

MOUSE MEDIA

VELBUS HOME AUTOMATION SYSTEMS

MODULE GUIDE

1. Introduction

Velbus is a modular system where every module has its own processor and memory connected by a “bus” system. This means you do not need to install a central control unit and prevents the entire home automation system from being blocked by a central unit failure. As the Velbus system does not require any master controller and relies on the backend bus every module can be placed anywhere in the house. Every module in the range has its own unique characteristics in the system, from switching relays to variable power outputs, etc.

The bus system is based on the extremely stable and reliable CAN bus used in the automotive sector. The most basic set-up has two modules: an input module and an output module. An input module uses short messages to send its status to the bus. An output module interprets these messages and executes actions relating to its programming

Velbus can easily be configured to command lights, curtains, heating and/or cooling systems as well as other electrical appliances. This document describes the module options for available and their characteristics.

2. Input panels

The most characteristic part of a Velbus installation are the input panels. There are many options available ranging from 1 to X inputs, including motion sensors, temperature sensors and much more. Each wall panel is seen as an “input” module, but also acts as an output module – for example to display the status of an item. For example, the VMBELO series has RGB colored LED’s that could indicate the garden lights are on, that the AC unit has an error or simply to light up during the night as a reference.



Figure 1: VMBELO series in thermostat mode

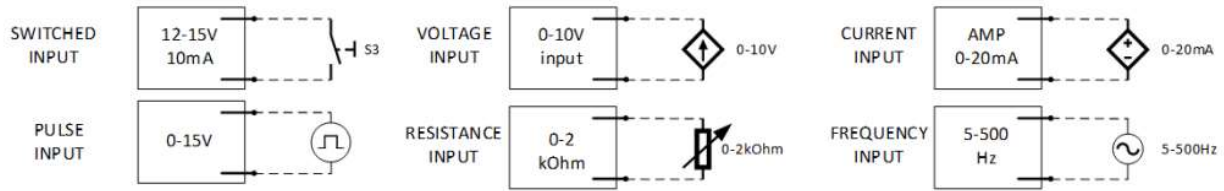
Each input module is shown in the VelbusLink software with the available “channels” representing the input from each panel. Some of the channels are “logical” channels such as Alarm, Cooler etc. These channels are also called “Triggers” in the system as they can trigger a configured action in the whole system.

02,06	VMBGPOD-2	
CH1	Push button 1	
CH2	Push button 2	
CH3	Push button 3	
CH4	Push button 4	
CH5	Push button 5	
CH6	Push button 6	
CH7	Push button 7	
CH8	Push button 8	
CH34	Temp. sensor	
CH35	Heater	
CH36	Boost	
CH37	Pump	
CH38	Cooler	
CH39	Alarm 1	
CH40	Alarm 2	
CH41	Alarm 3	
CH42	Alarm 4	

Figure 2: Overview of channels available per input panel

3. Input modules

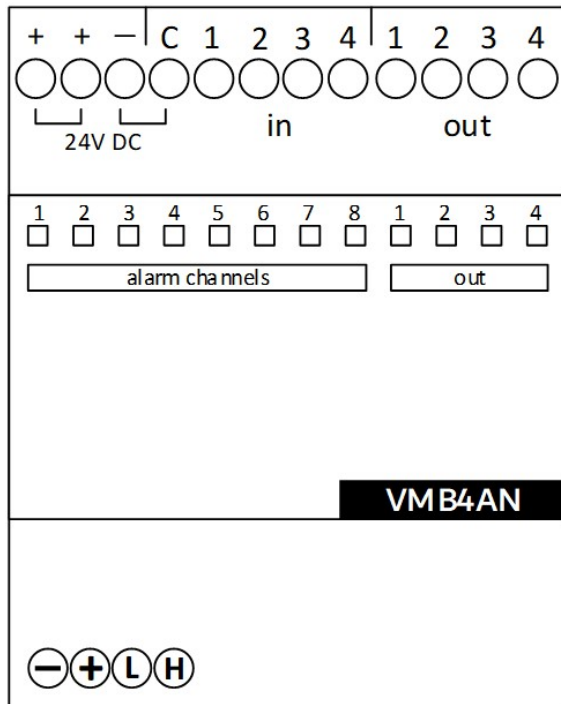
There are also other input modules available. These inputs can be used to receive external signals such as switches, pulse, variable voltage, resistance, or amps. These can be either packed in single units, or multiple input channels combined.



The input into the system can be used in multiple ways. Usually, triggers are based on threshold levels (100 pulses -> switch on light).

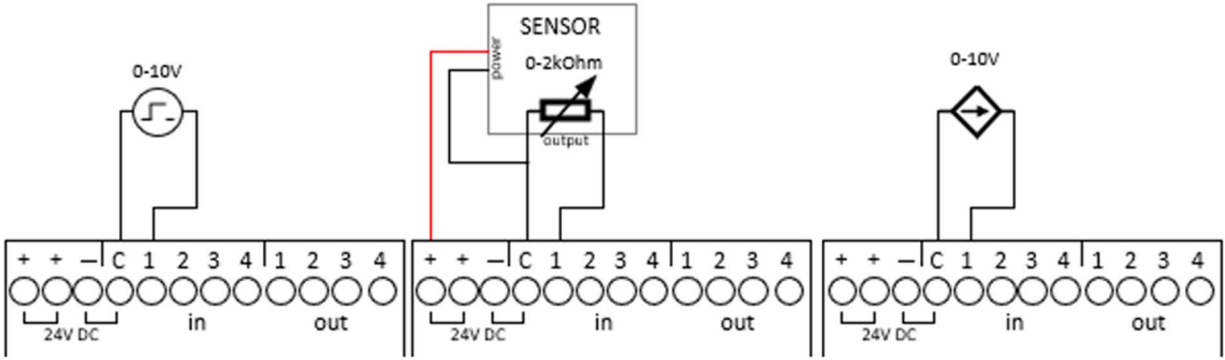
3.1. VMB4AN

The VMB4AN is a 4-channel analog input module that allows various signals to be received by the system. Configuration of the channels is through the VelbusLink software, but the connections to the VMB4AN to the external systems is dependent on the signal type itself.

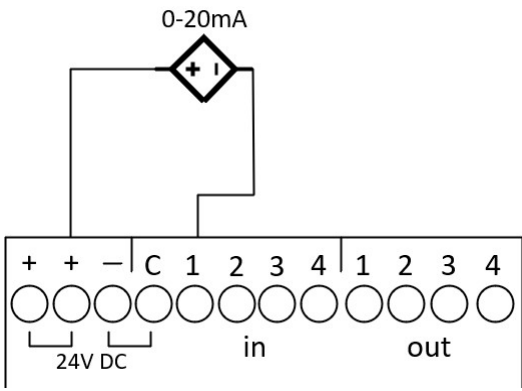


The module can provide 24V DC (5W [eg 20mA] max) to the sensors through the top left connections. There are two positive terminals and two (C and -) negative terminals available. The input channels 1-4 and 4 reserved output channels that cannot be used today. The module is connected through the standard Velbus terminals on the bottom of the device.

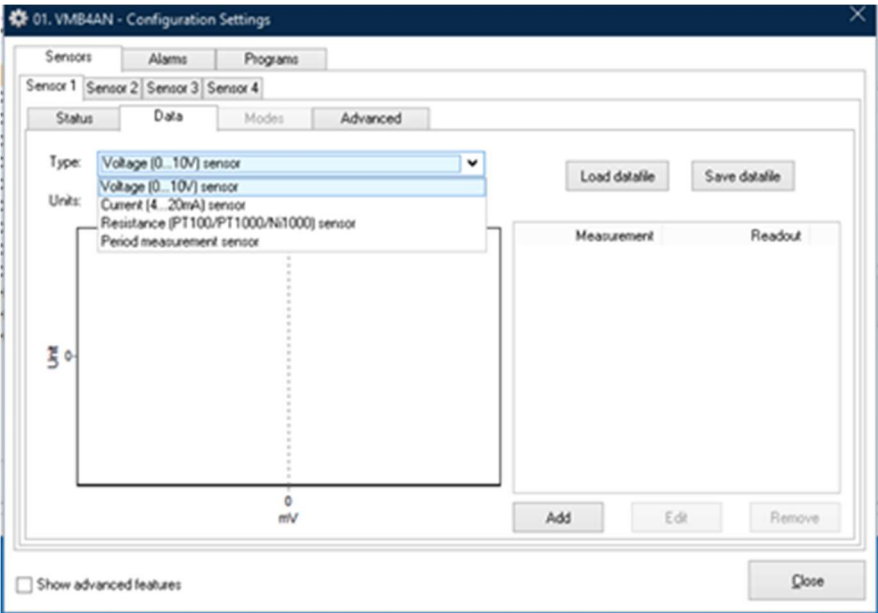
When connecting pulse (frequency), resistance or voltage input sensors, the 'common' and input terminals can be used as displayed in the above image. The sensors themselves can be powered by the 24V DC provided by the module.



For current (amp) based sensors, the + of the sensor can be connected to the 24V DC supply and the negative terminal can be connected to the desired input channel.



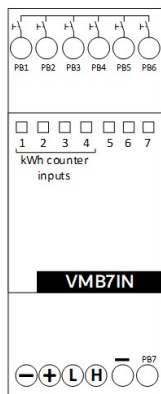
The input type for each channel can be configured in the VelbusLink software by configuring the VMB4AN, then selecting the sensor and the data tab.



Measurements and read-outs can be configured as thresholds. Upon reaching a threshold an action can be triggered. For example, a simple threshold could be: *if sensor 1 receives 5V, switch on module 1*. If multiple thresholds are entered, multiple “modes” can be achieved, and each mode can trigger different alarms. It is also possible to switch modes based on programs. For example: *threshold 1 is set to a temperature of 21C, threshold 2 is set to a temperature of 28C. Threshold 2 needs to be active during the day, while threshold 1 is active during the night. Programs can be used to switch the “active” threshold for the sensor. The result is that during the day the alarm (trigger) is activated on 28C, while it will be triggered on 21C during the night.*

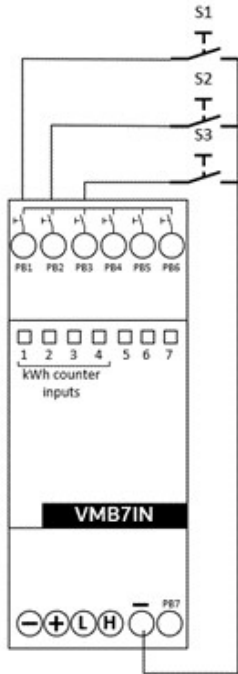
3.1. VMB7IN / VMBIN / VMB2PBAN-R / ...

The VMB7IN module allows 7 external switch inputs into the system through a single module. The module only supports switch or pulse-based inputs (pulse based on 0V).



This module can be used to input external sensors or switches that have a voltage free switching mechanism. This could be physical switches or relays from external systems – for example the error output from an HVAC unit, or a switch indicating a curtain has reached its endpoint.

Inputs from the VMB7IN are configurable in a similar way as an input panel. That is that the inputs can be set to single or dual mode (short/long presses). They can also be configured for Normally Open (NO) or Normally Closed (NC) configurations.

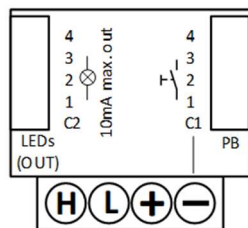


Different is the method to switch the first 4 inputs into “counter” mode (*note: This is not available on all input models*). In counter mode the pulse interval can be set to a value (such as kWh or liters or m3) as well as an alarm. For example, *an alarm can be activated when the system counted 10m3 of fluid over 1 dl/pulse inputs. As 10m3 == 10.000 is would be 100k pulses of 1dl.*

Other modules in the same input series (VMB7IN, VMBIN, VMB2PBAN-R, VMB2PBN-R, VMB6PBN) provide a similar input experience in a different format (and channels). Connecting them is the same.

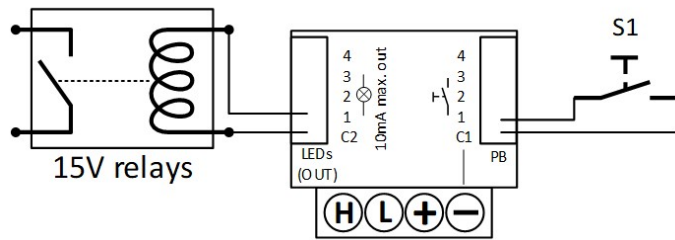
3.2. VMB4PB

While the VMB4PB 4-channel push button interface looks similar to the above-mentioned interfaces, this module has additional options that can be useful. The module provides 4 channels for input, but also has 4 output channels. These output channels can be configured for LED indication but can also be configured as separate output channels.



The input switches cannot be set in counter mode, but do support the dual button mode. By switching the unit to I/O (input/output) mode, the 4 LED outputs actually become switchable outputs. Each output can

provide 15V out (max 10mA) directly to the connected system, or drive a relay board to switch higher voltage/current or switch based inputs.



3.3. MOTION SENSORS

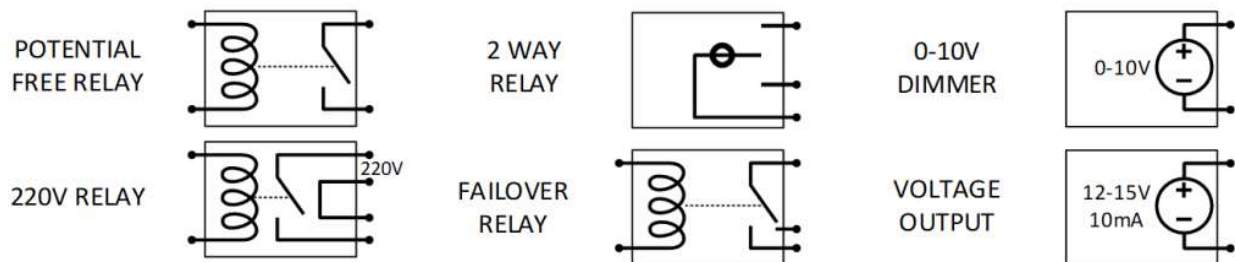
Velbus provides a variety of motion sensors. Either built-in to the wall switch panels, as separate ceiling units or outdoor modules that also act as temperature sensors. Each motion detection can be configure for sensitivity and provides a trigger channel in the VelbusLink software, such as that when motion (above the threshold) is detected an action can follow on one of the output modules.

The VMBMETEO can also detect the temperature – upon which it is possible to provide alarms or actions based on the measured temperature. Installation of these modules is simply connecting them to the Velbus bus system and configuration through the VelbusLink software.

4. Output modules

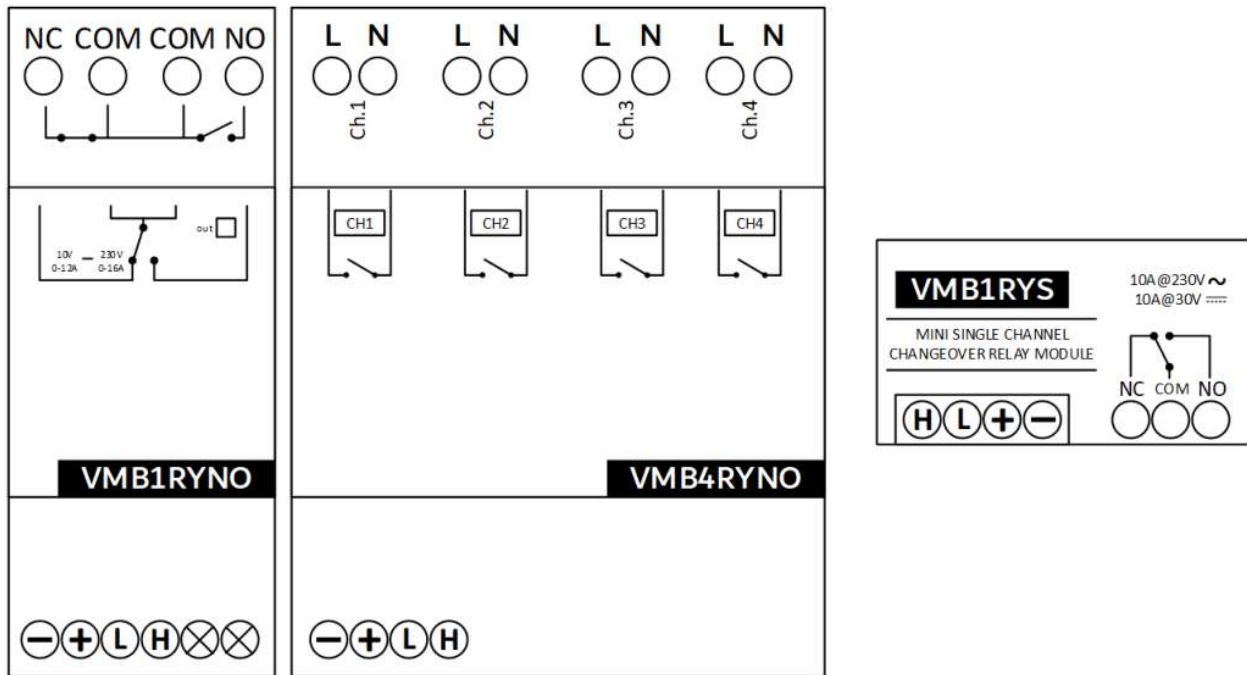
There are many modules for output, ranging from switched to variable voltage. Similar to the input modules configuration of these outputs is done with the VelbusLink software. In this software logic between various inputs (such as temperature, wind speeds, motion sensors, static values, etc) can be linked to the various output channels with “actions”. Actions include on/off, follow, delayed on/off and many more.

The various output logic that can be provided by Velbus modules:



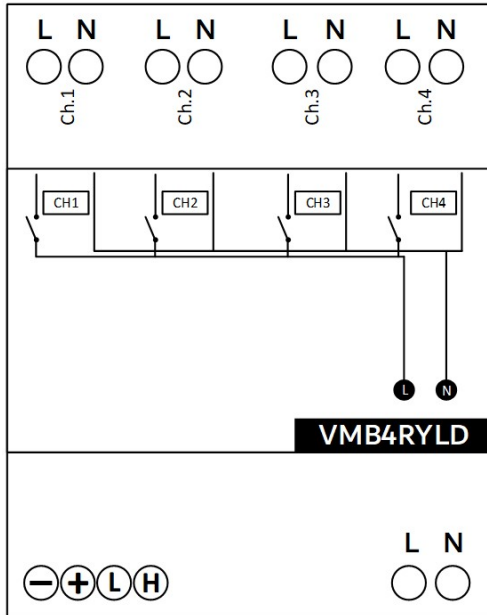
4.1. POTENTIAL FREE RELAYS

The VMB1RYNO and VMB4RYNO provide 1 and respectively 4 channels of potential free relays. While the VMB1RYNO and VMB1RYS provide NC and NO in 1 module, the VMB4RYNO only provides one of these at a time. Through the software the state for each channel in the VMB4RYLD can be configured to NO or NC, but the module does not provide the physical interface for configuring both at the same time.



4.1. VOLTAGE BASED RELAYS

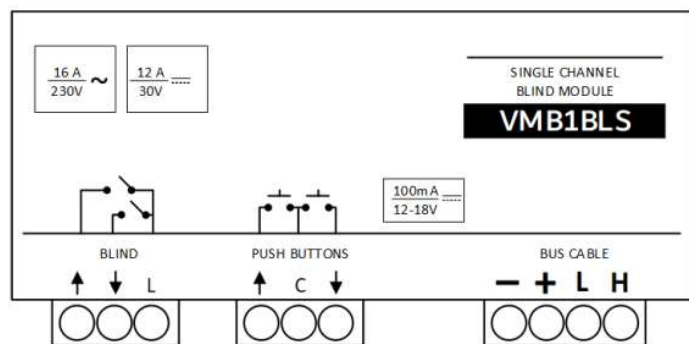
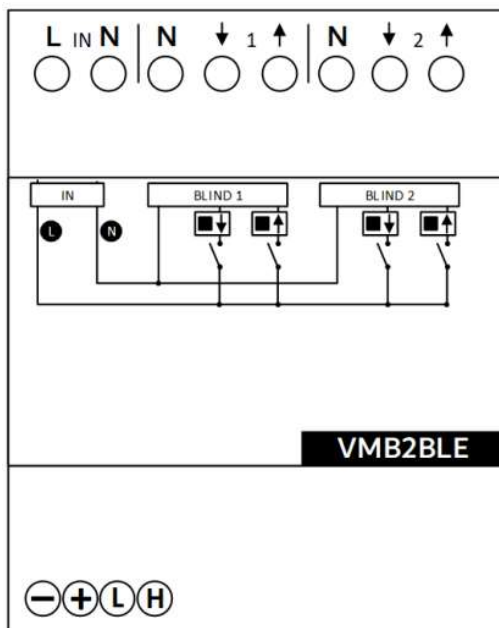
The VMB4RYLD as well as the blind modules (covered later), provide an easy way to provide a switched voltage-based output. While 230V can be switched, it is also possible to switch only a single wire or to switch for example 24V AC.



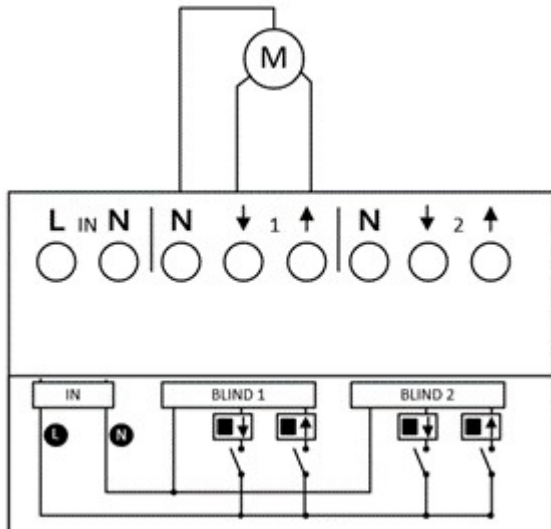
In short, the L input for the module will be switched to the various L outputs provided by the module, while the N inlet is always connected to the N outlets. Configuration of NC/NO can be configured through the software on a per channel basis.

4.1. BLIND MODULES

There are multiple blind modules available, these are essentially voltage-based dual relays where only 1 relay can close at any given time (or none). These modules allow for a timed base relay close to close the blind/curtains, or to open the blinds/curtains.

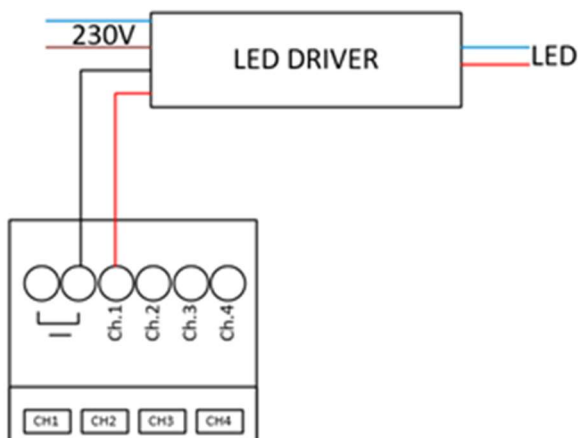


These modules are usually used in combination with motors that allow for two-mode (left/right rotation) but can also be used for dual speed motors (low/high) – where only 1 L-feed can be used at any given time.



4.1. 0/1-10V universal DIMMER

The VMB4DC is a 4 channel module that allows each outlet to provide between 0-10V. These modules are usually used to control LED dimming, but can also be used as input for other devices. Each channel can be configured to run in 0-10V or 1-10V in a linear or logarithmic mode, depending on the requirements of the LED driver or connected device. The speed of dimming, a minimal voltage and preset stages can also be configured per channel.

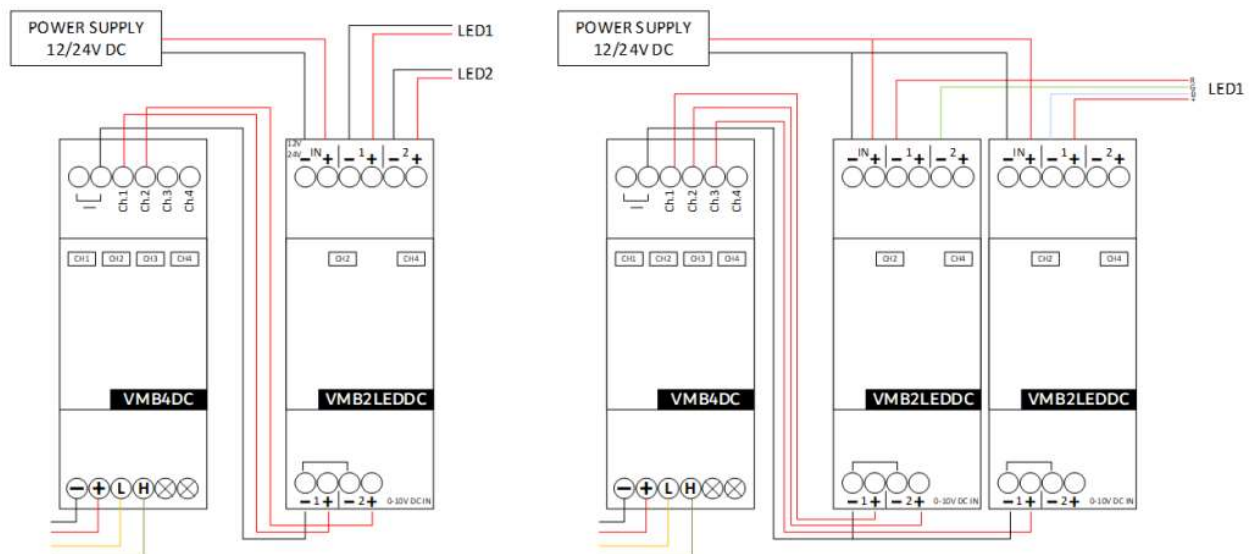


The device provides a shared negative over 2 terminals and 4 individual positive outlets. Note that the maximum output power is 10mA per channel. The feed is provided by the Velbus bus power supply.

If multiple channels need to be synchronized (dimming multiple channels jointly) – each channel can be setup in a master-slave configuration with a single dimmer being the master – and all slaves following using a 213 (slave / follow) action.

4.1. LED strip controller

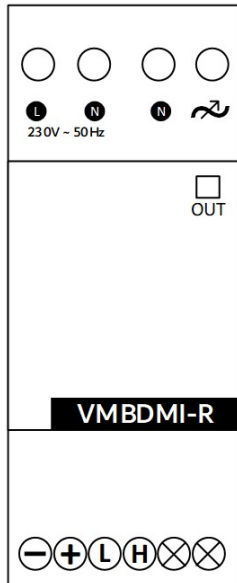
While the VMB4DC can be used with a variety of LED controllers, it can also be used with the VMB2LEDDC. This module is a 2 channel LED controller that uses a separate external power supply (it's one of the very few units not connected to the Velbus bus itself) as well as a 0-10V input (provided by the VMB4DC or another controller). Each channel provides 12V 100W or 24V 200W to drive the LED's, but these voltages cannot be mixed (input is either 12V or 24V depending on input voltage).



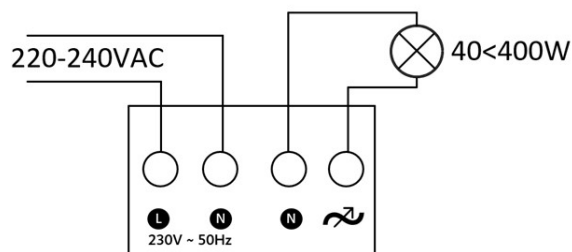
A single VMB2LEDDC can be used to drive 2 different LED's, however it is also possible to combine two VMB2LEDDC's to control a multicolored LED, where each output provides power to a color channel.

4.1. 230V TRIAC dimmer

To dim regular 230V lights the VMBDMI-R single channel dimmer can be used. This dimmer can be used with inductive loads as well as non-inductive loads. It uses 230V input and dimmable output.

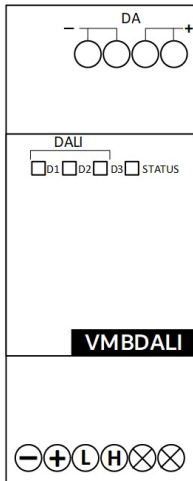


The minimal wattage required is 40Watts. If required, an electronic preload can be added to ensure the minimal standard is reached.

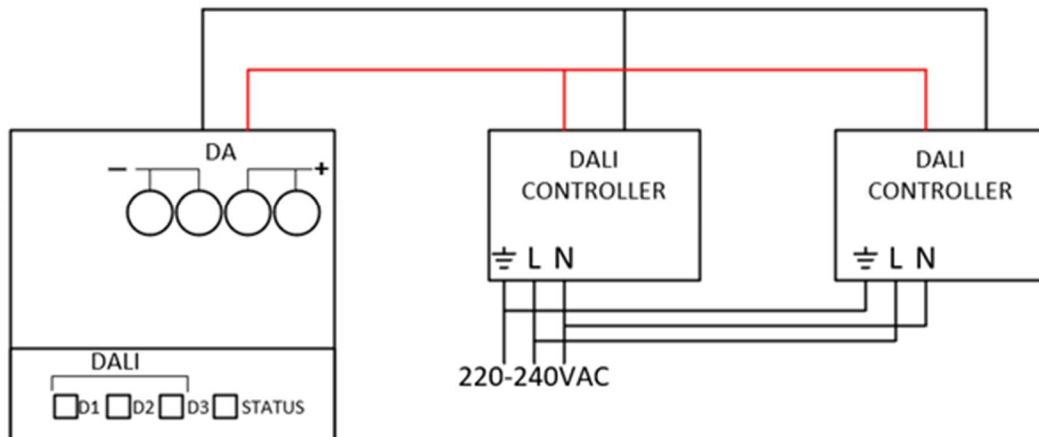


4.1. DALI gateway

To improve the performance and control of variable lighting, the DALI protocol was developed. DALI stands for Digital Addressable Lighting Interface and is a two-way open protocol – a digital, internationally adopted language used to control lighting such as LED Drivers. The protocol allows information to be transferred between devices, such as lighting commands, fault details and diagnostics. Within DALI each unit receives its own digital address for control. Velbus can be linked to DALI as well as DALI-2 compatible devices using the VMBDALI module.



The module can address 64 devices total, grouped into 16 groups maximum, as well as a maximum of 16 DALI based scenes.



For the DALI interface, two options exist. Either the VMBDALI provides the DALI bus power, or an external power supply is used. When the internal DALI power supply is enabled, the device can provide up to 300mA of power. The output voltage is 15V DC.

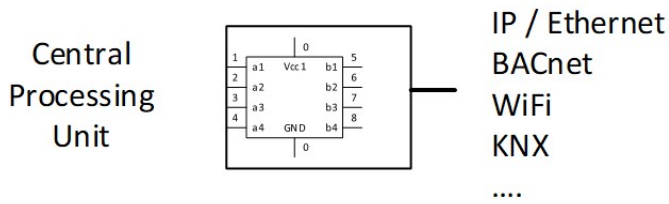
4.1. IoT gateway

While the Velbus system is an enclosed system – based on a decentralized architecture – it is possible to link the modules to an IOT Gateway in order to also control these modules through a compute unit. This provides additional system capabilities and more importantly also the ability for phone/remote control.

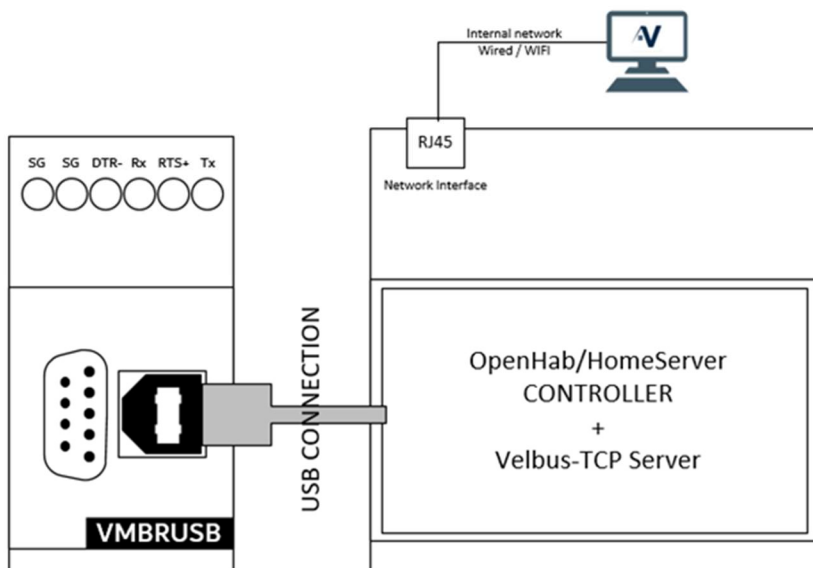
Within the Velbus system, the SIGNUM module is available. This module is based on a Raspberry PI with a specialized version of OpenHab.

It is also possible to link the Velbus system to a custom home server to further enhance the capabilities and extend the domotica system with non-Velbus modules, including but not limited to: Zigbee, Ikea

Tradferi, KNX, BACnet, etc. This can be done through OpenHab, Home Automation or any other application that supports Velbus connectivity.



The connection into a software application also provides the ability to run extensive scripts and rules and configure the system and logic to any desired method.



The interface from the computer to the Velbus system can either be by a serial (RS-232) or USB connection. In many cases a local server can be installed on the same computer to allow the VelbusLink software as well as the OpenHab/HomeServer installation to use the connection simultaneously.