GDS Manual

A Romosoft product

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1 GDS

1.1 First start :

In the ROMOSOFT toolbar, click on GDS ![icon]. (Read installation note document to use ROMOSOFT toolbar)

The following window appears:
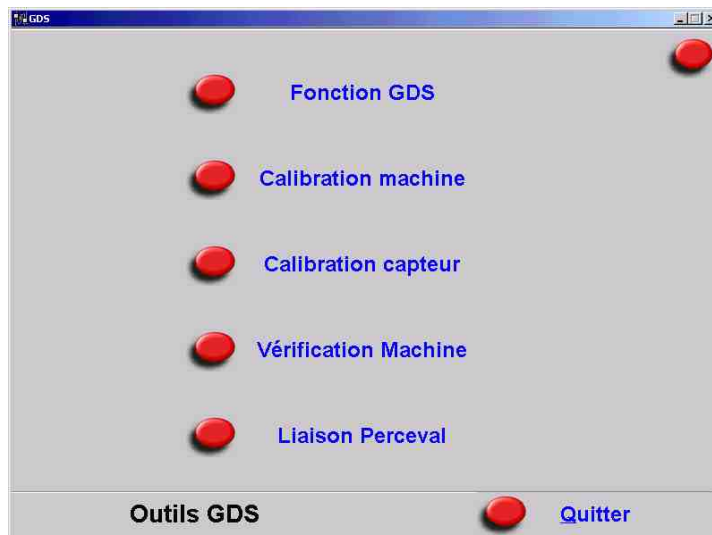
1.2 Description:

GDS is a maintenance tool for 3D portable gauging machines and an interface with gauging software.

This tool contains 4 maintenance functions
GDS Function
Machine Calibration
Probe Calibration
Check of Machine

And one interfacing function:
"Perceval" Link

2 Fonction GDS

2.1 Description of the interface
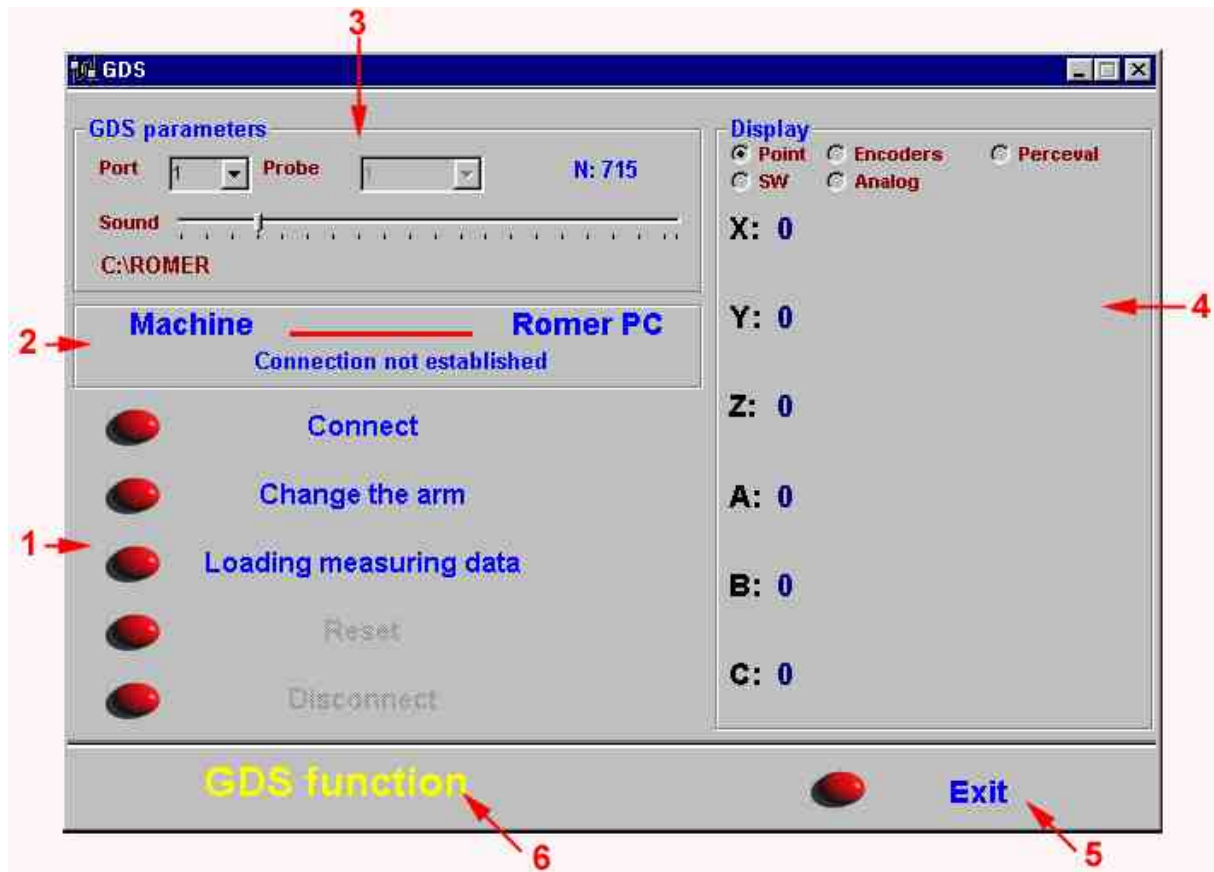
1. Communication and data management functions (Connect, Load Arm data …)
2. Zone of information on status of communication with arm
3. GDS configuration parameters
4. Choice of type of display
5. Exit from "GDS Function"
6. Reminder of function used

2.2 Communication and data management functions

2.2.1 Connect:

Used to set up the link between the machine and the GDS software.

Note: If a connection error occurs, the *Information on status of communication with arm* zone is refreshed and a troubleshooting help function is started automatically

2.2.2 Change of arm:

Used to choose the arm in use.

Click on the **Change arm** button. The list of arms in memory (Fig. 1) appears.
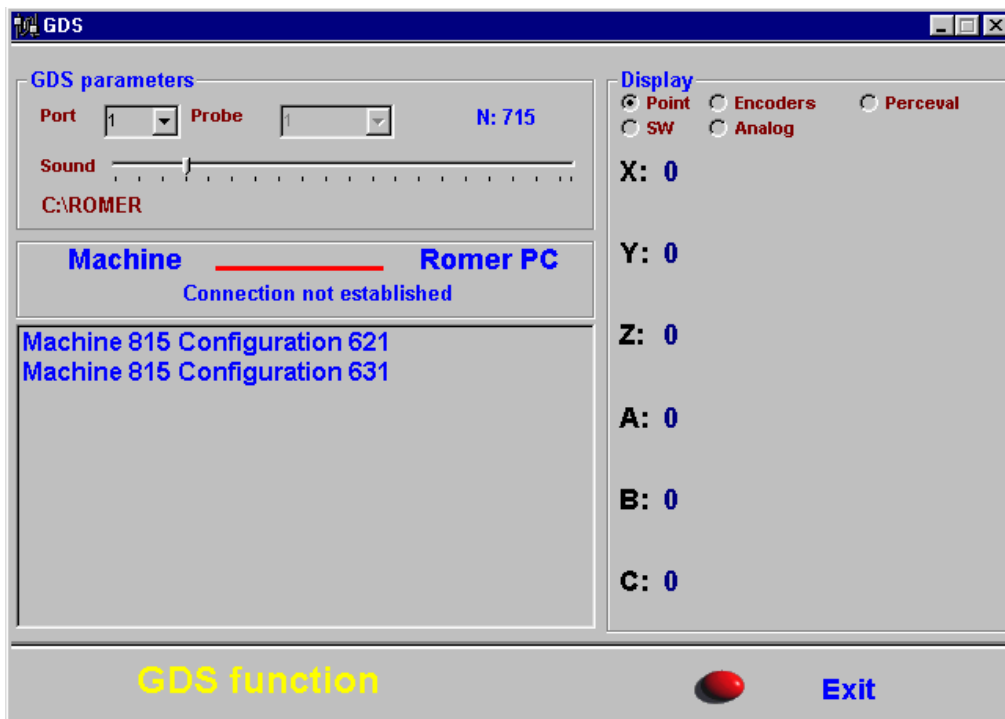
Fig. 1

❑ To select the Arm (or the configuration) in use, click on the corresponding line, then click on the button   and select « Activate «

❑ To add an arm or a configuration to the list, click on the button   and choose « add », give the type and number of the arm (replace the #)

❑ To erase an arm (or all the arms), click on the button   and choose « delete » ; answer YES to the question « Are you sure you want to change the configuration ? ».

2.2.3. Load arm data:

Used to load the data specific to a measurement arm.

If GDS is used with several arms select the arm (see previous paragraph)

Click on the **Load arm data** button. A window appears to let you select the machine data file. Two possible sources:

❑ Data download from a security disk: download is automatically done, GDS creates the directories for each configuration (on C:\Arm) and loads on it the corresponding data, or, if there is only one configuration, loads data in the root directory (C:\Arm). For each configuration a message indicates that data are well loaded.

❑ Data download from a directory of the workstation (or if the automatic load doesn't work): A window ensuring to select data files of the machine appears.

Select ARMSPECS.GDS file.

❑ For "Suprastuff" type data, select ARMSPECS file.

A window (fig. 2) appears. It lets you select the type of machine used (ARM 100, ARM 2000, ARM 2200, ARM 2500, Armony and IT5). Choose the type of machine and validate.
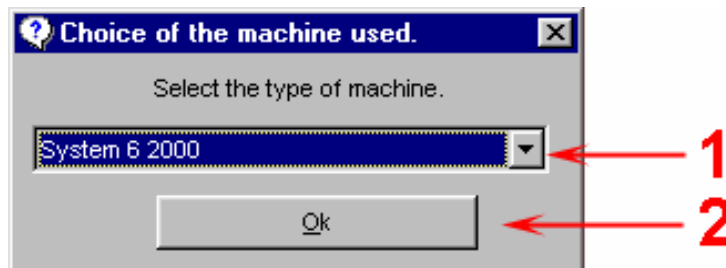
Fig. 2

1. Call up a list in which to choose the type of arm
2. Validate

Indicate the serial number of the machine in the next window (Fig. 3), then validate. A message indicates if the data are successfully loaded.
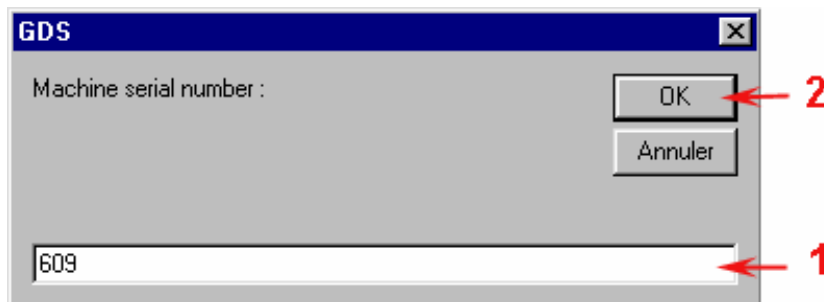
Fig. 3

1. Serial number of the machine
2. Validate

2.2.1   Load arm data with security disk :

2.2.1.1   Automatic Configuration

Put in the floppy disk driver, the security floppy disk delivered with the arm.

Click on **{GDS function}**, the following window will appear, click on **{load arm data}.**
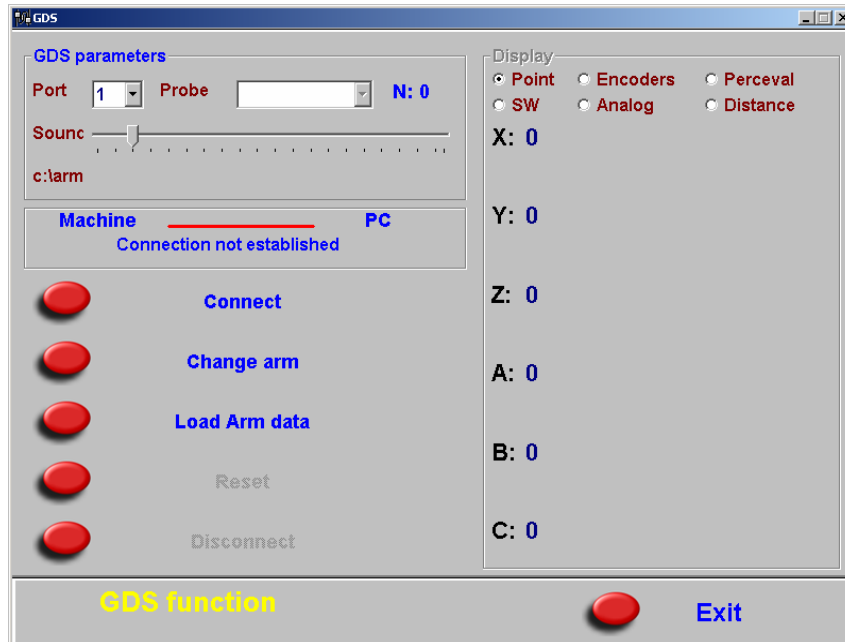
If the machine is an Armony with several configurations, validate all configurations you want to install and select the wanted configuration : Then click on **{Change arm}** and **{Activate}**.
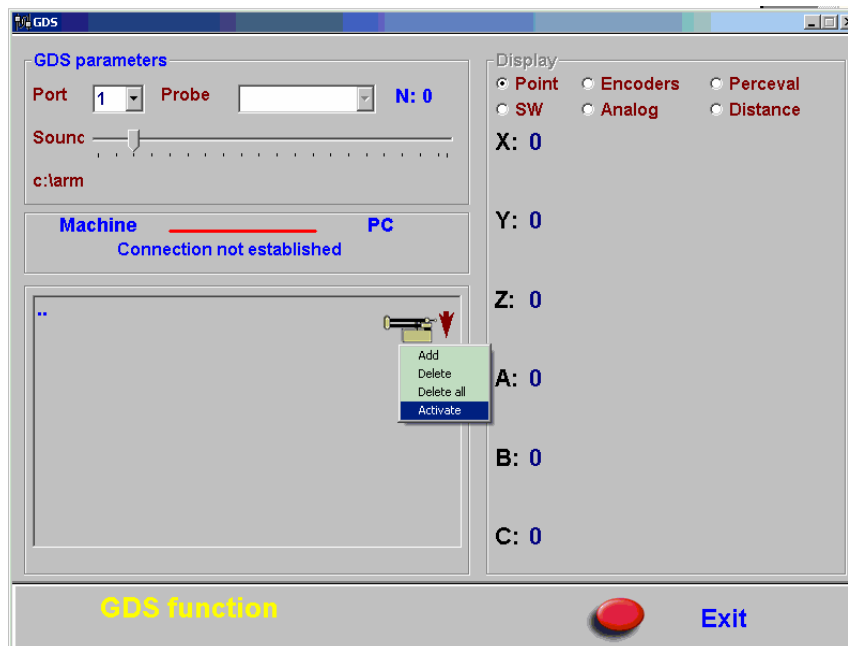
2.2.1.2 Manual configuration

The following window appears when the security floppy disk is an old version. In this case you have to load data manually. Look point 4.3.2.1 if you have one configuration, point 4.3.2.2 if you have several configurations.
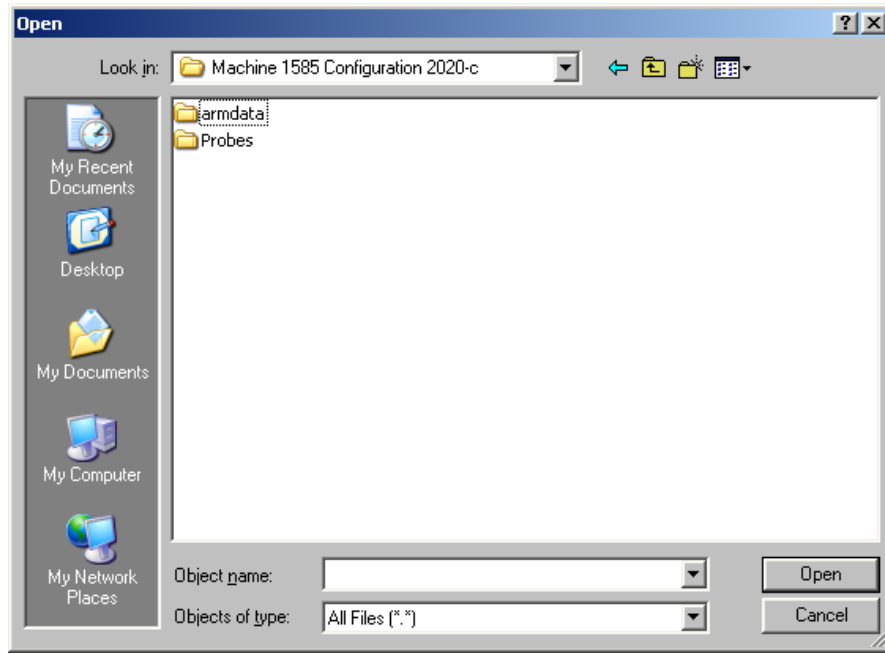
2.2.1.3 Manual loading of arm data with one configuration

Select on the security floppy disk the file Armspecs.gds and click **{open}**
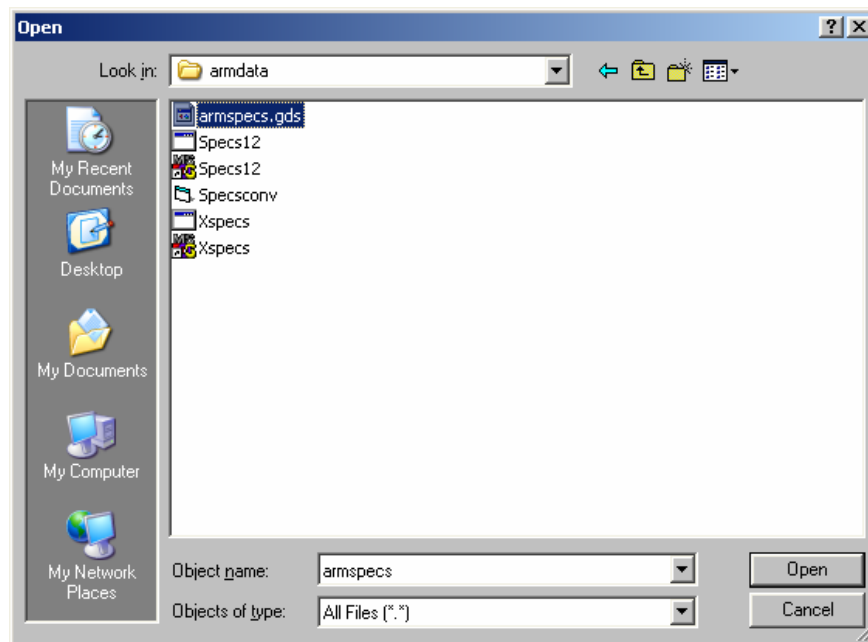
2.2.1.4   Manual loading of arm data with several configurations

- Create all configurations.

Close the following window selecting **{Cancel}**
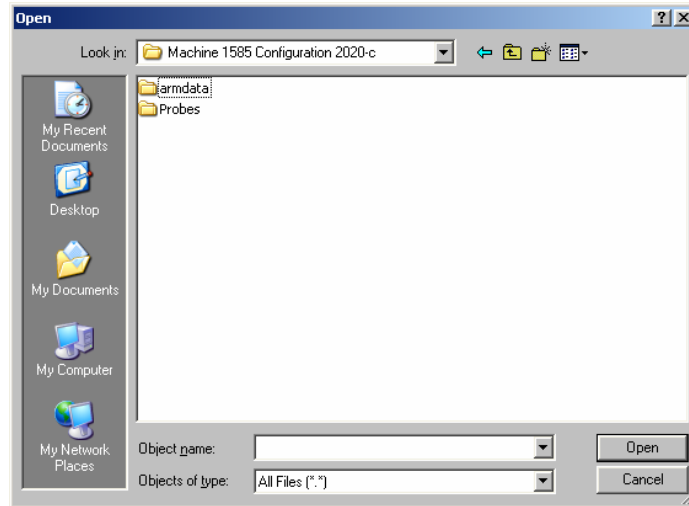
Select **{Change arm},** the following window will appear. Then click on the arm button and click **{Add}**
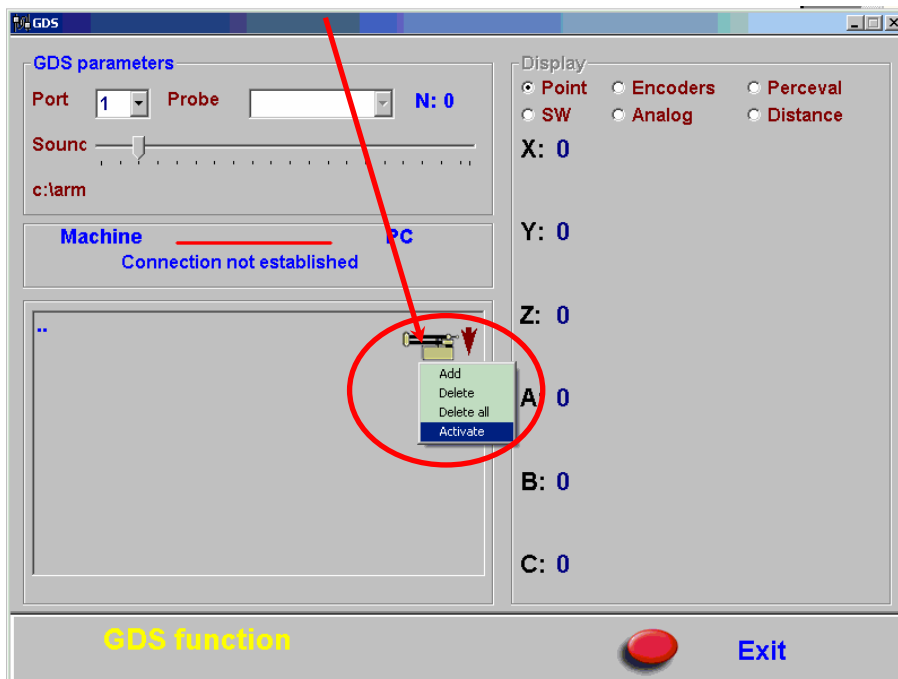
The following window will appear: put the machine serial number and the configuration instead of sharps (611, 621 etc.) than validate with **{OK}**
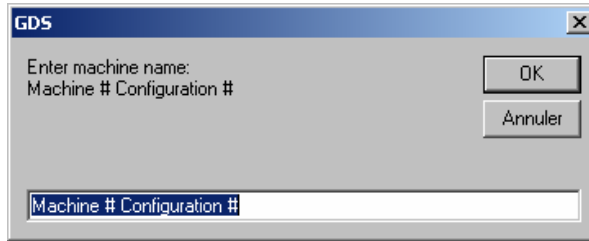
A new line appears in the machine list.

Repeat this action for each configuration configurations.
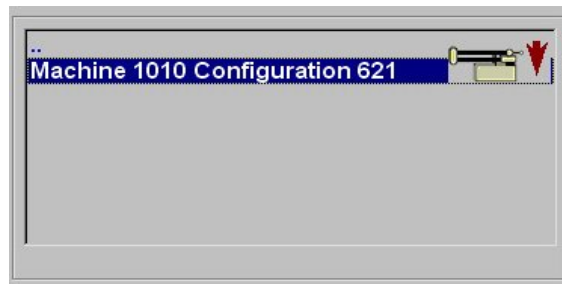
- Load data

When the last configuration is created, select it, and the click on the arm button and **{Activate}**. The chosen configuration has been activated.

Select **{Load arm data}** and select on the security floppy disk the file armspecs.gds of the activated configuration. (ex: a:\621\armspecs.gds)

For the next configuration select **{change arm},** in the configuration list choose the other configuration clicking on the arm button then select **{Activate}**

Repeat the operation for each configuration.

2.2.4. Reset:

Used to initialize the Machine axis : The bars switch on with the reset of every corresponding axis.

2.2.5   Disconnect:

De-activates communication between the machine and GDS software.

2.3   Zone of Information on status of communication with arm

Description

If an error occurs during the communication, this zone is refreshed with the corresponding Error code. Look up the list of errors for more information.

Example:
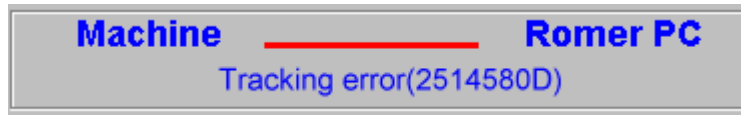
NB : When an axis is in electronic stop, « Error Tracking » appears.

2.4   GDS Configuration parameters

4.2.3   Description of the interface:
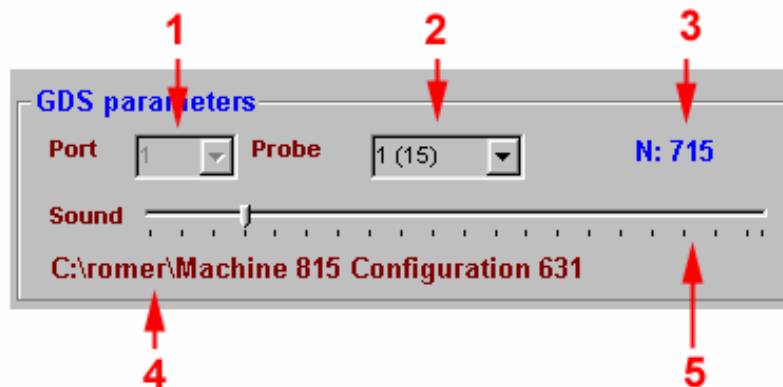
1.   Index of the serial port in use
2.   Index of the current probe
3.   Serial number of the machine in use
4.   Directory containing the data of the machine in use
5.   Volume adjustment

1.   Index of the serial port in use:

Used to change the serial port used to communicate with the arm. This function is available only if communication with the arm is not active.

2.   Probe file in use:

Used to change the current probe. This function is available only if communication with the arm is active.

5   Volume adjustment:

Used to change the arm sound volume. If communication is active, the arm produces a sound.

2.5   Types of display

Description of the interface:
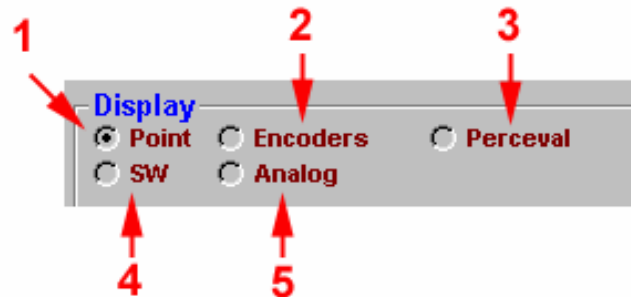
1. Display of sphere center point
2. Display of encoder information
3. Display of Perceval point
4. Display of pushbuttons status
5. Display of analog values
6. Display of distances between two points

1.   Display of sphere center point:

Used to display the current sphere center coordinates (XYZ) and the vector directed outward from the probe (ABC).

2.   Display of encoder information:

Used to display the encoder value

- □   without offset by clicking with left button

- □   with offset by clicking with right button.

3.   Display of Perceval point:

Used to display the current sphere center coordinates (XYZ) plus a point shifted 100 mm along the vector.

4.   Display of pushbuttons status:

Used to test the operation of the pushbuttons of the machine and of the beams if a non-contact Vee probe is used (tube inspection, for example).

NB: For a Vee probe, beam 2 is displayed by BP2.

5.   Display of analog values:

Used to test the operation of the analog inputs of the arm (e.g. case of a UDT or ALP probe).

6. Display of distances

Displays the distance in X, Y, Z (Referential of the arm) and in Distance between two successive (support on BP1) captures of points (ball center).

3 Description of "Calibration" and "Verification" windows

Menus "Machine Calibration", "Probes Calibration" and "Machine Check" follow the same principle.

Every function (" SCRIPT ") is divided in "STEP" (first line)

For every Step, several points must be measured (second line)
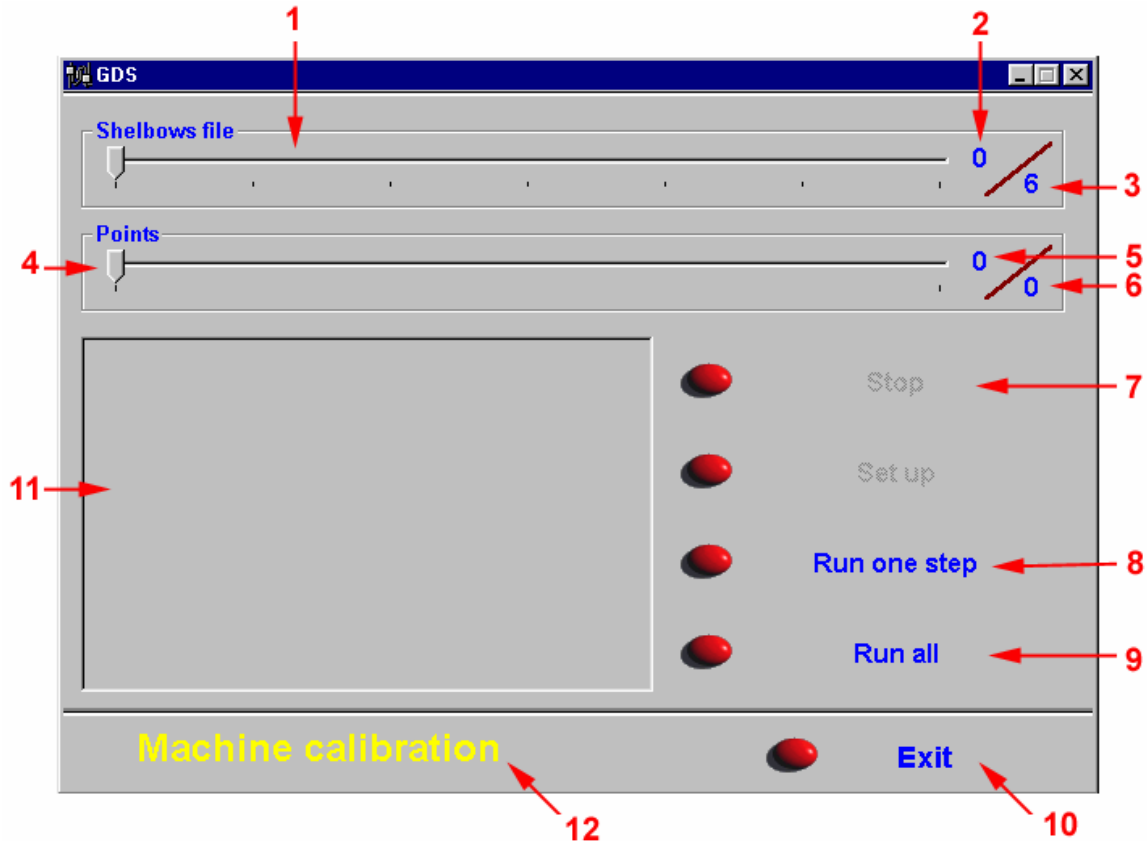
1. List of steps of machine calibration procedure
2. Index of current step
3. Number of steps to be performed altogether
4. List of Machine Positions
5. Index of current machine position in current step
6. Number of machine positions to be performed altogether in current step
7. Used to stop the current procedure
8. Used to resume running a step of the current procedure
9. Used to run all steps of the machine calibration procedure
10. Used to exit from the machine calibration procedure
11. Graphic representation of the machine position and gage control
12. Reminder of the current function

❑ To start a complete procedure : click on « *Run all* »

❑ To proceed step by step or execute only one step (for example if there is a mistake). In this case, move the cursor from the steps and bring it to the step you want, then click on « *Run a step* ». It stops at the end of the step.

❑ To start a complete procedure from a step in particular : move the cursor from the Steps to the step you want, and make a RIGHT click on « **Run all** ». (An error message warns you about the risk of malfunction because of a step not done)

❑ To load a special Script (Arm on Rail, Orbital, …),

  - Press Ctrl O, then select the line « Activate Load »

  - Click on « load », a window opens to select the script

4 Check on Machine (Tune up)

This check up concerns all arms except Sigma arm.

For Sigma arm use QC Control.

4.1 Description :

This function is used to check quickly whether the standard deviation of the gauging machine is within tolerances. It can be used before each measurement campaign.

The machine calibration procedure is divided into several STEPS. Four measurement STEPS plus a Calculation STEP. Each of the four STEPS representing a gage control is divided into six machine positions calls MACHINE POSITIONS.

Important:

➢ The aluminum bar must be rigidly fixed.

➢ The aluminum bar must be placed at mid-distance of the maximum radius of the arm.

For each position, measure three times the length of the aluminum bar between the holes A and C, as it is indicated on the screen (see picture).

Top view

Position 2

Position 3

Position 1
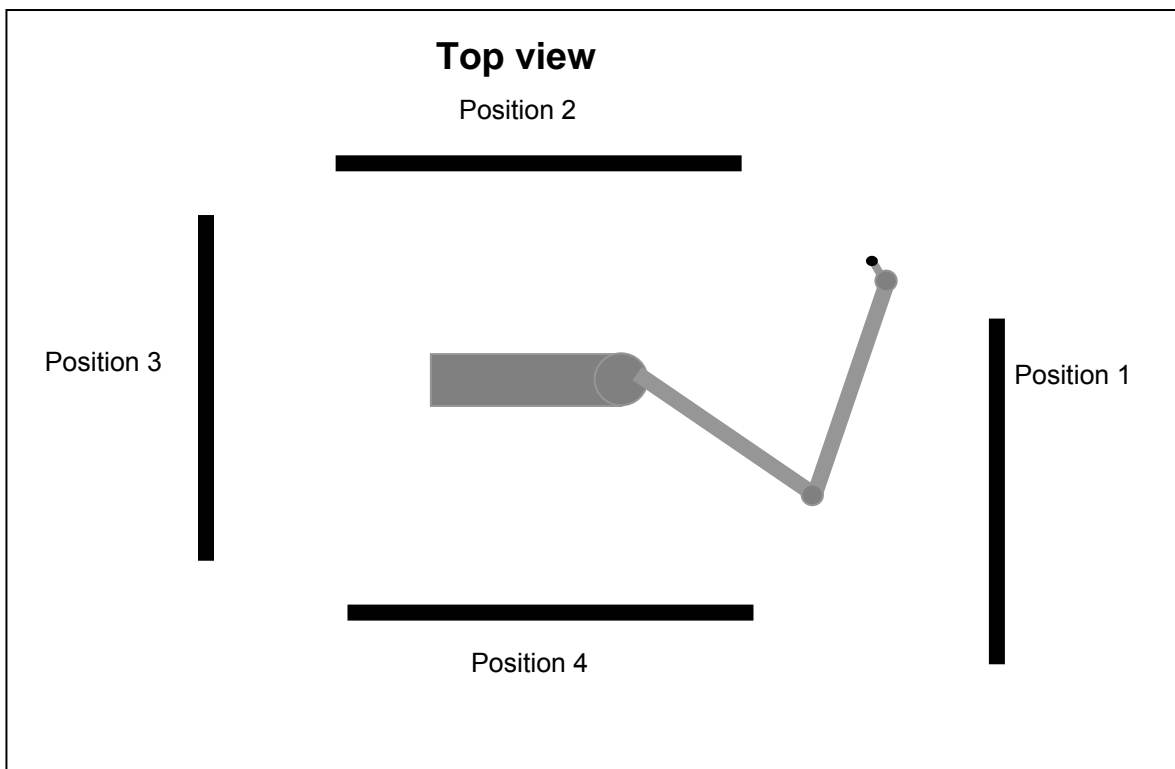
Position 4

4.2 Method :

- Start **GDS** Software up.

- Select *machine calibration*.

- Select the type of arm used then click on OK.

- Answer OK to the message "file already existing"

- Click on **Run all**.

- Measure for the first position 6 points as it is described here after:

  _ Point A, "bend" on the left (picture 2)

  _ Point C, "bend" on the left (picture 3)

  _ Point A, "bend" vertically (picture 4)

  _ Point C, "bend" vertically (picture 5)

  _ Point A, "bend" on the right (picture 6)

  _ Point C, "bend" on the right (picture 7)

Picture 1

Picture 2

Picture 3

Picture 4

Picture 5

Picture 6

- At the end of the 6 points, a screen results appears, the standard deviation value must be in the machine tolerances.
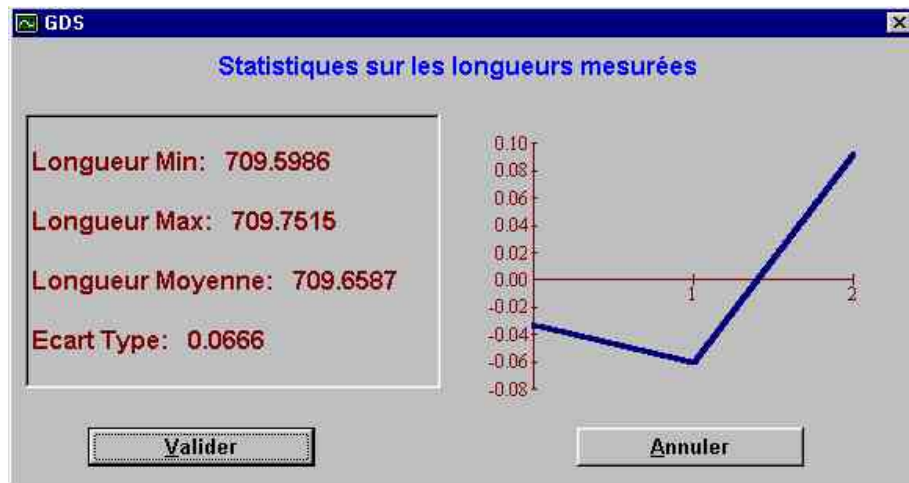
- Then, work on the next 3 positions measuring the 6 points in the same way.
- At the end of the 4 positions, a screen of global result appears ; the 4 individual results and the global result must be in the machine tolerances.
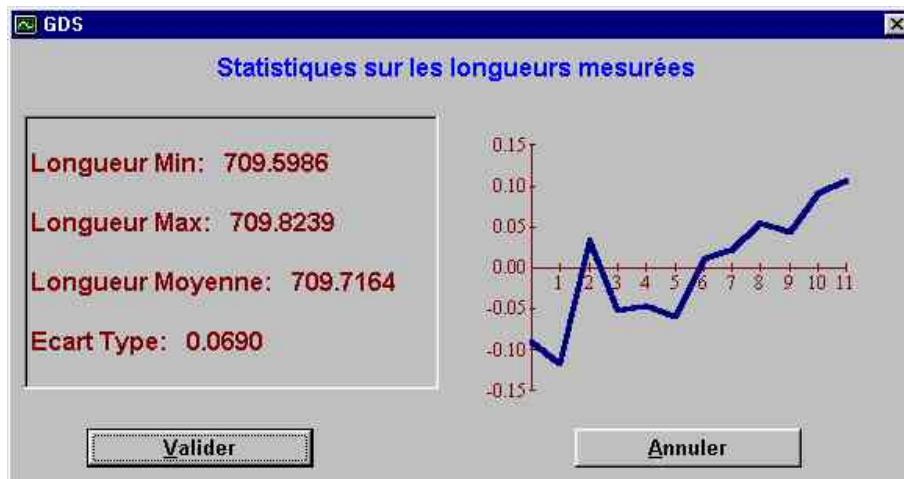
Note : It is possible to control the machine only on one Gage Position by moving the cursor representing the totality of the steps, on the step you want, and to click on **Execute a step**.

4.3 Results treatment

- The standard deviation is lower or equal to the satisfactory limit

    ⇒ Consequence : Arm can be used.

- Standard deviation is upper than the satisfactory limit

    ⇒ Consequence :   Arm doesn't comply with these specifications. You should contact service.

    NB : The result of the measurements is recorded in a file called Result.dat.

5 . QC Control

This check up concerns only Sigma arm.

5.1   Description :

This function is used to check quickly whether the standard deviation of the gauging machine is within tolerances. It can be used before each measurement campaign.

The machine calibration procedure is divided into 5 measurements.

Important:

> ➢ The aluminum bar must be rigidly fixed.
> ➢ The aluminum bar must be placed at mid-distance of the maximum radius of the arm.

For each position, measure three times the length of the aluminum bar between the holes A and C, as it is indicated on the screen.

Top view

Position 2

Position 4

Position 4

Position 3
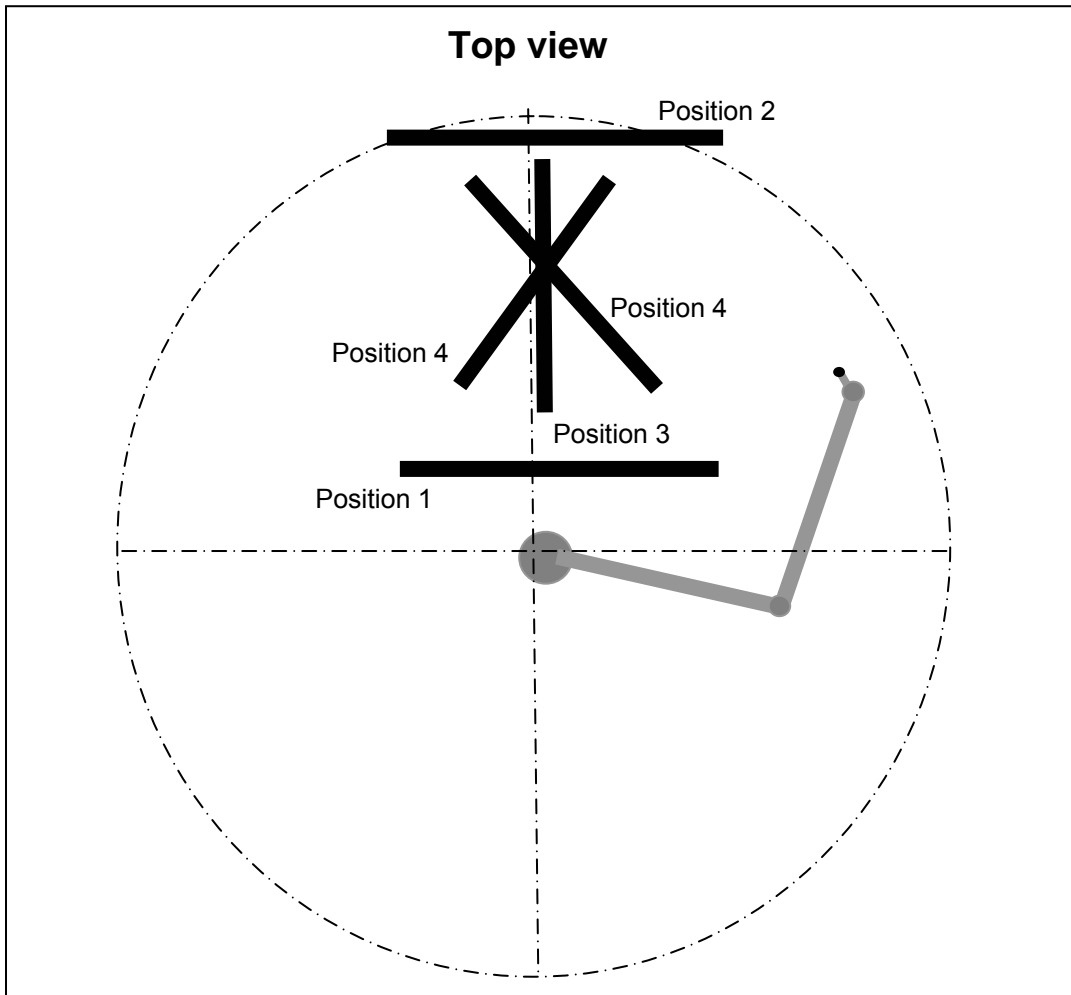
Position 1

5.2   Method :

- Start **GDS** Software up.

- Select *machine check*.
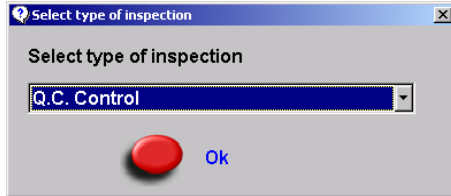
- Select "QC Control" then click on OK.
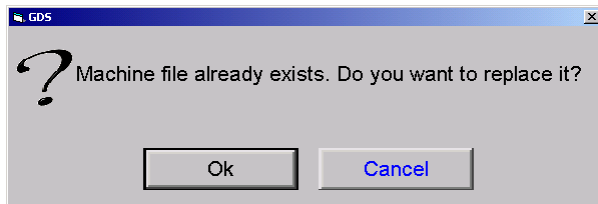
- Answer OK to the message "file already existing"
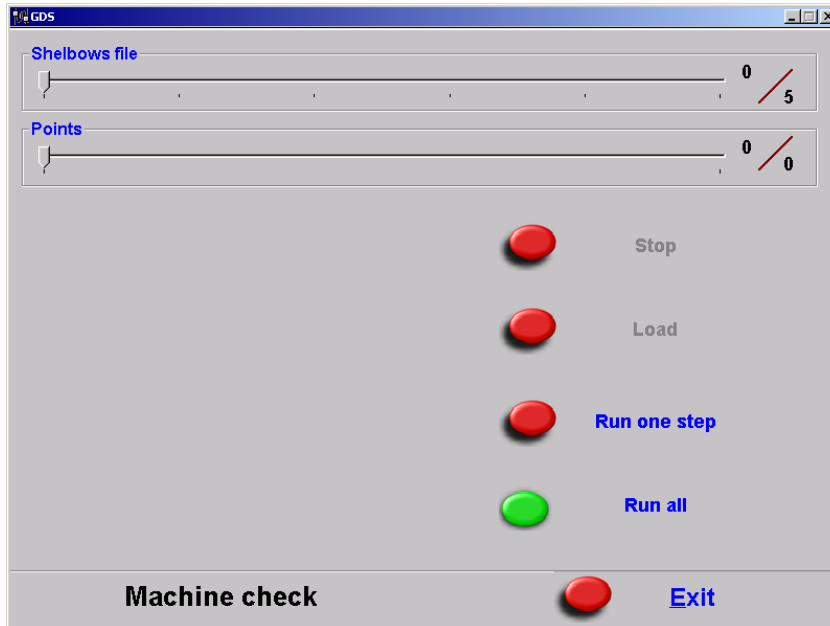
- Click on **Run all**.
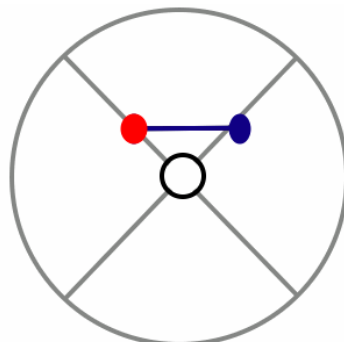
- Measure for the first position as it is shown by the drawing:

    _ Point A, "bend" on the left

    _ Point C, "bend" on the left

    _ Point A, "bend" vertically

    _ Point C, "bend" vertically

    _ Point A, "bend" on the right

    _ Point C, "bend" on the right

Image 2

Image 3

Image

Image 5

Image

Image 7

GDS

Measured length statistics

Average length: 359.8171

Accuracy test (in mm): 0.0996
Repeatability test(in mm): 0.1216

⬤ **V**alidate   ⬤ **Cancel**
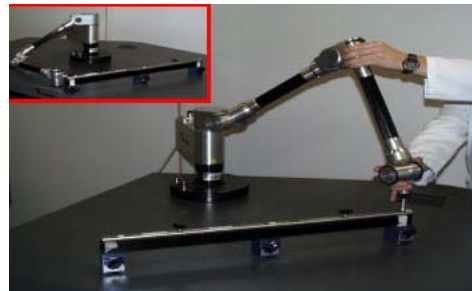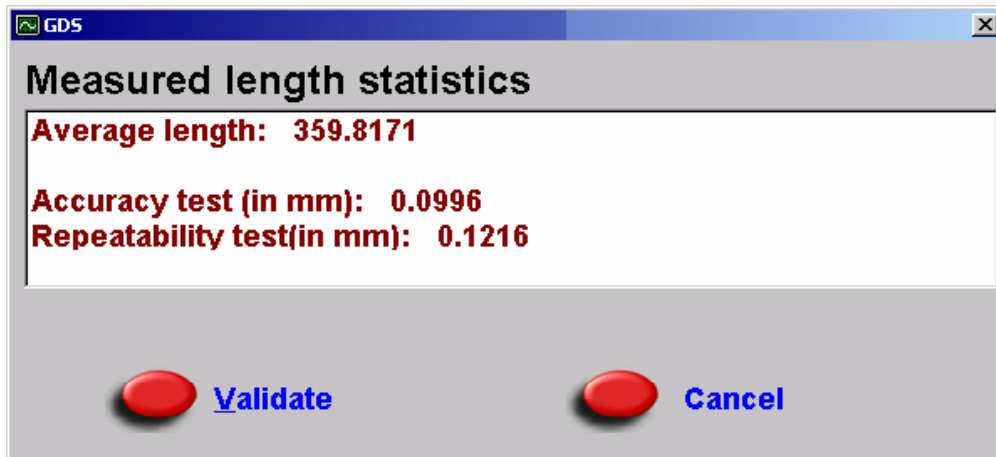
- At the end of the 6 points, an information screen results appears.

- Then, work on the next 4 positions measuring the 6 points in the same way.

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Measured length statistics

Average length: 350.1340

Accuracy test (in mm): 0.2815
Repeatability test(in mm): 0.0771

⬤ **V**alidate   ⬤ **Cancel**
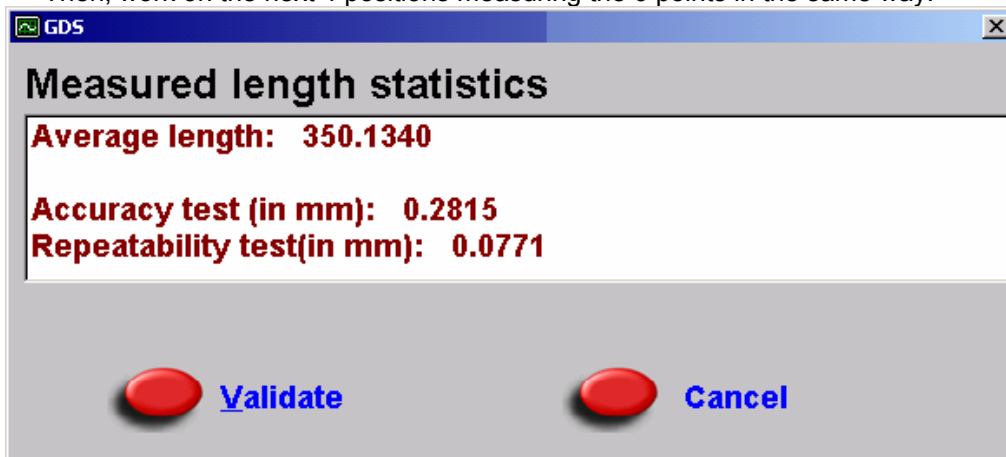
- At the end of the 4 positions, a screen of global result appears. Compare results with value that are on the table.

	1800	2200	2500	2800	3000	3200	3600	4600	5200
Accuracy (µm)	15	22	26	31	34	37	44	60	72
Repeatability (µm)	24	31	36	41	45	48	57	74	88

Be careful! These values do not represent value indicated on technical sheet that use B89 norm.

5.3 Results treatment

-       The standard deviation is lower or equal to the satisfactory limit
  ⇒   Consequence :   Arm can be used.
-       Standard deviation is upper than the satisfactory limit
  ⇒   Consequence :   Arm doesn't comply with these specifications. You should contact service.

6 Machine Calibration

6.1   Description:

This function is used when the standard deviation of the machine is outside tolerances. It is used to adjust the accuracy of the gauging machine using a control gage provided with it.

The machine calibration procedure is divided into several STEPS. Five measurement STEPS plus a Calculation STEP. Each of the five STEPS representing a gauging template position is divided into six machine positions called MACHINE POSITIONS.

The measured values of the firsts four STEPS are saved in files named Shelbow1.dat, Shelbow2.dat, Shelbow3.dat, and Shelbow4.dat, those of the fifth are in a file called Wrist1.dat.

6.2   Procedure

- Check (GDS Function) that the diameter 15 probe is in fact the probe in use and that the configuration of the communication parameters is correct.

- Select **Machine Calibration** button. (Do the arm reset if it is necessary)

- Select the type of machine used and validate with the OK button.
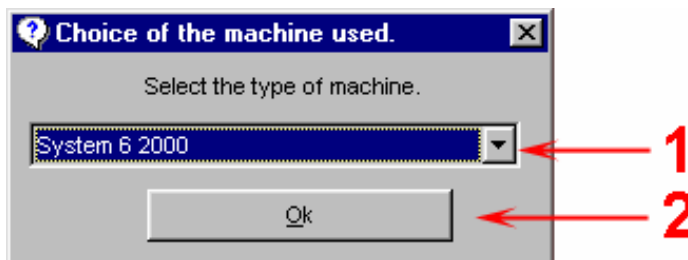
Fig. 1

1. Calls up a list in which to choose the type of arm

- Answer ok to the machine file message.

  NB: A directory bearing the serial number of the machine is systematically created in …\GDS\Calib to save Shelbows and Wrist files.

  If it already exists, a warning message appears to confirm the erasure. If information saved in this directory is no longer useful, validate by **OK**; otherwise, press **Cancel** and back it up using the *Microsoft Explorer.*

- Click on **Run all**.

- Follow stages described on the screen (§ 4.2.1. to § 4.2.5.): there are 6 points to measure for each position (4) of bar (Shelbow) and 20 points on the wrist point.

NB: To measure again one or several points, simply remove the cursor one or several notches.

- When the capture of points is finished, a message indicates that you are about to work on machine correction stage.

- Click on OK, then enter the value of the bar distance, from the point A to the point B, and then from the point A to the point C (if the values are unknown, enter 0 and 0).

- After that, there is the calculation. Wait for the end of this operation.
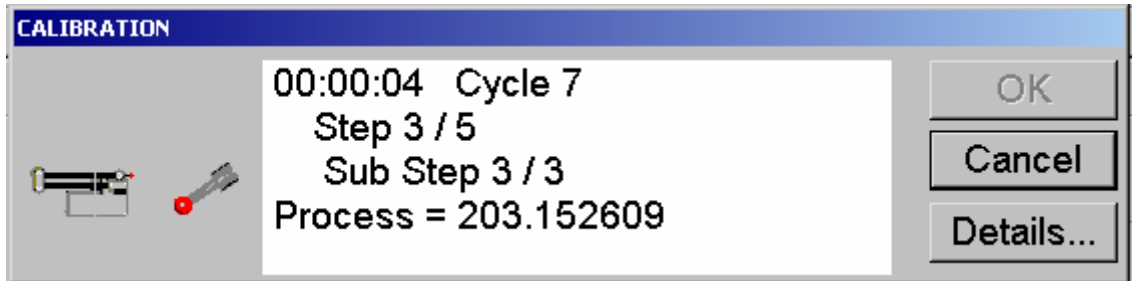
NB: During calculation process, it is possible to show the differences on the measured points: click on **Details**: if errors appear, click on **Cancel** and execute again the step which was the source of this error.

- After the end of the calculation, click on OK.

- Check once again the accuracy thanks to IPS007.

- If the accuracy is outside tolerances, contact the technical service.

4.2.1. Measurement of the first position

- Put the bar at 200 mm in front of the   arm (different distance depending on the type of arm)
- Measure the point A, bend placed on the left of the wrist (picture 1)
- Measure the point B, bend placed on the wrist (picture 2)
- Measure the point C, bend placed on the right of the wrist (picture 3)
- Measure the point A, bend placed on the right of the wrist (picture 4)
- Measure the point B, bend placed underneath the wrist (picture 5)
- Measure the point C, bend placed on the right of the wrist (picture 6)

4.2.2   Measurement of the second position

- Put the bar at 500 mm in front of the   arm (different distance depending on the type of arm)
- Measure the point A, bend placed on the left of the wrist (picture 1)
- Measure the point B, bend placed on the wrist (picture 2)
- Measure the point C, bend placed on the right of the wrist (picture 3)
- Measure the point A, bend placed on the right of the wrist (picture 4)
- Measure the point B, bend placed underneath the wrist (picture 5)
- Measure the point C, bend placed on the right of the wrist (picture 6)

4.2.3   *Measurement of the third position*

- Lay the bar down flat, the point B at 400 mm in front of the   arm with 45° (different distance depending on the type of arm)
- Measure the point A, bend placed on the left of the wrist (picture 1)
- Measure the point B, bend placed on the wrist (picture 2)
- Measure the point C, bend placed on the right of the wrist (picture 3)
- Measure the point A, bend placed on the right of the wrist (picture 4)
- Measure the point B, bend placed underneath the wrist (picture 5)
- Measure the point C, bend placed on the right of the wrist (picture 6)

4.2.4   *Measurement of the fourth position*

- Lay the bar down flat, the point B at 400 mm in front of the   arm with 45° in the other way (distance depending on the type of arm).
- Measure the point A bend placed on the left on the wrist (picture 1)
- Measure the point B bend placed on the wrist (picture 2)
- Measure the point C bend placed on the right of the wrist (picture 3)
- Measure the point A bend placed on the right of the wrist (picture 4)
- Measure the point B bend placed underneath the wrist (picture 5)
- Measure the point C bend placed on the right of the wrist (picture 6)

4.2.5   *Measurement of the wrist points*

- Put the bar at mid-distance of the measurement radius.
- Measure five points, pushbuttons being on the machine side, from the left to the right, by making pivot the axe F, and paying attention that the sphere must stay in the central gap.
- Turn the axe E of 90° and measure 5 points as before, with the pushbutton on the right.
- Turn the axe E of 90° and measure 5 points as before, with the pushbutton opposed to the first sequence.
- Turn the axe E of 90° and measure 5 points as before, with the pushbutton on the left.

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Next are the pictures ensuring the correct capture of points for the 4 positions Shelbow and 5 pictures ensuring to take the wrist point.
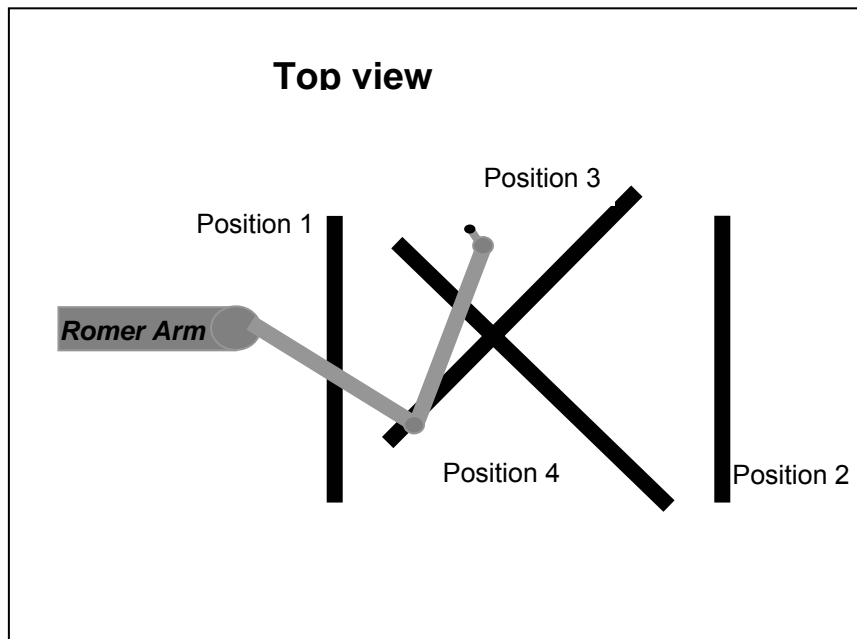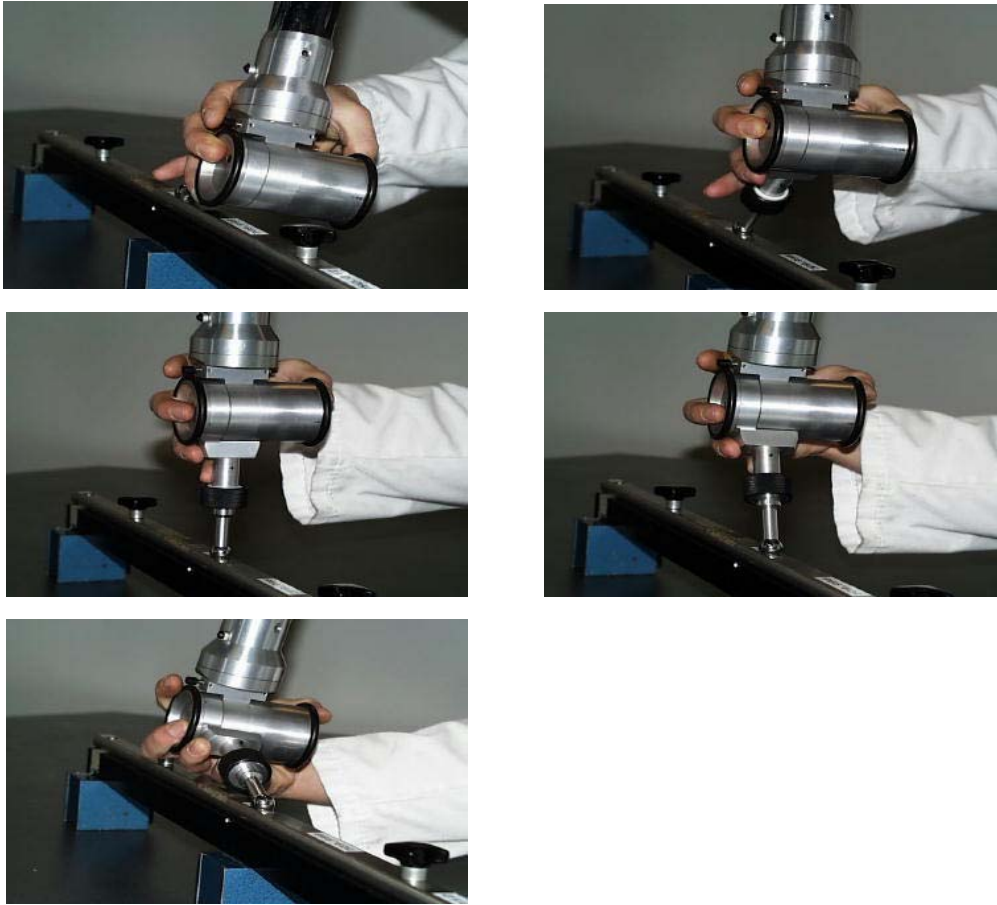
Note : If there is a mistake on a step, it is not necessary to repeat the whole procedure.

   You just have to move the cursor representing the totality of the steps, on the step you want to restart, and to click on **Execute a step**. Machine positions are thus recaptured and you just have to restart the calculation by moving the cursor on the calculation process, and then clicking on **Execute a step**.

   The modified machine data file (« armspecs «) is the one which is in use. You will have to recopy it using *Microsoft Windows®* Explorer on the backup disk provided with the machine.

5   Probe Calibration

5.1.   Description:

This function is used when one of the probes provided with the machine has been replaced, after a Tune-Up, or when a new probe is added.

(The measured values are saved in a file name probeX.dat.)

Note: It is not possible to calibrate probe 15 (Probe1.gds)

Maximum number of probes: 15

If a line "COMT, Add a Comment" is in second position in probe file "Add a Comment" will appear in probes list. Otherwise it is a normal display.
6.3   Different types of probes

Depending on the types of probes, calibration is different ; there are 3 types of calibration :

> Contact Probes (balls) ; Point Probes ; Automatic triggering Probes ; Laser Probes (ALP) ; Vertex : The procedure of probe calibration is divided in 6 steps of measurement plus a calculation step.
>
> It consists in measuring a plan with 3 points thanks to the 15 ball (probe of reference), then 5 plans with the probe to calibrate with different angles.
>
> -   Every non-contact Vee probe: Manual set-up of parameters (§ 6)
>
> -   Conic probe: The procedure consists in a wrist.

Note: By default the Probe1.gds, Probe2.gds, and Probe3.gds files are assigned to the diameter 15 and 6 and Point probes.

6.4   Contact Probe: Procedure

-    Start **GDS** up.

-    Check (GDS Function) that the communication parameters configuration is correct and note the path to the machine data.

-    Check whether the standard deviation of the gauging machine is within tolerances.

-    Click on *PROBE CALIBRATION*.

-    A window (Fig. 2) appears to let you indicate the type of Probe used. Select the type of probe used and validate with the OK button

- Select the type of probe used , then OK.

- Enter the probe number : (by default, GDS creates an additional probe), then OK.

- If the probe already exists, a message appears.
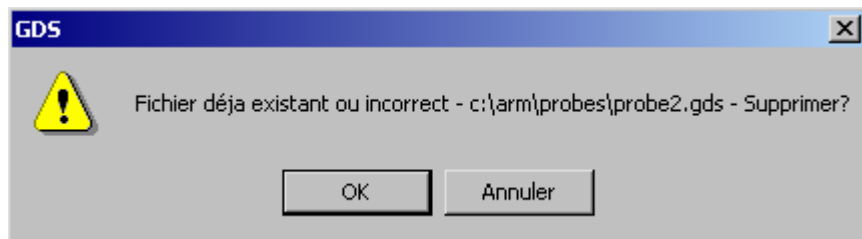
- Answer OK.

- Enter the probe diameter, and then OK (point probe is 0)

- Answer OK to the message "machine file already existing".

NB: A directory having the serial number of the machine is systematically created in ...\GDS\Calib to save files relating to calibration.

If it already exists, a warning message appears to confirm the deletion. If the saved information in this directory is not useful anymore, validate with **OK** otherwise press **Cancel** and make a back-up of the data thanks to Microsoft Explorer®.
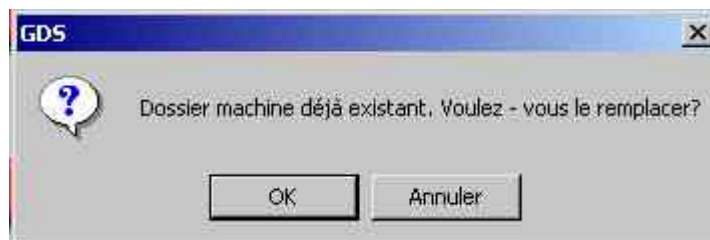
- Click on **Run all**.

- Follow stages indicated on the screen:

  - Install probe Dia 15

  - Measure 3 points on a plan (some cm²)

  - Install the point probe to calibrate

  - Measure these 3 points positioning the probe vertically (pos 1)

  - Measure these 3 points positioning the probe inclined (pos 2)

  - Measure these 3 points positioning the probe inclined (pos 3)

  - Measure these 3 points positioning the probe inclined (pos 4)

  - Measure these 3 points positioning the probe inclined (pos 5)

NB: The cursor indicating the machine position advances and the graphic representation changes as each position is
    taken. To repeat one or more machine positions, simply move the cursor one or several spaces.

- Click on OK when the message "finished measurement" appears – calculation starts.

- Wait for the end of calculation (Message "Finished Calculation")

- Click on Details, and note the values you obtain.

Acceptable value :

The probe is correct when Le capteur est dit conforme lorsqu'il est capable de mesurer une
distance dans le volume dans les précisions du bras.

Exemple : Bras Sigma 2030 à +/- 0.054. Pour tous les capteurs standards le bras doit rester
dans les tolérances annoncées.

Attention, pour les autres capteurs, dit non-standards, il n'y a pas de critère d'acception. Ceux-
ci sont considérés comme des accessoires spéciaux en vue de répondre à certaines
applications.

- Click on OK to accept the calculation or cancel not to keep values.

- GDS suggests to add a comment to the probe (comment will appear instead of "X mm
  probe" in software).
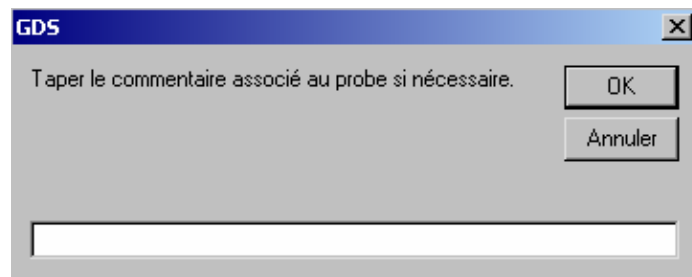
- If you start again calculation (moving higher cursor to extreme right limit and clicking « run
  one step ») will optimize calibration of the probe.

- This is the end of the procedure. Click on *Exit* to come back to the main menu.

GDS MANUAL
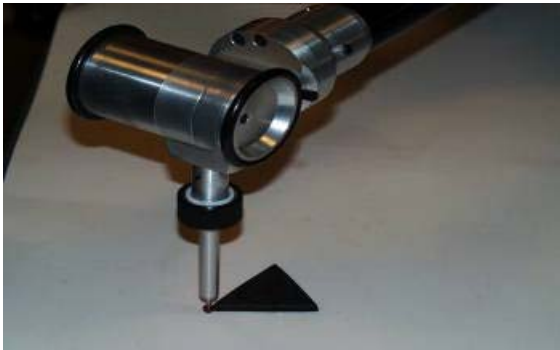
POS 1

POS 2

POS 3

POS 4

POS 5

6.5   Conic probe procedure

- Start **GDS** up.

- Check (GDS Function) that the configuration of communication parameters is correct and note the path to the machine data.

- Check whether the standard deviation of the gauging machine is within tolerances.

- Click on *PROBE CALIBRATION*.

- Select the type of Probe used, then click on OK.

- Enter the probe number : (by default, GDS creates an additional probe), then OK.

- If the probe already exists, a message appears.
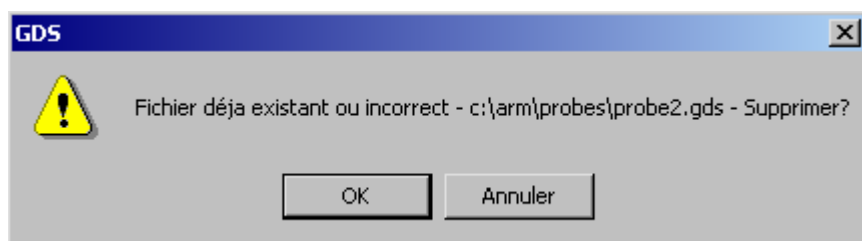
- Answer OK.

- Enter the diameter of the probe, then OK (Ordinarily 0 mm).

- Answer OK to the message file already existing.

    NB: A directory having the serial number of the machine is systematically created in ...\GDS\Calib to save files relating to the calibration.

    If it already exists, a warning message appears to confirm the deletion. If the saved information in this derectory is not useful anymore, validate by *OK*, otherwise press *Cancel* and make a back-up of the data thanks to Microsoft® Explorer.
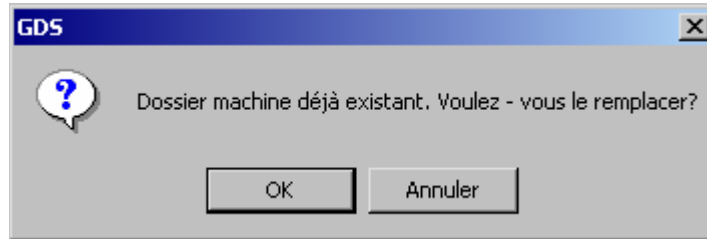
- Click on **Run all**.

- Follow stages indicated on the screen :

    - Install conic probe

    - Install a ball having a diameter equivalent to the diameter of the cone you want to calibrate

    - Measure a wrist point with the conic probe on the bending ball (§ 4.2.5)

NB: The cursor indicating the machine position advances and the graphic representation changes as each position is taken. To repeat one or more machine positions, simply move the cursor one or several spaces.

- Click on OK when the message finished measurement appears – calculation starts.
- Wait for the end of the calculation (Message " Finished Calculation ")
- Click on Details, and note the values you obtain.
- Click on OK to accept the calculation or cancel not to keep the values.
- GDS suggests to add a comment to the probe (the comment will appear instead of " X mm probe " in the software).
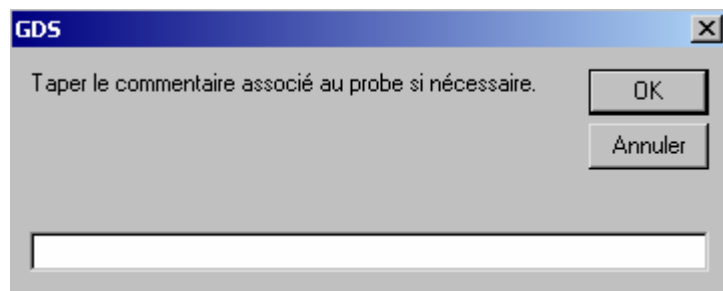
This is the end of the procedure, click on " Quit " to return to the main menu.

6. Non-Contact Vee Probe Calibration

6.6   Starting Up

- Start **GDS** up

- Check (GDS Function) that the configuration of the communication is correct and note the path to the machine data.

- Check whether the standard deviation of the gauging machine is within tolerances.

6.7   Check on parallelism

> ➢ If Vee probe is only one part, go to the next stage.

> ➢ If Vee probe is in several parts, you must check parallelism. Install the probe on the arm and put the E axis of the arm on the table. Vee probe forks must be parallel to the table.
>
> If it is not the case, unscrew the jubilee clip, adjust forks parallelism referring to the table, and tighten the jubilee clip to put the different parts of the probe altogether.

6.8   Execution of the calibration script

! **(to check or modify a current calibration, select** *GDS FUNTION* **>** *CONNECT* **> select Vee-probe >** *Ctrl O* **>** *Vee Control*

From GDS main menu, click on *{Probe Calibration}*

- Select the type of Vee probe in the following list :

- Enter probe number.

- If the probe already exists, a message appears.
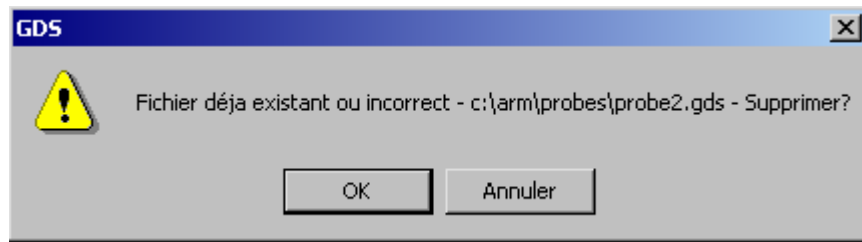
- Answer OK.

- Enter probe diameter. Example of values :

  - 10 $\rightarrow$ Micro Probe

  - 25 $\rightarrow$ 1 extended Inch

  - 35 $\rightarrow$ 3 Inches

  - 35 $\rightarrow$ 3 Inches

  - 70 $\rightarrow$ 7 Inches

- Reset axis if it is necessary.

- When you see the message " File already exixting. Do you want to replace it ? ", select Cancel.

- Click on *{Run all}*, the following screen appears :
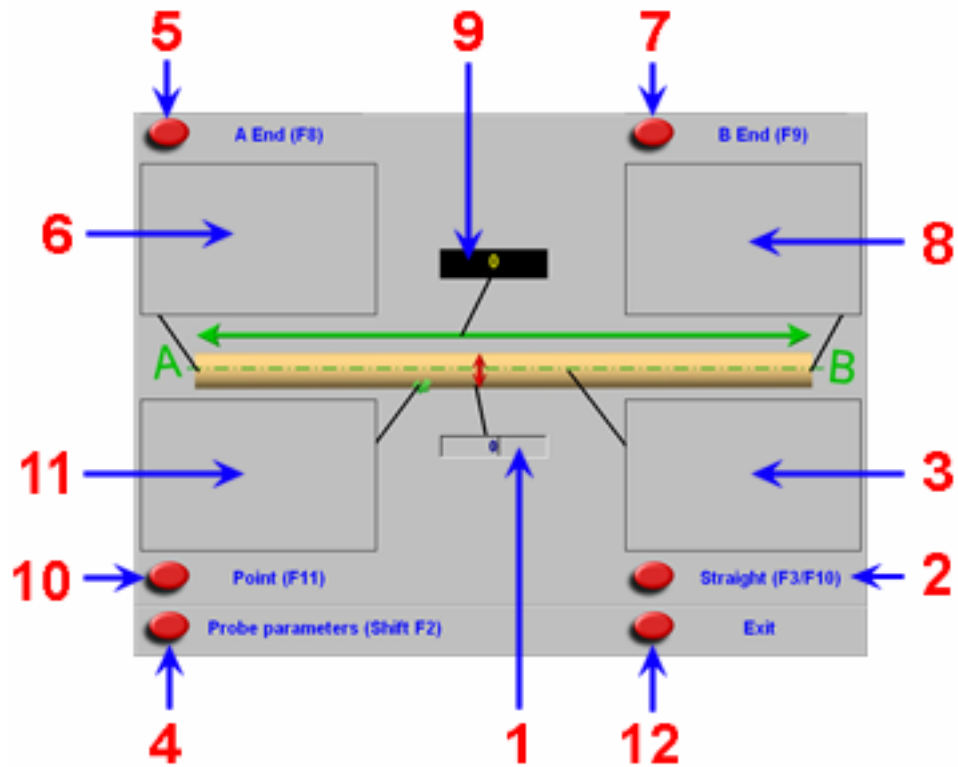
Click here to enter tube diameter → ***Window 1***
1.   F3 (Vector of reference), F10 (measured vector)
2.   Result of F3 (position) or F10 (deviation with the last F3) → Window ***3***
3.   Click here to modify parameters
4.   F8 : Measurement of the first extremity
5.   Deviation with the last measurement F8 → Window ***6***
6.   F9 : Mesure de la deuxième extrémité
7.   Deviation with the last measurement F9 → Window ***8***
8.   Distance between 2 measurements F8 and F9 → Window ***9***
9.   F11 : Inspection of the tube
10.   Distance between the beam 1 (and beam 2) and the vector of reference → Window ***11***
11.   Exit of the script of calibration

6.9   Preparation before calibration

The master tube must be about 300 mm of the arm (following figure).
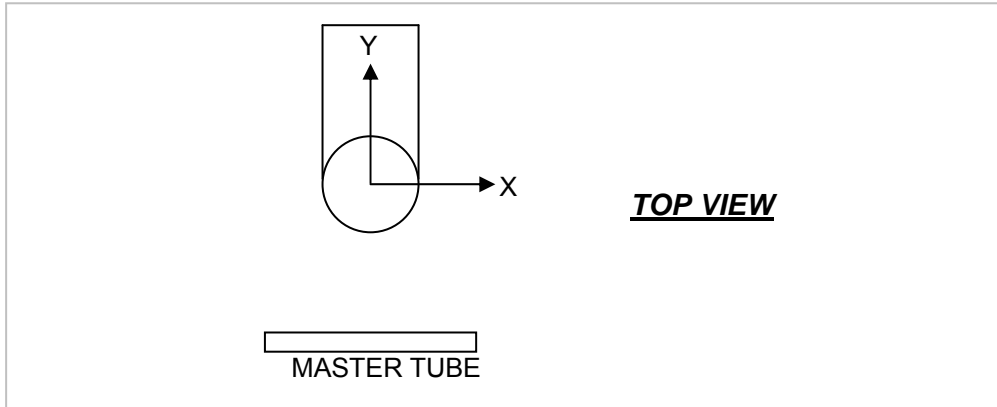
Make sure that for all measurement, Vee probe is always perpendicular to the tube.

Enter tube diameter (Window 1)

6.10   Description of the keys

F3			Measurement of the vector of reference (left click on the mouse)
F10			Measurement of the model vector , and value of deviation (right click on the mouse)
F8			Measurement of the first extremity
F9			Measurement of the second extremity
F2		Shift	Modification of probe parameters
Esc			Recording of modifications
Alt	+	F3	Inspection of the tube length
F11			Measurement of the distance Beam / Axis

6.11 Initialization and modification of parameters

Faire	Shift		F2	The following screen appears:
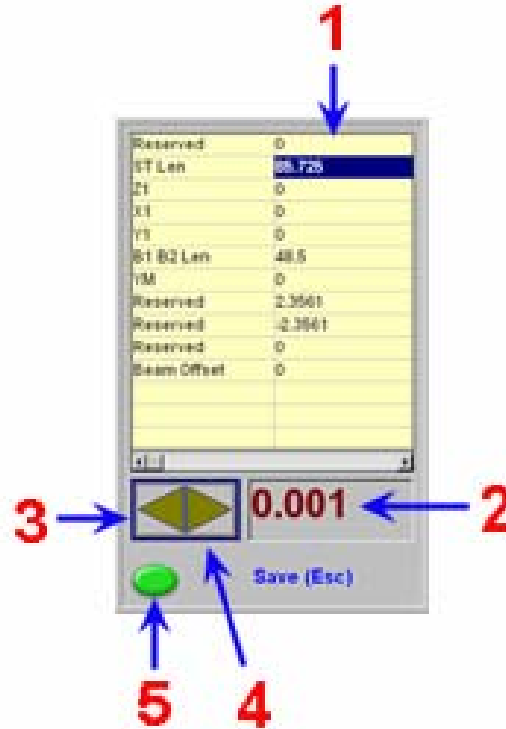
1. Modifiable parameters
2. Increment values
3. Reduce
4. Increase
5. Record and quit

To modify a parameter :

- Click on the parameter value

- Double Click on the parameter to enter directly the modified value

     OR

- Click on the increment and specify its value

- Click on one of the arrow (reduce or increase by the value of the increment)

- Click on *{Esc}* (exit and record of modifications)

NB : The parameter " ST LEN " = 85.725 for   probes

= 76 for Addison probes

6.12   6.7 Modification of B1 B2 LEN

- Place the tube vertically. For all the measures, probe push-button must be turned toward the top. Measure the vector of reference F3 on a side of the tube and measure the vector of comparison on the other side F10 (following figure).

NOTE : The longer vectors are, the better accuracy will be.

UP

Second measurement →   ← Second measurement

F3   F10

First measurement →   ← First measurement

DOWN
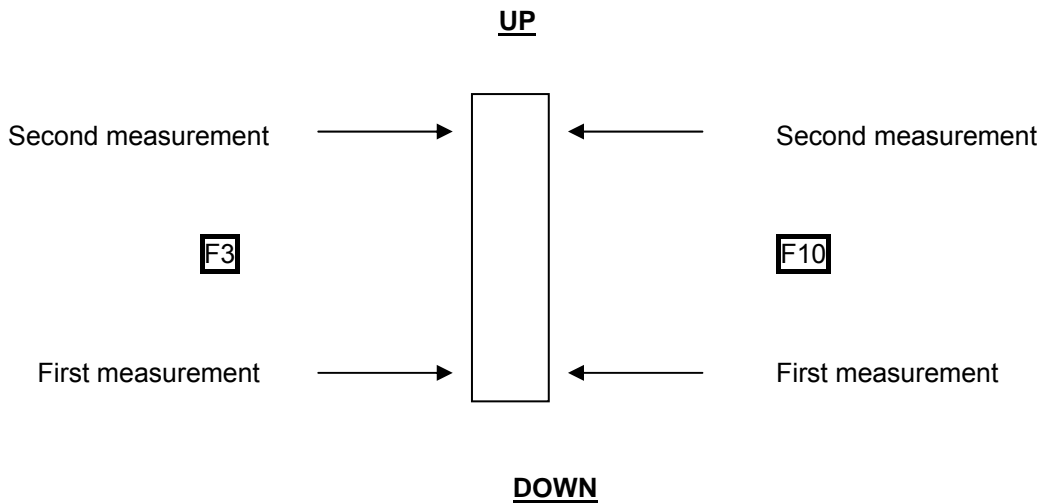
- For this parameter, look at the value of **X Dev** *(Window 3)*. If "X Dev" > 0,1 mm, add to or subtract from B1 B2 LEN, "X Dev" value divided by 2.

- To modify the parameter, do Shift F2. Don't forget to select parameter B1 B2 LEN.

- Repeat this process until "X Dev" < 0,1 mm

6.13   6.8 Modification of parameter X1

- Place the tube horizontally (picture page 4)

180°

1   2   3
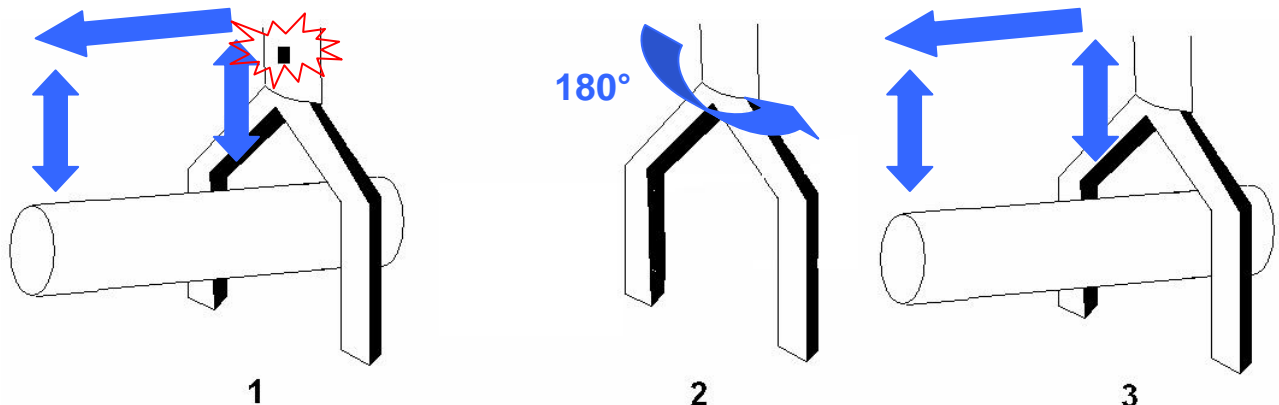
- For this process, measure the vector of reference F3 with the push-button in a direction, then measure the vector of comparison F10 with the push-button in the other direction.

- For this parameter, look at **Y Dev** *(Window 3)*. If "Y Dev" > 0,1 mm, add to or subtract from X1 value :

(Y Dev) / (ST LEN + B1 B2 LEN).

We get: **new X1 = former X1 +/- (Y Dev) / (ST LEN + B1 B2 LEN)**

- To modify this parameter, press Shift F2. Don't forget to select X1 parameter.

- Repeat this process until "Y Dev" < 0,1.

- Check that all the parameters are correct before going to the next stage.

6.14   6.9 Modification of Y1 parameter.

- Place the tube horizontally.

- For this process, the vector of reference must be measured as long as possible F3.
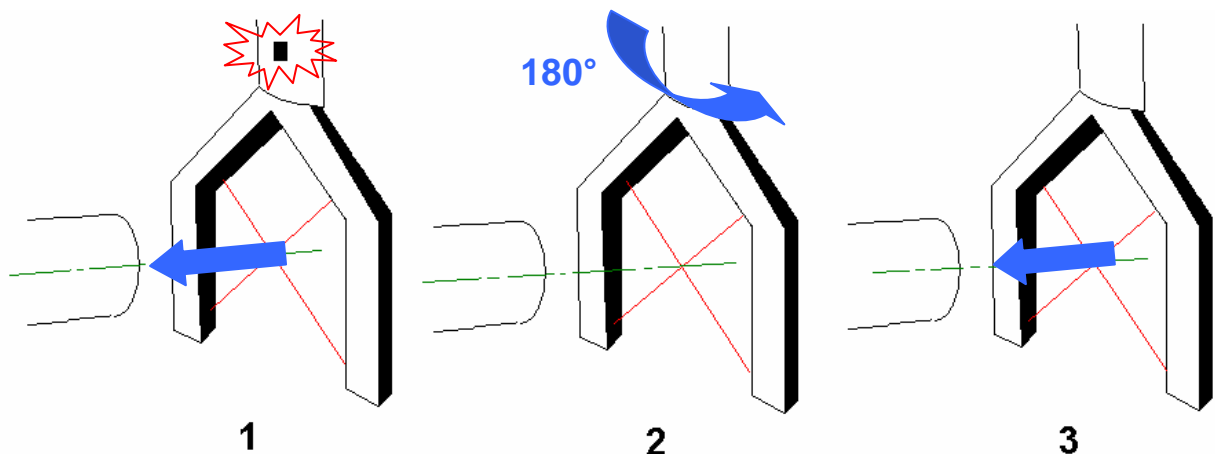
- Measure the extremity F8 of the side for vector's first point.

- Rotate Vee probe of 180° and click on F8 to measure the same extremity.

- Deviation between the 2 extremities appears **(Window 6).**

- If "**DX**" *(Window 6)* > 0,1 mm, add to or subtract from Y1 the following value:

(VG) / (ST LEN + B1 B2 LEN)

We get: **new Y1 = former Y1 +/- (VG) / (ST LEN + B1 B2 LEN)**

- To modify this parameter, press Shift F2. Don't forget to select parameter Y1.

- Repeat this process until **"DX" (Window 6)** < 0,1.

- Check that all the parameters are correct before going to the next stage.

6.15 6.10 Modification of Z1 parameter.

- Place the tube horizontally.

- For this process, the vector of reference must be measured as long as possible F3 .
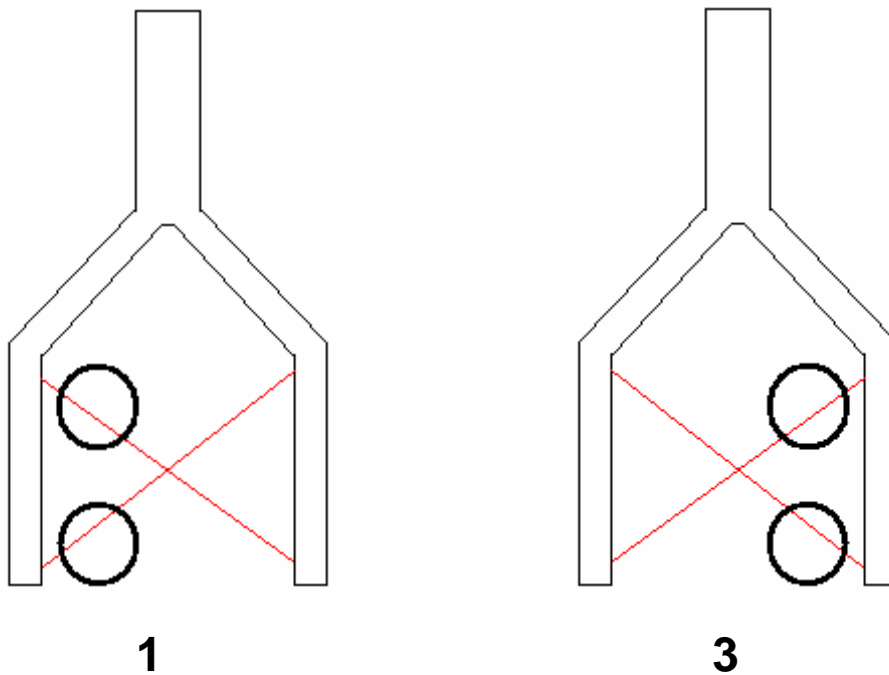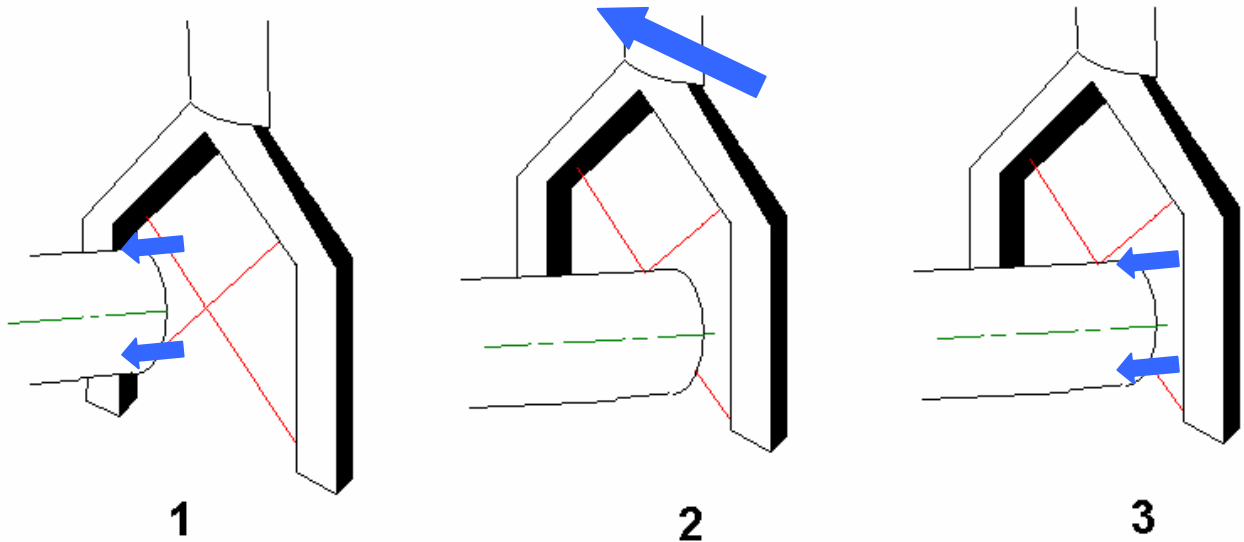
- Press F8 : break beam 1 then beam 2 of the first fork of Vee probe (the closest of the fork).

- Press F8 : repeat this process with the other fork of Vee probe.

Difference between the 2 extremities appears *(Window 6)*.

If **DX** *(Window 6)* > 0,1 mm, increase or reduce the value of Z1.

- To modify this parameter, press Shift F2 . Don't forget to select Z1 parameter.

- Change Z1 value using the following model wide and look again at the deviation:

New Z1 = old Z1 +/- VG / Non contact probe width

- Repeat this operation until _**DX**_ _(Window 6)_ < 0,1.

- Check that all the parameters are correct before going to the next stage.

6.16   6.11 Modification of the Beam Offset

- Place the tube horizontally.

- For this process, the vector must be measured the closest of the extremities.

- Press [Alt] + [F3]

- Measure the vector and its extremities.

- If the measured distance _(Window 9)_ is equal to the one of the tube with $\pm$ 0,1 mm, don't modify this parameter.

- If distance is 0,1 mm > or < than the value of the tube, modify **BEAM OFFS** parameter.

- As an example you can enter the value _**0.1**_ as an increment, make a modification and look once again at the deviation.

- Repeat this process until the measured value is equal to the one of the tube with $\pm$ 0,1 mm.

- Ccheck that all the parameters are correct. If it is necessary, make some modifications. If all the measures are correct, Vee probe calibration is finished.

7 *Calibrations and specific checks*

7.1   Arm on Rail

This instruction can be used when the 6-Axis version of the arm went through a Tune-up (IPS 006) or has been recalibrated, or if the rail has been recalibrated.

Essential elements:

- The calibration disk of the rail containing LI.GDS file (Li .gds must be on the root of the disk)

- Calibration data of the measuring am, coming from Suprastuff (ARMSPECS) or from GDS (ARMSPECS.GDS in 6-axis).

8.1.1   Installation

- Check, on the arm, that the fixius plate is well indexed. There must be only one possible angle.
- Put the arm on rail up.
- Connect DIN cable between the arm and the linear encoder.
- Connect the arm up to its main power and switch it on.
- Check in the registry base, that the IndexError sets to zero.

  In Windows' *START MENU*, click on Execute, then enter *"REGEDIT"*.

  Windows' registry base opens.

  Then select

  Workstation > HKEY_LOCAL_MACHINE > SOFTWARE > GDS > IndexError

  Check that this value sets to 0, otherwise, open this parameter (double click) and enter the value 0.

  Be careful : software shouldn't be opened during this process.

8.1.2   Run GDS

- Check that the number of LATCHS sets to 1 :

  From GDS main screen, press at the same time the *[Ctrl] [O]* keys

  Click on [Nb Latchs] and enter the value 1.

- Select menu *[GDS Function]*

  If it doesn't already exist, create a directory *7 axis configuration.*

  Load arm data (6 axis data to load in the 7 axis directory)

  Click on the [*Connect*] line, reset all the axis and check the way encoders count up and down.

- Return to the main screen.

- Let the security disk containing A:\LI.GDS in the reader.

8.1.3   Select the [Machine Calibration] menu

- Indicate the type of arm used.
- To the question *[Machine file already existing. Do you want to replace it ?]*, answer : OK

> [*Cancel*] if the capture of points is partially done and if you don't want to execute the whole process.

> [*OK*] to run the whole process since the beginning and erase the possible previous measures.

- [Machine Calibration] screen appears with the inactive [Load] function. (shade).
- Press at the same time on the [Ctrl] [O] keys

    Click on [Activate " Load "], [Load] function becomes active.

    Click on [Load] and open [ARM ON RAIL.GPD] script

    (on C:\Program Files\G-Pad\GDS\Config\Scripts\Arm on Rail.gpd)

- Click on *[Run all]*

8.1.4   Conversion of data into 7 axis

Some screens are about to be proposed to you. Validate all of them except for the question about the motorized rail :

    By default the answer is Yes, but for a non-motorized rail, click on No

    Note For Sigma arm :

```
* linear encoder counting direction
     write -1
* linear encoder resolution
     write 400
* motorised rail
     click on cancel
* linear encoder offset
     write 84000
```

Switch off and then switch on the main power of the arm.

Reset the arm and the rail.

8.1.5   *Measure the points as it is indicated on the screen*

- Put the rail at full stroke and measure a point in the center of the rail (well note the measured point).
- Move the rail toward the second extremity and measure twice the previous point.
- Move the rail toward the first extremity and measure the same point.

8.1.6   *Start calculation up*

At the end of the calculation, click on **DETAILS**, and note the values you obtain.

If they meet the system conditions (appendix 2 § 11.2), click on OK.

If it should not be the case, contact your dealer.

NB: the process will modify the ARMSPECS.GDS file.

Save the file ARMSPECS.GDS and ProbesX.GDS file and the LI.GDS file on the directory 7 Axis on the backup disk (create it if you need to) (from Windows Explorer).

8 Perceval Link

8.1   Description:

This function is used to export Sphere center coordinates in PERCEVAL format on a communication port.

At each pushbutton, a frame in ASCII format is sent to a communication port.

Format of PERCEVAL frame:

SP+/-######SP+/-######SP+/-######SP+/-######SP+/-######SP+/-######SP101CRLF

SP: equivalent to Space (32 in ASCII)

+/-:   equivalent to the plus or minus sign (43 or 45 in ASCII)

CR: equivalent to the Carriage Return character (13 in ASCII)

LF: equivalent to the Line Feed character (10 in ASCII)

######:   equivalent to digits from 0 to 9 (48 to 57 in ASCII). Each of the values is in 1/100th of mm and takes respectively the values XYZ (center of sphere) and XPYPZP, representing the sphere center point moved 100mm in the direction of the vector directed outward from the probe (Fig. 1).
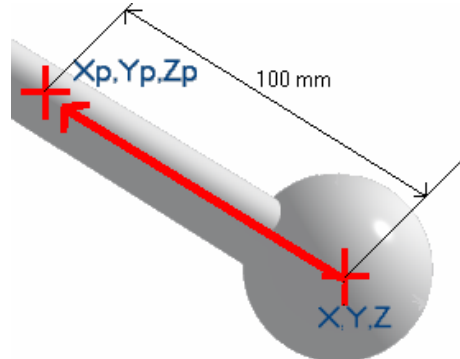
Fig. 1

8.2   <u>User Interface</u>
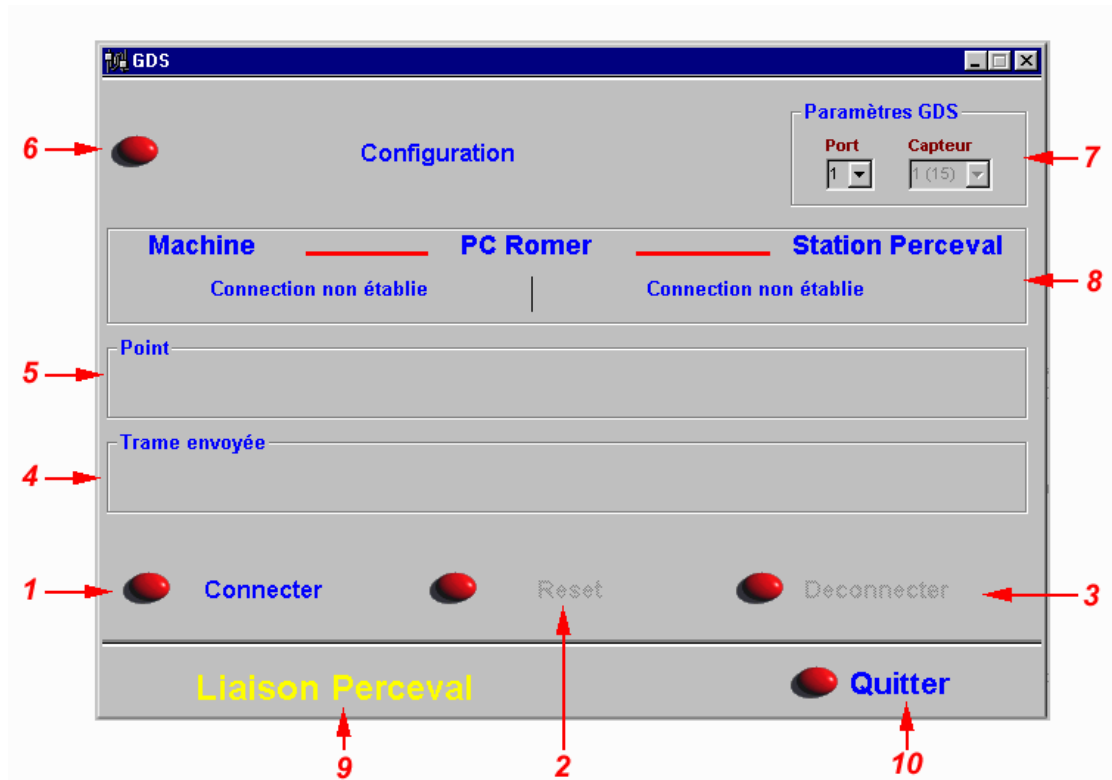
12. Start communication
13. Reset arm
14. De-activate communication with arm
15. Preview of frame sent
16. Display of current coordinate
17. Configuration of communication port intended for data export
18. Configuration of serial port used for the arm and the current probe
19. Display of Errors

9.2.1   *Start communication:*

Used to activate communication with the arm and open the communication port intended for export data. From that time, the current coordinate is displayed continuously and for each pushbutton a frame is sent to the communication port and displayed on the screen.

9.2.2   *Configuration of communication port intended for data export*
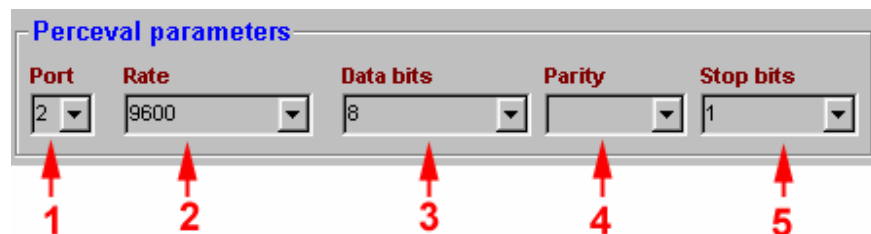
1. Index of port used (from 1 to 4)
2. Adjustment of Baud rate (from 1200 to 9600)
3. Adjustment of number of data bits (from 6 to 8)
4. Adjustment of parity (No, Even, Odd)
5. Adjustment of number of stop bits (from 1 to 4)

9.2.3 Call a referential made by G-Pad to export points in the created referential.

Method 1 :

- Save a referencing in G-pad (Edit/referencing/management mode then file:save)

- In gds, click on the referencing then add
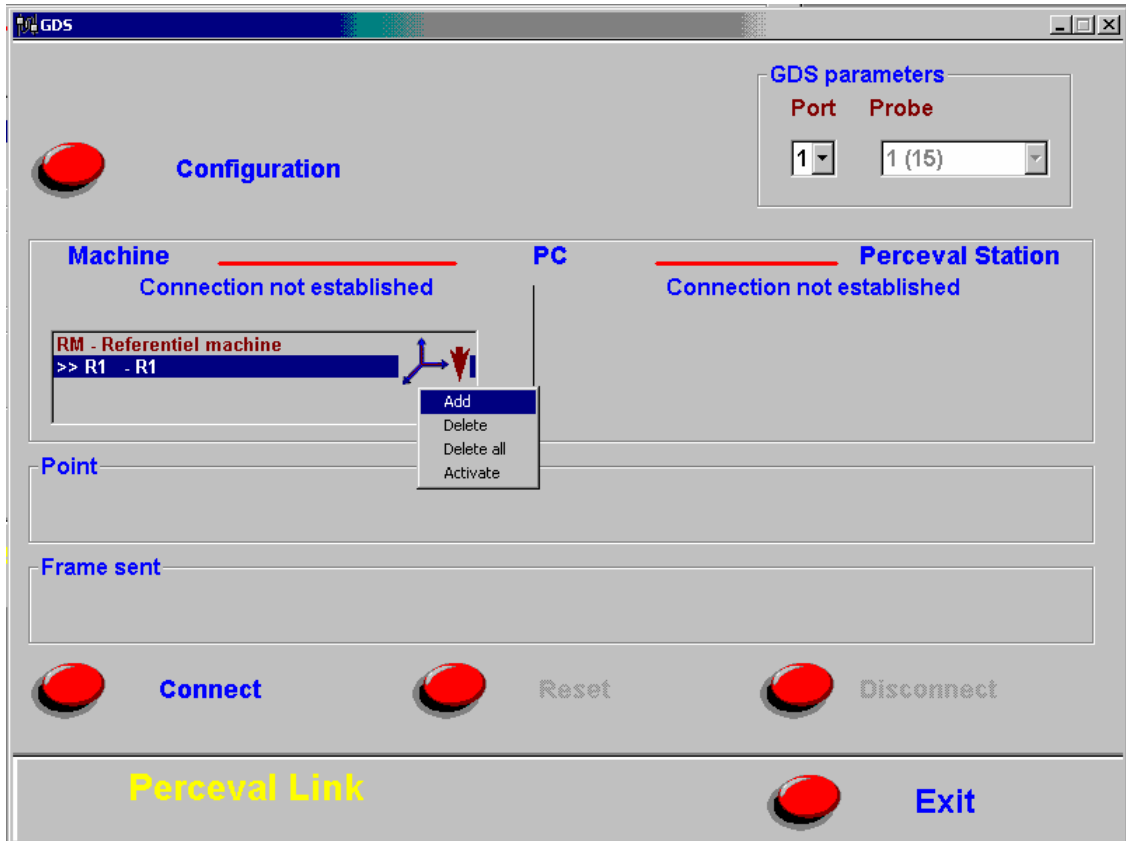
Referencings are saved in folder program files/G-Pad/groupes/…

Activate the referencing required.

Method 2 :

- Run Gds Sav to have the gds dialog box in the tools bar. (look 14.4 in the Gds Manual A.21102 for Romer agents only or contact Romer hotline))

- Select « Perceval link » in the menu

- Click connect

- Select the referential created by G-Pad in the "referencing" tab of the gds dialog box.
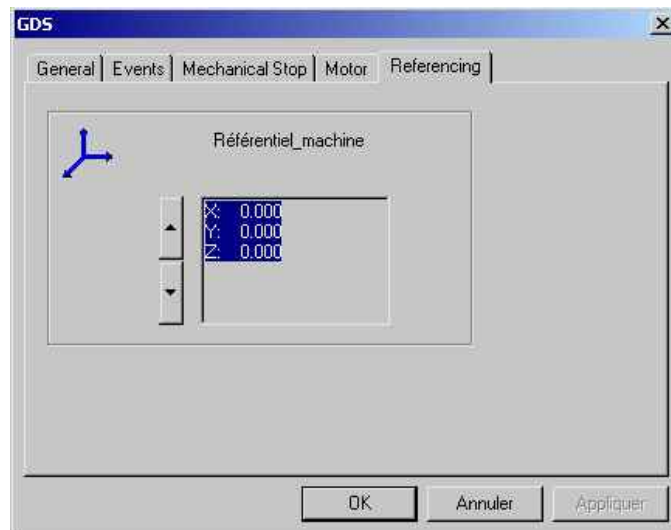
- Follow the instructions above at the point 9 to communicate the coordinates by the created referential to the linked computer.

7 GDS Dialog Box

GDS Dialog Box is the interface between the user and GDSDLL driver which controls the arm and its accessories.

It is made up with several tabs which vary depending on accessories GDS knows, and is used to configure systems.

7.1   General Tab

It is used to change the configuration of the arm used, its volume, and various parameters.
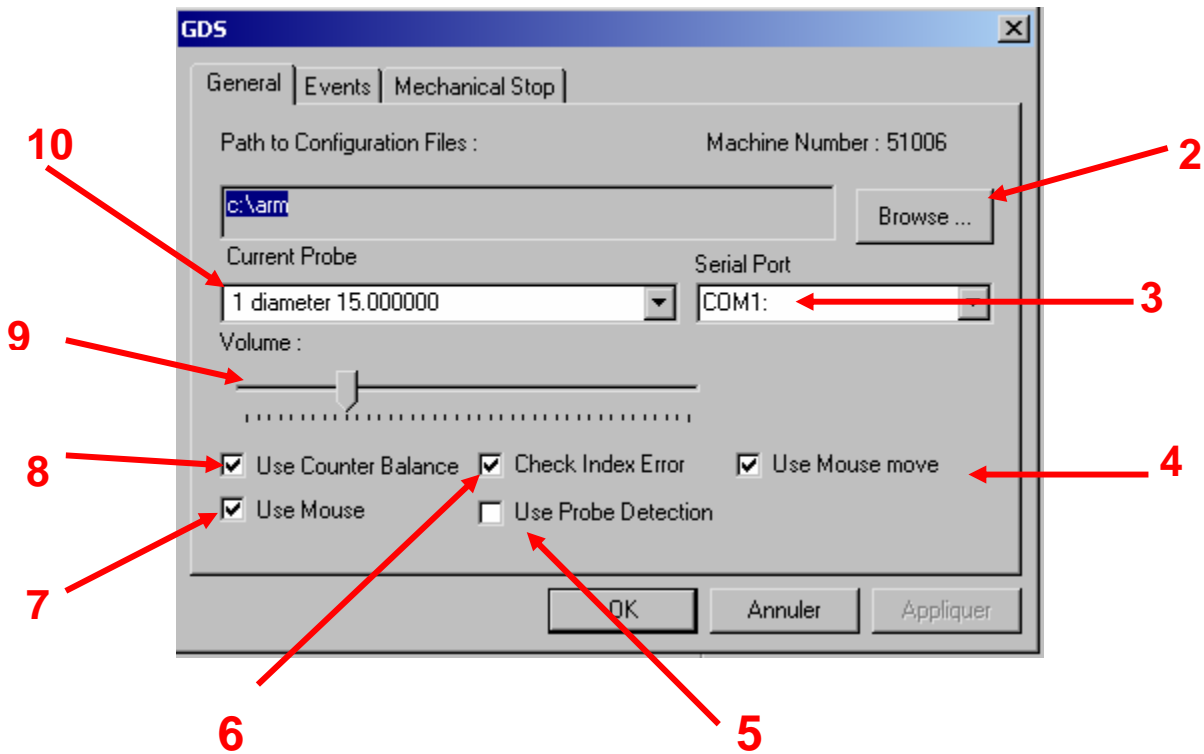
1.   Data files
2.   Browsing to change arm configuration
3.   Serial Port of communication with the arm
4.   Use of the mouse windows with the arm
5.   Probe ID
6.   Detection of loose encoder counts
7.   Activation of the Arm Mouse
8.   Counter balance Management
9.   Adjustment of the arm sound level
10.   Current probe

7.2   Events Tab

Used to modify sounds produced by the arm.
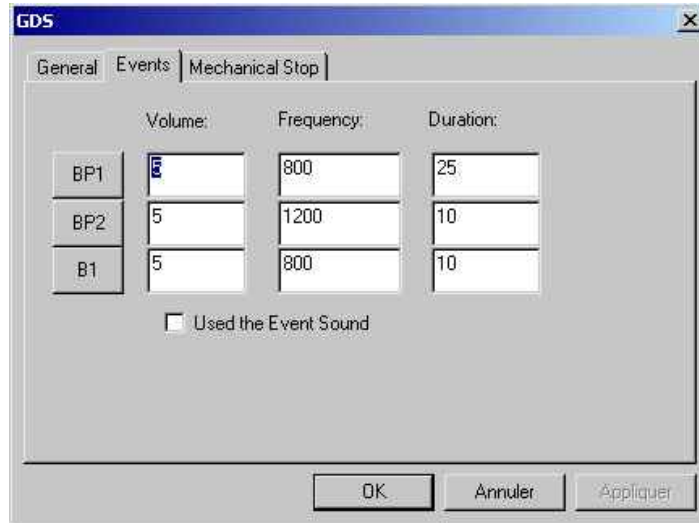
BP1 : sound produced by the pressure on BP1

BP2 : sound produced by the pressure on BP2 or by the break of the beam 2

B1 : sound produced by the break of the beam

Volume : Sound level produced by the arm

Frequency : Frequency of the sound

Duration : Duration of the sound

7.3 Mechanical Stop Tab

Used to manage stops of arm axis.
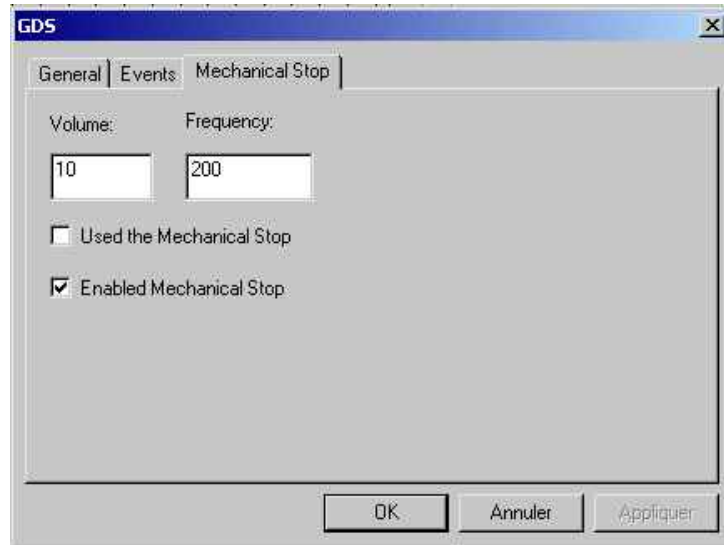
Used the mechanical stop : active / inactive stop

Enabled Mechanical Stop : use of the stops

Volume : Sound level of stops

Frequency : Frequency of the sound produced by stops

7.4 Motor Tab

Used to manage the use of a motorized rail.
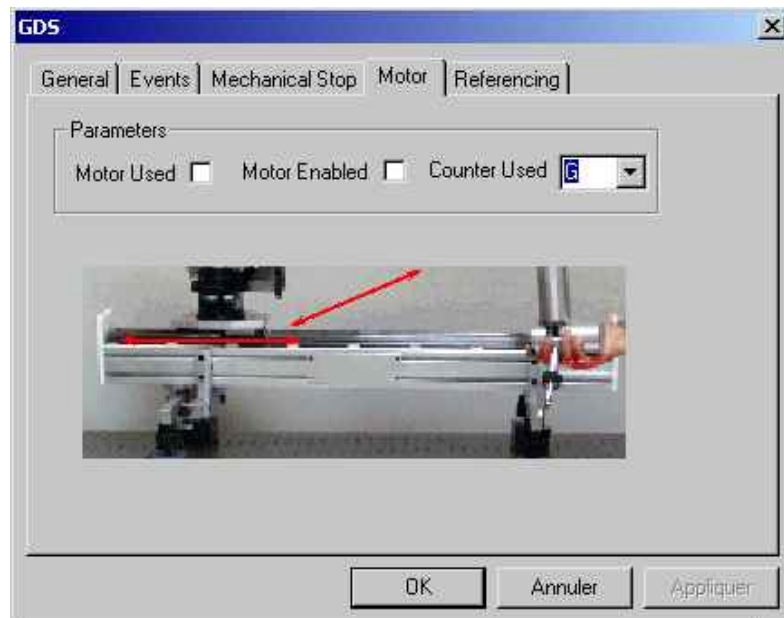
Counter Used : Index of the axis rail
Motor enabled : activation / de-activation of the use of the rail motor in measure
Motor used : active / inactive motor

7.5 Multireference Tab

GDS is used to manage several Machine References, for the use of systems such as EVM, Indexed Rails, coordinate registered pucks, with every software using GDSDLL.

Arrows ensure to change the position of the system.
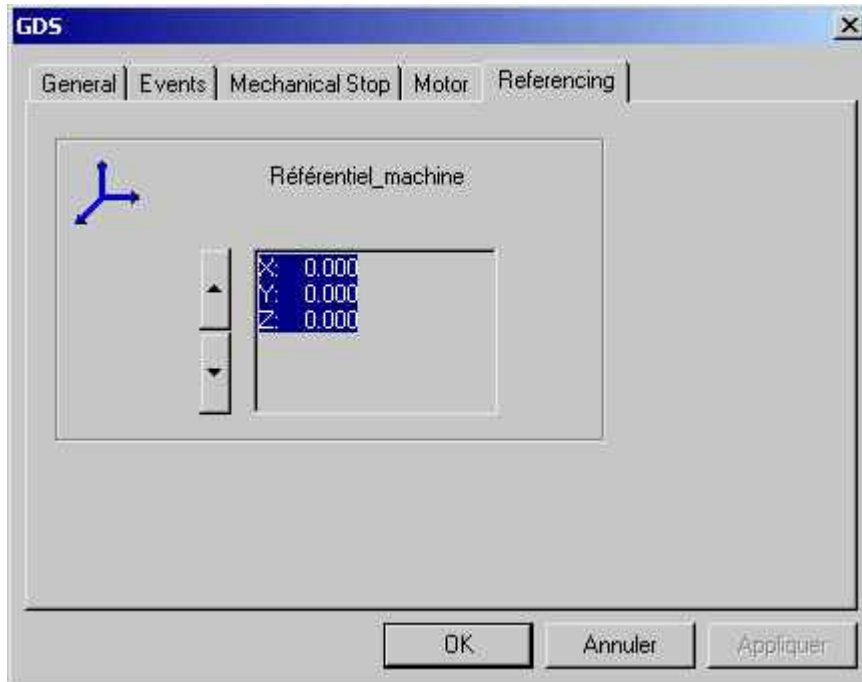
NB : The multireference use in GDSDLL driver requires an Index.gds file (with armspecs.gds) which contains references.

7.6 LeapFrog Tab

Used to change the position of the arm thanks to a Leap Frog.

You need to use at least three holes where fit the probe ball, enough spaced, non aligned, and measurable from the first position and the second position.

For that, modify the number of points used clicking on 1, then run the operation clicking on . Measure points from the first position, move the arm and measure once again the same points in the same order from the second position.

A Best-Fit value is displayed. That is the maximum LeapFrog default of the both positions. If this value is correct, then click on OK.
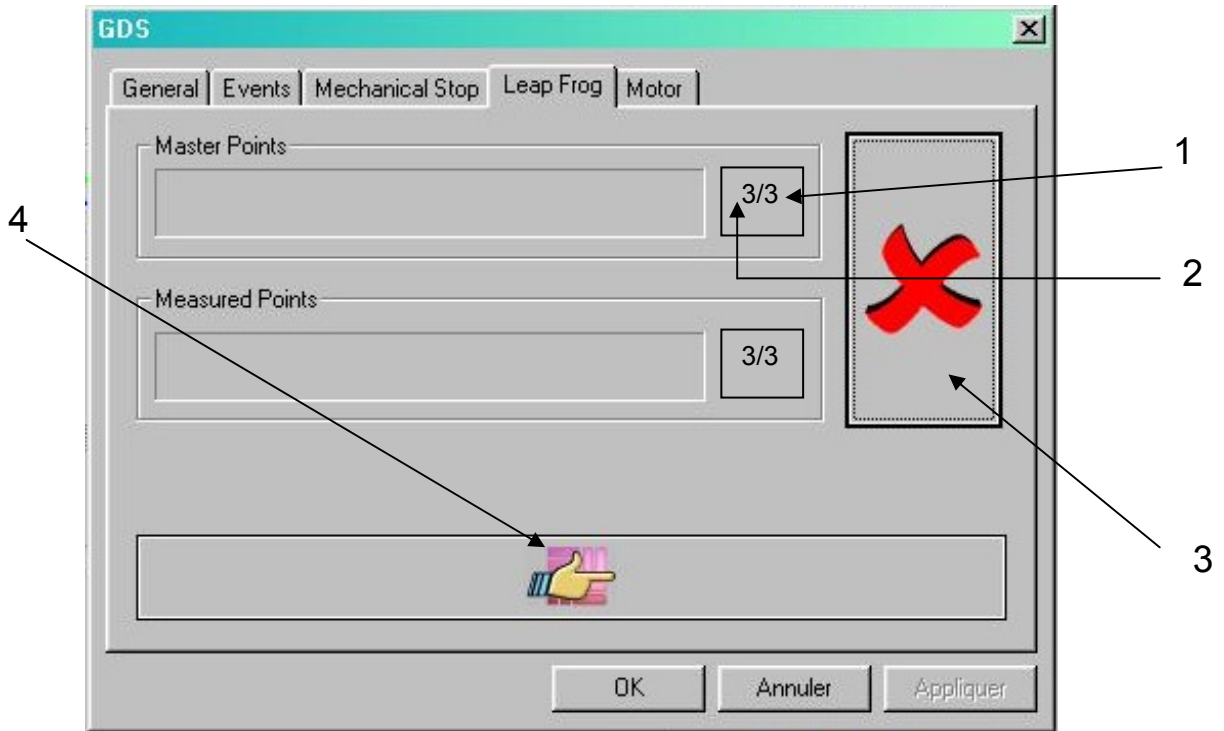
11. Number of points used for LeapFrog (modifiable)
12. Number of points measured
13. Cancel
14. Start LeapFrog up

NB : With LeapFrog, no referential multiplication is necessary for the use of a part reference. The operation keeps the referential of the first position.

Once Leap Frog is done, a " Reference " tab appears in GDS dialog box, and it is possible to choose between the last position ("Last LeapFrog"), and the initial one (Reference Machine).

7.7   <u>Camera setup</u>

It appears only when a g-Scan Rx Probe is selected.

The camera setup must be done to adjust the sensitivity of the camera, relative to the part colour. You must use the *{Video probe setup}* on the following menu: ***Options, Arm, Configuration (522). (The G-Scan probe (usually probe #4) must be selected in the 'general' menu before this tab becomes visible).***
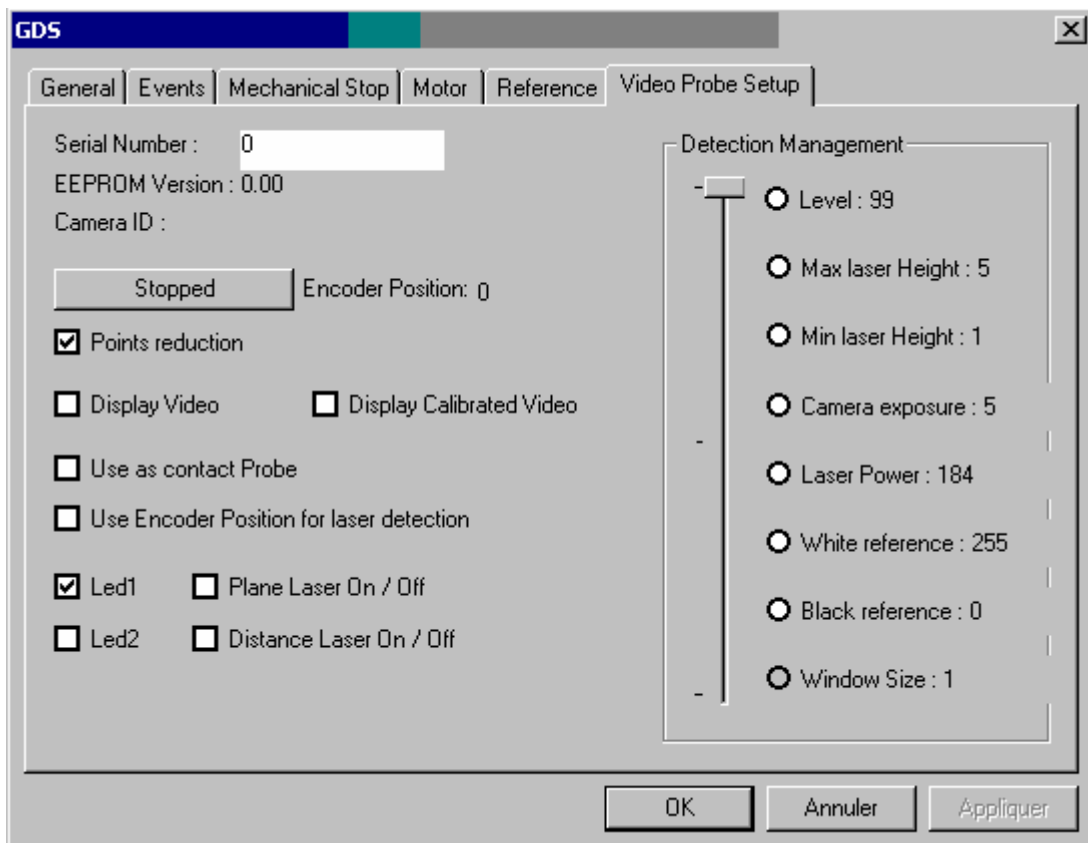
- Click in the 'Stopped' button (camera ID now shows the unit number and encoder value)

- *Tick… Points reduction…. to* reduce the number of points recorded during the measurement.

- Tick…. *Plane laser On…. distance laser On….<u>. then…..</u> Display video.*

- *NOTE……………Display calibrated Video, Use as a contact probe, Use encoder position for laser detection, led 1, led 2* are used by the calibration engineers.

- For the next step…. the camera must be held steady with laser beam and dot converged together on the part (dot not shown on computer screen) in *figure A below*. Now you can adjust the setup parameters of the camera as shown in *figure B…. (below right)*.
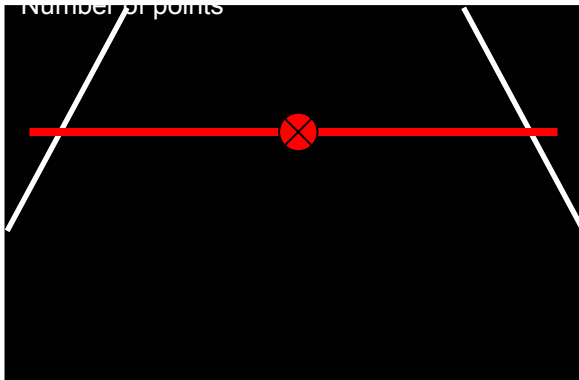
Figure A: video display
does not show red dot
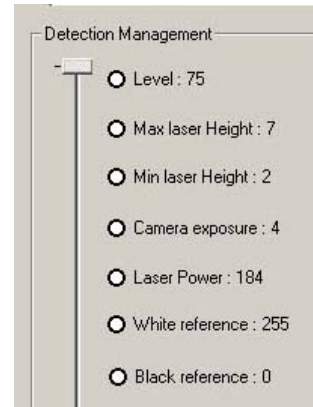
Figure B : parameters

- Setup definitions:

<u>Min Laser Height:</u> Is the minimum thickness of the beam to detect.

<u>Max Laser Height:</u> Is the maximum thickness of the beam to detect.

<u>Level:</u> Is the detection moment where the software will detect the (X) start and (Y) end of the beam in the video display. The (*Y-X*) value must be > *Min Laser Height* and < *Max Laser Height*.
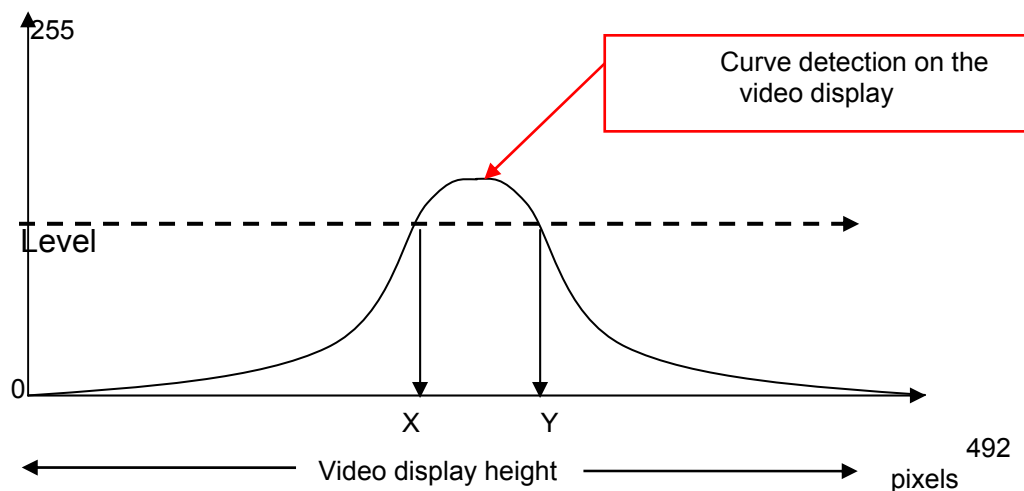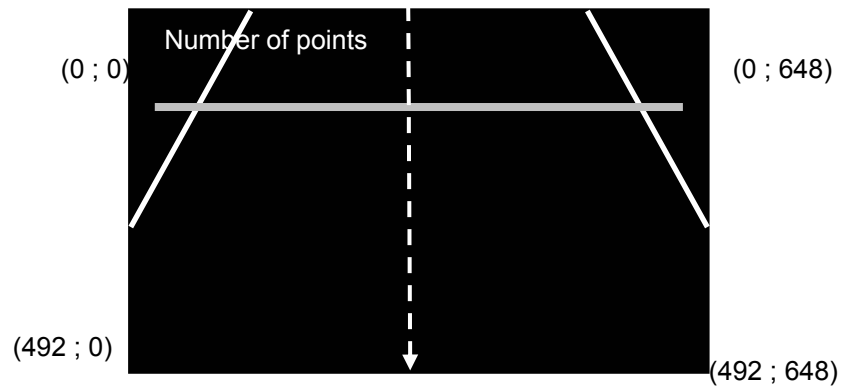
Camera exposure: Is the camera aperture time of the camera objective. More this duration is important and more the camera will be sensitive to the noises. A high aperture time is used only if you want to measure a very darkness part and if there is not enough points.

1 2   **6 7**

High duration exposure   Low duration exposure

High aperture time

Low aperture time
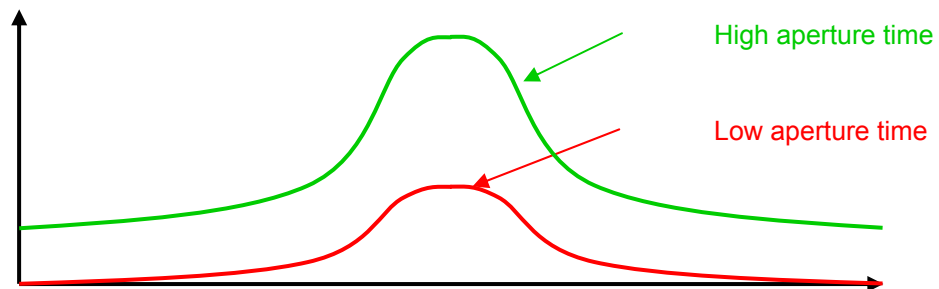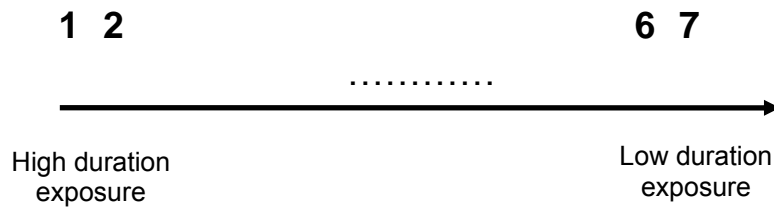
Laser Power: is the laser beam intensity. Is possible to change the profile of the curve detected by the camera.
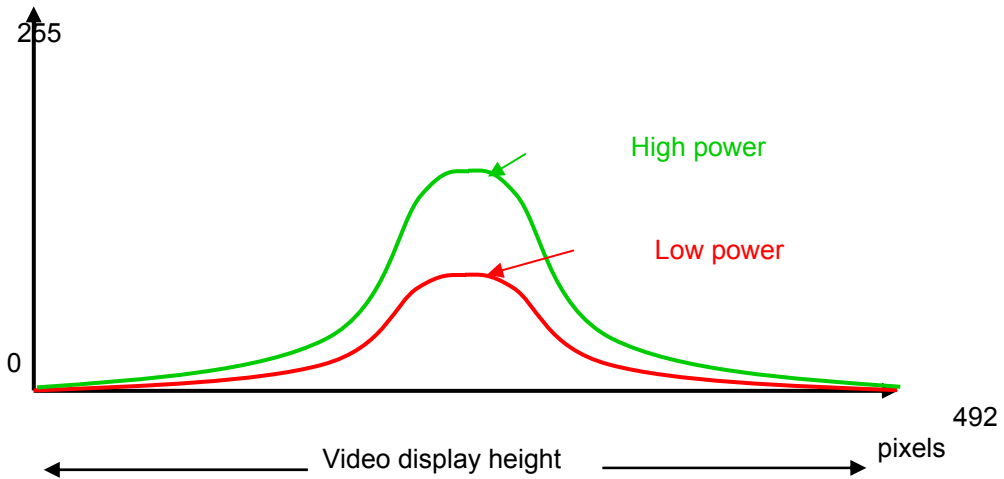
Use this parameter to have a maximum of points on the video display. (More than 300 points if the setup is done on a plane).

When the best setup is defined, you can start the measurement.

Deactivate *Display Video*, *Plane laser On/off* and *Distance laser On/off,* and close the GDS dialogue box clicking …. OK.

During the measurement, use the distance laser to have the correct position according to the part. If we exit of the 2 cm window, the measurement is stopped.
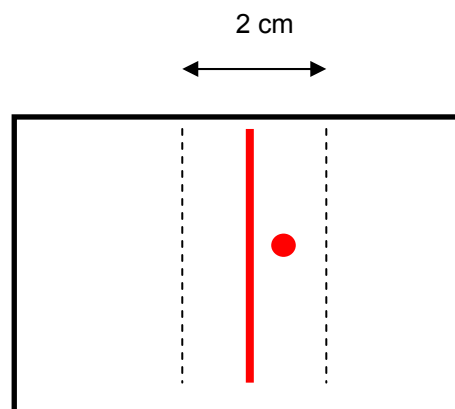
During the measurement, the distance between the camera and the surface will change the density of the points per line but not the number of points.

Window size: Opening window of the camera.

➢ Configuration 1 « large »:

Distance
prob/surface
88 mm
(Low limit)

49 mm / 400 points =

0.12 mm/Points

Distance
prob/surface
98 mm

60 mm/ 470 points =

0.13 mm/points

Distance
prob/surface
118 mm
Hight limit

75 mm / 540 Points =

0.14 mm/points

➢ Configuration 2 « better »:

28 mm / 280 points =

0.10 mm/Points

42 mm/ 354 points =

0.12 mm/points

Distance
prob/surface
88 mm
(Low limit)

Distance
prob/surface
100 mm

Distance
prob/surface
108 mm
Hight limit

53 mm / 415 Points =

0.13 mm/points

At least, the distance between two points is twice interpolated.

7.8   IP adress of the arm setup

Appear with sigma arm

4.2.4   *Working explanation*

To configure the IP address of the arm, knowledge of network management and installation of peripheral system like Ethernet, PCI, PCMCIA, USB boards is required.

The protocol used to transfer data between the arm and computer is a TCP/IP protocol. Each element of the communication chain (please look drawing below) have to possess the same address track.

RCM 2200 Ethernet board of the arm	←	Ethernet board of the computer	Sigma protocol (4) of GDS	Application (G-Pad GDS..
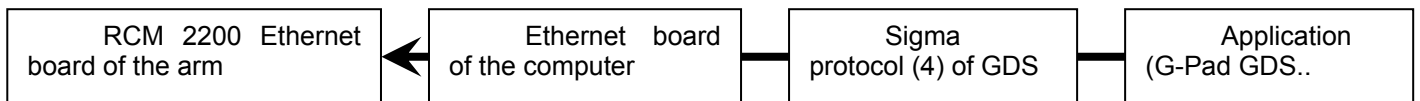
There are different solutions to connect Sigma arm to the computer. Each configuration is described in the following pages. The 3 described possibilities permit to solve each case.

Direct connexion with Ethernet RJ45 FTP category 5 crossed cable

Computer

Power supply box

GDSDLL

RCM 2200 Ethernet board

Sigma protocol (4)

192.168.7.249

192.168.7.249

255.255.255.0

255.255.255.0

Equality

Ethernet board

192.168.7.1
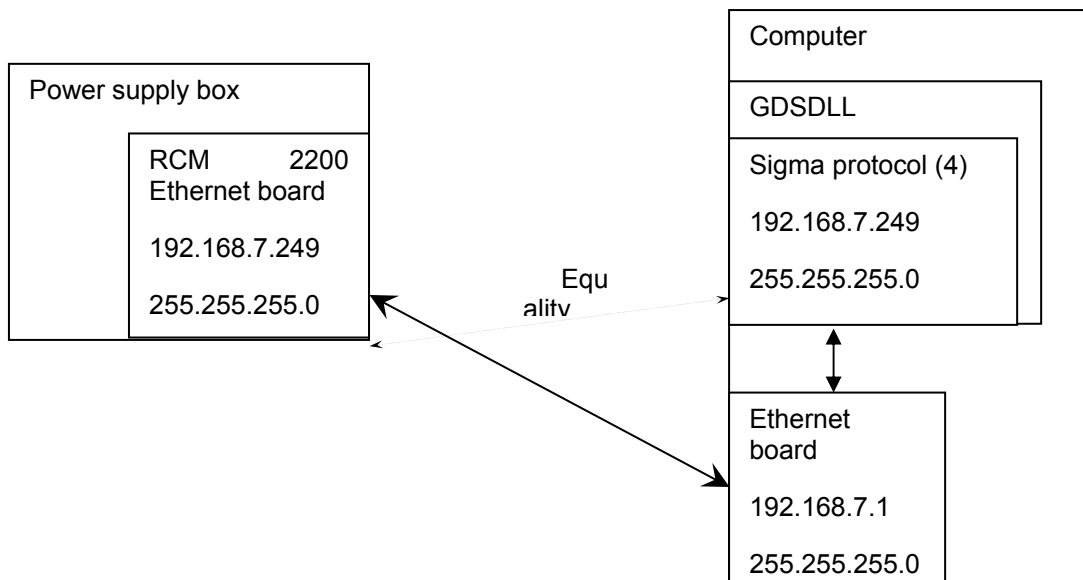
255.255.255.0

Setup:

By default the power supply box is configured with the following IP address 192.168.7.249 and a network mask 255.255.255.0.

So, it is necessary to configure the Ethernet board of the computer with 192.168.7.x (1<x<255 and ≠249). Please read following pages to *Configure IP of the computer*

4.2.5 *Indirect connexion with Ethernet RJ45 FTP category 5 straight cable and a network company*

```
┌─────────────────────────────┐         ┌──────────────────────────────────┐
│ Power supply box            │         │ Computer                         │
│                             │         │  ┌─────────────────────────────┐ │
│    ┌───────────────────┐    │         │  │ GDSDLL                      │ │
│    │ RCM      2200      │    │   Equ   │  │  ┌────────────────────────┐ │ │
│    │ Ethernet board     │◄╌╌╌╌╌╌╌╌╌ality│  │  │ Sigma protocol (4)     │ │ │
│    │                    │    │         │  │  │ 191.2.1.168            │ │ │
│    │ 191.2.1.168        │    │         │  │  │ 255.255.0.0            │ │ │
│    │                    │    │         │  │  └────────────────────────┘ │ │
│    │ 255.255.0.0        │    │         │  │            ↕               │ │
│    └───────────────────┘    │         │  ├─────────────────────────────┤ │
└─────────────────────────────┘         │  │ Ethernet                    │ │
              ↕                          │  │ Board                       │ │
              │                          │  │ 191.2.1.52                  │ │
              │                          │  │ 255.255.0.0                 │ │
              │                          │  └─────────────────────────────┘ │
              │                          └──────────────↕───────────────────┘
              │                                         │
     ┌────────┴─────────────────────────────────────────┴──────┐
     │              Network company                             │
     └──────────────────────────────────────────────────────────┘
```
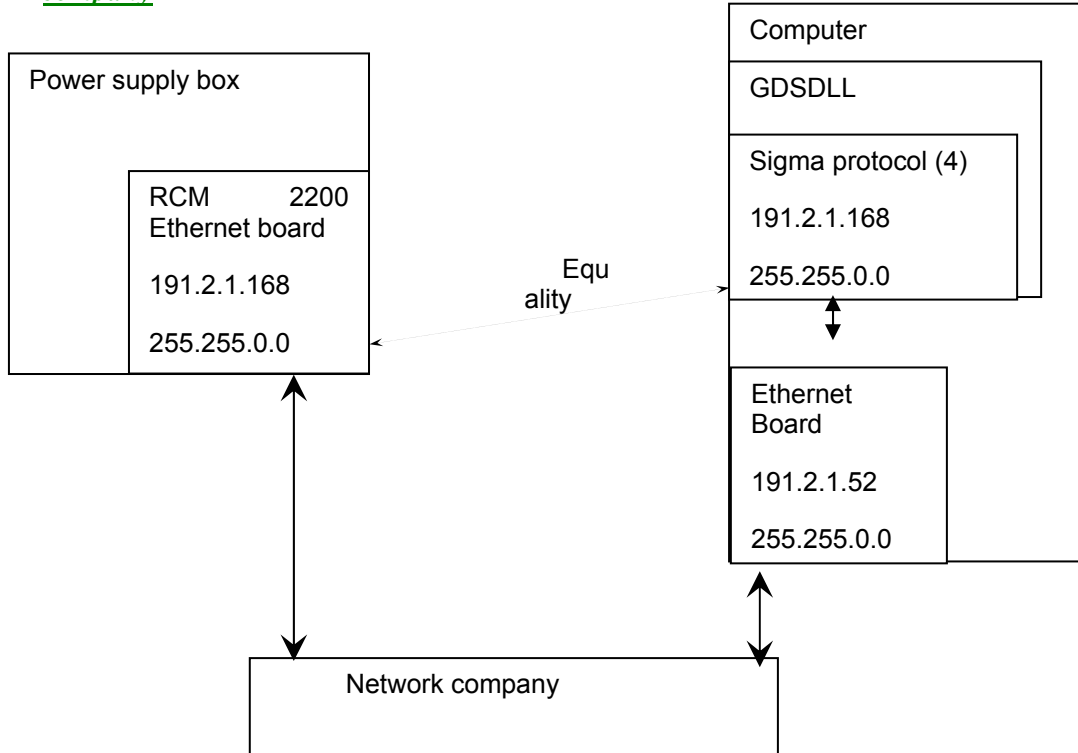
Setup:

Setup have to been made by the network company administrator (please read **Configure IP of the arm)**

4.2.6   *Direct connexion with Ethernet RJ45 FTP category 5 crossed cable and a network company in the same time*

```
                                              ┌─────────────────────────────┐
                                              │ Computer                    │
                                              │ ┌─────────────────────────┐ │
                                              │ │ GDSDLL                  │ │
                                              │ │ ┌─────────────────────┐ │ │
  ┌─────────────────────────────┐            │ │ │ Sigma Protocol (4)  │ │ │
  │ Power supply box            │            │ │ │                     │ │ │
  │ ┌─────────────────────────┐ │            │ │ │ 192.168.7.249       │ │ │
  │ │ RCM        2200         │ │            │ │ │                     │ │ │
  │ │ Ethernet board          │ │  Equali    │ │ │ 255.255.255.0       │ │ │
  │ │                         │ │◄---- ty --►│ │ └─────────────────────┘ │ │
  │ │ 192.168.7.249           │ │            │ │                         │ │
  │ │                         │ │            │ │ ┌─────────────────────┐ │ │
  │ │ 255.255.255.0           │ │◄───────────┼─┤ Ethernet Board      │ │ │
  │ └─────────────────────────┘ │            │ │ 192.168.7.1         │ │ │
  └─────────────────────────────┘            │ │ 255.255.255.0       │ │ │
                                              │ ├─────────────────────┤ │ │
                                              │ │ Ethernet 2 board    │ │ │
                                              │ │ 191.2.1.52          │ │ │
                                              │ │ 255.255.0.0         │ │ │
                                              │ └─────────────────────┘ │
                                              └─────────────────────────────┘
                                                        │
                                                        ▼
                                              ┌─────────────────────────┐
                                              │   Company network       │
                                              │                         │
                                              └─────────────────────────┘
```
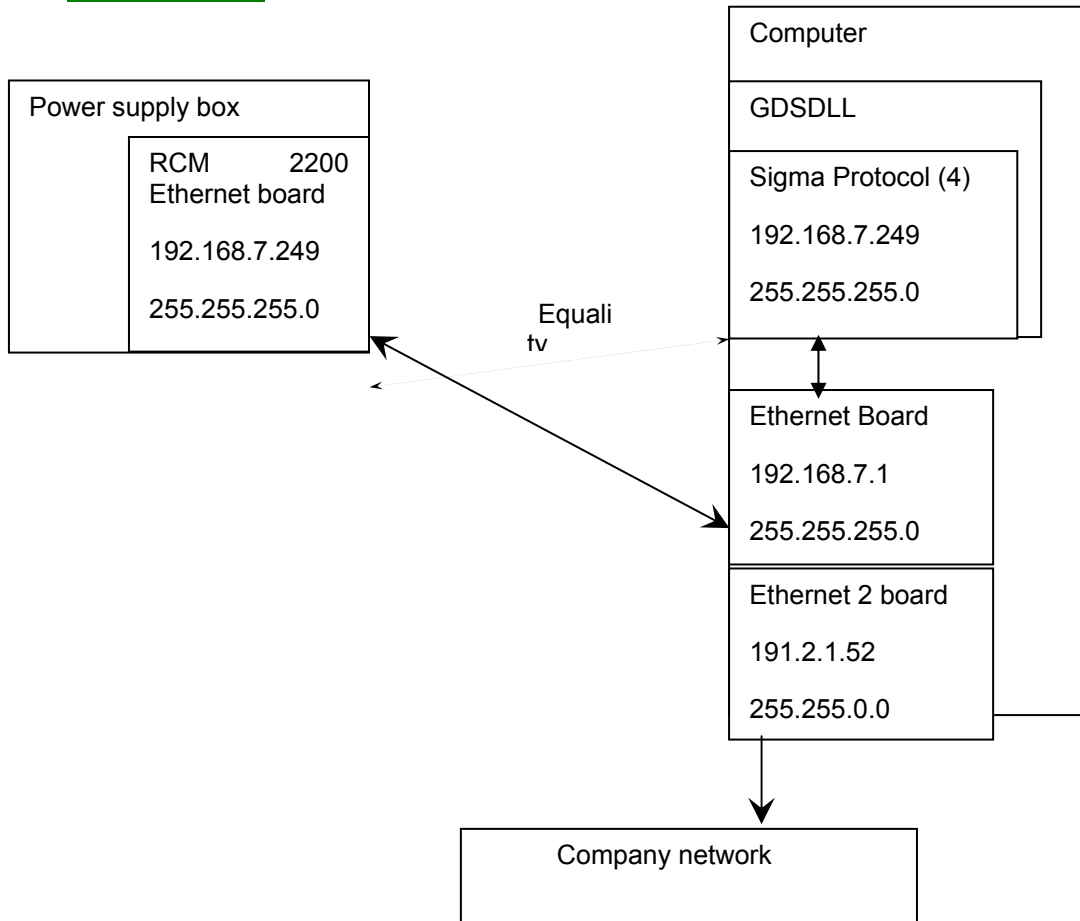
Setup:

By default the power supply box is configure with the following IP address 192.168.7.249 and with a network mask 255.255.255.0 so it is necessary to configure the Ethernet computer board with 192.168.7.x (1<x<255 and ≠249). Please read following pages to **Configure IP of the computer**

Note: With a desktop there are 2 solutions to install several network board.

- Ethernet PCI board with 10 MB minimum
- USB 2.0 Ethernet adaptator

With a laptop there are, also, 2 solutions to install several network board:

- USB 2.0 Ethernet adaptator
- PCMCIA FastEthernet board

4.2.7   *IP arm setup*

7.8.1.1   Sigma protocol setup (local on the computer)

The local setup permits to select the address of the arm with which one GDS has to communicate.

Open the gds dialog box then write the value of the IP address and the network mask.
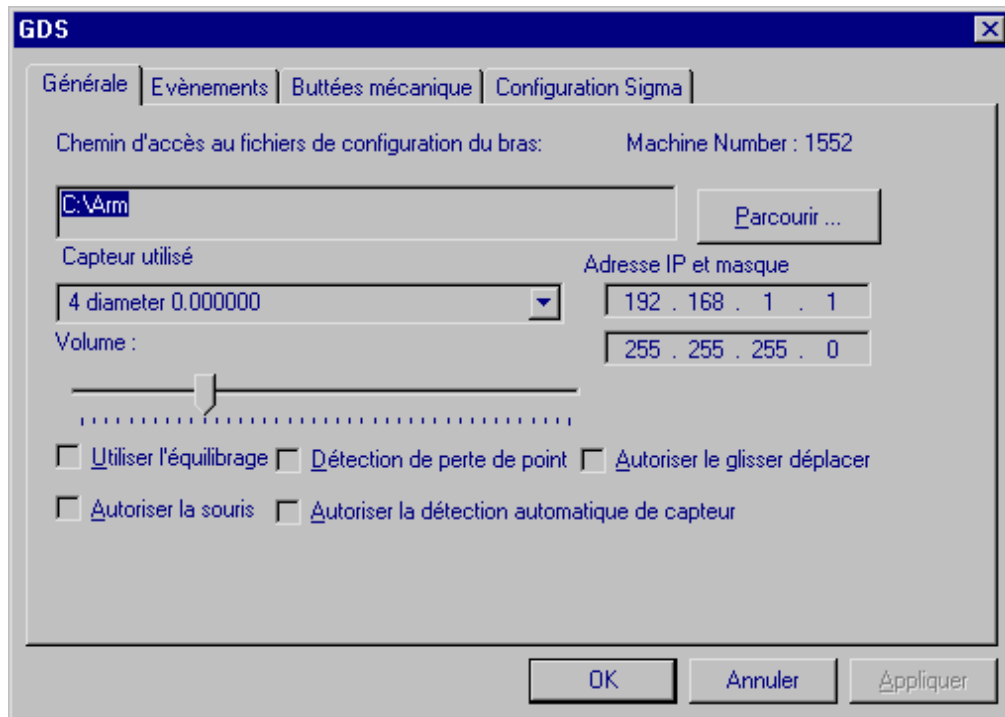
Note: If the address of the arm is lost or unknown, a default address can be used with a jumper plugged on G-Scan of the power supply box.

This action permits to use the following parameter:IP: 192.168.1.1   Mask: 255.255.255.0

7.8.1.2 Arm setup

To change arm IP address, select tab « *Sigma setup* »
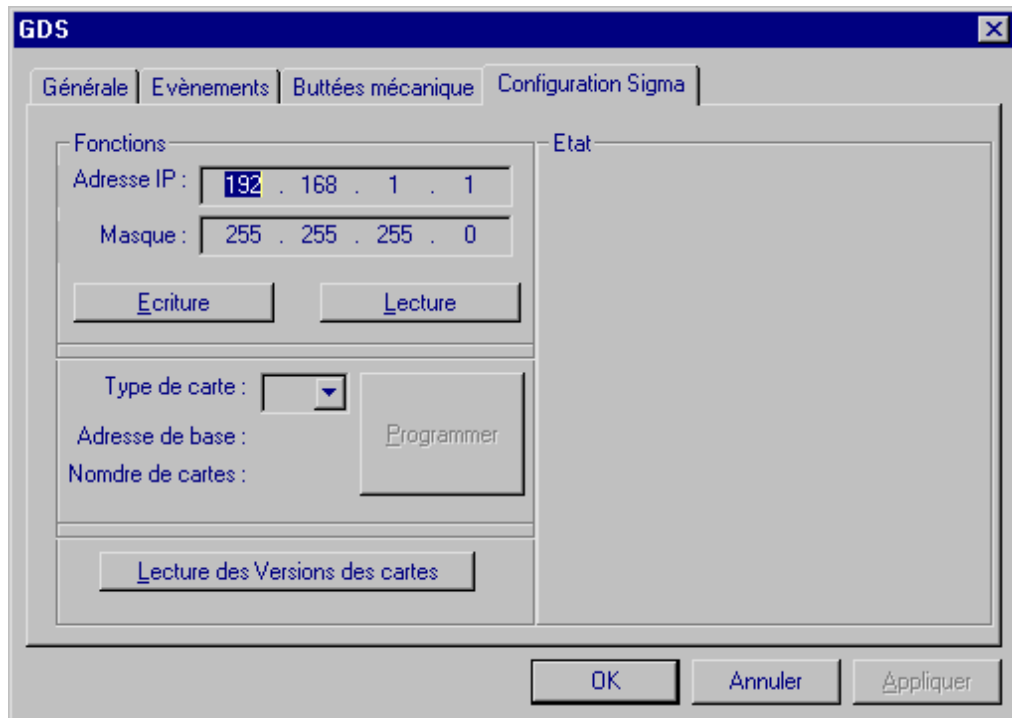
Write the value of the IP address and the network mask then click on the button *« Write »*. Power supply box have to restart after each modifications.

4.2.8   IP PC setup

Right Click on the icon « **Favoris réseau »**

Then click on "**Properties »** the following window will appear:
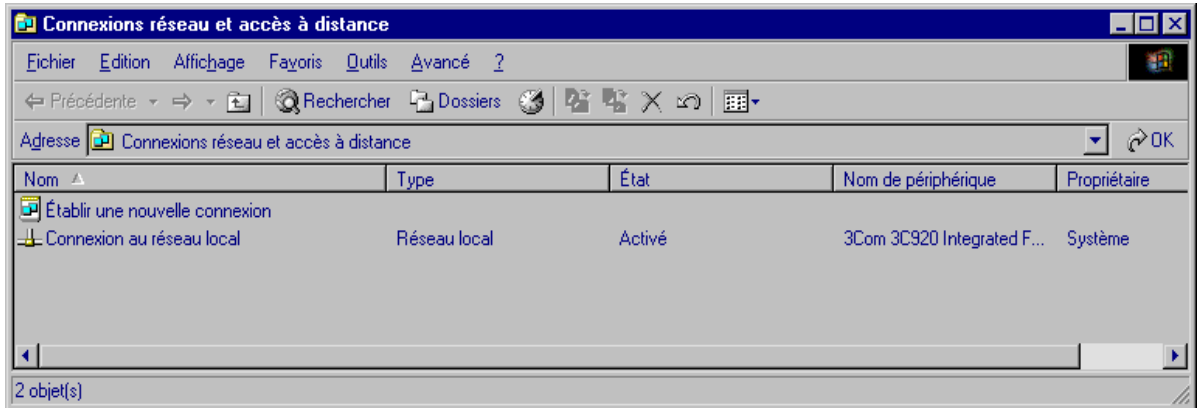
Select « **Connexion with the local network »** then click on the menu « **File »** then « **properties »**

The following window will appear:
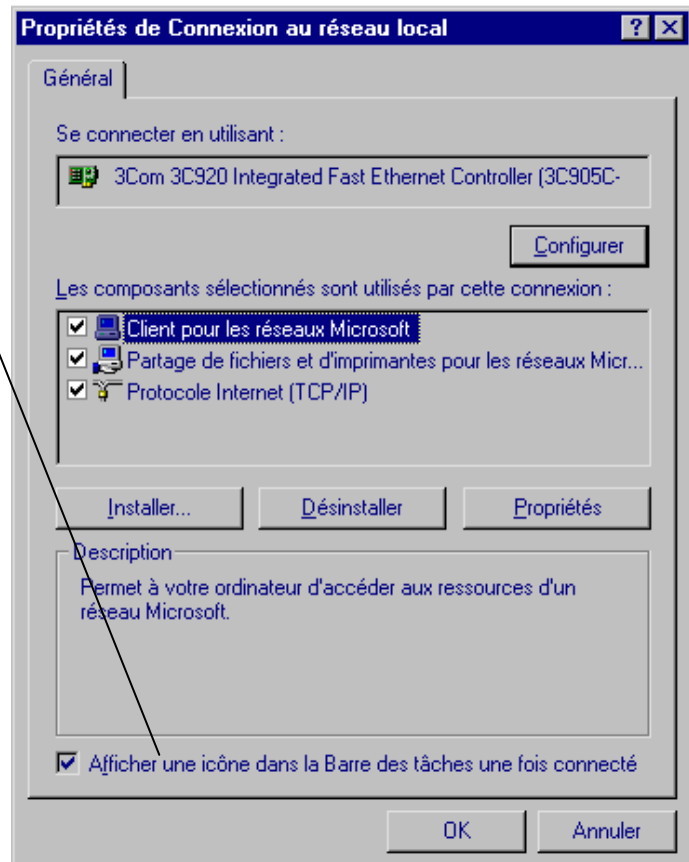
Select this function, this will permit to check quickly that the connexion with the network is correct.

Note: It is possible that the text *«Local network Connexion»* do not exist because it has been changed. Ensure that the right icon is selected.

Moreover it is possible to have several network boards (carte specified in the column *Peripheral name*) check that the selected board is connected with the arm and possibly put the name *« Sigma »* if that is a direct connexion.

Select Internet (TCP/IP) protocol then click on the button *« Properties ».*

The following window will appear:
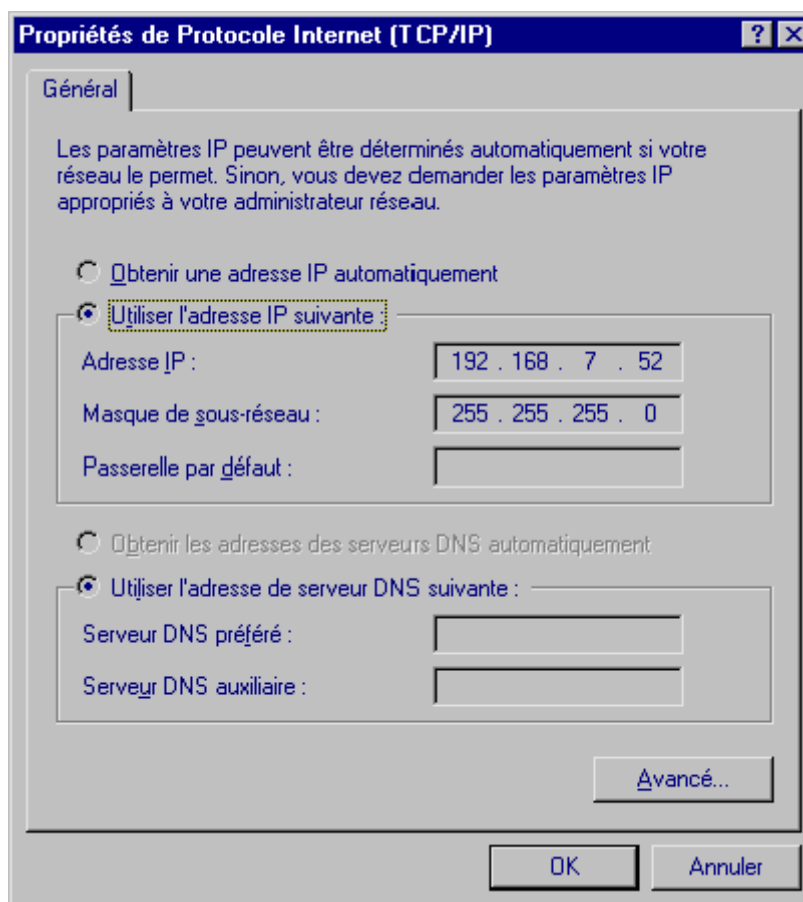
Write the value of the IP address and the network mask. Others don't change.

4.2.9   Method to change IP of the arm

Be carreful, the communication with the arm has to be operational before to start this step.

This method is used in the following case:

- The computer is already configured with a network company
- The computer possesses only one network board.

In this case, the solution is to change IP address of the arm to permit to the user to connect the computer to the network company or to the arm without change parameters.

Please follow attentively this instruction.

7.8.1.3   Step 1: Change IP of the arm and Gds.

- Check that connection is working, connecting the arm.
- Disconnect the arm.
- Press buttons « *Ctrl* » « *Shift* » « *o* »
- The following window will appear, click « *GDS dialog box* »
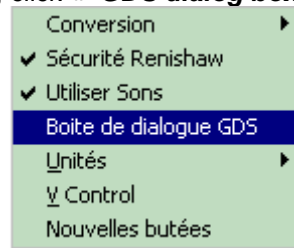
- The following window will appear,
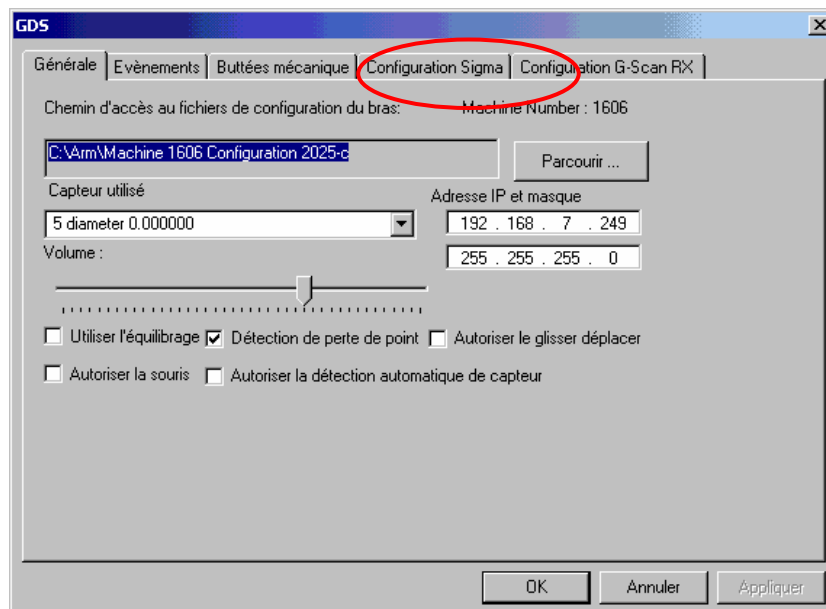
- Click « *Sigma Setup* »

- The following window will appear
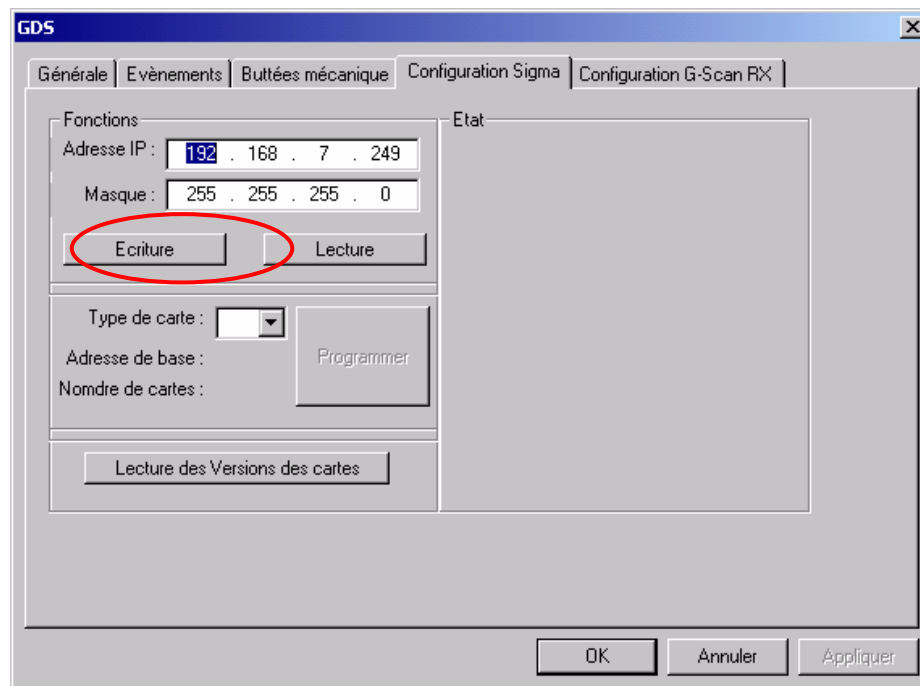
- Write IP address and the company Ethernet mask

Conditions: **- IP address has to be different of the computer IP address**

   - IP address has to be conform to the mask

Example: If the mask is 255.255.255.0 you can only change the last number.

- Click on the button « **Write** »

- The following sentence will appear.
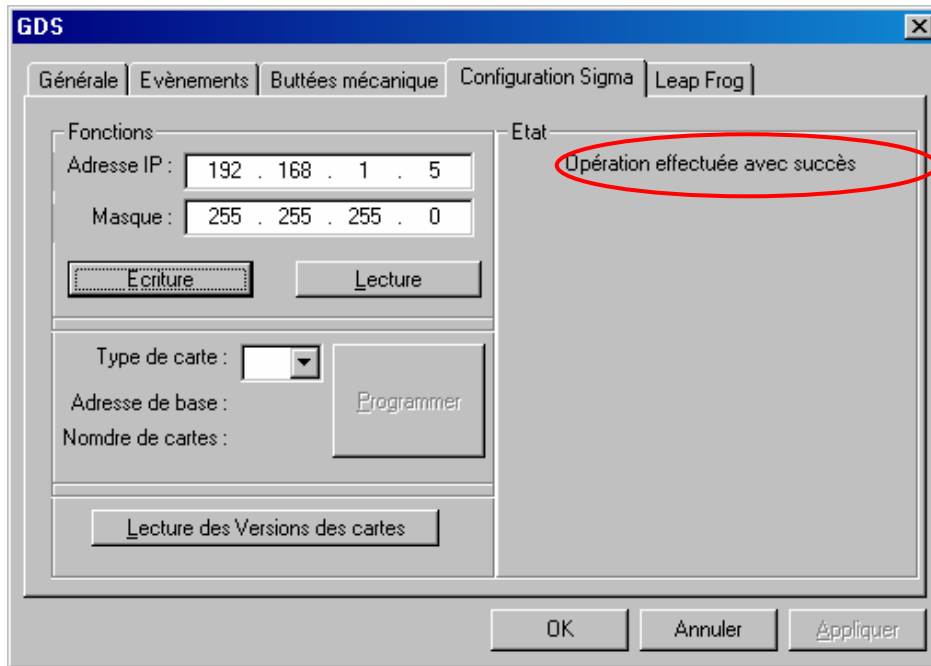
- Then click « **OK** »

7.8.1.4   Step 2: Put the original configuration on the computer.

Read chapter « Computer **IP setup** » to obtain the following window.

- Write original IP and mask.
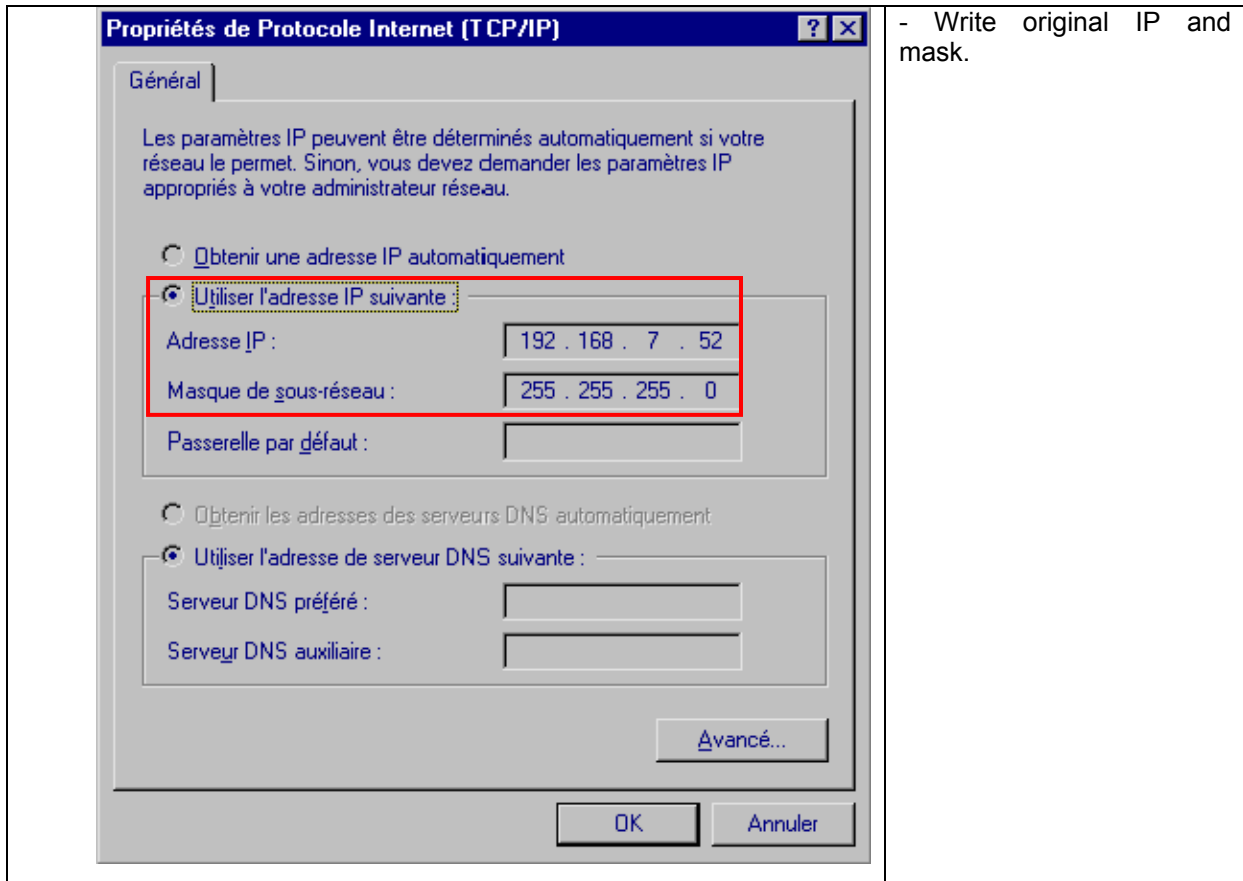
- Click « *OK* »

- Connect the arm, the connection is normally working.

Read chapter 9 if connection does not work.

11   *Maintenance*

7.9   Ramses "2" Security Disk

This disk must contain :

Install.exe of 05/21/2001

Install.ini of 05/21/2001

2000\armspecs.gds

2000\Probes*.gds

Install.ini contains all the path toward which we copy data.

[Machine] Machine Number=1132 Serial Board =8 axis [DIRECTORIES] PATH1=C:\ROMER NEXT1=2 PATH2=C:\ROMER32 NEXT2=0	Example to add one more	[Machine] Machine Number=1132 Serial Board =8 axis [DIRECTORIES] PATH1=C:\ROMER NEXT1=2 PATH2=C:\ROMER32 NEXT2=3 PATH3=C:\ROMER64 NEXT3=0

Note: The new version of the creation program for the backup disk manages Ramses disks creation.

7.10   Load of the Serial Card Prom

11.3.1   *6 Axis Board*

Switch the power supply of the arm on.

Select " START MENU > PROGRAM > GDS > ARM > WINLOAD "”

(If nothing's happening, run from Windows Explorer C:\ARM\WINLOAD\WINLOAD.BAT)

3 series of numbers are scrolling, the arm produces a Beep at the end of each batch.

IMPORTANT !!! : NEVER SWITCH OFF THE MAIN POWER OF THE ARM BEFORE THE END OF THE PROCESS

11.3.2   *8 Axis Board*

An 8 axis board 2.52 version produces 2 beeps when switching on, contrary to the 2.40 version which produces only one.

- **8_axis.S19 (52.268 octets)**

- **gds.dll version 1,9,0,0 (417 792 octets) or more**

Switch the arm on, run GDS, connect (axis reset) in " GDS FUNCTION " menu.

Return to GDS main screen, make sure that this window is active, press at the same time on Ctrl + O and select " Other Functions ", the following window appears :
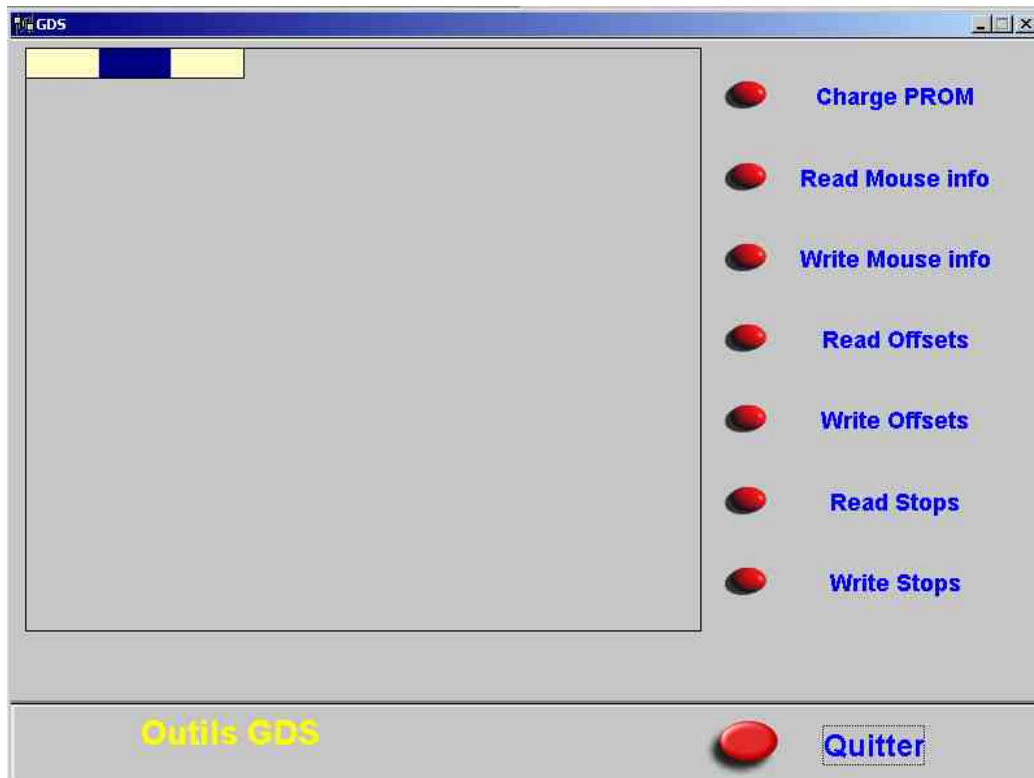
Click on [Load PROM], if it is necessary, Reset Axis and select the file:

c:\gtech\gds\PROM\2.52\ 8_axes.S19, validate, the following window appears :
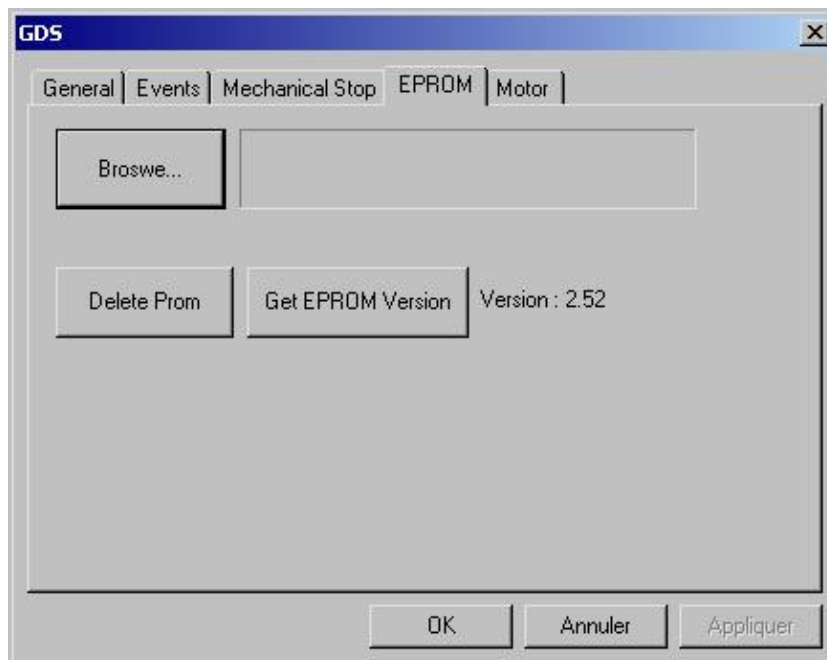
Click on [Browse] and select again the c:\program files\g-pad\gds\PROM\2.52\ 8_axes.S19.

Data are going to scroll, wait for the end and the message "Successful Operation". Switch off and switch on again main power of the arm (there should normally be two Beeps when switching on).

Then, validate :

7.11 List of Errors (Gds + Metrolog II)

Eror code Métrolog II	8 axis board Error code Romer	Meanning :
3770	0x25145001	Impossible to open the serial port
3771	0x25145002	Write error on serial port
3772	0x25145003	Error in configuration of mask
3773	0x25145004	Error in configuration of TimeOut
3774	0x25145005	Error in configuration of Statuses of signals
3775	0x25145006	Receive time out expired
3776	0x25145007	Transmit time out expired
3777	0x25145008	Read error on serial port
3778	0x25145009	The CRC of the received frame is incorrect
3779	0x2514500A	The Command returned in the received frame is incorrect
3780	0x2514500B	The number of characters in the frame is incorrect
3781	0x2514500C	The coder index is incorrect
3782	0x2514500D	The button index is incorrect
3783	0x2514500E	The event returned by the frame is not the one requested
3784	0x2514500F	The beam1 and beam2 events arrive at the same time
3785	0x25145010	The sound frequency value is incorrect
3786	0x25145011	The sound duration value is incorrect
3787	0x25145012	The sound volume value is incorrect
3788	0x25145013	The frame returned is incorrect
3789	0x25145014	The event requested is incorrect
3790	0x25145015	Error in number of coder points

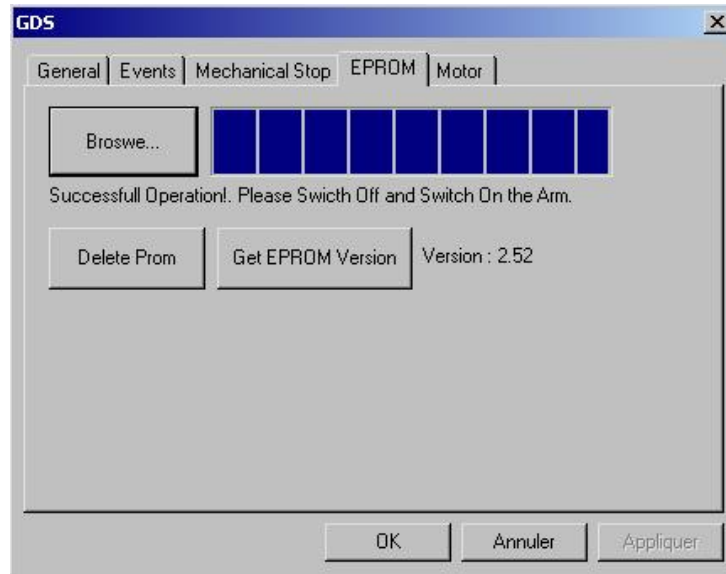| Eror code Métrolog II	6 axis board Error code Romer	Meanning :
-	0x25145100	Call already set up
3701	0x25145101	Memory allocation error
3702	0x25145102	CTS OFF
3703	0x25145103	Communication already cut off
3704	0x25145104	Frame receive error
3705	0x25145105	Receive time out expired
3706	0x25145106	Frame transmit error
3707	0x25145107	Transmit time out expired
3708	0x25145108	Call not set up
3709	0x25145109	System disconnected
3710	0x2514510A	Beginning of frame incorrect
3711	0x2514510B	Length of frame incorrect
3712	0x2514510C	CheckSum of frame incorrect
3713	0x2514510D	Frame not recognized
3714	0x2514510E	Encoder not active

	GDS Drivers	
Eror code Métrolog II	**Error code Romer**	**Meanning :**
3740	0x25145800	Call not set up
3716	0x25145801	Probe file not found
3717	0x25145802	Format of probe file incorrect
3718	0x25145803	Armspecs file not found
3719	0x25145804	Format of armspecs file incorrect
3745	0x25145805	Reset cancelled by user
3746	0x25145806	Stoppage of Mouse
3747	0x25145807	Reset Not Performed
3748	0x25145808	Impossible to set up communication
3749	0x25145809	Communication already set up
3750	0x2514580A	Encoder indexing error
3751	0x2514580B	Probe index incorrect
3752	0x2514580C	Invalid authorization code
3753	0x2514580D	Mechanical stop
3754	0x2514580E	Key incorrect
3755	0x2514580F	Key not found
3756	0x25145810	Protection file not found
3757	0x25145811	Protection file incorrect
3758	0x25145812	End of authorization
3759	0x25145813	Check the system date
3760	0x25145814	UserID incorrect
3761	0x25145815	Option invalid
3762	0x25145816	Protection error
3763	0x25145817	Limits of use reached
3764	0x25145818	Interpolation file too long
3765	0x25145819	Interpolation file not found
3766	0x2514581A	Incorrect reference index
3767	0x2514581B	The type of board used is incorrect
3768	0x2514581C	The action on the references is incorrect

7.12 help with Metrolog II

If you have not a connection with the arm in MTII:

- Check that you have this file g-tech.txt in c:\.

- Check you have the Romer option on the Metrolog2 dongle (option n° 6). To check this option, run MTII and click on **{ ? }** then on **{about}** and check on the line FULL that you have the number 6.

- In Metrolog 2, open or create the probes files. (open again the file romer.plp) or create P1 for the probe 15 mm, P2 for the probe 6 mm et P3 for the tip probe with Ø 0 mm.

7.13 Problems – Engineer

The most frequent errors and problems are noted here with the possible causes and their solutions.

11.5.1 *Explanations of error messages listed above*

0x25145001, 0x25145002 and 0x25145008 : computer's serial port problems : if another serial port is available on the computer (or thanks to an additional board), connect computer power flex on this one, and test the connection (don't forget to configure the serial port in GDS FUNCTION).

0x25145006 0x25145102 and 0x25145007 : electronic communication problem : check the connection on the serial port of the computer, on the power supply, on the arm, check the electric supply .

Error 5 during the connection : Com1 port is probably used by another software : Quit all other application program.

Error during connection (461) : Com1 port is not linked to the machine.

0x25145102 : CTS OFF : check that the power supply is switched on and that the cables are linked.

0x25145801 : Probe file not found: check in C:\Arm\(configuration in use)\Armdata\   directory, that the Armspecs.gds file is present. Otherwise, repeat the installation of the calibration data thanks to the backup disk.

0x25145802 : incorrect format for the probe file. Probe.gds file has been modified or is affected : repeat the installation of bending data thanks to the security disk.

0x25145803 : Untraceable Armspecs file : in C:\Arm\(configuration in use)\Armdata\ directory, check that Armspecs.gds file is present. Otherwise repeat the installation of bending data with the security disk.

0x25145804 : incorrect format for Armspecs file : the file doesn't match GDS version used : convert the file running specsconv.exe program in C:\Arm\(configuration in use)\Armdata.

0x25145805 : Reset cancelled by user : check again serial board configuration then run again the reset of the arm.

Unlawful version , 4 9 Error when running GDS. Dongle may be absent or useless, protection code may be wrong. Check the presence of the dongle and C:\G-Tech.txt file, check, while releasing it, that it matches the dongle number. Enter once again the protection code corresponding to the license.

0x2514580C : Invalid authorization code : check that C:\G-Tech.txt file contains the same code as the license written on the CD-ROM sleeve.

2514580B : Incorrect number of probe : it is an encoder error".
 Solution: If the GDS version permits to do it change in the registry data base (Start > Run > "REGEDIT" > go to "HEKY_LOCAL_MACHINE\SOFTWARE\GDS\COUNTER PARAMETERS" and change values of A and B (put 2).
If it is not possible with GDS version, put index error = 0 (change in the registry database (Start > Run > "REGEDIT" > go to "HEKY_LOCAL_MACHINE\SOFTWARE\GDS) and put "indexerror = 0)

Pb : A la connexion erreur NB 13 ou NB 9
Pb : Un seul capteur disponible dans la liste
Pb : Décalage au niveau des capteurs et diamètres (ex : Capteur 1 (6) au lieu de Capteur 1 (15))
Pb : Diamètre de Capteurs incorrects : 150000 au lieu de 15
Solution :
Aller dans Menu Démarrer > Paramètres > Panneau de Configuration
Selon Windows , ouvrir "Paramètres Régionaux" ou "Options Régionales",
Dans l'onglet "Nombres", vérifier :
     Symbole Décimal : '.' (point)
     Symbole de groupement des chiffres : ' ' (espace)
     Séparateur de listes : ';' (point virgule)
     Système de mesure : 'Métrique'
Vérification : Dans l'onglet "Symbole monétaire", vérifier :
     Symbole décimal : ',' (virgule)
     Symbole de groupement des chiffres : ' ' (espace)

12 Appendix

7.14   Appendix 2 :Communication Configuration

12.1.1   General :

In the arm family there are:

Three types of communication boards between G-Pad software and the arm, namely:
-   8-Axis Serial Board
-   6-Axis Serial Board
-   Den Board
- Ehternet

Two types of Drivers to control the boards, namely:

-   Winrds driver
-   GDS driver
- Ehternet

Note: For each type of Driver, there is one type of machine file.

Type of Driver	Machine files
Winrds	Armspecs.rmr (machine) ProbeX.rmr (Probe)
GDS	Armspecs.gds (machine) Index.gds (multireference) ProbeX.gds (Probe)

12.1.2   Type of Arm - Type of Board Link :

These boards depend on the type of arm used:

Type of Board/Type of Arm	8-Axis Serial	6-Axis Serial	Ethernet	6-axis Den Board
All sigma	No	No	Yes	Yes
All System 6.	Yes	Yes	No	No
All Arm	Yes	Yes	No	No
IT5	Yes	Yes (Sv only)	No	No
Orbital	Yes	No	No	No
ROMER 1000	No	No	No	No
Armony 6 series	Yes	Yes	No	No
Armony 7 series	Yes	No	NO	No
+ rail option	Yes	No	Yes	No
+ Non-contact Vee probe	Yes	No	Yes	No
+ Vertex Probe	Yes	No	Yes	No
+ Rx G-Scan	Yes	No	Yes	No
+ Alp Probe	Yes	No	Yes	No

12.1.3   Type of Driver - Type of Board Link:

These drivers depend on the type of board used

Type of Board/Type of Driver	8-Axis Serial	6-Axis Serial	Ethernet	6-Axis Den Board
Winrds	No	Yes	No	Yes
GDS	Yes	Yes		No
Ethernet	No	No	Yes	No