ИБП APC Silcon DP300E (400 кВА, 500 кВА) - руководство по эксплуатации. Юниджет

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Silcon DP300E Series
480V 400–500kVA
User Guide

www.apcc.com

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

7OA0004 US rev. 02

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS

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

WARNING!
Do not stand on or place any object on any UPS cabinet or UPS cubicle due to personal and product safety.

IF THE UPS IS SOUNDING AN ALARM, go to Section 6.0 To silence the audible alarm, press the silence alarm key shown at the right. If you do not silence the alarm, it will automatically silence itself after 30 seconds. Silencing the audible alarm does not correct the problem that caused the alarm.

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.apcc.com. See also **Section 11.0: How to contact APC.**

Copy of type sign (without battery):

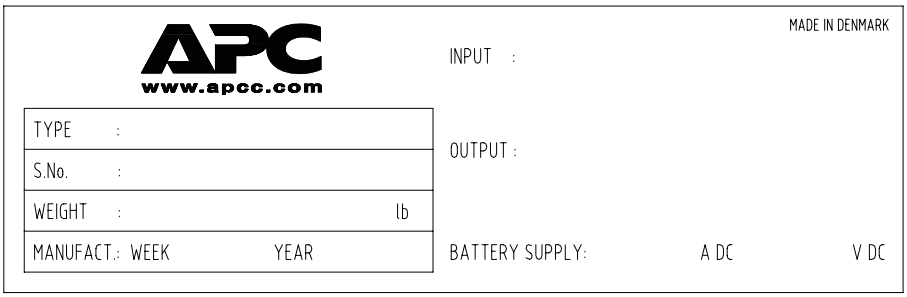


Table of Contents:

1.0 Introduction

1.1 General

Congratulations on your choice of Silcon DP300E UPS (Uninterruptible Power Supply). This UPS has been designed and produced for reliable and troublefree long-term use. For you it means that once installed and commissioned, you can forget it. However, you should arrange for preventive maintenance as described in section 8.0 of this manual.

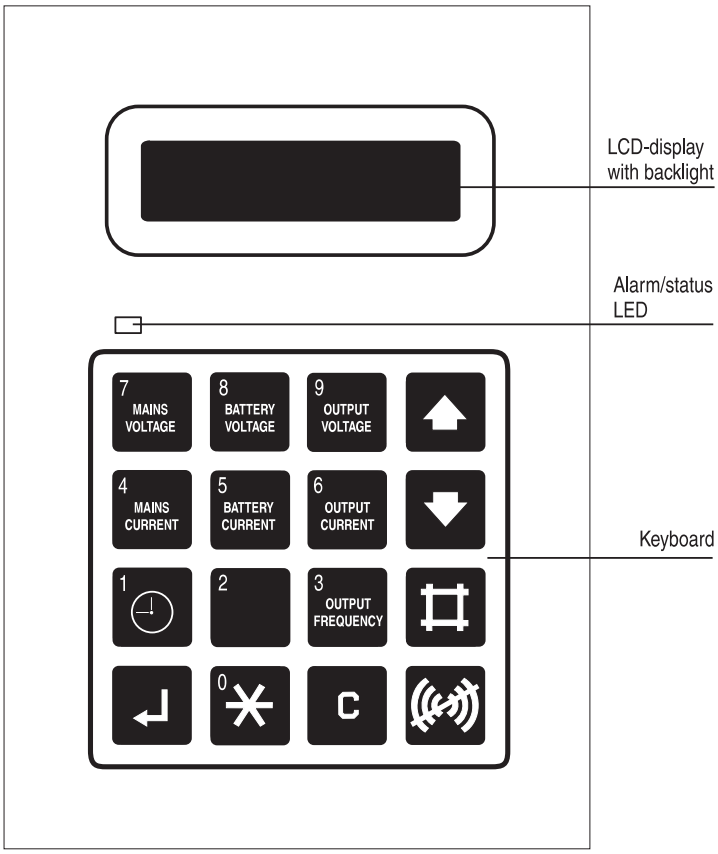
1.2 The display unit

The display unit – placed on the front of the Silcon DP300E UPS – is the link between user and UPS. It consists of a display, an alarm LED, and a keyboard. The display is used for showing parameters, measured values, and alarm messages. A backlight is activated in case of an alarm or if one of the keys are pressed. No activity or no alarm for 5 minutes will automatically switch of the light.

By pressing 2 and ▲ simultaneously you increase the contrast, and by pressing 2 and ▼ simultaneously you decrease the contrast.

The alarm LED is linked with an acoustic signal as an indicator for unusual operating situations. The light changes from green to red in case of alarm. The keyboard is used for programming of operating parameters and for calling read-outs of parameters/alarm messages.

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



2.0 Stop – Start and Operating the External Service Bypass Panel

2.1 General

> **CAUTION!**
>
> To avoid possible personal injury or equipment damage, be aware that there may be AC voltage at the UPS's output terminals/receptacles any time AC input power or DC battery voltage is applied. The UPS can provide output voltage from the batteries even when there is no AC input line voltage. When AC voltage is present, the UPS can provide output voltage even when the batteries are disconnected. If you want to be certain that there is no UPS output voltage, always disconnect the AC input source, switch off the UPS, AND switch off the DC. **TEST BEFORE TOUCHING!**
>
> Some units have been programmed at the factory for autostart. When this parameter is programmed to be on, the unit will automatically switch on whenever utility (AC line) is applied. To switch this parameter off, see chapter 4.0.

WARNING!
Please read chapter 2.4.1 "Switching off" in this User Guide, if UPS has to be stopped for more than 48 hours.

For safety reasons, only qualified service personnel should do a complete start-up or shut-down of the UPS whenever this is necessary. The qualified service person should follow the instructions in the User and Installation Manual. The UPS must be completely shut down before service or before the UPS is taken out of operation for more than 24 hours.

Although users cannot completely start-up or shut down the unit, they can switch the UPS into standby mode and return it to normal operation by following the instructions below. (In stand-by mode, the UPS does not provide output voltage).

2.2 Stop (stand-by)

WARNING!
If the UPS system is installed with a service bypass panel, and the load equipment must remain energized from utility, refer to operating service bypass panel before proceeding chapter 2.2 - 2.5.

Action	Display shows	Description
Open the front door and activate the red **"OFF"** push-button	System off	Alarm LED lights. Acoustic alarm sounds for 30 seconds.

2.3 Start (from stand-by)

Action	Display shows
Open the front door and activate the green **"ON"** push-button	Normal operation Load power xx%

2.4 Stop (for complete power down)

2.4.1 Switching off Silcon DP3400E – DP3500E

WARNING:
If the UPS system has a service bypass panel, and if load equipment must remain ernergized from the utility, refer to operation service bypass before proceeding.

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 third 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 the UPS and MCCB’s have been switched off before working on the UPS system.

	Display shows
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!!!**	
3. Press the red “OFF“ push-button. The red alarm LED below the display lights. The acoustic alarm sounds for 30 sec.*	** System OFF **
4. Switch off the utility power supply. The red alarm LED below the display lights. The acoustic alarm sounds for 30 sec.	** System OFF **
5. Switch off battery MCCB’s in MCCB box or battery cubicle. Please refer to LED indication and labelling in MCCB box or battery cubicle.	
6. Switch off utility power by opening Q001 and Q010, if dual utility.	
7. 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.

WARNING:
Make sure that all cable con–nections are in place prior to starting-up the first time after having completed the electrical installation.

NOTE:
After starting-up the system first time, check that the battery temperature can be displayed. (Press 5 and 8 simultaneously on the display; if not correctly installed display will show NV (Not Valid)). It is recommended to perform a battery capacity test after having completed the installation.

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

WARNING:
Do not close the external battery MCCB's without the display showing "Close MCCB" – otherwise you may damage the UPS.
If the display shows: "DC capacitor charge error", do not close MCCB, but call for assistance.

WARNING:
If "Autostart" is active (please refer to 4.2.1) the UPS will start automatically after step 9 with a delay of 1 minute.

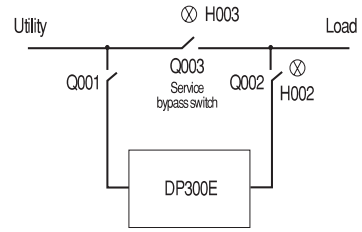
2.5 Start (from complete power down)

2.5.1 Starting up Silcon DP3400E – DP3500E

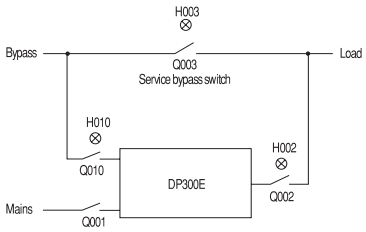
		Display shows
1.	Ensure that the system has been at stable environment for at least 12 hours to ensure any condensation has been evaporated before starting up.	
2.	Prepare the system by opening the front door(s).	
3.	Switch on the utility power supply	System type XXX XXX kVA - XXX
4.	Wait about 10 seconds	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.	Close battery MCCB's in MCCB-box or battery cubicle. Please refer to LED indication and labelling 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.	

Start up of system now completed.

Single Utility



Dual Utility



2.6 Operating the external service bypass switch, single systems

2.6.1 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	
	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“.	Only the lamp (H002) above the output switch handle (Q002) lights now
	Display shows
8. Open the front door and press the red “OFF“ push-button. The acoustic alarm sounds for 30 secs.*	**System OFF**
9. Turn the input switch (Q001) to position “0“. Turn the bypass input switch (Q010) to position “0”, if dual utility is present. The red alarm LED below the display lights and the acoustic alarm sounds for 30 secs.	

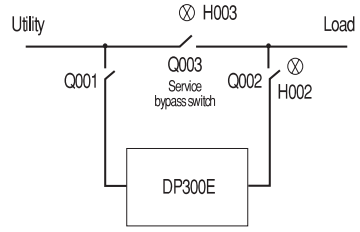
* The acoustic alarm can be reset by the [🔔] key

WARNING!
If the UPS is out of service for more than 48 hours the connected batteries might be damaged. Refer to total “Switching off“ as described in chapter 2.4.1.

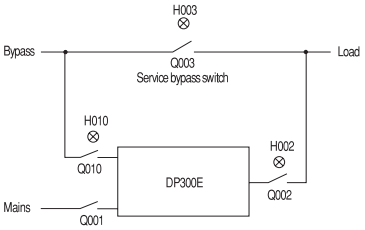
EMERGENCY (UPS not alive)

1. Turn the bypass switch (Q003) to position “1“.
2. Turn the output switch (Q002) to position “0“.
3. Turn the input switch (Q001) to position “0“.
4. If dual utility is present, turn bypass input switch (Q010) to position “0”.
5. Change released system input fuse(s), if any.

Single Utility



Dual Utility

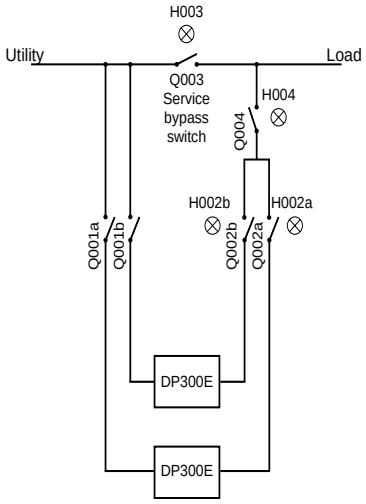


NOTE:
If battery has been disconnected please refer to "Starting Up" in Chapter 2.5.1 to connect battery(-ies) again.

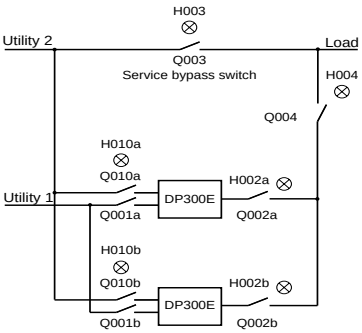
2.6.2 Switching the system from external bypass into normal UPS operation

Action	Display shows
1. Turn the input switch (Q001) to position "1". If dual utility is present, turn the bypass input switch (Q010) to position "1".	**System OFF**
2. Wait 10 sec. Open the UPS front door and press the green "ON" key	Normal operation load power 0%
3. Press ⌗ on the keyboard	
4. Press ▲ or ▼ on the keyboard until	Bypass operation : NO
5. Press C on the keyboard	Bypass operation : YES
6. Press ⌗ on the keyboard	
	Lamp indication on bypass panel
7. Check lamp indication on the service bypass panel	The green lamp (H002) above the output switch handle (Q002) lights
8. Turn the output switch (Q002) to position "1"	Now the green lamp (H003) above the bypass switch handle (Q003) lights too
9. Turn the bypass switch (Q003) to position "0"	Only the green lamp (H003) above the bypass switch handle (Q003) lights
	Display shows
10. Press ⌗ on the keyboard	
11. Press ▲ or ▼ on the keyboard until	Bypass operation : YES
12. Press C on the keyboard	Bypass operation : NO
13. Press ⌗ on the keyboard	
14. Press 0 ✱ on the keyboard	Normal operation load power xx%
15. Press ↵ on the keyboard	No lamps on the bypass panel light any longer

Single Utility



Dual Utility



WARNING!
If the UPS is out of service for more than 48 hours the connected batteries might be damaged. Refer to total "Switching off" as described in chapter 2.4.1.

2.7 Operating the external service bypass switch, parallel systems

2.7.1 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	Bypass operation : NO
2.	Press ▲ or ▼ on the keyboard until	Bypass operation : YES
3.	Press C on the keyboard	
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"	H003 turn off H002 & H004 still lights
8.	Turn all output switches (Q002) to position "0"	H002 & H004 still 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.* Repeat for (all) other system(s)	**System OFF**

10. Turn all input switches (Q001) to position “0“.
    On systems with dual utility, turn bypass input switches (Q010) to position “0”.

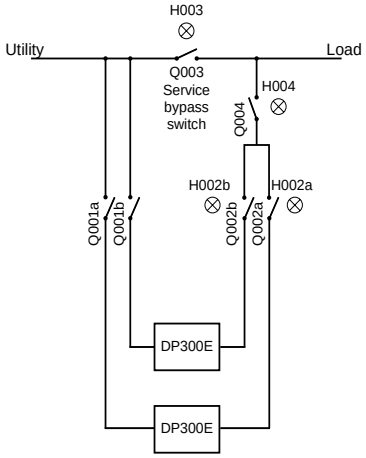
    The red alarm LED below the display lights and the acoustic alarm sounds for 30 secs.

    * The acoustic alarm can be reset by the  key

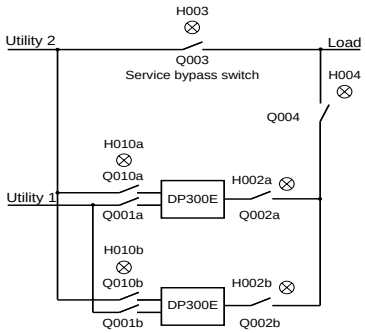
EMERGENCY (UPS not alive)

1. Turn the bypass switch (Q003) to position “1“.
2. Turn the output switch (Q004) to position “0”.
3. Turn the output switches (Q002) to position “0“.
4. Turn the input switches (Q001) to position “0“.
5. If dual utility is present, turn the bypass input switch (Q010) to position “0”.
6. Change released system input fuse(s), if any.

Single Utility



Dual Utility



NOTE:
If battery has been disconnected please refer to "Starting Up" in Chapter 2.5.1 to connect battery(-ies) again.

2.7.2 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 "1"	
3. Turn input switches (Q001) to position "1"	
4. On systems with dual utility, turn bypass input switches (Q010) to position "1"	**System OFF**
5. Wait 10 sec. Open the UPS front door and press the green "ON" push-button on **all systems**	Normal operation load power 0%
6. Press ⌗ on the keyboard	
7. Press ▲ or ▼ on the keyboard until	Bypass operation : NO
8. Press C on the keyboard	Bypass operation : YES
9. Press ⌗ on the keyboard	
All systems will transfer to bypass operation	Bypass operation

NOTE:
if Q002's are off "0" only programmed systems goes to bypass

Lamp indication on bypass panel

H002 & H004 lights

10. Turn the output switch (Q004) to position "1" — The green lamp (H003) above the bypass switch also lights.

11. 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.

Stop, Start & Operating the External Service Bypass Panel

The following can be carried out on any UPS

Display shows

14. Press  on the keyboard

15. Press  or  on the keyboard until

Bypass operation
: YES

Bypass operation
: NO

16. Press  on the keyboard

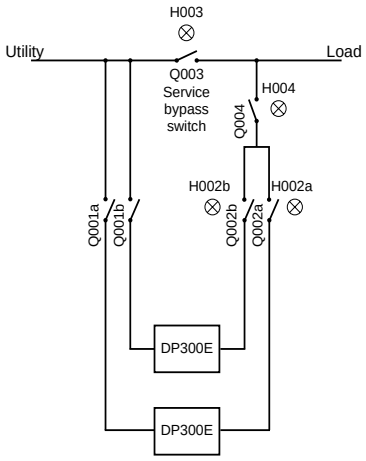
17. Press  on the keyboard

All the systems will transfer to normal operation.

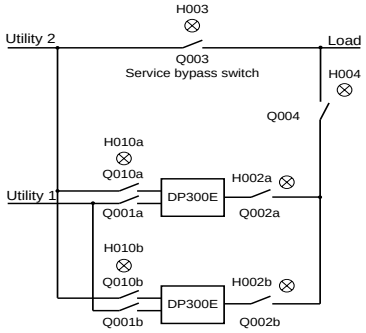
Normal operation
load power xx%

No lamps on the bypass panel light any longer

Single Utility



Dual Utility



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.

NOTE:
When Q002 is in position “0” the UPS can be operated and tested as a single system without affecting the other parallel UPS(s) if proper monitoring has been installed. Available on all APC bypass panels.

2.5.3 Isolating one UPS for service/maintenance

In a redundant system one UPS can be isolated for service/maintenance without affecting the other parallel 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 output and utility by turning output switch (Q002) to position “0” and input switch (Q001) to position “0”, disconnect battery by opening battery MCCB.

   If dual utility is present, turn the bypass input switch (Q010) to position “0”.

Switching back the UPS to normal parallel/redundant operation

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

   If dual utility is present, turn the bypass input switch (Q010) to position “1”.

2. Charge capacitors, connect battery and start up the UPS as described in chapter 2.5.

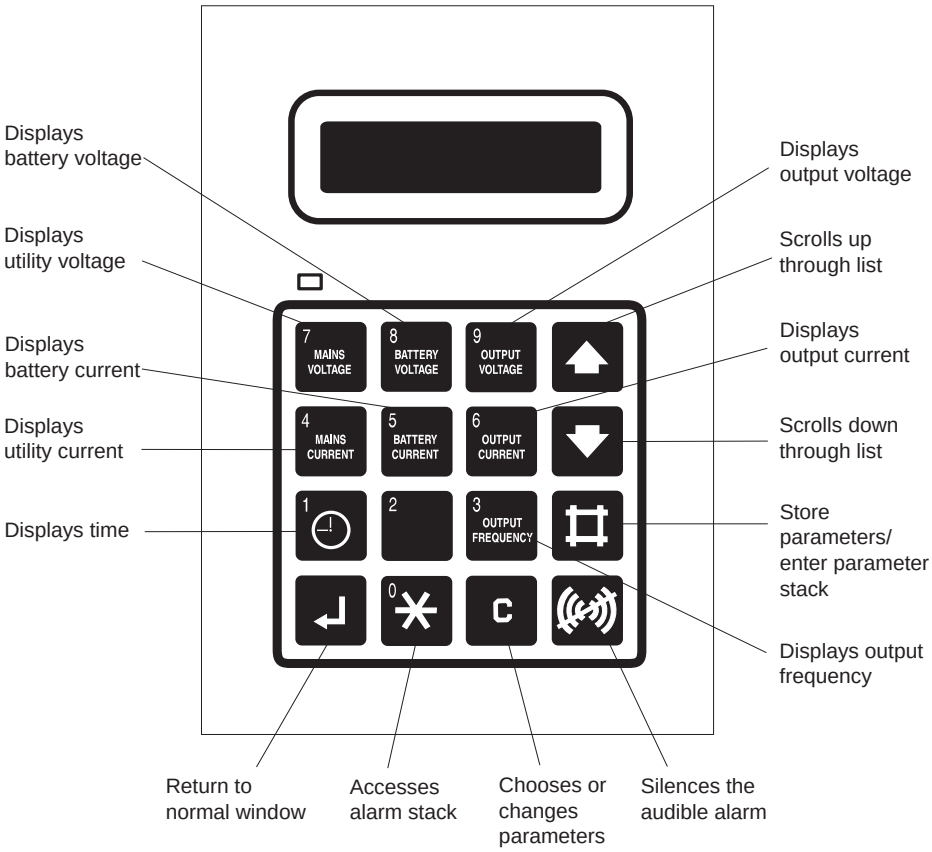
   The UPS will automatically switch to normal operation and start load sharing with the other parallelled UPS(s).

3.0 Operation

The display is used to show parameters, alarms/messages, and measured values. The alarm LED is used with an audible alarm to indicate unusual operating situations. The keyboard is used for programming and control of displaying parameters, alarm messages, and displaying measured values.

3.1 Keyboard description

NOTE:
Utility = Mains



4.0 Programming Parameters

4.1 General

Some operating parameters can be programmed directly from the keyboard. Unless you are quite sure of the consequence of changing the following parameters, please contact your local APC dealer for assistance.
Parameters are programmed as shown in the example 4.2.3.

4.2 Parameters

4.2.1

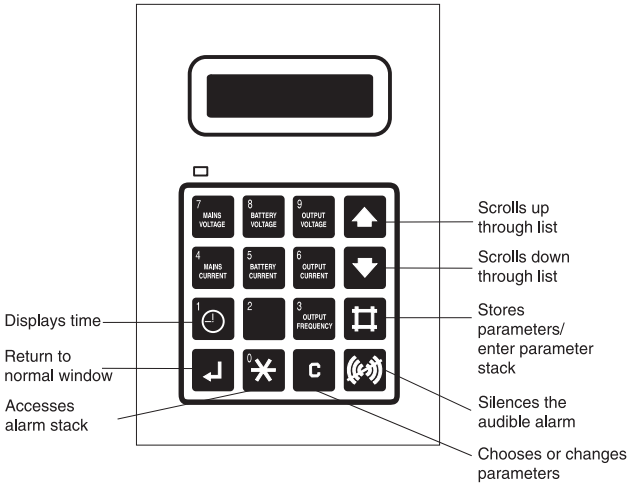
NOTE:
The system must not run in bypass mode for extended periods of time as the batteries will not be charged.

Parameter	Setting*	Comments
Bypass	YES, **NO**	"YES" will switch the system into bypass mode
Language	**GB**, D, F, I, DK, S, SF, NL, PL, CZ, E, P, SK, H	Language of text in display
Autostart	YES, **NO**	Automatic restart of UPS upon utility return. Ensures quick battery recharge.
Remote shutdown active	YES, **NO**	Shutdown of UPS by remote signal
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 (See section 8.4)
Battery monitor test**	-	Initiates check of battery condition by 25% discharging.
Automatic battery test**	**NO,** 3, 6	Activates the battery monitor test in cyclic intervals (Unit - months)
Battery monitor reset**	-	Pressing the C and ⌗ key after selecting this parameter resets any battery alarms.
Boost charge	YES, **NO**	"YES" results in boost charge (10 hours)
Autoboost charge	YES, **NO**	"YES" results in boost charge after every battery operation (10 hours)
Enter new date	YYMMDD	Local date can be entered
Enter new time	HHMMSS	Local time can be entered (24 hour clock)

* Text in bold letters are the standard setting
** Only for systems with battery monitor active

4.2.2 Keys used for programming

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



4.2.3 Programming example - switch to bypass operation

NOTE:
This is only to illustrate an example. Please see chapter 2.6 - 2.7 for further details.

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

To return to normal operation

Action	Display shows
6. Press [⌗] to enter parameter stack	
7. Press [▲] or [▼] until	Bypass operation : YES Bypass operation : NO
8. Press [C] until	
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.

4.3 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!!

4.3.1 System configuration parameters

Parameter	Setting*	Comments
Isolation trafo utility	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	**438**	Setting of float charge voltage at 20°C /68°F (Aut. compensation for deviations)
Boost charge voltage	**438**	Setting of boost charge voltage at 20°C /68°F (Aut. compensation for deviations)
Low battery warning	**346**	Warning for discharged battery
Low battery shut down	**326**	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 utility 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)
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 (service personnel only)
Battery connection	Common, Separate	Common if common battery is used in parallel system. Separate if separate battery is used
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**

* Text in **bold** letters are the factory standard setting

** **A**dvanced **B**attery **M**onitor

*** Viewable only in a parallel configuration.

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.

4.3.2 Programming example – change charge voltage to 446V*

***** For charge voltages, battery warnings and shut down voltages, and high battery temperature, the parameter is changed by entering the actual value like example 4.3.2.

NOTE:
Only for APC personnel and certified local APC personnel.

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

4.3.3 Programming example - change to output isolation transformer present**

****** The other parameters are selected by pressing the C key as step 4 in example 4.3.3. - one or more times.

Action	Display shows
1. Press 1 and 2 simultaneously to open for password input	Key in password :
2. Enter password xx xx xx by pressing	
	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%

Programming Parameters

4.4 Programming of battery monitor

NOTE:
Only for APC personnel and certified local APC personnel.

Action	Display shows
1. Press 1 and 2 simultaneously to open for password input	Key in password :
2. Enter password xx xx xx by pressing	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. 96%	
Press 1 4 MAINS CURRENT 0 ✱	Expected back-up time [min.]: 14.0
I.e. 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 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 section 4.4 **MUST** be carried out, otherwise the monitor may give false alarms.

4.5 Parallel 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 3 systems in parallel with separate batteries.

- Programme the station addresses 1-3: 1 for UPS 1, 2 for UPS 2 and 3 for UPS 3
- All UPS systems have to be programmed to “Highest station address” = 3.
- If APM 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.

Programming Parameters

Programming example – Highest Station No.
Parameters are selected by pressing the C key – one or more times.

Action	Display shows
1. Press 1 and 2 simultaneously to open for password input	Key in password :
2. Enter password xx xx xx by pressing	Last selected parameter
3. Press ▲ or ▼ until	Highest station address : 2
4. Press C for change	Highest station address : 3
5. Press ⌗ to store	Data stored
	Highest station address : 3
6. Repeat steps 3 to 5 for the rest of the parameters:	Station address : 1
	APM testmode active : NO
	Battery connection : separate
7. Wait about 1 second	
8. Press ↵ to exit.	Normal operation RED. 3/3 1%

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.
- Defective parallel cable.
- Wrong programming of “Station number”.
- Wrong programming of “Highest station number”.
- Inrush distortion on serial bus being used for communication.

5.0 Reading Out Measurements

Press as indicated below one key or two keys simultaneously (values used are only random for illustration):

NOTE:
Utility = Mains

Action	Display shows	Description
1	98.01.16 10.22,13	Year, month, day Hour, minute, second
7 MAINS VOLTAGE	Mains 1 voltage 480 480 480 V_{ac}	Utility 1 voltage is 3 x 480 V_{ac}
4 MAINS CURRENT	Mains 1 Current 100 100 100 A_{ac}	Utility 1 current is 3 x 100 A_{ac}
7 MAINS VOLTAGE + ▲	Mains 2 voltage 480 480 480 V_{ac}	Utility 2 voltage is 3 x 480 V_{ac}
4 MAINS CURRENT + ▲	Mains 2 Current 100 100 100 A_{ac}	Utility 2 current is 3 x 100 A_{ac}
8 BATTERY VOLTAGE	Battery voltage 438 437 V_{dc}	Battery voltage is 438 V_{dc} on batt.1. 437 V_{dc} on batt.2.
5 BATTERY CURRENT	Battery current + 20 A_{dc}	Charging current is (+) 20 A_{dc} (Discharging current (÷))
9 OUTPUT VOLTAGE	Output voltage 480 480 480 V_{ac}	Output voltage is 3 x 480 V_{ac}
6 OUTPUT CURRENT	Output current 180 180 180 A_{ac}	Output current is 3 x 180 A_{ac}
3 OUTPUT FREQUENCY	Output frequency 60Hz	Output frequency is 60 Hz
8 BATTERY VOLTAGE + 5 BATTERY CURRENT	Battery temp. 25ºC	Battery temperature is 25°C (77°F)
6 OUTPUT CURRENT + ▲	Output peak current 255 255 255 A	Output peak current is 3 x 255 A
↵	Normal operation load power xx%	Returns to normal status indication. If not pressed, automatic switch back will be performed after 20 seconds.
5 BATTERY CURRENT + ▲	Batt. load : 0 Batt. tank : 100	Battery load in procent. Left battery capacity in procent.

6.0 Alarms - What To Do

6.1 General

Alarms are indicated by the red LED (above the upper left corner of the keyboard) and by a 30 secs. acoustic signal. An alarm is registered in an alarm stack as long as it is present, and logged in the same succession as they arise.

IF THE UPS IS SOUNDING AN ALARM. To silence the audible alarm, press the silence alarm key shown at the right. If you do not silence the alarm, it will automatically silence itself after 30 seconds. Silencing the audible alarm does not correct the problem that caused the alarm.

6.2 The alarm stack

The alarm stack can be displayed by:

Action	Description
1. Press 	Access to the alarm stack
2. Press  or 	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.

6.3 Alarm messages

The alarm messages are used together with the events logger as part of a diagnostic system for the UPS service specialist.

Before calling for assistance you may take one or more of the following actions.

NOTE:
A battery monitor test can not be performed unless the battery is fully charged.

1. “Battery defective” means no back-up capacity any longer. Call for assistance. “Battery weak” means reduced back-up capacity. Reset the battery monitor alarm signal according to section 4.2.1 and start a battery monitor test according to section 8.5. Record the obtained back-up time and reset the new alarm from the battery monitor. Let the UPS recharge the battery for at least 16 hours, and with the same load as before start a second battery monitor test. If this results in improved back-up time, continue with further capacity tests until none or insignificant improvements take place. Above might “wake-up” the battery – else call for assistance.
2. “Battery operation”: Check the local utility power supply. One or more fuses may be blown or somebody could by accident have switched off the supply.
3. “Fan fault”: Check if the cooling air intake on your UPS has been blocked.
4. “Overload”: Check display for load on the UPS - the max. output capacity may be exceeded.
5. If there is no output voltage from the UPS - the utility supply is present and an attempt to restart gives no result – bypass the UPS as described in section 2.6 or 2.7 if external service bypass switch is present.

6.4 The events logger

The events logger is a memory stack, in which the last 250 events are stored in the same sequence as they may arise (showing the latest first).
Events stored are the alarms and the following operational modes:

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

6.5 Displaying the events stack

Action	Description
1. Press  and 	Press the two keys simultaneously to get access to the events stack
2. Press  or 	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 	Exit the events stack. If not operated the system will exit the events stack automatically after 30 seconds

6.6 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 call for assistance
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 switch not closed or released.	Close MCCB. If released again – call for assistance
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	–

NOTE:
Utility = Mains

Possible alarm	Description	Action
20. High temp. isolation transformer	Temperature on isolation input/output transformer to high	Check fan, check for airflow obstructions, check for overload
21. High temp. utility 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 Power down equipment
27. Mains is moment. out of tolerance	Short disturbances on the utility supply (1 ms transients)	–
28. Mains is out of tolerance	Utility input voltage r.m.s. value outside limits	–
29. Mains freq. is out of tolerance	Utility 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
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 MCCB switched off	Perform a battery capacity test
38. Battery defective	Insufficient battery capacity or battery MCCB switched off	Call for assistance

NOTE:
Utility = Mains

Possible alarm	Description	Action
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** close external MCCB due to preventing damage of UPS system. 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 utility	Check if phase rotation of bypass voltage is correct - if OK, call for assistance

NOTE:
The alarm can be reset from remote display. 

7.0 Remote Display

7.1 Remote Display Operation

The remote display is an inactive unit that is unable to influence the operation of the Silcon DP300E. It is impossible to adjust or 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 7.3.6.

7.1.1 Starting up the remote display

After having connected the supply the display will show:

"Remote display: DP300E UPS"

7.1.2 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,	The type of UPS to which the remote display has been connected

7.1.3 Operation

As described in section 3.0 Operation.

7.1.4 Reading out measurements

As described in section 5.0 Reading out measurements. However, reading out of time and utility 2 current is not possible from remote display.

7.1.5 Alarms

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
Datatransmission interrupted	A fault in the communication between UPS and remote display

Possible alarm	Description
Battery MCB is off	Battery MCCB 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 100%	Overload on UPS
Bypass is out of tolerance	Bypass input voltage outside limits
Mains is out of tolerance	Utility input voltage outside limits

NOTE:
Utility = Mains

7.1.6 Adjusting contrast

As described in chapter 1.0 Introduction.

8.0 Preventive Maintenance

8.1 General

The maintenance of the Silcon DP300E UPS systems should be carried out by trained service engineers. We recommend that you obtain a service and maintenance contract from APC or an APC certified and approved provider.

8.2 Fan

It is recommended to replace the fans. Please contact your local APC dealer for replacement interval.

8.3 Battery

8.3.1 Control of batteries

The batteries can be controlled in two ways:

1. Battery capacity test
2. Battery monitor test

For safety reasons battery tests should preferably be made during uncritical periods for the loads connected.

8.3.2 Function of battery capacity test

When performing a battery capacity test, the system switches to battery operation until low DC warning appears. The back-up time is valid for the actual load on the UPS, however, if load changes, the actual back-up time will change too. Then the UPS system will switch back to normal operation and back-up time will be stored in the battery capacity menu, see also section 8.4 on how to perform the test.

8.3.3 Function of battery monitor test

When performing an automatic or a manual battery monitor test, the back-up time is shown in the display and the condition of the battery is checked. The back-up time is valid for the actual load on the UPS, however, if load changes, the actual back-up time will change too.

See also section 8.5 “Battery monitor test” for more information and how to perform the test. The result is one of the following:

1. Battery is OK – nothing will happen. Normal back-up time is OK.
2. Battery has reduced capacity – “Battery weak” is given. Reduced back-up time.
3. Battery capacity far to low – “Battery defective” is given. Limited to no back-up time.

8.4 Battery capacity test

NOTE:
Expect 16 hours recharge time after a battery capacity test before full backup time is available.

Actions	Display shows	Description
1. Press 		
2. Press  or  until	Battery capacity test : xxx	"xxx" is back-up time from last test – if no previous test has been performed or if the test has been aborted the display will show "???"! A battery monitor test can be performed in the same way by selecting "Battery monitor test" in the display. However, this test will not start, unless the battery is fully charged. The next step starts up the test! To abort press  .
3. Press 	Battery capacity test : ON	Starts the battery test. (To interrupt a running test – perform point 1-2 and then press key and )
4. Press 	Data stored	
5. Wait about 1 sec.	Battery operation time : xxx min.	
6. Wait until backup times expires and a short alarm sounds. (No alarm in battery monitor test if battery is OK)	Normal operation load power xx%	
7. Press 	Battery capacity test : xxx	"xxx" is actual obtained back-up time in minutes. (Battery capacity test only).
8. Press 	Normal operation load power xx%	Exits the parameter stack. If not operated the system will automatically exit after 30 seconds.

WARNING!
The UPS must at least be in operation for min. 16 hours in a 3 month period to ensure that the battery is sufficiently charged. If not the battery might be damaged.

If the UPS has to be taken out of operation for more than 48 hours, the battery must be disconnected in order to prevent it from being totally discharged. The information how to do this can be found in chapter 2.4.1.

8.5 Battery monitor test

The battery monitor has two main purposes:

1. To show remaining back-up time, when the UPS operates in battery operation
2. To monitor the condition of the battery, during test or normal battery operation

8.5.1 Back-up time

The back-up time in the batteries is shown in the display, when UPS runs in battery operation. The back-up time is valid for the actual load on the UPS, however, if load changes, the actual back-up time will change too. The shown back-up time is also compensated for battery temperature changes, if a temperature sensor has been installed and calibrated.

8.5.2 Monitor function

During a test the battery monitor discharges 25% of the energy in the battery.

The monitor can detect, when a battery is weak, or if it is defective. The UPS gives an alarm, if one of the errors is detected. The criteria for the alarms are:

– Battery weak alarm is given, when the measured battery capacity is less than 75% of the original capacity.
– Battery detect alarm is given, when the measured battery capacity is less than 50% of the original capacity.

8.5.3 Functionality of battery test

The test can be started manually or automatically from the user stack.

The automatic test is enabled in the user stack and can be set to 3 or 6 months. When automatic test is enabled, the UPS performs a battery test every 3 or 6 months independent on manually activated battery tests. If conditions for starting a test are not correct at the moment where automatic test is going to start, the test will be skipped.

Conditions for starting a battery monitor test:

– A battery monitor test can only be started if the battery is fully charged (capacity = 100%).
– The UPS is operating in normal operation.

The test is interrupted if:

– The error “battery defective” is encountered.
– If utility fail during battery monitor test.
– The red OFF button is pressed.
– If “EPO” emergency power off is activated.
– If external shutdown is accepted.

After the test the UPS returns to normal operation.

The battery monitor test can be performed with load in the range of 10-150%. If the load exceeds this level, faulty results may occur.

8.5.4 Operation of the battery monitor

The operation of the battery monitor is performed from the user stack, the related parameters are:

Parameters in the user menu

– **Battery monitor test**
  This parameter is used for starting or interrupting a monitor test

– **Battery monitor reset**
  This parameter is used for resetting activated battery alarms

– **Battery monitor auto**
  This parameter is used for enabling or disabling of the automatic monitor test. Possible values are “OFF”, “3 months” (90 days), or “6 months” (180 days). When enabling is chosen the day counter will count starts. Please note that a change in setting will result in resetting of the day counter.

9.0 Economy Operation

9.1 General

In economy operation the load is supplied directly from the utility, however the UPS is monitoring the utility and the output voltages and will in case of utility failure switch to battery operation without interruptions.

NOTE:
When using economy mode there is **NO** power factor correction on the input or regulation of output voltage.

The system will in order to keep the batteries fully charged at all times switch to normal operation in a pre-programmed time sequence.

The operation of the system is the same as already described in this guide with the exception of the following points:

- When starting up, the system will at first go into normal operation to ensure a fully charged battery, but will then switch into bypass after the programmed time (8-10 hours).

10.0 System Specifications

10.1 Technical data

Input	Voltage	3 x 480V
	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	3 x 480V
	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 DP3400E-DP3500E)
	Load power factor	0,9 lead to 0,8 lag
	Frequency	60Hz (utility synchronized) ±0,1% free running
	Overload capacity Normal operation Normal operation Battery operation Bypass operation	 200% - 60 secs. 125% - 10 min. 150% - 30 secs. 125% - cont.
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 NEMA 1 EN50091-1 UL 1778 EN50091-2 Built-in Programmable Programmable

11.0 How to Contact APC

www.apcc.com

For more information call:
Tel: (800) 800-4APC - US & Canada
Tel: (401) 789-0204 - Worldwide

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Pre-sales Technical Support
1-877-474-5266 (1-877-4Silcon)

Post-sales Technical Support
1-877-287-7835 (1-877-2UPS-TEK)

Fax: 1-401-438-7761
Web: www.apcc.com/support/contact/contact_support.cfm