

araya[®]

TUNABLE COLOR

CTM1C
Tunable Color Round LED Light Engines
12 V and 24 V DC Input (Constant Voltage)

Data Sheet

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

MODIFICATION: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the device.



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1 DESCRIPTION AND PART NUMBERS



CTM1C09



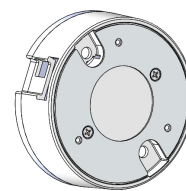
CTM1C12



CTM1C19
(12 V)



CTM1C19NR



CTM1C19
(24 V)

Description

Araya Color Tuning Modules (CTM1C) mix five colors of LEDs to deliver tunable and dimmable white light at 90+ CRI* and color consistency of < 2 MacAdam ellipse across a tuning range of 1650–8000 K. The light can be dimmed from 100–1% while maintaining constant CCT. Gradients of saturated colors from 1–100% can be added to color points within the tuning range.

When the optional Warm/Dynamic Dimming profile (DDM)** is chosen—which can be set back to Color Tuning (CTM) in the field if desired, but only if connected to DMX-RDM—the light dims from 3050 K at full intensity to 1800 K at 5% intensity, and then maintains 1800 K to 1%.

The light engines integrate the driver electronics for precise control of current and PWM inputs and LED light output. On-board closed loop thermal feedback compensates each color channel for thermally induced variations in optical output due to tuning, dimming or ambient temperatures.

The light engines are compatible with traditional 0–10 V wired controls, and feature on-board DMX512-A-RDM. For simple deployment, scene set allows up to five scenes to be pre-programmed into the light engine during production and recalled at the venue using a 0–10 V recommended dimmer.

Commissioning of the light engine, re-programming of scenes, and configuration of DMX channels is done via RDM or the wireless Araya Tunable Color 2.0 iOS app that connects to the embedded radio.

Key Features

- Tunable range: 1650–8000 K
- 90+ CRI*
- Dimmable from 100%–1% at constant CCT
- Color gamut control: gradients of saturated colors from 1–100% can be added to color points
- Warm/Dynamic Dimming from 3050–1800 K*
- On board thermal feedback for color consistency of < 2 MacAdam ellipse
- Zhaga compliant footprint and front heat sink mounting
- Compatible with 0–10 V wired controls
- On-board DMX512-A-RDM, with DMX slots set by RDM or via wireless Araya Tunable Color 2.0 iOS app
- Scene set enables up to five scenes to be preprogrammed and recalled using a 0–10 V recommended dimmer
- Provisions for reflector mounting
- Light emitting surface (LES): 9 mm, 12 mm and 19 mm (nominal)



Tunable Color
2.0 iOS App

Part Numbers

Input Voltage (DC)	Nominal Wattage	CTM1C09		CTM1C12		CTM1C19NR		CTM1C19	
		Typical Peak Lumens	Part Number**	Typical Peak Lumens	Part Number**	Typical Peak Lumens	Part Number**	Typical Peak Lumens	Part Number**
24 V	35 W	-	-	-	-	-	-	2000	80.002.082.01
	25 W	800	80.002.045.01	1000	80.002.048.01	1250	80.002.054.01	1500	80.002.083.01
	18 W	700	80.002.046.01	900	80.002.049.01	1000	80.002.055.01	1150	80.002.052.11
	12 W	500	80.002.047.01	650	80.002.050.01	750	80.002.056.01	800	80.002.053.11
12 V	12 W	550	80.002.071.01	650	80.002.076.01	750	80.002.081.01	750	80.002.079.01

*From 2200–6000 K, down to 5% dim level.

**To have units shipped in Dynamic Dimming AKA “Warm Dim” mode of operation, add “-P02” suffix to the end of the part number. For example; order as: ‘xx.xxx.xxx.xx-P02’. Lumen and wattage range is within +/- 10% of the nominal value. Peak efficacy is not necessarily at typical peak lumens.

2 ELECTRICAL AND CONTROL SPECIFICATIONS

2.1 Electrical Specifications and Photometric Information

Nominal Current Input	24 V: 35 W = 1.5 A; 25 W = 1.0 A; 18 W = 0.75 A; 12.5 W = 0.5 A 12 V: 12.5 W = 1.0 A
Power Supply Classification	Class 2
Control Options**	0–10 V, DMX512-A-RDM***
CRI (Ra) Across Tuning Range	> 90*
Dimming	100% to 1%, in increments of 1% at constant CCT
Nominal Color Consistency	< 2 MacAdam ellipse (± 0.002 Duv from ANSI C78.377-2008 curve)*
Color Consistency Over Life	Calibration maintains original color points over life*
Lumen Maintenance	L70 (70% of initial lumens) at 50,000 hours

*From 2200–6000 K, down to 5% dim level.

**DMX channel configuration is done via RDM or wireless Tunable Color iOS app.

***Remote Device Management or RDM is a protocol enhancement to DMX512-A that allows bi-directional communication between a lighting or system controller and attached RDM compliant devices over a standard DMX line.

2.2 Control Specifications

CONTROL SYSTEM / PROTOCOL	CTM1C (TUNABLE WHITE & TUNABLE COLOR CONTROL)			
	1 DIMMING	2 CCT	3 SAT	4 HUE
DMX512-A-RDM ¹	1%	1650–8000 K	Yes	Yes
0–10 V	~1% ²	1650–8000 K	See Note ³	See Note ³

1. Refer to the separate Araya DMX Lookup Tables for specific programming values and information.

2. 1–10 V signal dims light engine to approximately 1%. In-line power relay required to achieve 0% output.

3. Two 0–10 V lines can be used to control DIM and CCT independently, or program Scenes—in any combination of DIM, CCT, HUE and SAT—and recall them with five 0–10 V presets.

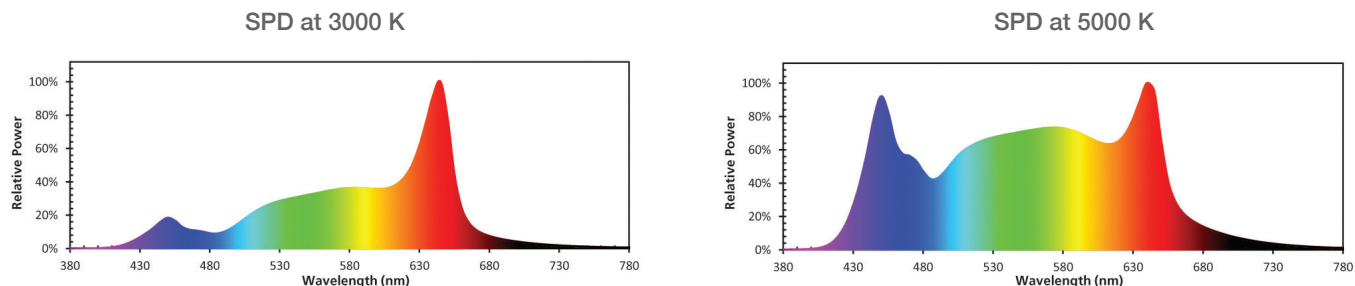
2.3 DMX512-A-RDM Commissioning and Control Specification

RDM PERSONALITIES			DMX ADDRESS (FACTORY DEFAULT START ADDRESS = 1)							
	Suffix*	Description	1	2	3	4	5	6	7	8
8-BIT MODE	Default (None)	Color Tuning 4CH (HSI)	DIM 0–100%	CCT 1700–8000 K	SAT 0–100	HUE 0–60	—	—	—	—
16-BIT MODE	P02	Warm Dim “DDM”	DIM 0–100%	fdim	—	—	—	—	—	—

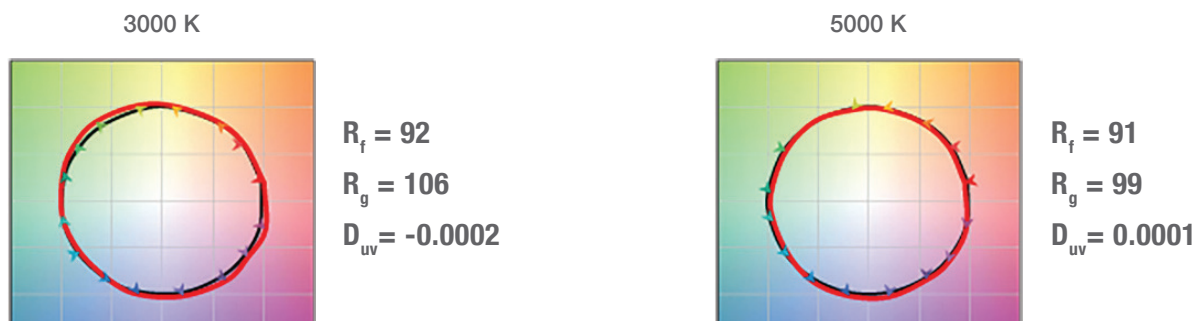
Download the separate Araya DMX512-A Lookup Tables on the ERP website, for specific programming values and information.

3 COLOR / DIMMING PERFORMANCE DATA

3.1 Typical Spectral Power Distribution (SPD) Curves



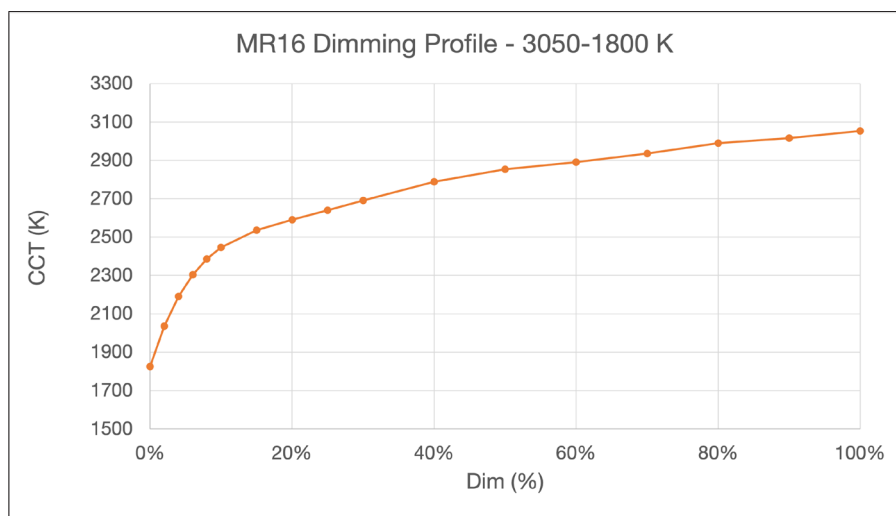
3.2 Typical TM-30 Data



3.3 Warm/Dynamic Dimming

Warm/Dynamic Dimming mimics the dynamic dimming characteristics of conventional MR16 halogen (3050–1800 K) lamps, wherein dimming the intensity of the lamp lowers its CCT.

When the optional Warm/Dynamic Dimming profile (DDM)** is chosen—which can be set back to Color Tuning (CTM) in the field if desired, but only if connected to DMX-RDM—the light dims from 3050 K at full intensity to 1800 K at 5% intensity, and then maintains 1800 K to 1%.



4 POWER SUPPLY REQUIREMENTS

Recommended Power Supplies (Constant Voltage)

Input Voltage: 24 V DC						
Manufacturer	Part Number	Rated Power	CTM1C (12 W)	CTM1C (18 W)	CTM1C (25 W)	CTM1C (35 W)
ERP	VLM40W-24	40 W	✓	✓	✓	
ERP	VLM60W-24	60 W			✓	✓

Input Voltage: 12 V DC			
Manufacturer	Part Number	Rated Power	CTM1C (12 W)
ERP	VLM40W-12	40 W	✓

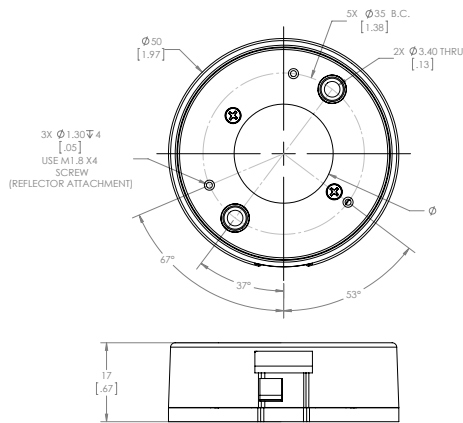
NOTES:

- Recommendations are subject to change. Consult your ERP representative for the most updated list.
- The CTM1C has on-board drive electronics, including dimming. **DO NOT** use a dimming driver.
- Using a constant current power supply will damage the light engine, and will void the ERP warranty.
- Using a triac or dimming driver will damage the light engine, and will void the ERP warranty.
- The power supply MUST be evaluated with the light engine(s) that it will be operated with.
- If unqualified power supplies are used in a fixture, it will void the ERP warranty.
- It is the responsibility of the fixture manufacturer to ensure that the power supply performance does not change over time. The ERP warranty is void if problems occur as a result of such changes.
- A power supply that is not part of the above list should be submitted for testing to ERP (during the design-in phase) to ensure compatibility.
- **DO NOT** hot plug the light fixtures.

5 MECHANICAL SPECIFICATIONS

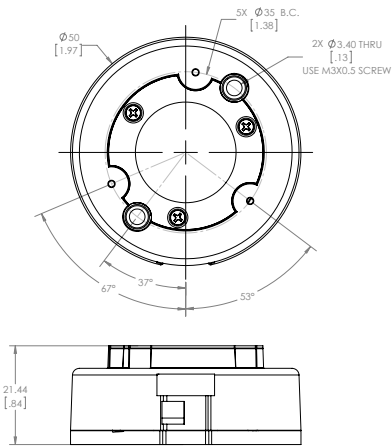
Dimensions	Diameter:	1.97 inches (50 mm)
	Height:	0.67 inches (17 mm); CTM1C19NR: 0.84 inches (21.44 mm)
Light Emitting Surface (LES)	9 mm, 12 mm and 19 mm (nominal)	
Weight	0.12 pounds (0.06 kg)	
Heat Sink Attachment	Front mount, M3 or 4-40 Screws	

CTM1C09, CTM1C12
CTM1C19 (12 V)

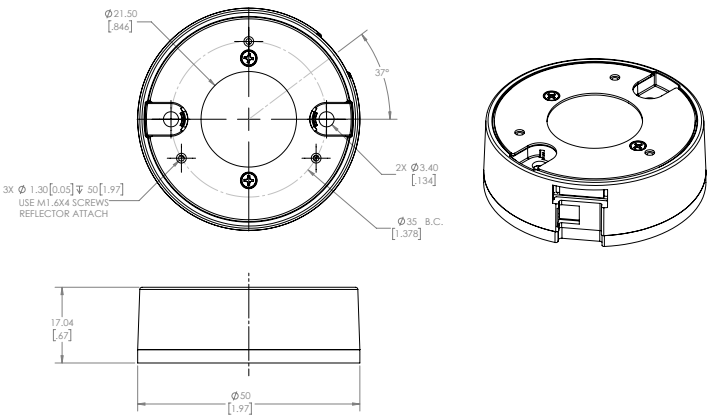


Model	LES Diameter
CTM1C09	9.5 mm (0.37 inches)
CTM1C12	12.75 mm (0.50 inches)
CTM1C19	21.5 mm (0.85 inches)

CTM1C19NR – Raised Face



CTM1C19 (24 V)



6 HEAT SINKING RECOMMENDATIONS

The CTM requires an external heat sink in order to ensure proper operating temperature of the LEDs. The CTM has a conductive aluminum case and an efficient thermal path to the LED array. These features promote efficient thermal management and allow for a simple heat sink design in most applications.

Examples of heat sinking methods are cast or extruded heat sinks. Both carbon and stainless steel are much less efficient at transferring heat than aluminum and therefore are not recommended as heat sink materials. The heat sink mounting surface should be flat and smooth. Metal-to-metal contact surfaces will result in best performance; anodized or unfinished mounting surfaces are recommended. Mounting the CTM on a painted aluminum surface will reduce the performance of the heat sink material.

In many fixtures, the air flow to the heat sinks is obstructed or the heat sink is in an enclosed container with no path to reject heat. The thermal design of the fixture must be optimized so that the maximum temperature is less than the $T_{c_{max}}$ (maximum case temperature) as indicated in the drawings in the following section. If the $T_{c_{max}}$ is exceeded in the application, the junction temperature of the LEDs will be higher than that required to meet the L70 life, and the ERP warranty will be void.

IMPORTANT: Most heat sinks are qualified in “free air” at an approximate ambient temperature of 25 °C. If the CTM is installed in an insulated can fixture (IC Can), the light engine may exceed the recommended operating temperature. The heat sink must be evaluated and temperature tested in the fixture at applicable ambient temperatures for the desired application.

6.1 Suggested Heat Sinks

The following table lists heat sink models that have compatible form factors and thermal resistance characteristics for use with the CTM. The thermal resistances assume an approximate ambient temperature of 25°C. The heat sinks listed here are suggestions only.

MechaTronix (round)

Part Number	Diameter (mm)	Height (mm)	Thermal resistance (°C/W)
Nano 7080	70	80	1.8
Micro 8630	86	30	1.8
Micro 8650	86	50	1.5
Micro 8680	86	80	1.2

Additional product information can be found at led-heatsink.com.

7 CASE TEMPERATURE MEASUREMENT POINTS

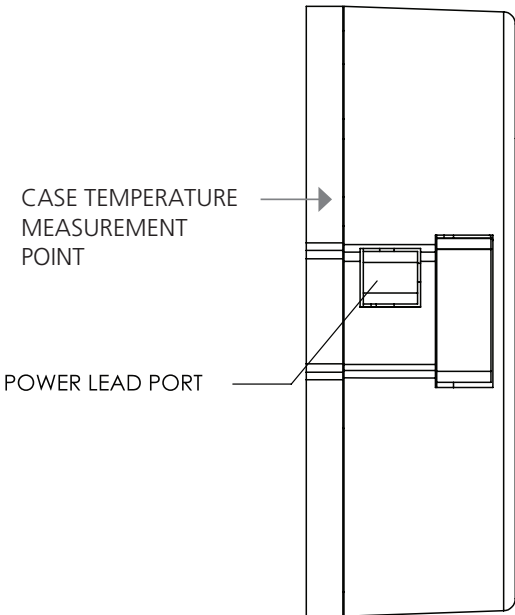
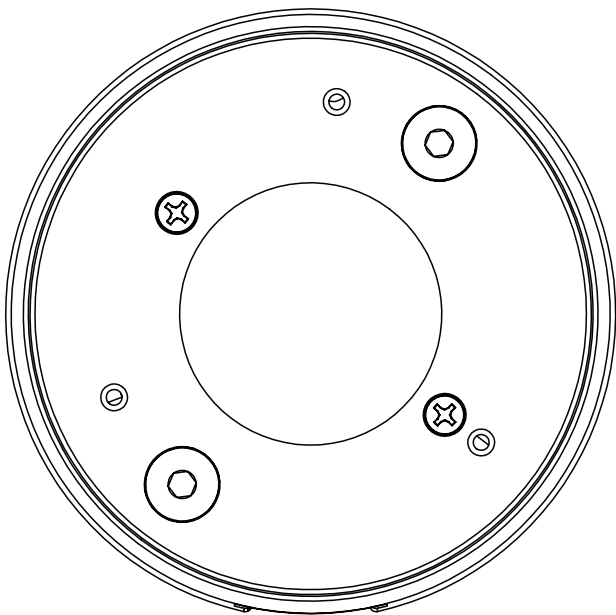
The thermal management characteristics of the heat sink used with the CTM1 should be validated by measuring its case temperature. This test should be done with the CTM1 installed in the fixture at ambient temperature and air flow conditions similar to the end-use installation. The proper case temperature measurement location is on the narrow metal band, next to the power lead port; see figure below. The case temperature reading should be made after the unit has reached steady state, where the case temperature levels out.

The power draw of the CTM1 family varies over the CCT range with peak power draw occurring at the CCT shown in the following table, and should be evaluated at the listed CCT setting.

CTM1C has on-board thermal protection to reduce the current to the LEDs when the maximum case temperature is exceeded. This prevents unacceptably high LED junction temperatures by slightly dimming the light engine until the internal temperature drops below 90 °C.

CCT Setting for Case Temperature (T_c) Measurement, and Maximum T_c

CCT range	CCT Setting to Measure T _c	Maximum T _c
1650–8000 K	8000 K	90 °C

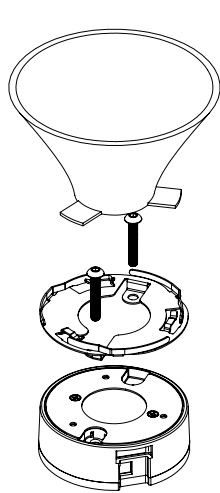


Case Temperature Measurement Point

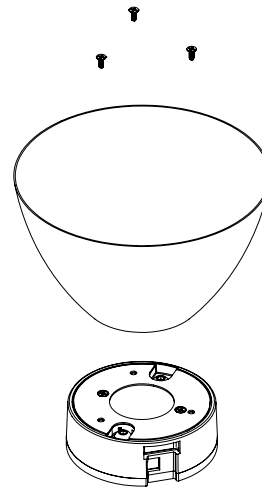
8 SECONDARY OPTICS

8.1 CTM1C Secondary Optics Fastener Specifications

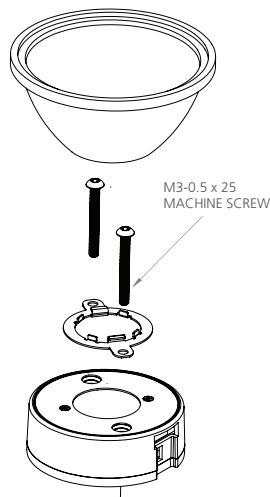
CTM1C Reflector	Fastener specifications	Screw length	Notes
Twist Lock w/ XSA-242 Adapter Ring (CTM1C19)	M3-0.5 x 18	18 mm	Machine screws; attach to heat sink (not directly to light engine)
Direct Attachment (CTM1C19)	M1.6 x 4	4 mm	Thread forming; use flat head screws
TE Type 2 Clip (CTM1C12 / CTM1C09)	M3-0.5 x 25	25 mm	Machine screws; attach to heat sink (not directly to light engine)
Twist Lock w/ Collar (CTM1C19NR)	2 - 28; M1.8 x 6	6 mm	Thread forming; use flat head screws



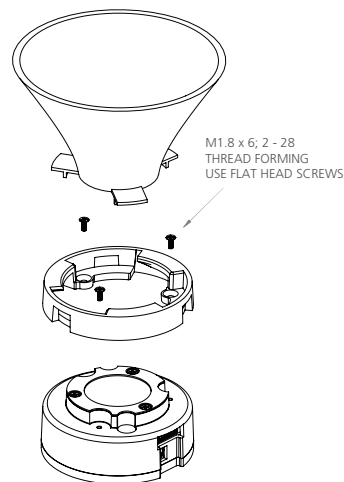
CTM1C19: Twist-Lock Style Reflectors with Xicato XSA-242 Adapter Ring



CTM1C19: Direct Attachment Reflectors



CTM1C12 / CTM1C09: TE Type 2 Clip Reflectors (by Khatod)



CTM1C19NR: Twist-Lock Style Reflectors with Attachment Collars

8 SECONDARY OPTICS

8.2 Suggested Reflectors for CTM1C09 and CTM1C12

Suggested Reflectors for CTM1C09

Manufacturer	M. Part Number	beam angle (deg)	outer dim (mm)	height (mm)	optical finish	optical finish 2	attach method
Khatod EASY	KCLP 1858ME		72	52	honeycomb lens	none	Zhaga Screw 35mm
Khatod EASY	KCLP 1858WI		72	52	bug eye lens	none	Zhaga Screw 35mm
Khatod Lyra	PLJT 1521				diffuser ball white		TE Type II

Suggested Reflectors for CTM1C12

Manufacturer	M. Part Number	beam angle (deg)	outer dim (mm)	height (mm)	optical finish	optical finish 2	attach method
Diffraction Optics	P13827	20	69	33	specular	superfacet, diamond	P13688, screw 35mm
Diffraction Optics	P13829	30	69	33	specular	superfacet, diamond	P13688, screw 35mm
Diffraction Optics	P13767	20	75	42.3	specular	superfacet, diamond	P13688, screw 35mm
Diffraction Optics	P13831	30	75	42.3	specular	superfacet, diamond	P13688, screw 35mm
Diffraction Optics	P13771	20	85	43.3	specular	superfacet, diamond	P13688, screw 35mm
Diffraction Optics	P13833	30	85	43.3	specular	superfacet, diamond	P13688, screw 35mm
Diffraction Optics	P13775	20	92	43.3	specular	superfacet, diamond	P13688, screw 35mm
Diffraction Optics	P13781	30	92	43.3	specular	superfacet, diamond	P13688, screw 35mm
Diffraction Optics	P13713	20	75	37	specular	faceted	P13688, screw 35mm
Diffraction Optics	P13715	35	75	37	specular	faceted	P13688, screw 35mm
JORDAN	11324 10 10101	25	111	66	specular	super facet	none
JORDAN	11324 00 10101	40	111	66	specular	super facet	none
JORDAN	11323 90 15101	40	75	42	specular	square sf	none
JORDAN	11415 60 10101	35	75	43	specular	fish scale sf	none
JORDAN	11415 40 10101	20	75	43	specular	fish scale sf	none
Khatod	KCLP 1682 ST (1429ST)	20	65	35	diffuse	none	TE Type II
Khatod	KCLP 1683 ST (1430ST)	24	65	35	diffuse	none	TE Type II
Khatod	KCLP 1685 ST (1432ST)	32	65	35	diffuse	none	TE Type II
Khatod	KCLP 1684 ST	28	65	35	diffuse	none	TE Type II
Khatod	KCLP 1687 ST	31	65	35	diffuse	none	TE Type II
Khatod	KCLP 1688 ST	38	65	35	diffuse	none	TE Type II
Khatod	KCLP 1689 ST	42	65	35	diffuse	none	TE Type II
Khatod	KCLP 1690 ST	50	65	35	diffuse	none	TE Type II
Khatod	KCLP 1691 ST	56	65	35	diffuse	none	TE Type II
Khatod EASY	KCLP 1858ME		72	52	honeycomb lens	none	Zhaga Screw 35mm
Khatod EASY	KCLP 1858WI		72	52	bugeye lens	none	Zhaga Screw 35mm
Khatod Lyra	PLJT 1521				diffuser ball white		TE Type II
Nata	3990-E	24	75	43	diffuse	super facet	none
Nata	3991-E	36	75	43	diffuse	super facet	none
Nata	3992-E	25	85	50.5	diffuse	super facet	none
Nata	3993-E	40	85	50.5	diffuse	super facet	none
Nata	4-1405E	16	98	66.4	specular	facets	none
Nata	4-1406E				diffuse	super facet	none
Nata	2-1535E		75	44	m-diffuse	super facet	none
Nata	4-1664E	24	111	65	m-diffuse	super facet	none / 3 tabs
Nata	4-1666E	38	111	65	diffuse	super facet	none / 3 tabs
Nata	4-1667E	45	111	61.3	m-diffuse	super facet	none
Nata	4-1820E	60	111	65	diffuse	super facet	none / 3 tabs
Widgerm	3205-BL	36	82	45	diffuse	faceted	none
Widgerm	1021-CZ, -LG	~43	50	24.5	satin	faceted	none
Widgerm	1128-CZ, -LG	~28	50	24.5	satin	none	none
Widgerm	2201-medium LES	10	72	43	diffuse	faceted	none
Widgerm	2202-medium LES	36	72	43	m-specular	faceted	none

NOTE: Beam angles listed above have been taken from the reflector manufacturers' data sheets.

Reflectors have been recommended based on independent optical tests conducted by ERP, and should be used as guidelines.

Final reflector evaluation should be made by fixture manufacturers with all optics in place.

8 SECONDARY OPTICS

8.3a Suggested Reflectors for CTM1C19 - Part-1

Manufacturer	M. Part Number	beam angle (deg)	outer dim (mm)	height (mm)	optical finish	optical finish 2	attach method
JORDAN	11324 10 10101	25	111	66	specular	super facet	none
JORDAN	11324 00 10101	40	111	66	specular	super facet	none
Khatod	KCLP 1682 ST (1429ST)	20	65	35	diffuse	none	XSA242 + KE1950W
khatod	KCLP 1683 CR (1430CR)	26	65	35	specular	none	XSA242 + KE1950W
khatod	KCLP 1683 ST (1430ST)	24	65	35	diffuse	none	XSA242 + KE1950W
khatod	KCLP 1685 ST (1432ST)	32	65	35	diffuse	none	XSA242 + KE1950W
khatod	KCLP 1688 CR	37	65	35	specular	none	XSA242 + KE1950W
khatod	KCLP 1688 ST	38	65	35	diffuse	none	XSA242 + KE1950W
khatod	KCLP 1689 ST	42	65	35	diffuse	none	XSA242 + KE1950W
khatod	KCLP 1690 ST	50	65	35	diffuse	none	XSA242 + KE1950W
khatod	KCLP 1691 ST	56	65	35	diffuse	none	XSA242 + KE1950W
khatod	PLJT 1866	n/a			diffuse ball		T/L XSM242
Nata	3990-E	24	75	43	diffuse	super facet	none
Nata	3991-E	36	75	43	diffuse	super facet	none
Nata	3992-E	25	85	50.5	diffuse	super facet	none
Nata	3993-E	40	85	50.5	diffuse	super facet	none
Nata	2-1050A	25	65	44	satın	none	XSA242
Nata	2-1131E	18	68	51	m-diffuse	facets	XSA242
Nata	2-1132E	30	68	51	m-diffuse	super facet	XSA242
Nata	2-1133E	45	68	51	m-diffuse	super facet, flare	XSA242
Nata	4-1149E2	39	111	65	m-diffuse	super facet	none
Nata	4-1150E5	39	111	65	m-diffuse	super facet	none
Nata	4-1405E	16	98	66.4	specular	facets	none
Nata	4-1406E				diffuse	super facet	none
Nata	2-1535E		75	44	m-diffuse	super facet	none
Nata	4-1536E	20	110	65.3	m-diffuse	super facet	none
Nata	4-1537E	30	110	62	diffuse	super facet	none
Nata	4-1664E	24	111	65	m-diffuse	super facet	none / 3 tabs
Nata	4-1666E	38	111	65	diffuse	super facet	none / 3 tabs
Nata	4-1667E	45	111	61.3	m-diffuse	super facet	none
Nata	4-1820E	60	111	65	diffuse	super facet	none / 3 tabs
Nata	3-1903M	40	79	51	m-diffuse	super facet	XSA242
Nata	4-1983E	24	110	65	specular	super facet	XSA242
Nata	2834A	43	70	43.5	satın	none	XSA242
Nata	4-1966E	7	111	65	m-diffuse	super facet	XSA242

NOTE: Beam angles listed above have been taken from the reflector manufacturers' data sheets.

Reflectors have been recommended based on independent optical tests conducted by ERP, and should be used as guidelines.

Final reflector evaluation should be made by fixture manufacturers with all optics in place.

8 SECONDARY OPTICS

8.3b Suggested Reflectors for CTM1C19 - Part-2

Manufacturer	M. Part Number	beam angle (deg)	outer dim (mm)	height (mm)	optical finish	optical finish 2	attach method
Widgerm	1009T-XC	38	49	30.5	specular	faceted	XSA242 T/L
Widgerm	208x-XM		71.5	54	satin	lightfaceted	XSA242 T/L
Widgerm	2087-XM	19	71.5	54	m-specular	faceted	XSA242 T/L
Widgerm	2096T-XM	50	72	45.5	satin	lightfaceted	XSA242 T/L
Widgerm	2202T-XM	35	72	44	m-diffuse	faceted	XSA242 T/L
Widgerm	3204T-XM	27	82	46	m-diffuse	faceted	XSA242 T/L
Widgerm	3205T-XM	36	82	46	specular	faceted	XSA242 T/L
Widgerm	3207T-XC	-	82	46	satin	none	XSA242 T/L
Widgerm	4219T-XM	20	111	36	diffuse	faceted	XSA242 T/L
Widgerm	4220T-XM	37	111	36	m-specular	faceted	XSA242 T/L
Widgerm	4221T-XM	47	111	36	m-specular	faceted	XSA242 T/L
Widgerm	4201T-XC	15	111	69	diffuse	faceted	XSA242 T/L
Widgerm	4301T-XM	36	111	69	m-diffuse	faceted	XSA242 T/L
Widgerm	4401T-XM	43	111	69	m-diffuse	faceted	XSA242 T/L
Widgerm	3158-CZ	15	91.5	47	diffuse	faceted	none
Widgerm	3159-CZ	34	91.5	47	m-specular	faceted	none
Widgerm	3163-CZ	22	91.5	47	m-specular	faceted	none
Widgerm	3205-BL	36	82	45	diffuse	faceted	none
Widgerm	2094-CZ	15	72	45	m-specular	faceted	none
Widgerm	2095-CZ	23	72	45.5	m-specular	faceted	none
Widgerm	2202-medium LES	36	72	43	m-specular	faceted	none

NOTE: Beam angles listed above have been taken from the reflector manufacturers' data sheets.
Reflectors have been recommended based on independent optical tests conducted by ERP, and should be used as guidelines.
Final reflector evaluation should be made by fixture manufacturers with all optics in place.

8 SECONDARY OPTICS

8.4 Suggested Reflectors for CTM1C19NR

Manufacturer	M. Part Number	beam angle (deg)	outer dim (mm)	height (mm)	optical finish	optical finish 2	attach method
Diffractive Optics	P7076 (xsa-17)						XSM T/L
Diffractive Optics	P6645						XSM T/L
Diffractive Optics	P6680						XSM T/L
Diffractive Optics	P7899 (xsa-22)	40	49.3	28.6	specular	faceted	XSM T/L
Diffractive Optics	P6764 (xsa-21)	60	50	29	specular	none	XSM T/L
JORDAN	11324 10 10101	25	111	66	specular	super facet	direct screws
JORDAN	11324 00 10101	40	111	66	specular	super facet	direct screws
Nata	3990-E	24	75	43	diffuse	super facet	none
Nata	3991-E	36	75	43	diffuse	super facet	none
Nata	3992-E	25	85	50.5	diffuse	super facet	none
Nata	3993-E	40	85	50.5	diffuse	super facet	none
Nata	4-1149E2	39	111	65	m-diffuse	super facet	none
Nata	4-1405E	16	98	66.4	specular	facets	none
Nata	4-1406E				diffuse	super facet	none
Nata	2-1535E		75	44	m-diffuse	super facet	none
Nata	4-1536E	20	110	65.3	m-diffuse	super facet	none
Nata	4-1537E	30	110	62	diffuse	super facet	none
Nata	4-1664E	24	111	65	m-diffuse	super facet	none / 3 tabs
Nata	4-1666E	38	111	65	diffuse	super facet	none / 3 tabs
Nata	4-1667E	45	111	61.3	m-diffuse	super facet	none
Nata	4-1820E	60	111	65	diffuse	super facet	none / 3 tabs
Widegerm	3159-CZ	34	91.5	47	m-specular	faceted	none
Widegerm	3205-BL	36	82	45	diffuse	faceted	none
Widegerm	2202-medium LES	36	72	43	m-specular	faceted	none

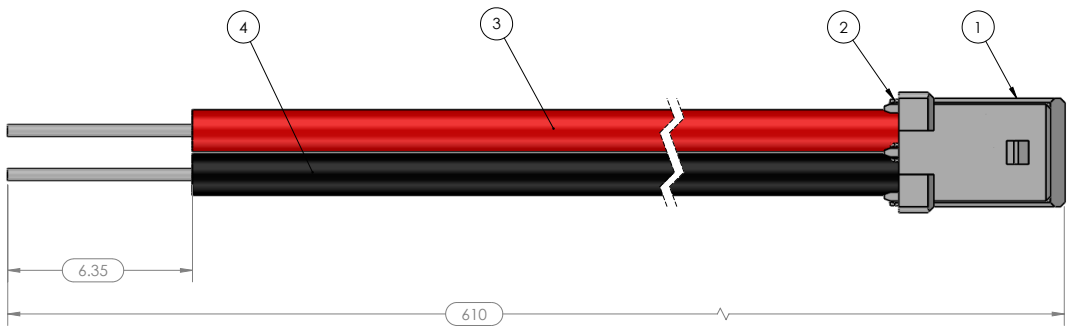
NOTE: Beam angles listed above have been taken from the reflector manufacturers' data sheets.
Reflectors have been recommended based on independent optical tests conducted by ERP, and should be used as guidelines.
Final reflector evaluation should be made by fixture manufacturers with all optics in place.

9 POWER / CONTROL CABLE ASSEMBLIES

9.1 Power Cable Assembly (INCLUDED)

Required for connecting each light engine to DC power.

Part Number: 28.002.001.01



Item Number	Part Number	Description	Input	Quantity
1	874390200	Molex Connector	N/A	1
2	874210000	Molex Crimp	N/A	2
3	A2015R-100-ND	24 AWG Wire, Red	Power DC (+)	1
4	A2015B-100-ND	24 AWG Wire, Black	Power Common (-)	1

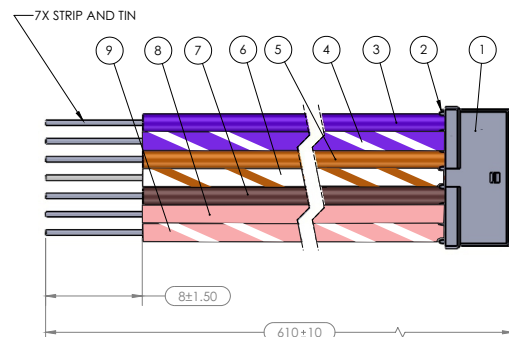
Note: All dimensions are in millimeters.

9 POWER / CONTROL CABLE ASSEMBLIES

9.2 Control Cable Assembly (7-Wire)

Required for connecting each light engine to either 0–10 V or DMX control.

Part Number: 28.002.002.01

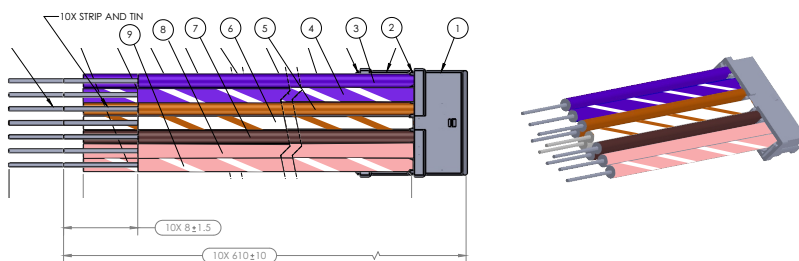


Item Number	Part Number	Manufacturer	Description	Input	Quantity
1	874390700	Molex	Connector 7-Pin	N/A	1
2	874210000	Molex	Connector Crimp	N/A	7
3	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Violet	0–10 V Dimming (+)	1
4	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Violet with White Spiral*	0–10 V Color (+)	1
5	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Orange	Data (-)	2
6	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 White with Orange Spiral*	Data (+)	2
7	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Brown	Digital Common	2
8	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Pink*	0–10 V Dimming (-)	1
9	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Pink with White Spiral*	0–10 V Color (-)	1

9.3 Control Cable Assembly (7+3 Wire)

Required for connecting each light engine to either 0–10 V or DMX control.

Part Number: 28.002.002.05



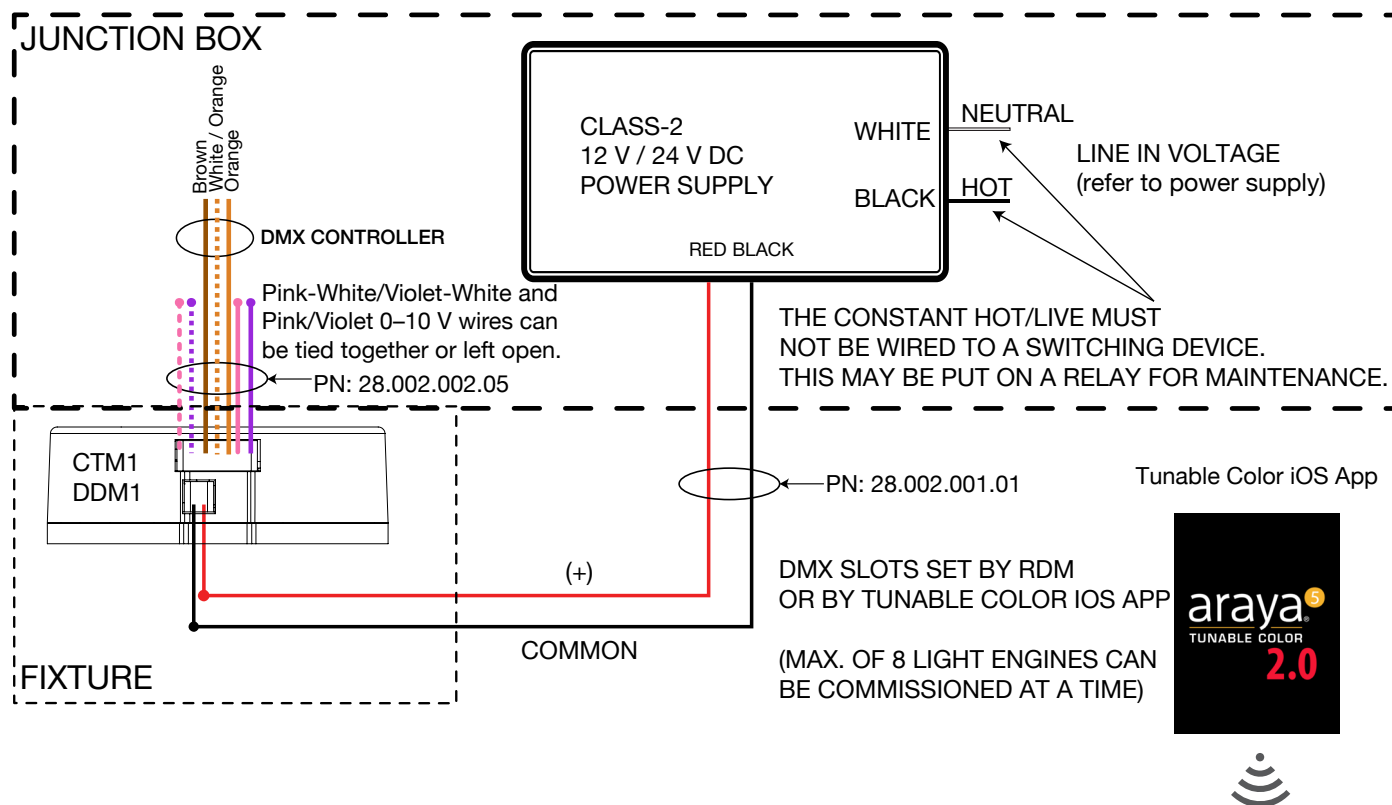
Item Number	Part Number	Manufacturer	Description	Input	Quantity
1	874390700	Molex	Connector 7-Pin	N/A	1
2	874210000	Molex	Connector Crimp	N/A	7
3	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Violet	0–10 V Dimming (+)	1
4	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Violet with White Spiral*	0–10 V Color (+)	1
5 (TOP / BOTTOM)	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Orange	Data (-)	2
6 (TOP / BOTTOM)	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 White with Orange Spiral*	Data (+)	2
7 (TOP / BOTTOM)	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Brown	Digital Common	2
8	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Pink*	0–10 V Dimming (-)	1
9	UL 1061	Any	Wire Stranded Tinned 24 AWG 7-32 Pink with White Spiral*	0–10 V Color (-)	1

* Some previous versions of the control cable assembly may be shipped with differently colored leads.

Note: All dimensions are in millimeters.

10 DMX512-A-RDM WIRING DIAGRAM

Please download the Araya DMX512-A Specifications guide on the ERP website, for more detailed information.



Lead Color and Input

Lead Color	Input
Red	Power 12V / 24 V DC (+)
Black	Power Common (-)
Violet	0-10 V Dimming (+); Left Open
Pink	Signal Common for 0-10 V Dimming (-); Left Open
Violet with White Spiral	0-10 V Color (+); Left Open
Pink with White Spiral	Signal Common for 0-10 V Color (-); Left Open
Orange (TOP / BOTTOM)	Data (-)
White with Orange Spiral (TOP / BOTTOM)	Data (+)
Brown (TOP / BOTTOM)	Digital Common

Part Numbers:

28.002.001.01 (2-wire power cable assembly)
28.002.002.05 (7+3-wire control cable assembly)

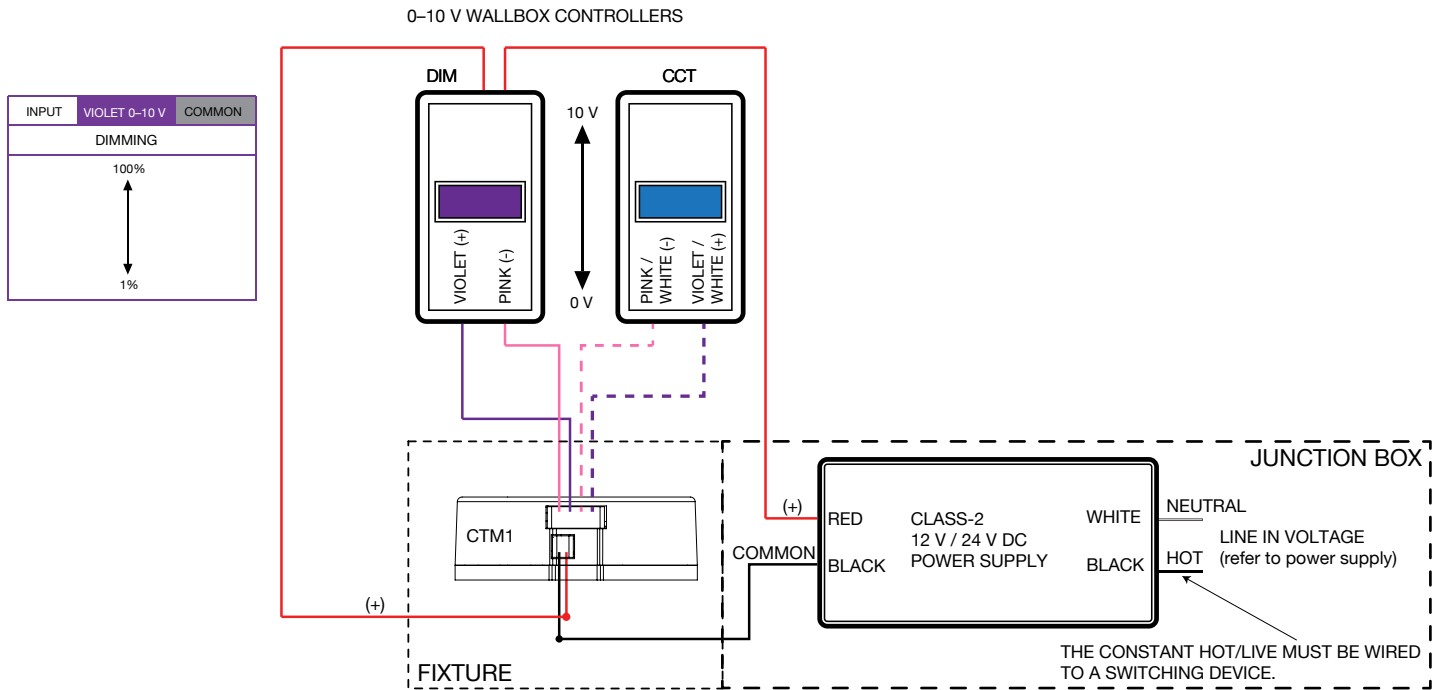
Notes:

- The DMX channels can be set by RDM or by using the Tunable Color iOS App.
- Maximum of 8 light engines can be commissioned at a time using the app.
- Bluetooth operation should only be used for commissioning light engines, NOT controlling them.
- The DMX control system should first be powered OFF, and only light engines that are connected to the DMX system should be powered on.
- If more than one line of DMX is needed, then a DMX Splitter must be used to create multiple independent branches of a DMX signal and/or to extend the usable distance of each branch. Each of the splitter's 4, 6, 8, or 16 output ports generates an independently protected DMX signal.
- See Tunable Color Instruction Manual for more details.
- Some older versions of the 7-wire control cable assembly may be shipped with differently colored leads.

11 0–10 V WIRING DIAGRAMS

Refer to the separate 0–10 V Specifications guide on the ERP Power website, for more detailed information.

11.1 0–10 V Analog Control of CCT and Dimming



Lead Color and Input

Lead Color	Input
Red	Power 12 V / 24 V DC (+)
Black	Power Common (-)
Violet	0–10 V Dimming (+)
Pink	Signal Common for 0–10 V Dimming (-)
Pink with White Spiral	Signal Common for 0–10 V Color (-)
Violet with White Spiral	0–10 V Color (+)

Notes:

- If 0–10 V control is not being used for dimming, the violet control lead must be grounded to gray common lead.
- CTM sources current to 0–10 V control at 0.2 mA nominal capacity.
- *If using a wall box dimmer, power only the DIM unit. The CCT unit does not get line-in voltage.
- Some older versions of the 7-wire control cable assembly may be shipped with differently colored leads.

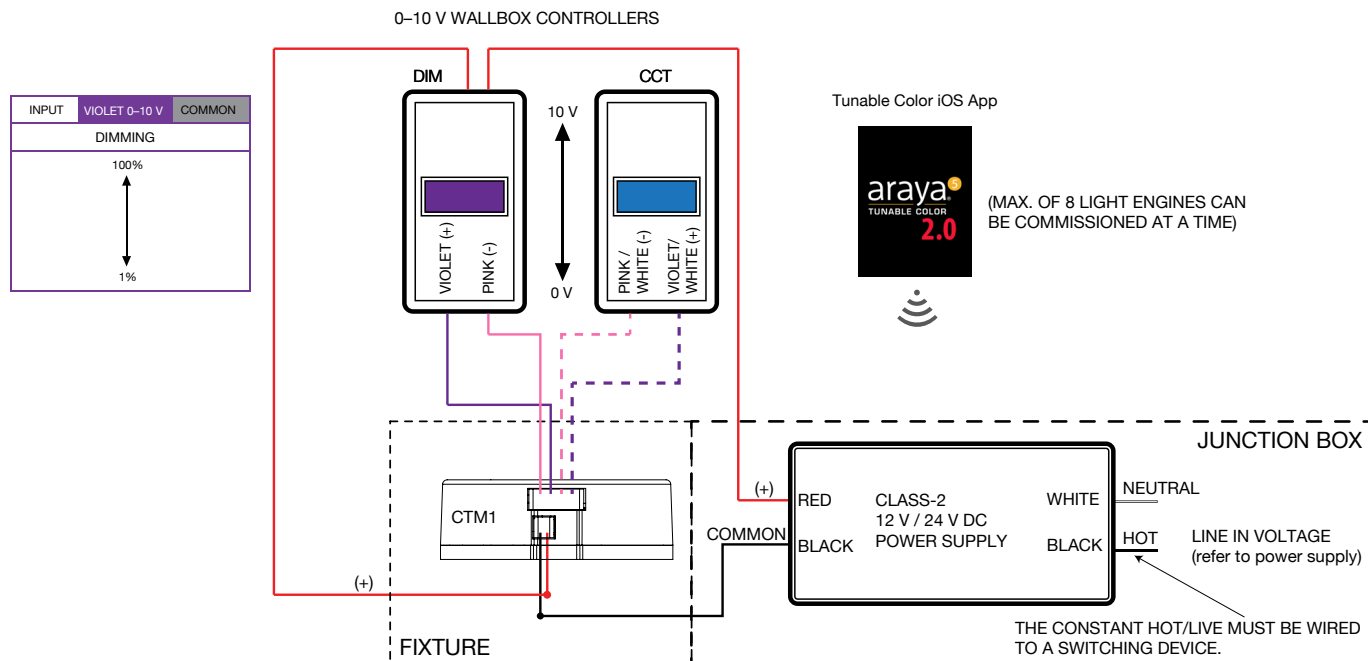
Part Number(s):

28.002.001.01 (power cable assembly)
28.002.002.01 (control cable assembly)

11 0–10 V WIRING DIAGRAMS

Refer to the separate 0–10 V Specifications guide on the ERP Power website, for more detailed information.

11.2 0–10 V Analog Control of Scenes / Tunable Color App to Set or Amend Scenes



Lead Color and Input

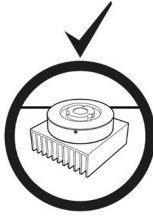
Lead Color	Input
Red	Power 12 V / 24 V DC (+)
Black	Power Common (-)
Violet	0–10 V Dimming (+)
Pink	Signal Common for 0–10 V Dimming (-)
Pink with White Spiral	Signal Common for 0–10 V Presets (-)
Violet with White Spiral	0–10 V Presets (+)

Part Number(s):

28.002.001.01 (power cable assembly)
28.002.002.01 (control cable assembly)

Notes:

- When the lamp is connected to a 0–10 V line, the default is control of the continuous CCT range. The 0–10 V line can instead be set to control scene set by sliding the Stored Scenes button to the “on” position in the Tunable Color iOS App. In this mode, the 0–10 V control will toggle the light between up to 5 preset scenes. A scene is comprised of a CCT, Dim, Saturation & Hue level. Individual preset scenes can also be modified and activated with the iOS app. See Tunable Color Instruction Manual for more instructions.
- If 0–10 V control is not being used for dimming, the violet control lead must be grounded to gray common lead.
- CTM sources current to 0–10 V control at 0.2 mA nominal capacity.
- *If using a wall box dimmer, power only the DIM unit. The CCT unit does not get line-in voltage.
- Some older versions of the 7-wire control cable assembly may be shipped with differently colored leads.



For long term reliable operation, proper heat sinking is critical.



The CTM diffuser is fragile. Avoid touching the diffuser during handling and assembly.



Do not rest or operate the CTM face down against a table or other solid surface.

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