Power Supply System ~ Telecom

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User's Guide

Smartpack2 Basic Controller

Monitoring and Control Units

Powerpack, Flatpack2 & Minipack

DC Power Supply Systems

350021.013

NS-EN ISO 14001 Certified

Certificate No:
11276-2007-AE-NOR-NA

NS-EN ISO 9001 Certified

Certificate No:
4072-2007-AQ-NOR-NA

Safety Precautions

- ☑ The equipment described in this guide must only be operated by *Eltek Valere* personnel or by persons who have attended a suitable *Eltek Valere* training course
- ☑ The equipment represents an energy hazard and failure to observe this could cause terminal injury and invalidate our warranty
- ☑ There are hazardous voltages inside the power system. As the modules incorporate large charged capacitors, it is dangerous to work inside the system even if the mains supply is disconnected
- ☑ Products into which our components are incorporated have to comply with a number of requirements. Installation is to be in accordance with the recommendations herein
- ☑ Please read the guide carefully before using the equipment

Part number for *Smartpack2 Basic Controller*: 242100.501

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Table of Contents

1. Introduction

The *Smartpack2 Basic* controllers are powerful and cost-effective modules used as slave controllers in *Smartpack2*-based power systems.

About this Guide

This booklet describes the *Smartpack2 Basic* controller's building blocks, external connections and technical specifications.

For detailed functionality description, browse and search through the *Functionality Description Help* file (or 350020.073) or *WebPower Online Help* file. The user guide for the *Smartpack2 Master* controller (Doc 350020.013) might also be helpful.

System Diagram — *Flatpack2* Power System w/SP2

The generic *Smartpack2* (SP2) distributed control system — used in *Flatpack2* PS systems — monitors and controls the whole system, and consists of the *Smartpack2 Master* controller, the *Smartpack2 Basic* controller and the *I/O Monitor2* CAN node.

The *Smartpack2 Master* serves as the local user interface between you and the system. The *Smartpack2 Basic* monitors and controls the power system's internal wiring and supplies the CAN bus with power. The *I/O Monitor2* CAN node provides the system with input monitoring and output controlling signals. The *WebPower* application enables system configuration via a standard web browser.

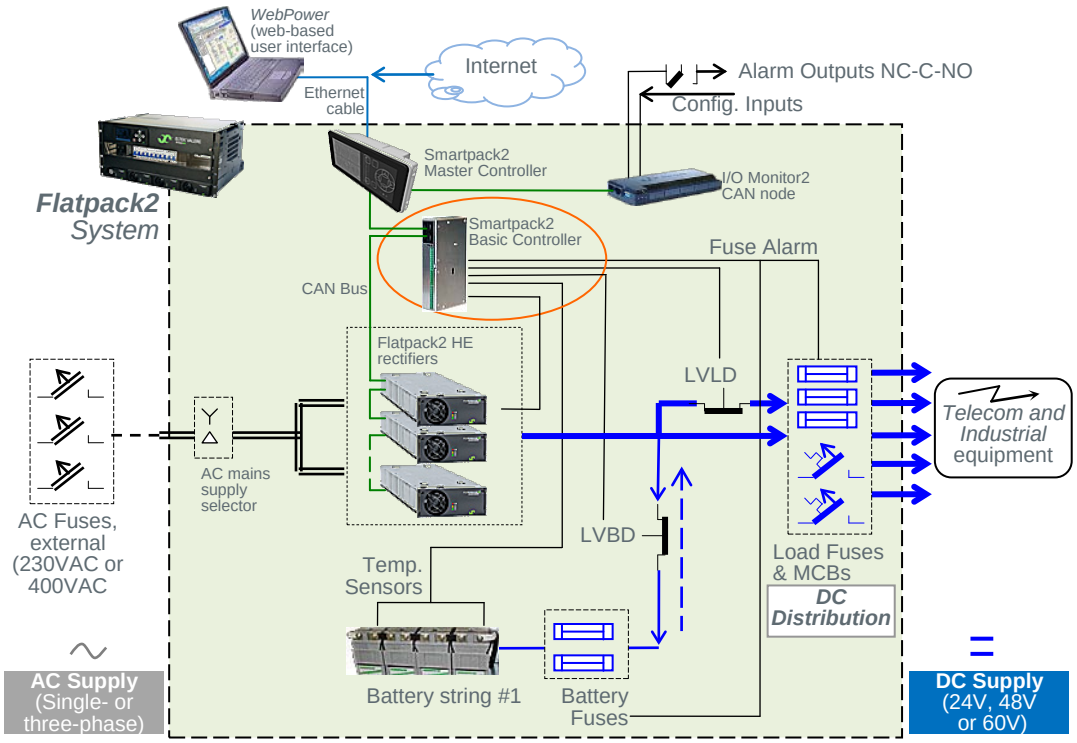


Figure 1 Typical *Flatpack2* DC power supply system for telecom and industrial equipment. The system is fed from an external AC mains supply, and consists of rectifiers in power shelves, master and basic controllers and DC distribution unit. Battery banks, LVD contactors, etc. are typically also a part of the system

2. The Smartpack2 Basic Controller

The *Smartpack2 Basic* controllers are powerful modules used as slave controllers in the distributed control system of *Smartpack2*-based power supply systems.

They are developed for monitoring and controlling of the power system's internal functionality and to supply distributed power for connected CAN nodes. They can also operate in stand-alone mode, maintaining normal operation of the system, thus providing redundancy and improving system reliability.

Key Features

A wide range of features are implemented in the *Smartpack2 Basic* controller:

- ✓ LEDs for local visual alarming (Major, Minor, Power ON)
- ✓ Supplies distributed power for CAN bus nodes
- ✓ 2 sense inputs for internal monitoring, 1 voltage sense and 1 current sense
- ✓ 2 configurable inputs for load and battery fuse monitoring
- ✓ 3 configurable multipurpose inputs (temperature, digital inputs or analog signals)
- ✓ 3 LVD control outputs, configurable for latching and non-latching contactors
- ✓ Up to 8 *Smartpack2 Basic* controllers may be connected the CAN bus
- ✓ CAN bus addressing via DIP switches
- ✓ Configuration via the master controller's front keys or *WebPower* on a standard web browser
- ✓ Firmware upgrade via the CAN bus (page 13)

Read also chapter "Technical Specifications", page 12, for more details.

Block Diagram

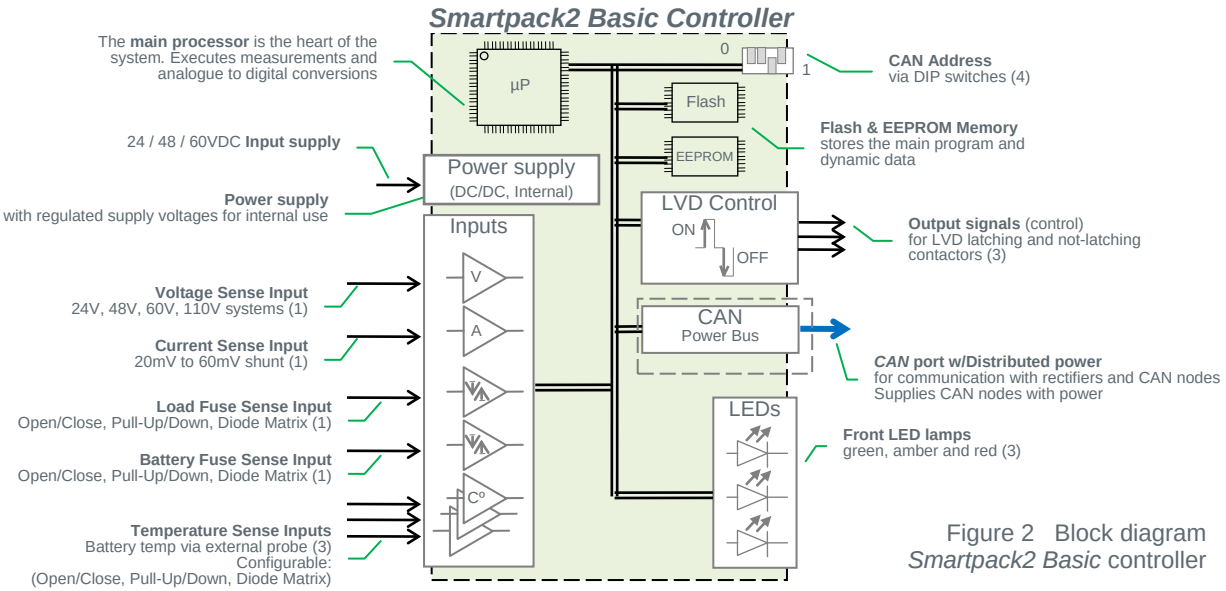


Figure 2 Block diagram *Smartpack2 Basic* controller

Location of Terminals, Ports, LEDs

For a complete list of signals, pin-out, etc., refer to chapter “Connection Drawing”, page 8.

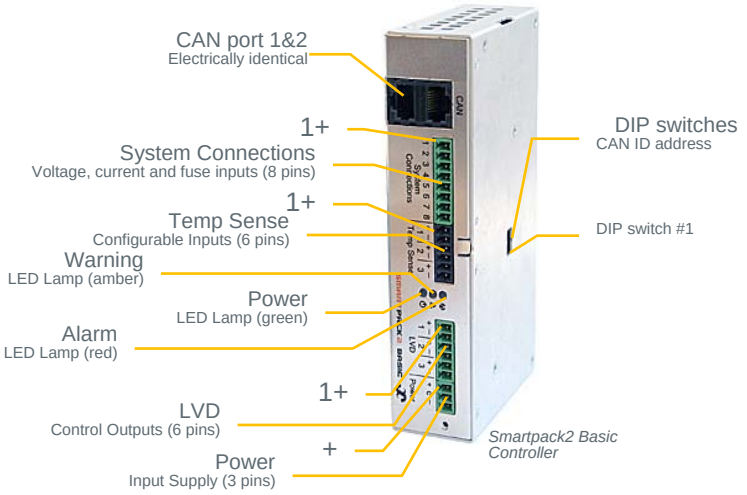


Figure 3 Location of pluggable terminal blocks, DIP switches, CAN ports and LED indicators in the *Smartpack2 Basic* controller. (The pluggable terminals may be black or green)

CAN port 1 and 2 are electrically identical, and are used to enable connection of the CAN bus incoming and outgoing CAT5 cables, or the RJ45 CAN bus termination plug.

LED Indicator	*Illumination Status*	*Description*
Power	OFF	The controller has NO supply
	ON green	Supply healthy
	Flashing Green	Distributed Power Fault
Warning	OFF	No Warning
	ON amber	Warning (Minor alarm, non-critical alarm)
	Flashing amber	Communications Fault
Alarm	OFF	No Alarm
	ON red	Alarm (Major Alarm, critical alarm)
	Flashing red	SW Fault / Boot Loader Mode

Table 1 Description of the *Smartpack2 Basic* controller’s LED illumination status

Installation of Smartpack2 Basic Controller

The *Smartpack2 Basic* controller is **always factory installed** in all *Flatpack2* PS systems that implement the "*Smartpack2* Distributed Control System".

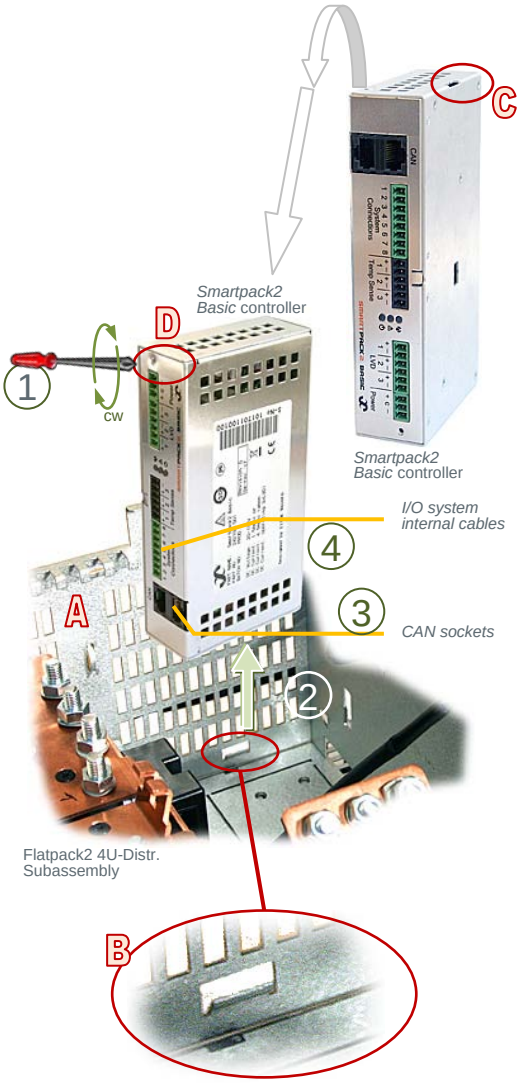
If you need to replace the installed *Smartpack2 Basic* controller with a new one, always follow the precautions relevant for installation, commissioning and general handling of the *Smartpack* and *Smartpack2*-based DC power systems.

Qualified personnel

CAUTION: For safety reasons, the **commissioning and configuration of the equipment is only to be performed** by Eltek Valere's personnel or by authorized and qualified persons; otherwise the warranty may be invalidated.
Please, **read the user documentation carefully** before installing and using the equipment, as installation and operation is to be performed as described in it.

You need standard installation tools and equipment used by an authorized electrician. NOTE: All tools must be insulated.

Fastening / Unfastening the Controller



You fasten the *Smartpack2 Basic* controller using two dedicated fixing tabs (A)(B) inside the DC power cabinet or subassembly, and a slot (C) and screw hole (D) on the controller, refer to Figure 4, page 7.

To unfasten the *Smartpack2 Basic* controller from the power system, switch OFF the power system, and

Power is OFF!

1. Loosen the top fixing tab screw from the screw hole (D)
2. Lift the controller carefully upwards, (the slot (C) disengage from the lower fixing tab (B)
3. Unplug the cables from the CAN bus sockets
4. Disconnect the pluggable I/O terminals by pulling them out

To fasten a new *Smartpack2 Basic* controller to the power system, first configure its CAN ID address and then, in the inverse order, carry out the opposite as described above (4, 3, 2, 1).

DIN rail mounting with dedicated plate is also possible.

Figure 4 *Smartpack2 Basic* controller's location in a cabinet or subassembly. (The pluggable terminals may be black or green)

Connection Drawing

Use this drawing as a connection reference for all cabling. You find the exact location of connection terminals, plugs and DIP switches, by referring to chapter “Location of Terminals, Ports, LEDs”, page 6.

The LVD control outputs may be configured for both latching and non-latching contactors using the *WebPower* via a standard web browser. LVD Output 1 is usually configured as LVBD, and output 2 and 3 as LVLD1 and LVLD2.

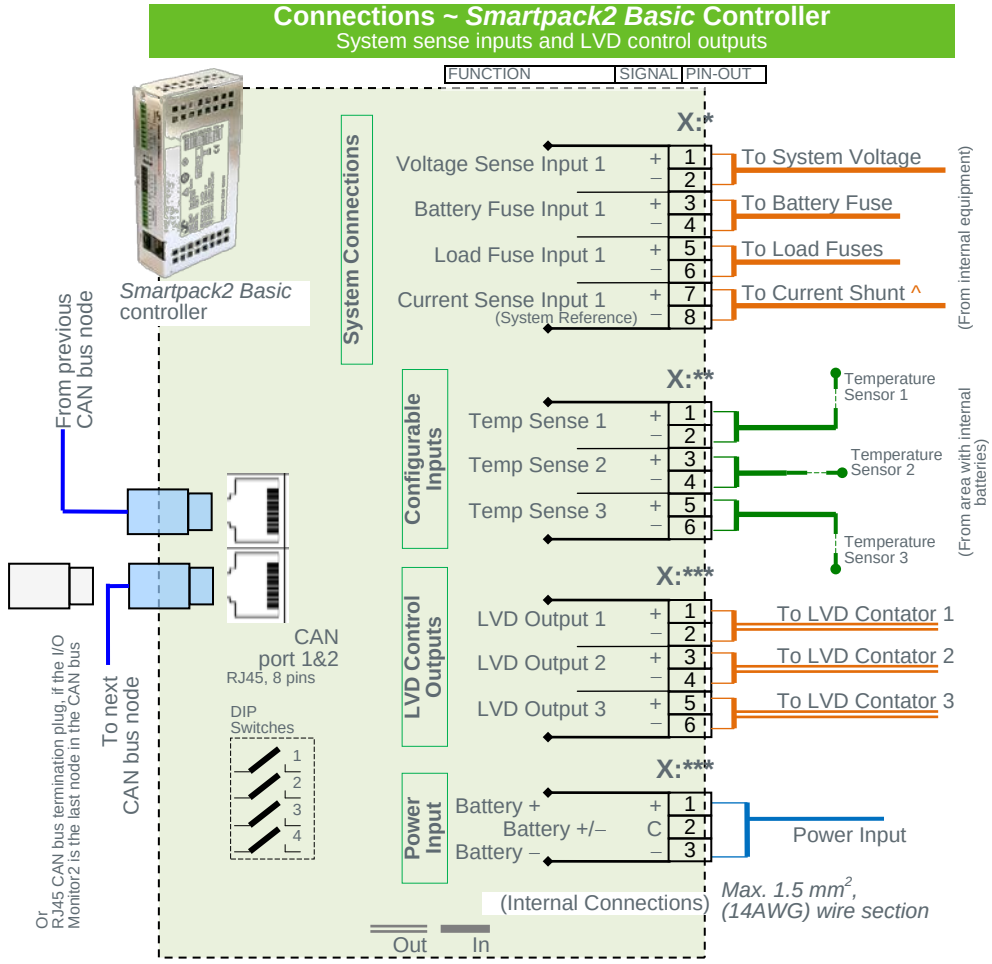


Figure 5 Connection Drawing *Smartpack2 Basic* controller

Read also chapter “Technical Specifications” page 12, for more details.

CAN Bus Termination

To ensure a correct bus communication and avoid data reflection, you must always terminate the CAN bus with two 120Ω resistors, one at each end of the line (60Ω bus impedance).

Smartpack and *Smartpack2*-based DC power systems are shipped from factory with the CAN bus already terminated with 120Ω resistors. The **CAN bus termination** is implemented with a special RJ45 plug with built-in 120Ω end-of-line resistor.

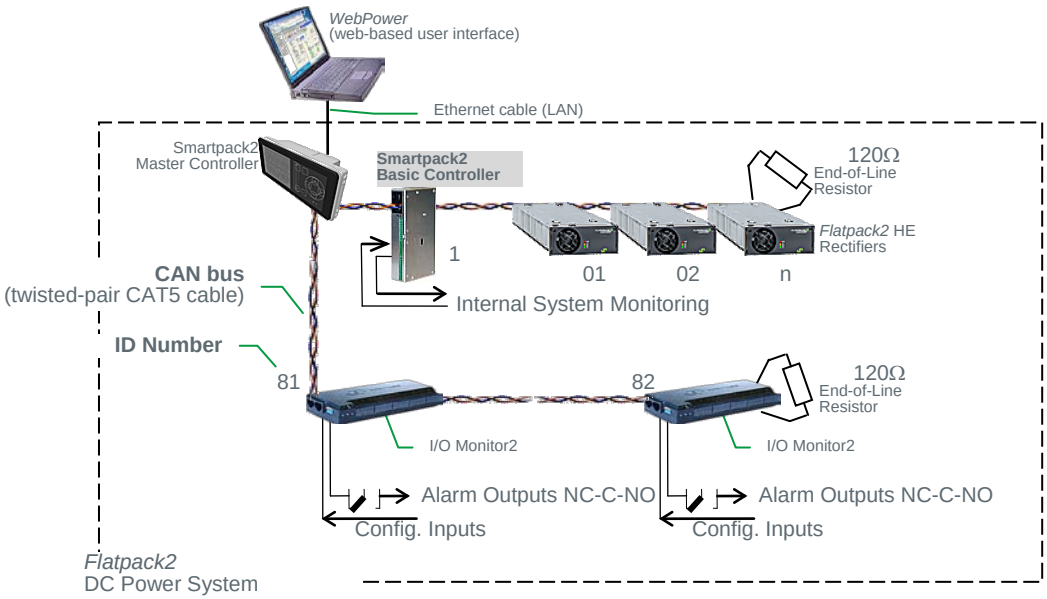


Figure 6 Example of CAN bus addressing and termination in a *Flatpack2* power system with *Smartpack2*-based control system and two "*I/O Monitor2 nodes*" connected the CAN bus

When connecting more CAN nodes to the bus, you have to remove the CAN bus termination plug from one of the CAN bus ends, and plug it in one of the CAN ports on the last connected CAN node.

Configuration

By the default, *Smartpack2*-based power systems are shipped from factory with one or several *Smartpack2 Basic* controllers correctly installed and configured inside the power system.

CAN Bus Addressing

The power system's master controller dynamically software-assigns ID numbers to rectifiers. The master controller registers the rectifiers' ID numbers — or CAN bus address (01, 02…) — together with their Serial Numbers (**software assignment**).

Other control units make use of DIP switches for configuring their unique CAN bus ID number (**hardware assignment**).

The *Smartpack2 Basic* controller's ID numbers (1, 2…8) are assigned by DIP switches on the controller's top.

A maximum of 8 *Smartpack2 Basic* controllers may be connected to the CAN bus.

*Smartpack2 Basic Controller***	*ID #*	*DIP Switch Position 1 —2 —3 —4*
1st Controller	1	OFF—OFF—OFF—OFF
2nd Controller	2	**ON** —OFF—OFF—OFF
3rd Controller	3	OFF— **ON**—OFF—OFF
4th Controller	4	**ON** — **ON**—OFF—OFF
5th Controller	5	OFF—OFF—**ON** —OFF
6th Controller	6	**ON** —OFF— **ON**—OFF
7th Controller	7	OFF—**ON**— **ON** —OFF
8th Controller	8	**ON** — **ON**— **ON**—OFF

** The DIP switch positions apply also to *Smartpack* controllers, but do not apply to *Smartpack2 Master* controllers

Smartpack2 Basic controller's DIP switch configuration
ID <1>
(All switches OFF)

Terminal Blocks

Note:
The controller's ID # corresponds to the DIP switch's binary value plus 1

Table 2 *Smartpack2 Basic* controller's DIP switch addressing

System Configuration

By the default, *Smartpack2 Basic* controllers are shipped from factory correctly configured inside the power system.

The *Eltek Valere* DC power supply system's functionality represents a vast **set of functions, characteristics or capabilities** implemented in the hardware and software of the controllers, control units and nodes connected to the system's CAN bus.

You can use following types of **user interfaces** to access the functions and parameters:

- **The controllers' front panel keypad**
  using software menus and submenu options
- **A standard web browser**
  to access the *WebPower* firmware, a platform-independent graphical user interface (GUI) built-in the controllers
- **The *PowerSuite* program**
  A PC application run on computers using MS Windows operating systems

All the mentioned functions, characteristics and parameters are **fully configurable**, and are organized in following ***system-oriented*** *logical groups*:

- Power System
- Mains
- Generator
- Rectifiers
- Battery
- Load
- Control System

Also, these functions, characteristics and parameters are presented in following ***task-oriented*** *logical groups*:

1. System Status
2. System Configuration
3. Alarm Configuration
4. Commands
5. Logs and Reports
6. Statistics
7. Commissioning
8. Up/Download

For detailed functionality description, browse and search through the *Functionality Description Help* file (or 350020.073) or *WebPower Online Help* file.

Technical Specifications

Specifications – Basic	
Input Voltage	Tolerances: 20-75 VDC Shutdown: < 18 VDC
Temperature Range	-40 to +65˚C (-40 to 140˚F)
Power Consumption	Max 1.5A Max 4.5A (3x LVD max loaded)
Contactor Outputs	3 x LVD control outputs
Configurable Inputs	3x NO/NC/Temperature: NTC probe
System Connections	
• Voltage Sense	24V, 48V, 60V systems
• Battery Fuse	Battery fuse sense, Open/Close
• Load Fuse	Battery fuse sense, Open/Close, Pull-Up/Down, Diode Matrix
• Current Sense	0-20mV and 0-60mV shunt ranges
Max Basic nodes	8 units on a single CAN-bus
Dimensions (WxHxD)	155 x 35 x 80mm 6.4 x 1.4 x 3.3”

Specifications are subject to change without notice

242100.50X.DS3– v2

Ordering Information

Part no.	Description
242100.501	Smartpack2 Basic Controller
242100.500	Smartpack2 Master Controller
242100.502	I/O Monitor2 CAN node (type 2 G2)

Firmware Upgrade Controller

Upgrade of the *Smartpack2 Basic* controller's firmware is performed via the power system's CAN bus, while the system is live. Upgrading the firmware does not delete or change any of the configuration and calibration values stored in the *Smartpack2 Basic* controller.

You can upgrade the *Smartpack2 Basic* controller's firmware using one of the following two methods. Refer to Figure 7, page 13.

A. **From the *Smartpack2 Master* controller.**
Insert in the *Smartpack2 Master* controller an SD card containing the *Smartpack2 Basic* controller's firmware source file <SP2BAS_x.xx.MHX>.
Use then the front keys to download the firmware.
Refer to the "Functionality Description Help" file (or guide 350020.073) for a detailed description.

B. **From a Personal Computer.**
You must connect a PC — via an USB-to-CAN Converter (art. 208565) — to one of the power system's CAN bus ends, and move the end-of-line resistor to one of the converter's CAN ports.
Run then the *FWLoader* program on the PC to download the firmware <SP2BAS_x.xx.MHX> to the *Smartpack2 Basic* controller.
You find a detailed description by browsing and searching through the *FWLoader Online Help* file.

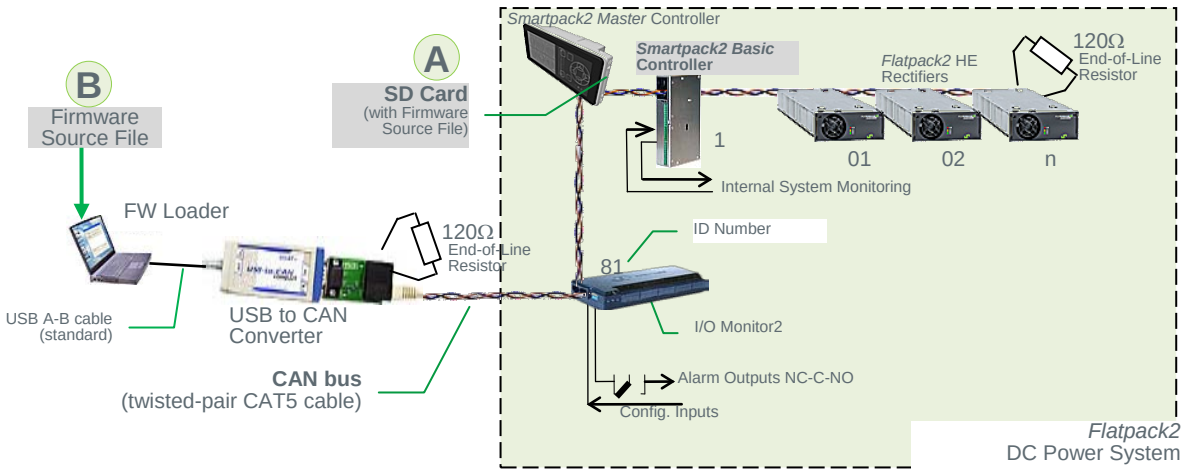


Figure 7 Example *Smartpack2 Basic* controller's firmware upgrade via SD card (A) or via PC (B)

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