounted on the stator of the refiner and measures the touch point vibration (TVD), the position of the measuring tip (APO) and also controls the movement of the tip using a stepping motor. The AGS head communicates with the Panel-PC through the ACM-DM1 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 include dual measure points and thereby includes a double set of units. The Panel-PC, however can handle dual nodes so it's always a single unit.

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

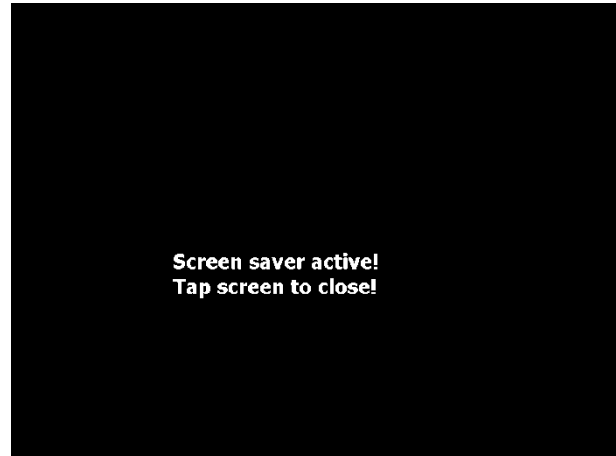
See the abbreviation chapter at the end of this document for descriptions for the abbreviations in the text.

## 2 Safety

It can be pointed out that all safety regarding the measurement signals and logic are as before located in the measurement modules which are suited for its purpose. The Panel PC and the accompanying software have the sole purpose of showing measured values, altering parameters and providing sequences for AGS calibration, etc. This means that the Panel PC can be turned off without any consequences for the operation of the refiner.

## 3 Screen saver

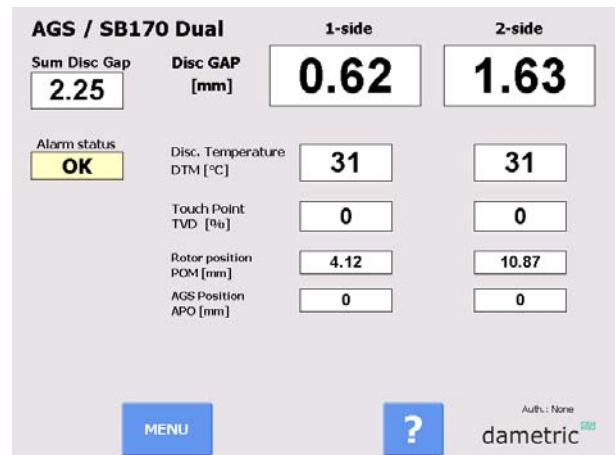
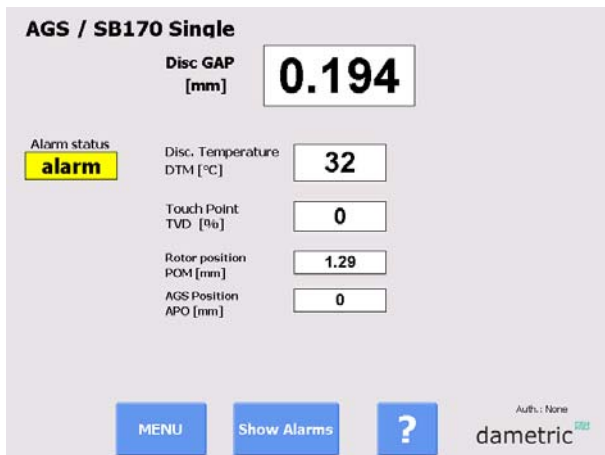
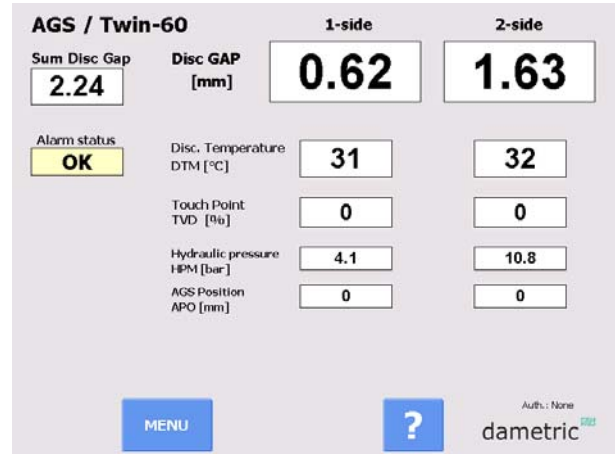
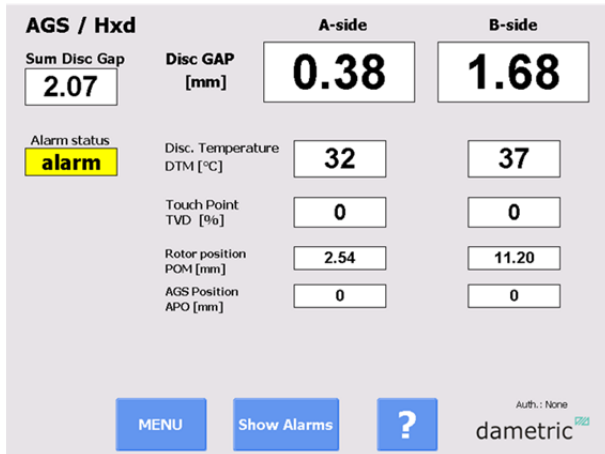
After some inactivity the screen saver will start. To close it, tap somewhere on the screen.



## 4 Normal View

In the normal view, the plate gap, rotor position, plate gap temperature, touch point and the AGS position are shown.

- 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 displays the alarms in a separate window.



## 5 Program Functions

The program functions are divided into the following main groups.

### 5.1 Menu

**AGS Service** This buttons gives access to services such as auto calibration of the AGS sensor and changing the measuring tip.

**Service** The functions in the Service menu are used to change parameters and to be able to calibrate the system's measurement functions.

The program gives you an overview over the functions and what settings are possible for each function. All settings and adjustments are stored in a permanent memory in the respective measurement module.

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

**Trend** The Trend tool shows a trend consisting of the most important signals in the system.

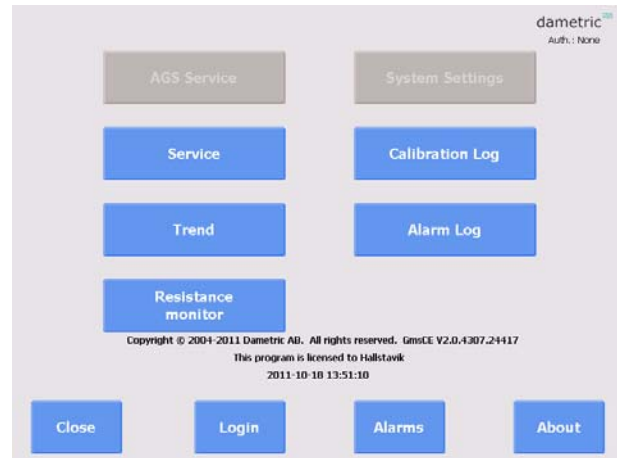
**Resistance monitor** This function is used to evaluate the resistance measurement between the tip and the rotor. This is showed only if the measurement is enabled.

**System Settings** Displays the system settings controlling the GMS-CE program logic. E.g, every measurement system can be given a suffix to make it easier to identify, when a 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, making it easier to perform service and diagnostics when something unpredicted occur.

**Alarm Log** Possible alarms are stored, making it easier to perform service and diagnostics when something unpredicted occur.

**Login/Logout** Use the Login button (or Logout depending of the login status) to login to the different authorization levels which give various access to the different settings and functions within the system. The available levels are "None", "Operator", "Service" and "Administrator".



### 5.2 AGS Service

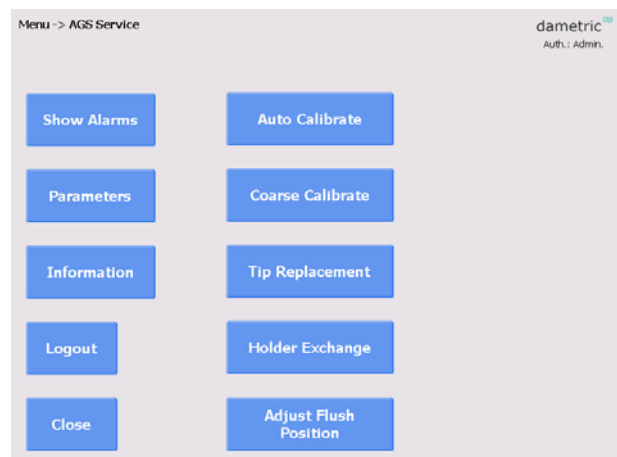
The AGS Service menu provides the following functionality:

**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** The coarse calibration is done automatically when a tip has been replaced, but can be done here as well.

**Tip Replacement** Gives access to replacing the AGS sensor tip.

**Holder Exchange** Use this function to exchange the holder or the AGS house.



**Adjust Flush Position** This function is used to position the measuring tip aligned to the stator plates and is used when the tip has been replaced.

**Adjust uncal. Span** To manually adjust a coarse calibrated to be able to load up a Twin-60 refiner. This button is not enabled for other systems.

**Show alarms** The active 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.

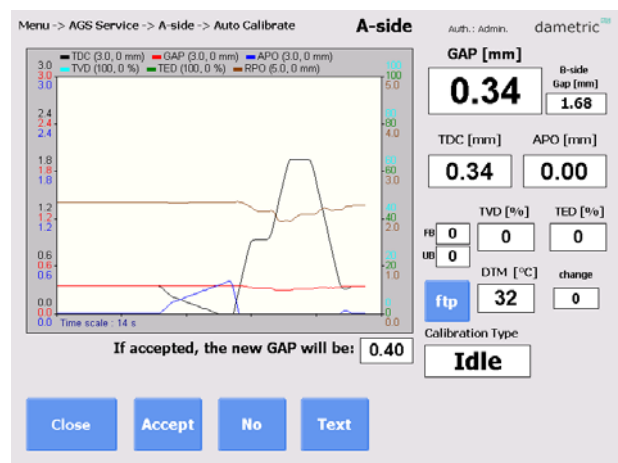
The user must be logged in as operator to be able to use the *Auto Calibrate* function.

The *Coarse Calibrate Tip Replacement*, *Holder Exchange*, *Adjust Flush pos* and *Parameters* functions are available when you have logged in using the service password. The *Coarse Calibrate* button is disabled after the sensor is calibrated to prevent the calibration to be destroyed unintentionally.

### 5.2.1 AGS Auto Calibrate

This is where the AGS sensors are calibrated using an automatic procedure.

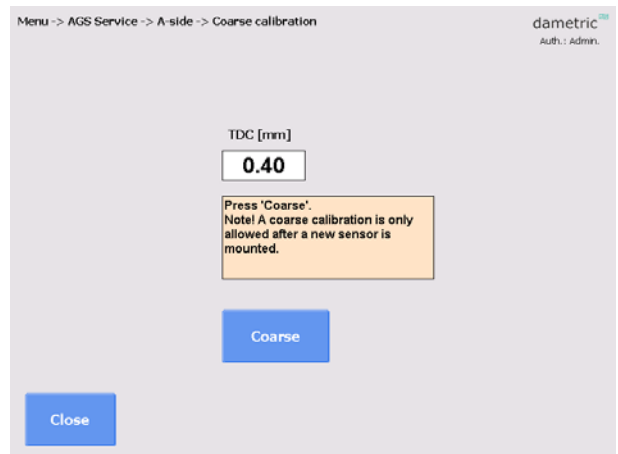
Consult the “GmsCe20Ags Calibration EN.pdf” for details.



### 5.2.2 Coarse Calibrate

Coarse calibration is performed when a new tip is mounted.

Consult the “GmsCe20Ags Calibration EN.pdf” for details.



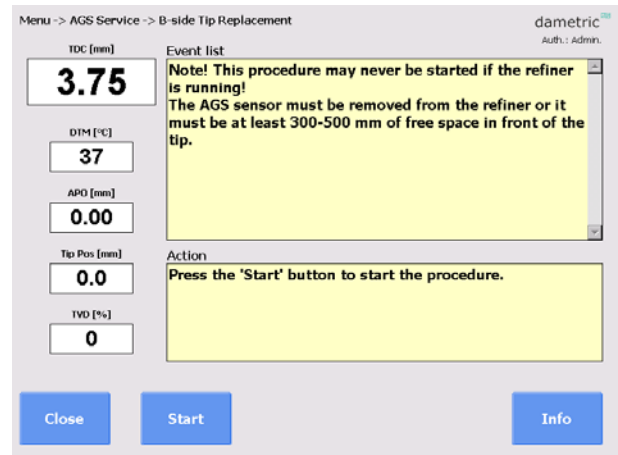
### 5.2.3 Tip Replacement

When the tip is worn out you use this sequence driven function to change to a new tip. Consult the “AGS-XXX Service Manual EN.pdf” for details.

It must NOT be started when in production mode or when the plate gap is less than 100 mm. Press Start to initiate the sequence. The progress is displayed in the yellow field.

During the sequence you will be prompted to remove the sensor tip and insert a new one. Note the id number; it has to be entered into the program when asked for.

The sequence can be interrupted by pressing the Halt button.

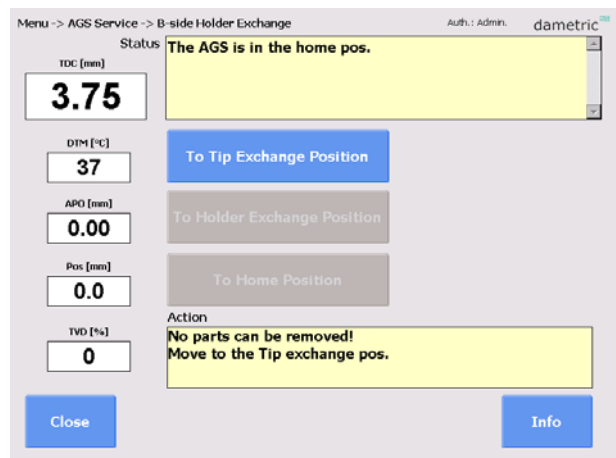


### 5.2.4 Holder Exchange

This procedure is used to replace the holder or the head of the AGS sensor. Consult the “AGS-XXX Service Manual EN.pdf” for details. It must NOT be started when in production mode or when the plate gap is less than 100 mm. However, 200-400 mm of free space in front of the sensor is required to successfully perform the sequence.

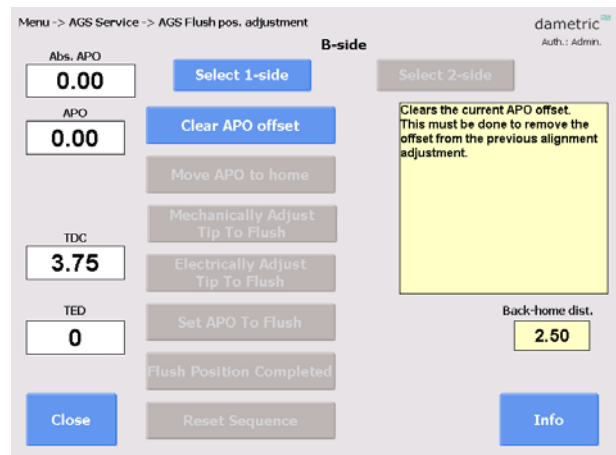
The sensor must be removed before the holder can be removed.

- Run the sensor to the tip exchange position and remove the tip.
- Then run the sensor to the Home position and replace the holder.
- Tighten the nut with the special tool.
- Run the sensor to the tip exchange position and insert a new tip.
- Run the sensor to the home position.
- Perform an APO adjustment and a coarse calibration.
- The sequence can be interrupted by pressing the Halt button.



### 5.2.5 Adjust flush position

Use this procedure to align the measuring tip with the stator plates. Consult the “AGS-XXX Service annual EN.pdf” for details.



### 5.3 Service

The service window shows the status of the various hardware functions. Select any of the measure functions to reach underlying parameters and calibrations.

**AGS Info** Presents data about the AGS sensor(s)

**Unit Info** Opens a form to check the status of the connected units

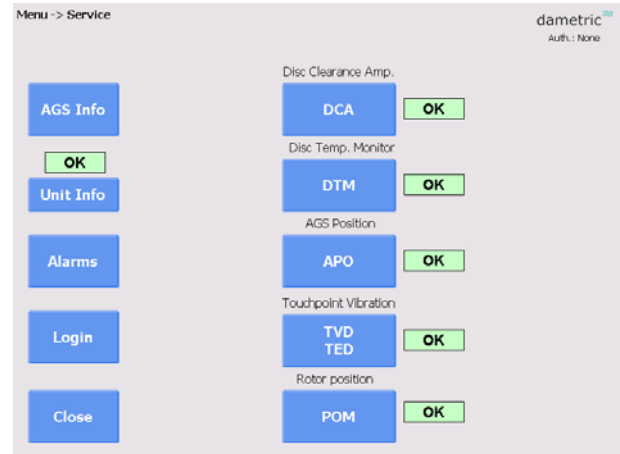
**DCA** Measures the disc gap

**DTM** Measures the disc temperature

**APO** Measures AGS position

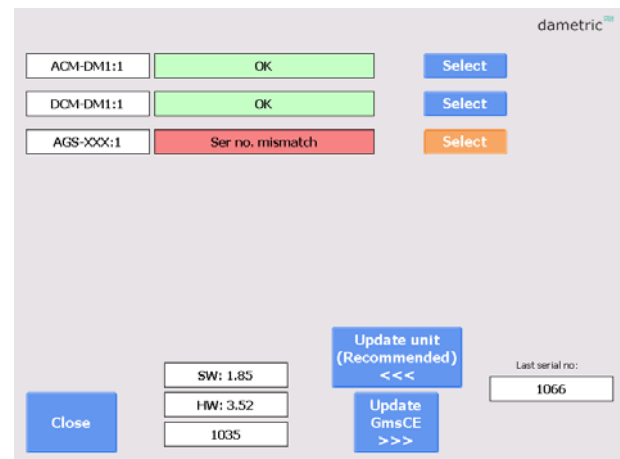
**TVD/TED** Measures the touchpoint value, by vibration and by electricity

**POM** Position monitor, stator or rotor position or the hydraulic pressure for the Twin-60 refiner.



#### 5.3.1 Unit info

This function is used to make sure that the different hardware units in the system are functioning correctly. If a unit is replaced, the program will notice this, by comparing the serial numbers, and the user must resolve how the user parameters should be handled. The user parameters are stored for every unit in the system. When replacing a unit it is thus possible to choose if the stored parameters should be written to the unit (recommended), or if the new unit's parameters should be transferred to the panel pc.

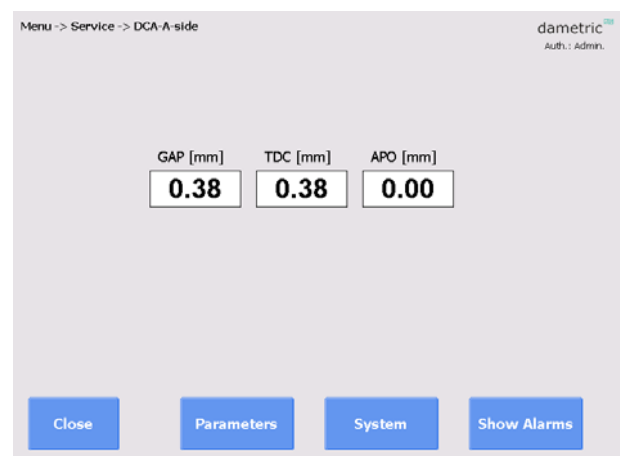


#### 5.3.2 DCA – Disc Clearance Amplifier

##### Parameters

Gives access to parameters for the DCA.

**System** (Only showed when logged in using the required password.)





### 5.3.3 DTM – Disc Temperature Monitor

#### Span Calibration

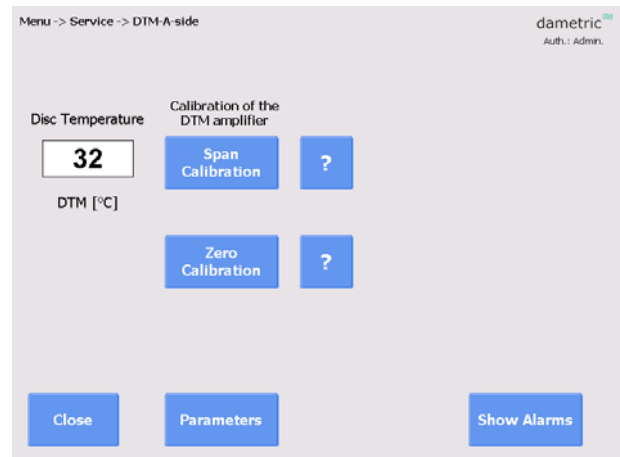
Calibrate the gain.

#### Zero Calibration

Calibrate the zero.

?

Displays help for the calibration.



### 5.3.4 APO – AGS Position

#### Parameters

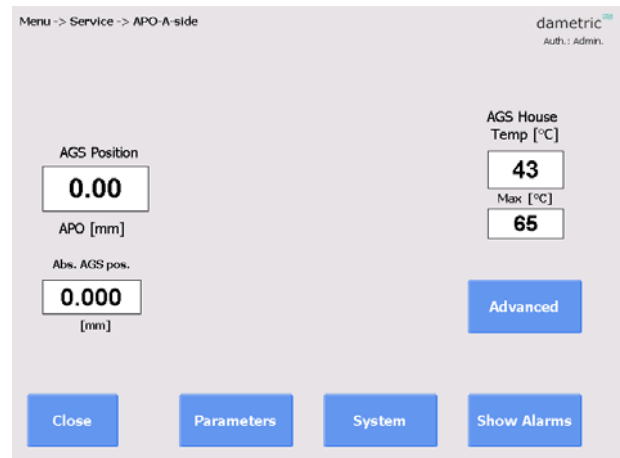
Changes parameters for the APO function.

**System** (Only showed when logged in using the required password.)

Changes more low-level hardware parameters.

**Advanced Functions** (Only showed when logged in using the required password.)

Gives access to the ability to move the tip manually.



#### APO Calibrate

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

#### Flush

Move the AGS to the home position (tip aligned with the stator segment).

<<--|

Move the tip from the rotor.

-->>|

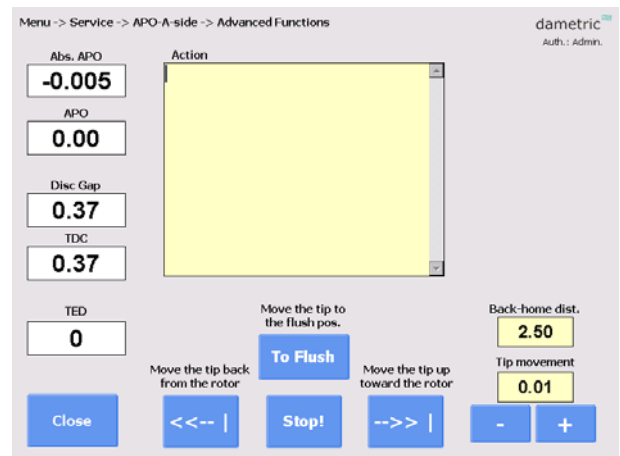
Move the tip towards the rotor.

#### Stop!

Stop the movement.

**Distance** - Step motor distance

Select the distance to run.



### 5.3.5 TVD – Touchpoint Vibration Detector

Functions for measuring of the touch point signal. Calibration of the signal can be performed as well modification of parameters for limits and sensitivity.

#### Span Calibration

Calibration of the gain. A signal generator is required.

#### Zero Calibration

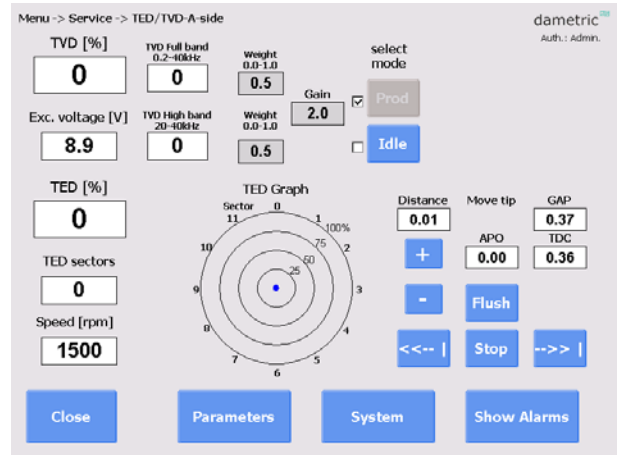
Calibration of the zero value.

#### Parameters

Changes parameters for the TVD function.

**System** (Only showed when logged in using the required password.)

Changes more low-level hardware parameters.



### 5.3.6 RPO – Rotor position

#### General

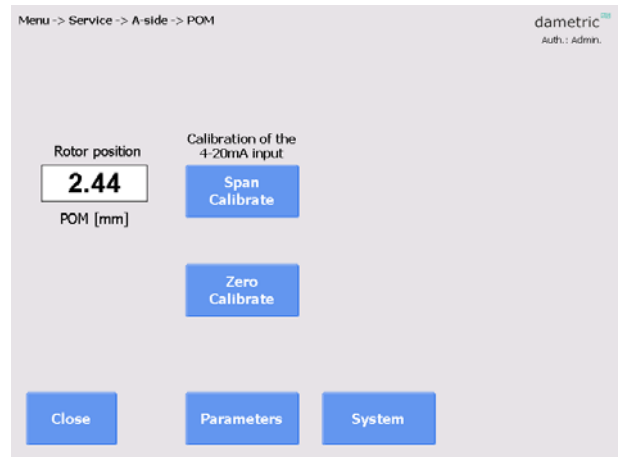
The value of the external current signal which reflects the rotor position is shown here.

#### Span Calibrate

Calibrates the gain (20.00mA). An external current generator is required.

#### Zero Calibrate

Calibrates the zero value (4.00mA). An external current generator is required.



### 5.4 Parameters

This is an example of a parameter list for the DCA function. Each parameter is displayed with a short description as well as the allowed limits.

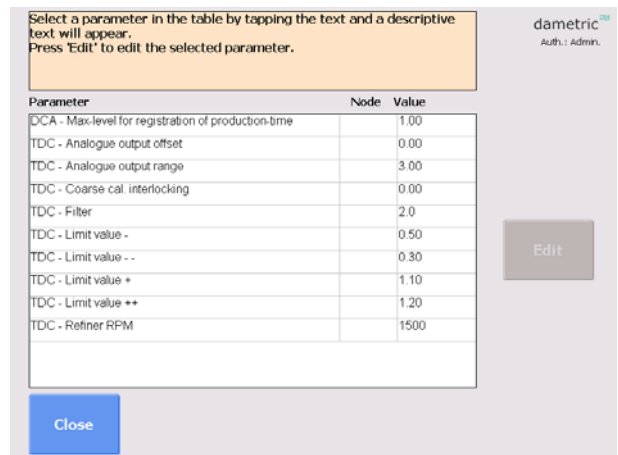
Furthermore, you can see to which node the parameter belongs to.

Because the list can be long, it can be filtered by node.

To change a parameter, do the following:

1. Select the desired parameter by tapping it in the list.
2. Press Edit to open an editor.
3. Enter the new value and press Save.

You cannot enter values outside the limits of the selected parameter.



## 5.5 System settings

Some parts of the functionality are protected by a password.

### 5.5.1 Login

Allows the user to login with a password to give access to restricted parts of the system.

### 5.5.2 System tab

#### 5.5.2.1 Service info

Address, phone and e-mail for service.

#### 5.5.2.2 Refiner ID

Defines a unique id for the installation, which is used when transferring files to an external USB memory.

#### 5.5.2.3 Program log

Displays program related events.

#### 5.5.2.4 Refiner type

Select the refiner type.

#### 5.5.2.5 Upgrade System

Updates the current version of the program from a newer version located on an external USB memory.

#### 5.5.2.6 Activate/Renew License

Activates or renews the license from an external USB memory.

#### 5.5.2.7 Regenerate

Regenerates the parameter definition file if it is suspected to be corrupt or outdated. GmsCE will restart.

#### 5.5.2.8 Change Date and Time

Press the + and – buttons to change the date and time. Press Save to save the changes and restart the system.

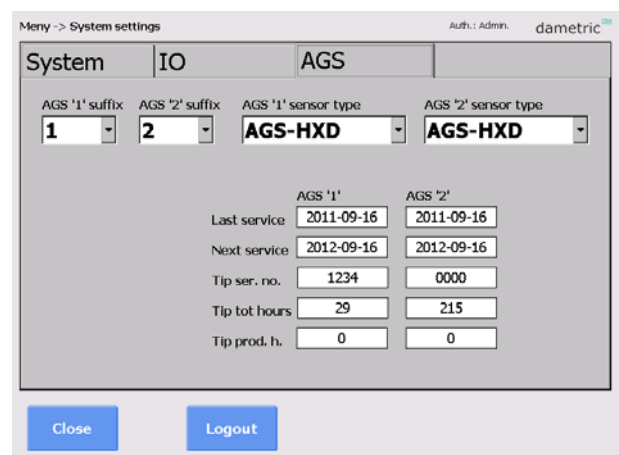
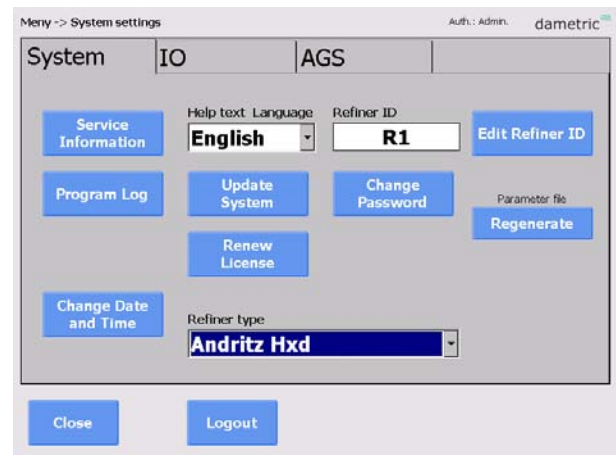
### 5.5.3 AGS-tab

#### 5.5.3.1 AGS 1 Suffix, AGS 2 Suffix.

Select a suffix for each AGS-sensor depending on the placement of them in the refiner. For example “C” for a sensor in the CD zone. The selection does not alter the functionality but only for display purposes.

#### 5.5.3.2 AGS sensor type

Select the desired AGS type.



**5.5.4 IO-tab**

**5.5.4.1 Touch panel calibration**

Calibrates the touch screen. Follow the instructions given.

**5.5.4.2 CEC Configuration**

Selects the IP address for the CEC-DM1 used in the system.

**5.5.4.3 Backup**

Performs a backup of data- and system files to the internal system memory attached to the cabinet. This allows for a complete restoration in case of a replacement of the panel pc.

**5.5.4.4 Copy files**

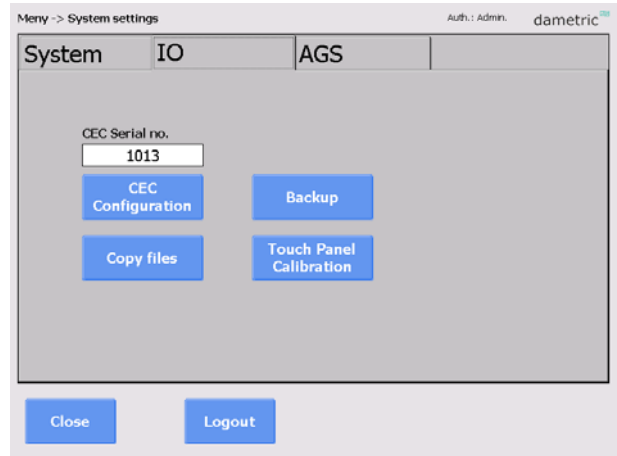
Copies data files to an external USB memory. This includes log files and database files.

**5.5.4.5 Password**

Changes the passwords for the different accounts.

**5.5.4.6 Run Installer**

Starts the installer, giving access to the old version (1.x) of GmsCE. Only do this if there are problems with the new version (2.x).

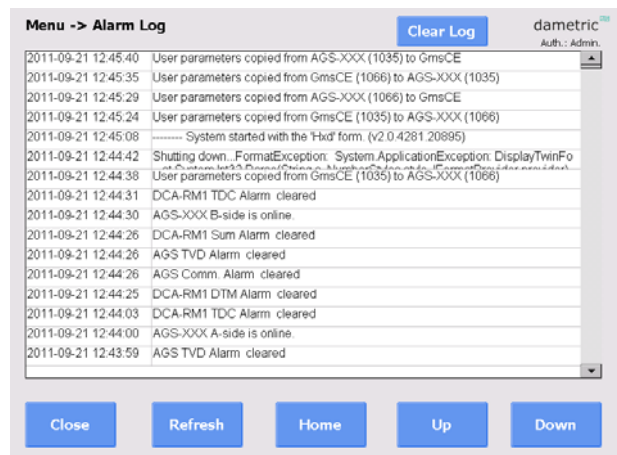


**5.6 Calibration log**

Displays the calibration log. Press Clear to empty it.

**5.7 Alarm log**

Displays all alarms and exceptional events that have occurred. Clear to empty it.



**5.8 Trend**

A trend graph showing the gap, touch point vibration and rotor position.

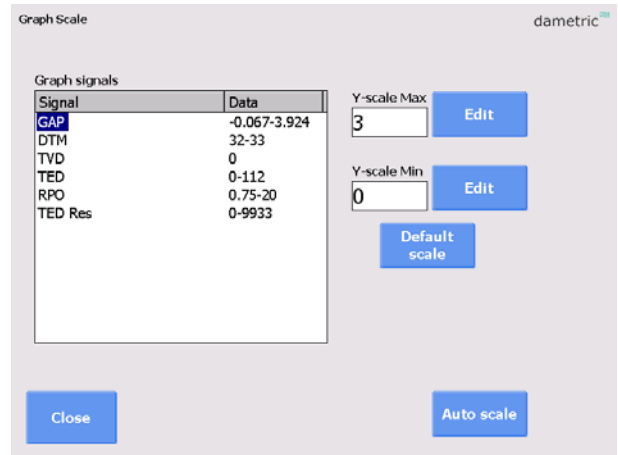
**Slower/Faster**

Changes the speed of the live graph.



### 5.8.1 Graph scale

Select a parameter and then change the limits. Default scale reverts to the factory defaults. The column Data shows the current range of values for each parameter. This can be useful when determining the limits. Select Auto scale to automatically determine the limits. Note that your selection will not be save when you close the trend window.

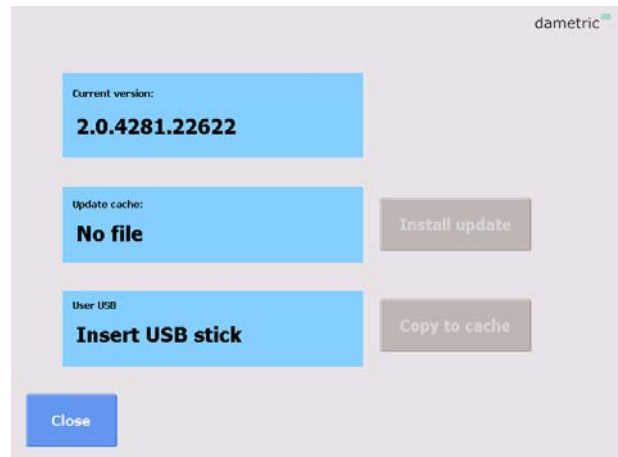


## 6 Updating the system

### 6.1 Update System

This function is used when updating the system files.

- Connect the USB memory to connector on the panel PC.
- The new files must be located in a folder called GmsCE\Update\.
- Select Copy to cache to copy the files to the panel PC.
- Select Install update to perform the actual upgrade. GmsCE will restart.

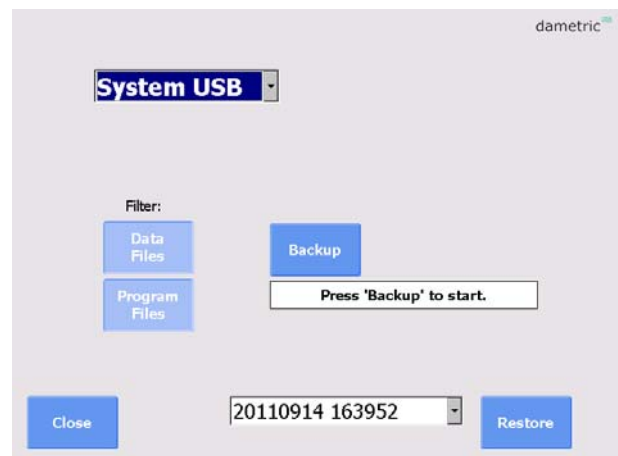


### 6.2 Backup and Restore

This function is used to perform backups and restorations of data- and systemfiles.

- Attach the USB memory to the panel PC.
- Select Backup to start the process.

As default, all important files will be copied to the internal system memory. This allows for a complete restoration of the program after change of the panel PC.

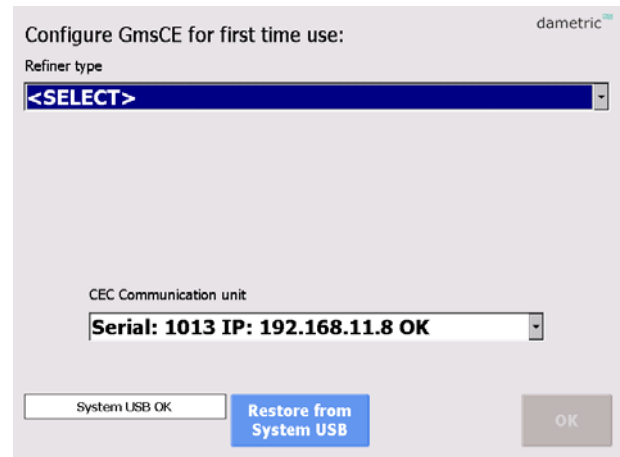


## 7 Startup of the system

### 7.1 Startup of GmsCE for the first time

The first time the program is started you will be asked to specify the type of refiner used as well as the CEC-DM1 .

If the panel PC is a new one, but in an existing system, it is possible to restore everything from the internal system memory, belonging to the cabinet. In this case it is not necessary to choose refiner and CEC, since this information will be found in the restored files.

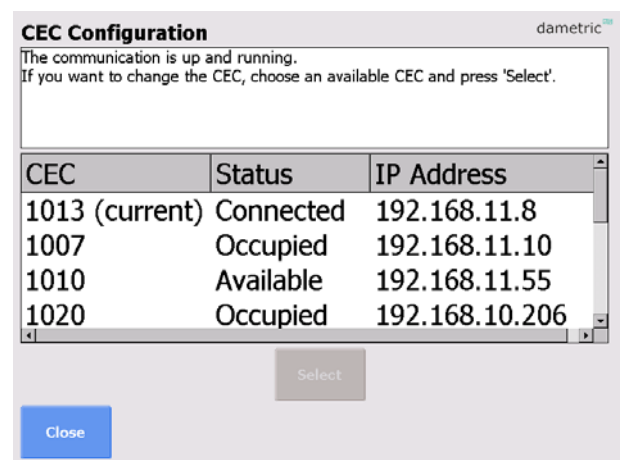


### 7.2 Configuration of the CEC-DM1

Select *CEC Configuration* from the System Settings-window.

Choose a CEC-unit by tapping on it in the list. Press *Select* to connect to the CEC.

If the system fails to start because the CEC is not properly installed, it is necessary to rescan the parameters (*Scan Retry* from the startup window).



## 8 Abbreviations

**CE** <sup>TM</sup>. 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 based on the vibration. 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.

**TED** – **Touch point Electric Detector**. The electrical 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 a 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).

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

**DCA – Disc Clearance Amplifier.** Measurement module for the plate gap and plate gap temperature.

**ACM – AGS Control Module.** Acts as a link between the AGS 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.

## 9 Contact

Development, production and service:

### Dametric AB

Jägerhorns Väg 19, SE-141 75 Kungens Kurva, Sweden

Phone: +46-8 556 477 00      Telefax: +46-8 556 477 29

E-mail: [dametric@dametric.se](mailto:dametric@dametric.se)      Homepage: [www.dametric.se](http://www.dametric.se)

dametric 