

# DDL9000

## DC Catenary Protection Catenary voltage up to 3 kV



Our DDL9000 protection relay protects the fixed electric traction installations responsible for supplying the catenaries with direct current up to 3 kV.

Thanks to a hybrid acquisition of currents and voltages (through sensors or IEC 61850-9-2 SV), it facilitates the operation of your railway electrical network.

Based on more than 40 years of experience in this field, our DDL9000 relay is part of our 9000 Series designed for monitoring and controlling railway systems.



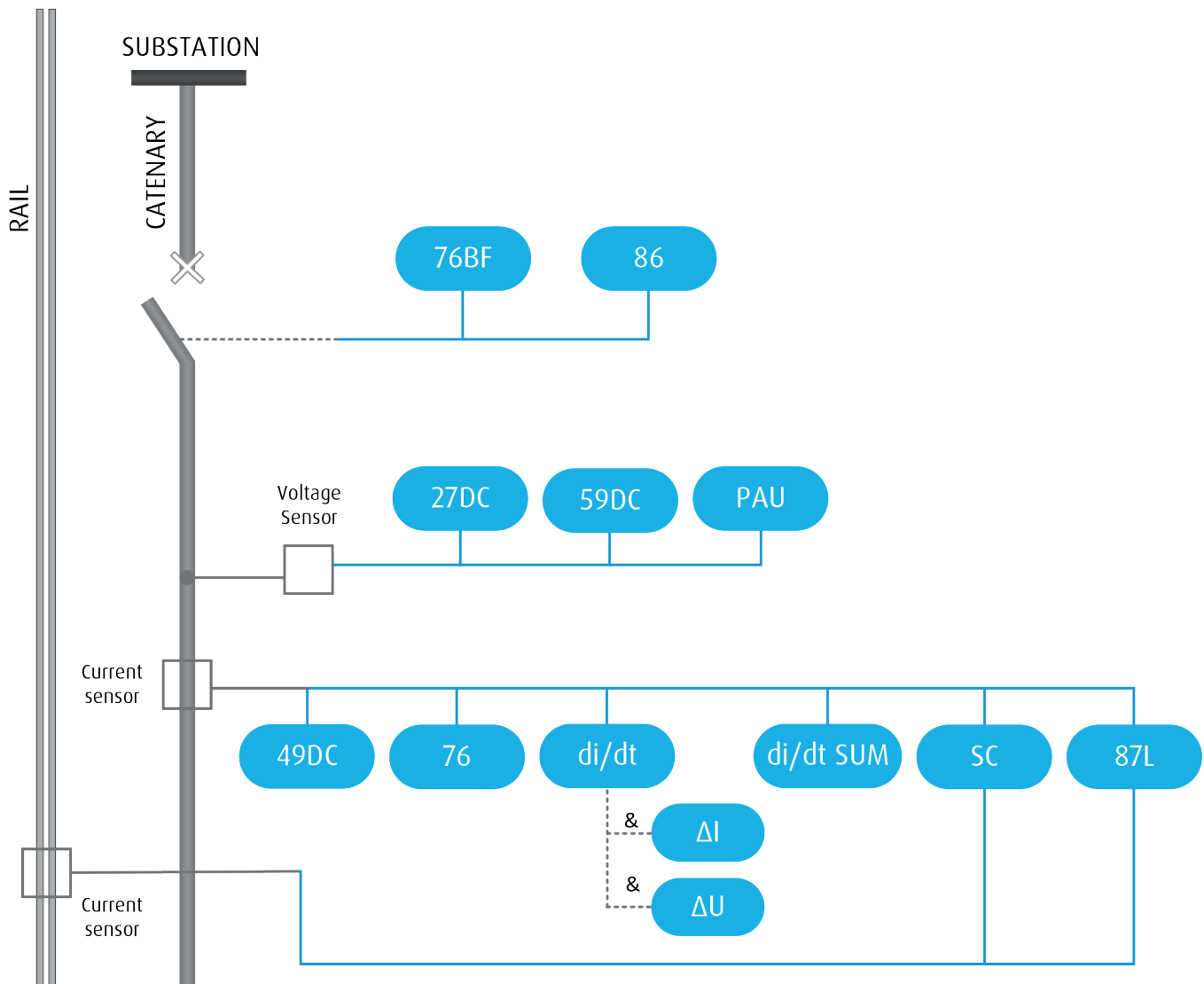
- High resolution colour touch screen
- Embedded web server
- IEC 61850 ed2 or Modbus servers
- 2x16 A circuit breaker outputs
- 12 configurable digital outputs
- 18 configurable digital inputs
- 16 configurable LEDs
- 48 Vdc to 125 Vdc  $\pm$  15% power supply
- 19" - 3U - 355 mm rack

- Performance
  - Instantaneous tripping time in less than 30 ms
  - Sampling rate: 4 kHz
  - Operating temperature: -5 °C to 55 °C
- Main standards
  - Design according to IEC 60255, EN 50124-1
  - EMC according to IEC 61000-4-\*, EN 50121-5
  - Communication according to IEC 61850
  - CE marking according to IEC 60255-27 and IEC 60255-26

#### OUR TRADEMARKS



## FUNCTIONAL SCHEME



## PROTECTION FUNCTIONS

- **[27DC]** **[59DC]** Catenary voltage monitoring
- **[76BF]** Breaker failure function
- **[76-1]** **[76-2]** Overcurrent function
- **[di/dt]** Rate of change of current function
  - AND criteria: **[ $\Delta I$ ]** Delta I current deviation
  - AND criteria: **[ $\Delta U$ ]** Voltage drop monitoring function
- **[87L]** De-icing differential function
- **[di/dt SUM]** Rate of change of summed current function
- **[49DC]** Cable thermal overload function
- **[PAU]** Presence and lack of catenary voltage

## MONITORING FUNCTIONS

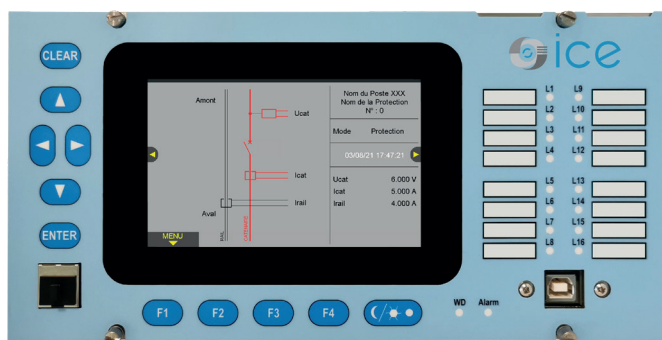
- **[SC]** Sensors monitoring
- **[86]** Circuit breaker monitoring
- Disturbance recording

## ADVANCED CONNECTIVITY

Compliant with the requirements of the IEC 61850 edition 2 standards, our DDL9000 relay also incorporates the following communication features:

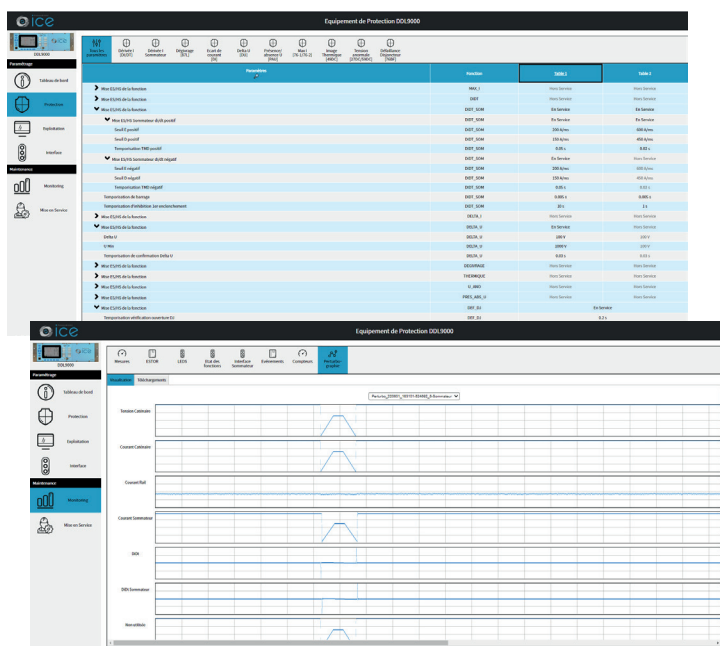
- IEC 61850-8-1 (MMS) and IEC 61850-9-2 (SV) synchronised by PTP 1588 (option)
- Modbus (serial and over TCP/IP) – 2 separate parameter sets
- Https (Configuration by Embedded Web Server)
- Time synchronisation by NTP
- Network redundancy via HSR/PRP (option)
- SFP cage (Ethernet RJ45 reception or optic fibre choice)

## HMI AND OPERATION



- 800x480 colour touch screen
- Navigation directly from the screen or via the dedicated keys
- 16 configurable LEDs

## WEB INTERFACE



- Interface easily accessible with a web browser, locally via the USB type b interface or via the Ethernet port
- Convenient tool that simplifies and speeds up operations of:
  - Diagnostic
  - Setup
  - Equipment commissioning

## TECHNICAL CHARACTERISTICS

### Current inputs: Catenary, Rail (2)

- $U_n = 5$  or  $10$  V
- Primary value from  $1\,000$  A to  $10\,000$  A
- Withstand a permanent  $12$  V |  $20$  V  $1$  s

### Voltage inputs: Catenary (1)

- $U_n = 5$  or  $10$  V
- Primary value from  $500$  V to  $4\,000$  V
- Nominal value from  $500$  V to  $3\,500$  V
- Withstand a permanent  $2$   $U_n$

### Digital inputs: 18

- Proofreading of inputs status
- Power supply:  $48$  Vdc to  $125$  Vdc  $\pm 10\%$
- Current:  $\geq 2$  mA

### CB outputs: 2

- Trip relay
  - DC voltage withstand:  $300$  V
  - Continuous current:  $16$  A
  - Breaking capacity:  $4,000$  VA
- Output control

### Digital outputs: 12

- Signalling relays
  - DC voltage:  $300$  V
  - Continuous current:  $6$  A
  - Breaking capacity:  $1,500$  VA
  - Max switching time:  $10$  ms (activation and deactivation)
- Coil/contact insulation:  $4$  kV
- Output control

### Performance

- Instantaneous tripping time  $< 30$  ms
- Sampling rate:  $4$  kHz

### Dimensions

- $19''$  -  $3U$  -  $355$  mm rack

### Recordings

- $1,000$  events
- $32$  disturbance records in COMTRADE format

### Communication protocols

- IEC 61850 edition 2
  - IEC 61850-8-1 (GOOSE, MMS)
  - IEC 61850-2 SV with IEEE 1588 PTP sync
- Network redundancy
  - PRP (Parallel Redundancy Protocol)
  - HSR (High-availability Seamless Redundancy)
- Modbus
- Configuration via HTTPS (Embedded Web server)

### Power supply

- $48$  V to  $125$  V  $\pm 15\%$

### Operating temperature

- From  $-5$  °C to  $+55$  °C

