

## TECHNICAL DATA Colours

02 Matt black
08 Frosted white RAL 9010
09 Matt white RAL 9010
10 Matt pearl white RAL 1013
14 Chrome
20 Natural anodised
28 Metalized anodized bronze
31 Anodised gold
32 Glossy anodised
36 Glossy dove grey RAL 1019
41 Matt light grey RAL 7032
42 Matt platinum grey RAL 7036
45 Matt wengè brown RAL 8019



The CE mark means that those products are allowed free circulation within the European market and is therefore a compulsory requirement to allow products to cross the European frontiers. All our products carry approval declarations which conform to the following specific directives: 2006/95 CE and 93/68 CEE concerning electrical safety as well as 2004/108/CE concerning electromagnetic compatibility.

## TECHNICAL DATA lamps

Aqlus  
244-245

		item	voltage V	wattage W	Lm/cd	socket	beam °	colour temp. K	life time	CRI	euro VAT excluded
	halogen dichroic QR-CB Ø50	<b>01.20D</b>	12	20	550 cd	GU5,3	38	3100	3000	100	<b>3,50</b>
		<b>01.35D</b>	12	35	1000 cd	GU5,3	38	3100	3000	100	<b>3,50</b>
		<b>01.50D</b>	12	50	1600 cd	GU5,3	38	3100	3000	100	<b>3,50</b>
	halospot AR-111	<b>01.50-24</b>	12	50	3500 cd	G53	24	3000	3000	100	<b>9,50</b>
		<b>01.75-08</b>	12	75	30000 cd	G53	8	3000	3000	100	<b>9,50</b>
		<b>01.75-24</b>	12	75	5300 cd	G53	24	3000	3000	100	<b>9,50</b>
		<b>01.75-45</b>	12	75	1700 cd	G53	45	3000	3000	100	<b>9,50</b>
		<b>01.100-08</b>	12	100	48000 cd	G53	8	3000	3000	100	<b>12,00</b>
		<b>01.100-24</b>	12	100	8500 cd	G53	24	3000	3000	100	<b>12,00</b>
		<b>01.100-45</b>	12	100	2800 cd	G53	45	3000	3000	100	<b>12,00</b>
		<b>01.35-24IRC</b>	12	35	4500 cd	G53	24	3000	4000	100	<b>12,90</b>
		<b>01.50-24IRC</b>	12	50	5800 cd	G53	24	3000	4000	100	<b>12,90</b>
		<b>01.50-45IRC</b>	12	50	2000 cd	G53	45	3000	4000	100	<b>12,90</b>
	halogen A55 ES	<b>02.53ES</b>	230	53	850 lm	E27	-	2700	2000	100	<b>4,30</b>
		<b>02.75P</b>	230	75	2200 cd	E27	30	2900	2000	100	<b>9,50</b>
	fluorescence T5 SEAMLESS	<b>03.W24</b>	-	24	1750 lm	G5	-	3000	18000	>80	<b>24,00</b>
		<b>03.N24</b>	-	24	1750 lm	G5	-	4000	18000	>80	<b>24,00</b>
		<b>03.W39</b>	-	39	3100 lm	G5	-	3000	18000	>80	<b>26,70</b>
		<b>03.N39</b>	-	39	3100 lm	G5	-	4000	18000	>80	<b>26,70</b>
		<b>03.W54</b>	-	54	4450 lm	G5	-	3000	18000	>80	<b>28,50</b>
		<b>03.N54</b>	-	54	4450 lm	G5	-	4000	18000	>80	<b>28,50</b>

## TECHNICAL DATA lamps

		item	voltage V	wattage W	Lm/cd	socket	beam °	colour temp. K	life time	CRI	euro VAT excluded
	fluorescence T5	<b>04.W21</b>	-	21	1920 lm	G5	-	3000	18000	85	<b>6,00</b>
		<b>04.N21</b>	-	21	1920 lm	G5	-	4000	18000	85	<b>6,00</b>
		<b>04.W28</b>	-	28	2625 lm	G5	-	3000	18000	85	<b>6,90</b>
		<b>04.N28</b>	-	28	2625 lm	G5	-	4000	18000	85	<b>6,90</b>
		<b>04.W35</b>	-	35	3325 lm	G5	-	3000	18000	85	<b>6,90</b>
		<b>04.N35</b>	-	35	3325 lm	G5	-	4000	18000	85	<b>6,90</b>
		<b>04.W39</b>	-	39	3500 lm	G5	-	3000	18000	85	<b>6,90</b>
		<b>04.N39</b>	-	39	3500 lm	G5	-	4000	18000	85	<b>6,90</b>
		<b>04.W54</b>	-	54	5000 lm	G5	-	3000	18000	85	<b>6,90</b>
		<b>04.N54</b>	-	54	5000 lm	G5	-	4000	18000	85	<b>6,90</b>
		<b>04.W80</b>	-	80	7000 lm	G5	-	3000	18000	85	<b>8,60</b>
<b>04.N80</b>	-	80	7000 lm	G5	-	4000	18000	85	<b>8,60</b>		
	electronic compact fluorescent DE-C	<b>06.W26E</b>	-	26	1800 lm	G24q-3	-	3000	10000	85	<b>6,00</b>
		<b>06.N26E</b>	-	26	1800 lm	G24q-3	-	4000	10000	85	<b>6,00</b>
	fluorescence TORNADO ES	<b>08.W15T</b>	230	15	950 lm	E27	-	2700	8000	81	<b>8,60</b>
		<b>08.W23T</b>	230	23	1500 lm	E27	-	2700	10000	81	<b>8,60</b>
		<b>08.W32T</b>	230	32	2200 lm	E27	-	2700	10000	82	<b>8,60</b>
	fluorescence T5c	<b>10.W55</b>	-	55	4200 lm	2GX13	-	3000	10000	85	<b>19,80</b>
		<b>10.N55</b>	-	55	4200 lm	2GX13	-	4000	10000	85	<b>19,80</b>
	compact fluorescent PL-L	<b>19.W36</b>	-	36	2900 lm	2G11	-	3000	10000	85	<b>7,80</b>
		<b>19.N36</b>	-	36	2900 lm	2G11	-	4000	10000	85	<b>7,80</b>
	mastercolour CDM-R111	<b>31.W35-10</b>	-	35	35000 cd	GX10	10	3000	10000	81	<b>60,00</b>
		<b>31.N35-10</b>	-	35	35000 cd	GX10	10	4200	10000	90	<b>60,00</b>
		<b>31.W35-24</b>	-	35	8500 cd	GX10	24	3000	10000	81	<b>60,00</b>
		<b>31.N35-24</b>	-	35	8500 cd	GX10	24	4200	10000	90	<b>60,00</b>

## TECHNICAL DATA lamps

	item	voltage V	wattage W	Lm/cd	socket	beam °	colour temp. K	life time	CRI	euro VAT excluded	
	mastercolour CDM-R111	<b>31.W35-40</b>	-	35	4000 cd	GX10	40	3000	10000	81	<b>60,00</b>
		<b>31.N35-40</b>	-	35	4000 cd	GX10	40	4200	10000	90	<b>60,00</b>
		<b>31.W70-10</b>	-	70	50000 cd	GX10	10	3000	10000	81	<b>60,00</b>
		<b>31.N70-10</b>	-	70	50000 cd	GX10	10	4200	10000	90	<b>60,00</b>
		<b>31.W70-24</b>	-	70	15000 cd	GX10	24	3000	10000	81	<b>60,00</b>
		<b>31.N70-24</b>	-	70	15000 cd	GX10	24	4200	10000	90	<b>60,00</b>
		<b>31.W70-40</b>	-	70	9000 cd	GX10	40	3000	10000	81	<b>60,00</b>
		<b>31.N70-40</b>	-	70	9000 cd	GX10	40	4200	10000	90	<b>60,00</b>

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### LED LAMPS

	masterled MR 16	<b>01.W04DL-24</b>	12	4	800 cd	GU5,3	24	3000	45000	82	<b>25,00</b>
		<b>01.W04DL-36</b>	12	4	520 cd	GU5,3	36	3000	45000	82	<b>25,00</b>
		<b>01.W07DL-36</b>	12	7	1950 cd	GU5,3	36	3000	40000	82	<b>40,00</b>
		<b>01.N07DL-36</b>	12	7	2050 cd	GU5,3	36	4000	40000	82	<b>40,00</b>
		<b>01.W10DL-24</b>	12	10	2840 cd	GU5,3	24	3000	30000	82	<b>53,00</b>
		<b>01.N10DL-24</b>	12	10	3010 cd	GU5,3	24	4000	30000	82	<b>53,00</b>
		<b>01.W10DL-36</b>	12	10	1560 cd	GU5,3	36	3000	30000	82	<b>53,00</b>
		<b>01.N10DL-36</b>	12	10	1580 cd	GU5,3	36	4000	30000	82	<b>53,00</b>
	masterled AR-111	<b>01.W10L-24</b>	12	10	3370 cd	G53	24	3000	45000	82	<b>91,00</b>
		<b>01.W10L-40</b>	12	10	1210 cd	G53	40	3000	45000	82	<b>91,00</b>
		<b>01.W15L-24</b>	12	15	4240 cd	G53	24	3000	45000	82	<b>96,00</b>
		<b>01.W15L-40</b>	12	15	1520 cd	G53	40	3000	45000	82	<b>96,00</b>
	masterled PAR30	<b>02.W12PL-25</b>	230	12	2250 cd	E27	25	2700	45000	82	<b>99,00</b>
	parathom-led classic A	<b>02.08L</b>	230	7,5	470 lm	E27	340	2700	30000	82	<b>23,00</b>
		<b>02.12L</b>	230	12	810 lm	E27	340	2700	30000	82	<b>29,00</b>
		<b>02.14L</b>	230	14,5	1055 lm	E27	340	2700	30000	82	<b>47,00</b>

## TECHNICAL DATA lamps

### LED MODULES

		item	voltage mA	wattage W	Lm/cd	socket	beam °	colour temp. K	life time	CRI	euro VAT excluded
	coinlight AR-111	<b>40.W16L-24</b>	700	16	5650 cd	-	24	2700	50000	85	<b>70,00</b>
		<b>40.N16L-24</b>	700	16	6310 cd	-	24	4000	50000	86	<b>70,00</b>
		<b>40.W16L-45</b>	700	16	2520 cd	-	45	2700	50000	85	<b>70,00</b>
		<b>40.N16L-45</b>	700	16	2810 cd	-	45	4000	50000	86	<b>70,00</b>
		<b>40.W25L-24</b>	700	25	8730 cd	-	24	2700	50000	85	<b>96,00</b>
		<b>40.N25L-24</b>	700	25	9700 cd	-	24	4000	50000	86	<b>96,00</b>
		<b>40.W25L-45</b>	700	25	3890 cd	-	45	2700	50000	85	<b>96,00</b>
		<b>40.N25L-45</b>	700	25	4320 cd	-	45	4000	50000	86	<b>96,00</b>
	cob led spot Ø50mm	<b>41.W10L-40</b>	700	10	1050 lm	-	40	3000	50000	82	<b>52,00</b>
		<b>41.N10L-40</b>	700	10	1100 lm	-	40	4000	50000	82	<b>52,00</b>

### 12V LED LAMPS

Before combining Aqlus products with 12V transformers with a different LED lamp from the one our company supplies, it is necessary to check compatibility by requesting the relative datasheets from the manufacturer as not all LED sources are technically and functionally made using the same technology.

Aqlus sells Philips Masterled which, unlike all other LEDs, uses an electronics which can trick the transformer, which is actually absorbing the wattage stated, into believing it is absorbing a greater dummy load. More specifically:

4W= 20W  
7W= 35W  
10W= 50W  
15W = 75W

We feel it is important to specify that this type of design does not allow the device to work with a direct current driver. Our devices are supplied with traditional electronic transformers so as to allow the user to choose freely both at time of purchase and, above all, subsequently whether to use traditional halogen lamps or Masterled without making any modifications to the product. However, as we know, electronic transformers must have a minimum charge, below which the lamp may not light up or may not work properly (for example it may go out after a brief time or start to flash). Moreover, we would like to inform our customers that all our spotlights designed for 12V lamps incorporate 105W transformers with a minimum charge of 20W and therefore consequently any lamp with a lower wattage cannot be used due to the issues mentioned above. It goes without saying that to meet customers' various needs Aqlus is, in any case, able to supply devices with direct current drivers to order. The transformers in our catalogues, sold as accessories, have the following minimum charge:

60W minimum charge 20W  
105W minimum charge 20W  
150W minimum charge 50W  
250W minimum charge 100W

## TECHNICAL DATA

### Protection degree

#### IP. Protection degree

##### *Protection against penetration of solid objects.*

1° number	Description	Symbol
0	Non-protected	
1	Protected against solid objects up to than 50 mm	
2	Protected against solid objects up to than 12 mm	
3	Protected against solid objects with Ø2,5 mm	
4	Protected against solid objects with Ø1 mm	
5	Dust-protected	
6	Dust-light	

##### *Protection against penetration of water.*

2° number	Description	Symbol
0	Non-protected	
1	Protected against dripping water	
2	Protected against dripping water when tilted up to 15°	
3	Protected against spraying water	
4	Protected against splashing	
5	Protected against water jets	
6	Protected against heavy seas	
7	Protected against the effects of immersion	
8	Protected against submersion	

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## CLASS

##### *Degree of protection against electric shocks.*

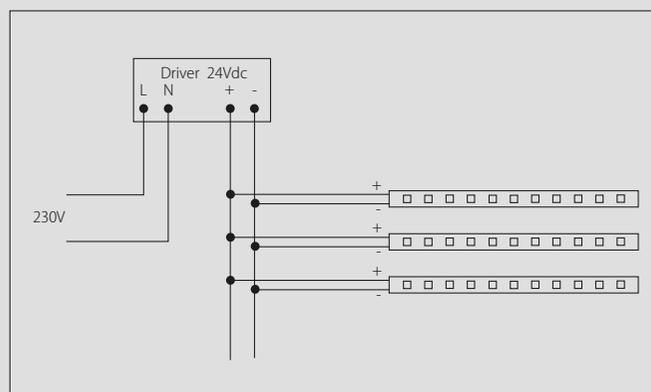
Class	Description	Symbol
0	Protection is achieved by simple insulation, there is no earth cable provided.	No symbol
I	The protection is achieved by simple insulation and connection of all metallic components to an earth wire protection cable.	No symbol
II	Protection is achieved by simple insulation and some other devices such as double insulation or reinforced insulation. There is no earth cable provided.	
III	Protection is achieved by every component of the luminaire having a start/functioning voltage of less than 50 VA (safety Extra Low Voltage SELV).	

## TECHNICAL DATA Driver

### DRIVER IN TENSIONE CONTINUA 24Vdc

Code	Wattage	IP	euro VAT excluded
0705	12W	40	20,00
0730	20W	67	26,00
0731	35W	67	38,00
0732	60W	67	52,00
0733	100W	67	74,00

*Sample parallel circuit diagram (direct current).*



## TECHNICAL DATA Control system

### Handling light intelligently

The right light, in the right quantity and in the right place are essential conditions for fighting constantly rising energy costs and for achieving that lighting comfort which favours an individual's feeling of wellbeing. Aqlus proposes a range of fixtures equipped with dimmable drivers and ballast using different technologies so as to satisfy the various needs of the user. To help customers make the right choice we briefly list the features and workings of the typologies proposed.

### DIMM. 1..10V and push-dim analogic control.

- 1..10V. Control See paragraph on DIMM1 analogic control on page 251.

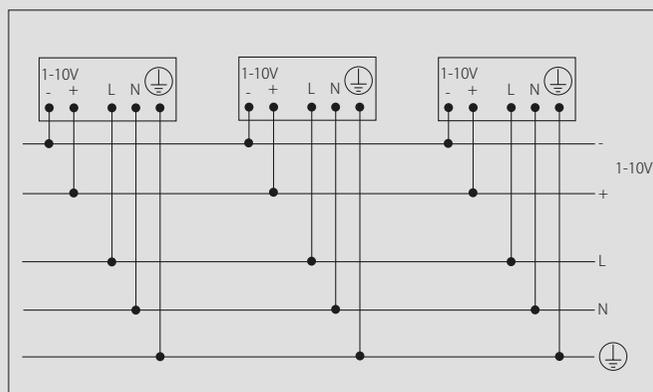
- Push-dim Control. The luminosity of fixtures is controlled by the use of an N/A button. This type of dimmer is recommended for small installations (max 4 fixtures per switch). In case of loss of synchrony between the fixtures controlled by a single PUSH button the following synchronisation procedure must be followed:

When the fixtures are switched on press the PUSH button down for at least a couple of seconds and then press down briefly (for less than one second). After the fixtures have been switched off keep the button pressed down again for more than two seconds.

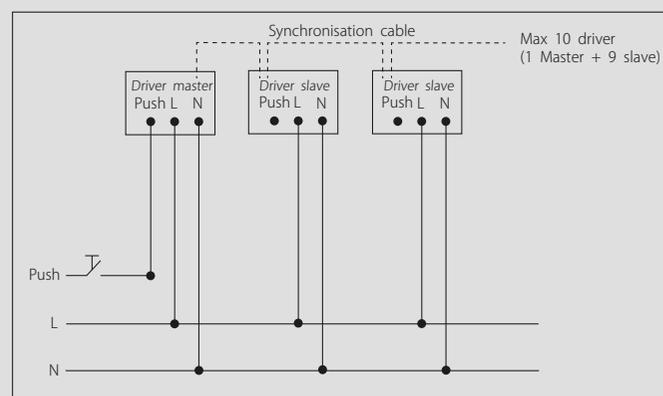
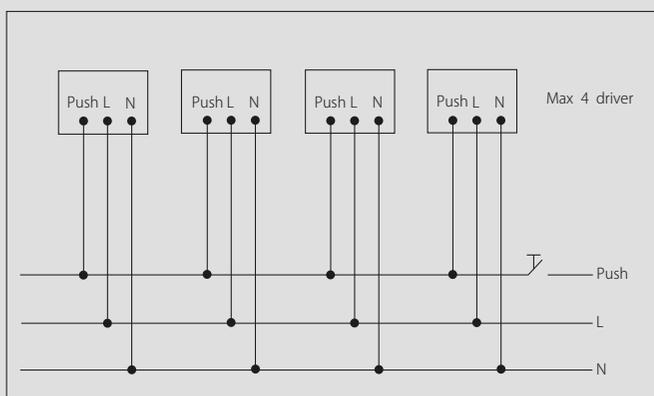
More than 4 fixtures require a synchronisation cable (to be ordered from our sales offices) or customers can opt for a switchDIM Dimm2 control system. (See relative paragraph on page 252).

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Sample 1..10V circuit diagram



Sample push-dim circuit diagram

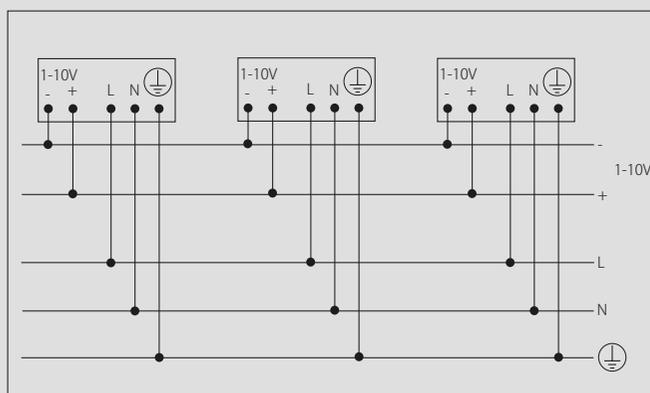


## TECHNICAL DATA Control system

### DIMM1. 1..10V Analogic control.

This type of control of the light flow works by means of a direct current signal which varies from 1V, for minimum brightness of the fixture (the control line is short-circuited), to 10V for maximum brightness intensity (the control line is open). The control wattage is generated by the electronic ballast and is absorbed by the control module linked to the ballast itself. The same control system can handle ballasts even if it is connected to different lines.

Sample 1..10V circuit diagram



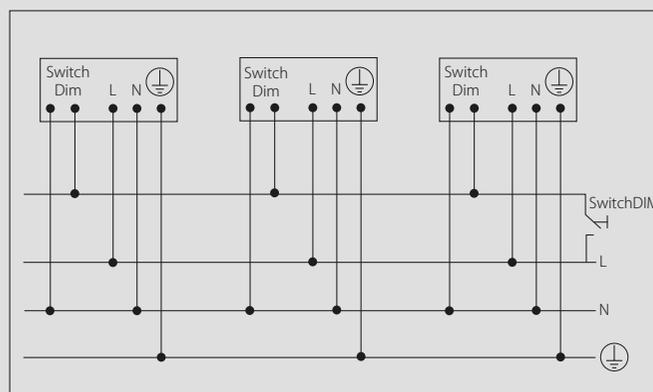
## TECHNICAL DATA Control system

### DIMM2. SwitchDIM digital control.

SwitchDIM applications use mains voltage as a control signal for digital dimmable ballasts. They are the simplest way of controlling brightness in small and medium sized installations and make switchDim technology extremely simple and user-friendly with an excellent quality/price ratio. Dimming, like switching the light on and off, can be done from various points simply by using conventional commercial N/A switches connected with mains voltage. The ballasts used by Aqlus are equipped with a memory and memorise the last brightness value selected even in the case of a power cut. Instructions for use: the fixture is switched on and off by rapidly pushing the button while fade up/down control requires the button to be held down for a longer time.

A button can control up to 20 electronic ballasts. In case of loss of synchronism between different lamps the fixtures can again be synchronised by keeping the button held down for approximately ten seconds.

Sample switchDIM circuit diagram

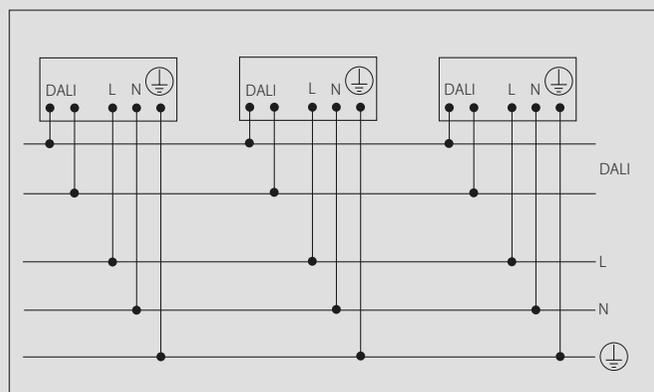


## TECHNICAL DATA Control system

### DIMM2. Digital control DALI.

The DALI (Digital Addressable Lighting Interface) is a protocol for dimmable electronic ballast which is functional and easy to use. With a two-wire differential bus you can handily control 64 DALI electronic ballasts, assign up to 16 groups and programme up to 16 lighting scenarios. Commutation and dimming are handled by the control wire and do not require a relay. Important information such as the state of the lamps is memorised in the ballast and is constantly accessible to the controller. Groups can be differently assigned at any time without the need for any costly new wiring, for instance following a home renovation. In short designing and installing a DALI plant means having a single control wire with a two-wire bus for up to 64 devices. The groups of lighting fixtures do not necessarily have to be assigned during the planning phase but can be configured later with the aid of a controller. The design of the dimming wire can consequently be completely separate from the power cable design. The control wire is non-polarised and can be routed together with the ballast, for example in a 5 conductor cable. The control wire only needs to be adjusted for mains voltage and does not necessitate special wiring. The groups of lighting fixtures are not connected directly. Individual fixtures are grouped simply by assigning them to groups with the aid of a controller.

*Sample DALI electrical circuit*

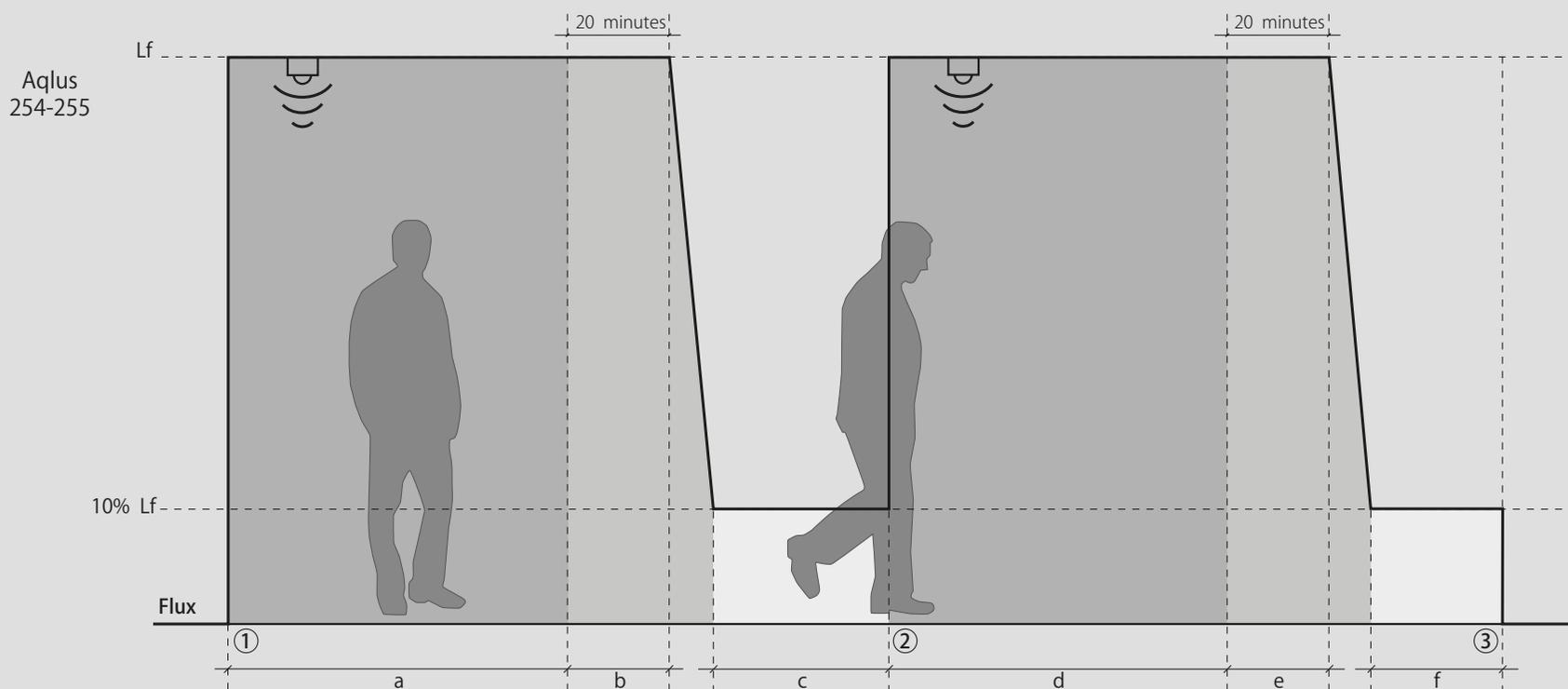


## TECHNICAL DATA

### Control system

#### USE OF AMBIENT LIGHT SENSOR AND PRESENCE DETECTOR FOR LIGHTING CONTROL

Humans have a series of requirements which lighting commands must be able to satisfy. To achieve this aim it is essential to achieve the right balance between automation techniques and human freedom. In lighting control sensor based on natural light and on presence, the natural light present in a room is integrated as required with artificial light, emitted by fixtures equipped with a dimmable electronic ballast. Light sensors detect the level of light produced by artificial and natural light and the fixture is controlled based on where it is in the room and the natural light available so as to maintain the predefined level of light. With the use of motion/presence detectors the light automatically self-regulates to produce a minimum flux (10%). Aqlus fixtures equipped with motion detectors and light sensors detect the lighting level of the environment and, based on the amount of daylight, generate only the quantity of artificial light required to achieve the level of lighting programmed. These fixtures are ideal for small and simple installations as they do not require further accessories. Every fixture is controlled by its own sensor which, connected directly to the ballast, monitors the surrounding area with precision. In case of need, and at any time, users can anyway switch on or off and regulate the flux emitted by the fixtures to their liking by means of a specific switchDIM. In order to satisfy customers' multiple requirements and to develop more complex projects our offices are always willing to help find and suggest the best customised solution. The best lighting is clean and free: exploiting daylight means cutting costs, considerably reducing CO2 emissions and achieving a high level of wellbeing.



$L_f$  = predefined level of flux

1 = manual switch on

a - d = period of presence

b - e = period without presence

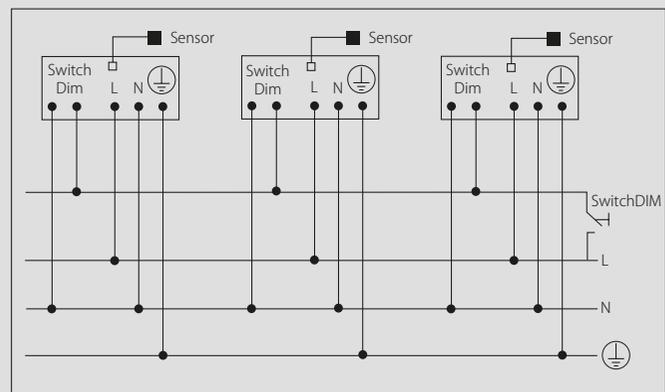
c - f = period without presence after 20 minutes

2 = motion detector switch on

3 = manual switch off

**TECHNICAL DATA**  
**Control system**

*Sample electrical sensor diagram + switchDIM*



## TECHNICAL DATA

### Emergency

#### EMERGENCY LIGHTING

Emergency lighting provides basic lighting when there is a sudden blackout due to electrical failure or tripped switches and in situations of danger. Its purpose is to guarantee a sufficient degree of illumination so as to ensure operations in all cases of risk. Emergency lighting is, therefore, above all in the most serious situations, a fundamental safety component.

Places which must be provided with emergency lighting are listed in the various regulations and laws in force. Its use is mandatory in all normally crowded environments such as hospitals, schools, workplaces, cinemas etc... Moreover, the home, where emergency lighting may be key to peoples' safety, should not be overlooked.

In order to choose the correct types of emergency lighting it is necessary to know them and understand how they work.

All Aqlus fixtures equipped with an inverter and battery are SA type (providing permanent lighting) meaning that the light stays on whether or not it is connected to the mains. Lighting with this feature is normally used to light emergency exits. Moreover, this type is usually found in places where it is not possible to add any more light sources. Indeed, just one fixture provides ordinary (on/off) and emergency lighting.

Other existing types are:

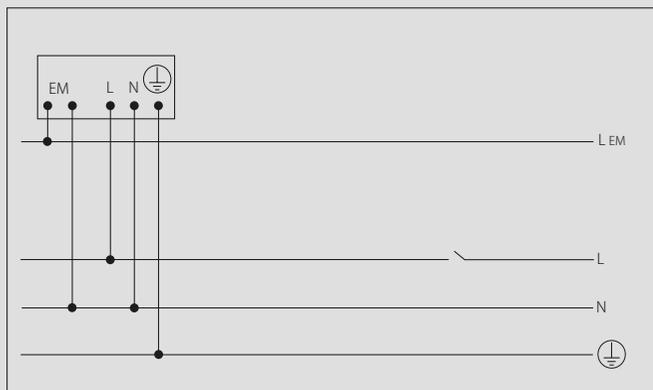
Non-permanent SE type fixtures: the light only goes on when there is an outage.

SL models: the fixtures are not supplied with battery packs and inverters but only with a ballast/driver to drive the light source. They may be charged with a voltage of 230V ac and used as ordinary lighting or connected to emergency central power supply systems.

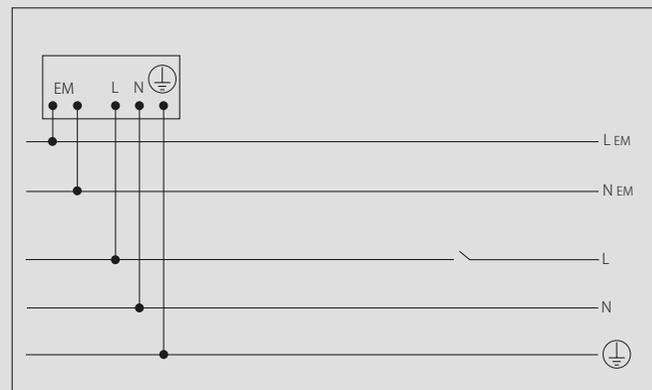
Minimum operating time guaranteed by emergency products supplied by Aqlus is 1 hour but products with 2 or 3 hour operating time can also be ordered (if available).

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*Sample electrical wiring for emergency lighting with shared neutral*



*Sample electrical wiring for emergency lighting with separate neutrals*



## TECHNICAL DATA

### Photobiological safety

#### PHOTOBIOLOGICAL SAFETY OF LAMPS AND LAMP SYSTEMS

We have passed from incandescent lamps, now obsolete and replaced by halogen and fluorescent lamps, to new LED technologies. This advancement has inevitably led to the emergence of numerous further standards.

The new IEC/EN 62471 "Photobiological safety of lamps and lamp systems" standard lays down guidelines for the evaluation and control of photobiological hazards, specifying the types of radiant energy to be measured in order to evaluate the risk to human skin and eyes posed by exposure to light emitted by lighting appliances using LED technologies.

Limit values are calculated on the basis of exposure time. In the case of lighting appliances, if the task to be performed does not demand a fixed light source, the vision is random and normally accidental.

The European standard is set pursuant to and in accordance with Low Voltage Directive 2006/95/CE. Consequently, electrical products incorporating LED and to which the Low Voltage Directive applies must conform to requirements specified in standard EN 62471.

This standard divides lighting appliances into four "risk groups" (exempt/low/moderate/high) based on the degree of radiation hazard.

Below is a table summarising the photobiological risk classification of lamps in accordance with standard CEI EN 62471:2009.

Group	Description
Group 0 (exempt)	Where no optical hazard is considered foreseeable, even for continuous, unrestricted use.
Group 1	Products are safe for most use applications, except for very prolonged exposures where direct ocular exposures may be expected.
Group 2	Products generally do not pose a realistic optical hazard if aversion responses limit the exposure duration or where lengthy exposures are unrealistic.
Group 3	Products pose a potential hazard even for momentary exposures and system safety requirements are generally essential.