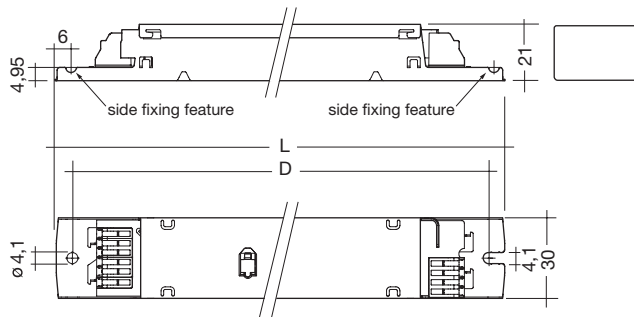


Electronic ballasts for dimming to 1 %
Linear lamps T5, 16 mm high efficiency, high output

PCA T5 EXCITE Ip x:tec 14–80 W 220–240 V 50/60/0 Hz



- world first: first processor-controlled ballast with x:tec inside
- operation of T5 lamps of the same length (e.g. FH 28W/FQ 54W)
- automatic lamp detection and operation with correct lamp parameters
- dimming range from 1–100 %
- lamp friendly warm start within 0.5 s with AC and 0.2 s with DC
- power input on standby < 0.5 W
- disturbance free precise control with a digital signal DALI (Digital Addressable Lighting Interface) or switchDIM
- fully digital lamp management for flash-free starting from any dimmer setting
- operating frequency ~40-100 kHz

- Intelligent Voltage Guard (over voltage indication and under voltage protection)
- Intelligent Temperature Guard (overtemperature protection)
- automatically triggered adjustable emergency light value for DC and rectified AC voltage
- SMART Heating Concept for optimum filament heating at any dimming level and cut off the electrodes at approx. 90 % dimmlevel for maximum energy efficiency

Extensive feedback functions and adjustable parameters:

- OEM-specific reserved memory for storing customer data in the ballast
- extensive diagnostic options

- the emergency light value can be set between 1 % and 100 %
- DALI-MEMORY

Packaging:
360 mm housing
box of 10
76 boxes/pallet
760 pieces/pallet

425 mm housing
box of 25
33 boxes/pallet
825 pieces/pallet

Certified:
EN 55015
EN 55022
EN 60929
EN 61000-3-2
EN 61347-2-3
EN 61547
Suitable for emergency installations according to EN 50172

Lamp	Ballast	article-number	length L mm	fixing centres D mm	weight kg	circuit power W @	lamp power W @	current at 230 V / 50 Hz A @	λ at 230 V / 50 Hz	tc point °C	temperature range °C ①
1x14	PCA 1x14/24 T5 EXCITE Ip x:tec	22176257	360	350	0.25	16.0	1x14	0.08	0.95	80	-25 → +60
2x14	PCA 2x14/24 T5 EXCITE Ip x:tec	22176259	360	350	0.28	32.5	2x14	0.15	0.97	80	-25 → +60
1x24	PCA 1x14/24 T5 EXCITE Ip x:tec	22176257	360	350	0.25	25.5	1x24	0.12	0.97	80	-25 → +60
2x24	PCA 2x14/24 T5 EXCITE Ip x:tec	22176259	360	350	0.28	51.0	2x24	0.23	0.98	85	-25 → +60
1x21	PCA 1x21/39 T5 EXCITE Ip x:tec	22176258	360	350	0.25	23.5	1x21	0.11	0.95	85	-25 → +60
2x21	PCA 2x21/39 T5 EXCITE Ip x:tec	22176260	425	415	0.35	45.5	2x21	0.21	0.97	80	-25 → +60
1x39	PCA 1x21/39 T5 EXCITE Ip x:tec	22176258	360	350	0.25	42.0	1x39	0.20	0.97	85	-25 → +60
2x39	PCA 2x21/39 T5 EXCITE Ip x:tec	22176260	425	415	0.35	82.5	2x39	0.38	0.99	85	-25 → +60
1x28	PCA 1x28/54 T5 EXCITE Ip x:tec	22176205	360	350	0.26	30.5	1x28	0.15	0.95	80	-25 → +60
2x28	PCA 2x28/54 T5 EXCITE Ip x:tec	22176206	425	415	0.35	60.5	2x28	0.28	0.97	80	-25 → +60
1x54	PCA 1x28/54 T5 EXCITE Ip x:tec	22176205	360	350	0.26	59.5	1x54	0.27	0.98	85	-25 → +60
2x54	PCA 2x28/54 T5 EXCITE Ip x:tec	22176206	425	415	0.35	116.5	2x54	0.53	0.99	85	-25 → +55
1x35	PCA 1x35/49/80 T5 EXCITE Ip x:tec	22176204	360	350	0.27	38.5	1x35	0.18	0.97	80	-25 → +60
2x35	PCA 2x35/49 T5 EXCITE Ip x:tec	22176207	425	415	0.34	75.0	2x35	0.33	0.97	80	-25 → +60
1x49	PCA 1x35/49/80 T5 EXCITE Ip x:tec	22176204	360	350	0.27	53.0	1x49	0.24	0.97	80	-25 → +60
2x49	PCA 2x35/49 T5 EXCITE Ip x:tec	22176207	425	415	0.34	105.5	2x49	0.47	0.98	85	-25 → +60
1x80	PCA 1x35/49/80 T5 EXCITE Ip x:tec	22176204	360	350	0.37	86.5	1x80	0.39	0.98	85	-25 → +60

① 10 °C to ta max: normal dimming operation

-25 °C to +10 °C: dimming operation from 100 % to 30 %.

-25 °C to +10 °C, dimming below 30 %: Ballast could shut down but will not cause failure. This applies to AC and DC operation.

② valid at 100 % light output

Electronic ballasts for dimming to 1 %
Linear lamps T5, 16 mm high efficiency, high output

Lamp starting characteristics:

Warm start
 Starting time 0.5 s with AC
 Starting time 0.2 s with DC
 Start at any dimming level

AC operation:

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

DC operation:

220–240 V 0 Hz
 198–280 V 0 Hz certain lamp start
 176–280 V 0 Hz operating range
 Use in emergency lighting installations according to EN 50172 or for emergency luminaires according to EN 61347-2-3 appendix J.

Emergency units:

The "PCA T5 EXCITE Ip xitec" ballasts are compatible with all emergency units from TridonicAtco. See the table in the data sheet. Also all "5-Pole" emergency units can be used. When used with other emergency units tests are necessary.

Temperature range:

Unlimited dimming range from 10 °C to ta max.

-25 °C to +10 °C: dimming operation from 100% to 30%. If dimm level goes below 30% malfunction possible, but no electronic ballast damage. This concerns the AC and DC Operation.

Dimming:

Dimming curve is adapted to the eye sensitiveness. Dimming range 1 % to 100 %

- DALI signal: 16 bit Manchester Code
 Maximum speed 10 % to 100 % in 550 ms
 Programmable parameter:
 Minimum dimming level
 Maximum dimming level
 Default minimum = 1 %
 Default Maximum = 100 %

Control input (DA, DA):

Digital DALI signal or a push-to-make switch (switchDIM) can be wired on the same terminals (DA and DA).

Digitales signal DALI:

The control input is non-polar and protected against accidental connection with a mains voltage up to 264 V. The control signal is not SELV. Control cable has to be installed in accordance to the requirements of low voltage installations.

Mains currents in DC operation (at 70% light output)

wattage W	Ballast type	Mains current at $U_n = 220\text{ V}_{DC}$	Mains current at $U_n = 240\text{ V}_{DC}$
1x14	PCA 1x14/24 T5 EXCITE Ip xitec	0.06 A	0.06 A
2x14	PCA 2x14/24 T5 EXCITE Ip xitec	0.12 A	0.12 A
1x24	PCA 1x14/24 T5 EXCITE Ip xitec	0.10 A	0.09 A
2x24	PCA 2x14/24 T5 EXCITE Ip xitec	0.20 A	0.18 A
1x21	PCA 1x21/39 T5 EXCITE Ip xitec	0.09 A	0.08 A
2x21	PCA 2x21/39 T5 EXCITE Ip xitec	0.17 A	0.16 A
1x39	PCA 1x21/39 T5 EXCITE Ip xitec	0.15 A	0.14 A
2x39	PCA 2x21/39 T5 EXCITE Ip xitec	0.30 A	0.28 A
1x28	PCA 1x28/54 T5 EXCITE Ip xitec	0.11 A	0.11 A
2x28	PCA 2x28/54 T5 EXCITE Ip xitec	0.21 A	0.20 A
1x54	PCA 1x28/54 T5 EXCITE Ip xitec	0.21 A	0.20 A
2x54	PCA 2x28/54 T5 EXCITE Ip xitec	0.42 A	0.38 A
1x35	PCA 1x35/49/80 T5 EXCITE Ip xitec	0.14 A	0.13 A
2x35	PCA 2x35/49 T5 EXCITE Ip xitec	0.26 A	0.24 A
1x49	PCA 1x35/49/80 T5 EXCITE Ip xitec	0.18 A	0.17 A
2x49	PCA 2x35/49 T5 EXCITE Ip xitec	0.36 A	0.33 A
1x80	PCA 1x35/49/80 T5 EXCITE Ip xitec	0.30 A	0.27 A

Ballast lumen factor AC operation (AC-BLF) EN 60929 Pkt.8.1:

wattage W	Ballast type	AC-BLF at $U_n = 230\text{ V}_{AC}$
1x14	PCA 1x14/24 T5 EXCITE Ip xitec	1.00
2x14	PCA 2x14/24 T5 EXCITE Ip xitec	0.99
1x24	PCA 1x14/24 T5 EXCITE Ip xitec	1.01
2x24	PCA 2x14/24 T5 EXCITE Ip xitec	1.02
1x21	PCA 1x21/39 T5 EXCITE Ip xitec	1.03
2x21	PCA 2x21/39 T5 EXCITE Ip xitec	1.02
1x39	PCA 1x21/39 T5 EXCITE Ip xitec	1.02
2x39	PCA 2x21/39 T5 EXCITE Ip xitec	1.02
1x28	PCA 1x28/54 T5 EXCITE Ip xitec	1.00
2x28	PCA 2x28/54 T5 EXCITE Ip xitec	1.01
1x54	PCA 1x28/54 T5 EXCITE Ip xitec	1.00
2x54	PCA 2x28/54 T5 EXCITE Ip xitec	1.01
1x35	PCA 1x35/49/80 T5 EXCITE Ip xitec	0.99
2x35	PCA 2x35/49 T5 EXCITE Ip xitec	0.98
1x49	PCA 1x35/49/80 T5 EXCITE Ip xitec	1.02
2x49	PCA 2x35/49 T5 EXCITE Ip xitec	1.00
1x80	PCA 1x35/49/80 T5 EXCITE Ip xitec	1.02

The ballast lumen factor for AC operation (AC-BLF) does not alter from $U_n = 198\text{ VAC}$ to $U_n = 254\text{ VAC}$.

The ballast lumen factor for DC operation (DC-BLF) on the basis of an automatic power reduction of the ballasts (default value is 70%) will be smaller than AC. It does not alter in the DC operating range (198–280 VDC).

Harmonic distortion in the mains supply (at 230 V / 50 Hz):

wattage W	Ballast type	THD	3	5	7	9	11
1x14	PCA 1x14/24 T5 EXCITE Ip xitec	10.2	5.4	6.1	3.2	2.2	1.6
2x14	PCA 2x14/24 T5 EXCITE Ip xitec	7.8	4.3	2.5	2.5	2.7	2.2
1x24	PCA 1x14/24 T5 EXCITE Ip xitec	6.1	4.6	1.1	1.2	1.2	1.2
2x24	PCA 2x14/24 T5 EXCITE Ip xitec	4.8	3.2	1.4	2.0	1.3	1.2
1x21	PCA 1x21/39 T5 EXCITE Ip xitec	8.1	5.9	2.4	2.5	2.5	1.6
2x21	PCA 2x21/39 T5 EXCITE Ip xitec	7.2	3.6	4.4	2.5	1.5	1.5
1x39	PCA 1x21/39 T5 EXCITE Ip xitec	7.0	5.5	1.1	2.1	1.5	1.3
2x39	PCA 2x21/39 T5 EXCITE Ip xitec	5.3	4.0	2.5	1.8	0.6	0.9
1x28	PCA 1x28/54 T5 EXCITE Ip xitec	9.1	3.1	3.1	3.4	3.3	3.3
2x28	PCA 2x28/54 T5 EXCITE Ip xitec	10.0	7.3	1.7	2.1	2.2	1.9
1x54	PCA 1x28/54 T5 EXCITE Ip xitec	5.6	3.5	1.5	1.6	1.1	1.3
2x54	PCA 2x28/54 T5 EXCITE Ip xitec	8.9	8.5	1.4	1.5	0.7	0.7
1x35	PCA 1x35/49/80 T5 EXCITE Ip xitec	9.1	6.0	4.2	2.2	1.9	1.8
2x35	PCA 2x35/49 T5 EXCITE Ip xitec	8.7	7.2	1.4	1.4	1.4	0.9
1x49	PCA 1x35/49/80 T5 EXCITE Ip xitec	9.6	7.8	4.3	1.8	1.0	1.0
2x49	PCA 2x35/49 T5 EXCITE Ip xitec	7.8	7.5	0.6	1.1	0.6	0.7
1x80	PCA 1x35/49/80 T5 EXCITE Ip xitec	8.1	7.8	1.6	0.6	0.5	0.6

switchDIM:

Integrated switchDIM function allows a direct connection of a push to make switch for dimming and switching.

Brief push (< 0.6 s) switches ballast ON and OFF. The ballasts switch-ON at light level set at switch-OFF. When the push to make switch is held, PCA ballasts are dimmed. After repush the PCA is dimmed in the opposite direction.

The switchDIM fade time is set to 3 s from min. to max. in the factory settings. With a 20 s push to the push to make switch this fade time can be changed to 6 s. In this instance the switchDIM application will be synchronized to 50 % light level after 10 s and after 20 s the light level rises to 100 % with the new fade time.

At every synchronisation (10 s keystroke) the device will reset to 3 s (factory setting)

In installations with PCAs with different dimming levels or opposite dimming directions (e.g. after a system extension), all PCAs can be synchronized to 50 % dimming level by a 10 s push.

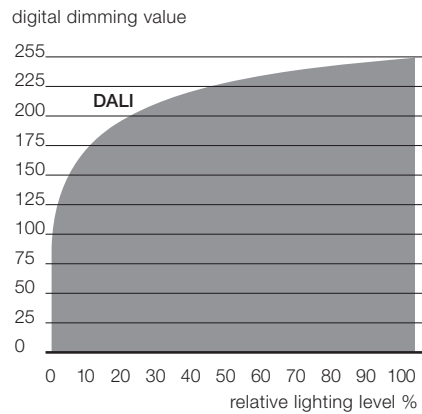
Use of push to make switch with indicator lamp is not permitted.

Lamp type recognition:

Each of the lamps for which the control gear is designed will be operated correctly according to the lamp specifications. The currently used lamp is recognised during the start up process.

To avoid an incorrect lamp recognition due to fast multiple ON/OFF switches, new lamp data are only restored if the lamp has operated for at least 5 seconds.

**Dimming characteristics
PCA T5 EXCITE Ip x:tec**

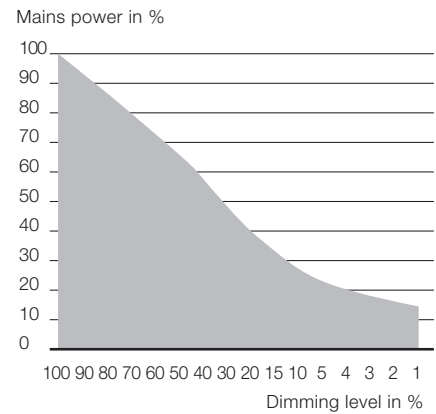


Intelligent Voltage Guard

Intelligent Voltage Guard is the name of the new electronic monitor from TridonicAtco. This innovative feature of the PCA family immediately shows if the mains voltage rises above or falls below certain thresholds (e.g. released by a neutral interrupt). Measures can then be taken quickly to prevent damage to the control gear.

- If the mains voltage rises above approx. 305 V (voltage depends on the ballast type), the lamp starts flashing.
- This signal "demands" disconnection of the power supply to the lighting system.

**Energy saving
PCA T5 EXCITE Ip x:tec**



- The active-current-control of these control gears is protected against failure caused by the high mains currents generated as a result of mains undervoltage. The switch off level depends on lamp wattage and is typically < 140 V.



Intelligent Temperature Guard

The intelligent temperature guard protects the PCA T5 EXCITE Ip x:tec from thermal overheating by reducing the output power or switching off in case of operation above the thermal limits of the luminaire or ballast. Depending on the luminaire design, the ITG operates at about 5 to 10 °C above Tc temperature.

Loading of automatic circuit breakers:

Automatic circuit breaker type	C10	C13	C16	C20	B10	B13	B16	B20
Installation \varnothing	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
PCA 1x14/24 T5 EXCITE Ip x:tec	50	80	150	180	25	40	75	90
PCA 2x14/24 T5 EXCITE Ip x:tec	24	34	48	52	12	17	24	26
PCA 1x21/39 T5 EXCITE Ip x:tec	34	50	76	86	17	25	38	43
PCA 2x21/39 T5 EXCITE Ip x:tec	16	22	30	36	8	11	15	18
PCA 1x28/54 T5 EXCITE Ip x:tec	24	34	48	52	12	17	24	26
PCA 2x28/54 T5 EXCITE Ip x:tec	14	20	26	32	7	10	13	16
PCA 1x35/49/80 T5 EXCITE Ip x:tec	16	22	30	34	8	11	15	17
PCA 2x35/49 T5 EXCITE Ip x:tec	14	20	26	32	7	10	13	16

Continuous operation: to calculate the protective safety switch see main current, page 1

Operating voltage:

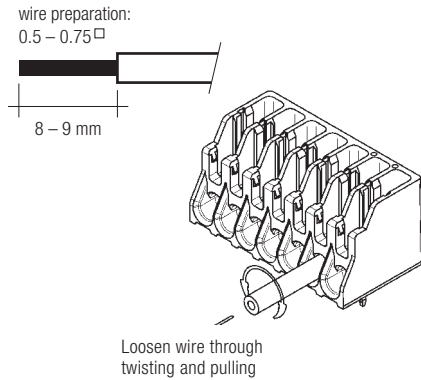
Wattage W	Ballast type	U _{out}
1x14	PCA 1x14/24 T5 EXCITE Ip x:tec	400 V
2x14	PCA 2x14/24 T5 EXCITE Ip x:tec	400 V
1x24	PCA 1x14/24 T5 EXCITE Ip x:tec	400 V
2x24	PCA 2x14/24 T5 EXCITE Ip x:tec	400 V
1x21	PCA 1x21/39 T5 EXCITE Ip x:tec	400 V
2x21	PCA 2x21/39 T5 EXCITE Ip x:tec	400 V
1x39	PCA 1x21/39 T5 EXCITE Ip x:tec	400 V
2x39	PCA 2x21/39 T5 EXCITE Ip x:tec	400 V
1x28	PCA 1x28/54 T5 EXCITE Ip x:tec	430 V
2x28	PCA 2x28/54 T5 EXCITE Ip x:tec	430 V
1x54	PCA 1x28/54 T5 EXCITE Ip x:tec	430 V
2x54	PCA 2x28/54 T5 EXCITE Ip x:tec	430 V
1x35	PCA 1x35/49/80 T5 EXCITE Ip x:tec	430 V
2x35	PCA 2x35/49 T5 EXCITE Ip x:tec	430 V
1x49	PCA 1x35/49/80 T5 EXCITE Ip x:tec	430 V
2x49	PCA 2x35/49 T5 EXCITE Ip x:tec	430 V
1x80	PCA 1x35/49/80 T5 EXCITE Ip x:tec	430 V

Electronic ballasts for dimming to 1 %
Linear lamps T5, 16 mm high efficiency, high output

Installationguide:

Wiring type and cross section:

The wiring can be solid cable with a cross section of 0.5 to 0.75 mm² for push terminal and 0.5 mm² for IDC terminal. For the push-wire connection you have to strip the insulation (8–9 mm).



Wiring advice:

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

Ballast Type	Terminal		Maximum capacitance allowed	
	Cold	Hot	Cold	Hot
PCA 1/xx T5 EXCITE Ip x tec	11, 12	9, 10	200 pF	100 pF
PCA 2/xx T5 EXCITE Ip x tec	11, 12, 13, 14	9, 10, 15, 16	200 pF	100 pF

With standard solid wire 0.5/0.75 mm² the capacitance of the lead is 30–80 pF/m.

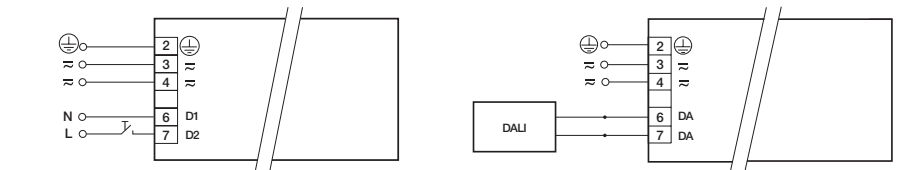
This value is influenced by the way the wiring is made.

Lamp connection should be made with symmetrical wiring.

Hot leads (9, 10, 15, 16) and cold leads (11, 12, 13, 14) should be separated as much as possible.

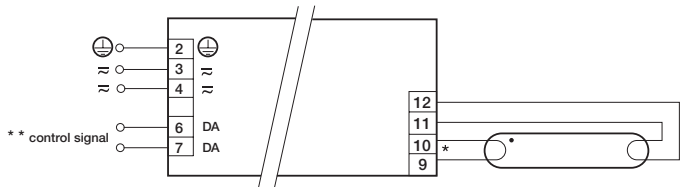
When using two or more dimmable ballasts in one luminaire with separate dimming controls, the lamp leads must be kept separate.

Dimmable ballasts from TridonicAtco have to be earthed.

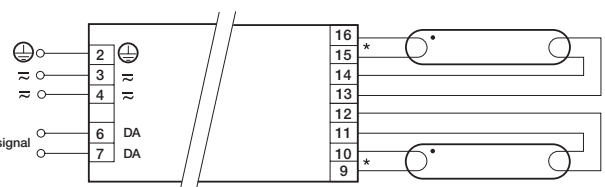


switchDIM PCA T5 EXCITE Ip x|tec

DALI PCA T5 EXCITE Ip x|tec



* leads 9, 10: keep wires short, max. 1.0 m
 leads 11, 12: max. 2.0 m; ballast must be earthed
 ** digital signal DALI or switchDIM



* leads 9, 10, 15, 16: keep wires short, max. 1.0 m
 leads 11, 12, 13, 14: max. 2.0 m; ballast must be earthed
 ** digital signal DALI or switchDIM

PCA T5 EXCITE Ip x|tec 1x14–80 W

PCA T5 EXCITE Ip x|tec 2x14–54 W

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 (ideally 5–10 cm distance)
- 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
- Mains wiring to be twisted when through wiring
- Keep the mains leads inside the luminaire as short as possible

General advise:

Electronic ballasts are virtually noise free. Magnetic fields generated during the ignition cycle can cause some background noise but only for a few milliseconds.

Programming:

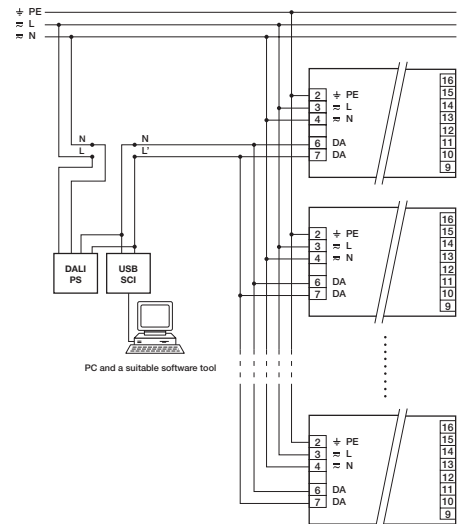
With appropriate software and a USB interface different functions can be activated and various parameters can be configured in the new PCA T5 EXCITE Ip x|tec. All that is needed is a DALI-USB and the software.

configTOOL

Full version for programming all the functions and parameters.

pcaCONFIGURATOR

For programming the device configuration (fade time, ePowerOnLevel, etc.) DC level, compatibility settings, and startup date and for resetting.



Wiring diagram for programming

① For further technical information please visit www.tridonicatco.com