wamco
LIGHTING

THE LARGEST
AEROSPACE LIGHTING
SUPPLIER IN THE WORLD

ABOUT US

SERVING THE AEROSPACE INDUSTRY SINCE 1968

1968

Established in 1968 as a supplier of subminiature lamps, Wamco has grown over the past several decades into a trusted and leading provider of lighting solutions to the aerospace, automotive and electronics markets worldwide.

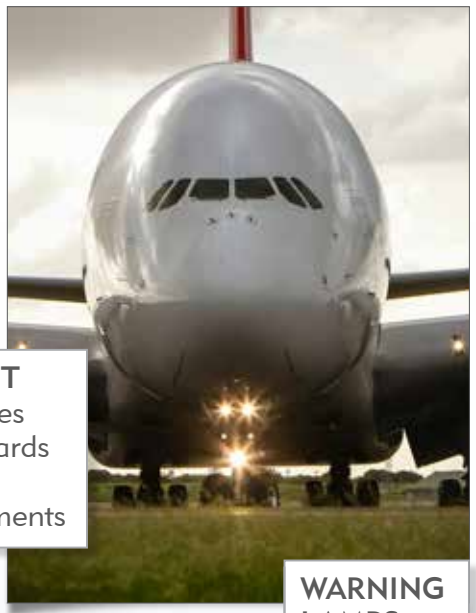
Wamco's ingenuity and vision steadily brought the company much deserved growth and success, and by 1980, became the leader in the development of high-contrast night vision compatible filters. Wamco continued to excel in this realm, constantly engineering new products in offering a wide assortment of high-quality products.

Today, Wamco serves its customers worldwide with offices both in Europe and North America. Wamco Lighting supplies the world's leading brands in aerospace lighting: Wamco Lamps (WL), Lamptronix (LTX), Micro Lamps (ML), and Direct View Filament Displays (KW). At present we are extremely proud to have our lights illuminating every Boeing around the globe.

Our vast talent-pool of experienced and innovative engineers makes Wamco a highly valuable resource in solving difficult lighting challenges. Wamco has the knowledge and know-how to solve even the most demanding problems in lighting and optoelectronics. Our expertise and history has made Wamco a trusted partner that is unmatched in the industry.

AVIATION LAMPS

LIGHTING YOUR WORLD

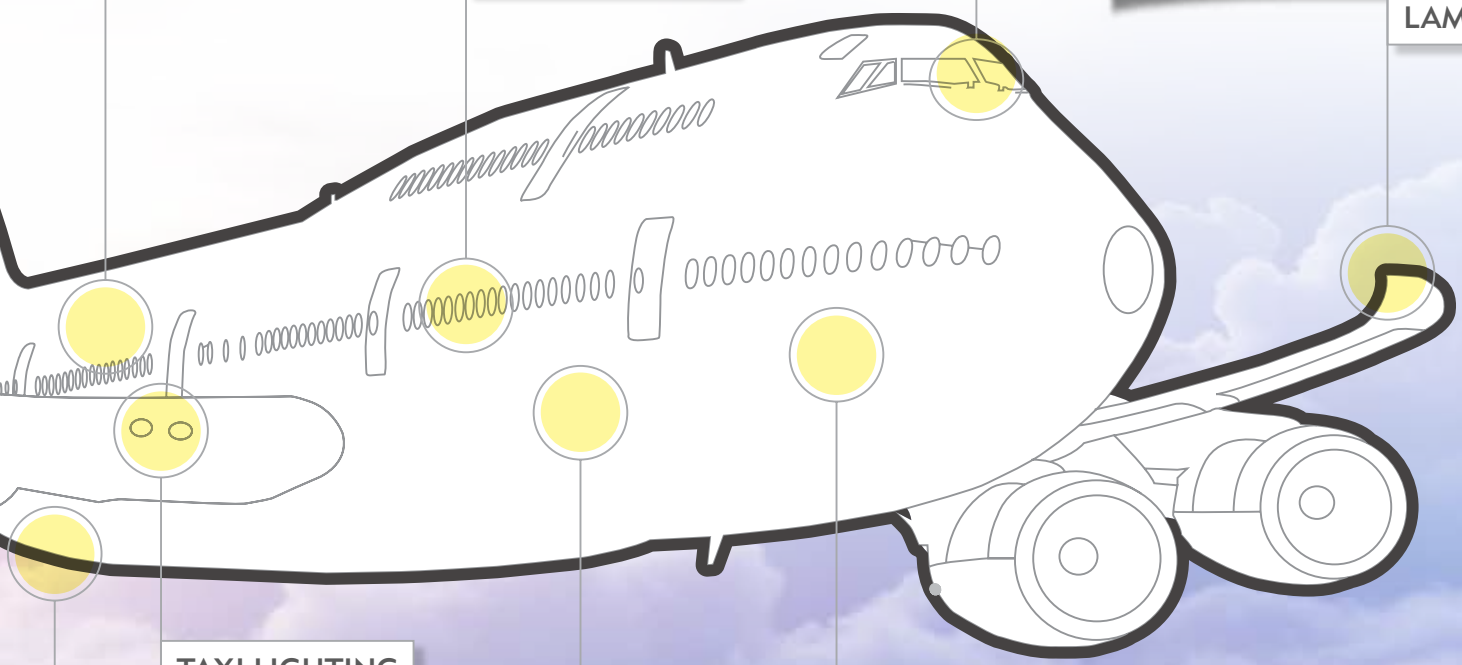


PASSENGER INFORMATION SIGNS
» Exit
» No Smoking / Fasten Seat Belt

COCKPIT
» Switches
» Keyboards
» Panels
» Instruments

CABIN
» Reading Lights
» Gallery Lighting

WARNING LAMPS



TAXI LIGHTING

CARGO AREA LIGHTING

FLOOR PROXIMITY
» Floor Mounted
» Seat Mounted

EMERGENCY SLIDE LIGHTING

PRODUCTS

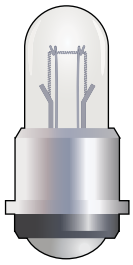
WL AIRCRAFT WARNING LAMPS

PART NUMBER	ENVELOPE	BASE	VOLTS	WATTS	FILAMENT
WL-600	GG10	BAY15s	6.2V	26W	C-6
WL-1512	GG10	BAY15s	14V	21W	C-6
WL-A-7512-12	GG10	BAY15s	14V	26W	C-6
WL-628	GG10	BAY15s	26.5V	26W	CC-6
WL-1524	GG10	BAY15s	28V	21W	CC-6
WL-A-7512-24	GG10	BAY15s	28V	26W	CC-6
WL-16870	GG12A	BAY15s	6.2V	40W	C-6
WL-A-7079B-12	GG12A	BAY15s	14V	40W	C-6
WL-8115	GG12A	BAY15s	28V	20W	CC-6
WL-617	GG12A	BAY15s	28V	40W	CC-6
WL-684	GG12A	BAY15s	28V	40W	CC-6
WL-A-7079B-24	GG12A	BAY15s	28V	40W	CC-6
WL-A-7796A-24	GG12A	BAY15d	28V	14W/40W	C-6V/CC-6
WL-626	GG12B	BAY15s	6.2V	40W	C-6
WL-11631	GG12B	BAY15s	6.2V	40W	C-6
WL-A-4174-12	GG12B	BAY15s	14V	40W	C-6
WL-A-4174-24	GG12B	BAY15s	28V	40W	CC-6
WL-A-4174-24X	GG12B	BAY15s	28V	40W	CC-6

WL MINIATURE LAMPS

PART NUMBER	ENVELOPE	BASE	VOLTS	CURRENT	FILAMENT
WL-1317	B6	BA15s	6V	510mA	C-6
WL-1309	B6	BA15s	28V	520mA	2C-2R
WL-1309IF	B6	BA15s	28V	520mA	2C-2R
WL-1308	B6	BA15s	28V	560mA	CC-8
WL-1308LL	B6	BA15s	28V	560mA	CC-8
WL-1315	G5	BA15s	2.5V	1000mA	C-6
WL-67	G6	BA15s	13.5V	590mA	C-2R
WL-301	G6	BA15s	28V	170mA	C-2F
WL-1251	G6	BA15s	28V	230mA	2C-26
WL-303	G6	BA15s	28V	300mA	C-2F
WL-1385	R12	BA15s	28V	720mA	CC-8
WL-311	S11	BA15s	28V	1290mA	C-2V
WL-3011	S11	BA15s	28V	1290mA	C-2V
WL-308	S8	BA15d	28V	670mA	C-2V
WL-305	S8	BA15s	28V	510mA	C-2V
WL-1691	S8	BA15s	28V	610mA	2C-2R
WL-2232	S8	BA15s	28V	640mA	CC-8I
WL-2232LL	S8	BA15s	28V	640mA	CC-8I
WL-2232SB	S8	BA15s	28V	640mA	CC-8I
WL-307	S8	BA15s	28V	670mA	C-2V
WL-2233	S8	BA15s	28V	770mA	CC-8I
WL-1665	S8	BA15s	28V	800mA	C-2V
WL-315	S8	BA15s	28V	900mA	C-2V
WL-1683	S8	BA15s	28V	1020mA	2C-6
WL-85	T1-3/4	WB	28V	40mA	C-2F
WL-1819	T3-1/4	BA9s	28V	40mA	C-2F
WL-1820	T3-1/4	BA9s	28V	100mA	C-2F
WL-313	T3-1/4	BA9s	28V	170mA	C-2F
WL-1864	T3-1/4	BA9s	28V	170mA	C-2F

WL SUBMINIATURE LAMPS



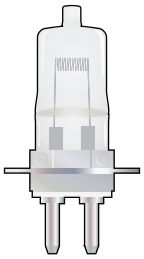
PART NUMBER	ENVELOPE	BASE	VOLTS	CURRENT	FILAMENT
WL-DT1673A	T3/4	WT	5V	21mA	C-2R
WL-8-2400	T1	BP	5V	115A	C-2R
WL-7839	T1	BP	28V	24mA	CC-2F
WL-3071BPEGPL	T1	BPE	5V	60mA	C-2R
WL-1280-481	T1	BPE	28V	24mA	CC-2F
WL-1280-482	T1	BPE	28V	24mA	CC-2F
WL-6839BPE	T1	BPE	28V	24mA	CC-2F
WL-6839BPEGPL	T1	BPE	28V	24mA	CC-2F
WL-3112	T1	FN	28V	24mA	CC-2F
WL-1750-06	T1	IBP	5V	75mA	C-2R
WL-1044-06	T1	IBP	28V	40mA	CC-2F
WL-7049	T1	POGO	28V	24mA	CC-2F
WL-565-101	T1	POGO	28V	24mA	CC-2F
WL-685	T1	SMF	5V	60mA	C-2R
WL-6180	T1	SMF	5V	60mA	C-2R
WL-718AS15	T1	SMF	5V	115mA	C-2R
WL-7241	T1	SMF	18V	26mA	C-2F
WL-6839	T1	SMF	28V	24mA	CC-2F
WL-6838	T1	WT	28V	24mA	CC-2F
WL-6838-1001	T1	WT	28V	24mA	CC-2F
WL-6832FS	T1 SHORT	UFO	5V	60mA	C-2R
WL-6832	T1 SHORT	WT	5V	60mA	C-2R
WL-6832AS15	T1 SHORT	WT	5V	60mA	C-2R
WL-7152	T1 SHORT	WT	5V	115mA	C-2R
WL-7009	T1 SHORT	WT	28V	20mA	CC-2F
WL-4009BPEGPL	T1-1/4	BPE	28V	40mA	C-2F
WL-7387	T1-3/4	BP	28V	40mA	C-2F
WL-382	T1-3/4	MF	14V	80mA	C-2F
WL-6034	T1-3/4	MF	28V	24mA	C-2F
WL-327	T1-3/4	MF	28V	40mA	C-2F
WL-385	T1-3/4	MF	28V	40mA	C-2F
WL-387	T1-3/4	MF	28V	40mA	C-2F
WL 3071BPE	T1	BPE	5V	60mA	C-2R
WL 3071	T1	SMF	5V	60mA	C-2R
WL 3071AS15-297	T1	SMF	5V	60mA	C-2R
WL 718	T1	SMF	5V	115mA	C-2R
WL 3335	T1	SMF	28V	16mA	CC-2F
WL 6839AS15	T1	SMF	28V	24mA	CC-2F
WL 6839AS15-297	T1	SMF	28V	24mA	CC-2F
WL 6838 TPL	T1	WT	28V	24mA	CC-2F
WL 6838AS15 TPL	T1	WT	28V	24mA	CC-2F
WL 6832AS15 TPL	T1 SHORT	WT	5V	60mA	C-2R
WL 7132AS15 TPL	T1 SHORT	WT	5V	75mA	C-2R
WL 7152AS15 TPL	T1 SHORT	WT	5V	115mA	C-2R
WL 8552 TPL	T1 SHORT	WT	28V	20mA	CC-2F
WL 737	T1-1/4	MF	28V	45mA	C-2F
WL 737AS15	T1-1/4	MF	28V	45mA	C-2F
WL 6034BP GPL	T1-3/4	BP	28V	24mA	C-2F
WL 387BP	T1-3/4	BP	28V	40mA	C-2F
WL 387BP GPL	T1-3/4	BP	28V	40mA	C-2F
WL 327AS15	T1-3/4	MF	28V	40mA	C-2F
WL 327AS15-297	T1-3/4	MF	28V	40mA	C-2F
WL 387AS15	T1-3/4	MF	28V	40mA	C-2F

PRODUCTS *(CONTINUED)*

WL LONG-LIFE READING LAMPS

PART NUMBER	ENVELOPE	BASE	VOLTS	WATTS	FILAMENT
WL-998502-20	T2-1/4	BA15s	28V	10W	CC-8
WL-998502-4	T2-1/4	BA9s	12V	10W	C-8Z
WL-998502-8	T2-1/4	BA9s	12V	10W	C-8Z
WL-998502-12	T2-1/4	BA9s	28V	10W	CC-8
WL-998502-13	T2-1/4	BA9s	28V	10W	CC-6
WL-998502-25	T2-1/4	BA9s	28V	11.5W	CC-6
WL-998502-15	T2-1/4	BA9s	28V	12W	CC-6
WL-998502-18	T2-1/4	BA9s	6V	10W	C-6
WL-9204	T2-1/4	SPECIAL BAYONET	28V	10W	C-6
WL-2059	T2-3/4	BA9s	12V	10W	CC-8
WL-2059X	T2-3/4	BA9s	12V	10W	CC-8
WL-8GH004554-28	T2-3/4	BA9s/EURO	28V	11.5W	CC-8
WL-8GH005448-28	T2-3/4	BA9s/EURO	28V	11.5W	CC-8
WL-8GH007429-28	T2-3/4	BA9s/EURO	28V	11.5W	CC-8
WL-8GH005678-06	T2-3/4	BA9s/EURO	6V	10W	C-8
WL-8GH003912-06	T2-3/4	BA9s/EURO	6V	12W	C-8

WL HALOGEN LAMPS

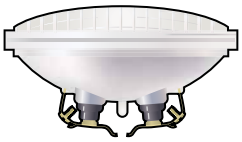


PART NUMBER	ENVELOPE	BASE	VOLTS	WATTS	FILAMENT
WL-767	T2-1/4	BA9s	6V	12W	C-6
WL-8GH005597-12	T2-3/4	BA9s/EURO	12V	25W	C-6
WL-9203	T3	BA15s	28V	35W	CC-8I
WL-1982	T3	BA15s	28V	75W	CC-8
WL-1982SP	T3	BA15s	28V	75W	CC-6
WL-250021	T3	CERAMIC	14V	50W	C-6
WL-3078	T3	SPECIAL	10V	100W	C-8
WL-1988	T3	SPECIAL SLEEVE	10V	100W	C-8
WL-1978X	T3	SPECIAL SLEEVE	10V	100W	C-8
WL-A103	T3	SPECIAL SLEEVE	28V	50W	CC-8
WL-1970X	T3	SPECIAL SLEEVE	28V	100W	CC-8
WL-HLX64621	T3-1/2	PG22dB	12V	100W	C-F6
WL-1983	T4	2-PIN	10V	100W	C-8
WL-1987	T4	BA15d	28V	150W	CC-6
WL-692	T4	BA15d	28V	25W	CC-6

WL NEON LAMPS

PART NUMBER	ENVELOPE	BASE	VOLTS	CURRENT	COLOR
WL-A1A	T1-3/4	WT	115V AC	.60mA	ORANGE
WL-A9A	T1-3/4	WT	115V AC	.60mA	ORANGE
WL-A3C	T1-3/4	WT	115V AC	1.50mA	RED
WL-A1G	T1-3/4	MF	115V AC	.30mA	ORANGE
WL-C7A	T1-3/4	MF	115V AC	.70mA	ORANGE
WL-A1H	T1-3/4	MF	115V AC	1.20mA	RED
WL-A1H-R18	T1-3/4	MF	115V AC	1.20mA	RED
WL-C9A	T1-3/4	MF	115V AC	1.90mA	RED
WL-B1A	T3-1/4	BA9s	115V AC	.25mA	ORANGE
WL-B2A	T3-1/4	BA9s	115V AC	1.10mA	RED

WL QUARTZ SEALED BEAM LAMPS

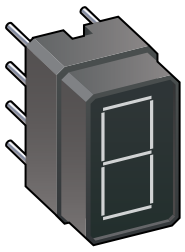


PART NUMBER	ENVELOPE	BASE	VOLTS	WATTS	FILAMENT
WL-Q4631	PAR36	F-2	13V	250W	C-6
WL-Q4632	PAR36	F-2	13V	250W	C-6
WL-Q5596	PAR46	F-2	28V	250W	CC-8
WL-Q4554	PAR46	F-2	28V	450W	CC-6
WL-Q4566	PAR46	F-2	28V	450W	CC-6
WL-Q4597	PAR46	F-2	28V	450W	CC-6
WL-Q4681	PAR46	F-2	28V	450W	CC-6
WL-Q4559X	PAR64	F-2	28V	600W	CC-6
WL-Q4509	PAR36	F-2	13V	100W	C-8
WL-Q4551	PAR46	F-2	28V	250W	CC-6
WL-Q4553	PAR46	F-2	28V	250W	C-8
WL-Q4626	PAR36	F-2	28V	150W	CC-6
WL-Q4635	PAR46	F-2	16.5V	450W	C-8
WL-Q5587	PAR36	F-2	28V	250W	CC-8

WL FLUORESCENT LAMPS

PART NUMBER	ENVELOPE	BASE	WATTS	CCT	SIZE
WL-5004CW	T5	PIN-LESS	4W	4200K	6″
WL-5004WW	T5	PIN-LESS	4W	3100K	6″
WL-5008CW	T5	PIN-LESS	8W	4200K	12″
WL-5008WW	T5	PIN-LESS	8W	3100K	12″
WL-5013CW	T5	PIN-LESS	13W	4200K	21″
WL-5013WW	T5	PIN-LESS	13W	3100K	21″
WL-5104CW	T5	BI-PIN	4W	4200K	6″
WL-5104WW	T5	BI-PIN	4W	3100K	6″
WL-5106CW	T5	BI-PIN	6W	4200K	9″
WL-5106WW	T5	BI-PIN	6W	3100K	9″
WL-5108CW	T5	BI-PIN	8W	4200K	12″
WL-5108WW	T5	BI-PIN	8W	3100K	12″
WL-5113CW	T5	BI-PIN	13W	4200K	21″
WL-5113WW	T5	BI-PIN	13W	3100K	21″
WL-F18T5CWRS	T5	BI-PIN	18W	4200K	30″
WL-F18T5WWRS	T5	BI-PIN	18W	3100K	30″

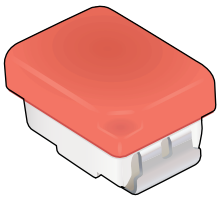
KW DISPLAYS & READOUTS



PART NUMBER	SEGMENTS	TYPE	VOLTS	CHARACTER SIZE
KW 104S	7-SEG	DIGIT	4V	.300″ x .155″
KW 104S-EW	7-SEG	EAST/WEST	4V	.300″ x .155″
KW 104S-NS	7-SEG	NORTH/SOUTH	4V	.300″ x .155″
KW 204S	7-SEG	DIGIT	4V	.225″ x 115″
KW 304S	7-SEG	DIGIT	4V	.167″ x .086″
KW 105S	7-SEG	DIGIT	5V	.300″ x .155″
KW 105S-TB	7-SEG	DIGIT	5V	.300″ x .155″
KW 205AL	16-SEG	ALPHANUMERIC	5V	.225″ x .187″
KW 205S	7-SEG	DIGIT	5V	.225″ x 115″
KW 205S-DP	1-SEG	DECIMAL POINT	5V	.047″
KW 205S-DP-TB	1-SEG	DECIMAL POINT	5V	.047″
KW 205S-L1	2-SEG	NUMERIC	5V	.225″
KW 205S-PM-TB	2-SEG	PLUS/MINUS	5V	.115″ x .115″
KW 205S-TB	7-SEG	DIGIT	5V	.225″ x 115″

PRODUCTS *(CONTINUED)*

WL COLOR BINNED LEDS



PART NUMBER	TYPE	CURRENT	COLOR	X	Y
WL-L2021B70C-075	MINI	5mA	BLUE-WHITE	.440	.405
WL-L2018B70C-006	COMPACT	20mA	BLUE-WHITE	.440	.405
WL-L2018B70C-007	COMPACT	20mA	IPL-WHITE	.510	.415
WL-L2017B70C-003	STANDARD	20mA	BLUE-WHITE	.440	.405
WL-L2017B70C-062	STANDARD	20mA	GREEN	.206	.566
WL-L2017B70C-004	STANDARD	20mA	IPL-WHITE	.510	.415
WL-L2017B70C-018	STANDARD	20mA	ORANGE/WHITE	.550	.400
WL-L2026B70C-093	POWER	150mA	BLUE-WHITE	.440	.405
WL-L2026B70C-094	POWER	150mA	IPL-WHITE	.510	.415

WL COLOR BINNED LEDS PRODUCT DETAILS

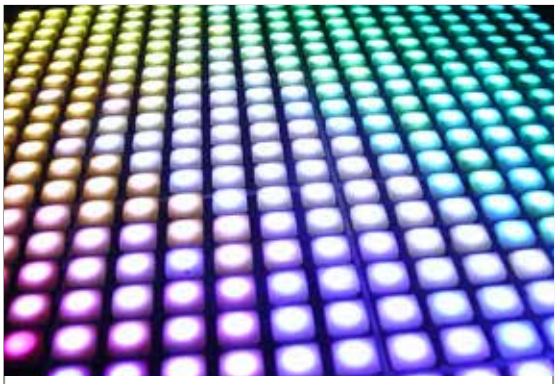
Wamco's booted LEDs provide a unique solution to an age-old problem of meeting stringent color requirements in the aerospace industry. By meeting precise color coordinates, Wamco helps reduce labor costs associated with "fine-tuning" or "balancing" lighted panels, keyboards, switches and indicators.Stability coupled with the high reliability of LED technology in shock and vibration environments make Wamco's booted LEDs an ideal choice for many applications.

BENEFITS

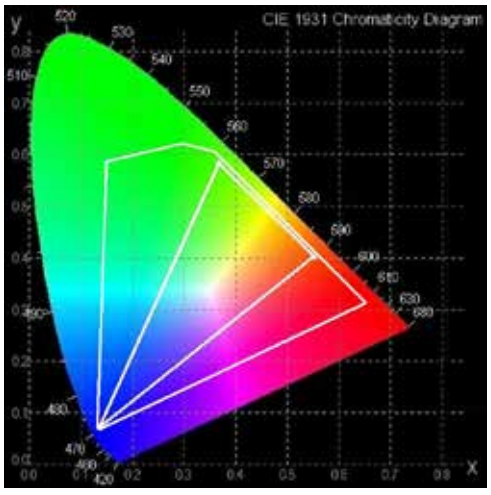
- Reduced manufacturing costs
- Custom color tuning capabilities with rapid turn-around
- Strict control of x & y color coordinates
- Excellent color and luminous stability
- Multiple form factors available
- Special kitting not required
- Compact design eliminates need for secondary filter
- Suitable for vapor-phase/infrared reflow processing

APPLICATIONS

- **Aerospace:** panel lighting, LCD backlighting, switch & indicator illumination
- **Automotive:** backlighting for gauges, car audio, panel switches and warning lights
- **Portable devices:** PDS, Handhelds, cellular phones, etc.



OVER **1000 COLOR VARIATIONS** POSSIBLE



wamco LIGHTING

BOOTED **LED PRODUCTS**

Wamco's booted LEDs provide a unique solution to an age-old problem of meeting stringent color requirements in the aerospace industry. By meeting precise color coordinates, Wamco helps reduce labor costs associated with "fine-tuning" or "balancing" lighted panels, keyboards, switches and indicators. Stability coupled with the high reliability of LED technology in shock and vibration environments make Wamco's booted LEDs an ideal choice for many applications.

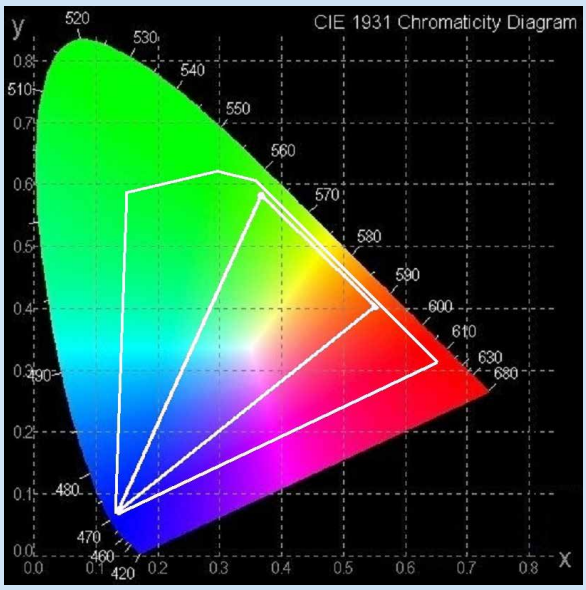
BENEFITS

- Reduced manufacturing costs
- Custom color tuning capabilities with rapid turn-around
- Strict control of x & y color coordinates
- Excellent color and luminous stability
- Multiple form factors available
- Special kitting not required
- Compact design eliminates need for secondary filter
- Suitable for vapor-phase/infrared reflow processing

APPLICATIONS

- **Aerospace:** panel lighting, LCD backlighting, switch & indicator illumination
- **Automotive:** backlighting for gauges, car audio, panel switches and warning lights
- **Portable devices:** PDS, Handhelds, cellular phones, etc.

OVER **1000 COLOR VARIATIONS** POSSIBLE

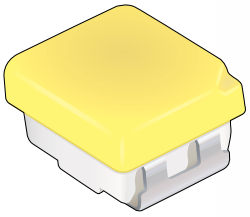


FOR THE FULL PRODUCT LINE AND DETAILED INFORMATION

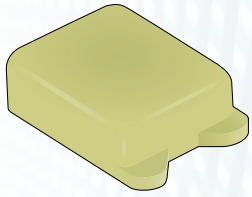
CALL 1-714-545-5560
VISIT WAMCOINC.COM
EMAIL INFO@WAMCOINC.COM

PRODUCTS

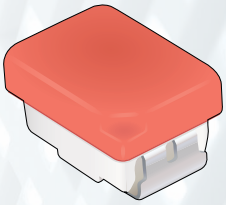
WL-202XXX



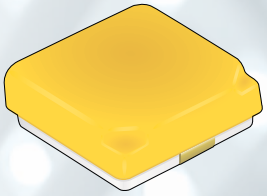
WL-2018XXX



WL-2021XXX



WL-2026XXX



CALL
1-714-545-5560

VISIT
WWW.WAMCOINC.COM

EMAIL
INFO@WAMCOINC.COM

wamco LIGHTING

INFINITE POSSIBILITIES
INFINITE SOLUTIONS

INDUSTRIES

» AEROSPACE
» ELECTRONIC
» SIGNAGE
» MARINE
» GENERAL
» TRANSPORTATION

PRODUCTS

» LEDs
» INCANDESCENT
» HALOGEN
» FLUORESCENT
» NEON
» READOUTS & DISPLAYS

With nearly 50 years in business supporting the lighting industry, Wamco has become the premier supplier of lighting products worldwide; providing the broadest range of standard products and custom lighting solutions.

Wamco's reputation for quality is based on understanding each lighting technology, the application, and most importantly, the needs of our customers. Whether it is the aviation, marine, transportation, general lighting, electronic or signage industry, you can find Wamco lamps lighting the way.

WAMCO'S CAPABILITIES INCLUDE:

» IN-HOUSE DESIGN
» FAA - PMA APPROVALS
» PROTOTYPING
» QPL
» LIGHTING DESIGN
» WORLDWIDE DISTRIBUTION NETWORK
» EXTENSIVE INVENTORY

wamco LIGHTING

COLT LED

LED TUBE CATALOG

Bi-Color LED Tubes

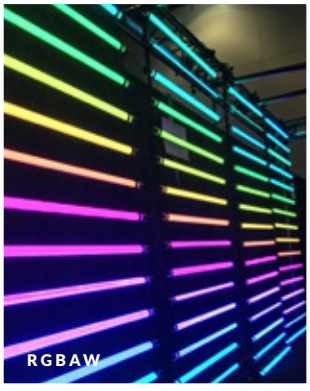
SIZES AVAILABLE (WATTS)	PRODUCT DESCRIPTION
1' (13.75 W) 2' (27.5 W) 4' (55 W) 8' (110 W)	☑ Patented Technology ☑ Intended for all uses that formerly required fluorescent tubes in either Daylight or Tungsten color temperatures. ☑ No pulse width modulation. Power runs through a semi-conductor controlled rectifier (SCR); constant voltage. ☑ 97+ CRI. Dimmable to 1%.

Color Mix LED Tubes

SIZES AVAILABLE (WATTS)	PRODUCT DESCRIPTION
1' (13.75 W) 2' (27.5 W) 4' (55 W) 8' (110 W)	☑ Patented Technology ☑ Intended for all uses requiring fluorescent tubes in Daylight / Tungsten mixed color temperatures. Color temperature and intensity can be controlled with standard dimmers. ☑ No pulse width modulation. Power runs through a semi-conductor controlled rectifier (SCR); constant voltage. ☑ 97+ CRI. Dimmable to 1%. Kelvin can shift between 3200°~5600°.

High Output LED Tubes

SIZES AVAILABLE	PRODUCT DESCRIPTION
1' 2' 4'	☑ Patented Technology ☑ Intent of use for this product is primarily for backlighting for translights or other various backings. When color temperature is not an issue, just looking for exposure.



RGBAW LED Tubes

SIZES AVAILABLE	PRODUCT DESCRIPTION
2' 4' 8'	☑ Individually addressable RGBAW LED T-12 Light Tubes. ☑ Profile for set up on high end lighting consoles is; Generic RGBAW 8 bit. This will match up Color tubes with the existing Color Picker/Color programs libraries and indexes. ☑ Or can be used on conventional lighting/dimming consoles 5 channels per Tube; Ch#1 Red, Ch#2 Green, Ch#3 Blue, Ch#4 Amber, Ch#5 White. ☑ Each Color tube requires a 110VAC power input, and Data signal via DMX Micro USB. Also for the First Color Tube in the Data run the Tube will require a 5 pin DMX to Micro USB connector. DMX signal can then be jumped via Micro USB jumper cables for Approximately 25 Color Tubes, however each tube Still requires 110VAC individually.

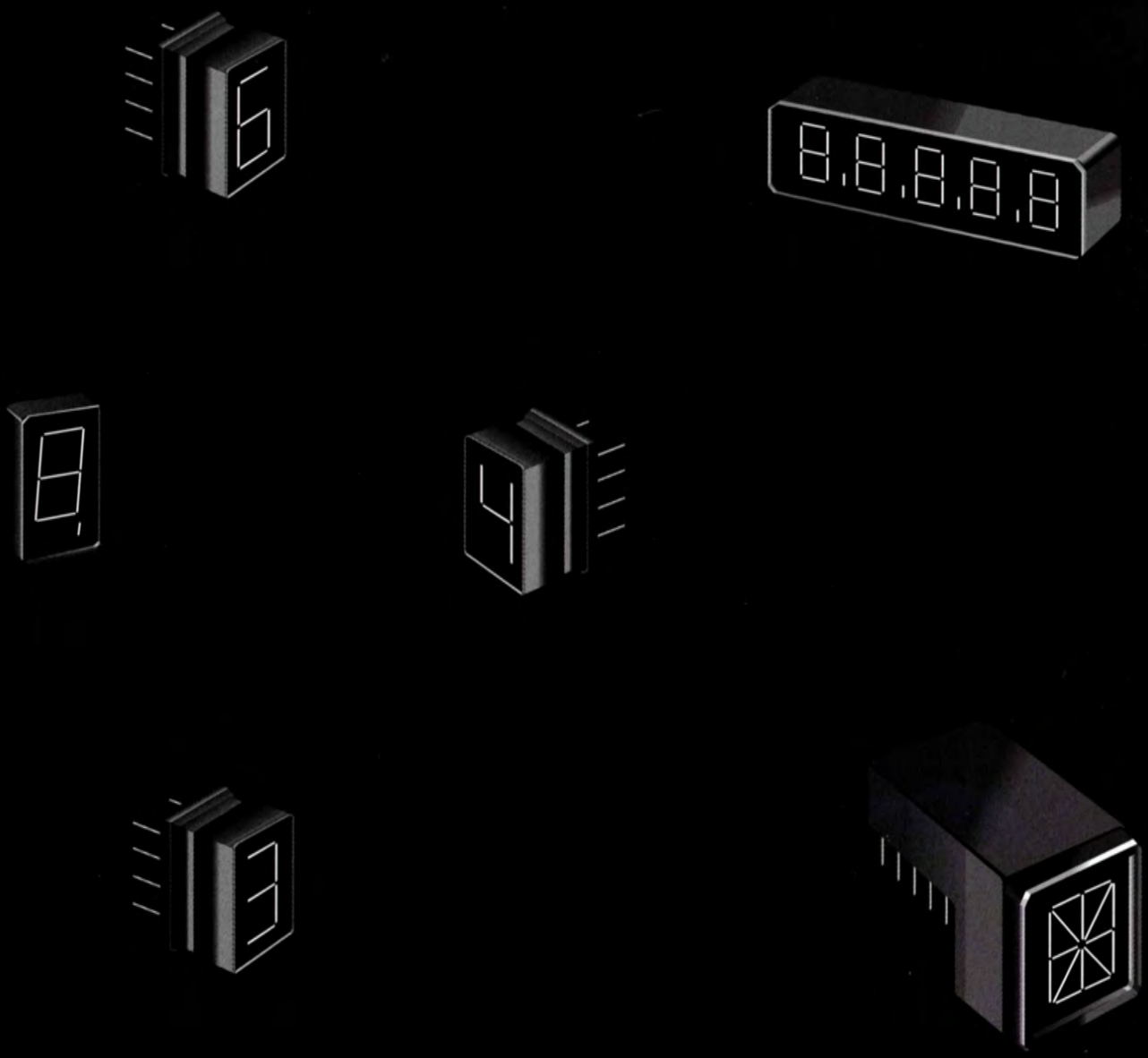
FIXTURES, HARNESSES, ACCESSORIES

PRODUCT DESCRIPTION
☑ Various components are available including harnesses, dimmers, fixtures, travel cases, cables, clips and more. Visit www.wamcoinc.com/colt or contact Wamco to see a current list of products.

CALL 1-714-545-5560
VISIT WWW.WAMCOINC.COM
EMAIL INFO@WAMCOINC.COM

wamco LIGHTING


COLT
LED



WAMCO

INCANDESCENT DISPLAYS

KW Series Direct View Filament (DVF) Displays & Connectors

The Company

Wamco began in 1968 as a supplier of high quality subminiature incandescent lamps to the Aerospace, computer and hi-rel electronics industries.

Today we are listed on the Federal Specification QPL WL-00111 and are a top supplier of subminiature incandescent lamps and DVF Displays to the Aerospace industry.

Wamco is noted for high quality products, quick response to new designs, excellent sales staff, and service which is backed by one of the largest lamp and DVF Display inventories in the United States and Canada.

Wamco's KW DVF Displays were developed as a result of requests we received from our Aerospace customers to design a truly high quality sunlight readable display capable of withstanding the most rigorous of environments.

The Factory

Wamco selected Wakoh Corporation in Tokyo, Japan to manufacture our readouts. Wakoh eagerly accepted the challenge to improve upon the current DVF Technology in the areas we felt were vitally important. We were confident they would be able to accomplish this task based on their experience and the research they had already accomplished in the development of a highly innovative and proprietary system for sealing and evacuation.

Superior Features of KW DVF Displays

Non-Crossed Filaments:
Eliminates potential of filaments accidentally touching (at the corners) during shock and vibration.

All Glass Package:
Increases reliability during temperature cycling because of the lack of dissimilar materials at the sealing seam of the face plate

Larger Sealing Area:
Our proprietary sealing process has eliminated vacuum leaks as a major problem.

Special Filament Mounting Pads:
Character dimensions are held to a tolerance of plus/minus .015".

Higher Vacuum Level:
Guarantees a longer life and reduces the tungsten evaporation rate closer to the theoretical rate.

Greater Filament Strength:
Proprietary processing and heat treating of Wamco filaments permits them to withstand high shock and vibration environments. Wamco readout filaments have been subjected to 50 G's without breakage, although we do not recommend their use under these conditions.

Water Cycle Eliminated:
Special processing eliminates the outgasing of water molecules (a phenomena which begins at 100° C +) from the glass which attacks the tungsten filament and drastically reduces filament life.

Benefits

- Sunlight readable
- Low power
- Night vision goggle readable
- Wide viewing angle
- Directly replaceable to other DVF displays
- Multiplexing
- Impervious to salt spray and humidity.
- Even brightness at rated and dimming voltages
- Long life
- Withstands temperature extremes
- Compact design
- Withstands transient voltages which damage solid state devices
- Compatible with LED display I.C. drivers
- Color filtering

Quality Control

Production lots coded for traceability.

100% aging 50 hours before shipment.

100% brightness measurement at both rated and dimmed voltages.

100% selected for current draw.

100% production lots are sample tested to special inspection level "S-4"; lot size "F"; 1.0 AQL in an oven @ 125° C for 15 hours.

Brightness

There are two methods of measuring the brightness of direct view filament displays. The first method yields candelas, and the second, footlamberts. Wamco uses the candela method. Candelas can be measured very accurately, and more importantly, the measurements have a high degree of repeatability. Candelas closely represent what the eye actually sees because it measures integrated light from all of the filament coils.

The history of measuring the brightness of filament displays in footlambert values has not offered a high degree of reliability. Accuracy is suspect and the repeatability of measurements is difficult. Footlambert measurements do not reflect what the eye sees because the photometer focuses on only a few filament coils. The only advantage of having footlambert values is to compare for equal brightness readouts of different sizes.

$$\text{Footlambert} = \frac{\text{Candela} \times \text{PL}}{\text{Lighted Area (Sq Ft)}}$$

Multiplexing

The rated pulse voltage is determined through the formula

$$PV = \frac{\text{Rated Voltage}}{\sqrt{\text{Duty Cycle}}}$$

The pulse voltage is critical in terms of life and brightness as shown in the chart.

The recommended minimum frequency is 500 H_z. Large thermal swings begin to occur below 500 H_z which can be detrimental to filament life and strength. The recommended minimum frequency is subject to change as more data is obtained from our life testing program.

Voltage Chart

The chart below demonstrates the affect overrated and underrated voltages have on an incandescent filament display. The numbers were derived from the following formulas:

$$\text{Life Factor} = \left(\frac{\text{Rated Voltage}}{\text{Application V}}\right)^{12}$$

$$\text{Brightness Factor} = \left(\frac{\text{Application V}}{\text{Rated V}}\right)^{3.5}$$

$$\text{Amperage Factor} = \left(\frac{\text{Application V}}{\text{Rated V}}\right)^{.55}$$

The 12th power law for life was established many years ago for large lamps with life ratings of 5000 hours or less. It is considered to be only fairly accurate from 95% to 110% of rated voltage.

Since our displays have a theoretical life rating of over 5000 hours, this chart should only be used as a guide to show the sensitivity of lamp life to over and under voltage operation. This chart should not be used to obtain actual life figures.

% Rated Voltage	% Rated Amps	% Rated Brightness	% Rated Life
95	97.2	83.6	185.1
96	97.8	86.7	163.2
97	98.3	89.9	144.1
98	98.9	93.2	127.4
99	99.4	96.5	112.8
100	100.0	100.0	100.0
101	100.5	103.5	88.7
102	101.1	107.2	78.8
103	101.6	110.9	70.1
104	102.2	114.7	62.5
105	102.7	118.6	55.7
106	103.3	122.6	49.7
107	103.8	126.7	44.4
108	104.3	130.9	39.7
109	104.9	135.2	35.6
110	105.4	139.6	31.9

Accelerated Life Test

This procedure is not recommended. Filaments are designed to be operated at rated voltages.

Life Specification

The only practical method for determining the life of "long life" incandescents is through calculations based on the tungsten evaporation rate. Theoretical life ratings assume perfect conditions and does not consider DC notching, Sorret effect, series operation or improper multiplexing. These conditions may reduce the theoretical life by as much as 70%.

Night-Vision Goggle Specification

When used with the proper Wamco NVG filter, KW Series readouts meet these NVG specifications:

- MIL-L-85762A N/R and color
- US Army secure lighting energy ratios
- United Kingdom Green/Red ratios

Environmental Characteristics

Operating Temperature Range: -55° C to 100° C.

Storage Temperature Range: -65° C to 125° C.

Thermal Shock — Meets requirement of MIL-STD-202, Method 107D, Test condition B, (-65° C thru 126° C.)

Vibration — Meets requirements of MIL-STD-202, Method 204C, Test condition C. (Except 5G)

Shock — Meets requirements of MIL-STD-202, Method 213B, Test condition G.

Seal — Meets requirements of MIL-STD-202, Method 112A, Test condition A.

Specifications subject to change without notice.

Specifications

Part No.	Description	Voltage (V)	Current Per Segment (mA)		Milli-candela (MCD)	Charater (In)		Package Dimensions (In)			Remarks
						Height	Width	H	W	D	
Theoretical life for each display is 100k hours											
KW-100											
KW-104S	Digit	4	15 ± 2		44 ± 8	.300	.155	.468	.306	.312	7 Segment
KW-104S-NS	North/South	4	15 ± 2		44 ± 8	.300	.155	.468	.306	.312	7 Segment
KW-104S-EW	East/West	4	15 ± 2		55 ± 10	.300	.155	.468	.306	.312	9 Segment
KW-104S-LR	Left/Right	4	15 ± 2		44 ± 8	.300	.155	.468	.306	.312	7 Segment
KW-104S-XY	X/Y	4	15 ± 2		25 ± 6	.300	.155	.468	.306	.312	4 Segment
KW-104S-PM	Plus/Minus	4	15 ± 2		13 ± 3	.155	.155	.468	.306	.312	2 Segment
KW-104S-DP	Decimal Point	4	13 ± 2		3.5 ± 1.7	.047	N/A	.468	.100	.312	1 Segment
KW-104S-CL	Colon	4	13 ± 2		7 ± 3.4	.047	N/A	.468	.100	.312	2 Segment
KW-104S-L1	Numeric1	4	15 ± 2		13 ± 3	.300	N/A	.468	.100	.312	2 Segment
KW-104AL	Alphanumeric	4	15 ± 2		90 ± 20	.300	.200	.468	.375	.312	16 Segment
KW-104S-TB	Digit	4	15 ± 2		44 ± 8	.300	.155	.468	.306	.312	7 Segment
KW-104S-DP-TB	Decimal Point	4	13 ± 2		3.5 ± 1.7	.047	N/A	.468	.100	.312	1 Segment
KW-104S-CL-TB	Colon	4	13 ± 2		7 ± 3.4	.047	N/A	.468	.100	.312	2 Segment
KW-104S-L1-TB	Numeric 1	4	15 ± 2		13 ± 3	.300	N/A	.468	.100	.312	2 Segment
KW-104G-H	Digit	4	15 ± 2		44 ± 8	.300	.155	.468	.306	.312	7 Segment
KW-114G	Digit with D.P.	4	15 ± 2	DP 13 ± 2	44 ± 8*	.300	.155	.605	.306	.185	7 Seg. with D.P.
KW-104G-DIP	Digit	4	15 ± 2		44 ± 8	.300	.155	.740	.400	.270	7 Segment
KW-114G-DIP	Digit with D.P.	4	15 ± 2	DP 13 ± 2	44 ± 8*	.300	.155	.740	.400	.270	7 Seg. with D.P.
KW-134G-DIP	Digit with Colon	4	15 ± 2	COL 13 ± 2	44 ± 8*	.300	.155	.740	.400	.270	7 Seg. with Colon
KW-104RG	Digit	4	15 ± 2		44 ± 8	.300	.155	.468	.306	.937	7 Segment
KW-104AL-RG	Alphanumeric	4	15 ± 2		90 ± 20	.300	.200	.468	.375	1.138	16 Segment
KWD-104AL-RG	Alphanumeric	4	15 ± 2		90 ± 20	.300	.200	.468	.375	1.138	16 Seg. with Diode
KW-105S	Digit	5	15 ± 2		52.5 ± 9.5	.300	.155	.468	.306	.312	7 Segment
KW-105S-NS	North/South	5	15 ± 2		52.5 ± 9.5	.300	.155	.468	.306	.312	7 Segment
KW-105S-EW	East/West	5	15 ± 2		67 ± 13	.300	.155	.468	.306	.312	9 Segment
KW-105S-LR	Left/Right	5	15 ± 2		52.5 ± 9.5	.300	.155	.468	.306	.312	7 Segment
KW-105S-XY	X/Y	5	15 ± 2		30 ± 6	.300	.155	.468	.306	.312	4 Segment
KW-105S-PM	Plus/Minus	5	15 ± 2		15 ± 3	.155	.155	.468	.306	.312	2 Segment
KW-105S-DP	Decimal Point	5	13 ± 2		4.2 ± 2.0	.047	N/A	.468	.100	.312	1 Segment
KW-105S-CL	Colon	5	13 ± 2		8.4 ± 4.0	.047	N/A	.468	.100	.312	2 Segment
KW-105S-L1	Numeric 1	5	15 ± 2		15 ± 3	.300	N/A	.468	.100	.312	2 Segment
KW-105AL	Alphanumeric	5	15 ± 2		109 ± 23	.300	.200	.468	.375	.312	16 Segment
KW-105S-TB	Digit	5	13 ± 2		52.5 ± 9.5	.300	.155	.468	.306	.312	7 Segment
KW-105S-DP-TB	Decimal Point	5	13 ± 2		4.2 ± 2.0	.047	N/A	.468	.100	.312	1 Segment
KW-105S-CL-TB	Colon	5	13 ± 2		8.4 ± 4.0	.047	N/A	.468	.100	.312	2 Segment
KW-105-S-L1-TB	Numeric1	5	15 ± 2		15 ± 3	.300	N/A	.468	.100	.312	2 Segment
KW-105G-H	Digit	5	15 ± 2		52.5 ± 9.5	.300	.155	.468	.306	.185	7 Segment
KW-115G	Digit with D.P.	5	15 ± 2	DP 13 ± 2	52.5 ± 9.5*	.300	.155	.605	.306	.185	7 Seg. with D.P.
KW-105G-DIP	Digit	5	15 ± 2		52.5 ± 9.5	.300	.155	.740	.400	.270	7 Segment
KW-115G-DIP	Digit with D.P.	5	15 ± 2	DP 13 ± 2	52.5 ± 9.5*	.300	.155	.740	.400	.270	7 Set. with D.P.
KW-135G-DIP	Digit with Colon	5	15 ± 2	COL 13 ± 2	52.5 ± 9.5*	.300	.155	.740	.400	.270	7 Seg. with Colon
KW-105RG	Digit	5	15 ± 2		52.5 ± 9.5	.300	.155	.468	.306	.937	7 Segment
KW-105AL-RG	Alphanumeric	5	15 ± 2		109 ± 23	.300	.200	.468	.375	1.138	16 Segment
KWD-105AL-RG	Alphanumeric	5	15 ± 2		109 ± 23	.300	.200	.468	.375	1.138	16 Seg. with Diode
KW-200											
KW-204S	Digit	4	14 ± 2		33 ± 7	.225	.115	.375	.275	.312	7 Segment
KW-204S-NS	North/South	4	14 ± 2		33 ± 7	.225	.115	.375	.275	.312	7 Segment
KW-204S-EW	East/West	4	14 ± 2		42 ± 10	.225	.115	.375	.275	.312	9 Segment
KW-204S-LR	Left/Right	4	14 ± 2		33 ± 7	.225	.115	.375	.275	.312	7 Segment
KW-204S-XY	X/Y	4	14 ± 2		19 ± 5	.225	.115	.375	.275	.312	4 Segment
KW-204S-PM	Plus/Minus	4	14 ± 2		10 ± 3	.115	.115	.375	.275	.312	2 Segment
KW-204S-DP	Decimal Point	4	10 ± 1.5		2.7 ± 1.4	.047	N/A	.375	.075	.312	1 Segment
KW-204S-CL	Colon	4	10 ± 1.5		5.4 ± 2.8	.047	N/A	.375	.075	.312	2 Segment
KW-204S-L1	Numeric 1	4	14 ± 2		10 ± 3	.225	N/A	.375	.075	.312	2 Segment
KW-204AL	Alphanumeric	4	14 ± 2		75 ± 15	.225	.187	.375	.335	.312	16 Segment
KW-204S-TB	Digit	4	14 ± 2		33 ± 7	.225	.115	.375	.275	.312	7 Segment
KW-204S-DP-TB	Decimal Point	4	10 ± 1.5		2.7 ± 1.4	.047	N/A	.375	.075	.312	1 Segment
KW-204S-CL-TB	Colon	4	10 ± 1.5		5.4 ± 2.8	.047	N/A	.375	.075	.312	2 Segment
KW-204S-L1-TB	Numeric 1	4	14 ± 2		10 ± 3	.225	N/A	.375	.075	.312	2 Segment
KW-204AL-RG	Alphanumeric	4	14 ± 2		75 ± 15	.225	.187	.375	.335	1.110	16 Segment
KWD-204AL-RG	Alphanumeric	4	14 ± 2		75 ± 15	.225	.187	.375	.335	1.110	16 Seg. with Diode

* Does not include decimal or colon

Specifications

Part No.	Description	Voltage (V)	Current Per Segment (mA)		Milli-candela (MCD)	Charater (In)		Package Dimensions (In)			Remarks
						Height	Width	H	W	D	
Theoretical life for each display is 100k hours											
KW-205S	Digit	5	12 ± 2		40 ± 6	.225	.115	.375	.275	.312	7 Segment
KW-205S-NS	North/South	5	12 ± 2		40 ± 6	.225	.115	.375	.275	.312	7 Segment
KW-205S-EW	East/West	5	12 ± 2		51 ± 10	.225	.115	.375	.275	.312	9 Segment
KW-205S-LR	Left/Right	5	12 ± 2		40 ± 6	.225	.115	.375	.275	.312	7 Segment
KW-205S-XY	X/Y	5	12 ± 2		23 ± 5	.225	.115	.375	.275	.312	4 Segment
KW-205S-PM	Plus/Minus	5	12 ± 2		11 ± 2.5	.115	.115	.375	.275	.312	2 Segment
KW-205S-DP	Decimal Point	5	10 ± 1.5		3.5 ± 1.6	.047	N/A	.375	.075	.312	1 Segment
KW-205S-CL	Colon	5	10 ± 1.5		6.4 ± 3.2	.047	N/A	.375	.075	.312	2 Segment
KW-205S-L1	Numeric1	5	12 ± 2		11 ± 2.5	.225	N/A	.375	.075	.312	2 Segment
KW-205AL	Alphanumeric	5	12 ± 2		89 ± 16	.225	.187	.375	.335	.312	16 Segment
KW-205S-TB	Digit	5	12 ± 2		40 ± 6	.225	.115	.375	.275	.312	7 Segment
KW-205S-DP-TB	Decimal Point	5	10 ± 1.5		3.2 ± 1.6	.047	N/A	.375	.075	.312	1 Segment
KW-205S-CL-TB	Colon	5	10 ± 1.5		6.4 ± 3.2	.047	N/A	.375	.075	.312	2 Segment
KW-205S-L1-TB	Numeric 1	5	12 ± 2		11 ± 2.5	.225	N/A	.375	.075	.312	2 Segment
KW-205AL-RG	Alphanumeric	5	12 ± 2		89 ± 16	.225	.187	.375	.335	1.110	16 Segment
KWD-205AL-RG	Alphanumeric	5	12 ± 2		89 ± 16	.225	.187	.375	.335	1.110	16 Seg. with Diode
KW-300											
KW-304S	Digit	4	12 ± 2		30 ± 6	.167	.086	.305	.225	.185	7 Segment
KW-500											
KW-515	Digit (WI) D.P.	5	17 ± 2	DP 13 ± 2	60 ± 15*	.472	.236	.886	.473	.227	7 Seg. with D.P.
KW-505F8	Digit	5	8 ± 1.5		2.4 ± .5	.362	.200	.865	.440	.236	7 Segment
KW-505F15	Digit	5	15 ± 2		20 ± 5	.362	.200	.865	.440	.236	7 Segment
KW-515F8	Digit (WI) D.P.	5	8 ± 1.5	DP 8 ± 1.5	2.4 ± .5*	.362	.200	.865	.440	.236	7 Seg. with D.P.
KW-515F15	(same)	5	15 ± 2	DP 13 ± 2	20 ± 5*	.362	.200	.865	.440	.236	7 Seg. with D.P.
KW-515F4-F15	(same)	5	15 ± 2	DP 13 ± 2	15 ± 4*	.362	.200	.865	.440	.236	7 Seg. with D.P.
KW-600											
KW-615-17	Digit with D.P.	5	17 ± 2	DP 13 ± 2	70 ± 18*	.614	.362	1.083	.630	.228	7 Seg. with D.P.
KW-615-30	Digit with D.P.	5	30 ± 4	DP 15 ± 3	**	.614	.362	1.083	.630	.228	7 Seg. with D.P.
KW-800											
KW-805-DIP	Digit	5	17 ± 2		55 ± 10	.450	.225	.700	.500	.270	7 Segment
KW-815-DIP	Digit with D.P.	5	17 ± 2	DP 13 ± 2	55 ± 10*	.450	.225	.700	.500	.270	7 Seg. with D.P.
KW-1000											
KW-1005-DIP	Digit	5	17 ± 2		58 ± 12	.635	.335	.970	.760	.320	7 Segment
KW-1015-DIP	Digit with D.P.	5	17 ± 2	DP 13 ± 2	58 ± 12	.635	.335	.970	.760	.320	7 Seg. with D.P.
ML "X"-200											
KW-ML2-214S	Digit with D. P.	4	14 ± 2		33 ± 7* (per digit)	.225	.115	.378	.602	.394	2 Digit with 1 D.P.
KW-ML3-214S	Digit with D. P.	4	14 ± 2		33 ± 7* (per digit)	.225	.115	.378	.850	.394	3 Digit with 2 D.P.
KW-ML4-214S	Digit with D. P.	4	14 ± 2		33 ± 7* (per digit)	.225	.115	.378	1.100	.394	4 Digit with 3 D.P.
KW-ML5-214S	Digit with D. P.	4	14 ± 2		33 ± 7* (per digit)	.225	.115	.378	1.346	.394	5 Digit with 4 D.P.
KW-ML6-214S	Digit with D. P.	4	14 ± 2		33 ± 7* (per digit)	.225	.115	.378	1.594	.394	6 Digit with 5 D.P.
KW-ML2-215S	Digit with D. P.	5	12 ± 2		40 ± 6* (per digit)	.225	.115	.378	.602	.394	2 Digit with 1 D.P.
KW-ML3-215S	Digit with D. P.	5	12 ± 2		40 ± 6* (per digit)	.225	.115	.378	.850	.394	3 Digit with 2 D.P.
KW-ML4-215S	Digit with D. P.	5	12 ± 2		40 ± 6* (per digit)	.225	.115	.378	1.100	.394	4 Digit with 3 D.P.
KW-ML5-215S	Digit with D. P.	5	12 ± 2		40 ± 6* (per digit)	.225	.115	.378	1.346	.394	5 Digit with 4 D.P.
KW-ML6-215S	Digit with D. P.	5	12 ± 2		40 ± 6* (per digit)	.225	.115	.378	1.594	.394	6 Digit with 5 D.P.
KW-BG											
KW-BG-20S	Bar-Graph	4 & 5	10 MAX.		**	.125	.05 X 19	.250	1.18	.394	20 elements
KW-BG-30-A-DL	Bar-Graph	4 & 5	10 MAX.		**	.180	.04 X 29	.300	1.44	.300	30 elements
KW-BG-36S	Bar-Graph	4 & 5	10 MAX.		**	.125	.05 X 35	.250	1.98	.394	36 elements
KW-BG-50-A-DL	Bar-Graph	4 & 5	10 MAX.		**	.180	.04 X 49	.300	2.24	.300	50 elements
KW-BG-56S	Bar-Graph	4 & 5	10 MAX.		**	.125	.05 X 55	.250	2.98	.394	56 elements
KW-BG-100-A-DL	Bar-Graph	4 & 5	10 MAX.		**	.180	.04 X 49	.300	4.24	.300	100 Segment

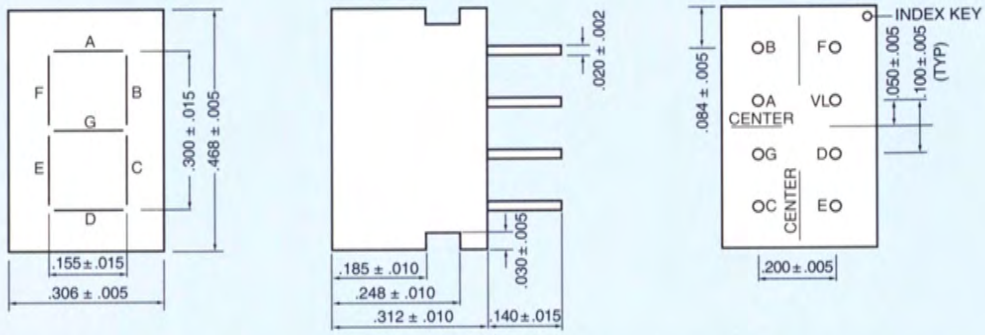
* Does not include decimal or colon

** Consult Factory

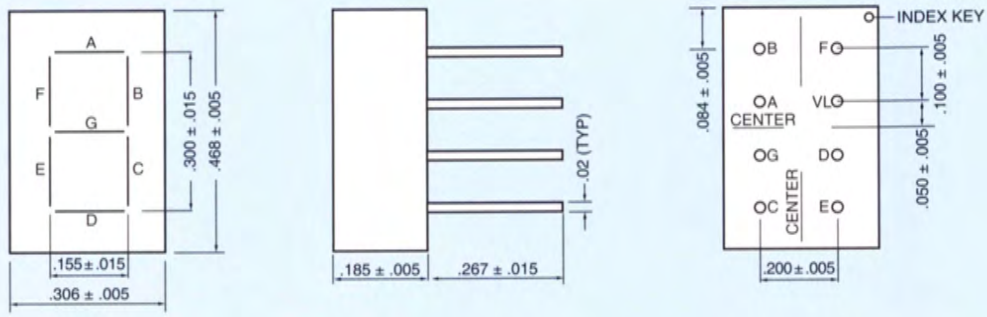
KW-104
KW-105

Dimensional Outline and Pin Configurations

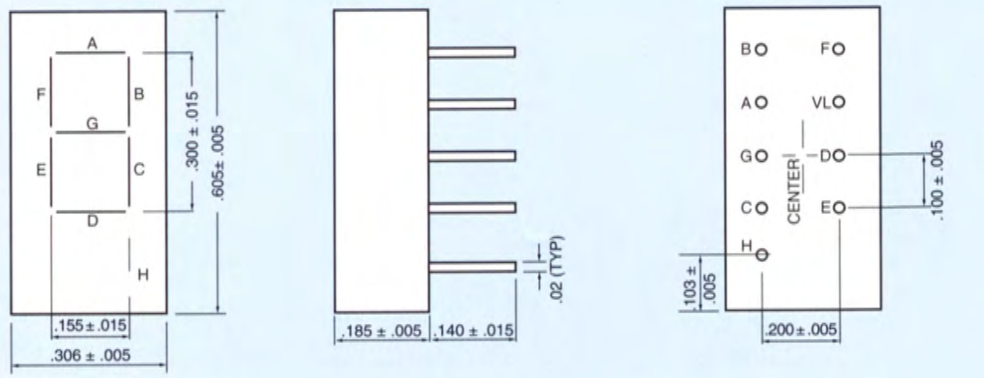
KW-104S
KW-105S



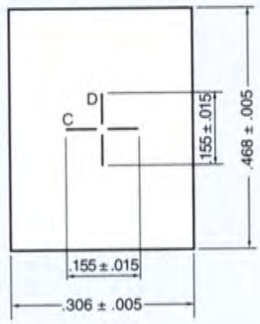
KW-104G-H
KW-105G-H

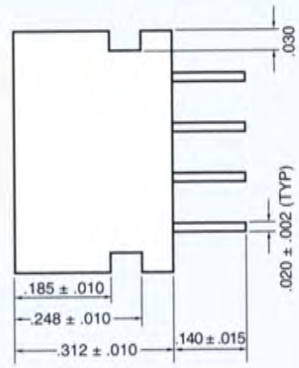


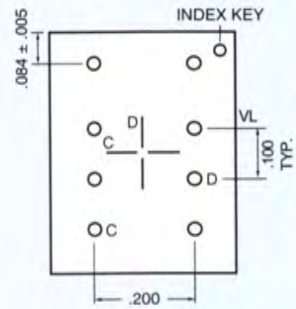
KW-114G
KW-115G



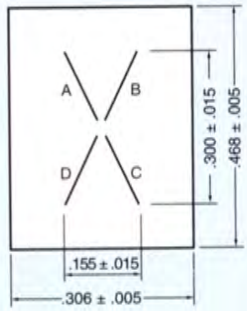
KW-104S-PM
KW-105S-PM

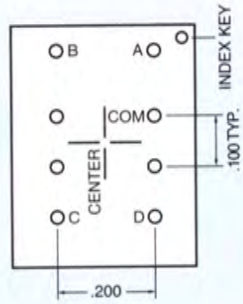


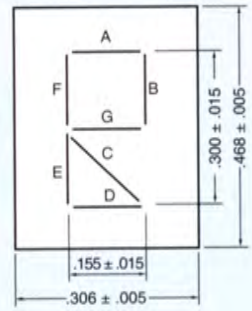


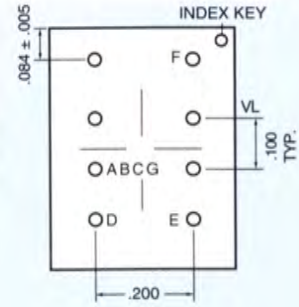


KW-104S-XY
KW-105S-XY
KW-104S-LR
KW-105S-LR

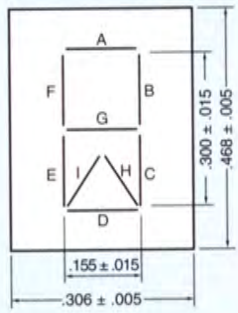


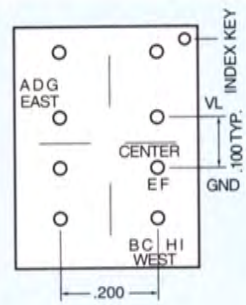


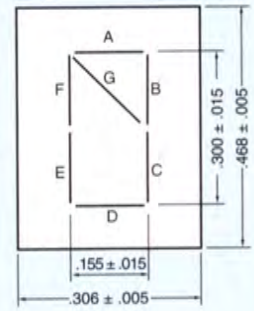


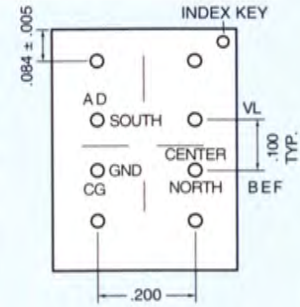


KW-104S-EW
KW-105S-EW
KW-104S-NS
KW-105S-NS

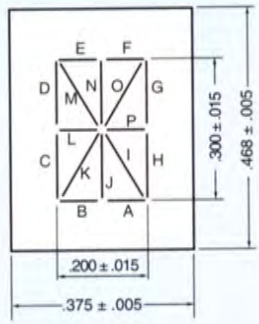


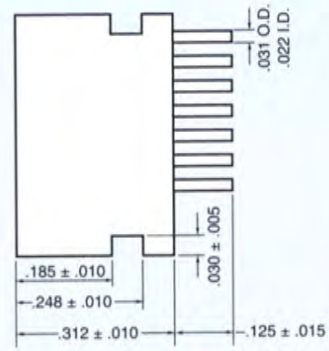


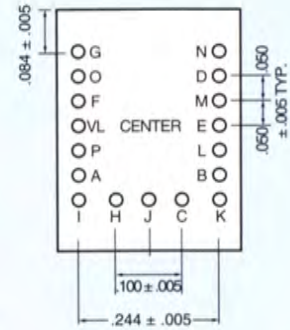




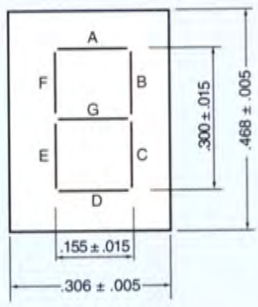
KW-104-AL
KW-105-AL

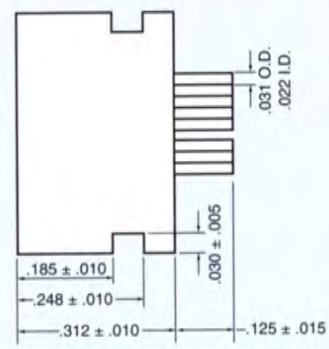


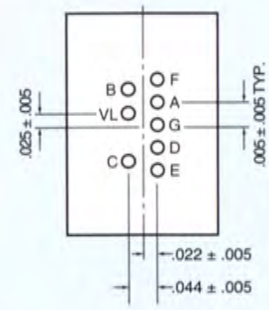




KW-104S-TB
KW-105S-TB

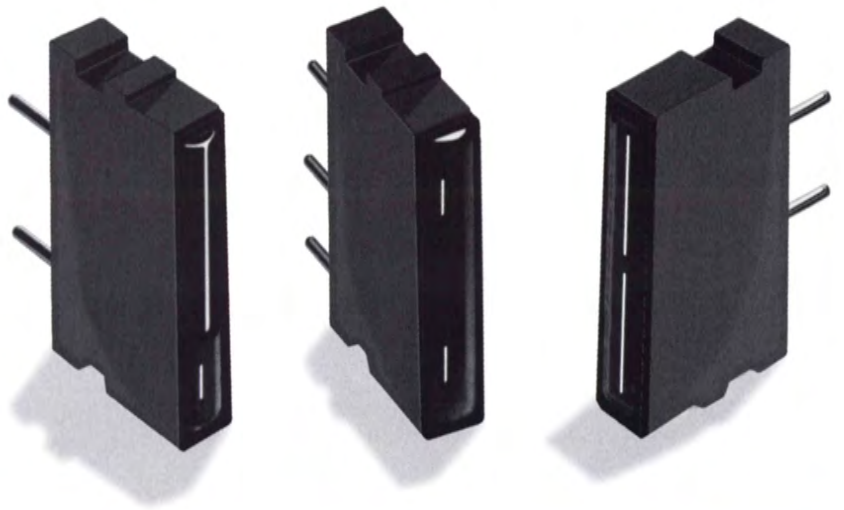




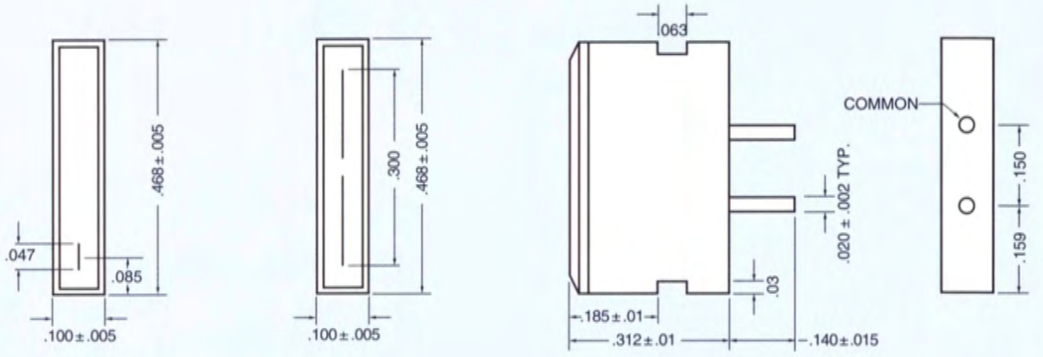


KW-104S
KW-105S

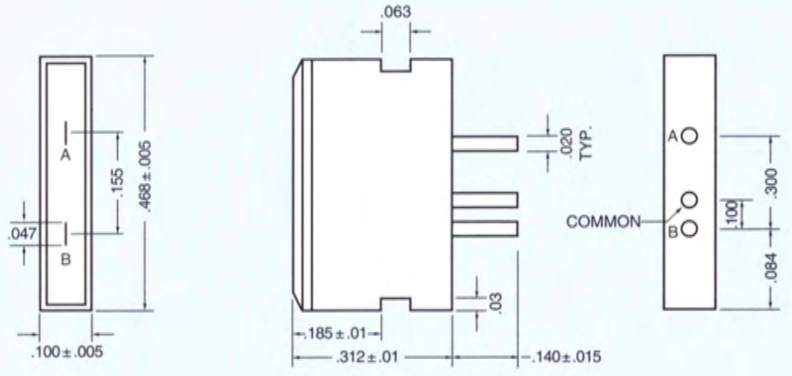
Dimensional Outline and Pin Configurations



KW-104S-DP
KW-105S-DP
KW-104S-L1
KW-105S-L1

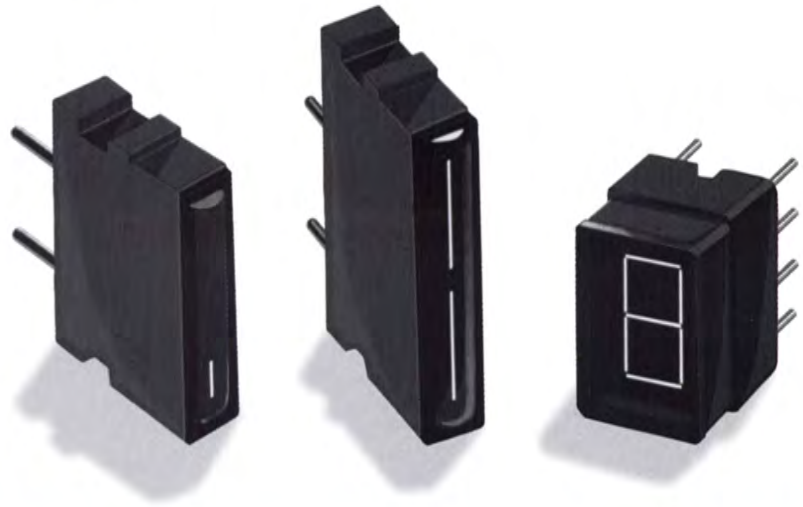


KW-104S-CL
KW-105S-CL

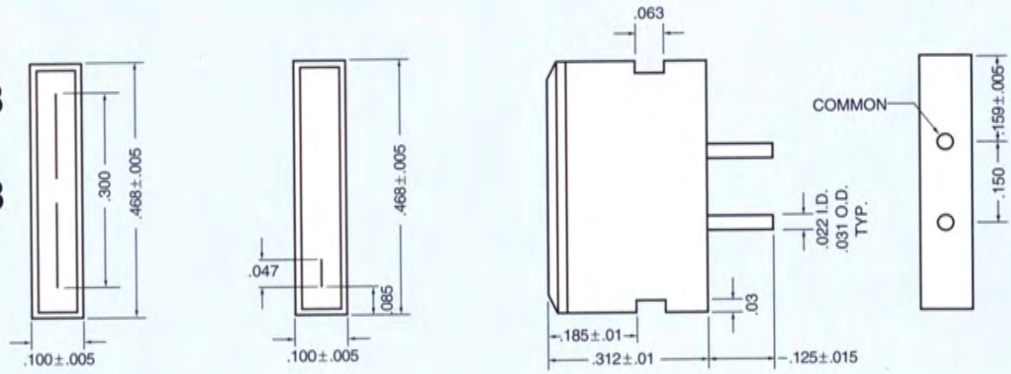


KW-104S
KW-105S
KW-304S

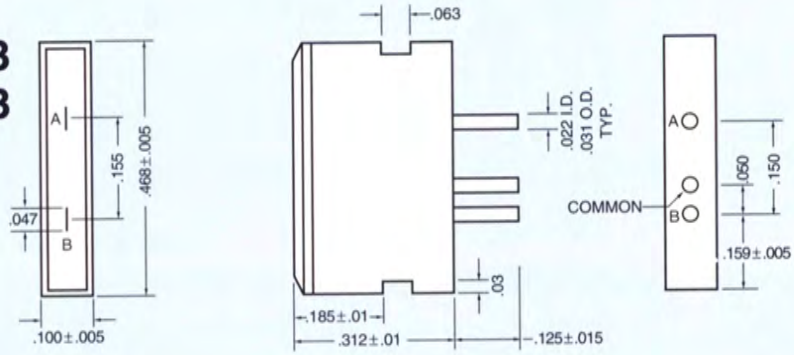
Dimensional Outline and Pin Configurations



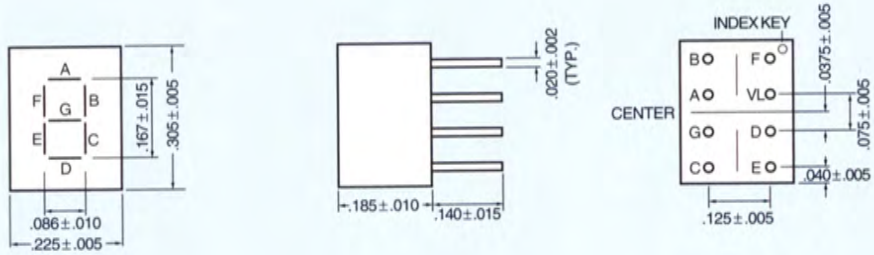
KW-104S-DP-TB
KW-104S-LI-TB
KW-105S-DP-TB
KW-105S-LI-TB



KW-104S-CL-TB
KW-105S-CL-TB



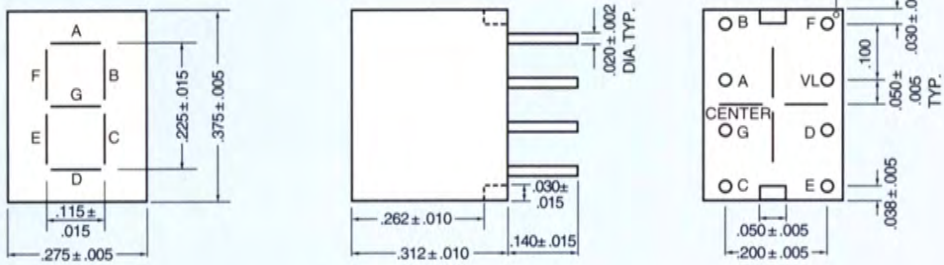
KW-304S



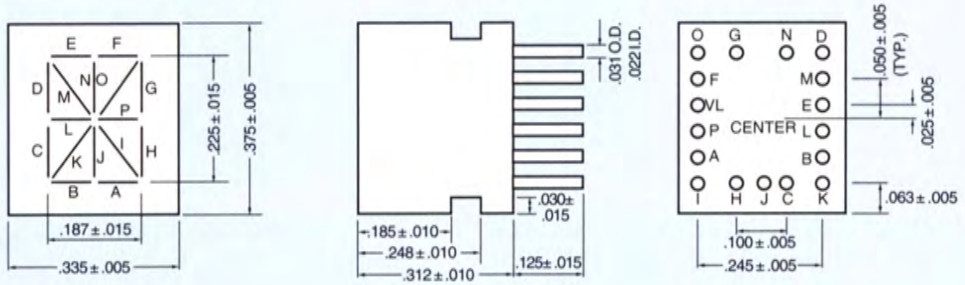
KW-204
KW-205

Dimensional Outline and Pin Configurations

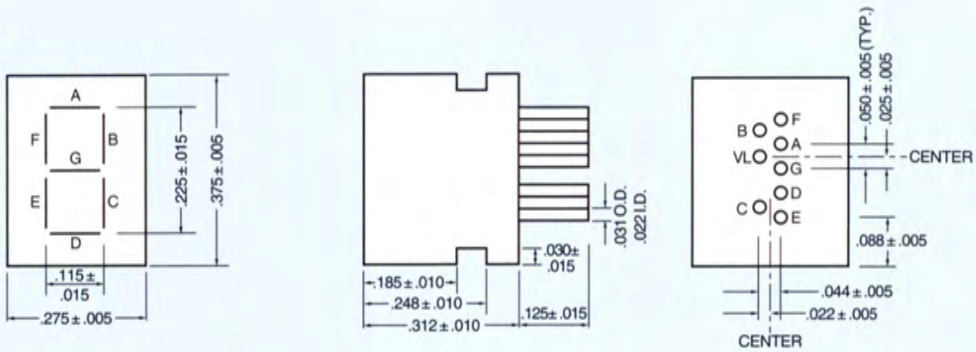
KW-204S
KW-205S



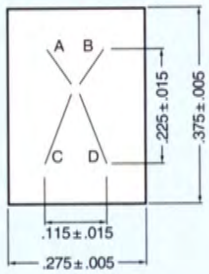
KW-204-AL
KW-205-AL

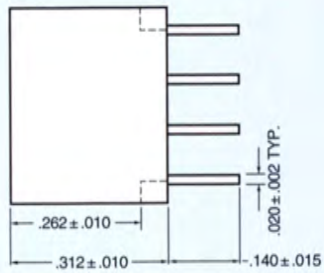


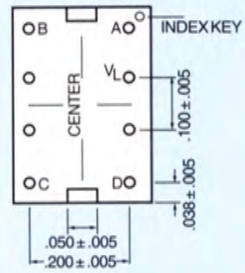
KW-204S-TB
KW-205S-TB



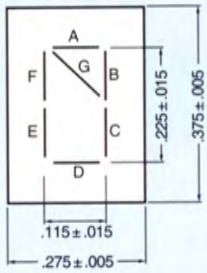
KW-204S-XY
KW-205S-XY

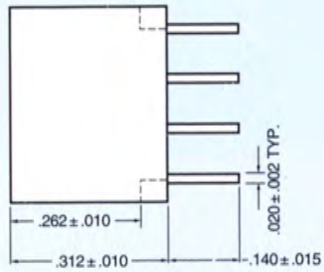


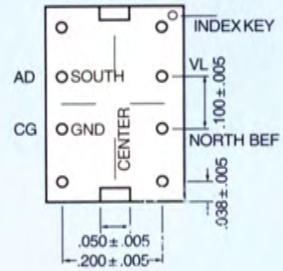




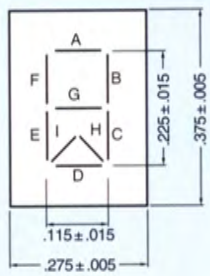
KW-204S-NS
KW-205S-NS

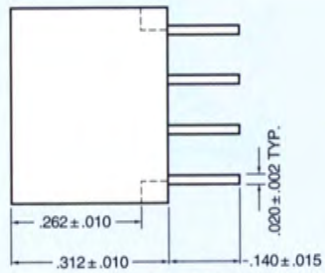


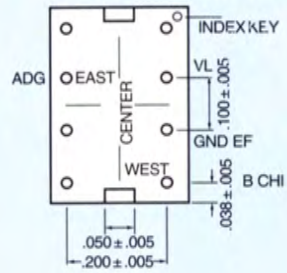




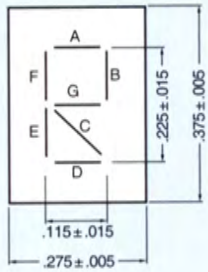
KW-204S-EW
KW-205S-EW

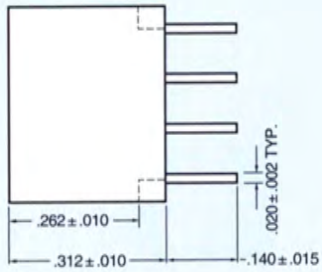


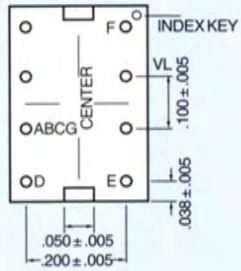




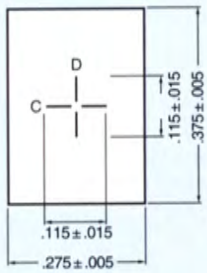
KW-204S-LR
KW-205S-LR

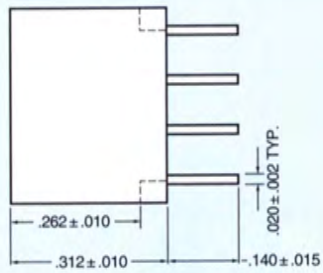


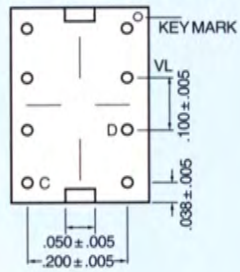




KW-204S-PM
KW-205S-PM



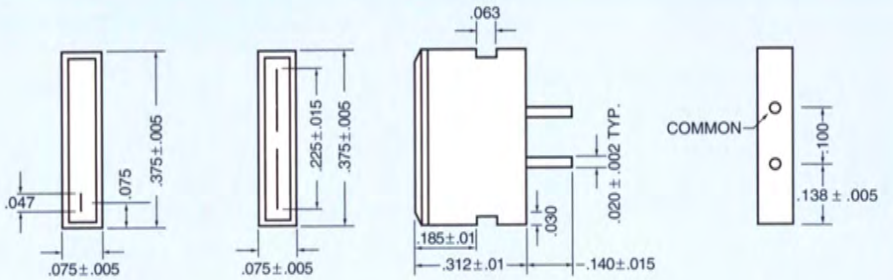




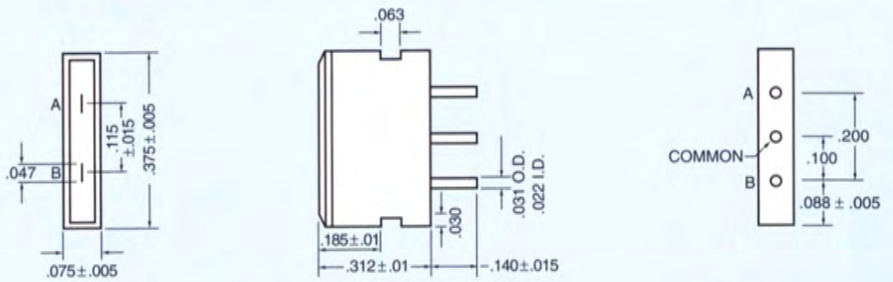
KW-204
KW-205
Decimal Colon #1

Dimensional Outline and Pin Configurations

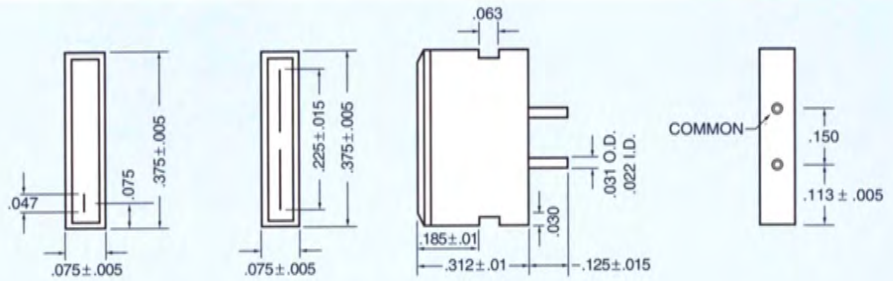
KW-204S-DP
KW-205S-DP
KW-204S-LI
KW-205S-LI



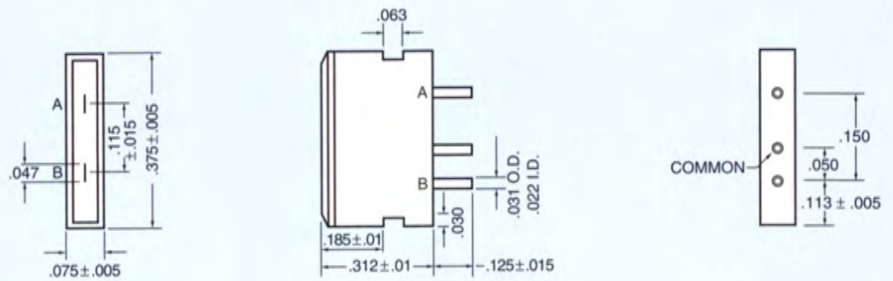
KW-204S-CL
KW-205S-CL



KW-204S-DP-TB
KW-205S-DP-TB
KW-204S-LI-TB
KW-205S-LI-TB

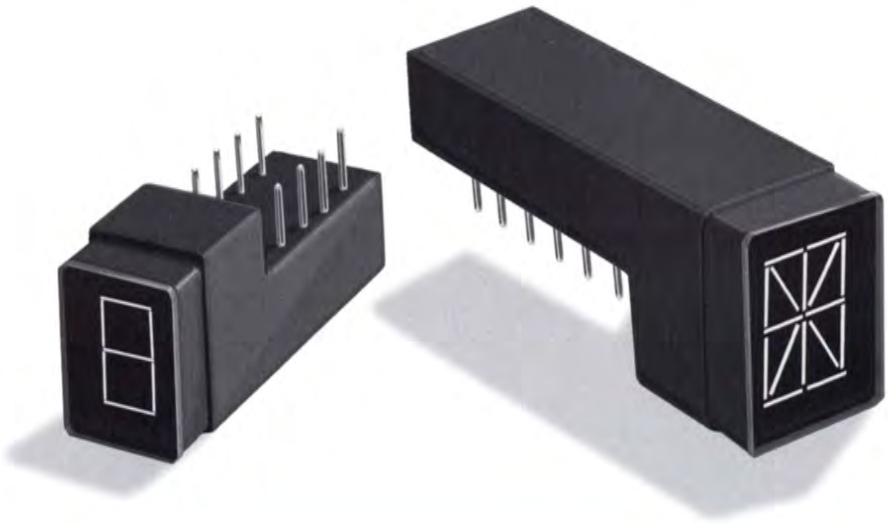


KW-204S-CL-TB
KW-205S-CL-TB

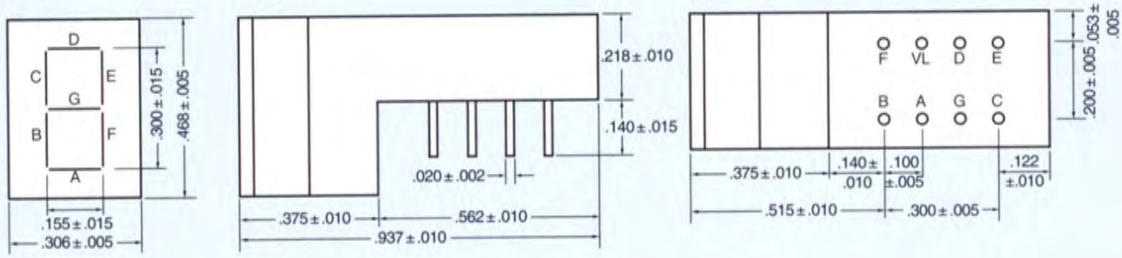


Right Angle Mount

Dimensional Outline and Pin Configurations

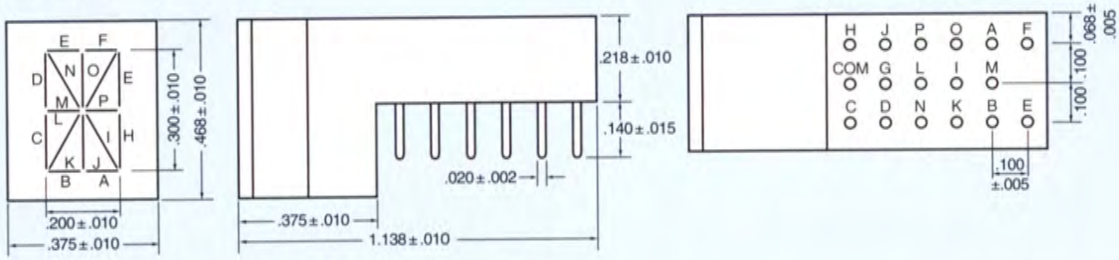


KW-104-RG
KW-105-RG



KW-104AL-RG
KW-105AL-RG

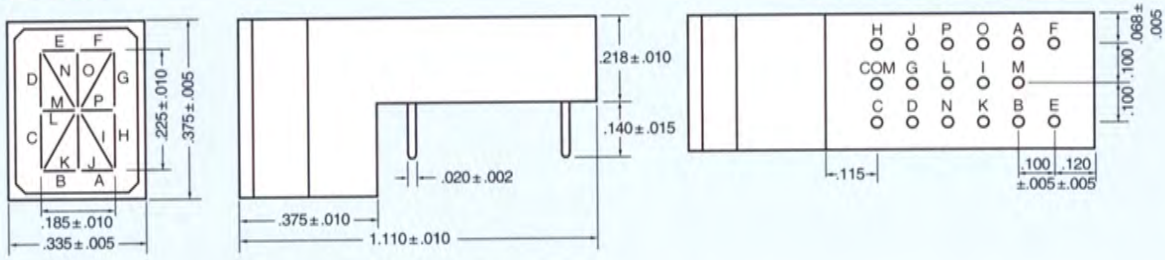
KWD-104AL-RG*
KWD-105AL-RG*



*KWD Series have internal diodes - consult factory for details

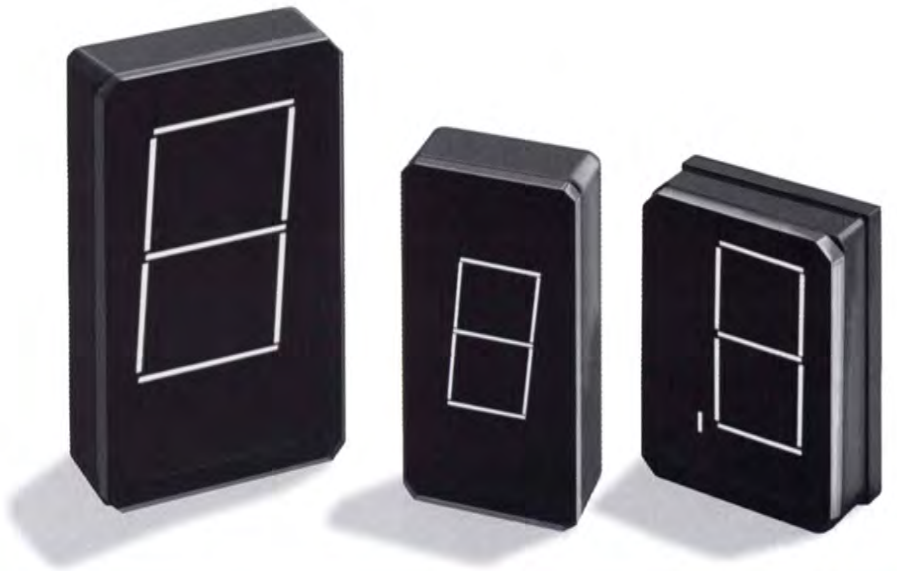
KW-204AL-RG
KW-205AL-RG

KWD-204AL-RG*
KWD-205AL-RG*

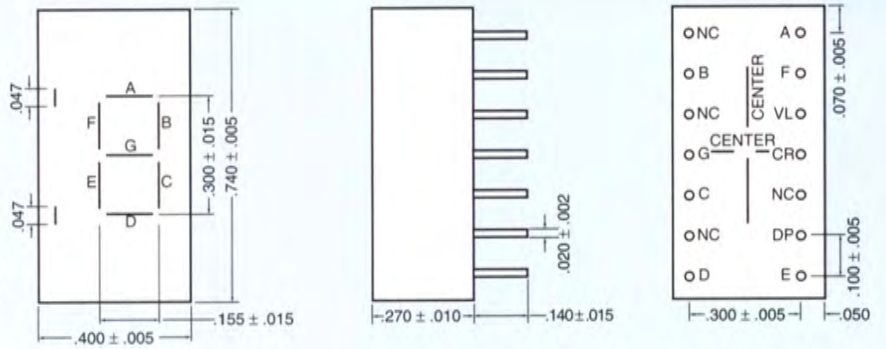


*KWD Series have internal diodes - consult factory for details

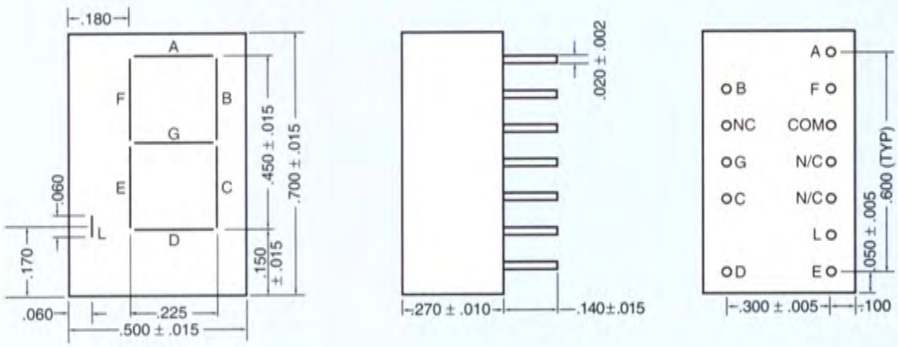
KW-100
KW-800
KW-1000
-DIP
SERIES



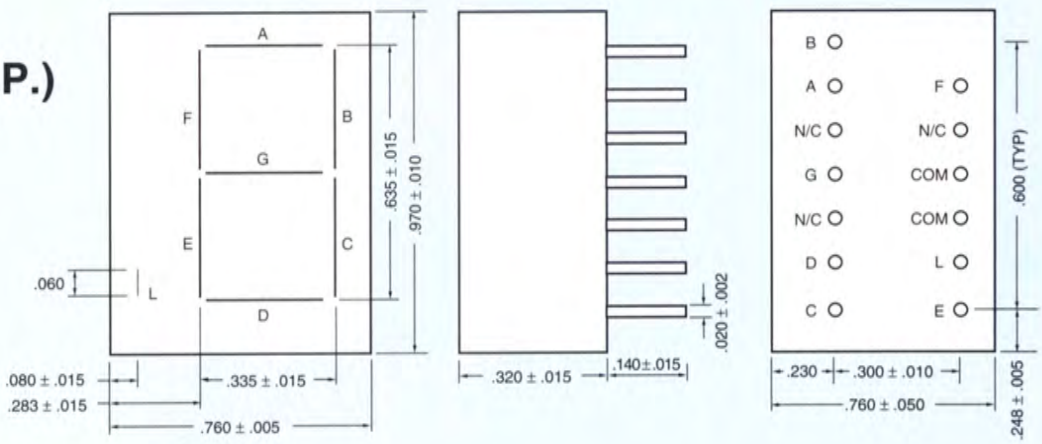
KW-104G-DIP
KW-105G-DIP
KW-114G-DIP(D.P.)
KW-115G-DIP(D.P.)
KW-134G-DIP(colon)
KW-135G-DIP(colon)



KW-805-DIP
KW-815-DIP(D.P.)



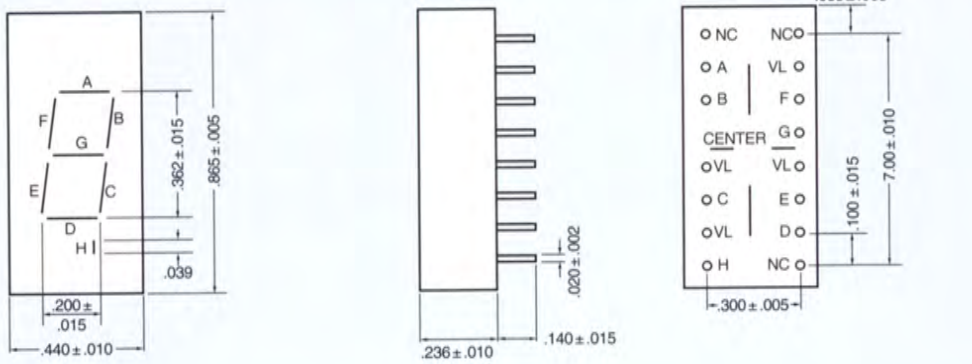
KW-1005-DIP
KW-1015-DIP(D.P.)



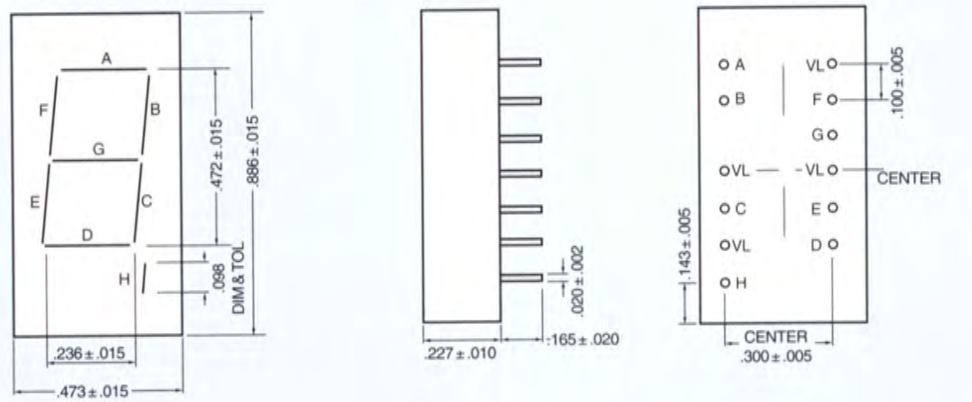
KW-505F
KW-515
KW-615

Dimensional Outline and Pin Configurations

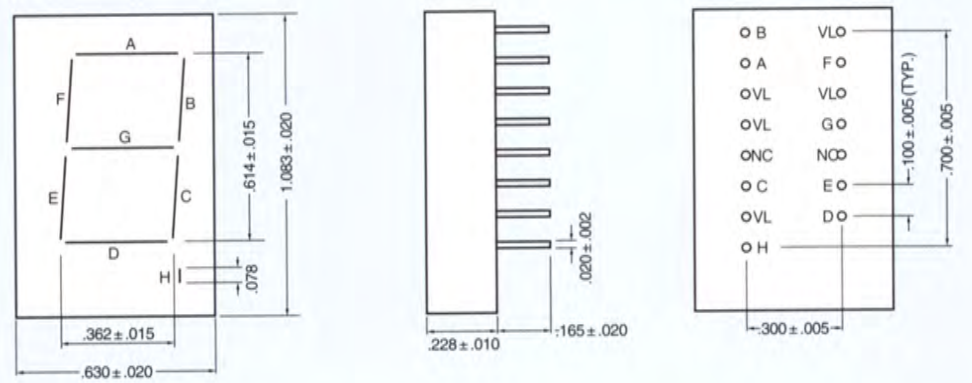
KW-505-F8
KW-515-F8
KW-505-F15
KW-515-F15
KW-515-F4-F15



KW-515



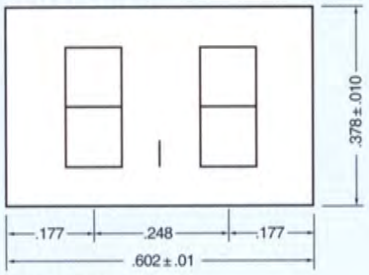
KW-615-17
KW-615-30
*KW-605-ARW



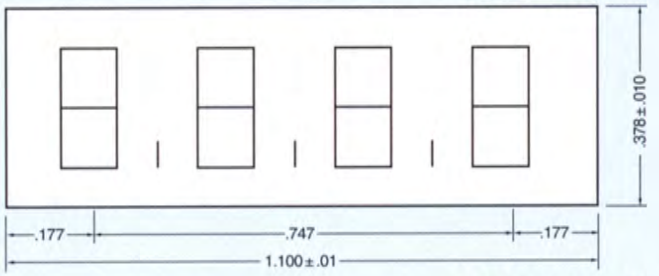
* Arrow not shown, consult factory

Multi-Digits

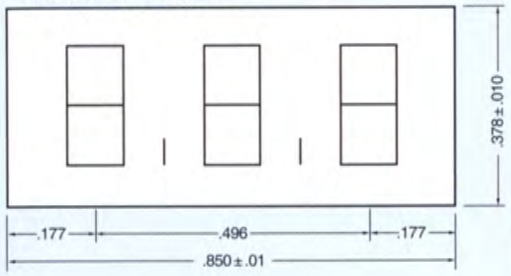
KW-ML-2-214S
KW-ML-2-215S



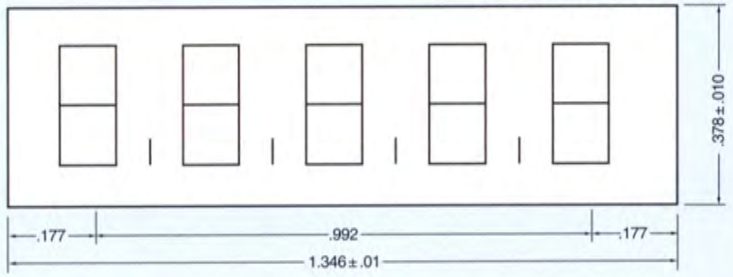
KW-ML-4-214S
KW-ML-4-215S



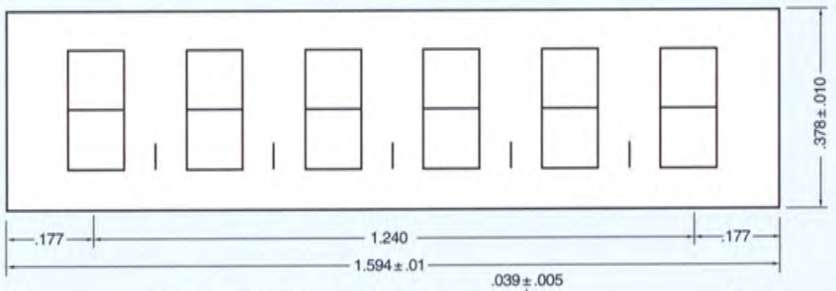
KW-ML-3-214S
KW-ML-3-215S

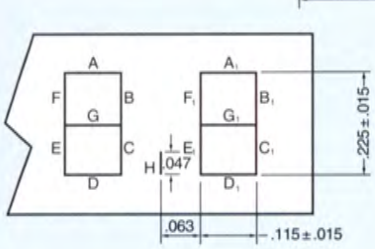


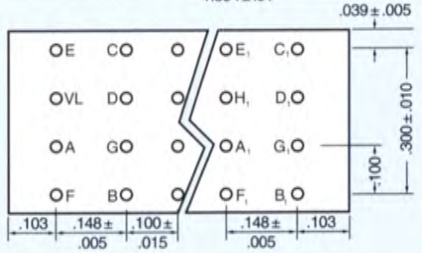
KW-ML-5-214S
KW-ML-5-215S

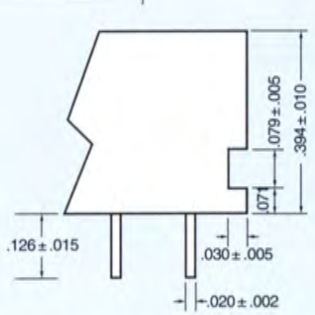


KW-ML-6-214S
KW-ML-6-215S



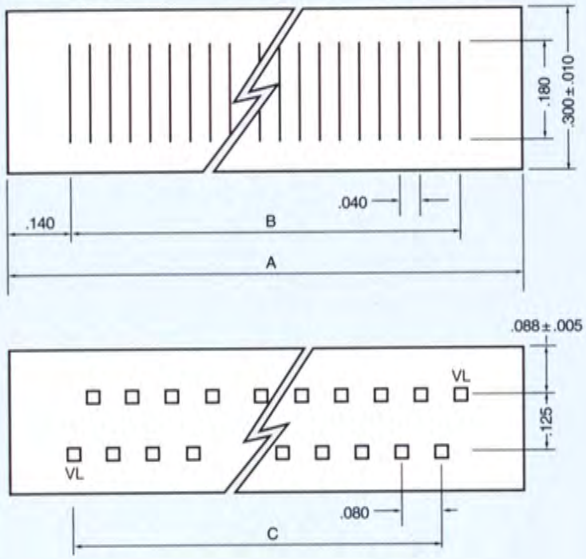


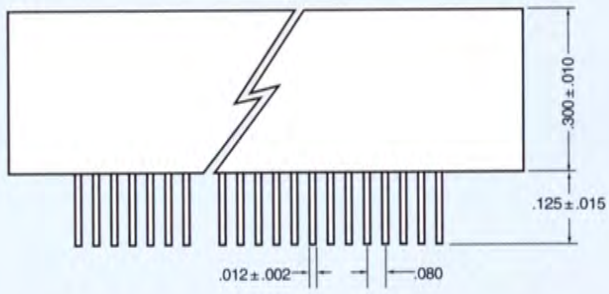




Bar Graphs

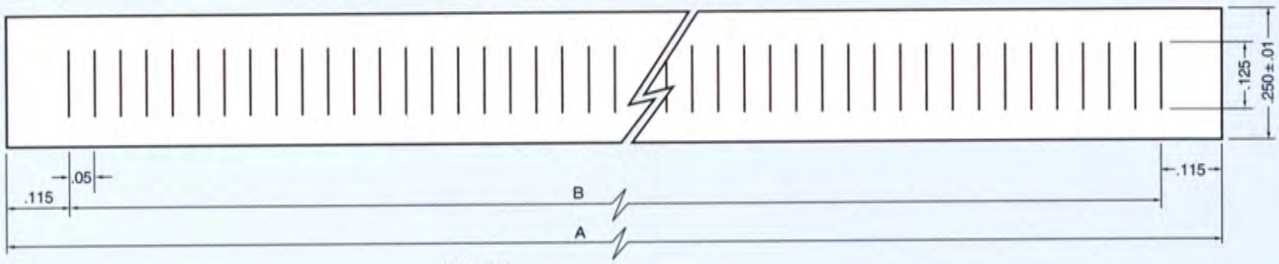
KW-BG (Special Connector Mount*)

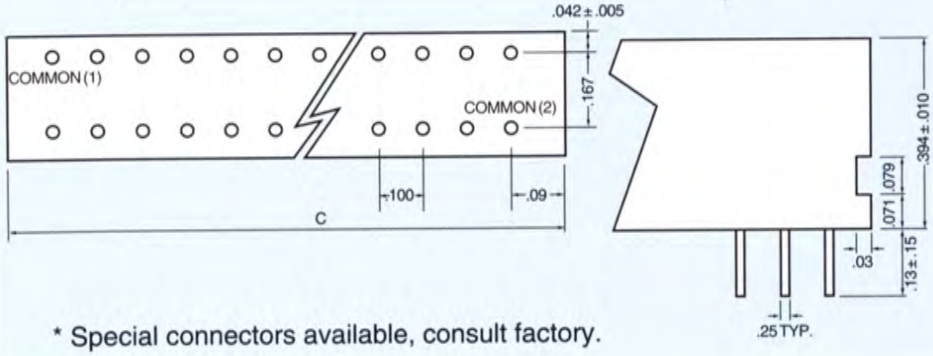




TYPE	A	B	C
KW-BG-30-A-DL	1.440	.040 X 29P	.080 X 15P
KW-BG-50-A-DL	2.240	.040 X 49P	.080 X 25P
KW-BG-100-A-DL	4.240	.040 X 99P	.080 X 50P

KW-BG (Panel Mount)





TYPE	A	B	C
KW-BG-20S	1.18	.05 X 19	.100 X 10
KW-BG-36S	1.98	.05 X 35	.100 X 18
KW-BG-56S	2.98	.05 X 55	.100 X 28

* Special connectors available, consult factory.

WAMCO DISPLAY ACCESSORIES

KWS Connectors for KW100S-TB, KW200S-TB, KW100AL and KW200AL Series Displays

Description:
The KWS Series Rack and Panel connectors mate with TB and Alpha-Numeric Series incandescent displays. Standard contact termination is uninsulated 1" solid #25 AWG tin plated copper leads which can be easily spread apart for hard wiring or direct connection to your PC board. Gold plated leads available upon request. (-GPL after part number.) Optional termination is#26 AWG, TFE insulated Type ET wire leads per MIL-W-16878. Consult factory for special hookup wire to meet your specific requirements.

Materials:

Insulator:
Polyphenylene Sulfide per MIL-P-46174 or Diallyl Phthalate per MIL-M-14 Type SDG-F.

Contact:
Copper alloy and beryllium copper, .000050" gold over copper flash per MIL-G-45204, Type II.

Standard Termination:
25 AWG solid copper tin plated.

Optional Termination:
26 AWG stranded wire, TFE insulated per MIL-W-16878, Type ET. Specify by adding suffix "W" and lead length (in inches) to part number.

Specifications:

Dielectric withstanding voltage: 500 VAC RMS.

Current rating: 3 amperes (max.)

Contact resistance: 4 milliohms, nominal.

Insulation resistance: 5,000 megohms, minimum.

Vibration: No discontinuity in excess of 1 microsecond during twelve 20 minute sweeps from 10 to 2,000 HZ at .060 DA or 20 G"s whichever is less.

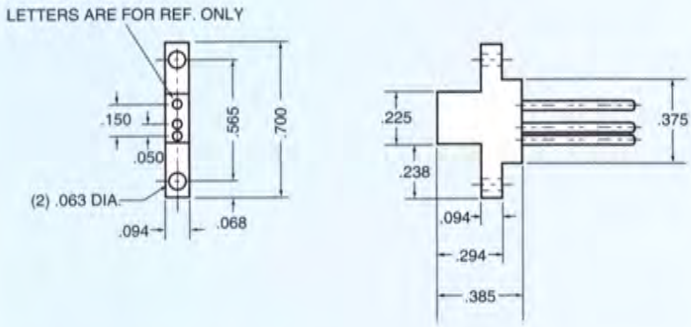
Marking: Per MIL-STD-1285.

Temperature: -65° C to +125°C (operating).

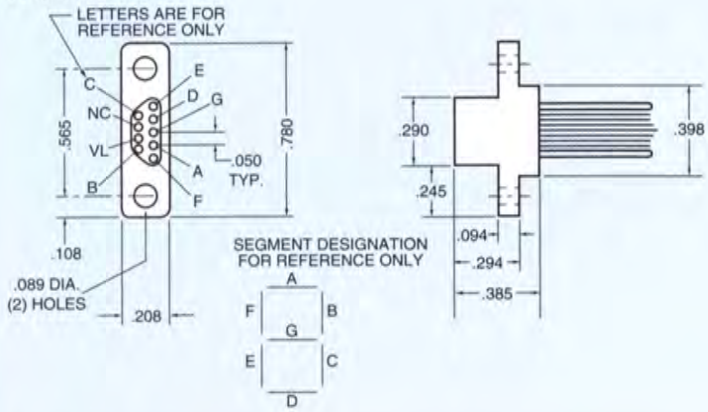
Contact Engaging Force: 6 oz. per contact maximum.

Contact Separation Force: 1/2 oz. per contact minimum.

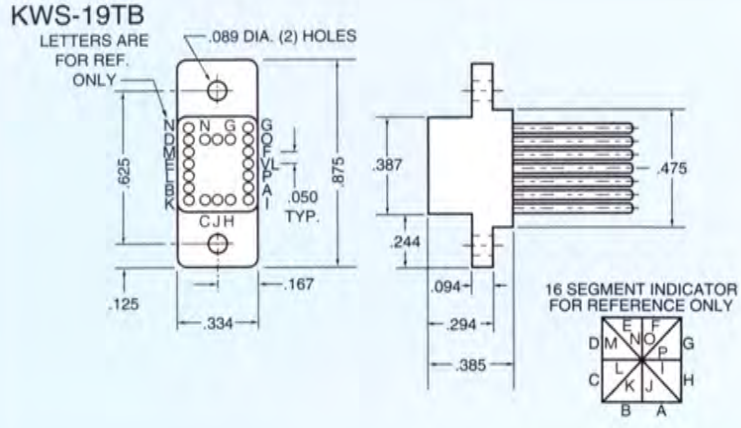
KWS-3TB



KWS-9TB



KWS-19TB



KWS Connectors for KW100S and KW200S Series Displays

Description:

This KWS Series connectors mate with all .020 Diameter pin series incandescent displays, and can be mounted directly to your PC board. High temperature body materials will not soften during soldering.

The advanced contact design of these connectors offer long life and consistent insertion and withdrawal forces. Electrical and mechanical characteristics are maintained after many insertions.

Materials:

Insulator:
Polyphenylene Sulfide per MIL-P-46174 or Diallyl Phthalate per MIL-M-14 Type SDG-F.

Terminal:
Brass per QQ-B-626. .00020 thick tin per MIL-T-10727 over copper per MIL-C-14550.

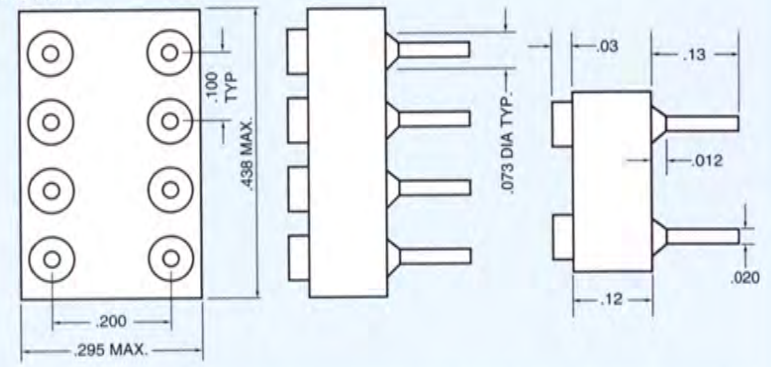
Contact:
Beryllium copper per QQ-C-533. .00003 thick gold per MIL-G-45204 over nickel per QQ-N-290.

Specifications:
Rated Voltage: 28 volts DC.
Rated Current: 500 Milliamps.

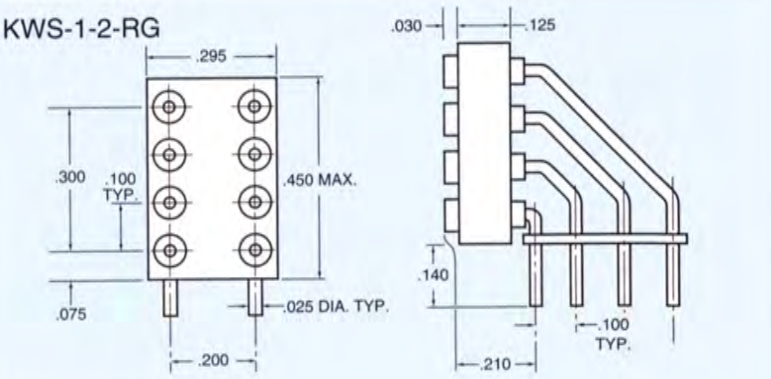
Insertion & Withdrawal Force:
4-18 ounces .020 ± .001 diameter pin.

Durability:
100 mating cycles without mechanical degradation.

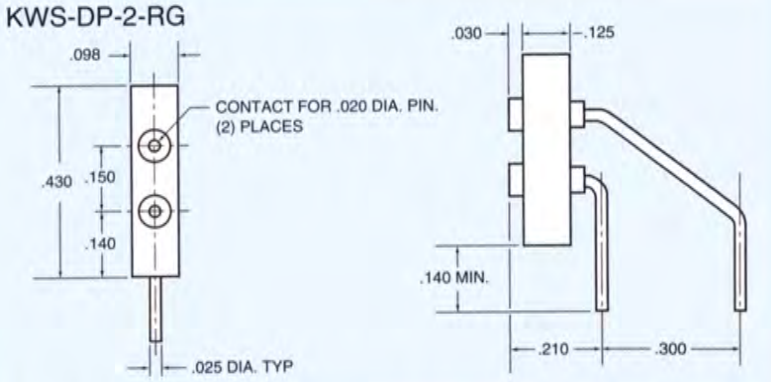
KWS-8



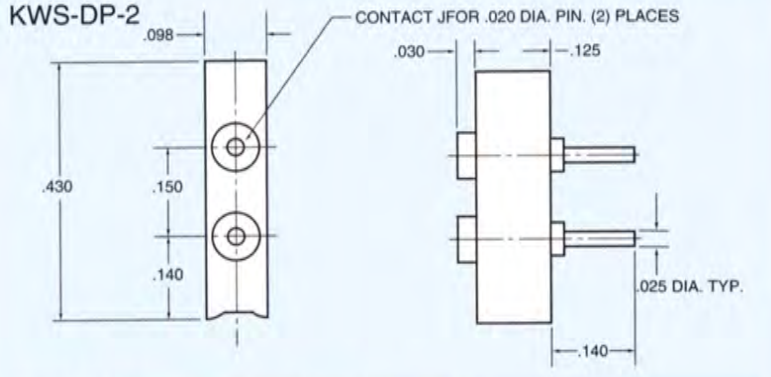
KWS-1-2-RG



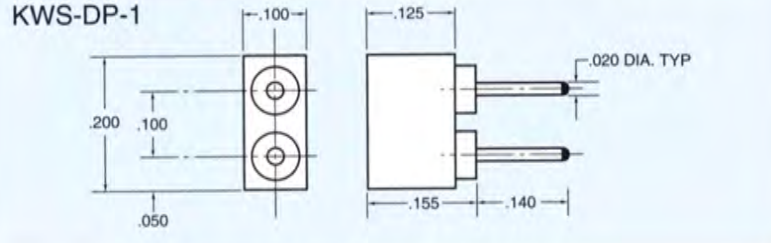
KWS-DP-2-RG



KWS-DP-2



KWS-DP-1



WAMCO KWS

DIODE/CONNECTOR FOR ALPHA NUMERIC DISPLAY

MODEL KWS-19D-X-XX-1 for $\frac{\text{KW204AL}}{\text{KW205AL}}$

MODEL KWS-19D-X-XX-2 for $\frac{\text{KW104AL}}{\text{KW105AL}}$

DESCRIPTION

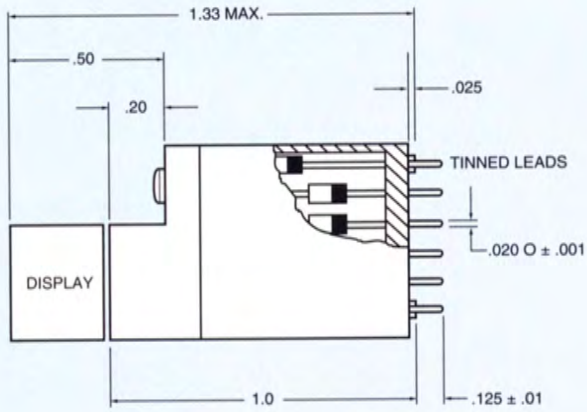
Models KWS-19D-X-XX-1 and KWS-19D-X-XX-2 are integral connector and diode packages. WAMCO displays KW104AL, KW105AL, KW204AL or KW205AL plug into one end. The KWS-19D-X-XX-1 and KWS-19D-X-XX-2 contain 16 isolation diodes needed for space-saving multiplex operation. The subminiature packages are terminated on .100' grid and can be PC mounted or plugged into solderless terminals such as AMP 7-330808-5. Costly individual handling of isolation diodes can be eliminated and makes diode repair a front panel replacement item.

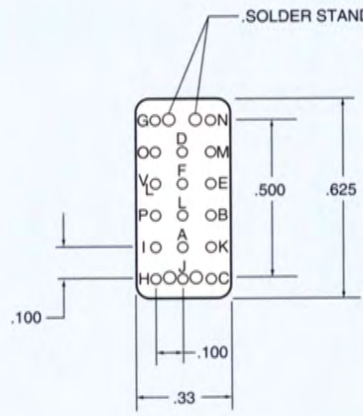
The advantage of this unique packaging concept is the ability to interconnect all like segments together in parallel, saving the cost and weight of the lower density standard interconnect approach. The diodes are packaged into the connector in such a way as to minimize behind-panel dimensions and permit displays to be mounted side-by-side without unsightly gaps. A convenient captive 2-56 mounting nut and a matching screw provide secure mounting compatible with front panel replacement requirements (Also available without 2-56 mounting nut and screw).

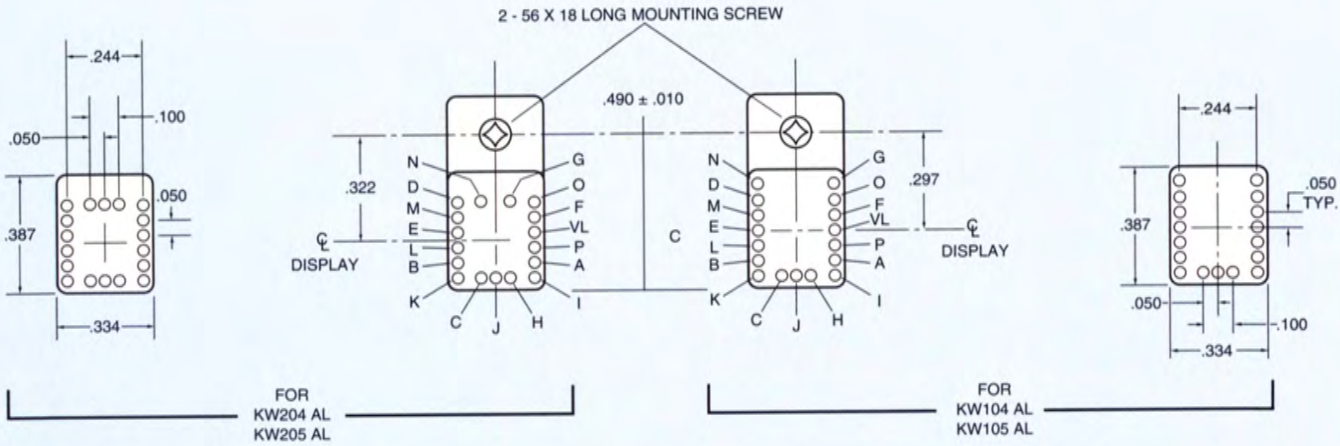
This component allows designers to utilize the many advantages of multiplexing incandescent displays without the disadvantage of how to package the diodes. Since the display connector also houses the isolation diodes, the connector may be printed circuit mounted with all segments wired on the PC board, a feature not practical with conventional display connector combinations.

The diodes are encapsulated in a urethane prepolymer potting compound and housed in a high temperature diallyl phthalate or polyphenylene sulfide per MIL-P-46174case. The unit will meet the most rugged military environmental requirements. The gold plated contact pins conform to MIL-G-45204, Type II Terminated with Copperweld (steel core, copper clad, solder plated) leads, the unit may be soldered or plugged in place.

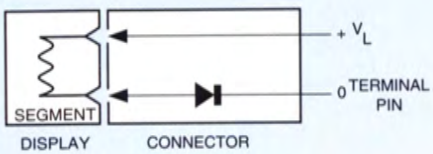
The connector can be supplied with either JAN or JAN-TX-IN4148-I, 4150-I or 4454-I



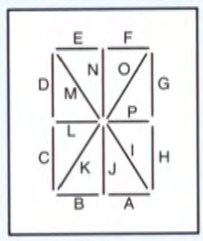




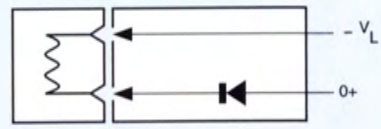
COMMON ANODE

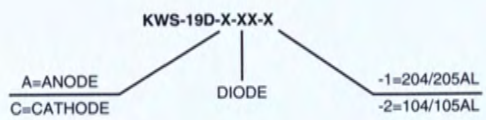


SEGMENT DESIGNATION (REF.)



COMMON CATHODE





PART NUMBER	DIODE TYPE	POLARITY
KWS-19D-A-06-X	JAN TX IN 4150-1	COMMON ANODE
KWS-19D-C-05-X	JAN TX IN 4148-1	COMMON CATHODE
KWS-19D-A-04-X	JAN TX IN 4148-1	COMMON ANODE
KWS-19D-A-03-X	IN 4454-1	COMMON ANODE
KWS-19D-C-02-X	IN 4454-1	COMMON CATHODE
KWS-19D-C-01-X	JAN TX IN 4150-1	COMMON CATHODE

ORDERING INFORMATION:

KW | 1 | 0 | 5 | S | NS | TB

MODEL NUMBER
KW- :SINGLE DIGIT OR ALPHANUMERIC
KW-ML :MULTI DIGIT
KW-BG :BAR GRAPH

KWD :WITH DIODE

CHARACTER HEIGHT
1 = .300 6 = .614
2 = .225 8 = .450
3 = .167 10 = .635
5 = .362/.472

DECIMAL POINT AND COLON
0: WITHOUT DECIMAL POINT
1: WITH DECIMAL POINT
3: WITH COLON

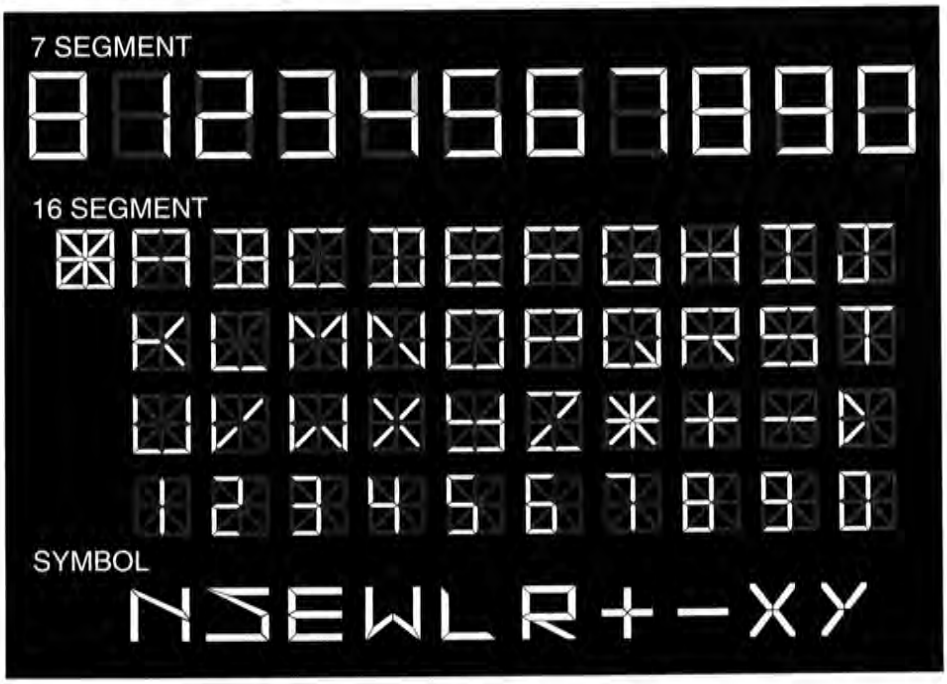
OPERATING VOLTAGE
3: 3 VOLT
4: 4 VOLT
5: 5 VOLT

PACKAGE
S : STANDARD
G : LOW PROFILE

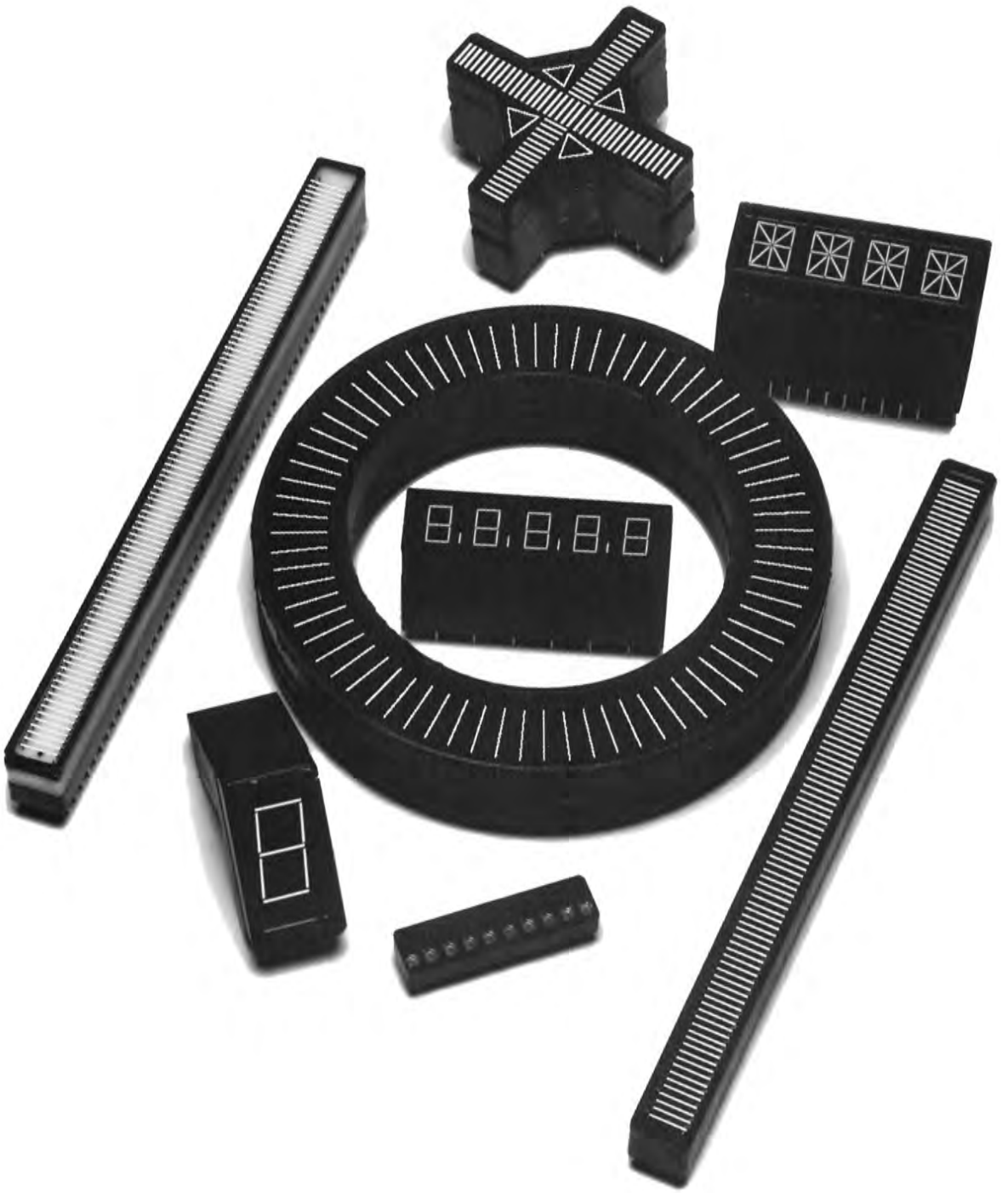
TERMINAL TYPE
TB : CANNON PIN
WT : WIRE TERMINAL
H : LONG PIN LENGTH
DIP : DUAL IN LINE
AU8P : SPECIAL 8 PIN
RG : RIGHT ANGLE MOUNT

CHARACTER CODE
AL : ALPHANUMERIC
NS : NORTH/SOUTH
EW : EAST/WEST
LR : LEFT/RIGHT
XY : X/Y
PM : PLUS/MINUS
DP : DECIMAL POINT
CL : COLON
SL1 : NUMERIC 1

TYPICAL DISPLAY PATTERN



Custom Displays

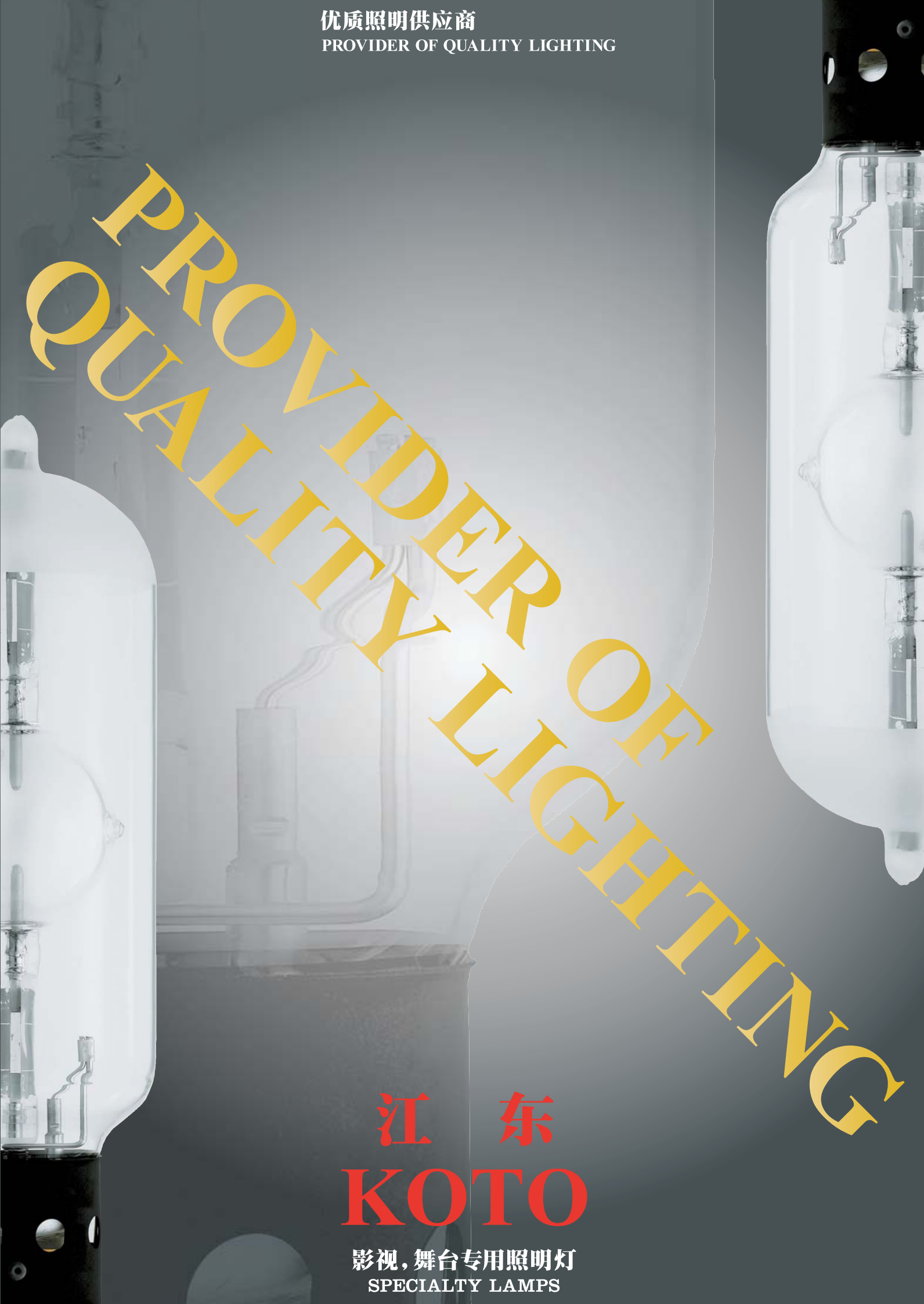


Consult Factory For Custom Displays

Wamco
Aerospace and automotive lighting
11555 Coley River Circle
Fountain Valley, CA 92708
714.545.5560 Fax: 714.545.6093
www.wamcolight.com

FSC 58774

优质照明供应商
PROVIDER OF QUALITY LIGHTING



江　东
KOTO

影视，舞台专用照明灯
SPECIALTY LAMPS

另一个太阳

Another Sun

◎作为有60年制造特种灯和电子设备的一种推动力量，江东电气以及他的合作公司以独有的革新技术，不断挑战制造高性能，值得信赖的产品。

◎江东制造的高技术小型电弧金属卤化灯和卤素灯，石英晶体的密封技术以及数位显示灯(飞机工业)，不论在国内还是世界上都广泛享有盛誉。

◎江东电气在日本的舞台/摄影棚/电影市场被看作是制造高品质特种卤钨灯的先驱，并且是日本第一家开发小型日光色源金属卤化物灯泡的公司，由于拥有60年开发灯泡技术的历史，江东知道电影，电视及舞台对光源的使用需求，并且继续为世界市场研究和开发新的，高品质的产品。

◎A driving force in the manufacture of speciality lamps and electronic devices for 60 years, Koto Electric and its partner companies continue to undertake the challenge of producing high-performance, reliable products with their unique and innovative technologies.

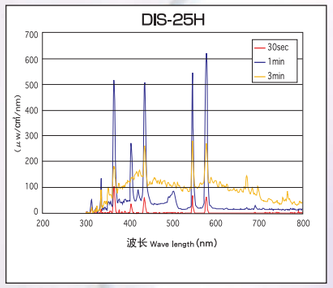
◎Koto's technologically advanced compact arc metal halide and halogen lamps, hermetic seals for quartz crystals and digital display lamps (aircraft industry) have been widely acclaimed domestically and worldwide.

◎Koto Electric is considered to be the pioneer of high-quality tungsten halogen speciality lamps within the Japanese stage/studio/film market and is the first to develop compact metal halide daylight color lamps in Japan. With its 60 year history of lamp technology development, Koto fully understands the requirements of the entertainment industry, which demands high-quality light sources for films, TV and stages, and also continues to conduct researches in the development of new, high-quality products for the worldwide markets.

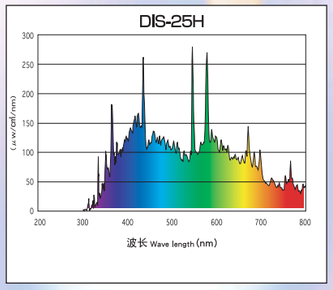
小型电弧金属卤化物灯泡

Compact Arc Metal Halide Lamps

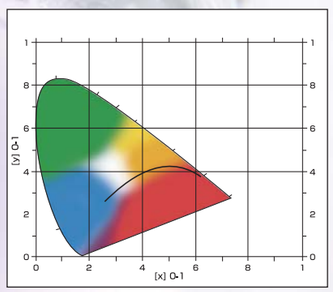
启动特性 Starting Characteristics



光谱分布 Spectral Radiation Distribution



色度图 Color chart



高亮度小型

Di-Lite 每瓦特提供85-108流明，亮度是卤钨的三倍，产生的热量却比较少。

卓越的色泽

Di-Lite 金属卤化灯的演色性超过90(Ra)，它是高效的组合和对演色性用途要求严格的首选。

经济高效

跟普通的卤钨灯相比，Di-Lite的电力消耗较少。还有，由于相对每瓦的流明效率高，
可容许尺寸较小的灯具。

演出效果的保证

Di-Lite 已经在许多严苛的灯光应用环境下有着完美的演出。所有新设计的产品在投入生产前，
都彻底地在典型的应用环境下完整的测试过。

SUPERB BRIGHTNESS AND COMPACT SIZE

Di-Lite lamps give off about 3 times the brightness of tungsten-halogen sources, with lumen efficiency of 85～108 lm per watt and generate considerablely less heat than tungsten-halogen lamps.

EXCELLENT COLOR

Di-Lite metal halide lamps have a Color Rendering Index (Ra) of more than 90. It's your best option for a combination of high efficiency and high color rendering for color-critical applications.

ECONOMICAL AND EFFICIENT

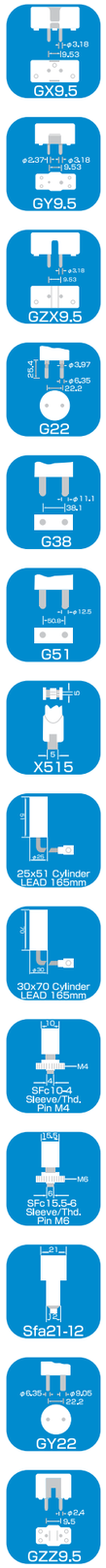
Compared to common tungsten-halogen lamps, Di-Lite metal halide lamps require less power consumption. Reduction of the fixture size is made possible due to the large lumen package per watt of power.

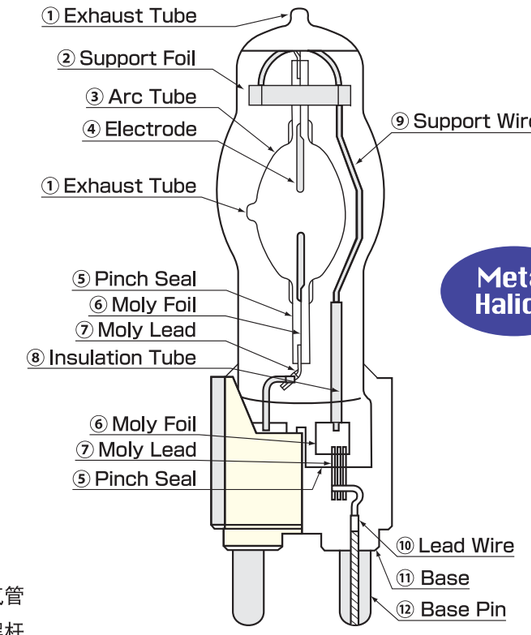
PROVEN FIELD PERFORMANCE

Di-Lite lamps perform flawlessly under many adverse conditions during lighting applications. All new designs are thoroughly tested under typical field conditions prior to mass production.

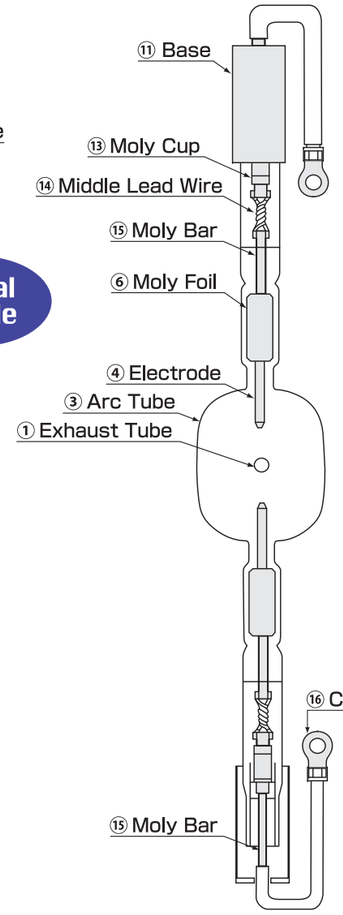
灯的构造图 Structure of Lamps

Base Types

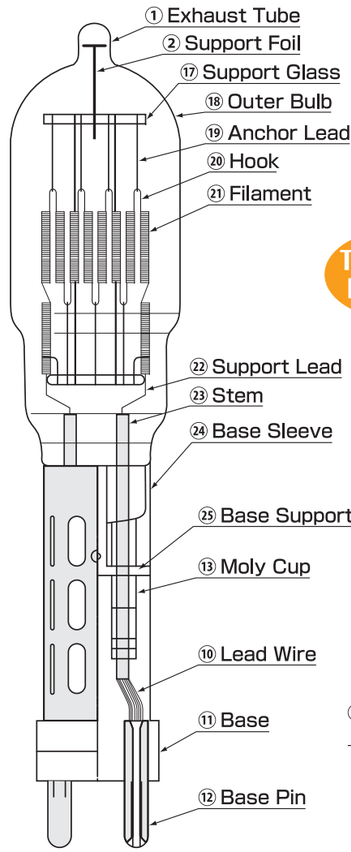




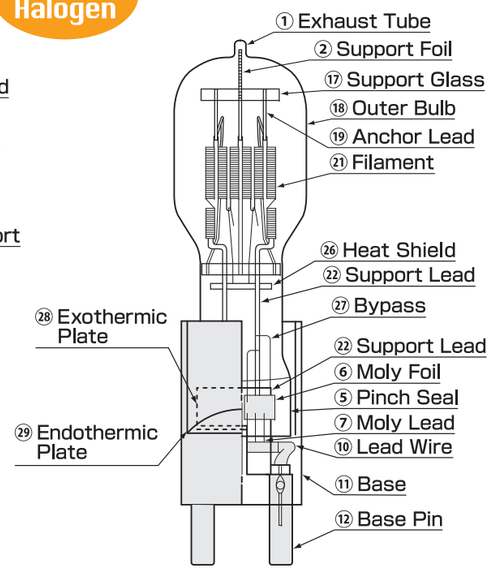
Metal Halide

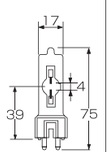
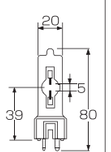
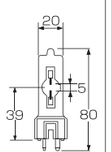
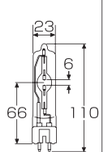
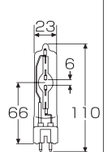
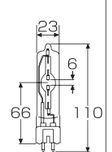
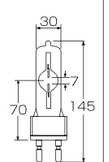
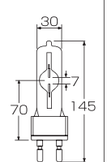
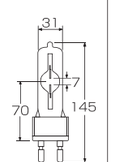


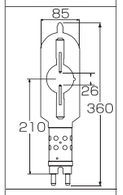
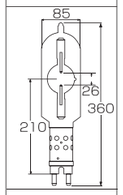
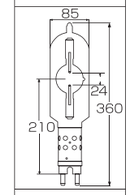
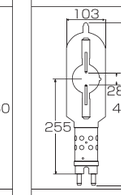
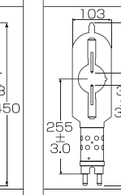
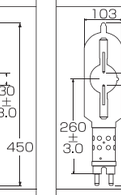
①排气管
②防摆杆
③发光管
④电极
⑤挤压封止
⑥钼箔
⑦钼导线
⑧绝缘管
⑨钼支柱
⑩导线
⑪灯座
⑫灯脚
⑬钼杯
⑭中间导线
⑮钼棒
⑯端子
⑰支撑玻璃
⑱灯壳
⑲U 型支撑线
⑳钩
㉑灯丝
㉒支柱
㉓基座
㉔灯座杆
㉕灯座支撑
㉖隔热板
㉗侧杆
㉘防热板
㉙吸热板

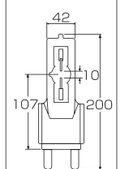
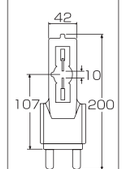
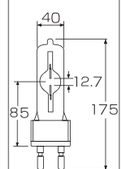
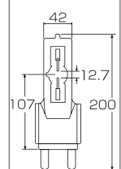
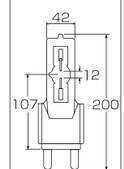
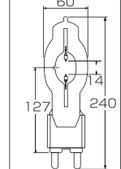
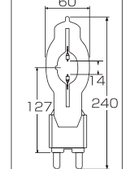
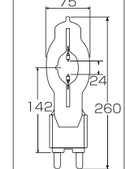
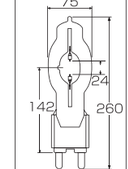


Tungsten Halogen



KOTO CODE	DIS-1H	DIS-2H	DIS-2H UV-Block	DIS-4H	DIS-4H UV-Block	DIS-4H/75	DIS-6H	DIS-6H UV-Block	DIS-8H UV-Block
V	80V	70V	70V	70V	70V	70V	95V	95V	95V
W	125W	200W	200W	400W	400W	400W	575W	575W	800W
灯座	GZX9.5	GZY9.5	GZY9.5	GZZ9.5	GZZ9.5	GZZ9.5	G22	G22	G22
点灯方向	任意	任意	任意	任意	任意	任意	任意	任意	任意
Lm	9,400Lm	15,000Lm	15,000Lm	32,000Lm	32,000Lm	28,000Lm	48,000Lm	49,000Lm	64,000Lm
K	5,600K	5,600K	6,000K	6,000K	6,000K	7,500K	6,000K	5,600K	5,800K
Hr	200Hr	200Hr	200Hr	750Hr	750Hr	750Hr	750Hr	750Hr	1,000Hr
mm									
MEMO									

KOTO CODE	DIS-60H	DIS-60H UV-Block	DIS-90H UV-Block	DIS-120H	DIS-120H UV-Block	DIS-180H
V	130V	130V	160V	160V	160V	225V
W	6,000W	6,000W	9,000W	12,000W	12,000W	18,000W
灯座	G38	G38	G38	G38	G38	G51
点灯方向	任意	任意	任意	任意	任意	任意
Lm	540,000Lm	540,000Lm	875,000Lm	1,100,000Lm	1,100,000Lm	1,650,000Lm
K	6,000K	5,500K	6,000K	6,000K	5,700K	6,000K
Hr	300Hr	300Hr	400Hr	250Hr	250Hr	250Hr
mm						
MEMO						

KOTO CODE	DIS-12H	DIS-12H UV-Block	DIS-16H UV-Block	DIS-18H	DIS-18H UV-Block	DIS-25H	DIS-25H UV-Block	DIS-40H	DIS-40H UV-Block
V	100V	100V	150V	150V	140V	115V	115V	200V	200V
W	1,200W	1,200W	1,600W	1,800W	1,800W	2,500W	2,500W	4,000W	4,000W
灯座	G38	G38	G22	G38	G38	G38	G38	G38	G38
点灯方向	任意	任意	任意	任意	任意	任意	任意	任意	任意
Lm	110,000Lm	110,000Lm	128,000Lm	165,000Lm	165,000Lm	220,000Lm	220,000Lm	380,000Lm	380,000Lm
K	6,000K	5,500K	6,800K	6,000K	6,000K	6,000K	5,600K	6,000K	5,600K
Hr	750Hr	750Hr	750Hr	750Hr	750Hr	500Hr	500Hr	500Hr	500Hr
mm									
MEMO									

Double End

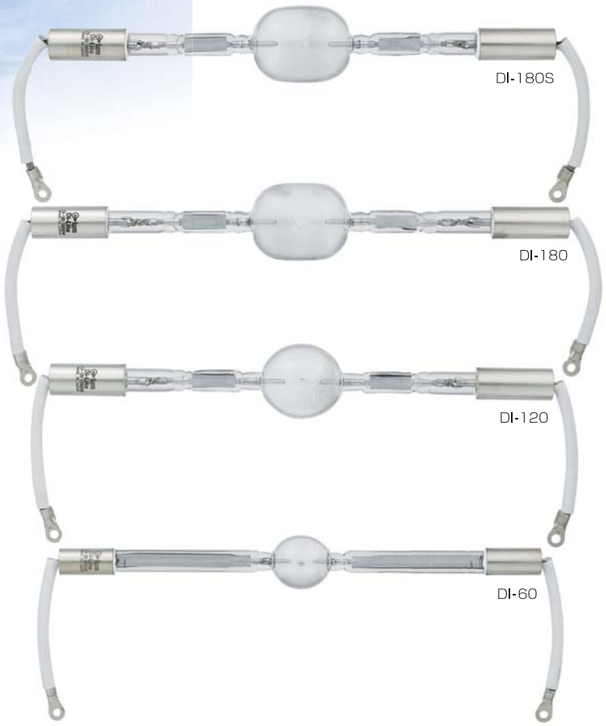

DI-40


DI-25


DI-12


DI-6

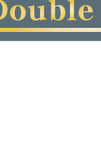

DI-2

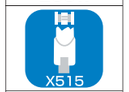
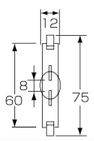
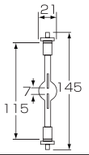
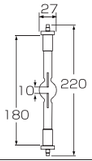
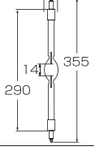
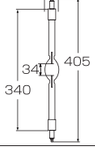
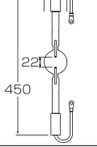
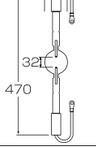
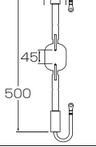
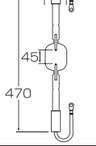

DI-180S

DI-180

DI-120

DI-60

KOTO CODE	KSR1200S/DE
	中国国内向け特殊ランプ
V	110V
W	1,200W
灯座	 SFc10-4 Without notch Pin M4
Lm	105,000Lm
K	6,200K
Hr	750Hr
mm	
MEMO	

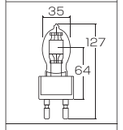
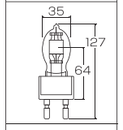
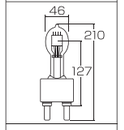
KOTO CODE	DI-2	DI-6	DI-12	DI-25	DI-40	DI-60	DI-120	DI-180	DI-180S
V	80V	95V	100V	115V	200V	125V	160V	225V	225V
W	200W	575W	1,200W	2,500W	4,000W	6,000W	12,000W	18,000W	18,000W
灯座	 X515	 SFc10-4 Sleeve/Thd. Pin M4	 SFc15.5-6 Sleeve/Thd. Pin M6	 Sfa21-12	 Sfa21-12	 25x5.1 Cylinder LEAD 165mm	 30x70 Cylinder LEAD 165mm	 30x70 Cylinder LEAD 165mm	 30x70 Cylinder LEAD 165mm
Lm	16,000Lm	49,000Lm	110,000Lm	240,000Lm	410,000Lm	570,000Lm	1,100,000Lm	1,650,000Lm	1,650,000Lm
K	6,000K	6,000K	6,000K	6,000K	6,000K	6,000K	6,000K	6,000K	6,000K
Hr	300Hr	750Hr	750Hr	500Hr	500Hr	300Hr	300Hr	300Hr	300Hr
mm									
MEMO									

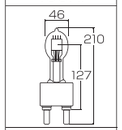
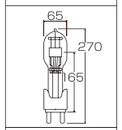
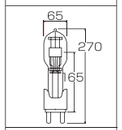
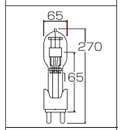
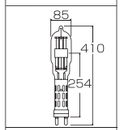
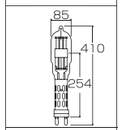
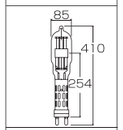
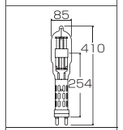
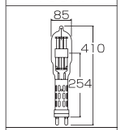
Halogen Lamps

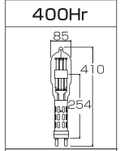
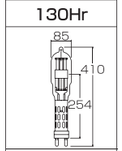
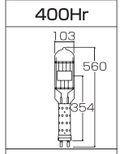
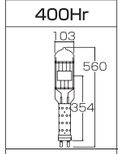
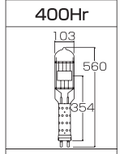
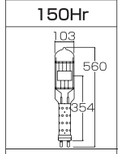
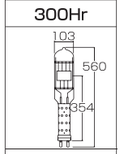
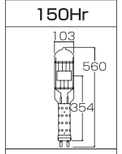
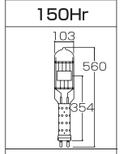

KP83・KP120H


KP200・KP240H

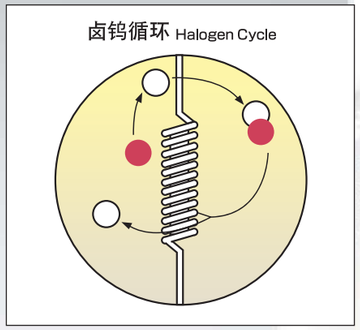

DTY

KOTO CODE	CP40/230V	CP40/240V	CP41/230V
V	230V	240V	230V
W	1,000W	1,000W	2,000W
灯座	G22	G22	G38
灯丝	C-13	C-13	C-13
Lm	27,000Lm	27,000Lm	52,000Lm
K	3,200K	3,200K	3,200K
Hr	200Hr	200Hr	400Hr
mm			
MEMO			

KOTO CODE	CP41/240V	DPY	CP29/230V	CP29/240V	DTY	KP83/220V	KP83/240V	KP120H/120V	KP120H/230V
V	240V	120V	230V	240V	120V	220V	240V	120V	230V
W	2,000W	5,000W	5,000W	5,000W	10,000W	10,000W	10,000W	12,000W	12,000W
灯座	G38	G38	G38	G38	G38	G38	G38	G38	G38
灯丝	C-13	C-13	C-13	C-13	C-13	C-13	C-13	C-13	C-13
Lm	52,000Lm	140,000Lm	135,000Lm	135,000Lm	290,000Lm	280,000Lm	280,000Lm	400,000Lm	400,000Lm
K	3,200K	3,200K	3,200K	3,200K	3,200K	3,200K	3,200K	3,400K	3,400K
Hr	400Hr	400Hr	400Hr	400Hr	500Hr	500Hr	500Hr	150Hr	130Hr
mm									
MEMO									

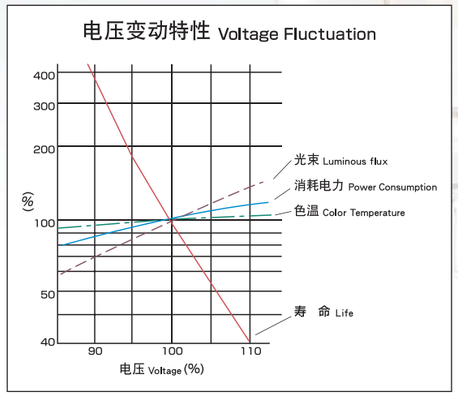
KOTO CODE	KP120/240V	KP120H/240V	KP200/208V	KP200/220V	KP200/240V	KP240H/208V	KP240/240V	KP240H/220V	KP240H/240V
V	240V	240V	208V	220V	240V	208V	240V	220V	240V
W	12,000W	12,000W	20,000W	20,000W	20,000W	24,000W	24,000W	24,000W	24,000W
灯座	G38	G38	G38	G38	G38	G38	G38	G38	G38
灯丝	C-13	C-13	C-13	C-13	C-13	C-13	C-13	C-13	C-13
Lm	345,000Lm	400,000Lm	580,000Lm	580,000Lm	580,000Lm	800,000Lm	800,000Lm	800,000Lm	800,000Lm
K	3,200K	3,400K	3,200K	3,200K	3,200K	3,400K	3,200K	3,400K	3,400K
Hr	400Hr	130Hr	400Hr	400Hr	400Hr	150Hr	300Hr	150Hr	150Hr
mm									
MEMO									

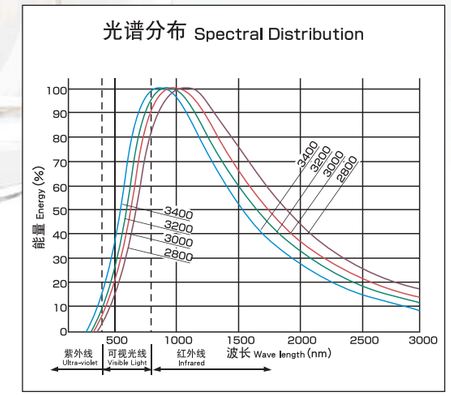
卤钨灯 Tungsten Halogen Lamps



当灯丝的温度上升到一定高度，灯泡里的钨被蒸发，拡散到温度较低的灯壁。钨，氧和卤素原子在灯壁或接近灯壁的地方混合，形成钨卤氧化分子。钨卤氧化分子在灯壁温度之下保持蒸气状，而这些蒸气慢慢向热的钨丝方向移动。灯丝附近的高温使得钨卤氧化分子分离。分离后的氧和钨原子返回灯壁，而钨原子则重新在灯丝上沉积，然后重复循环。这个过程叫"卤钨循环"。通过这个过程有效地防止了灯壁黑化，并且延长了灯的使用寿命。

When a filament is heated to a high temperature, tungsten atoms evaporate from the hot filament and diffuse toward the cooler bulb wall. Tungsten, oxygen and halogen atoms combine on or near the bulb-wall to form tungsten oxyhalide molecules. Tungsten oxyhalides remain in a vapour phase at the bulb-wall temperature, and this vapour moves toward the hot filament. High temperatures near the filament break the tungsten oxyhalide molecules apart. The oxygen and halogen atoms move back toward the bulb wall and the tungsten atoms are re-deposited on the filament. The cycle then repeats. This process is called the "Halogen Cycle". The halogen cycle prevents lamp blackening and extends the service life of the bulb.





卤钨灯代表高效率(每瓦特23流明)和长寿命的白炽灯。
寿命长，光白和小型使它成为在许多应用场所最好的选择。

江东的卤钨灯是舞台，影视照明最有效的选择。在整个寿命中，卤钨灯提供持续有效的色温和光输出。
由于各灯泡的光色稳定一致，即使替换后，也能确保光色的稳定性，避免出现光度和光色下降的现象。
小型重卷灯丝的构造能有效控制光源的特性并且和灯具作出极好的配合。

Tungsten halogen lamps represent an improved version of incandescent lamps, offering both higher efficiency (23 lumens per watt) and increased life. The longer life, whiter light and compact size of tungsten halogen lamps makes them an excellent choice for a large variety of applications.

Koto Tungsten Halogen lamps are your best choice for stage, studio, film and television lighting. These lamps provide virtually constant color temperature and light output throughout their life span. Lamp to lamp color consistency makes lamp replacement possible without degradation in light output or color. Compact and double-coiled filaments provide outstanding optical control and combine excellently with the fixtures.

安全使用说明 Safety Precautions

警告

◎请确保灯泡和专用的灯具配合使用(使用合适的灯头，功率，电压等)。否则可能导致灯泡的定格寿命缩短，或因破裂，设备过热受伤，还也可能导致灯泡受损，并且还会产生其他别的问题。
◎由于灯泡内部有很高的压力，请避免落下，碰撞，或施加强力，划伤。(清洁器具时要特别小心)如果灯泡破裂了的话，将会散成碎片，可能会引起受伤。
◎请不要用纸或其他物件罩住灯，也不要把灯接近易燃物体，否则可能会引起火灾。
◎请确保按照指定的点灯方向使用灯泡。尽管在短时间内允许任意的点灯方向，但即使在这段短时间里，也要保持灯头在灯泡的下方。否则可能会因破裂而受伤。
◎请确保在装卸，清洁电器之前切断电源。否则可能会导致触电。
◎决不要在点灯时触摸灯泡。即使关灯后，也不要触摸它，直到温度下降到安全范围内。否则可能会导致烧伤。
◎决对不要在可能燃烧或点火的环境下使用灯泡(或把灯暴露在有汽油，稀释剂，漆，粉剂等的地方)。否则可能会导致火灾或爆炸。
◎请不要长时间直视点着的灯泡。因为可能会引起眼睛不适甚至损害视觉。
◎如果专用设备前方的玻璃被移走或破损，或者外壳(灯壳)破损，决不要尝试点着灯泡。否则紫外线将会从设备破损处散发出来，会使眼睛/皮肤受损害。
◎至于摄影棚用的金属卤化物灯泡，请确保选择强化玻璃或有金属保护的密封型。因为如果破损发生，可能会造成身体的伤害。

注意事项

◎请不要用手直接接触灯泡。如果在不清洁的状态下点灯，会让灯泡成分发生变化，导致破裂或寿命的短缩。
◎请避免在有雨，水滴或湿度高的状态下使用。否则可能会引起破损。
◎请不要涂涂料。因为会使灯过热，引起破损。
◎不要在灯体的设定照射范围内使用。否则会引起被照射体的变色，破损或火灾。更严重的，可能会引起烧伤。
◎请确保灯泡与灯座紧密结合。安装不好会引起灯泡脱落，由于接触不良会引起的过热和产品冒烟。
◎请在定格电压下使用灯泡。高电压会引起寿命缩短甚至破损。
◎请避免灯泡搭配一般灯具在酸性或腐蚀性环境下使用。否则可能会引起漏电或在腐蚀环境里脱落。
◎请避免灯泡搭配一般灯具在灰尘多的地方使用，这可能会引起装置过热。
◎请避免用一般的卤素灯去引鱼。这可能会引起破损或缩短使用寿命。
◎请不要把两个或更多的灯泡连起来使用。这会引起破损或缩短使用寿命。
◎检查插头有没有任何破坏。任何的破坏可能引起无法点亮或过热。
◎请更换超过使用寿命的灯泡。否则会引起破损。
◎装卸时，确定用正确的灯座(螺丝插座，卡口插座)。不要用强力或摇晃的方式安装灯泡。
◎不要因废物处理而打破使用过的灯。打破时，散落的碎片可能会造成伤害。关于废物处理，一定要遵循相关法律规定。
◎当发生不正常点灯，比如频闪，请迅速切断电源并更换灯泡，否则可能会引起过热或冒烟。
◎请不要震动或撞击灯泡。还有，请不要在有震动和撞击的环境中使用。否则可能会引起破损和脱落。
◎更换到达平均寿命的灯泡。延长使用可能会引起石英玻璃结晶化(不透明)，严重增加爆炸的潜在危险。

Warning

◎Be sure to use the lamp with a suitable lighting appliance (with appropriate socket, wattage, voltage, etc). Failure to comply with this can result in shortened service life, injury caused by breakage, overheating of appliances or other problems.
◎Due to the high internal pressure of the glass bulb, avoid dropping, hitting, applying excessive force or scratching the lamp (particularly be careful when cleaning the lighting appliances). Glass fragments will be scattered if the bulb is broken, causing injury.
◎Do not cover the lamp with papers or other objects and do not bring it close to flammable objects of any kind due to the danger of causing a fire.
◎Be sure to use the lamp in the assigned direction. Lighting in a direction other than the assigned one is possible only for a short period of time. However, even during this short period of time, make sure to keep the lamp-socket below the light bulb. Failure to do this can cause injury or breakage of lamp.
◎Be sure to disconnect the power supply before fitting, detaching, or cleaning the appliance. Failure to comply with this can result in electric shock.
◎Never touch the lamp while it is burning. Even after the light is put out, do not touch it until the temperature drops to a safe level. Failure to comply with this can result in burns and injuries.
◎Never use in an environment where combustion or ignition may occur (exposure to gasoline, thinner, lacquer, dust etc.). Failure to comply with this can result in a fire or explosion.
◎Do not look directly at the lighted lamp for an extended period of time as it can cause eye discomfort, or in the worse case, impairment of eyesight.
◎Never try to burn the lamp if the front glass of the lighting appliance is removed or broken, or if the outer tube (glass bulb) is broken. Failure to comply with this can cause eye/skin trouble due to ultraviolet rays emitted from the breakage of the appliance.
◎With studio-use metal halide lamps, be sure to choose an encapsulated type that provides tempered glass or a metal guard. Breakage, if it occurs, can cause bodily injury.

Caution

◎Never touch the lamp directly with your bare hands. If the lamp is stained and then burned, the glass bulb's performance will deteriorate, resulting in breakage or a shortened service life.
◎Avoid exposure to rain, water drops, or a high humidity environment as it can result in breakage of the lamps.
◎Do not apply paints to the lamps. It can cause overheating of the lamp, resulting in breakage.
◎Avoid light utilization within close proximity (the designated irradiated area) of the fixture, as it can result in discoloration or damage of the irradiated subject or even fire. More seriously, it can result in burns or injuries.
◎Be sure to fit the lamp tightly into the socket. Inappropriate fitting can result in the lamp falling out of the lighting device, overheating due to contact failure, or fuming.
◎Adhere to the specified voltage. Use at a voltage higher than the specified one can result in a shorter service life and even breakage.
◎Avoid using the lamp with an ordinary lighting device in an acidic or corrosive environment. This can result in electrical leakage or falling in a corrosive environment.
◎Avoid using the lamp with an ordinary lighting device in a dusty place. This can result in overheating of the device.
◎Avoid using a standard halogen lamp to attract fish. This can cause breakage or a shortened service life.
◎Never use two or more lamps connected in series. This can cause breakage or a shortened service life.
◎Check the socket contacts for any damage. Presence of any damage can cause non-lighting or overheating.
◎Replace a lamp that has exceeded the rated service life; otherwise it may result in breakage of the lamp.
◎When fitting and detaching the lamp, be sure to use the correct base type (screw socket, bayonet socket). Do not apply excessive force or shock to the lamp.
◎Do not break used lamps for waste disposal, as glass fragments will be scattered, causing injury. For waste disposal, be sure to obey the relevant laws and regulations.
◎In case of abnormal behavior, such as repeated blinking, immediately cut off the power supply and change the electric bulb. Failure to do this can cause overheating or fuming.
◎Do not apply vibration or shock to the bulb. Also, do not use in environments that are exposed to vibration or shock. Failure to observe this can cause breakage or lamps falling down from the lighting devices.
◎Replace the electric bulb when the burning hours reach the average service life. Excessive use of a bulb can cause recrystallization (opaqueness) of the quartz glass, sharply increasing the potential risk of bursting.

wamco™
LIGHTING

LED LAMP **SERIES**

RoHS 2002/95/EC CE c UL us LISTED

PRODUCTS

PANEL MOUNT INDICATORS

Manufactured with LED technology these panel mount indicators can be purchased in numerous combinations of colors, voltages, terminals, bezels and lens types.

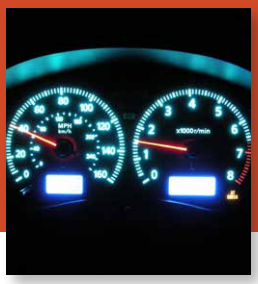
FEATURES
Mounting Holes: .25", .31", .50", .67", 8mm & 16mm
Voltages: 6V through 600V
Applicable Indicators have IP67 or NEMA3R Ratings
Sunlight Visible Indicators Available
Can Support Custom Lead Lengths and Terminals
Also Available with Incandescent or Neon Lamps

LED LIGHTING PRODUCTS

Our LED products are suitable for a broad spectrum of lighting applications, including architectural, accent, signage, workstation and machine lighting, to name a few.

FEATURES
Life Rating of 30,000+ Hours
IP65, IP66 & IP67 Ratings
RoHS Compliant
UL Approved
Available in Cool White and Warm White
RGB Light Bar with Optional Color Changing Dimmer

FOR MORE DETAILED PRODUCT INFORMATION
CALL 714-545-5560 **VISIT** WAMCOINC.COM
or **EMAIL** INFO@WAMCOINC.COM



BASED LEDs

These lamps can be purchased in numerous combinations of colors, voltages and base types to allow for direct replacement of many industry standard incandescent lamps.

FEATURES
Custom Design Available
High Energy Efficiency; up to 80% Power Reduction vs. Traditional Incandescent or Halogen Lamps
Reduced Maintenance Costs: 50,000 Hour Life
RoHS Compliant
Maintains Stable Temperature Ensuring Consistent Output
Voltages: 6V through 240V
Ideal for Indoor or Sealed Outdoor Applications

INCANDESCENT LAMPS

Wamco supplies one of the industry's broadest selections of subminiature and miniature incandescent lamps and is one of the few remaining suppliers of incandescent displays.

FEATURES
Meets Applicable ANSI & Military Standards
Broad Range of Shapes, Bases and Filament Configurations
Categories Available Include; Subminiature, Miniature, Halogen, Sealed Beam & Displays
Voltages: 1.5V through 240V
Sunlight Readable Displays

INFINITE POSSIBILITIES
INFINITE SOLUTIONS

INDUSTRIES

- » AEROSPACE
- » ELECTRONIC
- » SIGNAGE
- » MARINE
- » GENERAL
- » TRANSPORTATION

PRODUCTS

- » LEDs
- » INCANDESCENT
- » HALOGEN
- » FLUORESCENT
- » NEON
- » READOUTS & DISPLAYS

With nearly 50 years in business supporting the lighting industry, Wamco has become the premier supplier of lighting products worldwide; providing the broadest range of standard products and custom lighting solutions.

Wamco's reputation for quality is based on understanding each lighting technology, the application, and most importantly, the needs of our customers. Whether it is the aviation, marine, transportation, general lighting, electronic or signage industry, you can find Wamco lamps lighting the way.

WAMCO'S CAPABILITIES INCLUDE:

- » IN-HOUSE DESIGN
- » FAA - PMA APPROVALS
- » PROTOTYPING
- » QPL
- » LIGHTING DESIGN
- » WORLDWIDE DISTRIBUTION NETWORK
- » EXTENSIVE INVENTORY

CALL
1-714-545-5560

VISIT
WWW.WAMCOINC.COM

EMAIL
INFO@WAMCOINC.COM

wamco™ LIGHTING

wamco™ LIGHTING

AIRCRAFT **NAVIGATION LAMPS**

- Wamco's Aircraft Navigation and Anticollision Lamps meet the exacting specifications of today's aerospace industry.
- Utilized on commercial, private and military aircraft worldwide since 1968.
- Wamco lamps provide high light output with specific beam candle power distribution characteristics.
- Wamco lamps have a reputation for high quality with unsurpassed reliability.
- Tested and approved by the Federal Aviation Administration's (FAA) Parts Manufacturer Approval (PMA).
- Inspected using FAA approved fabrication inspection system that conforms to FAA CFR 21.303(h).
- Extensive inventory available via Wamco's Worldwide Headquarters and through various distribution partners worldwide.

APPLICATIONS

Applications include all major Aircraft manufacturers such as:

- Boeing
- Airbus
- Embraer
- Bombardier

Additionally, Wamco lamps are used on:

- Helicopter
- Business Jet
- General Aviation
- Military applications

CALL
1-714-545-5560

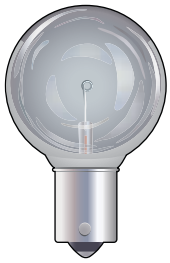
VISIT
WWW.WAMCOINC.COM

EMAIL
INFO@WAMCOINC.COM

wamco™ LIGHTING

PRODUCTS

WL AIRCRAFT WARNING LAMPS



PART NUMBER	ENVELOPE	BASE	VOLTS	WATTS	FILAMENT	LIFE HOURS
WL-600	GG10	BAY15s	6.2V	26W	C-6	300
WL-1512	GG10	BAY15s	14V	21W	C-6	300
WL-A-7512-12	GG10	BAY15s	14V	26W	C-6	300
WL-628	GG10	BAY15s	26.5V	26W	CC-6	300
WL-1524	GG10	BAY15s	28V	21W	CC-6	300
WL-A-7512-24	GG10	BAY15s	28V	26W	CC-6	300
WL-16870	GG12A	BAY15s	6.2V	40W	C-6	150
WL-A-7079B-12	GG12A	BAY15s	14V	40W	C-6	150
WL-8115	GG12A	BAY15s	28V	20W	CC-6	300
WL-617	GG12A	BAY15s	28V	40W	CC-6	150
WL-684	GG12A	BAY15s	28V	40W	CC-6	150
WL-A-7079B-24	GG12A	BAY15s	28V	40W	CC-6	150
WL-A-7796A-24	GG12A	BAY15d	28V	14W/40W	C-6V/CC-6	300/150
WL-626	GG12B	BAY15s	6.2V	40W	C-6	300
WL-11631	GG12B	BAY15s	6.2V	40W	C-6	300
WL-A-4174-12	GG12B	BAY15s	14V	40W	C-6	300
WL-A-4174-24	GG12B	BAY15s	28V	40W	CC-6	300
WL-A-4174-24X	GG12B	BAY15s	28V	40W	CC-6	300

FOR MORE DETAILED PRODUCT INFORMATION

CALL 714-545-5560 **VISIT** WAMCOINC.COM
or **EMAIL** INFO@WAMCOINC.COM

ABOUT WAMCO

With nearly 50 years of experience in the aerospace lighting industry, Wamco has become the premier supplier of lighting products to the aviation, aerospace and defense industries. Virtually every commercial airline worldwide uses Wamco products for both interior and exterior illumination. Applications range from cockpit lighting to landing lights.

Wamco's reputation for quality is based on understanding each lighting technology, the application, and most importantly, the needs of our customers. Whether it is the aviation, marine, transportation, general lighting, electronic or signage industry, you can find Wamco lamps lighting the way.

WAMCO'S CAPABILITIES INCLUDE:

- » IN-HOUSE DESIGN
- » FAA - PMA APPROVALS
- » PROTOTYPING
- » QPL
- » LIGHTING DESIGN
- » WORLDWIDE DISTRIBUTION NETWORK
- » EXTENSIVE INVENTORY

wamco™
LIGHTING

AIRCRAFT **READING LAMPS**

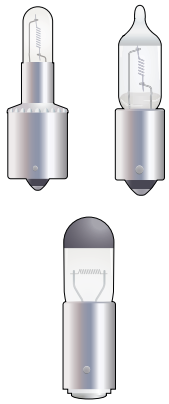
- Wamco's Aircraft Reading Lamps meet the exacting specifications of today's aerospace industry.
- Utilized on commercial, private and military aircraft worldwide since 1968.
- Wamco lamps have a reputation for high quality with unsurpassed reliability.
- Tested and approved by the Federal Aviation Administration's (FAA) Parts Manufacturer Approval (PMA).
- Inspected using FAA approved fabrication inspection system that conforms to FAA CFR 21.303(h).
- Extensive inventory available via Wamco's Worldwide Headquarters and through various distribution partners worldwide.

DATA SHEETS AVAILABLE

CALL 1-714-545-5560
VISIT WAMCOINC.COM
EMAIL INFO@WAMCOINC.COM

PRODUCTS

WL LONG-LIFE READING LAMPS



PART NUMBER	ENVELOPE	BASE	VOLTS	WATTS	FILAMENT	LIFE HOURS
WL-998502-20	T2-1/4	BA15s	28V	10W	CC-8	7,000
WL-998502-4	T2-1/4	BA9s	12V	10W	C-8Z	10,000
WL-998502-8	T2-1/4	BA9s	12V	10W	C-8Z	10,000
WL-998502-12	T2-1/4	BA9s	28V	10W	CC-8	7,000
WL-998502-13	T2-1/4	BA9s	28V	10W	CC-6	10,000
WL-998502-25	T2-1/4	BA9s	28V	11.5W	CC-6	2,000
WL-998502-15	T2-1/4	BA9s	28V	12W	CC-6	6,200
WL-998502-18	T2-1/4	BA9s	6V	10W	C-6	10,000
WL-9204	T2-1/4	SPECIAL BAYONET	28V	10W	C-6	10,000
WL-2059	T2-3/4	BA9s	12V	10W	CC-8	10,000
WL-2059X	T2-3/4	BA9s	12V	10W	CC-8	10,000
WL-8GH004554-28	T2-3/4	BA9s/EURO	28V	11.5W	CC-8	8,000
WL-8GH005448-28	T2-3/4	BA9s/EURO	28V	11.5W	CC-8	8,000
WL-8GH007429-28	T2-3/4	BA9s/EURO	28V	11.5W	CC-8	8,000
WL-8GH005678-06	T2-3/4	BA9s/EURO	6V	10W	C-8	6,000
WL-8GH003912-06	T2-3/4	BA9s/EURO	6V	12W	C-8	3,000

FOR MORE DETAILED PRODUCT INFORMATION

CALL 1-714-545-5560 **VISIT** WAMCOINC.COM
or **EMAIL** INFO@WAMCOINC.COM

ABOUT WAMCO

With nearly 50 years of experience in the aerospace lighting industry, Wamco has become the premier supplier of lighting products to the aviation, aerospace and defense industries. Virtually every commercial airline worldwide uses Wamco products for both interior and exterior illumination. Applications range from cockpit lighting to landing lights.

Wamco's reputation for quality is based on understanding each lighting technology, the application, and most importantly, the needs of our customers. Whether it is the aviation, marine, transportation, general lighting, electronic or signage industry, you can find Wamco lamps lighting the way.

WAMCO'S CAPABILITIES INCLUDE:

- » IN-HOUSE DESIGN
- » FAA - PMA APPROVALS
- » PROTOTYPING
- » QPL
- » LIGHTING DESIGN
- » WORLDWIDE DISTRIBUTION NETWORK
- » EXTENSIVE INVENTORY

U-BEND
FLUORESCENT LAMPS

wamco LIGHTING

Designed for
Boeing Galley Lighting

- Direct replacement for Osram Sylvania T8 curved fluorescent lamps
- High performance
- Energy efficient (65 Lumens per Watt)
- Long Life (20,000 hours)
- Tri-Phosphor coating with high color rendering index
- Available in multiple color ranges
- Manufactured under strict quality controls

DATA SHEETS AVAILABLE

CALL 1-714-545-5560
VISIT WAMCOINC.COM
EMAIL INFO@WAMCOINC.COM

PRODUCTS
U-BEND FLUORESCENT LAMPS

PART NUMBER	ENVELOPE	BASE	WATTS	COLOR	LUMINOUS FLUX NOM	CRI	COLOR TEMP (K)	LIFE HOURS
FB016/830	T8	G13	16W	Warm-White (WW)	1,050	>80	3,000	20,000
FB016/841	T8	G13	16W	Cool-White (CW)	1,050	>80	4,100	20,000
FB024/830	T8	G13	24W	Warm-White (WW)	1,925	>80	3,000	20,000
FB024/841	T8	G13	24W	Cool-White (CW)	1,925	>80	4,100	20,000

CALL
1-714-545-5560

VISIT
WWW.WAMCOINC.COM

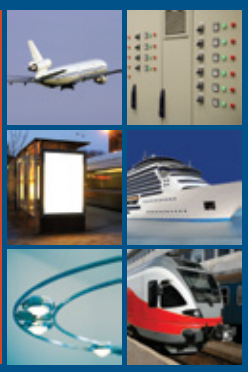
EMAIL
INFO@WAMCOINC.COM

wamco LIGHTING

INFINITE POSSIBILITIES
INFINITE SOLUTIONS

INDUSTRIES

» AEROSPACE
» ELECTRONIC
» SIGNAGE
» MARINE
» GENERAL
» TRANSPORTATION



PRODUCTS

» LEDs
» INCANDESCENT
» HALOGEN
» FLUORESCENT
» NEON
» INCANDESCENT DISPLAYS

With nearly 50 years in business supporting the lighting industry, Wamco has become the premier supplier of lighting products worldwide; providing the broadest range of standard products and custom lighting solutions.

Wamco's reputation for quality is based on understanding each lighting technology, the application, and most importantly, the needs of our customers. Whether it is the aviation, marine, transportation, general lighting, electronic or signage industry, you can find Wamco lamps lighting the way.

WAMCO'S CAPABILITIES INCLUDE:

» IN-HOUSE DESIGN
» FAA - PMA APPROVALS
» PROTOTYPING
» QPL
» LIGHTING DESIGN
» WORLDWIDE DISTRIBUTION NETWORK
» EXTENSIVE INVENTORY

wamco
www.wamcoinc.com