

TDK DC to DC Converters, DC to AC Inverters

For fluorescent display panels

40E D ■ 8821248 0005006 4 ■ TDKA

T D K CORP

T-57-29

CD SERIES CONVERTERS FOR DRIVING FLUORESCENT DISPLAY PANELS

Various fluorescent display panels are made by NEC Corporation, Ise Electronics Corporation (distributed by Noritake Co., Ltd.) and Futaba Corporation. The drive voltage, power consumption and drive system all differ according to the type of fluorescent display panel and since a multiple output power supply is required for the filament, anode, grid and cathode bias, the supply of a voltage from a converter can be said to display the greatest convenience.

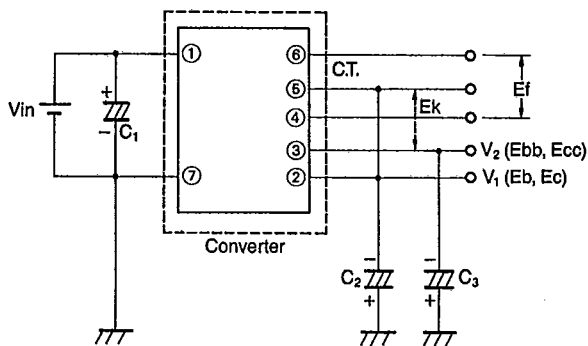
TEMPERATURE AND HUMIDITY RANGES

Operating temperature range	0 to +50°C [32 to 122°F]
Storage temperature range	-20 to +80°C [-4 to +176°F]
Humidity	90%RH max. (Maximum wet-bulb temperature: 38°C [100.4°F])

CONNECTIONS AND DRIVE CIRCUITS

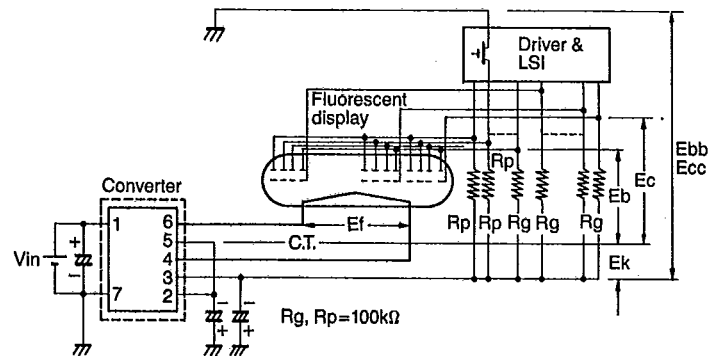
A. Negative voltage output type

Connections



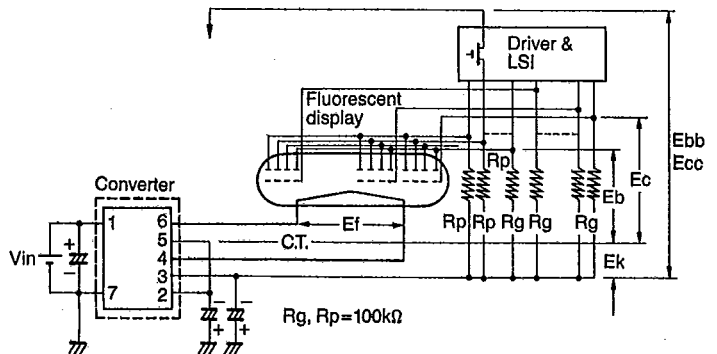
- Ef (filament voltage) A center tap (CT) is provided. Floating (insulated) A.C. r.m.s. output.
- V₁ (Eb, Ec): D.C. negative voltage output; anode, grid supply voltage.
- V₂ (Ebb, Ecc): D.C. negative voltage output; voltage for obtaining cathode bias voltage (Ek); Ek=(Ebb, Ecc) - (Eb, Ec); no output is provided with a display panel which does not require Ek.
- C₁, C₂, C₃: External smoothing capacitors; dielectric strength and capacitance are shown when samples are supplied.

Drive circuit-1



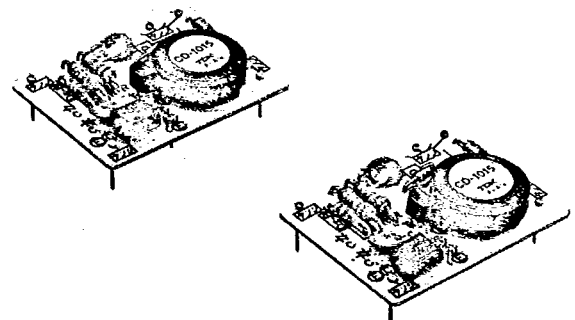
- When the anode and grid potential is ground potential, standard converters are designed to use with this drive circuit-1.

Drive circuit-2



- When the anode and grid potential is +5V (TTL level), standard converters cannot be used with this drive circuit-2.

If a converter is required for this drive circuit, specify "bias drive."



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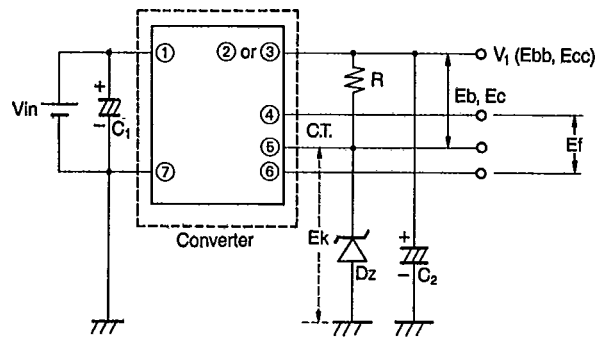
4DE D ■ 8821248 0005007 6 ■ TDKA

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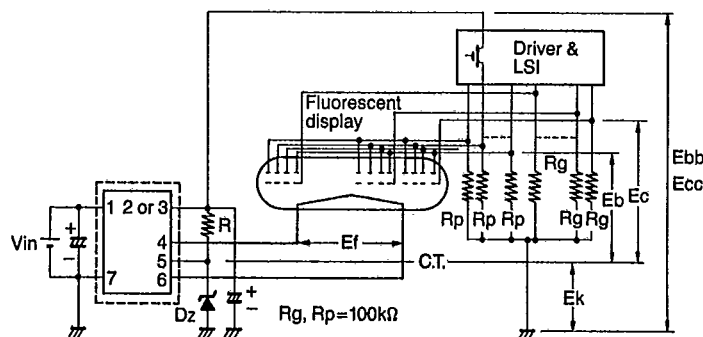
B. Positive voltage output type

Connections



- Ef (filament voltage): A center tap (CT) is provided. Floating (insulated) A.C. r.m.s. output.
- V₁ (Ebb, Ecc): D.C. positive output voltage; anode and grid supply voltage inclusive of cathode bias voltage (Ek).
- C₁, C₂: External smoothing capacitors; dielectric strength and capacitance are shown when samples are supplied.
- Dz, R: Dz and R are connected to obtain the cathode bias voltage (Ek) and for the zener voltage (V_Z), select 0.5 to 1.0V above the Ek voltage of display panel. Set the zener current (I_Z) by R from 1 to 2 mA. However, with display panels which do not require Ek, Dz and R are not necessary, and the V₁ output voltage is the supply voltage of only the anode and grid.
- Set the Ek voltage for a dot type panel to the grid elimination voltage (Ecco) plus 2 to 3V. When Ek is not required Dz and R are not necessary and the V₁ output voltage becomes the supply voltage for the anode and grid only.

Drive circuit



DC positive output (V₁) terminal

Shapes and dimensions*1	Terminal No.
C-1	2
C-2	2 or 3*2
C-3	3
C-4	3
C-5	2 or 3*2

*1 See page 175

*2 Please consult us.

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ELECTRICAL CHARACTERISTICS

Applications: Electronic cash registers (ECRs, POS systems) and others

For NEC fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type NEC No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAac) max.	I ₂ (mAac) max.		
CD-1601N	3.5	78	-42	-48	19.5	3.9	C-3	FIP8A11
CD-1601P	3.5	78	48	—	25.4	—		
CD-1602N	4.6	75	-45	-56	15.9	5.1	C-3	FIP9A13A
CD-1602P	4.6	75	56	—	23	—	C-4	
CD-1603N	5.1	75	-45	-56	20.4	5.1	C-4	FIP10A13
CD-1603P	5.1	75	56	—	27.5	—		
CD-1604N	5.0	120	-35	-43	19.5	4.3	C-4	FIP10B13
CD-1604P	5.0	120	43	—	25.8	—		
CD-1605N	5.2	120	-42	-50	27	5.0	C-4	FIP13B13
CD-1605P	5.2	120	50	—	34	—		

* Refer to page 175.

For ISE fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type ISE No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAac) max.	I ₂ (mAac) max.		
CD-1701N	4.0	18	-22	-26.5	3.5	2.4	C-1	FG116C6
CD-1701P	4.0	18	26.5	—	7.9	—		
CD-1702N	5.5	55	-30	-36.5	9.6	3.3	C-3	FG139A1
CD-1702P	5.5	55	36.5	—	14.9	—		
CD-1703N	5.2	55	-15	-21	22	8.4	C-3	FG79C6
CD-1703P	5.2	55	21	—	32.4	—		
CD-1704N	3.0	55	-24	-28	11.3	2.6	C-2	FG511E6
CD-1704P	3.0	55	28	—	15.9	—		
CD-1705N	4.7	120	-35	-40	15.8	3.5	C-3	FG913ES1
CD-1705P	4.7	120	40	—	21.3	—		
CD-1706N	5.0	120	-35	-40	19.5	3.8	C-3	FG1013RS1
CD-1706P	5.0	120	40	—	25.3	—		
CD-1707N	5.7	73	-30	-36	22.5	3.6	C-3	FG914RB1
CD-1707P	5.7	73	36	—	28.1	—		

* Refer to page 175.

For FUTABA fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type FUTABA No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAac) max.	I ₂ (mAac) max.		
CD-1801N	4.2	78	-26.5	-34	15	3.4	C-3	11-MT-61ZA
CD-1801P	4.2	78	34	—	20.4	—		
CD-1802N	4.6	75	-34	-41	19.5	4.1	C-3	9-LT-03Z
CD-1802P	4.6	75	41	—	25.6	—		

* Refer to page 175.

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Applications: Digital clocks, timers and others

For NEC fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type NEC No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAac) max.	I ₂ (mAac) max.		
CD-1621N	—	—	-24	-27	11.6	2.5	C-1	FIP4A8 FIP4A8A FIP4B8 FIP4C9
CD-1621P	—	—	27	—	16.1	—	C-2	
CD-1622N	2.3	75	-26	-30.5	9	2.8	C-2	FIP5D3
CD-1622P	2.3	75	30.5	—	13.8	—		FIP5D13A
CD-1623N	3.0	75	-18	—	26.2	—	C-3	FIP5A15S FIP5A15CS FIP5D15S FIP5E15S
CD-1623P	3.0	75	18	—	26.2	—		

* Refer to page 175.

For ISE fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type ISE No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAac) max.	I ₂ (mAac) max.		
CD-1721N	2.5	120	-26	-29.5	18.8	3.0	C-3	FG413D1
CD-1721P	2.5	120	29.5	—	23.8	—		
CD-1722N	4.0	73	-26	-31	24.5	3.4	C-3	FG515F1
CD-1722P	4.0	73	31	—	30	—		

* Refer to page 175.

For FUTABA fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type FUTABA No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAac) max.	I ₂ (mAac) max.		
CD-1821N	2.4	75	-26	-30.5	13.2	3.1	C-2	4-MT-032A 4-MT-072B 5-LT-31Z 5-LT-33Z
CD-1821P	2.4	75	30.5	—	16.5	—	C-3	
CD-1822N	3.0	120	-26	-30.5	24	3.1	C-3	4-LT-21ZA1
CD-1822P	3.0	120	30.5	—	29.1	—		
CD-1823N	3.0	75	-18	—	29.6	—	C-3	4-LT-16Z
CD-1823P	3.0	75	18	—	29.6	—		5-LT-16Z
CD-1824N	2.4	75	-15	—	22.8	—	C-2	4-LT-26Z
CD-1824P	2.4	75	15	—	22.8	—		5-LT-36Z

* Refer to page 175.

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Applications: Audio equipment, video equipment, analog instrumentation and others

For NEC fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type NEC No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAdc) max.	I ₂ (mAdc) max.		
CD-1641N	2.6	53	-24	-28	11.6	2.5	C-2	FIP5E8 FIP6A8A FIP6A8B
CD-1641P	2.6	53	28	—	16.1	—		
CD-1642N	2.7	73	-24	-27.5	10.8	2.6	C-2	FIP6B8
CD-1642P	2.7	73	27.5	—	15.4	—		
CD-1643N	2.3	75	-26	-31	7.5	2.7	C-2	FIP6C8
CD-1643P	2.3	75	31	—	12.2	—		
CD-1644N	3.0	100	-16	-17.5	32.1	4.2	C-3	FIP24B17YS FIP24A15YS FIP24A17YS
CD-1644P	3.0	100	17.5	—	38.3	—		
CD-1645N	5.4	78	-24	-31	84	6.2	C-4	FIP101B8Y FIP101B8AY
CD-1645P	5.4	78	31	—	92.2	—		
CD-1646N	2.7	196	-30	-33.5	74	21	C-4	FIP60B30T
CD-1646P	2.7	196	33.5	—	97	—		

* Refer to page 175.

For ISE fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type ISE No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAdc) max.	I ₂ (mAdc) max.		
CD-1741N	2.7	115	-15	-22	31	3.3	C-3	FG28SJ1
CD-1741P	2.7	115	22	—	36.3	—		
CD-1742N	5.5	37	-40	-47	13	10.4	C-3	FG100SA1 FG202SA1
CD-1742P	5.5	37	47	—	25.4	—		

* Refer to page 175.

For FUTABA fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type FUTABA No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAdc) max.	I ₂ (mAdc) max.		
CD-1841N	2.1	75	-8	—	11.3	—	C-1	7-BT-02Z
CD-1841P	2.1	75	8	—	11.3	—		
CD-1842N	3.6	75	-30	-36	10.5	3.6	C-3	8-MT-01Z
CD-1842P	3.6	75	36	—	16.1	—		
CD-1843N	3.3	75	-15	—	30.6	—	C-2	7-LT-02Z
CD-1843P	3.3	75	15	—	30.6	—		
CD-1844N	3.0	75	-16	—	24	—	C-2	BG-41Z
CD-1844P	3.0	75	16	—	24	—		
CD-1845N	3.0	75	-18	—	28.8	—	C-3	BG-42Z
CD-1845P	3.0	75	18	—	28.8	—		
CD-1846N	4.5	22	-22	-30	4.4	3	C-1	17-ST-22ZA
CD-1846P	4.5	22	30	—	9.4	—		
CD-1847N	3.3	78	-26	-30.5	12	3.1	C-2	6-LT-15Z
CD-1847P	3.3	78	30.5	—	17.1	—		
CD-1848N	5.2	120	-34.5	-43	32.3	4.3	C-4	6-JS-03Z
CD-1848P	5.2	120	43	—	38.6	—		

* Refer to page 175.

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Applications: Data terminals and others (dot type)

For NEC fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type NEC No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAdc) max.	I ₂ (mAdc) max.		
CD-1661N	5.5	55	-30	-37	7.8	7.8		
CD-1661P	5.5	55	37	—	17.6	—	C-3	FIP11A8X
CD-1662N	6.8	90	-35	-43	14.4	9.1		
CD-1662P	6.8	90	43	—	25.5	—	C-4	FIP16A11X
CD-1663N	5.1	78	-35	-43	15.0	10.9	C-3	
CD-1663P	5.1	78	43	—	27.9	—	C-4	FIP20B9X
CD-1664N	6.1	60	-45	-53	6.3	11.2		
CD-1664P	6.1	60	53	—	19.5	—	C-3	FIP32A5X
CD-1665N	8.4	78	-42	-51.5	22.5	12.9		
CD-1665P	8.4	78	51.5	—	37.4	—	C-4	FIP32A9X
CD-1666N	8.9	78	-45	-54	9.3	11.4		
CD-1666P	8.9	78	54	—	22.7	—	C-4	FIP40A5X
CD-1667N	9.7	78	-45	-54	24.0	14.3		
CD-1667P	9.7	78	54	—	40.3	—	C-4	FIP40B9X
CD-1668N	4.8	156	-48	-54.5	30	11.9		
CD-1668P	4.8	156	54.5	—	43.9	—	C-4	FIP60A5X
CD-1669N	9.0	156	-45	-56	45	12.2		
CD-1669P	9.0	156	56	—	59.2	—	C-5	FIP80A5X
CD-1670N	9.3	160	-55	-66.5	30	16.6		
CD-1670P	9.3	160	66.5	—	48.6	—	C-5	FIP80A6X
CD-1671N	9.0	208	-45	-56	45	14		
CD-1671P	9.0	208	56	—	61	—	C-5	FIP80A9X
CD-1672N	8.2	200	-48	-58.5	27	12.7		
CD-1672P	8.2	200	58.5	—	41.7	—	C-5	FIP160A4X

* Refer to page 175.

For ISE fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type ISE No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAdc) max.	I ₂ (mAdc) max.		
CD-1761N	3.6	22	-24	-30	4.5	6.3	C-1	
CD-1761P	3.6	22	30	—	12.8	—	C-2	DC95A2
CD-1762N	5.3	120	-35	-44	18	9.2		
CD-1762P	5.3	120	44	—	29.2	—	C-4	DC1015A2
CD-1763N	6.0	20	-28	-36	4.5	7.5		
CD-1763P	6.0	20	36	—	14	—	C-2	DC165A2
CD-1764N	4.8	120	-35	-43.5	13	9.1		
CD-1764P	4.8	120	43.5	—	24.1	—	C-4	DC169A2A
CD-1765N	5.7	37	-35	-43.5	6.3	9.1		
CD-1765P	5.7	37	43.5	—	17.4	—	C-3	DC205A2
CD-1766N	6.4	120	-35	-45	13	9.4		
CD-1766P	6.4	120	45	—	24.4	—	C-4	DC209A2
CD-1767N	9.0	78	-45	-55	13	11.5		
CD-1767P	9.0	78	55	—	26.7	—	C-4	DC406A2
CD-1769N	9.7	78	-45	-57	22.5	11.9		
CD-1769P	9.7	78	57	—	36.4	—	C-4	DC409A2
CD-1770N	9.3	160	-55	-72	16.5	18		
CD-1770P	9.3	160	72	—	36.5	—	C-5	DC806A2
CD-1771N	10.7	230	-60	-77	27	19.3		
CD-1771P	10.7	230	77	—	48.3	—	C-5	DC809B2
CD-1772N	9.0	156	-45	-55	33.8	12		
CD-1772P	9.0	156	55	—	47.8	—	C-5	DC40026B2
CD-1773N	9.3	240	-55	-72	22.5	18		
CD-1773P	9.3	240	72	—	42.5	—	C-5	DC80025C2
CD-1774N	7.6	200	-60	-77	19.8	16.7		
CD-1774P	7.6	200	77	—	38.5	—	C-5	DM256X26F

* Refer to page 175.

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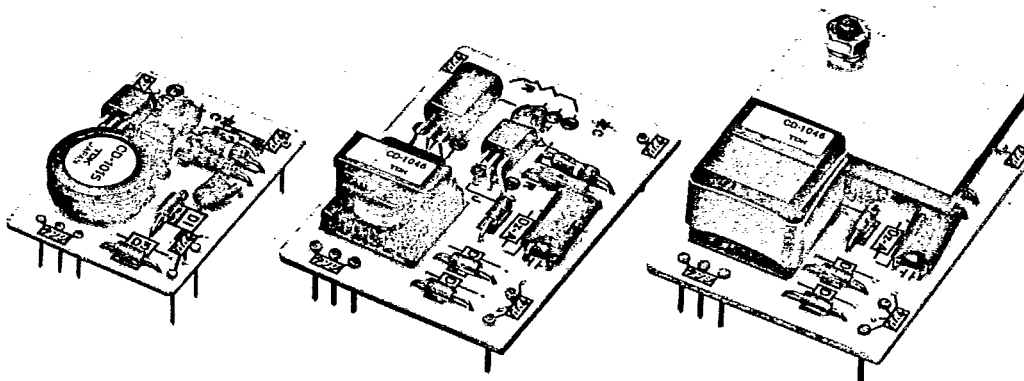
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Applications: Data terminals and others (dot type)

For FUTABA fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type FUTABA No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAdc) max.	I ₂ (mAdc) max.		
CD-1861N	5.0	78	-25	-31.5	15	8.1		
CD-1861P	5.0	78	31.5	—	25.1	—	C-3	20-SD-41Z
CD-1862N	4.9	22	-25	-31	7.3	6.5	C-1	
CD-1862P	4.9	22	31	—	12.9	—	C-2	16-SD-01Z
CD-1863N	7.3	75	-32	-41	8.1	10.5		
CD-1863P	7.3	75	41	—	20.6	—	C-3	32-SD-41Z
CD-1864N	7.8	156	-40	-49	27	10.2		
CD-1864P	7.8	156	49	—	39.2	—	C-4	402-SD-02Z
CD-1865N	5.4	153	-30	-37.5	13.5	7.8		
CD-1865P	5.4	153	37.5	—	23.3	—	C-4	28-BD-01Z
CD-1866N	5.5	135	-34	-41	7.9	10.5		
CD-1866P	5.5	135	41	—	20.4	—	C-4	40-SD-41Z
CD-1867N	5.6	22	-27	-33.5	5.1	7		
CD-1867P	5.6	22	33.5	—	14.1	—	C-2	20-SD-01Z
CD-1868N	7.8	150	-31	-40	27	10.2		
CD-1868P	7.8	150	40	—	39.2	—	C-4	402-SD-04Z

* Refer to page 175.



TDK DC to DC Converters, DC to AC Inverters

For fluorescent display panels

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Applications: Data terminals and others (alphanumeric)

For NEC fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type NEC No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAac) max.	I ₂ (mAac) max.		
CD-1681N	3.0	22	-24	-27.5	6.8	3.6	C-1	FIP8A5R
CD-1681P	3.0	22	27.5	—	12.4	—	C-2	
CD-1682N	3.9	16.5	-26	-32	6.8	4.2	C-1	FIP10A6R
CD-1682P	3.9	16.5	32	—	13.0	—	C-2	
CD-1683N	5.5	16.5	-24	-31	7.5	4.1	C-2	FIP16A5R
CD-1683P	5.5	16.5	31	—	13.6	—		
CD-1684N	7.8	120	-40	-51	27.6	6.7	C-4	FIP16A13R
CD-1684P	7.8	120	51	—	36.3	—		
CD-1685N	8.7	120	-45	-56	21.8	7.3	C-4	FIP18A14R
CD-1685P	8.7	120	56	—	31.1	—		

* Refer to page 175.

For ISE fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type ISE No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAac) max.	I ₂ (mAac) max.		
CD-1781N	3.3	12	-24	-28	2.2	3.6	C-1	FG85E2
CD-1781P	3.3	12	28	—	7.8	—	C-1	
CD-1782N	4.7	37	-26	-31	12	4.0	C-2	FG108M1
CD-1782P	4.7	37	31	—	18	—	C-3	
CD-1783N	6.4	120	-35	-43	24	5.6	C-4	FG209M2
CD-1783P	6.4	120	43	—	31.6	—		
CD-1784N	6.8	80	-45	-53	12	6.9	C-3	FG326A2
CD-1784P	6.8	80	53	—	20.9	—	C-4	

* Refer to page 175.

For FUTABA fluorescent display

TDK converter Part No.	Output characteristics						Shapes and dimensions*	Suitable display type FUTABA No.
	Ef r.m.s. (V)	If (mAac) typ.	V ₁ (Vdc)	V ₂ (Vdc)	I ₁ (mAac) max.	I ₂ (mAac) max.		
CD-1881N	5.8	17.5	-24	-31	5.4	4	C-1	16-SY-03Z
CD-1881P	5.8	17.5	31	—	11.4	—	C-2	
CD-1882N	4.7	50	-30	-37	10	4.8	C-3	20-SY-03ZL
CD-1882P	4.7	50	37	—	14.9	—		
CD-1883N	7.5	50	-35	-46	9.4	6	C-3	32-SY-03ZL
CD-1883P	7.5	50	46	—	17.4	—		
CD-1884N	7.2	75	-47	-58	20.4	7.5	C-4	16-LY-01ZL
CD-1884P	7.2	75	58	—	29.9	—		
CD-1885N	6.2	75	-31	-39.5	18	5.1	C-3	16-MY-01ZL
CD-1885P	6.2	75	39.5	—	25.1	—		

* Input voltage (V_{in}): +5 Vdc ± 10%

* Filament voltage is set to nominal value at V_{in} of +5.0V

* Correspondence with display panel specification table

N type-V₁: Voltage applied to grid and anode

V₂: Sum of voltage applied to grid, anode and cutoff voltage

P type-V₁: Sum of voltage applied to grid, anode and cutoff voltage

* Refer to page 175.

TDK DC to DC Converters, DC to AC Inverters

For fluorescent display panels

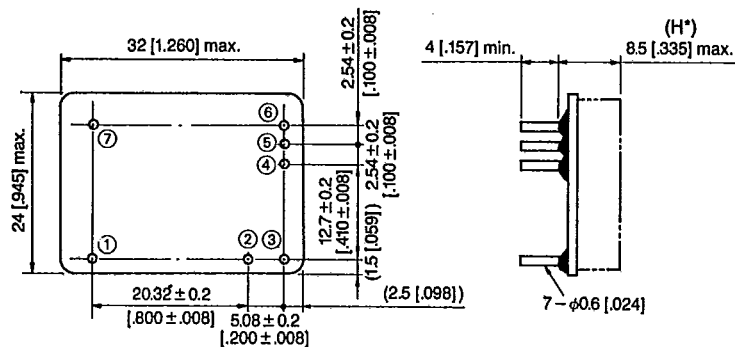
T D K CORP

40E D ■ 8821248 0005014 3 ■ TDKA

SHAPES AND DIMENSIONS

T-57-29

C-1



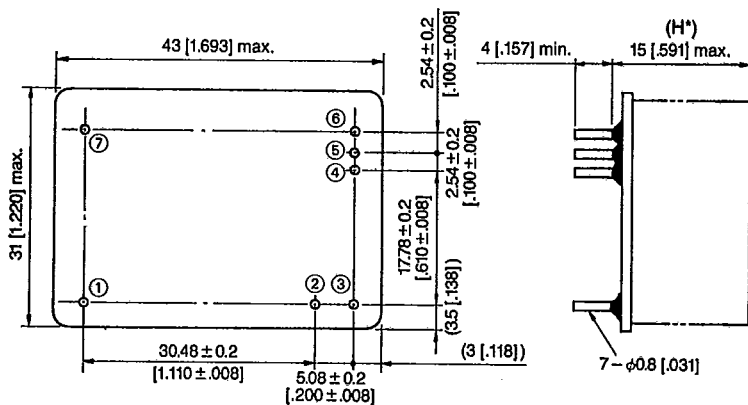
Output: 0.4W (400mW) max.
Weight: 4g

C-2

All dimensions are same as C-1, except (H*) changes to 10mm [.394 inches] max.

Output: 0.8W (800mW) max.
Weight: 6g

C-3



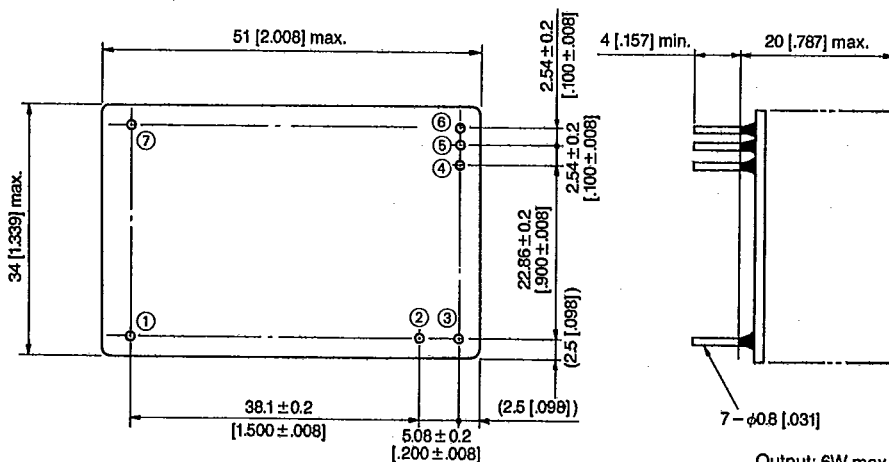
Output: 1.5W max.
Weight: 8g

C-4

All dimensions are same as C-3, except (H*) changes to 18mm [.709 inches] max.

Output: 3W max.
Weight: 16g

C-5



Output: 6W max.
Weight: 25g

Dimensions in mm [inches]