Document Number: 9200212
Revision: 1v2

Kinesys Mentor Series 3

Operating Manual
[ORIGINAL]

A safety controller for automation systems

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The contents of this manual are believed to be correct at the time of printing. In a commitment to a policy of continuous development and improvement, TAIT reserves the right to change the specification of the product or its performance, or the contents of this manual, without notice.

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Contents

List of figures

1. Introduction

1.1 Product description

Mentor comprises a range of safety controllers and distribution equipment to provide safety input, connection, and monitoring to Kinesys and third party automation systems.

The Mentor M307 and Mentor M308 are primarily designed for use with Velocity 2 and EVO V2 systems. They are connected via a Universal Device Interface (UDI) connector, which provides volt-free contact inputs and outputs for the connection of a wide range of systems.

The main difference between the M307 and M308 models is that the M308 model includes two additional drive connectors and a console connector.

When used with Kinesys safety input devices and suitable output devices, the emergency stop hold-to-run system complies with requirements up to PLe (EN 13849) or SIL3 (EN 62061). Contact Kinesys to determine the exact PL or SIL for your required combination of equipment.

1.1.1 Achievable safety performance

Velocity 2:	Emergency stop	SIL3 / PLe
	Dead man's handle (enabling switch)	SIL3 / PLe
	Group halt on axis fault	SIL3 / PLe
Evo V2:	Emergency stop	SIL3 / PLe
	Dead man's handle (enabling switch)	SIL3 / PLe
Array PD-ES:	Emergency stop	SIL3 / PLe
	Dead man's handle (enabling switch)	SIL1 / PLc

1.2 Scope and purpose

This manual describes the key features, means of operation and maintenance operations of the Mentor M307 & M308 and applies to the following two models:

- Mentor M307 (Part Number MEN-03-0070, MEN-03-0071)
- Mentor M308 (Part Numbers MEN-03-0080, MEN-03-0081)

The Mentor model number can be found on the rear panel or on the main display by accessing the System Setup menu.

This manual refers to features introduced in software version 22. Earlier software versions may not include all of the features described in this manual.

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 Support requests

For support, please use the following contact details:

support@kinesys.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 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 Mentor or do maintenance to the Mentor in an area that is accessible to children or other unqualified persons.**
- **Do not use the Mentor in an aggressive environment. An aggressive environment is defined as an environment which contains hazardous substances that may degrade equipment.**
- **Do not use the Mentor if it does not appear to be in 100% working order.**
- **Do not modify or attempt to repair the Mentor if it is not in working order.**

Safety precautions before operation

- **Do a full risk assessment of the location where the Mentor and its connected devices are intended to be used.**
- **Do not start movement operations until a qualified person has inspected the Mentor 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 Mentor must be covered to prevent unauthorised operation**
- **Test all safety devices on a regular basis, and following each new installation of a temporary system.**

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 Mentor 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.**
- **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.**

2.3 Visible damages

If any damage or breakages are detected during operation or during tests, do not operate the Mentor M307 & M308 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 Mentor is designed for indoor use only and to work in ambient temperatures between 5°C and 40°C (41°F and 104°F). The humidity of the environment must not exceed 90%.

2.6 Handling and storage

Condensation

The Mentor 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 Mentor to a power source immediately. Leave the unit disconnected until it has reached a safe temperature

Shocks

Do not shake, knock or drop the Mentor. Avoid excessive force when installing and operating the product.

Handling

Do not lift the Mentor 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 Mentor. Alternatively, a purpose-made flight case may be used (available separately).

3. Product overview

3.1 Front panel

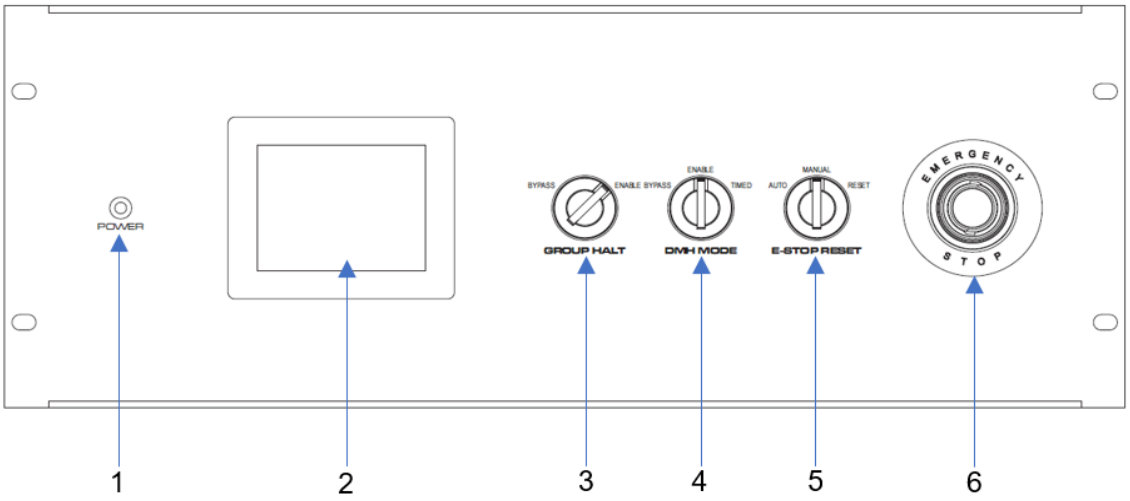


Figure 1. Front panel

Item #	Description
1	LED power indicator - illuminates blue when power is supplied
2	Touchscreen display
3	Group Halt Mode selection key switch
4	DMH (Hold-to-run) mode selection key switch
5	E-Stop reset mode / reset key switch
6	Local emergency stop button

3.2 Rear panel

Note: The Mentor M308 rear panel is shown below; the Mentor M307 rear panel is similar - refer to the table for more details.

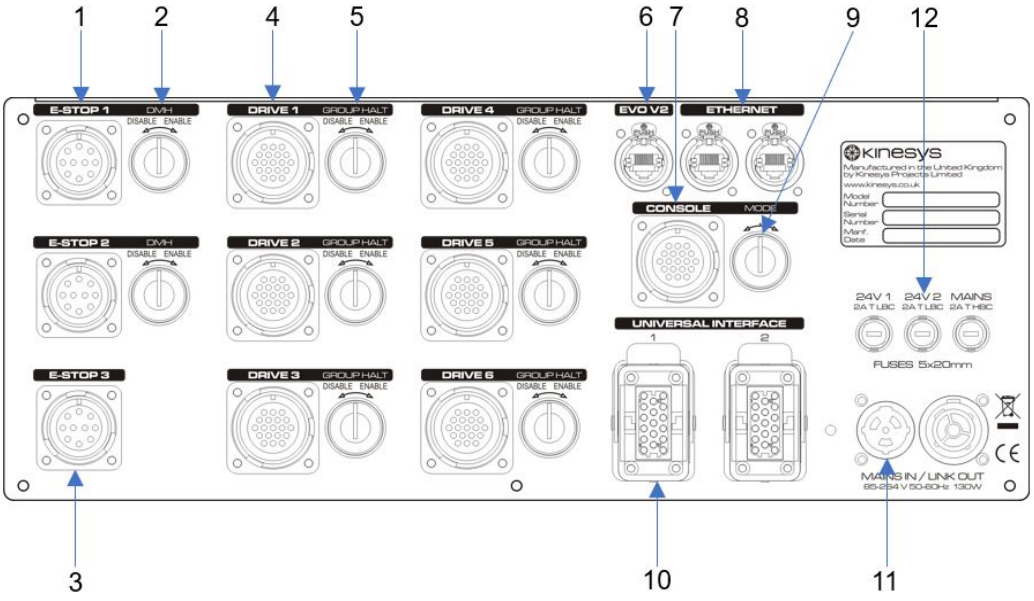


Figure 2. Rear panel

Item #	Description
1	Emergency stop /DMH connectors
2	Individual DMH enable / disable key switches
3	Emergency stop connector
4	Drive connectors (4 connectors on Mentor M307)
5	Drive Group Halt mode key switches (4 key switches on Mentor M307)
6	Evo V2 Ethernet & safety output
7	Console connector (not included on Mentor M307)
8	Ethernet connectors
9	Console DMH enable / disable key switch (not included on Mentor M307)
10	Universal Device Interface connectors
11	Mains input connector with link through
12	Mains fuses (5 x 20mm)

3.3 Touchscreen display

The touchscreen display shows system status messages to enable the easy diagnosis of faults and can be used to display further diagnostic information if needed by Kinesys support.

Only use a finger or touchscreen stylus to operate the touchscreen. Do not use sharp objects such as pens and screwdrivers as these may cause permanent damage to the touchscreen

Warning! Use only .

3.3.1 Home screen

The Home screen is shown automatically after the Mentor is powered on and can be accessed at any time by pressing the button.

Figure 3. Home screen

The screen shows the status of the Emergency Stop, DMH and Group Halt systems. A green indicator shows that the system is active; a red or yellow indicator shows a warning. Further information on each system can be accessed by touching any of the indicators or by pressing the button.

Refer to section 5 for details on the other screens within the touchscreen display.

4. Installation

Although it may be used freestanding, the Mentor is designed to be installed in a standard 19" rack.

4.1 Installation precautions

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

When rack mounting, make sure there is enough space within the rack to allow for cables and connections at the rear and the switches and controls at the front.

Make sure there is adequate ventilation when installing the Mentor to a rack.

4.2 Rack mounting

The Mentor has a height of 4U and can be mounted in a standard 19" equipment rack or flight case. A shock-mounted flight case is recommended for touring use.

It is recommended that the Mentor enclosure is supported at the rear to prevent stress on the front panel and rack structure caused by the weight of the unit and the cables connected to the rear panel.

The Mentor may also be supported in the rack using Accuride 3307 telescopic rack slides (available separately).

Cage nuts and bolts (available separately) should be used to secure the front of the unit in the rack.

4.3 Cooling

The Mentor does not require any clear space above or below the rack case, but avoid mounting the Mentor near other equipment that may generate a large amount of heat.

The Mentor has two cooling fans mounted on the right side panel (as viewed from the front). Cool air is drawn in through the ventilation slots on the left side panel and blown out by the cooling fans.

When mounting several types of equipment in a rack, make sure there is always a supply of cool air to the ventilation inlet slots on the left side panel of the Mentor. Do not obstruct the warm air outlets on the right side panel or allow the warm exhaust air to enter the cooling intake of other equipment.

4.4 Connections

Always switch the Mentor off before connecting and disconnecting any equipment, including shorting plugs.

The dual-channel error checking used on all safety devices requires both channels of a safety circuit to be made and broken simultaneously. An error may result if connections are not made and broken simultaneously when inserting or removing connectors.

All safety input and output devices must be tested following each new installation or change to the configuration

4.4.1 Power supply

Power supply connection is via a Neutrik PowerCON TRUE1 type connector. A link connector is provided for connection to other equipment. The total load of all connected equipment must not exceed the total capacity of the supply.

The PowerCON TRUE1 supply cable must be connected to an outlet protected by a 20A (or less) circuit breaker or fuse. Mentor includes a fuse for protection of the mains supply to the internal power supply.

The Mentor power supply must be earthed.

4.4.2 Emergency stop / DMH connectors

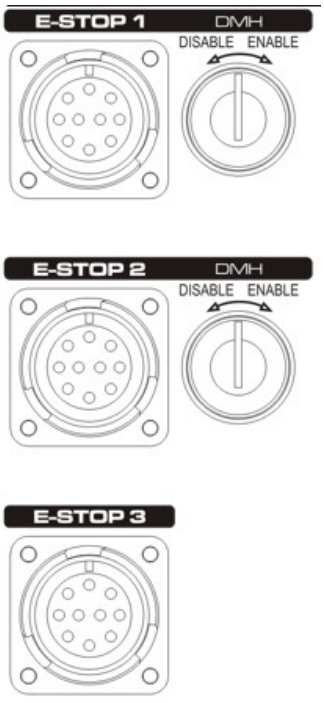


Figure 4. Emergency stop / DMH connections

Three connectors are provided for emergency stop buttons. A Dead Man's Handle or enabling switch may also be connected to inputs 1 and 2. Emergencyy stop switches, dead man’s handles, foot switches and other safety devices are available from Kinesys.

Connector:	MIL-C-5015 reverse bayonet 18-19 female receptacle e.g. Van-System CVBS 03 18-19S
Mating Connector:	MIL-C-5015 reverse bayonet 18-19 male plug e.g. Van-System CVBS 06 18-19P

Pin	Function	Description
A	TP0	Test Pulse 0 for E-Stop circuit
B	TP1	Test Pulse 1 for E-Stop and DMH circuits
C	ES0	E-Stop switch return
D	ES1	E-Stop switch return
E	TP0'	Test Pulse 0 for DMH circuit
F	DMH0	DMH switch return
G	DMH1	DMH switch return
H	24V	24V DC supply max 500mA*
I	0V	0V supply
J	LED ES	E-Stop switch LED indicator 24V DC max 75mA*

* Power outlets on emergency stop connectors are protected by a common 1A electronic circuit breaker. The total connected load of all emergency stop switching systems, indicators, beacons, and sirens must not exceed 1 A.

The maximum recommended cable length using 0.75 mm^2 cable is 500 m per input. The maximum total length of all connected cables is 1000 m.

Where required, expansion units are available to allow the connection of two or more emergency stop switches to a single Mentor input; contact Kinesys for further information.

Shorting plugs MEN-98-2010 must be fitted to all emergency stop connections when not in use.

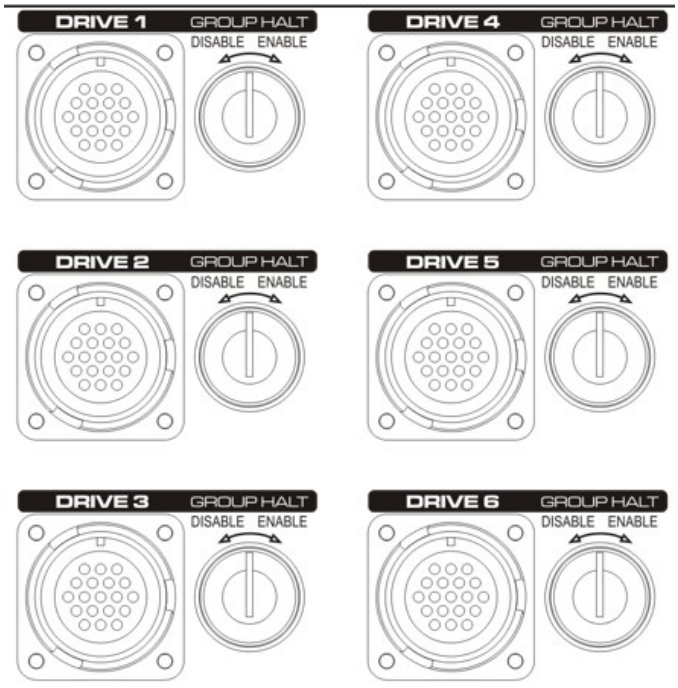


Figure 5. Velocity 2 Drive connectors

Six or four connectors are provided for Velocity 2 type drives on the Mentor M308 and Mentor M307 respectively. Further expansion is possible using additional components from the Mentor range.

The device connection includes an Ethernet data link.

Connector:	MIL-C-5015 reverse bayonet 20-A48 female receptacle e.g. Van-System CVBS 00 20-A48S
Mating Connector:	MIL-C-5015 reverse bayonet 20-A48 male plug e.g. Van-System CVBS 06 20-A48P

Pin	Function	Description
A	M-TP0	Test Pulse 0 from local device
B	M-TP1	Test Pulse 1 from local device
C	M-ES0	E-Stop circuit return to local device
D	ETH-S	Ethernet shield
E	M-ES1	E-Stop circuit return to local device
F	M-DMH0	DMH circuit return to local device
G	M-DMH1	DMH circuit return to local device
H	S-ES0	E-Stop circuit return to remote device
J	S-ES1	E-Stop circuit return to remote device
K	S-TP0	Test Pulse 0 from remote device
L	24V	24V DC supply max 1A
M	0V	0V supply
N	ETH-TX-	Ethernet data
P	ETH-RX-	Ethernet data
R	S-DMH1	DMH circuit return to remote device
S	S-DMH0	DMH circuit return to remote device
T	S-TP1	Test Pulse 1 from remote device
U	ETH-TX+	Ethernet data
V	ETH-RX+	Ethernet data

The maximum length of all connected cables is 90m.

Shorting plugs MEN-98-2010 must be fitted to all emergency stop connections when not in use.

4.4.3 EVO V2 Ethernet & safety connector

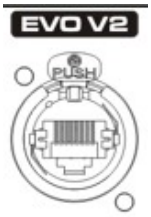


Figure 6. EVO V2 connector

One outlet is provided for connection to EVO devices with a V2 safety interface. Additional devices may be connected using EVO DC8 V2 distribution units.

Connector:	etherCON CAT5 e.g. Neutrik NE8FDV
Mating Connector:	etherCON CAT5 e.g. Neutrik NE8MC

Pin	Function	Description
1	ETH-TX+	Ethernet Data
2	ETH-TX-	Ethernet Data
3	ETH-RX+	Ethernet Data
4	S-TP0	Test Pulse 0 from remote device
5	S-TP1	Test Pulse 1 from remote device
6	ETH-RX+	Ethernet Data
7	S-ES0	E-Stop circuit return to remote device
8	S-ES1	E-Stop circuit return to remote device
Shell	ETH-S	Ethernet Shield

The maximum recommended cable length between devices is 90 m.

As this cable carries safety signals and Ethernet automation data, the use of a tactical grade cable (e.g. TMB Proplex PCCAT5EP cable with Neutrik Ethercon connectors) is highly recommended.

Shielded cables must be used for all Ethernet connections.

Note that not all flexible Ethernet cables are capable of supporting a 90m cable length while conforming to CAT5e standards – refer to the cable manufacturer for further information.

No shorting plugs are required when the EVO V2 connection is not in use.

4.4.4 Ethernet connectors

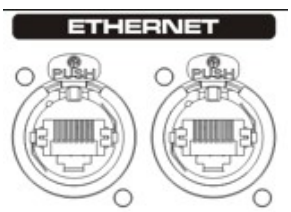


Figure 7. Ethernet connectors

Two Ethernet outlets are connected to the internal Ethernet switch on the rear panel.

Connector:	etherCON CAT5 e.g. Neutrik NE8FDV
Mating Connector:	etherCON CAT5 e.g. Neutrik NE8MC

Pin	Function	Description
1	ETH-TX+	Ethernet Data
2	ETH-TX-	Ethernet Data
3	ETH-RX+	Ethernet Data
4		No Connection
5		No Connection
6	ETH-RX+	Ethernet Data
7		No Connection
8		No Connection
Shell	ETH-S	Ethernet Shield

The maximum recommended cable length between devices is 90 m.

4.4.5 Console / pendant connector

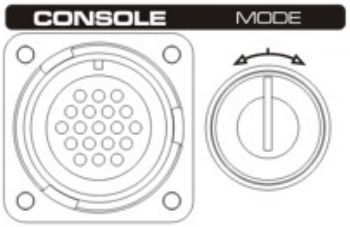


Figure 8. Console / pendant connector

The console / pendant connector allows connection of power, data and safety signals for an operator device via a single cable and connector. Note that this connector is not included on the Mentor M307.

Connector:	MIL-C-5015 reverse bayonet 20-A48 female receptacle e.g. Van-System CVBS 00 20-A48S
Mating Connector:	MIL-C-5015 reverse bayonet 20-A48 male plug e.g. Van-System CVBS 06 20-A48P

Pin	Function	Description
A	TP0	Test Pulse 0 for E-Stop and DMH circuits
B	TP1	Test Pulse 1 for E-Stop and DMH circuits
C	ES0	E-Stop switch return
D	ETH-S	Ethernet shield
E	ES1	E-Stop switch return
F	DMH0	DMH switch return
G	DMH1	DMH switch return
H	NC	No connection
J	NC	No connection
K	NC	No connection
L	24V	24V DC supply max 1A

M	0V	0V supply
N	ETH-TX-	Ethernet data
P	ETH-RX-	Ethernet data
R	NC	No connection
S	NC	No connection
T	NC	No connection
U	ETH-TX+	Ethernet data
V	ETH-RX+	Ethernet data

The maximum recommended cable length between devices is 90 m (subject to the cable manufacturer's recommended maximum cable length).

Shorting plugs MEN-98-2010 must be fitted to all emergency stop connections when not in use.

4.4.6 Universal Device Interface connetors

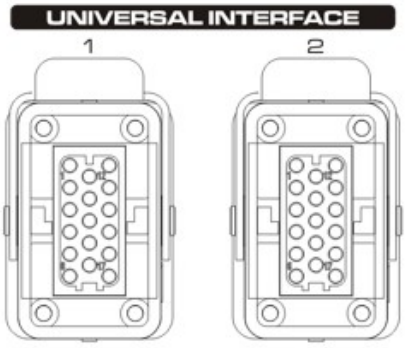


Figure 9. Universal Device Interface connectors

Two Universal Device Interface connectors are provided allowing the connection of legacy Kinesys equipment and third-party automation systems. Contact Kinesys for further advice on connecting other equipment such as Elevation 1+ or Digihoist systems, or third-party automation and safety systems.

Connector:	Harting DDD17F e.g. Harting 09 14 017 3101
Mating Connector:	Harting DDD17M e.g. Harting 09 14 017 3001

Pin	Function	Description
1	M-TP0	Test pulse 0 from local device
2	M-TP1	Test pulse 1 from local device
3	M-ES0	E-Stop circuit return to local device
4	M-ES1	E-Stop circuit return to local device
5	M-TP0	Test pulse 0 from local device
6	M-TP1	Test pulse 1 from local device
7	M-DMH0	DMH circuit return to local device
8	M-DMH1	DMH circuit return to local device
9	S-TP0	Test pulse 0 for E-Stop from remote device
10	S-TP1	Test pulse 1 for E-Stop from remote device

11	S-ES0	E-Stop circuit return to remove device
12	S-ES1	E-Stop circuit return to remove device
13	S-TP2	Test pulse 2 for E-Stop from remote device
14	S-TP3	Test pulse 3 for E-Stop from remote device
15	S-DMH2	DMH circuit return to remote device
16	S-DMH3	DMH circuit return to remote device
17	0V	0V reference

Shorting plugs MEN-98-2010 must be fitted to all emergency stop connections when not in use.

5. Operation

The Mentor is configured using the three key switches on the front panel. Information on the configuration can then be viewed on the touchscreen display. Each configuration should be assessed based on the system requirements and risk assessment. The required configuration for a particular installation should be clearly documented and carried out by a competent person.

5.1 Shorting plugs

Shorting plugs must be fitted whenever safety input device is not connected. The following connections on the Mentor's rear panel must have either safety devices or shorting plugs connected when not being used:

Connector	Shorting plug part number
Emergency Stop / DMH connectors 1 to 3	MEN-98-2010
Drive connectors 1 to 6 (1 to 4 on Mentor M307)	MEN-98-2020
Console connector (only on Mentor M308)	MEN-98-2020
Universal device interface connectors	MEN-98-2040

In some cases a connection cable may include wiring to short out the emergency stop input – for example, cables designed to connect devices to the Universal Device Interface connector.

5.2 Key switch configuration

Keys must be removed after configuration of the Mentor is complete and then stored in a location accessible only to personnel authorised to carry out configuration and reset operations.

Where the use of common key types may result in reduced security, alternative key profiles may be supplied on request.

5.3 E-STOP RESET key switch

The E-STOP RESET key switch controls the operation of the emergency stop system after all emergency stop buttons connected to the Mentor have been released. Select the appropriate mode based on the requirements of the installation and the risk assessment. The key may be removed in the AUTO and MANUAL positions. The key profile differs from that of the DMH MODE and GROUP HALT keys.

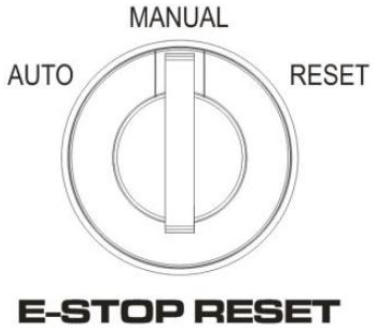


Figure 10. E-Stop Reset key switch

5.3.1 AUTO mode

In AUTO mode the emergency stop outputs will be reset to an ON condition immediately after all connected emergency stop buttons are released. Care must be taken in AUTO mode, as power may be restored to devices resulting in potentially unexpected movement.

A green E-STOP OUTPUT indicator on the Home screen shows that all connected emergency stop buttons have been released.

A red E-STOP OUTPUT indicator shows that at least one emergency stop button is in a pressed state or is missing.

5.3.2 MANUAL mode

In MANUAL mode the emergency stop outputs will only be reset to an ON condition after all connected emergency stop buttons are released **and** the E-STOP RESET key is turned manually to the RESET position. Emergency stop button resets should only be carried out by a competent person and the key must be removed after the reset operation.

When in MANUAL mode , the Home screen shows the following message prompting the operator to turn the E-STOP RESET key switch after the emergency stop buttons have been released.

5.3.3 RESET

Turning the key switch momentarily to the RESET position resets the emergency stop outputs in MANUAL mode after all emergency stop buttons have been released. This position is controlled by a spring and will return to the MANUAL position when released.

5.3.4 Emergency Stop Status screen

To access the Emergency Stop Status screen, press the E-STOP OUTPUT indicator or the  button on the Home screen.

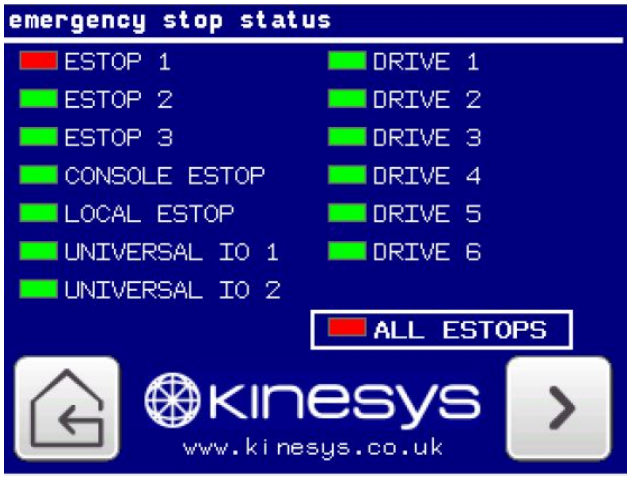


Figure 11. Emergency Stop Status screen

Each input on the Mentor is shown on the display along with an indicator. A missing or pressed emergency stop button is shown by a red indicator. Where applicable, indicators will flash when an emergency stop button has been pressed on the device connected to that connector.

5.4 DMH MODE key switch

Note - DMH stands for "dead man's handle" (also known as "enabling switch").

The DMH MODE key controls the operation of the dead man's handle system. Select the appropriate mode based on the requirements of the installation and risk assessment. The key can be removed when in any of the three positions. The key profile differs from that of the E-STOP RESET and GROUP HALT keys.

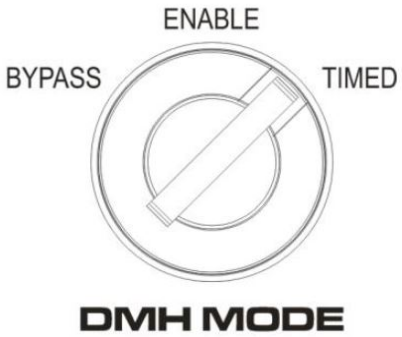


Figure 12. DMH Mode key switch

5.4.1 BYPASS mode

In BYPASS mode, dead man's handles are overridden and the device enable outputs are permanently active .

The Home screen shows the following message when the DMH MODE key switch is in BYPASS mode:

5.4.2 ENABLE mode

In ENABLE mode the device outputs are controlled by input from dead man's handle. Note that device outputs will always be turned off when the emergency stop system is disabled, irrespective of the state of the dead man's handle.

5.4.3 TIMED mode

TIMED mode operates in the same way as ENABLE mode, but features a timer to discourage an operator from physically or electrically overriding the dead man's handle. After 10 minutes the device outputs will be switched off until the dead man's handle is released. Alternative time delays and warning periods are available (factory reconfiguration required).

5.4.4 DMH Status screen

Press the DMH indicator or the › button twice to access the DMH Status screen.

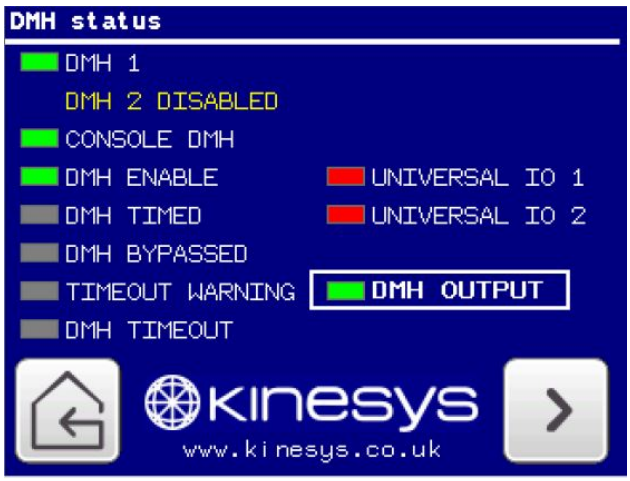


Figure 13. DMH Status screen

The selected DMH mode is highlighted in green on the DMH Status screen on the touchscreen display.

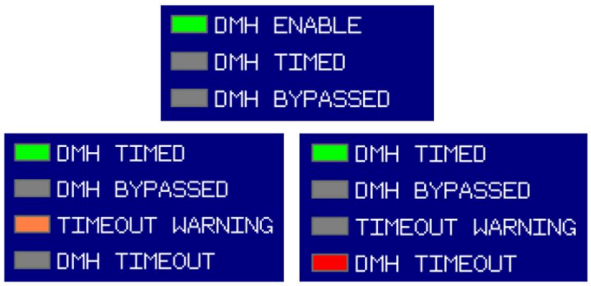


Figure 14. DMH Status screen

In TIMED mode the "TIMEOUT WARNING" indicator will turn amber when one minute of operation remains. When the time expires the "DMH TIMEOUT" indicator will turn red and all device outputs will be turned off.

5.4.5 DMH System configuration

The Mentor has several inputs for dead man's handles:

- E-STOP connector 1
- E-STOP connector 2
- Console connector (only available on Mentor M308)

Each input has an associated DMH key switch on the rear panel.

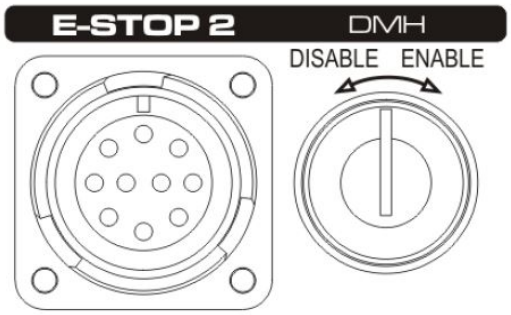


Figure 15. E-STOP connector DMH key switch

All DMH inputs that are set to ENABLE must be turned on in order to enable the connected drives.

The status of the DMH inputs is shown on the DMH Status screen. In the example below, the E-STOP 1 DMH input and Console DMH input are both enabled. The E-STOP 1 DMH input is activated while the Console DMH input is not activated. The DMH output will only be turned on when all inputs are activated.

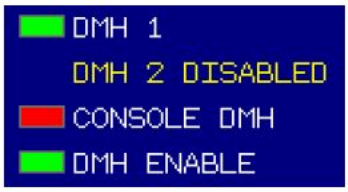


Figure 16. DMH Status screen example

5.5 GROUP HALT key switch

Figure 17. GROUP HALT key switch

The GROUP HALT key controls the operation of the group halt function for the connected Velocity 2 drives. Select the appropriate mode based on the requirements of the installation and the risk assessment. The key may be removed in either of the two positions. The key profile differs from that of the E-STOP RESET and DMH MODE keys.

5.5.1 BYPASS mode

In BYPASS mode the group halt system is overridden and all connected drive outputs will be permanently active when the emergency stop system and dead man's handle are enabled.

The Home screen will show the following message in BYPASS mode:

5.5.2 ENABLE mode

In ENABLE mode the group halt system is turned on. Drive outputs are only enabled when all connected and enabled drives are functioning correctly. Device outputs are turned off when the emergency stop system is disabled, irrespective of the state of the dead man's handle inputs.

5.5.3 Group halt configuration

Each Drive connector has an associated key switch that allows the group halt function for that particular device to be enabled or disabled.

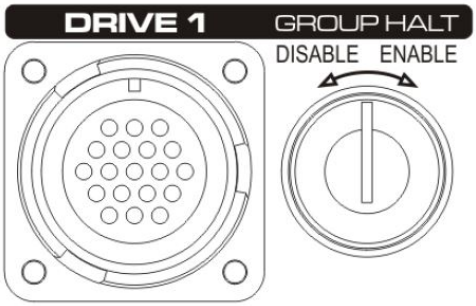


Figure 18. Drive connector GROUP HALT key switch

When the GROUP HALT key is set to DISABLE, the drive output will be enabled whenever the emergency stop button and dead man’s handle are both active. When the GROUP HALT key is set to ENABLE, the drive will only be enabled when the emergency stop button and dead man’s handle are active **and** all drives within the group are functioning correctly.

5.5.4 Group Halt Status screen

The status of all drives is shown on the Group Halt Status screen on the touchscreen display Press the Group Halt indicator or the › button three times to access the DMH Status screen.

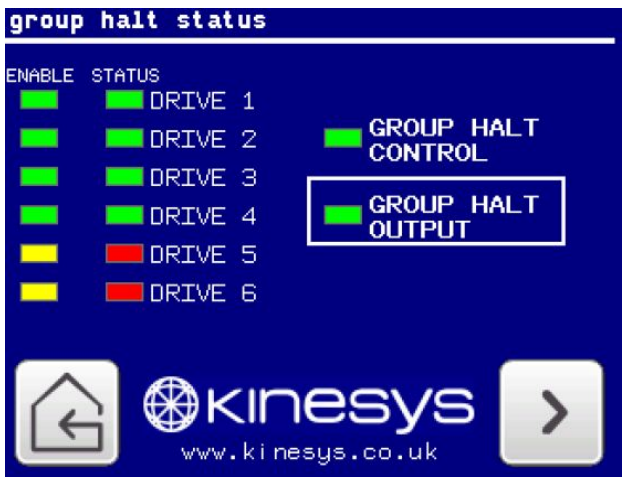


Figure 19. Group Halt Status screen

A drive with group halt enabled is be shown by a green indicator and a drive with group halt disabled is shown by a yellow indicator.

5.6 Functional tests

It is essential that all safety devices are tested after system installation, a change of configuration / wiring, or a change of operating program (controller program)

The test must include:

- correct functionality of all emergency stop buttons
- correct functionality of all dead man's handles (or other enabling switches)
- correct action on all connected devices on release of dead man's handle (or other enabling switches)
- dead man's handle timeout operation where selected
- emergency stop reset operation (automatic or manual)
- group halt operation

Test all emergency stop devices and dead man's handles regularly. A daily test is recommended for temporary installations; for permanent installations with fixed wiring, a longer test interval may be appropriate.

6. Service & End of Life

6.1 Service life

The Mentor safety system is designed based on a service life (“proof test interval” according to EN 62061; “mission time” according to EN 13849-1) of 20 years from the date of manufacture. After this time the safety related parts of the control system must be replaced.

The Mentor manufacturing date is shown on the serial number label on the rear panel above the mains input connector. The Mentor must be taken out of service and the safety related elements of the control system replaced no later than 20 years after the date of manufacture.

6.2 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.

6.3 Spare parts

The following table shows common spare parts and accessories for the Mentor M307 & M308. This is not an exhaustive list. Please contact Kinesys, or your local distributor, for any component that is not listed.

Item	Kinesys part number
Reset key, yellow, OMR 73033	5303099
Configuration key, black, OMR 73034	5303098
Maintenance key, blue, OMR 73038	5303096
Slide rail kit, Accuride 3307 20"	-
Power cable, PowerCON TRUE1 - bare ends, 2m	-
E-Stop input shorting plug	MEN-98-2010
Console input shorting plug	MEN-98-2020
Universal Device Interface shorting plug	MEN-98-2040

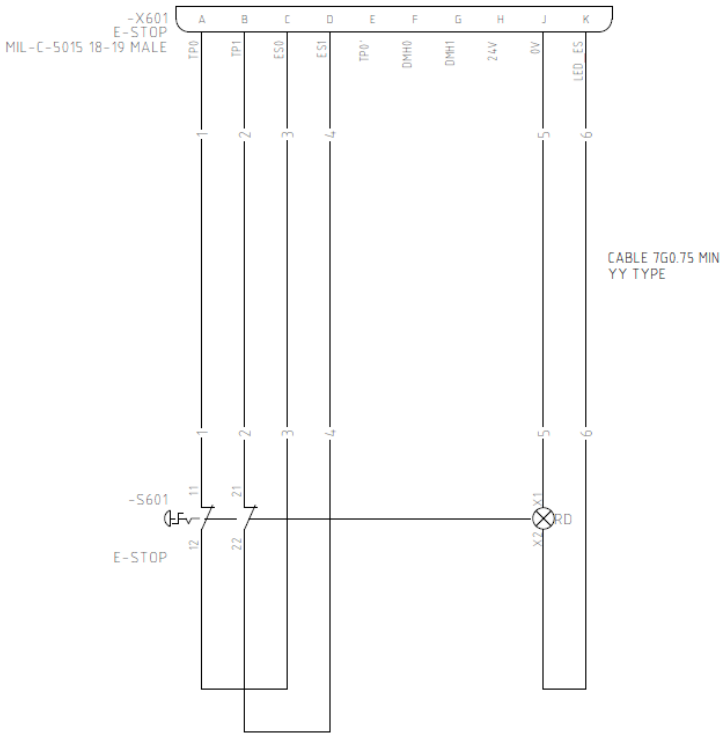
7. Product specifications

Feature	Specification
Environmental	
Operating temperature range	5°C to 40°C (41°F to 104°F)
Storage and transportation range	-25°C to 55°C (-13°F to 131°F)
Operating humidity	<50% at maximum 40°C
Maximum operating altitude	1000 m
Location	**For indoor use only**
Ingress Protection (IP) rating	IP30 - protected from tools and small wires greater than 2.5 mm (not protected from water).
Other	
Mains power supply	• 85-264V, 50-60 Hz, 70W via Neutrik powerCON TRUE1 with link ouput • Protected by 2A thermal magnetic circuit breaker.
Enclosure	• Steel enclosure, zinc plated finish • Steel front panel, blue stove enamel finish
Cooling	Forced air cooled (2 x internal DC fan)
Maximum safety level	• SIL3 (according to EN 62061) • PLe (according to EN 13849-1)
Rack mounting	Suitable for 19" rack mount, 4U x 504 mm (19.8 in) deep (excluding handles and connectors)
Dimensions	• Width: 483 mm (19 in) • Height: 177 mm (7 in) • Depth: 504 mm (19.8 in)
Weight	21.4 kg (47.2 lbs)

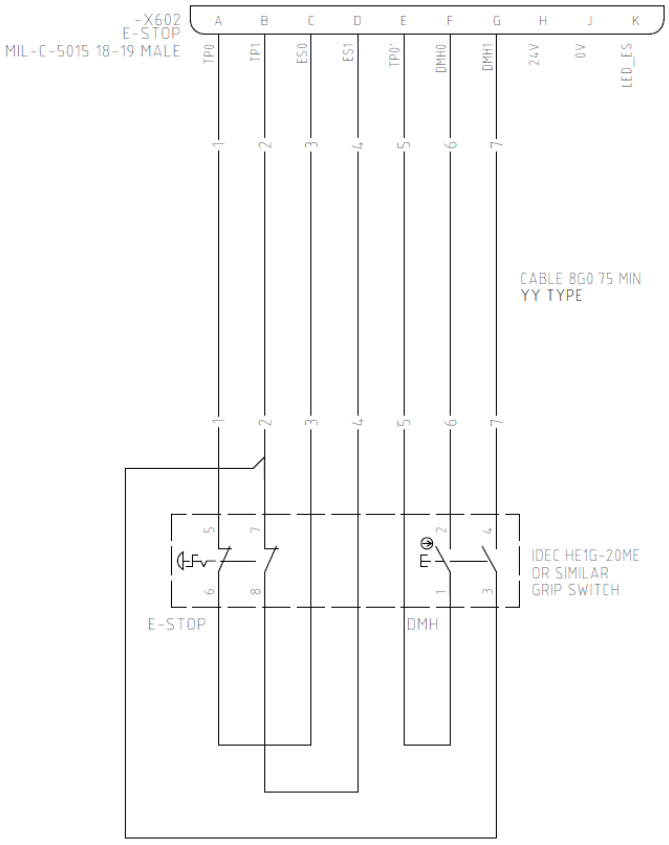
8. Supplementary information

8.1 Example device schematics

8.1.1 Emergency stop switch

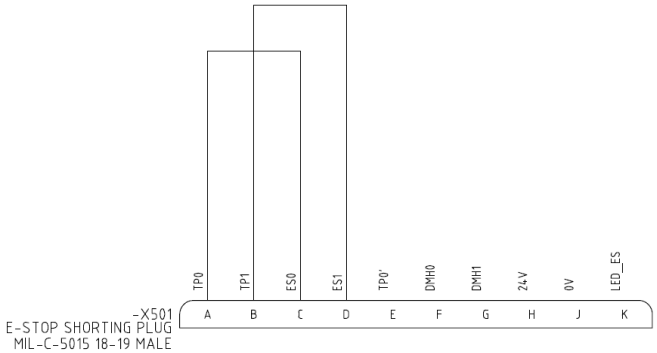


8.1.2 Emergency stop switch / dead man's handle (enabling switch)

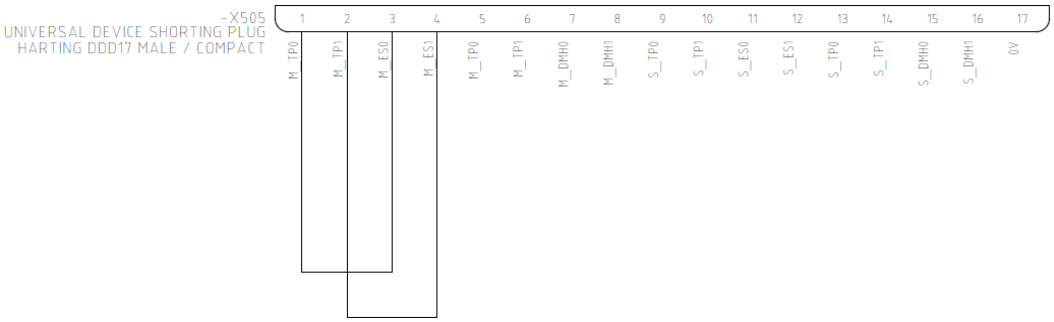


8.2 Shorting plug schematics

8.2.1 Emergency stop shorting plug



8.2.2 Universal Device Interface shorting plug



8.3 Connecting the Mentor to an Array PD-ES

The Mentor can be used in conjunction with a Kinesys Array PD-ES to provide emergency stops that conform to SIL3 / PLe and dead man's handles up to SIL1 / PLc.

For SIL3 emergency stops, the Array PD-ES must be fitted with dual line contactors. Array PD-ES units manufactured after August 2014 are fitted with dual mains contactors; units manufactured before this date may be modified by Kinesys as required. Array PD-ES units that have dual contactors can be indentified 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"
- two contactors inside the unit - type LC1D80 - identified as KM1 and KM3

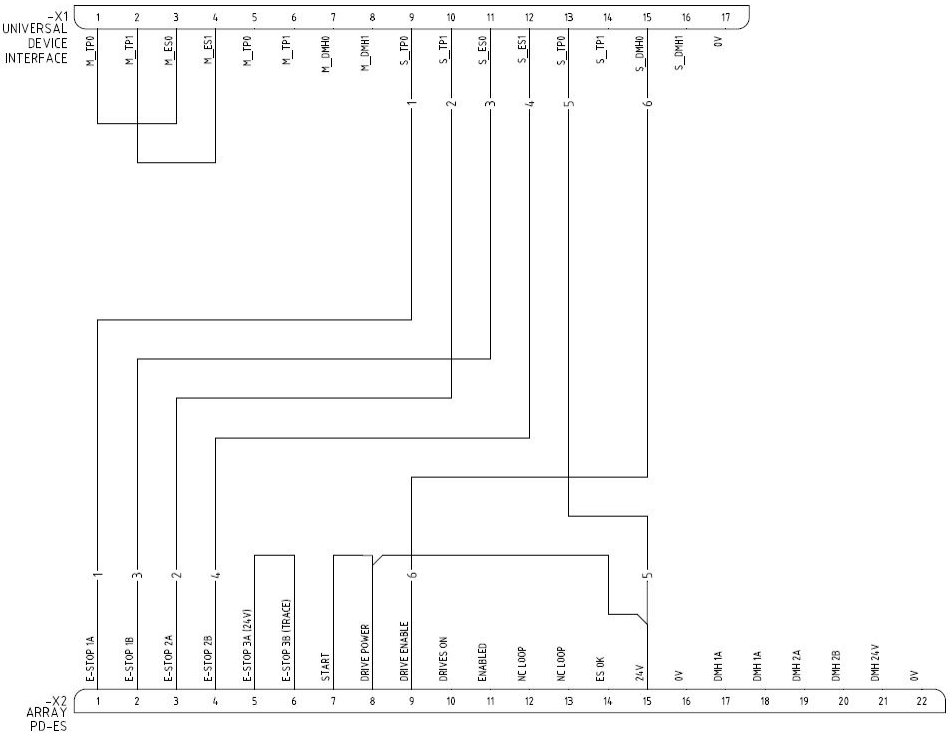
For SIL3 operation, the emergency stop button on the Array PD-ES must be securely covered to prevent inadvertent operation.

An additional emergency stop button may need to be connected to the Mentor in the vicinity to the Array PD-ES if required by the system risk assessment.

The Array PD-ES Mini does not have dual line contactors and should not be used where SIL3 safety is required

Where multiple Array PD-ES units are used, each unit must be connected to an individual Universal Interface Device connector using Kinesys cable MEN-98-2130. Note that linking Array PD-ES units using the 22-pin connectors restricts the system to SIL1 / PLc.

8.3.1 Universal Device Interface - Array PD-ES connection schematic



The cable must be connected to the Console / E-Stop 1 connector on the Array PD-ES and a shorting plug MEN-98-2010 must be fitted to the Link Out / E-Stop 2 connector.

9. 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 products:	**Kinesys Mentor M307 and Kinesys Mentor M308**
with part numbers:	**MEN-03-0070; MEN-03-0071; MEN-03-0080; MEN-03-0081**

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

EN 60204-1:2006	**Safety of machinery – Electrical equipment of machines – Part 1: General requirements**
EN 62061:2005	**Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems** Emergency stop circuit complies to SIL2.
EN 61000-6-1:2007	**Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments.**
EN 61000-6-3:2007	**Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-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 2015.

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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