2168 West Grove Parkway, Suite 300, Pleasant Grove, UT. 84062 USA
Telephone: 801 229-2800 • Fax: 801 224-0355

DIN Low Voltage Output Station — MODEL: LVOS-0-10-PWM-DIN

Overview

The Vantage LVOS-0-10-PWM-DIN has eight low voltage outputs. Loads 1-4 may be configured as 0-10V (analog) or PWM (source only) loads. Loads 5-8 are 0-10V, analog only.

Features

- 8, independent 0-10V low voltage outputs
- Outputs 1-4 can be configured as PWM or 0-10V
- Manual control and LED status for all 8 LV outputs on front
- High resolution performance when dimming
- Communicates via station bus
- Assembled in a 9 unit DIN case
- Override switch for ON and OFF states of all loads
- CE Certification / UL

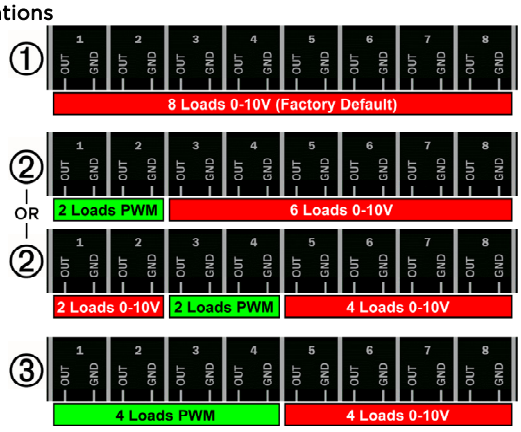
Station Specifications

General	
Dimensions, HWD	85.7mm x 157.2mm x 61.9mm 3.38" x 6.19" x 2.44"
Weight	237g / 8.36oz.
LED Indicators	Microprocessor status, configuration, loads LED on loads 1-4: Red = 0-10 / GREEN = PWM
Ambient Operating Temperature	32-104°F / 0-40°C
Relative Humidity	Maximum 90%, non-condensing
Cooling	Convection
Firmware	Upgradeable via station bus
Manual Control	Overlay with control/status for each output
FreeRTOS	Real-time scheduling provided by FreeRTOS (www.freertos.org)
Compliance	UL • CUL • RoHS• CE • FCC (see Certifications)
DC Input – Power Supply	
Input Voltage	13.8 – 36VDC
Input Power Draw	<15W
Connection Type	0.20" pitch removable plug
Connection Rating	300V 10A
Input / Output Connections (Low Voltage)	
Station Bus Connection	24V / 36V Station Bus
Station Bus Wire Specification	2C, 16AWG / 1.31mm2, twisted, non-shielded, <30pF per foot. Separate a minimum of 12" / 30.5cm from other parallel communication and/or high voltage runs.
Station Wiring	Daisy-chain/Star/Branch
Station Count	0.35W on IC-24 / 0.55W on IC-36
Auxiliary Inputs	4 Dry Contacts, (3 and 4 may be used for an IR Receiver and Light Sensor respectively)
Override Inputs	Yes – All ON or All OFF contacts
Low Voltage Output: 0-10V	
Specification	IEC 60929 Annex E
Number of outputs	8
Output	0-10V @ 100mA sink or source
External source voltage	Typical 10V / Maximum 20V
Loads Per Output	50@ 2.0mA per load (typical)
Resolution	>1024 steps
Connection type	0.20" pitch removable plug
Connection rating	300V 10A
Low Voltage Output: PWM	
Specification	IEC 60929 Annex E
Number of outputs	4
Output voltage	12V (source only)
Output current	100mA per channel, 400mA total
Loads Per Output	50@ 2.0mA per load (typical)
Resolution	> 1024 steps
Duty cycle	Variable 0% to 99.9%
Frequency	760Hz
Connection type	0.20" pitch removable plug
Connection rating	300V 10A
Protection	
DC input, over current protection	PTC fuse (self resetting)
Low voltage 0-10V output over current protection	
Low voltage PWM output over current protection	

Certifications	
CE, FCC Part 15, Sub-Part B	EN55022 Radiated / Conducted emissions EN55024 61000-4-2 ESD immunity EN55024 61000-4-3 Radiated immunity EN55024 61000-4-4 Fast transient immunity EN55024 61000-4-5 Surge immunity EN55024 61000-4-6 Conducted immunity EN55024 61000-4-8 Magnetic field immunity EN55024 61000-4-11 Voltage dips/interruption immunity 61000-3-2 Harmonics current emissions 610000-3-3 Flicker emissions

Load Configurations

Setting up the load configurations, as shown at right, is done in Design Center software. Only loads 1-4 may be configured as PWM. Set all four loads as PWM or in sets of two, e.g., loads 1&2, or loads 3&4.



Low Voltage Outputs, 0-10V (analog)

Low Voltage Controls 1-8 and Ground are used to control devices that work with an analog 0-10V signal. Ground provides the negative reference for the output voltages. All Grounds are connected internally to each other. Each control output, 1-8 can sink or source 0-100mA at any voltage from 0-10VDC. The load level sets the percentage between the minimum and maximum voltage that is selected for that load. LED load indicators are ***red*** for all loads in 0-10V mode; loads 5-8 are only 0-10V.

PWM Outputs, 12V (Source)

Low voltage outputs 1-4 may be configured as PWM (Pulse Width Modulation). Only use combinations 1-4, 1&2, or 3&4 as illustrated for PWM outputs. PWM Duty Cycles are programmed using Power Profiles from 0%-*Minimum On* to 100%- *Maximum On* (99.9% actual). The load level is a percentage between the minimum and maximum duty cycle (Power Profile Minimum On and Maximum On). The output can be reversed in Design Center through the Power Profile. For example, a 0% duty cycle can either be load ON or load OFF. LED load indicators 1-4 are ***green*** for loads in PWM mode.

> ***NOTE:*** *Loads 1 – 8, Low Voltage outputs, should be limited to 250 feet / 76.2 meters for each wire run, using a minimum of 18AWG / 0.823mm2 gauge wire. All connections use 4.4 inch pound torque. Stranded wire recommended.*

Software/Firmware

Design Center Software version 3.x or higher and accompanying Firmware, are compatible. For new projects it is recommended that software and firmware be kept to the most current release.

Power Profiles / Power Outages

The Dimmer Station stores Power Profile configuration data locally so that it will continue to operate correctly if communication with the system is lost. This information includes: load profile-duty cycle settings, last load level, and PWM or 0-10V power profiles. If a station is moved to a new location or if the load type connected is changed from a 0-10V load to a PWM load, or vice-versa, remember to change the load type in Design Center, to avoid unwanted results. Before testing new load type via the local buttons on the front, program the station to the system so the new load type is active in the station's output.
If a power outage occurs, when power is restored the station will return the loads to the last load level with all profiles at there last known settings. This occurs whether or not the station is connected to the Controller.

Actuator Buttons

The actuator buttons on the front of the station are for local control only and are not programmable through Design Center software. In *Diagnostics*, these eight buttons and the four dry-contacts have not been implemented in *Button Press Monitor*.

Button Operation

Button Action	Load Operation
Press/Release	1. The load ramps to 100% *or* fades to 0% over three seconds, alternating with every other press and release. 2. If the button is pressed again before the three seconds time, the load stops ramping/fading at its current level.
Press and Hold/Learn	*Press and Hold* and *learned level* features are *not* supported from the front panel buttons.

Installation
Installation of Vantage products should be performed or supervised by a *Certified Vantage Installer*. Each LVOS-0-10-PWM-DIN must be installed inside of a properly vented and covered DIN enclosure. Connection torque is 4.4 inch pounds.

Station Connection
The LVOS-0-10-PWM-DIN connects to a Vantage System via Station Bus. Two screw terminals are located in the low voltage section of the electrical box (through top). The two connectors are internally wired, in parallel, to facilitate daisy chaining the station bus. The wire should comply with the Vantage Station Bus wiring specification.

Remote Infrared Receiver or Dry-Contact
A remote infrared receiver (part # REMOTEIR) may be connected to the LVOS-0-10-PWM-DIN dry-contact 3. This terminal is not compatible with remote infrared receivers from other manufacturers.

The receiver connects to +12V, IR IN (dry contact 3) and Gnd. If not used with an IR receiver this input may be used as a standard dry contact input, connecting the contact between IR IN (dry contact 3) and Gnd.

Sensor Input or Dry-Contact
Dry contact 4 connects to +12V, SENSOR IN and Gnd. If not used for a light sensor, this input may be used as a standard dry contact input, connecting the contact between SENSOR IN (dry contact 4) and Gnd.

Wiring
Loads 1 – 8, Low Voltage outputs, should be limited to 250 feet / 76.2 meters for each wire run, using a minimum of 18AWG / 0.823mm2 gauge wire. All connections use 4.4 inch pound torque. Stranded wire recommended.

Override
The station supports two Override modes, ON and OFF. When either switch is closed, using a simple toggle switch, all loads are ON or OFF depending on which override loop is closed. However, the ON override takes precedence over the OFF override if both switches are closed. **NOTE:** *Station does not communicate to controller when in override.*

Power Connection
Connect the 13.8 – 36VDC power feed. Vantage recommends the *PSU36-DIN 36VDC* or *ACPDXXSM2 24VDC* power supplies*****. This provides power for the LVOS-0-10-PWM-DIN and is required for the station to operate. Use 16AWG / 1.31mm^2 wire between power supply and stations using a daisy-chain topology. *Total* wire length for all stations connected to power supply should not exceed 100ft / 30.5m.

*DIN Power Supply	LVOS-0-10-PWM-DIN Stations Supported
PSU36-DIN – 36V DC 3.5A 130W Max	Supports up to 8 Stations
ACPDXXSM2 – 24V DC 2.5A 60W Max	Supports up to 4 Stations

Configuration
When the LVOS-0-10-PWM-DIN station is first connected to the Station Bus, the diagnostic LED will blink twice followed by a pause. In Design Center, click on Configure Stations, the Status LED will blink 5 times followed by a pause. To finish configuring press any button on the Station 3 times. The station may also be configured by typing the serial number in the project file, using this method the station will automatically be configured when the system is programmed.

Diagnostic Information
The Status LED blinks evenly or flashes 2, 3, 4 or 5 times followed by a pause to indicate status information.

Off: The station is not powered. A power connection has not been made.
One Even blink: Station is operating correctly and is configured.
Two blinks: Station is operating correctly but is not configured.
Three blinks: Station is ***not*** communicating with the Main Controller. Verify that station bus wiring conforms to Vantage guidelines.
Four blinks: Station problem. Please contact the factory.
Five blinks: Configuration mode.

Firmware Upgradable From Design Center
1. The station must always be configured and programmed to the system in order to perform a firmware update.
2. Click on *System* | *Update Firmware* | *Update DIN LVOS Firmware*.
3. Select the checkbox for each DIN LVOS PWM station needing the firmware upgrade.
4. Complete the upgrade – wait for the process to finish.

Placing Station In Boot Code
If the application code is corrupted it may not be possible for Design Center to connect to the DIN LVOS PWM station to update. If this condition is suspected, place the DIN LVOS PWM station into boot code and then update following the steps above.
1. Remove DC voltage power to the station.
2. Press and hold buttons 2 and 3 while DC voltage power is restored.
3. All of the station's load and status LED lights will flash in unison.
4. While in this mode attempt the regular firmware update steps 2-4 again. (Above - *Firmware Upgradable From Design Center*)
5. When the firmware update is finished the update dialog box will display a green checkmark and the station will reboot automatically.

Line Drawings