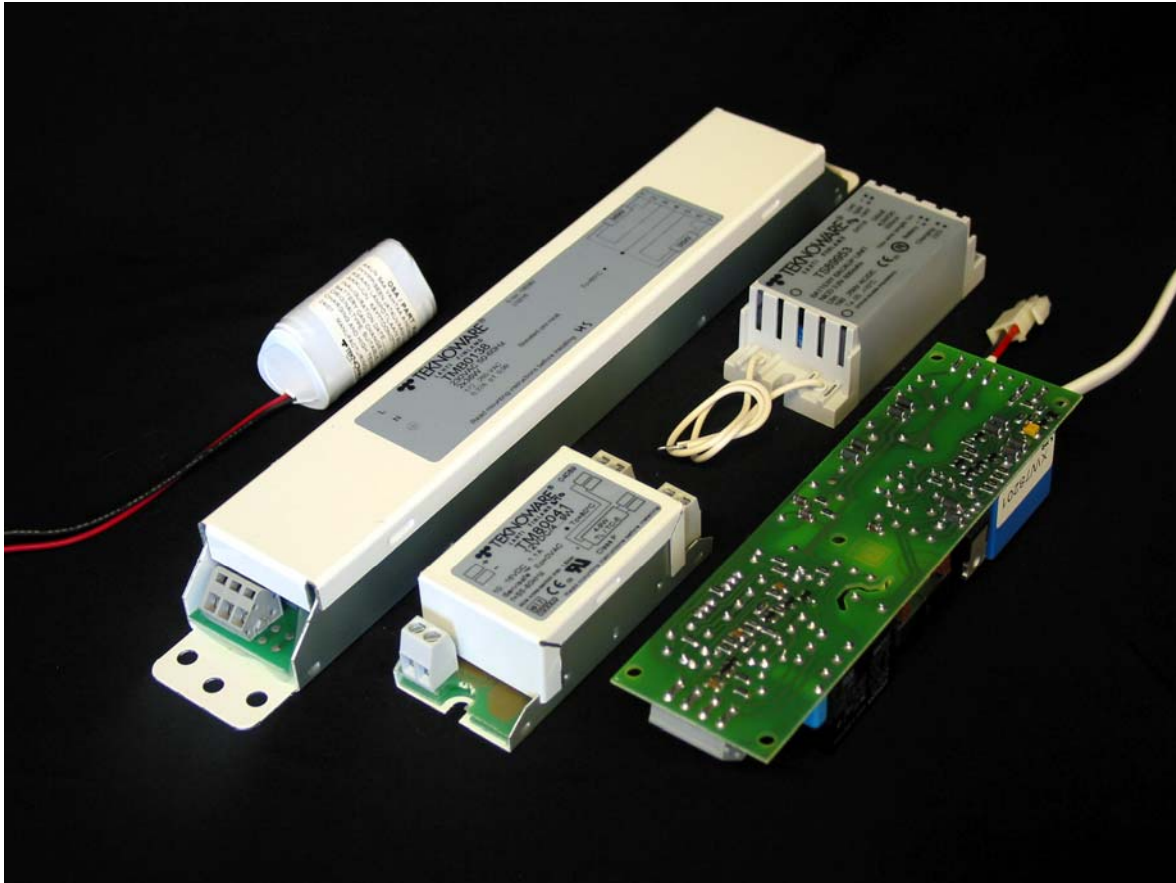




# LIGHTING ELECTRONICS



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Presented here is a selection of our basic types. There are also many other alternatives available and even customized solutions are possible. Please enquire.



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## **TEKNOWARE LIGHTING ELECTRONICS FOR DEMANDING APPLICATIONS**

Our core expertise lies in the design and manufacture of electronic ballasts for fluorescent lights and power sources for LEDs and halogen lamps. We designed and built our first electronic ballast for vehicle use in 1972 and today we are one of the leading developers of lighting technology for special applications. Our products are sold worldwide to over 35 countries.

Our strengths lie in our wide-ranging and long experience in the design and manufacturing of lighting electronics. Our innovative and effective product development and strong commitment to meeting customer needs serve to reinforce our strength as a lighting provider. The design process of a new product starts always with thorough study of the applied standards and customer specifications. We also pay a lot of attention to the verification of the design before launching the product. Many of our products are tested and certified by independent accredited laboratories. We have also approvals from many organisations as railway operators DB, RATP, SNCF and SBB. Naturally the products sold in the EU and subject to EMC and LV directives carry the CE-mark as a proof of compliance.

Our strategy is to develop user-friendly, reliable, long lasting and innovative products and comprehensive solutions to meet the needs of the customer. We have designed numerous technical features, which guarantee the customer the most appropriate solutions. Following are some examples of them:

### **Boosted Pre-Heat™**

Boosted Pre-Heat of the lamp cathodes enable that the lifetime of the fluorescent lamp is non-dependant on the amount of switching cycles. It is recommended when the average burning cycle is less than 3 hours.

### **Dimming**

There are available both 2-step and continuous dimming for the fluorescent lamp, even down to 2% of the nominal output.

### **Gentle Start™**

Gentle start feature is available with the continuous dimming. It controls the light output during and after the start-up so that the light level increases softly during approximately 5 seconds. This provides pleasant transition of the light level.

### **Servisafe®**

Servisafe® –function switches the output voltage off in all lamp fault situations providing safe operation and lamp replacement. Once the lamp is replaced, the normal operation returns automatically without any manual re-setting actions or cycling of the input voltage needed.

### **Regulated output power**

Electronic ballasts with regulated output power supply the lamp with the constant voltage and current regardless of the input voltage variations. This gives maximum life for the lamp and stable light output even if the input voltage fluctuates.

Generally, all our electronics products are protected against wrong polarity of the input voltage and all lamp fault situations.



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## AC/DC SUPPLIED ELECTRONIC BALLASTS FOR FLUORESCENT LAMPS

### TM71411



Dimensions (W x H x L): 38 x 28 x 85 mm

TM71411 is an electronic ballast designed especially for centrally supplied 24V AC/DC emergency luminaries. It can be used also in other 24V applications where long life and high reliability are essential.

Technical data	
Nominal input voltage:	<b>24V AC/DC</b> (16-28 VAC / 18-35 VDC)
Fluorescent lamp:	<b>4-13W TL, 5-11W TC-E</b>

Special features
Constant output power over the whole input voltage range
Servisafe™ –function which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.

Approvals:
CE –marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC

### TM71431



Dimensions (WxHxL): 34 x 27 x 116 mm

TM71431 is an electronic ballast designed especially for centrally supplied 24V AC/DC emergency luminaries. It can be used also in other 24V applications where long life and high reliability are essential.

Technical data	
Nominal input voltage:	<b>24V AC/DC</b> (16-28 VAC / 18-35 VDC)
Fluorescent lamp:	<b>18W TL / TC</b>

Special features
Constant output power over the whole input voltage range
Servisafe™ –function which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.

Approvals
CE –marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC



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## TM717xx



Dimensions (WxHxL): 44 x 29 x 150 mm

TM717xx is a small wattage electronic ballast designed especially for centrally supplied 230 V AC/DC emergency luminaries. It can be used also in other 230V applications where long life and high reliability are essential.

Technical data	
Nominal input voltage:	230 V AC/DC (180-250 V)
Fluorescent lamp:	
TM71720:	4-8 W TL / 5-11 W TC-E
TM71721:	6-13 W TL / 5-11 W TC-E

Special features
Servisafe™-function, which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.

Approvals
Tested and certified by SGS-Fimko and thus FI-marked
CE-marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC

## TMK4933



Dimensions (WxHxL): 44 x 29 x 142 mm

TMK4933 is a heavy duty electronic ballast designed for demanding use. Its especially wide input voltage range allows both 110 V and 230 V AC/DC supply.

Technical data	
Nominal input voltage:	110 - 230 V AC/DC (88-265 V)
Fluorescent lamp:	36-40W TL / TC

Special features
Constant output power within the whole input voltage range
Active power factor correction circuit
Especially vibration and shock-proof construction due to plated-through circuit board.

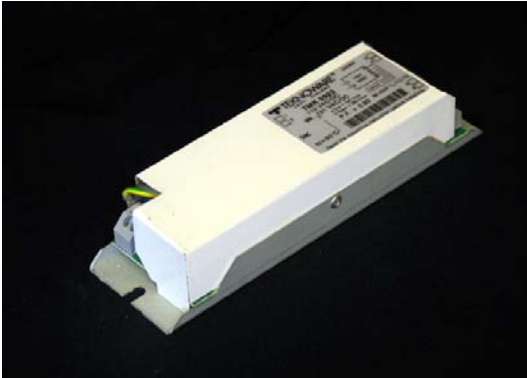
Approvals
CE-marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC



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## TMK59xx



Dimensions (WxHxL): 44 x 29 x 142 mm

TMK59xx is a heavy duty electronic ballast designed for demanding use.

Technical data	
Nominal input voltage:	
<b>TMK5923:</b>	<b>110 V AC/DC (99-121 V)</b>
<b>TMK5933:</b>	<b>230 V AC/DC (207-253 V)</b>
Fluorescent lamp:	<b>36-40W TL / TC</b>

Special features
Especially vibration and shock-proof construction due to plated-through circuit board.

Approvals
CE –marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC

## TMB01xx



Dimensions (WxHxL): 42 x 30 x 290 mm

TMB01xx is an electronic ballast designed especially for railway interior lighting, but it can be used also in other applications where long life, high reliability and good resistance against shocks and vibration are essential.

Technical data	
Nominal input voltage:	<b>230 V AC/DC (172-265 V)</b>
Fluorescent lamp(s):	
<b>TMB0131:</b>	<b>18 W TL / TC</b>
<b>TMB0132:</b>	<b>36 W TL / TC</b>
<b>TMB0138:</b>	<b>2 x 36 W TL / TC</b>

Special features
Constant light output between nominal and maximum input voltage.
Active power factor correction circuit
Boosted Pre-Heat for long lamp life in conditions where lights are switched on/off frequently.
Servisafe™ –function which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.
Especially vibration and shock-proof construction due to plated-through circuit board.



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## TMB03xx



Dimensions (WxHxL): 42 x 30 x 290 mm

TMB02xx is an electronic ballast with the same features as TMB01xx, but also with continuous dimming.

Technical data	
Nominal input voltage:	230 V AC/DC (172-265 V)
Fluorescent lamp(s):	
<b>TMB0335:</b>	2 x 18 W TL / TC
<b>TMB0338:</b>	2 x 36 W TL / TC
<b>TMB0338:</b>	2 x 36 W TL / TC
<b>TMB0366:</b>	2 x 14/21 W T5
<b>TMB0368:</b>	2 x 28/35 W T5
Dimming control input:	1...10VDC
Dimming range:	3%...100%

Special features
Constant light output between nominal and maximum input voltage
Active power factor correction circuit
Boosted Pre-Heating™ for long lamp life in conditions where lights are switched on/off frequently.
Servisafe™ –function which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.
Especially vibration and shock-proof construction due to plated-through circuit board.



## DC SUPPLIED ELECTRONIC BALLASTS FOR FLUORESCENT LAMPS

### TM80012



Dimensions (WxHxL): 35 x 27 x 90 mm

TM80012 is an electronic ballast designed especially for interior lighting of public transport vehicles. It can be used also in other applications where long life, high reliability and good resistance against temperature variations, shocks and vibration are essential.

Technical data	
Nominal input voltage:	<b>24VDC (18-32 V)</b>
Fluorescent lamp:	<b>8...14 W TL, 9...11 W TC</b>

Special features
Constant light output between nominal and maximum input voltage
Servisafe™-function which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.

Approvals
CE –marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC
e17 according to the European directive 95/54/EC

### TM80041



Dimensions (WxHxL): 39 x 29 x 85 mm

TM80041 is an electronic ballast for small wattage lamps, designed to meet the UL –requirements for electronic ballasts.

Technical data	
Nominal input voltage:	<b>12 V DC (10-16 V)</b>
Fluorescent lamp:	<b>4...9 W TL/TC</b>

Special features
Constant light output between nominal and maximum input voltage
Servisafe™-function which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.

Approvals
UL -recognized
CE –marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC
e17 according to the European directive 95/54/EC



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## TM500 –series



Dimensions (WxHxL):

Single lamp types: 35 x 23 x 195 mm

Twin lamp and dimmable types:  
35 x 23 x 195 mm

TM500 –series electronic ballasts are designed especially for the interior lighting of public transport vehicles. They can be used also in other applications where long life, high reliability and good resistance against temperature variations, shocks and vibration are essential.

Technical data	
Nominal input voltage:	
<b>TM5100x:</b>	<b>12 V DC (10-15 V)</b>
<b>TM5101x:</b>	<b>24 V DC (18-30 V)</b>
Fluorescent lamp(s):	
<b>TM510x1:</b>	<b>4...13 W TL</b>
<b>TM510x6:</b>	<b>15...40 W TL</b>
<b>TM510x2:</b>	<b>2 x 8 W TL</b>
<b>TM510x8:</b>	<b>2 x 18 W TL</b>

Special features
Optionally available also with Boosted Pre-Heating™ and/or 2-step dimming. Please enquire.

Approvals:
CE –marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC
e17 according to the European directive 95/54/EC

## TM871xx



Dimensions (WxHxL):

Single lamp types : 35 x 22 x 138 mm

Twin lamp types: 37 x 23 x 195 mm

TM871xx electronic ballasts are designed to enable the usage of T5 fluorescent lamps in public transport vehicles. They can be used also in other applications where long life, high reliability and good resistance against temperature variations, shocks and vibration are essential.

Technical data	
Nominal input voltage:	
<b>TM8714x:</b>	<b>12 V DC (10-15 V)</b>
<b>TM8715x:</b>	<b>24 V DC (18-32 V)</b>
Fluorescent lamp(s):	
<b>TM871x4:</b>	<b>14...21 W T5</b>
<b>TM871x6:</b>	<b>28 W T5</b>
<b>TM871x7:</b>	<b>2 x 14 W T5</b>

Special features
Constant light output between nominal and maximum input voltage
Boosted Pre-Heating™ for long lamp life in conditions where lights are switched on/off frequently.
Servisafe™ –function which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.

Approvals
CE –marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC
e17 according to the European directive 95/54/EC



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## TM927xx



Dimensions (WxHxL): 35 x 23 x 218 mm

TM927xx electronic ballasts are designed to enable the usage of T5 fluorescent lamps in public transport vehicles. It has all the features of the TM871xx, and additionally it has also the possibility to continuous dimming of the lamp.

Technical data	
Nominal input voltage:	24 V DC (18-32 V)
Fluorescent lamp(s):	
<b>TM92753:</b>	14 W T5
<b>TM92754:</b>	21 W T5
<b>TM92756:</b>	28 W T5
<b>TM92757:</b>	35 W T5

Special features
Continuous dimming 15...100%
Constant light output between nominal and maximum input voltage
Boosted Pre-Heating™ for long lamp life in conditions where lights are switched on/off frequently.
Servisafe™ –function which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.

Approvals
CE –marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC
e17, approval No. 020002

## TMAxxxx



Dimensions (WxHxL): 41 x 30 x 260 mm

TMAxxxx is an electronic ballast designed especially for railway interior lighting, but it can used also in other applications where long life, high reliability and good resistance against shocks and vibration are essential.

Technical data	
Nominal input voltage:	
<b>TMA0408:</b>	24 V DC (16,8-32 V)
<b>TMA0148:</b>	110 V DC (77-150 V)
Fluorescent lamp(s):	18...36 W / 2 x 18 W

Special features
Constant light output between nominal and maximum input voltage
Boosted Pre-Heating™ for long lamp life in conditions where lights are switched on/off frequently.
Servisafe™ –function which shuts the output voltage off in a case of lamp failure. The operation returns automatically when the lamp is replaced.
Especially vibration and shock-proof construction due to plated-through circuit board.

Approvals
CE –marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC

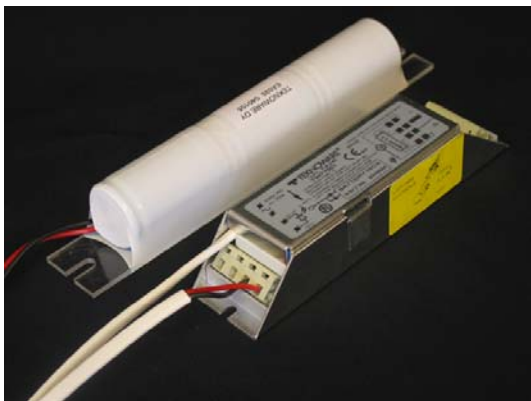


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## ELECTRONICS FOR SELF-CONTAINED EMERGENCY LUMINAIRES USING FLUORESCENT LAMPS

### TW770xx



Dimensions (WxHxL): 40 x 35 x 195

TW770xx is an emergency lighting conversion unit which can be used with both electronic and magnetic ballast.

Technical data	
Nominal input voltage:	230 VAC (207-253 V)
Fluorescent lamp:	
TW77001:	11... 65 W TL/TC-E
TW77002:	4...13W TL/TC-E
TW77003:	4...13W TL/TC-E
Emergency mode duration:	
TW77001:	1 h
TW77002:	1 h
TW77003:	3 h
Battery type:	NiCd 1,5 or 2,2 Ah

Approvals	
Tested and certified by SGS-Fimko and thus FI -marked	
CE -marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC	

### TW964xx



Dimensions (WxHxL): 41 x 28 x 225

TW964xx is an emergency lighting conversion unit which can be used with both electronic and magnetic ballast. Also available for 24V supply.

Technical data	
Nominal input voltage:	
TW9640x:	230 VAC (184-253 V)
TW96411:	24 VAC/DC (19,2-28,8 V)
Fluorescent lamp:	
TW96401:	11... 65 W TL/TC-E
TW96402:	4...13 W TL/TC-E
TW96403:	4...13 W TL/TC-E
TW96404:	18... 65 W TL/TC-E
TW96411:	11... 65 W TL/TC-E
Emergency mode duration:	
TW96401:	1 h
TW96402:	1 h
TW96403:	3 h
TW96404:	3 h
TW96411:	1 h
Battery type:	NiCd 1,5 or 2,2 Ah

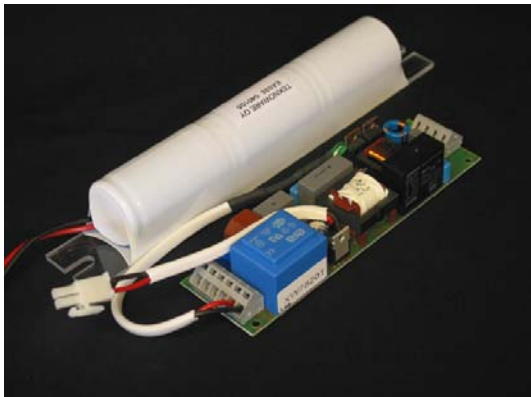
Approvals	
Tested and certified by SGS-Fimko and thus FI -marked	
CE -marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC	



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## XW782xx



Dimensions (WxHxL): 45 x 35 x 154  
Note : Supplied as an assembled circuit board without casing

XW782xx is an emergency lighting electronics unit, which includes an electronic ballast for continuous normal operation and electronics for battery mode operation. The unit can be connected for both maintained and non-maintained use. Separate magnetic or electronic ballast is not needed.

Technical data	
Nominal input voltage:	230 VAC (207-253 V)
Fluorescent lamp:	
XW78201:	4...13 W TL/TC-E
XW78202:	4...13 W TL/TC-E
Emergency mode duration:	
XW78201:	1 h
XW78202:	3 h
Battery type:	NiCd 1,5 or 2,2 Ah

Approvals
Tested and certified by SGS-Fimko and thus FI -marked
CE -marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC



## ELECTRONICS FOR LED -LUMINAIRES

### TS89934



Dimensions (WxHxL): 38 x 28 x 85 mm

TS89934 is a power converter designed especially to supply LEDs in an emergency luminaire.

Technical data	
Nominal input voltage:	230 VAC (180-250 V)
Output voltage:	24 VDC
Max output current:	200 mA

Special features
Regulated output voltage

Approvals
Tested and certified by SGS-Fimko and thus FI -marked
CE -marked according to the European EMC and LV directives 89/336/EEC and 73/23/EEC

### TS89953



Dimensions (WxHxL): 38 x 28 x 85 mm

TS89953 is a power converter with battery back-up, designed especially to supply LEDs in a self contained emergency luminaire.

Technical data	
Nominal input voltage:	230 VAC (180-250 V)
Output voltage:	3,6...4,6 VDC
Max output current:	500 mA
Battery type:	NiCd 3,6 V 600 mAh

Approvals
Tested and certified by SGS-Fimko and thus FI -marked
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We reserve the right to make modifications without prior notice

T252B/23/04



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