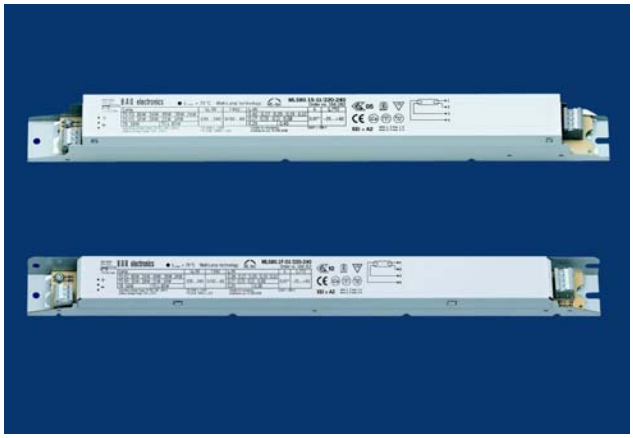
Electronic control gear units for fluorescent lamps in Multi-Lamp technology



Ausführung	Lampe
MLS 80.1S-11/220-240	T5 FH: 14W, 21W, 28W, 35W
Order no.: 166 282	T5 FQ: 24W, 39W, 49W, 54W, 80W
MLS 80.1F-01/220-240	T8: 58W
Order no.: 166 312	TC-L: 80W
MLS 54.2S-01/220-240	T5 FH: 14W, 21W, 28W, 35W
Order no.: 166 172	T5 FQ: 24W, 39W, 49W, 54W,
MLS 54.2F-01/220-240	80W (reduced luminous flux)
Order no.: 166 412	
MLS 39.2S-01/220-240	T5 FH: 14W
Order no.: 166 112	T5 FQ: 24W, 39W
	T8: 15W, 18W, 30W, 36W, 38W
	TC-L/F: 18W, 24W, 36W

MLS...S...: high design (30 mm) MLS...F...: flat design (21 mm)

Product features

- Universal ECG in Multi-Lamp technology, by means of automatic and exact lamp recognition for T5, T8 and TC fluorescent lamps
- One luminaire becomes viable with different lamp packages (e. g. T5: 35 W, 49 W, 80 W)
- Optimum lamp operation with fixed data according to IEC-regulations
- Flicker free light due to high frequency operation of the lamp; no stroboscopic effect
- Optimised warm start thanks to energy controlled preheating for preserving the electrodes and maximum lamp life independent of the switching frequency; starting time < 1 s
- Cut-Off technology: no heating current through the electrodes during operation for optimised luminous efficacy and minimised power loss
- Reliable lamp ignition even at low temperatures of –25 °C
- Automatic safety switch-off in case of abnormal lamp operation, e. g. defective electrodes and end of lamp life;
  tested acc. to EN 61 347-2-3/A1 + Test 2
- Automatic restart after lamp replacement
- Constant lamp output independent of mains voltage fluctuations
- Permanent voltage protection up to 380 VAC
- Certified as thermally protected ballasts, e. g. for application in ▽F luminaires
- Suitable for direct current operation and application in emergency lighting installations according to DIN VDE 0108
- Energy efficiency index A2 for all versions
- Conformance with international regulations regarding safety and operation, electromagnetic compatibility and immunity to interference
- Markings:

Conformance with regulations

- General and safety requirements:
  EN 60 928; EN 61 347-1; EN 61 347-2-3
- Requirements for thermally protected ballasts:
  EN 60 928 annex B; EN 61 347-2-3 annex C
- Performance requirements: EN 60 929
- Measurement method of total input power of ballast-lamp circuits: EN 50 294
- Limits for harmonic current emissions: EN 61 000-3-2
- Limitation of voltage fluctuations and flicker:
  EN 61 000-3-3
- 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 radio-frequency fields
  EN 61 000-4-8: power frequency magnetic field
  EN 61 000-4-11: voltage dips, short interruptions and voltage variations
- EMC immunity: equipment for general lighting purposes: EN 61 547
- Radio disturbances, frequencies < 30 MHz: EN 55 015
- Radio disturbances, frequencies > 30 MHz: EN 55 022
- Environmental tests for mechanical capacity:
  IEC 60 068-2-6 Test Fc: vibration (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

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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:	
MLS 80.1…; MLS 54.2…; MLS 39.2S	198 VDC – 276 VDC
Lowest limiting value for temporary operation:	
- MLS 80.1…; MLS 54.2…	154 VDC [1]
- MLS 39.2S	176 VDC [1]
Operating data:	see ‘operating data‘
Behaviour at mains overvoltage	
Switch-off of the lamp(s) at:	
- MLS 80.1…; MLS 54.2…	appr. 300 VAC [2]
- MLS 39.2S	appr. 270 VAC [2]
Overvoltage protection:	380 VAC (continuous)
Ambient temperature t_a	
- MLS 80.1…; MLS 39.2S	- 25 °C .... + 60 °C
- MLS 54.2…	- 25 °C .... + 55 °C
Limiting value t_c-temperature	$t_{c, max}$ = + 75 °C
Max. temperature at housing surface:	+ 110 °C (acc. to EN 61 347-2-3/C)
Mean service life of the ECG: (Failure rate ≤ 10%)	50000 h, at $t_c = t_{c, max}$
Leakage current:	< 0.5 mA/EVG
Ignition time of the lamp:	< 1 s
Single lamp operation	
- MLS 39.2S; MLS 54.2…	no
Automatic restart after lamp replacement	
- MLS 80.1…; MLS 54.2…	yes
- MLS 39.2S	yes; for lamp 2, see ‘wiring diagrams‘
Lamp and mains terminals	for solid single wire conductors
- Type:	90°- connector with key
- Wire cross section:	0.5 mm^2 – 1.5 mm^2
- Wire stripping length:	7.5 mm – 8.5 mm
Weights	
- MLS 80.1S	0.30 kg
- MLS 80.1F	0.28 kg
- MLS 54.2S	0.40 kg
- MLS 54.2F	0.36 kg
- MLS 39.2S	0.29 kg
Lamp wire lengths:	see ‘wiring diagrams‘

[1] Reliable lamp ignition only for ≥ 198 VDC
[2] Lamp restart after mains voltage interruption

Automatic lamp recognition

1. At completion of the lighting installation and first switch-on of the mains voltage supply, the process of lamp recognition starts automatically. For this, the lamp is ignited and operated for a period of five minutes with a test current. After this duration the type and the wattage of the lamp is determined by the electronic control gear. The operating data will then be adjusted for operating the lamp with its standard data. With any new switch-on the lamp will be started and operated with its specific data instantaneously.
2. If the mains voltage is switched-off within the five minutes time for the measurement process, the lamp recognition process is automatically started again with the next switch-on of the mains voltage supply.
3. When changing to a different lamp type or lamp wattage after completion of the lamp recognition process in general a manual start of the recognition process is necessary. This is achieved by the switching sequence OFF/ON – OFF/ON – OFF/ON – OFF/ON with the duration times of 1 s OFF and 1 s ON.
   An exception is the change between lamps with different detection indices DI (ref. to ‘Operating data’). In this case the detection process starts automatically, e.g. MLS 80.1S:
   T5FH 14W (DI = H) – T5FQ 24W (DI = L)
   T5FH 21W (DI = H) – T5FQ 39W (DI = L)
   T5FH 35W (DI = H) – T5FQ 80W (DI = L)

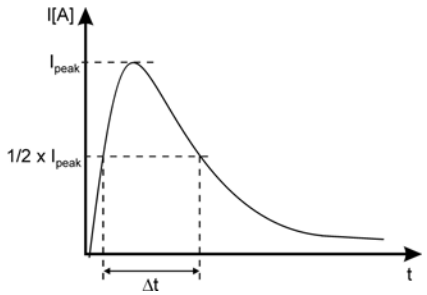
Circuit breaker/Inrush current

Data for U_{supply} = 230 VAC, mains impedance = 1 Ω.
Standard values for the maximum number of ECG at single-pole circuit breakers (CB):

ECG	CB-type	Rated current (CB)			
		10 A	16 A	20 A	25 A
MLS 80.1S	B	13	21	27	34
MLS 80.1F	C	21	34	42	53
MLS 54.2S	B	10	16	20	26
MLS 54.2F	C	16	26	32	41
MLS 39.2S	B	16	26	32	41
	C	25	40	50	63

- In case of multipolar CB the max. no. is reduced by 20%.
- The max. number of the CB from different manufacturers can be deviant. Please consider the specifications of the manufacturer.
- Basically, CB with C-characteristics are recommended to be used in lighting groups.

Inrush current:



ECG	I_{peak} [A]	Δt [µs]
MLS 80.1S; MLS 80.1F	typ. 32	typ. 180
MLS 54.2S; MLS 54.2S	typ. 34	typ. 220
MLS 39.2S	typ. 31	typ. 155

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Operating data

MLS 80.1S-11/220-240; MLS 80.1F-01/220-240

Lamp		System rating	Input current (at 230V)		Operating frequency	Power factor	Lamp power	Lamp socket	DI***
			Operation*	Detection**					
		W	A	A	kHz	–	W	–	–
T5 FH	14 W	16	0.08	0.970	99	0.85	1 x 14	G5	H
	21 W	24	0.11	0.127	97	0.90	1 x 21	G5	H
	28 W	32	0.15	0.153	94	0.97	1 x 28	G5	H
	35 W	38	0.17	0.186	93	0.97	1 x 35	G5	H
T5 FQ	24 W	25	0.12	0.103	63	0.90	1 x 24	G5	L
	39 W	42	0.19	0.144	67	0.97	1 x 39	G5	L
•	49 W	53	0.24	0.203	83	0.97	1 x 49	G5	L
	54 W	60	0.27	0.155	51	0.97	1 x 54	G5	L
•	80 W	88	0.39	0.196	49	0.97	1 x 80	G5	L
T8	58 W	54	0.24	0.135	50	0.98	1 x 50	G13	L
TC-L	80 W	88	0.39	0.203	49	0.97	1 x 80	2G11	L

* after lamp detection completed ** during lamp detection after 2 s *** lamp detection index

• **Special case:** The lamp detection is also started automatically for lamp changes T5 80 W → T5 49 W and T5 49 W → T5 80 W

MLS 54.2S-01/220-240; MLS 54.2F-01/220-240

Lamp		System rating	Input current (at 230V)		Operating frequency	Power factor	Lamp power	Lamp socket	DI***
			Operation*	Detection**					
		W	A	A	kHz	–	W	–	–
T5 FH	14 W	32	0.14	0.15	84	0.96	2 x 14	G5	H
	21 W	46	0.21	0.22	83	0.97	2 x 21	G5	H
	28 W	62	0.28	0.27	82	0.97	2 x 28	G5	H
	35 W	77	0.35	0.29	81	0.97	2 x 35	G5	H
T5 FQ	24 W	51	0.23	0.16	63	0.97	2 x 24	G5	L
	39 W	82	0.37	0.23	56	0.97	2 x 39	G5	L
	49 W	109	0.48	0.35	70	0.98	2 x 49	G5	L
	54 W	120	0.54	0.28	44	0.98	2 x 54	G5	L
•	80 W	146	0.64	0.30	44	0.99	2 x 69	G5	L

* after lamp detection completed ** during lamp detection after 2 s *** lamp detection index

• Operation with reduced Luminous Flux, BLF = 0,88

MLS 39.2S-01/220-240

Lamp		System rating	Input current (at 230V)		Operating frequency	Power factor	Lamp power	Lamp socket	DI***
			Operation*	Detection**					
		W	A	A	kHz	–	W	–	–
T5 FH	14 W	34	0.15	0.19	96	0.96	2 x 14	G5	H
T5 FQ	24 W	52	0.23	0.20	69	0.98	2 x 24	G5	L
	39 W	85	0.38	0.28	62	0.98	2 x 39	G5	L
T8	15 W	32	0.15	0.14	71	0.95	2 x 14	G13	L
	18 W	38	0.17	0.15	71	0.95	2 x 16	G13	L
	30 W	63	0.28	0.20	69	0.98	2 x 29	G13	L
	36 W	72	0.32	0.26	69	0.98	2 x 32	G13	L
	38 W	72	0.32	0.28	69	0.98	2 x 32	G13	L
TC-L	18 W	38	0.17	0.15	71	0.95	2 x 16	2G11	L
	24 W	49	0.22	0.18	69	0.98	2 x 22	2G11	L
	36 W	72	0.32	0.25	69	0.98	2 x 32	2G11	L
TC-F	18 W	38	0.17	0.13	71	0.95	2 x 16	2G10	L
	24 W	49	0.22	0.17	69	0.98	2 x 22	2G10	L
	36 W	72	0.32	0.25	69	0.98	2 x 32	2G10	L

* after lamp detection completed ** during lamp detection after 2 s *** lamp detection index

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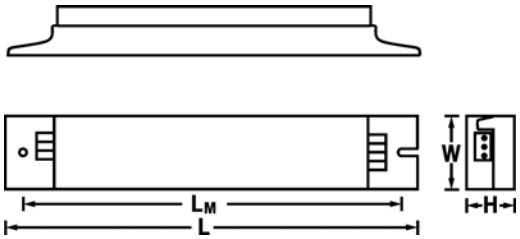
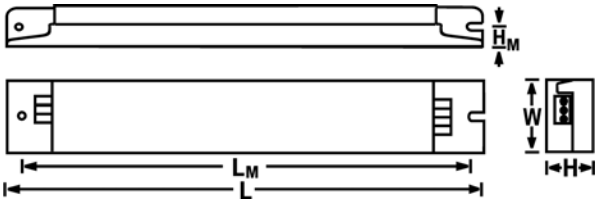
Dimensions

MLS 80.1S-11/220-240; MLS 54.2S-01/220-240
MLS 39.2S-01/220-240



MLS 54.2F-01/220-240
MLS 80.1F-01/220-240

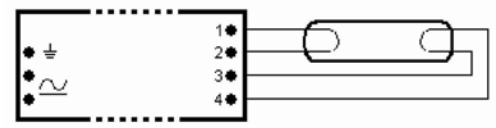


EVG	L	L_M	W	H	H_M
MLS 80.1S	360	350	30	30	-
MLS 80.1F	360	350	30	21	10,5
MLS 54.2S	425	415	30	30	-
MLS 54.2F	425	415	30	21	8,9
MLS 39.2S	360	350	30	30	-

all data in mm

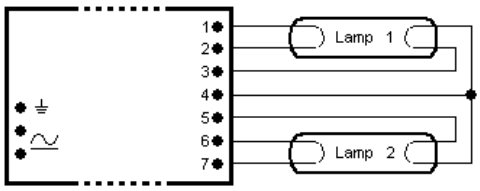
Wiring diagrams

MLS 80.1S-11/220-240
MLS 80.1F-01/220-240



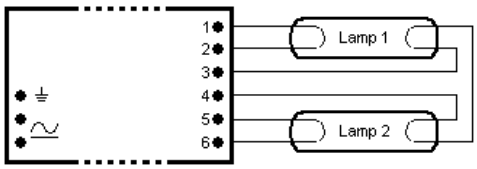
Wire lengths terminal 1, 2: max. 1.0 m
Wire lengths terminal 3, 4: max. 2,0 m
Keep wires short: terminal 1, 2

MLS 54.2S-01/220-240
MLS 54.2F-01/220-240



Wire lengths terminal 1, 2, 6, 7: max. 1,0 m
Wire lengths terminal 3, 4, 5: max. 2,0 m
Keep wires short: terminal 1, 2, 6, 7

MLS 39.2S-01/220-240



Wire lengths terminal 1, 2, 3, 4: max. 2,0 m
Wire lengths terminal 5, 6: max. 3,0 m
Keep wires short: terminal 1, 2