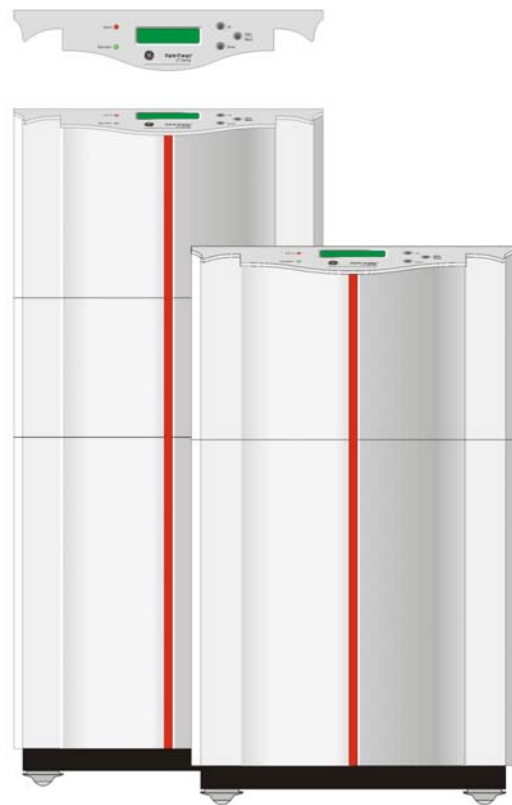# Product description

Digital Energy™ Uninterruptible Power Supply
On-line LP 11 / 31T UPS
3 - 5 - 6 - 8 - 10 kVA - CE

CE

Certified
Quality System
SQS
ISO 9001 / EN 29001
Reg. No. 10448

GE imagination at work

Contents:

1 - Introduction

The **GE (General Electric) Digital Energy™ LP Series UPS** is a true on-line double conversion, intelligent and heavy-duty UPS for centralized power protection. The continuous operation technology with isolated bypass provides the highest reliability against mains disturbances under the toughest conditions. The LP UPS is easy to install and service. It can be integrated into any office or industrial environment. Thanks to RPA (Redundant Parallel Architecture) the system power can be expanded by paralleling units or the system reliability can be increased by adding redundant units. The LP 11 are single phase UPSs, the LP 31T models are 3-phase in and 1-phase out.

Each GE Digital Energy UPS is thoroughly tested and conforms within tolerance to the following specifications. (Data are mean values and are subject to change without notice.) Information applies to all models unless otherwise specified.

2 - Functional explanation

2.1 Principles of operation

The UPS stores electric energy in batteries housed in the unit. This allows the UPS to supply output power even when the incoming mains power is cut off completely. Energy is stored as Direct Current (DC), while input and output energy are Alternating Current (AC) in sine wave form. Therefore the UPS contains an input converter (AC to DC) and an output converter (DC to AC) (See fig.1).

The LP 11/31T UPS is a SECOND GENERATION On-Line UPS with:
- a capacitor bank in the DC line
- battery not in line with the DC link, resulting in:
    - enhanced battery life
    - optimal battery charging
- full wave input converter with power factor correction
- extremely wide input voltage and input frequency tolerance
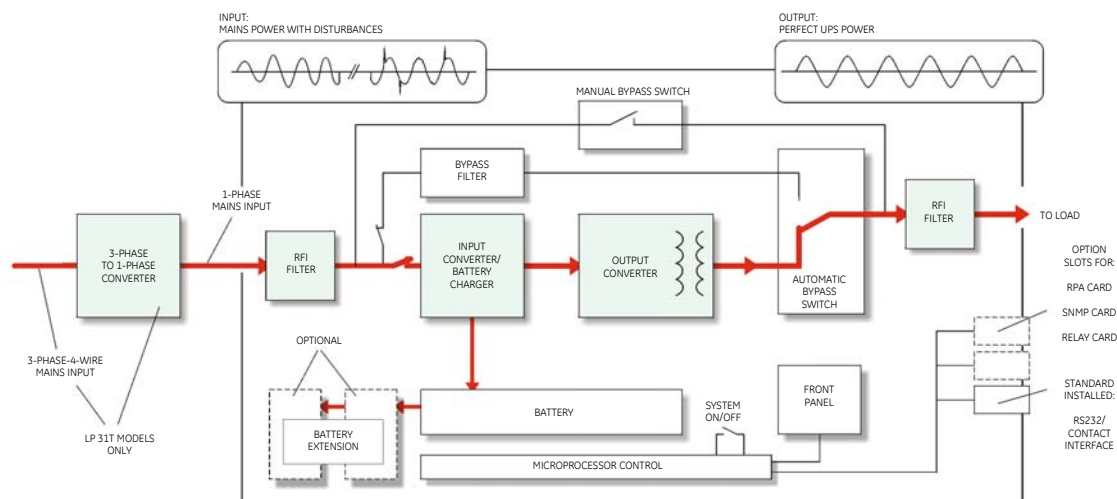
Figure 1   Block diagram of the LP 11/31T UPS, mains present

2.2 Normal conditions

Under normal input conditions (see section 4.2) energy from the mains is channeled through the input converter, which supplies the output converter and, together with the battery charger, keeps the battery fully charged. Surges and spikes are blocked completely at the input converter and very instable mains can be supported. The output converter synthesizes a completely new AC output sine wave to supply the load (electrical equipment).

2.3   Mains failure

In the event of a mains power failure (i.e. mains absent or outside tolerance) the output converter uses the energy reserve stored in the battery to continue to produce AC power, ensuring unbroken output (fig. 2).
No interruption or alteration will ever be noticed in the output power.
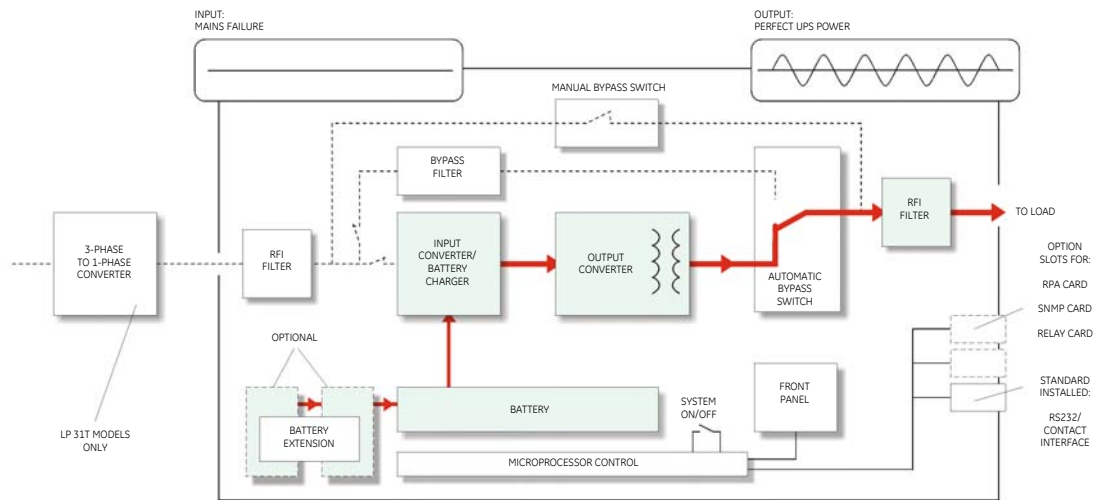
Figure 2   Block diagram of the LP 11/31T UPS, mains failure

In the event of an extended mains failure, the output converter will stop when the battery energy has been used up. At this point, the UPS is no longer able to power the connected equipment.
When the mains is re-established within tolerance, the input converter will be supplied again by the mains and the batteries will be recharged, making them ready to support future power failures.

2.4   Bypass operation

If the output converter is unable to deliver the demanded output power (overload, overtemperature) the bypass switch will automatically transfer the load to the mains. If bypass operation is caused by an overload situation, the UPS will switch back to output converter if the load is reduced to less than 100%. If bypass operation is caused by overtemperature, the unit will only switch back when the temperature has dropped below alarm level.
When the normal situation is restored, the load will be transferred back to the output converter.
If a power failure occurs during bypass operation, load power is lost. If the UPS functions under overload conditions it may not be able to protect the load.

Bypass operation is also used during ECO-Mode (see also section 5.7: Standard Features).
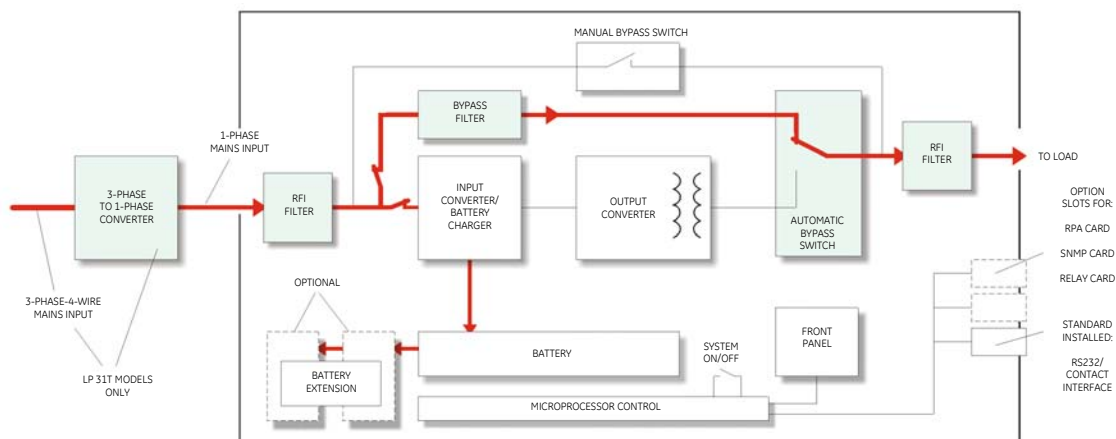
Figure 3   Bypass operation: automatic bypass

3 - External description

3.1   Front and rear panel
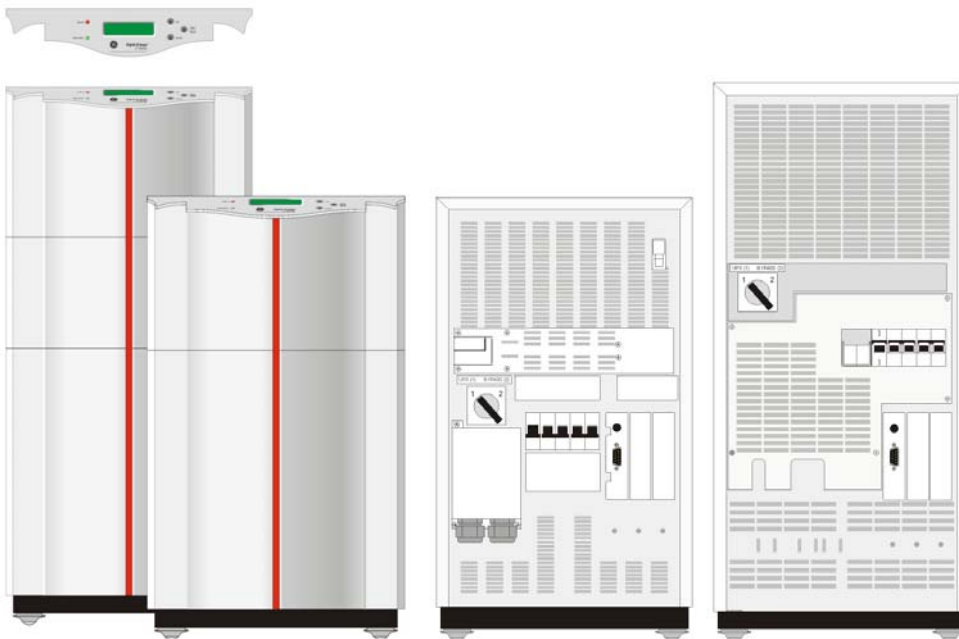
Figure 4   Front and rear panel LP 3/5/6-11 and LP 8/10-11 UPS

FRONT

Operation/alarm	:	green/red LED
LCD screen	:	2 × 16 characters
Push-buttons	:	down/enter - reset/up
Buzzer (resettable)		

REAR

3 option slots for	:	RS232 interface card (std installed)
	:	Potential free contacts*
	:	SNMP*
	:	RPA* redundant parallel architecture

On/Off switch
Manual bypass switch
Input/output terminals
DC connector for external batteries (not for 3 kVA model)
Line circuit breaker
Bypass circuit breaker   * = option
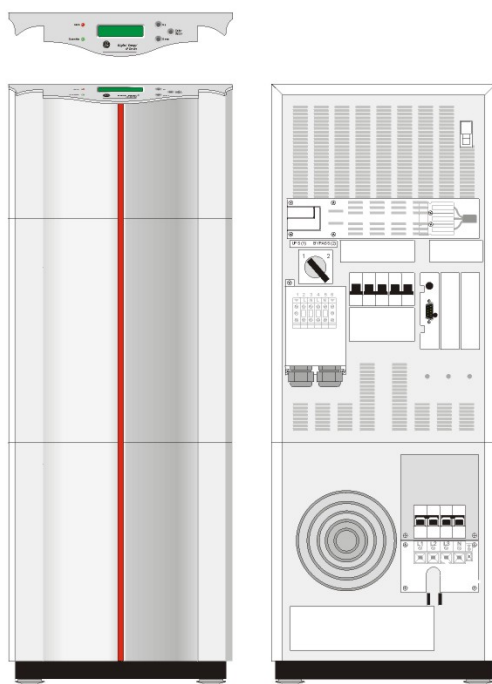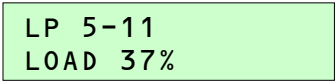
Figure 5
LP 31T models consist of a LP-11 UPS mounted on a
3-phase to 1-phase converter
(figure shows LP 5/6-31T)

The LCD screen shows UPS system data, status messages, alarm messages, settings.
The available languages are English, German, French, Spanish and Italian (user selectable)

Six types of screens can be displayed:
- the default screen
- information screens
- setup screens
- service screens
- status / alarm screens (see section 5.6)
- test screens

The *default screen* shows UPS model and actual load (values are examples):

```
LP 5-11
LOAD 37%
```

The *'information screens'* show the UPSs system data:
- Mains voltage and mains frequency, and the power delivered by the mains
- Output voltage and output frequency, and the power delivered by the UPS
- Temperature near the batteries, battery voltage and battery (dis)charge current
- Remaining runtime (during mains failure)
- The total operating time of the UPS

The *'setup screens'* show a programmable UPS function and its actual setting:
- System operating frequency
- System operating voltage
- Battery capacity
- No-load shutdown (<2%)
- Bypass enable/disable
- Language on display (English/German/French/Spanish/Italian)
- Frequency tracking range
- Service warning 28/24/20/16/12/8 months or disable

The *'service screens'* show service information targeted on trained service personnel:
- Serial number of the UPS, release number of the installed software
- Service information on internal components, fan speed, internal DC voltage, internal temperature levels, battery charger
- Start of a quick battery test or deep calibration test
- Forced (manual) transfer to bypass
- Enable/disable autorestart
- Enable/disable IEM (intelligent energy management)

The *'test screens'* show the proceeding of the following tests:
- General system test,
- Quick battery test,
- Battery calibration test,
- Bypass test

The *'event logging screens'* show historical events:
- Mains failures
- Alarm messages
- Error messages
- Status messages etc.

LP 11/31T model	:	3-11	5-11/31T	6-11/31T	8-11/31T	10-11/31T

3.2   Enclosure

Construction	:	sheet steel cubicle and ABS
Colour	:	RAL 9010 (white) and aluminium colour front
Protection	:	IP 20

3.3   Dimensions

LP 11

Cabinet type	:	- - - - - - - - - - - VSD1 - - - - - - - - - - -	- - - - - - - VSD2 - - - - - - -
Dimensions (hxwxd, mm)	:	537 x 313 x 590680 x 313 x 720	
Shipping dims (hxwxd, mm)	:	800 x 460 x 750915 x 460 x 810	

LP 31T

Cabinet type	:		- - - - VSD1+VSDT1 - - - -	- - - VSD2+VSDT2 - - -
Dimensions (hxwxd, mm)	:	n.a.	855 x 313 x 590	995 x 313 x 720
Shipping dims (hxwxd, mm)	:	n.a.	1260 x 460 x 810	1260 x 460 x 810

3.4   Weight

LP 11

Weight (kg)	:	85	110	115	165	170
Shipping weight (kg)	:	100	125	130	185	190

LP 31T

Weight (kg)	:	n.a.	180	185	270	275
Shipping weight (kg)	:	n.a.	200	205	290	295

4 - Electrical specifications

LP 11/31T model	:	3-11	5-11/31T	6-11/31T	8-11/31T	10-11/31T

4.1 Ratings

Output rating (kVA / kW)	:	3 / 2.4	5 / 4	6 / 4.8	8 / 6.4	10 / 8

4.2 3-phase to 1-phase converter (LP 5/6/8/10-31T models only)

Nominal AC input voltage	:	230/400V, 3 phase, 4 wire				
AC input voltage range	:	230/400V ± 15%				
Input frequency range	:	45-65Hz				
Input current (A), no-load	:	n.a.	4 x 1.8	4 x 1.8	4 x 1.9	4 x 1.9
Input current (A), 100% load	:	n.a.	4 x 11	4 x 13.5	4 x 17	4 x 21
Inrush current	:	none				
AC output voltage, 400Vac input	:	233V at 0% load				
		226V at 100% load				
No-load power consumption (W)	:	n.a.	215	215	245	245
Efficiency	:	94%				
Recomm. input fuse (slow blow, A)	:	n.a.	3 x 16	3 x 16	3 x 25	3 x 35
Protected against	:	- overtemperature				
		- missing input phase				
		- feedback to mains (input phases are disconnected at mains failure)				

4.3 Input UPS

Nominal AC input voltage	:	220 - 240 V				
AC input voltage range						
at 100% load	:	172 - 285 V				
at 50% load	:	147 - 285 V				
at 25% load	:	132 - 285 V				
Input frequency range	:	40-70 Hz				
Input current waveform	:	sinusoidal				
Input power factor	:	≥ 0.99				
THD input current	:	≤ 10%				
Max. input current (A)	:	16	28	28	40	50
Inrush current	:	none				
DC output voltage	:	380 V				

4.4 Battery charger

Characteristic	:	U/I-characteristic, constant current charging until float voltage, then constant voltage charging and boost charge mode for fast recharging of batteries				
DC input voltage range	:	350-450 V				
DC output voltage at 20°C						
LP 3-11	:	Float: 162.5 V Boost: 177 V				
LP 5/6/8/10-11/31T	:	Float: 274 V Boost: 295 V, temperature compensated: -18mV/°C per 12V battery				
Output current limit (Adc)	:	2.0	2.0	2.0	3.6	3.6

LP 11/31T model	:	3-11	5-11/31T	6-11/31T	8-11/31T	10-11/31T

4.5 Output

Output power at pf. = 0.8, VA* at nominal AC input voltage, W	:	3000	5000	6000	8000	10000
Semiconductor	:	IGBT				
AC output voltage	:	230V ± 1% static resistive load 230V ± 2% measured crest load 2.5:1 230V ± 2% dynamic mean deviation over one half cycle for 100% of rated load applied or removed				
Typical overload (temp. dependent)	:	110% ≥ 20 minutes 130% ≥ 3.5 minutes 150% ≥ 2 minutes				
Short circuit current, A (240ms)	:	32	45	50	67	100
Output frequency	:	50 or 60 Hz selectable, ± 0.1%, unless synchronized with the mains				
Freq. tracking range	:	± 2/4/6% of nominal (user selectable)				
Output wave form	:	sine wave				
Max. phase difference input-output	:	7°				
Harmonic distortion	:	2% max. with linear load				
Power factor range	:	Any lagging or leading power factor is permitted within the specified rating to pf. 0.5				
Output derating altitude	:	Till 1000m no derating Above 1000m 12.5% per 1000m, max. 4000m				
Protection	:	Automatic shut down (or transfer to bypass, if bypass is available) in case of - low/high DC voltage - overtemperature - overload / short circuit				

The output is protected against connection to the mains

* according to EN50091-1

4.6 Automatic bypass switch

The automatic switch provides transfer of the load to the line voltage without any interruption of the supply. The transfer is initiated by a signal from the output converter protection circuit in case of an overload or high temperature.
When the conditions return to normal the load is automatically transferred back to the output converter.
The automatic bypass switch can be disabled by the end-user.

Bypass voltage limits	:	- 15 % + 10% of nominal
Transfer transients	:	typically 2% mean deviation over one half cycle.
Frequency tracking range	:	± 2/4/6% of nominal (user selectable)
Slew rate	:	max. 1Hz/sec or 5Hz/sec (user selectable)

4.7 General design criteria

Mechanical	:	IP20
Humidity	:	95% non condensing
Safety	:	EN 50091-1; EN 60950; IEC 950
EMC	:	EN 50091-2
Surge capability	:	IEC 1000-4-5 (6kV 1.2/50µs, 3kA 8/20µs)

5 - Performance characteristics

LP 11/31T model	:	3-11	5-11/31T	6-11/31T	8-11/31T	10-11/31T

5.1 Efficiency (battery fully charged)

LP 11
Total efficiency (%)

- 20% load	:	75	80	80	80	84
- 50% load	:	85	85	85	86	88
- 100% load	:	86	88	88	87	89
Efficiency (%) on ECO Mode (%)	:	97	97	97	97	97

LP 31T
Total efficiency (%)

- 20% load	:	n.a.	75	75	75	79
- 50% load	:	n.a.	80	80	78	83
- 100% load	:	n.a.	83	83	80	84
Efficiency (%) on ECO Mode (%)	:	n.a.	91	91	91	91

5.2 No-load power consumption (battery fully charged)

The no-load power consumption is mainly caused by the microprocessor.

LP 11

No load power consumption (W)	:	131	188	200	265	225
if output off	:	25	25	25	25	25

LP 31T

No load power consumption (W)	:	n.a.	360	370	410	440
if output off	:	n.a.	240	240	270	270

5.3 Heat dissipation

LP 11

Normal operation
Watts:

100% load	:	390	545	655	872	988
50% load	:	211	350	423	520	545

Btu/hr:

100% load	:	1116	1860	2235	2976	3371
50% load	:	720	1195	1445	1774	1860

ECO Mode operation
Watts:

100% load	:	75	123	148	198	247
50% load	:	38	65	75	100	123

Btu/hr:

100% load	:	256	420	505	676	843
50% load	:	130	222	256	341	420

LP 11/31T model	:	3-11	5-11/31T	6-11/31T	8-11/31T	10-11/31T

Heat dissipation (cont'd)

LP 31T

Normal operation

Watts:

100% load	:	n.a.	835	1000	1342	1561
50% load	:	n.a.	500	600	758	835

Btu/hr:

100% load	:	n.a.	2849	3412	4580	5327
50% load	:	n.a.	1706	2047	2587	2849

ECO Mode operation

Watts:

100% load	:	n.a.	338	463	619	773
50% load	:	n.a.	195	232	310	388

Btu/hr:

100% load	:	n.a.	1153	1580	2112	2638
50% load	:	n.a.	665	791	1057	1324

5.4 Environment

Ambient temperature	:	-10 to +40°C
Audible noise at 1 meter	:	40 - 50dB(A),
		the audible noise is load and temperature dependent

5.5 Runtimes (ratings given for 25°C)

VA / Watts	runtime in minutes				
1000 / 800	34	62	62	112	112
2000 / 1600	15	30	30	57	57
3000 / 2400	8	14	14	37	37
5000 / 4000	-	9	9	20	20
6000 / 4800	-	-	7	16	16
8000 / 6400	-	-	-	10	10
10000 / 8000	-	-	-	-	7

Units connected to battery extension packs will have longer runtimes. See section 8.6.

5.6   Alarm conditions

The LCD screen on the front panel displays status messages and alarm messages. Three kinds of messages can be recognized.

- status indications   :   indicate the UPS operating mode
- low priority alarms   :   indicate abnormal operating situations; the screen message is accompanied by a 1x per sec. blinking red LED and a 1x per 8 secs. sounding buzzer, resettable.
- high priority alarms :   indicate situations in which the connected load is at risk as a proper output voltage of the UPS is no longer guaranteed; immediate action should be taken. The screen message is accompanied by a 1x per sec. blinking red LED 'alarm' and a 1x per second sounding buzzer, resettable.

Overview of the most important messages:

Message text	kind of message		
	status indication	low priority	high priority
On line	●		
On battery	●	●	
On bypass	●		●
Output off (requested)	●		
On manual bypass	●		●
No synchr.		●	
Bypass out of limits		●	
Temperature		●	
Overload			●
Replace battery			●
High temperature			●
Battery low			●
Int. battery fuse failure			●
Ext. battery fuse failure			●
Bypass fuse failure			●
Input fuse failure			●

Note: By using the RS232 interface, additional conditions can be monitored and signals include written screen messages (see chapter 6, Interfacing).

5.7   Standard features

Isolation transformer
The output of the output converter can be galvanically isolated from the mains. The neutral of the UPS output is internally connected to the input neutral. The output is totally isolated if the bypass circuit breaker is disconnected.

Bypass enable/disable
If you do not want the automatic bypass switch to transfer to bypass, e.g. in situations of very bad or unstable mains, the bypass switch can be disabled. This feature is essential if the UPS is used as a frequency converter.

Frequency tracking range
The output frequency will follow the bypass frequency within the frequency tracking range (standard ± 2%). If the bypass frequency is outside these limits, the inverter will run on its internal oscillator, and bypass transfer is inhibited. If you want the bypass switch to operate over a wider frequency range (e.g. in case of generator supply), the tracking range can be changed into ± 4% or ± 6%.

ECO-Mode

The LP UPS is equipped with the ECO-Mode feature. If the feature is enabled, the load is operated on mains through the electronic bypass switch. If the mains is interrupted or out of limits the load is automatically transferred to the inverter. Operating the load on mains improves the efficiency of the UPS and saves on energy costs. As the unit produces less heat in ECO-Mode, also the energy costs of an airco installation will be reduced. We advise not to use the ECO-Mode in case of an unstable mains.

NOTE: If LP units operate in parallel, the ECO-mode feature is not available.

Communications port : 9-pin Sub-D female plug (RS232/contact interface)

Auto restart

If this feature is enabled and the unit has shut down (e.g. due to overload) the UPS will start up automatically when the normal situation is restored. The factory setting is: enabled. If the auto restart feature is disabled the unit will not automatically restart when the normal situation is restored

Service warning

The LP UPS can generate a service warning periodically. The period can be set to 28, 24, 20, 16, 12 or 8 months. Default the service warning is disabled.

Event logging

The LP UPS stores the 200 last events in its memory. The service engineer can use this information for quick and accurate diagnostics. The event list contains all events like alarms, error and status messages.

Superior battery management for maximum battery life and reliability:

- **Load dependent battery-end voltage**
  The end of discharge voltage of the batteries depends on the discharge current: the higher the current, the lower the 'end-of-discharge' battery voltage. (9.4 – 10.4 V) This gives maximum capacity without overdischarging. Overdischarging results in failure to recover normal capacity and in shortened battery life.

- **Automatic (quick) battery test**
  The LP UPS conducts periodic automatic battery tests to ensure that the batteries and the wiring are healthy and able to support power failures. The tests do not cause any interruption in the function of the unit. Automatic tests are conducted after every 500 operating hours. A manual battery test can be activated either via the RS232 Port, or via the front panel.

- **Deep battery calibration test**
  The battery condition can be calibrated by the UPS monitoring software, ensuring accurate runtime prediction. Please refer to the manual of the appropriate monitoring software package for more information. During a deep battery test the batteries will be discharged until 'battery low' alarm level. The test will, after a complete recharge, result in new runtime predictions.

- **No-load shutdown**
  Whenever the load is <2% of the maximum load, and the input is absent for a period exceeding 10 minutes. If the input voltage is restored, the output will be available again. Standard: activated.
  Note: If LP units operate in parallel, the no-load shutdown feature is not available.

- **Boost mode**
  If after a discharge the battery voltage is lower than 240Vdc (LP 3-11: 144Vdc) the UPS will charge the batteries with a boosted charge voltage of 295Vdc (LP 3-11: 177Vdc). This enables fast recharging of the batteries. If the battery charger current is reduced to 0.03C Ampere, the battery charger will go to normal float voltage 271Vdc (LP 3-11: 162.5Vdc).

- **Temperature compensated battery charging**
  This feature reduces the battery charge voltage with increasing temperature (-18mV/°C per 12V battery). As a result poor charging of the batteries under low temperature conditions and overcharging of the batteries under high temperature conditions are prevented..

6 - RS232 / contact interface

The RS232/Contact interface (9-pole, sub D, rear panel) enables advanced communication between the UPS and e.g. a personal computer. An interface kit (cable and software) is delivered with the UPS. The software supports most common operating systems incl. Novell, UNIX, VMS, Windows, IBM OS/2, LINUX, has a modular and layered architecture and works for all degrees of network complexity: stand-alone, multi-vendor networks and large managed networks. During a power failure the UPS software takes a number of actions: processes are stopped, open files are closed and unattended systems will be shut down in a controlled way. When the mains power returns, the systems will automatically start up and will be up and running as soon as possible.

For specific information on GE Digital Energy™ connectivity products please contact your dealer or internet: www.gedigitalenergy.com.

Pin #	Function
1	Battery low
2	Serial data out
3	Serial data in / UPS shutdown
4	Not used
5	Common
6	Bypass active
7	Plug&Play / RTS
8	Utility failure
9	General alarm

contact interface: Max 48V / 30mA
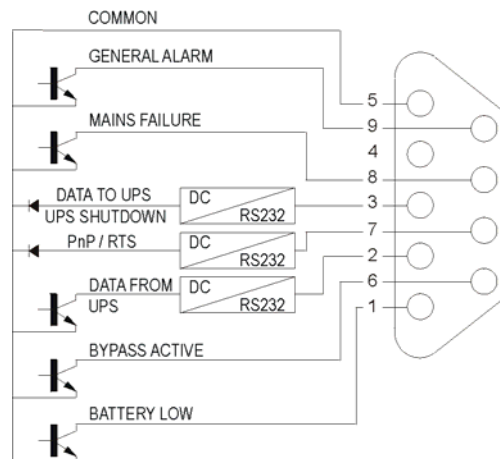
Fig. 6. RS232 / contact interface

7 - Batteries (ratings given for 25°C)

LP 11/31T model	:	3-11	5-11/31T	6-11/31T	8-11/31T	10-11/31T
Nominal voltage (V)	:	144/7	240/7	240/7	240/12	240/12
Number of batteries	:	12	20	20	20	20
Type	:	sealed and maintenance free				
Service life	:	up to 6 years (depending on operating conditions)				
Runtime	:	see section 5.5, Runtimes				
Battery recharge time	:	1.5 - 3 hours for 80% capacity				
Battery discharging	:	self discharge current 0.35 mA				
		discharge end voltage of battery depending on the actual load				
		10.5Vdc < 0.21 C till 7.8Vdc > 1.40 C				
		When the LP UPS is in sleeping mode the inverter will be switched off, battery charger and rectifier are in operation				

8 - Options

8.1 SNMP interface card

An SNMP interface card can be mounted to the rear panel of the UPS, and allows the data interface to be connected directly to an Ethernet network. When this option is installed the ComProt communication link is no longer available to the user.

8.2 Relay interface card

A relay interface card can be mounted to the rear panel of the UPS. Four potential free contacts are available for signalling the following alarms to a user defined system:
- bypass active
- mains failure
- battery low
- general alarm

Capacity of the relay contacts: Max: 48V 500mA
                                     Min: 5V 100mA

8.3 RPA Redundant Parallel Architecture

Nowadays there are many mission-critical applications that need a fault tolerant, 100 % reliable availability of mains power. By adding the optional RPA facility to the Digital Energy™ LP UPS, highest standards for reliability can be met. The RPA facility allows to connect 2, 3 or 4 units of equal power rating in parallel.

Connecting Digital Energy LP units in parallel is attractive for several reasons.

Redundancy: To achieve the highest possible level of power protection in a fault-tolerant network.
By connecting units in parallel, using the N+x system, a redundant system can be created. In this case all the UPSs equally share the load in the system during normal operation. In this way every possible single point of failure will be eliminated. This means that if one of the UPSs in the parallel system fails, the other(s) can still supply the load guaranteeing full protection without any interruption.

Scalability: To add power if needed without investments beforehand.
Another reason for paralleling units is upgrading the power rating of the system. If e.g. a 5kVA UPS is installed, the power rating can be upgraded to 10kVA by adding another 5kVA UPS in parallel. This spread investment makes sure that you don't have to invest in advance, but only when you need to.

GE's unique RPA system has the following major advantages:
- Digital Energy RPA offers true redundancy because not only the power electronics are redundant, but also the batteries, the bypass circuit and the control logic,
- The RPA system is an option: you don't have to buy it if you don't need it.

8.4 Alarm boxes

An **interface box** linked to the Interface port, the VIC/RELAYBOX/01 translates the RS232 signals to five independent change-over contacts, with a maximum switching capacity of 230V/5A each.
Wall mounted plastic **alarm boxes** are available for remote audible and visual alarm indication.

8.5 Connectivity products

A **splitter box** translates information from the RS232 Interface to several computers.

Interface kits (cables and/or software) are available for operating systems supporting JAVA and most commonly used network operating systems, including Novell, UNIX, VMS, Windows, IBM AS/400, IBM OS/2, LINUX.
Please contact your dealer for specific information.

8.6 Battery extension packs

Except for the 3-11 model, the LP 11/31T UPS can be equipped with additional batteries to increase the runtime of the unit. These additional batteries are housed in a separate battery pack. Additional batteries will increase the recharging time for the unit. All other operational information is the same.

If a battery pack is connected, the UPS must be informed about the new total battery capacity to allow a reliable recalculation of the available runtime. A maximum of 590 Ah can be programmed. Dependent of the charge condition of the new batteries the new runtime calculations may temporarily be unreliable.

Battery packs can be connected in parallel to increase the runtime. DC connectors make installation of battery packs easy and simple.

Fig. 7   Front and rear panel LP battery extension pack

Battery pack A: 240V / 7 Ah
Battery pack B: 240V / 14 Ah

Batt. pack(s)	cap. of batt. pack(s) (Ah)	tot. cap. incl. internal battery (Ah)		runtime (minutes) at 100% / 50% load			
		5/6-11/31T	8/10-11/31T	5-11/31T	6-11/31T	8-11/31T	10-11/31T
-	-	7	12	9/23	7/19	10/26	7/20
A	7	14	19	24/53	19/44	20/45	15/36
B	14	21	26	40/83	32/69	29/64	23/51
A+B	21	28	33	55/113	45/94	39/82	31/67
B+B	28	35	40	70/143	60/123	48/101	39/82

Sheet steel cubicle	:	VSDA1
Dimensions (hxwxd, mm)	:	537x313x590
Shipping dimensions (hxwxd, mm)	:	800x460x750
Battery	:	240Vdc/7Ah or 240Vdc/14Ah
Weight with battery (kg)	:	70kg or 120kg (without battery: 20kg)
Shipping weight with battery (kg)	:	85kg or 135kg (without battery: 40kg)

NOTE: A maximum of two Digital Energy 14Ah battery cabinets can be connected without additional fusing. Every two additional Digital Energy 14Ah battery cabinets must be connected over a 60Amp fuse, rated for 240Vdc.
7Ah battery packs cannot be connected in parallel.

NOTE: Third party battery cabinets must be connected over a 60Amp fuse, rated for 240Vdc, using the Digital Energy external battery cable (to be ordered separately).

9 - Transport / storage

No liability can be accepted for any transport damage when the equipment is shipped in non-original packaging.

Store the UPS in a dry location with the batteries in a fully charged state.Be sure that the UPS is switched off, and that no cable is connected to the interface port.
Storage temperature must be within -20 +45 °C. If the unit is stored for a period exceeding 3 months, optimal battery lifetime is obtained if the storage temperature does not exceed 25°C.
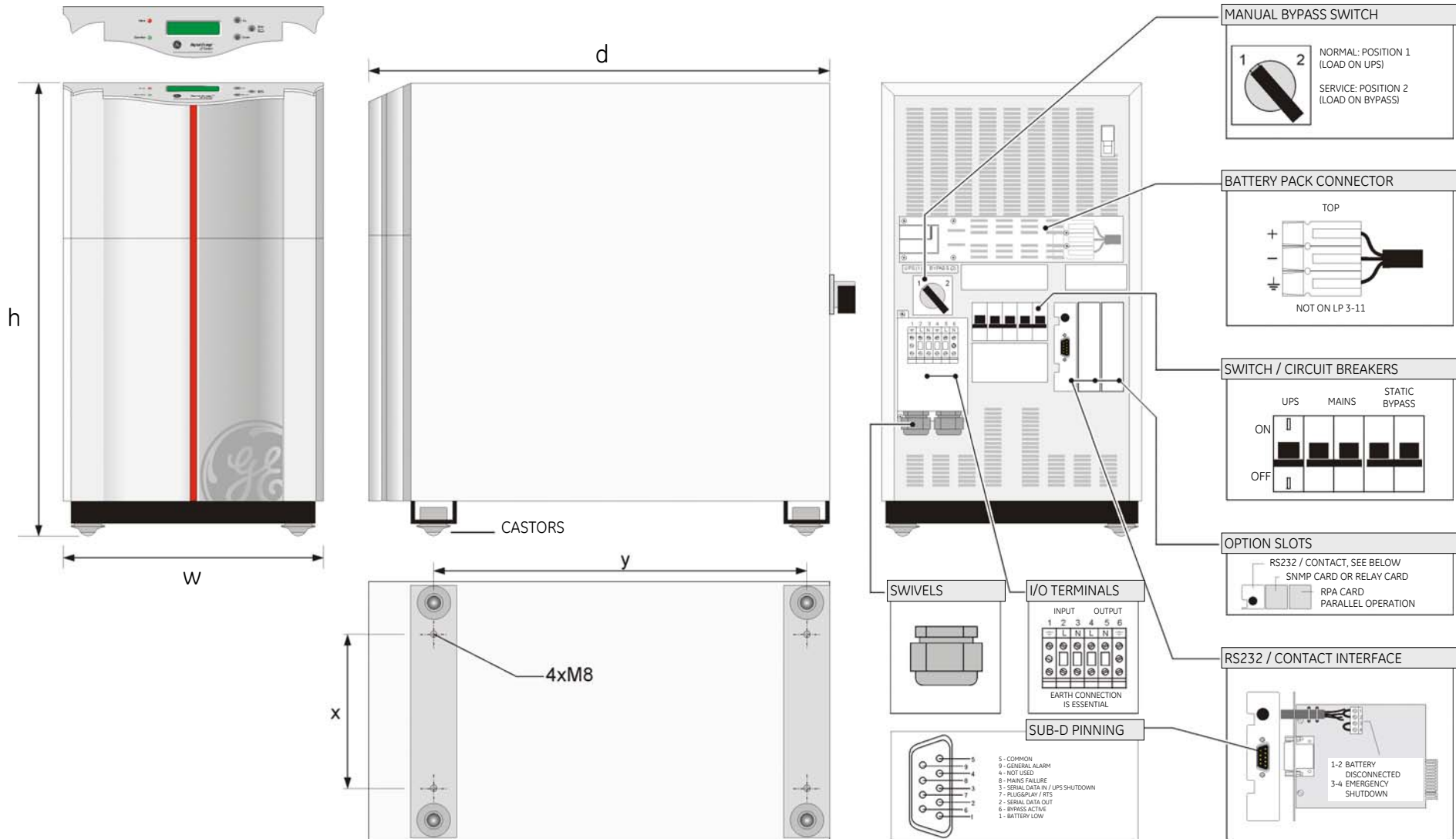
If the unit is stored for an extended period of time, the batteries must be recharged periodically. Connect the unit to the mains (switched on) and recharge the batteries for 24 hours:
- if the storage temperature is within -20 and +30°C: every 3 months,
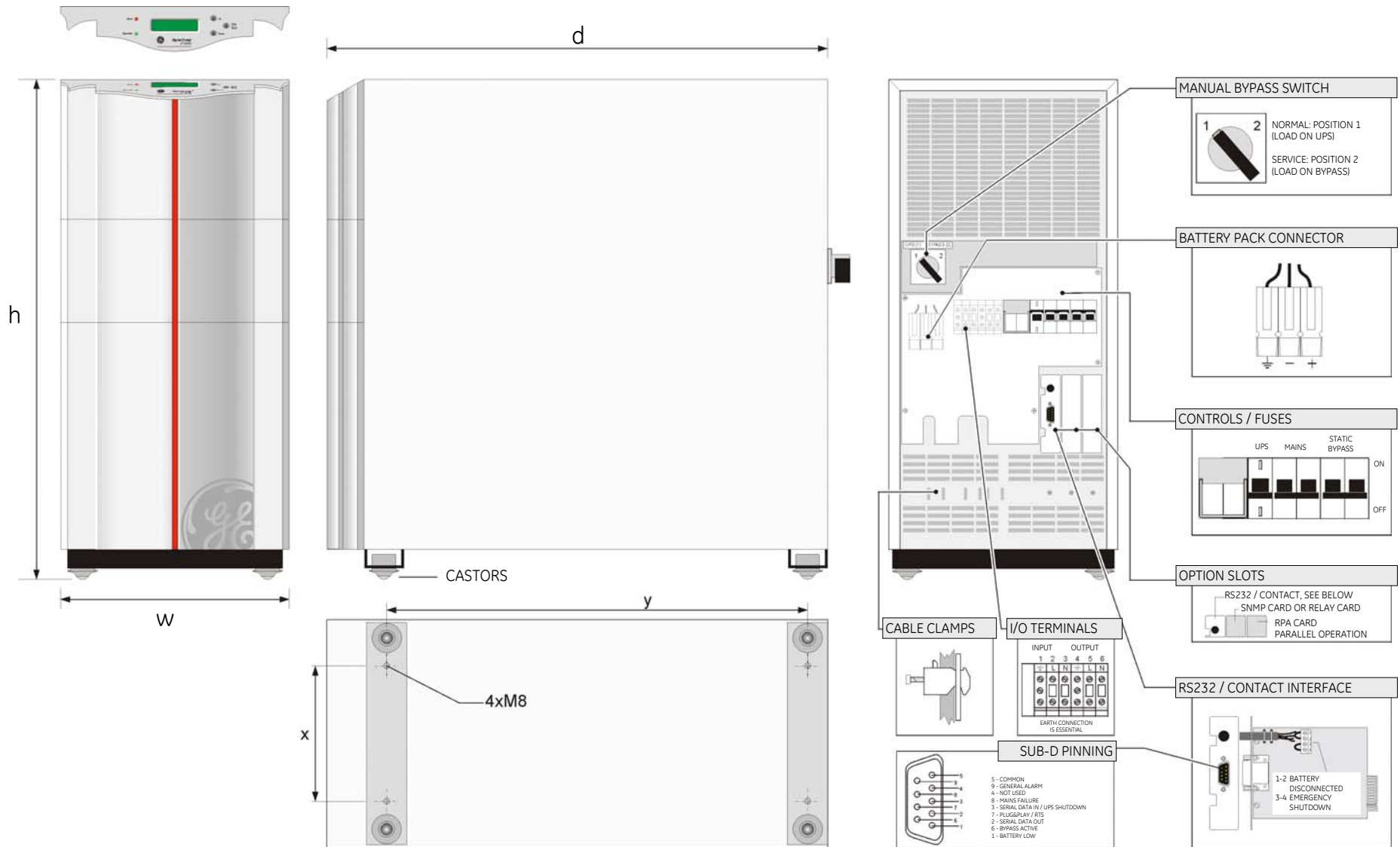- if the storage temperature is within -20 and +45°C: every month.

LP 3/5/6-11 installation data

Model	Heat dissipation				Dimensions			Weight	Air flow 100% load	Amb. temp.	Rel. humidity non-cond.	Altitude (max 4000m)	Branch protection slow	Input/output wiring		Minimum free space required			Bottom	
	100% load		50% load		h	w	d									front	side	rear	x	y
LP	W	Btu/hr	W	Btu/hr	mm	mm	mm	kg	m³/hr	°C	%	m	A	mm²	AWG	mm	mm	mm	mm	mm
3-11	327	1116	211	720	537	313	590	85	330	-10-40	<95	<1000, derating 12.5% per 1000	16	4	12	100	50	200	184	448
5-11	545	1860	350	1195	537	313	590	110	330	-10-40	<95		25	6	10	100	50	200	184	448
6-11	655	2235	423	1445	537	313	590	115	330	-10-40	<95		25	6	10	100	50	200	184	448

d

h

w

CASTORS

y

x

4xM8

SWIVELS

I/O TERMINALS

INPUT   OUTPUT
1 2 3 4 5 6
L N L N
EARTH CONNECTION IS ESSENTIAL

SUB-D PINNING

5 - COMMON
9 - GENERAL ALARM
4 - NOT USED
8 - MAINS FAILURE
3 - SERIAL DATA IN / UPS SHUTDOWN
7 - PLUG&PLAY / RTS
2 - SERIAL DATA OUT
6 - BYPASS ACTIVE
1 - BATTERY LOW

MANUAL BYPASS SWITCH

NORMAL: POSITION 1 (LOAD ON UPS)

SERVICE: POSITION 2 (LOAD ON BYPASS)

BATTERY PACK CONNECTOR

TOP

+
−

NOT ON LP 3-11

SWITCH / CIRCUIT BREAKERS

UPS   MAINS   STATIC BYPASS

ON

OFF

OPTION SLOTS

RS232 / CONTACT, SEE BELOW
SNMP CARD OR RELAY CARD
RPA CARD PARALLEL OPERATION

RS232 / CONTACT INTERFACE

1-2 BATTERY DISCONNECTED
3-4 EMERGENCY SHUTDOWN

LP 8/10-11 installation data

Model	Heat dissipation				Dimensions			Weight	Air flow 100% load	Amb. temp.	Rel. humidity non-cond.	Altitude (max 4000m)	Branch protection slow	Input/output wiring		Minimum free space required			Bottom	
	100% load		50% load		h	w	d									front	side	rear	x	y
LP	W	Btu/hr	W	Btu/hr	mm	mm	mm	kg	m³/hr	°C	%	m	A	mm²	AWG	mm	mm	mm	mm	mm
8-11	872	2976	520	1774	680	313	720	165	660	-10-40	<95	<1000, derating	50	10	8	100	50	200	184	578
10-11	988	3371	545	1860	680	313	720	170	660	-10-40	<95	12.5% per 1000	50	10	8	100	50	200	184	578

LP 5/6-31T installation data

Model	Heat dissipation				Dimensions			Weight	Air flow 100% load	Amb. temp.	Rel. humidity non-cond.	Altitude (max 4000m)	Branch protection slow	Input/output wiring		Minimum free space required			Bottom	
	100% load		50% load		h	w	d									front	side	rear	x	y
LP	W	Btu/hr	W	Btu/hr	mm	mm	mm	kg	m³/hr	°C	%	<1000m, derating 12.5% per 1000	A	mm²	AWG	mm	mm	mm	mm	mm
5-31T	835	2849	500	1706	855	313	590	180	660	-10-40	<95		3 × 16	4 / 6	12 / 10	100	50	200	184	448
6-31T	1000	3412	600	2047	855	313	590	185	660	-10-40	<95		3 × 16	4 / 6	12 / 10	100	50	200	184	448

d

h

w

MANUAL BYPASS SWITCH

NORMAL: POSITION 1 (LOAD ON UPS)

SERVICE: POSITION 2 (LOAD ON BYPASS)

OUTPUT TERMINALS

OUTPUT
4 5 6
L N

EARTH CONNECTION IS ESSENTIAL

SWIVEL

CASTORS

y

x

4xM8

BATTERY PACK CONNECTOR

TOP

SWITCH / CIRCUIT BREAKERS

UPS MAINS STATIC BYPASS

ON

OFF

OPTION SLOTS

RS232 / CONTACT, SEE BELOW

SNMP CARD OR RELAY CARD

RPA CARD PARALLEL OPERATION

RS232 / CONTACT INTERFACE

1-2 BATTERY DISCONNECTED

3-4 EMERGENCY SHUTDOWN

SUB-D PINNING

5 - COMMON
9 - GENERAL ALARM
4 - NOT USED
8 - MAINS FAILURE
3 - SERIAL DATA IN / UPS SHUTDOWN
7 - PLUG&PLAY / RTS
2 - SERIAL DATA OUT
6 - BYPASS ACTIVE
1 - BATTERY LOW

INPUT CONNECTION

L1 L2 L3 N
EARTH CONNECTION IS ESSENTIAL

CIRCUIT BREAKER

MAINS

ON

OFF

LP 8/10-31T installation data

Model	Heat dissipation				Dimensions			Weight	Air flow 100% load	Amb. temp.	Rel. humidity non-cond.	Altitude (max 4000m)	Branch protection slow	Input/output wiring		Minimum free space required			Bottom	
	100% load		50% load		h	w	d									front	side	rear	x	y
LP	W	Btu/hr	W	Btu/hr	mm	mm	mm	kg	m³/hr	°C	%	<1000m, derating 12.5% per 1000	A	mm²	AWG	mm	mm	mm	mm	mm
8-31T	1342	4580	758	2587	995	313	720	270	990	-10-40	<95		3 × 25	6 / 10	10 / 8	100	50	200	184	578
10-31T	1561	5327	835	2849	995	313	720	275	990	-10-40	<95		3 × 32	6 / 10	10 / 8	100	50	200	184	578