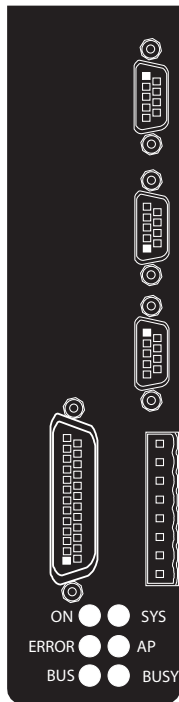


CD1-pm

gb

POSITIONER



INFRANOR®

CD1-pm

WARNING

This manual is describing a series of positioning servo amplifiers having output capability for driving AC brushless servo motors. This manual must be used in **conjunction** with both manuals CD1p-Installation and BD1/CD1p-User Guide of the CD1-p (Profibus) amplifier and **cannot be dissociated from it**. The conditions and recommendations of use as well as the responsibility and warranty restrictions mentioned in both manuals above are also valid for the present amplifier version **CD1-pm**.

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Chapter 1 – Operation mode

The **CD1-pm** positioner is an extended version of the CD1-p positioner. It has got several logic inputs/outputs and can work in the following modes:

- ❖ CD1-p compatible mode,
- ❖ Profibus mode with hardware addressing,
- ❖ Stand-alone.

The selection of the various operation modes is made by means of micro-switches accessible by the operator (see chapter 6).

1.1 - CD1-p compatible mode

This mode is activated by the **00** micro-switches selection.

This operation mode is the same as the one of the CD1-p positioner.

The positioner Profibus address is saved into a non volatile memory (EEPROM). This EEPROM can be modified via Profibus (message Set_Slave_Add) by a Profibus master of class 2. The new address will be automatically saved.

1.2 - Profibus mode with hardware addressing

This mode is activated by the **01** to **7D** micro-switches selections (Profibus address valid for one slave: 3 to 125).

In this mode, the drive address is defined by the micro-switches status and not by the serial link or by Profibus. The address modification via Profibus is still possible but the address taken into account at the next power up is always the one defined by the selection micro-switches.

1.3 - Stand-Alone mode

This mode is activated for the **7E** and **7F** combinations of the selection micro-switches:

- The **7E** combination corresponds to the stand-alone mode with VT100 (see chapter 8, section 8.2).
- The **7F** combination corresponds to the stand-alone mode without VT100.

In this mode, the Profibus is not used. The positioner operation is managed by the inputs **START**, **STOP**, **IN1** to **IN6** as well as by the outputs **SEQ**, **POS**, **SPEED**, **OUT1** to **OUT4**.

The **ENABLE** input enables/disables the positioner. The positioner cannot be enabled/disabled via the serial link RS-232 or by the Profibus. Consequently, **the positioner adjustment phase (autophasing, autotuning...) must not be made in stand-alone mode**. In stand-alone mode, the brake delay time with regard to the enabling/disabling is not possible either.

1.4 - Operation of the inputs/outputs

Except for the "stand-alone" mode, the inputs can be activated by means of the physical inputs or by Profibus. The outputs are accessible as well on Profibus as on the physical logic outputs.

Hardware inputs:

- ❖ **START**, **STOP**,
- ❖ **IN1** to **IN6**.

Hardware outputs:

- ❖ **SEQ**, **POS**, **SPEED**,
- ❖ **OUT1** to **OUT4**.

By default, the inputs are Profibus inputs (compatibility with the CD1-p positioner). Some bits of the positioner configuration word (PNU 742) allow the selection of the hardware inputs.

Bit	0	1
6	START via Profibus	START by hardware
7	STOP via Profibus	STOP by hardware
10	IN1 to IN6 via Profibus	IN1 to IN6 by hardware
11	SEQ output = 1 during the waiting for the start condition	SEQ output = 0 during the waiting for the start condition

The ASCII instruction for the serial link RS-232, equivalent to **PNU 742**, is **CF**.

1.5 - Inputs/outputs configuration

The inputs/outputs polarity is configurable. Regarding the outputs, the polarity effect is only applied on the physical outputs.

Inputs polarity **ASCII instruction: CE** **PNU : 820**

Defines the polarity of the hardware logic inputs.

Bit	Inputs
0	START
1	STOP
8	IN1
9	IN2
10	IN3
11	IN4
12	IN5
13	IN6

Outputs polarity **ASCII instruction: CS** **PNU : 821**

Defines the polarity of the hardware logic outputs.

Bit	Outputs
0	SEQ
1	POS
2	SPEED
8	OUT1
9	OUT2
10	OUT3
11	OUT4

Configuration of the conditional input **ASCII instruction: IS** **PNU : 822**

The logic inputs can be used for the selection of sequences or for being used as conditional inputs (start condition or stop condition).

Bit	0	1
0	IN1 SEQ input	IN1 conditional input
1	IN2 SEQ input	IN2 conditional input
2	IN3 SEQ input	IN3 conditional input
3	IN4 SEQ input	IN4 conditional input
4	IN5 SEQ input	IN5 conditional input
5	IN6 SEQ input	IN6 conditional input

Configuration of the pulse outputs**ASCII instruction: OP****PNU : 823**

The logic outputs can be pulse outputs: once the output activated, it will automatically be reset at zero after a time previously defined. If this output is not a pulse output, it will keep its status until its next modification.

Bit	Pulse output
0	OUT1
1	OUT2
2	OUT3
3	OUT4

Duration of the pulse outputs ASCII instruction: OT PNU : 824

Defines the pulse duration, in ms, of the pulse outputs.

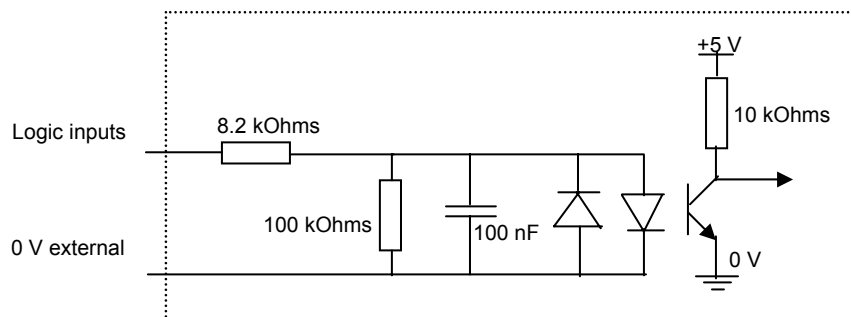
1.6 - Other functions

When starting a homing procedure directly by Profibus without using the sequences (bit 11 of the control word), parameter PNU 766 allows to define the homing mode (motion direction with or without switch, with or without marker pulse, ...). The value "Position reset" is always 0.

It is now possible to define a "Reset" value that is different from 0 with PNU 768 (double word).

Chapter 2 – Optocoupled logic inputs

2.1 - Diagram of the logic inputs



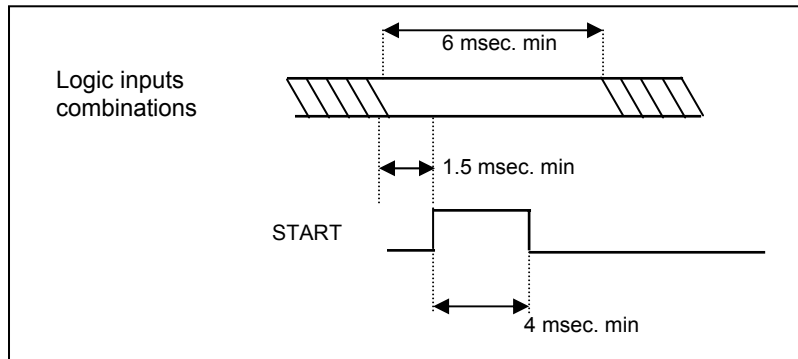
The input voltage corresponding to level 1 must remain between 18 V and 30 V.

2.2 - Specifications of the optocoupled logic inputs

2.2.1 - Dedicated inputs (number = 2)

❖ **START** input:

This input allows to start the sequence which number is defined by the programmable inputs. The level of this input will be taken into account after the end of the former sequence. This signal can be disabled before the end of the sequence.



❖ **STOP** input:

This input allows to stop the axis with a programmed deceleration.

2.2.2 - Programmable inputs (number = 6)

❖ Use of the inputs as "**Start condition**":

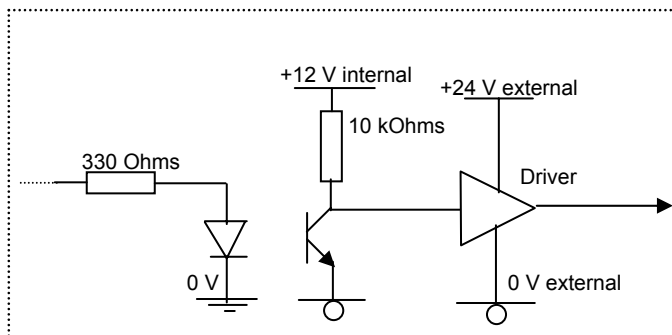
The sequence will be executed if the inputs condition is answered.

❖ Use of the inputs as "**Sequence control**":

The activation of the **START** input will execute the sequence defined by the programmable inputs. **The unused inputs in sequence control can then be used as start conditions.**

Chapter 3 – Optocoupled logic outputs

3.1 - Diagram of the logic outputs



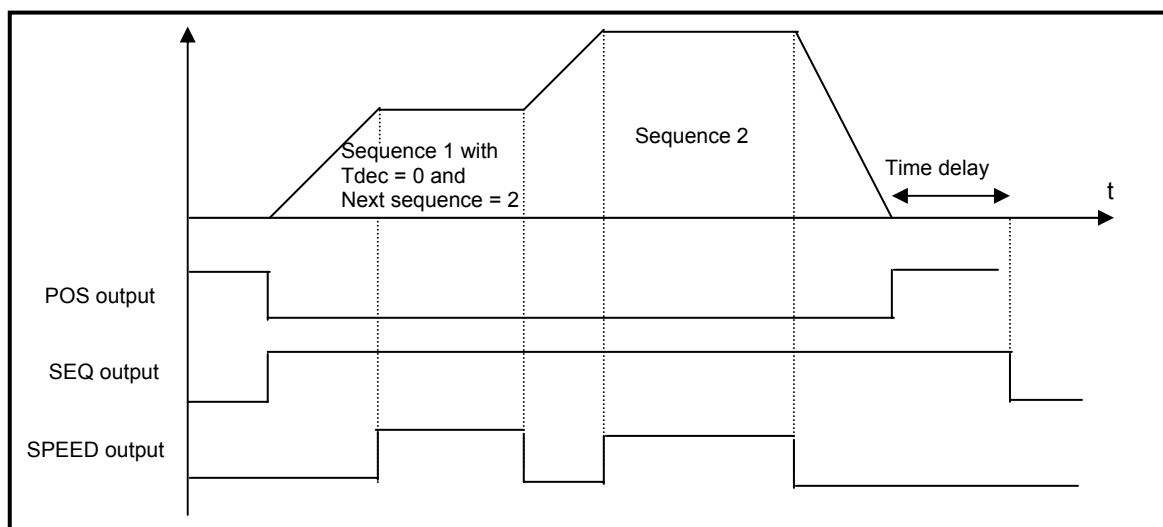
3.2 - Specifications of the optocoupled logic outputs

- ❖ External supply +24 V ($18\text{ V} < U < 30\text{ V}$)
- ❖ Maximum voltage drop = 2 V
- ❖ Protection against overloads
- ❖ Output current available per output (mA)

Number of activated outputs / Cyclic rate (%)	100	70	50	30
2	200	200	200	200
4	100	150	200	200
7	60	80	120	200

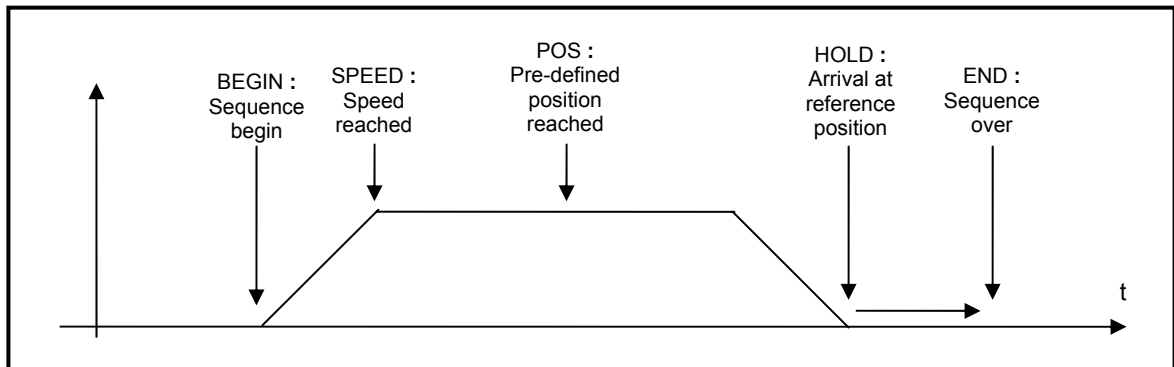
3.2.1 - Dedicated outputs (number = 3)

- ❖ **SEQ** output: Output indicating that a sequence is running.
- ❖ **POS** output: Output activated when the axis reaches its reference position. This output will remain active until the next motor shaft motion.
- ❖ **SPEED** output: Output activated when the step speed is reached during the axis motion.



3.2.2 - Programmable outputs (number = 4)

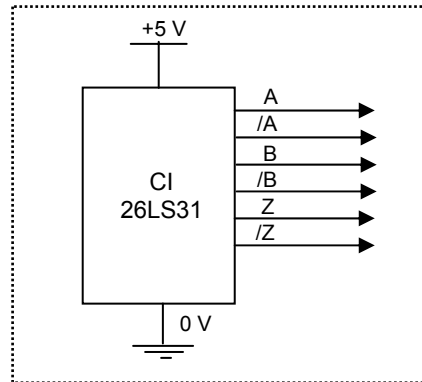
- ❖ Programmable status: "High" status - "Low" status - "Toggle" status.
- ❖ Various triggering types: **BEGIN**, **SPEED**, **POS**, **HOLD**, **END**.
- ❖ These outputs can be triggered once a programmed sequence.



Chapter 4 – Incremental encoder outputs

Two pulse channels "A" and "B" in quadrature with one marker pulse "Z" per revolution are available on the CD1-pm positioner.

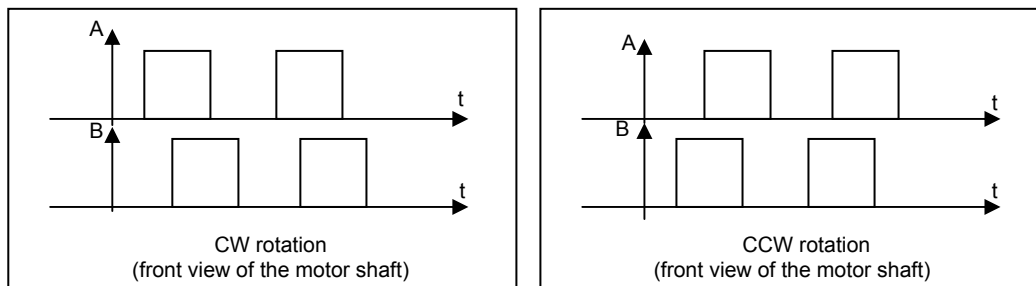
4.1 - Diagram of the encoder outputs



Recommended receiver: 26LS32.

4.2 - Specifications of the encoder outputs

- ❖ 4 differential signals A (/A), B (/B) in quadrature
- ❖ 2 differential signals Z (/Z): One "marker pulse" per revolution - Duration = [Period (A)/4],
- ❖ Non-modifiable resolution: 1024 periods/rev.



NOTE

The use of a shielded cable for the encoder signals is MANDATORY.

Chapter 5 – Pins of the I/O extension connector

Pins	I/O	Description
1	I	Optocoupled input " START "
2	I	Optocoupled input " STOP "
3	I	Optocoupled input IN1
4	O	Z/
5	O	Z
6	O	A/
7	O	A
8	O	B/
9	O	B
10	I	Optocoupled input IN2
11	I	Optocoupled input IN3
12	I	0 V external
13	I	Optocoupled input IN4
14	I	Optocoupled input IN5
15	I	Optocoupled input IN6
16	O	Isolated output SEQ
17	O	Isolated output POS
18	O	Isolated output SPEED
19	O	Isolated output OUT1
20	O	Isolated output OUT2
21	O	Isolated output OUT3
22	O	Isolated output OUT4
23	O	0 V
24	I	External supply +24 V (*)
25	I	0 V external

(*) +24 V input only required when the outputs **SEQ**, **POS**, **SPEED**, **OUT1**, **OUT2**, **OUT3**, **OUT4** are used.

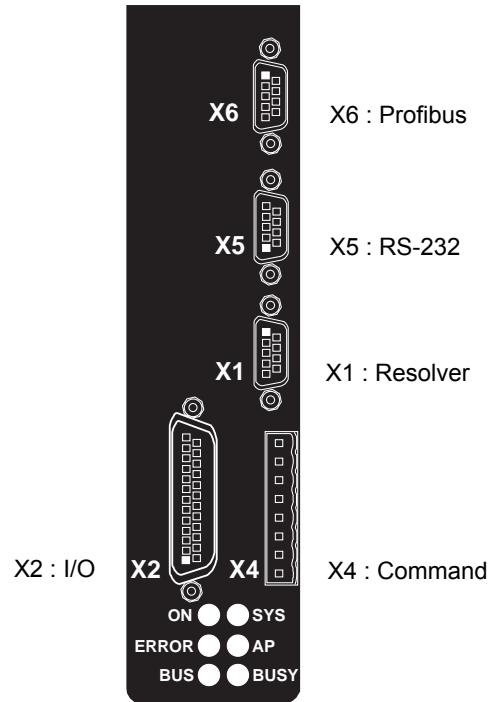
Chapter 6 - Selection of the various modes |

A **DIP micro-switch**, accessible by the operator, allows the selection of the various operation modes.

7 6 5 4 3 2 1 (Switch 7 = MSB Switch 1 = LSB)	Operation mode	Note
X0000000 (00)	Profibus CD1-p	This mode is compliant with the CD1-p drive Drive addressing via serial link RS-232
X1111111(7F)	Stand-alone Mode without VT100	Drive used in Positioner mode via inputs START, STOP, IN1 to IN6
X1111110(7E)	Stand-alone Mode with VT100	Drive used in Positioner mode via inputs START, STOP, IN1 to IN6 Possible use of a VT100 terminal
X0000001 (01) to X1111101 (7D)	Profibus hardware addressing	Profibus mode with hardware addressing via "DIP" switch

X : Cursor unused.

Chapter 7 – Location of the I/O extension connector (X2)



Chapter 8 – Use of the serial link

8.1 - RS-232 PROTOCOL

The parameter setting of the CD1-pm amplifier can be made by means of the PC software, but also by means of the serial link, by using the RS-232 protocol as well as the ASCII instructions described in the manual "INFRANOR drives parameter setting instructions".

8.2 - USE OF A VT100 TERMINAL

A VT-100 terminal can be connected to the serial link of the amplifier (X5 connector). The operator can use this terminal to display the axis position, to modify or execute pre-programmed motion sequences, to move the axis towards an absolute position or to control a JOG movement.

8.2.1 - CONFIGURATION

8.2.1.1 - Configuration of the terminal

- Display over 4 lines of 20 characters each
- Serial link RS-232:
 - * 19200 bud
 - * 1 Stop bit
 - * no parity
 - * VT-100 protocol

8.2.1.2 – Configuration of the positioner

The communication via the VT-100 terminal requires the amplifier to be configured on the hexadecimal address 7E by means of the DIP micro-switches.

8.2.2 – USE

8.2.2.1 – Main menu

1	Display position
2	Modify sequence
3	Run sequence
4	Move_





In the main menu, keys 1, 2, 3 or 4 allow:


1. To display the motor position. The operator can then move the motor (Jog+ or Jog-) by means of the arrow keys.
2. To modify a given sequence :
 - * Position modification of a given sequence: the operator enters the sequence number and the new position.
 - * Speed modification of a given sequence: the operator enters the sequence number and the newly programmed speed.
3. To start a sequence: the operator enters the number of the sequence to be executed.
4. To move until a position: the operator enters the position and moves the motor until this position.


8.2.2.2 – Position display

```

CD1-pm
      103.000 mm
  
```

The arrow keys     allow to move the motor (Jog+ or Jog-), when the ENABLE signal is activated.

The  key allows the operator to go back to the main menu.

In this window, the operator can stop the motor (if it is rotating) by pressing the  key.

```

STOP?_
  
```

The operator must press the  key for confirming the motor stopping or any other key for cancelling.

8.2.2.3 – Modification of a sequence

This menu allows the operator to modify position or speed of a given sequence.

```

MODIFY SEQUENCE
1   POSITION
2   SPEED_
  
```

The operator at first enters the sequence number (this sequence must exist).

```

MODIFY POS
Sequence:_
Pos:
Pos:
  
```

The former position is displayed and the operator can enter a new position or cancel by pressing the ENTER key.

```

MODIFY POS
Sequence: 1
Pos: 45.000
Pos:_
  
```

The operator can modify the speed of a give sequence in the same way:

```
MODIFY SPEED
Sequence: 1
Pos: 1000
Speed: _
```

8.2.2.4 – Execution of a sequence

When the position is not executing any sequence and when the ENABLE signal is activated, the operator can enter the number of a sequence to be executed:

```
RUN SEQUENCE
Sequence: _
```

8.2.2.5 - Motion

When the positioner is not executing any sequence and when the ENABLE signal is activated, the operator can enter a position to be reached:

```
MOVEMENT
POS: _
```