MEMORACK 15
MEMORACK 30

Instruction
Manual

ADB
Lighting Technologies

SUMMARY

Delivery - Unpacking

Upon delivery of your equipment, open the packaging carefully and examine the MEMORACK.

If you observe any damage, contact the shipping company immediately, and have your complaint duly recorded. You may rest assured that your equipment left the 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 and humidity, while awaiting final installation.
Never leave the material on the worksite under any circumstance.

Generalities - Safety

The MEMORACK is a professional fully digital dimmer built in accordance with European safety standards EN 60950 and EN 60204.

It is a Class I equipment designed and manufactured to EN 60950 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

Warning! Every user should read the chapter "Warning Messages"

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

The MEMORACK is a piece of 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.

Important Notice for Power Cables

Power supply cables and connectors are an important part of your equipment and contribute to its safety.

- always use an isolator or main circuit-breaker, or main fuses to interrupt the link; never pull on the cable
- do not damage the cable nor the connectors in any way, check them at each installation or at regular intervals in a permanent installation
- do not tie together power supply cables and signal cables

Intelligent 100% digital dimmer pack, available in two power configurations, for 19" rack mounting.
Suitable for insertion in touring racks and for fixed installations in MEMORACK 180 cabinets or 19" racks.

MEMORACK 15

Modified construction of MEMORACK 15 XT,
for 19" rack mounting - 3 x 5 kW or 6 x 3 kW

Supplied with:
- power supply on CEE 32 A (P17) socket
- front panel DMX input on XLR5
- XLR5 male and female connectors
- instruction manual

Dimensions (mm) : 484 x 133 x max. 540
Net weight (kg) : 18

MEMORACK 30

For 19" rack mounting - 6 x 5 kW or 12 x 3 kW.

Supplied with:
- power supply on HARTING socket 4 x 80 A + PE
- rear panel DMX input on DDK connectors;
  optional: front panel DMX input on XLR5
- rear panel power outlets on AMP connectors
- instruction manual

Dimensions (mm) : 484 x 133 x max. 540
Net weight (kg) : 20

MEMORACK

Main Features

- 5-key keypad, 12 character LED display and user friendly menus for easy access to all dimmer functions
- local controls for creation and storage of 20 (19+1) lighting cues
- individual selection of dimmer address (patch), law, smoothing and multiplication factor
- fade smoothing (4000-step resolution)
- 10 dimmer laws selectable per dimmer
- professional grade filtering (200 μs), for efficient attenuation of lamp filament noise
- protection circuitry against accidental 400 V wiring
- local status reporting: 400 V - overtemperature - fan failure - processor check - presence of DMX signal - DMX and analogue control levels
- hard-fired thyristors for control of tungsten halogen lamps, resistive and inductive loads, transformer-fed low voltage lamps, fluorescent lighting with suitable ballasts
- local test of a dimmer (steady, flash or chaser)
- automatic self-test capability
- high quality, low noise fan(s) for effective cooling, with automatic fan-stop
- overtemperature protection through gradual dimmer fade out

Technical Specifications

- power supply: 230 V / 400 V Star 3NPE (TN-S), 50/60 Hz
- individual protection by 1P HRC fuse 10 x 38 mm,
  fuse holder with integrated "fuse OK" neon indicator;
  optional 1P+N or MCB protection
- suitable for continuous duty (3 kW or 5 kW per dimmer) at 35°C; MemoRack 30: max. total load 30 kW
- digital input DMX 512/1990 and optional analogue inputs 0/+10 V (DB25-S)
- galvanic isolation on the DMX input
- for MEMORACK with AMP outputs and standard 1P protections, N and PE to the loads should be wired externally
- for MEMORACK with AMP outputs and optional '1P+N' protections, PE to the loads should be wired externally

Architectural Applications

The KIT/INPUT/ANA/24 analogue input option allows remote control by means of

- analogue control desk (0/+10V), or
- 3-position selector switch (up - down - steady), one switch can control one or several dimmers
- remote storage, playback and dimming of the
  20 memories; direct access, one switch per memory

Options

MEMORACK 15

• analogue input 0/+10 V retrofit kit, for 6 dimmers	KIT/INPUT/ANA/6
• analogue input 0/+10 V retrofit kit, for 12 dimmers	KIT/INPUT/ANA/12
• for remote memory control: analogue input 0/+10 V retrofit kit with 24 inputs	KIT/INPUT/ANA/24
• 1P+N instead of 1P protection for 12 dimmers	PROT/1P+N/12
• 1P+N instead of 1P protection for 6 dimmers	PROT/1P+N/6
• 1P+N instead of 1P protection for 3 dimmers	PROT/1P+N/3
• MCB instead of HRC fuse protection for 12 dimmers	PROT/DISJ/12
• MCB instead of HRC fuse protection for 6 dimmers	PROT/DISJ/6
• MCB instead of HRC fuse protection for 3 dimmers	PROT/DISJ/3
• pair of telescopic guides - 1 required per Rack	RAIL/MR30
• supply RCD 4P - 30 mA, compulsory for IT/TT supply	RCD/MEMO
• supply MCB 32 A - 4P - 6 kA	MCB/MEMO
• supply MCB+RCD 4P - 32 A - 30 mA - 6 kA	MCB/RCD/MEMO
• 2P instead of 1P protection for 6 dimmers	PROT/2P/6
• 2P instead of 1P protection for 3 dimmers	PROT/2P/3
• Star/Delta power supply, two-pole 3 kW dimmer protection; supply cable not included	ALIM / E-T / MEMO 6
• Star/Delta power supply, two-pole 5 kW dimmer protection; supply cable not included	ALIM / E-T / MEMO 3
• installed cable instead of power supply on CEE 32 A socket	C.ALIM/ 2 / MEMO

MEMORACK 30

• analogue input 0/+10 V retrofit kit, for 6 dimmers	KIT/INPUT/ANA/6
• analogue input 0/+10 V retrofit kit, for 12 dimmers	KIT/INPUT/ANA/12
• for remote memory control: analogue input 0/+10 V retrofit kit with 24 inputs	KIT/INPUT/ANA/24
• 1P+N instead of 1P protection for 12 dimmers	PROT/1P+N/12
• 1P+N instead of 1P protection for 6 dimmers	PROT/1P+N/6
• 1P+N instead of 1P protection for 3 dimmers	PROT/1P+N/3
• MCB instead of HRC fuse protection for 12 dimmers	PROT/DISJ/12
• MCB instead of HRC fuse protection for 6 dimmers	PROT/DISJ/6
• MCB instead of HRC fuse protection for 3 dimmers	PROT/DISJ/3
• pair of telescopic guides - 1 required per Rack	RAIL/MR30

MEMORACK 15

Front Panel

Indicators :

- Presence of DMX signal
- Microprocessor running
- Error messages (temperature warning, DMX error, …)

Protections

- HRC fuses, single pole 10.3 x 38 mm
- Supply and «fuse OK» indicators integrated in the fuse-holder
- Protection circuitry against accidental 400 V wiring errors
- Overtemperature protection (gradual fade-out)

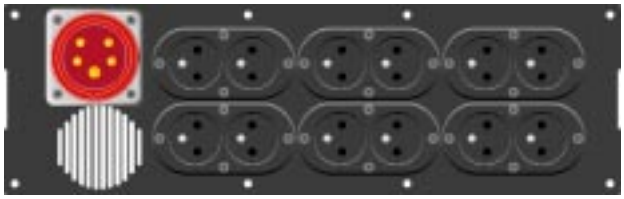
Power Supply Connection

- power supply on CEE 32 A (P17) socket
  The supply cable should be sized for the rating of the MEMORACK:
  - 27 A per phase for three-phase star operation (3 x 400 V + N); e.g. cable 5 x 4 mm^2, EPR insulation, 85 Celsius
  - 82 A for single-phase operation (230 V + N); e.g. cable 3 x 10 mm^2, EPR insulation, 85 Celsius

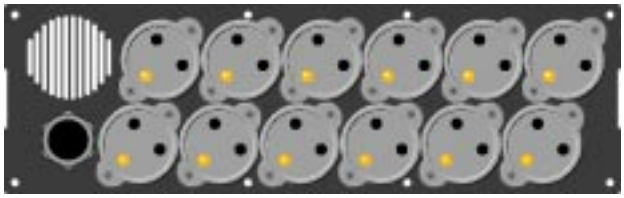
Mains Supply

- Star mains supply 3NPE (TN-S) 400 V 50 and 60Hz
- Single-phase operation possible (single-pole protected)

Outlets



6 x twin NF/CEBEC or 6 x twin Schuko
or 6 x triple Swiss



6 x twin UK 15 A (fitted with supply cable)

6 x CEE 16 A (P17) or 3 x CEE 32 A

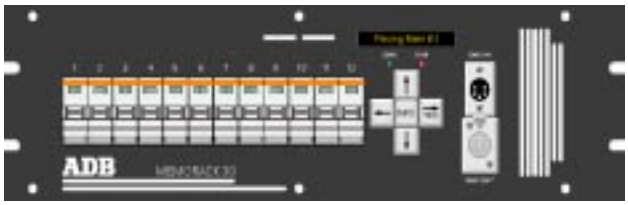
Blank panel with fan

AMP connector (12P - 15 A)

AMP connector (9P - 25 A)

MEMORACK 30

Front Panel



Indicators :

- Presence of DMX signal
- Microprocessor running
- Error messages (temperature warning, DMX error, …)

Protections

- HRC fuses, single pole 10.3 x 38 mm
- Supply and «fuse OK» indicators integrated in the fuse-holder
- Protection circuitry against accidental 400 V wiring errors
- Overtemperature protection (gradual fade-out)

Power Supply Connection

- power supply on HARTING socket 4 x 80 A + PE
  The supply cable should be sized for the rating of the MEMORACK:
  50 A per phase for three-phase star operation (3 x 400 V + N); e.g. cable 5 x 10 mm^2, EPR insulation, 85 Celsius
- rear panel DMX input on DDK connectors;
  optional: front panel DMX input on XLR5

Mains Supply

- Star mains supply 3NPE (TN-S) 400 V 50 and 60Hz

Outlets

AMP connector (12P - 15 A)

AMP connector (9P - 25 A)

Digital dimmers

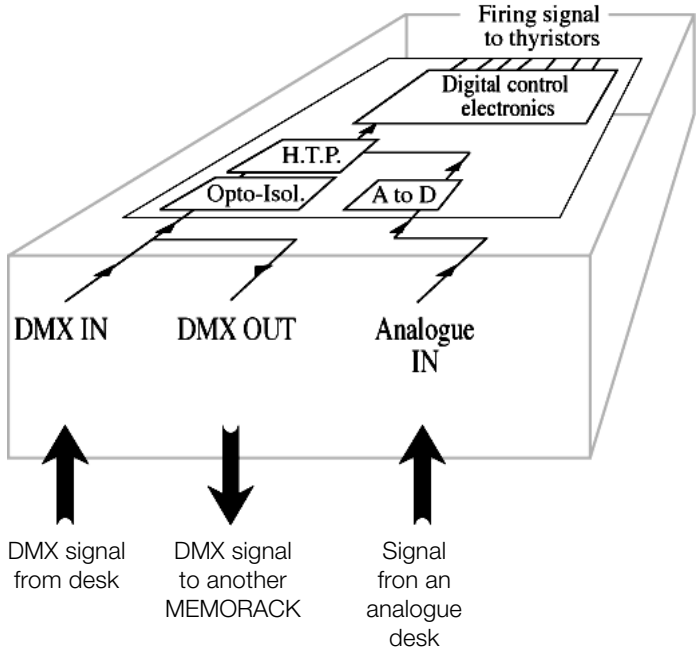
MEMORACK is a member of a family of fully digital dimmerpacks, using advanced microprocessor control and an Application Specific Integrated Circuit (= custom chip) designed by ADB.
Digital control offers stable, accurate and repeated performance over time, without the periodical recalibration required by dimmers with analogue circuitry.
The very straightforward menu-driven set-up provides maximum flexibility for a wide range of applications.
In a MEMORACK equipped with the Analogue Input option, the analogue control signals are converted to a digital signal by the DAC (Digital to Analogue Converter), and are further processed as digital data.

The analogue and the DMX levels are merged for every dimmer, on a "highest takes precedence" (HTP) basis.

Example :

- dimmer
  - DMX control desk at 70 %
  - analogue control desk at 50 %
  - dimmer output level will be 70 %

- dimmer
  - DMX control desk at 20 %
  - analogue control desk at 80 %
  - dimmer output level will be 80 %



Ratings

Your MEMORACK is suitable for continuous duty at 6 x 3 kW or 3 x 5 kW and 35°C ambient temperature.
When totalling up the load to a dimmer, one should include the losses in the cabling and, if applicable, the losses in the transformer.
The factory-fitted fuses have carefully been selected for optimum protection of the semiconductors and the cabling, for maximum safety and reliability.
Do not use types other than supplied for the MEMORACK .
The factory-supplied fuses and spare-parts are selected for continuous operation. Some fuses may be labelled at lower values (e.g. 12 A) due to the different fuse manufacturers' rating systems and thermal fusing characteristics.

Loads

The use of oversized antiparallel thyristors (rather than triacs) and an appropriate gate firing technique makes your MEMORACK suitable for a wide range of resistive and inductive loads, including tungsten lamps, low-voltage lamps with a suitable transformer, fluorescent lamps with a suitable ballast.

The following precautions improve the reliability and performance of dimmer systems in general:

- every low-voltage transformer must be protected by its own primary fuse
- use preferably more than one lamp on the secondary of a low-voltage transformer
- power-factor correction capacitors, such as supplied with some fluorescent lamp fixtures, should not be connected to a dimmer; they must be connected to the mains

Cooling

Your MEMORACK is equipped with a forced ventilation system, with a long-life, low-noise, high performance fan. This allows continous use at full rated load. Air intake apertures are on the socket panel, and the exhaust aperture is on the front panel. Do never obstruct these apertures !

The operation of the fan is controlled by microprocessor.

The automatic thermal protection scheme is detailled in "Miscellaneous - Gradual Shutdown".

Supply connections

Type of mains supply network

Before you connect electrical equipment, you must verify that it is adapted to the mains system at your venue.
If in doubt consult the electrician or the utility company.
The standard MEMORACK is suitable for a three-phase 3NPE 400V 50Hz and 60Hz, TN-S system (three phase wires + Neutral wire + Earth wire; Neutral directly connected to Earth).
The rated voltage between phase and Neutral is 230 V. The operating voltage must lie between 220 V - 10% and 240 V + 10% (198 V to 264 V).
The dimmer protections are single-pole, in the Live wire, as required for a three-phase TN-S supply.

Under some conditions, the MEMORACK can be operated on a single-phase supply. Details are described in "Single-phase conversion kit"

Protection on the supply side

The power outlet which feeds the MEMORACK and the supply cable must be adequately protected against overload and short-circuit by the installation; verify the current edition of the applicable wiring regulations.
Please also refer to “Supply Cable”, and to “Electrical Characteristics”.

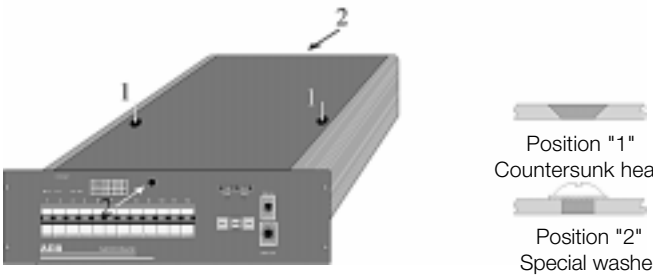
Supply terminals

All connections should be performed by a qualified electrician.
The supply terminals are suitable for cables up to 4 mm^2.
The colour code is blue for Neutral and yellow/green for PE.

The bottom cover must be removed to gain access to the supply terminals.

How to remove a cover (top or bottom)

- always disconnect the power supply before you remove the cover
- please refer to the sketch for the position of the ten screws which secure the cover. Do not remove any other screws !
- when closing the MEMORACK, carefully position the special washers (position 2)
- Do not remove top and bottom covers simultaneously



Position "1"
Countersunk head

Position "2"
Special washer

ADB
Lighting Technologies

Supply cable

The size of the Neutral wire must at least be equal to the size of the phases; reduced-size Neutral wires are DANGEROUS and are NOT allowed.

All supply cables and extension cables should have all conductors under the same sleeve, in order to reduce unwanted interferences to audio and video equipment.

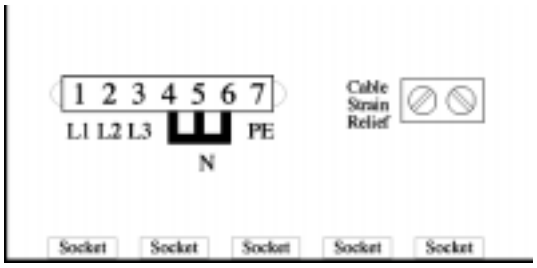
The supply cable should be sized for the rating of the MEMORACK:

- 27 A per phase for three-phase star operation (3 x 400 V + N);
  e.g. cable 5 x 4 mm^2, EPR sleeve, 85 Celsius for MEMORACK 15
- 50 A per phase for three-phase star operation (3 x 400 V + N);
  e.g. cable 5 x 10 mm^2, EPR sleeve, 85 Celsius for MEMORACK 30
- 82 A for single-phase operation (230 V + N);
  e.g. cable 3 x 10 mm^2, EPR sleeve, 85 Celsius for MEMORACK 15

Cables for lower current ratings are not allowed unless the protection devices in the installation (supply fuses or supply circuit-breaker) are selected accordingly.

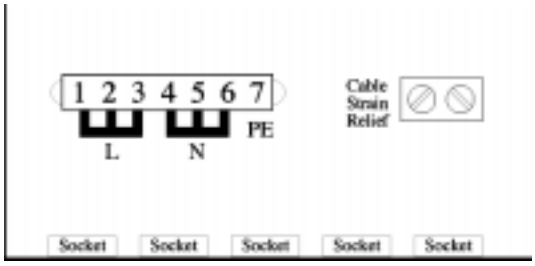
Spade cable terminals are required for connection to the three-phase terminals.
Spade terminals suitable for cables up to 10 mm^2 are included in the single-phase conversion kit.

Operation on a Star system (3 x 400 V + N + Earth)



The standard MEMORACK is suitable for a three-phase 3NPE 230/400V TN-S system (3 phases + neutral N + Earth; N directly connected to Earth). The voltage between a phase and the Neutral must lie between 198 V and 264 V.
The dimmer protections are single-pole, in the Live wire, as required for a three-phase TN-S supply. Optional 1P+N and 2P versions are available.

Single-phase conversion kit



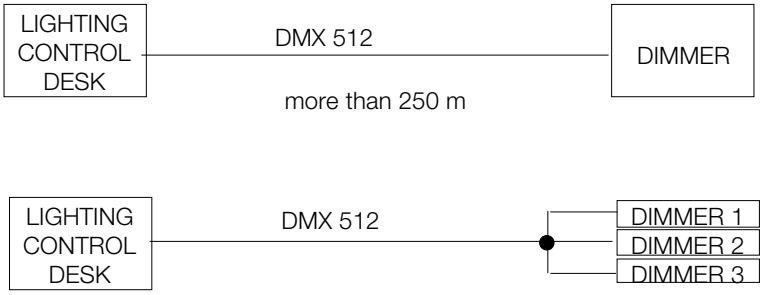
The MEMORACK 15 can under some circumstances be used on a single-phase supply. L1, L2 and L3 are linked for single-phase operation; the Live of the supply system is connected to central terminal No. 2. Terminals Nos. 4, 5 and 6 are always linked; the Neutral of the supply system is connected to central terminal No. 5.

WARNING

The MEMORACK (TN version) will operate on a single-phase supply, but the user must verify whether single-pole protections are allowed by the applicable wiring regulations.
The MEMORACK will operate reliably up to its full rated load (82 A) at 35°C. The actually available power may be limited by the power supply (cable size, supply fuse rating, supply mcb rating).

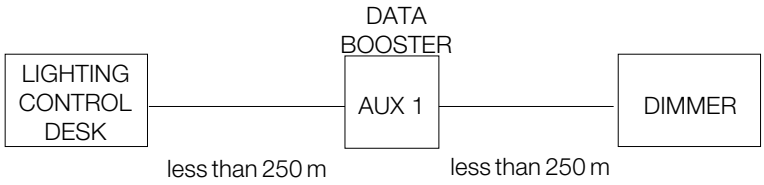
DMX Network - Application Examples

NO

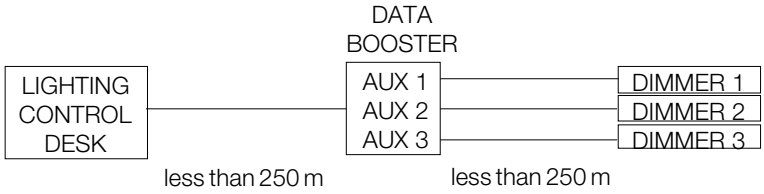


YES

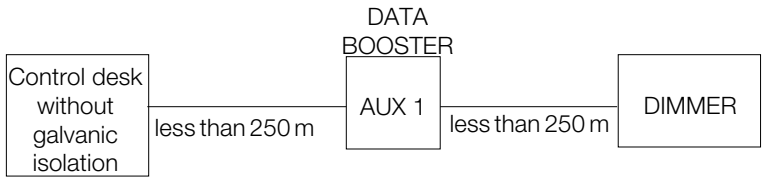
1 - When total length of DATA line exceeds the recommended length :
- DMX 512 Standard : 300 m
- ADB recommendation : 250 m



2 - When DATA line is split in a Y - junction



3 - Galvanic isolation for DATA line protection



ADB Lighting Technologies

Control Connections

Two lighting control desks can simultaneously control your MEMORACK: one DMX512 and one Analogue. The actual dimmer output will be the highest of the two levels (Highest Takes Precedence, HTP), as described in the example on page 5.

DMX512/1990

DMX512 (USITT) is internationally the most widely accepted communication standard for lighting control equipment. The standard is issued by the USITT (U. S. Institute of Theatre Technology); the suffix 1990 indicates the latest issue.
The DMX512 signal is a Digital MultipleXed control signal, suitable for the digital transmission of the levels of up to 512 dimmers.
Electrically it uses the RS-485 (EIA-485) standard, which states: wire pairs + screen; maximum 32 receivers on a line; cable length without reamplification max. 300 m; no splitting or Y-junctions. Transmission rate is high (250 kbit/s). Dimmer levels are sent in bytes of 8 bits (256 possible levels).

DMX512 network

The MEMORACK is fitted with two XLR5 connectors (IN and OUT) for a daisy-chain DMX512 network (see example 1). IN and OUT are wired through internally. Used pin numbers are indicated on the front panel and in the wiring diagrams at the end of this manual.

Termination of the DMX line

The DMX OUT of the last dimmer unit on the daisy-chain must receive a Termination Plug. This Termination Plug is an XLR5 receptacle with a small resistor of 120 Ω 0,33 W soldered between pins 2 and 3. A diagram is shown at the end of this manual.

Dimmer Address

The DMX address of the first dimmer in the MEMORACK is set by the Address item in the Menu list.
The addresses of the other five dimmers follow.

Example :
if the address is set at 019, then the six dimmers in the MEMORACK will be numbered 19 (first dimmer) through 24 (last dimmer). For non-sequential numbering : see "Patch".

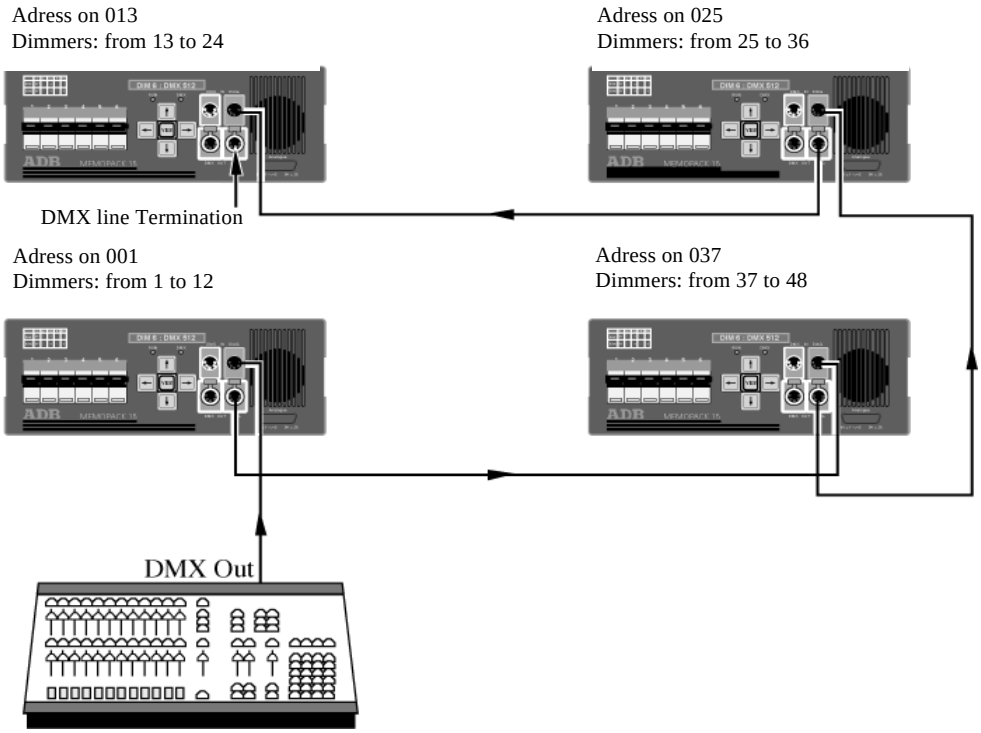
The DMX512 network

The DMX512 network starts from the lighting control desk. A first cable runs from the DMX OUT of the control desk to the DMX IN of the nearest MEMORACK. The daisy-chain continues by means of a second cable, connecting DMX OUT to DMX IN of the next MEMORACK. This daisy-chain is continued through all the dimmer packs in the system. In MEMORACK, the DMX IN and DMX OUT connectors are wired in parallel, so continuity of the daisy-chain is always provided. The continuity and quality of the DMX signal will not be affected when the MEMORACK is switched off, or when a failure occurs.

Opto-isolation

The DMX512 input of your MEMORACK is equipped with optocoupler isolation. This provides galvanic isolation between the DMX network and the microprocessor electronics in the MEMORACK. This is an important safety feature: should for example the DMX512 network come in contact with mains voltage, then the internal electronics of the MEMORACK will remain isolated from those dangerous voltages. Such accident could occur for example when cables are severely damaged or crushed, or when an isolation fault occurs in a control desk which has no opto-isolation in its output.

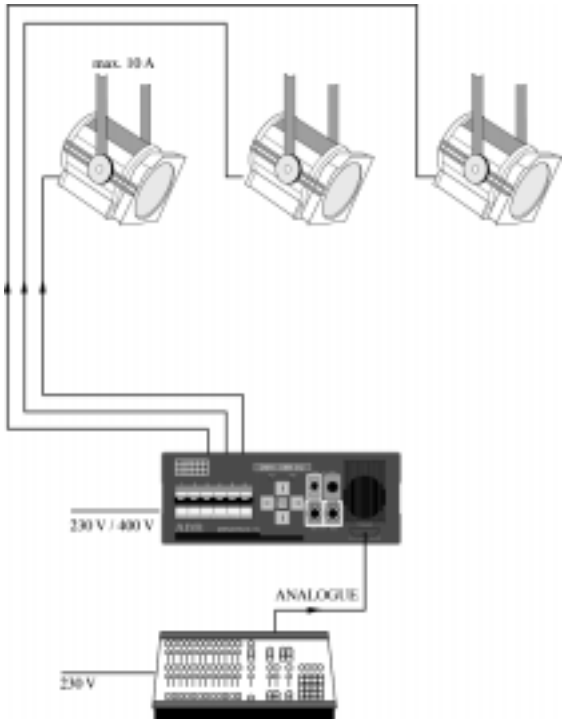
Example 1: four MEMORACKs (24 dimmers) controlled by a lighting control desk



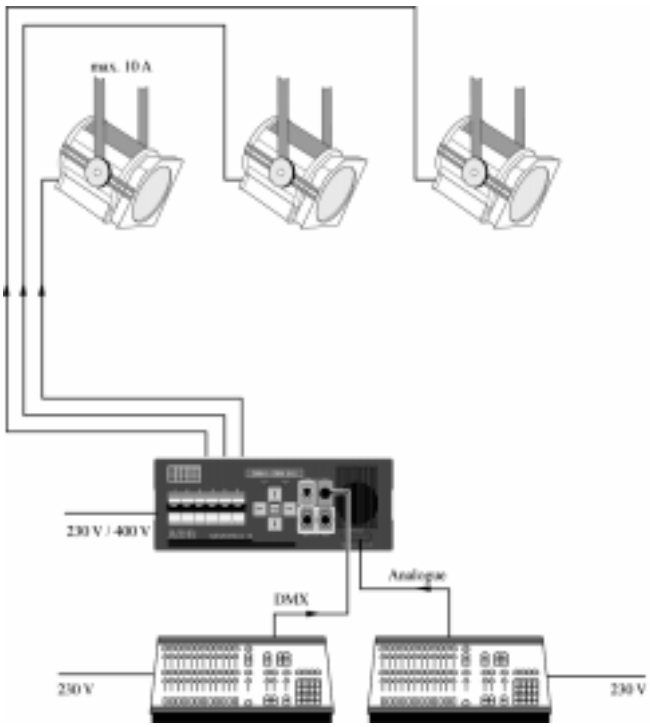
How to lay-out the DMX512 cables

- the MEMORACKs can be daisy-chained in any order (see example 1)
- the last unit on the DMX line must be equipped with a Termination Plug
- the overall length of the DMX cables (sum of the length of the individual cables) is very important.
  We recommend that it should not exceed 250 m. Longer cable runs are likely to reduce the quality of the DMX signal, which may result in unpredictable results.
  For cable runs exceeding 250 m an active amplifier is required, such as ADB's DATA BOOSTER. A 250 m cable run can be connected to each active output of the DATA BOOSTER.
- Y-splitting is not allowed. If the DMX network must fan out in different directions, then an active splitter is required, such as ADB's DATA BOOSTER
- the DMX512 standard states that max. 32 receiver units may be connected to one transmitter. So up to 32 MEMORACKs can be connected to a lighting control desk, or to an active output of a DATA BOOSTER/SPLITTER
- do not run DMX512 cables (or Analogue control cables) together with power cables
- for further information, please refer to the data sheet of the DATA BOOSTER, or the "Recommended Practice for DMX512" published by the Professional Light and Sound Association (PLASA) available from your supply ADB.

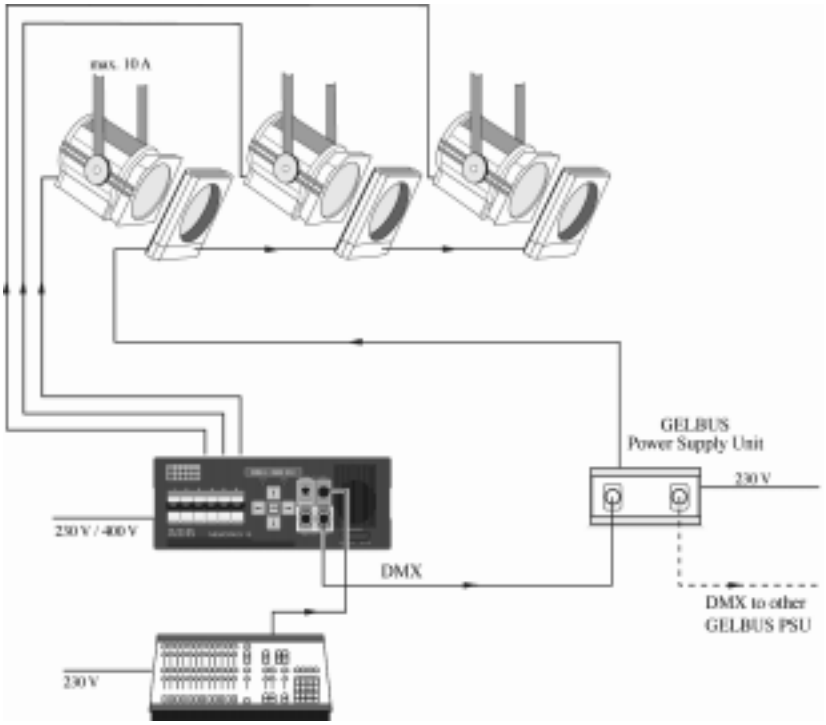
Example 2 : one MEMORACK, with Analogue Input Option, controlled by an analogue output desk



Example 3 : one MEMORACK, with Analogue Input Option, controlled simultaneously by an analogue output desk and a multiplexed desk (Highest Takes Precedence)



Example 4 : one MEMORACK controlled by a DMX desk, which also controls DMX colour scrollers (GELBUS)



Analogue inputs

Your MEMORACK can be equipped with Analogue Inputs, in which case it can be controlled by analogue control signals, 0/+10V or 0/+370 μA (filtered).
If the Analogue Inputs were factory-installed, they were set for 0/+10V operation; you can easily perform the conversion to 0/+370 μA yourself. See below for the detailed procedure.
The Analogue Inputs connector is a DB25-S receptacle, on the front panel.
The pin allocation is indicated on the front panel of your MEMORACK. The following table shows the pin allocation for all the connectors, including P3 and P4 on the Analogue Inputs board.

MEMORACK 15		DB-25 S	Internal (P3, P4)
control dimmer	1	pin 1	pin 1
control dimmer	2	pin 2	pin 3
control dimmer	3	pin 3	pin 5
control dimmer	4	pin 4	pin 7
control dimmer	5	pin 5	pin 9
control dimmer	6	pin 6	pin 11
		pin 7 through 24 not connected	
0 V		pin 25	pin 24 and 26

MEMORACK 30		DB-25 S	Internal (P3, P4)
control dimmer	1	pin 1	pin 1
control dimmer	2	pin 2	pin 3
control dimmer	3	pin 3	pin 5
control dimmer	4	pin 4	pin 7
control dimmer	5	pin 5	pin 9
control dimmer	6	pin 6	pin 11
control dimmer	7	pin 7	pin 1
control dimmer	8	pin 8	pin 3
control dimmer	9	pin 9	pin 5
control dimmer	10	pin 10	pin 7
control dimmer	11	pin 11	pin 9
control dimmer	12	pin 12	pin 11
		pin 13 through 24 not connected	
0 V		pin 25	pin 24 and 26

Internal setting for Analogue Inputs

- setting for 0/+10 V operation: the ribbon cable with the front-panel DB-25-S Analogue receptacle is plugged into P3 on the Analoge Input board PCB 1336
- setting for 0/+370 μA operation: the ribbon cable with the front-panel DB-25-S Analogue receptacle is plugged into P4 on the Analoge Input board PCB 1336
- W1 on PCB 1336: jumper removed, or placed between pin 2 and pin 3
- W2 on PCB 1336: jumper removed, or placed between pin 2 and pin 3

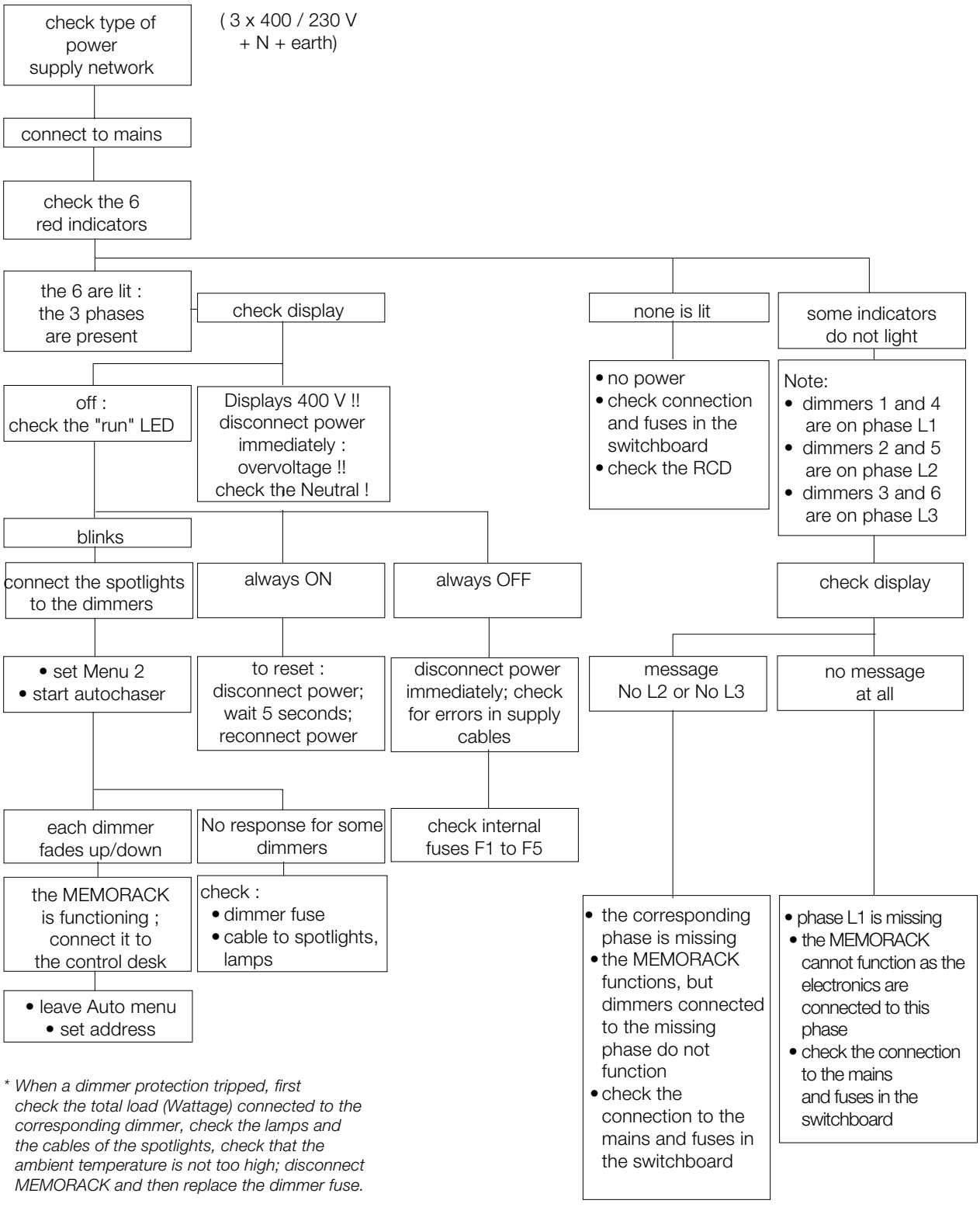
Analogue Inputs : selection 0/+10 V or 0/370 μA

Your MEMORACK was factory-set for 0/+10V analogue control signals. To convert it to 0/+370μA please refer to qualified personnel:

- disconnect the MEMORACK from the mains
- remove the top cover, see the sketch in the Supply Connections Chapter
- touch the aluminium heatsink to discharge electrostatic build-up
- identify on the small Analogue Inputs board connector P3, labelled 0->10V
- remove the 25-wire flat (ribbon) cable from that connector
- connect the 25-wire flat (ribbon) cable to connectorP4, labelled 0->370μA
- secure the connector
- close the cover, verify the presence of the special washers

Putting into Operation

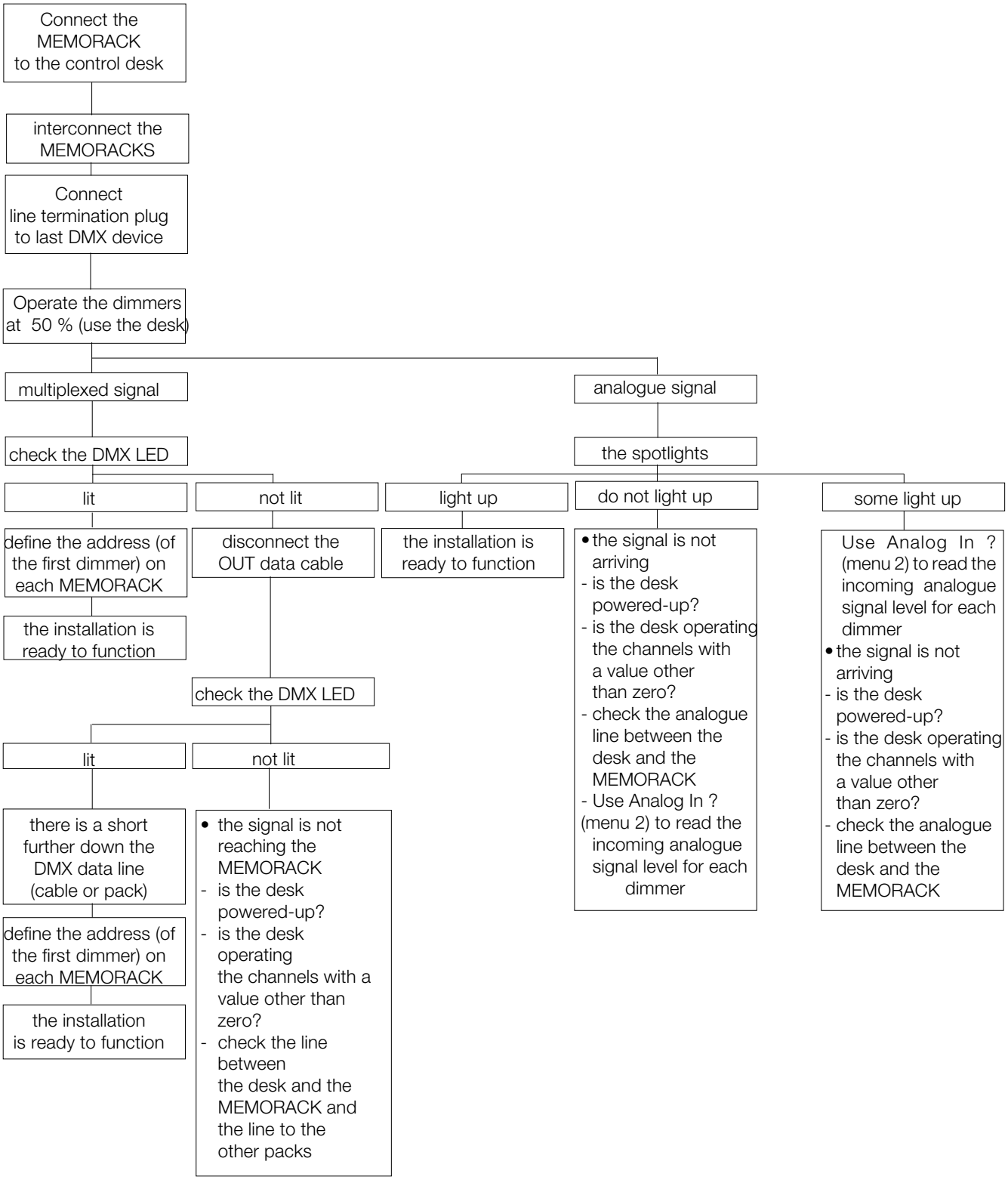
Power section



* *When a dimmer protection tripped, first check the total load (Wattage) connected to the corresponding dimmer, check the lamps and the cables of the spotlights, check that the ambient temperature is not too high; disconnect MEMORACK and then replace the dimmer fuse.*

Putting into Operation

Operating section



Miscellaneous

Protection against accidental 400 V

Warning : always check the mains voltage before you connect power to electrical equipment.
If excessive voltages are applied, the internal protection circuitry of your MEMORACK will disable the MEMORACK.

To restore normal operation:

- disconnect the MEMORACK from the mains
- remove the top cover, see sketch in "Supply Connections" chapter
- check the five fuses (5 x 20 mm) F1 through F5 - see sketch "Microprocessor board" - replace blown fuses by suitable type only
- close the MEMORACK; check presence of special washers
- verify the power source; possible cabling errors include inversion between phase and Neutral, or disconnected Neutral
- restore power to the MEMORACK only when you are confident that the power source is satisfactory

400 V Message

This warns you that an excessive voltage is applied to at least one of the phases. The MEMORACK has shut itself down, no dimmer will operate.
ACTIONS TO TAKE: see Warning Messages- 400 V

Loss of DMX signal - time-out

Should the DMX control signal disappear, then the microprocessor will keep the last levels indefinitely. Dimmer levels can always be brought back to “Off”

- by restoring the DMX line
- or by disconnecting the power to the MEMORACK
- or by entering the dimmer test mode (see "Test") and setting a "0 %" level

Microprocessor reset

The “Run” indicator on the front panel flashes at a rate of once per second, if the microprocessor is operational. Should the indicator stop blinking, then you can Reset the microprocessor by disconnecting the power supply to the MEMORACK.
Use the supply isolator, the RCD or the MCB; never use the supply plug!

For maintenance purposes (qualified personnel only ! dangerous voltages are present inside!), a manual Reset switch is located on the main microprocessor board:

- remove the top cover, see sketch in "Supply Connection"
- touch the aluminium heatsink to discharge electrostatic build-up
- identify on the main board the push-button labelled Sw1
- depress Sw1; release Sw1
- the RUN indicator on the front panel should resume blinking once per second
- close the cover; check the presence of the special washers !

Over-temperature - gradual shutdown

Your MEMORACK is equipped with a temperature monitoring system. Should the internal temperature rise, then the display will show a flashing message (TEMP).

Your MEMORACK is rated for continuous duty, so a TEMP warning is an indication of faulty operation or use.
Please verify :

- the room temperature (35°C max.)
- that the air intake and exhaust apertures are not obstructed
- that the air intake is not influenced by the warm air exhausted by other equipment
- that the fan is still operational
- that no dimmer is loaded to more than capacity (3 kVA or 5 kVA)

Reduced dimmer levels or loads will reduce the internal heat dissipation.

If the internal temperature remains too high for several minutes, then a TEMP message will flash and the MEMORACK will protect itself by a gradual shutdown:

- first all six dimmer levels will be slightly reduced
- followed later by further reductions of all six dimmer levels
- normal operation is automatically restored when a safe temperature is reached, and after reset

Internal fuses

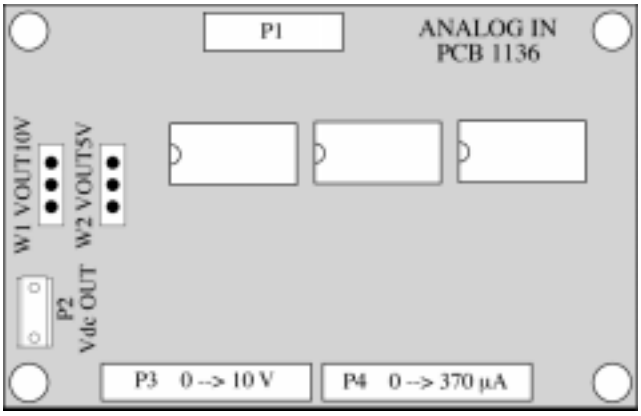
If the six dimmer indicators are lit, but the front panel LED's nor the display light up, then you should check the fuses for the control electronics. These fuses are independent of the dimmer protections on the front panel. They can easily be reached (qualified personnel only !) :

- disconnect the MEMORACK from the mains
- remove the top cover, see sketch in "Supply Connection"
- check the five fuses (5 x 20 mm) F1 to F5 - see sketch "Microprocessor board"
- replace fuses, if necessary; use suitable fuses only !
- close the cover; check the presence of the special washers

The use of incorrect fuses is dangerous, may cause permanent damage, and will void warranty. Correct fuse references are listed in the Maintenance chapter, Spare Part List.

Installation of the Analogue Inputs kit

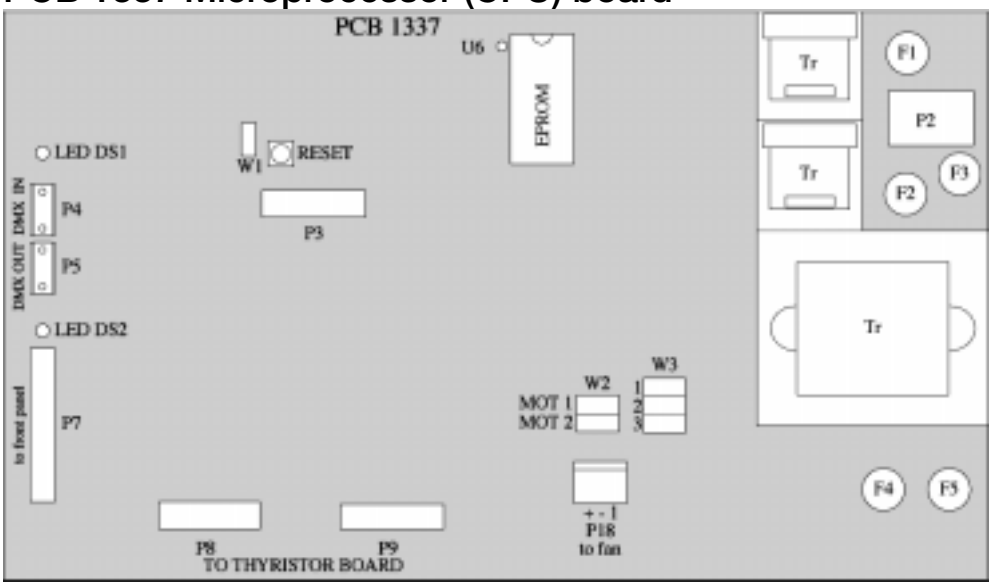
If your MICROPACK was not factory-equipped with the Analogue Inputs, you can upgrade it by means of a kit.



PCB 1336 Analoge Input board (option)

- disconnect the MICROPACK from the mains
- remove the top cover (10 screws, see sketch in “Supply terminals”)
- install board PCB 1336 (127 x 87 mm) + four plastic stand-offs
- P1 on PCB 1336 (Analogue Input board) mates with P3 of PCB 1337 (Microprocessor CPU board)
- for 0/+10 V operation: connect the ribbon cable (25 conductors) with the front panel Analogue receptacle (DB-25-S) to P3 on PCB 1336 (Analoge Input board)
- 0/+370 µA operation: connect the ribbon cable (25 conductors) with the front panel Analogue receptacle (DB-25-S) to P4 on PCB 1336 (Analogue Input board)
- secure the ribbon cable away from the filter chokes and power wiring
- close the cover (10 screws, carefully replace the special washers !!!)
- enable the Analogue Inputs, by means of the AinM function in Menu 3

PCB 1337 Microprocessor (CPU) board



Function of the five fuses

• fuse F1	phase L3 (mains reference)	80	mAM	Part N° 6130.07.105
• fuse F2	phase L1 (supply of microprocessor electronics, and mains reference)	100	mA	Part N° 6130.07.130
• fuse F3	phase L2 (mains reference)	80	mAM	Part N° 6130.07.105
• fuse F4	phase L1 (mains reference, transformer output)	250	mAT	Part N° 6130.12.130
• fuse F5	phase L1 (aux. supply, transformer output)	250	mAT	Part N° 6130.12.130

LED indicators

- DS1 (green) +5V aux
- DS2 (green) +5V

Jumper position W1

- W1: jumper must be present

Characteristics

Your MEMORACK is a piece of professional equipment, and should always be used in accordance with applicable safety regulations.

Electrical characteristics

Control electronics:
fully digital, microprocessor controlled

Ratings:
dimmers rated for continuous duty :
6 x 3 kW; 3 x 5 kW

Operating temperature range:
+ 5° C to 35° C, 25° C suggested;
relative humidity max. 95%,
non-condensing; altitude < 1000 m

Supply system:
3NPE 400V 50Hz and 60Hz
(TN-S system, Neutral directly connected to Earth; 230V between phase and Neutral)
Reduced-size N conductor is not allowed
Single-phase operation is possible (single-pole protected)

Supply voltage range:
198 V to 264 V (220V-10% to 240V+10%)

Accidental 400V supply:
internal protection circuitry will disable the dimmers

Rated supply current:
- Star 3-phase 3NPE supply: 27 A per phase for MEMORACK 15
- Star 3-phase 3NPE supply: 50 A per phase for MEMORACK 30

Dimmer protection:
- single-pole fuses, 10 x 38 mm, HRC (100 kA)

Residual Current Device:
when a RCD is required (e.g. TT and IT supply systems, or local regulations), this should be integrated in the supply installation.

Control inputs:
- DMX512/1990 (USITT digital multiplex standard)
- optional analogue 0/+10V or 0/+370 µA (internal conversion)
- simultaneous DMX and analogue inputs: Highest Takes Precedence

DMX control signal failure:
- the last valid DMX message will be kept indefinitely

DMX address:
- setting of the DMX-address of the first dimmer by means of Menu
- individual setting (patch)

Dimmer laws (selectable per dimmer):
- linear rms voltage, linear to 120V, fluorescent lighting, linear with 5% preheat level, square law, TV, non-dim (on at 15 %), and 3 spare / special
- multiplication factor per dimmer

Front panel indicators:
- "channel fuse is OK" per dimmer
- presence of DMX512 control signal
- microprocessor operational
- fault messages (display)

Dimmer test functions:
- automatic chaser at 70%
- one dimmer at any level
- one dimmer flashing at any level
- lighting cue without a desk
- self-test (internal)

Response time:
- DMX: better than 35ms (typical)
- analogue: better than 40 ms (typical)
- dimmer precision : 4000 dimmer levels

Power semiconductors:
antiparallel thyristors; current rating : 50 A or 75 A

Efficiency at rated load:
better than 98 %

Dissipation per dimmer at rated load:
below 60 W (3kW) and 100 W (5 kW)

DC component in output voltage:
below 1 V in rated load range

Minimum load:
45 W for a 3 kW; 60 W for a 5 kW; typical : 25 W

Types of load:
suitable for resistive and inductive loads, such as tungsten lamps, low voltage halogen lamps with a suitable transformer, fluorescent lamps with suitable ballast.

Fault current rating:
- dimmer fuses : 100 kA

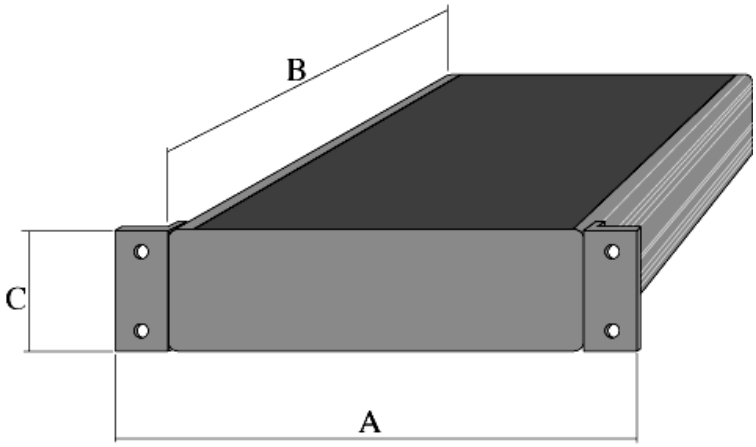
Colour code for supply cable
Brown and/or black : phases L1, L2, L3
Blue: Neutral
Yellow/green: Earth

Safety standards
- EN60204
- EN60950

Mechanical Characteristics

MEMORACK

Dimensions A x B x C	(mm)	484 x 500 x 133
Net Weight	(kg)	18
Packing	(mm)	540 x 595 x 245
Gross Weight	(kg)	20



Warning

Lethal voltages are used in this equipment. Refer servicing to trained personnel.
Power must be disconnected before a fuse is removed.
Power must be disconnected before a cover is removed.

Maintenance

Fuses

The six dimmer fuses are placed on the front panel.
The five internal fuses are accessible by removing the top cover (see sketch "Supply Terminals").
Always disconnect the power before you open the MEMORACK or replace a fuse!
Switch power off by means of the supply isolator, supply MCB or supply RCD.
Then disconnect the supply plug.
Always use fuses of the same type, size, current rating, fusing value (I2t value) and fault current rating as the originals. Contact your supplier for spare parts.

List of Accessories and Spare Parts

Always use original spare parts, do not use substitutes. The original components were selected to achieve the performance and reliability you expect of your equipment.

DMX cables

1145.12.775	DMX512 data cable with XLR 5 connectors (2 m)
1145.12.780	DMX512 data cable with XLR 5 connectors (5 m)
1145.12.785	DMX512 data cable with XLR 5 connectors (10 m)

Connectors, sockets

6117.15.110	XLR 5 M plug, for cable mounting, for DMX512
6117.15.120	XLR 5 F receptacle, for cable mounting, for DMX512
6117.47.012	DB25-P plug, for cable mounting, for Analogue Inputs
6117.47.013	cover for DB25-P plug
6113.34.003	output socket, double Schuko
6113.34.010	output socket, double CEBEC/NF
6113.34.005	output socket, double Swiss
6113.53.105	output socket, CEE16(P17)
6113.34.020	output socket, UK 15A (round pins)
6113.63.005	output socket, CEE 32 (P17)

Fuses, fuse-holders

6130.48.100	fuse for 3 kW dimmer (10 x 38 mm, High Rupturing Capacity, 12A)
6130.54.020	fuse for 5 kW dimmer (10 x 38 mm, High Rupturing Capacity, 20A)
6130.12.130	fuse 0,25 A T for F4, F5 on CPU board PCB 1337
6130.07.105	fuse 0,08 A M for F1, F3 on CPU board PCB 1337
6130.07.130	fuse 0,1 A T for F2 on CPU board PCB 1337
6132.00.095	fuse-holder for dimmer (integrated neon; 10 x 38 mm)
6130.99.515	fuse-holder for CPU board (F1 to F5), including cap

Note :

all fuses to be ordered per 10 pces.

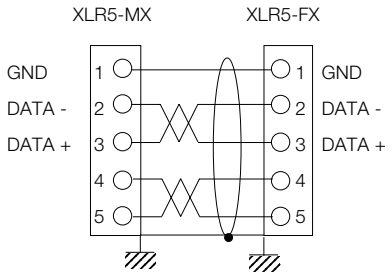
Boards

1131.02.010	PCB 1337 - microprocessor (CPU) board for MEMORACK
1139.75.030	PCB 1288.3 - board with thyristors 6 x 3 kW for MEMORACK
1139.75.040	PCB 1288.4 - board for thyristors 3 x 5 kW for MEMORACK
1139.98.020	PCB 1333.2 - front panel board (display, push-buttons) for MEMORACK
1131.01.010	PCB 1336.1 - analogue input board (version with 6 channels)

Miscellaneous

1112.07.000	Analogue Input kit 6 inputs (PCB 1336.1, ribbon cable, hardware)
7074.10.035	fan for MEMORACK
6351.84.350	thyristor for 3 kW
6351.85.000	thyristor-pair for 5 kW

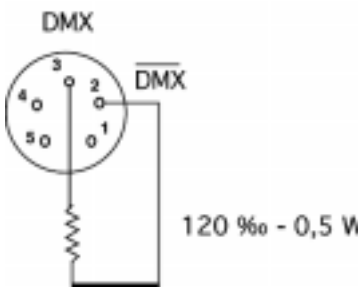
DATA CABLE



Cable suitable for data transmission
Length : maximum 250 m
Size : 2 x 2 x 0.34 mm^2, shielded

Standard DMX interconnection or extension cable

TERMINATING RESISTOR



XLR5-M
CN : 6117.15.110

The terminating resistor must be placed on the output connector of the last unit on the DMX line.

DMX Connection

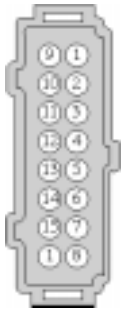
XLR5 -M

Pin	Signal
1	GND
2	RX - IN
3	RX + IN
4	TX - IN
5	TX + IN

XLR5 -F

Pin	Signal
1	GND
2	RX - OUT
3	RX + OUT
4	TX - OUT
5	TX + OUT

POWER SUPPLY



HARTING

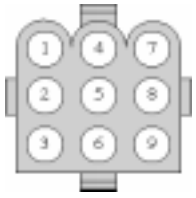
Pin	Phase	Channel
1	L	1
2	L	2
3	L	3
4	L	4
5	L	5
6	L	6
7	NC	
8	NC	
9	N	1
10	N	2
11	N	3
12	N	4
13	N	5
14	N	6
15	NC	
16	NC	

Dimmer Output Connections

AMP - 12 x 3 kW

	Connector 1		Connector 2	
Pin.	Phase	Channel	Phase	Channel
1	L	1	L	7
2	N*		N*	
3	L	2	L	8
4	N*		N*	
5	L	3	L	9
6	N*		N*	
7	L	4	L	10
8	N*		N*	
9	L	5	L	11
10	N*		N*	
11	L	6	L	12
12	N*		N*	

* only for 1P+N version



AMP - 12 x 3 kW

	Connector 1		Connector 2	
Pin.	Phase	Channel	Phase	Channel
1	L	1	L	4
2	N*		N*	
3	L	2	L	5
4	N*		N*	
5	L	3	L	6
6	N*		N*	
7	-		-	
8	-		-	
9	-		-	

* * only for 1P+N version

Summary

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