User's manual

Advanced Electronic/Air Column PC-2200

CONTENTS

CHAPTER 1. INTRODUCTION

1.1 GENERAL INFORMATION'S

- The column PC-2200 is an instrument system that measures and displays (ID, OD, Length related measurements such as misalignment, and others) in automotives, machines, electrical and electronic parts, and determines whether the measured results are acceptable or not.

- The user can identify the measurement values correctly and easily as the display is made on a 3-Color LED Bar (green, orange, red) and a DOT MATRIX LED (8 characters) mounted in the front side.

- The Status panel, positioned on the front bottom side, shows the current operating status in regards to the unit system (mm/inch) and operating sets (M1, M2, M3, M4) using 12 LED's (green).

- The Keypad being consisted as 9 membrane switches mounted below the Status panel, performs the user program such as the system setup. The user can build the program environment that can satisfy the user's requirements to the maximum in easy and free way through the Keypad such as selecting the menu and setting up the required variables.

- The rear upper side is configured as the AC power switch, Fuse holder, AC power inlet and Aux. power supply, and therefore, it can use several units of PC-2200 through connecting with only one unit of power supply. The AC power of AC 110/230 V and 50/60 Hz is applied. You can select the power source of 110V/230V (default : 230V) by inserting the connector on the DC power PC board that is fixed on the upper side of the system inside.

- With the 5 external interfaces on the rear center side, the column can by connected to an other column, or to PC, or Printer, or CNC.

- You can use the HBT, LVDT and CAPACITIVE probes as electronic system or AIR probes through the analog board on the rear bottom side. You should install the analog board (PCB) dedicated by the type of probe.

- The PC-2200 is an integrated high quality measurement system that performs various measurements and display functions such as inter-channel operations up to 4 channels and dynamic mode in addition to the simple displays of measurement values.

1.2 TECHNICAL SPECIFICATIONS

General :

Storage temperature	: -40° à +60°C /- *40°F to 140°F*
Operational temperature	: 0° à +50°C / *32°F to 122°F*
Power supply	: 110/230V (AC) 50/60Hz
Max. consumption	: 40VA
Fuse	: 2A delayed
MTBF (Mean Time between Failure)	: >100'000 heures
Average life of display	: > 50'000 heures

Performance :

Time for stabilization after switching ON	: 5 minutes
Measurement thermal drift	: 100PPM/°C
Measuring thermal drift between channels	: 30PPM/°C
PC-2200 equiped with HBT-LVDT-CAP probes Measuring accuracy at 20°C / *68°F* Resolution = 0.1 µm / *.00001"*	: +/- 0.5% +/- Resolution
PC-2200 equiped with Air System in the nominal conditions Working range	: +/- 50µm / *.002"*

Interfaces :

Analog **OUTPUT**

Range	: ± 5.0V F.S.
Full scale accuracy:	: 2% of full scale

Serial OUTPUT (RS 232)

Type	: RS 232 C
Transmission speed (Baud rate)	: 4800, 9600, 19200
Word length	: 7 ou 8
Parity control	: NONE, EVEN, ODD

DC-OUT Photo couplers

Maximal Voltage	: 30V
Maximal Tension	: 60mA

Weight and Dimensions :

Column

Dimensions (height * width * depth)	: 450 * 57 * 215mm / *17.7"*2.16"*8.66"*
Weight	: 4.12 kg

1.3 COLUMN DESCRIPTION

Front View

Bar scale

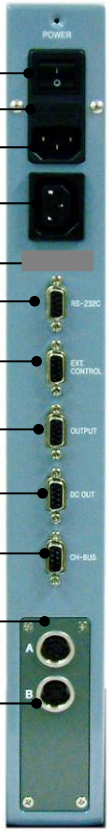
3-color LED-bar (103)

Display (LED) (8 chr.)

Status panel 12 (LED)

Keypad 9 Keys

Rear View



ON-OFF Switch

Fuse 2A

AC power line input

Auxiliary power line (for other column)

Identification and serial numbers

RS 232 C Interface

External Control Interface

OUTPUT Interface (class)

DC OUT Interface (V)

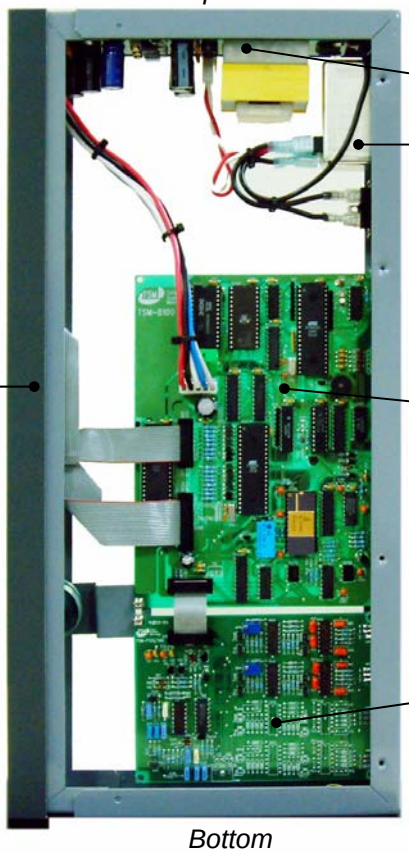
CH-BUS Interface (signal transfer)

Identification analog board

analog board for (HBT, LVDT,CAPACITIVE,AIR)

Internal View

Top



DC Power PCB

Noise filter module

Display (PCB)

Main board PCB

Front

Rear

Analog board PCB

Bottom

1.4 KEYPAD CONFIGURATION

Move upward
Measuring mode
Select M1, M2, M3, M4
Programming mode
Used to move from a specific menu to other menu, or to increase the values when setting the values of variables.

Program
Measuring mode
Access to the programming mode
Programming mode
no function

Escape
Measuring mode
Initialization of dynamic mode
Programming mode
Escape to previous menu.

Move left
Measuring mode
send data
Programming mode
Used to move from a specific menu to other or move the selected LED to the next left LED

Move right
Measuring mode
no function
Programming mode
Used to move from a specific menu to other or move the selected LED to the next right LED

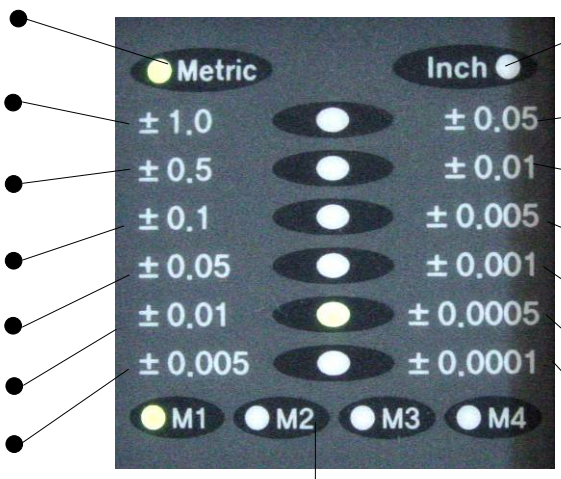
Move downward
Measuring mode
no function
Programming mode
Used to move from a specific menu to other menu, or to decrease the values when setting the values of variables.

Calibration
Measuring mode
Calibration functions
Programming mode
no functions

Preset
Measuring mode
Used to set the current measured values to 0 or pre-selected values
Programming mode
no function

Enter
Measuring mode
Instrument OFF
Enter + ON = **Reset**
Programming mode
Used to select the current menu or to set values of variables

1.5 STATUS PANEL



Metric display (mm)

Range
±1000µm / ±1 mm

Range
±500µm / ±0.5 mm

Range
±100µm / ±0.1 mm

Range
±50µm / ±0.050 mm

Range
±10µm / ±0.01 mm

Range
±5µm / ±0.005 mm

Inch display

Range
± 0.05 inch

Range
± 0.01 inch

Range
± 0.005 inch

Range
± 0.001 inch

Range
± 0.0005 inch

Range
± 0.0001 inch

Measure number

Chapter 2 : Installation

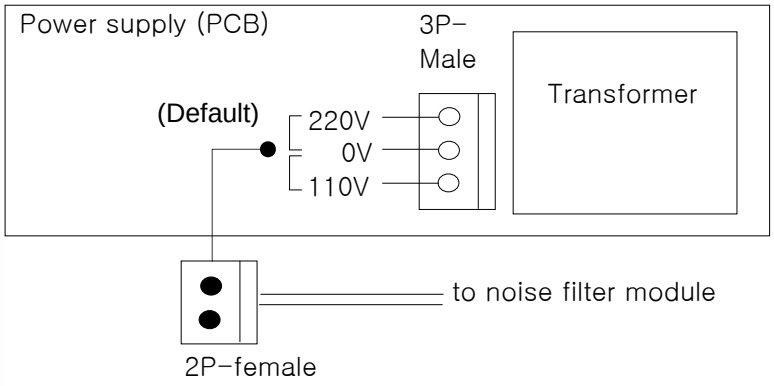
2.1 MECHANICAL INSTALLATION

Fix the column on the aluminum base and lock it with the 2 screws (M6 x16)
Connect the power supply cable (**A**) .
Connect the probe cable to the analog board (**B**)
Switch (**ON**) I.

2.2 ELECTRICAL INSTALLATION

Switching the Voltage from 230V to 110V.

Remove the cover by unscrewing the 8 screws.
Move the connector A on 110V.



Chapter 3 : HOW TO USE IT

3.1 SWITCHING ON THE COLUMN

To start the first time, we advise to make a general **RESET** .

Press Enter + **ON** simultaneously, T S M - C O R P ⇨ R E S E T ⇨ - 1 . 0 4 0 0

Do not release your pressure on Enter before the message RESET appears on the display, then a test program will start.

The default parameters are :

CHANNEL : Source : **Ext.** - **CH-A** Ratio :**1.000** Direc. **+**
MEASURE : **M1** – Bar :**Bottom** B.fact. **1.00** – Range : ± **1.0**mm Sens : **1.000** Resol.:**0.001**mm – Func: **A –** Mode: **STATIC**
SPEC. : M1 – NOMI. **000.0000** - -TOLER **–0.8000** - +TOLER **+0.8000** –APPROCH **–0.8000** + APPROCH : **+0.8000**
MASTER : M1 - -MASTER **+00.0000** +MASTER **+00.0000**
CLASS : **OFF**
RS232 : SPEED **9600**, DATA **8**, PARITY **N**, TERM **CRLF**, RTS **ON**, PRINT **BRIEF**, RSMODE **PRINT** ID NO. **000**
ETC : GENERAL UNIT **METRIC**, DISPLAY **mm**, INPUT **HBT**, P/W PROGRAM **0000**, CALIBR **OFF** AVERAGE BAR **003**, DIGIT **003**, A/D **10** VERSION **V2.00**

The above parameters are the default values so , it is necessary to modify the values according to your application.

Description of functions per menu.

CHANNEL : Select the source and the probes used with ratio and measuring direction.

MEASURE : Select the starting position of the bar, Bar factor, Range of the Bar, Resolution of the digital display. Combination of probes, Static or Dynamic measuring mode.

SPEC. : Store the nominal size, the upper tolerance, the lower tolerance, the upper warning limit, the lower warning limit of the component to be measured.

MASTER : Store the lower master value and the upper master value used.

CLASS : Active the classification mode, class number, starting value, class range.

RS232 : Select the transmission speed, word length, parity control, end of characters, request to send signal, printing mode, simplex or duplex mode, identity number.

ETC
GENERAL : Select the unit (mm or inch), type of display (mm or um), type of probes used, program and calibration password.

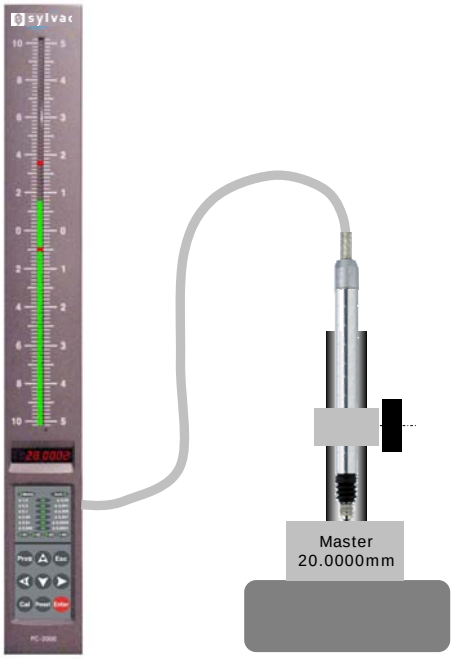
AVERAGE : Select the bar sensitivity , the display sensitivity, the analog board sensitivity.

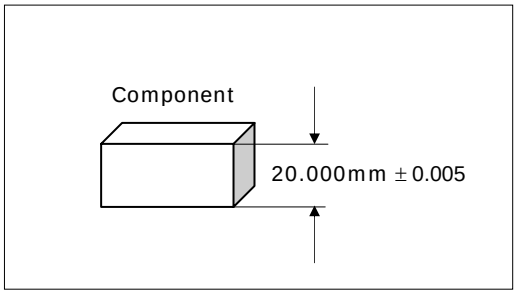
VERSION : Show the software version.

3.2 PROGRAMMING A SIMPLE MEASURE

Example N°1

Measure a component with a HBT probe connected to channel A.



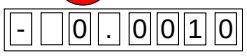


USING a HBT probe, we do not use the calibration, this mode will be explained in a subsequent chapter.

Step n°1 is to place the probe into a correct position to be able to get the maximum range and the minimum deviation.

Place the master 20.0000 mm on the stand, place the probe into position.

Press simultaneously  

Move the probe down to the electro-mechanical zero,  then,

approximately stop around zero, lock the probe . Press  to escape to the measuring mode.

Parameters to be changed for exemple number 1

MEASURE : **M1** –Range : ***±0.01****mm* Resol.:***0.0002****mm* –

SPEC. : M1 – NOMI. ***020.0000*** - -TOLER ***–0.0050*** - +TOLER ***+0.0050*** –APPROCH ***–0.0040***
+ APPROCH : ***+0.0040***

3.3 PROGRAMMING A PART (EXAMPLE 1)

Press Prog (2 sec) P/W 0000 Enter CHANNEL ▶ MEASURE Enter

M1 Enter SELECT ▶ BAR ▶ B.FACT ▶

RANGE Enter ±1.0 ▼ ±0.5 ▼ ±0.1 ▼

±0.05 ▼ ±0.01 ▼ ±0.005 Enter RANGE ▶

SENS. ▶ RESOL. Enter 0.0001 ▼ 0.0005 ▼

0.0002 Enter RESOL. Esc M1 Esc MEASURE ▶

SPEC. Enter M1 Enter NOMI. Enter 000.0000

S M ▶ ▼ 020.0000 Enter NOMI. ▶ -TOLER Enter

-0.8000 S M ▶ ▼ -0.0050 Enter -TOLER ▶

+TOLER Enter +0.8000 S M ▶ ▼ +0.0050 Enter

+TOLER ▶ -APPRO Enter -0.8000 S M ▶ ▼

-0.0040 Enter -APPRO ▶ +APPRO Enter +0.8000

S M ▶ ▼ +0.0040 Enter Esc M1 Esc SPEC. ▶

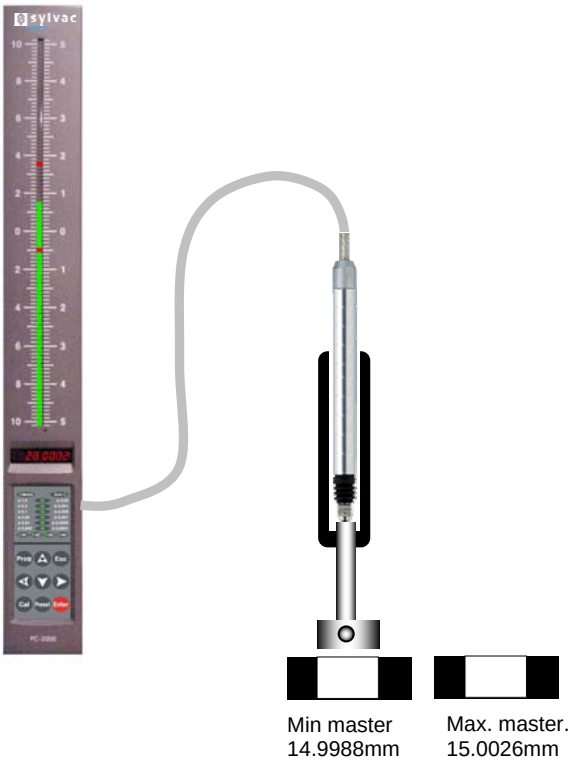
Esc SAVE? Enter

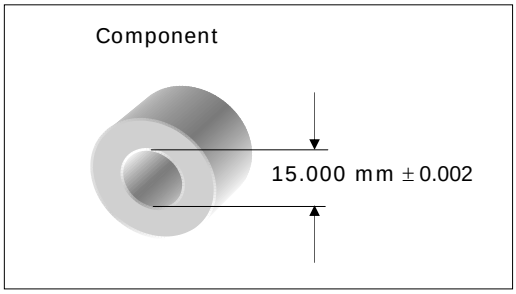
Place the master 20.0000mm in contact with the probe then press Preset PRESET ▶ Enter

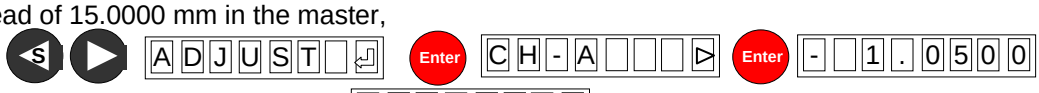
The warning limit should be smaller then the tolerance.

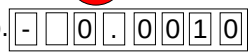
3.4 PROGRAMMING A DIAMETER

Measurement of a diameter with a HBT probe connected to channel **A**.





Step n°1 is to place the probe into is location to be able to get the maximum range and the minimum deviation.
Place the measuring head of 15.0000 mm in the master,
Press simultaneously 

Move the probe down to the electro-mechanical zero. 

then,

approximately stop around zero, lock the probe . Press 

to escape to the measuring mode.

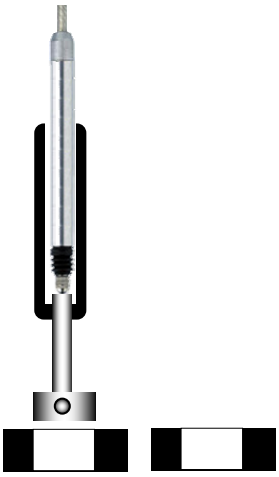
Parameters to be changed for exemple number 2

CHANNEL : Direc. **-**
MEASURE : **M1** –Range : ***±0.005*** *mm* Resol.: ***0.0001****mm* –

SPEC. : M1 – NOMI. ***015.0000*** - -TOLER ***–0.0020*** - +TOLER ***+0.0020*** –APPROCH ***–0.0016***
+ APPROCH : ***+0.0016***
MASTER : **M1** - -Master : **14.9988mm** - +Master : **15.0026mm**

3.5 PROGRAMMING A PART (EXAMPLE 2)

The Calibration
Example N°2
The parameters are now stored. The automatic calibration can be started.



Cal CAL..M1▷ Enter CAL.___ place the measuring head in the lower master. Enter

CAL.___ place the measuring head in the upper master. Enter ___0.981

The sensitivity is calculated automatically.

If the message MIN OVER appears, that means that the value between the two masters is bigger then the calculated value.

Cal CAL..M1▷ ▶ MODULE◁▷ Enter M1_____▷ Enter CAL%___◁ ▶

VALUE__◁ Enter ____000%

NONE : All sensitivity values are allowed.
000% : The sensitivity value will not be accepted if the calculated value during the calibration is different of the stored value.

XXX% : The sensitivity value will not be accepted if the calculated value during the calibration is different of XXX% of the stored value.

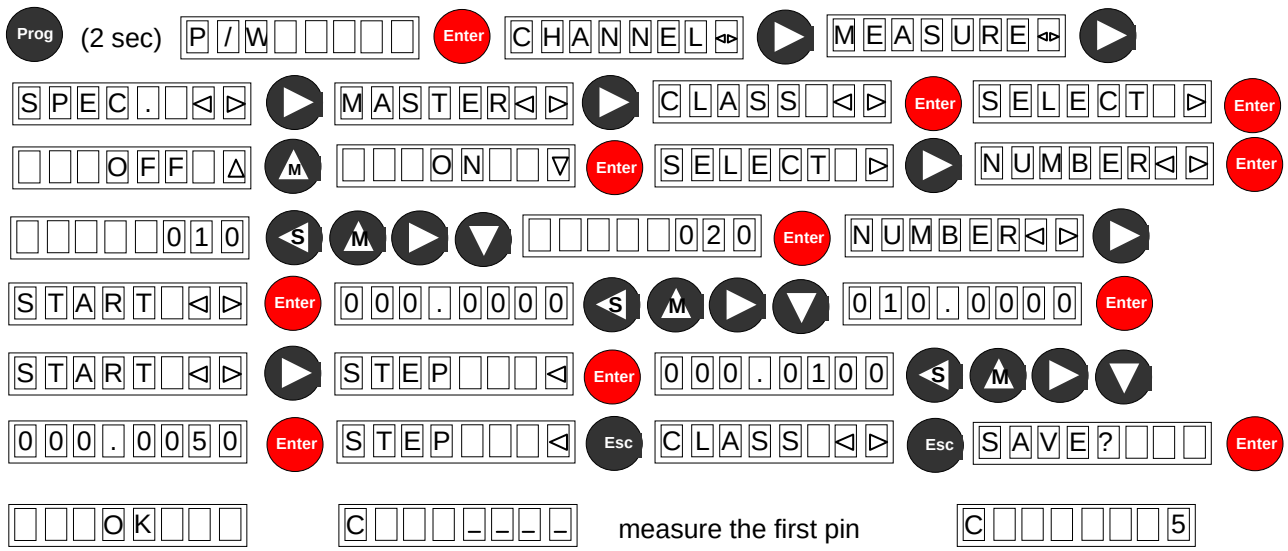
After the calibration the measurement can start.

3.6 THE CLASSIFICATION MENU

CLASS

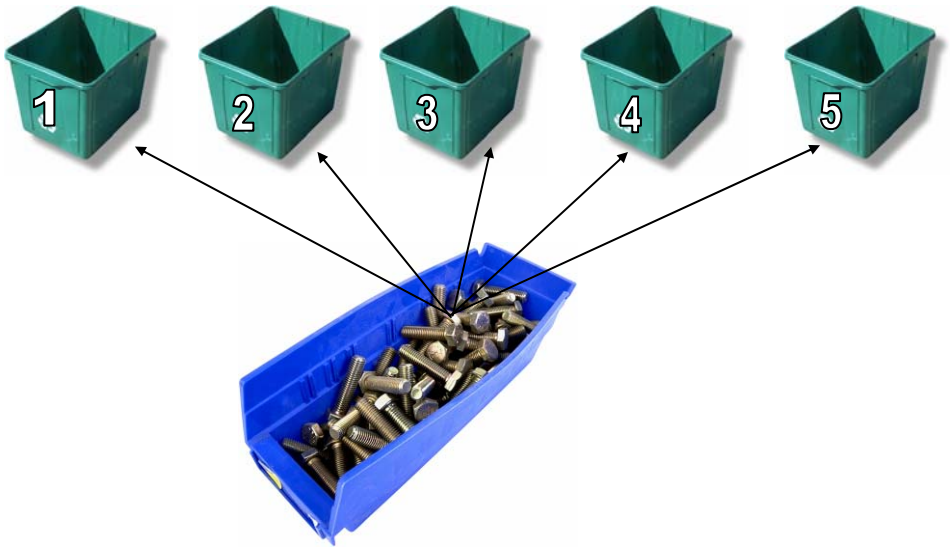
The class menu is use separately.

Example : Pin dia. 10mm - 0 +0.100mm to be classify by steps of 0.005mm , in 20 classes, starting from 10.0000 mm.



The first pin will be classify into class 5, the printed value will be between 10.025 and 10.030 mm

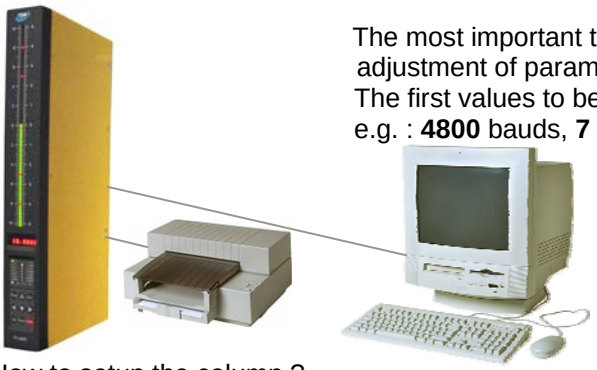
To escape from the Class menu, SELECT. **OFF**



3.7 THE RS232 INTERFACE

The RS 232 Interface allow to send the data to a printer, as well to a PC, also allow to modify the stored parameters in the column with the help of the communicator software.

How to connect a PC-2200 to a **serial** printer.



The most important to connect a column to a printer or a computer are the adjustment of parameters.
The first values to be known are the serial printer parameters.
e.g. : **4800** bauds, **7** bits, parity **even**.

How to setup the column ?

Prog (2 sec.) P/W 0000 Enter CHANNEL ▶ MEASURE ▶

SPEC. ▶ MASTER ▶ CLASS ▶ RS232 Enter

SPEED Enter 9600 M 4800 Enter SPEED ▶

DATA Enter 8 M 7 Enter DATA ▶

PARITY Enter NONE M EVEN Enter PARITY ▶

TERM Enter CR M CRLF Enter TERM ▶

RTS Enter ON ▼ OFF Enter RTS ▶

PRINT Enter BRIEF ▼ FULL Enter PRINT ▶

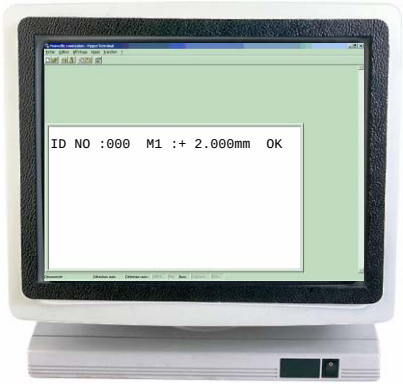
RSMODE Enter PRINT Enter RSMODE ▶

ID NO. Enter 000 Enter ID NO. Esc RS232 Esc

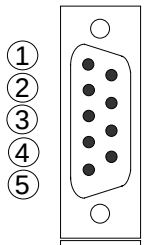
SAVE ? Enter 2.0000

Press S SEND ...

```
ID NO :000  M1 :+ 2.000mm  OK
```



3.8 LAYOUT OF IN/OUTPUT



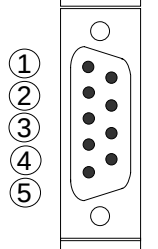
RS-232 C

Pin#	Functions
1	* (not connected)
2	Rxd
3	Txd
4	Vcc
5	Gnd
6	* (not connected)
7	Rts
8	Cts
9	Gnd

(*Connection of a serial printer or a PC*)

In the case of RS232-RS mode is set as "**PRINT**", the display value is printed via the RS232 by connecting the pins #1,9 of external control..

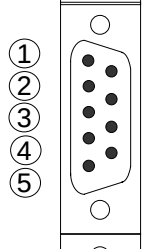
If the RS 232-RS mode is set as « **HOST** », the communication become (duplex) and allow to use the communicator software.



EXT.CON

Pin#	Functions
1	RS 232 sortie (0.5 sec.)
2	Current value display
3	Dynamic/Static
4	M1->M2->M3->M4
5	Hold measure
6	* (not connected)
7	* (not connected)
8	* (not connected)
9	Gnd

The external control functions can be activate by connecting the pins les pôles #1 à 5 to the pin #9(GND) according to the required function.
The following functions can be activated by connecting the pin #9 to pin # (foot pedal, box)
#1)Print the display value. #2) Change dynamic mode to static mode
#3) reset the dynamic mode (min.,max.) #4) Move the measurement mode (M1) to M2,……
M2,M3,M4 should be active. (ON)
#5) Freeze the displayed value.
Active the preset mode by connecting the pin #3 and #4 simultaneously



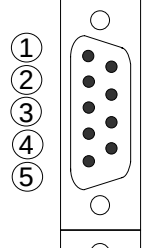
OUTPUT

Pin#	Functions
1	O.K (Green)
2	* (not connected)
3	Approch + (Orange)
4	+N.G (Red)
5	* (not connected)
6	Approch – (Orange)
7	-N.G (Red)
8	Drive Voltage
9	Gnd

Active the contact with GND pin#9 when the value of the bar is positioned in the corresponding range pins #1, 3, 4, 6, 7) .

This application show if the product is acceptable or not with an external unit such as lamps, relays, by powering the pins #8,9.

The power supply stops when the class menu is OFF.

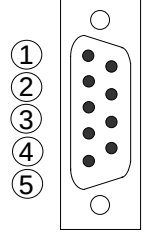


DC OUT

Pin#	Functions
1	D/A sortie
2	* (not connected)
3	* (not connected)
4	* (not connected)
5	* (not connected)
6	* (not connected)
7	* (not connected)
8	* (not connected)
9	Gnd

Analog output of the display (Signal Voltage (pin #1 and #9).

The voltage range is : ±4.3V with ±1 mm, or ±0.05 inch

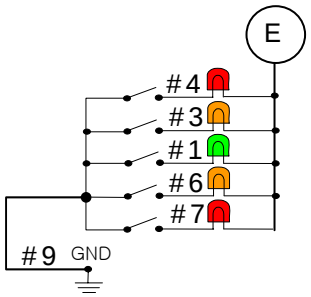


CH-BUS

Pin#	Functions
1	Ex-A
2	Ex-B
3	Ex-C
4	Ex-D
5	Gnd
6	* (not connected)
7	* (not connected)
8	* (not connected)
9	Gnd

This function is used when the signal of a probe should we shifted to a second column.
Application : Example : Display a maximum value on 1 column and a minimum value to the other column with only one probe..
The analog board of the importing value column should be disconnected,

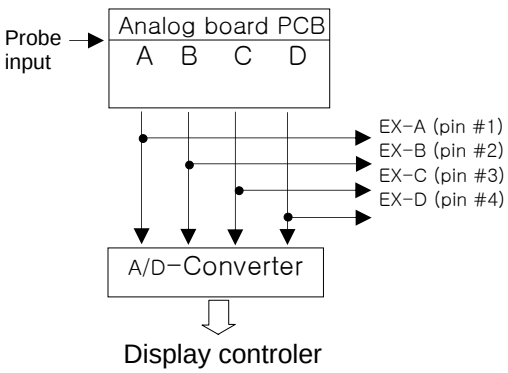
Circuit connection diagram (OUTPUT)



Red (bigger value then TOLER+)
Orange (Value between APPRO+ and TOLER+)
Green (Value between APPRO− and APPRO+)
Orange (Value between APPRO− and TOLER−)
Red (smaller value then TOLER−)

E= External voltage

CH-Bus diagram



Chapter 4 Functions

Definition of keypad functions per menu

4.1 THE MEASURING MODE FUNCTIONS

			Functions	Functions
Prog		Access to programming mode		
M		« M »Change the measure number (M1-M2) only if M2,M3,M4 (**ON**)	M1-M2-M3-M4	
Esc				
S		« S » send the displayed value to RS232		
▼		No function in measuring mode		
▶		No function in measuring mode		
Enter		Simultaneously when switching (**ON**)	RESET	
Preset	Preset Value M1 00.0000	Access to preset mode	PRESET	Maximum +/- 0.999mm
Cal	Calibration Module M1, M2, M3,M4 CAL%	Cal. Min__ et Max__ Cal. by measure M1, M2, M3, M4 NONE, Value 000%		

4.2 THE PROGRAMMING MODE FUNCTIONS

	Menu	Sub-menu	Functions	Functions	Functions	Functions
Prog	**CHANNEL**	SOURCE	***EXT.*** ***CH-BUS***			
		CH-A	RATIO	***1.000***	DIRECT	**+ / -**
		CH-B	RATIO	***1.000***	DIRECT	**+ / -**
		CH-C	RATIO	***1.000***	DIRECT	**+ / -**
		CH-D	RATIO	***1.000***	DIRECT	**+ / -**

SOURCE : **EXT**. Select the source of the probe on the analog board on this column.
CH-BUS. Select the source of the probe from another column thru the CH-BUS.
CH-A : Select the ration value and measuring direction for the channel A.
CH-B : Select the ration value and measuring direction for the channel B.
CH-C : Select the ration value and measuring direction for the channel C.
CH-D : Select the ration value and measuring direction for the channel D.

	Menu	Sub-menu	Functions	Functions	Functions
Prog	**MEASURE**	M1	ON	BAR B. FACT RANGE SENS. RESOL. FUNC MODE ……	***BOTTOM,CENTER,-10->0*** ***1.00*** ***±1.0, ±0.5, ±0.1, ±0.05, ±0.01, ±0.005*** **1.000** ***0.01,0.005,0.001,0.0005,0.0002,0.0001*** ***A,B,C,D,A+B,C+D,(A+B)-C,(A+B+C)/3*** ***(A+B+C+D)/4,(A+B)-(C+D)*** ***STATIC,MAXIMUM,MINIMUM,*** ***(M+m)/2,(M-m)/2,M-m.***
		M2, M3, M4	ON/OFF		

M1,M… : Select the characteristics of the measuring result M1, it is possible to store 4 different measuring results (M1,M2,M3,M4). M2,M3,M4 should be (**ON**)
BAR : Select the starting position of the LED-bar, (BOTTOM) start from bottom, (CENTER) start from center, (-10->0) start from an excentred position in case of being out of range with the LED – bar.
B.FACT : Bar multiplication factor, giving the possibility of adjusting several column at the same level.
RANGE : Select the measuring range.
SENS : Calculated sensitivity value after calibration.
RESOL : Select the measuring resolution..
FUNC : Select the setting of measurement.
MODE : Select the dynamic or static mode

	Menu	Sub-menu	Functions	Functions	Functions
Prog	**SPEC.**	M1		NOMI. -TOLER +TOLER -APPRO +APPRO	***000.000*** ***-0.8000*** ***+0.8000*** ***-0.8000*** ***+0.8000***
		M2		……	****…****

M1,M.. : Store in measurement number 1, 2, 3, 4.
NOMI. : Store the nominal size
-TOLER : Store the lower tolerance.
+TOLER : Store the upper tolerance.
-APPRO : Store the lower warning limit.
+APPRO :Store the upper warning limit.

Prog	Menu	Sub-menu	Functions	Functions	Functions
	MASTER	M1	-MASTER +MASTER		***+000.0000*** ***+000.0000***
		M2	…..		…….

M1,M… : Store in measurement number 1, 2, 3, 4.
-MASTER : Store the lower master value.
+MASTER :Store the upper master value.

	Menu	Sub-menu	Functions	Functions	Functions
Prog	**CLASS**	Select	ON/OFF	NUMBER START STEP	***000*** ***+00.0000*** ***0.0000***

CLASS : Switch ON or OFF the class menu.
NUMBER : Store the number of classes to be used.
START : Store the starting nominal value
STEP : Store the step value of the class.

	Menu	Sub-menu	Functions	Functions	Functions
Prog	**RS232**	SPEED DATA PARITY TERM RTS PRINT RSMODE ID NO.			***4800,9600,19200 BAUDS*** ***7,8 Bits*** ***NONE, ODD,EVEN*** ***CRLF / CR*** ***ON / OFF*** ***BRIEF / FULL*** ***PRINT /HOST*** ***000***

SPEED : Select the transmission speed .
DATA :Select the word length.
PARITY : Select the parity control : none, even, odd
TERM : Select the end characters : CR, CRLF
RTS : (Request to Send) request to send a signal
PRINT : Select the printing mode (BRIEF) send the minimum data, (FULL) send a complete protocol.
RS232 : Select the RS232 Interface in mode PRINT(Simplex) or HOST (Duplex)
ID NO : Store an identity number.

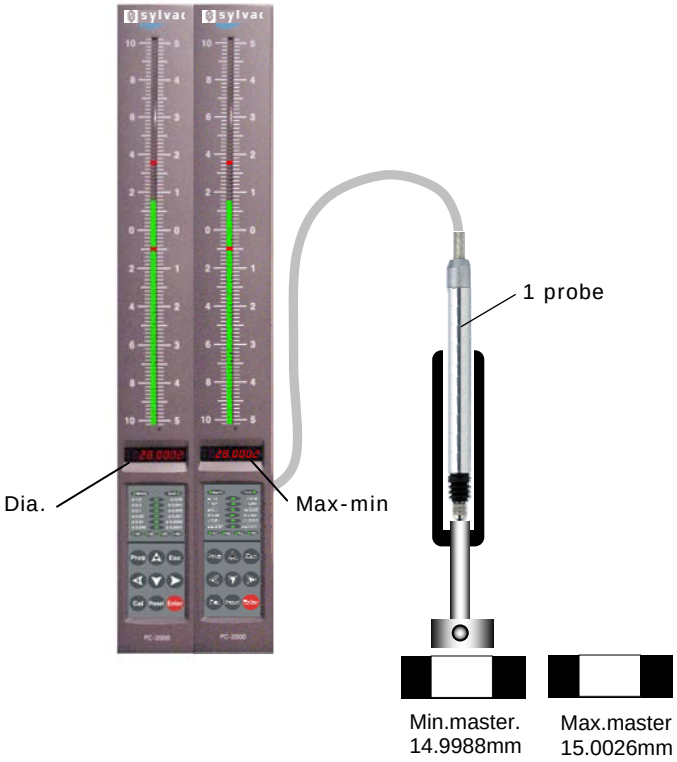
	Menu	Sub-menu	Functions	Functions	Functions
Prog	**ETC**	GENERAL	UNIT DISPLAY INPUT P/W	 PROGRAM CALIBR.	***METRIC, INCH*** ***mm ou um*** ***HBT,LVDT,CAP,AIR*** ***0000*** ***ON/OFF 0000***
		AVERAGE	BAR DIGIT A/D		***003*** ***005*** ***10***
		VERSION			***V 2.00 TMI***

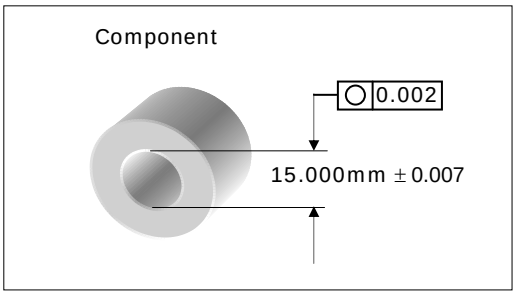
GENERAL : Select the measuring unit, select the display (mm or um), select the analog board used, store a PROGRAM password and a CALIBRATION password.
AVERAGE : BAR, Store a filter for the bar.
DIGIT, Store a filter for the digital display.
A/D, Store a filter for analog/digital converter.
VERSION : Show the software version.

4.3 CH-BUS APPLICATIONS

The CH-BUS channel transfer a signal to another column.

Application.

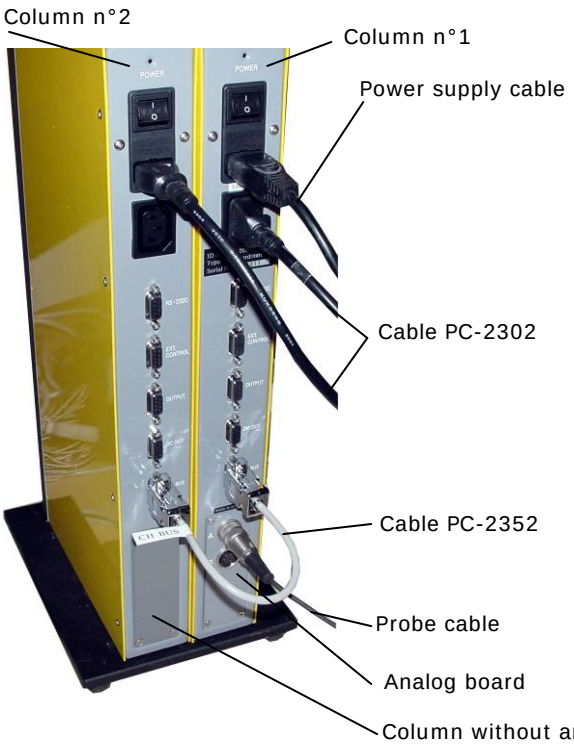




We need to see 2 values simultaneously.

1. Diameter 15.0000mm
2. max T.I.R 0.002mm

4.4 CH-BUS MECHANICAL INSTALLATION

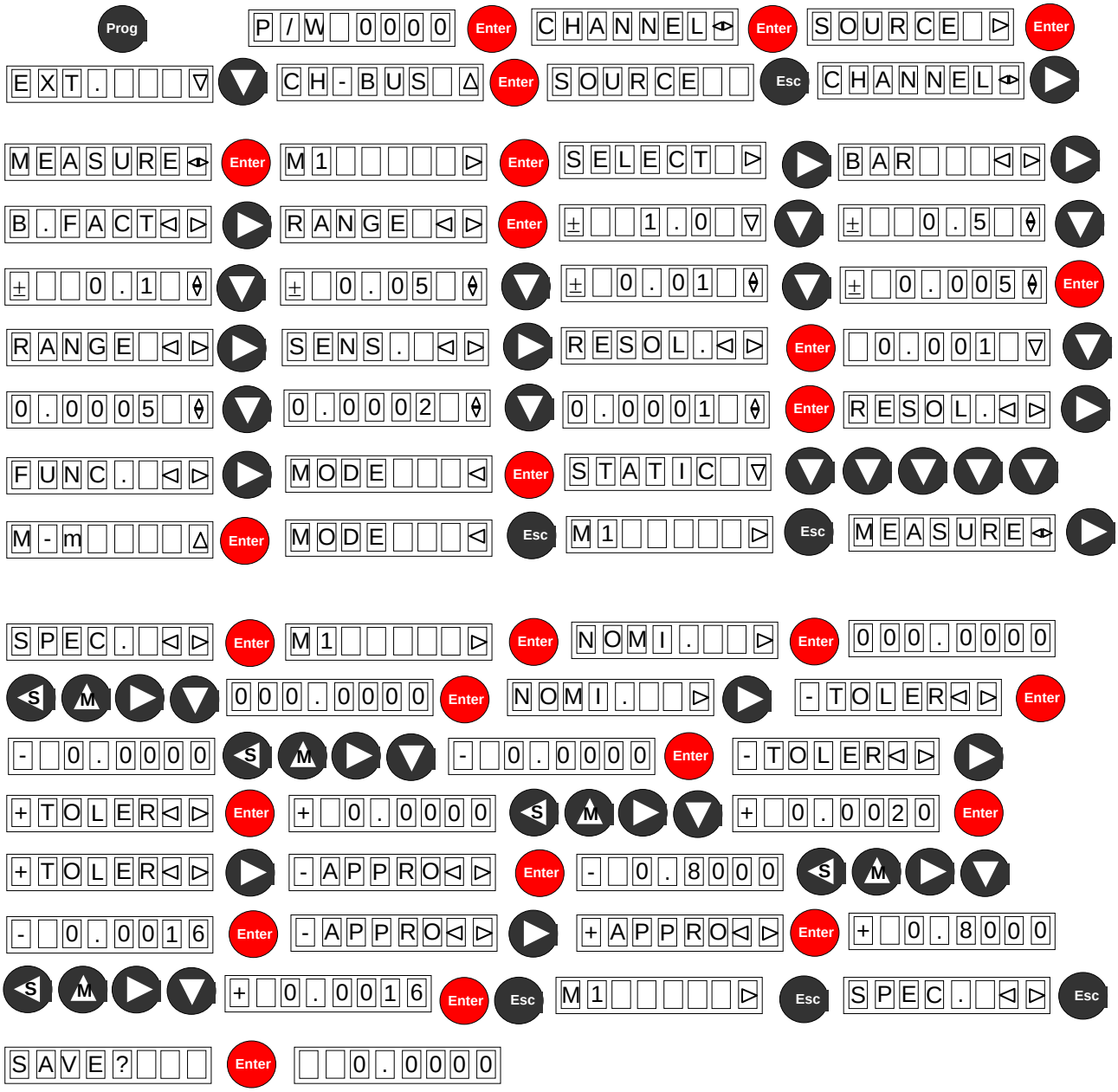


The receptive column should have the analog board removed.

4.5 PROGRAMMING THE CH-BUS

The column n°1 should be programmed like example n°2 to page n°15

Programming column n°2



Column n°1	Column n°2
15.0000	00.0000
Diameter 15.0000 mm	T.I.R 0.0020 mm

Chapter 5 PNEUMATIC INSTALLATION

Hose nipple for the air probe.

1. Fix the column and the converter on the aluminum base
2. Fix the hose of the air probe to nipple of converter.

air supply hose nipple

Connection cable PC-2332.

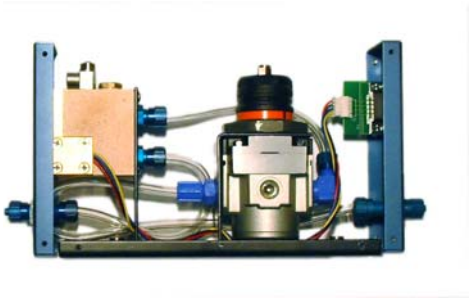
3. Connect the cable PC-2332 between the converter and the analog board.
4. Connect the air supply to the hose nipple on the converter.

Open the air pressure up to minimum 3 bars.

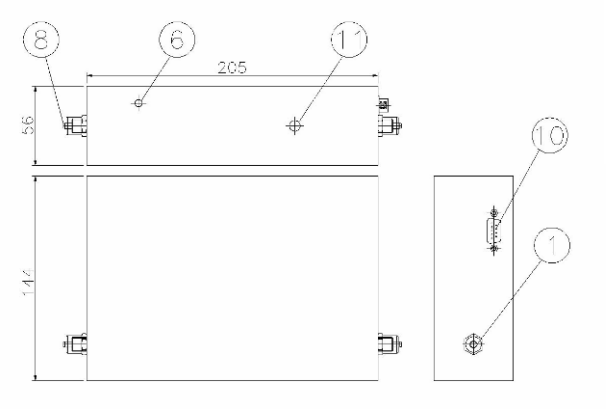
5.1 THE A/D CONVERTER

< Front View>

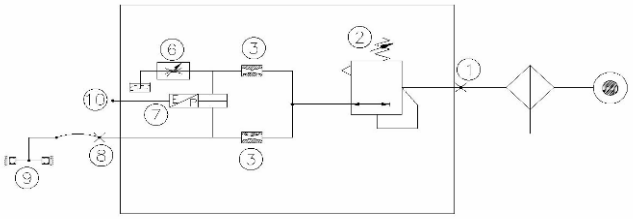
<Rear View>



<Internal View>



(View)



(Diagram)

Pressure source

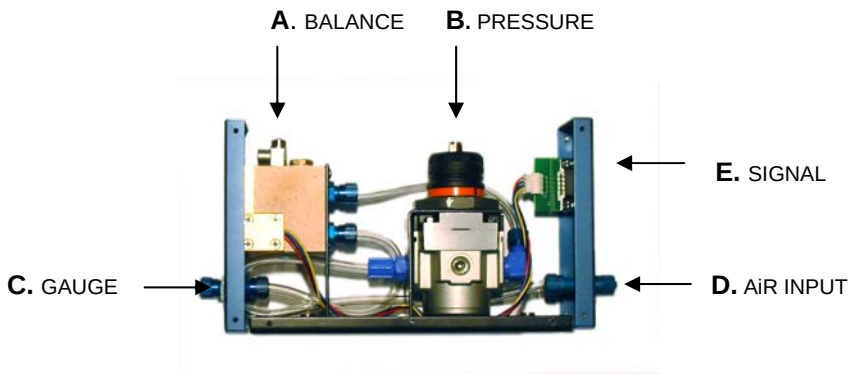
Filter

Connection

(2) Pressure regulator
(3) Preliminary nozzles
(6) Measurring adjustment nozzles (Measurring zero setting)
(7) Pressure transducer
(9) Measurring head.
(10) Connector (9–pin)
(11) Pressure setting hole

The programming procedure is similar to an electronic probe.

5.2 How to adjust the converter



It is necessary to adjust the converter for an optimal use

1) Pressure adjustment (STANDARD : 2 +/- 0.1 bar)

- Connect the gauge « C »
- Connect the air input « D » (Min. 3 bar)
- Adjust the pressure by turning the screw « B ».

The pressure by default is 2 bars (Factory setting)

- Connect the converter and the column with the cable (904-2332)
- Connect the gauge « C »
- Disconnect the pressure « D ».
- Press the PRESET key « 0.0000 ».
- Place the plug gauge into the min master
- Connect again the air input « D » (3 bars min.)
- Adjust the screw A

Example : Master value Min : -0.020mm

Displayed value : -0.020 mm

In the case of a bad adjustment, the measuring range can be smaller.

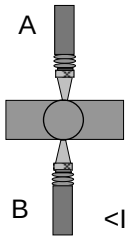
Chapter 6 GENERAL INITIALIZATION

(1) Function: Initialize all stored data to the default values. **CAUTION** : All your stored data will be erased. Press Enter + **ON**

6.1 TABLE OF DEFAULT VALUES

Menu	Sub-menu	Selection	Functions	Choice	Default value
CHANNEL	SOURCE	EXT.			**EXT.**
		CH-BUS			
		CH-A	RATIO	0 - 5.000	**1.000**
			DIREC.	+ / -	**+**
		CH-B	RATIO	0 - 5.000	**1.000**
			DIREC.	+ / -	**+**
		CH-C	RATIO	0 - 5.000	**1.000**
			DIREC.	+ / -	**+**
		CH-D	RATIO	0 - 5.000	**1.000**
			DIREC.	+ / -	**+**
MEASURE	M1	SELECT	ON		**ON**
			BAR	BOTTOM CENTER -10->0	**BOTTOM**
			B.FACT	-5.00 / +5.00	**1.00**
			RANGE	± 1.0mm ± 0.5mm ± 0.1mm ± 0.05mm ± 0.01mm ± 0.005mm	**± 1.0mm**
			SENS.	Valeur calculée après étalonnage	**1.000**
			RESOL.	0.01, 0.005, 0.001, 0.0005, 0.0002, 0.0001	**0.001**
			FUNC	A, B, C, D, A+B, C+D, (A+B)-C, (A+B+C)/3, (A+B+C+D)/4 (A+B)-(C+D)	**A**
			MODE	STATIC, MAXIMUM, MINIMUM,(M+m)/2, (M-m)/2, M-m	**STATIC**
SPEC.	M1	NOMI.	000.0000		**000.000**
		-TOLER.	-0.8000		**-0.8000**
		+TOLER	+0.0000		**+0.8000**
		-APPRO	-0.0000		**-0.8000**
		+APPRO	+0.0000		**+0.8000**
MASTER	M1	-MASTER	+00.0000		**+00.0000**
		+MASTER	+00.0000		**+00.0000**
CLASS	SELECT	OFF / ON			**OFF**
		NUMBER	1 - 100		**010**
		START	+00.0000		**+00.0000**
		STEP	0.0000		**0.0100**
RS232		SPEED	19200, 9600, 4800		**9600**
		DATA	7, 8		**8**
		PARITY	None,even,Odd		**None**
		TERM	CR,CRLF		**CRLF**
		RTS	ON / OFF		**ON**
		PRINT	BRIEF, FULL		**BRIEF**
		RSMODE	PRINT,HOST		**PRINT**
		ID NO.	000		**000**
ETC	GENERAL	UNIT	METRIC,INCH		**METRIC**
		DISPLAY	mm, um		**mm**
		INPUT	HBT,LVDT,CAP,AIR		**HBT**
		P/W	PROGRAM		**0000**
			CALIBR.	ON/OFF	**OFF**
	AVERAGE	BAR	000		**003**
		DIGIT	000		**003**
		A/D	00		**10**
	VERSION				**V2.00**

6.2 APPLICATION EXAMPLES
6.3 DIAMETER/THICKNESS



<Initialisation>

<Specification of the measure>

External diameter : 10.000 mm
Lower tolerance : - 20µm
Upper tolerance: +20µm
Lower warning limit: - 15µm
Upper warning limit: +15µm
Lower master : 9.980 mm
Upper master : 10.020 mm
Unit : mm

Menu	Sub-menu	Selection	Function	Choice	Values
CHANNEL	SOURCE	EXT.			EXT.
		CH-BUS			
		CH-A	RATIO	0 - 5.000	1.000
			DIREC.	+ / -	**+**
		CH-B	RATIO	0 - 5.000	1.000
			DIREC.	+ / -	**+**
		CH-C	RATIO	0 - 5.000	1.000
			DIREC.	+ / -	+
		CH-D	RATIO	0 - 5.000	1.000
			DIREC.	+ / -	+
MEASURE	M1	SELECT	ON		ON
			BAR	BOTTOM CENTER -10->0	**CENTER**
			B.FACT	-5.00 / +5.00	1.00
			RANGE	± 1.0mm ± 0.5mm ± 0.1mm ± 0.05mm ± 0.01mm ± 0.005mm	**± 0.05mm**
			SENS.	Valeur calculée après étalonnage	1.000
			RESOL.	0.01, 0.005, 0.001, 0.0005, 0.0002, 0.0001	0.001
			FUNC	A, B, C, D, A+B, C+D, (A+B)-C, (A+B+C)/3, (A+B+C+D)/4 (A+B)-(C+D)	**A+B**
			MODE	STATIC, MAXIMUM, MINIMUM,(M+m)/2, (M-m)/2, M-m	STATIC
SPEC.	M1	NOMI.	000.0000		**010.000**
		-TOLER.	-0.8000		**-0.0200**
		+TOLER	+0.0000		**+0.0200**
		-APPRO	-0.0000		**-0.0150**
		+APPRO	+0.0000		**+0.0150**
MASTER	M1	-MASTER	+00.0000		**+9.9800**
		+MASTER	+00.0000		**+10.0200**
CLASS	SELECT	OFF / ON			OFF
		NUMBER	1 - 100		010
		START	+00.0000		+00.0000
		STEP	0.0000		0.0100
RS232		SPEED	19200, 9600, 4800		9600
		DATA	7, 8		8
		PARITY	None,even,Odd		None
		TERM	CR,CRLF		CRLF
		RTS	ON / OFF		ON
		PRINT	BRIEF, FULL		BRIEF
		RSMODE	PRINT,HOST		PRINT
		ID NO.	000		000
ETC	GENERAL	UNIT	METRIC,INCH		METRIC
		DISPLAY	mm, um		mm
		INPUT	HBT,LVDT,CAP,AIR		HBT
		P/W	PROGRAM		0000
			CALIBR.	ON/OFF	OFF
	AVERAGE	BAR	000		003
		DIGIT	000		003
		A/D	00		10
	VERSION				V2.00

6.4 BLANK SETTING SHEET

Application

<Specification of the measure>

Nominal size :
Lower tolerance:
Upper tolerance:
Lower warning limit:
Upper warning limit:
Lower master :
Upper master:
Unit : mm

<Initialisation>

Menu	Sub-menu	Selection	Function	Choice	Values
CHANNEL	SOURCE	EXT.			
		CH-BUS			
		CH-A	RATIO	0 - 5.000	
			DIREC.	+ / -	
		CH-B	RATIO	0 - 5.000	
			DIREC.	+ / -	
		CH-C	RATIO	0 - 5.000	
			DIREC.	+ / -	
		CH-D	RATIO	0 - 5.000	
			DIREC.	+ / -	
MEASURE	M1	SELECT	ON		
			BAR	BOTTOM CENTER -10->0	
			B.FACT	-5.00 / +5.00	
			RANGE	± 1.0mm ± 0.5mm ± 0.1mm ± 0.05mm ± 0.01mm ± 0.005mm	
			SENS.	Valeur calculée après étalonnage	
			RESOL.	0.01, 0.005, 0.001, 0.0005, 0.0002, 0.0001	
			FUNC	A, B, C, D, A+B, C+D, (A+B)-C, (A+B+C)/3, (A+B+C+D)/4 (A+B)-(C+D)	
			MODE	STATIC, MAXIMUM, MINIMUM,(M+m)/2, (M-m)/2, M-m	
SPEC.	M1	NOMI.	000.0000		
		-TOLER.	-0.8000		
		+TOLER	+0.0000		
		-APPRO	-0.0000		
		+APPRO	+0.0000		
MASTER	M1	-MASTER	+00.0000		
		+MASTER	+00.0000		
CLASS	SELECT	OFF / ON			
		NUMBER	1 - 100		
		START	+00.0000		
		STEP	0.0000		
RS232		SPEED	19200, 9600, 4800		
		DATA	7, 8		
		PARITY	None,even,Odd		
		TERM	CR,CRLF		
		RTS	ON / OFF		
		PRINT	BRIEF, FULL		
		RSMODE	PRINT,HOST		
		ID NO.	000		
ETC	GENERAL	UNIT	METRIC,INCH		
		DISPLAY	mm, um		
		INPUT	HBT,LVDT,CAP,AIR		
		P/W	PROGRAM		
			CALIBR.	ON/OFF	
	AVERAGE	BAR	000		
		DIGIT	000		
		A/D	00		
	VERSION				

Chapter 7 General

7.1 TROUBLESHOOTING

Default	Actions
The digital display is off.	Le fuse is out of order, (2A)
The bar is off.	Le fuse is out of order, (2A)
The digital display is not counting or show wrong values.	Check if the probe connected is compatible with the analog board.
The function M2 , M3, M4 do not work	Les functions M2, M3, M4 must be turned ON MEASURE menu.
La calibration is refused « OVER MINIMUM »	One or few data are not compatible between the specification values and the master values.

7.2 MAINTENANCE

Remember that it is a measuring instrument
Take care of it.

Take notice that this user's manual is in relation with the software version V.2.00

Version 2.06 – E / 681.071-110