Silcon DP300E
208V/480V 10-80kVA
Installation Guide

www.apcc.com

Due to continuous product development information given in this guide is subject to change without notice.

7OY0002 US rev. 04

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS

This guide contains important instructions for your Silcon DP300E UPS that should be followed during installation and maintenance of the UPS and batteries.

The installation and use of this product must comply with all national, federal, state, municipal or local codes that apply. If you need help, please call APC's toll free technical support at: 1-877-287-7835 (1-877-2UPS-TEK).

WARNING!

UPS units contain hazardous AC and DC voltages. A qualified electrician must install the UPS, AC line service, and external batteries according to local and national codes and must be familiar with batteries and battery installation.

Before installing, maintaining, or servicing the UPS, shut off the UPS and disconnect all sources of AC and DC power.

This UPS system has no built-in disconnecting devices for the external AC and DC input power sources. Disconnecting devices must be provided as external parts in connection with the installation!

The installer must provide each external disconnecting device for this UPS system with labels having the following wording:

"Isolate the Uninterruptible Power Supply (UPS) as instructed in this guide before working on the circuit".

Whenever AC and/or DC voltage is applied, there may be AC voltage at the UPS output; this is true because the UPS can supply output power from mains or from its batteries. To avoid equipment damage or personal injury, always assume that there may be voltage at the UPS output.

This system is equipped with an auto-start function. If activated the system may start without warning. Please refer to chapter 6: "Programming parameters" in this guide to ensure de-activation.

TEST BEFORE TOUCHING!

To reduce the risk of fire or electric shock, install the UPS and external batteries in a temperature and humidity controlled indoor area, free of conductive contaminants.

UPS batteries are high current sources. Shorting battery terminals or DC terminal strips can cause severe arcing, equipment damage and injury. A short circuit can cause a battery to explode. Always wear protective clothing and eye protection and use insulated tools when working near batteries.

This unit contains components that are sensitive to electrostatic discharge (ESD). If you do not follow proper ESD procedures, you may cause severe damage to electronic components.

Contents

Introduction – Unpacking

1.0 Introduction

The information given in this installation guide is of general nature for the local authorized electrical installer. For the installation, please refer to national and local electrical codes.

2.0 Unpacking

WARNING!
The UPS and related equipment are very heavy. To prevent personal injury or equipment damage, use extreme care when handling and transporting the UPS cabinet and related equipment.

1. Unpack the system by removing the screws on the top and bottom part of the packaging side plates and lift up the side plates as a whole.
2. Check that the type sign placed inside on the front door corresponds to the ordered system, especially with respect to input / output voltages.
3. To simplify later identification of the installed system – please transfer the data from the type sign to the below blank copy.
4. Transport the system to the installation site by lifting underneath by means of a fork lift.

WARNING!
Do never lift or transport the system without the internal front cover plate mounted and fastened with screws.

Copy of type sign (without battery):

APC
www.apcc.com

MADE IN DENMARK

TYPE :	
S.No. :	
WEIGHT :	lb
MANUFACT.: WEEK	YEAR

INPUT :

OUTPUT :

BATTERY SUPPLY: A DC V DC

Copy of type sign (with battery):

APC
www.apcc.com

MADE IN DENMARK

TYPE :	
S.No. :	
WEIGHT :	lb
MANUFACT.: WEEK	YEAR

REPLACEMENT OF BATTERIES

	MONTH	YEAR
INSTALLED		
1. REPLACEMENT		
2. REPLACEMENT		

INPUT :

OUTPUT :

STORED ENERGY TIME : min.

TYPE OF BATTERIES : V/ Ah
STANDARD LONG LIFE
No. OF BATTERIES :
NOMINAL BATTERY VOLTAGE : V DC
NOMINAL BATTERY CURRENT : A
NOMINAL BATTERY CAPACITY : Ah

REPLACE BATTERIES EVERY 3 - 5 YEARS FOR STANDARD BATTERIES AND 6 - 10 YEARS FOR LONG LIFE BATTERIES. RECORD THE DATE OF REPLACEMENT.

3.0 Placing

3.1 Requirements on the installation site

The system is designed with all parts accessible from front or top, and cable entries from bottom. The system can be placed close to walls, only free space for front door opening has to be ensured.
Sufficient cooling and service clearance have to be ensured by a free space of min. 3 feet above and in front of the system.
Avoid placing the system in direct sunlight.

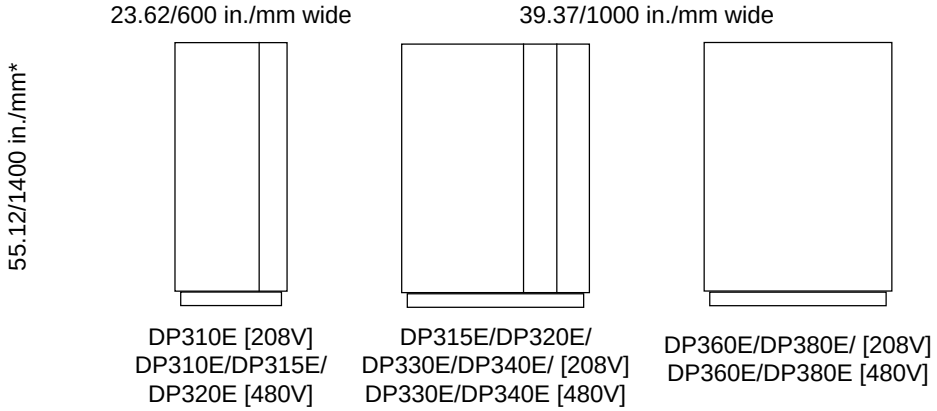
3.2 Dimensions

3.2.1 Dimensions Silcon DP310E-DP380E

Cubicle Dimensions HxWxD - 55.12/1400* x W x 31.50/800 [in./mm].
W [in./mm] as in below table.

	Built-in Batteries		For External Batteries
System	W:23.62/600	W:39.37/1000	W:39.37/1000
DP310E/208V	2 x 32 x 7Ah		
DP310E/480V	1 x 64 x 7Ah		
DP315E/208V		4 x 32 x 7Ah	
DP315E/480V	1 x 64 x 7Ah		
DP320E/208V		4 x 32 x 7Ah	
DP320E/480V	1 x 64 x 7Ah		
DP330E/208V		4 x 32 x 7Ah	
DP330E/480V		2 x 64 x 7Ah	
DP340E/208V		4 x 32 x 7Ah	
DP340E/480V		2 x 64 x 7Ah	
DP360E/208V*			X
DP360E/480V			X
DP380E/208V*			X
DP380E/480V			X

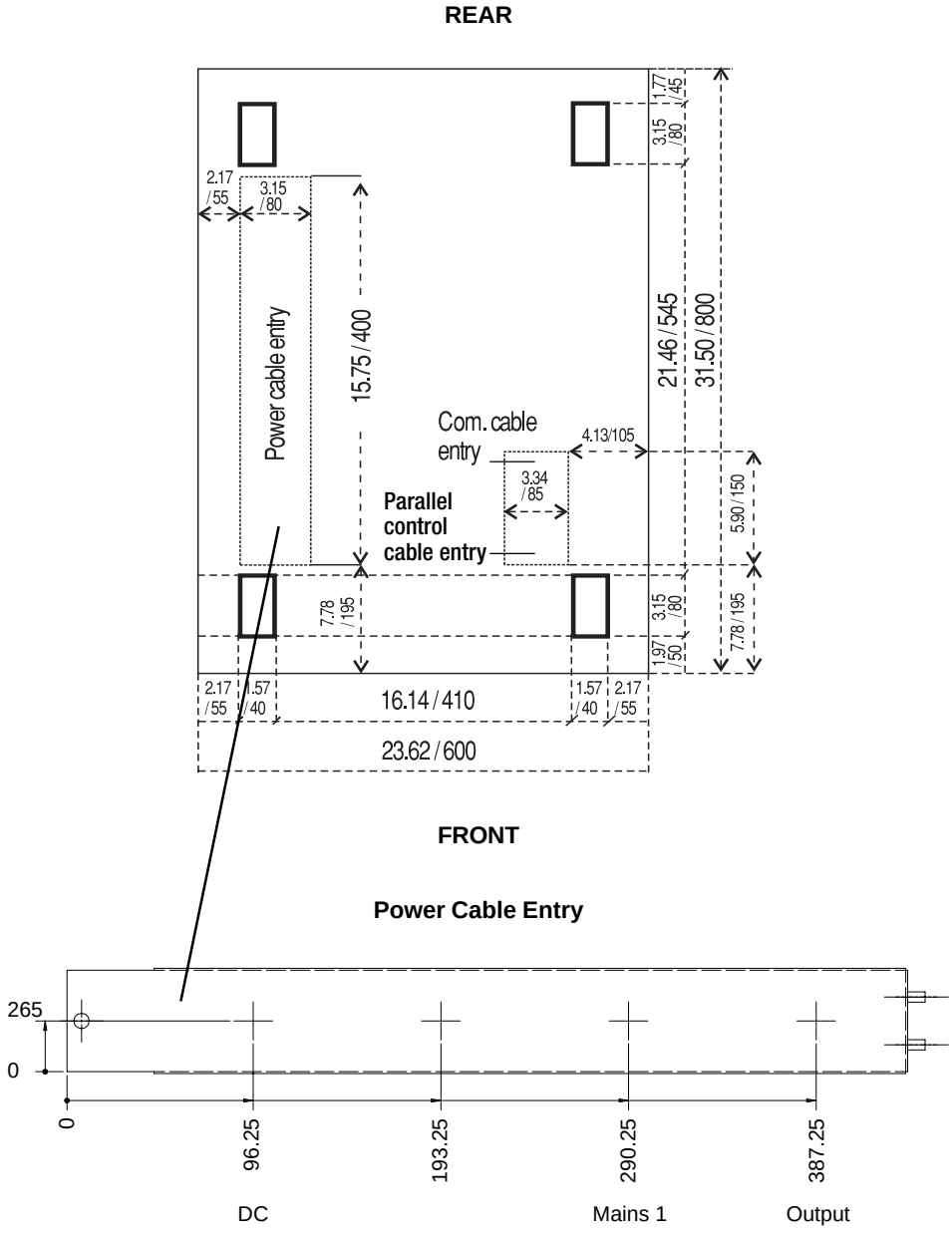
Cubicles:



* DP360E/DP380E [208V], H = 59.06/1500 in./mm.

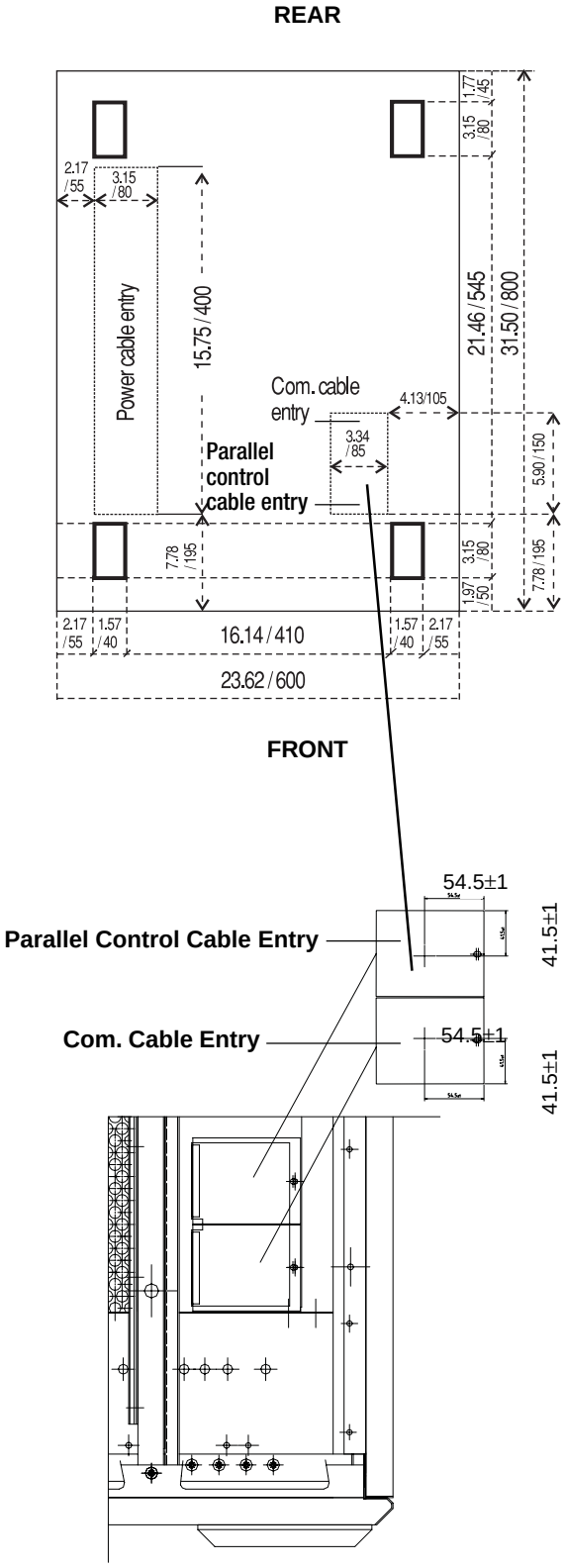
3.3 Foot prints

3.3.1 23.62/600 in./mm cubicle
DP310E [208/480V] - DP315E [480V] - DP320E [480V]

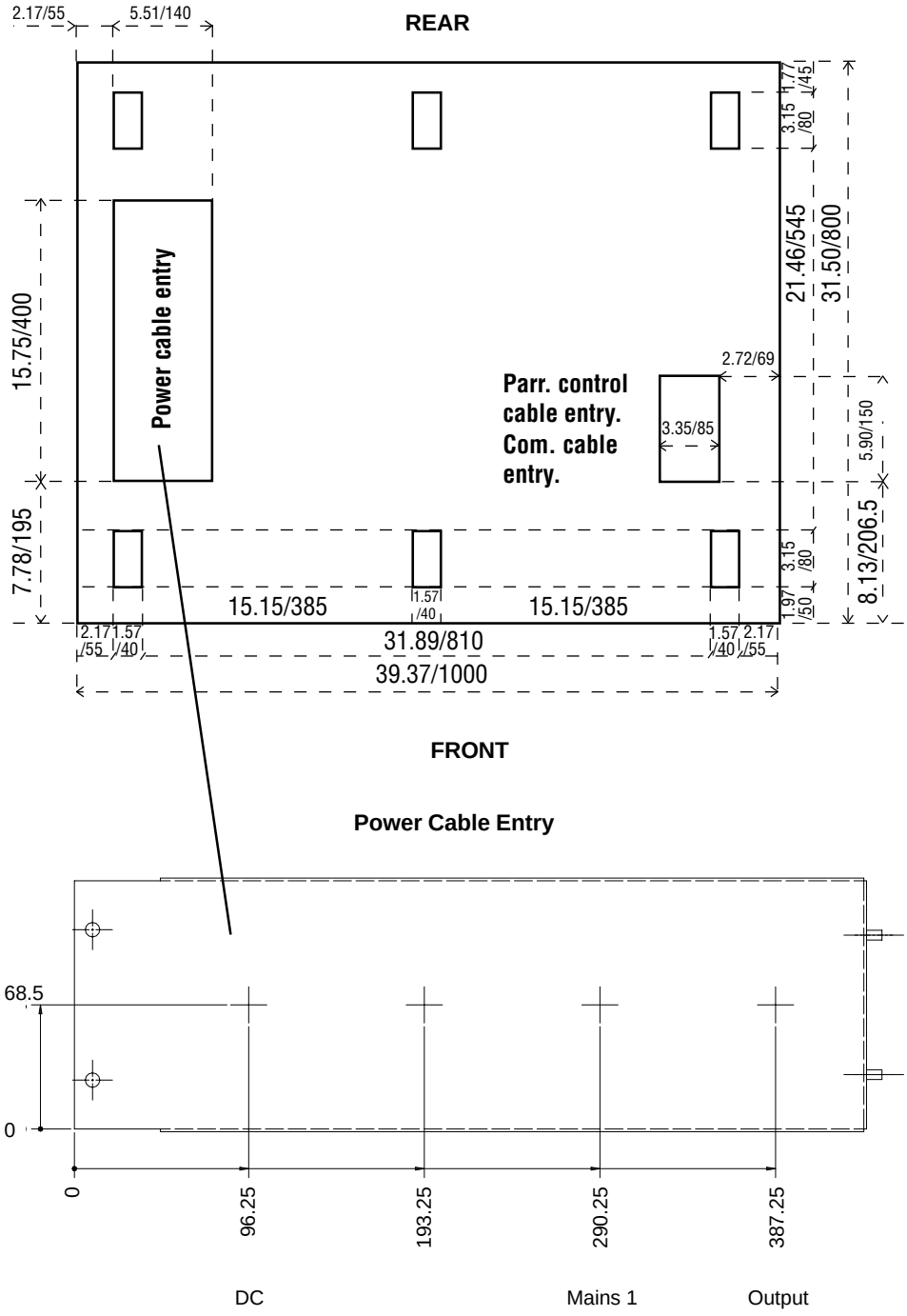


Recommended cable routing.

Placing

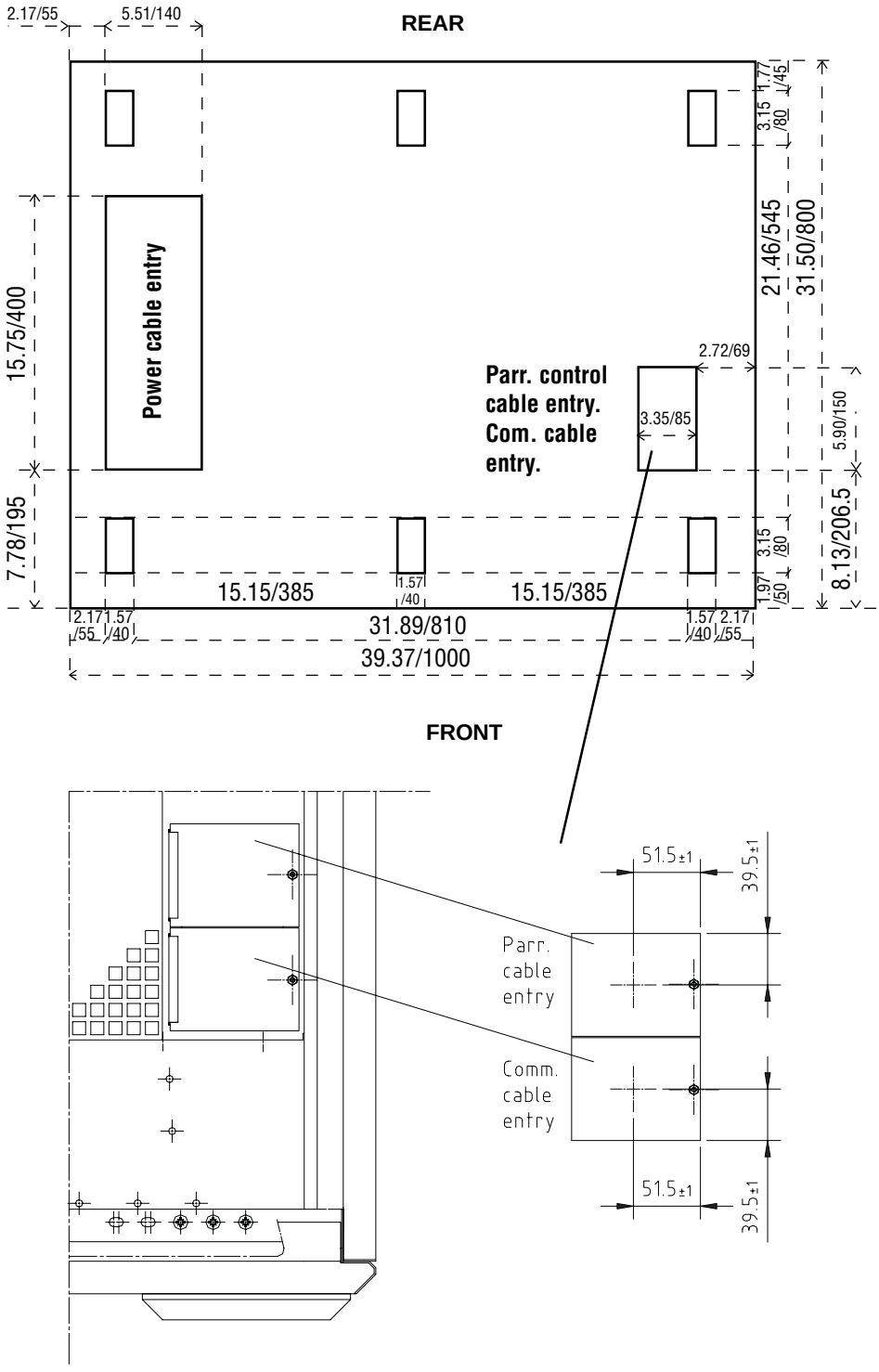

REAR
2.17 / 55
3.15 / 80
Power cable entry
15.75 / 400
21.46 / 545
31.50 / 800
1.77 / 45
3.15 / 80
Com. cable entry
4.13/105
3.34 / 85
Parallel control cable entry
5.90 / 150
7.78 / 195
3.15 / 80
7.78 / 195
1.97 / 50
2.17 / 55
1.57 / 40
16.14 / 410
1.57 / 40
2.17 / 55
23.62 / 600
FRONT
54.5±1
Parallel Control Cable Entry
41.5±1
Com. Cable Entry
54.5±1
41.5±1

3.3.2 39.37/1000 in./mm cubicle
DP315E [208V] - DP320E [208V] - DP330E [208V/480V] - DP340E [208V/480V] - DP360E [480V] - DP380E [480V]

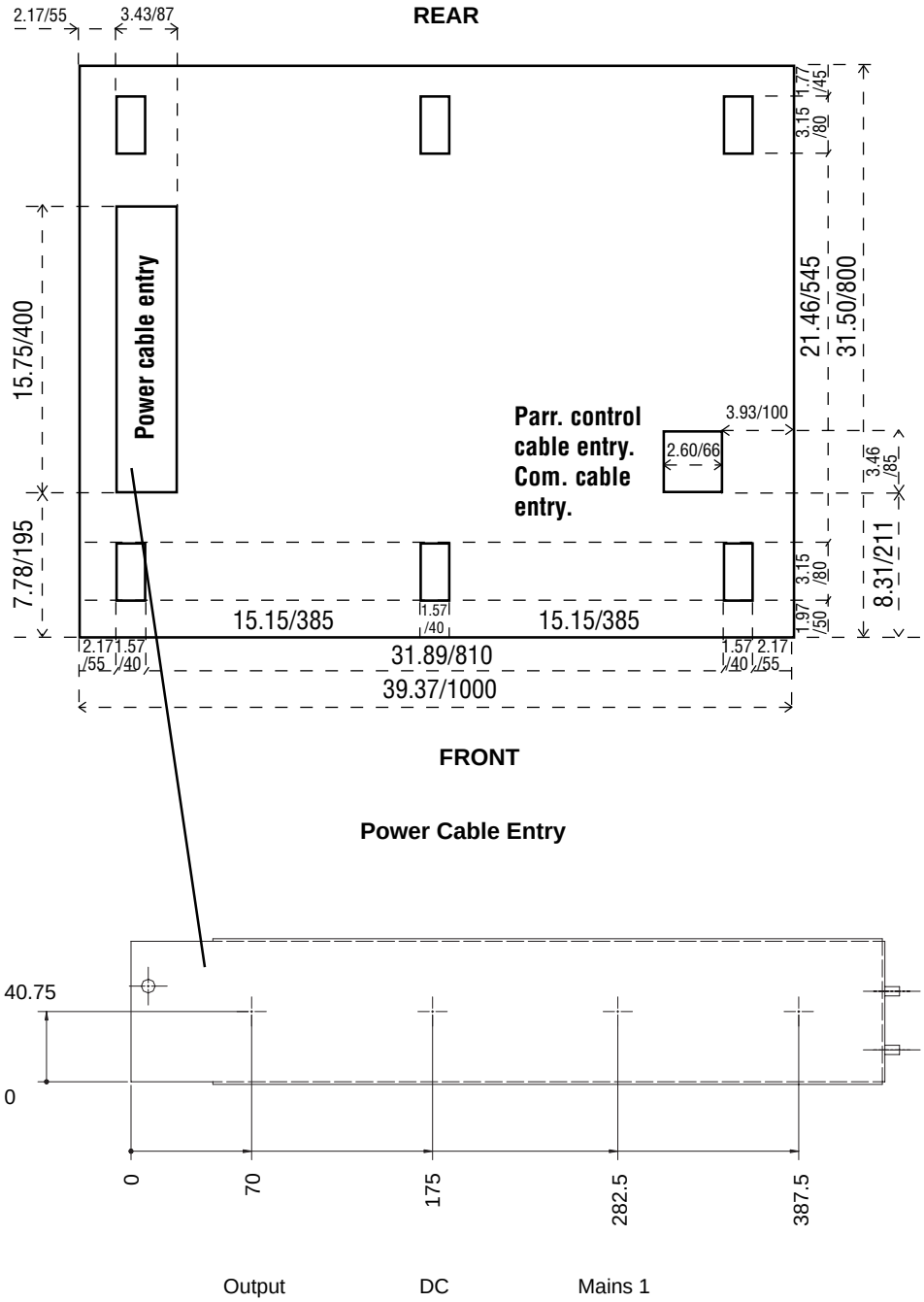


Recommended cable routing.

Placing

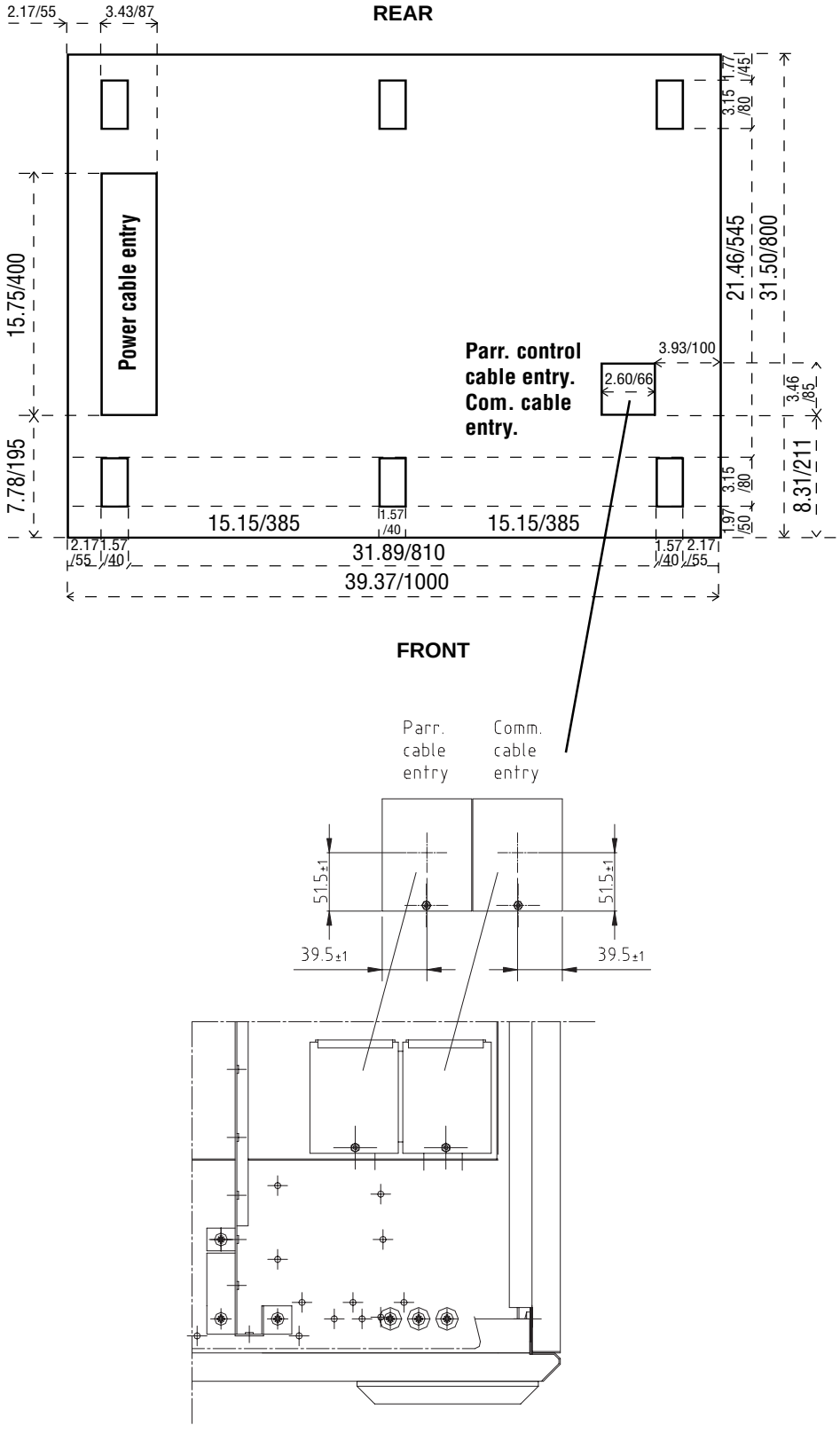

REAR
2.17/55
5.51/140
Power cable entry
Parr. control cable entry. Com. cable entry.
2.72/69
3.35/85
15.75/400
7.78/195
21.46/545
31.50/800
8.13/206.5
5.90/150
15.15/385
15.15/385
1.57/40
31.89/810
39.37/1000
FRONT
51.5±1
39.5±1
Parr. cable entry
Comm. cable entry

3.3.3 39.37/1000 in./mm cubicle
DP360E [208V] - DP380E [208V]



Recommended cable routing.

Placing


REAR
2.17/55
3.43/87
Power cable entry
15.75/400
7.78/195
Parr. control cable entry. Com. cable entry.
3.93/100
2.60/66
21.46/545
31.50/800
8.31/211
3.46/85
3.15/80
1.77/45
1.97/50
15.15/385
1.57/40
15.15/385
2.17/55
1.57/40
31.89/810
39.37/1000
FRONT
Parr. cable entry
Comm. cable entry
51.5±1
51.5±1
39.5±1
39.5±1

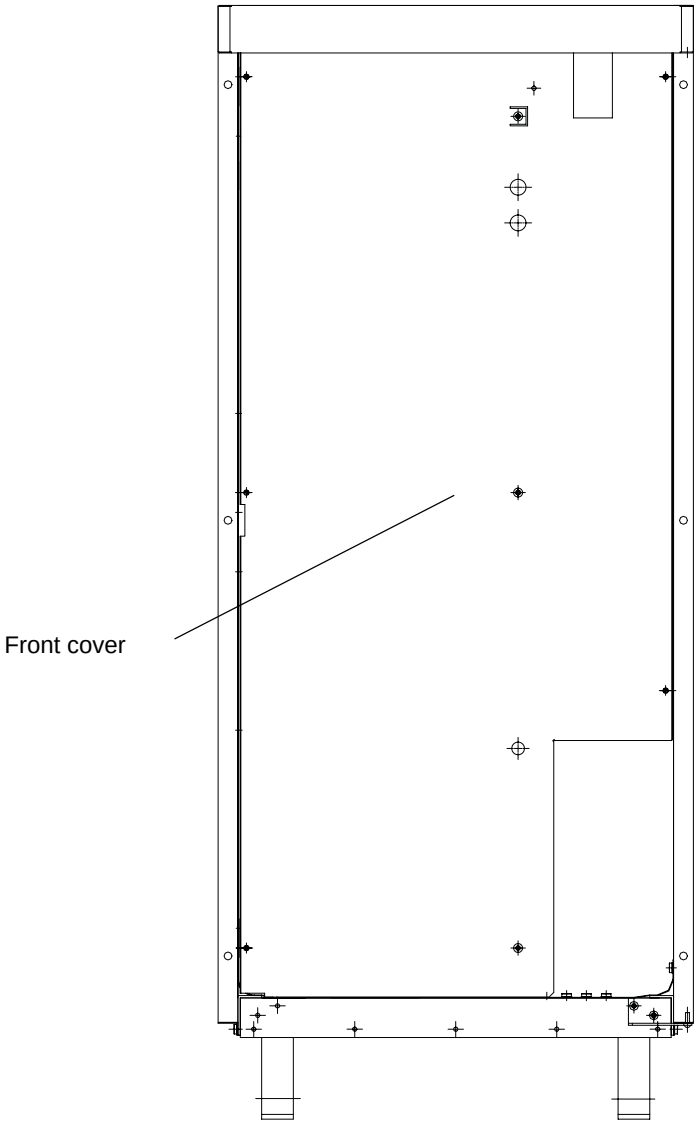
WARNING!
Before continuing, read the warnings on page 2 of this manual.

4.0 Connection

4.1 Connecting the Silcon DP300E

4.1.1 Connecting DP310E [208/480V] - DP315E [480V] - DP320E [480V]

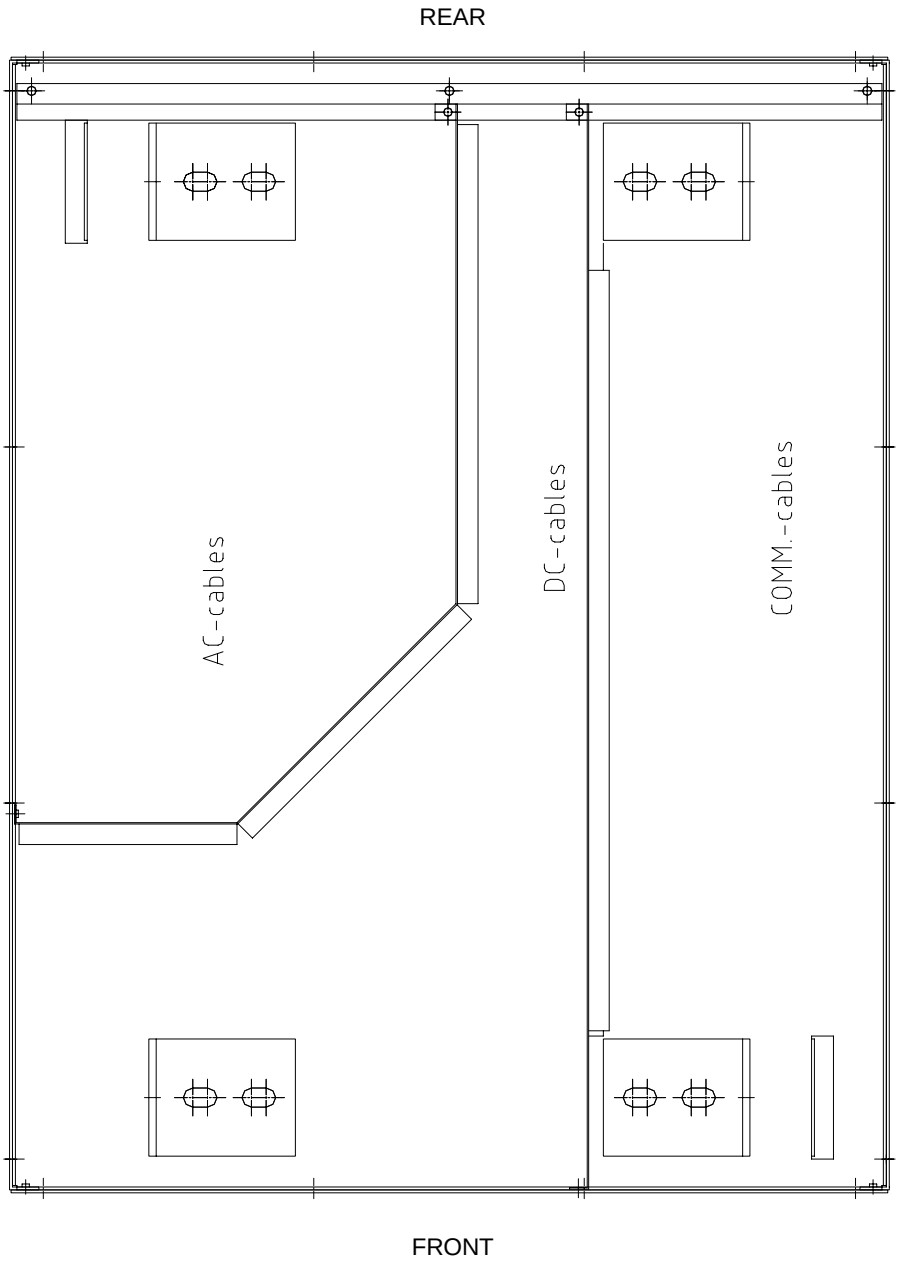
To get access to the cable terminals open the front door, remove the screws and lift off the front cover (Remember earth wire on rear side).



23.62/600 in./mm cubicle front view open door

Remember to remount the front cover (and earth wire) before start up of the system.

Conduit box 23.62/600 in./mm cubicle.



The conduit box is placed under the UPS, **always** with the solid plate facing to the rear and the perforated plate facing to the front.

Conduits can be attached to the rear side of the conduit box, which contains cable channels in order to separate AC, DC, and communication cables.

Connection

NOTE:
This UPS is intended to be supplied from a grounded WYE-service, either 3 or 4 wire.

NOTE:
With 3 wire input, the UPS can only be loaded 3 wire (phase to phase.

NOTE:
Ensure correct phase rotation of mains input voltage!!
Max. power cable size: 2 AWG.

NOTE:
All external cable dimensions are recommended.
Please refer to local legal provisions.

NOTE:
Glandplate in bottom of system must be mounted.

WARNING:
At 100% switch mode load the neutral shall be rated for 173% output phase current.

NOTE:
ϕ is symbol for “phase”.

is symbol for “risk of electric shock”.

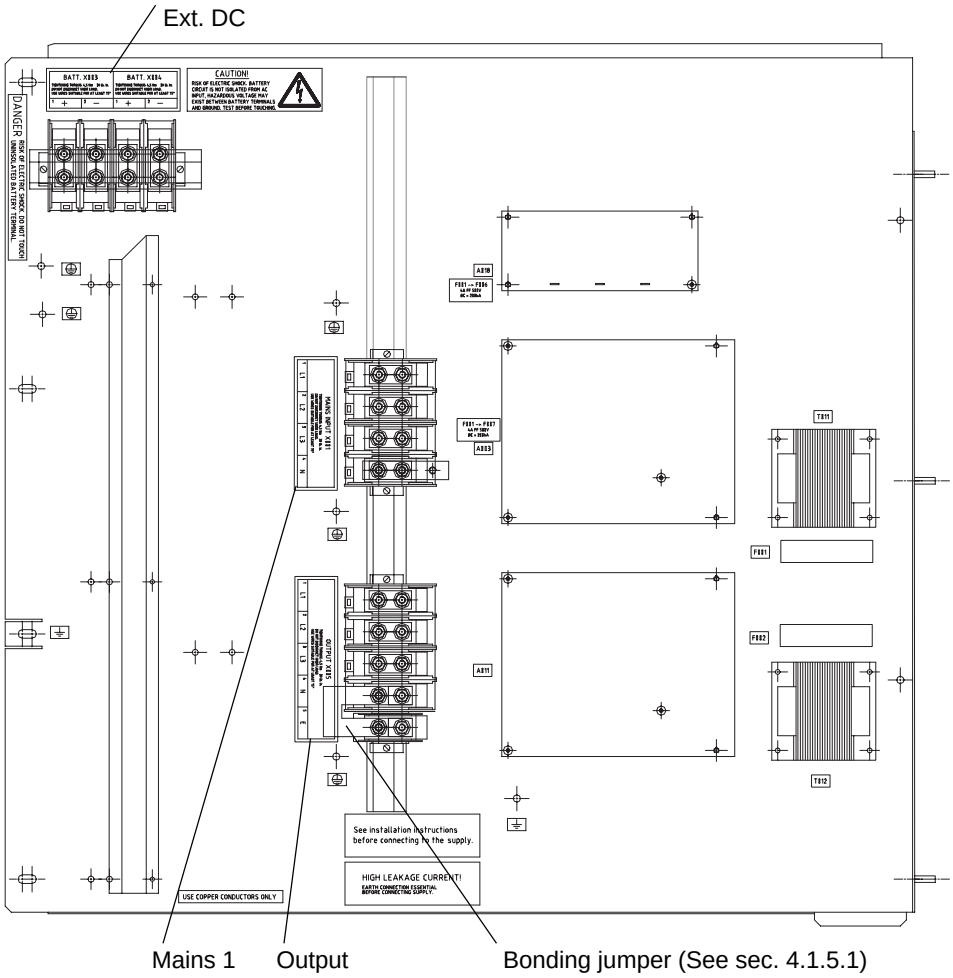
Terminal for Equipment Grounding Conductor is marked

Terminal for Grounding Electrode Conductor is marked “E”.

NOTE:
The terminals marked

and

are electrically connected to the teminal marked „E“.



SYSTEM	a) EXT. INPUT FUSES [A]	b) c) EXT. INPUT PHASE CONDUC. [AWG]	a) EXT. OUTPUT FUSES [A]	b) d) EXT. OUTPUT PHASE CONDUC. [AWG]	b) e) EXT. NEUTRAL CONDUC. [AWG]	EXT. EQUIP. GROUND. CONDUC. [AWG]	EXT. GROUND. ELECTRO. CONDUC. [AWG]	g) EXT. BATTERY MCCB [A]	b) EXT. DC CONDUC. [AWG]
DP310E [208V]	40	6	30	8	4	10	8	50	6
DP310E [480V]	20	12	15	14	10	12	8	30	10
DP315E [480V]	25	10	20	10	8	10	8	50	6
DP320E [480V]	35	8	25	10	6	10	8	50	6

NOTE:
Grounding, please refer to local legal provisions.

a) Class J-fast acting in accordance with UL248-8.

b) Cable sizes refer to US National Electric Code, Table 310-16, Copper material, cables rated 75˚C/167˚F at max. 40˚C/104˚F ambient in conjunction with "Notes to Ampacity Tables of 0 to 2000 Volts" point 8. Input, output and DC cables are routed in separate conduits.
All AC cables rated 600V.
DC cables for 208V systems rated 600V.
DC cables for 480V systems rated 1000V unless stated otherwise.
As regards recommended cable lugs and crimping tool, see section 4.1.4.

c) Input phase cable dimensioned for max. UPS input current. (Please refer to Quick Reference DP300E Series UL for current values).

d) Output phase cable dimensioned for rated UPS output current. (Please refer to Quick Reference DP300E Series UL for current values).

e) Output neutral cable dimensioned for max. non-linear load. ($I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$).
Input neutral cable dimensioned for max. non-linear load in bypass mode.
($I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$).
For linear load neutral cable can be rated as output phase cables.

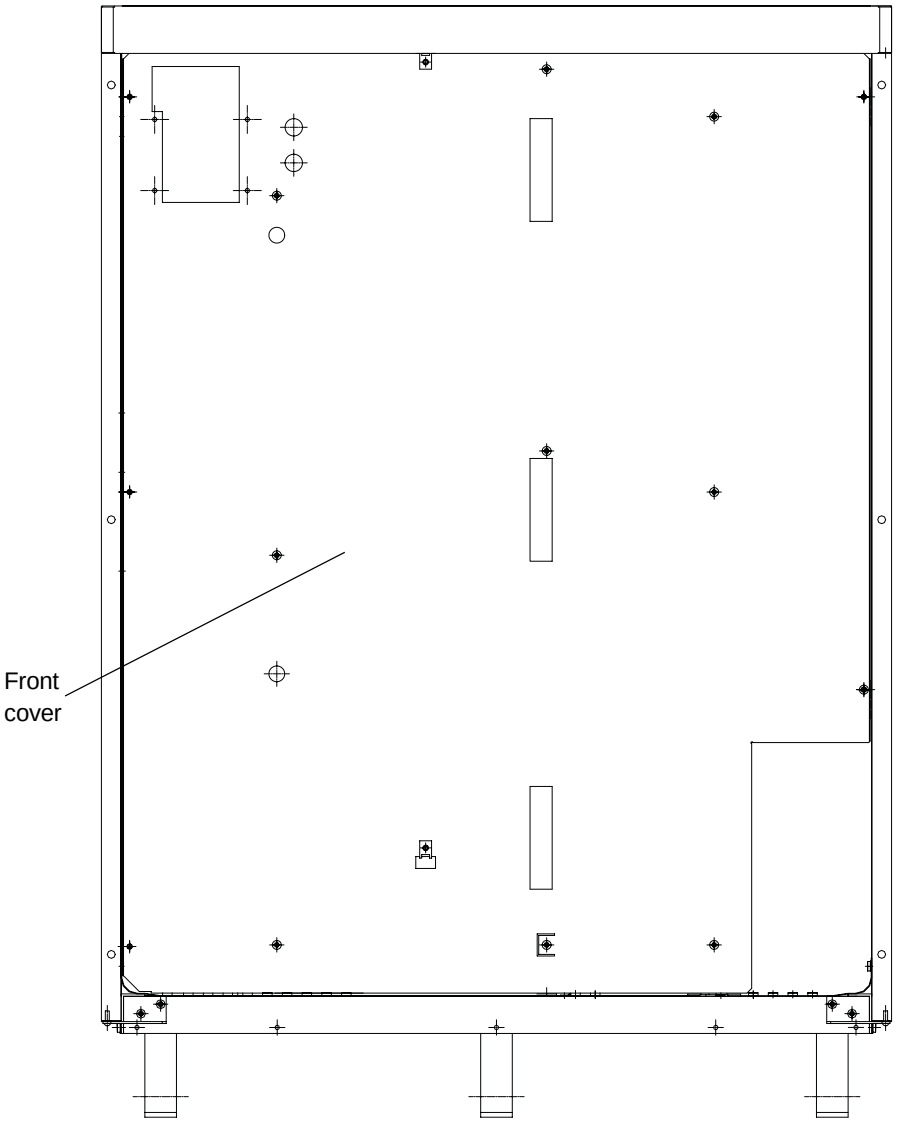
f) DC cables dimensioned for maximum discharge current. (Please refer to Quick Reference DP300E Series UL for current values).

g) Alternate suppliers of battery cubicle must be Listed by Unterwriters Laboratory.
When APC battery cubicle is not used, the appropriate APC MCCB-box is mandatory.

WARNING!
Before continuing, read the warnings on page 2 of this manual.

4.1.2 Connecting DP315E [208V] - DP320E [208V] - DP330E [208V/480V] - DP340E [208V/480V]

To get access to the cable terminals open the front door, remove the screws and lift off the front cover (Remember earth wire on rear side).



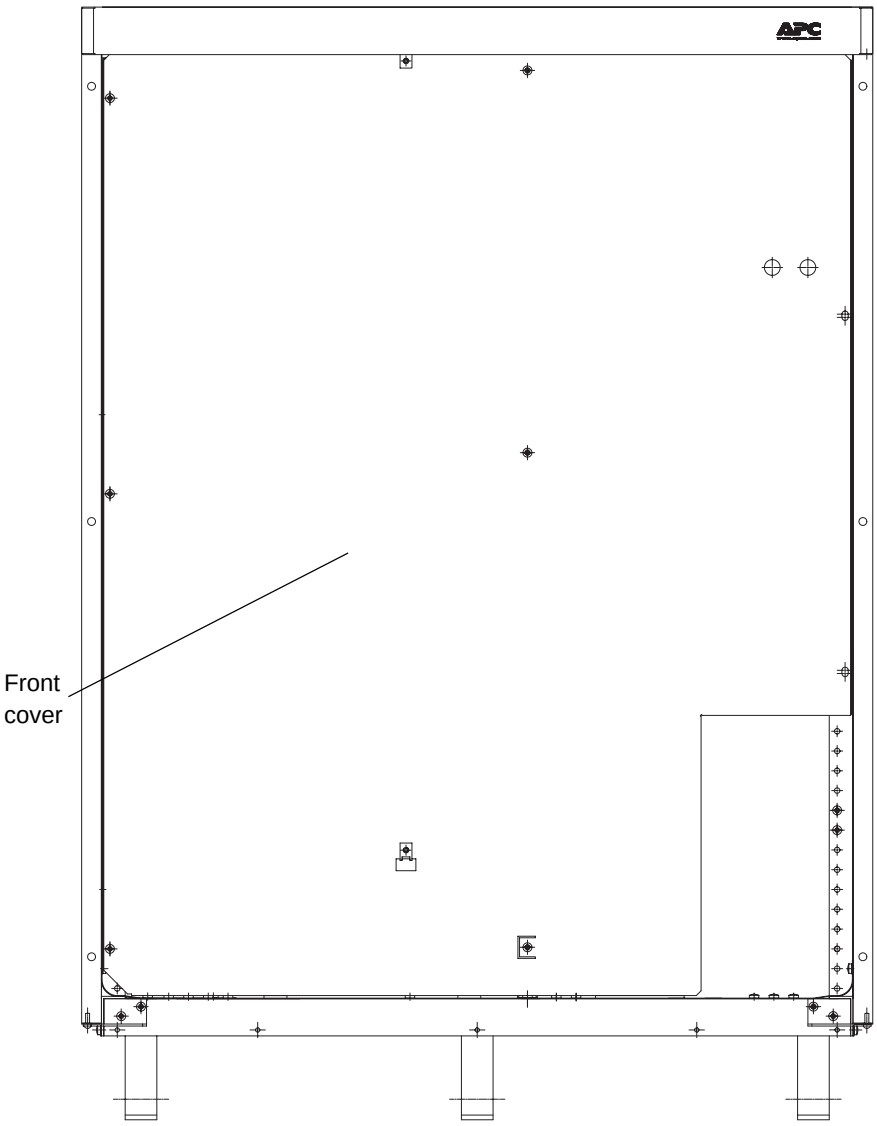
39.37/1000 in./mm cubicle front view open door

Remember to remount the front cover (and earth wire) before start up of the system.

WARNING!
Before continuing, read the warnings on page 2 of this manual.

4.1.2.1 Connecting DP360E [480V] - DP380E [480V]

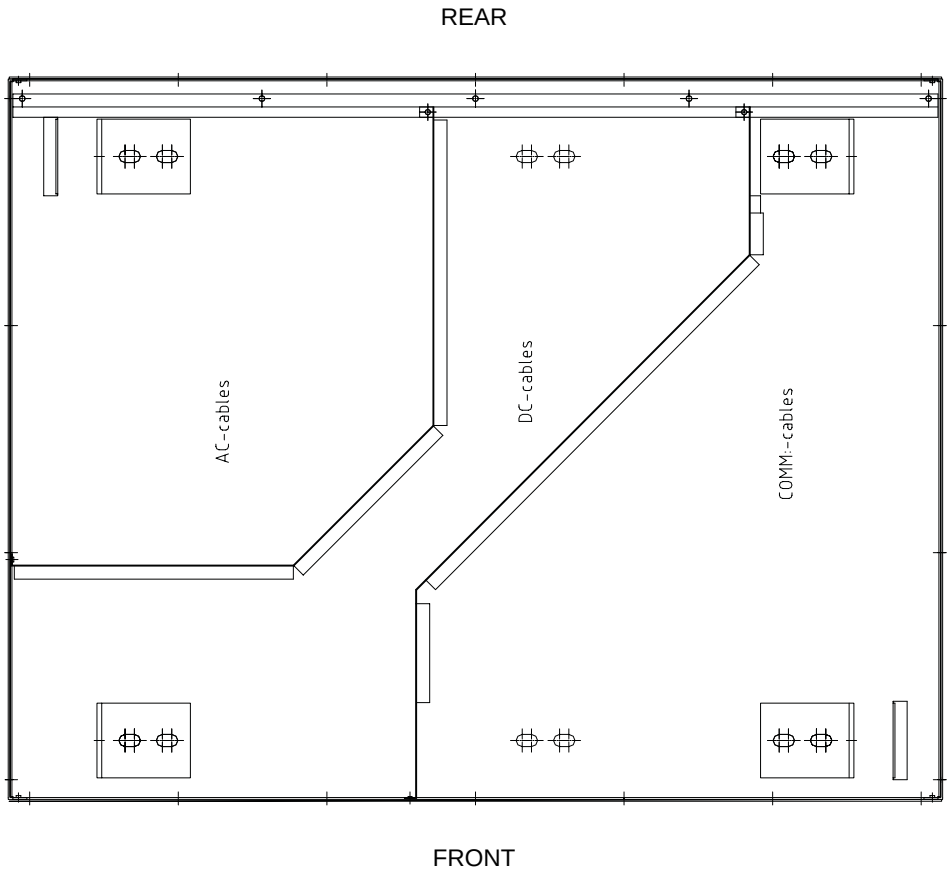
To get access to the cable terminals open the front door, remove the screws and lift off the front cover (Remember earth wire on rear side).



39.37/1000 in./mm cubicle front view open door

Remember to remount the front cover (and earth wire) before start up of the system.

Conduit box 39.37/1000 in./mm cubicle.



The conduit box is placed under the UPS, **always** with the solid plate facing to the rear and the perforated plate facing to the front.

Conduits can be attached to the rear side of the conduit box, which contains cable channels in order to separate AC, DC, and communication cables.

Connection

NOTE:
This UPS is intended to be supplied from a grounded WYE-service, either 3 or 4 wire.

NOTE:
With 3 wire input, the UPS can only be loaded 3 wire (phase to phase.

NOTE:
Ensure correct phase rotation of mains input voltage!!
Max. power cable size:
250 kcmil.

NOTE:
All external cable dimensions are recommended.
Please refer to local legal provisions.

NOTE:
Glandplate in bottom of system must be mounted.

WARNING:
At 100% switch mode load the neutral shall be rated for 173% output phase current.

NOTE:
ϕ is symbol for “phase”.

is symbol for “risk of electric shock”.

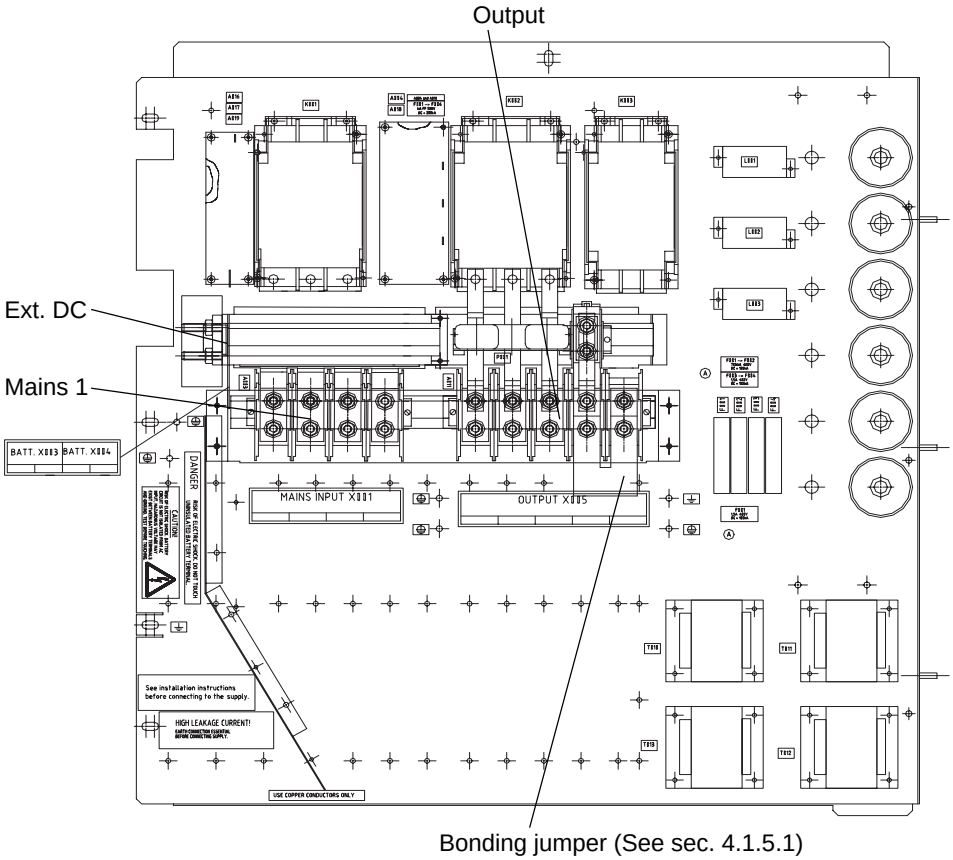
Terminal for Equipment Grounding Conductor is marked

Terminal for Grounding Electrode Conductor is marked “E”.

NOTE:
The terminals marked

and

are electrically connected to the teminal marked „E“.



SYSTEM	a) EXT. INPUT FUSES [A]	b) c) EXT. INPUT PHASE CONDUC. [AWG]	a) EXT. OUTPUT FUSES [A]	b) d) EXT. OUTPUT PHASE CONDUC. [AWG]	b) e) EXT. NEUTRAL CONDUC. [AWG]	EXT. EQUIP. GROUND. CONDUC. [AWG]	EXT. GROUND. ELECTRO. CONDUC. [AWG]	g) EXT. BATTERY MCCB [A]	b) EXT. DC CONDUC. [AWG]
DP315E [208V]	60	4	45	6	2	10	8	100	2
DP320E [208V]	80	2	60	4	1/0	8	8	100	2
DP330E [208V]	125	2/0	90	1	4/0	6	6	125	1/0
DP330E [480V]	50	4	40	6	3	10	8	100	2
DP340E [208V]	150	4/0	125	2/0	250 kcmil	6	6	125	1/0
DP340E [480V]	70	3	50	4	1	8	8	100	2
DP360E [480V]	100	1/0	80	2	3/0	8	6	100	2
DP380E [480V]	125	3/0	100	1/0	250 kcmil	6	6	125	1/0

NOTE:
Grounding, please refer to local legal provisions.

a) Class J-fast acting in accordance with UL248-8.

b) Cable sizes refer to US National Electric Code, Table 310-16, Copper material, cables rated 75˚C/167˚F at max. 40˚C/104˚F ambient in conjunction with "Notes to Ampacity Tables of 0 to 2000 Volts" point 8. Input, output and DC cables are routed in separate conduits.
All AC cables rated 600V.
DC cables for 208V systems rated 600V.
DC cables for 480V systems rated 1000V unless stated otherwise.
As regards recommended cable lugs and crimping tool, see section 4.1.4.

c) Input phase cable dimensioned for max. UPS input current. (Please refer to Quick Reference DP300E Series UL for current values).

d) Output phase cable dimensioned for rated UPS output current. (Please refer to Quick Reference DP300E Series UL for current values).

e) Output neutral cable dimensioned for max. non-linear load. ($I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$).
Input neutral cable dimensioned for max. non-linear load in bypass mode.
($I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$).
For linear load neutral cable can be rated as output phase cables.

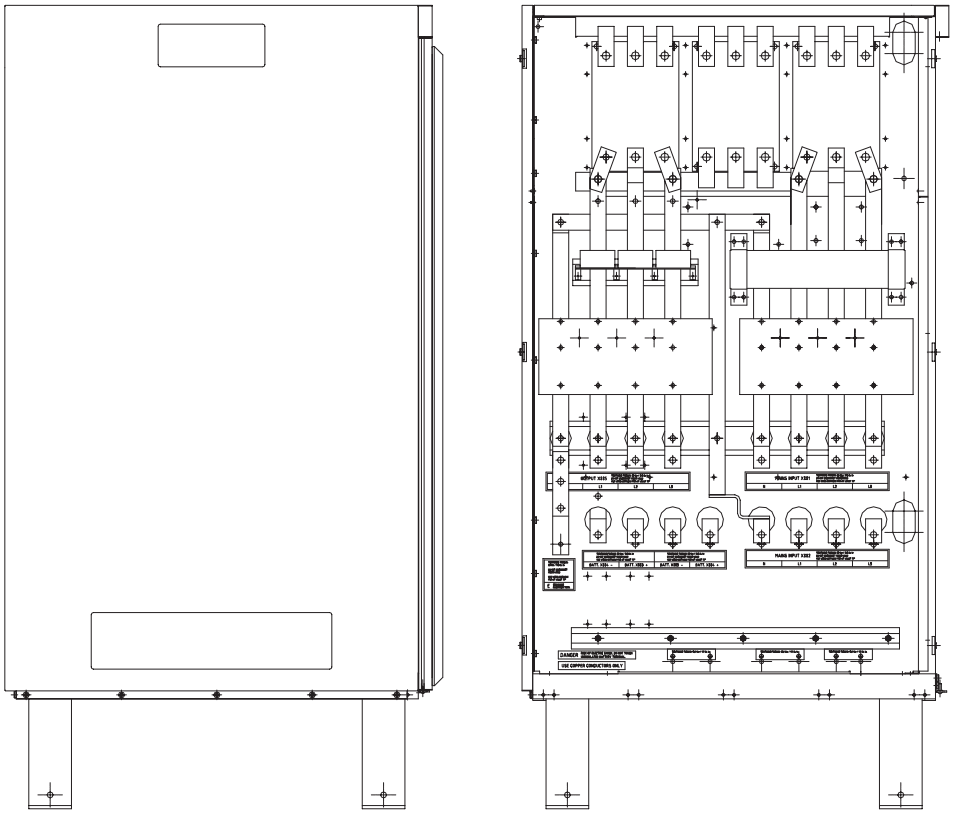
f) DC cables dimensioned for maximum discharge current. (Please refer to Quick Reference DP300E Series UL for current values).

g) Alternate suppliers of battery cubicle must be Listed by Unterwriters Laboratory.
When APC battery cubicle is not used, the appropriate APC MCCB-box is mandatory.

WARNING!
Before continuing, read the warnings on page 2 of this manual.

4.1.3 Connecting DP360E [208V] - DP380E [208V]

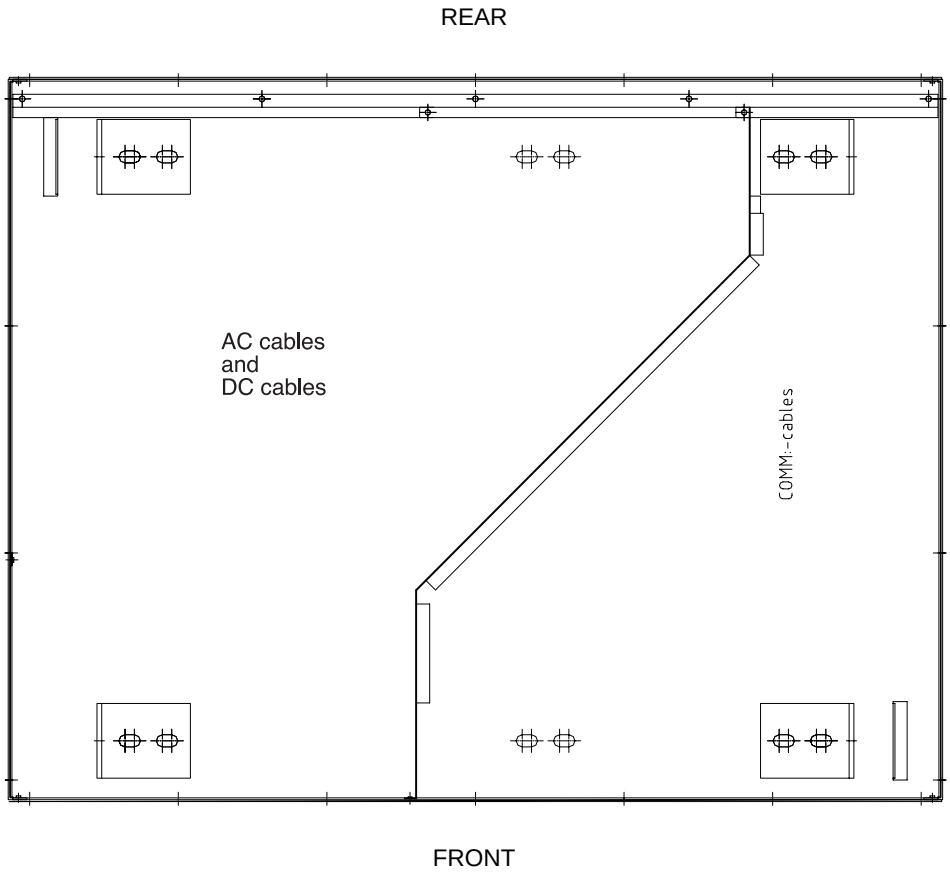
The cable terminals are located at the left side of the unit. To get access to the cable terminals, remove the screws at the bottom and lift off the side cover (Remember earth wire on rear side).



39.37/1000 in./mm cubicle left side view without side cover

Remember to remount the side cover (and earth wire) before start up of the system.

Conduit box 39.37/1000 in./mm cubicle.



The conduit box is placed under the UPS, **always** with the solid plate facing to the rear and the perforated plate facing to the front..

Conduits can be attached to the rear side of the conduit box, which contains cable channels in order to separate AC, DC, and communication cables.

Connection

NOTE:
This UPS is intended to be supplied from a grounded WYE-service, either 3 or 4 wire.

NOTE:
With 3 wire input, the UPS can only be loaded 3 wire (phase to phase.

NOTE:
Ensure correct phase rotation of mains input voltage!!
Max. power cable size:
500 kcmil.

NOTE:
All external cable dimensions are recommended.
Please refer to local legal provisions.

NOTE:
Glandplate in bottom of system must be mounted.

WARNING:
At 100% switch mode load the neutral shall be rated for 173% output phase current.

NOTE:
ϕ is symbol for “phase”.

is symbol for “risk of electric shock”.

Terminal for Equipment Grounding Conductor is marked

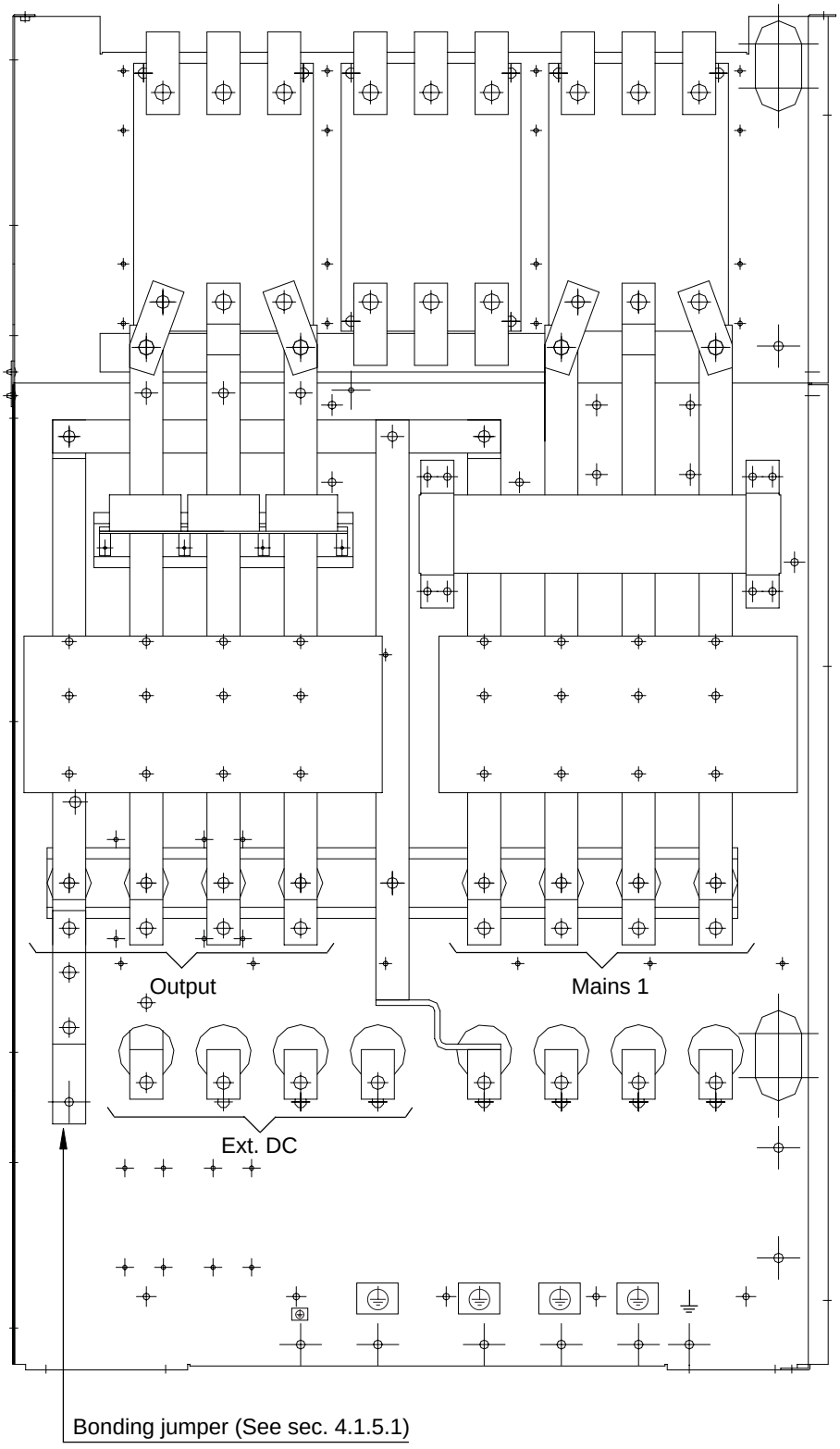
Terminal for Grounding Electrode Conductor is marked “E”.

NOTE:
The terminals marked

and

are electrically connected to the teminal marked „E“.

Side view (left)



NOTE:
Grounding, please refer to local legal provisions.

SYSTEM	a) EXT. INPUT FUSES [A]	b) c) EXT. INPUT PHASE CONDUC. [AWG]	a) EXT. OUTPUT FUSES [A]	b) d) EXT. OUTPUT PHASE CONDUC. [AWG]	b) e) EXT. NEUTRAL CONDUC. [AWG]	EXT. EQUIP. GROUND. CONDUC. [AWG]	EXT. GROUND. ELECTRO. CONDUC. [AWG]	g) EXT. BATTERY MCCB [A]	b) EXT. DC CONDUC. [AWG]
DP360E [208V]	225	2 * 3/0	175	2 * 1/0	2 * 250 kcmil	4	2	200	4/0
DP380E [208V]	300	2 * 250 kcmil	250	2 * 3/0	2 * 400 kcmil	4	2	250	350 kcmil

a) Class J-fast acting in accordance with UL248-8.

b) Cable sizes refer to US National Electric Code, Table 310-16, Copper material, cables rated 75˚C/167˚F at max. 40˚C/104˚F ambient in conjunction with “Notes to Ampacity Tables of 0 to 2000 Volts” point 8. Input, output and DC cables are routed in separate conduits.
All AC cables rated 600V.
DC cables for 208V systems rated 600V.
DC cables for 480V systems rated 1000V unless stated otherwise.
As regards recommended cable lugs and crimping tool, see section 4.1.4.

c) Input phase cable dimensioned for max. UPS input current. (Please refer to Quick Reference DP300E Series UL for current values).

d) Output phase cable dimensioned for rated UPS output current. (Please refer to Quick Reference DP300E Series UL for current values).

e) Output neutral cable dimensioned for max. non-linear load. ($I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$).
Input neutral cable dimensioned for max. non-linear load in bypass mode.
($I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$).
For linear load neutral cable can be rated as output phase cables.

f) DC cables dimensioned for maximum discharge current. (Please refer to Quick Reference DP300E Series UL for current values).

g) Alternate suppliers of battery cubicle must be Listed by Unterwriters Laboratory.
When APC battery cubicle is not used, the appropriate APC MCCB-box is mandaroty.

4.1.4 Recommended cable lugs and crimping tools, manufacturer FRAMATOME CONNECTORS INTERNATIONAL (FCI)

Cable Size [AWG]	Terminal bolt diameter 6mm		
	Cable lug Type	Crimping tool	
		Tool	Die
14	YAV10-2TC14	Y8MRB-1	Groove 2
12	YAV10-2TC14	Y8MRB-1	Groove 2
10	YAV102TC14	Y8MRB-1	Groove 2
8	YA8CL2TC14	Y8MRB-1	Groove 2
6	YA6CL2TC14	Y2MR	Blue Die

Cable Size [AWG]	Terminal bolt diameter 8mm		
	Cable lug Type	Crimping tool	
		Tool	Die
8	YA8CL2TC38	MD7-34R	W8CVT
6	YA6CL2TC38	MD7-34R	W5CVT
4	YA4CL2TC38	MD7-34R	W4CVT
3	YA3CL2TC38	Y35	U3CRT
2	YA2CL2TC38	MD7-34R	W2CVT
1	YA1CL2TC38	MD7-34R	W1CVT
1/0	YA25L2TC38	MD7-34R	W25VT
2/0	YA26L2TC38	MD7-34R	W26VT
3/0	YA27L2TC38	MD7-34R	W27VT
4/0	YA28L2TC38	MD7-34R	W28VT
250kcmil	YA29L2TC38	MD7-34R	W29VT

Cable Size [AWG]	Terminal bolt diameter 12mm		
	Cable lug Type	Crimping tool	
		Tool	Die
3/0	YA272LN	MD7-34R	W26VT
4/0	YA282LN	MD7-34R	W28VT
250kcmil	YA292LN	MD7-34R	W29VT
300kcmil	YA302LN	MD7-34R	W30VT
350kcmil	YA312LN	MD7-34R	W31VT
400kcmil	YA322LN	MD7-34R	W32VT

4.1.5 Grounding

4.1.5.1 System grounding

If none of the UPS neutral inputs are connected to a grounded service neutral conductor per NEC 250-23, provisions have to be made as follows:

a. The bonding jumper is mounted between output terminals X005:N and X005:E.

b. The output terminal X005:E, also marked “Grounding electrode terminal”, is connected by the grounding electrode conductor to a local grounding electrode per NEC 250-26.

4.1.5.2 Equipment grounding

Terminals marked ⏚ are intended for equipment grounding.

Provisions have to be made as followed:

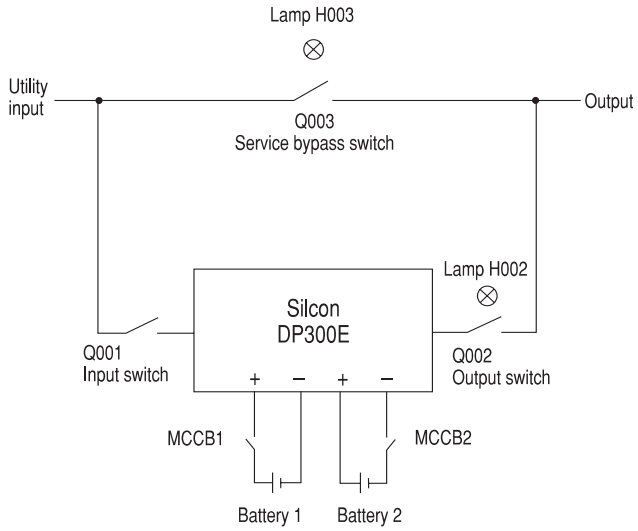
- The input equipment ground terminal(s) shall be connected to the grounding electrode(s) provided for the service entrance(s).

4.2 System Integration Interface

4.2.1 Introduction

Single Mains Input

NOTE:
Use of the same designations in your diagrams make information exchange much easier.

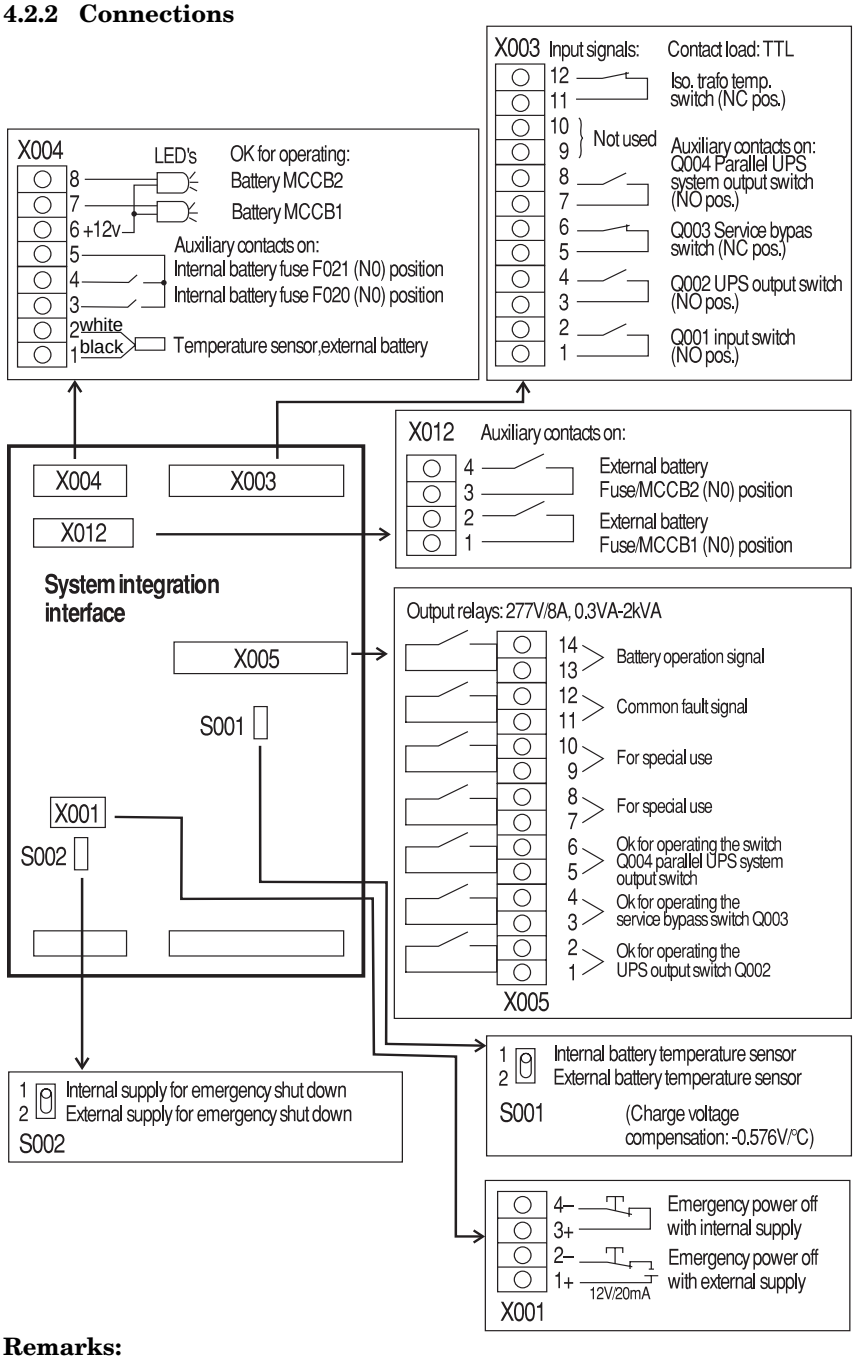


The system Integration Interface (SII) is the control link between the UPS and the system main switches as shown in the above diagram. The purpose is to ensure correct operation of the switches without loosing the system output power.

Position information from auxiliary contacts on the main switches are the inputs for the SII-board and the outputs are the lamp signals giving “the green light” for operating the specific switches.

Besides above the SII-board also have input facilities for emergency shut down and temperature compensation of the charge voltage for systems with external battery. “Battery operation” and “Common fault” are the two main status relay signals also coming from the SII-board.

4.2.2 Connections



NOTE:
When installing UPS systems with Emergency Power Off (EPO) all input sources must be provided with disconnecting device when activating EPO.

Remarks:

X003 and X004, auxiliary contacts:
When switching Q001, Q002, MCCB1, and MCCB2 from “ON” to “OFF” the auxiliary contacts have to give a signal before the corresponding mains switch is opened.
When switching from “OFF” to “ON” the auxiliary contact has to be activated with max. 0.5 sec. delay from the corresponding main switch.
When switching Q003 from “OFF” to “ON” the auxilliary contact has to give a signal before Q003 is closed. When switching from “ON” to “OFF” the auxilliary contact has to be activated with max. 0.5 sec. delay.

NOTE:
All alarm and signal circuit field wiring shall be rated 300V minimum.

X005, output relays:
The battery operation signal is 30 secs. delayed, but inhibited during battery tests. The common fault relay is delayed. Standard factory setting is 10 secs. but other periods can be programmed as described in 6.3.
Same phase as power source for the output relays is mandatory for voltages above 170V.

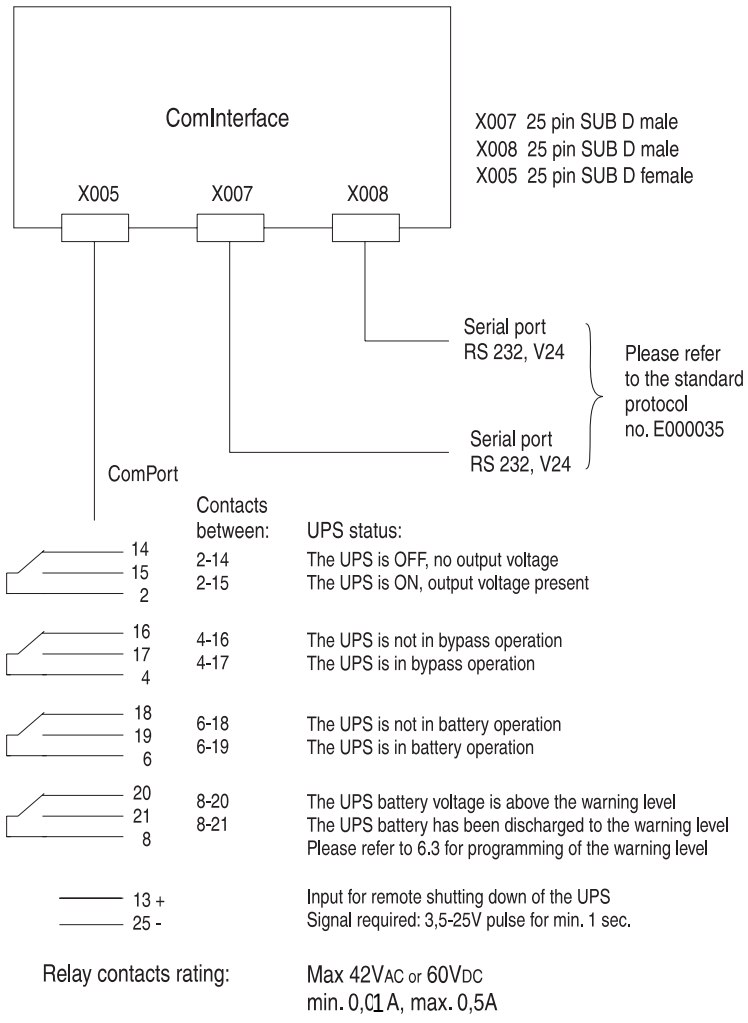
Terminals X001, X003, X005, X004, X012:
Cable size AWG18 to AWG14, use solid copper conductors only.

4.3 Communication interface – ComInterface

4.3.1 Introduction

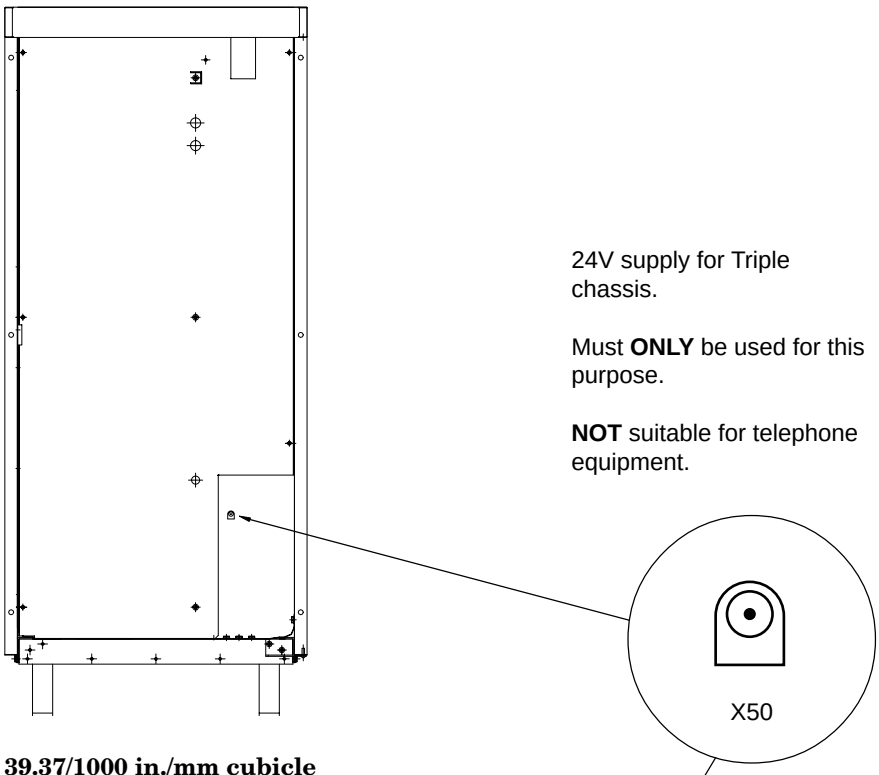
The ComInterface having 3 ports - is used when an interaction between UPS and e.g. a computer system has to be established. The main purpose is to ensure a controlled shut down of the computer in case of failures
in the mains supply.

4.3.2 Connections

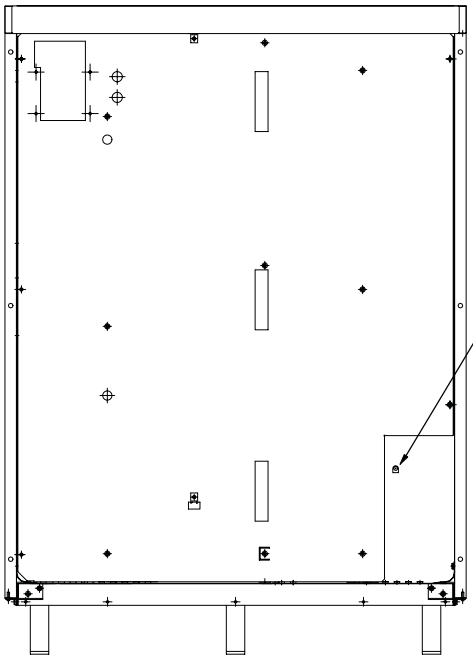


4.4 Triple Chassis for Smart Slot

23.62/600 in./mm cubicle



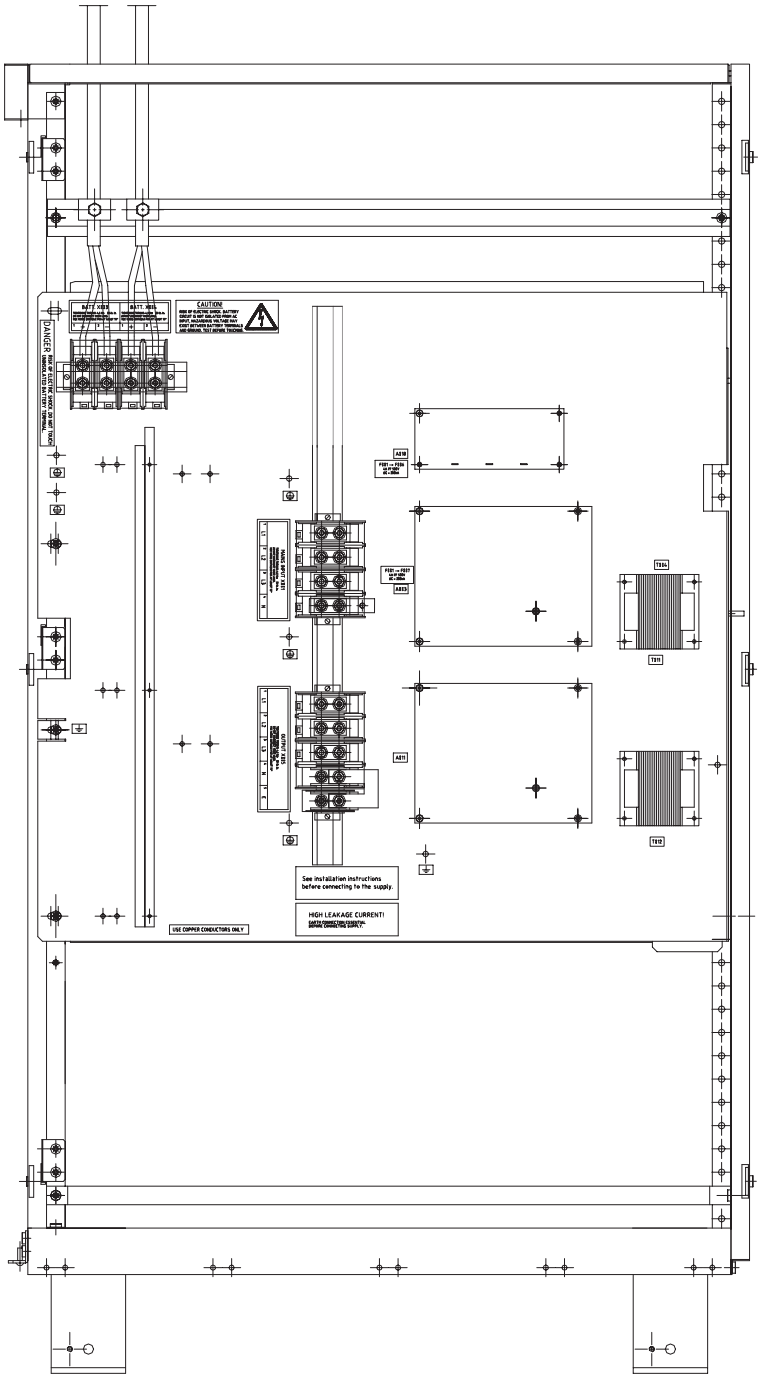
39.37/1000 in./mm cubicle



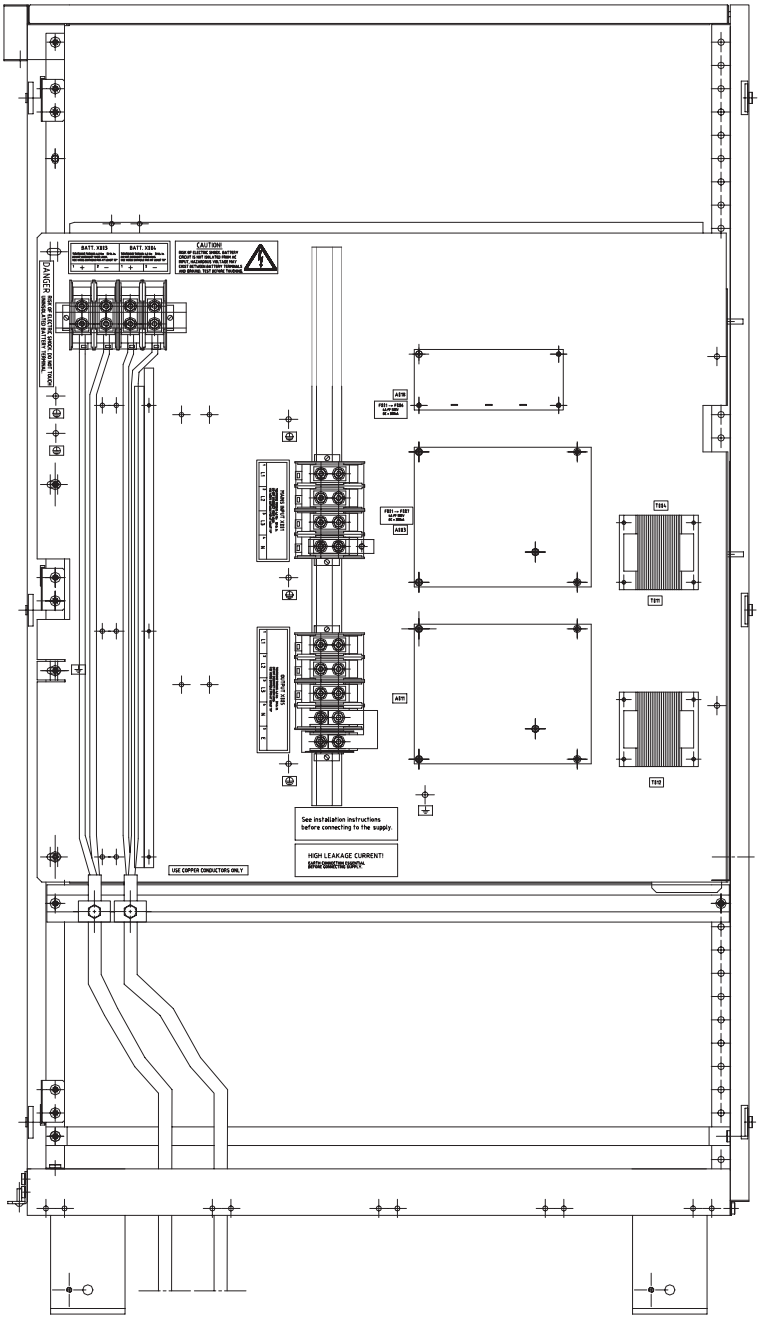
4.5 External DC connection

4.5.1 External DC connection Silcon DP310E [208V], DP310E [480V], DP315E [480V], and DP320E [480V]

Top entry



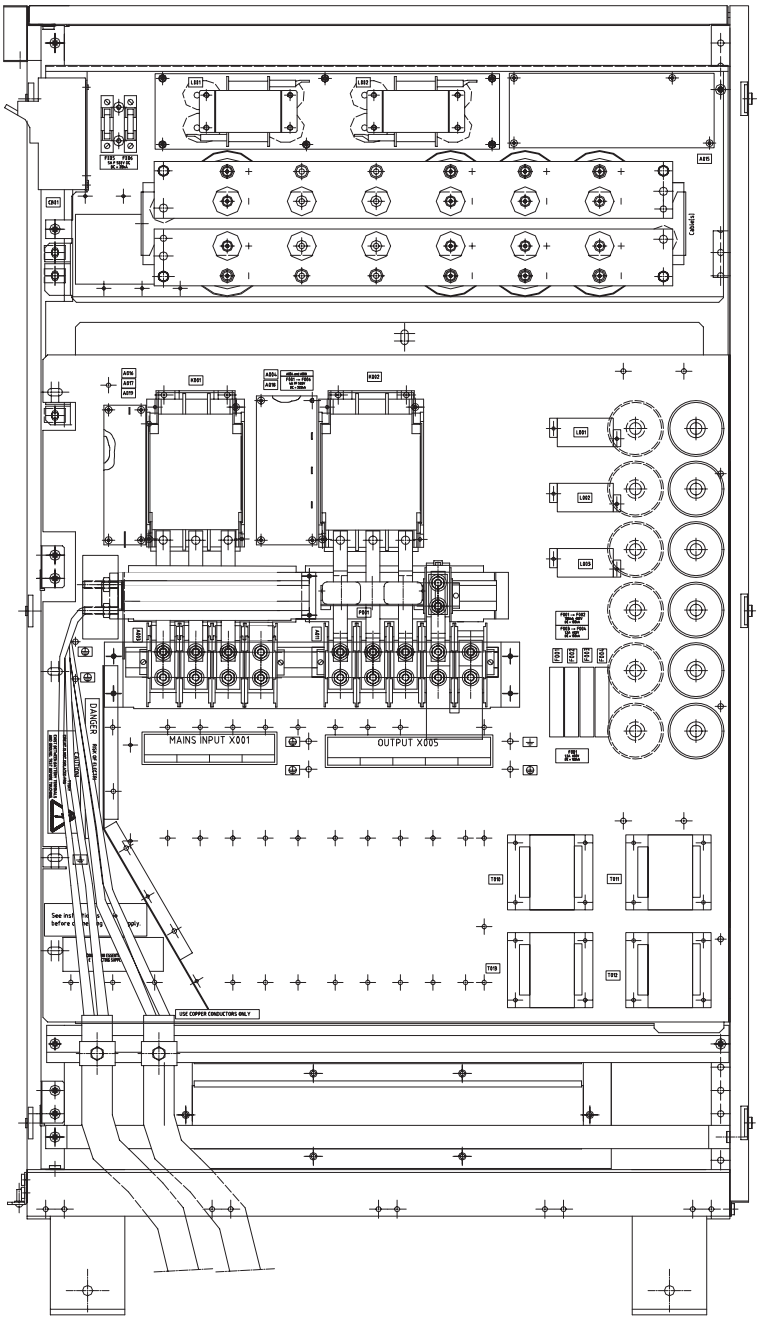
Bottom entry



Please refer to section 4.1.1 regards cable sizes.

4.5.2 External DC connection Silcon DP315E [208V], DP320E [208V], DP330E [208V], DP330E [480V], DP340E [208V], DP340E [480V] DP360E [480V], and DP380E [480V]

Bottom entry



Please refer to section 4.1.2 regards cable sizes.
For top entry please refer to section 8.9.

4.6 Installation of battery drawers

Important Safety Instructions

a) Installation of battery drawers in the UPS cubicle should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

b) When replacing batteries, replace with the same number and type as installed.

c) **CAUTION** - Do not dispose of battery or batteries in a fire. The battery may explode.

d) **CAUTION** - Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

e) **CAUTION** - A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries:

1) Remove watches, rings, or other metal objects.
2) User tools with insulated handles.
3) Wear rubber gloves and boots.
4) Do not lay tools or metal parts on top of batteries.
5) Disconnect charging source prior to connecting .

The installation and use of this product must comply with all national, federal, state, municipal or local codes that apply. If you need assistance, please have your UPS model and serial number available and call APC's toll free technical support at: 1-877-287-7835 (1-877-2UPS-TEK).

You can find additional product information on the APC World Wide Web site at http://www.appc.com. See also **Section 11.0: How to contact APC.**

4.6.1 DP300E cubicle

WARNINGS

The total system contains **HAZARDOUS AC/DC VOLTAGES** and is supplied from more power sources. Some terminals and components are live even when the system is switched off!

ONLY qualified electricians are allowed to perform the installation according to national and local codes!

NO Silcon DP300E types are allowed to have built-in batteries when connected to external batteries!

Do **NOT** install other batteries that do not follow the specification indicated by APC, otherwise the installer takes over the full responsibility!

Do **NEVER** lift or transport the batteries when connected and installed.

4.6.2 Preparing the batteries

WARNINGS

Battery drawer weighs approx. 48 lbs.

The 12V, 7.2 Ah batteries are glued to the drawer plate.

Battery drawer constitutes a risk of electrical shock and an energy hazard. Before installing the battery drawer, remove conductive jewellery such as chains, wrist-watches and rings. High short circuit current through conductive materials may cause severe burns.

Do not install battery drawers into the Silcon DP300E frame before all AC/DC dis-connections are made.

If battery drawers are to be stored for an extended time, store them in a dry, cool environment.

Keep the battery drawer upside according to labels.

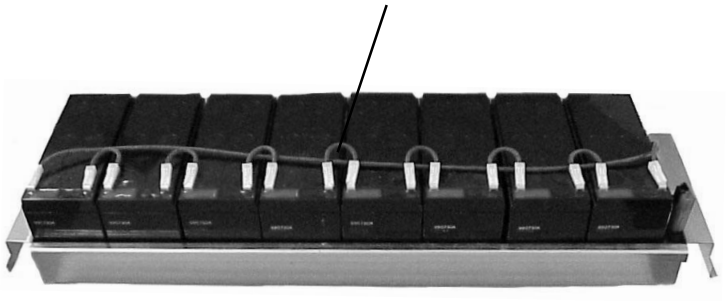
Do not stack more than 3 battery drawers wrapped in cardboard on top of each other.

Cardboard part no. SL9800167.

The battery drawer comes on a pallet, and the battery drawer is wrapped in cardboard.

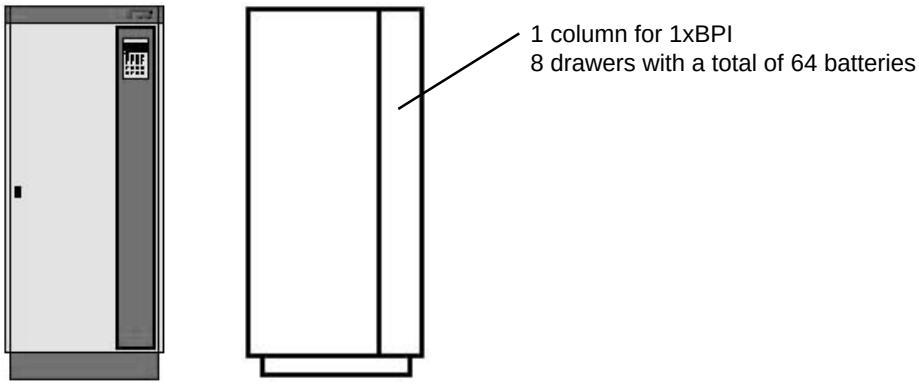
Unpack the battery drawer, check that the type, no., and size are corresponding to the ordered.

Connect the wire according to below picture.

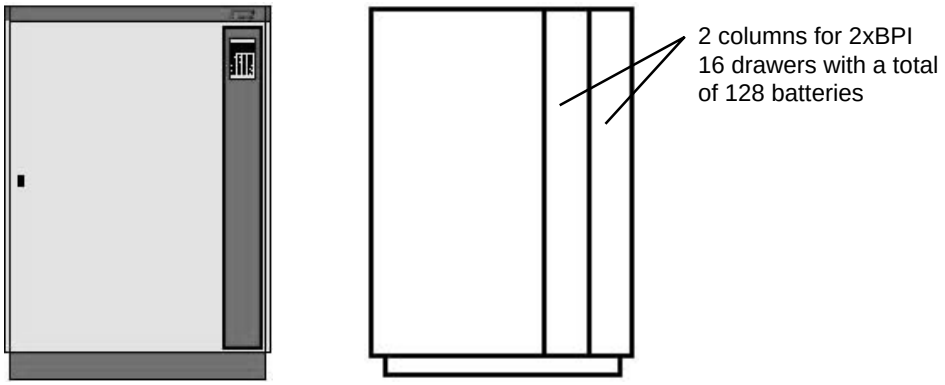


4.6.3 Placing

Silcon DP300E in 23,62/600 in./mm cubicle



Silcon DP300E in 39,37/1000 in./mm cubicle



4.6.4 Mounting the batteries

WARNINGS

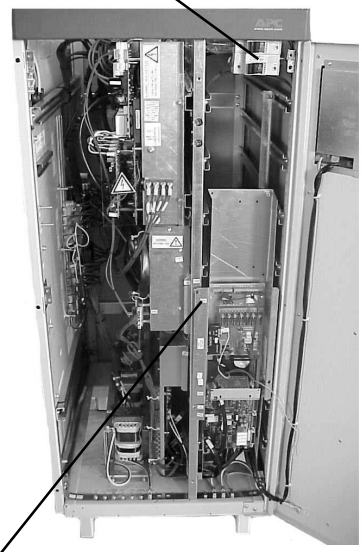
Open the front door of the Silcon DP300E and unscrew front cover.

Do not install battery drawers into the Silcon DP300E frame before all AC/DC disconnections are made.

Disconnect charging source prior to connecting. Ensure that breakers F001 and F002 are in position “off”.

Position of the F001 and F002

Insert all battery drawers



Unscrew front frame on Silcon DP300E 10-20kVA systems and slide the frame down as shown above.
All other systems come with direct access for the installation of the battery drawer, just by moving the front cover.

Check all battery connections for proper contact.

Rear

Front

Red and black connector in the front

Insert battery drawers in Silcon DP300E

Connect all battery drawers to the terminal on the left side of the column

4.6.5 Before starting-up

WARNINGS

1. Ensure that no electric power supply source has been connected to the Silcon DP300E for at least 5 min.
2. Ensure that F001 and F002 are in position “off”.
3. Follow the described “starting-up procedure” in the Guides provided with the system.

4.7 Battery replacement

a. Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

b. When replacing the batteries in a system having internal batteries, it is demanded that the batteries are R/C (BAZR2).

   Max. length each battery: 152mm
   Max. width each battery: 67mm

   When the batteries are to be mounted, there must be at least 0,5mm space between the batteries and between the batteries and the battery shelf.

c. **CAUTION** - Do not dispose of battery or batteries in a fire. The battery may explode.

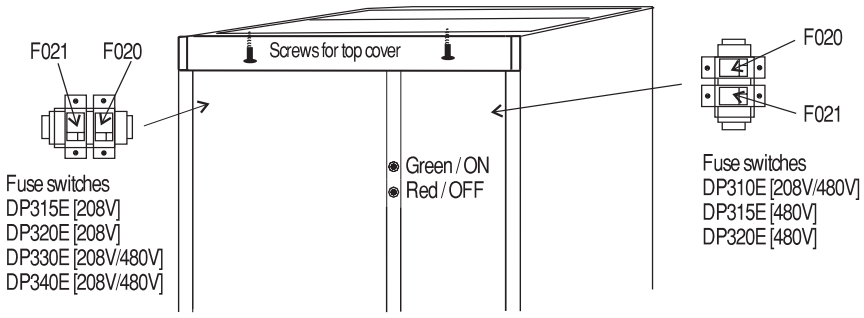
d. **CAUTION** - Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin an eyes. It may be toxic.

e. **CAUTION** - A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries:

   1. Remove watches, rings, or other metal objects.
   2. Use tools with insulated handles.
   3. Wear rubber gloves and boots.
   4. Do not lay tools or metal parts on top of batteries.
   5. Disconnect charging source prior to connecting or disconnecting battery terminals.
   6. Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source of ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance (applicable to a UPS and a remote battery supply not having a grounded supply circuit).

5.0. Starting up

5.1 Starting up Silcon DP310E - DP380E



NOTE:
If the starting up procedure for any reason is interrupted – wait until the display shows the step 4 picture and repeat from this step.

WARNING:
Do not insert F020 or F021 or external battery MCCB's without the display showing "Close MCCB" – otherwise you may damage the UPS.
If there is a fault in the charge circuit the display will show: "DC capacitor charge error". Do not insert F020 or F21 or close MCCB, but call for assistance.

WARNING:
If "Autostart" is active (please refer to 6.2) the UPS will start up automatically after step 9 with a delay of 1 minute.

	Display shows
1. Ensure that the system has been at stable environment for at least 12 hours to ensure any condensation has been evaporated before starting up.	
2. Prepare the system by opening the front door(s).	
3. Switch on the mains power supply	System type XXX XXX kVA - XXX
4. Wait about 10 seconds	Stop charge DC capacitors : YES
5. Press **c** on the keyboard	Start charge DC capacitors : YES
6. Press ⌗ on the keyboard	Data stored
7. Wait about 1 second	Start charge DC capacitors : YES
8. Wait about 1 minute	Insert fuse or close MCB
9. **a)** Systems with built-in batteries (only possible with Silcon DP310E/DP340E). Insert F020 and F021. **b)** Systems with external batteries. Close battery MCCB's in MCCB box or battery cubicle. Please refer to LED indication and labeling in MCCB box or battery cubicle.	** System OFF **
10. Press the green "ON" push-button.	Normal operation load power XX%
11. Close the front door.	

The system is now started up and ready for use.

6.0 Programming parameters

6.1 General

Below listed parameters can be programmed directly from the keyboard during the commissioning.
Parameters are programmed as shown in the example 6.2.3.

6.2 Parameters

6.2.1

NOTE:
The system must not run in bypass mode for longer periods of time as the batteries will not be recharged.

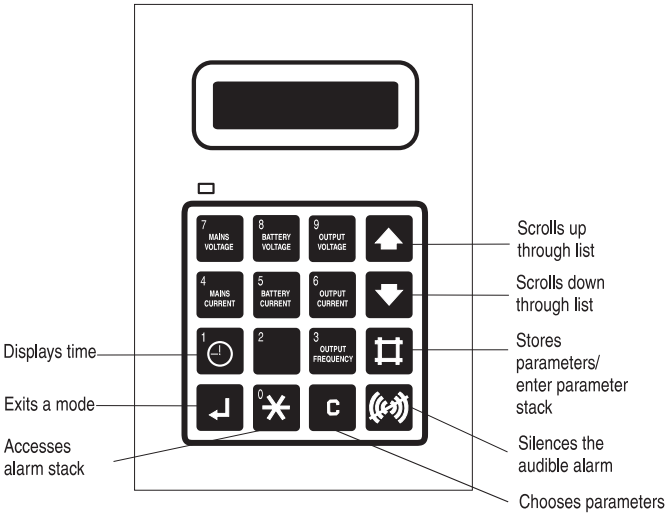
Parameter	Setting*	Comments
Bypass	YES, **NO**	"YES" will switch the system into bypass mode
Language	**GB**, D, F, DK, S, SF NL, PL, CZ E, P, SK, H	Language of text in display
Autostart	YES, **NO**	Automatic restart by mains return (1 min. delay). Ensures quick battery recharge.
Remote shutdown active	YES, **NO**	Shutdown of UPS by remote signal when in battery operation. Saves battery energy.
Remote shutdown polarity	**HIGH**, LOW	Nature of remote shutdown signal polarity
Remote shutdown time	0, 1, **2**, 3, 4 5, 6, 7, 8, 9 10 min.	Time delay on remote shutdown of UPS
Battery capacity test	–	Initiates check of back-up time. The measured time is from start until it reaches low DC warning level (Se section 8.4)
Battery monitor test**	–	Initiates checks of battery condition by 25% discharging.
Auto battery test**	**3**, 6 months OFF	Activates the battery monitor test in cyclic intervals (standard 3 months)
Battery monitor reset**	–	Pressing the c and ⌗ key after selecting this parameter resets alarms and flushes messages in the alarm stack
Boost charge	YES, **NO**	"YES" results in boost charge (10 hours)
Autoboost charge	YES, **NO**	"YES" results in boost charge after battery operation. (10 hours)
Enter new date	YYMMDD	Local date can be entered
Enter new time	HHMMSS	Local time can be entered

* Text in bold letters are the factory standard setting
** Only for systems with Battery Monitor active

Programming parameters

NOTE:
The display accuracy is ±2%, ±1 digit.

6.2.2 Keys used for programming



6.2.3 Programming example - switch to bypass operation

Action	Display shows
1. Press [⌗] to enter parameter stack	
2. Press [▲] or [▼] until	Bypass operation : NO
3. Press [C] until	Bypass operation : YES
4. Press [⌗] to store	
5. Press [↵] to exit	Bypass operation load power xx%

To return to normal operation

Action	Display shows
6. Press [⌗] to enter parameter stack	
7. Press [▲] or [▼] until	Bypass operation : YES
8. Press [C] until	Bypass operation : NO
9. Press [⌗] to store	
10. Press [↵] to exit	Normal operation load power xx%

Programming of the other parameters can be performed in exactly the same way.

6.3 Programming of system configuration parameters

The system configuration parameters are protected by a password because most of them are critical for correct operation of the system. **Wrong programming can for example destroy the battery or cause loss of output voltage during operation!!**

6.3.1 System configuration parameters

Parameter	Setting*	Comments
Isolation trafo mains	YES, **NO**	YES if optional input isolation transformer is present
Isolation trafo output	YES, **NO**	YES if optional output isolation transformer is present
Delta soft start time	1, **10**, 20, 40 secs.	Input current switching in ramp function. Higher values used together with smaller/ unstable diesel generators
External SSW present	YES, **NO**	YES for systems with external static bypass switch
Normal charge voltage		Setting of float charge voltage at 20°C /68°F (Aut. compensation for deviations)
Boost charge voltage		Setting of boost charge voltage at 20°C /68°F (Aut. compensation for deviations)
Low battery warning		Warning for discharged battery
Low battery shut down		Switches off the system at min. permissible battery voltage
Synchronization	0.25, 0.5, **1** 2, 4 Hz/sec	Synchronisation speed. Higher values used with very unstable mains frequencies
High battery temperature	15-40°C /59-104°F **35°C /95°F**	Alarm for too high battery ambient temperature
Common fault delay	0, **10**, 20 30 secs.	Delay before the common fault alarm relay is activated
Reset operation mode lock	YES, **NO**	YES resets system locked in bypass or battery operation mode caused by system failures (Only for service personnel)
Expected back-up time [min.]	0,1-999,9 **5,0**	Expected back-up time for UPS in minutes, when running at 100% ohmic load. Time used by the ABM**
Battery capacity in [Ah]	0,1-999,9 **7,0**	Total battery capacity in Ah. Setting used by the ABM**
Highest station address	2-9	Highest station address in parallel system
Station address	1-9	Station address in parallel system
Advanced power management (APM)	None	Only used in parallel system. Off: Advanced power management disabled. Parallel +1: Redundant operation with all units in operation. Redundant +1: Redundant operation with one unit being inactive in parallel system
APM test mode active	YES, NO	YES, if APM test mode is active
Battery connection	Common, Separate	Common if common battery is used in parallel system. Separate if separate battery is used

NOTE:
Common battery pack is a technical possibility.
However, APC recommend separate battery pack due to a higher safety degree in connection with redundant/parallel operation.
The UPS system is prepared for both solutions.

* Text in bold letters are the factory standard setting
** **A**dvanced **B**attery **M**onitor

Programming parameters

WARNING:
If not complete sure about the consequences of changing a parameter – please contact your local dealer!

NOTE:
The level used in the programming example 6.3.2 is only valid for 480V versions.
For 208V versions the level is 223V.

6.3.2 Programming example – change charge voltage to 446V*

Action	Display shows
1. Press 1 and 2 simultaneously to open for password input	Key in password :
2. Enter password 28 28 28 by pressing 2, 8 BATTERY VOLTAGE, 2, 8 BATTERY VOLTAGE, 2, 8 BATTERY VOLTAGE	Last selected parameter
3. Press ▲ or ▼ until	Normal charge voltage : 438
4. Press 4 MAINS CURRENT, 4 MAINS CURRENT, 6 OUTPUT CURRENT	Normal charge voltage : 446
5. Press ⌗ to store	Data stored
6. Wait about 1 second	Normal charge voltage : 446
7. Press ↵ to exit	Normal operation load power XX%

6.3.3 Programming example - change to output isolation transformer present*

Action	Display shows
1. Press [1] and [2] simultaneously to open for password input	Key in password :
2. Enter password 28 28 28 by pressing [2] [8 BATTERY VOLTAGE] [2] [8 BATTERY VOLTAGE] [2] [8 BATTERY VOLTAGE]	Last selected parameter
3. Press ▲ or ▼ until	Isolation trafo output : NO
4. Press C for change	Isolation trafo output : YES
5. Press ⌗ to store	Data stored
6. Wait about 1 second	Isolation trafo output : YES
7. Press ↵ to exit	Normal operation load power XX%

*For charge voltages, battery warnings and shut down voltages and high battery temperature the parameter is changed by entering the actual value like example 6.3.2. The other parameters are selected by pressing the C key as step 4 in example 6.3.3. - one or more times.

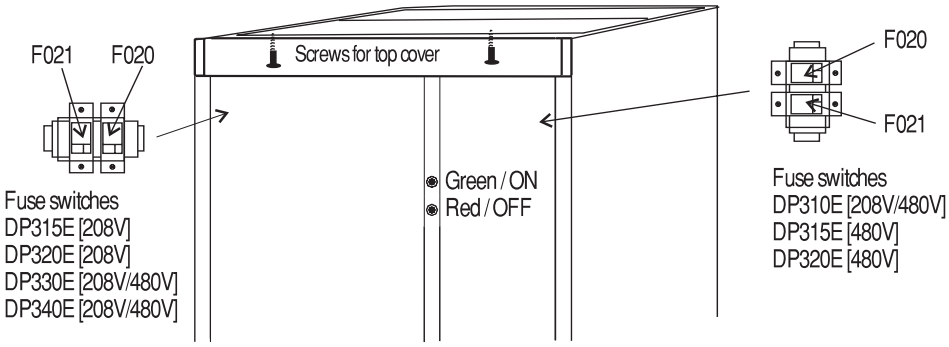
6.4 Programming of battery monitor

Action	Display shows
1. Press [1] and [2] simultaneously to open for password input	Key in password :
2. Enter password 28 28 28 by pressing [2] [8 BATTERY VOLTAGE] [2] [8 BATTERY VOLTAGE] [2] [8 BATTERY VOLTAGE]	Last selected parameter
3. Press ▲ or ▼ until	Expected back-up time [min.]: XXX.X
4. Enter the expected back-up time in min. at 100% ohmic (pf = 1) load, when the inverter has a mean efficiency of approx. 94%	
Press [1] [4 MAINS CURRENT] [0 ✱]	Expected back-up time [min.]: 14.0
Data for DP310E: A-Pack (7Ah) = 14.0 min.	
5. Press ⌗ to store data	Data stored
6. Press ▲ or ▼ until	Battery capacity in [Ah]: XX.X
7 Press [0 ✱] [7 MAINS VOLTAGE] to set Ah = 7.0 for battery	Battery capacity in [Ah]: 7.0
8. Press ⌗ to store data	Data stored
9. Press ↵ to exit	Normal operation load power XX%

Installation of new batteries:
When installing new batteries the procedure in 6.4 **MUST** be carried out, otherwise the monitor may give false alarms.

7.0 Switching off

7.1 Switching off Silcon DP310E-DP380E



WARNING:
This UPS system contains a special design feature, which guarantees output voltage in the form of bypass operation. This function comes into operation in case of failure in internal power supply or in controller circuit.
Even if the UPS system is assumed to be switched off, there may be voltage at the UPS output because of the special bypass feature.
Switching off by pressing the red “OFF”-button.
TEST BEFORE TOUCHING!

WARNING:
Batteries out of service could be damaged if not recharged every 3rd month.

WARNING:
Internal DC-capacitor may contain energy even after the UPS has been switched off.
On account of the automatic discharging, wait at least 5 minutes after that the UPS has been switched off until working on the system is commenced.

1.	Prepare the system by opening the front door(s).	
2.	Continue with the next point (3) and observe that this **next step will interrupt the system output voltage!!!**	
		Display shows
3.	Press the red “OFF“ push-button. The acoustic alarm sounds for 30 sec.*	** System OFF **
4.	Switch off the mains power supply The red alarm LED below the display ligths. The acoustic alarm sounds for 30 sec.	** System OFF **
5.	**a)** Systems with built-in batteries (only possible for Silcon DP310E/DP340E). Open F020 and F021. **b)** Systems with external batteries. Switch off battery MCCB’s in MCCB box or battery cubicle. Please refer to LED indication and labeling in MCCB box or battery cubicle. The acoustic alarm sounds shortly.	Blank

*The acoustic alarm can be reset by the key.

The UPS is now isolated. Maintenance/repair work can take place or the UPS can be disconnected and removed.

NOTE:
Do only use the original control cable delivered with the parallel board.

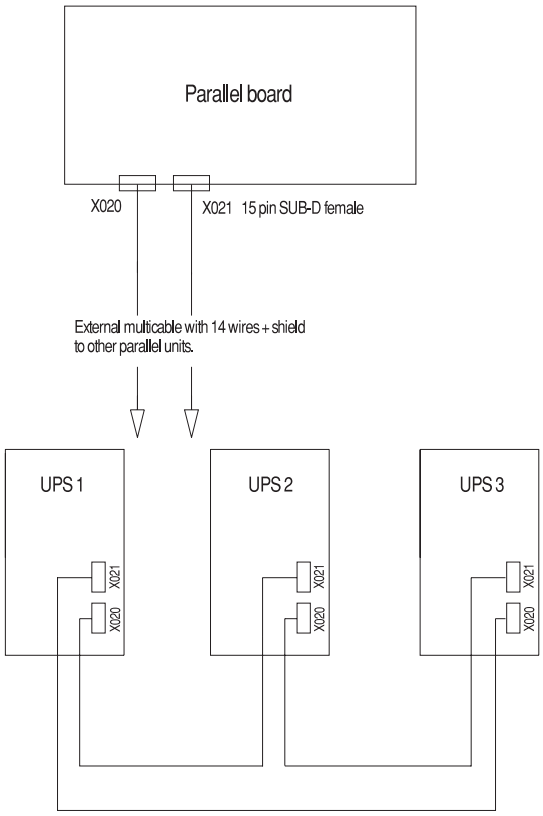
NOTE:
The control cables must be separated from the AC and DC power cables.

8.0 Options/Accessories

8.1 Parallel/Redundant operation

The parallel board.

Introduction.
The parallel board establishes the possibility to connect two or more systems in parallel - either to obtain increased security or to obtain higher total output power. Among other functions the parallel board ensures a correct load sharing between the parallel connected systems.



Control cables.
The external multicable is terminated with a 15 pin SUB-D plug in both ends. Pin 1 to pin 1, pin 2 to pin 2, and so on up to pin 15 - except pin 8, which is not connected. Shield is connected to plug cover in both ends.
The terminals X020 and X021 for the control cables are situated on the parallel board. X020 in UPS1 is connected to X021 in UPS2, X020 in UPS2 is connected to X021 in UPS3 and so on. X020 in last UPS is connected to X021 in UPS1.

Power cables.
To optimize load sharing in parallel operation the external power circuits must be “symmetrical”, i.e. power input cables must have same lengths and cross-sections and the same for output cables.

General programming/operation.
Programming parameters for advanced parallel operation.

To use the advanced parallel functions the following parameters must be programmed:

1. “Station number”
2. “Highest station address”
3. “Advanced power management”
4. “APM test mode active”
5. “Battery connection”

Description of settings.

1. “Station number”
   - Valid station numbers: 1-9 stating the UPS parallel address in the system.
2. “Highest station number”
   - Valid station numbers: 2-9 stating the number of UPS’s in the system.
3. “Advanced power management”
   - “Disabled”: Advanced power management is inactive.
   - “PARALLEL+1”: Advanced power management is activated when the system operates as PARALLEL+1, meaning that one system can be isolated without overloading the remaining systems (N systems/UPS).
   - “REDUNDANT+1”: Advanced power management is activated when the system operates as REDUNDANT+1, meaning that one system can be isolated without overloading the remaining systems (N systems/UPS) with one spare system.
4. “APM test mode active”
   - “No”: Stand-by time will be 24 hours - on-line time will be 48 hours * N systems.
   - “Yes”: Stand-by time will be 1 min. - on-line time will be 2 min. * N systems.
5. “Battery connection”
   - “Separate”: Separate battery for this UPS.
   - “Common”: Common battery in a parallel system. When this setting is chosen, the highest battery temperature that can be found in the parallelled systems is used (for charge voltage compensating).

NOTE:
Common battery pack is a technical possibility.
However, APC recommend separate battery pack due to a higher safety degree in connection with redundant/parallel operation.
The UPS system is prepared for both solutions.

Programming guide.
Example with 4 systems in parallel with separate batteries.

- Programme the station addresses 1-4: 1 for UPS 1, 2 for UPS 2, 3 for UPS 3, and 4 for UPS 4.
- All UPS systems have to be programmed to “Highest station address” = 4.
- If AMP should not be tested, “APM test mode active” must be “NO”.
- If a system is isolated due to service the station numbers must be reprogrammed for the remaining active systems starting with number 1 and ending with max. number of active systems. No numbers must be left out in this sequence. Furthermore “Highest station address” must be changed to number of active UPS’s in parallel.

Parallel operation alarms.

General.
If alarms concerning the parallel operation communication arise all parallel operation functions being controlled by the advanced management will be inactive. If the advanced parallel operation functions are inactive, “only” the simple hardware control of parallel operation, which controls load sharing, operation mode, etc., is left.

Alarm texts conc. parallel operation.
In case of fault in parallel operation the following alarm will be active in the alarm stack:

- “Communication to parallel IF lost”.

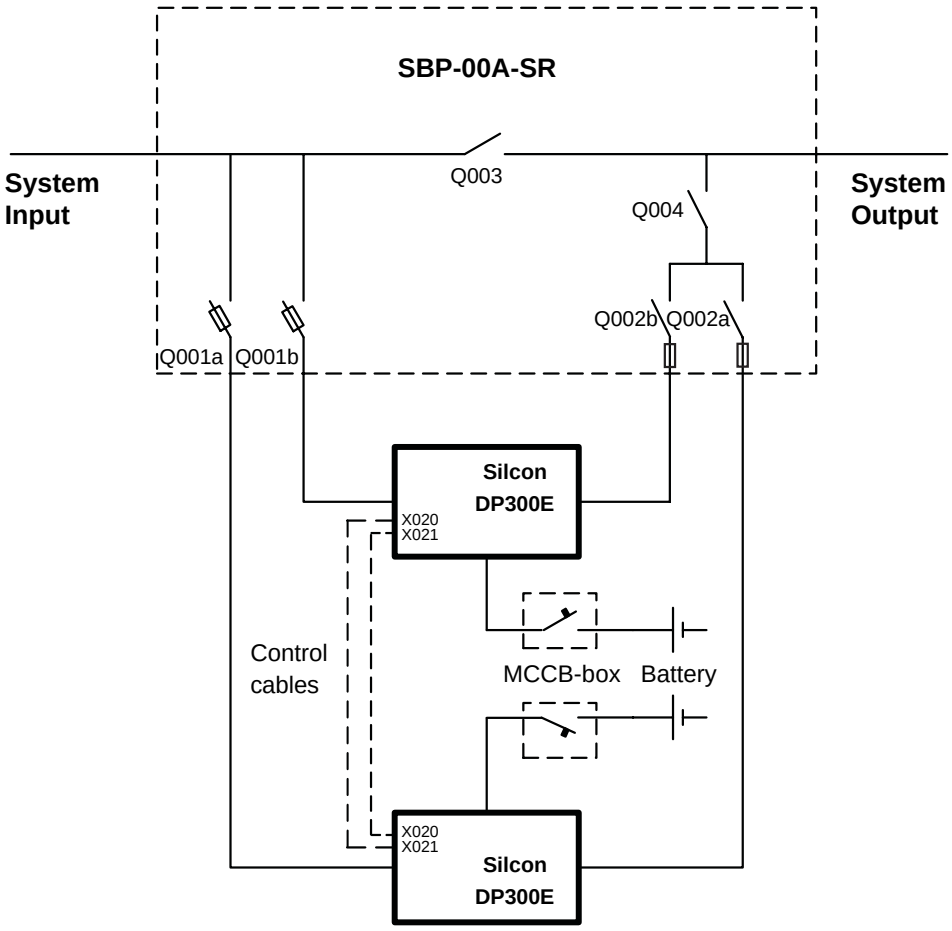
Other reasons for parallel operation alarm.

- When a system is isolated (PSU OFF) due to service this fault will as well arise on the systems still operating. The reason is that the isolated system is no longer to be found (active) in the parallel system. The fault can only be deleted by turning on the PSU or by reprogramming the station addresses on all systems so that the sequence is: 1 to max_number_system.

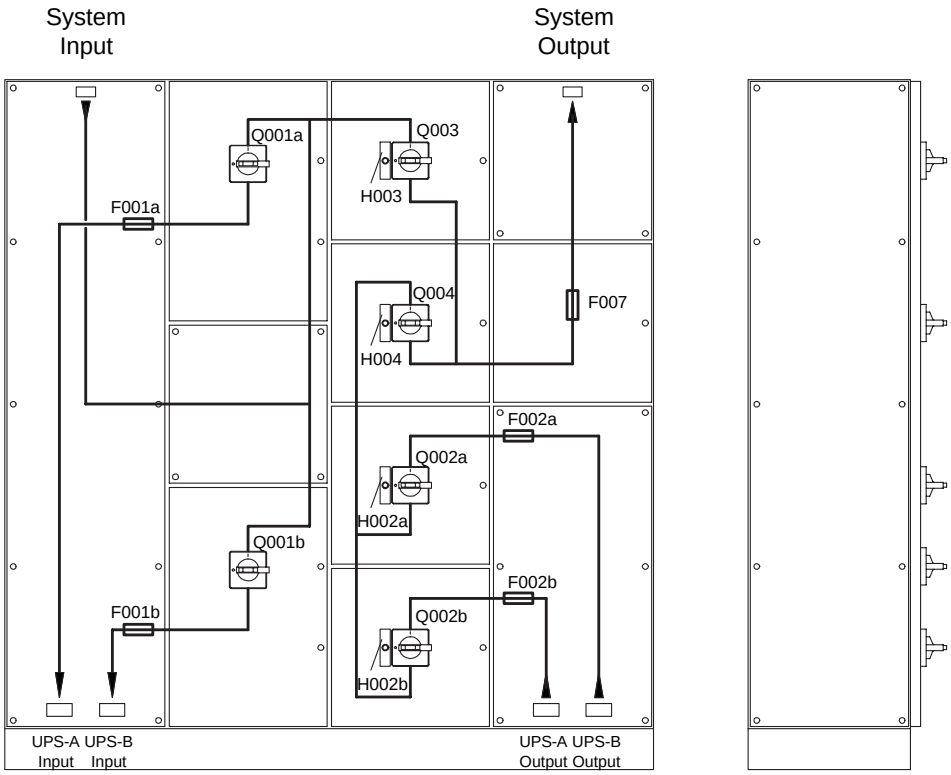
8.2 Service Bypass Panel for Parallel Redundant Operation, Single Mains, SBP-00A-SR

The SBP-00A-SR series contains 3 models, SBP-40A-SR, SBP-80A-SR and SBP-175A-SR, covering the range 10 to 40kVA, 208V and 10 to 80kVA, 480V.

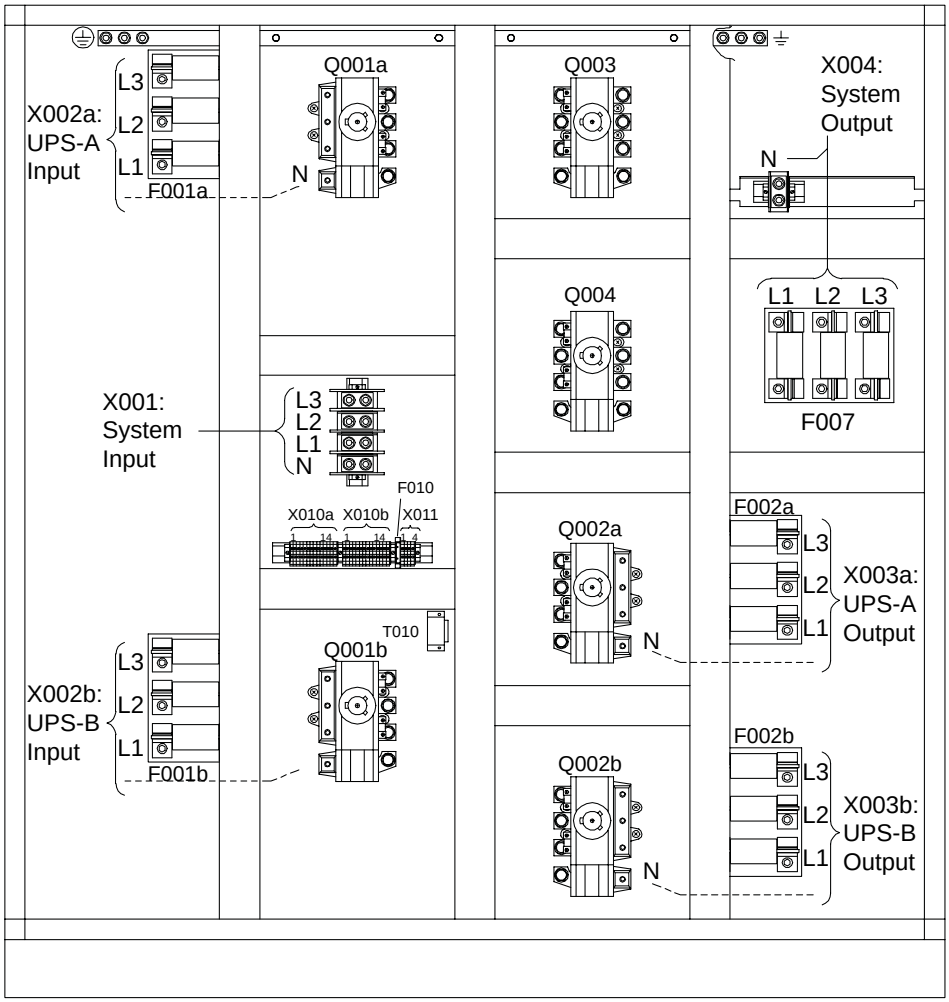
8.2.1 General arrangement



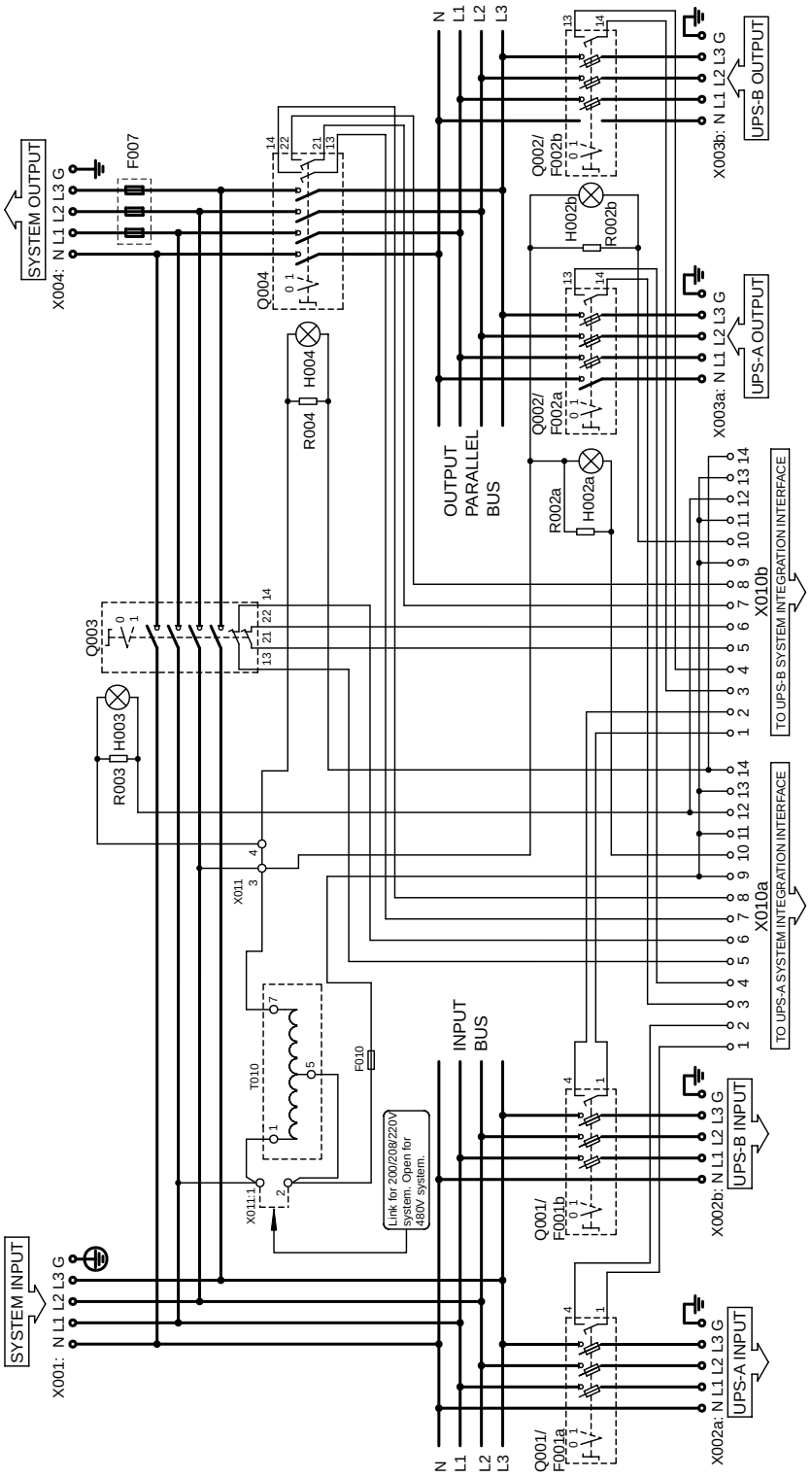
FRONT VIEW


System
Input
System
Output
Q001a
Q003
H003
F001a
Q004
F007
H004
F002a
Q002a
H002a
Q001b
F002b
F001b
Q002b
H002b
UPS-A
Input
UPS-B
Input
UPS-A
Output
UPS-B
Output

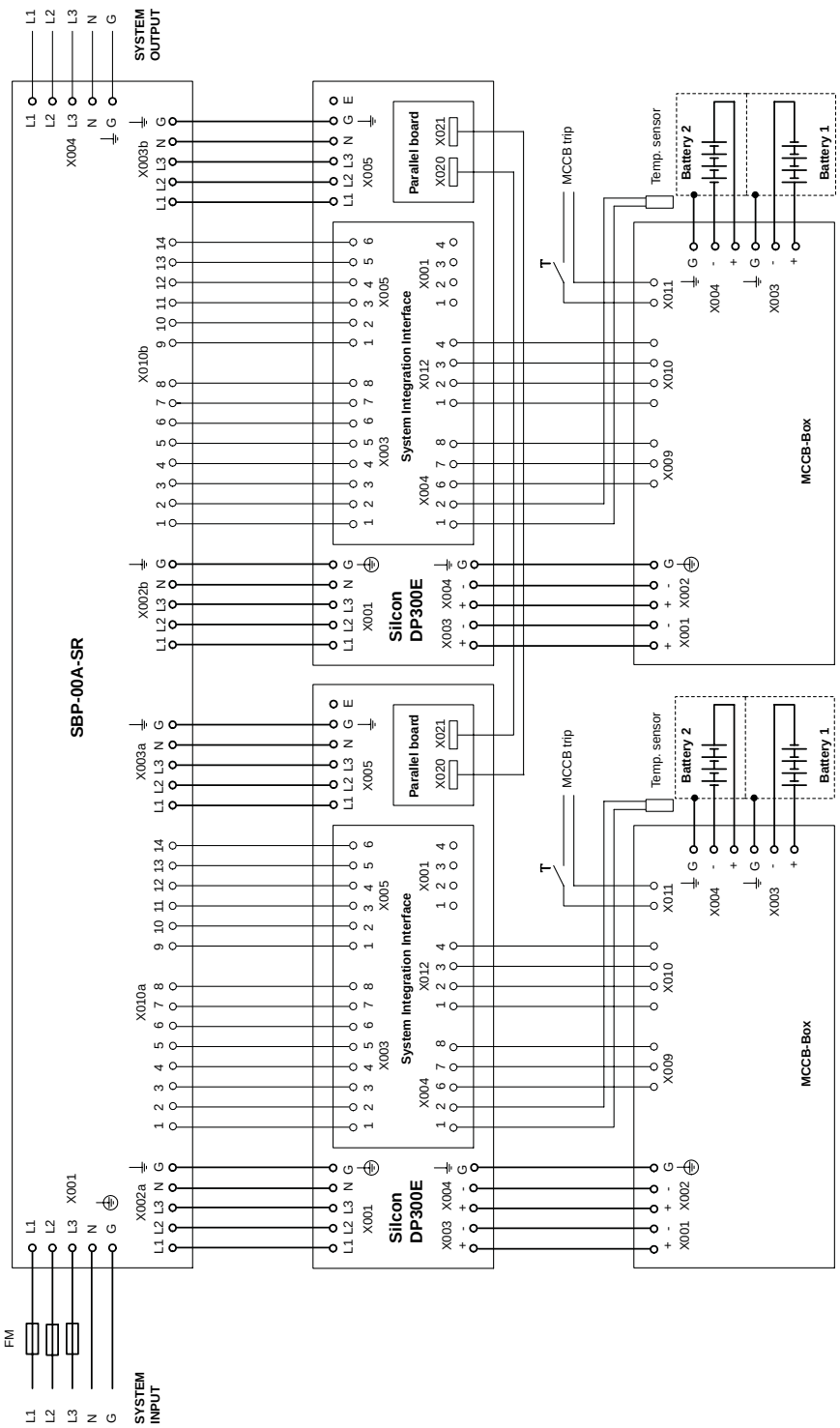
INTERNAL FRONT VIEW



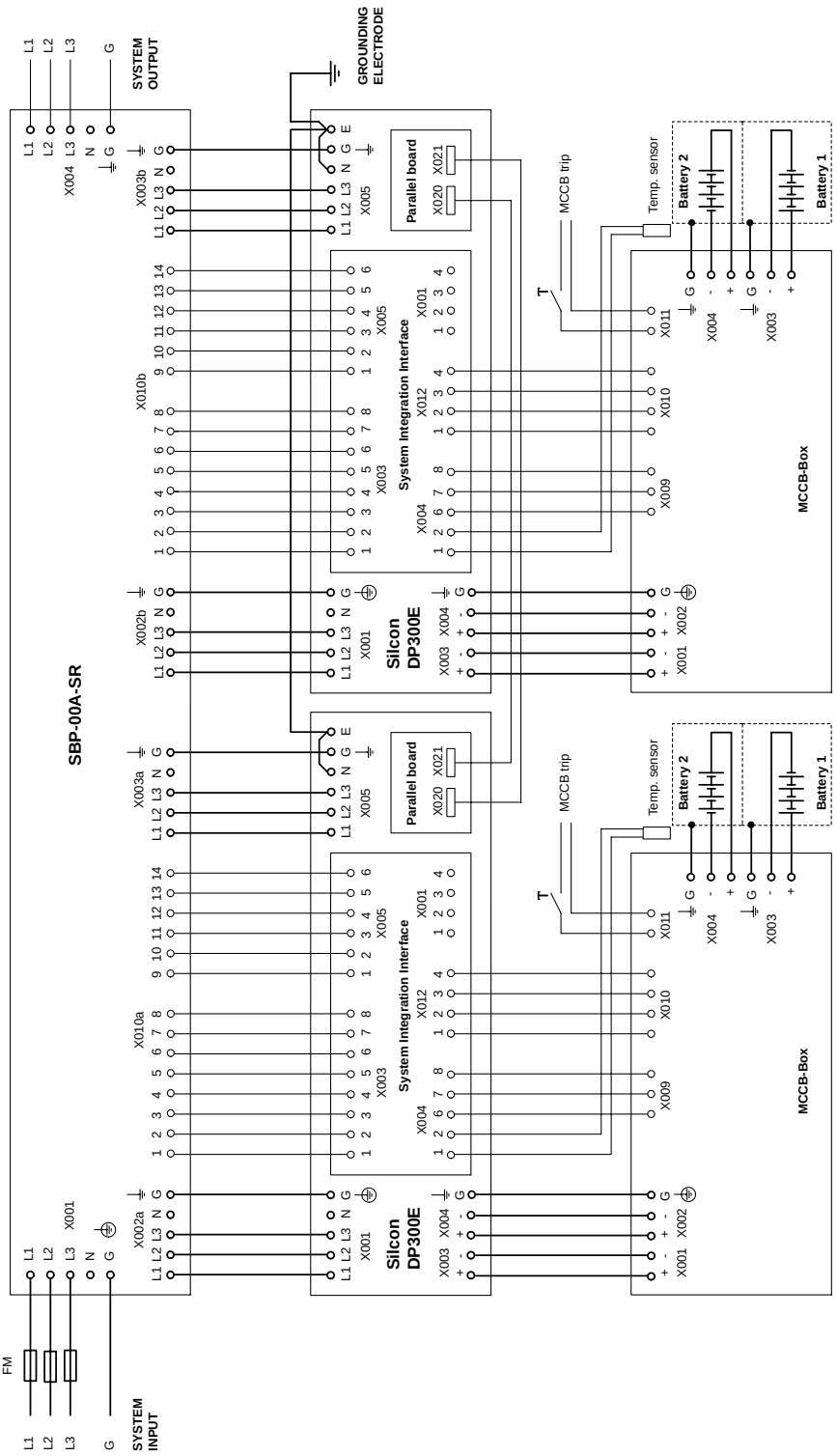
8.2.2 Diagram


SYSTEM INPUT
X001: N L1 L2 L3 G
SYSTEM OUTPUT
X004: N L1 L2 L3 G
F007
Q004
H004
R004
Q003
H003
R003
X011
T010
F010
Link for 200/208/220V system. Open for 480V system.
OUTPUT PARALLEL BUS
INPUT BUS
Q002/ F002b
H002b
R002b
Q002/ F002a
H002a
R002a
Q001/ F001b
Q001/ F001a
X003b: N L1 L2 L3 G
UPS-B OUTPUT
X003a: N L1 L2 L3 G
UPS-A OUTPUT
X002b: N L1 L2 L3 G
UPS-B INPUT
X002a: N L1 L2 L3 G
UPS-A INPUT
X010b
TO UPS-B SYSTEM INTEGRATION INTERFACE
X010a
TO UPS-A SYSTEM INTEGRATION INTERFACE
N
L1
L2
L3

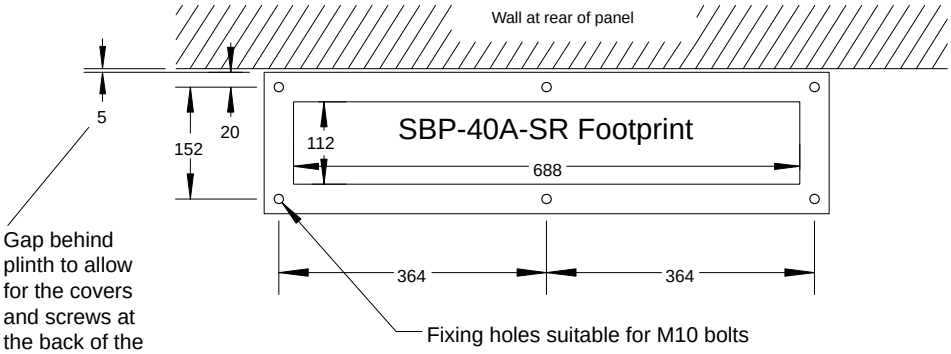
8.2.3 Parallel/Redundant Silcon DP300E with SBP-00A-SR and External Battery via MCCB Box - Single Mains - 4 wire grounded WYE service



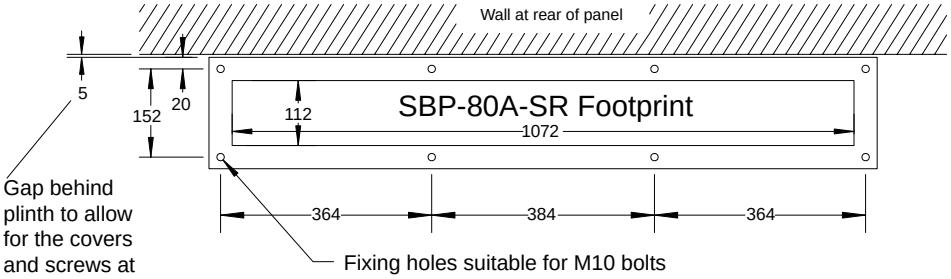
8.2.4 Parallel/Redundant Silcon DP300E with SBP-00A-SR and External Battery via MCCB Box - Single Mains - 3 wire grounded WYE service



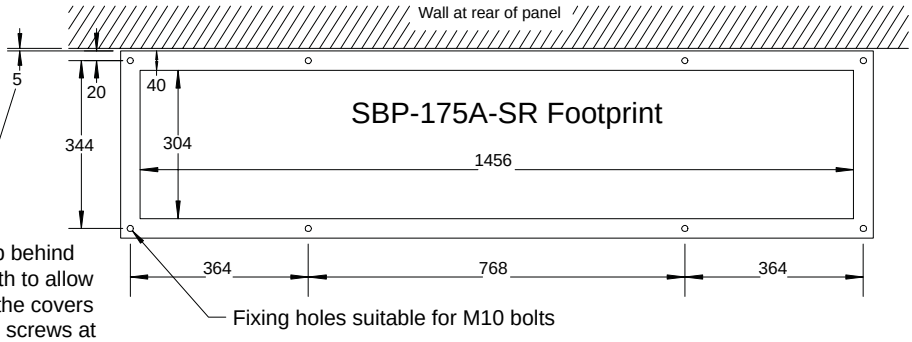
8.2.5 Mounting and Connection



Gap behind plinth to allow for the covers and screws at the back of the main part of the enclosure. Similar at the left and right hand ends.



Gap behind plinth to allow for the covers and screws at the back of the main part of the enclosure. Similar at the left and right hand ends.



Gap behind plinth to allow for the covers and screws at the back of the main part of the enclosure. Similar at the left and right hand ends.

Options/Accessories

NOTE:
All external cable dimensions are recommended.
Please refer to local legal provisions.

WARNING:
At 100% switch mode load the neutral conductor shall be rated for 173% output phase current.

NOTE:
ϕ is symbol for “phase”.


is symbol for “Risk of Electric Shock”.

Terminal for Equipment Grounding Conductor is marked 

NOTE:
Grounding, please refer to local legal provisions.

NOTE:
Ensure correct phase connection of inputs and outputs.

Type	For System	Dimensions HxWxD* [mm]	Weight [kg]
SBP-40A-SR	DP310E - 480V	1250 x 770 x 216	90
	DP315E - 480V		
	DP320E - 480V		
	DP310E - 208V		
SBP-80A-SR	DP330E - 480V	1632 x 1155 x 216	150
	DP340E - 480V		
	DP315E - 208V		
	DP320E - 208V		
SBP-175A-SR	DP360E - 480V	1632 x 1540 x 408	250
	DP380E - 480V		
	DP330E - 208V		
	DP340E - 208V		

* Depth of enclosure including switch handles stated in brackets.

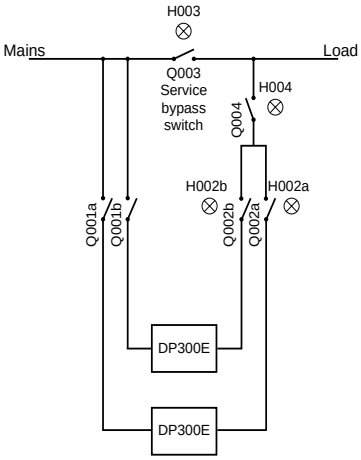
Options/Accessories

[d] TYPE	FOR SYSTEM	[a] EXT. INPUT FUSES [A]	[a] INT. INPUT FUSES [A]	[b] EXT. INPUT PHASE CONDU. [AWG]	[a] INT. OUTPUT FUSES [A]	[b] EXT. OUTPUT PHASE CONDU. [AWG]	[b+c] EXT. NEUTRAL CONDU. [AWG]	EXT. EQU. GND. CONDU. [AWG]
SBP-40A-SR	DP310E - 480V	25	20	10	15	14	10	10
	DP315E - 480V	30	25	8	20	10	8	10
	DP320E - 480V	40	35	8	25	10	6	10
	DP310E 208V	45	40	6	30	8	4	10
SBP-80A-SR	DP330E - 480V	60	50	4	40	6	3	10
	DP340E - 480V	80	70	3	50	4	1	8
	DP315E - 208V	70	60	3	45	6	2	8
	DP320E 208V	90	80	1	60	4	1/0	8
SBP-175A-SR	DP360E - 480V	110	100	1/0	80	2	3/0	8
	DP380E - 480V	150	125	3/0	100	1/0	250 kcmil	6
	DP330E - 208V	150	125	3/0	90	1	4/0	6
	DP340E - 208V	175	150	250 kcmil	125	2/0	250 kcmil	6

a) Class J-fast acting in accordance with UL248-8.
b) Cable sizes refer to US National Electric Code, Table 310-16, cables rated 75˚C/167˚F at max. 40˚C/104˚F ambient.
All cables rated 600V.
As regards recommended cable lugs and crimping tool, see section 4.1.4.
c) Dimensioned for switch mode load. ($I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$)
For linear load neutral cable can be rated as output phase cables.
d) The internal input and output fuses have to be configured for the appropriate DP300E types.

8.2.6 Operating the external service bypass switch for parallel systems

Single Mains



WARNING!
If the UPS is out of service for more than 8 days the connected batteries might be damaged. Refer to total "Switching off" as described in Chapter 7.0.

8.2.6.1 Bypassing the parallel UPS system

Action
Point 1-4 can be carried out with any of the parallel systems, however this will switch all systems into bypass operation.

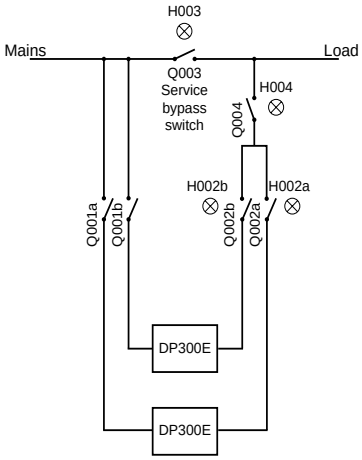
		Display shows
1.	Press ⌗ on the keyboard	
2.	Press ▲ or ▼ on the keyboard until	Bypass operation : NO
3.	Press C on the keyboard	Bypass operation : YES
4.	Press ⌗ on the keyboard	
	All systems will transfer to bypass operation	Bypass operation
	Do not switch off any of the UPS systems until point 5-8 has been carried out	
		Lamp indication on bypass panel
5.	Check lamp indication on the bypass panel	The green lamp (H003) above the bypass switch handle (Q003) lights
6.	Turn the external bypass switch (Q003) to position "1"	The green lamp (H004) above the output switch (Q004) and the green lamps (H002) above the output switch handles (Q002) light
7.	Turn the output switch (Q004) to position "0"	The green lamps (H002) above the output switch (Q002) light and the green lamp (H004) above the output switch (Q004) lights
8.	Turn all output switches (Q002) to position "0"	Now the lamps (H002) above the output switch handles (Q002) light and the green lamp (H004) above the output switch (Q004) lights

	Display shows
9. Open the front door and press the red “OFF” push-button in any of the systems. The acoustic alarm sounds for 30 secs.*	**System OFF**
Repeat for (all) other system(s)	
10. Turn all input switches (Q001) to position “0“	
The red alarm LED below the display lights and the acoustic alarm sounds for 30 secs.	
* The acoustic alarm can be reset by the  key	

EMERGENCY (UPS not alive)

1. Turn the input switches (Q001) to position “0“.
2. Turn the output switches (Q002) to position “0“.
3. Turn the output switch (Q004) to position “0”.
4. Change any released system input fuse(s).
5. Turn the bypass switch (Q003) to position “1“.

Single Mains



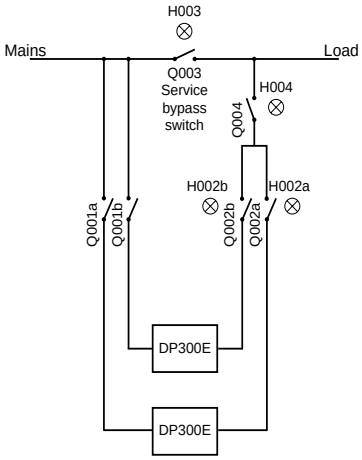
NOTE:
If battery has been disconnected please refer to "Starting Up" in Chapter 5.0 to connect battery(-ies) again.

8.2.6.2 Switching the parallel system from external bypass into normal UPS operation

Action	Display shows
1. Check that the output switch (Q004) is in position "0"	
2. Check that all output switches (Q002) are in position "0"	
3. Turn input switches (Q001) to position "1"	**System OFF**
4. Open the UPS front door and press the green "ON" push-button	Normal operation load power 0%
5. Press ⌗ on the keyboard	
6. Press ▲ or ▼ on the keyboard until	Bypass operation : NO
7. Press C on the keyboard	Bypass operation : YES
8. Press ⌗ on the keyboard	
All systems will transfer to bypass operation	Bypass operation
	Lamp indication on bypass panel
9. Check that all output switches (Q002) are in position "0"	The green lamps (H002) above all the output switch handles (Q002) lights. The green lamp (H004) above the output switch (Q004) handle also lights.
10. Turn all output switches (Q002) to position "1"	
11. Turn the output switch (Q004) to position "1"	The green lamps (H002) above all the output switch handles (Q002) light. The green lamp (H004) above the output switch (Q004) handle and the green lamp (H003) above the bypass switch also light.
12. Turn the bypass switch (Q003) to position "0"	The green lamps (H002) and (H004) do not light any longer, but (H003) will light until normal operation.

The following can be carried out on any UPS	Display shows
13. Press  on the keyboard	
14. Press  or  on the keyboard until	Bypass operation : YES
15. Press  on the keyboard	Bypass operation : NO
16. Press  on the keyboard	
All the systems will transfer to normal operation.	Normal operation load power xx%
	No lamps on the bypass panel light any longer

Single Mains



WARNING!
The system will discharge built-in capacitors. However, before working on the system check with a multimeter that there is no dangerous voltage on the terminals .

8.2.7 Isolating one UPS for service/maintenance

In a redundant system one UPS can be isolated for service/maintenance without affecting the other parallelled UPS(s).

1. Check that the remaining UPS(s) will be able to carry the load when one UPS is isolated.

2. Switch off the system to be isolated for maintenance by pushing the red “OFF” push-button.

3. Disconnect battery, mains, and output by opening battery MCCB and turning input switch (Q001) and output switch (Q002) to position “0”.

   When Q002 is in position “0” the UPS can be operated and tested as a single system without affecting the other parallelled UPS(s).

Switching back the UPS to normal parallel/redundant operation

1. Turn the input switch (Q001) and the output switch (Q002) to position “1”.

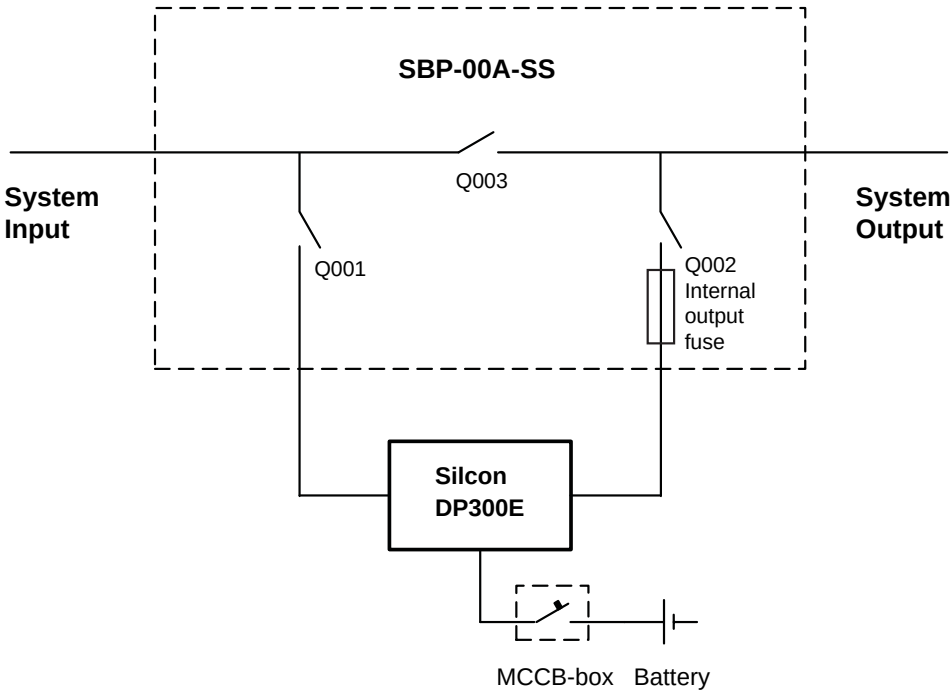
2. Charge capacitors, connect battery and start up the UPS as described in chapter 5.0.

   The UPS will automatically switch to normal operation and start load sharing with the other parallelled UPS(s).

8.3 Service Bypass Panel for Single Operation, Single Mains, SBP-00A-SS

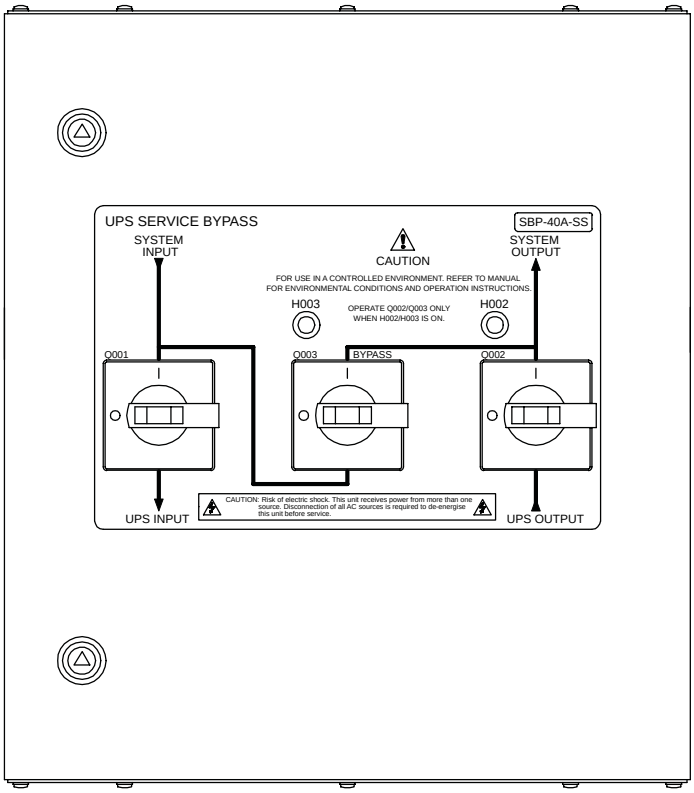
The SBP-00A-SS series contains 3 models, SBP-40A-SS, SBP-80A-SS and SBP-175A-SS, covering the range 10 to 40kVA, 208V and 10 to 80kVA, 480V.

8.3.1 General arrangement

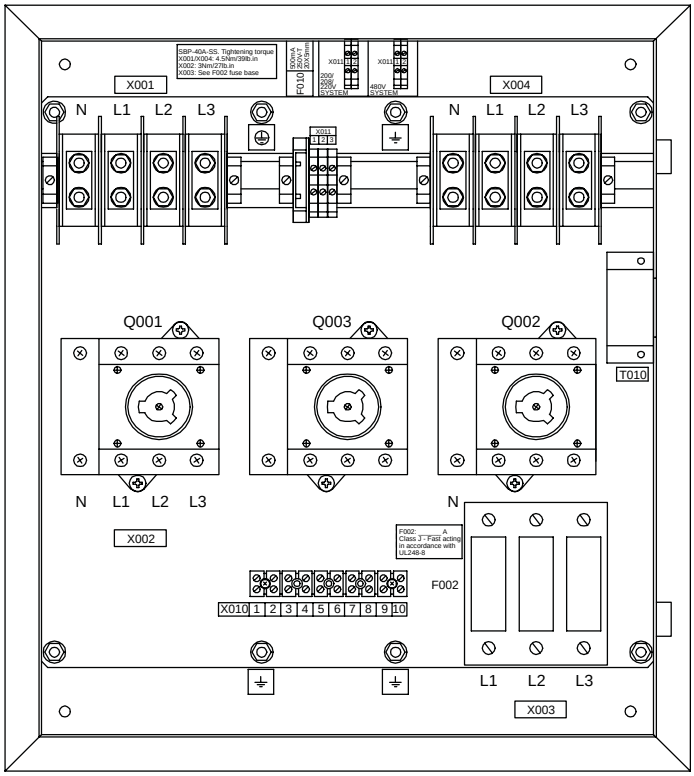


Options/Accessories

FRONT VIEW

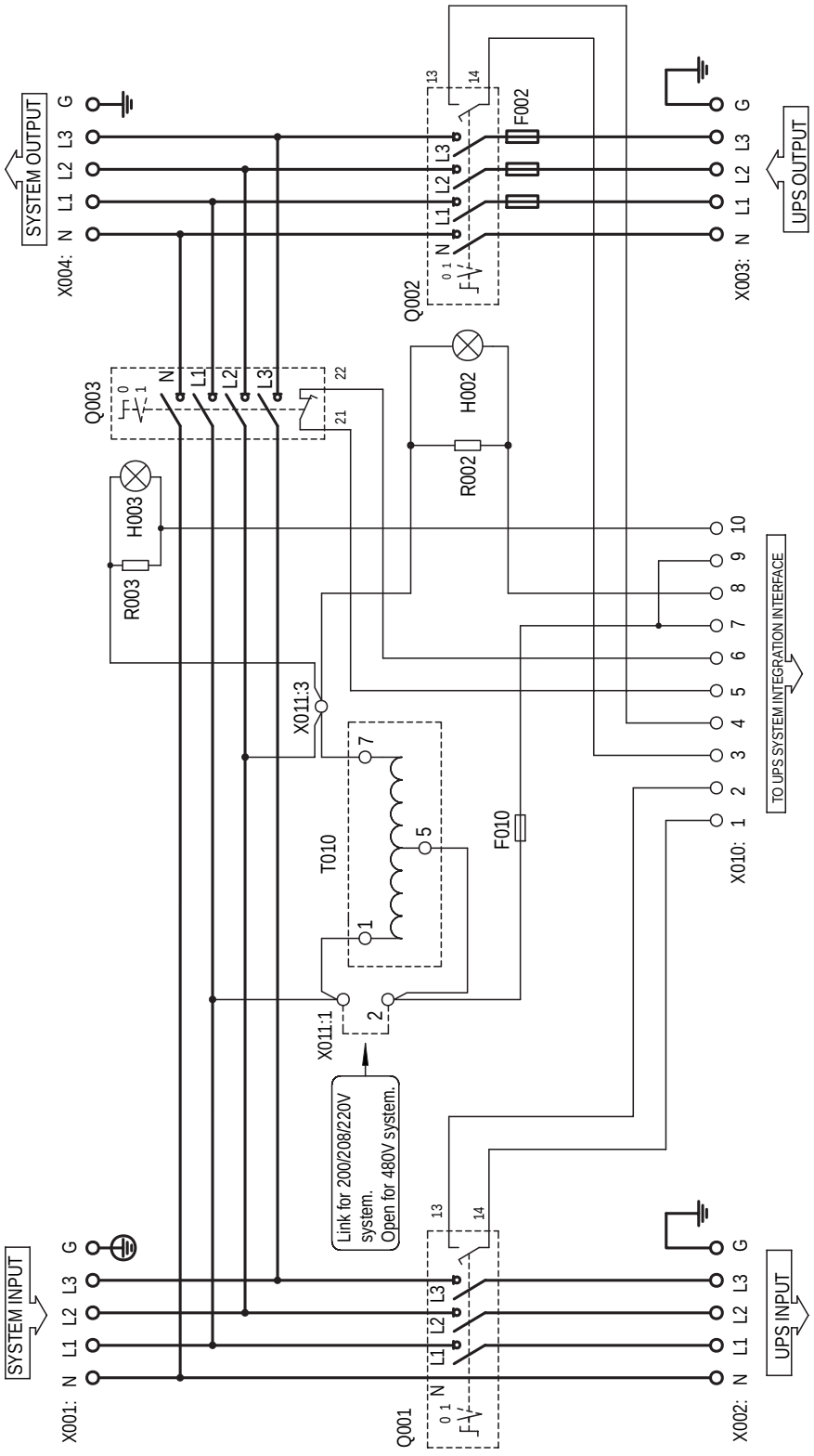


INTERNAL
FRONT VIEW

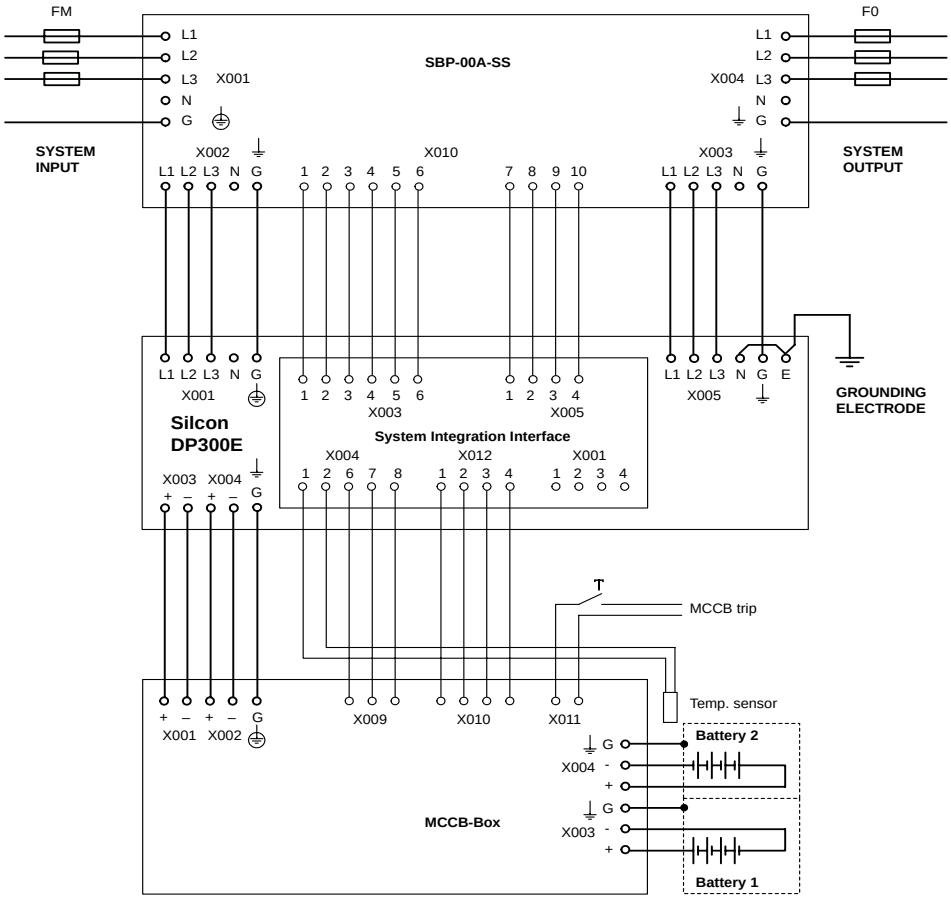


7OY0002 US rev. 04

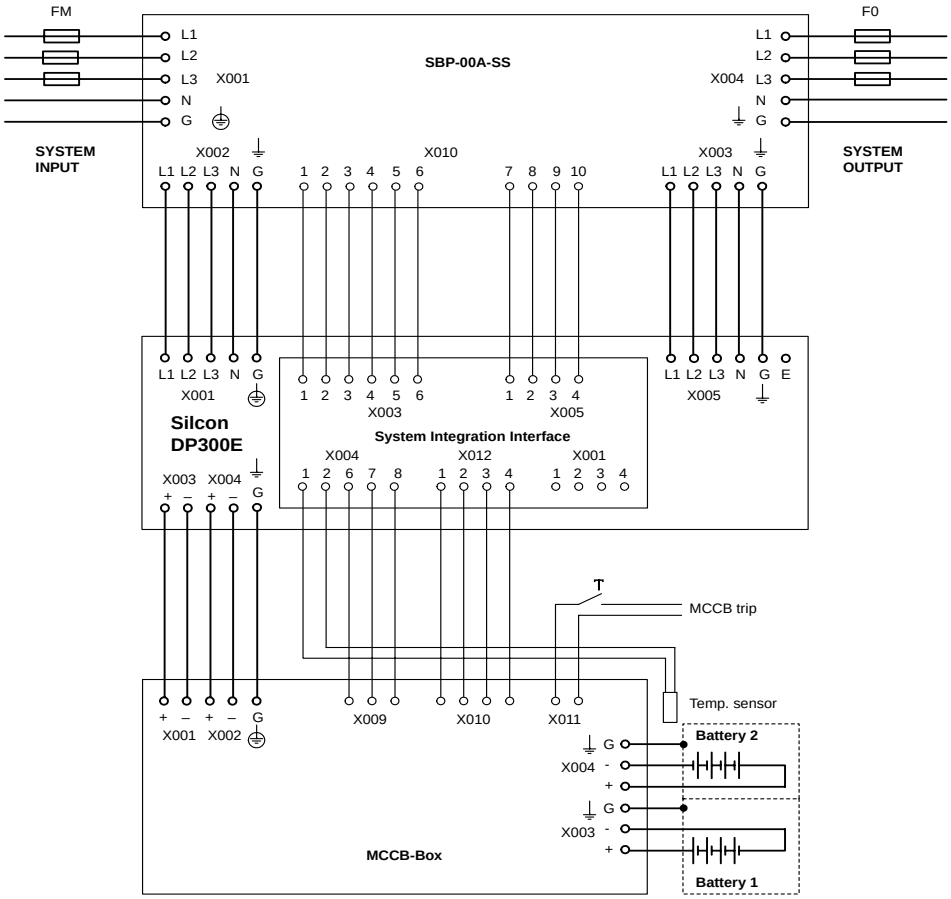
8.3.2 Diagram


SYSTEM OUTPUT
X004: N L1 L2 L3 G
UPS OUTPUT
X003: N L1 L2 L3 G
Q002
F002
H002
R002
Q003
H003
R003
X011:3
T010
F010
X011:1
TO UPS SYSTEM INTEGRATION INTERFACE
X010: 1 2 3 4 5 6 7 8 9 10
Link for 200/208/220V system.
Open for 480V system.
SYSTEM INPUT
X001: N L1 L2 L3 G
UPS INPUT
X002: N L1 L2 L3 G
Q001

8.3.3 Silcon DP300E with SBP-00A-SS and External Battery via MCCB Box - Single Mains - 3 wire grounded WYE-service



8.3.4 Silcon DP300E with SBP-00A-SS and External Battery via MCCB Box - Single Mains - 4 wire grounded WYE-service



8.3.5 Mounting & Connection

NOTE:
All external cable dimensions are recommended.
Please refer to local legal provisions.

WARNING:
At 100% switch mode load the neutral conductor shall be rated for 173% output phase current.

NOTE:
ϕ is symbol for “phase”.

is symbol for “Risk of Electric Shock”.

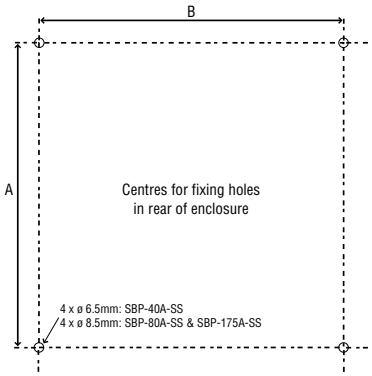
Terminal for Equipment Grounding Conductor is marked

NOTE:
Grounding, please refer to local legal provisions.

NOTE:
Ensure correct phase connection of inputs and outputs.

Type	For System System	Dimension HxWxD* [mm]	Fixing centres AxB [mm²]
SBP-40A-SS	DP310E – 480V	400 x 460 x 125(175)	380x330
	DP315E – 480V		
	DP320E – 480V		
	DP310E – 208V		
SBP-80A-SS	DP330E – 480V	560 x 750 x 175(235)	460x660
	DP340E – 480V		
	DP315E – 208V		
	DP320E – 208V		
SBP-175A-SS	DP360E – 480V	960 x 750 x 175(235)	860x660
	DP380E – 480V		
	DP330E – 208V		
	DP340E – 208V		
SBP-300A-SS	DP360E – 208V	1250 x 1155 x 410(470)	For floor mounting
	DP380E – 208V		

* Depth of enclosure including switch handles stated in brackets.

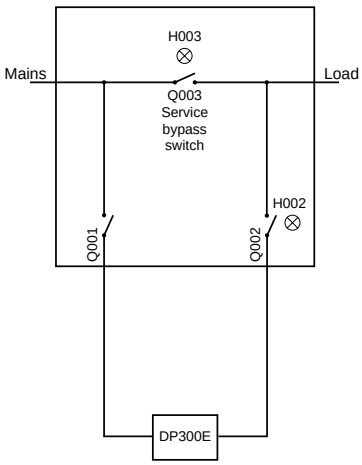


[d] TYPE	FOR SYSTEM	[a] EXT. INPUT FUSES [A]	[b] EXT. INPUT PHASE CONDU. [AWG]	[a] EXT. & INT. OUTPUT FUSES [A]	[b] EXT. OUTPUT PHASE CONDU. [AWG]	[b+c] EXT. NEUTRAL CONDU. [AWG]	EXT. EQU. GND. CONDU. [AWG]
SBP-40A-SS	DP310E - 480V	20	12	15	14	10	12
	DP315E - 480V	25	10	20	10	8	10
	DP320E - 480V	35	8	25	10	6	10
	DP310E 208V	40	6	30	8	4	10
SBP-80A-SS	DP330E - 480V	50	4	40	6	3	10
	DP340E - 480V	70	3	50	4	1	8
	DP315E - 208V	60	4	45	6	2	10
	DP320E 208V	80	2	60	4	1/0	8
SBP-175A-SS	DP360E - 480V	100	1/0	80	2	3/0	8
	DP380E - 480V	125	3/0	100	1/0	250 kcmil	6
	DP330E - 208V	125	2/0	90	1	4/0	6
	DP340E - 208V	150	4/0	125	2/0	250 kcmil	6
SBP-300A-SS	DP360E - 208V	225	2 x 3/0	175	2 x 1/0	2 x 250 kcmil	4
	DP380E - 208V	300	2 x 250 kcmil	250	2 x 3/0	2 x 400 kcmil	4

a) Class J-fast acting in accordance with UL248-8.
b) Cable sizes refer to US National Electric Code, Table 310-16, cables rated 75˚C/167˚F at max. 40˚C/104˚F ambient.
All cables rated 600V.
As regards recommended cable lugs and crimping tool, see section 4.1.4.
c) Dimensioned for switch mode load. ($I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$)
For linear load neutral cable can be rated as output phase cables.
d) The internal output fuses have to be configured for the appropriate DP300E type.

8.3.6 Operating the external service bypass switch

Single Mains



WARNING!
If the UPS is out of service for more than 8 days the connected batteries might be damaged. Refer to total "Switching off" as described in Chapter 7.0.

8.3.6.1 Bypassing the UPS

Action	Display shows
1. Press [⌗] on the keyboard	
2. Press [▲] or [▼] on the keyboard until	Bypass operation : NO
3. Press [C] on the keyboard	Bypass operation : YES
4. Press [⌗] on the keyboard	
The system will transfer to bypass operation.	Bypass operation

	Lamp indication on bypass panel
5. Check lamp indication on the bypass panel	The Green lamp (H003) above the bypass switch handle (Q003) lights
6. Turn the external bypass switch (Q003) to position „1"	The Green lamp (H002) above the output switch handle (Q002) lights
7. Turn the output switch (Q002) to position „0"	Now only the lamp (H002) above the output switch handle (Q002) lights

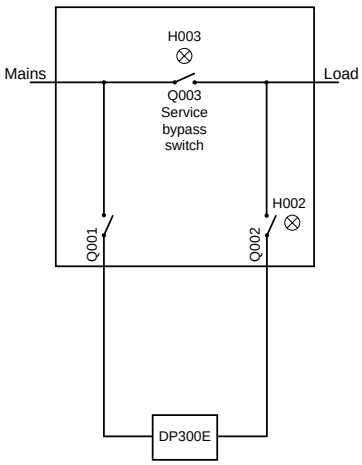
	Display shows
8. Open the front door and press the red "OFF" key.	**System OFF**
The acoustic alarm sounds for 30 secs.*	
9. Turn input switch (Q001) to position „0"	
The red alarm LED below the display lights and the acoustic alarm sounds for 30 secs.	

* The acoustic alarm can be reset by the [🔔] key

EMERGENCY (UPS not alive)

1. Turn the input switch (Q001) to position „0".
2. Turn the output switch (Q002) to position „0".
3. Change any released system input fuse(s).
4. Turn the bypass switch (Q003) to position „1".

Single Mains

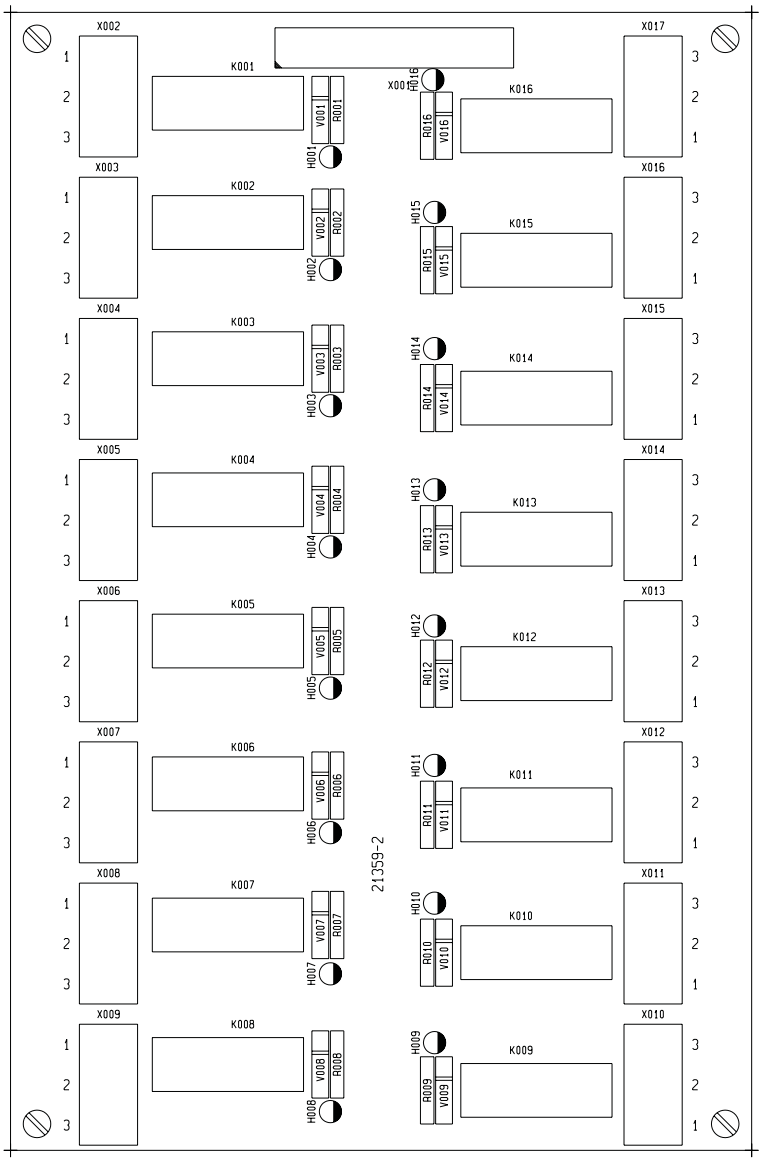


NOTE:
If the battery has been disconnected please refer to "Starting up" in chapter 5.0 to connect battery(ies) again.

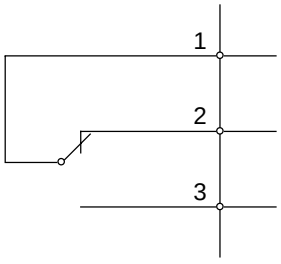
8.3.6.2 Switching the system from external bypass into normal UPS operation

Action	Display shows
1. Check that the output switch (Q002) is in position "0"	
2. Turn the input switch (Q001) to position "1"	**System OFF**
3. Open the UPS front door and press the green "ON" push-button	Normal operation load power 0%
4. Press ⌗ on the keyboard	
5. Press ▲ or ▼ on the keyboard until	Bypass operation : NO
6. Press C on the keyboard	Bypass operation : YES
7. Press ⌗ on the keyboard	
The system will transfer to bypass operation	Bypass operation
	Lamp indication on bypass panel
8. Check that output switch (Q002) is in position "0"	The green lamps (H002) above the output switch handle (Q002) lights.
9. Turn the output switch (Q002) to position "1"	Now also the green lamp (H003) above the bypass switch handle (Q003) lights.
10. Turn the bypass switch (Q003) to position "0"	Only the green lamp (H003) above the bypass switch handle (Q003) lights.
11. Press ⌗ on the keyboard	
12. Press ▲ or ▼ on the keyboard until	Bypass operation : YES
13. Press C on the keyboard	Bypass operation : NO
14. Press ⌗ on the keyboard	
The system will transfer to normal operation.	Normal operation load power xx%
No lamps on the bypass panel light any longer.	

8.4 Relay Board



Relays.
All relays are “fail safe”, i.e. relay coil is energized when there is no alarm.



The relay is shown in alarm position.

Max. load: 8.0A - 277V_{AC}
0.3A - 60V_{DC}

Min. load: 0.05A - 6V_{AC}
0.05A - 6V_{DC}

8.4.1 Relay Board, relay functions

NOTE:
If “Communication to controller lost” alarm is active, ALL relays will indicate failure.

Relay No.	Name	Events that will trigger the alarm
1 ## (X002)	Mains Outside Limits	Mains voltage RMS value is outside limits Mains wave form (fast detector) is outside limits Mains frequency is outside limits
2 ## (X003)	Bypass Outside Limits	Bypass voltage RMS value is outside limits Bypass wave form (fast detector) is outside limits Bypass frequency is outside limits
3 ## (X004)	Output Outside Limits	Output voltage RMS value is outside limits Output wave form (fast detector) is outside limits Output frequency is outside limits
4 (X005)	System overload	Output load is over 100% Delta inverter current limiter is active Main inverter current limiter is active
5 (X006)	Fan fault	Blocked or faulty fan
6 (X007)	Equipment high temperature	Too high temperature on static switch Too high temperature on main inverter Too high temperature on delta inverter Too high temperature on magnetics Too high temperature on isolation transformer (option) Too high battery temperature
7 (X008)	Battery MCB OFF	Battery MCB is off
8 (X009)	Normal operation	UPS is running in normal operation (Status)
9 ## (X010)	Battery operation	UPS is running in battery operation (Status)
10 ## (X011)	Bypass operation	UPS is running in bypass operation (Status)
11 ## (X012)	Stand-by operation	UPS is in stand-by (Hot stand-by, parallel systems only)
12 (X013)	Maintenance bypass operation	The maintenance bypass switch is active
13 ## (X014)	Boost charge operation	UPS is boost charging on the battery
14 (X015)	Battery voltage outside limits	Too high DC voltage (shut down) DC voltage under warning level Too low DC voltage (shut down)
15 (X016)	Battery condition fault	The ABM has detected that the battery is week The ABM has detected that the battery is defective (ABM = Advanced Battery Monitor)
16 ## (X017)	Common fault	All alarms as mentioned above (Not relay 8+9+10+11) Internal power supply fault System locked in operation mode Fault in internal memory Fault in internal communication

Delay programmable in 282828 stack under “Common fault delay”. Settings: 0, 10, 20, 30 seconds.

8.4.2 Relay Board, cable sizes

Cable sizes 24 AWG to 12 AWG are suitable. Use copper conductors only.
Cable size depends on current demand and ambient temperature.

8.5 Seismic anchoring

8.5.1 Mounting seismic anchoring without conduit box

8 holes for Ø10mm bolts have to be drilled according to dimensioned sketch, where the UPS is going to be placed.

The 4 squares for seismic anchoring can be loosely tightened in the holes before the UPS-system is placed. The system is placed, and then the squares are tightened in the holes and in the feet of the UPS.

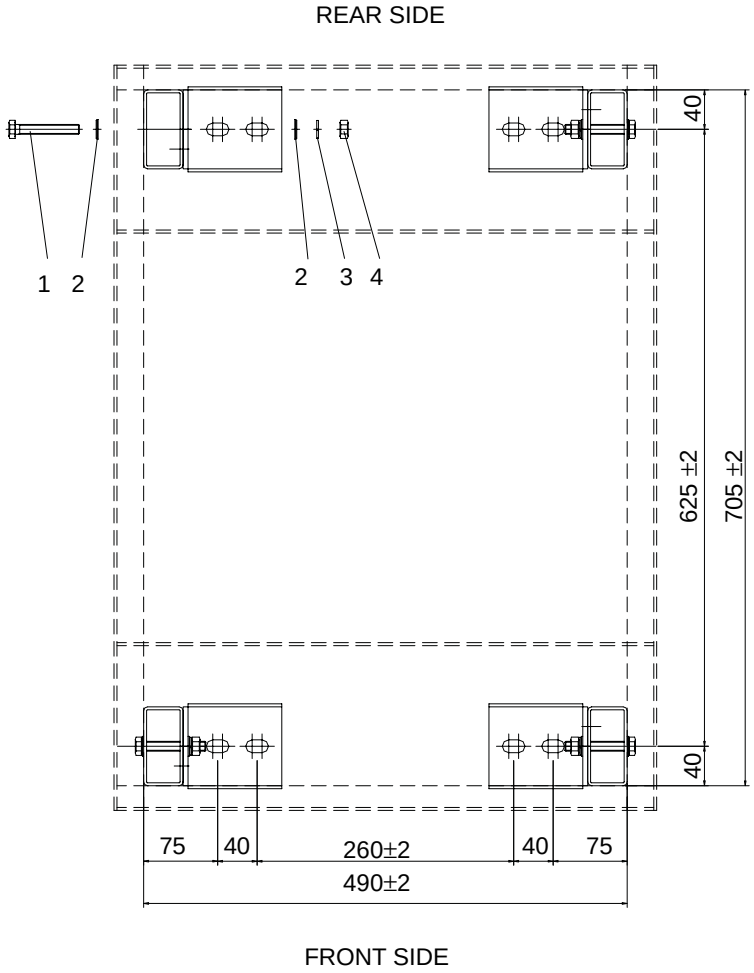
Or:
the system is placed after drilling the holes, and then the 4 squares are tightened in the holes and the feet of the UPS. At a 39.37/1000 in./mm cubicle the seismic anchoring can be bolted in the 4 outside feet or in the 2 middle feet and the 2 right or left feet.

IMPORTANT!
Remember to tighten all bolts in the 4 squares, both in the floor and in the feet of the UPS. Bolts for the floor are not enclosed.

The square for seismic anchoring is placed towards the foot and bolted with bolt (1) and plain washer (2) towards the foot and plain washer (2), string washer (3) and nut (4) towards the square.

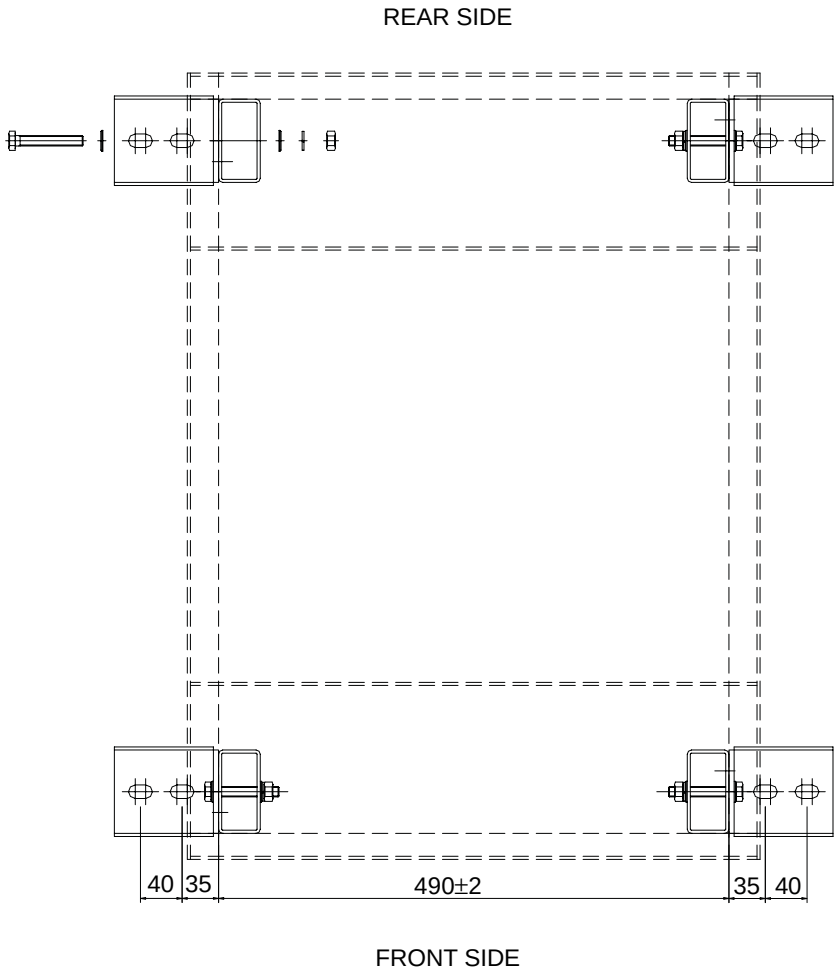
8.5.1.1 Seismic anchoring 23.62/600 in./mm cubicle mounted under frame

(measurements in mm)



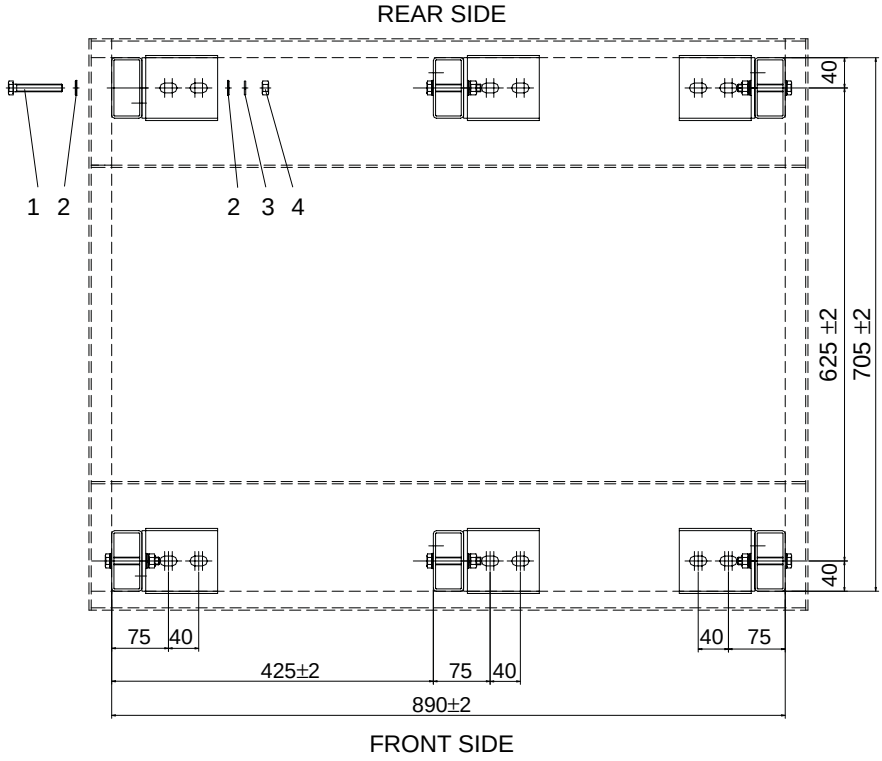
8.5.1.2 Seismic anchoring 23.62/600 in./mm cubicle mounted outside frame

(measurements in mm)



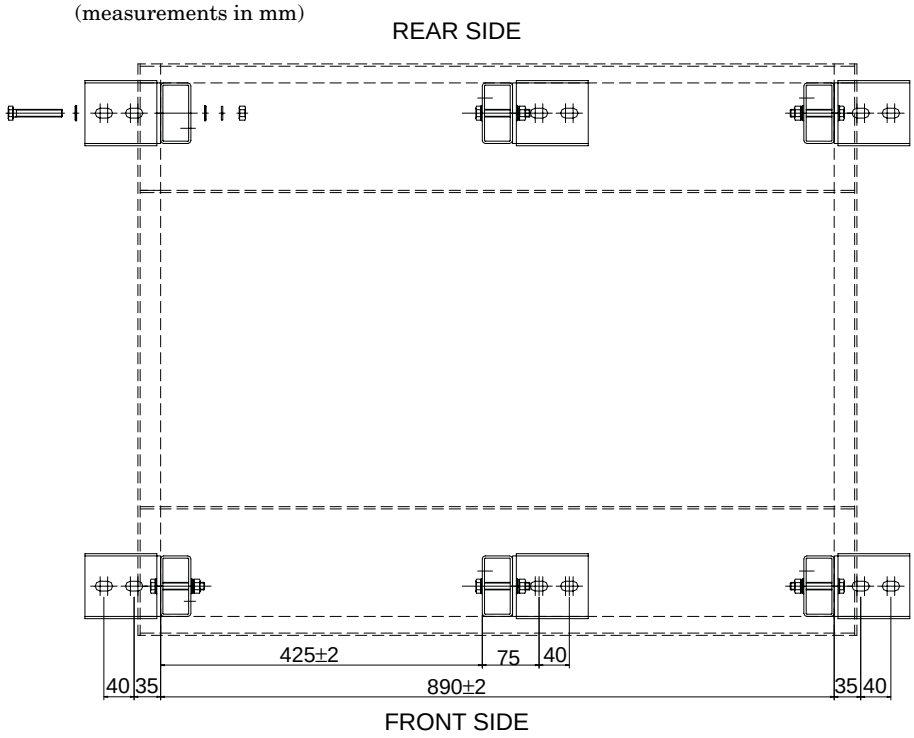
8.5.1.3 Seismic anchoring 39.37/1000 in./mm cubicle mounted under frame

(measurements in mm)



8.5.1.4 Seismic anchoring 39.37/1000 in./mm cubicle mounted outside frame

(measurements in mm)



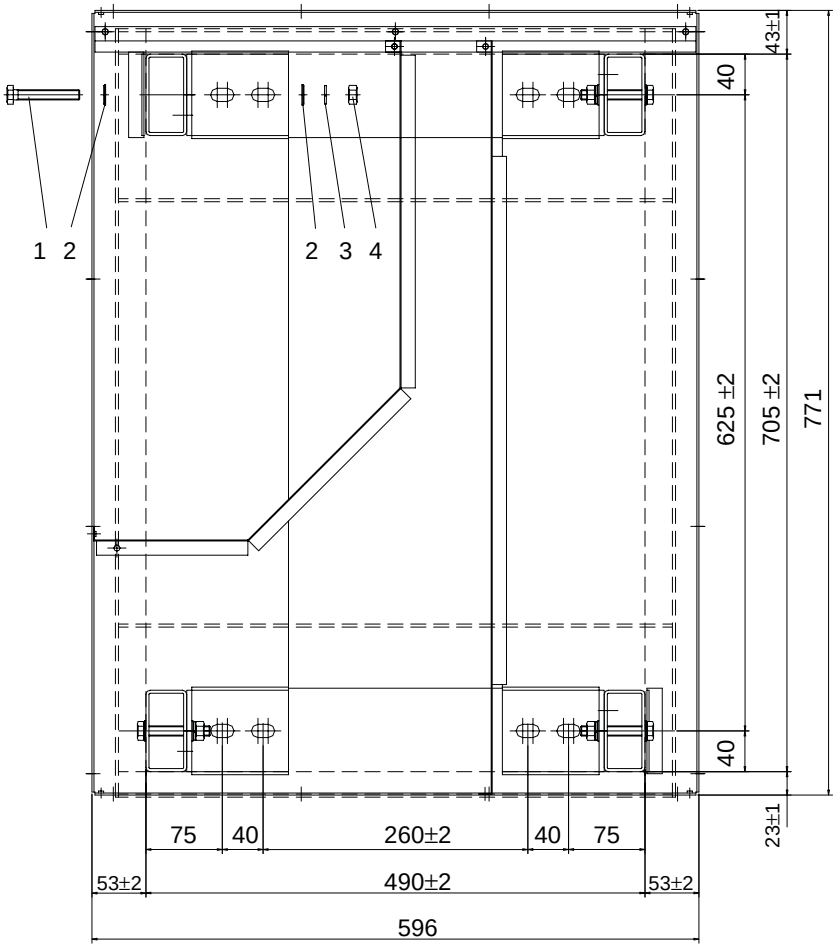
8.5.2 Mounting seismic anchoring with conduit box

The conduit box is placed where the UPS-system is going to be placed. Then follow the same procedure as described in section 8.3.1.

8.5.2.1 Seismic anchoring for 23.62/600 in./mm cubicle with conduit box

(measurements in mm)

REAR SIDE

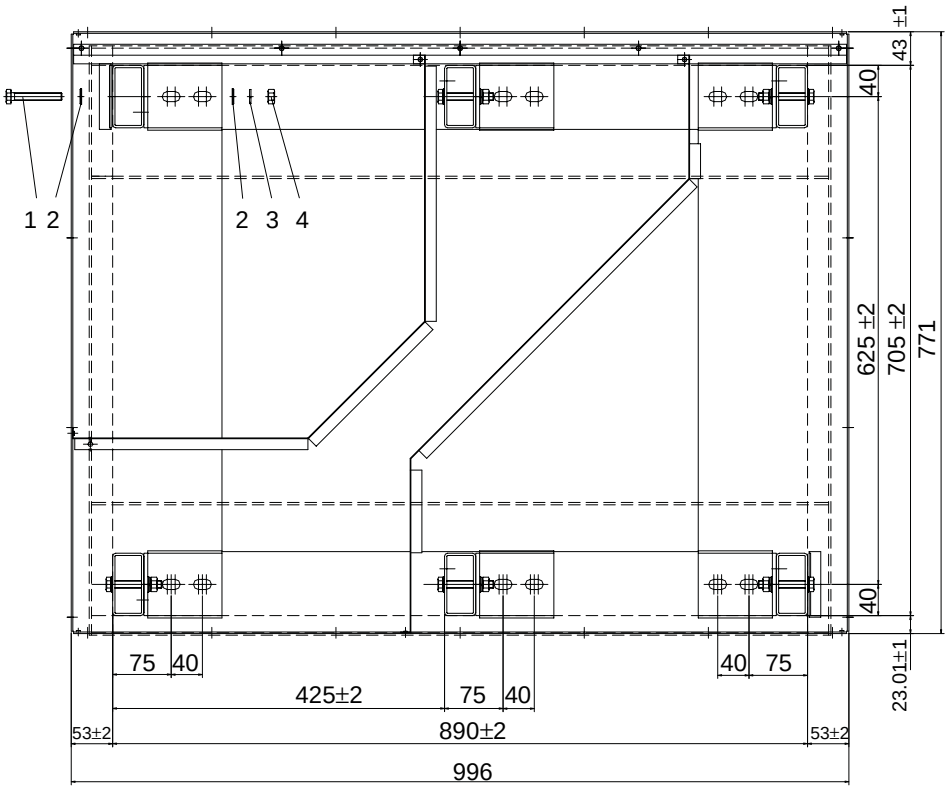


FRONT SIDE

8.5.2.2 Seismic anchoring for 39.37/1000 in./mm cubicle with conduit box

(measurements in mm)

REAR SIDE



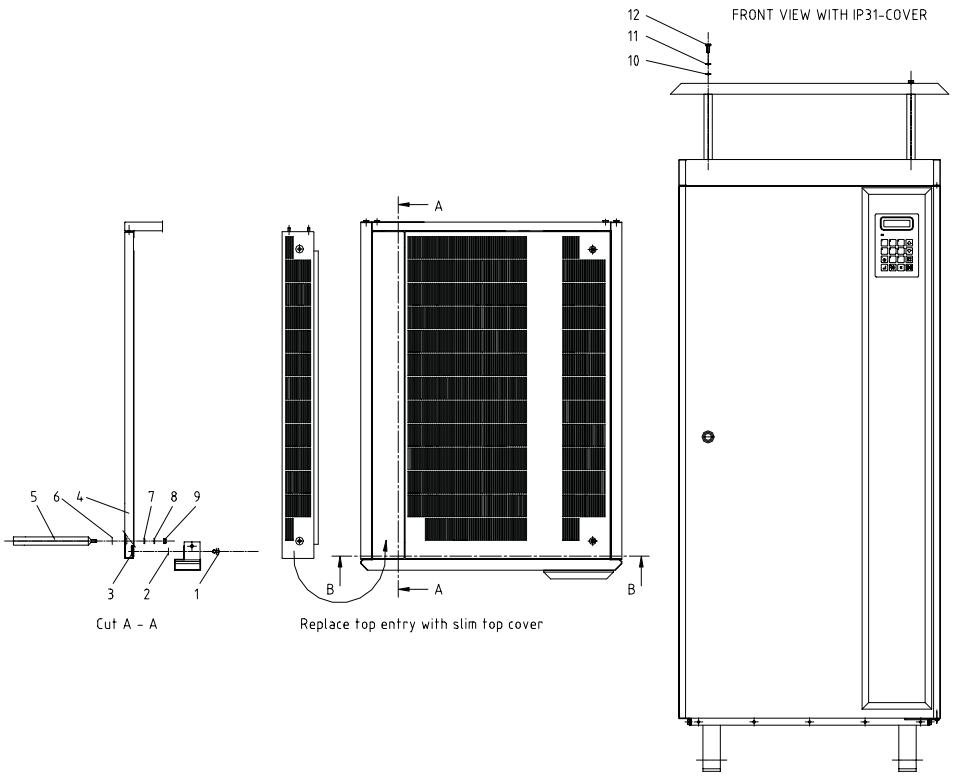
FRONT SIDE

8.6 IP31 cover

8.6.1 Mounting IP31 cover

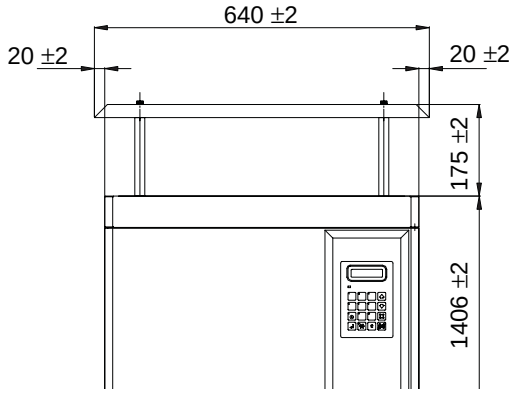
- Demount the front cover as described in section 4.1.1 for 23.62/600 in./mm cubicle and as described in section 4.1.2 for 39.37/1000 in./mm cubicle.
- Demount the top covers. The covers are fixed with screws from below, placed near the cubicle front.
- Replace the locking screw and the metal locking washer for top entry with locking screw (1) and metal locking washer (2) for narrow top cover (3).
- Mount the earth cable from top entry and clips (4) on the narrow top cover.
- Demount the 2 screws in the wide top cover (3).
- Mount 2 distance stays (5) with plastic locking washer (6), plain washer (7), spring washer (8) and nut (9) on narrow and wide top cover.
- Mount both top covers on the system, mount both earth cables and lock both top covers with the locking screws*).
- Mount the IP31 cover with plain washer (10), spring washer (11) and screw (12) on the 4 distance stays.

*) On the 39.37/1000 in./mm cubicle there is no top entry to be replaced. The 4 distance stays has to be mounted on the top cover. Otherwise it is same procedure as described above.



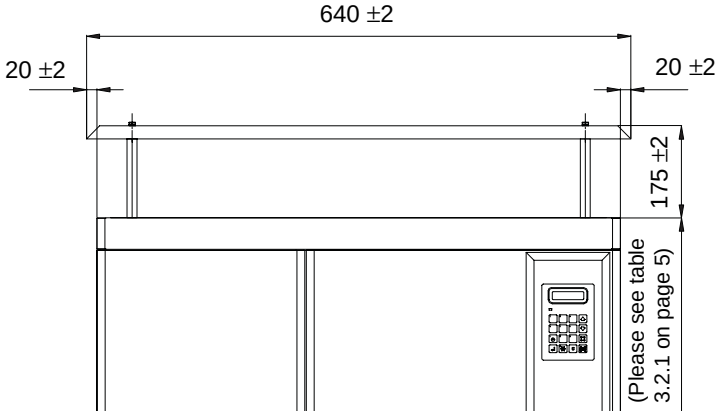
8.6.1.1 Front view with IP31-cover, 23.62/600 in./mm cubicle

(measurements in mm)



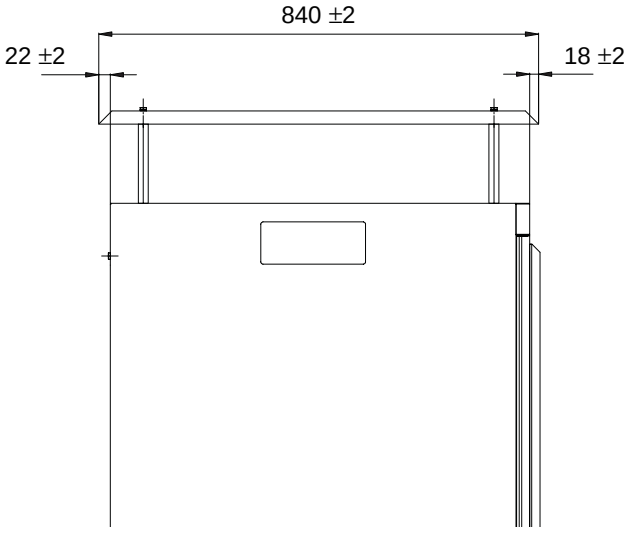
8.6.1.2 Front view with IP31-cover, 39.37/1000 in./mm cubicle

(measurements in mm)



8.6.1.3 Side view with IP31-cover, 23.62/600 and 39.37/1000 in./mm cubicle

(measurements in mm)



8.7 Remote display

8.7.1 Introduction

The remote display unit provides the Silcon DP300E series with the possibility to display condition data at remote sites of up to 25 meters away from the Silcon DP300E unit. For extension of communication distance, see section 8.7.1.1 below.

The remote display can easily be connected to the Silcon DP300E series via the serial communication ports on the communication interface.

To obtain a transmission distance of 3.2 km the normal RS232C signal levels of the serial in/out port must be converted to a 20mA current loop. The RS232C/20mA converter must be placed outside the Silcon DP300E cubicle.

8.7.1.1 Extension of communication distance for remote display

The remote display communicates with the UPS through a 3 wire RS232 interface. The remote display is a DTE (Data Terminal Equipment) employing a SUB-D 9 pole female connector. The communication speed is 9,600 bps.

The communication distance is rather limited, see Table I. If a longer distance is necessary or if the communication cable goes through magnetic noisy areas, it is necessary to insert converters. Table 1 gives examples of three ways of increasing the communication distance. All converters must be locally purchased.

Table 1: Examples of communication extension to remote display.

	Standard (RS232)	RS485	Current Loop	Optic fibre
Max. distance	25 meters	1,200 meters	3,200 meters	2,000 meters
Converter Manufacture Art. code	No converter	BLACK BOX IC 109A-E	BLACK BOX ME 800A-E	BLACK BOX ME540AE-ST
RS232 connector on black box		Sub-D 25 pole female	Sub-D 25 pole female	Sub-D 9 pole female
Interconnector of black boxes		4-screw terminal	4-screw terminal	ST fibre terminal

Connections - without converter:

A 3 wire shield cable with a 25 pole female Sub-D and a 9 pole male Sub-D must be made. Connect the cables as shown in Table 2. Do only connect the shield in one end.

Table 2: Pin connection for interconnection without converter.

25 pole female	9 pole male
Pin no.	Pin no.
2 (TXD)	2 (RXD)
3 (RXD)	3 (TXD)
7 (GND)	5 (GND)
House	No connection

Connections - with converter:
When buying a converter solution, the enclosed manual will explain how the connections must be made. Please follow this manual carefully.

As an example, the connection of the Black box: ME 800A-E (current loop) will be described in the following by Table 3.

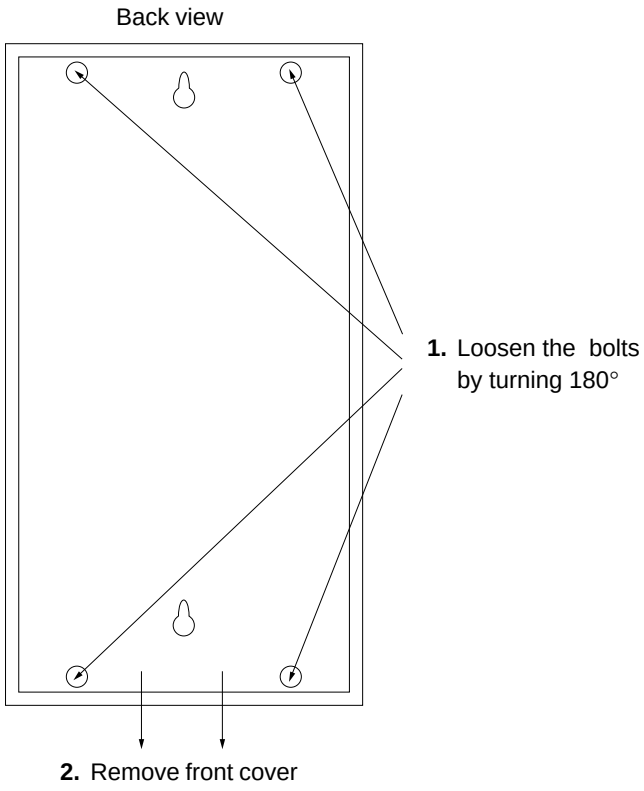
Table 3: Pin connections from host to ME 800A-E and from ME 800A-E to Remote display

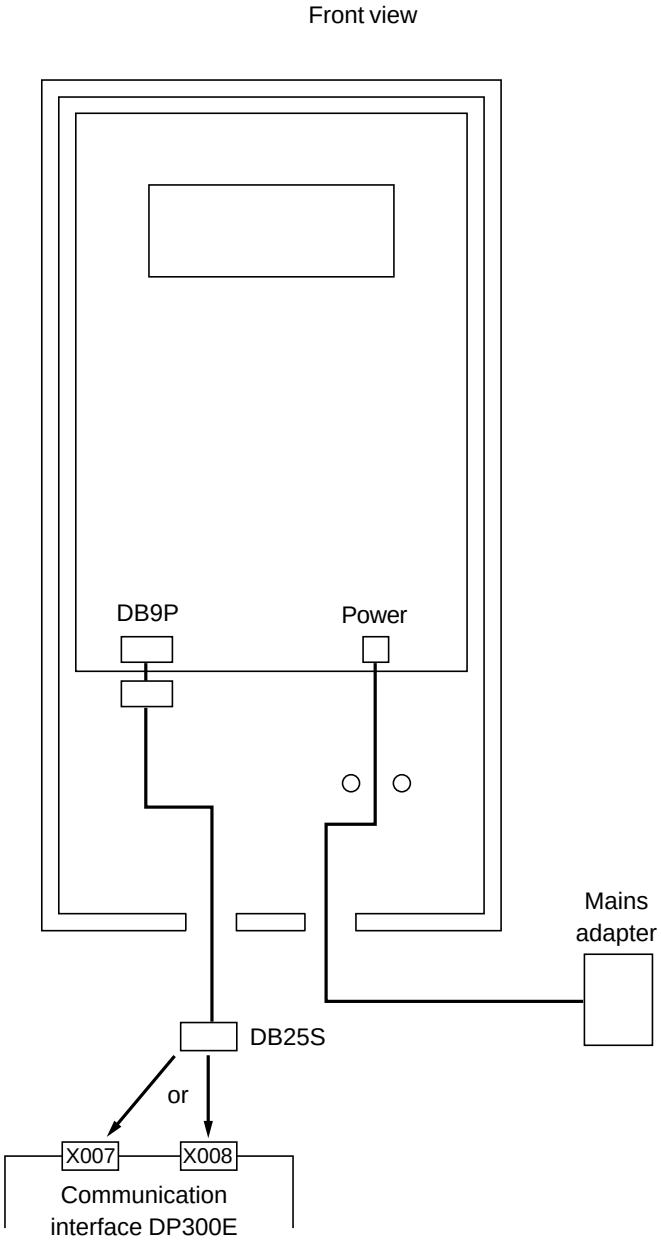
Host (DTE)	ME 800A-E (DCT)	Inter-connection	ME 800A-E (DCT)	Remote display (DTE)
Pin no.	Pin no.		Pin. no.	Pin no.
2 (TXD)	2		3	2 (RXD)
3 (RXD)	3		2	3 (TXD)
7 (GND)	7		7	5 (GND)
House (Shield)	No connection		No connection	House (Shield)

The ME 800A-E must be set up as a DCT with no RTS/DTR control.
The interconnection cable is a 4 wire twisted pair telephone cable with or without shield. The shield improves noise immunity but reduces the maximum communication distance.

8.7.2 Installation of remote display

8.7.2.1 Connecting RS232C and mains adapter





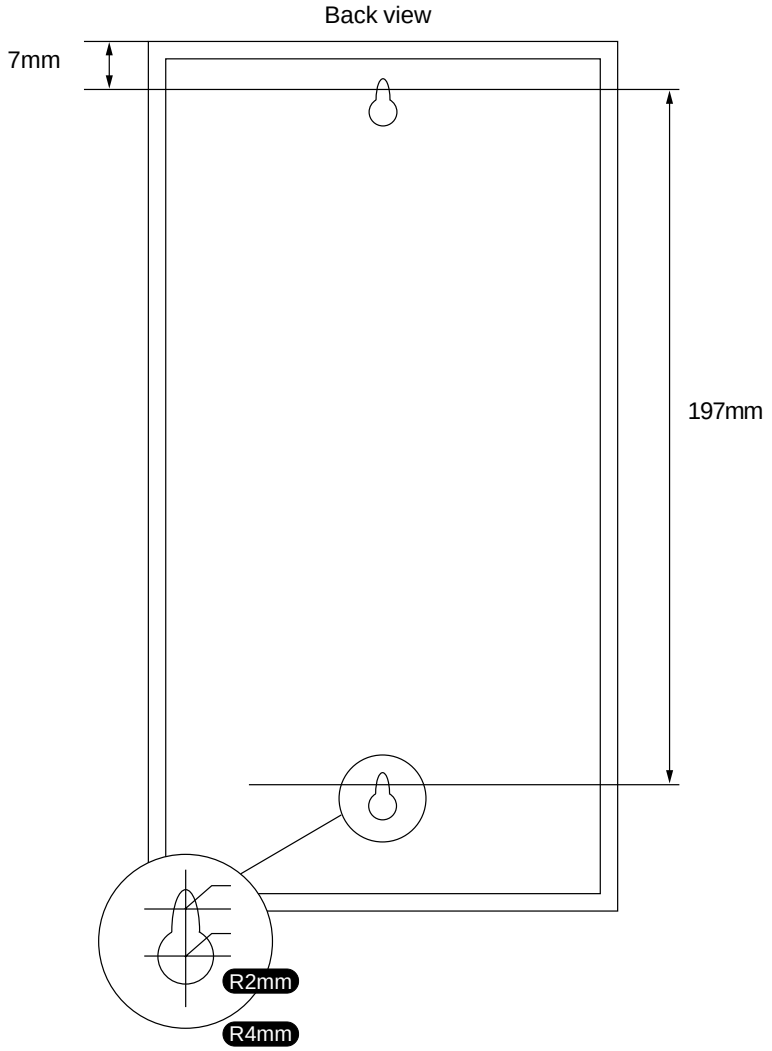
3. Remount the front cover.

8.7.2.2 Remote display power supply

The remote display power supply is a normal AC power supply with no battery back-up. This means that if data transmission with the Silcon DP300E has to continue during break down of the commercial mains, the remote display has to be supplied from the Silcon DP300E or another uninterruptible power source.

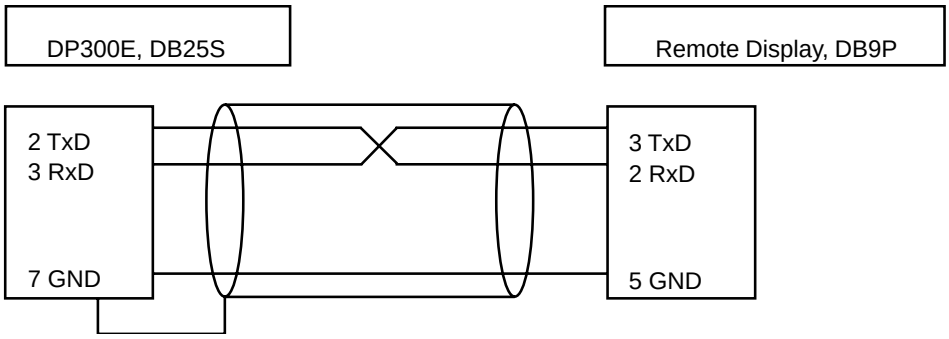
NOTE:
All alarm and signal circuit field wiring shall be rated 300V minimum.

8.7.2.3 Mounting remote display



8.7.2.4 Cables for remote display

RS232C to RS232C cable:



Connect shield at one end only!
Rating: Cable must be rated 600V minimum.

8.7.3 Using the remote display

The remote display is an inactive unit that is unable to influence the operation of the Silcon DP300E. It is impossible to adjust or otherwise influence the function of the DP300E. The alarms available on remote display are a subset of the alarms, which can be shown on the internal display. Available alarms are described in section 8.7.3.6.

8.7.3.1 Starting up the remote display

After having connected the supply the display will show:

"Remote display: DP300E UPS"

8.7.3.2 Fault in communication

A fault in the communication between UPS and remote display will be shown in the display as follows:

"Datatransmission interrupted"

8.7.3.3 Setting remote display

Through the #-stack it is possible to set language and to which type of UPS the remote display has been connected.

Parameter	Setting	Comments
Language	GB, D, F, DK, S, SF, NL, PL, CZ, E, P, SK, H	Language of text in display
Host	SDC charger, DP300E, 300E	The type of UPS to which the remote display has been connected

8.7.3.4 Operation

As described in section 3.0 Operation (User Guide, 7OY0001).

8.7.3.5 Reading out measurements

As described in section 5.0 Reading out measurements (User Guide, 7OY0001). However, reading out of time and mains 2 current is not possible from remote display.

8.7.3.6 Alarms

As described in section 6.0 Alarms - What to do (User Guide, 7OY0001).

It is possible to show the following alarms:

Possible alarm	Description
Output is out of tolerance	Output voltage outside limits
Battery voltage low, shutdown	The battery has been discharged to minimum permissible level
Common fault	An alarm is detected by the UPS
Overload. Load is over 100%	Overload on UPS
High temperature static switch	Temperature on input or bypass static switch to high
Synchronization error	The UPS cannot synchronize to the input frequency
Battery MCB is off	Battery MCB/fuse switch not closed or released
High temp. isolation transformer	Temperature on isolation input/output transformer too high
Battery voltage high	Battery voltage outside limits
High inverter temperature	Temperature on main or delta inverter too high
Battery voltage low, warning	The battery is nearly discharged
Inverter current limiter active	Peak current limiter has been activated and UPS switched to bypass operation. System overload
Overload. Load is over 150%	Overload on UPS
Bypass is out of tolerance	Bypass input voltage outside limits
Mains is out of tolerance	Mains input voltage outside limits

8.7.3.7 Adjusting contrast

As described in section 1.0 Introduction (User Guide, 7OY0001).

8.8 Isolation Transformer Module

Introduction.
The isolation transformer module is used in following mentioned configurations:

1. Between mains supply and UPS input, when a 3-phase Delta-service, phase or midpoint of 2 phases grounded, is available.
2. Between mains supply and UPS input, when galvanic isolation is required.
3. Between UPS output and load, when galvanic isolation is required.

The isolation transformer is configured as Delta-WYE with accessibel neutral (Dyn11).

Isolation Transformer Type	For UPS System
10kVA - 480V	DP310E - 480V
15kVA - 480V	DP315E - 480V
20kVA - 480V	DP320E - 480V
30kVA - 480V	DP330E - 480V
40kVA - 480V	DP340E - 480V
60kVA - 480V	DP360E - 480V
80kVA - 480V	DP380E - 480V
10kVA - 208V	DP310E - 208V
15kVA - 208V	DP315E - 208V
20kVA - 208V	DP320E - 208V
30kVA - 208V	DP330E - 208V
40kVA - 208V	DP340E - 208V
60kVA - 208V	DP360E - 208V
80kVA - 208V	DP380E - 208V

8.8.1 Requirement on the installation site

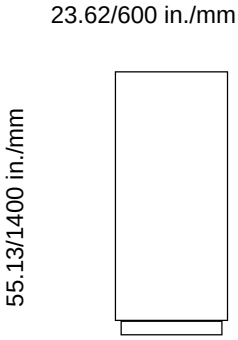
The isolation transformer is designed with all parts accessible from front or top, and cable entries from bottom. The isolation transformer can be placed close to walls, only free space for front door opening has to be ensured. Sufficient cooling has to be ensured by a free space of min. 19.68 in./500mm above the ventilation slots in the top cover. Avoid placing the isolation transformer in direct sunlight.

8.8.2 Cubicles and dimensions

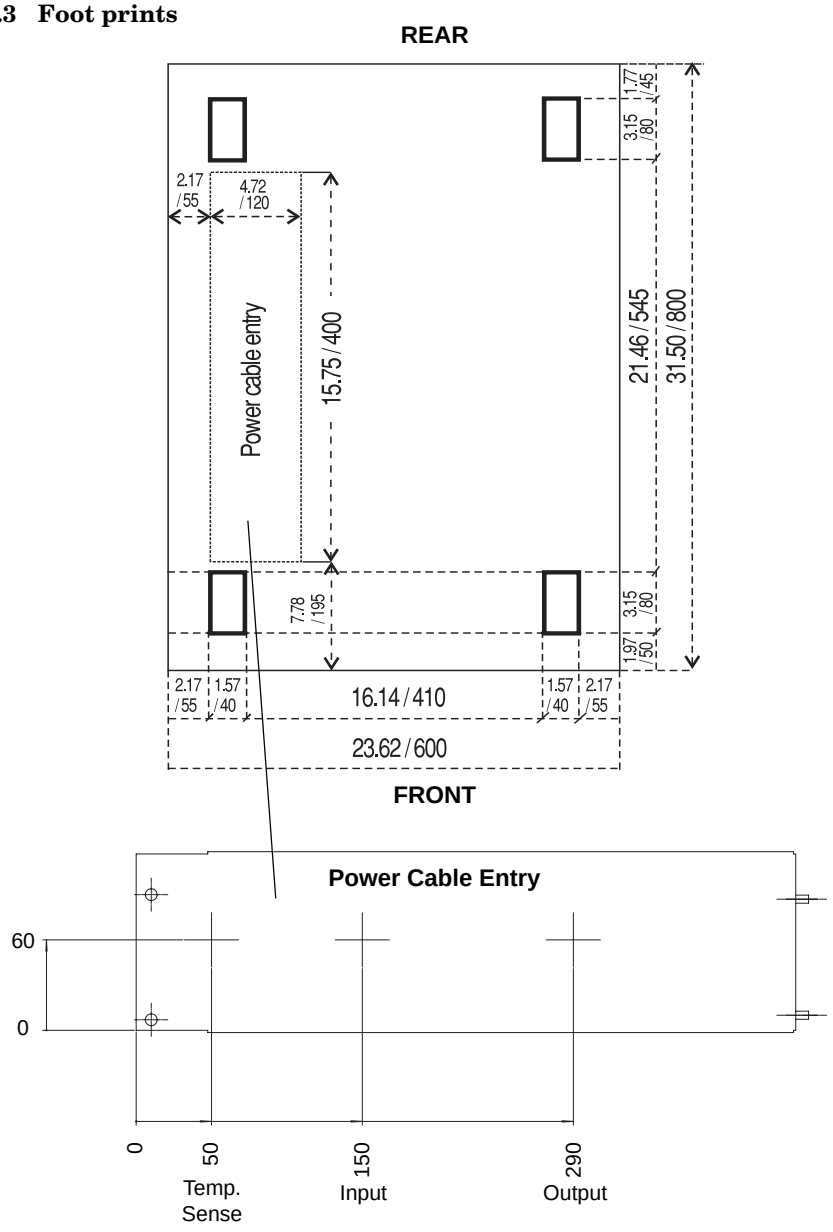
Isolation Transformer Type	Dimensions WxDxH [in./mm]			Weight approx. [Kg]
	W	D	H	
10kVA - 480V	23.62/600	31.50/800	55.13/1400	190
15kVA - 480V	23.62/600	31.50/800	55.13/1400	250
20kVA - 480V	23.62/600	31.50/800	55.13/1400	250
30kVA - 480V	23.62/600	31.50/800	55.13/1400	335
40kVA - 480V	23.62/600	31.50/800	55.13/1400	335
60kVA - 480V	23.62/600	31.50/800	55.13/1400	630
80kVA - 480V	23.62/600	31.50/800	55.13/1400	630
10kVA - 208V	23.62/600	31.50/800	55.13/1400	190
15kVA - 208V	23.62/600	31.50/800	55.13/1400	250
20kVA - 208V	23.62/600	31.50/800	55.13/1400	250
30kVA - 208V	23.62/600	31.50/800	55.13/1400	335
40kVA - 208V	23.62/600	31.50/800	55.13/1400	335
60kVA - 208V	23.62/600	31.50/800	55.13/1400	570
80kVA - 208V	23.62/600	31.50/800	55.13/1400	570

For foot prints please refer to section 8.8.3.

Cubicle



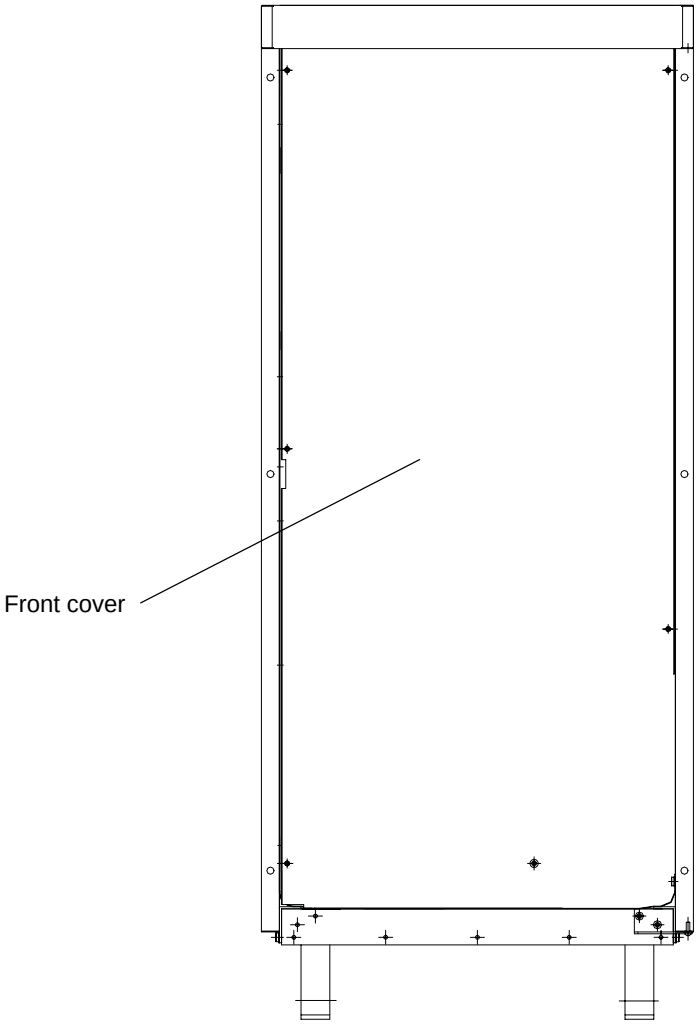
8.8.3 Foot prints



Recommended cable routing.

8.8.4 Connecting the isolation transformer

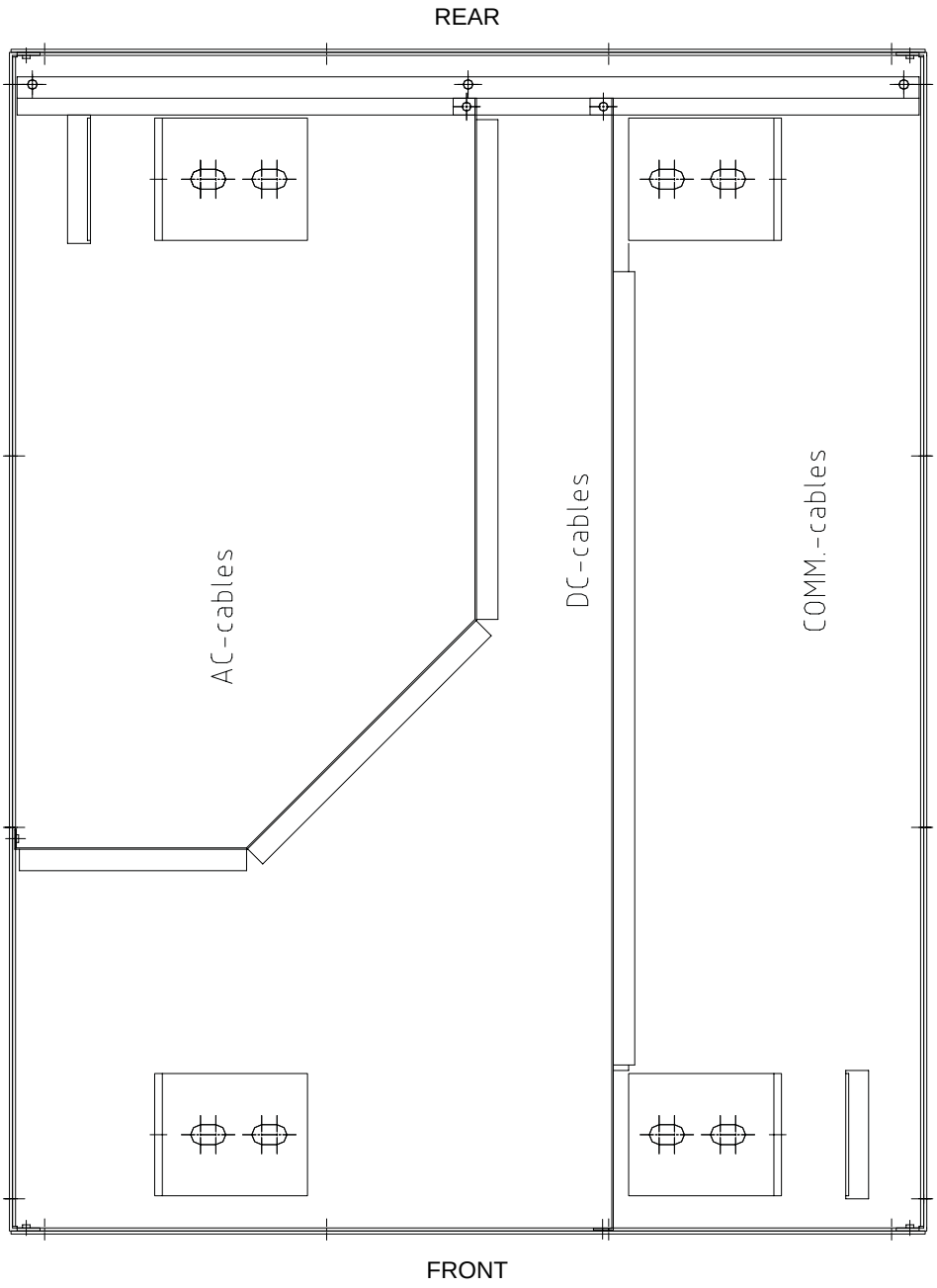
To get access to the cable terminals open the front door, remove the screws and lift off the front cover (Remember earth wire on rear side).



23.62/600 in./mm cubicle front view open door

Remember to remount the front cover (and earth wire) before start up of the system.

Conduit box 23.62/600 in./mm cubicle.



The conduit box is placed under the UPS, **always** with the solid plate facing to the rear and the perforated plate facing to the front.

Conduits can be attached to the rear side of the conduit box, which contains cable channels in order to separate AC, DC, and communication cables.

Options/Accessories

NOTE:
This transformer is intended to be supplied from a 3 wire Delta or WYE-service.

NOTE:
Ensure correct phase con-nection of inputs and outputs.
Max. power cable size: 250kcmil, excl. 60 to 80kVA, 208V.

NOTE:
All external cable dimensions are recommended.
Please refer to local legal provis-ions.

NOTE:
Glandplate in bottom of system must be mounted.

WARNING:
At 100% switch mode load the neutral shall be rated for 173% output phase current.

NOTE:
ϕ is symbol for “phase”.

is symbol for “risk of electric shock”.

Terminal for Equipment Grounding Conductor is marked:

Terminal for Grounding Electrode Conductor is marked “E”.

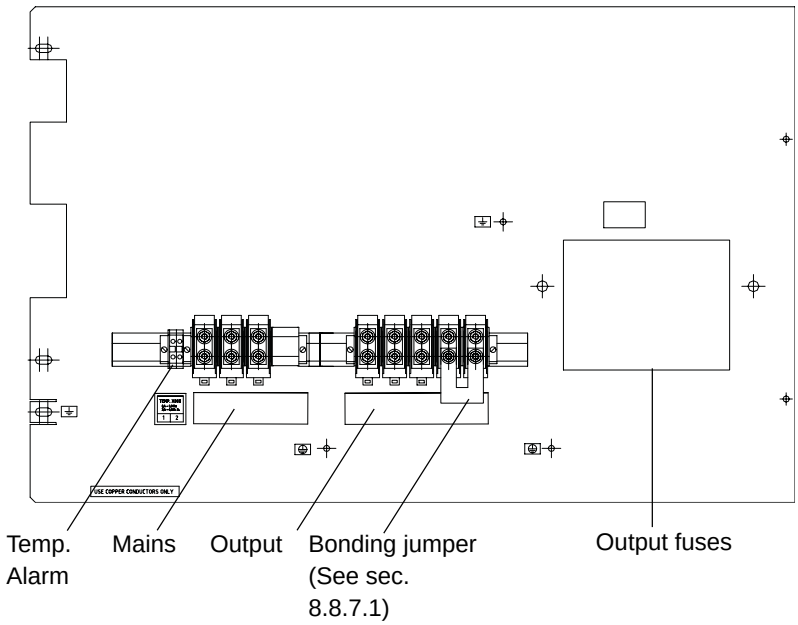
NOTE:
Grounding, please refer to local legal provisions.

NOTE:
The terminals marked

and

are electrically connected to the terminal marked “E”.

Input/output field 10 to 80kVA – 480V, 10 to 40kVA – 208V.



Isolation transformer mounted upstream with respect to Service Bypass Panel

TYPE	FOR SYSTEM	a) EXT. INPUT FUSES [A]	b) EXT. PHASE CONDU. [AWG]	a) INT. OUTPUT FUSES [A]	b+c) EXT. NEUTRAL CONDU. [AWG]	EXT. GND. ELECT. CONDU. [AWG]	EXT. EQU. GND. CONDU. [AWG]
ISO-310E-480	DP310E - 480V	25	10	25	10	8	10
ISO-315E-480	DP315E - 480V	30	8	30	8	8	10
ISO-320E-480	DP320E - 480V	40	8	40	6	8	10
ISO-330E-480	DP330E - 480V	60	4	60	3	8	10
ISO-340E-480	DP340E - 480V	80	3	80	1	8	8
ISO-360E-480	DP360E - 480V	110	1/0	110	3/0	6	6
ISO-380E-480	DP380E - 480V	150	3/0	150	250 kcmil	6	6
ISO-310E-208	DP310E - 208V	45	6	45	4	8	10
ISO-315E-208	DP315E - 208V	70	3	70	2	8	8
ISO-320E-208	DP320E - 208V	90	1	90	1/0	8	8
ISO-330E-208	DP330E - 208V	150	3/0	150	4/0	4	6
ISO-340E-208	DP340E - 208V	175	250 kcmil	175	250 kcmil	6	6
ISO-360E-208	DP360E - 208V	250	2 x 3/0	250	2 x 250 kcmil	2	4
ISO-380E-208	DP380E - 208V	350	2 x 300 kcmil	350	2 x 400 kcmil	1/0	3

Isolation transformer mounted downstream with respect to Service Bypass Panel

TYPE	FOR SYSTEM	[a+e)] EXT. INPUT FUSES [A]	[b)] EXT. PHASE CONDU. [AWG]	[a+d)] INT. OUTPUT FUSES [A]	[b+c)] EXT. NEUTRAL CONDU. [AWG]	EXT. GND. ELECT. CONDU. [AWG]	EXT. EQU. GND. CONDU. [AWG]
ISO-310E-480	DP310E - 480V	15	14	15	10	8	12
ISO-315E-480	DP315E - 480V	20	10	20	8	8	12
ISO-320E-480	DP320E - 480V	25	10	25	6	8	10
ISO-330E-480	DP330E - 480V	40	6	40	3	8	10
ISO-340E-480	DP340E - 480V	50	4	50	1	8	10
ISO-360E-480	DP360E - 480V	80	2	80	3/0	8	8
ISO-380E-480	DP380E - 480V	100	1/0	100	250 kcmil	6	8
ISO-310E-208	DP310E - 208V	30	8	30	4	8	10
ISO-315E-208	DP315E - 208V	45	6	45	2	8	10
ISO-320E-208	DP320E 208V	60	4	60	1/0	8	10
ISO-330E-208	DP330E - 208V	90	1	90	4/0	8	8
ISO-340E-208	DP340E - 208V	125	2/0	125	250 kcmil	6	6
ISO-360E-208	DP360E - 208V	175	2 x 1/0	175	2 x 250 kcmil	4	6
ISO-380E-208	DP380E - 208V	250	2 x 3/0	250	2 x 400 kcmil	2	4

a) Class J-fast acting in accordance with UL248-8.

b) Cable sizes refer to US National Electric Code, Table 310-16, cables rated 75˚C/167˚F at max. 40˚C/104˚F ambient.
All cables rated 600V.
As regards recommended cable lugs and crimping tool, see section 4.1.4.

c) Dimensioned for switch mode load. ($I_{NEUTRAL} = \sqrt{3} * I_{LOAD\ PHASE}$)
For linear load neutral cable can be rated as output phase cables.

d) The isolation transformer is delivered with internal output fuses for upstream mounting with respect to Service Bypass Panel. For downstream mounting, fuses have to be replaced with types as indicated in column.

e) Not recommended when Redundant Service Bypass Panel, SBP-00A-SR, is used.

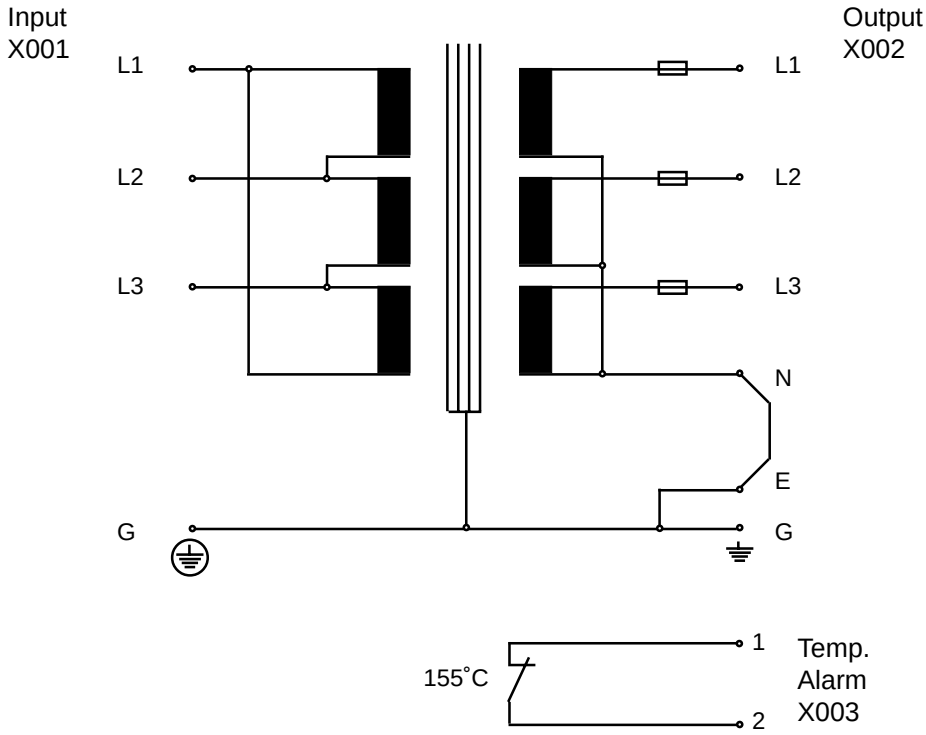
8.8.4.1 External temperature alarm cable

Voltage rating must be 600V. Cable size can be 18 to 14 AWG.

8.8.5 Recommended cable lugs and crimping tool types

See section 4.1.4.

8.8.6 Isolation transformer - Diagram Delta-WYE configuration (Dyn11)



8.8.7 Grounding the isolation transformer

8.8.7.1 System grounding

Provisions have to be made as follows:

a. If not mounted, the bonding jumper is mounted between output terminal X002:N and X002:E.
No bonding jumper is required on the Silcon DP360E and DP380E, 208V insolation transformer since the X002:N and X002:E is a common terminal.

b. The output terminal X002:E, also marked “Grounding Electrode Terminal” is connected by a grounding electrode conductor to a local grounding electrode per NEC 250-26.

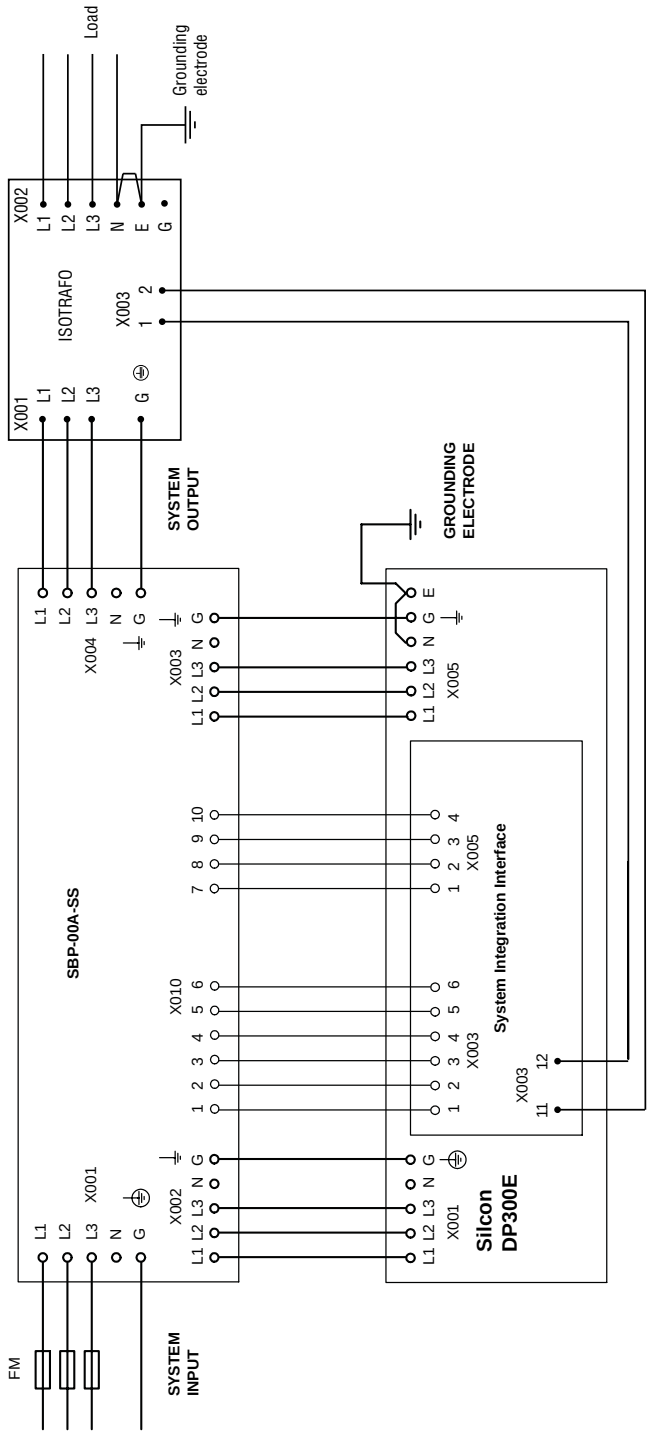
8.8.7.2 Equipment grounding

a. Terminal marked ⏚ is intended for equipment grounding.

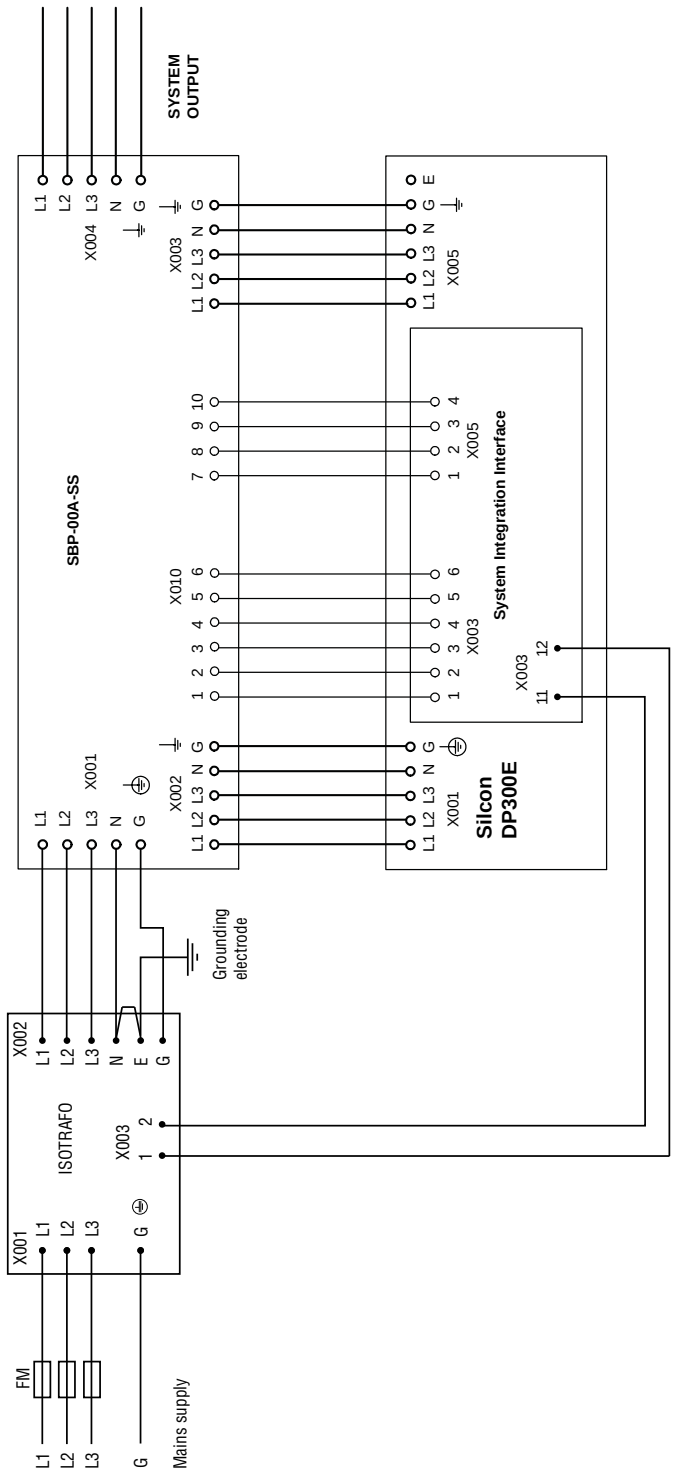
8.8.8 Wiring up the DP300E with optional Dyn11 isolation transformer

8.8.8.1 DP300E with SBP-00A-SS and isolation transformer module at output - single mains - 3 wire grounded WYE-service

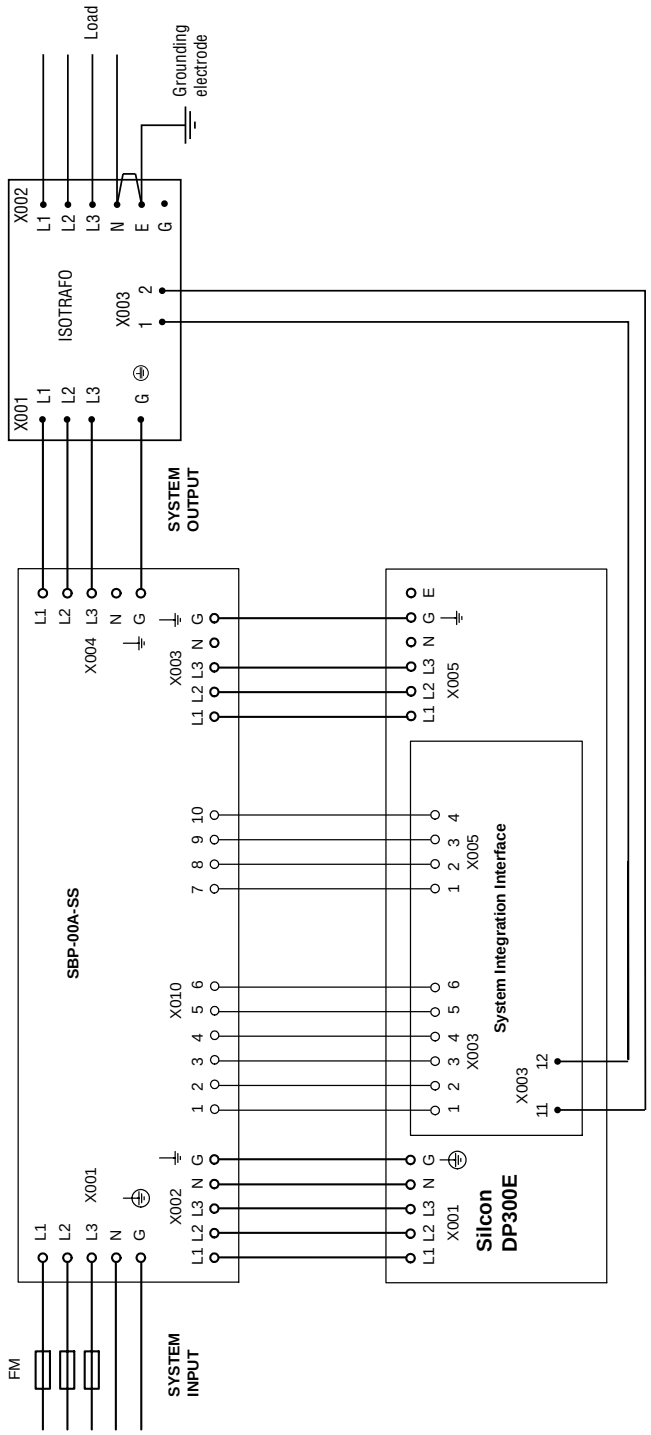
WARNING!
The Dyn11 isolation transformer is a phaseshifting element, which ensures galvanic isolation between the mains supply and the load. To avoid damaging circulation currents and to prevent the load from loosing the galvanic isolation do not bypass the isolation transformer.



8.8.8.2 DP300E with SBP-00A-SS and isolation transformer module at input - single mains - 3 wire grounded WYE-service



8.8.8.3 DP300E with SBP-00A-SS and isolation transformer module at output - single mains - 4 wire grounded WYE-service

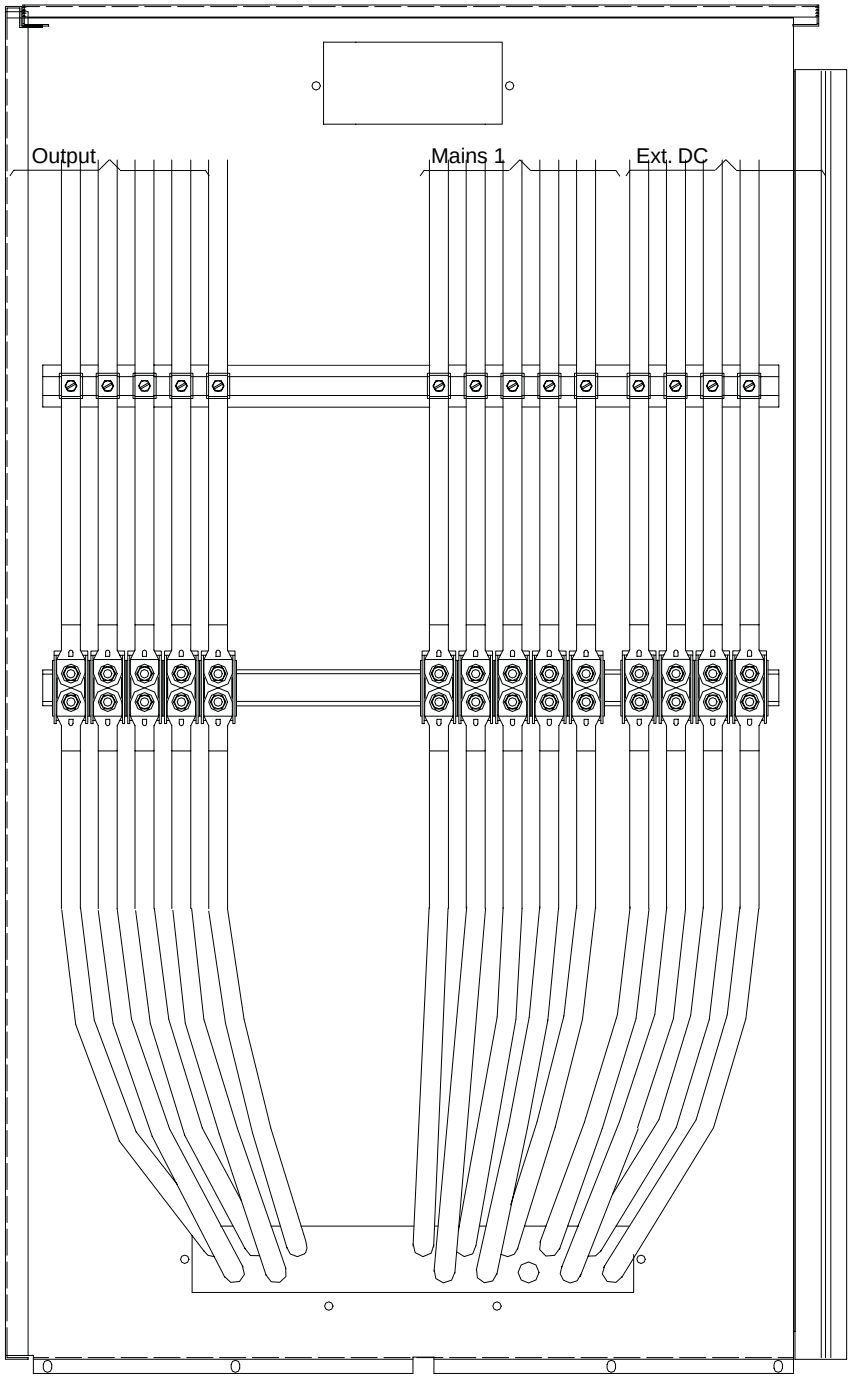


8.9 Top cable entry modules

8.9.1 External connection Silcon DP315E [208V], DP320E [208V], DP330E [208V], DP330E [480V], DP340E [208V], DP340E [480V], DP360E [480V], and DP380E [480V], - 39.37/1000 in./mm cubicle

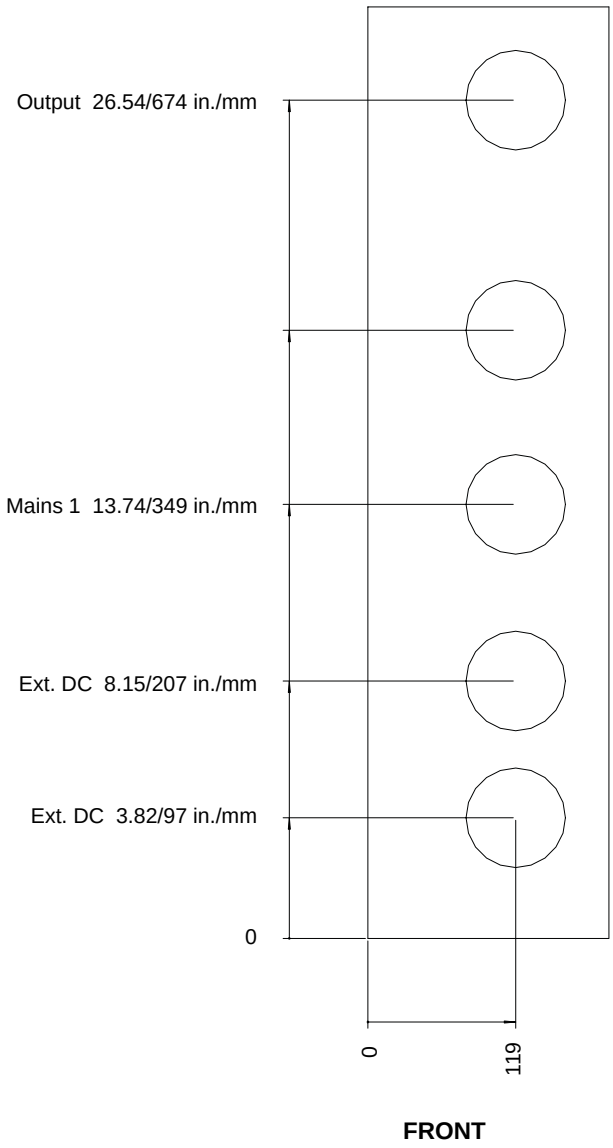
NOTE!
With top cable entry modules for 39.37/1000 in./mm cubicles 3 ft. of free space is needed on the left side of the cubicle for cable mounting.

Top entry module



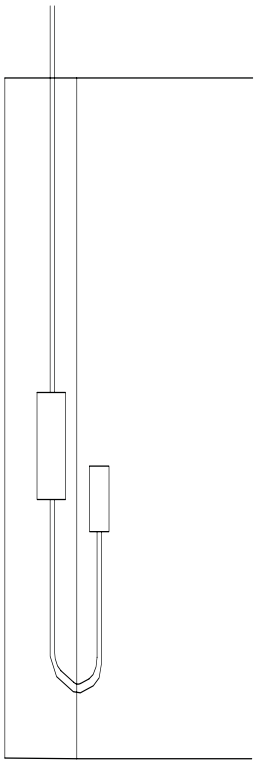
Top entry modules ....continued....

Top cable entry



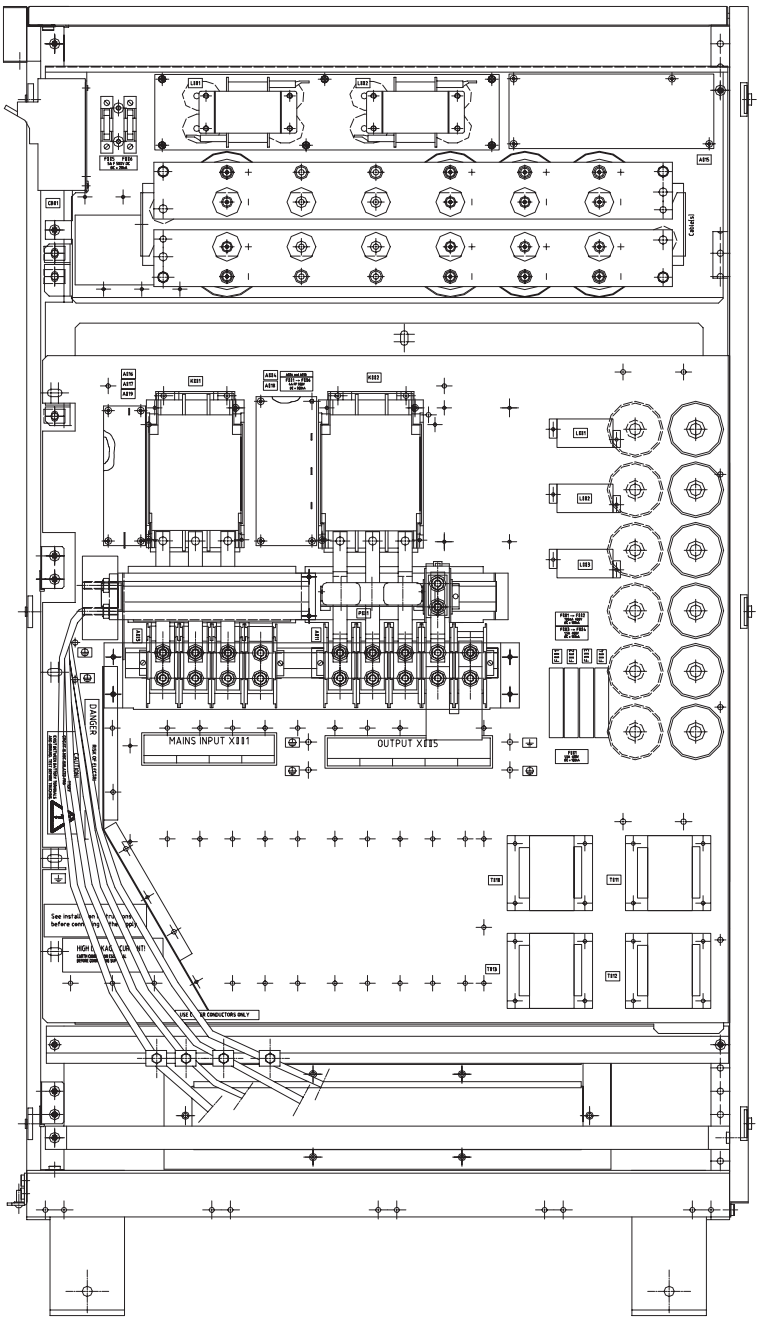
Top entry modules ....continued....

Ext. DC through top entry



Options/Accessories

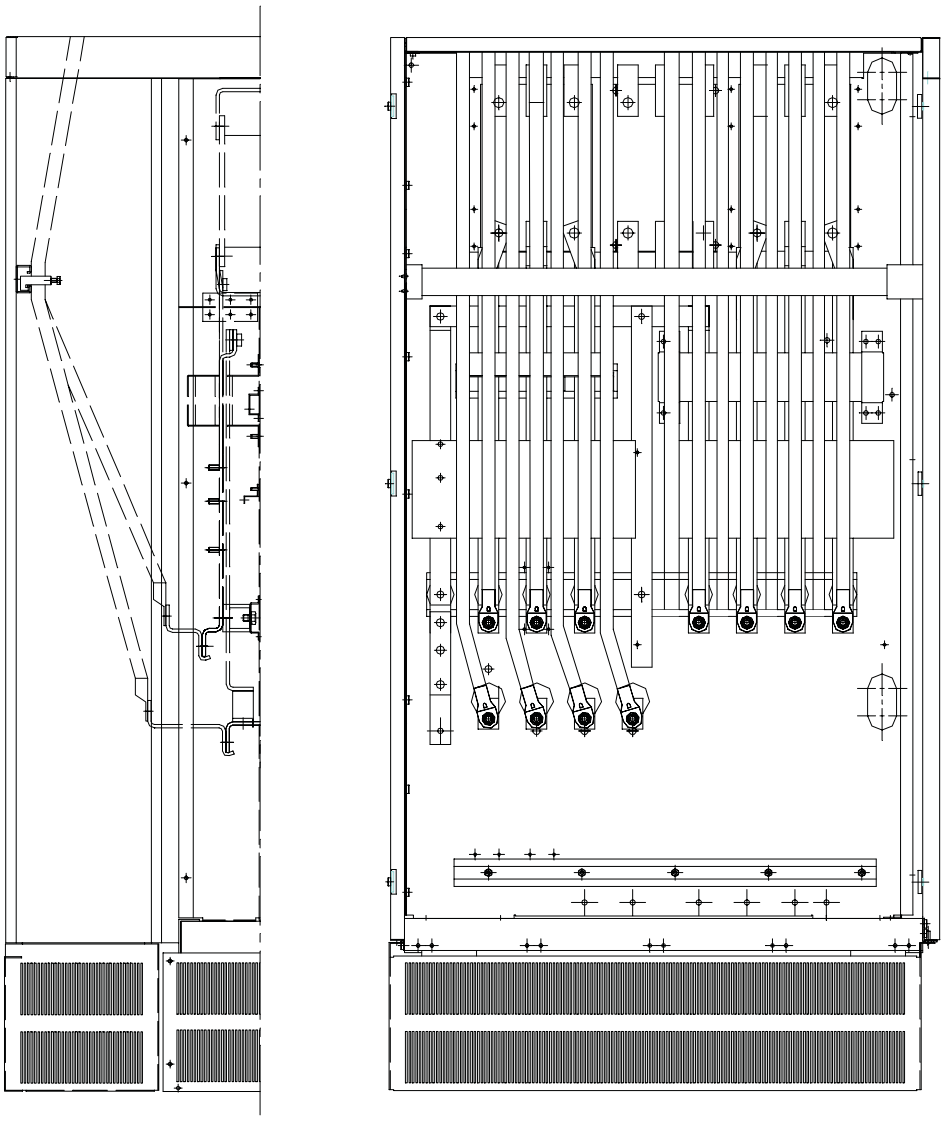
DC cabling with top entry module.



8.9.2 External connection Silcon DP360E [208V] and DP380E [208V], – 39.37/1000 in./mm cubicle

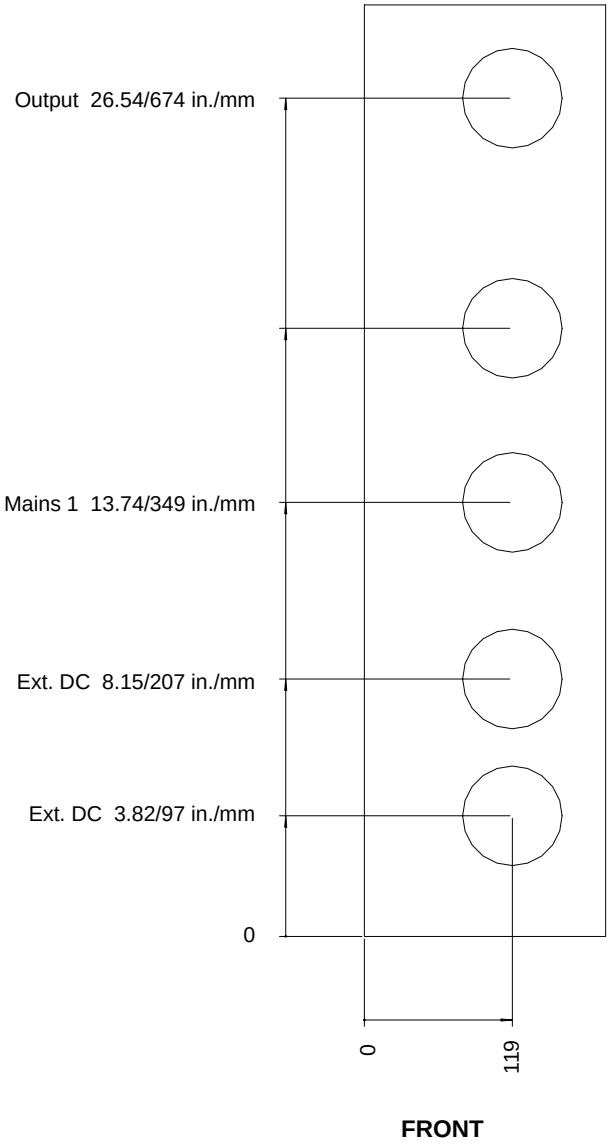
NOTE!
With top cable entry modules for 39.37/1000 in./mm cubicles 3 ft. of free space is needed on the left side of the cubicle for cable mounting.

Top entry module

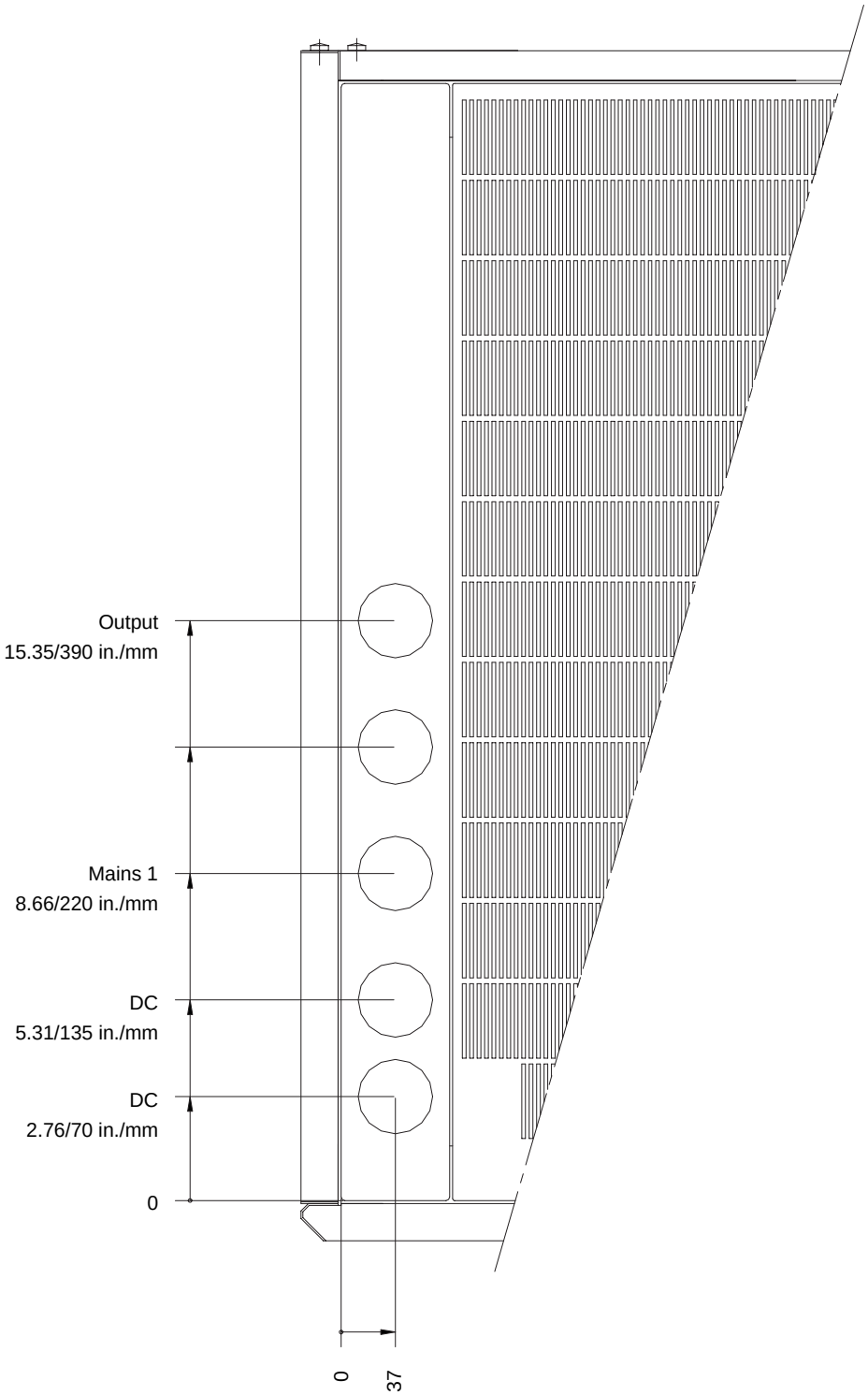


Top entry modules ....continued....

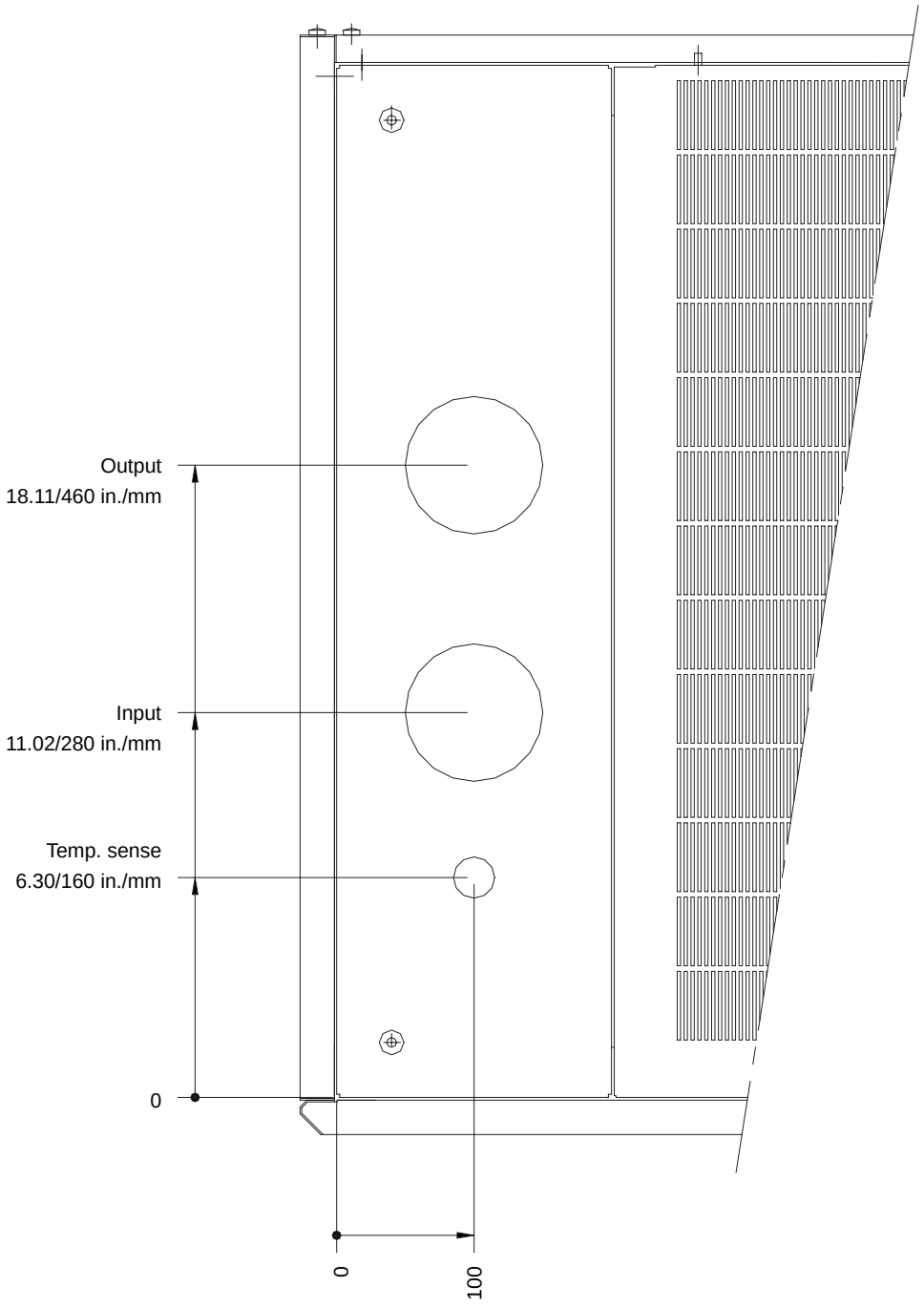
Top cable entry



8.9.3 Top cable entry module for 23.62/600 in./mm cubicle



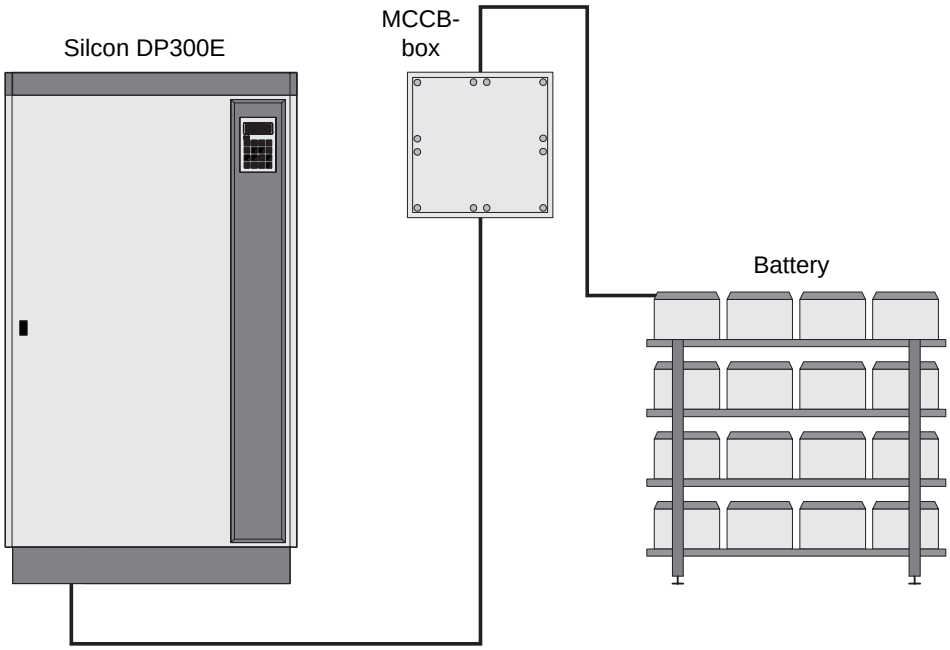
8.9.4 Top cable entry module for Isolation Transformer Module



8.10 MCCB-box for external batteries

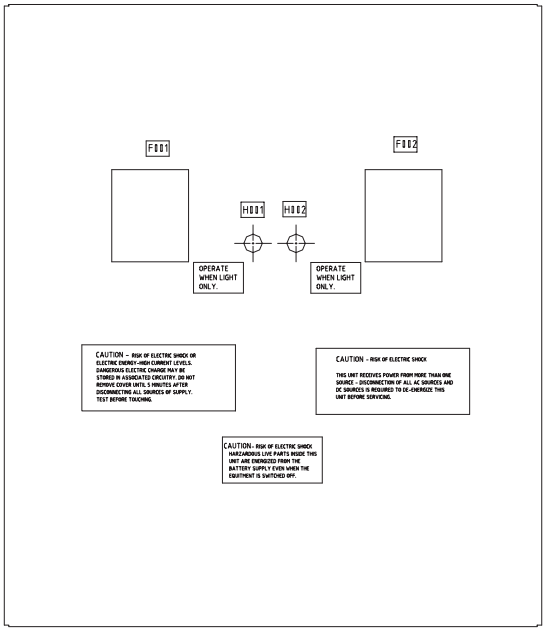
The MCCB-box is used for overcurrent and shortcircuit protection when the Silcon DP300E is installed with an external battery.

8.10.1 General arrangement

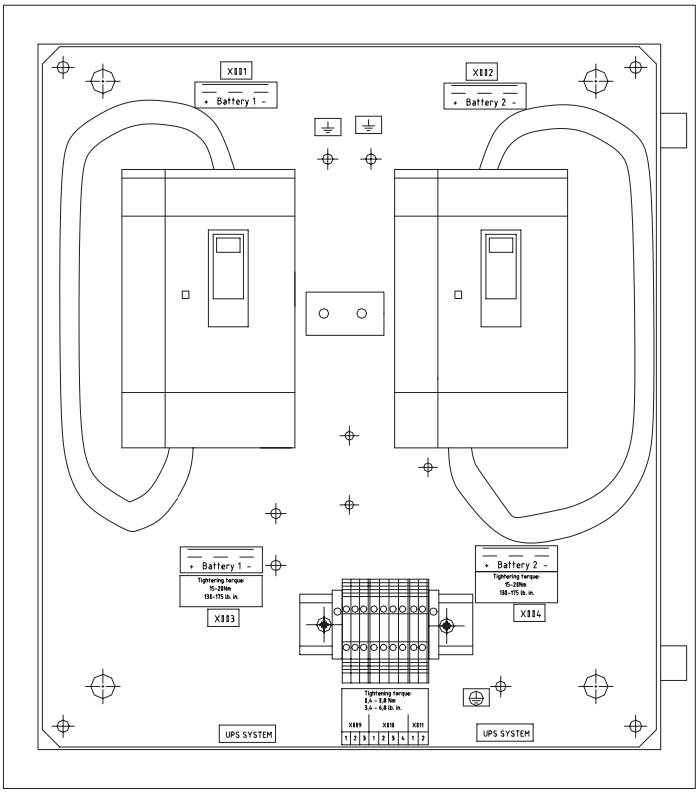


8.10.2 Front view / Front view (open door)

Front view



Front view (Open door)



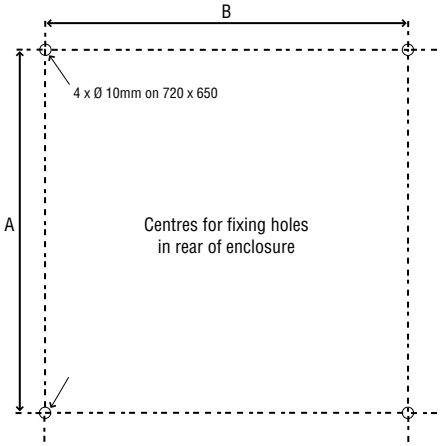
8.10.3 Mounting and Connection

NOTE:
All external cable dimensions are recommended.
Please refer to local legal provisions.

NOTE:
Ensure correct polarity at connection of DC cables.

NOTE:
Terminal for Equipment Grounding Conductor is marked ⏚

NOTE:
Grounding, please refer to local legal provisions.



Type	For System	a) Ext. DC Conductor [AWG]	Ext. Equipment Grounding Conductor [AWG]	Dimensions HxWxD [mm]	Fixing Centres AxB [mm²]	Weight [kg/lbs]
MCCB-310E-480	10kVA 480V	10	10	450x400 x125	350x285	13/28.6
MCCB-320E-480	15kVA 480V 20kVA 480V	6	10	450x400 x125	350x285	13/28.6
MCCB-340E-480	30kVA 480V 40kVA 480V	2	8	450x400 x125	350x285	13/28.6
MCCB-360E-480	60kVA 480V	2	8	450x400 x125	350x285	13/28.6
MCCB-380E-480	80kVA 480V	1/0	6	750x550 x175	648x448	24/52.8
MCCB-310E-208	10kVA 208V	6	10	450x400 x125	350x285	13/28.6
MCCB-320E-208	15kVA 208V 20kVA 208V	2	8	450x400 x125	350x285	13/28.6
MCCB-340E-208	30kVA 208V 40kVA 208V	1/0	6	750x550 x175	648x448	24/52.8
MCCB-360E-208	60kVA 208V	4/0	6	750x550 x175	648x448	24/52.8
MCCB-380E-208V	80kVA 208V	300 kcmil	4	750x550 x175	648x448	24/52.8

a) Cable sizes refer to US National Electric Code, Table 310-16, cables rated 75˚C/167˚F at max. 40˚C/104˚F ambient.

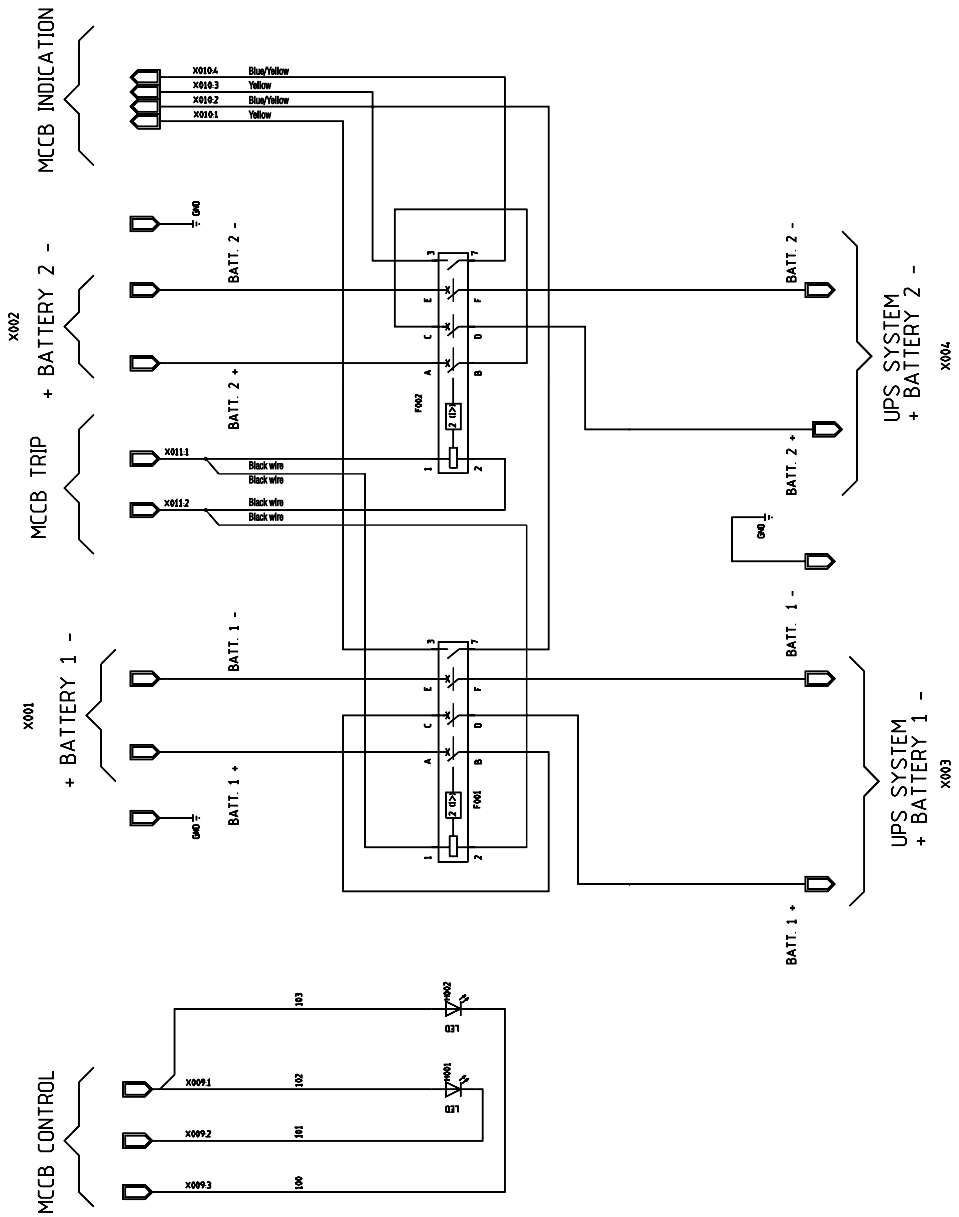
As regards recommended cable lugs and crimping tool, see section 4.1.4.

8.10.3.1 Mounting and Connection

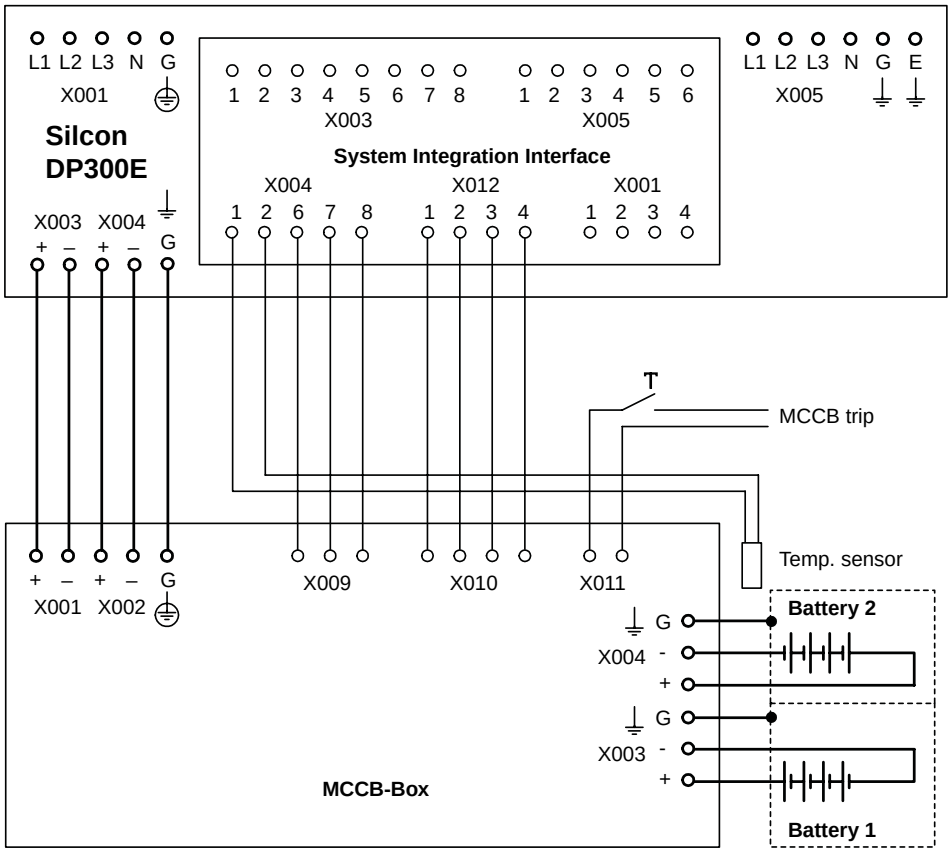
DC-cables rated 600V, unless otherwise stated.

DC-cables rated 1000V on 480V systems from MCCB-box to UPS.

8.10.4 Diagram



8.10.5 Silcon DP300E with external battery via MCCB-box



9.0 Alarms

9.1 Introduction

Alarms are indicated by the red lamp (above the left corner of the keyboard) and a 30 seconds acoustic signal. An alarm is registered in an alarm stack as long as it is present, and if more in the same order as they arise.

All alarms are also registered in an events logger and remains there in a stack with room for 250 events. The events are stored in the same order as they arose – showing the latest first.

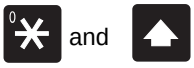
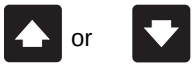
Besides the alarms the following operational modes are also stored in the events logger.

Mode	Comments
MPU is reset	UPS has been totally switched off
Stand-by	UPS has been in stand-by mode by parallel system
Normal operation	UPS has been in normal operation
Battery operation	UPS has been in battery operation
Bypass operation	UPS has been in bypass operation
System off	UPS has been off

9.2 Displaying the alarm stack:

Action	Description
1. Press 	Access to the alarm stack
2. Press 	Scroll up or down through the alarm stack messages. Last message is “No (further) alarm”.
3. Press 	Exits the alarm stack. If not operated the system will exit the alarm stack automatically after 30 seconds.

9.3 Displaying the events stack:

Action	Description
1. Press 	Press the two keys simultaneously to get access to the events stack
2. Press 	Scroll up or down through the events stack (last message is “No (further) event”)
3. Press 	Displays the time where the event happened
4. Press 	Exits the events stack. If not operated the system will exit the events stack automatically after 30 seconds

9.4 Possible alarms

Possible alarm	Description	Action
1. Peak current limiter active	Peak current limiter has been activated and UPS switched to bypass operation. System overloaded	Check for blown fuses in your installation
2. Bypass power supply fault	Fault in redundant PSU for bypass. UPS has still 100% performance and can operate in all modes.	Call for assistance
3. Delta current limiter active	Input current limiter has been activated and UPS switched to bypass operation	Check for overload. If repetitiv – call for assistence
4. Fan fault	Blocked or faulty fan	Remove blocking or exchange fan
5. High DC warning	Switching off big output load	If repetitive reduce the load change
6. High DC shutdown	Fault in UPS	Call for assistance
7. Off button pushed	Off button or emergency power down activated	–
8. Synchronization error	The UPS can't synchronize to the input frequency	Check if phase rotation of main input voltage is correct – if OK call for assistance
9. Inverter voltage error	Inverter average voltage out of limits (normal message during starting up/switching off the system)	–
10. Parallel sync. error	Parallel UPS's are not able to synchronize	Check external parallel cables Call for assistance
11. Inverter current limiter active	Overload on inverter	Reduce UPS output load
12. Overload Load is over 100%	Overload on UPS	Reduce UPS output load
13. Second power supply fault	Fault in UPS (Only in systems >160kW)	Call for assistance
14. Internal power supply fault	Fault in UPS. Only bypass operation possible	Call for assistance
15. Battery MCB is off	Battery MCCB/fuse switch not closed or released	Close MCB/insert new fuse. If released again – call for assistance

Possible alarm	Description	Action
16. ** Q004 off **	Position of output switch for UPS in parallel	–
17. ** Q003 on **	Position of external bypass switch	–
18. ** Q002 off **	Position of UPS output switch	–
19. ** Q001 or Q010 off **	Position of UPS input switch	–
20. High temp. isolation trans former	Temperature on isolation input/output transformer to high	Check fan, check for airflow obstructions, check for overload
21. High temp. mains static switch	Temperature on static input switch too high	As no. 20
22. High temp. bypass static switch	Temperature on static bypass switch too high	As no. 20
23. High temperature main inverter	Temperature on main inverter too high	As no. 20
24. High temperature delta inverter	Temperature on delta inverter too high	As no. 20
25. Low DC shutdown	The battery has been discharged to minimum permissionable level	Ensure battery recharging
26. Low DC warning	The battery is nearly decharged	Save your data now
27. Mains is moment. out of tolerance	Short disturbances on the mains supply (1 ms transients)	–
28. Mains is out of tolerance	Mains input voltage r.m.s. value outside limits	–
29. Mains freq. is out of tolerance	Mains input frequency outside limits	–
30. Bypass is moment out of tolerance	Short disturbances on the bypass voltage	–
31. Bypass is out of tolerance	Bypass input voltage outside limit	–
32. Bypass freq. is out of tolerance	Bypass input frequency outside limits	–
33. Output is moment. out of tolerance	Short disturbances on the output voltages (inrush current)	If repetitive call for assistance
34. Output is out of tolerance	Output voltage outside limits	Call for assistance

Possible alarm	Description	Action
35. Output freq. is out of tolerance	Output frequency outside limits	Call for assistance
36. High battery temperature	To high battery ambient temperature	Check system ambient temp., check fan, check for airflow obstructions
37. Battery week	Battery capacity below 75% or battery MCB/fuse switched off	Perform a battery capacity test
38. Battery defective	Insufficient battery capacity or battery MCB/fuse switched off	Call for assistance
39. System is locked in oper. mode	UPS has attempted 10 times within 1 min. to switch from bypass to battery operation or “High DC warning” has appeared 10-20 times within 1 min.	If the system is locked in bypass operation and the alarm “Inverter voltage error” exists in the alarm stack do **not** try to unlock the operations mode lock but - call for assistance!
40 RAM1 memory write error	Fault in UPS	Call for assistance
41. Memory write error	Fault in UPS	Call for assistance
42. Communication to VQ bypass lost	Fault in UPS	Call for assistance
43. Communication to VQ output lost	Fault in UPS	Call for assistance
44. Communication to DMU lost	Fault in UPS	Call for assistance
45. Communication to controller lost	Fault in UPS. Display will show invalid data for UPS	Call for assistance
46. Communication to parallel IF lost	Fault in UPS	Call for assistance
47. External shutdown accepted	Remote signal for switching off the UPS accepted – UPS switches off itself	–
48. DC capacitor charge error	Fault in DC charge circuit	Do **NOT** insert fuse F020 and F021 (or close ext. MCCB) to prevent damage of UPS. Call for assistance
49. Communication to VQ mains lost	Fault in UPS	Call for assistance
50. Bypass sync error	The UPS cannot synchronize to the bypass mains	Check if phase rotation of bypass voltage is correct - if OK, call for assistance

10.0 System specifications

10.1 Technical data

Input	Voltage	3x208V / 3x480V
	Voltage tolerance Normal operation Bypass operation	 ±15% ±10% (standard) ±4, 6, 8% (programmable)
	Frequency	60Hz ±6% standard ±0,5-8% (programmable)
	Input PF	Load 25% min. 0,97 Load 100% min. 0,99
	Current distortion	Max. 5%
Output	Voltage	3x208V / 3x480V
	Voltage tolerance	±1% static, sym. load ±3% static, asym. load ±5% 0-100% load step
	Voltage distortion	Max. 3%, linear load Max. 5%, non-linear load (Silcon DP310E-DP380E)
	Load power factor	0,9 lead to 0,8 lag
	Frequency	60Hz (mains synchronized) ±0,1% free running
	Overload capacity Mains operation Mains operation Battery operation Bypass operation Bypass operation	 200% - 60 secs. 125% - 10 min. 150% - 30 secs. 125% - cont. 1000% - 500 ms. (Silcon DP310E-DP380E)
General	Ambient temperature	0-40°C/32-104°F (Above 25°C/77°F the battery life time is reduced)
	Humidity Protection class Safety Emission and Immunity Static bypass switch Auto restart Economy mode	Max. 95%, non condensing IP30 EN50091-1 UL 1778 EN50091-2 Built-in Programmable Programmable

10.2 Back-up time, dimensions, and weight Silcon DP310E-DP380E

Type	Back-up time* with built-in batteries	Height inch/mm	Width inch/mm	Depth inch/mm	Weight lbs/kg
DP310E/208V	22 min	55.12/1400	23.62/600	31.50/800	803/365
DP310E/480V	22 min.	55.12/1400	23.62/600	31.50/800	869/395
DP315E/208V	13 min.	55.12/1400	39.37/1000	31.50/800	902/410
DP315E/208V	31 min.	55.12/1400	39.37/1000	31.50/800	1287/585
DP315E/480V	13 min.	55.12/1400	23.62/600	31.50/800	990/450
DP320E/208V	8 min.	55.12/1400	39.37/1000	31.50/800	902/410
DP320E/208V	22 min.	55.12/1400	39.37/1000	31.50/800	1287/585
DP320E/480V	8 min.	55.12/1400	23.62/600	31.50/800	990/450
DP330E/208V	13 min.	55.12/1400	39.37/1000	31.50/800	1430/650
DP330E/480V	13 min.	55.12/1400	39.37/1000	31.50/800	1606/730
DP340E/208V	8 min.	55.12/1400	39.37/1000	31.50/800	1430/650
DP340E/480V	8 min.	55.12/1400	39.37/1000	31.50/800	1606/730
DP360E/208V	N/A	55.12/1400	39.37/1000	31.50/800	1155/525**
DP360E/480V	N/A	55.12/1400	39.37/1000	31.50/800	1122/510
DP380E/208V	N/A	55.12/1400	39.37/1000	31.50/800	1210/550**
DP380E/480V	N/A	55.12/1400	39.37/1000	31.50/800	1166/530

* Back-up time at PF = 0.7

** Estimated

How to Contact APC

11.0 How to contact APC

www.apcc.com

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Pre-sales Technical Support
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Web: www.apcc.com/support/contact/contact_support.cfm