Roblon

Libra

Roblon Libra is a flexible, multi-functional luminaire for illuminating objects. It is based on very high quality LED lighting technology.

The luminaire's design freedom makes it ideal for use in many indoor lighting situations – for high-intensity levels, for low-intensity levels, in showcases, in niches, free-standing, wall-mounted or surface-mounted.

The illuminating heads on each Libra luminaire have an extremely high degree of directivity. Their elegant form makes them suitable for a very wide range of lighting applications. This means that standard models can be used to fulfil the vast majority of Libra lighting tasks.

Should, however, a particular lighting task require a special configuration, customised Libra solutions can also be designed.

The lighting intensity requirement in any individual situation determines how many Libra heads are used, what reflectors are needed and the extent of dimming.

Libra guarantees very high colour rendering in all colour spectra. This ensures superior white light, which is crucial in order to guarantee true colour reproduction for every illuminated object.

Its very high colour rendering is achieved through Roblon's special design for optimal thermal management and is further secured by the use of very high-quality LEDs.

A ground-breaking new reflector system has also been developed and designed by Roblon. It ensures both extreme precision and smooth control of light distribution. It utilizes the light energy to a very high degree, it ensures high efficiency and it limits glare.

Because the reflector system can easily be changed any time during normal daily operations, optimal light can quickly be achieved for any new lighting situation.

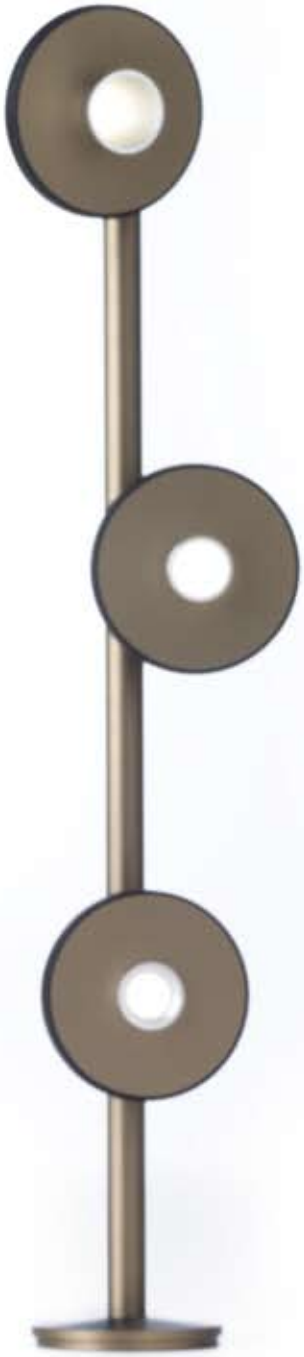
To extend sustainability even further, any LED module in any Libra luminaire can be replaced individually on-site without any others having to be replaced too.

LED lighting solutions from Roblon are infused with the wide-ranging lighting experience and detailed technical expertise that have long differentiated Roblon lighting solutions worldwide.

Libra is LED technology handled in a superior way, then modestly hidden away in a long-life luminaire that is easy to apply in different lighting situations, easy to install, uncomplicated to handle and which never overshadows the quality light it creates.

As with all lighting solutions from Roblon, Libra's mechanical, electrical and optical features are meticulously documented.

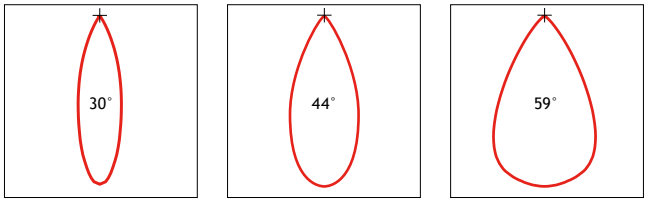
Libra designed for Roblon
by Schmelling Industriel Design



Libra fundamentals

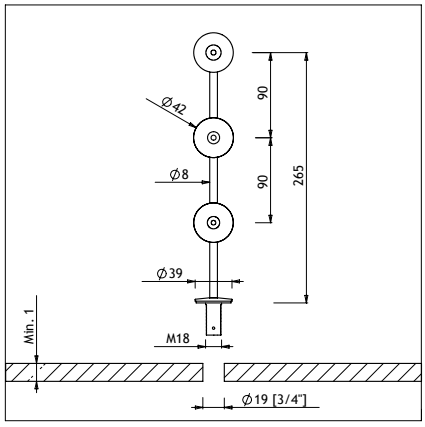
Property				
Optical	CCT (nominal)		3,000	4,500	K
	CRI_8 (Ra)		90	95	
	UV-A, 320-400 nm		< 1	< 1	µW/lm
	UV-B, 280-320 nm		< 1	< 1	µW/lm
	Medium 30	Beam angle	30	30	°
		Luminous flux	45	50	lm/head
	Medium 45	Beam angle	44	44	°
		Luminous flux	46	50	lm/head
	Wide 60	Beam angle	59	59	°
		Luminous flux	48	53	lm/head
Efficacy	LED efficacy		63	71	lm/W
	Fixture efficacy		42 - 45	48 - 51	lm/W
	Luminaire efficacy*		18 - 38	20 - 41	lm/W
Mechanical	Mounting hole diameter			Ø19	mm
	Wire length			2	m
	LEDs per head			1	
	Materials			Anodised aluminium, POM, ABS	
Electrical	Electrical driver mode			Constant Current	
	Fixture input current			Max. 350	mA
	Applied LED			Nichia NS6x083y-H1	
	Power per head @ 350 mA			1.1	W
	Luminaire power consumption* @ 350 mA			3 - 5	W
	Plug type			RCY by JST	
Thermal	Operating ambient temperature (T_A)			-20 to +45	°C
	Surface temperature (T_C) @ T_A = 45°C			Max. 75	°C
	LED junction temperature (T_J) @ T_A = 45°C			Max. 90	°C
Safety	c-UL-us (pending)			UL 2108	
	CB (pending)			EN 60.598	

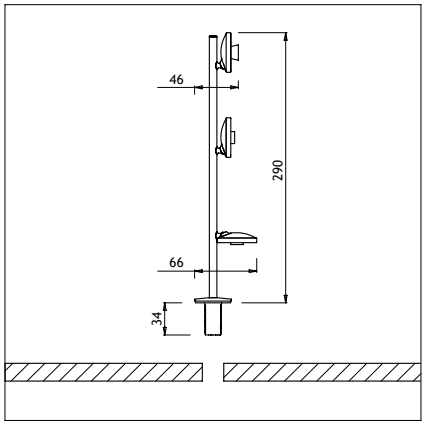
* Luminaire includes external driver. Luminaire efficacy depends greatly on system configuration. See 'Driver selection guide' p10

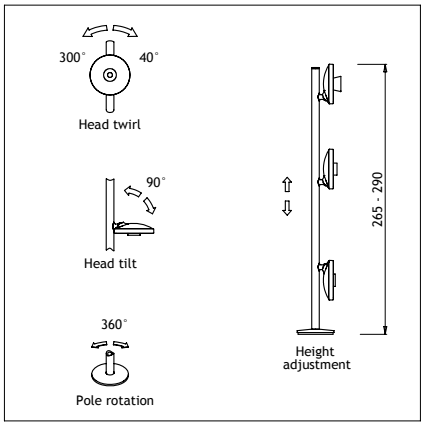


Options		
Colour	Black, grey or bronze/black	
Height (standard 290 mm)	75 - 700	mm
Number of heads	1 to 3	

Units: mm





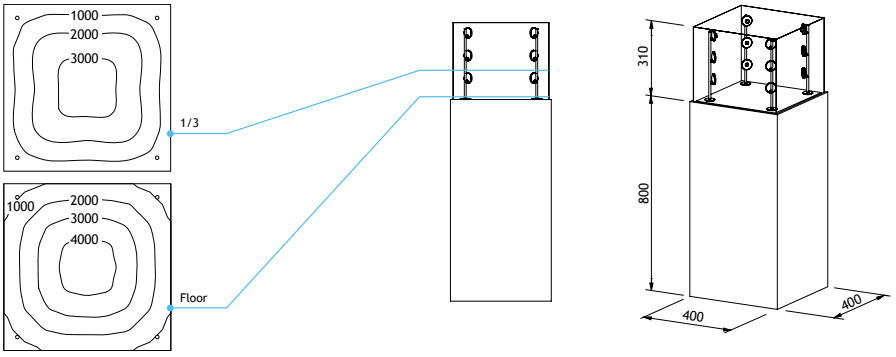


High-intensity example

Libra 3

Item no.	1127 6420	Tot. fixture power	12.5 W
CCT	4,500 K	Tot. output flux	612 lm
Beam angles	30°, 45°, 60°	Luminaire TMP	48°C
No. of fixtures	4	Inside case temp.	26°C
Current level	350 mA	Ambient temp.	22°C

Units: lux

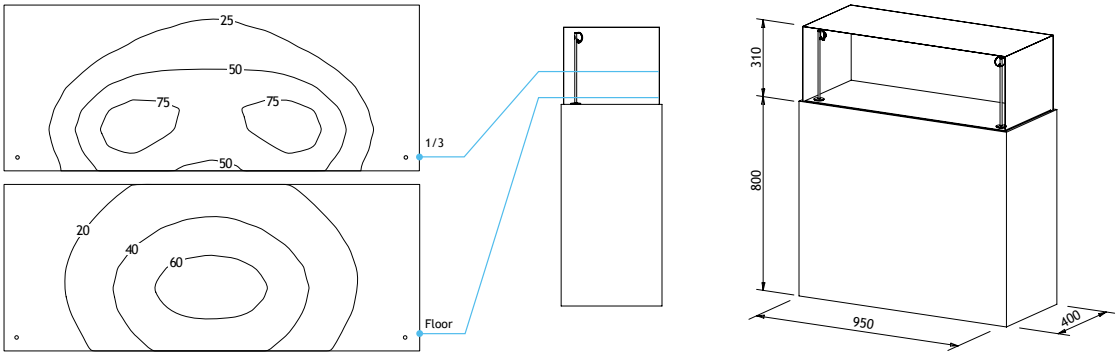


Low-intensity example

Libra 1

Item no.	1127 1010	Tot. fixture power	0.4 W
CCT	3,000 K	Tot. output flux	26 lm
Beam angles	30°	Luminaire TMP	26°C
No. of fixtures	2	Inside case temp.	22°C
Current level	70 mA	Ambient temp.	22°C

Units: lux



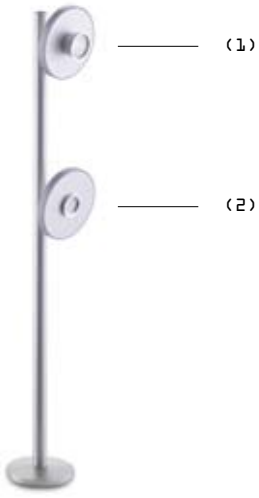
Libra models

Libra 1

CCT	Colour	Beam angle (1)	Item no.
3,000 K	Black	30°	1127 1010
		60°	1127 1210
	Grey	30°	1127 1020
		60°	1127 1220
	Bronze/black	30°	1127 1071
		60°	1127 1271
4,500 K	Black	30°	1127 4010
		60°	1127 4210
	Grey	30°	1127 4020
		60°	1127 4220
	Bronze/black	30°	1127 4071
		60°	1127 4271

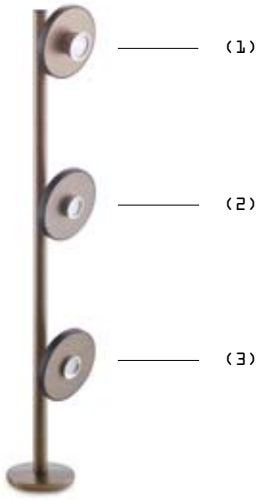
Libra 2

CCT	Colour	Beam angle (1,2)	Item no.
3,000 K	Black	30°, 60°	1127 2210
	Grey	30°, 60°	1127 2220
	Bronze/black	30°, 60°	1127 2271
4,500 K	Black	30°, 60°	1127 5210
	Grey	30°, 60°	1127 5220
	Bronze/black	30°, 60°	1127 5271

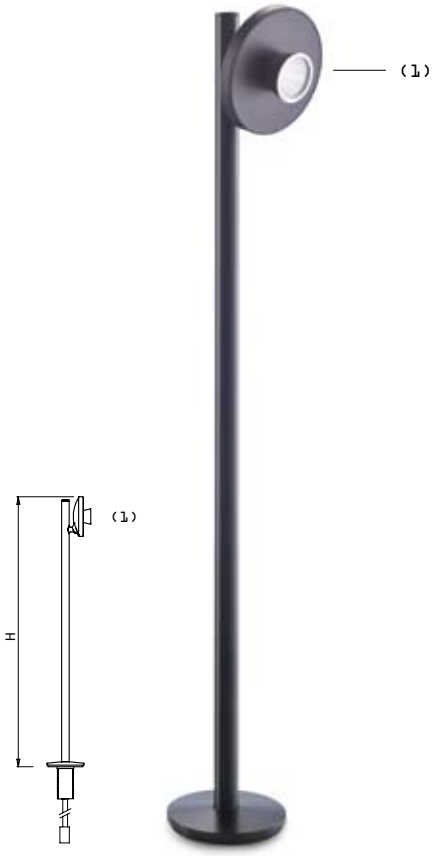


Libra 3

CCT	Colour	Beam angle (1,2,3)	Item no.
3,000 K	Black	30°, 45°, 60°	1127 3410
	Grey	30°, 45°, 60°	1127 3420
	Bronze/black	30°, 45°, 60°	1127 3471
4,500 K	Black	30°, 45°, 60°	1127 6410
	Grey	30°, 45°, 60°	1127 6420
	Bronze/black	30°, 45°, 60°	1127 6471

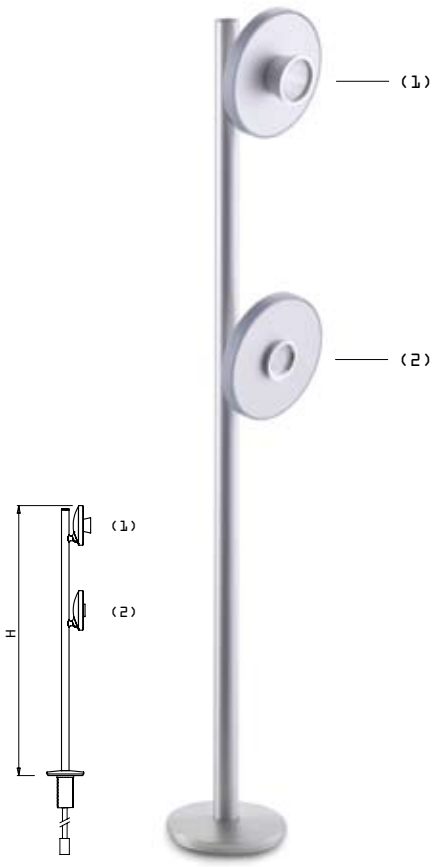


Libra easy order guide



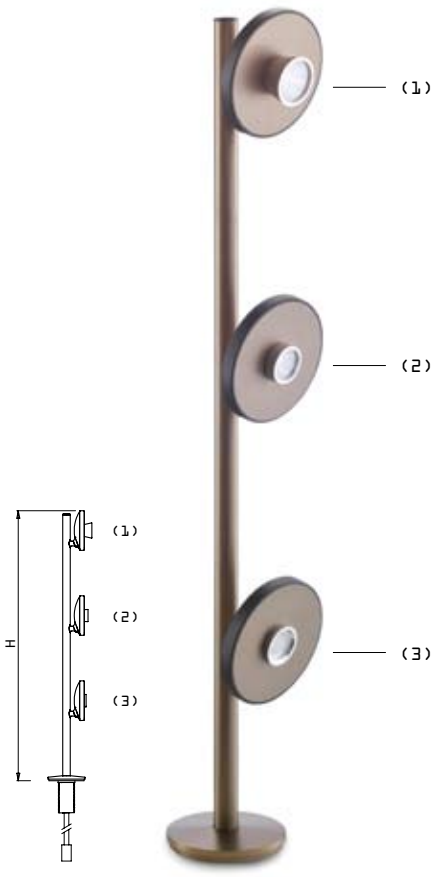
Libra 1 custom

Colour	Item no.
Black	1123 2110
Grey	1123 2120
Bronze/black	1123 2171



Libra 2 custom

Colour	Item no.
Black	1123 2210
Grey	1123 2220
Bronze/black	1123 2271



Libra 3 custom

Colour	Item no.
Black	1123 2310
Grey	1123 2320
Bronze/black	1123 2371

Step 1 Define basic type

Item no. _____ Qty. _____

Height (H) in mm _____

Max. 700 mm (Standard = 290 mm)

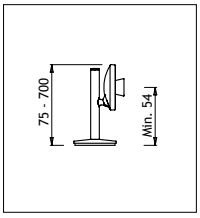
Driver item no. _____

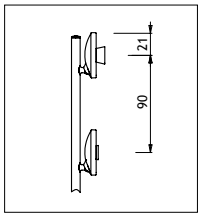
Splitter item no. _____

Step 2 Choose head configuration

Pos.	CCT	Beam angle
1	☐ 3,000 K ☐ 4,500 K	☐ 30° ☐ 45° ☐ 60°
2	☐ 3,000 K ☐ 4,500 K	☐ 30° ☐ 45° ☐ 60°
3	☐ 3,000 K ☐ 4,500 K	☐ 30° ☐ 45° ☐ 60°

Design rules





Customer ref. no. _____

Libra accessories & spare parts

Libra reflector medium 30

Colour	Item no.
Black	1126 0310
Grey	1126 0320
Bronze/black	1126 0371

Libra reflector medium 45

Colour	Item no.
Black	1126 0410
Grey	1126 0420
Bronze/black	1126 0471

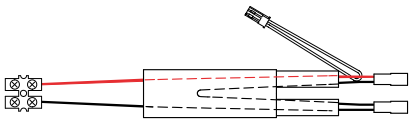
Libra reflector wide 60

Colour	Item no.
Black	1126 0610
Grey	1126 0620
Bronze/black	1126 0671

Libra LED spare part modules

CCT	Item no.
3,000 K	1129 5130
4,500 K	1129 5145

NB: when ordering spare part modules, the product serial number must be quoted. The product serial number is found on the product label on the lead wires. It identifies the specific flux and colour bin.



Serial splitter, RCY

Connections	Jumpers	Item no.
2	1	1108 0012
4	2	1108 0014
8	4	1108 0018

- Connects to driver with screw terminals
- Connects to fixture via RCY plugs by JST
- Jumper wires included

Libra driver selection guide

Use the 'Driver selector' table to determine the required luminaire system configuration.

The LEDs in the fixture are connected in series. To optimize luminaire efficacy, one driver can supply several fixtures in series. For information about permitted driver loads, see 'Driver types'.

1. Select driver type
   - Type 1 is a low-voltage Class 2 non-dimmable constant current 350 mA driver
   - Type 2 is a low-voltage Class 2 dimmable constant current 350 mA driver

2. To achieve optimal efficacy, connect the maximum permitted number of LEDs to each driver

   Never connect more LEDs to a driver than the max. no. given in 'Driver types'.

3. Select the item no. of the driver that best meets the required power and approvals

4. Select the appropriate serial splitter to connect the fixtures to a driver in an easy way

   In order to ensure consistently well-defined light output, always connect Libra fixtures in series.

Driver selector

3,000 K

Total LEDs	Fixture consumed power [W]	Total luminous flux [lm]	Driver power rating [W] Type 1	Driver power rating [W] Type 2	Luminaire efficacy [lm/W] Type 1	Luminaire efficacy [lm/W] Type 2
1	1.1	48	10	9	20	19
2	2.1	96	10	9	26	25
3	3.2	145	10	9	30	29
4	4.3	193	10	9	32	31
5	5.3	241	10	9	34	33
6	6.4	289	10	9	35	34
7	7.5	337	10	9	36	34
8	8.5	386	10	9	36	35
9	9.6	434	10	18	37	36
10	10.7	482	-	18	-	37
11	11.7	530	-	18	-	37
12	12.8	578	-	18	-	38

4,500 K

Total LEDs	Fixture consumed power [W]	Total luminous flux [lm]	Driver power rating [W] Type 1	Driver power rating [W] Type 2	Luminaire efficacy [lm/W] Type 1	Luminaire efficacy [lm/W] Type 2
1	1.0	53	10	9	22	21
2	2.1	106	10	9	29	28
3	3.1	159	10	9	33	32
4	4.2	212	10	9	35	34
5	5.2	266	10	9	37	36
6	6.3	319	10	9	38	37
7	7.3	372	10	9	39	38
8	8.4	425	10	9	39	39
9	9.4	478	10	18	41	40
10	10.4	531	-	18	-	40
11	11.5	584	-	18	-	41
12	12.5	637	-	18	-	41

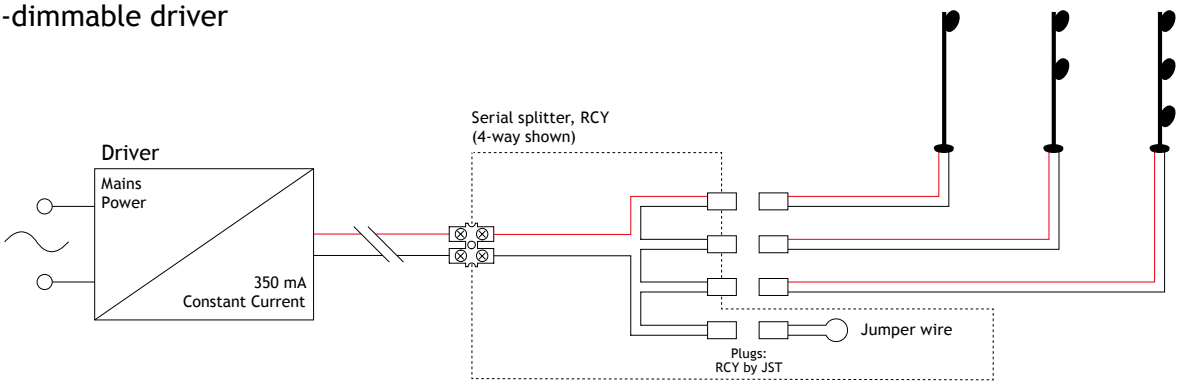
Driver types

Type	Dimming	No. of LEDs	Approvals	Power rating [W]	Roblon item no.	Manufacturer	Model	Voltage rating [V AC]	Life [h]	L x W x H [mm]	Connections	Efficiency rating [%]
1	None	1-9	EN/UL	10	1100 0101	Lightech	901010350-LED	120-240	50,000	100x40x27	Screw terminals	80
2	1-10 V	1-8	EN	9	1103 2104	OSRAM	OT 9/200-240/350 DIM	200-240	50,000	109x53x33	Screw terminals	76*
2	Phase control	4-12	UL	18	1103 1181	Lightech	LED-18-350-120-D	120	50,000	183x44x30	Wire	80

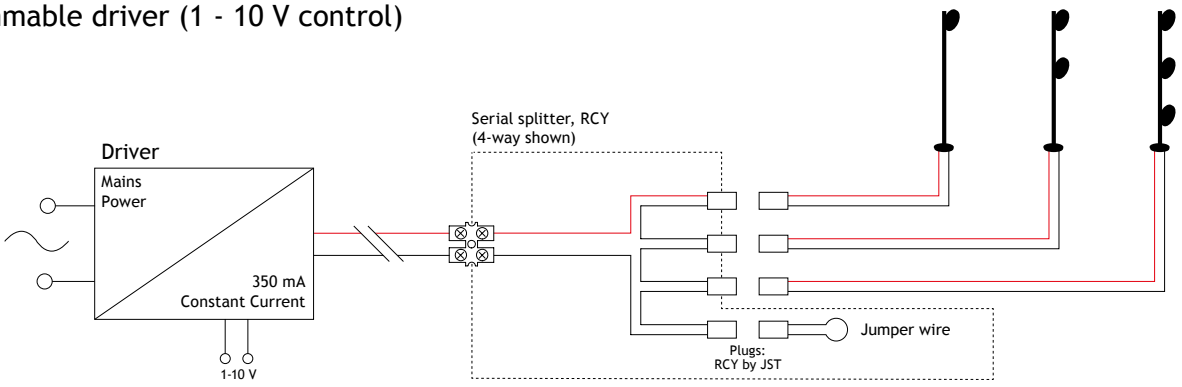
* Measured by Roblon at maximum load. Not provided by driver manufacturer

Libra driver wiring guide

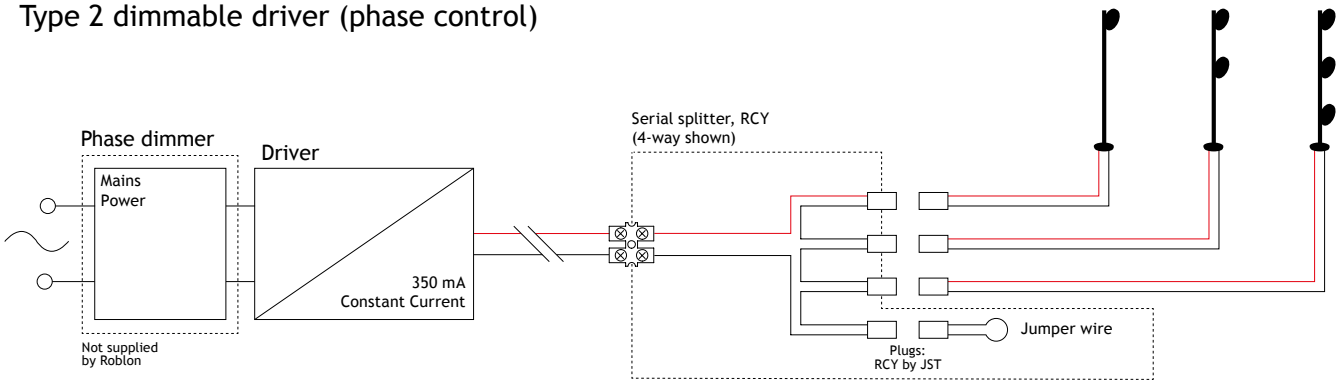
Type 1 non-dimmable driver



Type 2 dimmable driver (1 - 10 V control)

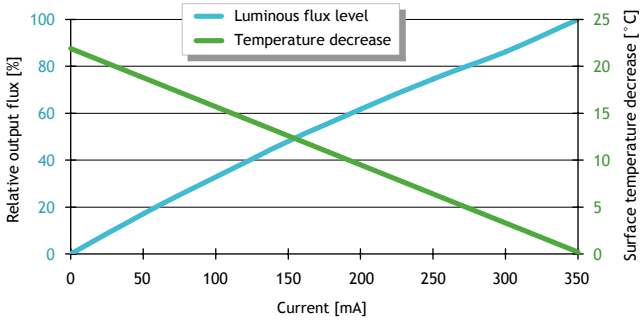


Type 2 dimmable driver (phase control)

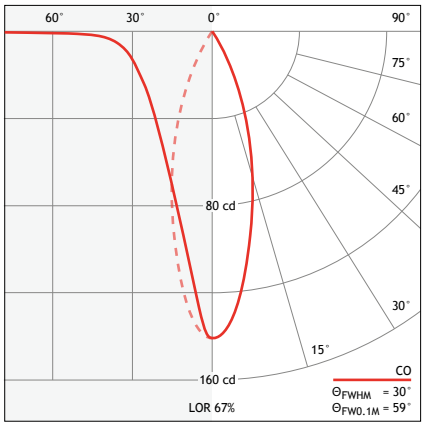


Dimming performance

When the fixture is dimmed, the light output and surface temperature decreases accordingly. The plot provides a guideline to the performance depending on drive current. Throughout the dimming range, CCT is maintained within 50 K and CRI_8 within 1.

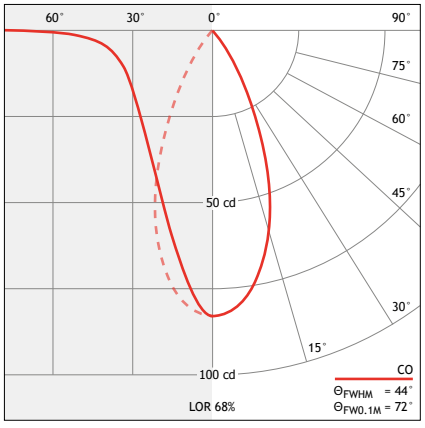


Medium 30



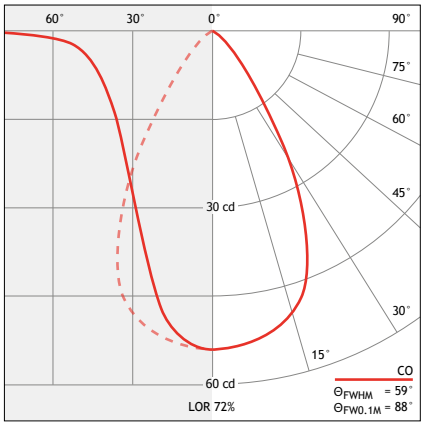
h [m]	Avg. E [lux]	Max. E [lux]	D_{FWHM} [m]	$D_{FW0.1M}$ [m]
0.25	1,700	2,200	0.14	0.30
0.5	420	550	0.28	0.59
1.0	110	140	0.53	1.1
1.5	48	62	0.79	1.7
h	109/h²	139/h²	0.53·h	1.1·h

Medium 45



h [m]	Avg. E [lux]	Max. E [lux]	D_{FWHM} [m]	$D_{FW0.1M}$ [m]
0.25	1,110	1,420	0.19	0.35
0.5	269	340	0.39	0.70
1.0	64	80	0.80	1.4
1.5	28	36	1.2	2.2
h	64/h²	80/h²	0.80·h	1.4·h

Wide 60



h [m]	Avg. E [lux]	Max. E [lux]	D_{FWHM} [m]	$D_{FW0.1M}$ [m]
0.25	700	870	0.29	0.49
0.5	170	210	0.58	0.97
1.0	45	55	1.1	1.9
1.5	19	25	1.7	2.9
h	45/h²	55/h²	1.1·h	1.9·h

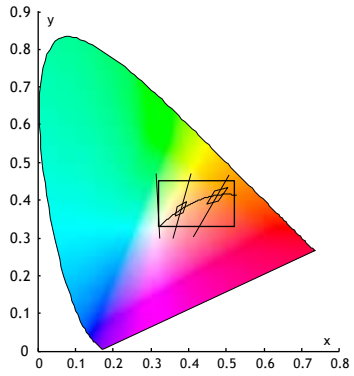
Θ_{FWHM} is the full-width beam angle where intensity is half the maximum level.

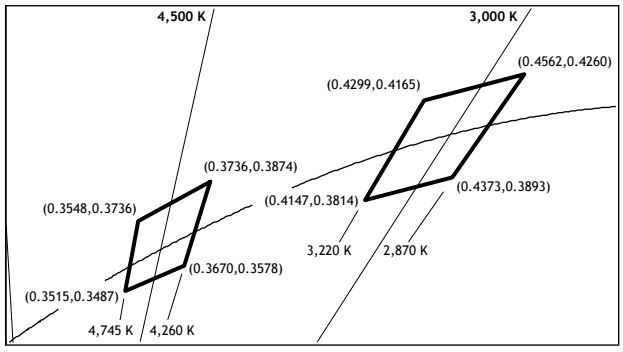
$\Theta_{FW0.1M}$ is the full-width beam angle where intensity is a tenth of the maximum level. This is a non-standard measurement that is close to the perceived beam angle.

Illuminance values account for distances (h) greater than 100 mm. The photometric performance was measured at thermal steady state in 22°C ambient temperature using 4,500 K LEDs driven at 350 mA. Multiply results by 0.93 to get according values for 3,000 K. If the luminaire is dimmed, scale the results in accordance with 'Dimming performance' readings on p11.

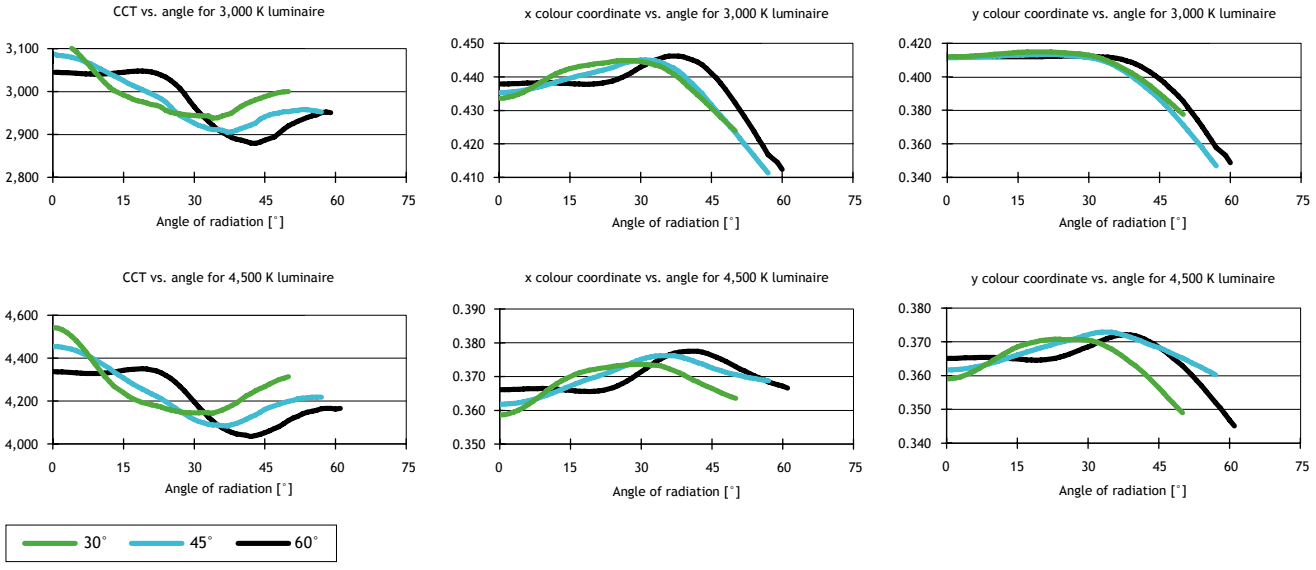
Libra chromatic details

LED chromaticity and CCT chart





Luminaire chromaticity and CCT uniformity



CRI details

				3,000 K		4,500 K	
Index	x	y	Colour	Luminaire[1]	LED	Luminaire[1]	LED
CRI 01	0.3692	0.3291	Light greyish red	90	91	96	97
CRI 02	0.3794	0.3955	Dark greyish yellow	92	92	97	97
CRI 03	0.3772	0.4880	Strong yellow green	93	93	95	95
CRI 04	0.2892	0.3963	Moderate yellowish green	91	92	96	96
CRI 05	0.2578	0.3078	Light bluish green	89	89	95	95
CRI 06	0.2360	0.2365	Light blue	89	89	93	93
CRI 07	0.2770	0.2372	Light violet	94	94	97	97
CRI 08	0.3259	0.2584	Light reddish purple	83	84	94	94
CRI 09	0.5492	0.3045	Strong red	59	61	84	85
CRI 10	0.4376	0.4601	Strong yellow	81	81	91	92
CRI 11	0.2551	0.4162	Strong green	90	91	95	96
CRI 12	0.1517	0.1490	Strong blue	72	72	69	70
CRI 13	0.3690	0.3510	Light yellowish pink (skin)	90	91	97	98
CRI 14	0.3538	0.4284	Moderate olive green (leaf)	96	95	97	97
CRI_8 (Ra)	-	-	**Average level of CRI 01-08[2]**	**90**	**91**	**95**	**96**
CRI_{14}	-	-	**Average level of CRI 01-14**	**86**	**87**	**93**	**93**

1) All 3 reflector types perform consistently
2) In accordance with CIE 13.3:1995

Libra thermal details

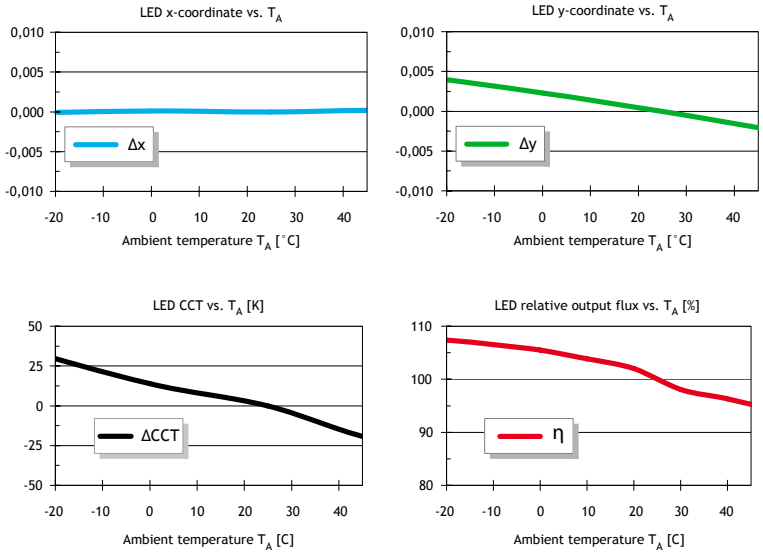
Property	
Operating ambient temperature (T_A)	-20 to +45°C
Surface temperature increment (ΔT_{CA})	Max. 30°C
Surface temperature (T_C)	Max. 75°C
Temperature Measurement Point reading (TMP)	Max. 75°C
LED junction temperature increment (ΔT_{JC})	Max. 45°C
LED junction temperature (T_J)	Max. 90°C
Max. permitted operating LED junction temperature (LED manufacturer data)	Max. 120°C
Internal temperature protection type	None
Internal temperature protection threshold	-
Luminous intensity level when temperature protection is activated	-

The TMP is at the centre of the back of the head. Temperature readings are for installations where the distance from the heads to any object or surface is minimum 25 mm.

Example:
A luminaire is driven at 350 mA (100% light output). If ambient temperature is 25°C the surface temperature at TMP is maximum 25 + 30 = 55°C and the LED junction temperature is maximum 25 + 45 = 70°C at thermal steady state.

If the luminaire is then dimmed to 100 mA (~30% light output) the surface temperature at TMP decreases by 16°C, as seen in 'Dimming performance' p11. The temperature at TMP is now maximum 55 - 16 = 39°C.

Temperature vs. light output



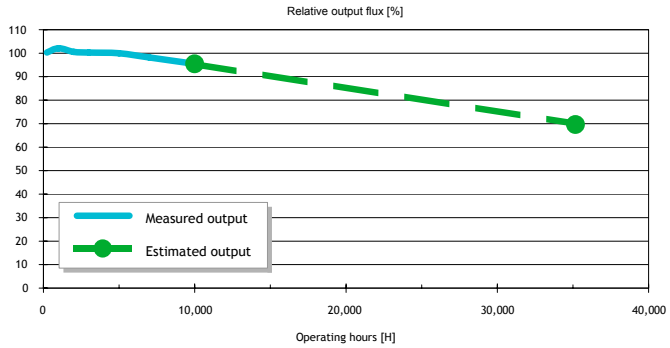
Protection circuits

The LED modules are designed to be immune to inverted polarity from the low-voltage driver. The modules are not protected against high voltage, e.g. mains power.

The LED modules comply with radio interference suppression and electromagnetic compatibility regulations (EMC) EN 55.015, EN 61.000-3-2, EN 61.547 and FCC part 15.

Libra lifetime and maintenance

Expected lifetime



Expected output depreciation at 45°C ambient. Plots are based on the LED manufacturer's ongoing end-of-life tests after 10,000 hours. The 35,000-hour lifetime (L70) is accepted in accordance with IESNA LM 80-08 if the lumen maintenance is minimum 94.1% after 6,000 hours of operation. The LED manufacturer's measurements show that the actual level is minimum 98.5%.

Lifetime is defined as the number of operating hours when lumen output reaches 70% of the initial level. The LED modules inside the luminaire are designed to last minimum 35,000 hours with ambient temperature at or below 45°C.

The LED manufacturer's rating for the LEDs alone corresponds to 35,000 hours in luminaire ambient temperature at or below 75°C.

The values in this section are not exact measurements as data is not yet available from the manufacturer's full end-of-life tests. The values have been determined on the basis of manufacturer specifications, luminaire design measurements and short duration luminaire tests.

Maintenance

Cleaning
Only use a dry cloth to clean. Avoid exposing the LED or reflector foil to any liquid or solvent, as this may reduce LED lifetime or performance.

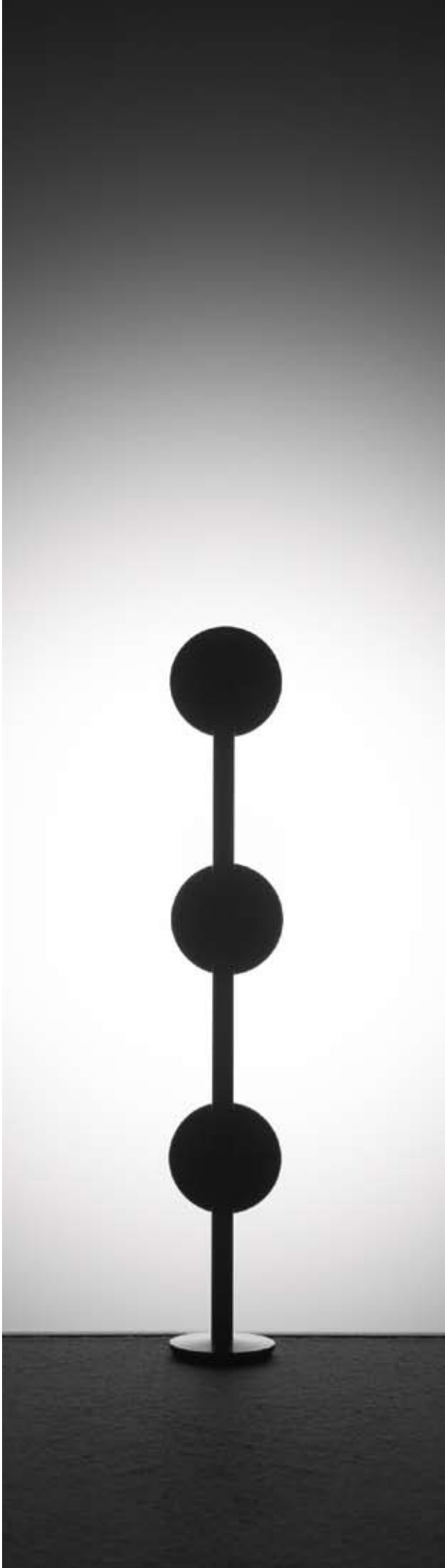
Operating
There must be a sufficient air gap around the fixture and driver. Keep air and other vents free from obstruction at all times.

Service
If an LED module stops operating, it can be replaced individually on-site without any others having to be replaced too. See spare parts p9.

Only trained or authorised personnel should change the LED module.

Because LED modules can be changed, a different CCT can always be ordered and installed if requirements change.

Consistency
Every luminaire has a unique Roblon serial number that registers the initial flux and colour bin. This ensures that a new LED module ordered as a spare part will perform consistently.



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