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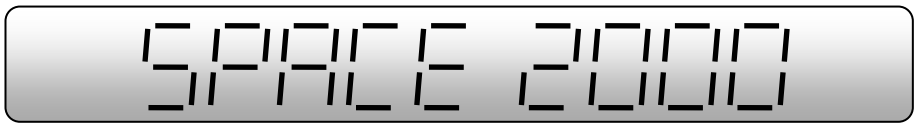
HIGH INTEGRATION

DIGITAL READOUT



Operation Manual

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Operation Manual

(Code 19.06.3030.01)

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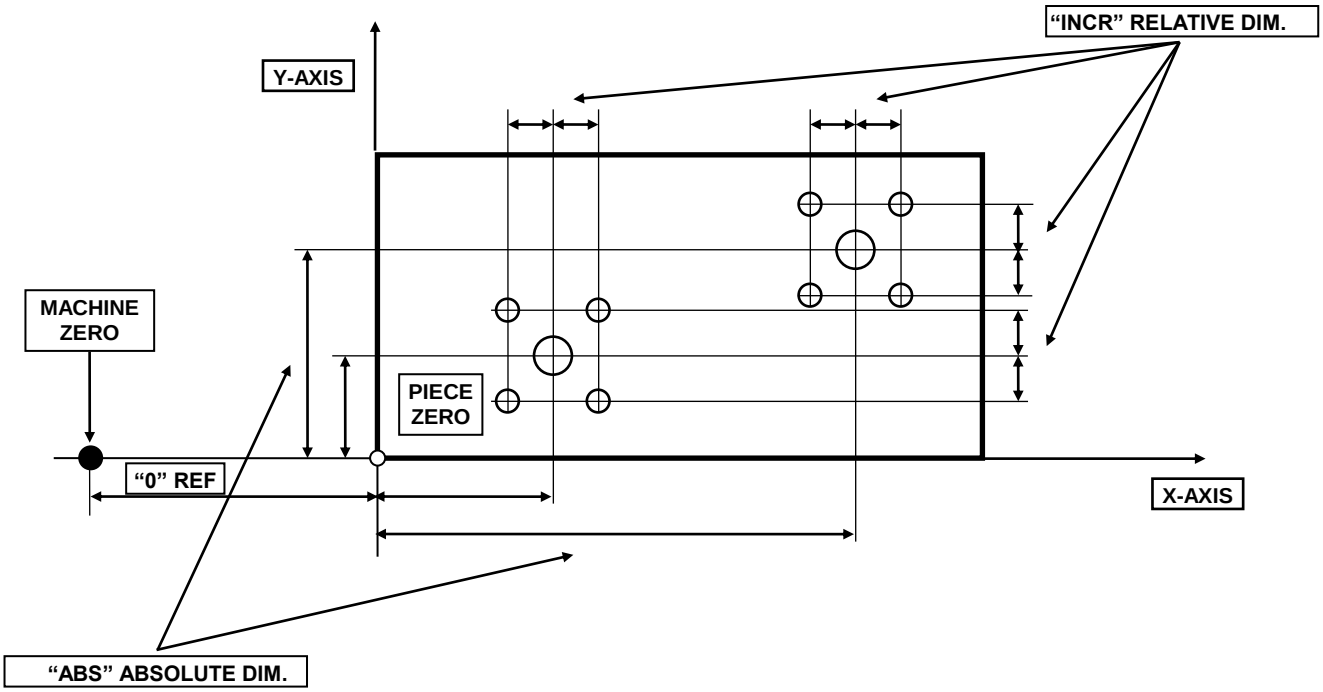
OPERATING INSTRUCTIONS

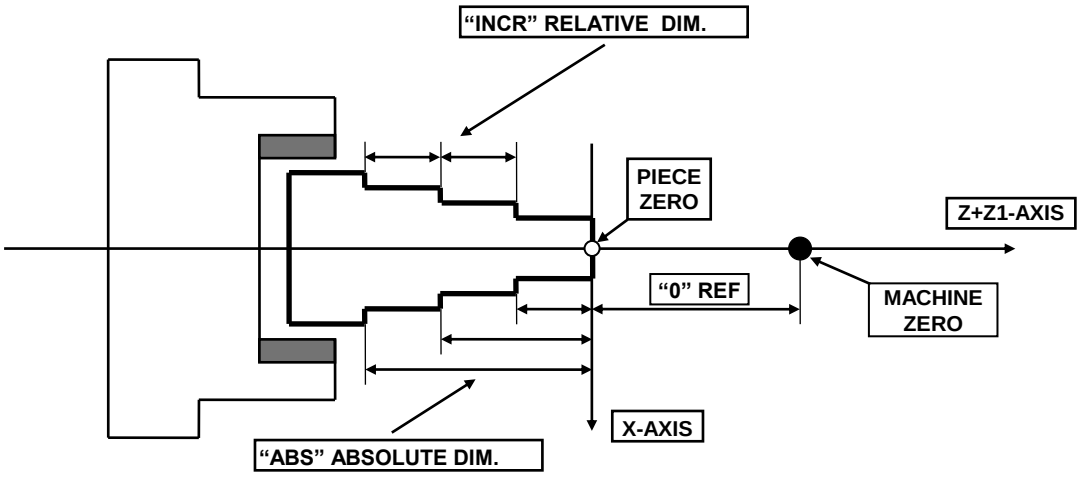
Overview

In order to clearly understand the operating procedures described in this manual, the meanings of the following terms must be absolutely clear.
See the figure below:

SPACE 2000 - M version

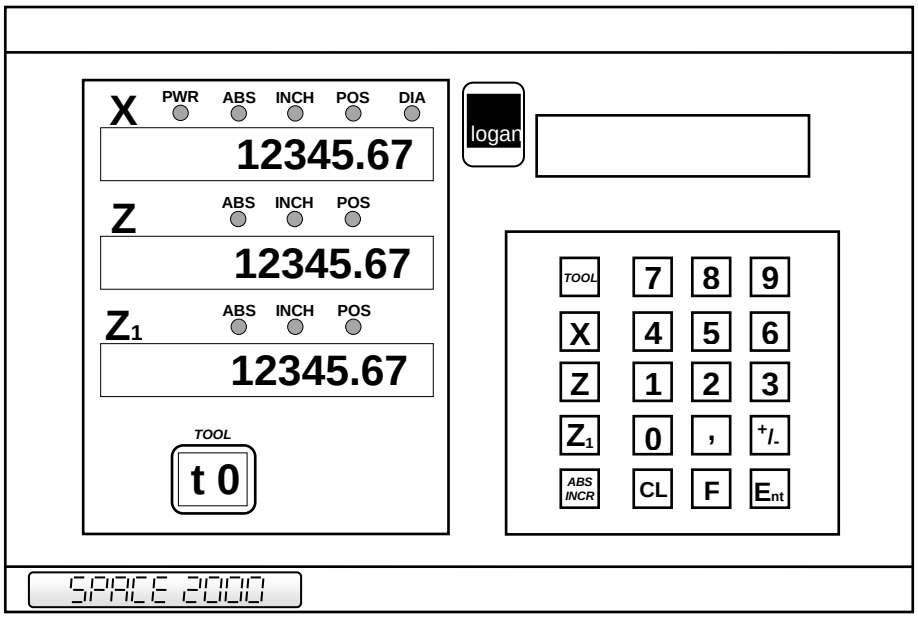


SPACE 2000 - T version



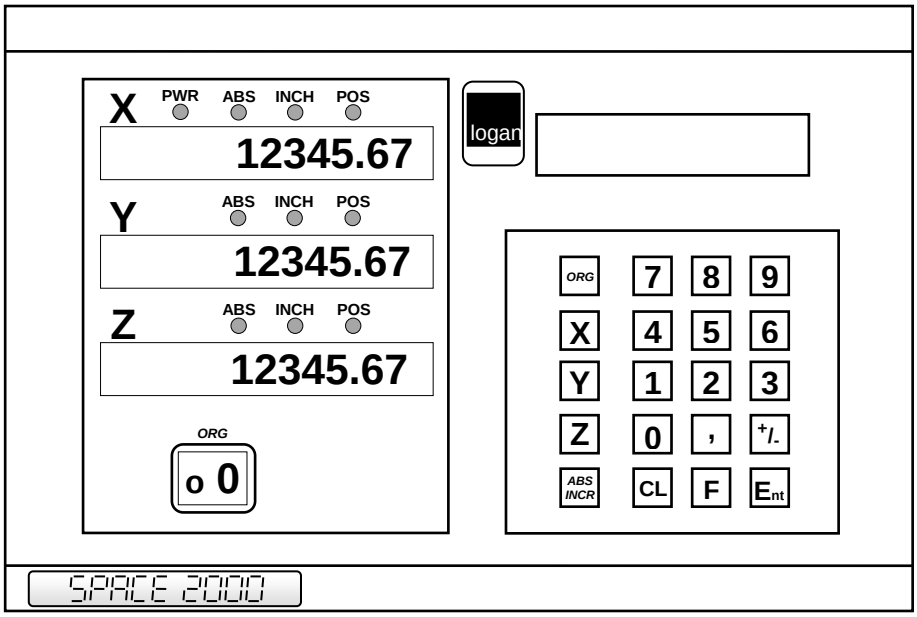
Operation panel

SPACE 2000 T - SPACE 2000 RIF T version



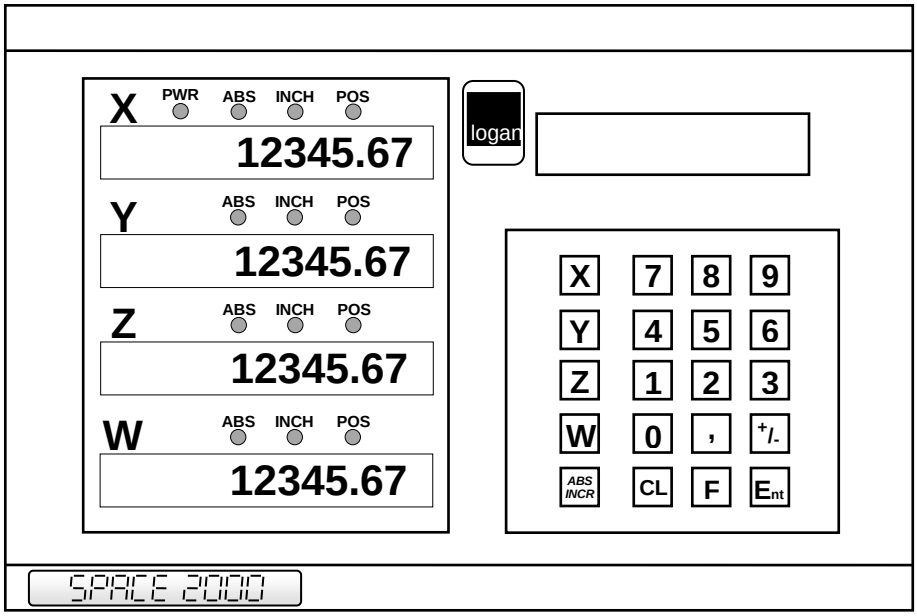
X Z Z1	Axis selection key
0 9	Number keys for dimension setting
,	Decimal point setting key
+/-	Sign setting key
Ent	Setting confirmation key
CL	Cancel key
F	Function enabling key
TOOL	Tool enabled selection key
ABS INCR	Absolute to incremental dimension and vice-versa switching key
PWR	Power supply connected signal
ABS	Signalling of “absolute zero” dimension
INCH	Signalling of dimension expressed in inches
POS	Signalling of position display
DIA	Signalling of diametral dimension (only for X-axis)

SPACE 2000 M - SPACE 2000 RIF M version



X Y Z	Axis selection key
0 9	Number keys for dimension setting
,	Decimal point setting key
+/-	Sign setting key
Ent	Setting confirmation key
CL	Cancel key
F	Function enabling key
ORG	Origin enabled selection key
ABS INCR	Absolute to incremental dimension and vice-versa switching key
PWR	Power supply connected signal
ABS	Signalling of “absolute zero” dimension
INCH	Signalling of dimension expressed in inches
POS	Signalling of position display

SPACE 2000 M 4 axis version



X Y Z W	Axis selection key
0 9	Number keys for dimension setting
,	Decimal point setting key
+/-	Sign setting key
Ent	Setting confirmation key
CL	Cancel key
F	Function enabling key
ABS INCR	Absolute to incremental dimension and vice-versa switching key
PWR	Power supply connected signal
ABS	Signalling of “absolute zero” dimension
INCH	Signalling of dimension expressed in inches
POS	Signalling of position display

Basic operating functions

This chapter provides detailed descriptions of the procedures to be followed to enable the SPACE 2000 most elementary functions. For easier learning, this part of the manual has been divided into "modules", each one of which describes a single operative procedure. Regardless of its length, each "module" has the same simple structure.

TITLE OF MODULE

The title is followed by a brief explanation of the function performed by the procedure that provides immediate knowledge of how it works and the consequences of its use. Whenever necessary, its relationship with other procedures described in other modules is explained.

Indications on the appropriateness of the function are provided that make perfectly clear how, why and when the respective function can be used.

To facilitate learning, the operative functions of the SPACE 2000 are described in the order in which they will most probably be used. Given that many are independent, they can be used in any order as required.

The first division line is followed by the necessary conditions that must exist prior to starting the procedure.

This part of the description must be given careful attention because in many cases the successful use of a procedure depends on the manoeuvres performed previously.

Each procedure is composed of a series of elementary steps. For each step, the **OPERATION** that the operator must perform on the machine or the keys that must be pressed is defined in the **first column**.	The **CONSEQUENCES** and how the SPACE 2000 responds to the operator's manoeuvres (indicated in the first column) are shown in the **second column**.	Any particular conditions, differences or variations from normal use are described under **IF NECESSARY** in the **third column,** which explains how to avoid or remedy error conditions and resume normal use.
Each elementary step is separated from the previous step and the following step by a division line.	Expert operators who have already acquired working experience with the SPACE 2000 can skip reading the second column and concentrate solely on the first, which provides a check-list of the operations to be performed.	Readers of the manual for the first time are advised to pay special attention to the warnings and information written in boldface or underlined.

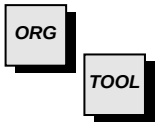
Power supply connection

During this phase, the SPACE 2000 self-diagnostics program runs an internal operating check and then prepares itself for the following operations to be performed by the operator if the outcome is positive.

The system must:
- be connected to the power mains.
- have the inputs of the axes connected to the respective position transducers (encoders or optical scales).
- have its digital parameters programmed adequately to the specifications of the system in which it will be installed.

Consult the section of the manual entitled "MACHINE PARAMETER PROGRAMMING" for further details.

Set the power supply switch on the rear panel in ON position.	The SPACE 2000 PWR LED begins flashing as the internal operating check is run. At the end of the check, the PWR LED remains lit up steadily and all the display conditions that were valid before switching off are re-proposed with flashing LED. The flashing of the dimensions means that these dimensions can be considered valid, provided that: • the axes have not been shifted with the SPACE 2000 power supply switched off; • the internal memory has not been set to zero (the ZERO POWER RAM offers a minimum duration of 10 years). All the INCH, ABS, and POS LEDs are switched off.	Whenever anomalies are present, the X-axis display will provide a message that identifies the type of anomaly (see TROUBLE-SHOOTING) If the buffer battery option is not present and the previously memorised PIECE ZERO must be restored, proceed as described for the **PIECE ZERO RESTORATION** function.
Select the key: 	The flashing of the dimensions comes to an end, the LEDs, the functions and the origin enabled resume the status they had prior to the last time the readout was switched off. The SPACE 2000 is now ready for operation.	



Origin enabled selection (only M version - optional)
Tool enabled selection (only T version - optional)

With this function, the SPACE 2000 switches from one origin/tool enabled to another.
Using more than one origin (max. 10 ORG) on a milling/boring machine permits work to be performed on a corresponding number of pieces that have been set to zero in different points on the table by following the working dimensions indicated in a single drawing.
Using more than one tool (max. 10 TOOL) on a lathe permits a piece to be made according to the drawing with tools of different size that have been previously set to zero on the machine's reference axes (e.g. spindle rotation axis and any reference shoulder provided).
For each origin/tool enabled, the SPACE 2000 offers the functions described further on in the manual as if the user were equipped with 10 digital readouts and not just one.

Necessary conditions:
the SPACE 2000 must be set in position display conditions ("POS" LEDs ON)

Select the key : ORG "M" version TOOL "T" version	The **orG=** or **tool=** message appears on the X-axis display to indicate the command executed and the waiting for the numerical value of origin/tool. All the LEDs switch off except PWR. The origin/tool display is switched off awaiting modifications.	In order to quit this selection and return to the position display, press the key : F
Select the numerical value of the origin/tool to be enabled 0 ····· 9	The numerical value appears after the equal sign and awaits the confirmation command.	In order to quit this selection and return to the position display, press the key : F
Select the key: Ent	The displays show the dimensions that correspond to the origin/tool selected. The origin/tool display assumes the value selected. The ABS – POS – INCH – DIA LEDs assume the conditions they had previously in the origin/tool selected.	If the setting format is incorrect, the "**orG. inc.**" or "**tool inc.**" message will appear for 2 seconds (see TROUBLE-SHOOTING) After the error message has been given, the display of the erroneous selection resumes and awaits correction. Use the key : CL to cancel erroneous data.

ABS INCR

Simultaneous absolute zero-setting

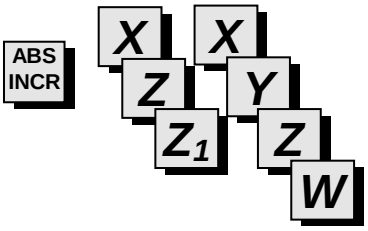
With this function, the SPACE 2000 permits the absolute zero-setting of all the axes displayed simultaneously.

The operator must bring the axes of the machine to the zero point, which we also refer to as the “piece zero” and which all the most important dimensions of the working to be performed refer to.

Simultaneous zero-setting makes setting up the SPACE 2000 for work quick and easy.

Necessary conditions:
the SPACE 2000 must be set in position display conditions (“POS” LEDs ON)

Select the key : ABS INCR	The **ABS** message appears on the X-axis display to indicate the selection of the command. All the LEDs switch off.	In order to quit this selection and return to the position display, press the key : F
Select the key: Ent	The position dimensions set to zero appear on the displays. The ABS and POS LEDs are ON for all the axes enabled.	



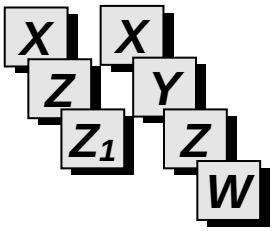
Absolute pre-selection

With this function, the SPACE 2000 permits the entry of an absolute dimension independently for each axis displayed.
The entry of an absolute dimension is necessary whenever the operator takes a position whose distance from the "piece zero" is known as a point of reference.

Necessary conditions:

the SPACE 2000 must be set in position display conditions ("POS" LEDs ON)

Select the key : **ABS INCR**	The **ABS** message appears on the X-axis display to indicate the selection of the command. All the LEDs switch off.	In order to quit this selection and return to the position display, press the key : **F**
Select the axis in question by pressing any of the keys: **T version** **X** **Z** **Z1** **M version** **X** **Y** **Z** **W**	The flashing digit "**0"** will appear on the display of the axis selected. The display of the other axes is disabled The LEDs stay OFF.	If the wrong axis is selected by mistake, press the correct selection key. In order to quit this selection and return to the position display, press the key : **F**
Use the numeric keyboard to set the distance between the current position and the PIECE ZERO with the sign and the decimal point. **0** ..... **9** **+/-** **,** The number to be set must be expressed in millimeters with the format selected from the machine parameters.	The display of the axis selected will gradually show the figures entered followed by the flashing cursor. During this setting, the selection of the axis can still be changed because the SPACE 2000 assigns the figures entered to the new axis up to this moment.	In order to cancel one or more figures entered erroneously, press the cancel key: **CL** When this key is kept pressed down, cancellation extends progressively to all the other figures set. In order to quit this selection and return to the position display, press the key : **F**
In order to enter the dimension entered, select the key : **Ent**	The SPACE 2000 checks the coherence of the number set (format check). If the setting is correct, it is memorised and the dimension entered is confirmed on the display selected. All the axes displays are re-enabled and the SPACE 2000 resumes normal position display status. The axis selected prepares to display the absolute dimensions. The ABS LED is ON.	If the setting format is incorrect, the "**For. inc.**" message will appear for 2 seconds (see TROUBLE-SHOOTING) After the error message has been given, the display of the erroneous selection returns and awaits correction. Use the key : **CL** in order to cancel the wrong data.



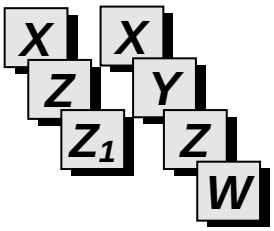
Zero-setting and relative pre-selection

This function is used to define a RELATIVE ZERO that does not coincide with the principal "piece zero" origin in order to permit the dimension display to start from any point whatsoever selected as required (display in "**INCR**" mode).
Each zero-setting or relative pre-selection defines a new origin and annuls the previous setting.
Zero-setting or relative pre-selection can be performed at any point along the stroke of the axes without losing the memory of the absolute references that have been set (see "Simultaneous absolute zero-setting" and "Absolute pre-selection")

Necessary conditions:

the SPACE 2000 must be set in position display conditions ("POS" LEDs on)

Select the axis involved by pressing any of the keys: **T version** X Z Z_1 **M version** X Y Z W	A flashing **"0"** appears on the display of the axis selected. The display of the other axes is disabled. All the LEDs switch off.	If the wrong axis is selected by mistake, press the correct selection key. In order to quit this selection and return to the position display, press the key: F
Whenever only zero-setting must be performed, skip to the next operation; otherwise use the numeric keyboard to set the distance with sign between the current axis position and the RELATIVE ZERO to be established 0 ····· 9 +/- , The number to be set must be expressed in millimeters with the format selected from among those of the machine parameters.	The display of the axis selected will gradually show the figures entered followed by the flashing cursor. During this setting, the selection of the axis can still be changed because the SPACE 2000 assigns the figures entered to the new axis up to this moment.	In order to cancel one or more digits entered erroneously, press the cancel key : C_L When this key is kept pressed down, cancellation extends progressively to all the other figures set. In order to quit this selection and return to the position display, press the key : F
In order to enter the dimension entered, select the key : Ent	The SPACE 2000 controls the coherence of the number set (format check). If the setting is correct, it is memorised and the dimension entered is confirmed on the display selected. All the axes displays are re-enabled and the SPACE 2000 returns to normal position display status. The axis selected prepares to display the relative dimensions (**INCR**). The ABS LED is OFF.	If the setting format is incorrect, the "**For. inc.**" message will appear for 2 seconds (see TROUBLE-SHOOTING) After the error message has been given, the display of the erroneous selection returns and awaits correction. Use the key : C_L in order to cancel the wrong data.



Absolute - Relative Switching

This function is used to switch from the absolute dimension display to the relative dimension display and vice-versa, and is usually used only to return to the absolute dimensions because they regard the PIECE ZERO; the opposite passage is made automatically for many functions.
The SPACE 2000 shows the absolute dimension display with the ABS LED ON.
The display of the relative dimensions refers to the zero set by the latest zero-setting or the relative pre-selection.

Necessary conditions:

the SPACE 2000 must be set in position display conditions ("POS" LEDs on)

Select the axis involved by pressing any of the keys: **T version** X Z Z_1 **M version** X Y Z W	A flashing **"0"** appears on the display of the axis selected. The display of the other axes is disabled. All the LEDs switch off.	If the wrong axis is selected by mistake, press the correct selection key. In order to quit this selection and return to the position display, press the key : *F*
In order to enable the function, select the key : ABS INCR	The display shows the absolute dimension of the axis selected if the relative dimension was shown previously and vice-versa. The ABS LED either lights up or if it was previously lit up, switches off. All the displays of the axes are re-enabled and the SPACE 2000 returns to normal position display status.	

Switching to the absolute dimensions takes place automatically in the following cases:

- after the simultaneous absolute zero-setting command. Pag. 13
- after the absolute pre-selection command. Pag. 14
- after the absolute zero memorisation function ("**F1**"). Pag. 17
- after the absolute zero restoration function ("**F2**"). Pag. 18

Switching to the relative dimensions takes place automatically in the following cases:

- after the relative pre-selection or zero-setting command. Pag. 15
- after the average point calculation function ("**F3**"). Pag. 19
- after the automatic preset function ("**F4**"). Pag. 20

F 1 Absolute zero memorisation ("piece zero")

This function is used to memorise the distance between the PIECE ZERO and the MACHINE ZERO.
The term MACHINE ZERO is used to indicate a point on the measurement transduction (optical scales in photoengraved crystal or steel, rack and pinion systems or encoders installed with screw and nut) that remains physically stable in terms of position even if the electrical power supply is interrupted.
Some measurement transductions possess only one MACHINE ZERO point, which is usually found at the center or at the side; others have more than one.

This operation must be performed whenever the references that regard the PIECE ZERO must be kept in permanent memory in order to permit future use even after power failure.

Necessary conditions :

- **absolute zero-setting must have been performed for the axis in question**
- **the axis in question must have been brought near the MACHINE ZERO (only if the transduction has more than one)**
- **the SPACE 2000 must be set in position display conditions ("POS" LEDs on)**

3 axes "T" version

- the axes summing function must have been disabled with the "F8" function key pag.24

Select the function by pressing the following keys : F 1	The **"F1"** message appears on the X-axis display to indicate the choice of the function to be enabled. All the LEDs except PWR and the displays of the other axes are switched off. The indication of the origin/tool remains enabled.	In order to quit this selection and return to the position display, press the key : F
In order to enable the function selected, press: Ent	The X-axis display will show the **"SEL. ASSE"** message in order to inform the operator to select the axis for the execution of the function selected .	In order to quit this selection and return to the position display, press the key : F
Select the axis involved by pressing any of the keys: **T version** X Z Z_1 **M version** X Y Z W	The display of the axis selected will show a **"0"** that shifts from right to left and vice-versa. The display of the other axes and the respective LEDs remain disabled in order to show the operator that the procedure must still be concluded.	In order to quit this selection and return to the position display, press the key : F
Move the axis selected by making it transit over the transduction's MACHINE ZERO point.	When the MACHINE ZERO point is detected, the moving **"0"** disappears and the value of the distance between the machine zero and the piece zero to be memorised will be displayed for 2 seconds. Subsequently, the SPACE 2000 restores the display of all the axes in the position status and the respective LEDs.	If the transduction does not have only one MACHINE ZERO point, be careful to avoid committing serious errors by transiting over an erroneous reference point. If this occurs, repeat the procedure from the start.

F 2 Absolute zero restoration (“piece zero”)

This function automatically resets the distance between the MACHINE ZERO and the PIECE ZERO when the axis involved in the manoeuvre transits over the transduction's MACHINE ZERO point.

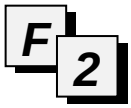
This function is used either when the system is switched back on or after an interruption in the power supply in order to restore the PIECE ZERO position previously memorised (*F1*).

Necessary conditions :

- **absolute zero-setting must have been performed for the axis in question**
- **the position of the PIECE ZERO position of the axis in question must have been memorised**
- **the axis must have been brought near the MACHINE ZERO (only if the transduction has more than one)**
- **the SPACE 2000 must be set in position display conditions ("POS" LEDs on)**

3 axes “T” version

- **the axes summing function must have been disabled with the “F8” function key pag.24**

Select the function by pressing the following keys : 	The **“F2”** message appears on the X-axis display to indicate the choice of the function to be enabled. All the LEDs except PWR and the displays of the other axes are switched off. The indication of the origin/tool remains enabled.	In order to quit this selection and return to the position display, press the key : 
In order to enable the function selected press: 	The X-axis display will show the **“SEL. ASSE”** message in order to inform the operator to select the axis for the execution of the function selected.	In order to quit this selection and return to the position display, press the key : 
Select the axis involved by pressing any of the keys: **T version**  **M version** 	The display of the axis selected will show a **“0”** that shifts from right to left and vice-versa. The display of the other axes and the respective LEDs remain disabled in order to show the operator that the procedure must still be concluded.	In order to quit this selection and return to the position display, press the key : 
Move the axis selected by making it transit over the transduction's MACHINE ZERO point.	When the MACHINE ZERO point is detected, the moving **“0”** disappears and the display of all the axes in the position status and the respective LEDs are restored. The axis for which the “PIECE ZERO” has been restored is now ready for work.	If the transduction does not have only one MACHINE ZERO point, be careful to avoid committing serious errors by transiting over an erroneous reference point. If this occurs, repeat the procedure from the start.

F 3 Average point calculation

This function can be used for a relative zero-setting of the display of the axis at the center of two points measured previously.

This function is used for centring inside a hole or to define the center of a plate.

Necessary conditions :

- **absolute or relative zero-setting must have been performed for the axis in question**
- **the axis must have been shifted after zero-setting in order to define the segment for which the average point will be calculated**
- **the SPACE 2000 must be set in position display conditions ("POS" LEDs on)**

Select the function by pressing the following keys : F 3	The **"F3"** message appears on the X-axis display to indicate the choice of the function to be enabled. All the LEDs except PWR and the displays of the other axes are switched off. The indication of the origin/tool remains enabled.	In order to quit this selection and return to the position display, press the key : F
In order to enable the function selected, press: Ent	The X-axis display will show the **"SEL. ASSE"** message in order to inform the operator to select the axis for the execution of the function selected.	In order to quit this selection and return to the position display, press the key : F
Select the axis involved by pressing any of the keys: **T version** X Z Z_1 **M version** X Y Z W	The display of the axis selected will show the distance from the average point. Now when the axis is brought to zero, it will be exactly at the center of the position displayed prior to the use of the "**F3**" key.	The displays of the other axes and the respective LEDs return to normal in order to show the operator that calculation function has been concluded.

F 4 Automatic relative pre-set

With this function, the SPACE 2000 permits the re-selection of the latest relative dimension set with the use of the relative pre-selection command.

This function is used to perform working at equidistant steps using the "return to zero" technique.

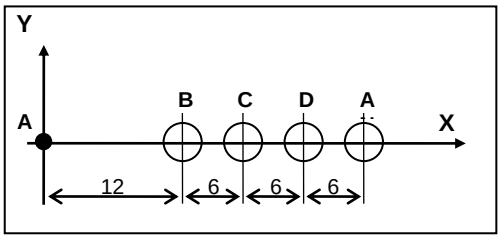
Necessary conditions :

- **an initial relative pre-selection must have been made that contains the work step value.**
- **the SPACE 2000 must be set in position display conditions ("POS" LEDs on)**

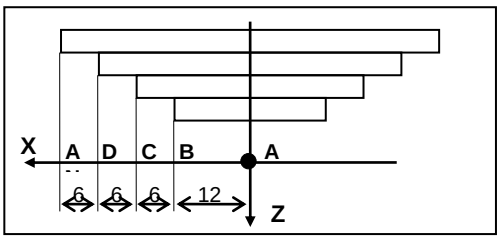
Select the function by pressing the following keys : F 4	The **"F4"** message appears on the X-axis display to indicate the choice of the function to be enabled. All the LEDs except PWR and the displays of the other axes are switched off. The indication of the origin/tool remains enabled.	In order to quit this selection and return to the position display, press the key : F
In order to enable the function selected press: Ent	The X-axis display will show the **"SEL. ASSE"** message in order to inform the operator to select the axis for the execution of the function selected.	In order to quit this selection and return to the position display, press the key : F
Select the axis involved by pressing any of the keys : **T version** X Z Z_1 **M version** X Y Z W	The display of the axis selected will show the algebraic sum of the dimension displayed and the latest relative pre-selection made. The operator interested in the use of this function must obviously translate the axis and bring it to zero in order to execute the step selected each time the dimension is recalled.	If the step called is not the step required for the working in question and it must be substituted with another step with different value, the relative pre-selection operation must be repeated by entering the new value which will be subsequently available for this function.

EXAMPLE

M VERSION



T VERSION



N°	"X"-AXIS MOVEMENT	OPERATIONS ON THE SPACE 2000	"X" DISPLAY
1	Bring the axis to position "A" PIECE ZERO and then perform absolute zero-setting (pag.14)	ABS INCR X Ent	● ○ ● ABS INCH POS **0,00**
2	Reach point "B" by shifting 12 mm.		● ○ ● ABS INCH POS **12,00**
3	Perform a relative pre-selection equal to the drilling step but with the opposite sign in order to reach zero in the right direction. (pag.15)	X +/- 6 Ent	○ ○ ● ABS INCH POS **- 6,00**
4	Reach point "C" by bringing the display to zero		○ ○ ● ABS INCH POS **0,00**
5	With the axis in point "C", in order to represent the same step defined above, proceed as follows : (pag.20)	F 4 Ent X	○ ○ ● ABS INCH POS **- 6,00**
6	Reach point "D" by bringing the display to zero, and hypothesise a positioning error of 0.02 mm.		○ ○ ● ABS INCH POS **- 0,02**
7	With the axis in point "D", in order to represent the same step defined above proceed as follows: (pag.20)	F 4 Ent X	○ ○ ● ABS INCH POS **- 6,02**
8	As may be seen in point "7" the dimension recalled has considered the positioning error, and now point "E" can be reached		○ ○ ● ABS INCH POS **0,00**
9	Recall the absolute dimension in order to enable return to point "A" and begin a new working. (pag.16)	X ABS INCR	● ○ ● ABS INCH POS **30,00**

Millimeter - inch conversion

This function is used to convert millimeters to inches and vice-versa for dimensions displayed on the SPACE 2000 axis displays.
If the system is working in inches, the "***INCH***" LED lights up; otherwise the dimensions displayed are expressed in millimeters.
When the SPACE 2000 is switched, it prepares for working in the conditions it was in when switched off.
Remember that ***"F5"*** function works only on the dimension display and not for the setting of values, which must always be expressed in millimeters. For this reason, with the display working in inches, after each setting operation recognised in millimeters, the SPACE 2000 performs the conversion required.

Necessary conditions:

the SPACE 2000 must be set in position display conditions ("POS" LEDs on)

Select the function by pressing the following keys : 	The **"F5"** message appears on the X-axis display to indicate the choice of the function to be enabled. All the LEDs except PWR and the displays of the other axes are switched off. The indication of the origin/tool remains enabled.	In order to quit this selection and return to the position display, press the key : 
In order to enable the function selected, press: 	The **"inch ON"** message appears on the X-axis display if "millimeter" display conditions were enabled; if "inch" display conditions were enabled, the **"inch OFF"**. message appears on the X-axis display. The "INCH" LED of all the axes will light up if the display is in "inch" display conditions. When the display set in "inch" is switched on, the decimal point for each axis displayed will shift to the left by one digit for a more correct resolution of the unit of measure.	Carefully check the conditions of the "INCH" LEDs on the axes in order to avoid committing serious errors during working.

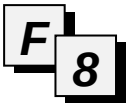
Radius - diameter switching (only T version)

This function enabled only in the SPACE 2000 T version switches the display of the X-axis (diametral axis) from radius to diameter and vice-versa.
With diameter displayed on the X-axis display, the "DIA" LED lights up.

Necessary conditions:

a SPACE 2000 T version must be present.
the SPACE 2000 must be set in position display conditions ("POS" LEDs on).

Select the function by pressing the following keys : 	The **"F7"** message appears on the X-axis display to indicate the choice of the function to be enabled. All the LEDs except PWR and the displays of the other axes are switched off. The indication of the origin/tool remains enabled.	In order to quit this selection and return to the position display, press the key : 
In order to enable the function selected press: 	The **"DIA ON"** message appears on the X-axis if the "radius" display condition was enabled; otherwise the **"DIA OFF"** message appears if "diameter" display condition was enabled. The "DIA" LED on the X-axis will light up if the display is in "diameter" condition.	Carefully check the conditions of the "DIA" LED on the X-axis in order to avoid committing serious errors during working.

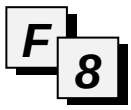


Axes summation enabling (only for 3-axes T version and 4-axes M version)

This function enabled only in the SPACE 2000 3-axes T version switches from independent 3-axes display to 2-axes display, one of which is the summation of two axes.
The purpose is to reach the algebraic sum of the two coaxial axes (longitudinal carriage and tool-holder axes) and then obtain a single display in order to facilitate working on the lathe.
The two axes must be separable for two reasons:

- during the absolute zero restoration and memorisation operations (each axis has its own MACHINE ZERO on the transduction)
- in order to perform taper working in which the tool-holder is inclined, and in this way no longer coaxial with the carriage's longitudinal axis.

Necessary conditions:
a SPACE 2000 3-axes T version must be present.
the SPACE 2000 must be set in position display conditions ("POS" LEDs ON)

Select the function by pressing the following keys : 	The **"F8"** message appears on the X-axis display to indicate the choice of the function to be enabled. All the LEDs except PWR and the displays of the other axes are switched off. The indication of the origin/tool remains enabled.	In order to quit this selection and return to the position display, press the key : 
In order to enable the function selected press: 	The **"DUAL ON"** message appears on the X-axis display if the axis summation condition was not enabled; otherwise, the **"DUAL OFF"** message appears if the axis summation condition was enabled. The visual effect of the function enabled is very simple: the central Z-axis switches off and the sum value of the two axes appears on the Z1-axis.	

MACHINE PARAMETER PROGRAMMING (M.P.)

This command permits the programming of the machine parameters that define SPACE 2000 functionality.

The operations described in this paragraph are usually used during the installation and initial operation of the SPACE 2000 most often conducted by LOGAN technical personnel.

Whenever possible, machine parameter programming has already been performed by LOGAN in accordance with the supply specifications: for this reason, the information in this section is provided only for reference.

Entry into the SPACE 2000 machine parameter table is obtained by keeping the following key pressed: **F** during switch-on until the first parameter appears.	The first parameter **"P00"** appears on the X-axis display together with its value. All the LEDs except PWR and the displays of the other axes are switched off. The indication of the origin/tool is also disabled.	Each time the following key is pressed: **Ent** the SPACE 2000 runs a coherence check on the parameter. If the parameter is considered correct, it is memorised and the next parameter appears on the display. Whenever incoherence is found, the display provides the "**Par. inc.**" error message for around 2 seconds and then shows the wrong parameter for correction.
In order to quit M.P. programming, press: **F**	The X-axis display will show the **"OFF - ON"** message.	Switch the SPACE 2000 off and then on until it resumes normal operation and any parameters modified are enabled.

MACHINE PARAMETER TABLE

The table below provides a brief description of each parameter and the respective range of standard values for lathe and milling machine applications.
The final column must be filled out by LOGAN Technical Service whenever the application in question requires specific values other than standard.

GENERAL PARAMETERS

General parameters regard functional characteristics that involve the equipment in its entirety and are distinguished by the fact that their numerical value begins with a zero.

M.P.	DESCRIPTION	VALUES		
		LATHE	MILLER	SPEC.
P00	Selection of type of application and number of axes enabled (“n”)	**0”n”**	**1”n”**	
P01	Switching to Display OFF condition	**0000**	**0000**	
P02	Selection of message language (only for SPACE PRO version)	**0**	**0**	
P03	RS 232 serial line enabling (Optional)	**0**	**0**	
P04	Serial line character format	**0**	**0**	
P05	Serial line Baud rate	**0**	**0**	
P06	Input enabling for the measurement tracer point (Optional)	**0**	**0**	
P07	Measurement tracer point sphere diameter value	**0**	**0**	
P08	Zero achieved signal operation mode (Optional)	**0**	**0**	
P09	Numerical value that defines P08 mode	**0**	**0**	

INDEPENDENT PARAMETERS PER AXIS

These parameters define the operation of each axis independently and are distinguished from one another by the numerical value of the first digit.

M.P.	DESCRIPTION	VALUES		
	X-AXIS (T and M versions)	**LATHE**	**MILLER**	**SPEC.**
P10	Enabling (the X-axis cannot be disabled)	**1**	**1**	
P11	Counting direction	**0**	**0**	
P12	Display format	**4.2**	**5.2**	
P13	Transducer pulse value (integer part)	**0005**	**0001**	
P14	Transducer pulse value (decimal part)	**0000**	**0000**	
P15	Zero achieved output enabling (Optional)	**0**	**0**	
	Z-AXIS (T version) - Y-AXIS (M version)			
P20	Enabling (depends on the value “n” of parameter P00)	**1**	**1**	
P21	Counting direction	**0**	**0**	
P22	Display format	**4.2**	**5.2**	
P23	Transducer pulse value (integer part)	**0010**	**0001**	
P24	Transducer pulse value (decimal part)	**0000**	**0000**	
P25	Zero achieved output enabling (Optional)	**0**	**0**	
	Z1-AXIS (T version) - Z-AXIS (M version)			
P30	Enabling (depends on the value “n” of parameter P00)	**1**	**1**	
P31	Counting direction	**0**	**0**	
P32	Display format	**4.2**	**5.2**	
P33	Transducer pulse value (integer part)	**0010**	**0001**	
P34	Transducer pulse value (decimal part)	**0000**	**0000**	
P35	Zero achieved output enabling (Optional)	**0**	**0**	
	X1-AXIS (T version) - W-AXIS (M version)			
P40	Enabling (depends on the value “n” of parameter P00)	**0**	**1**	
P41	Counting direction	**0**	**0**	
P42	Display format	**4.2**	**5.2**	
P43	Transducer pulse value (integer part)	**0005**	**0001**	
P44	Transducer pulse value (decimal part)	**0000**	**0000**	
P45	Zero achieved output enabling (Option)	**0**	**0**	

MACHINE PARAMETER DESCRIPTION

P00 = Selection of type of application and number of axes enabled ("n").

The coherent values for this parameter are: **0"n" / 1"n"**

With parameter P00, the SPACE 2000 defines whether the application is for a lathe (P00= 0"n") or a milling machine or boring machine (P00= 1"n").

The value "n" varies from 1 to 4 axes for the Space 2000, and from 1 to 3 axes for the Space 2000 " RIF".

Whenever any of these values are selected, the SPACE 2000 automatically writes the standard values indicated in the machine parameter table in the following parameters and enables the number of axes that corresponds to the value "n". (see the M.P. table)

P01 = Switching to Display OFF condition.

The range of coherent values runs from: **0000** to **9999**

When left in out-of-use condition (without making any selections on the keyboard or axis shifting) and after the time (expressed in seconds) set using parameter P01, the SPACE 2000 automatically assumes display OFF condition (display switching off and enabling of the moving decimal point for all the axes enabled, digit by digit).

The value of parameter **P01 = 0000** defines the disabling of the function.

Display OFF condition can be changed by making any selection with the Enter key or by simply shifting an axis.

P02 = Selection of message language (only for SPACE PRO version)

The range of coherent values varies as prescribed in the table below:

0 = ITALIAN
1 = FRENCH
2 = SPANISH
3 = ENGLISH
4 = GERMAN

In the standard version, only the "0" value can be entered because the messages that appear on the "X"-axis are universally understandable symbols.

P03 = RS 232 serial line enabling (Optional)

The serial line is an optional that requires hardware variations in the main board. The values that can be set for this parameter are as follows:

0 = Serial line not enabled
1 = Serial line enabled in operation mode "1"
2 = Serial line enabled in operation mode "2"

* Contact LOGAN Technical Service for further details.

P04 = RS 232 serial line character format

This defines the format of the character to be used for adaptation to the peripherals to which the serial line is connected (Personal Computer, Printers)

The values that can be programmed for this parameter are shown in the table below.

"P04" VALUE	*START BIT*	*BIT no.*	*PARITY*	*STOP BIT*
00	START	7 BIT DATA	----------	1 STOP
01	START	7 BIT DATA	----------	2 STOP
02	START	7 BIT DATA	EVEN	1 STOP
03	START	7 BIT DATA	EVEN	2 STOP
04	START	8 BIT DATA	----------	1 STOP
05	START	8 BIT DATA	----------	2 STOP
06	START	8 BIT DATA	EVEN	1 STOP
07	START	8 BIT DATA	EVEN	2 STOP
10	START	7 BIT DATA	----------	1 STOP
11	START	7 BIT DATA	----------	2 STOP
12	START	7 BIT DATA	ODD	1 STOP
13	START	7 BIT DATA	ODD	2 STOP
14	START	8 BIT DATA	----------	1 STOP
15	START	8 BIT DATA	----------	2 STOP
16	START	8 BIT DATA	ODD	1 STOP
17	START	8 BIT DATA	ODD	2 STOP

P05 = RS 232 serial line Baud rate

This defines the transmission speed to be used for adaptation to the peripherals to which the serial line is connected (Personal Computer, Printers)
The values that can be set for this parameter are as follows:

0 = 38400 Baud
1 = 19200 Baud
2 = 9600 Baud
3 = 4800 Baud
4 = 2400 Baud
5 = 1200 Baud
6 = 600 Baud

P06 = Input enabling for the measurement tracer point

The measurement tracer point input is an optional that requires hardware variations in the main board.
The values that can be programmed for this parameter are as follows:

0 = Input for tracer point disabled
1 = Input for tracer point enabled in operation mode "1"
2 = Input for tracer point enabled in operation mode "2"

* Contact LOGAN Technical Service for further details

P07 = Tracer point contact sphere diameter value

The value that can be programmed runs from 0000 to 9999.
The unit of measurement of the programmable value corresponds to the least significant unit of the display format programmed. For example, if the format is 5.2, each unit is equal to 1 hundredth of a millimeter; if the format is 4.3, the same unit is equal to one thousandth of a millimeter.

P08 = Zero achieved signal operation mode

The zero achieved signal is an optional that requires hardware variations in the main board.

The values that can be programmed for this parameter are as follows :

0 = The zero achieved signal is enabled by the passage of the display over the “0" value and maintained for the period of time set with parameter P09

1 = The zero achieved signal is enabled by the passage of the display over the “0" value and maintained until it shifts positively or negatively from the "0" point by the space defined with parameter P09

P09 = Numerical value that defines P08 mode

The value that can be programmed runs from 0000 to 9999.

With P08 = 0 – Each P09 unit corresponds to 20 ms

With P08 = 1 – Each P09 unit corresponds to the value of the transducer pulse defined for the axis in which the zero achieved signal is enabled.

INDEPENDENT PARAMETER FOR AXIS

P10 - P20 - P30 - P40 = Enabling

The coherent values for this parameter are: **0** / **1**

With parameter Px0, the SPACE 2000 defines axis disabling with the “0” value and axis enabling with the "1" value.

For the X-axis (P10), the SPACE 2000 accepts only the value “1” because this is the axis for dialogue with the user.

P11 - P21 - P31 - P41 = Counting direction

The coherent values for this parameter are: **0** / **1**

With parameter Px1, the SPACE 2000 defines no inversion in the counting direction with the "0" value and counting direction inversion with the "1" value.

P12 - P22 - P32 - P42 = Display format

This parameter is composed of two numbers separated by a decimal point.

The first number indicates the digits to the left of the decimal point (integer) and the second number indicates the digits to the right (decimal) that must be shown on the display.

All combinations are possible except:

- values in which the sum of the two numbers exceeds “7” (the maximum number of digits)
- values in which the first number is equal to “0” (the minimum number of the integer digit = 1)

Example :	P12= 5.2	**X-**axis display	**X 00000.00**	
	P22= 4.3	**Y**-axis display	**Y 0000.000**	
	P32= 4.2	**Z**-axis display	**Z 0000.00**	
	P12= 7.0	**X**-axis display	**X 0000000**	(only integers)
	P12= 5.3	Par. inc. (Incoherent parameter)		
	P22= 0.7	Par. inc. (Incoherent parameter)		

P13 - P23 - P33 - P43 = Resolution factor - integer part

The range of coherent values runs from: **0000** to **9999**

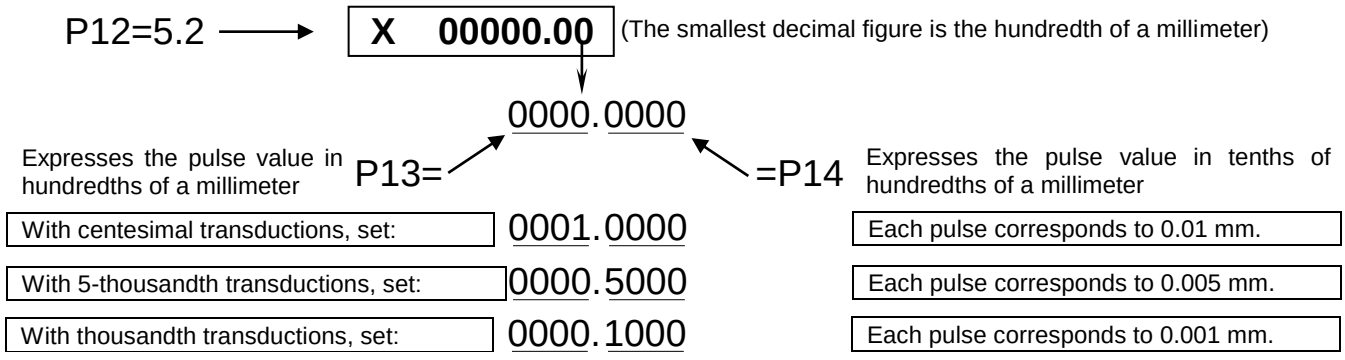
P14 - P24 - P34 - P44 = Resolution factor - decimal part

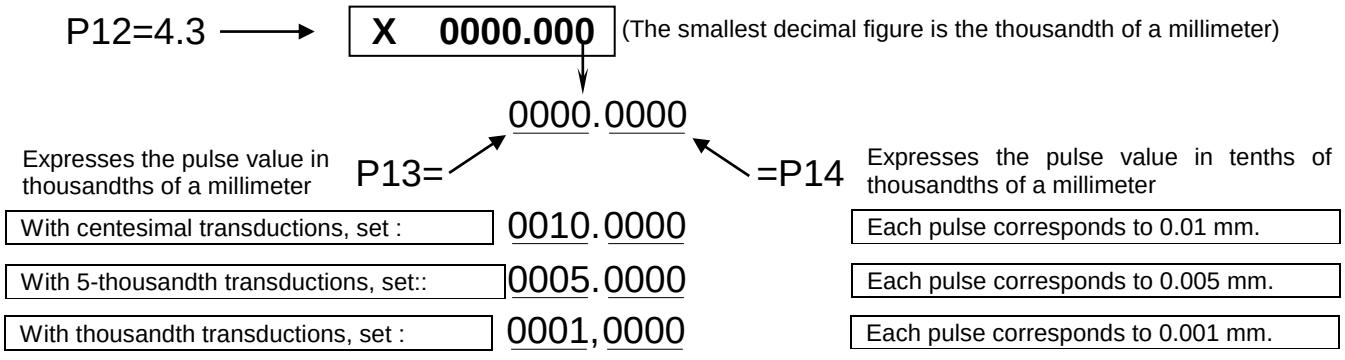
The range of coherent values runs from: **0000** to **9999**

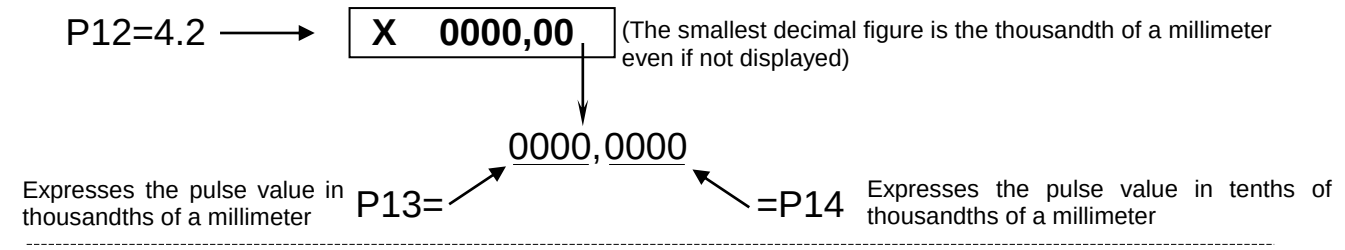
Resolution factor

The resolution factor is composed of the union of the two parameters above: the integer part and the decimal part, and is strictly linked to the display format (P12 - P22 - P32 - P42).

The pulse sent by the transducer connected to the SPACE 2000 is multiplied by "4" in order to obtain the maximum direct resolution available and is then multiplied by the "Resolution factor".
The value of the Resolution factor runs from "0000,0000" to "9999,9999".
The unit of measurement of the Resolution factor can be varied according to the display format set.
Example: (X-axis – P12 – P13 – P14 parameters)







The possibility to modify the resolution factor in units of tenths of thousandth with respect to the smallest unit of measurement displayed provides the way to make linear correction for any errors that might be present in the tool machine axis.

P15 - P25 - P35- P45 = Zero achieved output enabling (Optional)

The zero achieved output is an optional that requires hardware variations in the main board.

The range of coherent values runs from: **0** to **7**

With the "0" value, the zero achieved output is disabled; values from 1" to "7" identify the enabling and the corresponding output.

SERVICE MESSAGES

Service messages guide the user in selecting the right operative sequence during the enabling of the SPACE 2000 various commands.

N°	MESSAGE	MEANING
1	**"ABS"**	Indicates the selection of the ABS/INCR key and is used during simultaneous zero-settings or absolute pre-selection.
2	**"SEL. ASSE"**	Indicates that the user must select an axis in order to proceed further.
3	**"F_"**	Indicates the selection of the F function enabling key and waits for the user to enter the numerical value that corresponds to the function to be performed.
4	**P00=_**	This appears only after a cancellation from memory or after the Incoherent parameter condition procedure triggered by switch-on has been quit and waits for the user to enter the numerical value coherent with the type of product application.
5	**Inch. On** **Inch. OFF**	These messages appear during the enabling or disabling of the **"F5"** function for the indication of the selection being made.
6	**DIA. On** **DIA. OFF**	These messages appear during the enabling or disabling of the **"F7"** function for the indication of the selection being made.
7	**DUAL. On** **DUAL. OFF**	These messages appear during the enabling or disabling of the **"F8"** function for the indication of the selection being made.
8	**SER. On** (Optional) **SER. OFF**	These messages appear during the enabling or disabling of the **"F9"** function in mode **"2"** of parameter **"P03"** for the indication of the selection being made.
9	**Batt. On** (Optional) **Batt. OFF**	With the battery inserted option, whenever a power failure occurs in the mains, the "Batt. On" message appears. This message changes to "Batt. OFF" when mains power supply returns.

ERROR MESSAGES

Error messages help the user establish the operating limits of the SPACE 2000 or its anomalies.

N°	MESSAGE	MEANING
1	**"Par. inc."**	**A)** Indicates the presence of one or more incoherent parameters if displayed when the equipment is switched on; in order to quit, press the following key: **CL** The SPACE 2000 sets the entire memory to zero and provides the **P00=_** service message on the "X" display and waits for the user to enter the value that corresponds to the application in use. When the **P00** value is entered all the other parameters are automatically set with the standard corresponding values (see the M.P. table) **B)** This message appears during the normal writing of machine parameters whenever the user enters a parameter value that is incoherent with the system. In this case, the message is shown for around 2 seconds and then the incoherent parameter reappears for correction by the user (see the description provided for the M.P.)
2	**"Fun. inc."**	This message appears during the entry of a function value that is incoherent with the system. The control test is conducted when the **"Enter"** key is pressed after the entry of the numerical value. The message is shown for around 2 seconds and then the incoherent function reappears for correction of the value by the user.
3	**"For. inc."**	This message appears during the entry of an absolute or relative preset dimension that is not coherent with the display format set previously by parameters **P12-P22-P32**. The control test is conducted when the **"Enter"** key is pressed after the entry of the numerical value. The message is shown for around 2 seconds and then the incoherent dimension reappears for the correction of the format by the user.

4	**"Org. inc."** **"tool. inc."**	This message appears during the entry of an origin/tool value that is not coherent with the system. The control test is conducted when the **"Enter"** key is pressed after the entry of the numerical value. The message is shown for around 2 seconds and then the incoherent function reappears for the correction of the value by the user.
5	**"ASSE Out"**	This message appears when the numerical value of an axis exceeds the maximum stroke that can be managed according to the display format set with parameters **P12-P22-P32**. In any case, the internal counters of the SPACE 2000 do not lose the position, and by inverting the movement and returning within the range of values that can be displayed, working can be continued without error. If possible, select the display format most coherent with the application in question.

INSTRUCTIONS FOR REPAIR

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EC – DECLARATION OF CONFORMITY

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VAT n. IT 01347930016
N° Mecc. TO 035708

Declares that the Component of Safety:

***SPACE 2000*____**
Serial no._____
manufactured in 200____

is in conformity with EC MACHINERY DIRECTIVE 83/392 - 91/368 - 93/44 - 93/68 and complies with the requirements of the standard specified

Volvera , _____

The Legal Representative
(Roberto Palermi)
Director

SPACE 2000					
VERSION		T	M	SPEC	
OPTIONS	SERIAL LINE				
	ZERO ACHIEVED				
	BUFFER BATTERY				
SERIAL NUMBER					
SOFTWARE VERSION					
POWER SUPPLY		24	110	220	
TRANSDUCER POWER SUPPLY		5	12		
AXES NO.		1	2	3	4
INSPECTION DATE					
INSPECTOR					

NOTES