EURODIM Twin Tech

Installation Manual
V 1.2

ADB STAGELIGHT
AN OSRAM BUSINESS

Summary

1 Warning and notice convention:

GB

1) Warning: Incorrect connection may cause damage or injury
2) For professional use only
3) The equipment shall be installed and serviced by skilled and trained personnel exclusively.
4) Read notice and warning before use
5) Warning: high leakage current; this equipment must be grounded
6) Isolate before removing covers.

FR

1) Attention: une connexion incorrecte peut causer des dommages ou des blessures
2) Pour usage professionnel seulement
3) L'équipement doit être installé et entretenu par du personnel qualifié et formé exclusivement.
4) Lire les notice et avertissements avant utilisation
5) Avertissement: courant de fuite élevé; Cet équipement doit être mis à la terre
6) Isoler avant de retirer les capots.

DE

1) Warnung: Falsche Verbindung kann zu Schäden oder Verletzungen führen
2) Nur für den professionellen Gebrauch
3) Die Ausrüstung muss professionell und ausschließlich mit Personal besetzt sein.
4) Vor Gebrauch Hinweise und Warnhinweise lesen
5) Warnung: hoher Leckagestrom; Dieses Gerät muss geerdet sein
6) Vor dem Entfernen der Abdeckungen isolieren.

DK

1) Advarsel: Forkert forbindelse kan forårsage skade eller skade
2) Kun til professionel brug
3) Udstyret skal kun installeres og serviceres af faglært og uddannet personale.
4) Læs varsel og advarsel inden brug
5) Advarsel: høj lækstrøm; Dette udstyr skal være jordet
6) Isolér inden fjernelse af dæksler.

FI

1) Varoitus: Väärä yhteys voi aiheuttaa vaurioita tai vammoja
2) Vain ammattikäyttöön
3) Laitetta saa käyttää ja huoltaa vain ammattitaitoinen ja koulutettu henkilöstö.
4) Lue ilmoitus ja varoitus ennen käyttöä
5) Varoitus: suuri vuotovirta; tämä laite on maadoitettava
6) Erota ennen kansien poistamista.

ES

1) Advertencia: una conexión incorrecta puede causar daños o lesiones
2) Sólo para uso profesional.
3) El equipo debe ser instalado y reparado exclusivamente por personal calificado y capacitado.
4) Lea el aviso y la advertencia antes de usar
5) Advertencia: alta corriente de fuga; Este equipo debe estar conectado a tierra
6) Aislar antes de retirar las cubiertas.

IT

1) Avvertenza: un collegamento errato può causare danni o lesioni
2) Solo per uso professionale
3) L'apparecchiatura deve essere installata e sottoposta a manutenzione esclusivamente da personale qualificato e addestrato.
4) Leggere avviso e avvertenze prima dell'uso
5) Attenzione: alta corrente di dispersione; questa apparecchiatura deve essere collegata a terra
6) Isolare prima di rimuovere i coperchi.

GR

1) Προειδοποίηση: Η εσφαλμένη σύνδεση μπορεί να προκαλέσει ζημιά ή τραυματισμό
2) Μόνο για επαγγελματική χρήση
3) Ο εξοπλισμός πρέπει να εγκαθίσταται και να συντηρείται αποκλειστικά από εξειδικευμένο και καταρτισμένο προσωπικό.
4) Διαβάστε την ειδοποίηση και προειδοποίηση πριν από τη χρήση
5) Προειδοποίηση: υψηλό ρεύμα διαρροής. αυτός ο εξοπλισμός πρέπει να είναι γειωμένος
6) Απομονώστε πριν αφαιρέσετε τα καλύμματα.

NL

1) Waarschuwing: Verkeerde aansluiting kan schade of letsel veroorzaken
2) Alleen voor professioneel gebruik
3) De apparatuur moet uitsluitend worden geïnstalleerd en onderhouden door bekwaam en opgeleid personeel.
4) Lees kennisgeving en waarschuwing voor gebruik
5) Waarschuwing: hoge lekstroom; deze apparatuur moet worden geaard
6) Isoleer voordat u de afdekkingen verwijdert.

NO

1) Advarsel: Feil tilkobling kan forårsake skade eller skade
2) Kun for profesjonell bruk
3) Utstyret skal installeres og betjenes av faglært og utdannet personell utelukkende.
4) Les varsel og advarsel før bruk
5) Advarsel: høy lekkasjestrøm; Dette utstyret må være jordet
6) Isoler før dekslene fjernes.

PT

1) Aviso: conexão incorreta pode causar danos ou ferimentos
2) Apenas para uso profissional
3) O equipamento deve ser instalado e reparado exclusivamente por pessoal qualificado e treinado.
4) Leia o aviso e aviso antes de usar
5) Aviso: alta corrente de fuga; Este equipamento deve ser aterrado
6) Isole antes de remover as tampas.

PO

1) Ostrzeżenie: Nieprawidłowe podłączenie może spowodować uszkodzenie lub obrażenia
2) Tylko do użytku profesjonalnego
3) Sprzęt powinien być instalowany i serwisowany wyłącznie przez wykwalifikowany i przeszkolony personel.
4) Przeczytaj ostrzeżenie przed użyciem
5) Ostrzeżenie: wysoki prąd upływowy; ten sprzęt musi być uziemiony
6) Izoluj przed usunięciem pokryw.

SE

1) Varning: Felaktig anslutning kan orsaka skada eller skada
2) Endast för professionell användning
3) Utrustningen ska installeras och underhållas av kunnig och utbildad personal uteslutande.
4) Läs varsel och varning före användning
5) Varning: hög läckström; Denna utrustning måste jordas
6) Isolera innan du tar bort locket.

BU

1) Предупреждение: Неправилната връзка може да причини повреда или нараняване
2) Само за професионална употреба
3) Оборудването се инсталира и обслужва изключително от квалифициран и обучен персонал.
4) Прочетете предупреждение и предупреждение преди употреба
5) Предупреждение: висок ток на утечка; това оборудване трябва да бъде заземено
6) Изолирайте, преди да свалите капаци.

RO

1) Atenție: Conexiunea incorectă poate provoca avarierea sau rănirea
2) Numai pentru uz profesional
3) Echipamentul trebuie instalat și deservit exclusiv de personal calificat și instruit.
4) Citiți avizul și avertizarea înainte de utilizare
5) Atenție: curent de scurgere ridicat; acest echipament trebuie să fie împământat
6) Izolați înainte de a scoate capacele.

Warms you when electricity may cause injury

Warms you when there is a possibility of other type of injurie

Warms you that instruction must be readied.

Protective earthing conductor terminal

Connection, protective conductor (PE) The protective conductor (PE) should be connected first to main protective earthing terminal before connecting the line and neutral to avoid shock hazard, and a PE connection to the main PE terminal is essential before connecting the mains to avoid electric shock

1.1 Safety

The Eurodim twintech is professional fully digital dimmers built in accordance with European safety standards EN 62368.
It is a Class I equipment designed and manufactured to EN 62368 and requires imperatively a safety earth connection in compliance with local regulations.

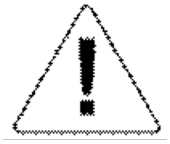
To prevent any risk of electric shock, do not remove any cover or part of the enclosure. Access to internal parts is not required for normal operation. **Refer servicing to skilled and trained service personnel exclusively**. Disconnect from the power supply prior to opening for inspection or service.

WARNING! LETHAL VOLTAGES ARE PRESENT INSIDE

Connection to an inappropriate power source may irreversibly damage the dimmer unit, it is the user's responsibility to use it for its intended purpose and to check the equipment connected to it.

The Eurodim Twintech is professional equipment developed with the simplicity of use in mind.
However, to obtain full benefits of the safety measures, the equipment shall be installed and serviced by skilled and trained personnel exclusively.

This equipment is not suitable for use in locations where children are likely to be present

CAUTION! 

Installation is entirely at your own risk. Read this installation manual from cover to cover before attempting installation. Do not attempt installation unless you are suitably qualified. Installation errors may endanger operators and cause system damage and failure. If you do not understand a point in this manual, don't guess. Contact ADB or one of our authorized distribution partners for advice.
We recommend ordering commissioning through ADB or one of our authorized partners prior energizing the system. Not following this recommendation may result in equipment damage that may not be covered by your warranty!

The equipment shall be installed and serviced by skilled and trained personnel exclusively.

2 DELIVERY - UNPACKING

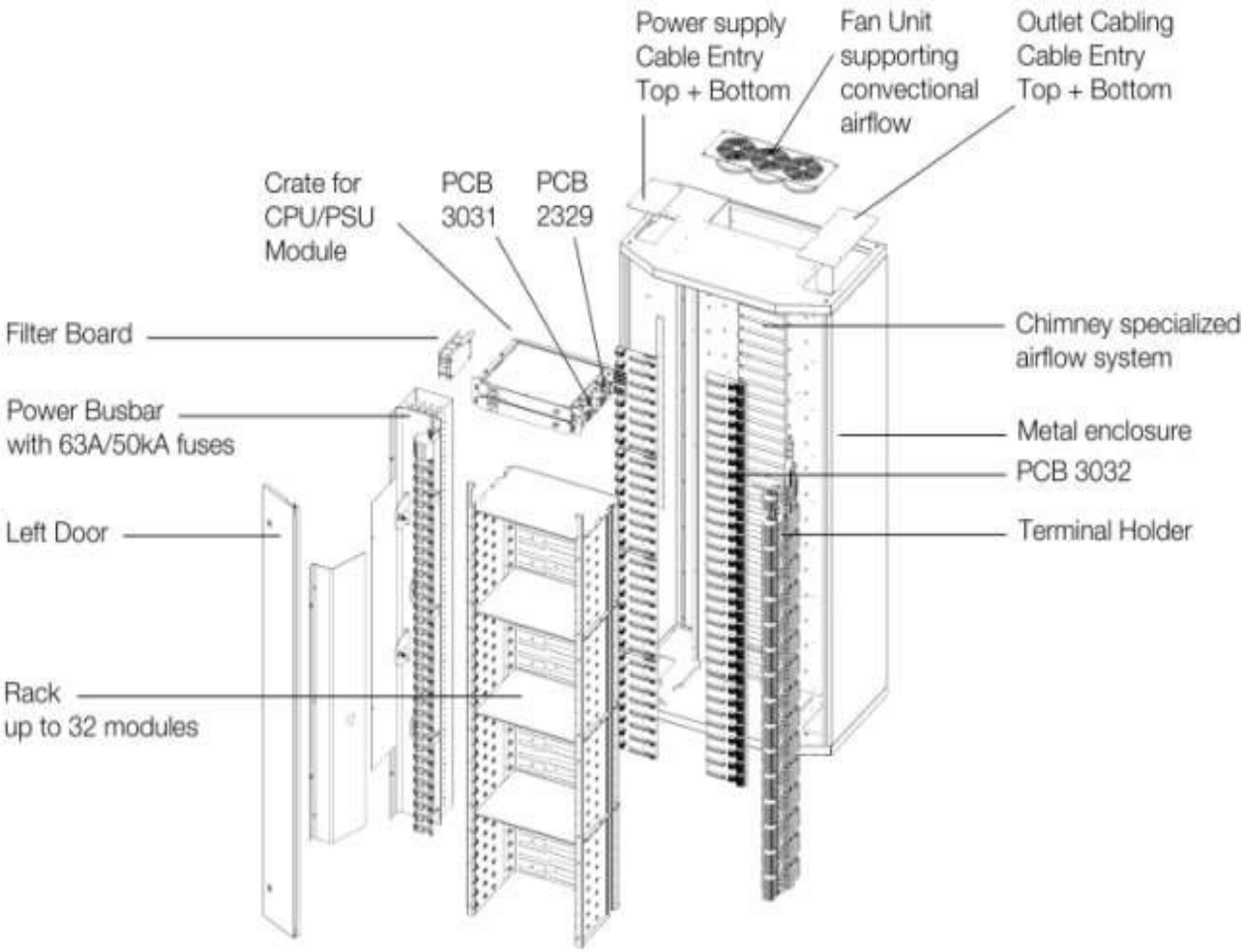
Thank you for purchasing our EURODIM Twin Tech installation dimmer. We have designed this installation dimmer to provide you with a superior professional dimmer in design and engineering. We are confident that it will perform to our expectations for many years to come.

Upon delivery of your equipment, open the packaging carefully and examine the device. If you observe any damage, contact the shipping company immediately and have your complaint duly recorded. Please take pictures in order to prevent further misunderstandings.

The plug-in dimmer modules, Human (User) Interface and controller(s) are shipped separately from the cabinet. You may rest assured that your equipment left our factory in perfect condition. Check whether what you have received is in conformity with the delivery notice and whether the notice is in conformity with your order.
In the event of any error, contact your shipper immediately to clarify the situation and receive full satisfaction.
If you find nothing wrong, replace the material in the packing and store it in a warm place, away from dust, humidity and mechanical hazards, while awaiting final installation.
Never leave the material unprotected on the work site.

Programming and setting up the cabinet (configuration) is described in a separate manual.

3 DESCRIPTION



4 INSTALLATION

4.1 Dimmer room

4.1.1 Preparation

Determine the dimensions of the dimmer room so as to place all EURODIM Twin Tech cabinets easily. Provide for an open space of approximately 90 cm in front of the cabinets to facilitate maintenance. Before attempting to move the rack(s) into the final position, check access routes to the dimmer room for space to manoeuvre through doorways and around corridor corners. The cabinets can be placed against a wall, side by side or back to back. The supply cables and the load cables can enter the wiring compartment either from the top or bottom of the cabinet. See drawing for size and location of cable entries.

RISK OF FIRE

Install only on concrete or other non-combustible floor

Dimmer Room Requirements

- A clean (not dusty) temperature-controlled environment.
- Restricted public access to prevent any unauthorized tampering with the dimmer settings.
- Soundproofing or performance area separation to muffle ventilation fan noise. Acoustic measurements are available from ADB Lighting Technologies.
- Provide for a free space, minimum 30 cm above the EURODIM Twin Tech so as to facilitate the exhaust airflow. If an optional “Silencer” is used, then more space may be necessary. The dimensions and weight of the cabinets are included in the Chapter “Characteristics”. Plan for fire extinguishers in compliance with local regulations. The lighting of the area should be sufficient for maintenance and inspection. A level of 300 lux is considered satisfactory. Plan for mains outlets in the room, independent of the supply of the dimmers.

Plan for an Ethernet network to the control room and a cable for remote “CPU1 - CPU2” selection (if applicable).

EURODIM Twin Tech cabinets are professional equipment and relevant safety rules are applicable. EURODIM Twin Tech cabinets should be placed in areas that are accessible only to persons responsible for maintenance, surveillance or repair of the equipment.
Please refer to local regulations and requirements.

The equipment shall be installed and serviced by skilled and trained personnel exclusively.

Such an area should be located as close as possible to the stage or studio, in order to reduce the length of the electrical cables, and therefore, the cost of installation. At the time of installation of the cabinets in the area, it should be completely unobstructed; that is, that all engineering work, wall or floor covering work, painting, electric lighting work, drilling,

welding, etc., must be completed.
Do not install the plug-in modules until all wiring installation is completed.

4.2 Ventilation of the dimmer room

The dimmer room should be dry at all times, free from dust and ventilated in such a manner as to comply with the following:

- Relative humidity: 5% to 90% without condensation.
- Temperature between + 5 °C and + 35 °C (ideal: + 20 °C).

In order to size the air-conditioning equipment required for the dimmer room, refer to the following dissipations:

- Cabinet electronics: 150 W global value for CPU(s), PSU and fans
- Thyristor modules:
  - 4 x 3 kW modules : 56 W per dimmer (worst case)
  - 3 x 5 kW modules : 76 W per dimmer (worst case)
  - 1 x 10 kW modules : 170 W per dimmer (worst case)

- Sinewave modules:
  - 4 x 2.5 kW modules : 60 W per dimmer (worst case)

- No-load losses of sine wave dimmers:
  - Sine wave dimmers have a no-load loss of approximately 4 W per dimmer.

In practice, you may consider a utility factor of 0.7: that is, on the average, 70% of the dimmers are at full load, while 30% are off.

4.2.1 Example No. 1

A dimmer room with a EURODIM Twin Tech cabinet equipped with 128 thyristors dimmers of 3 kW and a second cabinet with 96 thyristors dimmers of 5 kW. The cabinets are fitted with a back-up power supply for the processor unit. Utility factor = 0.7

1) Cabinet N°1:

Electronics: 1 x 150 W
Dimmers 128 x 56 W x 0.7 = 5017 W

2) Cabinet N°2:

Electronics: 1 x 150 W
Dimmers 96 x 76 W x 0.7 = 5107 W

ROOM TOTAL: 10124 W

In this example, it will be necessary to evacuate approximately 10124 W of losses.

4.3 Installation of the cabinets

4.3.1 Tools for commissioning

Operation	Connection Designation	Qty	Torque	Tools
Remove Doors	Pan Head Screw M4x12 PZ	1	1,5 Nm	Screw Driver PZ2
Remove Card Cage Dimmers	Pan Head Screw M4x12 PZ	5	2 Nm	Screw Driver PZ2
	Slotted Flat Head Screw M4 x 12 PZ	16	1,5 Nm	Screw Driver PZ 2
Open Cables aperture In & Out	Pan Head Screw M4x12 PZ	8	2 Nm	Screw Driver PZ 2
PE Connection Power In	Nut M10	1	8 to 10 Nm	Metric Wrenches 17
Sequential Diagnostics (Optional)	Nut M 5 / Flat Washers M 5 / Helical Spring Lock Washers M 5	2 of each	1,5 Nm	Metric Wrench 8
Input Connection (Bus Bar)	Nut M12	4	8 to 10 Nm	2 x Metric Wrenches 19
	Bolt M12	4	8 to10 Nm	
Output Connection (Output)	Terminal Connection Free Drive Screw	256	**1,2 Nm**	Flat Screw Driver 1 x 6, 5 (do not use power tools!)
PE connection (Output)	Screws M4 x 8	128	1,2 Nm	Screw driver PZ 1
DMX Connection	RJ 45	1		
	Phoenix MSTBVA 2,5 – 6	6	0,5 Nm	Flat Screw Driver 0,5 x 3, 5
Ethernet Connection	RJ 45	1		
TTD Human Interface	Nut M 4 / Flat Washers M 4 / Helical Spring Lock Washers M 4	X4 (of each)	1,5 Nm	Metric Wrench 7
Junction Plate (Accessory)	Hex Cap Screw M 16 x 25	4	3 Nm	Metric Wrenches 24

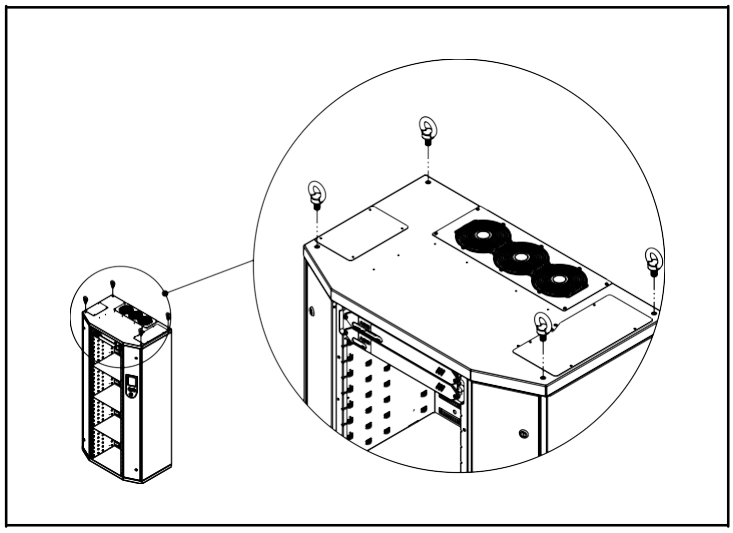
ADB recommend using Insulated Screwdriver.

4.3.2 Packaging

The cabinets are shipped on a wooden pallet.
Standard transport position is vertical; first open the top panel after removing the screws of the side panels.
The control processors, TTD Human Interface and dimmer modules are packed separately.

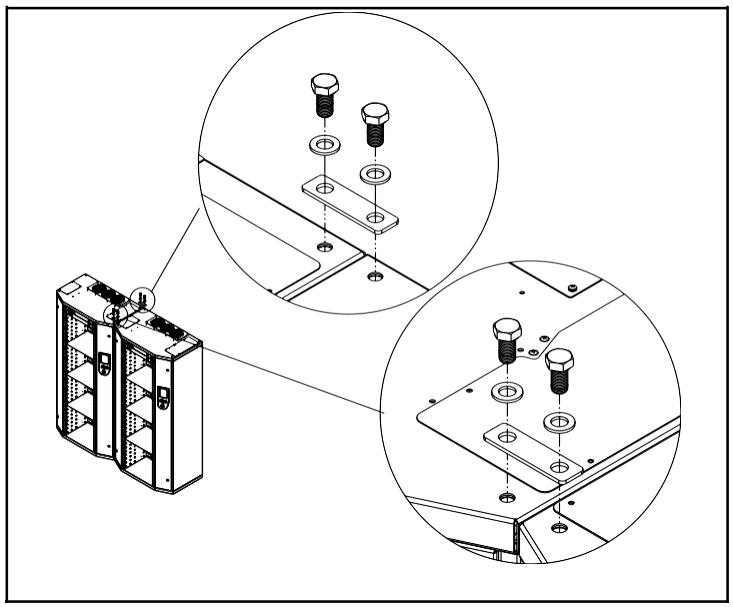
4.3.3 Lifting Eyes (Optional Accessory)

If the cabinet must be elevated with a crane, use 4 lifting eyes TTD/CAB/LIFT kit including 4 Lifting Eyes.



4.3.4 Junction Plate (optional part)

With the optional junction plate two cabinets can be connected to guarantee permanent fixation.



The weight and dimensions of the cabinets are included in Chapter “Characteristics”. Prior to positioning each cabinet, ensure that the floor is flat and horizontal to ensure a good weight distribution.

It is the responsibility of the system integrator or installer to check if the cabinet weight load can be supported by the building structure!

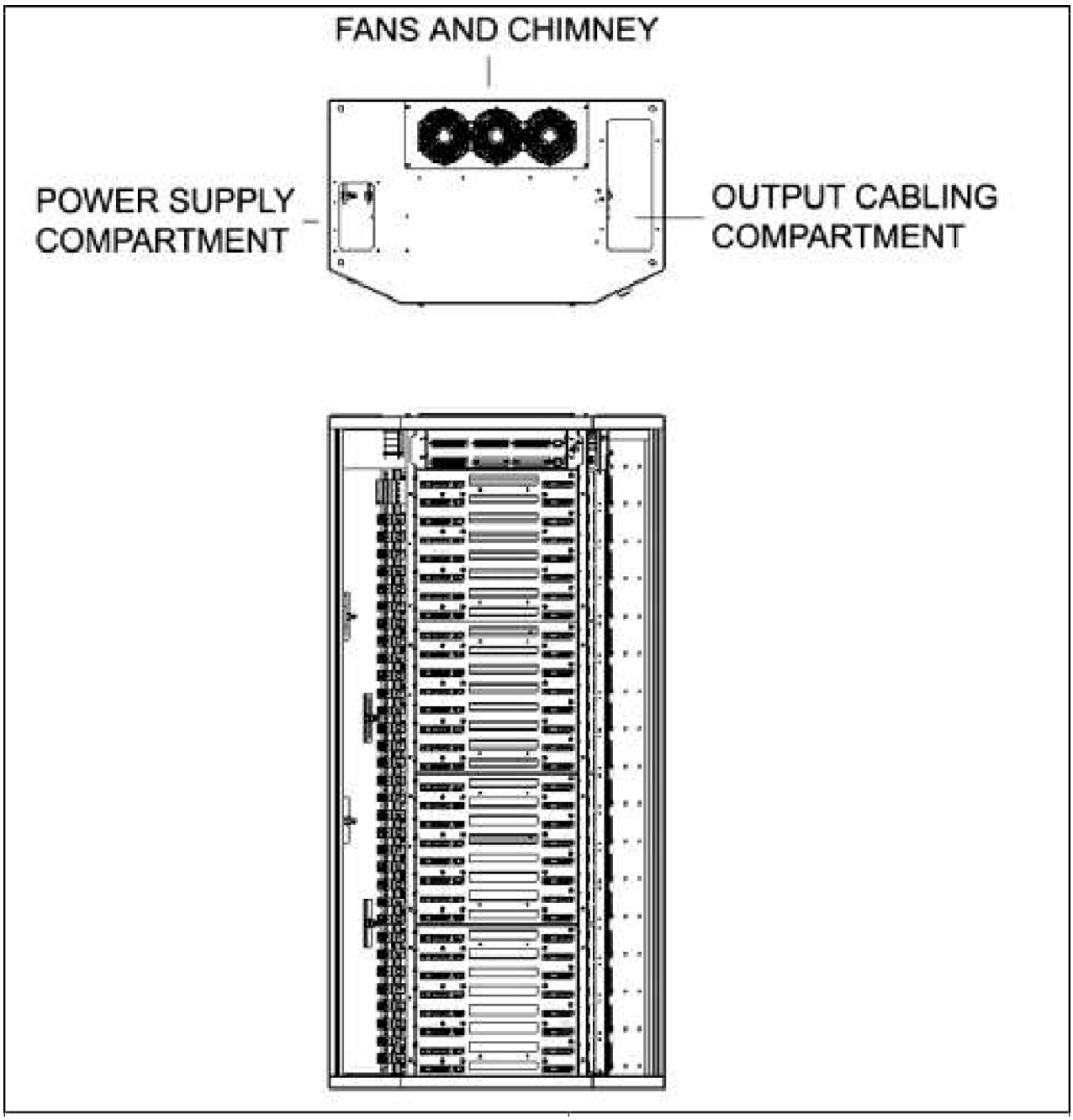
After you have positioned the cabinets:
- Do not remove the plastic, so as to keep a protection during the cabling works.
- Cut the plastic to have an access to the cabling areas.
- Remove the doors of the contractor's areas by simply opening the door hinges.

CAUTION! The doors are grounded / earthed.

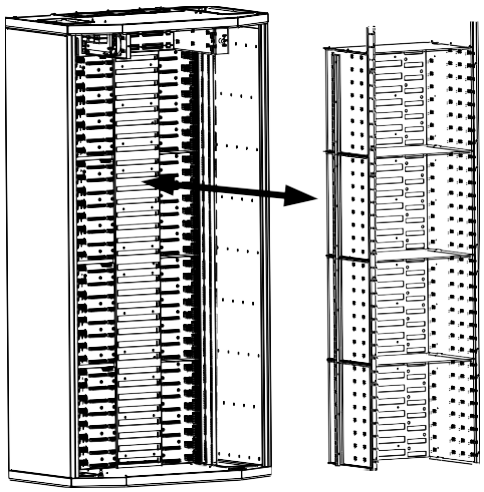
Gently remove this grounding connection
WHICH MUST BE RESTORED
when the door is eventually put back in place.
During the cabling works, leave the doors in a clean area and covered with a protection.

5 CONTRACTOR'S COMPARTMENT – SUPPLY

Front access only is required. Cable entry is possible through bottom and top of the cabinet. Cover panels for the unused cable entry/ exit apertures are supplied.

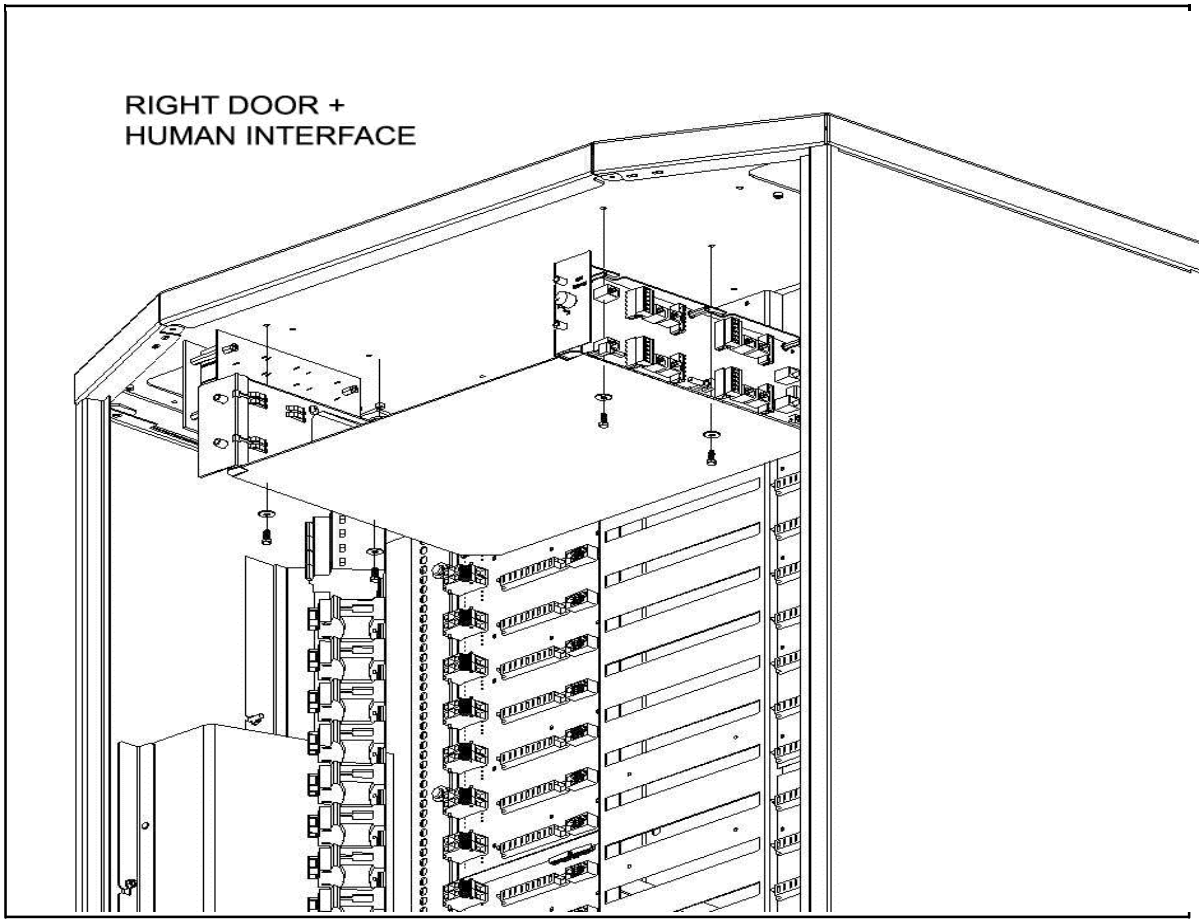


In order to gain maximum space to access the cabinet for installation and maintenance purposes, remove the two doors, loosen the 16 crosshead screws in the back and 3 left + right at the bottom and dismount the entire card cage in one piece.
Mounting the cabinet, first insert the card cage, **enter two dimmer modules to align the rack** and ***fasten the 16 screws***. Put the doors in place and **reconnect the doors earth connection**.



5.1 Controller Electronics - CPU/ PSU crate

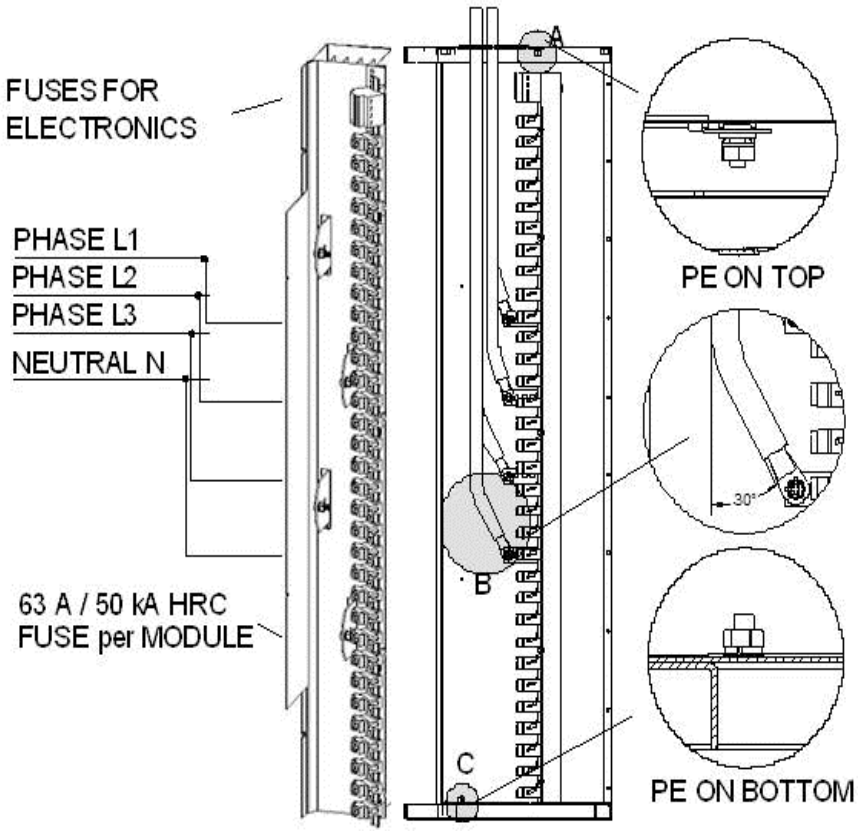
The CPU/ PSU crate is already mounted in our factory. If a removal is required, loosen the 4 screws and remove the complete crate gently. Replace the connected flat cables with caution.



5.2 Supply voltage

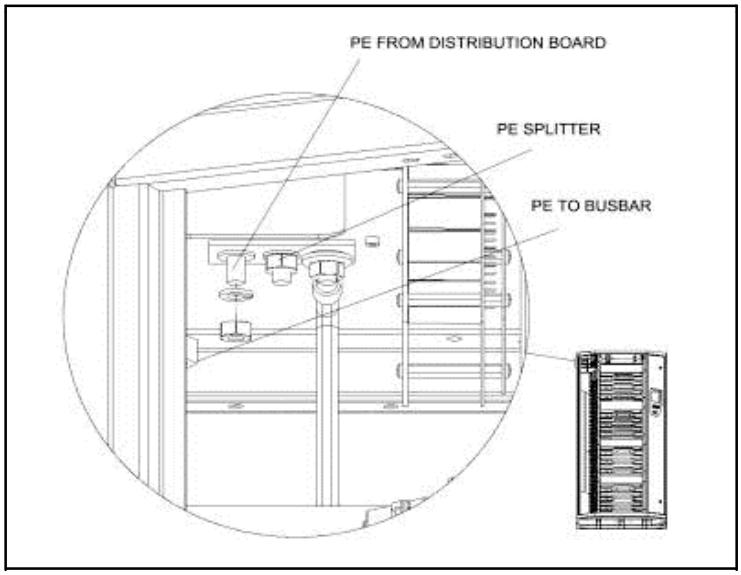
The high voltage/low voltage power transformer MUST ABSOLUTELY provide a three phase star system with available neutral (3NPE-400), and rated line voltage 380 V to 415 V between phases and 220 V to 240 V rated voltage between each phase and neutral. See “Protections” for more details.
The supply cable must have the four current-carrying power conductors (not necessarily the PE conductor) twisted under the same sleeve, in order to reduce the electrical noise induced by large dimmed currents.
The neutral conductor must be of equal or larger size than the phase conductors.
See the Appendix to this manual for more details about power supply systems for dimmer systems.

5.3 Supply busbar



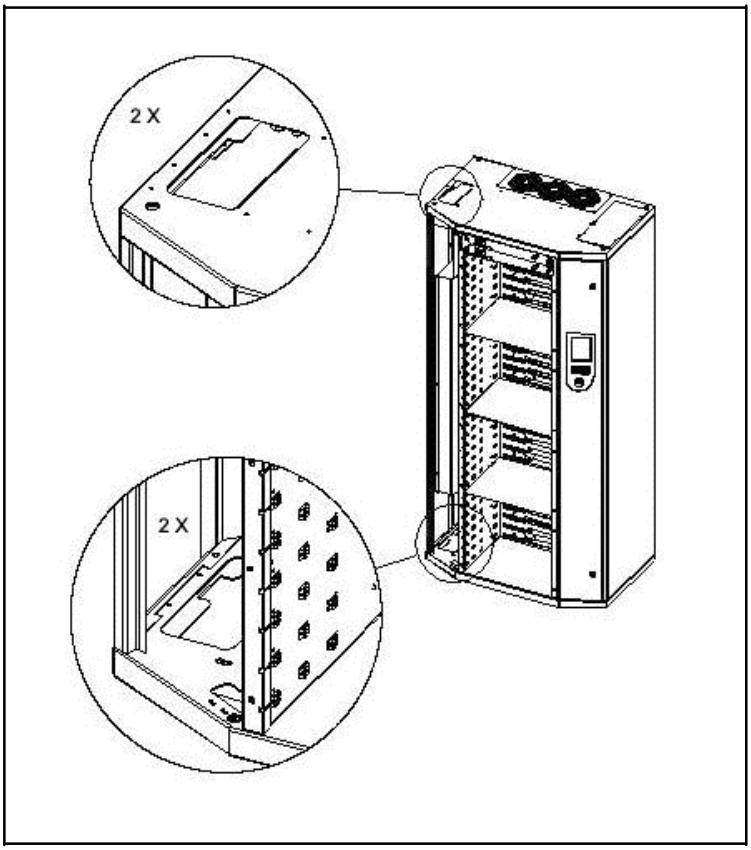
The three phase connection points are labelled L1 (phase No. 1, phase R), L2 (phase No. 2, phase S) and L3 (phase No. 3, phase T).
The Neutral is labelled N and the colour code for the Neutral is blue, as per IEC Recommendation 446.
The Phase and Neutral connection bars have 2 holes of Ø 13 mm, with 22 mm distance between centres. Connections are suitable for size M 12 bolts and nuts, for connection of up to four supply conductors. The conductors must be fitted with cable lugs.

5.3.1 Protected Earth (PE)



The Protective Earth (PE) on the busbar connection is a bolt and nut, size M10. Colour code: green/yellow. The equipotential connection, connecting the metal frame, is provided at the top of the supply cabling compartment. This connection is already wired to the busbar PE. An additional PE connection is provided on the cabinet's bottom of the supply compartment. All necessary nuts and washers are included.

5.4 Connecting power supply cables.



Supply cables can be wired in parallel, whilst each of these cables must contain the three phases and the Neutral under the same sleeve. This cable must be protected in the switchboard. The total size of the conductors must be chosen depending on the total power of the dimmers, the utility factor, the general protection on the supply side, the voltage drop in the line and local regulations. We suggest the use of several cables placed in parallel, to facilitate the work of the contractor: the cables usually have a bending radius of min. 15 times their external diameter. Respect an angle of 30 degree to connect the supply cable in order to achieve necessary distance between the cables and busbar. Use the wholes on bottom and top to connect the cable wraps for stress relief.

5.5 Ground and Earth Connections

The sound or video earth should be separated from the dimmer earth. The distance between the dimmer earth and the others should be as large as possible. Refer to local regulations for grounding.
Regarding the Protection Earth (PE) local and international rules and regulations apply. If in doubt about the correct please consult a local approved electrical engineer specialists for advice in your particular case.

6 SEQUENTIAL DIAGNOSTICS (Optional)

In case the client has ordered the option:
One Sequential Diagnostics kit must be installed for each dimmer cabinet in the installation.

The sequential diagnostics function is similar in function to the diagnostics already used in the EURODIM 3. The dimmer channels are examined one after the other (sequential) and the value is reported either to the local Human Interface or a remote program running the TTD Management Software.

The communication to a single remote reporting pc is done via RDM protocol based on an Ethernet Network to a Personal Computer with the Windows Operating System running the TTD RDM Management Software. The Ethernet information is generated by each EURODIM Twin Tech controller and physically available for each individual controller on dedicated RJ45 connectors (Two possible per cabinet if double controller options are used).

The TTD RDM Management Software and the necessary hardware are available as option for the EURODIM Twin Tech cabinet, which shall be ordered separately installation.

Standard functions include

- Presence of Mains and DMX signal
- Processor (active) check
- Over Temperature
- Fan Failure (Information per FAN!)
- DMX Control Levels
- Local test of a dimmer (steady, flash or chaser)
- Automatic self-test of control electronics.

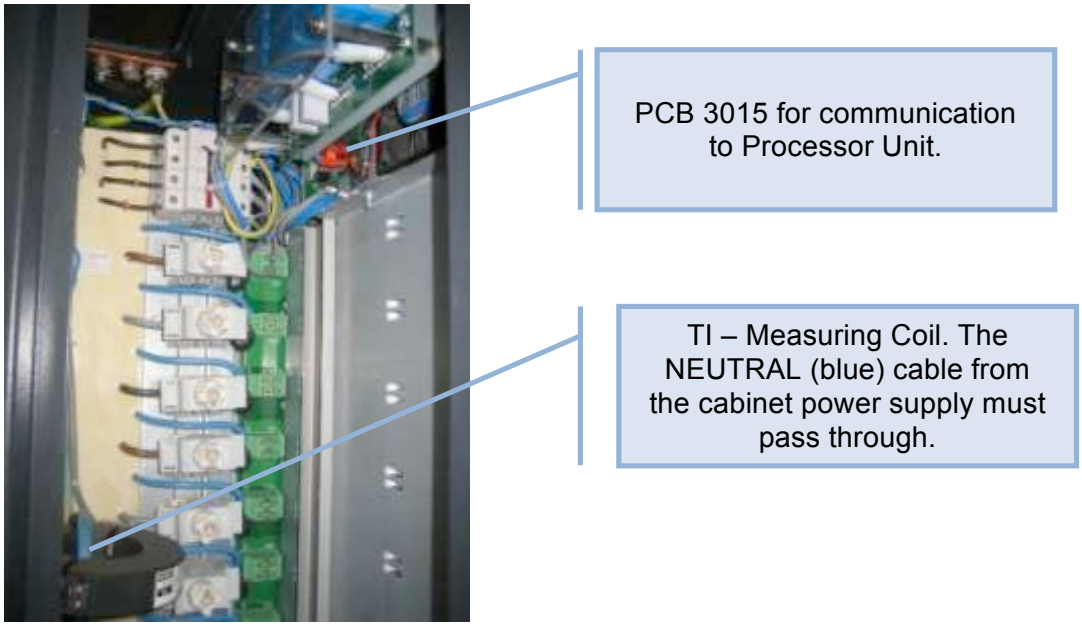
Error messages and all events/parameters are available for display locally on the EURODIM Twin Tech Human Interface Controller and/or remotely on the TTD RDM Dimmer Manager PC connected via an Ethernet Network.
Scan Load and the related functions are pre-show[1] test routines providing additional information on the status of each dimmer, i.e.

- Value of the dimmer load (kW)
- Deviation from reference load
- No load, overload warnings
- Short-Circuit

The necessary hardware to perform Sequential Diagnostic measurements is an option and which shall be installed at the client's site.

[1] Sequential Diagnostics cannot be used during a show, since control is disabled and the dimmers system runs through a test routine.

6.1 Hardware installation



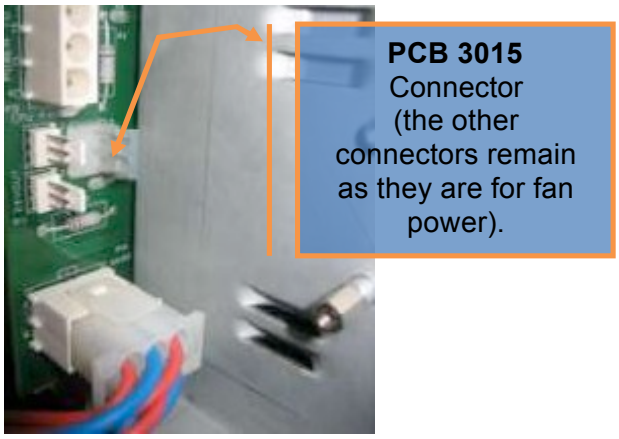
Overview of EDTT cabinet - Supply Compartment

All the hardware installations are to be performed in the left hand contractor department. This is where the EURODIM Twin Tech cabinet receives the power supply. It is advisable to mount the hardware before you introduce the power supply cables, because there is more space for the installation left.

The only cable which shall pass through the TI (power coil) is the neutral cable (blue) - the other supply lines pass on the outside of the TI. The TI coil has a latching mechanics allowing to open the coil and to pass the (large) neutral cable through it. There is a cable (approx. 150 cm) with grey and blue wire. This cable is to be brought to the upper right hand side of the cabinet, where the PCB 3015 is to be mounted.

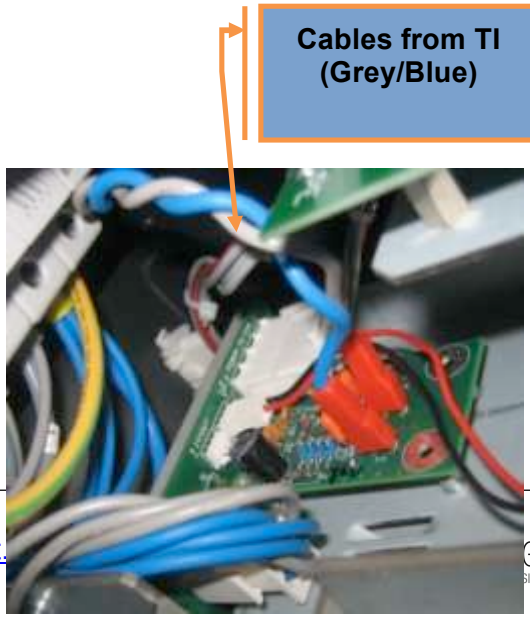
6.2 Mounting Procedure

Figure 1: open TI before mounting
(Cable for connection to PCB 3015)



Detail of Mounting Place for PCB 3015

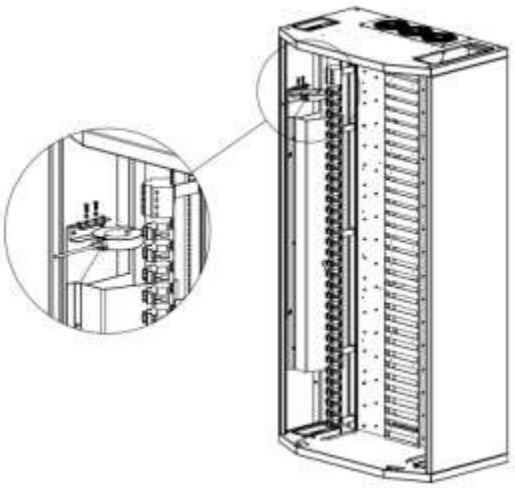
6.3 Finished installation



Detail of mounting kit

Detail of PCB 3015 connected

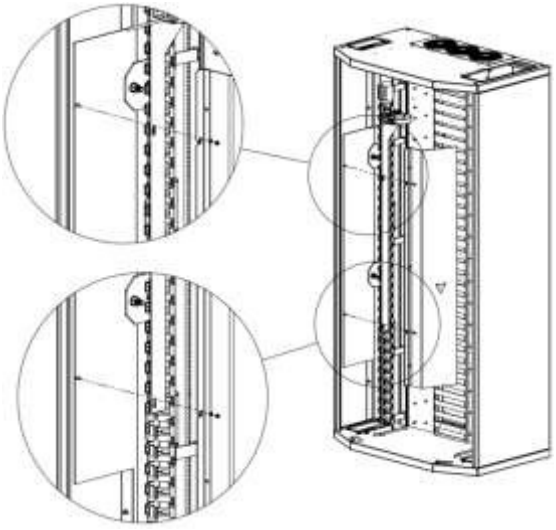
The PCB 3015 is fixed with 2 provided screws to the central controller housing.



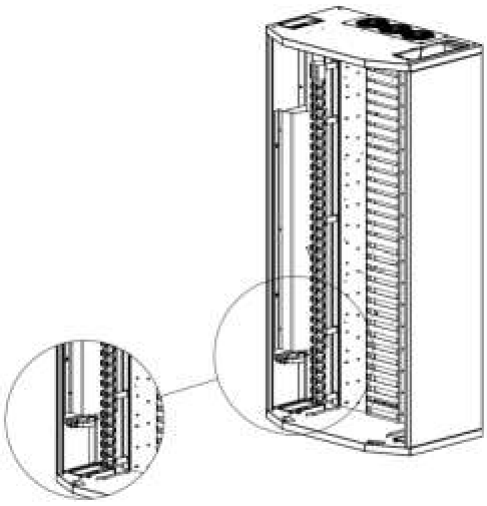
Installation of TI

– Measurement device

1.) Remove the Bus-Bar protection (2 Screws).
2.) Install the TI-Holder (long metal plate) – Direction depends if the cable entry is from the top or bottom of cabinet.
3.) Connect Phase and Ground Cable to the Bus-Bar with suitable screws.
4.) Bring the NEUTRAL (blue) cable through the TI (the TI can be opened for easier installation.
5.) Connect the NEUTRAL to the bus bar.
6.) Place the Bus-Bar protection back in the cabinet – and attach with the two screws..



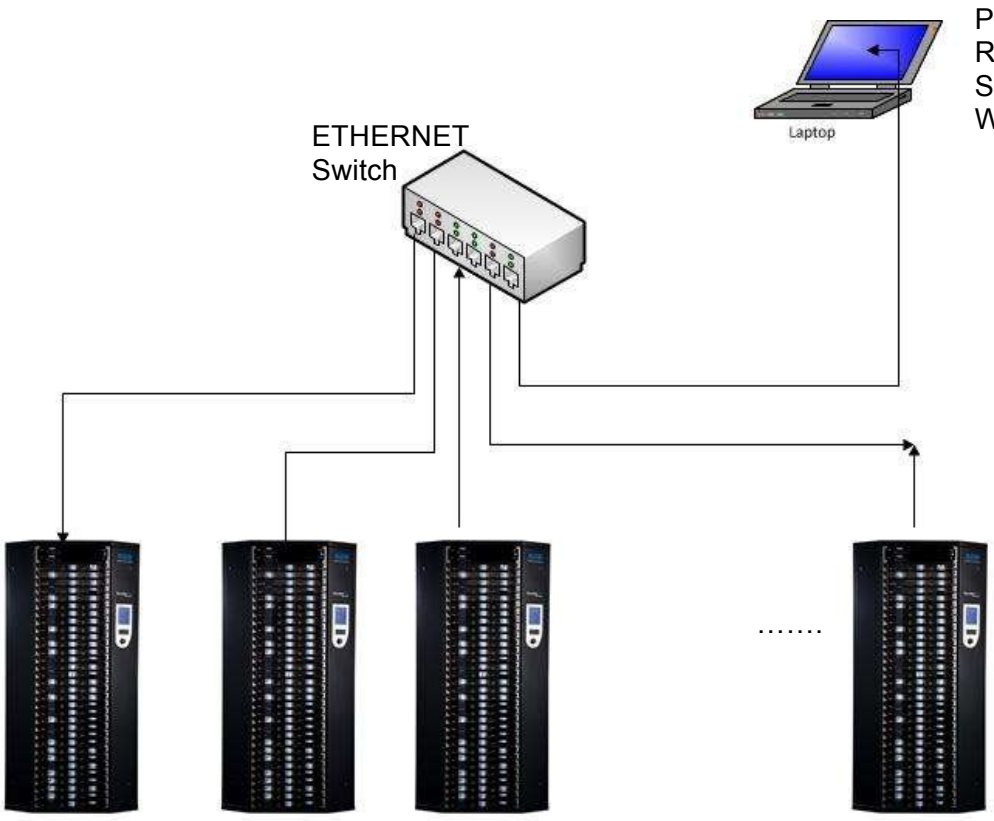
Mounting of the TI for supply cable entry from the top of the cabinet



Mounting of the TI for supply cable entry from the top of the cabinet

6.4 Software Installation

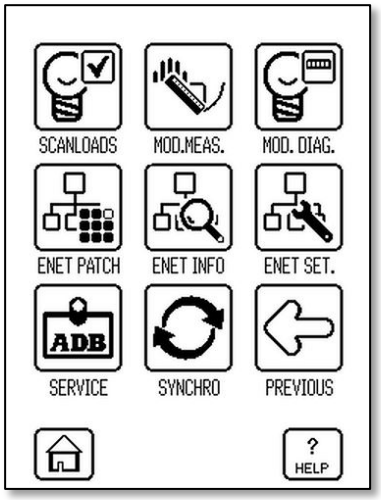
The black lines are ETHERNET connections between the EURODIM Twin Tech, Switch and PC running the TTD RDM Management Software. This software must only be installed one time.
At the same time a lighting control desk (which must support ArtNET or sACN communications protocol) may be connected to the ETHERNET Switch. To simplify the image the control desk has not been included in the drawing. Both the PC running TTD RDM Management Software and the lighting control desk (e.g. ADB LIBERTY, FREEDOM or MENTOR desks) may operate simultaneously and there is no influence, since both systems work with different protocols. Alternatively the control desk may be connected to one of the DMX inputs of the EURODIM Twin Tech cabinet. (Instead of using ArtNET or sACN protocol). The ETHERNET switch is connected with suitable communication cables (e.g. CAT5) to handle the dimmer information as well as the ArtNET or sACN communication.

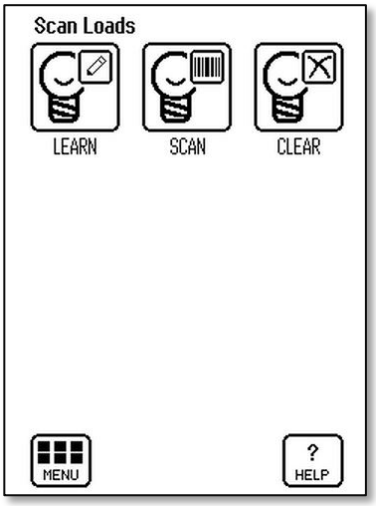


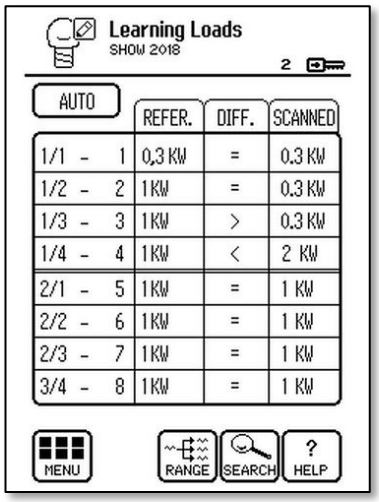
Multiple EURODIM Twin Tech Cabinets (TTD) – The ETHERNET cable is connected on the controls input board. The Diagnostics Information is transported over the same physical wire as the ArtNET or sACN signal. The report information is transported to the TTD RDM Management Software.

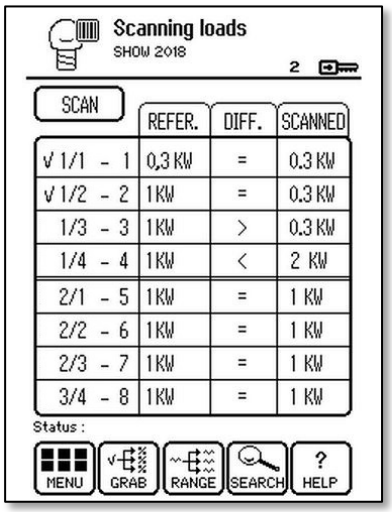
6.5 Overview of the User Interface Menu items

Below are screen shots of the local menu items, when addressing the Scan Load Function on the EURODIM Twin Tech itself. – When the Scan Load sequence is started the dimmer steps through all enabled channels. On the display (after the scan) the unit reports if there any differences to a pre-defined or measured value.
This informs the operator easily if the channel is not working or the load has changed.









Overview of Sequential Diagnostics related Menus.

6.6 TTD RDM Management SOFTWARE

To remote control the EURODIM Twin Tech from a central control room ADB provides as an option the TTD RDM Management Software. This software tool is designed to run on Window OS (32 or 64 Bit) and is optionally available. Instructions are in the dedicated manual.

6.7 References and Element Codes

- **Sequential Diagnostics Kit (optional)** consisting of:
    - Kit PCB3015
    - Fixation : N1115.04.420
    - PCB3015 : 1131.44.001 with two screws to mount the PCB in the cabinet

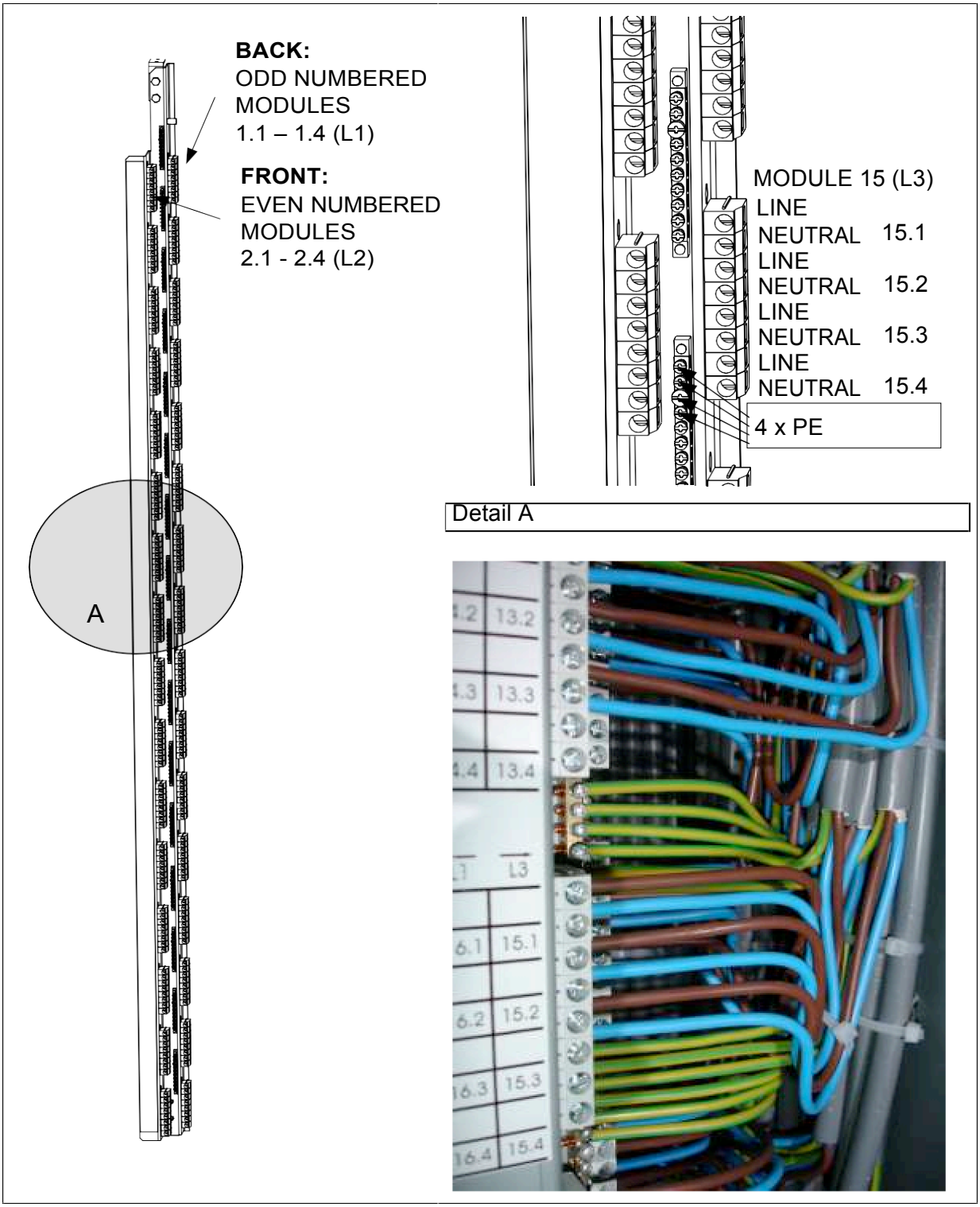
ADB Code:
ADB REF: TTD/SEQD
PYRE DESCRIPTION: Sequential Diagnostics – optional kit including: one Measurement TI for Neutral phase current measurement with a communications PCB, cable kit and mechanical installation material.
This kit is foreseen for on-site client installation.
One kit is necessary to be provided for each dimmer cabinet in the installation.

- **TT Dimmer Manager Software**

ADB Code: 1109.00.140
ADB REF: TTD/DM/SOFT
PYRE DESCRIPTION: TTD RDM Management Software for Window OS (OS not included)

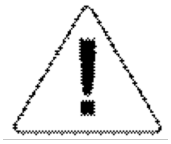
7 CONTRACTOR'S COMPARTMENT – OUTPUTS

Front access only is required. Cable entry is possible through bottom and top of the cabinet.



7.1 Outputs to the loads

The cabling compartment with output terminals is on the right hand side. The load terminals are mounted next to the relevant module. The numbering is shown on self-adhesive labels.
These terminal blocks are suitable for cable sizes up to 10 mm². Special Adaptors are available for cables up to 25 mm² when installing 10 kW circuits. Grey = L ; blue = N.
The load cables must be sized in accordance with local regulations. Increased sizes may be required in order to reduce the voltage drop on the line to the luminaire. We suggest limiting the voltage drop to 3%.



Pay attention when fasting the load cables and tightening the terminal screws!

Do not over tighten the screws, do not use power tools (e.g. electric drill machines) – this may damage the terminals, and they will need to be replaced. This is a time consuming operation!

Maximum torque = 1.2 NM.

The data cables may follow the power cables on the condition that they are minimum 250 mm apart or in a separate shielded trucking (e.g. steel tube). Sound and video cables must be kept at a minimum distance of 500 mm from all power cables. If cables or ducts have to cross, then a crossing at right angles will reduce interferences.

7.2 Identification of the dimmers

The dimmers in a cabinet are identified by [slot number].[dimmer in the module]. Example: dimmer 2.3 is the third dimmer in the second module of the cabinet.
The pre-printed label also shows the module's supply phase. Custom labelling of the terminals is possible, e.g. the outlet or channel number.

7.3 Load terminals for 4 x 2.5 / 3 kW modules

Use all four pairs (L+N) of output terminals. Please also see drawing N° 3500.01.650

7.4 Load terminals for 3 x 5 kW modules

Use only the first three pairs (L+N) of output terminals. Do not use the fourth pair, labeled x.4.

7.4.1 Load terminals for 2 x 3 kW fluo modules

Each fluo dimmer comes with a dimmed output and a direct output on the second set of output terminals. This can be compared to a standard 4 x 3 kW module. All 4 circuits need to be patched to a DMX address.

Your Fluo circuitry should be connected as follows:

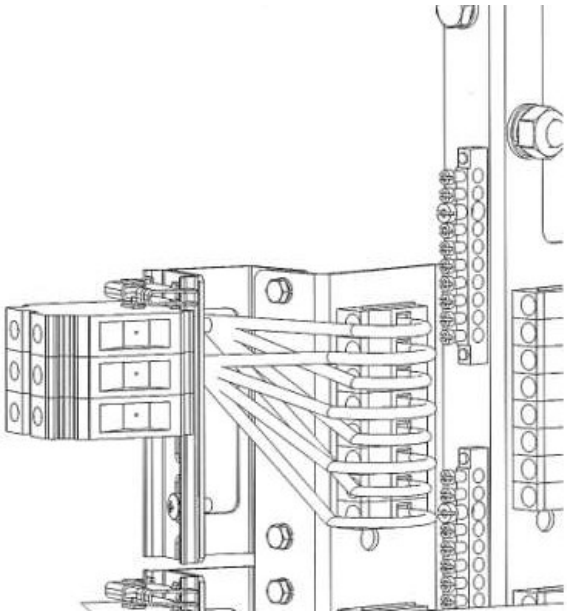
- fluo dimmer 1 DIM: dimmed phase output on output e.g. 15.1 LINE
- fluo dimmer 1 DIM: dimmed neutral output on output e.g. 15.1 NEUTRAL
- fluo dimmer 2 DIM: dimmed phase output on output e.g. 15.2 LINE
- fluo dimmer 2 DIM: dimmed neutral output on output e.g. 15.2 NEUTRAL
- fluo dimmer 1 DIRECT: direct phase output on output e.g. 15.3 LINE
- fluo dimmer 1 DIRECT: direct neutral output on output e.g. 15.3 NEUTRAL
- fluo dimmer 2 DIRECT: direct phase output on output e.g. 15.4 LINE
- fluo dimmer 2 DIRECT: direct neutral output on output e.g. 15.4 NEUTRAL

etc…

Tripping the MCB of a fluo dimmer will disconnect the dimmer and its associated direct output. The direct output can be patched to an independent DMX channel.
Please also see attached drawing N° 3500.01.710

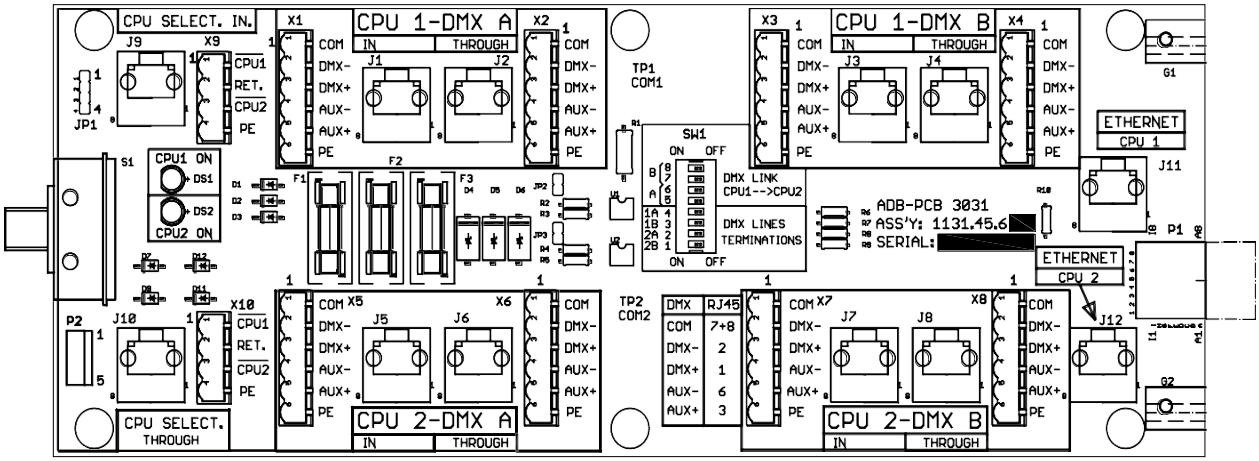
7.4.2 Load terminals for 10kW modules

Each 10 kW module is shipped with a special adaptor allowing the user to connect cables with up to 25mm² in diameter. The adaptor is screwed on to the edge of the cable bar and the four cables are connected to the terminals leading to the module.
Attention: All four cables must be connected!



7.5 DMX and Ethernet terminals

All control signals are connected to the data input board PCB3031, located at the top of the right-hand cabling compartment.



PCB 3031

7.5.1 DMX Connection – type of cable

Use data cable with two twisted pairs + 1 conductor (can be from a third pair) + overall screen. Use data cable which is suitable for digital data transmission (EIA 485 / RS 485; 250kBaud). The data cable must meet the DMX512-A specification (ANSI E1.11 – 200x). Do not use audio cable for DMX, as this has the wrong capacitance and impedance and WILL NOT reliably transmit DMX signals. The DMX signal uses fairly high frequencies, well above 1000 kHz.

Cable model LIYCY 3 x 2 x 0.35 + shield is suitable for this purpose. Two pairs are used for data transmission, and one conductor for the 0V (common) GND. The cable shield is connected to the PE.

Use of Ethernet cables for DMX

It is allowed to use Cat5 (or higher) STP and FTP Ethernet cable for DMX. STP = shielded twisted pair.
FTP = foil twisted pair.
UTP = unshielded twisted pair.
WARNING: UTP Ethernet cable is not suitable for DMX.

Each EURODIM Twin Tech processor is equipped with two physical DMX inputs, and one Ethernet port. For cabinets with optional 'instant back-up', each processor has its own independent data connectors.

Identification of the ports

The DMX ports of the top processor (Processor No. 1) are identified CPU1–DMXA and CPU1–DMXB.
The DMX ports of the optional second processor (Processor No. 2) are identified CPU2–DMXA and CPU2–DMXB.
Each DMX port has an Input and a through (link).
All pin numbering information is also indicated on the data port PCB3031.

Screw connector in parallel with RJ45-for-DMX

For the convenience of the contractor, each physical DMX input has two types of connector in parallel: a pluggable screw terminal block, and a RJ45.
Use one, never use both.
The RJ45 are very convenient to use off-the-shelf STP cables for daisy-chaining between dimmer cabinets, and connection to RJ45 DMX patch fields.

7.5.2 Pin numbering

For standard DMX cables (2 pairs + screen), the connectors X1 through X8 are connected as follows:

1	COM	0 Volt conductor (different from the screen)
2	DMX-	data 1- (DMX)
3	DMX+	data 1+ (DMX)
4	AUX-	data 2- (second data pair)
5	AUX+	data 2+ (second data pair)
6	PE	screen in the DMX cable and connection to PE.

(For optimum EMC (Electro-Magnetic Compatibility) performance we recommend to separate 0V from PE)
All screens in all cables should be interconnected.
One end only should be connected to PE, to prevent an earth loop.

Pin configuration of the RJ45-for-DMX:
- pin 2 = data 1- (DMX)
- pin 1 = data 1+ (DMX)
- pin 6 = data 2-
- pin 3 = data 2+
- pin 7 and 8 = common 0V

7.5.3 DIP switches SW1 – termination of the DMX data lines

On PCB3031, SW1 switches 1 through 4 allow termination of the cabinets four DMX inputs.

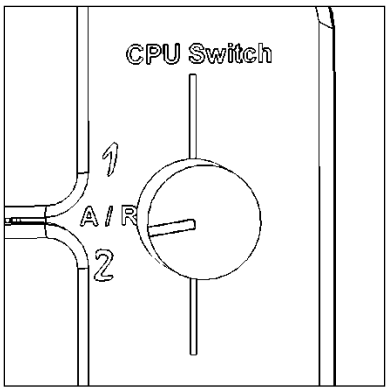
To terminate CPU1-DMXA: set Switch 4 to ON. To terminate CPU1-DMXB: set Switch 3 to ON.

To terminate CPU2-DMXA: set Switch 2 to ON. To terminate CPU2-DMXB: set Switch 1 to ON.

DIP switches instead of link cables
On PCB3031, SW1 switches 5 and 6 connect “DMX1A Through” with “DMX2A In”. Similarly, SW1 switches 7 and 8 connect “DMX1B Through” with “DMX2B In”.
This is a convenient and reliable alternative for short jumper cables.

7.6 Local / Remote Controller selector switch CPU1 – CPU2 – Automatic

The Controller or CPU selector switch is located next to the CPU slots. The connection for the remote selector switch is provided in the right compartment on the PCB 3031. Please see the attached drawing for the exact wiring of the switch.
The following table explains the use of the local and remote switch.



Jumpers J1 (PCB3031)	Local switch	Remote Switch	Terminal signals (*) Enable_CPU1	Terminal signals (*) Enable_CPU2	CPU Active
Not mounted	CPU1	N/A	1	0	CPU1 (**)
	CPU2	N/A	0	1	CPU2 (**)
	A-R	CPU1	1	0	CPU1 (**)
	A-R	CPU2	0	1	CPU2 (**)
	A-R	Automatic or not connected Wires short circuited (***)	1	1	Automatic software selection
			0	0	
Mounted	N/A	N/A	0 (****)	0 (****)	

The jumper J1 is by default NOT mounted.

- Power supply voltage: Vcc = 24V (thru 1.5K and protection fuses on PCB3031)
- Enable_CPU signals are active high
- (*) 0 = terminal connected to 0 V; 1 = terminal is open
- (**) Manual selection by the user
- (***) Only for information
- (****) Value forced by presence of Jumpers J1

For remote CPU or controller selection, use a shielded cable of 3 x 0.5 mm². The shield should at one end be connected to PE. See wiring and interconnection diagram in 30-490 and 30-500.

8 TTD HUMAN INTERFACE

The EDTT is delivered without the TTD Human Interface installed.

The TTD Human Interface is found in a separate packing. In case such a unit has to be reordered the ADB code Nr is: 1115.10.055. The package includes the TTD HUMAN INTERFACE with a mounted metal back part, one connection cable, and one SD card (mounted in the HUMAN INTERFACE) and one EURODIM Twin Tech user and programming manual in English and French.

Installation Procedure:

1. Open the door of the right compartment.
2. Remove the protective cover covering the opening in the door panel.
3. Take the metal lid off the back of the Human Interface.
4. Prepare the flat cable (included in package) – It has on one side a large connector and on the other two smaller connectors.
5. Plug the flat cable (large connector) into the socket on the upper right hand corner (viewed from the PCB side) with the red cable facing towards the right. Do not force the connector into the socket!
6. Fit the Human Interface with its metal cover from the backside on the door and screw the nut tight with a 7mm wrench.
7. Connect the 2 flat cable connectors to the CPU communication panel connectors CPU0 and CPU1 (see drawing). The Connector with the red cable facing out shall be connected to the connector CPU1.

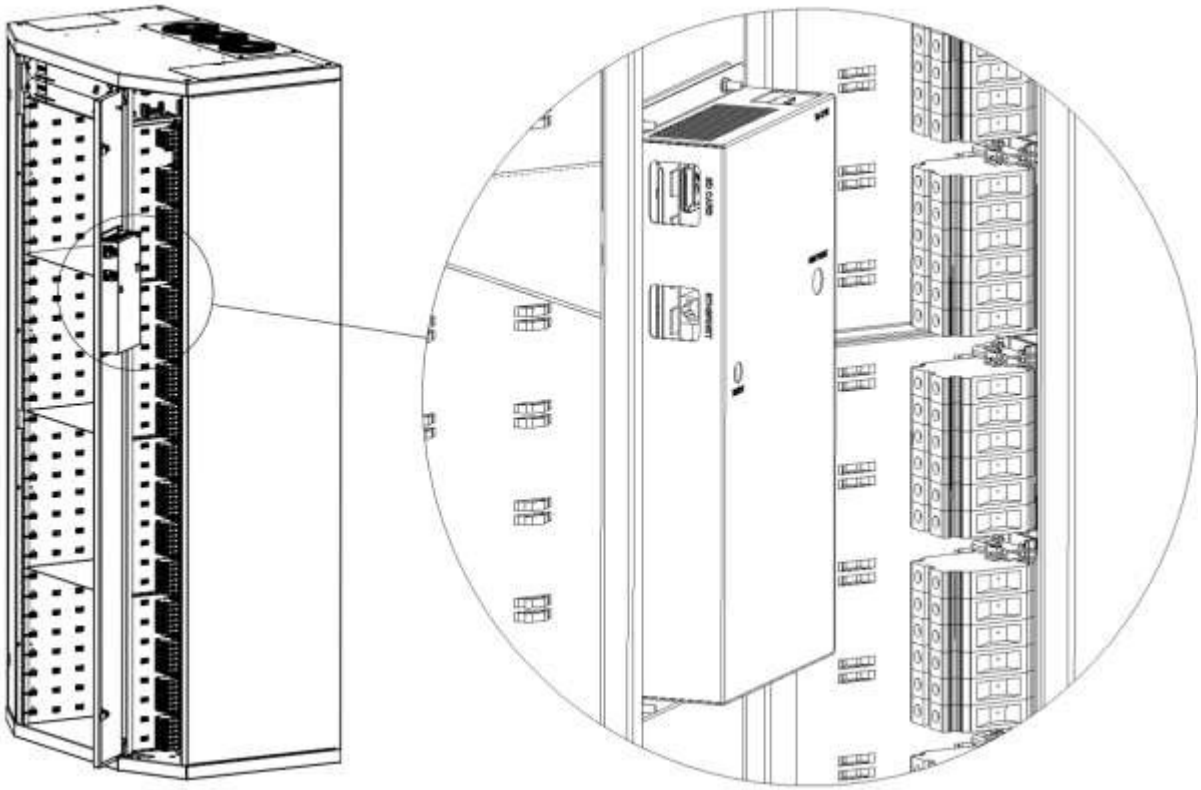


Figure 2: Human Interface Installed - SD Card Slot towards front

9 PLUG IN MODULES

Before inserting the plug in modules in the cabinet, check that the 16 screws of the card cage have been mounted and are fastened. (See chapter: 4 Contractors Compartment)

9.1 DimSwitch - Thyristor Technology

4 x 3 kW:	this module contains 4 dimmers of 3 kW (13A)
3 x 5 kW:	this module contains 3 dimmers of 5 kW (20A)
1 x 10 kW:	this module contains one 10 kW dimmer (50A)
2 x 3 kW Fluo:	this module contains 2 dimmer of 3 kW. The second output from the module supplies direct mains voltage (same phase) for the pre-heating of the fluorescent lamps, or for electronic ballasts. (See drawing below)

EURODIM Twin Tech DimSwitch modules are thyristor based, thereby eliminating the problems associated with the arcing of electromechanical contacts. Thyristor switching is at zero crossing. Contrary to many Solid State Relays, EURODIM Twin Tech DimSwitch modules have no 'minimum load' requirement.

9.2 Sine Wave Technology

4 x 2.5 kW:	this module contains 4 dimmers of 2.5 kW

9.3 NON-DIM (Feed Through) modules

4 x 3 kW:	NON-DIM module with 4 MCB's of 13 A
3 x 5 kW:	NON-DIM module with 3 MCB's of 20 A

NON-DIM modules are direct feed through with no remote control. They cannot be switched from the lighting control desk.

9.4 Blank Panels

Panels are available to cover one or eight slots. These modules contain no dimmer.

9.5 Distribution of the dimmers over the phases

The supply phases alternate: next slot
= next phase. Modules 1, 4, 7, 10 etc.
are supplied by L1.
Modules 2, 5, 8, 11 etc. are supplied by L2.
Modules 3, 6, 9, 12 etc. are supplied by L3.
The Module number appears on the right of the module.

9.6 Protections – types, number of poles

EURODIM Twin Tech is a standard cabinet to suit all installation types (IEC 60364). All configurations relay on the used plug in modules.

Switch Off before unplugging

Since a dimmer module is rated above 32 A, hot patching of modules is forbidden by IEC EN 60439 and local regulations such as NF C 15-100.
It is highly advised that one must switch off the dimmer protection (MCB, RCD, and RCBO) before withdrawing or positioning a module. Additionally, the breaking of the contacts is sequential: first control, then power, and Earth last.

ADB has taken precautions that there is a minimal impact in case this rule is forgotten. When a module is plugged into the cabinet – first the protection earth is connected, then the supply and load supplies are connected and finally the control wiring connection is performed. This is to avoid that any sparks are pulled because the dimmer has been accidently fired.

9.7 Dimmer module protection by HRC fuse

Each power module is protected by a High Rupturing Capacity supply fuse (HRC, 63 A, 50 kA). This HRC fuse is located in the supply cabling compartment, on the left hand side of the cabinet.
Each individual circuit is supplied through an MCB or RCBO (MCB+RCD), in the module. See next paragraph.
The protection in the main switchboard must be selected to ensure a proper fault current protection in relation with the line distribution short circuit current.

9.8 Dimmer protection by MCB

All ADB EURODIM Twin Tech power modules are standard equipped with MCBs per dimmer channel. The MCBs comply with EU rules and protect the wiring against overload and short- circuit.
Please note that in unfavorable fault conditions, both the dimmer MCB and the HRC supply fuse may trip. In the event of severe damage to the thyristor modules, additional protection circuitry may intervene and will limit the fault to the dimmer cabinet.
The dimmer module should be removed or repaired first. Other elements should only be checked after the faulty dimmer is removed or repaired.

9.9 Residual Current Devices (RCD Ground Fault Protection)

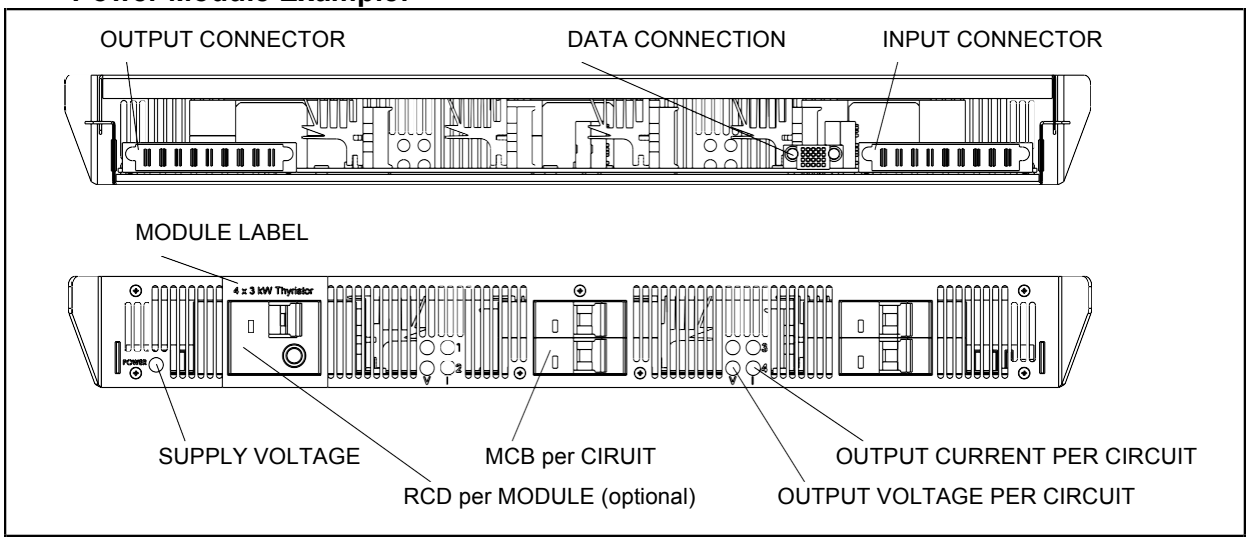
EURODIM Twin Tech DimSwitch Thyristor modules are optionally available with an RCD per module, or an RCBO (MCB+RCD) per dimmer.

Warning: RCDs and common Neutral wires.
To solve a particular problem, or with some multicore lay-outs, you may consider using a single (large size) Neutral wire for a group of dimmers.
If the RCD protection is provided, then the following rule applies: the “common neutral” should be common only to dimmers supplied by the same RCD. Failing to do so will invariably result in nuisance tripping of an RCD.

9.10 Installing Dimmer Modules

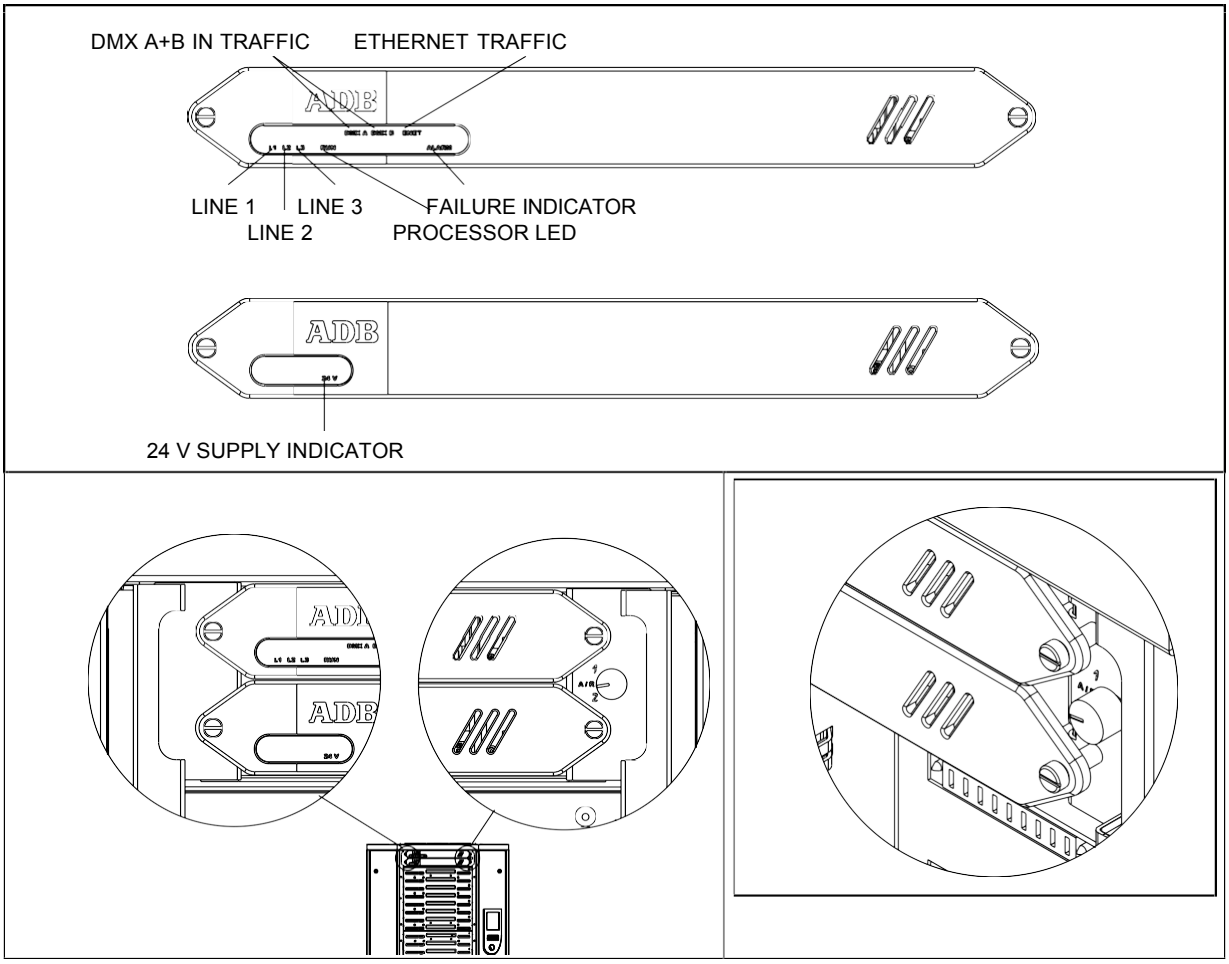
When inserting dimmer modules in to the crate please do so carefully. If the modules are forced into the crate, the connectors on the back may be damaged, or in the worst case the backplane PCB of the dimmer cabinet is damaged.
This will make a replacement of the large PCB necessary by dismantling the entire cabinet.

Power Module Example:



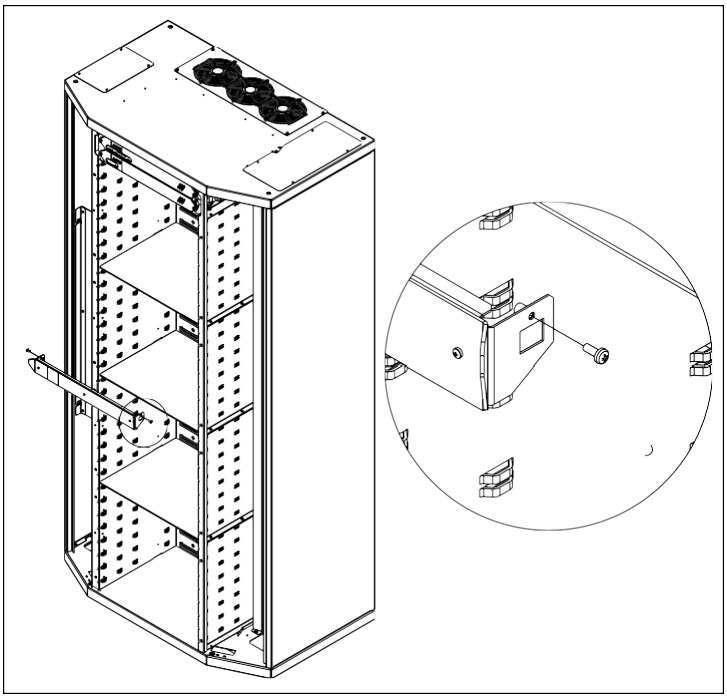
9.11 CONTROLLER UNIT (CPU) - POWER SUPPLY UNIT (PSU)

Ordering EURODIM Twin Tech you have the choice to either configure the cabinet with 2 identical Controller units for full data and power backup **or** 1 Controller (CPU) unit + 1 PSU unit for power supply backup.
In order to assure permanent contact with the CPU backplane the units shall be secured with one screw left and right. (See below)



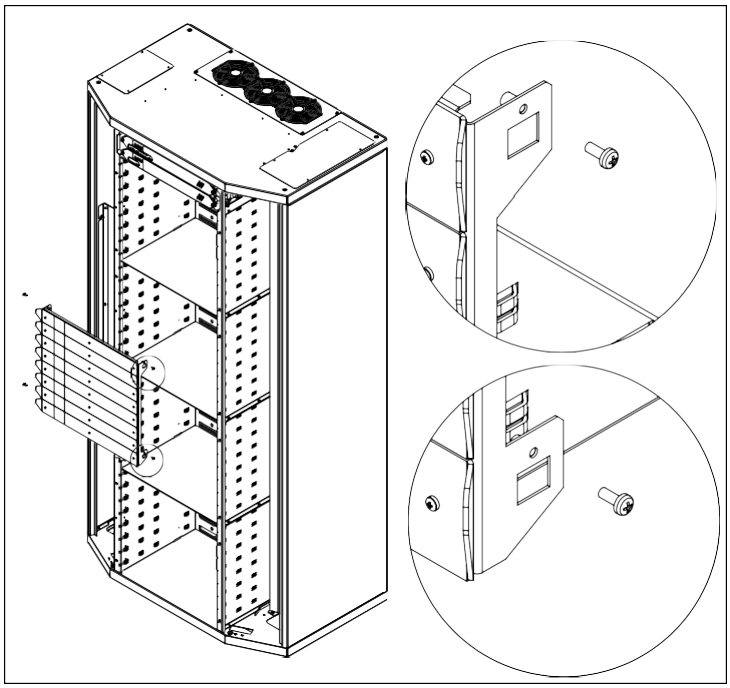
9.12 BLANK MODULES

Empty dimmer slots shall be filled with blank panels. Two versions are available:



TTD/TB

Blank modules for one slot:
The blank modules must be screwed on each side to the module rack.
Open the two doors and use the delivered screws at the assigned drill holes.



TTD/TB/8

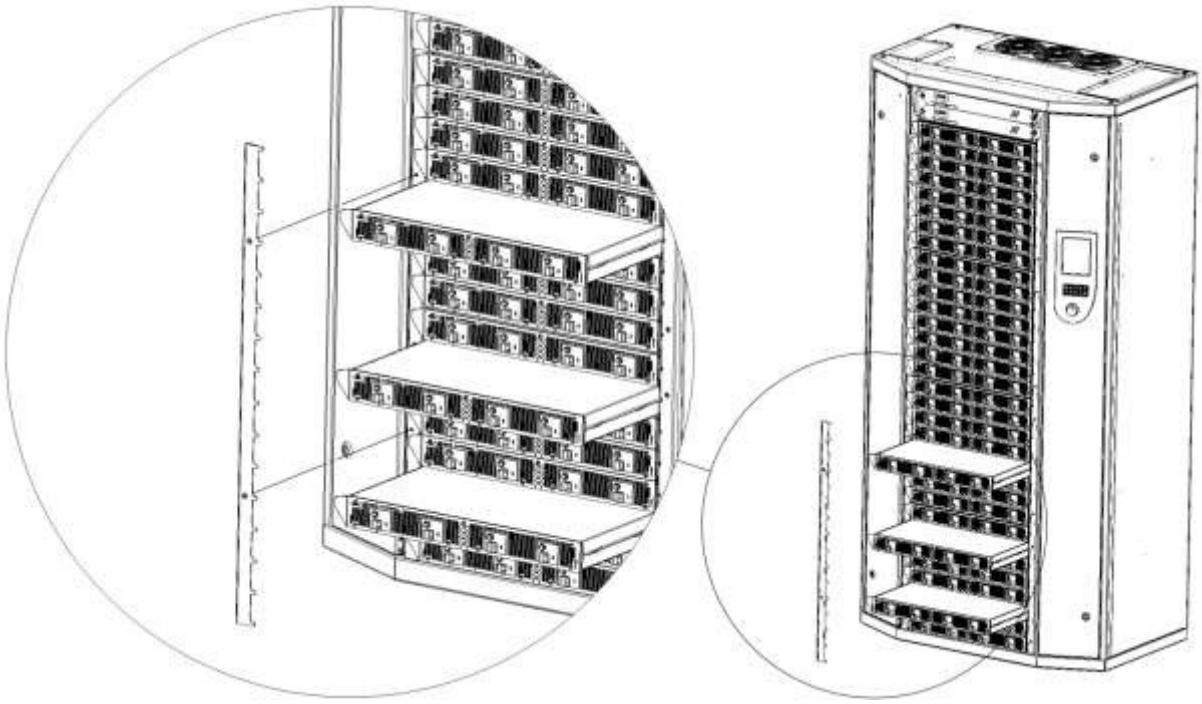
Blank modules for eight slots:
The blank modules must be screw
Open the two doors and use the delivered screw at the assigned drill whole.

The 8 slot blank panel shall only be used to cover slot 1-8, 9-16, 17-24 and 25-32.

9.13 MODULE LOCKS

A set of two bars are optionally available.
(ADB REF: TTD/CAB/LOCK, ADB Code: 1113.33.010).

These are intended to be used a locks for the modules, to avoid physical tampering with the configuration of the dimmer and the placement of the modules. The bars must be screwed on the left hand side of dimmer. Remove (if any) the plastic plugs from the front and screw on the two bars.



10 CHARACTERISTICS

10.1 Electrical characteristics

Supply voltage: 3 NPE 400 TN-S or TN-C Operating voltage:

198 V to 264 V, 50/60 Hz.

Max line current: 600 A per phase
600 A for the Neutral
(Due to the possibility of unbalanced 3 phase system, the neutral supply cable shall be oversized by 125% compared to the phases)

Max derating factor: 600 A / 1.25 = 480A
480 A x 3 x 230 V = 331 kW
- cabinet fully fitted with 4 x 3 kW modules: 384 kW (= 0.86)
- cabinet fully fitted with 4 x 2.5 kW modules: 320 kW (= 0.96)
- cabinet fully fitted with 3 x 5 kW modules:

320 kW (= 0.68) Fault current rating: 50 kA

Capacity of the cabinet:

- 32 x Dimmer modules 4 x 3 kW (thyristors)
- 32 x Dimmer modules 3 x 5 kW (thyristors)
- 32 x Dimmer modules 4 x 2.5 kW (sine wave)
- 32 x Dimmer modules 3 x 5 kW (sine wave)
- Or any mix thereof.

Control inputs of each processor unit:

- Two digital inputs according to DMX512-A (ANSI E1.11).
- One Ethernet port, incl. three ArtNet or sACN inputs (Art-DMX).
- Ports are galvanically isolated to 2500 V.

- Dynamic performance: no overshoot nor oscillation of output voltage.

Range of regulation:

DimSwitch Thyristors: full dimming of any incandescent lamp between 0% and 100% of rated dimmer current.
Sine wave: full dimming of any incandescent lamp between 0% and 100% of rated dimmer current.

10.2 Physical characteristics

EURODIM TWIN TECH for 32 modules

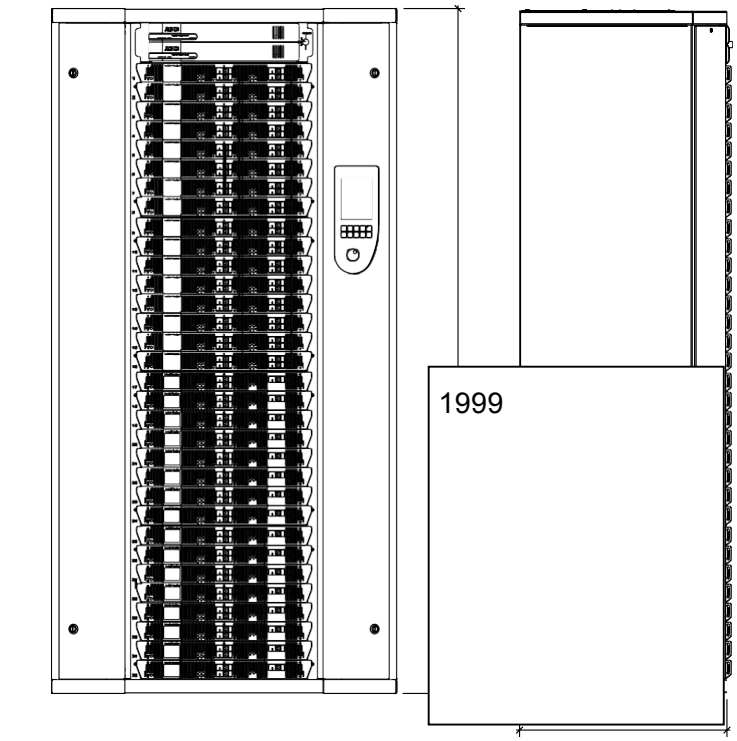
Dimensions: Width: 990 mm
Depth: 596 mm
Height: 1999 mm.

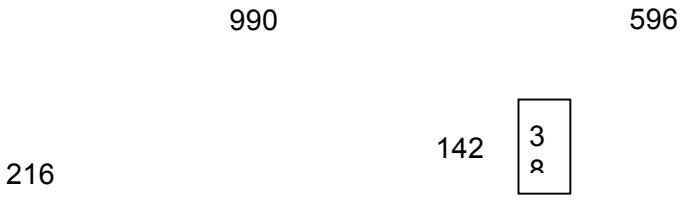
Weight:

Cabinet: 229 kg (without modules or processors)
Processor unit: 10 kg
Thyristor module 4 x 3 kW – 12.2 kg for 400µs/ 9.5 kg for 200µs
Thyristor module 3 x 5 kW 10.9 kg for 400µs/ 9,3 kg for 200µs
Sine wave module 4 x 2.5 kW 11.5 kg
Sine wave module 3 x 5 kW 10 kg

Storage Temperature: -30°C to 70°C with humidity 0% to 90% non-condensing.
Operating Temperature: 10 °C to 35 °C with humidity 0% to 90% non-condensing.

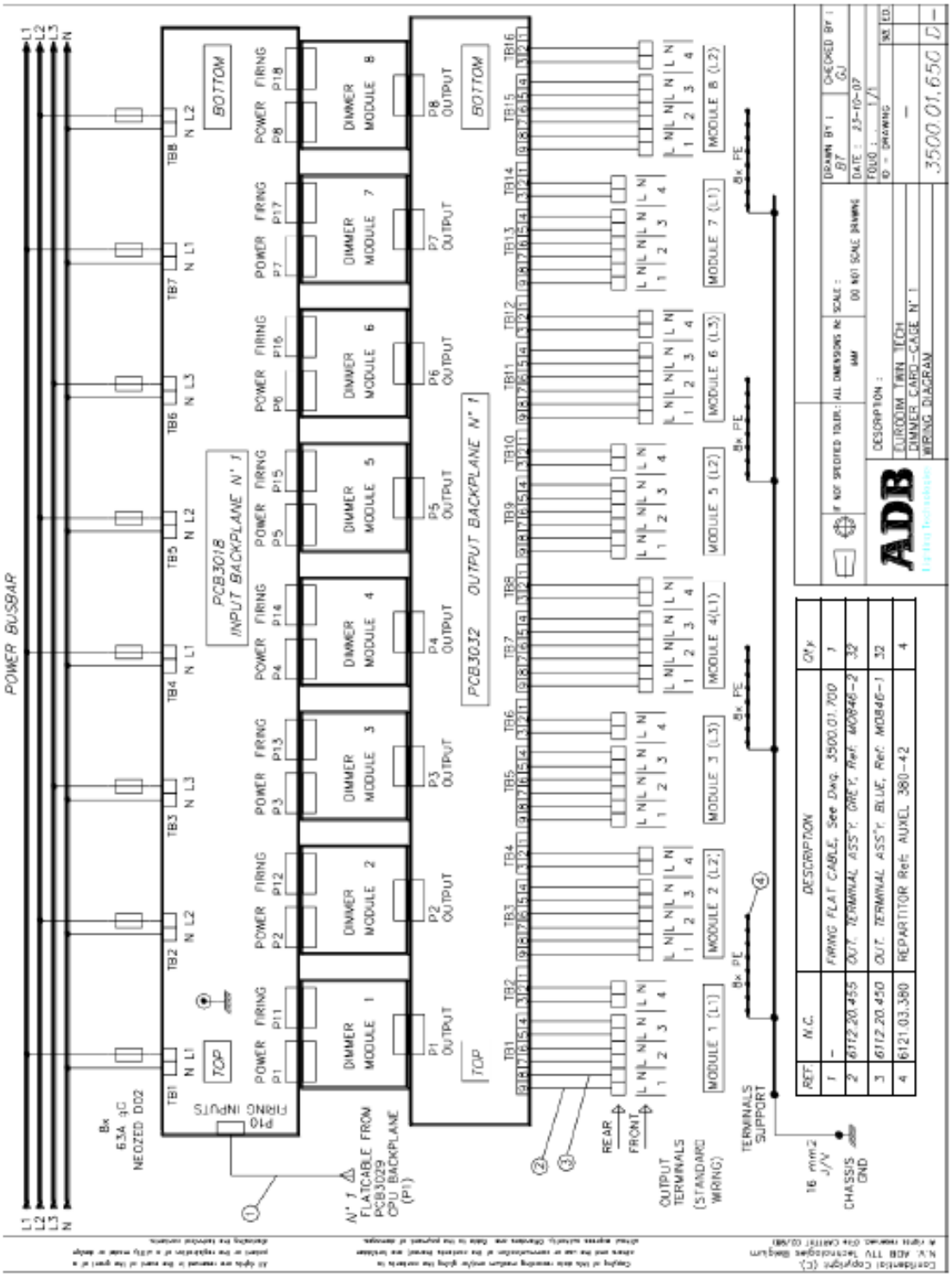
Cable entry apertures (top & bottom) for supply cables on left side.
Cable entry apertures (top & bottom) for data (DMX, Ethernet) and output cables on right side.



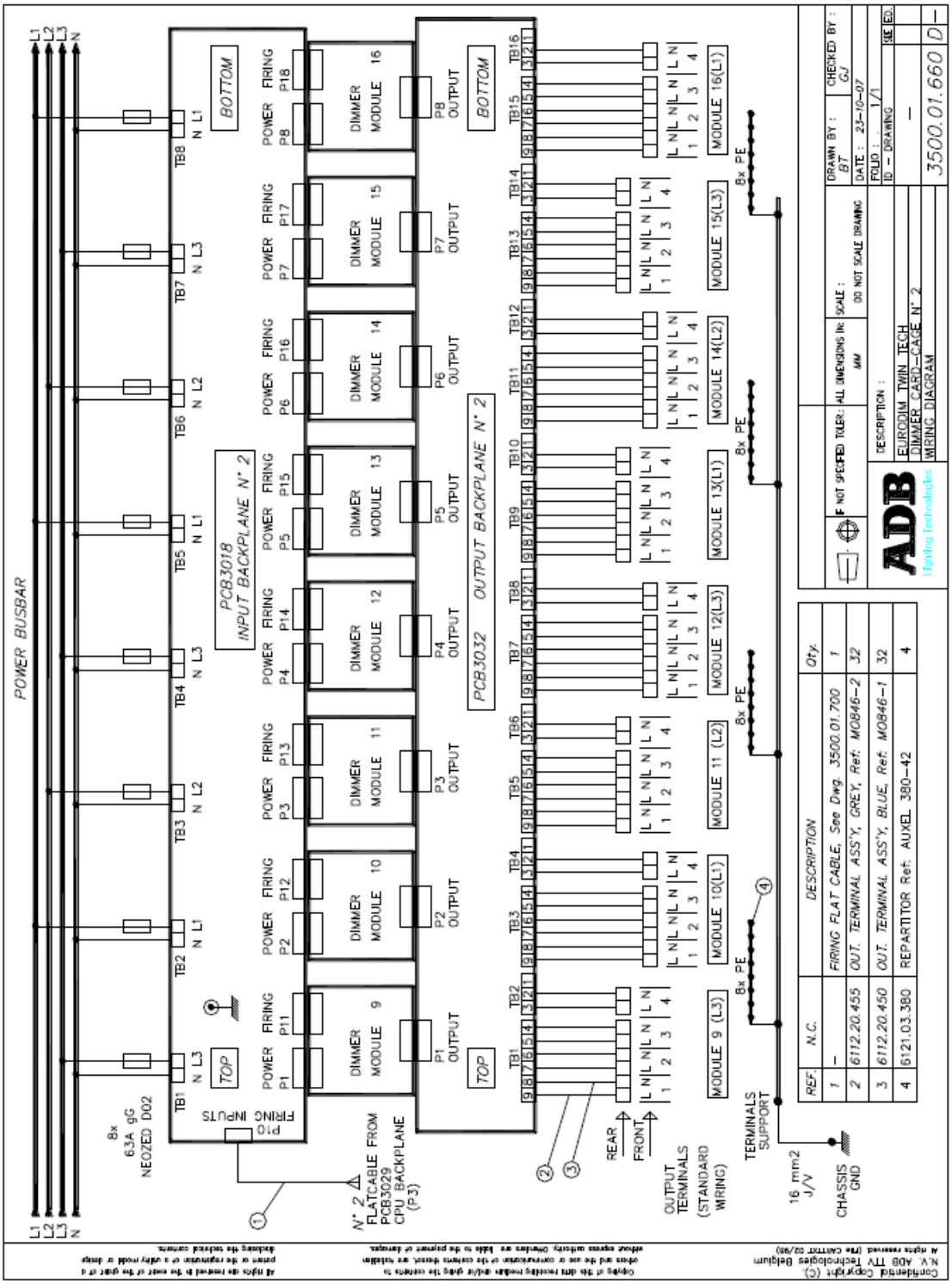

990
596
142
3
216

11 Appendix B – Drawings

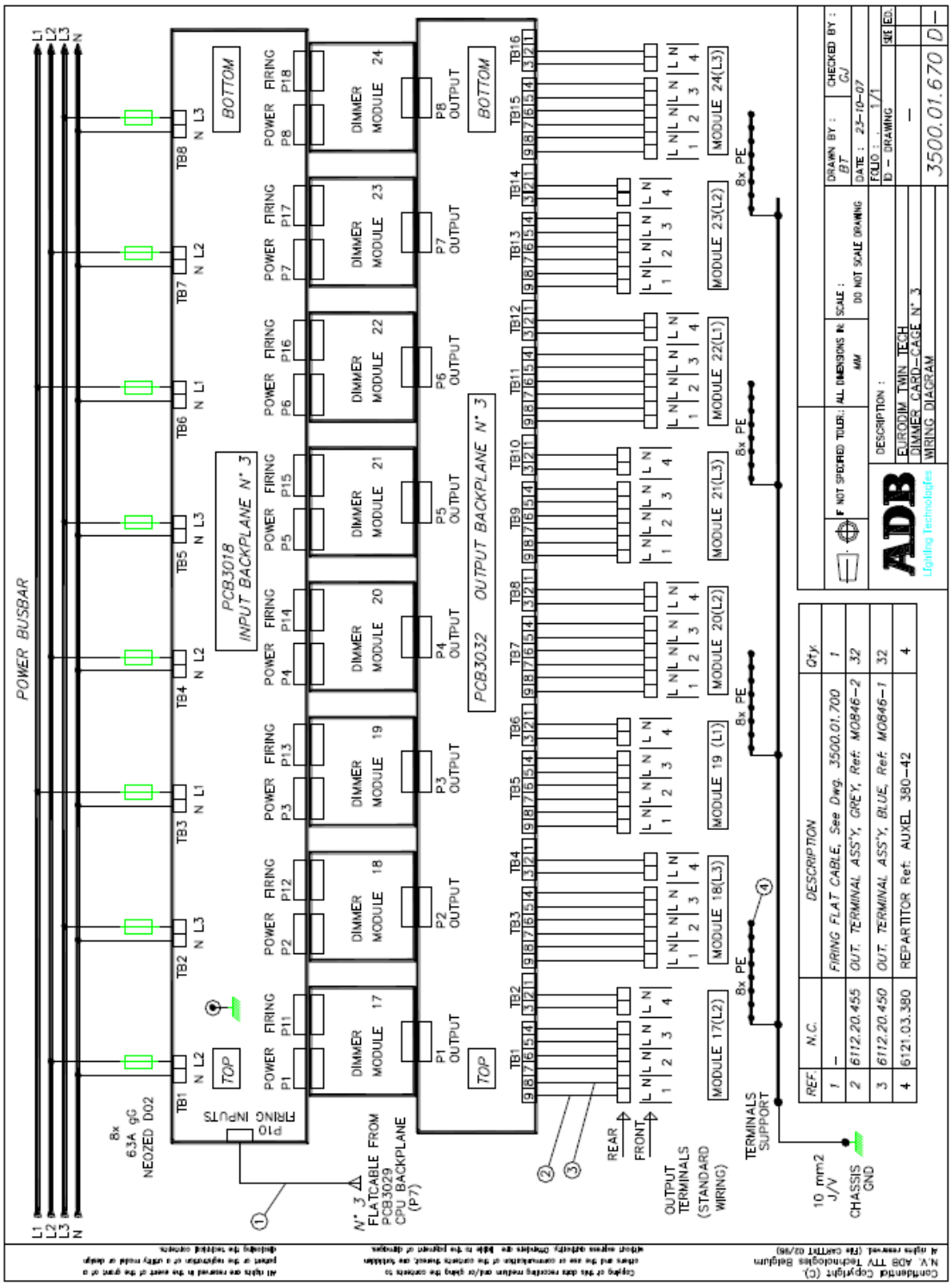
11.1 3500.01.650 Power Modules 1 - 8



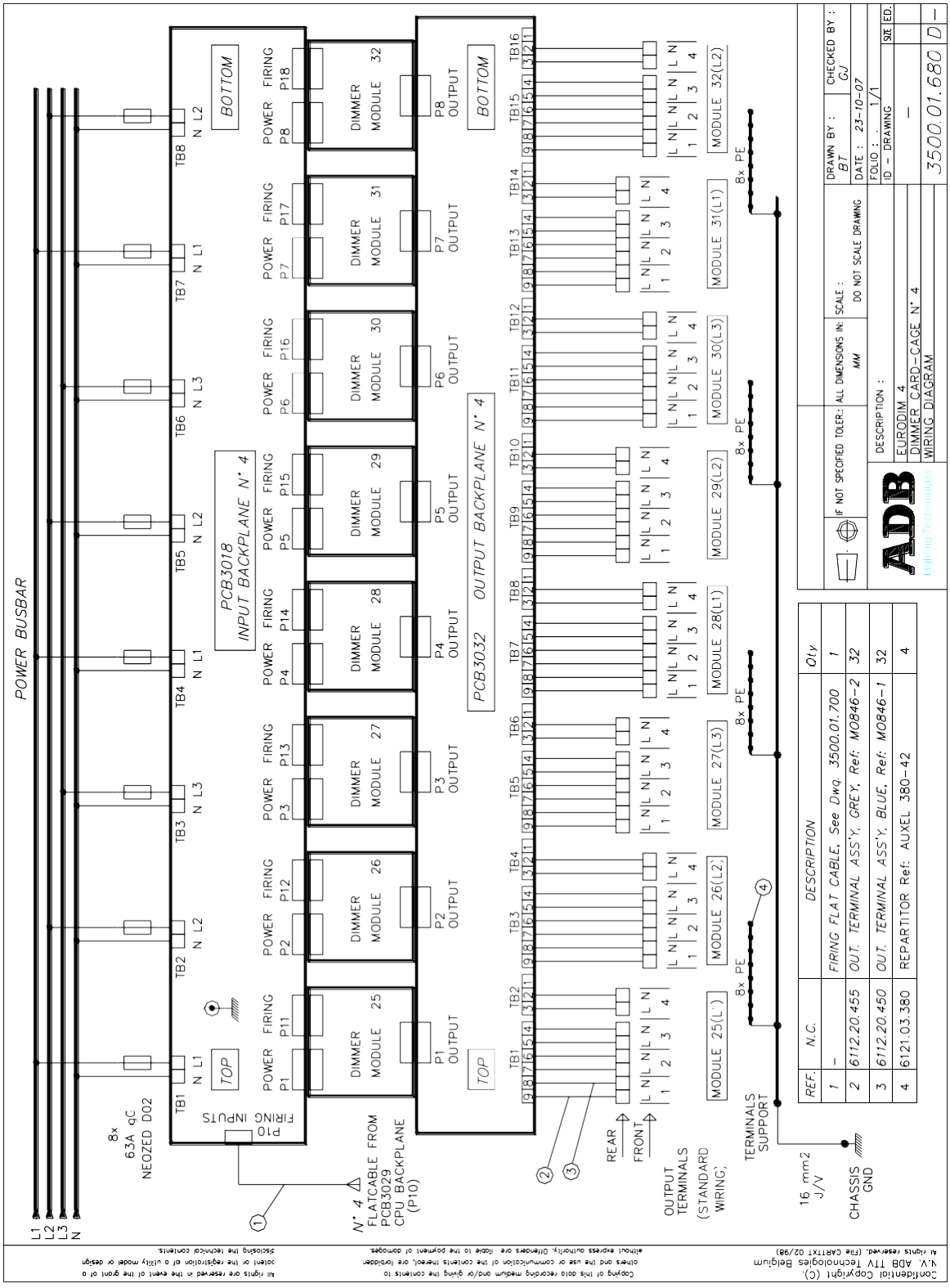
11.2 3500.01.660 Power Modules 9 - 16



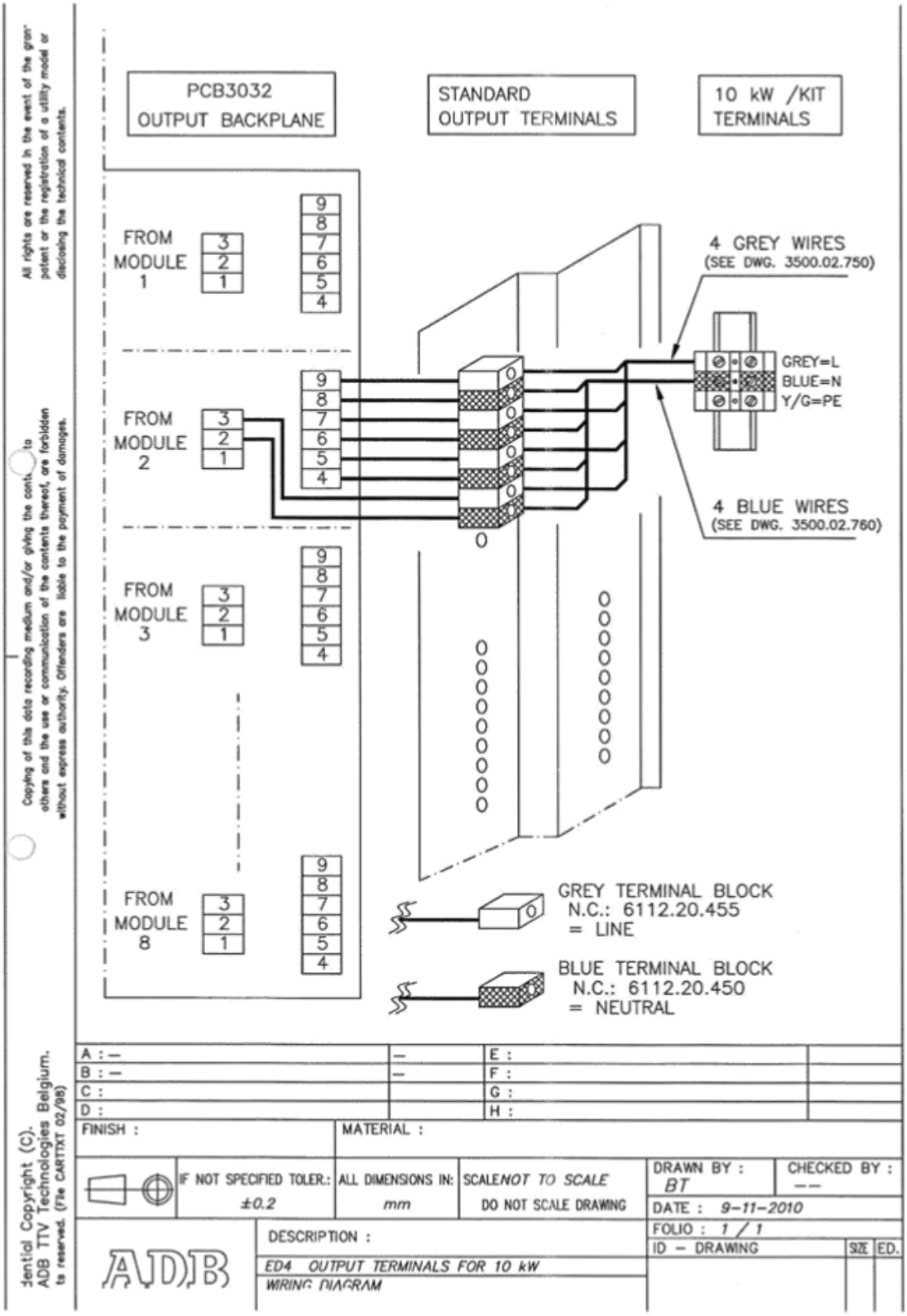
11.3 3500.01.670 Power Modules 17 – 24



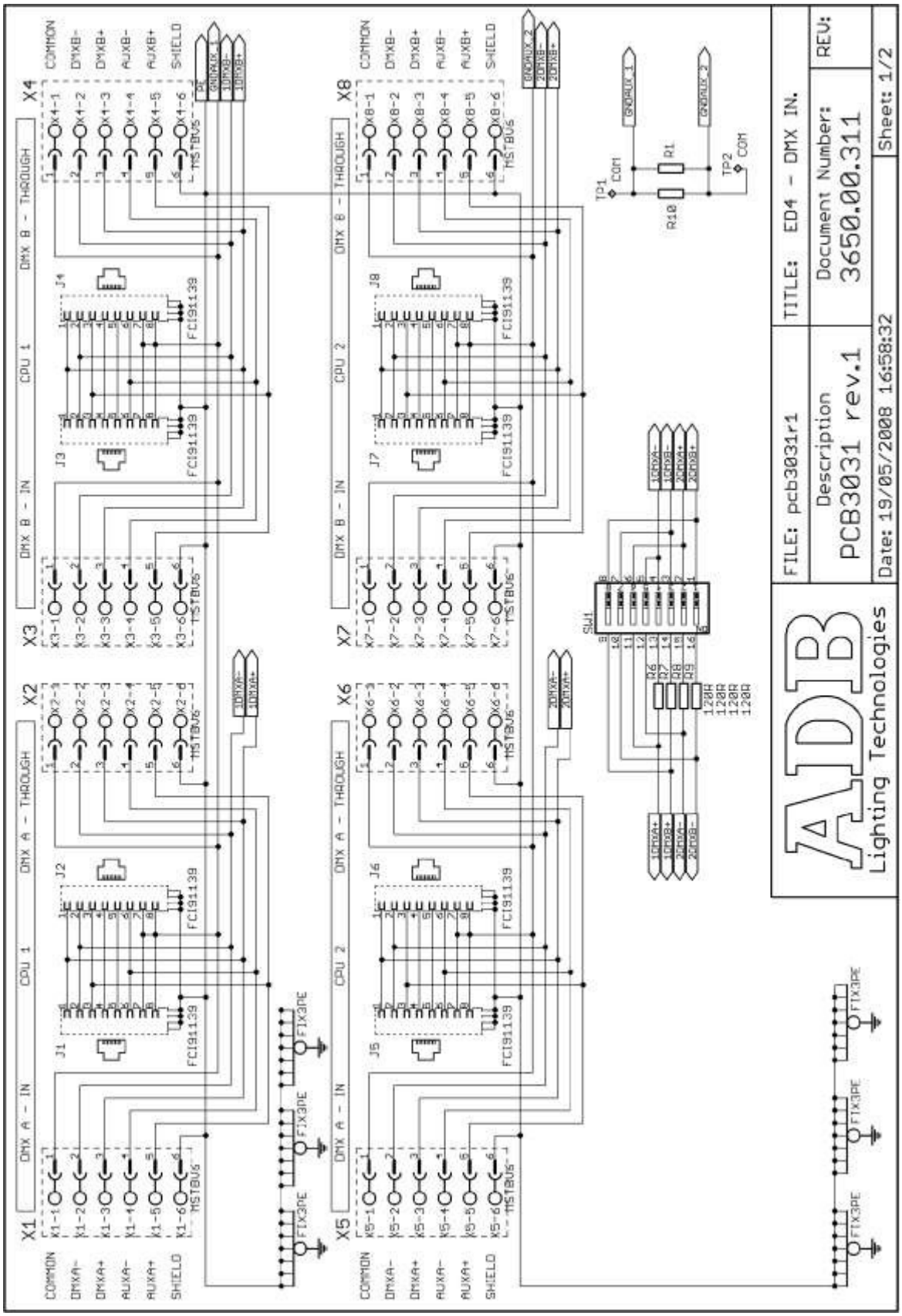
11.4 3500.01.680 Power Modules 25 - 32



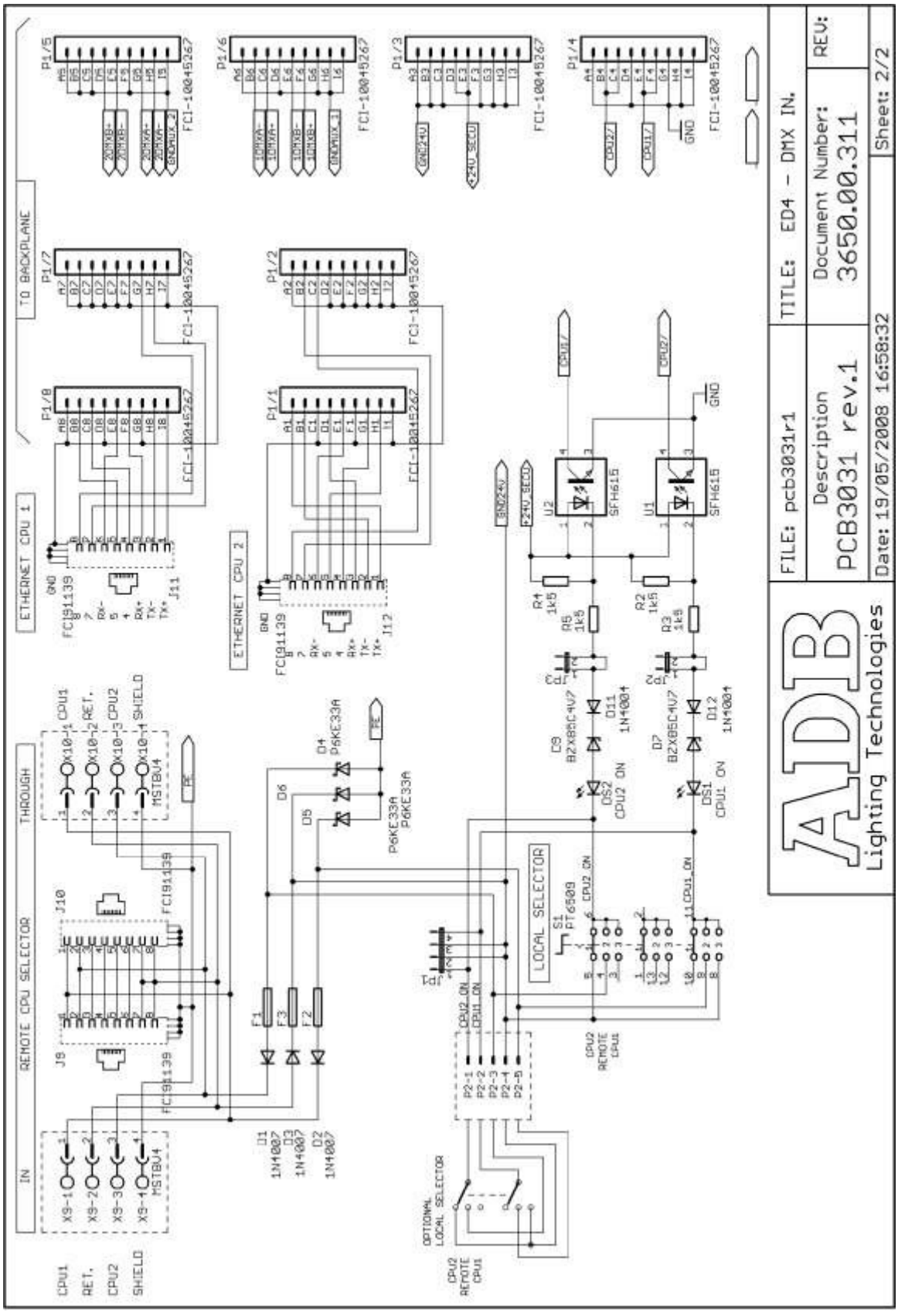
11.5 10 kW Module Connection



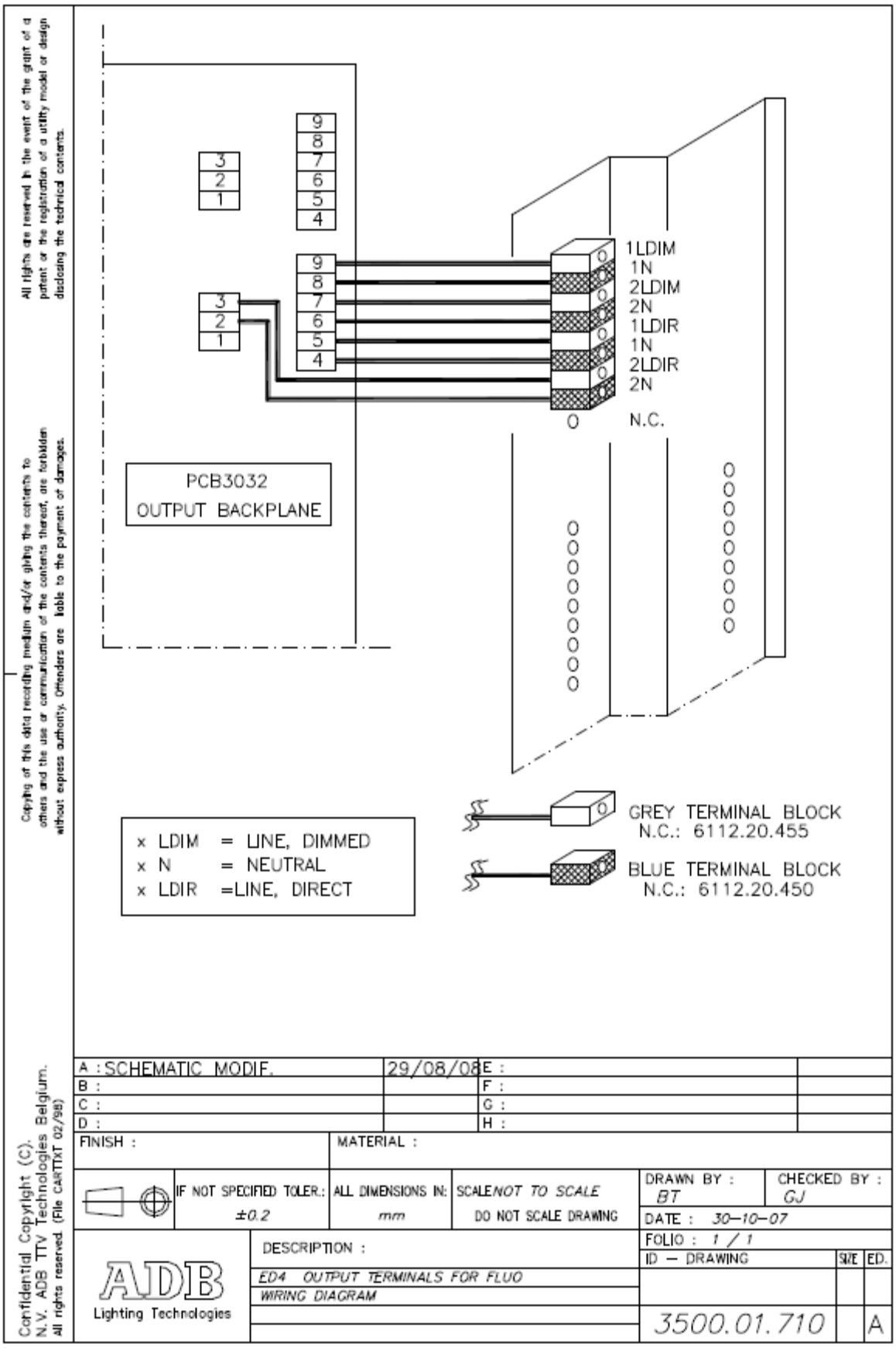
11.6 3650.00.311 PCB3031 DMX512 Connection



11.7 3650.00.311 PCB3031 Selector with Wiring



11.8 3500.01.710 OUTPUT TERMINAL FOR FLUO Modules



12 Appendix C– Power Supply for Thyristor Dimmers – Basic Principles for Safe Electrical Design

The global performance of a dimmer system depends on the dimmers and also on its electrical supply system: supply transformer, supply cabling to the dimmers. Planners and electrical contractors may not be fully aware that some rules which are valid for resistive loads and sinusoidal currents (heating systems, incandescent lighting) do not apply to a phase-control dimmer system. With this Technical Information we try to provide some basic technical information about lesser-known aspects of a dimmer system.

12.1 Phase-control dimmers

The broad principles of phase-control dimmers are as follows.

- In an ideal world, the input voltage of a dimmer is a pure sine wave, with a frequency of 50Hz or 60Hz. A phase-control dimmer reduces the voltage by switching off part of the sine wave. So the shape of the dimmer output voltage is no longer sinusoidal: it contains the fundamental frequency (50Hz) and also harmonics (odd multiples of the fundamental: 150Hz, 250Hz, 350Hz ...).
- The output voltage of the dimmer is applied to the lamp. A lamp is comparable to a resistor, so the current has the same shape as the dimmer output voltage: part of a sine wave. So the current contains the same harmonics as the dimmer output voltage.

Note: this current flows through all parts of the system: lamp, dimmer, supply cables, switchgear, supply transformer.

12.2 Use ‘true rms’ voltmeters only

For a correct measurement of the output voltage of a dimmer, you need a ‘true rms’ voltmeter. Other – cheaper – voltmeters are useless. They give a false reading when used on the output of a dimmer. They assume that the voltage is a sine wave.

12.3 Current in the Neutral – Sine Wave

Equipment requiring more than say 10 kW is usually supplied from a ‘star’ (wye) three-phase system: three live Lines and a Neutral (and Protective Earth PE). The Neutral is the common return conductor for the three Lines. The symbols for the Lines are L1, L2, L3; Lines are sometimes called Phases.

The following rules are well-known

1. When you use only one phase of a three-phase system, then the current in the Neutral is identical to the current in the Phase.
2. When an identical linear load is connected to all three phases, we speak of ‘a balanced load’. In that case the actual current in the Neutral is 0. Indeed the sum of three sine wave currents, equal in amplitude, 120° out of phase, is zero.
3. for sine wave currents, the max. current in the Neutral is equal to - or lower than - the max. current in any Line. For sine wave currents it is never larger.

IMPORTANT

Rule No. 1 is also valid for dimmers. It is a sufficient reason to forbid the use of supply cables with a reduced-size Neutral.

Rules No. 2 and No. 3 are NOT VALID for systems with phase-control dimmers! That is because their currents are not sine wave.

12.4 Current in the Neutral – Dimmer Systems

The harmonics in each of the three phase currents add up in the Neutral. The current in the Neutral can be higher (!) than the current in any Line.

Rule with phase-control dimmers
The max. current in the Neutral is 125% of the max. current in the Line.

Warning
Never use supply cables with a reduced-sized Neutral conductor. This is dangerous and not compliant with standards / regulations.

125% in the Neutral – how can I see this for myself ?
You can see this with a simple set-up which requires only basic equipment:
- any 3-phase dimmer, e.g. an ADB MEMOPACK or MICROPACK, connected to a three- phase star supply (3P+N+E)
- three identical lamp loads e.g. 1 kW luminaires
- a true rms A-meter with 10 A range, or with a 10 A current clamp
- a lighting control desk e.g. an ADB MIKADO or LIBERTY lighting control desk.

Connect the lamps to dimmers on three different phases; e.g. dimmers 1, 2, 3 for MEMOPACK 15 or MICROPACK. Connect the A-meter to measure the current in the supply Neutral.
Try out various combinations of level settings, including combinations of: one dimmer @ 100%, one @ 70%, one @ 0%.
You'll find that the Neutral current can reach 125% of the lamp current.

12.5 Practical implications

12.5.1 Example No. 1

If you want certainty for continuous duty and any combination of dimmer levels, then a CEE63 (3P+N+E) plug is suitable for a dimmer unit of max. 34kW. Larger loads can overload the N pin for some combinations of levels.
Formula: Watts = 3 x 230V x (63 / 1.25) A.

12.5.1 Example No. 2

A 3-phase dimmer cabinet rated for a Line current of 100A, will/should have Line busbars rated for minimum 100 Arms and a Neutral busbar rated for minimum 125A rms.

12.5.2 Example No. 3

Existing installation, and the existing cable has a half-size N. The circuit-breaker which feeds the cable is a type with four sensing devices: three in the Lines and one in the Neutral (rated for half current). The sensitivity of the MCCB has been trimmed to e.g. 200A for each Line, and consequently 100A for N.
- if the load is a 'balanced load' without dimmers, then $I_{neutral}$ is approx. 0, and this installation is suitable for 138kVA. Formula: 3 x 230V x 200A.
- if the load is a dimmer system, with luminaires nicely distributed evenly over the three phases, then you risk tripping for a power as low as 55kW. Indeed, for the most unfavourable combination of dimmer level settings, a total load above 55 kW can result

in a Neutral current above 100 A. The trip device in the N-pole of the MCB could react. Formula: worst case $I_{neutral}$ = 55000W / 3 / 230V x 1,25 = $100A_{rms}$.

12.6 Main transformer, cables, switchgear, busbar systems

The main transformer, the switchgear and the supply cables to the dimmer cabinet carry these non-sinusoidal currents.
This is valid for all phase-control dimmers (thyristor, triac, and some transistor dimmers), independent of brand and manufacturer.

A 'classic' recommendation is

- Inform the (future) supplier of the power transformer about the presence of thyristor- controlled dimmers. He will select a suitable, type taking into account the extra losses due to the harmonics and the increased rms current in the N
- over-size the kVA rating of the main transformer; e.g. by 50% above the expected max. load.

12.7 Voltage distortion and 'short-circuit voltage' of the main transformer

Another aspect is that the harmonic currents cause distortion of the sine wave voltage. And with a distorted voltage wave-form, the dimmer electronics have a harder time to find the 'zero crossing'; unstable 'zero crossing' means that the light levels may flicker in some instances.
In more technical terms: the combination of the source impedance of the supply system (transformer, switchboard, busbars, and supply cables) with the harmonic currents will distort the voltage at the input terminals of the dimmers.

Main transformer – recommendation

The transformer plays an important role. Its output voltage will show less distortion of the sine wave if the transformer's series impedance is low, i.e. if the transformer has a low 'short- circuit voltage'. We recommend that the main supply transformer should have a 'short-circuit voltage' of max. 4%. Again, this recommendation is valid for all phase-control dimmers (thyristor, triac, and phase-control transistor dimmers), of all brands and manufacturers.

13 Appendix D: Specification of Magnetic Circuit Breakers (MCB)

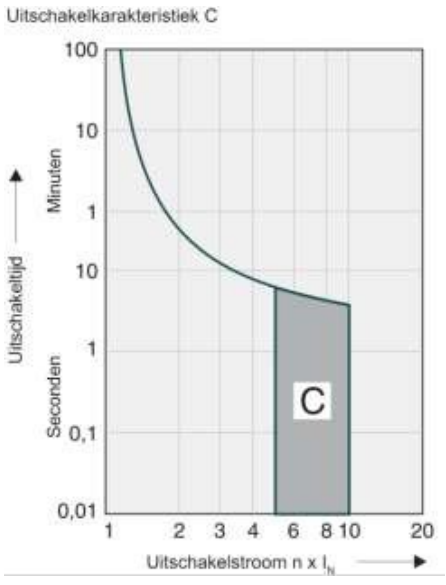
In this chapter we would like to discuss the dimension and types of MCB used for our dimmers. For 3 kW circuits ADB uses 13 A and for 5 kW circuits 20 A rated MCB with C Curve. Below we will explain why we use these values; it has been carefully designed in our product, for your maximum safety and protection.
Now following the laws we have all learned:

P(Watt) = U(Volts) x I(Amperes)

By applying this formula and a Voltage of 230 V you will receive 2.990W[3] (13 A) and 4.600 W (20 A) maximum loads. At first sight this may be not sufficient – be reassured this has been well thought of and is fully intentional as we will explain.

ATTENTION: This formula may not be applied as simple as that because there is a second factor to keep in mind and that is the curve of the selected line protection device. There are many different curves MCB may have depending on the application (Motors, General Household applications etc…)

"C" curve type protection is used exclusively for lighting applications. Below you can see the graph depicting the current passing through the MCB. If you look carefully to the curve, you will notice that the MCB will hold the factor of minimum 1.13 (maximum 1.45) for an infinite amount of time.
The 13A nominative MCB will hold min. 14.69A (or 3.38kW) and the 20A nominative MCB will hold min. 22.6A (or 5.2kW) over an infinite amount of time.



ADB digital dimmers perform intelligent soft-starts when flashing the circuit by the lighting console to full. This clever programming algorithm of our digital dimmers prevents the MCB from tripping and helps you to save lamp life by inflicting less stress on the lamp filament!

Attention: But one must never plug in cold tungsten halogen loads in a dimmer (or even an undimmed circuit) at 100% Full. Large tungsten filament lamps may appear as short-circuit to any MCB exceeding by far the short-circuit current of 10x nominative value.

Result: the MCB will trip for sure!
Therefore always make sure that a dimmer circuit is turned off, or at least at a very low value when hard- plugging luminaires.

Additional Safety Features for extremely high short circuit values:
ADB exclusively features 63A HRC fuses protecting the modules against any internal short- circuit and improving the ICC value of the cabinet to 50kA. This is an additional safety feature may not be often found in competitor products.

[3] All calculations are done with a supply current of nominative 230V in these examples.

14 CONFIGURATION TABLES

EURODIM TWIN TECH CABINET / VERSION WITH 32 MODULES					
PHASE	MODULE	TYPE (*)	ADB ID	USER ID (eg. outlet number)	CABLE TYPE
L1	1	4x3kW / 3x5kW	1.1		
			1.2		
			1.3		
			1.4		
L2	2	4x3kW / 3x5kW	2.1		
			2.2		
			2.3		
			2.4		
L3	3	4x3kW / 3x5kW	3.1		
			3.2		
			3.3		
			3.4		
L1	4	4x3kW / 3x5kW	4.1		
			4.2		
			4.3		
			4.4		
L2	5	4x3kW / 3x5kW	5.1		
			5.2		
			5.3		
			5.4		
L3	6	4x3kW / 3x5kW	6.1		
			6.2		
			6.3		
			6.4		
L1	7	4x3kW / 3x5kW	7.1		
			7.2		
			7.3		
			7.4		
L2	8	4x3kW / 3x5kW	8.1		
			8.2		
			8.3		
			8.4		

PHASE	MODULE	TYPE (*)	ADB ID	USER ID (eg. outlet number)	CABLE TYPE
L3	**9**	4x3kW	9.1		
			9.2		
		3x5kW	9.3		
			9.4		
L1	**10**	4x3kW	10.1		
			10.2		
		3x5kW	10.3		
			10.4		
L2	**11**	4x3kW	11.1		
			11.2		
		3x5kW	11.3		
			11.4		
L3	**12**	4x3kW	12.1		
			12.2		
		3x5kW	12.3		
			12.4		
L1	**13**	4x3kW	13.1		
			13.2		
		3x5kW	13.3		
			13.4		
L2	**14**	4x3kW	14.1		
			14.2		
		3x5kW	14.3		
			14.4		
L3	**15**	4x3kW	15.1		
			15.2		
		3x5kW	15.3		
			15.4		
L1	**16**	4x3kW	16.1		
			16.2		
		3x5kW	16.3		
			16.4		

PHASE	MODULE	TYPE (*)		ADB ID	USER ID (eg. outlet number)	CABLE TYPE
L2	17	4x3kW	3x5kW	17.1		
				17.2		
				17.3		
				17.4		
L3	18	4x3kW	3x5kW	18.1		
				18.2		
				18.3		
				18.4		
L1	19	4x3kW	3x5kW	19.1		
				19.2		
				19.3		
				19.4		
L2	20	4x3kW	3x5kW	20.1		
				20.2		
				20.3		
				20.4		
L3	21	4x3kW	3x5kW	21.1		
				21.2		
				21.3		
				21.4		
L1	22	4x3kW	3x5kW	22.1		
				22.2		
				22.3		
				22.4		
L2	23	4x3kW	3x5kW	23.1		
				23.2		
				23.3		
				23.4		
L3	24	4x3kW	3x5kW	24.1		
				24.2		
				24.3		
				24.4		

PHASE	MODULE	TYPE (*)		ADB ID	USER ID (eg. outlet number)	CABLE TYPE
L1	25	4x3kW	3x5kW	25.1		
				25.2		
				25.3		
				25.4		
L2	26	4x3kW	3x5kW	26.1		
				26.2		
				26.3		
				26.4		
L3	27	4x3kW	3x5kW	27.1		
				27.2		
				27.3		
				27.4		
L1	28	4x3kW	3x5kW	28.1		
				28.2		
				28.3		
				28.4		
L2	29	4x3kW	3x5kW	29.1		
				29.2		
				29.3		
				29.4		
L3	30	4x3kW	3x5kW	30.1		
				30.2		
				30.3		
				30.4		
L1	31	4x3kW	3x5kW	31.1		
				31.2		
				31.3		
				31.4		
L2	32	4x3kW	3x5kW	32.1		
				32.2		
				32.3		
				32.4		

(*) Module types and required outlets
- 4 x 3 kW - 4 x (L+N+PE)
- 4 x 2,5 kW - 4 x (L+N+PE)
- 3 x 5 kW - 3 x (L+N+PE)
- 2 x 3 kW (FLUO) - 2 x L, 2 x N, 2 x L(direct), 2 x PE
- 1 x 10 kW - 1 x L+N+PE (DO NOT PLACE directly above/under a 10 kW module)
  (Remark: A special adaptor must first installed see Chapter 6.6)

Notes

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