

FOR ENERGY EFFICIENT INNOVATIONS

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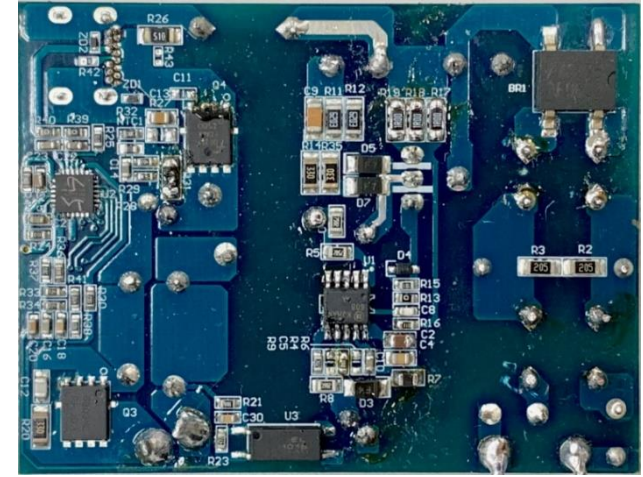
**60W EVB(PD2.0/3.0/PPS) with FAN6081+FAN6390**

**Travel Adaptor Power Supply**

Public Information



# USB-C/PD 60W (PD2.0/3.0/PPS) – Overall Features



EVB Size: Length 68mm x Width 50mm x Height 20mm

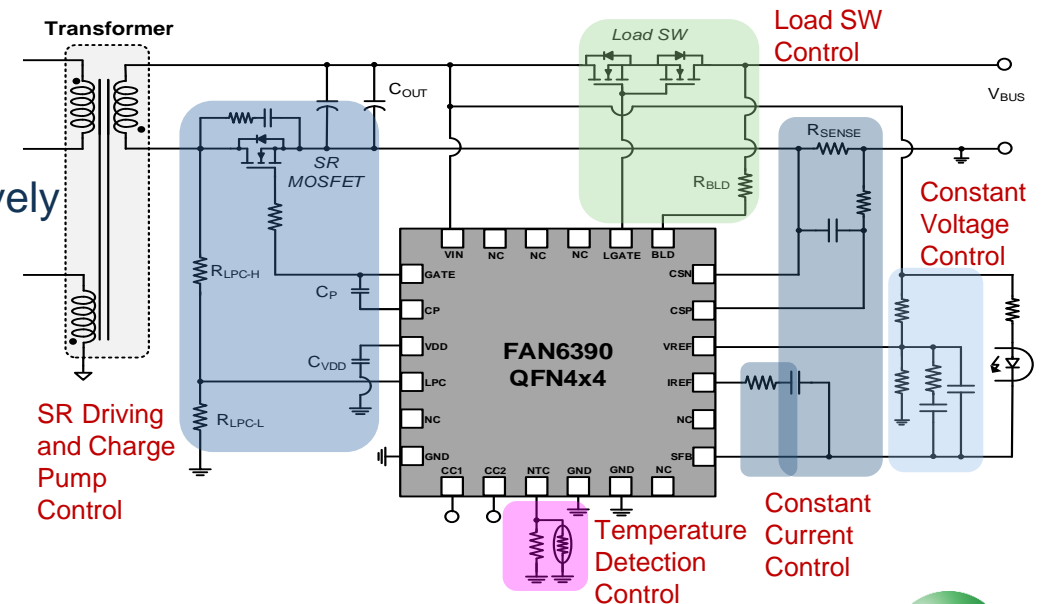
- **Compact size of 68 x 50 x 20 [mm]**
  - Power density of 0.000882 [W/mm<sup>3</sup>]
  - Power density of 0.882353 [W/cm<sup>3</sup>]
  - Power density of 14.45926 [W/inch<sup>3</sup>]
- **Less BOM**
  - Two controllers only, one is at primary and the other is at secondary
  - No bulky additional circuit and simple transformer configuration
  - Total BOM is 87 components

- **High efficiency with conventional flyback**
  - 91.38% / 91.80% at 20V/3A, 115V<sub>AC</sub> / 230V<sub>AC</sub> respectively
  - 91.43% / 91.26% average eff. at 20V/3A, 115V<sub>AC</sub> / 230V<sub>AC</sub> respectively

- **Lower temperature at maximum load**

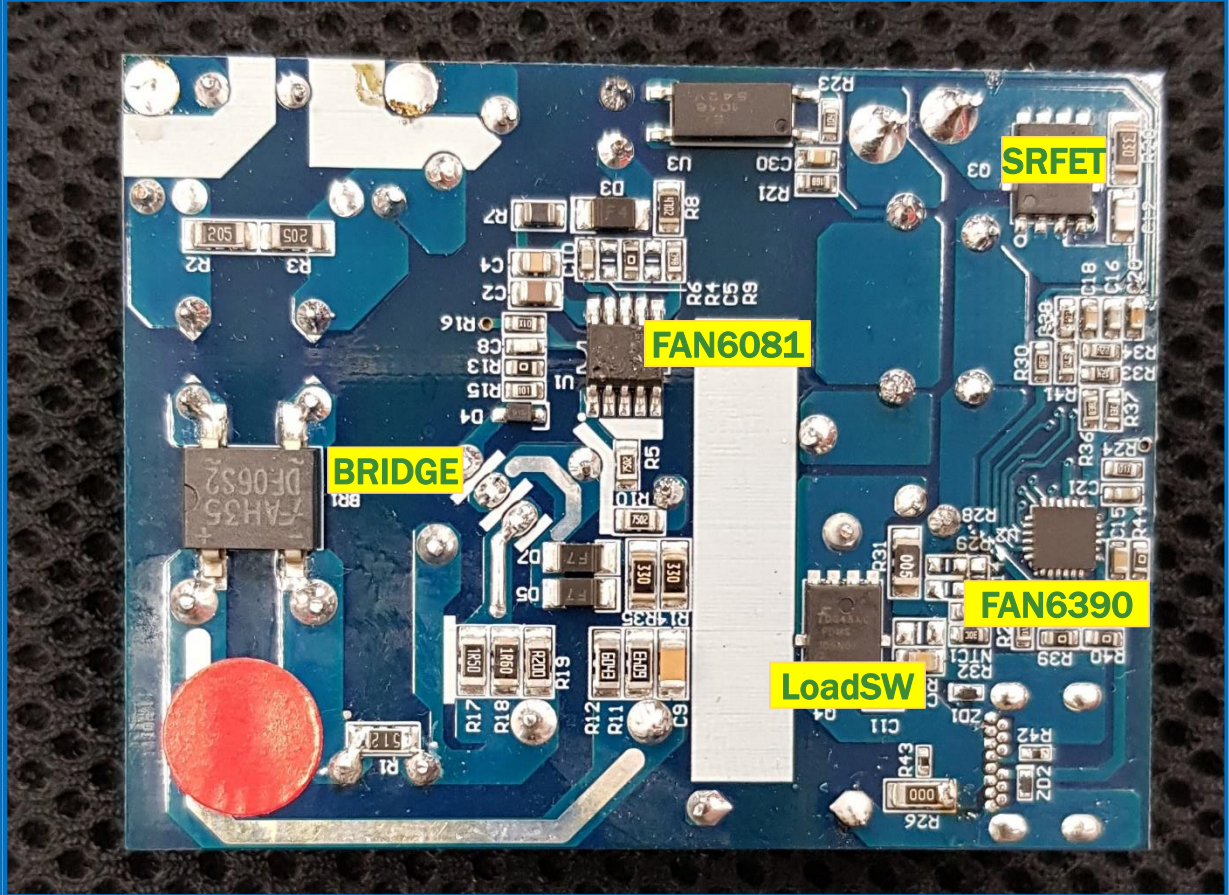
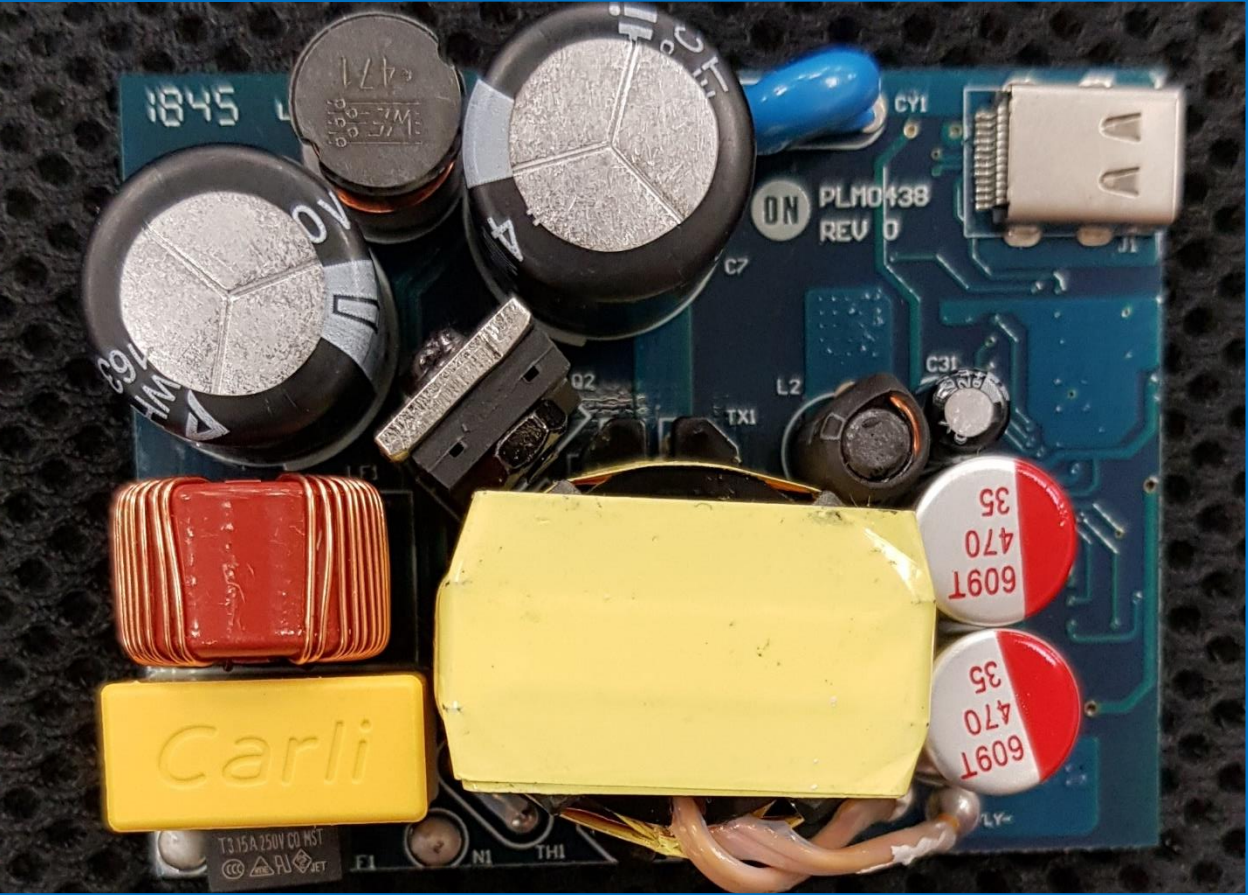
- Primary MOSFET 90.4 degree Celsius
- Transformer 91 degree Celsius

- **Flexible FAN6390 solution**



# USB-C/PD 60W (PD2.0/3.0/PPS) - EVB Picture

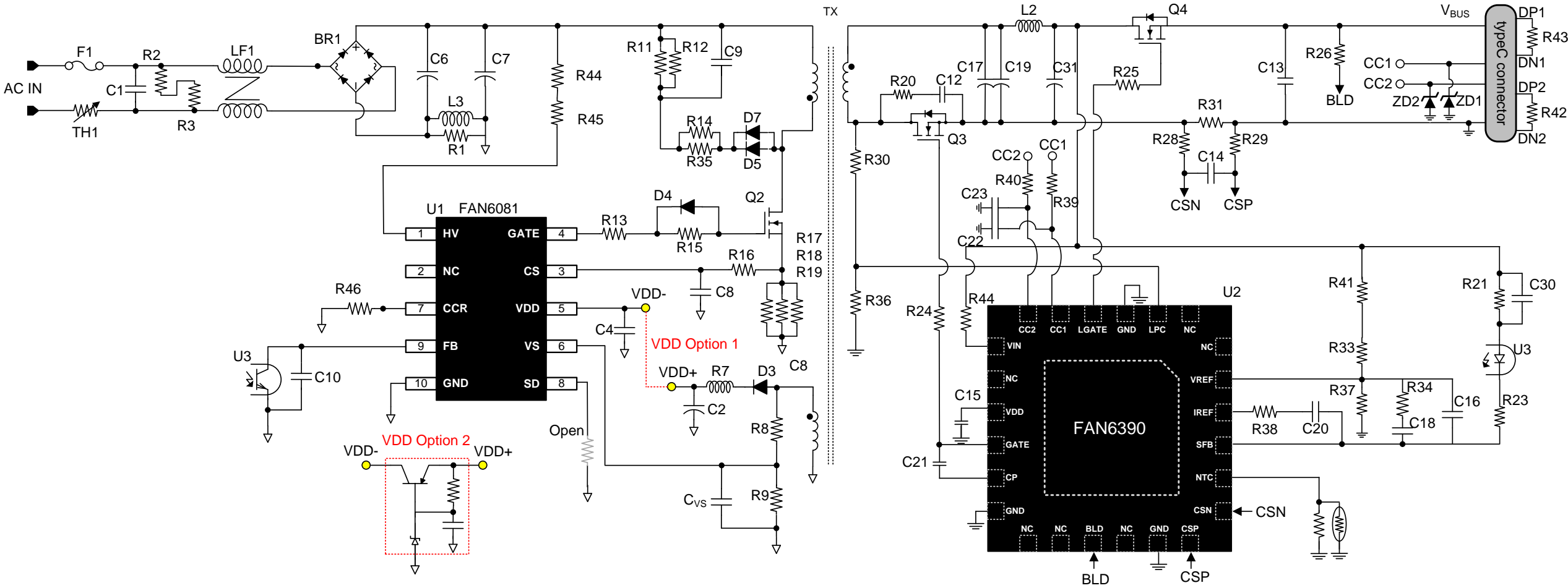
PCB TOP VIEW



PCB BOTTOM VIEW



# USB-C/PD 60W (PD2.0/3.0/PPS) - Schematics

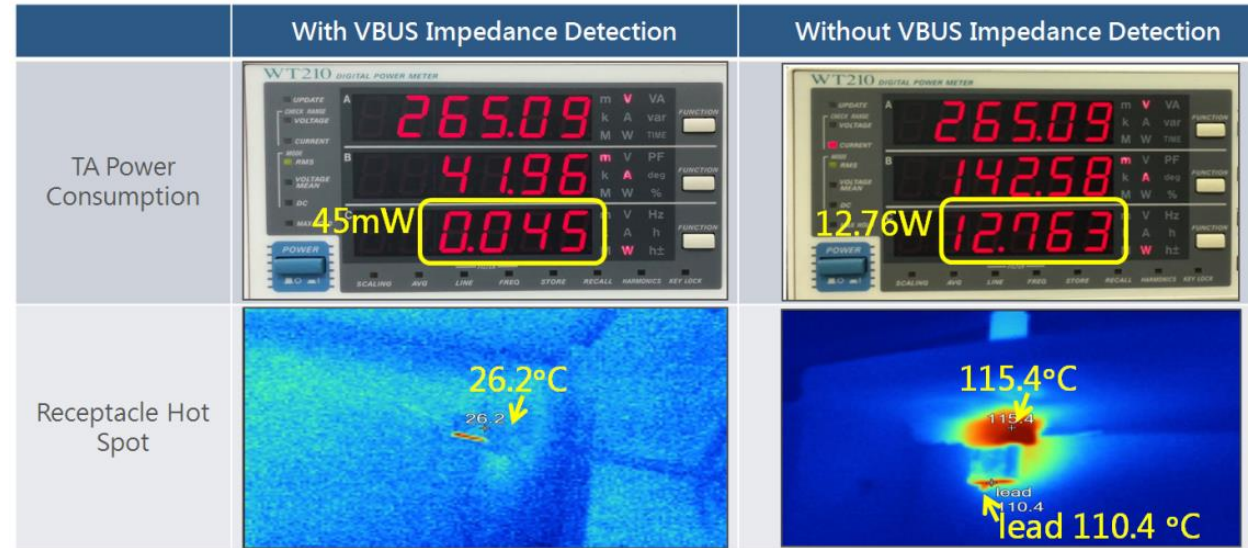
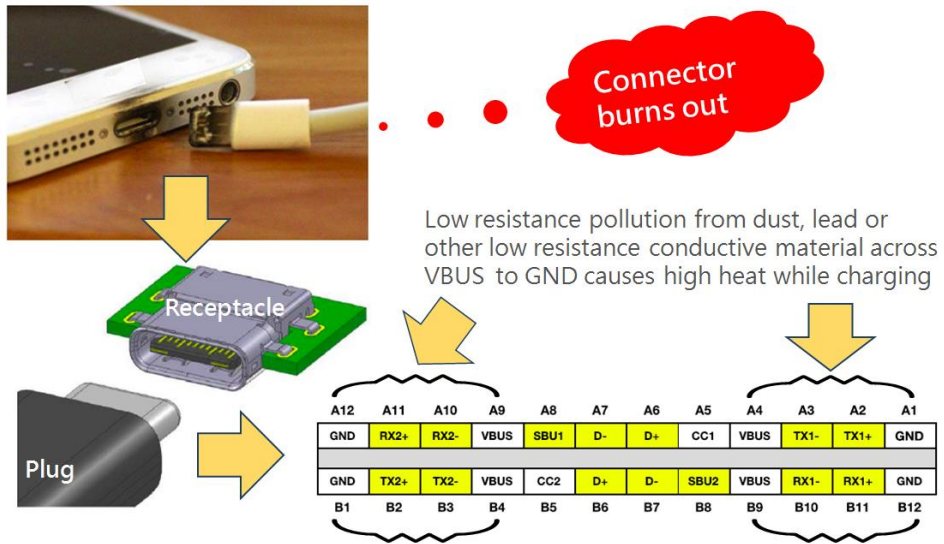


- For 5V PDO~20V PDO application, VDD Option 1 is enough.
- For 3.3V~16V PPS(5V APDO~15V APDO) application, VDD Option 1 is enough.
- For 3.3V~21V PPS(5V APDO~20V APDO) application, VDD Option 2 is must.



# VBUS Impedance Detection(ONSEMI's patent)

- Function enabled within the de-bounce time of 150ms between  $R_D$  detection and load SW ON.
- Before detecting pollution and after detecting pollution on the BUS, bleeder be enabled to clean the remained voltage.
- Pollution impedance and threshold level
  - $2k\Omega$  is the maximum allowed resistance.
  - In order to avoid miss-triggering by noise, decided relatively higher voltage for threshold but PD spec recognizes 0.8V as a zero voltage so need to be less than 0.8V.
  - Since BLD pin is shared for BUS impedance detection, external bleeding resistance ( $\sim 50\Omega$  typ.) should be considered as a total resistance.



# Efficiency Results on the EVB

VBUS=5.0V, IBUS=0.75A~3.0A, 15W					
	0.75A	1.5A	2.25A	3.0A	Avg.
115Vac	89.18%	90.43%	90.48%	90.38%	90.12%
230Vac	84.80%	88.49%	89.33%	89.52%	88.03%

VBUS=9.0V, IBUS=0.75A~3.0A, 27W					
	0.75A	1.5A	2.25A	3.0A	Avg.
115Vac	90.26%	91.33%	91.31%	91.28%	91.05%
230Vac	88.27%	90.50%	90.76%	90.93%	90.11%

VBUS=15V, IBUS=0.75A~3.0A, 45W					
	0.75A	1.5A	2.25A	3.0A	Avg.
115Vac	90.88%	91.47%	91.47%	91.83%	91.41%
230Vac	89.80%	90.95%	90.97%	91.55%	90.82%

VBUS=20V, IBUS=0.75A~3.0A, 60W					
	0.75A	1.5A	2.25A	3.0A	Avg.
115Vac	91.32%	91.56%	91.45%	91.38%	91.43%
230Vac	90.49%	91.23%	91.53%	91.80%	91.26%