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Kinesys Array PD-ES

Operating & Maintenance Manual
[ORIGINAL]

A power distribution and E-Stop system

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1. Introduction

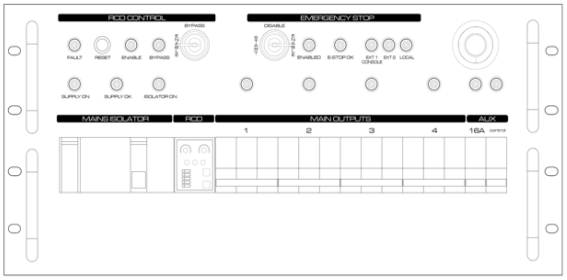
1.1 Product description

The Array PD-ES is a power distribution unit incorporating data management functionality and an emergency stop system. It is designed to work in conjunction with the Kinesys Elevation product family.

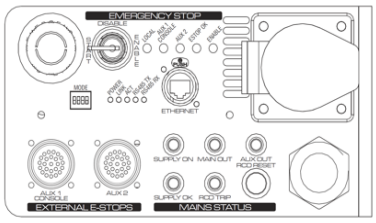
The Array PD-ES incorporates a single-phase auxiliary outlet, dual XLR7 data outputs for connection to Kinesys Elevation conttollers and an Ethernet to RS485 data interface for translating Ethernet data from motion control software to the RS485 data standard required by Kinesys Elevation controllers.

The front panel features an integrated emergency stop button, status indicators, individual outlet mains circuit breakers (MCBs) and an adjustable Residual Current Device (RCD).

The Array Mini PD-ES is a smaller version of the Array PD-ES. The Array Mini PD-ES is also covered in this manual as the functionality and features are similar to those of the larger version.



Array PD-ES



Array Mini PD-ES

1.2 Scope and purpose

This manual describes the key features, means of operation and maintenance operations of the Array PD-ES and Array Mini PD-ES.

The equipment described in this manual may only be operated by personnel qualified to do so. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with this and associated equipment.

1.3 Model part numbers

The Array PD-ES is available in either 208V or 400V versions. The Array Mini PD-ES is only available in a 400V version. Make sure you are using the correct version for the mains supply voltage in your location. If you are unsure which is the correct version to use please check with your supplier or Kinesys.

This manual applies to the following Array PD-ES models:

Part number	Power source	Auxiliary power connections
ELE-03-0013	Powerlock 400V	13A + Blue CEE Form
ELE-03-0018	Powerlock 400V	Schuko + Blue CEE Form
ELE-03-0020	Powerlock 400V	Australian "Type 1" + Blue Cee Form
ELE-03-0023	Cam-lok 208V	Edison + Yellow CEE Form
ELE-03-0024	Cam-lok 208V	TRUE1 + Edison
ELE-03-0025	Cam-lok 400V	Schuko + Blue CEE Form
ELE-03-0026	Cam-lok 208V	Edison + Edison

This manual applies to the following Array Mini PD-ES model:

Part number	Power source	Auxiliary power connections
ELE-03-0053	32A 3P+N+E IEC60309 ("Ceeform")	16A + Blue CEE Form

1.4 Safety performance

The Array PD-ES contains a safety relay and mains line contactors which control the power output to Elevation controllers, providing a category 0 stop according to EN 60204-1:2018 "stopping by immediate removal of power to the machine actuators". In addition, the line contactor and the drive enable signal in the Elevation controller are switched off via control lines in the Elevation data cable.

The line contactors in the Array PD-ES are monitored to prevent restarting of the system in the event of a fault; the control lines to the Elevation controller are not monitored, and a fault in these control circuits may lead to a loss of the safety function within the Elevation controller. To provide an increased level of safety, dual line contactors are fitted to some Array PD-ES units.

Array PD-ES units manufactured after August 2014 are fitted with dual mains connectors. Units manufactured before this date may be modified by Kinesys as required. Units conforming to the new standard (dual mains connectors) can be identified as follows:

- A label on the front panel stating "EN 13849 CAT4 DUAL LINE CONTACTORS"
- A label on the rear panel stating "EN 13849 CAT4 DUAL LINE CONTACTORS"

The Array Mini PD-ES is only fitted with a single line contactor and as such can only be used in systems requiring a SIL1 or PLc emergency stop.

The following table describes the emergency stop system safety performance that can be achieved with different Array PD-ES models.

System	SIL (EN62061)	PL (EN ISO 13849)
Array PD-ES, single contactor, all operation modes	SIL 1	PLc
Array PD-ES, dual contactor, with up to 2 additional external E-Stop devices and front panel E-Stop switch	SIL 2	PLd
Array PD-ES, dual contactor, with one external E-Stop device only and front panel E-Stop covered.	SIL 3	PLe
Array PD-ES, dual contactor, linked systems	SIL 1	PLc
Array PD-ES, dual contactor, with Mentor controller (multiple Array PD-ES if required)	SIL 3	PLe
Array Mini PD-ES, all operation modes	SIL 1	PLc

1.4.1 Important setup details relating to safety performance

For SIL 3 applications, the emergency stop button on the front of the Array PD-ES must be covered to prevent unauthorised operation.

When a single emergency stop button is connected, this must be located next to the system operator at all times.

All emergency stop buttons must be tested after each installation of a touring system, and regularly for a permanant installation.

Where multiple emergency stop buttons are required, all emergency stop buttons must be connected to the inputs of a Mentor safety controller to guarantee SIL 3 compliance.

1.5 System example

The system below shows an example where the Array PD-ES may be used in conjunction with an Elevation system and other devices such as the Array 485, Rigger and Vector Console. For support and technical enquiries on your specific application of the Array PD-ES please contact support@taittowers.com.

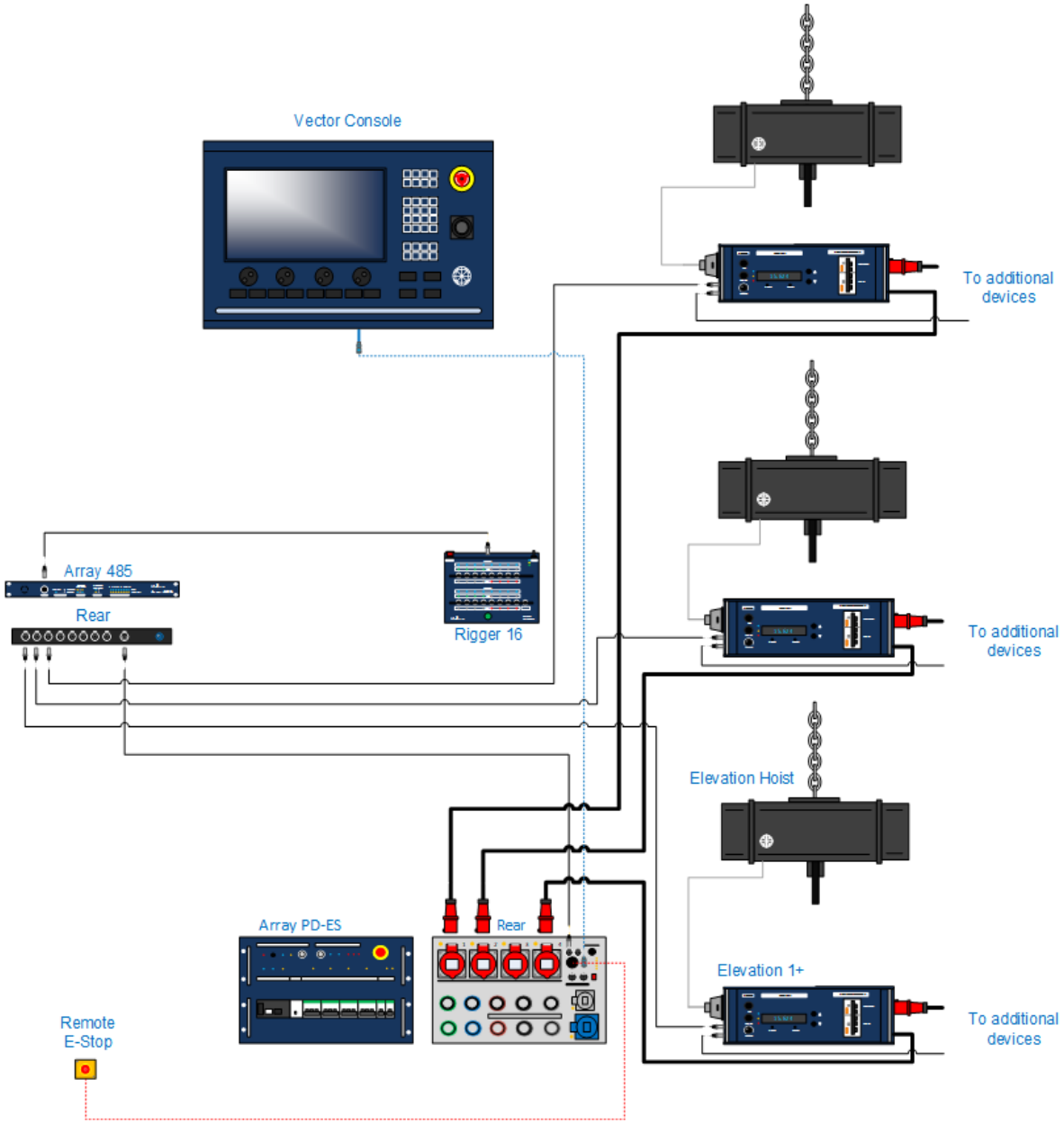


Figure 1. System example

1.6 Support requests

For support, please use the following contact details:

support@taittowers.com
Tel: +44(0) 20 8481 9850

To resolve your support request as quickly as possible, please provide the following information, if available, when contacting Kinesys:

- Site name, address, machine location details and your contact details.
- As much detail as possible on the behaviour observed, including any unusual changes in behaviour that are different from normal operation and any environmental conditions that may be a factor (e.g. fluctuations in temperature and water damage).
- Details on the behaviour that should have been expected.
- The exact steps required that produce the issue.
- Any solutions to fix the issue that you have already tried.
- Any workarounds that you have found.
- Equipment item numbers and serial numbers, such as those displayed on the identification plates/labels.
- Version numbers of any software being used.
- Any screen shots, photographs or videos of the issue.

2. Safety information

The following symbols are used to indicate specific items which require special attention by the user:

	**Warning: Instructions which relate to safety**
	**Warning: Instructions which relate to safety where there is a particular risk of electric shock**
	**Warning: Instructions which relate to safety where there is a particular overhead risk**
	**Danger: Prohibited actions which are forbidden under all circumstances**
	**Additional important information**

2.1 Safety regulations

The following regulations serve as the basis for assembly, installation, certification and maintenance of automation equipment within the area of the European community. For countries other than those mentioned, local legislation and directives may apply in addition to or in place of the European regulations as stated in this manual.

The manufacturer's guarantee depends on the consideration of these regulations and the operating instructions.

European regulations

2006/42/EC	EC - Machinery Directive
2014/30/EU	EC - Directive relating to electromagnetic compatibility
2014/35/EU	EC - Electrical equipment designed for use within certain voltage limits

BGV accident prevention regulations (Germany only)

DGUV Vorschrift 3 (BGV A1)	Principles of accident prevention
DGUV Vorschrift 3 (BGV A3)	Electrical facilities and equipment
DGUV Vorschrift 52 (BGV D6)	Accident prevention regulation for use in crane systems
DGUV Vorschrift 54 (BGV D8)	Accident prevention regulation for electric winches, lifting and pulling equipment
DGUV Regel 100-500 (BGR 500)	Hoisting accessories
DGUV Grundsatz 309-001 (BGG 905)	Principles for crane inspections

Harmonized regulations

EN 17206	Machinery for stages and other production areas; Safety requirements and inspections
EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 14492-2	Cranes - Power driven winches and hoists
EN 818-7	Short link chain for lifting purposes; Fine tolerance hoist chain, Grade T
EN ISO 13849-1 & 2 / BS EN 62061	Safety of machinery - Safety-related parts of control systems; General principles for design
EN 60034-1	Rotating electrical machines; Rating and performance
EN 60034-5	Rotating electrical machines; Degrees of protection provided by the integral design of rotating electrical machines
EN 60204-1	Electrical equipment of machines, General requirements
EN 60204-32	Electrical equipment of machines; Requirements for hoisting machines
EN 60529	Degrees of protection provided by enclosures (IP-Code)
EN 60947-1	Low-voltage switchgear and control gear
EN 61000-6-2	Electromagnetic compatibility; Immunity for industrial environments
EN 61000-6-4	Electromagnetic compatibility; Emission standard for industrial environments
EN 82079-1	Preparation of instructions for use - Structuring, content and presentation
UL 508A	Construction of Industrial Control Panels

Regulations and technical specifications

FEM 9.511:1986	Rules for the design of series lifting equipment; Classification of mechanisms
FEM 9.683:1995	Series lifting equipment; Selection of hoisting and travelling motors
FEM 9.751:1998	Series lifting equipment; Power driven series hoist mechanisms; Safety
FEM 9.755:1993	Serial hoist units; Measures for achieving safe working periods

2.2 Safety warnings

IF IN DOUBT ABOUT ANY ASPECT OF MOVING OBJECTS, ALWAYS SEEK PROFESSIONAL ADVICE BEFORE OPERATION.

Make sure this Operating & Maintenance Manual is always kept in a complete and fully readable condition and that it is always accessible to all operators of the equipment.

Prohibitions of operation

- **Do not install the Array PD-ES or do maintenance to the Array PD-ES in an area that is accessible to children or other unqualified persons.**
- **Do not use the Array PD-ES in an aggressive environment. An aggressive environment is defined as an environment which contains hazardous substances that may degrade equipment.**
- **Do not use the Array PD-ES if it does not appear to be in 100% working order.**
- **Do not modify or attempt to repair the Array PD-ES in any way other than those described in the maintenance procedures within this manual.**
- **Do not connect the Array PD-ES to equipment with a current consumption higher than specified**

Safety precautions before operation

- **Do a full risk assessment of the location where the Array PD-ES and its connected devices are intended to be used.**
- **If used in rigging, the Array PD-ES and its connected lifting device must be attached from suitable scaffolds, approved working platforms, or similar safe working positions. Make sure a qualified rigging specialist has assessed that the structure where the Array PD-ES, lifting device and attached load are installed can safely support the combined weight of the equipment.**
- **Do not start movement operations until a qualified person has inspected the Array PD-ES and all other connected equipment, and confirmed that is in 100% working order.**
- **Make sure all machine stop buttons, emergency stop buttons and enabling switches in the system have been tested and are functioning correctly.**
- **Make sure all operators know the locations of the machine stop buttons, emergency stop buttons and enabling switches in the system.**
- **Make sure all attached loads are unobstructed and will not come into contact with other static or moving objects during movement.**
- **Make sure all attached loads are always visible to the operator where possible. If this is not possible, make sure the operator has reliable communication with a person who can clearly see the attached loads.**
- **Make sure all persons in the hazard zone underneath the lifting equipment are**

aware of the potential for movement.

- **For SIL 3 applications, the emergency stop button on the front of the Array PD-ES must be covered to prevent unauthorised operation**

Safety instructions during operation

- **If you notice any unexpected or dangerous movement during operation, press the machine stop button on the front panel of the Array PD-ES or an emergency stop button on a venue-wide safety controller to bring all movement to an immediate stop. Note that not all stop buttons in the system necessarily stop the movement an individual lifting device. Alternatively, if an enabling switch is used in the system, then release the enabling switch.**
- **If an enabling switch is used in your system to initiate movement of the connected lifting device, be aware that releasing it may cause movement to stop unexpectedly.**
- **After a stop button has been pressed, the reason for its actuation must be found, and all possible failures in the system removed by trained personnel. The stop button must then be reset before continuing operation. Note that the stop button reset procedure may be different for different devices - refer to individual product manuals for more details.**

Safety instructions during maintenance

- **Maintenance and repairs to the Array PD-ES must only be carried out be competent and trained personnel.**
- **Only use original Kinesys parts when replacing components, including all fixings such as nuts, washers and screws.**
- **Do not modify or attempt to repair the Array PD-ES in any way. If the Array PD-ESneeds repair work done beyond what is described in this manual, contact Kinesys to arrange a repair.**
- **Always disconnect the power and remove the load when carrying out maintenance procedures.**
- **Make sure the maintenance area is secure before carrying out maintenance work.**

2.3 Visible damages

If any damage or breakages are detected during operation or during tests, do not operate the [[[Undefined variable Project Specific.Product Name Long]]] until it has been repaired and a qualified person has checked and approved it.

2.4 Spare parts

Only original fixing components, spare parts, and accessories listed in manufacturer's spare parts catalogue are acceptable for use. The manufacturer's guarantee is given for those spare parts only. The manufacturer cannot be held responsible for any damages due to the use of non-original parts or accessories.

2.5 Operating environment

The Array PD-ES is designed for indoor use only and to work in ambient temperatures between 5°C - 40°C (41°F -104°F). The humidity of the environment must not exceed 90%.

2.6 Handling and storage

Condensation

The Array PD-ES is designed for indoor use only. If the product has been exposed to temperature fluctuations, for example during transport, there may be risk of condensation which may result in damage. Do not connect the Array PD-ES to a power source immediately. Leave the unit disconnected until the it has reached a safe temperature

Shocks

Do not shake, knock or drop the Array PD-ES. Avoid excessive force when installing and operating the product.

Handling

Do not lift the Array PD-ES by any of its cables or connectors as this may cause damage to the unit and/or the cables; use the transportation handles instead.

Packaging

Where possible, use the original packaging to transport the Array PD-ES. Alternatively, a purpose-made flight case should be used (available separately).

3. Array PD-ES product overview

3.1 Front panel overview

The front panel of the Array PD-ES features user controls, indicators, the local emergency stop button, Miniature Circuit Breakers (MCBs) and the Residual Current Device (RCD).

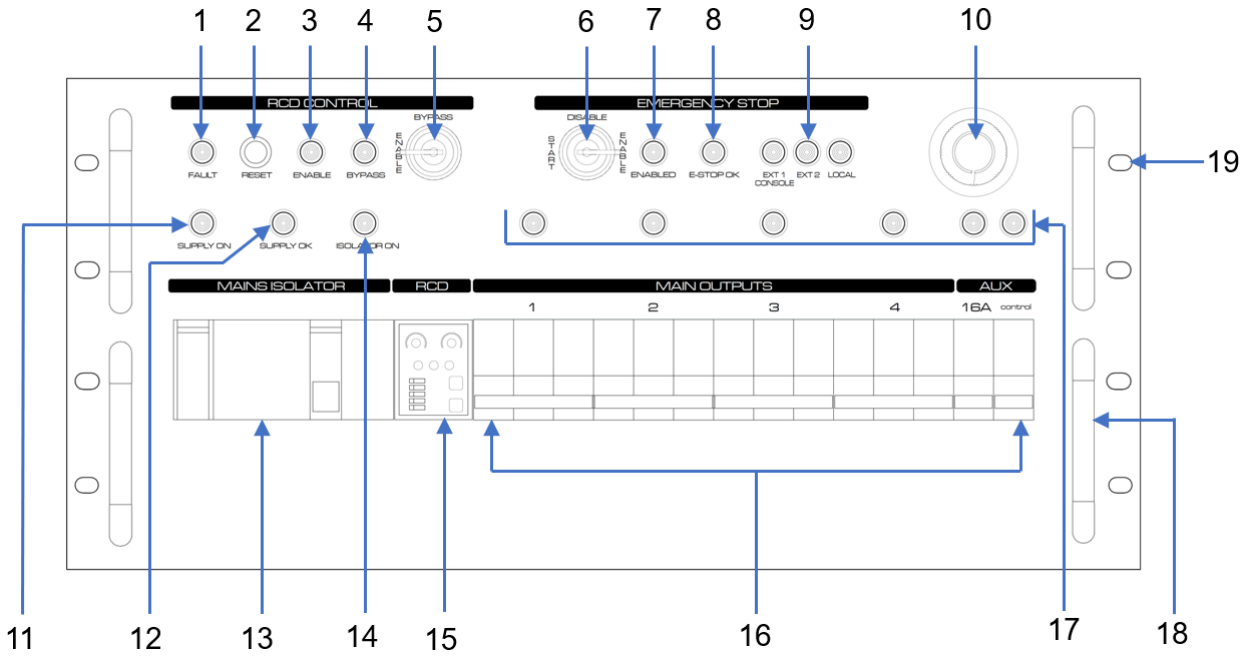


Figure 2. Front panel layout

Item #	Description	Notes
1	RCD Fault LED	Illuminates red when the RCD has been tripped.
2	RCD Reset button	If the RCD has been tripped press this button to reset the system.
3	RCD Enable LED	Illuminates when the RCD key switch is in the ENABLE position.
4	RCD Bypass LED	Illuminates when the RCD key switch is in the BYPASS position.
5	RCD key switch	Used for enabling or bypassing the RCD.
6	Emergency stop key switch	Used for enabling or disabling the controllers plugged into the Array PD-ES. If the emergency stop system is wired to require a start / reset command this is done via the Start position of the key switch.
7	System Enabled LED	Illuminates when the emergency stop key switch is in the ENABLE position and the system is enabled.
8	Emergency stop OK LED	Illuminates to show that the emergency stop system is OK and no faults are present.
9	Emergency stop indicators	If an emergency stop button connected to the rear panel is pressed or the emergency stop circuit is not complete

Item #	Description	Notes
		either the EXT1 or EXT2 LED will illuminate red. If the emergency stop button on the front panel is pressed the LOCAL LED will illuminate red.
10	Local emergency stop button	Used to stop movement operations of all connected hoists and controllers.
11	Supply ON LED	Illuminates when the Array PD-ES has a live incoming power supply.
12	Supply OK LED	Illuminates when the incoming power supply contains all phases, a neutral connection and the correct voltage.
13	Isolator ON LED	Illuminates when the mains isolator has been engaged.
14	Mains Isolator	Used to isolate the mains power to the Array PD-ES.
15	Residual Current Device (RCD)	See section 11 for details.
16	Mains output and auxiliary MCBs (Miniature Circuit Breakers)	MCBs 1-4 control the four main outputs on the rear panel. The 16A auxiliary RCBO controls the auxiliary outlet connectors. The Control MCB supplies power to the Array PD-ES control circuit
17	Output indicators	Illuminate when the corresponding MCBs below them are switched on.
18	Transportation handles	Used for handling and transporting the Array PD-ES. Note: some older models may have two handles instead of four.
19	Rack mount holes	For installation to a industry-standard 19" rack. Note: some older models may have four holes instead of eight.

3.2 Rear panel overview

The rear panel features the power input, power output, data and emergency stop connections.

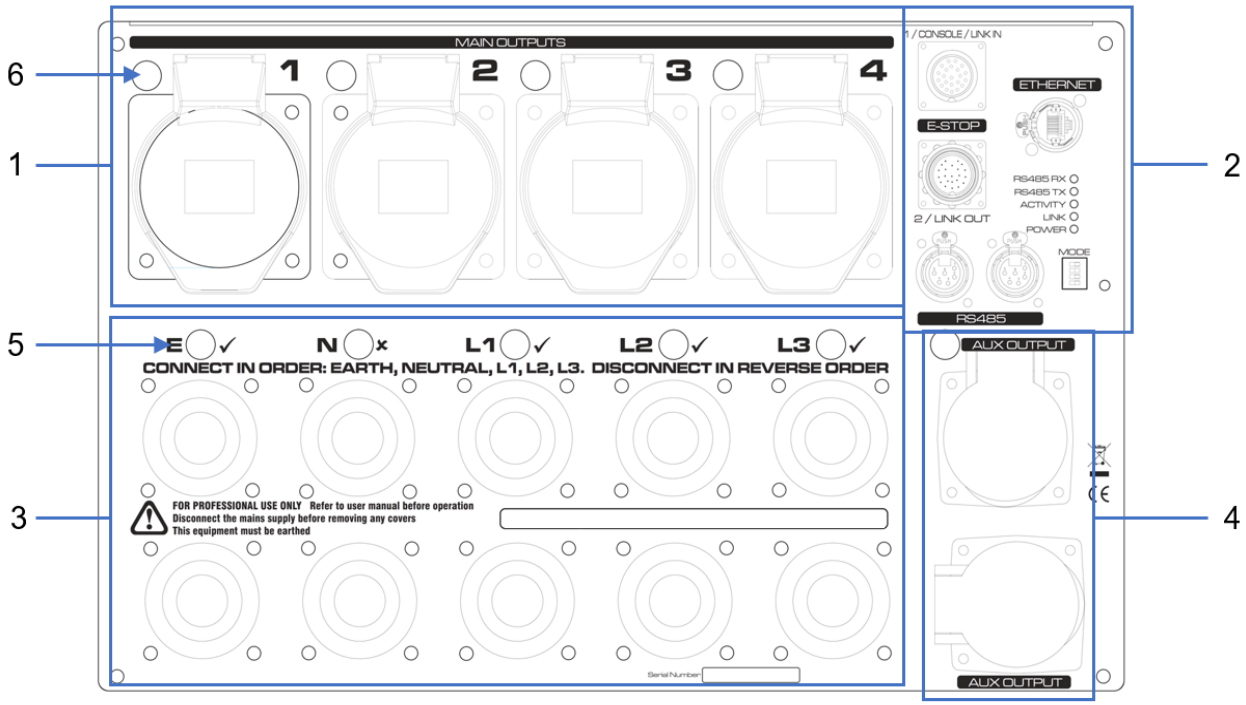


Figure 3. Rear panel overview

Item #	Description	Notes
1	Main power outputs	4 x 32A 5 pin CEE Form connectors in either Blue (208V) or Red (400V).
2	Data / emergency stop connections	This area contains two E-Stop Socapex 22 connections, two XLR data connections and an Ethernet connection for linking to a PC. There are also five status indicators and a set of DIP switches for setting the IP address - see section 1 for details.
3	Main power input	Options include Powerlock and Cam-lok connections in European, Australian or US configurations. See section 1 for more details.
4	Auxiliary outputs	Options include combinations of UK 13A socket, European Schuko socket, Australian "Type 1" socket and "Edison" socket. See section 1 for more details.
5	Input indicators	The green indicators indicate a good mains connection. If any green indicators are missing, or the red 'N' indicator illuminates, check the incoming supply for correct connection of three phases, neutral and earth.
6	Power output indicators	Illuminate to show a live power connection is available on each channel.

4. Array Mini PD-ES product overview

Although it has many similar connections and features, the layout of the Array Mini PD-ES differs slightly from the full-size version in some of the features on the front, back and side panels. The side panel of the Array Mini PD-ES features the MCBs and RCD that appear on the front panel of the full-size version and the front panel features the Auxiliary power, E-Stop and Ethernet connections that appear on the rear panel of the full-size version.

4.1 Front panel overview

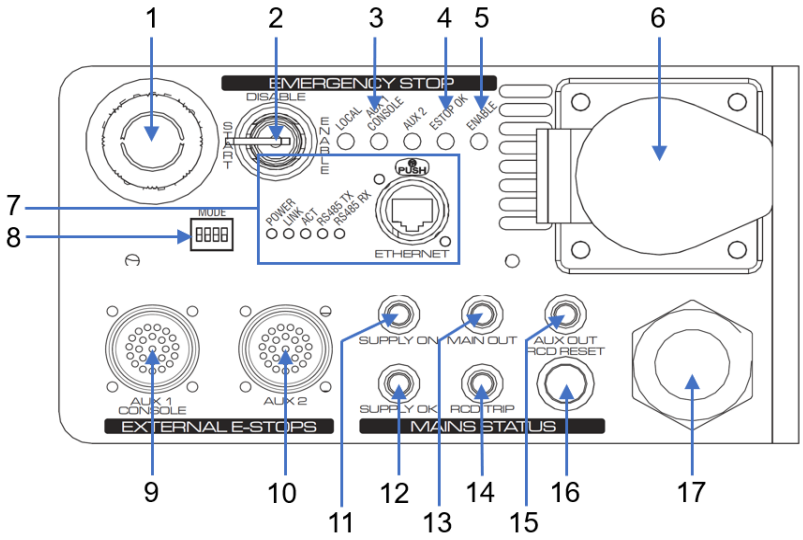


Figure 4. Front panel overview

Item #	Description	Notes
1	Emergency stop button	Used to stop movement operations of all connected hoists and controllers.
2	Emergency stop key switch	Used for enabling or disabling the controllers plugged into the Array Mini PD-ES. If the emergency stop system is wired to require a start / reset command this is done via the Start position of the key switch.
3	Emergency stop indicators	If an emergency stop button connected to the rear panel is pressed or the emergency stop circuit is not complete either AUX1 Local Console or AUX2 LED will illuminate red. If the emergency stop button on the front panel is pressed the LOCAL LED will illuminate red.
4	E-Stop OK LED	Illuminates to show that the emergency stop system is OK and no faults are present.
5	Enable LED	Illuminates when the emergency stop key switch is in the ENABLE position and the system is enabled.
6	Auxiliary output	There is only one type of auxiliary output for the Array Mini PD-ES which is a 230V 16A Blue CEE Form connector.
7	Ethernet connection and indicators	For connecting a computer for data communications. The five indicators are the same as the main version - see section 7.2.4

Item #	Description	Notes
8	DIP switches	Used for setting the IP address of the unit - see section 8 for details.
9	External E-Stop / Aux 1 / Console connection	The Socapex 22-pin input is for connecting external E-Stop buttons, Dead Man's Handles or a Kinesys K2 Console.
10	External E-Stop / Aux 2 connection	External E-Stop / Aux 1 Console connections.
11	Supply ON LED	Illuminates when the Array Mini PD-ES has a live incoming power supply.
12	Supply OK LED	Illuminates when the incoming power supply contains all phases, a neutral connection and the correct voltage.
13	Main Out LED	Illuminates when the Array Mini PD-ES has a live outgoing power supply.
14	RCD Trip LED	Illuminates when the Residual Current Device has been tripped.
15	Aux Out LED	Illuminates when the Array Mini PD-ES has a live outgoing auxiliary power supply.
16	RCD reset button	Used for resetting the RCD when it has been tripped. See section 1 for details.
17	Mains Power In	Incoming mains power supply. See section 7 for details.

4.2 Rear panel overview

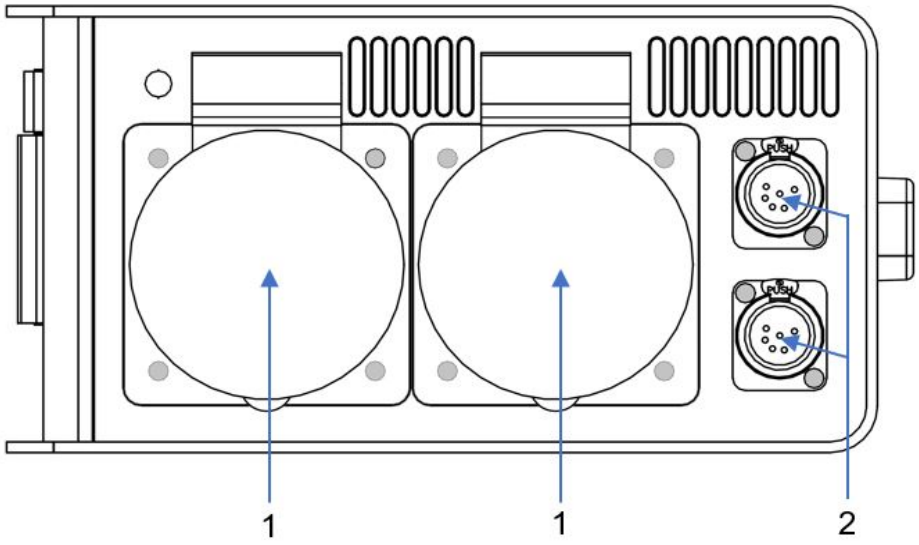
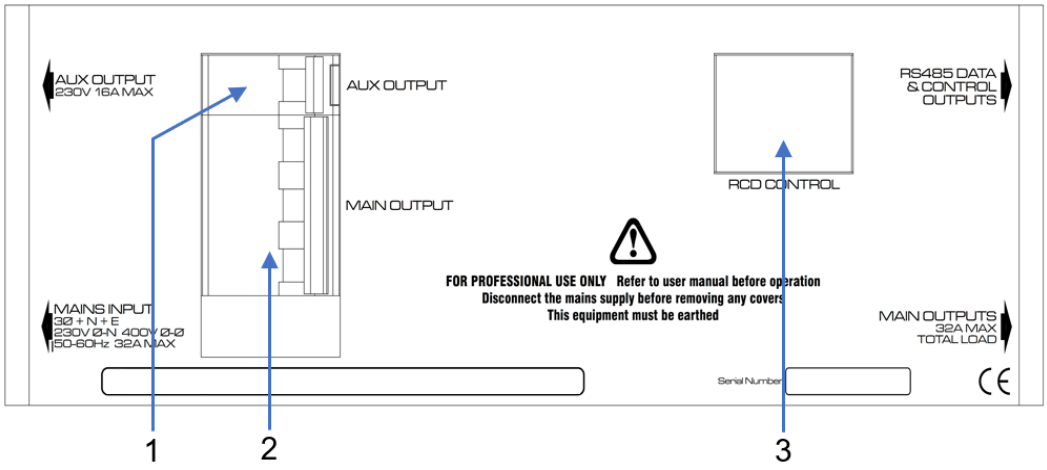


Figure 5. Rear panel overview

Item #	Description	Notes
1	Main power outputs	2 x 32A 5-pin CEE Form connectors
2	RS485 Data & Control outputs	2 x XLR7 connections for connecting equipment that can be controlled via software such as the Kinesys Elevation controller.

4.3 Side panel overview



Item #	Description	Notes
1	Aux output Residual Current Circuit Breaker (RCBO)	Controls the output of the auxiliary output on the front of the Array Mini PD-ES.
2	Main Output Miniature Circuit Breaker (MCB)	Controls the output of the main power outputs on the rear of the Array Mini PD-ES.
3	Residual Current Device (RCD)	See section 1 for details.

5. Installation

5.1 Risk assessment

Before installing the Array PD-ES or Array Mini PD-ES do a risk assessment to determine where emergency stop buttons should be located. Emergency stop buttons should always be located next to the show operator. The Array PD-ES and Array Mini PD-ES have one emergency stop button on the front panel and options for the connection of two additional emergency stop buttons on the rear panel. See section 7.2.1 for details on connecting additional emergency stop buttons.

5.1.1 Installation location

When considering the location to install the unit, make sure the device is not exposed to extremes of heat, cold, moisture, humidity or dust.

5.2 Array PD-ES rack installation

The rear of the Array PD-ES must always be supported to reduce the strain on the front panel mounting holes caused by the weight of cables.

Installation of the Array PD-ES to an industry standard 19" can be achieved in a number of ways including the use of sleeves, angle supports, slide rails, or other equipment to support the weight of equipment at the rear of the case. The method of installation is at the discretion of the customer.

5.2.1 Rack installation procedure

To install the Array PD-ES into a 19" rack using a rack slide kit, contact Kinesys and quote the part number 7200031C. The rack slide kit contains the following items:

Part Number	Description	Qty
7200030	Rack slides, telescopic, 508/533 mm , pair	1
7200031	Rack slide kit, for telescopic slide, 40 mm limit	1
7500616	Screw, pozi/pan, M6x16 mm steel, black	8
7567006	Nylon washer, M6, black	8
7591307	Caged nut, narrow type, M6, 0.71-1.63 mm	8

The Array PD-ES is a heavy unit. Use at least two people to install it safely into the rack.

1. Install the two drawer slides to the sides of Array PD-ES using four M4 x 8 mm button head screws on each side, making sure the sliding portion faces the front of the unit.

   Note: Do not use screws longer than 8 mm as these may foul internal components.

2. Install twelve M6 cage nuts into the square holes in the front of the rack enclosure on each side using the pattern shown in the guide on the next page. Take note of which cage nuts will be for securing the rack slides and which will be used for securing the Array PD-ES.

Note: the configuration and quantity of cage nuts will be different for older versions of the Array PD-ES that have four attachment holes instead of eight.

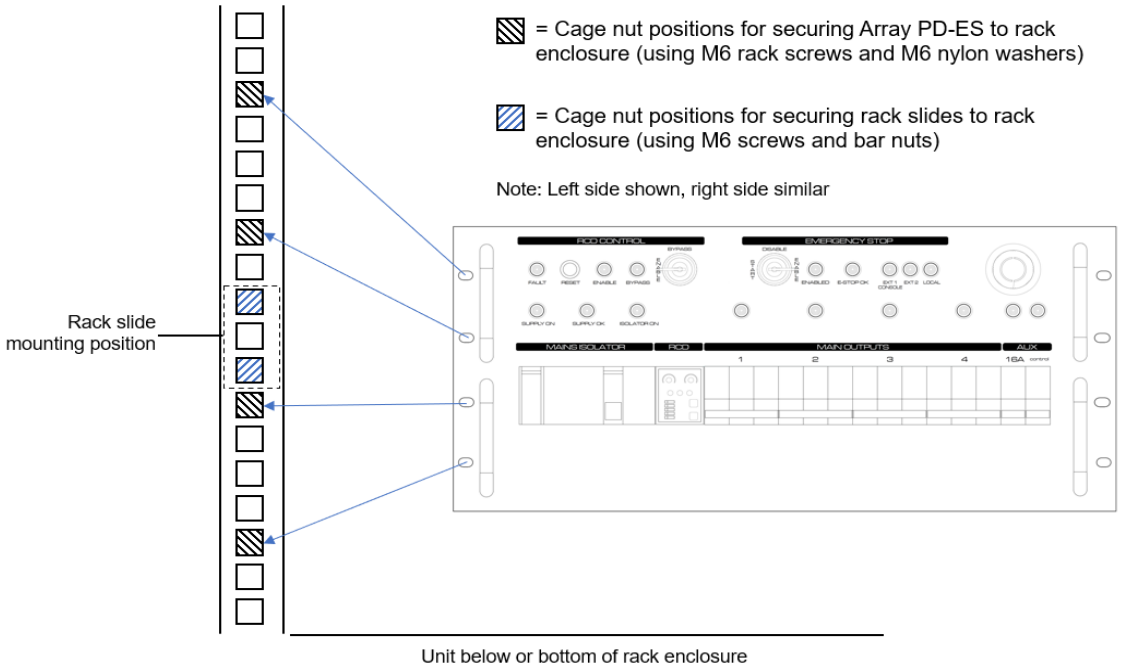


Figure 6. Rack installation - cage nuts

3. Install four M6 cage nuts into the square holes in the rear of the rack enclosure on each side. These will be used to secure the rack slides to the rear of the rack enclosure and must be adjacent to the equivalent cage nuts at the front.
4. If necessary, adjust the lengths of the rack slides so that they will fit properly in the rack enclosure - this can be done by loosening the nuts and sliding the end brackets. Once the rack slide is adjusted to the correct length, make sure to re-tighten the nuts.

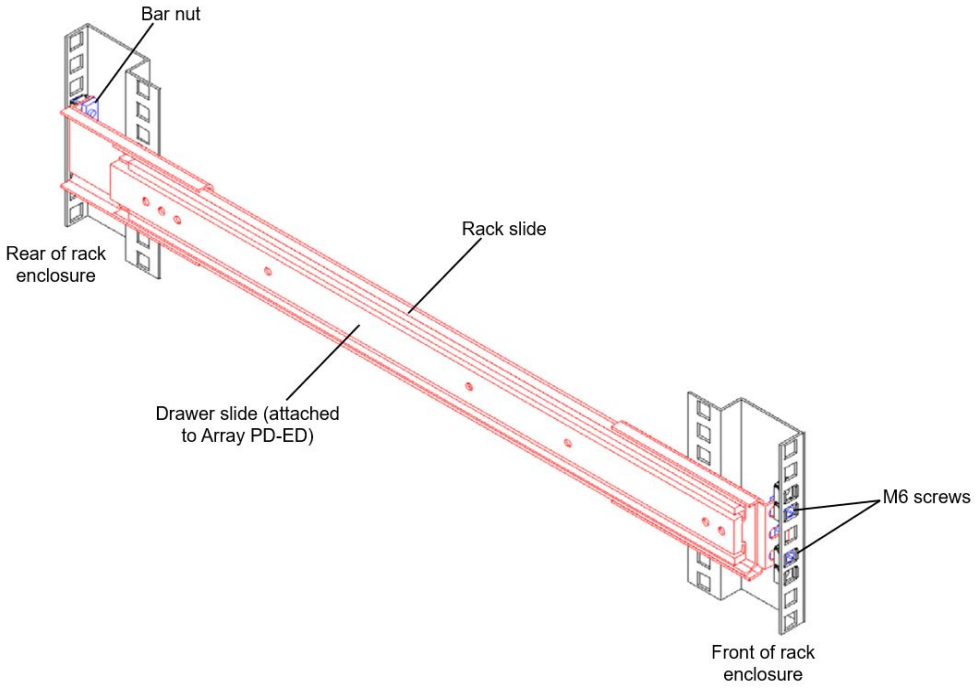


Figure 7. Rack installation - rack slide

5. Attach the two rack slides to the left and right side of the rack enclosure, making sure that the attachment holes align with the cage nuts. Loosely install M6 screws and bar nuts to hold the rack slides in position - this may require a second person.
6. With the ball bearing carriage on each rack slide pulled fully forwards, and using at least two people, carefully slide the Array PD-ES into the rack slides on each side of the rack enclosure. Make sure that the inner rail aligns with the nylon guides and the ball bearings slide in behind. Press the retaining clips inwards and push the Array PD-ES fully home into the rack enclosure.
7. Once installed into the rack enclosure, slide the Array PD-ES back out and hold it in firmly in position. Use a second person to fully tighten the M6 screws and bar nuts at the front and rear of the rack enclosure that were installed loosely in Step 5.
8. Slide the Array PD-ES back into the rack enclosure and secure the front of the unit to the rack enclosure using eight M6 rack screws and Nylon washers.

5.3 Array Mini PD-ES installation

The Array Mini PD-ES cannot be rack mounted but instead has six mounting points to enable it to be mounted in rigging or trusses using half couplers with M12 nuts and bolts securing them to the casing.

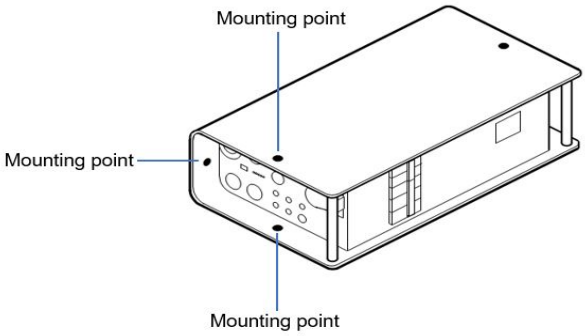


Figure 8. Array Mini PD-ES mounting points

5.3.1 Safety bond

A safety bond is supplied with a support already fitted to one of the carry handles. This is used to provide secondary support when the unit is truss mounted. The safety bond must be passed around the supporting truss and clipped to itself using a carabiner. In the unlikely event of a failure the truss mounting failing or becoming dislodged, the safety bond will restrain the Array Mini PD-ES.

6. Mains power input

This section applies to both the Array PD-ES and Array Mini PD-ES.

Always switch off all circuit breakers on the Array PD-ES before making or breaking connections.

Observe the following safety precautions when working with single-pole mains connections:

- **Always connect Earth/Ground first, followed by neutral, then L1, L2, L3. Disconnect in the reverse order.**
- **Isolate the incoming power supply before making or breaking single-pole connections.**
- **Make sure disconnected single-pole connectors are rendered safe by fitting insulating caps or by isolating and locking off the power supply at the source.**

6.1 Mains power input connection types

The Array PD-ES and Array Mini PD-ES require a three-phase power supply. Refer to the following tables for the correct socket colour and voltage.

Connection type	Earth/Ground	Neutral	Live L1	Live L2	Live L3
UK/Europe (230V / 400V)	Green	Blue	Brown	Black	Grey
UK (Old) (230V/ 400V)	Green	Black	Red	Yellow	Blue
Europe (Old) (230V / 400V)	Green	Blue	Brown	Black	Black
Australia (230V / 400V)	Green	Black	Red	White	Blue
USA (120V / 208V)	Green	White	Black	Red	Blue

6.2 Phase presence detection

The "Supply OK" LED will only illuminate if the incoming power supply contains all three phases and neutral and are connected in the correct order. If this LED is not illuminated, check the incoming power supply.

7. Making connections

Always switch off all Mains Circuit Breakers (MCBs) on the Array PD-ES before making or breaking connections.

7.1 Mains power output connections

The mains power output connections consist of four 32A CEE Form sockets as described by the IEC International Standard IEC 60309. CEE Form connectors are designed so that a plug of one type cannot be inserted into a socket of a different type. Different current ratings are distinguished by different diameters on the connector housing.

The Array PD-ES power outputs is available in in Red 400V or Blue 208V versions.

The Array Mini PD-ES power output is available in the Red 400V version only.

Always switch off all Mains Circuit Breakers (MCBs) on the Array PD-ES before making or breaking connections.

Different voltage and voltage and frequency combinations are distinguished by the location of the ground / earth pin in relation to the Major Keyway. The Major Keyway is a projection on the plug casing that aligns with a groove on the socket and is positioned at the 6 o'clock position. The ground / earth pin is thicker and longer than the other pins and is orientated differently in relation to the Major Keyway for different voltages so that connectors and sockets that are mismatched cannot be connected together.

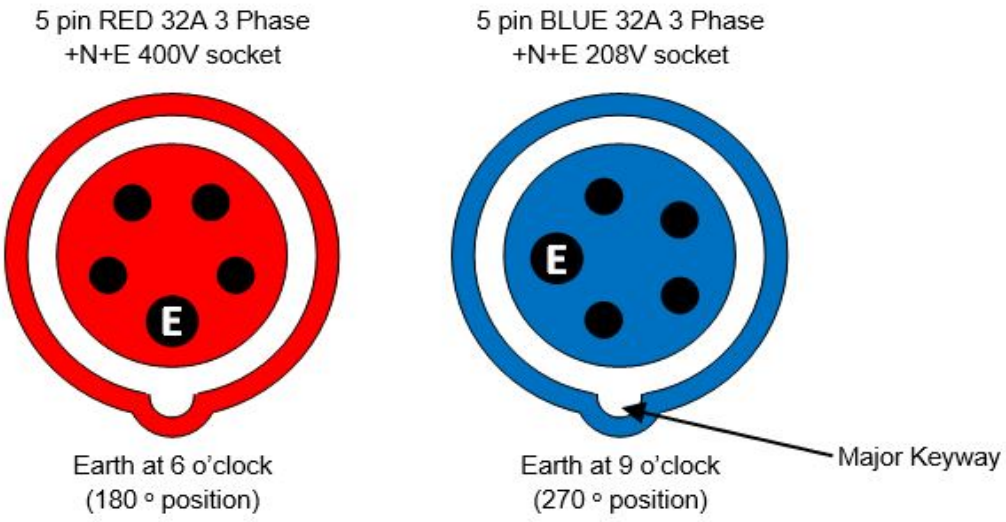


Figure 9. CEE Form connectors

7.2 Data, E-Stop and RS485 connections

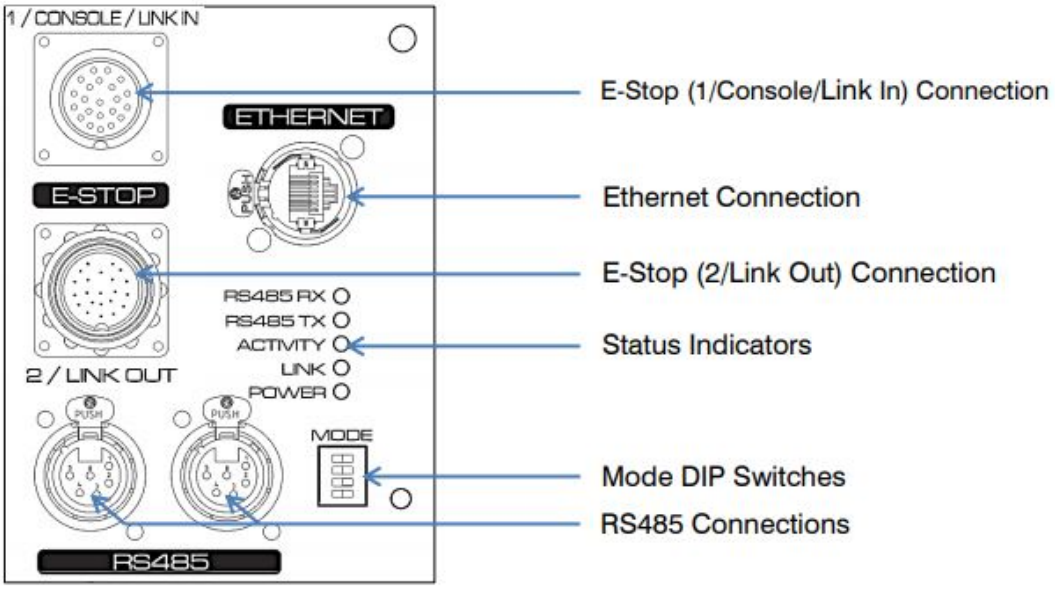


Figure 10. Array PD-ES data, Ethernet and E-Stop connections

7.2.1 Emergency Stop 1 / Console / Link In connection

This Socapex 22 pin input is for connecting remote emergency stop buttons, Dead Man's Handles, a Kinesys K2 Console, or to link a second Array PD-ES or Array Mini PD-ES unit. To install, push the connector into position, taking note of the notch at the bottom of the socket, and screw the locking ring tightly to lock the connector in place.

Figure 11. Socapex 22 connections

The equivalent connection on the Array Mini PD-ES is the "Aux 1 Console" connection on the front panel.

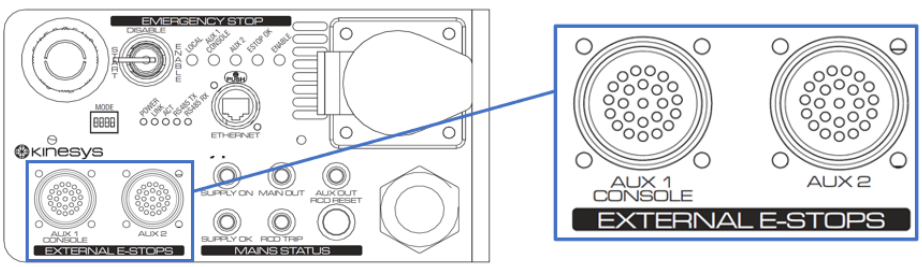


Figure 12. Array Mini PD-ES Aux connections

7.2.2 Ethernet connection

This input is used to connect the Array PD-ES to a computer running motion control software such as Vector and K2 using a "cross-over" type Ethernet cable. The Array PD-ES converts control information from the computer into RS485 information for use with Kinesys products such as the Elevation controller.

The equivalent connection on the Array Mini PD-EScan be found at the following location on the front panel.

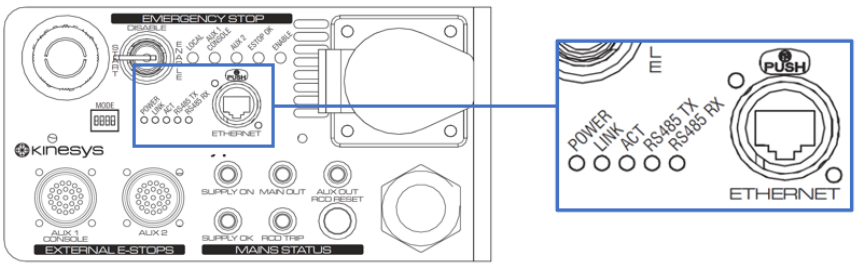


Figure 13. Array Mini PD-ES Ethernet connection

7.2.3 Emergency Stop 2 / Link Out

This male Socapex 22 pin output is used to link the Array PD-ES systems. Note that the achievable safety level is reduced when linking systems (refer to section 1.4).

An additional emergency stop button may also be connected to this output.

The equivalent connection on the Array Mini PD-ES is the "Aux 2" connection on the front panel.

7.2.4 Status indicators

RS485 RX - will flash to indicate data is being received from an RS485 connected device.

RS485 TX - will flash to indicate the Array PD-ES is transmitting RS485 data.

Activity - will flash to indicate Ethernet data is being received.

Link - will illuminate to confirm the Ethernet signal is present.

Power - will illuminate to indicate there is power present on the Ethernet interface module.

7.2.5 RS485 data connections

The Array PD-ES incorporates a Transform 485 interface with two XLR7 connections for connecting equipment such as the Elevation controller. To install, locate the notch at the top of the socket with the notch in the connector and push until a click is heard. To disconnect, press the PUSH tab above the socket and pull the connector free. Do not pull the connector using the cable as this can cause damage to the connector and the wire inside.

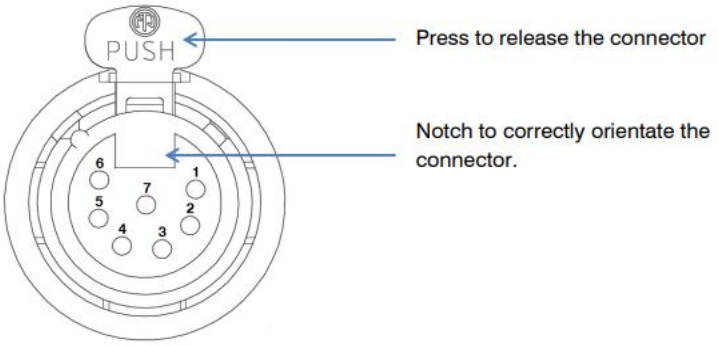


Figure 14. RS485 data connection

The two RS485 connections on the Array Mini PD-ES can be found on the rear panel.

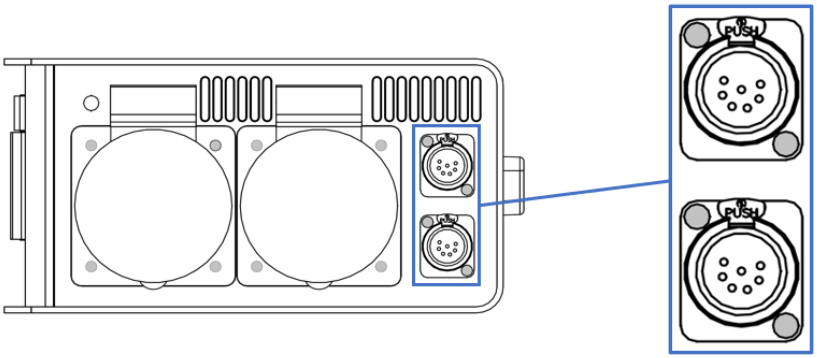
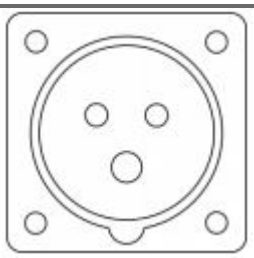
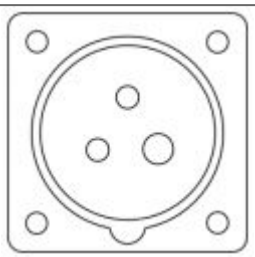


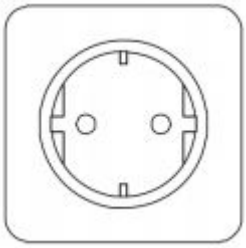
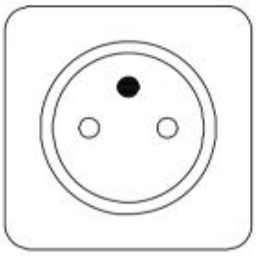
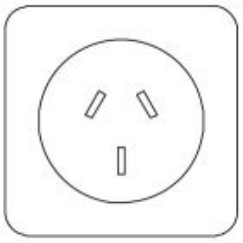
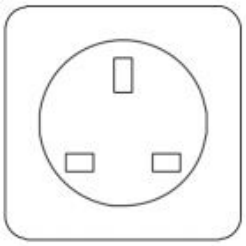
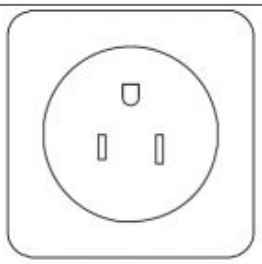
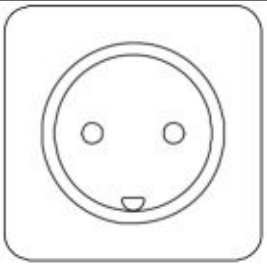
Figure 15. RS485 data connection

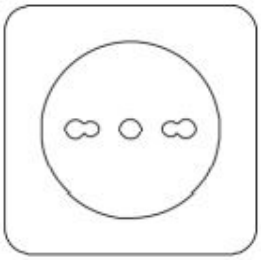
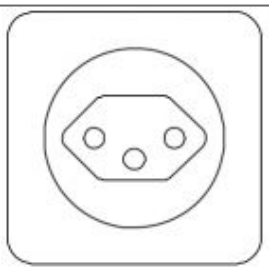
7.3 Auxiliary power connections

The Array PD-ES is available with two standard auxiliary connections. These can be supplied in any combination and are used to supply power to additional equipment that require mains voltage and will remain live after the emergency stop system has been activated.

The following table shows the auxiliary connections available. Note that some connections depend on whether the Array PD-ES is the 208V or 400V version. Please contact Kinesys or your supplier to confirm the correct combination of connections.

Connection type	Regions used	Drawing
CEE Form Blue 16A	Europe	
CEE Form Yellow 16A	USA	

Connection type	Regions used	Drawing
CEE 7/4 Schuko	Denmark, Finland, Germany, Greece, Netherlands, Norway, Portugal, Spain, Sweden	
CEE 7/4 French	France, Belgium, Czechia, Poland, Slovakia	
AS 3112 Australian 15A	Australia, China, New Zealand	
BS 1363 UK 13A	UK, Ireland, Hong Kong, UAE	
NEMA 5-15R Edison	USA, Canada, Mexico, Japan	
DK 107-2-D1*	Denmark	

Connection type	Regions used	Drawing
CEI 23-26/VII *	Italy, Chile	
SEV1011 Swiss *	Switzerland, Liechtenstein	

* = currently available on special order only - additional costs and extended lead times for roduction may apply.

Note that 16A CEE Form Yellow and NEMA 5-15 Edison are intended for use on equipment with 120V nominal supplies. All other types are intended for use on equipment with 230V nominal supplies.

The Array Mini PD-ES has one type of auxiliary power connection which is the blue 16A CEE Form socket as described by the International Electro technical Commission (IEC) International Standard IEC 60309. It is located on the top right of the front panel.

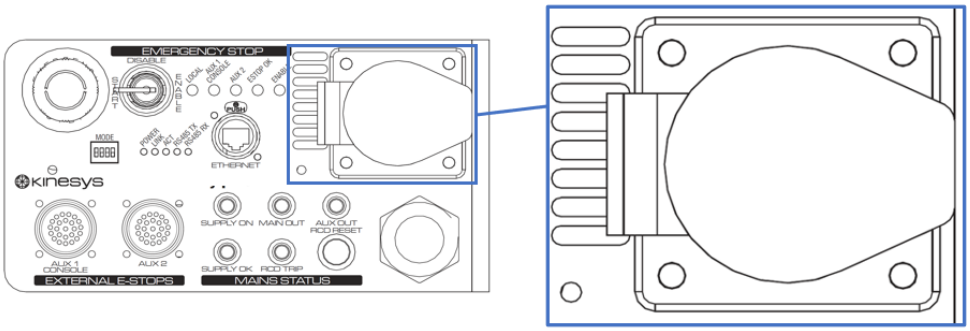


Figure 16. Array Mini PD-ESAuxiliary power connection

8. Setting the IP address

When using multiple Array PD-ES or Array Mini PD-ES units in the same system in conjunction with software such as Vector or K2 each unit must have a unique IP address. The IP address of the unit can be set using the DIP switch panel and the correct combination of On/Off configurations.

8.1 DIP switch locations

The DIP switch panel is located on the rear panel of the Array PD-ES and the front panel of the Array Mini PD-ES. On the Array PD-ES the DIP switch panel is turned 90 degrees so that the upper position is left and the lower position is right.

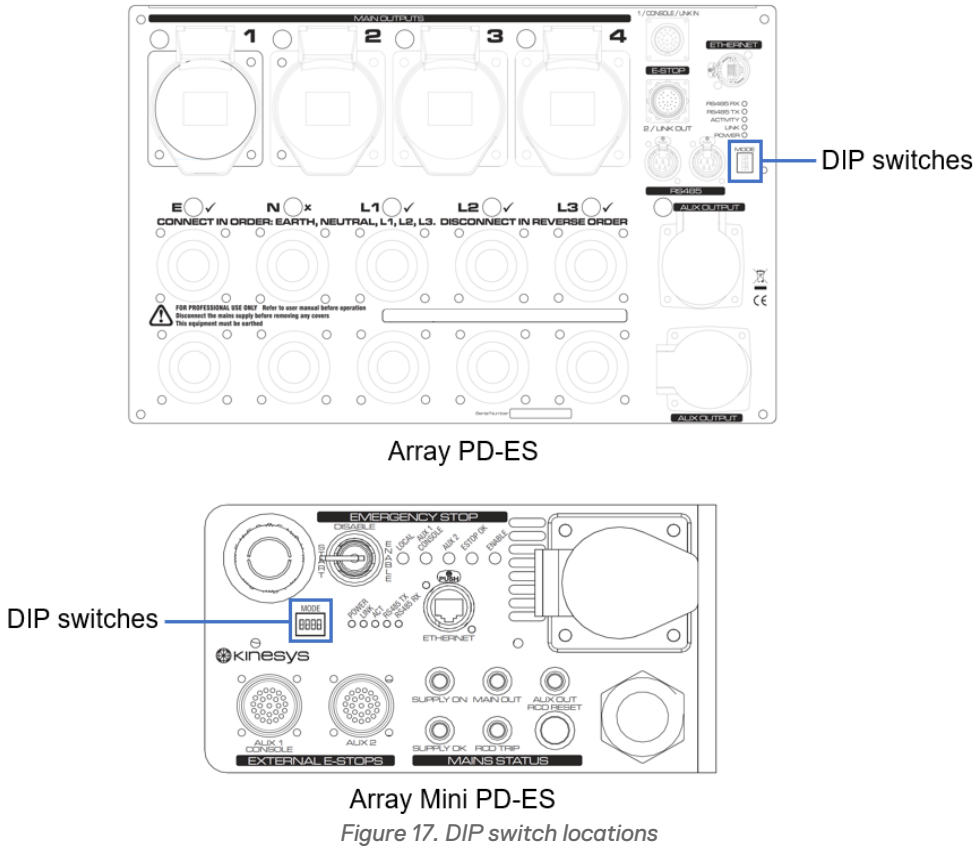


Figure 17. DIP switch locations

8.2 Setting the IP address

The switch is ON when in the left/upper position and OFF when in right/lower position. The example below shows switch 1 in the ON position and all other switches in the OFF position.

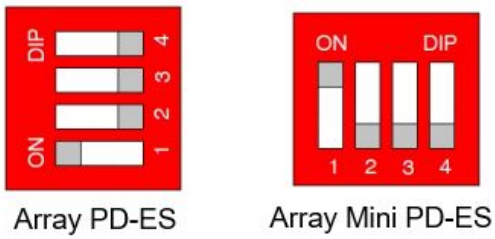


Figure 18. DIP switch settings

To set the IP address, use the following table:

IP address	DIP 1	DIP 2	DIP 3	DIP 4
192.168.18.51	OFF	OFF	OFF	OFF
192.168.18.52	OFF	OFF	ON	OFF
192.168.18.53	OFF	ON	OFF	OFF
192.168.18.54	OFF	ON	ON	OFF
192.168.18.55	ON	OFF	OFF	OFF
192.168.18.56	ON	OFF	ON	OFF
192.168.18.57	ON	ON	OFF	OFF
192.168.18.58	ON	ON	ON	OFF

9. Array PD-ES MCBs

There are several types of Miniature Circuit Breaker (MCB) on the Array PD-ES, all of which can be found on the front panel.

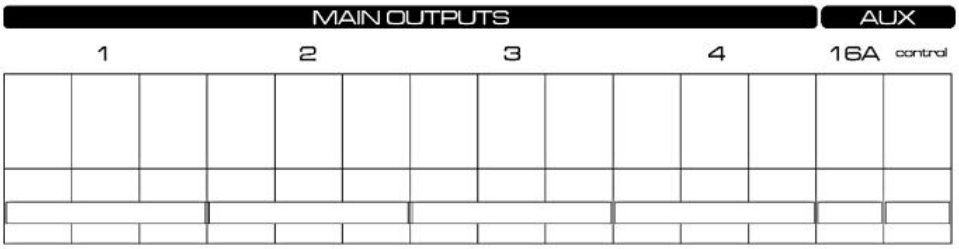


Figure 19. Front panel MCBs

9.1 Main output MCBs

Each of the four outputs of the Array PD-ES is protected by an individual 32A three-pole Miniature Circuit Breaker (MCB). When the MCB is in the ON position and the output is live, the indicator lights above each MCB and above each output socket on the rear panel will illuminate.

9.2 Auxiliary 16A MCB / RCBO

The auxiliary outputs on the 400V version of the Array PD-ES are protected by a Residual Current Breaker with Overload (RCBO), which is a circuit breaker that incorporates a Residual Current Device (RCD). The RCD must be tested regularly by pressing the test button located below the MCB handle.

If the RCD fails to trip when the test button is pressed, the unit must be replaced by contacting Kinesys or your supplier.

The auxiliary outputs on the 208V version are protected by a standard single-pole MCB.

9.3 Control MCB

The control circuits within the Array PD-ES are protected by a single-pole control MCB. This must be turned on for normal operation of the emergency stop system and Elevation data connections.

9.4 Turning MCBs on and off

To isolate the power to the four main MCBs or two Auxiliary MCBs move the lever of the MCB down so that the green "0-OFF" writing can be seen. To restore the power move the lever up so that the black "I-ON" writing can be seen.

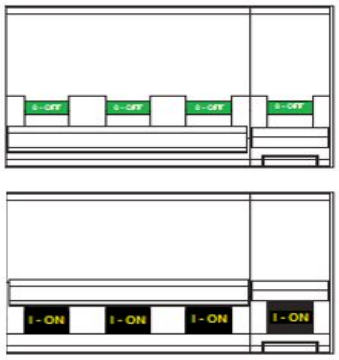


Figure 20. MCB On and Off positions

9.5 Mains isolator MCB

The Array PD-ES is fitted with an MCB to isolate the mains input, located on the left side of the front panel. The mains isolator MCB is "volt free" meaning it will trip when the incoming mains power supply is lost, even momentarily. It will remain off even if the power returns to the unit and must be manually switched on again. In the event of a trip condition such as power loss, RCD fault, or overcurrent, the mains isolator MCB will go into the tripped state which is indicated by the lever moving to the middle position.

If the mains isolator MCB has been tripped, continue as follows:

1. Switch the MCB off by moving the lever to the lower position as shown below.

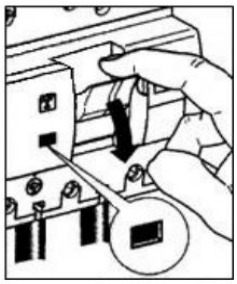


Figure 21. Mains isolator MCB in the OFF position

2. Once the mains isolator MCB is in the off position, it may only be switched on by moving the lever to the top position as shown below. When the MCB is on, the "Isolator ON" LED will turn on.

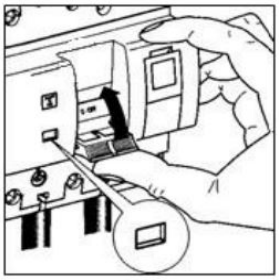


Figure 22. Mains isolator MCB in the ON position

3. If the MCB trips again immediately, check that the "Supply OK" LED is on and that the RCD has not tripped (the "Fault" LED should be off).

10. Array Mini PD-ES MCBs

The main outputs and auxiliary outputs of the Array Mini PD-ES are protected by three-pole Miniature Circuit Breakers (MCBs) and are located on the side panel of the unit.

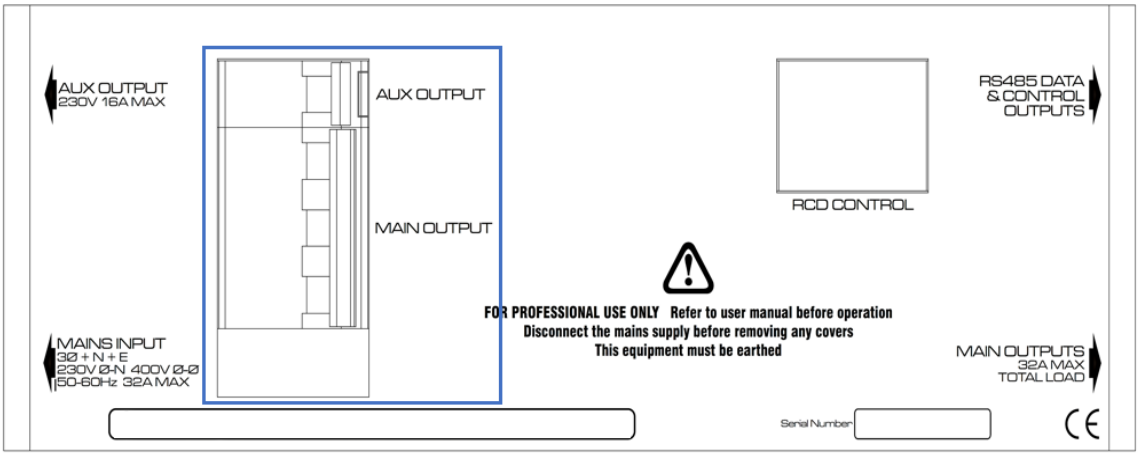


Figure 23. Array Mini PD-ES MCBs

10.1 Turning MCBs on and off

To isolate the power to the four main MCBs or two Auxiliary MCBs move the lever of the MCB down so that the green "0-OFF" writing can be seen. To restore the power move the lever up so that the black "I-ON" writing can be seen.

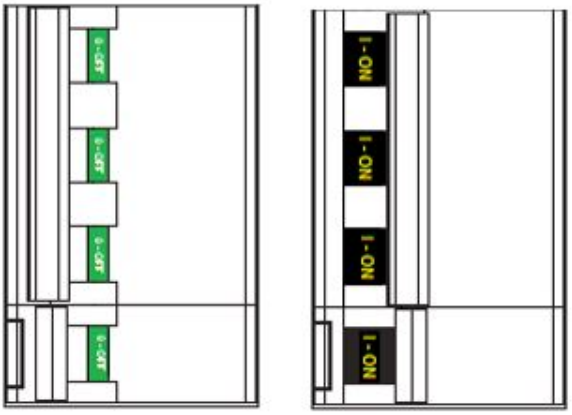


Figure 24. MCB On and Off positions

11. RCD overview

The outputs of the Array PD-ES and Array Mini PD-ES are protected by a microprocessor-controlled RCD (Residual Current Device) which trips the mains isolator MCB in the event of excessive earth leakage current. The RCD operating parameters are set directly on the RCD module adjacent to the mains isolator MCB.

The RCD is different depending on the date of manufacture of the Array PD-ES. The process of adjusting settings is therefore different for each RCD type.

Date of Manufacture	RCD type	Settings adjustment
08/2024 and earlier	Dossena 9DER3/0D	Section 11.2
08/2024 and later	Bender RCMA423	Section 11.3

11.1 RCD controls

The Array PD-ES features indicators on the front panel to show the status of the RCD and a key switch to reset and bypass the RCD system.

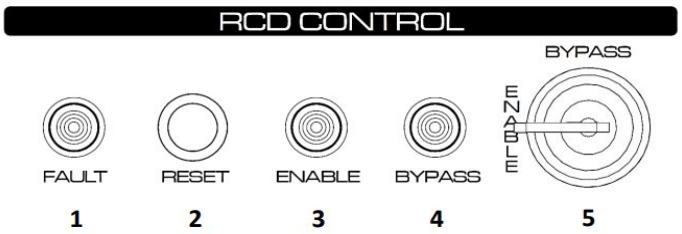


Figure 25. RCD front panel controls

1	RCD Fault LED	Illuminates red when the RCD has been tripped.
2	RCD Reset button	If the RCD has been tripped press this button to reset the system.
3	RCD Enable LED	Illuminates when the RCD key switch is in the ENABLE position.
4	RCD Bypass LED	Illuminates when the RCD key switch is in the BYPASS position.
5	RCD key switch	Used for enabling or bypassing the RCD.

11.1.1 RCD bypass

A bypass option is available for the RCD by setting the key switch to the BYPASS position on the front panel.

The bypass setting should only be operated by a qualified person who is directly responsible for resolving an issue that involves bypassing the RCD. The RCD must be returned to the ENABLE setting as soon as the issue has been resolved.

11.2 RCD Settings - Dossena 9DER3/0D type

11.2.1 Feature overview

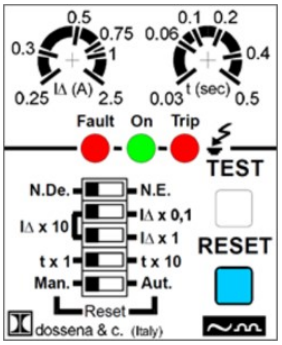


Figure 26. RCD main features

TEST	Test button to verify the operation of the earth differential relay
RESET	Manual reset button
IΔ (A)	Trip current adjustment potentiometer
t (sec)	Trip adjustment potentiometer
Fault	Fault / over temperature LED
On	Power supply LED
Trip	Trip indicator LED

11.2.2 DIP switch overview

N.De.	Normally non-excited
N.E.	Normally excited
IΔ x 10 / IΔ x 0,1 / IΔ x 1	Multiplier factors to define trip current in conjunction with IΔ (A) potentiometer
t x 1 / t x 10	Multiplier factors to define time of non-intervention in conjunction with trip t (sec) potentiometer
Man. / Aut.	Switches the Reset state to either Manual or Auto

11.2.3 Default RCD Settings

The Array PD-ES and Array Mini PD-ES are supplied with RCDs set to the correct settings for use with Kinesys equipment and under normal circumstances should not need changing. The default settings are shown in Figure 27.

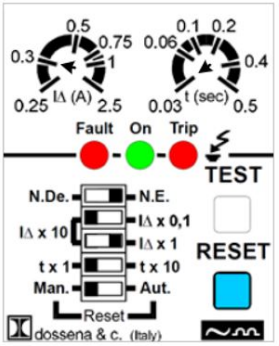


Figure 27. Default RCD settings

DIP switches	As shown
IΔ (A)	0.3
t (sec)	0.03

11.2.4 Adjusting the RCD Settings

Adjusting the RCD settings away from the factory defaults poses an electric shock risk and must only be done by qualified personnel.

During the life of the product is may become necessary to adjust the RCD settings away from the default.

Adjusting the trip current

Set the trip current using the left potentiometer labelled IΔ (A). Use the applicable DIP switch combination as shown below to multiply the current, measured in A, by either 0.1, 1 or 10.

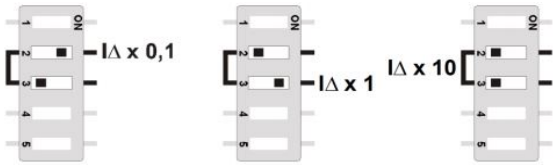


Figure 28. Adjusting the trip current

For example, if the potentiometer is set to 2.5A the three DIP switch settings from left to right would be 0.1 x 2.5A = 0.25A; 1 x 2.5A = 2.5A; and 10 x 2.5A = 25A.

Adjusting the trip time

Set the trip time using the right potentiometer labelled t (sec). Then in a similar way to the trip current, use the correct DIP switch combination as shown below to multiply the time by either 1 or 10.

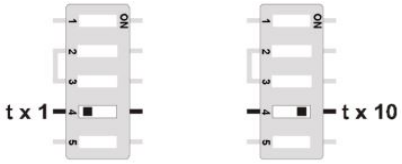


Figure 29. Adjusting the trip time

For example, if the potentiometer is set to 0.5 s the two DIP switch settings from left to right would be 1 x 0.5s = 0.5s and 10 x 0.5s = 5s.

For most applications a setting of 30 ms (0.03 s) is recommended. This is achieved by turning the potentiometer fully to the left and selecting the t x 1 DIP switch.

11.3 RCD Settings - Bender RCMA423 type

11.3.1 Feature overview

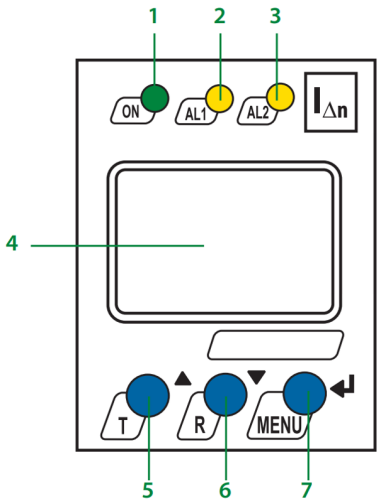


Figure 30. RCD main features

1	LED "ON" (green)	Illuminates when power is applied to the device. Flashes when the CT connection alarm is active.
2	LED *AL1" (yellow)	Illuminates when the prealarm is activated. Flashes when the CT connection alarm is active.
3	LED "AL2" (yellow)	Illuminates when the main alarm is activated. Flashes when the CT connection alarm is active.
4	Backlit LCD Display	
5	TEST / UP button	Illuminates when the main alarm is activated. Flashes when the CT connection alarm is active.
6	RESET / DOWN button	Resets device / scrolls down inside main menu.
7	MENU / ENTER button	Activates main menu / Confirms (momentary push) or goes back a step (held > 1.5 s) inside main menu.

11.3.2 Default RCD Settings

The Array PD-ES and Array Mini PD-ES are supplied with RCDs set to the correct settings for use with Kinesys equipment and under normal circumstances should not need changing. The default settings are shown below.

Main Alarm trip value	300 mA
Prealarm trip value	Not used
Time delay (t_{on2})	0.3 s
Latching memory behaviour	ON
Contact operation	N/C

11.3.3 Menu flow chart for RCD settings

	DOWN ARROW button	< 1.5 s	Momuntary button push
	UP ARROW button	> 1.5 s	Hold button for at least 1.5 s, then release
	MENU / ENTER button		

11.3.4 Adjusting the RCD settings

Adjusting the RCD settings away from the factory defaults poses an electric shock risk and must only be done by qualified personnel.

Adjusting the main alarm trip current

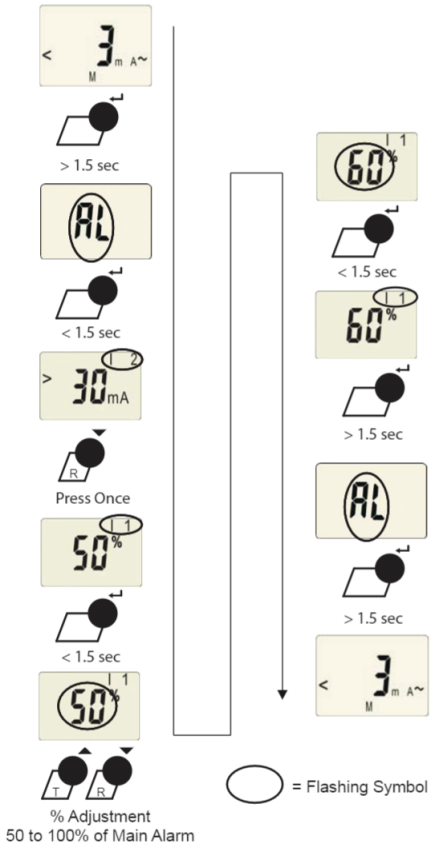


Figure 31. Setting the main alarm trip current

Adjusting the prealarm trip current

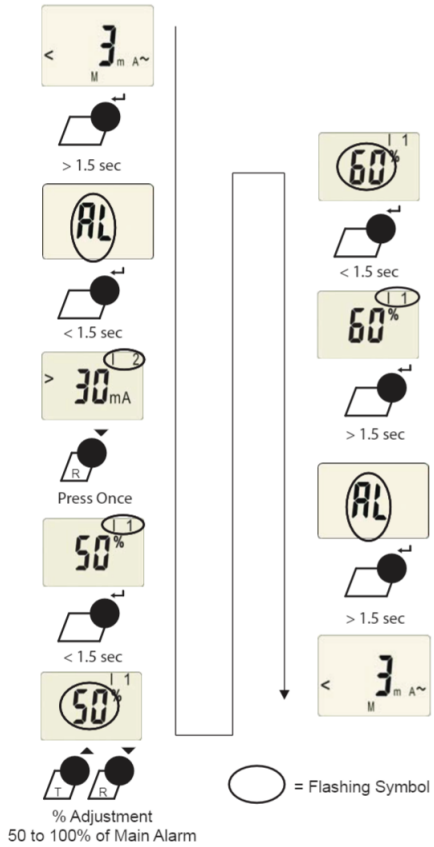


Figure 32. Adjusting the prealarm trip current

Adjusting the time delay

Four separate time delays are available:

- t_{on1} - Response delay, prewarning
- t_{on2} - Response delay, main alarm
- t - Startup display
- t_{off} - Delay on release

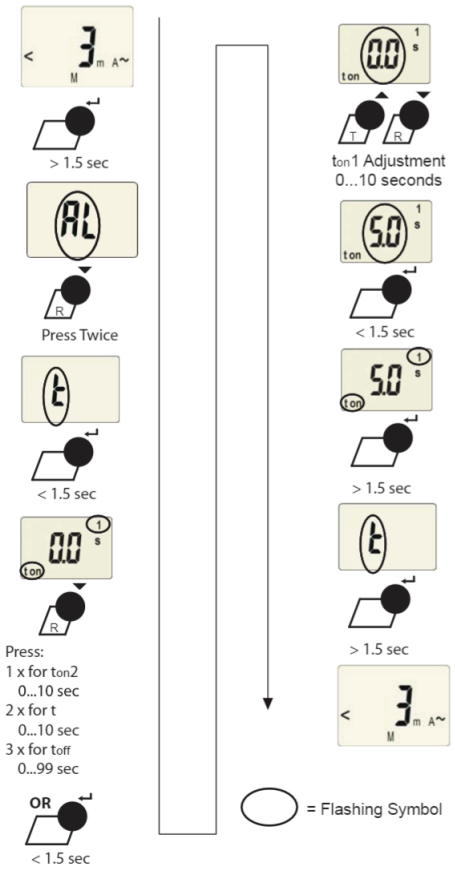


Figure 33. Adjusting the time delay

Adjusting the latching behaviour

Changing this setting to “ON” will cause the RCMA423 to latch in the event of an alarm, and require a manual reset if the alarm clears. Changing this setting to “OFF” will cause the RCMA423 to automatically reset if the alarm clears. Changing this setting to “CON” will activate latching mode; additionally, in this mode, if power is lost to the RCMA423, it will remain in alarm when power is restored.

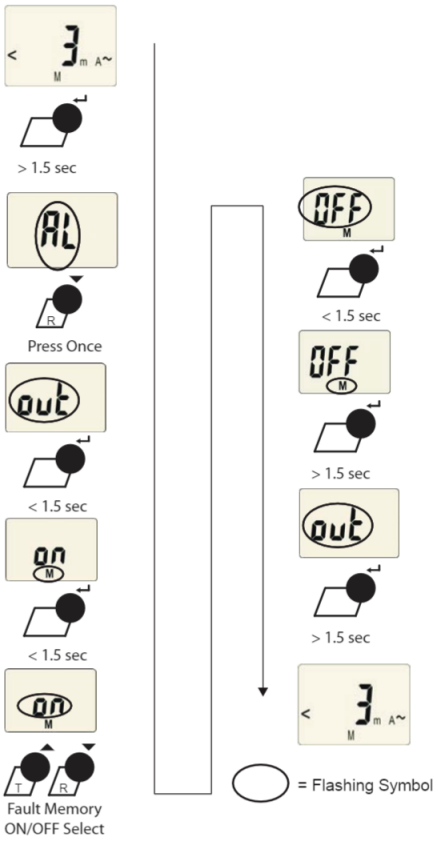


Figure 34. Adjusting the latching behaviour

Adjusting the contact operation

Use this option to change the behavior of the contacts between normally deenergized (non-failsafe) mode and normally energized (failsafe) mode. The two SPDT contacts may be changed individually. Note that the RCMA423 labels normally deenergized operation as “N/O” and normally energized operation as “N/C”; utilzing a normally open or normally closed contact only depends on which contact output is wired.

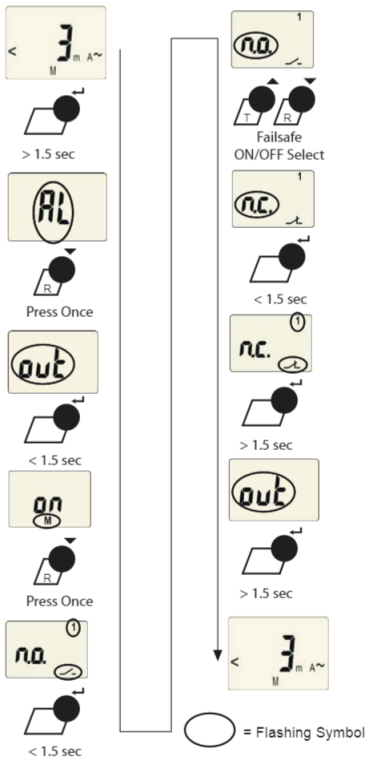


Figure 35. Adjusting the contact operation

12. Emergency stop system

The Array PD-ES and Array Mini PD-ES feature a local emergency stop button on the front panel of the unit. This emergency stop button will activate the emergency stop system in the same way as any external emergency stop buttons connected to the unit. The emergency stop system does not affect the power supplied from the auxiliary power connections.

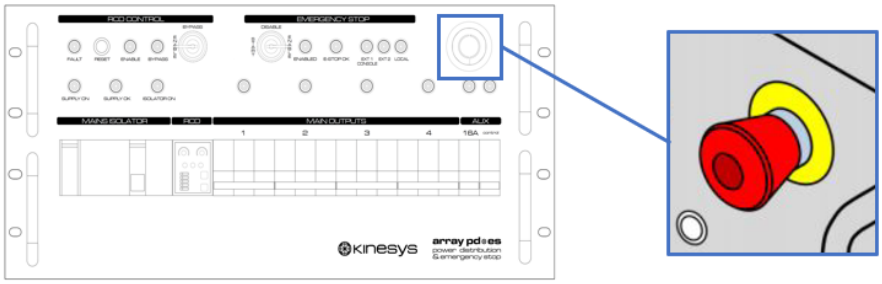


Figure 36. Local emergency stop button - Array PD-ES

12.1 Testing the emergency stop system:

1. Press the emergency stop button on the front panel to activate the emergency stop system.
2. Make sure the green "E-STOP OK" LED turns off.
3. Twist the emergency stop button clockwise to release it.
4. Turn the key to the reset position to reset the emergency stop circuit (unless a connected accessory has been wired to automatically reset the emergency stop system).
5. Make sure the "E-STOP OK" LED turns back on, indicating that the system is working correctly.

If the emergency stop system test fails do not use the Array PD-ES. Contact your supplier or Kinesys for support.

Do not attempt to bypass the emergency stop system.

12.2 Emergency stop shorting plugs

The Array PD-ES and Array Mini PD-ES are supplied with two shorting plugs must be used whenever an emergency stop button is not connected to the 22-pin Socapex connectors.

Shorting plugs can be used in any combination to complete the chain in systems of multiple Array PD-ES or Array Mini PD-ES units.

Warning! Always store unused shorting plugs securely to prevent misuse. The system configuration should be designed following a risk assessment and should only be implemented and modified by authorized persons.

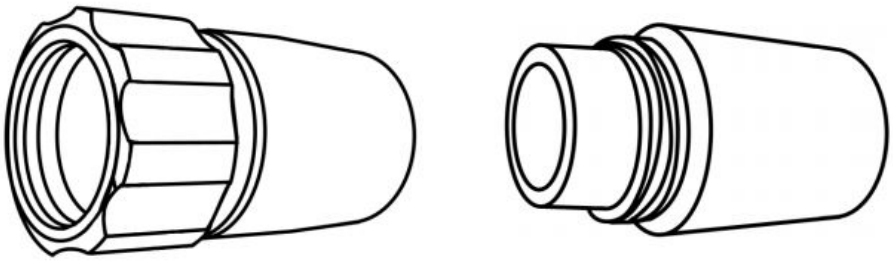


Figure 37. Shorting plugs

12.3 Alternative emergency stop connectors

Some early models of the Array PD-ES were manufactured with a 9-pin emergency stop connector. In order to be able to use a standard 22-pin connector, the following adapter cables may be used:

- STP-00-0130, 22 Pin Socapex Female to 9 Pin Female Adapter Cable
- STP-00-0140, 22 Pin Socapex Male to 9 Pin Female Adapter Cable

These are available separately. Contact your supplier or Kinesys for details.

13. Linking Array PD-ES units

It is possible to link multiple Array PD-ES units to combine emergency stop functionality across a large system.

Note that linking Array PD-ES units reduces the safety level of the system - see section 1.4 for details.

To link an Array PD-ES to another use a 22-pin Socapex Male to Female cable to link the emergency stop connections. If a computer is being used for control both Array PD-ES units must be connected to an Ethernet switch such as the Kinesys Array IP8. The end of the emergency stop chain must have one of the supplied shorting plugs or a second remote emergency stop switch installed.

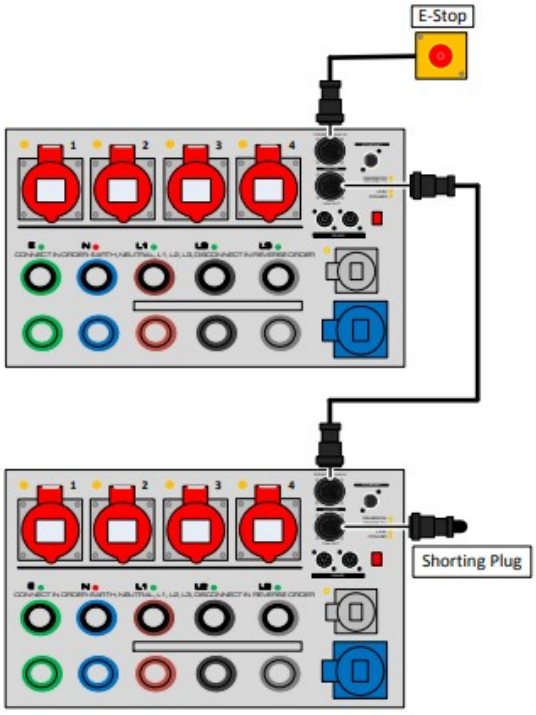


Figure 38. Linking Array PD-ES units

13.1 Linking Array PD-ES to an Array Mini PD-ES

It is also possible to connect an Array PD-ES to an Array Mini PD-ES using a 22-pin Socapex Male to Female cable.

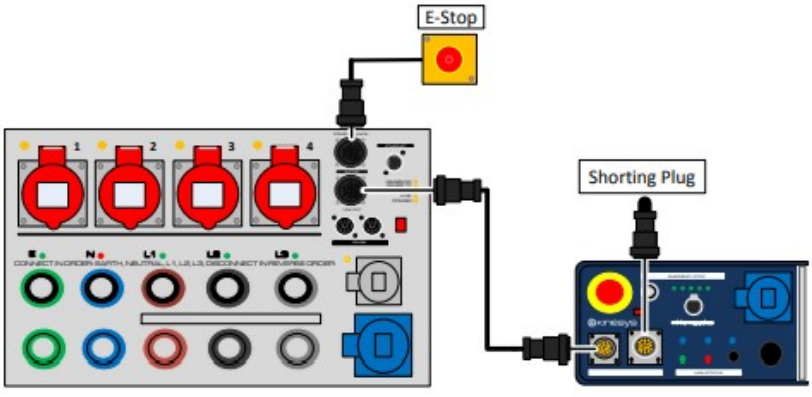


Figure 39. Linking an Array PD-ES to an Array Mini PD-ES

14. Using Mentor as an E-Stop controller

The emergency stop system on the Array PD-ES can be used in applications up to PLd (EN ISO 13849) or SIL2 (EN IEC 62061). In order to achieve PLe / SIL3 a Kinesys Mentor safety controller is required.

Kinesys Mentor safety controllers are available in different sizes with various connections in order to combine the emergency stop facilities of different Kinesys products. The products specific to your application will determine which Mentor should be used. Contact Kinesys or your supplier for more guidance.

The following illustration shows how the Mentor can be used as a hub for the emergency stop facilities of various Kinesys products.

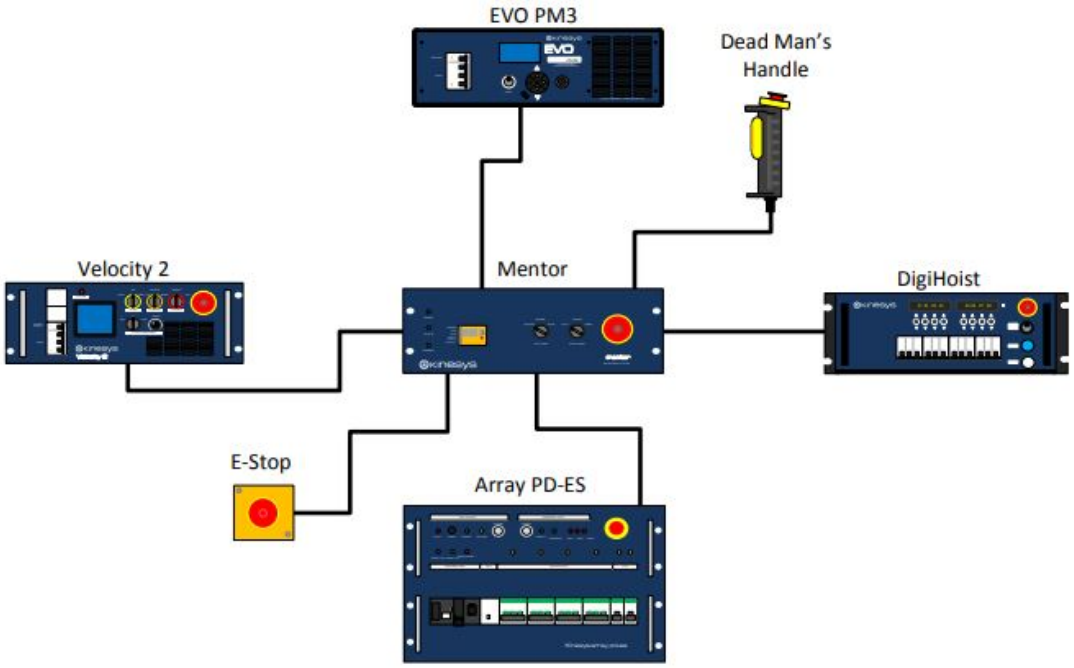


Figure 40. Using Mentor as an E-Stop controller

15. Maintenance and repair

The Array PD-ES and Array Mini PD-ES units are designed for long service in a demanding professional environment. In normal use no user maintenance should be required beyond periodic functional and safety testing and cleaning.

In the event of damage or premature failure please contact Kinesys or your supplier to arrange for service support or repair.

15.1 Cleaning and inspection

Always Turn off the power to the unit before cleaning and inspection.

The enclosure must be kept clean and dust free by periodically wiping down with a dry lint free cloth. A small clean dry paintbrush may be used to remove dirt from grilles and around controls.

Light dirt or finger marks may be removed using a slightly dampened cloth if necessary.

To avoid damaging the surface finishes of the unit do not use harsh chemicals or abrasive materials when cleaning.

Check the integrity of all connectors and controls. If damage is noted then contact Kinesys or your supplier to arrange repair.

15.2 Service and end of life

In the event of a product being considered beyond economic repair it should be disposed of with care and in line with local legislation on disposal of Waste Electrical and Electronic Equipment (WEEE).

In Europe WEEE shall be disposed of in accordance with European Union Directive 2012/19/EU.

In most regions of the world, similar legislation exists to ensure that WEEE is handled separately to maximise reuse of materials and avoidance of landfill.

16. Product specifications

16.1 Array PD-ES specifications

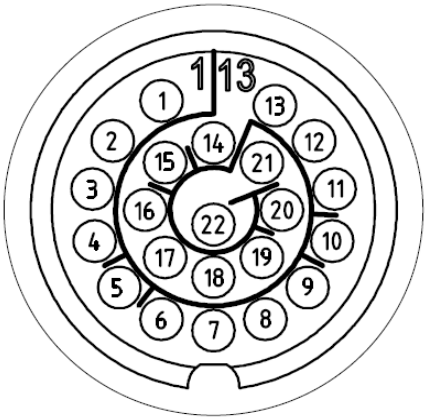
Feature	Specification
Ingress Protection (IP) rating	IP40 (protected from tools and small wires greater than 1 mm (not protected from water).
Operating temperature	5°C - 40°C (41°F -104°F)
Mains In	3 Phase + Neutral + Earth 50-60 Hz, via Powerlock or CamLok E1016 single-pole connectors with through outlets
Power output	4 x 32A CEE Form type IEC60309 5-pole individually switched connectors with a maximum output of 125A collectively.
Auxiliary power output options	• 16A CEE Form Blue • 16A CEE Form Yellow • CEE 7/4 Schuko • CEE 7/5 French • AS 3112 Australian 15A • BS 1363 UK 13A • NEMA 5-15R Edison
Data connections	• 1 x EtherCON Ethernet • 2 x RS485 • 1 x Male 22 Pin Socapex E-Stop • 1 x Female 22 Pin Socapex E-Stop
E-Stop safety system	• EN ISO 13849- 1: Safety of machinery - Safety-related parts of control systems. Part 1: General principles of design. Emergency stop circuit complies with PLd. • EN IEC 62061: Safety of machinery - Functional safety of safety- related electrical, electronic and programmable control systems. Emergency stop circuit complies with SIL2.
Dimensions	• 6U 19" rack mountable • 500 mm x 225 mm x 445 mm (L x H x W). These measurements do not include connections at the back of the unit or buttons, keys and switches on the front of the unit.
Weight	32.5 kg (77.6 lbs)

16.2 Array Mini PD-ES specifications

Feature	Specification
Ingress Protection (IP) rating	IP40 (protected from tools and small wires greater than 1 mm (not protected from water).
Operating temperature	5°C - 40°C (41°F -104°F)
Mains In	3 Phase + Neutral + Earth 50-60 Hz, via CEE Form type IEC60309 5-pole individually switched connector
Power output	2 x 32A CEE Form type ICE60309 5-pole individually switched connectors with a maximum output of 32A
Auxiliary power output options	• 1 x 16A CEE Form Blue
Data connections	• 1 x EtherCON Ethernet • 2 x RS485 • 1 x Male 22 Pin Socapex E-Stop • 1 x Female 22 Pin Socapex E-Stop
E-Stop safety system	• EN ISO 13849- 1: Safety of machinery - Safety-related parts of control systems. Part 1: General principles of design. Emergency stop circuit complies with PLd. • EN IEC 62061: Safety of machinery - Functional safety of safety- related electrical, electronic and programmable control systems. Emergency stop circuit complies with SIL2.
Dimensions	424 mm x 126 mm x 241 mm (L x H x W). These measurements do not include connections at the back of the unit or buttons, keys and switches on the front of the unit.
Weight	9.1 kg (20 lbs)

17. Connector pinouts

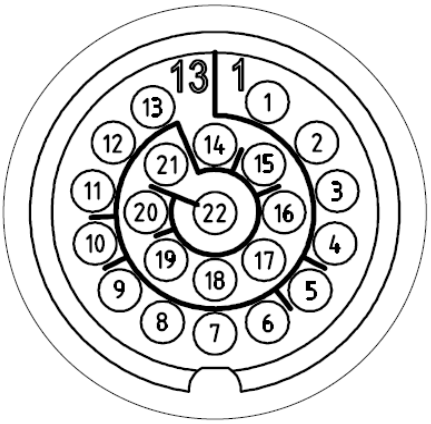
17.1 E-Stop 1 / Console /Link in Socapex SL222F (Female)



Connector	Socapex 222 type panel female with locking threads - Amphenol SLEF222P / Ceep 9202222P00S020
Mating connector	Socapex 222 type line male with locking ring - Amphenol SLFMD222P / Ceep 9206222P00SB20

Pin	Description	Notes
1	E-Stop in Circuit 1	E-Stop switch normally closed - contact 1
2	E-Stop in Circuit 1	
3	E-Stop in Circuit 2	E-Stop switch normally closed - contact 2
4	E-Stop in Circuit 2	
5	24 V	E-Stop switch normally closed - trace contact
6	E-Stop Trace In	
7	Start In	Connect to 24 V to reset E-Stop system; link to 24 V for automatic start
8	Power Control In	Connect to 24 V to turn on line contactors
9	Enable Control In	Connect to 24 V to enable drives
10	Drives On Signal	Line contactors signal output 24 V
11	Enable On Signal	Drive enable signal output 24 V
12	Feedback Contact	Linked systems only
13	Feedback Contact	
14	E-Stop OK Signal	E-Stop OK signal output 24 V
15	24 V	24 V supply
16	0 V	0 V supply
17	E-Stop Out Circuit 1	E-stop output contact 1 - linked systems only
18	E-Stop Out Circuit 1	
19	E-Stop Out Circuit 2	E-stop output contact 2 - linked systems only
20	E-Stop Out Circuit 2	
21	HTR Signal	Not used
22	0 V	0 V supply

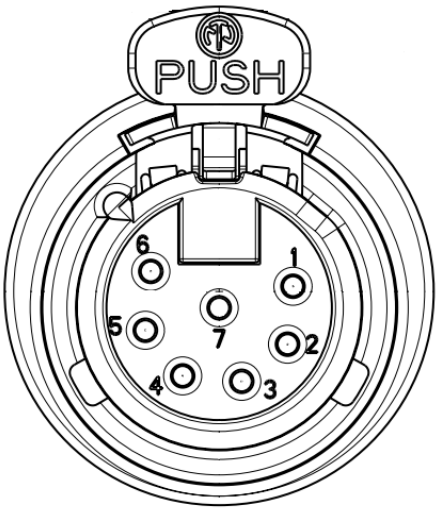
17.2 E-Stop 2 / Link out Socapex SL222M (Male)



Connector	Socapex 222 type panel male with locking ring - Amphenol SLFMD222P / Ceep 9206222P00SB20
Mating connector	Socapex 222 type line female with locking threads - Amphenol SLEF222P / Ceep 9202222P00S020

Pin	Description	Notes
1	E-Stop UpLink Circuit 1	Linked to 2
2	E-Stop UpLink Circuit 1	Linked to 1
3	E-Stop UpLink Circuit 2	Linked to 4
4	E-Stop UpLink Circuit 2	Linked to 3
5	No connection	
6	E-Stop OK Signal	E-Stop OK signal output 24 V
7	24 V	24 V supply
8	Drives On Signal	Line contactors signal output 24 V
9	Enable Control Out	Enable control loop - linked systems only
10	No connection	
11	Enable Control Return	Enable control loop - linked systems only
12	Feedback Input	Feedback contact - linked systems only
13	Feedback Input	
14	E-Stop Trace In	Connect to 24 V via NC contact in E-Stop switch
15	No connection	
16	0 V	0 V supply
17	E-Stop in Circuit 1	E-Stop switch normally closed - contact 1
18	E-Stop in Circuit 1	
19	E-Stop in Circuit 2	E-Stop switch normally closed - contact 2
20	E-Stop in Circuit 2	
21	HTR Signal	Not used
22	0 V	0 V supply

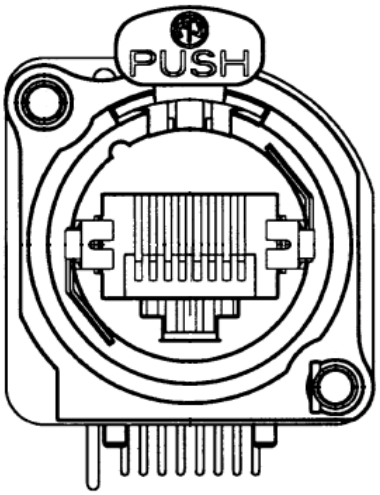
17.3 Elevation data output



Connector	XLR7 female - Neutrik NC7FD-LX
Mating connector	XLR7 male - Neutrik NC7MXX

Pin	Description	Notes
1	Data Ground	Data common / cable shield
2	Data -	RS485 data
3	Data +	RS485 data
4	24 V	24 V supply from Elevation (not used b Array PD-ES)
5	0 V	0 V reference
6	E-Stop	12 V E-Stop signal (Elevation line contactor)
7	Enable	24 V enable signal (Elevation drive enable)

17.4 Ethernet connector

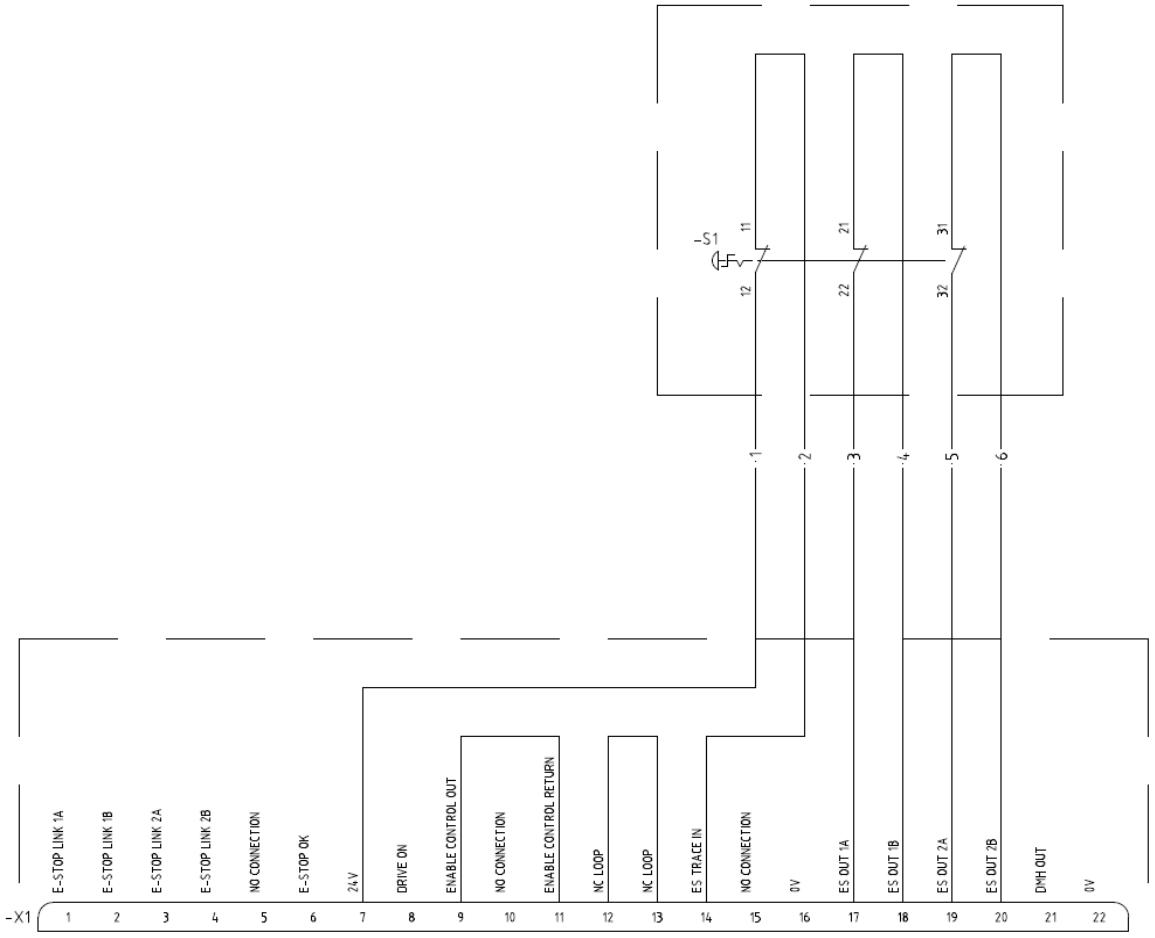


Connector	Ethercon female - Neutrik NE8FBH
Mating connector	Ethercon male (recommended) or RJ45 - Neutrik N8mC-1

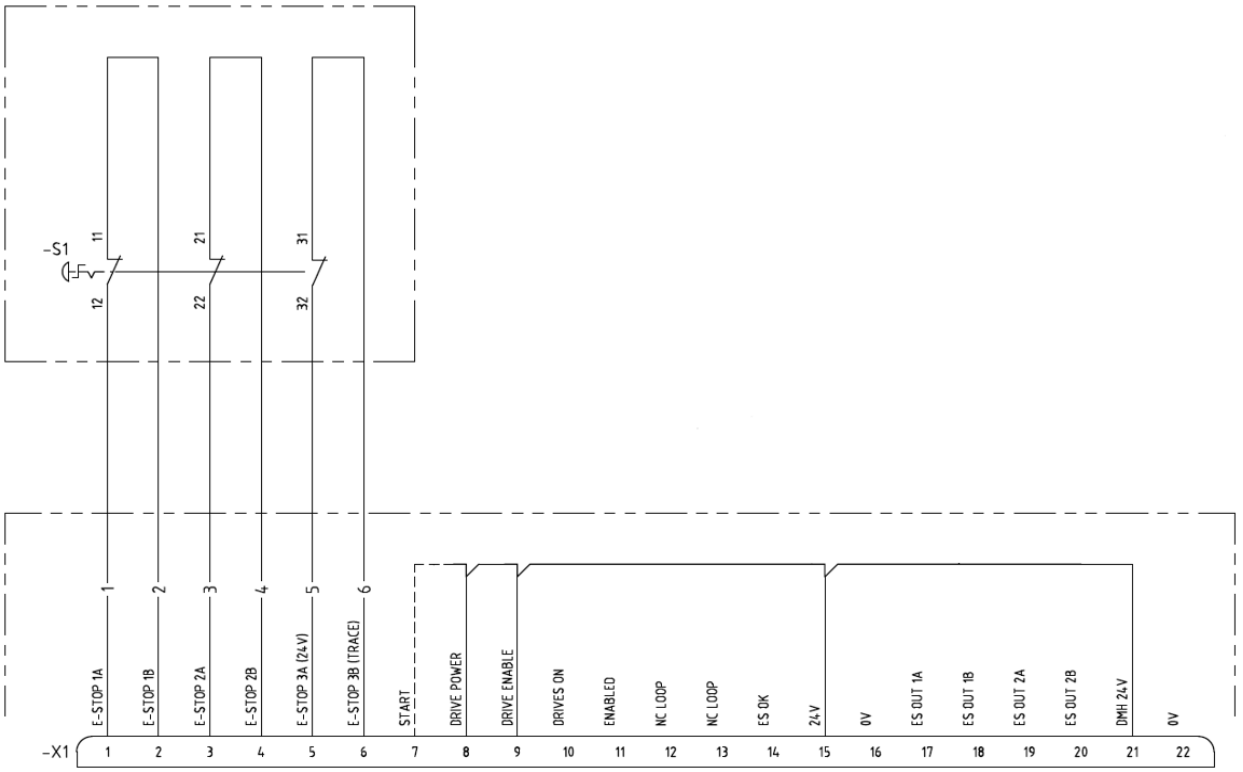
Pin	Description	Notes
1	Ethernet TX+	10-base T
2	Ethernet TX-	Use crossover cable for direct connection to devices without auto MDI
3	Ethernet RX+	
4	No connection	
5	No connection	
6	Ethernet RX-	
7	No connection	
8	No connection	
S	Shield	

18. Device schematics

18.1 E-Stop 1 / Console /Link in Socapex SL222F (Female)

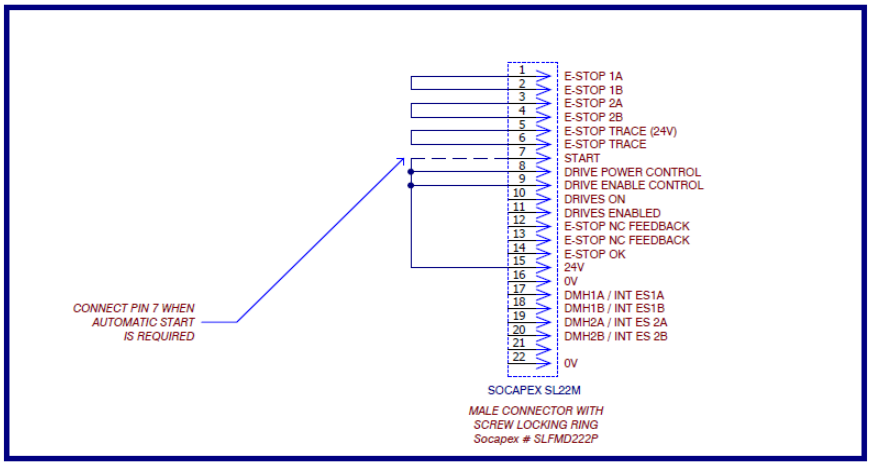


18.2 E-Stop 2 / Link out Socapex SL222M (Male)

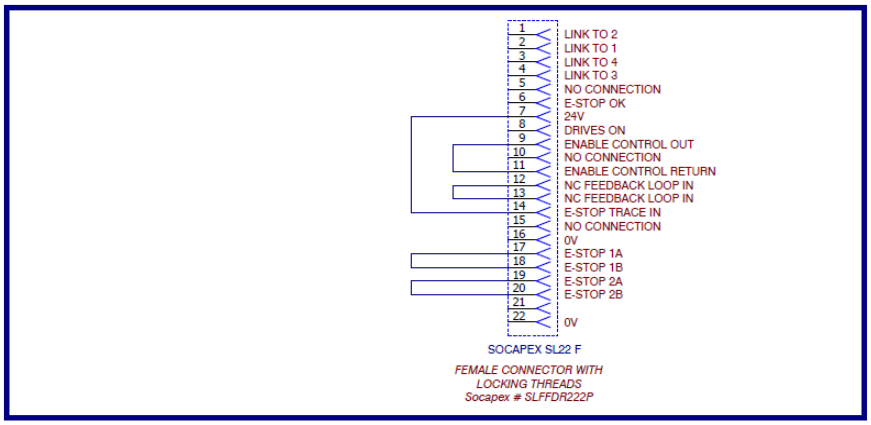


18.3 Shorting plug

E-STOP 1 / CONSOLE INPUT VERSION (MALE SOCAPEX)



E-STOP 2 / LINK INPUT VERSION (FEMALE SOCAPEX)



19. Declaration of Conformity

ORIGINAL

EC Declaration of Conformity

Manufacturer:	Kinesys Projects Limited
of the address:	Unit 2 Kempton Gate, Oldfield Road, Hampton, Middlesex, TW12 2AF, UK
in accordance with the following EC directives:	**Low Voltage Directive 2014/35/EU** **EMC Directive 2014/30/EU**
declares that the product:	**Kinesys Array PD-ES**
with description:	Power distribution with emergency stop
and part number:	**ELE-03-001X; ELE-03-002X; ELE-03-003X**

is in conformity with the applicable requirements of the following harmonised standards:

EN 60204-1	**Safety of machinery – Electrical equipment of machines – Part 1: General requirements**
EN 62061	**Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems**
EN 61000-6-2	**Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments.**
EN 61000-6-4	**Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments.**

The manufacturer hereby declares that the products named above have been designed to comply with the relevant sections of the above referenced standards. The units comply with all applicable essential requirements of the directives.

In the EU the party authorised to compile the technical file is:
TAIT Netherlands B.V.
Weesperplein 4a, 1018 XA Amsterdam, The Netherlands
In the UK the party authorised to compile the technical file is:
Kinesys Projects Ltd.
Unit 2 Kempton Gate, Oldfield Road, Hampton,
Middlesex, TW12 2AF, UK

Equipment referred to in this Declaration of Conformity was first manufactured in 2003.

D Weatherhead
Managing Director
Hampton, November 2024

The attention of the specifier, purchaser, installer, or user is drawn to special measures and limitations to use which must be observed when these products are taken into service to maintain compliance with the above directives. Details of these special measures and limitations to use are available on request and are also contained in the product manuals.

Kinesys Projects Ltd.
TAIT Technologies UK Ltd.
Unit 5 Langthwaite Road, Langthwaite Grange Ind Estate, South Kirkby, Pontefract, West Yorkshire, UK, WF9 3AP

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