IT Terminals and Operating Procedures

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SAFETY WARNING INSTRUCTIONS

	All activities in this manual must be performed ONLY by skilled and trained personnel physically and intellectually suited.
Qualified and trained personnel	These persons must: ▸ know how the installation works and be aware of the contents of all use and maintenance manuals (complete set: from Vol. 1 to Vol. OEM), especially with regard to their specific function;
Rules and signs	All persons shall accurately comply with safety rules and signs;
Safety devices removed	All safety devices removed during maintenance interventions must be repositioned immediately before the machine starts operating;
Precautions and procedures	All safety precautions and procedures for industrial work and personnel safety should be followed at all times;
Machine involved in the maintenance operation	Make sure that the machine involved in the maintenance operation and those adjacent cannot be started, intentionally or accidentally;
Maintenance operations	Personnel must wear proper clothing and appropriate equipment/tools have to be used;
Prohibited behavior	Walking on and/or leaning against the machine is strongly forbidden;
Loading	No loading other type than the machine has been designed and built for can be put on the cells, even if its center of gravity is aligned with the sliding rail of the cells;
Accidental starting	To prevent accidental starting, a safety breaker is foreseen for each motor or for groups of motors. This lockable device has to be used and the key has to be kept by the maintenance people (instructed person).

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Tables

1 System overview

1.1 System architecture

Sorting system	The sorting system is composed by one sorter machine, the sorting system is controlled by one or more PC Rack with up to 3 sections with one CPU in each sections: ▸ Section#1: normally is dedicated to the Sorter or Conveyors Real Time Control ▸ Section#2: normally is dedicated to the Induction Stations or Conveyors Real Time Control ▸ Section#3: normally is dedicated to the Induction Stations or Conveyors Real Time Control
Real-time sorter role	The scope of the Sorter Real Time Control PCs (MSC & ISPC & UPSTR) is: ▸ Sorting control (speed control, uploading, transfer and outlet of items, etc.). ▸ Interface of transmission through Ethernet with OAMENG ▸ Control of Sorter's components. ▸ Operation of alarms. ▸ Induction lines and upstream conveyors control. It controls the transfer of the items from the inlet point (orienting belt) to the uploading point, corresponding to the transfer belt (or throws). ▸ user interface; ▸ Interface of transmission through Ethernet with SCADA and DAC.

On each CPU, the PC Lock application is installed to allow the system administrator to access to the setup functions of these computers.

1.2 Control system rack description

Each control system is based on a Compact PCI CPU provided with the software required to manage the real-time control operations.

The system consists of one unit suitable to perform all functions to control the sorter, the induction lines and the conveyors.

All CPUs run on the Windows platform (Windows Embedded) with a real-time extension (IntervalZero RTX®).

All CPUs are equipped with a solid state Hard Disk unit (Compact Flash).

All boards installed into the rack are equipped with front panel connectors in order to give quick and easy access to maintenance operators in case of substitution.

Figure 1: Control system rack

In case of the UPS failure, the power supply of sorter control rack should be switched to main power, refer to “Procedure to switch from UPS to main power supply” section.

WARNING

If there is a main power problem after the switch from UPS to main power, the controller will not execute the shutdown procedure but it will stop suddenly.

The Rack is a Compact PCI rack with three segments with the features listed in the next table.

Description of the rack	
Model	
Description	cPCI Rack with three segments (controller unit)
Appropriate software	Operating system: ▸ Windows Embedded (English version) ▸ IntervalZero RTX® Fives Real-Time applications
Installed CPU boards* (minimal configuration)	CPU board, model MEN F23 ▸ Intel I7 Quad Core 2.4 GHz ▸ RAM: 2,5GB ▸ Compact Flash 32GB ▸ HARD DISK 300GB ▸ Integrated VGA ▸ Dual port Ethernet LAN ▸ USB ports
Notes	

Table 1: Rack Description

The CPU(s) are equipped with two Ethernet ports. Only the first Ethernet port will be used by all the FIVES CPUs and exchange data and diagnostic information between all the subsystems.

According to the subsystem to manage the following additional hardware can be installed:

- Profibus Master controller (one more card according to the system size and configuration)
- Digital input boards (only in the sorter controller subsystem)

Each control system **could be supplied** with a “Warm Backup” unit (“Warm Backup” it is meant that each rack has its own backup in the MCP).

It is underlined that each segment of backup is turned off during normal operations. A segment of backup will be turned on whenever a failure occurs to the corresponding segment of main rack. The switch between the segments is almost immediate and activated by means of three position selector (segment of main rack turn on and segment of backup rack turn off; segment of main rack turn off and segment of backup rack turn on; both segment of main rack and segment of backup rack turn off).

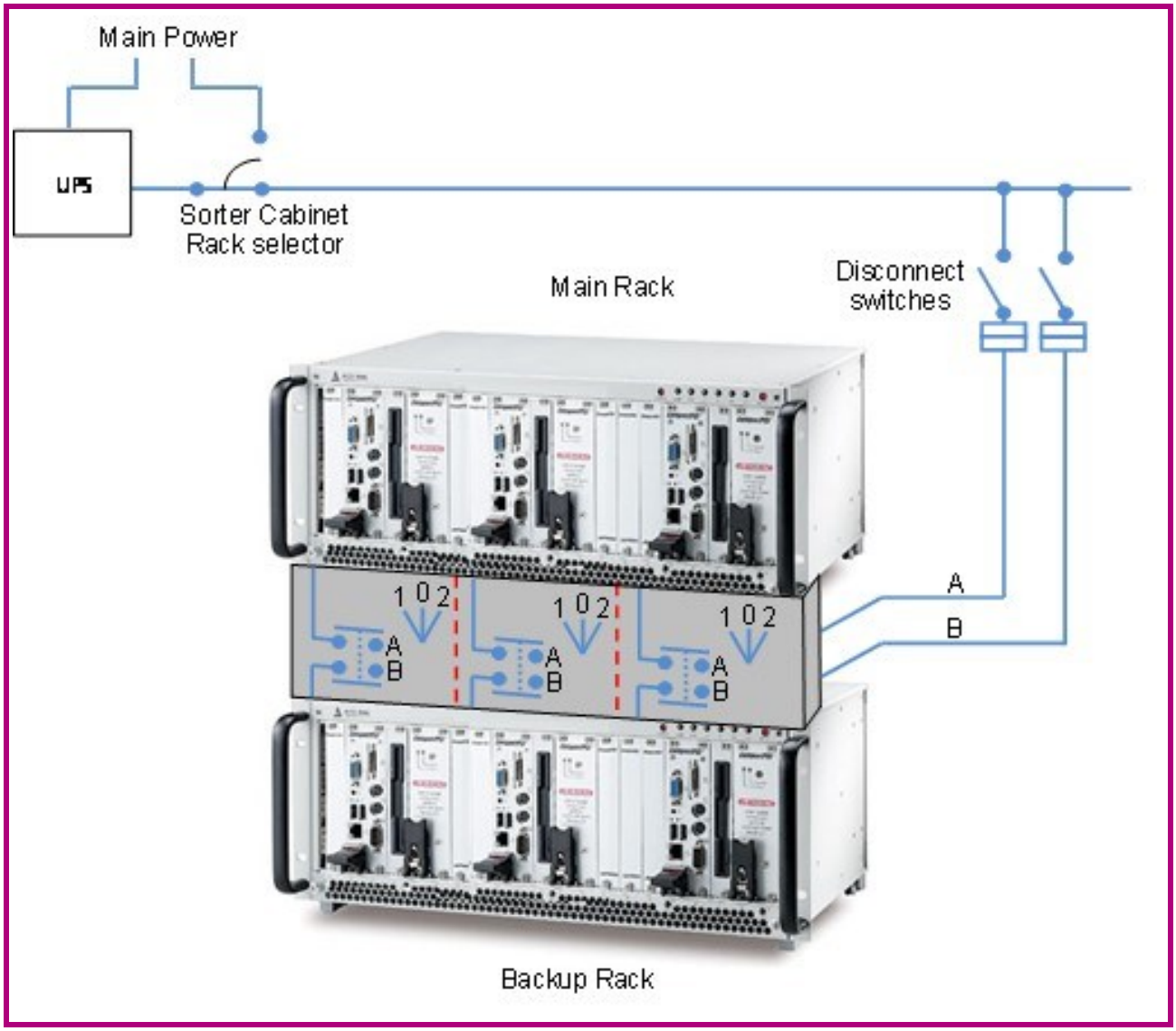

Figure 2: ASC Warm backup (not supplied)

2 Description of the start and stop of the software components

Application is automatically started.

It is not allowed to quit the application during production, as correct sorting can only be realized with a running application. However, it may be necessary in emergency cases (e.g. for maintenance work or in case of a hardware failure) to Shut Down/Restart the server.

2.1 Sorter, Induction and upstream HMI

The use of the operator interface is very easy and intuitive because it is fully integrated in the Windows environment.

To access the various functions the user simply needs to select the functions from the main menu.

2.1.1 Startup

- Wait until the “boot-strap” is completed and the application started.

2.1.2 Use of the mouse and keyboard

The use of the keyboard follows the general rules of Windows.

Both the left and the right mouse button are active.

2.1.3 General Structure of the screens

The main screen shows the main page only.

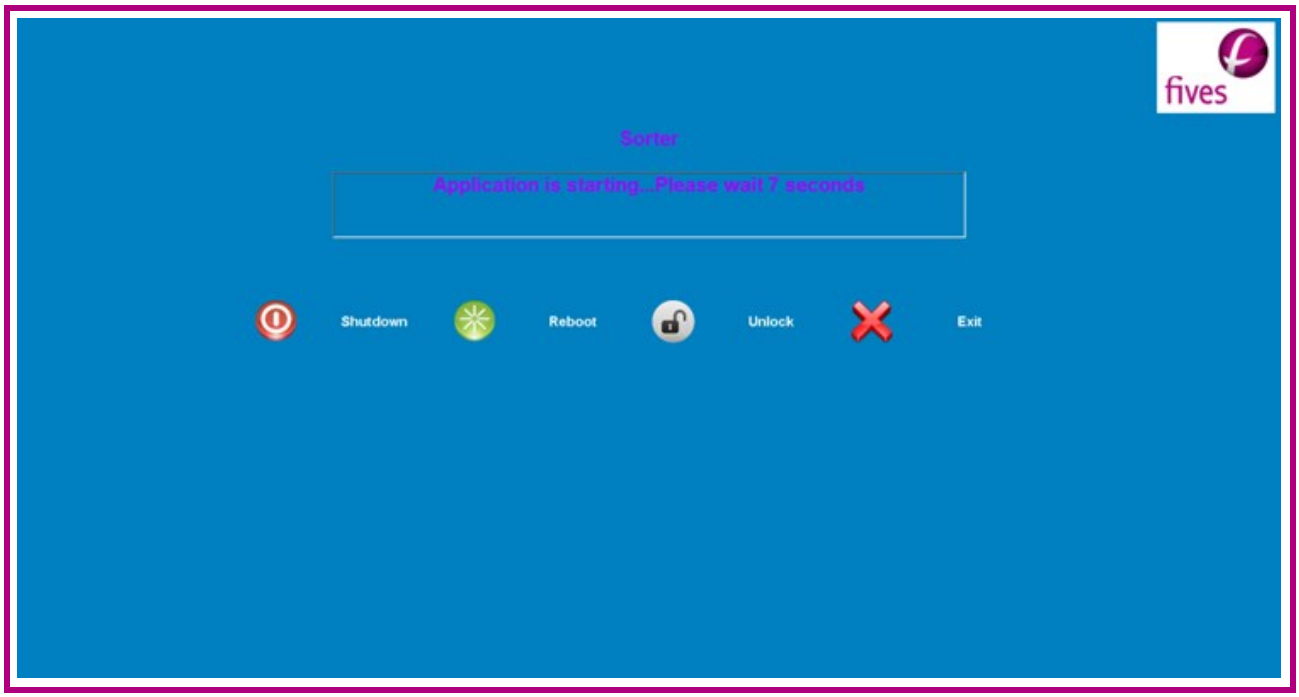

Figure 3: Main Screen

2.1.4 How to close a working session

The working session is closed with the following functions:

- Shutdown
- Reboot

2.1.5 Shutdown

The system shutdown is performed by moving the supply selector located on the PC, the same used for Startup.

2.1.6 Description and use of screens

2.1.6.1 Main Screen

The figure shows the screen that is displayed immediately after the starting of the application.

Figure 4: Main screen after start-up

At this point the user must choose the type of booting, between the followings:

- Reset database

This option must be choosen from the user ONLY at the first boot, after a failover of PC.

This option must be used ONLY if sorter database must be initialized.

In order to downloads data from OAMENG to MSC, refer to OAMGUI User Manual.

- Init I/O

This option must be choosen, from the user, ONLY after substitution of PROFIBUS card. When selected, the control system downloads the configuration into the card.

2.1.6.1.1 Init I/O Board Procedure

During the starting of PC , in order to change the I/O card, it is necessary to press on “Init I/O Board” button. Look in picture here below.

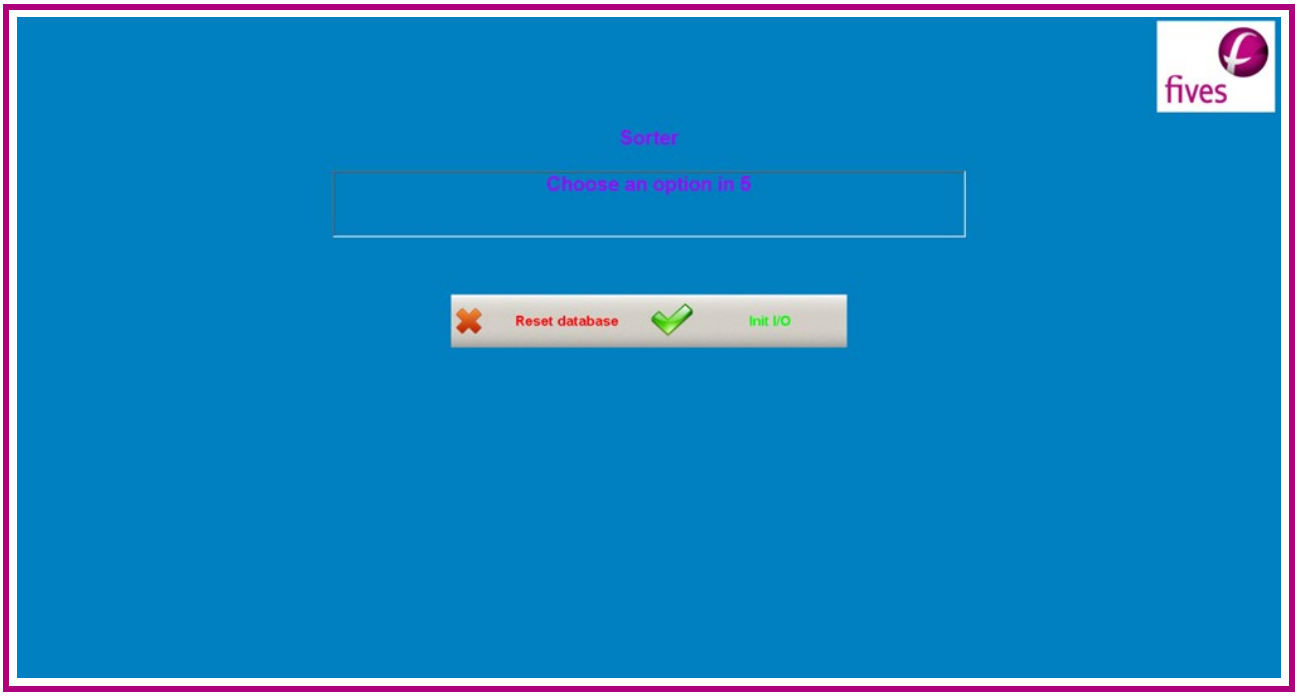

Figure 5: Press "Init I/O" button to change the IO card (Sorter PC version)

When the counter elapses, the application starts the changing I/O card procedure.

Four different situations can be occurred:

- Maintenance operator has changed no I/O card. In this condition, the software detects no I/O card has been changed and then, it shows an error message (see the picture here below. As soon as the operator presses “OK” button, the application restarts the computer

Figure 6: I/O cards not changed

- Maintenance operator has changed just one I/O card. The software detects that only one I/O board has changed, and it updates the configuration in order to allow the system working with the new I/O card. When it has finish, it informs the operator showing the barcode (Serial Number) of both I/O board the new one and the old one (see the picture here below). As soon as the operator presses “OK” button, the application restarts the computer.

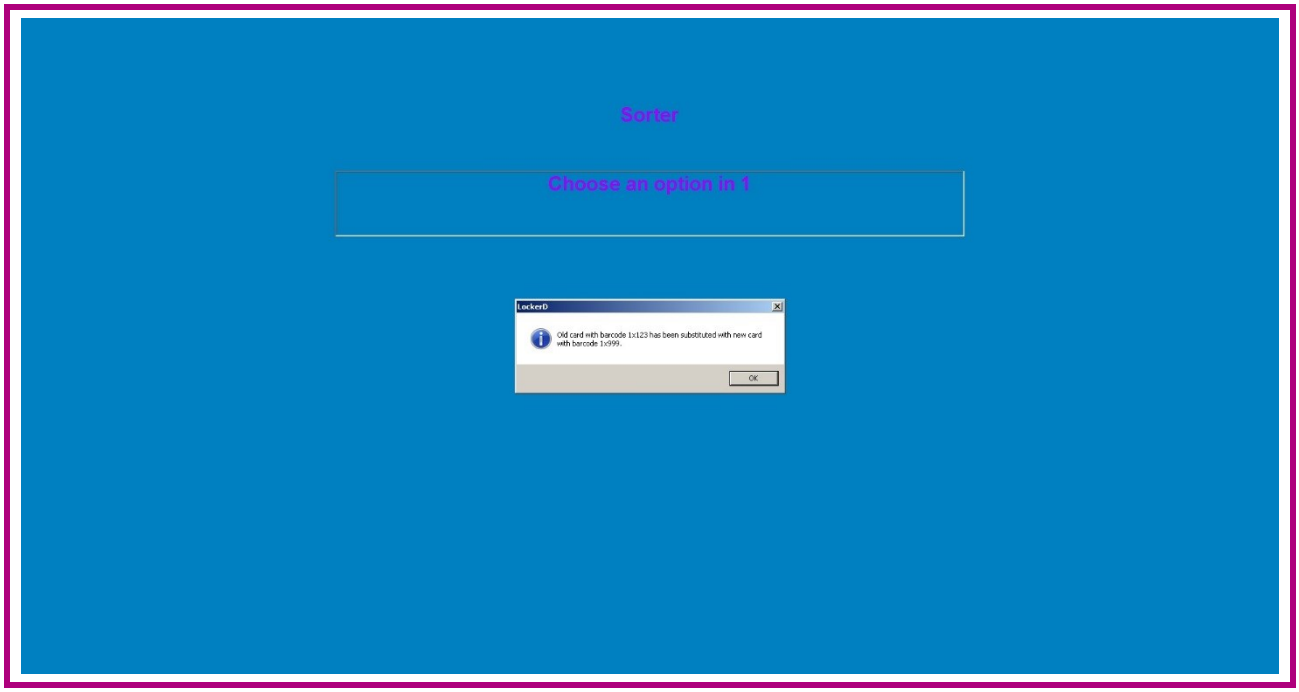

Figure 7: Old I/O card has been substituted with the new one

- Maintenance operator has changed more than one I/O card. The software detects all new I/O cards and present to the operator the choice to assign, for each old board, the new I/O card installed. This matching occurs by means of the barcode of each I/O board: the barcode of the old card is shown in the title of the window, while in the list below are shown all available new I/O card barcode (see the picture here below).

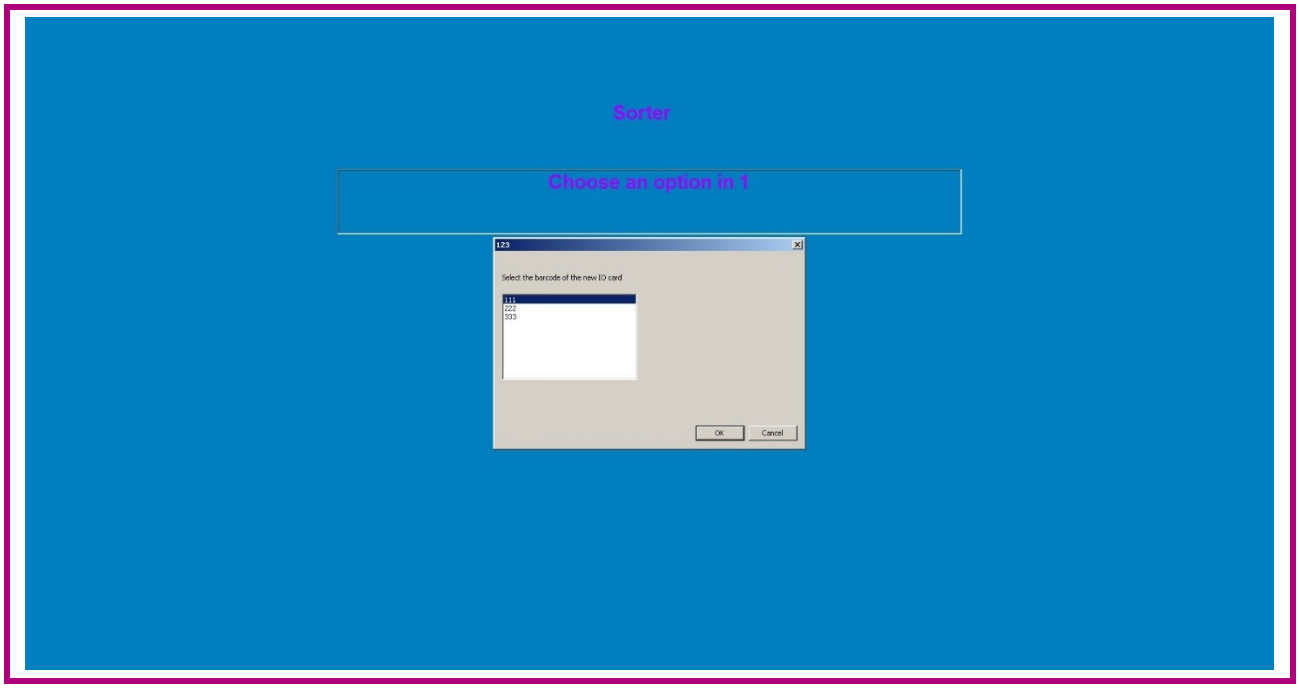

Figure 8: Assignment old I/O card with the new one

- After the operator has selected the right new I/O card, a window will be opened in order to ask the confirmation to proceed (see the image here below).

Figure 9: Confirmation to proceed for substituting of the I/O card

The application informs when it finishes showing a message window (see the picture here below). As soon as the operator presses “OK” button, the application restarts the computer.

Figure 10: Old I/O card has been substituted with the new one

The number of I/O cards installed is not the same of what has been configured. In this condition, the software cannot perform any action of substituting of I/O cards, so it is necessary to install the right number of I/O cards (see the picture here below). As soon as the operator presses “OK” button, the application restarts the computer.

Figure 11: The number of I/O cards installed mismatches from I/O cards configured

After that all needed applications will be started and the following screen will be displayed.

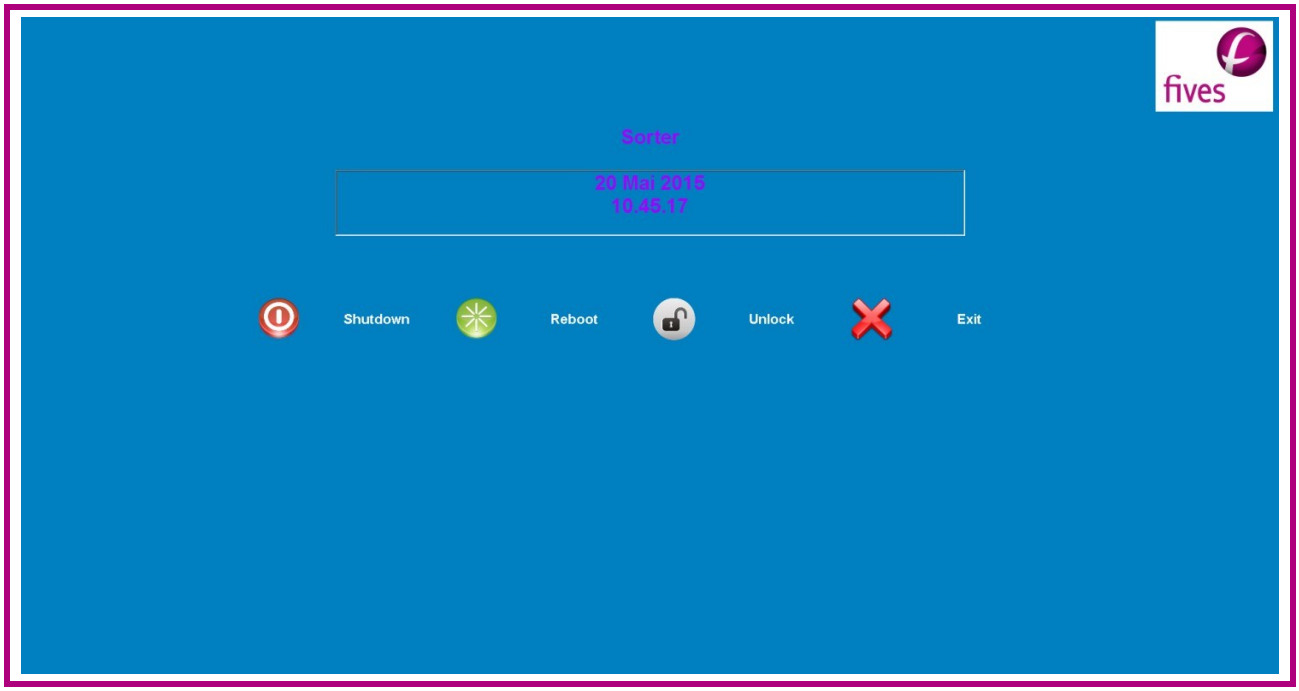

Figure 12: Main Screen

When the application is in the foreground all the special Windows keys, including “CTRL+ALT+DEL”, are intercepted and disabled.

On the top at the center of the page the host computer name is displayed.

The available functions are listed below:

- Shutdown (Performs the computer shutdown)
- Reboot (Performs the computer restart)
- Unlock (Allows ’access to the desktop of Windows with reduced functionality because some special keys like back space or alt are disabled
- Exit. (Terminates the application restoring all the Windows special keys)

To correct any possible typing mistakes, move the cursor with the arrows and use the CANC. key only

The Back Space key is disabled

2.1.7 Password management

The access password is defined by the user with the procedure described in the following paragraphs.

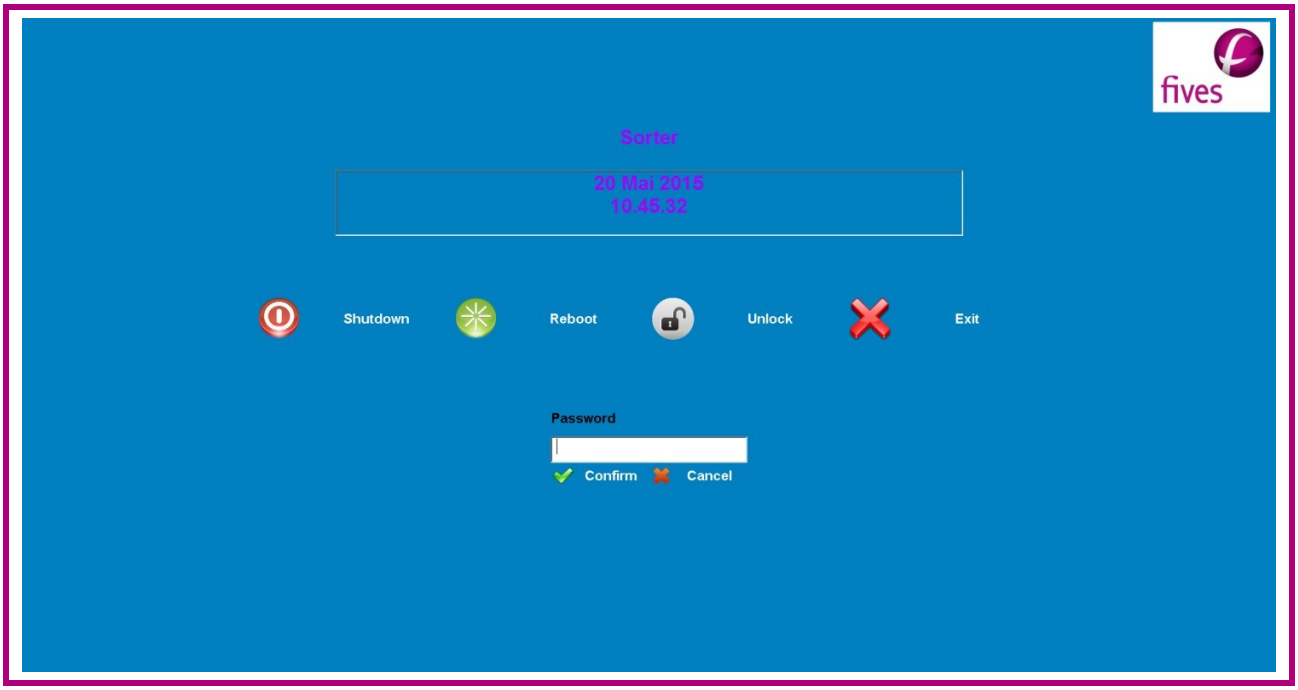

Figure 13: Password Request

The controller has two passwords.

- The first one is reserved to the Fives personnel.
- The second one can be defined, by means of a dedicated XML file located inside the PRODUCTION folder, by the user.

2.2 Singulator HMI

The Singulator HMI allow to monitor the status of the device and give to the user also the possibility to send the Start, Pause and Reset commands.

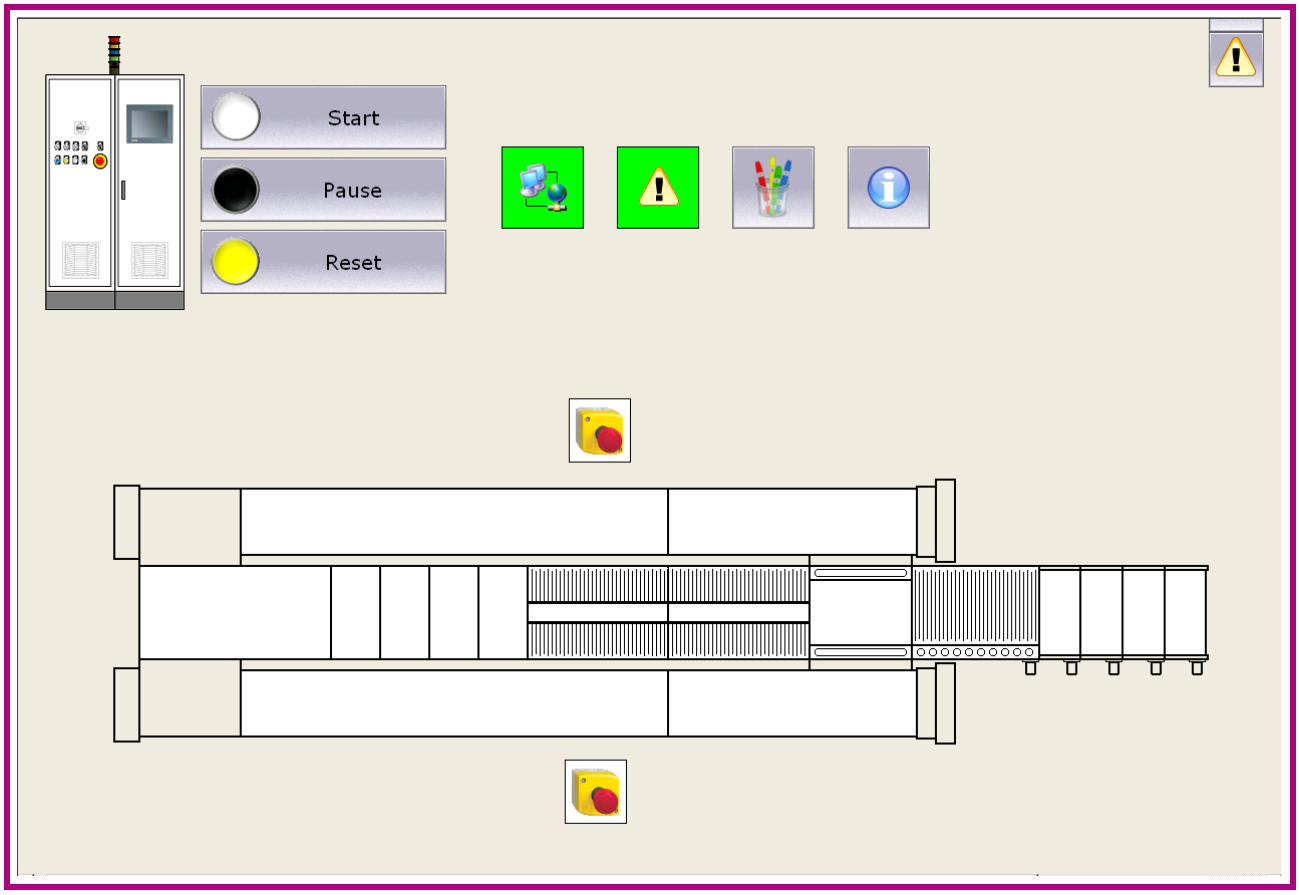

Figure 14: Singulator HMI

3 Sorter control cabinet

3.1 Procedure to switch from UPS to main power supply (If applicable)

In case of UPS failure, in order to power on the controller rack the maintenance person must operate on a switch located into sorter main cabinet.

The mentioned switch is located into as in the next picture:

Figure 15: UPS/Main Power Supply switch

At that point the maintenance person must change the switch position on proper way.

4 Hardware setup and installation

In this section there is a description of the setting (DIP switch or jumpers configuration) requested by the boards to install.

4.1 CPCI-NETX (Profibus DP master)

You can use the following check list when installing the CPCI-NETX in a system.

- Power-down the system.
- Insert the CPCI-NETX into the system slot of your Compact PCI system.
- Connect Profibus cable to the connector at the front panel.
- Power-up the system.

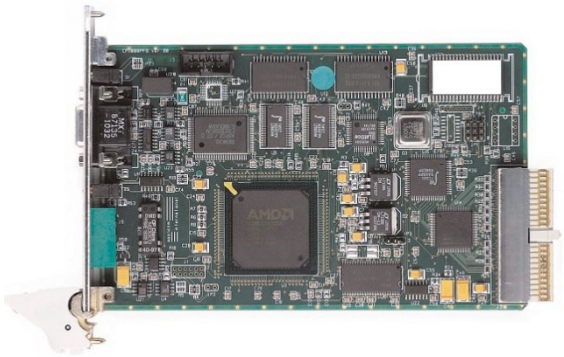

Figure 16: CPCI-NETX (Profibus board)

WARNING

After substitution of PROFIBUS master card it's necessary to download the right configuration, about that procedure, refer to previous paragraphs.

4.2 Integrating the CPU Board (F23) into a System

You can use the following check list when installing the F23 in a system.

Figure 17: CPU Board

- Power-down the system.
- Insert the F23 into the system slot of your Compact PCI system.

NOTE

The system slot of every Compact PCI system is marked by a triangle on the backplane and/or at the front panel. It also has red guide rails.

- Connect a USB keyboard and mouse to the USB connectors at the front panel.
- Connect KVM to the VGA connector at the front panel.
- Connect Ethernet cable.
- Power-up the system.

4.3 TPMC600 (Encoder Board) setup

You can use the following check list when installing the TPMC600 in a system.

- Power-down the system.
- Insert the TPMC600 into the slot of your Compact PCI system.
- Connect cable to the connector at the front panel.
- Power-up the system.

The board has no jumpers to configure the board.

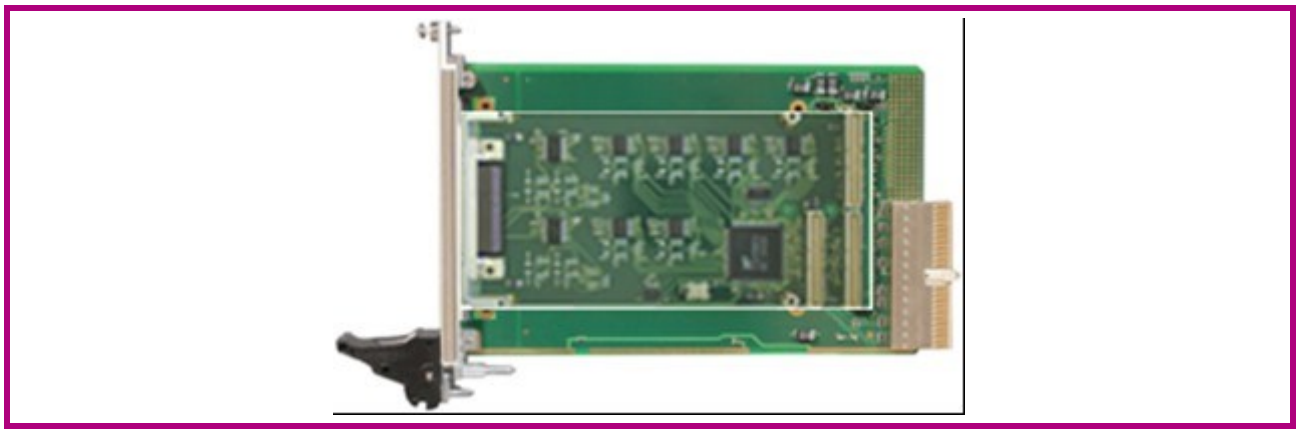

Figure 18: TPMC600 (Encoder Board)

It is not necessary any other operations.