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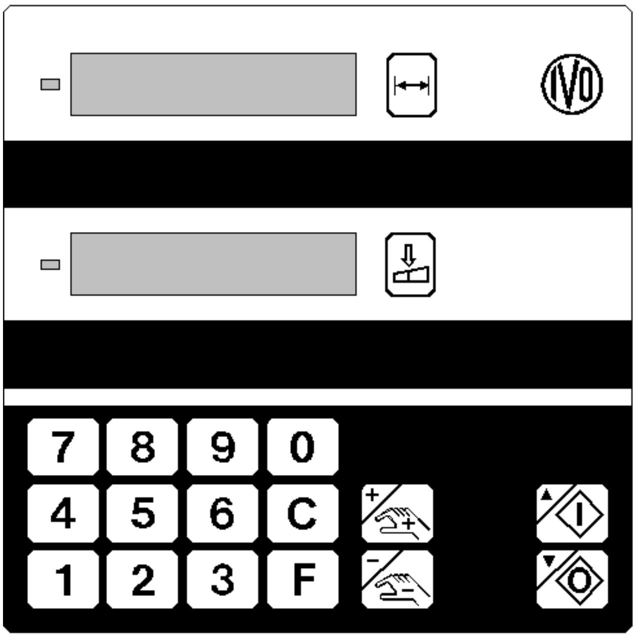
NA 1204



PROGRAMMABLE 1-AXIS POSITIONER

LINEAR AND ANGULAR POSITIONING

FOR SSI ABSOLUTE AND INCREMENTAL ENCODERS

WITH ANALOG AND RELAY OUTPUTS

. 1 positioning pre-selection with quantity of pieces to be produced

. Start value

. Slow-down value

. Inertia value with automatic correction

. + and - tolerance values

. Back-lash take-up values

. Back-off value

. PARKING value

. Minimum and maximum software stops

. Safety time

. Pulse conversion factor

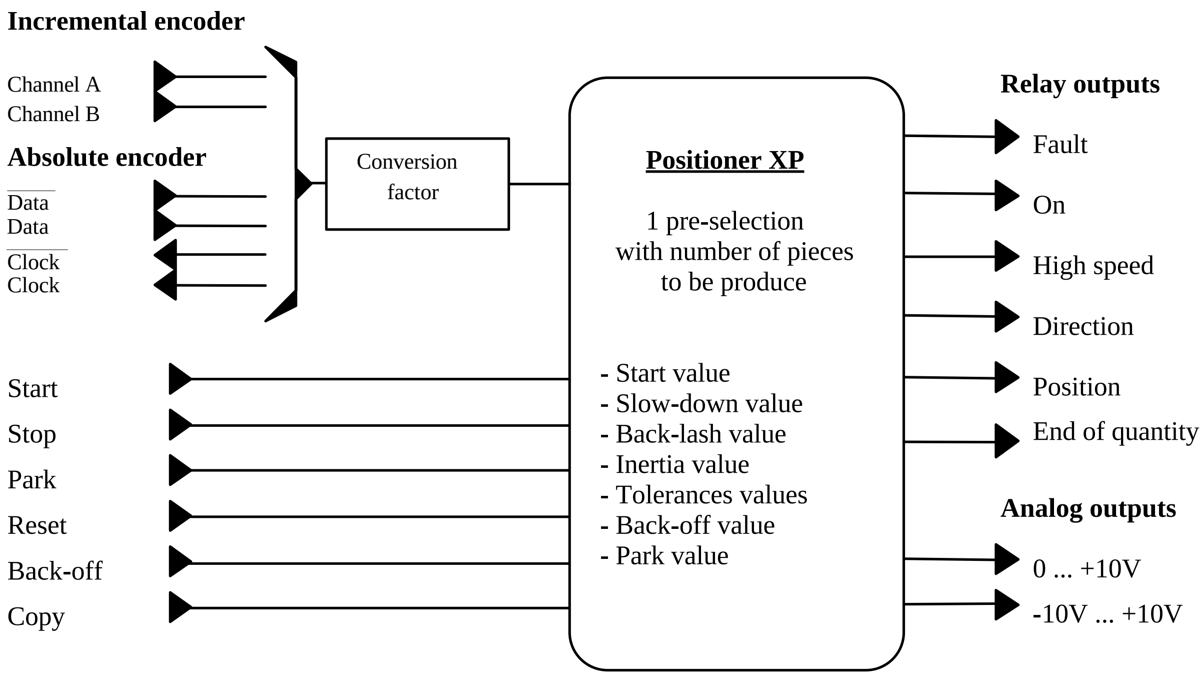
. 6 relay outputs

. 2 analog outputs
0 ... +10V and -10V ... +10V

EDITION 08/97

SUMMARY

1. BLOCK DIAGRAM



2. GENERAL DESCRIPTION

The **NA1204** programmable and multi-function 1-axis positioner is entirely microprocessor controlled and was designed to handle a variety of positioning requirements. It consists of the following:

1 XP 1-axis positioner

6 digits with ± sign

May be used with an SSI absolute encoder
- BINARY or GRAY code
- choice of encoder resolution : 25, 24, 13, 12 bits
- choice of encoder read rate : 1000, 500 kHz
- the encoder's most significant bit may be used as a sign bit, if necessary

May be used with an incremental encoder, with 2 channels 90° out of phase
- choice of pulse multiplication coefficient: X1, X2, X4

1positioning pre-selection, with programming of the number of pieces to be produced.

1 **Parking** pre-selection

Programmable minimum and maximum software stops to prevent positioning to values not between the minimum and maximum stops.

Programmable minimum and maximum security pre-selections, they define 2 security zones where all movement to a pre-selection, impossible east if the operator does not maintain any manner continues the START or PARK command.

Linear or angular positioning

For angular positioning :
- programming of number of encoder points per revolution
- rotation direction selection; either automatic using the shortest path, or pre-set to the increasing or decreasing direction

8 positioning values for optimum searching of the target position :
- start value
- slow-down value
- inertia value with automatic search of the final value and correction
- + and - tolerance values
- positive and negative back-lash take-up values
- back-off value

Input pulse conversion factor from 0.00001 to 9.99999

6-digit programmable resetting value with ± sign, to create an origin point offset

Manual start value (RESET) with keypad or external signal
- selection of displacement direction enables or disables resetting
- the **Reset** input may be combined with the **Copy** input. In this case, resetting is only possible if both inputs are enabled.

Pulse presence check. The safety time disables the ON output if there are no counting pulses during a pre-programmed time. This time is programmable in $1/10^{th}$ second steps, over 2 digits

Selection of a display decimal point

Maximum counting rate: 10 kHz

Analog outputs

- **0 ... 10V** : 12-bit resolution; the displacement direction is indicated by the Direction relay
- **-10V ... +10V** : 12-bit resolution; the displacement direction is indicated by the voltage sign

4 analog ramps for optimum searching of the target position :

- starting ramp
- slow-down ramp
- inertia ramp
- back-off ramp

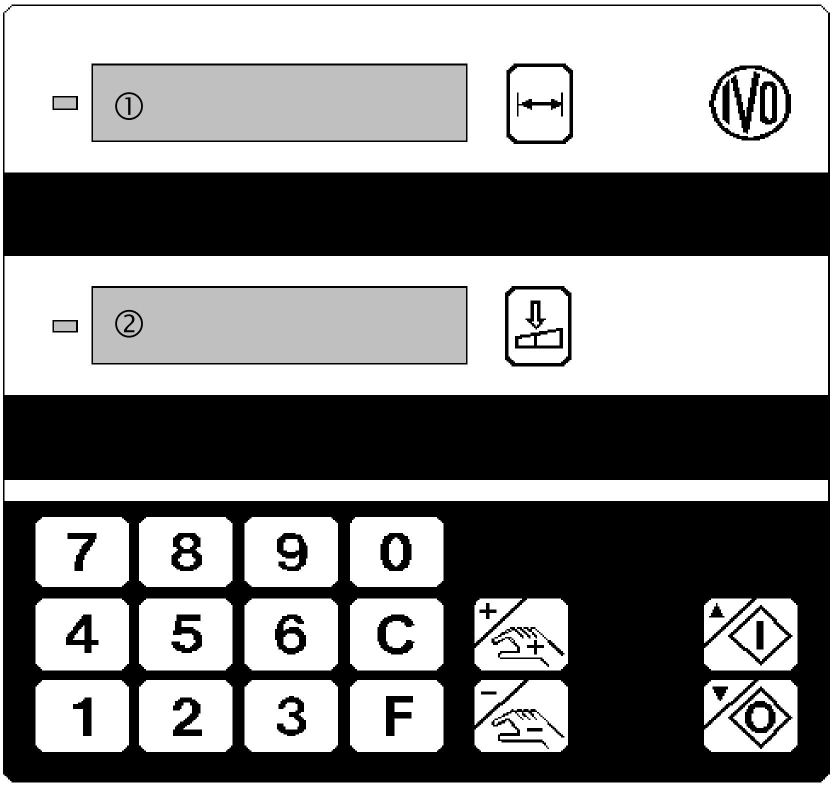
Control inputs :

- **Channel A**, **Channel B** : incremental encoder connection
- **Data** , $\overline{\textbf{Data}}$ / **Clock** , $\overline{\textbf{Clock}}$: SSI absolute encoder connection
- **Start** : positioning cycle start
- **Stop** : positioning cycle stop
- **Reset** : resetting of the positioner used with an incremental encoder
- **Park** : start positioning cycle at the parking value
- **Back-off** : start back-off cycle and count number of pieces to be produced
- **Copy** : transfer, in query mode, the positioner’s current value to a pre-selection value (teaching function)

Relay outputs :

- **On** : relay activated from the Start command to the positioning value
- **High-Speed** : control relay for a 2-speed motor
- **Direction** : control relay for a 2-direction motor
- **Position** : relay activated at the positioning value
- **Fault** : relay activated if the safety time, which checks the encoder’s progress, has been exceeded
- **End of Quantity** : relay activated when the number of pieces to be made has been produced or relay activated when the last piece of the last positioning pre-selection was produced.
  This relay is originally assigned to the XB auxiliary counter but may be assigned by programming as the XP positioner’s relay.

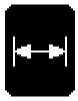
3. KEYPAD AND DISPLAY



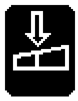
3.1 DISPLAY

The NA 1204's display enables simultaneous display of 2 settings. It includes:

❒ ① **One 6-digit display with - sign**, to display the current positioner value represented by the symbol ....



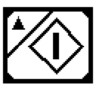
❒ ② **One 6-digit display with - sign**, to display the current pre-selection value represented by the symbol ....



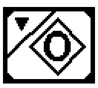
3.2 KEYPAD

The NA 1204 keypad is equipped with all of the keys required for easy positioner programming and operation. It includes :

❒ Positioner control keys



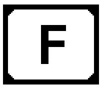
START key
Starts a positioning cycle by enabling the ON and HIGH-SPEED outputs if necessary. The operation DIRECTION output will be enabled according to the target value and the positioner's current value.



STOP key
Stops a positioning cycle and disables the ON and HIGH-SPEED outputs.

PARK key
Starts the positioning cycle at the Parking value. The positioner must be in the STOP phase or the command will be ignored.
Its function is identical to the START function

RESET key
Resets the positioner’s current value to a resetting value.
This function is only possible if the positioner is used with an incremental encoder

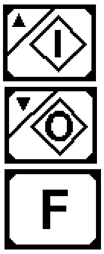


FUNCTION key
Call to the display the number of pieces remaining to produce. This display is maintained so as the key is pressed. This number of pieces remaining to produce is also displayed during 3 seconds after each **DEGAGE** command

MANU + key
Moves in the positive direction, at low speed, by enabling the ON & DIRECTION outputs, as long as the key is pressed.

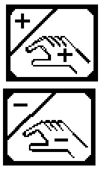
MANU - key
Moves in the negative direction, at low speed, by enabling the ON & DIRECTION outputs, as long s the key is pressed.

- Positioner programming keys



Movement keys ▲ , ▼ , ▶
Move **UPWARD**, **DOWNWARD** and to the **RIGHT**, within the various programming mode settings

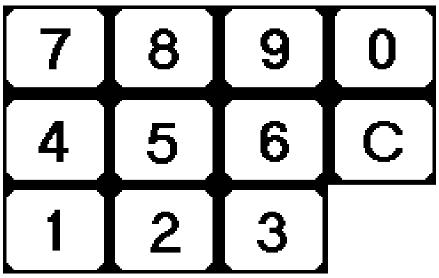
The secondary **MOVEMENT** function of these 3 keys is only possible in programming mode.



+ and - keys
Used to program the sign of the positioning pre-selections and other settings programmed with a + or - sign.

The secondary **SIGN** function of these 2 keys is only possible in programming mode

C key
Resets the displayed setting to zero.



Numeric keys
Used to program numerical data.

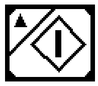
4. INPUTS AND OUTPUTS

4.1 CONTROL INPUTS

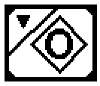
- **Channel A and Channel B**
  Incremental encoder connection

- **Data ±, Clock ±**
  SSI absolute encoder connection

- **Start**
  Same function as the START control key
  Starts a positioning cycle by enabling the ON and HIGH-SPEED outputs if necessary. The operation DIRECTION output will be enabled according to the target value and the positioner's current value.



- **Stop**
  Same function as the STOP control key
  Stops the positioning cycle and disables the ON and HIGH-SPEED outputs



- **Park**
  Same function as the PARK control key
  Starts the positioning cycle at the Parking value. The positioner must be in the STOP phase or the command will be ignored.
  Its function is identical to the START function

- **Reset**
  Same function as the RESET control key
  Resets the positioner's current value to a resetting value. This function is only possible if the positioner is used with an incremental encoder

- **Back-off**
  Starts a positioning cycle at the back-off value by enabling the ON output and counting off the number of parts to be produced.

- **Copy**
  Used to teach positioning pre-selection. This function is only available in **QUERY** mode.
  When the Copy input is enabled; the positioner's current value is then copied into the pre-selection value as long as the input is enabled.

4.2 RELAY OUTPUTS

- **On**
  Relay enabled by the Start command at the positioning value.

- **High speed**
  Control relay for a 2-speed motor.

- **Direction**
  Control relay for a 2-direction motor.

- **Position**
  Relay enabled at the positioning value.

- **Fault**
  Relay enabled when the positioner is switched on.
  It is disabled when the security time which tests for encoder changes has been exceeded.

- **End of Number**
  Relay enabled when the number of parts to be produced has been reached.

5. POSITIONER OPERATION

5.1 POSITIONING TYPE

The positioner may be used for linear or angular positioning :

5.1.1 LINEAR Positioning

The pre-selections programming range is a straight line ranging from -99999 to +99999. The positioning displacement to a pre-selection is carried out along this straight line.

5.1.2 ANGULAR positioning

The pre-selections programming range is circular and ranges from 0 to a programmable number of points per revolution.

The positioning displacement to a pre-selection is carried out along this circle, according to the following three programming modes:

- the positioner automatically determines the direction of rotation to reach the pre-selection using the shortest path.
- the displacement is pre-set to always follow the increasing direction of pulses.
- the displacement is pre-set to always follow the decreasing direction of pulses.

NOTE
For angular positioning, the SC resetting value is ignored and canceled.

5.2 POSITIONING VALUES

Positioning to the pre-selection value is achieved using the following values :

5.2.1 START value

This value serves to delay the enabling of the HIGH-SPEED output after a START command. The machine will be gradually started, beginning with a low-speed phase before switching to high-speed.

5.2.2 SLOW-DOWN value

This value is used to disable the HIGH-SPEED output before the programmed positioning pre-selection value is reached. The final phase of displacement will then be carried out at low speed.

5.2.3 INERTIA value

This value is used to anticipate the stopping of the motor before the positioning pre-selection value is reached. This serves to prevent any over-shoot due to the machine's momentum after the motor's electrical power is cut off.

Automatic value search with inertia correction

This automatic search is performed if the programmed positioning pre-selection value was not reached within the specified tolerance range.

The positioner then performs the following operations :
1° displacement to the **inertia back-off value**
2° automatic calculation of the new inertia value based on the previous error.
3° new positioning to the programmed pre-selection using the new inertia value.

Particular characteristic of the inertia value and the inertia back-off value

A START command is sent and the stop is already in the target pre-selection's inertia zone
1° If the inertia back-off value is 0, no displacement will be performed.
2° If an inertia back-off value is programmed, the positioner will execute a displacement to this value before searching for the desired positioning value.

Note :
The **inertia back-off** value serves to move a programmable distance from the stop value to perform automatic inertia correction or a START command in the inertia zone.

5.2.4 + TOLERANCE value & - TOLERANCE value

These two values are used to define a range of tolerance around the positioning value. The POSITION output will be enabled if the final stop is made within this range.

5.2.5 + BACK-LASH TAKE-UP value & - BACK-LASH TAKE-UP value

These two values optimize operation by ensuring that final pre-selection search is always carried out in the same direction.

Example : positive back-lash take-up is programmed to correct play along a screw.

1° If the displacement required to reach the pre-selection is in the positive direction, the positioner will overshoot the target value by the + back-lash take-up value, and then will reverse the direction of displacement and search for the value in the negative direction.
2° If the displacement required to reach the new value is in the negative direction, back-lash take-up will be ignored.

5.2.6 BACK-OFF value

This value is used, when the pre-selection has been reached and the BACK-ORDER command is sent, to move away from the stop value by a programmable distance and during a programmable time. Once this time has elapsed, the positioner will once again search for the initial value.

Example : this value may be used to back-off a positioning stop to a part to be removed.

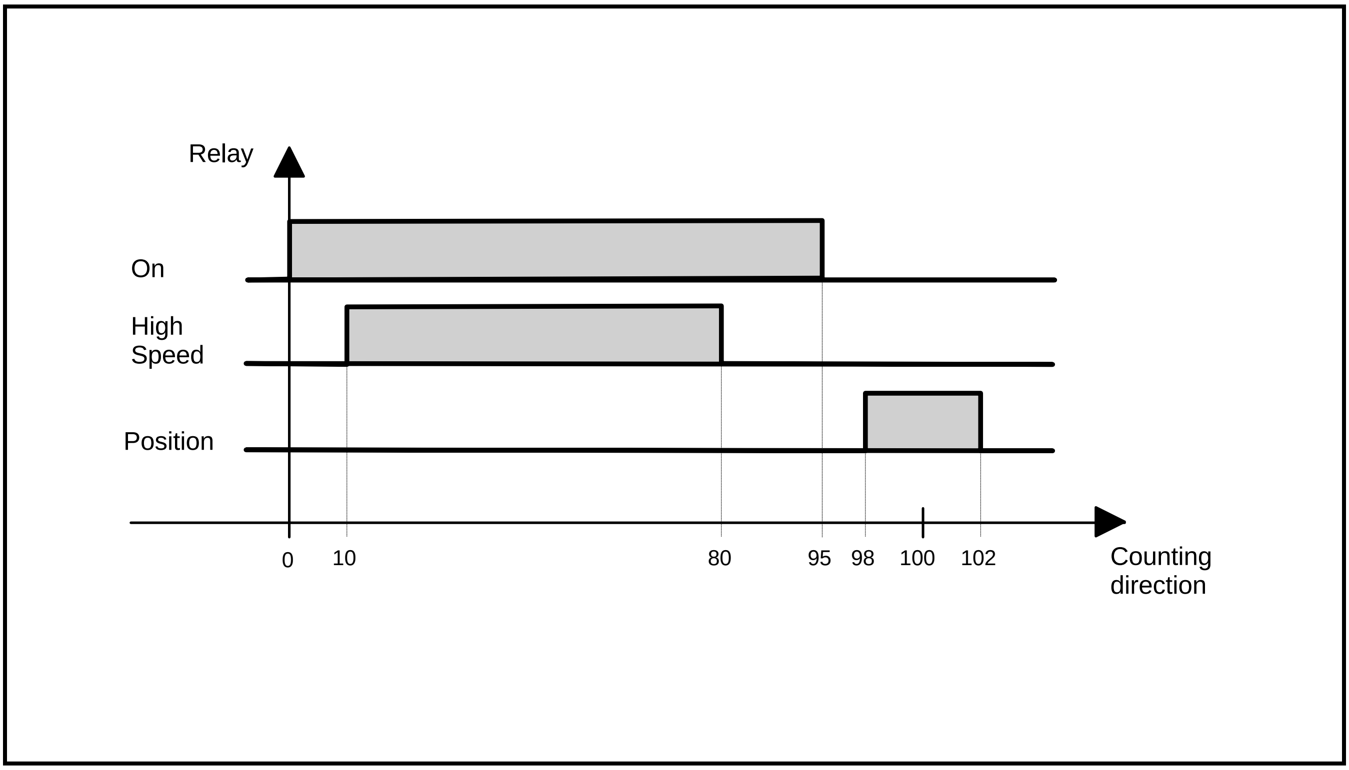
5.2.7 PARKING positioning value

This value is equivalent to a positioning value and may be called at any time by the PARK input or by pressing the key .... $\boxed{0}$

Example: this pre-selection may be used to move a tool or a stop to the end of the machine's shaft to enable servicing.

5.3 EXAMPLES OF OPERATION

5.3.1 Positioning without back-lash take-up



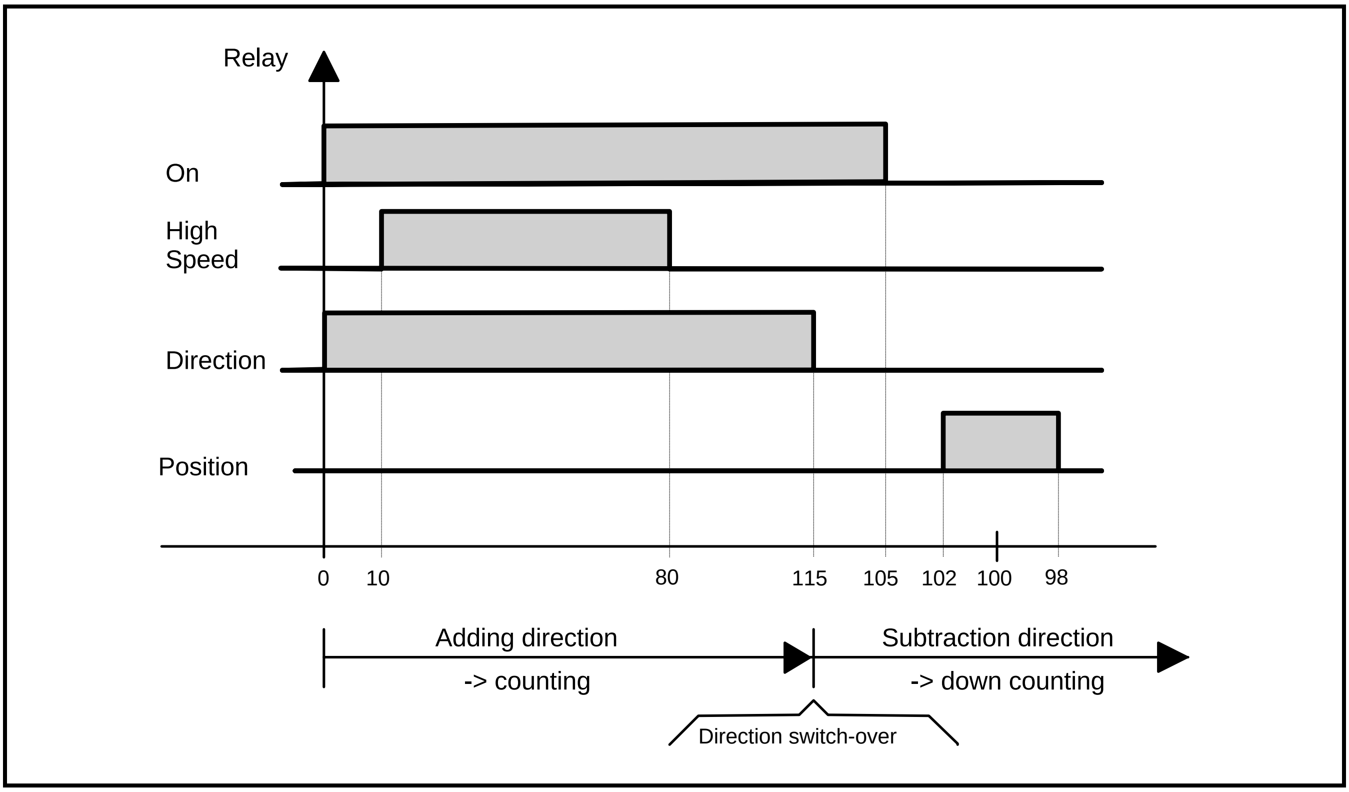
Programmed positioner settings

initial value	:	0	
target value	:	100	(PRESET)
starting value	:	10	(DEM)
slow-down value	:	20	(RAL)
inertia value	:	5	(INER)
tolerance range	:	-2; +2	(TOL_MO;TOL_PL)

Operation

1° START command: the On relay cuts in.
Low Speed start until value 10 is reached (0 + DEM).
2° Switch to High Speed : the High-Speed relay cuts in.
High Speed displacement until the slow-down value 80 is reached (PRESET - RAL).
3° Switch to Low Speed: the High Speed relay cuts out.
Low Speed displacement until the inertia value 95
(PRESET - INER) is reached.
4° The ON relay cuts out. Inertia displacement only.
5° The Position relay cuts in if the final stop occurs within the tolerance range
98 (PRESET - TOL_MO) to 102 (PRESET + TOL_PL)

5.3.2 Positioning with a positive back-lash take-up



Programmed positioner settings

initial value	:	0	
target value	:	100	(PRESET)
starting value	:	10	(DEM)
slow-down value	:	20	(RAL)
inertia value	:	5	(INER)
back-lash take-up value	:	15	(JEU_PL)
tolerance range	:	-2; +2	(TOL_MO;TOL_PL)

Operation

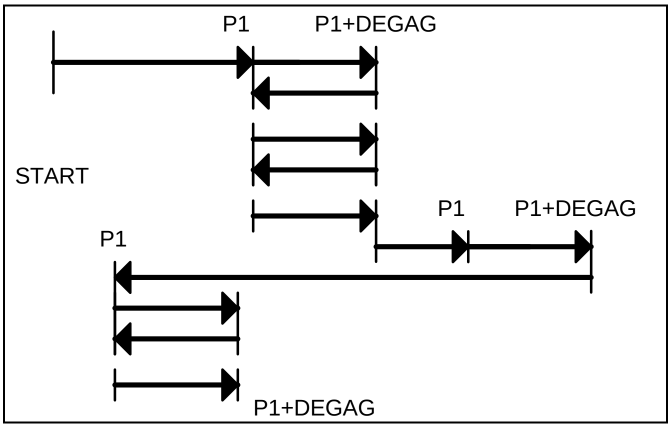
1° START command: the On relay cuts in.
Low Speed start until value 10 is reached (0 + DEM).
2° Switch to High Speed : the High-Speed relay cuts in.
High Speed displacement until the slow-down value 80 is reached (PRESET - RAL).
3° Switch to Low Speed: the High Speed relay cuts out.
Low Speed displacement until the back-lash take-up value 115 (PRESET - JEU_PL) is reached.
4° Operation Direction relay switches over
Low Speed movement until the inertia value 105 is reached (PRESET + INER)
5° The ON relay cuts out. Inertia displacement only.
6° The Position relay cuts in if the final stop occurs within the tolerance range
102 (PRESET - TOL_MO) to 98 (PRESET - TOL_PL)

5.4 Positioning cycles

The positioner, **when used with an incremental encoder** may be programmed to operate in one of the following two operating cycles :

5.4.1 CHAINED positioning pre-selections

The positioner goes from positioning pre-selection to positioning pre-selection without resetting.



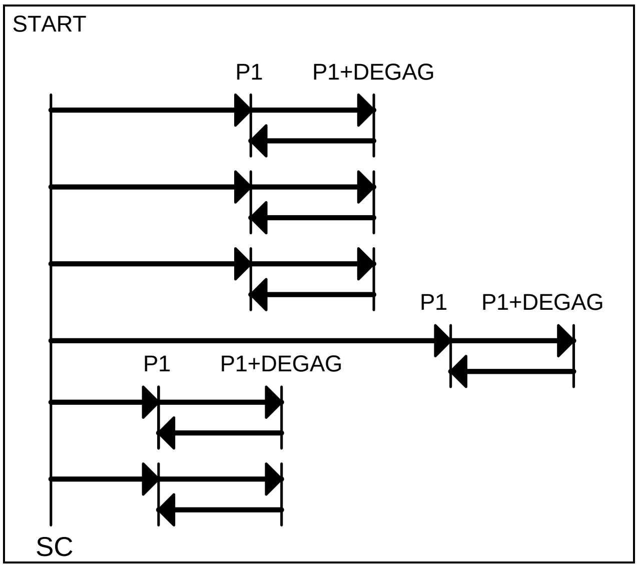
When the START command is sent, the positioner searches for pre-selection.

Each BACK-OFF command will start a back-off cycle.

A new START command will start another positioning cycle at the new pre-selection, starting from the current value of the positioner.

5.4.2 CASCADE positioning pre-selections

The positioner goes from positioning pre-selection to positioning pre-selection while resetting to SC with each START command.



When the START command is sent, the positioner searches for pre-selection.

Each BACK-OFF command will start a back-off cycle

A new START command will start another positioning cycle at the new pre-selection, after resetting the current value of the positioner to SC.

6. ANALOG OUTPUT OPERATION

The NA 1204 positioner has two analog voltage outputs

- **0 .. 10V** : 12-bit resolution; the displacement direction is indicated by the Direction relay
- **-10V .. +10V** : 12-bit resolution; the displacement direction is indicated by the voltage sign

6.1 POSITIONING RAMPS

The positioner generates voltage ramps from the various positioning values which control the relay outputs.

6.1.1 START ramp

This ramp is linked to the start value and is used to start the motor gradually.
When a START or ± MANU command is sent, a programmable **STARTING VOLTAGE** is applied to the analog output; full speed is reached at the start value.

6.1.2 SLOW-DOWN ramp

This ramp, which is linked to the slow-down and inertia values, is used to gradually stop the motor.
It is calculated from the slow-down value to reach a programmable **INERTIA VOLTAGE** at the inertia value.

6.1.3 INERTIA ramp

This ramp, which is linked to the positioning pre-selection and the inertia values, provides a 2nd slow-down ramp to stop the motor gradually.
It is calculated from the inertia value to reach a **MINIMUM VOLTAGE** at the positioning pre-selection before the motor stops.

6.1.4 BACK-OFF ramps

These ramps, which are linked to the positioning pre-selection and back-off values, provide a back-off start ramp and a back-off slow-down ramp, to gradually start and stop the motor.

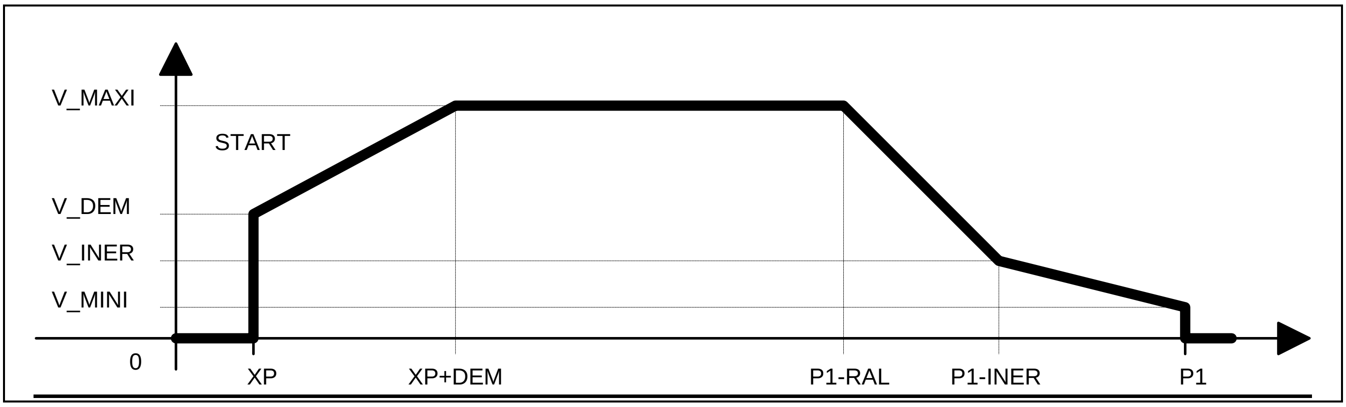
They are calculated as follows :

- for the back-off start ramp, from the positioning pre-selection to reach a programmable **BACK-OFF VOLTAGE** mid-way to the back-off value.
- for the back-off slow-down ramp, from mid-way to the back-off value, to reach a programmable minimum voltage at the back-off value.

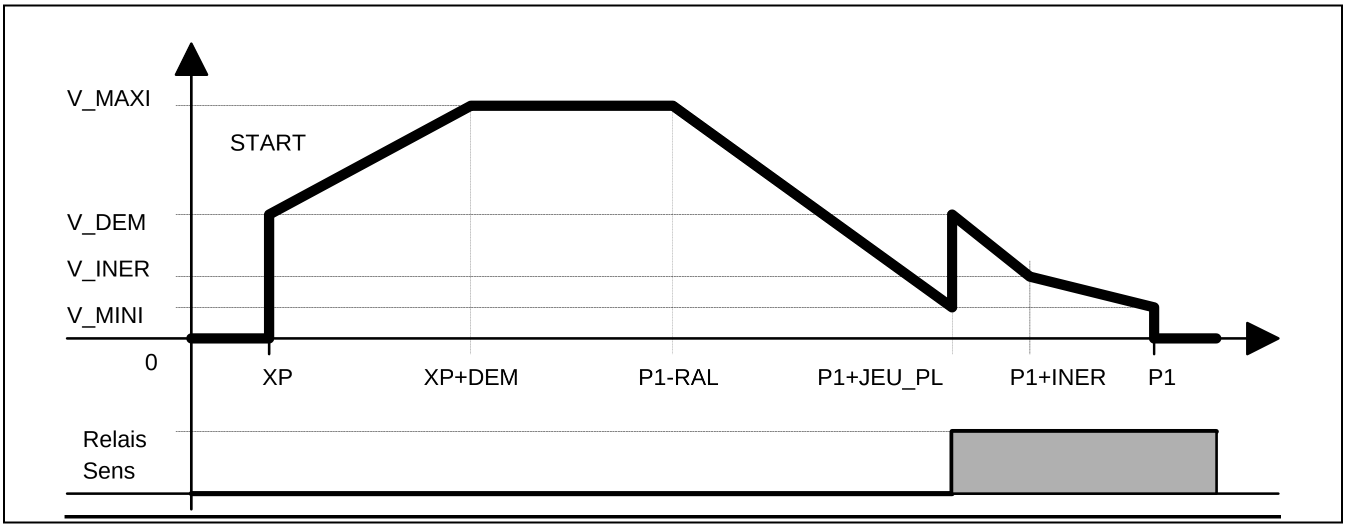
and vice-versa to return from the back-off value to the positioning pre-selection.

6.2 Operating examples

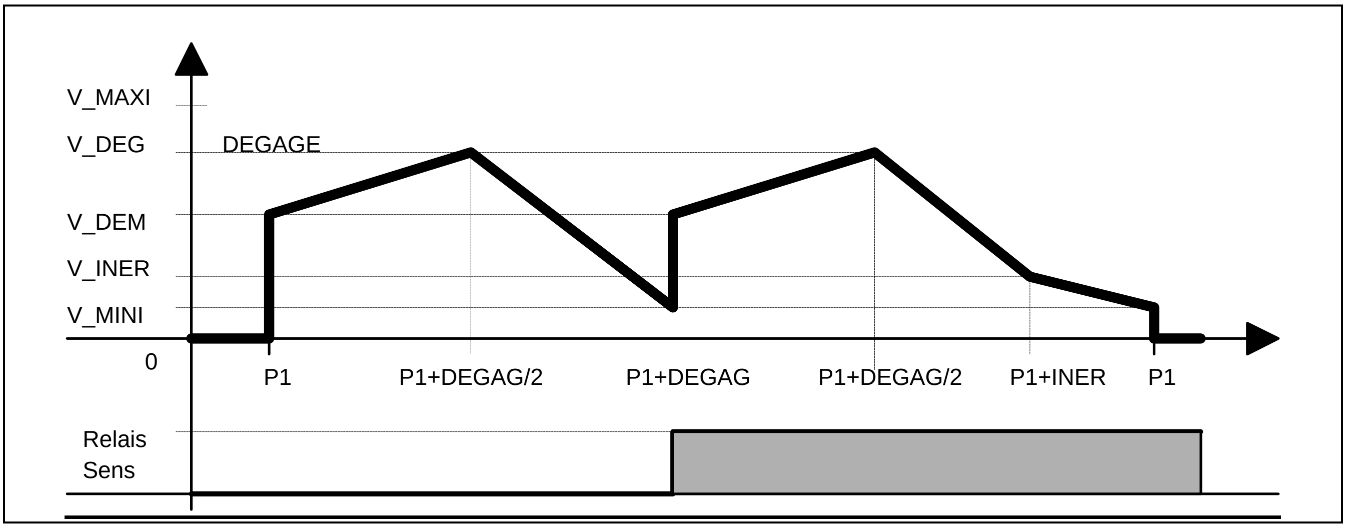
6.2.1 Positioning without back-lash take-up and with the 0..+10V analog output



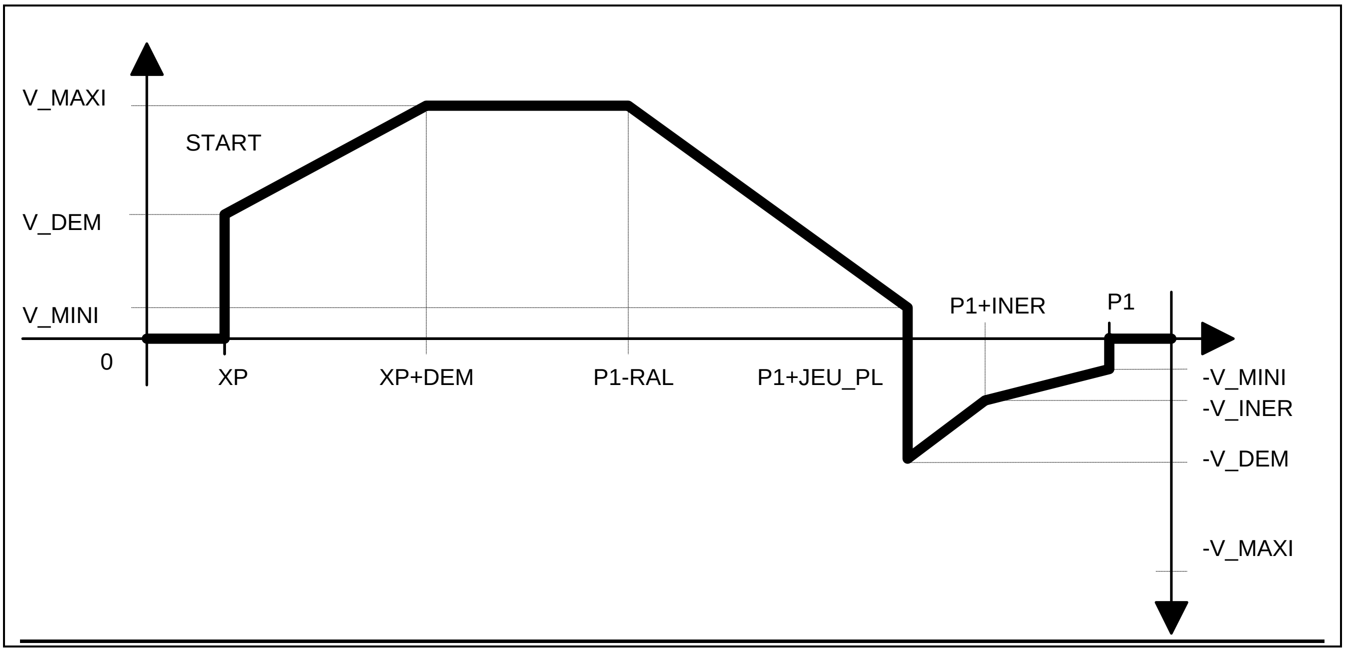
6.2.2 Positioning with + back-lash take-up and the 0..+10V analog output



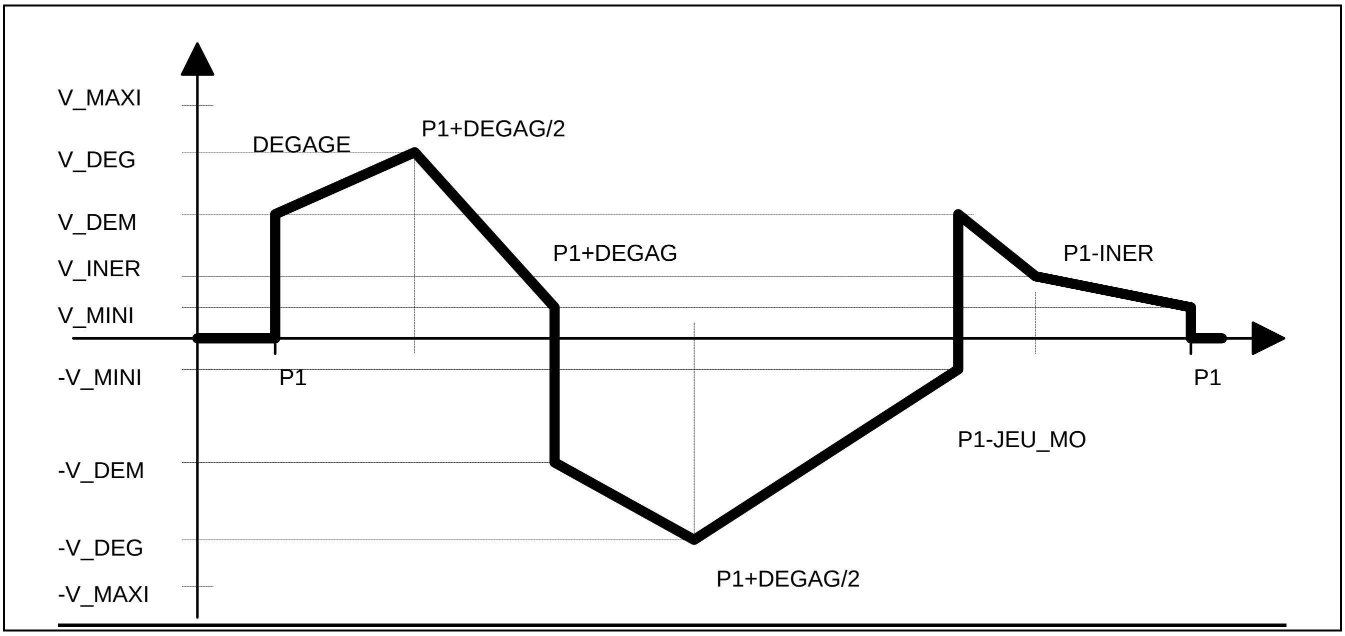
6.2.3 Back-off cycle, without back-lash take-up and with 0..+10V analog output



6.2.4 Positioning with + back-lash take-up and -10..+10V analog output



6.2.5 Back-off cycle with - back-lash take-up and -10..+10V analog output

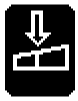


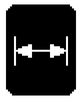
7. PROGRAMMING THE PRE-SELECTION

The access to the programming of the positioning pre-selection value does itself directly while pressing one of the keys of the paved numerical. This programming is possible if the positioner is located in STOP mode.

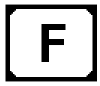
Procedure :

1° Press on one of the keys of the numeric keypad,
the message **[PrESEt]** is displayed on the 6-digit display represented by the symbol,.... the old positioning pre-selection value is put back to zero,
the value of the pressed key is the first digit for the pre-selection that is displayed on the 6-digit display represented by the symbol ....

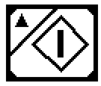




2° Enter the positioning pre-selection value on the numeric keypad



3° If it's necessary to program a number of pieces to produce, press the F key.
The **[NBRE]** message appears on the 6-digit bottom display,
enter the number of parts to be produced on the numeric keypad.



4° Confirm the datas by pressing the START key ....
and begin a positioning cycle.

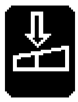
8. PROGRAMMING THE RESETTING VALUE

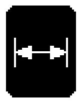
The resetting value can be programmed :

- in the **programming mode** with all the given others parameters of the positioner (see following pages),
- directly from the **programming mode of the pre-selection** describes above.
  In this case the value of the pre-selection also will be taken as the resetting value.

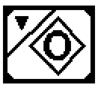
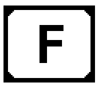
Procedure :

1° Press on one of the keys of the numeric keypad,
the message **[PrESEt]** is displayed on the 6-digit display represented by the symbol,.... the old positioning pre-selection value is put back to zero,
the value of the pressed key is the first digit for the pre-selection that is displayed on the 6-digit display represented by the symbol ....





2° Enter the positioning pre-selection value on the numeric keypad

3° Confirm the data by pressing the  and  keys during 5 seconds.
The positioner's current value take automatically the resetting value that has just been programmed.

9. QUERY AND PROGRAMMING

9.1 QUERY MODE

The positioner is in this mode when power is switched on.

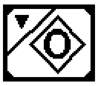
It is in query mode that the encoder is read, the pre-selection is compared, control inputs are read and outputs are enabled.

9.2 PROGRAMMING MODE

Programming mode is used to fully set up positioner operation. It can be protected by an accesses code.

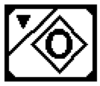
This mode cannot be accessed if the positioner is executing a positioning cycle. Otherwise the **[ERROR IN START]** message is displayed**.**

9.3 SWITCH FROM OPERATING MODE TO PROGRAMMING MODE

1° The passage in the programming mode is done by pressing the  and  keys during 5 seconds. To the end of this time, the message **[CODE]** is diplayed.

2° If the DOWN ARROW key is then pressed, the counter will switch to programming mode if it is not protected by an access code.

3° If the correct access code is entered on the keypad before pressing the DOWN ARROW key, the counter will enter programming mode. Otherwise the **[Error CodE]** message is displayed.



4° The various programming lines may be accessed using the 2 UP, DOWN arrow keys and and **[F]** key to move in the RIGHT direction.

▲ , ▼ , F

5° Program data is entered using the numeric keypad keys. The F key is used to select an operating option.

0,1,2, ... 9
F

6° The return to the operating mode is done after scrolling all the lines of the programming mode using the UP an DOWN arrow keys.

PLEASE NOTE :
All outputs are disabled in manufacturing programming mode and inputs are ignored.

11	PrESEt	A: 0	▶	noMbrE	B: oFF

Field A : Value of positioning pre-selection 1P.
6 digits with plus or minus sign.

PLEASE NOTE :
For angular positioning, the pre-selection value must always be less than the number of points per revolution **X** the conversion factor.

Field B : Number of parts value for the pre-selection
This value is counted down by the **Back-off** input.
4 digits.

If a number of parts is not used, it may be canceled using the C key, OFF is then displayed as the number.

12	PArC	A: 0

Field A : The **PARKING** value.
It is considered by the positioner to be a pre-selection value.
6 igits with sign.

for example – backing off the tool to the end of the machine shaft.

The parking command is triggered by the PARK key or the **Park** input.

0

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30	dEM	A: 0	▶	rAL	B: 0

Field A : **START value**
The START value (in display units) before the **HIGH SPEED** output is enabled, and after a START command.
4 digits.

Field B : **SLOW-DOWN value**
The SLOW-DOWN value (in display units) before the **HIGH SPEED** output is disabled; and before the current pre-selection.
4 digits.

31	InEr	A: 0	▶	tPS In	B: oFF
▶	dEG In	C: 0			

INERTIA value

Field A : The INERTIA value (in display units), before the ON output is disabled;
and before the current pre-selection is reached.
This value must be less than the slow-down value.
4 digits.

Field B : Maximum time allowed to reach the pre-selection after the ON output is disabled. If the pre-selection has not been reached by this time, automatic correction of the inertia value is carried out, if this was programmed for in line n°40.
If the pre-selection was reached by the programmed time, the **POSITION** output is enabled.
2 digits, in 1/10th of a second.
If may be canceled by the C key. **OFF** is then displayed in place of the time value.

Field C : The INERTIA BACK-OFF value (in display units) from the current pre-selection, for automatic correction of the inertia value.
4 digits with sign.

The command to move to this inertia back-off value is sent automatically if the current pre-selection was not reached by the time programmed in field B. This movement is always carried out at low speed.

		A			B	
32	**JEU Mo**		**0**	► **JEU PL**		**0**

BACK-LASH TAKE-UP values

Value of the current positioning pre-selection overshoot (in display unit) before reversing the **DIRECTION** output and positioning in the reverse direction.
This function is used to take-up the back-lash along a screw when direction is reversed, and position to the various pre-selection values consistently in the same direction.
These values must be greater than the inertia value.
4 digits.

Field A : Negative back-lash take-up value, for movement in the **decreasing direction**.
Field B : Positive back-lash take-up value, for movement in the **increasing direction**.

		A			B	
33	**ToL Mo**		**0**	► **ToL PL**		**0**

TOLERANCE values

Field A : Negative tolerance.
Value of the acceptable tolerance, in display units, before the current positioning pre-selection.
This value must be less than the inertia value.
4 digits.

Field B : Positive tolerance.
Value of the acceptable tolerance, in display units, after the current positioning pre-selection.
4 digits.

If the positioner stops within the tolerance range specified around the positioning pre-selection, the POSITION output is enabled.

		A			B
34	**dEGAG**	**0**	▶	**tPS dE**	**0**

BACK-OFF value

Field A : BACK-OFF value (in display units) from the current pre-selection.
4 digits with sign.

for example : this value may be used to back-off the positioning stop to enable the part to be removed.

The back-off command is sent by the BACK-OFF input and is only performed if the current pre-selection has been reached. Back-off is always carried out at low speed. This same command also decrements the part counter.

File B : Maximum stop time at the back-off value.
2 digits, in 1/10 of seconds.

The **ON** output is disabled when the back-off value is reached for the time programmed, the positioner then once again searches the current pre-selection value.

When a time of 0 is programmed using the C key, OFF is then displayed as the time value.
In this case, stooping at the back-off value is maintained as long as the BACK-OFF input is enabled.

		A			B
39	**U dEM**	**1.000**	▶	**U InEr**	**1.000**
		C			D
▶	**U dEG**	**5.000**	▶	**U MI**	**0.500**
		E			
▶	**U MA**	**9.9999**			

Analog output voltage levels, 4 digits, in volts.

Field A : Value of the voltage applied for starting.
Field B : Value of the voltage to be reached at the inertia value.
Field C : Value of the maximum voltage to be reached during a back-off cycle.
Field D : Value of the minimum voltage to be reached at the pre-selection or back-off value.
Field E : Value of the maximum voltage which may be applied to the speed controller.

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		A	B
40	**InEr**	**MAnu**	**Auto**

Automatic or manual inertia correction selection

Field A : When the positioner is in the inertia phase and the current positioning pre-selection value has not been reached, the positioner remains in its position.
The operator must then move manually to this position.

Field B : When the positioner is in the inertia phase and the current pre-selection value has not been reached, the positioner moves automatically to the inertia back-off value, calculates the new inertia value and once again searches the current positioning pre-selection value.

This operation is performed only once with each pre-selection. In this mode, an **inertia time** and an **inertia back-up value** must be programmed.

		A	B
41	**DEGAG**	**PrESEt**	**PoSIt**

Back-off return position selection

Field A : The back-off position is calculated from the current pre-selection value.
The back-off return position is also the pre-selection value.

Field B : The back-off position is calculated from the actual displayed position.
The back-off return position is also the initial position.

		A	B
42	**PoSIt**	**rEELLE**	**PrESEt**

Selection of value displayed in the tolerance field

Field A : The encoder's actual value is displayed in the tolerance field.
Field B : The pre-selection value is displayed instead of the encoder's actual value.

		A	B
43	**toLEr**	**InEr**	**JEU**

Selection of the comparison of the current value of the positioner to the tolerance zone

Field A : Comparison effectuated after the inertia value, this is to say after the desable of the ON output

Field B : Comparison effectuated after the back-lash take-up value and before the inertia value if this last one value is inferior to the tolerances values.

PLEASE NOTE : in this case, the POSITION output will be activated while the ON output again is activated.

		A	B	C
46	**InCrEM**	**r P-M**	**r PL**	**r Mo**

Selection of positioner resetting operation options when an incremental encoder is used

Field A : Resetting of the positioner's current value to the **SC** positioning value is possible in both operating directions.

Field B : Resetting of the positioner's current value to the **SC** positioning value is only possible in the positive direction (Plus).

Field C : Resetting of the positioner's current value to the **SC** positioning value is only possible in the negative direction (Minus).

For example : such as resetting by a detector during operation, and always in the same direction.

		A	B
47	**InCrEM**	**CoPIE**	**CALAGE**

Selection of the positioner's **Copy** input operation options for an **incremental encoder**

Field A : The **Copy** input is used for the positioning pre-selections teaching function.

Field B : The **Copy** input is associated with the positioner's **Reset** input.
The **Reset** input is ignored if the **Copy** input is not enabled.

48	InCrEM	A CHAInE	B CASCAd

Selection of positioner pre-selections operation options when used with an **incremental encoder**

Field A : Chained pre-selections
The positioner goes from pre-selection to pre-selection with each START command.

Field B : Cascade pre-selections
The positioner switches from pre-selection to pre-selection by resetting the positioner's current value to the SC value with each START command.

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50	SF CP	A 1.00000

Conversion factor for incremental encoder input pulses or the absolute encoder value.
6 digits from 0.00001 to 9.99999.

IMPORTANT :
If the conversion factor is zero (**OFF** is displayed), the encoder is disabled.

51	SC CP	A 0

Resetting value of the positioner's current value used with an **incremental or absolute encoder** and programmed for **linear positioning** operation. This value is continuously added to the encoder's value.
6 digits with sign

52	dEc Pt	A oFF	B 0.0	C 0.00	D 0.000

Position of displayed decimal point for the various positioning values.

53	PrE MI	A oFF	►	PrE MA	B oFF

Field A : Minimum software stop value.
6 digits with sign.
Field B : Maximum software stop value.
6 digits with sign.

When a START command is sent, the positioner checks whether the target positioning pre-selection value is between the minimum and maximum stops. If this is not the case, the **PRESET ERROR** message is displayed. When a +/- MANU command is sent, the positioner checks, during movement, whether the positioner's current value is between the minimum and maximum stops. If this is not the case, the **PRESET ERROR** message is also displayed.

The minimum and/or maximum stop may be disabled by pressing the C key. The stop value is then displayed as **OFF**.

		A	
54	**tPS CP**		**oFF**

Security time
Maximum time allowed, in Start mode, between 2 incremental encoder pulses or between 2 absolute encoder code changes.
2 digits, in seconds.

The security check begins when the **ON** output is enabled.
If this time is exceeded, the **ON** output is disabled and the **[Error codEur]** error message is displayed. This message is cleared by pressing the C key.

When a time of zero is programmed, **OFF** is displayed as the security time and the test is then disabled.

		A				B	
53	**SEC MI**		**oFF**	▶	**SEC MA**		**oFF**

Field A : Value of the minimum security pre-selection.
All movement to an inferior positioning pre-selection at the minimum security pre-selection is impossible from this value if the operator does not maintain any manner continues the START or PARK command. If the command is not maintained, the positioner goes in STOP mode.
6 digits with sign.

Field B : Value of the maximum security pre-selection.
All movement to an superior positioning pre-selection at the maximum security pre-selection is impossible from this value if the operator does not maintain any manner continues the START or PARK command. If the command is not maintained, the positioner goes in STOP mode.
6 digits with sign.

		A	
58	**nb**		**oFF**

Positioning type selection

Angular positioning :

Angular positioning is enabled by indicating the maximum number of encoder points per revolution.
The range of programmable pre-selections is similar to a circle ranging from 0 to this maximum number of encoder points.
6 digits.

PLEASE NOTE : Angular positioning is impossible with an absolute encoder

Linear positioning :

After pressing the C key, the maximum number of points per revolution is displayed as "oFF", which enables linear positioning. The pre-selections programming range is a straight line ranging from -99999 to +99999.

		A	B	C
56	**PoSIt**	**AngLE Au**	**AngLE PL**	**AngLE Mo**

Angular positioning direction selection

Field A : The positioner **automatically** determines the direction of rotation to teach the positioning pre-selection by the shortest path possible.

Field B : The direction is pre-set and always performed in the increasing pulse direction (**PLUS)**.

Field C : The direction is pre-set and always performed in the decreasing pulse direction (**MINUS)**.

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		A	B	C	D	E
60	**CodEur**	**InCr 1**	**InCr 2**	**InCr 4**	**SSI bi**	**SSI Gr**

Encoder type selection
Field A : **Incremental** encoder with 2 channels with a 90° phase difference, **multiplication by 1**
Field B : **Incremental** encoder with 2 channels with a 90° phase difference, **multiplication by 2**
Field C : **Incremental** encoder with 2 channels with a 90° phase difference, **multiplication by 4**
Field D : **SSI absolute** encoder, **BINARY** code
Field E : **SSI absolute** encoder, **GRAY** code

		A	B	C	D
61	**rS SSI**	**25 bIt**	**24 bIt**	**13 bIt**	**12 bIt**

SSI absolute encoder resolution selection
Field A : 25 bits
Field B : 24 bits
Field C : 13 bits
Field D : 12 bits

		A	B	C	D
62	**rS SSI**	**1.000 Mb**	**0.750 Mb**	**0.500 Mb**	**0.250 Mb**

SSI absolute encoder read rate
Field A : 1 MHz
Field B : 0.750 MHz
Field C : 0.500 MHz
Field D : 0.250 MHz

		A	B
63	**rS SSI**	**SIGnE**	**no SIGnE**

Assignment of the **SSI** absolute encoder's most significant bit
Field A : Sign bit: encoder position with sign.
Field B : Bit included in the encoder position: encoder position without sign.

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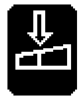
		A	B
70	**AFFICh**	**PrESEt**	**NoMbrE**

Selection of the value to be displayed of permanent manner on the display represented by the symbol



Filed A : The positioning pre-selection is displayed permanently
By the key [F], the operator can consult the number of pieces remaining to produce and this so as the key is pressed. This number of pieces remaining to produce is also displayed during 3 seconds to each **DEGAGE** command.

Field B : The number of pieces remaining to produce is displayed permanently.
By the key [F], the operator can consult the value of the positioning pre-selection so as the key is pressed.

		A	B
71	**SEtuP**	**on**	**oFF**

Field A : Automatic transfer of the positioner current valeur to the pre-selection value when power is switched on. In this case all movement by a **START** command is impossible while the current position of the positioner corresponds to the pre-selection value.

Field B : The old value of the positioning pre-selection is preserved when power switched on.

		A
80	**CodE**	**oFF**

Value of the access code to the programming mode.
To access programming without using a code, cancel the latter by pressing the C key (code value is displayed as **oFF**).
4 digits.

		A	B
81	**StArt**	**on**	**oFF**

Field A : The keypad's START control key is enabled.
Its function is identical to that of the **START** input.
Field B : The START control key is disabled; only the input remains enabled.

		A	B
82	**Stop**	**on**	**oFF**

Field A : The keypad's STOP control key is enabled.
Its function is identical to that of the **STOP** input.
Field B : The STOP control key is disabled; only the input remains enabled.

		A	B
83	**PArC**	**on**	**oFF**

Field A : The keypad's PARK control key is enabled.
Its function is identical to that of the **PARK** input.
Field B : The PARK control key is disabled; only the input remains enabled.

		A	B
84	**rESEt**	**on**	**oFF**

Field A : The keypad's C control key is enabled.
Its function is identical to that of the **RESET** input.
Field B : The C control key is disabled; only the input remains enabled.

		A	B	C	D
85	**MAnu**	**on**	**InC.on1**	**InC.on2**	**oFF**

Field A : The keypad's MANU + and MANU - keys are enabled.
Field B : The keypad's MANU + and MANU - keys are enabled and their actions depend on state of the electric input **START:**

- **Input enable** : Each action on MANU + or MANU- increment or decrement the value of the positioning pre-selection.
- **Input disable** : Manual movement as long the keys are pressed.

The action on the MANU keys + and MANU- is forbidden if the positioner is in START mode.
Field C : The keypad's MANU + and MANU - keys are enabled.
Each action on MANU + or MANU- increment or decrement the value of the value of the positioning pre-selection.
The action on the MANU keys + and MANU- is authorized if the positioner is in START mode.
Field D : The keypad's MANU + and MANU - keys are disabled

		A	B
86	**noMbrE**	**on**	**oFF**

Field A : Usage of the number of pieces to produce enabled.
In this case the call and the programming of this data is authorized.
Field B : Usage of the number of pieces to produce disabled.

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		A
89	**nA 1204**	**XX-XX-XX**

Positioner model number.

		A	
90	**- tESt -**		**CountEr**

Test start message

		A	
▶	**888888**		**888888**

Test of displays and LEDs. The entire display is illuminated.

		A	
▶	**- tESt -**		**boArd**

Keypad test. When a key is pressed, the - sign is displayed.

		A	
▶	**- tESt -**		**In**

Counter inputs test. The number of the enabled input is displayed; only one input must be enabled at a time.

		A	
▶	**- tESt -**		**out**

Outputs test, by displaying each relay's identification number. The relay is enabled as long as the key is pressed.

1 for the **FAULT** relay
2 for the **DIRECTION** relay
3 for the **HIGH SPEED** relay
4 for the **ON** relay
5 for the **POSITION** relay
6 for the **END OF NUMBER**.

PLEASE NOTE : do not perform the outputs test if the outputs directly control the starting of the machine.

10. ELECTRICAL CHARACTERISTICS

Power supply

24-48-110-220 VAC ± 10%, 50-60 Hz
Consumption : 10 VA

Control inputs

8 photo-coupler control inputs; NPN or PNP programmable
using terminal 12
terminal 12 connected to terminal 13 = PNP.
terminal 12 connected to terminal 14 = NPN.

Control current > 7 mA and < 15 mA
Quiescent current < 0.5 mA

CHANNEL A, CHANNEL B, RESET	Impedance 1.8 kOhms, maximum rate 10 kHz
START, STOP, PARK, BACK-OFF, COPY	Impedance 3.3 kOhms, minimum pulse duration 50 msec

24 V output

To supply detectors and encoder control inputs
This output is electrically insulated from the device's internal power supply
Voltage : 12-26 VDC, depending on load
Current : 100 mA max.

Relay outputs

6 reverse current relay outputs.
Breaking capacity : 110 VA, 220 VAC max., 1A max.
Mechanical lifetime: 10^7.

Analog outputs

2 analog outputs :
- **0 ... 10V** : 12-bit resolution; the displacement direction is indicated by the Direction relay
- **-10V ... +10V** : 12-bit resolution; the displacement direction is indicated by the voltage sign

Memory
All positioner settings are stored in an EEPROM for 10 years.

Red LED display

12 alphanumeric digits, 10 mm..

16-key keypad
Used to program and operate the positioner

11. MECHANICAL CHARACTERISTICS

Protection

IP 54

Weight

1 kg approximately

Temperature

Operation : 0°...+50°C
Storage : -20°...+80°C

Dimensions

MODEL NUMBERS : NA 1204. + I + II + III

I =

	Analog output
00	**relay outputs**
10	**relay outputs and analog outputs**

II =

	Mounted with
A0	**U-bolts**

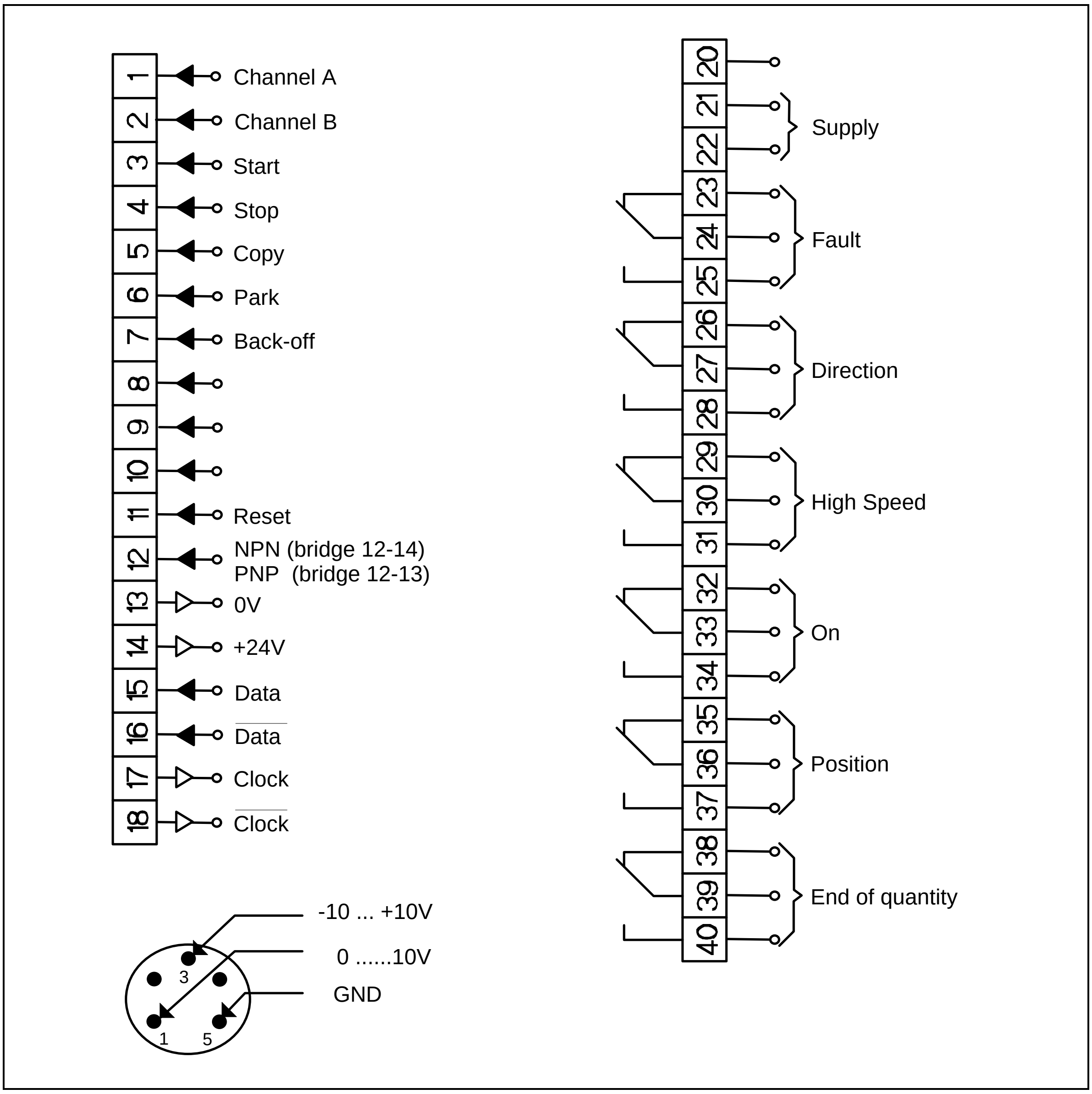
III =

	Power supply
1	**24 VAC**
2	**48 VAC**
3	**110 VAC**
4	**220 VAC**

Model number example : NA 1204.10A04 Multi-function positioner
With analog output
Mounted with U-bolts
220 VAC power supply

12. CONNECTIONS

2 connectors with locating key and 1.5 mm2 gauge screw-on terminal.



Notes

All control inputs are NPN or PNP compatible, depending on whether terminal 12 is connected to terminal 14 or 13. To insure safe and reliable operation, we recommend using a shielded cable to connect the control lines and separating them from power lines.