

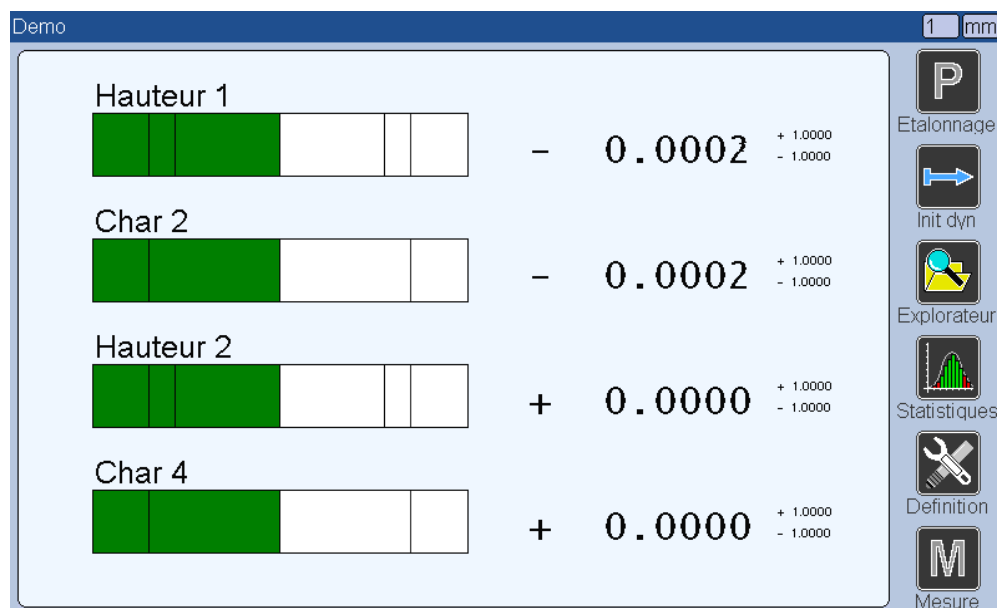
55-AIR3

Multi-functional display unit – Quick Set Up Guide



Outline

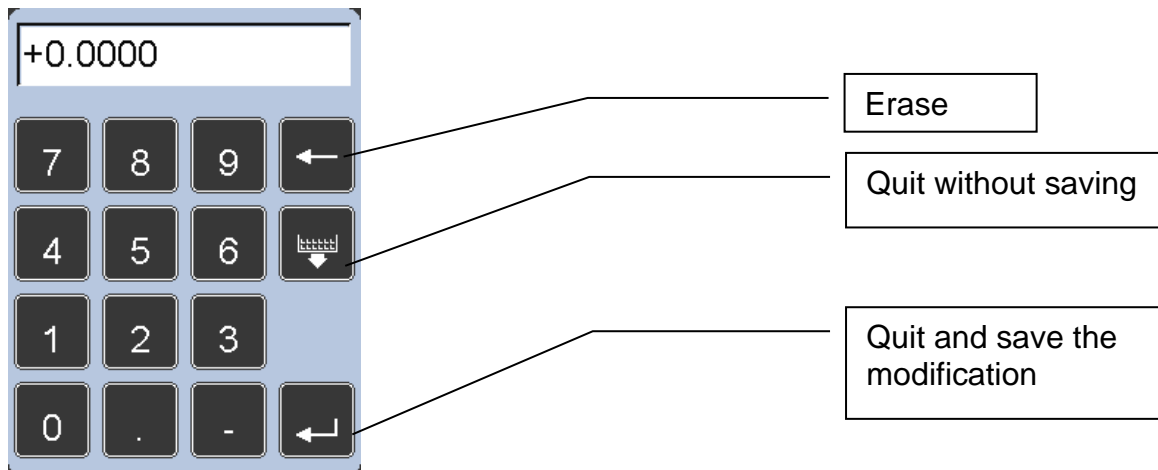
The purpose of this guide is to enable the user to make a simple program setting of one fixture, with all channels displayed on one screen in BAR form.



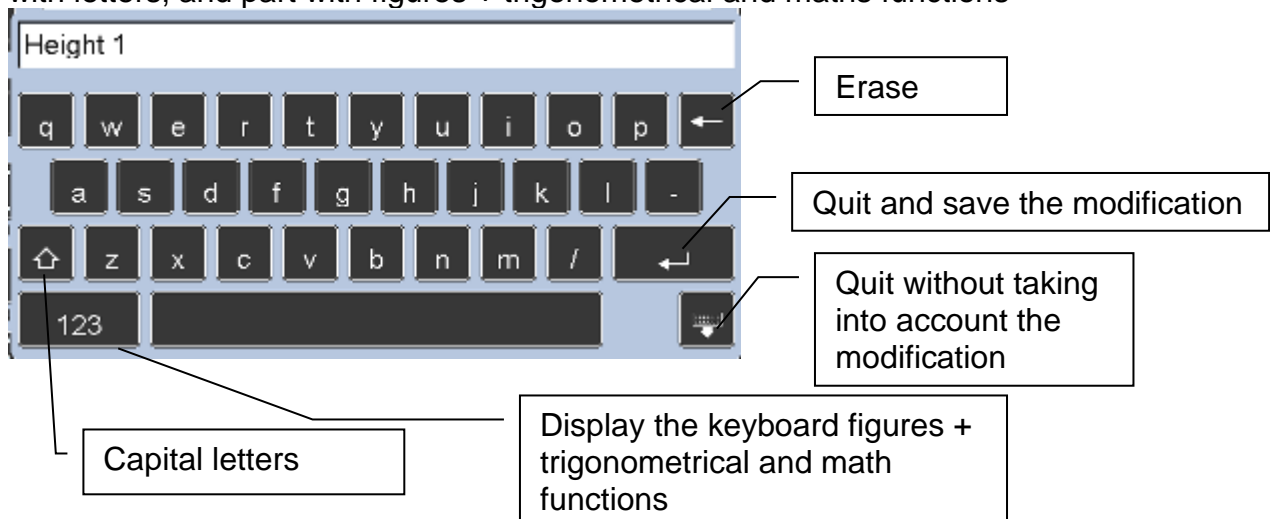
Section	Topic	Page Number
1.	Parts Checker.....	
2.	Services requirement.....	
3.	Restrictor selector.....	
4.	Air connection requirements	
5.	MB-AG Module Connection – Cabling	
6.	Identifying modules and coupling to display	
7.	Calibration / Ranging of MB-AG Modules	
8.	Basic Fixture creation	
9.	Assigning MB-AG Modules	
10.	Pre-setting Air Channels post calibration	

2 types of virtual keyboards are available

1. Numerical keyboard



2. Alpha-numerical keyboard. This keyboard is divided in 2 parts : parts with letters, and part with figures + trigonometrical and maths functions





C(1)-C(2)

sin asin cos acs tan atn ←

sqr exp dr rd abs pi -

* / = ; : C(+

Abc () " , ↵

7 8 9

4 5 6

1 2 3

0 .

Quit without taking into account the modification

Display the keyboard with letters

C(means « channel » in a calculation formula.
Example C(1) means channel 1 (M-Bus input nr 1)

→ if you don't know the probe number, just move the instrument or probe and the corresponding formula C(x) will appear automatically.

The entire text can be selected by long press, the cursor can move in the text by short press.

Section 1 : Parts Checker.

Make sure all the following parts are available.

- 55-AIR3 Display
- Mains Power pack for display with suitable power outlet lead
- 55-MB-AG air gauge modules, one required per live air channel
- Selection of restrictors, see section 3
- 55-81210-2 (or -5) M-Bus connecting cable to connect MB-AG modules to display, see section 5
- 55-MBV001 one required for every three MB-AG modules
- 8mm OD/6mm ID Poly Pipe – see diagram in section 4
- 6mm OD/4mm ID Poly Pipe – see diagram in section 4
- 8mm to 6mm Tee pieces – see diagram in section 4
- Air gauge tooling
- Masters, minimum two for each air gauge tooling

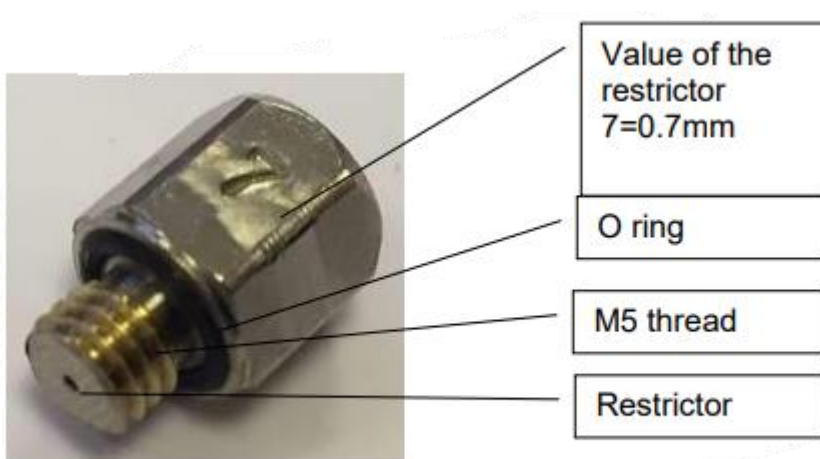
Section 2 : Services Required

- Clean air supply minimum 6 bar
- Mains voltage
- Suitable work bench with clean parking facility for air tooling

Section 3 : Identifying tooling / restrictor selection

For the tooling to work correctly, it is important to establish the air jets used in the air gauge tooling as this information is used to decide on the correct restrictor selection. Ensure you have two masters along with their most recent calibrated sizes. Use the chart below to select the correct restrictor.

The MB-AG modules 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.

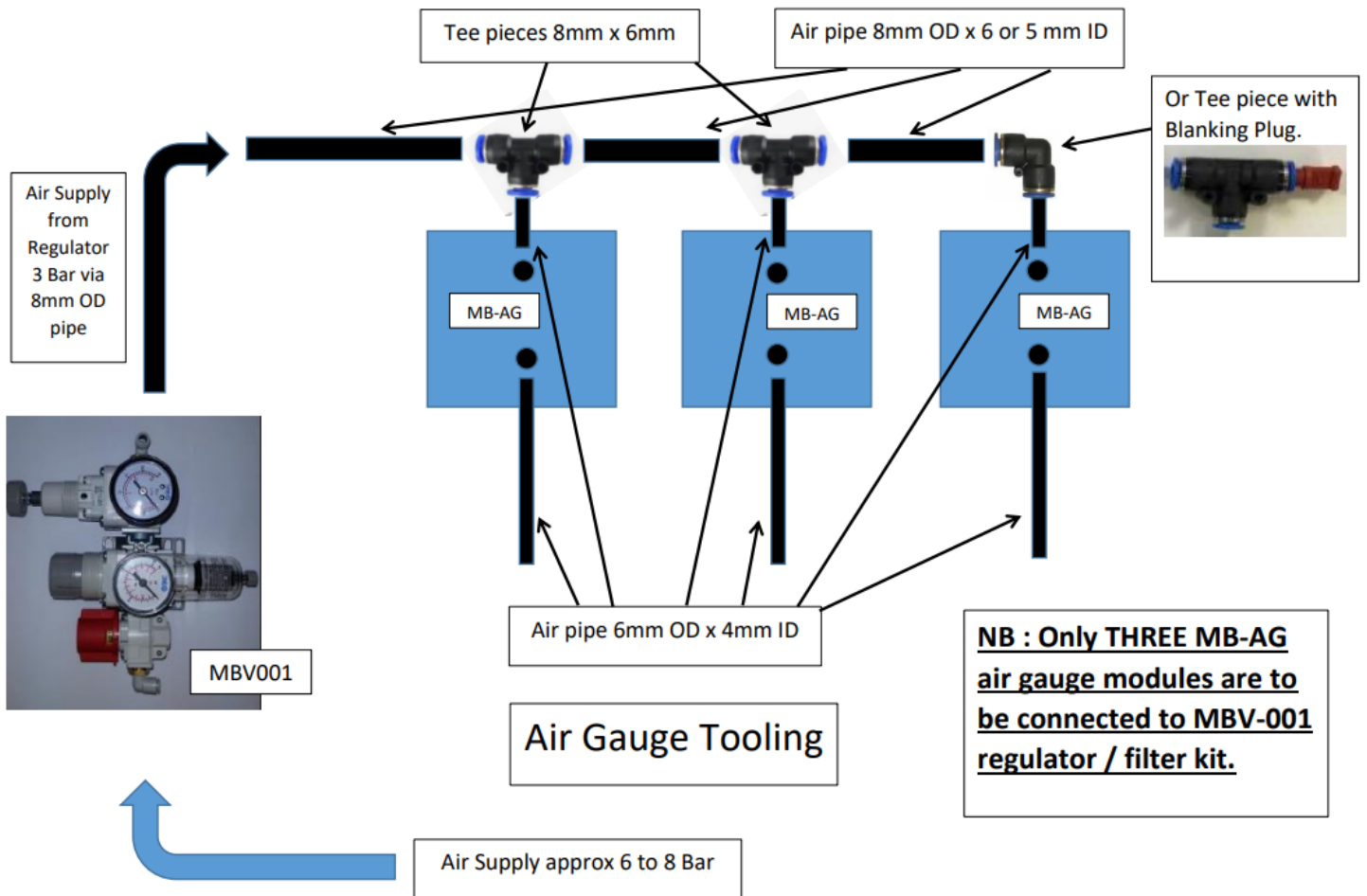


The following table shows some frequent cases to define which restrictor will be the most adapted to your application. To get the best linearity, the most important is to get 2.8 BAR at the nominal (pressure indicated on the Setup menu, it is a relative pressure from the atmospheric pressure, while the 3 BAR at the output of the regulator is absolute) If you order a turnkey solution at Bowers, we will deliver the modules with the adapted restrictor. But if you want to use the display together with your existing air gauge, you will have to use the adapted restrictor by your own. It is advised to contact Bowers for advice or confirmation on this subject.



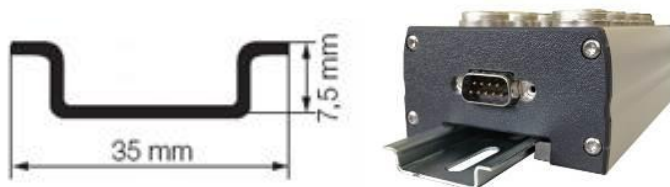
Nozzle diameter in mm	number of nozzles	total flow surface in mm ²	Restrictor
0,3	2	0,14	0,3
0,4	2	0,25	0,4
0,5	2	0,39	0,4
0,6	2	0,57	0,5
1	2	1,57	0,7
2,07	2	6,73	0,9
0,3	3	0,21	0,3
0,4	3	0,38	0,4
0,5	3	0,59	0,5
0,6	3	0,85	0,5
1	3	2,36	0,7
0,3	4	0,28	0,4
0,4	4	0,50	0,4
0,5	4	0,79	0,5
0,6	4	1,13	0,5
1	4	3,14	0,7

Section 4 : Air Connections



Section 5 : MB-AG Module mounting and connection plus Power Supply

M-Bus modules should be mounted on a standard DIN Rail 7.5*35mm.



M-Bus cable reference	Length
55-81210-2	2m
55-81210-5	5m
55-81210-10	10m

Modules can be connected directly between each other's or through the M-Bus cables (3 standard length 2, 5 or 10m). Connect to port (1) as shown below. **Always connect the modules when the 55-AIR3 display is switched off.**

Ensure you have been supplied with the correct mains outlet cable. Plug the Screw in connector into port (7).



Section 6 : MB-AG Identification / Calibration

With the 55-AIR3 display switched off, Connect the MB-AG module/s to the 55-AIR3 with an M-BUS Cable. Start the Display.

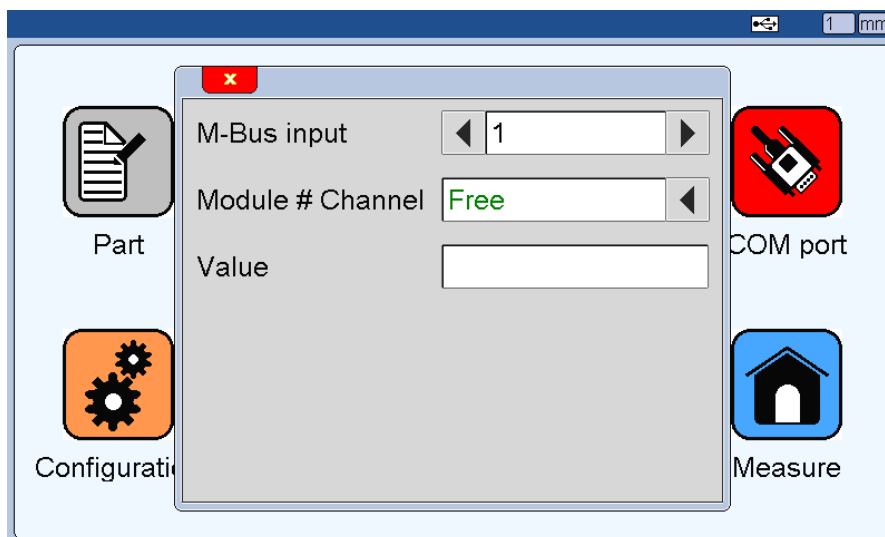
The 55-AIR3 starts on the measuring screen. Go the configuration screen by pressing the « Definition » key.



From the new screen, press « M-BUS » key.

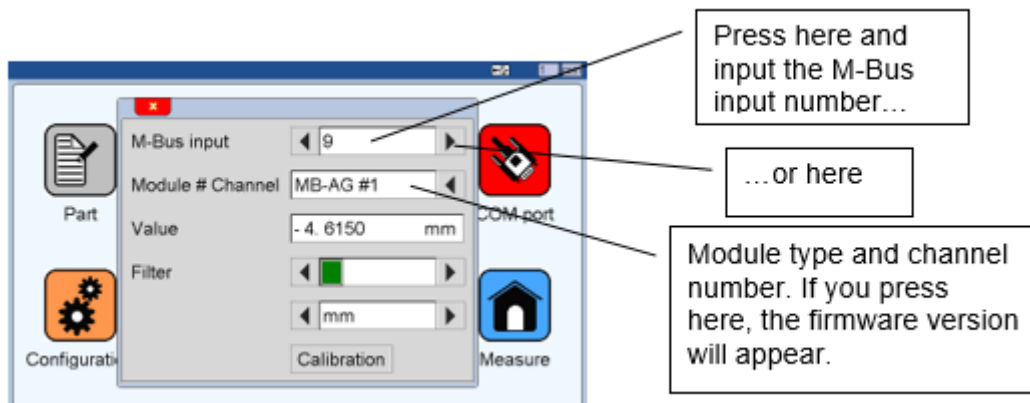


This window appears, no module is identified (message “Free”):



You are now ready to identify the modules.

Just push the “ID” button of the module and it will appear in the “Module # Channel” box.

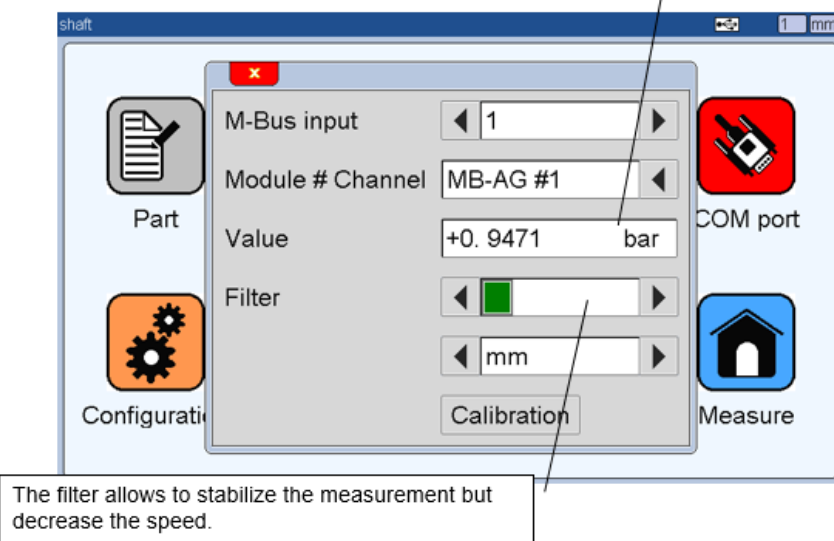


When the module is not identified, the LED located on the module is blue and blinking. When it is identified the LED becomes blue and fixed.

To identify the next module, select the next “Free” M-Bus input (for example the input nr 9)

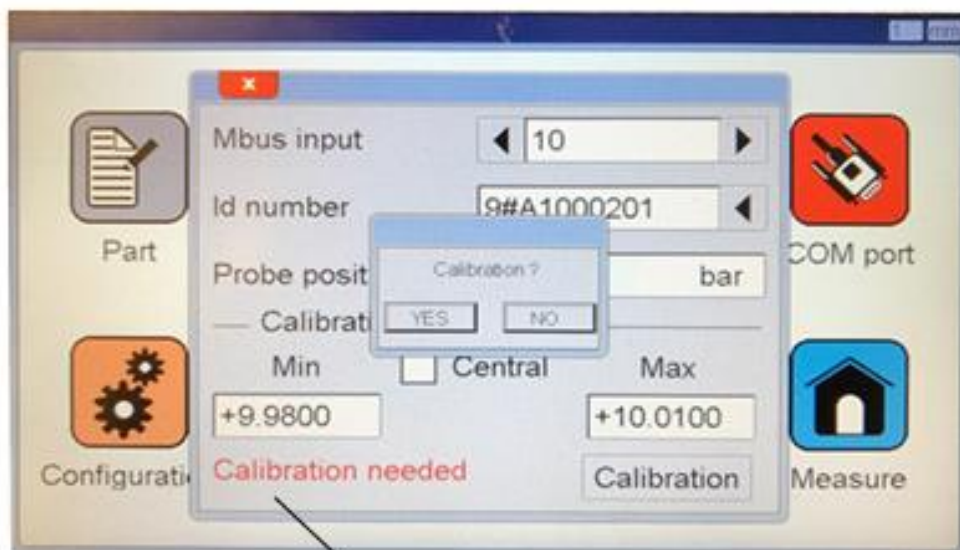
Before use, the MB-AG modules must be calibrated with 2 or 3 masters. In most cases, 2 masters are enough. When the module is not identified, the LED located on the module is blue and blinking. When it is identified but not calibrated the LED becomes purple and fixed. When it is calibrated, the LED becomes blue and fixed. If the module is damaged, the LED would be red.

When the MB-AG is not calibrated, this field displays the pressure in BAR. After the calibration, this field will display mm. It is however possible to see the pressure by touching the unit (mm) on the touchscreen. **With the correct restrictor, the nominal pressure should be 2.8 bar. This is important to achieve good linearity.**



Section 7 : Calibration / Ranging of the MB-AG Modules

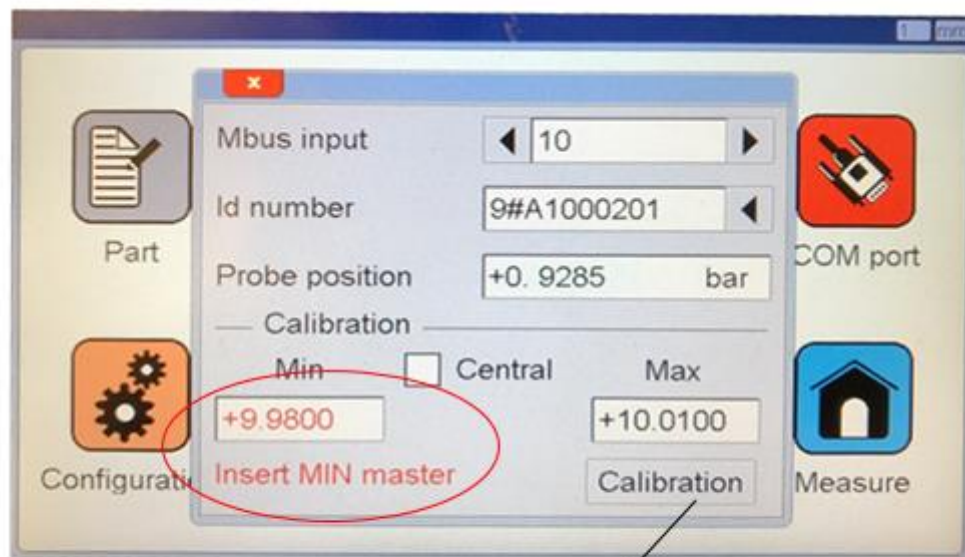
Once all modules have been recognised, they need to be calibrated / ranged for use on the required tooling. Connect the required air tooling making sure all air connections are leak free. With the air supply on, check the bar pressure reading in the 'value' box whilst in the upper and lower master and make sure the value is nominally around 2.8 bar. When the above condition has been satisfactorily met, press the 'calibration' button.



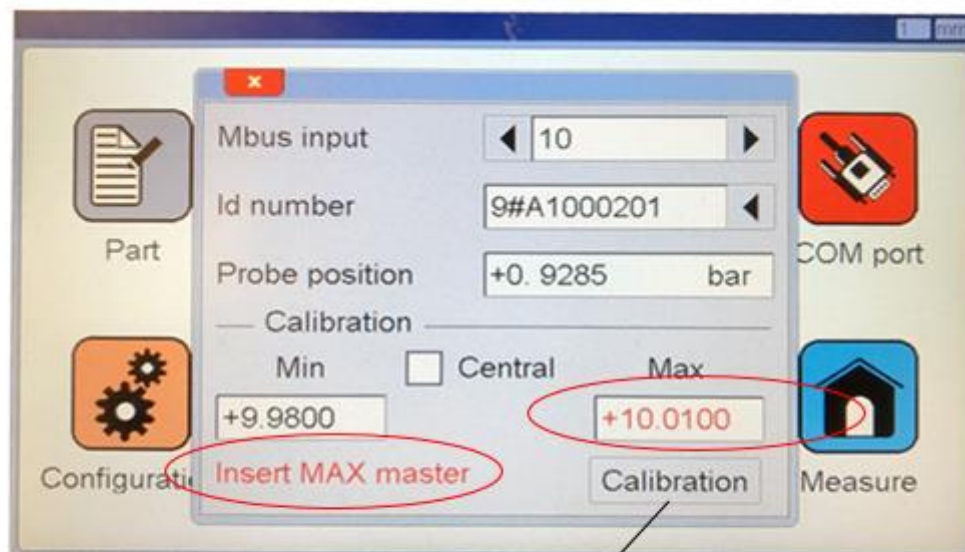
If the MB-AG is not calibrated, the warning message "calibration needed" appears

Once the MIN and MAX values are entered, press on the "Calibration" button.

When you are ready, confirm by "YES" Then the calibration procedure begins.

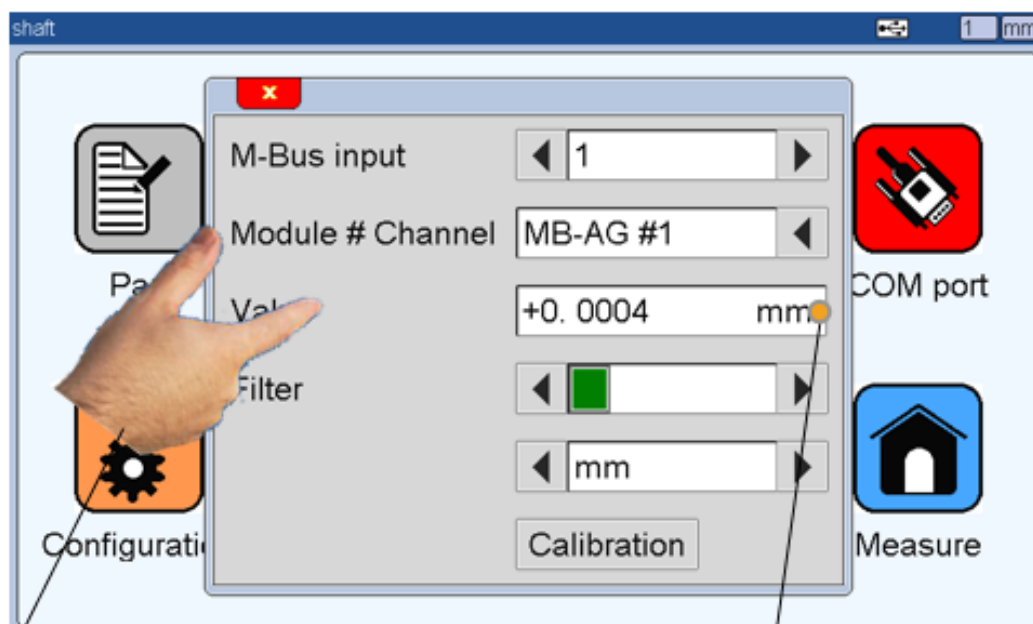


Just follow the indication. « **Insert Min master** » with the value of the master, here 9.9800mm. When the min master is on the air gauge, confirm by pressing on the « Calibration » button



Then do the same for the Max master here 10.0100mm. When the max master is on the air gauge, confirm by pressing on the « Calibration » button

When the module is calibrated, the screen is like the following picture, and the LED of the module becomes fixed blue.



When the module is calibrated, the position is in millimetre.
When the MIN master is placed on the air gauge, the value will be at 0.0000mm.
When the MAX master is placed on the air gauge, the value will correspond to the dimension.

After the calibration, if you touch the « probe position » text, the unit will change to BAR and return to mm after 10s.

Generally, the best linearity is achieved at around 2.8BAR at the nominal value (=1.8BAR over the atmospheric pressure).

Changing the restrictor size will change the pressure value.

The calibration values of the MB-AG are stored on its internal memory.

You can make a reset of the module and it will erase the calibration; the module will therefore return to its original configuration.

Procedure :

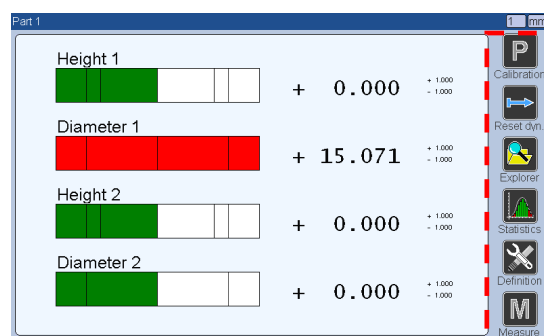
The 55-AIR3 must be ON, press about 8 sec on the ID button of the module. When the LED becomes **red** you can release the button, the module is then reset.

If the module is in an error state, the LED of the module will become red. This can happen if an over pressure has been applied on the module (over 5 BAR / 0.5 MPA). If this happens, you should send the module to Bowers for inspection / repair.

Section 8 : Basic Fixture Creation

The measuring screen allows to see the measurement results and to use them. The 55-AIR3 starts on this screen. For reaching the configuration

screens, press on the  **Definition** button..

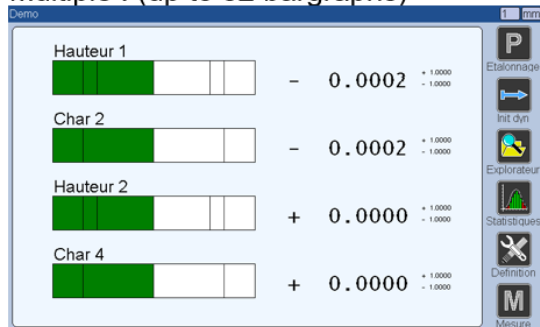


Measuring
screen
menu

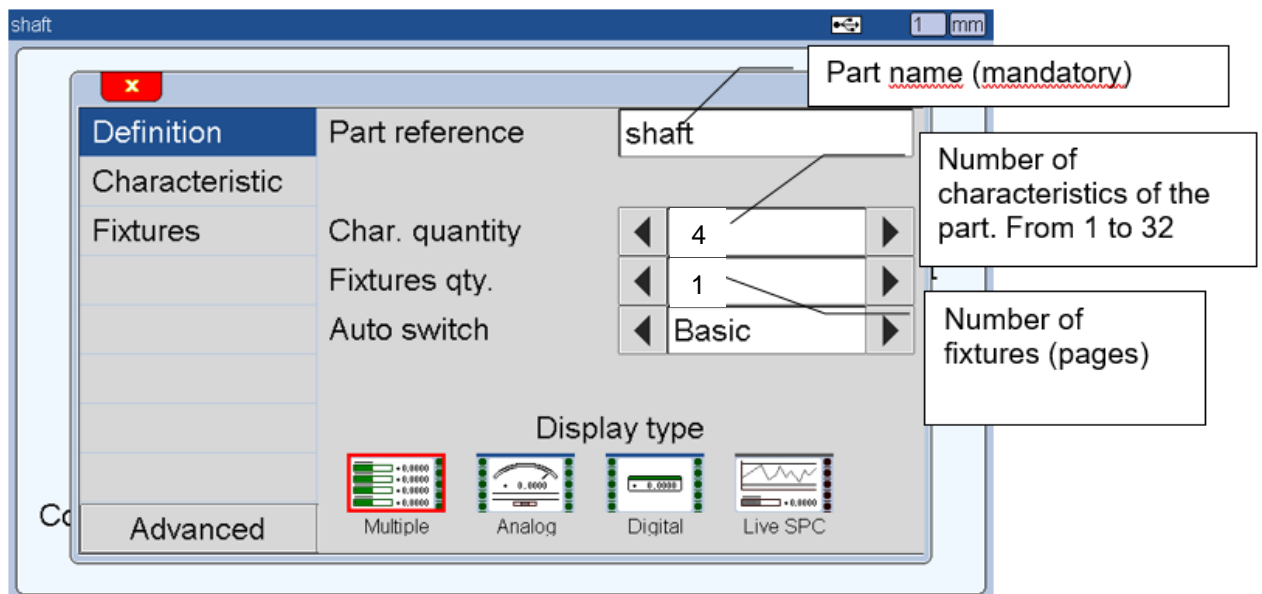
..and then press  **Part**

The following example shows how to create a single fixture with four features (characters) being measured. All four measurements will be shown on the screen simultaneously.

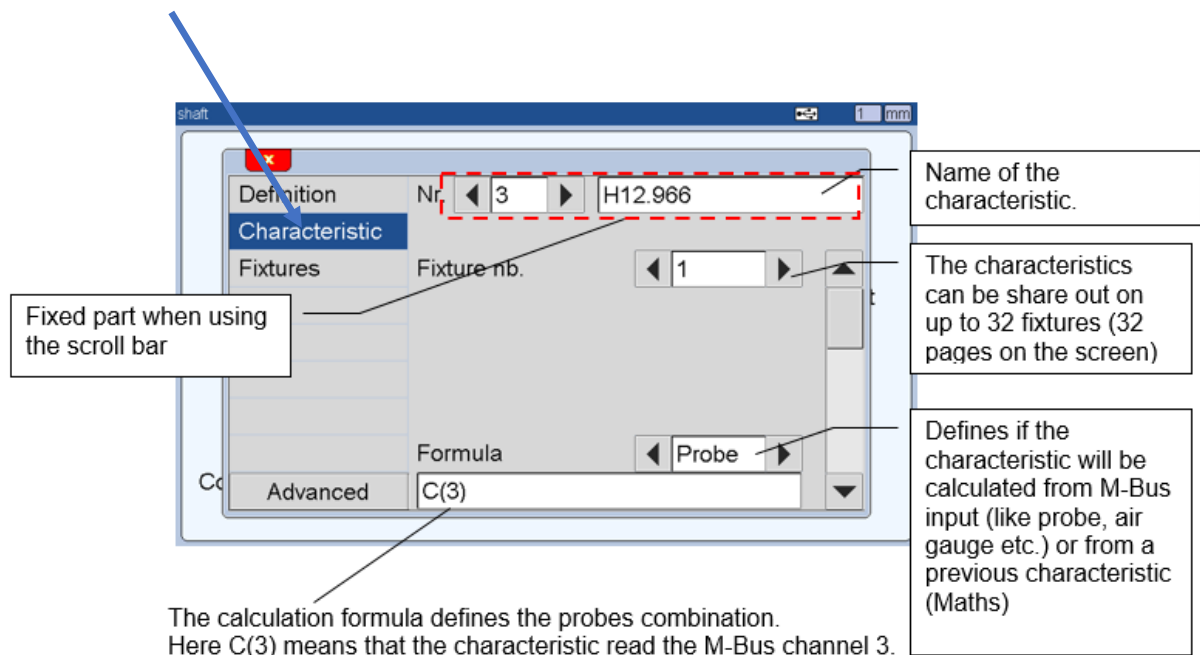
Multiple : (up to 32 bargraphs)



Please note, with a single fixture, the Auto switch function is not relevant and therefore not shown.



Once the fixture has been “defined” you can move on to setting up each “Characteristic”



Fixed part when using the scroll bar


Name of the characteristic.

The characteristics can be share out on up to 32 fixtures (32 pages on the screen)

Defines if the characteristic will be calculated from M-Bus input (like probe, air gauge etc.) or from a previous characteristic (Maths)

The calculation formula defines the probes combination. Here C(3) means that the characteristic read the M-Bus channel 3.

After clicking on the formula area, a formula keyboard will be displayed:

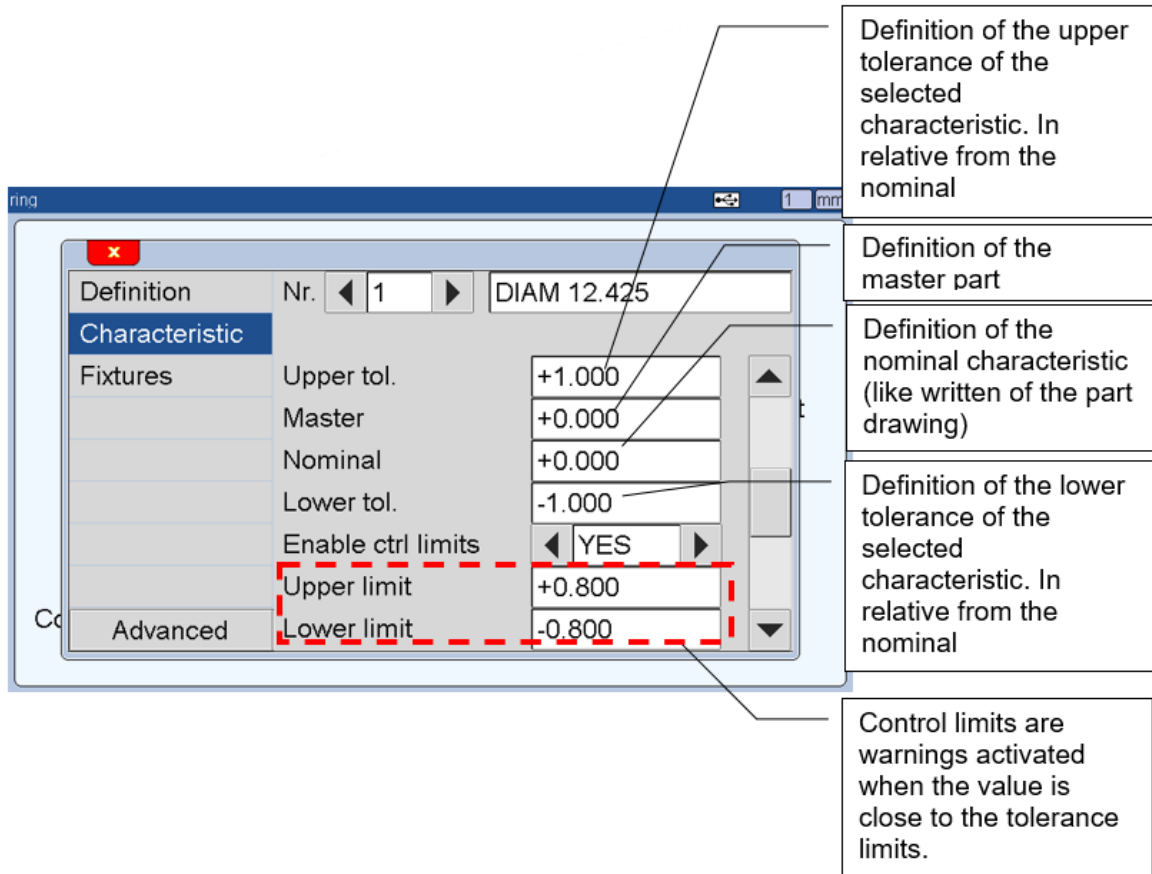


The 55-AIR3 has 4 types of formula.

2 types of variables can be used according to the source of measurement:

- **FORMULA TYPE PROBE (m-bus Channel):**

C(n) where 'n' is the number of the probe (n≤99)



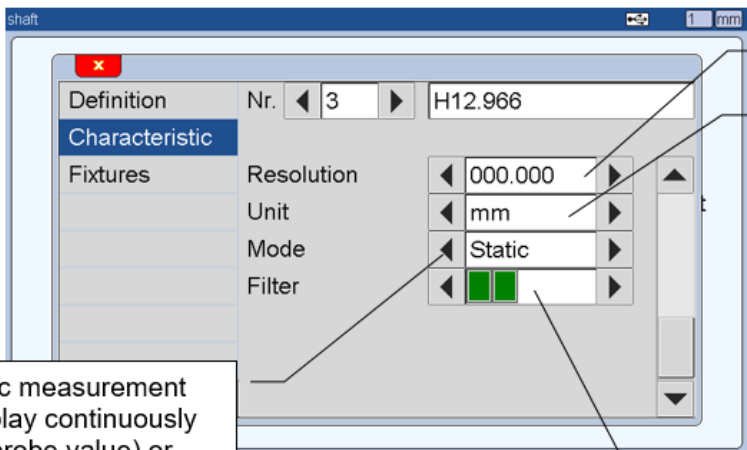
The screenshot shows a software window titled "ring" with a "Definition" tab. The "Characteristic" section is active, showing a list of fields: "Fixtures", "Upper tol.", "Master", "Nominal", "Lower tol.", "Enable ctrl limits", "Upper limit", and "Lower limit". The "Advanced" tab is also visible. The "Upper limit" and "Lower limit" fields are highlighted with a red dashed box. Callouts provide definitions for these fields:

- Definition of the upper tolerance of the selected characteristic. In relative from the nominal**: Points to the "Upper tol." field, which contains the value "+1.000".
- Definition of the master part**: Points to the "Master" field, which contains the value "+0.000".
- Definition of the nominal characteristic (like written of the part drawing)**: Points to the "Nominal" field, which contains the value "+0.000".
- Definition of the lower tolerance of the selected characteristic. In relative from the nominal**: Points to the "Lower tol." field, which contains the value "-1.000".
- Control limits are warnings activated when the value is close to the tolerance limits.**: Points to the "Enable ctrl limits" field, which contains the value "YES".

The "Upper limit" field contains the value "+0.800" and the "Lower limit" field contains the value "-0.800".

The "Master" will be the preset size. With air gauging, we recommend using the setting master with the smallest clearance.

Scrolling down the page, the Resolution, Unit, Mode and filter can be set.



Resolution


Unit : mm, inch or DMS (degrees – Minutes-Seconds)

Static measurement
(display continuously the probe value) or dynamic (displays the min, max, max-min (TIR), average or median value seen from the reset of the dynamic measurement memory)

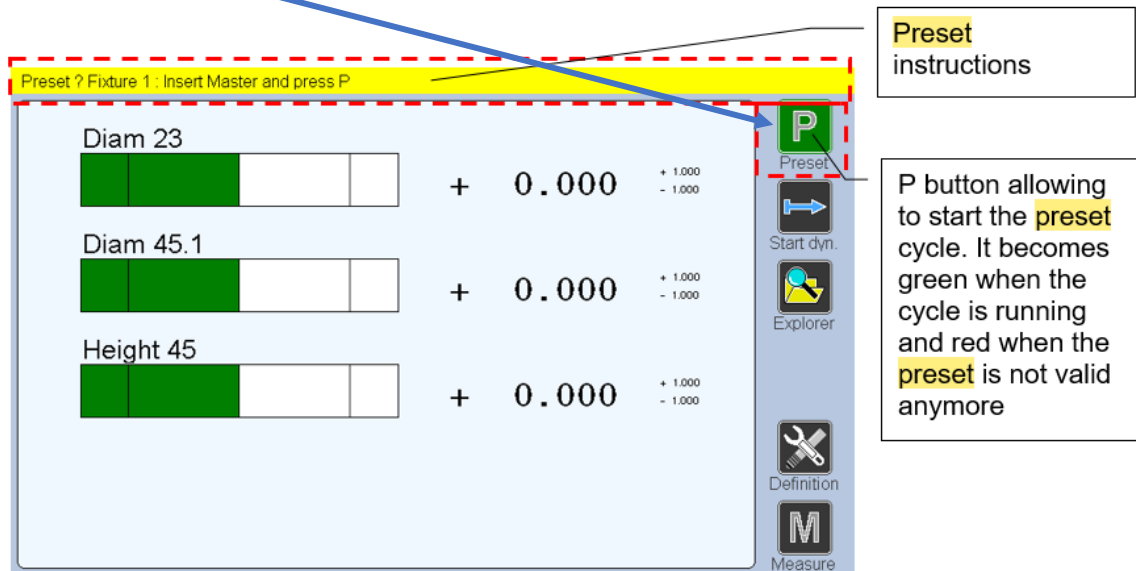
Allows to average the probe's refreshment rate on the screen in order to limit the blinking of the last decimals.

Carry out the same process for each Nr. Characteristic.

Once you have completed the process of setting up all the

Characteristics, press the Measure (home)  to take you back to the measuring screen.

Place the relevant Preset masters on each gauge and press the Preset icon.



If you are ready to start calibration cycle, press YES. Preset button goes green to indicate ready – press preset to confirm.
All channels / characteristics have now been preset to the chosen masters.

You are now ready to measure!

For further instructions, please contact Bowers or your local distributor.