Technical argumentation

Argumentation technique

VD Range

Gamme VD

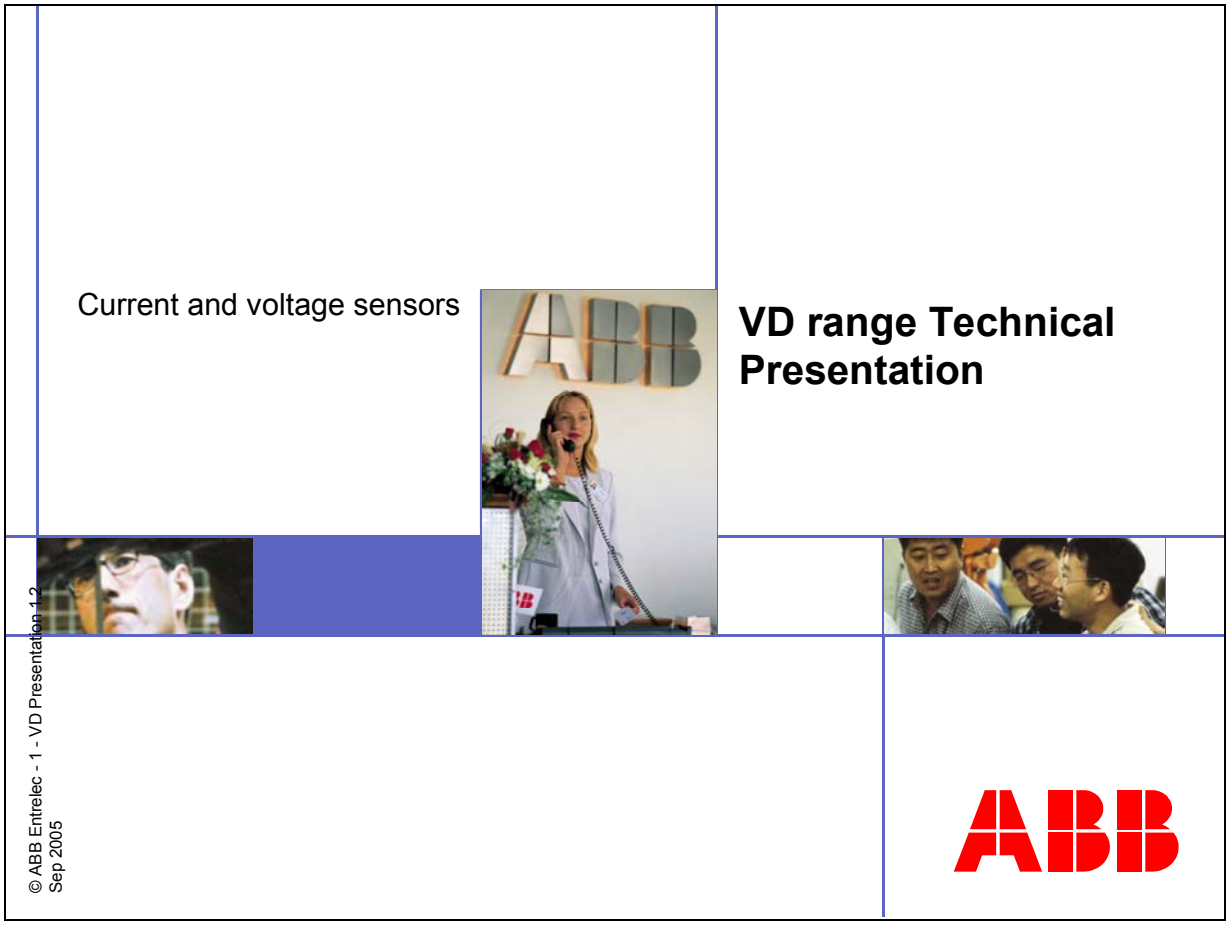
1SBC147007C1701 Technical Presentation VD range 1.0 - Version 1.0

100% electronic
voltage detector

Détecteur de tension
100% électronique

SUMMARY

SOMMAIRE



Technical presentation summary

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- 2 The aimed applications
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- 5 The main characteristics
- 6 The options and accessories
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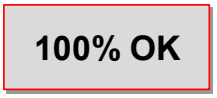
1 The customers' needs

- Standards respect

- Reliability & security



- High quality

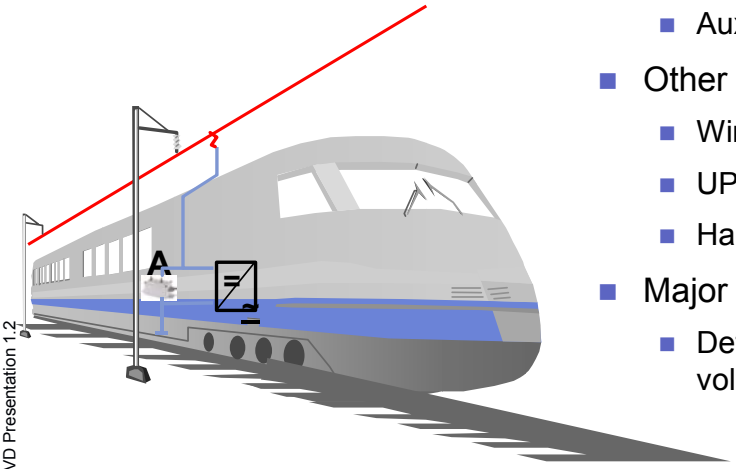
- High performances

- Compactness

- Price

- Reliable supplier

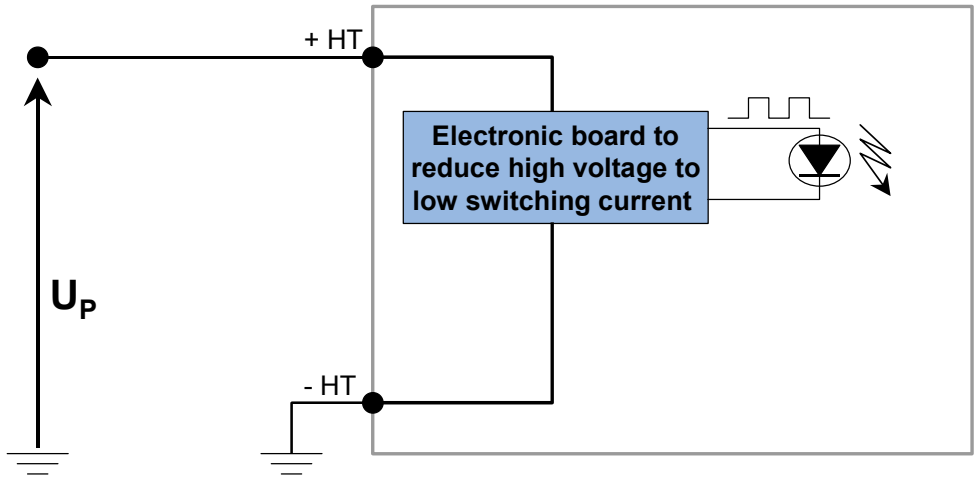
2 The aimed applications



- Traction application
  - Main converters
  - Auxiliary converters
- Other possible applications
  - Windmills
  - UPS
  - Harmonic active filters
- Major function
  - Detection of both dc and ac voltage by LEDs

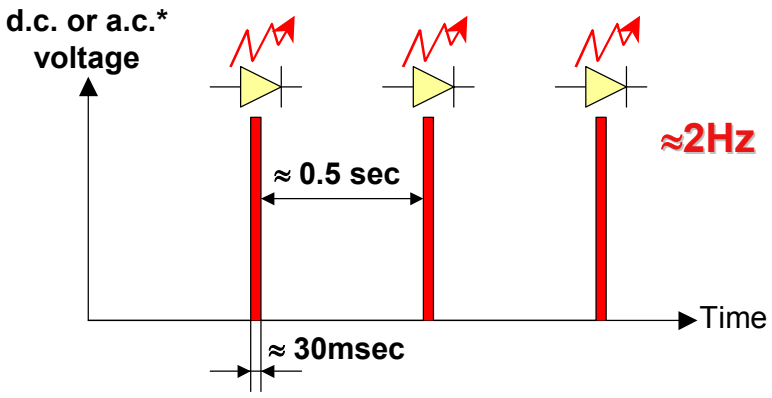
3 The technology

- Functioning principle



3 The technology

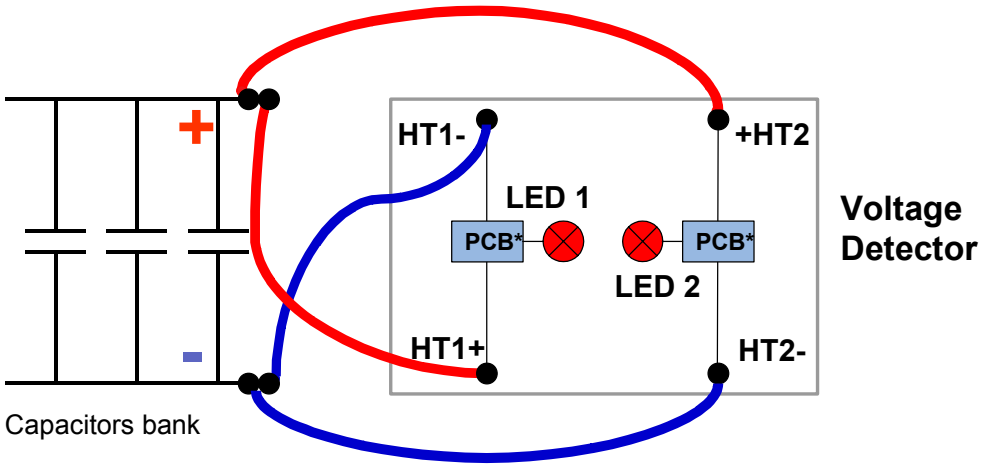
- The LEDs flashing



*a.c. voltage under conditions

3 The technology

- Installation principle



*PCB = Printed Circuit Board = Circuit Electrique

3 The technology

- Technologies comparison for current sensing

	Neon light	VD technology
Standards respected	No	Yes
Trigger level	approx 70V	Adjustable
ac and dc voltage	Yes	Yes
Installation	Easy and very compact	Easy and compact
Power consumption	Very low	Very low
Visual indication	Good	Flashing and intense
Cost (product + LCC)	High	Average
Security	To be done by the customer	Integrated in the product
Life time (hrs)	approx. 5000	> 100 000

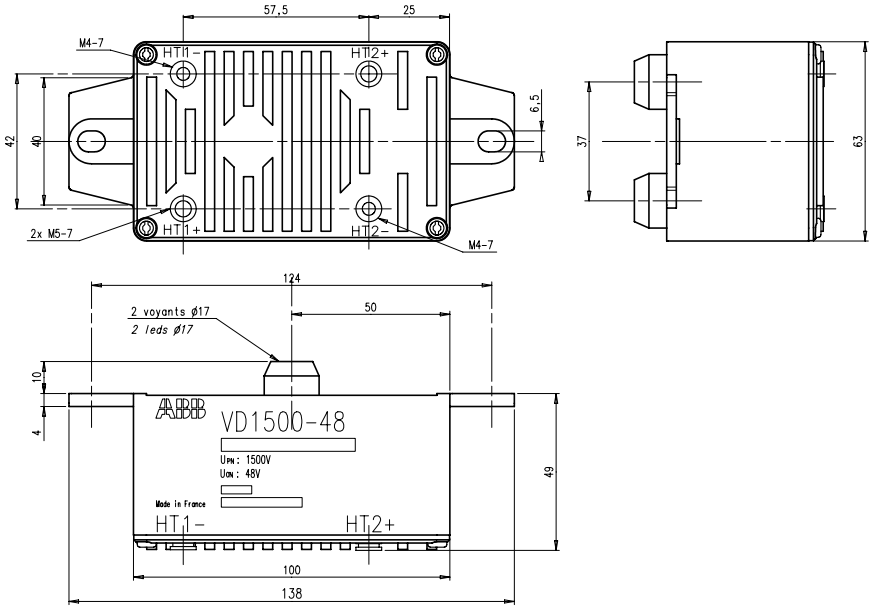
4 The range

- To detect from 50 up to 1500V d.c. or 1000V a.c.*
  - VD1500
    - 1500 = 1500 V d.c. or 1000 V a.c.*

a.c.* under conditions

4 The range

- VD1500: mechanical dimensions



5 The main characteristics

- VD1500: main characteristics

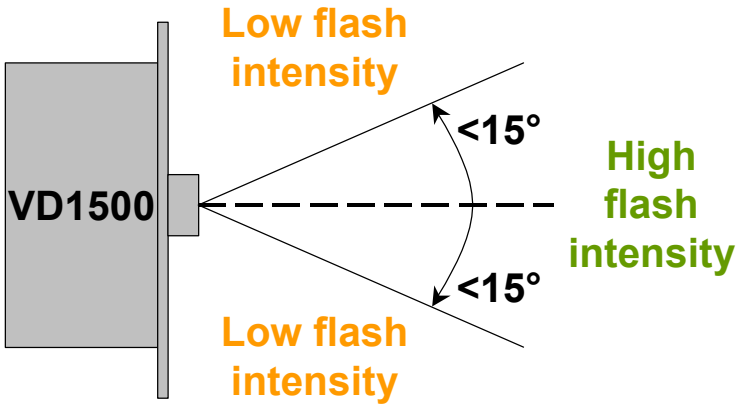
	Unit	VD1500
Nominal primary voltage (U_{PN})	Vd.c.	1500
Nominal primary voltage (U_{PN})	Va.c.*	1000
Max. long duration voltage 5min (U_{PMAX2})	Vmax dc	1950
Max. peak voltage 20msec (U_{PMAX3})	Vmax dc	2538
Mass	kg	<0.5
Operating temperature	°C	-40…+70
Storage temperature	°C	-40…+85
LED switching ON/OFF voltage	V d.c.	40…45
LED color		Red
LED vision angle	°	≤15

- For further requests, please contact us.

a.c.* under conditions

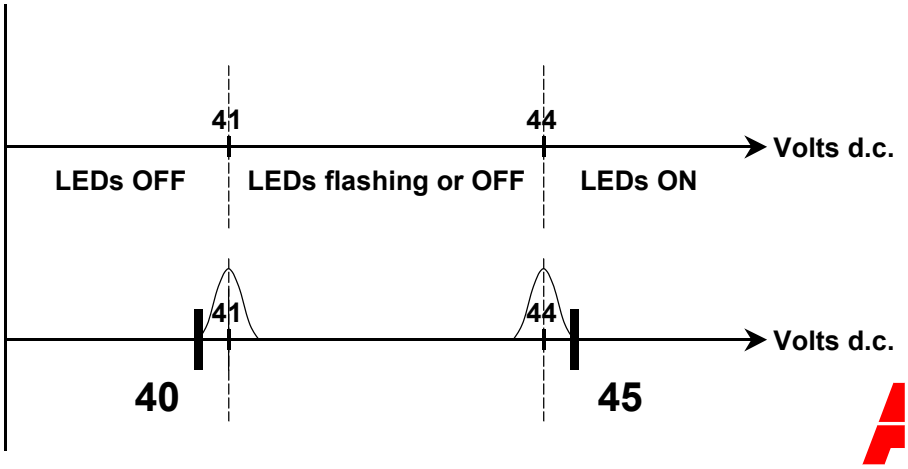
5 The main characteristics

- LED vision best angle



5 The main characteristics

- VD1500: trigger characteristics (d.c. voltage)
  - U_P > 45V : 2 LEDs flashing
  - U_P < 40V : 2 LEDs OFF
  - 40V < U_P < 45V : 2 LEDs flashing or OFF



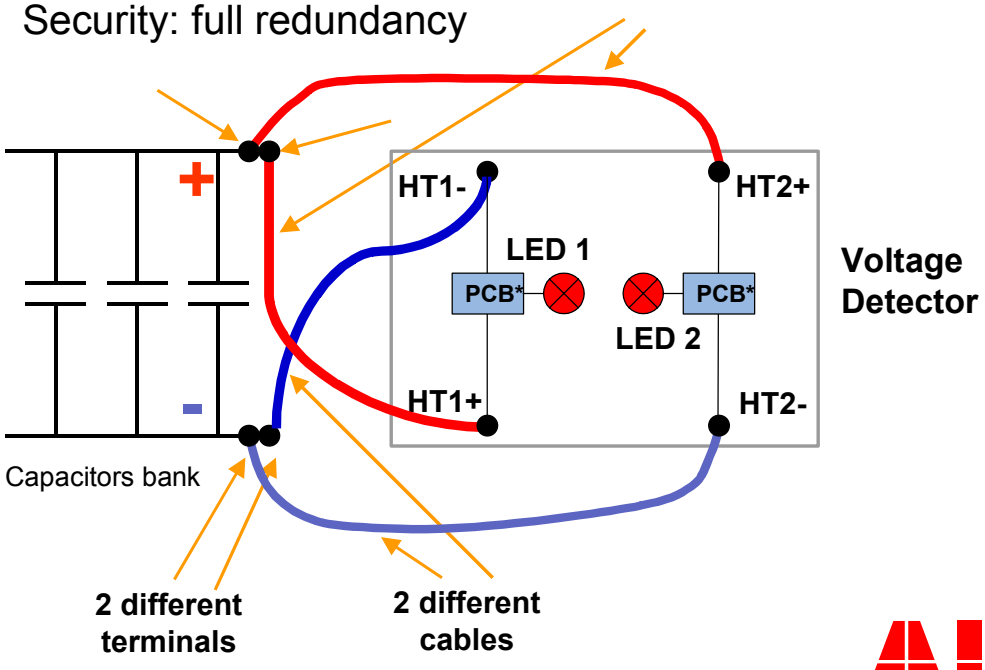
6 The options and accessories

- Options
  - Primary voltage terminals
  - LEDs switching on/off threshold
  - Remote visualisation of LEDs
- Accessories
  - Maintenance kit for LEDs replacement

- Regular maintenance is a key issue

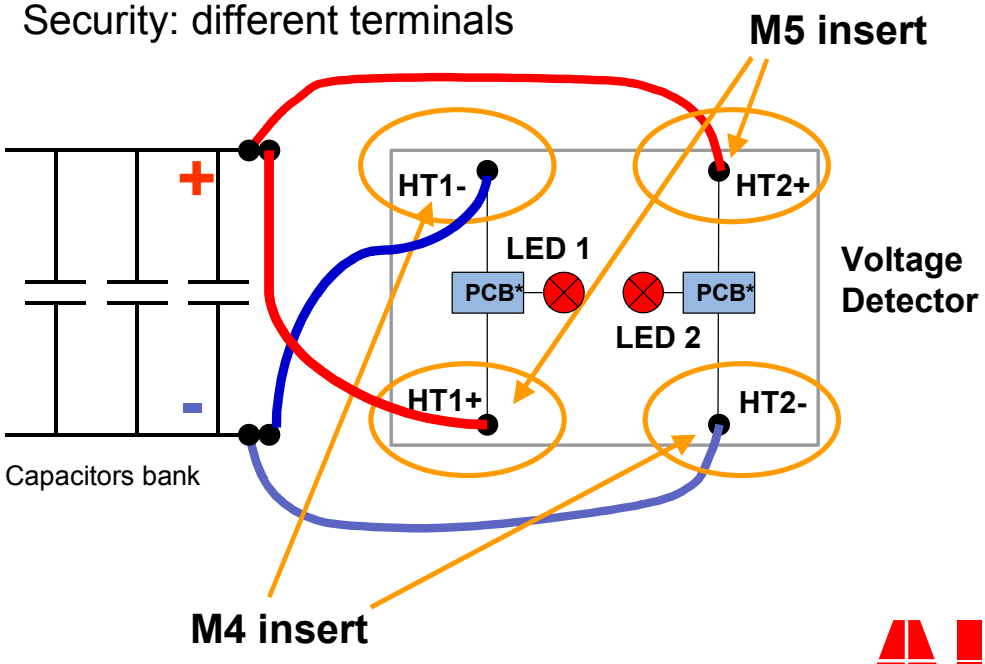
7 The electrical connections (d.c. voltage)

- Security: full redundancy



7 The electrical connections (d.c. voltage)

- Security: different terminals



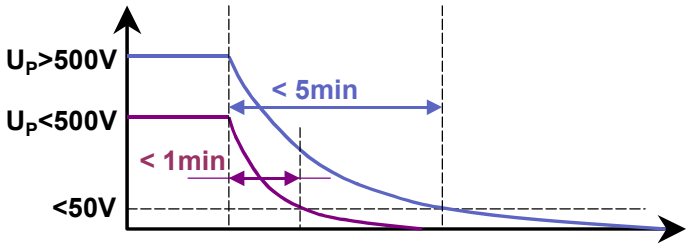
8 The advantages

- Construction
  - The first traction voltage detector fully compliant with standards
  - High reliability detector (double function with reparable parts)
  - A voltage detector 100% resin potted
    - Electronic board protected
    - Withstand high vibration constraints
    - High thermal capacities
  - The best compromise: performance/volume/price
  - No need of external power supply
  - Recyclable packaging

9 The used standards: railways applications

- CF60-100 : SNCF specifications
  - To specify the rules to apply for the design of parts and assemblies in order to protect personal against electrical shocks
  - §6 Particular measures for capacitors

"The permanent discharge circuit must be designed to drop down the residual voltage from the max. nominal voltage to less than 50V in less than 1 minute for nominal voltage below 500V and in less than 5 min for nominal voltage above 500V. In such case, a visual system must be implemented externally to the cabinet or coffer to indicate the presence of a voltage greater than 50V. This system consists of 2 lights connected directly to any single or capacitors bank. The lights remain switched on, while residual voltage is above 50V.



Under progress

9 The used standards: railways applications

- EN50155 (Dec 2002)
  - Testing (see details in the concerned Type Test Report)
    - Functioning : @ +25°C, @-40°C, @+70°C
      : overload
      : magnetic environment
    - Other climatic tests : salt mist
      : humid heat cycling
      : storage

Under progress

9 The used standards: railways applications

- EN50163 (Nov 1995)
  - Standard rated voltages

Rated voltage (U_N)	1500Vdc
Umax1 (permanent)	1800Vdc
Umax2 (max. 5 min)	1950Vdc
Umax3 (20msec)	2538Vdc

Under progress

9 The used standards: railways applications

- EN50121-3-2 (Sep 2000) for ground mobile equipments
  - Electro-magnetic compatibility (see details in the concerned Type Test Report)
    - Immunity : burst
      : surges
      : electrostatic discharges
      : conducted perturbations
      : electromagnetic fields
      : network magnetic fields
    - Emission : conducted
      : radiated

Under progress

9 The used standards: railways applications

- IEC61373 (Jan 1999) for ground mobile equipments
  - Vibrations and shocks (see details in the concerned Type Test Report)
    - Tests : random vibrations with functional sensor
      : random vibrations without functional sensor
      : shocks
    - Vibrations severity : category I class B

Under progress

9 The used standards: railways applications

- EN50124-1 (Jan 1999)
  - Insulation coordination
    - Rated voltage : 1500Vdc (1950Vdc for 5min)
    - Pollution degree : PD2 (no conductivity and low humidity with rare condensation)
    - Insulation distance : OV3 (same as OV4 with less requirements on over voltages, reliability & disponibility)
      : 23.6 mm air distance (reinforced insulation)
      : material group II (400≤CTI<600)
    - Creepage distance : 27.7mm (reinforced insulation) with grooves having minimum 1.5 mm

Under progress

9 The used standards: railways applications

- EN50129 (May 2003): Security Electronic Device
  - Design documentation for approval:
    - Management quality folder
    - Management security folder
    - Technical and functional security folder
    - Security approval
  - Design levels
    - SIL 2 ($1*10^{E6}$ < MTBF “hours” < $1*10^{E7}$)
    - Full redundancy
    - Preventive and curative maintenance

Under progress

9 The used standards: railways applications

- Other specs:
  - NFF16101 & NFF16102
    - Usage : category A1
    - Class : 2 (technical location)
    - Class : 3 (passenger or driver location)
  - FS306158 (Dec 1995)
  - CF60-100 (Feb 1984)

Under progress

9 The used standards: industrial applications

- IEC60038 (Feb 2002):
  - Standard industrial voltage
    - Rated voltage : 1000V a.c. under conditions

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10 The technical documentation

- Technical file
  - Technical presentation: this document
  - Mounting instructions
  - Usage and maintenance
  - Data sheets
  - Type tests report
  - MTBF calculation
  - Fire/smoke certificate
  - Environmental certificate

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