

# Dimming Guide

## ML4 Series

HALO

The ML4 LED Series provides continuous dimming with select leading or trailing edge 120V phase cut dimmers.

### ML4 - 90CRI

ML4D09NFL927E	ML4D09FL927E	ML4D09NFL927E010	ML4D09FL927E010	ML4D09NFLD2WE
ML4D09NFL930E	ML4D09FL930E	ML4D09NFL930E010	ML4D09FL930E010	ML4D09FLD2WE
ML4D09NFL935E	ML4D09FL935E	ML4D09NFL935E010	ML4D09FL935E010	ML4D09NFLD2WE010
ML4D09NFL940E	ML4D09FL940E	ML4D09NFL940E010	ML4D09FL940E010	ML4D09FLD2WE010

### Phase Control Dimming

ML4 luminaires installed with surface housing.



Eaton's AL Series dimmers offer versatile options to set the mood and reduce energy consumption.

Visit [www.eaton.com](http://www.eaton.com) for more information.



\*Note: The Rapid Start feature is used to ensure the right amount of power boost during start-up. When a dimmer with Rapid Start is turned on from a low dimmer setting, the LED lighting may exhibit a momentary flash. Select dimmer models offer an adjustment of the Rapid Start feature. The user may wish to adjust this setting to reduce the boost and resulting momentary flash. If this capability is desired, the user should select dimmer models designated as "fully adjustable" or "selectable ON or OFF".

Dimmer Features	Smart (AAL06)	Decorator (DAL06P)	Slide (SAL06P)	Toggle (TAL06P)
Rapid Start feature*	Selectable ON or OFF	Fully adjustable	Fixed ON	Fully adjustable
Adjustable high-end trim	•			
Adjustable low-end trim	•	•	•	•
Wiring configurations	Single-pole or multi-location	Single-pole or 3-way	Single-pole or 3-way	Single-pole or 3-way
Color change kits	•	•		•

## LED Rated Dimmers

Manufacturer	Series	Model	Minimum Luminaires (per circuit)	Maximum Luminaires (per circuit)	Minimum Measured Light Output	Maximum Measured Light Output	Low End Start Time
EATON	Decorator	DAL06P	1	19	1%	99%	<1s <sup>1,2</sup>
EATON	Smart	AAL06P	1	19	1%	97%	<1s <sup>2</sup>
EATON	Toggle	TAL06P	1	19	8%	99%	<1s <sup>1,2</sup>
EATON	Slide	SAL06P	1	19	2%	99%	<1s <sup>2</sup>
EATON	Slide	SLC03P	1	19	5%	98%	<1s <sup>5,6</sup>
EATON	Toggle	DLC03P	1	19	5%	99%	<1s <sup>7</sup>
EATON	iLumin	SC277-06-UN	1	31	3%	100%	<1s
Leviton	SureSlide	6674	1	9	1%	96%	<1s <sup>1</sup>
Leviton	Illumatech	IPL06	1	9	1%	97%	<1s
Vantage	Enclosure Module	SDM12-EM	2	34	1.8%	95.5%	<1s
Vantage	Enclosure Module	UDIMMOD-FWD	1	65	1.6%	95.1%	<1s
Vantage	Enclosure Module	UDIMMOD-REV	1	65	1.1%	95.5%	<1s
Vantage	ScenePoint	DS/RD	2	10	1.4%	95%	<1s
Savant	Metropolitan Lighting	WIK-LAS104	1	6	13%	99%	--
ETC	Sensor 3	D20	1	100	0.21%	--	>1s <sup>8</sup>
ETC	Sensor 3	ELV10-S	1	50	0.20%	--	>1s <sup>9</sup>
Crestron	iLux	CLS-C6	--	--	6%	100%	--
Crestron	iLux	CLS-C6M	--	--	6%	100%	--
Crestron	iLux	CLS-C6EX	--	--	6%	100%	--
Crestron	iLux	CLS-C6MEX	--	--	6%	100%	--
Crestron	iLux	CLS-C6MRF	--	--	6%	100%	--
Crestron	iLux	CLS-C6RF	--	--	6%	100%	--
Crestron	iLux	CLS-EXP-DIM	--	--	3%	100%	--
Crestron	iLux	CLS-EXP-DIMU	--	--	3%	100%	--
Crestron	CLX	CLX-1DIM4	--	--	2%	100%	--
Crestron	CLX	CLX-1DIM8	--	--	2%	100%	--
Crestron	CLX	CLX-2DIM2	--	--	2%	100%	--
Crestron	CLX	CLX-2DIM8	--	--	2%	100%	--
Crestron	CLX	CLX-1DELV4	--	--	3%	100%	--
Crestron	DIN Rail	DIN-1DIM4	--	--	3%	100%	--
Crestron	DIN Rail	DIN-1DIMU4	--	--	3%	100%	--
Crestron	Cameo Express	CLW-DIMEX-E	--	--	6%	100%	--
Crestron	Cameo	CLW-DIMEX-P	--	--	6%	100%	--
Crestron	Cameo Express	CLW-DIMSWEX-E	--	--	6%	100%	--
Crestron	Cameo	CLW-DIMSWEX-P	--	--	6%	100%	--
Crestron	Prodigy	P-DIMEX	--	--	6%	100%	--
Crestron	Green Light	GLX-DIM6	--	--	2%	100%	--
Crestron	Green Light Express	GLXX-2DIM8	--	--	2%	100%	--
Crestron	Cameo Express	CLW-DELVEX-E	--	--	2%	100%	--
Crestron	Cameo	CLW-DELVEX-P	--	--	2%	100%	--
Crestron	CLX	CLX-1DIMU4	--	--	2%	100%	--
Crestron	CLX	CLX-2DIMU8	--	--	2%	100%	--
Lutron	Diva	C-L wall-mount dimmers (T1, T4, T5, T8)	1	12	13%	88%	<1s <sup>4</sup>
Lutron	Skylark	C-L wall-mount dimmers (T1, T4, T5, T8)	1	12	13%	88%	<1s <sup>4</sup>
Lutron	Skylark Contour	C-L wall-mount dimmers (T1, T4, T5, T8)	1	12	13%	88%	<1s <sup>4</sup>

## LED Rated Dimmers

Manufacturer	Series	Model	Minimum Luminaires (per circuit)	Maximum Luminaires (per circuit)	Minimum Measured Light Output	Maximum Measured Light Output	Low End Start Time
Lutron	Ariadni / Toggler	C-L wall-mount dimmers (T1, T4, T5, T8)	1	12	13%	88%	<1s <sup>4</sup>
Lutron	Lumea	C-L wall-mount dimmers (T1, T4, T5, T8)	1	12	13%	88%	<1s <sup>4</sup>
Lutron	RadioRA 2	RRD-10ND	1	12	3%	89%	<1s
Lutron	Maestro Wireless	MRF2-6ND	1	12	3%	89%	<1s
Lutron	HomeWorks QS	HQRD-6ND	1	12	3%	89%	<1s
Lutron	HomeWorks QS	HQRD-10ND	1	12	3%	89%	<1s
Lutron	RadioRA 2	RRD-6NA	1	12	18%	89%	<1s
Lutron	HomeWorks QS	HQRD-6NA	1	12	18%	89%	<1s
Lutron	HomeWorks	HxD-6ND	1	18	5%	85%	<1s
Lutron	Stanza	SZ-6ND	1	18	5%	85%	<1s
Lutron		PHPM-PA with Grafik Eye QS Main Unit	1	52	4%	99%	<1s
Lutron		PHPM-WBX with 3-wire fluorescent control	1	52	4%	99%	<1s
Lutron	Panel Module	HW/LP-RPM-4A-120	1	52	12%	86%	>1s
Lutron	Panel Module	HW/LP-RPM-4U-120	1	85	20%	99%	<1s
Lutron	Grafik QS/Wallbox Power Module	"Grafik Eye QS Main Unit Family/ LQRJ-WPM-6P"	1	64	4%	100%	<1s <sup>2</sup>
Lutron	Panel Module	GP (Harrier) Card	1	85	4%	100%	<1s <sup>2,3</sup>
Lutron	Grafik Eye 3000/ HomeWorks	Grafik Eye 3000 Family/HWI-WPM-6D-120	1	64	4%	100%	<1s <sup>2</sup>
Lutron	Caseta Wireless	PD-6WCL (6D11)	1	12	14%	83%	<1s
Lutron	RadioRA 2	RRD-6CL (R3)	1	12	8%	82%	<1s
Lutron	Maestro Wireless	MRF2-6CL (M6)	1	12	8%	82%	<1s
Lutron	HomeWorks QS	HQRD-6CL (H2)	1	12	8%	82%	<1s
Lutron	HomeWorks QS	HQRA-6CL (H2)	1	12	8%	82%	<1s
Lutron	RadioRA 2	RRD-6D	2	12	9%	91%	<1s
Lutron	RadioRA 2	RRD-H6BRL (with neutral)	1	8	10%	89%	<1s
Lutron	HomeWorks QS	HQRD-H6BRL (with neutral)	1	8	10%	89%	<1s
Lutron	Diva	250W C-L dimmers (T5, T8)	1	20	13%	88%	<1s <sup>4</sup>
Lutron	Ariadni	250W C-L dimmers (T5, T8)	1	20	13%	88%	<1s <sup>4</sup>
Lutron	Nova T	NTCL-250 (T8)	1	20	13%	88%	<1s <sup>4</sup>
Lutron	Grafik T	GT-150 (T6) (without neutral)	1	12	19%	89%	>1s
Lutron	Grafik T	GTJ-150 (M6) (without neutral)	1	12	19%	89%	>1s
Lutron	Grafik T	GTJ-250M (M6) (without neutral)	1	20	19%	89%	>1s
Lutron	Grafik T	GT-250M (T7) (without neutral)	1	20	19%	89%	>1s
Lutron	RadioRA 2	RRT-G25LW (R3) (without neutral)	1	20	19%	89%	>1s
Lutron	HomeWorks QS	HQRT-G25LW (H2) (without neutral)	1	20	19%	89%	>1s
Lutron	HomeWorks QS/myRoom	LQSE-4A1-D	1	9	5%	100%	<1s
Lutron	HomeWorks QS/myRoom	MQSE-4A1-D	1	9	5%	100%	<1s
Lutron	HomeWorks QS/myRoom	MQSE-3A1	1	9	5%	100%	<1s
Lutron	HomeWorks QS/myRoom	MQSE-2A1-D	1	9	5%	100%	<1s

### Notes:

- <sup>1</sup> Moderate flash at startup                      <sup>6</sup> 2% dimming took 2 seconds to start  
<sup>2</sup> Moderate shimmer                              <sup>7</sup> 1% dimming took 2 seconds to start  
<sup>3</sup> Moderate flicker                                <sup>8</sup> 1% dimming took 3 seconds to start  
<sup>4</sup> Steppy dimming                                 <sup>9</sup> 1% dimming took 4 seconds to start  
<sup>5</sup> Shimmer under 2% dimming

## Dimmers - for reference only

Manufacturer	Series	Model	Minimum Luminaires (per circuit)	Maximum Luminaires (per circuit)	Minimum Measured Light Output	Maximum Measured Light Output	Low End Start Time
EATON	Toggle	TI061	1	9	6%	90%	<1s
EATON	Aspire	9530AW	1	9	5%	100%	<1s
EATON	Rotary	RI061	1	9	39%	99%	<1s <sup>1,3</sup>
EATON	Decorator	DE06P	1	9	3%	91%	<1s <sup>4,6</sup>
Lutron	Toggler	TG-600P	1	11	11%	96%	<1s
Lutron	Diva	DV-600P	1	11	2%	96%	<1s <sup>1</sup>
Lutron	Lumea	LG600P	1	11	4%	96%	<1s
Lutron	Skylark	S-600P	1	14	1%	97%	>1s <sup>2</sup>
Lutron	Skylark Contour	CT103P	1	19	3%	96%	<1s
Lutron	Diva	DV603P	1	11	6%	96%	<1s
Lutron	Nova T	NTFTU-5A	1	11	25%	99%	<1s
Lutron	Maestro	MAELV600	1	39	6%	94%	<1s
Lutron	Faetra	FAELV500	1	32	5%	93%	<1s
Lutron	Diva	DVELV303P	1	19	2%	88%	<1s
Lutron	Skylark	SELV300P	1	19	2%	90%	<1s
Leviton	Decora	6673	1	9	13%	96%	<1s
Leviton	SureSlide	6631-2	1	9	1%	98%	<1s <sup>1</sup>
Leviton	Illuminatech	IPI06	1	9	5%	99%	<1s <sup>1</sup>
Leviton	Vizia	VP106	1	9	1%	96%	<1s <sup>1</sup>
Leviton	SureSlide	6633-P	1	9	1%	99%	>1s <sup>2,3</sup>
Leviton	Vizia	VPE06	1	9	1%	99%	<1s
Leviton	Illuminatech	IPE04	1	4	2%	95%	<1s
Leviton	Vizia	VZE04	1	6	6%	96%	<1s
Lightolier	Sunrise	ZP260QEW	1	4	1%	92%	<1s
Lutron	Ariadni	AY-600P	1	14	10%	98%	<1s
Lutron	Contour	CT-103P	1	24	3%	97%	<1s
Lutron	Contour	CT-600P	1	14	3%	97%	<1s
Lutron	Rotary	D-600P	1	14	15%	96%	<1s <sup>1,3,4,5</sup>
Lutron	Glyder	GL-600P	1	14	4%	97%	<1s
Lutron	Lumea	LG-600PH	1	14	2%	97%	<1s
Lutron	Ariadni	AYLV-600P	1	11	7%	98%	<1s
Lutron	Glyder	GLV-600	1	11	2%	99%	<1s
Lutron	Diva	DVLV-600P	1	11	4%	97%	<1s
Lutron	Lumea	LG-103P	1	24	5%	97%	<1s
Lutron	Skylark	SLV-600P	1	10	2%	97%	<1s
Lutron	Nova	NTLV-600	1	11	4%	99%	<1s

### Notes:

<sup>1</sup> Moderate shimmer

<sup>2</sup> Low end start time up to 4 seconds

<sup>3</sup> Zero light at minimum dim

<sup>4</sup> Blinking at low light

<sup>5</sup> Moderate flicker

<sup>6</sup> Moderate flash at startup

## 0-10V Dimmers - for reference only

Manufacturer	Series	Model	Minimum Luminaires (per circuit)	Maximum Luminaire (120V)	Maximum Luminaire (277V)	Max Dimming Range (%)	Minimum Dimming Range(%)	Low End Start Time
Eaton	Slide Dimmer	SF10P	1	22	32	100	1	>1
Eaton	Decorator Dimmer	DF10P	1	22	32	100	1	>1
Leviton	Illumatech	IP710-DL	1	22	29	100	1	>1
Lutron	NTFTV	NOVA T	1	36	84	100	1	>1
Lutron	DIVA	DVTV	1	36	84	100	1	>1
Eaton	iLumin	SC277-06	1	36	84	100	1	>1
Eaton	Greengate	CK4A	1	45	105	100	1	>1

### Dimmer Notes:

- 1) Start time is measured at the lowest dimmer setting.
- 2) Some LED rated dimmers have a "rapid start" design used to provide a momentary power boost for LED and CFL lamps during start-up. When a LED luminaire is on a dimmer with "rapid start" the boost may cause a momentary flash of the LED lighting. This "flash" is generated by the dimmer, and may be more noticeable when the dimmer is at a low setting. A solution is available in the following Eaton dimmers which provide adjustment capability of the "rapid start": Decorator (DAL06P), Smart (AAL06P), and Toggle (TAL06P). Refer to product specifications online at [www.eaton.com/lighting](http://www.eaton.com/lighting) for more details.

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