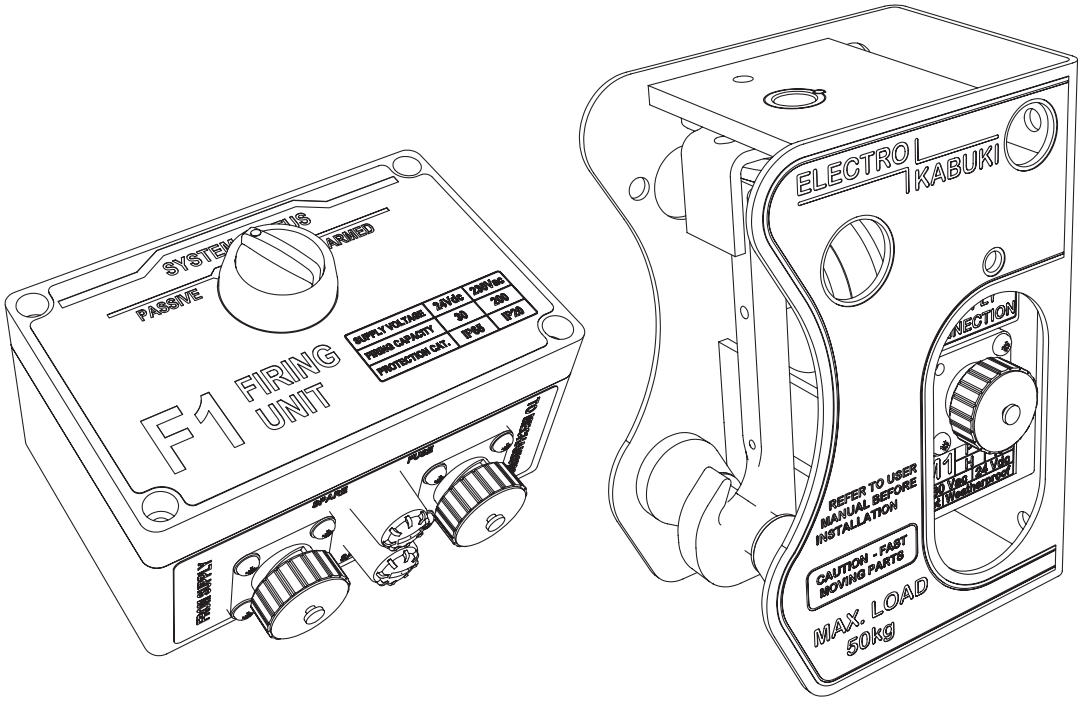
User Manual

ELECTRO KABUKI DROP

Mechanism • Firing Unit • Cabling



The Electro Kabuki Drop is part of a range of equipment used in the theatre/events industry. Some more devices are shown on the back cover.

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Section 1 - Safety

The function of the Electro Kabuki Drop is to suspend a load and release it on command from a remote location. Although the equipment is highly reliable, it must be remembered that NO SYSTEM IS 100% RELIABLE. The Electro Kabuki must therefore not be used in an application where untimely release of the load might cause injury, death or damage to property.

1.1 Load limits

The Electro Kabuki is designed to hold and release a maximum combined static and dynamic load of 50kg(490N). For the safety of all persons and equipment nearby it is important that this load is never exceeded and users must ensure that all loads and forces that may be present are included in the calculation of the total loading. This is of particular importance when the mechanism is used outside, where wind forces may form a high proportion of the total loading.

It is important to make extra allowance for shock or suddenly applied loads which could increase total loading to a point several times that of the static condition. If in doubt always err on the side of caution and use more mechanisms to support the load.

At the other end of the scale, the Electro Kabuki will operate reliably even with very light loads. The special design of the remnance spring ensures that even without a load present, rotation of the load arm will take place whenever the unit is 'fired'.

1.2 Maintenance for safety

It is important that the Electro Kabuki is correctly maintained to ensure that safety is maintained and the maximum load capability is available for use.

If load capacity falls, the most likely cause is failure of the armature to make full contact with the pole faces of the magnet, The reason for this might either be damage to the pole faces or foreign matter between the armature and the pole faces. For details of the various features of the Electro Kabuki see section 3.

The equipment should be regularly inspected if in constant use and when first used after storage. See section 5 for details of the required maintenance and servicing.

Inspections and maintenance should not be limited to the Electro Kabuki itself; the various mounting bolts, brackets, structures and cabling must also be checked for tightness, wear and damage.

1.3 Competent persons

The equipment must only be installed and operated by persons who:

- are aware of the potential hazards of restrained or supported loads
- know the principle of operation of the Electro Kabuki and Firing Unit
- have authority to prevent its use if, in their opinion, the application is unsafe
- have studied this user manual

1.4 System configuation

Transferred loading can force mistimed release, resulting in swinging or sideways displaced loads. Installation must always be tested with the safety catch on to prove correct function.

If the Electro Kabuki is used in conjunction with other equipment, care must be taken to ensure compatibility.

1.5 Mounting

The Electro Kabuki can be mounted to a surface using the 4 holes in the back of the frame, or by means of a single M12 bolt at either of the two locations specified on the diagram in Section 3.1. Note the maximum penetration depth of the M12 bolt.

Tightening torque for the M12 mounting bolt should be 40 Nm. Thread locking compound can be used where extra assurance is required.

See section 4 for detailed information regarding mounting of the unit. Note that the limits stated in that section must not be exceeded or safety will be compromised.

It is important that the correct Magnet Module is used for the ambient conditions. The label on the magnet module states either ‘Weatherproof’ or ‘Not Weatherproof’

1.6 Safety catch

A safety catch is provided to prevent accidental load release and provide a facility for testing the system (without releasing the load). The safety catch should be locked on (using the holes in the mounting plate and disc) until it is safe to release the load.

1.7 Electrical connection

Electrical connections are made using AMP ® CPC Series 1 connectors.
Safe operation cannot be guaranteed if other makes or models of connectors are used with the Electro Kabuki.

Note that cable connectors are colour coded to the socket label on the Magnet Module. In addition, the cable connectors are keyed to prevent them being inserted into the wrong socket. Do not try to force a connection.

Connecting and interlinking cables must be adequately supported along their length and strain relief should be provided at the points of connection. A suitable strain relief anchoring point is provided just above the connector cut out in the frame.

Never install or dismantle live cables; the cable which delivers power to the firing unit should be the last one fitted during installation, and the first removed during dismantling.

1.8 Transportation

There are 2 holes in the top of the frame which provide a means of threading the Electro Kabuki onto a carrying strap.

The Electro Kabuki should never be carried by a cable which is connected to the Magnet Module. The electrical connectors in the Magnet Module are not designed to be load bearing.

Section 2 - Technical Specification

2.1 Mechanical

mass:	Electro Kabuki (without Magnet Module) - 2.0 kg
size:	see section 3
load capacity:	50 kgs maximum (all Electro Kabukis), when used in accordance with the user manual
ambient temperature:	only use within the range -5^{0}C to + 45^{0}C

2.2 Electrical

Magnet Modules:

power consumption: (at 20^{0}C magnet coil temp)	6.6W (impulse)
voltage options:	110Vac (50 Hz or 60 Hz)
	Maximum pulse duration for 'energise to release' (type M1P) Magnet Modules is 3 seconds (avoid holding down the 'fire' button on the Firing Unit)
connector options:	AMP® CPC Series 1
protection:	Magnet Modules fitted with - AMP® connectors - are weatherproof

Firing Unit:

supply voltage: 110Vac (50 or 60 Hz)

capacity: The number of Electro Kabukis in a multiple system is limited by the current rating of the Firing Unit: -

110Vac Firing Unit 75 Electro kabukis

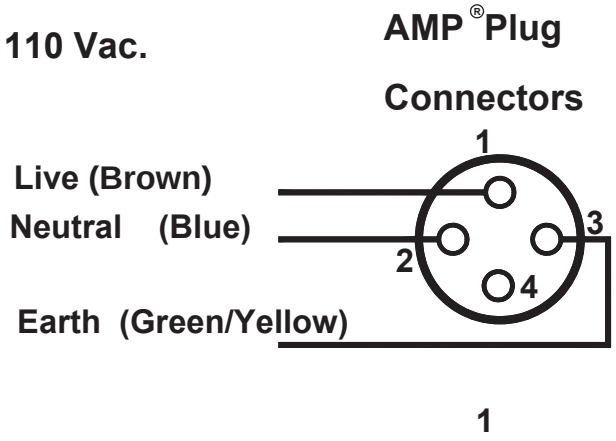
Note
Very long cable runs may produce excessive voltage drop. Always test the system.

fuse rating: 8 A

connector options: AMP® CPC Series 1

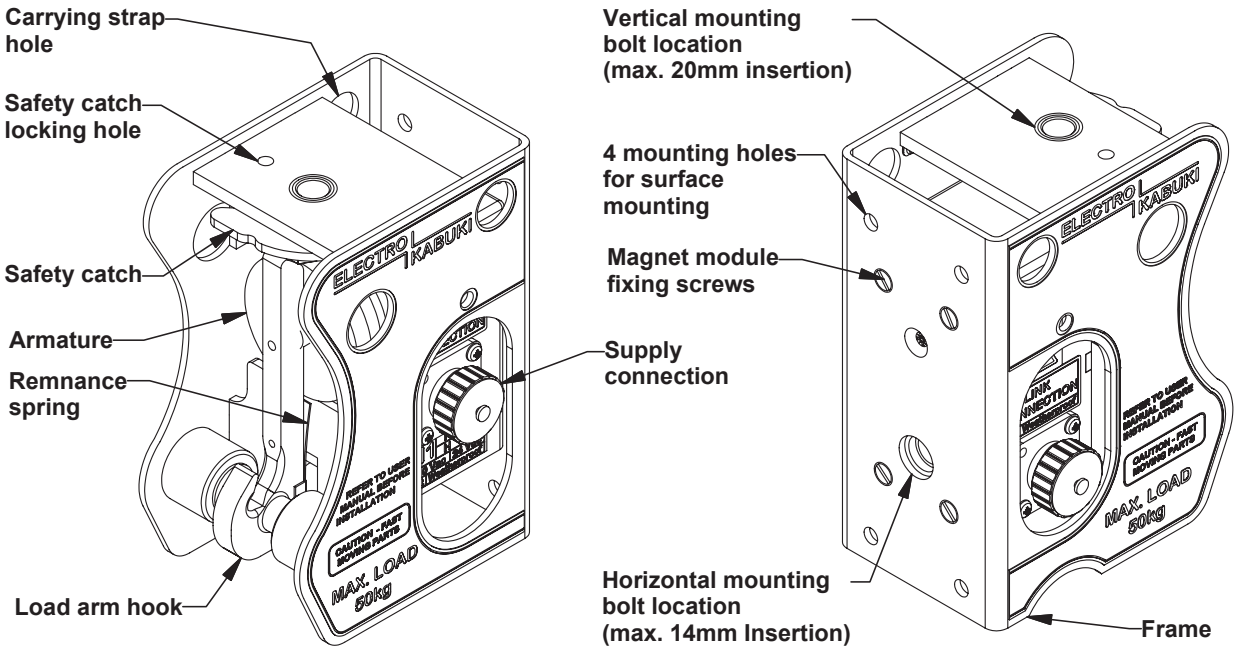
protection: Firing Units fitted with AMP® Connectors are weatherproof

Cable: Cable is fitted with connectors to suit the Magnet Modules. Cable Connection details are shown below.

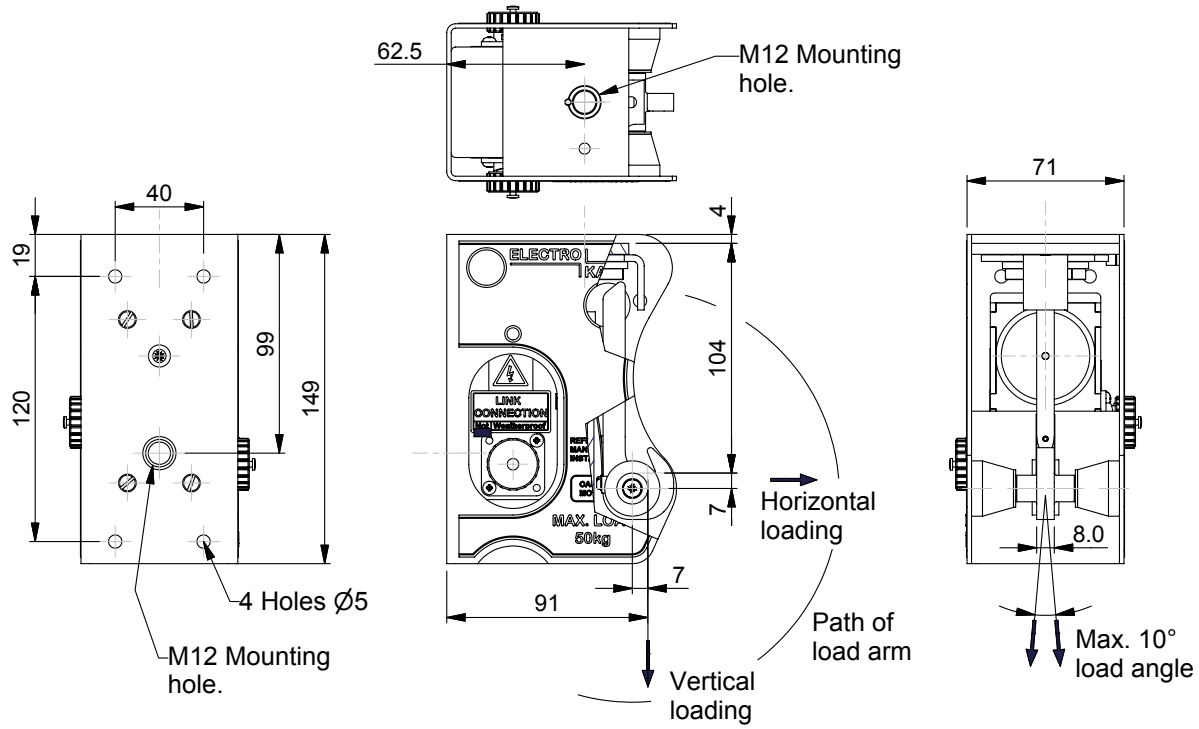


Section 3 - Features and Dimensions

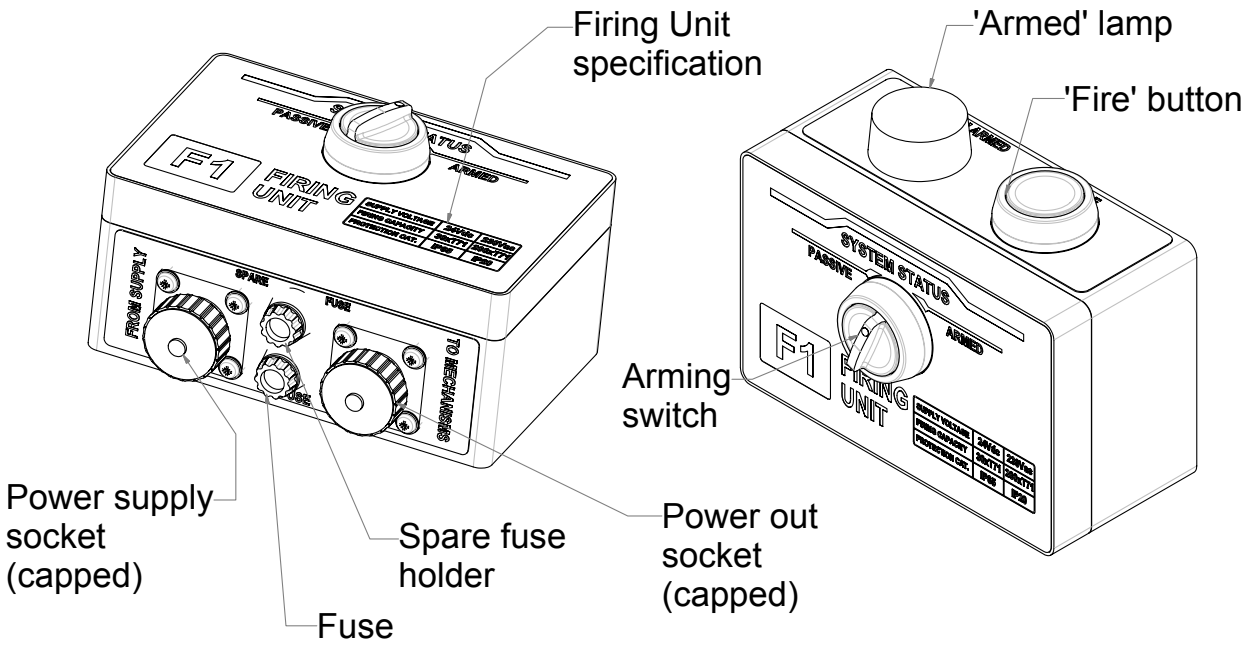
3.1 Features - Electro Kabuki



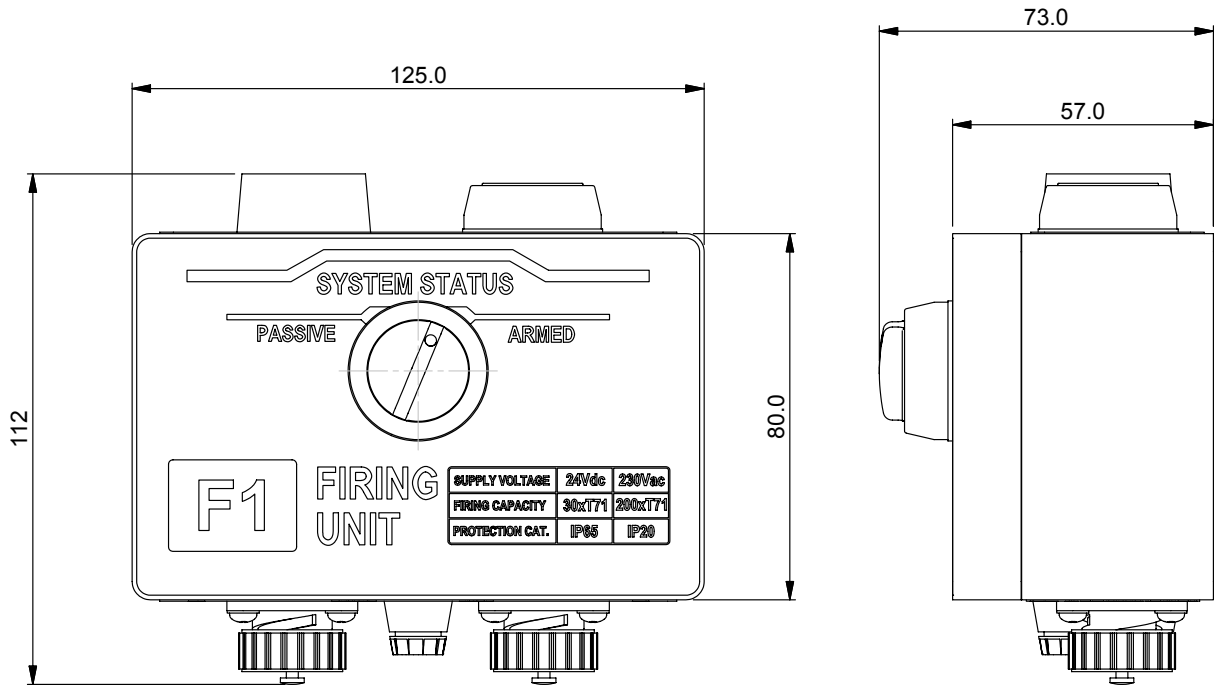
3.2 General Dimensions - Electro Kabuki



3.3 Features - Firing Units



3.4 General Dimensions - Firing Units



Section 4 - Mounting & Electrical Connection

4.1 General

The correct mounting of the Electro Kabuki is important for safe and proper functioning.

It is important to remember that the action of releasing a heavy load can set up considerable ‘recoil’ vibrations in the supporting structrue unless carefully designed.

4.2 Mechanical fixing

The Electro Kabuki is designed to be fixed in position using 4 clearance holes in the frame or a single M12 bolt of Property Class 8.8. Such bolts have a minimum ultimate tensile load capability of 51900N (5290kgf). The recommended tightening torque for such bolts (clean and unlubricated) is 40 Nm.

Care must be exercised in the selection of the bolt length in order to restrict the insertion of the bolt into the Magnet Module to a maximum of 14mm. Serious damage to the Magnet Module can result if an overlength bolt is used.

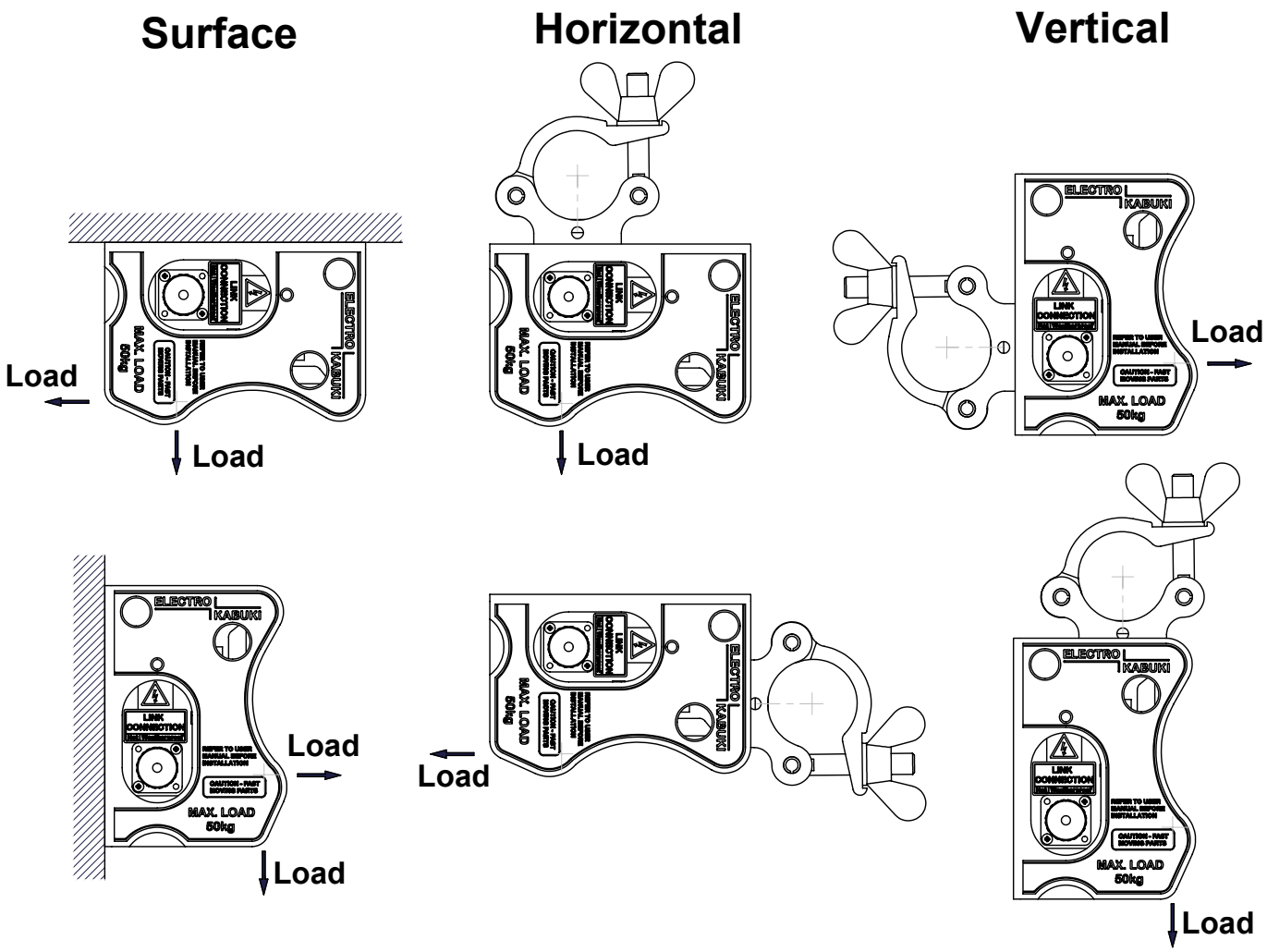
For fixing to 2”(150mm) diameter poles, half couplers drilled for M12 countersunk screws are supplied.

The line of action of the load should not lie more that 5^0 either side of the principal load axis (section 3).

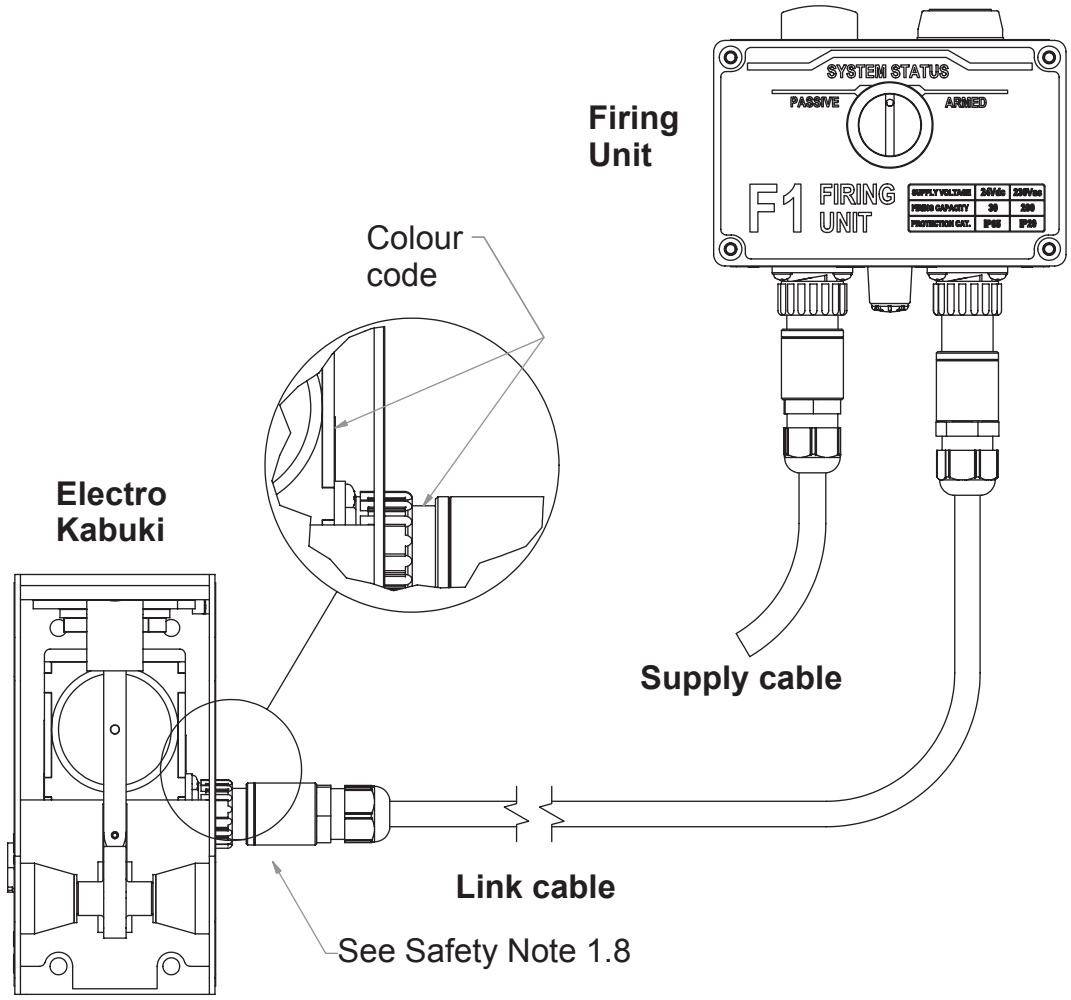
Mounting Arrangements

The arrangements below are examples, they do not represent all possibilities.
The important points are:-

- That the load directly opposes the mounting position when half couplers are used.
- That the load is parallel to or normal to the rear face of the frame when surfacing mounting is used.



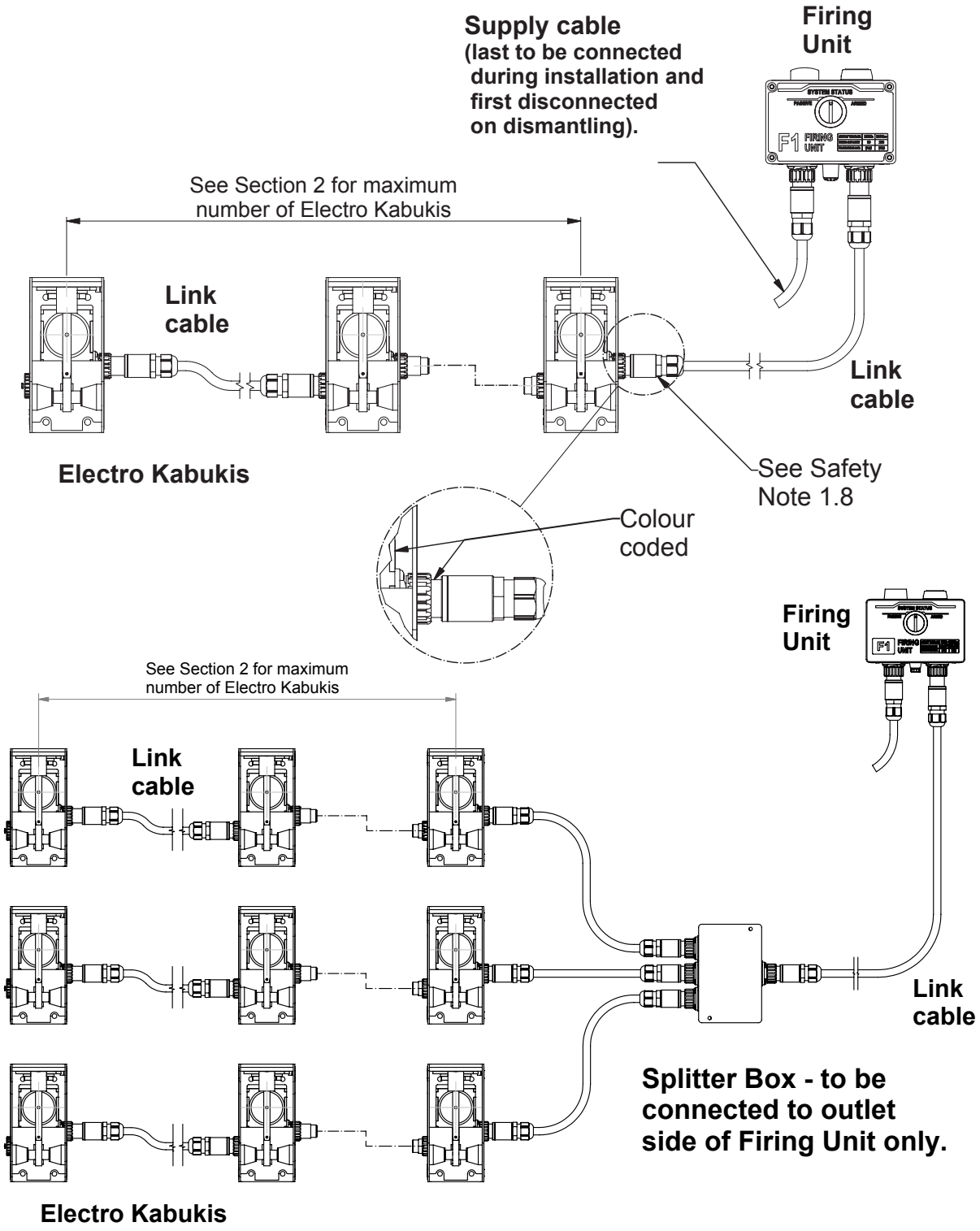
4.3 Single unit electrical connection



Care should be exercised in the support and routing of the link cable between the Firing Unit and the Electro Kabuki in order to minimise strain on the connections and prevent the cable forming a tripping or choking hazard.

4.4 Multiple unit electrical connection

Electro Kabukis maybe 'daisy chained' to provide a release system spanning a large distance and/or supporting a greater load.



Section 5 - Maintenance and Servicing

5.1 Maintenance

The Electro Kabuki and Firing Units are very robost devices and require minimal attention, but the following must be observed to maintain safe operation and optimal performance:-

storage: Equipment must be stored in a clean, dry environment and ambient temperature within the range - 5^0C to +55^0C. Relative humidity should be no greater than 80% (non-condensing). Ensure there is adequate protection to avoid physical damage to the equipment. The armature should be attached to the magnet pole faces during periods of non-use (this protects the armature and pole faces from damage.)

inspection: Regular inspections, at intervals to suit the frequency of use, are essential. Particular attention should be paid to:

armature and magnet pole faces:
The armature is attached to the load arm by a centre mounting screw. Check that the screw is in good condition and secure. Slight damage to the metal surfaces or presence of foreign particles will greatly reduce the holding force of the magnet. Keep the surfaces clean and protected from damage. Replace parts if the specified holding force cannot be achieved.

connectors:
Magnet Module, Firing Unit and cable connectors should be clean and free from damage. Use the dust caps on the AMP connectors to protect the contact from dust and fluids. Replace any items that are not in good order.

load arm:
The load arm must swing freely on its spindle. Check the condition of the load arm/hook to ensure that it has not suffered damage. If there are signs of wear or cracking, the load arm must be replaced.

safety catch:
The safety catch is a 2-position device that is held by a spring. Check that the spring is in good working order and that the catch itself has not suffered damage.

frame:
Check the condition of the frame and labels. If there are signs of structural damage to the frame or the labels are illegible, the frame should be replaced.