# 1    USB PORT

⚠️ **Important:** the USB pen drive can be used to perform the following operations:
- UPLOAD - copy files from USB pen drive to the controller;
- DOWNLOAD - download files from controller to USB pen drive,

only when a terminal is used, either built-in or connected to the controller via pLAN.

The pCO5 controller has 2 USB ports, A and B, accessible after having removed the cover S, and two LEDs, L1 and L2.
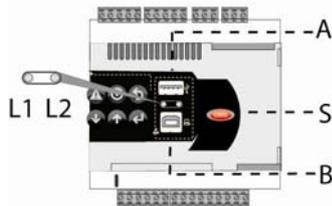
Fig. 1



Port A can be used to connect a USB pen drive, while port B is for direct connection to a computer where the pCO Manager program has been installed. LED L1 comes on steady after connection and flashes during data transfer. The keypad has six buttons that, pressed alone or in combination, are used to perform all the UPLOAD and DOWNLOAD operations between the pen drive and the controller.
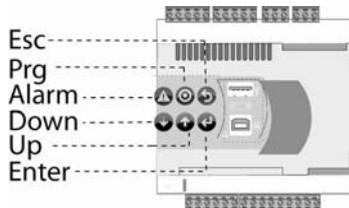
Fig. 2



⚠️ **Important:**
• before using the USB pen drive, it must be formatted with the FAT32 system;
• up to two levels can be accessed on the pen drive:
ROOT→LEVEL1→LEVEL2;
• do not use port A and port B at the same time;

## 1.1    Manual, automatic and autorun modes

- Manual mode involves selecting which operations are to be performed by browsing the options from the keypad, offering maximum flexibility and the possibility to freely choose the type of operations to be performed;
- Automatic mode requires the creation of special text configuration files (**.txt extension**) that contain information on the functions to be performed and the files to be transferred;
- Autorun mode requires the creation of a configuration file called "autorun.txt". When the pen drive is inserted, the controller immediately starts Autorun mode and after confirmation from the terminal performs the operations contained in the file.

## 1.2    Upload and Download

Three UPLOAD modes are available:
- 1. manual mode: the user selects manual mode from the keypad, then the file to be uploaded and finally confirms the operation.

- 2. automatic mode: the user selects automatic mode from the keypad, then the configuration files that contain instructions on the operations to be performed;
- 3. autorun mode: after inserting the pen drive, a screen is shown that indicates autorun mode is active. After confirming, the instructions contained in the "autorun.txt" file are run automatically. The contents of this file are similar to those in the UPLOAD configuration files, however in this case the name must be "autorun.txt".

Two DOWNLOAD modes are available:
- 1. manual mode: the user selects manual mode, then the files to be downloaded and finally confirms the operation.
- 2. autorun mode: after inserting the pen drive, a screen is shown that indicates "autorun" mode is active. After confirming, the instructions contained in the "autorun.txt" file are run automatically. The contents of this file are similar to those in the DOWNLOAD configuration files, however in this case the name must be "autorun.txt".

➡️ **Note:** the configuration and autorun files must be located in the main directory.

## 1.3    File extensions, contents and names

The UPLOAD and DOWNLOAD files differ and can be distinguished by the extension.

### 1.3.1    File names

In order to be recognised, directory and file names on the USB pen drive must have **a maximum of 8 characters**; the controller cannot recognise differences between lower and upper case characters. During DOWNLOAD, the names of the directories created on the USB pen drive by the controller are only in upper case.

UPLOAD FILE TYPES      Tab. 1

| File extension | Description |
|---|---|
| .IUP | Defines the screens used on the terminal. |
| .BLB | Contains the application. |
| .BIN | Contains the application (with pLAN table) |
| .BLX | Contains the C language logic of the user atoms |
| .GRP | Graphics |
| .DEV | Contains the default values of the configuration parameters |
| .PVT, .LCT | Contains the descriptions of the public variables to be saved. Generated by 1tool, this is used by the LogEditor module and must be loaded with the .LCT file |

The downloaded files are saved in directories created automatically, with names such as:

NAMXY_WZ

Where:
XY: progressive number from 0 to 99
WZ: controller pLAN address.

⚠️ Important: more than 100 files of the same type cannot be downloaded to the USB pen drive, as the directories created range from XY=00 to 99.

DOWNLOAD FILE TYPES (controller pLAN address =1)      Tab. 2

| File extension | Contents in the directory | Description |
|---|---|---|
| .DWL | LOG00_01 | Log data |
| .DWL,.DEV, .LCT, .PVT | BKP00_01 | Application |
| .DEV | DEV00_01 | Non-volatile parameters |
| .DWL, .DEV, .LCT, .PVT | CPY00_01 | All controller data |

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## 1.4  Automatic upload

### 1.4.1  Structure of the configuration files

The configuration files must start with the string "[FUNCTION]" followed by a string that identifies the specific function, as shown in the table.

| Function to be performed | String | Tab. 3 |
|---|---|---|
| UPLOAD an application or a BIOS file and an application | Installation | |
| UPLOAD non-volatile memory | Upload non volatile memory | |
| UPLOAD entire contents of pCO | Copy pCO upload | |

Various options are available after the function performed:
-    1. to copy the entire contents of the directory, simply specify the name of the directory (e.g. entire contents of the UPDEV directory);

```
[FUNCTION]                          Fig. 3
Upload non volatile memory

[DIR]
UPDEV
```

-    2. to copy just 1 file in a directory, specify the name (e.g. FILE_DEV.DEV file in the UPDEV directory);

```
[FUNCTION]                          Fig. 4
Upload non volatile memory

[DIR]
UPDEV

FILE_DEV.DEV
```

To display a string describing the operation being performed, the "[NAM]" statement can be added, followed by the string to be displayed. The following file shows the specified string on the display:

"UPL        FILE_DEV.DEV"

```
[FUNCTION]                          Fig. 5
Upload not volatile memory

[DIR]
UPDEV

[NAM]
UPL FILE_DEV.DEV

FILE_DEV.DEV
```

-    3. to select just some of the files present in the same directory, this must be listed by adding a label. The allowed labels, which must be entered in the order shown in the table, are:

LABELS FOR UPLOAD FILES                          Tab. 4

| No. | LABEL | FILE TYPE | No. | LABEL | FILE TYPE |
|---|---|---|---|---|---|
| 1 | [BIO] (*) | file.bin | 6 | [PVT] | file.pvt |
| 2 | [IUP] | file.iup | 7 | [LCT] | file.lct |
| 3 | [BIN] | file.bin, blb | 8 | [OED] | file.oed |
| 4 | [DEV] | file.dev | 9 | [SGN] | file.sgn |
| 5 | [GRP] | file.grp | | | |

(*) BIO = BIOS file

➡ **Note:** the [IUP] label can be followed by one or more ".iup" files.

⚠ **Important:**
• the order in which the file name is entered is fundamental and cannot be changed;
• do not enter empty lines or spaces in the file names (for example at the end of the line);
• each file after the last line of code must contain a "carriage return" (CR ⤶), as shown in the following example.

**Example:** below is a file for uploading the BIOS and an application.

```
[FUNCTION]⤶                         Fig. 6
Installation⤶

⤶
[DIR]⤶
BIOS_FTA⤶

⤶
[NAM]⤶
BIOS+FT+LOGSv58B36⤶

⤶
[BIO]⤶
biosn431.bin⤶

⤶
[IUP]⤶
TestEN.iup⤶

⤶
[BIN]⤶
TEST.blb⤶

⤶
[DEV]⤶
TestIT.dev⤶

⤶
[GRP]⤶
Test.grp⤶

⤶
[PVT]⤶
pgd1.pvt⤶

⤶
[LCT]⤶
pgd1.lct⤶
```

### 1.4.2  Display

Below are the operations for automatically uploading the non-volatile memory as described in the previous paragraph.
Procedure:
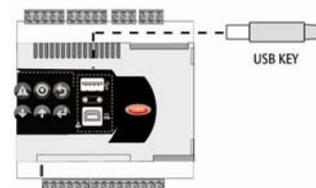

Fig. 7

1. Connect the USB pen drive to port A. The green LED on the controller comes on to confirm recognition.
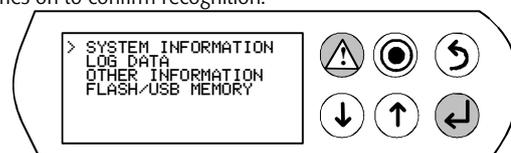

Fig. 8

2. Press Alarm and Enter together for 3 s to enter the multiple choice menu. Select FLASH/USB memory and confirm by pressing Enter.
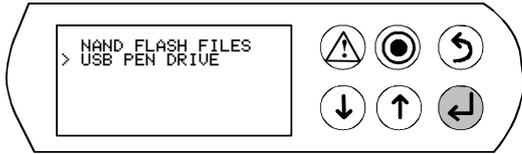
Fig. 9

3. Select USB pen drive and confirm by pressing Enter

⚠ **Important:** wait at least 25s after inserting the pen drive for recognition by the controller. If the message: "No USB disk or PC connected" is displayed temporarily, requesting insertion of the pen drive or USB cable from the computer, wait a few seconds until the recognition message: "USB disk found" is shown and then the following screen is displayed:
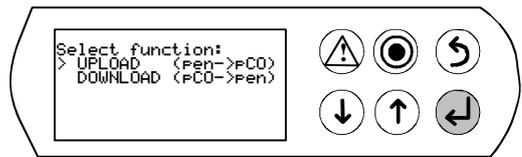


Fig. 10

4. Select the UPLOAD operation
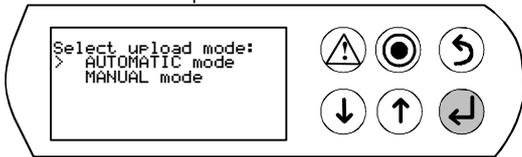


Fig. 11

5. Select automatic mode. A screen is shown describing the functions of the buttons, press Enter to confirm.
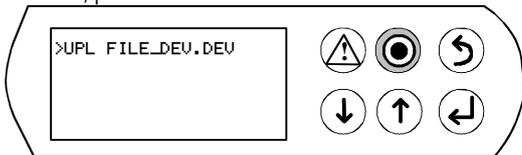


Fig. 12

6. Confirm by pressing Prg. A screen is shown prompting confirmation of the Upload non-volatile memory operation. Press Enter to confirm.
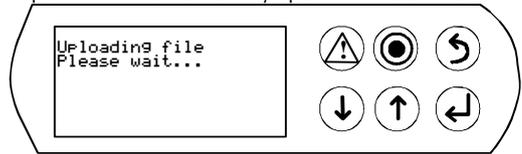


Fig. 13

7. At the end of the procedure a message is shown asking the user to remove the pen drive.

## 1.4.3   Upload in autorun mode

The BIOS + application or application only can be uploaded. To upload a file in Autorun mode, a configuration file needs to be created with the string "Installation" and named "autorun.txt".
Example of how to upload the BIOS + application. The upload is performed in two steps, first the BIOS is updated and then the application. If different, the pCO built-in display and the pGD1 terminal displays are shown.
Procedure:
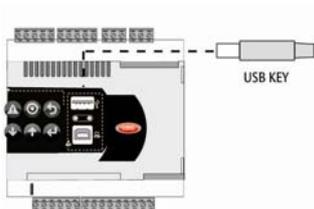


Fig. 14

1. Connect the USB pen drive to port A. The green LED on the controller comes on to confirm recognition.
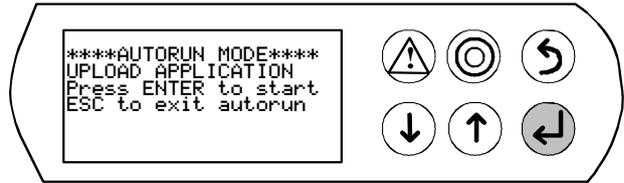
Fig. 15

2. After around 25 s Autorun mode starts. Press Enter to confirm.
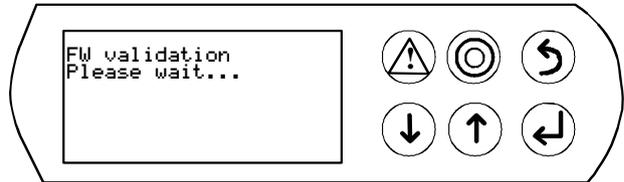


Fig. 16

3. The validity of the FW is then checked and the BIOS is uploaded
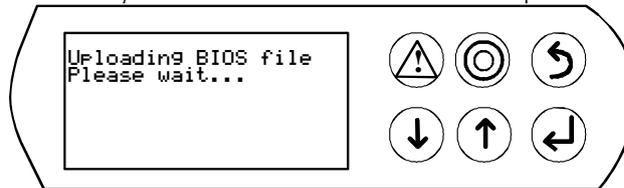


Fig. 17





Fig. 18

4. The display flashes to indicate that after uploading the new BIOS the controller is being restarted
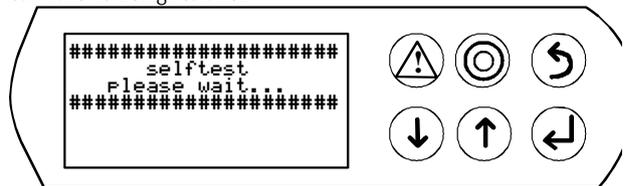


Fig. 19



Fig. 20

5. The test phase then starts
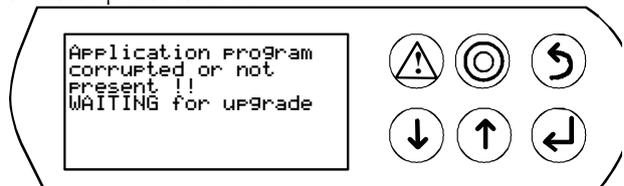


Fig. 21



Fig. 22

6. The controller warns that the application is missing
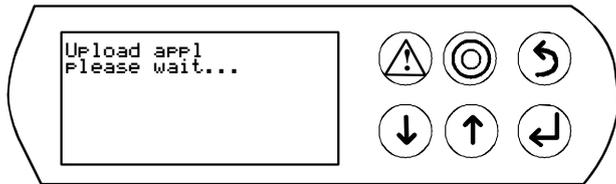
Fig. 23
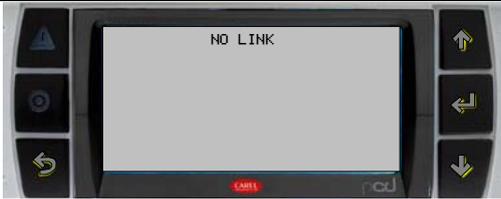


Fig. 24

7. The application starts uploading.
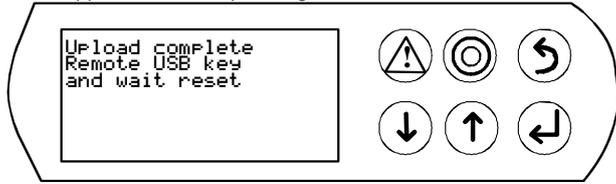


Fig. 25



Fig. 26

8. Remove the USB pen drive. The update is terminated. Wait for the display to stop flashing, indicating the reset phase before restarting.

⚠ **Important:** as can be seen, during the BIOS and application upload, the pGD1 terminal indicates there is no connection with the message "NO LINK". Consequently, don't remove the terminal, wait until the operation has ended, when the pGD1 terminal replicates the messages on the built-in display.

➡ **Note:** autorun mode is ideal when needing to run the same operation on a series of controllers. For example, if needing to load different applications on controllers connected in a pLAN network, one autorun file can be created containing different directories on the USB pen drive based on the controller address. The controller with address XY will only load the directory named: "dirname_XY". Then simply insert the pen drive in each controller to complete the upload, confirming from the shared terminal.

## 1.5  Download

As mentioned, two modes are available for DOWNLOAD:
- 1. manual mode: follow the steps described in paragraph 1.4.1 and choose manual operation. Then each file must be selected and downloaded;
- 2. autorun mode: prepare a file called "autorun.txt", which contains a string identifying the function to be performed.

| Function to be performed | String | Tab. 5 |
|---|---|---|
| DOWNLOAD logged data | Download logs | |
| DOWNLOAD application | Download application | |
| DOWNLOAD non-volatile memory | Download non volatile memory | |
| DOWNLOAD entire contents of the pCO | Copy pCO download | |

The result is the creation of files with the required extension, located in the corresponding directories, as shown in the paragraph "file names".
When the operation is complete the display shows a message with the name of the directory created.
**Example**: on the controller with address 1, the following autorun file will create the directory BKP00_01, and copy the APPL_PCO.DWL and FILE_DEV.DEV files.

```
[FUNCTION]

Download non volatile memory
```

Fig. 27

The display shows the following screen.
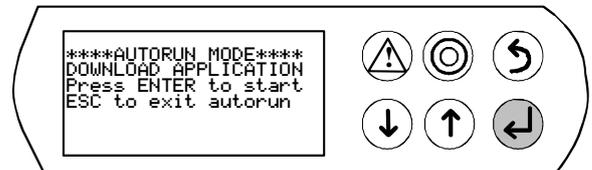


Fig. 28

1. Press Enter to confirm
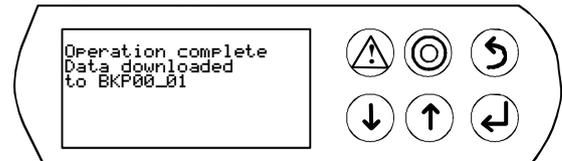


Fig. 29

2. Download completed

### 1.5.1  Setting the password

If the application contains a password that needs to be entered on a special screen, this is required for each DOWNLOAD from the pCO to the USB pen drive. The password is used to:
- protect the download of the pCO contents to USB pen drive;
- protect the PC connection (this is a standard procedure in pCO Manager).

## 1.6  Connecting the computer

Connect the controller slave USB port to the USB port on the computer where the pCO manager program is installed.

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Fig.
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USB CONNECTOR FROM
COMPUTER
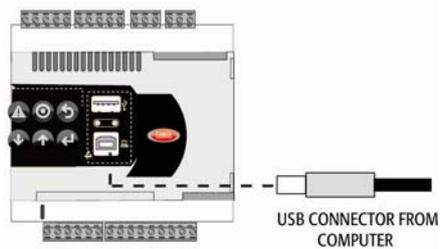
⚠ Important:
• Do not install any converters between the computer and port B, even if
specified by the program's guided procedures;
• the pCO manager program manages compressed files (.GRT/.OS)

Once having made the connection, the following operations can be
performed:
- 1. UPLOAD the application or the BIOS + application;
- 2. DOWNLOAD non volatile memory;
- 3. DOWNLOAD the logged data;
- 4. Commissioning;
- 5. Manage NAND flash memory.

After having removed the USB cable, the port is available again after
around 5 s.

⚠ Important: if, after inserting the USB cable, there is no connection to
the pCO manager program, after removing wait at least 1 minute before
using the USB ports again.