

# 10 GDS Helpsheet



*World Leaders in Computer Controlled Testing  
Systems for Geotechnical Engineers and Geologists*

## Hardware

### Power Supply Requirements for an ELDyn

### Mains Electricity Supply Requirements

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## 1. Introduction

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The GDS ELDyn is an Electro-mechanically controlled machine and therefore has specific power supply requirements. Most GDS systems also typically include microprocessor based digital controllers which may be interfaced with a computer. This combination of equipment needs a clean and stable electrical power supply. This is particularly important where long term tests are being carried out. Even a very short power interruption can cause the computer or a GDS controller to lose its program. The device will then need to be powered off then on again to establish normal operation.

In addition to this a major cause for concern, when initially powering up the device, is the tripping out of the Earth Leakage Trip. This is caused by having an imbalance in current between the live and neutral phases - and this imbalance not being compensated for, by an adequate sized "Residual Current-operated Circuit-breaker" on your mains board.

This document briefly describes the main points which will help you effectively set up your power requirements for an ELDyn.

## 2. Voltage (Power Supply)

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The supply voltage must be correct for the machine, controllers and computer. Normally this is 220/240V or 110V. Corresponding frequencies are 50Hz or 60Hz. The actual voltage depends on your local supply voltage and on other factors described by the details on the back of the equipment and in the equipment handbooks.

### IEC Type Power Connector

110 to 240 Volts A/C 50/60 Hz

### Supply

Single phase supply

### Specifically for an ELDyn

The supply to the ELDyn is protected by an "Earth Leakage Circuit Breaker" (ELCB), which effectively trips when there is an imbalance between the live current and the neutral current. To trip the system, it mainly depends on which part of the cycle the current is in when the power is turned on i.e. if there is an imbalance on power-on then the circuit will trip - therefore sometimes it will trip and sometimes it won't.

With the ELDyn machine, as it is an electromagnetic system, by law we are required to have EMC Filter capacitors which are used to draw a small amount of current to ground. These large dynamic loading systems require relatively large filter capacitors however and therefore have a larger earth leakage current than a lot of other electrical equipment.

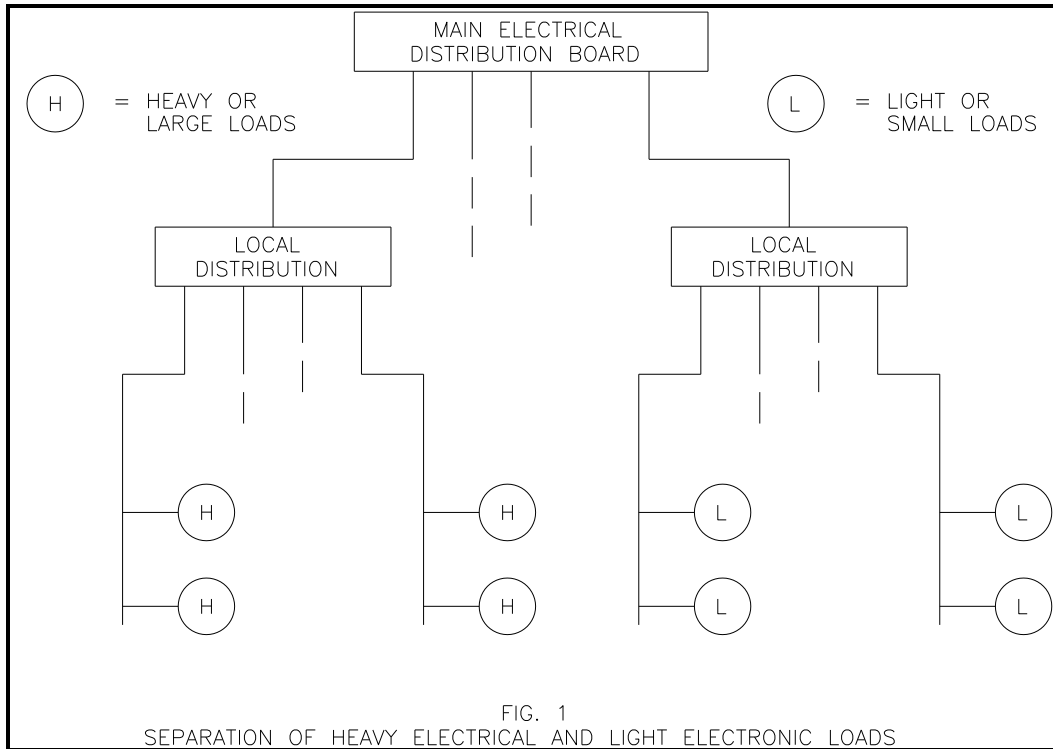
The size of the ELCB i.e. 20 mA, 50 mA or 100 mA, can reflect the susceptibility of the system to trip (need a larger ELCB for large capacitors).

In order to overcome this, specifically for the ELDyn, you need to have a "Residual Current-operated Circuit-breaker" (Earth Leakage Trip) of at least 100 mA, or alternatively use an isolating transformer. **It is recommended** by GDS to use an isolating transformer as this will inevitably cancel out any current imbalances. This transformer should be at least 2 kW/8Amps. An important thing to note when using an isolating transformer is that you need to remove the centre tap, if there is one present. If not removed, this can potentially harm the machine.

## 3. Mains Power Loading

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The equipment should be connected to a power supply that is not shared by high powered electrical equipment such as large motors, compressors or welding machines. These high powered machines can cause variations in the power supply and can take the equipment out of its recommended operating voltage range. A schematic drawing showing a desirable arrangement is shown in Fig. 1.



## 4. Earth Loops

Interconnection between devices by IEEE and RS232 interface cables may give rise to circulating earth currents if the devices are connected to the mains at different points. As mentioned above, this can add to the potential tripping of your earth Leakage trip fuse. To avoid this, all of the associated equipment should be connected to one power point. This can be achieved most easily by using a short extension cable with multiple output sockets plugged into one mains socket as shown in Fig. 2.

