

# KEOR T 60 kVA

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## 1. GENERAL SPECIFICATIONS

Legrand UPS model KEOR T 60 is an uninterruptible power source with 3-Level IGBT switching technology, high frequency PWM technology, Double Conversion On-line, solid neutral, with the possibility to have N+X on site modular redundancy up to total 8 units, Rated Power 60 kVA–54 kW.

Batteries are lead acid, sealed, free maintenance, valve regulated, and arranged, inside the UPS in dedicated Drawers or external battery cabinet.

The architecture of this UPS is a Tower type. 1650h cabinet size is available for internal battery configuration providing a minimum uptime of 8 minutes at 70% of 0,9PF load. It is possible to install up to 180pcs battery (7Ah or 9Ah) to 1650h cabinet.

### 1.1 Architecture

Legrand UPS model KEOR T 60 has stand-alone architecture. UPS is composed by following parts;

- IGBT Rectifier/PFC
- 3-Level IGBT Switching Technology
- Digital Signal Processor (DSP)
- 3.5" TFT Touch Panel
- Automatic Bypass
- Dual Input Bypass
- Internal Manual Bypass
- Standard Internal Backfeed Protection
- Internal Battery Drawer Shelves

The UPS can be easily configured on site, by the authorized personnel, to operate in parallel. Also it is possible to arrange the dual bypass by removing bridge connection on each input phase.

Legrand KEOR T 60 has 3-Level IGBT switching technology and there is no transformer in the unit. These provide high efficiency for the unit.

Backfeed protection provides additional protection at the input in the event of bypass thyristors are short circuited.

By using internal backfeed contactor in bypass line provides safety when fault situation occurs in static bypass line and prevents upstream energy to the input.

The internal backfeed protection provides an easy on site installation without any additive cabling or special MCCB type in the upstream distribution panel.

### 1.2 Redundancy:

The Redundancy of the UPS allows N+X redundant configurations. Up to 8 units of same size UPS can be connected in parallel.

### 1.3 By-pass

KEOR T has internal both static bypass and mechanical (maintenance) bypass as standard. Addition to this input and bypass inputs can easily be separated to obtain dual input by removing the bridge on the connector.

### 1.4 Control and Monitoring:

KEOR T is equipped with a touch screen graphic TFT display that provides information, measurements, statuses and alarms of the UPS in different languages. Below this display, there is a multicolour LED bar showing status of UPS.

- GREEN: Normal or ECO Mode Operation
- ORANGE: Bypass or Battery Operation
- RED: Load not Supplied

A dedicated software of remote monitoring and management, installed on a PC connected to the UPS, allows to check and set all working parameters of KEOR T (the same functions available on the UPS control panel) and, furthermore, to schedule and program computer remote shutdown. Optional software (UPSMAN) or Net Interface card (CS121 SK) allow the multi server shutdown and UPS remote control on the LAN. Also, standard interface board comes with;

- RS232 Serial Communication Port
- Emergency Power Off (UPS OFF)
- Generator Contact (GEN ON)
- 4pcs programmable Dry Contact Information
- 2 contactor relays for Bypass and Battery
- ModBus (over RS485, with 2400 Baud Rate)

Standard Dry Contact Alarms are General Alarm, Bypass Active, Input Failure and Synchronization OK. Addition to these; High Temperature, Battery Test Failure, Output Failure alarms can be assigned to the contacts. Each alarm can be assigned to separate contacts but also one alarm may be assigned to all contacts.

KEOR T front panel is controlled by DSP microprocessor which works together with DSP microprocessors in rectifier and inverter; by display is possible to check all measurements, working parameters and status of the system.

Here follow the measurements and working parameters available on the **display**:

#### RECTIFIER (INPUT)

- Voltage (Vac), per phase
- Current (Aac), per phase
- DC BUS Voltage ( $\pm$ Vdc)
- Heatsink Temperature ( $^{\circ}$ C)

#### FREQUENCY

- Input Frequency (Hz)
- Output Frequency (Hz)

#### BATTERY

- Voltage ( $\pm$ Vdc)
- Current ( $\pm$ Adc)
- Temperature
- Autonomy (minute)

#### INVERTER (OUTPUT)

- Voltage (Vac), per phase
- Current (Aac), per phase
- Apparent Power (kVA), per phase
- Active Power (kW), per phase
- Power Factor (load), per phase
- Bypass Voltage, per phase
- Load (%), per phase
- Heatsink Temperature ( $^{\circ}$ C)

## 1. GENERAL SPECIFICATIONS *(continue)*

The UPS allows also the following settings by **display**:

### OUTPUT

Voltage (380/400/415)  
Frequency (50Hz/60Hz)

### PARALLEL MODE

Parallel Mode  
(Enable/Disable(Single))  
UPS ID

### BATTERY

Battery String  
Battery Capacity

Redundancy (+1, +2, ..., +7)  
Operation Mode (Redundancy  
Power Increase)

### COMMAND MENU

Priority (Online (Inverter) /Green (Bypass))  
Battery Test (KEOR T tests the battery automatically once  
each 90 days)  
Maintenance (Rectifier, Inverter, Bypass, Load Supply – YES/NO)

### RELAY FUNCTIONS

Relay 1 (General Alarm as standard. Can be adjusted from 7 different  
alarms)  
Relay 2 (Input Failure as standard. Can be adjusted from 7 different  
alarms)  
Relay 3 (Battery Failure as standard. Can be adjusted from 7  
different alarms)  
Relay 4 (Output Failure as standard. Can be adjusted from 7 different  
alarms)

### OPTIONS

Alarm Voice (Enable/Disable)  
Key Voice (Enable/Disable)  
Warning Window (Enable/Disable)

### OTHER

Display Brightness (0 to 100)  
Emergency Power Off (NC/NO)  
Generator Mode (NC/NO)  
ModBus ID  
Time (hh:mm. Required for Event Log stamp)  
Date (dd:mm:yyyy. Required for Event Log stamp)  
Language (English)

Legrand KEOR T displays up to 380 last events. Events are stored in  
EEPROM using FIFO method. Order number of last occurred event is  
001 and the last event in the list is erased when there are 380 events.

The UPS KEOR T has the CE Mark accordingly with the EU Directives  
73/23, 93/68, 89/336, 92/31, 93/68 and it complies with following  
standards:

- EN 62040-1 "General rules for electric safety"
- EN 62040-2 "Electromagnetic compatibility and immunity (EMC)"
- EN 62040-3 "Performances and testing rules"

## 2. TECHNICAL SPECIFICATIONS

General Specifications	
UPS Topology	On line double conversion VFI SS 111
Architecture of the UPS	Stand alone, transformerless, On-Site Paralleling
In/Out phase Configuration	Three phase-Three phase
Neutral	Neutral Passing through
Switching Technology	3-Level IGBT
Backfeed Protection	Internal, standard
Output wave form on mains operation	Sinusoidal
Output wave form on battery operation	Sinusoidal
Standards	EN 62040-1, EN 62040-2, EN 62040-3

Input	
Nominal Voltage	400 3ph+N+PE
Voltage Range	312 - 467 Ph-Ph full load 208 - 467 Ph-Ph half load <sup>1</sup>
Frequency	45 - 65Hz
THDin	< 3% at full load
Power Factor	> 0.99

Bypass	
Nominal Voltage	400 3ph+N+PE
Voltage Range	±10% (adjustable)
Frequency	±3Hz (adjustable)
Bypass type	Static and electro-mechanic
Transfer time	Zero
Manual Bypass	Built-in

Output with mains (AC-AC)	
Nominal Voltage	380, 400, 415 3ph+N+PE
Nominal Power	60.000 VA
Active Power	54.000 W
Voltage variation (static)	± 1%
THDv on nominal power (linear load)	< 2%
THDv on nominal power (non-linear load)	< 4%
Frequency	50 Hz or 60 Hz (selectable)
Frequency tolerance	± 0,1% Synchronized with input frequency
Current Crest Factor	3:1 accordingly to IEC 62040-3
Overload capability: 10 min 60 sec	125% load rate with no bypass transfer 150% load rate with no bypass transfer

Output in battery Operation (DC-AC)	
Nominal Voltage	380, 400, 415 3ph+N+PE
Nominal Power	60.000 VA
Active Power	54.000 W
Voltage variation (static)	± 1%
THDv on nominal power (linear load)	< 2%
THDv on nominal power (non-linear load)	< 4%
Frequency	50 Hz or 60 Hz (selectable)
Frequency tolerance	± 0,01% free run
Current Crest Factor	3:1 accordingly to IEC 62040-3
Overload capability: 10 min 60 sec	125% 150%

Battery	
Type	Lead Acid, sealed, free maintenance VRLA
Unit Capacity	7 or 9 Ah (12V)
Nominal UPS Battery Voltage	±360 Volt DC
Max. n. of possible internal battery - 1650H	180pcs
Battery charger type	IGBT Rectifier also charges batteries
Charging Cycle	Intelligent with boost charge and advanced management"
Max Charging Current without derating	5 A

Environmental specs	
Noise level @ 1m	< 55dBA
Operating temperature range	from 0°C to +40°C
Stock temperature range	from -20°C to +50°C
Humidity range	20-95% not condensing
Protection degree	IP20

Mechanical and Miscellaneous	
Net Weight without batteries <sup>1</sup>	277 kg
Dimensions (WxHxD)	600 x 1650 x 900 mm
Colour	Enclosure: RAL 7016 Front Door Metal: RAL 9005
Communication Interface	1 serial port RS232, 1 RS485, 1 smart port for internal SNMP, 4 Dry Contacts, 1 EPO, 1 GENSET
Input/Output connections	3Ph + N + PE
Input/Output Circuit Breaker	125A
Internal Battery Shelf	Drawer type

<sup>1</sup> The weigh depends by the number of the installed batteries accordingly with the required autonomy.