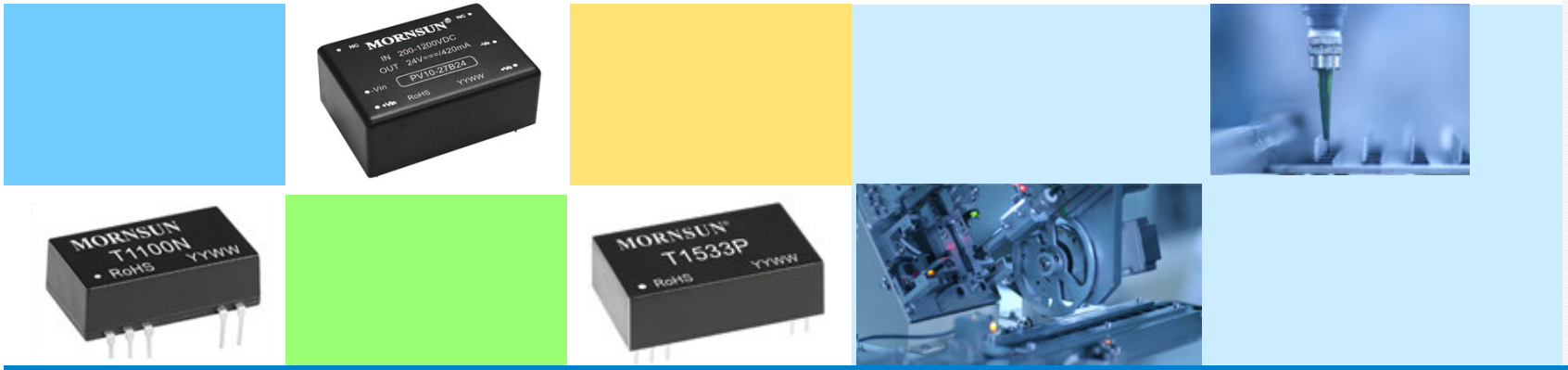
MORNSUN®



AC-DC Product and Application

Content

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AC-DC product family introduction

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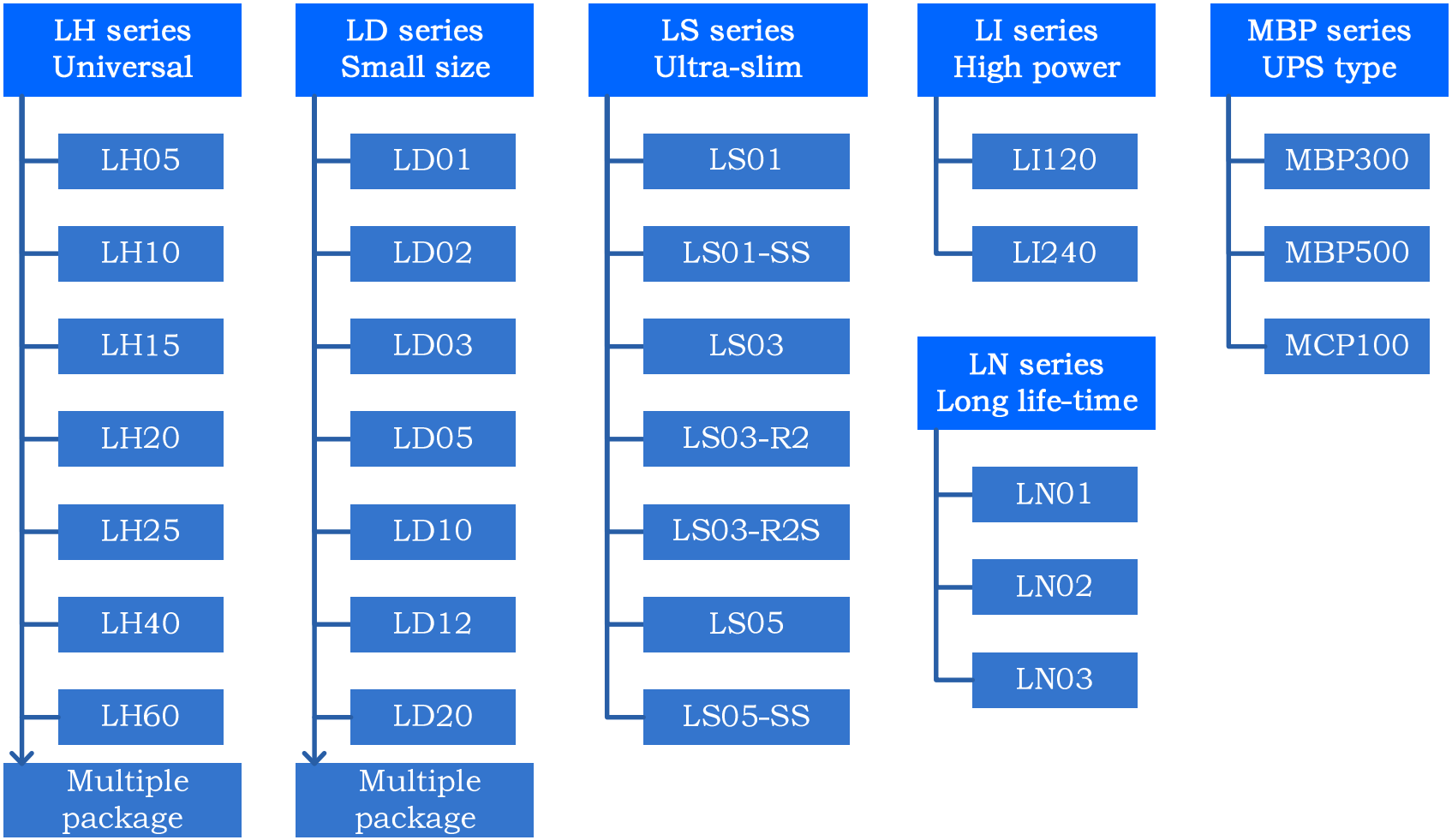
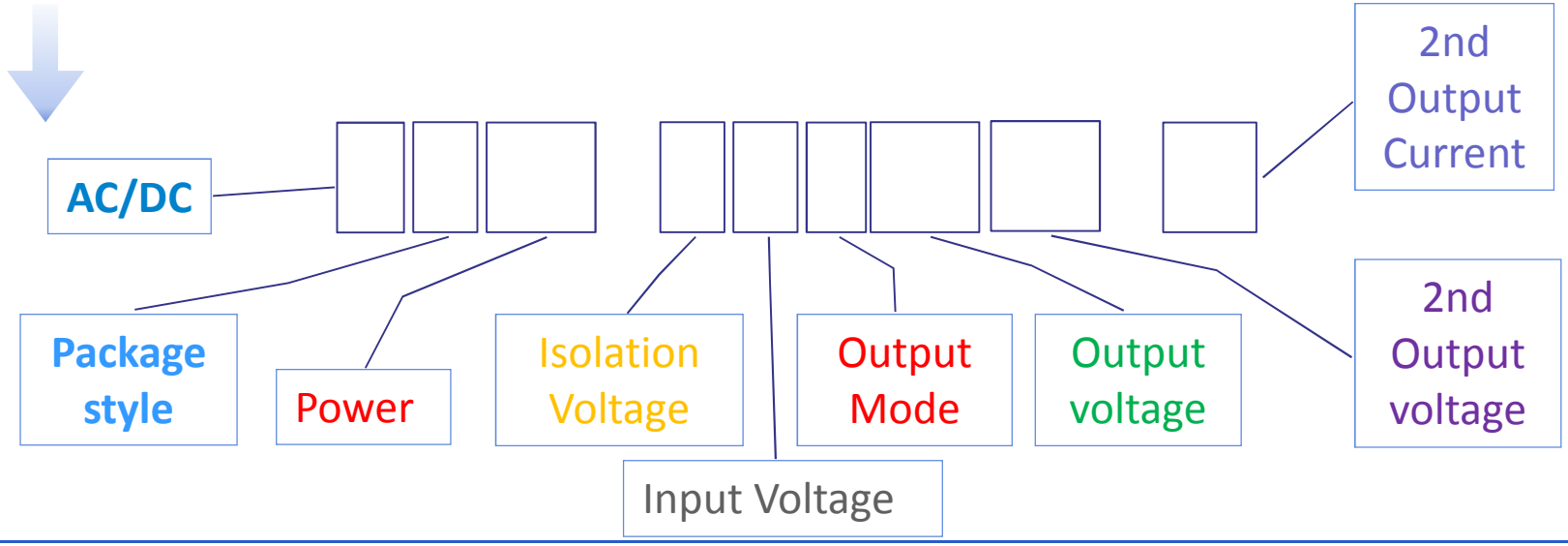
Featured products layout:



AC-DC products naming rule:

L H 20 – 1 0 C 05 05 - 05



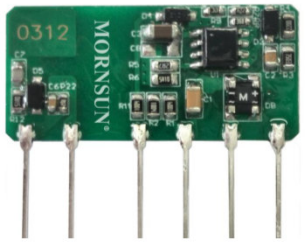
Package Style

- O: Open Frame
- M: Metal Case
- H: DIP Package
- S: SIP Package
- I: DIN Package

AC-DC product family introduction

MORNSUN®

- Package Style
  - M Metal Case
  - O Open Frame
  - H&D DIP Package
  - S SIP Package
  - I DIN Package



AC-DC product family introduction

MORNSUN®

Package Style

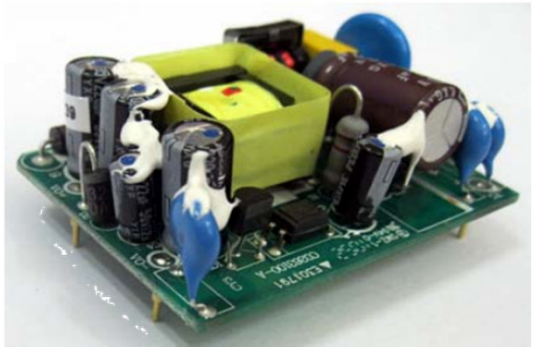
- O: Open Frame
- M: Metal Case
- H: DIP Package
- S: SIP Package
- I: DIN Package

Isolation Voltage

- 0: 2000VAC
- 1: 3000VAC
- 2: 4000VAC

Isolation Type

0	1	2
2000VAC	3000VAC	4000VAC



LD10-00B24E **LH15-10B05** **LH60-20B024**

Notice: This parameter is the isolation voltage between input terminal L/N and output terminal Vo+/Vo-.

AC-DC product family introduction

MORNSUN®

Package Style

- O: Open Frame
- M: Metal Case
- H: DIP Package
- S: SIP Package
- I: DIN Package

Input Voltage

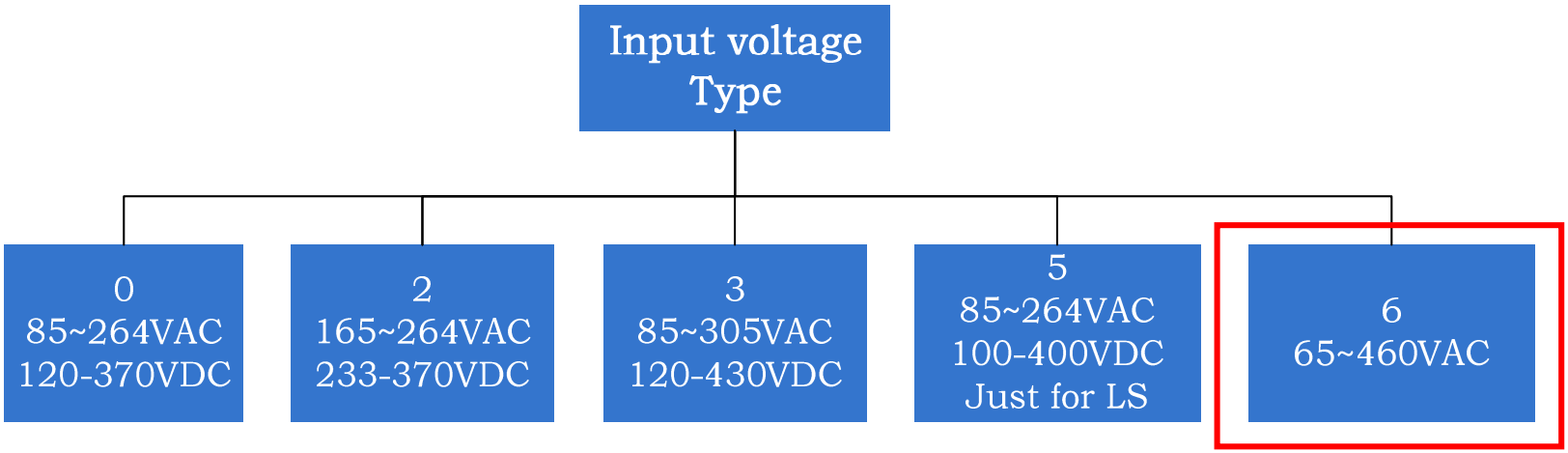
- 0: 85~264VAC/120-370VDC
- 1: 85~130VAC
- 2: 165~264VAC
- 3: 85~305VAC/120-430VDC
- 4: 30~300VAC
- 5: 85~264VAC/100-400VDC
- 6: 65~460VAC

Isolation Voltage

- 0: 2000VAC
- 1: 3000VAC
- 2: 4000VAC

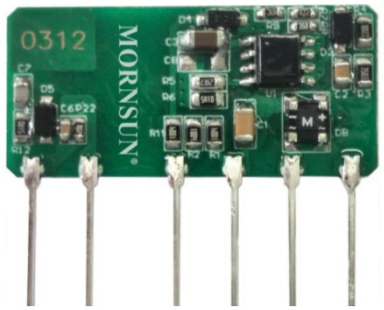
AC-DC product family introduction

MORNSUN®



LN02-12B05

LH10-13B05



LS03-15B03SR2S

Notice: In future, there will be more kinds of input voltage with needs of different application

AC-DC product family introduction

MORNSUN®

Package Style

- O: Open Frame
- M: Metal Case
- H: DIP Package
- S: SIP Package
- I: DIN Package

Input Voltage

- 0: 85~264VAC/120-370VDC
- 1: 85~130VAC
- 2: 165~264VAC
- 3: 85~305VAC/120-430VDC
- 4: 30~300VAC
- 5: 85~264VAC/100-400VDC
- 6: 65~460VAC

Isolation Voltage

- 0: 2000VAC
- 1: 3000VAC
- 2: 4000VAC

Output Mode

- A: Dual Output
- B: Single Output
- C: Triple Output
- D: Isolate Twin Output

Content

MORNSUN®

Universal type: LH40/60 Series Features (40/60W)

LH40-10Bxx series

LH60-20Bxx series

- input voltage: 90～264VAC/122～370VDC
- EMI meet EN55022 CLASS B
- EMS meet 2KV/4KV surge，4KV EFT without external circuit
- Output Short-circuit , over-current protection over voltage protection
- UL60950 and EN60950 approval

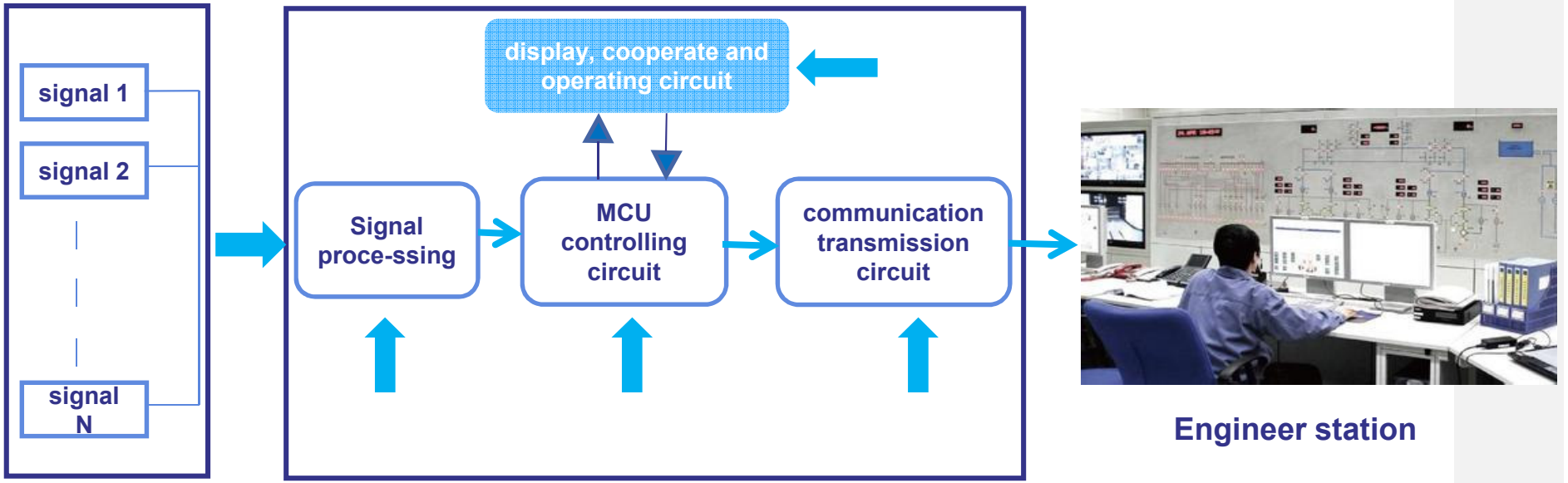
Universal type: LHxx-13B Series Features (5~25W)

LHxx-13Bxx series

LHxx-13BxxA4 series

- Wide input voltage: 85~305VAC/100~430VDC
- EMI meet EN55022 CLASS B
- Operating temperature range: -40~+70℃
- Output short-circuit, over-current protection
  over-voltage protection
- IEC60950, EN60950, UL60950 approval

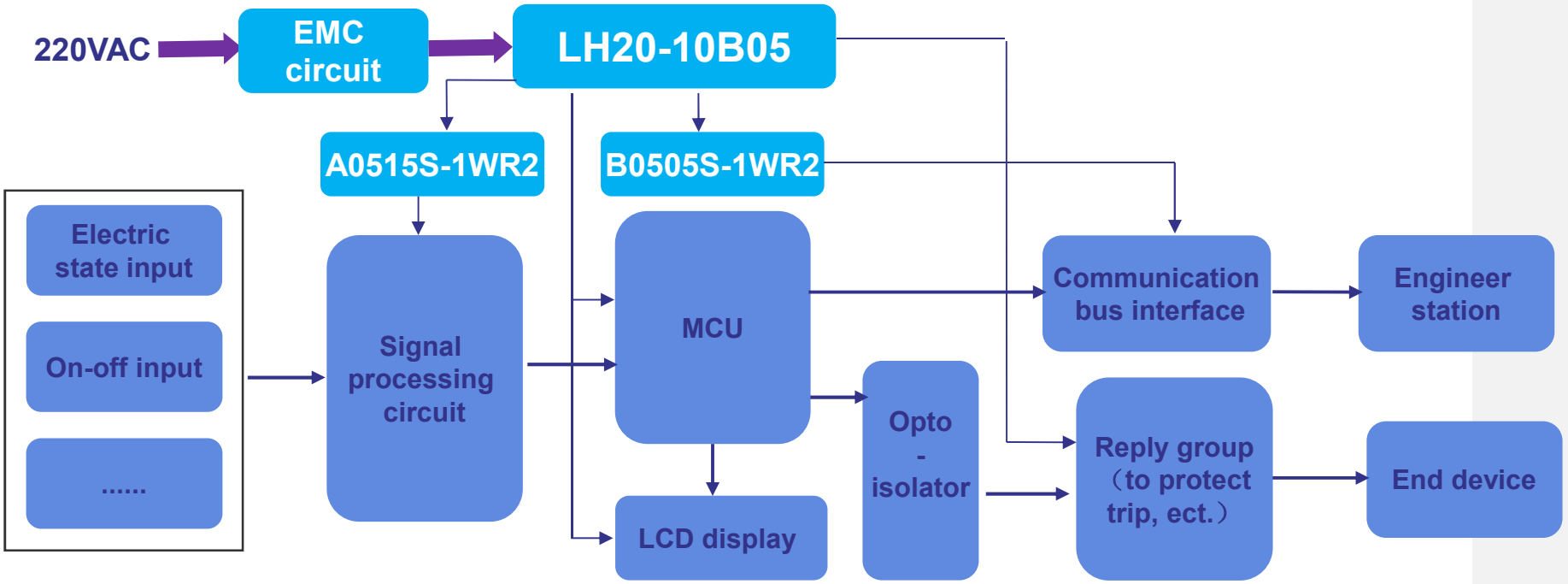
microcomputer protection device typical frame diagram



- Our products are mainly used in four parts: Signal processing, MCU control circuit, communication transmission circuit and display, operation, action circuit.

- The system transmit those signals, which need to be checked to the MCU through processing circuit. On one hand, the MCU displays the data in real time and protects it from abnormal situation. On the other hand transmit the data to the engineering station to save, analyze, process and alarm the data effictively.

microcomputer protection device typical frame diagram



- By using AC-DC converter LH20-10B05, the host power supply part meets the isolation transmission from high to low input voltage, meanwhile low input voltage restrains the impact of main power supply circuit from relay and other operation components because of isolation.
- Generally, there are dual outputs of signal processing circuit, so A0515S-1WR2 with output of ±15V can well ensures the reliability.
- Communication circuit will isolate the power supply and signal to ensure the accuracy, B0505S-1WR2 has the 5 VDC input pass through isolation to generate an isolated 5VDC output to power supply the circuit.

Content

MORNSUN®

Small size: LD05-23B Series (5W)

Micro DIP AC-DC

- Wide input voltage range: 85~305VAC/100~430VDC
- High efficiency, high power density
- Protection of output short circuit, output over-current, over –voltage
- IEC60950, EN60950, UL60950 approval

Small size: LD-MU Series (5-10W)

Micro DIP AC-DC

- Universal input range: 85～264VAC/100～370VDC
- High efficiency, high power density
- Protection of output short circuit output over-current, over –voltage
- EN60601,UL60601 approval (2 MOPP Medical safety according to EN60601-1 3rd edition)

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Medical injection pump

Electrical system

Control circuit

Drive circuit

Power supply

Control Display System

RS232 interface

Drive system

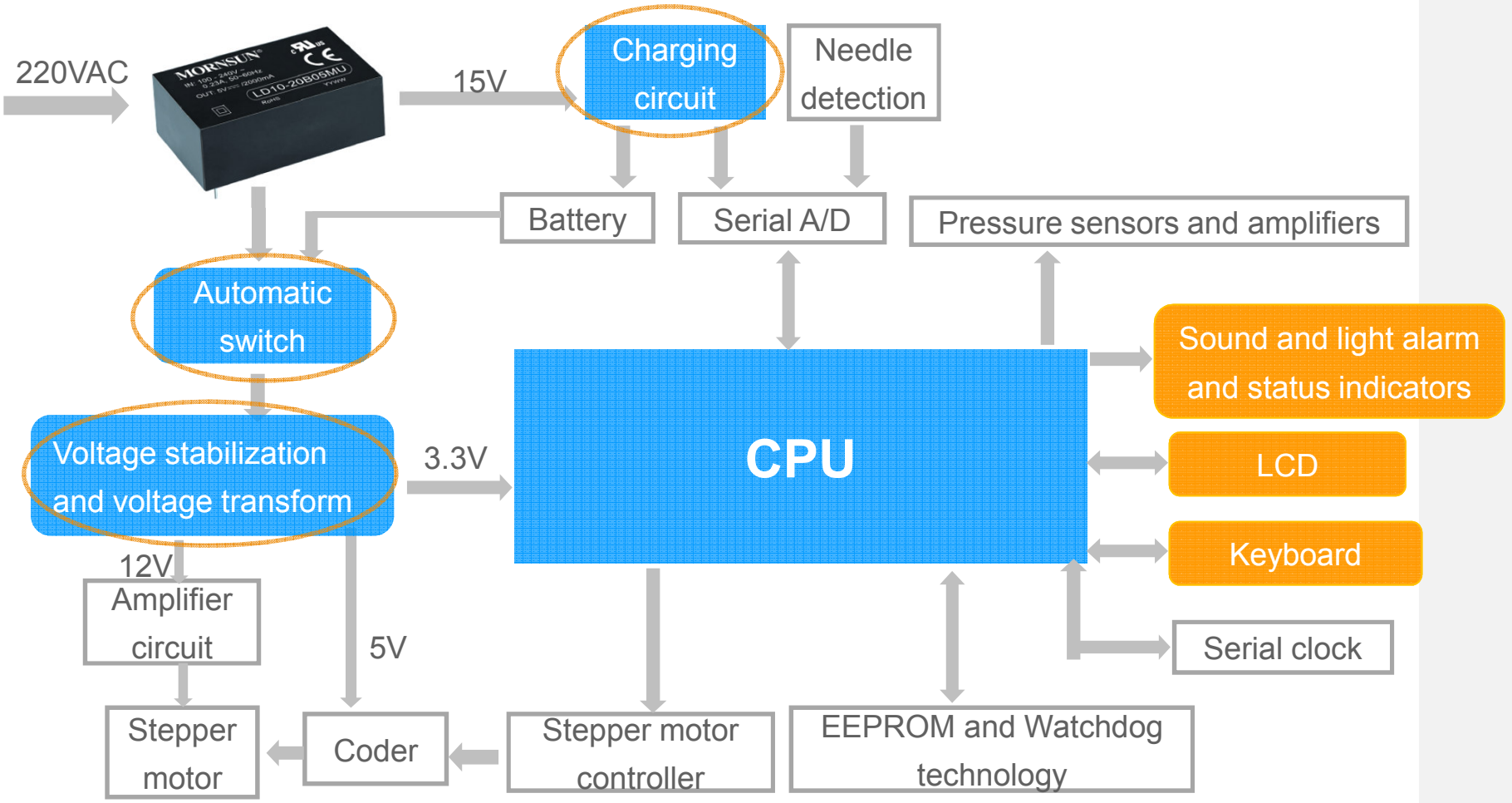
Power supply system

Sensing System

Software system

Mechanical system

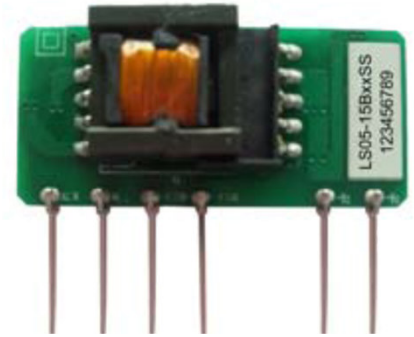
Medical injection pump's frame diagram

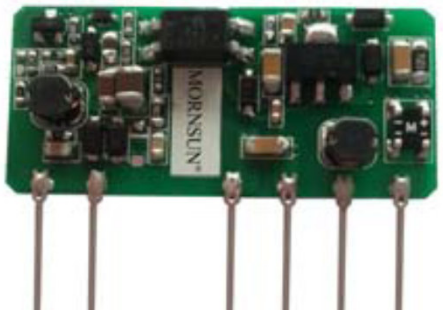


Content

MORNSUN®

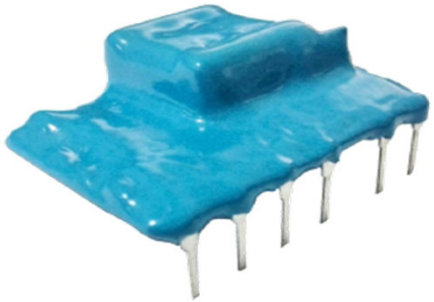
LS Series Feature (1~5W)



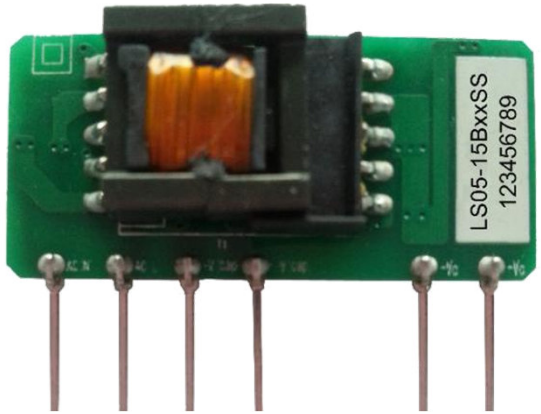


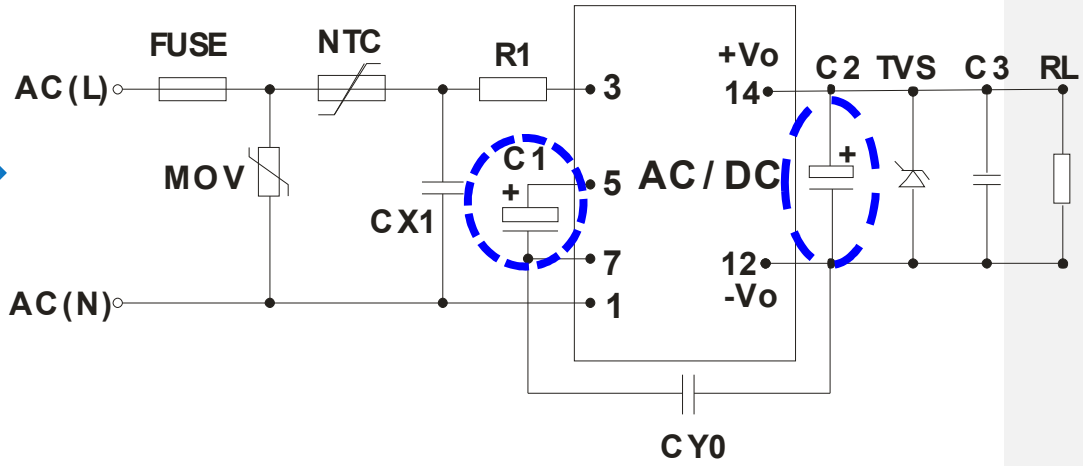
The thinnest AC-DC

- ◆ Wide input voltage range: 85~264VAC/100~400VDC
- ◆ Over current protection and short circuit protection
- ◆ High efficiency, high safety isolation 3000VAC
- ◆ SIP package
- ◆ UL60950, EN60950 approval



LS Series typical circuit



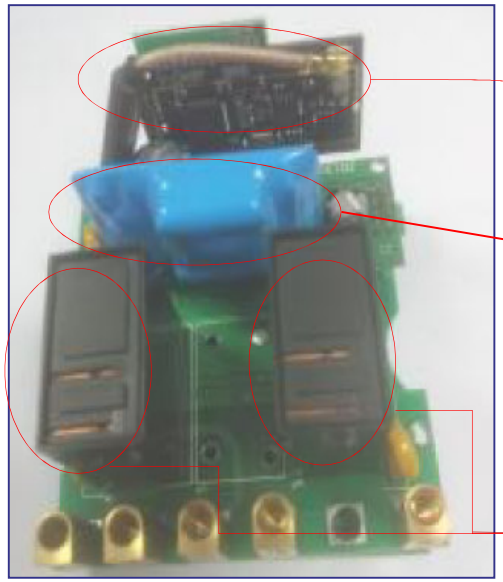


For a certain module, please refer to our datasheet to find its specific parameters.

Intelligent switches

The entire system modules (including programmable modules) are positioned behind the switch control panel. This part is usually embedded in the wall, thereby saving space and beautifully designed.

Internal system components

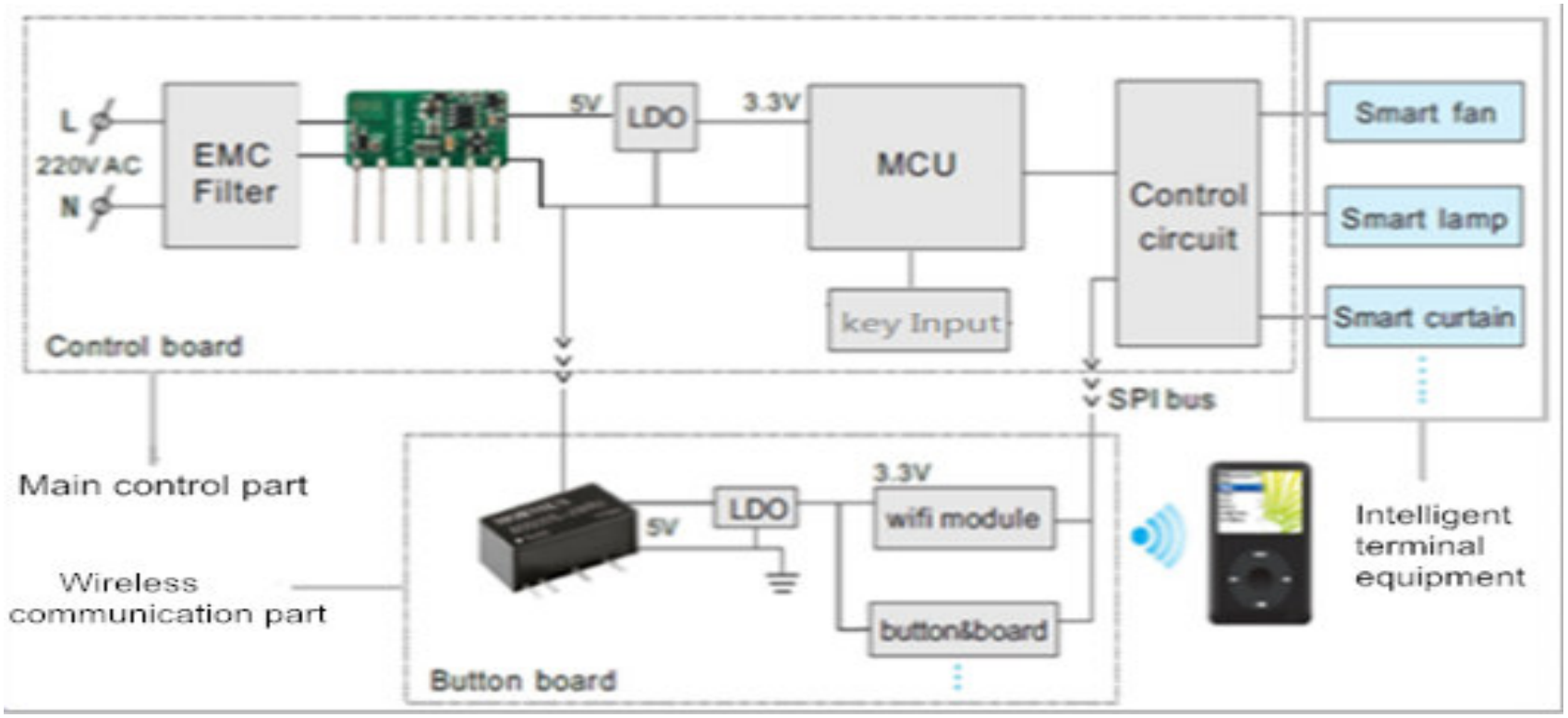


RF circuit (wireless receiver module, including a wireless receiver chip) receives the distant control signal, to realize remote control functions.

Mornsun AC-DC module transform the commercial power into operating voltage which meet the requirement of subordinate circuit.

Relay (action block), controled by signal processor, always be ready to do on / off operation.

Intelligent switch control circuit frame diagram



Typically, the terminal equipment is controlled by using the weak electricity to control the strong electricity (such as relays). Therefore, it can be seen from the chart that our AC-DC converters are mainly used to power the MCU, wireless communications module, then operating the intelligent devices through the instructions of MCU and control circuits.

Content

MORNSUN®

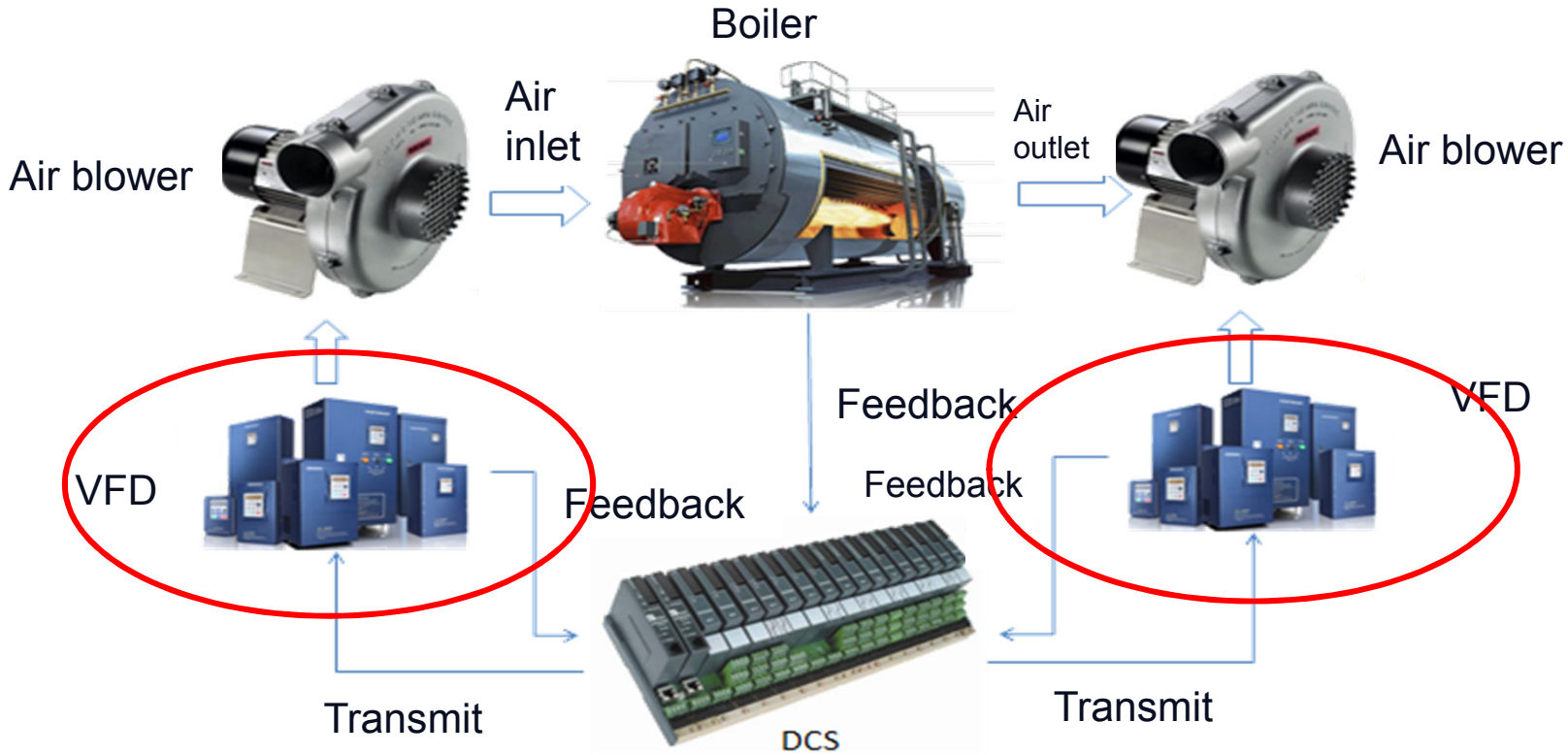
High power: LI120/240 Series (120~240W)

LI120 Series

LI240 Series

- Input voltage: 85~264VAC/120~370VDC
- PFC function
- 3000VAC high isolation voltage
- Remote control
- over-temperature protection
- output short circuit, over-current, over-voltage protection
- EMC level four without external circuit

Low-voltage AC Variable-Frequency Drive



Variable-frequency Drive(VFD) is applied in boiler control system of thermal power station. In order to increase productivity of generator set, reduce energy consumption and ensure reliability, the driving system of air blower is real-time controlled by high voltage VFD. Through remote control function of DCS,VFD can remotely operate and monitor the administration screen of DCS. Moreover, received signal from DCS system, VFD system itself is controlled, at the same time, VFD output signal and feedback to DCS system, which contributes to the accuracy control of air blower and sufficient combustion, thus, energy waste is avoided.

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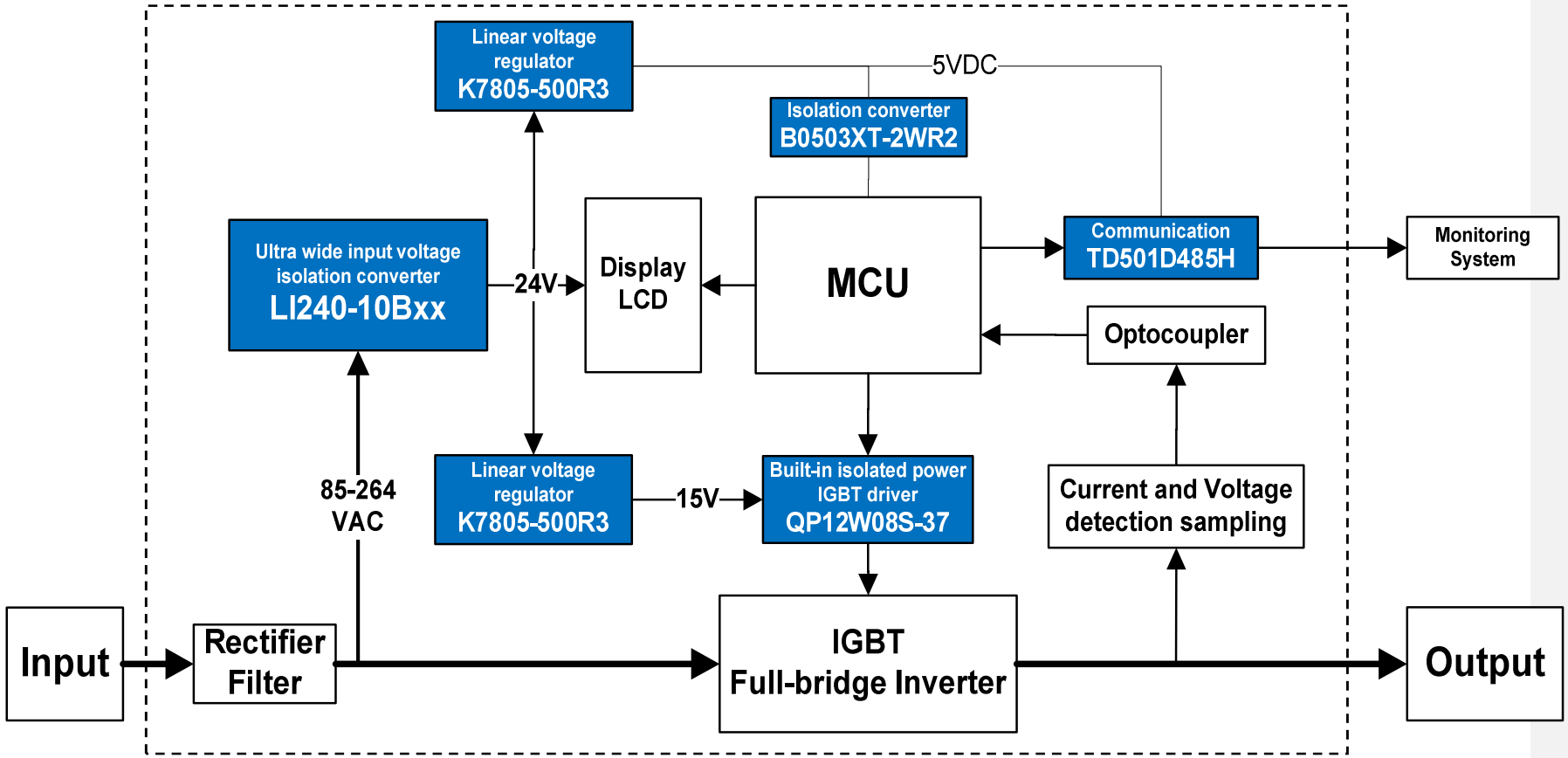
AC VFD control unit diagram



Inverter is mainly composed of control circuit, drive circuit and inverter circuit. The whole system is powered by the power module, which converters voltage first and then output DC voltage to power control panel and the driver of IGBT full-bridge inverter.

Content

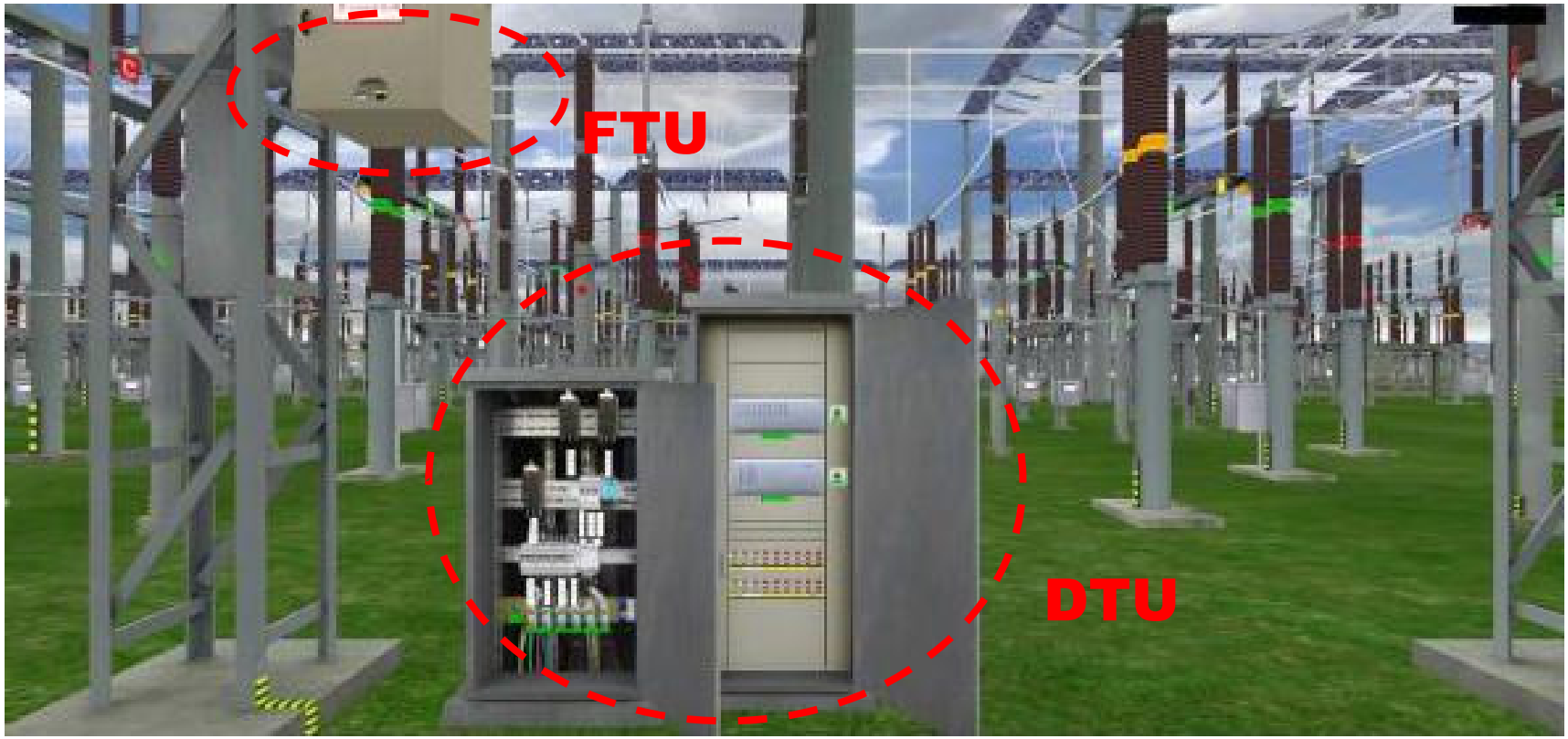
MORNSUN®

UPS type: MBP Series (300/500W)

Battery charge, UPS power supply

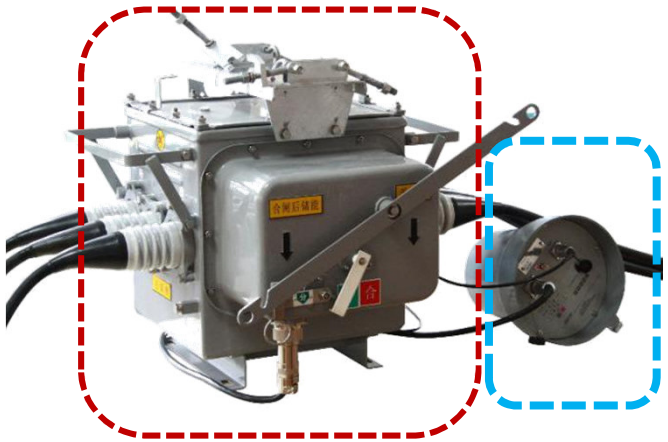
- **Uninterrupted power supply when connected with battery**
- **Battery management function**
- **Output over-current and over-voltage protection**
- **Max instantaneous power up to 540W**
- **Operation temperature: -40℃ ~ +70℃**

Basic construction of smart substation

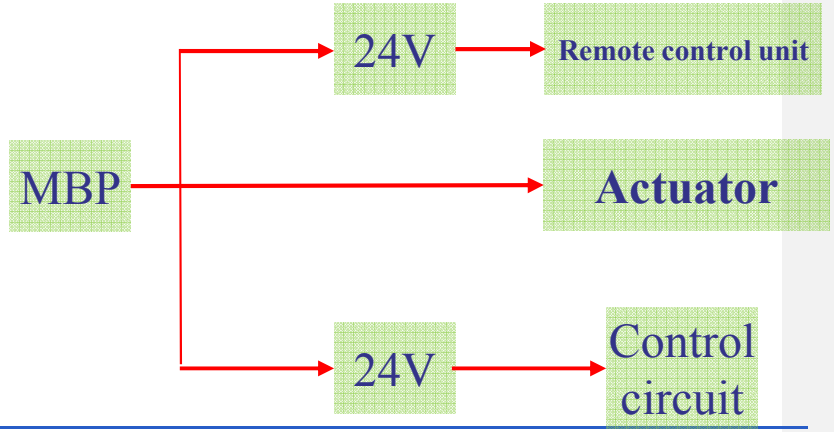


Smart grid construction will need FTU, DTU, TTU and such congeneric products

FTU system



FTU and controller



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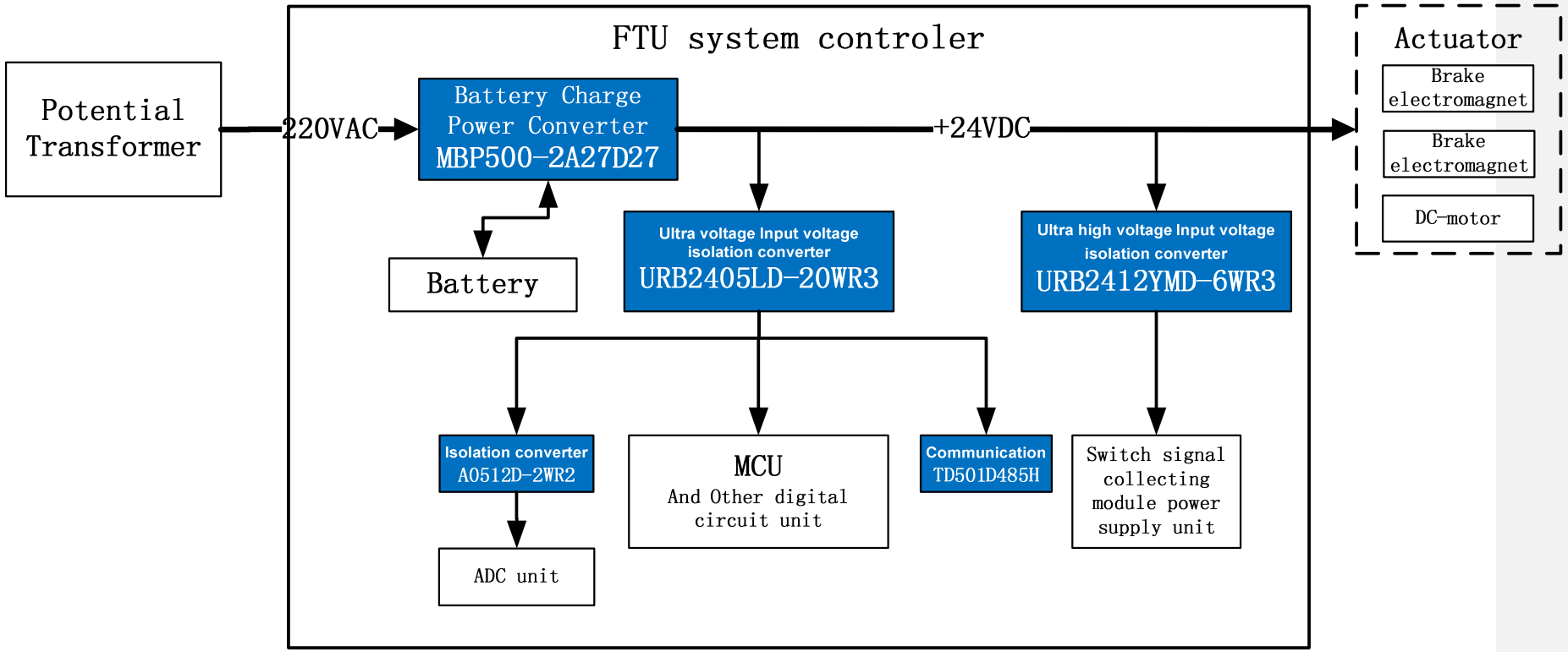
FTU system diagram



FTU system acquire signal of three-phase current, voltage and switching value and then operate according to its data analysis. Its power supply requirement is as follow: adopting dual power supply - switching power supply and accumulator to realize uninterrupted power supply function and they two can switch over automatically; DC-DC module can stand voltage change because of charge and discharge of accumulator; High dielectric strength and can insulate coupled interference from AC side; when main power supply and accumulator power down, it should be ensured that Power-off protection time more than 500ms.

Content

MORNSUN®

Long lifetime: LN Series (1~3W)

Without electrolytic capacitor

- **Input voltage range: 165~264VAC/233~370VDC**
- **Isolation voltage: 3000VAC**
- **Better EMC performance: EMI class B and surge ±2KV without external circuit**
- **Operating Temperature Range: -40℃ ~ +70℃**
- **No derating at low temperature**
- **Longer warranty: 5 years**

Content

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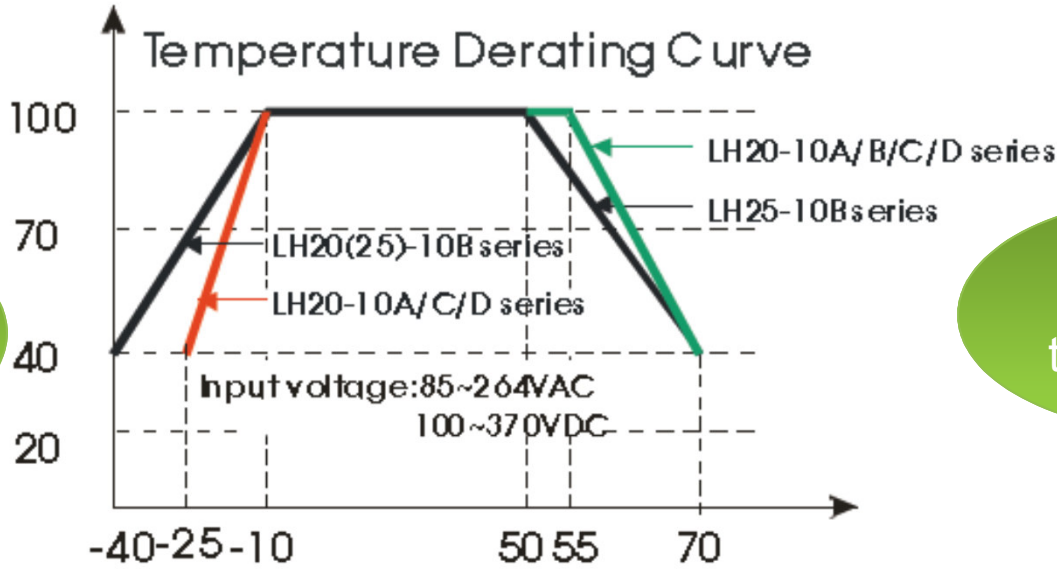
Relation between ambient temperature and derating

Low temperature



High temperature

On the condition of low temperature, the capacity of electrolytic capacitor will drop, hence it's capacity of storing energy will drop accordingly. If it still working without dereting, then the poor starting will happen to the AC DC converter;

On the condition of high temperature, the electrolyte will be evaporated, which will affect the lifetime of electrolytic capacitor;

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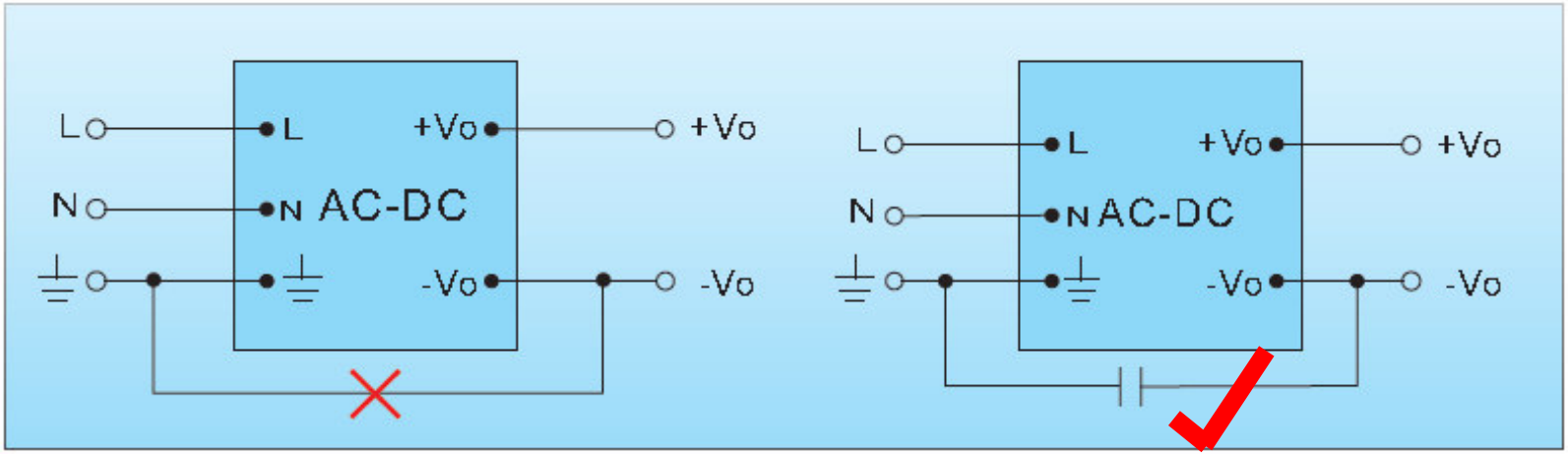
PE, GND wiring



1. Isolation performance lose efficacy or weakened
2. Lighting strike surge, pulse train and such destroy products easily

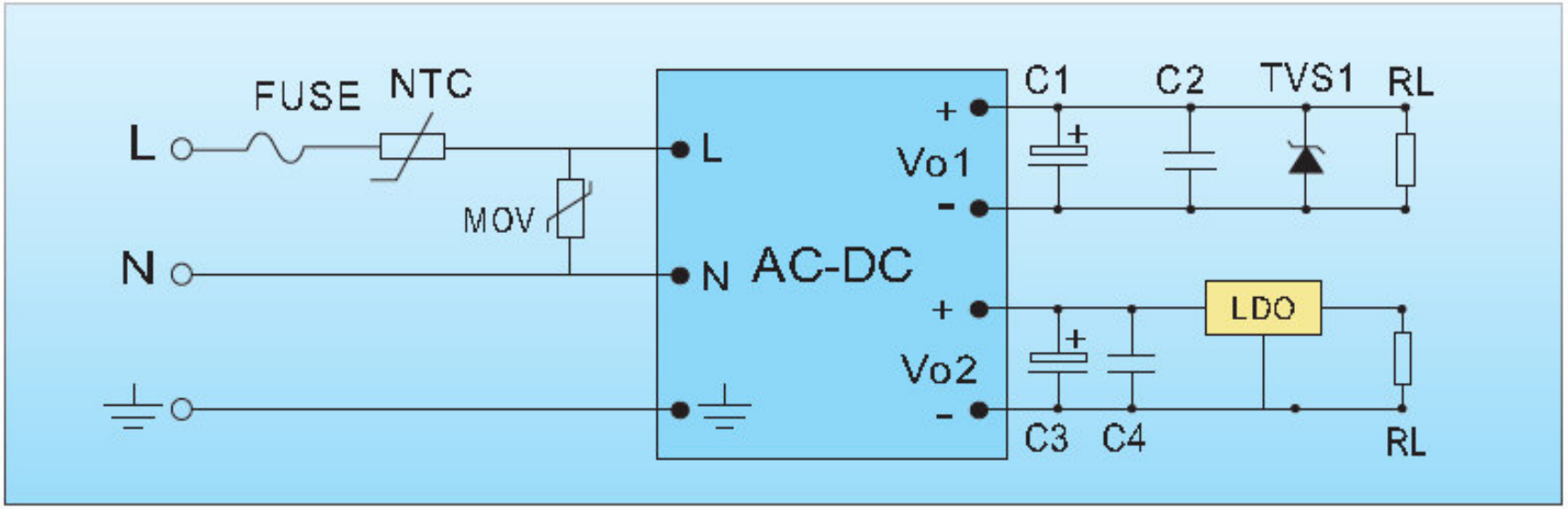
1. Isolation performance is normal
2. Anti lighting strike surge and pulse performance is normal
3. Module possesses grounding loop

Multiplexed output load

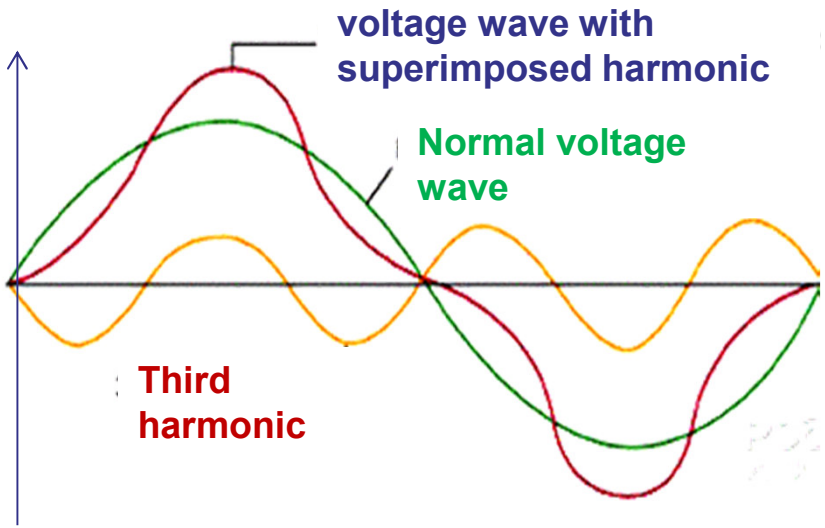
Multiplexed output design：

For common multiplexed output power module, usually, the voltage stabilization is only designed for main circuit. However, output voltage accuracy of each side circuit is greatly affected by backend load, so it is required that every circuit should be with proportional balanced load.

When customer is strict on output voltage accuracy of auxiliary circuit, please add a low drop-out linear voltage regulator behind auxiliary circuit. (It is mainly applied in the situation when the load of auxiliary circuit is light, the output voltage steps up)



Input voltage fluctuation risk



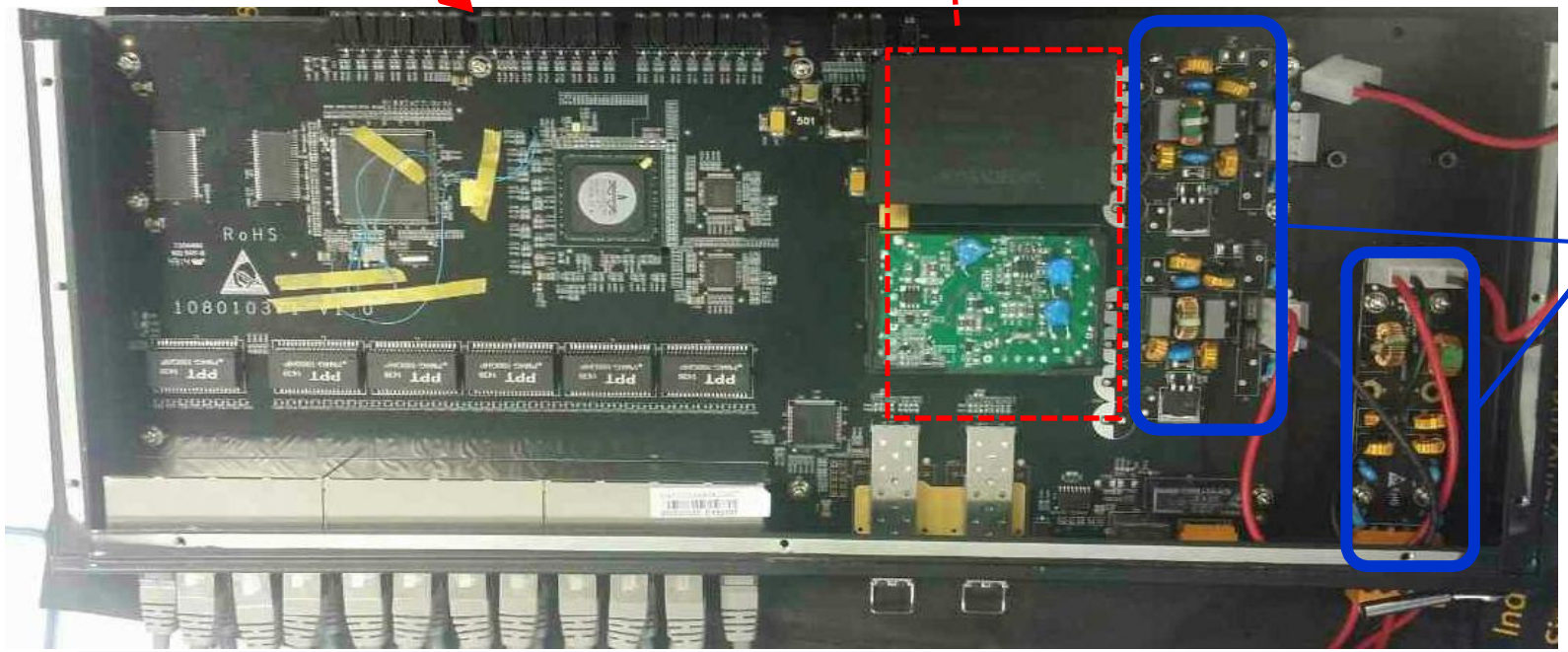
1. Actual input voltage beyond the input voltage range causes——destroyed！！！
2. Input voltage affected by harmonic disturbance——unstable working loop circuit
3. Insufficient input protection filtering——Overall EMC dissatisfy requirements！

Connecting with the practical situation, please choose wider input voltage range modules

Anti-thunder grade exceeding usage

Overall surge test: 4KV, appearing reset abnormality

Surge standard: 2KV



Remedial measure: Using two surge filter in the front end to optimize parameter of protection device

Please choose corresponding module that can meet lightning withstand level according to practical situation.

Thank You!