

MLD
eVo^{II} DIM

Dimmable electronic control gear for T5 fluorescent lamps in Multi-Lamp technology



Performance characteristics

- Dimmable ECG in Multi-Lamp technology with automatic lamp recognition for optimum operation of T5 lamps
- Luminaire can be fitted with different lamps (e.g. T5: 35W, 49W, 80W)
- Dim interface: DALI or Push-Dim
- Push-Dim: dim and switch with push button with memory function
- Dimming range 1...100% luminous flux
- Energy-controlled electrode preserving lamp warm start for maximum lamp life irrespective of switching frequency; starting time < 1 s
- Cut-Off technology at 100% luminous flux: minimised heat current through electrodes during operation, for optimum light output and reduced power loss
- Safety switch-off in case of abnormal lamp operation, e. g. defective electrode and end of lamp life; tested acc. to EN 61347-2-3 + Test 2
- Automatic restart after lamp replacement
- Suitable for direct current operation and emergency lighting installations
- Quick restart of lamps after short power disruptions
- Energy efficiency EEI = A1BAT
- Nominal service life: 50.000 h with failure rate of $\leq 10\%$ and operation at $t_c = t_{c,max}$

ECG model

Version	Order no.	Lamp
MLD39.1FR-11/220-240/DALI	10097811	T5 1 x 14 W, 21 W, 24 W, 39 W
		TC-L/F 1 x 18 W, 24 W, 40 W
MLD54.1FR-11/220-240/DALI	10097815	T5 1 x 28 W, 35 W, 49 W, 54 W
MLD80.1FR-11/220-240/DALI	10097820	T5 1 x 35 W, 49 W, 80 W
		TC-L 1 x 55 W, 80 W
MLD39.2FR-11/220-240/DALI	10092117	T5 2 x 14 W, 21 W, 24 W, 39 W
		TC-L/F 2 x 18 W, 24 W, 40 W
MLD54.2FR-11/220-240/DALI	10092121	T5 2 x 28 W, 35 W, 49 W, 54 W
MLD14/24.3FR-04/220-240/DALI	10105150	T5 3 x 14 W, 24 W
		TC-L 3 x 18 W, 24 W
		T8 3 x 18 W
MLD14/24.4FR-04/220-240/DALI	10105151	T5 4 x 14 W, 24 W
		TC-L 4 x 18 W, 24 W
		T8 4 x 18 W
MLD80.2FR-11/220-240/DALI	10101905	T5 2 x 35 W, 49 W, 80 W
		TC-L 2 x 55 W, 80 W

Markings



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Technical data

Mains voltage supply	
Rated voltage range	220 V – 240 V
Max. admissible voltage range (continuous)	198 V – 264 V
Frequency	0, 50 Hz ... 60 Hz
Battery operation	
Voltage range for continuous operation	198 VDC – 278 VDC
Lowest limiting value for temporary operation (0,5h)	176 VDC ¹⁾
Dimming operation DALI	
Dimming range	1 % ... 100 %
Obervoltage protection	264 V
Dimming operation Push-Dim	
Control signal	L(Line)
Obervoltage protection	264 V
Maximum number of ECGs on one push button	25
Behaviour at mains overvoltage	
Switch-off of the lamp(s) at	approx. 320 VAC ²⁾
Overvoltage protection	350 VAC / 2 h
Stand-by power	< 0.5 W
Leakage current	< 0.5 mA / EVG
Ignition time of the lamp	< 1.0 s
Behaviour in case of defective lamp	Switch-off of the lamp
Automatic restart after lamp replacement	yes
Max. temperature at housing surface	+ 110 °C (acc. EN 61 347-2-3 / C)
Nominal service life	50.000 h with failure rate ≤ 10 % and operation at $t_c = t_{c, max}$ 100.000 h at $t_c = t_{c, max} - 10K$
Lamp and mains terminals	
Type	IDC-Terminal
Push - in contact:	0,5 mm ² – 1,0 mm ² solid
Wire cross section	
Horizontal - contact	0,5 mm ² stranded
Wire stripping length	8,0 mm – 9,0 mm
Lamp wire lengths	see "wiring diagrams"

¹⁾ Reliable lamp ignition only for ≥ 198 VDC

²⁾ Lamp restart after mains voltage interruption

Admissible temperatures

Version	Ambient (t_a)	Case (t_c)
MLD39.1FR-11/220-240/DALI	+ 5 °C ... + 60 °C	75 °C
MLD54.1FR-11/220-240/DALI	+ 5 °C ... + 60 °C	75 °C
MLD80.1FR-11/220-240/DALI	+ 5 °C ... + 60 °C	75 °C
MLD39.2FR-11/220-240/DALI	+ 5 °C ... + 55 °C	75 °C
MLD54.2FR-11/220-240/DALI	+ 5 °C ... + 55 °C	75 °C
MLD14/24.3FR-04/220-240/DALI	+ 5 °C ... + 50 °C	75 °C
MLD14/24.4FR-04/220-240/DALI	+ 5 °C ... + 50 °C	75 °C
MLD80.2FR-11/220-240/DALI	+ 5 °C ... + 55 °C	75 °C

Inrush current / Circuit breaker

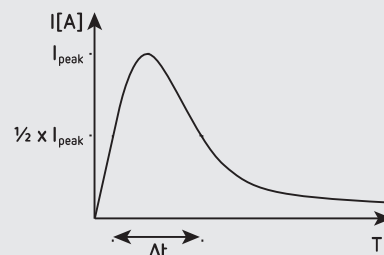
Version	typ. $I_{peak} / \Delta t$	No. of ECG at single-pole circuit breakers				
		LS-Typ	10 A	16 A	20 A	25 A
MLD39.1FR-11	30 A / 268 μ s	B	9	15	19	24
		C	16	25	32	39
MLD54.1FR-11	40 A / 185 μ s	B	10	17	21	26
		C	17	28	35	44
MLD80.1FR-11	40 A / 185 μ s	B	10	17	21	26
		C	17	28	35	44
MLD39.2FR-11	37 A / 180 μ s	B	12	18	23	29
		C	19	31	38	48
MLD54.2FR-11	47 A / 272 μ s	B	6	9	12	15
		C	10	16	20	25
MLD14/24.3FR-04	31 A / 260 μ s	B	9	15	19	24
		C	16	26	32	41
MLD14/24.4FR-04	31 A / 260 μ s	B	9	15	19	24
		C	16	26	32	41
MLD80.2FR-11	31 A / 260 μ s	B	4	6	8	10
		C	7	11	14	18

All data for $U_{supply} = 230$ VAC, mains impedance = 1 Ω

In case of multipolar CB the max. no. is reduced by 20 %

The max. number may differ depending on CB manufacturer. Please consider the specifications of the manufacturer.

Basically, CB with C-characteristics are recommended to be used in lighting groups.





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Operating data



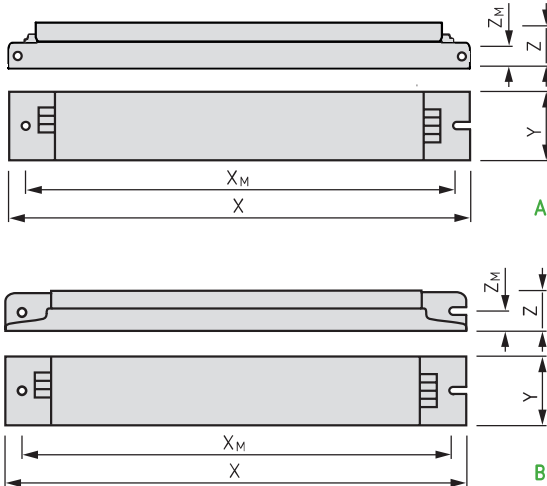
Version	Lamp	System rating	Input current*	Operating frequency	Power factor	Lamp power	Lamp socket	EEI	Approvals
		W	A	kHz		W			
MLD39.1FR-11/220-240/DALI	1 x T5 14 W	17	0,09	99...120	0,9	15	G5	A1 BAT	a, b
	1 x T5 21 W	22	0,11	96...120	0,92	21	G5	A1 BAT	a, b
	1 x T5 24 W	28	0,13	69...120	0,93	25	G5	A1 BAT	a, b
	1 x T5 39 W	39	0,18	71...100	0,96	35	G5	A1 BAT	a, b
	1 x TC-L/F 18 W	19	0,09	64...120	0,9	16	2G11/2G10	A1 BAT	a, b
	1 x TC-L/F 24 W	26	0,12	69...120	0,94	24	2G11/2G10	A1 BAT	a, b
MLD54.1FR-11/220-240/DALI	1 x TC-L 40 W	41	0,18	73...100	0,97	40	2G11	A1 BAT	a, b
	1 x T5 28 W	33	0,16	90...100	0,94	29	G5	A1 BAT	a, b
	1 x T5 35 W	40	0,17	87...100	0,95	35	G5	A1 BAT	a, b
	1 x T5 49 W	55	0,25	79...100	0,98	49	G5	A1 BAT	a, b
MLD80.1FR-11/220-240/DALI	1 x T5 54 W	56	0,27	52...100	0,99	52	G5	A1 BAT	a, b
	1 x T5 35 W	39	0,17	88...100	0,96	35	G5	A1 BAT	a, b
	1 x T5 49 W	55	0,25	79...100	0,98	51	G5	A1 BAT	a, b
	1 x T5 80 W	81	0,38	45...100	0,99	76	G5	A1 BAT	a, b
MLD39.2FR-11/220-240/DALI	1 x TC-L 55 W	62	0,28	46...100	0,99	56	2G11	A1 BAT	a, b
	1 x TC-L 80 W	83	0,38	45...100	0,99	77,5	2G11	A1 BAT	a, b
	2 x T5 14 W	33	0,15	69...120	0,94	28	G5	A1BAT	a,b
	2 x T5 21 W	45	0,2	72...120	0,97	42	G5	A1BAT	a,b
	2 x T5 24 W	49	0,22	40...120	0,97	48	G5	A1BAT	a,b
	2 x T5 39 W	79	0,35	40...120	0,99	78	G5	A1BAT	a,b
MLD54.2FR-11/220-240/DALI	2 x TC-L/F 18 W	36	0,16	40...120	0,97	32	2G11/2G10	A1BAT	-
	2 x TC-L/F 24 W	48	0,22	40...120	0,97	44	2G11/2G10	A1BAT	-
	2 x TC-L 40 W	85	0,37	40...120	0,99	80	2G11	A1BAT	-
	2 x T5 28 W	63	0,28	40...120	0,98	57	G5	A1BAT	a,b
MLD14/24.3FR-04/220-240/DALI	2 x T5 35 W	78	0,34	40...120	0,99	73	G5	A1BAT	a,b
	2 x T5 49 W	104	0,45	40...120	0,99	98	G5	A1BAT	a,b
	2 x T5 54 W	115	0,51	40...120	0,99	107	G5	A1BAT	a,b
	3 x T5 14 W	49	0,22	42...110	0,95	45	G5	A1BAT	a,b
MLD14/24.4FR-04/220-240/DALI	3 x T5 24 W	77	0,35	42...110	0,95	69	G5	A1BAT	a,b
	3 x TC-L 18 W	50	0,23	42...110	0,95	45	2G11	A1BAT	a,b
	3 x TC-L 24 W	75	0,34	42...110	0,95	69	2G11	A1BAT	a,b
	3 x T8 18 W	58	0,27	42...110	0,95	51	G13	A1BAT	a,b
MLD80.2FR-11/220-240/DALI	4 x T5 14 W	63	0,29	42...110	0,95	60	G5	A1BAT	a,b
	4 x T5 24 W	103	0,47	42...110	0,95	92	G5	A1BAT	a,b
	4 x TC-L 18 W	71	0,32	42...110	0,95	64	2G11	A1BAT	a,b
	4 x TC-L 24 W	100	0,46	42...110	0,95	92	2G11	A1BAT	a,b
MLD80.2FR-11/220-240/DALI	4 x T8 18 W	75	0,34	42...110	0,95	68	G13	A1BAT	a,b
	2 x T5 35 W	77	0,34	42...115	0,98	69	G5	A1BAT	a,b
	2 x T5 49 W	101	0,46	42...115	0,99	99	G5	A1BAT	a,b
	2 x T5 80 W	177	0,74	42...115	0,99	160	G5	A1BAT	a,b
	2 x TC-L 55 W	125	0,47	42...115	0,99	110	G11	A1BAT	a,b
	2 x TC-L 80 W	177	0,74	42...115	0,99	160	G11	A1BAT	a,b

* at U_{Mains} = 230 VAC

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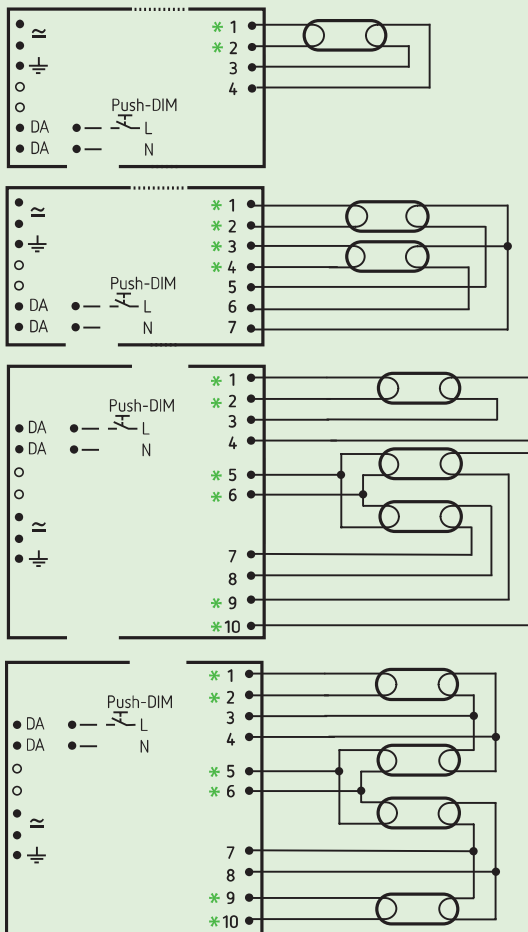
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Dimensions



Version	Skizze	X	X _M	Y	Z	Z _M	Weight
		mm	mm	mm	mm	mm	kg
MLD39.1FR-11/220-240/DALI	A	360	350	30	21	9	0,26
MLD54.1FR-11/220-240/DALI	A	360	350	30	21	9	0,27
MLD80.1FR-11/220-240/DALI	A	360	350	30	21	9	0,27
MLD39.2FR-11/220-240/DALI	A	360	350	30	21	9	0,28
MLD54.2FR-11/220-240/DALI	A	360	350	30	21	9	0,32
MLD14/24.3FR-04/220-240/DALI	B	360	350	39	22	-	0,38
MLD14/24.4FR-04/220-240/DALI	B	360	350	39	22	-	0,39
MLD80.2FR-11/220-240/DALI	A	425	415	30	21	9	0,37

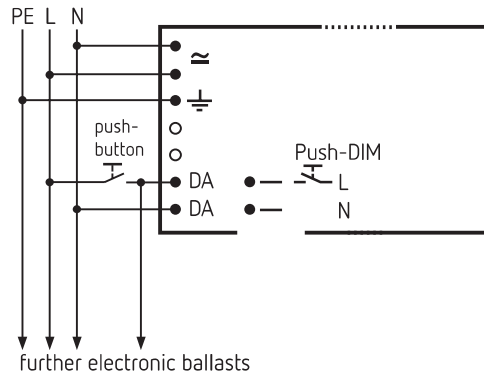
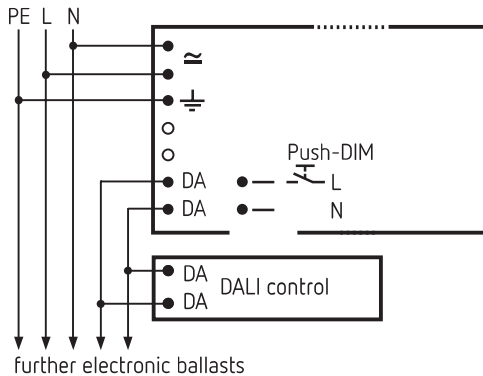
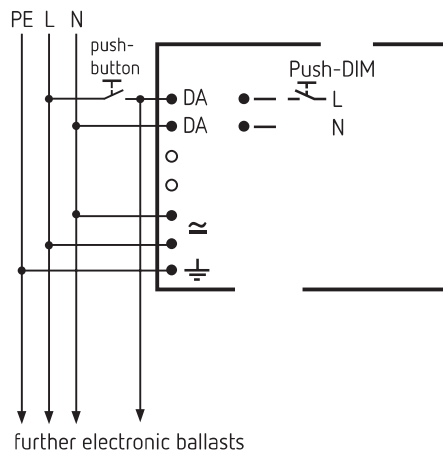
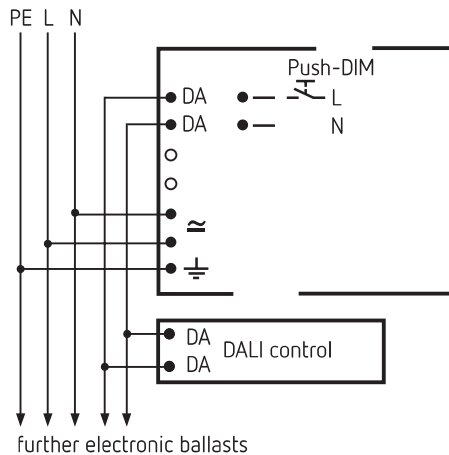
Wiring diagrams



* keep lamp wires as short as possible (max.1,0 m)
Pay attention to a symmetrical lamp wiring
To ensure a smooth operation earth connection has to be fitted

Conformance with regulations

EN 61 347-1	General and safety requirements
EN 61 347-2-3	
EN 61 347-2-3/C	Requirements for thermally protected ballasts
EN 60 929	Performance requirements
EN 62386-102	Digital adressable lighting interface - general requirements-controlgear
EN 50 294	Measurement method of total input power of ballast-lamp circuits
EN 61 000-3-2	Limits for harmonic current emissions
EN 61 000-3-3	Limitation of voltage fluctuations and flicker
General EMC immunity:	
EN 61 000-4-2	Electrostatic discharge
EN 61 000-4-3	Radiated, radio-frequency, electromagnetic field
EN 61 000-4-4	Electrical fast transient/burst
EN 61 000-4-5	Surge
EN 61 000-4-6	Conducted disturbances, induced by radiofrequency fields
EN 61 000-4-8	Power frequency magnetic field
EN 61 000-4-11	Voltage dips, short interruptions and voltage variations
EN 61 547	EMC immunity: equipment for general lighting purposes
EN 55 015	Radio disturbances, frequencies < 300MHz (CDN method)
Environmental tests for mechanical capacity:	
IEC 60 068-2-6	Test Fc: vibrations (sinusoidal)
IEC 60 068-2-27	Test Ea: shock and bump
IEC 60 068-2-29	Test Eb: shock and bump
Quality management certified according to ISO 9001	

MLD
evo[®]_{DIM}**Dimmable electronic control gear**
for T5 fluorescent lamps in Multi-Lamp technology**Wiring diagrams for DALI and Push-Dim operation****1 x/2 x Version****3 x/4 x Version****Warning:**

The Push-Dim operation of the new 1 – and 2 – lamp MLD EVO ECG on the same push- button (mixed mode) is **not** compatible with the following ECG types:

MLD54.1F-01/220-240/DALI (167192) (previous version)

MLD80.1F-01/220-240/DALI (166672) (previous version)

MLD14/24.3FR-04/220-240/DALI (10105150)

MLD14/24.4FR-04/220-240/DALI (10105151)

Push-Dim operation

A momentary push-button can also be used for dimming and switching instead of DALI interface.

Key press	Status: ECG switched off (stand-by)	Status: ECG switched on (lamp operation)
Short key press:	Switch-on the light at previous dimming level (memory function)	Switch-off the light and store dimming level
Long key press:	Switch-on the light at previous dimming level (memory function) and dim up resp. Down	Dimming up resp. down, every new key press inverts the dimming direction
Long key press (10 s):	–	Synchronisation mode (luminous flux: 100 %)
Long key press (20 s):	–	ECG changes to 1% luminous flux. If the button is released extended "memory function" * will be enabled
Long key press (> 25 s):	–	ECG changes to 100 % luminous flux. If the button is released "extended memory function" * will be disabled

*** Extended memory function for 1- and 2- lamp types:**

In the factory setting the extended memory function is disabled:

- After a mains voltage interruption, the device starts at 100 %.

The extended memory function can be enabled via push-button programming:

- After mains voltage interruption the ECG will start at last set state (standby or last dimming level).

MLD 3/4 lamp types: In case of power failure the ballast will store the current lightlevel.

- After mains voltage interruption the ECG will start at last set state (standby or last dimming level).

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Errors excepted. We reserve the right to make alternations in the interest of improving our products.