

PC2003 amplifier Programming Manual



www.detector-france.com

PROPC2003EN – index A

	Pages
1 INTRODUCTION	2
2 PARAMETER SETTING	4
2.1 Calibrating the reference	4
2.2 Adjusting the tolerances	7
3 CONTROL FUNCTIONS	8
3.1 Masking a measurement	8
3.2 Transferring a measurement	9
3.3 Setting the machine shutdown parameter	11
3.4 Table of the programming modes	12

1. Introduction

Détektor France congratulates and thanks you for having selected its **PC2003** amplifier for your applications. After a brief presentation of the device's capabilities, this guide describes all the menus and functions you will encounter during programming and use. For details about the sensor and its mechanical mounting, please refer to the **Integration and mechanical adjustment manual**.

Don't hesitate to contact us for additional information or problems, a technician will answer your questions.

The **PC2003** is designed to measure part length or diameters (depending on the sensor type chosen) using an LVDT linear probe. Three measurement modes are available: **Peak** , **Peak Controlled** or **Realtime**.

The **Peak mode** (default) can be described as follows:

- 1- During the passing of a part (spindle indexing), the sensor moves when it comes in contact with the part.
- 2- The largest value (the sensor's peak movement) is stored by the amplifier.
- 3- After the valid signal is sent by the machine at end of the cycle, the stored value is compared to the reference value and the programmed tolerances.
- 4- The amplifier instantaneously triggers relays based on the results of its comparison (good part, min. part, max. part or machine shutdown).
- 5- If the measured part is not within tolerance, the machine can be shutdown using these relays. On the contrary, if the measured part is within tolerance, the amplifier is automatically reset and awaits the next cycle.

The **Peak Controlled** mode differs only from the Peak mode because there is another check (internal to the amplifier) to assure that the sensor is working correctly:

The first stages (**1 and 2**) are the same until the valid signal.

3-When the valid signal is sent from the machine, the value stored in memory is compared to the reference and to the programmed tolerances, but there is also another check of the instantaneous position of the sensor (sensor value at the time of the valid signal). This control will be correct only if this instantaneous value is not within the defined tolerances at the moment of the valid signal.

4-The amplifier instantaneously sends the results to the machine (control of the stored value + control of the instantaneous value)

5-If the measured part is not within tolerance, the machine will be shutdown at the end of the cycle and will show a bad part on the screen.

If the sensor does not come back to its initial position, so the instantaneous value at the moment of the valid signal is still within tolerance, the machine will stop at the end of the cycle and show defective sensor on the screen.

On the contrary if the 2 controls are Ok (peak measure within tolerance and instantaneous measure at the moment of the valid signal not within tolerance) the machine is not shutdown and the measurement is reset and will wait for the next cycle.

The **Realtime mode** can be described as follows:

- 1- The sensor, mounted at a station (like a drill tool), comes in contact with the part (during the work) until it is at the machining end stop.
- 2- Then the valid pulse is sent by the machine; the instantaneous (current position of sensor) value is directly compared to the reference and the tolerances.
- 3- The amplifier triggers the relays based on the result of its comparison (good part, min. part, max. part or machine shutdown).
- 4- If the measured part is not within tolerance, the machine can be shutdown using these relays. On the contrary, if the measured part is within tolerance, the measurement is reset and awaits the next valid signal.

Other functions are present in this amplifier, such as the **masking** of a measurement during a material feed operation, the **transfer** of a measurement, or the **machine shutdown** function.

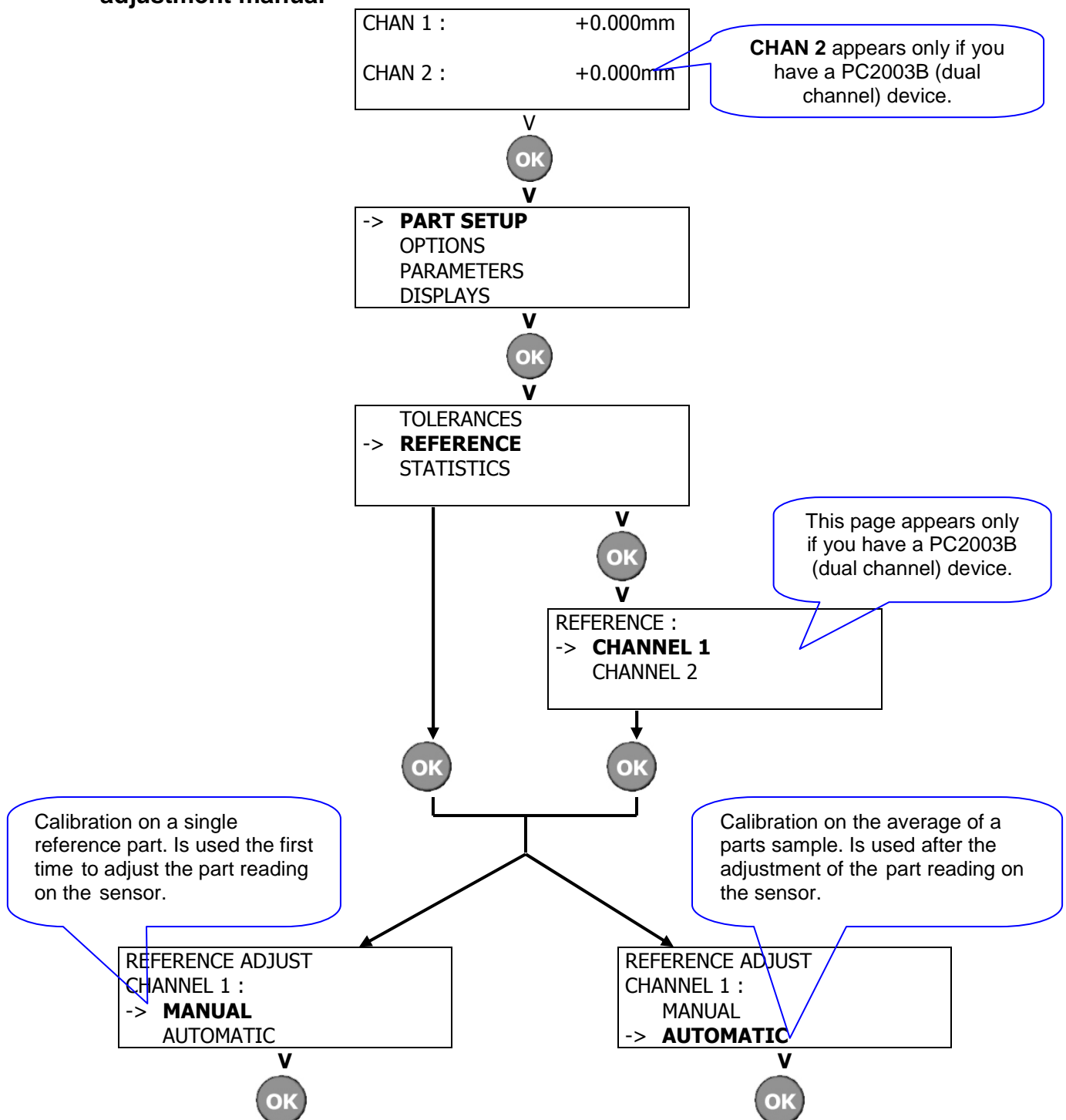
The PC2003 is suitable for most multi-spindle/single spindle machine tools which are cam driven or numerically controlled. Thanks to the user friendliness of the menus, any user can rapidly plug in and use the amplifier and easily navigate within it. In addition, once adjusted, the amplifier can be locked to prevent any handling errors.

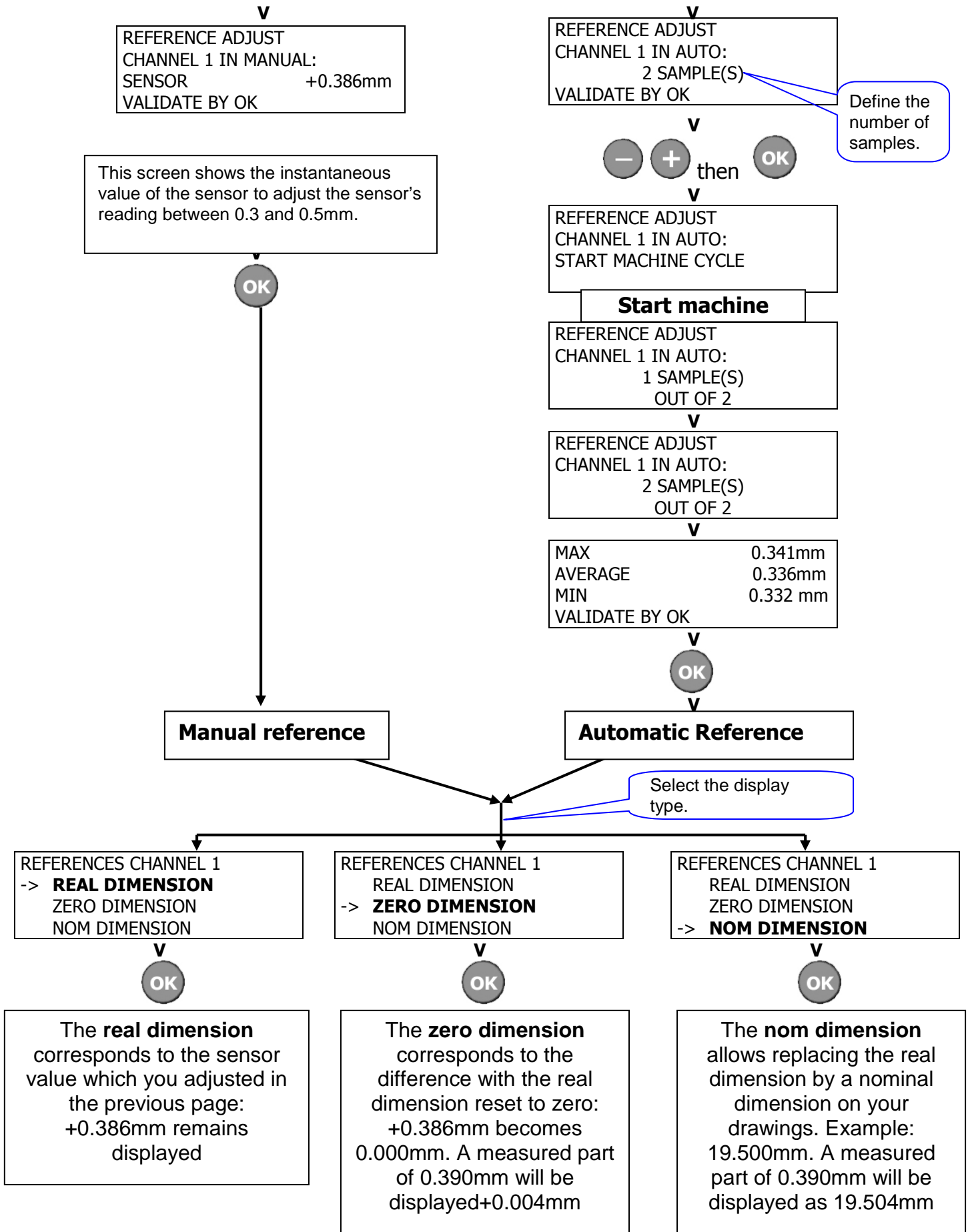
All the menus and functions are detailed in the rest of this guide.

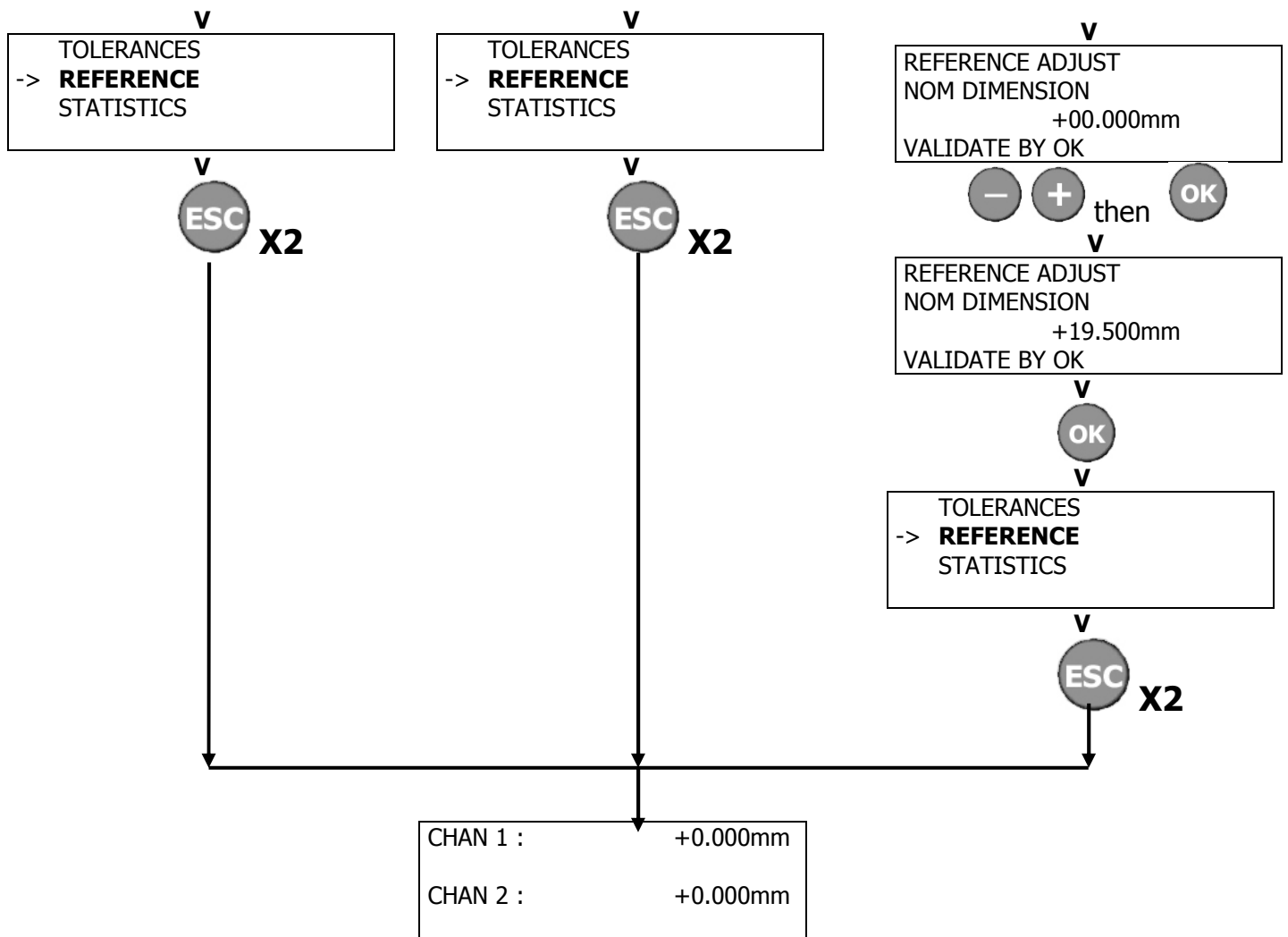
2. PARAMETER SETTINGS

2.1 Calibrating the reference

Calibrating the reference allows the calibration of the sensor to a reference part on your machine. Calibration must be done only after the amplifier has been correctly wired and your machine correctly adjusted so that the dimension to be measured is a mean and stable dimension (without machine drift). By default, the sensor is delivered to you preloaded in the probe. However, if the internal sensor was disassembled from the probe for replacement or a cleaning, the sensor has to be preloaded and tare reset in the probe. This procedure is detailed below in subsection **Adjusting sensor preloading** in **Integration and mechanical adjustment manual**

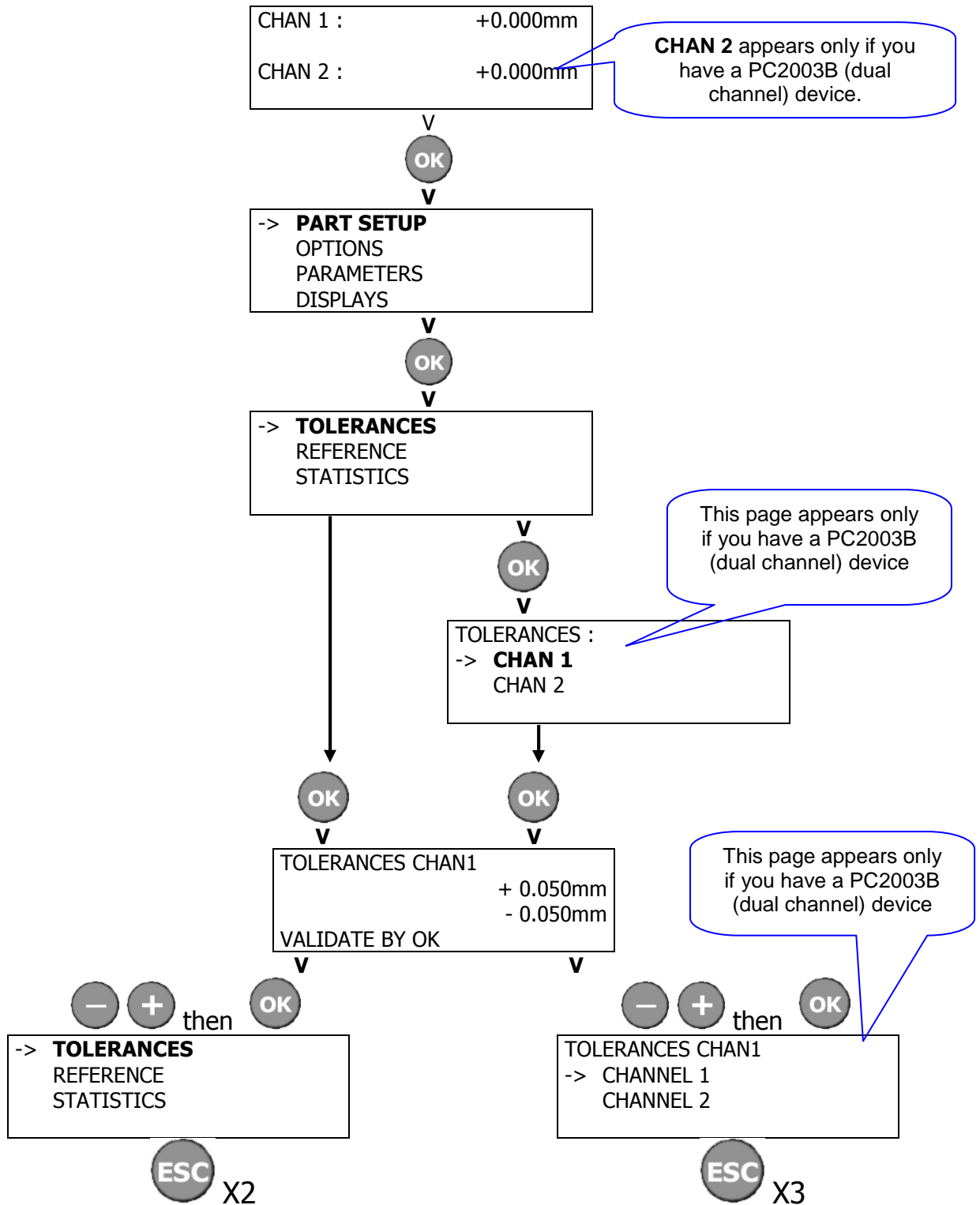






2.2 Adjusting the tolerances

The tolerances limits define the range of acceptable readings, beyond which the amplifier is going to react by triggering relays to their fault states. These tolerances are adjusted with respect to a reference, which must be set earlier.



3. CONTROL FUNCTIONS

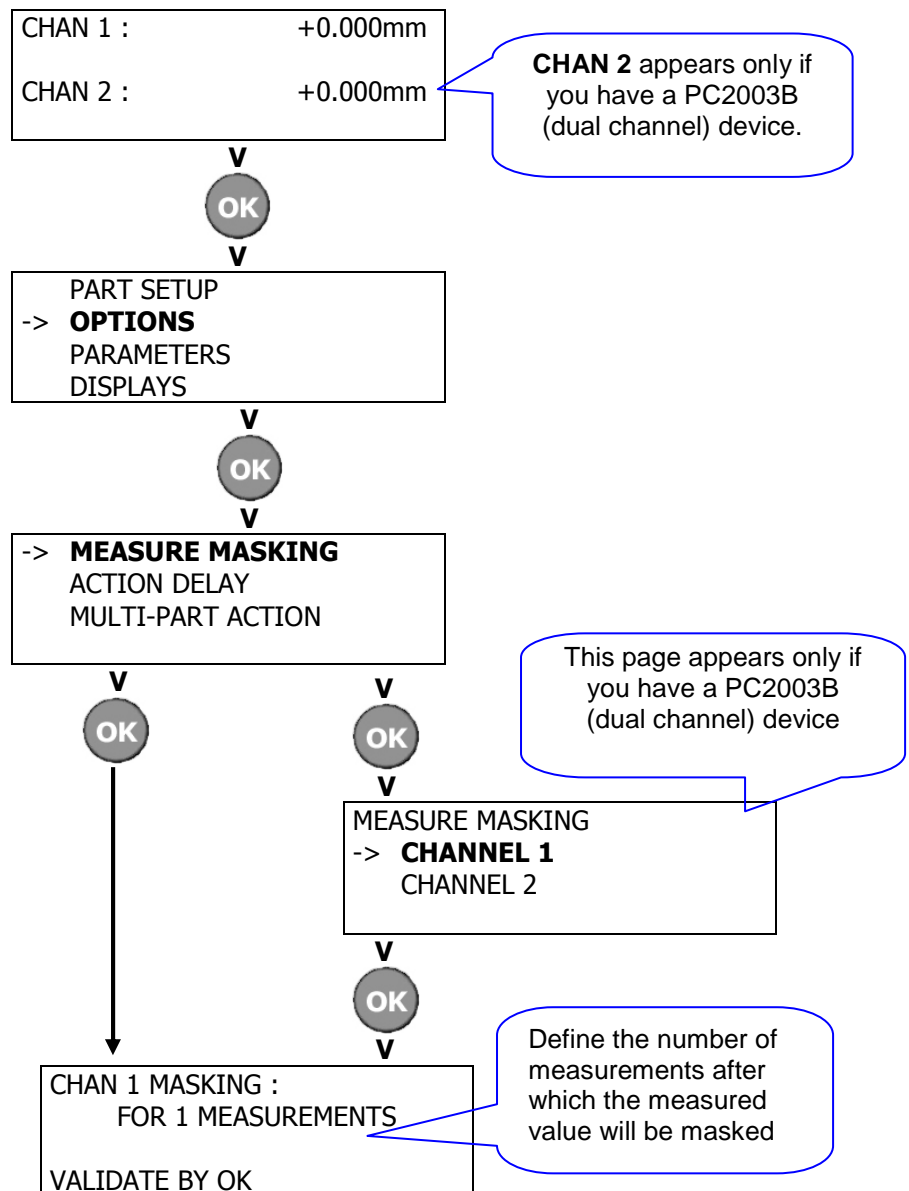
3.1 Masking a measurement

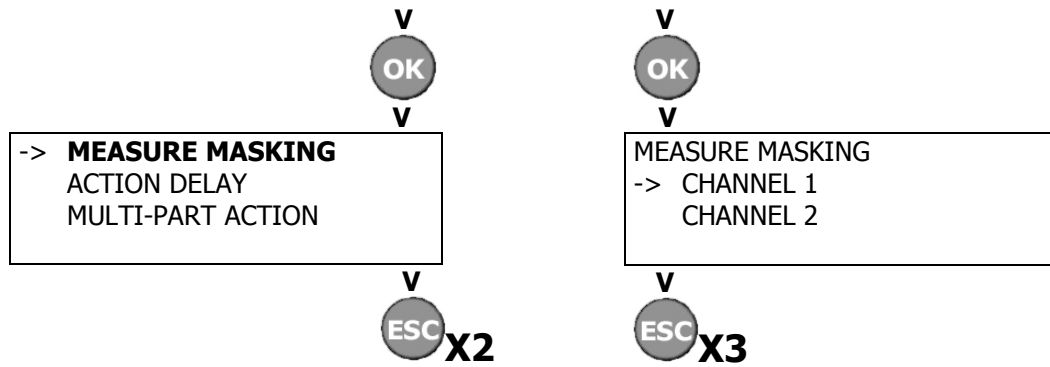
This function allows masking of a measurement during a material feed operation, isolating the fed part (short) without shutting down the machine.

The masking of a measurement can be configured:

- Either inactive (no masking) ;
- Or at N closures of the VALID input (N between 1 and 25) after the MASKING input is closed.

For a masked measurement, the corresponding channel indicates "VALUE MASKED" in addition to the display of the measured value; the indicator corresponding to the defect, if any, remains off and the outputs remain inactive.





Here is an example to get a better understanding of this function:

Everything depends on the station which the machine feeds and where the sensor is positioned.

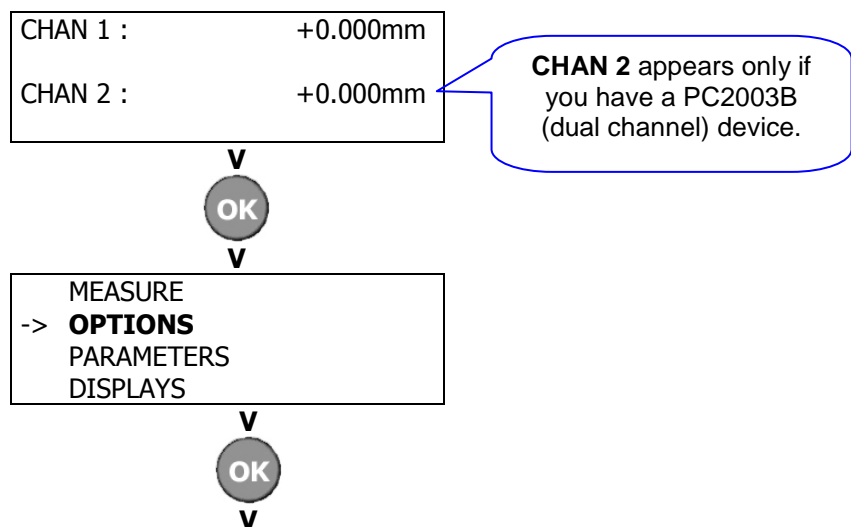
For our example, let's take a TORNOS AS14 (6 spindles) machine and place the sensor between spindles 5 and 6:

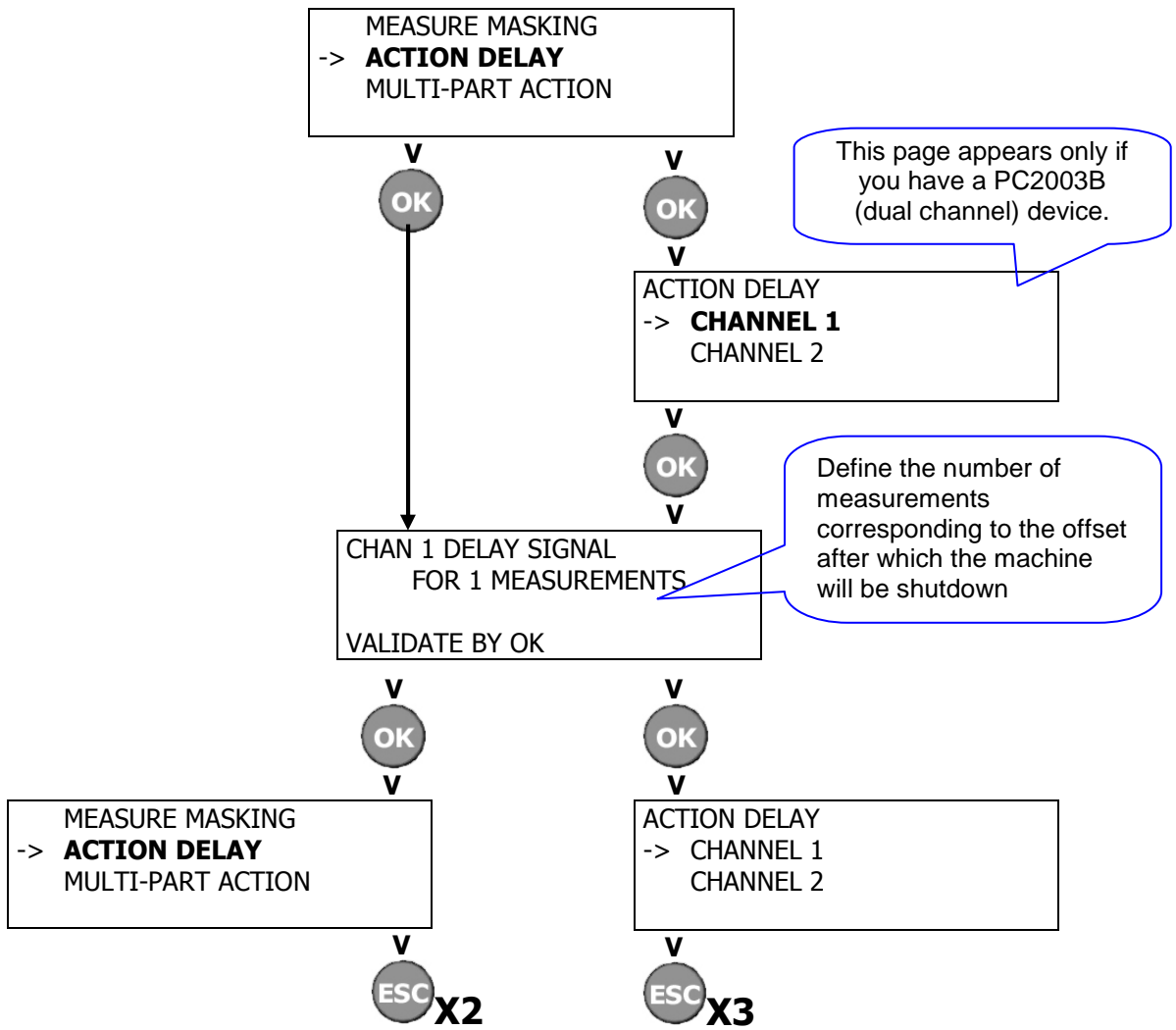
The feeding takes place at station 6, and at the same time the feed information is sent to the amplifier. From then on, the electronic box is going to count down the number of measurements in order to mask the measurement of the fed part which will be short. Therefore, the 6th measurement after the masking pulse (feed information) has to be masked and so the amplifier has to be programmed **FOR 6 MEASUREMENTS**.

3.2 Transferring a measurement

Transferring a measurement's processing consists of offsetting a relay's fault state to the desired station. An immediate action after a part is detected outside tolerance is not always practical for its removal. Therefore, this function allows triggering the machine shutdown relay when the bad part is accessible, such as when it is located in the pickoff spindle.

This function can be INACTIVE or ACTIVE after n measurements (1 to 25 maximum).

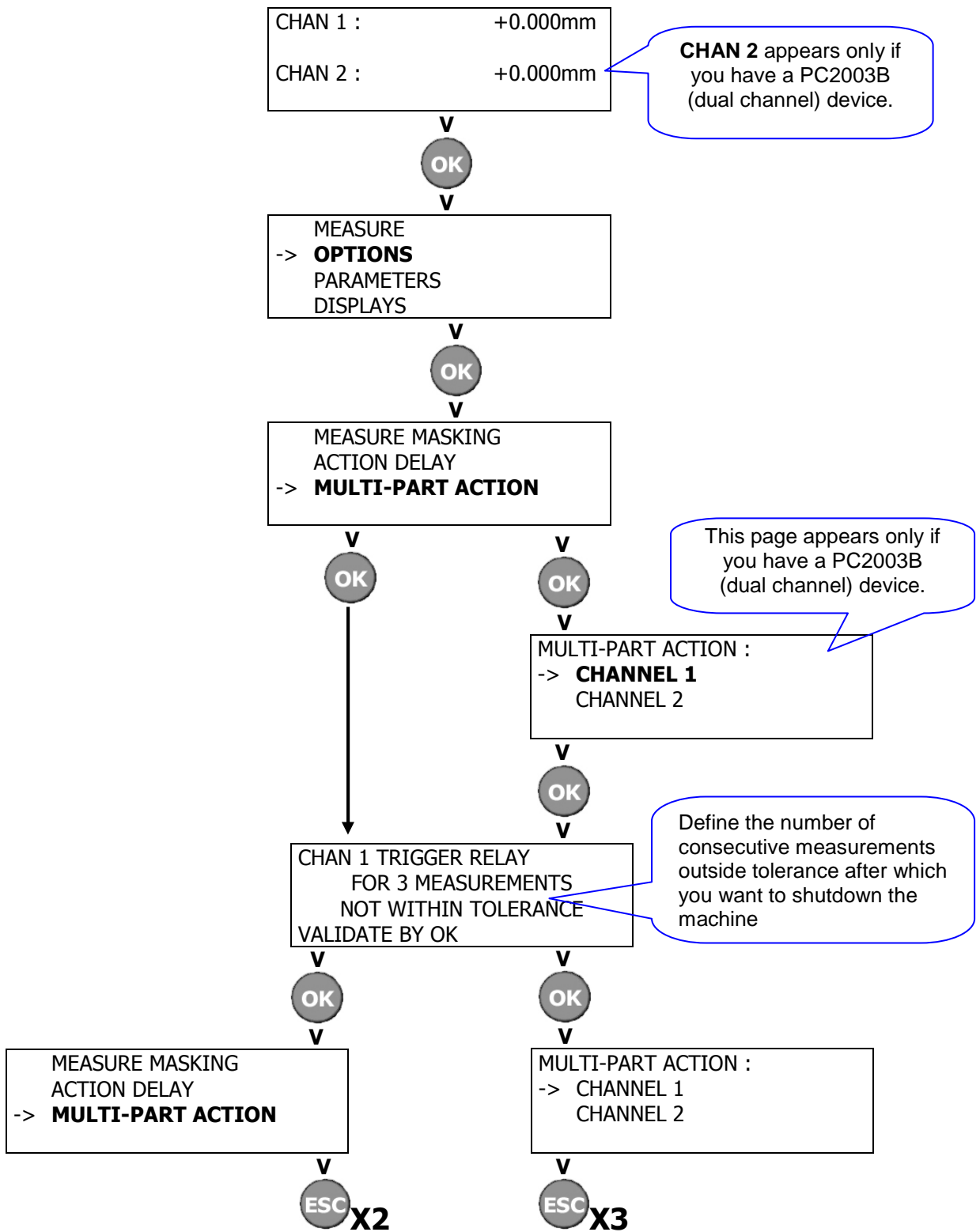




3.3 Setting the machine shutdown parameter

Setting the "machine shutdown" parameter is very useful if you don't want to penalize productivity by shutting down the machine even though the measured bad parts are isolated from production by a recovery system controlled by the MIN and MAX contacts.

The parameter to be adjusted is the number of consecutive measurements outside tolerances after which the machine will be shutdown. This parameter is adjusted by default to the minimum, that is, after 1 measurement outside tolerance. The maximum is 25 measurements.+




3.4 Table of the programming modes

This table is a summary of all the menus and the adjustments present in the amplifier.

>MEASURE OPTIONS PARAMETERS DISPLAYS	>TOLERANCES REFERENCE STATISTICS	TOLERANCES : > CHANNEL 1 > CHANNEL 2	Adjusting the tolerance in a range of $\pm 2\text{mm}$	
	TOLERANCES >REFERENCE STATISTICS	REFERENCE : > CHANNEL 1 > CHANNEL 2	REFERENCE ADJUST: CHANNEL 1 OR 2 > MANUAL AUTOMATIC	Calibrating the reference value on a part between 0.300 and 0.400mm
			REFERENCE ADJUST : CHANNEL 1 OR 2 MANUAL > AUTOMATIC	-Calibrating the reference value from 0.300 to 0.4000 mm in manual. - Choice of number of samples (1 to 25). - Measurement in automatic - Calculation of the mean
	TOLERANCES REFERENCE >STATISTICS	STATISTICS CHOICE > STANDARD SAMPLING	STANDARD : Display of the measurement statistics: number of measurement, number of measurement undersized, number of measurement oversized. Reset to zero with OK.	
STATISTICS CHOICE STANDARD >SAMPLING			SAMPLING : - Choice of the number parts samples (1 to 200) - Measurement in automatic - Calculation of the mean + min. value and max. value maxi.	
	MEASURE >OPTIONS PARAMETERS DISPLAYS	>MEASUREMASKING ACTION DELAY MULTI-PART ACTION	MEASURE MASKING : > CHANNEL 1 > CHANNEL 2	INACTIVE disables the function. MEASUREMENT MASKING after 1 to 25 measurements. Description of the function in subsection 3.1, pages 8
MEASURE MASKING >ACTION DELAY MULTI-PART ACTION		ACTION DELAY: > CHANNEL 1 > CHANNEL 2	INACTIVE disables the function. Measurement Transfer after 1 to 25 measurements. Description of the function in subsection 3.2, page 9	
MEASURE MASKING ACTION DELAY >MULTI-PART ACTION		MULTI-PART ACTION : > CHANNEL 1 > CHANNEL 2	INACTIVE disables the function. Machine Shutdown after 1 to 25 measurements. Description of the function in subsection 3.3, page 11	

MEASURE OPTIONS >PARAMETERS DISPLAYS	>SENSOR PARAMETERS ADDITIONNAL DATA PROGRAM SETTINGS ADMIN	>TARE MEAS. ARM CORRECT. TOLERANCES MODE MEASUREMENT MODE	TARE : > CHANNEL 1 > CHANNEL 2	Adjustment of the tare of the sensor in the probe. (See Integration an mechanical adjustment for gauge)
		TARE >MEAS.ARM CORRECT. TOLERANCES MODE MEASUREMENT MODE		This parameter is used only for the length gauges L00A and L00B. It allows to correct the ratio of the measuring arm.
		TARE MEAS.ARM CORRECT. >TOLERANCES MODE MEASUREMENT MODE	TOLERANCES MODE : INTERVALS VALIDATE BY OK	Allows to choose the display mode of tolerances : INTERVALS : Ex : +0.05 / -0.05 LIMITS : 5.95/6.05
		TARE MEAS.ARM CORRECT. TOLERANCES MODE >MEASUREMENT MODE	NUMBER OF SENSORS ONE VALIDATE BY OK	Allow to select the number of sensor: ONE, TWO INDEPENDENT, TWO COUPLED and HIRTH. Then select the measurement mode: PEAK, PEAK CONTROLLED or STABILIZED.
	SENSOR PARAMETERS >ADDITIONNAL DATA PROGRAM SETTINGS ADMIN	Extended data are released via 4 digits (release code), allowing additional data to be obtained at the output of the RS232 link exploited and analyzed by a specific software. speed of the serial link : 9.6 Kbauds parity of the serial link : NONE		
	SENSOR PARAMETERS ADDITONNAL DATA >PROGRAM SETTINGS ADMIN	>CONFIGURATION GOOD MEASUREMENT MI/MA MEASUREMENT	Configuration of the logical outputs : INACTIVE 60S: As soon as you enter the programming mode, measurements are no longer taken. After 60 seconds without any manipulation of the keypad, the measurement mode is returned to and therefore measurements are again taken. INACTIVE INF: the same as for adjustment INACTIVE 60S; but without automatically return to measure mode. ACTIVE 60S: Your entry in the programming mode doesn't stop measurements as in adjustment INACTIVE. After 60 seconds without any manipulation on the keypad, there is an automatic exit from the programming mode ACTIVE INF: the same as for adjustment ACTIVE 60S; but without automatically return to measure mode.	
MEASURE OPTIONS >PARAMETERS DISPLAYS	SENSOR PARAMETERS ADDITIONNAL DATA >PROGRAM SETTINGS ADMIN	CONFIGURATION >GOOD MEASUREMENT MI/MA MEASUREMENT	Memorization of the output good measurement: STORED: When a part is good, the output relay "good" closes and stays closed until the next valid signal. The state of the output is stored. NOT STORED: When a part is good, the output relay "good" closes for 50ms minimum and then reopens. The state of the output is not stored. (adjustment by default)	

MEASURE OPTIONS >PARAMETERS DISPLAYS	SENSOR PARAMETERS SERIAL PORT >PROGRAM SETTINGS ADMIN	CONFIGURATION GOOD MEASUREMENT >MIMA MEASUREMENT	Memorization of the outputs min. and max.: STORED: When a part is bad min. or max., the outputs close (or open if Normally Closed) and stay close until the next valid signal. The state of the output is stored. (adjustment by default) NOT STORED: When a part is bad, the outputs min. or max. close 50ms minimum and reopen. The state of the outputs is not stored.
	SENSOR PARAMETERS SERIAL PORT PROGRAM SETTINGS >ADMIN	>LOCK UNLOCK CODE CHANGE FACTORY VALUES	This function allows locking all the adjustments (preload, reference, tolerances, etc) made, leaving only the display to the user. The original code is 0000.
		LOCK >UNLOCK CODE CHANGE FACTORY VALUES	This function allows unlocking all the adjustments (preload, reference, tolerances, etc.).
		LOCK UNLOCK >CODE CHANGE FACTORY VALUES	Change the original code (0000) by the code you want.
		LOCK UNLOCK CODE CHANGE >FACTORY VALUES	Return to the box's original parameter. Warning: This will force you to redo the preload, referencing and adjustment of the tolerances.
PART SETUP OPTIONS PARAMETERS >DISPLAYS	>BRIGHT./CONTRAST LANGUAGE MEASUREMENT UNIT	Adjust the brightness of the LCD screen. Minimum 0 and maximum 15. NB : After the factory values are returned to, the value will be 8 Adjust the contrast of the LCD screen. Minimum 0 and maximum 15. NB : After the factory values are returned to, the value will be 8	
	BRIGHT./CONTRAST >LANGUAGE MEASUREMENT UNIT	Select the language, Français, English, Italiano, Espagnol and Deutsch NB : After the factory values are returned to, the value will be French.	
	BRIGHT./CONTRAST LANGUAGE >MEASUREMENT UNIT	Select the measurement unit, Millimeter or Inch. NB : After the factory values are returned to, the value will be MILLIMETER In mm: 3 digits are displayed before the decimal point + 3 digits after the decimal point. Maximum 999.999mm In Inch: 2 digits are displayed before the decimal point + 4 digits after the decimal point. Maximum 21.4747in	

 : Screens appear only if you have a PC2003 DUAL CHANNEL device.



Manufacturer

DETECTOR FRANCE

36 route des lacs – PAE des Jourdiés

74800 Saint Pierre en Faucigny

Tél : +33 (0)450 037 998

Fax : +33 (0)450 036 792

Email : commercial@detector-france.com

www.detector-france.com

PROPC2003EN – index A