USING MANUAL

GT-300 PRODIG

VERSION N° GT3PRODIG-UK03/2021

CONTENTS

1. INTRODUCTION

The GT-300 PRODIG is a device able to measure the gel time of sample while curing process. As viscosity of sample will increase, device will measure it and plot on display curve: Viscosity = f(t).

To be able to find gel time, device will find it by detecting inflexion point on curve viscosity over time.

The fluid is forced to a shear rate (rotational speed) and the shear stress (motor torque) is measured. The values of shear rate and shear stress then make it possible to calculate the viscosity using the Newton equation and the constants associated with the mobile used.

Equation of Newton is: $\eta = \dfrac{\tau}{\dot{\gamma}}$

With η for viscosity in Pa.s, τ for shear stress in Pa and $\dot{\gamma}$ for shear rate in s^{-1}.

Shear stress and shear rate are calculated by using constants of each measuring system as:

τ = M x K_{Tau} with M for motor torque in mNm and K_{Tau} in Pa/mNm.

$\dot{\gamma}$ = n x K_D with n for rotational speed in rpm and K_D in s^{-1}/ rpm.

The device calculates the viscosity by dividing the shear stress by the shear rate for each measuring point. The K_{Tau} and K_D constants used depend on the measuring system selected for the measurement.

Viscosity depends on the temperature, then it must be essential that all viscosity values are associated to a reading of the sample temperature, in order to compare viscosity for different samples.

The device is constituted with a continuous current motor and an optical encoder, in order to warranty a great accuracy of rotational speed, on all torque range.

The device has an easy touch screen display, on which you could read the **speed**, **shear rate**, **shear stress**, **measuring spindle** reference, the measured torque and the dynamic **viscosity** in **mPa.s (=cPoises) or Pa.s**. It is possible to program and save methods, use inflexion analysis, show curve on display and print result directly on printer.

The Device GT-300 PRODIG can be used with disposable hook and cup. All information you need to know to us them are explain in section 3.

1.1. COMPONENTS

The device is delivered inside a foam protection with power supply to avoid any problem during transport. All other accessories needed to use such as measuring geometries or stand and installation pieces are delivered in another carton.

Here is in detail what is contained in this foam. The device must be dislodged with care in order to prevent any damage.

| Model : N129000 | Models: N129100, N129200, N129400, N129500, N129600 and N129700 |

The GT300 PRODIG (all model) is delivered with user notice and:

1- AC power adaptor for measuring head.
2- Fixture for hook.

For models with temperature control (excepted N129000):

3- Cable for power supply of temperature unit.
4- Cable for connexion of measuring head with programmer (model N129200, N129500 and N129700).
5- Cable for reading probe of the temperature control. Then Thermocouple (000645) is ordered, this cable is not present in shipment.

Accessories delivered with the GT300 PRODIG (according to order):

Aluminium disposable cup (set of 100) PN 700011	Measuring hook (Vol. 50-80mL) (Set of 100) PN 700010	Measuring hook (Vol. 35-50mL) (set of 100) PN 700040	RheoTex with mini USB or RS232/USB cable

| Breakable thermocouple (25m) PN 000645	Holder for thermocouple (Ref 405000)

1.2. GENERAL VIEW OF YOUR DEVICE

The GT300 PRODIG is available in three versions. Without temperature control, with Peltier effect air-cooled and with electric heating.

Colour touch screen 7''

On/Off Light switch

Aluminium Arm

Holder for thermocouple (optional)

Stainless steel Rod

Temperature unit (except for model N129000)
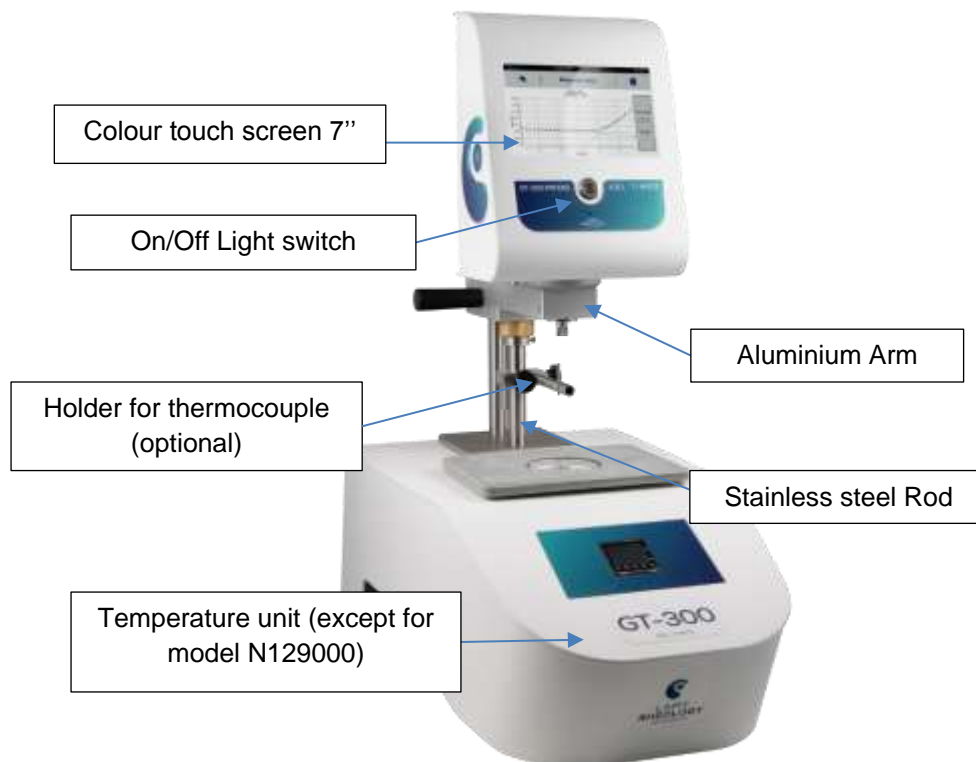
Available model

Part number	Designation
N129000	GT300 PRODIG GEL TIMER WITHOUT TEMPERATURE CONTROL
N129100	GT300 PRODIG GEL TIMER WITH ELECTRICAL HEATING (Room to +300°C)
N129200	GT300 PRODIG GEL TIMER WITH ELECTRICAL HEATING (Room to +300°C) WITH PROGRAMMER*
N129400	GT300 PRODIG GEL TIMER WITH AIR PELTIER (+15°C to +60°C)
N129500	GT300 PRODIG GEL TIMER WITH AIR PELTIER (+15°C to +60°C) WITH PROGRAMMER*
N129600	GT300 PRODIG GEL TIMER WITH AIR PELTIER (0°C to +150°C)
N129700	GT300 PRODIG GEL TIMER WITH AIR PELTIER (0°C to +150°C) WITH PROGRAMMER*

The temperature controller that equips the models N129100, N129200, N129400, N129500, N129600 and N129700 is the following:


Set value decrease button

Set value increase button

Button to move cursor on other digit
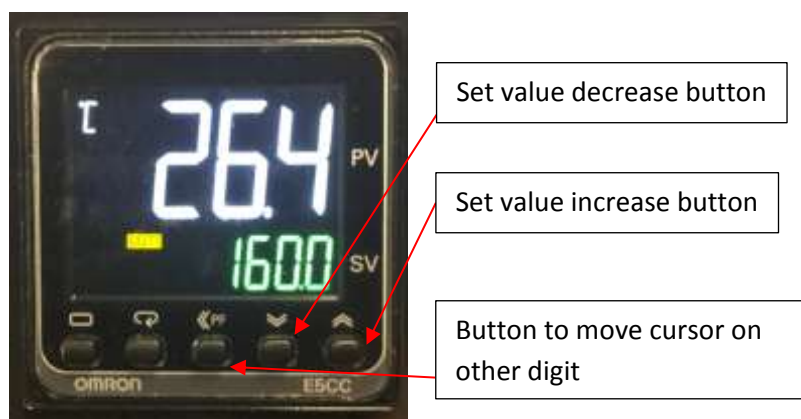
- **TOUCH Screen**

The new GT300 PRODIG series is equipped with a 7" colour touch screen. It gives you greater working comfort and a clearer view of your data and analysis results. Large screen allow display of curve

- **On / Off Switch**

Always with the aim of improving your experience, LAMY RHEOLOGY has decided to equip all of its PLUS range with a luminous and design switch. It has been placed in the centre of the device for greater intuitiveness.

Luminous On/Off switch
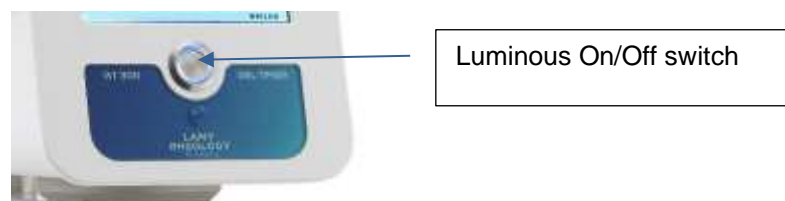
- **Aluminium arm**

The aluminium arm is equipped with the clamping knob allows you to maintain the measuring head at the highest position and a handle for easy handling. The measuring head is fixed to the arm by two screws on each side of the motor shaft.

Screw to fix measuring head

Hand for manipulation

Knob to block measuring head at highest position
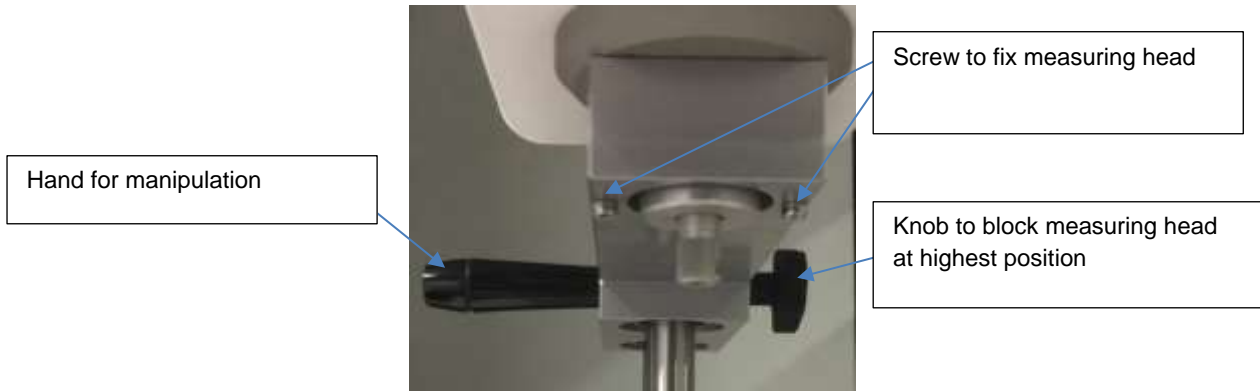
- **Stainless steel rod**

The rods of the GT300 PRODIG are made of stainless steel for a solid hold of the measuring head. They have a very long life. One of them is equipped with a ring with a tightening knob. It is used as a stop for a repeatable installation during measurement.

Stop ring

Tightening knob

- **Anodized aluminium support (model N129000)**

The stand is entirely made of anodized aluminum. It gives our instruments a very good stability (the maximum permissible temperature on the white part is 50 ° C).
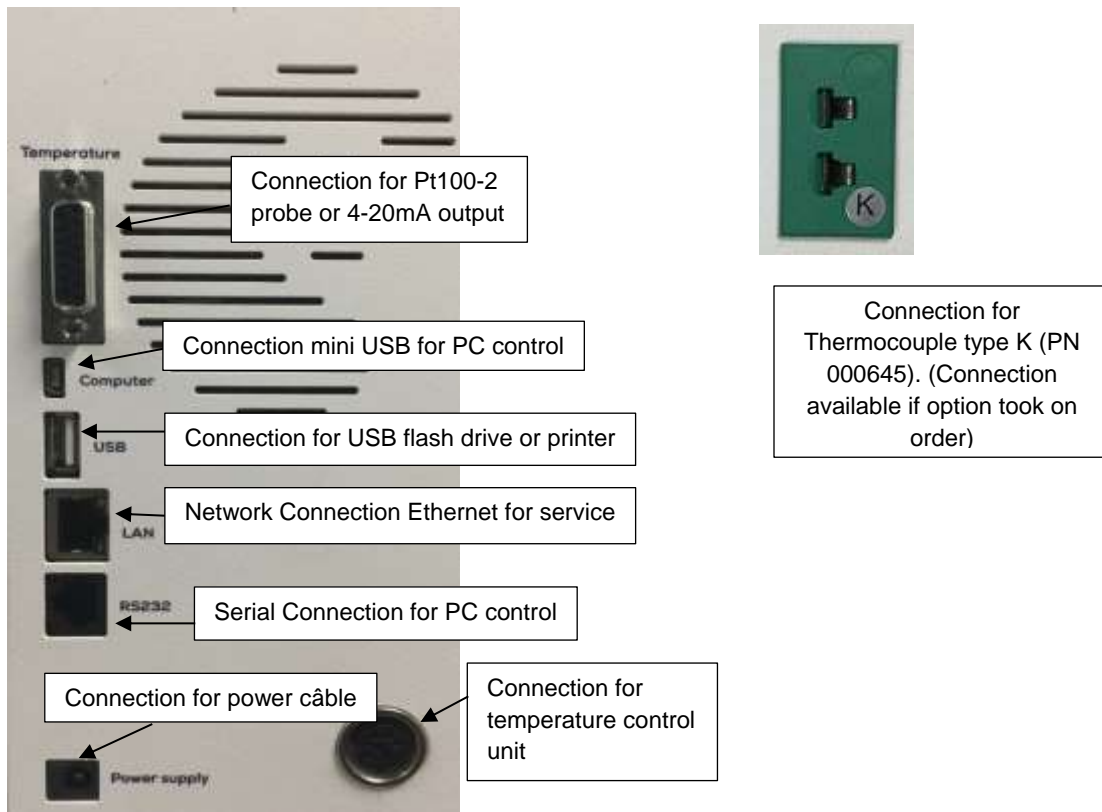
- **Support with temperature control (Model: N129100, N129200, N129400, N129500, N129600 and N129700)**

The plate placed on the temperature unit is made of composite acting as a thermal barrier and thus reduces the risk of burns for the operator. It is fixed with four screws.
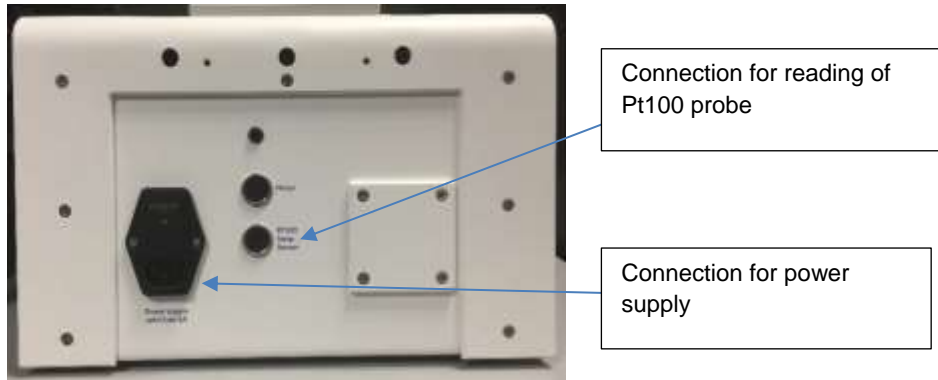

1.3. CONNECTIONS

According to delivery, rear panel of device get this available connections.

Connection for Pt100-2 probe or 4-20mA output

Connection mini USB for PC control

Connection for USB flash drive or printer

Network Connection Ethernet for service

Serial Connection for PC control

Connection for power câble

Connection for temperature control unit

Connection for Thermocouple type K (PN 000645). (Connection available if option took on order)

For models with temperature, the connection is as follows:

Connection for reading of Pt100 probe

Connection for power supply

1.4. SPECIFICATIONS

Type of instrument: Rotating springless device with 7'' Touch screen

Rotation speeds: Unlimited number of speeds between 0.3 and 1500 rpm

Torque range: From 0.05 to 30 mNm.

Temperature: The GT-300 PRODIG is also available in temperature control version from 0°C to 300°C (according to models).

Accuracy: +/- 1 % of the full scale

Repeatability: +/- 0,2%

Display: Viscosity – Speed – Torque – Time – Temperature, Choice of viscosity units: cP/Poises or mPa.s / Pa.s – Shear rate, Shear stress.

Language: French/English/Turkish/German

Compatible measuring system: Disposable Hook.

Supply voltage: 90-240 VAC 50/60 Hz

Analog output: 4 - 20 mA

PC connections: RS232 Port and USB (Some device with Bluetooth)

Printer connections: USB Host Port – Compatible PCL/5

Dimensions and weight: GT300 PRODIG without temperature unit (N129000): D320 x H650 x W200 mm. Weight: 14 kg

GT300 PRODIG with temperature unit: D610 x H700 x W340 mm. Weight: 22 kg

1.5. INSTALLATION

Your device should be installed in a clean, vibration-free environment. Even if no level is necessary, choose a stable and flat table.

The installation of the GT300 PRODIG is very simple. The measuring head is already screwed on the stem, it is sufficient to put the instrument on a stable table. No level of the device is needed.

1.5.1. Model without temperature control (N129000)

Connect you device by plugging power cable on to rear panel of device. And cable for software connection when it is provided.

Start with the luminous button.

If you are using a breakable thermocouple, go to section 1.5.3.

1.5.2. Model with temperature control (N129100, N129200, N129400, N129500, N129600 and N129700)

Connect the power cable of the measuring head and temperature unit. Then connect the blue one between the measuring head and the temperature control unit.


Switch on the measuring head and the temperature control unit. At the top right of the touch screen, the temperature of the Pt100 probe located in the warm-up unit is displayed. If this is not the case please contact LAMY RHEOLOGY or your local agent. Check the cable between the measuring head and the temperature setting unit is correctly connected.

1.5.3. Installation and use of breakable thermocouple (PN 000645)

Depending on the delivery, a breakable thermocouple can be used to measure the temperature in the sample during the measurement. You can connect it to the port on the back of the GT300 PRODIG's measuring head. If displaed temperature value on display is not correct one please contact LAMY RHEOLOGY or your local agent.

When the thermocouple is used with a GT300 PRODIG model equipped with a heat-up unit, it is not possible for you to display on the GT300 PRODIG touch screen in same time the temperature of the thermocouple and that of the probe Pt100 of the heat-up unit.

After each measurement, you can cut the two threads above the product. For a next measurement, you must strip the ends of the two cables and twist them again.
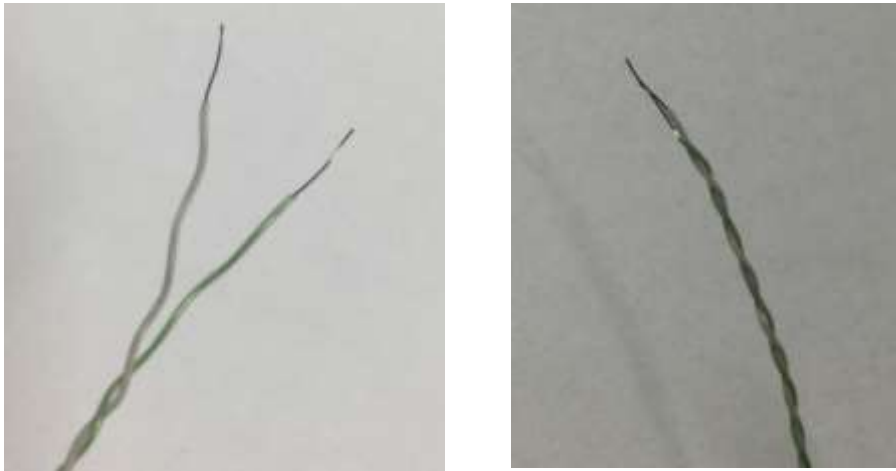
If you have ordered holder for Thermocouple, you can install it on metallic rod and insert cable inside tube. Please don't forget that the two stripped side should not touch metallic part.
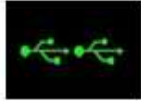
2. GETTING STARTED

Once power cable has been plugged on rear panel of device (see section 1.3), you can click on button to switch on your device (see section 1.2).

2.1. STATE ICONS

Once your device is switched on, you will see some icons on Touch Screen.

	No Device is connected to the instrument.
	Only one Device is connected to the instrument.
	Two Devices are connected to the instrument.
22.2°C	Give you the temperature of probe in the sample or from temperature unit
⚙	Enable to go to parameters of instrument.
🏠	Enable to come back to Main Menu.
↩	Enable to come back to previous menu.

2.2. PRIMARY CONCEPTS

2.2.1. MAIN MENU

Main menu enable to you to browse between different tabs of your GT-300 PRODIG. Acces is always available by clicking on home button 🏠 .
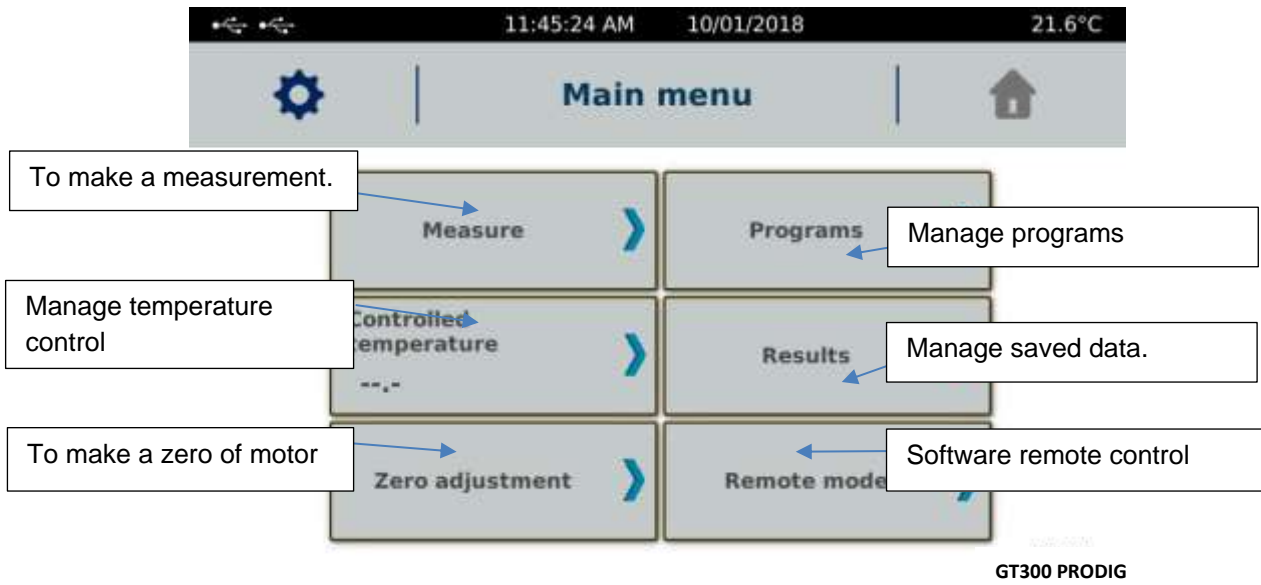
Depending on the factory settings of your GT-300 PRODIG, the temperature set button is visible when your device is paired with controllable temperature unit.

GT300 PRODIG

2.2.2. MEASURE

Measure tab is central part of your GT-300 PRODIG. Before to use it, you should install your measuring system and your sample. Please see section 3.

Then you click on "Measure", you will see a new window.

Manual Mode enables to you to personalize direct measure with shear rate or speed selection.

Automatic Mode enables you to select a predefined method saved on your GT300 PRODIG memory.
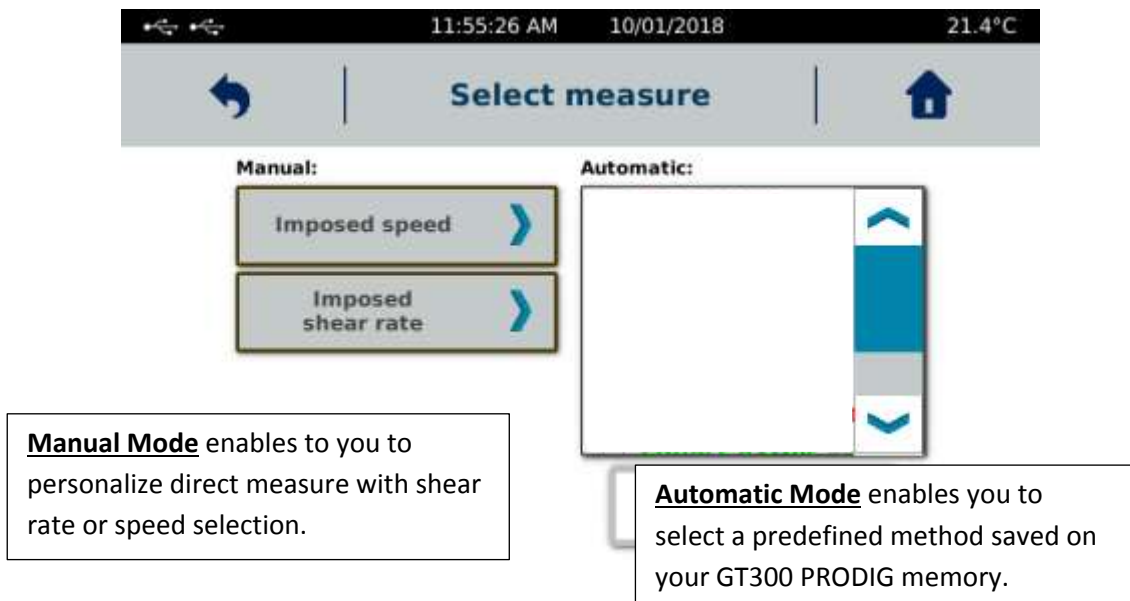
2.2.2.1. MANUAL MODE

Manual Mode enables to choose your measurement parameters like "Measuring System", "Speed" or "Shear rate" then "Time of measurement".

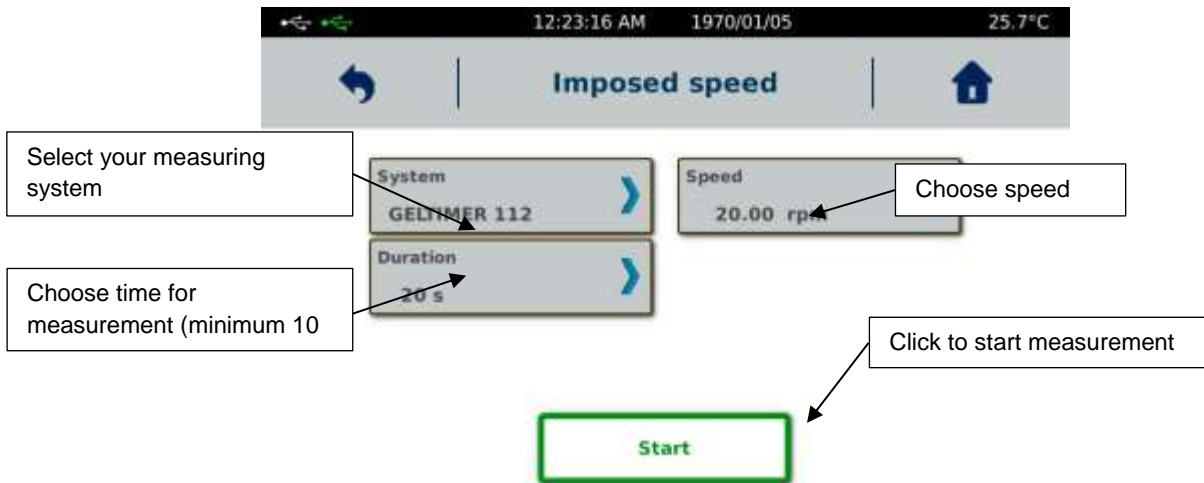This mode is interesting when a simple measurement of viscosity at a constant speed or shear rate is sufficient. When your test has to incorporate gel time analysis with inflexion point, it will be necessary to create a program (see section 2.2.3).

The "imposed speed" mode is recommended with GT300 PRODIG and disposable hook.

"Imposed Shear rate" mode is recommended when using MS RV/LV to check your device with oil (see section 4).
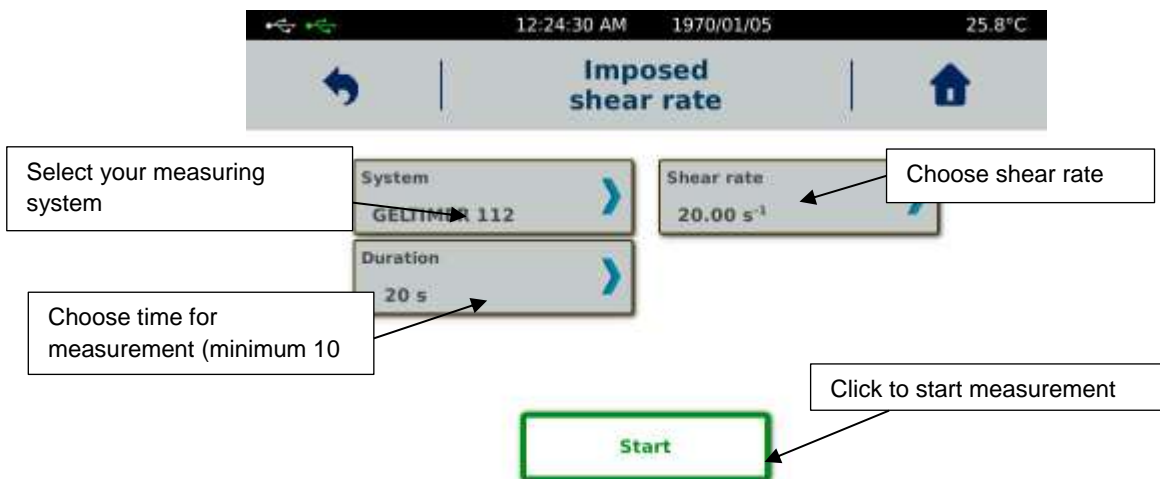
> **Rq** : If « Time » = 0, you could modify « speed » underline during the measurement.
> This could help you to define the best conditions to work on your sample.

If your measuring system is not in list, you may have to create it. Please refer to section 2.2.8.6.

Choice between "Speed" or "Shear rate" is according to your measuring system. If you need to know what is the corresponding speed then you are using shear rate, you have to use constant K_D of your measuring system (information available in section 2.2.8.6) and use this simple equation.

$$\text{SPEED} = \text{SHEAR RATE} / K_D$$

With speed unit in rpm, shear rate in s^{-1} and K_D is rpm/s^{-1}.

When your parameters are filled in, you can click on "Start" to start your measurement after having installed the geometry (see paragraph 3).

Depending on the chosen control mode, you will get both views during the test.

Imposed speed	Imposed shear rate
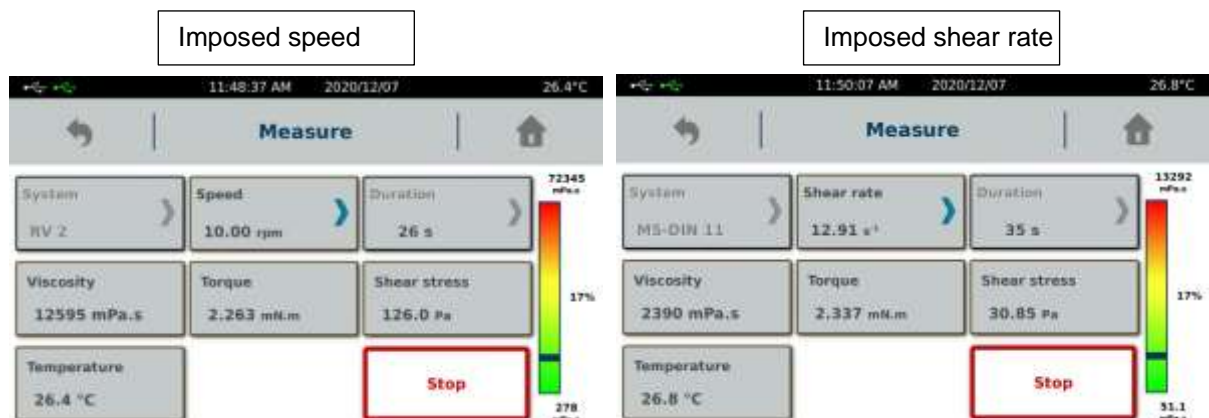
During your measurement, you will see a torque gauge (on the right side of the display). Boundaries of this gage give you minimum and maximum viscosity you can measure with your selected spindle and set speed/shear rate. You have also value in % corresponding of measured torque vs maximum torque of device. This maximum torque or viewing % can be set on device. Please contact your local agent or LAMY RHEOLOGY to manage this settings.

You must verify that the measured torque is not too close to the upper or lower limit, because you can get message as "Lower Torque" or "Torque Overload" and measurement will stop automatically. If this is the case, increase speed/shear rate. If you are close to the lower limit, please decrease speed/shear rate. If the torque reading is close to the upper limit, please decrease speed/shear rate

You will find several information available on the screen such as torque (mN.m), stress (Pa), temperature (° C), time (s) or viscosity (mPa.s). If the units do not suit you, you can change them in parameters (see section 2.2.8.5).

When your measurement is complete, you will get the window below. You will find all the data you need and will be able to save it in the internal memory or print it (if a printer is connected). If you choose "Save", the device will ask you to give a name to your measure. You will have the opportunity to read it later (see section 2.2.4.).

2.2.2.2. AUTOMATIC MODE

Automatic mode allows you to select pre-recorded programs (see section 2.2.3).
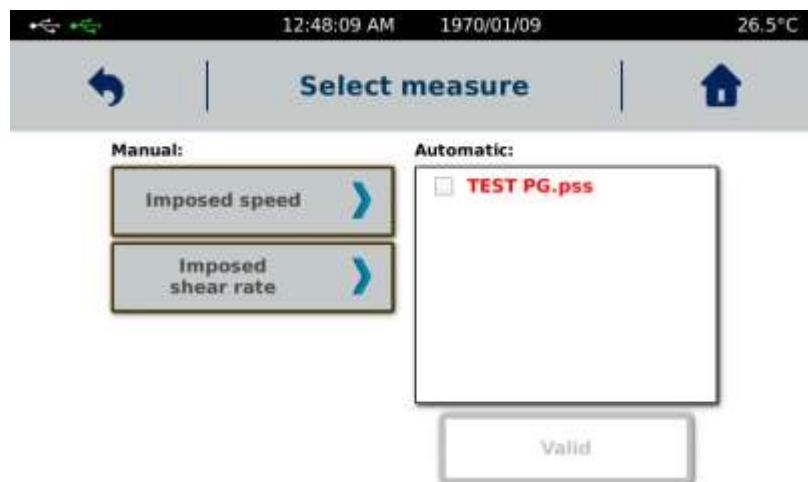
The format of the methods is as follows:
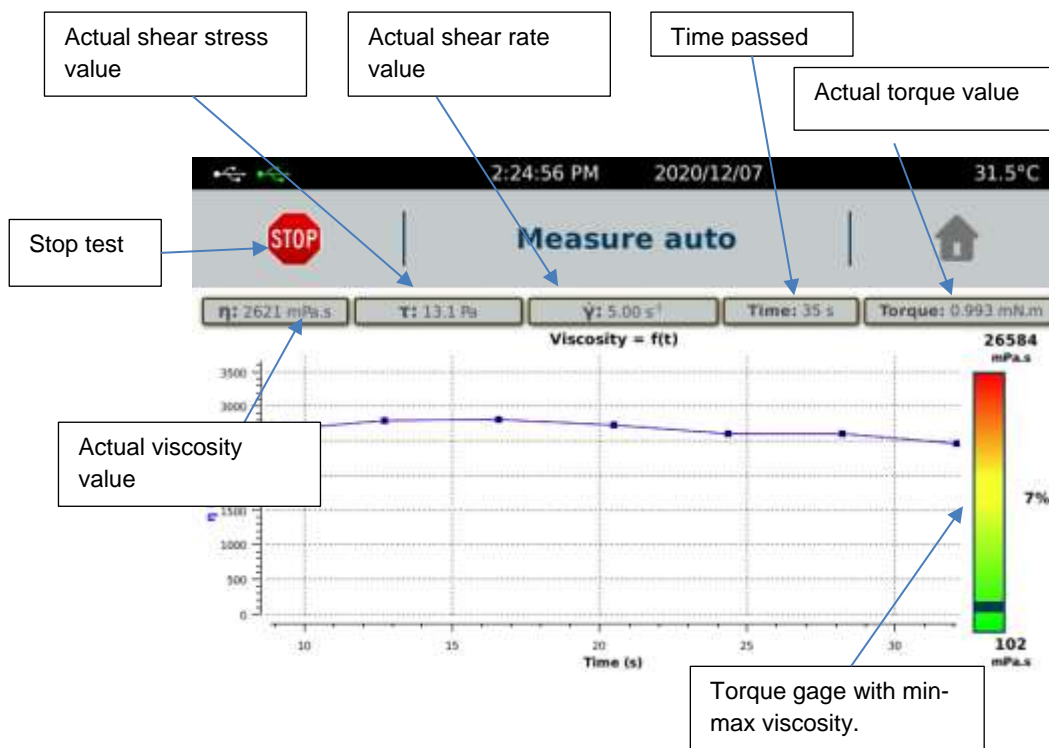
- Files in "* .pss" for speed/shear rate step method.

Select the program from the list and click "Valid" to start your measurement. The display adjusts automatically to show you the parameters of the chosen program.

Start measure

STEPS

File name	TEST PG.pss
Measuring system	GELTIMER 111
Step of	Speed
Num. of steps	1
Num. of points	50

Start

Whatever type of program selected, the instrument will ask you to save your measurement when you click on "Start". If you wish to see in detail the contents of each method, we invite you to consult the paragraph 2.2.3.2.

Methods in step mode (format pss) contain only one step. These methods are intended for constant parameter measurements over time. The display of the curve will be different with time on x-axis. The name of the graph is also different (here Viscosity = f (t)).

Actual shear stress value

Actual shear rate value

Time passed

Actual torque value

Stop test

Actual viscosity value

Torque gage with min-max viscosity.

At any time you have the option to stop the measurement by clicking on the "Stop" button. The device will then ask you whether you want to save the measurement or not.

Methods contain an analysis at the end of the measurement (gel time, see 2.2.3 for more information). When the measurement comes to an end, you will be able to see the result of this analysis as well as the curves obtained.

RES1.A00
Viscosité = f(t)

Gel time

40.55 sec
Points: 10 %

θ Avg.
21.9°C

Give you time when
inflexion time (means
Gel Time) is reached.
Please see section
2.2.3 for explanation.

All saved results can be read later (see section 2.2.4.)

2.2.3.   PROGRAMS

In the Programs tab you will be able to create your Measurement methods as well as edit /
modify or delete them. The last two buttons are accessible only after selecting a saved method.

2.2.3.1. NEW PROGRAM

When you click on the "New Program" button, the device will offer you two different types of programs. Choose one you want to have and click on create.

This programming mode makes it possible to carry out a speed / gradient ramp.


At the beginning of your programming, all the buttons are grey except for the "System" button. Selecting the measurement system and validating will automatically activate the next button and so on. You will then be able to indicate the number of points, the duration of the pre-shear (can be set to 0 if it is not necessary) as well as the speed/shear rate (a value must be indicated here even if pre-shearing is not necessary). Next is the speed/shear rate (for information the speed range of the GT-300 PRODIG is from 0.3 to 1500 rpm and for the shear rate range see the tables in paragraph 3 concerning each type of measuring system) and its duration in seconds.

The "Temperature" button is only available if your device is delivered with temperature device controllable by the GT-300 PRODIG. By default this function is inactive. If you subsequently acquire such a warm-up unit, you must contact LAMY RHEOLOGY to activate the function on the GT-300 PRODIG which will allow you to set a constant set point temperature for the

duration of the measurement. The "Start temperature" function allows you to wait for the set temperature to be reached before starting the measurement.

The "Curve fitting" button allows you to perform an analysis on your measurement at the end of it.
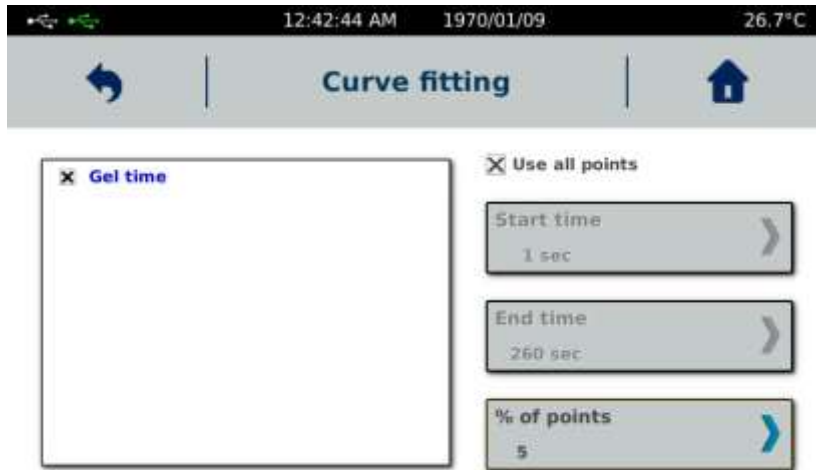
Gel time model is a tool to find inflexion point on curve viscosity over time. While curing process, viscosity of you product will increase. After a specific time, curing reaction will go faster and a turning point will appear on curve. Gel time analysis will plot two tangent (one for the first part and one for terminal after turning point). To allow plotting of these two tangent, you should indicate each part it has to use for these tangent with "% of points". This percentage corresponds to number of point use for tangent calculation. For example, if your method gets 100 total point, 5% means the first 5 points and last 5 points. So device will use this two zone to plot tangent and finally find intersection time of them to give Gel Time.
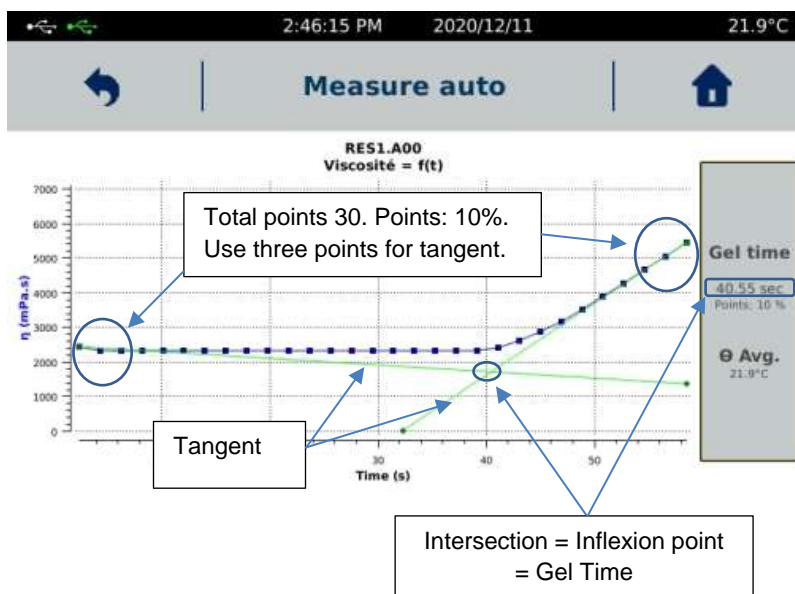
You can also use all point on curve or a part of them with "Start time" and "End time". % will be real number of point selected between these two boundaries selected.

Once your programming is complete, click on "Save" and give a name to your method.

2.2.3.2. EDIT PROGRAM

This function allows you to edit a program to view its content or edit it. Just select it from the list and click on "Edit Program". When you have made changes, you can save the new method by giving it a new name or rewrite the old method with the same name. If you only want to view the settings, just click the back arrow to return to the previous view.


2.2.3.3. DELETE PROGRAM

This function allows you to delete a program from the memory. Just select it from the list and click on "Remove Program". The instrument will ask for confirmation of the deletion. If you do not want it anymore, just press the return arrow to return to the previous display.

2.2.4. RESULTS

This menu allow you to read, export or delete data from internal memory. Press on «Results» tab in Main menu.


Once you are on the screen below, simply select the measurement in the list and choose the desired option. The measurements in green correspond to results obtained with a programmed method while the measurements in red come from measurement in manual mode (see paragraph 2.2.2).
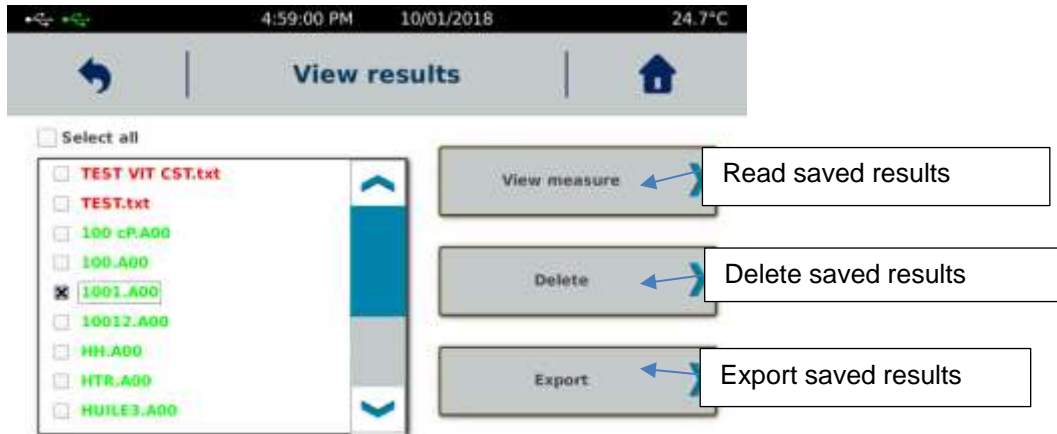
When you select measurements done in manual mode, you will get this view with all important information saved with the result.

When you select a measurement obtained through a programmed method, you will get this display.
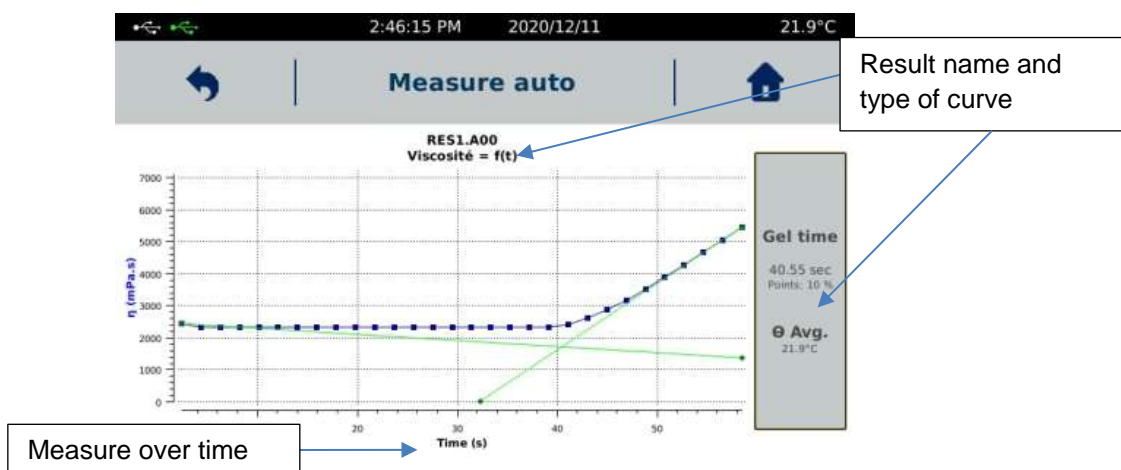
When a printer is installed and connected to your device (see section 2.2.8.9.), A symbol next to the "Home" button allows you to directly print your curve or result.

The "Export" function is accessible only when a USB key is connected to the back of the GT-300 PRODIG (see connection section 1.3). If you want to export all the measurements at the same time, you can do this by checking the "Select all" box. Whatever the program used for the measurement, only the recorded data can be exported. It is not possible to export or copy a diagram.

The format of the data generated and saved by the device is ASCI (* .csv). Once your data has been copied to the USB drive, you can open the files using the EXCEL spreadsheet. To do this, simply copy the data from the USB stick to your computer. Then open Excel, then choose "File", "Open", taking care to select "All files *. *". The Excel spreadsheet will offer you to convert your data by displaying three successive windows.
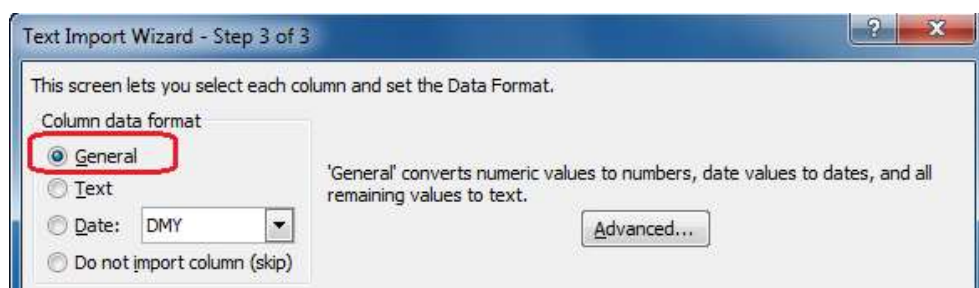
Verify that the "Delimited" function is selected and then click next.
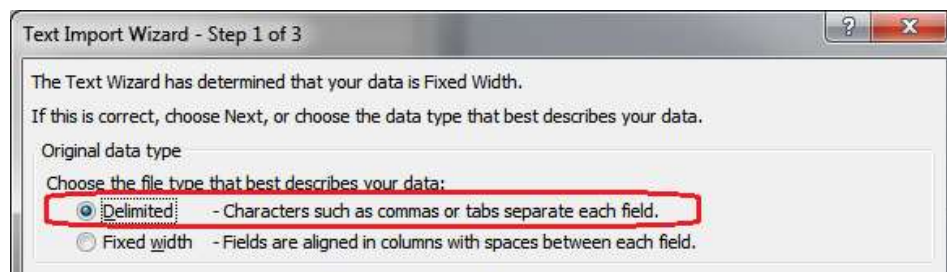
On the next window, be sure to select the "semicolon" as the separator and click next
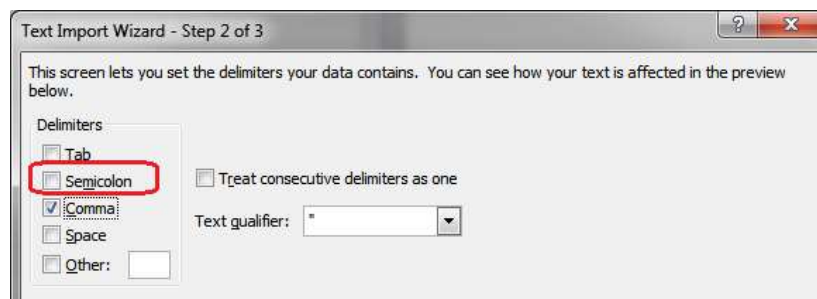
On the window below, select the general mode and click on finish. Your will get a table with all the information.

To delete a result, simply select your measurement in the list and click on "Delete". The deletion will be complete only after confirmation from you. You can also delete all measurements by clicking on "Select all" then "Delete".

2.2.5. CONTROLLED TEMPERATURE

This function is available on the main menu display.

As described in section 2.2.2, this function is only available if your device is delivered with temperature control controllable by the GT-300 PRODIG. By default this function is inactive. If you subsequently acquire such a warm-up unit, you must contact LAMY RHEOLOGY to activate the function on the GT-300 PRODIG which will allow you to set a constant set-point temperature for the duration of the measurement. It may be different from the temperature set-point set in the registered method. If so, temperature set in method will be automatically used then test will be launched.

2.2.6. ZERO ADJUSTMENT

The zero setting allows you to calibrate your GT-300 PRODIG to take account of the engine's empty friction.

The rotation speed for zero adjustment can be changed to suit your needs, giving you much more accurate measurements at specific speeds close to your measurement parameters.
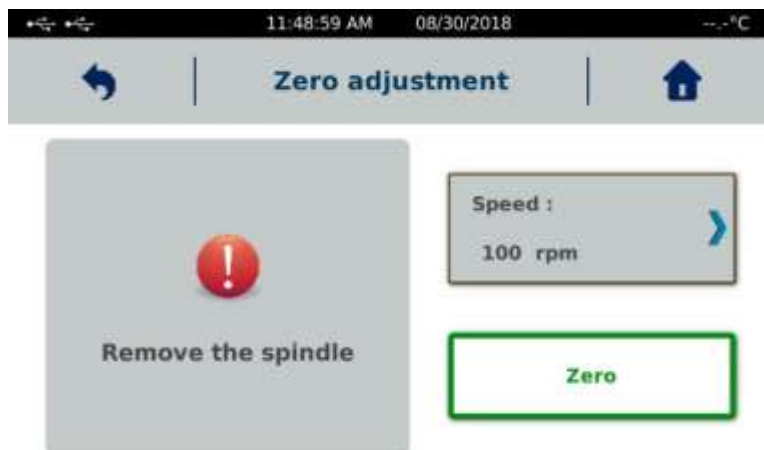
This operation must be done without measuring system. Then zero is finished you can click on OK and internal motor friction will be automatically saved inside memory of device. If a problem occurs during zero setting, please try again. If the problem still present, please contact your local distributor or society LAMY RHEOLOGY.

2.2.7. REMOTE MODE

This mode enables to drive GT-300 PRODIG by external RheoTex software, supplied on option. This function is available on the main menu.

Once the device is connected to the PC, you must select the type of port (USB or RS232) and click on "Ok" to start the communication. As long as communication is not established, a "Waiting Connection ..." message appears on the screen. Then launch the software and check that the screen switches to the display below. If this is not the case, check the connections and make sure that the COM port number set in the default settings of the RheoTex software is correct and identical to that recognized by WINDOWS in "Control Panel", then "System and "Device Management" (see the operating instructions for the RheoTex software).

2.2.8. SETTINGS

This parameters menu allows you to change settings of your device. It is reachable by clicking on icon ⚙ in upper left corner of touch screen which is only available then you are in "Main menu".


2.2.8.1. LANGUAGES

It enables you to select language of your GT-300 PRODIG. You have choice between French or English. Then you have selected your desired language, you have to click on "Ok" and device will reboot automatically to show new language. In this menu you will be able to see Firmware version of your device.

2.2.8.2. DATE / HOUR

It enables you to adjust hour and date of your GT-300 PRODIG.
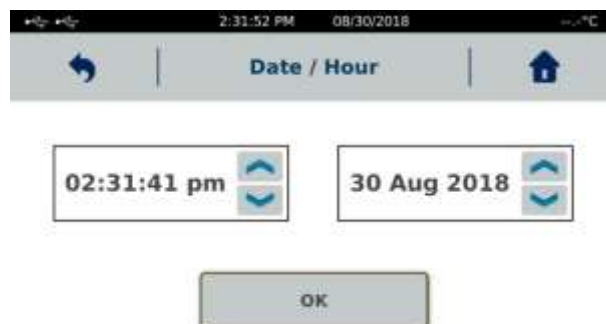
2.2.8.3. SOUNDS / STANDBY / LIGHTING

It allows you to modify sounds, lighting and activate or not the Standby mode of your GT-300 PRODIG.

Choose if you want to get sound during using touch screen.

Choose if you want to switch off automatically your device after no using. After selecting "Standby enable", you will have to set time. Your device will be switch off after this time.

Choose if you want to get sound then measurement is finished.

Choose if you want to change brightness of Touch Screen.

2.2.8.4. USER NAME

Operator mode will allow you to create different operators for your GT-300 PRODIG. This function allows you to identify operator doing measurement and lock some functions of instrument. It can be combined with the "Locked mode" to increase protection level of settings and data (see section 2.2.8.7).

Operator management must always start with the creation of the first account, which will become the administrator. You can create other operator accounts or delete them. The administrator account must be associated with a password (here called PIN).

To create the administrator account, click on "Add user with code PIN". Fill in the name and the associated PIN code.

After indicating the name and password, the administrator just created will have his name in red in the list. You can now create other operators with or without a PIN. All other accounts will be indicated with black colour.

To delete an account, administrator account must be used. Select the account to be deleted from the list and click on "Remove user". The administrator account can only be deleted when it is the last available account.

To use the operator accounts you must activate mode by selecting "Enable user mode". Once activated, you must select an operator and enter the PIN code if necessary. By returning to the Main Menu, you will be able to see the name of the operator logged under "Main Menu". By clicking on the arrow below the name of the operator, you can turn off the GT-300 PRODIG or change operator.
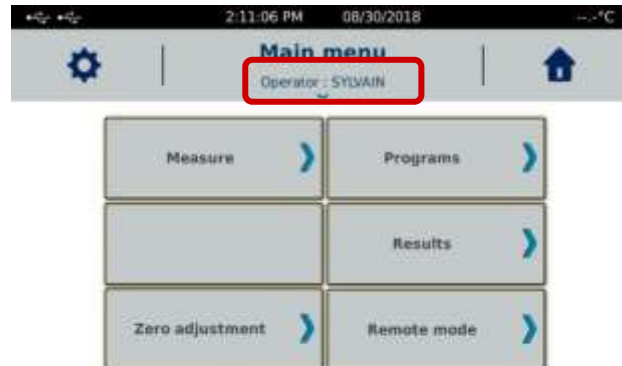
If the instrument is turned off and on while operator mode is on, it will be asked you to select the desired operator. Select the operator, enter the PIN code if necessary and confirm.

When an operator account other than the administrator account is used, some functions of the "Settings" menu are disabled. They are all if the "Locked mode" is activated (see section 2.2.8.7).

| User mode alone | User mode and locked mode activated |
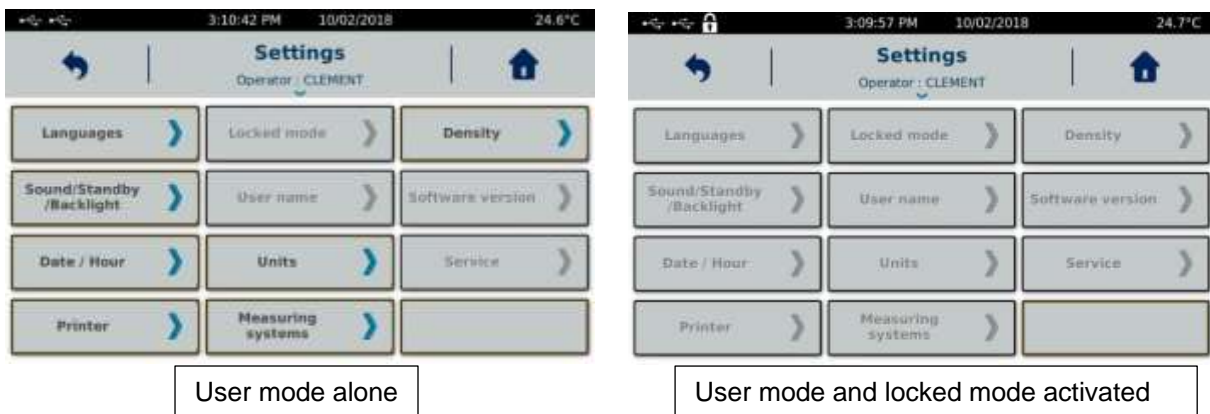
To disable the "User" mode, the administrator account must be used. Then click on "Disable user mode". This disabling doesn't lead to the deletion of created accounts.
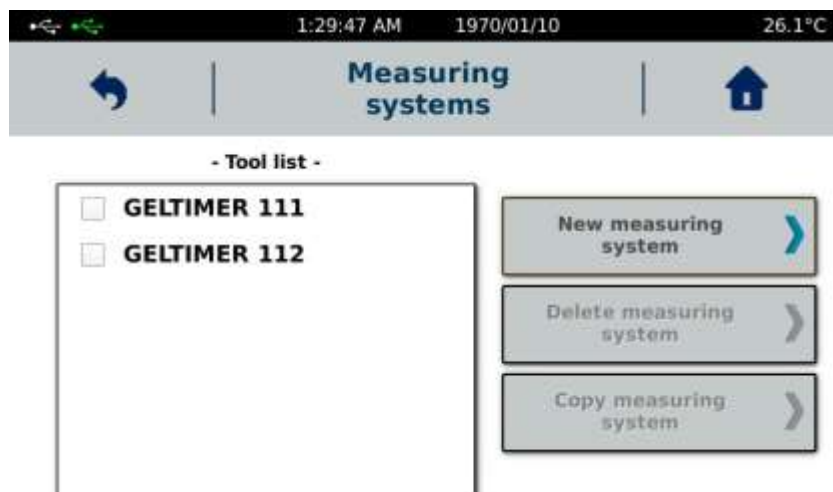

2.2.8.5. UNITS

Allows you to change units of viscosity and stress used for programming methods and displaying results and diagrams.

2.2.8.6. MEASURING SYSTEMS

It allows you to add or remove a Measuring System.

All measurement systems stored by default in memory are not removable. Only those you have created yourself can be removed. To delete a measuring system, select it from the list and choose "Delete Measuring System". If this function remains greyed out when you have selected a system, it is part of the default mobile stored in the instrument's memory.

To add a new measuring system, you have two possibilities. Either create it using the "New measuring system" function, or select an existing system using the "Copy measuring system" function.

You are not allowed to change the constant of an existing measuring system. If you want to use a new constant for an existing measuring system, you have to copy this measuring system by renaming it and then enter the constants you want to use. Note that the KD constant is used to convert rotational speed to shear rate and KTau to convert torque to shear stress. Shear rate and shear stress are used to calculate the viscosity value. If you use a different constant value, you will get a different viscosity result.

Here is the list of constants used for measuring systems compatible with the GT-300 PRODIG.

| SYSTEM	Ktau / 1 mNm in Pa	Kd / 1 RPM in S-1	Ri / Ra
GELTIMER 111	155	1	1
GELTIMER 112	140	1	1

2.2.8.7. LOCKED MODE

"Locked Mode" protects all data, settings, results and methods stored in the instrument's memory. It is indicated by the presence of a small padlock next to the USB symbols. It should be used if you want to protect some settings on your device. All the functions in the "Settings" menu will be locked, except for the "Locked mode" button to enable deactivation.

This function will also block the parameters for the measurement. This way, if you want to always use the same measurement settings, you must enable this locked mode to make sure that no one will change the measurement settings. Automatic mode is normally accessible for method selection.

In protected mode, it is not possible to change the temperature set-point or to access the program creation or editing mode. The visualization of results is accessible as well as the export of data. But no suppression is possible. The "zero adjustment" is accessible but it is not possible to change the speed of rotation used.

After selecting "Locked Mode", you must click "Enable". The GT-300 PRODIG will ask you to register a 4-digit code that will be required to disable this protected mode. Each activation is independent and can be done with a different code and the deactivation of the mode will always be done with the code used to activate it. To disable protected mode, you must return to "Settings" and "Locked Mode" and click "Disable" by entering the 4-digit code.

This function can be combined with the "User" mode, thus increasing the protection level of this mode. If you want to combine these two mode, you must first activate the user mode (see section 2.2.8.4). Then use the administrator account to enable the '' Locked mode ''. When a simple user account is used, we will find the features of the protected mode.
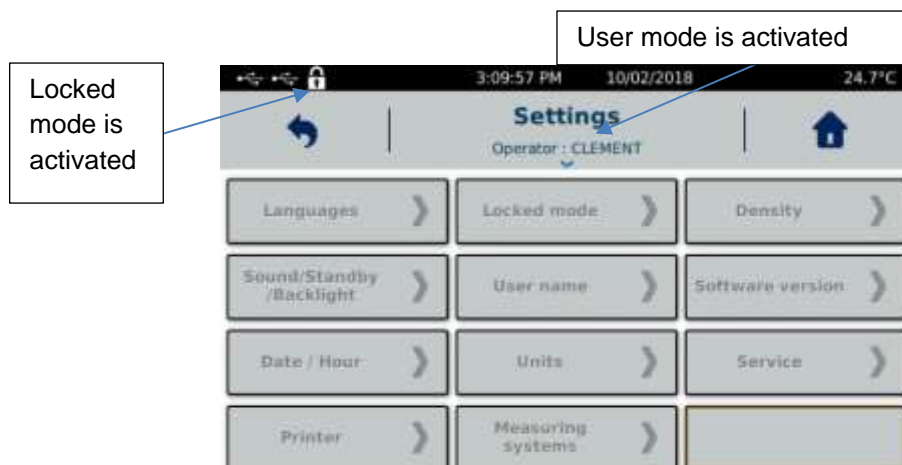
Disabling the protected mode in this configuration will be done only when the administrator is connected.

2.2.8.8. DENSITY

It enables you to enter density value of your product in order to measure his kinematic viscosity.

If you set a density value, you will get all the time viscosity in cStoke. Please remove density information if you want to get back Pa.s or Poise for unit of viscosity.

2.2.8.9. PRINTER

Allows you to connect a printer, print a test page, and choose the print interval time you want during measurement.
The GT-300 PRODIG can be connected to all printers with a PCL5 print protocol. This includes many A4 printers. The connection is made to the "USB host" port on the back of the instrument. Once the printer is connected, simply click on "Install Printer".

Once the printer is recognized and installed, you can see its name on the screen.

Printing a test page verifies good communication. If you choose to connect your instrument to another printer, be sure to delete the one already installed.

When a printer is connected, the printer symbol appears when viewing a result or at the end of the measurement.

You have the possibility to print the measurement information (date, operator, result name, geometry used), a table with all the recorded values, the diagram and the result of the regression if they are present.

2.2.8.10. SOFTWARE VERSION

This menu allows you to update the firmware of your GT-300 PRODIG. This function is used when updating the machine data is necessary. Do not go in this menu without being invited by the company LAMY RHEOLOGY. The update is done via a USB key connected to the "USB" port. You can then click on "Update" to update your instrument. At the end, your device will turn off and you will have to turn it on again.

"Calibration monitoring" settings indicate time while device has been switched ON and time while it was used for measurement. You can also set next date for checking to allow device to remind you.

2.2.8.11. TORQUE THRESHOLD

This function allow user to set value of torque to stop automatically the measurement. As explain to the first section (see 1 Introduction), torque value and speed are used to calculate viscosity value. Link to constant for each spindle GELTIMER 111 and GELTIMER 112 (see section 2.2.8.6) and speed, torque value will correspond to viscosity value. So set device to stop at specific torque value is similar to stop at viscosity value.
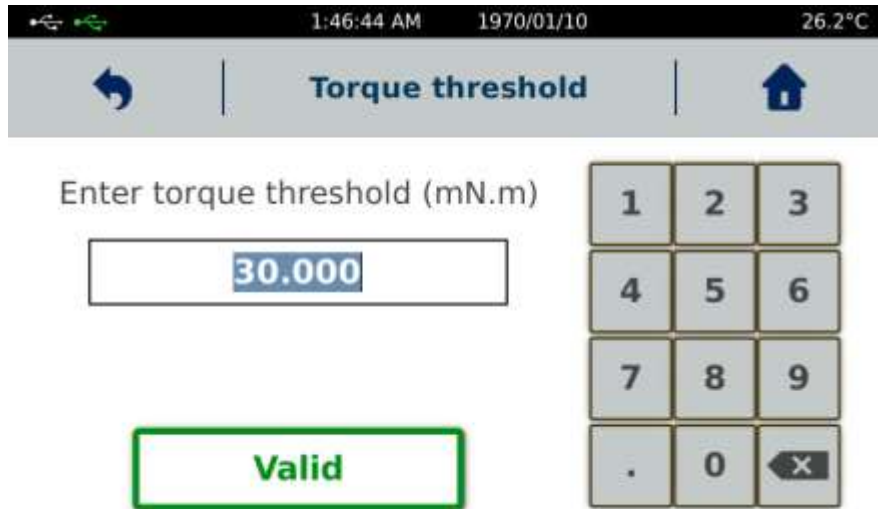
2.2.8.12. SERVICE

Reserved to LAMY RHEOLOGY engineers.

3. MEASURING WITH YOUR DEVICE

This section will show how use the different measuring systems with your device.

Device need to be installed before next section of this manual (see section 1.5).

3.1. INSTALLATION OF MEASURING SYSTEM

Read the installation of your measuring system in the following sections before inserting it on your device. Indeed some measuring systems require the installation of accessory before the insertion of the spindle.

As the GT-300 PRODIG get only one kind of bayonet coupling system, way to install measuring bob on shaft of device is always the same.

Depending on the order, the GT300 PRODIG comes with fixture and hooks. To set the hooks, please unscrew the clamping knob, insert the hook and lock it by tightening.
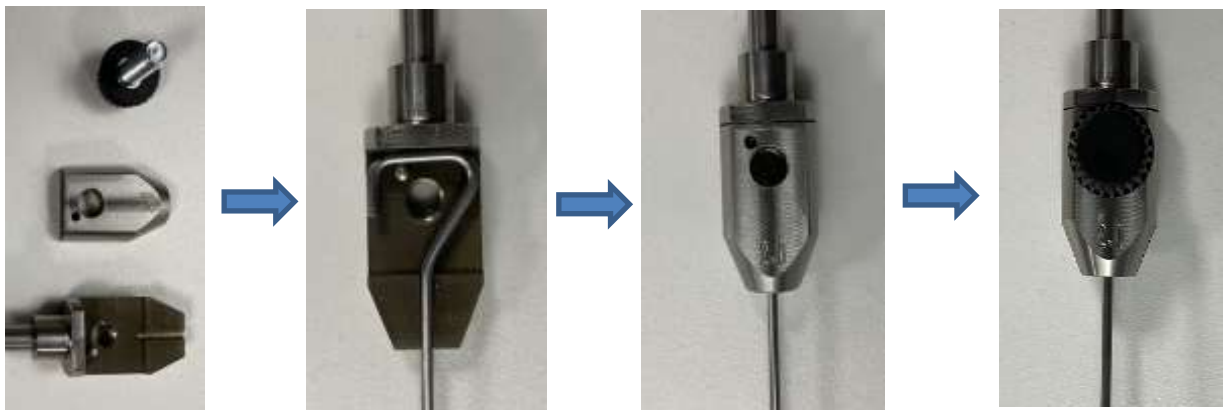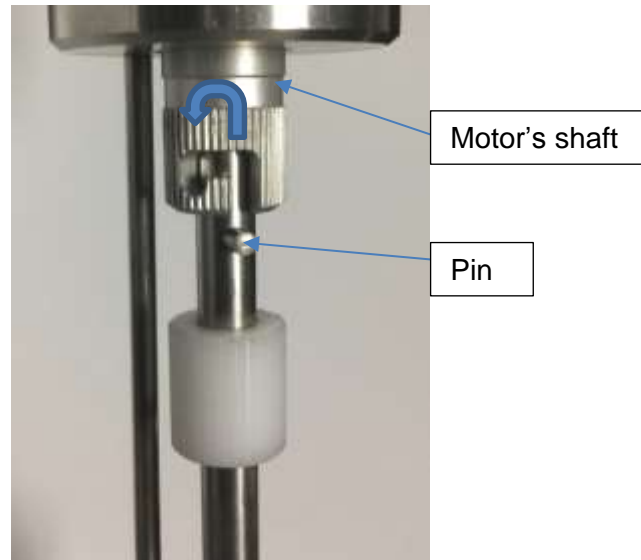

Measuring hook
GELTIMER 111
(Vol. 50-80mL) (Set
of 100) PN 700010

Measuring hook
GELTIMER 112
(Vol. 35-50mL) (set
of 100) PN 700040

Insert the hook holder with the bayonet coupling into the motor shaft by pushing and turning slightly so that the pin is lodged in the space provided.

Motor's shaft

Pin

Make sure the assembly is well aligned by slightly rotating the assembly. If necessary, reposition the hook by twisting slightly, taking care to hold the motor shaft with your other hand to prevent damage to the motor.

You can then set up the disposable cup that will accommodate the product.

Check that the disposable cup is touching the bottom of the well. Be careful not to burn if the bottom of the well is already in temperature.

Place the stop ring on the rod at the lowest position by unscrewing it completely (see section 1.2). Lower the measuring head by holding it with the handle of the arm so that the hook is closer to the bottom and the walls of the bucket without touching it. Block the head in this position using the screw on the arm. Check by applying a slight rotation that there is no friction between the hook and the cup. If this is the case, move the measuring head again. Once the position is final, place the stop ring just below the arm and lock it with the knob. This then allows you to raise the head to the highest position while keeping the measurement position with the stop ring.

Fill the cup with your product. Make sure that the quantity is sufficient for the hook to be immersed. The quantity needed can be judged using water first.

Lower the measuring head to the stop ring. It is useless again to tighten the screw on the stem

4. VERIFICATION OF YOUR DEVICE

Your instrument is calibrated at the factory with an ASTM R2 measuring system (see calibration certificate) and a certified oil with a viscosity close to 1000 mPa.s. The verification method differs depending on the measurement system selected. You may decide to perform the verification with your own measurement systems, but it is highly recommended to use one of the two measurement systems mentioned above. In case other systems are used, please contact LAMY RHEOLOGY for the most appropriate verification method.

If you don't have ASTM RV2 spindle, please contact your local partner or LAMY RHEOLOGY.

Viscosity measurement on a 1000 mPa.s standard silicon oil with a ASTM 2555 R2 measuring system.

- See section 3.1 for detail about preparation and insertion of spindle.

- Adjust the automatic zero in the air at 50rpm, without any spindle, until it stops (see section 2.2.6).

- Fill the 600ml beaker with the standard oil.

- Place the 600ml beaker in a controlled temperature unit like thermostatic bath to stabilize temperature around 23°C.

- Place the 600ml beaker above disposable cup chamber of GT300 PRODIG.

- Attach the spindle R2 (See section 3.1) to the device and immerge the spindle in the oil at the good level (mark on the spindle).

- Select on the instrument the measuring system R2 (see section 2.2.8.6 if you need to create it with constant Ktau=55.65, Kd=1 and Ri/Ra=1), select 50 rpm for the speed, select 60 seconds for the measuring time, and start the measurement (see section 2.2.2).

Result at the end of the measurement must be within +/-5% of the standard viscosity value. If the measure is out, your instrument might need to be recalibrated.

Check if the error does not come from a wrong filling, a wrong zero adjustment, a wrong spindle rotation, or a wrong temperature value.

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