

# CEDI Modules

## Changes in DC Voltage Required, Designing with DC3 Controller

### Summary

In March of 2009 (IPTB 2009-01), Ionpure announce a reduction in power consumption of CEDI modules that allowed operating at lower DC voltage. Further improvements in module construction have provided additional reduction in power consumption and allowed for further drop in applied DC voltage. The latest power supply sizing recommendations are shown in the tables below. Changes only apply to LX-EU, LX-X, LX-Z, VNX-EP, VNX-E and VNX-EX modules, not LX-HI, VNX-HH and VNX-CDIT.

**Table 2-1.** Electrical Requirements for the VNX Modules

| VNX Model *   | Previous DC Volts | New DC Volts | DC Amps   |
|---------------|-------------------|--------------|-----------|
| IP-VNX-MINI-1 | Not applicable    | 480          | 1 - 7     |
| IP-VNX-MAX-1  | Not applicable    | 600          | 1 - 7     |
| IP-VNX28EP-2  | 600               | 300          | 1 - 6.6   |
| IP-VNX55EP-2  | 600               | 300          | 2 - 13.2  |
| IP-VNX55E-2   | 600               | 300          | 10 - 13.2 |
| IP-VNX55EX-2  | 600               | 300          | 10 - 13.2 |

\* Changes do not apply to VNX25, VNX50, VNXHH or VNXCDIT

**Table 2-2.** New Electrical Requirements for the LX-EU, LX-X and LX-Z Modules

| LX Model ** | Previous DC Volts | New DC Volts | DC Amps |
|-------------|-------------------|--------------|---------|
| LX-04       | 53                | 27           | 1 - 6   |
| LX-10       | 133               | 67           | 1 - 6   |
| LX-18       | 240               | 120          | 1 - 6   |
| LX-24       | 320               | 160          | 1 - 6   |
| LX-30       | 400               | 200          | 1 - 6   |
| LX-45       | 600               | 300          | 1 - 6   |

\*\* Changes apply to LX models with -4 suffix, not to any LX-HI

### Power Supply Design Recommendations

The new Ionpure DC3 power controller (IP-3PH600V15A-M1) is a very high efficiency device designed to provide up to 600VDC and up to 15 amps DC. This allows it to be used effectively with VNX modules containing two stacks, such as the VNX55-EP, VNX55-EX, VNX55-E, VNX55HH and VNX30-CDIT, which require higher amperage.

Our power supply recommendations have not changed for VNX modules containing 2 stacks (2 sets of electrodes) such as the VNX55 variants and VNX30CDIT. These would continue to use one power supply for each module.

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CEDI modules constructed with a single pair of electrodes provide an opportunity for reducing power supply cost by driving 2 modules with a single DC3 power controller. For example, the new single-stack VNX-Mini and VNX-Max modules require up to 7 amps DC and thus two modules can be fed in parallel from one 15A DC3, cutting the cost of the power solution in half.

While this may seem like a departure from our previous power supply design recommendations, we view it as more of an enhancement that can be utilized in cases where cost or footprint may be more important factors. For optimum system performance, a separate DC power controller for each CEDI module would be best. This is not always cost-effective, especially as system size increases. As a result, installed Ionpure CEDI systems range from one power controller per module to one power controller for 45 modules.

For the proposed configuration of 2 single-stack modules per DC3 power controller, these are what we see as the advantages and disadvantages:

#### Pros

- Reduces cost of DC power controllers and associated electrical components.
- Less power panel assembly labor.
- Smaller power cabinet with reduced footprint.
- Still allows constant current operation, but controls one pair of modules in parallel.
- Higher power supply efficiency, lower overall power consumption.
- Still allows simple maintenance, cost-effective stocking of spares (compared to one large power supply for all modules on the skid).

#### Cons

- Slightly less operational flexibility (taking one power supply out of service affects two modules rather than one).
- Can only optimize current for a pair of modules, not for each individual one.

**IONPURE® CEDI Modules**  
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