DISCOVER OUR DISPLAY UNIT FOR AIR AND PLUG GAGES WITH 1 OR 2 INPUTS

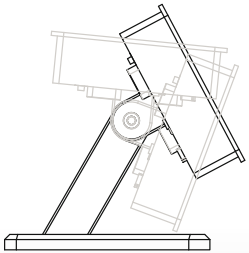
The new Display Unit **D70A** : available in 2 versions (one or two inputs) for all air and plug gages.

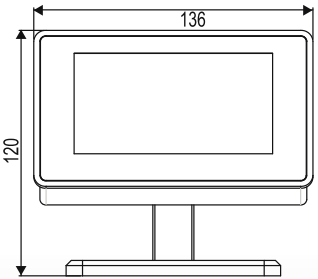


Display Unit D70A

- **4.3" touch screen display**
- Compatible with all brands of plug and air gages
- **Multi-display (bargraph, needle, Go-NoGo...)**
- Input for MB-10
- **1 or 2 inputs for air or plug gage**

Display Unit D70A







TECHNICAL SPECIFICATIONS

Specifications	804.2074	804.2075
Type of version	D70A – 1 input	D70A – 2 inputs
Overall dimension	136x120x111	
Weight	0.6kg	
Case	Aluminium	
Protection rating	IP40	
Connection	mini-USB / RS232	
Instruments	Plug and air gages*	

* Plug and air gage available on request



Air gage preparation kit
804.2203



Bracket for panel mounting
804.2202



Restrictors
Ø0.3, Ø0.4, Ø0.5 or Ø0.7mm

SYLVAC SA Ch. du Closalet 16 / CH-1023-Crissier Tél: +41 (0) 21 637 67 57 Web: www.sylvac.ch

sylvac

Display unit for air gage measurement
Unité d'affichage pour mesure à air
Anzeigeeinheit luftmessung

E

F

D

D70A



User guide
Manuel d'utilisation
Bedienungsanleitung

Software version V1.6

2. Introduction

2.1. Product presentation

The display Unit D70A allows making dimensional control using 1 or 2 air gages. (air plug gauge, air caliper gauge, ring, crutch…).
Depending on the version it is possible to perform simple measurement (with one air gage), or it is also possible to display 2 characteristics on the screen and can make static measurement or dynamic (Min, Max et…)

Measurements can be made by comparison with a reference part: calibration master.
Thanks to the many user-programmable functions, the D70A fits into many control applications.

The display Unit D70A can be connected to a PC thanks to its RS232 or USB connection that can export the measurement on to a CSV files via a USB key.

A footswitch can be connected in order to transfer measurement.

2.2. Versions



D70A - 1 input
1 input for air gage



D70A - 2 inputs
2 inputs for air gage

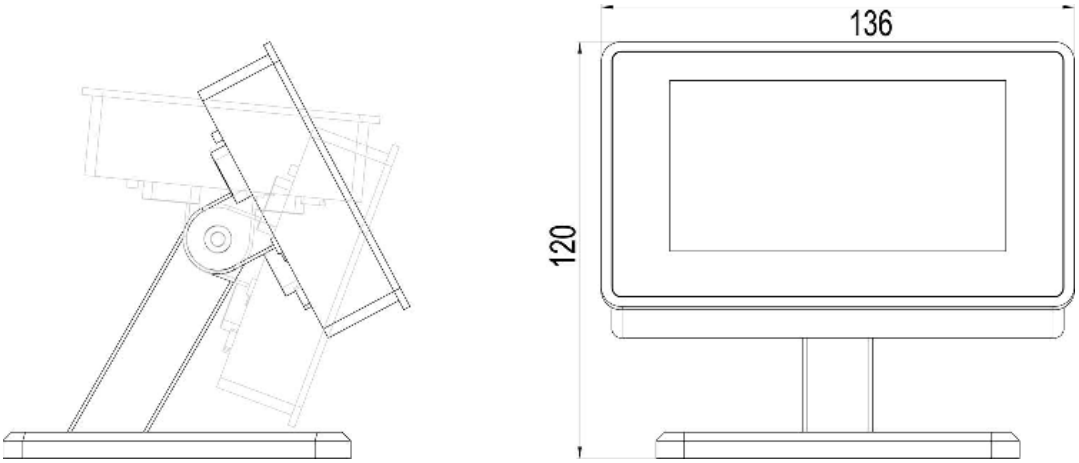
2.3. Characteristics

2.3.1. Main technical characteristics

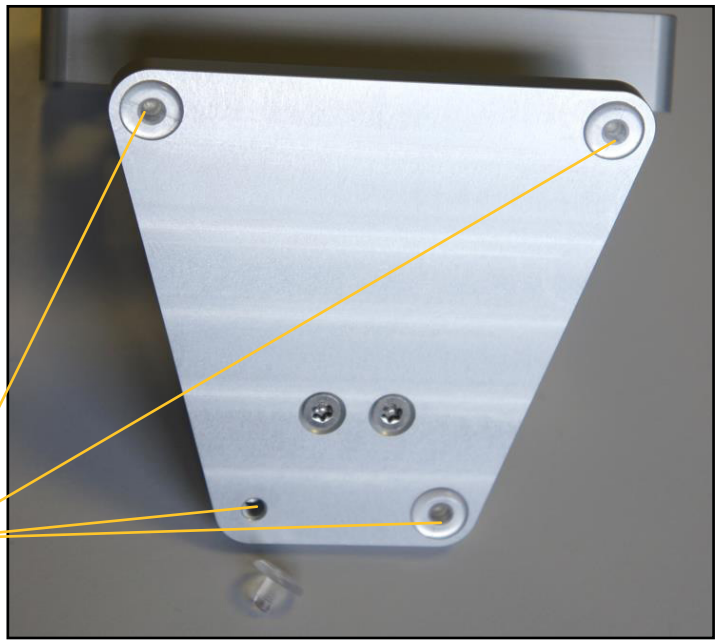
- TFT colour touch screen display 4,3", resolution 480x272.
- Static or dynamic measurements (Max, Min, Max-Min, Average, Median)
- Analogue or digital display
- 1 or 2 measurement configurations (2 characteristics)
- Possibility to select automatically the characteristic by using the air gage or by touching the screen.
- Relative or absolute display
- Display resolution (up to 0.1µm)
- Metric (mm or µm) or Imperial (Inches) measurement
- RS232 port for communication with a PC
- USB port for communication and/or power supply

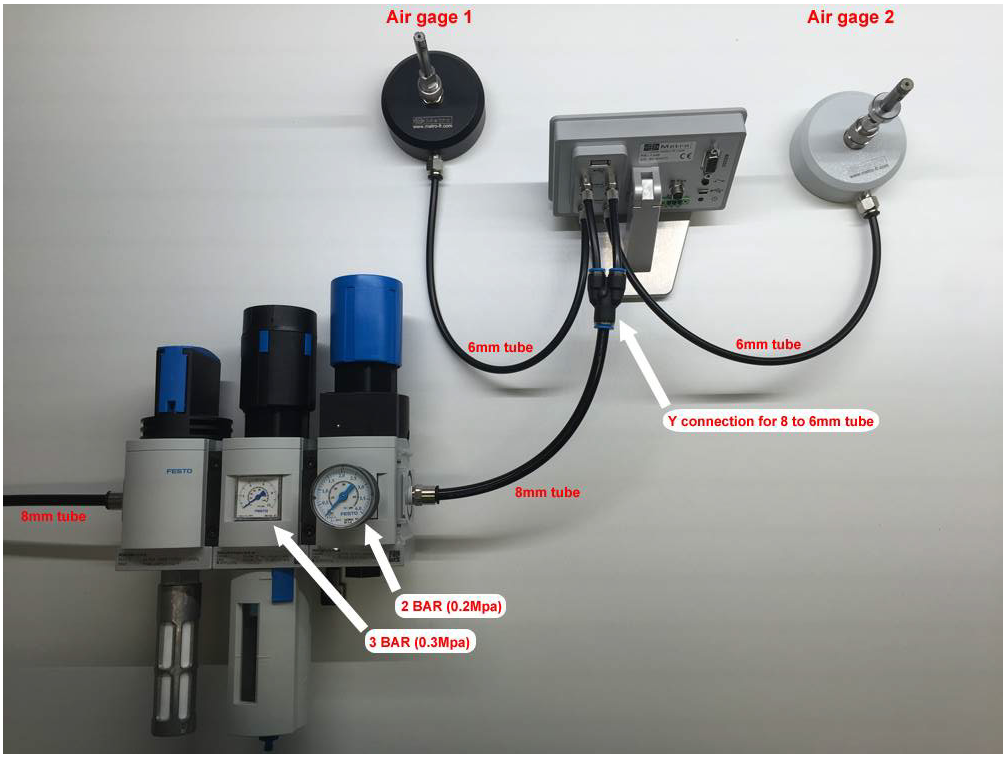
- USB Stick for data saving on a CSV file
- Optional connection of Mbus modules : I/O or relay
- Measurement transfer by pressing a key, footswitch input or retro-command on the RS232 port.
- Operating temperature : : +15°C to +30°C
- Power supply from 85 to 265 VAC by using the supplied main transformer (or by
- connecting it directly on your PC USB port, or through the 24 VDC screw terminal.
- Relative humidity : maximum 80%
- Dimensions : width 130 mm, height 111 mm, depth 105 mm
- Mass : 600 grams (700g with the power supply)

2.3.2. Dimensions and setup



The D70A is fitted with 4 thread M5 allowing to attach it. To access to these threads, it is necessary to remove the 4 anti-skid plastic parts.





E

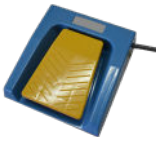
2.3.4. Contains of the packaging

The D70A's box includes :

- 1 D70A display mounted on an orientable stand
- 1 USB cable, (length =1.8m) for power supply and/or data transfert
- 1 USB main adaptor for the display power supply. The D70A can also be powered by a computer when connected to it with the USB.
- 1 Mini-CD containing the user manual.

2.3.5. Accessories

804.2203	Air preparation unit : It is mandatory to use a precision regulation system, otherwise the measurements will not be stable. We can supply the adapted air preparation unit from Festo, including stop valve, filter and regulator + precision regulator. The precision regulator must be adjusted at 2 BARS (0.2MPa)	
	For D70A displays. It allows to divide the 8mm tube at the output of the air preparation unit into 2 tubes of 6 mm adapted for the connection on the D70A input.	

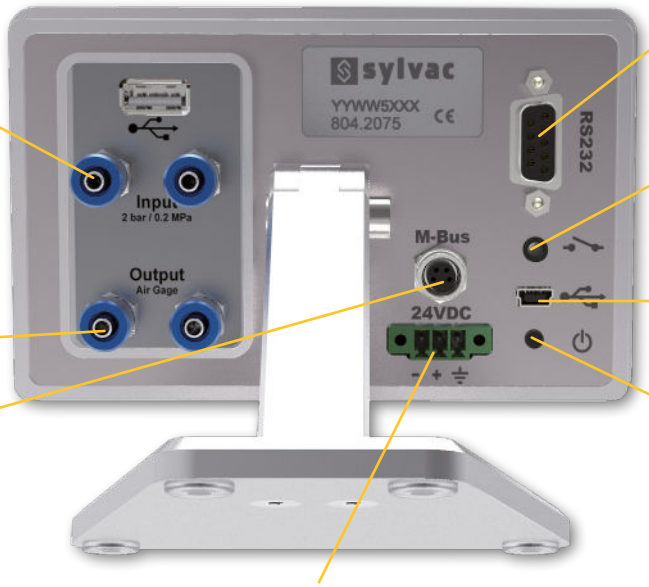
	Soft polyurethane tubes 6*4mm : The D70A are fitted with 2 connectors for air tube with 6mm external diameter and 4mm internal diameter. We advice to use soft polyurethane tubes from SMC, because their flexibility prevent the display to knock over due to the pressure of the tubes on the table.	
	Soft polyurethane tubes 8*5mm : The air preparation unit delivered by Sylvac is fitted with a connexion for 8mm tubes (external diameter)	
926.7021	This footswitch with a robust construction can be configured in different ways : preset, measurement transmission, start dynamic measurement etc...	
804.2202	Accessory for panel mounting.	
804.2130	This M-Bus module is fitted with 8 input/outputs isolated with optocouplers allowing to get additional functionalities.	
804.2205	M-Bus cable for D70A. This cable allows to connect the compatible M-Bus modules on a D70A display unit.	
804.2201	RS232 cable. This cable allows to connect a D70A display to a computer or a PLC.	
804.2204	Cross-cable RS232 1X1 to communicate with PC	

2.3.4. Connectors

2 inputs for AIR at 2BAR (0.2Mpa) (air filtered at 5µm and regulated at 0.1BAR / 0.01MPA). NEVER INCREASE 4BAR/0.4MPA. It is very recommended to use the FRL (Air preparation set ref 804.2203.) See details chap. 2.3.5

Output to the Air gage

To connect m-bus modules (Optional)



RS232 connector for connection to a PC

Multi-function footswitch connector

Mini-USB connector for power supply and measurement transfer to a PC

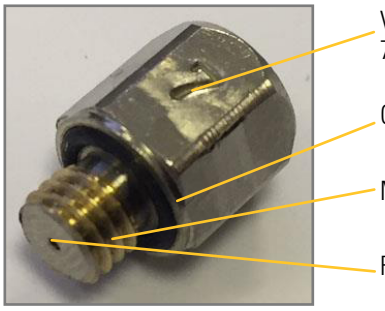
On/Off switch (press 2s. for shutting down)

24 VDC power supply. If you choose this connector to power the display, the ON-OFF switch will be deactivated.

2.3.5. Characteristics of the air input and output

The D70A are delivered with 1 or 2 restrictors of 0.5mm on the air input + 1 or 2 0.7mm restrictors as spare parts. The value of the restrictor is indicated as below :

7 =0.7mm
5=0.5mm
Etc.



The following table shows some frequent cases to define which restrictor will be the most adapted to your application. If you order a turnkey solution at Sylvac, we will deliver the display with the adapted restrictor. But if you want to use the D70A display together with your existing air gage, you will have to use the adapted restrictor. It is advised to contact Sylvac or one of its distributors for advices or confirmation around this subject.

Nozzle Ø in mm	Number of nozzles	Total flow surface mm²	Adapted restrictor
0.3	2	0.14	0.3
0.4	2	0.25	0.4
0.5	2	0.39	0.4
0.6	2	0.57	0.5
1	2	1.57	0.7
2.07	2	6.73	0.7
0.3	3	0.21	0.3
0.4	3	0.38	0.4
0.5	3	0.59	0.5
0.6	3	0.85	0.5
1	3	2.36	0.7
0.3	4	0.28	0.4
0.4	4	0.50	0.4
0.5	4	0.79	0.5
0.6	4	1.13	0.5
1	4	3.14	0.7

2.3.6. Communication port

The D70A is fitted with a RS232 port. It allows linking the M2 to PC or an external system. The configuration is as following

9600 bauds, 8 bits, 1 bit de stop, parity none

CONNECTOR PINOUT
It is fitted with a SUBD 9 pins female connector.

Pin	Signal	Direction	Description
1			Not used
2	RX	Input	Reception of data

3	TX	Output	Transfer of data
4	IN1	Input	Do not use. Only for testing.
5	Gnd	-	Ground
6			Not used
7	IN2	Input	Do not use. Only for testing.
8 & 9			Not used

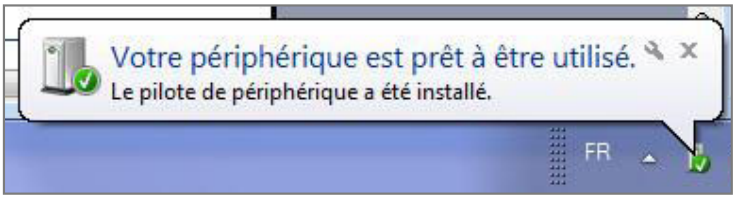
2.3.7. Mini-USB

The mini-USB connector has 2 functions:

1. Power supply through a wall mounted transformer. This transformer supplies a regulated 5V/1A DC voltage.

2. Measurement transmission. If you connect your D70A to a PC, the PC will detect and install automatically the D70A as a standard USB keyboard with the standard drivers of your operaing system (Windows, Mac OS etc..). When you will send the measurement, the value will be written on your PC screen where your cursor is, in the same way as it would have been typed with a keyboard.

Message from Windows telling you that the D70A is well detected and installed :



2.3.8. The 24VDC connector

It is advised to use this power supply when the D70A is panel mounted. Using this power supply instead of the mini-USB will deactivate the ON-OFF switch. Therefore, when the D70A is powered, it will start automatically.

2.3.9. The USB stick connector

It is possible to save measurements on a CSV file. In this case the display must be set the following way : Configuration ->Transfer –>USB key

Then once the user either press on the « PRINT » button of the measuring screen or on the footswich, one line will be added on the CSV file. (a « Sylvac.csv » file is created when the operator transfers the data for the first time). When the USB stick has been correctly detected, a USB logo will appear on top bar. If the USB stick is not connected when the operator transfers the measurement, an error message will pop up.

3. Air preparation unit - Air Pipes

3.1 Air preparation unit

Air gaging is a measurement of pressure variation.

The variation of pressure must be due to the variation of distance between the gage and the part being measured. Therefore it is mandatory to have a high stability air input, in order not to have variation of pressure due to air input variation.



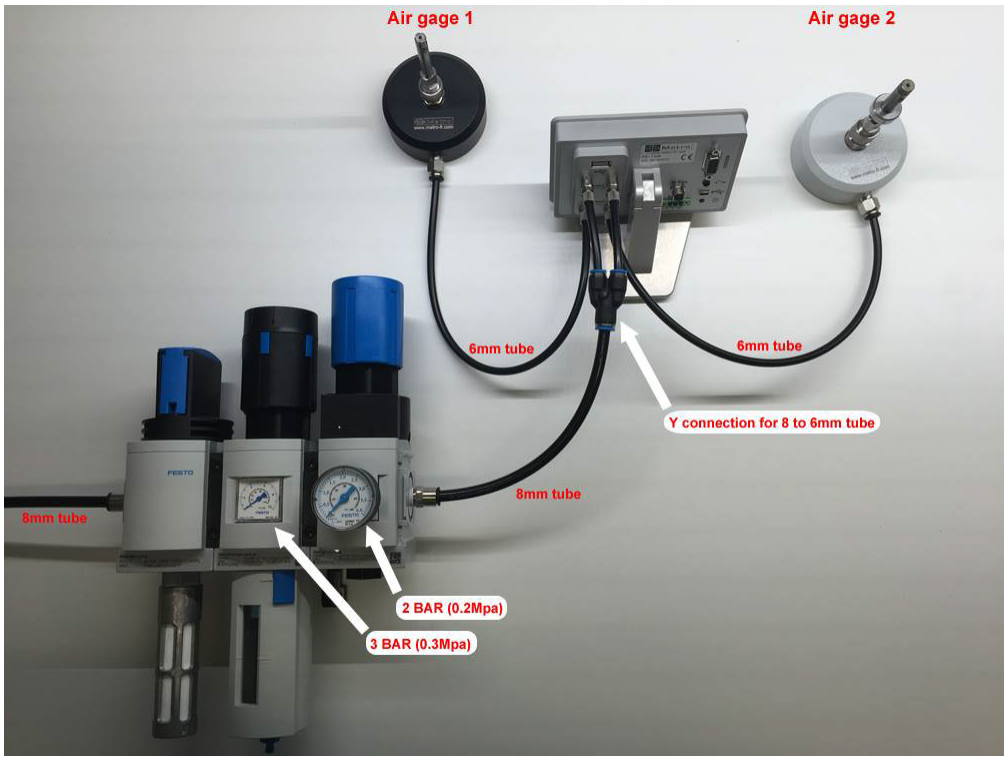
Sylvac can supply the air preparation set REF : 804.2203

The air supply set delivered from Sylvac for the D70A display consists of :
- 1 push in connector for 8mm ext. tubes
- 1 shut off valve
- 1 regulator adjusted at 3 BAR (0.3 MPa) with a 5µm filter
- 1 precision regulator adjusted at 2 BAR (0.2MPa)
- 1 push in connector for 8mm ext. tubes

3.2 Air pipes

The D70A are fitted with air connectors adapted to connected pipes with 6mm external diameter and 4mm internal diameter.

In the case of the D70A with 2 inputs (804.2075), it is however recommend to use a 8mm ext. tube from the output of the air preparation unit to a Y connection/reduction to 6mm to the display. We recommend to use flexible pipes that prevent risk of fall or tilt over of the display due to the orientation of the pipes. See the following picture.

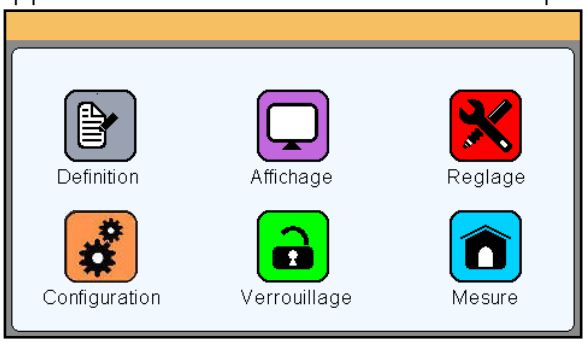


4. Quickstart

1 – Connect the air input to the air preparation unit ref 804.2203. The air pressure should be at 2 BAR (0.2Mpa) and never exceed 4 BAR (0.4MPA). It is advised to lock the pressure adjustment in order not to let someone change the pressure value after having calibrated the display. Air gaging corresponds to a pressure variation measurement, if the air input change, the dimensional result on the display will change accordingly.
2 – Connect your air gage on the output « OUTPUT – AIR GAGE »
3 – Power the D70A either with the mini USB or with the 24VDC terminal.
4 – Turn on the D70A by pressing the ON-OFF switch.

5- Calibration of the device :

Note : To be done the first time, and can be done or verified again periodically (wear of the master or the gage)
The D70A requires 2 masters for the calibration. The MIN and MAX masters should respectively correspond to the lower and upper tolerance limits of the measured part.



A – From the « SETUP » icon, write the master values according to your calibration certificate. The display need 2 masters MIN and MAX to be used.

B – Place your MIN master in measuring position and press on the corresponding « P » button. The button becomes green for a couple of seconds.

C – Repeat the step B for the MAX master.

D – You can check by placing again the MIN master. The value on the « position » field must be at 0.0000, then by placing the MAX master, the « position » field must indicate the dimensional difference between the 2 masters.

6 – Configuration of the part to be measured. (From the Icon « definition »)

A – Use the scroll bar to reach the 2nd screen.

B – Write the value of MIN and MAX tolerances (that should correspond to your MIN and MAX masters). The tolerance must be written relative from the nominal value. For example if your part has a nominal diameter of 10mm +/-0.005, you must write in the Upper tolerance 0.005 and lower tolerance -0.005, and in the nominal field: 10. It is then advised to use the min master in the case of external diameter measurement, and to use the MAX master in the case of internal diameter measurement. So you need to fill the « Master » field with the adapted value.

C – close the window, and come back to the measuring screen by pressing the « measure » icon.

7 – Preset

A – Place your Min or MAX master according to what you have defined in 6-B.

B – Press on the « PRESET » button. The value must change to the master value. You can now check with the 2 masters if the values are correct.

You are now ready to measure.

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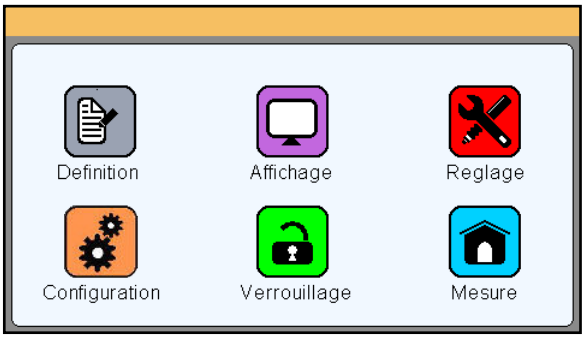
5. Graphical interface

The graphical interface of the D70A has been designed to be easy to use and intuitive. This section gives you a preview of the different screens and commands available.

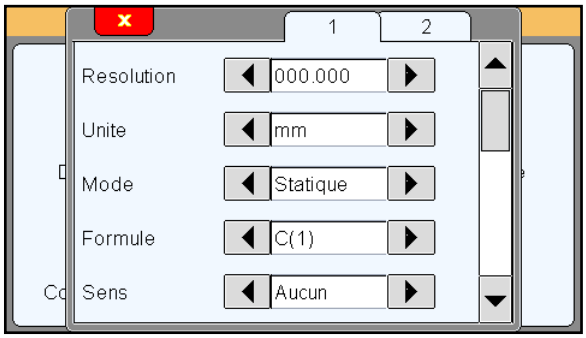
5.1. Main parts

The graphical interface of your D70A is divided in 2 main parts:

- A part that allows configuring the device and the measure. It consists of an icon desktop with windows.



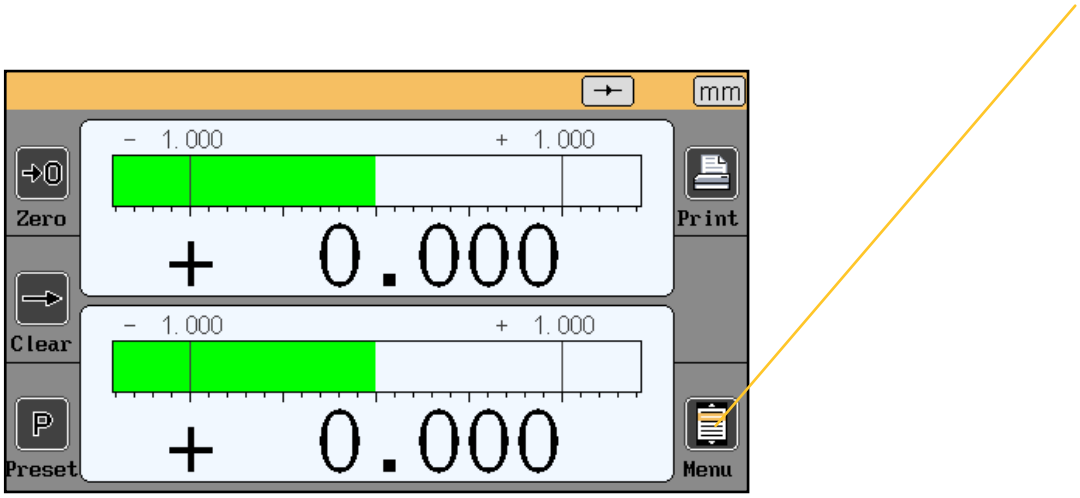
Icon desktop



Icon desktop with configuration windows

The second part (measuring screen) can be reached by pressing the button measure. 

- This part allows to see the measurement result and to use them. The 70A starts on this screen. For reaching the configuration screens, press on the menu button.



Measuring screen

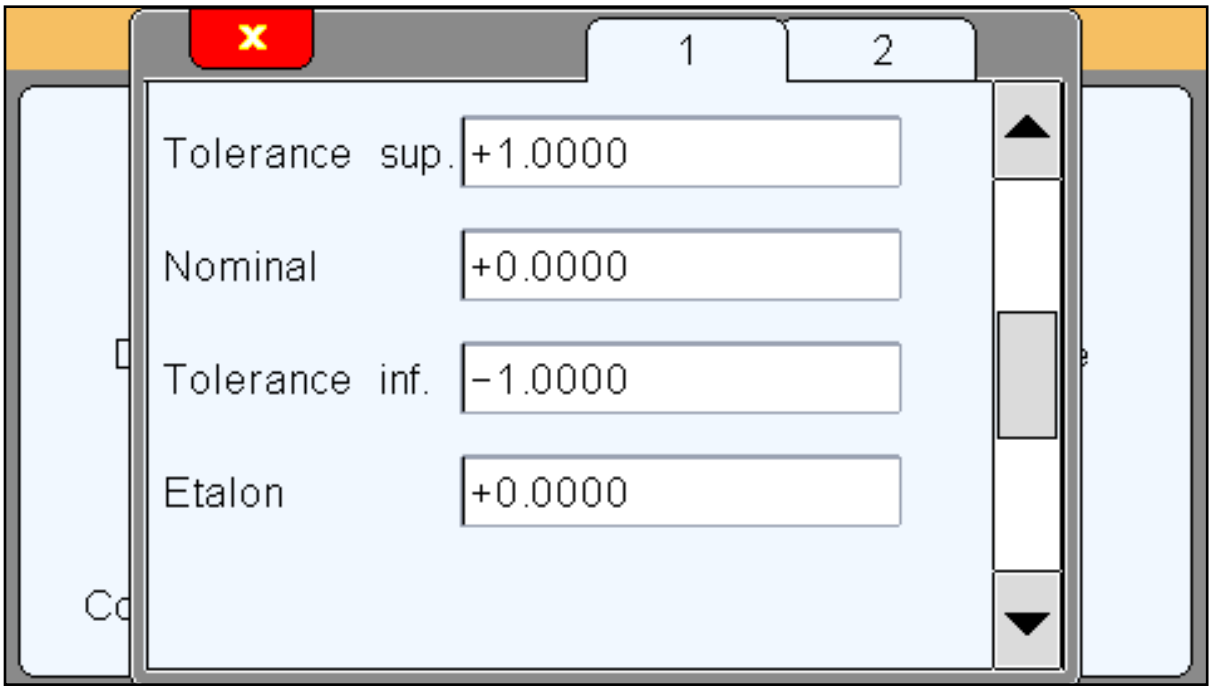
5.2. Generalities

The following information can be seen of the upper part of the screen.



5.3. Configuration windows

The following information can be seen of the upper part of the screen.



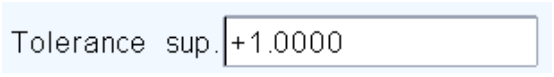
Example of configuration windows

Data are typed by different ways and are saved after validating while quitting the window.

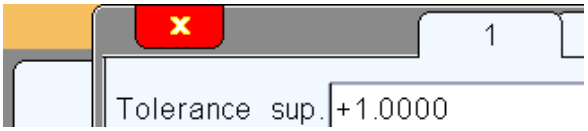
- Multiple selection box. Press on the black arrows to change the pre-defined value.

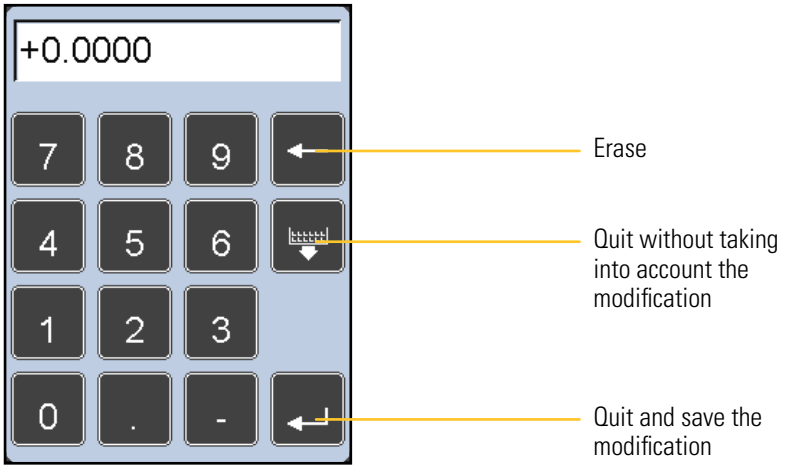


- Edit box. A virtual keyboard appears after clicking on the edit box.



- Closing a window : All the windows can be closed by clicking on the white
- cross on a red background on the top left corner on each window.



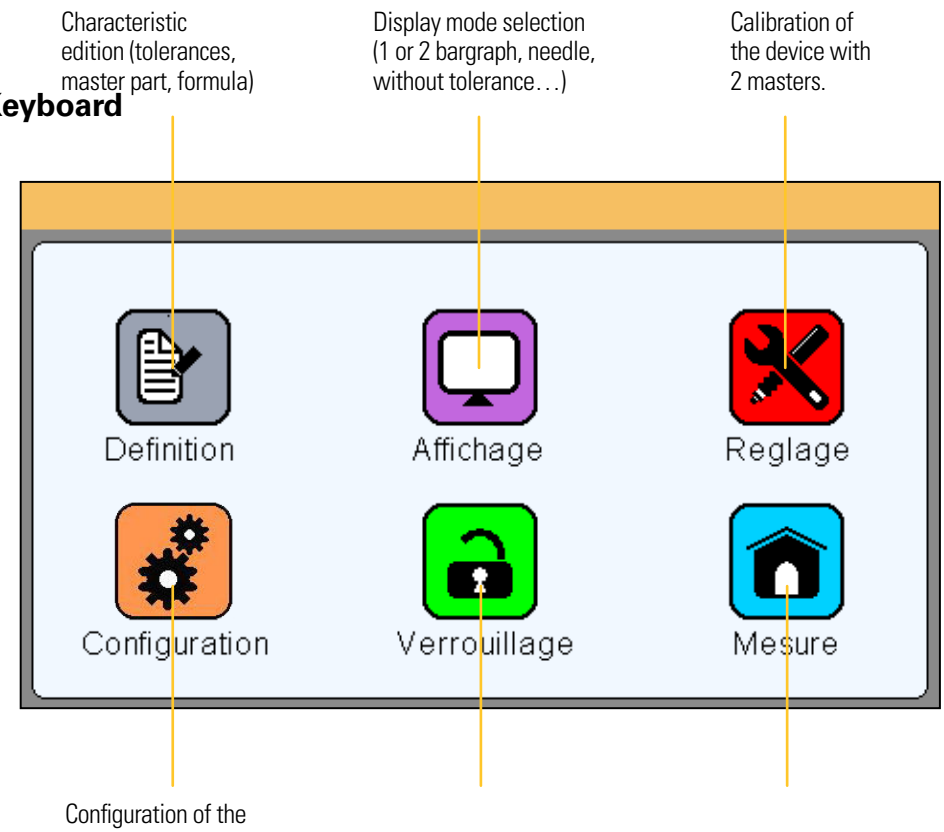


6. Configuration of the device and the measure

This section describes the different windows that are accessible from the icon desktop.
If you are on the measuring screen, you can reach the icon desktop by pressing on menu button.

Your D70A can be entirely configured (language, communication etc…) from this window.
The measure (tolerances, characteristics etc…) is also configured from this window.

5.4. Virtual Keyboard

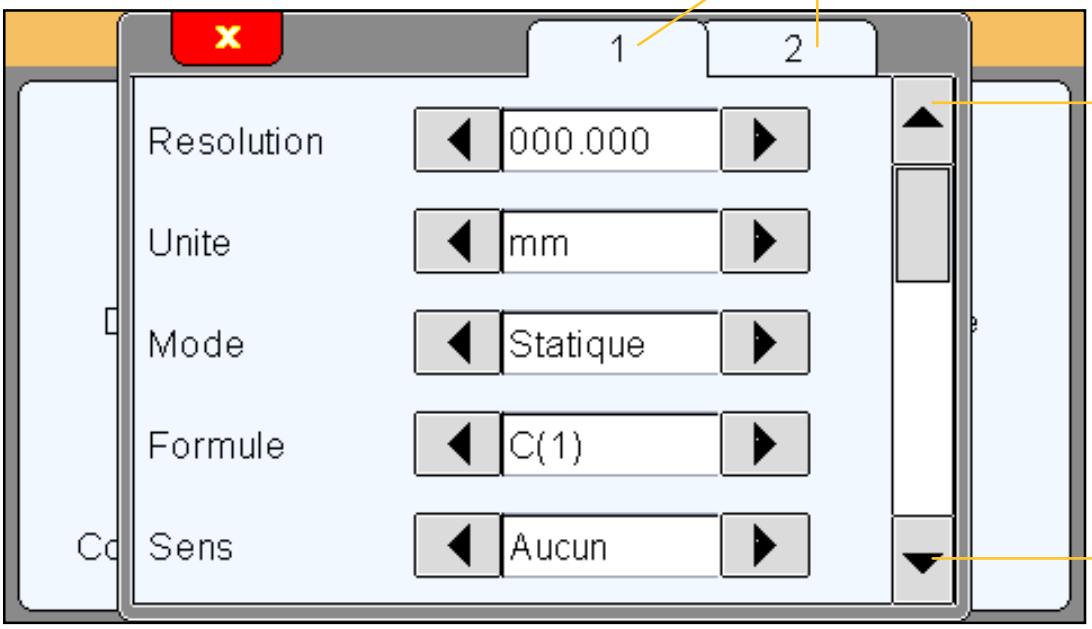


The 6 following sections describe the 6 icons of this screen.

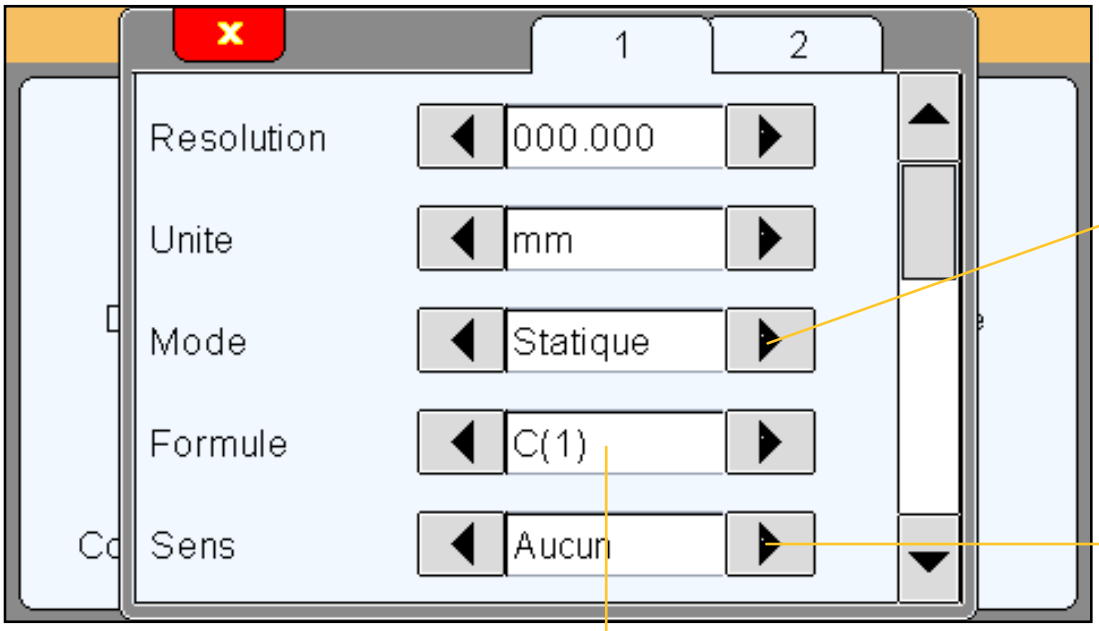
6.1. Définition

After pressing the icon « **definition** », the windows below appears.
It gives the possibility to define the tolerances, the master, the master part characteristic, the resolution of each of the 2 available measurement configurations.

This window is divided in 2 parts for the configuration of the 2 measurement configurations :



6.1.1. Part 1



Formula choice :C(1) / C(2) / C(1) + C(2) / C(1) - C(2) / -C(1) / -C(2) / -C(1) + C(2) --> C = probe

it is possible to affect a coefficient for each probe or air gage on « **Setup** »

6.1.1.1 Resolution

000.000 = micron
00.0000 = 0.1 micron

6.1.1.2 Unit

mm : millimeter
In : inches

6.1.1.3 Mode

Static = direct reading: The display is refreshed together with the probe is moving.
Dynamic : The following mode starts after pressing on the clear button of the measuring screen. (or through a I/O or footswitch command)
- Max
- Min
- Max-Min
- Average
- Median = (max+min)/2

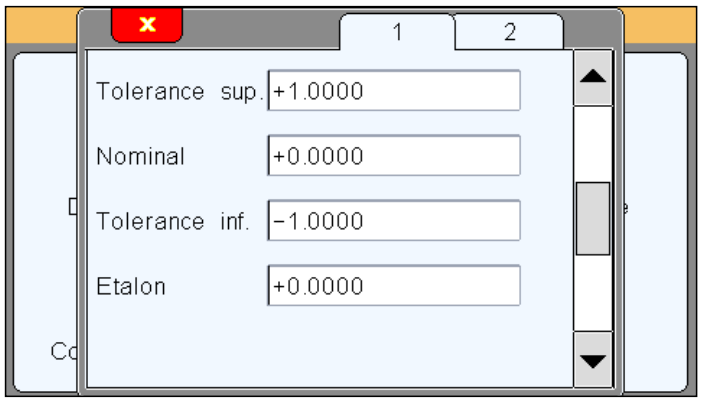
6.1.1.4. Formula

Choice of the formula :
- C(1)
- C(2)
- C(1) + C(2)
- C(1) - C(2)
- -C(1)
- -C(2)
- -C(1)+C(2)

« C » means « Probe » (air gage or probe)
It is possible to give a coefficient for each air gage from the menu «**Setup**» 

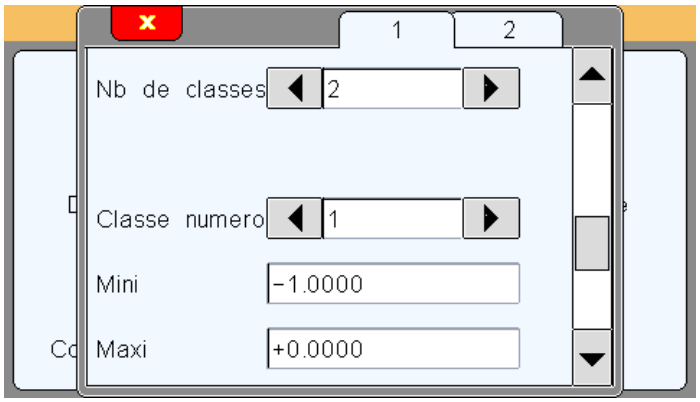
6.1.2. Part 2

This screen allows to input tolerances and the characteristics (nominal and master)
Just press on the corresponding edit box to input the needed values.



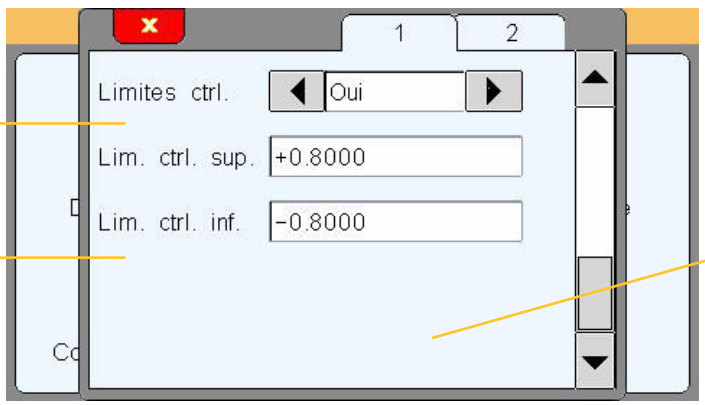
6.1.3. Part 3

This screen allows to setup a part sort according to their dimension. Up to16 classes can be define.



6.1.3. Part 4

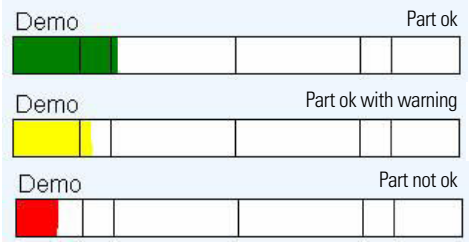
This screen allow to display or not the control limits (warnings) and to define them. Control limits are warning that inform the user is the measure become to close to the tolerances limits. (yellow color on the bargraph)



Define the control limits

This part is hidden if « no » has been selected

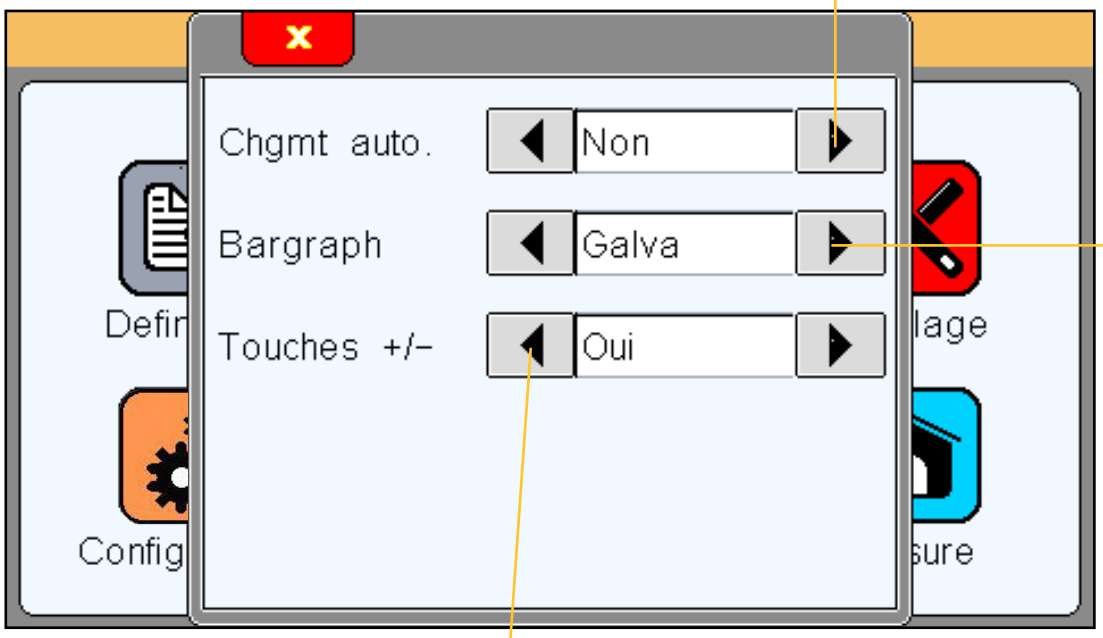
Example of characteristic displayed with control limits



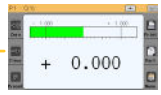
6.2. Display

After pressing the icon « **display** », the window below appears.
This window allows to define if 1 or 2 measure are displayed on the screen and on which format. (Needle = galva, horiziontal bargraph or value only)

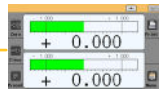
The auto-switch function allows to call the corresponding program by a simple probe movement. Example:
- Move probe 1, part 1 is displayed.
- Move probe 2, part 2 is displayed.



Left, simple



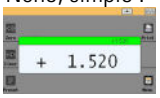
Left, double :



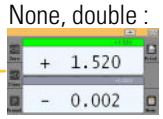
Galva :



None, simple :



None, double :



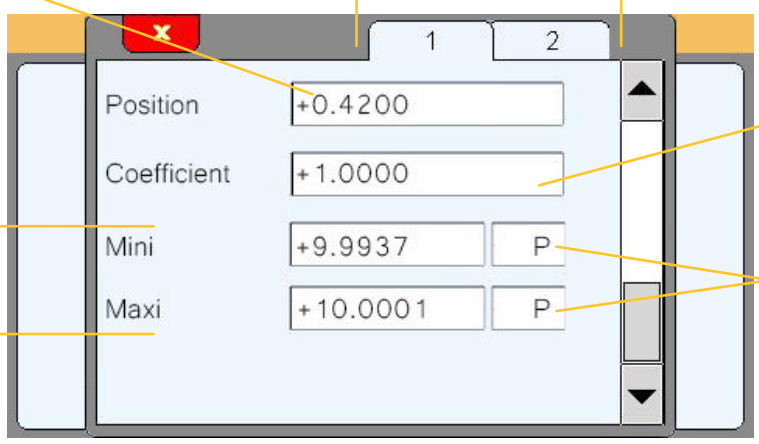
The +/- keys appears on the needle indicator (galva) and allow to move the needle like with the screw on an old analogue display.

6.3. Setup

After pressing the icon « **setup** », the windows below appears.
From this windows you can calibrate each channel. (the D70A must be calibrated with 2 maters).

Before mastering, this field indicates the pressure in BAR. After it should indicate 0.0000mm when the min master is in measuring position, and the dimensional difference between the 2 masters when the MAX master is inserted.

Channel 1 and channel 2 (only for D70A)



Allows to apply a coefficient to the channel. The Defaut value is 1.

MIN and MAX master input area.

Press the button when the master value has been written and that the master is in leasuring. This button becomes green for 1s after validation.

Important information : In order to have a good measuring resolution, an adapted restrictor must be used depending on your air gage (see chap 3.3.1). The air preparation unit 804.2203 gives 0.1 millibar of stability.

You can use the following method to know what resolution you will have with the couple airgage/ restrictor you use, and eventually change the restrictor.

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Before mastering, you can place the MIN and then the MAX master and write the corresponding pressure values. Then calculate :

$$\frac{\text{(dimension of MAX master)-(dimension of the MIN master)}}{\text{(MAX pressure-MIN Pressure)*1000}} = \text{resolution in µm for 1millibar}$$

In order to have 0.1µm stable, the result of the previous calculation should be = 0.1

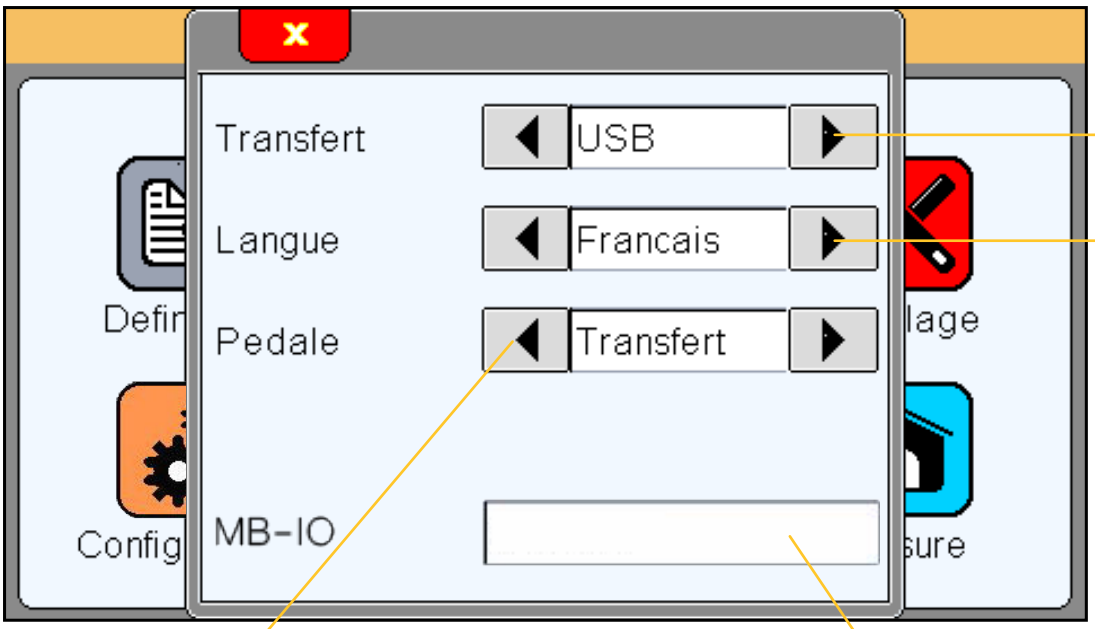
It is generally acceptable to have the result up to 0.2.

Over 0.2, it is recommend to change the restrictor (if you need 0.1µm stable).

6.4. Configuration

After pressing the icon « **configuration** », the windows below appears.

This window allows configuring the general communication settings of your D70A.



Choice of the transfer mode : RS232, Keyboard or USB Stick

Language selection. Other languages can be installed on demand.

Footswitch function

If the optional I/O module has been connected, it will be identified here after pressing the « Id » button.

- - « Preset » Calibration
- - « transfert » : send the measurement to the RS232 or USB
- - « part » : change the active part (part 1 / part 2)
- - « Init Dyn » : start dynamic measurement (min, max…)
- - « zéro » : Set the displayed value at zero

sylvac.csv" file will be created on the connected USB stick, and each time you press the "Print" button of the measuring screen, a line will be added on the file.

If you select transfer->keyboard, the D70A will be detected as a keyboard when connected to a computer, without installing a specific driver or software.

Then when you transfer the measure (with screen, IO or footswitch), the displayed value will appear on your PC when your cursor is. (for example on an Excel cell), in the same way than you would have typed with your standard keyboard.

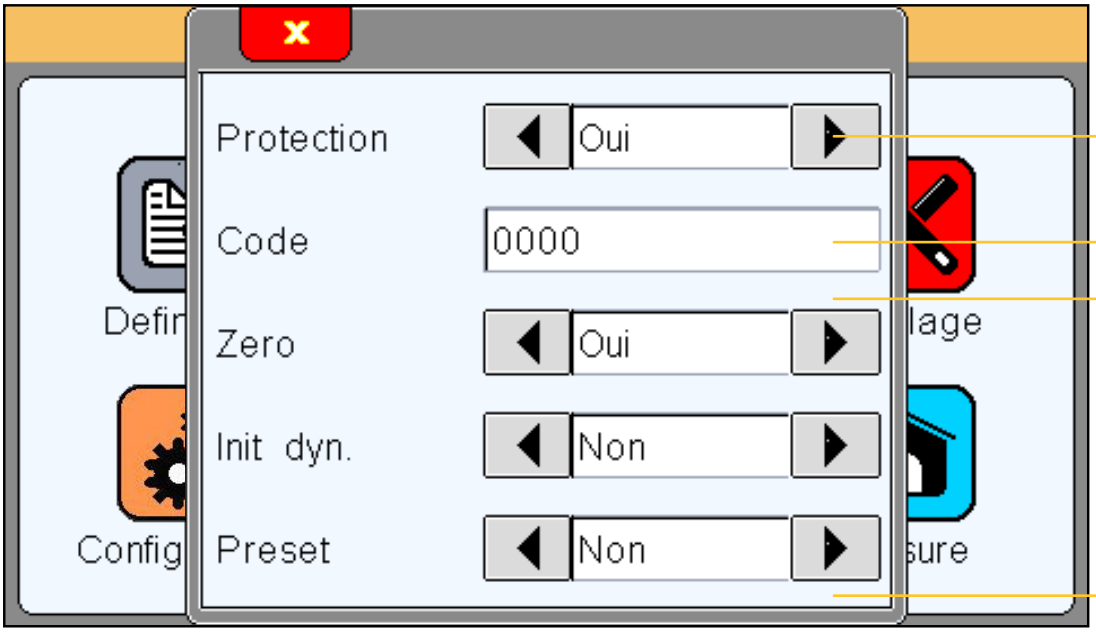
If you select transfer-->USB Stick, a "

6.5. Lock



After pressing the icon « **lock** », the windows below appears.

This screen allows to lock by password some functions of the D70A.



If « yes », a password will be asked to access to the icon desktop

Modification of the password. By default : 0000

Allow to remove the corresponding buttons from the measuring screen.

6.6. Measure



After pressing the icon « **measure** », the windows below appears.

Refer to the below chapter« Measuring display», for the presentation of this menu.

7. Measuring display

La D70A starts on this screen.

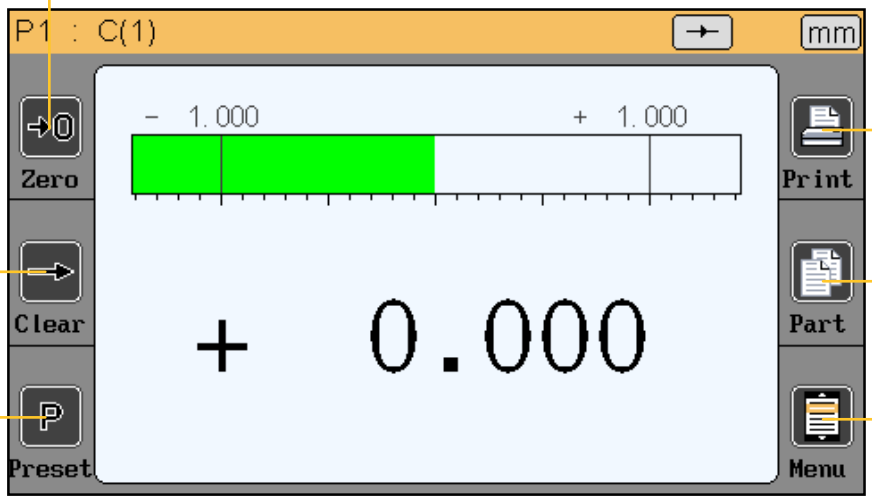
The measuring screen allows seeing the characteristics of the part that has to be controlled. A needle/bargraph indicator allows seeing the characteristic in function of the tolerance of the part from definition menu.

7.1. Lateral button functions

Absolute or relative mode allows to make a « zéro » at a defined position.

If the relative mode is selected, the button become red 

To come back to the absolute mode, press on the « clear » button



Start dynamic measurement (Min, Max...) clear the zero function.

Calibration/Preset. After pressing this button, the displayed value will take the master value.

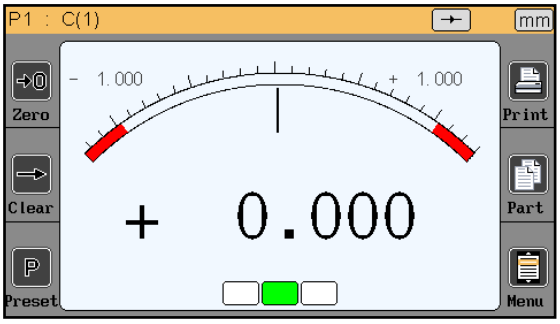
Measurement transfert (RS232 or USB)

Change manually the active part (part 1 or part 2)

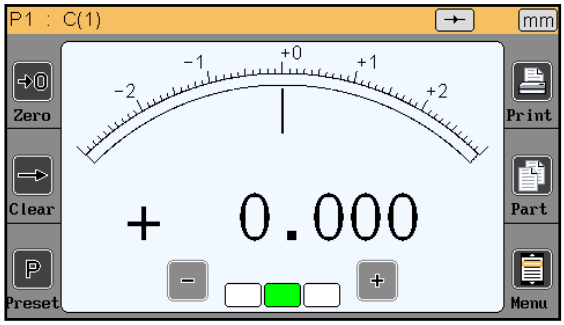
Go to the icon desktop

7.2. Choice of the needle indicator style

If the D70A is configured with the needle indicator (mode Galva), it is possible to change manually the type of scale.



Automatic

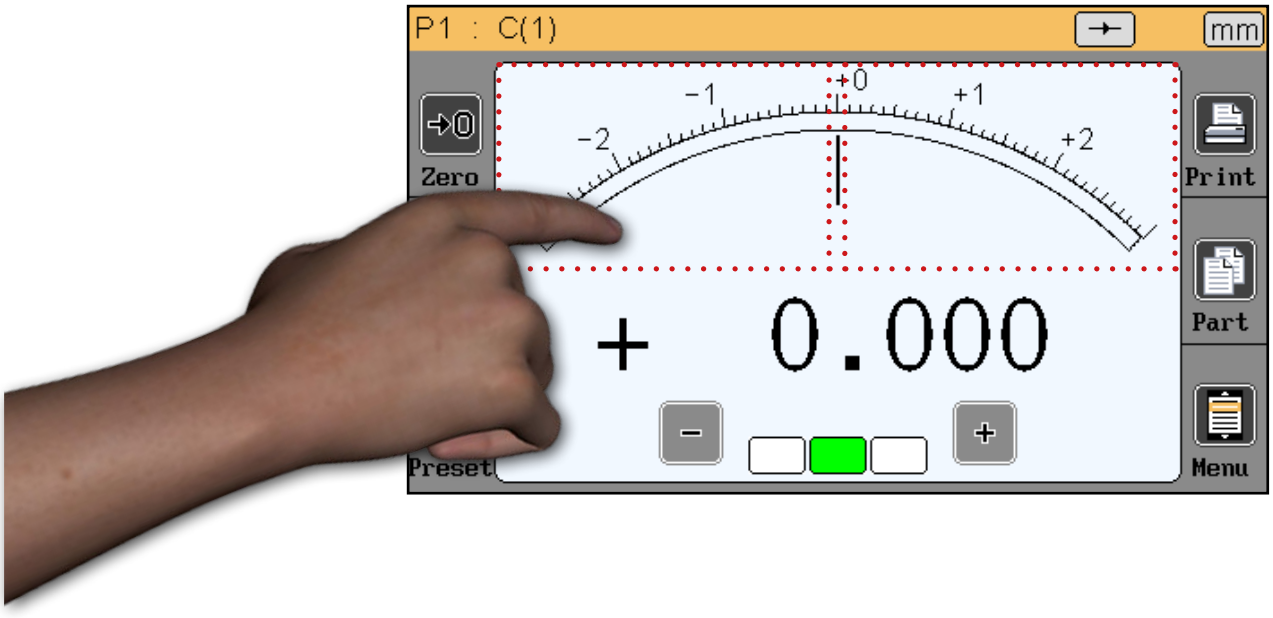


Manual

The automatic needle scale adapts automatically with the part tolerances.

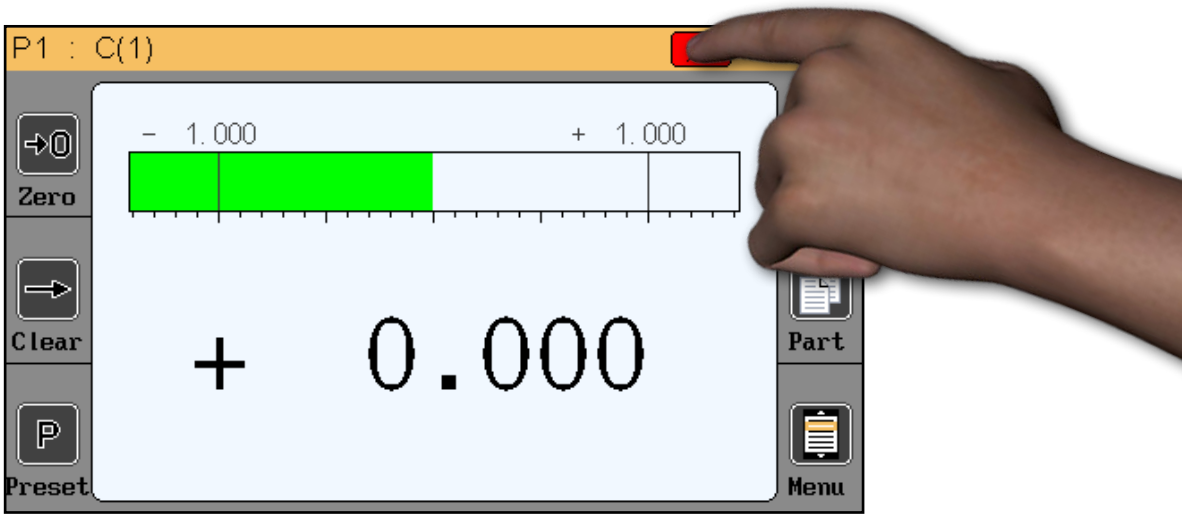
The manual needle has fixed scales and allows to use the +/- option (see chapter «display»)

You can change the scale type by touching the area as on the below picture :



7.3. Temporary dynamic mode

The characteristic is defined either as « static » (direct) or « dynamic » (Max, Min …) If a characteristic has been adjusted as static, it is nevertheless possible to change temporarily to a dynamic mode, directly from the measuring screen.



To change the measuring mode, press on the icon as shown on the above picture.

In order :

Static measurement Max Min Max-Min Average Median

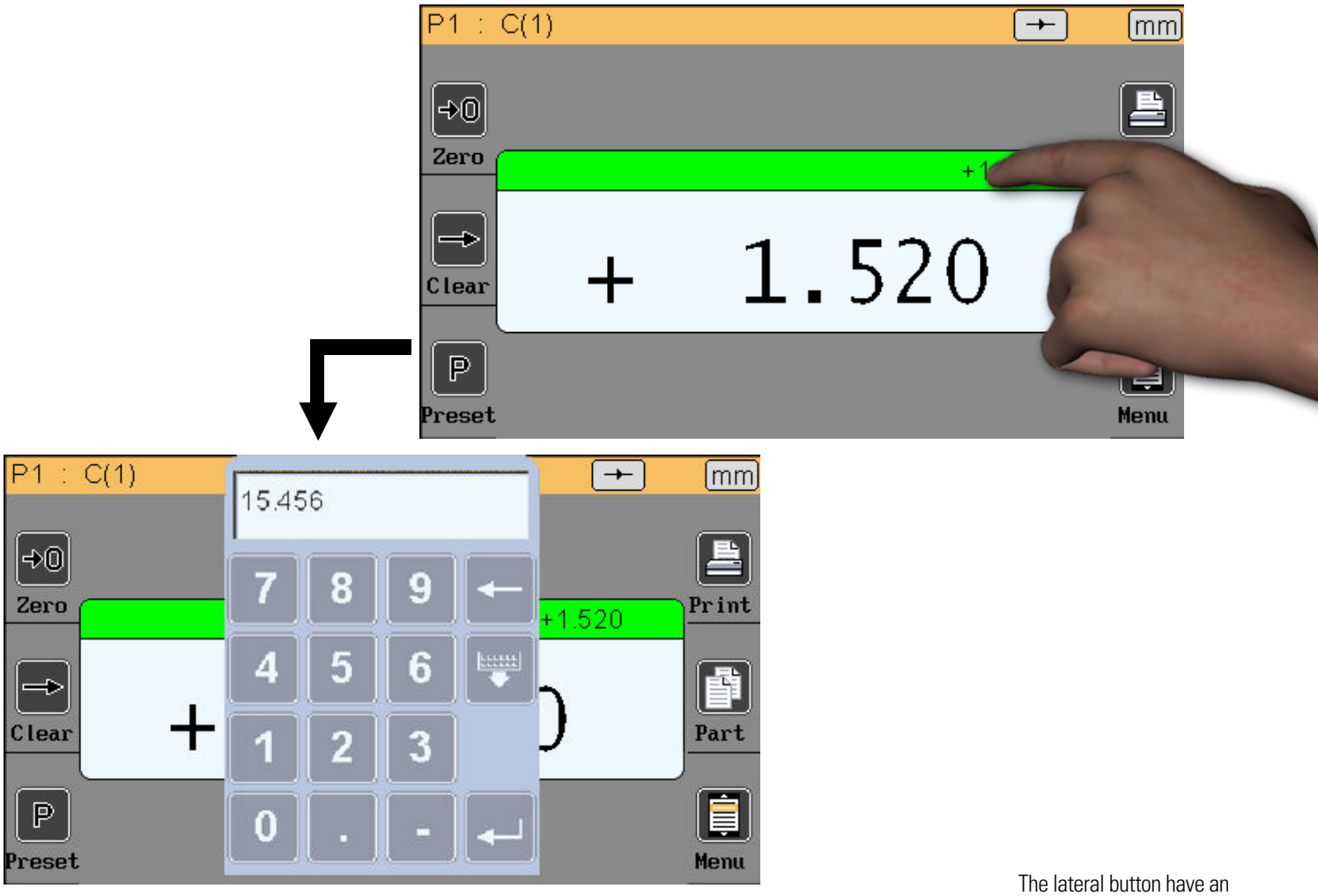
When a dynamic mode has been selected, press on the button  or on the footswitch (if configured as « init dyn » (see chapter «Configuration») to start recording.

7.4. Display mode without tolerance

This display mode is very adapted to be used with incremental probes like Heidenhain. (MT-101)

This mode allows to display only the numerical value, without tolerance indication.

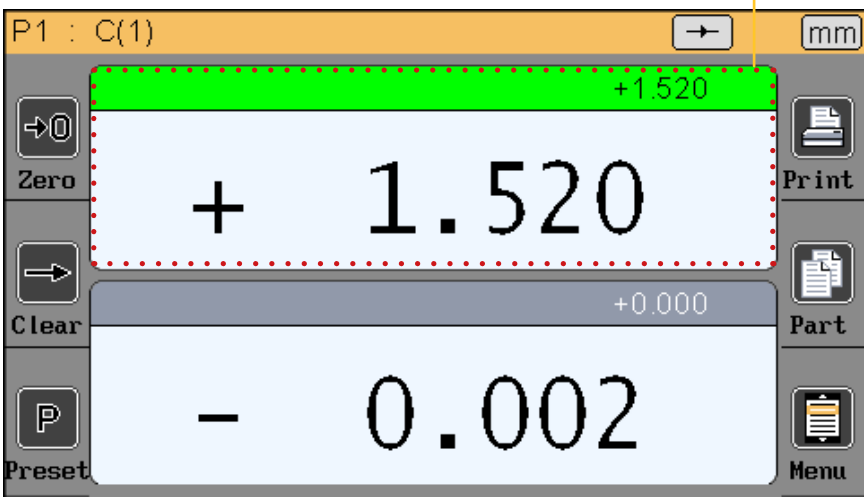
It is also possible to change the preset value (calibration) directly from this screen. Press on the value as shown on the below picture, an input the new value with the keyboard.



The lateral button have an effect only on the active characteristic

If the double display mode is selected, the 2 characteristics can move together, but
only 1 is active.

The lateral buttons have an effect only on the active characteristic. For selecting the active characteristic, press on it and the top of the box will become
green.



8. Communication protocol RS232

The D70A can communicate with an ASCII protocol allowing to master and configure all the functions.. To connect the to a computer or a PLC, you have to use a cross cable RS232, ref. 804.2204, sold separatly.



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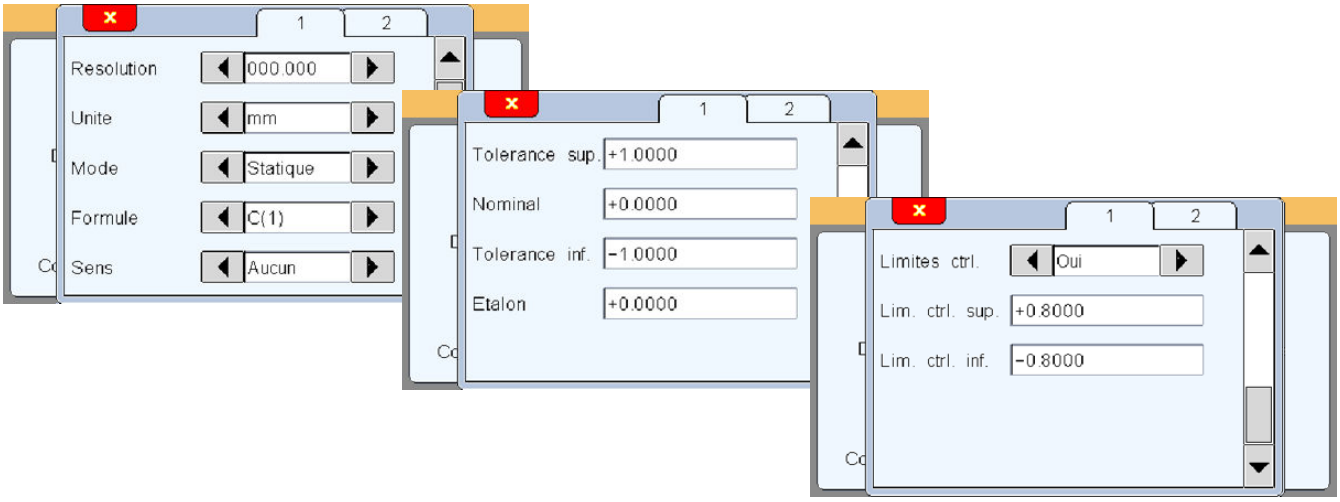
8.1. Commands

7.1.1. Generalities

All the commands must be ended by a « CR » character. (ASCII code 13/ $0D). The commands can be sent grouped by separating with a « ; » (max 500 characters). The display is refreshed only once after reception of the « CR » character.

8.2. List of the commands

7.2.1. Window DEFINITION



Window «Definition» (Command by characteristic with «n» = 1 or 2 (number of the characteristic))

Rubric	Read command	Write command	Comment
Resolution	nRES?	nRES=x	x=1 à 5 (number of decimals) x=0(mm) x=1 (inch) x=2 (µm)
Unit	nUNIT?	nUNIT=x	x=0 (static) x=1 (maxi) x=2 (mini) x=3 (maxi-mini) x=4 (average) x=5 (median)
Dynamic mode	nDYN?	nDYN?=x	x=0 (static)
Formula	nFM?	nFM=x	x=0 (C1) x=1 (C2) x=2 (-C1) x=3 (-C2) x=4 (C1+C2) x=5 (C1-C2) x=6 (-C1+C2) x=7 (-C1-C2)

Window «Measuring screen»			
Rubric	**Read command**	**Write command**	**Comment**
Zero		ZERO	Zero relative
Clear		CLR	Start dynamic measurement
Preset		PRESET	Calibration
Print		?	Measurement transfert : If 1 characteristic mode, transfert the value with the format :+000.00000<CR> If double characteristic mode, transfert the value with format +000.00000,+000.00000<CR>
Part 1 Mise hors tension		G1 OFF G2	Part 2 Part 1 Turn off the display

9. MODBUS RTU Protocol

This process allows to connect the M3 to an compatible and programmable automate.
This process allows to control all the functionnality of the D70A thanks to a lot of register.
A maximum of 256 register can be read.



Example of a RTU Modbus communication with an automate Pro-face.

Trame Modbus RTU	Adr	Code	Data	CRC16

Address : always equal to 1
Code : the D70A supports codes « 3 » by reading and « 16 » by written
Data : 1 to 256 register
CRC16 : verification code on 2 octets

The following functionality are available :
- Reading of the position of 2 probes
- Instant reading of the value of 2 characteristic
- Preset
- Reading / programing of the tolerances, of the master value, the formula...

Function	Address	Size (word)	Value
Preset (W)	0	1	1
Start a dynamic measure (W)	1	1	1
Active programm (R/W)	4	1	0 or 1
Life word (change each 100ms) (R)	6	1	0 or 1
Stop	7	1	1
D70A active	8	1	1 = measure 0 = menus

Register by characteristic: from 100 to 188 for the characteristic 1 and from 200 to 288 for the characteristic 2.

Function	Address	Size (word)	Value
Formula (R/W)	100	1	0 = C1 1 = C2 2 = -C1 3 = -C2 4 = C1 + C2 5 = C1 - C2 6 = -C1 + C2 7 = -C1 - C2
Maxi of a dinamical cote (R)	101	2	
Mini of a dynamical cote (R)	103	2	
Lower control limit (R/W)	105	2	
Upper control limit (R/W)	107	2	
Active class	109	1	1 à 16
Unit	110	1	0 = mm 1 = inch 2 = µm
Control limit activated	111	1	0 = no 1 = yes
Resolution	112	1	1 à 5 (decimal)
State of the characteristic	113	1	0 = Good 1 = < Mini 2 = > Maxi 3 = < Lower ctrl limit 4 = > Upper ctrl limit
Type of the characteristic	114	1	0 = Static 1 = Maxi 2 = Mini 3 = Maxi-Mini 4 = Average 5 = Median
Nominal	115	2	
Lower tolerance	117	2	
Upper tolerance	119	2	
Master value	121	2	
Measure	123	2	Displayed value
Mini class 1	126	2	
Mini class 2	128	2	
Mini class 3	130	2	
Mini class 4	132	2	
Mini class 5	134	2	
Mini class 6	136	2	
Mini class 7	138	2	

Function	Address	Size (word)	Value
Mini class 8	140	2	
Mini class 9	142	2	
Mini class 10	144	2	
Mini class 11	146	2	
Mini class 12	148	2	
Mini class 13	150	2	
Mini class 14	152	2	
Mini class 15	154	2	
Mini class 16	156	2	
Maxi class 1	158	2	
Maxi class 2	160	2	
Maxi class 3	162	2	
Maxi class 4	164	2	
Maxi class 5	166	2	
Maxi class 6	168	2	
Maxi class 7	170	2	
Maxi class 8	172	2	
Maxi class 9	174	2	
Maxi class 10	176	2	
Maxi class 11	178	2	
Maxi class 12	180	2	
Maxi class 13	182	2	
Maxi class 14	184	2	
Maxi class 15	186	2	
Maxi class 16	188	2	
Probe 1	7000	2	
Probe 2	7002	2	

10. Optionnal I/O Module

As an option, it is possible to connect a M-Bus module with 8 inputs/output isolated by opto-coupler. (ref 804.2205)

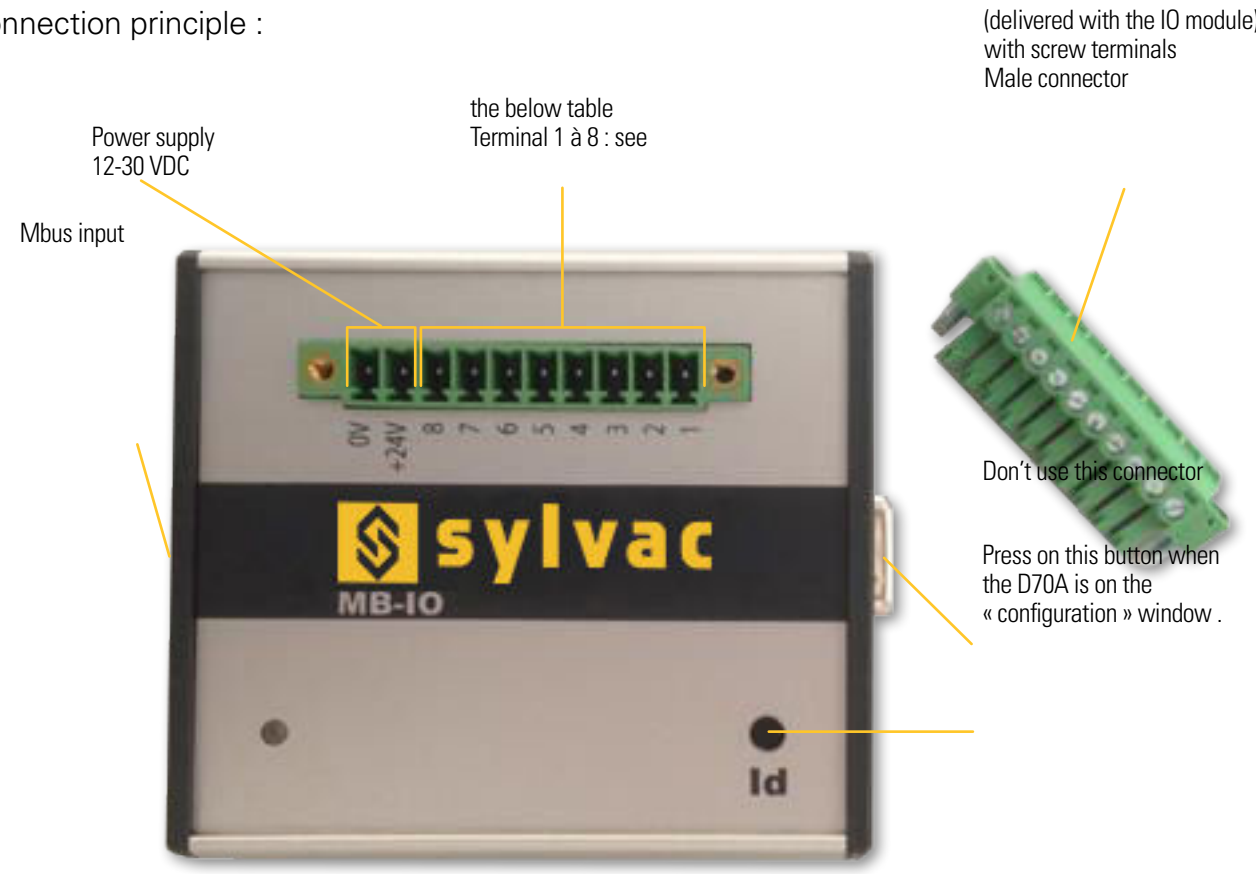
The 8 outputs are similar to the « open collector PNP » type. They can be used with an external power supply 12 to 30 VDC maximum. The maximal output current drained by each output is 50mA

The 8 inputs represent a 2.2kOhms load connected to the 0 volt.



For using your IO module, it is necessary to identify it on the D70A. For this, go to the "configuration" window and press the "Id" button on the module. The identification number of the modules appears.

Connection principle :



List of available functions :

Typ	Terminal nr	Function
Outputs	1	Part 1 state (active with part OK)
	2	Part 2 state (active with part OK)
Inputs	3	Preset (calibration)
	4	Start dynamic measurement (init dyn)
	5	Measurement tranfer
	6	Zero (relative)
	7	Part change : Low = part 1 High = part 2
	8	Stop (freeze the screen)

11. Factory reset

This function allows to come back to the factory setting.

Warning : At the end of this procedure, all the parametes of your D70A will be reset (tolerances, masters, formulas…)

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Follow the steps :

1. Shut down the D70A
2. Start the D70A
3. When the splash screen appears, press on the Sylvac logo
4. A desktop with 5 icons appear.
5. a – Press on « initialization »
6. b – Confirm YES or cancel NO
7. – Press Home to come back to the mesuring screen

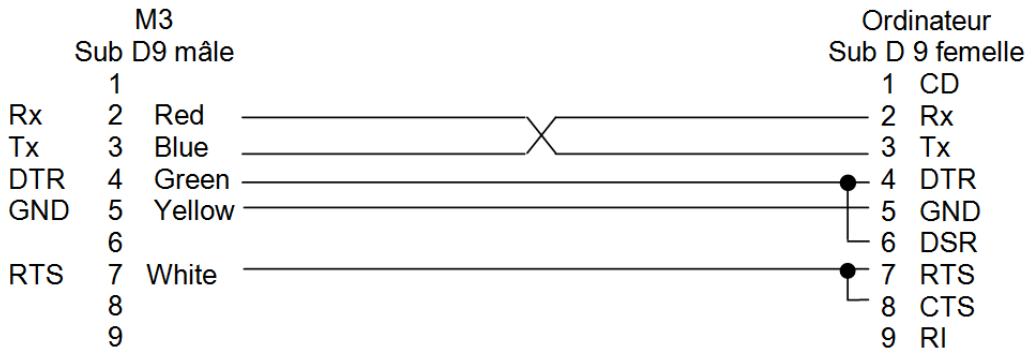


12. Firmware update

It is possible to update the D70A firmware.

The update require a cable RS232, réf 804.2201. It is possible to use a converter RS232/USB if your computer is not equipped with a serial port.

If you don't have a RS232 cable, you can make your own by following this schematic :



The firmware update requires to use the « flash magic » software that can be download (free) from this adress : *www.flashmagictools.com*

After installation, please configure the software on the following way :

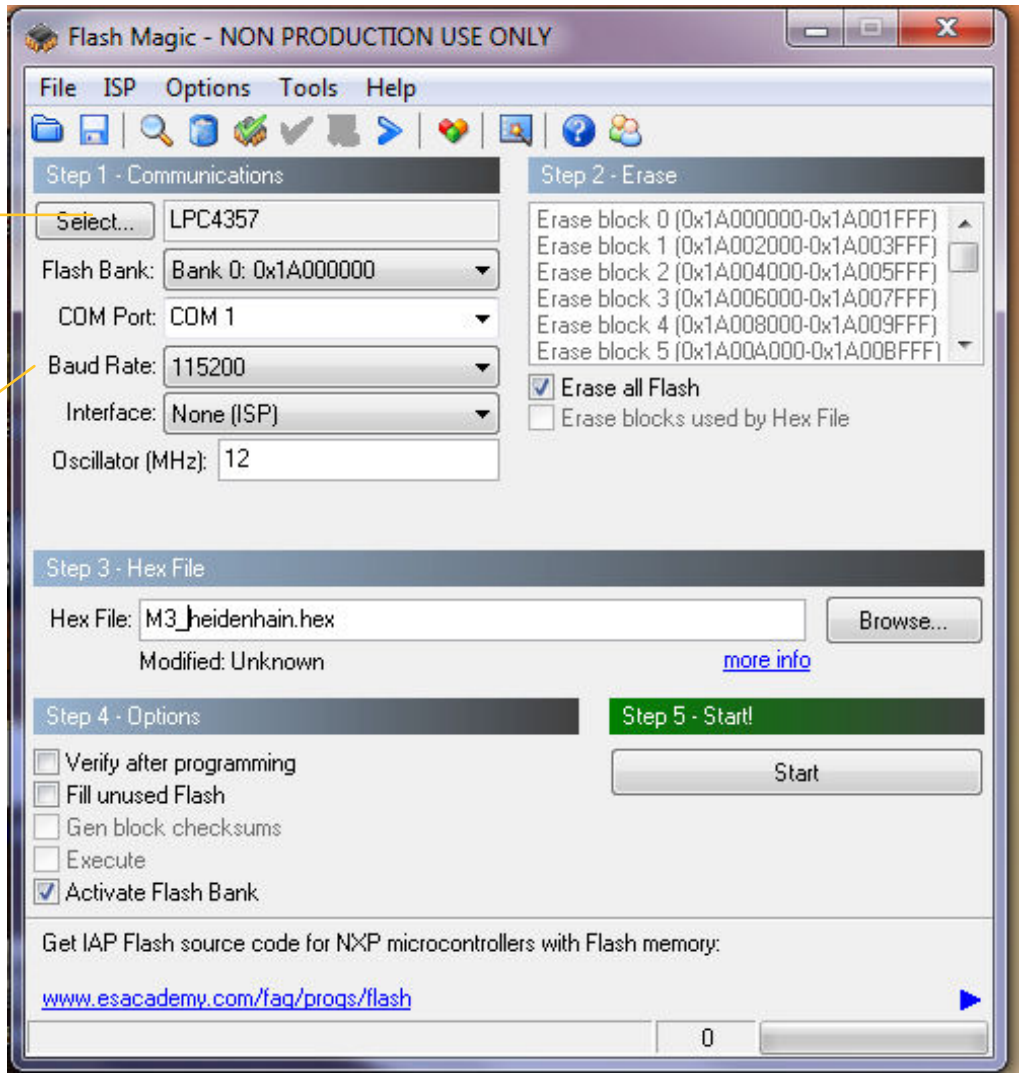
Process

1 – Connect the D70A with the cable cable ref 804.2201 to the computer
2 – Start the D70A
3 – Configure the flash magic sotware according to the above picture.
4 – Click on "Start" It takes from 2 to 5 min depending on the Baud rate selected. During the update, the screen becomes blurred.
5 - The D70A restart automatically when it is finished.
6 - Reset the D70A by following the procedure on the previous chapter.

The LPC4357 can be found on the "ARM Cortex" category after clicking on « Select ».

If you are connected directly on a serial port, you can use the baud rate 115200bauds.

If you use a USB/RS232 convertor, use 38400 bauds.



CERTIFICATE OF CONFORMITY
Sylvac certifies that this instrument has been manufactured in accordance with our Quality Standard and tested with reference to masters of certified traceability by the Swiss Federal Office of Metrology.

CERTIFICAT DE CONFORMITE
Sylvac certifie que cet instrument a été fabriqué et contrôlé selon ses normes de Qualité et en référence avec des étalons dont la traçabilité est reconnue par l'office fédéral suisse de métrologie.

QUALITÄTSZEUGNIS
Sylvac bestätigt, dass dieses Gerät gemäss seinen internen Qualitätsnormen hergestellt wurde und mittels Normalen mit anerkannter Rückverfolgbarkeit, kalibriert durch das Schweizerische Bundesamt für Metrologie, geprüft worden ist.

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EU DECLARATION OF CONFORMITY (DoC)

We, Sylvac SA, hereby declare under our sole responsibility that the product

Name	D70A Display unit
Description	Display unit for plug air gauges
Part Numbers	804-2074, 804-2075

has been submitted to a conformity assessment and fulfils the essential requirements of the following European directives/re.

2001/95/EU	General product safety
2014/30/EU	EMC
2011/65/EU & 2015/863/EU	RoHS

and complies with the following harmonized standards or other normative documents

EN 61326-1:2021	Electrical equipment for measurement, control and laboratory use – EMC requirements
EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic, products with respect to the restriction of hazardous substances

Person authorized to compile the technical file and issue the declaration of conformity: Eric Schnyder

Place and date of issue	Yverdon-Les-Bains, September 28, 2023
Name (position)	Eric Schnyder (CEO)
Signature	