

0-10V Lighting Controllers

Command BUS Ports

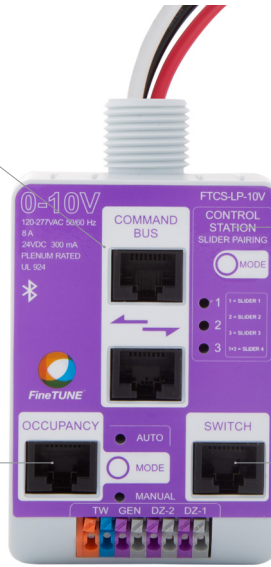
Connecting other devices using the BUS defines the installed space and allows for communication amongst all devices.

The following devices connect via the BUS:

- 0-10V Layer Packs**
- FMX Layer Packs**
- Daylight Sensor Packs**
- Control Stations**

Occupancy Port

Plug an occupancy sensor into this port and all other Layer Packs sharing the same BUS will respond to its state. Daisy chain occupancy sensors using standard CAT5 cable. Using the MODE button, the installer can toggle between Auto Mode and Manual Mode (Vacancy).



Control Station - Slider Pairing

If a Control Station is specified, using the MODE button, the installer can easily select the proper slider number to correspond with the Control Station and Layer Packs installed.

Switch Port

A dedicated switch port allows for the installing contractor to easily match switches to the proper "layer of light" (control zone) they are needing to control. Five switch options are available. See local and master switches tech sheet for more information.

Product Information

The lighting control devices for the FineTune® Tailored Control System are called Layer Packs. Layer Packs use a BUS system to connect and communicate to each other and other system devices. The 0-10V Layer Pack has the capability to control three "layers of light" (control zones). 0-10V Layer Packs can be combined and work seamlessly with FMX Layer Packs. They can also be used to control static color temperature luminaires.

Control Zones:

- GEN = General Lighting Zone
 - DZ-1 = Daylight Zone 1
 - DZ-2 = Daylight Zone 2
- } DZ-1 and DZ-2 act as general lighting zones if no Daylight Sensors are applied.

For design purposes, each Layer Pack is a single switch leg with three sub zones (a, ad1, ad2). These three outputs should be considered one manual control zone.

For example, a FineTune TCS dimmer switch would turn all three zones On and Off together, as well as, adjust the intensity of each zone together. These three control zones cannot be manually controlled separately and designed to adjust intensity based on input from Daylight Sensors.

Tunable White

Every 0-10V Layer Pack has a separate 0-10V output to adjust Tunable White luminaires. Tunable White luminaires must have a 0-10V input for intensity control and a 0-10V input for color control and dim to 10%. Static white luminaires can be specified to dim to 1%.

Default Controller Settings

- High-End Trim** - No High-End Trim Applied (100% Light Output)
- Occupancy Mode** - Auto On / Auto Off
- Occupancy Partial On** - Lights turn On to 70% Light Output
- Demand Response** - 20% Light Reduction on ADR Event

Ordering Information

Ordering Code	Description
FTCS - LP - 10V	0-10V Layer Pack - 120/277VAC~50/60 Hz / 8A Relay / 24V Power Supply @ 300mA / UL924 / UL916 (Includes 6-inch CAT5 jumper cable in every box)

Control Specifications - Switched Load (Option 1)

120/277VAC ~ 50/60 Hz
8A Relay
24V Power Supply @ 300mA
UL2043 - Plenum Rated
UL924 - Emergency Device
UL916 - Energy Management Equipment
Sink Current - 25mA for each 0-10V output
5-Year Warranty

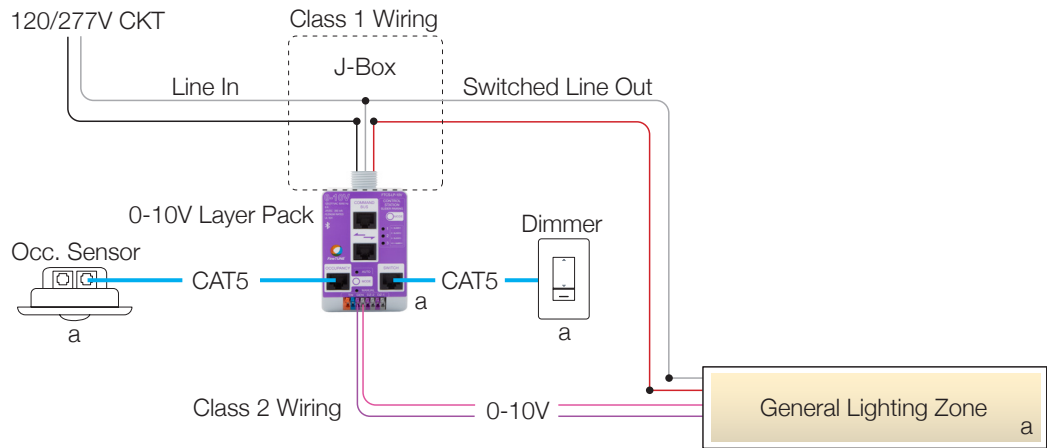
Each 0-10V Layer Pack supports up to an 8 amp load.

Take care in designing the connected lighting load with this amp limit in mind.

Total load allowed @120VAC = 960 Watts
Total load allowed @277VAC = 2,216 Watts

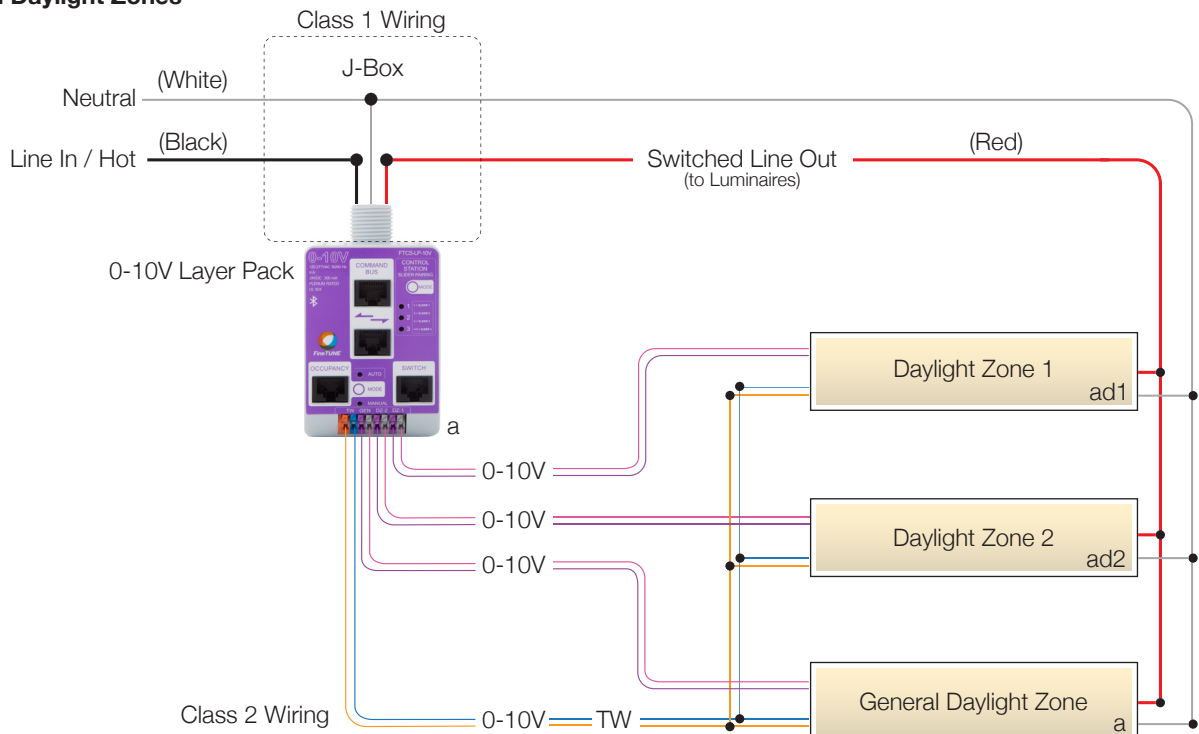
0-10V System Diagram

Static White
Dimmable to 1%



Tunable White with Daylight Zones

Dimmable to 10%



Luminaire Wiring

- **Purple (+) / Pink (-)** control wires are for intensity control
- **Orange (+) / Blue (-)** control wires are for Tunable White control

Control Specifications - Dim to Off (Option 2)

120/277VAC ~ 50/60 Hz
8A Relay
24V Power Supply @ 300mA
UL2043 - Plenum Rated
UL924 - Emergency Device
UL916 - Energy Management Equipment
Sink Current - 25mA for each 0-10V output
5-Year Warranty

With this option, luminaires are turned off by the dimming signal.

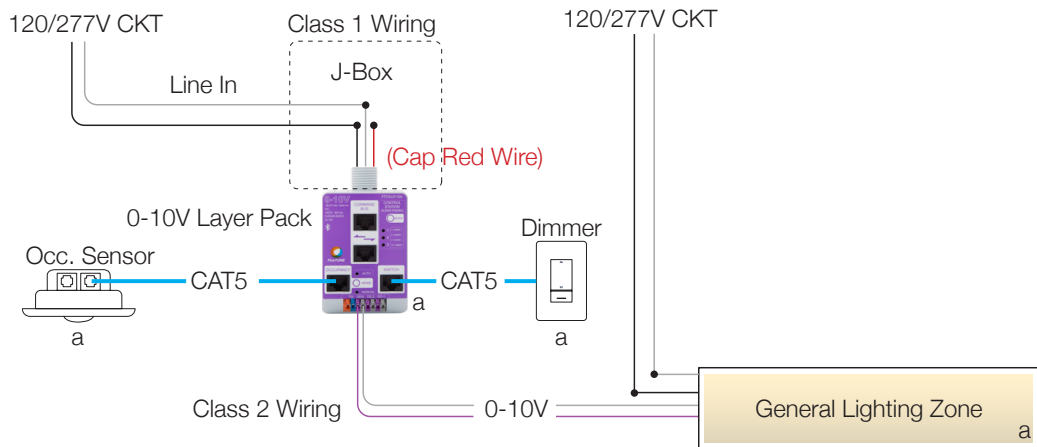
Simply run the 0-10V pairs per required zones and run an un-switched circuit to the luminaires.

0-10V drivers MUST be programmed to a “Dim to Off” setting.
Sink Current - 25mA per 0-10V output (see chart on page 4)

0-10V System Diagram

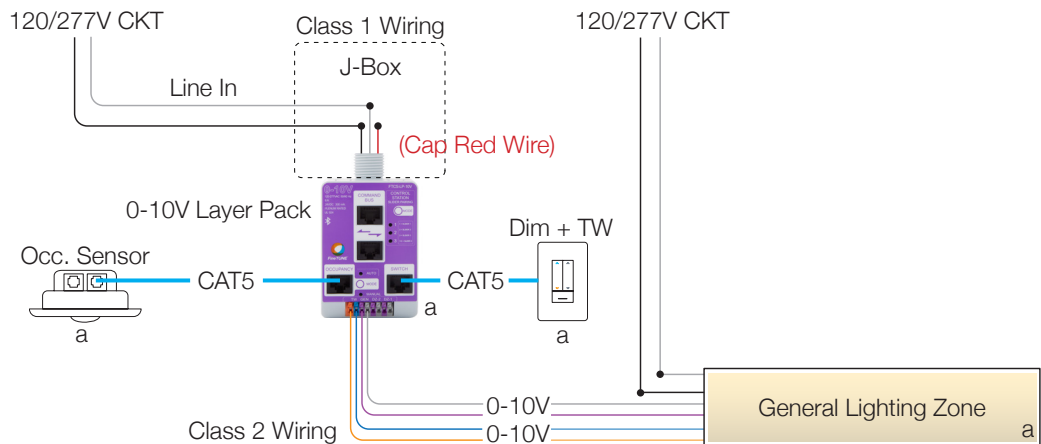
Static White

Dimmable to 1%



Tunable White

Dimmable to 10%



Luminaire Wiring

- **Purple (+) / Gray (-)** control wires are for intensity control
- **Orange (+) / Blue (-)** control wires are for Tunable White control

Note: 0-10V drivers must be programmed to a “Dim to Off” setting

0-10V Output

Only one controller is needed to control a general zone and two daylighting zones. Run each output based on space requirements.



TW - Tunable White Control

If luminaires have Tunable White functionality, connect this 0-10V output to all luminaire zones connected to this Layer Pack. Each luminaire will be provided with an **Orange (+)** and **Blue (-)** lead.

GEN - General Lighting Zone

Connect this 0-10V output to the General Lighting luminaires. This zone is not affected by daylight.

DZ1 - Daylight Zone 1

Luminaire connected to this 0-10V output will respond to the Daylight Sensor connected to DZ1 of the "Daylight Sensor Pack".

DZ2 - Daylight Zone 2

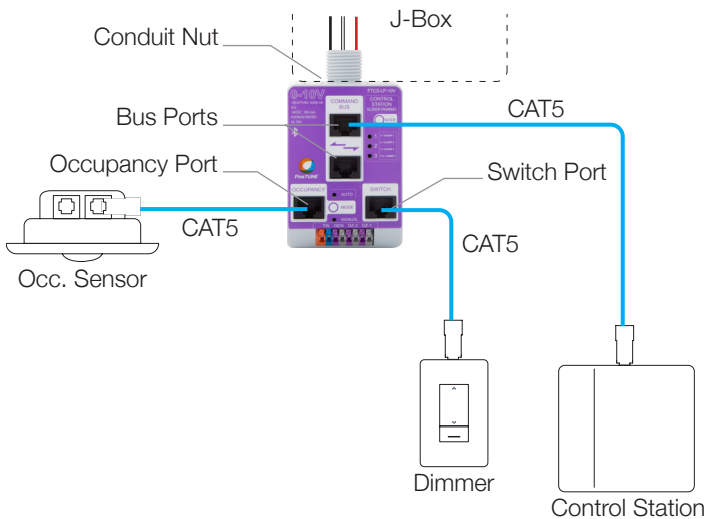
Luminaire connected to this 0-10V output will respond to the Daylight Sensor connected to DZ2 of the "Daylight Sensor Pack".

Notes:

- 0-10V outputs can be run as Class 1 or Class 2.
- Run 0-10V outputs to corresponding zones specified by project requirements.
- If luminaires were specified as Tunable White (using 0-10V protocol), connect all luminaires together using **Orange (+)** and **Blue (-)** 0-10V output.

Connection

Connection Overview



Connect Multiple Layer Packs

Daisy chain system components using the BUS to define the installed space.



Typical Side-by-Side Mounting

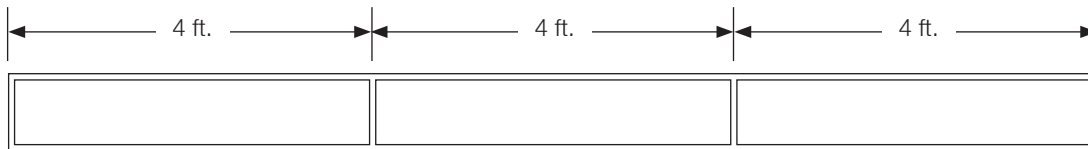
Visit our website for complete 0-10V Layer Pack instructions:

www.finelite.com/downloads/instructions/TCS/FL_0-10V_Layer_Pack_Instructions.pdf

Guidelines For Determining Linear Luminaires Sink Current

Finelite's Standard 0-10V Driver	
Luminaire Type	mA per 4 ft. Linear Run
Static White	0.2 mA
Tunable White	0.4 mA

If luminaire is Indirect & Direct, calculate total mA as if they were separate linear luminaires



12' Linear Luminaire - 0.6 mA Static White / 1.2 mA Tunable White

Determining Linear Luminaire Watts Per Foot

Please refer to Finelite's website and review luminaire tech sheets specific to your project for "Watts Per Foot" data.

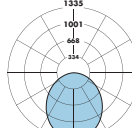
<http://www.finelite.com>

Tech Sheet Examples:

FINELITE High Performance 2" Aperture (HP-2) - Recessed

PHOTOMETRY - DOWNLIGHT: FLUSH DIFFUSER

Very High Output - 4' Luminaire
Efficacy: 89 lumens per watt
Total luminaire output: 3287 lumens (822 lumens/foot)
36.9 watts (9.2 watts/foot)
Peak Candela Value: 1335 @ 0°
CCT: 3500K
CRI: 80
ITL LM79 Report 85135



CANDELA DISTRIBUTION					
0	10	20	30	40	50
0	1335	1335	1335	1335	1335
5	1327	1326	1325	1325	1324
15	1294	1254	1255	1248	1242
25	1138	1122	1116	1100	1090
35	967	951	937	915	904
45	773	760	742	719	711
55	575	565	549	529	522
65	386	379	368	354	350
75	214	209	203	197	196
85	85	83	81	80	80
90	0	0	0	0	0

Total Light Output, 3500K, 80 CRI (Lumens) - 4' Luminaire			
S*	B*	H*	V**
1346	1692	2557	3287

Lumen Adjustment Factors - 80 CRI	
3000K	0.985
3500K	1.000
4000K	1.032

Light Output, 3500K, 80 CRI (Lumens Per Foot)			
S*	B*	H*	V**
336	423	639	822

Lumen Adjustment Factors - 90 CRI	
3000K	0.746
3500K	0.760
4000K	0.789

Power, 3500K, 80 CRI (Watts Per Foot)			
S*	B*	H*	V**
3.6	4.6	7.1	9.2

Efficacy, 3500K, 80 CRI (Lumens Per Watt)			
S*	B*	H*	V**
93	92	90	89

Apply a lumen adjustment factor to calculate lumens for the desired CCT and CRI.

SAMPLE LUMEN ADJUSTMENT CALCULATION
High Output (H), 4000K, 90 CRI
Lumen Adjustment Factor = 0.789

Total Light Output =
2557 lm x 0.789 = 2017 lm

Total Light Output per Foot =
639 lm/ft x 0.789 = 504 lm/ft

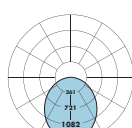
watts/foot = 7.1 W/ft

$$\text{Efficacy} = \frac{504 \frac{\text{lm}}{\text{ft}}}{7.1 \frac{\text{W}}{\text{ft}}} = 71 \text{ lm/W}$$

FINELITE Tunable White High Performance 4" (HP-4) - Recessed

PHOTOMETRY - FLUSH DIFFUSER DOWNLIGHT

Very High Output - 4' Luminaire
Total luminaire output: 3726 Lumens (932 lumens/foot)
Peak Candela Value: 1442 @ 0°
CCT: 3500K
ITL LM79 Report 85128



CANDELA DISTRIBUTION SUMMARY					
0.0	22.5	45	67.5	90	112.5
0	1442	1442	1442	1442	1442
5	1434	1434	1433	1433	1434
15	1367	1360	1365	1364	1359
25	1241	1226	1232	1225	1219
35	1064	1053	1055	1043	1037
45	864	853	851	840	834
55	650	644	640	631	626
65	441	436	433	428	428
75	238	237	238	237	236
85	70	69	70	72	71
90	0	0	0	0	0

Total Light Output, 3500K, 80 CRI (Lumens) - 4' Luminaire			
B*	V**		
1917	3726		

Lumen Adjustment Factors - 80 CRI	
2700K	0.968
3000K	0.985
3500K	1.000
4000K	1.032
6500K	1.032

Lumen Adjustment Factors - 90 CRI	
2700K	0.731
3000K	0.746
3500K	0.760
4000K	0.789
6500K	0.789

Apply a lumen adjustment factor to calculate lumens for the desired CCT and CRI


SAMPLE LUMEN ADJUSTMENT CALCULATION
Boosted Standard Output (B), 4000K, 90 CRI
Lumen Adjustment Factor = 0.789

Total Light Output =
1917 lm x 0.789 = 1513 lm

Total Light Output per Foot =
479 lm/ft x 0.789 = 378 lm/ft

watts/foot = 5.1 W/ft

$$\text{Efficacy} = \frac{378 \frac{\text{lm}}{\text{ft}}}{5.1 \frac{\text{W}}{\text{ft}}} = 74 \text{ lm/W}$$

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Download the FineTune® TCS Mobile App

Connect to the space you want to modify

Blink A “Blink” button will flash the lights to confirm you are connecting to the right space.

Add the name of the space and choose from options below.

Operational Hours / Sweeps

1. Apply operational hours to everyday or weekdays and weekends
2. Select an “enable On” time
3. Select an “Off” time
4. Press “Save” to complete

Add Tunable Schedules

Select from Finelite’s factory designed schedules **OR** customize your own:

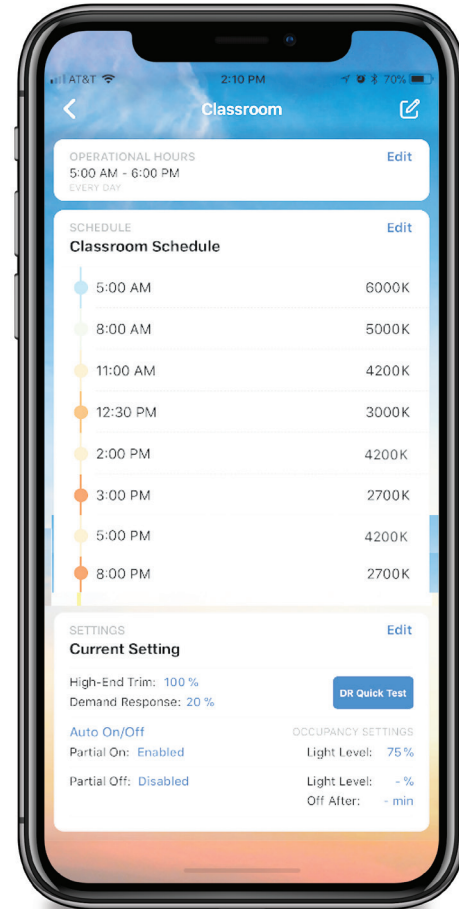
1. Select a time
2. Choose a transition time
3. Select a CCT (2700K - 6500K)
4. Repeat and 'Save' when complete

Adjust System Settings

- Set High-End trim to all luminaires in a space
- Adjust Demand Response reduction level
- Select Occupancy functionality:
 - Auto On / Off (Default)
 - Manual On / Auto Off (Vacancy)
 - Set a Partial On (Auto On / Off only)
 - Set a Partial Off



FineTUNE TCS



FineTune® TCS App

Note: Custom settings and scheduling can be created On or Off site. These setting are saved and can easily be uploaded to other spaces.



iOS



ANDROID
(coming soon)



Bluetooth