NUM 720

Utilities Manual

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CNC HighEnd Applications

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The programming examples described in this manual are intended for guidance only. They must be specially adapted before they can be used in programs with an industrial application, according to the automated system used and the safety levels required.

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NUM 720

Update

UTILITIES MANUAL

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1 - GENERAL

1.1 - DEFINITION OF THE UTILITIES

The utilities are stored in the NC memory. When starting up the NC and the machine, the utilities are used to set machine parameters, calibrate the axes, etc...

To access the utilities, press the "SERVICE" key, which displays the utilities menu. All the utilities listed can be accessed by the end-user, with the exception of utility 5. However, these may not be used without the prior consent of the machine manufacturer.

1.1.1 - Utility 0 : peripheral baud rate

This utility is used to select the baud rate of the tape reader or tape punch.

1.1.2 - Utility 2 : axis calibration

This utility is used to correct measurements along the various axes, according to the movements carried out along the axes.

1.1.3 - Utility 3 : resident macros

This utility is used to enter special workpiece programs (eg machining cycles specific to the machine, tool change cycles) in the EEPROM memory.

These cycles are defined by the machine manufacturer. Other cycles may be defined by the user. Utility 3 is also used to memorize programs specified by the manufacturer and relating to conversational programming.

1.1.4 - Utility 5 : machine setup data

Utility 5 cannot be accessed by the end-user (software lock-out).

It is used to enter, display or modify the various machine parameters, such as axis declaration, maximum axis speed, servo-control gain, reference switches and soft limits.

This utility is also used to load parameters from the tape reader and to make bakup copies by downloading to the tape reader.

1.1.5 - Utility 6 : PLC background mode

Backround mode is used to create, modify, enter or read the PLC program from terminal TSX T407, controlled by the NC.

1.1.6 - Utility 9 : "user" machine parameters

Access to this utility is available to the end-user. It allows the display of the contents of all machine parameters defined by utility 5. Should the need arise, this utility enables the modification of the following eight parameters : P16, P17, P18, P37, P38, P39, P48 and P59.

1.1.7 – Utility 11 : EEPROM data processing

This utility is used to save the binary (data and software) stored in EEPROM or to store this binary information in the memories.

1.1.8 – Utility 12 : system reconfiguration

This utility allows the manufacturer to customise systems (ie: change options) for each stage of the manufacturing process and so deliver the system in its final customised version.
The system reconfiguration utility is stored in RAM.

1.1.9 – Utility 13 : utility loader

This utility is used to initialize the NC or reset the RAM memories (preferably at the integration stage, the first time the equipment is switched on) or load utilities in RAM using a tape reader or computer.

Access to these utilities, utility 12 excepted, is restricted to NUM personnel.

NOTE :

All the utilities listed above exist in both French and English versions. The utilities menu provides the user with the facility to selected the language required (F = Français, A = English).

To select the language required, Type F or A followed by LF in the menu page. The selection is memorized and remains unchanged until the user chooses a different language.

1.2 – CALLING THE UTILITIES

With the numerical control switched on, press the "SERVICE" key (F10) to display the utilities menu:

```
HAND              JOG                   100%
----------------------------------------------
             RESIDENT UTILITIES
      A = ENGLISH     ,     F = FRANCAIS
 READER :  9600 b   ,  PUNCHER :  1200 b
             NO UTILITIES IN RAM

  0 PERIPHERAL BAUD RATE
  2 AXIS CALIBRATION
  3 FIXED SUBPROGRAMS
  5 MACHINE SETUP DATA
../..

?_
```

Press the "NEXT" key (key F1) to access the following utilities ; the top half of the page remains unchanged as far as "NO UTILITIES..." inclusive :

```
 0 PERIPHERAL BAUD RATE
 6 PC TRANSPARENT MODE
 9 MACHINE SETUP DATA
11 EEPROM DATA TREATMENT
../..

?_
```

Press the "NEXT" key to access the following utilities :

```
 0 PERIPHERAL BAUD RATE
13 UTILITIES LOADER

?_
```

Press the "NEXT" key again to return to the first page of utilities.

To select a utility, enter its number followed by LF.

If no utility is selected, the user may quit the menu by changing page (eg Current point – Tool).

NOTE :

If utilities have been loaded in the RAMs, the message "NO UTILITIES ..." is replaced by "SERVICE" : UTILITIES IN RAM".
The menu listing these utilities is accessed by pressing the "SERVICE" key again. To return to the list of resident utilities, press the ↓ key.

The special utilities stored in the RAM memories are loaded by utility 13 after utility 0, which is not the same as the resident utility of the same number, has been loaded.

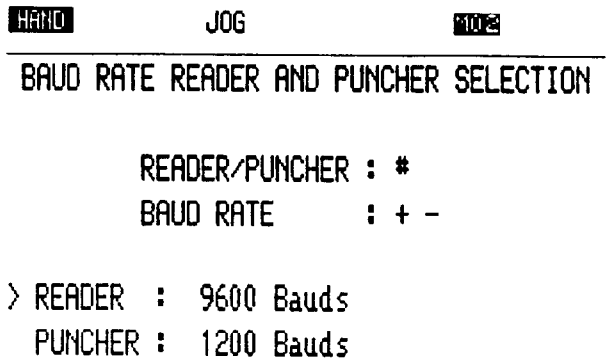
NOTES

2 – UTILITY 0 : PERIPHERAL BAUD RATE

This utility is used to select the transmission speed of the reader or the puncher. The speed selection must be made if loading or unloading is required in the use of the following utilities.

Press the "SERVICE" key to access the menu of resident utilities.

Write 0 followed by LF to display the menu below :



The # key is used to position the cursor on one of the two headings.

The + and – keys are used to select the speed for the reader or the puncher, depending on the position of the cursor. The range of speeds is given below :

150 – 300 – 600 – 1200 – 2400 – 4800 – 9600 – 19200 bauds.

NOTES

3 - UTILITY 2 : AXIS CALIBRATION

This utility is used to correct measurements along all axes of the machine, whether linear or rotary.

A maximum of 500 points overall may be corrected. Thus a single axis may have 500 correction points if the other axes are not corrected.

The coordinates of the point to be corrected and the value of the correction itself are expressed in microns with no decimal point. The maximum correction possible is $\pm$ 9999μ.

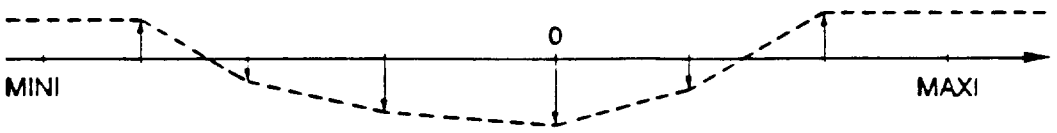
The correction between two successive points is linear. The distance between two corrected points is not restricted.

It is advisable to apply correction to the minimum and maximum travel limit stops (defined in machine parameter P17), otherwise the value of the last correction will be applied at these points.

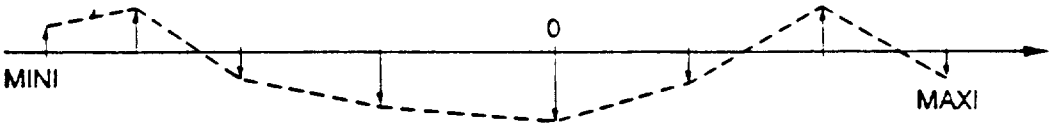
Point 0 (0 measurement) may be corrected.

EXAMPLES :

- Without correction on the travel limit stops



- With correction on the travel limit stops

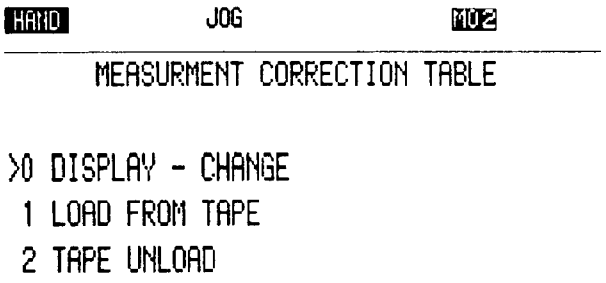


NOTE :

For rotary axes, the correction on points 0° and 360° MUST be the same.

Press the "SERVICE" key to access the menu of resident utilities.

Write 2 followed by (LF) to display the menu below :



To quit this menu, press the CTRL and S keys to obtain X OFF. If corrections have been entered, or if modifications have been made, "WRITING..." is displayed, followed by return to the "Current Point" page at the end of the picture.

3.1 - DISPLAY - CHANGE

Type Y (LF). The question "AXIS ?" appears on the dialog line.

Specify the number of the axis which is to be corrected. This number is given by machine parameter P0 (0 and 1 for lathes, 0 to 3 for milling machines).

Type the number of the axis, followed by (LF) : the "MEASUREMENT CORRECTION" table is displayed : (0 to 3).

This table is arranged in ascending order of correction values, from the largest negative value to the largest positive value for the dimensions of the points to be corrected.

M ± dimension of point to be corrected ␣ C ± value of correction.

If there is no correction, the table is blank and only the heading is displayed.

Corrections are entered in the format given below :

M ± dimension ␣ C ± correction (LF)

The + sign is taken by default.

Dimensions may be entered in any order. The system then arranges them automatically in order, from the largest negative number to the largest positive number.

To delete a correction, position the cursor at the beginning of the line and type -(LF).

To modify or insert a line, it is not necessary to select the line to be modified or the line which precedes the one to be inserted.

To modify a line, it is necessary to rewrite the entire line.

To correct another axis, quit the procedure by pressing the "SERVICE" key to return to the menu, then start the procedure again from the beginning.
When all axes have been corrected, enter X OFF (CTRL and S) to start data write and display the message :

MAINS CUT. NOT DETECTED
ACKNOWLEDGE (Y/N) ?

The response Y LF will return the system to the "Current Point" page after automatic initialization of the NC.

NOTE :

If no modification is made, the system will automatically return to the "Current Point" page when "X OFF" is entered.

3.2 – LOADING FROM TAPE

Type 1 (LF). The message "READY (Y/N) ?" is displayed on the dialog line.

With the tape installed on the reader, answer "Y (LF)" to start data read.

If the task number corresponds to the numerical control in which the corrections are entered, data read is carried out in a single process, after which the system returns to the menu.

If the task number does not correspond to the numerical control, data read will stop after the task number and this number will be displayed on the dialog line. Superimpose the correct number on the number displayed, then type (LF) to restart data read. The system will return to the menu at the end of data read.

Data write takes place once X OFF (CTRL and S) has been entered.

In the event of an error, the line is displayed on the dialog line. Make the necessary corrections, then restart by (LF). (A character is replaced by – when the cursor is positioned on it).

Structure of the perforated tape

Perforation on teleprinter.

```
% 0 0 0 8 4 2 7 2 ; 0 9          (Task number)
A X E   :   0 ; 0 7
M - 1 0 0 0 0   C - 1 0 ; 0 C
M - 3 5 0 0   C - 2 ; 0 A
M - 5 0 0   C 3 ; 0 8
M 1 2 0 0   C 6 ; 0 8
M 4 2 0 0   C 1 0 ; 0 9
M 1 0 0 0 0   C 5 ; 0 9
A X E   :   1 ; 0 7
M - 5 0 0 0 0   C 8 ; 0 A
M - 2 5 0 0 0   C 3 ; 0 A
M - 1 0 0 0 0   C - 2 ; 0 B
M - 2 0 0 0   C - 6 ; 0 A
M 0   C - 8 ; 0 6
M 1 0 0 0   C - 3 ; 0 9
M 2 0 0 0 0   C - 2 ; 0 A
M 5 0 0 0 0   C 1 ; 0 9
X 0 F F
```

The two digits after the ; indicate the number of characters in each line, including spaces (in hexadecimal). They must be calculated for each line.

It is essential to respect the syntax used for the axis number : 1 space between E and :, and one space between : and the first digit of the axis.

If comments appear after the task number, they are ignored by the NC.

If the tape is printed out by a NC, the dimensions are centered and the total number of characters per line is always 17 (in hexadecimal).

NOTE :

The transmission speed must have been selected beforehand using utility 0.

3.3 – DOWNLOADING TO TAPE

Type 2 (LF) ; the message "READY (Y/N) ?" is displayed on the dialog line.

With the tape punch set up for operation, answer "Y (LF)" to start tape perforation.

Perforation takes place along 1 metre of leader tape and the NC affaire number will be displayed. This number can be modified by superimposing a new number (including the % sign), using the cursor control function and the alphanumeric keyboard.

Restart perforation by entering (LF). The tables of all the corrected axes are downloaded to the perforated tape. The system returns to the menu at the end of data unload.

The structure of the perforated tape is shown below. The two digits at the end of each line represent the number of characters on each line, expressed in hexadecimal, with spaces included. There are always 23 characters, 17 in hexadecimal.

```
%00084001 ;0A
AXE : 0;07
M-   10000   C-      2;17
M-     789   C+      1;17
M+       0   C+      8;17
M+     500   C-      5;17
M+   12000   C+      4;17
AXE : 1;07
M-   50000   C+      8;17
M-   32000   C+      5;17
M-   16000   C+      3;17
M+      10   C-      1;17
M+   20000   C+      5;17
AXE : 2;07
M-  100000   C+     10;17
M-   50000   C+      2;17
M+       0   C+      5;17
M+   30000   C-      1;17
M+   80000   C-      5;17
;01
```

Comments may be added after the task number before restarting perforation, eg "% 00084001 JUNE 20 1988".

NOTE :

The transmission speed must have been selected beforehand using utility 0.

4 - UTILITY 3 : RESIDENT MACROS

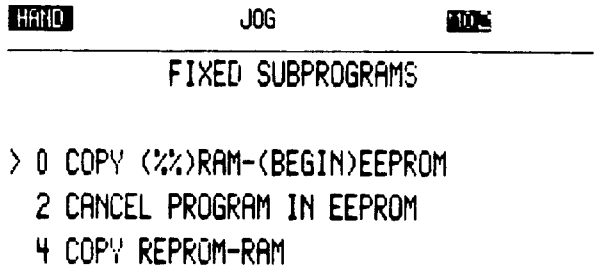
This utility is used to transfer programs relating to specific machine cycles, or individual programs (stored in RAM) developed by the machine manufacturer or the user, to EEPROM. It is also used to transfer programs from REPROM to RAM (used in conversational programming).

The memory space available is 64 Kb.

These programs must first be programmed in RAM (workpiece program) before they can be transferred to EEPROM.

Press the "SERVICE" key to access the menu of resident utilities.

Write 3 followed by (LF) to display the following menu :



To quit this menu, enter X OFF (CTRL and S) which returns the system to the "Current Point" page.

X OFF will reinitialise the NC once the request has been satified.

4.1 - copy RAM - EEPROM

Allows transfer of one or all programs from RAM to EEPROM memory.

Type O (LF) ; the dialog line displays : (%% OR % ---> &) % _

4.1.1 - Copying a program

Enter the number of the program which is to be copied, followed by LF. The number will appear in place of the cursor. At this stage, there are four possibilities :

- The program does not exist in RAM : "PROGRAM DOES NOT EXIST" appears above the dialog line and the cursor flashes on the program number.
- The program is already in EEPROM : "PROGRAM EXISTS ALREADY" appears above the dialog line and the cursor flashes on the program number. If the duplication request is maintained, the user must erase the program no longer required (2 in the menu), and return to 0.
- Insufficient memory in EEPROM to store the program. "RAM OR EEPROM SATURATED" appears above the dialog line and the cursor flashes on the program number.
- The message "COPYING ...." appears, flashing, above the dialog line to indicate successful copying of the desired program.
  On completion, the message "END COPYING" appears and the cursor is positioned on the program number. At this point, the user may either quit the procedure by pressing the "SERVICE" key to return to the menu or by entering X OFF (which displays the message "MAINS CUT. NOT DETECTED ACKNOWLEDGE (Y/N)" to which the response Y LF returns the system to the "Current Point" page after system initialization), or he may repeat the operation for another program.

4.1.2 - Copying several programs

If several programs are stored in RAM memory, they may be copied in a single operation. Instead of displaying the program number, enter % (LF).

Thereafter, the procedure is the same as for copying a single program.

NOTE :

- If rewrite problems arise when the duplication process is started, the message "WRITE DIFFICULTY" appears and remains on the screen while duplication is in progress. On completion of data write, the messages "END COPYING" and "WRITE DIFFICULTY" are displayed, but the program transfer has taken place.

- If the messages "COPYING ..." and "WRITE DIFFICULTY" are displayed steadily on the screen, the memories are faulty.

4.2 - CANCEL PROGRAM IN EEPROM

This procedure is used to erase one or more programs stored in EEPROM memory.

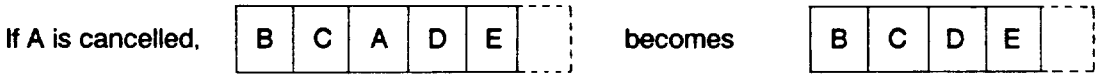
Type 2 (LF); the dialog line displays : (- & % ..) - & % _

Type the number of the program to be erased, followed by (LF). The value appears in place of the cursor.

If the program does not exist, the message "PROGRAM DOES NOT EXIST" appears above the dialog line and the cursor flashes on the program number.

If the program does exist, the flashing message "CANCELLING ..." appears. At the end of data erase, the steady message "PROGRAM CLEARED" appears with the cursor positioned on the program number. The user can now erase another program or can quit the procedure by pressing the "SERVICE" key or by entering X OFF.

If the program which is erased is not the last program stored in the EEPROM, the following programs will be relocated :



4.3 - COPY REPROM - RAM

This command is used when conversational programming software has been installed in the machine. It allows the user to transfer one or more of programs %9980 to %9985 to a RAM and to modify the contents. The modified sequences can then be stored under the same program number as was used in the EEPROM from which they were transferred, given that it is not possible to transfer from a RAM to a REPROM memory. The system scans first the RAMs, then the EEPROMs and finally the REPROMs, which means that the modified sequences stored in the EEPROMs will be read and those stored in REPROMs will be ignored.

Type 4 (LF) ; the dialog line displays : ($%.. --> %...) $% _.
Type the program number, followed by LF. The value appears in place of the cursor.

Rapid display of COPYING ...., then END COPYING. The program is now in the RAM memory.

If the program requested is already in the RAM memory, the message PROGRAM EXISTS ALREADY is displayed.

If the program requested is not in the REPROM memory, the message PROGRAM DOES NOT EXIST is displayed.

If the memory space available in RAM is insufficient, the message RAM OR EEPROM SATURATED is displayed.

4.4 - DISPLAY OF PROGRAMS SAVED IN EEPROM

Quit utility 3 by entering X OFF, then press the LIST key.
(&) (%% or %.. N..) _ is displayed on the dialog line.

Enter & %% (LF) on the keyboard. The list of programs stored in EEPROM is displayed, together with the number of bytes occupied by each program, the total number of bytes used and the number of bytes available.

The contents of a program stored in an EEPROM cannot be displayed on the screen ; only the name and number of the program, if it exists.

NOTES

5 – UTILITY 5 : MACHINE PARAMETERS

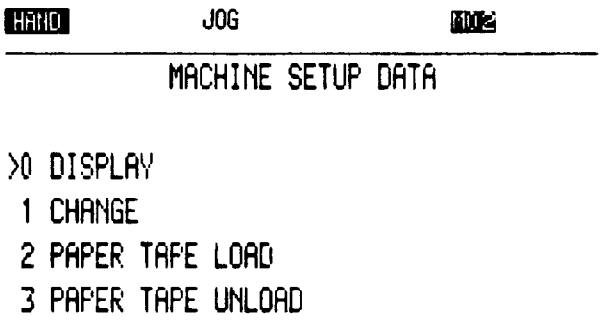
Machine parameters are loaded, displayed or modified using utility 5.

Access to this utility is not available to the end–user (see utility 9).

Press the "SERVICE" key to display the utility selection menu or abandon.

Enter 5 (LF) to display the message : "PASSWORD ?"

Once the password has been entered, the menu below is displayed :



To leave the menu, enter X OFF (CTRL and S). The system returns to the "Current Point" page. If the contents of a parameter have been modified, the "NC ready" bit sent to the PC goes to zero. The power supply to the servo–drives may now be cut off. Enter X OFF to display the message below :

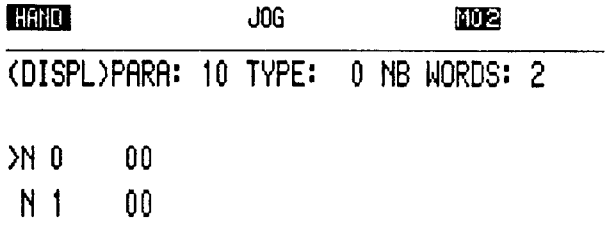
MAINS CUT. NOT DETECTED
ACKNOWLEDGE (Y/N) ?

The response Y LF returns the system to the "Current Point" page after automatic initialization of the NC.

5.1 – DISPLAY

When the menu is called up, the cursor is automatically positioned on 0. Press the "next" key to display the question "PARAMETER ?" on the dialog line.

Select the parameter to be displayed using the alphanumeric keyboard, eg P10 (LF). The following will appear on the screen :

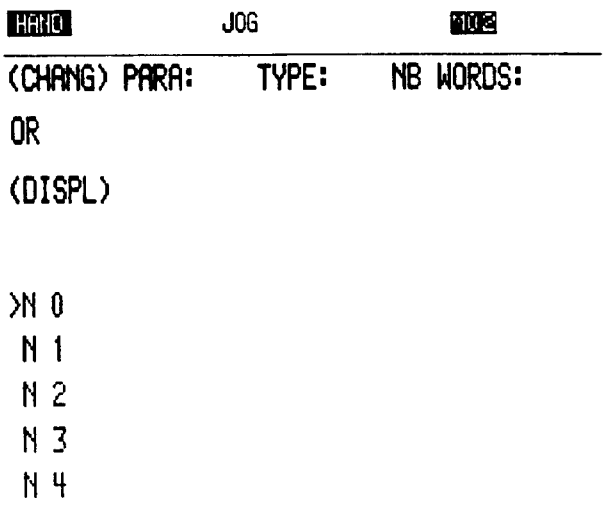


To display all the parameters, press the "next" key in response to the "PARAMETER ?" question. This displays P0. Then press the "next" key again to call up P1, and so on.

Press the "SERVICE" key to return to the menu.

Page displayed for a parameter

If the modification or display of a parameter has been requested, the following page appears on the screen :



- The number of the parameter requested is displayed after PARA.

- After TYPE, either 0, 1, 2 or 3 is displayed.
  . 0 corresponds to a word written in hexadecimal from 00 to FF.
  . 1 corresponds to a word written in decimal from – 32767 to + 32767.
  . 2 corresponds to a word in decimal from – 99999999 to + 99999999.
  . 3 means that the word corresponds to a character, eg X.

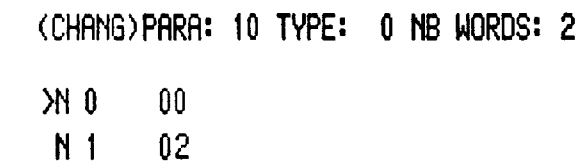
- NO WORDS indicates the number of words contained in the parameter.

- N0 – N1 – N2..... gives the number of the word. A maximum of 5 words is displayed on the screen. To obtain subsequent words, press the "↓" key.

5.2 – MODIFICATION

With the "MACHINE SETUP DATA" menu on the screen, enter 1 (LF) to position the cursor on the "CHANGE" line. The question "PARAMETER ?" appears on the dialog line.

Enter the parameter to be modified on the keyboard, followed by LF. Example : P10 (LF). The following appears on the screen :



Position the cursor opposite the line to be modified, then enter # "New Value" (LF) to modify the word. Up to 10 successive values can be corrected on the selected line. To do so, write # followed by N values ($N \leq 10$), separated from each other by a space. If the number of values, N, is greater than 10, only the first 10 values will be accepted and the remainder ignored.

If only one character on the line is to be modified, entering # followed by (LF) will position the line selected on the dialog line and the modification will be made using the cursor.

Press the "SERVICE" key to return to the menu.

5.3 - LOADING FROM TAPE

Press 2 (LF) to position the cursor opposite 2 in the menu. The question "READY ?" appears on the dialog line.

Install the program tape on the tapereader. Enter the response "Y (LF)" to start data transfer and high speed scrolling of the data on the screen. On completion of data transfer, return to the menu.

If the tape identification number does not correspond to the task number in the NC memory, data transfer will be interupted and the tape ID number will appear on the dialogue line. Enter the correct number, then type (LF) to resume data transfer. The system will return to the menu once this task is complete.

NOTE :

The transmission speed must be selected beforehand using utility 0.

5.4 - DOWNLOADING TO TAPE PUNCH OR PRINTER

Press 3 (LF) to position the cursor opposite 3 in the menu. The question "READY ?" appears on the dialog line.

Connect the tape punch. Enter the response "Y LF" to start sprocket punching along approximately 1.50 metres of tape and display the task number on the dialog line (max. 8 digits), eg % 00082575.

It is possible to modify the task number and enter a comment. Press (LF) in order to punch the number, the comment and all the parameters on the tape.

Once printout is completed, the tape runs approximately 1 metre before stopping. The menu then reappears on the screen.

NOTE :

The transmission speed must be selected beforehand using utility 0.

5.5 - LISTING FORMAT

```
%00000001    comments    ;16
P0N0;04
#X Z C;06
P1N0;04
#0 4;04
P2N0;04
#0 7;04
P3N0;04
#0 7;04
"
"
"
"
"
P17N0;05
#-2000000 +1000000 -1000000 +1000000 -1000000 +1000000 +0 +0;3C
"
"
"
P37N0;05
#16 2 3 16 6 15 4 5 1D;16
P38N0;05
#9 8 E 17 0 0 0 0 8 9;15
P38N10;06
#17 0 0 0 0 0;0D
"
"
"
P65N0;05
#+0;03
;01
```

- % 00000001 indicates the task number.
- The digit at the end of each line represents the number of characters on the line, including # or spaces, in hexadecimal. It is essential to type ; followed by 2 digits.
- The symbol # means that the line is a line of data.
- N followed by one or two digits indicates the number of the first word on the next line of data. Thus, for P38, the first line of data concerns the value of words 0 to 9, and the second line if data concerns the value of words 10 to 15.
- A line of data may not contain more than 10 words.
- Parameter P50 must not be modified. The basic value is set at 10000.
- It is not necessary to enter those parameters of which the basic value is not modified.
- If the program is typed on a teleprinter, it must end with X OFF.

6 - UTILITY 6 : PC TRANSPARENT MODE

When a PLC program is created, modified, entered or read by the TSX T407 terminal or the IBM PC/PS via the NC, the NC should be in the transparent mode.

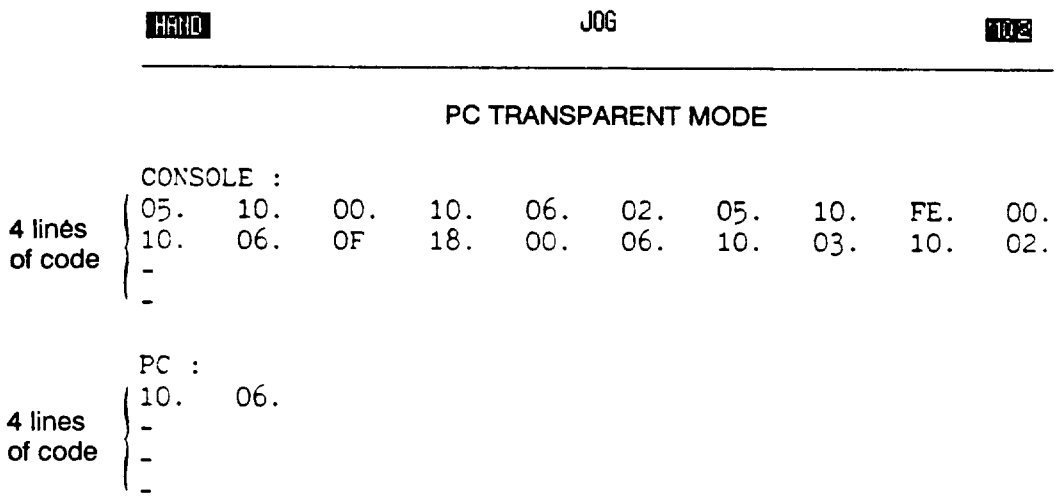
NOTE :

This mode must be selected before the terminal is connected.

Press the NC "SERVICE" key and select utility 6 from the menu by entering 6 LF. The screen displays the message "WAITING FOR PC LINK", followed a few seconds later by the additional message "WAITING FOR POWER AND CONSOLE LINK".

Connect the TSX T407 terminal, via unit 201037, to the 25-pin Canon connector on the front panel of the NC control unit, then power up.
To connect the IBM PC/PS, see Appendix 2.

Once the TSX T407 terminal test is completed, the following appears on the NC display :



The lines of code are modified gradually as exchanges take place between the terminal and the PC.

The data displayed after "CONSOLE" relates to calls for information made from the terminal to the PC and data displayed after "PC" relates to the responses of the PC.

This page is of no relevance for the user. It is used primarily by NUM.

If all the items of data are zero, the system is faulty.

On completion of tasks using the terminal, exit utility 6 by entering X OFF (CTRL and S) to return to the "Current Point" page. Then switch off the terminal prior to disconnecting.

NOTE :

To install the PL7.2 programming software on the IBM PC or PS, see the NUM 720 "Commissioning Manual".

NOTES

7 – UTILITY 9 : "USER" MACHINE PARAMETERS

This utility allows the user to monitor the contents of the machine parameters which were defined by the machine manufacturer, using utility 5, during the integration process.

The user has the option of modifying, if necessary, eight parameters :

- P16 gives the position of the origin reference switch in machine coordinates for each axis,
- P17 corresponds to the travel limits of the various axes : lower travel limit and upper travel limit,
- P18 gives the reversal error for each axis,
- P37, P38 and P39 are the definition parameters for the DNC1 link : formatting characters , translating characters, time delays,
- P48 gives the spindle origin offset,
- P59 selects the printer,

  (see appendix for definition of above parameters).

An attempt to modify any other parameter will have no effect on the said parameter.

With the utilities menu page on the screen, press 9 LF to display the page below :

```
HAND          JOG                 M02
                MACHINE SETUP DATA

>0 DISPLAY
 1 CHANGE
```

- **Display :**

  0 LF asks the user to select a parameter, eg P9 :

  the page becomes :

```
HAND          JOG                 M02
(DISPL)PARA:  9 TYPE:  0 NB WORDS: 3

>N 0    00
 N 1    01
 N 2    02
```

  Other parameters can be displayed in the same way. If the user wishes to display all the parameters one after the other, he may do so by pressing the "NEXT" key (F1) each time.

  To quit, press the "SERVICE" key (F10) to return to the utility 9 menu, then enter X OFF (CTRL and S together) to return to the "Current Point" page.

- **Modification**

1 LF asks the user to select the parameter to be modified.

A request for another parameter will be accepted and the parameter displayed, but it cannot be modified.

With the parameter to be modified displayed on the screen, select the word to be modified using ↓. Enter #, which appears on the dialog line, then enter the new value. Press LF to transfer the dialog line to the position of the word, thus replacing the original value.

If other words in the parameter are to be modified, repeat the proceedure. Similarly, if another parameter is to be modified, enter P xx LF. This new parameter will then be displayed.

When all the modifications have been made, press the "SERVICE" key (F10) to return to the menu of machine parameters (UT9).

To quit, enter X OFF (CTRL and S together). The following message is displayed :

MAINS CUT. NOT DETECTED
ACKNOWLEDGE (Y/N) :

The response Y LF returns the system to the "Current Point" page after reinitialization of the NC.The response N LF leaves the system on the message.

If the user has entered the modification paragraph but has not made any modifications, X OFF will automatically return the system to the "Current Point" page without initializing the system.

8 – UTILITY 11 : EEPROM DATA STORAGE

This utility is used to save the binary data and software memorized in EEPROM.

The download operation is compulsory at the end of the machine integration process, or after every parameter modification. The tapes which are downloaded must remain on the machine.

The loading operation is run when PCBs are replaced (customization or replacement of NC software).

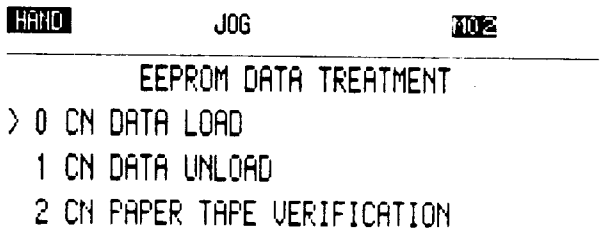
The task number is specified on all tapes so that these can be checked for conformity during loading.

The items of data are as follows :

- Number of software, options grid and key
- Type and table of parameters
- Measurement corrections
- Resident macros.

8.1 – IMPLEMENTATION

Select 11 (LF) in the utilities menu to display the followig menu :



The desired command is chosen by entering the corresponding number followed by LF.

To quit, press the "SERVICE" key. This returns the system to the utility menu.

To quit the utility menu, enter X OFF (CTRL and S together). The following message is displayed :

MAINS CUT. NOT DETECTED
ACKNOWLEDGE (Y/N) ?

The response Y LF returns the system to the "Current Point" page after automatic reinitialization of the NC.

8.2 - LOADING NC DATA

NC data is loaded via the connector on the front panel of the NC control unit.

Press 0 LF to display the following menu :

```
                    OPTION KEY
> 0 RETENTION OF OPTIONS WRITTEN
  1 RESTORATION OF TAPE OPTIONS
```

The option allowing retention of the options already written is used when installing a personality PCB that includes new options (addition).

The option allowing reinstatement of the tape options is used after a faulty EEPROM has been replaced by a general purpose EEPROM.

Reinstatement is possible (heading 0 or 1) if the following conditions are satified :

- the task number downloaded to tape is identical to the task number in the EEPROM,
- or the machine task number is equal to "00000000" (reloading in a general purpose EEPROM). In this case, the tape task number is written into the EEPROM and replaces the number "00000000".

If the above conditions are not satisfied, the message "TASK NO INCORRECT" is displayed.

The number of axes authorized per group is taken into account in the same way as the software options in the reinstatement mode selected.

- **Machine parameters**

  If the type of machine parameter table is not the same as for the data propcessing tape, the following message is displayed :

  ```
  TAPE PARA TABLE TYPE NOT
  SAME AS EEPROM TABLE TYPE
  LOAD PARAMETERS ON TAPE ?
  (Y/N) ?
  ```

  If the response N LF is entered, no machine parameters will be loaded (the tape runs at high speed in the area reserved for machine parameters).

  If the response Y LF is entered, the machine parameters stored on the tape will be loaded normally. The data relating to parameters which do not exist in the table or to words which do not exist in a parameter are not used.

- **Corrected points**

  If the number of points corrected on the data process tape is greater than the amount of space available in the correction table, the following message is displayed :

  ```
  TOO MANY POINTS CORRECTED ON TAPE
  MEASUREMENT CORRECTIONS NOT LOADED
  NEXT ? (TAPE READ NECESSARY)
  (Y/N) ?
  ```

  The response Y LF must be entered to continue reinstatement of the macros. The excess points are not restored. Those corrections which have already been loaded are retained.

- **Macros**

  If there is insufficient space in the resident macros zone, the following message is displayed :

  SUBPROGRAM SPACE SATURATED
  NEXT SUBPROGRAMS NOT LOADED
  NEXT ? (TAPE READ NECESSARY)
  (Y/N) ?

  Enter the response Y LF to continue reinstatement of the NC data. The excess macros will not be loaded and those already loaded are retained by the system. The tape runs at high speed to the end.

  When data is being written with the tape at a standstill, the user is notified by the flashing message "WAIT".

NOTE :

The data transmission speed must be selected beforehand using utility 0.

8.3 - DOWNLOADING NC DATA

When the tape punch is ready, the operator enters Y (LF) in response to the question "READY ?"

No further commands are necessary. When perforation is completed, the system returns to the utility menu.

One metre of tape with sprocket is created automatically before and after the tape is punched.

NOTE :

The transmission speed must be selected beforehand using utility 0.

8.4 - CHECKING THE NC TAPE

After a download, it is necessary to check that the data on the tape is consistent with that of the EEPROM.

Install the tape on the reader and select "READ".

Enter Y (LF) in response to the question "READY ?"

The tape is read and the message "VERIFYING ..." is displayed :

- If the tape data conforms, return to the menu at the end of tape read.
- If a fault is detected, display of message "PAPER TAPE FAULTY".

  Repeat the operation from the beginning, since the fault may have been caused by dust on the tape.

  If the fault persists and the tape is correct when checked, repeat the download operation and repeat the check.

NOTES

9 - UTILITY 12 : SYSTEM RECONFIGURATION

This utility allows manufacturers to carry out customization for each stage of the manufacturing process.

Customizing will be carried out following the procedure laid out below and must be completed before final delivery to the customer.

This utility is not resident in the CN, so must be loaded into RAM. When the system has been reconfigured the utility must be cleared from the RAM to provide free space for programs.

This utility is available on punched tape or diskette. It comes supplied with utility 0 (utility management), which should not be confused with the resident utility 0 (peripheral baud rate). It is loaded using utility 13 which is resident (see paragraph 10.4).

9.1 - USING THE OPTIONS KEY

A client may need to change his original option configuration requirements by adding or removing options.

A new OPTIONS KEY has then to be devised in order to reconfigure options.

This is done by NUM SA, and then issued to manufacturers. The new option key is loaded using utility 12.

9.2 - IMPLEMENTATION OF UTILITY 12

Load the utility to RAM, then press the SERVICE (F10) key twice to display the following menu:

```
HAND                                    MO2
                        JOG
-------------------------------------------

RESIDENT UTILITIES
      A = ENGLISH, F = FRANÇAIS
READER: 9600 B, PUNCHER: 1200 B
      0   UTILITIES MANAGEMENT
      12  SYSTEM RECONFIGURATION
      ?
```

Type 12 LF to display the following menu:

```
HAND                                    MO2
                        JOG
-------------------------------------------

SYSTEM RECONFIGURATION

0   JOB REFERENCE
1   OPTIONS GRID
2   NUMBER OF AXES
3   OPTIONS KEY
4   EDITING
```

The treatement of each topic should follow the order layed out above.

9.2.1 - Job reference number

The affaire number appears in this field, thereby enabling the user to check that the required affaire number will be locked.

If the answer is NO, press N. The following message then appears:

JOB REFERENCE DOES NOT MATCH
LOCKING NUMBER
EXIT UTILITY : X-OFF

The answer YES (press Y) returns to the menu.

9.2.2 – Options grid

The following appears in this field:

OPTIONS GRID
GRID
?

Enter the options grid (supplied by NUM) which matches the software options selected.

Press LF to display the options grid.

Example : For the commercial options selected on a 720T (40113 – 40110), the following options grid (supplied by NUM) should be entered:

20400029.

The following is then displayed:

OPTIONS GRID
GRID : 204029

Press the SERVICE key to return to the menu.

9.2.3 – Number of axes

The following appears in this field:

NUMBER OF AXES
NUMBER OF SPINDLES MEASURED
S : O
NUMBER OF AXES PER GROUP :
GR1 : 0
?

- To enter in the number of spindles, type the following:

  Sx LF (x being the number of spindles)

  Example : for one spindle, type S1 LF and the page display changes to :

NUMBER OF AXES
NUMBER OF SPINDLES MEASURED
S : 1
NUMBER OF AXES PER GROUP :
GR1 : 0
?

- To enter in the number of axes, type the following :

  GR1 : x (x being the number of axes).

Example: (continuation of above example with one spindle)
* for 2 axis 720T, type: GR1 2 LF and the page displayed changes to :

NUMBER OF AXES
NUMBER OF SPINDLES MEASURED
S : 1
NUMBER OF AXES PER GROUP :
GR1 : 2
?

* for 3 axis 720F, type: GR1 3 LF and the page display changes to :

NUMBER OF AXES
NUMBER OF SPINDLES MEASURED
S : 1
NUMBER OF AXES PER GROUP :
GR1 : 2
?

- To return to the main menu, press the SERVICE key.

9.2.4 – OPTIONS key

The following appears in this field :

OPTIONS KEY
KEY : 0000
?

- Enter the options key (supplied by NUM) which matches the current affaire number.
- Press LF to display the options key.

If there is incompatibility between the affaire number, the number of axes declared, the options grid and the options key, the following message appears :

AT LEAST ONE DATA ITEM NOT VALID
REENTER DATA

Return to the main menu by pressing the SERVICE key and re–enter data in fields 0 to 3.

If all data is correct, enter the key and the following message then appears :

SYSTEM LOCKING

When locking is complete the following message appears :

SYSTEM LOCKED

2 options are now available :

- Press SERVICE to output customization data for filing and to return to the main menu.
- Press the X OFF key to quit the utility and for there to be no output of customising data. The following page is then displayed :

MAINS CUT NOT DETECTED
ACKNOWLEDGE (Y/N)

Y (YES) LF displays the CURRENT POINT page.

9.2.5 - Editing

The following appears in this field :

OUTPUT DATA

READY

- If any one of the previous operations has been omitted and the user answers Y (YES), the following message then appears:

  OUTPUT DENIED
  DATA NOT LOCKED

  To return to the main menu, press the SERVICE key.

- If all the previous operations have been carried out, the following message then appears:

  READY ? Y/N

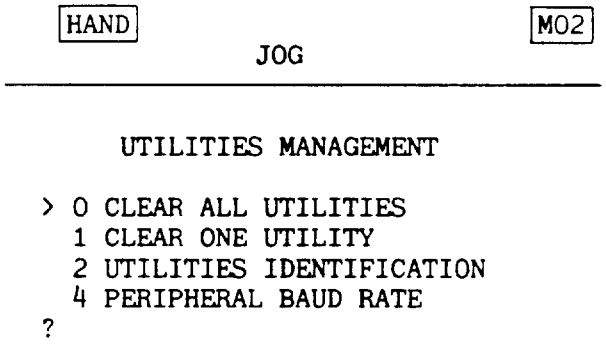
  Press Y (YES) to start output of the personalised parameters.

When editing is completed press X-OFF to exit UTILITY 12 and return to the CURRENT POINT page.

9.3 - DELETING UTILITY 12

When the system has been reconfigured, the utilities 0 and 12 should be deleted from RAM to free memory space.

Access the PROGRAM UTILITIES AVAILABLE menu, then select field 0. The following menu is displayed:



- Field 0 clears all the utilities (in this case utilities 0 and 12) contained in the memory.
  Type O LF, then answer the following question:

  "CLEAR UTILITIES (Y/N) :_"

  . if the answer is N (NO), the system returns to the CURRENT POINT page and the utilities remain in the memory.
  . if the answer is Y (YES), the system returns to the CURRENT POINT page and the utilities are cleared freeing memory space.

- Field 1 clears one specific utility (e.g., 12 while retaining 0). To clear Utility 0, field 0 must be used.

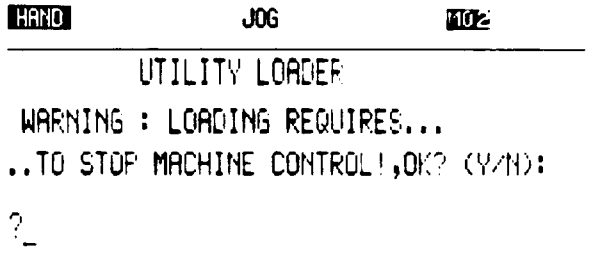
- Field 2 provides information concerning the reference and index numbers of the utilities in the RAM and the available program area.

- Field 4 selects the baud rate between the tape reader and the NC, or between the NC and tape puncher.

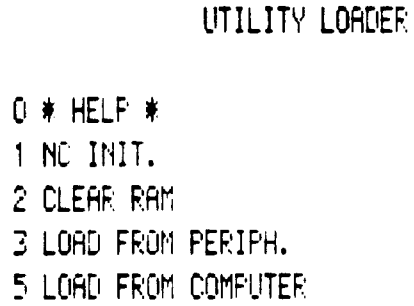
10 – UTILITY 13 : UTILITY LOADER

This utility is used to set the NC, reset all or part of the RAM memories to zero and to load one more special maintenance utilities from a peripheral (tape reader, diskette, etc.) or from a computer.

When 13 is called from the utilities menu, the following is displayed :



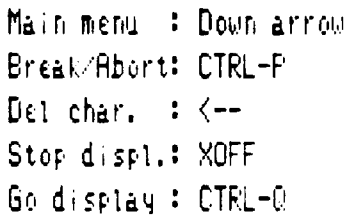
The response Y LF sends the "NC ready" bit to the PC, thereby stopping machine control. The following menu is displayed :



10.1 – HELP

This function describes the various commands which can be used either during dialog with a computer or for returning to the main menu shown above.

When 0 is selected, the following list is displayed :



Press the key to retun to the menu.

10.2 – NC INITIALISATION

This function allows the user to reset the system. It is used after one or more of the subsequent functions from the menu have been used (each of the functions returns the user to this menu).

Select 1 to display the following message :

MAINS CUT. NOT DETECTED
ACKNOWLEDGE (Y/N) ?

If the response entered is Y LF, the NC is reinitialized and the system returns to the "Current Point" page.

If the response is N LF, the system remains on the message (no effect on NC).

10.3 – CLEAR RAM

The clear RAM memory function is used primarily when the numerical control is first integrated with the machine. It is also used to erase all the workpiece programs in RAM.

Select 2 to display the following menu :

1 NO CLEAR
2 CLEAR EXCEPT UTILITIES
3 TOTAL CLEAR

Field 1 allows the user to return to the utility loader menu without carrying out a reset. To be used in the event of an error when selecting 2 from the main loader menu.

Field 2 allows the user to reset all the RAM memories with the exception of those containing any special utilities which may have been loaded. The memories containing the utilities may be cleared by using utility 0 (saved in RAM).

After typing 2, the message ".. RUNNING" appears, and the message "OK !" is displayed once the reset is completed.

Return to loader menu via ↓.

Field 3 allows the user to clear all the RAM memories, especially if the utilities were stored in RAM.

10.4 – LOADING FROM PERIPH

This function is used to load the special utilities from a tape reader or from floppy disks, with the peripherals connected to the front panel or at the rear of the NC control unit (front panel plug RS232, rear plug RS232 DNC1).

Select 3 to display the following :

```
PERIPH. READY? (Y/N)
PORT   (MODIFY USING #)    : FRONT
BAUD RATE (MODIF. USING +-):  9600
```

Before entering the response Y, select front or rear connection using the # key and select the baud rate using the + or – keys.

When the loading process is finished, the message LOAD OK is displayed. Return to the utility menu using the ↓ key, then initialize the NC by selecting 1.

If Y LF is entered in response to the question "PERIPH. READY", the system will return to the utility menu.

If the transmission speed of the peripheral is not the same as the speed shown on the NC, a mixture of characters are displayed and no message appears at the end of transmission.

NOTE :

To load utilities from an IBM PC or PS, see Appendix 2.

10.5 – LOAD FROM COMPUTER

Special utilities may be loaded from a computer. The computer may be connected to the front panel or at the rear of the NC control unit.

Select 5 to display the following :

```
1 LOADING FROM COMPUTER
4 DISPLAY FORMAT MODIFY

PORT   (MODIFY USING *)    : FRONT
BAUD RATE (MODIF. USING +-):  9600
```

Field 4 allows the user to reduce the format of the characters displayed and is used by NUM for the development service. The user's choice does not modify the NC in any way.

When field 1 is selected, the message "LOAD COMMAND." is displayed. Give the code which will allow the computer to start transmission of the utility (the utility is not displayed). At the end of transmission, the message "LOAD OK !" appears ; return to the utility menu using the ↓ key.

If the wrong transmission speed is selected or if transmission is faulty, the display will show a mixture of characters.

NOTES

APPENDIX 1

LIST OF MACHINE PARAMETERS

WHICH MAY BE MODIFIED USING UTILITY 9

NUM 720	PARAMETER P9	FUNCTION			
	Address of machine axes	Declaration of axes			
WORD TYPE	■ 0 Hexadecimal (00 to FF) ☐ 1 Decimal (−32767 to + 32767) ☐ 2 Decimal (−99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS	3		
		VERSION	T		

Address of each programmable machine axis. This address is determined by the wiring of the axis PCB for the axis concerned.

The addresses possible are 0 and 1.

The absence of an axis is declared by address FF.

0	X
1	Z
FF	

NOTE :

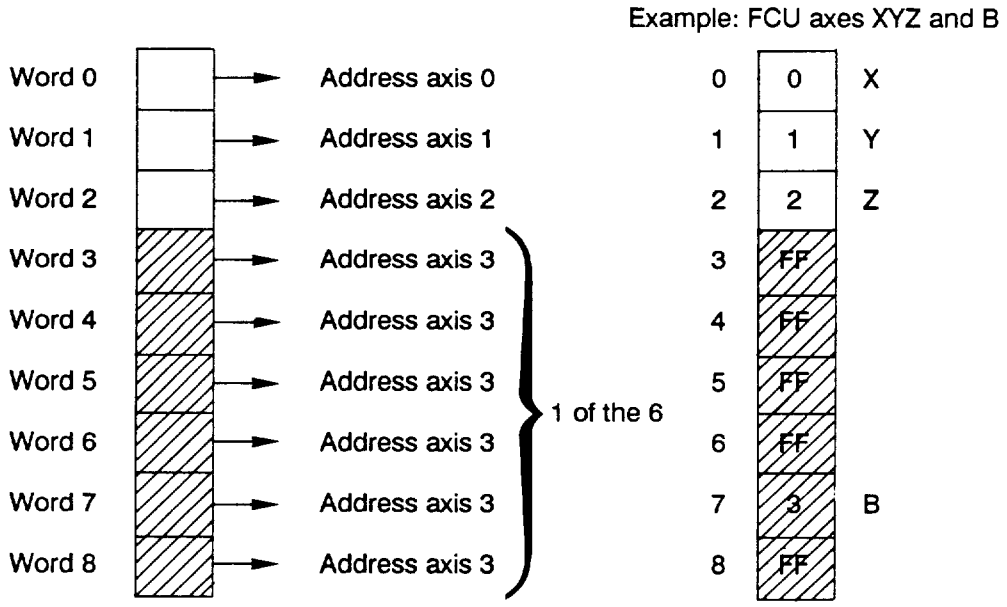
See P0 for correspondence with programmable axes.

			ADRAX
9.88	Creation		P9 1/1

NUM 720	PARAMETER P9	FUNCTION			
	Address of machine axes	Declaration of axes			
WORD TYPE	■ 0 Hexadecimal (00 to FF) ☐ 1 Decimal (-32767 to + 32767) ☐ 2 Decimal (-99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS		9	
		VERSION		F	

This parameter gives the address of each programmable axis. Each address corresponds to the wiring of the axis PCB for the axis concerned.

The addresses possible are numbered 0 to 3. The absence of an axis is declared by address FF.



NOTE :

See P0 for correspondence with programmable axes.

			ADRAX	
9.88	Creation		P9	1/1

NUM 720	PARAMETER P16	FUNCTION			
	Position of origin switch in machine dimensions	Measurements and travel			
WORD TYPE	☐ 0 Hexadecimal (00 to FF) ☐ 1 Decimal (-32767 to + 32767) ■ 2 Decimal (-99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS	3	6	
		VERSION	T	F	

Each word number in the parameter corresponds to the axis with the same number (the number of the axis is determined by the wiring of the axis PCB connector defined by P9).

Each word contains the position, in machine dimensions, of the origin switch on the corresponding axis. The sign is determined by the direction of the machine origin to the switch.

This, in machine dimensions, is the position of the point corresponding to the zero of the 2 mm pitch encoder (2 mm corresponds to 1 revolution) on which the switch is located.

NOTE :

The dimensions for the linear axes are given in microns. For the rotary axis they are expressed in thousandths of degrees.

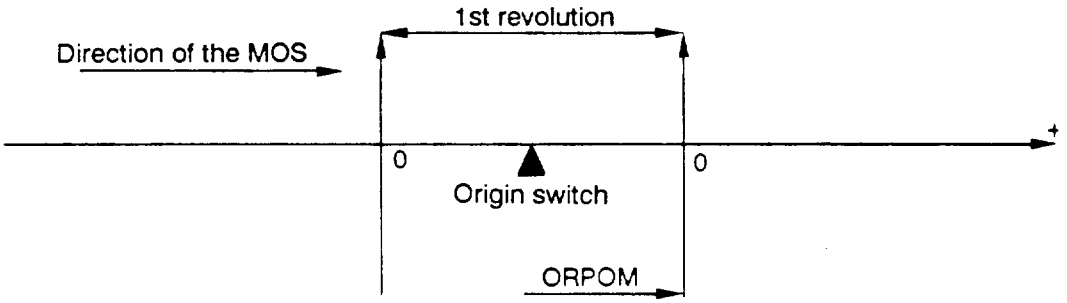
NOTE :

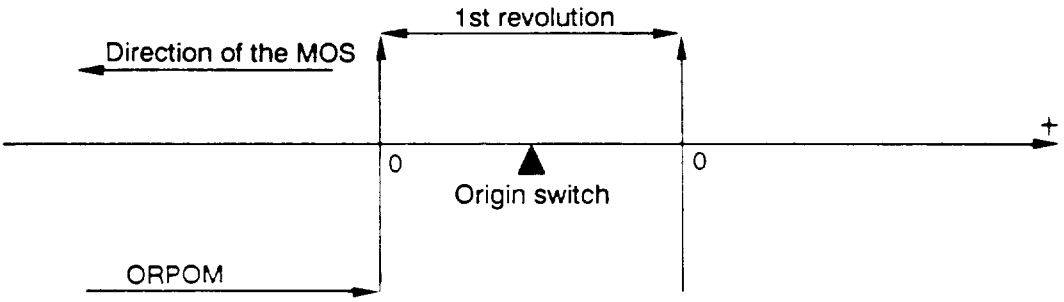
See P9 for the definition of the axis numbers.

			ORPOM	
9.88	Creation		P16	1/2

NUM 720	PARAMETER P16	FUNCTION
	Position of origin switch in machine dimensions	Measurements and travel

Encoder :





ORPOM gives the dimension of the first encoder zero encountered after the switch during MOS.

			ORPOM	
9.88	Creation		P16	2/2

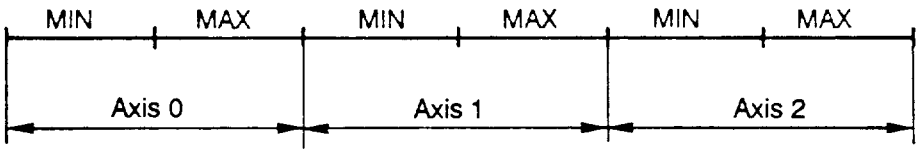
NUM 720	PARAMETER P17	FUNCTION			
	Axis travel limits	Measurements and travel			
WORD TYPE	☐ 0 Hexadecimal (00 to FF) ☐ 1 Decimal (−32767 to + 32767) ■ 2 Decimal (−99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS	8	12	
		VERSION	T	F	

Each pair of words corresponds to an axis (even word – odd word).

The even word gives the lower travel limit : MIN (in machine dimensions) for the corresponding axis.

The odd word gives the upper travel limit : MAX (in machine dimensions) for the corresponding axis.

The dimensions for linear axes are expressed in microns. For the rotary axis, they are expressed in thousandths of degrees.



			FDCX	
9.88	Creation		P17	1/1

NUM 720	PARAMETER P18	FUNCTION			
	Reversal error compensation	Measurements and travel			
WORD TYPE	☐ 0 Hexadecimal (00 to FF) ■ 1 Decimal (−32767 to + 32767) ☐ 2 Decimal (−99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS	4	6	
		VERSION	T	F	

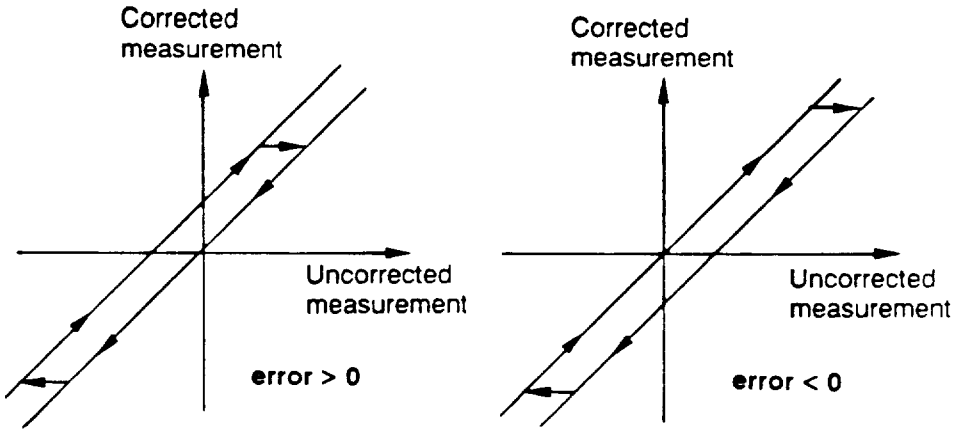
Each word corresponds to an axis and contains a signed value.

The absolute value of the content of a word gives the reversal error on the corresponding axis.

The sign of the value gives both the direction of movement for which the reversal error applies and the correction sign.

Value > 0 : Positive correction, applied when the axis moves in the positive direction.

Value < 0 : Negative correction, applied when the axis moves in the negative direction.



The corrections for linear axes are expressed in microns. For the rotary axis, they are expressed in thousandths of degrees.

			JEU	
9.88	Creation		P18	1/1

NUM 720	PARAMETER P37	FUNCTION			
	Character formatting Service character code	DNC lev. 1			
WORD TYPE	■ 0 Hexadecimal (00 to FF) ☐ 1 Decimal (−32767 to + 32767) ☐ 2 Decimal (−99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS	9	9	
		VERSION	T	F	

1 – **Word 0** : Character formatting

This word defines the serialization mode of the characters on the line.

The values allowed for this word are the following :

02 : 7 bits + parity bit + 2 stop bits

06 : 7 bits + odd parity bit + 2 stop bits

0A : 7 bits + parity bit + 1 stop bit

0E : 7 bits + odd parity bit + 1 stop bit

12 : 8 bits + 2 stop bits

16 : 8 bits + 1 stop bit

1A : 8 bits + parity bit + 1 stop bit

1E : 8 bits + odd parity bit + 1 stop bit

NOTE :

This parameter is used only with the DNC1 link procedure.
If this option is absent, the content of the parameter is irrelevant.

			FORMAT	
9.88	Creation		P37	1/2

NUM 720	PARAMETER P37	FUNCTION
	Character formatting Service character code	DNC lev. 1

2 – **Words 1 to 8** : Service character codes

Words 1 : STX (Start of text) = $ 02
2 : ETX (End of text) = $ 03 (with IBM–PC BEL = $ 07)
3 : SYN (Initialization) = $ 16
4 : ACK (Positive acknowledge) = $ 06 (with IBM–PC SOH = $ 01)
5 : NAK (Negative acknowledge) = $ 15
6 : EOT (End of transmission) = $ 04
7 : ENQ (Repeat request) = $ 05
8 : GS (Block separator) = $ 1D

			FORMAT	
9.88	Creation		P37	2/2

NUM 720	PARAMETER P38	FUNCTION			
	Translation of the special characters in operator/computer dialog	DNC. lev.1			
WORD TYPE	■ 0 Hexadecimal (00 to FF) ☐ 1 Decimal (−32767 to + 32767) ☐ 2 Decimal (−99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS	16	16	
		VERSION	T	F	

This table is used to translate the codes which can be used to control the dialog between the operator of the NC and the computer.

Generally speaking, the codes correspond to cursor backspace, line deletion, etc.

This parameter is a table of 16 words divided into two parts.

1 – **Words 0 to 7** : (Translation of the characters transmitted from the keyboard and sent to the computer).

- Even words : code of the control characters transmitted from the NC keyboard.
- Odd words : translation of the code contained in the preceding word.

  This translation is sent to the computer.

2 – **Words 8 to 15** :

- Even words : code of the control characters transmitted by the computer.
- Odd words : translation of the code contained in the preceding word, which will be transmitted to the NC display.

			CARSPE	
9.88	Creation		P38	1/2

NUM 720	PARAMETER P38	FUNCTION
	Translation of the special characters in operator/computer dialog	DNC lev. 1

Example : Using the keyboard character "backspace arrow" (hex. : 09) as control character for the "cursor backspace" function.

The code for the "backspace cursor" function is hexadecimal code 09 on the display and code 08 on the computer concerned.

0	09	1	08	2	00	3	00
4	00	5	00	6	00	7	00
8	08	9	09	10	00	11	00
12	00	13	00	14	00	15	00

NOTE :

This parameter is used only with the DNC1 link procedure.
If this option is not available, the content of the parameter is irrelevant.

			CARSPE	
9.88	Creation		P38	2/2

NUM 720	PARAMETER P39	FUNCTION			
	Time delays used in the DNC1 protocol	DNC. lev.1			
WORD TYPE	☐ 0 Hexadecimal (00 to FF) ☐ 1 Decimal (-32767 to + 32767) ■ 2 Decimal (-99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS	3	3	
		VERSION	T	F	

Word 0	
Word 1	
Word 2	

- **Word 0** : defines the minimum delay which the NC must respect between receiving a message or acknowledge, and sending back the acknowledge or message.

  This time delay gives the computer time to switch to receive mode. It is expressed in milliseconds.

- **Word 1** : defines the maximum time delay allowed for the computer to answer after a message or acknowledge has been set by the NC. It is expressed in milliseconds.

- **Word 2** : defines the time delay used to space characters sent by the NC to the computer.

  This time delay is not necessary if the CTS and RTS signals are used to synchronize both partners. In this case, the content of word 2 should be zero.

  If the control signals are not used, word 2 must contain the character spacing value expressed in microseconds.

  The maximum permitted value for this time delay is 81900 microseconds.

NOTE :

This parameter is used only with the DNC1 link procedure.
If this option is not available, the content of the parameter is irrelevant.

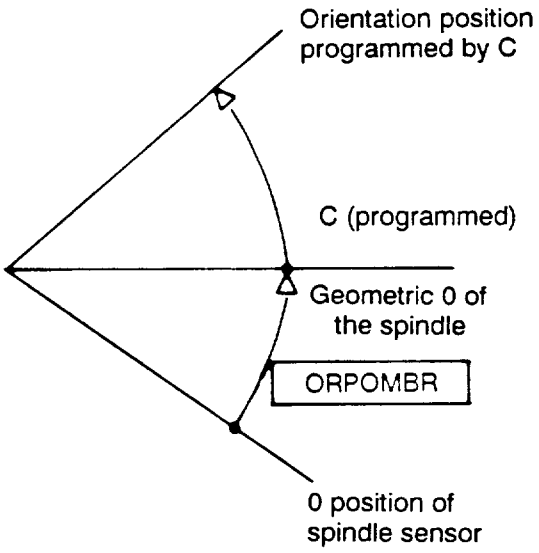
			DELAI	
9.88	Creation		P39	1/1

NUM 720	PARAMETER P48	FUNCTION			
	Spindle origin offset	Spindle			
WORD TYPE	☐ 0 Hexadecimal (00 to FF) ■ 1 Decimal (-32767 to + 32767) ☐ 2 Decimal (-99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS	1		
		VERSION	T		

(See "SPINDLE ORIENTATION" chapter)

This parameter (ORPOMBR) is used to adjust the 0 position of the spindle, and consequently the orientation position. It is expressed in 1/4096ths of a revolution.

$$\text{ORPOMBR} = \text{offset (degrees)} \quad \frac{4096}{360}$$



			ORPOMBR	
9.88	Creation		P48	1/1

NUM 720	PARAMETER P59	FUNCTION			
	Graphic parameter	Miscellaneous			
WORD TYPE	■ 0 Hexadecimal (00 to FF) ☐ 1 Decimal (-32767 to + 32767) ☐ 2 Decimal (-99.999.999 to + 99.999.999) ☐ 3 Character	NUMBER OF WORDS	2	2	
		VERSION	T	F	

- The first word of this parameter is used to define whether the Hard Copy output in graphic display mode will be on a colour printer type EPSON EX 800 or EX 1000, or on a monochrome printer EPSON LX or RX 80.

  $ 01 : Monochrome printer

  $ 03 : Colour printer

- The second parameter defines the type of screen on the NC.

  $ 00 : Monochrome screen

  $ 01 : Colour screen

The second byte is tested in conversational mode. If the screen is declared monochrome, all displays in conversational mode will be in the "Grey" plane, which is highlighted in order to obtain maximum brilliance.

Hard Copy and the colour screen are not currently available. The value should be $ 01,00.

			GRAPHI	
9.88	Creation		P59	1/1

APPENDIX 2

LOADING UTILITIES ON DISKETTE FROM AN IBM PC

A2.1 - PC CONFIGURATION

- IMB PC or PS, or compatible
- micro-computer operating system : DOS version 3.0
- Serial port

A2.2 - CABLING

Connect the NC unit READ/PUNCH connection to the serial port n°1 (COM 1) with a cable, max length 15 metres.

cable 201 548 for IBM PC
cable 201 771 for IMB PS

The READ/PUNCH line must be configured to the same transmission speed as the speed selected for the micro-computer.

A2.3 - LOADING THE DISKETTE

Press the NC "SERVICE" key and select utility 13. The procedure for loading the NC is laid out in paragraph 10.4.

To configure the PC serial port COM 1, follow the instructions below :

>MODE ⌐¬ COM 1 : 9600, n, 8, 1., this instruction corresponds to a baud rate of 9600, no parity, 8 bits per character. 1 corresponds to stop.

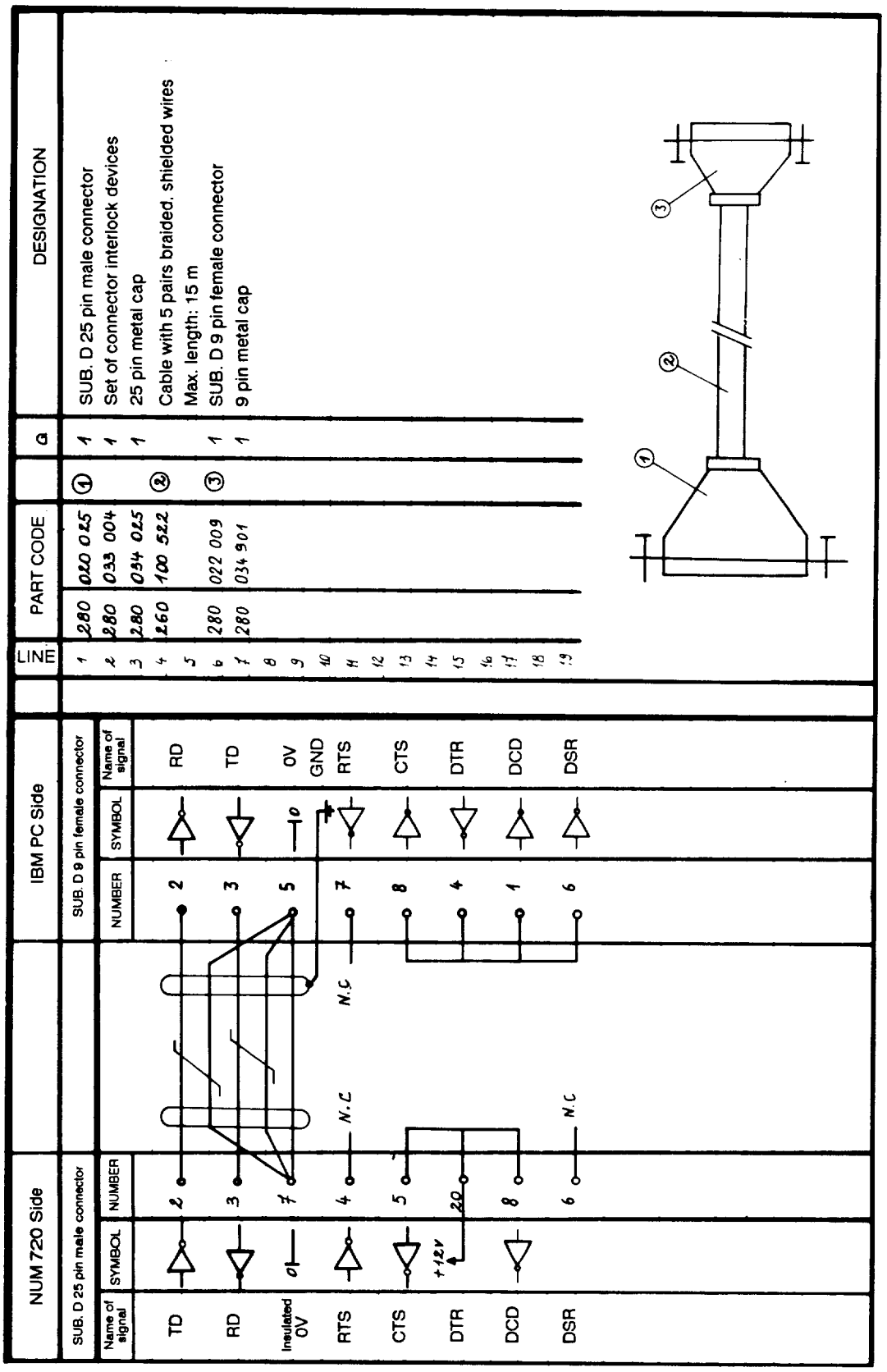
Use the following instructions to insert the diskette and load :

>COPY ⌐¬ A : AU x. BIN ⌐¬ COM 1 : (Enter) x : utility number.

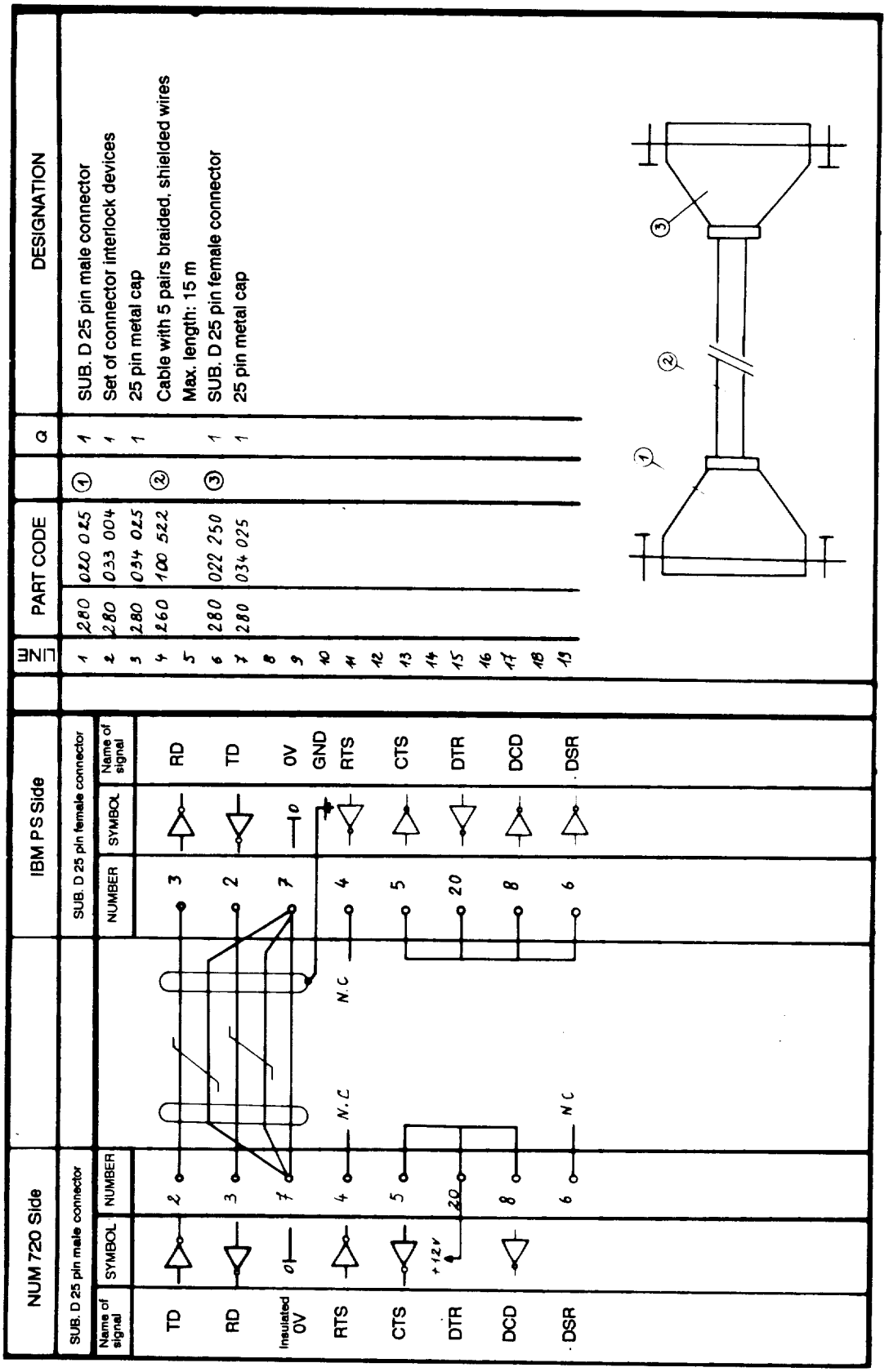
When loading is complete the PC displays the ">A :" prompt and the NC displays "CHARG OK".

In the event of an error in transmission speed, the wrong letters scroll down the screen. If there is a transmission fault (faulty connection of link) a message is displayed on the micro-computer screen.

PC LINK WITHOUT CONTROL SIGNALS (201 548/B)



PS LINK WITHOUT CONTROL SIGNALS (201 771/A)



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