Smart Building System

Fieldbus
Communication networks are used extensively in Building Automation systems at the automation and management levels, but are less used at the device level – in most cases, the DDC Controller needs a home run for each data point connection. There can be many good reasons why traditional star wiring is still used, but for sure issues with cost and complexity of the available device level fieldbus solutions are important factors.

This situation is about to change. Carlo Gavazzi is now introducing a brand new range of products that have been specifically developed to simplify the wiring and reduce the cost of Building Automation systems at the device level. The system is based on Dupline®, the robust and proven industrial fieldbus used in more than 150,000 installations worldwide.

The cost savings by using the Dupline® decentralized solution can be substantial, especially in systems with a high level of I/O distribution.

**Dupline® 2-wire bus**
Robust and proven technology with over 150,000 installations worldwide including building automation, mining, oil drilling, railroads, and many, many, more...

**Cost reduction using device level bus technology**
- Direct interface with industry accepted DDC solutions, using BACnet/IP communications
- Freely compatible with new and existing building automation systems, thus saving time and money on commissioning

**Simplified wiring at the field level**
- Standard 2-wire Dupline® bus connecting all devices, such as sensors, indicators and actuators
- Eliminates expensive wiring home runs, saving money on wiring and installation costs versus traditional Device-to-DDC solutions

**Fewer subpanels and DDC controllers**
- Distance from subpanel or DDC to field devices is greatly increased using Dupline® 2-wire bus technology
- Number of I/Os of DDC Controller is substantially increased

**Flexible, modular and expandable**
- System can easily be expanded by simply extending the Dupline® bus cable and adding the desired modules
- System flexibility, backwards compatibility and expandability save costs by minimizing the requirements for the system
- Last minute changes are easily accommodated

**Easy handling**
Easy design, planning, installation and commissioning are inherent features of the Dupline® fieldbus. Saving time in these project phases is a key factor to reduce cost of the complete solution.
SB2WEB – The BACnet link to Dupline® decentralized I/O

Bus-powered sensors and decentralized I/O-modules installed at the actual field device locations are linked together via the Dupline® 2-wire bus in a multi-drop connection. This greatly simplifies the wiring compared to a DDC star connection. The wiring topology is free, a branch can be made at any point, and even loop wiring providing redundancy is allowed. There is no need for special cable, e.g. a standard unshielded 2 x 1.5 mm² cable can be used, and the cable runs can be up to 5 km long. It is allowed to run the bus cable in parallel with power cables in the same conduit, and cable end terminations are not required.

In order to provide an easy and fast integration with the DDCs and BMS, all the Dupline® data points are automatically made available as BACnet objects through the SB2WEB BACnet Controller. This allows for all major DDC brands to integrate in a seamless way to the Dupline® system via BACnet/IP.

The SB2WEB also connects via RS485/Modbus to Carlo Gavazzi Energy Meters and 3’rd party devices and makes all the electrical parameters available as BACnet objects.

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The Dupline® fieldbus carries out the task to link together all the field level devices in a simple and cost-effective way, and centralize the data in the BACnet Controller SB2WEB. Any DDC and BMS front end with the capability to act as BACnet client then have access to all the Dupline® data points via the BACnet/IP connection, thereby eliminating the need for hardwired I/O.
SB2WEB - BACnet building controller

The SB2WEB is the controller in Carlo Gavazzi’s modular concept for Smart Buildings. The Linux-based controller is equipped with an Etherport for BACnet/IP and Modbus/TCP communication, and via the two RS485 ports it can collect data from Carlo Gavazzi energy meters and various 3’rd party modbus devices. Through the local bus connector in the side it connects to up to 7 Dupline® driver modules, each able to manage more than 400 data points. Similar communication modules for DALI and wireless field devices are under development.

USB
USB port supports flash for data transfer

Local bus 2
GSM modem

USB, SD
Data transfer using PC or SD card

RS485
Modbus-RTU devices

RJ connection
- BACnet/IP
- Modbus/TCP
- Webserver

Local bus 1
Communication modules (up to 7)
- Dupline®

RS485
Energy meters

Dupline® environmental sensors

Carlo Gavazzi’s new line of bus-powered CO₂, temperature and humidity sensors provides significant wiring advantages in HVAC control systems, especially in those cases where the sensors are widely distributed into several rooms of the building. The Dupline® 2-wire bus cable is simply multi-dropped from sensor to sensor collecting all the measured values - no power supply is required. If additional sensors are needed later on, it is merely a question of connecting them to the already existing bus cable. The measured values can be shown on the optional backlit LCD display.
Smart Building System
Benefit from the Dupline® decentralized solution

**BACnet building controller**
- SB2WEB24
  - Multi-protocol device
  - Flexible modular plug-in concept for Dupline® bus drivers
  - Manages up to 7 Dupline® Bus segments
  - Connects directly to Energy Meters via Modbus RS485
  - Any data point and internal value available as BACnet object
  - Easy and fast configuration
  - Compact 2-DIN housing
  - DC Power Supply
  - cUL approved

**Dupline® bus driver**
- SH2MCG24
  - Master Channel Generator for one Dupline® bus segment
  - Capacity for 120 DigIn, 116 Dig-Out, 256 Analogue I/O
  - Provides power and communication for the connected Dupline® modules
  - Compact 2-DIN housing
  - DC Power Supply
  - cUL approved

**Digital output modules - DIN-rail**
- SH2RE16A2E230
  - DC powered module with 2x16A relay outputs and built-in load energy metering (kWh, W, V, A ..)
- SH2RE16A4
  - Bus-powered module with 4x16A relay outputs
- SH2SSTRI424
  - DC powered  module with 4x10W TRIAC outputs for heating valve control
- SH2ROAC224
  - DC powered modules with 4x5A interlock relay outputs for control of 2 roller blind motors, AC or DC

**Digital input modules - DIN-rail**
- SH2INDI424
  - Module with 4 digital inputs
  - Input types: NPN, PNP or voltage free
  - Inputs can be used as counters
  - Compact 2-DIN housing
  - DC Power Supply
  - cUL approved

**Digital input modules - decentralized**
- BDB-INCON4-U
  - Bus-powered small-dimension 4 x contact input module
- BDB-INCON8-U
  - Bus-powered small-dimension 8 x contact input module
- BDB-IOCP8-U
  - Bus-powered small-dimension 4 x contact input / 4 x PNP output module
- BDA-INVOL-U
  - Bus-powered small-dimension 1 x voltage input module

**Digital output modules - decentralized**
- BDA-RE13A-U
  - Bus-powered small-dimension 1 x 13A relay output module
  - High inrush current capability (130A), thereby suitable for direct lighting loads
  - cUL approved
- SHDRODC230
  - AC-powered small-dimension 2 x 5A relay outputs for control of roller blind motor
  - Relay interlock function for roller blind motor protection
  - cUL approved

All modules listed above are cUL approved.
Analogue I/O modules - decentralized

SHPINV324
- DC powered small-dimension 3 x 0-10 V input module

SHPINT1P1
- Bus-powered small-dimension 1 x 10K3 + 1 x Variable resistor input module

SHPINV2TP124
- DC powered small-dimension 1 x 10K3 + 1 x Variable resistor + 2 x 0-10 V input module

SHPOUTV224
- DC powered small-dimension 2 x 0-10 V output module

All modules listed above are cUL approved.

Environmental sensors

SHE5XLS4TH
- Bus-powered, low current consumption sensors for temp. and %RH
- Wall-mounting
- Available in different combinations
- CO₂ measuring range: 0 to 2000 ppm
- CO₂ measurement: Dual source infrared NDIR technology
- Temperature measuring range: -20 to +50°C (-4 to 122°F)
- Humidity measuring range: 0 to 100 %RH

SHE5XTEMDIS
- Temperature controller with display
- Fits into sockets from Gira, Jung and ELKO (55x55 mm)
- Shows room, floor and outdoor temperatures
- Switch ON/OFF heating / cooling
- Set wanted room/floor temperature
- Energy Save through 3 heating/cooling setpoints
- cUL approved

Other sensors and detectors

BSN-ANE-U
- Bus-powered wind sensor

BSF-WAT-U
- Bus-powered water leakage detector

BSG-SMOA-U
- Bus-powered smoke detector without battery backup

BSG-SMO-U
- Bus-powered smoke detector with battery backup

BSH-LUX-U
- Bus-powered lux sensor

BSI-TEMANA-U
- Bus-powered outdoor temperature sensor

All modules listed above are cUL approved.