# Base Load Power Hub (BLPH)

## AC and DC UPS system
## HEAT DISSIPATION

Document Number : 1724000372-EL-CA-00013

ROSETTI MARINO

| | |
|---|---|
| 1 | NO COMMENTS - APPROVED - WORK MAY PROCEED |
| 2 | MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED |
| 3 | MAJOR COMMENTS – REJECTED – DO NOT PROCEED |
| 4 | APPROVAL NOT REQUIRED |

*NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.*

| Sign | Date |
|---|---|
|  | 10/04/2024 |

Document Class : 3

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| 02 | 09/04/2024 | Issue for Information (IFI) | DA | DA | AD |
| 01 | 04/04/2024 | Issue for Information (IFI) | DA | DA | AD |
| 00 | 25/03/2024 | Issue for Information (IFI) | DA | DA | AD |
| Rev. | Date | Description | Prepared | Reviewed | Approved |

3W power | a company of AEG POWER SOLUTIONS

*This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy*

## Revision / Change Log

| Rev. | Description |
|---|---|
| 00 | Issue for Information (IFI) |
| 01 | Issue for Information (IFI) |
| 02 | Issue for Information (IFI) |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

## HOLDS LIST

| No. | Description |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |

*This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy*

# Table of contents


Description Sheet

COVER ..... 1

REVISION/CHANGE LOG ..... 2

HOLD LIST..... ..... 2

TABLE OF CONTENTS ..... 3

HEAT LOSS CALCULATION ..... 4

GENERAL ..... 4

CALCULATIONS ..... 5



*This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy*

# HEAT LOSS CALCULATION

## GENERAL

The heat loss calculation has been made considering the real UPS system load (defined as "normal running" load in the updated document AC UPS Load rev1) and are referred to the worst working condition (load shared between the two UPSs belonging to the redundant system). The heat loss of the By-Pass Transformer is the typical value considering the normal no-load condition. The heat loss of the battery is referred to the worst case (discharging).

| TAG number | Description | Typical estimated heat losses |
|---|---|---|
| UP-200F3 | AC UPS Protect 8.33 40kVA | 3.878 W |
| 35 kVA | AC UPS By-Pass Transformer 35kVA | 250 W |
| | AC UPS Battery MCCB box 200A | 120 W |
| | AC UPS Battery 18 x FLG 12-150 | 1.755 W |

| TAG number | Description | Typical estimated heat losses |
|---|---|---|
| UP-200F4 | AC UPS Protect 8.33 20kVA | 2.645 W |
| 15 kVA | AC UPS By-Pass Transformer 15kVA | 120 W |
| | AC UPS Battery MCCB box 200A | 120 W |
| | AC UPS Battery 3 x 18 x FTG 12-120 | 985 W |

| TAG number | Description | Typical estimated heat losses |
|---|---|---|
| UP-200F1 | DC UPS Protect TPRe 110V 100A | 1.509 W |
| 10 kW | DC UPS Battery MCCB box 125A | 75 W |
| | DC UPS Battery 10 x FLG 12-150 | 339 W |

The battery typical estimated heat losses, shown in the present document, have been calculated in the worst case.

## CALCULATIONS

AC UPS 35KVA UP-200F3 system

| | | | | |
|---|---|---|---|---|
| a | Nominal load power | 16.720 | W | |
| b | UPS efficiency AC/AC | 83,8 | % | |
| c | UPS input power | 19.952 | W | a / b |
| d | Calculated heat dissipation | 3.232 | W | c - a |
| e | Calculation margin | 20 | % | |
| | Heat dissipation | 3.878 | W | d x e |

AC UPS 15KVA UP-200E4 system

| | | | | |
|---|---|---|---|---|
| a | Nominal load power | 3.120 | W | |
| b | UPS efficiency AC/AC | 58,6 | % | |
| c | UPS input power | 5.324 | W | a / b |
| d | Calculated heat dissipation | 2.204 | W | c - a |
| e | Calculation margin | 20 | % | |
| | Heat dissipation | 2.645 | W | d x e |

BATTERY AC UPS 35KVA UP-200F3 system

| | | | | |
|---|---|---|---|---|
| a | Nominal load power | 28.000 | W | |
| b | UPS efficiency DC/AC | 91,7 | % | |
| c | Battery load during discharging | 30.534 | W | a / b |
| d | Battery current during discharging | 141,4 | A | c / f / 2 (Pb) |
| e | Battery string number | 1 | | |
| f | Battery cell number per string | 108 | | |
| g | Battery internal resistance per cell | 0,65 | mΩ | |
| h | Calculated heat dissipation | 1.404 | W | g x (d / e)$^2$ x f x e |
| i | Calculation margin | 25 | % | |
| | Heat dissipation | 1.755 | W | h x i |

BATTERY AC UPS 15KVA UP-200F4 system

| | | | | |
|---|---|---|---|---|
| a | Nominal load power | 12.000 | W | |
| b | UPS efficiency DC/AC | 91,1 | % | |
| c | Battery load during discharging | 13.172 | W | a / b |
| d | Battery current during discharging | 122,0 | A | c / f / 2 (Pb) |
| e | Battery string number | 3 | | |
| f | Battery cell number per string | 108 | | |
| g | Battery internal resistance per cell | 1,47 | mΩ | |
| h | Calculated heat dissipation | 788 | W | g x (d / e)$^2$ x f x e |
| i | Calculation margin | 25 | % | |
| | Heat dissipation | 985 | W | h x i |

BATTERY DC UPS 10KW UP-200F1 system

| | | | | |
|---|---|---|---|---|
| a | Nominal load power | 10.000 | W | |
| b | UPS efficiency DC/AC | - | % | |
| c | Battery load during discharging | 10.000 | W | a / b |
| d | Battery current during discharging | 83,3 | A | c / f / 2 (Pb) |
| e | Battery string number | 1 | | |
| f | Battery cell number per string | 60 | | |
| g | Battery internal resistance per cell | 0,65 | mΩ | |
| h | Calculated heat dissipation | 271 | W | g x (d / e)$^2$ x f x e |
| i | Calculation margin | 25 | % | |
| | Heat dissipation | 339 | W | h x i |