TIEPOLO

STD 1

USER'S MANUAL

MANUAL VERSION: ***1.1***	
Refers to software version:	***TIEPOLO:*** ***1.xx***
MANUAL CODE :	***MA TPL U STD 1 1.1***

DATE: 29 JUNE 2005

CE

This documentation has been created by S&h to be used exclusively by users of TIEPOLO equipment.
Its contents are the property of S&h and may not be reproduced in whole or in part without the written permission of S&h.
The information contained in this document is subject to change without prior notice and does not represent a commitment by S&h.

GENERAL

INTRODUCTION

The contents of this manual describe the technical features and performance of the TIEPOLO operator interface. It is designed to be a useful reference guide for the operator for a quick understanding and also for effective use of all the functionsMain features:

Main features:

- 240x128 pixel graphic LCD monitor
- Polyester control and programming keyboard
- Power supply: +24Vdc / 6W
- Handling the program variables
- 2 serial ports one for connecting to the CNC and one fot connecting the PC.

VERSION

The information contained in this manual refers to the Software Version of the TIEPOLO stated on the cover.
The version of the software present in the TIEPOLO is displayed on the screen on start-up.

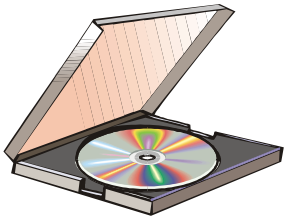
INSTALLATION AND CONNECTION

UNPACKING

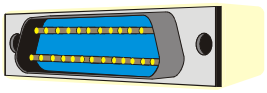
The TIEPOLO package contains the following articles:

6 PIN CONNECTOR

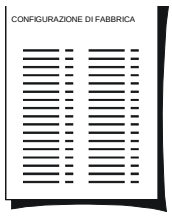
3 PIN CONNECTOR



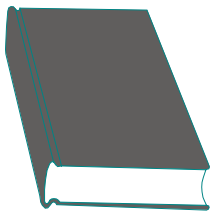
CDROM CONTAINING BACH SOFTWARE AND MANUAL



HARDKEY FOR ENABLING SPECIAL SOFTWARE FUNCTIONS



FACTORY CONFIGURATION SHEET



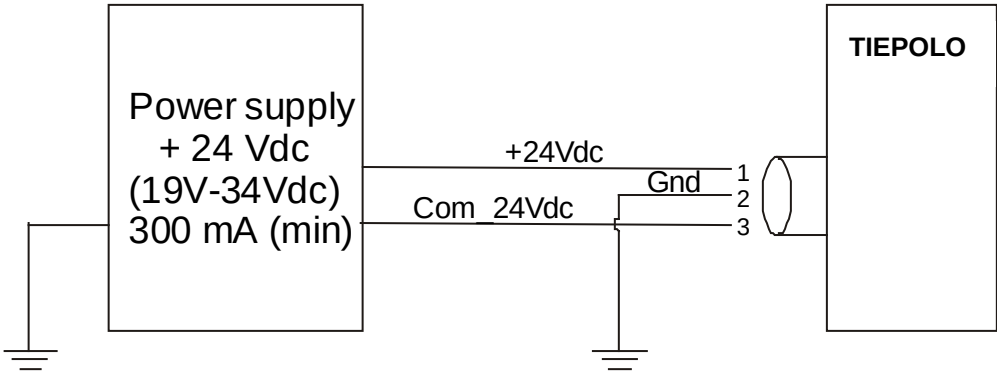
USER'S MANUAL

(*) : The LT version of the BACH software supplied with the unit does not require the use of the hardkey, while other special functions are optional and must be specified on ordering and their operation requires the presence of the programmed hardkey.

Check that all articles shown in the drawing are present and undamaged.
Once the package has been inspected, the power may be connected.

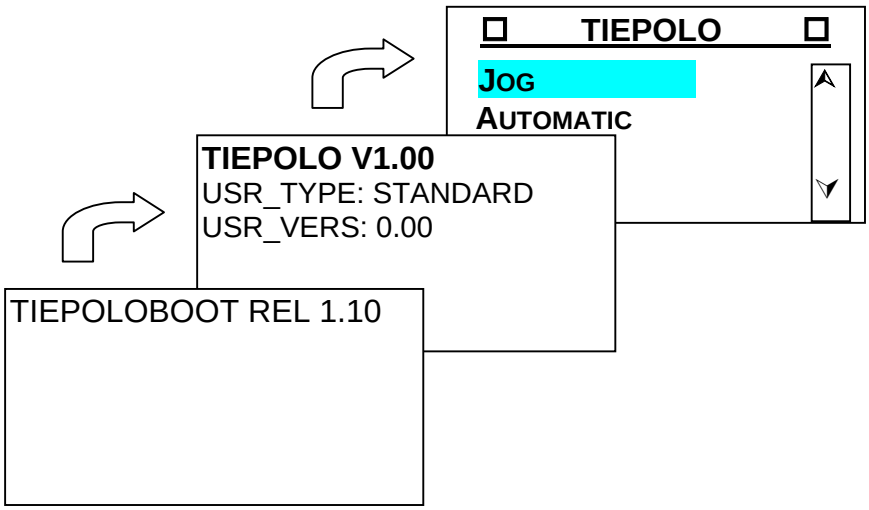
POWER WIRING

Connect the TIEPOLO to a 24Vdc (+19VDC ... +35VDC; 320 mA minimum) power supply, using the three pin connector supplied, following the drawing below:



Once connected, the TIEPOLO may be powered up.

When switched on, the TIEPOLO emits an audible signal and a message appears on the screen to indicate the model and version of software that has been installed in the internal memory. About 3 seconds later, the screen will show the Main Menu page with the two items «jog» e «automatic».



At this point it is already possible to connect the encoders, drives, can-bus etc., following the instructions in this manual.

CNC LINK ERROR

The display of this error indicates that the TIEPOLO has not detected any CNC on the Serial Port No. 1.

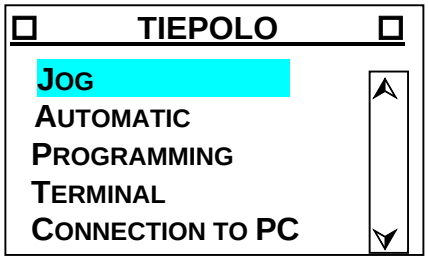
CONNECTING THE PC

To communicate from the PC to the TIEPOLO, a few steps must be followed:

- Connect the X13 connector of the TIEPOLO to the COM1 or COM2 port of the computer, using a serial cable (Standard PC cross-over type)

Operations to be performed on the TIEPOLO

- Type the password “74269” to enable the protected functions in the controller. The following screen will appear:

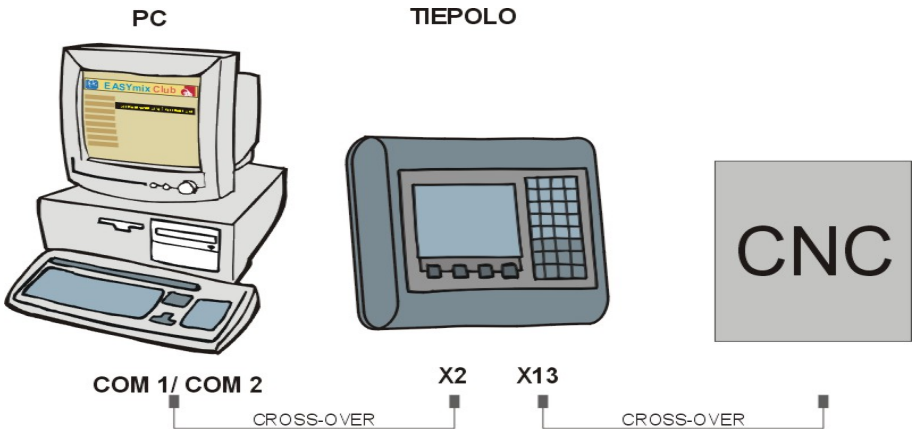


- Select the item “PC connection” , pressing the  key until this line is displayed in reverse and confirm with the  key;

Operations to be performed on the PC

- Install the “BACH” software, following the attached instructions;
- Configure the system, following the same instructions

For greater technical detail, refer to the page entitled **“CONNECTION TO SERIAL PORT NO.1/2”** in this manual.



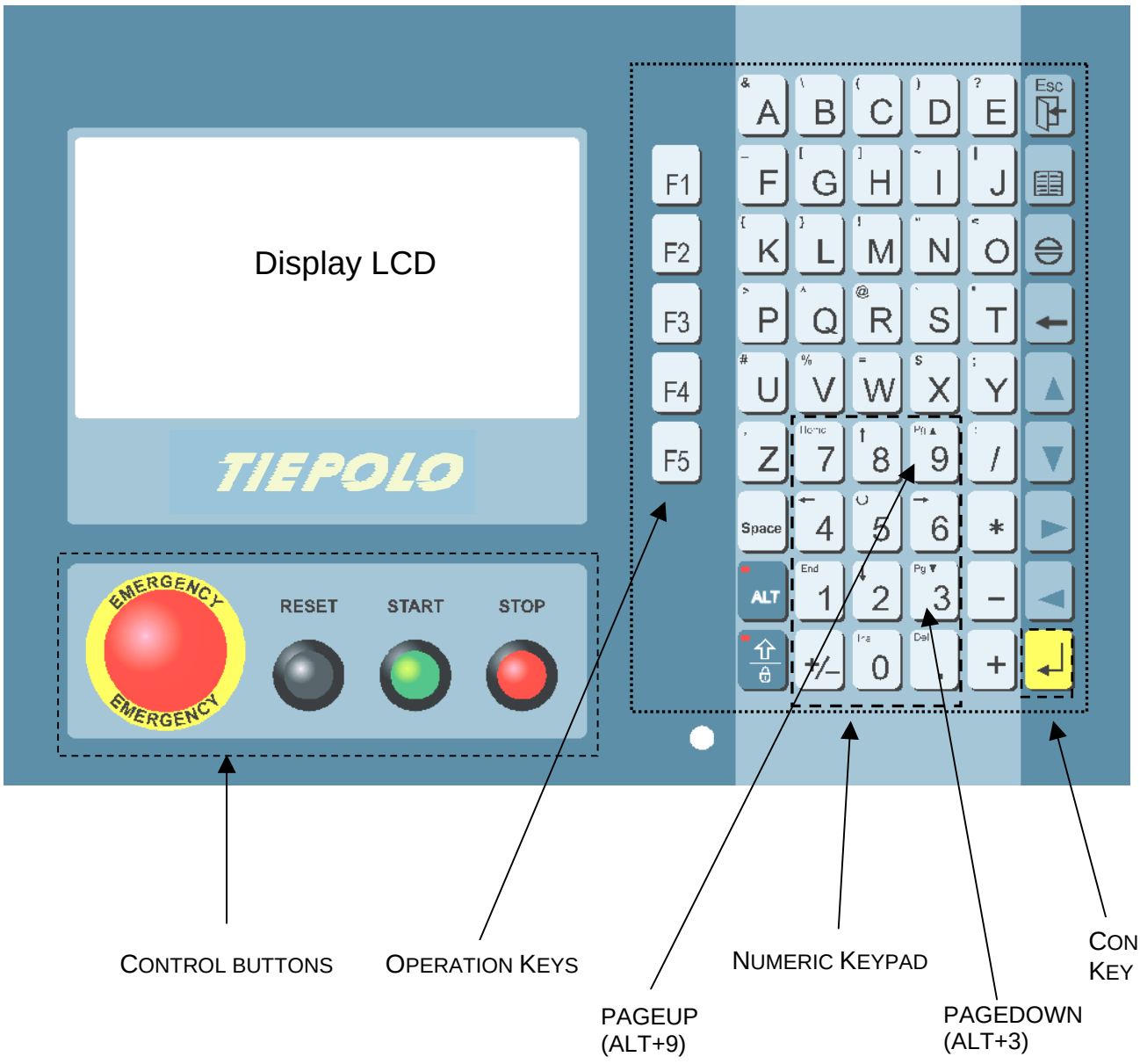
OPERATOR INTERFACE

This chapter explains how to access all the functions of the TIEPOLO using the local keypad, without using the Bach program or the serial link to a PC. In doing this, wherever possible a path will be followed that, at the same time, illustrates the functions of all the keys that are active at any moment and which will enable the user to perform most of the operations that will normally be needed.
It is recommended that these pages are read at least once, following the operations described on a working TIEPOLO that is not attached to the motors.

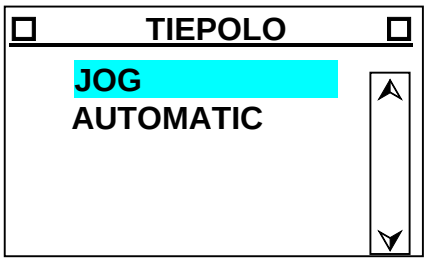
SCREEN, KEYBOARD AND LED'S

The TIEPOLO has an LCD graphic screen (240*128 pixel), a polyester keyboard complete with the operational keys, numeric keys and function keys, 2 LED's to indicate the active status of the key.

FRONT PANEL



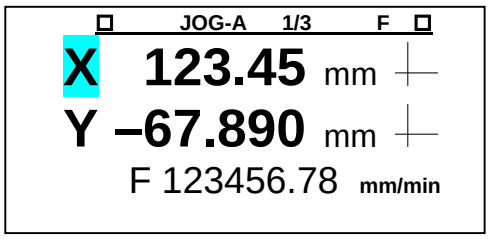
If the power supply has been connected, and the eventual error message **RAM CHECK ERROR** has been cancelled, the screen will show the following image.



In this situation, it is possible to adjust the contrast of the display. The adjustment is made using the potentiometer on the left of TIEPOLO, until the right contrast is obtained.

 **KEY**

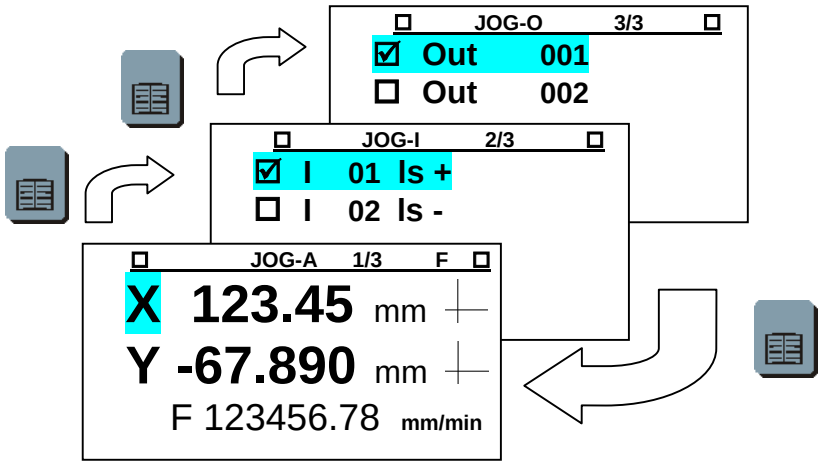
This key is used to confirm data or instructions entered. If this key is pressed after entering a numerical data value, it confirms the value entered to the controller. Pressing it now confirms the choice of jog operation and the display becomes as shown here:



The status line at the top of the screen informs us that the mode of operation is currently “jog displacement of the axes” (JOG – AXES), and the displayed screen is the first of three and that there is a function associated with this screen that can be accessed by pressing the  key (F). The symbol  indicates that co-ordinates refer to the machine origin and the actual position has not been searched for. If the position has been searched for, in its place will appear the symbol  .

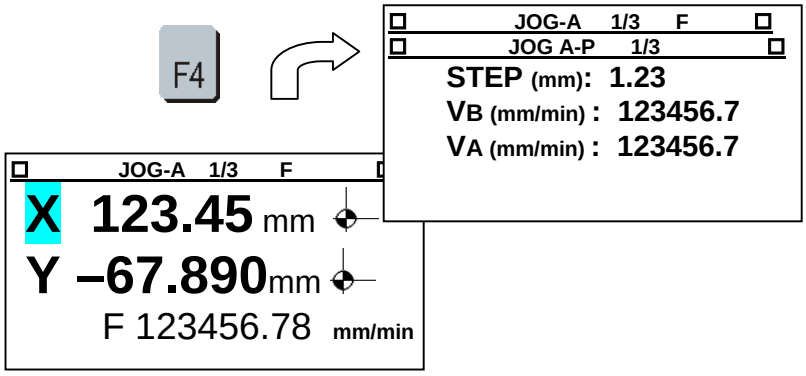
OR F3 KEY

This key is used to switch, between the various operations, within the active operating mode. For the "Jog" mode, these are "DISPLACEMENT AXES", "READ INPUTS" and "DISPLAY OUTPUTS".



F4 KEY

Returning to the "JOG-AXES" screen, pressing the F4 key, the screen of the jog displacement parameters appears. These are the step, i.e. the unit entity of the displacement obtained when using the + or – keys, and the two speeds at which the displacements will be executed.



ESC KEY

This is the "EXIT" key used to abandon the current operation and return to the operational level or previous menu. The first time it is pressed, the "JOG-AXES" screen will re-appear. The second time will bring up the general menu screen.

KEYS

Arrow keys: move the cursor and/or select lines of menu, according to the mode. These key take on particular meanings in specific modes: for example, in "JOG-AXES", the key is used to make a continuous movement along the selected axis in the positive direction of the co-ordinates and the key is used to move the same axis in the negative direction.

KEY

This key is used to make direct entry of numerical data. For example, in "JOG-AXES", if this key is pressed, it is possible to enter the co-ordinate to which the axis must move. When confirmed with the  key, the TIEPOLO move the chosen axis to the specified co-ordinate.

KEY

This is used to select one of the characters present on each key. For example, the 

key contains the characters "**Y**" and "**;**". When there are more than one character on a key, the 

key is used to select the one to use. On power up, the LED is off and the large character at the centre of the key is active.

The first time the 

key is pressed, the character at the upper left of the key is activated and LED turns on. Therefore, when the 

key is pressed, the screen will show the character "**;**".

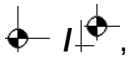

KEY

This is used to select from the capital letter or the lower case character. On power up, the LED is on and the capital letter character at the centre of the key is active.

The first time the 
key is pressed, the lower case character of the key is activated and **LED** turns off. Therefore, when the 

key is pressed, the screen will show the character "**y**".

KEY

If pressed while in the "write text" mode, it is the "space" character. Otherwise it is used as a key for switching between immediate parameters. For example, in "JOG-AXES", it toggles the origin of the co-ordinates of the axes:  , respectively the 0 at the machine origin and the 0 for a local origin.

OR 

KEY

If pressed in the "DATA ENTRY" mode, it is used to change the sign of the data (setting negative values); otherwise it is used to switch between immediate parameters. For example, in "JOG-AXES", it switches between the "SLOW" and "FAST" movement of the axes.


KEY

This is the "DELETE" key for deleting the previous character entered in the write program or data entry operations, otherwise it is used as a key to delete or cancel inside a specific operation.

, F1 OR RESET KEY

This is the "SET" / "RESET" key used to enable/disable the emergency or alarm conditions.

Ins 0, End 1, ↓ 2 ... Pg▲ 9 KEYS

These are the numeric keys that are used to enter numerical values, for example, the co-ordinates of axes or number of the program to be selected.

+, – KEYS

The "+" and "-" keys associated with the numeric keypad are used to add the entered value to or subtract it from the current value (just like a normal calculator). They can also be used for special meanings in specific modes: for example, in "JOG-AXES", they are used to execute the displacement of one step towards the positive and towards the negative co-ordinate direction respectively.

Del . KEY

Decimal point: used during the entry of numerical values, to enter the decimal part of the data.

STOP KEY

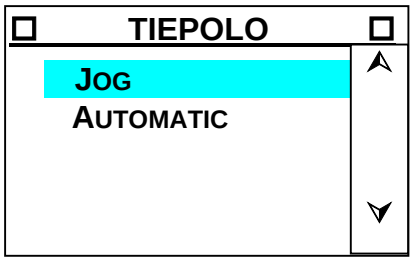
The "STOP" key stops the execution of the current program while in "AUTOMATIC" mode. While writing a series of characters, it disables the INSERTION mode.

START KEY

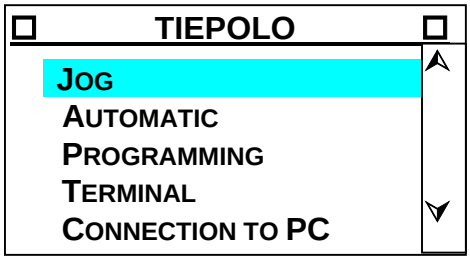
The "START" key runs the selected program within "AUTOMATIC" mode. In other modes, it has different functions. For example, while writing a series of characters it enables the INSERTION mode.

PASSWORD TO ACCESS PROTECTED FUNCTIONS

The normal display of the main menu is the following:



This allows only jog displacement of the axes, machine zero seeking and the selection of a previously written program.
All the other mode functions are protected. It is possible to access these by typing the password “74269”. After doing this, the main menu looks like this:



Typing in the same password again restores the normal display.

Once the general meaning of all keys and the principles of the display are clear, we are ready to expand our knowledge of the TIEPOLO and start making it perform its CNC functions. With this intention, the equipment must first have the parameters regarding the mechanical and electrical characteristics of the moving parts loaded into its memory. If this configuration has not been performed in the factory, refer to the relative appendix, which describes the methods for calculating the parameters to be entered.

MENU

The structure of the “OPERATOR INTERFACE” section of the TIEPOLO is based essentially on the display of menus, or lists of possible operations, that allow the operator to identify and select the actions to perform from time to time.

MAIN MENU AND MENU LEVELS

On power up, after the initialisation screens, the TIEPOLO shows the main menu that is a list of the main operations that can be performed with the TIEPOLO itself.
The selection of one of these functions can bring up the display of another menu: this will go on until the action to perform has been defined completely. In other words, different levels of menu are structured, so that starting from the main menu, and entering into different levels of submenus, the action required will be arrived at see also: MENU TREE)

DISPLAY AND SELECTION OF LINES OF MENU

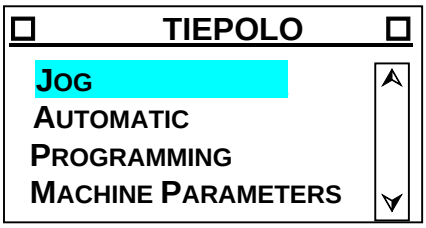
During the display of a menu, the line selected is displayed in "REVERSE" colours, i.e. white letters on a black background. There is also a scroll bar on the right of the screen (last column) that also indicates the displayed lines of the menu.

The  and  keys are used to select the next or previous line to one currently displayed as being selected. These keys will also cause an update of the screen that will scroll the page up or down.

The 

and 

keys are used to select the next or previous page to one currently displayed.



CONFIRMATION OF THE LINE SELECTED

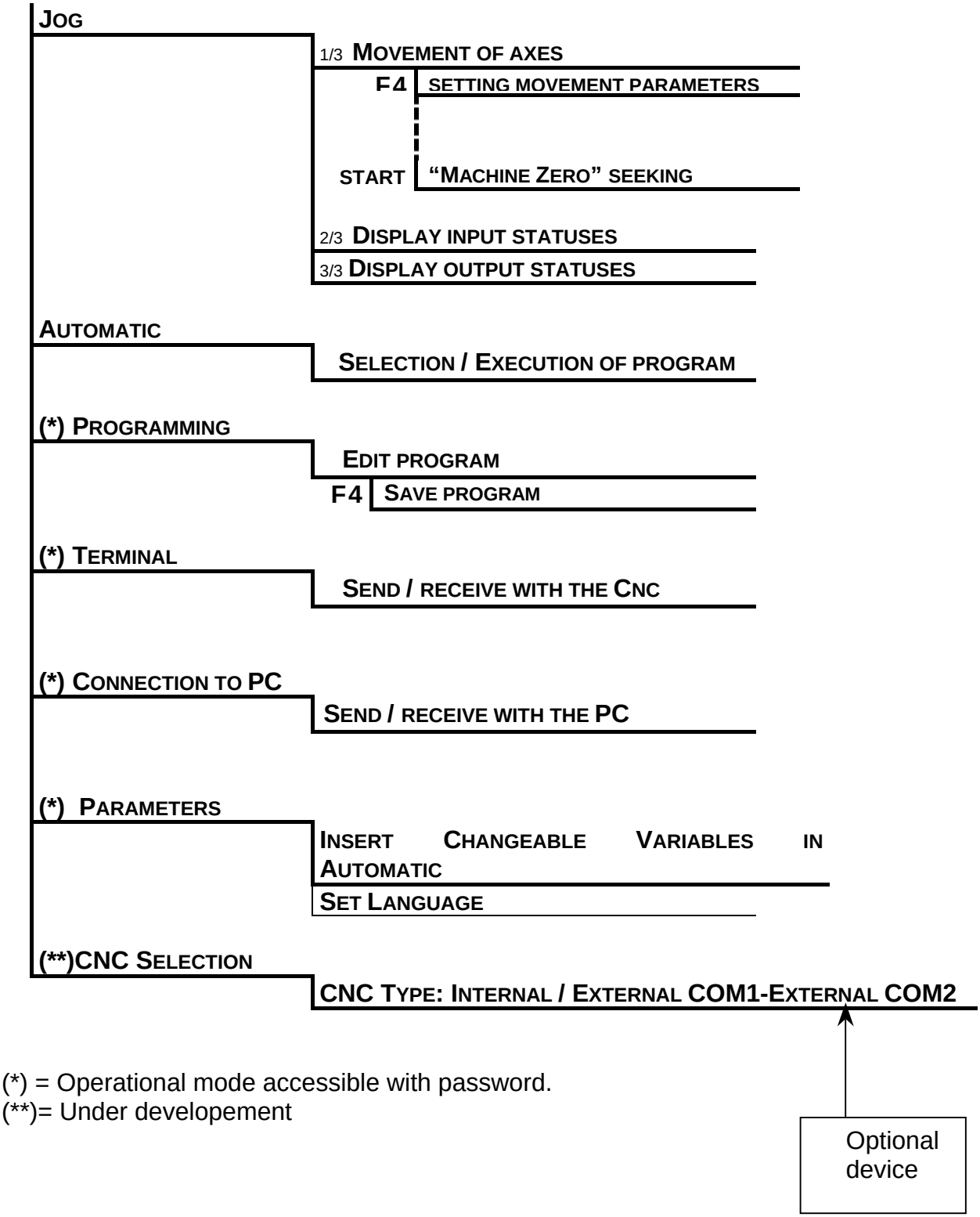
Once the required line has been selected, the choice is confirmed by pressing  key that will cause the execution of the corresponding task.

ESCAPING FROM A MENU

Apart from when in the MAIN MENU, it is possible to escape from any submenu and return to the previous level of menu by pressing the 

key. This is independent of the line selected at the time.

MENU TREE



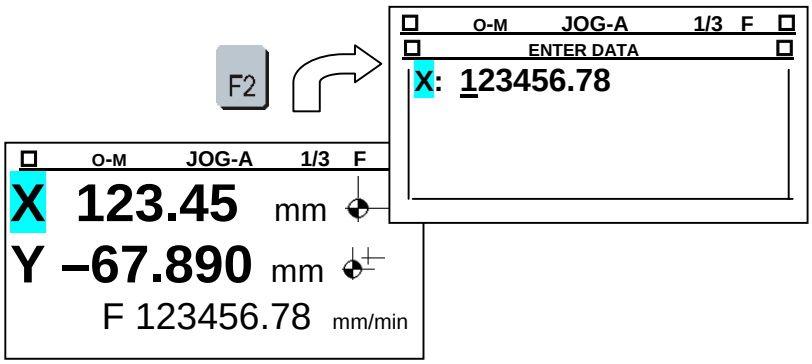
(*) = Operational mode accessible with password.
(**)= Under developement

SETTING DATA

During the execution of some operations, the operator is asked to enter numerical values. These can be integers or real numbers, with or without sign, as a function of the type of data that must be set for this particular operation, for example, co-ordinate, velocity, program number, etc.

FIELD OF ENTRY

When a numerical data entry is requested, an entry field will appear on the screen showing the current value of the data and another for entering the new value. The dimensions of this field, and the position of this field, will change according to the function of the data that must be entered.
Example:



ENTERING DATA

Data is entered using the numeric keys 0…9, the decimal point key ., and, if required, the +/–, + or – key to define the sign of the number (positive or negative). Only the keys that are required for entering that particular data type are accepted for this operation.

CORRECTION

At any time before the data is confirmed, the entry can be corrected using the ← key.

When the ← key is pressed, the cursor moves one place to the left, cancelling the last character entered.

CONFIRM AND ESCAPE

Once the required value has been entered, it must be confirmed using ↵ key. The Esc is used to exit from the DATA ENTRY mode without entering new data.

CHECKING THE ENTERED VALUES

The TIEPOLO performs certain checks on the entered data and if it is incorrect or falls outside the predetermined limits, the anomaly is indicated and the data entry is not accepted.

JOG

The jog mode allows the following functions:

- 1/3 MOVEMENT OF THE AXES
  - SET MOVEMENT PARAMETERS
  - MACHINE ORIGIN SEEKING
  - EXECUTION OF 5 PROGRAMMES THROUGH KEYBOARD
- 2/3 DISPLAY OF THE STATUSES OF THE INPUTS
- 3/3 DISPLAY OF THE STATUSES OF THE OUTPUTS

The presence of the different mode of "JOG" is indicated on the status line at the top of the screen where the number of the active mode and the total number of functions is displayed: "**1/3**".
Furthermore, the status line at the top of the screen shows the symbol "**F**" whenever there is an associated submenu.

The  key is used to switch between the various available functions:

- 1/3 MOVEMENT OF THE AXES
- 2/3 DISPLAY OF THE STATE OF THE INPUTS
- 3/3 DISPLAY OF THE STATE OF THE OUTPUTS

When in the screen for "MOVEMENT OF THE AXES" It is possible to switch to the function "PARAMETERS" using the 

key":

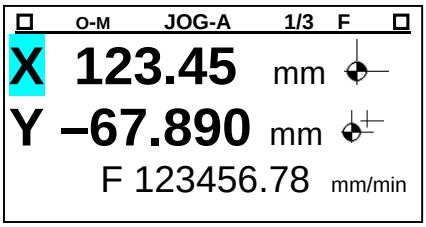
- 1/3 MOVEMENT OF THE AXES
  - PARAMETERS: MOVEMENT

When in the "MOVEMENT OF THE AXES" screen, the start 

key can be used to activate the "SEARCH FOR MACHINE ORIGIN" function.

JOG: 1/3 MOVEMENT OF THE AXES

In this mode, the axes can be moved manually. The operator can select the required axis with the  and  keys. The selected axis is clearly identified on the screen inn "REVERSE".



The display of the co-ordinates can be switched between "ABSOLUTE" and "INCREMENTAL" immediately using the 

key or in the "PARAMETERS" menu. The indication of the origin selected and therefore the type of display that is active is shown to the right of the co-ordinate, where the  symbol appears if it is absolute and the  symbol appears if it is in incremental.

Pressing the  key, it is also possible to define the current position of the selected axis as the absolute origin of the co-ordinates. In this way, it is possible to refer all movements to an arbitrary position chosen by the user. TIEPOLO does however request confirmation before executing the instruction.

MOVEMENT OF THE AXES

The axis selected can be moved "*in continuous mode*", forward or reverse respectively, using the  or  keys and holding them down. When the key is released, the movement of the axis will stop.

The selected axis can be moved just one "STEP", forward or reverse respectively, pressing the  or  key.

During the movement, the co-ordinate of the axis is continuously updated on the screen.

Use the  key to switch the displacement velocity of the axes immediately between "HIGH" and "LOW". The velocity is displayed at the bottom of the screen.

Pressing the  key, it is possible to set the "PARAMETERS" of the "JOG" mode, i.e. the dimensions of the "STEP", the "SLOW SPEED" and the "FAST SPEED"

The selected axis can be moved to a defined co-ordinate using the direct entry of the co-ordinate to which it is required to move the axis. There are two different cases:

1) Displacement to the co-ordinate entered

   Press the  key to enter into the "DATA ENTRY" mode, enter the required co-ordinate for the selected axis and then press the  key to confirm the data and move the axis to the entered co-ordinate.

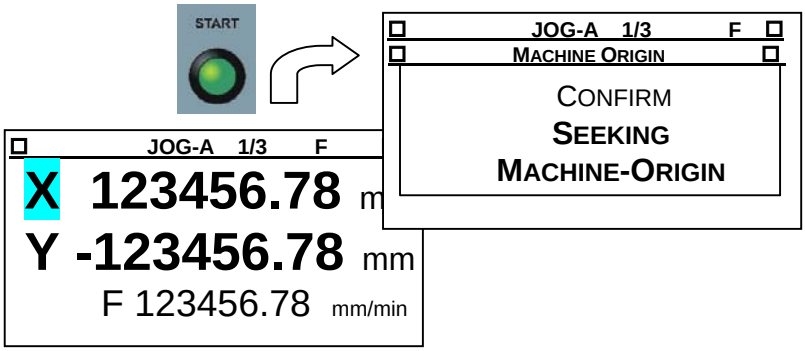
2) Relative displacement to an entered co-ordinate

   Press the  key to enter into the "DATA ENTRY" mode, enter the required co-ordinate for the selected axis and then press the  o  key to confirm the data. The value entered will be added or subtracted from the current co-ordinate and the axis will move to the resultant position.

N.B.: The values for absolute displacements are anyway referred to the selected origin: machine origin  or local origin  .

"MACHINE-ORIGIN" SEEKING

In the "JOG, …MOVEMENT OF THE AXES" mode, the "MACHINE ZERO SEEKING" function can be performed. To activate this procedure, press the start key  . The screen will show the screen that will request confirmation for the activation of the procedure.



Press the  key to activate the "SET POINT" procedure. The axes will move in the predetermined direction until they activate the respective microswitches that indicate the zero position.
N.B. The procedure to seek the machine origin runs the CNC program No.116. This program is not visible on the menu, like all those above number 99, but it can still be accessed using the procedure for "DATA SETTING PROGRAMMING"

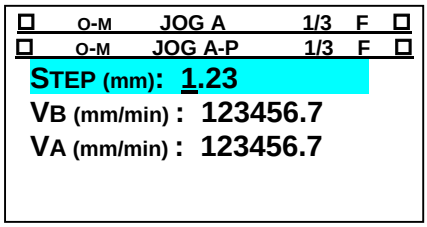
To interrupt the "SET POINT" procedure, press the STOP key  .

PARAMETER ENTRY

The "PARAMETERS" mode is accessed by pressing the 

key. In this mode the following parameters can be changed:

- *PARAMETERS: MOVEMENT*
  - *"STEP"*
  - *Velocity "SLOW"*
  - *Velocity "FAST"*



The parameter selected is that on which the cursor is resting. Use the  and  keys to select the parameter to be modified. Enter the new value and confirm it with the  key before exiting from the page.

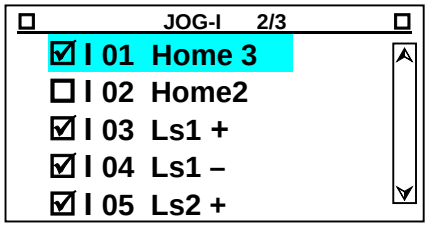
N.B. The step data must be within the range between the "minimum" and "maximum" values defined for the AXES PARAMETERS (refer to the programming manual).

EXECUTION OF 5 PROGRAMMES THROUGH KEYBOARD

Pressing button ALT followed from one of the key F1,…,F5 allows the execution of 5 programmes (form 137 to 141) saved on the CNC memory which TIEPOLO is connected to. These programmes cannot be modified directly through TIEPOLO; to modify them it will be necessary to connect through serial line with the CNC and to use Bach software.

JOG: 2/3 DISPLAY THE STATUSES OF THE INPUTS

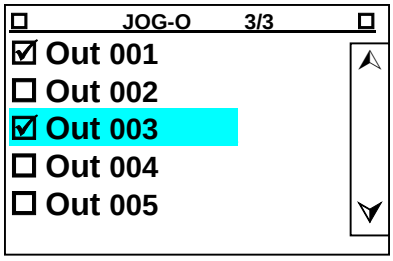
In this mode, the statuses of the digital inputs to the TIEPOLO can be displayed. The screen will show a list of the inputs where each line will show a letter "I" (meaning Input), the number of the input, and the description of the input when this has been defined.
The status of the input is seen as "ACTIVE"(☑) or "DISACTIVE"(☐), displayed on the left of the line.



Use the ▲ and ▼ keys to position the cursor on the input to be displayed: the input selected is seen in "REVERSE" colour.

JOG: 3/3 DISPLAY AND CHANGE THE STATES OF THE OUPUTS

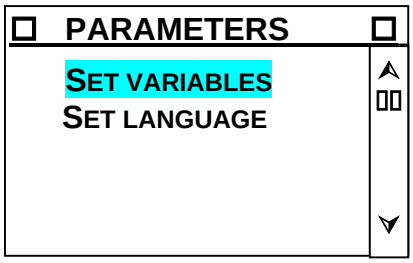
In this mode, the statuses of the digital outputs of the TIEPOLO can be displayed. The screen will show a list of the outputs where each line will show a letter "O" (meaning Output), the number of the output, and the description of the output.
The status of the output is seen as "ACTIVE"(☑) or "DISACTIVE"(☐), displayed on the left of the line.



Use the ▲ and ▼ keys to position the cursor on the output to be displayed: the output selected is seen in "REVERSE" colour. When an output is selected, its state can be changed by pressing the ↵ key.

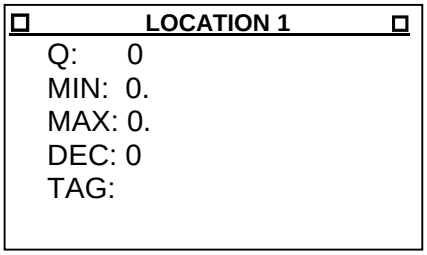
PARAMETERS

Selecting this item from the MAIN MENU, a submenu appears:



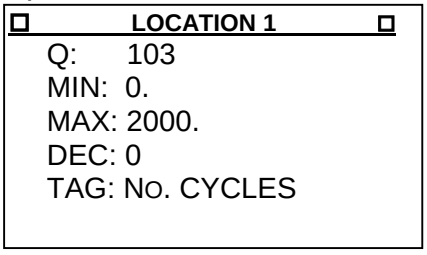
SET VARIABLES

In this operational mode, it is possible to associate twenty variables used in the program to twenty memory locations in the TIEPOLO operator interface. In particular, it is possible to specify the number indicative of the variables (Q), the description or physical significance (TAG), the limit values that they can assume (MIN and MAX), the number of decimals with which the numerical values will be expressed (DEC). The TIEPOLO makes 20 locations available, but the number indicated is arbitrary. Therefore there is nothing to stop associating variable Q103 to location 1. In the status line, at the top, the sequential number of the location that is being operated is displayed.



In the "AUTOMATIC" operational mode, during the running of a program, it will be possible to assign the current value to the locations defined here and this value will then be assigned to the associated CNC variable.

Use the  ,  ,  and  keys to position the cursor on the field whose contents are to be modified. For example, the location 1 could be defined as follows:



And now in the program, the variable will be referred to as Q103, it shall be an integer that can assume any value between 0 and 2000 and when its value is assigned in Automatic, it will be indicated by the description "NO. CYCLES". In assigning the indicative number of the variable, remember that:

- Variables from Q1 o Q100 are volatile (their value is not remembered if power is removed)

- Variables Q96, Q97, Q98, Q99 and Q100 are reserved by the controller for its own functions, among these, the only ones that are of interest to the user are Q98 = entity of a step in jog and Q99 = current velocity in jog displacement.

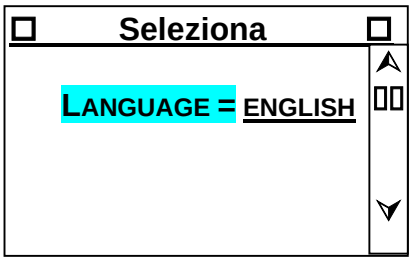
- Variables from Q101 to Q200 are non-volatile.

The field Q can assume all values between 1 and 199. The fields MIN and MAX are limited to 9 characters, including the decimal point, but excluding an eventual minus sign. If both these fields are set to 0, the variable can assume any value. The DEC field can assume the values 0, 1, 2 and 3. The TAG field is limited to 10 characters.

To display the locations associated, use the + and – keys. Press the START key to associate a new location. To annul an existing association, press the STOP key while it is displayed.

SET LANGUAGE

In this menu it is possible to choose the language in which the messages appear on the display



The ◄ and ► keys are used to scroll between the languages English, French, German and Italian. Use the ↵ key to confirm the choice and to return to the PARAMETERS menu.

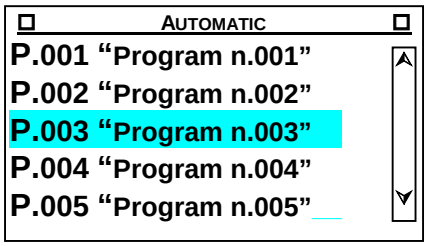
N.B.: the change of language becomes completely operational only after the unit is switched off and powered up again.

AUTOMATIC

The “Automatic” mode is that which allows one of the programs present in the equipment’s memory to be selected and run.

AUTOMATIC: SELECT PROGRAM

When the “AUTOMATIC” mode is entered, the screen displays the programs that are present in the TIEPOLO.
Each line carries the letter “P” (for program), the No. of the program, the name of the program.



Use the ▲ and ▼ keys to position the cursor on the program to be displayed: the program selected is seen in "REVERSE" colour.

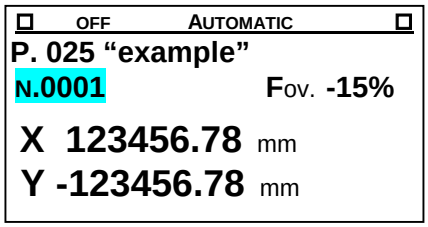
Alternatively, to go directly to the required program, press the F2 to enter the "DATA ENTRY" mode and enter the number of the required program (1…100) and press the ↵ key to confirm the selection.

Once the program has been selected, press the ↵ key to move to the "PROGRAM EXECUTION" mode.

AUTOMATIC: PROGRAM EXECUTION

In this mode, the screen will show:

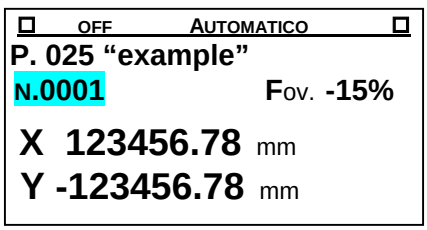
- The number of the program (P.025) and its name ("example") on the first row at the top after the "status line".
- The number of the line currently being executed and the information regarding the variation in % of the work speed, "F override", on the second row at the top after the "status line".
- The co-ordinates of the axes are displayed on the rest of the screen



The number of the line currently being executed, the co-ordinates of the axes and the "F override" data are continually updated, even during the execution of the program.

START PROGRAM

When the START or START key is pressed, the program selected begins to run.
While the program is running, the screen will be continually updated with the number of the line being executed, the value for the percentage variation of the speed (Fov) and the values of the co-ordinates of the axes.
The functions available during the running of a program are:



1) **STOP**: interrupt the running of the program. This is performed by pressing the  key. If a START ( key) command is made, the program will restart at the point at which it was interrupted.

2) **SET EMERGENCY**: the emergency condition can be activated using the  key
3) **EXIT FROM AUTOMATIC**: abandon the automatic mode. This is performed by pressing the  key. Once the automatic mode is exited, any program that is running will be interrupted (STOP) and cancelled ("←").

STOP PROGRAM

Pressing the STOP  key while a program is running will interrupt the program. In this condition, the functions available are the following:

1) **START**: the  key, recommences the program from the point at which it was interrupted with the STOP command

2) **CANCEL THE RUNNING OF THE PROGRAM**: the  key cancels the execution of the active program. Any subsequent START ( key) command will make the program start from the beginning.
3) **EXIT FROM THE AUTOMATIC MODE**: abandon the automatic mode. This is performed by pressing the  key.

EXECUTION BY STEP

This mode of operation enables the program to be executed step by step, which means one line at a time. The execution of each step is obtained using the  key.
It is possible to return to the continuous running of the program, starting from the line at which it has arrived, by pressing the  or START key.

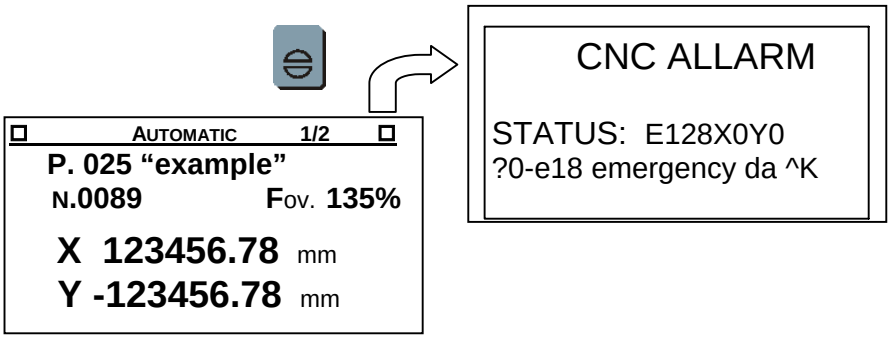
N.B. If the execution of the program has been interrupted with the  key and the  is pressed, TIEPOLO executes all the instructions accumulated in the receiving buffer of the CNC. Only after this buffer has been emptied it goes into the step-by-step execution mode.

SET EMERGENCY

If the  key is pressed at any point, the emergency condition is established (on the operator's request) and the screen will show the text "WARNING !" with an indication regarding the condition that has generated the emergency.
The functions available in this condition are those referred to in the "ALARM/ERROR HANDLING" mode.

ALARM/ERROR HANDLING

During the running of the program, the presence of alarms or errors is continually checked. Should an alarm be detected, the program that is running will be temporarily suspended the screen will show the text "WARNING !" with an indication regarding the condition that has generated the emergency.



When the system is in the "WARNING !" mode, the available functions are:

1) **RESET EMERGENCY**: the  key silences the active state of emergency. The "WARNING !" screen disappears. At this point the state of emergency is removed and it is possible to proceed with "RUN PROGRAM" mode, that nevertheless re-starts from the beginning.

2) **SILENCE EMERGENCY:** pressing first the  key, all the operational modes can be accessed. As the emergency condition has not been annulled, it will not be possible to move the axes and the "CNC ALARM" screen is shown returning to the modes "JOG" and "AUTOMATIC".

For the meaning of the status string, which appears only if it has been activated, refer to the programming manual. The string is the reply to the ^D instruction

FOV: % SPEED VARIATION

At any moment, while in the "AUTOMATIC" mode, the value of the "work speed" defined in the program to be changed in the range **1% …0%... 200%**, the value of 0% is interpreted as leaving the value of the velocity defined by the program unaltered.

Use the  key to increase (in %) the value of the "work speed".

Use the  key to decrease (in %) the value of the "work speed".

If desired, using "F override", data can be entered directly. Press  to enter into the "DATA ENTRY" mode. Enter the required value (-99 … 0 … 100) and press the  key to confirm.

CHANGE PARAMETERS

This command will allow variables defined in the “Parameters” menu to be changed.

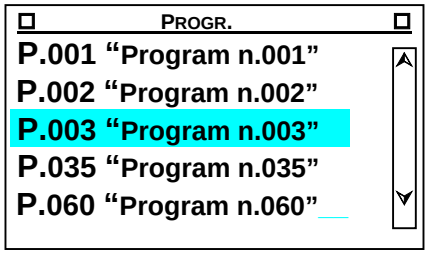
To activate, press the key.
The first available parameter will be displayed. It may be modified by entering a new value (the original value will be displayed in brackets).

To scroll through the variables, use the + and − keys, press the key to confirm and store the value.

To return to automatic, press the ESC key.

PROGRAMMING

The “Programming” mode is the one in which all operations concerning the handling of programs in the CNC are permitted: reading, writing, insertion, deleting.
Entering in this mode, the screen will show the list of programs present in the "PROGRAM MEMORY". Every line will carry the letter “P” (for program), the No. of the program and the name of the program.



SELECT PROGRAM

The and keys can be used to scroll through the list and position the cursor on the required program. The program selected is displayed on the screen in “REVERSE” colours.

After positioning the cursor on the required program, use the key to enter the “DISPLAY/MODIFY A PROGRAM” page.

Alternatively, to move directly to the number of the program required, press the F2 key to enter the “DATA ENTRY” mode, enter the number of the program (1…200) and press the to confirm.
N.B.: if the program selected is not present in the memory (empty),
Automatically the “ DISPLAY/MODIFY A PROGRAM ” mode is entered.

To exit from the programming mode, press the key.

ORGANISATION OF THE MEMORY

See the user manual of each CNC model.

INSERT PROGRAM

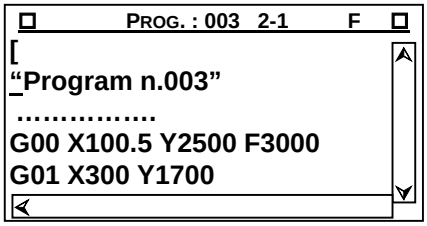
To insert a new program (one that is not yet present in the " PROGRAM MEMORY" of the CNC), press the F2 key to recall the "DATA ENTRY" page and enter the number of the program (1…199). Then press the ↵ key to confirm.
If the program is empty the TIEPOLO runs the editing function to insert the first program line.

DELETE A PROGRAM

After positioning the cursor on the required program in the "SELECT PROGRAM" mode, press the ← key to delete it. Before proceeding to delete the program, the TIEPOLO asks the operator to confirm the request.

DISPLAY / MODIFY A PROGRAM

Entering this mode, the program selected will appear on the screen. The program is made up of "lines" /strings of characters that define the relative instructions and/or comments).
The number of the program selected, the number of the line on which the cursor is positioned and the number of column are displayed on the status line (1st line at the top).



The procedure is to all effects a ***full screen editor***, which means that it is possible to move the cursor to the required position, in order to display, modify, or insert modifications at any point in the program.
In particular, the functions available are:

MOVE CURSOR

The ▲ e ▼ keys can be used to scroll the lines of the program up and down, in order to position it on the required line.

The ◄ e ► keys can be used to move the cursor backwards and forwards along the line, in order to position it on the required character.

INSERT / OVERWRITE A CHARACTER

During the operation of "EDITING" a program, it is possible to use two different modes of working :

1) INSERT ENABLED (cursor: "_")

If the insert function is active, pressing an alphanumeric key will cause a character to be inserted starting from the position of the cursor. The characters to the right of the cursor will consequently move to the right to make room for the new characters inserted.

The "INSERT ENABLED" mode is activated by the  key.

2) INSERT DISABLED (cursor: "▮")
   If the insert function is disabled, pressing an alphanumeric key will cause the character to be typed on top of the character over which the cursor is placed.

   The "INSERT DISABLED" mode is activated by the  key.

DELETING CHARACTERS

When the  key is pressed, the character immediately to the left of the cursor will be deleted.

INSERTING A NEW LINE

To insert a new line of program:

1) Enable the mode: INSERT ENABLED (cursor: "_")
2) Position the cursor immediately to the right of the last character of the line after which it is required to insert the new line.
3) Press the  key to insert the new line. The following lines will automatically be shifted one place towards the bottom.

Naturally, if the line of program is the last, the  key adds the new line automatically at the end of the program.

DELETING A LINE

Position the cursor on the first character of the line following the line that needs to be deleted and use the  in sequence until all the characters of the line have been deleted.

TERMINAL

This procedure is used to connect the CNC process in direct mode. It is thus possible to send strings of instructions (see: CNC – instruction manual). Type directly on the TIEPOLO keyboard to the CNC process and see the relative reply on the screen.

The instruction string typed can be corrected, before being confirmed ( key), using the  key.

To send the "IMMEDIATE INSTRUCTIONS", such as <Ctrl-W>, <Ctrl-O> etc. (for their meanings see the CNC instruction manual) press the 

key followed by the letter required.

Use the 

key to exit from the TERMINAL mode.

CONNECTION TO A PC

This mode is used to work with the relative "BACH" support software to dialogue and handle the "CNC process" inside the TIEPOLO from the PC over a serial link.
For the communication protocol, see Appendix 2. For the physical connections refer to the chapter "CONNECTION TO SERIAL PORT NO. 1"

CNC SELECTION

The features is under development. Keep the default setting.

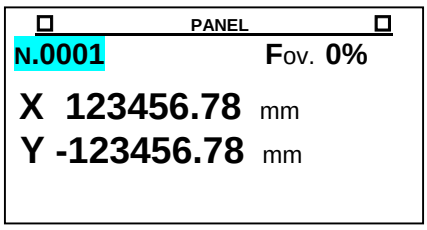
To change the selection, use the  and  keys, then confirm the selection with the  key. The screen will show a message to confirm that communications have been successfully established or, if the attempt has failed, an error message. To continue, press the  key again.

OPERATOR PANEL MODE

The operating mode allows a program to be run from the command from a logic input of the TIEPOLO. When an input assumes its active state, the corresponding program is launched. The inputs can be defined as active when the key is pressed down, and/or active when the key is released. The table for the correspondence between the inputs and programs that are run is shown below. Some of the programs that are launched in this way correspond to actions in the jog mode. For example, program 116 is run to perform the machine zero seeking in either jog mode or automatic mode. If program 101 is not present, the manual displacement key functions as described in the related paragraphs. If program 101 does exist, to an instruction to make a positive displacement on the X-axis, the program will be executed.

Number of input	Program on key down	Associated key	Program on key up	Associated key
1	101	X+	121	X+
2	102	X-	122	X-
3	103	Y+	123	Y+
4	104	Y-	124	Y-
5	105	Z+	125	Z+
6	106	Z-	126	Z-
7	107		127	
8	108		128	
9	109		129	
10	110		130	
11	111		131	
12	112		132	
13	113		133	
14	114		134	
15	115		135	
16	116	Machine zero	136	Machine zero

The OPERATOR PANEL MODE can be activated from the main menu by pressing the F2 key, or if the TIEPOLO has been programmed with the panel active (@97,1), the TIEPOLO automatically starts up in this mode each time it is switched on. If active, the PANEL page is displayed (see following figure):



The PARAMETERS menu is used to change the value of a variable, press the  key; the 

key can be used to change the velocity of the execution of axis movement. Pressing the 

key disables the panel, returning the control to the initial menu: to re-enable the panel, press the 

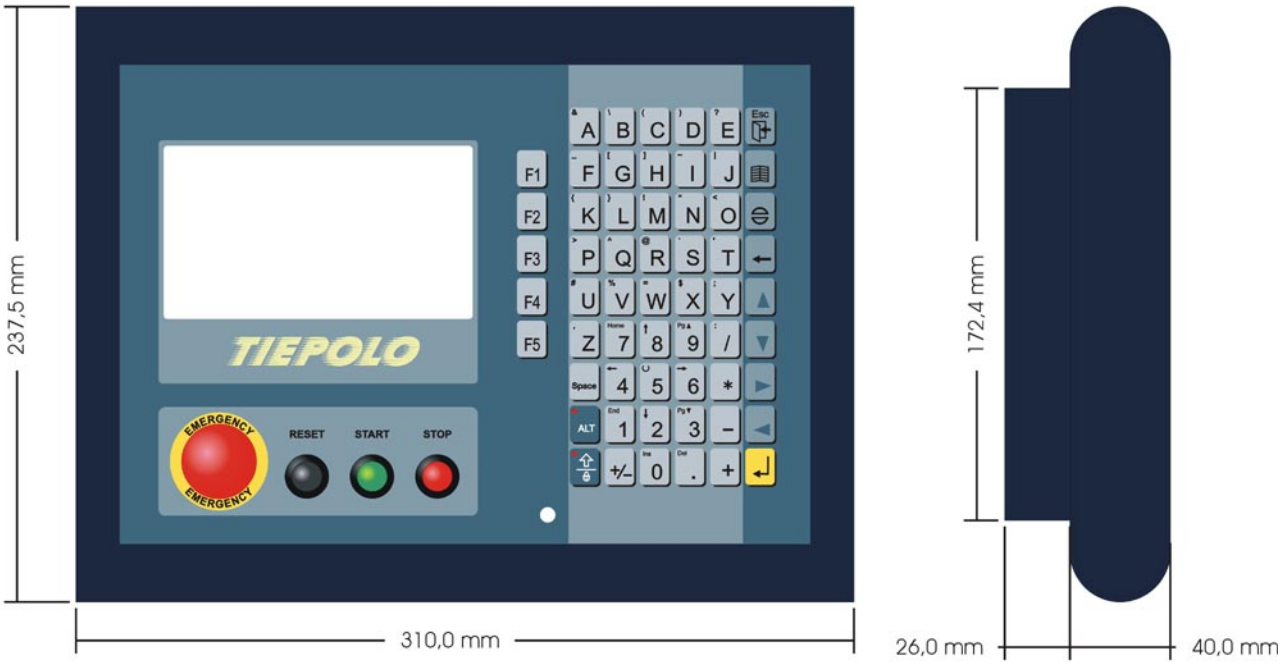
key.

AUTOMATIC PROGRAM LAUCH ON START-UP

See the CNC instructions.

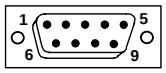
TECHNICAL DATA

POWER SUPPLY VOLTAGE	+24VDC (+19VDC ... +35VDC)
CONSUMPTION	6 W
STOCKING TEMPERATURE	-20 to +60 C°
WORKING TEMPERATURE	+0 to +50 C°
RELATIVE HUMIDITY	20% ... 80% (NON-CONDENSING)
WEIGHT	3.4 kg
DIMENSION	WIDTH: 310 mm HEIGHT: 237,5 mm DEPTH: 66 mm



TIEPOLO Connectors

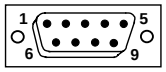
SERIAL PORT 1 (COM1)



DB-9
MALE CONNECTOR
X2

Pin	*RS232*		*RS422*	
1				
2	**RX①**	I	**RX+①**	O
3	**TX①**	O	**TX+①**	O
4				
5	**COM (0V)**			
6				
7	**RTS①**	O	**TX-①**	I
8	**CTS①**	I	**RX-①**	I
9				

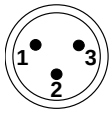
SERIAL PORT 2 (RS232,COM1)



DB-9
MALE CONNECTOR
X13

Pin	*Signal*	*I/O*
1		
2	**RX②**	I
3	**TX②**	O
4		
5	**COM (0V)**	-
6		
7		
8		
9		

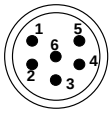
POWER SUPPLY



3 PIN CIRCULAR
MALE CONNECTOR
X10

Pin	*Signal*
1	**+24VDC**
2	**GROUND**
3	**COM_24VDC**

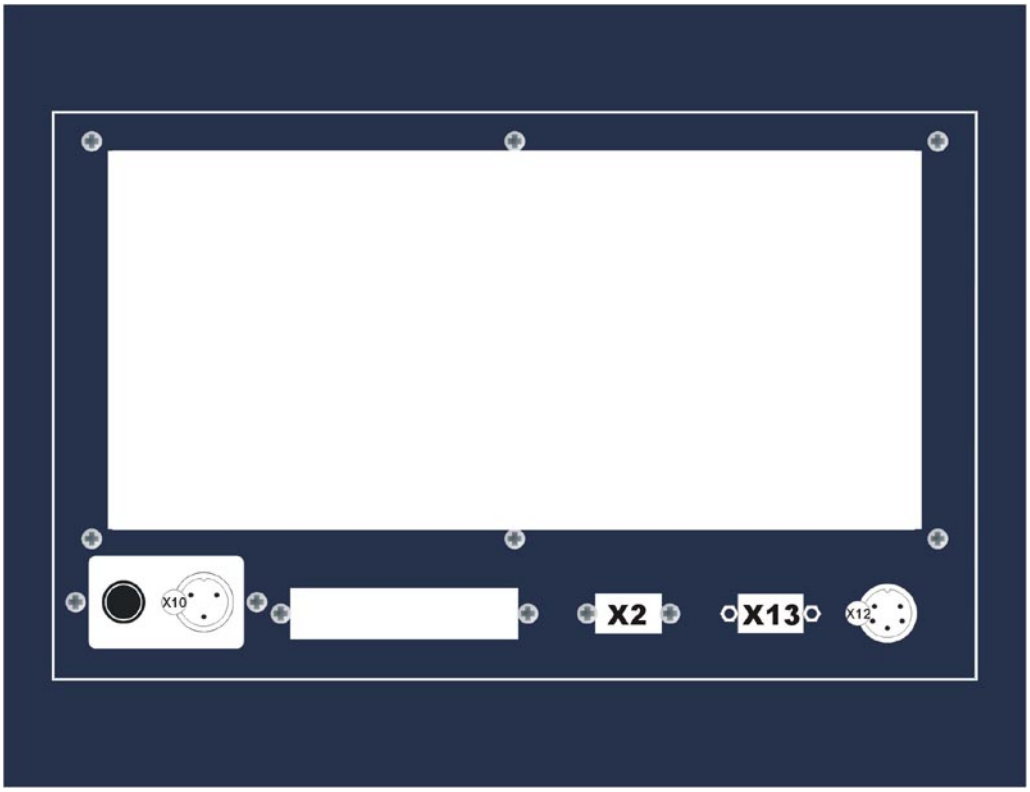
EMERGENCY



6 PIN CIRCULAR
MALE CONNECTOR
X12

Pin	*Segnale*
1	**CONT. EMERGENCY**
2	**CONT. EMERGENCY**
3	
4	
5	
6	

TIEPOLO BACK PANEL



Fuse

Alimentation

COM 1

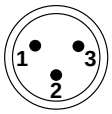
COM 2

Emergency

TIEPOLO POWER SUPPLY

CONNECTOR: X10

POWER SUPPLY



3 PIN CIRCULAR
MALE CONNECTOR
X10

Pin	*Signal*
1	**+24VDC**
2	**GROUND**
3	**COM_24VDC**

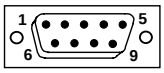
The CNC TIEPOLO requires a power supply voltage of +24VOLT d.c.. This can be supplied via the X10 connector found on the back panel.
The technical data of power supply are:

POWER SUPPLY VOLTAGE	**+24VDC** (+19VDC ... +35VDC)
CONSUMPTION	**6W**

CONNECTION TO SERIAL PORT NO.1

CONNECTOR: X2

SERIAL PORT 1



DB-9
MALE CONNECTOR
X2

Pin	*RS232*		*RS422*	
1				
2	**RX①**	I	**RX+①**	I
3	**TX①**	O	**TX+①**	O
4				
5	**COM (0V)**			
6				
7	**RTS①**	O	**TX-①**	O
8	**CTS①**	I	**RX-①**	I
9				

SERIAL PORT 1

RS232
(a)

Pin	*Segnale*	*I/O*
1		
2	**RX①**	I
3	**TX①**	O
4		
5	**COM (0V)**	-
6		
7	**RTS①**	O
8	**CTS①**	I
9		

SERIAL PORT 1

RS422
(b)

Pin	*Segnale*	*I/O*
1		
2	**RX+①**	I
3	**TX+①**	O
4		
5	**COM (0V)**	-
6		
7	**TX-①**	O
8	**RX-①**	I
9		

Note: (a) Factory set = RS232
(b) Only on specific order

To connect a TIEPOLO with a PC (through serial line RS232), perform these steps:

- Connect the PC serial port COM1 with the TIEPOLO serial port n.1 (connector X2) with a standard PC serial female/female cross-over cable (Cable pin connections respect the following table of correspondence between the pins of the two connectors:

1-4
2-3
3-2
4-1
5-5
7-8
8-7
9-9

- screen-screen

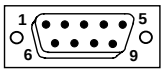
Note: <u>the power must be removed from the PC and the TIEPOLO</u>

Nota Bene: Use a screened cable with the screen connected to the body of the connector.

CONNECTION TO SERIAL PORT NO.2

CONNECTOR: X13

SERIAL PORT 1



DB-9
MALE CONNECTOR
X2

Pin	*RS232*		*RS422*	
1				
2	**RX①**	I	**RX+①**	I
3	**TX①**	O	**TX+①**	O
4				
5	**COM (0V)**			
6				
7	**RTS①**	O	**TX-①**	O
8	**CTS①**	I	**RX-①**	I
9				

SERIAL PORT 1

RS232
(a)

Pin	*Segnale*	*I/O*
1		
2	**RX①**	I
3	**TX①**	O
4		
5	**COM (0V)**	-
6		
7	**RTS①**	O
8	**CTS①**	I
9		

Note: (a) Factory set = RS232

To connect a TIEPOLO with a PC (through serial line RS232), perform these steps:

- Connect the PC serial port (COM1 or COM2) with the TIEPOLO serial port n.1 (connector X2) with a standard PC serial female/female cross-over cable (Cable pin connections respect the following table of correspondence between the pins of the two connectors:

1-4
2-3
3-2
4-1
5-5
7-8
8-7
9-9
- screen-screen

Note: <u>the power must be removed from the PC and the TIEPOLO</u>

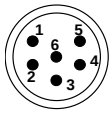
- Power up the TIEPOLO
- With the “arrow keys”,  and  move the cursor and select the menu line: “Connection to PC”, then confirm with  key.
- Power up the PC and use the BACH software program, or another standard PC communication program (e.g.. Hyper Terminal of Windows) to communicate with the TIEPOLO.

Nota Bene: Use a screened cable with the screen connected to the body of the connector.

EMERGENCY PUSH BUTTON

LAYOUT EMERGENCY CONNECTOR

EMERGENCY



6 PIN CIRCULAR
MALE CONNECTOR
X12

Pin	*Signal*
1	**EMERGENCY CON.**
2	**EMERGENCY CON.**
3	
4	
5	
6	

Emergency Push Button

The Emergency push button is present in the front panel, it is a normally close contact and it's directly connected to emergency connector, situated in the rear panel.