LED pool light
Intelligent Remote Controller

OWNER'S MANUAL

PLP-REM

Spectravision™
lighting

**Multi-functional Controller
for Spectravision Pool Lights
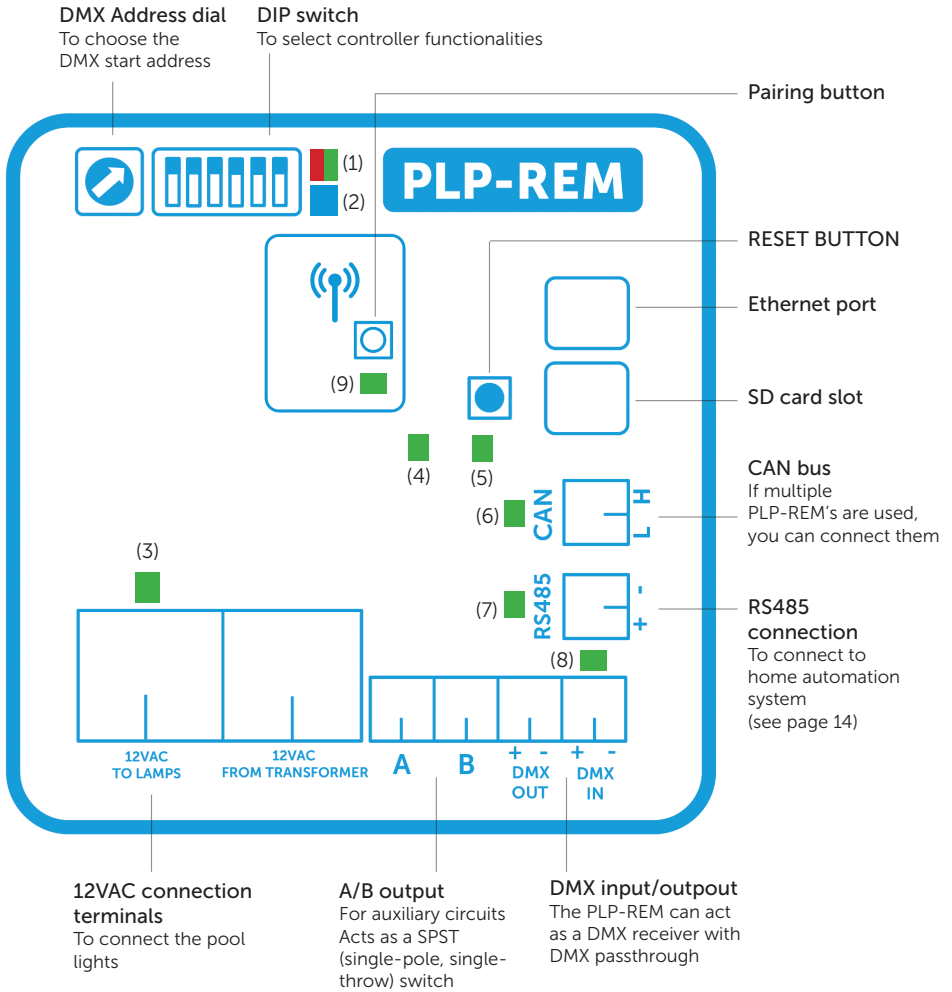and 2 auxiliary circuits**

Table of contents

Spectravision™ lighting

Technical specifications

General specifications

Input Voltage:	12VAC
Max rating "12VAC TO LAMPS" contact	60A / 12VAC
Max rating relay contact A &B	16A / 250 VAC
Max switching power A & B	4000VA
RF band	868 MHz
Ambient Air Temperature:	0°C to +40°C
Humidity	10% to 90% RH non condensing
Ingress protection rate:	IP54
IEC Protection Class:	Class II ☐

Spectravision™
lighting

Logic board

DMX Address dial
To choose the DMX start address

DIP switch
To select controller functionalities

Pairing button

(1)
(2)

PLP-REM

(9)

RESET BUTTON

Ethernet port

SD card slot

(4)   (5)

CAN bus
If multiple PLP-REM's are used, you can connect them

(6) **CAN**

(3)

(7) **RS485**

RS485 connection
To connect to home automation system (see page 14)

(8)

| 12VAC TO LAMPS | 12VAC FROM TRANSFORMER | A | B | + − DMX OUT | + − DMX IN |

12VAC connection terminals
To connect the pool lights

A/B output
For auxiliary circuits Acts as a SPST (single-pole, single-throw) switch

DMX input/outpout
The PLP-REM can act as a DMX receiver with DMX passthrough

Status LED's:

(1) General status: Green = OK
                    Red = error (see p.18)
(2) RESET status (see page 17)
(3) 12VAC to Pool lamps (Green = ON)
(4) Switch A (Green = ON)

(5) Switch B status (Green = ON)
(6) CAN status
(7) RS485 signal
(8) DMX signal
(9) Pairing status (see page 11)

Installation Instructions

Single PLP-REM unit

- Connect a 12VAC magnetic transformer to the "12VAC FROM TRANSFORMER" terminal of the PLP-REM.
  Connect the pool lights to the "12VAC TO LAMPS" terminal in the PLP-REM.

- Install the filter Ⓒ (included in box) to the primary circuit (230VAC side) of the transformer

- The "12VAC TO LAMPS" relay contact has a max rating of 60A. Make sure the total power load does not exceed this (60A x 12VAC = 720VA)
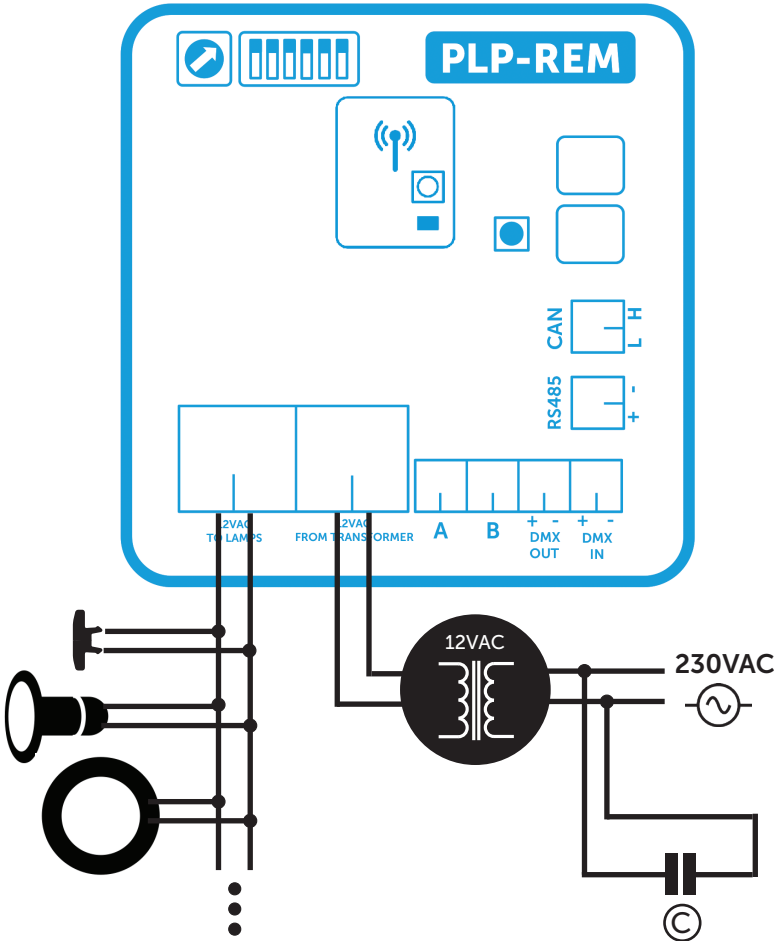
Multiple PLP-REM installation

For extended installations (total lamp power > 720VA), multiple PLP-REM's can be linked together. This way, a perfect synchronisation of all pool lights is still guaranteed.

The PLP-REM's need to communicate to each other, to ensure all the lamps are in perfect sync. There are 2 options:

    1) Connect Wirelessly

      This is done automatically. Each PLP-REM has a built in wireless module that detects other PLP-REM's in the neighbourhood.

    2) Connect Hardwired

      Preferred if multiple PLP-REM's are at a very long distance from each-other

      Connect the PLP-REM's with each other in PARALLEL:

      Connect the CAN terminals of the first PLP-REM with the CAN terminal of the second PLP-REM.
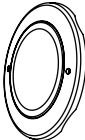
      If more than 2 PLP-REM's are necessary, simply daisy chain each CAN terminal with the one from the next PLP-REM (see below)

      Respect the polarity of the terminals! (CAN L & H)

CAN BUS
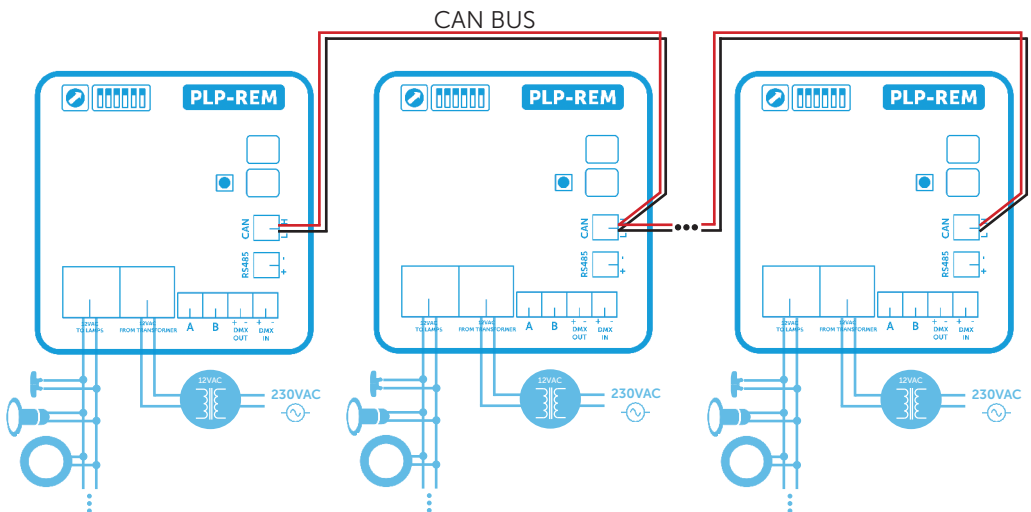
Operation Modes

The PLP-REM has 2 main operation modes:
"ON/OFF control mode" & "PLC control mode". Each mode has it's own functionalities:

	ON/OFF control	PLC control
Compatible lamps	Adagio PRO Adagio+ Moonlight	Adagio PRO
Switch lamps ON/OFF	YES	YES
Change lamp color	YES[1]	YES[1]
Operate Relay A & B	YES	YES
Dimming lamps	NO	YES[1]
DMX control	NO	YES
RS485 control	YES[2]	YES
Dip switch setting	DIP 1 ON	DIP 1 OFF
Remote keypad type[3]	Color A B	ON/OFF

1) Only for RGB lamps
2) In ON/OFF control mode, only a few RS485 commands are available (see p 16)
3) Depending on which control mode is selected, the keypad of the transmitter needs to be changed

DIP switch functionalities

The DIP switch on the main circuit board of the PLP-REM allows the user to customise the way the PLP-REM operates.

⚠ CAUTION: Always switch off the main power supply to the PLP-REM before changing the DIP switches

ON position

OFF position
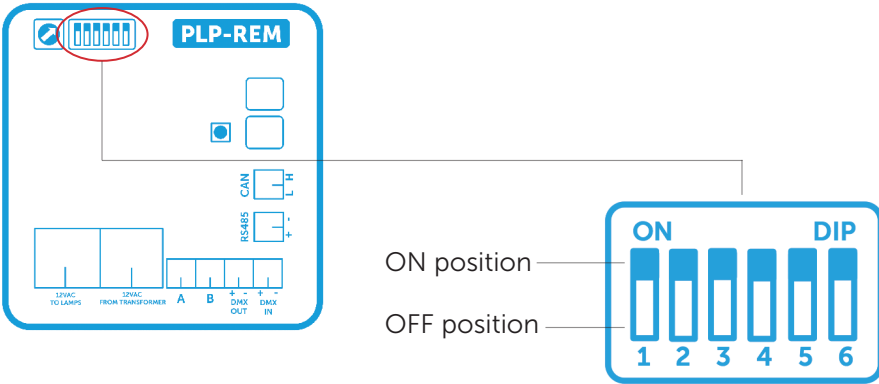
		DIP SWITCH					
function	setting	1	2	3	4	5	6
Mode of operation	ON/OFF	ON					
	PLC	OFF					
Relay A	PULSE mode		ON				
	TOGGLE mode		OFF				
Relay B	PULSE mode			ON			
	TOGGLE mode			OFF			
ON/OFF CONTROL pulse duration	SHORT				ON		
	LONG				OFF		
DMX	NO LOOP					ON	
	LOOP					OFF	
MASTER/SLAVE mode	SLAVE						ON
	MASTER						OFF

* ON/OFF CONTROL pulse duration:
To change colors, the lamps need to switch OFF and then back ON.
With SHORT pulse duration, the switching transition is not noticeable and the lamps change color very smoothly (short pulse only possible for Adagio Pro RGB lamps)

Transmitter functions

MODE 1: PLC CONTROL   (default mode)
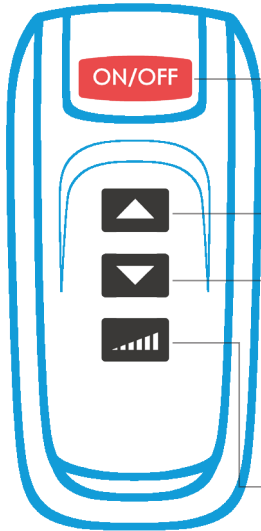
Short push (< 1 sec):
   Toggle the lamp ON of OFF [1]
Long push (> 2 sec[2]):
   All lamps & "12VAC TO LAMPS" relay are turned OFF [1]

Short push:
   Go to next color program
Long push:
   Toggle output A ON/OFF

Short push:
   Go to the previous color program
Long push:
   Toggle output B ON/OFF

Short push:
   Select next dimming level:
   100% -- 50% -- 25%   ---> 100% -- ...
Long push:
   Set lamps to program 1 (blue) & full brightness

MODE 2: ON/OFF CONTROL
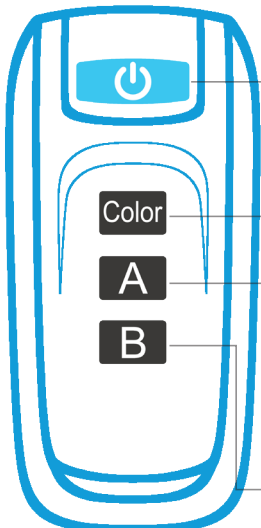
Short push (< 1 sec):
   Toggle the lamp ON of OFF [1]
Long push (> 2 sec[2]):
   All lamps & "12VAC TO LAMPS" relay are turned OFF [1]

Short push:
   Go to next color program
Long push:
   Auto sync procedure [3]

Short push:
   Toggle output A ON/OFF
Long push:
/

Short push:
   Toggle output B ON/OFF
Long push:
/

(1) Lamp ON or OFF status is memorized after power down
(2) The green LED in the transmitter will light up as soon as you start pressing a button, and will stop after 2 seconds, so you know exactly when to release the button.
(3) The lamps will be turned off for 30 seconds and then switched ON/OFF 3 times. This will set all lamps to program 1: blue

Replacing transmitter Keypad (Control mode selection)

Depending on which control mode is selected, the keypad of the transmitter needs to be changed:

- Remove the philips head screw and open the transmitter
- Replace the Keypad in the top part of the transmitter housing
- Reassemble in reverse order

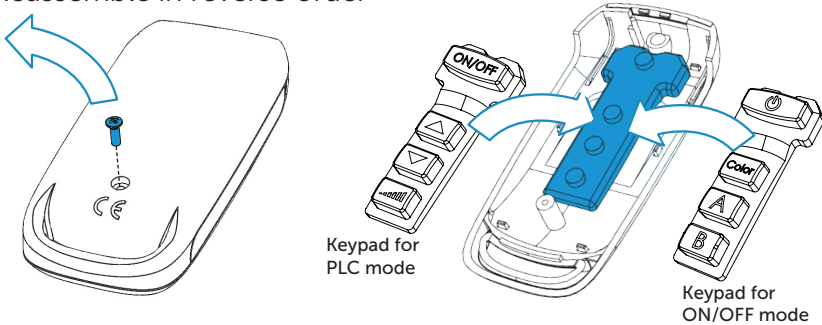Keypad for
PLC mode

Keypad for
ON/OFF mode

Pairing the handheld transmitter to the PLP-REM controller

All handheld transmitters are already paired in the factory and ready to use. In case a problem arises, the pairing process can be done as below:

1) Press the pairing button on the small circuit board, inside the PLP-REM for at least 5 seconds

   ---> The GREEN LED will start to blink fast

2) Within 25 seconds, push any button on the handheld transmitter.

   ---> If the remote is paired correctly, the GREEN LED will flash slowly for 5 times

   ---> *UNPAIRING:*
   If no button is pushed within 25 seconds, the pairing memory of the PLP-REM will be cleared. All remotes will be unpaired from the PLP-REM
   (in this "unpaired" mode, the PLP-REM will communicate with ANY transmitter)

PLP-REM

Pairing button

Pairing Indicator LED
(green)

12VAC TO LAMPS   12VAC FROM TRANSFORMER   A   B   + - DMX OUT   + - DMX IN

CAN   L H
RS485   + -
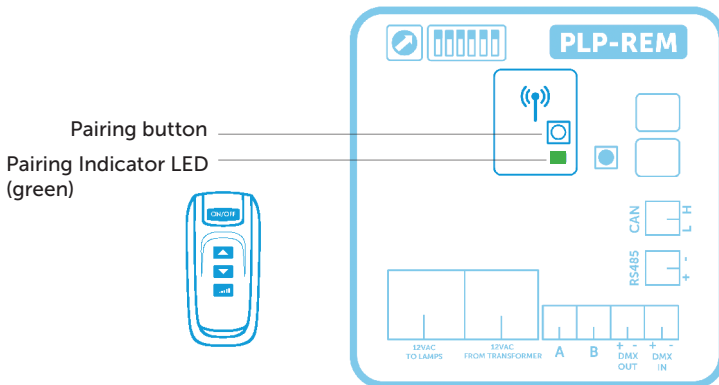
DMX 512 communication

Single PLP-REM unit

Address dial — PLP-REM unit diagram with DMX PANEL connection. Connect DMX panel to DMX IN (+/-)
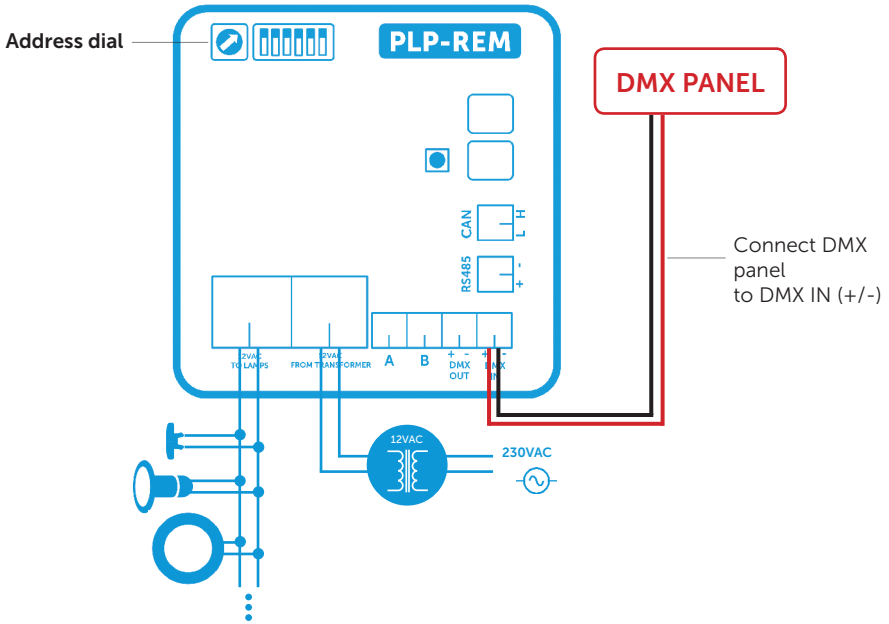
Address dial setup

Setting the DMX address of the PLP-REM:
Select the desired number on the address dial. The chosen number determines the DMX addresses of the PLP-REM & lamps.
Each lamp uses 3 bytes of DMX data (R-G-B), and all lamps receive the same DMX data from the PLP-REM.

Address dial position	0			1			2			...
	R	G	B	R	G	B	R	G	B	...
DMX address	1	2	3	4	5	6	7	8	9	...

The DMX start address can be overruled by using the RS-485 command:
"set DMX start address" (see page 16)

Multiple PLP-REM installation

1) Connect the DMX panel to the "DMX IN" port of the first PLP-REM
2) Connect the PLP-REM's with each other (open loop):
   DMX OUT --> DMX IN (polarized terminals + -)
3) Set the DMX address for each PLP-REM via the address dial.
   - Option 1: All PLP-REM's can be set to the same address:
         This implies that all lamps will receive the same DMX data,
         And will all operate identically
   - Option 2: PLP-REM's can be set to different addresses:
         Each PLP-REM will have it's own group of connected lamps
         that will operate identically.
         However, since each PLP-REM has it's own unique address,
         the different lamp groups can be controlled separately
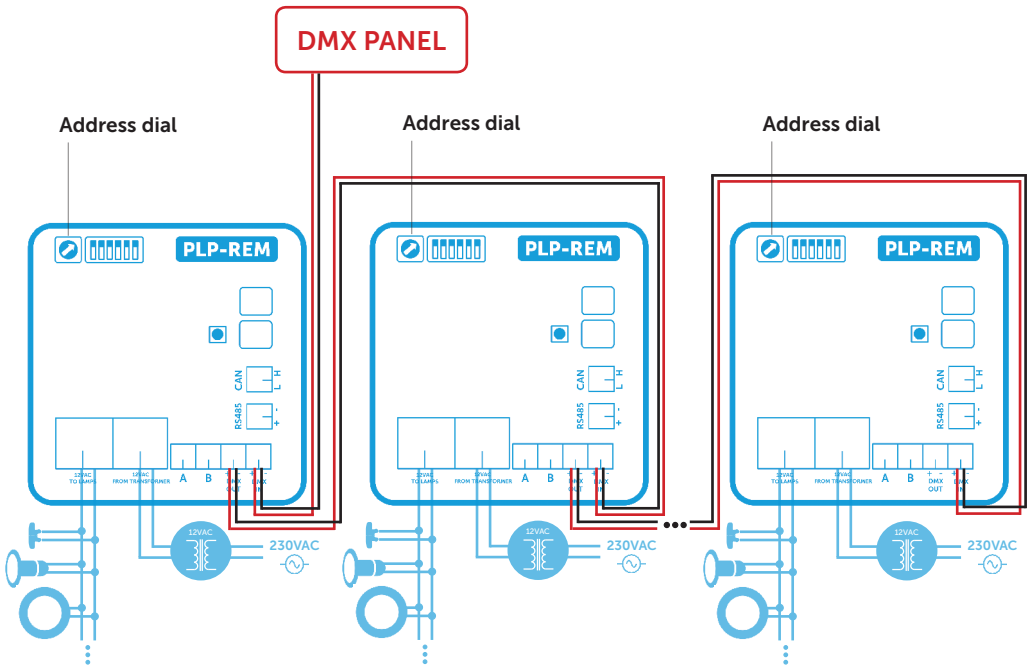
RS485 communication

Single PLP-REM unit

1) Connect the RS485 source to the "485" port on the PLP-REM
2) Communication settings: 9600, 8, 1, n
3) Command list: see page 16
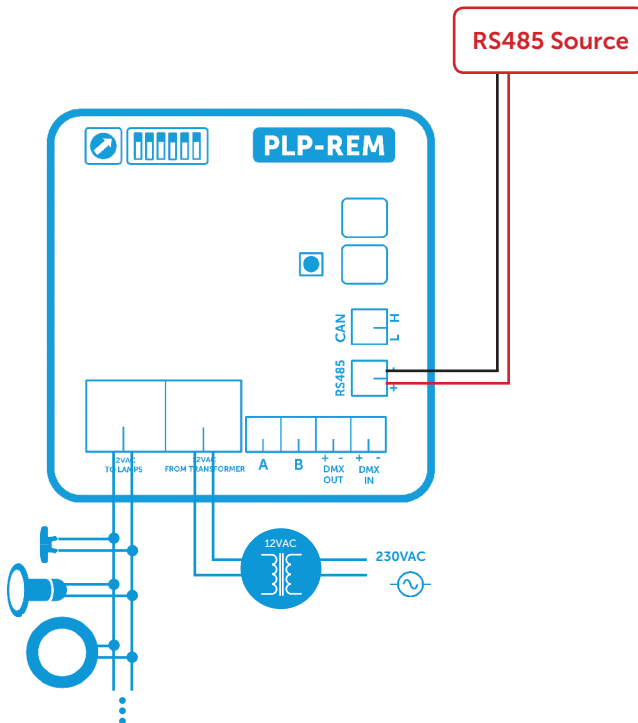
Multiple PLP-REM installation

1) Connect the RS485 panel to the "RS-485" port of the first PLP-REM
2) Connect the PLP-REM's with each other in PARALLEL:
   Connect the CAN terminals of the first PLP-REM with the CAN terminal of the second PLP-REM. If more than 2 PLP-REM's are necessary, simply daisy chain each CAN terminal with the one from the next PLP-REM. Respect the polarity of the terminals! (CAN H & L)
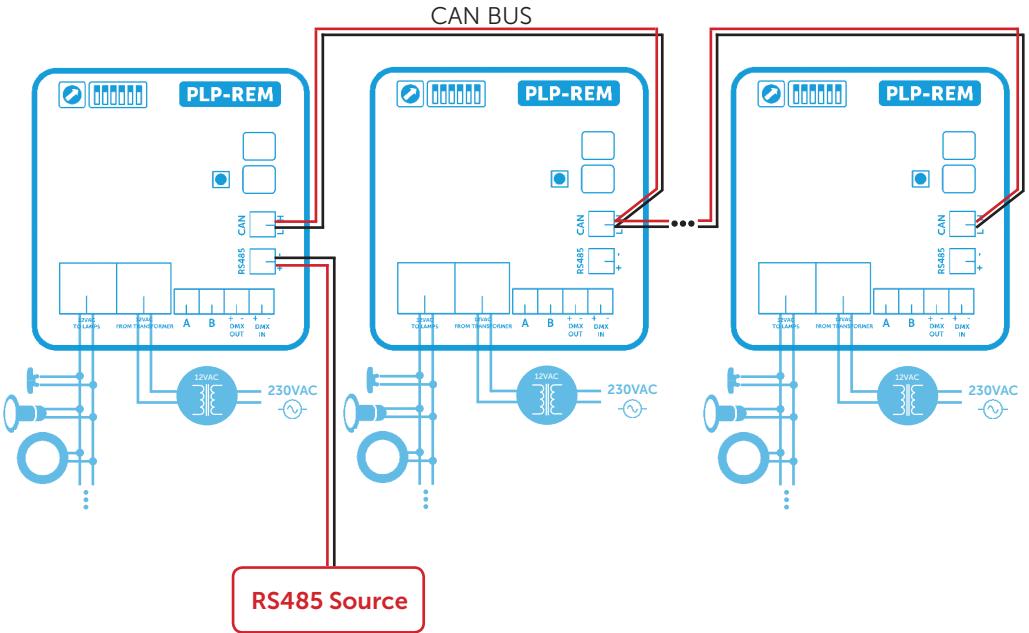
RS485 Command set

| Command	Command	Remark	Example	available in ON/OFF mode	available in PLC mode
Lamps OFF	PL0	All lamps OFF		X	X
Lamps ON	PL1	All lamps ON		X	X
Program UP	PsU	Jump to next program		X	X
Program Down	PsD	Return to previous program			X
Set Program	PSxx	xx is the decimal representation of the program number (01 - 14)	PS06 = jump to program 6		X
Auto sync procedure	PsS	executes the auto sync procedure (see page 10)		X	X
White 1	PW1	Jump to White 1 (program 12)			X
White 2	PW2	Jump to White 2 (program 13)			X
White 3	PW3	Jump to White 3 (program 14)			X
Set RGB	PCrrrgggbbb	rrr, ggg and bbb are the decimal representation of the RGB value (with leading zero's)	1) PC255128064 = Full output level on Red color, half output level on Green color, 1/4 output level on Blue color 2) PC255255255 = All colors at full output level 3) PC000000000 = All colors OFF		X
Set Dim value	PDxxx	set the OUTPUT value of the lamp in % (000 - 100)	PD075 = 75% output level (on all LED's)		X
set DMX startAdress	PAxxxyz	y = 'e' or 'E'	PA035E = set DMX start address to 35 [35(R), 36(G), 37(B)]		X
Set color in percentage	Pprgbe	variable size, rgb = ASCII 0-255, e = end character	Pp25050100e = Red 25%, Green 50%, Blue 100%		X
Set color in hex	Pcrgbe	variable size, rgb = ASCII 0-255, e = end character	Pc64128255e = Red 25%, Green 50%, Blue 100%		X
Relay A control	PRAx	x = 1 (ON), 0 (OFF), P (Pulse) !this overrules dipswitch	PRA1 = Relay A ON PRA0 = Relay A OFF	X	X
Relay B control	PRBx	x = 1 (ON), 0 (OFF), P (Pulse) !this overrules dipswitch	PRB1 = Relay B ON PRB0 = Relay B OFF	X	X
ON/OFF relay control	PRMx	x = 1 (ON), 0 (OFF)	PRM1 = Relay ON/OFF control ON	X	X
Color temperature	PTxyz	x = ten thousand ; y = thousand ; z = hundred	PT035 = Set white color temperature to 3500K (in steps of 500K)		X

RESET procedure

RESET procedure for the control board

1) Make sure the PLP-REM is switched ON
2) Press and hold the RESET button on the logic board for minimum 5 seconds. (the blue LED will light up as soon as you press, and will stop after 5 secs, so you know exactly when to release the button)
3) Release the RESET button

The control board has been RESET.

page 17
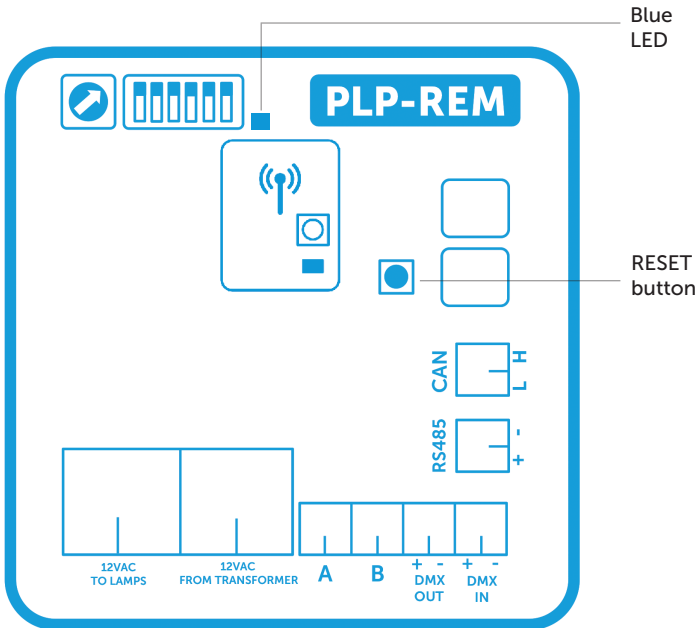
Troubleshooting

| PROBLEM	SOLUTION
The PLP-REM doesn't react to transmitter commands	• Perform a RESET procedure • Check the battery of the handheld transmitter (see below) • The transmitter is not paired-correctly with the PLP-REM. Repeat the pairing process • Reduce the distance between handheld transmitter and PLP-REM and/or remove obstacles • Check the General status light on the logic board. If it's red, then the secondary voltage is too high (>14VAC) or there is a short circuit
The pool lights don't work or don't change colors correclty	• Perform a RESET procedure • Check if all connections are made according to the electrical scheme. • Switch the PLP-REM to ON/OFF mode (DIP switch nr 1) and check if the lamps work

Transmitter battery

Check battery status:
Push and release any button on the remote. The green LED should still light up 1 second after you released. If the LED stops faster, then the battery needs to be replaced

Replacing transmitter battery:
• Remove the philips head screw and open the transmitter
• Replace the battery, respecting the polarity
  Battery type: A23 12V
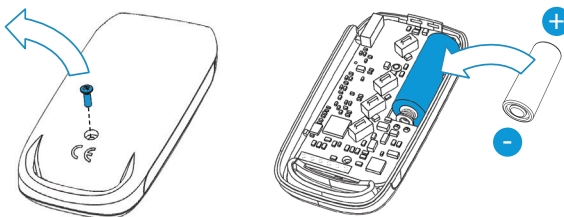
Declaration of Conformity

We, Propulsion Systems bvba, declare under our sole responsibility, that the equipment described below conforms with the essential requirements of the following directives and standards:

DIRECTIVE 2011/65/EC (RoHs 2)
- EN 50581

DIRECTIVE 1999/5/EC Radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity
- EN 300 220   Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 Mhz to 1000 Mhz frequency range with power levels ranging up to 500 mW

DIRECTIVE 2006/95/EC (LVD) Low Voltage Directive
- EN 61347-1   Control gear safety
- EN 61347-2-13   Control gear for LED modules

DIRECTIVE 2004/108/EC Electromagnetic compatibility
- EN 300 683   Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for Short Range Devices (SRD) operating on frequencies between 9 kHz and 25 GHz
- EN 301 489-3   Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services, Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz
- EN 55015:2009   EMC radio disturbance
- EN 61000-3-2:2009   EMC harmonic current
- EN 61547:2009   EMC immunity requirements

Equipment: handheld transmitter/receiver for remote control & base unit transmitter/ receiver 868MHz band DuraLink™

Trade Mark: SpectraVision™

Model Nr.:	Description:
PLA-REM	Communications & remote control box for Adagio+ RGB DuraLink™
PLA-REM-300	350VA PSU & comms box for Adagio+ RGB DuraLink™
PL-REM	Remote control for Moonlight, Adagio+, Adagio Pro DuraLink™
PL-REM-P	Remote control for Moonlight, Adagio+, Adagio Pro (Pulsed) DuraLink™
PL-REM-200	200VA PSU & remote control for Moonlight, Adagio+, Adagio Pro DuraLink™
PLP-REM	Communications & remote control box for Spectravision lamps Duralink™
PLP-REM-300	350VA PSU & comms box for Spectravision lamps DuraLink™
TX868-PLA	Transmitter; Duralink™ 868 MHz; for PLA-REM(-300)
TX868-PL	Transmitter; Duralink™ 868 MHz; for PL-REM(-60/200)

Propulsion Systems bvba
Dooren 72
B-1784 Belgium
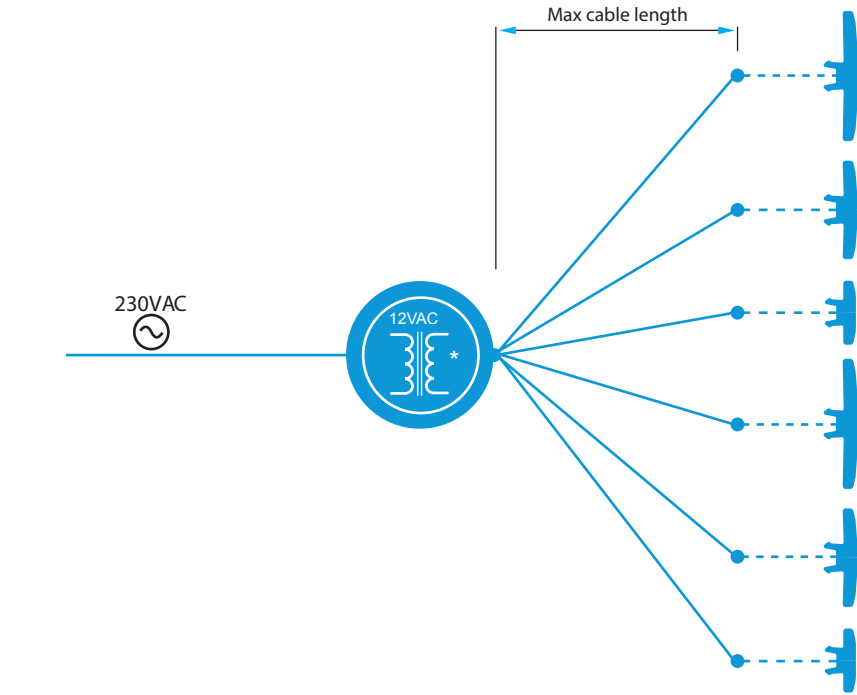
Date of signature: 12/01/2016
Signature:

Name: Mr. Marc Lamberts
Title: Managing Director

CE

Pool light wiring instructions

Adagio PRO

Each lamp is connected to the transformer by a separate cable
(Preferred for new installations)

Max cable length

230VAC

12VAC

*

- - - - 4m cable included in lamp package
——— Separate cable (not included)

⚠ **Warning:** Always use a Torroidal transformer

MAX CABLE LENGTH BY CABLE CROSS SECTION

LAMP TYPE	1,5 mm²	2,5 mm²	4,0 mm²	6,0mm²	10mm²	VA TRANSFORMER (12VAC)*
PLP050-WH PLP050-WW PLP050- BL	77m	129m	207m	311m	519m	16
PLP100-WH PLP100-WW PLP100-BL	21m	35m	57m	85m	142m	56
PLP170-WH (-LC) PLP170-WW (-LC) PLP170-BL	4m	7m	11m	16m	28m	147
PLP50-RGB	62m	103m	165m	248m	414m	12
PLP100-RGB	12m	20m	33m	50m	80m	48
PLP170-RGB (-LC)	6m	10m	16m	25m	42m	82

MAXIMUM AND STABLE LIGHT OUTPUT IS ONLY GUARANTEED WHEN THE INSTALLED CABLE CROSS SECTION MATCHES OR EXCEEDS THE ADVISED VALUES IN THE ABOVE TABLE

* The transformer VA rating must be greater or equal to the sum of VA ratings of all connected lamps.

These cable lenghts are calculated with worst case voltage drops in the electrical wiring.

Contact details

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