

PC TC PRO 1/2x9 – 70 W

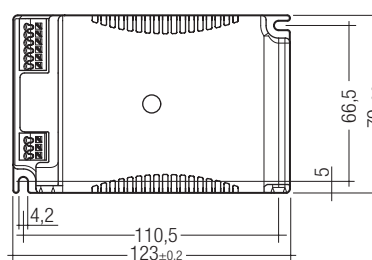
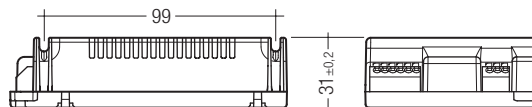
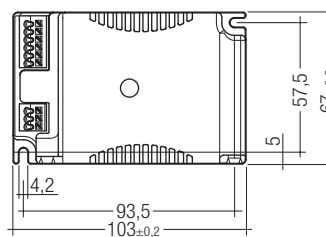
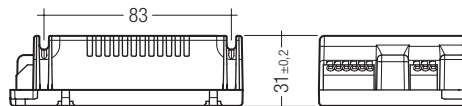
TC-DEL, TC-SEL, TC-TEL, TC-TEL HE, TC-L, TC-F, T5c
compact fluorescent lamps

Product description

- Average life = 50,000 hours (at t_a for $\geq 50,000$ h with a failure rate ≤ 0.2 % per 1,000 hours)
- Large temperature range (for values see table)
- Safety shutdown at end of life
- Automatic start after replacement of defective lamps
- For emergency lighting systems as per EN 50172
- Constant luminous flux irrespective of fluctuations in mains voltage
- For luminaires of protection class 1 and protection class 2
- For luminaires with F or M and MM as per EN 60598, VDE 0710 and VDE 0711
- Temperature protection as per EN 61347-2-3 C5e
- Devices can operate either 1 or 2 lamps

Technical data

AC voltage range	198 – 264 V
DC voltage range	176 – 280 V (Lamp start ≥ 198 V DC)
Overvoltage protection	320 V AC, 1 h
Defined warm start	≤ 1.6 s
Operating frequency	≥ 40 kHz
Type of protection	IP20



Standards, page 3

Wiring diagrams and installation examples, page 8

Ordering data

Type	Article number
For luminaires with 1 lamp	
PC 1x57/70 TC PRO	22176409
For luminaires with 1 or 2 lamps	
PC 1/2x9–13 TC PRO	22176405
PC 1/2x11–17 TC PRO	22176406
PC 1/2x18 TC PRO	22176407
PC 1/2x26–42 TC PRO	22176408
For luminaires with 2 lamps	
PC 2x26–42 TC PRO	22176410

Packaging 103 mm casing: 15 pieces/carton, 750 pieces/pallet

Packaging 123 mm casing: 10 pieces/carton, 500 pieces/pallet

Standards

EN 55015
 EN 60929
 EN 61000-3-2
 EN 61347-2-3
 EN 61347-2-4
 EN 61547
 according to EN 50172

Lamp starting characteristics

Warm start
 Starting time ≤ 1.6 s with AC and DC operation
 Cathode heating will be reduced after preheat time

AC operation

Mains voltage:
 220–240 V 50/60 Hz
 198–264 V 50/60 Hz including safety tolerance (± 10 %)
 202–254 V 50/60 Hz including performance tolerance (+6 % / -8 %)

DC operation

Mains voltage:
 220–240 V 0 Hz
 198–280 V 0 Hz certain lamp start
 176–280 V 0 Hz operating range
 Light output level in DC operation: 100 %

Emergency lighting

Use in emergency lighting installations according to EN 50172 or for emergency luminaires according to EN 61347-2-3 appendix J.

Instant start after mains interruption < 0.5 s

Mains current for defective or missing lamps at DC operation < 10 mA.

Intelligent Voltage Guard

Intelligent Voltage Guard is the name of an electronic monitor from Tridonic. This innovative feature of the PC PRO family of control gear from Tridonic immediately shows if the mains voltage rises above or falls below certain thresholds. Measures can then be taken quickly to prevent damage to the control gear.

- If the mains voltage rises above ≥ 306 V the lamps flash.
- This signal "demands" disconnection of the power supply to the lighting system.
- If the mains voltage falls below 150 V the control gear automatically disconnects the lamp circuit (light off) to protect the control gear from being irreparably damaged.

Smart Heating

PC PRO with smart heating ignition technology optimises lamp start and ensures no energy is wasted. After the lamp has struck the filament heating is reduced automatically to a defined minimum value. This reduction in filament heating, saves energy, yet maintains the proper operating conditions for the lamp. The lamp is always operated within specification.

Mains current in DC operation

Type	Lamp type	Wattage	Mains current at	
			$U_n = 220 V_{DC}$	$U_n = 240 V_{DC}$
PC 1x57/70 TC PRO	TC-TEL	1x57 W	272 mA	250 mA
	TC-TEL	1x70 W	334 mA	306 mA
	TC-DEL	1x10 W	55 mA	51 mA
	TC-DEL	2x10 W	99 mA	91 mA
	TC-DEL	1x13 W	73 mA	67 mA
PC 1/2x9–13 TC PRO	TC-DEL	2x13 W	139 mA	127 mA
	TC-SEL	1x9 W	50 mA	46 mA
	TC-SEL	2x9 W	90 mA	82 mA
	TC-SEL	1x11 W	68 mA	62 mA
	TC-SEL	2x11 W	129 mA	118 mA
PC 1/2x11–17 TC PRO	TC-TEL	1x13 W	70 mA	64 mA
	TC-TEL	2x13 W	130 mA	119 mA
	TC-TEL HE	1x11 W	66 mA	61 mA
	TC-TEL HE	2x11 W	127 mA	116 mA
	TC-TEL HE	1x14 W	80 mA	74 mA
PC 1/2x18 TC PRO	TC-TEL HE	2x14 W	157 mA	144 mA
	TC-TEL HE	1x17 W	94 mA	86 mA
	TC-TEL HE	2x17 W	186 mA	171 mA
	TC-DEL	1x18 W	90 mA	82 mA
	TC-DEL	2x18 W	170 mA	156 mA
PC 1/2x26–42 TC PRO	TC-TEL	1x18 W	90 mA	83 mA
	TC-TEL	2x18 W	174 mA	159 mA
	T5c	1x22 W	117 mA	107 mA
	T5c	2x22 W	225 mA	206 mA
	T5c	1x40 W	189 mA	173 mA
	TC-DEL	1x26 W	125 mA	114 mA
	TC-DEL	2x26 W	242 mA	222 mA
	TC-F	1x18 W	77 mA	71 mA
	TC-F	2x18 W	142 mA	130 mA
	TC-F	1x24 W	106 mA	97 mA
	TC-F	2x24 W	211 mA	193 mA
	TC-L	1x18 W	83 mA	76 mA
	TC-L	2x18 W	155 mA	142 mA
	TC-L	1x24 W	114 mA	104 mA
	TC-L	2x24 W	223 mA	204 mA
PC 2x26–42 TC PRO	TC-TEL	1x26 W	125 mA	115 mA
	TC-TEL	2x26 W	243 mA	223 mA
	TC-TEL	1x32 W	157 mA	144 mA
	TC-TEL	1x42 W	198 mA	181 mA
	T5c	2x22 W	237 mA	218 mA
	T5c	22+40 W	309 mA	283 mA
	T5c	2x40 W	370 mA	339 mA
	TC-DEL	2x26 W	263 mA	241 mA
	TC-F	2x18 W	151 mA	138 mA
	TC-F	2x24 W	216 mA	198 mA
	TC-L	2x18 W	161 mA	148 mA
	TC-L	2x24 W	239 mA	219 mA
	TC-TEL	2x26 W	259 mA	237 mA
	TC-TEL	2x32 W	329 mA	302 mA
	TC-TEL	2x42 W	417 mA	382 mA

Harmonic distortion in the mains supply

Type	Lamp type	Wattage	THD at 230V/50Hz
PC 1x57/70 TC PRO	TC-TEL	1x57W	< 10%
	TC-TEL	1x70W	< 10%
	TC-DEL	1x10W	< 17%
	TC-DEL	2x10W	< 12%
PC 1/2x9-13 TC PRO	TC-DEL	1x13W	< 15%
	TC-DEL	2x13W	< 10%
	TC-SEL	1x9W	< 17%
	TC-SEL	2x9W	< 12%
	TC-SEL	1x11W	< 12%
	TC-SEL	2x11W	< 10%
	TC-TEL	1x13W	< 15%
PC 1/2x11-17 TC PRO	TC-TEL	2x13W	< 10%
	TC-TEL HE	1x11W	< 15%
	TC-TEL HE	2x11W	< 10%
	TC-TEL HE	1x14W	< 12%
	TC-TEL HE	2x14W	< 10%
	TC-TEL HE	1x17W	< 12%
PC 1/2x18 TC PRO	TC-TEL HE	2x17W	< 10%
	TC-DEL	1x18W	< 15%
	TC-DEL	2x18W	< 10%
	TC-TEL	1x18W	< 15%
PC 1/2x26-42 TC PRO	TC-TEL	2x18W	< 10%
	T5c	1x22W	< 12%
	T5c	2x22W	< 10%
	T5c	1x40W	< 10%
	TC-DEL	1x26W	< 12%
	TC-DEL	2x26W	< 10%
	TC-F	1x18W	< 17%
	TC-F	2x18W	< 10%
	TC-F	1x24W	< 12%
	TC-F	2x24W	< 10%
PC 1/2x26-42 TC PRO	TC-L	1x18W	< 17%
	TC-L	2x18W	< 10%
	TC-L	1x24W	< 12%
	TC-L	2x24W	< 10%
	TC-TEL	1x26W	< 12%
	TC-TEL	2x26W	< 10%
	TC-TEL	1x32W	< 10%
	TC-TEL	1x42W	< 10%
	T5c	2x22W	< 12%
	T5c	22+40W	< 10%
PC 2x26-42 TC PRO	T5c	2x40W	< 10%
	TC-DEL	2x26W	< 12%
	TC-F	2x18W	< 15%
	TC-F	2x24W	< 12%
	TC-L	2x18W	< 15%
	TC-L	2x24W	< 12%
	TC-TEL	2x26W	< 12%
	TC-TEL	2x32W	< 10%
	TC-TEL	2x42W	< 10%

Output voltage

Type	Lamp type	Wattage	U _{out}
PC 1x57/70 TC PRO	TC-TEL	1x57W	400V
	TC-TEL	1x70W	400V
	TC-DEL	1x10W	300V
	TC-DEL	2x10W	300V
PC 1/2x9-13 TC PRO	TC-DEL	1x13W	300V
	TC-DEL	2x13W	300V
	TC-SEL	1x9W	300V
	TC-SEL	2x9W	300V
	TC-SEL	1x11W	300V
	TC-SEL	2x11W	300V
	TC-TEL	1x13W	300V
PC 1/2x11-17 TC PRO	TC-TEL	2x13W	300V
	TC-TEL HE	1x11W	400V
	TC-TEL HE	2x11W	400V
	TC-TEL HE	1x14W	400V
	TC-TEL HE	2x14W	400V
	TC-TEL HE	1x17W	400V
PC 1/2x18 TC PRO	TC-TEL HE	2x17W	400V
	TC-DEL	1x18W	250V
	TC-DEL	2x18W	250V
	TC-TEL	1x18W	250V
PC 1/2x26-42 TC PRO	TC-TEL	2x18W	250V
	T5c	1x22W	300V
	T5c	2x22W	300V
	T5c	1x40W	300V
	TC-DEL	1x26W	300V
	TC-DEL	2x26W	300V
	TC-F	1x18W	300V
	TC-F	2x18W	300V
	TC-F	1x24W	300V
	TC-F	2x24W	300V
PC 1/2x26-42 TC PRO	TC-L	1x18W	300V
	TC-L	2x18W	300V
	TC-L	1x24W	300V
	TC-L	2x24W	300V
	TC-TEL	1x26W	300V
	TC-TEL	2x26W	300V
	TC-TEL	1x32W	300V
	TC-TEL	1x42W	300V
	T5c	2x22W	300V
	T5c	22+40W	300V
PC 2x26-42 TC PRO	T5c	2x40W	300V
	TC-DEL	2x26W	300V
	TC-F	2x18W	300V
	TC-F	2x24W	300V
	TC-L	2x18W	300V
	TC-L	2x24W	300V
	TC-TEL	2x26W	300V
	TC-TEL	2x32W	300V
	TC-TEL	2x42W	300V

Ballast lumen factor (EN 60929 8.1)

Type	Lamp type	Wattage	AC/DC-BLF at U = 198–254V, 25 °C
PC 1x57/70 TC PRO	TC-TEL	1x57W	1.00
	TC-TEL	1x70W	0.98
	TC-DEL	1x10W	0.98
	TC-DEL	2x10W	1.02
	TC-DEL	1x13W	1.05
PC 1/2x9–13 TC PRO	TC-DEL	2x13W	1.09
	TC-SEL	1x9W	1.02
	TC-SEL	2x9W	1.05
	TC-SEL	1x11W	1.10
	TC-SEL	2x11W	1.10
	TC-TEL	1x13W	1.05
	TC-TEL	2x13W	1.08
PC 1/2x11–17 TC PRO	TC-TEL HE	1x11W	1.01
	TC-TEL HE	2x11W	1.03
	TC-TEL HE	1x14W	1.01
	TC-TEL HE	2x14W	1.04
	TC-TEL HE	1x17W	1.01
PC 1/2x18 TC PRO	TC-TEL HE	2x17W	1.03
	TC-DEL	1x18W	1.03
	TC-DEL	2x18W	1.06
	TC-TEL	1x18W	1.02
	TC-TEL	2x18W	1.04
PC 1/2x26–42 TC PRO	T5c	1x22W	1.00
	T5c	2x22W	1.03
	T5c	1x40W	1.01
	TC-DEL	1x26W	1.02
	TC-DEL	2x26W	1.08
	TC-F	1x18W	0.94
	TC-F	2x18W	0.98
	TC-F	1x24W	1.01
	TC-F	2x24W	1.05
	TC-L	1x18W	0.94
	TC-L	2x18W	1.01
PC 2x26–42 TC PRO	TC-L	1x24W	1.01
	TC-L	2x24W	1.06
	TC-TEL	1x26W	1.00
	TC-TEL	2x26W	1.04
	TC-TEL	1x32W	0.98
	TC-TEL	1x42W	0.99
	T5c	2x22W	1.04
	T5c	22+40W	1.07
	T5c	2x40W	1.00
	TC-DEL	2x26W	1.08
	TC-F	2x18W	0.99
PC 2x26–42 TC PRO	TC-F	2x24W	1.06
	TC-L	2x18W	0.98
	TC-L	2x24W	1.08
	TC-TEL	2x26W	1.08
	TC-TEL	2x32W	1.01
	TC-TEL	2x42W	1.01

PC PRO with xitec processor

The very latest in lighting management design technology. The lamp friendly warm start is delivering maximum lamp life and enables many frequency applications. Smallest power loss and new freedom in the lamp design thanks to convincing thermal management.

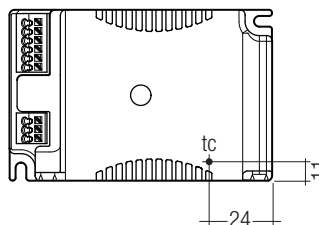
Energy class: CELMA EEI = A2 BAT / A2¹⁾

Maximum energy efficiency:

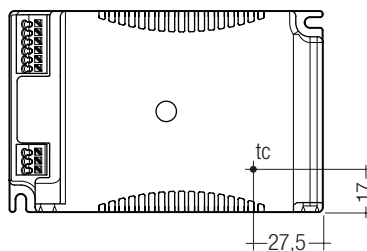
Right from the early stages in the development of xitec technology the focus has always been on achieving maximum energy efficiency. In conjunction with Smart Heating Technology, PC TC PRO is rated in the best possible efficiency class of A2 BAT that CELMA provides for ballasts with a constant luminous flux.

¹⁾ according to the EU directives on ecodesign requirements (EC) No. 245/2009 and (EC) No. 347/2010

Temperature range



PC TC PRO, L = 103 mm



PC TC PRO, L = 123 mm

The ballast life duration is related to the ambient temperature t_a . The relation of t_c to t_a temperature depends also on the luminaire design. If the measured t_c temperature is approx. 5 K below t_c max. or higher, t_a temperature should be checked and eventually critical components (e.g. ELCAP) measured. Detailed information on request.

PC TC PRO is designed for an average service life of 50,000 (at t_a for ≥ 50.000 h) hours under reference conditions and with a failure probability of less than 10 %. This corresponds to an average failure rate of 0.2 % for every 1,000 hours of operation.

Humidity: 5 % up to max. 85 %, not condensed (max. 56 days/year at 85 %)

Storage temperature: -40 °C up to max. +80 °C

The devices have to be within the specified temperature range (t_a) before they can be operated.

Expected lifetime

Type	Lamp type	Lamp power		ta = 40 °C	ta = 50 °C	ta = 55 °C	ta = 60 °C	ta = 65 °C	ta = 70 °C	ta = 75 °C			
PC 1x57/70 TC PRO	TC-TEL	1x57 W	tc	50 °C	60 °C	65 °C	70 °C	75 °C	x	x			
			Lifetime	> 100,000 h	90,000 h	70,000 h	50,000 h	35,000 h	x	x			
	TC-TEL	1x70 W	tc	50 °C	60 °C	65 °C	70 °C	75 °C	x	x			
			Lifetime	> 100,000 h	65,000 h	50,000 h	35,000 h	25,000 h	x	x			
PC 1/2x9–13 TC PRO	TC-SEL TC-DEL	1x9 W 1x10 W	TC-SEL	45 °C	55 °C	60 °C	65 °C	70 °C	75 °C	x			
				Lifetime	> 100,000 h	> 100,000 h	> 100,000 h	95,000 h	65,000 h	45,000 h	x		
	TC-SEL TC-DEL	2x9 W 2x10 W	TC-SEL	45 °C	55 °C	60 °C	65 °C	70 °C	75 °C	x			
				Lifetime	> 100,000 h	> 100,000 h	> 100,000 h	85,000 h	50,000 h	35,000 h	x		
	TC-SEL TC-DEL	2x11 W 2x13 W	TC-SEL	50 °C	60 °C	65 °C	70 °C	75 °C	x	x			
				Lifetime	> 100,000 h	> 100,000 h	100,000 h	70,000 h	45,000 h	x	x		
	PC 1/2x11–17 TC PRO	TC-TEL HE TC-TEL HE	1x11 W 1x14 W	TC-TEL HE	50 °C	60 °C	65 °C	70 °C	75 °C	80 °C	x		
					Lifetime	> 100,000 h	> 100,000 h	> 100,000 h	75,000 h	50,000 h	35,000 h	x	
TC-TEL HE TC-TEL HE		2x11 W 2x14 W	TC-TEL HE	55 °C	65 °C	60 °C	75 °C	x	x	x			
				Lifetime	> 100,000 h	> 100,000 h	95,000 h	50,000 h	x	x	x		
PC 1/2x18 TC PRO	TC-DEL TC-TEL	1x18 W 1x18 W	tc	45 °C	55 °C	60 °C	65 °C	70 °C	75 °C	x			
				Lifetime	> 100,000 h	> 100,000 h	> 100,000 h	90,000 h	70,000 h	50,000 h	x		
	TC-DEL TC-TEL	2x18 W 2x18 W	tc	50 °C	60 °C	65 °C	70 °C	75 °C	x	x			
				Lifetime	> 100,000 h	> 100,000 h	75,000 h	60,000 h	45,000 h	x	x		
PC 1/2x26–42 TC PRO	T5c TC-DEL TC-F TC-F TC-L TC-L TC-TEL	1x22 W 1x26 W 1x18 W 1x24 W 1x18 W 1x24 W 1x26 W	tc	50 °C	60 °C	65 °C	70 °C	75 °C	x	x			
				Lifetime	> 100,000 h	> 100,000 h	90,000 h	65,000 h	45,000 h	x	x		
				T5c TC-F TC-L TC-TEL TC-TEL	1x40 W 2x18 W 2x18 W 1x32 W 1x42 W	tc	50 °C	60 °C	65 °C	70 °C	75 °C	x	x
							Lifetime	> 100,000 h	> 100,000 h	75,000 h	55,000 h	40,000 h	x
	T5c TC-DEL TC-F TC-L TC-TEL	2x22 W 2x26 W 2x24 W 2x24 W 2x26 W	tc	60 °C	65 °C	70 °C	75 °C	x	x	x			
				Lifetime	> 100,000 h	85,000 h	60,000 h	45,000 h	x	x	x		
				TC-F TC-L	2x18 W 2x18 W	tc	45 °C	55 °C	60 °C	65 °C	70 °C	75 °C	80 °C
							Lifetime	> 100,000 h	> 100,000 h	> 100,000 h	95,000 h	70,000 h	50,000 h
	TC-F TC-DEL TC-F TC-L TC-TEL	2x22 W 2x26 W 2x24 W 2x24 W 2x26 W	tc	50 °C	60 °C	65 °C	70 °C	75 °C	x	x			
				Lifetime	> 100,000 h	> 100,000 h	> 100,000 h	75,000 h	50,000 h	x	x		
				T5c T5c	22+40 W 2x40 W	tc	55 °C	65 °C	70 °C	x	x	x	x
							Lifetime	> 100,000 h	90,000 h	60,000 h	x	x	x

x = not permitted

Maximum loading of automatic circuit breakers

Automatic circuit	C10	C13	C16	C20	B10	B13	B16	B20	Inrush current	
Installation cross section	1.5 mm ²	1.5 mm ²	1.5 mm ²	2.5 mm ²	1.5 mm ²	1.5 mm ²	1.5 mm ²	2.5 mm ²	I _{max}	time
PC 1x57–70 TC PRO	24	34	48	54	12	17	24	27	23.4 A	238 μs
PC 1/2x9–13 TC PRO	40	68	136	140	20	34	68	70	15.7 A	236 μs
PC 1/2x11–17 TC PRO	22	32	44	50	11	16	22	25	22.3 A	255 μs
PC 1/2x18 TC PRO	48	72	160	160	24	36	80	80	13.0 A	200 μs
PC 1/2x26–42 TC PRO	24	38	62	66	12	19	31	33	23.5 A	245 μs
PC 2x26–42 TC PRO	14	20	24	30	7	10	12	15	37.1 A	205 μs

Wiring advice

The lead length is dependant on the capacitance of the cable.

With standard solid wire 0.5/0.75 mm² the capacitance of the lead is 30–80 pF/m. This value is influenced by the way the wiring is made. Lamp connection should be made with symmetrical wiring.

Ballast Type	Terminal	Maximum capacitance allowed			
		Cold	Hot	Cold	Hot
PC 1xx TC PRO		4, 5	8, 9	200 pF	100 pF
PC 2xx TC PRO		4, 5, 6, 7	8, 9	200 pF	100 pF

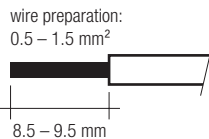
To avoid the damage of the control gear, the wiring must be protected against short circuits to earth (sharp edged metal parts, metal cable clips, louver, etc.)

Installation instructions

Wiring type and cross section

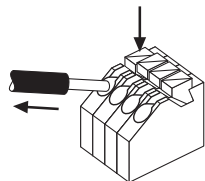
The wiring can be in flexible cable with ferrules or solid with a cross section of 0.5–1.5 mm².

Strip 9.5 mm of insulation from the cables to ensure perfect operation of the push-wire terminals.



Release of the wiring

Press down the "push button" and remove the cable from front.



Mounting of device

Max. torque for fixing: 0.5 Nm/M4

RFI

- Connection to the lamps of the "hot leads" must be kept as short as possible
- Mains leads should be kept apart from lamp leads
- Do not run mains leads adjacent to the electronic ballast
- Twist the lamp leads
- Keep the distance of lamp leads from the metal work as large as possible
- Ballast must be earthed
- Keep the mains leads inside the luminaire as short as possible

Defective lamp

If a lamp is defective, the ballast switches off and goes into standby. Switch off tested according to EN 61347-2-3 17.3 (EoL-Test 2). There is an automatic restart once the lamp has been changed.

Isolation and electric strength testing of luminaires

Electronic devices can be damaged by high voltage. This has to be considered during the routine testing of the luminaires in production.

According to IEC 60598-1 Annex Q (informative only) or ENEC 303-Annex A, each luminaire should be submitted to an isolation test with 500 V_{DC} for 1 second. This test voltage should be connected between the interconnected phase and neutral terminals and the earth terminal.

The isolation resistance must be at least 2 MΩ.

As an alternative, IEC 60598-1 Annex Q describes a test of the electrical strength with 1500 V_{AC} (or 1.414 x 1500 V_{DC}). To avoid damage to the electronic devices this test must not be conducted.

Glow-wire test according to EN 60598-1

850 °C passed

Additional information

Additional technical information at www.tridonic.com → Technical Data

Guarantee conditions at www.tridonic.com → Services

No warranty if device was opened.

Accessories

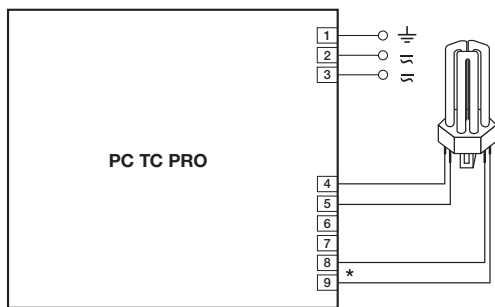
PC compact gear box for independant solutions



Ordering data

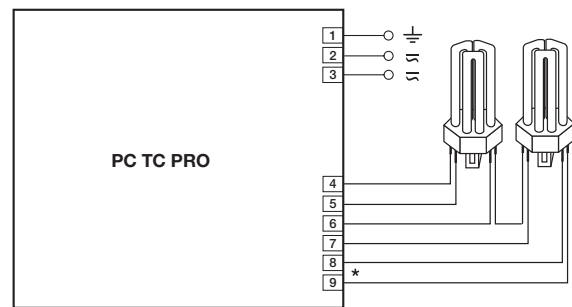
Dimensions LxWxH	Type	Article number
278 x 114 x 55 mm	PC Ballast box, upper section	24138824
278 x 114 x 55 mm	PC Ballast box, lower section	24138825

Wiring diagrams



* Leads 8, 9 max. 1.0 m (< 100 pF)
Leads 4, 5 max. 2.0 m (< 200 pF)
For luminaires of protection class 1: Earthing via earth terminal (to IEC 60598)
For luminaires of protection class 2: No earthing required

PC 1x57/70 TC PRO with 1 lamp
PC 1/2x9-13 TC PRO with 1 lamp
PC 1/2x11-17 TC PRO with 1 lamp
PC 1/2x18 TC PRO with 1 lamp
PC 1/2x26-42 TC PRO with 1 lamp



* Leads 8, 9 max. 1.0 m (< 100 pF)
Leads 4, 5, 6, 7 max. 2.0 m (< 200 pF)
For luminaires of protection class 1: Earthing via earth terminal (to IEC 60598)
For luminaires of protection class 2: No earthing required

PC 1/2x9-13 TC PRO with 2 lamps
PC 1/2x11-17 TC PRO with 2 lamps
PC 1/2x18 TC PRO with 2 lamps
PC 1/2x26-42 TC PRO with 2 lamps
PC 2x26-42 TC PRO with 2 lamps