Congratulations on choosing a Rainbow Colour Changers product! We thank you for your custom. Please note that this product has been designed and made with total quality to ensure excellent performance and best meet your expectations and requirements.

It is essential to know the information and comply with the instructions given in this manual in order to ensure the fitting is installed, used and serviced correctly and safely.

Carefully read this instruction manual in its entirety and keep it safe for future reference! Please hand this manual over if you sell or give this product to somebody else.

General
- Rainbow Colour Changers products are intended for professional use and should only be used by qualified personnel or under their supervision.
- Follow all cautions and warnings indicated on the unit.
- After unpacking this product, please check if the device is intact. If this is not the case, please contact the support service.

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Installation
- Make sure all parts for fixing the colour changer are correct.
- Make sure the fixture is stable before positioning the Colour Changer.
- Do not fix this device on or near flammable surfaces.

Usage
- This product is designed for indoor use only. For the fitting to operate well and reliably, it should not be used in humid environments. The ambient temperature should not exceed 40°C (104°F) or fall below 0°C (32°F).
- Avoid any liquids or metallic items entering the unit.
- Ensure adequate ventilation and do not block or cover any ventilation slots in the device – they guarantee the reliable functioning of the unit and protect it against overheating.
- The scroller may only be used in its standard position, which is +/- 60° from horizontal.
- The colour changer may only be put into operation with original Rainbow Colour Changer power supply units (PSU).
- Check that the mains frequency and voltage correspond to those for which the PSU is designed as given on the surface label of the PSU. Refer to the manual about the max. amount of scrollers to be connected

Maintenance
- All service work should be exclusively performed by qualified personnel.
- Do not dismantle the scroller or modify it yourself.
- Before starting any maintenance work or cleaning the scroller, remove the power from the PSU.
- The surface of the device may heat up due to the luminaire used. Please let the scroller cool down before touching it.

Rainbow Colour Changers GmbH disclaims all liability for damage to the fitting or to other property or persons deriving from installation, use and maintenance that have not been carried out in conformity with this instructions manual, which must always accompany the fitting.
Rainbow Colour Changers GmbH reserves the right to modify the characteristics stated in this instructions manual at any time and without prior notice.

System introduction

Controlling the Rainbow scrollers

The Rainbow scrollers are controlled with a 0-10V Analog signal or a DMX512 digital signal. DMX signal can only be used if the DMX option card has been fitted. The DMX option card can be fitted at any time by your local dealer, and will still allow Analog operation. The Analog and the Digital systems are treated seperately in this manual. There are great advantages in using a digital system. The units can be linked and addressed seperately, making rigging easy. The speed of a unit is directly proportional to the speed of your control signal.

Calibrating

Contrary to most other scrollers on the market, Rainbow scrollers will remain in position at loss of power. They will not require any form of startup process (Most other scrollers will "learn" the Gel string at startup by running through all colours and "remembering" the tabs. They will also "forget" the tabs at loss of power. This means trat they will have to run through the Gel string after a loss of power to function properly. This procedure can take up to 30 seconds. The Rainbow Colour Changer will find it´s position according to the control signal as sson as it´s powered up).
This is due to the fact, trat they are run with a DC motor together with a feedback potentiometer. Another advantage of this construction is trat you are able to position anywhere along the Gel string and at any speed.

Mounting on instuments

There are diffrent mounting plates for mounting the units to diffrent lanterns. The maximum aperture of the PAR scroller is 192 mm. It can be mounted to work in any position.

Power supplies

There are Power supplies for 12 or 24 units. The power is fed to the splitter box and distributed from there to each unit in the same as the control signal. The power supply can be fitted with a G clamp to be mounted in the truss. The power supply is a short circuit proof switched mode construction which allows AC mains to alter between 200/260 V or 100/130 V, (factory setting).

Splitterbox

The splitterboxes differ depending on it you are running an Analog or a Digital system. The same power supply is used in both cases. Each type is described seperately in this manual. General for all splitterboxes is an input for the control signal, another input for 24 V from the power supply and several output conectors to the scrollers. The splitterboxes can be fitted with a G- clamp to be mounted in the truss.

System introduction

Gel rolls

The gel roll construction of the units consists of two spools, one with a gold knob and the other with a black knob. The spool with a gold knob has a build-in spring which takes care of tensioning the gels. You can easily prepare, mount and install gel rolls following the instructions in this manual. Changing gel rolls in a unit is done without need of any tools in amatter of minutes.
The units are factory trimmed foe a working range of 11 colours, or a total filter lenght of 3080 mm plus a leader and a tail of 320 mm each. The standard number of colours is eleven because it gives one colour for each 10% control signal input to a unit. You are free to change the lenght of each colour within the total lenght of the colour string without need for readjusting the unit. If however you wish to change the total lenght of the colour string, you will have to re-trim the unit with the trim pot in the back of the unit. This described later in this manual. A unit can be trimmed for 2-16 colours.
If the colour string is shorter than the range it will be ripped of the spool and if it´s too long you won´t be able to reach the end colours.

Cooling

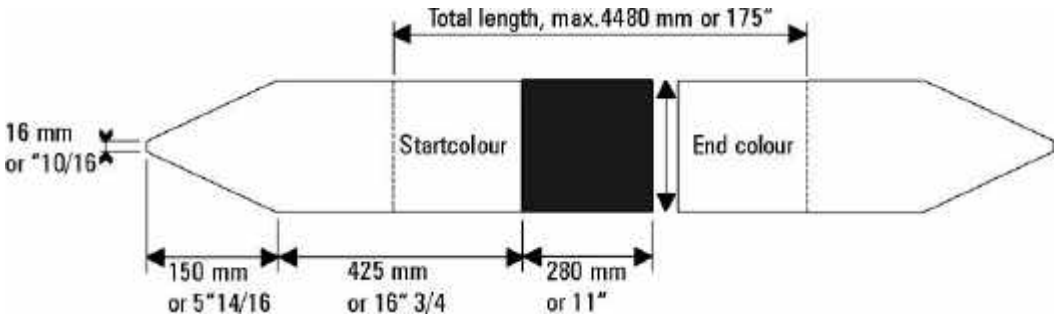
To lenghten the life span of the gels we have fitted each unit with an internal fan. The fan can run at two speeds, high or low. This is set with the fan switch on each scroller. Running on low speed will shorten the life span of the gel string and should be used only when extremely quiet operation is needed.

Rigging a Rainbow scroller system

The units are mounted on the lighting instruments of your choice. You can mount the splitterbox and the power unit (1 per 24 units) in the truss with G-clamps. The power is fed into the splitterbox and distributed from there to each unit. The distribution and the splitterbox depend on if your system is controlled digitally (DMX512) or Analog (0-10V). The cables used for distribution to the units are of the same sort in both systems. Standeard four pin XLR connectors are used. (seepage17 on Power/control cables).
On the base of each unit there are three LED indicators. The red LED indicates, trat power is on. The yellow LED shows the input signal to the unit. The green LED indicates, trat the incoming DMX data is correct. If the red LED is flashing, it indicates "auto motor shut off" is activated –the scroller for some reason cannot reach it´s position.

Cutting and mounting a gel string

Drawing:



Step 1
Use cutting templates provided by us or make your own as described above.
Use a razor or a sharp knife to cut the filters.

Step 2
Align filters correctly, no overlapping.

Step 3
Tape only on one side. Cut ends of exessive joining tape. Use only high temperature tape Scotch 3M. Avaible from us.

A gel roll can have 2-16 colours and will always consist of two leaders measuring as above and filters inbetween measuring 280 x 208 mm. You can vary the size of the gels but the maximum total length trat a scroller can be trimmed for is 4480 mm.

Hint1:
When preparing spare rolls, take care to store rolls with the joining tape outwards and the end colour outward. It is then easier to mount the gel string on the spool with the black knob as described further on.

Hint2:
Dark coloured filters will react to heat and become deformed earlier than lighter coloured filters. This can effect the positioning of the other filters if the darker filters are placed as the last filters, thus being rolled up most of the time. Therefore it is a good idea to place darker filters closer to the start colour than to the end colour.

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Mounting gels on rolls

Drawing:

Step 1:
Attach the start and end colours to the midpart of the rolls with the heat resistant tape (100 mm). Make sure trat the joining tape is on the outside of the gels when you wind up the roll as described in Step 2.

Step 2:
Make sure trat the gel string is wound up counter clockwise on the roll with the black knob (seen from the top). This makes it easier for you when you are mounting and synchronizing the roll in the scroller.

Take care not to force the gold knob counter clockwise when tensioning the gel roll. If not you might break the tensioning spring.

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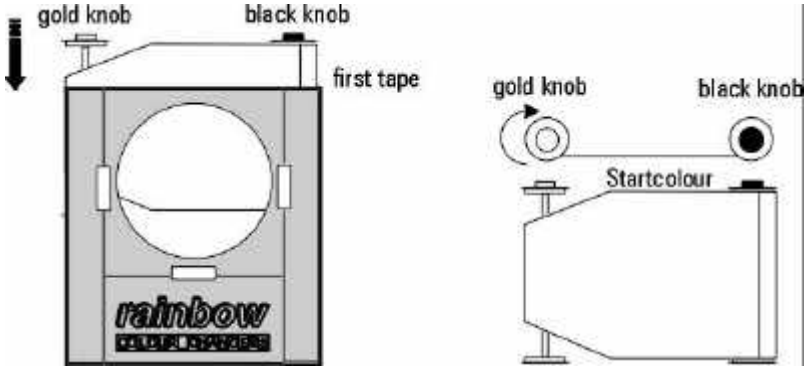
Mounting gel rolls in scroller

To trim the zero position of the gel roll in the scroller, the scroller has to be connected to a control desk.

Step 1:
Make sure trat the signal from the control desk to the scroller is at zero level. The yellow LED indicating input to the scroller should be off.

Drawing:



Step 2:
Make sure trat the gel string is wound up on the spool with the black knob. The tape should join of the first filter should be aligned to the spool with the black knob as in the figure.

Step 3:
Fit the roll with the black knob into the scroller and make sure it has locked around the socket pin inside the scroller. Then turmn the gold knob clockwise to tension the gel string. If your gel string has got other than 11 colours, or your control desk doesn´t give exact values you now will have to calibrate your scroller.

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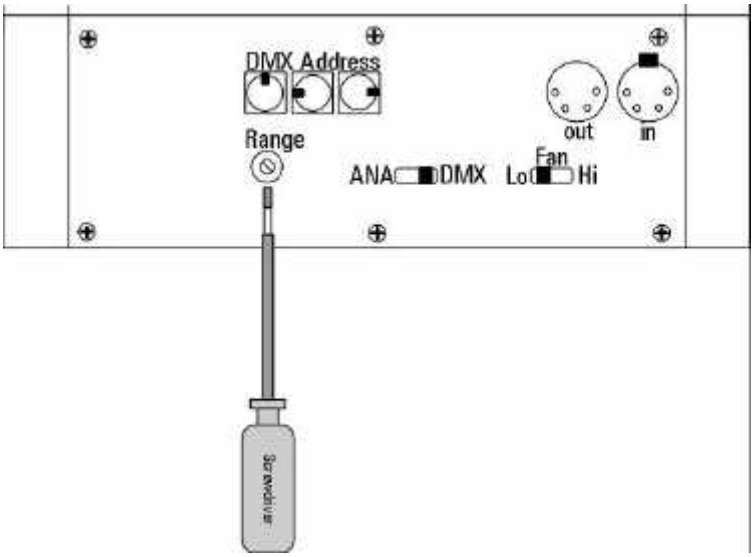
Calibrating

The scrollers are factory calibrated for a gel string of 11 colours. If your gel string has other than 11 colours, or your control desk doesn´t give exact values you now will have to calibrate your scroller.

Drawing:



Step 1:

Use a small screwdriver at the trimpot. "range" on the back of the scroller and turn this pot. fully counter clockwise before power on. This pot can change the trimming range between 2 and 16 colours, therefore you might have perform up to 15 turns to set it fully to it´s end position, you will not feel the ends apart from a "small klicking" sound.

Drawing

Step 2:

Set the control desk to 100%. Use the trimm pot. to trim the end colour. Your scroller is trimmed when 100% on the control desk corresponds to the end colour. Repeat this trimming procedure for each unit. Trimming clockwise will prolong the trimming range.

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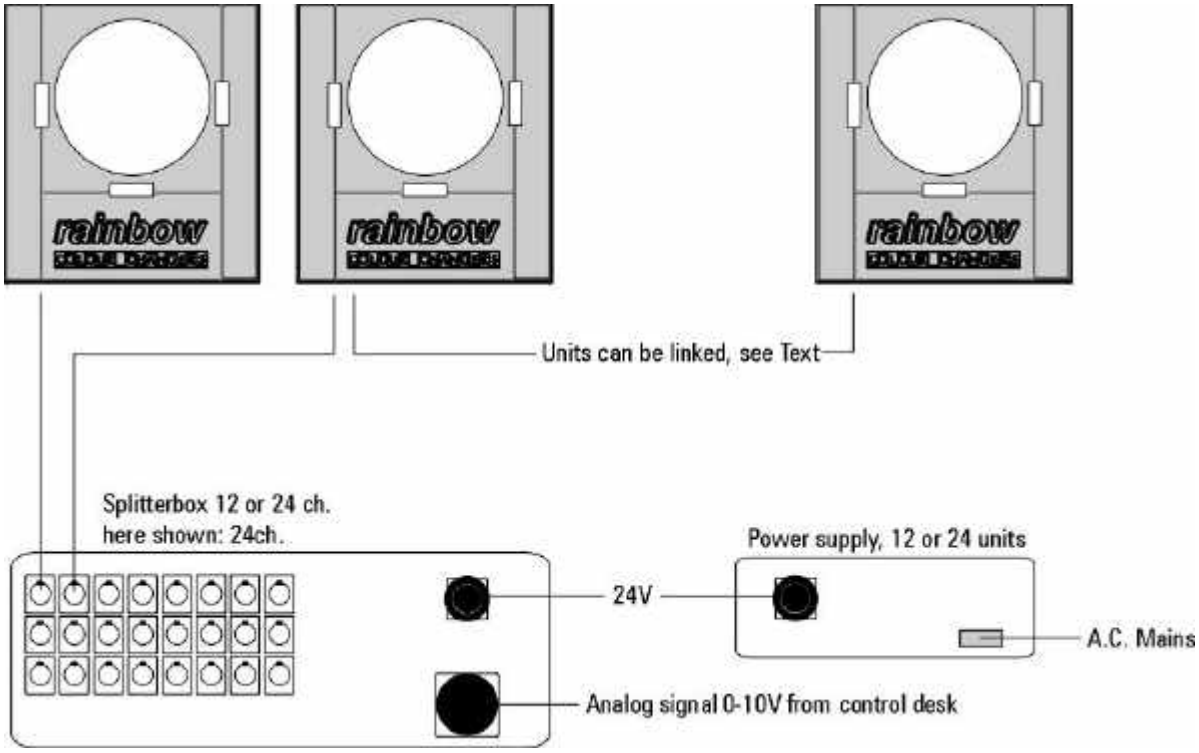
Analog system

Drawing



General:

In an Analog system 0-10V standard output signal from any type of control desk is fed into the splitterbox together with the 24 V DC from the power supply unit. The power/control signal is distributed from the splitterbox to a maximum of 12 or 24 individual scrollers.
Up to 6 scrollers can be linked to the same output if cable lengths do not exeed 10 meters, but you can never exeed the capacity of the power supply unit. To power more than 24 units from one splitterbox you will have to use the option of connecting two 24 unit power supplies in parallel.
As any analogically controlled moving unit, the Rainbow Colour Changer analog system requires a stable analog control signal. Any variations in the signal will be noticed more or less in the positioning of the scroller.

Hint:

If your analog control signal is passing any other equipment connected to mains (dimmers for example), make sure trat the same mains earth is used also for this equipment. If possible, check trat your scroller system is "floating" against the mains earth before you power up for the first time. This is done with an Ohm –Meter measuring between the signal ground and the mains ground. There should be no connection between these two whatsoever, which is indicated by infinity ohm´s on the Ohm –Meter.

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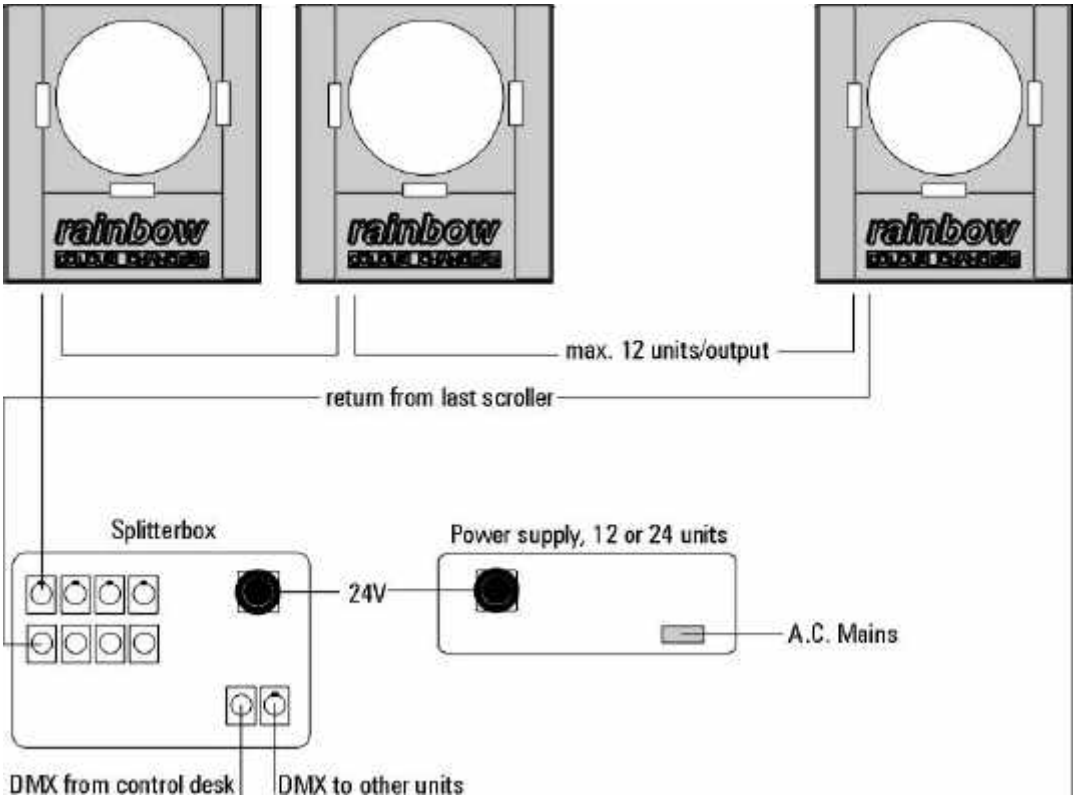
DMX System

Drawing:



General:

The DMX signal from a control desk is fed into the splitterbox together with the 24V DC from the power supply unit. The power/control signal link is distributed from the splitterbox in 4 paralell outputs. Each output can support up to 12 individual scrollers. This makes a possible total of 48 scrollers/splitterbox. Make sure trat you connect the return cable from the last unit to the splitterbox to ensure reliable functioning. Each scroller is given an address with the switches at the back of the scroller. T power more than 24 units from one splitterbox, you will have to use the option of connecting two 24 unit power supplies in parallel.

Return connection:

The return connection from the last scroller back to the splitterbox ensures sufficeint power for the scrollers within the loop. It also serves the the purpose of a correct termination for the DMX signal. You can replace the return cable with a terminator plug in the last scroller of each output –providing the speed of the last scroller isn´t affected by not having a return cable. A terminator plug is made of a male 4-pin XLR connector with a 100Ohm resistor between pin 2&3.

Analog desk –DMX system:

If you want to run the scrollers in DMX mode from a control desk with an Analog output, you will need an Analog to Digital converter. DMX gives easy patching of channels to the scrollers.

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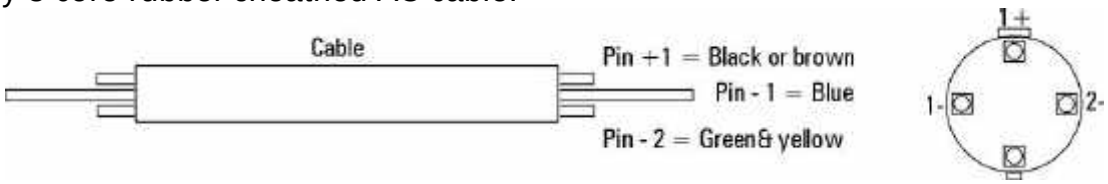
Power Cable 24 V

Cable lengths:

Use ordinary 3 core rubber sheathed AC cable.



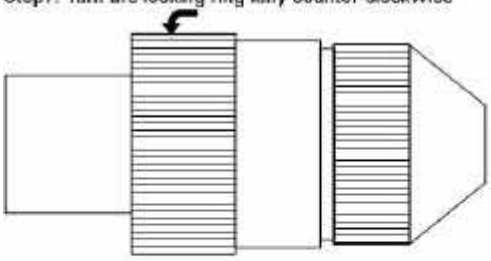
Cable size	Cable lengths	Voltage drop at full load*
1,5 mm ²/16AWG	5 meters/15 feet	1V
	15 meters/45 feet	4V
2,5 mm ²/12AWG	8 meters/24 feet	1V
	25 meters/75 feet	4V
4,0 mm ²/10AWG	12 meters/36 feet	1V
	40 meters/120 feet	4V
6,0 mm ²/8AWG	18 meters/55 feet	1V
	60 meters/180 feet	4V

- Voltage drop does not affect positioning, just the maximum speed.

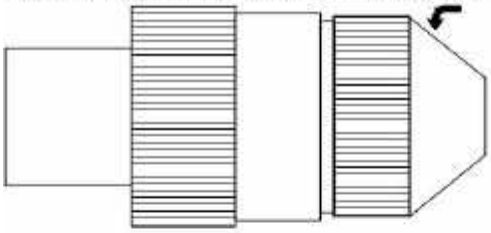
Neutrik NL4 24V Connector

This is how you connect the Neutrik 24V connector:

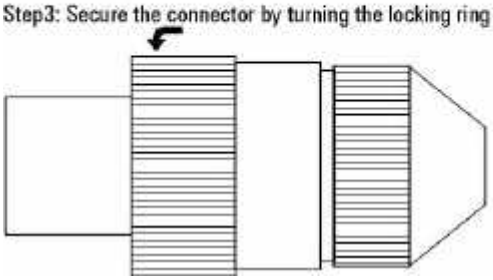
Step1: Turn the locking ring fully counter clockwise



Step2: Hold rear end and insert, then turn clockwise until it "snaps" in.



Step3: Secure the connector by turning the locking ring fully clockwise.



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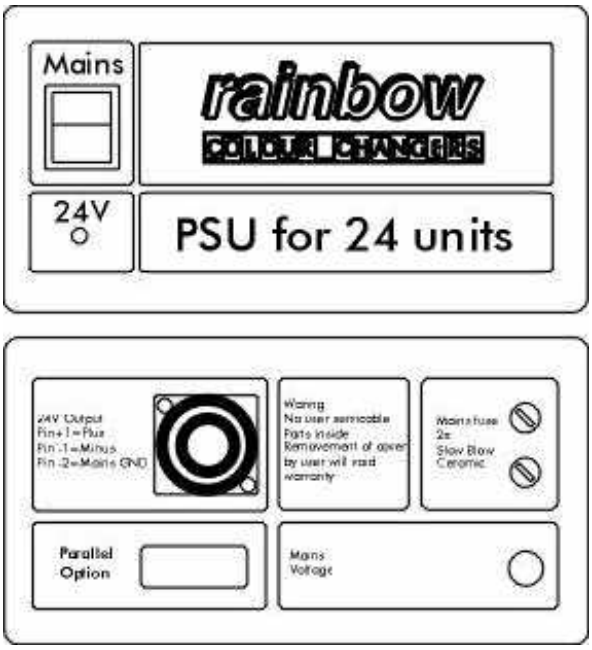
Power supply for 12 or 24 units

The power supplies come in two sizes; for 12 or for 24 units. They can be fitted with a G-clamp to be mounted in the truss.

	PSU 24 units	PSU 12 units
Heigth:	85mm/3,5 ”	85mm/3,5 ”
Width:	215mm/8,25 ”	215mm/8,25 ”
Depth:	330mm/13 ”	330mm/13 ”
Weight:	3,8kg/8,5lbs	3,2kg/7lbs
Fuse:	5AT 6,3x32mm	4AT 6,3x32mm
Current:	230V:2,5A 115V:4,4A	230V:1,6A 115V:2,7A



Caution: The PSU **must** be connected to an A.C mains outlet ith mains earth. Do **not** connect to a dimmer circuit.

Power: The power supply is a light weight switched mode construction allowing mains to alter between 220-240V, or 110-120V, +/- 10% depending on the factory setup.

Parallel option: Two power supplies can be connected in parallel via the ”parallel option ” connector. This enables you to connect the max. amount of scrollers possible to a DMX splitterbox and power them on a single line. The option connector should not be used for other purposes.

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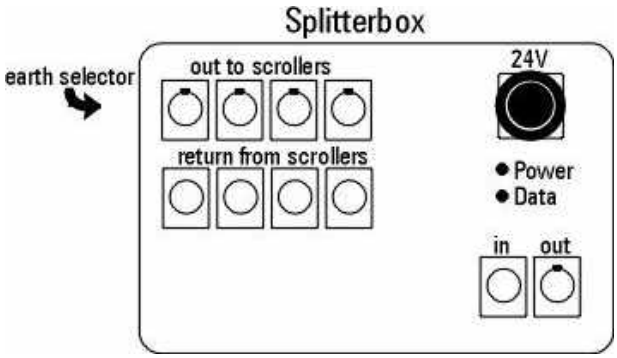
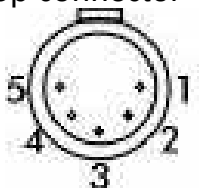
DMX 512 digital splitter box:

The DMX splitter box is fully buffered and re-amplifies the signal. Always connect a return cable from the last scroller from each output to the return sockets. This improves current feeding and DMX transmission, see page 10.



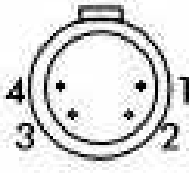
Signal Connectors:

DMX 512 Connector
XLR-5p connector



Pin 1:	Signal earth
Pin 2:	Data –
Pin 3:	Data +

Power/Control cable
XLR-4p Female connector



Pin 1:	24V -
Pin 2:	Data -
Pin 3:	Data +
Pin 4:	24V +

24V connector:

Neutrik NL4 connector

Pin 1-	: 24V –
Pin 1+	: 24V +
Pin 2-	: Mains earth (for DMX use)

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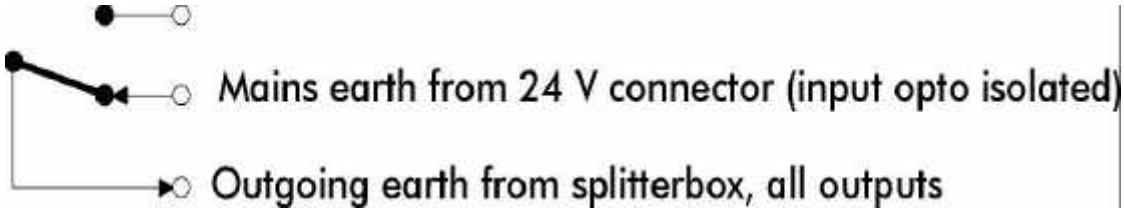
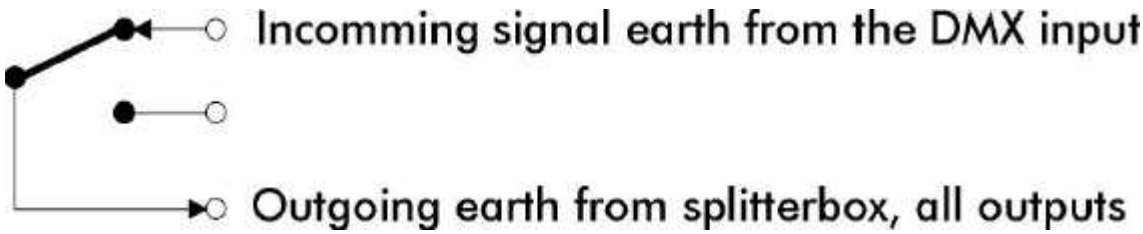
DMX spiltterbox Earth selector:

Variations in the signal earth may cause problems in a system. Therefore we have incorporated an earth selector in the DMX splitterbox, so you can seperate the earth in the scroller system from the rest of your DMX line and the equipment connected to it. We recommend trat you always try to seperate the signal earth of the scrollers from any other equipment by selective use of this selector switch as described below.
There are two positions for the earth selector: **LOCAL** and **COMMON**.

Local:
The incomming signal earth will end in this splitterbox. A new earth point is created for the DMX signal at the outputs of this splitterbox on the DMX line. If the DMX line continues from the last splitterbox to other equipment, then set this last splitterbox to local also.



Common:
The common position will continue the incomming earth. The POWER LED on the front of the splitterbox will indicate common earthing by flashing. This position is used for all splitterboxes except the first and last if several are used.



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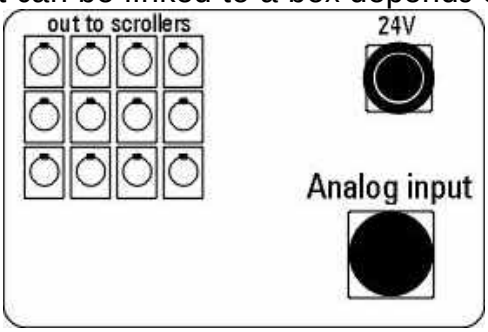
Analog splitterboxes 12 or 24:

The analog splitterbox comes in two sizes: 12 channels and 24 channels. The amount of scrollers trat can be linked to a box depends on the capacity of the power supply.

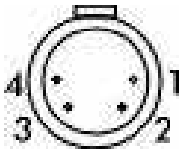


	12 channels	24 channels
Heigth:	165mm/6,5 ”	165mm/6,5 ”
Width:	230mm/9 ”	230mm/9 ”
Depth:	60mm/2,5 ”	60mm/2,5 ”
Weight:	2,2kg/5lbs	3,3kg/7,25lbs
Current:	0,0A	0,0A

Analog signal connector

The analog splitterboxes are not fitted with a standard input connector for the control signal. The connector type is offered at request and is fitted where shown. Among the available connectors are Socapex, AVAB KPT& D-sub 25.

Power / Control cable



Pin 1: 24V -
Pin 2: Data -
Pin 3: Data +
Pin 4: 24V +

24V connector:

Neutrik NL4 connector

Pin 1- : 24V –
Pin 1+ : 24V +
Pin 2- : Mains earth (for DMX use)

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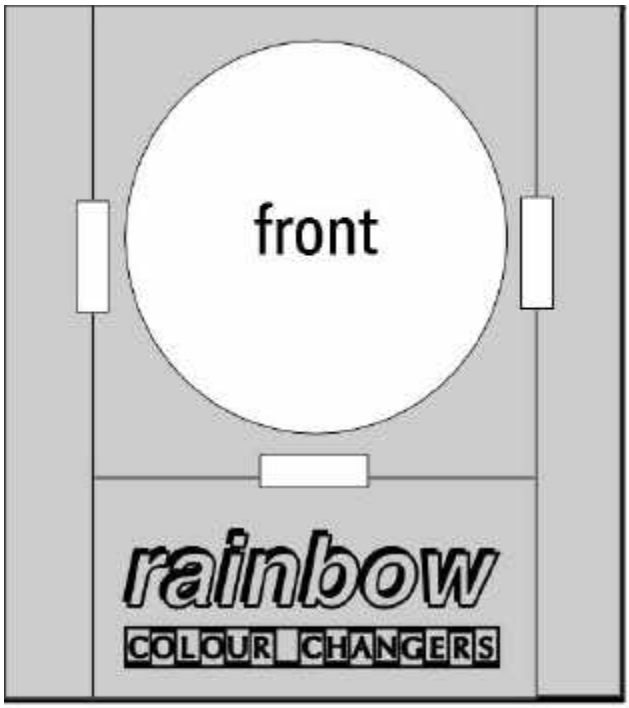
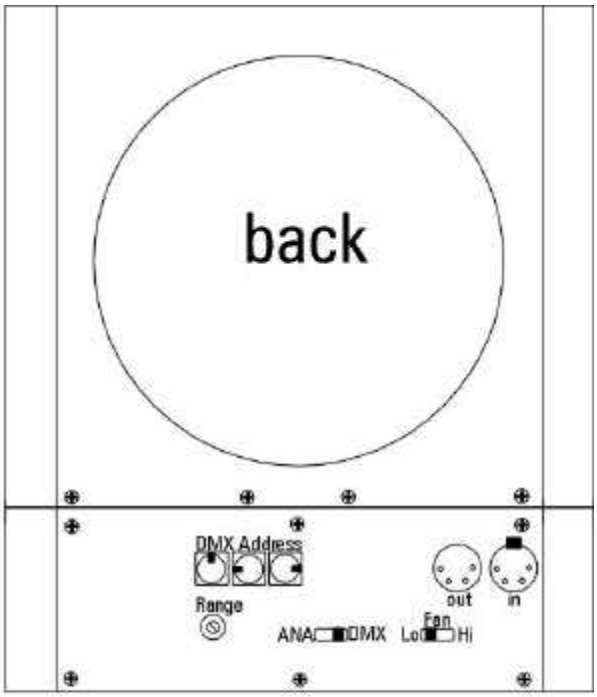
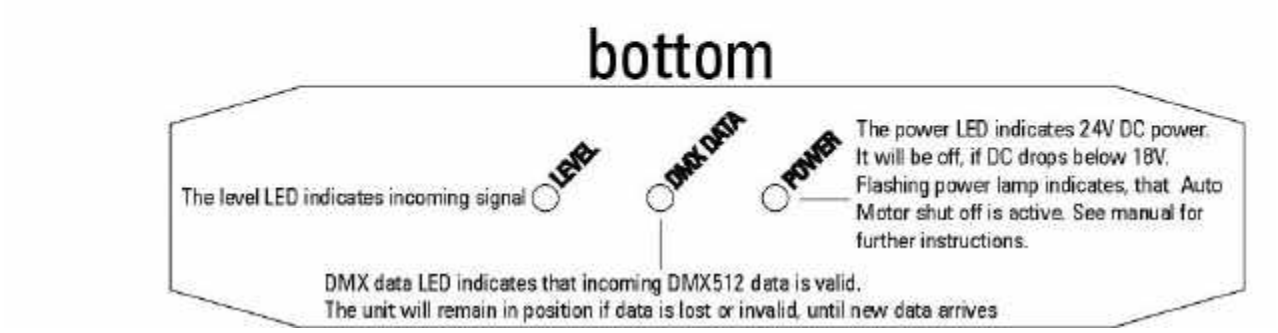
PAR scroller:

The PAR scroller can operate in analog or DMX mode. The three LED´s on the bottom of each unit will indicate power and running status according to the text figure below.







DMX address:

Each unit in a DMX system has to be given an address. If several units have the same address, they will respond simultaneously to incoming signals.

Analog or DMX selector:

This switch decides if the scroller works in Analog or DMX mode.

Fan:

This selector allows two fan speeds for optimum noise/cooling setting.

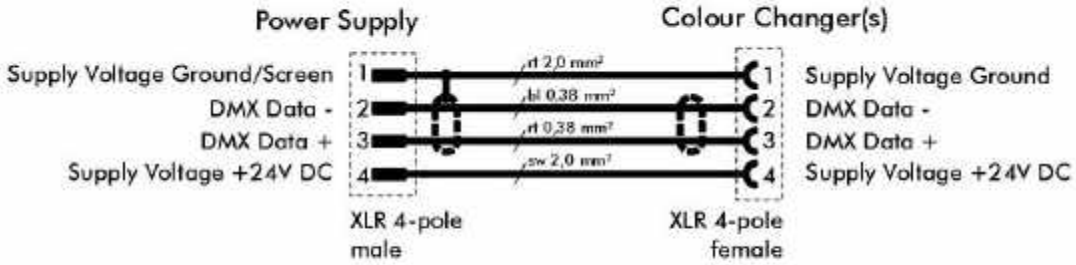
Range:

This is where you trim the gel range for the unit. See calibrating on page 8.

General:

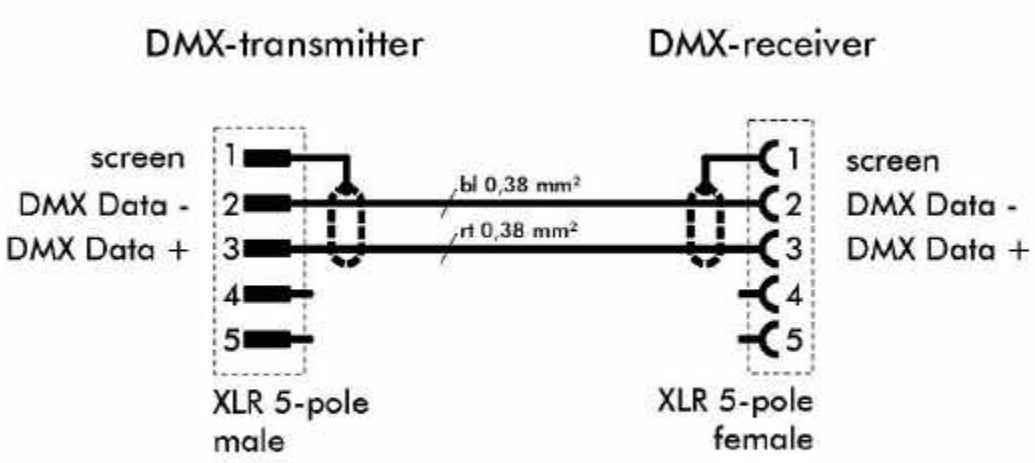
It is essential that all custom made cables confirm to our specifications.
The gauge must be at least the rated one.
Cables should be screened and must not be connected to the case of the connectors. A screen touching the case of the connector is always hazadous to the function of both analog or digital scroller systems, because it creates an unwanted earthloop.
Insulate each pin with some kind of tubing. Any shortcircuit within the connector will ruin the functioning of the system and might even distroy other components in the equipment. In a DMX system a shortcircuit between pin 4 and pins 2 or 3 will destroy the output line driver. This is because 24V will be fed back to the output of the linedriver circuit.

Rainbow Power/Data Cable



The screen is only to be connected on the male plug´s end. On the female connector, the screen wire stays isolated (floating)
Generally the XLR connector´s housing are not connected to screen or signals ground.

DMX512/1990 Cable



The screen is to be connected on the male and on the female end of the connectors.
Generally the XLR connector´s housing are not connected to screen or signal ground.

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Safety in the system:

We have incorporated several safety features in each RCC. The following can be good to know.

Internal fuse:

An internal reversible fuse in each scroller will protect the rest of your system from breaking down in case of major problems in a single unit. This fuse will automatically be reset at no overload.

Line input:

The line input of the scrollers will withstand any voltage within +/- 24V relative to the earth (pin1) without tearing the gel string.

Feedback pot:

The feedback pot inside each scroller has no end stops and will therefore not be broken by forcing past the zero or end position.

Motor:

The motor is protected from overload and will not burn.

Auto motor shut off circuit:

The auto motor shut off circuit in each scroller will stop the RCC if for any reason the position cannot be reached within 10 seconds. This could be caused by a broken cable, locked rolls or other mechanical or electrical disturbance to the servo system. This ensures trat a scroller never will run out of control. The scroller resets at power down aund up.

DMX card:

The DMX card is equipped with a watchdog trat will reset automaticcally at any signal disturbance.

Troubleshooting a system:

Here are some hints on troubleshooting a RCC scroller system. Remember trat the guarantee will be void if unauthorized personell opens housing of the equipment.

All systems: Scrollers will not move at all

If motors receive less than 18V, they will automatically be shut off.

- Check the 24V LED on the PSU (Power Supply Unit) If it is off, the PSU is delivering less than 18V.
- The lamp in the PSU mains switch indicates trat there is power to the PSU. Check fuses at PSU back.
- Check POWER LED on the bottom of the RCC units. It will not be lit if less than 18V reaches the unit.
- If PSU is okay and RCC POWER LED is off, check Power/control cable for short circuits or loose leads.
- If RCC POWER LED flashes, it means trat the Auto motor shut off function is activated. Check the scroller and gel roll. Reset by power off-on.
- In an emergency situation, you can substitute a faulty PSU with two 12V car batteries connected in serial.

Digital system: scrollers are juddering

A corrupt DMX signal can create a juddering effect in the scrollers.

- Make sure the return connection from the last scroller is connected. If not, make sure there is a terminator plug consists of a 100 ohm resistor between pin 2&3 in a male 4 pin XLR connector.
- If several scrollers are linked to an output, try disconnecting one or two and see if the fault disappears.
- It might be an earth problem. See page 14 about the earth selector in the DMX splitterbox.
- If an A/D converter is used to let a control desk with analog output control a digital scroller system, it may cause this problem. A/D converters often create something called bit jittering within the DMX signal due to "noise" in the incomming analog signal. This jittering may result in a position variation from 13 mm to half a colour in a scroller.

Make sure trat the A/D converter is placed as close to the control desk as possible. Use short screened cables for the analog signals to prevent noise pickup. There are converters on the market trat take care of this problem better than others. Do not hesitate to contact us if you run into this specific problem.

Troubleshooting:

Digital system: Speed diffrence between first and last scrollers:

- Connect the return cable from the last scroller instead of using a terminator plug.

Digital system: Scrollers stay in position but will not move:

- If DMX data is faulty or missing, the RCC will stay in it´s position until new DMX data is received.
- Check DMX transmission cables and control desk.

Analog system: Scrollers are juddering, chasing or moving to sound:

- Check the analog control signal with an oszilloscope to see trat it is stable.
- Check trat signal earth is "floating" against mains earth and trussing. Like this: Disconnect the signal multicable at the control desk. Measure with an ohm meter between signal earth in the multicable and mains earth, trussing etc. There should be no connection al all between signal earth and the rest of the equipment. If there is, check cables and connectors to see if screen is touching connectors or broken.
- Do not power two splitterboxes from one PSU. This will create earthloops trat mostly cause problems.
- In scrollers version 2 and up (see serial numbers below), you may need a link in the splitterbox between signal earth and minus 24V. There is a simple way to achieve this: Just connect pin 1 and 2 in a male XLR 4 pin connector and insert it into a free output in the analog splitterbox.

Serial numbers	RCCversion 2 and up
1658	PAR scrollers
43	Lightcurtain 9x PAR56
8	Lightcurtain 6x PAR56
56	2kw-5kw Fresnel
138	Thomas 8 lite

Analog system: Scroller goes to zero position:

- If analog control signal is missing, the scrollers will return to their zero position. There is no position memory in the analog mode.

Appendix:

Using the PAR TWO-16 with fresnel luminaires:

There are mounting plates to mount the units on diffrent luminaires, of course you can also mount the PAR TWO-16 on fresnel luminairs.
However, when mounted on fresnel luminairs with adjustable beam angles, keep in mind, that the maximum aperture is still 192 mm. If you flood the unit to ist maximum, the rolls will be exposed to a lot of heat and this can cause damage to the rolls themself.
Especially in a television or film situation –you might want to flood the unit to reduce light intensity in stead of dimming it –to maintain colour temperature.

rainbow™
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This manual is valid from the 1st of July 2007. All previous manuals are herewith not valid any longer.

All technical specifications are subject to change without notification.