

2021

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LOYALSHINE

KEEP LOYAL, KEEP SHINE!

Lighting for Hazardous and Industrial Areas

Industrial Lighting

NINGBO LOYALSHINE OPTOELECTRONICS CO., LTD.

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KEEP LOYAL, KEEP SHINE!

We are convinced that our leading role in future will also contribute to your success.



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KEEP LOYAL, KEEP SHINE



ATEX Cert No.: SEV 19 ATEX 0166 X
IECEX Cert No.: IECEX SEV 19.0029

ATEX Cert No.: SEV 18 ATEX 0152
IECEX Cert No.: IECEX SEV 18.0031

ATEX Cert No.: INERIS 13ATEX0062X
IECEX Cert No.: IECEX INE 15.0019X

■ EX Mark:  II 2G Ex d IIB T6 Gb
 II 2D Ex tb IIIC T80°C Db IP66

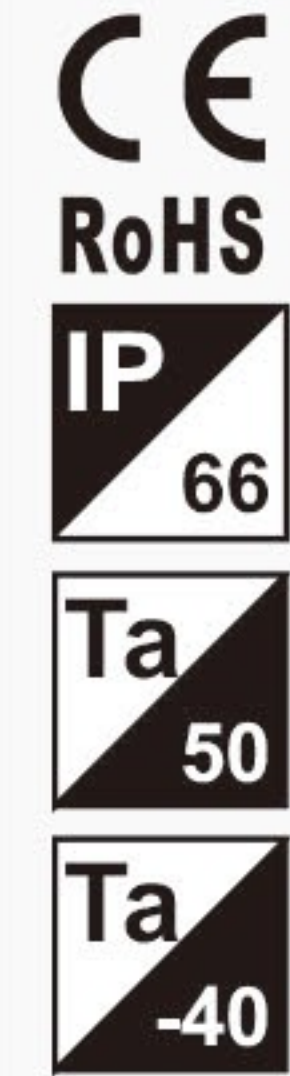
■ Cable Entry: G3/4"



*Material is 304 stainless steel

■ Power plants, substations, chemical plants, metallurgical plants and other indoor and outdoor lighting.

■ Cable Entry: M16



ZY8101



Type	Rated voltage (V)	Wattage (W)	Light output (lm)	Net weight (kg)	Size (mm)	Replaces MH
ZY8101— L25	100~240VAC	25W	2800	4.7	300×300×75	70W
ZY8101— L40		40W	4200			100W
ZY8101— L60		60W	5900			150W
ZY8101— L80		80W	7200			175W
ZY8101— L25D	20~39VAC/ 20~50VDC	25W	2800	4.7	300×300×75	70W
ZY8101— L40D		40W	4200			100W
ZY8101— L60D		60W	5900			150W

■ Power plants, substations, chemical plants, metallurgical plants, docks and other indoor and outdoor lighting.

■ Cable Entry: M16



ZY8102



Type	Rated voltage (V)	Wattage (W)	Light output (lm)	Net weight (kg)	Size (mm)	Replaces MH
ZY8102— L80	100~277VAC	80W	8800	5.2	322×363×150	175W~250W
ZY8102— L100		100W	11000			250W
ZY8102— L120		120W	12200			250W~400W
ZY8102— L150		150W	16500	6.2	417×363×150	400W
ZY8102— L180		180W	18900			400W~600W
ZY8102— L240		240W	25200	7.2	512×363×150	600W
ZY8102— L300		300W	31500	8.2	607×363×150	600~1000W

*The lamp can be matched with a lens: 80°×100°.

■ Power plants, substations, chemical plants, metallurgical plants, docks and other indoor and outdoor lighting.

■ Cable Entry: M20



ZY8302



Type	Rated voltage (V)	Wattage (W)	Light output (lm)	Net weight (kg)	Size (mm)	Replaces MH
ZY8302— L80	100~277VAC	80W	7600	8	380×270×427	150W
ZY8302— L100		100W	9000			175W
ZY8302— L120		120W	10200			175~250W
ZY8302— L150		150W	11250			250~400W

*The lamp can be matched with a lens: 5°(80~120W), 50°(80~150W). CCT: 3000K, 4000K, 5000K

■ Suitable for plant lighting to high, medium and low installation height region with demanding high temperature performance.

■ Cable Entry: G3/4"



ZY8501



Type	Rated voltage (V)	Wattage (W)	Light output (lm)	Net weight (kg)	Size (mm)	Replaces MH
ZY8501— L80	100~277VAC	80W	7600	7.5	Ø380×270	150W
ZY8501— L100		100W	9000			175W
ZY8501— L120		120W	10200			175~250W
ZY8501— L150		150W	11250			250~400W

*The lamp can be matched with a lens: 50°, 65°. CCT: 3000K, 4000K, 5000K

■ Suitable for oil drilling, refining platform, chemical petrol factory, pharmaceutical factory, polishing factory, etc.



ZY8502



Type	Rated voltage (V)	Wattage (W)	Light output (lm)	Net weight (kg)	Size (mm)	Replaces MH
ZY8502— L60	100~277VAC	60W	7000	2.2	Ø230×175	150W
ZY8502— L80		80W	8800	2.6	Ø230×180	175W
ZY8502— L100		100W	11600	4.8	Ø300×235	250W
ZY8502— L120		120W	12700			250~400W
ZY8502— L150		150W	16800			400W
ZY8502— L200		200W	23700			400W~600W

*The lamp can be matched with a lens: 25°, 40°, 60°, 80°, 100°, 200°. CCT: 3000K, 4000K, 5000K

■ Suitable for low installation height region in high temperature, high humidity and vibration corrosive environments, like offshore platforms, ship transport corridors, passages, etc.

■ Cable Entry: M20×1.5, NPT1/2" (P type/ S type)
M25×1.5, NPT3/4", G3/4" (P type)



ZY8603P



ZY8603S



Type	Rated voltage (V)	Wattage (W)	Light output (lm)	Net weight (kg)	Size (mm)	Replaces MH
ZY8603P— L30	100~277VAC	30W	3500	4.2	Ø230×270	70W
ZY8603P— L40		40W	4600			100W
ZY8603P— L50		50W	5600			100~150W
ZY8603P— L60		60W	7000			150W
ZY8603P— L80		80W	8800			175W
ZY8603S— L30	100~277VAC	30W	3500	4.9	245×260×270	70W
ZY8603S— L40		40W	4600			100W
ZY8603S— L50		50W	5600			100~150W
ZY8603S— L60		60W	6900			150W
ZY8603S— L80		80W	8800			175W

*The lamp can be matched with a lens: 18°, 40°, 60°, 80°, 100°, 200°, 60°×80°, 90°×110° CCT: 3000K, 4000K, 5000K.
*The rated voltage of 30W/ 40W/ 50W/ 60W could be chosen as 20~39VAC/ 20~50VDC low voltage.

■ Suitable for low installation height region in high temperature, high humidity and vibration environment, like offshore platforms, ship transport corridors, passages, etc.

■ Cable Entry: M20×1.5, NPT1/2" (P type/ S type)
M25×1.5, NPT3/4", G3/4" (P type)



ZY8605P



ZY8605S



ZY8605S



Type	Rated voltage (V)	Wattage (W)	Light output (lm)	Net weight (kg)	Size(mm)	Replaces MH
ZY8605P— L100	100~277VAC	100W	11500	6.4	Ø300×290	250W
ZY8605P— L120		120W	13200			250~400W
ZY8605P— L150		150W	16800			400W
ZY8605P— L200		200W	23700			400~600W
ZY8605P— L240		240W	29100			600~800W
ZY8605S— L100	100~277VAC	100W	11800	7.5	295×330×350	250W
ZY8605S— L120		120W	13600			250~400W
ZY8605S— L150		150W	17300			400W
ZY8605S— L200		200W	23300			400~600W
ZY8605S— L240		240W	28400			600~800W
ZY8605S— L100— 18°	100~277VAC	100W	10000	8	295×350×350	250W
ZY8605S— L120— 18°		120W	11500			250~400W
ZY8605S— L150— 18°		150W	14600			400W
ZY8605S— L200— 25°		200W	21500			400~600W
ZY8605S— L240— 25°		240W	25500			600~800W

*The lamp can be matched with a lens: 18°/ 25°, 40°, 60°, 80°, 100°, 200°, 60°×80°, 90°×110°. CCT: 3000K, 4000K, 5000K

■ Suitable for ultra-high area, high temperature and high humidity area and vibration environment, like docks, offshore airports, container yard of transfer station, stockyard, ultra-high plant, etc.

■ Cable Entry: M20×1.5, M25×1.5, NPT3/4",
NPT1/2", G3/4"



ZY8606S



ZY8606S



Type	Rated voltage (V)	Wattage (W)	Light output (lm)	Net weight (kg)	Size (mm)	Replaces MH
ZY8606S— L240	100~277VAC	240W	27200	13	602×250×340	600W
ZY8606S— L300		300W	34600			600~1000W
ZY8606S— L400		400W	46600			1000W
ZY8606S— L480		480W	56800			>1000W
ZY8606S— L240— 18°	100~277VAC	240W	23000	14	602×270×340	600W
ZY8606S— L300— 18°		300W	29200			600~1000W
ZY8606S— L400— 25°		400W	43000			1000W
ZY8606S— L480— 25°		480W	51500			>1000W

*The lamp can be matched with a lens: 18°/25°, 40°, 60°, 80°, 100°, 200°, 60°×80°, 90°×110°. CCT: 3000K, 4000K, 5000K

■ Cable Entry: G3/4", M25×1.5



*The lamp can be matched with a lens: 18°, 40°, 60°, 80°, 100°, 200°, 60°×80°, 90°×110° CCT: 3000K, 4000K, 5000K.
*The rated voltage of 30W/ 40W/ 50W/ 60W could be chosen as 20~39VAC/ 20~50VDC low voltage.

ZY8702—L150	150W	10300	7.5	615×315×100	400~600
ZY8702—L180	180W	18900			400~600

ZY8800—L6D	20~39VAC/ 20~50VDC	6W	600	1	180×130×66	12W
ZY8800—L12D		12W	1200			22W

*Other beam angle available: 40°, 60°, 80°, 100°, 60°×80°, 90°×110°. CCT: 3000K, 4000K, 5000K

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ATEX Cert No.: ECM 18 ATEX-B 2655

■ EX Mark: II 2G Ex db e IIC T6 Gb
 II 2D Ex tb IIIC T80°C Db IP66

■ Cable Entry: G3/4"

*The indicator icon on the lamp can be customized depends on the quantity.



*Equipped with explosion proof emergency box BXP01; only one tube lighting when emergency.



ATEX Cert No.: EPT16 ATEX 2484 X
IECEX Cert No.: IECEx EUT 17.0012X

■ EX Mark: II 2G Ex db IIC T6 Gb
 II 2D Ex tb IIC T80°C Db

■ Cable Entry: M20×1.5, M25×1.5, NPT3/4",
NPT1/2", G3/4"

PM2.5	100-249 μg/m ³	200 μg/m ³	250 μg/m ³	200 μg/m ³	2.5
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■ EX Mark: Ex d IIB T6 Gb
Ex tD A21 IP66 T80°C

■ Cable Entry: G3/4"



A white, rectangular, explosion-proof light fixture with a grid of ventilation holes and a red warning label. The label contains the text: "Ex", "IP65/67", "Group 1", "Zone 0", "Zone 1", "Zone 2", "Ex", "IP65/67", "Group 1", "Zone 0", "Zone 1", "Zone 2".

BC9101B— L15	100~240VAC	/	15W	1800	120min	9

/ 50W



- Suitable for emergency lighting to low installation height region in extreme climate, like offshore oil, chemical equipment platforms, tankers, ships, docks, piers, etc.

BC9306AP/BP



BC9306AS/BS



ATEX Cert No.: EPT16 ATEX 2484 X
IECEX Cert No.: IECEX EUT 17.0011X

- EX Mark: Ⓜ II 2G Ex db e IIC T6/T5 Gb
Ⓜ II 2D Ex tb IIIC T80℃ / T95℃ Db

- Cable Entry: M20×1.5, NPT1/2" (P type/ S type)
M25×1.5, NPT3/4", G3/4" (S type)

Type	Rated voltage (V)	Wattage (W)	Emergency wattage (W)	Emergency light output (lm)	Emergency duration (min)	Net weight (kg)	Application	Size (mm)	Replaces MH
BC9306AP— L40— 15	100~240VAC	40W	15W	1800	120min	4.2	class I, zone1 &zone2, zone21 &zone22	Ø230×270	100W/ 35W
BC9306AP— L40— 25			25W	3300	70min				100W/ 50W
BC9306BP— L15		/	15W	1800	120min				/ 35W
BC9306BP— L25			25W	3300	70min				/ 50W
BC9306AS— L40— 15	100~240VAC	40W	15W	1800	120min	4.9	class I, zone1 &zone2, zone21 &zone22	245×260×270	100W/ 35W
BC9306AS— L40— 25			25W	3300	70min				100W/ 50W
BC9306BS— L15		/	15W	1800	120min				/ 35W
BC9306BS— L25			25W	3300	70min				/ 50W
*The lamp can be matched with a lens: 40°, 60°, 80°, 100°, 200°, 60°×80°, 90°×110°						CCT: 3000K, 4000K, 5000K.			

- Power plants, substations, chemical plants, metallurgical plants and other indoor and outdoor emergency lighting.

ZY8101A ZY8101B



- Cable Entry: M16

Type	Rated voltage (V)	Wattage (W)	Emergency wattage (W)	Emergency light output (lm)	Emergency duration (min)	Net weight (kg)	Size (mm)	Replaces MH
ZY8101A— L25— 15	100~240VAC	25W	15W	1800	120min	4.7	300×300×75	70W/ 35W
ZY8101A— L40— 15		40W	15W	1800				100W/ 35W
ZY8101A— L60— 15		60W	15W	1800				150W/ 35W
ZY8101A— L25— 25	100~240VAC	25W	25W	3000	70min	4.7	300×300×75	70W/ 50W
ZY8101A— L40— 25		40W	25W	3000				100W/ 50W
ZY8101A— L60— 25		60W	25W	3000				150W/ 50W
ZY8101B— L15	100~240VAC	/	15W	1800	120min	4.7	300×300×75	/ 35W
ZY8101B— L25		/	25W	3000	70min			/ 50W
*ZY8101B— L15, ZY8101B— L25 only have emergency lighting function.								

- Suitable for emergency lighting to low installation height region in high temperature and humidity and vibration corrosive environments, like offshore platforms, ship transport corridors, passages, etc.

ZY8603AP/BP



ZY8603AS/BS



- Cable Entry: M20×1.5, NPT1/2" (P type/ S type)
M25×1.5, NPT3/4", G3/4" (P type)

Type	Rated voltage (V)	Wattage (W)	Emergency wattage (W)	Emergency light output (lm)	Emergency duration (min)	Net weight (kg)	Size (mm)	Replaces MH
ZY8603AP— L40—15	100~240VAC	40W	15W	1800	120min	4.2	Ø230×270	100W/ 35W
ZY8603AP— L40—25			25W	3300	70min			100W/ 50W
ZY8603BP— L15		/	15W	1800	120min			/ 35W
ZY8603BP— L25			25W	3300	70min			/ 50W
ZY8603AS— L40—15	100~240VAC	40W	15W	1800	120min	4.9	245×260×270	100W/ 35W
ZY8603AS— L40—25			25W	3300	70min			100W/ 50W
ZY8603BS— L15		/	15W	1800	120min			/ 35W
ZY8603BS— L25			25W	3300	70min			/ 50W
*The lamp can be matched with a lens: 40°, 60°, 80°, 100°, 200°, 60°×80°, 90°×110°.						CCT: 3000K, 4000K, 5000K		

- Suitable for emergency lighting to low installation height region in high temperature and humidity and vibration corrosive environments, like offshore platforms, ship transport corridors, passages, etc.

ZY8603A1P/B1P



ZY8603A1S/B1S



- Cable Entry: M20×1.5, NPT1/2" (P type/ S type)
M25×1.5, NPT3/4", G3/4" (P type)

Type	Rated voltage (V)	Wattage (W)	Emergency wattage (W)	Emergency light output (lm)	Emergency duration (min)	Net weight (kg)	Size (mm)	Replaces MH
ZY8603A1P—L40—15	100~240VAC	40W	15W	1800	240min	5.2	Ø260×270	100W/ 35W
ZY8603A1P—L40—25			25W	3300	140min			100W/ 50W
ZY8603B1P—L15		/	15W	1800	240min			/ 35W
ZY8603B1P—L25			25W	3300	140min			/ 50W
ZY8603A1S—L40—15	100~240VAC	40W	15W	1800	240min	5.9	245×260×270	100W/ 35W
ZY8603A1S—L40—25			25W	3300	140min			100W/ 50W
ZY8603B1S—L15		/	15W	1800	240min			/ 35W
ZY8603B1S—L25			25W	3300	140min			/ 50W
*The lamp can be matched with a lens: 40°, 60°, 80°, 100°, 200°, 60°×80°, 90°×110°.						CCT: 3000K, 4000K, 5000K		

- Power plants, substations, chemical plants, metallurgical plants and other indoor and outdoor emergency lighting.



ZY8810A ZY8810B



Type	Rated voltage (V)	Wattage (W)	Emergency wattage (W)	Emergency light output (lm)	Emergency duration (h)	Net weight (kg)	Size (mm)	Replaces Fluorescent lamp
ZY8810A— A	100~240VAC	12W	6W	600	> 10	2	180×130×65	28W
ZY8810B— A		6W	4W	300				18W
ZY8810A— M		12W	6W	600				28W
ZY8810B— M		6W	4W	300				18W
*ZY8810A— A, ZY8810B— A for auto emergency, ZY8810A— M, ZY8810B— M for the manual emergency.								

Explosion Proof Portable Lights



Spot Flood

BW3210

Light source	30W LED
Rated capacity	12Ah 24V
Runtime	12hrs(High) / 24hrs(Low)
Ex Mark	Ex de IIC T6 Gb

Application: This product is widely used as mobile lighting for all kinds of night work tasks, repairing, inspection and accident relief etc.



RoHS



BW6210

Light source	1W LED
Rated capacity	5.2Ah 3.7V
Runtime	8hrs(High) / 40hrs(Low) 55hrs(Flood)
Ex Mark	Ex ib IIC T5 Gb

Application: It is widely used as mobile lighting in the power station, oil filed, chemical industry, fire fighting, police, military and other hazardous areas.



BW6610A

Light source	3×3W LED
Rated capacity	5.2Ah 11.1V
Runtime	8hrs(High) / 15hrs(Low)
Ex Mark	Ex de IIC T6 Gb

Application: This product is ideal for use in patrol, inspection, repairing and other night work tasks in explosive and flammable atmosphere.



BW7300A BW7300B

Light source	3W/ 1W LED
Rated capacity	2.6Ah 3.7V
Runtime	BW7300A 4hrs(High) / 10hrs(Low) BW7300B 8hrs(High) / 18hrs(Low)
Ex Mark	Ex d IIC T6 Gb

Application: This product is used in the fields of electric power, fire fighting, petrol, petrochemical, metallurgy, etc. It can also be used for signal communication.



BW4100B

Color available	Red, Blue, Yellow, Green, White.
Flashing frequency	2.7Hz
Runtime	500hrs
Ex Mark	Ex ia IIC T5 Ga

Application: It can serve as signal communication tools in hazardous area such as construction, fire fighting, rescue etc.



BW6310A BW6310B

Light source	1W LED
Rated capacity	1.4Ah 3.7V
Runtime	BW6310A 4hrs(High) / 8hrs(Low) BW6310B 8hrs(High) / 16hrs(Low)
Ex Mark	Ex ib IIC T4 Gb

Application: It is the ideal lighting solution for workers in power station, oil filed, chemical industry, fire fighting, military and other hazardous areas.



RoHS



BW7101

Light source	3×3W LED
Rated capacity	2.6Ah 22.2V
Runtime	11hrs(High) / 16hrs(Low) 20hrs(Flash)
Ex Mark	Ex d ib IIC T6 Gb

Application: It is the ideal lighting solution for workers in power station, oil filed, chemical industry, fire fighting, military and other hazardous areas.



BW7500A BW7500B

Light source	5W/ 3W LED
Rated capacity	5.2Ah 3.7V
Runtime	BW7500A 4hrs(High) / 10hrs(Low) BW7500B 6hrs(High) / 10hrs(Low)
Ex Mark	Ex d IIC T6 Gb

Application: It is ideal for the night work tasks in explosive area such as fire fighting, gas station, power station, police, inspection and other hazardous areas.

LED

IP66

M1/ M1 Plus

Rated capacity	3.6V; 2.5Ah (M1)/ 5Ah(M1 Plus)	
Light output/ Runtime (Flashlight)	M1	200 lm; 10hrs(High)/20hrs(Low)
	M1 Plus	200 lm; 15hrs(High)/30hrs(Low)
Light output/ Runtime (Floodlight)	M1	260 lm; 6~80hrs
	M1 Plus	460 lm; 12~160hrs

Application: It is ideal to be used in all kinds of outdoor sports lighting (such as trekking, camping, expedition, group activities, etc.).

HID

IP65

CE

ZW3320

Light source	35W HID	
Input voltage range	DC(9~28V)	
Light output	ZW3320A	3,200 lm
	ZW3320B	4,100 lm

Application: It is ideal to be used in the wild, road or on the sea for searching, patrol, rescue etc.

LED

IP65

CE

ZW7600

Light source	1W LED	
Rated capacity	4.4Ah 3.7V	
Runtime	10hrs(Work light)	30hrs(Signal light)
	30hrs(Signal light)	
Signal light Color	Red, Green, Yellow	

Application: It is used at railway, aviation and other transportation area and some special fields, serving as signal indication, safety warning and normal illumination.

LED

IP67

ZW7710B ZW7710C

Light source	3W LED	
Rated capacity	2.6Ah 3.7V	
Runtime	ZW7710B	3hrs(High) / 9hrs(Low)
	ZW7710C	9hrs(High) / 19hrs(Low)

Application: It is widely used in the public security department, railway, military, police, transportation, civil aviation, inspection and customs preventive officer etc.

LED

IP66

ZW4308

Light source	1W LED
Solar maximum power	1.5W
Rated capacity	0.8Ah 3.7V
Lighting mode	1Hz

Application: It is ideal to be used in high-voltage cable lines, ground dangerous places as warning signals, also used in construction, operation monitoring, emergency and other places for signal prompts and azimuth display.

LED

IP66

CE

RoHS

ZW6220

Light source	1W LED
Rated capacity	5.2Ah 3.7V
Runtime	8hrs(High) / 40hrs(Low)
	55hrs(Flood)

Application: This product is suitable for inspection, repairing, rescue and some other night work tasks.

LED

IP65

CE

ZW7610

Light source	1W LED
Rated capacity	4.4Ah 3.7V
Runtime	10hrs / 20hrs(Low)

Application: It is used at railway, aviation and other transportation area and some special fields, serving as normal illumination and emergency lighting.

LED

IP65

ZW3500D

Specification	Unit	ZW3500D	
Rated voltage	VAC	220	220
Power of lamp head	W	2×150	2×240
Light output	lm	2×17300	2×26700
Continuous working time	h	13	
Minimum lifting height	mm	1,750	
Maximum lifting height	mm	4,500	
Generator	Rated power	W	2,000
	Rated volume	L	15
Beam angle		60°×80°/25°	

Application: It is applicable to large and high brightness lighting in the operation sites of large scale construction, rescue and maintenance, accident handling, disaster relieve, etc.

LED

IP65

ZW3500F

Specification	Unit	ZW3500F	
Rated voltage	VAC	220	220
Power of lamp head	W	4×60	4×100
Light output	lm	4×6500	4×9000
Continuous working time	h	13	
Minimum lifting height	mm	1,750	
Maximum lifting height	mm	4,500	
Generator	Rated power	W	2,000
	Rated volume	L	15
Beam angle		60°×80°	

Application: It is applicable to large and high brightness lighting in the operation sites of large scale construction, rescue and maintenance, accident handling, disaster relieve, etc.

LED

IP65

ZW3500E

Specification	Unit	ZW3500E	
Rated voltage	VAC	220	220
Power of lamp head	W	4×150	4×240
Light output	lm	4×17300	4×26700
Continuous working time	h	13	
Minimum lifting height	mm	1,750	
Maximum lifting height	mm	4,500	
Generator	Rated power	W	2,000
	Rated volume	L	15
Beam angle		60°×80°	

Application: It is applicable to large and high brightness lighting in the operation sites of large scale construction, rescue and maintenance, accident handling, disaster relieve, etc.

LED

IP65

ZW3520C

Specification	Unit	ZW3520C	
Rated voltage	VAC	220	220
Power of lamp head	W	2×60	2×100
Light output	lm	2×6500	4×9000
Continuous working time	h	>6	
Minimum lifting height	mm	1,450	
Maximum lifting height	mm	2,800	
Generator	Rated power	W	900
	Rated volume	L	3.8
Beam angle		18°/60°×80°	

Application: This product is suitable for use as large area illumination solution at the working sites of constructions, maintenance, repair, accident spot, and disaster relief etc.

Ex

IECEX

ATEX

IP68

Material	Brass/ Stainless Steel
Gland type	Unarmored/ Cable
Cable type	Unarmored
Ex Mark	Exd IIC Gb/Exe II Gb

Application: Zone 1, Zone 2 IIA-IIC Explosive gas atmosphere, Zone 21, Zone 22 flammable dust atmosphere, it is widely used in petroleum, chemical, food, pharmaceutical, military industries, and other electrical cable fixing and sealing.

Ex

IECEX

ATEX

IP66

Material	Brass/ Stainless Steel
Gland type	Unarmored/ Cable
Cable type	Unarmored
Ex Mark	Exd IIC Gb/Exe II Gb

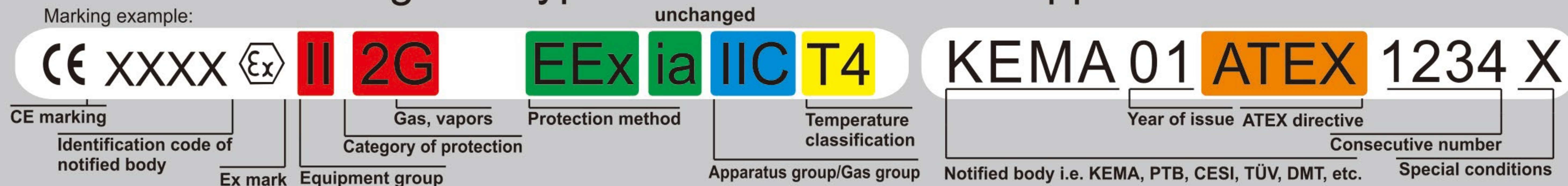
Application: Zone 1, Zone 2 IIA-IIC Explosive gas atmosphere, it is widely used in petroleum, chemical, food, pharmaceutical, military industries, and other electrical cable fixing and sealing.

ATEX certified instrumentation from Endress+Hauser

ATEX Marking

Type of Protection

Approval number EC



II 2G

Category of Equipment

ATEX directive divides equipment into groups and additional into categories:

Group I (Mines)	Group II (Surface (non-mining) equipment)
Subdivided into categories	Category subdivided into Zone
M1 Equipment remains functional with an explosive atmosphere present	1G (gas) Equipment with a very high level of protection 0 (gas) 20 (dust)
	2G (gas) Equipment with a high level of protection 1 (gas) 21 (dust)
M2 Equipment to be de-energized in the event of an explosive atmosphere	3G (gas) Equipment with a normal level of protection 2 (gas) 22 (dust)

Note: category 2D apparatus required for Zone 22 (conductive dust).

Examples of Category marking:
1/2G for equipment interfacing Zone 0 and Zone 1 areas
1/3D for equipment interfacing Zone 20 and Zone 22 areas
(1) for associated apparatus with intrinsically safe output into Zone 0

T4

Temperature Classification

Maximum Surface Temperature		Temperature Classification	
Degree C	Degree F	IEC/European	North American ^{*1}
450	842	T1	T1
300	572	T2	T2
280	536		T2A
260	500		T2B
230	446		T2C
215	419		T2D
200	392	T3	T3
180	356		T3A
165	329		T3B
160	320		T3C
135	275	T4	T4
120	248		T4A
100	212	T5	T5
85	185	T6	T6

^{*1} for comparison only

IIC

Apparatus Group and Gas/Dust Group

Hazard Categories	Apparatus Classification		Min. Ignition Energy
	Europe	North America ^{*1}	
Mines	Group I	Group D (gaseous mines)	
Acetylene	Group IIC	Class I, Group A	20 µJ
Hydrogen	Group IIC	Class I, Group B	20 µJ
Ethylene	Group IIB	Class I, Group C	60 µJ
Propane	Group IIA	Class I, Group D	180 µJ
Metal dust	-	Class II, Group E	More easily ignitable
Coal dust	-	Class II, Group F	
Grain dust	-	Class II, Group G	
Fibers	-	Class III	

ATEX Directives

ATmosphereEXplosible

Old directives specify the European standards

New directives specify the so called Essential Health and Safety Requirements

Dust-Ex hazardous areas are regulated first time in EC.

At this moment there are three directives for equipment intended for use in Hazardous Area:

82/139/EEC (Mines)
Will be valid until June 30, 2003
Only Electrical Equipment

76/117/EEC (Surface Industries)
Will be valid until June 30, 2003
Only Electrical Equipment

New directive
94/9/EC (ATEX) valid since March 1, 1996 mandatory July 1, 2003
All Equipment, Protective Systems and Components

Summary of changes:
Categorisation of equipment matching area classifications.
Categorisation based upon Essential Safety Requirements (ESR):
- Consider electrical and non-electrical equipment, also dust-Ex hazardous areas
- Influencing equipment design with respect to Protective method
Choice of materials
Equipment marking
Safety instructions included
Environmental and atmospheric conditions
Software included

It will be mandatory to re-certify equipment certified under the old directives if you want to sell this equipment after July 1, 2003.

EEx ia

Protection Method

Summary of protection methods against explosion

General Principles	IEC / European		American ^{*1}		Principle Characteristics
	Practice	Zone	Cenelec EN	Practice Division	
Explosion Containment	Explosion-proof Ex »d«	1, 2	50018	Explosion-proof	1, 2 Relatively easy to be applied, but with specific mechanical requirements. Maintenance and checks are more time consuming.
Segregation	Pressurization Ex »p«	1, 2	50016	Purging	1, 2 Suitable for cabinets and motors. Requires specific monitoring alarm systems.
	Encapsulation Ex »m«	1, 2	50028	Not recognized	Suitable for sensors, small circuits and solenoid valves. Maintenance practically impossible.
	Oil-immersion Ex »o«	1, 2	50015	Oil-immersion	1, 2 Suitable for transformers and where there are moving parts. Generally not widely used.
Prevention	Powder filling Ex »q«	1, 2	50017	Not recognized	- Suitable where there are no moving parts. Present maintenance difficulty. Not widely used.
	Increased safety Ex »e«	1, 2	50019	Not recognized	- Suitable for non-sparking apparatus during normal functioning (terminals, connections, lamp sockets, motors). Particular construction requirements.
	Intrinsic safety Ex »ia«	0, 1, 2 (20, 21, 22)*	50020 50039 50284	Intrinsic safety	1, 2 Suitable for process instrumentation. Economical and easy installation, maintenance and checks. Limited to low power circuits.
	Intrinsic safety Ex »ib«	1, 2 (21, 22)*	50020 50039	Not recognized	- Similar to Ex »ia« except for the number of faults to be considered.
Special requirement for category 1 equipment	Type n Ex »n«	2	50021	Non incendive	2 Alternative to standardized types of protection for zone 2 and division 2. No certificate required in Europe.
		0 (1, 2)*	50284	Not recognized	- Additional requirements for equipment protected by standardized types of protection.
Dust Ex Protection	Protection by enclosure and temperature limitation	20, 21, 22	50281	NEC Section 90-4	1, 2 Special requirements for equipment in dust explosion hazardous areas.

Certified Instrumentation from Endress+Hauser for North America

Markings for Canada (Marking Examples)

Option A: Zones

Option B: Divisions

Ex ia IIC T4

Class I, Division 1, Groups A, B, C & D T4

Means:

Means:

Ex	Explosion protected	Class I	Flammable gas or vapor
ia	Protection method (Intrinsic Safety)	Division 1	Area classification (explosive atmosphere may exist under normal operating conditions)
IIC	Gas group (acetylene & hydrogen)	Group A, B, C & D	Gas groups
T4	Temperature class	T4	Temperature code

Markings for the United States (Marking Examples)

Option A: Zones

Option B: Divisions

Class I, Zone 0, AEx ia IIC T4

IS Class I, Division 1, Groups A, B, C & D T4

Means:

Means:

Class I	Flammable gas or vapor	IS	Protection method (Intrinsic Safety)
Zone 0	Area classification (explosive atmosphere present continuously)	Class I	Flammable gas or vapor
A	Conformity to US requirements	Division 1	Area classification (explosive atmosphere may exist under normal operating conditions)
Ex	Explosion protected	Group A, B, C & D	Gas groups
ia	Protection method (Intrinsic Safety)	T4	Temperature code
IIC	Gas group (acetylene & hydrogen)		
T4	Temperature class		

Special Purpose Enclosures

Enclosure Type US (NEMA 250) and Canada (CSA Std. C22.2 No. 94)	Approximate equivalent IP-Code (IEC 60529)	Protection against
1	→ IP10	incidental contact with the enclosed equipment
2	→ IP11	dripping and light splashing of liquids
3	→ IP54	windblown dust, rain, sleet, snow and external formation of ice
3R	→ IP14	rain, sleet, snow and external formation of ice
3S	→ IP54	windblown dust, rain, sleet, snow and external mechanism(s) remain operable when ice laden
4	→ IP56	windblown dust, rain, sleet, snow, splashing water, hose-directed water
4X	→ IP56	windblown dust, rain, sleet, snow, splashing water, hose-directed water and corrosion
5	→ IP52	settling airborne dust, lint, fibers, flyings, dripping and light splashing of liquids
6	→ IP67	hose-directed water, entry of water during occasional temporary submersion at limited depth
6P	→ IP67	hose-directed water, entry of water during prolonged submersion at limited depth

Zone/Division

Area Classification

		Flammable Material Present Continuously (> 1000 h/y)	Flammable Material Present Intermittently (10...1000 h/y)	Flammable Material Present Abnormally (< 10 h/y)
IEC				
CENELEC	Gas	Zone 0	Zone 1	Zone 2
CENELEC	Dust	Zone 20	Zone 21	Zone 22
NEC & CEC (North America)	Gas, Dust and Fibers	Division 1 Zone 0	Division 1 Zone 1	Division 2 Zone 2

IIC/Groups

Hazardous Locations Groups

Typical Hazard	North America CEC Section 18, NEC Article 500	CENELEC/IEC CENELEC EN50014, IEC 60079
Acetylene	Class I/Group A or IIC	IIC
Hydrogen	Class I/Group B or IIC	IIC
Ethylene	Class I/Group C or IIB	IIB
Propane	Class I/Group D or IIA	IIA
Methane	Group D (gaseous mines) or I	I
Metal Dust	Class II/Group E	—
Coal Dust	Class II/Group F	—
Grain Dust	Class II/Group G	—
Fibers	Class III	—

Ex/AEx

Protection Concepts

Method of Protection	Code	Permitted Use	Standard US (FM)	Standard Canada (CSA)	Protection Principle
Increased Safety	AEx e Ex e	Class I, Zone 1	FM 3600* (ISA S12.16.01)	CSA Std. E79-7	No arcs, sparks or hot surfaces
Non-incendive	(NI)	Class I, Div 2	FM 3611	CSA Std. C22.2 No. 213 and CEC, Part I, App. J	
Non-sparking	Ex nA	Zone 2	IEC 60079-15	CSA Std. E79-15	
Explosionproof	(XP)	Class I, Div 1	FM 3615	CSA Std. C22.2 No. 30	
Flameproof	AEx d Ex d	Class I, Zone 1	FM 3600* (ISA S12.22.01)	CSA Std. E79-1	Contain the explosion and quench the flame
Powder Filled	AEx q Ex q	Class I, Zone 1	FM 3600* (ISA S12.25.01)	CSA Std. E79-5	
Enclosed Break	Ex nC	Zone 2	IEC 60079-15	CSA Std. 79-15	
Intrinsic Safety	(IS)	Class I, Div 1	FM 3610†	CSA Std. C22.2 No. 157	
	AEx ia AEx ib Ex ia	Class I, Zone 0 Class I, Zone 1 Zone 0	FM 3610† FM 3610† IEC 60079-11	CSA Std. E79-11 CSA Std. E79-15 CSA Std. C22.2 No. 157/	Limit energy of sparks and surface temperature
	Ex ib Ex nA Ex nL	Zone 1 Zone 2 Zone 2	IEC 60079-11 IEC 60079-15 IEC 60079-15	CSA Std. E79-11 CSA Std. E79-15 CSA Std. E79-15	
Limited Energy					
Pressurized	Type X Type Y Type Z	Class I, Div 1 Class I, Div 1 Class I, Div 2	FM 3620 FM 3620 FM3620		
	Ex p Ex px Ex py Ex pz Ex nZ	Zone 1 Zone 1 Zone 1 Zone 2 Zone 2	IEC 60079-2 IEC 60079-2 IEC 60079-2 IEC 60079-2 IEC 60079-15	CSA Std. E79-2 CSA Std. E79-15 CSA Std. E79-15	Keep flammable gas out
Restricted Breathing	Ex nR	Zone 2	IEC 60079-15	CSA Std. E79-15	
Encapsulation	AEx m Ex m	Class I, Zone 1 Zone 1	FM 3600* (ISA S12.23.01) IEC 60079-18	CSA Std. E79-18	
Oil Immersion	AEx o Ex o	Class I, Zone 1 Zone 1	FM 3600* (ISA S12.26.01) IEC 60079-6	CSA Std. E79-6	

*Also shall comply with ISA S12.00.01

†Based on ISA S12.02.01

T4

Temperature Code and Temperature Class

Maximum Surface Temperature [°C]	North American Temperature Code	CENELEC/IEC Temperature Class
450	T1	T1
300	T2	T2
280	T2A	
260	T2B	
230	T2C	
215	T2D	
200	T3	T3
180	T3A	
165	T3B	
160	T3C	
135	T4	T4
120	T4A	
100	T5	T5
85	T6	T6