

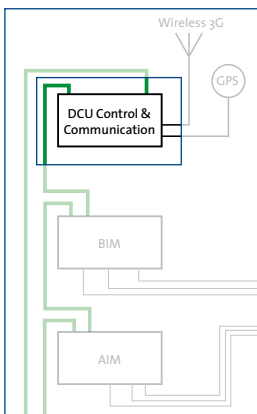


Dispersed Control Unit (DCU221)

Brings intelligence to the secondary substation



The Dispersed Control Unit (DCU221) is the computing, communication and power management device of SASensor MLV.



The DCU221 is the “all-in-one-box” unit with a Computer, Communication interfaces like Ethernet, RS485/422, RS232, Current-Link-Interface, wireless 3G. The unit is powered from a DC source and/or with an external battery. Time synchronization is performed by the build-in GPS receiver.

The power over Ethernet ports are the combined communication and power supply ports to the SASensor Interface Modules.

Dispersed Control Unit (DCU221)



The main tasks of the DCU221 are:

1. Application processing
2. Communication
3. Power management

Computer

The application processing is performed by an “off-the-self” Single Board Computer (SBC) with an Intel Atom processor of 1.1GHz, 512 MB DRAM and a solid state disk (Compact Flash) of 4 GB.

Communication

1. Ethernet (10M, 100M, 1Gb/s) UTP – PoE
2. Wireless – 3G with external antenna
3. RS232 serial communication
4. RS485/422 multi drop serial communication
5. Current Link Interface serial communication

Power supply

The DCU221 is a DC powered device with the option to connect a battery as backup supply to the DCU. The DCU221 will perform the loading of the battery in a software configurable manner with temperature monitoring.

GPS

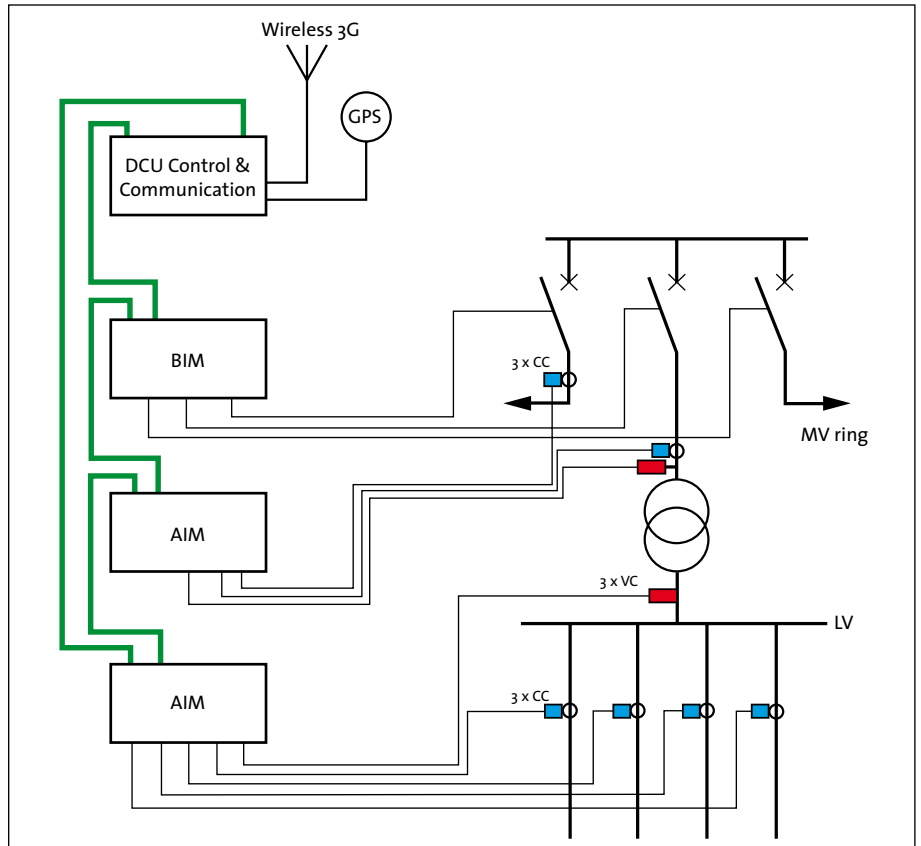
The GPS uses an external active antenna. The GPS is used for accurate time synchronization and position indication.

Configurations

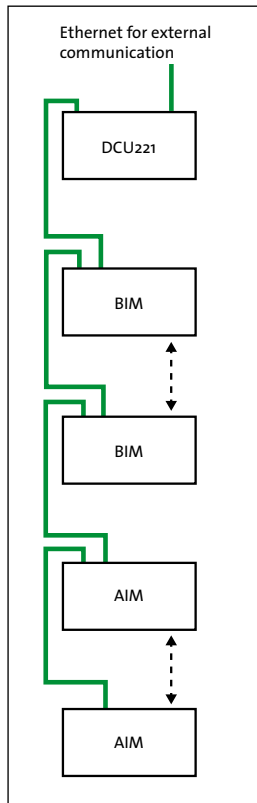
The DCU221 can be used in single or redundant mode if critical functions require a high availability.

Networks

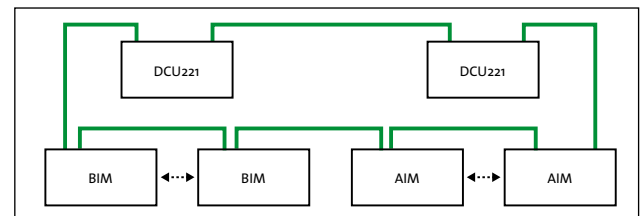
The ring network communication of the Ethernet network ensures full availability if the system requires extension or a device replacement. If a star network is used one of the Ethernet ports is usable for external communication.



SASensor MLV configuration



Single mode star network



Redundant mode ring network



SASensor - Dispersed Control Unit (DCU221)

Serial communication port

| RS232 port | |
|--------------------|---|
| Connector type | RJ45 |
| Number of ports | 1 |
| Cable type | STP |
| Interface | EIA/TIA561 RXD, TXD, GND, RI/DCD, DTR, CTS <i>RI/DCD is software selectable</i> |
| Galvanic isolation | 2kV |

The AUX port is used for communication with intelligent electronic devices like digital protection relays or external disturbance indicators based on multi-drop RS485 or Current Link Interface.

| AUX port | |
|-----------------------------------|--|
| Connector type | 12 pins |
| Number of ports | 1 x RS485 |
| RS-485 | 7 pins RX+, RX-, TX+, TX-, GND1, ENA+, ENA- |
| RS-485 Galvanic isolation | Yes, 2kV |
| Number of ports | 1 x CLI |
| 4 .. 20 mA Current Link Interface | 3 pins IN1, OUT1 24V, 100mA, GND2 |
| Galvanic isolation | NO |

The power supply connector wires to the power supply source as well as independent watchdog output contacts for indication purpose.

| APWR port | |
|------------------|--|
| Port | 6 pins, 5 A, 70W, |
| Watchdog output | 3 pins 1 x Normally Open (NO) 1 x Normally Closed (NC) |
| Power connection | 2 pins 20 ..140V DC |

An external battery can optionally be connected to this port. Battery temperature measurement can be connected to monitor the battery for overheating.

| BAT port | |
|--------------------------|--|
| Port | 6 pins, 5 A, |
| Battery input | 2pins 24 V or 48 V |
| Battery Temp Measurement | 2 pins IN1, 4 .. 20 mA Current Link Interface |
| Current Link Power | 2 pins, 24V, 100mA |

Ports for inter-module communication and power supply for Interface Modules

| POE Ports | |
|--------------------------------|---|
| Connector type | RJ 45 |
| Number of ports | 2 (POE1, POE2) |
| Cable type | STP, CAT5e or better |
| Ethernet Protocols | IEEE802.3i (10MB/sec), IEEE802.3u (100MB/sec) IEEE802.3ab (1GB/sec) |
| Power over Ethernet compliance | EEE802.3at and Locamation Cascaded Ring Extension |
| POE output voltage | 18..60V |
| POE output power | 25W per port |
| POE power pass through | 100W max (4-pairs) |
| Galvanic insulation | 1500V |

Wireless communication is facilitated with an external antenna. The SIM card is not retrievable from the outside of the module for theft prevention.

| 3G | |
|-------|------------------------|
| Port | SMA |
| Input | 800..900,1800,2100 MHz |
| Modem | GPRS/UMTS 3G modem |
| SIM | Internal SIM |

The GPS antenna is external and requires free line of sight of the sky. The GPS is used for accurate time synchronisation.

| GPS | |
|--------------|------------------------|
| Port | SMA |
| Input | 1575,7 MHz GPS antenna |
| PPS Accuracy | <50ns when locked |



| Generic CE | | |
|-------------|--------------|---|
| Description | Standard | |
| Immunity | IEC61000-6-5 | immunity requirements for power station and substation environments |
| | IEC61000-6-2 | generic immunity for industrial environments |
| Emissions | IEC61000-6-4 | emission standards for industrial environments |

| EMC immunity | | | | | | |
|-------------------------------|--------------------------------|---------------------------------------|----------------------|----------------------|----------------------|----------------------|
| Description | Standard | Enclosure | POE | BAT/PWR | RS232, RS422/485 | GPS/3G, CL (4-20mA) |
| Electrostatic Discharge | IEC61000-4-2 | 6kV contact 8kV Air | | | | |
| RF immunity radiated | IEC61000-4-3 | 10V/m | | | | |
| Fast transient | IEC61000-4-4 | | 4kV CM | 4kV CM | 4kV CM | 4kV CM |
| Surge | IEC61000-4-5 | | 4kV CM 2kV DM | 4kV CM 2kV DM | 4kV CM 2kV DM | 4kV CM 2kV DM |
| RF immunity conducted | IEC61000-4-6 | | 10V | 10V | 10V | 10V |
| RF magnetic field | IEC61000-4-7 | 100A/mtr continuous 1000A/mtr,3sec | | | | |
| 100kHz, 1MHz oscillatory wave | IEC61000-4-12 IEC61000-4-18 | | 2,5kV CM 1,0kV DM | 2,5kV CM 1,0kV DM | 2,5kV CM 1,0kV DM | 2,5kV CM 1,0kV DM |

| EMC emission | | | | | | |
|--------------|-------------------------|-----------|-----------------|---------------------------|------------------|--------|
| Description | Standard | Enclosure | POE, RS232, AUX | BAT/PWR | RS232, RS422/485 | GPS/3G |
| Radiated | EC61000-6-4 CISPR22 | Class B | | | | |
| Conducted | IEC61000-6-4 CISPR22 | | | By external mains adapter | | |

| Safety | | | | | | |
|----------------------------------|-------------------------|--|---------------------------|---------------------------|---------------------------|--------|
| Description | Standard | Enclosure | POE | RS232, RS422/RS485 | BAT/PWR | GPS/3G |
| Degree of protection (IP) | IEC60255-27 IEC60529 | | IP54 | | | |
| Clearance and creepage distances | IEC60255-5 | Rated insulation voltage: 63V Overvoltage category III Pollution degree 3 Basic insulation HLV circuits | By external mains adapter | | | |
| PF high voltage withstand | IEEE802.3 IEC60255-5 | | 1500V @1min | By external mains adapter | | |
| Insulation resistance | IEC60255-5 | | | | By external mains adapter | |
| Flammability | IEC60255-27 | | UL94/Vo/V2 | | | |
| Single fault condition | IEC60255-27 | | No electrical hazards | No electrical hazards | No electrical hazards | |
| Protective fuse | | | 2A | | 5A | |

| Environmental | | |
|-----------------------|---|-------------------------|
| Description | Standard | Test levels |
| Operating temperature | IEC60068-2-1, IEC60068-2-2, IEC60255-27 | -20 .. +55°C |
| Storage temperature | IEC60068-2-1, IEC60068-2-2, IEC60255-27 | -25 .. +70°C |
| Humidity | IEC60068-2-78, IEC60255-27 | +40°C, 93% r.h, 10 days |
| Vibration | EC60068-2-6 | Class 1 |
| Shock | IEC60068-2-31 | Class 1 |



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