Using an Elevation 1+ with RCDs

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The Kinesys Elevation 1+ is designed to comply with European legislation for variable speed drives, which require that an RFI (Radio Frequency Interference) filter is included to prevent the noise generated by the drive from interfering with nearby computer systems, radio equipment etc. The inverter drive within the Elevation 1+ is an independently manufactured product widely available within Europe and the US which incorporates the filtering required to comply with the European EMC (ElectroMagnetic Compatibility) directive 89/336/EEC. One of the consequences of including such a filter is a small current leakage to ground within each Elevation 1+.

The total ground leakage for a typical Elevation system may be in the region of 60-300mA, which will be more than sufficient to trip the 30mA RCD (Residual Current Device) fitted to many house rigging supplies within Europe. A single Elevation 1+ may also trip a sensitive RCD on power-up due to the charging of the internal capacitors – this is a common situation when using any variable speed drive.
As most moving lights, video screen power supplies etc. will also have a inherent earth leakage due to internal RFI filters nuisance tripping may increase when other equipment is turned on.

RCDs are set at a default level of 30mA as this has been found to be the point at which an RCD will trip before a current high enough to cause physiological damage will flow through the human body in the event of accidental contact – refer to IEC publication 479 “effects of currents passing through the human body” for further information.
Where a system has an inherent leakage, some protection may still be provided by setting the RCD at a level approximately 30mA higher than the system’s base leakage current – this will overcome the problem of nuisance tripping and yet still provide a degree of personnel protection.
Kinesys have addressed this issue by providing an adjustable RCD within the Array PD-ES power distribution. The adjustable RCD should be set to a point approximately 30mA higher than the point at which a full system trips on powerup – 100mA would be a good starting point. The time delay should always be set to minimum (30ms).

To set the RCD to 100mA the second DIP switch should be set to the “IΔ x 0,1” position; set the top left potentiometer to 1 to set a trip current of 100mA. Make sure the fourth DIP switch is in the “tx1” position and the right hand potentiometer is turned fully counterclockwise to set a minimum time delay of 30mS.

In any large power distribution system, for example a venue power supply which is distributed to various departments such as lighting, automation, sound etc, the ideal situation is for each service to be protected by its own RCD, set to provide the required level of protection. An overall RCD on the generator or incoming supply should be set to a current value higher than any of the downstream devices, and should also incorporate a time delay. With this system, a fault on a final circuit such as a hoist controller or video screen will still result in disconnection of the final supply but will not cause disruption to other departments.