MEDÆS

>>Medical, Architectural & Engineered Systems

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Installation Manual

Envirom H Sys

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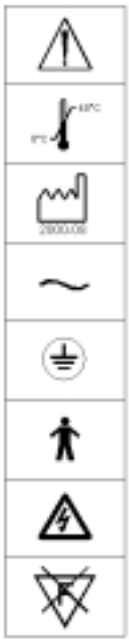
Installation and Commissioning Instructions - Envirom Bedspace Management System

1. Safety Information

CAUTION!
Do not use oil or grease on any terminal units or pipework, for any reason. This could lead to a **FIRE** or an **EXPLOSION**. Only use approved **OXYGEN COMPATIBLE** lubricants, which can be obtained from MEDÆS.

WARNING!
Before carrying out any maintenance on **low voltage electrical services** within the trunking**,** ensure that the circuits behind all fascias that are to be accessed are **de-energised and isolated first.**

The trunking carcass requires no special maintenance procedures, other than if it becomes damaged. Individual fascia plates are removable by peeling back the plastic cover strip at the top of the fascia and removing the screws. Fascia plates are split between extra low voltage, low voltage and gas services. This enables maintenance to be carried out without disturbance to other services. Circuit diagrams, component parts lists and descriptions are all available on request. The following symbols apply to this product and are used in these instructions and on the product in question. The meanings of these symbols are as specified below, left: -



- Read instructions
- Temperature range
- Date of manufacture (Year/Month)
- Alternating current
- Protected earth connection
- Type B applied part (EN 60601-1:1990)
- Dangerous voltage
- No suitbale for mounting on normally flammable surfaces (EN 60589-1)

Environmental Transport, Storage and Operating Conditions
Minimum ambient temperature - 0 degrees Celsius
Maximum ambient temperature - 40 degrees Celsius
Minimum relative humidity (non-condensing) - 10%
Maximum relative humidity (non-condensing) - 95%
Atmospheric pressure range - 700-1100 hPa

Cleaning
The trunking and components should be wiped over with a damp cloth frequently to remove any dust or foreign substances.

Environmental Protection
Discard the unit and/or components in any standard refuse facility. The unit does not contain any hazardous substances.

Electromagnetic Interference
Ensure any input and data cables are physically separated from other mains and data cables. MEDÆS General Ward Trunking with integral lighting units fitted is not suitable for use with euipment that may be affected by electromagnetic interference. Electromyograms, Electroencephalograms and Electrocardiograms should not be used in conjunction MEDÆS General Ward Trunking if integral lighting is fitted.

2. Electrical Details

WARNING!
It is necessary to check the integrity of the power source for safety at regular intervals. These checks should be carried out annually and replacement power supplies used as necessary.

Power source - Mains operated using various voltages and currents. See full component details for further information.
Type of protection against electric shock - Class 1 (Mains supplied equipment using a protected earth)
Mode of operation - Continuous (equipment may be left switched on indefinitely)
Degree of protection against ingress of liquids - IPX0 (Not protected)
Degree of mobility - Permanently installed (This unit is electrically connected by permanent means)
Degree of protection - Type B (no Applied Part or with and Applied Part not designed to meet F type (floating) requirements)
Degree of protection against flammable anaesthetic mixtures - Not protected (not for use with flammable gases)

3. Description

The Envirom Bedspace Management System is designed to provide a safe, efficient means of delivering services to patients/staff in general ward areas. The lighting units are designed to provide illumination for both reading and general area illumination. Lighting is designed to comply with the requirements of CIBSE LG2 "Hospitals and Healthcare Buildings". LG2 is a recommendation which is produced by the 'Chartered Institute of Building Services Engineers' (CIBSE) in the U.K.. LG2 is a comprehensive in-depth guide, which has been developed over many years, incorporating the vast experience of its many authors. Integral luminaires provided are classified as fixed, general purpose, with class I protection against electric shock and IP4X. These luminaires are not suitable for mounting on normally flammable surfaces.

Each trunking system consists of a number of specifically designed extrusions, joined together to form a carcass to suit the particular application. A medical rail extrusion can be added as an accessory at any time. The dimensions of the medical rail profile (10mm x 30mm) comply with the European standard EN 12218 and will accept most clamps currently on the market.

Segregation of services i.e. extra low voltage (<48 volts), low voltage (<600 volts but >48 volts) and medical gases, is maintained throughout. Electromagnetic noise in communication and data systems is minimised with metallic shielding forming the segregation. The trunking system is manufactured in accordance with EN 793 for “Medical Supply Units”, EN 60601-1 for "Medical Electrical Equipment" and International Standard, ISO 11197. All units comply to HTM 2015 and HTM2022 and with the latest edition of the IEE and IEC regulations. The trunking is ‘CE’ marked under the Medical Devices Directive 93/42/EEC with approval from notified body no. 0301 (BVQI). Under this directive, trunking is classified as a Class IIb Medical Device. All lights are tested to and comply with EN 60598-1and EN 60598-2-25 "Luminaires - General requirements and tests" and "Luminaires - Particular requirements for safety - Luminaires for use in clinical areas of hospitals and healthcare buildings".

Electrical sockets from the U.K., Europe and the U.S. and many other types of socket may be fitted. Provision for nurse call's, data and monitoring sockets can be made at the point of manufacture. Trunking is usually supplied pre-piped, pre-wired and fully tested but may also be supplied in carcass form.

The trunking system is capable of taking most terminal units currently on the market including MEDÆS Gem 10’s. The general ward trunking system is designed to deliver Oxygen, Nitrous Oxide, O2/N2O 50%/50%, Medical Air, Surgical Air and Vacuum services. Gem 10 terminal units **must** only be used with probes complying with BS 5682:1998. Other terminal units should only be used with probes approved for medical applications by the original terminal unit manufacturer. Details of probes which may be used can be obtained by contacting MEDÆS technical department.

For all products carrying the CE mark, terminal units comply with EN 737-1 for pressure gases and vacuum. These terminal units, and therefore the trunking system in which they are housed are designed for installation as part of a medical gas pipeline system complying with EN 737-3. The following tables lists minimum performance requirements met by terminal units of these types. The performances may well be greatly exceeded in some cases.

Terminal unit nominal distribution pressure (kPa)	Test pressure (kPa)	Test flow (l/min)	Maximum pressure drop across terminal unit (kPa)
400-500	320	60	15
400-500	320	200	70
800-1000	640	300	70
Vacuum	40[1)]	40	15

[1)]Absolute pressure

4. Installation

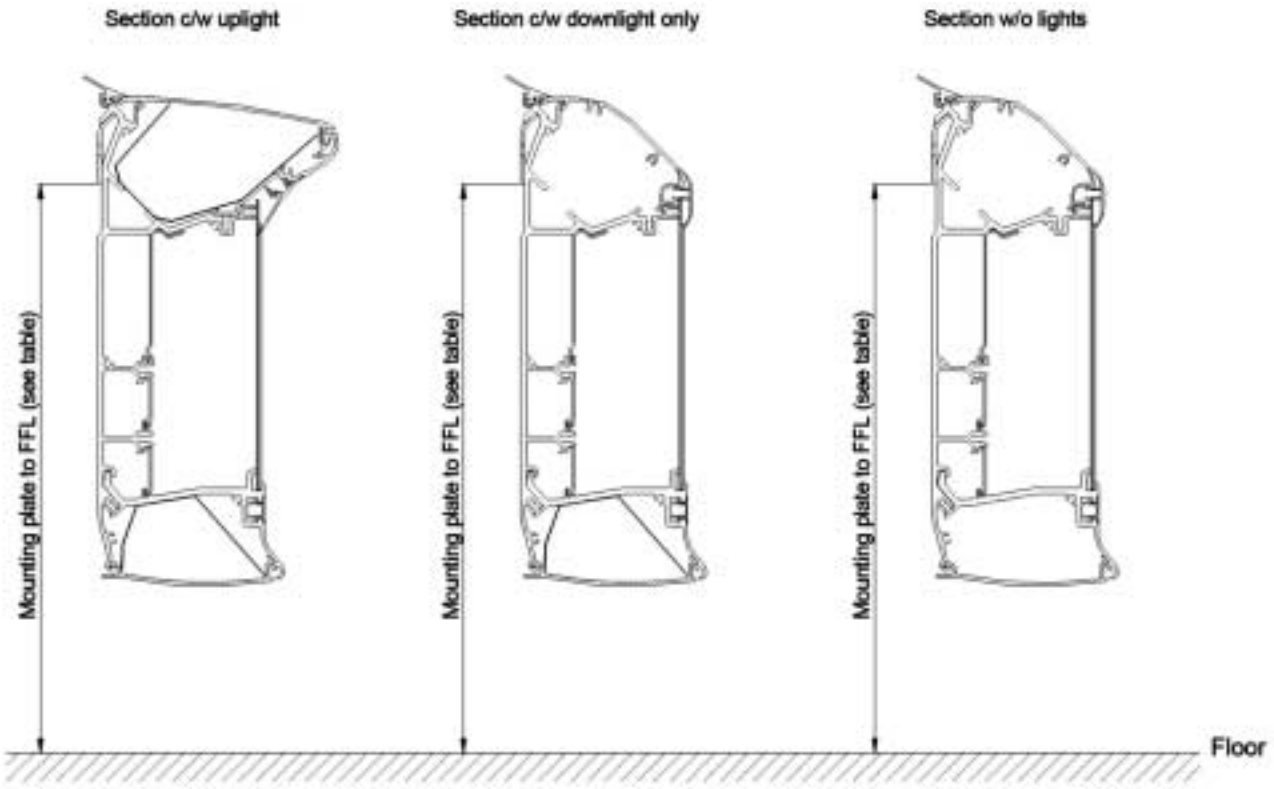
Note...

The installation of the mounting plates will form the basis of the trunking installation. It is vital that the correct mounting height is adhered to when mounting trunking with integral lighting. Please see figure 1 for the details of mounting height of different sections. There may be certain circumstances where a different mounting height is necessary, due to low ceilings or specific requirements, this will be shown on the approved drawing from MEDÆS. It is also very important to ensure that if fitted, reading lights are installed centrally to the bed positions. **When installing trunking that are made up of numerous joined sections, ensure that the wall space is at least 200mm longer than the entire length of the trunking.**

4.1 Trunking Wall Mounting Plates. Install

(a) Chalk line the position of the bottom of the wall mounting plate onto wall. The mounting height to the top of the plate is given in **figure 1.**Check wall for flatness. If the wall is not flat ensure that all mounting plates are packed out to give a straight linear edge on which to mount trunking. **If the plates are not packed out sufficiently, tightening of screws during final fixing will inevitably bend the trunking carcass.**

Figure 1 - Selection of Trunking Mounting Height

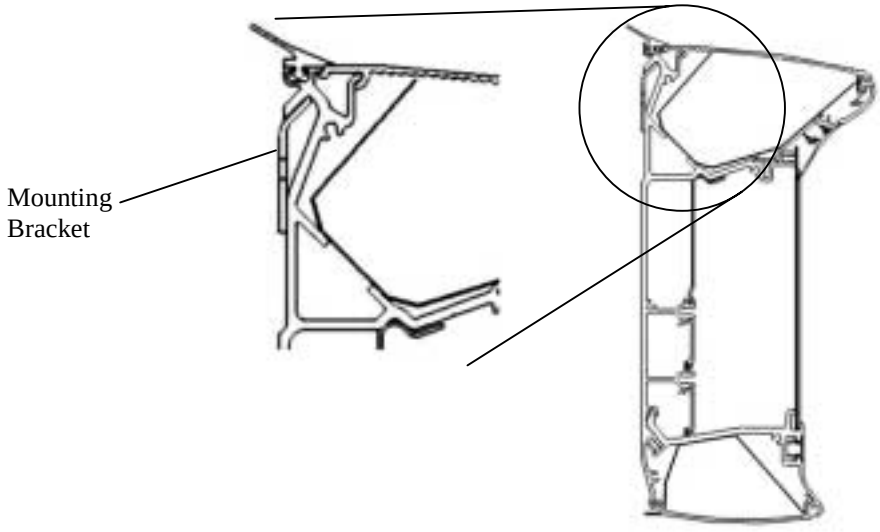


Section Type	Factors Affecting Mounting Height
All sections with an uplight	The mounting height should be 1750mm **except where otherwise specified on the drawing supplied by MEDÆS.**
Section with downlight only	The most suitable mounting height for a reading light will be to suit the height of the bed, taking into account the height of a patients shoulders in an upright seated position. Ensure that there will be no obstruction by bed frames or other equipment.
Section without any lights	The only factor to take into account here is the terminal unit mounting height. HTM2022 recommends that the central point of any terminal unit should be between 900 and 1400mm.

(b) Fix mounting plates to wall using suitable screws. It is suggested that either UK or DIN M6 countersunk machine screws or No.10 countersunk woodscrews are suitable sizes for fixing the plates. There should be a minimum of 2 mounting plates per trunking section, with 3 being required per section for lengths in excess of 3.0m.
(Note: When joining multiple sections of trunking it is desirable to fit a mounting plate between the trunking joint.)

(c) Position trunking to wall locating the lip of the backplate over the angled protrusion of the mounting plate. Please see **figure 2** for pictorial detail. Ensure that trunking is horizontal along full length. If trunking does not sit neatly on the mounting plates, lower trunking and pack out plates to suit.

Figure 2 – Mounting Plate Position

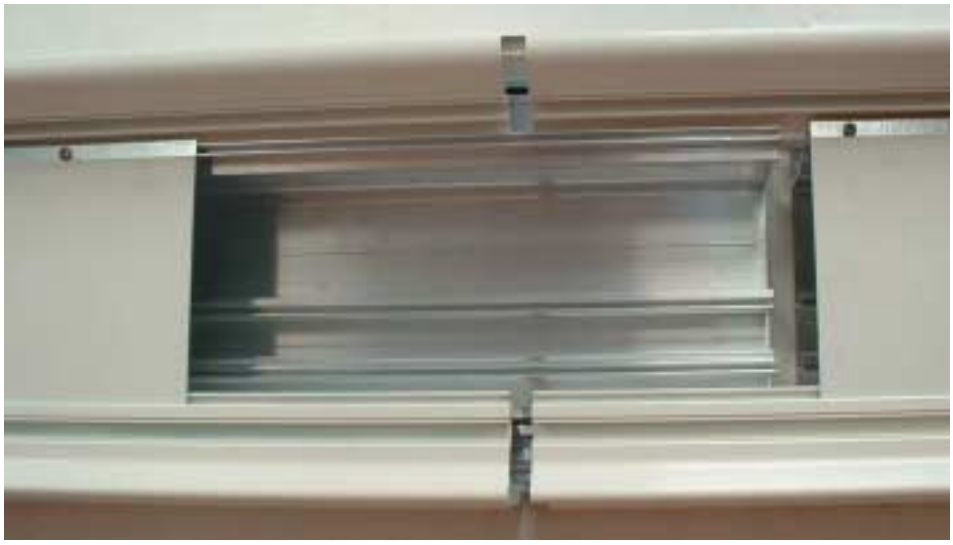


(d) When joining multiple sections of trunking always start from the gas feed end. Remove the over lapping section of fascia plate and gas pipe end caps. Fit joining pins and copper pipe couplings to one section of the trunking as shown in figure 3. Position next section of trunking to wall locating the lip of the backplate over the angled protrusion of the mounting plate. Ensure that trunking is horizontal along full length. If trunking does not sit neatly on the mounting plates, lower trunking and pack out plates to suit.

Figure 3 – Preparation for Trunking Joining

Slide the trunking sections together ensuring that the sections, pins and pipe couplings are inline (See figure 4).

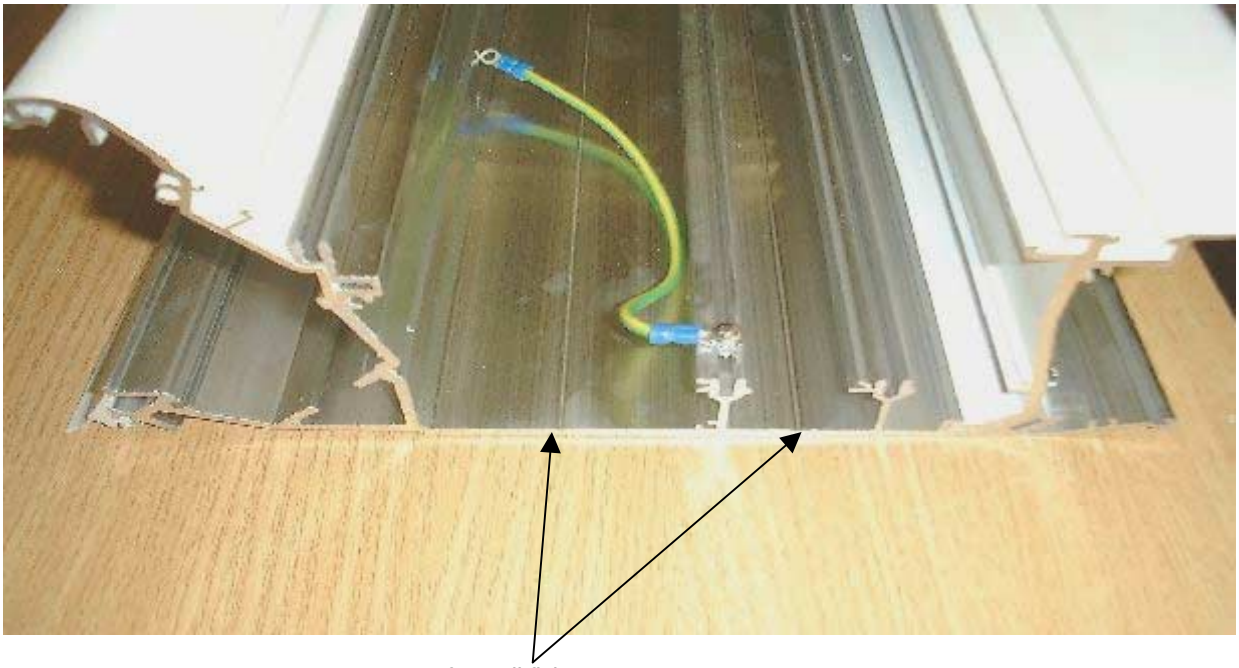
Figure 4 – Trunking Joining



Protect the end of the trunking and gentle tap together using a soft mallet until the gap between the trunking sections has closed.

(d) Remove trunking fascia plates.
(e) Drill suitable holes through trunking backplate and into wall accept wall fixings. Take note of **figure 5**, which shows correct positions in backplate for fixings to be inserted.

Figure 5 - Screw Hole Positions



(f) Insert fixings and tighten, ensuring that the trunking carcass does not bend due to over tightening the backplate to the wall. Packing may again be required if the wall is not sufficiently flat.
(g) Check that the trunking carcass is secure and no movement of the carcass in relation to the wall can be seen by exerting firm hand pressure from the side, front, below and above individually. When the trunking has been fixed securely to the wall move to step 4.2.

4.2 Downdrops. Install (if required).

(a) Mark and drill the mounting holes in the downdrop.

(b) Centralise the downdrop back plate between the entry point in the trunking. There should be approximately 7mm gap on either side of the downdrop (See Figure 6).

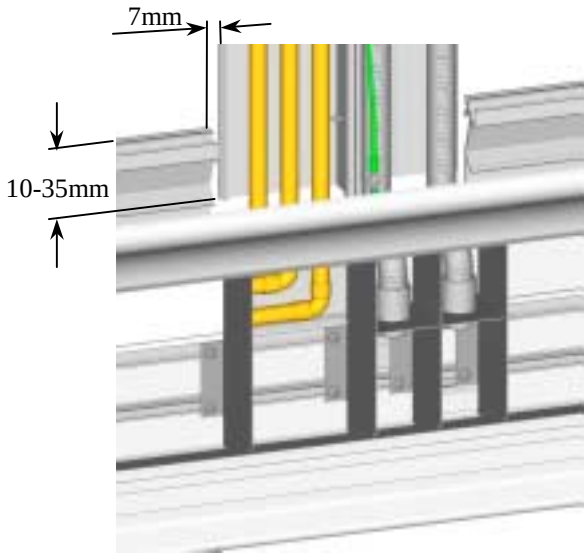
(c) Ensuring that downdrop is vertical and the rear face is in line with rear of trunking. With the back plate up against the line of the ceiling the bottom of the downdrop should be between 10 and 35mm below the line of the trunking (See figure 6).

(d) Mark the wall in the positions of the downdrop mounting holes.

(e) Fix to wall with adequate fixings, pack out as necessary.

(f) Do not replace cover plate at this stage. Only replace when installation is complete.

Figure 6 – Install Downdrop Backplate



4.3 Pipework. Braze (where applicable).

Note... The gas pipework already installed in the trunking has been workshop leak tested, only new joints made should normally be tested. Remove any plastic components around area to be brazed.

WARNING!
Cross connection of medical gas pipelines could prove fatal. Only work on one gas service at a time, and ensure that all labelling is correct and maintained throughout the pipeline length. Cross connection tests are detailed in EN 737-3, of which copies are available from MEDÆS. If in doubt ask.

(a) All brazed joints made should be made using the approved jointing technique as detailed in the contract specification. HTM 2022 installations should use the fluxless brazing technique with Oxygen-free Nitrogen purge.

(b) Make and braze all necessary joints.

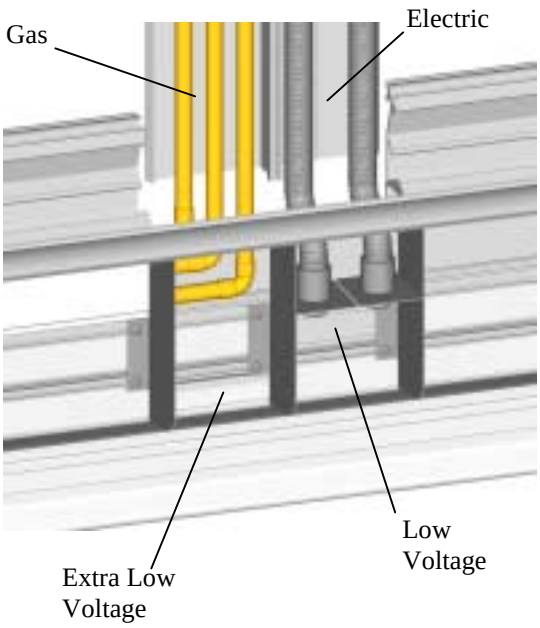
4.4 Low voltage electrical connections. Connect (where applicable).

(a) The trunking is supplied pre-wired with a customer-specified number of low voltage ring/radial mains, which are terminated into the electrical sockets. For a radial main, the electrical contractor should terminate the supplies into the first socket on each circuit, which will be the socket closest to the feed end. Where a ring main is specified, the electrical contractor should terminate the supplies into the first and last sockets on each circuit. These will be the sockets closest to and furthest from the feed end on each circuit. Segregation of the low voltage supplies is maintained through the downdrop (where applicable). 2 conduits are available to carry the low voltage cables through the downdrop to the trunking.

(b) Where integral lighting units are supplied, a terminal block is provided in the main body of the trunking system. A round bodied 2 core and earth cable (4-7mm diameter) should be brought into the trunking system, and terminated through the strain relief bushing provided. The supply to the lights should be fused so as to protect the 0.75 sq.mm cables factory fitted to the termination block.

(c) Where a single piece of trunking is installed all the internal pre-wiring has been carried out, however when 2 or more pieces are to be joined some final termination of low voltage cables is to be carried out as follows: -

Figure 7 – Cable Routing



At each trunking carcass split line marked cables will be coiled for connection to their respective components i.e. Ring 1 power sockets, Uplights, Reading Lights etc. These cables are to be connected by the electrical contractor.

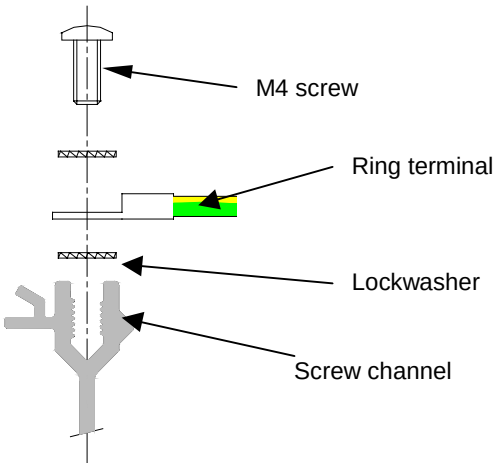
4.5 Extra low voltage electrical connections. Connect (where applicable).

(a) Normally no extra-low voltage cables will be installed, this is the responsibility of the electrical contractor.
(b) Extra-low voltage cables are to be run within the lower channel in the main body behind the fascia plates.
(c) Segregation of extra-low voltage supplies is maintained through the downdrop (if used).

4.6 Trunking earth bonding cables. Connect.

(a) Top covers, bottom covers and fascia plates all have earth bonding cables attached, these should be connected prior to fitting the covers. See **figure 8** for pictorial view of an earth strap fitted to cover.
(b) When joining two or more trunking carcass lengths an earth bonding strap must be fitted between the two adjoining backplates. This bonding strap is normally already fitted to one of the carcasses.
(c) At the feed end of the trunking, a 16mm^2 earth conductor shall be brought in and attached as shown in **figure 8**. A ring crimp terminal should be fitted as shown using the lockwashers and screw supplied.

Figure 8 - Electrical Installation Details



Installation of 16mm^2 earth cable

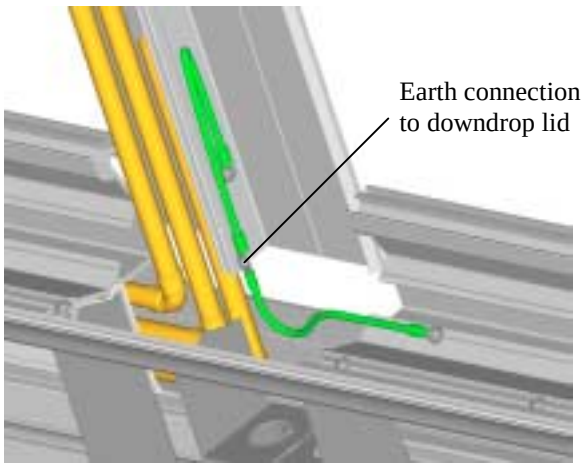
A continuity test or visual check should be made on each pipeline to ensure that the medical gas pipes have been connected to earth upstream of the trunking system. If no functional earth provision is fitted, a suitable earth fitting should be attached around each pipeline and connected to earth. No earth provisions for pipes have been factory

4.7 Downdrop earth bonding cables. Connect (where applicable).

(a) The backplate and the downdrop cover must have earth bonding cables attached, these need to be connected prior to fitting the downdrop and trunking covers. See **figure 9** for pictorial view of an earth strap fitted.
(b) Earth bonding straps are pre-fitted to the downdrop base and trunking. When fitting the downdrop cover, connect the

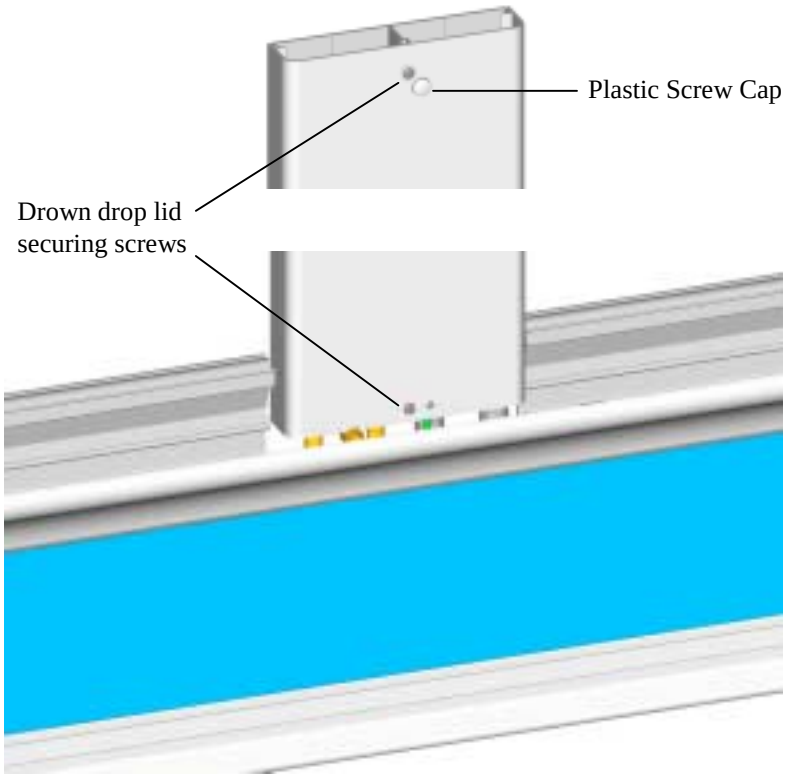
(c) earth bonding from the trunking and base as shown in figure 9.

Figure 9 – Downdrop Earthing



(d) Secure the downdrop lid at the top and bottom of the unit as shown in figure 10.

Figure 10 – Securing Downdrop Lid



(d) Ensure that installation is sound and replace all fascia plates on trunking.

5. Commissioning

Note…
This product forms part of the piped medical gas system, designed to comply with EN 737-3. The commissioning procedure within this document must be followed, unless otherwise specified in the contract specification.

5.1 Commissioning Procedure for Medical Gas Pipeline System

The following is a list of all tests that need to be carried out for compliance with EN 737-3 clause 12.2. All tests noted in clause 12.1 of EN 737-3 are carried out during manufacture of the trunking system: -

(a) test for leakage;
(b) test for leakage and check shut-off valves for closure, zoning and identification;
(c) test for cross connection;
(d) test for obstruction;
(e) check terminal units and NIST connectors for mechanical function, gas-specificity and identification;
(f) verification of system performance;
(g) test of pressure-relief valves;
(h) functional test of all sources of supply;
(j) tests of control, monitoring and alarm systems;
(k) purging with test gas;
(l) test for particulate contamination of the pipelines;
(m) filling with specific gas;
(n) test of purity of air produced by compressor;
(o) test of gas identity.

Please see EN 737-3 for full details of the requirements of each test listed above. Copies of EN 737-3 can be obtained from MEDÆS Ltd. as required.

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