

AC/DC Power Supply



Thrane & Thrane A/S

AC/DC Power Supply
Installation Manual

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DISPOSAL

Old electrical and electronic equipment marked with this symbol can contain substances hazardous to human beings and the environment. Never dispose these items together with unsorted municipal waste (household waste). In order to protect the environment and ensure the correct recycling of old equipment as well as the re-utilization of individual components, use either public collection or private collection by the local distributor of old electrical and electronic equipment marked with this symbol.



Contact the local distributor for information about what type of return system to use.

Safety summary

The following general safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the equipment. Thrane & Thrane assumes no liability for the customer's failure to comply with these requirements.

Observe marked areas

Under extreme heat conditions do not touch areas of the unit that are marked with this symbol, as it may result in injury.



KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove equipment covers. All repair and servicing tasks must be made by qualified maintenance personnel. Do not service the unit with the power cable connected. Always disconnect and discharge circuits before touching them.

MAKE SURE THE UNIT IS GROUNDED DURING OPERATION.



Warning! Never insert or remove a power supply while its power switch is in the On (I) position. Make sure the power switch is Off (O) first.

About the manual

Intended readers

This manual is an installation and user manual for the AC/DC Power Supply system. It is important that you observe all safety requirements listed in the beginning of this manual, and operate the AC/DC Power Supply according to the instructions and guidelines in this manual. All installation must be done by qualified service personnel.

Manual overview

This manual has the following chapters:

- **Introduction** contains a description of the principle of operation and uses and features of the power supply.
- **Installation** contains step-by-step guidelines how to install the power supply as a stand-alone unit or in a combined setup and describes the connectors.
- **Service and repair** contains information on support, how to return units for repair and instructions how to exchange the fuses.

Typography

In this manual, typography is used as indicated below:

Bold is used to emphasize words and to indicate connector names of the unit.

Italic is used to emphasize the paragraph title in cross-references.

Example: “For further information, see *Connecting Cables* on page...”.

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Introduction

General description

The TT-6080A AC/DC Power Supply can deliver 300 W output power on average with a peak of 370 W for a minimum of 2 minutes. This is useful for MF/HF applications and DSC transmissions of 2 minutes duration. It is AC powered with a battery switch-over function. The AC/DC Power Supply has an on/off switch. It is lit when the power is turned on.



All connectors are placed at the same end of the power supply to simplify mounting and installation. The connector panel is protected by a transparent lid. To secure an installation with heavy cables a cable-relief bracket can be installed.

When mounted vertically the AC/DC Power Supply fulfills IP32 in areas with more than 42 V and IP22 in other areas. This means that the unit is protected against the intrusion of solid objects (including body parts like fingers), dust, water etc.

Features

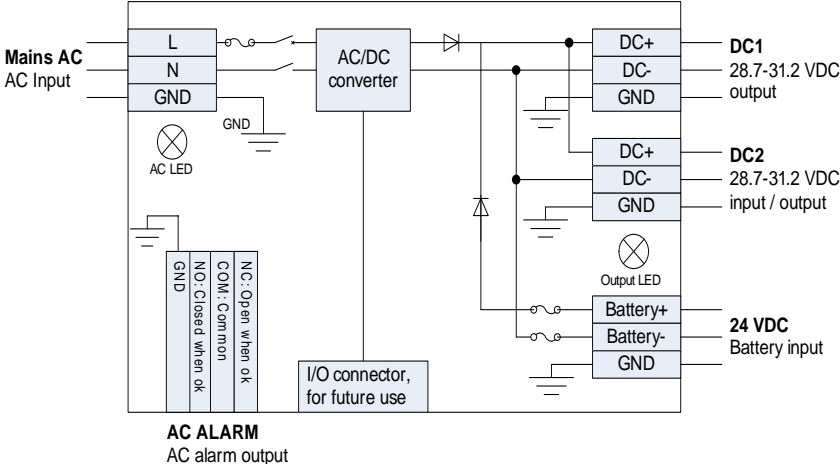
The AC/DC Power Supply has the following features:

- IEC 60945 Maritime approval
- Two DC connectors, output, range: 28.7 V - 31.2 V
- Output power 300 W continuous, 370 W peak (2 min., 100-240 VAC) or 270 W continuous, 333 W peak (2 min., 90-100 VAC)
- AC input (100-240 VAC operating) with fuse (6.3 A)
- Automatic selection of input voltage range
- AC alarm and On/off switch
- Daisy-chaining of up to three units to give up to 900 W.¹
- Short circuit protection
- Over-temperature protection (shutdown with automatic restart)
- Battery switch-over in case of AC supply failure, secured by 2 fuses (30 A)
- No forced cooling required
- IP 3X for internal high voltage areas (>42 V), IP 2X in other areas
- IP X2 when vertically mounted (wall) and connector panel is facing down

1. Output power capability depend on the mounting position (horizontal or vertical), input voltage, ambient temperature and ventilation at the place of installation.

Block diagram

The drawing below shows the block diagram of the AC/DC Power Supply.

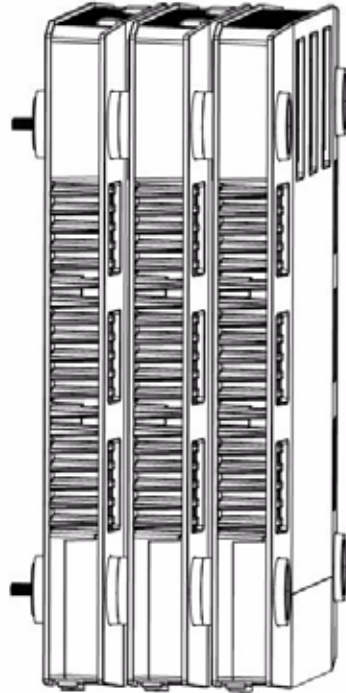


Applications

The AC/DC Power Supply is designed to be used with BGAN-X and FleetBroadband terminals. It can be used as a stand-alone DC power supply or as a building block in a larger power supply.

When more power is needed than one power supply can give, i.e. 300 W, you can stack up to three power supplies on top of each other and connect them.

When stacking 2 or 3 units the load on each of the units is automatically balanced among the units.



Installation

The AC/DC Power Supply can be mounted on its own as a single unit, or you can daisy-chain and stack up to 3 units. The AC/DC Power Supply can also be fitted in a 1 U rack mount.

Unpacking

- TT-6080A AC/DC Power Supply
- 1 AC fuse, 6.3 A
- 2 battery fuses, 30 A
- 4 mounting bolts for mounting 1 unit, M6X55 mm, DIN912 Unbrako
- Cable-relief bracket, comb-style
- AC/DC Power Supply Installation manual (this manual)

Optional accessories

The following optional accessories are available and can be ordered:

- Wall-mount tray, heavy duty, with cable-relief bracket, order number: 406080A-opt.001
- 4 mounting bolts for mounting 2 AC/DC Power Supply units, M6X100 mm, DIN912 Unbrako, order number: 406080A-opt.002
- 4 mounting bolts for mounting 3 AC/DC Power Supply units, M6X140 mm, DIN912 Unbrako, order number: 406080A-opt.003

Installing the AC/DC Power Supply

You can mount the power supply in a vertical or horizontal position. When mounted in a vertical position, with the connector panel pointing downwards, the unit fulfills IP32 in areas with more than 42 V and IP22 in other areas.



Warning! Never insert or remove a power supply while its power switch is in the On (I) position. Make sure the power switch is Off (O) first.

Important

To ensure adequate cooling of the AC/DC Power Supply an unobstructed space of minimum 5 cm must be maintained around all sides of the unit except for the bottom side.

Connector overview



On/off
switch

AC input

AC alarm

DC 1

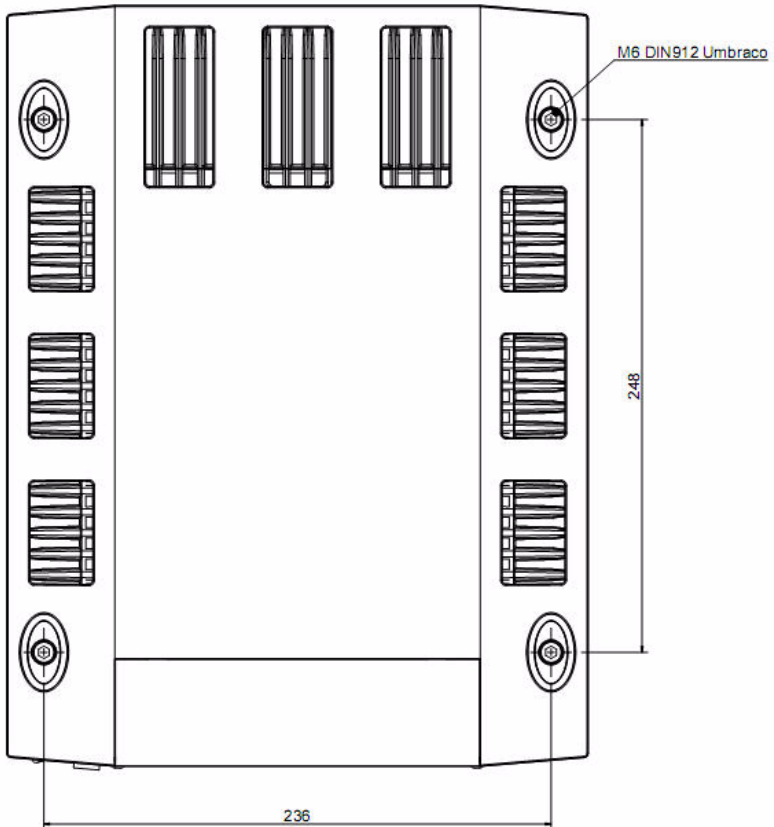
DC 2

Battery

Outline and dimensions

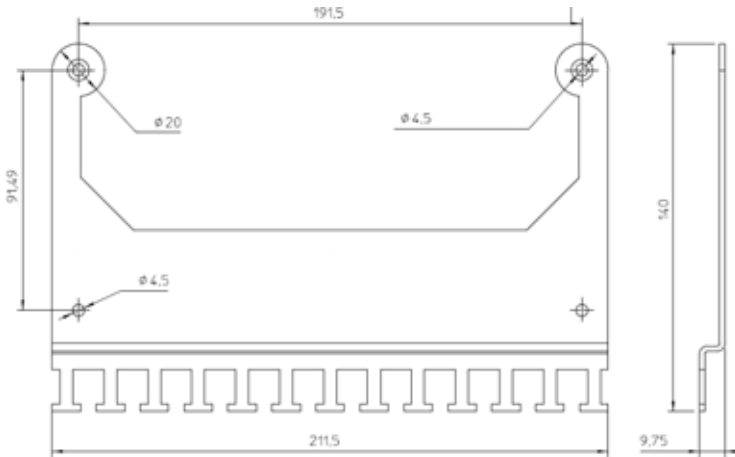
The following drawing shows the AC/DC Power Supply and the position of the mounting holes. It is mounted with four mounting bolts.

- 4 mounting bolts for mounting 1 unit, M6X55 mm, DIN912 Unbrako



To install the AC/DC Power Supply, do as follows:

1. Install the cable-relief bracket, if required. Align it with the connector row of the AC/DC Power Supply.
2. Fasten the cable-relief bracket directly to the wall, between the wall and the AC/DC Power Supply, with four M4 x 6 mm screws.

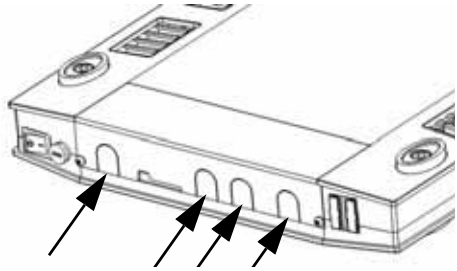


3. Fasten the AC/DC Power Supply to the wall with 4 mounting bolts, M6X55 mm, DIN912 Unbrako (included the delivery).

An optional, larger Wall-mount tray, heavy duty, is available for the AC/DC Power Supply. For further details see *Wall-mount tray (option)* on page 25.

Protective lid for the connector panel

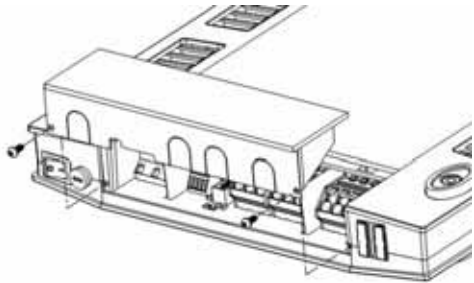
The connectors are protected by a plastic lid. To access a connector you have to remove the lid. To make room for the connector cables you must remove the U-shaped cutout for the respective cable in the plastic protective lid.



Removing the protective lid

To connect the cables you must remove the protective lid.

To do this, unscrew the two screws (M3x7mm" Torx-8) as shown in the picture and put the lid aside.



Inserting the cable in the spring terminal connector

The connectors are spring-terminal connectors. Use a suitable tool to open the spring and insert the cable in the opening below.




Connectors

AC input

The AC/DC Power Supply is typically AC powered. To connect the AC input do as follows:

1. Connect the Mains cable to the connector marked **MAINS AC**.

Mains AC	
Connector type	Spring terminal, dual-row connector
Wire cross section	Up to 2.5 mm ²
L	Line AC power cord: brown (Europe), black (USA)
N	Neutral AC power cord: blue (Europe), white (USA)
	GND AC power cord: green/yellow (Europe), green (USA)
Fuse	6.3 A. It is accessible from outside the housing. It is positioned next to the on/off switch. To remove the fuse turn the device that holds the fuse and extract it.


2. Remove the u-shaped cut-out for this input from the protective lid.
3. In order to be able to daisy-chain up to three AC/DC Power Supply units the **Mains AC** connector has two terminals:
 - Use one terminal for the incoming mains power.

- Use the other terminal for the mains power going to the next AC/DC Power Supply.

DC output

The AC/DC Power Supply supplies a DC output. To connect the DC output **DC1** do as follows:

1. Connect the DC cable to the connector marked **DC1** and the equipment that must be powered.

DC 1	
Connector type	Spring terminal
Wire cross section	Up to 6 mm ²
Maximum load	30 A
+	DC out, plus
-	DC out, minus
	GND

2. Remove the u-shaped cut-out for this input from the protective lid.

When connecting 2 or 3 units in parallel, the combined power may be drawn from a single connector. A single connector can handle 30 A.



Caution! If you need more than 3x300 W or 30 A you need to follow special guidelines when connecting the required AC/DC Power Supply units. Refer to *Wiring four or more AC/DC Power Supply units* on page 27 to see how to connect the AC/DC Power Supply units to meet these requirements.

DC output or optional input for daisy-chaining

The second DC connector (DC 2) of the AC/DC Power Supply can be used for 2 purposes, to provide DC output or to serve as an input connector when daisy-chaining up to 3 AC/DC Power Supply units.

To connect to **DC2** do as follows:

1. To have a second DC output:
Connect the DC cable to the connector marked **DC1** and the equipment that must be powered.
2. To daisy-chain a second AC/DC Power Supply.
Connect the cable from **DC1** in AC/DC Power Supply unit 1 to **DC2** in AC/DC Power Supply unit 2.
Connect the DC cable to the connector marked **DC 2** and the equipment that must be powered.
3. Remove the u-shaped cut-out for this input from the protective lid.

To daisy-chain a third AC/DC Power Supply repeat step 2. The connector specifications are the same as for **DC1**.


To see an overview how to connect AC/DC Power Supply units in a daisy chain see *Wiring for daisy-chaining* on page 16.

Battery input

You can connect an external 24 V emergency battery to the AC/DC Power Supply to make sure the unit is operational in case the AC input fails. The battery input is protected against wrong polarity of the battery.

To connect the **BATTERY** input do as follows:

1. Connect the cable to the connector marked **BATTERY** and the battery.

BATTERY	
Connector type	Spring terminal
Wire cross section	Up to 6 mm ²
+	Battery plus
-	Battery minus
	GND
Fuses	Two 30 A fuses, one for battery plus and one for the battery minus. These are accessible from outside the housing and are positioned to the right of the protective lid.

2. Remove the u-shaped cut-out for this input from the protective lid.


AC alarm output

The AC alarm output provides an alarm signal when the AC/DC Power Supply cannot deliver the required power from the AC input. This is the case when

- No AC power is present.
- The AC fuse is blown.
- The on/off switch is in the position off.
- The output is short-circuited or heavily overloaded.
- An internal error has occurred.

To wire the **AC alarm** output do as follows:

1. Connect the cable to the connector marked AC Alarm according to the specifications in the table below:

AC ALARM (AC/DC Power Supply)	
Connector type	Spring terminal
Wire cross section	Up to 1.5 mm ²
Terminal 1	Closed when ok
Terminal 2	Open when ok
Terminal 3	Common
Terminal 4 	GND

Installing 2 or 3 AC/DC Power Supply units

You can mount up to three AC/DC Power Supply units in a vertical (recommended to use the Wall-mount tray, heavy duty, with cable-relief bracket, order number: 406080A-opt.001) or horizontal position. When mounted in a vertical position, with the connector panel pointing downwards, the unit fulfills IP32 in areas with more than 42 V and IP22 in other areas. The mounting holes in the AC/DC Power Supply are designed in such a way that units fit nicely on top of each other when being stacked.

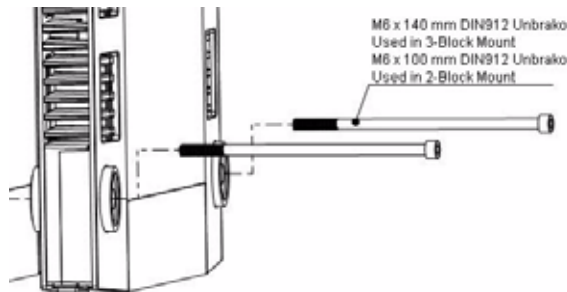
Important

To ensure adequate cooling of the AC/DC Power Supplies an unobstructed space of minimum 5 cm must be maintained around all sides of the group of units (except between the units and the bottom side).



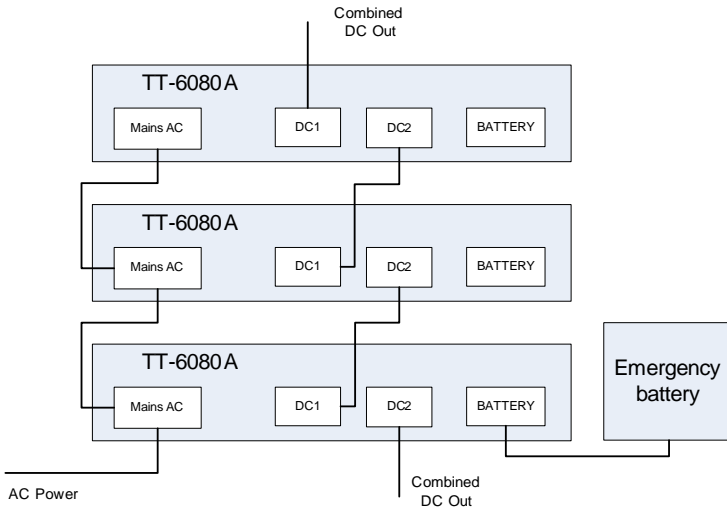
The drawing shows the specifications of the mounting bolts needed when installing two or three units on top of each other.

- 2-block mount: 4 x M6X100 mm DIN912 Unbrako
- 3-block mount: 4 x M6X140 mm DIN912 Unbrako



Wiring for daisy-chaining

The following drawing shows how to wire the AC/DC Power Supply units when daisy-chaining two or three units.



To daisy-chain two or three AC/DC Power Supply units proceed as follows:

1. Connect Mains AC of unit 1 to unit 2.
2. Connect DC1 of unit 1 to DC2 of unit 2.
3. For the third unit, repeat steps 1. and 2. to connect unit 2 to unit 3.



Caution!

If you need more than 3x300 W or 30 A you need to follow special guidelines when connecting the required AC/DC Power Supply units. Refer to *Wiring four or more AC/DC Power Supply units* on page 27 to see how to connect the AC/DC Power Supply units to meet these requirements.

Service and repair

The AC/DC Power Supply is designed to operate without preventive maintenance.

Repair or repair attempts performed by unqualified personnel may limit the warranty. The warranty on the system is defined and outlined by the distributor that supplied the AC/DC Power Supply.

Contact for support

For support contact the distributor that supplied the AC/DC Power Supply.

For further information on warranty and service, you may also use the Thrane & Thrane home page at www.thrane.com

Repair and servicing

The AC/DC Power Supply does not require maintenance and adjustment apart from routine checking of its installation.



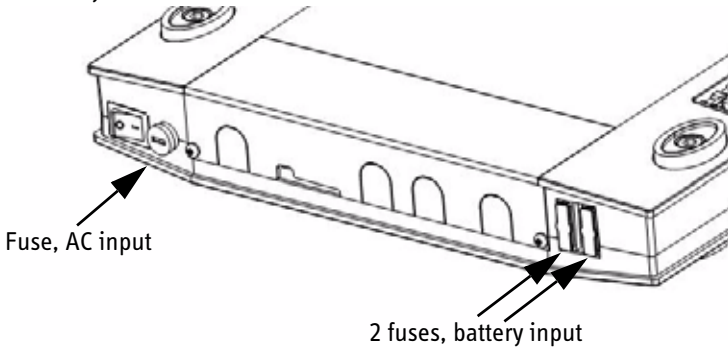
Warning! Never insert or remove a power supply while its power switch is in the On (I) position. Make sure the power switch is Off (O) first.

Important

In case of malfunctioning do not open the AC/DC Power Supply but send it in for repair. For information how to proceed see *Returning units for repair* on page 19.

Exchanging the fuses

The AC/DC Power Supply has two fuses to secure AC input and input from an external battery.



Exchanging the AC fuse

To exchange the AC fuse, do as follows:

1. Locate the fuse, it is accessible from outside the housing. It is positioned next to the on/off switch.
2. Turn the device that holds the fuse and extract it.
3. Take out the old fuse and insert a new one (type: 5x20 mm, 6.3 AT)
4. Insert and fasten the fuse holder.



Caution! If the AC fuse is blown directly after being replaced there might be a serious fault in the AC/DC Power Supply. Return the unit for repair.

Exchanging the BATTERY fuses

To exchange the two BATTERY fuses, do as follows:

1. Locate the fuses for battery plus and one for battery minus. These are accessible from outside the housing, They are is positioned to the right of the protective lid.
2. Pull out the fuses.
3. Insert two new fuses (type: ATO Blade Fuse, 30 A)

Returning units for repair

To return equipment to Thrane & Thrane for repair this Return Material Authorization (RMA) procedure must be followed. Failure to comply with this procedure may cause shipping delays and additional charges.

Warranty returns

Equipment that qualifies for warranty repair can be returned to Thrane & Thrane for repair or replacement at our discretion. The customer is charged for the shipping costs to Thrane & Thrane, and Thrane & Thrane will pay the shipping costs to return the repaired/replaced unit to the customer.

Non-warranty returns

Equipment that fails to work properly because of improper or negligent use, abuse, shipping damaged or any other condition can still be returned to Thrane & Thrane for repair or replacement at our discretion.

The customer will be notified of the cost to repair or replace the unit before invoicing for repair or replacement. The customer is charged for the shipping cost to and from Thrane & Thrane.

Repackaging requirements

An AC/DC Power Supply unit should be returned to Thrane & Thrane in the original packaging. If the original packaging is not available, follow these guidelines when repacking the unit(s):

1. Protect the connectors from physical damage and electrostatic discharge.
2. Wrap the unit in heavy paper or in bubble plastic sheets. Attach a tag with model number, serial number and return address.
3. Use a strong shipping container, e.g. double-walled carton or similar.
4. Protect the front and rear panel with suitable material (cardboard, foam or bubble plastic sheets) and insert a 7-10 cm layer of shock absorbing material between all surfaces of the equipment and the sides of the container.
5. Seal the shipping container securely.
6. Mark the shipping container FRAGILE to ensure careful handling.

Failure to do so may invalidate the warranty.

RMA procedure

Before returning units for repair, please follow this procedure:

1. Have the following information ready before calling the Customer Service Center:
 - T&T Model number.
 - Serial number (example: 00443322).
 - A thorough description of the fault.
2. If you have purchased your AC/DC Power Supply from a Thrane & Thrane distributor, contact the Customer Service Center of the distributor.
3. Describe the fault as thoroughly as possible and ask for assistance. In some cases, the error may be resolved over the phone.
4. If the unit has to be returned for repair, request an RMA number.
5. Request replacement/loan unit if required.
6. Pack the equipment or parts to be returned in approved shipping containers.
7. Write the RMA number on the outside of all shipping containers and ship to the following address:

Thrane & Thrane A/S
Lundtoftegårdsvej 93 D
DK-2800 Kgs. Lyngby
Denmark

Technical specifications

The following tables show the electrical and environmental specifications of the AC/DC Power Supply.

Specifications	Value
Output power at 100 VAC - 240 VAC	300 W continuous 370 W peak (2 min.)
Output power at 90 VAC - 100 VAC	270 W continuous 333 W peak (2 min.)
DC output (nominal)	31.2 VDC at 0 A 29.3 VDC at 10 A 28.7 VDC at 13 A
AC input voltage	115-230 VAC nominal, 100-240 VAC operating
Alarm in case of	AC power failure
IP rating in high voltage (>42 V)	IP 3X
IP rating in other areas	IP 2X
IP rating when mounted vertically on a wall	IP X2
Operating temperature	-25° to +55° C

Appendix A: Technical specifications

Specifications	Value
Storage temperature	-40° to +80° C
Cooling	No forced cooling required.
Survival temperature (power on)	-40° to +80° C
Dimensions	H: 46.5 mm, L: 354 mm, W: 265 mm
Weight	Approx. 3.7 kg
Compass safe distance	30 cm

Wall-mount tray (option)

A Wall-mount tray, heavy duty, with cable-relief bracket is available and can be ordered (order number: 406080A-opt.001).

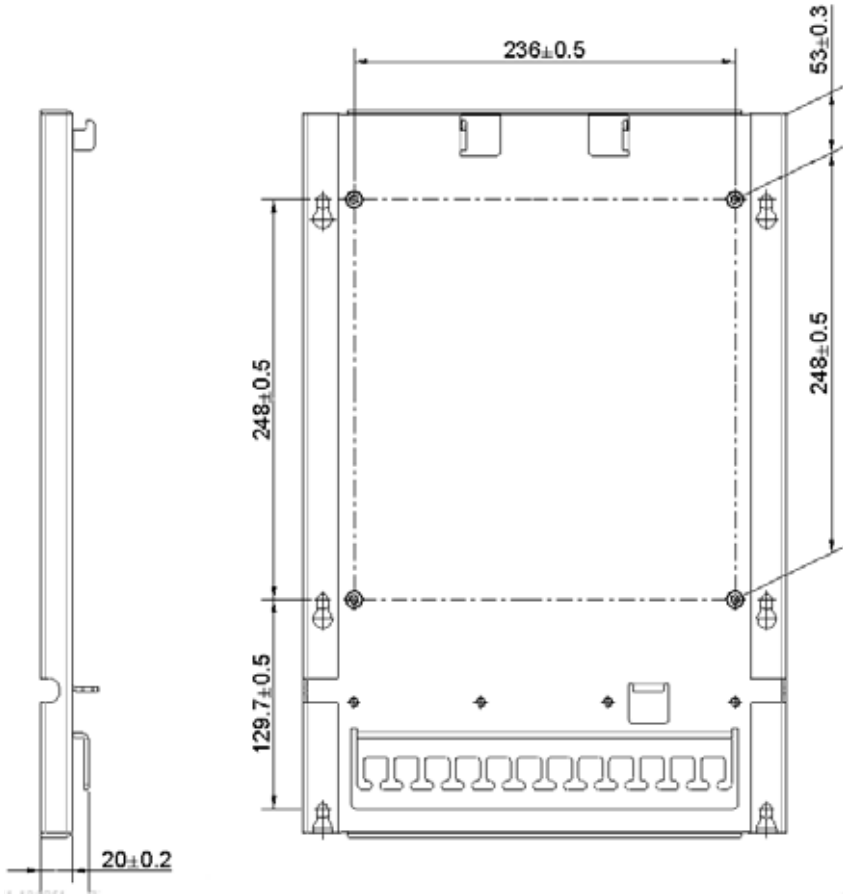


Wall-mount tray (option)

Up to 3 AC/DC Power Supply units can be mounted on this tray.

Dimensions and weight

Dimensions



Weight

The Wall-mount tray, heavy duty, weighs 2.5 kg.

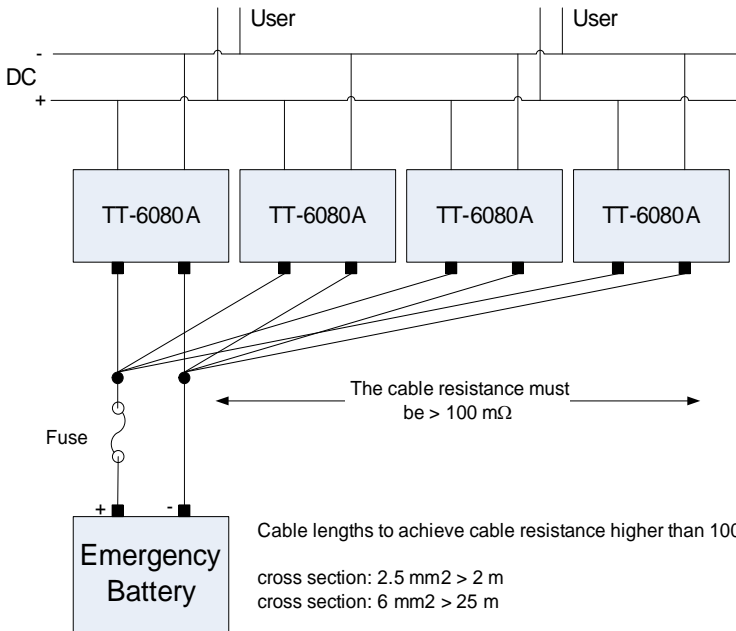
Special installation

If you need more than 3x300 W or 30 A you can connect more than 3 AC/DC Power Supply units.

Important

You must connect the units as shown in the drawing. This is to make sure that a single connector is never overloaded with more than 30 A.

Wiring four or more AC/DC Power Supply units



Declaration of conformity

CE (LVD & EMC)

The AC/DC Power Supply is CE certified (LVD & EMC directives) as stated in the “Declaration of Conformity with LVD and EMC Directives”, enclosed in copy on the next page.

Thrane & Thrane A/S

Declaration of Conformity with LVD and EMC Directives

The undersigned of this letter declares that the following equipment complies with the specifications of EC directive 73/23/EC concerning Low Voltage Safety and EC directive 89/336/EC concerning EMC.

Equipment included in this declaration

TT-6080A AC/DC Power Supply

PN = 406080A

Equipment Applicability

The TT-6080A AC/DC Power Supply is a general AC supplied Power Supply with a battery switch-over function. When more power is needed than one power supply can give (i.e. 300 W), you can stack up to three power supplies on top of each other and connect them.

Declaration

The safety requirement with respect to the LVD directive 73/23/EC is met by conforming to the harmonized EU standards EN 60950-1. The protection requirement with respect to the EMC directive 89/336/EC is met by conforming to the harmonized EU standards EN 60945 and EN 55022.

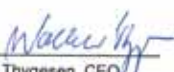
Manufacturer

Thrane & Thrane A/S,

Lundtoftegårdsvej 93D, DK-2600 Kgs. Lyngby, Denmark
Porsvej 2, DK-9200 Aalborg SV, Denmark

Place and Date

Kgs. Lyngby, 14. December 2009


Walther Thygesen, CEO
Thrane & Thrane A/S



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A

AC Alternating Current

C

CE Conformité Européenne, European conformity in French.

D

DC Direct Current

E

EMC Electromagnetic Compatibility

I

IEC International Electrotechnical Commission is an international standards organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

IP International Protection Rating, sometimes also interpreted as Ingress Protection Rating, consists of the letters IP followed by two digits and an optional letter. It classifies the degrees of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact, and water in electrical enclosures.

L

LVD Low Voltage Directive

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