

MTS4 Outdoor Enclosure

Service manual

EN

Dantherm No. 045893 • rev. 2.3 • 16.03.2012
Motorola No. 6866588D43

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Dantherm can accept no responsibility for possible errors and changes
Irrtümer und Änderungen vorbehalten
Dantherm n'assume aucune responsabilité pour erreurs et modifications éventuelles

1. Introduction

Overview

Product coverage This manual covers the MTS4-outdoor enclosure with all options including power back-up supplied by batteries (product no. 352894) The MTS4-outdoor enclosure is based on the Dantherm ICS 2000 platform.

Should you have required the Fuel Cell power backup solution with the MTS4-outdoor enclosure (product no. 352895), the fuel cell and hydrogen handling and storage is not covered in this manual, but is described in the *IPSM-A1600 power backup module for installation in the MTS4-outdoor enclosure manual* (product no. 046234), 6866600D34, which is a supplement to this manual (product no. 045893 – Motorola product no. 6866588D43).

WARNING

It is the responsibility of the operator to read and understand this service manual and other information provided, and to use the correct operating procedures.

Read the entire manual before the initial start-up of the installation of the MTS4-outdoor enclosure. It is important to know the correct operating procedures for the unit and all safety precautions to prevent the possibility of property damage and/or personal injury.

Safety

The MTS4-outdoor enclosure including the IPSM-A1600 power backup system should be protected against traffic accidents by a fence or a concrete barrier and obey all other legal requirements for installation and storage of hydrogen high pressure bottles which are not listed in this manual.

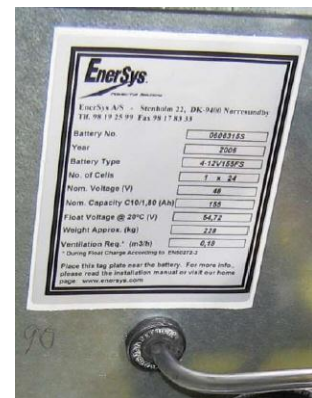
Ventilation requirement

In case the MTS4-outdoor enclosure is placed indoor in a closed room, the ventilation capability of the room should minimum be in accordance with the battery standard and battery manufactures recommendations.

This can be found on a label situated next to the batteries (when installed).

The requirement is 0.19 m³/h.

When the cabinet is installed outdoor, no additional ventilation is required with required degassing kit installed (tube system from battery valve to exterior) through retaining grommet. Always check if this tube has not been damaged or removed.



Left bay of the enclosure above the power distribution panel offers a 19" rack system with 12RU available for auxiliary equipment.

It is important that any active component in the rack, including those components that will be installed later in addition to Dantherm's deliverable, must have a self-protecting mechanism, which switches off the component in case of an overheat situation.

Further it is important that the heat dissipation of equipment installed do not exceed 200 W or max. permitted ambient temperature will have to be de-rated.

Continued overleaf

1.1 General information, *continued*

Table of contents This installation manual covers the following main topics:

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1.1 General information, *continued*

Revisions

This is the revision history of this manual:

Date	Section	Change
11/2-10	1	Changed number
	2.3	Changed alarm names, new column 4 and 1 st row added
	2.3	Alarm pin layout changed
	2.3	Operation of Generator switch, added
	2.4	Control system, "max." added
	4.2	Dantherm part 046392, description changed/added
	4.2	Dantherm part 046398, description changed/added, new illustr.
	4.2	Dantherm part 046400, description changed/added
	4.2	Dantherm part 046496, description changed/added
	4.2	Dantherm part 060575, description changed/added
	4.2	Dantherm part 062905, added
	4.2	Dantherm part 064624, added
	4.2	Dantherm part 064627, added
	4.2	Dantherm part 064628, added
	4.2	Dantherm part 064629, added
	4.2	Dantherm part 064630, added
	4.2	Dantherm part 064631, added
	4.2	Dantherm part 064632, added
	4.2	Dantherm part 064633, added
	4.2	Dantherm part 064634, added
20/5-10	4.2	Dantherm part 064635, added
	4.2	Dantherm part 064636, added
	5.4	Wiring diagrams changed, and new added
	2	Illustration changed
	2.1	Illustration changed
16/3-12	2.1	New text in line 1 on page 10
	2.3	Minor text changes page 15
	5.5	Minor text changes page 72
	5.5	Wire colors added
16/3-12	2.3	Illustrations with generator switch updated
	3.5	Illustrations with generator switch updated
	4.2	Illustrations with generator switch updated. Added new supply switch kit.

1.1 General information

Introduction	This section gives the general information about this service manual and about the MTS4-outdoor enclosure.																		
Manual, part number	Part number of this service manual is 045893. For Fuel Cell power backup option: please see the manual <i>IPSM-A1600 power backup module for installation in the MTS4-outdoor enclosure</i> (product no. 046234).																		
Target group	The target group for this service manual is the technicians who install, maintain, and exchange parts on the unit.																		
Copyright	Copying of this service manual, or part of it, is forbidden without prior written permission from Dantherm Air Handling A/S.																		
Reservations	Dantherm Air Handling A/S reserves the right to make changes and improvements to the product and the service manual at any time without prior notice or obligation.																		
MTS4-outdoor enclosure	<p>Dantherm Air Handling A/S, Marienlystvej 65, DK-7800 Skive hereby declare that the product mentioned below:</p> <p>CE Product No.: 352894 MTS4 outdoor enclosure basis and the 2 versions below with enclosure extensions for storage 352895 MTS4 outdoor FC-5 352896 MTS4 outdoor FC-3</p> <p>are in conformity with the following directives covering the provisions of the normative European Council Directives:</p> <table border="0"> <tr> <td>2006/42/EC</td> <td>Directive on the safety of machines</td> </tr> <tr> <td>2006/95/EC</td> <td>Low Voltage Directive</td> </tr> <tr> <td>2004/108/EC</td> <td>EMC Directive</td> </tr> </table> <p>Description: MTS4 outdoor enclosure is a 2 door steel based outdoor enclosure equipped for accommodating and servicing an MTS4 radio base station. The enclosure has multiple configurations ranging from a standard configuration with only a basic set-up up to a full integrated option list as defined in the service manual no 045893. Basis is equipped with a door mounted heat exchanger (CE marked), a power distribution panel (CE-marked) and internal cables, cabin lights, a backup installation (battery pack using VRLA size batteries (optional)), battery charger, surge arrestors etc. Items not listed in the service manual are not covered by this declaration.</p> <p>The versions 352895 and 352896 with enclosure extensions for storage also offers a power backup system (IPSM-A1600) based on fuel cell technology using hydrogen as energy source. This backup system is CE-marked and further described in manual p/n 046614.</p> <p>and Manufactured in conformity with the following harmonised standard:</p> <table border="0"> <tr> <td>EN60529:2001</td> <td>IP55 (Degree of protection provided by enclosures)</td> </tr> <tr> <td>EN 12000-1:2005</td> <td>Safety of machinery – Part 1: Basic terminology</td> </tr> <tr> <td>EN 12000-2:2005</td> <td>Safety of machinery – Part 2: Technical principles</td> </tr> <tr> <td>EN 60 950-1:2006</td> <td>Installation safety (CB by Intertek, ref: 714719-01)</td> </tr> <tr> <td>EN 60 950-22:2006</td> <td>Information technology equipment - Safety - Part 22: Equipment installed outdoors</td> </tr> <tr> <td>EN50272-2:2001</td> <td>Battery installation</td> </tr> </table>	2006/42/EC	Directive on the safety of machines	2006/95/EC	Low Voltage Directive	2004/108/EC	EMC Directive	EN60529:2001	IP55 (Degree of protection provided by enclosures)	EN 12000-1:2005	Safety of machinery – Part 1: Basic terminology	EN 12000-2:2005	Safety of machinery – Part 2: Technical principles	EN 60 950-1:2006	Installation safety (CB by Intertek, ref: 714719-01)	EN 60 950-22:2006	Information technology equipment - Safety - Part 22: Equipment installed outdoors	EN50272-2:2001	Battery installation
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EN50272-2:2001	Battery installation																		

Continued overleaf

1.1 General information, *continued*

MTS4-outdoor enclosure



EN 61 000-2:2005 Immunity
 EN 61 000-3:2007
 +A11:2004 Emission (EN 55022 version:
 1998+A1:200+A2:2003_Class B)
 ETSI EN 300 019-2-1 v2.1.4
 Storage: not temperature controlled storage locations:
 T 1.2
 ETSI EN 300 019-2-2 v2.1.2
 Transportation: public transportation. T2.3
 ETSI EN 300 019-2-4 v2.2.2
 In use: non-weather protected locations T 4.1 (or T4.1E)
 ETSI ETS 300 753 october 1997
 Acoustic noise

It is further declared that the installation and commissioning of MTS4 base station and site installation are not covered by to this declaration.



Skive, 11.06.2008

Managing director Jesper Holm Thorstensen



Project manager

Recycling

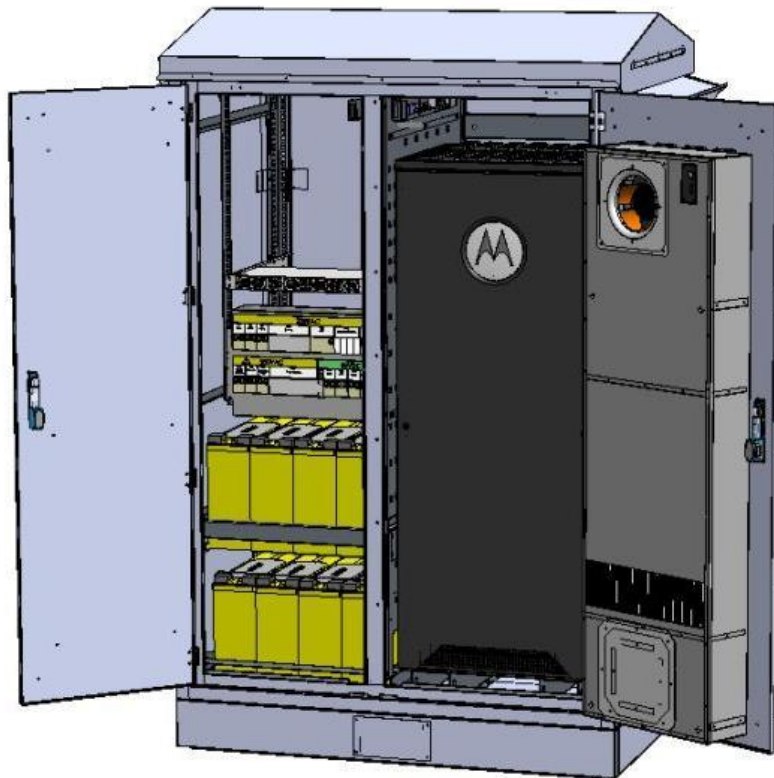
The MTS4-outdoor enclosure is designed to last for many years. When the time comes for the unit to be recycled, the unit should be recycled according to national rules and procedures to protect the environment.

2. Product and functional description

Overview

Introduction This section will give you a product and functional description of the MTS4-outdoor enclosure.
A detailed description of the MTS4-outdoor enclosure is to be found on the following pages.

Illustration This illustrates the MTS4-outdoor enclosure with the MHX 85 (heat exchanger unit) hanging on the right door:



Content This section covers the following topics:

Topic	See page
2.1 MTS4-outdoor enclosure	9
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2.5 Door stop	20

2.1 MTS4-outdoor enclosure

Introduction

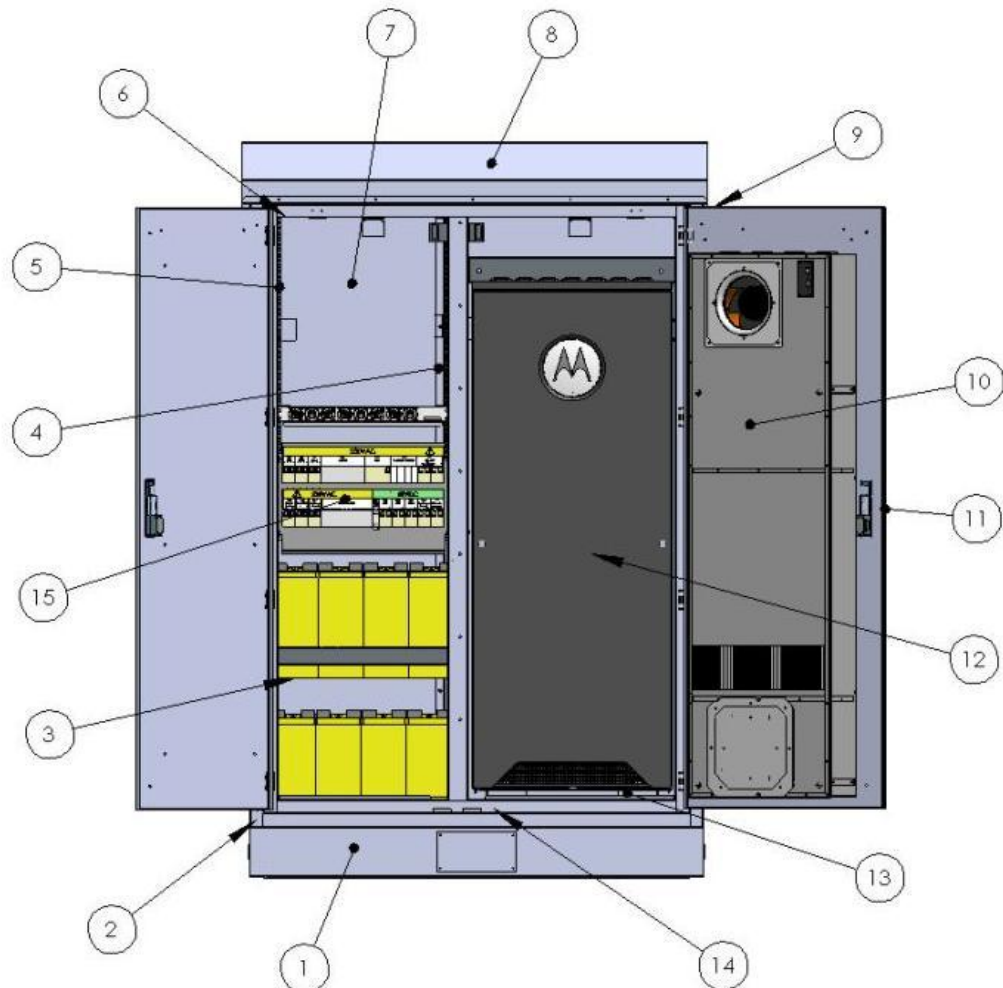
This section will give you a description of the MTS4-outdoor enclosure and its functionality.

The MTS4-outdoor enclosure is designed to accommodate a Motorola MTS4 base station, which is further described by Motorola, part number 6802800U74 "MTS2 and MTS4 configuration, installation and service manual". For more information please contact Motorola.

The MTS4-outdoor enclosure is designed to withstand rough environment and many years of service. Basis is a welded steel frame with dismountable side panels with protected double gaskets for protecting the sealed environment inside.

Illustration

This illustrates where the basic parts are installed in the MTS4-outdoor enclosure:



Continued overleaf

2.1 MTS4-outdoor enclosure, *continued*

Parts

This table gives information about the basic parts installed in the MTS4-outdoor enclosure:

	Part
1	Plinth with removable painted cover panels including front access to generator cable
2	Drain system
3	Shelf for storing battery pack
4	Basic cable routing for specified equipment
5	Double 19" rack system in left bay
6	Door stop system
7	Internal insulation panels
8	Dismountable painted protection roof
9	RF protection cover
10	Heat Exchanger mounted on right door
11	Cabinet with 2 doors with 3 position swing lock system with stainless steel swing handle with key system
12	Air divider plate for MTS4
13	Mounting system for MTS4
14	Cable glands in bottom plate
15	Power distribution panel with protection cover

2.2 Optional equipment

Introduction

The MTS4-outdoor enclosure might be equipped with different options, shown in the following list.

The chosen options are installed from factory but afterwards they can be ordered as spare part kits. Installation and service instructions for the spare parts will be a part of the spare part kits.

NB: The Motorola option numbers in the option list below can not be used when ordering spare parts. The spare parts have separate Motorola spare part numbers.

Please note that 48VDC power supply is required for heat exchanger to operate. A battery pack is required for MTS4 PSU to be able to power the heat exchanger.

Part	Function	Dantherm No.	Motorola No.
Heater	In case of cold external temperatures the heater supplies heat maintaining required minimum temperatures for the batteries as well as maintaining a non condensing environment when the MTS4 is not in operation. (DBK Cirrus 80 with thermostat)	046123	TG00116AA
Smoke detector	Detects smoke and sends an alarm signal to the MTS4 controller (Regin S65)	046122	TG00117AA
Cabin Light	LED panel light (48VDC) installed in both sides activated by door contacts	046132	TG00119AA
GPS Surge arrester	Protection of the GPS equipment against lightning or excess voltage. Can accommodate up to 2 S.A. (Polyphaser DGX+6NFNF-A + jumper cable)	039911	TG00111AA
Antenna Surge arrester	Protection of the receiver against lightning or excess voltage. Can accommodate up to 5 of S.A.s. (Polyphaser VHF50HD + 650 mm cable)	045884	TG00112AA
Microlink Surge arrestors	Protection of Microlink equipment when installed. Can accommodate up to 6 of S.A. (Pholyphaser GT-NFF-AL)	045887	TG00150AA
External battery charger	Quick charger for the batteries. 1600 W Power One Aspiro charger offered. Incl. shelf for support during transport. Battery temperature sensor installed	045892	TG00115AB
Powermeter	Shows AC power consumption (ABB 3 phase ODIN)	046164	TG00114AB
Generator switch	Switch for easy selection between power sources, incl wiring and external plug for generator NB: Generator switch and power meter can not be present at the same time	046140	TG00154AA

Continued overleaf

2.2 Optional equipment, *continued*

Part	Function	Dantherm No.	Motorola No.
Backup system, battery powered	Supplies backup time when power is unavailable. 2 shelves for 2 sets of batteries. Each set can give 155Ah. ⚠️ Only lower shelf is safe for transportation when installed. (Energys 12V155FSx4 pack incl. degassing kit + internal wiring) and (LVD if required) For longer backup time, fuel cell system is available	046137	TG00108AB
LVD relay	<u>L</u> ow <u>V</u> oltage <u>d</u> isconnect relay. This relay is placed in line with the battery cable and enables a battery disconnect function controlled by the MTS4 when battery is discharged below recommended voltage (40,5VDC).	046118	TG00151AA
Data line Surge arrester	Protection of the data line against lightning or excess voltage (Polyphaser NX2-05 with shielded cat 5)	039886	TG00118AA

2.3 Power distribution panel

Introduction

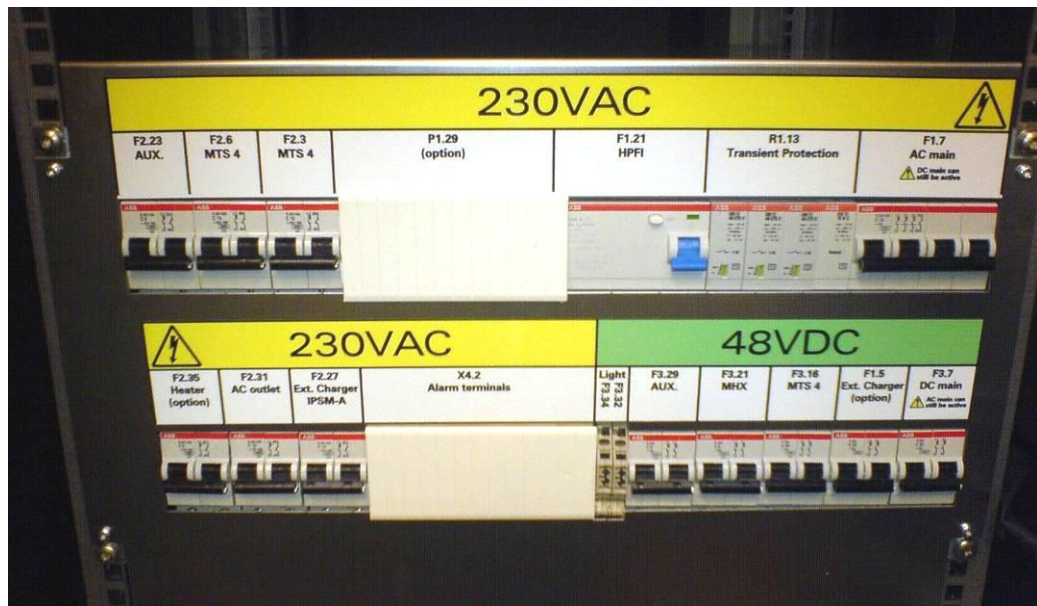
This section will give you a description of the power distribution panel (PDP) and its functionality.

The power distribution panel (PDP) is located in the mid section in the left bay of the MTS4-outdoor enclosure.

Illustration

This illustration gives an overview of the power distribution panel which is build into the MTS4-outdoor enclosure

Please see section “5.5 References for the wiring diagrams”, page 73 for further references of the power distribution panel.



Description

The power distribution panel (PDP) is the electrical centre of the MTS4 outdoor installation. It connects and distributes power to all functions inside the enclosure.

Various circuit breakers rated to protect the consumer and further surge protection (overvoltage and lightning) as well as a RCCB (Residual Current Circuit Breaker) relay are used to protect for potential earth faults. In Scandinavia also known as HPFI relay.

Optional a power meter can be included.

Various alarms for i.e open doors, high temperature, smoke etc. is also connected and collected from the PDP.

The circuit breakers can also be used to activate or deactivate the function listed on the overlay.

The basic PDP design is for installation into a 19” rack system and offers a 2 row DIN rail space each sized for 25 module and it is tested to fulfil the safety regulations in accordance to EN60950. It also has a CE marking.

Continued overleaf

2.3 Power distribution panel, *continued*

Power distribution panel ON

Layout wise the PDP is split in 2 main sections. 230VAC is marked yellow and 48VDC is marked green (see illustration on the previous page)

The illustration to the right shows the power entry on the upper right section.

With the circuit breaker F1.7 and earth fault protection (HPFI F1.21) flipped upwards the PDP is ON when power is connected to the enclosure.



Test and check

It is recommended that the small white test button on the HPFI is activated regularly (every 6 month) to test function. Make sure Backup is active when doing this to avoid any unplanned downtime on the Radio base station.

If a lightning or other surge voltage have hit the PDP the R1.13 transient protection might have been damaged (and possibly saved the equipment inside). Check if the easy replaceable blocks are okay by seeing if the window is still green.

AC area

All 230 VAC loads are connected to the 6 circuit breakers on the left side of the PDP.



DC area

All 48VDC loads (40-60VDC) are connected to the 5 circuit breakers in the lower right corner of the PDP + additional 2 small fuses for the cabin light

The one to the right switches off all 48 VDC distribution inside the enclosure, except cabin light.

Flip open the F3.32 and F3.34 to disconnect cabin light.

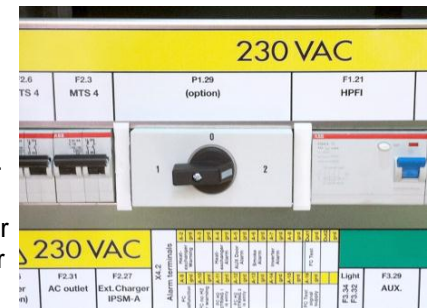


Option

In the middle of the upper row there is an optional P1.29 space (covered with a blind if no options selected).

Two options are currently considered.

This can be used for a multiple single phased power meter or a switch for dual power intake (generator switch). The illustration is showing the generator switch installed. In shown position the mains power is switched on.



Continued overleaf

2.3 Power distribution panel, *continued*

Alarm block

Behind the blind in the centre of the lower row there is an alarm block with screw terminals which is connected to the alarm port (25pin D-sub on top of the MTS4).

All alarms that are to be collected here should be attached to the alarm block X4.2.

Alarm name	MTS4 D-25 pin #	Alarm block #	Remarks
-	N.A.	N.A.	Door alarm – connectet to the MTS4 door connector (logically A-1 in the basestation)
Heat exchanger-warning	1	A-2	-
Spare	14	A-3	-
Heat exchanger - alarm	2	A-4	-
Aux door alarm	15	A-5	Spare – free to use for other door(s)
Smoke detector	3	A-6	-
Inverter - alarm	16	A-7	Spare – used if inverter installed
Spare A-8	4	A-8	Spare – used if flooding sensor installed
FC malfunction	17	A-9	Defined in 1266510N38
FC no H2 or warning	5	A-10	Defined in 1266510N38
FC H2 STRING 1 is emty	18	A-11	Defined in 1266510N38
FC H2 STRING 2 is emty	6	A-12	Defined in 1266510N38
Spare A-13	19	A-13	Spare – used if low temp.sensor installed
Spare A-14	7	A-14	Spare – used if high temp.sensor installed
Spare A-15	20	A-15	-
FC Test signal Supply	8	A-16	Defined in 1266510N38
FC Test	24	Relay out 1	Defined in 1266510N38
FC Test	12	Relay out 1	-
Spare output 2	25	Relay out 2	Ground (GND inputs)
Spare output 2	13	Relay out 2	-
Ground (GND inputs)	9, 10, 11, 21, 22, 23	GND inputs	-

Continued overleaf

2.3 Power distribution panel, *continued*

Alarm pin layout

X4.2 Alarm terminals			
FC malfunction	A-9 grd	Heat-exchanger Warning	A-2 grd
FC no H2 or warning	A-10 grd		A-3 grd
FC H2 STRING 1 is empty	A-11 grd	Heat-exchanger Alarm	A-4 grd
FC H2 STRING 2 is empty	A-12 grd	AUX Door Alarm	A-5 grd
	A-13 grd	Smoke Alarm	A-6 grd
	A-14 grd	Inverter Alarm	A-7 grd
	A-15 grd		A-8 grd
FC Test signal supply	A-16 grd	FC Test	Out1 grd
			Out2 grd

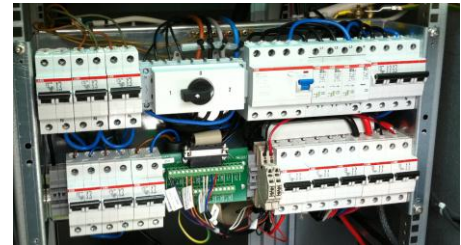
Warning

The cover panel is easily removed by removing the 4 screws holding it, but be aware of danger when the cover is removed from the PDP.

⚠ Only Authorized personal should remove the cover and do modification to the PDP.

Dantherm will not take responsibility to any unauthorized modifications done to the PDP.

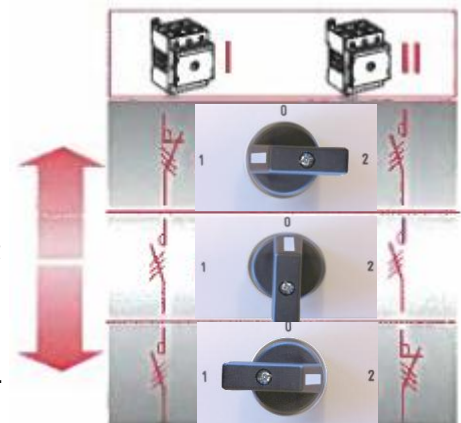
The PDP operates with a multiple single phase system, which means 415VAC live voltage can be found between live phases.



Operation of Generator switch (optional)

The generator switch has 3 positions:

- 1: When turned to the left it selects the power source connected to left set of contacts (I) which will be the alternative power source, normally a diesel generator connected to the CEEE connector located in the plinth of the cabinet.
- 0: This position (mid picture) will disconnect External power sources.
- 2: selector turned right (lower picture). This is the normal position with mains on.



2.4 Heat exchanger – MHX 85

Introduction

This section will give you a description of the MHX 85 and its functionality.

The MHX85 is a high end heat-exchanger especially designed to meet the requirements and challenges within telecom applications.

Core of the product is the new revolutionary Dantherm plastic counter flow heat exchanger core, which offers unique performances. It is powered by top quality DC fans and controlled by specially designed embedded microprocessor operated controller.

Sheet metal

The cabinet is made of aluzink® sheet metal parts. The heat exchanger outer cabinet (chassis body) is made out of one big part sealed and riveted together in each corner. One big lid is riveted to this part. Internal parts are riveted and screwed together. The tightness between the inner- and outer circuit is obtained by use of soft foam/gaskets and liquid sealant. Cleaning of the internal and external fans as well as cleaning of the core is possible through inspection/service lids.

Mounting

The heat exchanger unit is designed to be fixed to the inside of the door by using 4 long M8 screws (13 mm hex head). A gasket is applied between heat-exchanger and door duct to seal the airway and maintain the IP55 barrier.

Illustration

This illustration gives an overview of the heat exchanger which is build into the MTS4-outdoor enclosure (seen from inside the cabinet):

Air inlet, this is where the warm air returning from the enclosure is being sucked into the heat exchanger to be cooled down

Supply air outlet, from where the cooled air is supplied back to the enclosure



Two separate air flows

The two air flows (internal/external) are totally separated (IP55). The external air is only used to cool down the internal air via the heat exchanger. The air flows are never mixed.

Internal air flow

The warm internal air is sucked from the enclosure into the internal fan at the top of the MHX 85 and let through the heat exchanger, where it is cooled down.

After the cooling in the heat exchanger, the air is let back into the enclosure.

External air flow

The cold external air is sucked into the external fan at the bottom of the MHX 85 and let through the heat exchanger, where it is cooling down the internal air.

After having passed through the heat exchanger, the air is let back to the external environment at the top of the unit.

Continued overleaf

2.4 Heat exchanger – MHX 85, *continued*

Control system

The MHX 85 heat exchanger is controlled via a controller that controls the speed of the fans.

The key features of the controller are:

- Onboard temperature sensor (NTC type)
- Microprocessor based control in accordance with preselected strategy
- Minor and major alarm output
- Polarity protection
- Input voltage -40 V DC to -60 V DC
- Power consumption max. 120 W

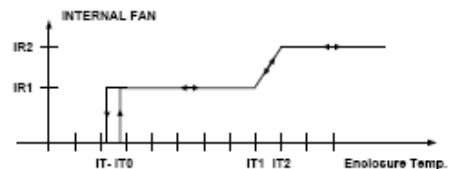
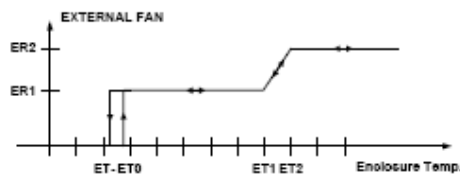


Part	Function																		
RS 232	To be used for factory testing or to get further information from the controller																		
Alarm LED	Gives signal about alarms: <ul style="list-style-type: none"> • Flashing = minor alarm (high temperature) • Constant = major alarm (fan or sensor failure) Both alarms can be monitored (potential free contact) on the power/alarm plug.																		
Sub-D 9 pin, male	Power and alarm plug Pin designation: <table border="0"> <tr><td>1</td><td>N/C</td></tr> <tr><td>2</td><td>+ 48 V DC</td></tr> <tr><td>3</td><td>+ 48 V DC</td></tr> <tr><td>4</td><td>Minor alarm +</td></tr> <tr><td>5</td><td>Major alarm +</td></tr> <tr><td>6</td><td>0 V DC</td></tr> <tr><td>7</td><td>0 V DC</td></tr> <tr><td>8</td><td>Minor alarm ÷</td></tr> <tr><td>9</td><td>Major alarm ÷</td></tr> </table>	1	N/C	2	+ 48 V DC	3	+ 48 V DC	4	Minor alarm +	5	Major alarm +	6	0 V DC	7	0 V DC	8	Minor alarm ÷	9	Major alarm ÷
1	N/C																		
2	+ 48 V DC																		
3	+ 48 V DC																		
4	Minor alarm +																		
5	Major alarm +																		
6	0 V DC																		
7	0 V DC																		
8	Minor alarm ÷																		
9	Major alarm ÷																		

Control strategy

This shows the control strategy for the controller:

See the table on the next page for an explanation of the values.



Continued overleaf

2.4 Heat exchanger – MHX 85, *continued*

Values

This table shows the set points/control strategy for the MHX 85 heat exchanger. All listed temperatures are return air temperatures (from the enclosure to the heat exchanger). Fan speeds are detected and controlled from speed signals from the fans.

Reduction	Designation	Value
IR1	Minimum internal fan speed	1100 RPM
IR2	Maximum internal fan speed	2100 RPM
IT-	Cut off temperature, internal fan	0 °C
IT0	Cut in temperature, internal fan	5 °C
IT1	Ramp up temperature set point, internal fan	40 °C
IT2	Maximum RPM temperature set point, internal fan	50 °C
ER1	Minimum external fan speed	1100 RPM
ER2	Maximum external fan speed	2000 RPM
ET-	Cut off temperature, external fan	25 °C
ET0	Cut in temperature, external fan	30 °C
ET1	Ramp up temperature set point, external fan	45 °C
ET2	Maximum RPM temperature set point, external fan	50 °C

2.5 Door stop

Introduction

This section will give you a description of the door stop mechanism installed in the doors of the basic MTS4-outdoor enclosure and its functionality.

Function

Both left and right door is equipped with a door stop “hook”, which will stop the door at an opening angle of approx. 110°. When it hits the stop end it will snap and keep the door in this position until it is released. The release is done by simply lifting the hook and closing the door.

If the door opening angle should be more than the 110° the door stop has a further release feature. In approx. half way open position, the door hook can be completely lifted out of the guide it normally operates in. By doing so the doors can reach a full 180° opening angle.

Left door

The illustration to the right is showing the wind hook located near the upper edge of the left door being released enabling a full 180° opening.

The door stop is re-inserted in the guide in the same way as it was lifted out.

⚠ Always put the hook back in the guide after it has been disconnected to avoid personal injury and physical damage to the enclosure.



Right door

The illustration to the right is showing the wind hook located near the upper edge of the right door being released enabling a full 180° opening.

The door stop is re-inserted in the guide in the same way as it was lifted out.

⚠ Always put the hook back in the guide after it has been disconnected to avoid personal injury and physical damage to the enclosure.



WARNING

Forcing the doors at 180° might damage both doors and hinges.

With door stop disconnected there might be a risk of personal injury, especially in high wind conditions, if a heavy wind hits the door and force it either open or shut can cause personal injury on a person being behind this.

Keep the door stops in position.

Test and check

It is recommended to test the “hook” function on every visit.

The door stop can be damaged by rough use and in a high wind situation this can be dangerous.

Report or correct malfunction to service responsible.

3. Get ready for use

Overview

Content

This section covers the following topics:

Topic	See page
3.1 How to unpack and mount the MTS4-outdoor enclosure	22
3.2 How to install power to the MTS 4-outdoor enclosure	26
3.3 How to install the battery pack (backup power)	30
3.4 How to install the MTS4 into the outdoor enclosure	34
3.5 How to power up the MTS4-outdoor enclosure (cold start)	38

3.1 How to unpack and mount the MTS4-outdoor enclosure

Introduction This section provides information about unpacking and mounting the MTS4-outdoor enclosure.

Transport The MTS4-outdoor enclosure including options and MTS4 is designed to withstand public transport (lorry transport) ETSI EN 300019-2-2.

Necessary tools The following tools are needed for the installation:

- 27 mm wrench
- 5 mm hexagon socket spanner (Allen)
- 8, 10 and 13 mm socket wrench
- Torx 20, 25 and 30 screw driver
- Riveting tool for 4mm rivets

WARNING! The enclosure has a weight in the range of 300-1000kg depending on configuration, why precaution shall be taken to avoid any risk of personal injury lifting and handling the cabinet for transport and installation.

- Use approved means of lifting aids.
- Do not get underneath the enclosure when lifted from ground.
- Secure the cabinet to prevent it from tripping over.

Lifting the enclosure All lifting of the enclosure must be done through the plinth. The plinth offers multiple ways of applying lifting aids:

- 3 passages going between front and back (left, mid and right)
- 2 passages going between left and right

These can further be used for forklifts or similar.



Foundation The enclosure shall be installed on an even horizontal secure ground, such as a concrete foundation or similar that is designed for the weight of the fully populated enclosure.

Use tarboard or similar as separator between the concrete foundation and the plinth. This can also be used to compensate for possible misalignment on foundation, which can cause cabinet doors not to be working optimal.

Detailed drawing of the mounting holes in the plinth (bottom) of the enclosure can be found in Appendix A (mounting template). The mounting template is showing the big enclosure that includes the hydrogen bottle compartment.




NB: Reserve extra space if the hydrogen bottle compartment may be added later.

Continued overleaf

3.1 How to unpack and mount the MTS4-outdoor enclosure, *continued*

Procedure






Follow these steps to unwrap and mount the enclosure:

Step	Action	
1	<p>Remove the wrap and the straps</p> <p>Check the enclosure for damages</p> <p>The enclosure is delivered without having the cover panels to plinth and protection cover for surge arrestors installed. These panels are supplied in a separate package with appropriate fasteners</p>	
2	<p>Remove the 4 screws (13 mm head) that are securing the enclosure to the pallet and lift it off the pallet</p>	
3	<p>Prepare the mounting site according to the mounting template in Appendix A</p>	
4	<p>Secure the enclosure to the foundation in minimum 6 anchor points split on at least 3 sides</p>	
5	<p>Install the power according to the section “3.2 How to install power to the MTS 4-outdoor enclosure”, page 26.</p> <p>NB: To avoid condensation and thereby a potential risk of damage to the installed equipment it is important that the enclosure is powered up with as a minimum the installed 600W heater in operation within 24 hours after unpacking.</p>	
6	<p>Place the front and rear panels (these are the longer ones and they are alike) to their designated positions on the plinth. Note that one of the two long cover panels has a removable service cover. This can be used to get quick access to i.e. a generator plug or similar stored in the plinth.</p>	
7	<p>Add the flange on the left side and tighten the 3 M6 screws with washer closest to the rear side of the enclosure using a 5mm Allen key.</p> <p>Tighten the upper and lower 2 of M6 screw with washer closest to the front side of the enclosure using a 5mm unbrako key.</p>	

Continued overleaf

3.1 How to unpack and mount the MTS4-outdoor enclosure, *continued*

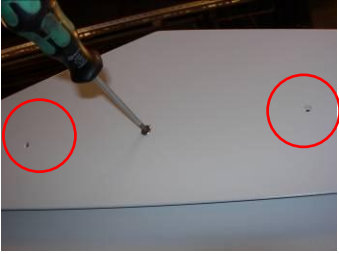

Procedure, *continued*

Step	Action	
8	Slide in the outer cover closest to the rear side of the enclosure and join the mid screw in the side closest to the front side of the enclosure.	
9	Repeat step 7 and 8 on the opposite side	
10	<p>Attach a blind for the holes that are left open on both sides of the enclosure by two rivets, if additional protection towards intrusion is requested.</p> <p>The blinds are supplied with the enclosure</p>	
11	<p>Install the protection cover on the upper right side of the enclosure after all antenna cables have been installed to designated surge arrestors</p> <p>Use 4 included M6 nuts with washer (10 mm spanner) to secure the cover</p> <p>Install 4 rivets on the top plate of the protection cover if further protection towards intrusion is requested</p>	 

Continued overleaf

3.1 How to unpack and mount the MTS4-outdoor enclosure, *continued*

Procedure, *continued*

Step	Action
12	<p>The rooftop of the enclosure is removable by untighten the 3 screws on left and right side.</p> <p>Should further protection towards theft of rooftop be desired, 2 additional holes for “security” rivets can be found on each side (marked with a red circle)</p> 
13	<p>Earth protection (towards antennas) connection point can be found on each corner of the enclosure bottom plate, in accordance with the R56 requirements. (Use M10 x 16 mm (max) screws and washer to connect cabinet).</p> 
14	<p>Power up within 24 hours to avoid condensation problems. Activate heater as a minimum</p>
15	<p>The enclosure has a very robust and protective double coated paint. This is essential part of corrosion protection insuring a long service lifetime of the enclosure.</p> <p><i>If the enclosure has got any damages on the paint with a risk of breaching the corrosion protection it is important to repair these damages immediately as part of the warranty obligations.</i></p> <p>Appendix B is a check list to be used on the enclosure when commissioning</p>

3.2 How to install power to the MTS 4-outdoor enclosure

Introduction This section provides information about installing mains power to the MTS4-outdoor enclosure.

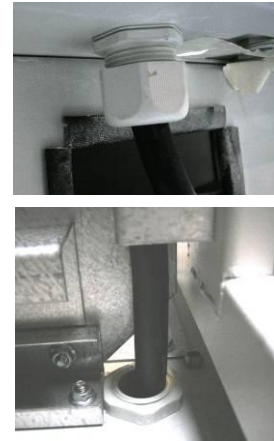
Necessary tools The following tools are needed for the installation:

- 8 mm wrench
- Torx T20 and T25 screw driver
- PZ 2 screwdriver

Electrical connection A PG21 cable gland is located at the middle of the bottom and is to be used as main power cable entry. See appendix A for recommended entry area of the power cable in the foundation. The power cable needs to be attached to the main circuit breaker, with N and L (phase) a ground stud (M6) is next to this serving as main ground.

The installation must be done by authorized personal only.

The main circuit breaker is rated 16 A (3 phase + N).



WARNING! All work on a power installation must be done by authorized personal only. Working on a live installation is hazardous and must be avoided by switching off all power prior to working on the 230 VAC installation. Make sure that 230VAC cannot be active before the work is completed.

Procedure Follow this procedure to install mains power to the MTS4-outdoor enclosure:

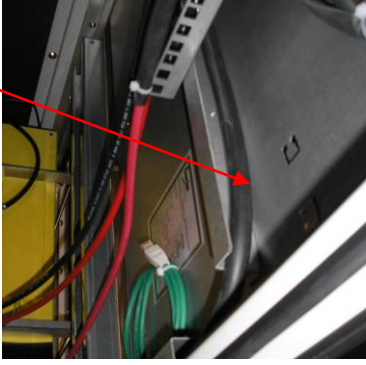


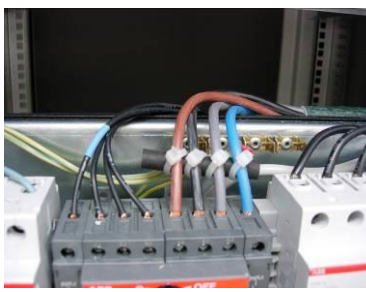
Step	Action
1	Make sure all power has been switched off and secured
2	Loosen the 3 screws (T20) that keeps the metal cable duct in place
3	Lead the cable through the plinth to the entry hole




Continued overleaf

3.2 How to install power to the MTS 4-outdoor enclosure, *continued*

Procedure, *continued*

Step	Action	
4	Route the mains supply cable as shown on the illustration. Here the cable duct is put back on	
5	Connect the power by securing the ground. Terminate the ground cable by a 5 mm terminal ring. Insert the terminal ring to the earth stud located to the top right side of the power distribution board. (Cover not on). Tighten the nut using a 8mm wrench.	
6a	If the generator switch option is chosen go to step 6b. If not continue: Insert the N, L1, L2 and L3 to the main circuit breaker located at the top right side of the power distribution panel Recommended tightening torque is 2Nm	
6b (OLD)	Only if generator switch is installed: Insert the N, L1, L2 and L3 to the generator switch located on location P1.29 (mid top rail). Connection to Mains grid starting from right N (blue) followed by L1,L2 and L3, The 4 wires left are connecting the generator cable located in the plinth. ⚠️ Recommended tightening torque is 0,8Nm	

Continued overleaf


Step	Action
6c (new)	<p>Only if generator replacement switch is installed: Insert the N, L1, L2 and L3 to the generator switch located on location P1.29 (mid top rail). Connection to Mains grid starting from right N (blue) followed by L1,L2 and L3, The 4 wires left are connecting the generator cable located in the plinth.</p> <p> Recommended tightening torque is 2.0Nm</p>
7	<p>Tighten and secure the cable using cable ties</p>



Continued overleaf

3.2 How to install power to the MTS 4-outdoor enclosure, *continued*

Procedure, *continued*

Step	Action	
8	Tighten the cable gland in the entry hole (use appropriate tooling) so the cable is locked and the IP barrier is activated	
9	Reinstall the cover of the power distribution panel and switch power on to the MTS4 outdoor enclosure	

Other entry holes

4 Other entry holes are available for other cables for i.e. communication lines or generator power input.

These are on a loose mounting plate located in the bottom just behind the right door.

There are 3 PG11 glands and 1 additional PG21. To avoid any ingress to the cabinet, they are plugged by delivery and should remain so until put in use



Example of a data cable routed through a cable gland



Please note that all entry holes must be covered at all time to avoid moisture ingress due to condensation

3.3 How to install the battery pack (backup power)

Introduction

This section guides you through the installation or replacement of a battery pack on the MTS4-outdoor enclosure.

The MTS4-outdoor enclosure is designed to accommodate two sets of 48 V DC backup power battery packs. One pack is stored in the bottom of the cabinet. When installed as described below the solution has been tested and approved for lorry transport.

The second pack is to be installed on site on the shelf right above the first battery pack. Please note that this pack is not secured for transport. Interconnections and degassing is similar to the lower pack.

IMPORTANT: They are all VRLA types with approved ventilation kit. The ventilation kit shall be installed in accordance with the description below:

- ⚠ **WARNING:** Careful battery handling is described in the separately enclosed Installation, Operations and Maintenance Instructions for the battery pack.

When to replace it It is necessary to replace the battery pack if:

- required power backup time is not sufficient
- cell voltage is below manufactures recommendations after charging period
- recommended operational lifetime is exceeded
- any physical damage is found on the battery pack

Before you start Before you start to replace the batteries, make sure that you have the following ready:

- A replacement pack of batteries including degassing kit with hose, T-connectors etc., type label and manual
- The installation, Operations and Maintenance Instructions coming with the batteries READ THIS and follow the instructions
- A 10 mm and 13 mm spanner (insulated)
- Lifting aid for handling the battery cells. Each cell can have a weight of up to 57 kg

Illustration: This illustrates the battery pack located at the bottom of the left compartment:





Continued overleaf

3.3 How to install the battery pack (backup power), *continued*

Procedure





Follow these steps to install and replace the batteries (both upper and lower battery pack):

Step	Action	
1	READ the Installation, Operations and Maintenance Instructions, and follow these at any time	
2	Check the contents of the battery pack to be installed (DA p/n 045869). This shall include: <ul style="list-style-type: none"> • 4 off 12V155FS batteries • Degassing kit: 4 manifolds, 3m hose, 4 T-pieces, 1 angle loop • 3 jumpers • Type label • Safety instruction and manual • Black and Red AWG6 wire for interconnection 	
3	Make sure that the system is not in back-up mode	
4	Switch off the DC mains circuit breaker and cabin light	
5	<p>Prepare new batteries for installation: Clean top of batteries, preferably with alcohol or similar. Remove protection tape on degassing cap. Attach degassing cap on top of the battery so that the 6 holes inside cap match the 6 venting holes on battery.</p> <p>NOTE: Do not remove filter in venting hole on battery.</p>	
6	<p>Lift /slide the batteries in place one by one</p> <p>WARNING: Lifting aid is needed</p> <p>Each battery has a weight of 57 kg.</p> <p>Serious risk of personal injury or damage on equipment if dropped.</p>	
7	<p>Remove safety caps on the two batteries starting from left, and attach the jumpers and tighten nut with spring washer and flat washer behind.</p> <p>Recommended torque 4Nm on battery terminals</p> <p>Put safety cap back on</p>	
8	Repeat step 7 until all 4 batteries are connected	
9	<p>If not installed, find the enclosed black AWG 6 cable, and screw it on the pole to the left marked “-“.</p> <p>Put safety cap back on</p>	
10	<p>Screw the other end of the black AWG 6 cable to similar “-“ pole on the lower battery pack. Route cable carefully and secure it so it cannot touch any sharp edges. Put safety cap back on.</p>	
11	<p>If not installed find the red AWG 6 cable and screw this on the “+” pole to the right. Before tightening the nut go to the next step</p>	

Continued overleaf

3.3 How to install the battery pack (backup power), *continued*





Procedure, *continued*

Step	Action
12	Screw the other end of the red AWG 6 cable to similar + pole on the lower battery pack. Route cable carefully and secure it so it cannot touch any sharp edges. Put safety cap back on.
Degassing installation	
13	<p>Install the tube on battery 4 as shown on the picture to the right. Batteries are numbered from left to right, 1,2,3,4.</p> <p>Tube length: 105.5 mm</p> 
14	<p>Install the tube on battery 2 and 3 as shown on the picture to the right</p> <p>Tube length: 24.5 mm on both</p> 
15	<p>Install the tube on battery 1 as shown on the picture to the right</p> <p>Tube length: 80.5 mm</p> 
16	<p>Connect the tubes on battery 3 and 4 by using a T-connector</p> 

Continued overleaf

3.3 How to install the battery pack (backup power), *continued*

Procedure, *continued*

Step	Action	
17	Connect battery 2 and 3 by using a T-connector and a tube Tube length: 101.5 mm	
18	Connect battery 1 and 2 by using a T-connector and a tube Tube length: 60 mm	
19	Locate the degassing hose from the lower battery pack in the front left corner. Cut this hose approx. 10 cm. above the batteries of the upper shelf. Insert the extra T-connector and connect a piece of hose between the T-connector from step 19 and the newly inserted T-connector in the hose leading to the exhaust in the roof.	
20	Place the battery type label visible on the left innerskin beside the existing type label (if present)	
21	Check that the battery voltage is as specified before switching DC backup on	
22	Check again that the degassing kit of the batteries is intact with all hoses installed in accordance with this instruction	
23	Switch on the power again	

3.4 How to install the MTS4 into the outdoor enclosure

Introduction

This section will guide you through the installation of the MTS4 into the outdoor enclosure.

The outdoor enclosure is specially designed for installing the Motorola MTS4 base station. No redesign of the MTS is needed, but a few precautions need to be taken in order to ensure optimum performance of the outdoor temperature regulation and to ensure normal operation.




Necessary tools

The following tools are needed for the installation:

- 10 and 13 mm wrench
- Torx T30 screwdriver
- Adjustable pliers

Procedure






Follow these steps to install the MTS4 into the outdoor enclosure:

Step	Action
1	<p>Unpack the MTS4 and remove the door (The door should not be used, when the base station is fitted in an outdoor enclosure)</p> 
2	<p>Remove the lifting eyes completely and spare two screws for later use</p> 
3	<p>Remove the levelling feet from the base station completely (the levelling feet should not be used, when the base station is fitted in an outdoor enclosure)</p> 

Continued overleaf

3.4 How to install the MTS4 into the outdoor enclosure, *continued*






Procedure, *continued*

Step	Action	
4	Remove the fixing bracket which is situated inside the outdoor enclosure	
5	Mount the bracket at the rear of the MTS using two of the screws which was previously used for holding the lifting eyes	
6	For optimum access to the junction panel of the MTS when it is mounted in the enclosure, it is advised to remove the top lid from the MTS before fitting it in the outdoor enclosure.	
7	<p>Depending on the site where the mounting of the MTS is taking place, some lifting aid might be needed to get the MTS4 into the outdoor enclosure.</p> <p>Always follow local regulations regarding personal lift and transportation as the MTS4 can have a max weight of up to 150 kg.</p>	
8	<p>Once the MTS4 is inside the outdoor enclosure it should be secured at the rear top and in the bottom front.</p> <p>Two M8X50 are used for fixing the MTS4 in the front. The screws are let through the guides on the bottom front flange of the MTS4 and the holes on the ducts underneath. Use the M8 nuts and a washer to secure the screw from inside the ducts. Don't tighten the screws until all four screws are mounted.</p>	

Continued overleaf

3.4 How to install the MTS4 into the outdoor enclosure, *continued*




Procedure, *continued*

Step	Action	
9	<p>...And two M8 at the rear side, which originally held rear top bracket, are mounted in their original positions. All four bolts should now be tightened.</p>	
10	<p>Now all standard connections to the MTS should be made: Ground, AC, DC, Alarm, E1, GPS, X21, battery temperature sensor and antenna connections should be made as in any other standard installation.</p>	
11	<p>The battery temperature sensors from the MTS should be mounted together with the cables on the terminals of the battery. (some times only one sensor) The plastic cover might need modification in order to be refitted after the temperature sensors have been fitted. One sensor should be fitted on the "+" terminal and another one on the "-" terminal.</p>	
12	<p>Now lids and beauty panel should be removed and the special air divider plate should be mounted.</p>	
13	<p>The air divider, which is supplied with the outdoor enclosure, is mounted as shown in order to ensure the specified temperature range, using the original fitted screws.</p>	

Continued overleaf

3.4 How to install the MTS4 into the outdoor enclosure, *continued*

Procedure, *continued*


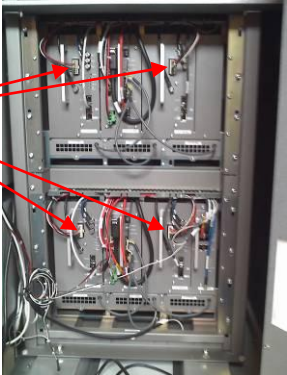
Step	Action	
14	<p>The door sensor of the MTS is disabled by disconnecting the small black plug. Instead the door sensor cable from the outdoor enclosure, marked “door sensor”, is connected.</p>	
15	<p>In case a smoke detector has been ordered, there will be a Wire marked “Smoke detector” fixed inside the enclosure. This cable should be connected to the ATCC output on the lower PSU in the MTS4.</p> <p>In case this output on the PSU is already used, you need to connect the existing plug to the spare plug on the Y-cable wiring from the smoke detector and then connect the Y-cable plug into the PSU output socket.</p>	
16	<p>In case a LVD relay has been ordered there will be a wire marked “LVD”. This cable should be connected to the POWER output on the lower site controller in the MTS4.</p> <p>Similar to the smoke detector connection, you need to connect the existing wire to the spare plug on the Y-cable wiring from the LVD relay and then connect the Y-cable plug into the PSU output socket.</p> <p>LVD (Low Voltage Disconnection) is a relay function that will protect against destructive discharge of the backup batteries.</p>	

3.5 How to power up the MTS4-outdoor enclosure (cold start)

Introduction This section will guide you through how to power up the MTS4-outdoor enclosure after installation and power has been connected.
The procedure is split into to scenarios depending on state of installation.

Scenario 1: Antennas installed If all antennas are installed and connected to a MTS4 base station it is allowed in principle to switch on all circuit breakers at one time, but the procedure below is the better way to check for correct function of installed equipment.

Scenario 2: Antennas not installed **If antennas not installed or other reasons for not powering up the base station.** If all antennas are NOT installed and connected to a MTS4 base station or if the base stations are not ready for “going in the air” then only do step 1 to 4. Before continuing with step 5 to 14 the following must be done.

Step	Action
Do before step 5	<p>The power supply plugs shall be disconnected from the base radios. Carefully pull out the power supply plug.</p> 
Do before step 5	<p>The MTS4 Base station may have up to 4 x Base Radio's. The power supply plug shall be disconnected on all Base Radios in the MTS4 rack.</p> 

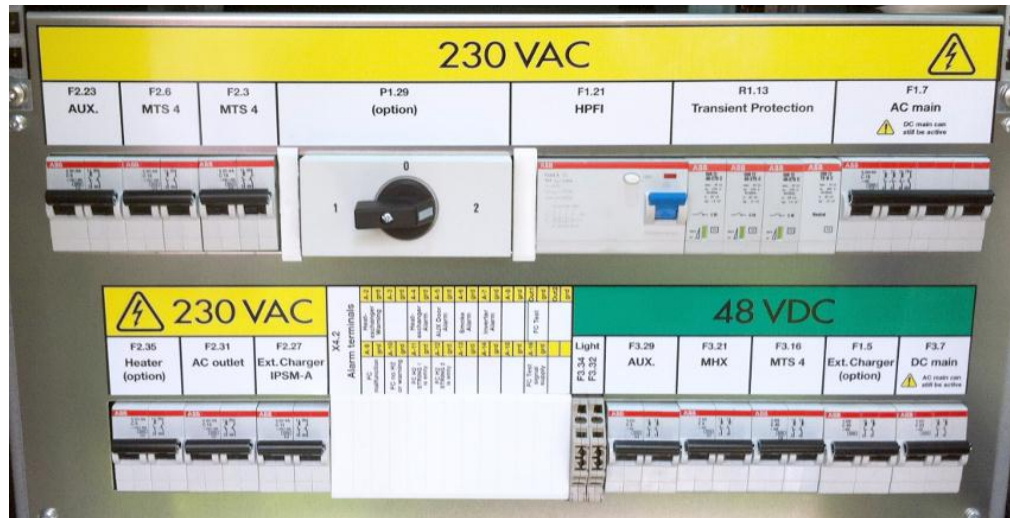
Doing this will ensure that no Base Radio will be damaged or unintentionally transmit. It will also ensure that heating is enabled and external equipment (modem / microwave) can have 48DVC supply. Now it is safe to continue with step 5 to 14.

Continued overleaf

3.5 How to power up the MTS4-outdoor enclosure (cold start), *continued*

Illustration

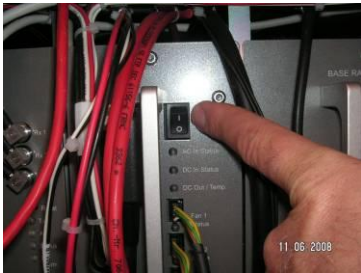
This illustrates the power distribution panel and where all the circuit breakers are located. The power distribution panel is located behind the left door in the basic outdoor enclosure.



Procedure

Follow this procedure to power up the MTS4-outdoor enclosure:

WARNING: If the expected reaction is not fulfilled STOP

Step	Action and reaction
1	Switch off all circuit breakers (switch pointing downwards).
2	Switch off all (one or two) power supplies on base station. 
3	<p>Diesel switch has 3 positions. Upside down is neutral (0). (No AC power source is engaged)</p> <p>Turning knob towards right (clockwise) switch on normal power grid.</p> <p>Turning knob towards left (counter clockwise) enables external power supply through the red CEE plug stored in the plinth.</p> <p>Select desired power source.</p>

Continued overleaf

3.5 How to power up the MTS4-outdoor enclosure (cold start), *continued*

Procedure, *continued*

Step	Action and reaction
4	F1.7 Main Switch is switched on- No reaction should be observed
5	F1.21 RCCB (HPFI) relay is switched on- No reaction should be observed
	If reason not to power MTS4 base station up - then do scenario 2 steps described on previous page
6	Breaker contacts on both power supplies on base station are switched on
7	F2.3 followed by F2.6. MTS4 AC supply circuit breakers are switched on. The MTS4 base station will start more or less up. The MTS4 PSU LED AC In Status turn green
8	F3.7 DC Main circuit breaker is switched on. The MTS4 PSU LED DC In Status turn green
9	F3.16 MTS4 DC Supply circuit breaker is switched on. No reaction should be observed
10	F2.27 External Charger circuit breaker switched on. In a battery equipped cabinet with external charger this should power up.
11	F1.5 External Charger circuit breaker switched on (48VDC side). In a battery equipped cabinet with external charger this should be visible on the display, but else no reaction
12	F2.23 and F2.31 on- reaction, all equipment (230VAC) connected to these should become live
13	F3.21 Heat-exchanger on. The heat-exchanger should start up, after a few seconds the internal fan should start to rotate.
14	F3.29 AUX on. Reaction- All connected auxiliary equipment (48VDC) should become live
15	F2.35 Heater switched on – if temperature is below set point on Thermostat B2.35 heater with fan will start up.

4. Service guide

Overview

Content

This chapter covers the following topics:

Topic	See page
4.1 Preventive maintenance	42
4.2 Spare parts	44
4.3 Fault finding	56
4.4 Service agreement	57

4.1 Preventive maintenance

Introduction Proper maintenance of the unit is necessary in order to achieve trouble-free operation. This section contains description of the recommended maintenance.

Contractual service Dantherm Air Handling A/S provides contractual service agreements covering preventive and/or corrective maintenance – see section "4.4 Service agreement", page 57 for further information.

CAUTION Always disconnect the power from the MTS4-outdoor enclosure before doing any preventive maintenance!

Preventive maintenance, MTS4-outdoor enclosure Please follow this procedure to carry out the preventive maintenance, which should not exceed 6 months:

Step	Action
1	Check if door gaskets are damaged – exchange if necessary
2	Check and clean if necessary the door louvres
3	Check and replace if necessary the drain filters
4	Check exterior for any paint damages and cover these with original touch-up paint to avoid any potential corrosion issue

Preventive maintenance, power distribution panel Dantherm Air Handling recommends to switch all circuit breakers off and back on (if in use) once a year. Make sure that the base station is not unintentionally affected by this. It is recommended that the small white test button on the HPFI is activated regularly (every 6 months) to test function. Make sure Backup is active when doing this to avoid any unplanned downtime on the Radio base station. Recommended every 6 months: Further the F1.34 transient protection can be damaged by a strike of lightning or similar in the power supply. It has a replaceable cartridge that needs replacement when the indicator in front turns red. If a lightning or other surge voltage have hit the PDP the R1.13 transient protection might have been damaged (and possibly saved the equipment inside). Check if the easy replaceable blocks are okay by seeing if the window is still green.

Preventive maintenance, MHX 85 It is recommended to carry out preventive maintenance to the heat exchanger every 6 month. The preventive maintenance is done by visual inspection for defects mainly due to contamination of the airways of the heat exchanger including controller and fans, and if so cleaning of these. Normal working service life of fans is 5 years of operation. In case of strong contamination or malfunction of the unit it is recommended to do a swap of the unit with a replacement unit and return it to Dantherm service shop for service. The unit is easy removed by disconnecting the power/alarm cable and loosening the 4 M8x170 screws. Always make sure the interface gasket is in place and undamaged when mounting the heat exchanger.

Continued overleaf

4.1 Preventive maintenance, *continued*

Preventive maintenance, MHX 85, *continued*

Please follow this procedure to carry out the preventive maintenance, which should not exceed 6 months:

Step	Action
1	Clean the fans, either vacuum clean or use compressed air with caution (cleaning is possible through inspection/service lids)
2	Clean the cross heat exchanger with a vacuum cleaner
3	Check the fans and the fan blades for cracks – exchange the MHX85 if necessary
4	Check the fans for abnormal noise – exchange the MHX85 if necessary

Preventive maintenance, batteries

Please follow this procedure to carry out the preventive maintenance, which should not exceed 6 months. Batteries are optional equipment.

Step	Action
1	Check that the battery ventilation hoses are intact and in place. If damaged order a replacement degassing kit

Preventive maintenance, door stop

It is recommended to test the door stop “hook” function on every visit.

The door stop can be damaged by rough use and in a high wind situation this can be dangerous.

4.2 Spare parts

List

List of spare parts for the MTS4-outdoor enclosure:

Dantherm therm-Part No.	Motorola Part No.	Description	Illustration
046392	6766500A01	Heater w/ thermostat 600W PTC type	
046393	5166566A01	GPS surge arrester	
046394	5166565A01	Antenna surge arrester	
046395	5166564A01	Microlink surge arrester	
046396	0166561A01	External battery charger	

Continued overleaf

4.2 Spare parts, *continued*



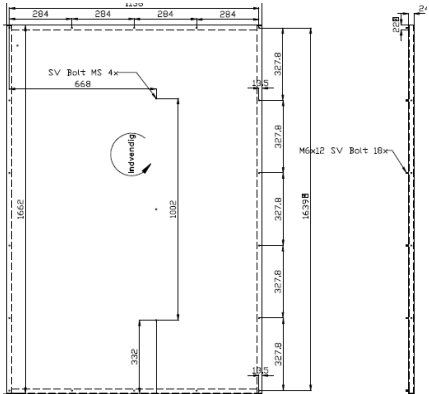
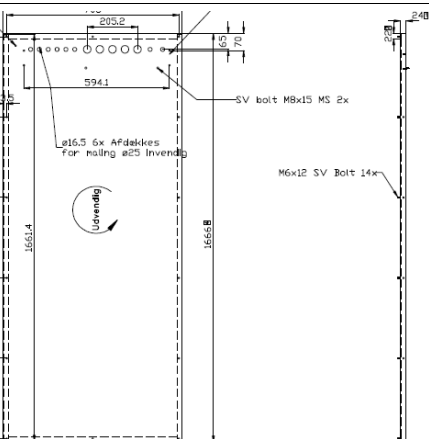
List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
046397	5166563A01	Dataline surge ar- restor	
046398	4866547A01	Light (internal) 48VDC ,5W LED light, 400 LUX	
046399	5166562A01	Smoke alarm	
046400	6066502A01	Batteries Set of 4x12V155AH VRLA type with degassing kit.	
046401	5166561A01	LVD build in kit	
046402	3966500A01	Power distribution panel with diesel switch	

Continued overleaf

4.2 Spare parts, *continued*

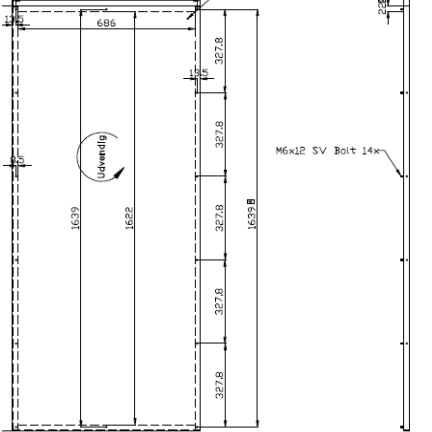
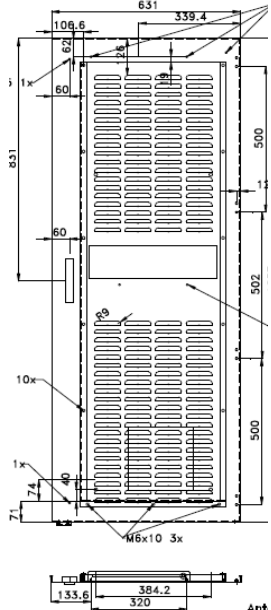
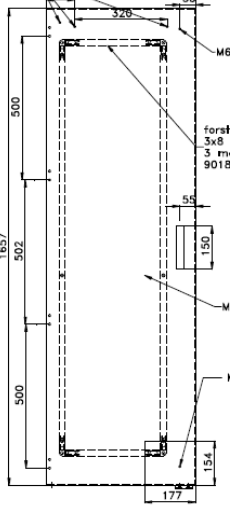
List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
046403	6766500A12	Powermeter	
046405	4066557A01	Door contact F79-00A	
046457	1566568A01	Cover plate complete	
046458	1566569A01	Right side cover plate complete	

Continued overleaf

4.2 Spare parts, *continued*

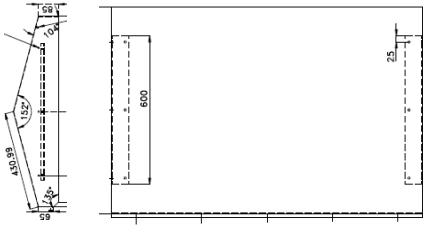



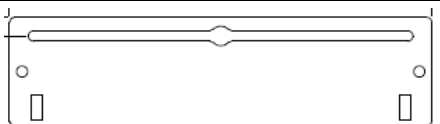
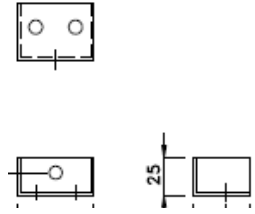
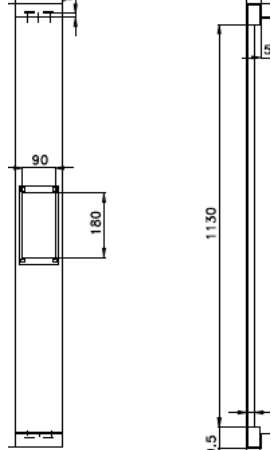
List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
046460	1566567A01	Left side cover plate complete	
046461	1566566A01	Right door complete	
046462	1566565A01	Left door complete	

Continued overleaf

4.2 Spare parts, *continued*

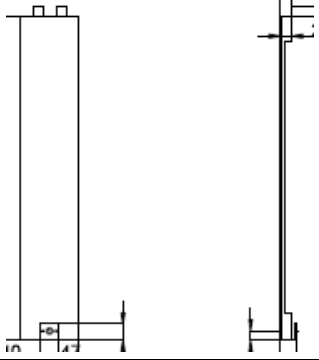
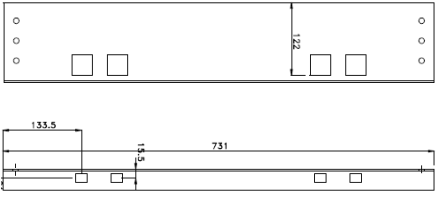
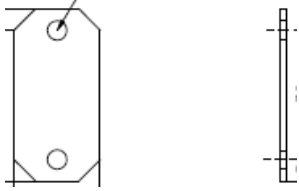
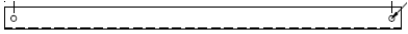
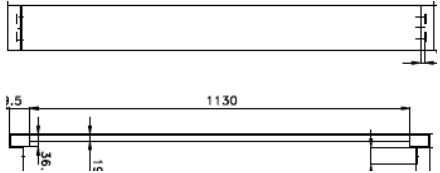
List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
046463	1566564A01	Roof complete	
046464	1566563A01	Housing for surge arrester	
046465	0766555A01	Pole for door stopper right side	
046466	0766550A01	Pole for door stopper left side	
046467	0766556A01	Gate stopper for door	
046468	0766557A01	Gate stopper for closet	
046469	6466520A01	Beauty panel long for socket front	

Continued overleaf

4.2 Spare parts, *continued*

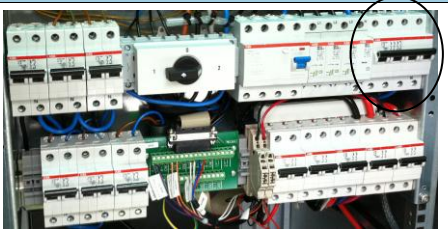
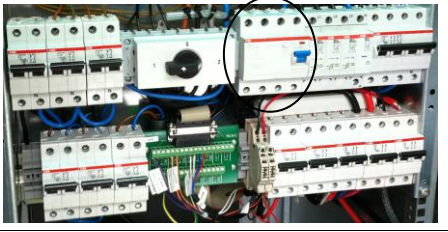
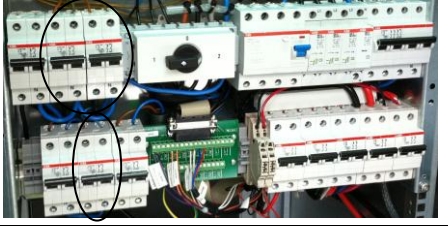


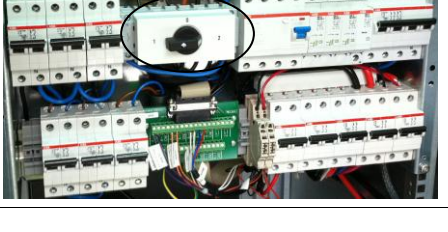
List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
046470	6466521A01	Beauty panel short for socket	
046471	6466522A01	Elbow for socket	
046472	1566570A01	Hole covering plate for socket	
046474	0766558A01	Battery bracket	
046475	3266509A01	Sealing strip 2mm opening door right side	
046476	3266510A01	Sealing strip 2mm opening door left side	
046477	3266511A01	Sealing strip 2mm door right side	
046478	3266512A01	Sealing strip 2mm door left side	
046719	1166510A01	25 ml. repair paint Ral 7035	
046721	1166511A01	25 ml. primer Ral 7035	
046782	6466519A01	Beauty panel long for socket rear	

Continued overleaf

4.2 Spare parts, *continued*


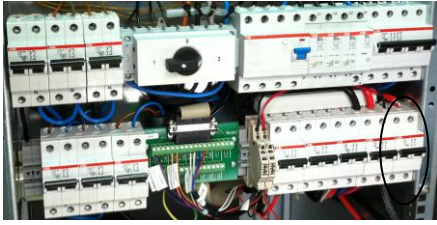
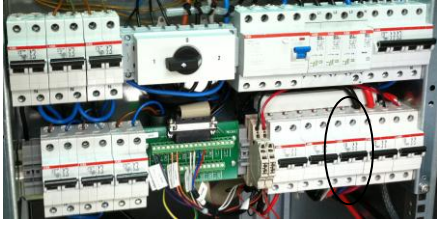

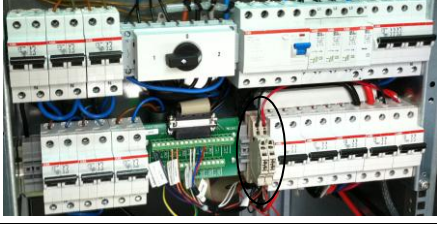

List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
046481	4066560A01	F1.7 Circuit Breaker (S203-C16 NA)	
046482	4066567A01	F1.21 Ground fault circuit interrupter (F204A-40/0,03)	
046483	4066559A01	F2.3 & F2.31 & F2.6 Circuit breaker (S201-C10 NA)	
046486	4066558A01	F2.23 & 2.35 Circuit breaker (S201-C6 NA)	
046487	4066561A01	F2.27 Circuit breaker (S201-C13 NA)	
046488 OR: 067219	4066566A01	Q1.2 Supply selector ULT25/4E(new) Kit if replacing old OT25E4C	

Continued overleaf

4.2 Spare parts, *continued*

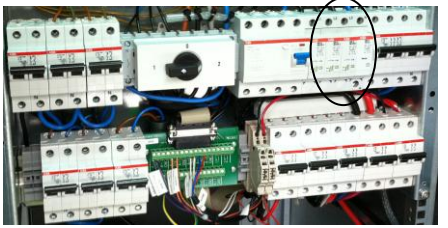

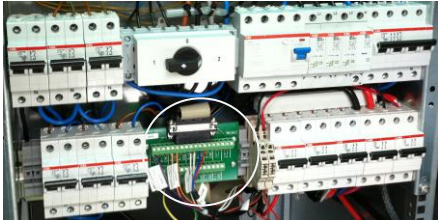

List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
046489	3066611A01	Generator cable	
046490	4066562A01	F3.7 Circuit breaker (S202-C63)	
046491	4066563A01	F3.16 Circuit breaker (S202-C40)	
046492	4066564A01	F3.21 & F3.29 Circuit Breaker (S202-C6)	
046493	4066565A01	F3.32 & F3.34 Circuit Breaker (ZSI 2.5/2)	
046494	3066609A01	Harness complete	

Continued overleaf

4.2 Spare parts, *continued*



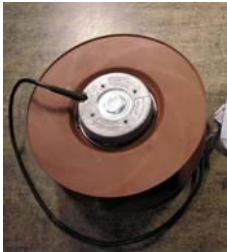

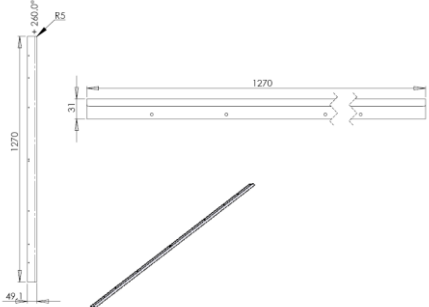
List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
046495	5166560A01	Overvoltage protection (OVR T2 3N 40-275P)	
046496	6566507A01	10 pcs fuses 1A	
046497	0166562A01	Alarm distribution board	
046515	9766500A01	MHX85 heat exchanger	

Continued overleaf

4.2 Spare parts, *continued*

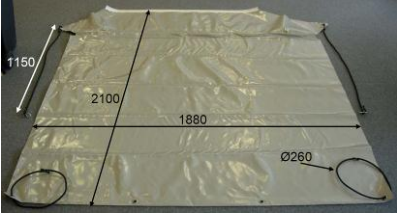






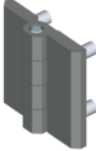
List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
060575	-	AC/DC rectifier 800W 48VDC	
060576	-	Control unit PCC for XS1948	
062905		Fan for MHX85 internal or external	
064624		Controller MHX85	
064627		Tent guide complete with rivets	

Continued overleaf

4.2 Spare parts, *continued*


List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
064628		Spray hood komplet i transporttaske	
064629		Warning: smoking and fire forbidden	
064630		Warning: remove pressure bottles at fire	
064631		Thorsman grommet TET-C 5-7/16/5-7/21	
064632		Thorsman grommet TET-C 14-20/29/14-20/35	
064633		Handle for door Basic cabinet	
064634		Handle for door Bottle cabinet	
064635		Hinge for door with locking pin including nuts	

Continued overleaf

4.2 Spare parts, *continued*

List, *continued*

Dantherm Part No.	Motorola Part No.	Description	Illustration
064636		Lock pole for complete door	

4.3 Fault finding

Fault finding, MHX 85

Use this table to identify and remedy a problem or fault:

Problem	Cause	Action
The red LED illuminates constantly (=major alarm)	Too high temperature in the enclosure, above 70°C or a fan failure	Check if airways are clear if not clear them. If alarm does not clear, replace fan
The red LED is flashing (=minor alarm)	The on board sensor has been disconnected/shorted	Replace the controller
The internal fan runs at low speed	The temperature in the enclosure is below 40°C	This is due to the control strategy – no fault
The external fan does not run	The temperature in the top of the enclosure is below 30°C	This is due to the control strategy – no fault
The external fan runs at low speed	The temperature in the enclosure is below 45°C	This is due to the control strategy – no fault


Fault finding, MTS4-outdoor enclosure

Use this table to identify and remedy a problem or fault:

Problem	Cause	Action
No cabin light	• LVD disconnected	Connect LVD
	• Fuse blown	Replace fuse
	• No DC voltage present	Switch on DC power
	• Door switch/wiring defective	Check connection of switch/wiring
Heater not working	Thermostat set point incorrect	Adjust set point (see description below)

Heater set point

The optional heater (located in the back of the shelf in the left side of the enclosure) will, if power is present, be active when temperature is below set point. Follow this procedure to adjust set point:

Step	Action
1	Use the dial to adjust the thermostat set point. Default setting is 20°C 

4.4 Service agreement

Introduction

The unit includes mechanical and electrical parts and the unit is often placed in a rough environment where the components are exposed to different climate conditions. Therefore the unit will need preventative maintenance on a regular basis.

Hotline

The After Sales Support Department of Dantherm Air Handling A/S is ready to help you in case of a problem.

To be able to offer quick and efficient help, please have the following information ready when contacting Dantherm Air Handling A/S:

- Name
- Company
- Country
- Phone no.
- Email
- Type (unit)
- Site/location (unit)
- Serial no/order no.
- Description of the problem

Contact Dantherm Air Handling A/S, ask for the After Sales Support department and help will be provided as soon as possible:

Phone: +45 96 14 37 00

Fax: +45 96 14 38 00

Email: service@dantherm.com

Preventive maintenance

Dantherm Air Handling A/S offers to do the preventive maintenance on the units so that they at all times will operate according to factory standards.

Corrective and emergency repair

In case of malfunctions of the product Dantherm Air Handling A/S offers to do emergency repair on the climate units. Agreements will be made with the customer on response time and price.

Setup

Dantherm Air Handling A/S has established a network of service partners to do the preventative maintenance. The partner is trained and certified on the actual climate units. The partner will also carry an adequate number of spare parts – so that any repairs can be made during the same visit.

The agreement will be made with Dantherm Air Handling A/S – and the overall responsibility for the agreement will be Dantherm Air Handling A/S's.

Further information

For further information about a service agreement in your country or region, please contact:

Henrik Hersted
After Sales Support Manager
Dantherm Air Handling A/S
Phone: +45 9614 4767
Mobile: +45 2399 4066
Email: heh@dantherm.com

5. Technical information

Overview

Introduction This section contains the technical data for the unit.

Contents This section covers the following topics:

Topic	See page
5.1 Technical data, MTS4-outdoor enclosure	59
5.2 Technical data, MHX 85 heat exchanger	61
5.3 Wiring diagram, MHX 85 heat exchanger	64
5.4 Wiring diagrams MTS4-outdoor enclosure – power distribution panel	65
5.5 References for the wiring diagrams	73

5.1 Technical data, MTS4-outdoor enclosure

General data

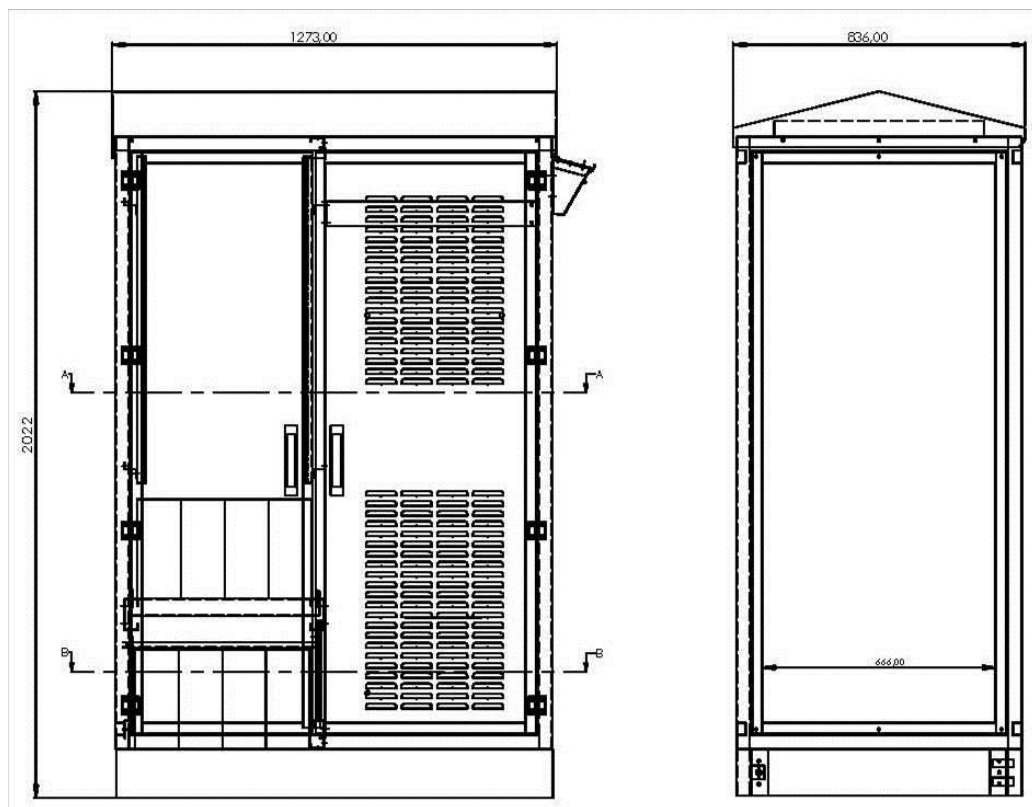
The general technical data on the MTS4-outdoor enclosure is shown in the following table:

Specification	Designation	Value
Operating range - humidity	%RF	5 – 100 condensing
Operating range – ambient temperature	°C	÷ 30 to + 40
Power supply	V AC	3x400 / 230
Max. current, main fuse	A	3X16
Max. cooling capacity with MXH 85 installed	W	1700
Temperature range	°C	max. 60 °C internal at 40 °C ambient
Sound level 1 m distance	dB(A)	67
Weight, excl. options	kg	300
Dimensions (W x D x H)	mm	1273 x 836 x 2022
Safety class	IP	55

Dimensions

Section view: Front and side of enclosure

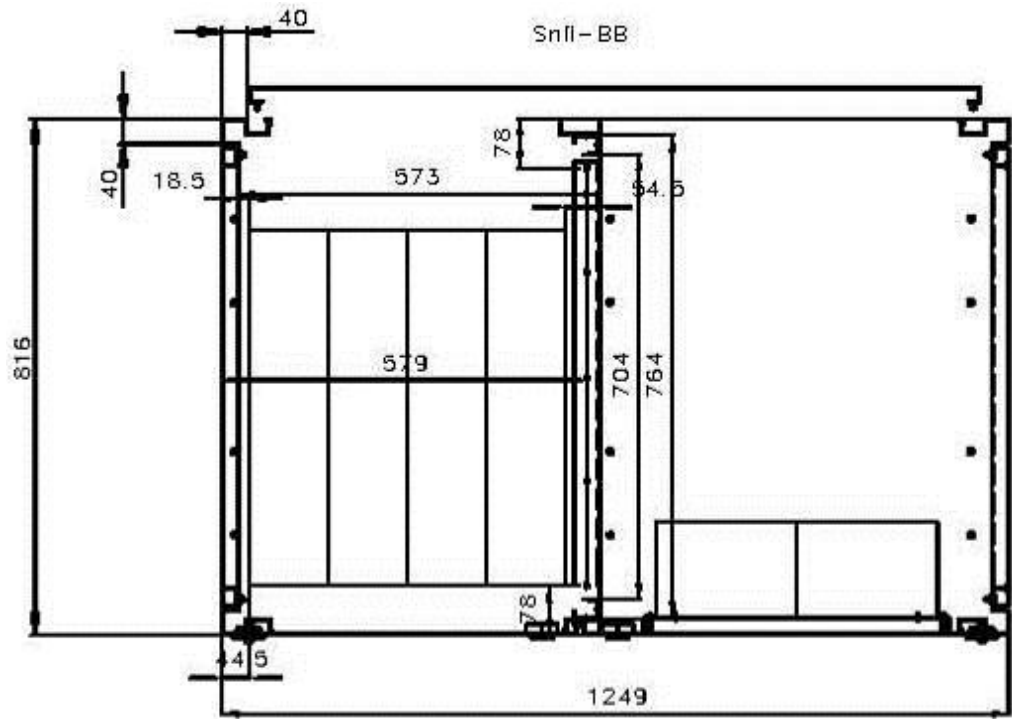
This following illustrates the dimensions of the MTS4-outdoor enclosure:



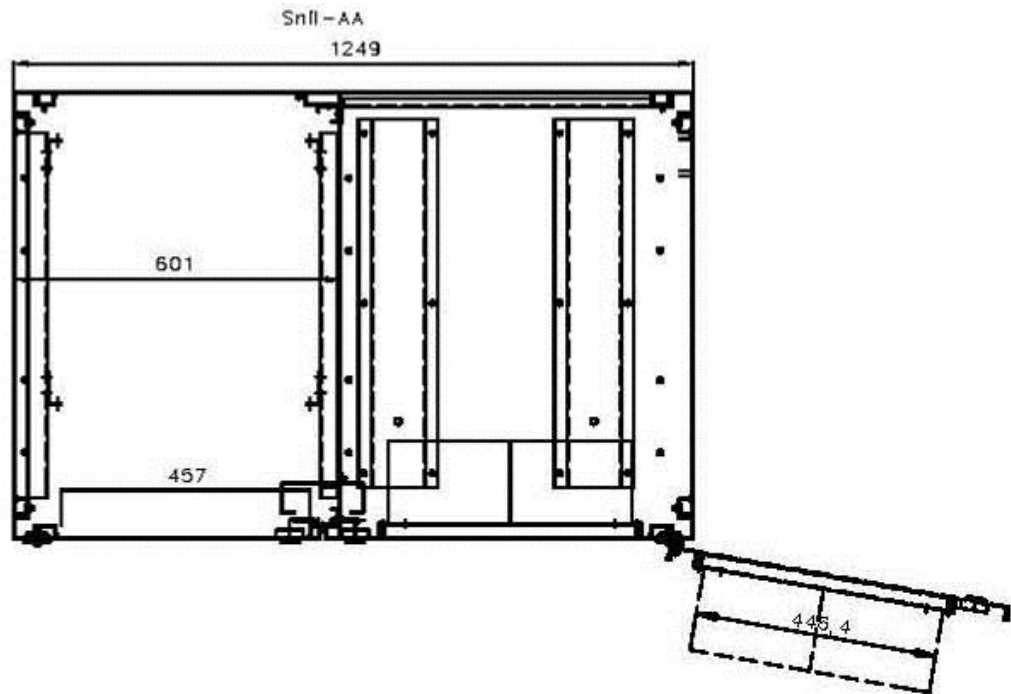
Continued overleaf

5.1 Technical data, MTS4-outdoor enclosure, *continued*

Section view:
Top of enclosure



Section view:
Top of enclosure
with right door
open



5.2 Technical data, MHX 85 heat exchanger

General data

The general technical data on the heat exchanger is shown in the following table:

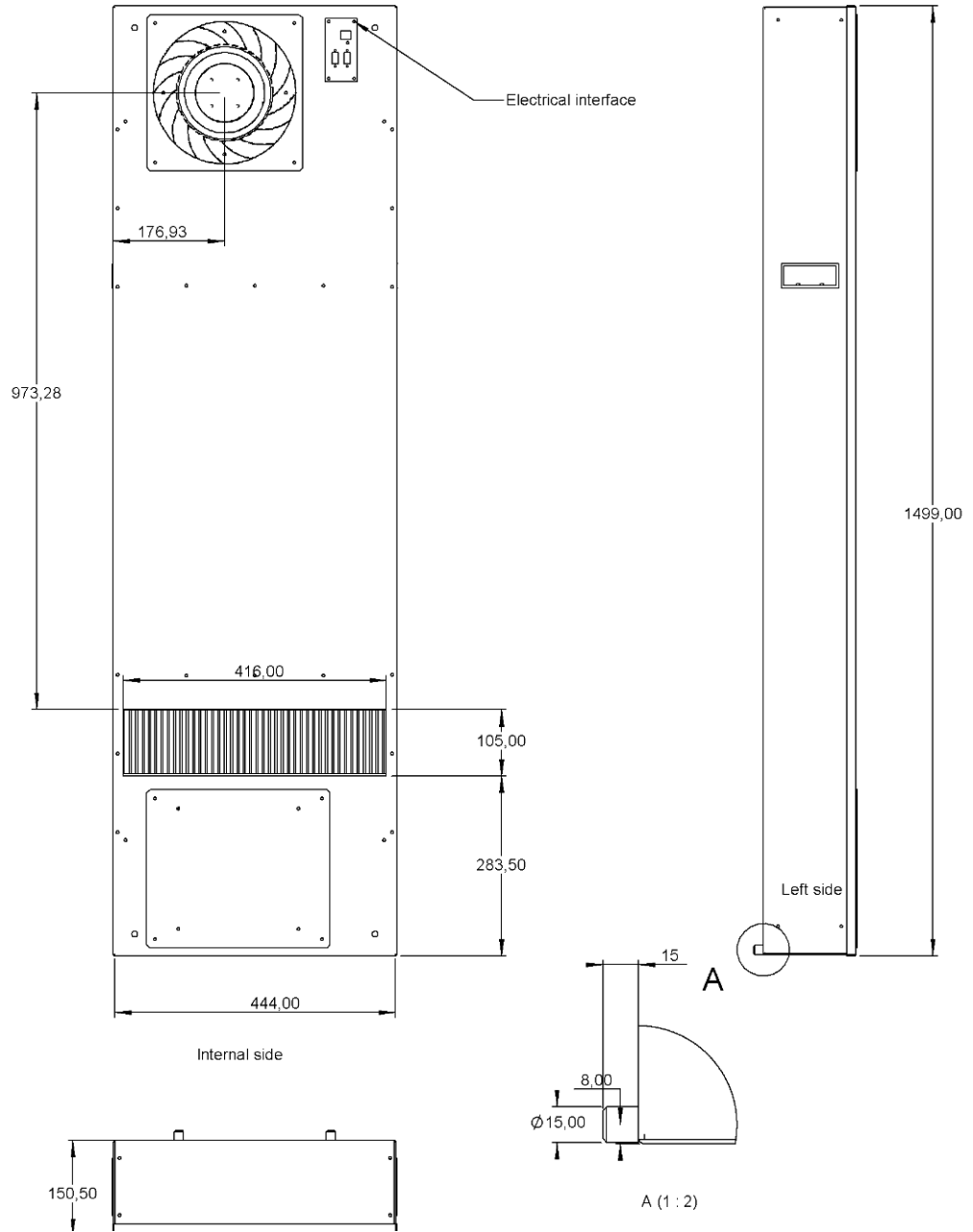
Specification	Designation	Value
Maximum ambient temperature (ETS 300 019-1-4)	°C	40
Minimum ambient temperature (ETS 300 019-1-4)	°C	-30
Max. cabinet return temperature	°C	60
Specific cooling capacity incl. Solar	W/K	85 (max)
Voltage supply (range)	VDC	52 (40-56)
Sound pressure (1m) as stand alone (max power) When mounted in double walled door significant reduction on this can be achieved. Lower max performance will also give lower noise emissions.	dB(A)	68
Air flow internal @ max. cooling, $\eta \sim 60\%$	m ³ /h	400
Air flow external @ max. cooling $\eta \sim 60\%$	m ³ /h	400
Service, recommended preventive maintenance intervals	months	6
Operating range - humidity	%RF	5-99 non condensing environment
Operating range – temperature	°C	÷ 30 – 70
Power supply	V DC	40-60 Nominal 52
Power consumption (48 VDC) @ max. cooling	W	120
Performance	W/K	85
Weight	kg	20
Dimensions (W x D x H)	mm	1500 x 450 x 155
Safety class, mounted on door	IP	55

Continued overleaf

5.2 Technical data, MHX 85 heat exchanger, *continued*

Dimensions

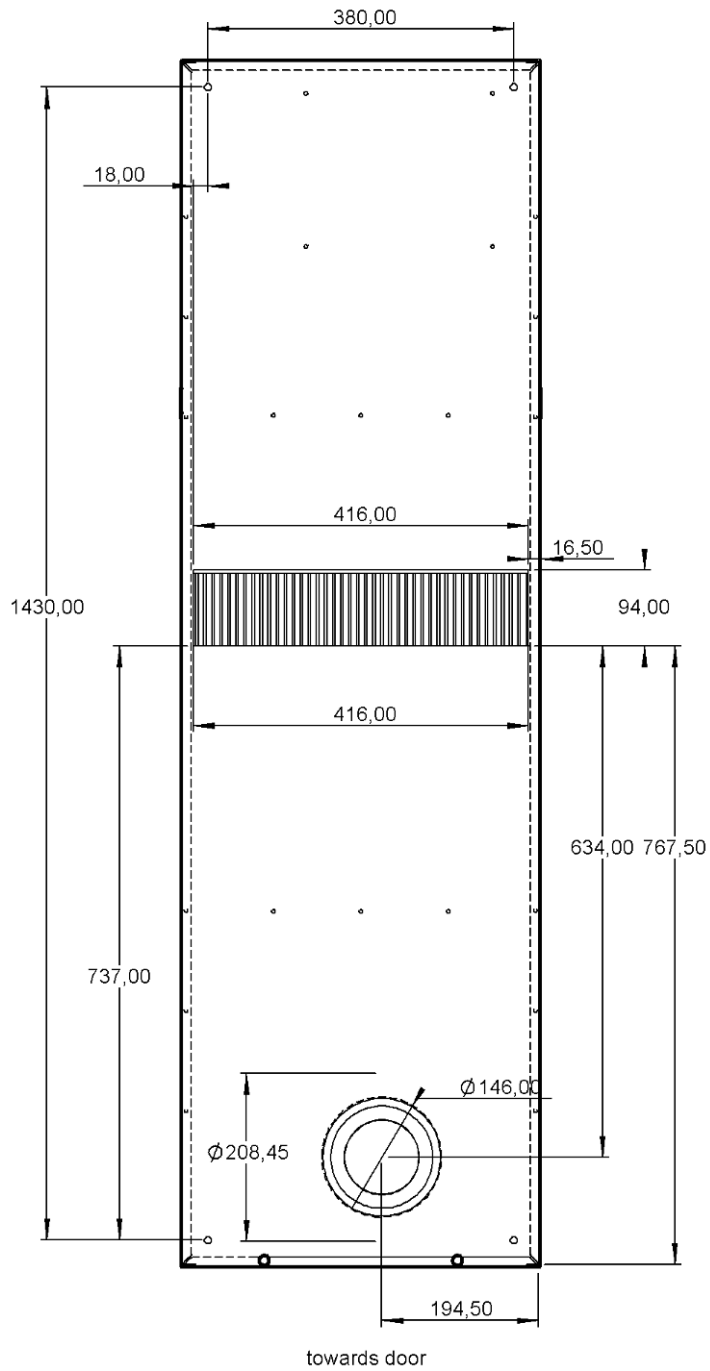
This shows the dimensions of the MHX 85 heat exchanger:



Continued overleaf

5.2 Technical data, MHX 85 heat exchanger, *continued*

Dimensions

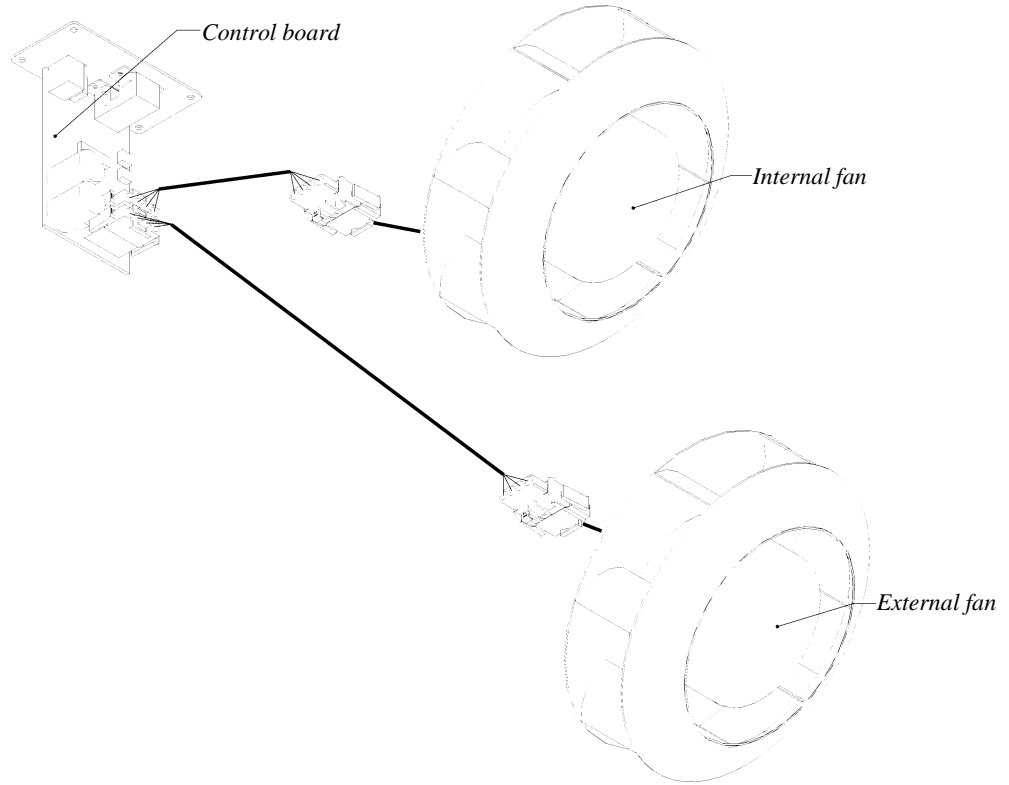


Weight: 28kg

5.3 Wiring diagram, MHX 85 heat exchanger

Diagram

This is the wiring diagram for the MHX 85 heat exchanger:

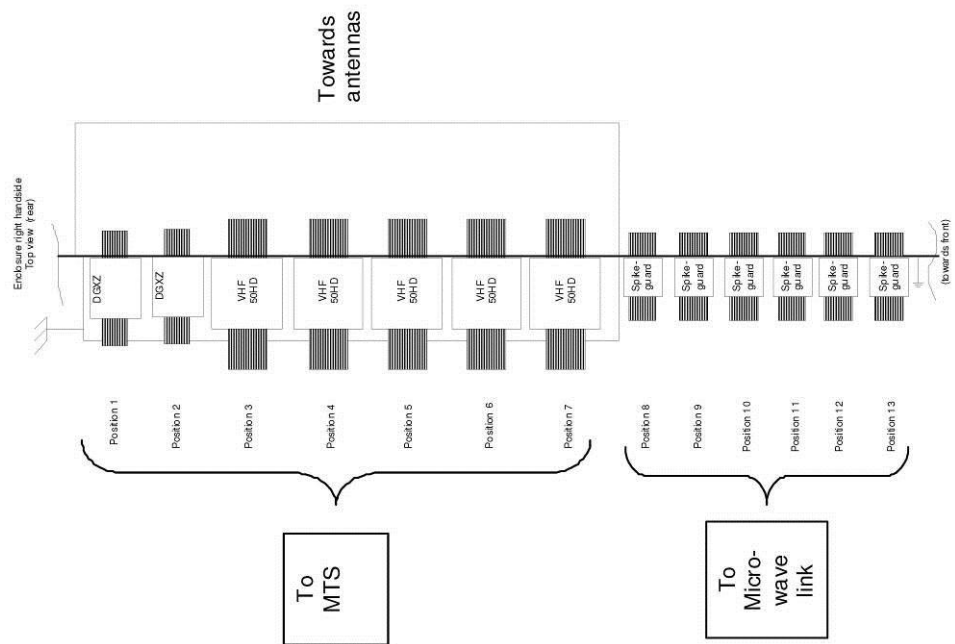


5.4 Wiring diagrams MTS4-outdoor enclosure – power distribution panel

Surge arrester

Overview of MTS4 outdoor enclosure RF surgearrester layout (max. configuration)

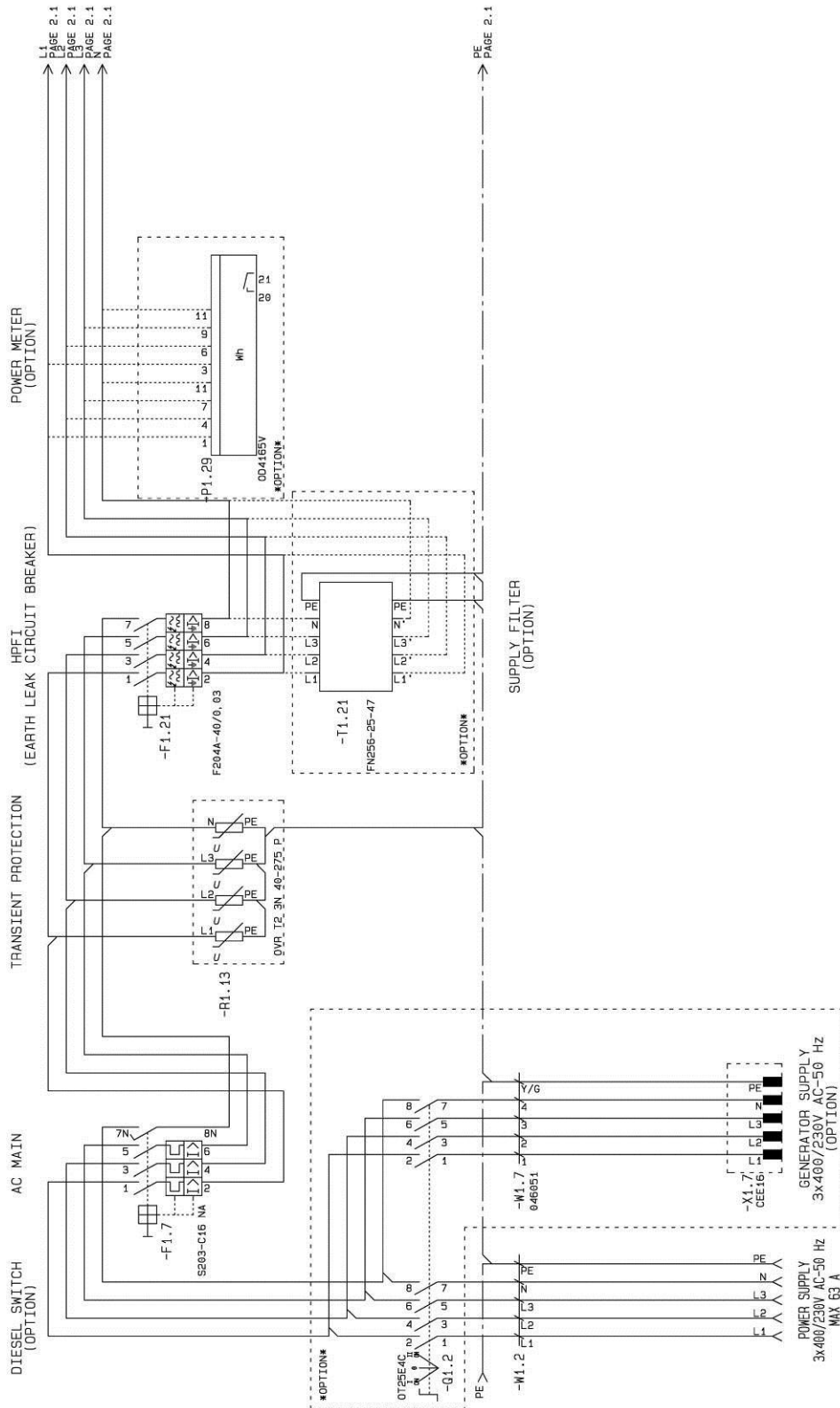
Position	Connector	gender (inside/outside)	Designated use	surge arrester type /internal jumper/	Dantherm Partnumber
1	N	female-female	GPS 1	Polyphaser DGXZ+06NFNF-A/500mm jumper M-M	046392
2	N	female-female	GPS 2	Polyphaser DGXZ+06NFNF-A/500mm jumper M-M	046392
3	7-16	female-female	RF 1	Polyphaser VHF50HD/650mm jumper M-M	046394/
4	7-16	female-female	RF 3	Polyphaser VHF50HD/650mm jumper M-M	046394/
5	7-16	female-female	RF 2	Polyphaser VHF50HD/650mm jumper M-M	046394/
6	7-16	female-female	RF 4	Polyphaser VHF50HD/650mm jumper M-M	046394/
7	7-16	female-female	RF 5	Polyphaser VHF50HD/650mm jumper M-M	046394/
8	N	female-female	Micro-wave link	Polyphaser Spikeguard GT-NFF-AL	046395
9	N	female-female	Micro-wave link	Polyphaser Spikeguard GT-NFF-AL	046395
10	N	female-female	Micro-wave link	Polyphaser Spikeguard GT-NFF-AL	046395
11	N	female-female	Micro-wave link	Polyphaser Spikeguard GT-NFF-AL	046395
12	N	female-female	Micro-wave link	Polyphaser Spikeguard GT-NFF-AL	046395
13	N	female-female	Micro-wave link	Polyphaser Spikeguard GT-NFF-AL	046395



Continued overleaf

5.4 Wiring diagrams MTS4-outdoor enclosure – power distribution panel, *continued*

Diagram
with generator
switch installed
(AC circuit part 1)

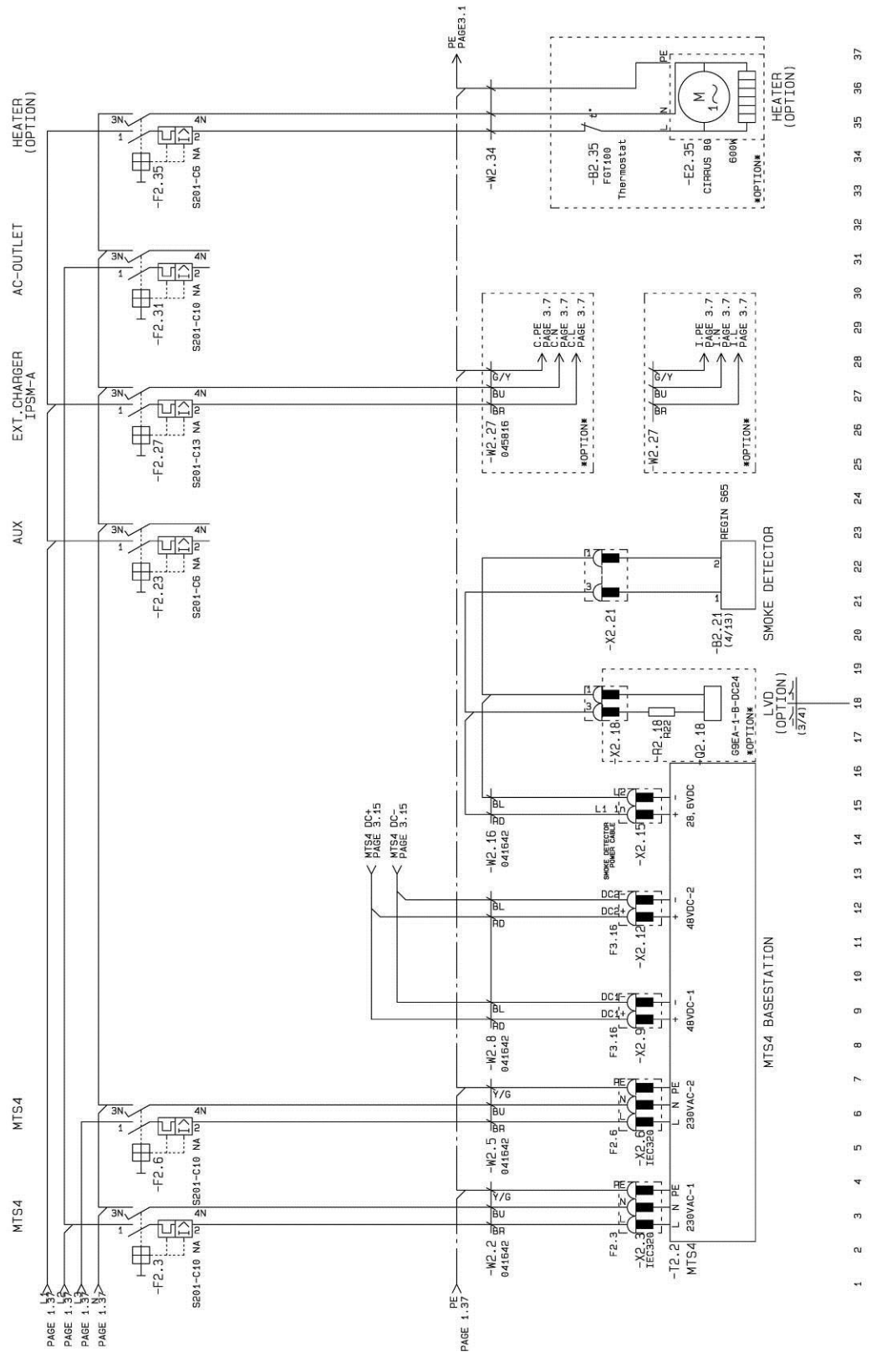


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

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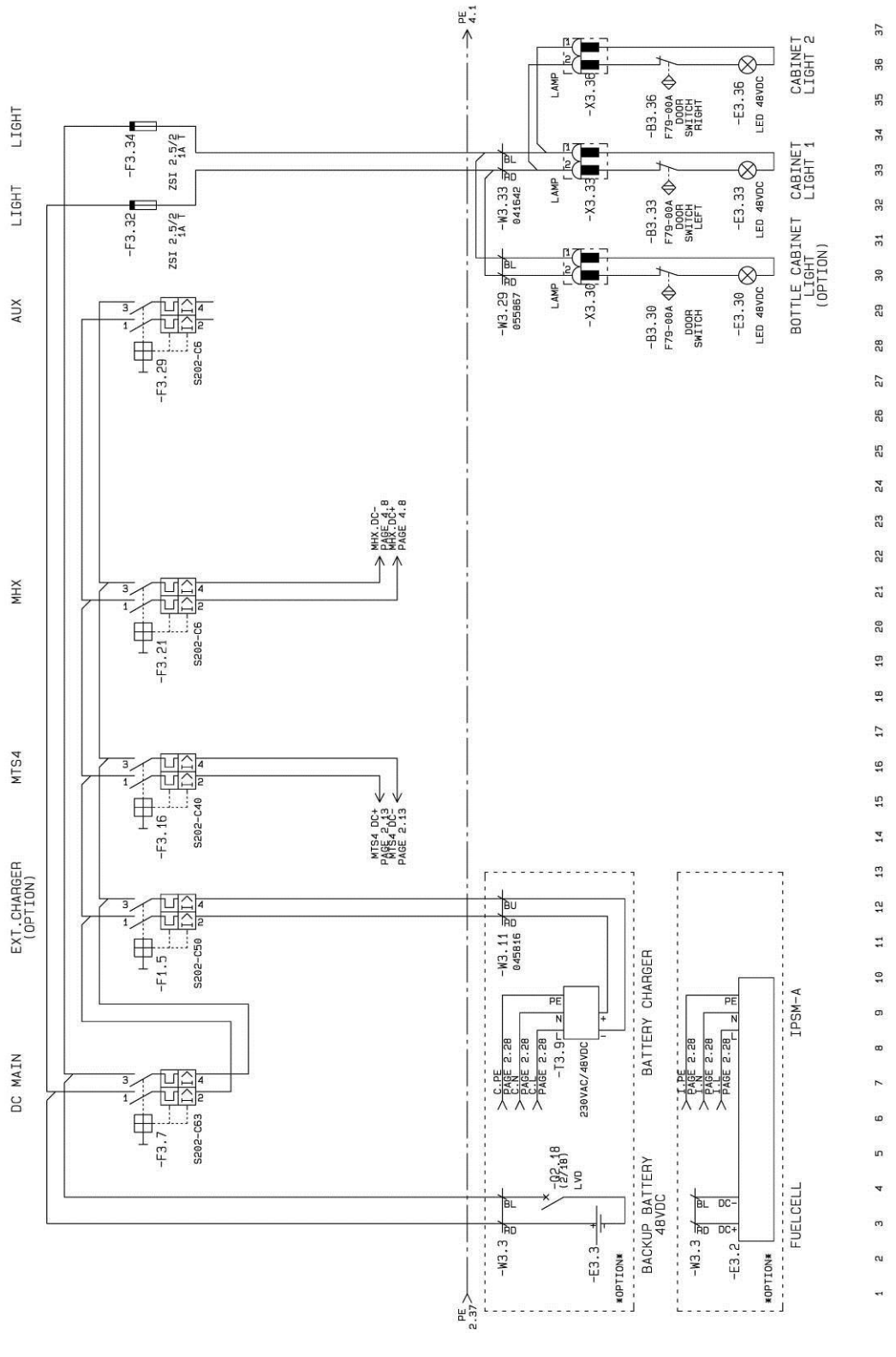
5.4 Wiring diagrams MTS4-outdoor enclosure – power distribution panel, *continued*

Diagram
(AC circuit part 2)



5.4 Wiring diagrams MTS4-outdoor enclosure – power distribution panel, *continued*

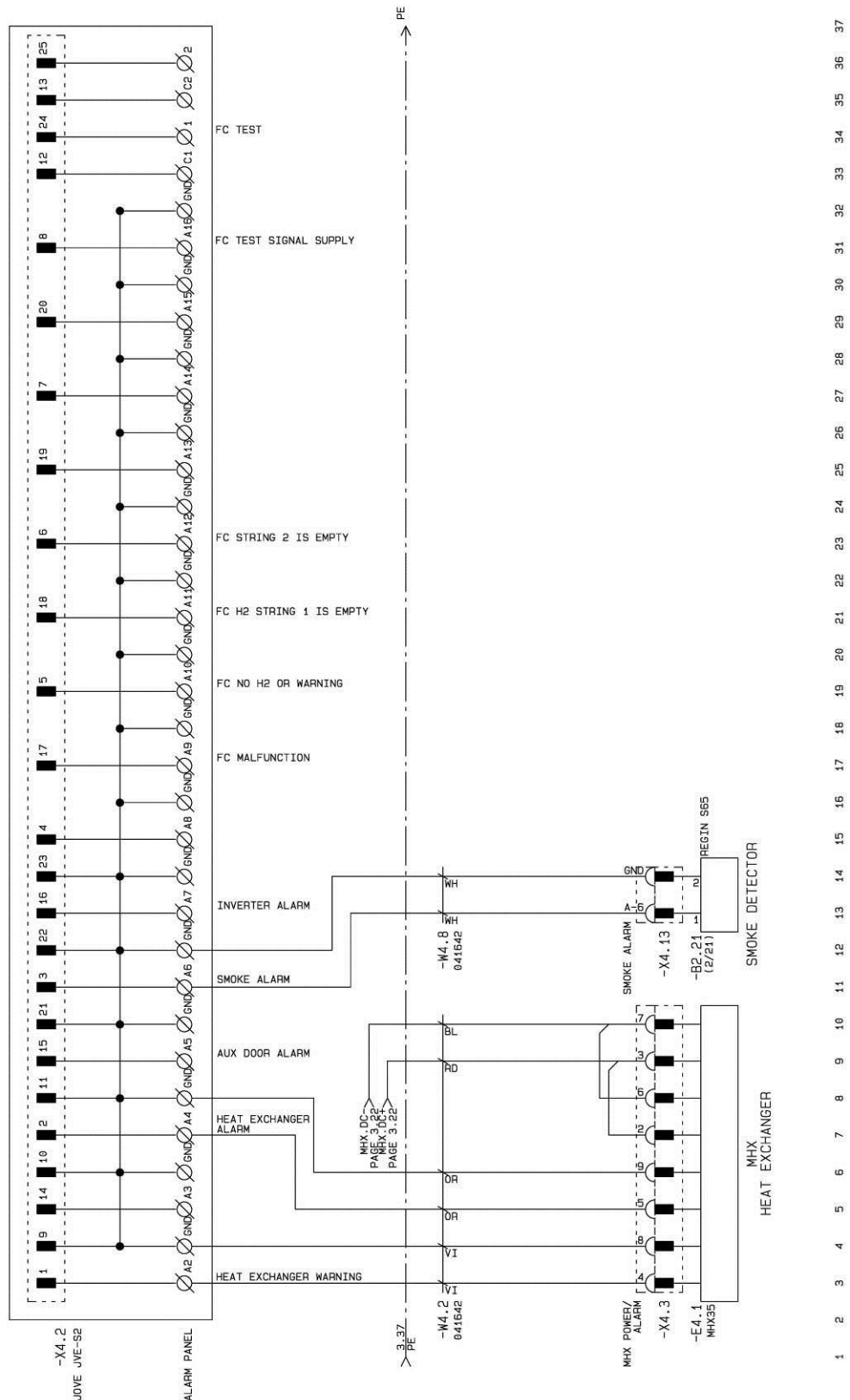
Diagram
(DC circuit part 1)



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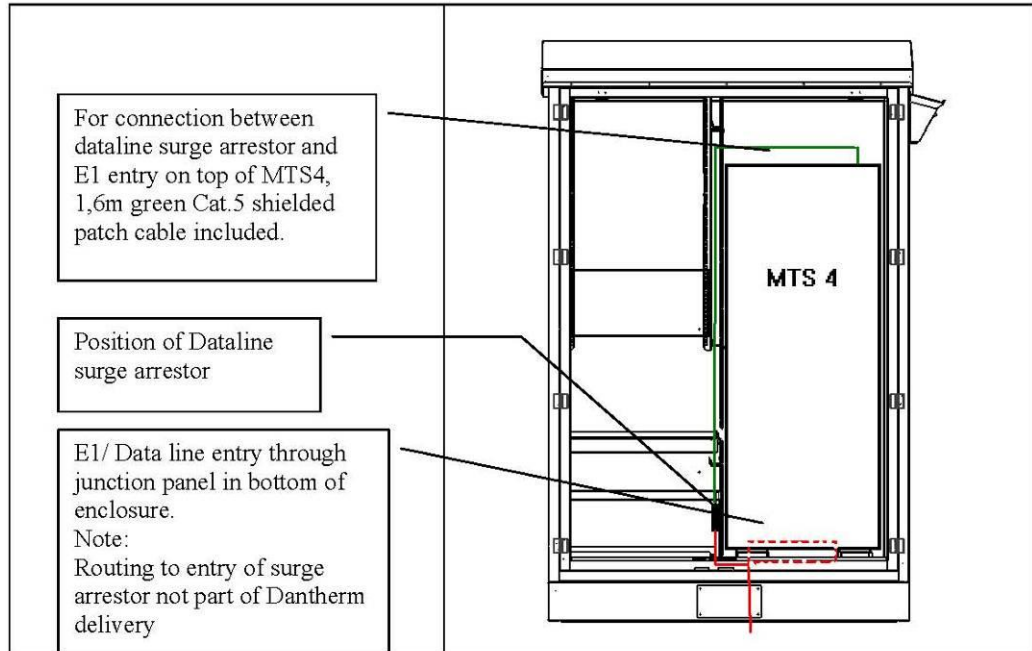
5.4 Wiring diagrams MTS4-outdoor enclosure – power distribution panel, *continued*

Diagram with power meter installed (Variant AC circuit part 1)



5.4 Wiring diagrams MTS4-outdoor enclosure – power distribution panel, *continued*

E1/Dataline Cable routing in Enclosure



Picture 1, Data line surge arrester datasheet

MAXIMUM CHARACTERISTICS

PAIRS PROTECTED:
1/2, 1/5, 3/3, 7/8

PAIRS PROTECTED:
ALL S, L & L-O

TURN ON (910-A):
+1700V TYPICAL 1-A & 1-B

SERIES RESISTANCE:
<math>< 0.02\Omega</math>

TYPICAL CAPACITANCE:
55pF, L-L & L-O

MAX SURGE:
100A: 10/1000 USDC (BELLGORE 1000), L-L & L-O

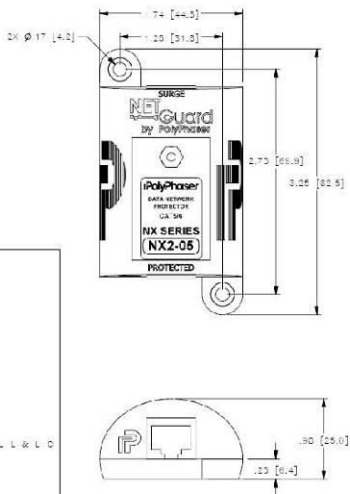

HUMIDITY:
0 TO 100% CONDENSING

TEMPERATURE:
-40°C (-40°F) TO 55°C (131°F) PER

APPLICATIONS:
INDOOR, RJA, STP

TYPICAL WEIGHT:
0.2 lb.

NOTES:
1. GROUND UNIT USING ATTACHED RING TERMINAL TO NEAREST POINT.

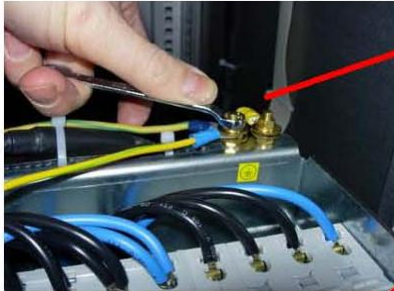
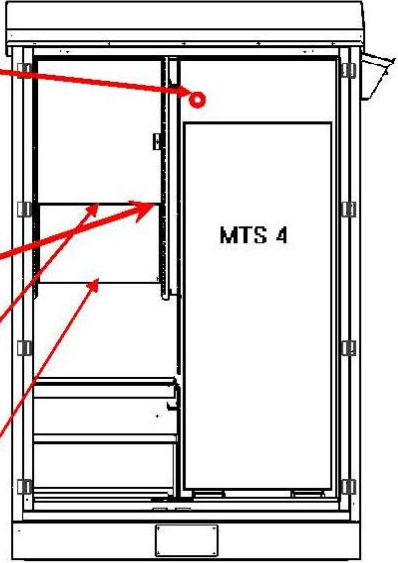

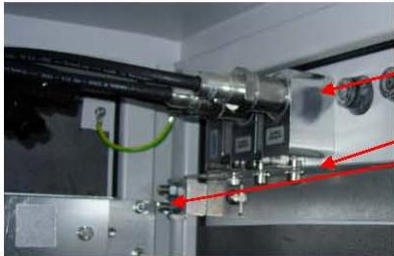



REVISED	R. SMART	04/25/05	PolyPhaser <small>FOR SIGNALS - PROTECTIVE - TELECOMMUNICATIONS - NETWORKS</small> NX2-05 CUSTOMER PRINT	<small>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES SERIALS: 0.15mm (0.006") ASSEMBLY: 0.25mm (0.010") FINISH: 0.05mm (0.002") MATERIAL: 30303 DIN EN 17063 POLYPHASER CORPORATION 10000 WILSON AVENUE MILWAUKEE, WI 53222-3300 USA TEL: 414.224.4400 WWW.POLYPHASER.COM</small>
REVISED	R. DUNNIG	05/24/05		
REVISED	L. CHONG	05/24/05		
REVISED	L. JACKLES	12/13/05		
REVISED	S. DOTTER	05/12/05		

Continued overleaf

5.4 Wiring diagrams MTS4-outdoor enclosure – power distribution panel, *continued*

Grounding points of enclosure

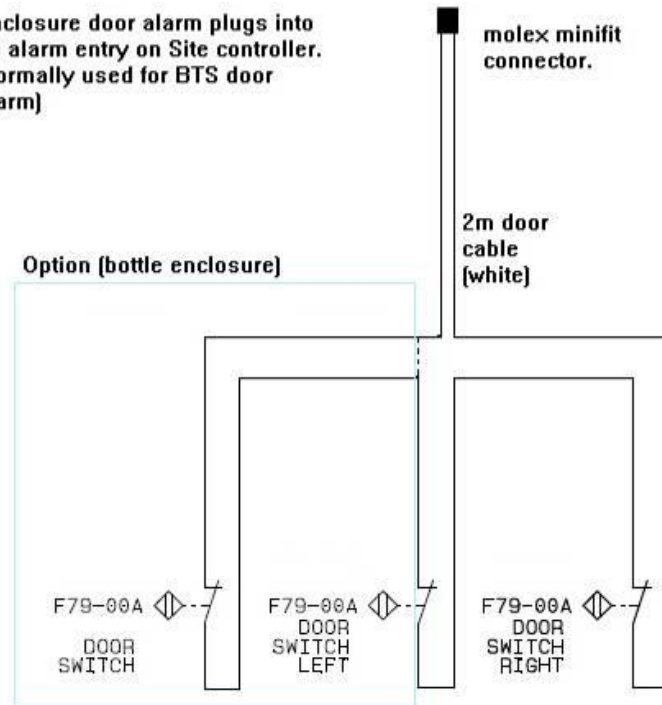
<p>MTS 4 BTS has separate M8 grounding point just close to the grounding point on top of the BTS on the junction panel.</p> <p>Brass studs with serrated washers and nut on top right of Powerdistribution board for ringterminal ground straps. M10 spanner for tightening (spare one on lower edge of board.</p>  <p>Right stud used for primary ground the power</p>	
	<p>8 of ground terminals (with locking hole)for 6,3mm shoes.On top edge of power distribution panel (4 spare)</p> <p>Similar 8 off terminals available og lower egde of power distribution panel.</p>
	<p>The antenna and gps surgearrestors are grounded through the right panel and shelf.</p> <p>This is connected to the ground ring system</p> <p>To be connected to the 4 off ground nuts located In each lower corner of the enclosure.</p>
<p>Doors and panels connected to enclosure frame with groundstraps</p>	

Continued overleaf

5.4 Wiring diagrams MTS4-outdoor enclosure – power distribution panel, *continued*

Door alarm schematics

Enclosure door alarm plugs into 3b alarm entry on Site controller. (normally used for BTS door alarm)



5.5 References for the wiring diagrams

Information

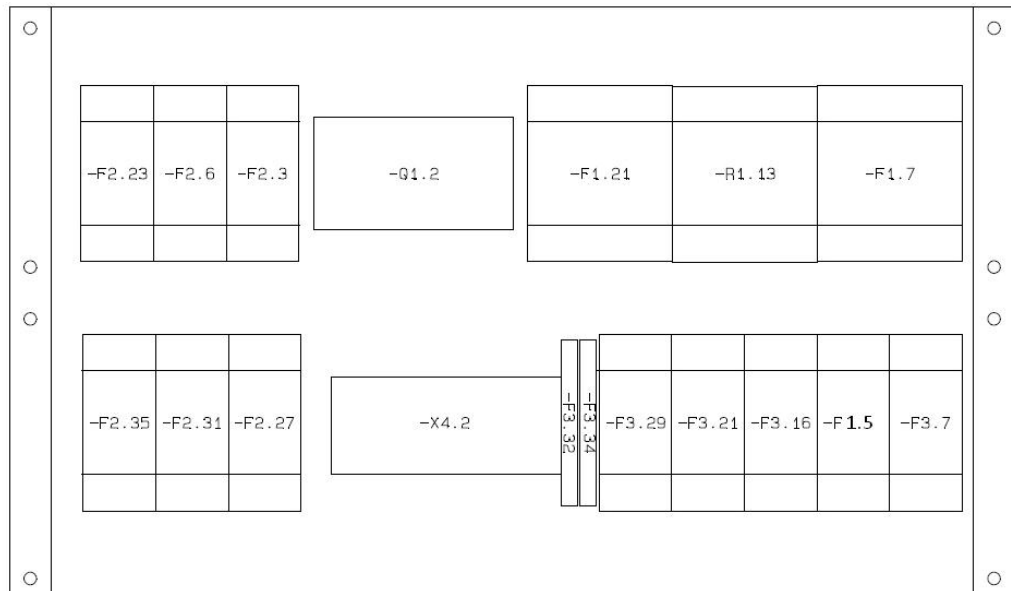
For further details on MTS4 wiring please see the Motorola's *MTS2 and MTS4 Configuration, installation and service manual*.

References, wiring diagrams

The table shows references that corresponds to the wiring diagrams. References to sparepart numbers on sparepart list page 44:

Reference	Type	Reference	Type
-F1.7	S203-C16 NA	-F3.16	S202-C40
-F1.21	F204A-40/0,03	-F3.21	S202-C6
-F2.3	S201-C10 NA	-F3.29	S202-C6
-F2.6	S201-C10 NA	-F3.32	ZSI 2.5/2
F2.23	S201-C6 NA	-F3.34	ZSI 2.5/2
F2.27	S201-C13 NA	-Q1.2	OT25E4C(old) ULT25/4E(new) (generator switch option)
-F2.31	S201-C10 NA	-Q2.19	G9EA-1-B-DC24
-F2.35	S201-C6 NA	-R1.13	OVR T2 3N 40-275 P
-F3.7	S202-C63	-R2.19	R22
-F1.5	S202-C50	-X4.2	MOT spec.
-T1.28	FN256-25-47		

Panel layout



Continued overleaf

5.5 References for the wiring diagrams, *continued*

Wire colors

This shows the colors of the wires specified in the wiring diagrams

Electrical Specifications

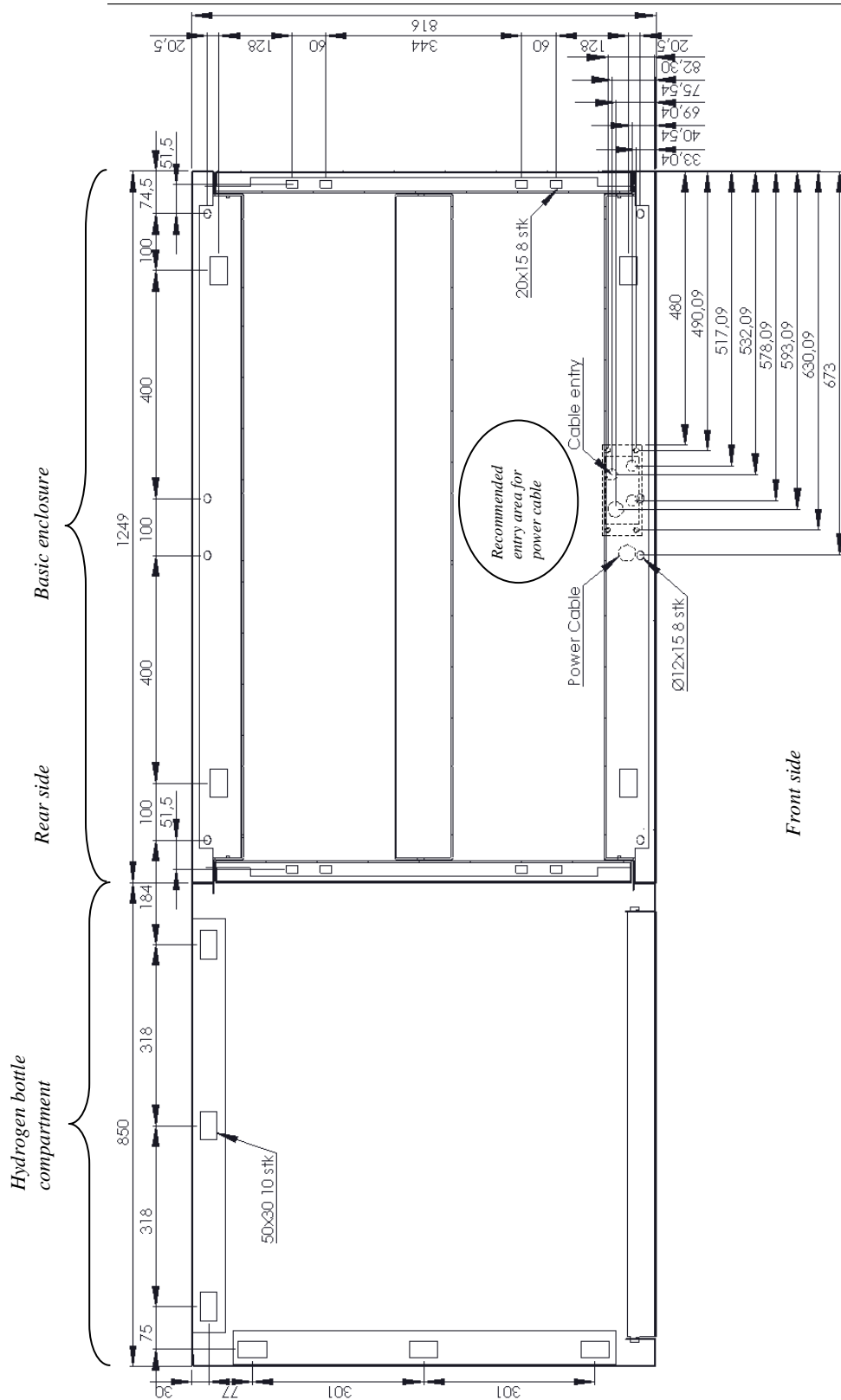
Name:	Power Distribution Panel
Type :	MTS4
Dantherm No.:	041 641
Power supply:	3 x 400/230V AC-50 Hz
Current:	Max 13A
Effect:	Max 4,4 kW

Wire colors - Shortening

BL	Black
BR	Brown
BU	Blue
G/Y	Green/Yellow
OR	Orange
RD	Red
WH	White

Appendix A - Mounting template

NOTE: Reserve extra space if hydrogen bottle compartment may be added later



Appendix B - MTS4-outdoor enclosure check list

Introduction

This section provides a check list for installation, service and maintenance of the outdoor enclosure.

Check list

Follow this check list for installation, service and maintenance of the outdoor enclosure:

	Check points	Action
1	Has the enclosure been properly secured to the ground, on a solid and levelled surface	Check
2	Are all gaskets in place and still undamaged	Check
3	Are door handles working properly, closing function and door alignment	Test
4	Door stop function (lock and release all doors)	Test
5	Lubricate rubber gaskets using a silicone based stick	Preventive maintenance
6	Any transport transport/installation damages	Check, repair any damage on paint.
7	Check drain holes in bottom of doors and side panels	Check
8	4 drains in bottom – one in each corner, is there a filter in the hole	Check
9	Enclosure heater is switched on before leaving the site. Check thermostat set point default setting 20°C	Check