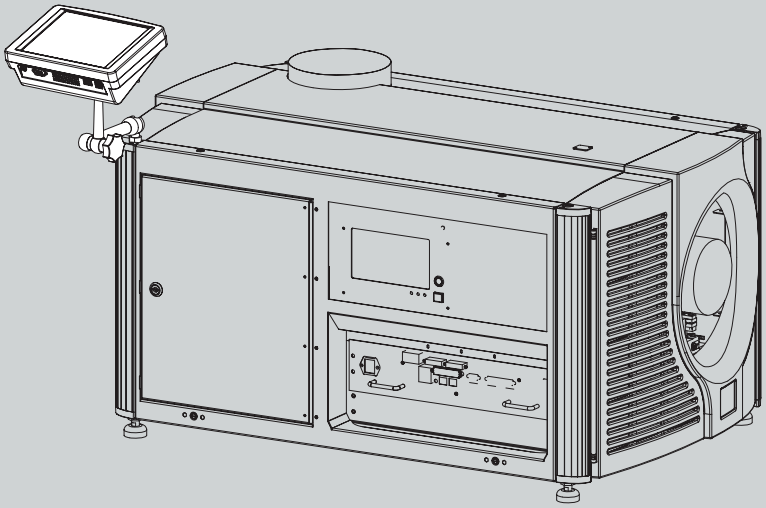
DP-3000



Service manual

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BARCO

Visibly yours

Barco nv Entertainment Division
Noordlaan 5, B-8520 Kuurne
Phone: +32 56.36.82.11
Fax: +32 56.36.883.86
Support: www.barco.com/esupport
Visit us at the web: www.barco.com

Barco Inc. Media and Entertainment Division
11101 Trade Center Drive, Rancho Cordova, California 95670, USA
Phone: +1 916 859-2500
Fax: +1 916 859-2515
Support: www.Barco.com/esupport
Visit us at the web: www.barco.com

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TABLE OF CONTENTS

1. Safety 5
1.1 Safety Instructions 6

2. General 9
2.1 Convention projector orientation 10
2.2 Location of the main components of the projector 11
2.3 Convention Power Unit orientation 14
2.4 Location of the main components of the Power Unit 15
2.5 Projector block diagram 17
2.6 Spare part list 20

3. Preventative maintenance actions 25
3.1 1 month maintenance actions 26
3.2 Lamp change maintenance actions 27
3.3 6 month maintenance actions 28
3.4 1 year maintenance actions 29
3.5 4 year maintenance actions 32
3.6 10 year maintenance actions 33

4. Trouble shooting 35
4.1 First level troubleshooting 36
4.2 Trouble shooting checklist 37

5. Power Unit 75
5.1 Introduction 76
5.2 LPS module diagnostic LED's 79
5.3 Connecting the power unit with the projector head 81
5.4 Connecting the power unit with the power net 84
5.5 Removal of an LPS module 86
5.6 Installation of an LPS module 88
5.7 Removing the LPS rack from the base of the Power Unit 90
5.8 Replacement of the LPS communication interface 92
5.9 Replacement of the Mains Filter 94
5.10 Installing the LPS rack upon the base of the Power Unit 96

6. Start Pulse Generator 99
6.1 Introduction 100
6.2 Troubleshooting 101
6.3 Removal of the Start Pulse Generator 102
6.4 Installation of the Start Pulse Generator 103

7. Lamps and Lamp House 105
7.1 Introduction 106
7.2 Supported xenon lamps for the DP-3000 108
7.3 Removing the lamp house 111
7.4 Removal of the xenon lamp 113
7.5 Installation of the xenon lamp 116
7.6 Installing the Lamp House 121
7.7 Resetting the lamp parameters 123
7.8 Realignment of the lamp in its Reflector 124
7.9 Alignment of the arc stabilizing magnet 126
7.10 Replacement of the Lamp Info module 128
7.11 Replacement of the UV blocker 131
7.12 Replacement of the Lamp Reflector 135
7.13 Cleaning the UV blocker of the Lamp House 138
7.14 Cleaning the Reflector of the Lamp House 139

8. Cold Mirror 141
8.1 Introduction 142
8.2 Replacement of the Cold Mirror 143
8.3 Adjusting the Cold Mirror 145
8.4 Cleaning the Cold Mirror 147

9. Integration Rod 149
9.1 Introduction 150
9.2 Integration Rod diagnostic 151
9.3 Removal of the Integration Rod assembly 152
9.4 Installing a new Integration Rod assembly 153
9.5 Adjusting the Integration Rod 155

10. Sealed Light Processor Assembly 157
10.1 Introduction 158
10.2 Diagnostics 160

10.3 Removal of the Sealed Light Processor 161
10.4 Installation of the Sealed Light Processor 164
10.5 Adjusting the convergence 171
10.6 Adjusting the Fold Mirror 174
10.7 Adjusting the Light Pipe Zoom Lens 176
10.8 Adjusting the Notch Filter 177
10.9 Cleaning the Notch Filter 178
10.10 Cleaning the Prism exit side 179
10.11 Replacement of the Dowser (Shutter) 180
10.12 Replacement of the Light Sensor Module 181
10.13 Replacement of the Notch Filter 182

11. Liquid Cooling Circuit 183
11.1 Introduction 184
11.2 Diagnostics 186
11.3 Pressure verification of the Liquid Cooling Circuit 188
11.4 Excluding the Sealed Light Processor 189
11.5 Draining the Liquid Cooling Circuit 190
11.6 Filling the Liquid Cooling Circuit 192
11.7 Refreshing the Liquid Cooling Circuit 195
11.8 Expelling air from the Liquid Cooling Circuit 197
11.9 Pressurizing the Liquid Cooling Circuit 199
11.10 Calibrating the Liquid Cooling Circuit 201
11.11 Removal of the Pump 204
11.12 Installing the Pump 207
11.13 Cleaning the Pump 210
11.14 Replacement of the Pump motor and rotor 212
11.15 Replacement of the complete Pump 214
11.16 Replacement of the Heat Exchanger 216

12. Lenses and Lens Holder 219
12.1 Introduction 220
12.2 Available lenses 222
12.3 Lens selection 224
12.4 Lens installation 225
12.5 Lens removal 227
12.6 Cleaning the lens 228
12.7 Adjusting the Lens Holder 229
12.8 Removal of the Lens Holder 232
12.9 Installation of the Lens Holder 234
12.10 Replacement of the vertical shift motor 236
12.11 Replacement of the horizontal shift motor 238
12.12 Replacement of the focus motor 240
12.13 Replacement of the Lens Signal Distribution board 242

13. Card Cage 243
13.1 Introduction 244
13.2 Card Cage diagnostic 245
13.3 Removal of the Card Cage cover 248
13.4 Installation of the Card Cage cover 250
13.5 Authorization to clear security warning on DP-3000 251
13.6 Replacement of a Card Cage board 252

14. Updating TI Boards 255
14.1 Installation of the Update Package 256
14.2 Start up the update program 257
14.3 Make a serial connection (RS232) 258
14.4 Make an Ethernet connection (10/100 BASE-T) 259
14.5 Installation of the new software release 261
14.6 Logging of the operation 263
14.7 Special functions 265
14.8 Factory Install Options 266
14.9 Recovery option - Stay in Boot option 267

15. Input & Communication unit 269
15.1 Introduction 270
15.2 Control ports of the DP-3000 digital projector 272
15.3 Data source input ports of the DP-3000 digital projector 274
15.4 About General Purpose Inputs & Outputs (GPIO) 275
15.5 Removal of the Input & Communication unit 277
15.6 Installation of the Input & Communication unit 280
15.7 Replacement of the DVI input board 283
15.8 Replacement of the GPIO board 284
15.9 Replacement of the DIMM PC 285

16. Control Panel 287
16.1 Introduction 288

16.2 Local keypad of the DP-3000 digital projector 289
16.3 Replacement of the Button module 291
16.4 Replacement of the Local Keypad 294
16.5 Replacement of the Status Lights 297

17. Communicator Touch Panel 299
17.1 Introduction 300
17.2 Installing the touch panel interface 301
17.3 Reposition the touch panel interface 304

18. Fan replacement procedures 305
18.1 Replacement of the Anode Fan 306
18.2 Replacement of the Cathode Fan 312
18.3 Replacement of the Outlet Fan 316
18.4 Replacement of the Cold Mirror Top Fan 321
18.5 Replacement of the Cold Mirror Bottom Fan 324
18.6 Replacement of the SPG Fan 325
18.7 Replacement of the Card Cage Fans 326

19. Projector covers 327
19.1 Removal of the right cover 328
19.2 Removal of the left cover 329
19.3 Removal of the front cover 330
19.4 Removal of the rear cover 331
19.5 Removal of the top cover 332
19.6 Removal of the bottom cover 333
19.7 Installation of the bottom cover 334
19.8 Installation of the top cover 335
19.9 Installation of the rear cover 336
19.10 Installation of the front cover 337
19.11 Installation of the left cover 338
19.12 Installation of the right cover 339
19.13 Cleaning the dust filters 340
19.14 Cleaning the exterior of the projector 341

A. Anamorphic lens and holder 343
A.1 Mounting the anamorphic lens in its holder 344
A.2 Alignment of the Anamorphic Lens position 346
A.2.1 Removing the Anamorphic lens holder driver cover 347
A.2.2 Distance between Anamorphic and Prime lens 348
A.2.3 Remounting the Anamorphic lens holder driver cover 350
A.2.4 Image centering on Anamorphic lens 351
A.2.5 Horizontal alignment of the image top line 352
A.3 Anamorphic lens holder locking motor replacements 353
A.3.1 Preparations to remove the motor 354
A.3.2 Removing the motor 355
A.3.3 Preparation of the new motor 356
A.3.4 Mounting the motor 357
A.4 Anamorphic lens holder rotation motor replacements 358
A.4.1 Removing the Anamorphic lens holder front cover 359
A.4.2 Removing the motor 360
A.4.3 Mounting the motor 361
A.4.4 Remounting the Anamorphic lens holder front cover 362
A.5 Anamorphic lens holder shift motor replacements 363
A.5.1 Preparations to remove the motor 364
A.5.2 Removing the motor 366
A.5.3 Preparation before inserting the new motor 367
A.5.4 Mounting the motor 368

B. Pin configurations 369
B.1 Pin configuration of the Input & Communication ports 370

Glossary 373

Index 375

1. SAFETY

About this chapter

Read this chapter attentively. It contains important information to prevent personal injury while servicing the DP-3000 projector. Furthermore, it includes several cautions to prevent damage to the DP-3000 projector. Ensure that you understand and follow all safety guidelines, safety instructions and warnings mentioned in this chapter before servicing the DP-3000 projector. After this chapter, additional “warnings” and “cautions” are given depending on the service procedure. Read and follow these “warnings” and “cautions” as well.

WARNING: This manual is only intended for qualified service personnel.

Overview

- Safety Instructions

1.1 Safety Instructions

WARNING: Before removing/replacing any projector components, disconnect the power to the unit mains terminals and unplug the power cord at UPS INLET.

Safety Instructions

1. Before returning an instrument to the customer, always make a safety check of the entire instrument, including, but not limited to, the following items:
   a) Be sure that no built-in protective devices are defective and/or have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, insulating materials, barriers, covers/shields, and isolation resistor/capacitor networks. Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Service people who defeat safety features or fail to perform safety checks may be liable for any resulting damage.
   b) Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) excessively wide cabinet ventilation slots, and (2) an improperly fitted and/or incorrectly secured cover panels.
   c) Leakage Current Hot Check. With the instrument completely reassembled, plug the AC line cord directly into a 220 V AC outlet (Do not use an isolation transformer during this test). Use a leakage current tester or a metering system that is designed to comply with the new IEC, ANSI and UL standards. With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal waterpipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.). especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 3,5 mA. Reverse the instrument power cord plug in the outlet and repeat test. ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING ACCESSORIES.

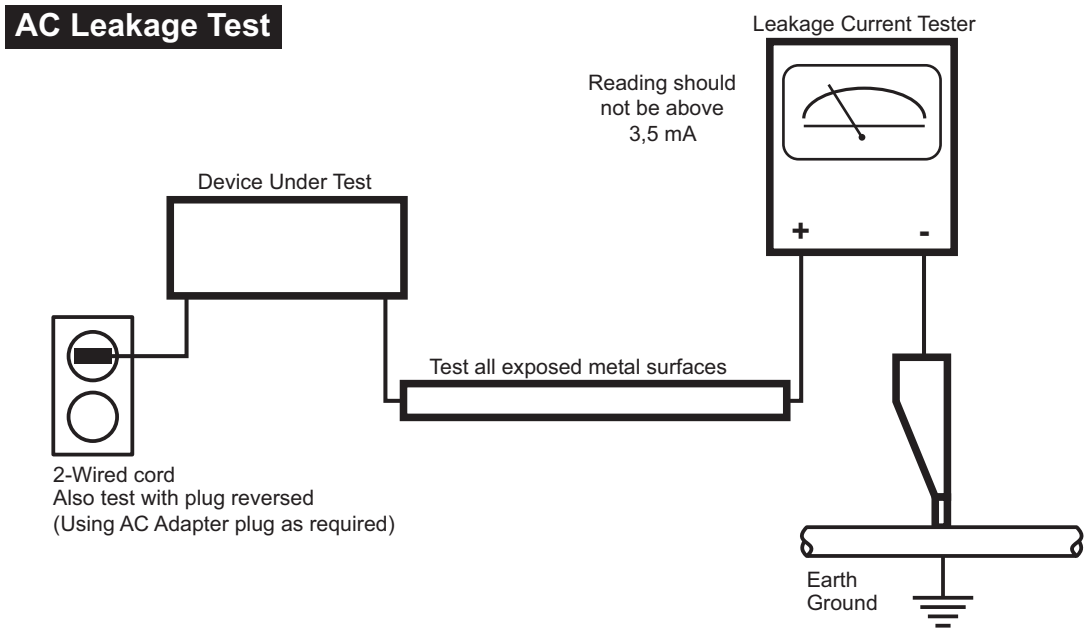


Image 1-1

   d) Ultraviolet Radiation exposure - Warning: This lamp can cause serious skin burn and eye inflammation from shortwave ultraviolet radiation if not operated in enclosed fixtures. DO NOT operate this lamp in a fixture with a missing or broken lens cover.
   e) Ozone: Operating lamp generates ozone gas which is harmful to the respiratory system. Therefore the lamp should be operated in adequately ventilated equipment.
2. Read and comply with all caution and safety-related notes on or inside the projector cabinet or on the projector chassis, or on the picture tube.
3. Design Alteration Warning - Do not alter or add to the mechanical or electrical design of this apparatus. Design alterations and additions, including, but not limited to, circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this apparatus and create a hazard to the user. Any design alterations or additions may void the manufacturer's warranty and may make you, the servicer responsible for personal injury or property damage resulting therefrom.

4. Lamp explosion Protection Warning – The lamp in this projector operates with a high internal pressure and there is a slight risk that the lamp may explode, particularly if it is used beyond its rated life. Do not remove, install, or otherwise handle the lamp in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while lamps are handled. Keep the lamp away from your body. For continued explosion protection, replace the lamp only with one of the same type number. Always replace the lamp before the rated life time.
5. Hot Chassis Warning - This projector chassis has two ground systems: the primary ground system is formed by the negative voltage of the rectified mains (power) and is only used as a reference in primary circuits; the secondary ground system is connected to earth ground via the earth conductor in the mains (power) lead. Separation between primary and secondary circuits is performed by the safety isolation transformers. Components bridging these transformers are also safety components and must never be defeated or altercated. All user-accessible conductive parts must be connected to earth ground, or are kept at SELV (Safety Extra Low Voltage).
6. Observe original lead dress. Always inspect in all areas for pinched, out-of-face, or frayed wiring. Do not change spacing between components, and between components and the printed-circuit board. Check AC power cord for damage. Take extra care to assure correct lead dress in the following areas:
   a) near sharp edges
   b) near thermally hot parts - be sure that leads and components do not touch thermally hot parts
   c) the AC supply
   d) high voltage
7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.
8. PRODUCT SAFETY NOTICE - Many electrical and mechanical parts have special safety-related characteristics some of which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part in BARCO service data parts list might create shock, fire, and/or other hazards. Product Safety is under review continuously and new instructions are issued whenever appropriate. For the latest information, always consult the appropriate current BARCO service literature.
9. Do not spray chemical on or near this instrument or any of its assemblies.
10. Electrostatically Sensitive (ES) Devices Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity:
    a) Immediately before handling any semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available high impedance discharging wrist strap device.
    b) After removing an electrical assembly equipped with ES devices, place the assembly on a static dissipative surface such as a 3M No 8210 table mat, to prevent electrostatic charge buildup or exposure of the assembly.
    c) Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
    d) Do not remove a replacement ES device from its protective package until immediately before you are ready to install it (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminium foil or comparable conductive material).
    e) Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed. CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
    f) Minimize bodily motions when handling unpacked replacement ES devices (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

2. GENERAL

About this chapter

This chapter contains some general information on projector level such as the location of the main components, internal wiring diagram, spare parts list, etc.

Overview

- Convention projector orientation
- Location of the main components of the projector
- Convention Power Unit orientation
- Location of the main components of the Power Unit
- Projector block diagram
- Spare part list

2.1 Convention projector orientation

Convention

This manual refer to the left side of the projector as the side at your left hand when standing behind the projector and looking at the projection screen in front of the projector.

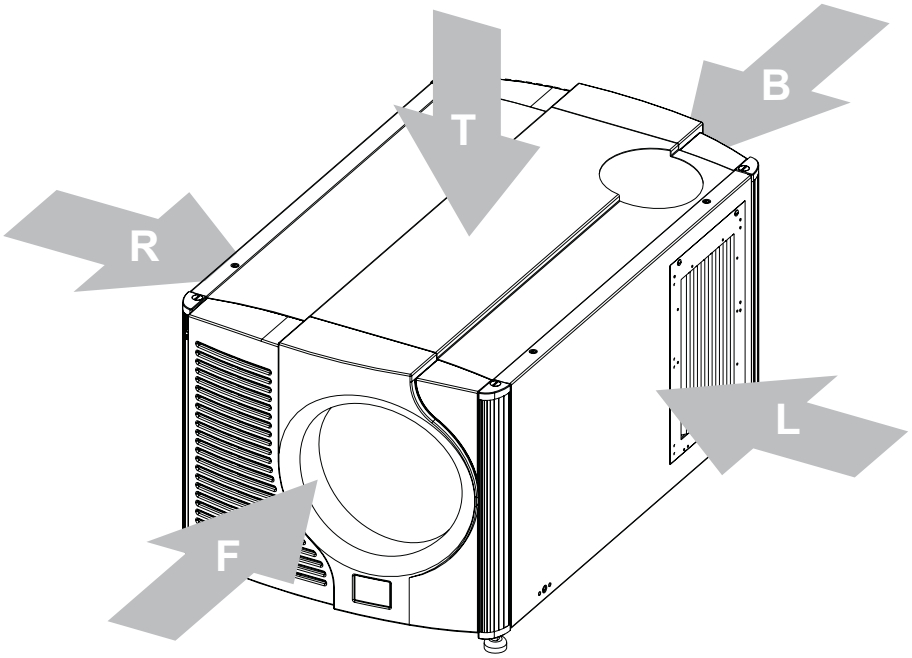


Image 2-1
T Top of the projector.
L Left side of the projector (Light Processor side).
F Front of the projector.
R Right side of the projector (Lamp side & Input side).
B Back side of the projector.

2.2 Location of the main components of the projector

Housing and air inlet filters

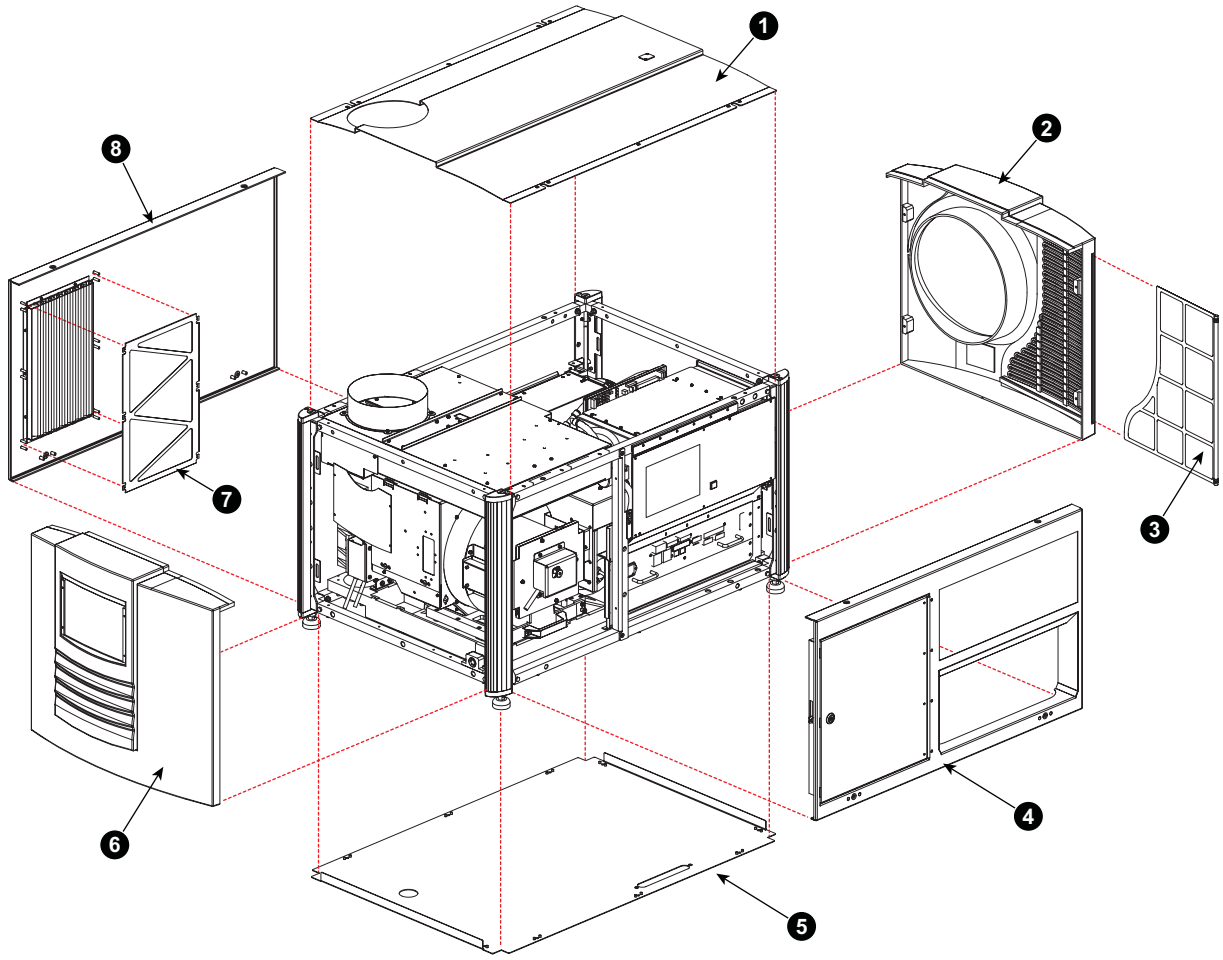


Image 2-2
1 Top cover.
2 Front cover.
3 Front filter (slide into front cover).
4 Right side cover (lamps side).
5 Bottom cover.
6 Rear cover.
7 Side filter.
8 Left side cover (light processor side).

Main internal components

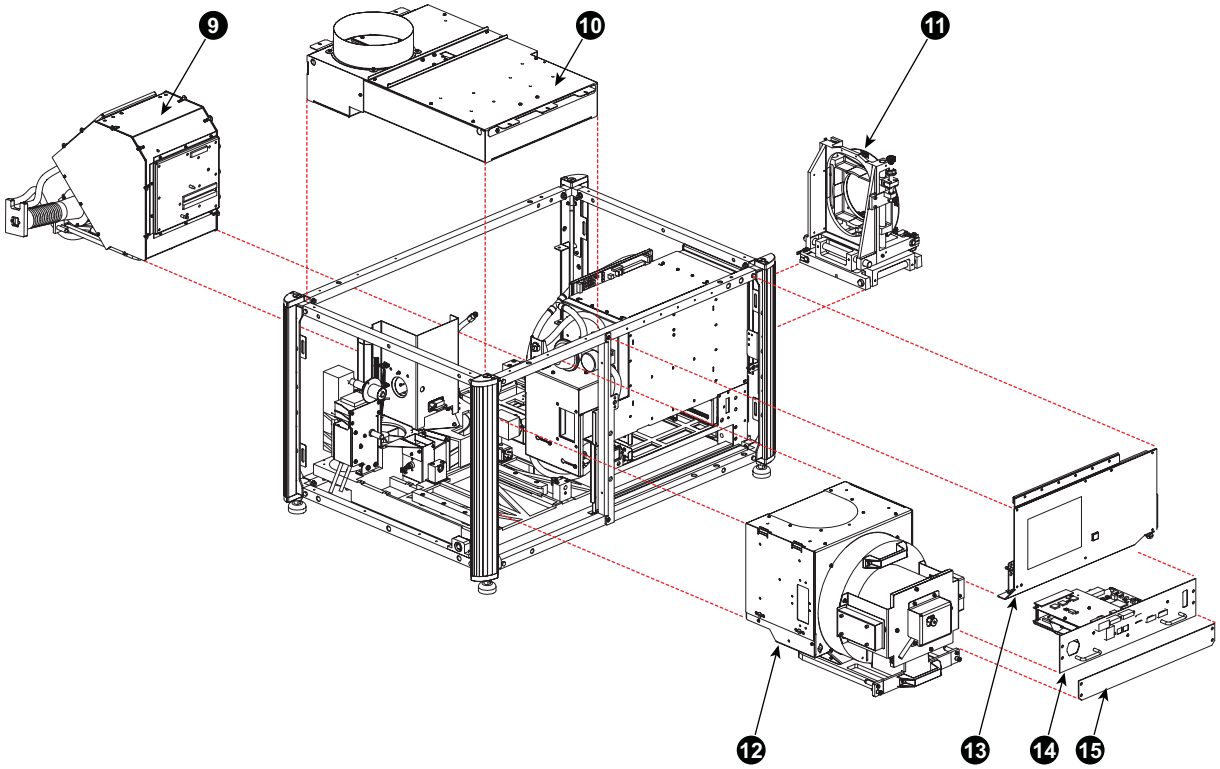


Image 2-3
9 Sealed Light Processor unit (SLP).
10 Heat exhauster (Outlet Fan).
11 Lens Holder.
12 Lamp House.
13 Control Panel (includes Button Panel).
14 Input & Communication unit (includes Barco Cinema Controller).
15 Cover for future expansion.

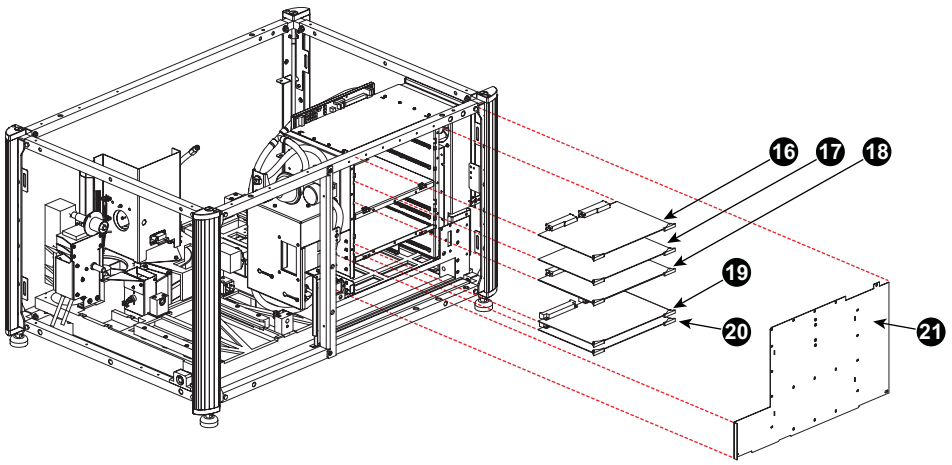


Image 2-4
16 SMPS CTRL board.
17 SMPS PFC board.
18 SMPS DCDC board.
19 TI Cinema Processor board.
20 TI Cinema Interface board.
21 Card cage securing cover.

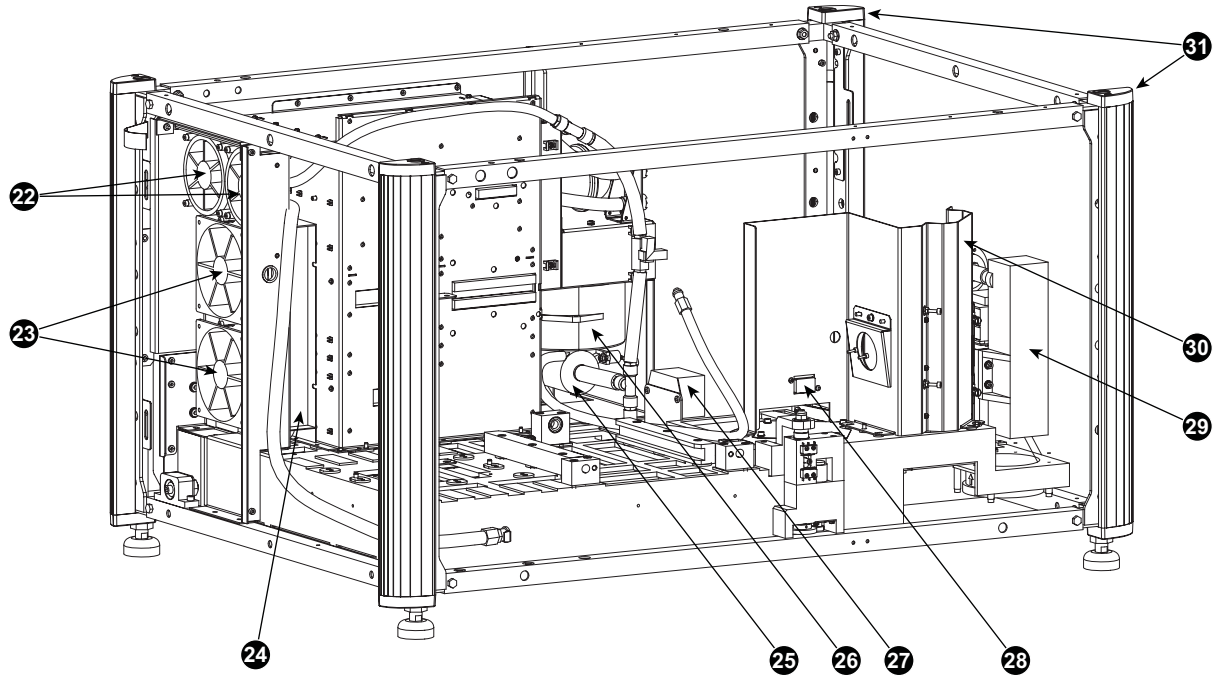


Image 2-5
22 Fans card cage power compartment.
23 Fans heat exchanger of liquid cooling circuit.
24 Heat exchanger.
25 Pump.
26 Fan for lamp cathode cooling.
27 Mains input filter.
28 Electrical connector for lamp house (lamp info).
29 Start Pulse Generator (SPG).
30 Cold mirror assembly (rear side).
31 Status lights on projector corners.

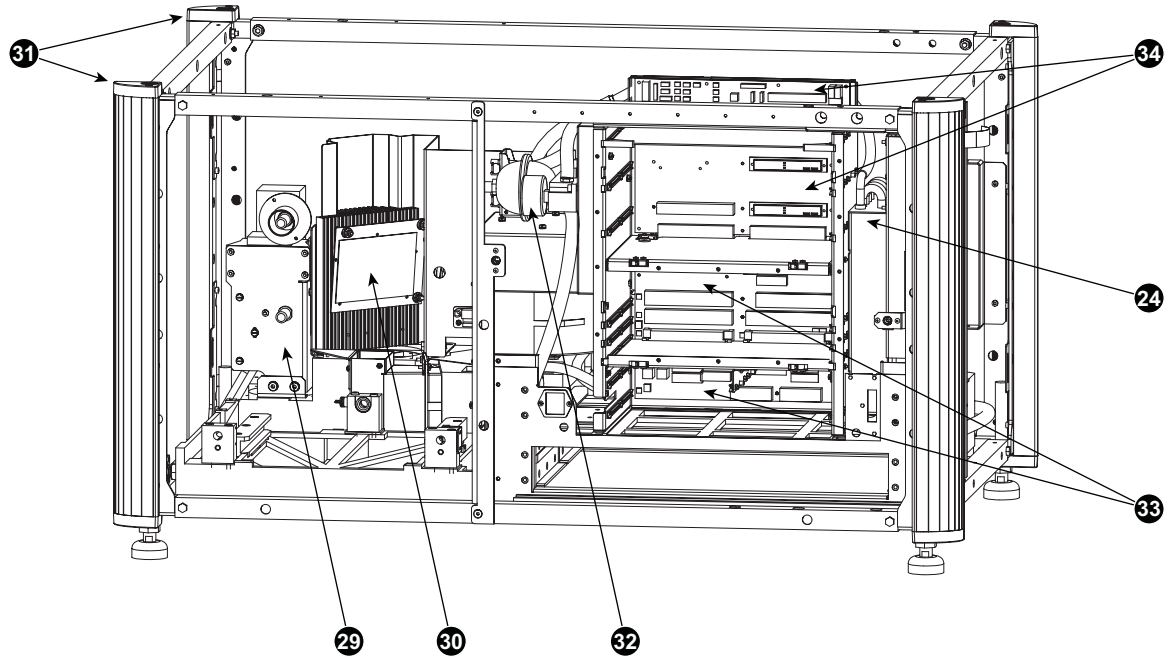


Image 2-6
24 Heat exchanger.
29 Start Pulse Generator (SPG).
30 Cold mirror assembly (front side).
31 Status lights on projector corners.
32 Manometer.
33 Card cage Power Backplane.
34 Card cage Signal Backplane.

2.3 Convention Power Unit orientation

Convention

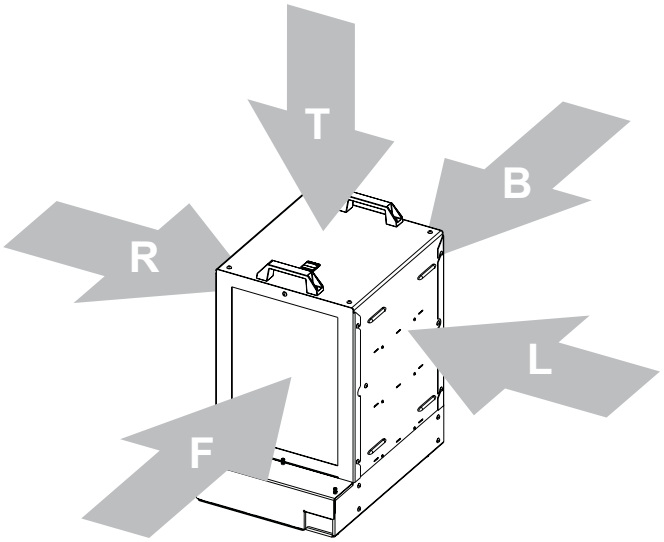


Image 2-7
T Top of the Power Unit.
L Left side of the Power Unit.
F Front of the Power Unit (air outlet).
R Right side of the Power Unit.
B Back side of the Power Unit (air inlet).

2.4 Location of the main components of the Power Unit

Main internal components of the Power Unit

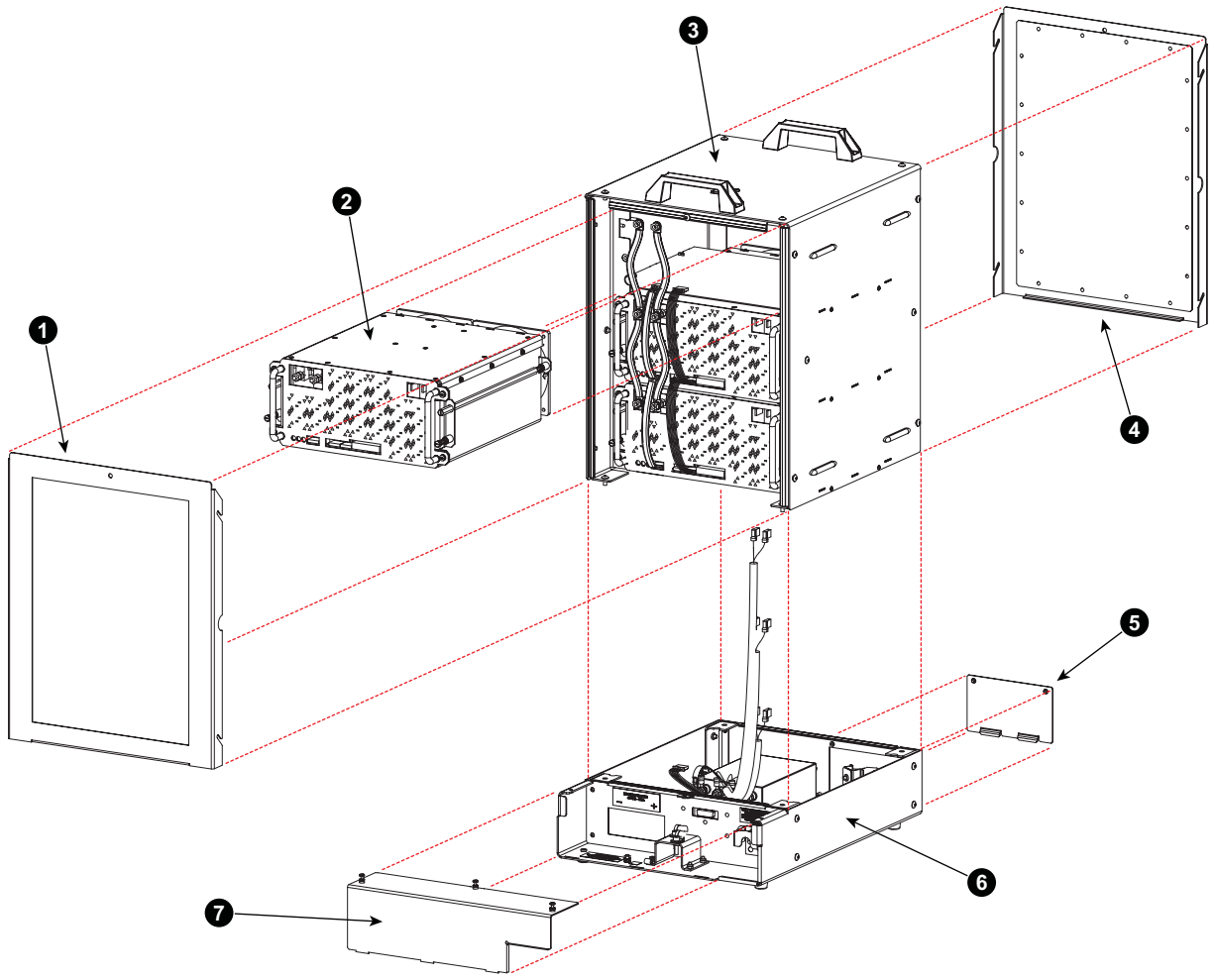


Image 2-8
1 Front cover with air outlet grid.
2 Lamp Power Supply (LPS).
3 Power rack.
4 Rear cover with air inlet grid.
5 Cover plate mains connections.
6 Power Unit base assembly.
7 Cover plate power output sockets.

Parts of the base of the Power Unit

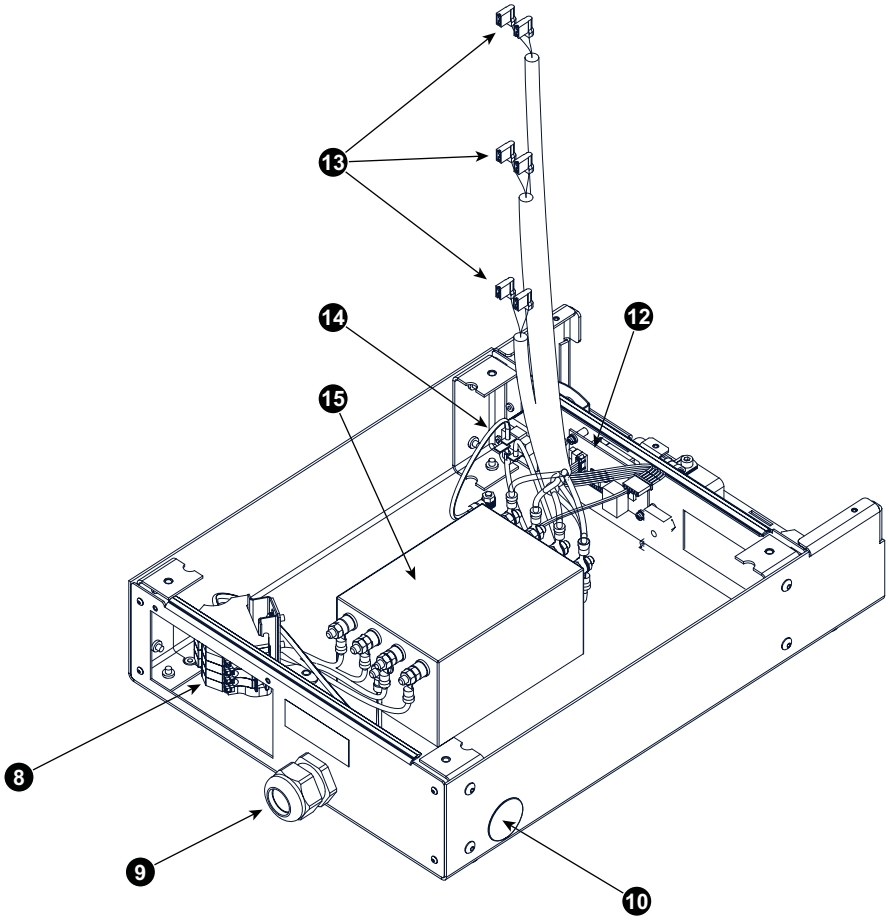


Image 2-9
8 Mains input distribution strip.
9 Cable gland for mains input cable.
10 Optional entrance for mains input cable.
12 LPS communication board.
13 Mains connection per LPS module.
14 Mains output socket for projector head.
15 Mains input filter.

2.5 Projector block diagram

Signal flow Card Cage and Sealed Light Processor

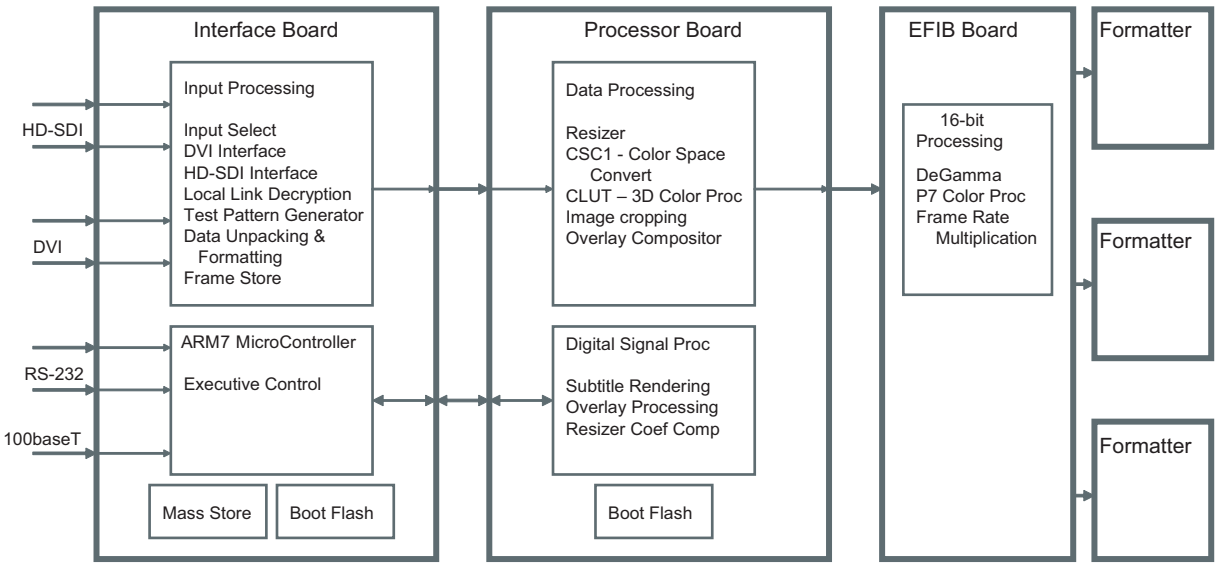


Image 2-10

Internal wiring diagram

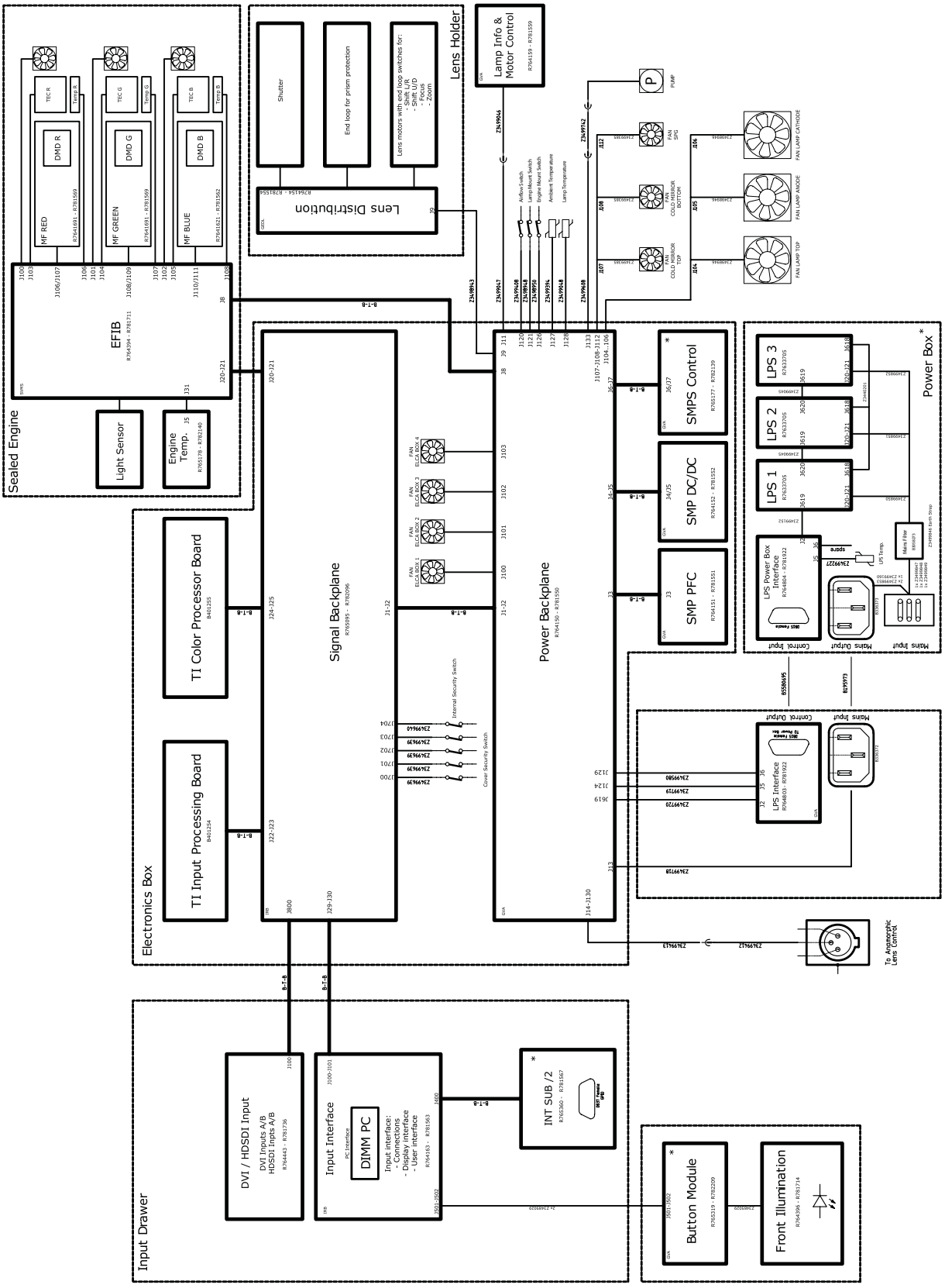


Image 2-11

Projector power circuitry

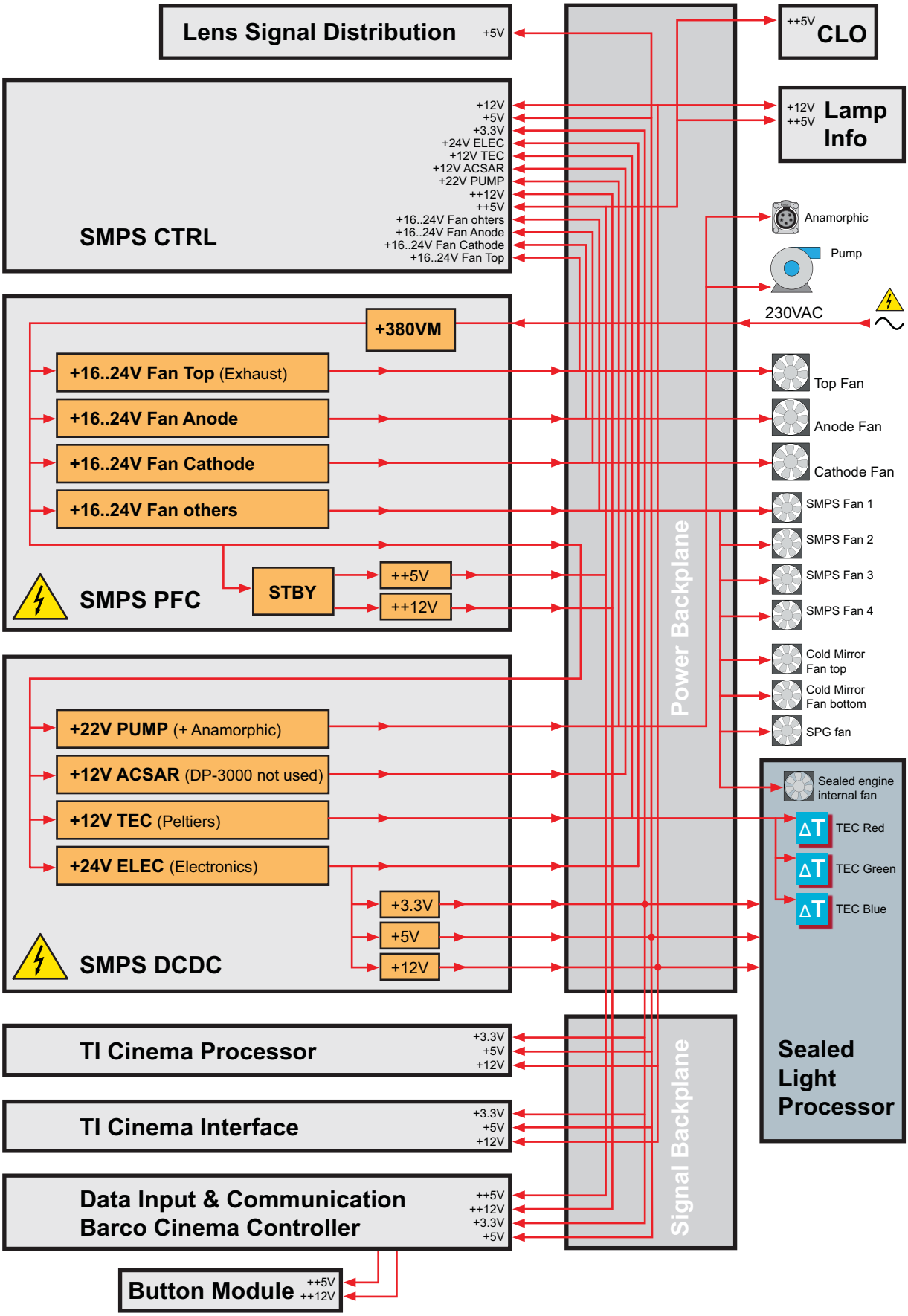


Image 2-12

2.6 Spare part list

Look at the secured Barco website https://My.Barco.com for the most recently updated spare parts list.

Optical spare parts

Order No.	Description	Applies to	Reference
R9855942	1,2" DC2K Zoom Lens (1,45-2,05 : 1) (Motorized)	DP-3000	page 222
R9855943	1,2" DC2K Zoom Lens (1,6-2,35 : 1) (Motorized)	DP-3000	page 222
R9855945	1,2" DC2K Zoom Lens (1,8-2,8 : 1) (Motorized)	DP-3000	page 222
R9855946	1,2" DC2K Zoom Lens (2,15-3,6 :1) (Motorized)	DP-3000	page 222
R9855947	1,2" DC2K Zoom Lens (2,8-5,5 :1) (Motorized)	DP-3000	page 222
R9806790	Anamorphic Lens + Motorized Lens Holder	DP90, DP100 and DP-3000	Manual No: R5976797.
R9806110	Anamorphic Lens 1.25x for 2,39 display format	DP90, DP100 and DP-3000	Manual No: R5976797.
R828887K	Cold mirror	DP90, DP100, DP-3000 and XLM	page 143
R856961(K)	Integration Rod	DP-3000	page 149
R828289K	Lamp House Reflector set	DP-3000	page 135
R9855950	Lamp Xenon Osram 3kW DHS	DP-3000	page 105
R9855949	Lamp Xenon Osram 4,5kW DHP	DP-3000	page 105
R9806860	Lamp Xenon Osram 6,5kW DHP	DP-3000	page 105
R9806864	Lamp Xenon Osram 6,5kW DHP (4 pieces)	DP-3000	page 105
R98064901	Lamp Xenon Osram 6kW HP	DP-3000	page 105
R9855953	Lamp Xenon Ushio 3kW DXL30BA	DP-3000	page 105
R9855952	Lamp Xenon Ushio 4,5kW DXL45BA	DP-3000	page 105
R9806520	Lamp Xenon Ushio 6,0kW DXL60BA2	DP-3000	page 105
R9855951	Lamp Xenon Ushio 6,5kW DXL65BA	DP-3000	page 105
R857103K	Sealed Light Processor + Light Pipe + Shutter assembly	DP-3000	page 157
R857088(K)	Notch Filter	DP-3000	page 182
R863206K	UV blocker with screwed anode support for lamp house	DP-3000	page 131

Electrical spare parts

Order No.	Description	Applies to	Reference
R9861300	ACS-2048 (Alternative Content Switcher)	DP-1200, DP-1500, DP-2000, DP-3000	Manual No: 26-0603000-00
R829436K	Air flow switch	DP90, DP100, DP-3000	page 316
R846905K	Anamorphic Lens Holder motor kit (lock)	DP90, DP100,DP-3000	Manual No: R5976802
R846906K	Anamorphic Lens Holder motor kit (rotor)	DP90, DP100,DP-3000	Manual No: R5976803
R846907K	Anamorphic Lens Holder motor kit (trans)	DP90, DP100, DP-3000	Manual No: R5976804
R764396K	Backlight for the Input & Communication unit	DP90, DP100, DP-3000	page 287
R765319(K)	Button Module	DP-3000	page 291

Order No.	Description	Applies to	Reference
R9855853	Communicator Touch Panel	DP90, DP100, DP-3000	"Communicator Touch Panel", page 299 Manual No: R59770129
R764491K	Corner status light unit	DP90, DP100, DP-3000	page 297
R765564(K)	DIMM PC + Software	DP-3000	page 285
R7649632K	DP-3000 power unit for 3 x 400V AC + Neutral (EU)	DP-3000 EU	page 75
R7649633K	DP-3000 power unit for 3 x 208V AC without neutral (US)	DP-3000 US	page 75
R764443K	DVI input unit	DP90, DP100, DP-3000	page 283
B32455191DK	Fan axial 24V (28 l/s @ 41db) • Small fans above heat exchanger. Used to cool the power boards in the upper compartment of the card cage. • Small fan below Start Pulse Generator.	DP50, DP90, DP100, DP-3000	"Replacement of the Card Cage Fans", page 326 "Replacement of the SPG Fan", page 325
B3245961DK	Fan axial 24V (59 l/s @ 50 db) • Fan mounted underneath the optical base below the Cold Mirror. • Fans (large) mounted on the heat exchanger assembly.	DP50, DP90, DP100, DP-3000	"Replacement of the Cold Mirror Bottom Fan", page 324 "Replacement of the Card Cage Fans", page 326
B3246271DK	Fan centrifugal 24V 280 l/s 73dB (Outlet Fan)	DP90, DP100, DP-3000	page 316
B3245959DK	Fan radial 24V (10 l/s @ 50 db). Fan cooling Cold Mirror. Fan is mounted above the Cold Mirror.	DP30, DP50, DP90, DP100, DP-3000	page 321
B324639DK	Fan radial 24V 56LS 400 (Cathode Fan)	DP90, DP100, DP-3000	page 312
B3245631DK	Fan radial 24V 63LS MNL (Anode Fan)	DP90, DP100, DP-3000	page 306
R8285302K	Input & Communication drawer	DP-3000	page 269
R764163K	Input & Communication Interface board	DP90, DP100, DP-3000	page 269
R765365K	Lamp Info Module	DP90, DP100, DP-1500, DP-2000, DP-3000	page 128
R7633705K	Lamp Power Supply unit (LPS)	DP90, DP-3000	page 88
R764154K	Lens Signal Distribution board	DP90, DP100, DP-3000	page 242
R764684K	Light sensor (CLO)	DP90, DP100, DP-3000	page 181
R724934K	Local Keypad	DP-1200, DP-1500, DP-2000, DP-3000	page 294
R764804K	LPS Interface board	DP90, DP-3000	page 92
B3588520DK	Motor for lens holder horizontal shift	DP90, DP100, DP-3000	page 238
B3588521DK	Motor for lens holder vertical shift or focus	DP90, DP100, DP-3000	page 236 & page 240
B3058273K	Net Filter 3 Phase	DP100, DP-3000	page 94
R764150K	Power Backplane	DP90, DP100, DP-3000	page 243
R765360(K)	RS232/422 + General Purpose board	DP-3000	page 284
R765095K	Signal Distribution Backplane DCI	DP90, DP100, DP-3000	page 243

Order No.	Description	Applies to	Reference
R765177(K)	SMPS CTRL board	DP-3000	page 248
R764151K	SMPS PFC board	DP90, DP100, DP-3000	page 248
R764152K	SMPS DCDC board	DP90, DP100, DP-3000	page 248
R764429K	SPG sub unit	DP90, DP100, DP-3000	page 99
R7642762K	Start Pulse Generator (SPG) module	DP90, DP100, DP-3000	page 99
B401643K	TI Cinema Interface board DCI & ROHS S1 + SK (Security Kit)	DP90, DP100, DP-1500, DP-2000, DP-3000	page 248
B401634K	TI Cinema Interface Board HDCP S1	DP90, DP100, DP-1200, DP-1500, DP-2000, DP-3000	page 248
B401254K	TI Cinema Processor Board ROHS	DP90, DP100, DP-1200, DP-1500, DP-2000, DP-3000	page 248
R765314K	Touch Panel display	DP-1200, DP-1500, DP-2000, DP-3000	page 299

Mechanical spare parts

Order No.	Description	Applies to	Reference
R864132K	Anode Adaptation Bushing (for integrated anode support)	DP-3000	page 108
R842215K	Anode Adaptation Ring (for three leg anode support)	DP-3000	page 108
R859985K	Anode Adapter (No:5)	DP-3000	page 108
R859986K	Anode Adapter (No:6)	DP-3000	page 108
R859987K	Anode Adapter (No:7)	DP-3000	page 108
R8436061K	Cathode Adapter (No:3) with engagement pins	DP-3000	page 108
R8436081K	Cathode Adapter (No:4) with engagement pins	DP-3000	page 108
R8436101K	Cathode Adapter (No:5) with engagement pins	DP-3000	page 108
R8436111K	Cathode Adapter (No:6) with engagement pins	DP-3000	page 108
R859984K	Cathode Adapter (No:7) with engagement pins	DP-3000	page 108
B1909086K	Cooling liquid 1 liter	DP series	page 192
B400952K	Cooling Liquid pump	DP90, DP100, DP-3000	page 212 & page 214
R395198K	Cooling liquid refill & calibration kit (2 liter)	DP series	page 183
R829828K	Dust filter front side	DP90, DP100, DP-3000	page 340
R8298281K	Dust filter kit	DP90, DP100, DP-3000	page 340
R841545K	Dust filter left side panel	DP90, DP100, DP-3000	page 340
B400924K	Heat Exchanger	DP90, DP100, DP-3000	page 216
R9855990	Lamp House	DP-3000	page 121
R843613K	Lamp House Cathode nut	DP-3000	page 105
R853189K	Lens Holder Motorize	DP-3000	
R9806800	Safety kit for lamp replacement (One pair of leather gloves and one full face mask)	DP series	page 105
R856811K	Shutter assembly (Dowser)	DP-3000	page 180
R859361K	Stacking Points	DP-3000	

Order No.	Description	Applies to	Reference
R9856060	Universal pedestal adapter plate	DP3-000	Manual No: 26-0603100-00
R9856050	Universal pedestal for DP series	DP series	Manual No: 26-0603100-00

3. PREVENTATIVE MAINTENANCE ACTIONS

Maintenance program

The maintenance program is subdivided in time frames going from monthly maintenance actions which can be done by a trained projectionist to annually and 4 yearly maintenance actions which must be done by certified service personnel who are familiar with potential hazards of the product and all product safety checks.

Overview

- 1 month maintenance actions
- Lamp change maintenance actions
- 6 month maintenance actions
- 1 year maintenance actions
- 4 year maintenance actions
- 10 year maintenance actions

3.1 1 month maintenance actions

Every month

The 1 month maintenance actions, listed below, may be performed by a trained projectionist who is familiar with potential hazards associated with the product.

No.	Maintenance action	Remarks
1	Clean the front and side dust filters of the projector.	Use a vacuum cleaner. Replace damaged filters immediately. See chapter "Cleaning the dust filters", page 340.
2	Check the surface of the lens output side for dust. (it is not needed to remove the lens from the projector). Only clean if necessary.	Clean the lens output side in case dust is clearly visible upon the surface. See "Cleaning the lens", page 228. Note that if the lens was removed from the projector, all used 'lens files' must be updated. See user guide of the Communicator software.
3	Check the porthole (both sides) for dust.	Clean the porthole in case dust is clearly visible upon the surface. Use an optical cloth.

3.2 Lamp change maintenance actions

Maintenance actions at every lamp change

The maintenance actions, listed below, which are required at every lamp change may be performed by a trained projectionist who is familiar with potential hazards associated with the xenon lamp.

No.	Maintenance action	Remarks
1	Check the UV blocker of the lamp house for dust.	Only clean the UV blocker in case dust is clearly visible upon the surface of the UV blocker (both sides). Use an optical cloth. See "Cleaning the UV blocker of the Lamp House", page 138.
2	Check the reflector of the lamp house for dust.	Only clean the reflector in case dust is clearly visible upon the surface of the reflector. Take the lamp house to another room and use compressed air to blow away the dust. Use an optical cloth. See "Cleaning the Reflector of the Lamp House", page 139.
3	Visual inspection of the lamp anode and cathode connectors of the lamp house.	Replace the lamp house in case of degradation, damage, etc. See "Lamps and Lamp House", page 105.
4	Visual inspection of the lamp anode and cathode cables of the lamp house.	Replace the lamp house in case of degradation, damage, etc. See "Lamps and Lamp House", page 105.
5	Check if all cables are still tightened.	See chapter "Lamps and Lamp House", page 105.

3.3 6 month maintenance actions

Every 6 month

The 6 month maintenance actions, listed below, may be performed by a trained projectionist who is familiar with potential hazards associated with the product.

No.	Maintenance action	Remarks
1	Clean the air vents/inlets of the projector: • air inlet grid of the electronic compartment (front side projector). • air inlet grid of the Lamp Power Supply (separate power unit of the projector). • air inlet grid of the Cold Mirror (left side of the projector).	Use a vacuum cleaner.
2	Clean the cabinet of the projector. (Removal overall dust accumulation on projector covers)	See cleaning procedure "Cleaning the exterior of the projector", page 341.
3	Pressure verification of the liquid cooling circuit.	This pressure, indicated on the internal manometer, should be between 0,5 and 1 bar. See "Pressure verification of the Liquid Cooling Circuit", page 188. If not, corrective action should be taken by certified service personnel.

3.4 1 year maintenance actions

Every year

The 1 year maintenance actions, listed below, may ONLY be performed by certified service personnel who are familiar with potential hazards of the product and all product safety checks.

No.	Component	Maintenance action	Remarks
1	**Dust in general**	Clean the metal mesh grid of the fan below the Cold Mirror.	Use a vacuum cleaner and brush.
2	**Dust in general**	Remove all dust inside the lamp compartment.	Use a vacuum cleaner. Do NOT touch the Cold Mirror.
3	**Dust in general**	Check the Cold Mirror for dust, burn damage, degradation, cracks, etc.	Only clean the Cold Mirror in case dust is clearly visible upon the surface of the Cold Mirror. See "Cleaning the Cold Mirror", page 147. Replace the Cold Mirror in case of burn damage, degradation, cracks, etc. See "Replacement of the Cold Mirror", page 143.
4	**Dust in general**	Clean the metal mesh grid on top of the lamp house.	Use a vacuum cleaner.
5	**Dust in general**	Check the mask and the integrator entry for burn damage, degradation, cracks, etc. Remove the lamp house and look at the mask and integrator entry via the Cold Mirror.	Replace the integration rod and mask in case of burn damage, degradation, cracks, etc. See "Integration Rod", page 149.
6	**Dust in general**	Open the dowser (shutter) and check the prism exit side for dust, discoloration, damage, degradation, cracks, etc.	Only clean the prism exit side in case dust is clearly visible upon the surface of prism. See "Cleaning the Prism exit side", page 179. Replace the complete Sealed Light Processor Unit in case of degradation, cracks, etc. See "Sealed Light Processor Assembly", page 157.
7	**Dust in general**	Check the porthole (both sides) for dust.	Only clean the porthole in case dust is clearly visible upon the surface. Use an optical cloth.
8	**Dust in general**	Clean the projector exterior (housing). Report on cleanliness of booth!	See cleaning procedure "Cleaning the exterior of the projector", page 341.
9	**Dust in general**	Check the condition (hot state) of the light pipe and prism by looking for artifacts in the projected full white and full black patterns.	If artifacts are visible diagnose the integration rod. See "Integration Rod diagnostic", page 151. Replace the integration rod In case the integration rod causes the artifacts. See "Removal of the Integration Rod assembly", page 152. Replace the complete Sealed Light Processor Unit in case the prism causes the artifacts. See "Removal of the Sealed Light Processor", page 161.
10	**Diagnostics**	Check actual diagnostics/self tests after 1 hour play with black image. See user guide of the Communicator software.	Note any irregularities and follow up. Take the necessary measurements if required.
11	**Diagnostics**	Check and save TI and projector log/history files. See user guide of the Communicator software.	Note any irregularities and follow up.
12	**Diagnostics**	Verify projector date and time and correct if required.	See Communicator software.
13	**Software version**	Check for the latest version of Barco and TI software. See user guide of the Communicator software. The latest software version can be downloaded from the secured Barco web site.	Upgrade the projector software with the latest version. See user guide of the projector toolset.
14	**Info-T's**	Check if all Info-T's are implemented. Note that the Info-T's are listed on the secured Barco web site.	If not, implement all Info-T's and update the projector service docket.
15	**Cooling circuit**	Check the condition of the tubing of the liquid cooling circuit for degradation, UV cracking, kinking of tubes, leakage.	Replace damaged parts immediately. See "Liquid Cooling Circuit", page 183.

No.	Component	Maintenance action	Remarks
16	**Cooling circuit**	Replace the liquid of the cooling circuit. (drain, refill, expel air and pressurize)	See chapter "Liquid Cooling Circuit", page 183.
17	**Cooling circuit**	Check calibration of the liquid cooling circuit.	Connect syringe to circuit to determine compensation volume (50 - 70 ml). See "Pressurizing the Liquid Cooling Circuit", page 199.
18	**Electrical connections**	Check the torque values/general condition of all critical electrical connections and components. Use a torque wrench to verify the torque values of the critical electrical connections listed: • Nuts (x2) of the SPG socket inside the lamp house: 25 Nm. • Cathode cable nut for the lamp cathode socket: 17 Nm. • Hexagon socket head cap screw at the lamp cathode socket : 5 Nm. • Nuts of the LAMP OUT ports of each LPS unit: a) Copper nuts and rods (old LPS) : 8 Nm. b) Brass nuts and rods : 4 Nm. c) Nickel plated brass nuts and rods : 4 Nm d) Nickel plated steel nuts and rods : 8 Nm	Do not release the nuts to check the torque. Just verify. See chapters "Installation of an LPS module", page 88, "Installation of the Start Pulse Generator", page 103 and "Installation of the xenon lamp", page 116.
19	**Lamp Module**	Check the UV blocker of the lamp house for dust, burn damage, degradation, cracks, etc. Note that in case of a passive 3D projection system the UV blocker has an adapted 3D coating.	Only clean the UV blocker in case dust is clearly visible upon the surface of the UV blocker (both sides). See "Cleaning the UV blocker of the Lamp House", page 138. Replace the UV blocker in case of burn damage, degradation, cracks, etc. See "Replacement of the UV blocker", page 131.
20	**Lamp Module**	Check the reflector of the lamp house for dust, degradation, cracks, etc.	Only clean the reflector in case dust is clearly visible upon the surface of the reflector. Take the lamp house to another room and use compressed air to blow away the dust from the reflector. See "Cleaning the Reflector of the Lamp House", page 139. Replace the reflector in case of burn damage, degradation, cracks, etc. See "Replacement of the Lamp Reflector", page 135.
21	**Lamp Module**	Visual inspection of the lamp anode and cathode connectors of the lamp house.	Replace the lamp house in case of degradation, damage, etc. See "Lamps and Lamp House", page 105.
22	**Lamp Module**	Visual inspection of the lamp anode and cathode cables of the lamp house.	Replace the lamp house in case of degradation, damage, etc. See "Lamps and Lamp House", page 105.
23	**Lamp Module**	Check motors (not yet available) and manual adjustments. Lubricate if needed.	
24	**Lamp Module**	Check the positional integrity of automatic lamp alignment/CLO.	Perform auto alignment. Manual adjustment afterwards should not improve light output.
25	**Lens holder**	Check the lens holder shift functionality (up/down & left/right). Lubricate where needed.	In case of a motorized lens holder use the local keypad and the Communicator software to shift.
26	**Lens holder**	Check the positional integrity of motorized adjustments by switching Macro's.	Verify correct alignment on screen between flat and scope.
27	**Lens holder**	Check the focus uniformity.	Adjust the lens holder (Scheimpflug) ONLY if needed. See "Adjusting the Lens Holder", page 229
28	**Lens**	Check the optic surfaces of the lens input and output for dust.	Only clean the input and/or output side in case dust is clearly visible upon the surfaces. Use an optical cloth. See "Cleaning the lens", page 228. Note that a lens removal requires an update of all used 'lens files'. See user guide of the Communicator software.

No.	Component	Maintenance action	Remarks
29	**Lens**	Check the lens Zoom & Focus motors.	Use the local keypad and the Communicator software to Zoom and to Focus.
30	**Shutter**	Check the functionality of the Dowser (shutter). Loose components, wear and tear.	Use the local keypad and the Communicator software to Open and Close the shutter. Replace the shutter if needed. See "Replacement of the Dowser (Shutter)", page 180.
31	**Electronic boards**	Check the general condition of the electronic boards: Status LED's, dust, connections, etc. Boards to check: LPS, SMPS PFC, SMPS CTRL, TI Interface Board, TI Processor Board, Input & Communication Board.	Blow out dust.
32	**Security**	Check the Tamper Switch Activation Report and Security Logs for security infringements.	Report if intruded.
33	**Security**	Verify if the Dallas key is present and working.	Report if missing, lost or damaged.
34	**Air Extraction**	Check customer air extraction system for adequate extraction.	The air extraction system must be capable of removing minimum 10 m^3/min or 350 CFM per installed DP-3000 digital projector.
35	**Color calibration**	Measure the color coordinates of the projected image and calibrated if necessary.	See user guide of the Communicator software.
36	**Documentation**	Check if the projector manuals are present and up-to-date.	Download current manual version from https://My.Barco.com.
37	**Documentation**	Update projector service docket.	List all maintenance actions and remarks.

3.5 4 year maintenance actions

Every 4 years

The 4 year maintenance actions, listed below, may ONLY be performed by certified service personnel who are familiar with potential hazards of the product and all product safety checks.

No.	Maintenance action	Remarks
1	Replace the pump of the liquid cooling circuit	Follow correct pressurize procedure after replacement. See "Replacement of the complete Pump", page 214.
2	Check the lamp fans: vibrations, noise, speed, etc. (speeds: via diagnostics)	Replace if needed. See "Fan replacement procedures", page 305.

3.6 10 year maintenance actions

Every 10 years

The 10 year maintenance actions, listed below, may ONLY be performed by certified service personnel who are familiar with potential hazards of the product and all product safety checks.

No.	Maintenance action	Remarks
1	Check all fans: vibrations, noise, speed, etc.	Replace if needed. See "Fan replacement procedures", page 305.

4. TROUBLE SHOOTING

About this chapter

This chapter enumerates all possible error codes which can appear on the Touch Panel display of the cinema projector or in the projector log files. Note that some codes have a warning and an error state. Some only have an error state, others have only a warning state. In case of a “warning” the projector remains to operate. Nevertheless, it is recommended to solve the problem which causing the “warning” as soon as possible otherwise, the “warning” state may turn into an “error” state which will switch off the projector consequently.

The codes are placed in alphabetical order to make it easier to look up the code and find an appropriate solution.

Overview

- First level troubleshooting
- Trouble shooting checklist

4.1 First level troubleshooting

First level troubleshooting flowchart

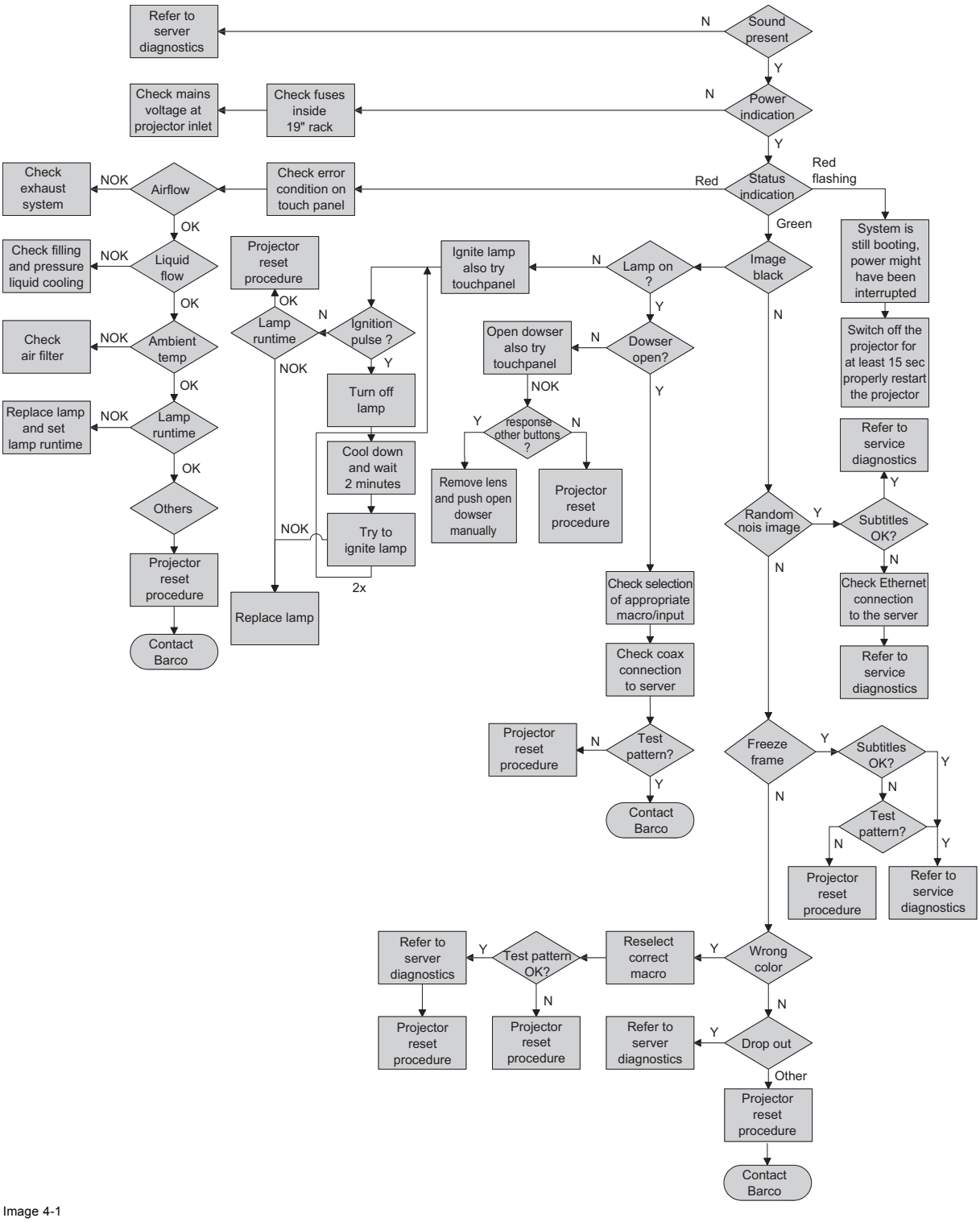


Image 4-1

Projector reset procedure:

a) Turn off the Lamp and cool down the Lamp for at least 1 minute if hot.

b) Switch off the power of the unit and wait for at least 15 seconds.

c) Switch on the power of the unit and respect normal startup procedure.

4.2 Trouble shooting checklist

Code: “++5v - voltage high” (Warning)

Situation	Solution
The ++5 volt supply voltage for the electronics is about to exceed its maximum limit.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.

Code: “++5v - voltage low” (Warning)

Situation	Solution
The ++5 volt supply voltage for the electronics is almost below its minimum limit.	1. Check if the SMPS PFC board is working properly. If not, replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252. 2. Check if the SMPS CTRL board is working properly. If not, replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252. 3. Check the Power Backplane for bad connections. Note that the ++5V standby supply is generated on the PFC board and enters the SMPS CTRL board via the Power Backplane.

Code: “++12v - voltage high” (Warning)

Situation	Solution
The ++12 volt supply voltage for the electronics is about to exceed its maximum limit.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.

Code: “++12v - voltage low” (Warning)

Situation	Solution
The ++12 volt supply voltage for the electronics is almost below its minimum limit.	1. Check if the SMPS PFC board is working properly. If not, replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252. 2. Check if the SMPS CTRL board is working properly. If not, replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252. 3. Check the Power Backplane for bad connections. Note that the ++12V standby supply is generated on the PFC board and enters the SMPS CTRL board via the Power Backplane.

Code: “+3.3v - voltage high” (Warning)

Situation	Solution
The +3.3 volt supply voltage for the electronics is about to exceed its maximum limit.	1. Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252. 2. If the problem remains, replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “+3.3v - voltage low” (Warning)

Situation	Solution
The +3.3 volt supply voltage for the electronics is almost below its minimum limit.	1. Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252. 2. If the problem remains replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252. 3. Check the Power Backplane for bad connections. Note that the +3.3V is derived from the +24V on the SMPS DCDC board.

Code: “+5v - voltage high” (Error)

Situation	Solution
The +5 volt supply voltage for the electronics is about to exceed its maximum limit.	1. Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252. 2. If the problem remains, replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “+5v - voltage low” (Error)

Situation	Solution
The +5 volt supply voltage for the electronics is almost below its minimum limit.	1. Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252. 2. If the problem remains replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252. 3. Check the Power Backplane for bad connections. Note that the +5V is derived from the +24V on the SMPS DCDC board.

Code: “+12v - voltage high” (Error)

Situation	Solution
The +12 volt supply voltage for the electronics is about to exceed its maximum limit.	1. Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252. 2. If the problem remains, replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “+12v - voltage low ” (Error)

Situation	Solution
The +12 volt supply voltage for the electronics is almost below its minimum limit.	1. Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252. 2. If the problem remains replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252. 3. Check the Power Backplane for bad connections. Note that the +12V is derived from the +24V on the SMPS DCDC board.

Code: “+24v - voltage high” (Error)

Situation	Solution
The +24 volt supply voltage for the electronics is about to exceed its maximum limit.	1. Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252. 2. If the problem remains, replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.

Code: “+24v - voltage low” (Error)

Situation	Solution
The +24 volt supply voltage for the electronics is almost below its minimum limit.	1. Check if the SMPS DCDC board is working properly. If not, replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252. 2. Check the Power Backplane for bad connections. Note that the +24V supply is generated on the SMPS DCDC board and enters the SMPS CTRL board via the Power Backplane.

Code: “airflow - not ok” (Error)

Situation	Solution
Blocked outlet of the air exhaust.	Check if the outlet of the air exhaust on top of the projector is not blocked.
Failure of the external air exhaust system.	Check the external air exhaust system. Note that the installed exhaust blower must remove an air volume of 10 m^3/min or 350 CFM per installed DP-3000 projector.
Blocked air inlet	1. Check if the air inlet at the front and at the left side of the projector is not blocked. 2. Check both dust filters of the projector. Clean if necessary or replace if damaged.

Situation	Solution
Disconnected air flow switch.	Check the wire unit of the air flow switch (reference 1 image 4-2) in the air outlet channel of the projector and check if the wire unit (reference 2 image 4-2) is connected with the Power Backplane.
Defect air flow switch.	Replace the air flow switch. The air flow switch is located inside the Outlet Fan assembly. To disassembly the Outlet Fan assembly see page 316.

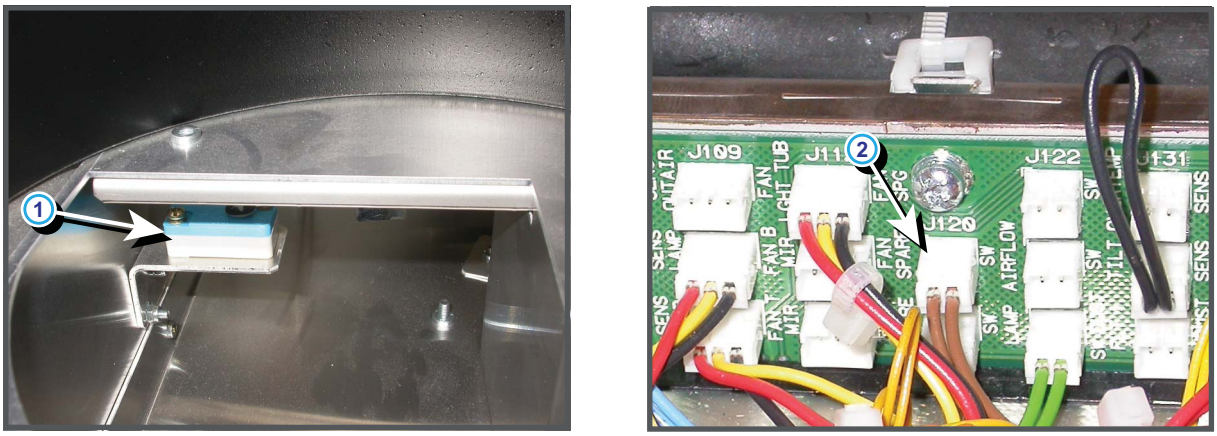


Image 4-2

Code: “ambient - temperature too high” (Error)

This error code is probably proceeded by the warning code: “ambient - temperature high”. The same troubleshooting table can be applied.

Code: “ambient - temperature too low” (Error)

This error code is probably proceeded by the warning code: “ambient - temperature low”. The same troubleshooting table can be applied.

Code: “ambient - temperature high” (Warning)

Situation	Solution
Blocked air filter at the front side and/or left side of the projector.	Clean the air filters of the projector. Replace if damaged. See procedure "Cleaning the dust filters", page 340.
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).

Code: “ambient - temperature low” (Warning)

Situation	Solution
Low ambient temperature. Note that a too low ambient temperature may prevent the Sealed Light Processor to start up.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature is higher then 10°C (50°F). Tip: Ignite the lamp to warm up the Sealed Light Processor of the projector.
Damaged wire unit of the temperature sensor at the air inlet (reference 1 image 4-3) causes an open circuit.	Repair the wire unit if possible or replace.
Wire unit (reference 2 image 4-3) of the temperature sensor is disconnected from the Power Backplane.	Remove the top cover of the projector and check if the wire unit of the temperature sensor is well inserted in the Power Backplane.
Defect temperature sensor.	Replace the temperature sensor.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

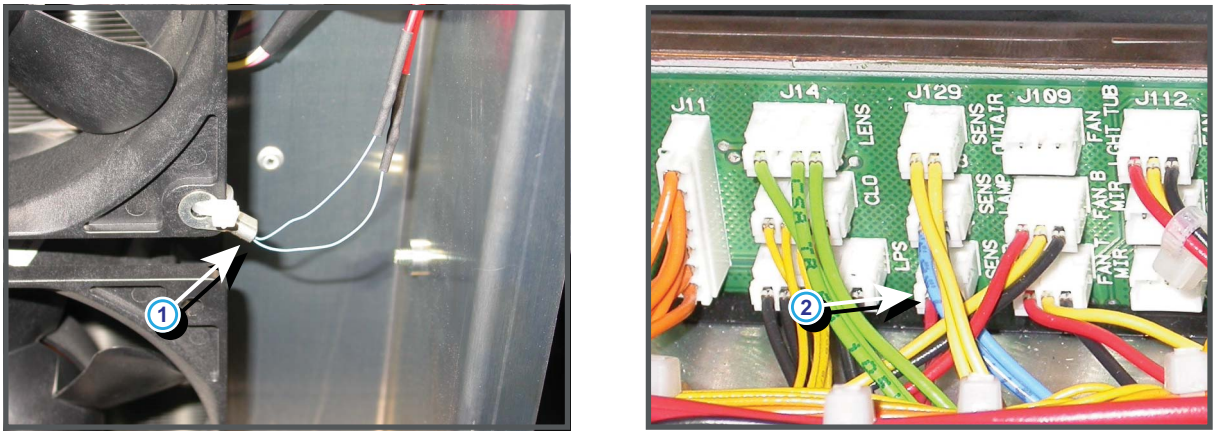


Image 4-3

Code: “Cold Mirror bottom fan - speed high” (Warning)

Situation	Solution
Defect wire unit (reference 2 image 4-4) causing a disruption in the feedback circuit of the fan speed.	Check the wire unit of the fan (reference 1 image 4-4) for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS DCDC board.	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252..
Defect fan (reference 1 image 4-4).	Replace the fan. See "Replacement of the Cold Mirror Bottom Fan", page 324.

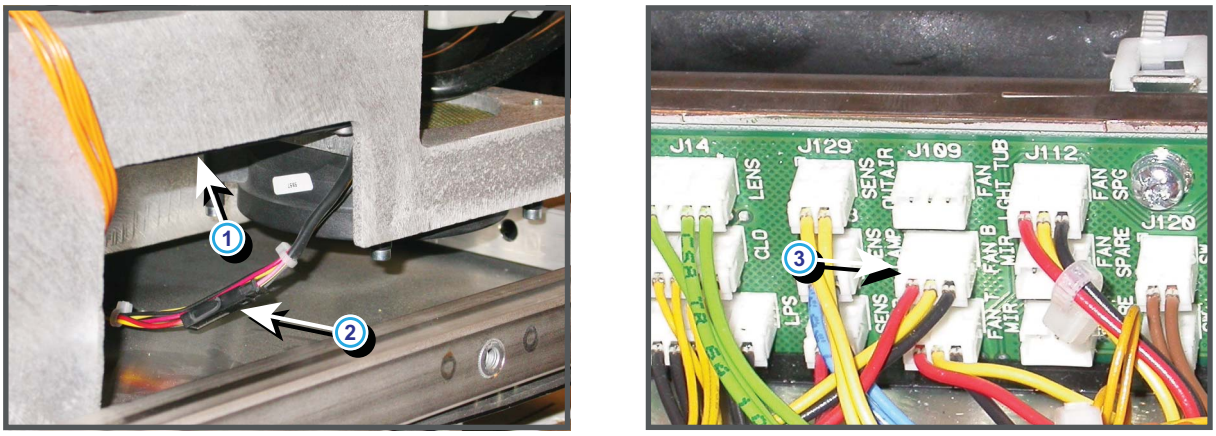


Image 4-4

Code: “Cold Mirror bottom fan - speed low” (Warning)

Situation	Solution
Wire unit (reference 2 image 4-4) of the Cold Mirror fan disconnected.	Remove the left cover of the projector and check the connection of the wire unit of the fan below the Cold Mirror.
Wire unit (reference 3 image 4-4) disconnected from the Power Backplane.	Remove the top cover of the projector and check if the wire unit (reference 3 image 4-4) is inserted in the Power Backplane.
Blocked fan (reference 1 image 4-4).	Unblock the fan. Ensure that the fan can turn freely.
Damaged wire unit.	Check if the wire unit of the fan is not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Situation	Solution
Malfunction SMPS DCDC board.	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Fan end of life.	Replace the fan. See "Replacement of the Cold Mirror Bottom Fan", page 324.

Code: “Cold Mirror top fan - speed high” (Warning)

Situation	Solution
Defect wire unit (reference 2 image 4-5) causing a disruption in the feedback circuit of the fan speed.	Check the wire unit of the fan (reference 1 image 4-5) for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252
Malfunction SMPS DCDC board.	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Defect fan (reference 1 image 4-5).	Replace the fan. See "Replacement of the Cold Mirror Top Fan", page 321.

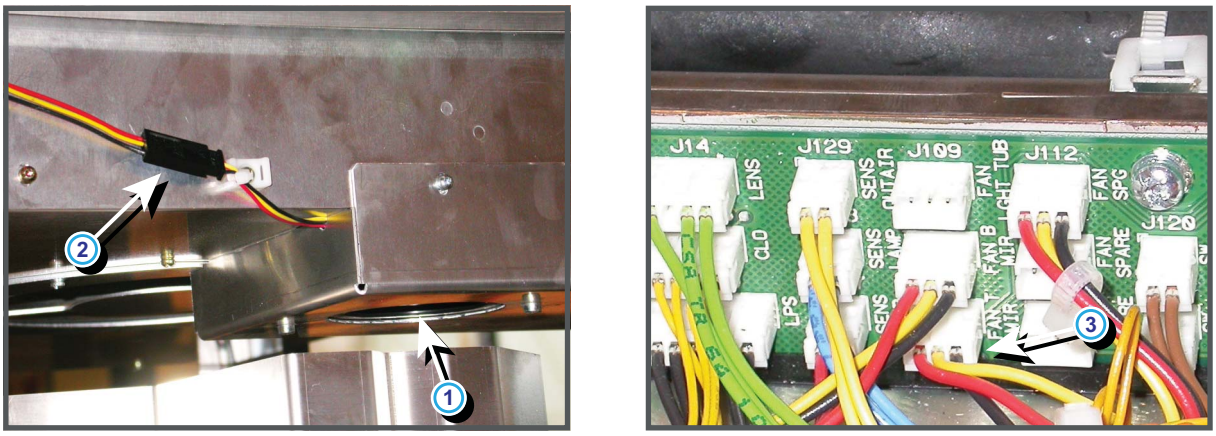


Image 4-5

Code: “Cold Mirror top fan - speed low” (Warning)

Situation	Solution
Wire unit (reference 1 image 4-5) of the Cold Mirror top fan disconnected.	Remove the left cover of the projector and check the connection of the wire unit (reference 2 image 4-5) of the fan above the Cold Mirror.
Wire unit (reference 3 image 4-5) disconnected from the Power Backplane.	Remove the top cover of the projector and check if the wire unit (reference 3 image 4-5) is inserted in the Power Backplane.
Blocked fan.	Unblock the fan. Ensure that the fan can turn freely.
Damaged wire unit.	Check if the wire unit of the fan is not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS DCDC board.	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Fan end of life (reference 1 image 4-5).	Replace the fan. See "Replacement of the Cold Mirror Top Fan", page 321.

Code: “dmd blue - temperature too high” (Error)

This error code is probably proceeded by the warning code: “dmd blue - temperature high”. The same troubleshooting table can be applied to.

Code: “dmd blue - temperature too low” (Error)

Situation	Solution
The electronics of the Sealed Light Processor remains off due to a too low DMD temperature.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature is higher then 10°C (50°F). Tip: Turning on the lamp will heat up the Sealed Light Processor and the DMD’s.

Code: “dmd blue - temperature high” (Warning)

Situation	Solution
Blocked air inlet filters. The other DMD temperatures are too high as well.	Clean the blocked air inlet filters. Replace damaged filters immediately. See procedure "Cleaning the dust filters", page 340.
The liquid cooling circuit of the Sealed Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the other DMD temperatures are too high as well.	Check if the cooling circuit of the Sealed Light Processor is connected with the pump and heat exchanger. See "Excluding the Sealed Light Processor", page 189.
Malfunction SMPS DCDC board. The LED “+24V” on the SMPS DCDC board remains off. See "Card Cage diagnostic", page 245	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Failure of one of the components inside the Sealed Light Processor (Peltier, DMD, Temp sense, etc.).	Replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Do not open and service the Sealed Light Processor yourself. See "Sealed Light Processor Assembly", page 157.

Code: “dmd blue - temperature low” (Warning)

Situation	Solution
The temperature of the DMD is close to the minimum allowed temperature. In case the temperature drops further the Sealed Light Processor will shut down to protect the DMD.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature is higher then 10°C (50°F). Tip: Turning on the lamp will heat up the Sealed Light Processor and the DMD’s.

Code: “dmd red - temperature too high” (Error)

This error code is probably proceeded by the warning code: “dmd red - temperature high”. The same troubleshooting table can be applied to.

Code: “dmd red - temperature too low” (Error)

Situation	Solution
The electronics of the Sealed Light Processor remains off due to a too low DMD temperature.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature is higher then 10°C (50°F). Tip: Turning on the lamp will heat up the Sealed Light Processor and the DMD’s.

Code: “dmd red - temperature high” (Warning)

Situation	Solution
Blocked air inlet filters. The other DMD temperatures are too high as well.	Clean the blocked air inlet filters. Replace damaged filters immediately. See procedure "Cleaning the dust filters", page 340.
The liquid cooling circuit of the Sealed Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the other DMD temperatures are too high as well.	Check if the cooling circuit of the Sealed Light Processor is connected with the pump and heat exchanger. See "Excluding the Sealed Light Processor", page 189s

Situation	Solution
Malfunction SMPS DCDC board. The LED “+24V” on the SMPS DCDC board remains off. See "Card Cage diagnostic", page 245	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Failure of one of the components inside the Sealed Light Processor (Peltier, DMD, Temp sense, etc.).	Replace the whole Light Processor unit and return the malfunction Light Processor to factory for repair. Do not open and service the Sealed Light Processor yourself. See "Sealed Light Processor Assembly", page 157.

Code: “dmd red - temperature low” (Warning)

Situation	Solution
The temperature of the DMD is close to the minimum allowed temperature. In case the temperature drops further the Sealed Light Processor will shut down to protect the DMD.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature is higher then 10°C (50°F). Tip: Turning on the lamp will heat up the Sealed Light Processor and the DMD’s.

Code: “dmd green - temperature too high” (Error)

This error code is probably proceeded by the warning code: “dmd green - temperature high”. The same troubleshooting table can be applied to.

Code: “dmd green - temperature too low” (Error)

Situation	Solution
The electronics of the Sealed Light Processor remains off due to a too low DMD temperature.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature is higher then 10°C (50°F). Tip: Turning on the lamp will heat up the Sealed Light Processor and the DMD’s.

Code: “dmd green - temperature high” (Warning)

Situation	Solution
Blocked air inlet filters. The other DMD temperatures are too high as well.	Clean the blocked air inlet filters. Replace damaged filters immediately. See procedure "Cleaning the dust filters", page 340.
The liquid cooling circuit of the Sealed Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the other DMD temperatures are too high as well.	Check if the cooling circuit of the Sealed Light Processor is connected with the pump and heat exchanger.
Malfunction SMPS DCDC board. The LED “+24V” on the SMPS DCDC board remains off. See "Card Cage diagnostic", page 245	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Failure of one of the components inside the Sealed Light Processor (Peltier, DMD, Temp sense, etc.).	Replace the whole Light Processor unit and return the malfunction Light Processor to factory for repair. Do not open and service the Sealed Light Processor yourself. See "Sealed Light Processor Assembly", page 157.

Code: “dmd green - temperature low” (Warning)

Situation	Solution
The temperature of the DMD is close to the minimum allowed temperature. In case the temperature drops further the Sealed Light Processor will shut down to protect the DMD.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature is higher then 10°C (50°F). Tip: Turning on the lamp will heat up the Sealed Light Processor and the DMD’s.

Code: “efib - i2c failed” (Error)

Situation	Solution
Communication failure with the Formatting Interface Board (EFIB). Note that the Formatting Interface Board is located inside the Sealed Light Processor unit.	Check if the Sealed Light Processor unit is well inserted.

Situation	Solution
Defect SMPS CTRL board. See "Card Cage diagnostic", page 245	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - command/parameter error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - system failure” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - flash update error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - flash mailbox download error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - sequence data error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - modular formatter sequence error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - modular formatter/dmd mismatch error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - modular formatter architecture error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - modular formatter green link communication error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - modular formatter red link communication error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “efib - modular formatter blue link communication error” (Error)

Situation	Solution
Malfunction Formatting Interface Board (EFIB).	1. Reboot the projector. 2. If the problem remains, replace the whole Sealed Light Processor unit and return the malfunction Sealed Light Processor to factory for repair. Under no circumstances the Sealed Light Processor may be serviced at the field. Service on the Sealed Light Processor unit can only be done at factory.

Code: “elcabox - temperature high” (Warning)

Situation	Solution
Blocked air inlet at the front side of the projector.	Make sure that the air inlet at the front of the projector is free so that fresh air can easily flow into the projector.
Filthy air filter at the front side of the projector	Clean the front air filters of the projector. Replace if damaged. See procedure "Cleaning the dust filters", page 340.
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Malfunction air extraction system.	Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 10 m³/min or 350 CFM per installed DP-3000 digital projector.
Malfunction SMPS CTRL board. See Card Cage Diagnostic "Card Cage diagnostic", page 245.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Defect temperature sensor on the SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “elcabox - temperature low” (Warning)

Situation	Solution
Low ambient temperature. Note that a too low ambient temperature may prevent the Sealed Light Processor to start up.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature is higher then 10°C (50°F). Tip: Ignite the lamp to warm up the Sealed Light Processor of the projector.
Malfunction SMPS CTRL board. See Card Cage Diagnostic "Card Cage diagnostic", page 245.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Defect temperature sensor on the SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “elcabox fan1 - speed high” (Warning)

Situation	Solution
Defect wire unit (reference 1 image 4-6) causing a disruption in the feedback circuit of the fan speed.	Check the wire unit of the fan for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS DCDC board.	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Defect fan.	Replace the fan. See "Replacement of the Card Cage Fans", page 326.

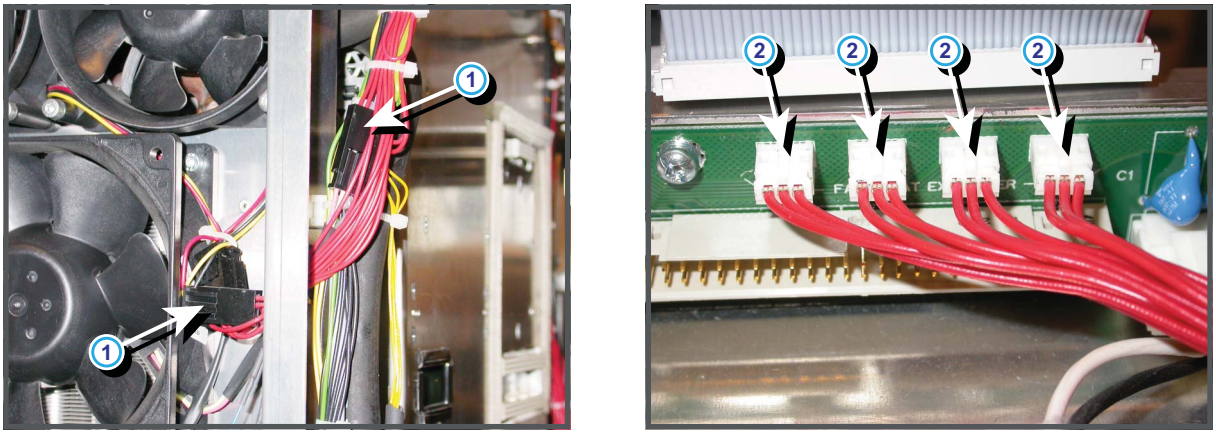


Image 4-6

Code: “elcabox fan1 - speed low” (Warning)

Situation	Solution
Wire unit (reference 1 image 4-6) of the fan is disconnected.	Remove the front cover of the projector and check the connections of the four fans.
Wire unit (reference 2 image 4-6) of the fan is disconnected from the Power Backplane.	Remove the top cover of the projector and check if the four wire units (reference 2 image 4-6) are inserted in the Power Backplane. Note that the sockets for those four wire units are hidden behind the flat cable from the Lens Signal Distribution.
Blocked fan.	Check if none of the four fans at the front side of the projector are blocked. Ensure that the fans can turn freely.
Damaged wire unit.	Check if the wire unit of the four fans at the front side of the projector are not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board. None of the four Card Cage fans are working.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Fan end of life. When switching the wire unit of the slow fan with one of the wire units of the other three fans the same fan has a visible low speed and the warning indicates another fan number.	Replace the fan. See procedure "Replacement of the Card Cage Fans", page 326.

Code: “elcabox fan2 - speed high” (Warning)

Situation	Solution
Defect wire unit (reference 1 image 4-6) causing a disruption in the feedback circuit of the fan speed.	Check the wire unit of the fan for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Defect fan.	Replace the fan. See "Replacement of the Card Cage Fans", page 326.

Code: “elcabox fan2 - speed low” (Warning)

Situation	Solution
Wire unit (reference 1 image 4-6) of the fan is disconnected.	Remove the front cover of the projector and check the connections of the four fans.
Wire unit (reference 2 image 4-6) of the fan is disconnected from the Power Backplane.	Remove the top cover of the projector and check if the four wire units (reference 2 image 4-6) are inserted in the Power Backplane. Note that the sockets for those four wire units are hidden behind the flat cable from the Lens Signal Distribution.
Blocked fan.	Check if none of the four fans at the front side of the projector are blocked. Ensure that the fans can turn freely.
Damaged wire unit.	Check if the wire unit of the four fans at the front side of the projector are not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board. None of the four Card Cage fans are working.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Fan end of life. When switching the wire unit of the slow fan with one of the wire units of the other three fans the same fan has a visible low speed and the warning indicates another fan number.	Replace the fan. See fan replacement procedures "Replacement of the Card Cage Fans", page 326.

Code: “elcabox fan3 - speed high” (Warning)

Situation	Solution
Defect wire unit (reference 1 image 4-6) causing a disruption in the feedback circuit of the fan speed.	Check the wire unit of the fan for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Defect fan.	Replace the fan. See "Replacement of the Card Cage Fans", page 326.

Code: “elcabox fan3 - speed low” (Warning)

Situation	Solution
Wire unit (reference 1 image 4-6) of the fan is disconnected.	Remove the front cover of the projector and check the connections of the four fans.
Wire unit (reference 2 image 4-6) of the fan is disconnected from the Power Backplane.	Remove the top cover of the projector and check if the four wire units (reference 2 image 4-6) are inserted in the Power Backplane. Note that the sockets for those four wire units are hidden behind the flat cable from the Lens Signal Distribution.
Blocked fan.	Check if none of the four fans at the front side of the projector are blocked. Ensure that the fans can turn freely.
Damaged wire unit.	Check if the wire unit of the four fans at the front side of the projector are not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board. None of the four Card Cage fans are working.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Fan end of life. When switching the wire unit of the slow fan with one of the wire units of the other three fans the same fan has a visible low speed and the warning indicates another fan number.	Replace the fan. See fan replacement procedures "Replacement of the Card Cage Fans", page 326.

Code: “elcabox fan4 - speed high” (Warning)

Situation	Solution
Defect wire unit (reference 1 image 4-6) causing a disruption in the feedback circuit of the fan speed.	Check the wire unit of the fan for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Defect fan.	Replace the fan. See "Replacement of the Card Cage Fans", page 326

Code: “elcabox fan4 - speed low” (Warning)

Situation	Solution
Wire unit (reference 1 image 4-6) of the fan is disconnected.	Remove the front cover of the projector and check the connections of the four fans.
Wire unit (reference 2 image 4-6) of the fan is disconnected from the Power Backplane.	Remove the top cover of the projector and check if the four wire units (reference 2 image 4-6) are inserted in the Power Backplane. Note that the sockets for those four wire units are hidden behind the flat cable from the Lens Signal Distribution.
Blocked fan.	Check if none of the four fans at the front side of the projector are blocked. Ensure that the fans can turn freely.
Damaged wire unit.	Check if the wire unit of the four fans at the front side of the projector are not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Situation	Solution
Malfunction SMPS PFC board. None of the four Card Cage fans are working.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Fan end of life. When switching the wire unit of the slow fan with one of the wire units of the other three fans the same fan has a visible low speed and the warning indicates another fan number.	Replace the fan. See fan replacement procedures "Replacement of the Card Cage Fans", page 326.

Code: “engine - not connected” (Error)

Situation	Solution
The Sealed Light Processor Unit is not correctly installed.	Check if the Sealed Light Processor Unit is properly installed. Ensure that both fixation screws (reference 1 & 2 image 4-7) at the foot of the Sealed Light Processor Unit are fastened. See "Installation of the Sealed Light Processor", page 164.
Wire unit of the micro switch (reference 3 image 4-8) disconnected from the Power Backplane.	Check if the wire unit (reference 4 image 4-8) is plugged in on the Power Backplane.
Defect micro switch.	Replace the micro switch.

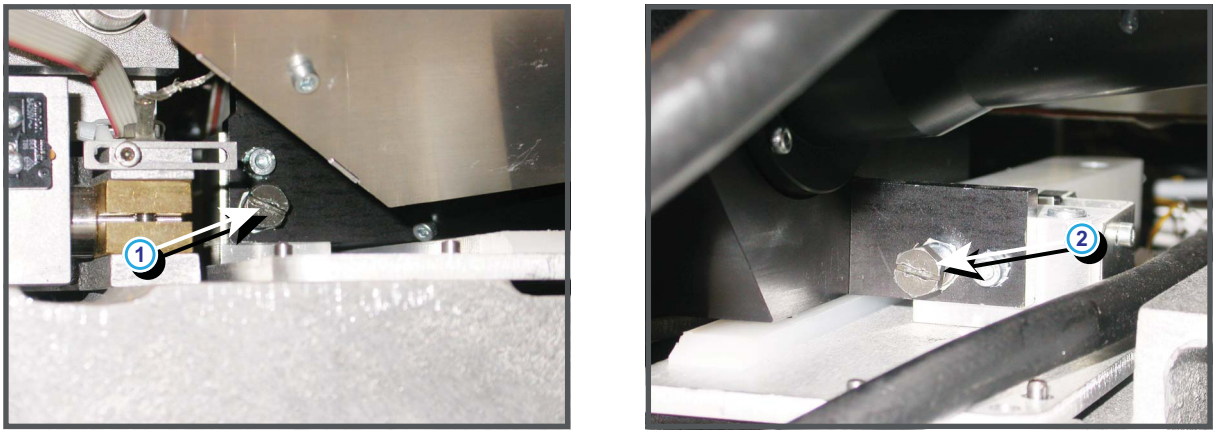


Image 4-7

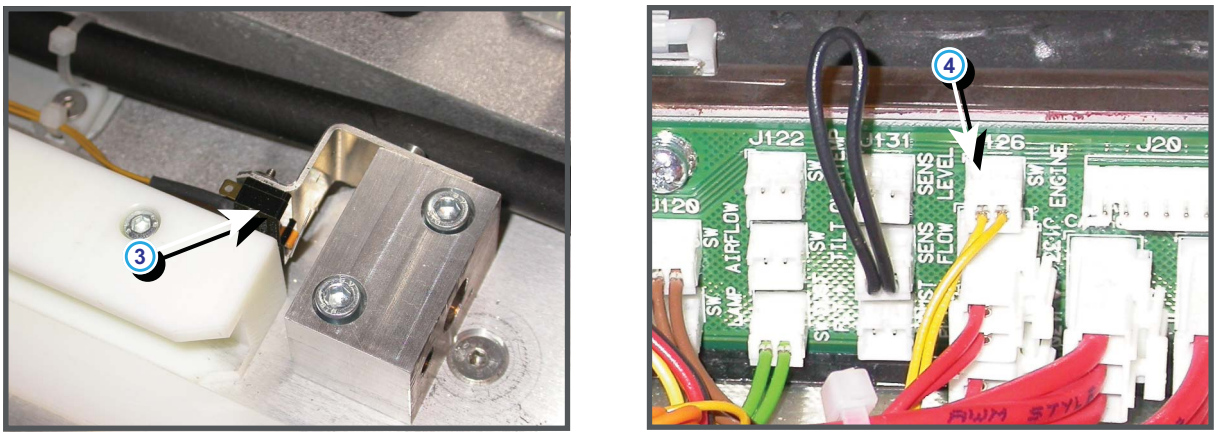


Image 4-8

Code: “lamp - read run time failed” (Error)

Situation	Solution
Wrong Lamp House inside lamp compartment.	Replace the Lamp House with a compatible Lamp House for this projector.

Situation	Solution
No communication with the Lamp House.	1. Check if the blue socket (reference 1 image 4-9) of the lamp house is not damaged. 2. Check if the blue socket (reference 2 image 4-9) in the lower right corner of the lamp compartment is not damaged. 3. Check wiring at the rear side of the blue socket (reference 3 image 4-10) inside the projector. The rear side of the blue socket inside the projector is visible after removal of the left side cover (Sealed Light Processor side). 4. Check if the wire unit coming from the blue socket in the lamp compartment is plugged into its socket (reference 4 image 4-10) on the Power Backplane. 5. Check if the wire unit (reference 5 image 4-11) of the Lamp Info Module is connected with its socket on the module.
Malfunction Lamp Info Module.	Replace the Lamp Info Module. See "Replacement of the Lamp Info module", page 128.

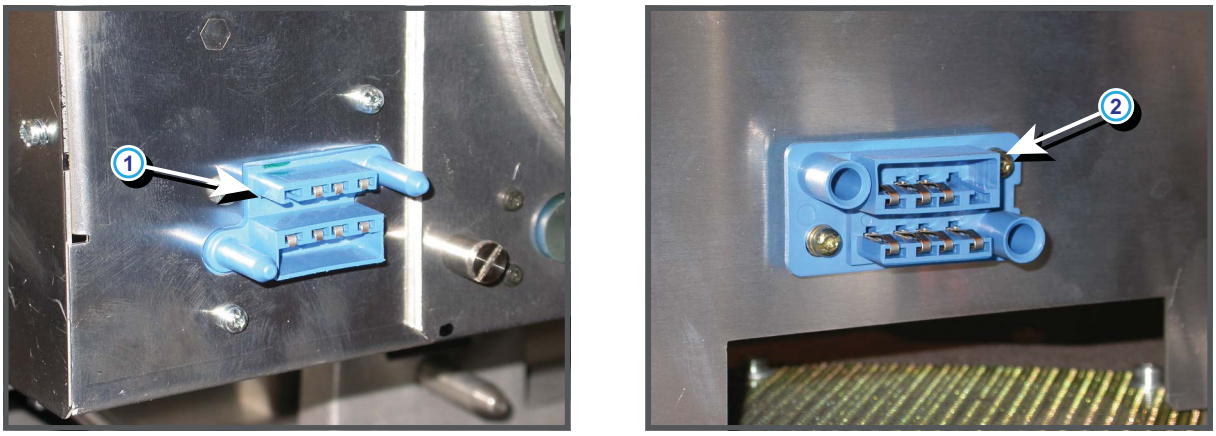


Image 4-9

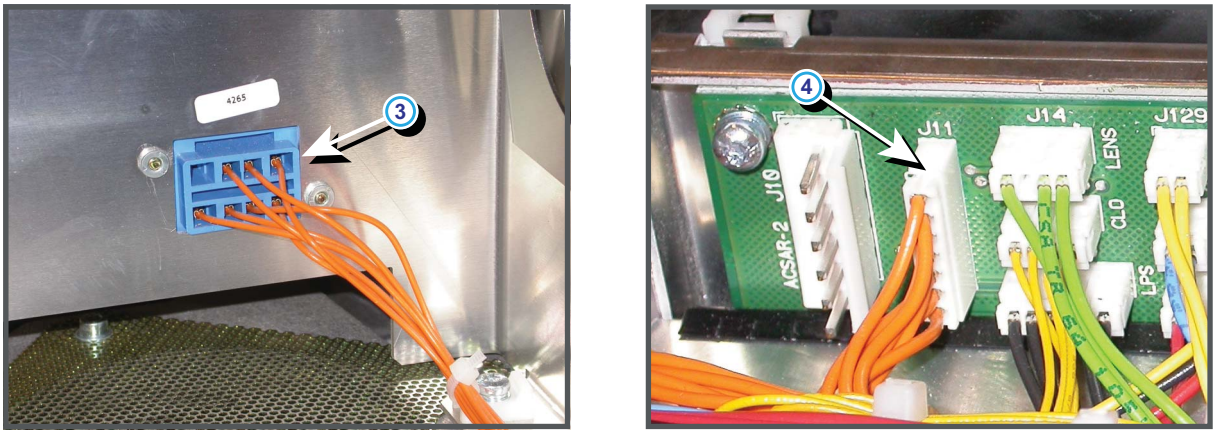


Image 4-10

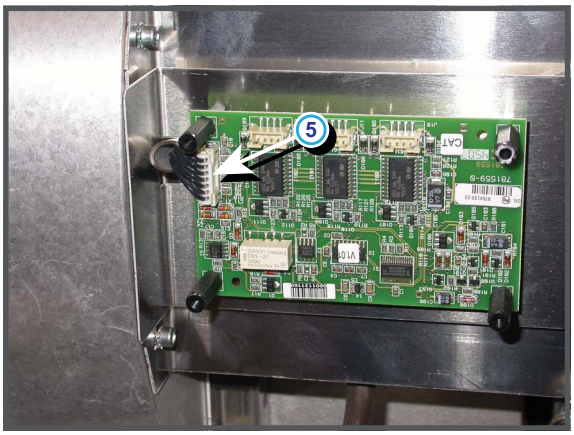


Image 4-11

Code: “lamp - read run time limits failed” (Error)

Situation	Solution
Wrong Lamp House inside lamp compartment.	Replace the Lamp House with a compatible Lamp House for this projector.
No communication with the Lamp House.	1. Check if the blue socket (reference 1 image 4-9) of the lamp house is not damaged. 2. Check if the blue socket (reference 2 image 4-9) in the lower right corner of the lamp compartment is not damaged. 3. Check wiring at the rear side of the blue socket (reference 3 image 4-10) inside the projector. The rear side of the blue socket inside the projector is visible after removal of the left side cover (Sealed Light Processor side). 4. Check if the wire unit coming from the blue socket in the lamp compartment is plugged into its socket (reference 4 image 4-10) on the Power Backplane. 5. Check if the wire unit (reference 5 image 4-11) of the Lamp Info Module is connected with its socket on the module.
Malfunction Lamp Info Module.	Replace the Lamp Info Module. See "Replacement of the Lamp Info module", page 128.

Code: “lamp - run time warning” (Warning)

Situation	Solution
The lamp inside the lamp house is about to exceed its maximum run time. Within 30 hours the lamp will exceeds its maximum run time	Replace the lamp as soon as possible with a new lamp. See "Lamps and Lamp House", page 105.

Code: “lamp - run time exceeds maximum” (Error)

Situation	Solution
The lamp inside the lamp house has exceeded its maximum run time.	Replace the lamp immediately with a new lamp. See "Lamps and Lamp House", page 105.

Code: “lamp - run time too high - soon no startup” (Error)

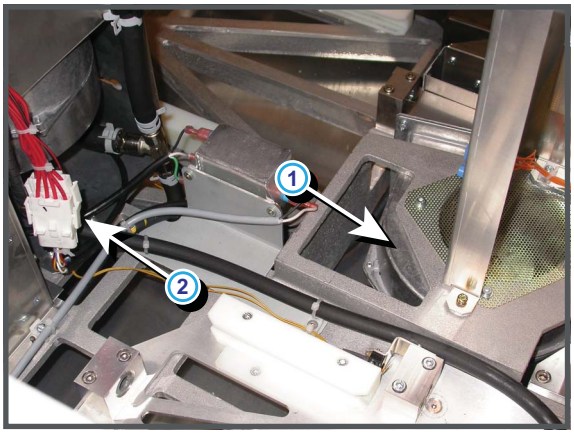
Situation	Solution
The lamp inside the lamp is far beyond its maximum run time (almost double). Soon the lamp start up will be blocked.	Replace the lamp immediately with a new lamp. See "Lamps and Lamp House", page 105. Note that the lamp is really exhausted and that the light output of the lamp is far below the minimum requirements.

Code: “lamp - run time too high - startup blocked” (Error)

Situation	Solution
The lamp inside the lamp is far beyond its maximum run time (more then double). The projector refuses to strike the lamp. This to prevent damage to other parts of the projector.	Replace the exhausted lamp. See "Lamps and Lamp House", page 105.

Code: “lamp anode fan - speed high” (Error)

Situation	Solution
Defect wire unit (reference 2 image 4-12) causing a disruption in the feedback circuit of the fan speed.	Check the wire unit of the fan for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Defect anode fan (reference 1 image 4-12).	Replace the fan. See "Replacement of the Anode Fan", page 306.



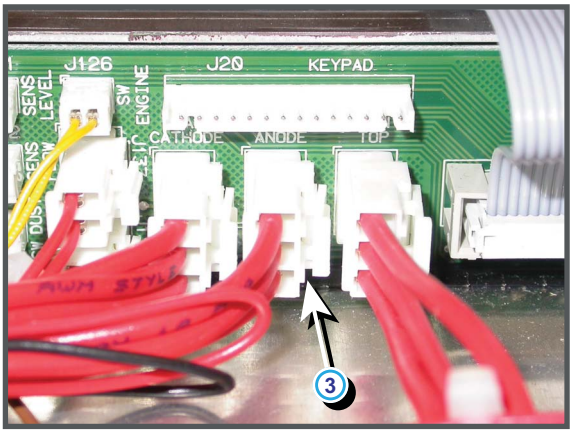


Image 4-12

Code: “lamp anode fan - speed low” (Error)

Situation	Solution
Wire unit (reference 2 image 4-12) of the fan is disconnected.	Remove the left side cover of the projector and the Sealed Light Processor and check the connection of the fan.
Wire unit (reference 3 image 4-12) of the fan is disconnected from the Power Backplane.	Remove the top cover of the projector and check if the wire unit (reference 3 image 4-12) is inserted in the Power Backplane.
Blocked fan (reference 1 image 4-12).	Check if the fan is not blocked. Ensure that the fan can turn freely.
Damaged wire unit.	Check if the wire unit of the anode fan is not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Situation	Solution
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Anode fan (reference 1 image 4-12) end of life.	Replace the anode fan. See fan replacement procedures "Replacement of the Anode Fan", page 306.

Code: “lamp anode fan - voltage high” (Error)

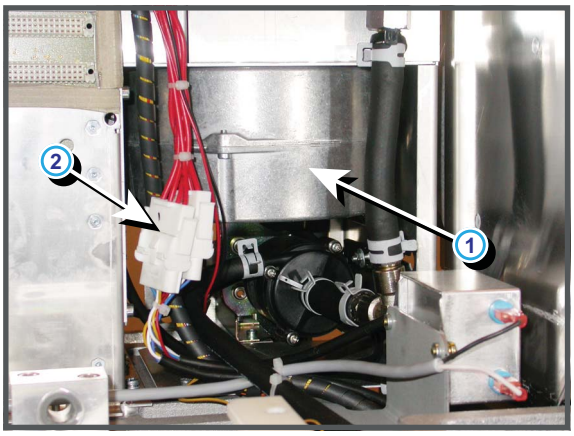
Situation	Solution
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.

Code: “lamp anode fan - voltage low” (Error)

Situation	Solution
Damaged insulation of the wire unit (reference 2 image 4-12) of the anode fan.	Check the insulation of the wire unit of the anode fan. 1. Repair the insulation of the wire unit using shrink sleeve. 2. If not repairable, replace the whole wire unit and/or fan.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Malfunction Power Backplane (bad connection)	Replace the Power Backplane. See chapter "Card Cage", page 243.

Code: “lamp cathode fan - speed high” (Error)

Situation	Solution
Defect wire unit (reference 2 image 4-13) causing a disruption in the feedback circuit of the fan speed.	Remove the left side cover of the projector and the Sealed Light Processor and check the wire unit of the fan for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Defect cathode fan (reference 1 image 4-13).	Replace the fan. See "Replacement of the Cathode Fan", page 312.



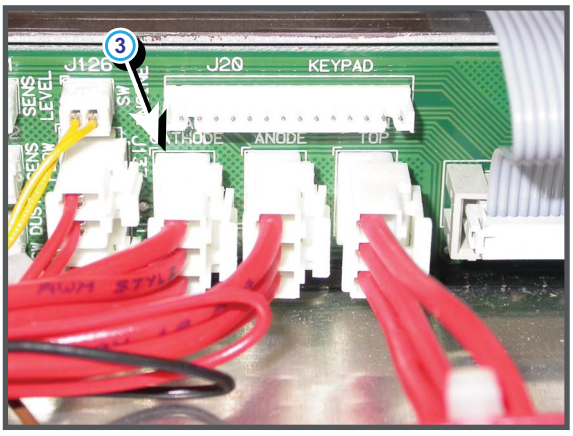


Image 4-13

Code: “lamp cathode fan - speed low” (Error)

Situation	Solution
Wire unit (reference 2 image 4-13) of the fan is disconnected.	Remove the left side cover of the projector and the Sealed Light Processor and check the connection of the fan.
Wire unit (reference 3 image 4-13 of the fan is disconnected from the Power Backplane.	Remove the top cover of the projector and check if the wire unit (reference 2 image 4-13) is inserted in the Power Backplane.
Blocked fan.	Check if the fan is not blocked. Ensure that the fan can turn freely.
Damaged wire unit (reference 2 image 4-13).	Check if the wire unit of the four fans at the front side of the projector are not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252..
Cathode fan (reference 1 image 4-13) end of life.	Replace the fan. See fan replacement procedures "Replacement of the Cathode Fan", page 312.

Code: “lamp cathode fan - voltage high” (Error)

Situation	Solution
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.

Code: “lamp cathode fan - voltage low” (Error)

Situation	Solution
Damaged insulation of the wire unit (reference 2 image 4-13) of the cathode fan.	Check the insulation of the wire unit of the cathode fan. 1. Repair the insulation of the wire unit using shrink sleeve. 2. If not repairable, replace the whole wire unit and/or fan.

Situation	Solution
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Malfunction Power Backplane (bad connection)	Replace the Power Backplane.

Code: “lamp house - not connected” (Error)

Situation	Solution
Lamp House is not correctly installed.	Check if the Lamp House is properly installed. Make sure that both fixation screws (reference 1 & 2 image 4-14) at the base of the Lamp House are fastened. See "Installing the Lamp House", page 121.
Defect micro switch (reference 3 image 4-15).	Replace the micro switch.
Wire unit of the micro switch (reference 4 image 4-15) disconnected from the Power Backplane.	Check if the wire unit (reference 4 image 4-15) is plugged in on the Power Backplane.

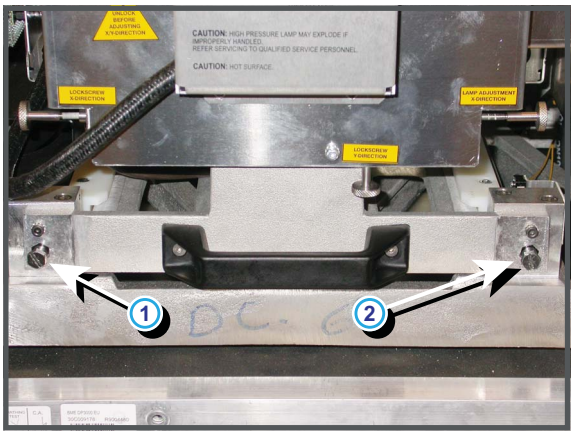
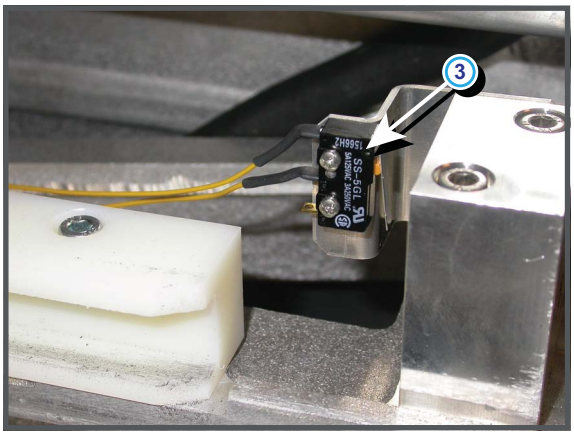


Image 4-14



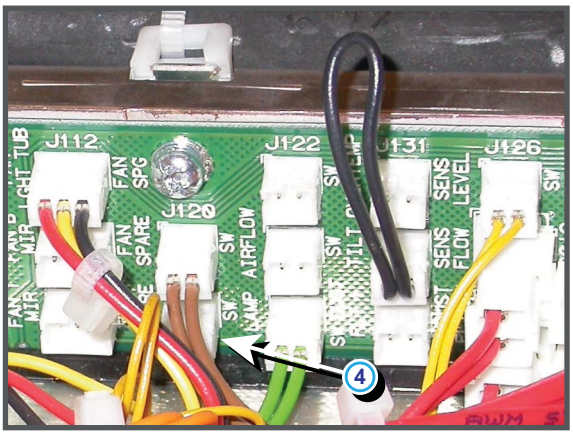


Image 4-15

Code: “lamp house - temperature too high” (Error)

This error code is probably proceeded by the warning code: “lamp house - temperature high”. The same troubleshooting table can be applied to.

Code: “lamp house - temperature high” (Warning)

Situation	Solution
Blocked air inlet at the front side of the projector.	Make sure that the air inlet at the front of the projector is free so that fresh air can easily flow into the projector.
Filthy air filter at the front side of the projector	Clean the front air filters of the projector. Replace if damaged. See procedure "Cleaning the dust filters", page 340
Ambient temperature too high.	Check the ambient temperature at the air inlets of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Malfunction air extraction system.	Check the condition of the air extraction system. The air extraction system must be capable of removing minimum 10 m³/min or 350 CFM per installed DP-3000 digital projector.
Defect temperature sensor (reference 1 image 4-16)	Replace the defect temperature sensor.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

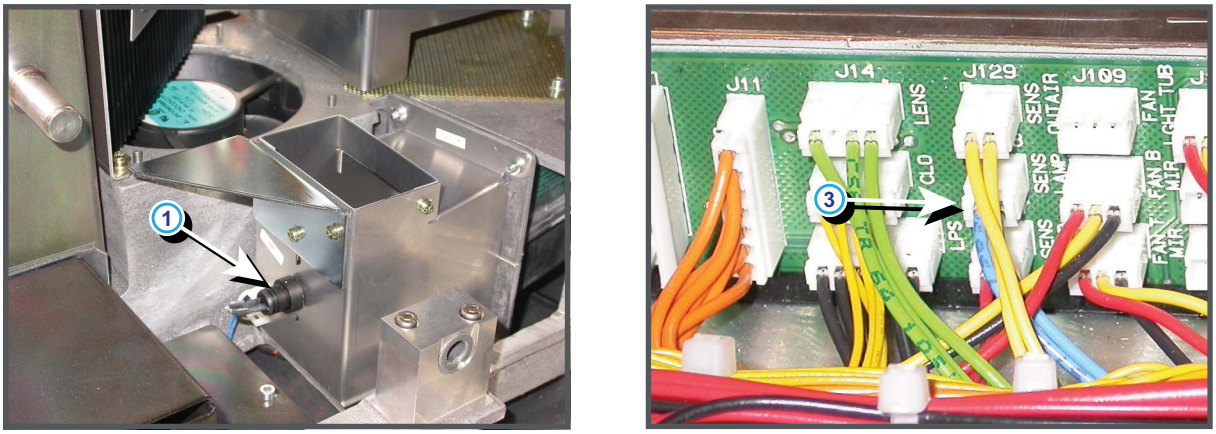


Image 4-16

Code: “lamp house - temperature low” (Error)

Situation	Solution
Disconnected temperature sensor (reference 1 image 4-16) inside the air channel of the lamp anode cooling.	Check the wire unit of the temperature sensor at the base of the Lamp House compartment.
Wire unit (reference 3 image 4-16)of the temperature sensor disconnected from the Power Backplane.	Check if the wire unit of the temperature sensor is connected with the Power Backplane.
Defect temperature sensor (reference 1 image 4-16).	Replace the temperature sensor.

Code: “lamp top fan - speed high” (Error)

Situation	Solution
Defect wire unit (reference 2 image 4-17) causing a disruption in the feedback circuit of the fan speed.	Check the wire unit of the fan for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Situation	Solution
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Defect top fan. The top fan is located inside the exhaust box (reference 1 image 4-17) on top of the Lamp House compartment.	Replace the Outlet Fan. See "Replacement of the Outlet Fan", page 316.

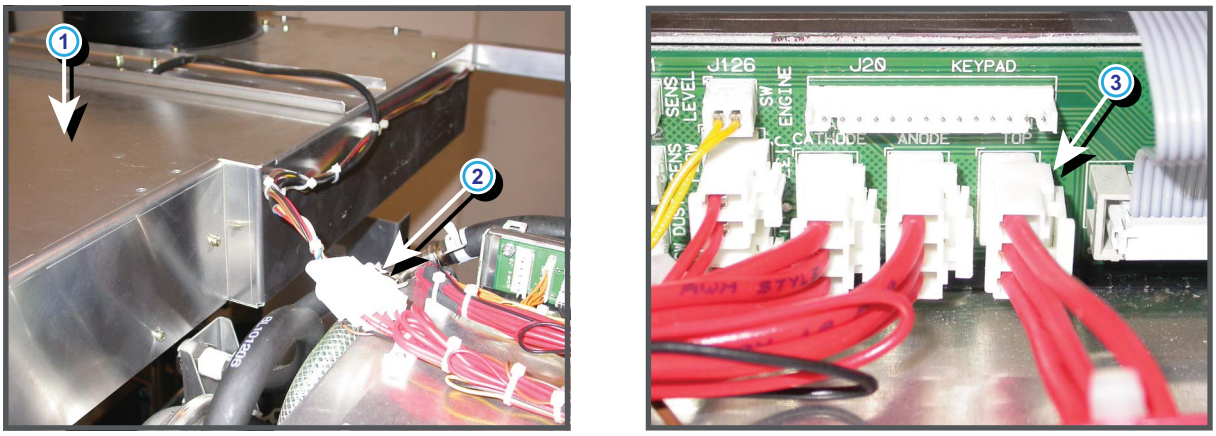


Image 4-17

Code: “lamp top fan - speed low” (Error)

Situation	Solution
Wire unit (reference 2 image 4-17) of the fan is disconnected.	Check the connection of the fan.
Wire unit (reference 3 image 4-17) of the fan is disconnected from the Power Backplane.	Remove the top cover of the projector and check if the wire unit (reference 3 image 4-17) is inserted in the Power Backplane.
Blocked fan.	Check if the fan is not blocked. Ensure that the fan can turn freely.
Damaged wire unit (reference 2 image 4-17).	Check if the wire unit of the fan is not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Fan end of life.	Replace the fan. See fan replacement procedures "Replacement of the Outlet Fan", page 316.

Code: “lamp top fan - voltage high” (Error)

Situation	Solution
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.

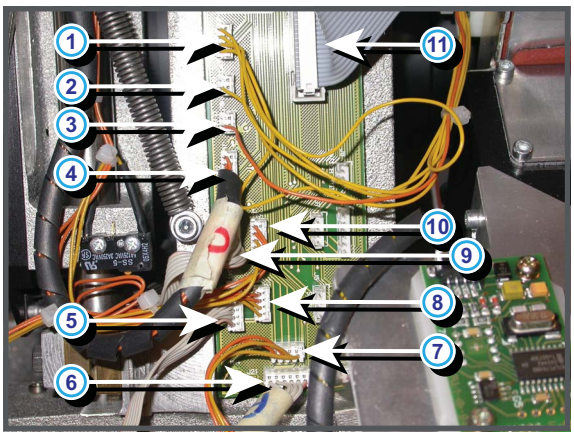
Code: “lamp top fan - voltage low” (Error)

Situation	Solution
Damaged insulation of the wire unit (reference 2 image 4-17) of the lamp top fan.	Check the insulation of the wire unit of the fan. 1. Repair the insulation of the wire unit using shrink sleeve. 2. If not repairable, replace the whole wire unit and/or fan.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Malfunction Power Backplane (bad connection)	Replace the Power Backplane.

Code: “lens focus position - requested target not reached” (Error)

This error may occur if the projector is switched off while the lens file is still active. See also Info-T 761: Storing lens positions in the DP series.

Situation	Solution
The activated lens file does not correspond with the lens mounted on the projector.	Activate a lens file which do correspond with the mounted lens or mount an other lens which correspond with the lens file you wan to activate.
Corrupt lens file.	Delete current lens file and create a new lens file. Note that each time the lens is removed a new lens file has to be created.
The final lens position lays very close to the mechanical limits which disable the motorized lens position.	Position the lens manually, or reposition the projector so that the lens position lays further away from the mechanical limits, or try to use another lens which range is more suitable.
Disconnected wire unit (reference 6 image 4-18) of the focus motor of the motorized Lens Holder.	Check if all wire units of the Lens Holder are connected with the Lens Signal Distribution board. See reference image 4-18.
Disconnected wire unit, of the focus limit switch (reference 7 image 4-18).	Check if all wire units of the Lens Holder are connected with the Lens Signal Distribution board. See reference image 4-18.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction focus motor of the Lens Holder.	Use the local keypad to focus the image on the screen. If unsuccessful, replace the focus motor of the Lens Holder. See "Replacement of the focus motor", page 240.
Disconnected flat cable of the Lens Signal Distribution board.	Check if the flat cable is connected with Lens Signal Distribution board (reference 11 image 4-18) and with the Power Backplane (reference 12 image 4-18).



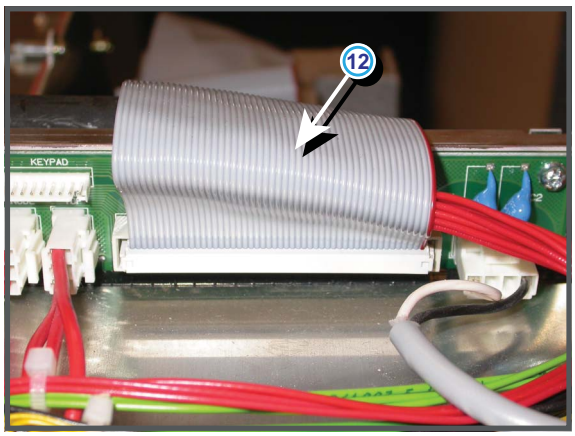


Image 4-18
1 Connection with Shutter (Dowser) motor.
2 Limit switch for Shutter in open position (yellow wire).
3 Limit switch for Shutter in closed position (orange wire).
4 Connection with Zoom motor on the lens.
5 Connection with Horizontal Shift motor of the Lens Holder.

6 Connection with Focus motor on the Lens Holder.
7 Limit switch for Focus.
8 Limit switch for Horizontal Shift.
9 Connection with Vertical Shift motor of the Lens Holder.
10 Limit switch for Vertical Shift.
11 Lens Signal Distribution flat cable from Power Backplane.
12 Lens Signal Distribution flat cable from Lens Signal Distribution board.

Code: “lens horizontal shift position - requested target not reached” (Error)

Situation	Solution
The activated lens file does not correspond with the lens mounted on the projector.	Activate a lens file which do correspond with the mounted lens or mount an other lens which correspond with the lens file you wan to activate.
Corrupt lens file.	Delete current lens file and create a new lens file. Note that each time the lens is removed a new lens file has to be created.
The final lens position lays very close to the mechanical limits which disable the motorized lens position.	Position the lens manually, or reposition the projector so that the lens position lays further away from the mechanical limits, or try to use another lens which range is more suitable.
Disconnected wire unit (reference 5 image 4-18) of the horizontal shift motor of the motorized Lens Holder.	Check if all wire units of the Lens Holder are connected with the Lens Signal Distribution board. See reference image 4-18.
Disconnected wire unit, of the horizontal shift limit switch (reference 8 image 4-18).	Check if all wire units of the Lens Holder are connected with the Lens Signal Distribution board. See reference image 4-18.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction horizontal shift motor of the Lens Holder.	Use the local keypad to shift the image horizontal on the screen. If unsuccessful, replace the horizontal shift motor of the Lens Holder. See "Replacement of the horizontal shift motor", page 238.
Disconnected flat cable of the Lens Signal Distribution board.	Check if the flat cable is connected with Lens Signal Distribution board (reference 11 image 4-18) and with the Power Backplane (reference 12 image 4-18).

Code: “lens vertical shift position - requested target not reached” (Error)

Situation	Solution
The activated lens file does not correspond with the lens mounted on the projector.	Activate a lens file which do correspond with the mounted lens or mount an other lens which correspond with the lens file you wan to activate.
Corrupt lens file.	Delete current lens file and create a new lens file. Note that each time the lens is removed a new lens file has to be created.
The final lens position lays very close to the mechanical limits which disable the motorized lens position.	Position the lens manually, or reposition the projector so that the lens position lays further away from the mechanical limits, or try to use another lens which range is more suitable.
Disconnected wire unit (reference 9 image 4-18) of the vertical shift motor of the motorized Lens Holder.	Check if all wire units of the Lens Holder are connected with the Lens Signal Distribution board. See reference image 4-18.
Disconnected wire unit, of the vertical shift limit switch (reference 10 image 4-18).	Check if all wire units of the Lens Holder are connected with the Lens Signal Distribution board. See reference image 4-18.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction vertical shift motor of the Lens Holder.	Use the local keypad to shift the image horizontal on the screen. If unsuccessful, replace the horizontal shift motor of the Lens Holder. See "Replacement of the vertical shift motor", page 236.
Disconnected flat cable of the Lens Signal Distribution board.	Check if the flat cable is connected with Lens Signal Distribution board (reference 11 image 4-18) and with the Power Backplane (reference 12 image 4-18).

Code: “lens zoom position - requested target not reached” (Error)

Situation	Solution
Manual lens installed.	Replace the manual lens with a motorized lens.
The activated lens file does not correspond with the lens mounted on the projector.	Activate a lens file which do correspond with the mounted lens or mount an other lens which correspond with the lens file you wan to activate.

Situation	Solution
Corrupt lens file.	Delete current lens file and create a new lens file. Note that each time the lens is removed a new lens file has to be created.
The final lens position lays very close to the mechanical limits which disable the motorized lens position.	Position the lens manually, or reposition the projector so that the lens position lays further away from the mechanical limits, or try to use another lens which range is more suitable.
Disconnected wire unit (reference 4 image 4-18) of the zoom motor of the installed lens .	Check if all wire units of the Lens Holder are connected with the Lens Signal Distribution board. See reference image 4-18.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction zoom motor of the installed lens.	Use the local keypad to zoom the image on the screen. If unsuccessful, replace the installed lens. See "Lenses and Lens Holder", page 219.
Disconnected flat cable of the Lens Signal Distribution board.	Check if the flat cable is connected with Lens Signal Distribution board (reference 11 image 4-18) and with the Power Backplane (reference 12 image 4-18).

Code: “lps - communication failed” (Error)

Situation	Solution
Power interruption of the LPS Power unit.	Check the mains power of the LPS Power unit.
LPS communication cable disconnected from the LPS Power unit.	Remove the cover plate of the LPS Power unit to see the connections of the LPS Power unit. Check if the LPS communication cable (reference 1 of image 4-19) is inserted in its socket. Make sure that the thumbscrews have been tightened.
LPS communication cable disconnected form the projector head.	Check if the LPS communication cable (reference 2 image 4-19) is connected with the projector head. Make sure that the thumbscrews have been tightened.
Disconnected wire units from the LPS communication interface board inside the projector head and the Power Backplane.	Check if all wire units (reference 1, 2 and 3 image 4-20) are connected with the Power Backplane and the communication interface board of the projector.
Disconnected wire unit between the “CTRL IN” and “CTRL OUT” sockets of one of the LPS modules and the LPS communication interface inside the LPS Power unit. (brown wire units)	Reconnect the wire units (reference 3 image 4-21) between the “CTRL IN” and “CTRL OUT” sockets of the LPS modules and make sure that the first wire unit in the loop is connected with the LPS communication interface of the Power Unit.
Malfunction of one of the LPS modules. The red LED “ERR” of the malfunction LPS module flashes fast.	Replace the malfunction LPS module of the Power unit. See "Removal of an LPS module", page 86.
Malfunction LPS Communication Interface board of the projector head.	Replace the LPS Communication Interface board of the projector head.
Malfunction LPS Communication Interface board of the LPS Power unit.	Replace the LPS Communication Interface board of the LPS Power unit. See "Replacement of the LPS communication interface", page 92.
Malfunction Input & Communication unit.	Replace the malfunction Input & Communication unit. See "Installation of the Input & Communication unit", page 280.

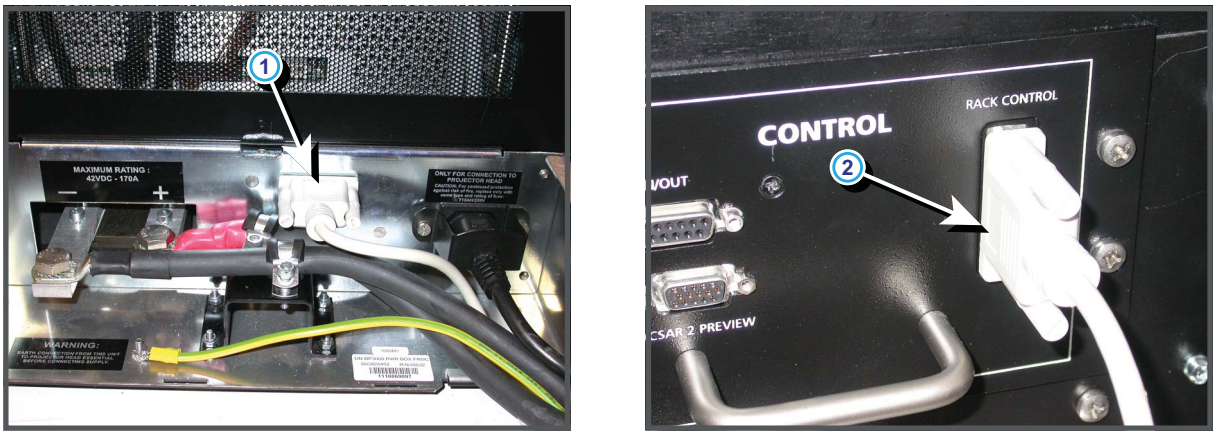


Image 4-19

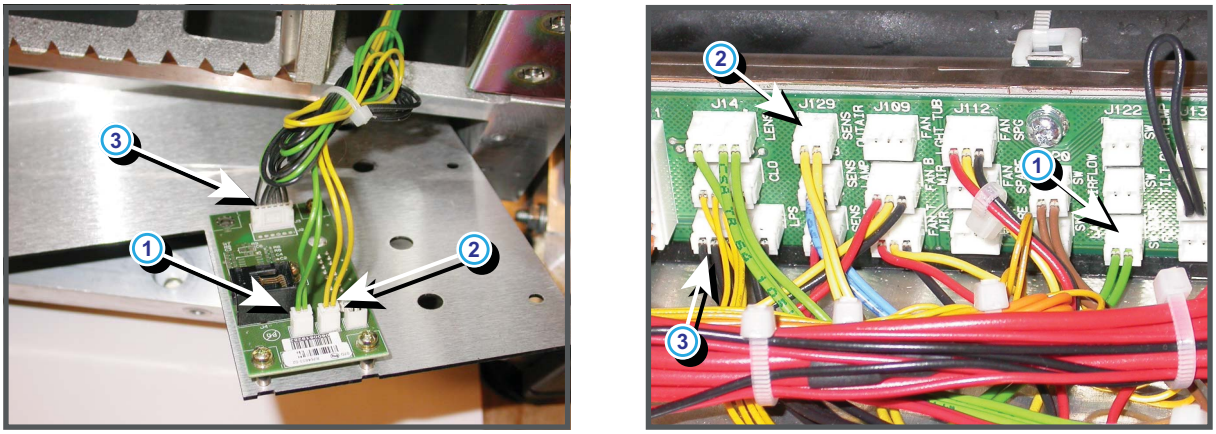


Image 4-20
1 Wire unit for LPS detection.
2 Wire unit for rack (Power Unit) temperature sensor.
3 Wire unit for LPS control signals.

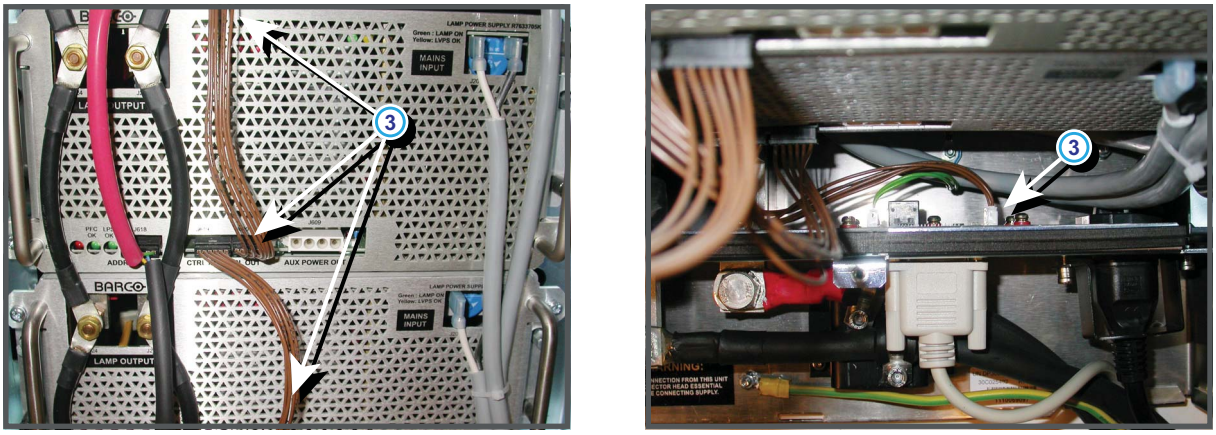


Image 4-21
3 Wire units for LPS control signals between LPS units and LPS communication interface.

Code: “lps - not detected” (Error)

Situation	Solution
None of the LPS modules could be detected during the start up (initialization) of the projector head due to a disconnected LPS communication cable.	Check if the LPS communication cable (reference 1 and 2 image 4-19) is well connected with the LPS Power unit (RACK CONTROL) and the projector head.

Situation	Solution
The LPS Power unit is not connected with the power net.	Check the wire unit (reference 1 image 4-22) of the mains power of the LPS Power unit.
Disconnected wire units from the LPS communication interface board inside the projector head and the Power Backplane.	Check if all wire units (reference 1, 2 and 3 image 4-20) are connected with the Power Backplane and the communication interface board of the projector.
Disconnected CTRL wire (reference 3 image 4-21) of the LPS communication interface inside the LPS Power unit. (brown wire units)	Reconnect the wire unit (reference 3 image 4-21) with the LPS communication interface of the Power Unit.
Malfunction LPS Communication Interface board of the projector head.	Replace the LPS Communication Interface board of the projector head.
Malfunction LPS Communication Interface board of the LPS Power unit.	Replace the LPS Communication Interface board of the LPS Power unit. See "Replacement of the LPS communication interface", page 92.
Malfunction of one of the LPS modules. The red LED “ERR” of the malfunction LPS module flashes fast.	Replace the malfunction LPS module of the Power unit. See "Removal of an LPS module", page 86.
Malfunction Input & Communication unit.	Replace the malfunction Input & Communication unit. See "Input & Communication unit", page 269.

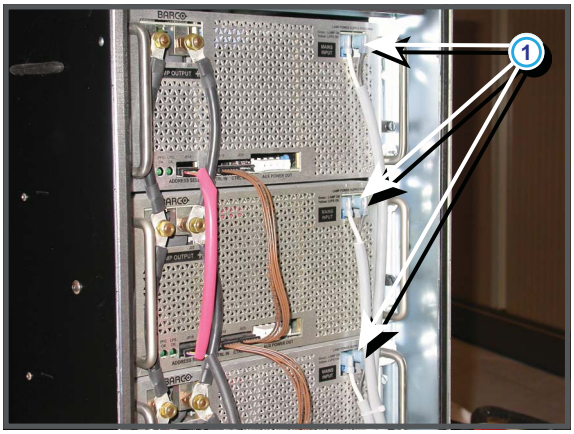


Image 4-22

Code: “lps - at least one could not be detected” (Error)

Situation	Solution
Disconnected wire unit (reference 1 image 4-23) of the “ADDRESS” sockets between the LPS modules inside the LPS Power unit. (black wire unit)	Reconnect the wire unit with the ADDRESS sockets of the LPS modules. See "Installation of an LPS module", page 88
Disconnected wire unit (reference 2 image 4-23) between the “CTRL IN” and “CTRL OUT” sockets of one of the LPS modules inside the LPS Power unit. (brown wire unit)	Reconnect the wire unit between the “CTRL IN” and “CTRL OUT” sockets of the LPS modules. See "Installation of an LPS module", page 88
Malfunction of one of the LPS modules. The red LED “ERR” of the malfunction LPS module flashes fast.	Replace the malfunction LPS module of the Power unit. See "Removal of an LPS module", page 86.

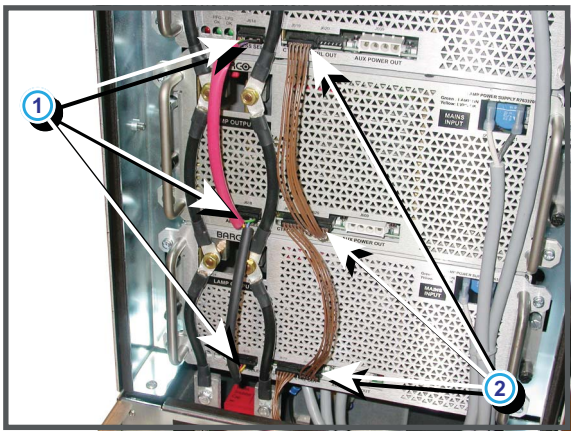
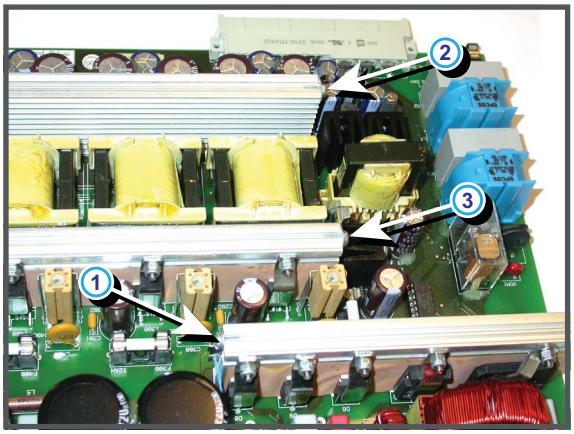


Image 4-23

Code: “pfc - temperature high” (Error)

Situation	Solution
The temperature of the heat sink (reference 1 image 4-24) of the PFC circuitry on the SMPS PFC board is too high due to an too high ambient temperature.	Check the ambient temperature at the front air inlet of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
The temperature of the heat sink (reference 1 image 4-24) of the PFC circuitry on the SMPS PFC board is too high due to a blocked air inlet	Check the dust filter at the front of the projector. Clean if necessary or replace if damaged. Make sure that the air inlet at the front side of the projector is not blocked.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.



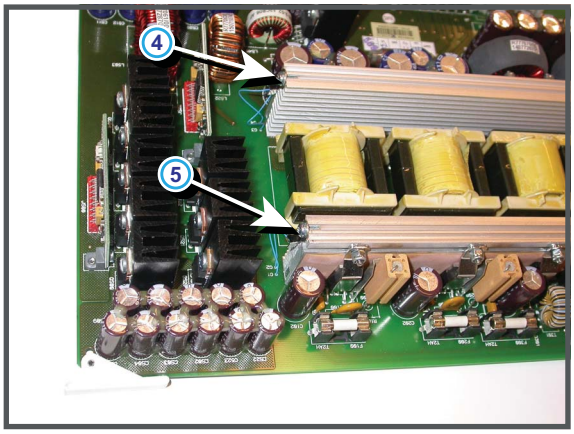


Image 4-24
1 SMPS PFC board: temperature sensor PFC heat sink.
2 SMPS PFC board: temperature sensor SMPS1 secondary heat sink.
3 SMPS PFC board: temperature sensor SMPS1 primary heat sink.
4 SMPS DCDC board: temperature sensor SMPS2 secondary heat sink.
5 SMPS DCDC board: temperature sensor SMPS2 primary heat sink.

Code: “pfc - temperature low” (Error)

Situation	Solution
Disconnected temperature sensor (reference 1 image 4-24) of the PFC heat sink on the SMPS PFC board.	Check if the wire unit of the temperature sensor is connected with the SMPS PFC board.

Situation	Solution
Defect temperature sensor (reference 1 image 4-24).	Replace the temperature sensor.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “pulse generator fan - speed high” (Error)

Situation	Solution
Defect wire unit (reference 2 image 4-25) causing a disruption in the feedback circuit of the fan speed.	Check the wire unit of the fan (reference 1 image 4-25) for damage. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Defect fan.	Replace the fan. See "Replacement of the SPG Fan", page 325.

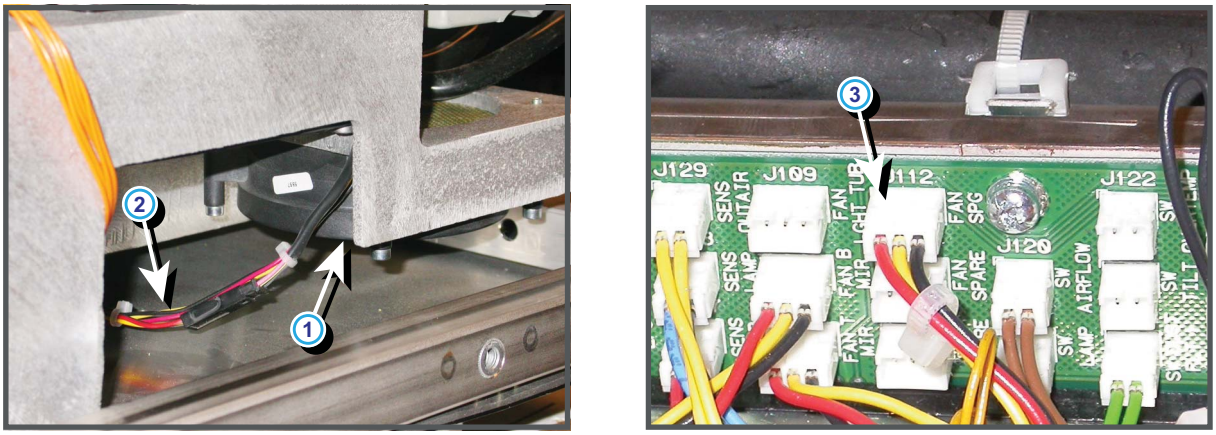


Image 4-25

Code: “pulse generator fan - speed low” (Error)

Situation	Solution
Wire unit (reference 2 image 4-25) of the Start Pulse Generator (SPG) fan disconnected.	Remove the left cover of the projector and check the connection of the wire unit of the fan below the SPG.
Wire unit (reference 3 image 4-25) disconnected from the Power Backplane.	Remove the top cover of the projector and check if the wire unit is inserted in the Power Backplane.
Blocked fan.	Unblock the fan. Ensure that the fan can turn freely.
Damaged wire unit.	Check if the wire unit of the fan is not damaged. Repair if possible, otherwise replace with new one.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Fan end of life.	Replace the fan. See "Replacement of the SPG Fan", page 325.

Code: “rack - temperature high” (Error)

Situation	Solution
The temperature inside the Power unit (LPS) is too high due to a blocked air inlet.	Clean the grid of the air inlet with a vacuum cleaner. Make sure that there is sufficient free space in front of the air inlet so that fresh air can easily flow into the Power unit.
Ambient temperature too high.	Check the ambient temperature at the air inlet of the Power unit. Make sure that the ambient temperature does not exceed 35°C (95°F).
Malfunction LPS module.	Check the diagnostic LED’s of all LPS modules. See "LPS module diagnostic LED’s", page 79. Replace defect LPS modules. See "Removal of an LPS module", page 86.

Code: “rack - temperature low” (Error)

Situation	Solution
Disconnected wire unit (reference 2 image 4-26) of the temperature sensor (reference 1 image 4-26) of the Power unit.	Check if the wire unit of the temperature sensor is connected with the LPS communication board inside the Power unit.
Wire unit (reference 2image 4-20) of the temperature sensor disconnected from the Power Backplane.	Remove the top cover of the projector and check if the wire unit is connected with the Power Backplane.
Wire unit (reference 2 image 4-20 disconnected from the LPS communication board in the projector head.	Check if the wire unit is connected with the LPS communication board in the projector head. The LPS communication board is located behind the RACK CONTROL socket.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Defect temperature sensor (reference 1 image 4-26).	Replace the temperature sensor.

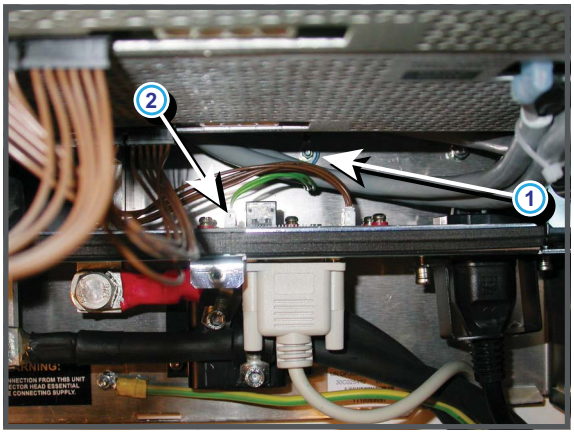


Image 4-26

Code: “sealing fan - speed high” (Error)

Situation	Solution
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Defect fan inside the Sealed Light Processor unit.	Replace the complete Sealed Light Processor unit. See "Removal of the Sealed Light Processor", page 161. Return the malfunction Sealed Light Processor unit to factory for repair.

Code: “sealing fan - speed low” (Error)

Situation	Solution
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Fan inside the sealed compartment is end of life.	Replace the complete Sealed Light Processor unit. See "Removal of the Sealed Light Processor", page 161. Return the malfunction Sealed Light Processor unit to factory for repair.

Code: “smps - i2c failed” (Error)

Situation	Solution
Failure of the I²C communication protocol between the SMPS CTRL board and the Barco Cinema Controller board.	Reboot the projector by switching OFF and ON. Wait a few seconds before switching ON again.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction Input & Communication Interface.	Replace the Input & Communication Interface. See "Removal of the Input & Communication unit", page 277.

Code: “smps1 primary - temperature high” (Error)

Situation	Solution
The temperature of the heat sink (reference 3 image 4-24) of the primary smps circuitry on the SMPS PFC board is too high due to an too high ambient temperature.	Check the ambient temperature at the front air inlet of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
The temperature of the heat sink (reference 3 image 4-24) of the primary smps circuitry on the SMPS PFC board is too high due to a blocked air inlet.	Check the dust filter at the front of the projector. Clean if necessary or replace if damaged. Make sure that the air inlet at the front side of the projector is not blocked.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “smps1 primary - temperature low” (Error)

Situation	Solution
Disconnected temperature sensor (reference 3 image 4-24) of the primary smps heat sink on the SMPS PFC board.	Check if the wire unit of the temperature sensor is connected with the SMPS PFC board.
Defect temperature sensor (reference 3 image 4-24).	Replace the temperature sensor.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “smps1 secondary - temperature high” (Error)

Situation	Solution
The temperature of the heat sink (reference 2 image 4-24) of the secondary smps circuitry on the SMPS PFC board is too high due to an too high ambient temperature.	Check the ambient temperature at the front air inlet of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
The temperature of the heat sink (reference 2 image 4-24) of the secondary smps circuitry on the SMPS PFC board is too high due to a blocked air inlet.	Check the dust filter at the front of the projector. Clean if necessary or replace if damaged. Make sure that the air inlet at the front side of the projector is not blocked.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “smps1 secondary - temperature low” (Error)

Situation	Solution
Disconnected temperature sensor (reference 2 image 4-24 of the secondary smps heat sink on the SMPS PFC board.	Check if the wire unit of the temperature sensor is connected with the SMPS PFC board.
Defect temperature sensor (reference 2 image 4-24).	Replace the temperature sensor.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “smps2 primary - temperature high” (Error)

Situation	Solution
The temperature of the heat sink (reference 5 image 4-24) of the primary smps circuitry on the SMPS PFC board is too high due to an too high ambient temperature.	Check the ambient temperature at the front air inlet of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
The temperature of the heat sink (reference 5 image 4-24) of the primary smps circuitry on the SMPS PFC board is too high due to a blocked air inlet.	Check the dust filter at the front of the projector. Clean if necessary or replace if damaged. Make sure that the air inlet at the front side of the projector is not blocked.
Malfunction SMPS DCDC board.	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “smps2 primary - temperature low” (Error)

Situation	Solution
Disconnected temperature sensor (reference 5 image 4-24) of the primary smps heat sink on the SMPS DCDC Board.	Check if the wire unit of the temperature sensor is connected with the SMPS DCDC board.

Situation	Solution
Defect temperature sensor (reference 5 image 4-24).	Replace the temperature sensor.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “smps2 secondary - temperature high” (Error)

Situation	Solution
The temperature of the heat sink (reference 4 image 4-24) of the secondary smps circuitry on the SMPS DCDC board is too high due to an too high ambient temperature.	Check the ambient temperature at the front air inlet of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
The temperature of the heat sink (reference 4 image 4-24) of the secondary smps circuitry on the SMPS DCDC board is too high due to a blocked air inlet.	Check the dust filter at the front of the projector. Clean if necessary or replace if damaged. Make sure that the air inlet at the front side of the projector is not blocked.
Malfunction SMPS DCDC board.	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “smps2 secondary - temperature low” (Error)

Situation	Solution
Disconnected temperature sensor (reference 4 image 4-24) of the secondary smps heat sink on the SMPS DCDC board.	Check if the wire unit of the temperature sensor is connected with the SMPS DCDC board.
Defect temperature sensor (reference 4 image 4-24).	Replace the temperature sensor.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “tec - voltage high” (Error)

Situation	Solution
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.

Code: “tec - voltage low” (Error)

Situation	Solution
Malfunction SMPS DCDC board. The +VTEC diagnostic LED remains off.	Replace the SMPS DCDC board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
One of the Peltier elements causes a short circuit.	Replace the Sealed Light Processor unit. Return the malfunction Sealed Light Processor to factory for repair. See "Removal of the Sealed Light Processor", page 161.

Code: “tec blue - not connected” (Error)

Situation	Solution
The wire unit of the Peltier element (TEC) inside the Sealed Light Processor is disconnected.	Replace the Sealed Light Processor unit. Return the malfunction Sealed Light Processor to factory for repair. See "Removal of the Sealed Light Processor", page 161.
Defect Peltier element (TEC).	Replace the Sealed Light Processor unit. Return the malfunction Sealed Light Processor to factory for repair. See "Removal of the Sealed Light Processor", page 161.

Code: “tec blue - temperature high” (Warning)

Situation	Solution
Too high ambient temperature. The other DMD temperatures are too high as well.	Check the ambient temperature at the front air inlet of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Blocked air inlet filter at the front of the projector.	Clean the air inlet filter. Replace in case of damage. See "Cleaning the dust filters", page 340.
Malfunction SMPS CTRL board. The LED “+VTEC” on the SMPS CTRL board remains off.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Interruption of the liquid cooling circuit.	Check if the loop of the liquid cooling circuit is closed. See chapter "Liquid Cooling Circuit", page 183.
The liquid cooling circuit of the Sealed Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the other DMD temperatures are too high as well.	Check of the cooling circuit of the Sealed Light Processor is connected with the pump and heat exchanger. See chapter "Liquid Cooling Circuit", page 183.
No or insufficient liquid inside the cooling circuit. The pump is sucking air and sounds noisier then normal.	Fill the cooling circuit with liquid and expel all air. Pressurize the circuit. See "Filling the Liquid Cooling Circuit", page 192.
The pump of the water cooling is electrical disconnected.	Check if the wire unit of the pump is properly connected with the pump (reference 1 image 4-27) and with the Power Backplane (reference 2 image 4-27).
Malfunction pump of the cooling circuit. You don’t feel any vibrations when touching the pump after activating the “Refill mode” via the Communicator software.	1. Check the electrical resistance of the pump winding. Replace the pump if infinite. See "Replacement of the Pump motor and rotor", page 212. 2. Drain the liquid cooling circuit, open the pump and check if the pump rotor is not blocked. If so, remove the rotor and clean the bearings of the pump. See "Cleaning the Pump", page 210.
Malfunction Peltier element (TEC) of the involved channel.	Replace the Sealed Light Processor and return the malfunction Sealed Light Processor to factory for repair. See chapter "Removal of the Sealed Light Processor", page 161.

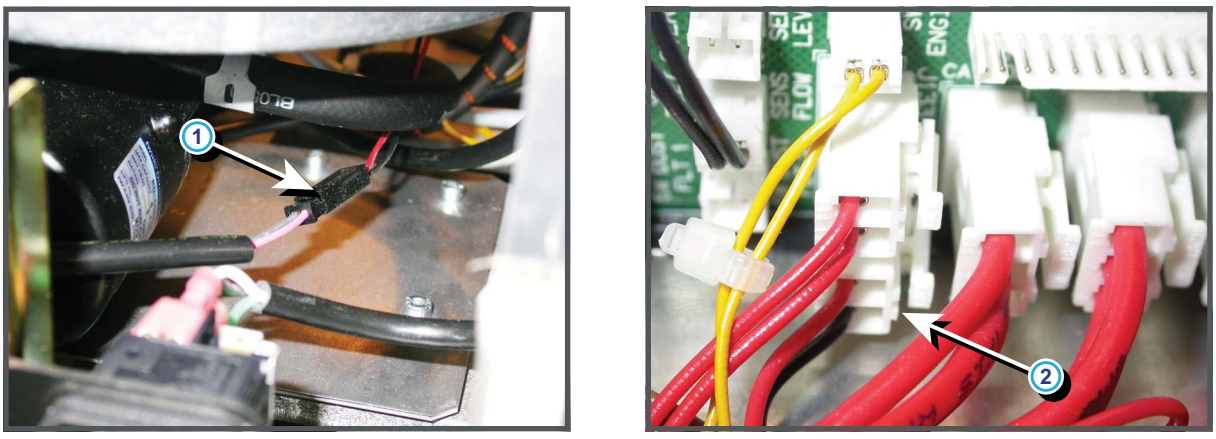


Image 4-27

Code: “tec blue - temperature too high” (Error)

This error code is probably proceeded by the warning code: “tec blue - temperature high”. The same troubleshooting table can be applied to.

Code: “tec green - not connected” (Error)

Situation	Solution
The wire unit of the Peltier element (TEC) inside the Sealed Light Processor is disconnected.	Replace the Sealed Light Processor unit. Return the malfunction Sealed Light Processor to factory for repair. See "Removal of the Sealed Light Processor", page 161.
Defect Peltier element (TEC).	Replace the Sealed Light Processor unit. Return the malfunction Sealed Light Processor to factory for repair. See "Removal of the Sealed Light Processor", page 161.

Code: “tec green - temperature high” (Warning)

Situation	Solution
Too high ambient temperature. The other DMD temperatures are too high as well.	Check the ambient temperature at the front air inlet of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Blocked air inlet filter at the front of the projector.	Clean the air inlet filter. Replace in case of damage. See "Cleaning the dust filters", page 340.
Malfunction SMPS CTRL board. The LED “+VTEC” on the SMPS CTRL board remains off. See "Card Cage diagnostic", page 245.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Interruption of the liquid cooling circuit.	Check if the loop of the liquid cooling circuit is closed. See chapter "Liquid Cooling Circuit", page 183.
The liquid cooling circuit of the Sealed Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the other DMD temperatures are too high as well.	Check of the cooling circuit of the Sealed Light Processor is connected with the pump and heat exchanger. See chapter "Liquid Cooling Circuit", page 183.
No or insufficient liquid inside the cooling circuit. The pump is sucking air and sounds noisier then normal.	Fill the cooling circuit with liquid and expel all air. Pressurize the circuit. See "Filling the Liquid Cooling Circuit", page 192.
The pump of the water cooling is electrical disconnected.	Check if the wire unit of the pump is properly connected with the pump (reference 1 image 4-27) and with the Power Backplane (reference 2 image 4-27).
Malfunction pump of the cooling circuit. You don’t feel any vibrations when touching the pump after activating the “Refill mode” via the Communicator software.	1. Check the electrical resistance of the pump winding. Replace the pump if infinite. See "Replacement of the Pump motor and rotor", page 212. 2. Drain the liquid cooling circuit, open the pump and check if the pump rotor is not blocked. If so, remove the rotor and clean the bearings of the pump. See "Cleaning the Pump", page 210.
Malfunction Peltier element (TEC) of the involved channel.	Replace the Sealed Light Processor and return the malfunction Sealed Light Processor to factory for repair. See "Removal of the Sealed Light Processor", page 161.

Code: “tec green - temperature too high” (Error)

This error code is probably proceeded by the warning code: “tec green - temperature high”. The same troubleshooting table can be applied to.

Code: “tec red - not connected” (Warning)

Situation	Solution
The wire unit of the Peltier element (TEC) inside the Sealed Light Processor is disconnected.	Replace the Sealed Light Processor unit. Return the malfunction Sealed Light Processor to factory for repair. See "Removal of the Sealed Light Processor", page 161.
Defect Peltier element (TEC).	Replace the Sealed Light Processor unit. Return the malfunction Sealed Light Processor to factory for repair. See "Removal of the Sealed Light Processor", page 161.

Code: “tec red - temperature high” (Error)

Situation	Solution
Too high ambient temperature. The other DMD temperatures are too high as well.	Check the ambient temperature at the front air inlet of the projector. Make sure that the ambient temperature does not exceed 35°C (95°F).
Blocked air inlet filter at the front of the projector.	Clean the air inlet filter. Replace in case of damage. See "Cleaning the dust filters", page 340..
Malfunction SMPS CTRL board. The LED “+VTEC” on the SMPS CTRL board remains off. See "Card Cage diagnostic", page 245.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Interruption of the liquid cooling circuit.	Check if the loop of the liquid cooling circuit is closed. See chapter "Liquid Cooling Circuit", page 183.
The liquid cooling circuit of the Sealed Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the other DMD temperatures are too high as well.	Check of the cooling circuit of the Sealed Light Processor is connected with the pump and heat exchanger. See chapter "Liquid Cooling Circuit", page 183.
No or insufficient liquid inside the cooling circuit. The pump is sucking air and sounds noisier then normal.	Fill the cooling circuit with liquid and expel all air. Pressurize the circuit. See "Filling the Liquid Cooling Circuit", page 192.
The pump of the water cooling is electrical disconnected.	Check if the wire unit of the pump is properly connected with the pump (reference 1 image 4-27) and with the Power Backplane (reference 2 image 4-27).
Malfunction pump of the cooling circuit. You don’t feel any vibrations when touching the pump after activating the “Refill mode” via the Communicator software.	1. Check the electrical resistance of the pump winding. Replace the pump if infinite. See "Replacement of the Pump motor and rotor", page 212. 2. Drain the liquid cooling circuit, open the pump and check if the pump rotor is not blocked. If so, remove the rotor and clean the bearings of the pump. See "Cleaning the Pump", page 210.
Malfunction Peltier element (TEC) of the involved channel.	Replace the Sealed Light Processor and return the malfunction Sealed Light Processor to factory for repair. See "Removal of the Sealed Light Processor", page 161.

Code: “tec red - temperature too high” (Error)

This error code is probably proceeded by the warning code: “tec red - temperature high”. The same troubleshooting table can be applied to.

Code: “ti - boards - interface board security enclosure error - replace interface board” (Error)

Situation	Solution
The GORE protection of the TI Cinema Interface board has been triggered and therefore the TI Cinema Interface board is irreversible out of order.	Replace the TI Cinema Interface board.

Code: “ti - system status = fail” (Error)

Situation	Solution
The TI system status failure is caused by the projector which is too cold. The DMD’s should not be operated at a temperature lower then 10°C (50°F). The projector has some protections for that. Below that temperature, the engine is switched of, and the result is a TI system status failure. This situation can occurs when the projector is recently installed and did not had the time to acclimate to the normal room temperature. There is also a message that the	Activate the lamp to warm up the Sealed Light Processor Unit. After a few seconds the temperature of the DMD’s should be higher then 10°C (50°F) which allows a successful start up of the Sealed Light Processor Unit. Or let the projector acclimate to the normal room temperature which should be higher then 10°C (50°F) and lower then 35°C (95°F).

Situation	Solution
temperatures are too low. See log files.	
The projector is set for DHCP and thus requires an address from the DHCP server but the projector does not receive an address.	1. Check the network. 2. Check if the DHCP server is operational.

Code: “ti - system status read failed” (Error)

Situation	Solution
(no info available)	(no info available)

Code: “ti - security error, please authorize” (Error)

Situation	Solution
The cover of the card cage has been reinstalled.	Clear the security warning. See procedure "Authorization to clear security warning on DP-3000", page 251.
The Sealed Light Processor unit has been removed and installed again.	Clear the security warning. See procedure "Authorization to clear security warning on DP-3000", page 251.

Code: “other fans - voltage high” (Error)

Situation	Solution
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.

Code: “other fans - voltage low” (Error)

Situation	Solution
Damaged insulation of the wire unit of one of the following fans: • Fan on top of the Cold Mirror. • Fan at the bottom of the Cold Mirror. • Fan at the bottom of the Start Pulse Generator (SPG). • The four fans at the front side of the projector.	Check the insulation of the wire unit. 1. Repair the insulation of the wire unit using shrink sleeve. 2. If not repairable, replace the whole wire unit and/or fan.
Malfunction SMPS CTRL board.	Replace the SMPS CTRL board. See "Replacement of a Card Cage board", page 252.
Malfunction SMPS PFC board.	Replace the SMPS PFC board. See "Replacement of a Card Cage board", page 252.
Malfunction Power Backplane (bad connection)	Replace the Power Backplane.

Code: “water - flow not ok” (Error)

Situation	Solution
Interruption of the liquid cooling circuit.	Check if the loop of the liquid cooling circuit is closed. See chapter "Liquid Cooling Circuit", page 183.

Situation	Solution
The liquid cooling circuit of the Sealed Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the DMD temperatures are too high.	Check of the cooling circuit of the Sealed Light Processor is connected with the pump and heat exchanger. See chapter "Liquid Cooling Circuit", page 183.
The maintenance valve of the cooling circuit is open causing a bypass of the cooling liquid.	Close the valve of the cooling circuit. See chapter "Liquid Cooling Circuit", page 183.
No or insufficient liquid inside the cooling circuit. The pump is sucking air and sounds noisier then normal.	Fill the cooling circuit with liquid and expel all air. Pressurize the circuit. See "Filling the Liquid Cooling Circuit", page 192.
The pump of the water cooling is electrical disconnected.	Check if the wire unit (reference 1 & 2 image 4-27) of the pump is properly connected.
Malfunction pump of the cooling circuit. You don't feel any vibrations when touching the pump after activating the "Refill mode" via the Communicator software.	1. Check the electrical resistance of the pump winding. Replace the pump if infinite. See "Replacement of the Pump motor and rotor", page 212. 2. Drain the liquid cooling circuit, open the pump and check if the pump rotor is not blocked. If so, remove the rotor and clean the bearings of the pump. See "Cleaning the Pump", page 210.
Strap (reference 1 image 4-28) missing on the SENS FLOW socket of the Power Backplane.	Check if the strap is present.

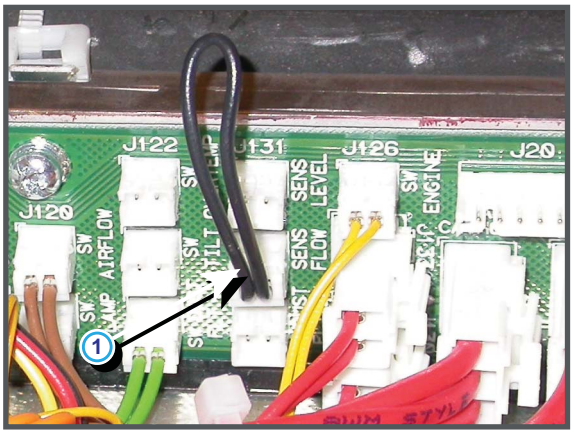


Image 4-28

5. POWER UNIT

About this chapter

This chapter describes the different parts of the Power Unit and their replacement procedures.

Overview

- Introduction
- LPS module diagnostic LED’s
- Connecting the power unit with the projector head
- Connecting the power unit with the power net
- Removal of an LPS module
- Installation of an LPS module
- Removing the LPS rack from the base of the Power Unit
- Replacement of the LPS communication interface
- Replacement of the Mains Filter
- Installing the LPS rack upon the base of the Power Unit

5.1 Introduction

Functionality of the Power Unit

The power unit is separated from the projector head. The base of the power unit houses the power input/output ports, the mains input filter, the LPS communication board and a temperature sensor. Upon the base a power rack with three LPS slots is mounted. Each slot contains one Lamp Power Supply (LPS) module connected with each other in parallel. The three LPS modules together can supply maximum 7000 watt to the xenon lamp inside the projector head. The maximum current that the power unit can supply is limited upon 170 ampere.

To ignite the lamp the voltage on the output pins of the LPS modules is brought up to 110 volt. This boots voltage will trigger the Start Pulse Generator (SPG) to ignite the lamp. Once the lamp is ignited the voltage on the output pins of the LPS modules is dropped to the typical arc voltage of the lamp e.g. 39 volt for a 6,5 kW lamp.

One LPS module can deliver maximum 2500 watts and maximum 100 amps. In normal situation, each LPS module delivers 1/3 of the required power. So, for a 6,5 kW lamp having an arc voltage of 39 volt, each LPS module deliver 55,3 amps at 39 volt which is equal to 6500 watt.

When one of the three LPS modules suddenly fails during the event the other LPS modules will continue delivering 55,3 amps at 39 volt. As a result the projector light output will be reduced. In case the projector starts up and one LPS module remains down the other LPS modules will run on their maximum power and deliver each 64,1 amps at 39 volt which is equal to 5000 watt in total.

In case on of the LPS modules fails an error will be logged in the projector log file.

Main internal components of the Power Unit

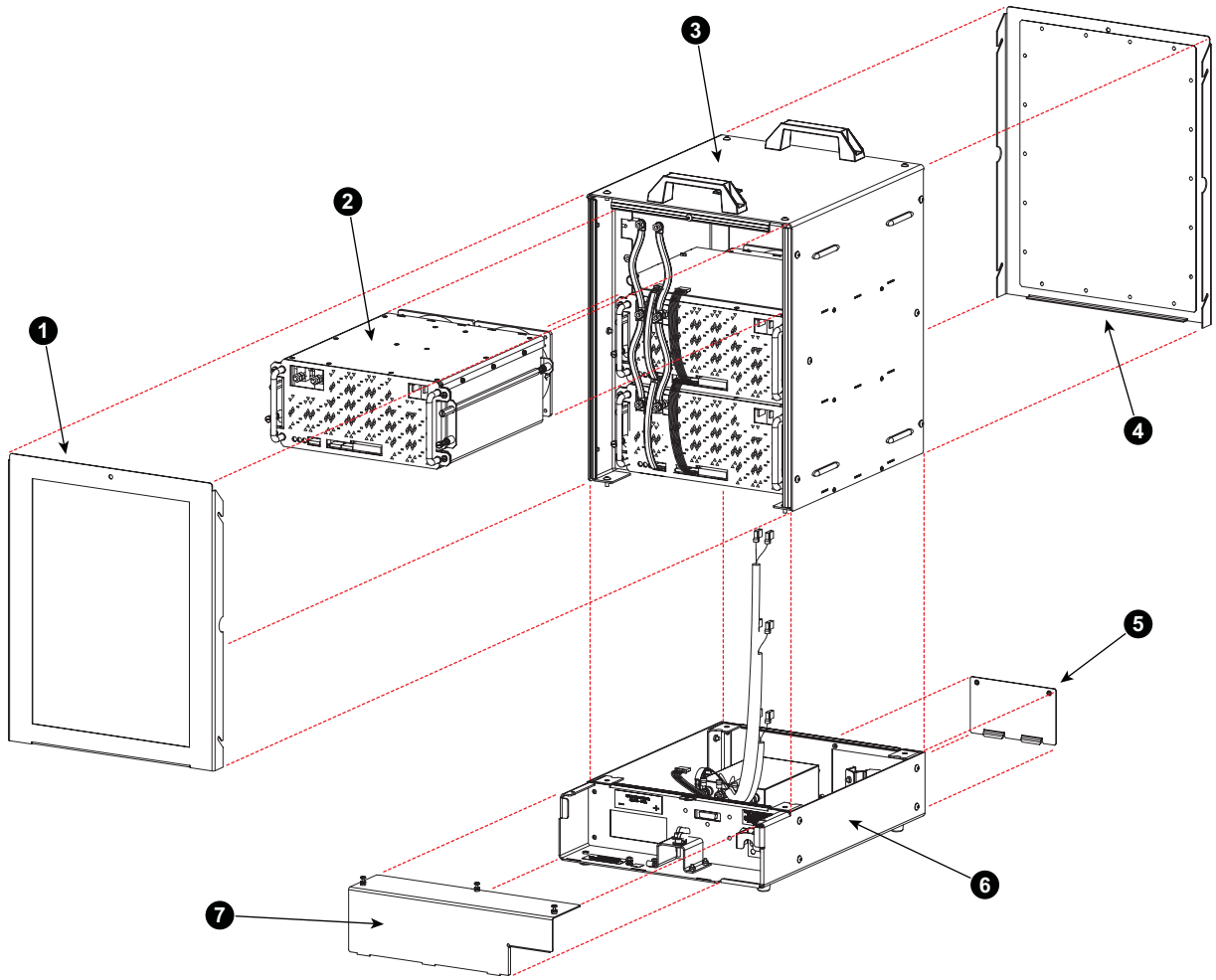


Image 5-1
1 Front cover with air outlet grid.
2 Lamp Power Supply (LPS).
3 Power rack.
4 Rear cover with air inlet grid.
5 Cover plate mains connections.
6 Power Unit base assembly.
7 Cover plate power output sockets.

Parts of the base of the Power Unit

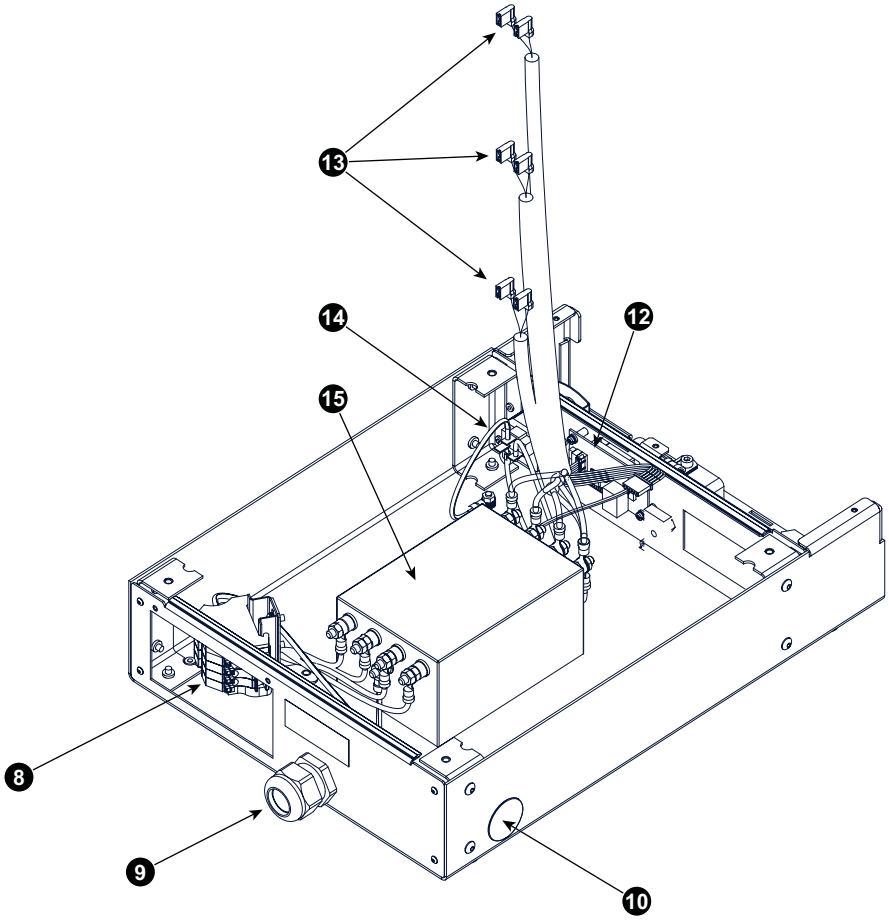


Image 5-2
8 Mains input distribution strip.
9 Cable gland for mains input cable.
10 Optional entrance for mains input cable.
12 LPS communication board.
13 Mains connection per LPS module.
14 Mains output socket for projector head.
15 Mains input filter.

Front panel of the Lamp Power Supply

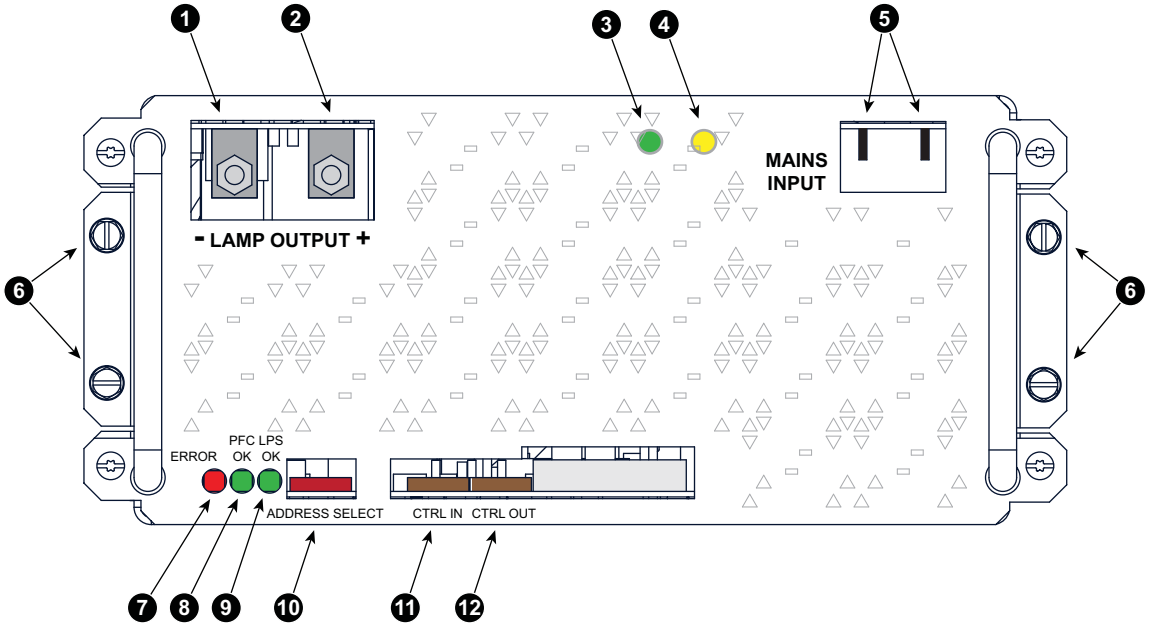


Image 5-3
1 Lamp output pin "-".
2 Lamp output pin "+".

3 Diagnostic LED “LAMP ON” (green).
4 Diagnostic LED “LVPS OK” (yellow).
5 Mains input.
6 Retaining fixation screws.
7 Diagnostic LED “ERROR” (red).
8 Diagnostic LED “PFC OK” (green).
9 Diagnostic LED “LPS OK” (green).
10 Socket for ADRESS cable.
11 Socket for CTRL IN cable.
12 Socket for CTRL OUT cable.

5.2 LPS module diagnostic LED's

Status LED's on the LPS module

One LPS module contains in total 5 status LED's. One orange, three green and one red LED. The orange LED "LVPS OK" lights up immediately after the projector is switched on. All other status LED's of the LPS module remains off. This is the standby status of the LPS module. Once the command is send to the LPS modules to start up the projector lamp the green LED's are lighting up one after the other. First the green LED "PFC OK", then the green LED "LPS OK" and finally, when the lamp is ignited, the green LED "LAMP ON".

The red LED "ERR" remains off unless an error is detected inside the LPS module or all LPS modules where ordered to shutdown due to a malfunction somewhere else inside the projector.

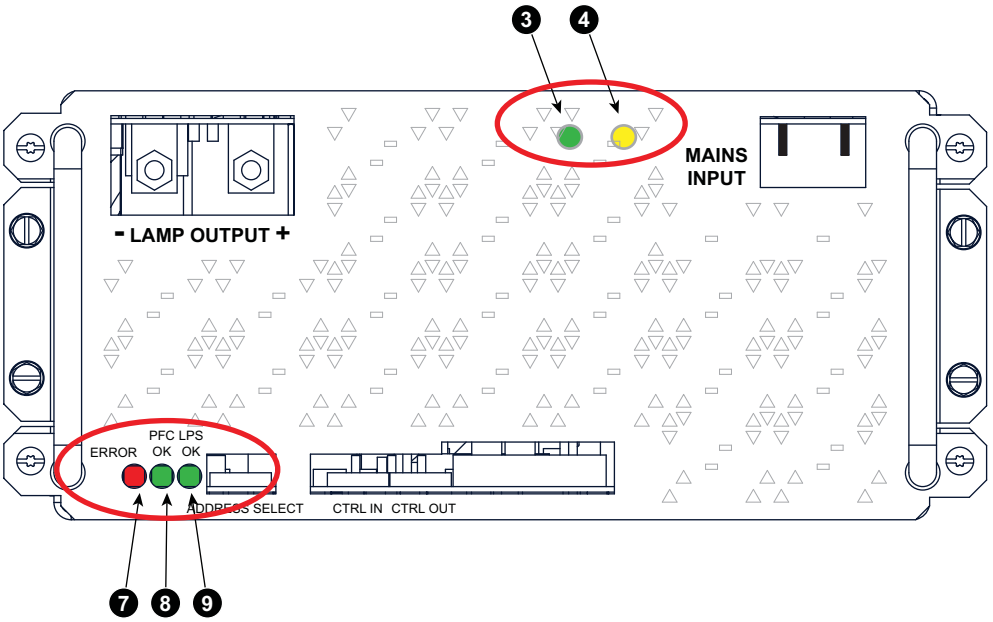


Image 5-4
3 Diagnostic LED "LAMP ON" (green).
4 Diagnostic LED "LVPS OK" (yellow).
7 Diagnostic LED "ERROR" (red).
8 Diagnostic LED "PFC OK" (green).
9 Diagnostic LED "LPS OK" (green).

Diagnostic

Or.	Gr.	Gr.	Gr.	Re.	Diagnostic	Action
LVPS OK	PFC OK	LPS OK	LAMP OK	ERROR		
OFF	OFF	OFF	OFF	OFF	No input voltage.	Switch on the projector.
ON	OFF	OFF	OFF	OFF	Standby modus of LPS module.	—
ON	ON	ON	OFF	OFF	PFC and LPS seems to work normally but the lamp is not ignited. This situation can be the result of a bad lamp or SPG module.	• Install another xenon lamp in case the voltage on the "LAMP OUT" pins is 110 volt and you hear the SPG module three times clicking to ignite the lamp. • Replace the SPG module in case the voltage value on the "LAMP OUT" pins is 110 volt and you do not hear the SPG module clicking to ignite the lamp. • Replace the LPS modules in case the voltage value on the "LAMP OUT" pins is below 110 volt and the lamp is not ignited.

Or.	Gr.	Gr.	Gr.	Re.	Diagnostic	Action
LVPS OK	**PFC OK**	**LPS OK**	**LAMP OK**	**ERROR**		
ON	ON	ON	ON	OFF	LPS module is operating normally. Projector lamp is ignited.	—
ON	OFF	OFF	OFF	ON	LPS internal temperature is to high.	• Check if the power unit air inlet is not blocked. • Check if the power unit air outlet is not blocked. • If the problem remains, replace the LPS module.
ON	OFF	OFF	OFF	Flashing fast	Error detected inside this LPS module.	Replace the LPS module.
ON	OFF	OFF	OFF	Flashing slow	All LPS modules where ordered to shutdown due to a malfunction somewhere else inside the projector.	Check the error logged in the projector log file.

5.3 Connecting the power unit with the projector head

What has to be done?

Three loose cables are entering the bottom plate of the projector head. These cables (2 x LPS power + PE) have to be connected with the output side of the power unit. Furthermore, a power cord (reference P of image 5-5) and a data cable (reference D of image 5-5) have to be installed between the power unit and the input & communication unit of the projector head. This power cord is required to supply the electronics of the projector head with power. The data cable is needed for the communication between the power unit and the projector head.

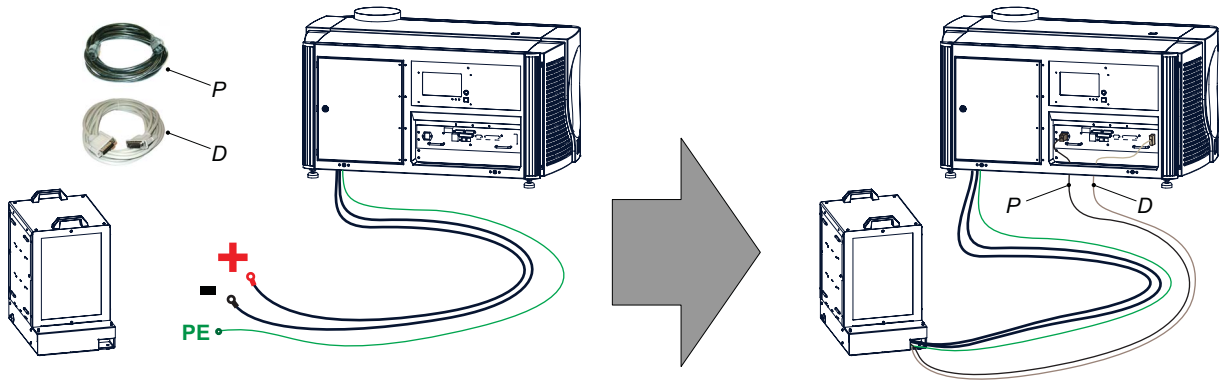


Image 5-5

Necessary tools

- Phillips screwdriver PH1.
- Torque wrench with 10mm hexagon socket (4Nm).
- 3 mm Allen wrench.
- 4 mm Allen wrench.
- 7 mm nut driver.

Necessary parts

- Power cord (5 meter, sockets C13/C14).
- Data cable (5 meter, D-SUB 15 pins).

How to connect the power unit with the projector head?

1. Remove the cover from the output side of the power unit by releasing the three captive screws as illustrated. Use for that a Phillips screwdriver PH1.

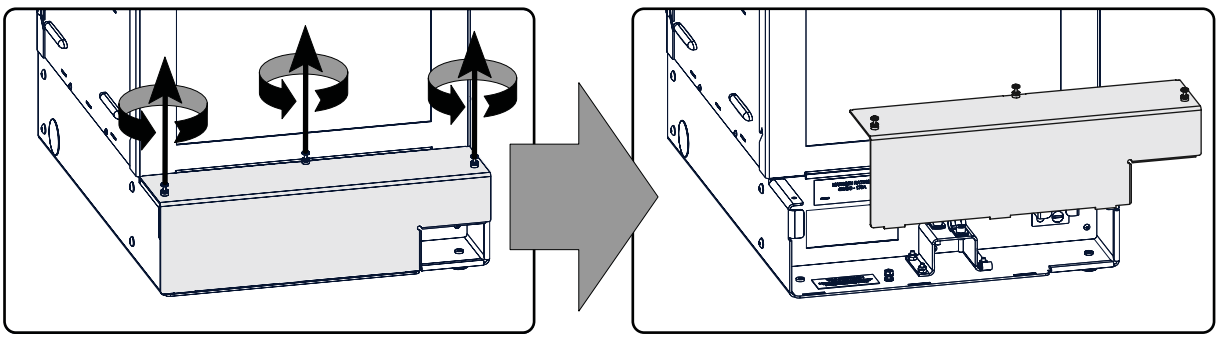


Image 5-6

2. Connect the green/yellow ground wire from the projector head with the chassis (PE) of power unit as illustrated. Place a lock washer B between the nut A and the wire ring lug C. Secure the wire with the strain relief clamp E. Use a 7 mm nut driver to fasten the nuts A and D.

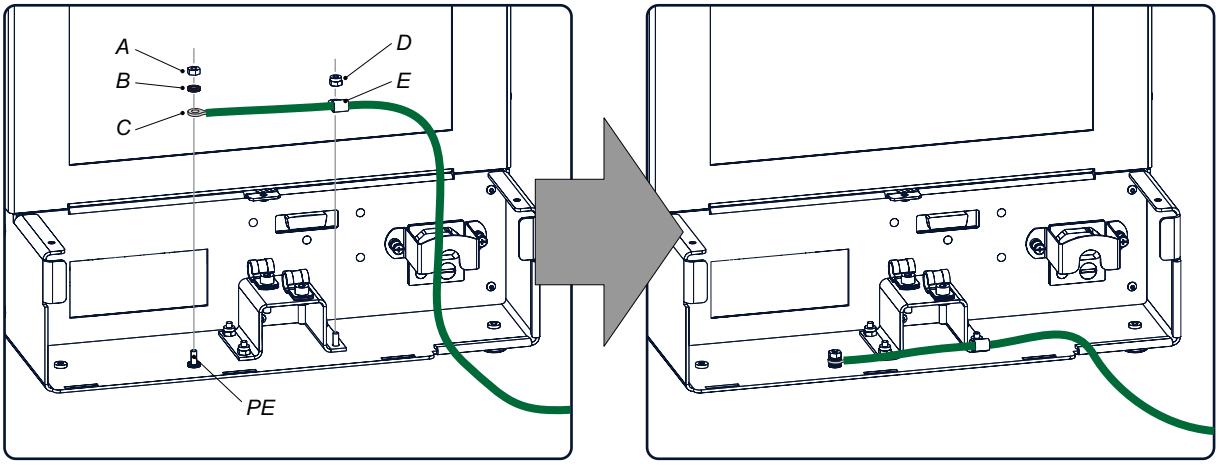


Image 5-7

3. Remove the front cover from the Power Box. Use 3mm Allen wrench to release the 5 screws of the front cover.
4. Connect the long power cables, coming from the projector head, with the output pins of the lowest LPS unit in the Power Box. Guide the power cables trough the opening at the base as illustrated prior to connect the wire lugs. Fasten the nuts with a torque of **4Nm** (2.95 lbt*ft). Use a torque wrench with a 10mm hexagon socket. Respect the polarity of the pins and the cables.
   Caution: *Make sure to place the plain washers, and cable eyes in correct order upon the pins of the LPS units. First the wire lugs (short and long cable), then the plain washer and finally the nut.*

   Note: *The electrical high power connections of the LPS units must be checked on a yearly bases.*

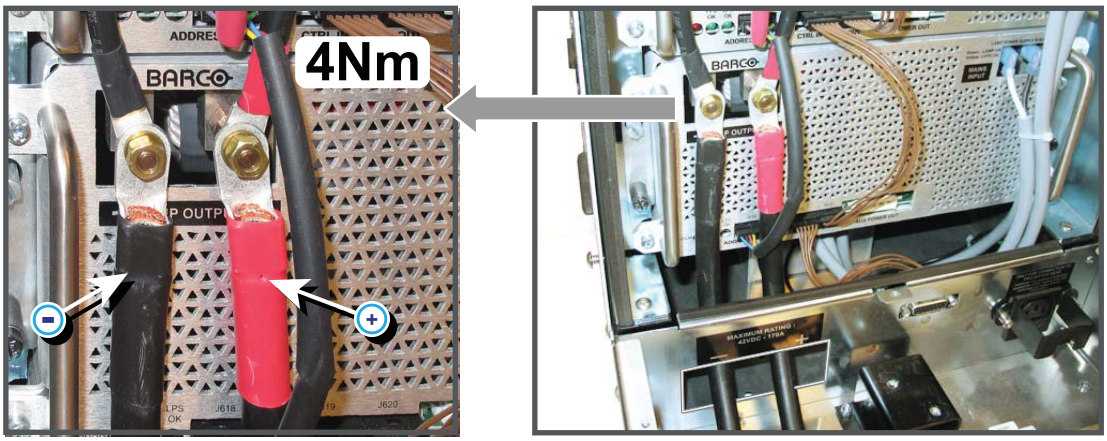


Image 5-8

5. Secure the LPS power cables with two strain relief clamps (reference 5 image 5-9). Use a 4 mm Allen wrench.

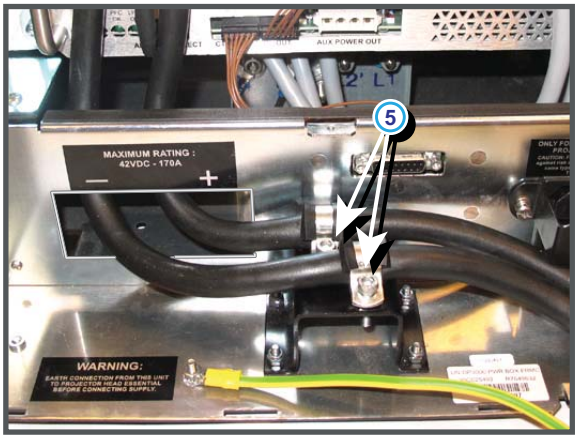


Image 5-9

6. Reinstall the front cover of the Power Box.
7. Reconnect the data cable and power cord. Fasten the thumbscrews of the data cable (reference 6 image 5-10) and secure the power cord (reference 7 image 5-10) with the strain relief bracket which you removed is step 2. Use a PH1 Phillips screwdriver to fasten the bracket.

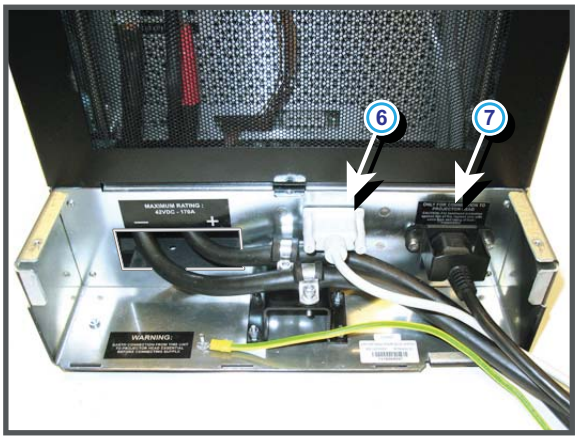


Image 5-10

8. Reinstall the base cover from the Power Box.

WARNING: Use cable ties to fasten all cables between the power unit and the projector head.

5.4 Connecting the power unit with the power net

WARNING: Make sure that the voltage range of the power unit matches with the voltage of the local power net. Note that there exist two types of power units. One for a 3 x 400V AC + Neutral power net and one for a 3 x 208V AC power net. The power unit for a 3 x 400V AC + Neutral power net has a five-way distribution strip. The power unit for a 3 x 208V AC power net has a four-way distribution strip. The power input distribution strip is located behind the sealed compartment at the base of the power unit.

WARNING: The cross-sectional area of the conductors in the power supply cord shall not be less than 4 mm² or 10 AWG.

WARNING: The projector casing must be grounded, because of high voltages impressed during the ignition cycle.

Necessary tools

- Phillips screwdriver PH1.
- Flat blade screwdriver 4 x 120.
- Adjustable wrench.

How to connect the main power net with the power unit?

1. Remove the cover from the power input compartment of the power unit by releasing the two captive screws as illustrated. Use for that a Phillips screwdriver PH1.

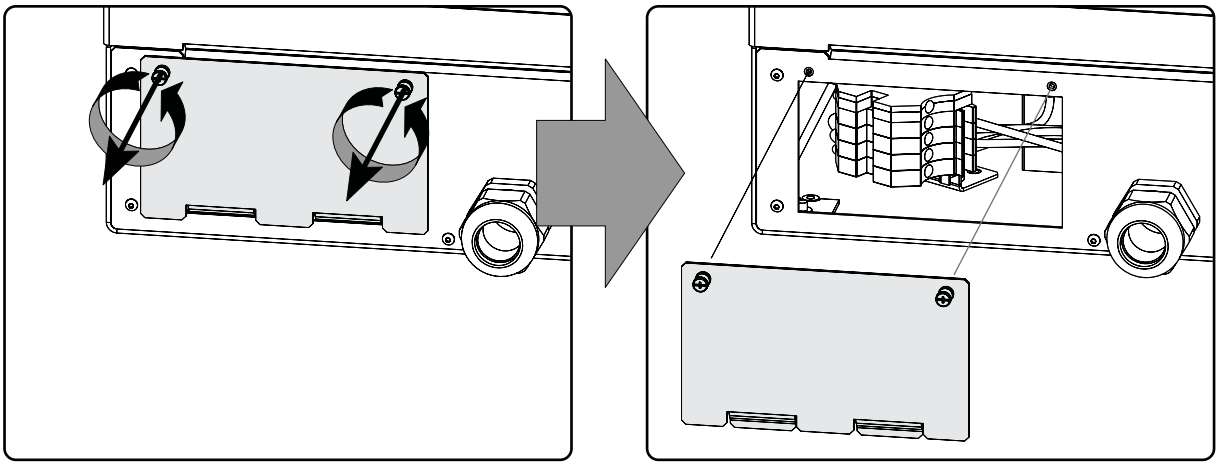


Image 5-11

2. Insert the power supply cord through the cable gland as illustrated. When using a flexible power cord, make sure that each conductor end is provide with an end sleeve.
   Note: *The cable gland is default mounted at the rear side of the power unit. But, if required you can reposition the cable gland to the side of the power unit.*

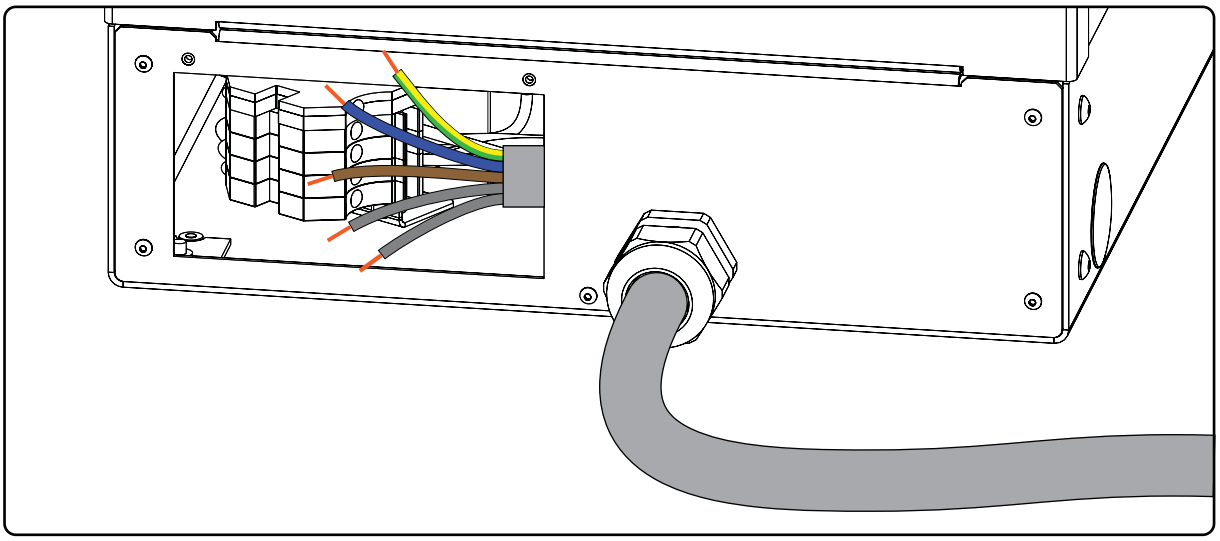


Image 5-12
This illustration shows a power cord and a power unit for a 3 x 400V AC + Neutral power net.

3. Connect the conductors of the power cord with the distribution strip. When having a neutral conductor N (blue wire), make sure to connect the neutral N conductor with the blue socket of the power strip. Always connect the ground wire (PE) with the yellow/green socket of the distribution strip. Use a flat blade screwdriver to fasten all screws of the distribution strip.

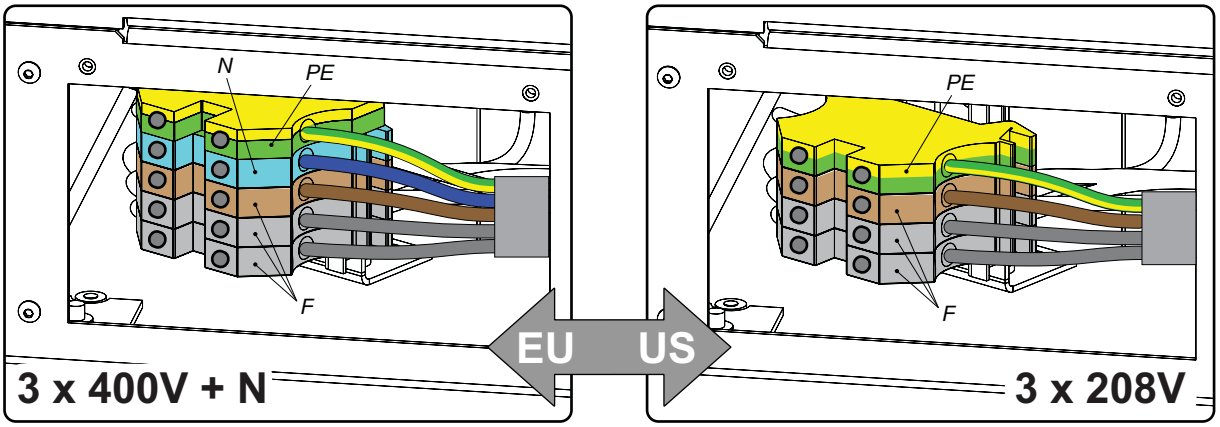


Image 5-13

4. Reinstall the cover as illustrated. Fasten the two captive screws of the cover using a Phillips screwdriver PH1.

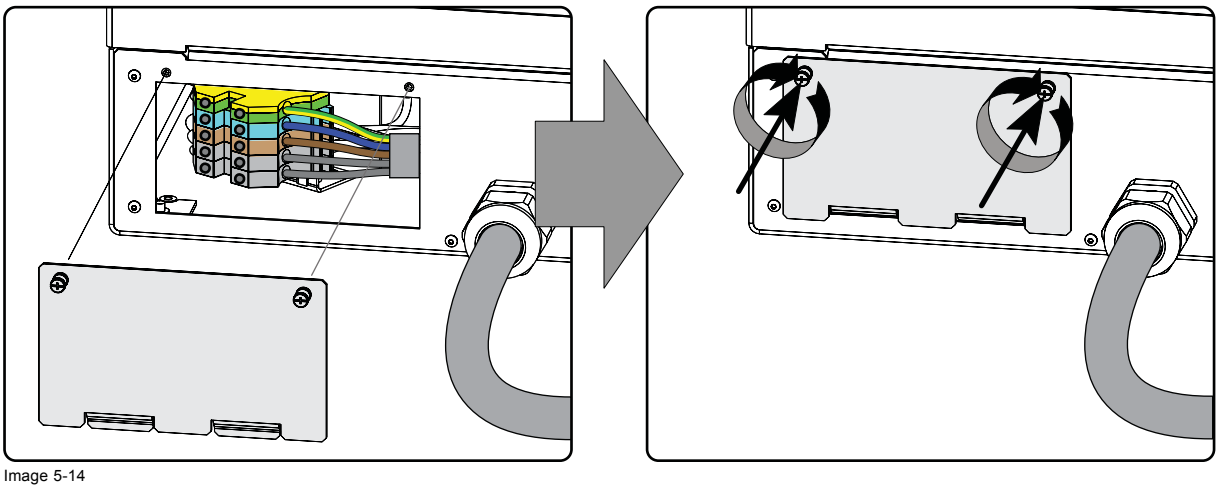


Image 5-14

5. Fasten the cable gland using an adjustable wrench.

5.5 Removal of an LPS module

This procedure describes how to remove the LPS module located in the middle of the power rack. Nevertheless, the same procedure is applicable upon the other LPS modules in the power rack.

Necessary tools

- 3 mm Allen wrench.
- 10 mm nut driver.
- 8 mm nut driver or flat screw driver.

How to remove an LPS module from the Power Unit?

1. Make sure that the power to the Power Unit is switched off.
2. Remove the front cover of the Power Unit by loosening (a few turns) the four hexagon socket button screws (reference 1 image 5-15) at the sides of the cover and removing the screw (reference 2 image 5-15) at the top of the cover. Use a 3 mm Allen wrench.

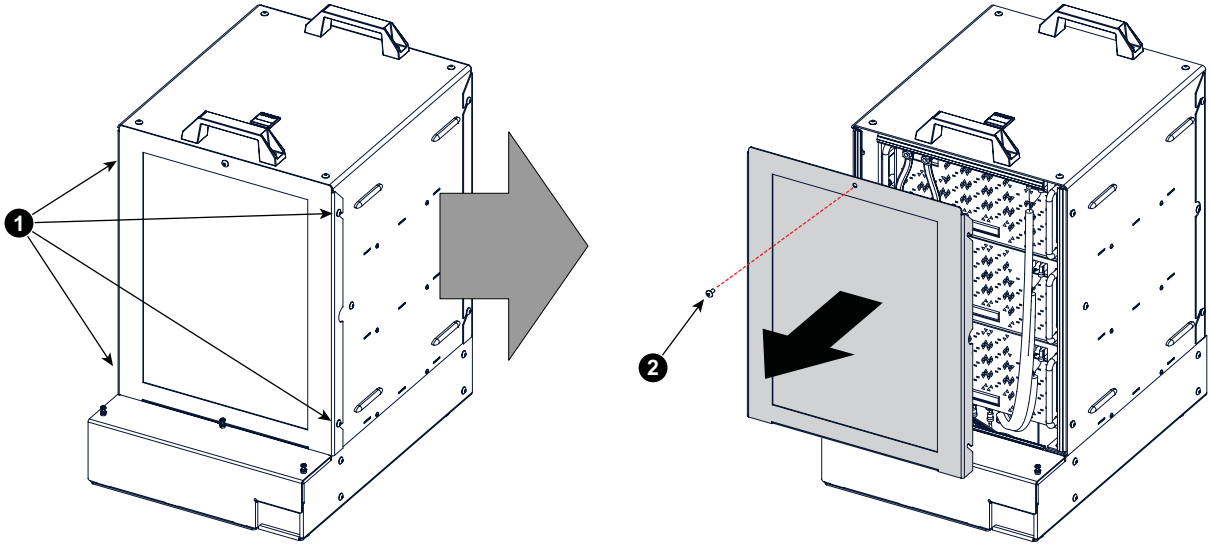


Image 5-15

3. Disconnect the ADDRESS CONTROL wire unit (reference 3 & 4 image 5-16) form the LPS module and the LPS module(s) above.
4. Disconnect the MAINS INPUT cables (reference 7 & 8 image 5-16) form the LPS module and the LPS module(s) above.
5. Disconnect the CTRL IN (reference 5 image 5-16) and the CTRL OUT (reference 6 image 5-16) wire unit from the LPS module.

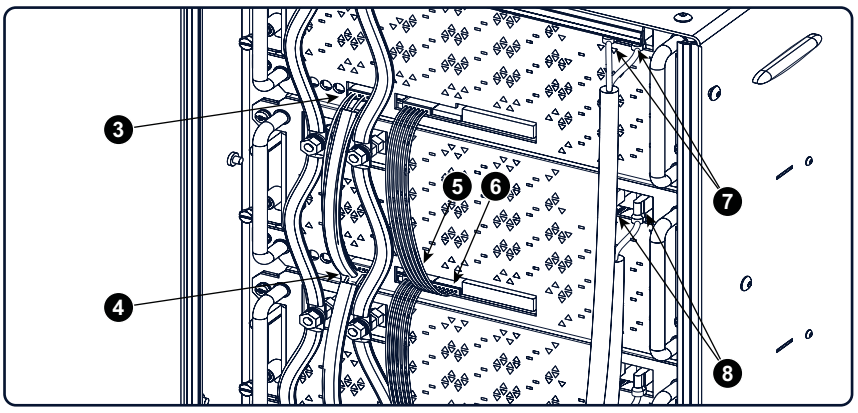


Image 5-16

6. Disconnect both LAMP OUTPUT power cables from the LPS module. Use a 10 mm nut driver to loosen the nuts (reference 9 image 5-17).

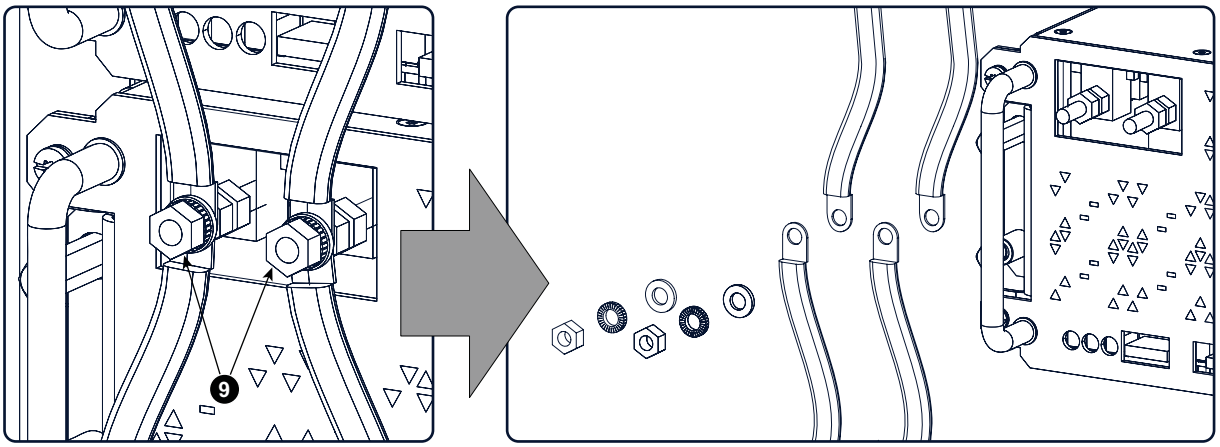


Image 5-17

7. Loosen the four retaining screws (reference 10 image 5-18) of the disconnected LPS module. Use an 8 mm nut driver or a flat screw driver.

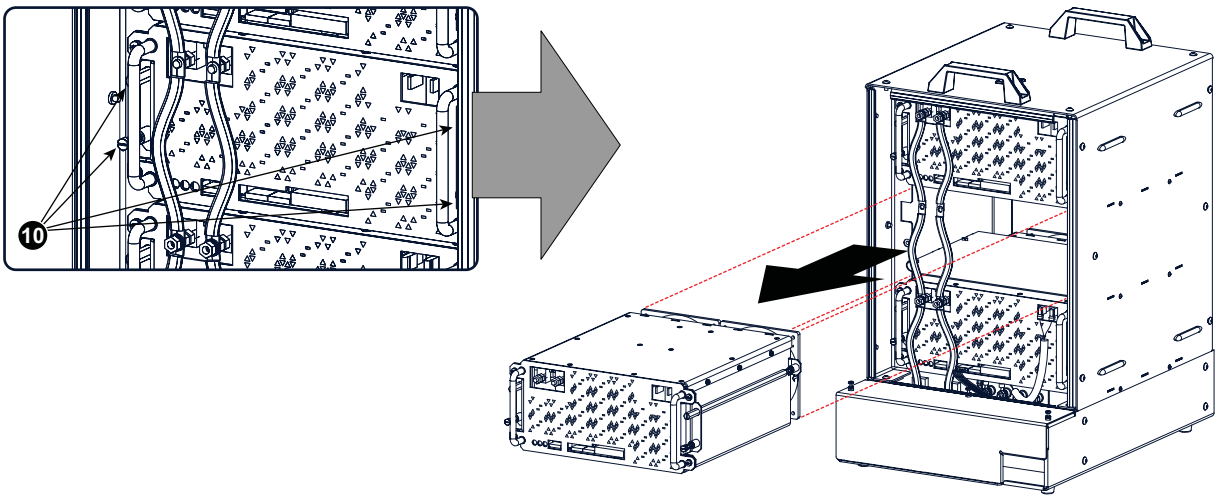


Image 5-18

8. Hold the LPS module by its handles and pull out of its compartment.

5.6 Installation of an LPS module

This procedure describes how to install the LPS module located in the middle of the power rack. Nevertheless, the same procedure is applicable upon the other LPS modules in the power rack.

Necessary tools

- 3 mm Allen wrench.
- Torque wrench with a 10 mm hexagon socket.
- 8 mm nut driver or flat screw driver.

How to remove an LPS module from the Power Unit?

1. Hold the LPS module by its handles and slide it into its compartment as illustrated.
2. Fasten the four retaining screws (reference 1 image 5-19) of the LPS module. Use an 8 mm nut driver or a flat screw driver.

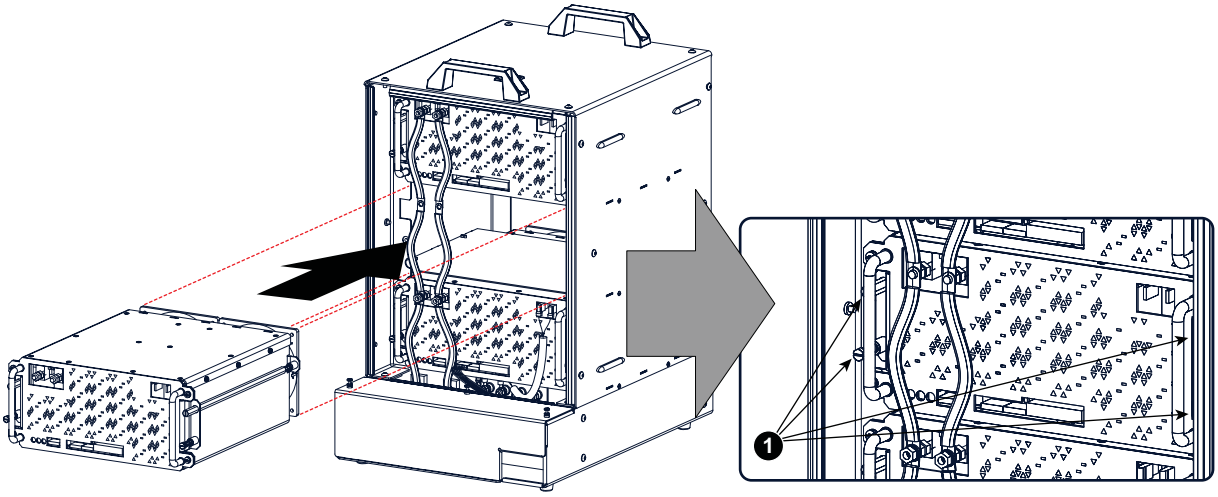


Image 5-19

3. Connect the LAMP OUTPUT power cables with the LPS module as illustrated. Respect the polarity of the socket and cables. Use torque wrench with a 10 mm hexagon socket to fasten the nuts on the pins with a torque of:
   - 8 Nm (5.9 lbt*ft) in case of copper nuts and rods (old LPS).
   - 4 Nm (2.95 lbt*ft) in case of brass nuts and rods.
   - 4 Nm (2.95 lbt*ft) in case of nickel plated brass nuts and rods.
   - 8 Nm (5.9 lbt*ft) in case of nickel plated steel nuts and rods.

   Caution: *Make sure to place the washers and cable eyes in correct order upon the pin as illustrated in image 5-20. First the wire lugs (reference 1 & 2), then the plane washer (reference 3), then the lock washer (reference 4) and finally the nut (reference 5).*

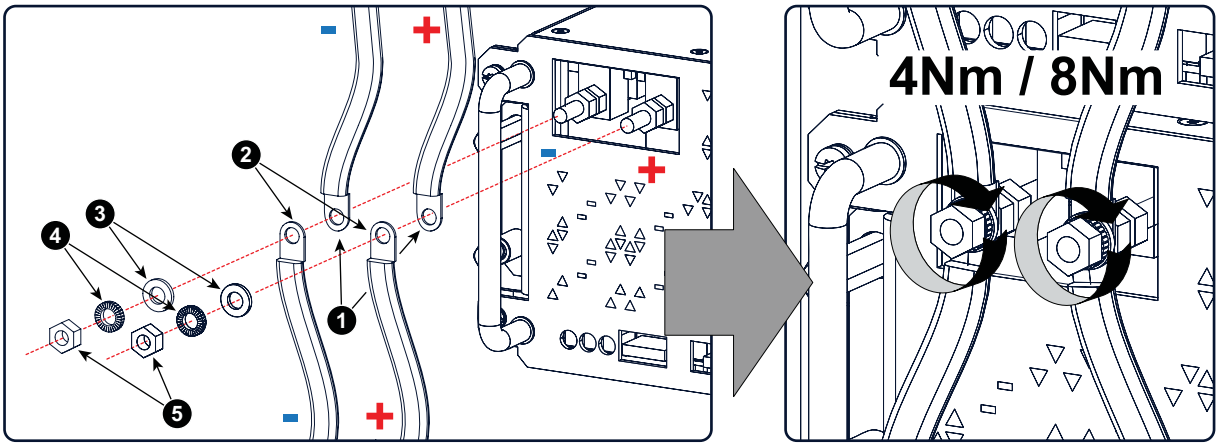


Image 5-20

4. Connect the CTRL IN (reference 5image 5-21) and the CTRL OUT wire unit (reference 6) with the LPS module. Make sure that the CTRL OUT of the LPS module below is connected with the CTRL IN socket and the CTRL IN of the LPS module above is connected with the CTRL OUT socket.

5. Connect the MAINS INPUT cables (reference 7 & 8image 5-21) with the LPS modules.
6. Connect the ADDRESS CONTROL wire unit (reference 3 & 4image 5-21) with the LPS module and the LPS module(s) above.

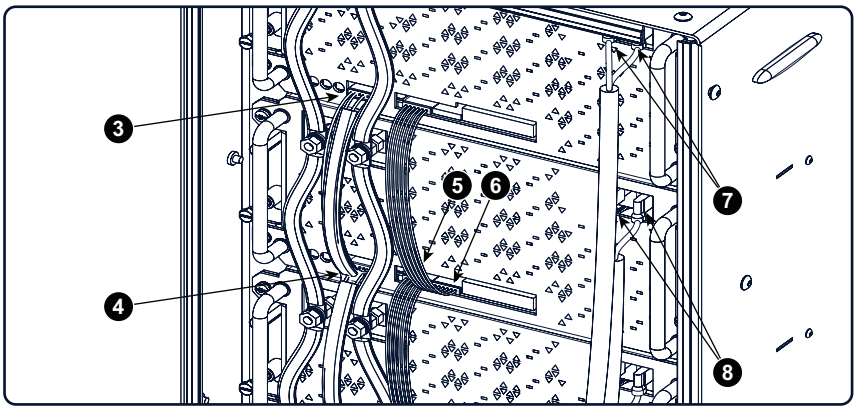


Image 5-21

7. Install the front cover of the Power Unit. Use a 3 mm Allen wrench to fasten the five screws (reference 1 & 2 image 5-22) as illustrated.

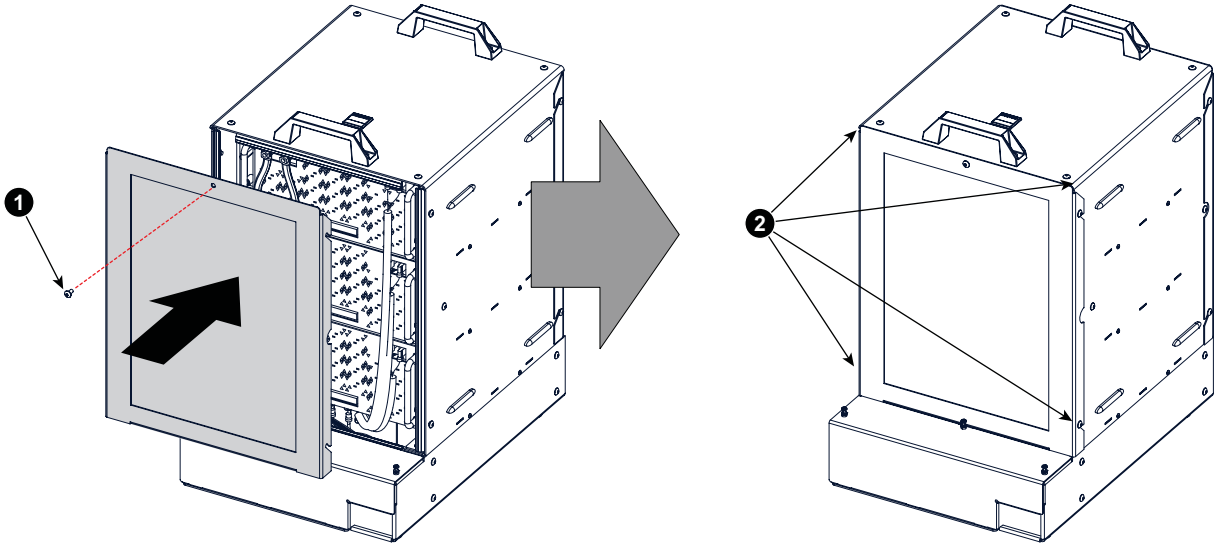


Image 5-22

5.7 Removing the LPS rack from the base of the Power Unit

Why removing the LPS rack form the base of the Power Unit?

To access the parts inside the base of the Power Unit, such as the LPS communication interface and Mains Input filter, the LPS rack on top of the base has to be removed.

Necessary tools

- 3 mm Allen wrench.
- 10 mm nut driver.
- 8 mm nut driver or flat screw driver.

How to remove the LPS rack form the base of the Power Unit?

1. Make sure that the power to the Power Unit is switched off.
2. Remove the front and rear cover of the Power Unit. Use a 3 mm Allen wrench to loosen the 5 screws (reference 1 & 2 image 5-23) per cover.

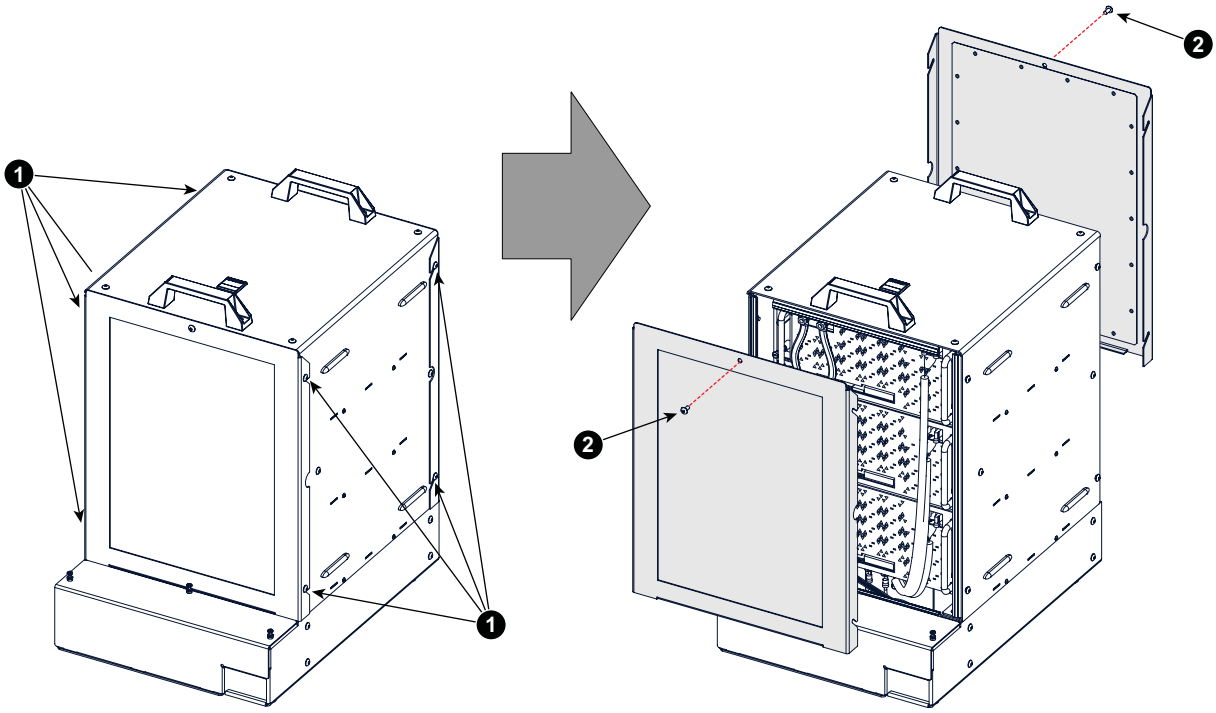


Image 5-23

3. Disconnect the MAINS INPUT cables (reference 1, 2 & 3 image 5-24) from each LPS module in the power rack.
4. Disconnect the CTRL IN wire unit (reference 4 image 5-24) from the LPS module at the bottom of the LPS rack.
5. Disconnect both LAMP OUTPUT power cables from the LPS module at the bottom of the power rack. Use a 10 mm nut driver to loosen the nuts (reference 5 image 5-24).

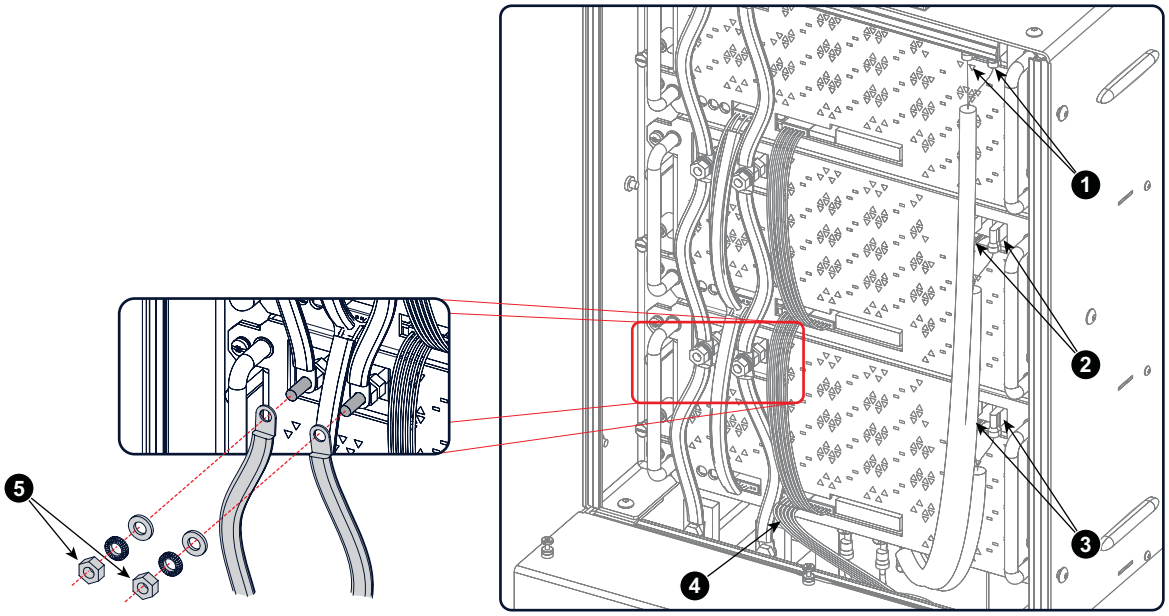


Image 5-24

6. Loosen the four screws, one in each corner, at the bottom of the LPS rack (reference 1 image 5-25). Use a 3 mm Allen wrench.

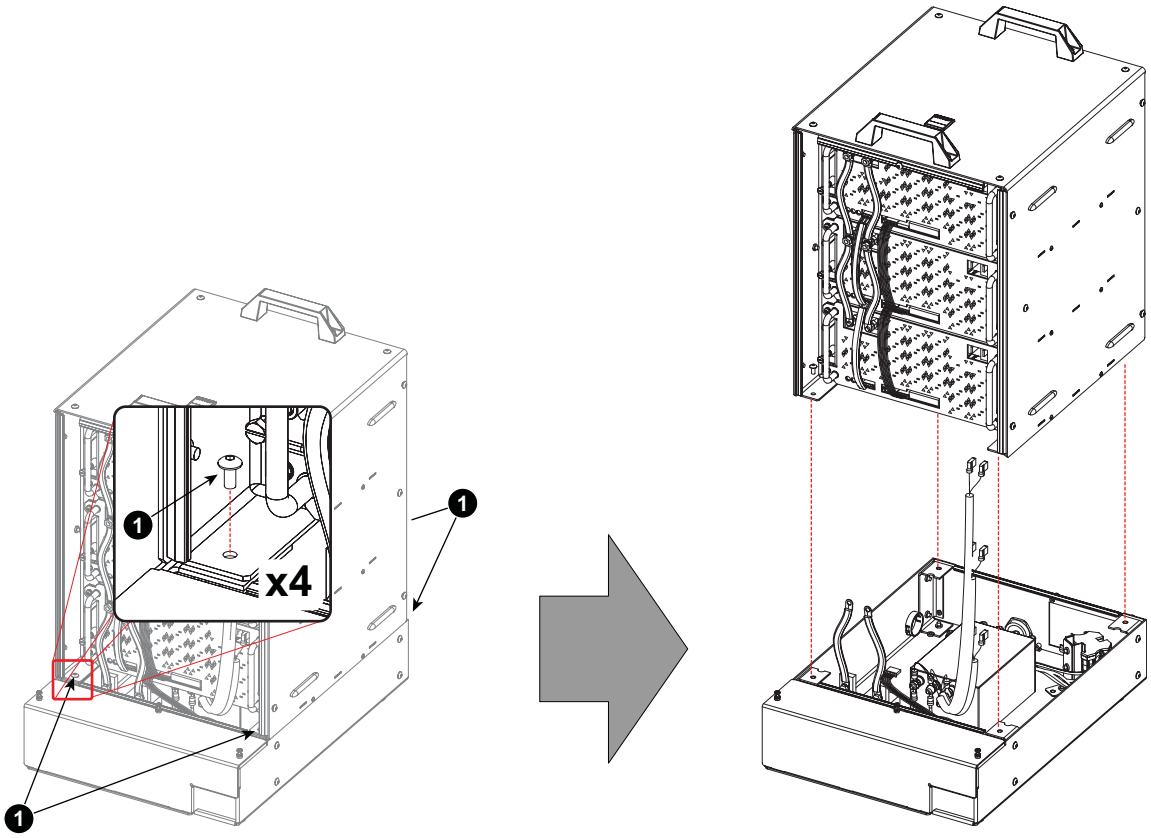


Image 5-25

7. Hold the LPS rack by its handles at the top and remove it from the base.

5.8 Replacement of the LPS communication interface

To access the LPS communication interface the LPS rack has to be removed from the base of the Power Unit. This procedure assumes that the LPS rack is already removed. See "Removing the LPS rack from the base of the Power Unit", page 90.

Necessary tools

- PH1 Phillips screwdriver.
- T10 Torx screwdriver.

How to replace the LPS communication interface from the Power Unit?

1. Remove the cover of the output side of the Power Unit by releasing the three retaining screws (reference 1 image 5-26). Use a Phillips screwdriver PH1.
2. Disconnect the data cable (reference 2 image 5-26) from the D-SUB socket as illustrated.

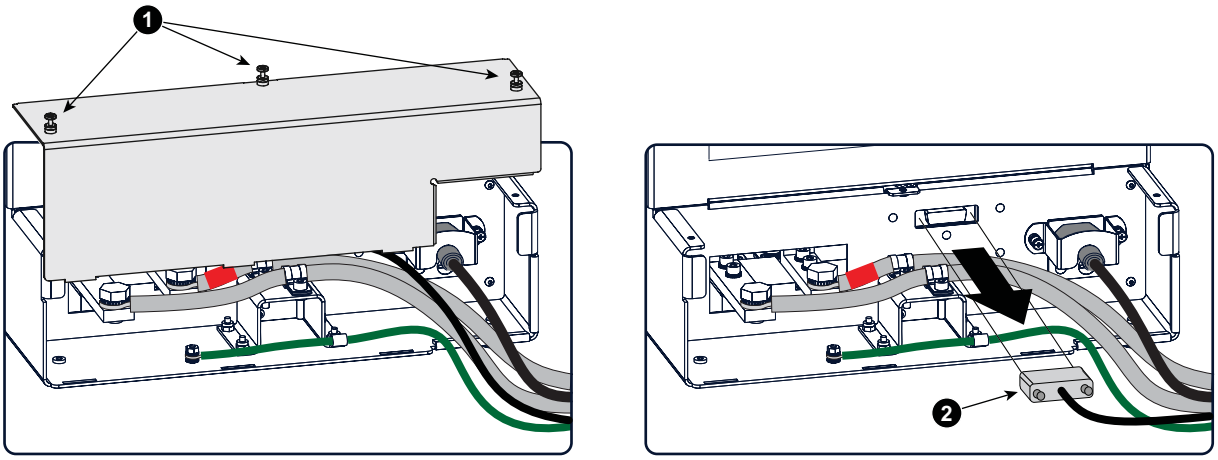


Image 5-26

3. Disconnect the wire unit of the temperature sensor (reference 2 image 5-27) and the CTRL wire unit (reference 1 image 5-27).

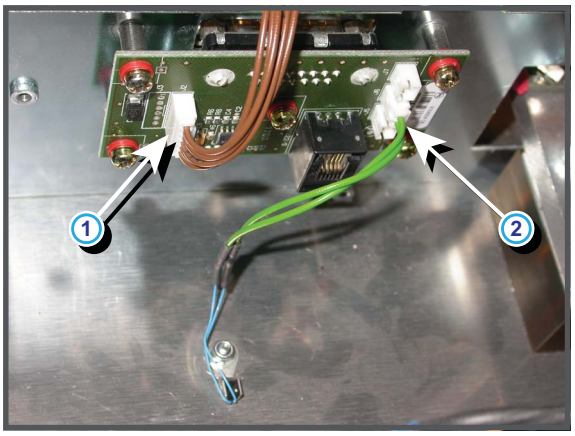
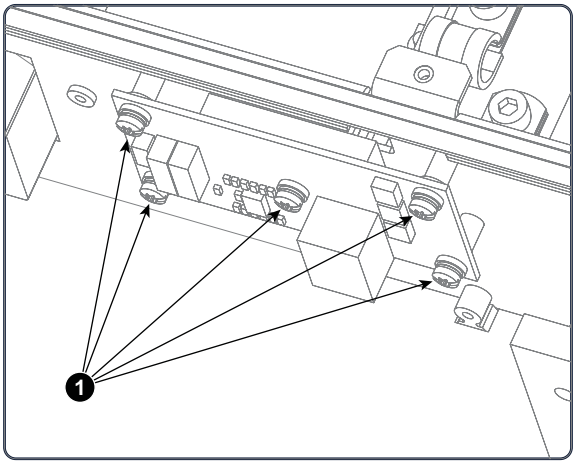


Image 5-27

4. Remove the LPS communication interface by loosening the five Torx screws (reference 1 image 5-28) as illustrated. Use a T10 Torx screwdriver.
5. Install a new LPS communication interface. Make sure to place plastic washers (reference 2 image 5-28) at both sides of the PCB board.



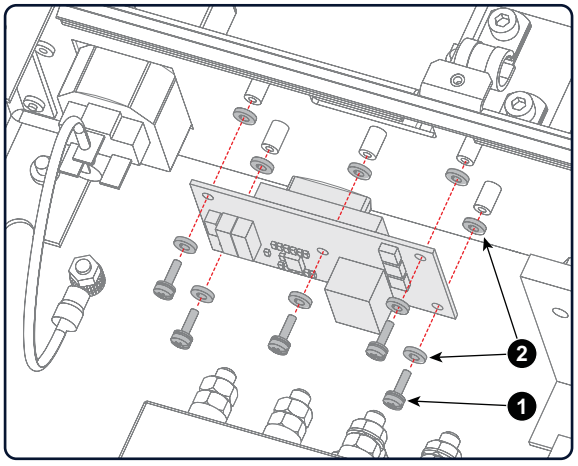


Image 5-28

6. Reconnect the CTRL wire unit and the temperature sensor.
7. Reconnect the data cable with the D-SUB socket.
8. Reinstall the cover.

5.9 Replacement of the Mains Filter

To access the Mains Filter the LPS rack has to be removed from the base of the Power Unit. This procedure assumes that the LPS rack is already removed. See "Removing the LPS rack from the base of the Power Unit", page 90.

Necessary tools

- 10 mm open-end wrench.
- 3 mm Allen wrench.
- Torque wrench with a 10 mm hexagon socket.

How to replace the Mains Filter from the Power Unit?

1. Disconnect all the wires from the input and output pins of the Mains Filter. Use a 10 mm open-end wrench to loosen the nuts of the pins.
2. Remove the Mains Filter from the base of the Power Unit by loosen the four screws (reference 1 image 5-29) at the bottom of the base. Use a 3 mm Allen wrench.
3. Install a new Mains Filter in the base of the Power Unit. Make sure that the input pins of the Mains Filter are facing the power distribution strip.

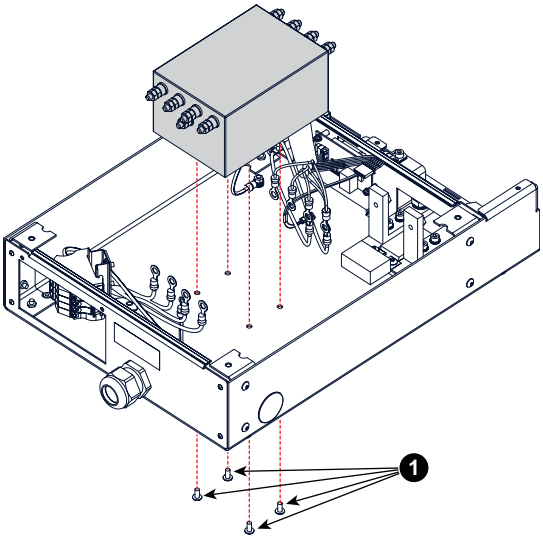


Image 5-29

4. Reconnect the wires from the power distribution strip with the **input pins** of the Mains Filter. When having a neutral conductor N (blue wire), make sure to connect the neutral N conductor with the neutral N pin (reference 4 image 5-30) of the Mains Filter. Always connect the ground wire (PE, reference 5 image 5-30) with the ground pin of the Mains Filter.

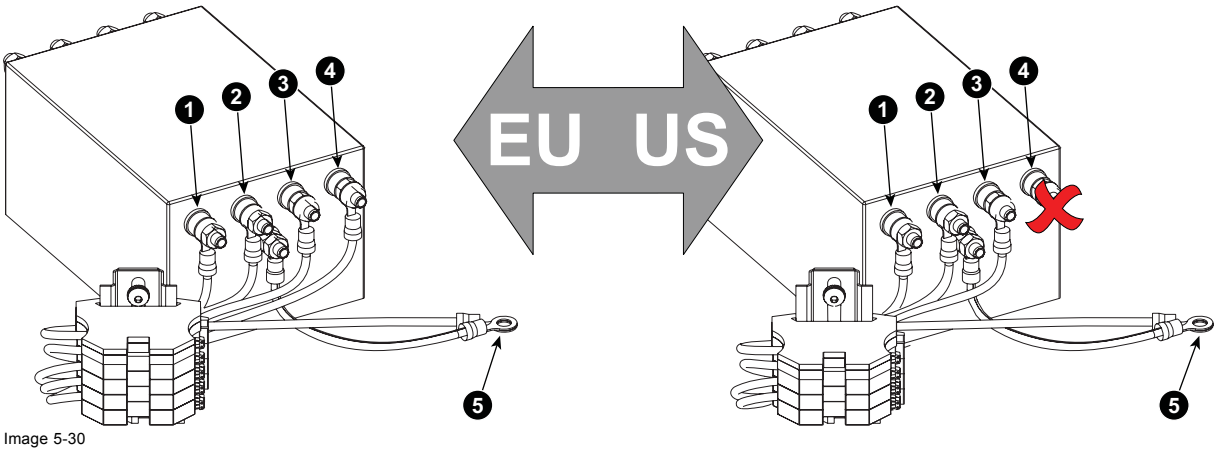


Image 5-30

5. Reconnect the wires from the LPS modules with the **output pins** of the Mains Filter as illustrated.

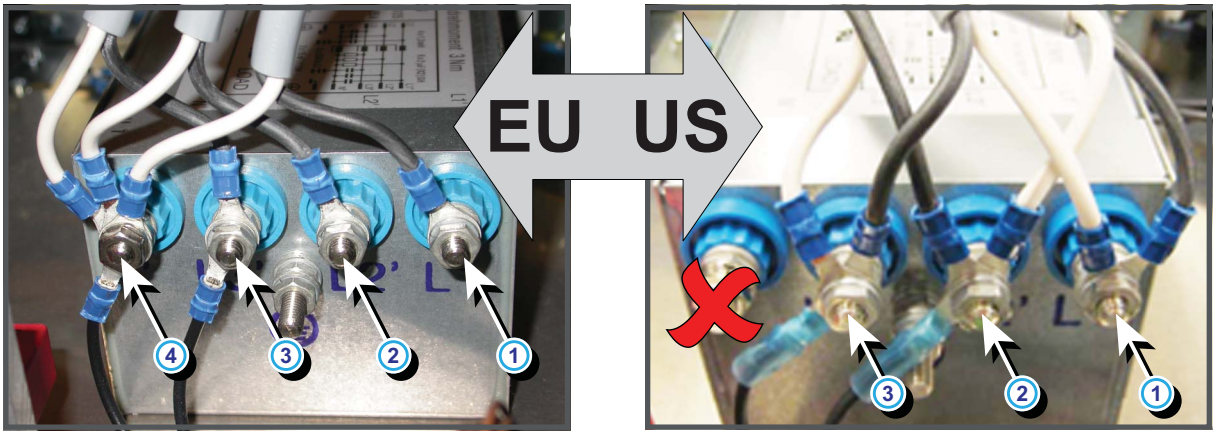


Image 5-31

6. Fasten the nuts on the all input and output pins of the Mains Filter with a torque of 3 Nm (2,2 lbf*ft). Make sure to place a washer (reference 2 image 5-32) between the wire lug (reference 1 image 5-32) and the nut (reference 3 image 5-32). Use a torque wrench with a 10 mm hexagon socket.

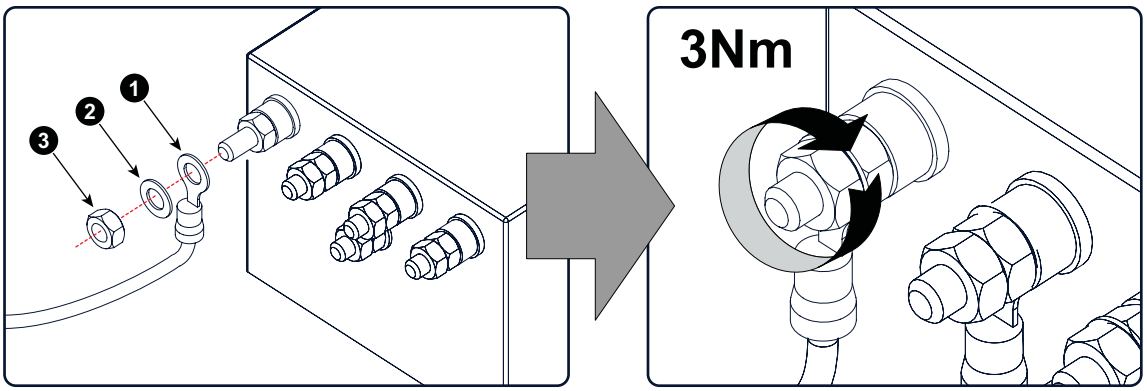


Image 5-32

5.10 Installing the LPS rack upon the base of the Power Unit

Necessary tools

- 3 mm Allen wrench.
- 10 mm nut driver.
- 8 mm nut driver or flat screw driver.

How to install the LPS rack upon the base of the Power Unit?

1. Hold the LPS rack by its handles at the top and place it upon the base. Make sure that the LPS rack is correctly aligned.
2. Secure the LPS rack with four screws, one in each corner, at the bottom of the LPS rack (reference 1 image 5-33). Use a 3 mm Allen wrench.

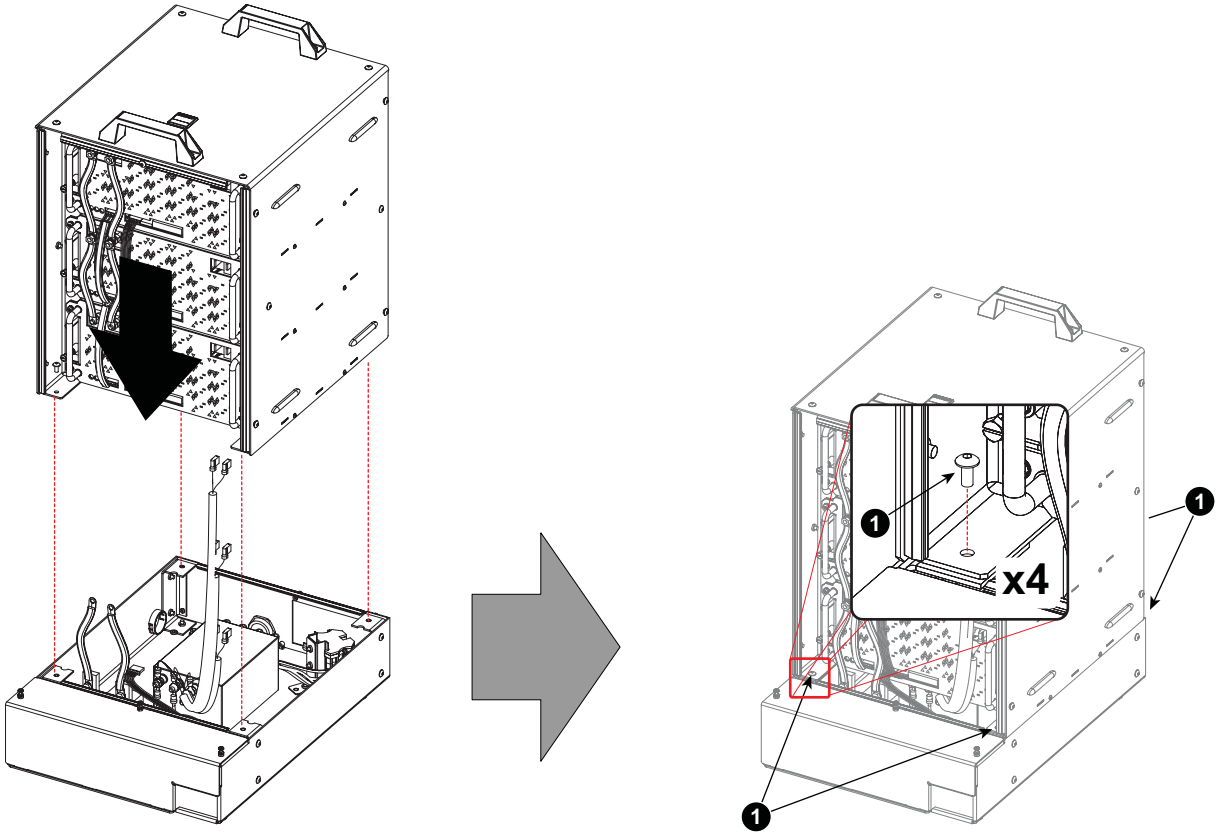


Image 5-33

3. Connect the LAMP OUTPUT power cables with the LPS module as illustrated. Respect the polarity of the socket and cables. Use torque wrench with a 10 mm hexagon socket to fasten the nuts on the pins with a torque of:
   - 8 Nm (5.9 lbt*ft) in case of copper nuts and rods (old LPS).
   - 4 Nm (2.95 lbt*ft) in case of brass nuts and rods.
   - 4 Nm (2.95 lbt*ft) in case of nickel plated brass nuts and rods.
   - 8 Nm (5.9 lbt*ft) in case of nickel plated steel nuts and rods.

   Caution: *Make sure to place the washers and cable eyes in correct order upon the pin as illustrated in image 5-34. First the wire lugs (reference 1), then the plane washers (reference 2), then the lock washers (reference 3) and finally the nuts (reference 4).*

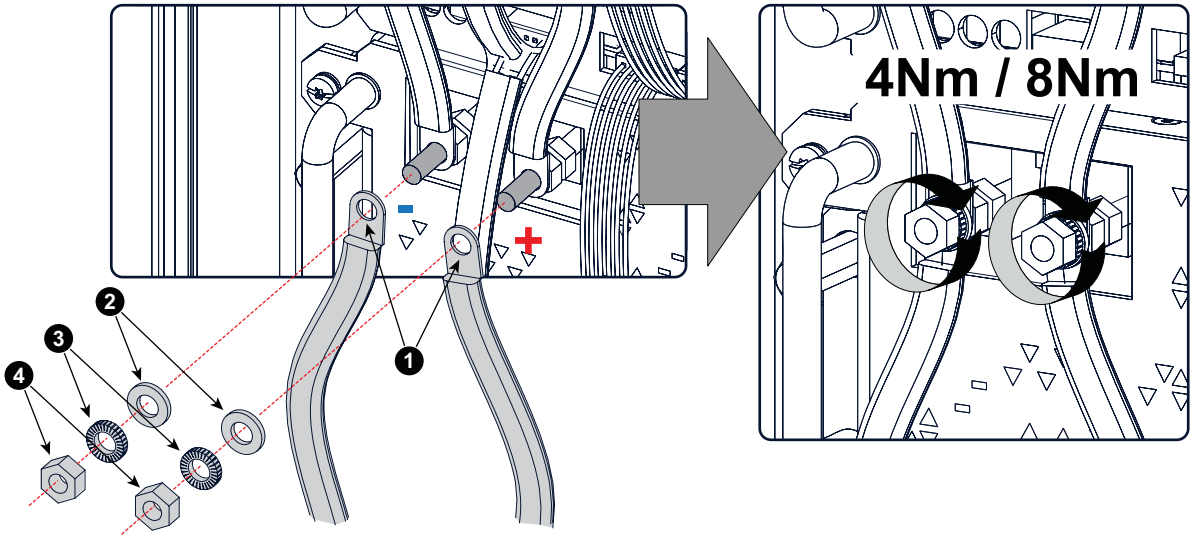


Image 5-34

4. Connect the three MAINS INPUT cables (reference 1, 2 & 3 image 5-35) with the LPS modules in the power rack.
5. Connect the wire unit (reference 4 image 5-35) from the LPS communication interface with the CTRL IN socket of the LPS module at the bottom of the LPS rack.

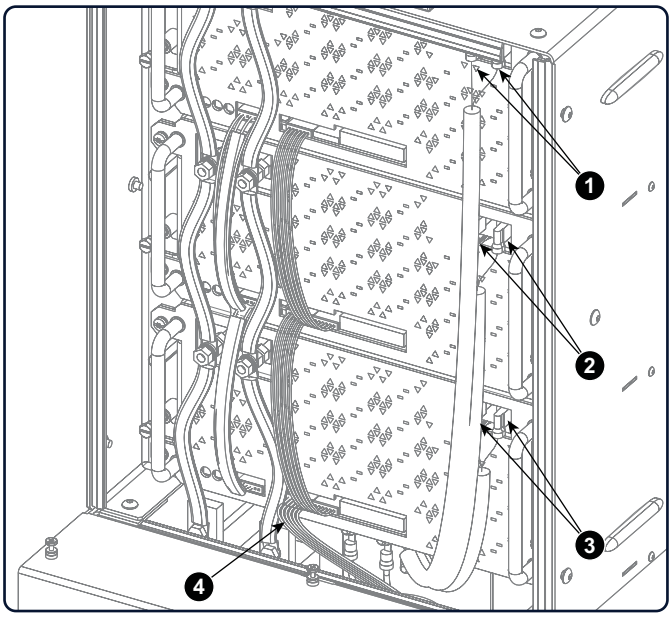


Image 5-35

6. Install the front and rear cover of the Power Unit. Use a 3 mm Allen wrench to fasten the 5 screws (reference 1 & 2 image 5-36) per cover.

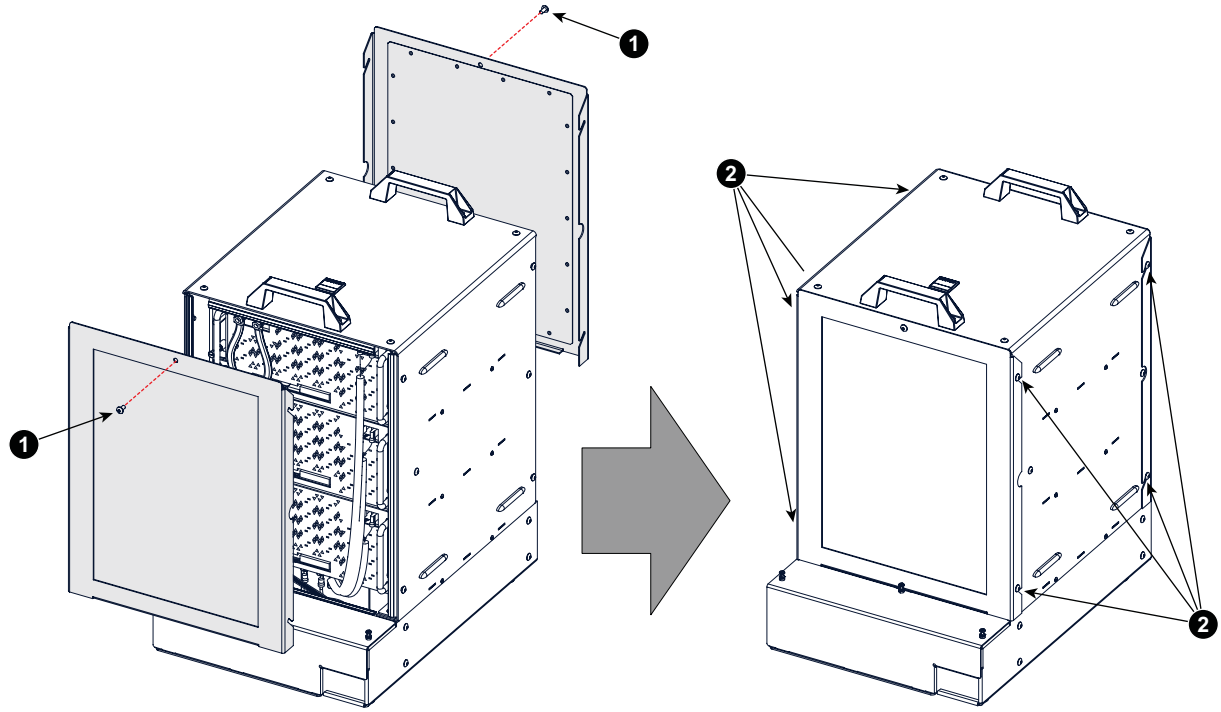


Image 5-36

6. START PULSE GENERATOR

About this chapter

This chapter describes briefly the functionality, the different parts and the replacement procedure of the Start Pulse Generator (SPG) module.

Overview

- Introduction
- Troubleshooting
- Removal of the Start Pulse Generator
- Installation of the Start Pulse Generator

6.1 Introduction

Functionality of the Start Pulse Generator

The purpose of the Start Pulse Generator (SPG) is to ignite the lamp with a burst of high voltage peaks. The SPG superimposes high voltage peaks onto the normal dc start-up voltage of the lamp supplied by the Lamp Power Supply modules from the projector Power Unit. Once the lamp is started up and illuminating the high voltage is removed and the lamp voltage drops to the arc voltage. The high voltage peaks are added to the lamp voltage by a superimposing transformer which is in series with the positive connection from the LPS to the lamp. The negative connection from LPS to lamp is direct and is connected to the chassis at the lamp side. The full lamp current passes through the secondary of the superimposing transformer.

Parts

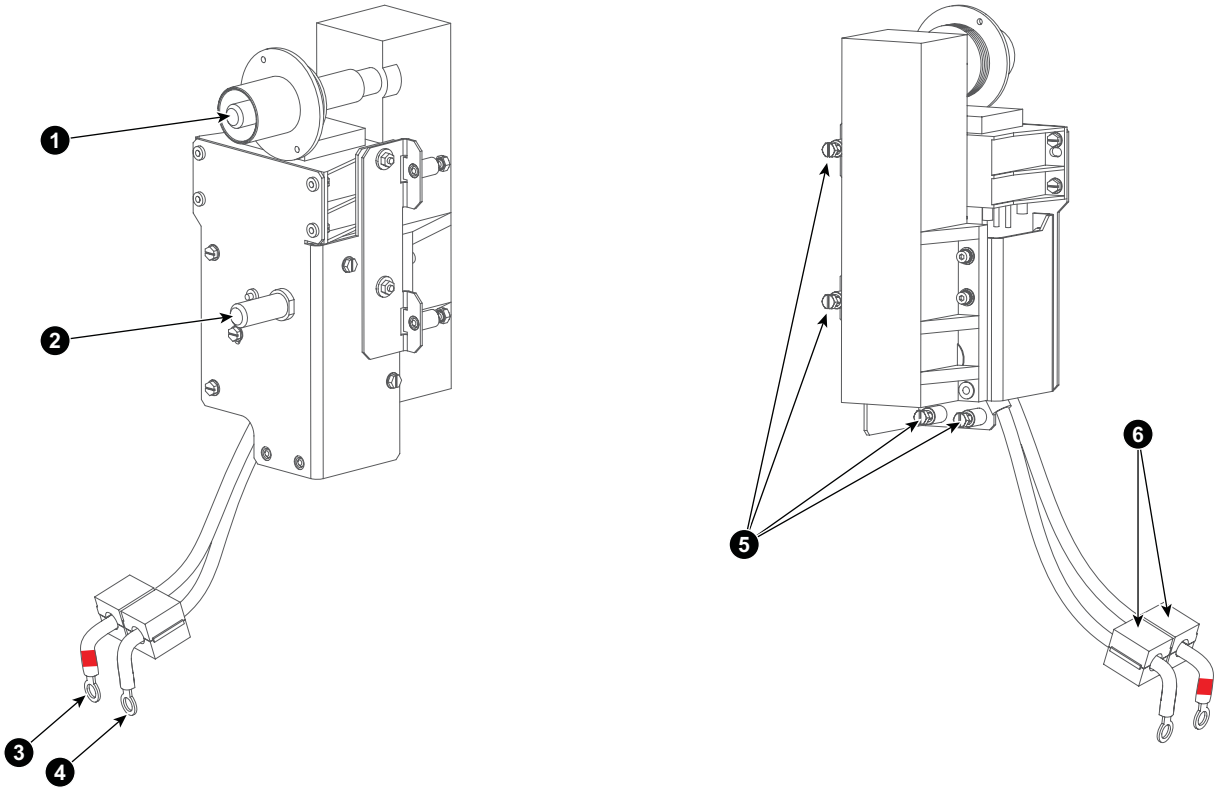


Image 6-1
1 Positive connection pin from SPG to Lamp House.
2 Negative connection pin from SPG to Lamp House.
3 Red marked cable lug. Has to be connected with the positive “LAMP OUT” pin of the LPS modules.
4 Black marked cable lug. Has to be connected with the negative “LAMP OUT” pin of the LPS modules.
6 Retaining fixation screws.
6 Ferrite block.

6.2 Troubleshooting

Lamp fails to ignite after you switched the projector from standby to operation

Situation	Solution
You can hear the SPG module three times clicking in an attempt to ignite the lamp. The voltage on the “LAMP OUT” pins of the LPS modules of the Power Unit is first greater than 110 volt during the attempt to ignite and then drops to 0 volt. **Note**: The ambient noise must be low to hear the SPG clicking in an attempt to ignite the lamp.	• The LPS modules and SPG seem the work normally but the lamp is bad. Install another lamp house. • If the problem remains, replace the SPG module.
You can not hear the SPG module three times clicking in an attempt to ignite the lamp. The voltage on the “LAMP OUT” pins of the LPS modules of the Power Unit is first greater than 110 volt during the attempt to ignite and then drops to 0 volt. **Note**: The ambient noise must be low to hear the SPG clicking in an attempt to ignite the lamp.	• Check the cabling of the SPG module. • Replace the SPG module.
You can not hear the SPG module three times clicking in an attempt to ignite the lamp. The voltage on the “LAMP OUT” pins of the LPS modules of the Power Unit is below 110 volt during the attempt to ignite. The diagnostic LED’s of the LPS module indicates a problem with the LPS module. **Note**: The ambient noise must be low to hear the SPG clicking in an attempt to ignite the lamp.	• Check the cabling of the LPS module. • Replace the LPS module.

6.3 Removal of the Start Pulse Generator

To remove the Start Pulse Generator, the left cover, the right cover, the rear cover and the Lamp House have to be removed first. This procedure assumes that the left cover, the right cover, the rear cover and the Lamp House are already removed.

Necessary tools

- 4mm Allen wrench.
- 5mm Allen wrench.
- 8mm nut driver.

How to remove the Start Pulse Generator?

1. Remove the strain relief clamps of the SPG power cables (reference 9 of image 6-2). Use a 4 mm Allen wrench.

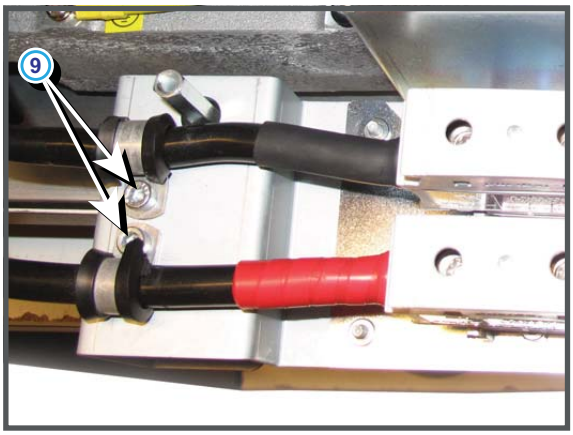


Image 6-2

2. Disconnect the SPG power cables from the Terminal Block. Use a 5mm Allen wrench.
3. Remove the SPG module from the projector by releasing the four retaining screws. Use a 8 mm nut driver.

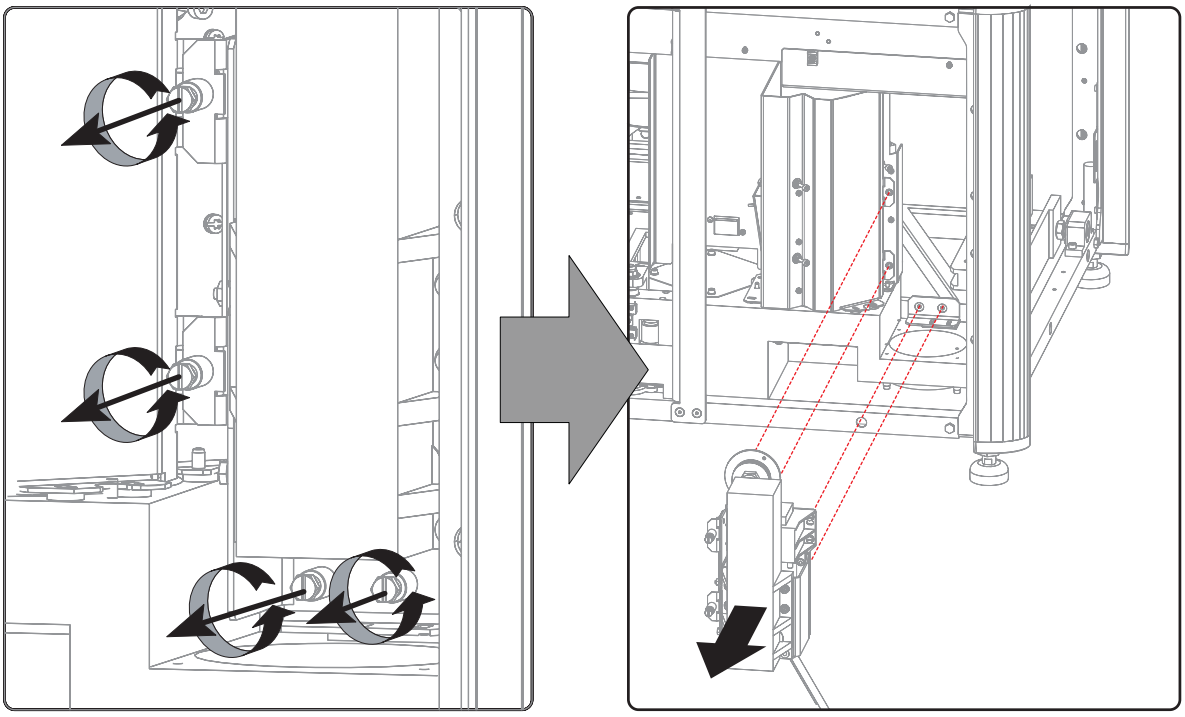


Image 6-3

6.4 Installation of the Start Pulse Generator

To install the Start Pulse Generator, the left cover, the right cover, the rear cover and the Lamp House have to be removed first. This procedure assumes that the left cover, the right cover, the rear cover and the Lamp House are already removed.

Necessary tools

- 4 mm Allen wrench.
- Torque wrench with 17 mm hexagon socket.
- 8 mm nut driver.

How to install the Start Pulse Generator?

1. Place the SPG module into position and fasten the four retaining screws. Use a 8 mm nut driver.

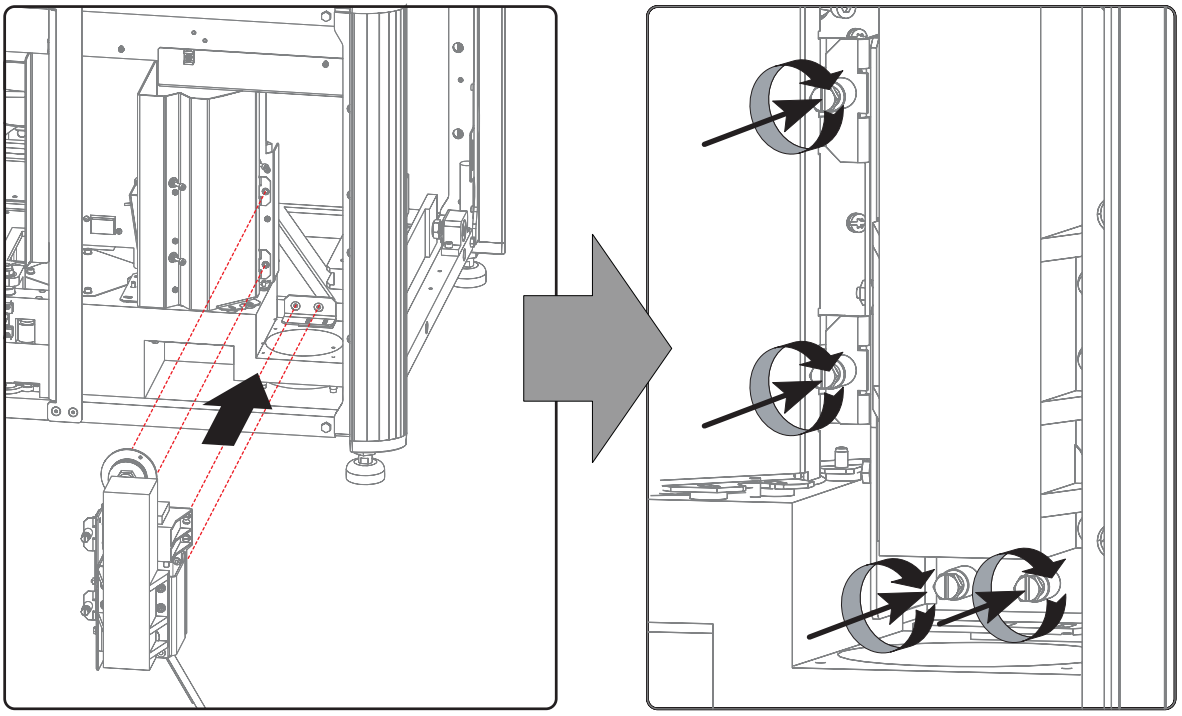


Image 6-4

2. Make sure that the SPG power cables are equipped with a ferrite block.
3. Connect the SPG power cables with the Terminal Block as illustrated. Fasten the cables with at torque of **10Nm** (7.4 lbf*ft). Use torque wrench with a 5 mm Allen socket.

   Warning: *Respect the polarity of the SPG power cables. Make sure that the head of the ferrule is completely inserted in the Terminal Block.*

   Warning: *There must be 1 cm space between the housing of the Terminal Blocks.*

   Note: *The electrical high power connections of the Terminal Blocks must be checked on a yearly bases.*

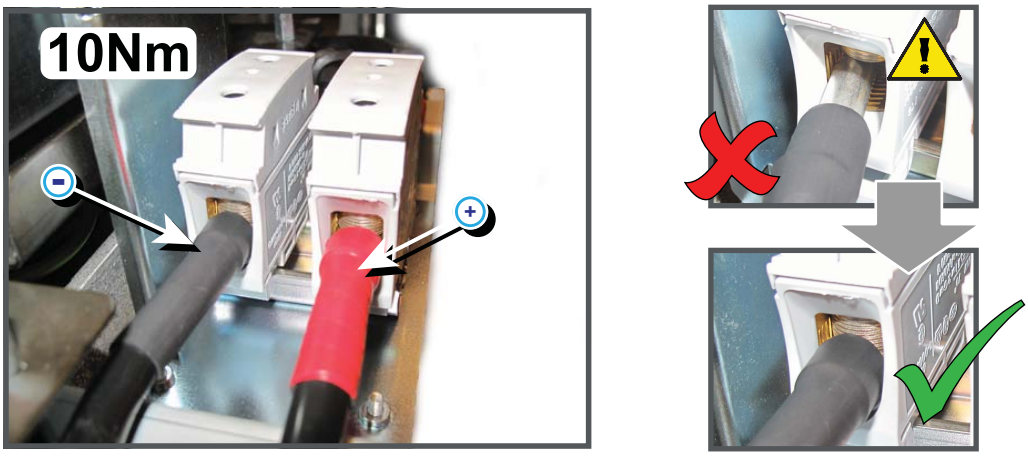


Image 6-5

4. Reinstall the strain relief clamps of the SPG power cables (reference 9 of image 6-6). Use a 4 mm Allen wrench.

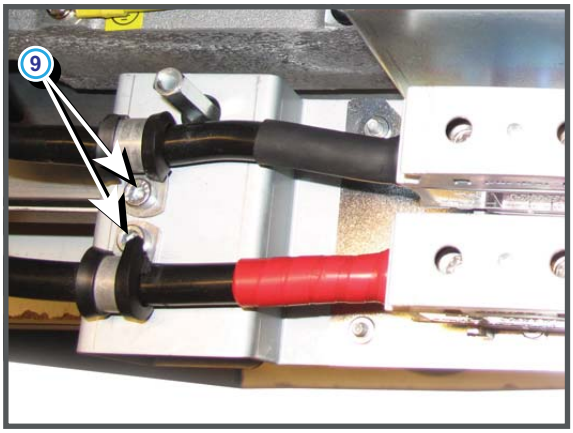


Image 6-6

5. Loosen the four retaining screws, which you fastened in step 1, one turn.
6. Install the Lamp House. See "Installing the Lamp House", page 121.
7. Fasten the four retaining screws of the LPS module.

7. LAMPS AND LAMP HOUSE

About this chapter

This chapter enumerates all the supported xenon lamps for the DP-3000 digital projector and how to replace the xenon lamp in the Lamp House. Also included are the procedure to reset the lamp parameters, which is required after a xenon lamp replacement, and the procedure to realign the lamp in its reflector for optimal performance.

Also included in this chapter are the replacement procedures for the UV blocker, Lamp Reflector and the Lamp Info module.

WARNING: DO NOT PERMIT UNAUTHORIZED PERSONNEL TO PERFORM OR ATTEMPT ANY PHASE OF XENON LAMP HANDLING OR SERVICE. ONLY TRAINED AND QUALIFIED TECHNICAL SERVICE PERSONNEL ARE ALLOWED TO HANDLE THE XENON LAMP.

CAUTION: Xenon compact arc lamps are highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled. Whenever the lamp house, containing a xenon lamp, has to be dismantled or whenever the protective container or cloth has to be removed from the xenon lamp, authorized protective clothing MUST be worn!

WARNING: Always wear face protection (full face shield with neck protector) when handling xenon lamps.

WARNING: Always wear protective clothing (welder's jacket) when handling xenon lamps.

WARNING: Always wear clean leather gloves with wrist protectors when handling xenon lamps.

Overview

- Introduction
- Supported xenon lamps for the DP-3000
- Removing the lamp house
- Removal of the xenon lamp
- Installation of the xenon lamp
- Installing the Lamp House
- Resetting the lamp parameters
- Realignment of the lamp in its Reflector
- Alignment of the arc stabilizing magnet
- Replacement of the Lamp Info module
- Replacement of the UV blocker
- Replacement of the Lamp Reflector
- Cleaning the UV blocker of the Lamp House
- Cleaning the Reflector of the Lamp House

7.1 Introduction

Lamp and Lamp House

Xenon lamps are highly pressurized. At room temperature the pressure inside the bulb is between 10 and 15 bar. When ignited, the normal operating temperature of the bulb increases the pressure up to somewhere between 30 and 50 bar. The bulb temperature of an ignited lamp is approximately 700°C and the temperature of the arc is approximately 12000°C! To ignite a xenon lamp a voltage of 40000 volt is required. Once the lamp is ignited the startup voltage drops to a level between 20 and 42 volt. The DC current consumed by the lamp during normal operation can increase to 170 ampere. The maximum light produced by the xenon lamp inside the DP-3000 digital projector is roughly 250000 lumens.

The xenon lamp is safely sheltered inside the Lamp House. The Lamp House exist in a reflector, a UV blocker, a lamp anode socket, a lamp cathode socket, a Lamp Info module, an adjustable arc stabilizing magnet and an XYZ-adjustment mechanism to align the lamp in the reflector. The Lamp House can handle xenon lamps up to 6500 Watt. The xenon lamp and Lamp House can be removed from the projector as a whole, which allows a fast lamp replacement in cases when time is critical.

The Lamp Info module holds the lamp parameters and keeps track of the lamp history such as lamp power, number of strikes, total lamp run time, etc. For that it is important to reset the lamp parameters after each lamp replacement.

Parts identification xenon lamp

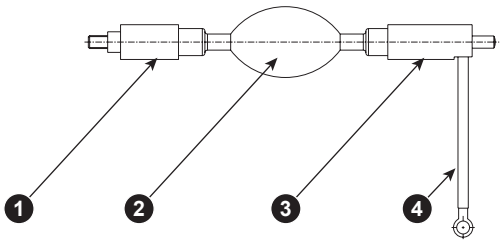


Image 7-1
1 Cathode of the xenon lamp.
2 Envelope (bulb) of the xenon lamp.
3 Anode of the xenon lamp.
4 Anode wire of the xenon lamp.

Parts identification Lamp House

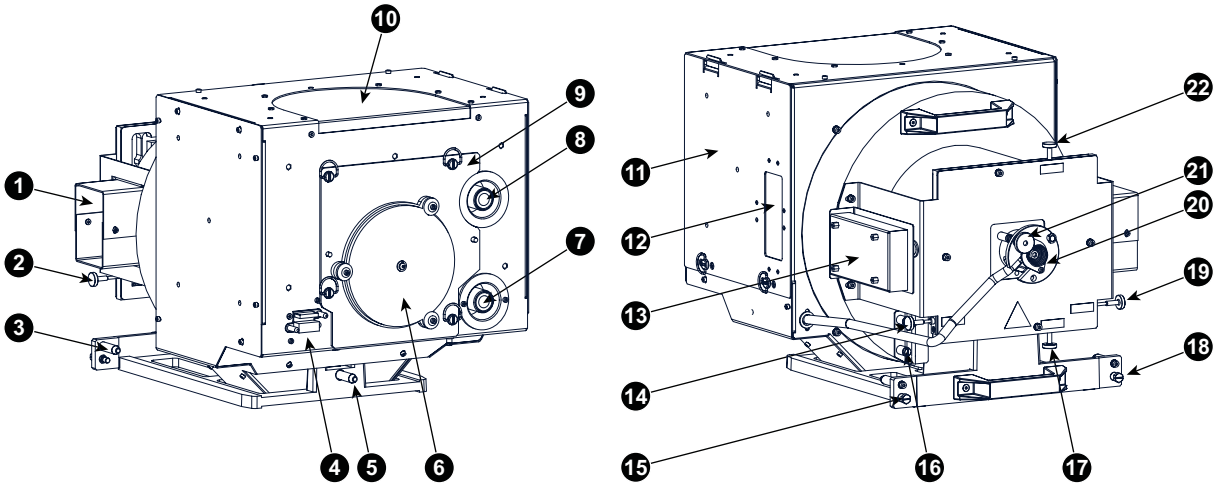


Image 7-2
1 Air inlet cathode cooling.
2 Adjustment screw horizontal lamp alignment.
3 Positioning pin.
4 Connection Lamp Info module.
5 Positioning pin.
6 UV blocker.
7 Cathode connection with SPG.
8 Anode connection with SPG.
9 Removable front cover.
10 Air out let.
11 Removable side cover.
12 Viewing port lamp arc.
13 Lamp Info module.
14 Lock screw horizontal lamp alignment.
15 Lamp House fixation screw.
16 Arc stabilizing magnet.
17 Lock screw vertical lamp alignment.
18 Lamp House fixation screw.
19 Adjustment screw horizontal lamp alignment.
20 Lamp cathode fixation screw.
21 Adjustment screw for lamp Z-alignment.
22 Adjustment screw vertical lamp alignment.

Protective packaging

The xenon lamp is packed in a protective container or wrapped in a protective cloth. Never remove this protective container or protective cloth without wearing adequate protective clothing (face chield, clean cotton glovers, welder's jacket).

Image 7-3

7.2 Supported xenon lamps for the DP-3000

Anode and cathode lamp adapters are used to position the arc of the xenon lamp in the middle of the reflector inside the lamp house. The size of the xenon lamp vary from type to type. Because of that different lamp adapters are required. Futhermore, some lamp types require an anode adaptation ring to fit precisely into the anode support assembly. The table below shows for each supported xenon lamp which anode/cathode adapters have to be used and if an anode adaptation ring/bushing is required.

List of supported lamp types and their respective anode/cathode adapters:

Lamp type	Supplier	Cathode adapter	Anode adapter	Anode adaptation ring or bushing	Barco Order No.
2000W HS-OFR	OSRAM XBO	R8436061K	R859987K	-	-
2500W HS OFR	OSRAM XBO	R8436061K	R859987K	-	-
3000W HS-OFR	OSRAM XBO	R8436061K	R859987K	-	-
3000W DHS OFR	OSRAM XBO	R8436061K	R859987K	-	**R9855950**
4000W HS-OFR	OSRAM XBO	R8436081K	R859986K	-	-
4500W HS-OFR	OSRAM XBO	R8436081K	R859986K	-	-
4500W DHP-OFR	OSRAM XBO	R8436081K	R859986K	-	**R9855949**
5000W HBM-OFR	OSRAM XBO	R8436081K	-	R842215K or R864132K	-
6000W HS-OFR	OSRAM XBO	R8436081K	-	R842215K or R864132K	-
6000W HP-OFR	OSRAM XBO	R8436081K	-	R842215K or R864132K	-
6000W DHP-OFR	OSRAM XBO	R8436081K	-	R842215K or R864132K	**R98064901**
6500W DHP-OFR	OSRAM XBO	R8436081K	-	R842215K or R864132K	**R9806860**
UXL-20SC	USHIO	R8436061K	R859987K	-	-
UXL-25SC	USHIO	R8436061K	R859987K	-	-
UXL-30SC	USHIO	R8436061K	R859987K	-	-
DXL-30BA	USHIO	R859984K	R859985K	-	**R9855953**
UXL-40SC	USHIO	R8436101K	R859986K	-	-
DXL-45BA	USHIO	R8436111K	-	-	**R9855952**
UXL-50SC	USHIO	R8436101K	R859986K	-	-
UXL-60SC	USHIO	R8436101K	-	R842215K or R864132K	-
DXL-60BA2	USHIO	R8436111K	-	-	**R9806520**
DXL-65BA	USHIO	R8436111K	-	-	**R9855951**

WARNING: Always use the right adapter(s) for the xenon lamp. Neglecting this may result in poor performance of the lamp and damage to the xenon lamp and Lamp House. Some adapters looks the same, therefore check the engraved item number upon the adapter to ensure you uses the right adapter.

Types of lamp anode support

There are two types of lamp anode supports. The oldest type consist in three legs spider assembly (reference 1 image 7-4) which is attached to the metal front cover. The current type of lamp anode support (reference 2 image 7-4) is integrated on the UV blocker of the Lamp House. The lamp replacement procedure is basically the same for both types. Important to know is that the **anode adaptation ring** (reference 3 image 7-4) which has to be used with some xenon lamps supported with a three legs spider assembly, is replaced with an **anode adaptation bushing** (reference 4 image 7-4) in case of an integrated anode support.

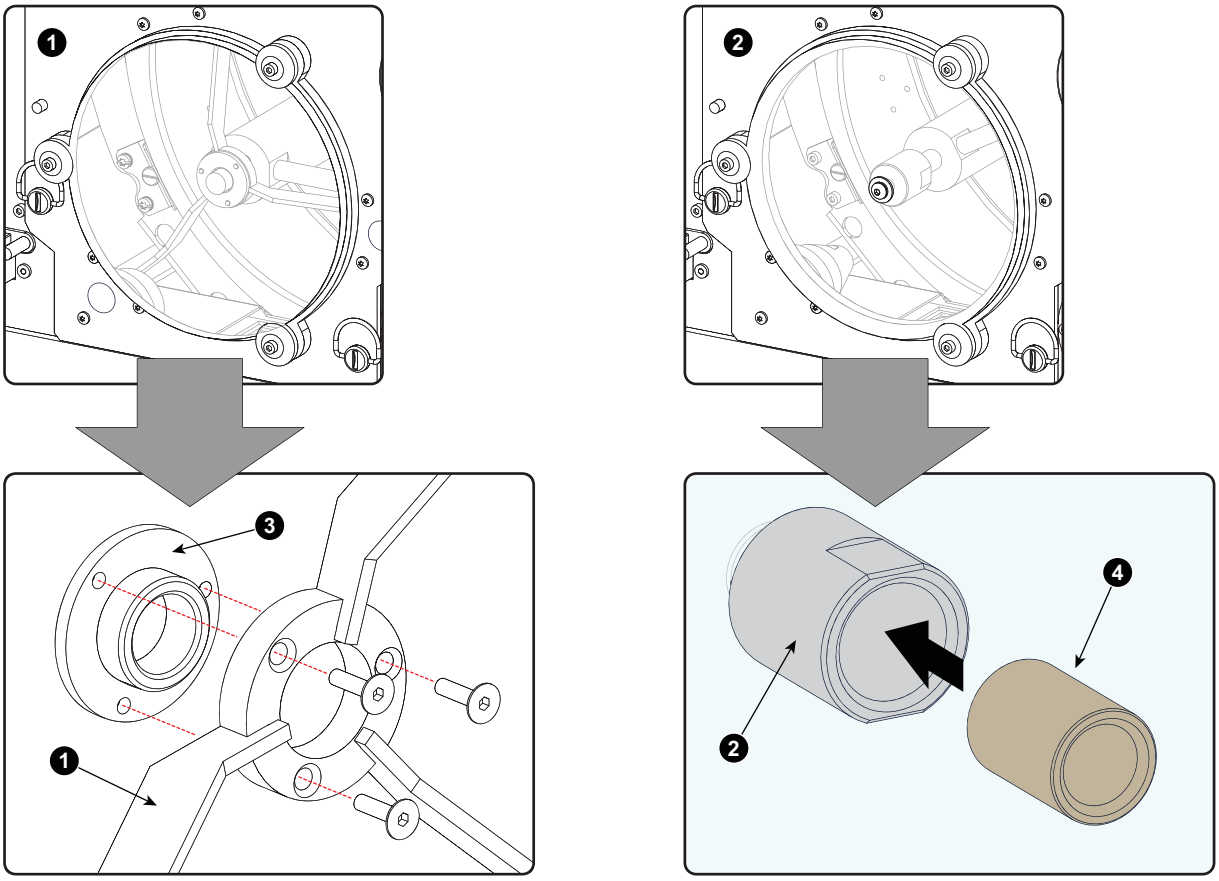
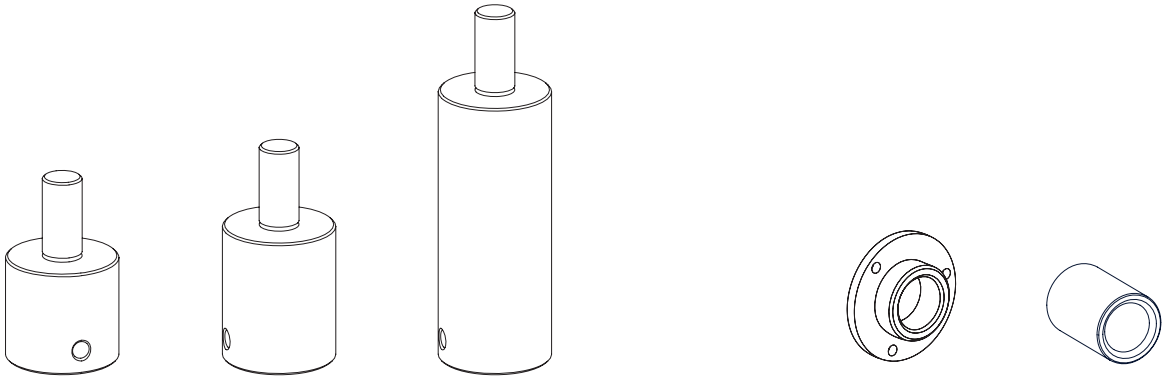


Image 7-4

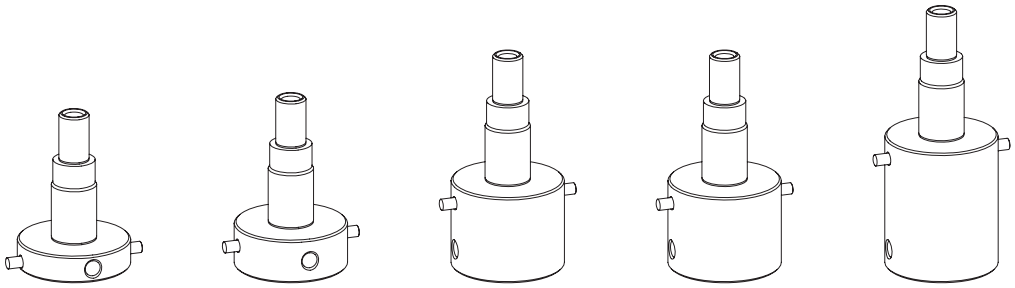
Anode adapters, adaptation ring and adaptation bushing



R859986K *R859985K* *R859987K* *R842215K* *R864132K*

Image 7-5

Cathode adapters



R8436101K *R8436081K* *R859984K* *R8436111K* *R8436061K*

Image 7-6

7.3 Removing the lamp house

WARNING: The Lamp House is very hot after operation. To avoid burns, let the projector cool down for at least 15 minutes before proceeding to remove the Lamp House.

Necessary tools

- Square lock key.
- 10 mm nut driver.

How to remove the lamp house from the projector?

1. Open the door of the lamp compartment as illustrated. Use the square lock key, delivered with the projector, to unlock the door. Turn the key clockwise to unlock.

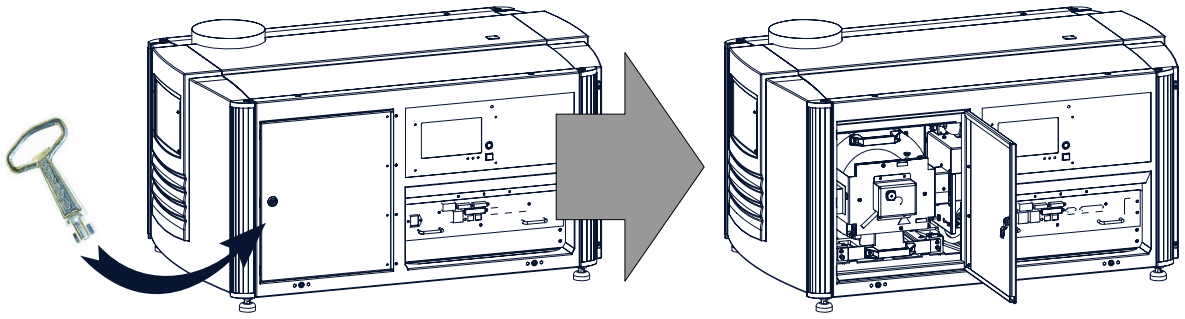


Image 7-7

2. Release the two captive screws at the base of the lamp house as illustrated. Use for that a 10 mm nut driver.

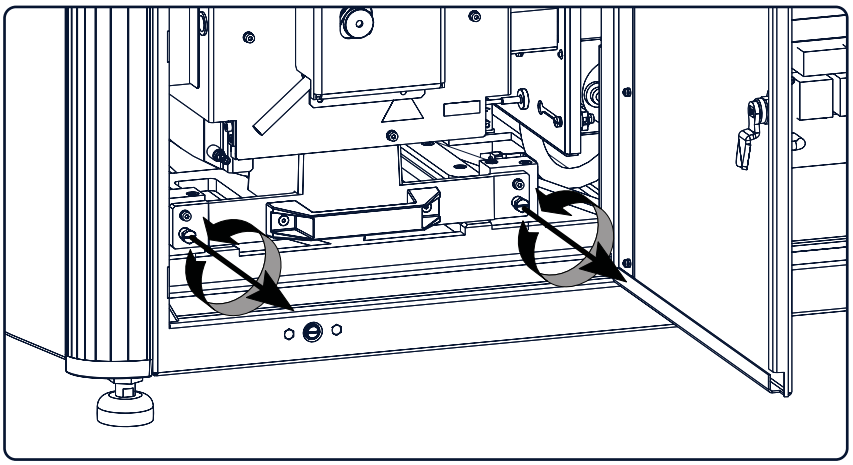


Image 7-8

3. Remove the lamp house as follows:
   - Grip the lamp house by the bottom handle and partially slide it out of the lamp compartment.
   - Grip the lamp house by both handles and remove the lamp house completely from the projector.
   - Place the lamp house on a stable support.

   Warning: *Be aware of the weight of the lamp house.*

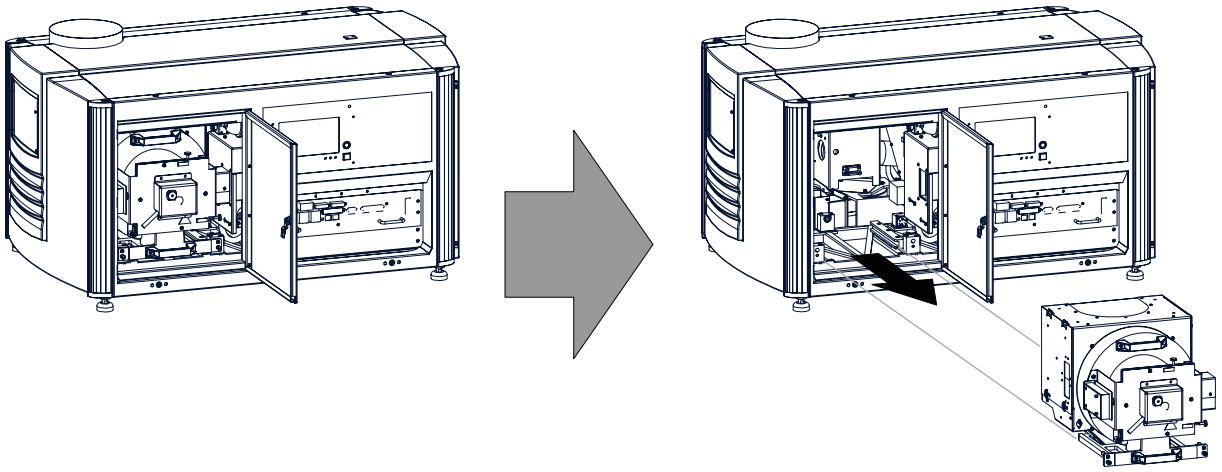


Image 7-9

7.4 Removal of the xenon lamp

WARNING: DO NOT PERMIT UNAUTHORIZED PERSONNEL TO PERFORM OR ATTEMPT ANY PHASE OF XENON LAMP HANDLING OR SERVICE. ONLY TRAINED AND QUALIFIED TECHNICAL SERVICE PERSONNEL ARE ALLOWED TO HANDLE THE XENON LAMP.

WARNING: This procedure may only be performed by qualified technical service personnel.

CAUTION: Xenon compact arc lamps are highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled. Whenever the lamp house, containing a xenon lamp, has to be dismantled or whenever the protective container or cloth has to be removed from the xenon lamp, authorized protective clothing MUST be worn!

WARNING: Always wear face protection (full face shield with neck protector) when handling xenon lamps.

WARNING: Always wear protective clothing (welder's jacket) when handling xenon lamps.

WARNING: Always wear clean leather gloves with wrist protectors when handling xenon lamps.

Necessary tools

- Two open-end wrenches of 22 mm.
- 5 mm Allen wrench.
- Lamp protective container or protective cloth with two binders.
- Flat blade screw driver.
- 2,5 mm Allen wrench.

How to remove the xenon lamp out of the Lamp House?

1. Remove the side cover of the Lamp House by releasing the two quarter turn screws (reference 1 image 7-10) at the bottom of the side cover as illustrated.

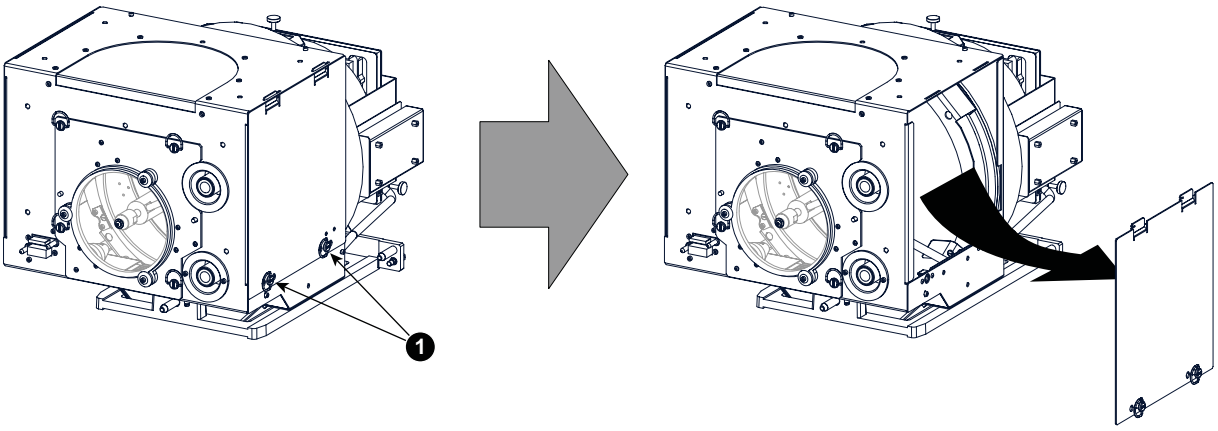


Image 7-10

2. Remove the anode wire lug (reference 3 image 7-11) from the anode socket. Use for that two open ended spanners of 22 mm. Hold the first nut (reference 4) with one spanner while releasing the second nut (reference 5 image 7-11) with the other spanner.
   Tip: *Place the flat washers (reference 6 & 7 image 7-11) and nut back on the rod after the lug is removed.*

   Note: *The most recent Lamp Houses for the DP-3000 makes it possible to remove the anode socket together with the xenon lamp from the Lamp House. The anode socket can be release from the xenon lamp once the xenon lamp is safely sheltered in its protective container or wrapped in a protective cloth.*

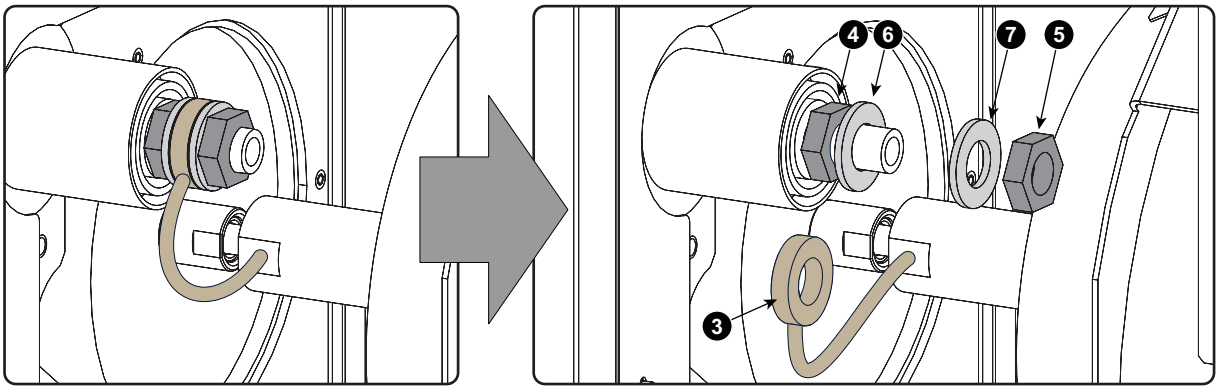


Image 7-11

3. Remove the hexagon socket head cap screw (reference 9) which fasten the cathode of the xenon lamp. Use a 5 mm Allen wrench.
   Note: *The cathode wire remains in its position after the screw (reference 9) and washer (reference 10) are removed.*

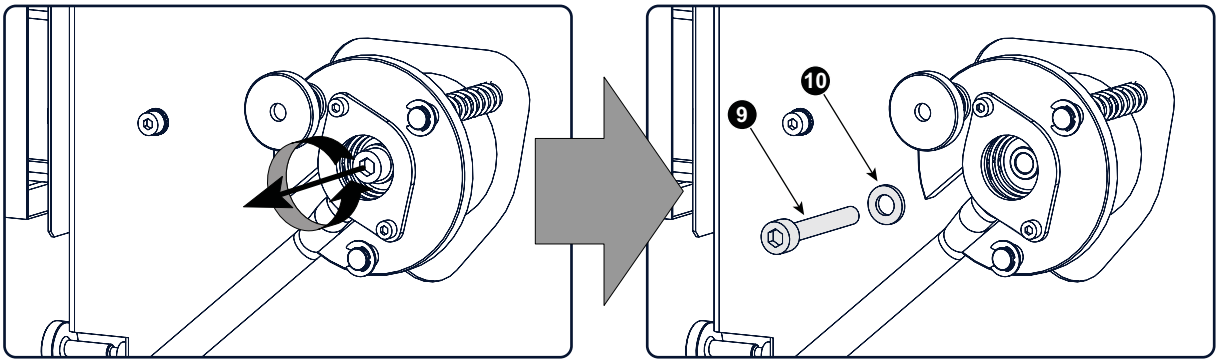


Image 7-12

4. Release the four quarter turn screws (reference 2 image 7-13) of the UV blocker assembly as illustrated. Make sure that the anode support remains in its position while releasing the screws.
   Caution: *Ensure that you wear protective clothing, a full face shield and protective gloves.*

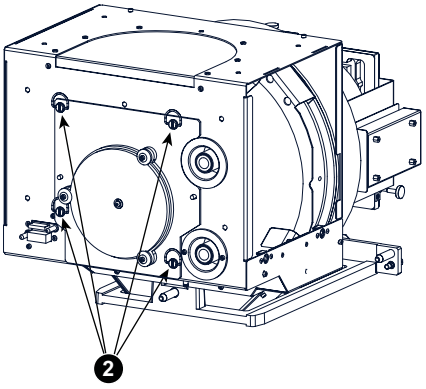


Image 7-13

5. Support the xenon lamp inside the Lamp House with one hand while removing the UV blocker assembly from the lamp house. Note that some xenon lamps are installed with an anode adaptation bushing (reference 12 image 7-14).
   Warning: *Supporting the xenon lamp with one hand to prevents it from bumping against the chassis of the Lamp House.*

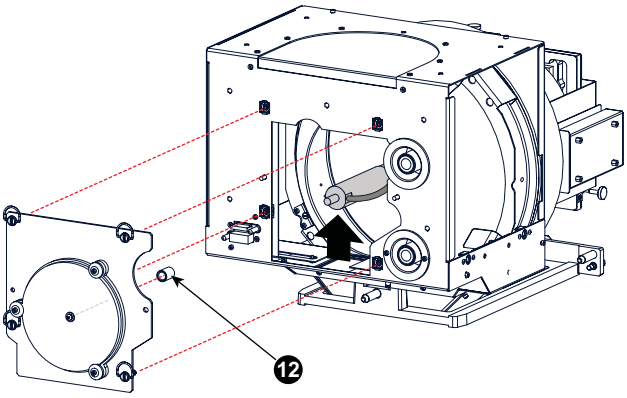


Image 7-14

6. Gently remove the xenon lamp out of the Lamp House. Do not use excessive force upon the xenon lamp. Normally the xenon lamp will easily slide out the cathode socket of the Lamp House.
   Warning: *Supporting the xenon lamp with one hand while pulling it out with other hand prevents it from bumping against the chassis of the Lamp House.*

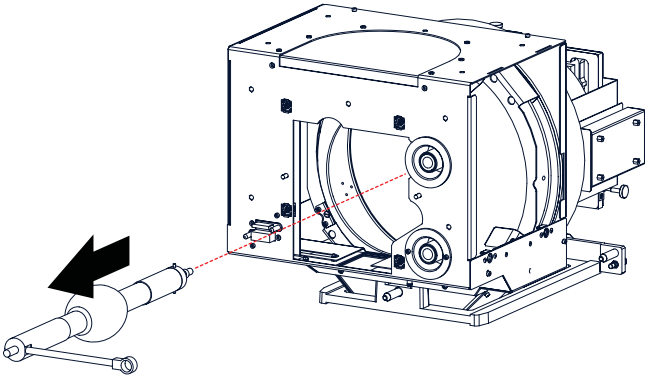


Image 7-15

7. Place the xenon lamp in its protective container or wrap the xenon lamp in a protective cloth and secure with two binders.

Image 7-16
Left: Xenon lamp wrapped in a protective cloth. Right: Xenon lamp captured in a protective container.

8. Remove the adapter(s) from the xenon lamp by releasing the hexagon socket head set screw of the lamp adapter as illustrated. Use for that a 2,5 mm Allen wrench.

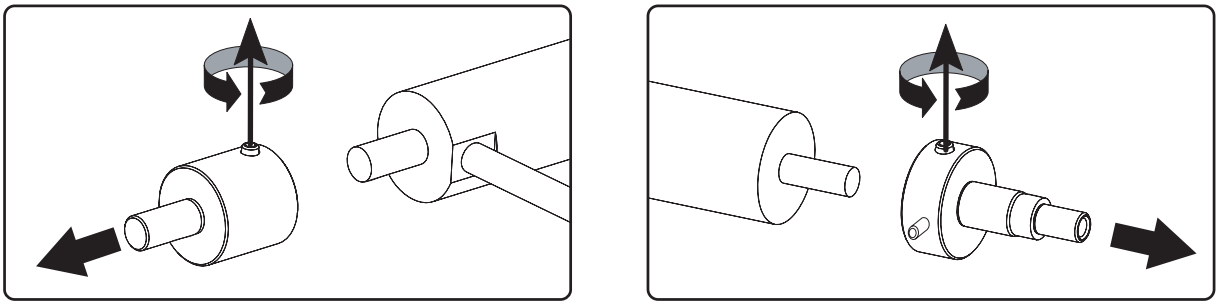


Image 7-17

Reinstall the UV blocker assembly and the side cover in case you do not intend to install another xenon lamp immediately in the Lamp House.

7.5 Installation of the xenon lamp

WARNING: DO NOT PERMIT UNAUTHORIZED PERSONNEL TO PERFORM OR ATTEMPT ANY PHASE OF XENON LAMP HANDLING OR SERVICE. ONLY TRAINED AND QUALIFIED TECHNICAL SERVICE PERSONNEL ARE ALLOWED TO HANDLE THE XENON LAMP.

WARNING: This procedure may only be performed by qualified technical service personnel.

CAUTION: Xenon compact arc lamps are highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled. Whenever the lamp house, containing a xenon lamp, has to be dismantled or whenever the protective container or cloth has to be removed from the xenon lamp, authorized protective clothing MUST be worn!

WARNING: Always wear face protection (full face shield with neck protector) when handling xenon lamps.

WARNING: Always wear protective clothing (welder's jacket) when handling xenon lamps.

WARNING: Always wear clean leather gloves with wrist protectors when handling xenon lamps.

This procedure assumes that the anode support assembly and the side cover are already removed from the Lamp House due to the removal of the xenon lamp. Futhermore, this procedure is applicable upon a Lamp House equipped with an UV blocker with an integrated anode support instead of a three leg anode support. It is recommended to upgrade the Lamp House with an integrated anode support before installing a new xenon lamp.

Necessary tools

- Torque wrench with a 2,5 mm Allen socket.
- 1,5 mm Allen wrench.
- 22 mm open-end wrench.
- Torque wrench with a 22 mm hexagon socket.
- Torque wrench with a 5 mm Allen socket.

How to install the xenon lamp into the Lamp House?

1. Install the appropriate lamp cathode adapter upon the cathode of the xenon lamp. Fasten the set screw of the cathode adapter with a torque of **2,5 Nm** (1,84 lbf*ft). Use for that a torque wrench with a 2,5 mm Allen socket. Make sure that there is full contact between the adapter flat surface and the lamp base. Note that some lamp types have a cathode pin with screw threat.
   Tip: *See chapter "Supported xenon lamps for the DP-3000", page 108, to know which cathode adapter your lamp requires.*

   Warning: *Install the cathode adapter prior to removing the protective container or protective cloth from the xenon lamp.*

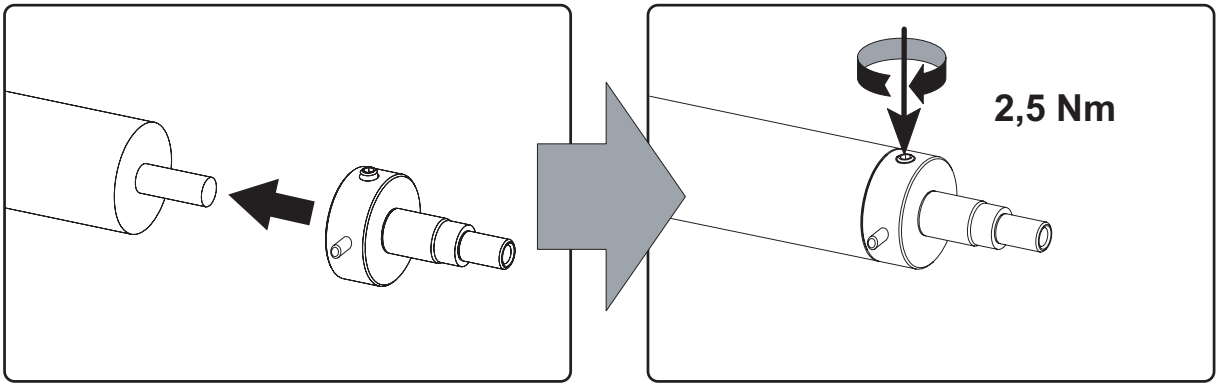


Image 7-18

2. Does the xenon lamp which you want to install requires an anode adapter?
   Tip: *See chapter "Supported xenon lamps for the DP-3000", page 108, to know if your lamp requires an anode adapter.*

   If yes, install the appropriate lamp anode adapter upon the anode of the xenon lamp. Fasten the set screw of the anode adapter with a torque of **2,5 Nm** (1,84 lbf*ft). Use for that a torque wrench with a 2,5 mm Allen socket. Make sure that there is full contact between the adapter flat surface and the lamp base.

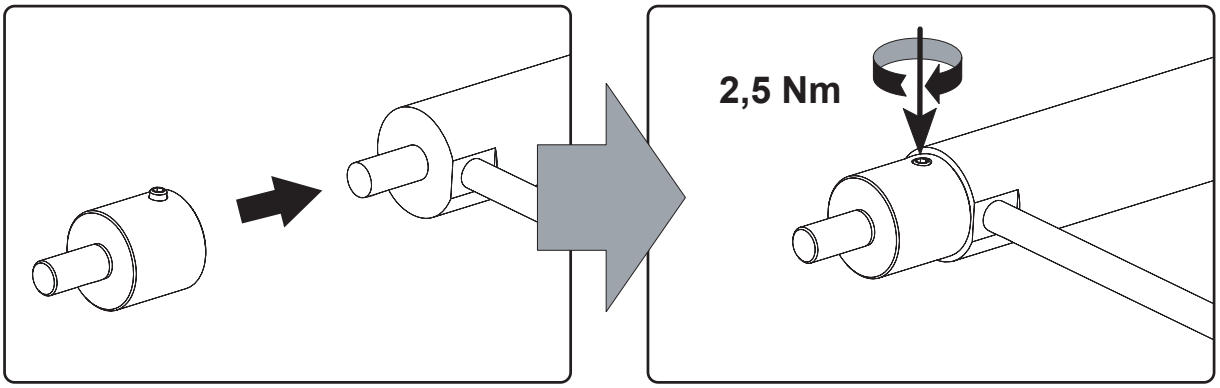


Image 7-19

   If no, make sure that there is no anode adapter installed upon the anode of the xenon lamp.

3. Does the xenon lamp which you want to install requires an anode adaptation bushing inside the anode support?
   Tip: *See chapter "Supported xenon lamps for the DP-3000", page 108, to know if your lamp requires an anode adaptation bushing.*

   If yes, insert the anode adaptation bushing (ref 4 of image 7-20) into the integrated anode support of the UV blocker.

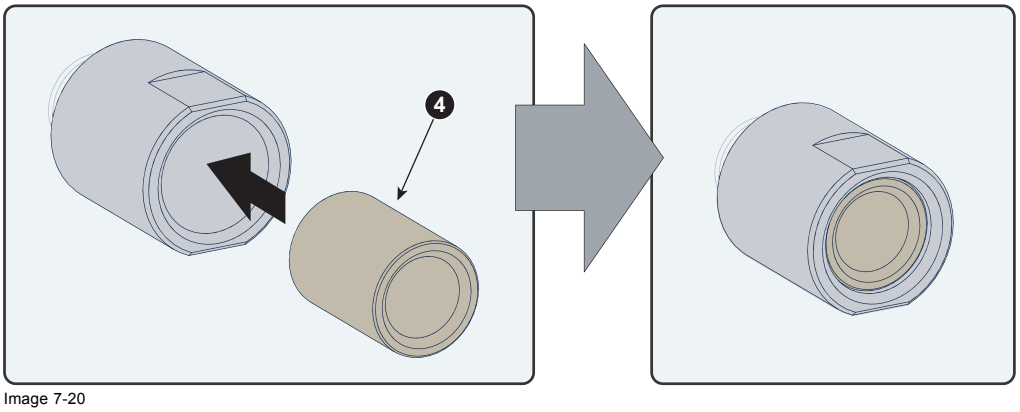


Image 7-20

   If no, make sure that there is no anode adaptation bushing inserted into the anode support.

4. Remove the protective packing from the xenon lamp and gently insert the xenon lamp into the Lamp House as illustrated. Lamp cathode first, Make sure that the wire of the lamp anode is upwards oriented. While inserting the lamp, rotate it slightly, **engaging the pins** (reference 11 of image 7-21) of the cathode adapter in the foreseen slots. This is to ensure the lamp cathode is completely inserted. Keep supporting the anode of the lamp with one hand once the xenon lamp is in position.
   Caution: *Ensure that you wear protective clothing, a full face shield and protective gloves.*

   Tip: *Write down the serial number of the xenon lamp. You will need this while updating the lamp parameters after installation of the xenon lamp. The serial number of the xenon lamp is engraved in the neck of the xenon lamp.*

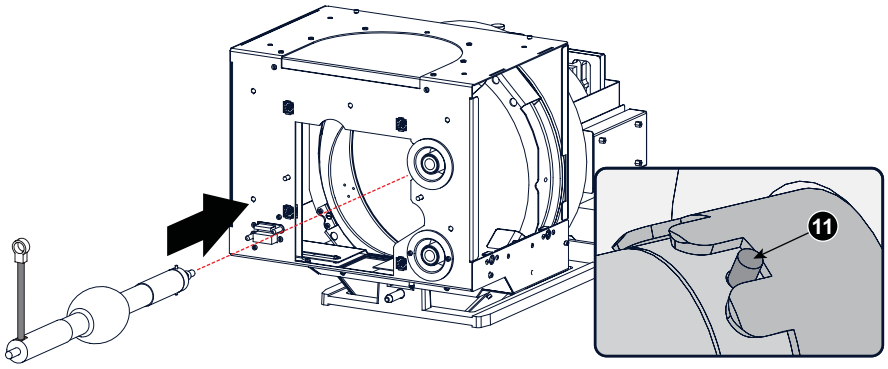


Image 7-21

5. Install the UV blocker assembly as illustrated. Use the opening at the side of the Lamp House to guide the anode pin of the xenon lamp into the anode supporting mechanism of the UV blocker. Make sure that the tick wire of the lamp anode is upwards oriented.

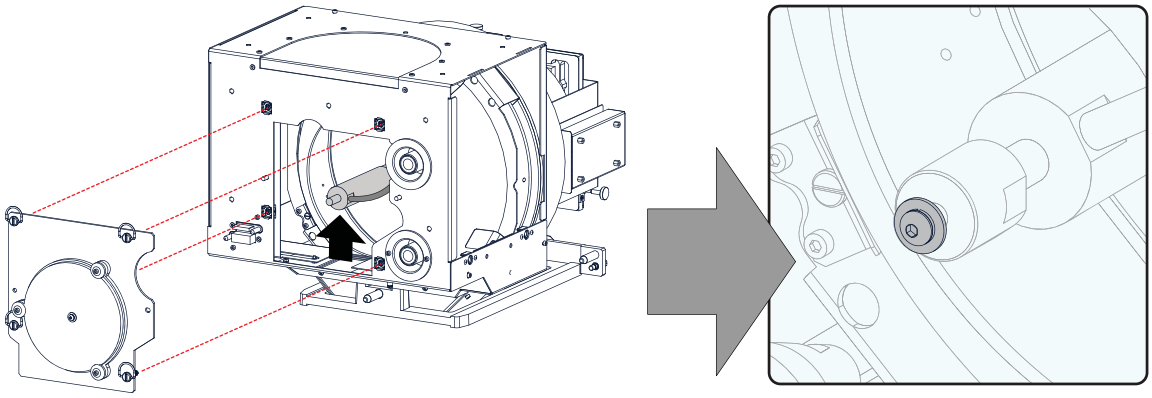


Image 7-22

6. Secure the UV blocker by fastening the four quarter turn screws (reference 2 image 7-23) as illustrated.
   Note: *Ensure that the quarter turn screws turning wires are flush with the cover or interference will occur while inserting the Lamp House into the projector.*

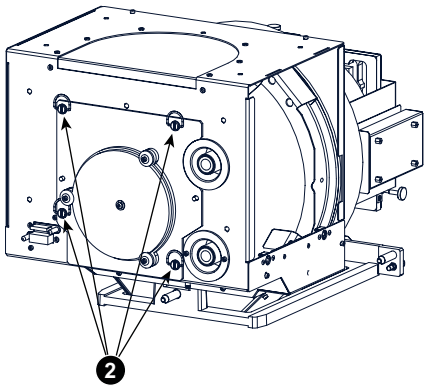


Image 7-23

7. Install the anode wire lug (reference 3 image 7-24) upon the anode socket inside the Lamp House as illustrated. Use an open-end wrench of 22 mm to hold the first nut (reference 4 image 7-24) while fastening the second nut (reference 5 image 7-24) with a torque of **25 Nm** (18,4 lbf*ft) using a torque wrench. Ensure that there is a flat washer (reference 6 & 7 image 7-24) at both sides of the wire lug (reference 3 image 7-24).
   Tip: *Use flat washers instead of star washers: Flat washer specifications: DIN125A silver finished flat washer with inside diameter 15 mm, outside diameter maximum 28 mm, and thickness 2,5 mm.*

   Warning: *A torque of **25Nm** (18.4 lbf*ft) must be applied to fasten the nuts. Make sure that there is no tension on the anode wire of the xenon lamp.*

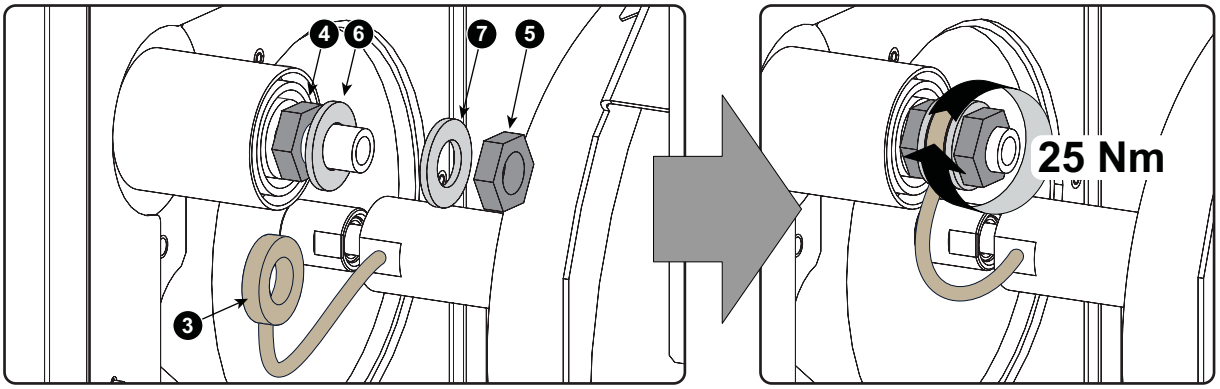


Image 7-24

8. Check the cathode connection inside the lamp house. Use an 22 mm open-end wrench to hold the first nut while fastening the second nut on the rod with a torque of **25 Nm** (18,4 lbf*ft) using a torque wrench with 22 mm hexagon socket. Ensure that there is a flat washer at both sides of the wire lug.
   Caution: *These cathode connections must be checked with every lamp change!*

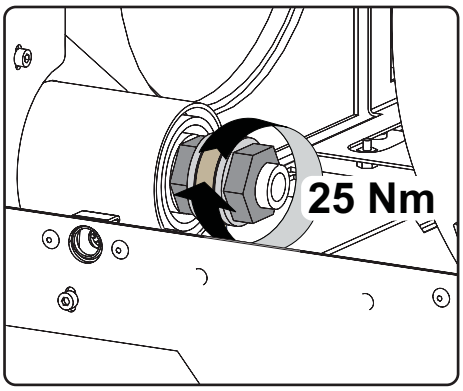


Image 7-25

9. Secure the xenon lamp cathode with the hexagon socket head cap screw (reference 9 image 7-26) and washer (reference 10 image 7-26) as illustrated. Fasten the screw with a torque of **5 Nm** (3,7 lbf*ft). Use a torque wrench with a 5 mm Allen socket.
   Caution: *Make sure that both pins (reference 11 of image 7-26) of the cathode adapter remain engaged in the foreseen slots.*

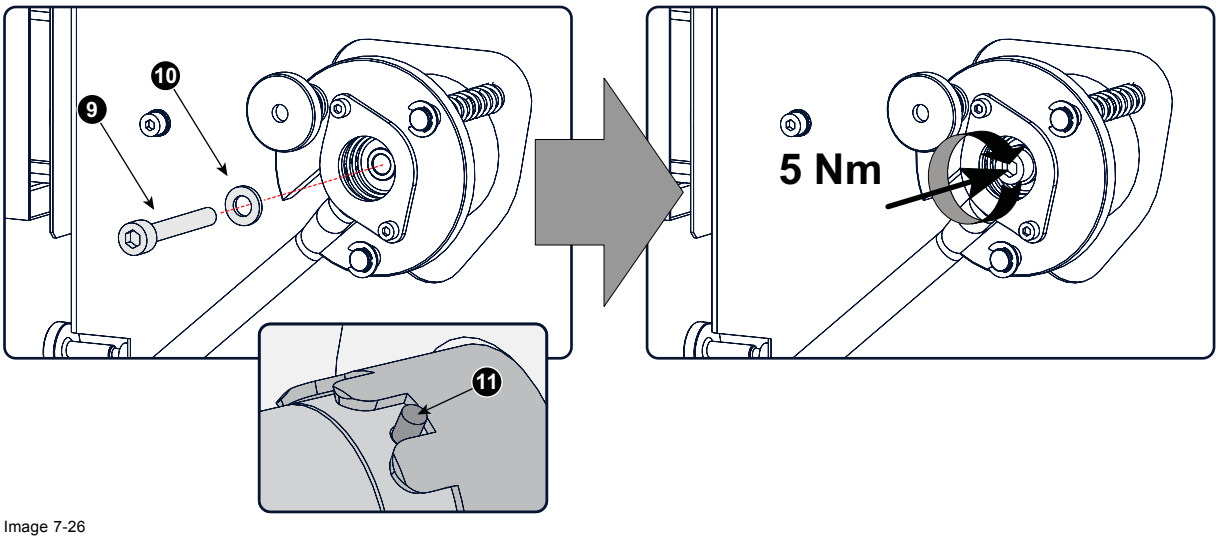


Image 7-26

10. Install the side cover of the Lamp House and fasten the two quarter turn screws (reference 1 image 7-27) at the bottom of the cover.
    Note: *Please ensure that the quarter turn screws turning wires are flush with the cover or interference will occur while inserting the Lamp House into the projector.*

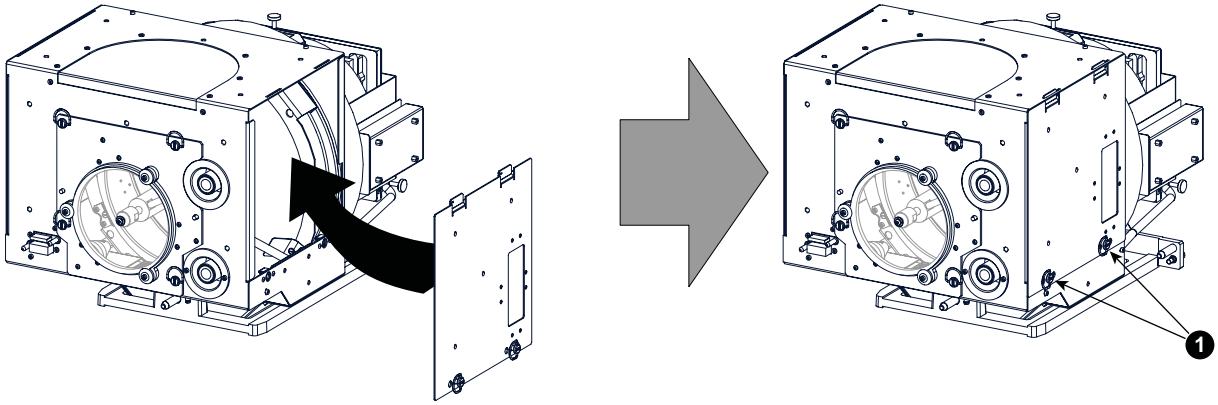


Image 7-27

CAUTION: The "LAMP INFO" parameters which are stored on a chip inside the Lamp House MUST be updated after each installation of an xenon lamp inside the Lamp House. Neglecting this update will result in poor performance and short life time of the xenon lamp.

A realignment of the xenon lamp in its reflector is required after the installation of the xenon lamp in the Lamp House.

7.6 Installing the Lamp House

Necessary tools

- Square lock key.
- 10 mm nut driver.

How to install the Lamp House into the projector?

1. Check if the six quarter turn screws turning wires (reference 1image 7-28) are flush with the cover or interference will occur while inserting the Lamp House into the projector.

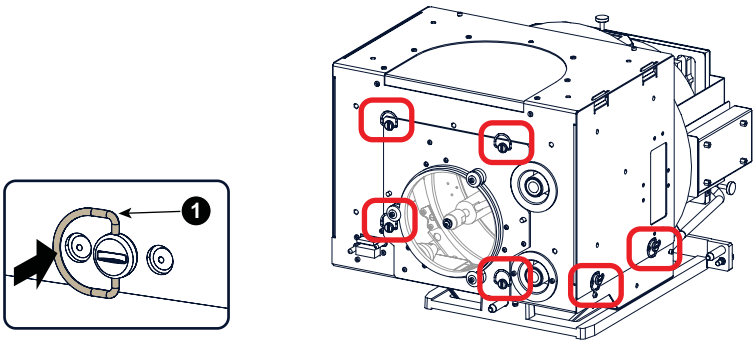


Image 7-28

2. Grip the Lamp House by both handles and place the front of the Lamp House on the base plate inside the lamp compartment of the projector, lining up the foot of the Lamp House with the slots on the base.
   Warning: *Be aware of the weight of the Lamp House.*

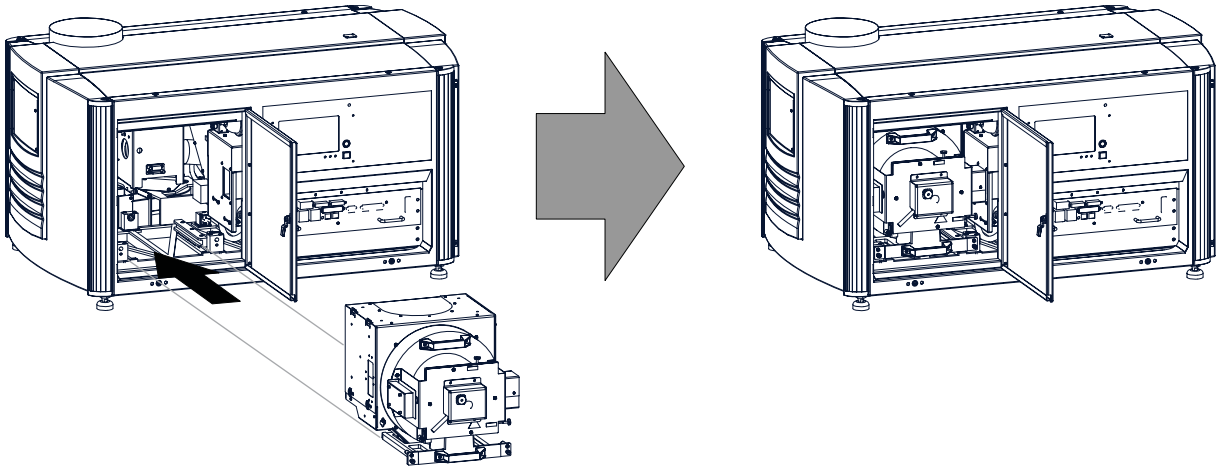


Image 7-29

3. Push the Lamp House fully into the slots.
4. Secure the position of the Lamp House by fastening the two retaining screws at the base of the Lamp House as illustrated. Use for that a 10 mm nut driver.

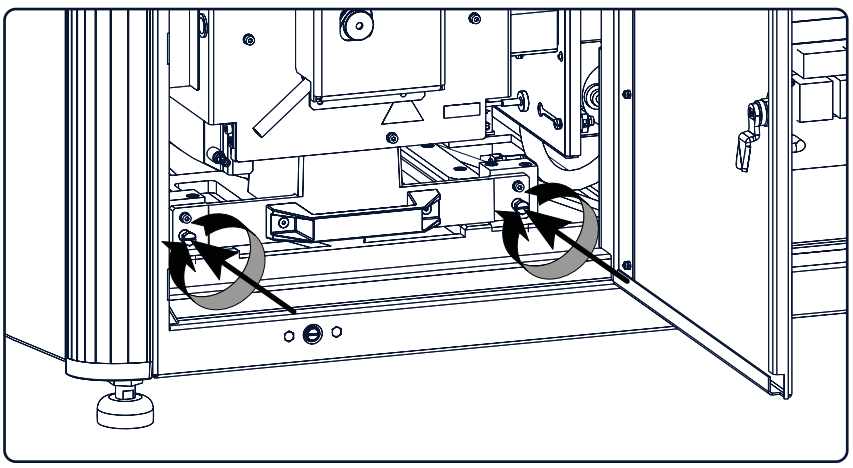


Image 7-30

5. Close the door of the lamp compartment. Use the square lock key, delivered with the projector, to lock the door. Turn the key counterclockwise to lock.

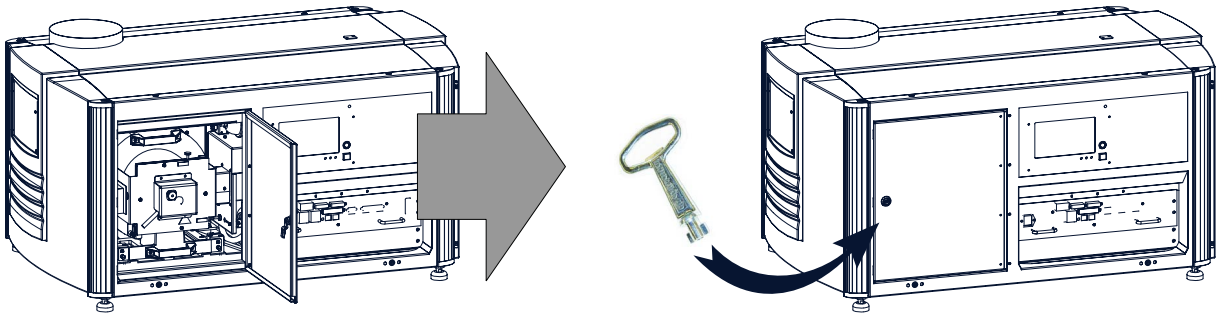


Image 7-31

Each xenon lamp replacement requires a reset of the lamp parameters. See procedure "Resetting the lamp parameters", page 123.

To ensure maximum light output it is recommended to realign the lamp. See procedure "Realignment of the lamp in its Reflector", page 124.

7.7 Resetting the lamp parameters

CAUTION: The "LAMP INFO" parameters MUST be updated after each installation of an xenon lamp inside the Lamp House. Neglecting this update will result in poor performance and short life time of the xenon lamp.

How to reset the lamp parameters?

1. Start up the projector but do not ignite the lamp.
2. Go via the **Communicator** touch panel to the menu "**Installation**" > "**Lamp**" > "**Lamp information**".
3. While the *Lamp information* window is displayed, tap on **Reset** (1).

   A reset message is displayed (2).
4. Tap on **Select** (3) to display a list of possible article numbers (4). Select a article number (5) and tap **OK** (6).

   The software will validate the selected article number (7).
5. Fill out the serial number of the lamp (8).
6. Click **Reset** (9).

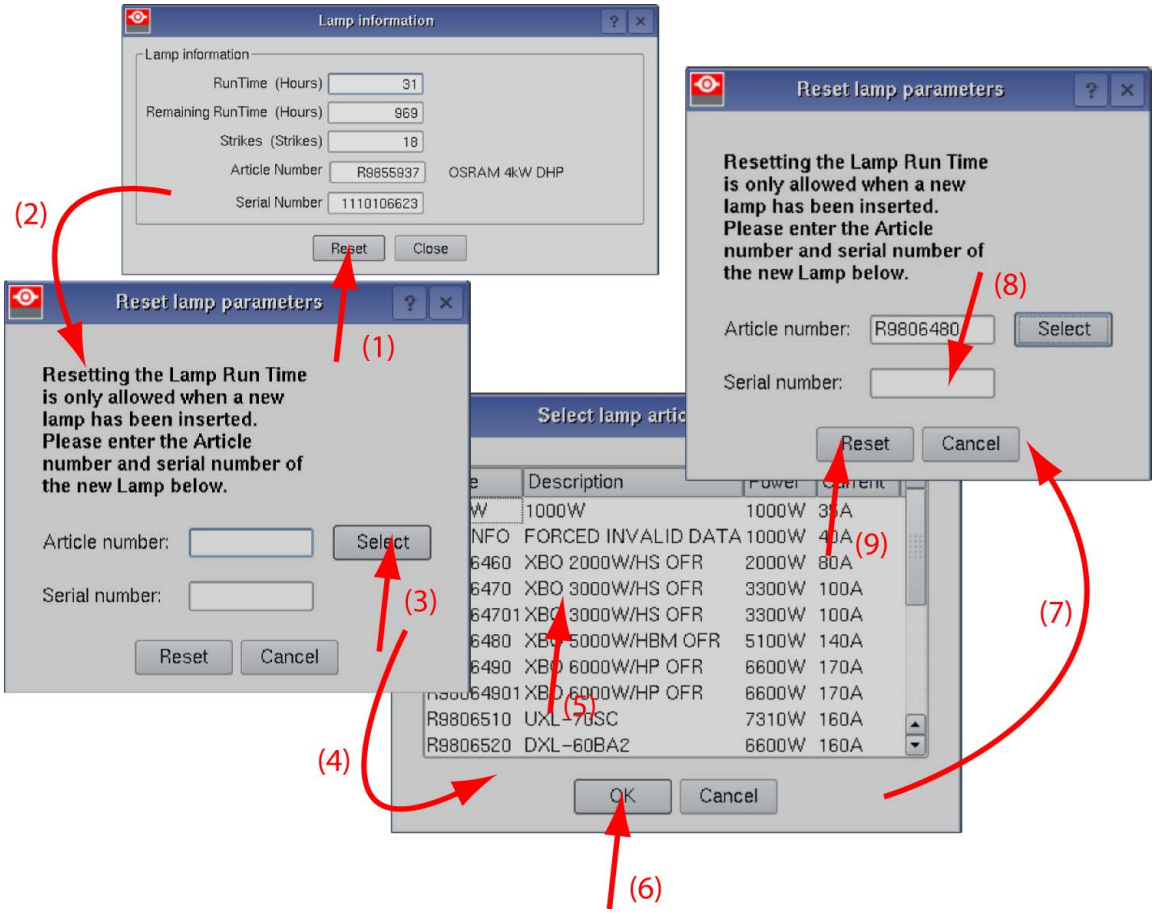


Image 7-32
Reset lamp info

CAUTION: For more information about using the Communicator Touch Panel consult the user's guide of the Communicator Touch Panel.

7.8 Realignment of the lamp in its Reflector

What has to be done?

The arc of the xenon lamp has to be placed in the center of the Reflector for maximum light output.

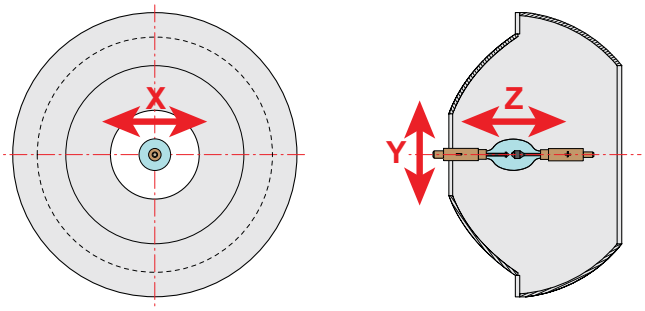


Image 7-33

Each xenon lamp installation requires a realignment of the lamp in its Reflector for optimal performance of the xenon lamp in the DP-3000 digital projector. Furthermore, it is recommended to realign the lamp after the first run time of 100 and 200 hours. Especially the Z-axis of the lamp.

WARNING: This procedure may only be performed by qualified technical service personnel.

Necessary tools

Square lock key.

How to realign the lamp in its reflector?

1. Open the door of the lamp compartment to gain access to the X-, Y-, and Z-axis adjustment thumbscrews of the lamp.
2. Switch on the projector and start up the lamp.
3. Go via the Communicator touch panel to the menu **“Installation”** > **“Lamp”** > **“Light output”**.
4. Set the “**Light output mode**” in **normal mode** and the “**Lamp Dimming**” on maximum (**255**).
   Note: *This window on the Communicator touch panel shows in the upper left corner the measured value of the built-in light sensor of the projector.*

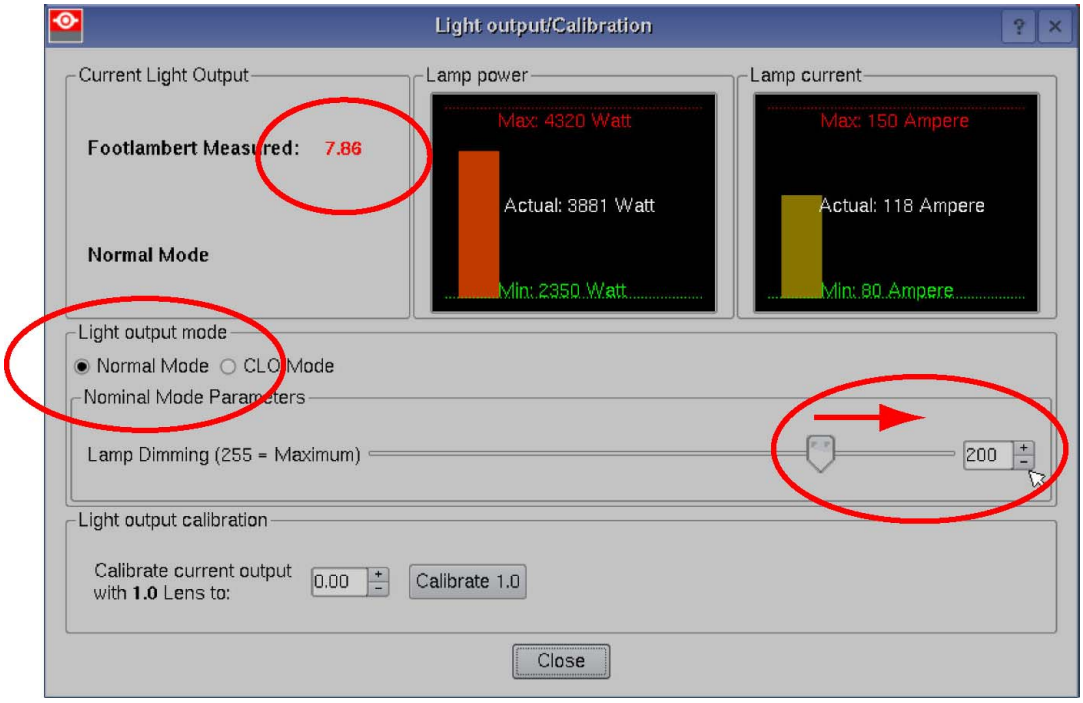


Image 7-34

5. Release the X-axis lock thumb screw (ref $\mathbf{X_L}$) and Y-axis lock thumb screw (ref $\mathbf{Y_L}$).
6. Adjust the X-axis (ref $\mathbf{X_A}$), the Y-axis (ref $\mathbf{Y_A}$) and the Z-axis (ref $\mathbf{Z_A}$) for maximum current light output (Footlambert Measured). Carefully turn the thumbscrew for maximum light output. Once over the maximum, turn slightly in opposite direction to reach the maximum light output again. Do this for each direction and minimum repeat this adjustment cycle twice.
7. Fasten the X-axis lock thumb screw (ref $\mathbf{X_L}$) and Y-axis lock thumb screw (ref $\mathbf{Y_L}$).

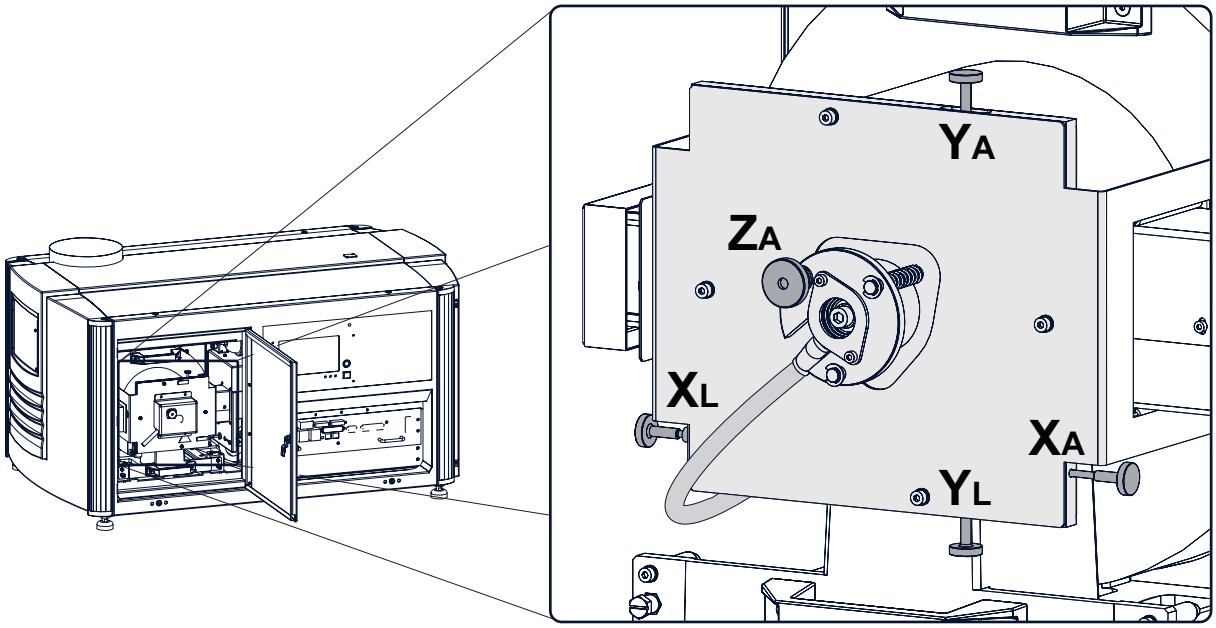


Image 7-35

8. Switch off the projector.
9. Close and lock the door of the lamp compartment.

7.9 Alignment of the arc stabilizing magnet

WARNING: This procedure may only be performed by qualified technical service personnel.

A realignment of the acre stabilizing magnet is seldom. It can happen that a realignment is required after the installation of a xenon lamp from another supplier. Due to the fact that this adjustment has almost no effect on the newer xenon lamps and the obsolescence of the welding glass, used in the viewport, Barco has decide to replace the welding glass with a sheet metal part in the Lamp Houses produced since March 2009.

Necessary tools

Flat blade screw driver.

How to align the arc stabilizing magnet?

1. Remove both side covers and the rear cover of the projector head.
2. Remove the cover of the stabilizing magnet by releasing the two captive screws as illustrated. Use a flat blade screw driver. The stabilizing magnet is located at the rear left bottom of the Lamp House.

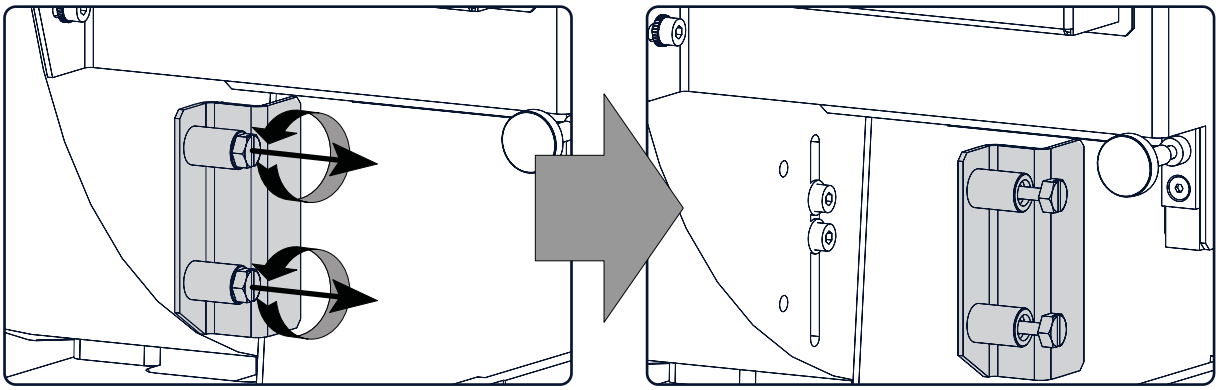


Image 7-36

3. Power up the projector, ignite the lamp and open the dowser as follows:
   - Push the main switch on the input & communication unit into the “I” position.
   - Press the STANDBY button on the local keypad.
   - Press the DOWSER button on the local keypad.
4. Look through the arc viewing port at the rear side of the projector and observe the arc of the xenon lamp in the Lamp House.
   - The normal arc, when viewed through the arc viewing port, will appear as in figure A. This represents the correct magnet position.
   - Figure B shows the position of the arc when the magnet is to low.
   - Figure C shows the position of the arc when the magnet is to high.

   Caution: *Observe all safety precautions when working in the lamp house compartment.*

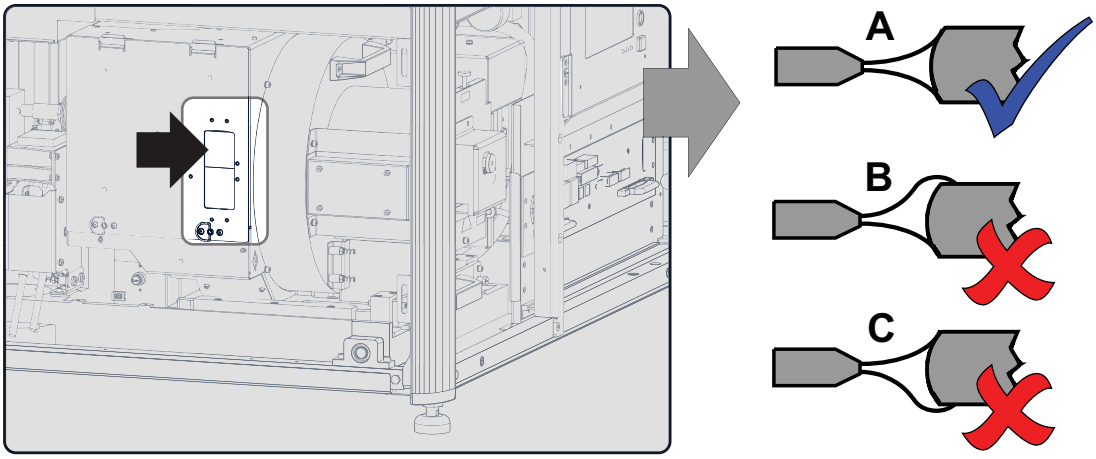


Image 7-37

5. If required, reposition the arc stabilizing magnet as follows:

- Loosen the two hexagon socket head cap screws, using an Allen wrench of 3 mm.
- Place a flat screw driver between the two screws and raise the magnet to lower the arc or lower the magnets to raise the arc.
- Hold the magnet into position and tighten the two hexagon socket head cap screws, using an Allen wrench of 3 mm.

Warning: *The Lamp House is very hot during operation. To avoid burns, use a screw driver to reposition the arc stabilizing magnet.*

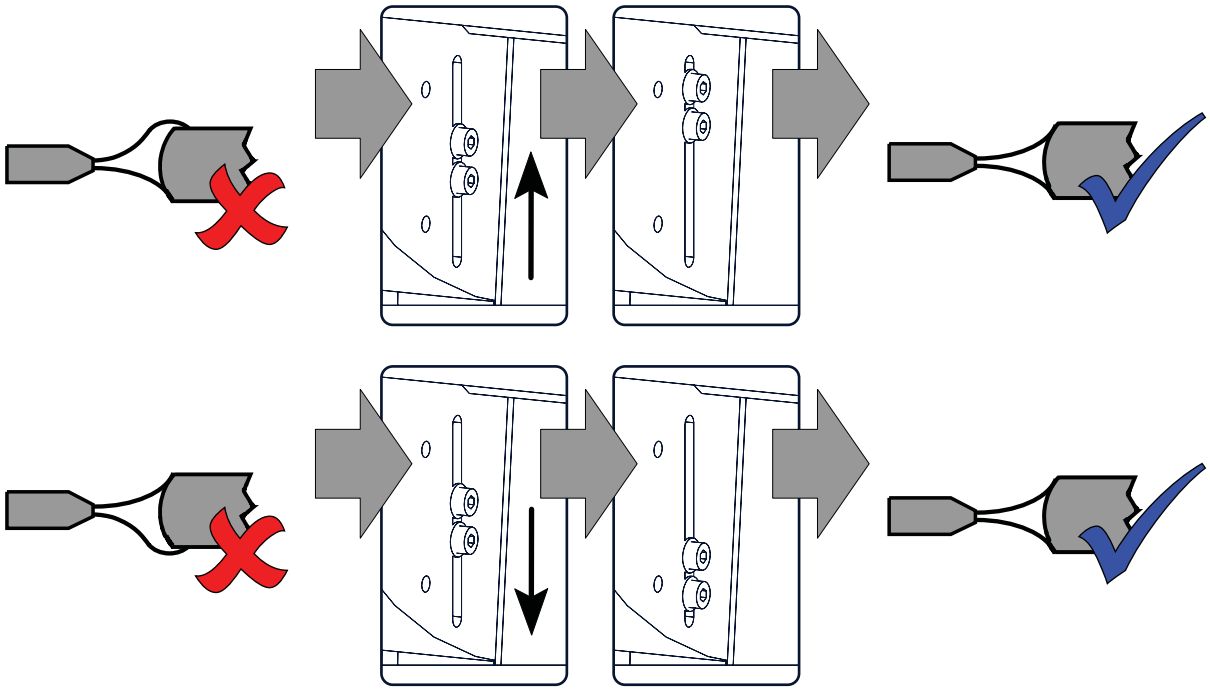


Image 7-38

6. Install the cover of the stabilizing magnet and fasten the two captive screws as illustrated. Use a flat blade screw driver.

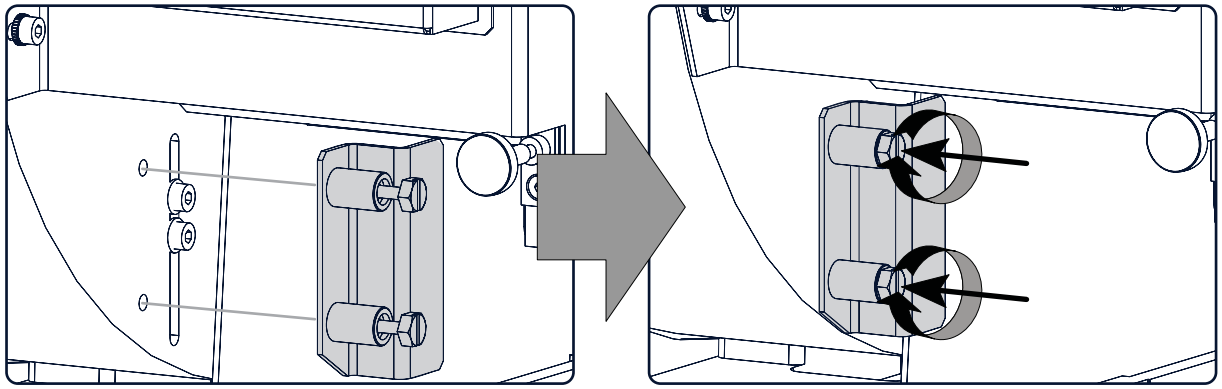


Image 7-39

7. Reinstall the rear cover and both side covers of the projector head.

7.10 Replacement of the Lamp Info module

This procedure requires that the Lamp House is removed from the projector.

Necessary tools

- 6mm nut driver.
- 3mm Allen wrench (depends on design).

How to replace the Lamp Info module?

1. Remove the cover of the Lamp Info module by releasing the four screws (or short spacers) as illustrated (reference 1).

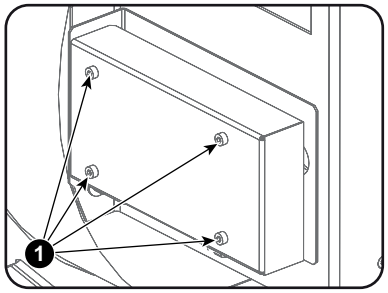


Image 7-40
Lamp info module cover

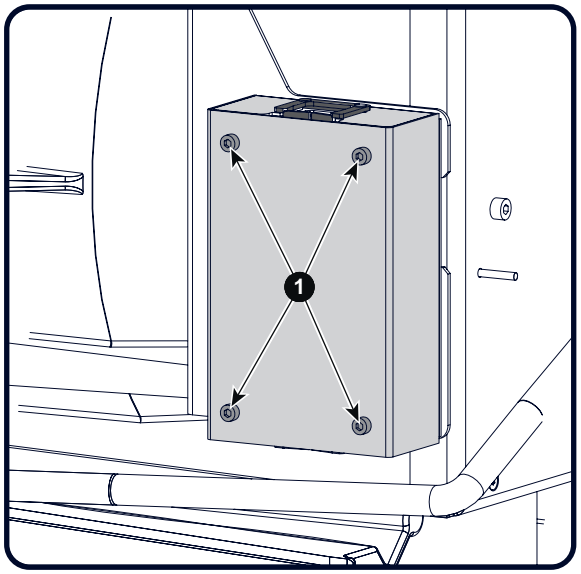


Image 7-41
Lamp info module cover on second generation lamp house

2. Disconnect all wire units (reference 1, 2, 3 and 4) from the Lamp Info module.
   Note: *In case of a manual Lamp House the wire units with reference 2, 3 and 4 are omitted.*

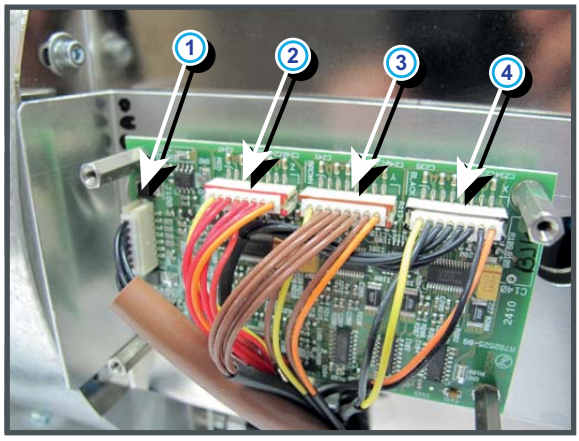


Image 7-42
Connections lamp info module

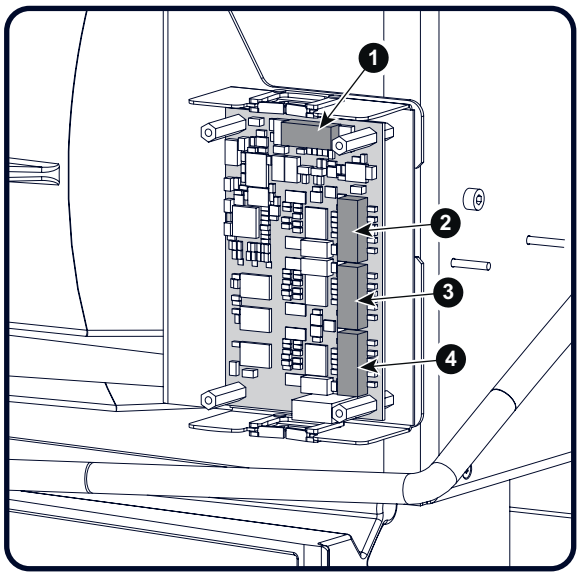


Image 7-43
Connections lamp info module on a second generation lamp house

3. Remove the Lamp Info module from the Lamp House by releasing the four spacers as illustrated. Use for that a 6 mm nut driver.

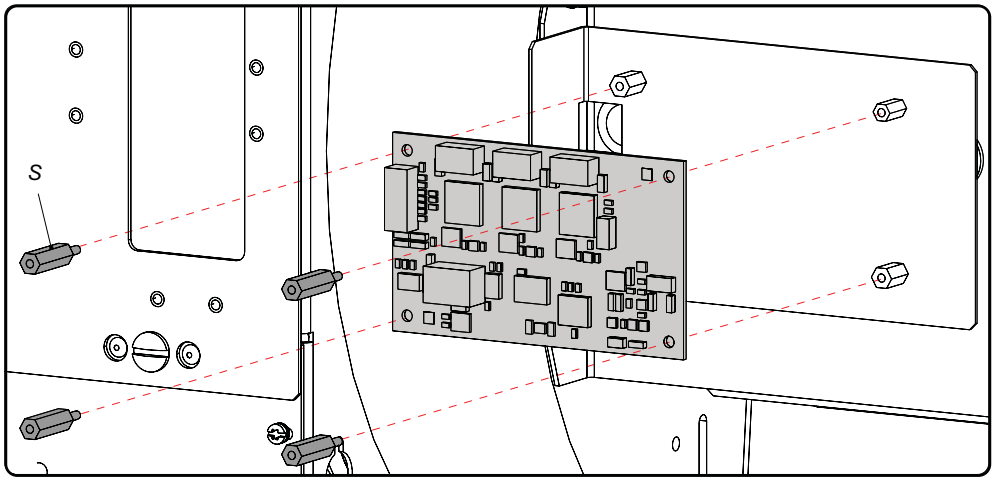


Image 7-44
Removing lamp info module

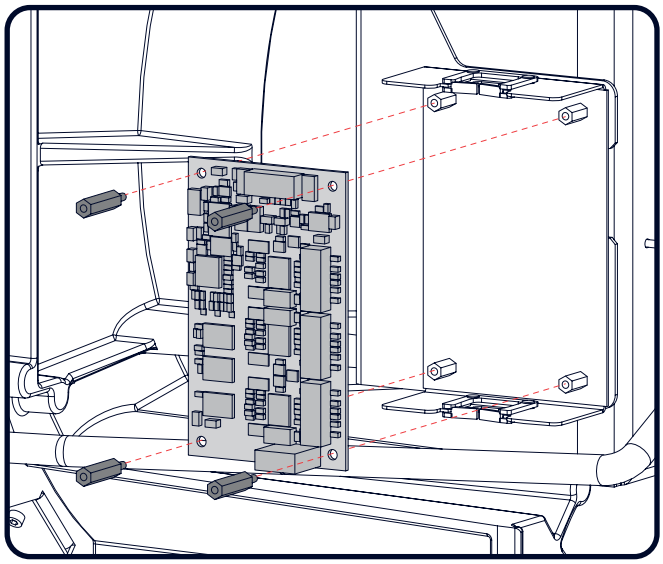


Image 7-45
Removing lamp info module on a second generation lamp house

4. Reinstall a new Lamp Info module and fasten with four spacers. Use a 6 mm nut driver.
   Note: *Make sure that the Lamp Info module is correctly oriented. See corresponding drawing.*
5. Reconnect all three wire units (reference 2, 3 & 4) from the stepper motors (if motorized lamp house) and the wire unit (reference 1) from the Lamp House with the Lamp Info module. Respect the color marking on the connectors.
6. Reinstall the cover of the Lamp Info module as illustrated. Fasten with four screws (or short spacers) (reference 1).

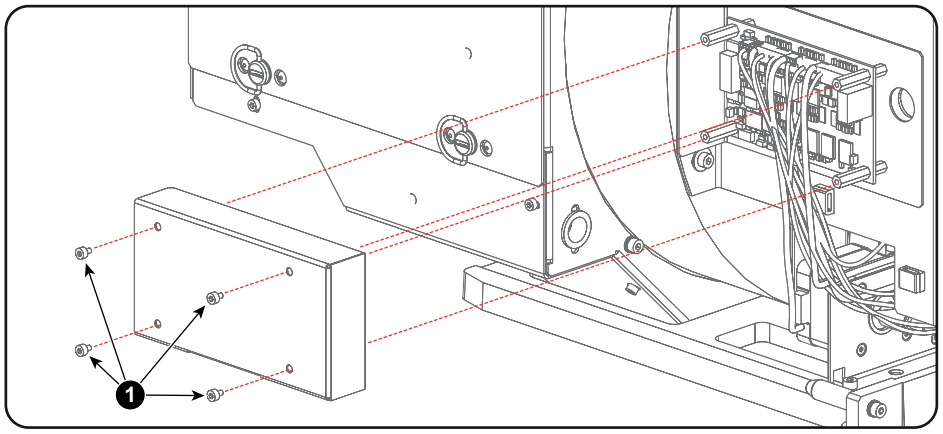


Image 7-46
Lamp info module on lamp house

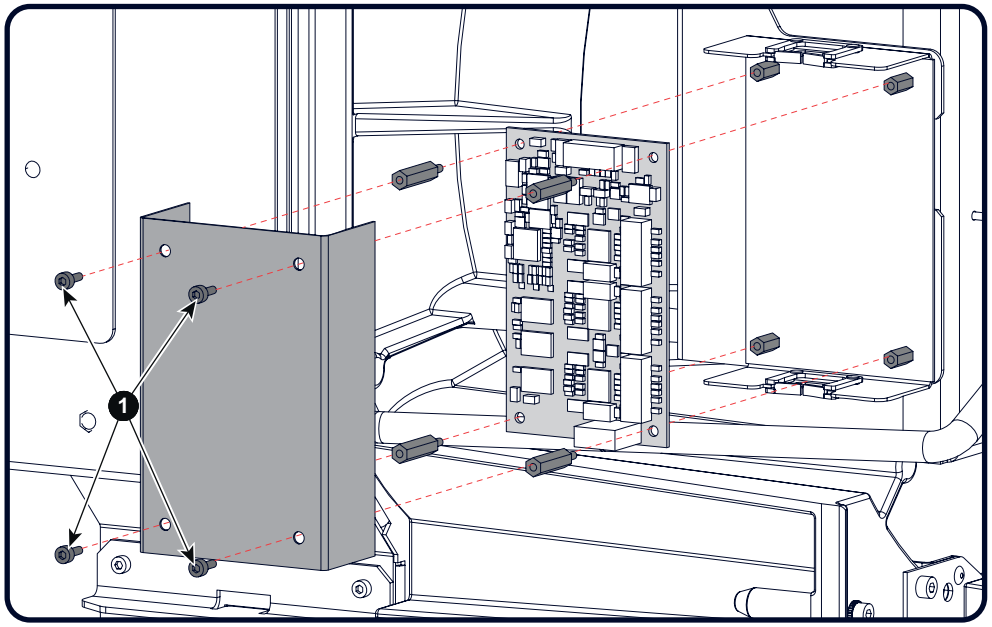


Image 7-47
Lamp info module on second generation lamp house

7.11 Replacement of the UV blocker

This procedure requires that the Lamp House is removed from the projector. Futhermore, this procedure is applicable upon a Lamp House equipped with an UV blocker with an integrated anode support instead of a three leg anode support. It is recommended to replace a three leg anode support with an integrated anode support. The three leg anode support is no longer available.

CAUTION: The person that performs this procedure MUST be wearing a full face shield with neck protector, a welder's jacket and clean leather gloves with wrist protectors. This is required to safely dismantle or assemble the lamp house, which contains a xenon lamp.

Necessary tools

- 2,5 mm Allen wrench.
- Latex or cotton gloves.

How to replace the UV blocker with integrated anode support?

1. Remove the side cover of the Lamp House by releasing the two quarter turn screws (reference 1 image 7-48) at the bottom of the side cover as illustrated.

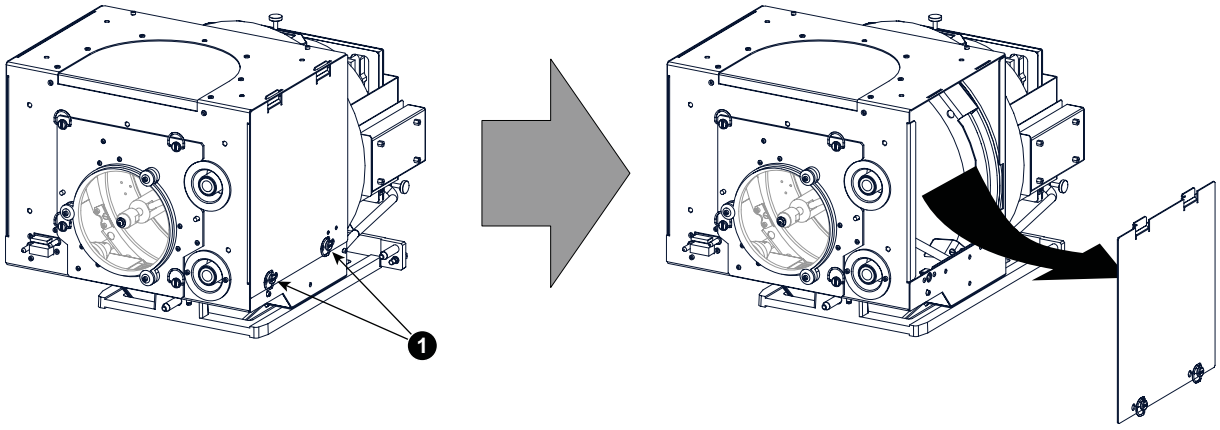


Image 7-48

2. Release the four quarter turn screws (reference 2 image 7-49) of the UV blocker assembly as illustrated. Make sure that the anode support remains in its position while releasing the screws.

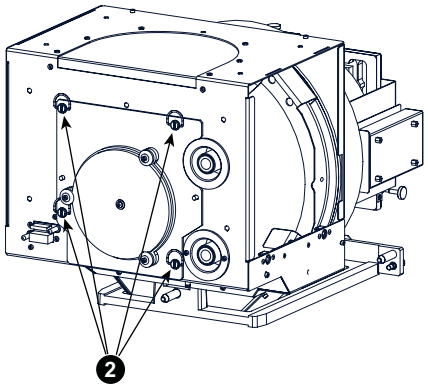


Image 7-49

3. Support the xenon lamp inside the lamp house with one hand while removing the UV blocker assembly from the Lamp House. Note that some xenon lamps are installed with an anode adaptation bushing (reference 12 image 7-50).
   Caution: *Ensure that you wear protective clothing, a full face shield and protective gloves.*

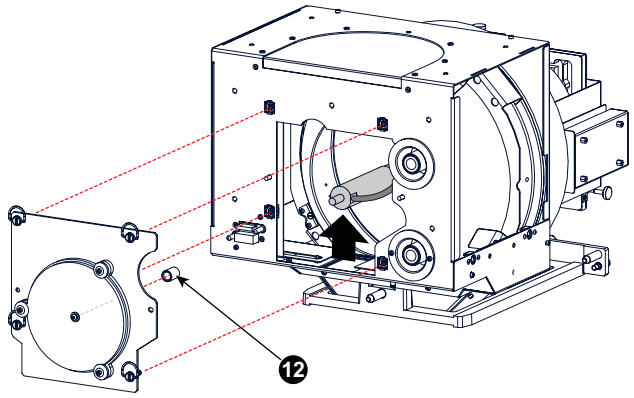


Image 7-50

4. Remove one of the three washers (reference 2 image 7-51) which secure the UV blocker. Use a 2,5 mm Allen wrench to loosen the hexagon socket head cap screw (reference 1 image 7-51).
5. Loosen the fixation screws of the remaining two washers with a few turns. Use a 2,5 mm Allen wrench.

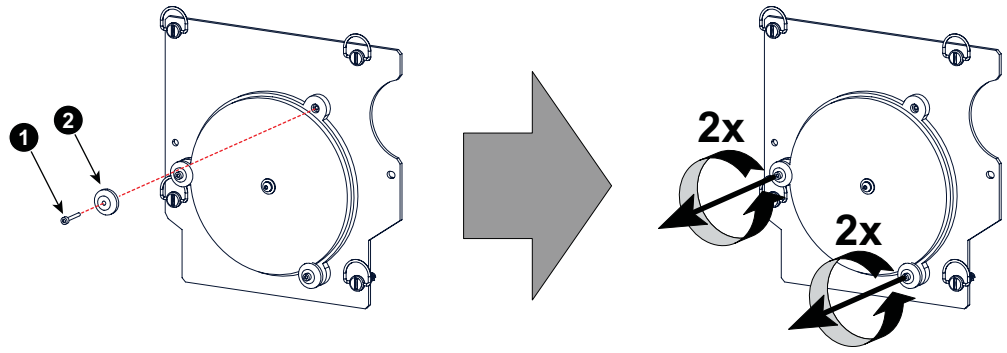


Image 7-51

6. Replace the UV blocker with integrated anode support with a new one.
   Caution: *Do not touch the new UV blocker with bare fingers. Wear latex or cotton gloves.*

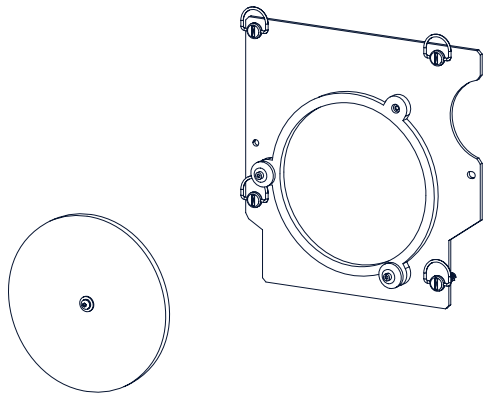


Image 7-52

Note: *One side of the UV blocker is marked with a white dot on the border. The UV blocker must be mounted so that the glass side with the white dot is the outer side of the Lamp House.*

7. Fasten the three spacers which hold the UV blocker. Use a 2,5 mm Allen wrench.

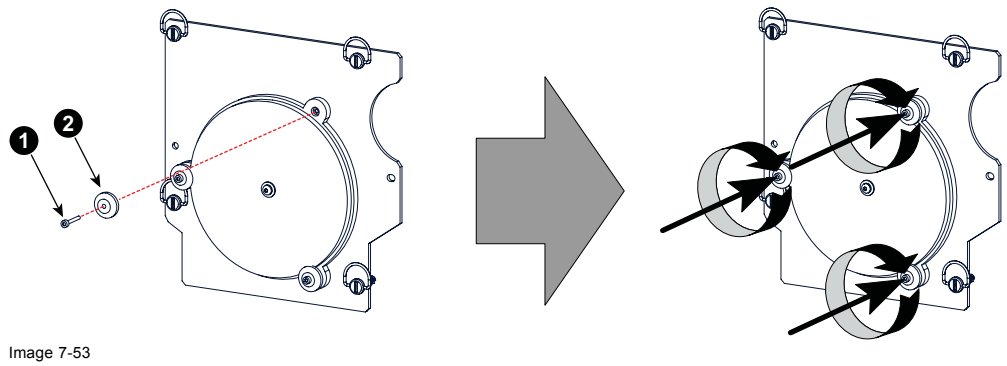


Image 7-53

8. Install the UV blocker assembly as illustrated. Make sure that the xenon lamp is properly supported by the lamp supporting mechanism. Use the opening at the side of the Lamp House to guide the supporting pin of the xenon lamp into the supporting mechanism. Make sure that the tick wire of the lamp anode is upwards oriented.
   Caution: *Do not forget to use an anode adaptation bushing in case one is needed for the xenon lamp inside the Lamp House.*

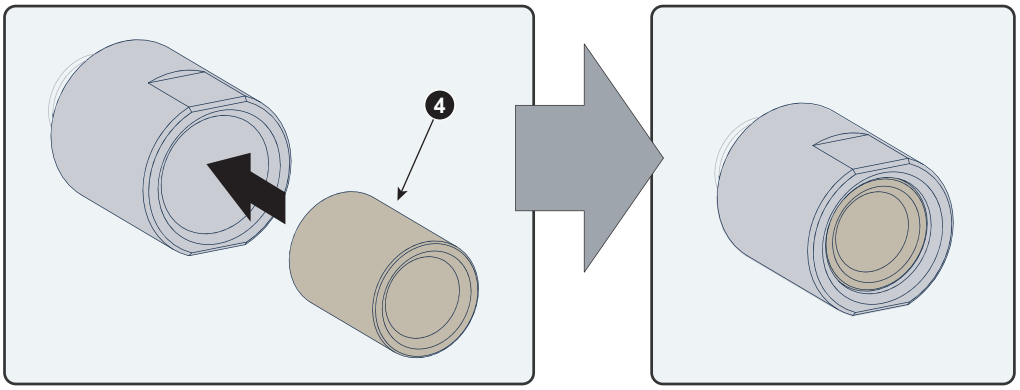


Image 7-54

Tip: *Check if the UV blocker is clean. If not, see procedure "Cleaning the UV blocker of the Lamp House", page 138, before installing the UV blocker assembly on the Lamp House.*

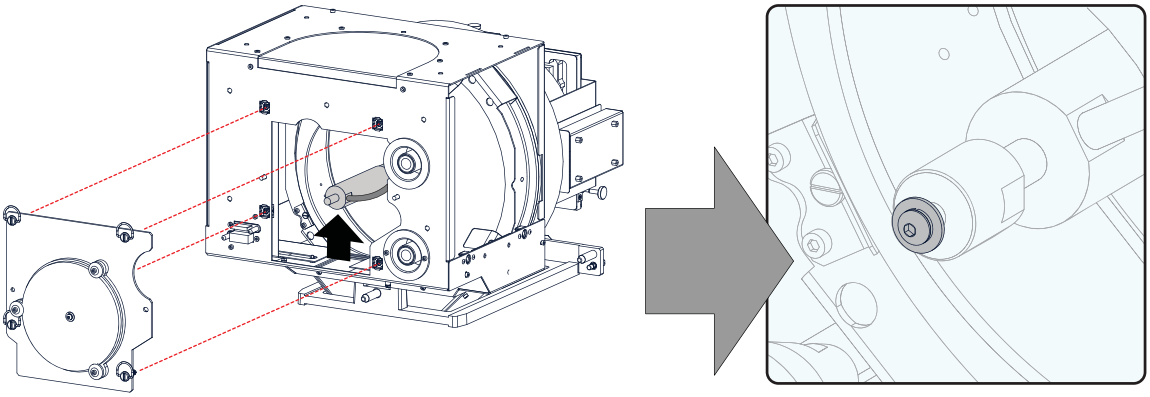


Image 7-55

9. Secure the UV blocker by fastening the four quarter turn screws (reference 2 image 7-56) as illustrated.
   Note: *Please ensure that the quarter turn screws turning wires are flush with the cover or interference will occur while inserting the Lamp House into the projector.*

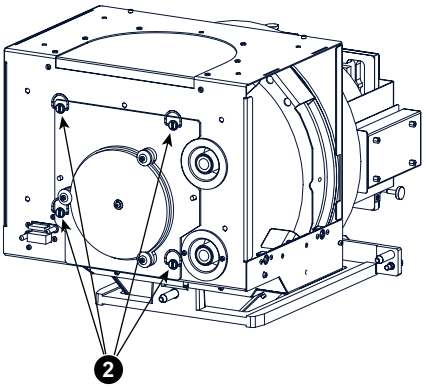


Image 7-56

10. Install the side cover of the Lamp House and fasten the two quarter turn screws (reference 1 image 7-57) at the bottom of the cover.
    Note: *Please ensure that the quarter turn screws turning wires are flush with the cover or interference will occur while inserting the Lamp House into the projector.*

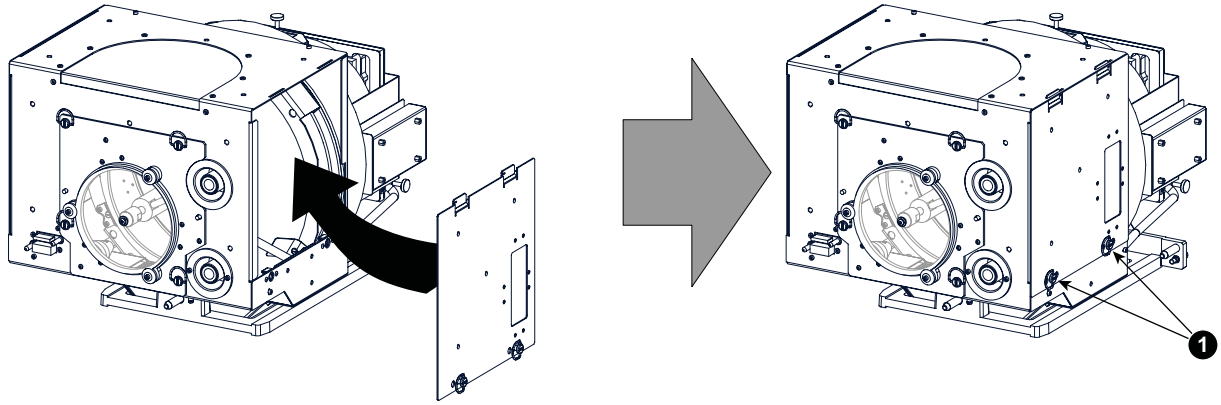


Image 7-57

7.12 Replacement of the Lamp Reflector

Lamp Reflector assembly

The Lamp Reflector assembly of the Lamp House has three major parts. One metal mounting ring, one spheric glass mirror and one elliptic glass mirror. Both mirrors are assembled on the metal ring and are perfectly aligned with each other.

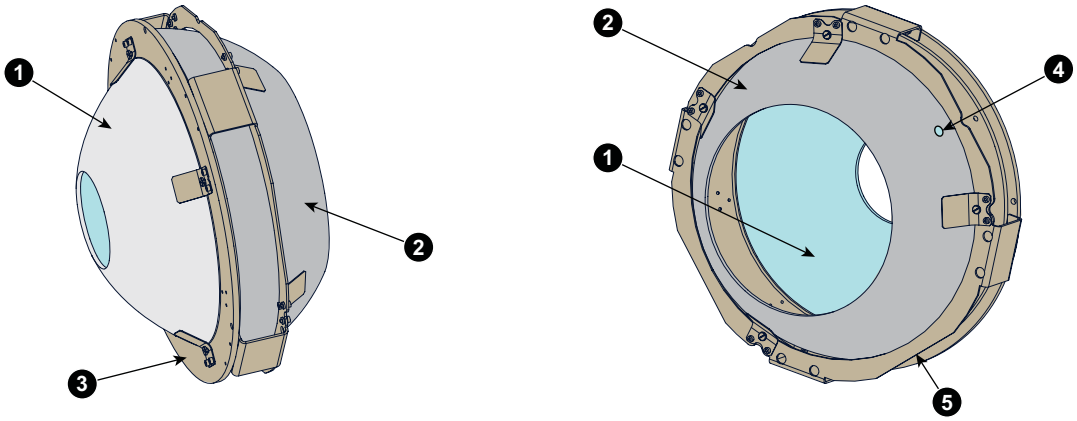


Image 7-58
1 Elliptic glass mirror.
2 Spheric glass mirror.
3 Metal mounting ring
4 View port hole.
5 Bottom side of the assembly.

This procedure assumes that there is no lamp installed inside the Lamp House and that the side cover of the Lamp House is already removed. See procedure "Removal of the xenon lamp", page 113.

CAUTION: Do not touch the glass of the reflector assembly while unpacking and installing. Hold fast the reflector assembly by its metal mounting ring.

Necessary tools

- Two 22 mm open-end wrenches.
- Torque wrench with 22 mm hexagon socket.
- 2,5 mm Allen wrench.
- 3 mm Allen wrench.

How to replace the Reflector of the Lamp House?

1. Disconnect the cathode wire lug (reference 3 image 7-59) from the Lamp House as illustrated. Use two 22 mm open-end wrenches to release the nuts (reference 4 & 5 image 7-59).
   Tip: *Place the plane washers (reference 6 & 7 image 7-59) and nut back on the rod after the lug is removed.*

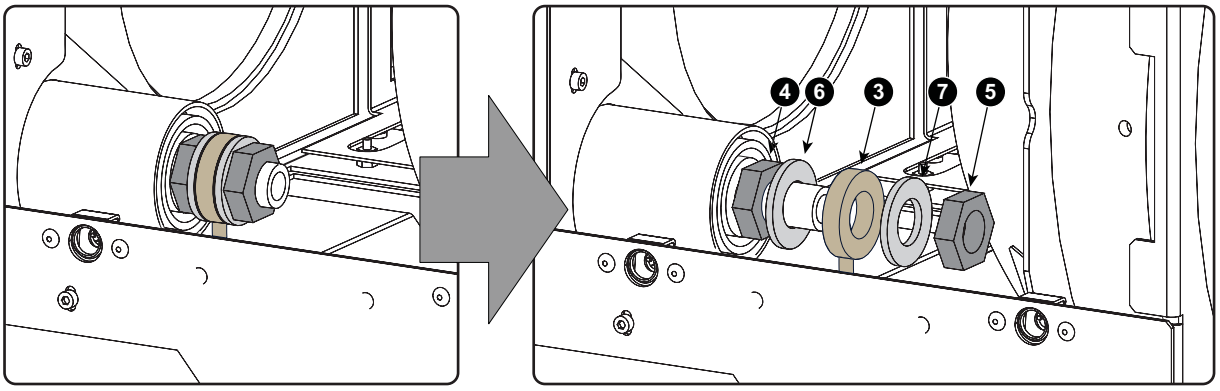


Image 7-59

2. Remove the corner plate of the Lamp House as illustrated. Use a 2,5 mm Allen wrench to loosen the four screws (reference 1 image 7-60) which hold the plate.

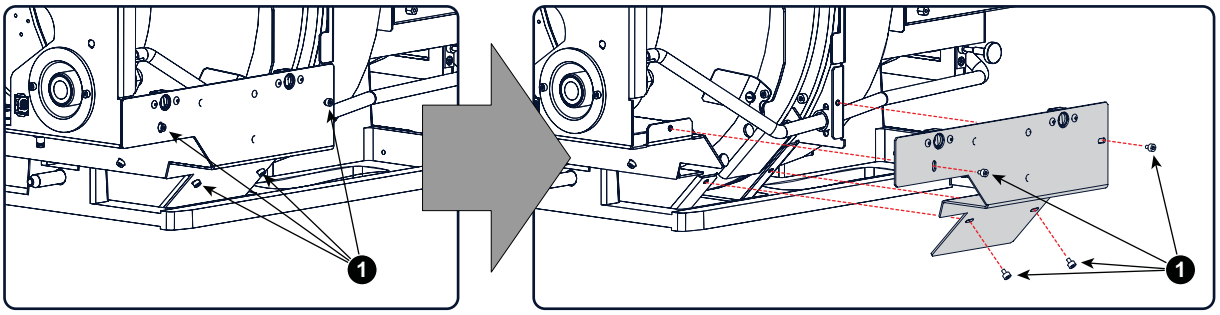


Image 7-60

3. Cut the cable tie (reference 2 image 7-61) of the wire unit from the Lamp Info module. This gives the wire unit more play when removing the front assembly of the Lamp House.

Image 7-61

4. Remove the front assembly of the Lamp House by loosening the 8 indicated screws (reference 3 image 7-62). Use a 2,5 mm Allen wrench.
   Caution: *Do not damage the wire unit (reference 4 image 7-62). The front assembly is still connected via the wire unit of the Lamp Info module with the base of the Lamp House. This wire unit has some play so that you can turn the front assembly away from the Lamp House.*

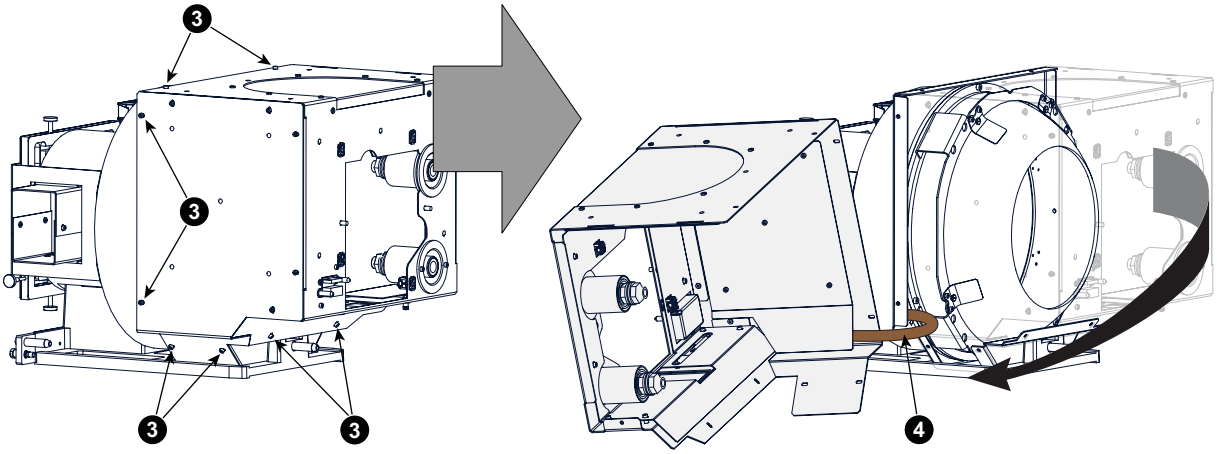


Image 7-62

5. Remove the Reflector assembly from the Lamp House by loosening the three hexagon socket head cap screws (reference 5 image 7-63) as illustrated. Use a 3 mm Allen wrench.

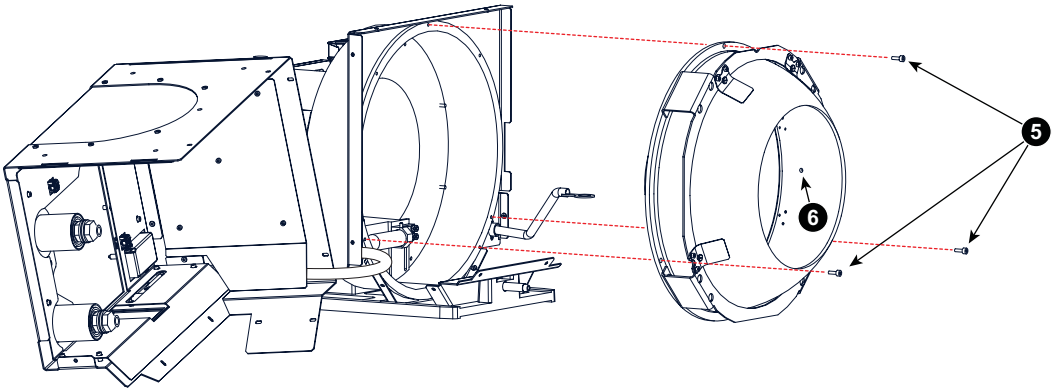


Image 7-63

6. Place a new Reflector assembly in the Lamp House and fasten with 3 hexagon head cap screws. Align the view port hole (reference 6 image 7-63) to your right. Use a 3 mm Allen wrench to fasten the screws (reference 5 image 7-63).
   Caution: *Do not touch the glass of the Reflector assembly. Hold fast the Reflector assembly by its metal mounting ring.*
7. Reinstall the front assembly of the Lamp House. Use a 2,5 mm Allen wrench to fasten the 8 hexagon head cap screws (reference 3 image 7-62).
   Caution: *Take care that the wire unit (reference 4 image 7-62) of the Lamp Info module does not get jammed.*
8. Fasten the wire unit with a cable tie (reference 2 image 7-61).
9. Reinstall the corner plate of the Lamp House. Use a 2,5 mm Allen wrench to fasten the 4 hexagon head cap screws (reference 1 image 7-60).
10. Reconnect the cathode wire with the Lamp House. Make sure to place a plane washer (reference 6 and 7 image 7-64) between the nuts and the wire lug (reference 3 image 7-64). Use a torque of **25 Nm** (18,4 lbf*ft) to fasten the nuts (reference 4 and 5 image 7-64). Block the first nut (reference 4 image 7-64) with a 22 mm open-end wrench while applying a torque of 25 Nm on the second nut (reference 5 image 7-64) with a torque wrench.

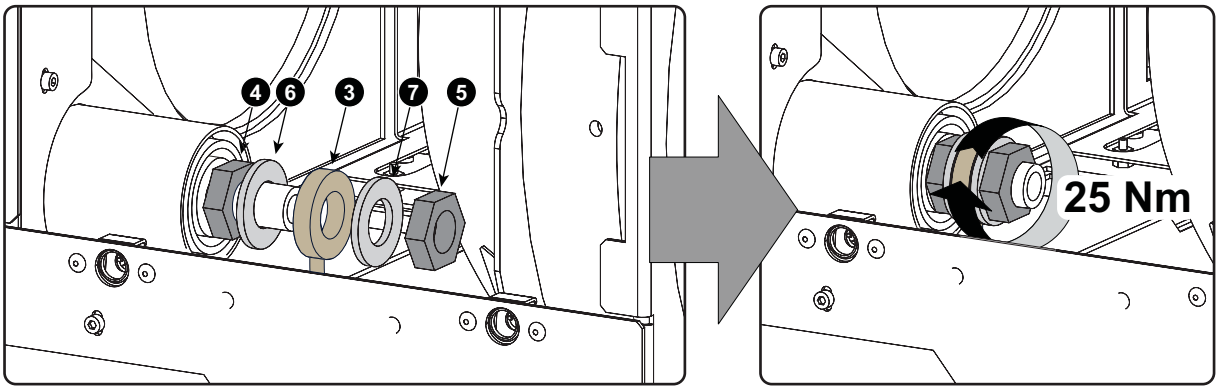


Image 7-64

The Lamp House is now ready to install an xenon lamp. See procedure "Installation of the xenon lamp", page 116.

It is recommended for optimal performance to readjust the Cold Mirror after the replacement of the Lamp Reflector. See procedure "Adjusting the Cold Mirror", page 145.

7.13 Cleaning the UV blocker of the Lamp House

When cleaning the UV blocker?

Only clean the UV blocker of the Lamp House in case it is really necessary. This means in case dust is clearly visible upon the surface of the UV blocker.

This procedure requires that the UV blocker is removed from the Lamp House.

WARNING: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Irritating to eyes and skin. Always use in a well ventilated area. Vapors may cause drowsiness and dizziness. Avoid contact with skin and eyes. In case of contact with the eyes, rinse immediately with plenty of water and seek medical advise.

CAUTION: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Lightly flammable. Always use in a well ventilated area. Keep away from sources of ignitions. Do not smoke while working with isopropanol. Exclusive keep in original container tightly closed at a cool, well ventilated and fireproof storage space.

Necessary tools

- Clean Torayse cloth.
- Clean cotton cloth.
- Demineralized water.
- Isopropanol alcohol.

How to clean the UV blocker of the Lamp House?

1. Wipe off the dust of both sides of the UV blocker. Use for that a clean Torayse cloth.
   Tip: *Limit the number of wipe movements. This to protect the optical coating. It is better to wipe of the dust with one good wipe movement than with 10 soft wipe movements.*
2. Is all dust removed from the UV blocker?
   If yes, stop this cleaning procedure.
   If no, wipe off the dust of the UV blocker with a clean cotton cloth and demineralized water.
   Tip: *Use isopropanol alcohol instead of demineralized water to remove fingerprints.*

CAUTION: Never reinstall a UV blocker which is cracked or has a damaged coating. Neglecting this will result in irreversible damage of optical parts in the projector.

7.14 Cleaning the Reflector of the Lamp House

When cleaning the Reflector?

Only clean the Reflector of the Lamp House in case it is really necessary. This means in case dust is clearly visible upon the surface of the Reflector.

This procedure requires that the xenon lamp is removed from the Lamp House.

WARNING: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Irritating to eyes and skin. Always use in a well ventilated area. Vapors may cause drowsiness and dizziness. Avoid contact with skin and eyes. In case of contact with the eyes, rinse immediately with plenty of water and seek medical advise.

CAUTION: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Lightly flammable. Always use in a well ventilated area. Keep away from sources of ignitions. Do not smoke while working with isopropanol. Exclusive keep in original container tightly closed at a cool, well ventilated and fireproof storage space.

Necessary tools

- Compressed air.
- Clean Torayse cloth.
- Clean cotton cloth.
- Demineralized water.
- Isopropanol alcohol.

How to clean the Reflector of the Lamp House?

1. Try to blow away the dust with compressed air.
2. Is all dust removed from the Reflector?
   If yes, stop this cleaning procedure.
   If no, wipe off the dust of the Reflector. Use for that a clean Torayse cloth.
   Tip: *Limit the number of wipe movements. This to protect the optical coating. It is better to wipe of the dust with one good wipe movement then with 10 soft wipe movements.*
3. Is all dust removed from the Reflector?
   If yes, stop this cleaning procedure.
   If no, wipe off the dust of the Reflector first with a clean cotton cloth and demineralized water and than with a clean Torayse cloth.
   Tip: *Use isopropanol alcohol instead of demineralized water to remove fingerprints.*

CAUTION: Never use a Lamp House which Reflector is cracked or has a damaged coating. Neglecting this will result in irreversible damage of the projector.

8. COLD MIRROR

About this chapter

This chapter describes how to replace the Cold Mirror. It also describes the adjustments for the Cold Mirror and when an adjustment or cleaning is needed.

CAUTION: Normally the Cold Mirror should never be readjusted in the field except when the Cold Mirror or Lamp Reflector has been replaced. In case a readjustment is required follow the instructions in this chapter precisely. Only qualified technicians who have experience with adjusting the Cold Mirror may adjust the Cold Mirror. A misaligned Cold Mirror may cause irreversible damage to other parts of the projector!

Overview

- Introduction
- Replacement of the Cold Mirror
- Adjusting the Cold Mirror
- Cleaning the Cold Mirror

8.1 Introduction

Functionality of the Cold Mirror

The location of the Cold Mirror in the light path is between the light source (xenon lamp) and the light pipe. The Cold Mirror reflects the visible light and absorbs the infra red light. Due to this absorbing, a lot of heat is produced. The Cold Mirror is mounted with the rear side upon a big heat sink. The fan below the heat sink blows cold air and the fan above extracts hot air from the Cold Mirror and heat sink. The hot air is transported to the outside of the projector. The Cold Mirror has three adjustment screws to modify the position of the Cold Mirror so that the centre of the light spot is precisely reflected in the centre of the integration rod entrance for optimal performance.

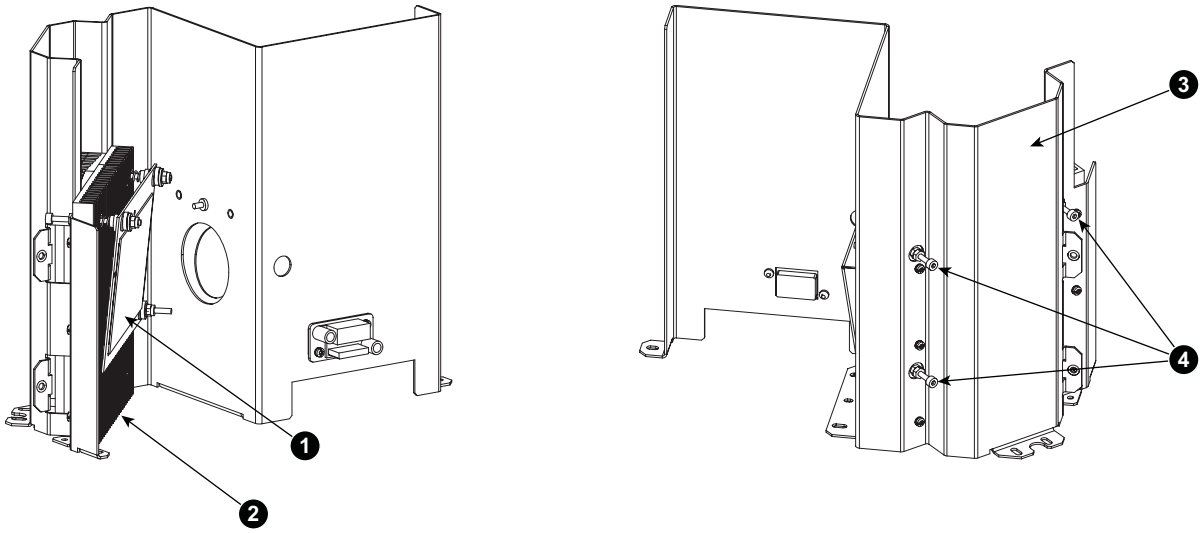


Image 8-1
1 Cold Mirror.
2 Heat sink.
3 Mounting plate.
4 Adjustment screws.

Diagnostic

The easiest way to check the condition of the Cold Mirror is by removing the Lamp House. When the Lamp House is removed, the Cold Mirror becomes visible at the end of the lamp compartment. In case the Cold Mirror is not damaged but dirt is clearly visible upon the surface of the mirror it is recommended to clean the Cold Mirror. Always replace the Cold Mirror with a new one in case the Cold Mirror is damaged. Possible damages are:

- Cold Mirror is broken.
- Coating peels off.
- Cold Mirror is cracked.

The light output on the screen will be lower than the normal light output in case of a damaged or dirty Cold Mirror.

8.2 Replacement of the Cold Mirror

The Lamp House has to be removed to get access to Cold Mirror. This procedure assumes that the Lamp House is already removed.

Necessary tools

- 7 mm open-end wrench.
- 3 mm Allen wrench.
- Latex or cotton gloves
- Slide caliper.

How to replace the Cold Mirror?

1. Remove the nut (reference 10image 8-2) from each fixation point. Use a 7 mm open-end wrench.
   Note: *When the nut is removed, support the mirror so that it cannot drop.*

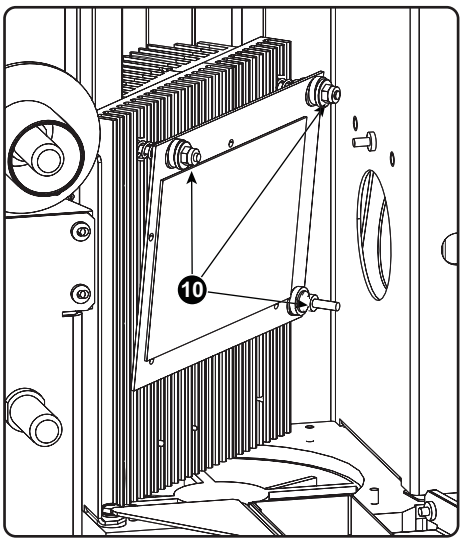


Image 8-2

2. Slide off all other small components and take off the Cold Mirror. See left side image 8-4.
3. Check if the three adjustment screws at the rear side of the Cold Mirror are 20,5 mm from the fixation plate. Adjust if necessary. Use a 7 mm open-end wrench for the lock nuts (reference 1 image 8-3) and a 7 mm Allen wrench for the adjustment screws (reference 2 image 8-3).

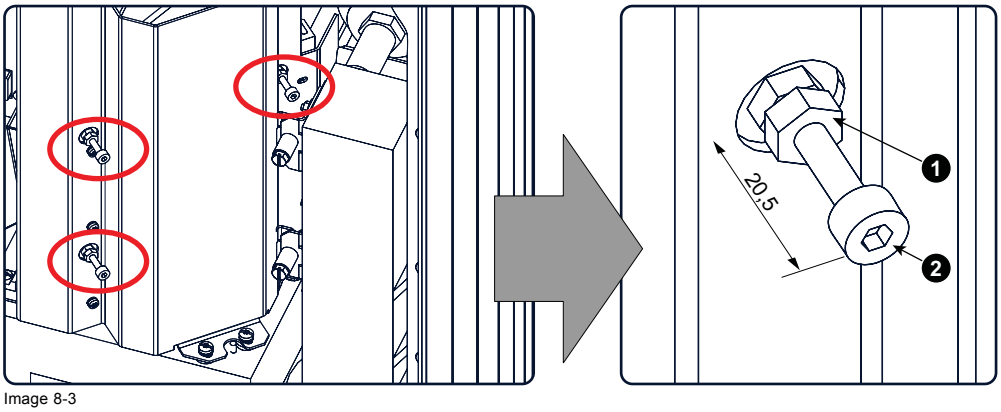


Image 8-3

4. Place the mounting parts and Cold Mirror upon the three rods in that order as illustrated. Note that the number and type of mounting parts on the lower rod are slightly different than those on the upper two rods.
   Caution: *Do not touch the new Cold Mirror with bare fingers. Wear latex or cotton gloves.*

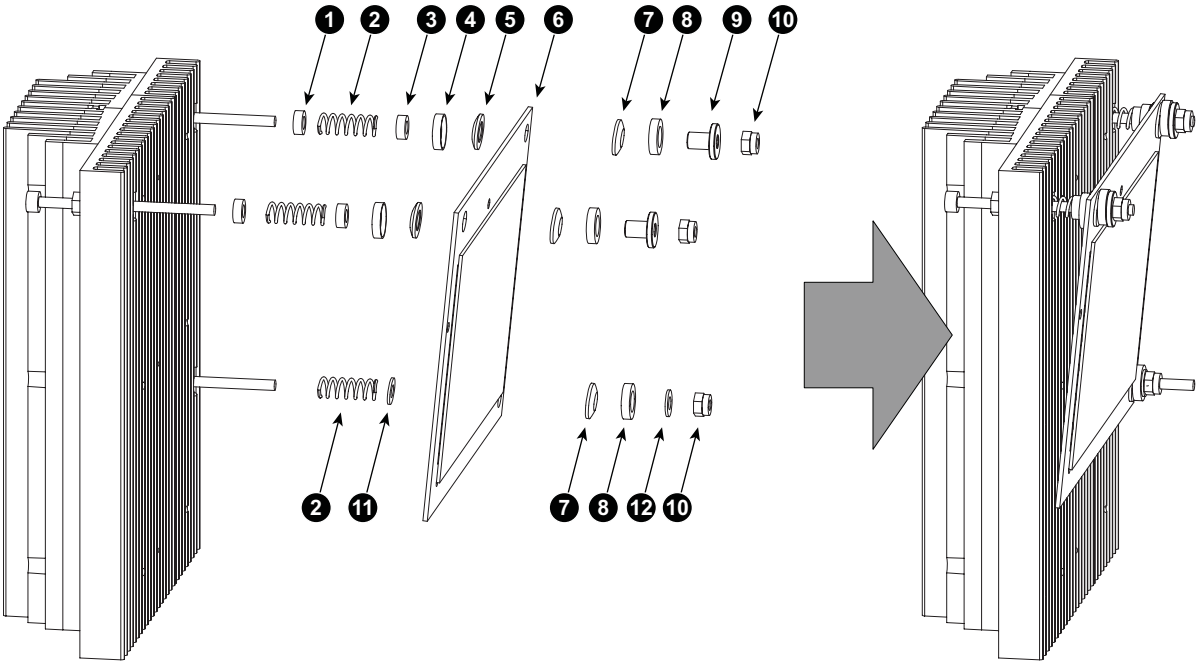


Image 8-4

5. Turn the lock nut on each rod as far as illustrated. Use a 7 mm open-end wrench.
   - Upper right rod (reference 1 image 8-5): turn until the rod is 0,8 mm out of the lock nut.
   - Lower rod (reference 2 image 8-5): turn until the rod is 11,4 mm out of the lock nut.
   - Upper left rod (reference 3 image 8-5): turn until the rod is 1,5 mm out of the lock nut.

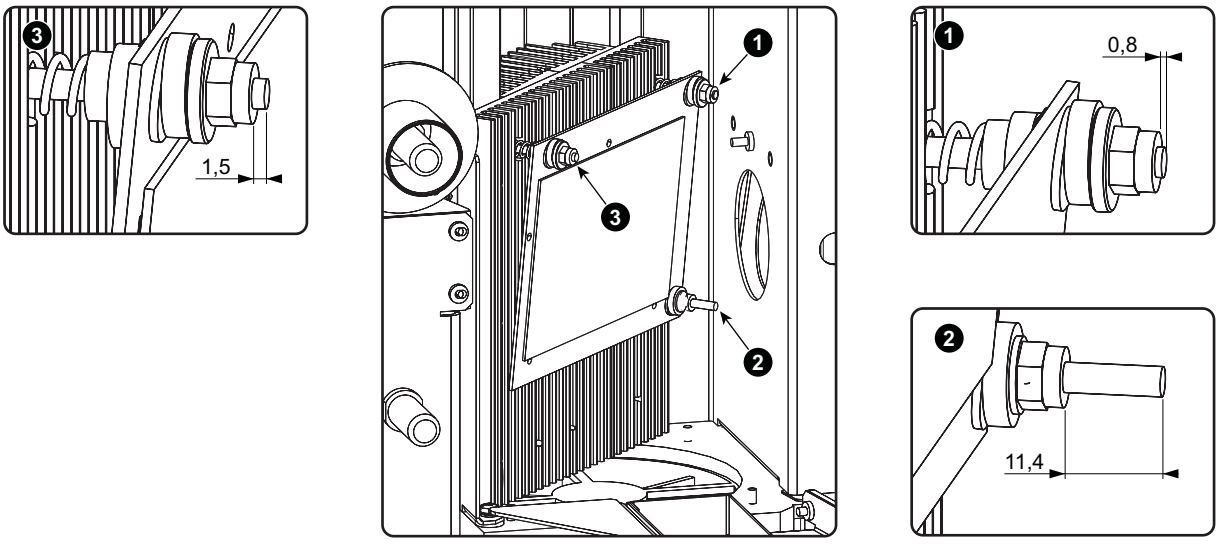


Image 8-5

6. Check the Cold Mirror for dirt. If necessary clean the Cold Mirror. See cleaning procedure "Cleaning the Cold Mirror", page 147.
7. Adjust the Cold Mirror for optimal performance. See adjustment procedure "Adjusting the Cold Mirror", page 145.

8.3 Adjusting the Cold Mirror

Important note!

The position of the xenon lamp in its Reflector effects the position of the Cold Mirror with respect to the entrance of the Integration Rod. Hence the adjustment of the Cold Mirror requires simultaneous adjustment of the xenon lamp in its Reflector for maximum light output. This procedure describes how to do so. However, if you are 100% sure that the xenon lamp is perfectly aligned in the Lamp House you can skip the adjustments on the Lamp House.

Adjust the Lamp House first in another projector, which Cold Mirror is correctly adjusted, or have it aligned by Barco before proceeding with the Cold Mirror adjustments. That way any Lamp House will be usable in that projector, or all others, and vise versa.

Once the Cold Mirror and xenon lamp are optimally adjusted, the Cold Mirror should never be adjusted again. A xenon lamp replacement only requires realignment of the xenon lamp in its Reflector. Only when the Cold Mirror or Reflector is replaced, should the Cold Mirror be readjusted.

Necessary tools

- 3 mm Allen wrench.
- 7 mm open-end wrench.
- Light meter.
- Slide caliper.

How to setup the projector for adjusting the Cold Mirror?

1. Open the door of the lamp compartment and remove the left cover of the projector.
2. Loosen the three lock nuts (reference 4 image 8-6) of the Cold Mirror adjustment screws. Use for that a 7 mm open-end wrench.

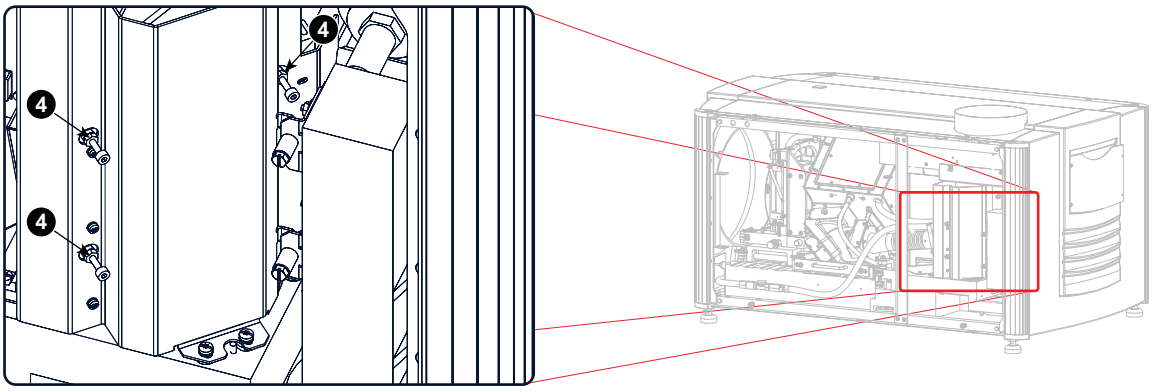


Image 8-6

3. Release the X and Y axis lock thumb screws (reference LX & LY image 8-7) of the Lamp House.
   Tip: *If you are 100% sure that the xenon lamp is perfectly aligned in the Lamp House you can skip the adjustments on the Lamp House. See "Important note!" above.*

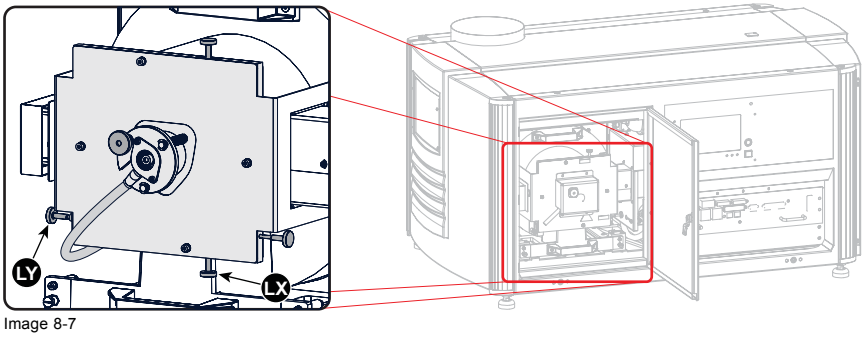


Image 8-7

4. Check the nominal position of the Cold Mirror and if required adjust. The distance between the head of the each adjustment screw and the assembly plate should be 20,5 mm for nominal position. This nominal position is the best position to start the adjustment procedure. Use a 7 mm open-end wrench for the lock nuts (reference 1 image 8-8) and a 7 mm Allen wrench for the adjustment screws (reference 2 image 8-8).

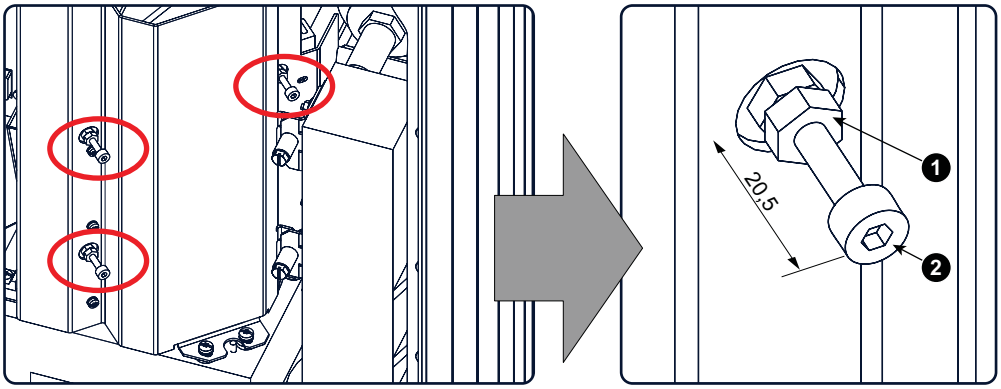


Image 8-8

5. Project a white test pattern.
   Tip: *Start the adjustment procedure with a dimmed xenon lamp.*
6. Place the light meter in the center of the projected image.

How to adjust the Cold Mirror?

1. Turn the adjustment screw 2 (reference 2 image 8-9) in or out until the maximum light output is measured. Use for that a 7 mm nut driver.

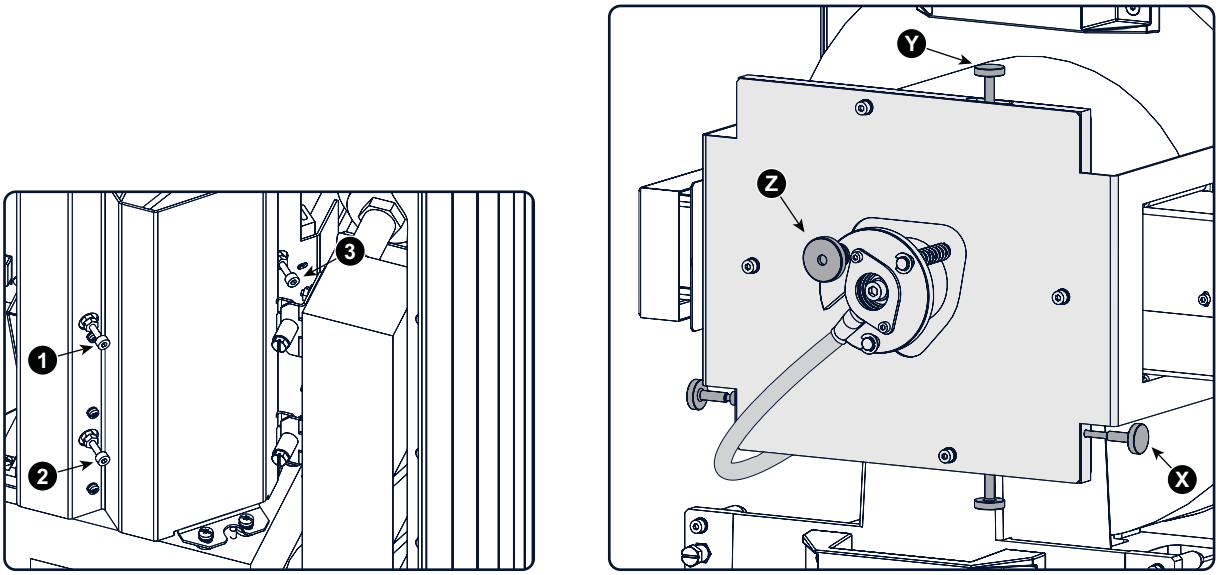


Image 8-9

2. Turn the adjustment screw 3 (reference 3 image 8-9) in or out until the maximum light output is measured.
3. Repeat step 1 and 2 until the maximum light output is measured.
4. Adjust the X-axis, Y-axis and Z-axis (reference X, Y & Z image 8-9) of the xenon lamp in the Lamp House for maximum light output. Carefully turn the thumbscrew for maximum light output. Once over the maximum, turn slightly in opposite direction to reach the maximum light output again. Do this for each direction and minimum repeat this adjustment cycle twice.
   Tip: *If you are 100% sure that the xenon lamp is perfectly aligned in the Lamp House you can skip the adjustments on the Lamp House. See "Important note!" above.*
5. Turn the adjustment screw 1, 2 and 3 (reference 1, 2 & 3 image 8-9) equally in or out until the maximum light output is measured.
6. Repeat from step 1 until the maximum light output is measured.
7. Check the brightness uniformity. In most cases it will be OK.
   If not OK, turn slightly on the adjustment screws 2 and 3 (reference 2 & 3 image 8-9) until a uniform brightness is obtained.
   - Screw 2 (reference 2 image 8-9) will correct the difference between the left and the right side of the projected image.
   - Screw 3 (reference 3 image 8-9) will correct the difference between the top and the bottom side of the projected image.

   Check again and repeat if necessary.
8. When the adjustment is finished, secure the position of the Cold Mirror by turning the lock nuts (reference 4 image 8-6) against the plate (hold on the screws while securing the nuts).
9. Secure the position of the xenon lamp in its Reflector by turning the X and Y axis lock thumb screws (reference LX & LY image 8-7) of the Lamp House.

8.4 Cleaning the Cold Mirror

When cleaning the Cold Mirror?

Only clean the Cold Mirror in case it is really necessary. This means in case dust is clearly visible upon the surface of the Cold Mirror.

This procedure requires that the Lamp House is removed from the projector.

WARNING: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Irritating to eyes and skin. Always use in a well ventilated area. Vapors may cause drowsiness and dizziness. Avoid contact with skin and eyes. In case of contact with the eyes, rinse immediately with plenty of water and seek medical advise.

CAUTION: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Lightly flammable. Always use in a well ventilated area. Keep away from sources of ignitions. Do not smoke while working with isopropanol. Exclusive keep in original container tightly closed at a cool, well ventilated and fireproof storage space.

Necessary tools

- Clean Torayse cloth.
- Clean cotton cloth.
- Demineralized water.
- Isopropanol alcohol.

How to clean the Cold Mirror?

1. Wipe off the dust of the Cold Mirror. Use for that a clean Torayse cloth.
   Tip: *Limit the number of wipe movements. This to protect the optical coating. It is better to wipe of the dust with one good wipe movement than with 10 soft wipe movements.*
2. Is all dust removed from the Cold Mirror?
   If yes, stop this cleaning procedure.
   If no, wipe off the dust of the Cold Mirror with a clean cotton cloth and demineralized water.
   Tip: *Use isopropanol alcohol instead of demineralized water to remove fingerprints.*

9. INTEGRATION ROD

About this chapter

This chapter describes briefly the functionality of the Integration Rod, how to diagnose the Integration Rod, how to replace the Integration Rod and how to adjust the Integration Rod.

Overview

- Introduction
- Integration Rod diagnostic
- Removal of the Integration Rod assembly
- Installing a new Integration Rod assembly
- Adjusting the Integration Rod

9.1 Introduction

Functionality of the Integration Rod

The Integration Rod is made of fused silica and is approximately 15 centimeter long. The cross-section of the rod has the same aspect ratio as the active surface of the DMD's used in the Light Processor. The function of the Integration Rod is to match the shape of the light path to the shape of the DMD's and to neutralize the hot spot effect caused by the light source. Furthermore, the Integration Rod ensures that the light beam is focused on the DMD's, which results in an optimally focused light beam on the screen.

The Integration Rod is located at the entrance of the Light Pipe. The light emitted by the lamp is reflected via the Cold Mirror into the rod, which integrates the incoming light into a homogeneous rectangle shaped beam of light.

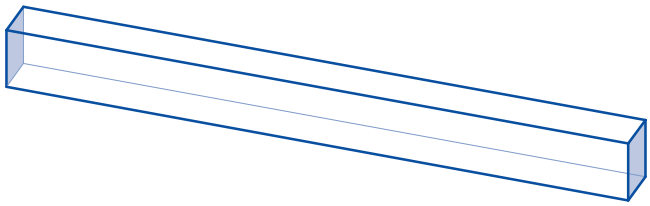


Image 9-1

The entrance and exit side of the Integration Rod are coated to achieve optimal performance. Clearly the rod may never be contaminated with grease, dirt, liquid or the such. For optimal protection the rod is mounted inside an aluminium tube, which requires replacing together with the rod. This aluminum tube also contains an adjustment mechanism to position the rod inside the Light Pipe. The Integration Rod, the aluminium tube and the adjustment mechanism together form the "Integration Rod assembly".

Parts

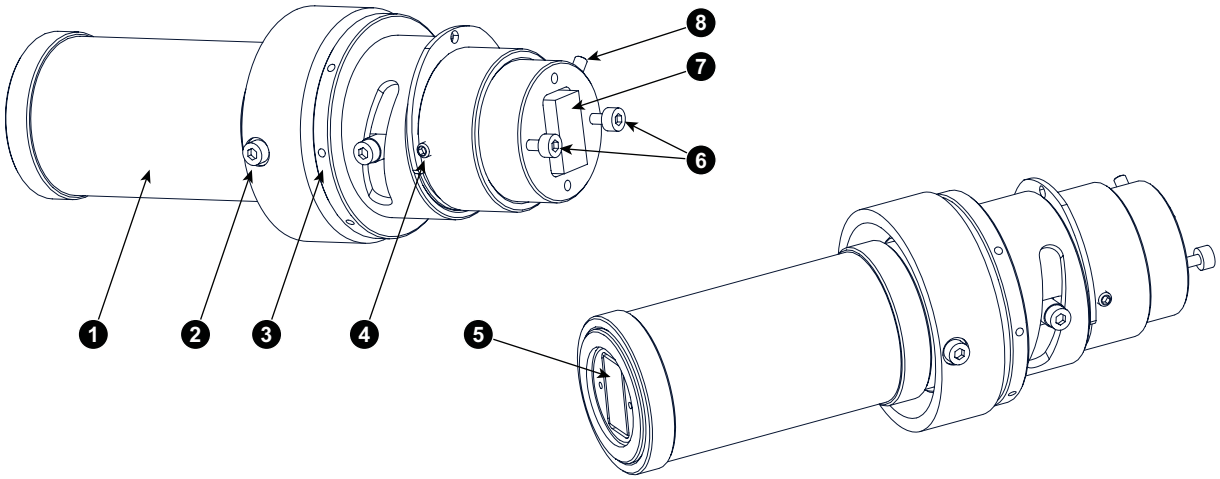


Image 9-2
1 Aluminium tube.
2 Fixation screw rod assembly.
3 Rod adjustment ring.
4 Set screw for rod focus adjustment.
5 Rod exit.
6 Fixation screws for cooling block.
7 Rod entrance.
8 Rod assembly positioning pin for cooling block.

CAUTION: Never touch the entrance or exit of the Integration Rod assembly. Greasy fingerprints or other dirt on the Integration Rod entrance or exit will burn into the rod and cause permanent damage.

9.2 Integration Rod diagnostic

General

Due to bad environmental conditions the Integration Rod may become contaminated with grease, dust, dirt or other particles, which will burn into the rod and cause permanent damage. As a result spots may become visible in the projected image on the screen. To confirm that these spots are caused by a damages to the rod please diagnose the rod as described in the following procedure.

Necessary tools

- 7 mm flat screw driver.
- 2 mm Allen wrench.

How to diagnose the Integration Rod of the projector?

1. Remove the side cover of the projector.
2. Switch on the projector and project a white test pattern. See users manual of the projector to do so. Make sure that the projected white test pattern is focused.
3. Loosen the two set screws (reference 1 image 9-3) a few turns. Use a 2 mm Allen wrench. It's not necessary to remove the set screws.

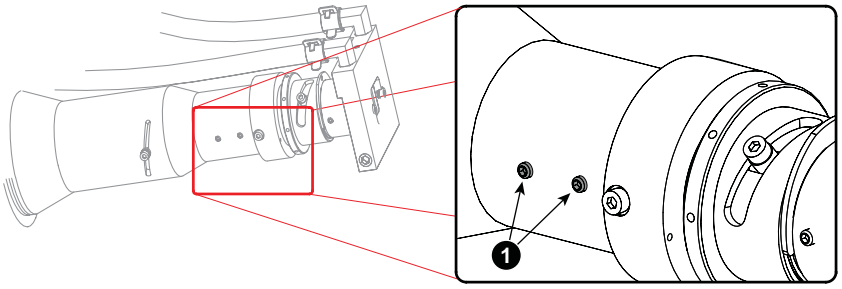


Image 9-3

4. Gently rotate the adjustment ring (reference 2 image 9-4) of the Integration Rod assembly back and forward while watching the projected image.

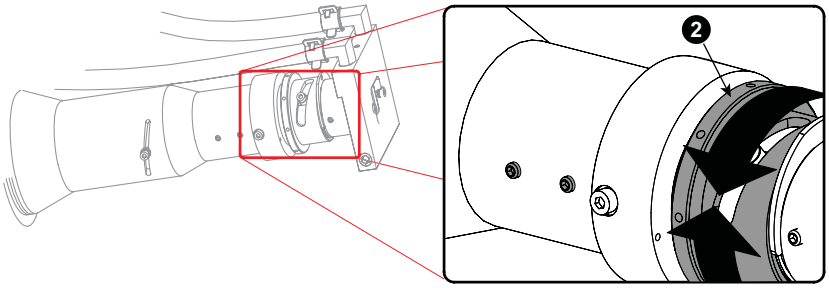


Image 9-4

5. Do you see spots in the projected image rotate along with the movements of the rod?
   If yes, these spots are caused by damages to the Integration Rod. Replace the rod assembly.
   If no, Integration Rod is OK. Re-adjust and secure the Integration Rod and reinstall the side cover of the projector.

9.3 Removal of the Integration Rod assembly

To remove the Integration Rod assembly from the Light Pipe the Light Processor unit has to be removed from the projector first. This procedure assumes that the Light Processor is already removed from the projector.

CAUTION: All servicing to the Light Processor unit has to be done in a dust free area. Use compressed air to blow away all dust on the outside of the Light Processor unit before entering the unit into the dust free area.

Necessary tools

- Compressed air.
- 2 mm Allen wrench.
- 2,5 mm Allen wrench.

How to remove the integration rod from the light pipe?

1. Remove the cooling block at the Light Pipe entrance by releasing the two socket head cap screws (reference 1 image 9-5) as illustrated. Use a 2,5 mm Allen wrench.

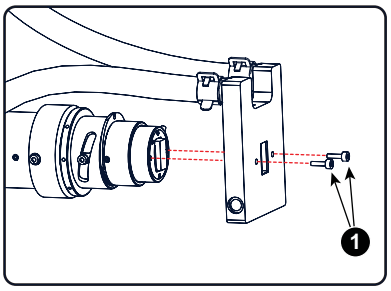


Image 9-5

2. Loosen the two set screws (reference 2) a few turns. Use a 2 mm Allen key. It's not necessary to remove the set screws.
3. Remove the socket head cap screw (reference 3) as illustrated. Use a 2,5 mm Allen wrench.

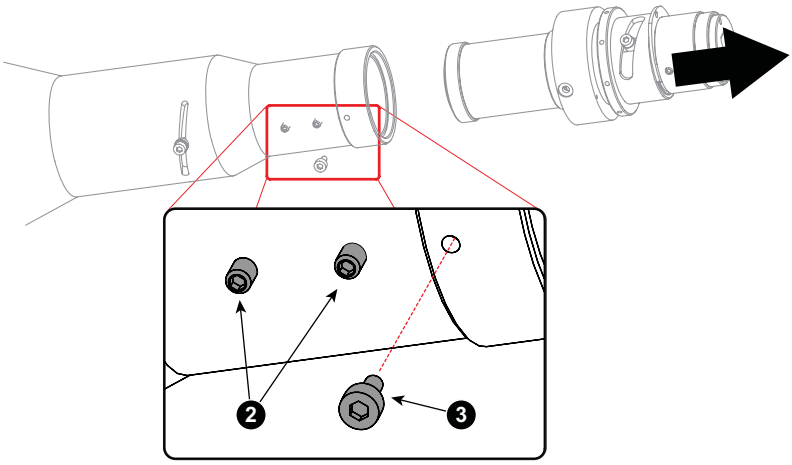


Image 9-6

4. Pull the Integration Rod assembly out of the light pipe.

Do not keep the Light Pipe entrance open (no Integration Rod installed) for a long period. This to prevent dust intrusion.

9.4 Installing a new Integration Rod assembly

Necessary tools

- Compressed air.
- 2 mm Allen wrench.
- 2,5 mm Allen wrench.

Necessary parts

Integration rod assembly.

How to install a new Integration Rod assembly?

1. Check if there are no dust particles present on the exit side of the Integration Rod assembly. If necessary remove the dust with compressed air.
   Caution: *Never touch the entrance or exit side of the integration rod assembly.*

   Note: *The exit side of the rod is much more critical than the entrance side of the rod.*
2. Check if the inner side of the Light Pipe entrance is dust free. If necessary remove the dust with compressed air.
3. Gently slide the Integration Rod into the light pipe as illustrated in image 9-7.
4. Secure the Integration Rod with a hexagon socket head cap screw (reference 1 image 9-7). Use a 2,5 mm Allen wrench.

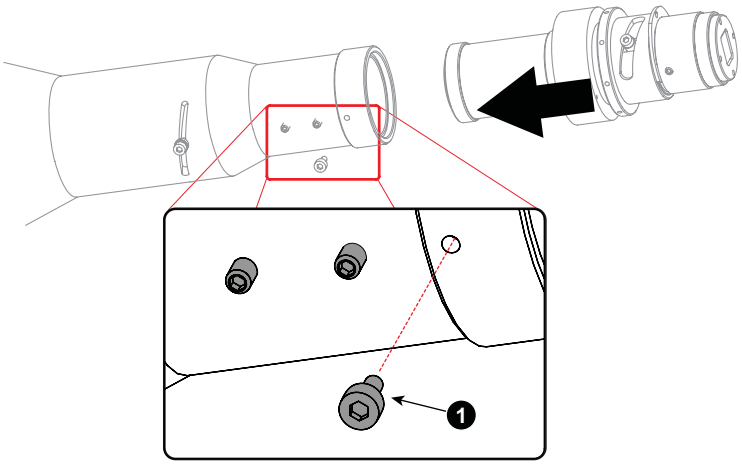


Image 9-7

5. Rotate the Integration Rod until the set screws (reference 2 image 9-8) of the Light Pipe are aligned with the set screw (reference 3 image 9-8) of the Integration Rod assembly as illustrated.

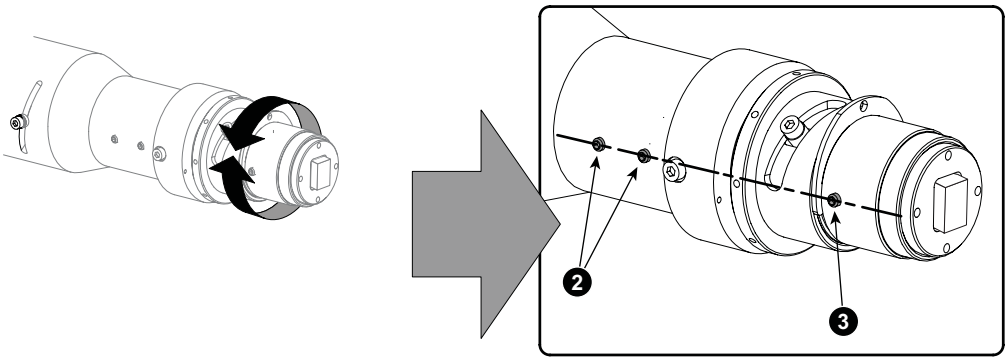


Image 9-8

6. Fasten the set screws (reference 2 image 9-9). Use a 2 mm Allen wrench.

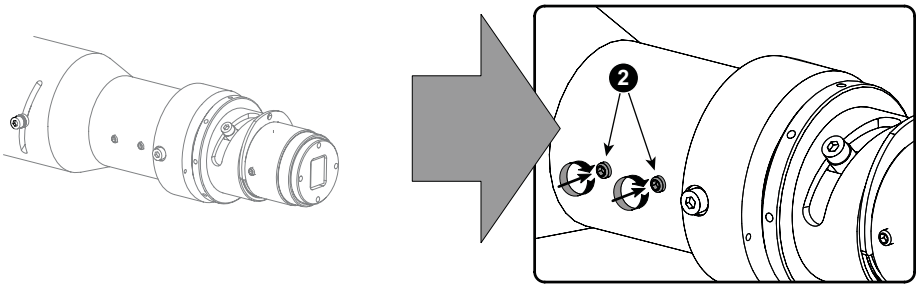


Image 9-9

7. Install the cooling block with two hexagon screws (reference 4 image 9-10) as illustrated. Use a 2,5 mm Allen wrench.
   Caution: *Align the positioning pin (reference 5 image 9-10) of the Integration Rod with its corresponding slot on the cooling block while approaching the Integration Rod.*

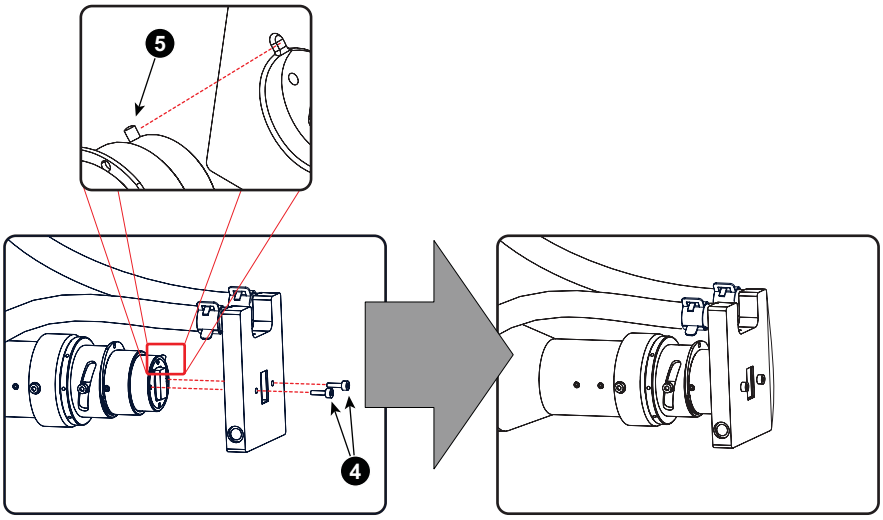


Image 9-10

The Integration Rod must be adjusted after installation.

9.5 Adjusting the Integration Rod

To adjust the Integration Rod you have to remove the side cover (Light Processor side) first.

Necessary tools

2 mm Allen wrench.

How to adjust the Integration Rod of the projector?

1. Check if the rod rotation set screws (reference 1 image 9-11) and the rod focus set screw (reference 2 image 9-11) are aligned. If not see procedure "Installing a new Integration Rod assembly", page 153, to align the set screws.

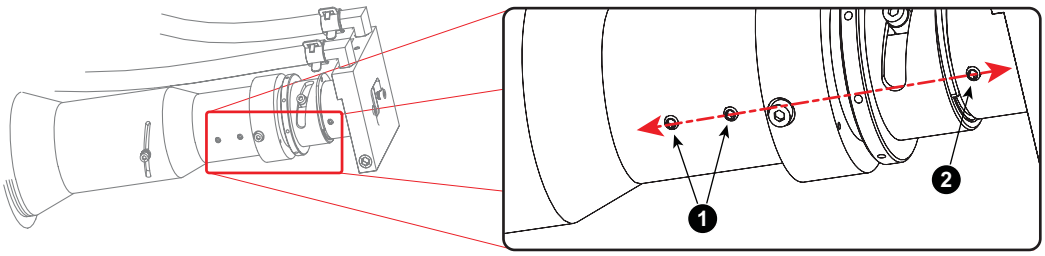


Image 9-11

2. Loosen the rod focus set screw (reference 2 image 9-12). Use a 2 mm Allen wrench.

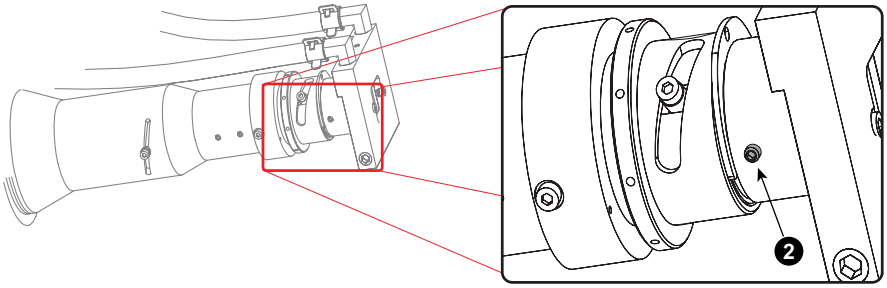


Image 9-12

3. Start up the projector but do not activate the lamp yet.
4. Set up the projector using the Communicator software to display a white internal pattern with a maximum contrast and a maximum dimming. Do not activate the lamp yet.
   a) Switch on the projector. Do not activate the lamp yet.
   b) Select : `Control Service > Light output mode > Normal mode > Lamp dimming > 0`
   c) Select : `Control > Test patterns > Full white`
   d) Make sure that you have a 2 mm Allen wrench within reach for the next steps.

   Caution: *Maximum ten (10) seconds are allowed of minimum light output on an non-adjusted Integration Rod. Otherwise, the DMD's be damaged.*
5. Activate the lamp and zoom the projector lens in or out until the projected image is focused.
   Note: *Dialog windows must be displayed sharp instead of blurry. This is independent of the focus of the light beam.*
6. Gently rotate the rod adjustment ring (reference 3 image 9-13) back or forward to a position which projects the sharpest possible edges on the screen.
   Tip: *Place a 2 mm Allen wrench in one of the holes on the outer side of the adjustment ring. The Allen wrench function as an extension bar of the adjustment ring. This allows a more precise adjustment.*

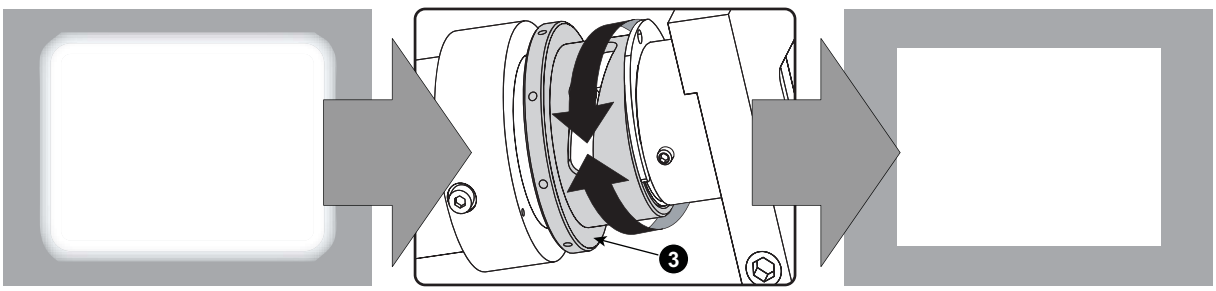


Image 9-13

7. Fasten the rod focus set screw (reference 2 image 9-12) which you released in step 2.

8. Loosen the two rod rotation set screws (reference 1 image 9-14) as illustrated. Use a 2 mm Allen wrench.

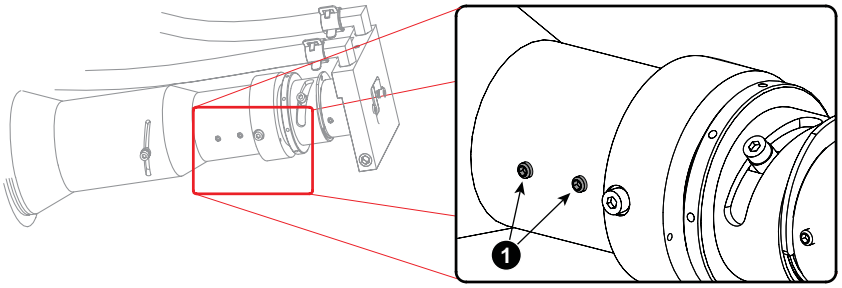


Image 9-14

9. Gently rotate the rod adjustment ring (reference 3 image 9-15) until the projected light beam matches the projected outline of the DMD's.

   Note: *No spots in the projected image may move along with the movements of the Integration Rod. Spots which move with the movements of the Integration Rod indicates that the exit side of the Integration Rod is contaminated with dust. If this is the case, remove the Integration Rod and try to blow away the dust. If this doesn't help replace the Integration Rod.*

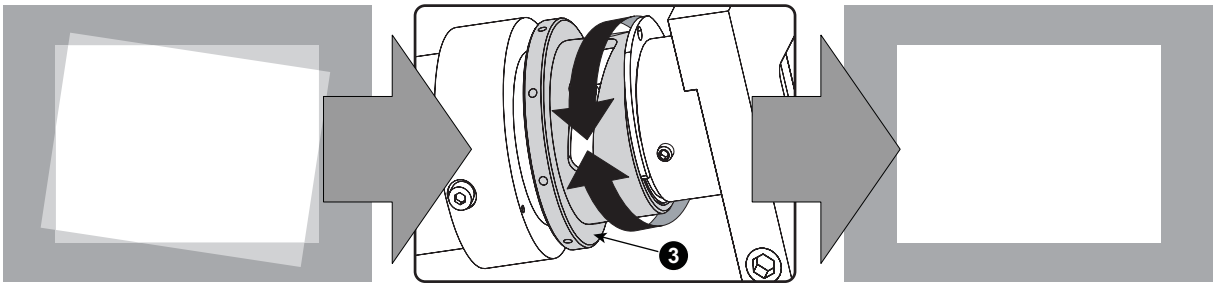


Image 9-15

10. Fasten the two rod rotation set screws (reference 1 image 9-14) which you released in step 8 and reinstall the projector side cover.

When you are familiar with this adjustment procedure you can optimize the focus position of the Integration Rod by first rotate the Integration Rod until you clearly see the sloped edges on the screen and then focusing these edges as sharp as possible. Then rotate the Integration Rod back until the projected light beam matches the projected outline of the DMD's. This way of focusing the Integration Rod has to be done quickly. Otherwise, the sealing between the DMD's and the prism will be damaged.

10. SEALED LIGHT PROCESSOR ASSEMBLY

About this chapter

This chapter gives a brief introduction of the Sealed Light Processor assembly. Futhermore, this chapter includes the replacement procedure of the whole Light Processor or sub assemblies e.g. Shutter, Light Sensor module and notch filter. The convergence adjustment procedure is also included in this chapter. Note that the service information about the Integration Rod and the Liquid Cooling Circuit are grouped in a separate chapters in this manual, see page 149 and page 183.

CAUTION: Never dismantle the housing of the Sealed Light Processor. Note that the housing is foreseen with temper evidence labels.

Overview

- Introduction
- Diagnostics
- Removal of the Sealed Light Processor
- Installation of the Sealed Light Processor
- Adjusting the convergence
- Adjusting the Fold Mirror
- Adjusting the Light Pipe Zoom Lens
- Adjusting the Notch Filter
- Cleaning the Notch Filter
- Cleaning the Prism exit side
- Replacement of the Dowser (Shutter)
- Replacement of the Light Sensor Module
- Replacement of the Notch Filter

10.1 Introduction

Sealed Light Processor & Light Pipe

The Light Processor and Light Pipe have three major parts, namely:

- The Light Processor. The prism of the Light Processor first splits up the homogeneous white light coming from the Light Pipe into red, green and blue light. Then integrates the video information on the three DMD's with the red green and blue light beams. Next, the prism merges the three integrated light beams back in to one full color video image, which is projected via the lens onto the screen.
- The Formatting Interface Board (FIB), which is the interface between the Pixel Mapping Processor (PMP) and the Formatting boards of the DMD's. The Formatting Interface Board is located inside the sealed housing of the Light Processor.
- The Light Pipe, which transforms the light emitted by the lamp into a homogeneous light beam and focuses this beam precisely on the active surface of the DMD's.

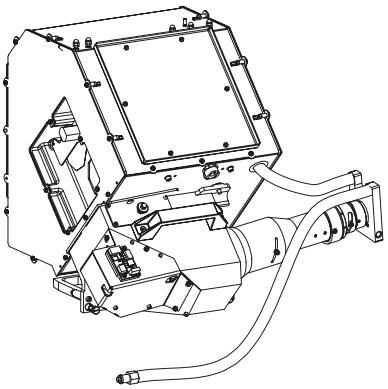


Image 10-1

Note that the Light Processor and Light Pipe assembly includes: Light Processor, Light Pipe, cooling circuit for the DMD's and light pipe entrance, Integration Rod, Formatter Interface Board (FIB) and motorized shutter (dowser).

Parts

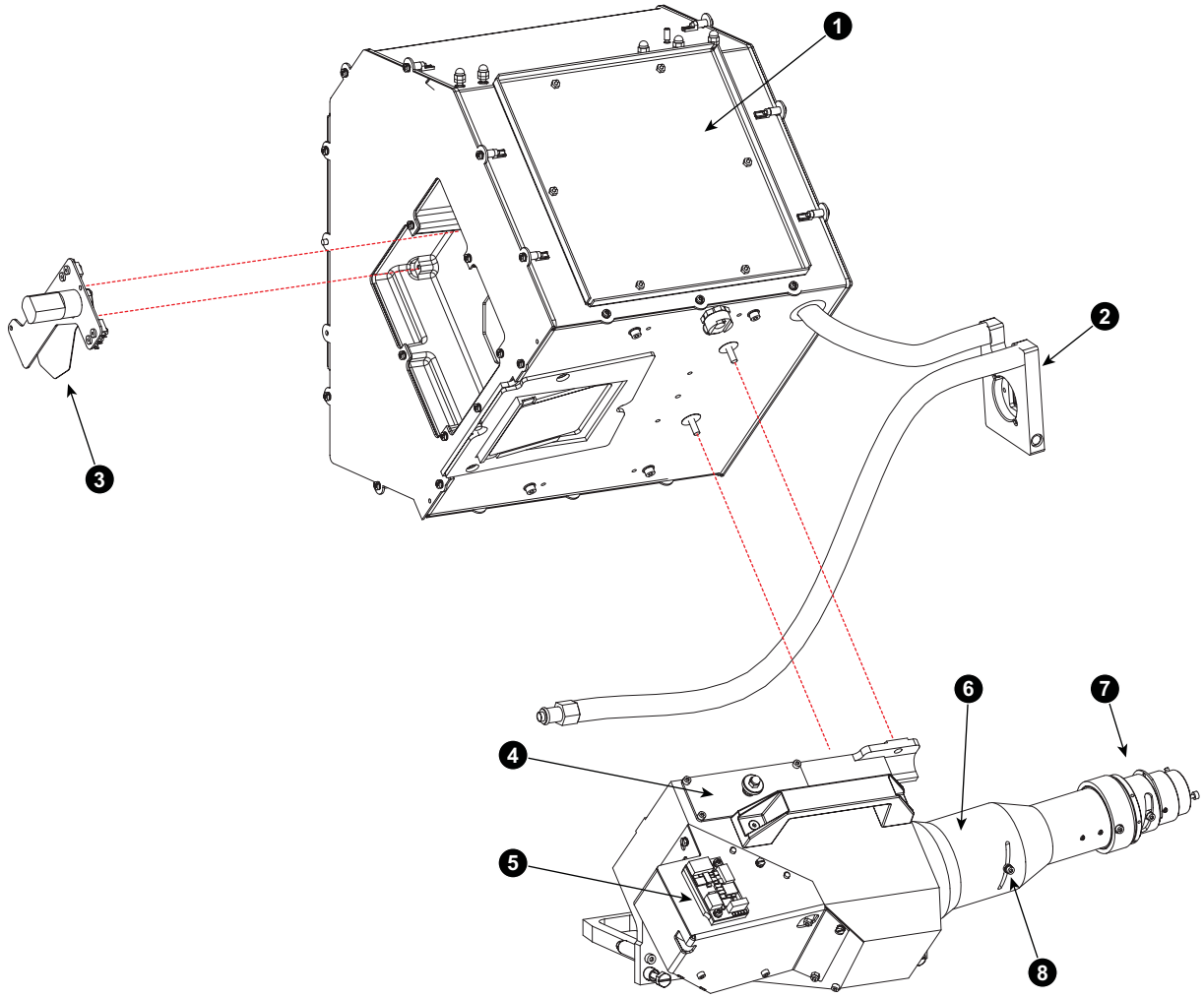


Image 10-2
1 Sealed compartment. Includes Light Processor (prism + DMD's) and Formatter Interface Board (FIB).
2 Cooling block for the Integration Rod entrance.
3 Shutter assembly (Dowser).
4 Notch filter.
5 CLO assembly.
6 Light Pipe assembly. Includes Integration Rod.
7 Integration Rod assembly.
8 Adjustment handle of the Light Pipe zoom lens.

10.2 Diagnostics

Troubleshooting of the Sealed Light Processor and Light Pipe

There are several reasons why removal or replacing of the Light Processor is required. Nevertheless, try to avoid unnecessary removal of the Light Processor. The list below gives an overview of the most common problems which require removal or replacement of the Light Processor. Check this list to ensure the problem is caused by the Light Processor.

- Artifacts in the projected image. These artifacts are also visible on the internal service patterns of the FIB or Formatter boards.
- A crack in the prism, which can result in convergence problems and may disables you to focus the projected image.
- Defect Peltier element, which causes a too high DMD temperature.
- Damaged Integration Rod, which causes permanent spots in the projected image.
- Unacceptable amount of dark, bright or flat state pixels on one or more DMDs.
- Blocked dowser (shutter). Dowser does not respond when pressing the “PAUSE” button.
- Leakage in liquid cooling circuit.

Check the projector log files for errors or warnings and look for a solution in the chapter "Trouble shooting checklist", page 37.

10.3 Removal of the Sealed Light Processor

To access the Sealed Light Processor you have to remove the left cover of the projector first.

CAUTION: Remove the lens before removing the Sealed Light Processor.

Necessary tools

- 3 mm Allen key.
- Flat screwdriver or a 10 mm nut driver.

How to remove the Sealed Light Processor from the projector?

1. Remove the lens and the left cover of the projector.
2. Release the two upper and the two lower hexagon socket screws (reference 1 & 2 image 10-3) which fasten the cross bar with the projector base, as illustrated.

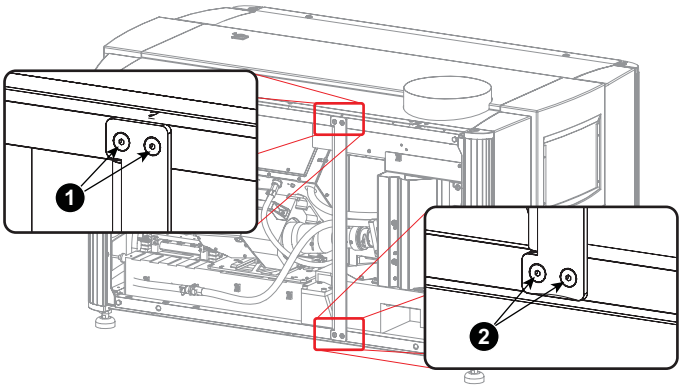


Image 10-3

3. Remove the cross bar.

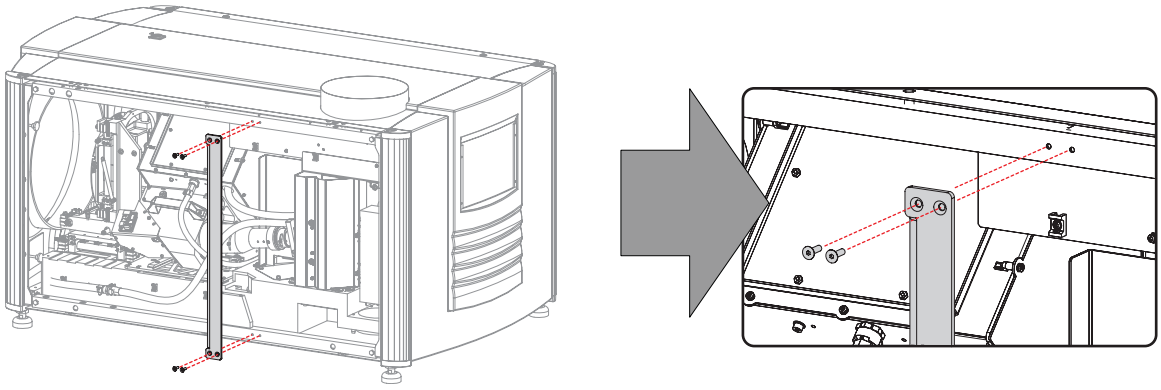


Image 10-4

4. Disconnect the three wire units (reference 1, 2 & 3 image 10-5) of the dowser (shutter) from the lens distribution board.
   Note: *Former projector versions only have one wire unit (reference 1 image 10-5) for the dowser. Newer versions have three wire units.*

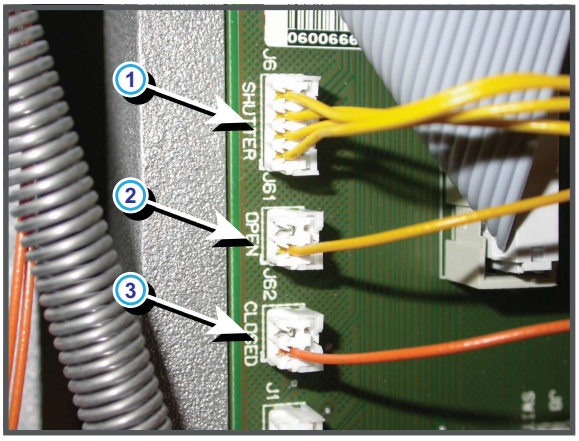


Image 10-5
Newer version.

5. Disconnect the wire unit (reference 1 image 10-6) from the Light Sensor (CLO module) which is located at the left side of the Light Pipe.

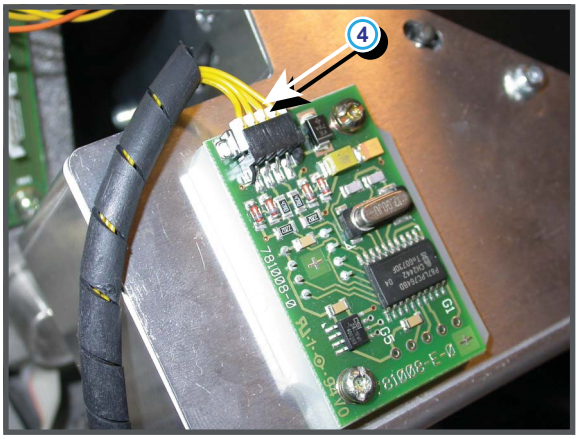


Image 10-6

6. Uncouple the cooling circuit from the Sealed Light Processor by unplugging the two valved fittings as illustrated. One valved fitting is located on the sealed compartment and the other valved fitting is located at the base of the projector.
   Tip: *Sometimes a little cooling liquid will be spilled. Wrap a small cloth around the valved fitting while uncoupling to absorb the spilled cooling liquid.*

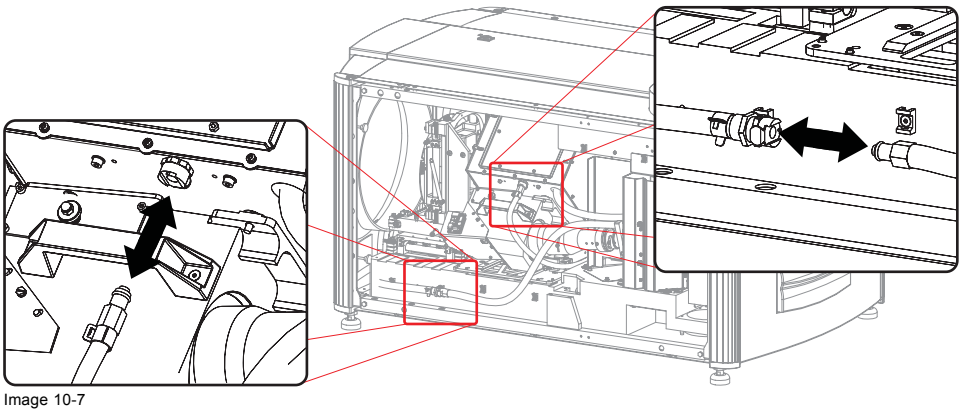


Image 10-7

7. Release the two retaining screws (reference 3 image 10-8) at the bottom of the Sealed Light Processor. Use for that a flat screwdriver or a 10 mm nut driver.

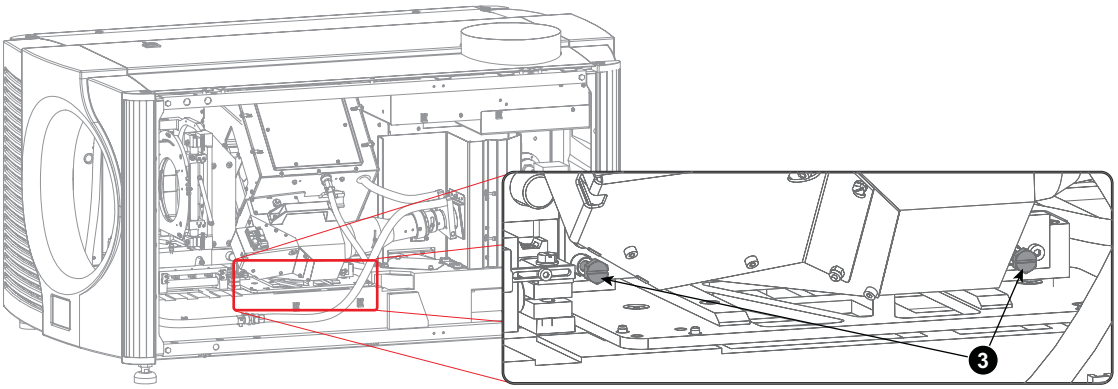


Image 10-8

8. Gently remove the Sealed Light Processor out of its compartment.

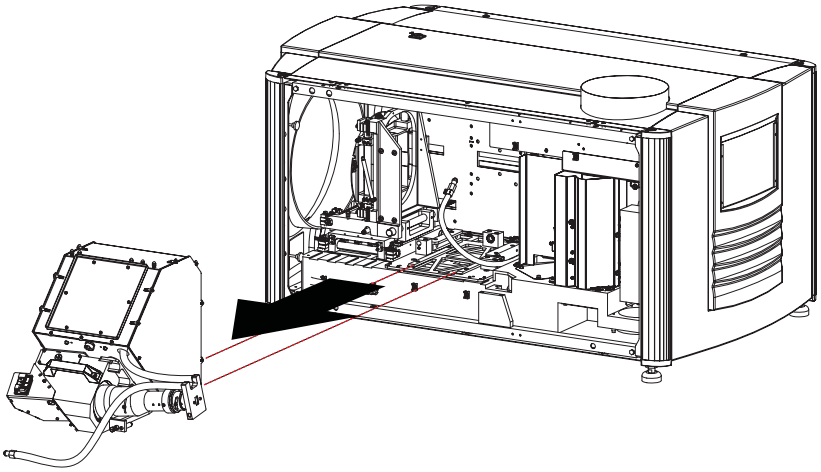


Image 10-9

CAUTION: Never open the sealed compartment of the Light Processor unit. Always send the Sealed Light Processor as a whole back to factory for repair.

10.4 Installation of the Sealed Light Processor

About this chapter

This chapter describes the installation process of the Sealed Light Processor. The process consists of the following stages:

1. Removing the cable clamp behind the Light Processor
2. Installing the Light Processor
3. Checking if the Light Processor connections are sufficient
4. If the check failed, loosening the fixation screws of the backplane
5. Trying again to install the Light Processor
6. Finalizing the installation process

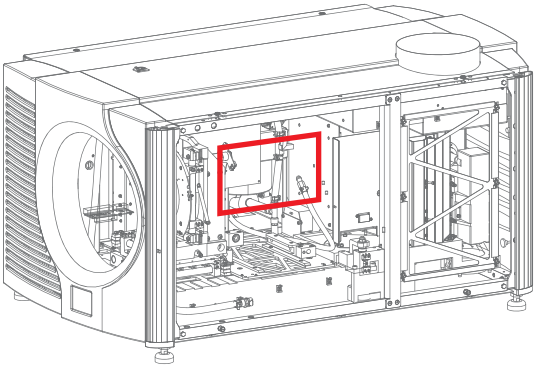
WARNING: Make sure that there is no lens mounted in the Lens Holder while installing the Sealed Light Processor.

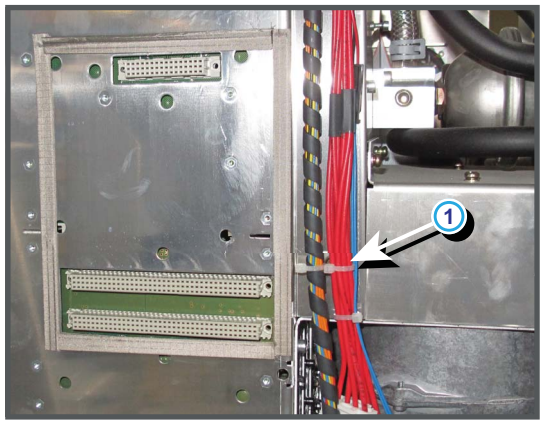
How to remove the cable clamp behind the Light Processor?

Next to the Light Processor connectors behind the Light Processor, a bunch of cables is mounted using a cable clamp. These cables with clamp can prevent the Light Processor from sliding fully into the connectors and this can cause a bad contact.

Perform the following procedure to remove the cable clamp:

1. Switch off the projector and unplug the power cord.
2. Wait for 15 minutes to let the projector cool down before starting any of the procedures below.
3. Remove the lens.
4. Remove the left projector cover.
5. Remove the Light Processor.
6. Cut the cable tie (reference 1, image 10-10) and remove the clamp (reference 2, image 10-10) by first removing the screw. Use a T10 Torx screwdriver.





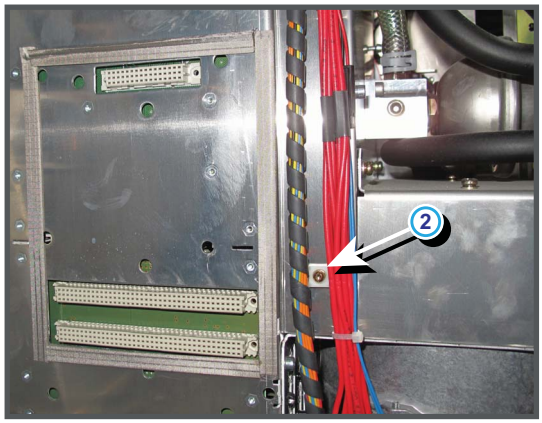


Image 10-10

How to install the Sealed Light Processor?

Necessary tools

- 3 mm Allen wrench
- Flat screwdriver or a 10 mm nut driver

1. Firmly hold the Sealed Light Processor and gently slide the Sealed Light Processor into its compartment. Note that the bottom of the Sealed Light Processor is equipped with guides and positioning pins.

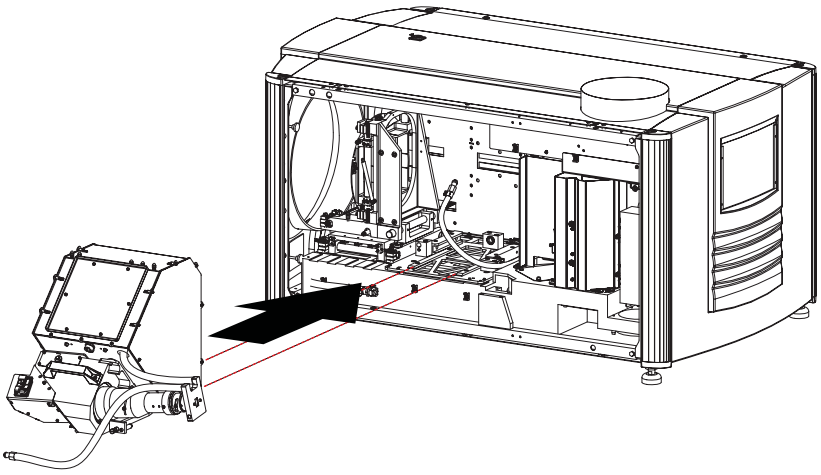


Image 10-11

2. Fasten the two retaining screws (reference 3 image 10-12) at the bottom of the Sealed Light Processor as illustrated. Use for that a flat screwdriver or a 10 mm nut driver.

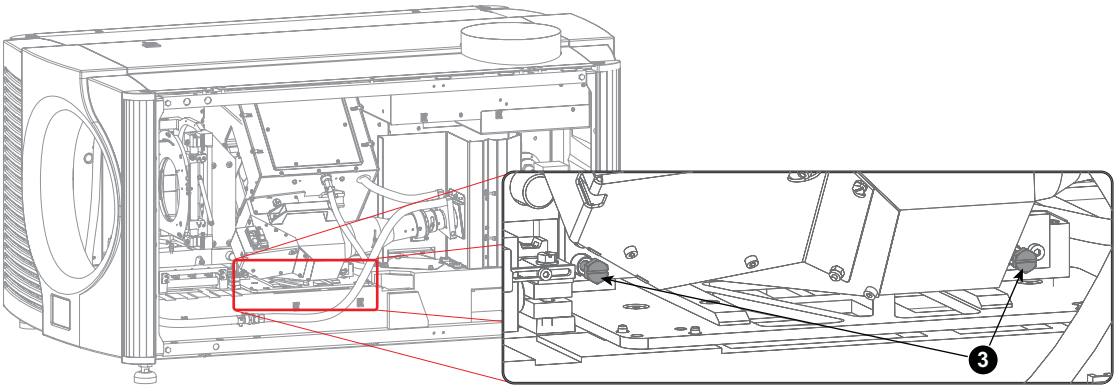


Image 10-12

3. Couple up the cooling circuit from the Sealed Light Processor with the cooling circuit of the projector.
Caution: To avoid damage to the connector seal, always depress the connector tab of the female valved fitting prior to inserting the male valved fitting.

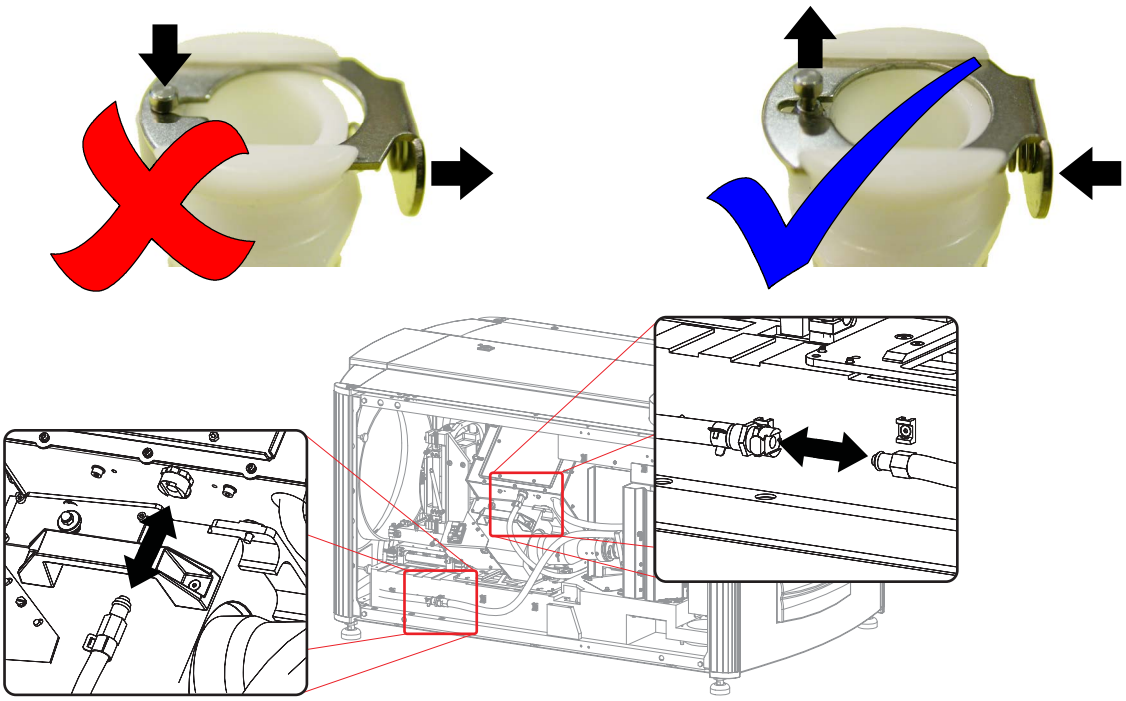


Image 10-13

4. Reconnect the wire unit of the dowser assembly (shutter) with the distribution board located at the side of the Lens Holder. Make sure to connect the three plugs of the wire unit as follows:
   - Plug with four pins into J6 (reference 1 image 10-14)
   - Plug with two pins and yellow wire into J61 (reference 2 image 10-14)
   - Plug with two pins and orange wire into J62 (reference 3 image 10-14)

   Note: Former projector versions only have one wire unit ((reference 1 image 10-14) for the dowser. Newer versions have three wire units.

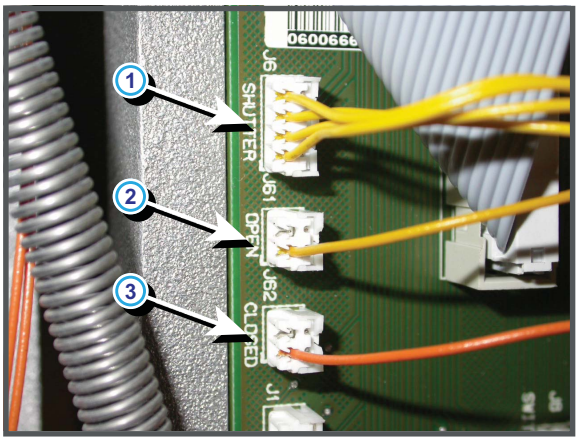


Image 10-14
Newer version.

5. Reconnect the wire (reference 4 image 10-15) unit of the Light Sensor (CLO) which is located at the left side of the Light Pipe.

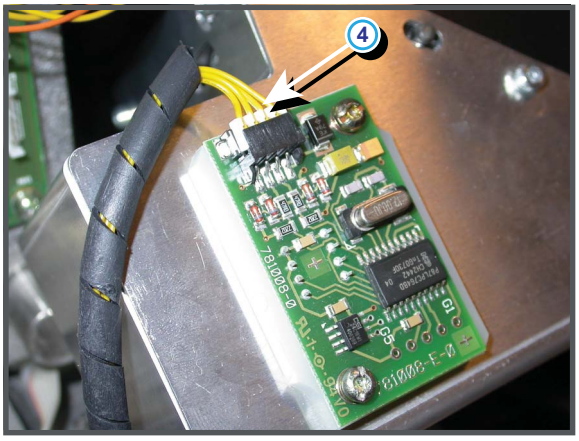


Image 10-15

6. Reconnect the wire (reference 4 image 10-16) unit of the Light Sensor (CLO) which is located at the left side of the Light Pipe.

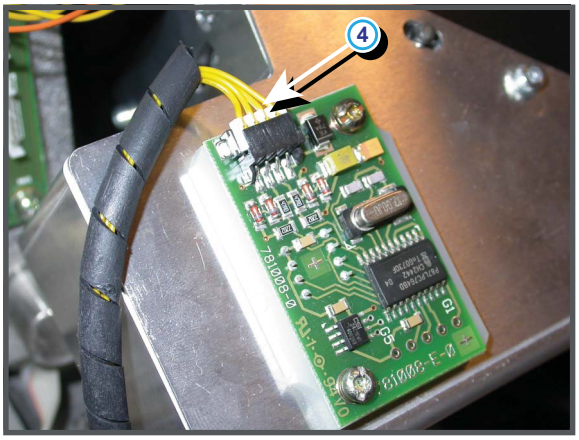


Image 10-16

7. Install the cross bar as illustrated.

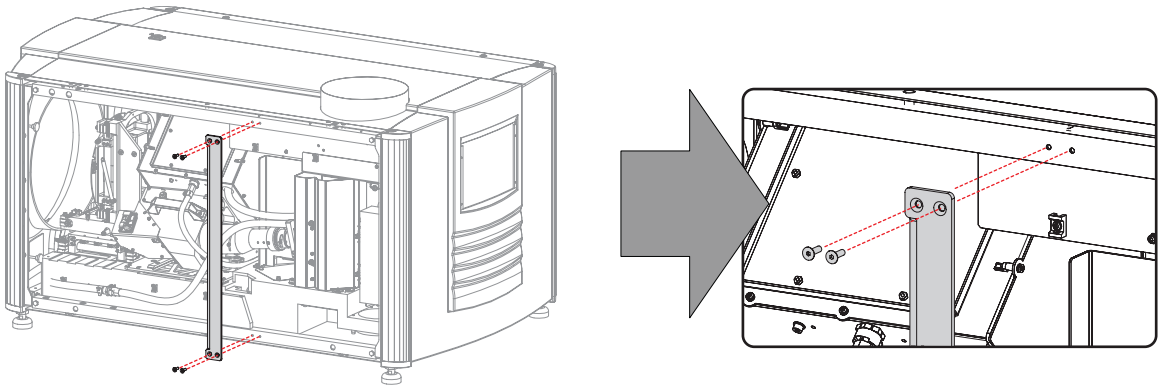


Image 10-17

8. Fasten the cross bar with the projector base using two screws at the top and two screws at the bottom of the cross bar. Use for that a 3 mm Allen wrench.

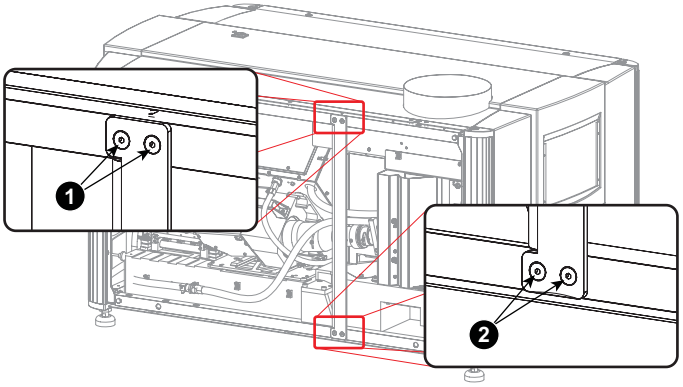


Image 10-18

9. Reinstall the projector side cover.
   Tip: It is recommended, after each reinstallation of the Sealed Light Processor, to check the pressure indicated on the internal manometer of the liquid cooling circuit. This manometer is located inside the compartment of the Lamp House. This pressure should be between 0,5 and 1 bar. Take the necessary corrective action in case the pressure is out of range.

How to check if the Light Processor connections are sufficient?

To make sure the Light Processor connections are sufficient, a check has to be performed. This check can be done from the front side of the projector after the front cover has been removed. A 2 mm gauge is needed. Perform the following procedure:

1. Remove the front projector cover.
2. Take the 2 mm gauge and try to push it between the Card Cage plate and the Light Processor plate.
   - If the gauge does not fit between the 2 plates, the Light Processor connections are sufficient.
     Install the projector covers.
   - If the gauge does fit between the 2 plates, the check has failed. This means that the Light Processor is not close enough to the Card Cage and thus not sufficiently connected to the Card Cage backplane connectors.
     Remove the Light Processor and proceed with the next stage (How to loosen the fixation screws of the backplane?).

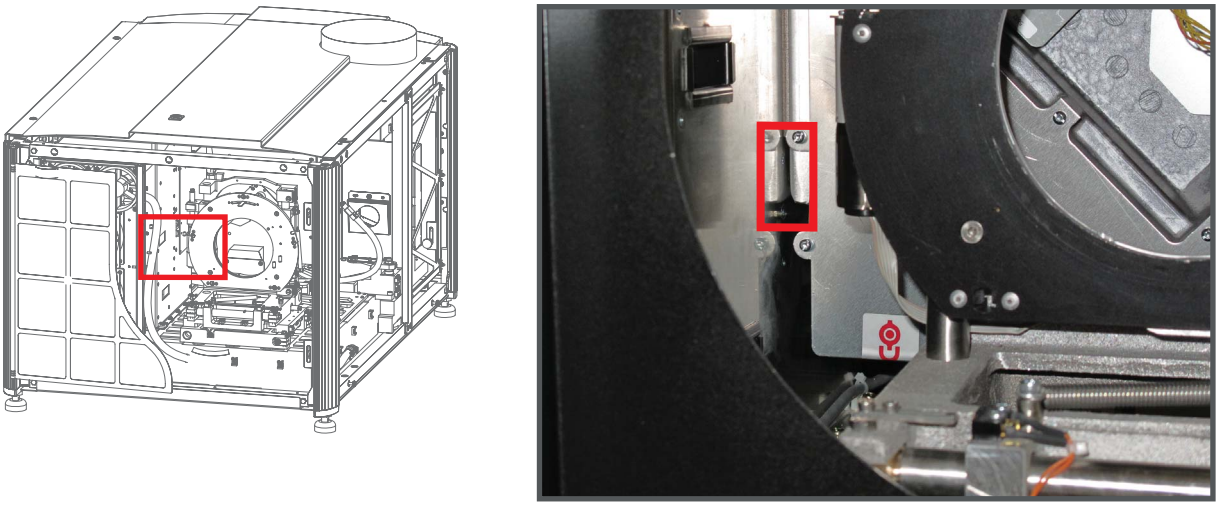


Image 10-19

(If the check failed) How to loosen the fixation screws of the backplane?

For more detailed information about the steps below, consult the service manual of your projector.

1. Remove the right cover of the projector.
2. Remove the Card Cage cover.
3. Remove all boards from the Card Cage.
4. Remove the Input & Communication unit.
5. Remove the exhaust system on top of the projector.
6. Remove the top cover of the projector.
7. Loosen the fixation screws by turning them 1 turn anticlockwise. They are located on the following places:
   - 4 screws on the top side of the projector (reference 1, image 10-20). Disconnect the grey flat cable (reference 2, image 10-20) first.
   - 13 screws in the upper part of the Card Cage (reference 3, image 10-20).
   - 12 screws in the middle part of the Card Cage (reference 4, image 10-20).
   - 3 screws in the lower part of the Card Cage (reference 5, image 10-20).

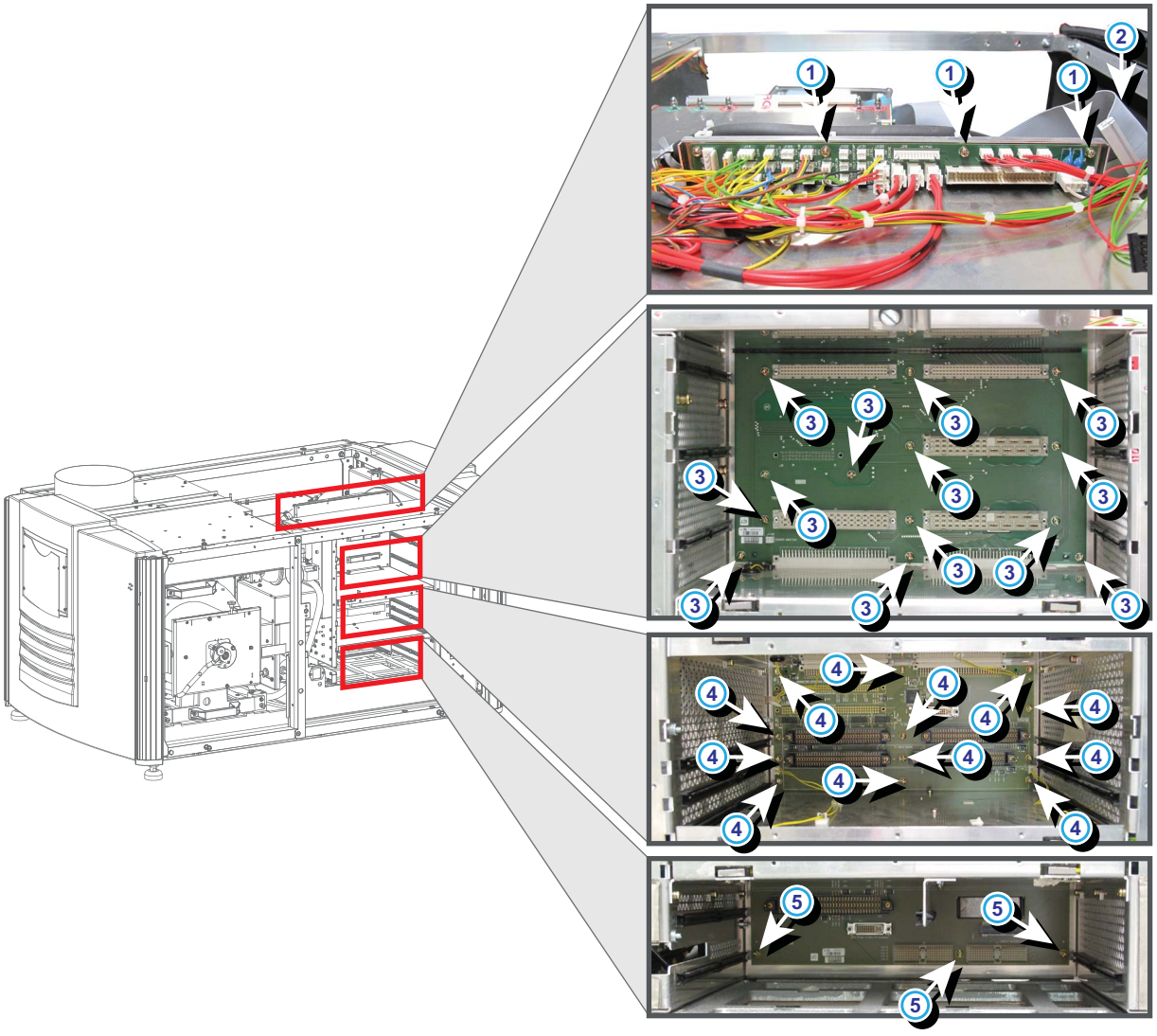


Image 10-20

Tip: Ensure you did not forget any screw by fiddling at the backplane. It should move a little bit.

8. Try to install the Sealed Light Processor again.

Finalize the installation process

1. Secure the fixation screws of the backplane (image 10-20). Don't forget to reconnect the grey flat cable on the top side of the projector (reference 2, image 10-20).
2. Install the Input & Communication unit.
3. Install all boards back in the Card Cage.
4. Install the Card Cage cover.
5. Install the right cover of the projector.
6. Install the top cover of the projector.
7. Install the exhaust system on top of the projector.
8. Plug the power cord back in.

10.5 Adjusting the convergence

Definitions-Abbreviations

- **X**: Horizontal direction on the screen, with origin in the centre of the screen and + to the right
- **Y**: Vertical direction on the screen, with origin in the centre of the screen and + to the top
- **Z** rotation: Tilting of the X and Y axes in their plane: + is clockwise rotation
- **[1]** ; **[2]** ; **[3]** ; **[4]** ; **[5]** ; **[6]** : these are the 6 adjustments available as they appear on the standard convergence adjustment screen.

Convergence Test pattern

For the manual correction of the DMD convergence, a typical convergence test pattern is generated.

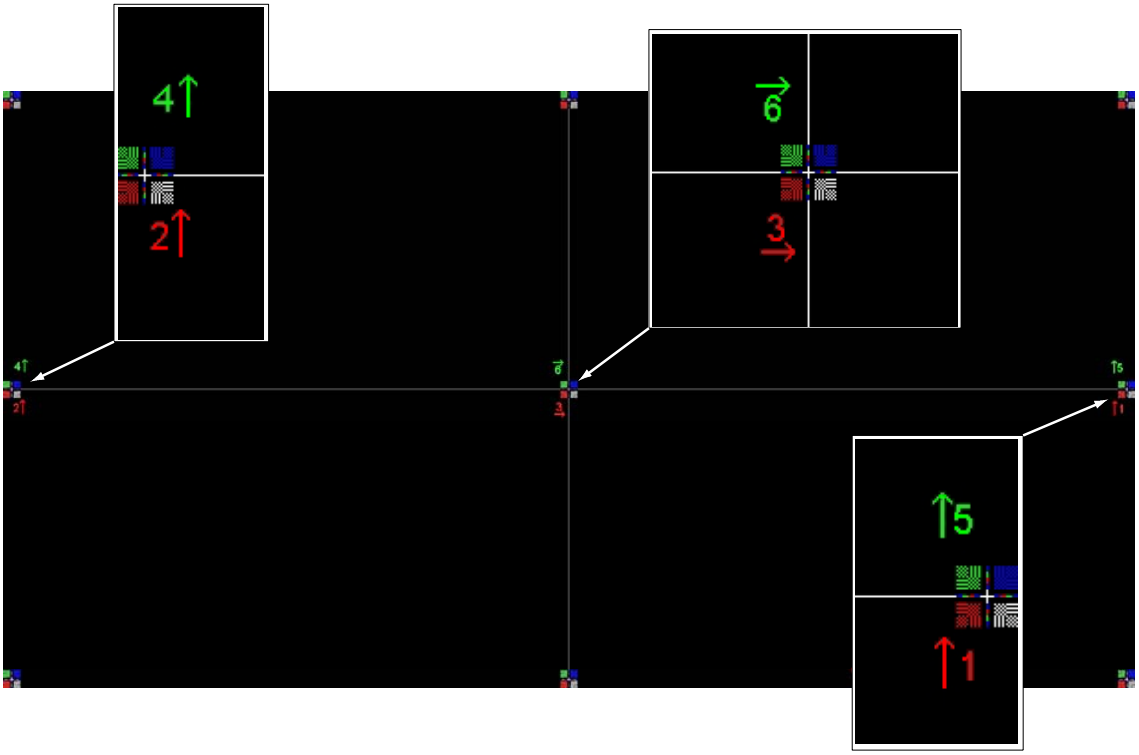


Image 10-21
Convergence test pattern

Work Instructions:

- GREEN and RED DMD's are to be adjusted with reference to the BLUE dmd.
- Each adjustment allows for approximately 10 pixels maximum displacement to either side of the nominal BLUE position
- Rotation is limited to approximately +/- 5pixels on the left screen flank and +/- 5 pixels on the right screen flank
- One turn of an adjustment screw relates to an approx. 5-pixel displacement on the screen.

Take Care:

- In rear cases it can happen that the nominal position falls in the **dead zone** where the mechanism changes from a pushing to a pulling function. The dead zone is due to inherent tolerances within the mechanism. Approximately 2 turns are required to get out of the dead zone. If it so happens that the nominal position of an adjustment falls within this dead zone, it is preferable to continue screwing through the dead zone for another 2 turns. Then return to the required nominal position. The dead zone should now be displaced away from the required end position. The DMD is now securely held in the nominal position.
- Each adjustment is limited to approximately 10 pixels displacement. DO NOT try to force the adjustment beyond this point. The system has an end of travel in both directions, but with excessive force one could cause damage.

Converging the RED pattern onto the BLUE pattern

Start with aligning the RED DMD in the vertical directions [1] and [2] and then proceed with the horizontal direction [3]

1. To translate RED vertically in the Y + direction, turn both [1] and [2] clockwise. Turn screws in equal increments.
2. To translate RED vertically in the Y - direction, turn both [1] and [2] anti-clockwise. Turn screws in equal increments.
3. To translate RED horizontally in the X + direction, turn [3] clockwise.
4. To translate RED horizontally in the X - direction, turn [3] anti-clockwise.

5. For clockwise rotations of RED, turning [1] anti-clockwise would generally suffice. If much rotation is required, [2] may also be turned in the opposite direction. Slight corrections to Y may be required after rotation.
6. For anti-clockwise rotations of RED, turning [1] clockwise would generally suffice. If much rotation is required, [2] may also be turned in the opposite direction. Slight corrections to Y may be required after rotation.

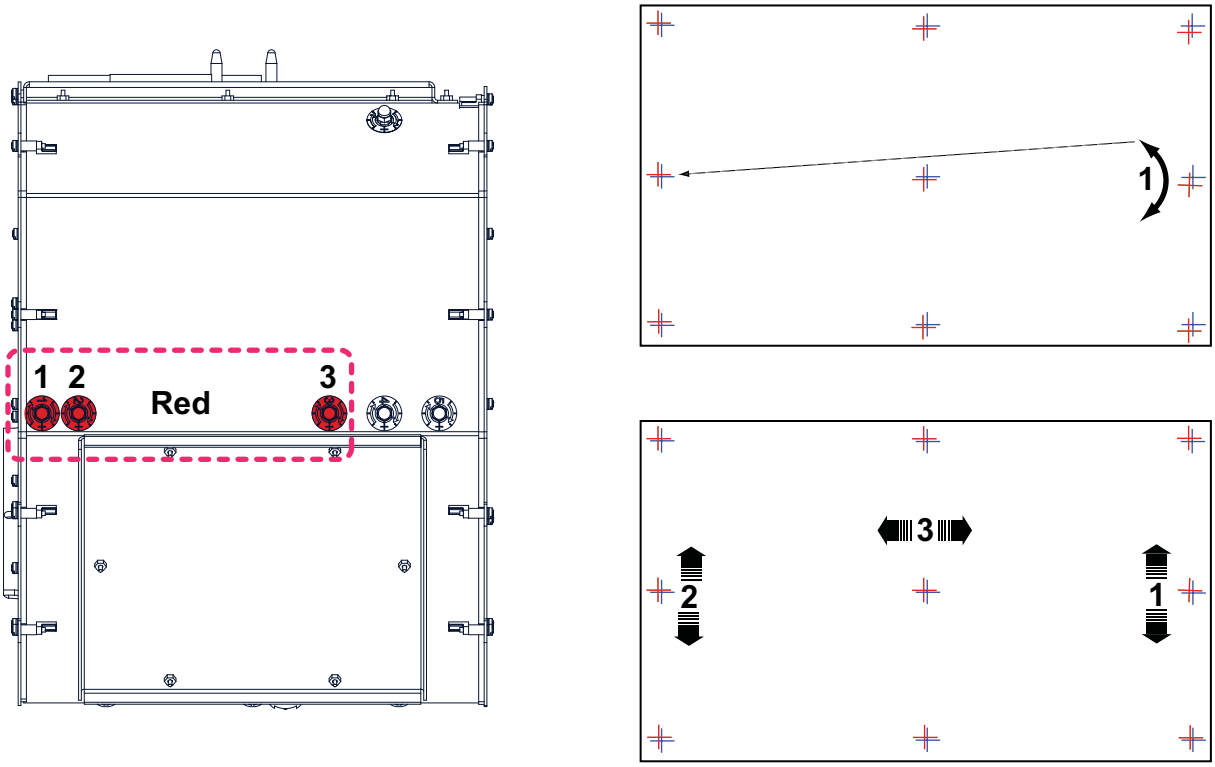
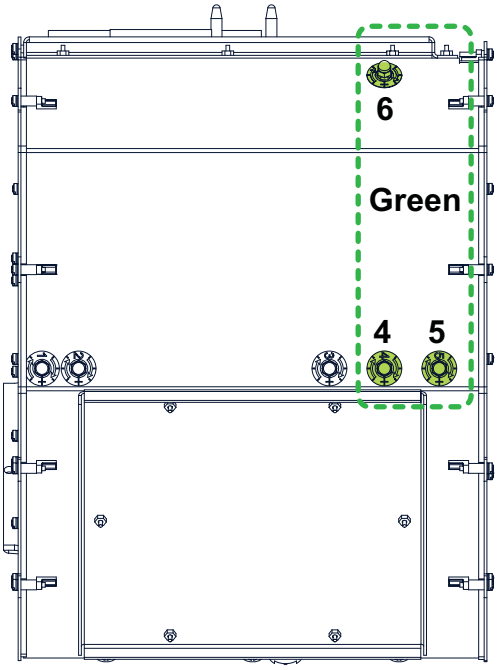


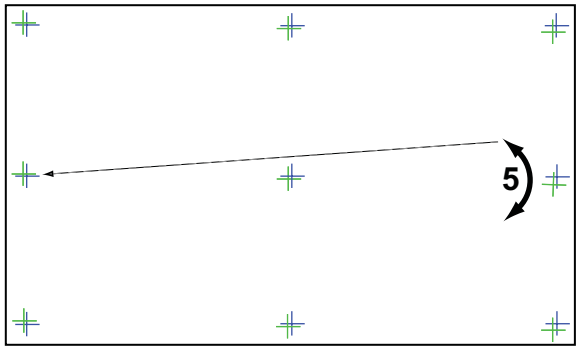
Image 10-22

Converging the GREEN pattern onto the BLUE pattern

Next , align the GREEN DMD in the vertical directions [4] and [5] and then proceed with the horizontal direction [6].

1. To translate GREEN vertically in the Y + direction, turn both [4] and [5] clockwise. Turn screws in equal increments.
2. To translate GREEN vertically in the Y - direction, turn both [4] and [5] anti-clockwise. Turn screws in equal increments.
3. For clockwise rotations of GREEN, turning [5] anti-clockwise would generally suffice. If much rotation is required, [4] may also be turned in the opposite direction. Slight corrections to Y may be required after rotation.
4. For anti-clockwise rotations of GREEN, turning [5] clockwise would generally suffice. If much rotation is required, [4] may also be turned in the opposite direction. Slight corrections to Y may be required after rotation.
5. To translate GREEN horizontally in the X + direction, turn [6] clockwise.
6. To translate GREEN horizontally in the X - direction, turn [6] anti-clockwise.





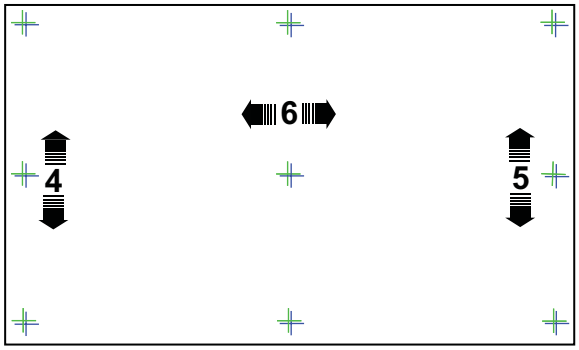


Image 10-23

10.6 Adjusting the Fold Mirror

Purpose of the Fold Mirror

The Fold Mirror is folding up the light path of the projector to make the projector more compact. The Fold Mirror is located at the left side of the Light Pipe and reflects the light, which entrance the Light Pipe via the Integration Rod, upon the prism of the Sealed Light Processor. The position of the light spot upon the DMD's can be adjusted with the Fold Mirror.

CAUTION: Normally the Fold Mirror should never be readjusted in the field. In case a readjustment is required follow the instructions in this chapter precisely. Only qualified technicians who have experience with adjusting the Fold Mirror may adjust the Fold Mirror. A misaligned Fold Mirror may cause irreversible damage to other parts of the projector!

To access all three adjustment screws of the Fold Mirror the left side cover has to be removed from the projector and the Fold Mirror cover plate has be removed from the Light Pipe. This procedure assumes that the left side cover is already removed from the projector.

In most cases the Fold Mirror can be correctly aligned by turning the upper two adjustment screws of the Fold Mirror. These upper two screws can be accessed with a nut driver through the holes of the Fold Mirror cover. So, the removal of the Fold Mirror cover is unnecessary.

Necessary tools

5,5 mm nut driver.

How to adjust the Fold Mirror?

1. Disconnect the wire unit (reference 4 image 10-24) from the Light Sensor Module.

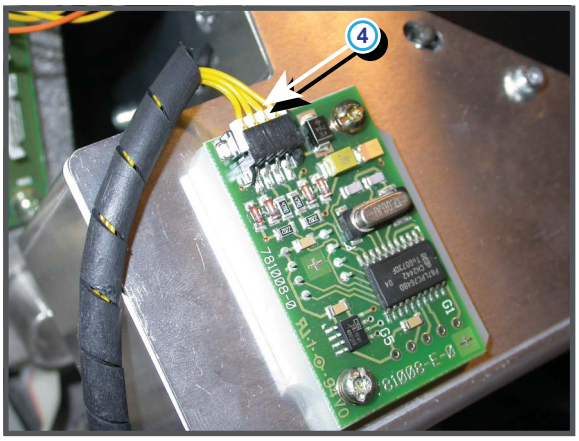


Image 10-24

2. Remove the Fold Mirror cover and the Light Sensor Module as a whole from the Light Pipe as illustrated. Do this by loosening the four screws (reference 1 image 10-25), which fasten the cover plate, a few turns. Use a 5,5 mm nut driver.

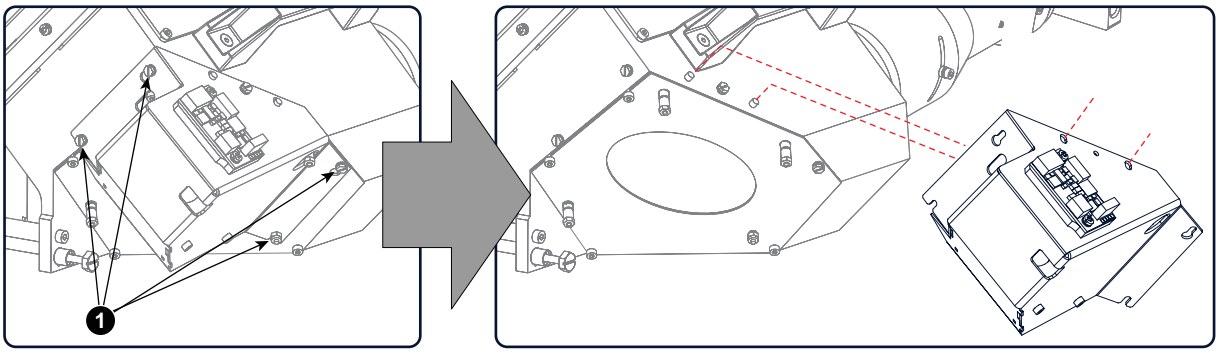


Image 10-25

3. Start up de projector and display a white test pattern with maximum dimming.
   Caution: *Projecting a misaligned light spot for more then 10 seconds may cause irreversible damage to the Light Processor. Therefore, it is important to maximum dim the light output and adjust the light spot as quickly as possible.*

4. Turn the adjustment screws A, B or C in or out until the light spot (5) matches with the outline of the DMDs (4). Use for that a 5,5 mm open end wrench. The illustration below shows the movements of the light spot (5) upon the screen (6) for each adjustment screw.

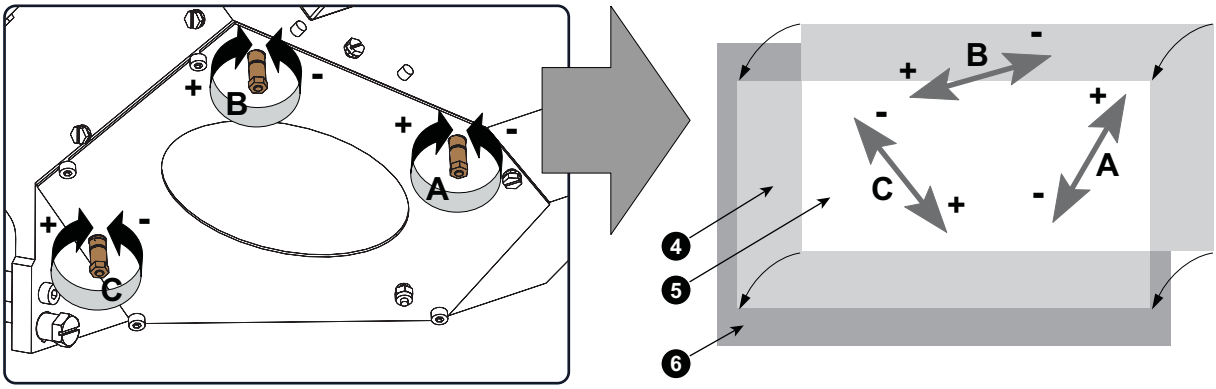


Image 10-26

5. Reinstall the cover of the Fold Mirror.
6. Reconnect the Light Sensor Module.
7. Place a light meter in the center of the screen and calibrate the Light Sensor Module. For detailed instructions see user guide of the Communicator software.

Turn the three adjustment screws of the Fold Mirror equally counterclockwise to achieve a higher contrast of the projected image. Then, readjust the adjustment screws individual until the light spot matches with the outline of the DMDs. Take into account that a higher contrast is at the expense of brightness.

10.7 Adjusting the Light Pipe Zoom Lens

Purpose of the Light Pipe Zoom Lens

The Light Pipe Zoom Lens is located inside the Light Pipe between the Integration Rod and the Fold Mirror. The light spot upon the DMDs can be reduced or enlarged with the Light Pipe Zoom Lens to fit with the outline of the DMDs.

The cover of the Light Processor has to be removed from the projector to adjust the Light Pipe Zoom Lens. This procedure assumes that the this cover is already removed from the projector.

Necessary tools

2,5 mm Allen wrench.

How to adjust the Light Pipe Zoom Lens?

1. Release the hexagon socket head cap screw (reference 1 of image 10-27). Use a 2,5 mm Allen wrench.
2. Start up de projector and display a white test pattern with maximum dimming.
   Caution: *Projecting a light spot which is larger then the DMD outline for more then 10 seconds may cause irreversible damage to the Sealed Light Processor. Therefor, it is important to maximum dim the light output and adjust the light spot as quickly as possible.*
3. Adjust the position of the Light Pipe Zoom Lens by moving the hexagon socket head cap screw (reference 1) as illustrated until the size of the light spot (reference 2) matches the projected outline (reference 3) of the DMDs upon the screen (reference 4).

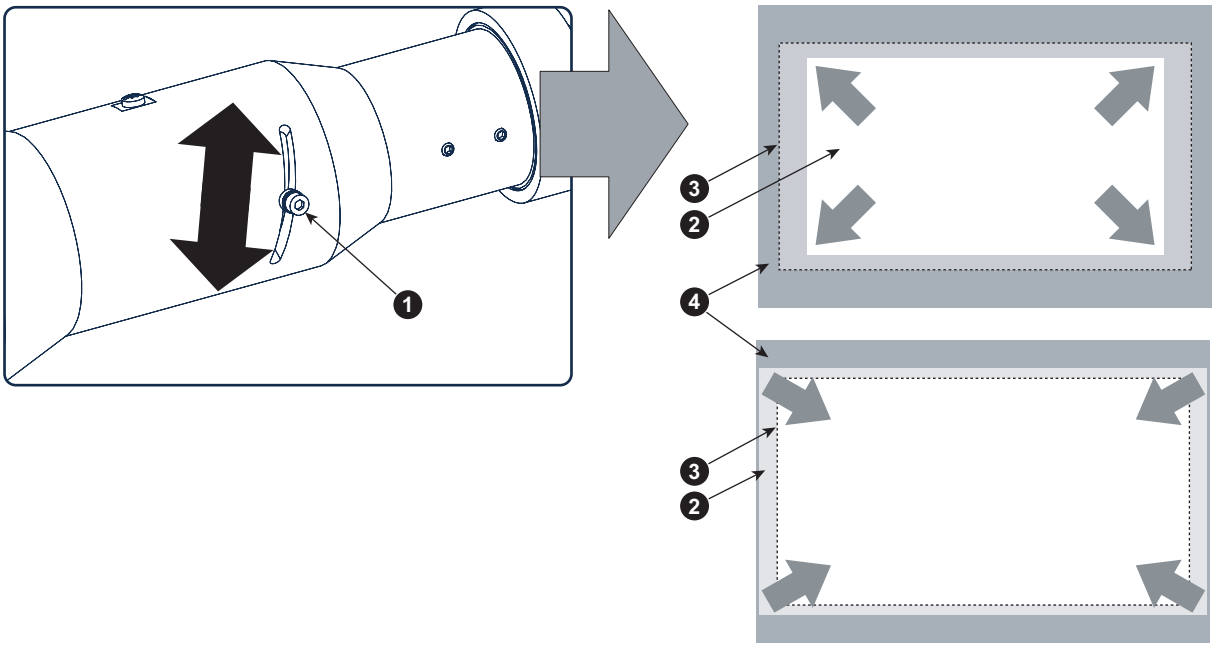


Image 10-27

4. Fasten the hexagon socket head cap screw. User a 2,5 mm Allen wrench.

10.8 Adjusting the Notch Filter

Purpose of the Notch Filter

The Notch Filter is a coated glass plate located at the end of the Light Pipe assembly. The Notch Filter applies some small color corrections of the light coming out of the Light Pipe, which is emitted by the xenon lamp of the projector. This is done to achieve an optimal color calibration of the native colors. The Notch Filter can slightly turn, with respect to the light path, which allows a small adjustment of the native colors. Note that, next to the pure optical color calibration by the Notch Filter there is also a software color calibration.

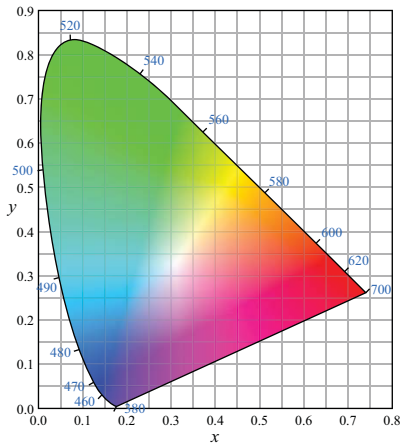


Image 10-28
Color triangle.

To access the Notch Filter the left side cover has to be removed from the projector. This procedure assumes that the left side cover is already removed from the projector.

Necessary tools

- 6 mm open-end wrench.
- Colorimeter (e.g. CS-200 chroma meter from Konica Minolta or the PR-650 SpectraScan® from Photo Research)

How to adjust the Notch Filter?

1. Release the lock nut (reference 1) of the Notch Filter. Use for that a 6 mm open-end wrench.

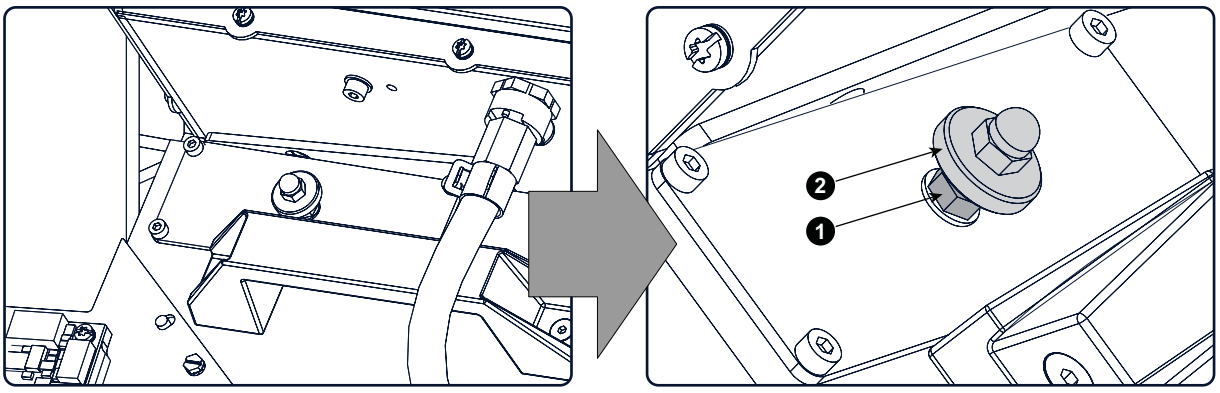


Image 10-29

2. Start up the projector and display an uncorrected red test pattern.
   Tip: *See user guide of the Communicator software for detail instructions about color calibration*
3. Measure the X and Y values of the projected red test pattern. Use for that a colorimeter. Make sure that the red test pattern is uncorrected.
4. Slightly rotate the thumb screw (reference 2 of image 10-29) of the Notch Filter until the measured X and Y values are within the required specs.
   Note: *The adjustment range of the Notch Filter is limited. For most projectors the mid position of the thumbscrew gives also the most optimal result.*
5. Fasten the lock nut, reference 1 of image 10-29, to secure the position of the Notch Filter. Use for that a 6 mm open-end wrench. Make sure that the position of the Notch Filter remains unchanged while fastening the lock nut.

10.9 Cleaning the Notch Filter

When cleaning the Notch Filter?

Only clean the Notch Filter in case it is really necessary. This means in case dust is clearly visible upon the surface of the Notch Filter.

This procedure requires that the Notch Filter is removed from the Light Pipe.

WARNING: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Irritating to eyes and skin. Always use in a well ventilated area. Vapors may cause drowsiness and dizziness. Avoid contact with skin and eyes. In case of contact with the eyes, rinse immediately with plenty of water and seek medical advise.

CAUTION: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Lightly flammable. Always use in a well ventilated area. Keep away from sources of ignitions. Do not smoke while working with isopropanol. Exclusive keep in original container tightly closed at a cool, well ventilated and fireproof storage space.

Necessary tools

- Clean Torayse cloth.
- Clean cotton cloth.
- Demineralized water.
- Isopropanol alcohol.

How to clean the Notch Filter?

1. Wipe off the dust of both sides of the Notch Filter. Use for that a clean Torayse cloth.
   Tip: *Limit the number of wipe movements. This to protect the optical coating. It is better to wipe of the dust with one good wipe movement than with 10 soft wipe movements.*
2. Is all dust removed from the Notch Filter?
   If yes, stop this cleaning procedure.
   If no, wipe off the dust of the Notch Filter with a clean cotton cloth and demineralized water.
   Tip: *Use isopropanol alcohol instead of demineralized water to remove fingerprints.*

10.10 Cleaning the Prism exit side

When cleaning the Prism exit side?

Only clean the Prism exit in case it is really necessary. This means in case dust is clearly visible upon the surface of the Prism exit.

This procedure requires that the lens is removed from the projector.

WARNING: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Irritating to eyes and skin. Always use in a well ventilated area. Vapors may cause drowsiness and dizziness. Avoid contact with skin and eyes. In case of contact with the eyes, rinse immediately with plenty of water and seek medical advise.

CAUTION: ISOPROPANOL ALCOHOL (200–661–7).

Hazardous product. Lightly flammable. Always use in a well ventilated area. Keep away from sources of ignitions. Do not smoke while working with isopropanol. Exclusive keep in original container tightly closed at a cool, well ventilated and fireproof storage space.

Necessary tools

- Clean Torayse cloth.
- Clean cotton cloth.
- Demineralized water.
- Isopropanol alcohol.

How to clean the clean the Prism exit side?

1. Wipe off the dust of the Prism exit. Use for that a clean Torayse cloth.
   Tip: *Limit the number of wipe movements. This to protect the optical coating. It is better to wipe of the dust with one good wipe movement than with 10 soft wipe movements.*
2. Is all dust removed from the Prism exit?
   If yes, stop this cleaning procedure.
   If no, wipe off the dust of the Prism exit with a clean cotton cloth and demineralized water.
   Tip: *Use isopropanol alcohol instead of demineralized water to remove fingerprints.*

10.11 Replacement of the Dowser (Shutter)

Dowser

The Dowser (Shutter) of the projector is mounted upon the Sealed Light Processor just above the light output path of the Prism. The Dowser assembly has an “open” and a “close” state. In the “close” state the Dowser blade shuts off the light beam between the Light Processor (DMD’s) and lens. In the “open” state, the Dowser blade is retracted from the light path.

The lens and the Sealed Light Processor have to be removed from the projector before replacing the Dowser. This procedure assumes that the Sealed Light Processor is already removed from the projector.

Necessary tools

TX10 Torx screwdriver.

Necessary parts

- Two Torx screw M3 x 8.
- Dowser assembly.

How to replace the Dowser of the Sealed Light Processor?

1. Prepare the Sealed Light Processor by removing the damaged dowser.
2. Make sure that the mounting holes M1 and M2 (image 10-30) on the Sealed Light Processor are free.

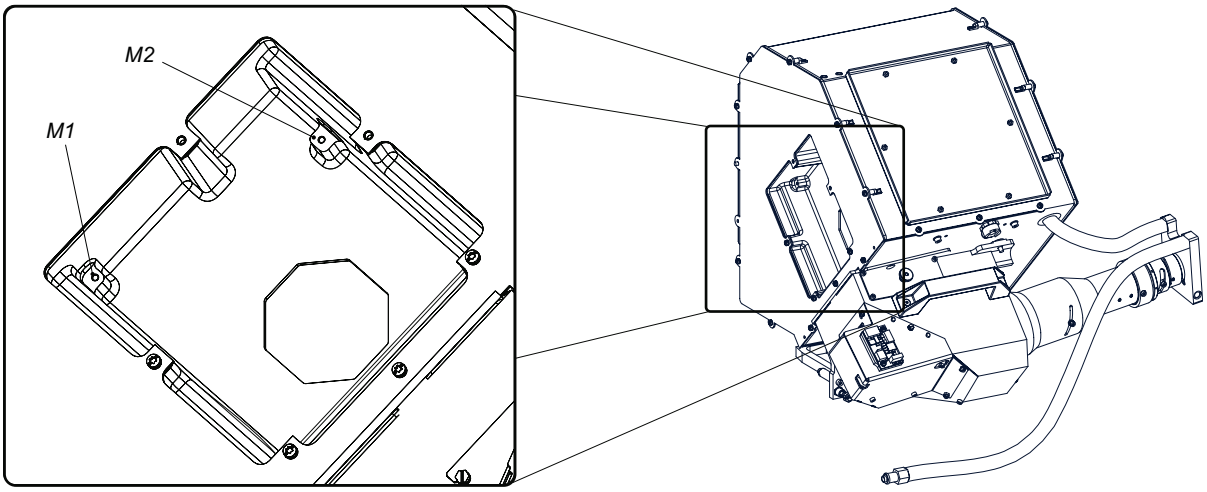


Image 10-30

3. Fasten the new Dowser with two Torx screws (A) upon the Sealed Light Processor as illustrated. Use for that a TX10 Torx screwdriver.

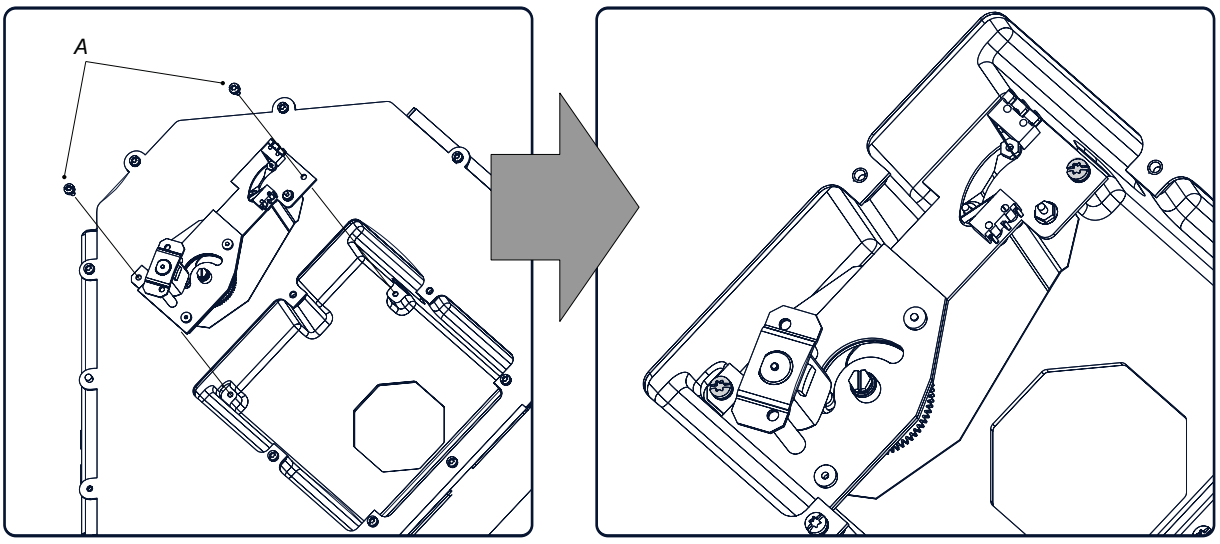


Image 10-31

10.12 Replacement of the Light Sensor Module

Purpose of the Light Sensor in the Light Pipe

To obtain a Constant Light Output (CLO) from the projector a Light Sensor is mounted just behind the Fold Mirror. On a regular base the controller of the projector read the measured values of this light sensor and, if required, sends corrective information to the Lamp Power Supply (LPS).

The left cover has to be removed from the projector to replace the Light Sensor Module. This procedure assumes that the left cover is already removed from the projector.

Necessary tools

- TX10 Torx screw driver.
- Light meter.

How to replace the Light Sensor Module of the Light Processor?

1. Disconnect the wire unit (reference 4 image 10-32) from the Light Sensor Module.

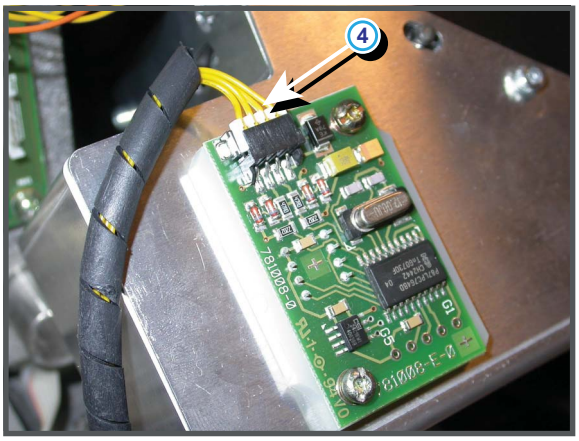


Image 10-32

2. Remove the Light Sensor Module by releasing the two Torx screws (reference 1 image 10-33). Use a TX10 Torx screw driver.
   Note: *The plastic spacer (reference 2 image 10-33) underneath the Light Sensor Module comes loose with the module.*

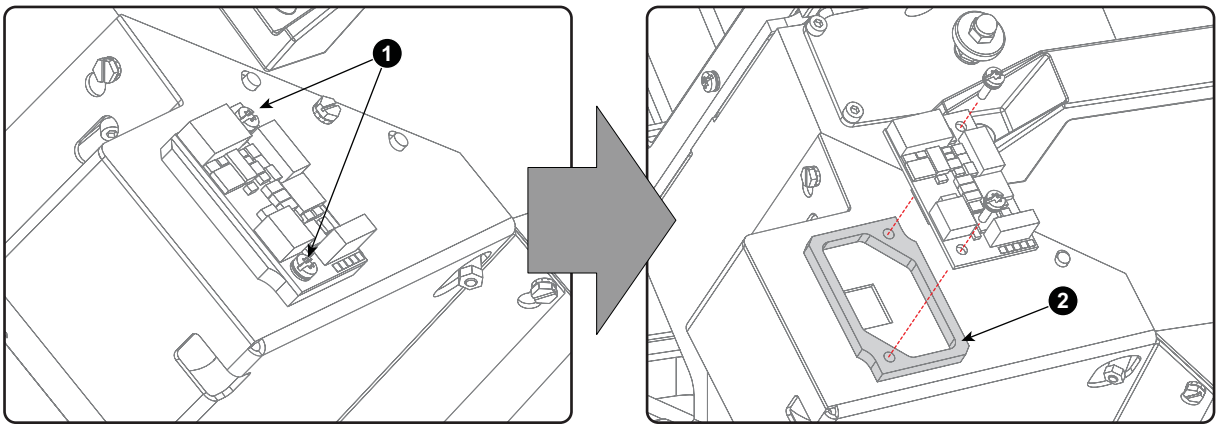


Image 10-33

3. Install a new Light Sensor Module. Make sure to reuse the plastic spacer (reference 2 image 10-33). Use a TX20 Torx screw driver to fasten both screws (reference 1 image 10-33).
4. Reconnect the wire unit (reference 4 image 10-32) with Light Sensor Module.
5. Place a light meter in the center of the screen and calibrate the Light Sensor Module. For detailed instructions see user guide of the Communicator software.

10.13 Replacement of the Notch Filter

To access the Notch Filter the left side cover has to be removed from the projector. This procedure assumes that the left side cover is already removed from the projector.

Necessary tools

2,5 mm Allen wrench.

How to replace the Notch Filter?

1. Remove the Notch Filter from the Light Pipe by releasing the four hexagon head cap screws (reference 1 image 10-34) as illustrated. Use for that a 2,5 mm Allen wrench.

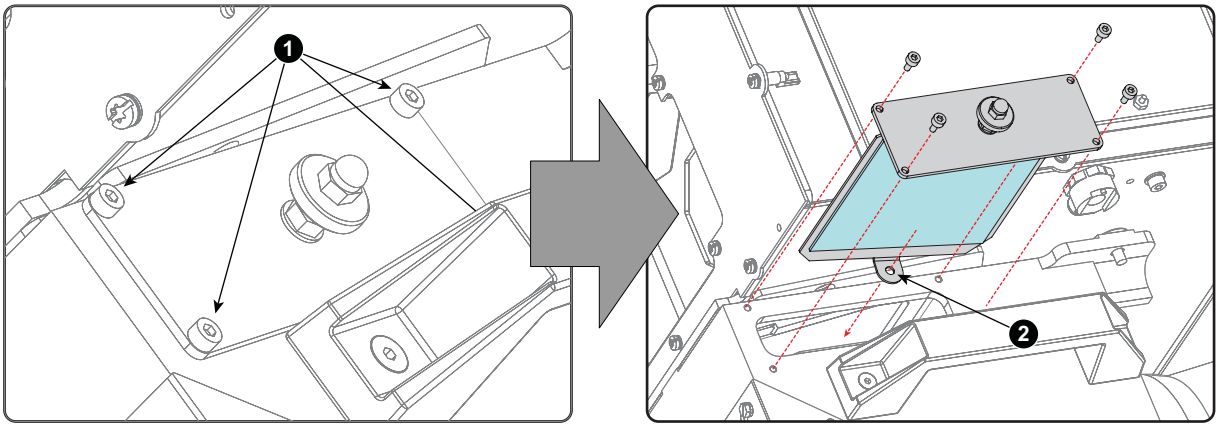


Image 10-34

2. Insert a new Notch Filter. Make sure that the positioning hole (reference 2 image 10-34) of the Notch Filter fits upon its positioning pin inside the Light Pipe.
   Caution: *Do not touch the Notch Filter with bare fingers. To clean the Notch Filter see procedure "Cleaning the Notch Filter", page 178.*
3. Fasten the Notch Filter with four hexagon head cap screws (reference 1). Use for that a 2,5 mm Allen wrench.
4. Readjust the Notch Filter. See procedure "Adjusting the Notch Filter", page 177.

11. LIQUID COOLING CIRCUIT

About this chapter

This chapter describes how to diagnoses and maintain the Liquid Cooling Circuit of the projector.

WARNING: All actions performed on the Liquid Cooling Circuit should occur in normal ambient conditions (approximately 25 °C). The projector should have sufficiently cooled down (minimum 2 hours).

WARNING: Do not change the air pressure of a calibrated Liquid Cooling Circuit (see marking on pressure vessel), unless stated explicitly in the servicing procedure.

WARNING: Only use Barco approved cooling liquid to refill the liquid cooling circuit of the projector. Neglecting this may lead to irreversible damage of the projector.

WARNING: Hazardous product: Blue antifreeze diluted 1,2 ethanediol (1/3 ethanediol – 2/3 Demi water).

Not for household use. Keep out of reach of children. Harmful by oral intake. Avoid exposure to pregnant women. Avoid contact with eyes, skin and clothing. Avoid inhalation of the noxious fumes.

Handling the cooling liquid

- Avoid contact of the liquid with Eyes, Skin and Clothing.
- Avoid inhaling noxious fumes.
- Conserve the product in the original package and in a well ventilated room.

Personal protection rules

- Handle the cooling liquid in a well ventilated room.
- Under no circumstances eat, drink and smoke while handling the liquid.
- Wear gloves (Butylrubber, PVC....) and Goggles.
- Wear suitable protection clothing.

Overview

- Introduction
- Diagnostics
- Pressure verification of the Liquid Cooling Circuit
- Excluding the Sealed Light Processor
- Draining the Liquid Cooling Circuit
- Filling the Liquid Cooling Circuit
- Refreshing the Liquid Cooling Circuit
- Expelling air from the Liquid Cooling Circuit
- Pressurizing the Liquid Cooling Circuit
- Calibrating the Liquid Cooling Circuit
- Removal of the Pump
- Installing the Pump
- Cleaning the Pump
- Replacement of the Pump motor and rotor
- Replacement of the complete Pump
- Replacement of the Heat Exchanger

11.1 Introduction

Functionality

Much heat has to be extracted from the DMD's and from the Light Pipe entrance during operation of the projector. The Liquid Cooling Circuit takes care of this. The Liquid Cooling Circuit is a closed loop of flexible tubing comprising of a pump, three cooling blocks for the DMD's, a cooling block for the Light Pipe entrance, a heat exchanger, a pressure vessel and a manometer. The cooling liquid inside the circuit absorbs the heat of the cooling blocks. Via the pump, the heated-up liquid is transported to the heat exchanger, which in turn cools down the liquid.

The pressure vessel in the circuit makes it possible to put a small pressure on the cooling liquid. The required pressure exerted via the pressure vessel serves to prevent cavitation and hence ensures the good working condition of the pump. Note that the pressure doesn't influence the cooling capacity of the system.

Parts of the Liquid Cooling Circuit

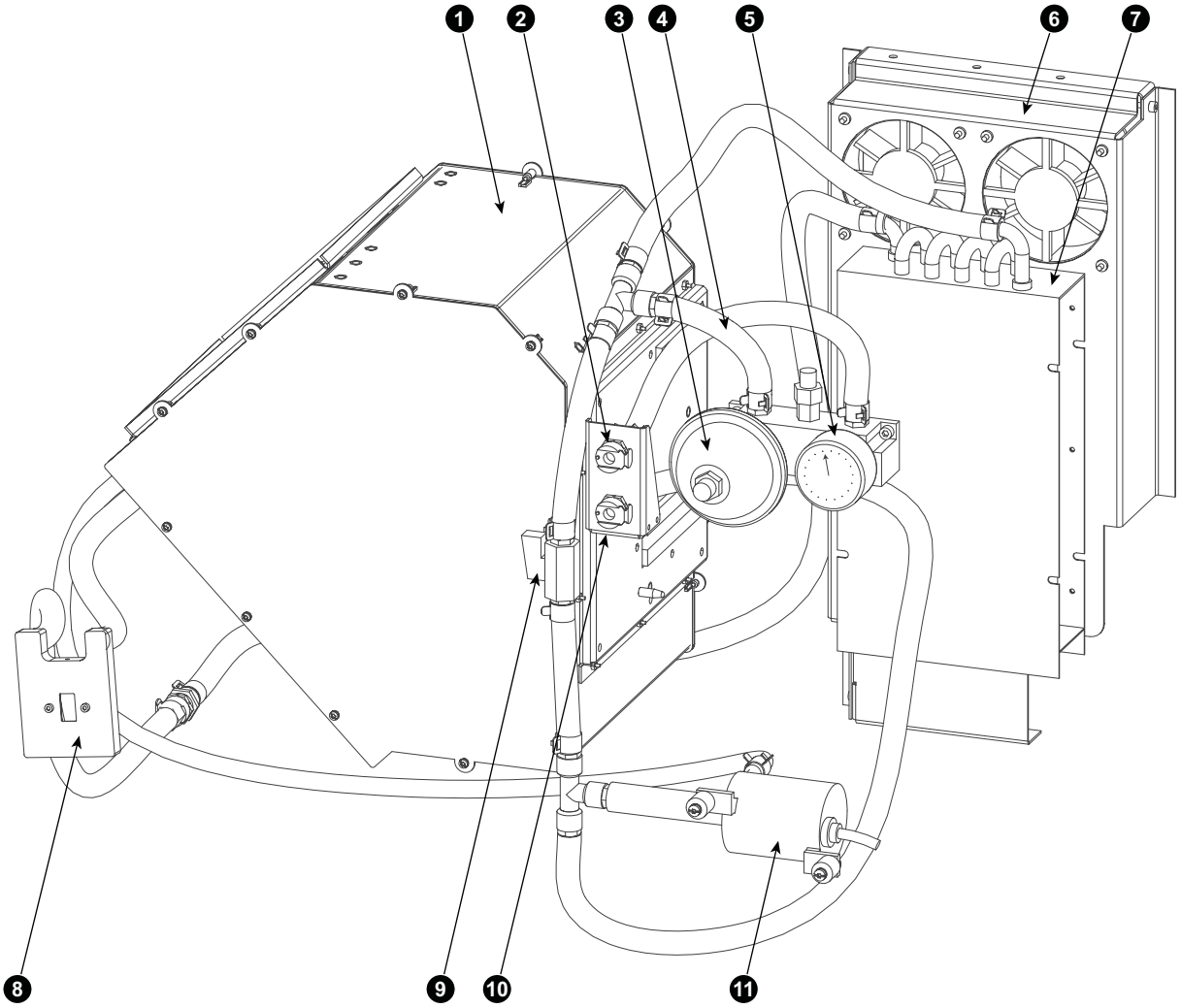


Image 11-1
1 Sealed Light Processor.
2 Outlet of the cooling circuit.
3 Pressure vessel.
4 Transparent tube for visual check.
5 Manometer.
6 Fan assembly.
7 Heat exchanger.
8 Cooling block Light Pipe Entrance.
9 Valve.
10 Inlet of the cooling circuit.
11 Cooler pump.

Tools used in the liquid cooling servicing procedures

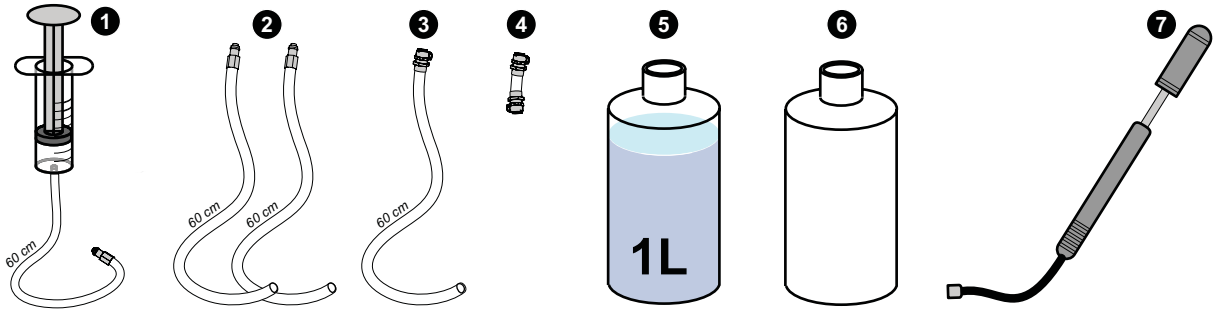
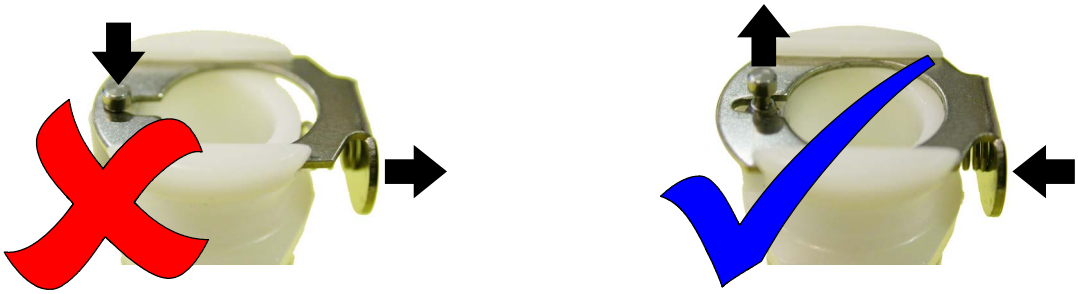


Image 11-2
1 Syringe with plastic tube (60 cm) and male valved fitting.
2 Two plastic tubes of 60 cm with male valved fitting.
3 60 cm plastic tube with female valved fitting.
4 Female/female valved fitting adaptor.
5 Bottle with 1 liter cooling liquid.
6 Empty bottle with a volume of 1 liter.
7 Air pump with Shrader type air hose fitting.

CAUTION: To avoid damage to the connector seal, always depress the connector tab of the female valved fitting prior to inserting the male valved fitting.



11.2 Diagnostics

General

Over extended periods there may be small losses of pressure in the liquid cooling system of the projector. It is therefor recommended to check the pressure at regular intervals. In case the pressure drops below 0,5 bar it is recommended to restore the pressure of the liquid cooling system.

CAUTION: In case of a rapid loss in pressure check the liquid cooling circuit for leakage. Solve the problem before starting up the projector.

Troubleshooting cooling loop

- Any significant or rapid drop in pressure indicates a leakage of liquid. If this be the case, verify whether the circuit shows any visible sign of liquid leakage.
- As critical components rely on this liquid cooling, it is essential that any leakage is detected timely.
- Periodic checking of the liquid cooling pressure is essential to guarantee overall good performance of the projector and the pump.
- The factory pressure preset is approximately 1 bar in the 'Projector Off' status at a room temperature of 25 °C. This may drop slightly during operation.

Too high ambient temperature

An Error or warning message "Ambient temp high" is displayed on the Communicator Touch Panel. See manual of the Communicator for accessing error messages.

Possible cause	Solution
Ambient temperature of the projector is too high.	Measure the ambient temperature nearby the projector. In case the measured temperature is higher than 35°C (95°F) take the necessary measurements to ensure that the ambient temperature is below 35°C (95°F).
Blocked filter at the front side and the left side of the projector	Clean the blocked filter.

One of the DMD's is too high in temperature

An Error or warning message "DMD temp high" is displayed on the Communicator Touch Panel. See manual of the Communicator for accessing error messages.

Possible cause	Solution
Malfunction Peltier element of the involved DMD. Only one DMD is too high in temperature while the other two DMD's have a normal and almost equal temperature.	No custom serviceable parts inside the Sealed Light Processor. Take contact with a Barco service center to return the Sealed Light Processor.
The wire units of two Peltier elements or there respective temperature sensors (NTC's) have been swapped. While the temperature of one DMD is too high, the other will most likely be to low.	No custom serviceable parts inside the Sealed Light Processor. Take contact with a Barco service center to return the Sealed Light Processor.
Poor assembly of DMD or Peltier + cooler block.	Take contact with a Barco service center to return the Sealed Light Processor.

All DMD's are too high in temperature

An Error or warning message "DMD temp high" is displayed on the Communicator Touch Panel. See manual of the Communicator for accessing error messages.

Possible cause	Solution
The Liquid Cooling Circuit of the Sealed Light Processor is mistakenly excluded from the main liquid cooling circuit.	Check of the cooling circuit of the Sealed Light Processor is connected with the pump and heat exchanger.
None of the wire units of the Peltier elements or there respective temperature sensors (NTC's) are connected.	Take contact with a Barco service center to return the Sealed Light Processor.
Blocked filter of the heat exchanger.	Clean the blocked filter.

No flow of the cooling liquid

An Error message "water - flow not ok" is displayed on the Communicator Touch Panel. See manual of the Communicator for accessing error messages.

Possible cause	**Solution**
Interruption of the Liquid Cooling Circuit.	Check if the loop of the Liquid Cooling Circuit is closed.
The liquid cooling circuit of the Sealed Light Processor is mistakenly excluded from the main liquid cooling circuit. Most likely the DMD temperatures are too high.	Check of the cooling circuit of the Sealed Light Processor is connected with the pump and heat exchanger.
The maintenance valve of the cooling circuit is open causing a bypass of the cooling liquid.	Close the valve of the cooling circuit.
No or insufficient liquid inside the cooling circuit. The pump is sucking air and sounds noisier then normal.	Fill the cooling circuit with liquid and expel all air. Pressurize the circuit.
The pump of the water cooling is electrical disconnected.	Check if the wire unit of the pump is properly connected.
Malfunction pump of the cooling circuit. You don't feel any vibrations when touching the pump after activating the "Refill mode" via the Communicator software.	1. Check the electrical resistance of the pump winding. Replace the pump if infinite. 2. Drain the liquid cooling circuit, open the pump and check if the pump rotor is not blocked. If so, remove the rotor and clean the bearings of the pump.
Defect pump. When the projector is running, you don't feel any vibrations when touching the pump.	Drain the Liquid Cooling Circuit, replace the pump, fill and pressurize the Liquid Cooling Circuit. Tip: It's not necessary to drain the cooling circuit of the Sealed Light Processor. Bypass this part of the cooling circuit.

11.3 Pressure verification of the Liquid Cooling Circuit

CAUTION: The pressure of the Liquid Cooling Circuit should be checked regularly. This pressure, indicated on the internal manometer, should be between 0,5 and 1 bar. If not, corrective action should be taken by qualified technical service personnel.

How to check the pressure of the Liquid Cooling Circuit?

1. Switch off the projector.
2. Open the door of the lamp compartment.
3. Check the pressure indicated on the internal manometer of the Liquid Cooling Circuit. The manometer is located at the upper left side of the lamp compartment.
4. This pressure should be between 0,5 and 1 bar. If the pressure, indicated on the manometer, is out of range take necessary corrective action.

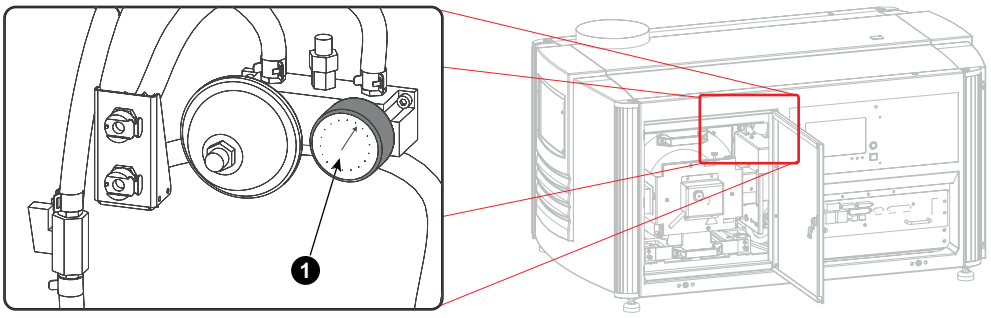


Image 11-3

5. Close and lock the door of the projector.

11.4 Excluding the Sealed Light Processor

When excluding the Liquid Cooling Circuit of the Sealed Light Processor?

When service actions are required to the pump, heat exchanger, or other parts of the Liquid Cooling Circuit which are not mounted inside the Sealed Light Processor then the cooling circuit of the Sealed Light Processor can be excluded from the cooling circuit of the projector. Excluding the Sealed Light Processor will minimize the risque on air bubbles in the cooling system.

The service procedures for the liquid cooling system such as draining and filling are described for the whole cooling circuit. Nevertheless, you can use the same procedures and exclude the Sealed Light Processor if applicable.

CAUTION: Do not exclude the Liquid Cooling Circuit of the Sealed Light Processor when expelling air from, pressurizing, or calibrating the liquid cooling circuit.

How to exclude the Liquid Cooling Circuit of the Sealed Light Processor?

1. Interrupt the Liquid Cooling Circuit by uncoupling the valved fitting below the Sealed Light Processor. The tube which you are uncoupling comes from the cooling block on the Light Pipe entrance and goes to the heat exchanger.
2. Interrupt the Liquid Cooling Circuit by uncoupling the valved fitting at the Sealed Light Processor unit. The tube which you are uncoupling comes from the pump exit.

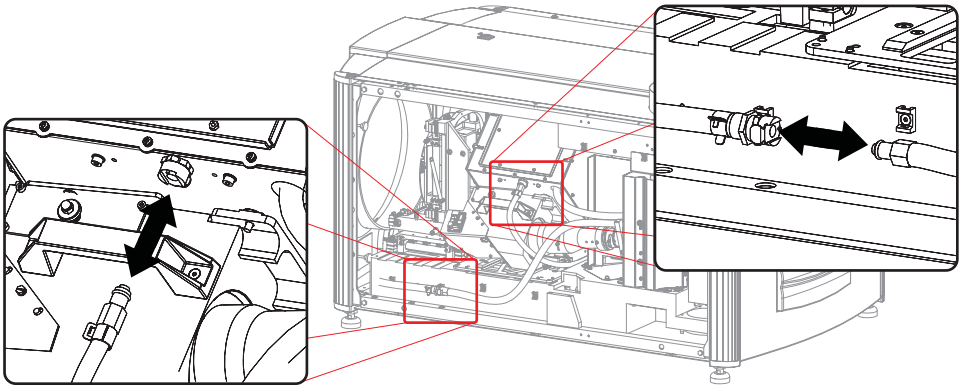


Image 11-4

3. Couple the tube that comes from the pump exit with he valved fitting which goes to the heat exchanger.

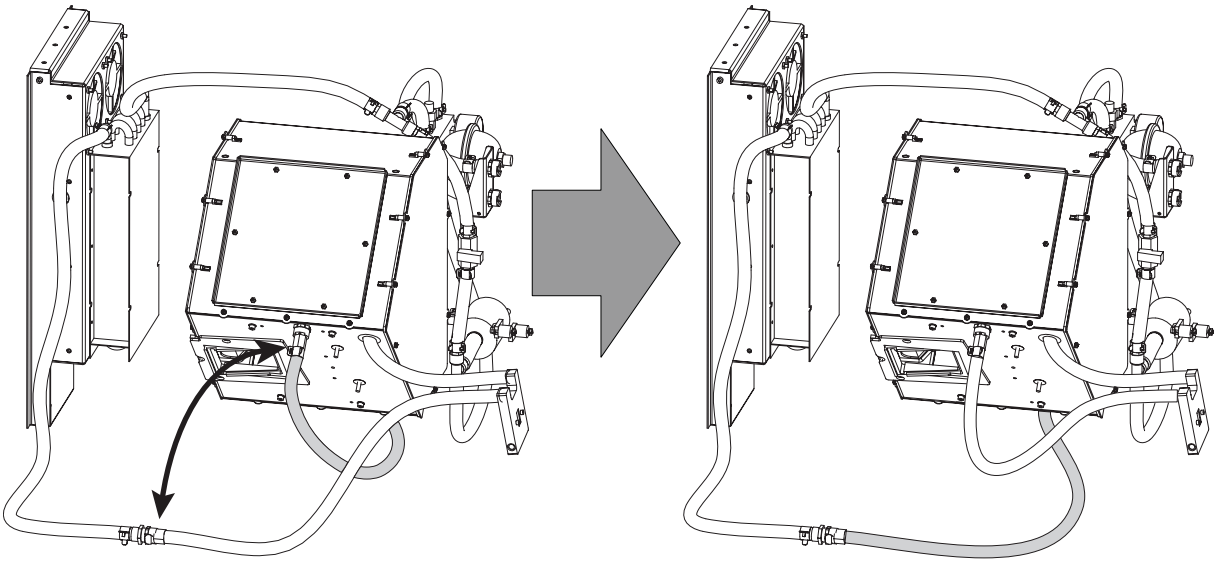


Image 11-5
Left: Sealed Light Processor included. Right: Sealed Light Processor excluded.

4. You may connect the tube which comes from the cooling block on the Light Pipe entrance with the unused valved fitting of the Sealed Light Processor. This to prevent that the tube is hanging loose.

CAUTION: Do not forget to include the cooling circuit of the Sealed Light Processor afterwards.

11.5 Draining the Liquid Cooling Circuit

In case of part replacement, consider only draining that part of the cooling circuit which contains the defective part. E.g. in case of pump replacement; it is preferred to bypass the cooling circuit of the Sealed Light Processor. This is to exclude the Sealed Light Processor from the problem.

Necessary tools

- 60 cm of plastic tube with male valved fitting.
- Syringe connected with short tube with male valved fitting.
- Empty bottle with a volume of 1 liter.
- Cloths.

How to drain the Liquid Cooling Circuit ?

1. Insert a plastic tube, which contains a male valved fitting, into an empty bottle and then couple the male valved fitting withe the outlet (upper female valved fitting) of the Liquid Cooling Circuit.
   Note: *Circuit is pressurized, so first insert tube end into empty bottle.*

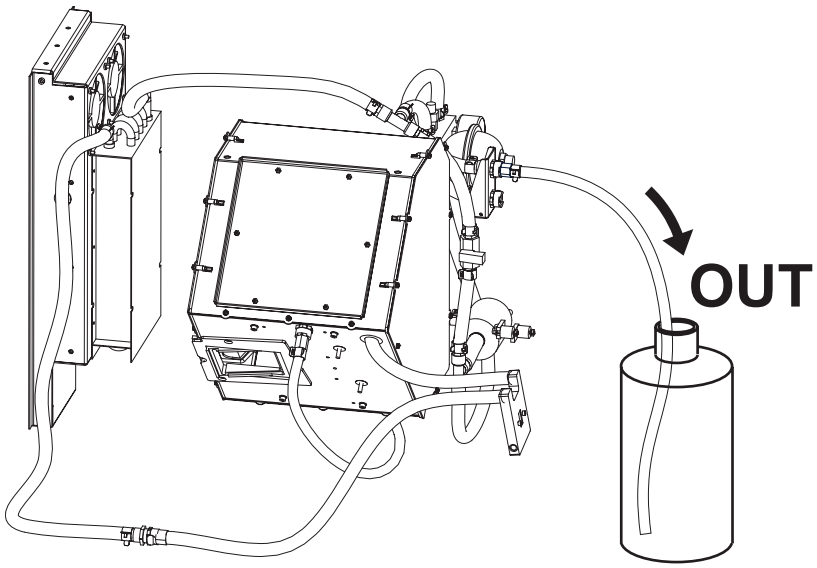


Image 11-6

2. **Close the valve.**

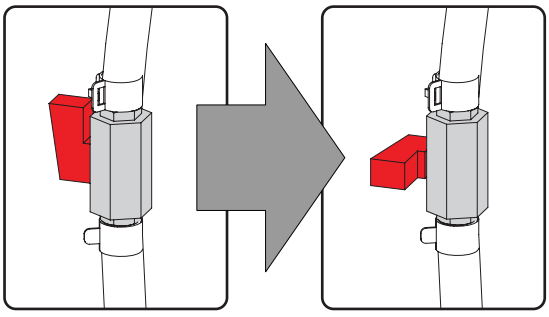


Image 11-7

3. Fill the syringe with air. Press in the valve of the male fitting when extracting air.

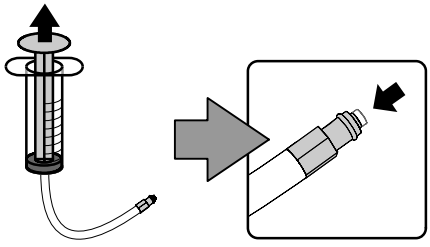


Image 11-8

4. Couple the air filled syringe to the inlet of the cooling circuit and force air into the circuit via the syringe. Liquid will be expelled from the circuit exit side into the empty bottle.

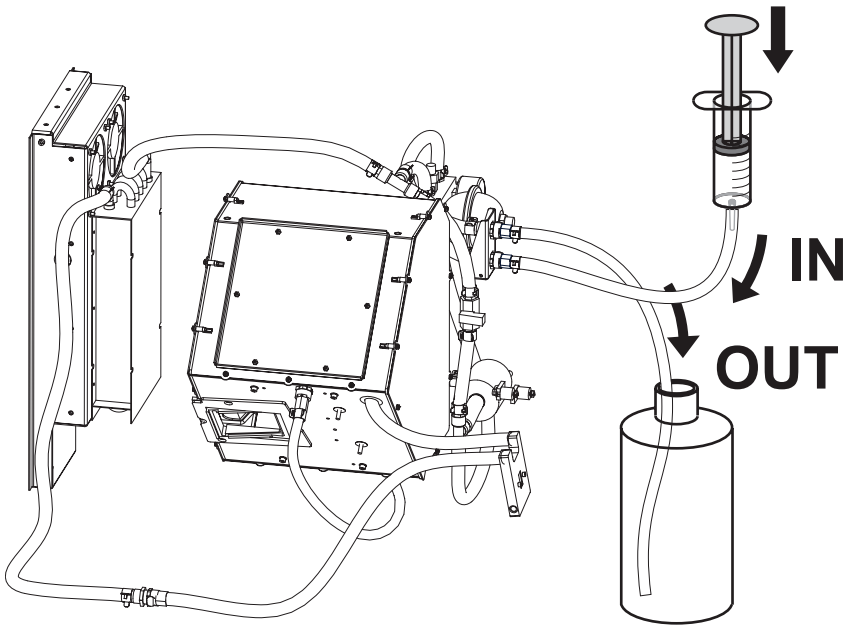


Image 11-9

5. Disconnect the syringe from the cooling circuit and repeat from 3 until all cooling liquid is drained.

11.6 Filling the Liquid Cooling Circuit

This procedure can only be used to fill an empty (drained) cooling circuit.

Necessary tools

- 60 cm of plastic tube with male valved fitting.
- 60 cm of plastic tube with female valved fitting.
- Syringe connected with short tube with male valved fitting.
- Bottle with cooling liquid.
- Empty bottle with a volume of 1 liter.
- Cloths.

How to fill the Liquid Cooling Circuit ?

1. Check if the valve is closed. If not, close the valve.

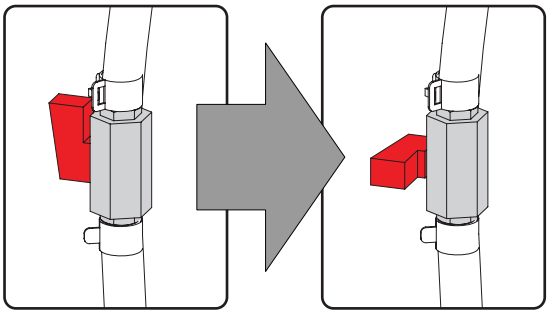


Image 11-10

2. Couple a plastic tube, which contains a male valved fitting, to the outlet of the cooling circuit and lead the tube end to an empty bottle.

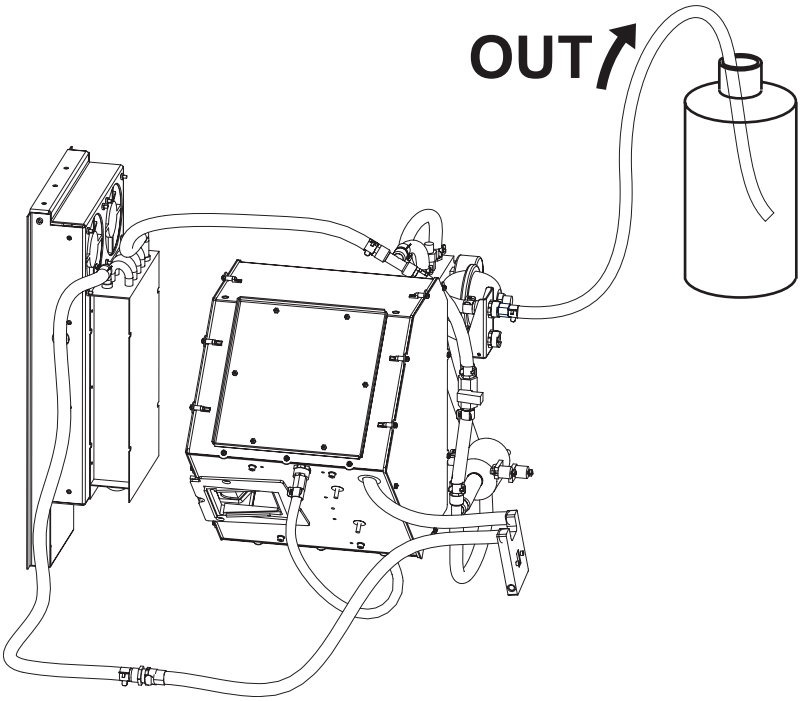


Image 11-11

3. Fill the syringe with cooling liquid as follows:

a) Couple the female (F) fitting of a plastic tube to male (M) fitting of the syringe and emerge the tube end. Make sure that the piston of the syringe is completely pressed in.
b) Extract cooling liquid into the syringe by pulling out the piston.
c) Turn the syringe upside down, so that the air inside the syringe is located at the outlet.
d) Push the piston in until all air bubbles inside the syringe and tubes are expelled. Ensure that the tube end in the bottle remains emerged.
e) Pull out the piston to fill the tubes and syringe completely with cooling liquid.
f) Disconnect the filled syringe from the tube.

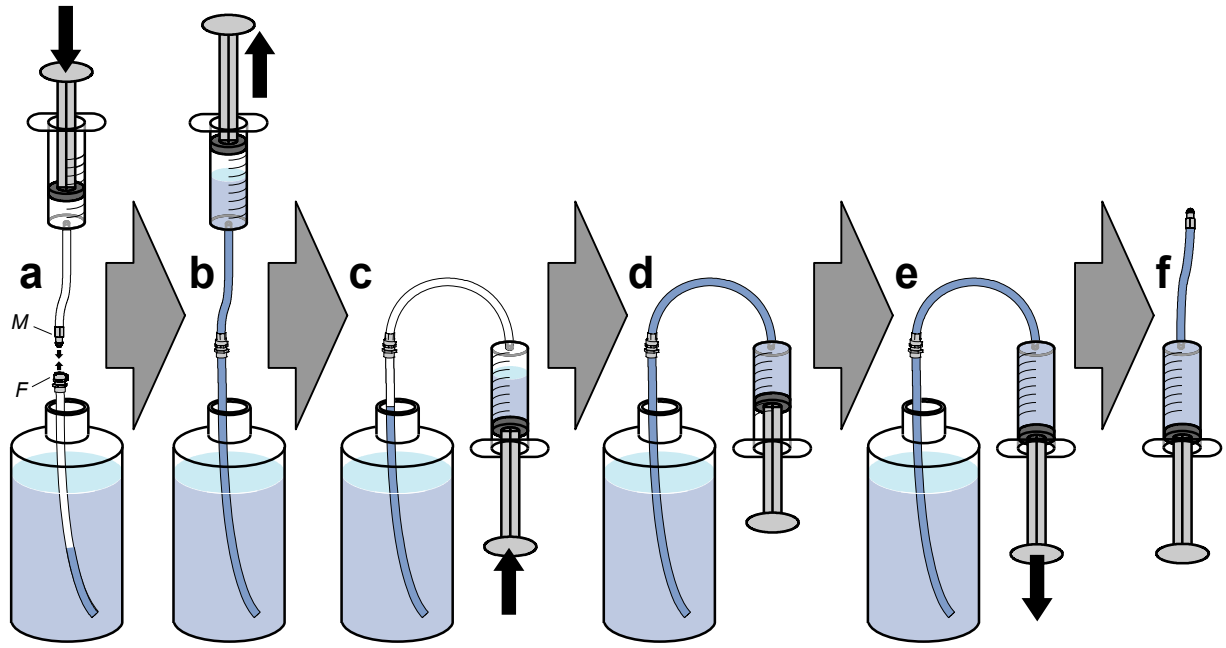


Image 11-12

4. Couple the filled syringe to the inlet of the cooling circuit and press the cooling liquid inside the circuit.
Caution: *Position the empty bottle above the liquid circuit (on top of projector).*

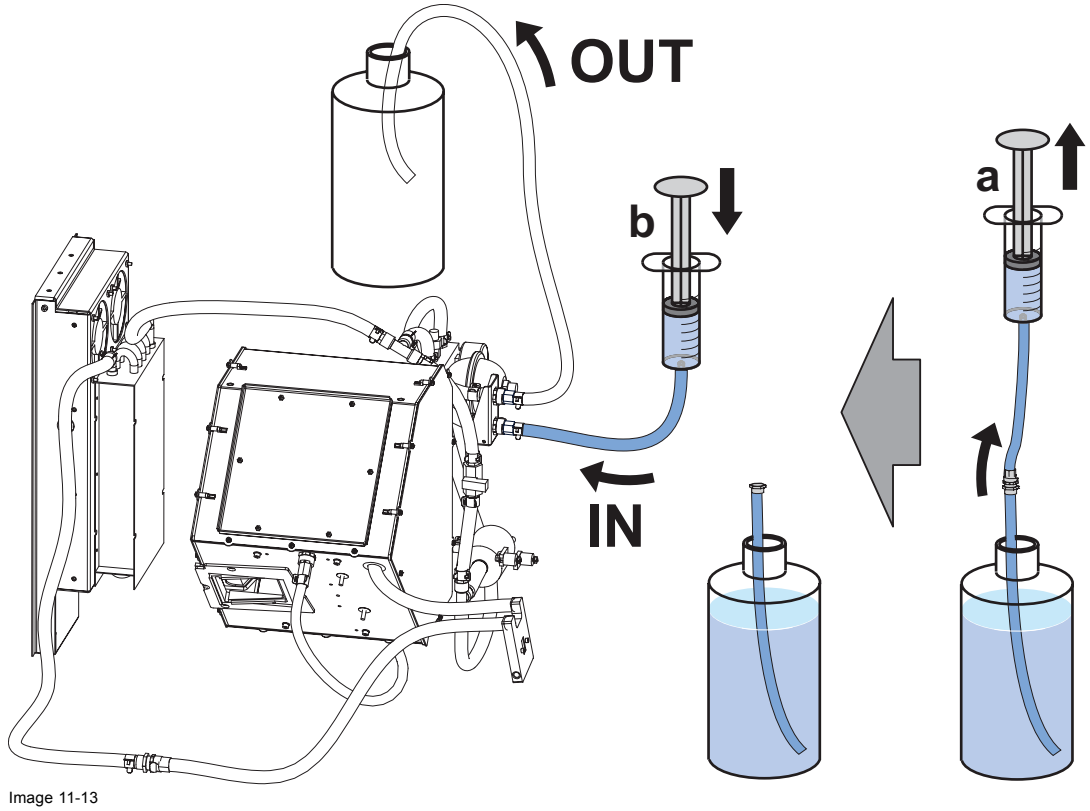


Image 11-13

5. Disconnect the syringe from the cooling circuit and repeat from 3 until cooling liquid comes out the outlet of the cooling circuit.

6. Proceed with expelling the air from the Liquid Cooling Circuit. See procedure "Expelling air from the Liquid Cooling Circuit", page 197.
   Tip: *You can use the bottle with the remaining fresh cooling liquid and the same tubes for the expelling procedure.*
7. Pressurize the Liquid Cooling Circuit. See procedure "Pressurizing the Liquid Cooling Circuit", page 199.

11.7 Refreshing the Liquid Cooling Circuit

Over time the cooling liquid may show deterioration and hence less effective cooling characteristics. To maintain sound cooling properties, we advise ANNUAL replacement of the cooling liquid.

Necessary tools

- 2 x 60 cm of plastic tube with male valved fitting.
- Syringe equipped with male valved fitting.
- Female/female tube adapter (short tube with female valved fitting at both sides).
- Bottle with 1 liter cooling liquid.
- Empty bottle with a volume of one liter.
- Cloths.

How to refresh the Liquid Cooling Circuit ?

1. Insert a plastic tube, which contains a male valved fitting, into an empty bottle and then couple the male valved fitting withe the outlet (upper female valved fitting) of the Liquid Cooling Circuit.
   Note: *Circuit is pressurized, so first insert tube end into empty bottle.*

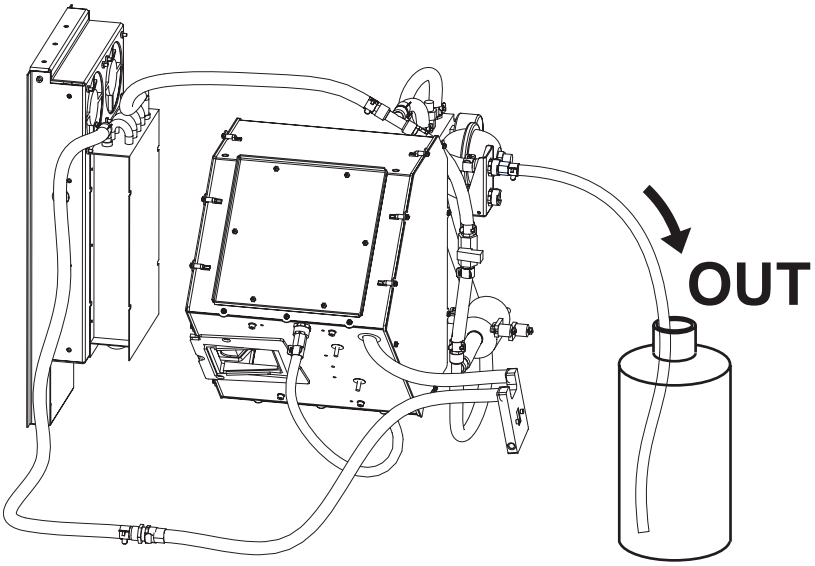


Image 11-14

2. **Close the valve.**

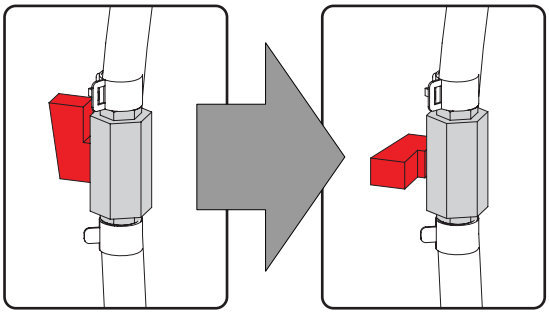


Image 11-15

3. Fill a plastic tube, which contains a male fitting, with cooling liquid as follows:
   a) Connect a tube, which contains a male (M) fitting, to the male (M) fitting of the syringe using a female/female (F) adapter.
   b) Emerge the tube end and make sure that the piston of the syringe is completely pressed in.
   c) Extract cooling liquid into the syringe by pulling out the piston.
   d) Disconnect the filled tube from the syringe. Make sure that the tube remains immersed.

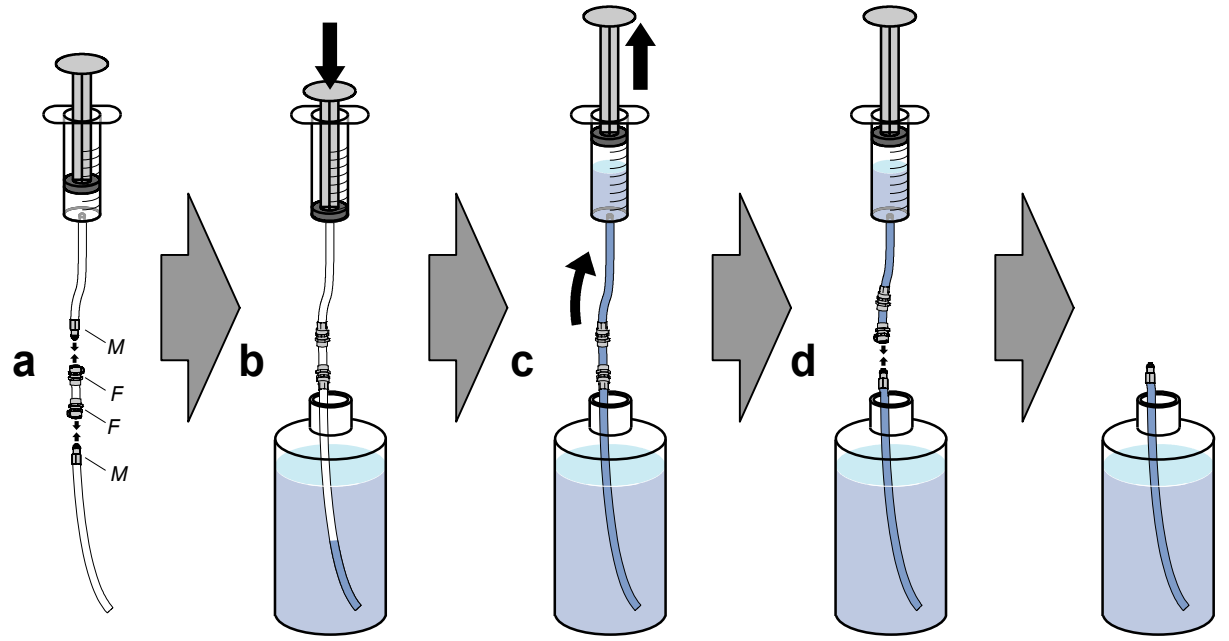


Image 11-16

Caution: *It's important that there is no air inside the tube. The pump is not self priming and hence is only capable of sucking through small volumes of air.*

4. Push the male valved fitting of the filled tube into the inlet of the cooling circuit. Make sure that the inlet of the filled tube remains immersed.

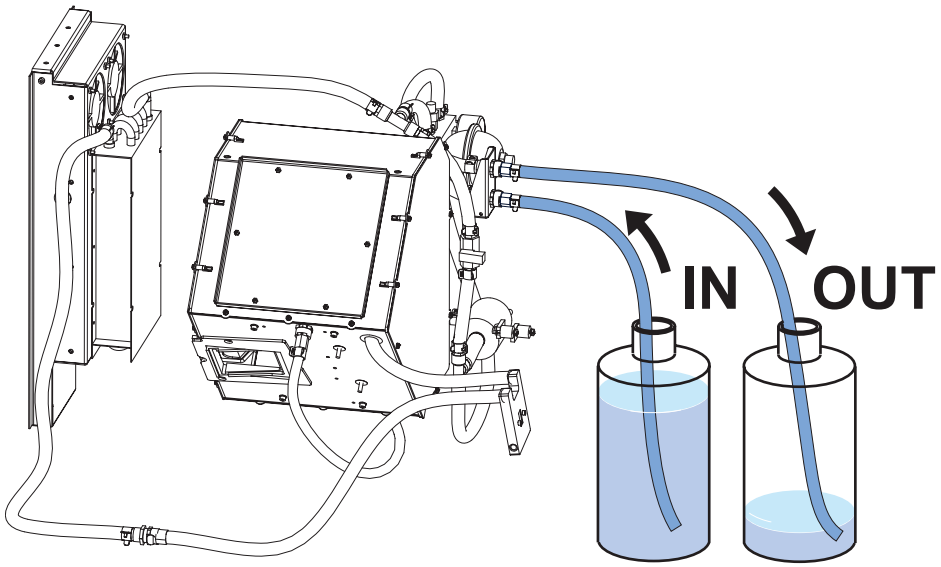


Image 11-17

5. Switch on the projector. After projector boot-up procedure, the internal pump will automatically start sucking-up the fresh liquid
   Note: *Make sure that the end of the plastic tube remains immersed in the bottle with fresh cooling liquid.*
6. Switch off the projector after **2/3** of the fresh cooling liquid is sucked up into the circuit.
7. Proceed with expelling the air from the Liquid Cooling Circuit. See procedure "Expelling air from the Liquid Cooling Circuit", page 197.
   Tip: *You can use the bottle with the remaining fresh cooling liquid and the same tubes for the expelling procedure.*
8. Pressurize the Liquid Cooling Circuit. See procedure "Pressurizing the Liquid Cooling Circuit", page 199.

11.8 Expelling air from the Liquid Cooling Circuit

Necessary tools

- 2 x 60 cm of plastic tube with male valved fitting.
- Bottle with cooling liquid (minimum 1/3 liter).
- Syringe equipped with male valved fitting.
- Female/female tube adapter (short tube with female valved fittings at both sides).
- Cloths.

How to expel the air from the Liquid Cooling Circuit?

1. **Close the valve.**

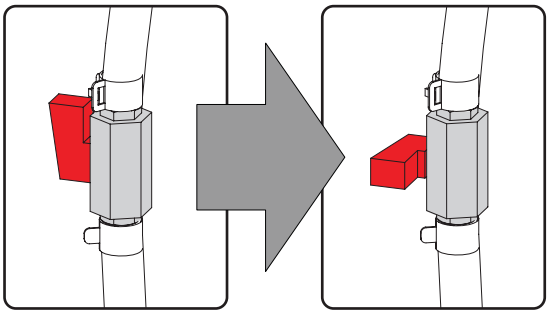


Image 11-18

2. Fill a plastic tube, which contains a male fitting, with cooling liquid as follows:
   a) Connect a tube, which contains a male (M) fitting, to the male (M) fitting of the syringe using a female/female (F) tube adapter.
   b) Emerge the tube end and make sure that the piston of the syringe is completely pressed in.
   c) Extract cooling liquid into the syringe by pulling out the piston.
   d) Disconnect the filled tube from the syringe. Make sure that the tube remains immersed.

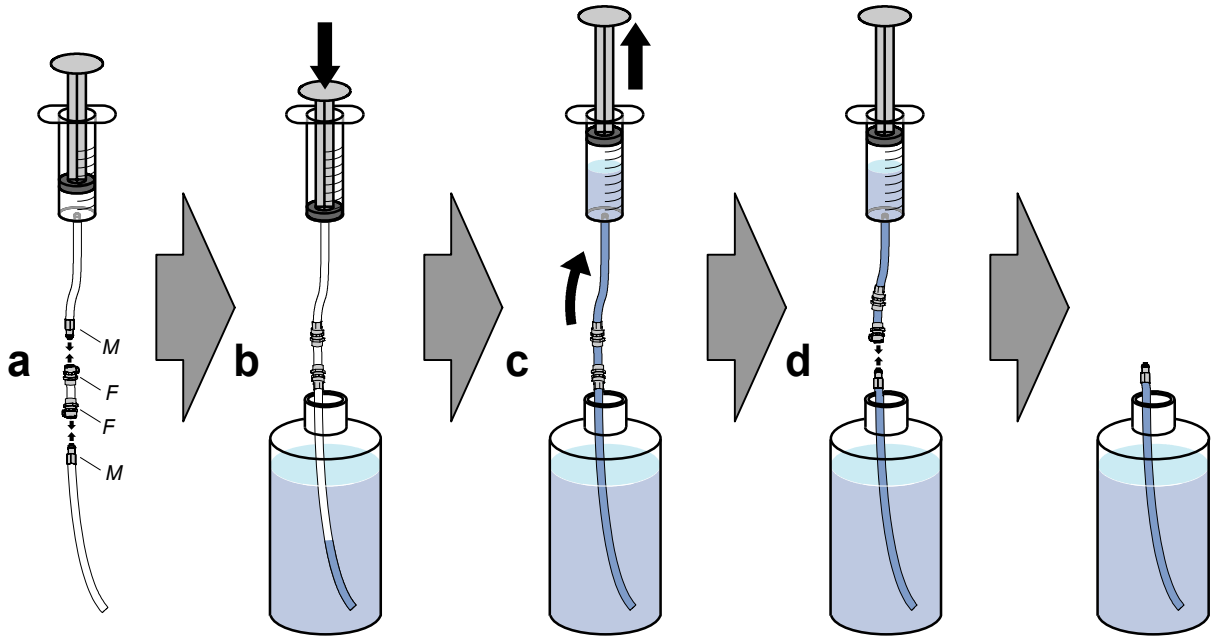


Image 11-19

Caution: *It's important that there is no air inside the tube. The pump is not self priming and hence is only capable of sucking through small volumes of air.*

3. Push the male valved fitting of the filled tube into the inlet of the cooling circuit. Make sure that the inlet of the filled tube remains immersed.

4. Couple a second plastic tube to the outlet of the cooling circuit and immerge the tube end without fitting in the same bottle wherein the first tube is immersed.

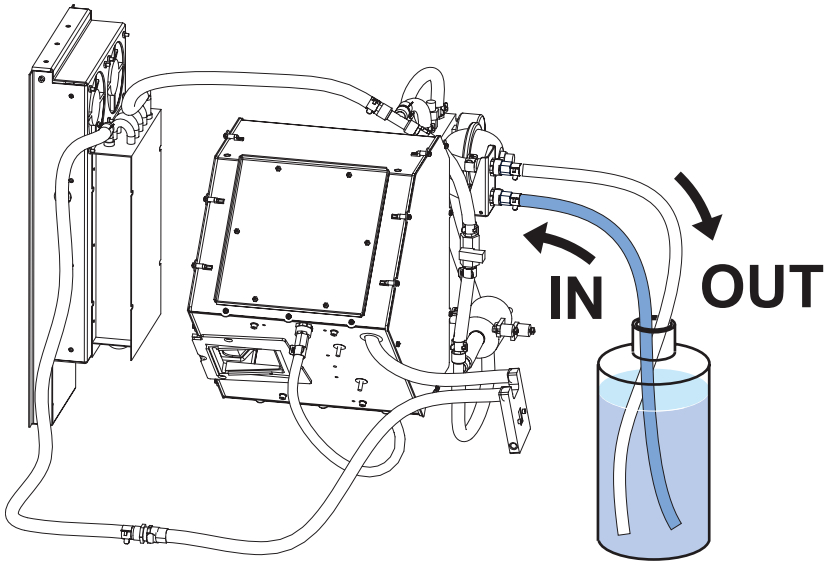


Image 11-20

5. Switch on the projector. After projector boot-up procedure, the internal pump will automatically start sucking-up the fresh liquid while air bubbles are pressed out of the circuit.
   Caution: *Switch off the projector immediately in case the pump is sucking air (no circulation of liquid). Bypass the cooling circuit of the Light Processor and inject cooling liquid into the main cooling circuit using a syringe. Ensure that you don't inject air bubbles.*

   Caution: *Make sure that air bubbles coming out of the tube in the bottle doesn't enter the other tube in the bottle.*

6. Open the valve after 10 minutes and proceed 2 or 3 minutes with expelling air from the cooling circuit.
   Tip: *You may repeat this action a few times (open and close the valve) to make sure that all air bubbles are expelled.*

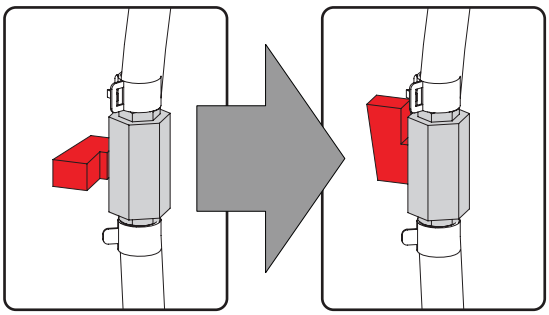


Image 11-21

7. Switch off the projector after all air bubbles are expelled.
   Tip: *Air bubbles may no longer come out the exit of the tube in the bottle with cooling liquid.*

8. Uncouple the two plastic tubes.
   Note: *Make sure that both ends of the plastic tubes in the bottle remains immersed until the plastic tubes are uncouple from the liquid cooling circuit.*

   Tip: *Sometimes a little cooling liquid will be spilled. Wrap a small cloth around the valved fitting while uncoupling to absorb the spilled cooling liquid.*

9. Pressurize the Liquid Cooling Circuit. See procedure "Pressurizing the Liquid Cooling Circuit", page 199.

Check within 24 hours if the pressure remains 1 bar. If not, search for leakage.

11.9 Pressurizing the Liquid Cooling Circuit

Before pressurizing the Liquid Cooling Circuit ensure that the circuit is filled with cooling liquid and that all air bubbles are expelled.

CAUTION: This procedure is only valid in case the Liquid Cooling Circuit is calibrated. This means that the pressure vessel was not subject to any modifications, i.e. releasing or increasing pressure via the valve of the vessel. In case the pressure vessel was subject to modifications use the calibration procedure to pressurize the Liquid Cooling Circuit.

WARNING: All actions performed on the Liquid Cooling Circuit should occur in normal ambient conditions (approximately 25 °C). The projector should have sufficiently cooled down (minimum 2 hours).

Necessary tools

- 60 cm of plastic tube with female valved fitting.
- Syringe connected with short tube with male valved fitting.
- Bottle with cooling liquid.
- Cloths.

How to pressurize the Liquid Cooling Circuit?

1. Fill the syringe with cooling liquid as follows:
   a) Couple the female (F) fitting of a plastic tube to male (M) fitting of the syringe and emerge the tube end. Make sure that the piston of the syringe is completely pressed in.
   b) Extract cooling liquid into the syringe by pulling out the piston.
   c) Turn the syringe upside down, so that the air inside the syringe is located at the outlet.
   d) Push the piston in until all air bubbles inside the syringe and tubes are expelled. Ensure that the tube end in the bottle remains immersed.
   e) Pull out the piston to fill the tubes and syringe completely with cooling liquid.
   f) Disconnect the filled syringe from the tube.

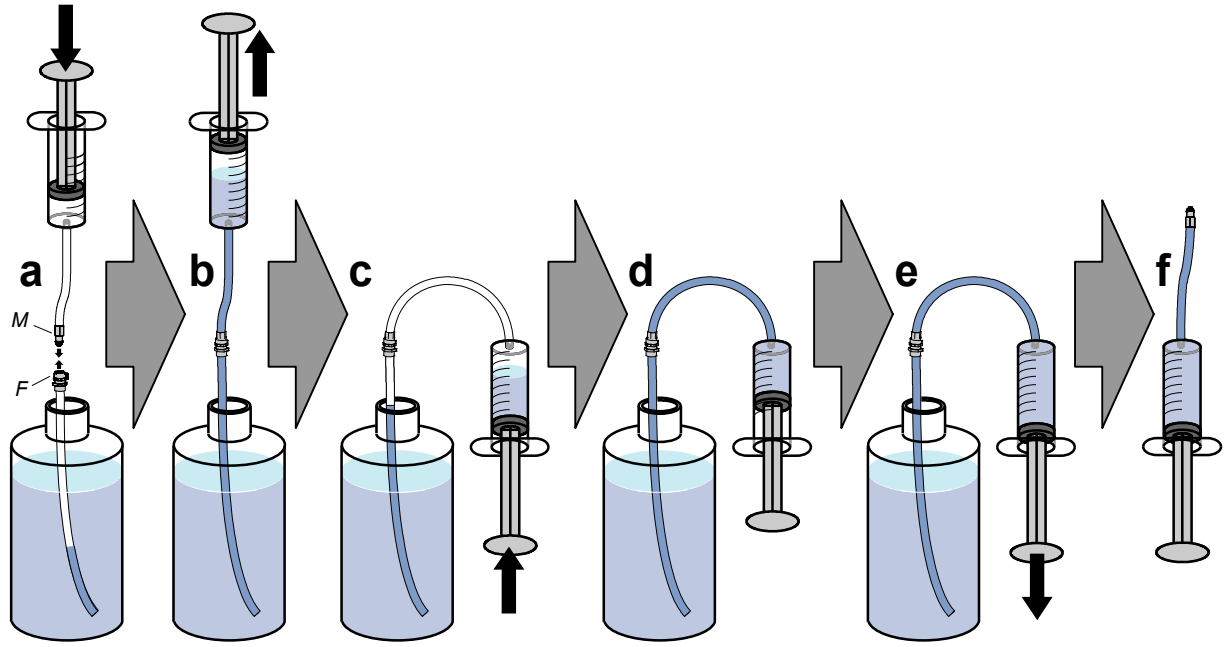


Image 11-22

2. Couple the syringe to the inlet of the cooling circuit and press the cooling liquid inside the circuit until the manometer indicates **1 bar** pressure. Ensure that **no air bubbles** are injected into the circuit.
   Caution: *Maximum 1 bar of pressure is allowed on the Liquid Cooling Circuit. More pressure than 1 bar may damage the circuit.*

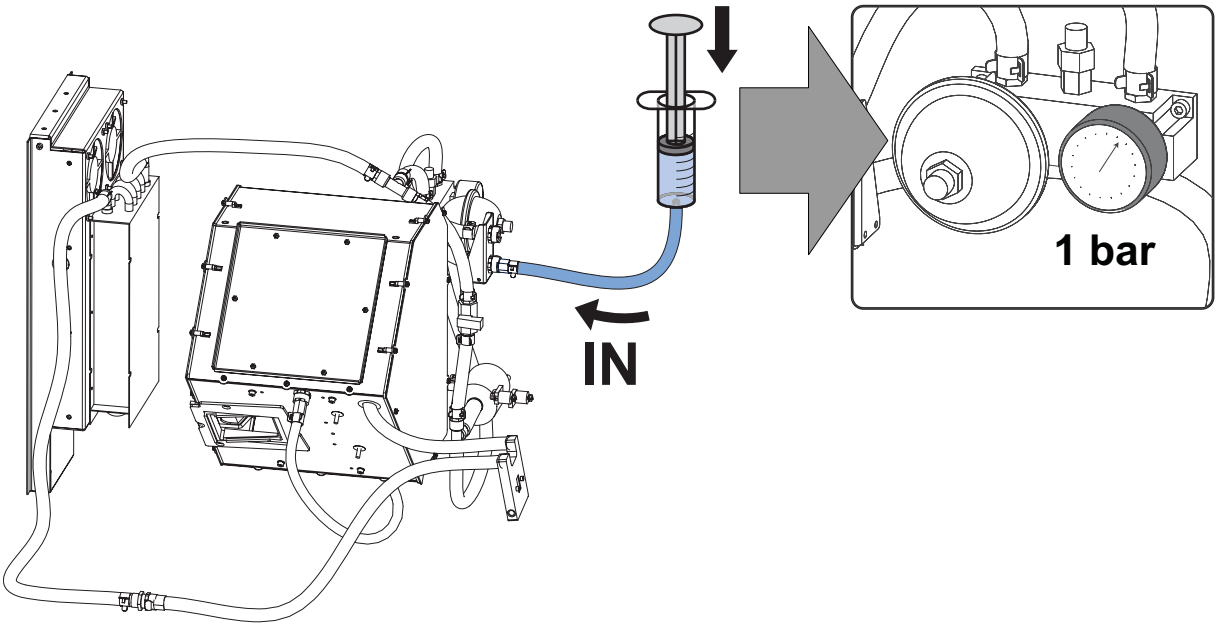


Image 11-23

3. Disconnect the syringe from the inlet of the cooling circuit while pressurizing the cooling circuit to **1 bar** by pushing the piston of the syringe. When this is done properly, the manometer should indicate 1 bar after the syringe is disconnected.
4. Check if the cooling circuit was correctly calibrated. Proceed as follows:
   a) Taking note of the liquid level in the syringe, while pressurizing the cooling circuit up to 1 bar (see previous step).
   b) Release the plunger. As a result the pressure of the cooling circuit will drop from 1 to 0 bar and cooling liquid is automatically expelled from the circuit into the syringe.
   c) Check if the amount of expelled liquid is between 50 and 70 ml. If not, start the procedure "Calibrating the Liquid Cooling Circuit", page 201.
   d) Push the plunger of the syringe to reinject the expelled liquid back into the circuit. The pressure would hence return to 1 bar.
5. Disconnect the syringe from the cooling circuit. Make sure that the pressure remains 1 bar.
6. Check that the valve is open.

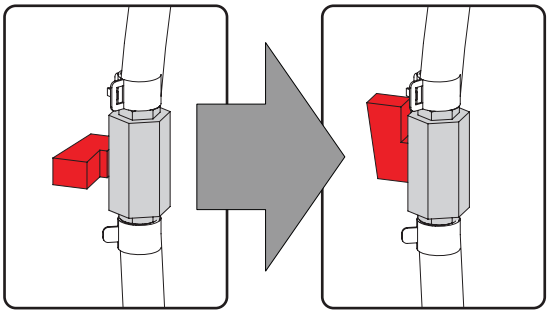


Image 11-24

Check within 24 hours whether the pressure has stabilized close to 1 bar. If not, search for leakage.

11.10 Calibrating the Liquid Cooling Circuit

To check if the pressure vessel is correctly calibrated you may connect the syringe with the cooling circuit and measure the amount of liquid that is automatically expelled. The pressure would have dropped from 1 to 0 bar. The expelled amount of cooling liquid should be between 50 and 70 ml. Make sure that there are no air bubbles in the syringe while doing this. Reinject the expelled liquid back into the circuit. The pressure would hence return to 1 bar.

A calibrated Liquid Cooling Circuit means that the ratio between the volume of cooling liquid in the circuit and the volume of air in the pressure vessel is defined. This is achieved by first filling the vessel completely with liquid consequently expelling air from the vessel. Secondly a predefined volume of cooling liquid is extracted from the circuit. Finally the liquid cooling circuit has to be pressurized to 1 bar by pumping air into the vessel.

Make sure that all air is expelled from the Liquid Cooling Circuit and that the cooling circuit of the Sealed Light Processor is included before starting the calibration procedure

Necessary tools

- 60 cm of plastic tube with female valved fitting.
- Syringe connected with short tube with male valved fitting.
- Bottle with cooling liquid.
- Air pump.
- Cloths.

How to calibrate the Liquid Cooling Circuit?

1. Remove the valve cap of the pressure vessel and **release the pressure**.

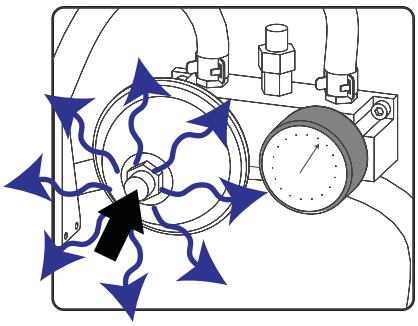


Image 11-25

2. **Fill the syringe with cooling liquid as follows:**
   a) Couple the female (F) fitting of a plastic tube to male (M) fitting of the syringe and emerge the tube end. Make sure that the piston of the syringe is completely pressed in.
   b) Extract cooling liquid into the syringe by pulling out the piston.
   c) Turn the syringe upside down, so that the air inside the syringe is located at the outlet.
   d) Push the piston in until all air bubbles inside the syringe and tubes are expelled. Ensure that the tube end in the bottle remains emerged.
   e) Pull out the piston to fill the tubes and syringe completely with cooling liquid.
   f) Disconnect the filled syringe from the tube.

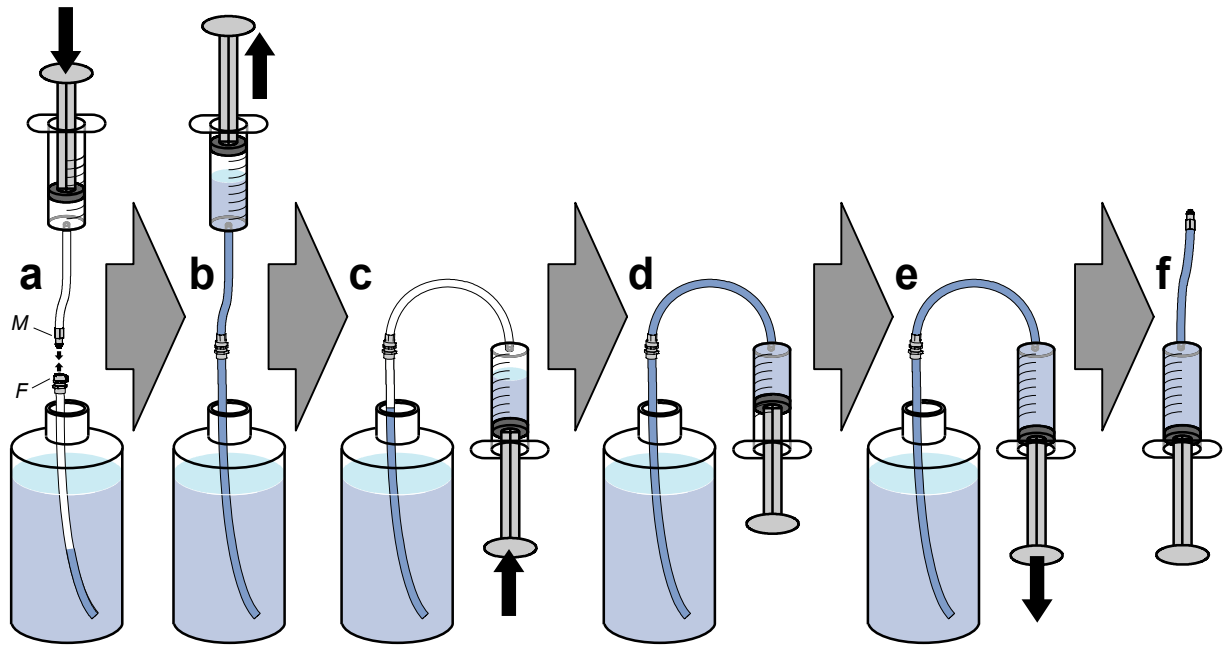


Image 11-26

3. **Fill the pressure vessel with liquid as follows:**
   a) Couple the syringe with the inlet of the cooling circuit. Keep holding the syringe vertical with the outlet downwards.
   b) Increase the pressure by pushing in the piston of the syringe (maximum 1 bar indicated on the manometer).
   c) While pressing, expel air from the pressure vessel.
   d) Continue expelling air while pressurizing the circuit (up to 1 bar) until the valve of the vessel becomes hard to push in. This indicates that the pressure vessel is completely filled with cooling liquid.

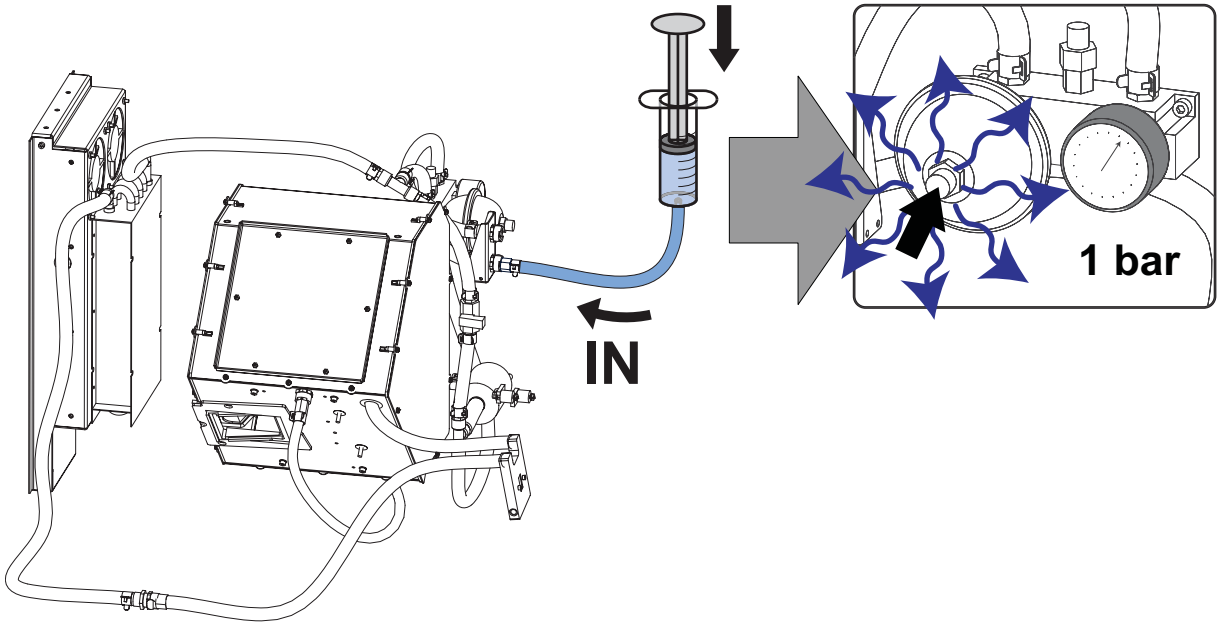


Image 11-27

4. Now that the pressure vessel is liquid filled you have to increase the **pressure to 1 bar** by pushing in the piston of the syringe. Then immediately disconnected the syringe. When this is done properly, the manometer should indicate 1 bar.
5. **Extract 75 ml** back into the syringe by doing the following:
   a) First empty the syringe but make sure that the tube of the syringe remains filled with cooling liquid.
   b) Couple the syringe (plunger completely pressed in) with the inlet of the cooling circuit. Keep holding the syringe vertical with the outlet downwards.
   c) Release the plunger. Note that cooling liquid is pressed into syringe while the pressure drops.
   d) Now fill the syringe by slowly pumping air into the vessel (connect air pump to valve).
   e) Stop once 75 ml has been expelled.
   f) Disconnect the syringe from the cooling circuit.

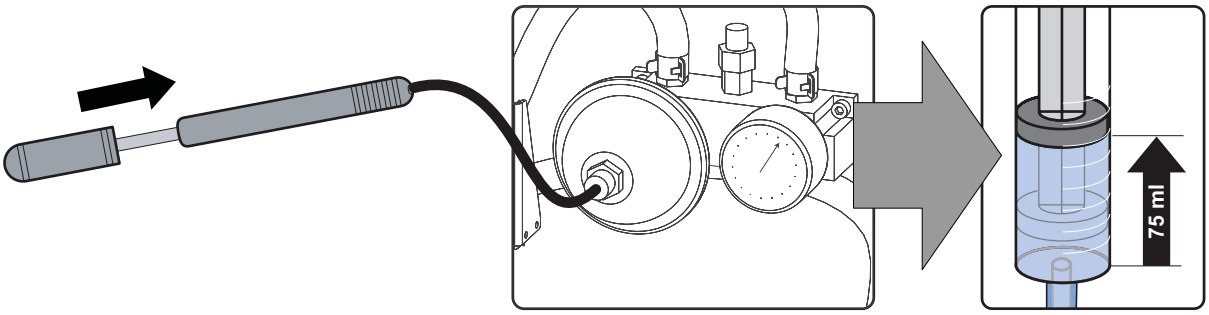


Image 11-28

6. Pump up the air pressure to **1 bar** (on manometer) and reinstall the valve cap tightly on the pressure vessel.

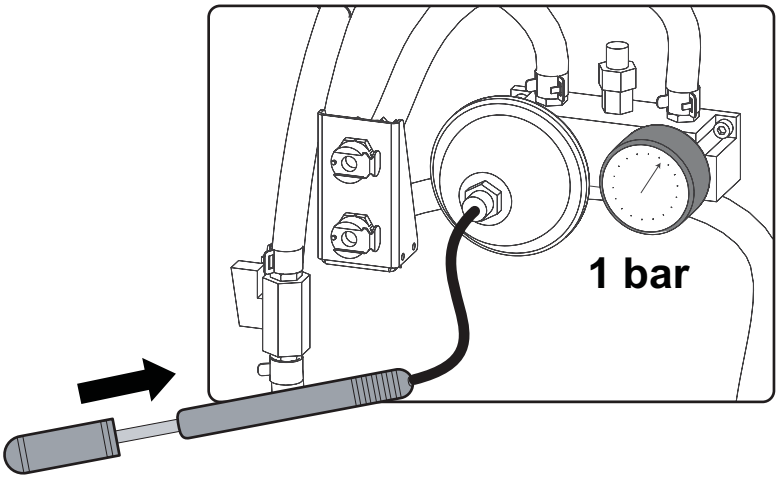


Image 11-29

7. Mark the pressure vessel with the calibration date for future reference.

8. Check that the valve is open.

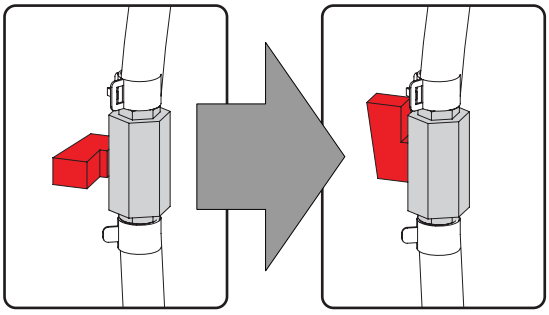
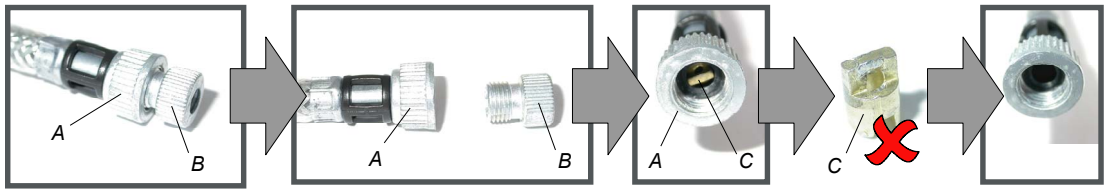


Image 11-30

The air hose fitting of the air pump must be of the Shrader valve type (A) to match with the pressure vessel, so the Presta valve type (B) has to be removed. Futhermore, the pin (C) inside the Shrader valve has to be removed as well.



Check within 24 hours whether the pressure has stabilized close to 1 bar. If not, search for leakage.

11.11 Removal of the Pump

Where is the Pump located?

The Pump (reference 2 image 11-31) of the Liquid Cooling System is located below the Cathode Fan (reference 1 image 11-31) and between the compartment of the Lamp House and the Card Cage. To access the Pump, for service purposes, the Pump has to be removed from its location prior to disconnecting the tubes from the Pump. For that the valve (reference 3 image 11-31) of the Liquid Cooling Circuit and the Mains Input Filter (reference 4 image 11-31) has to be detached from the projector base first.

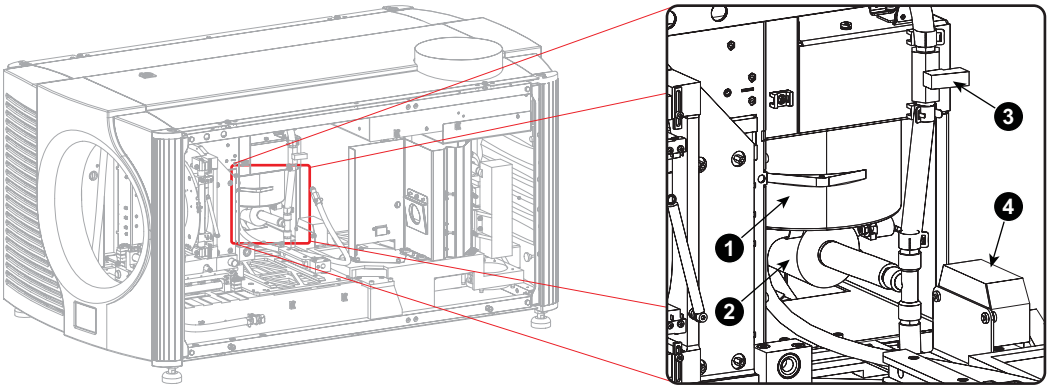


Image 11-31

Removing the Pump (and tubing) from its mounting location is required when the Pump needs cleaning or parts of the Pump or the whole Pump has to be replaced. Prior to removing the Pump from its mounting location the Liquid Cooling Circuit has to be **drained first**. The Pump must also be removed from its mounting location in case the Cathode Fan has to be replaced. In this case the Liquid Cooling Circuit has not to be drained.

To access the Pump, both projector side covers (1), the Sealed Light Processor (2), the Lamp House (3), the Mains Input Filter (4), the Input & Communication unit (5) and the Card Cage cover (6) has to be removed. This procedures assumes that all these parts are already removed from the projector. See the corresponding chapters of the involved parts for detailed removal instructions.

Necessary tools

- T20 Torx driver (short).
- Set of cutting pliers.
- 3 mm Allen wrench.

How to remove the Pump from its mounting location?

1. Loosen the socket of the INLET and OUTLET valves. Use a short T20 Torx driver the loosen the two screws (reference 1 image 11-32) a few turns and then slide the socket away from its position.
   Tip: *Do not forget to drain the Liquid Cooling Circuit prior to removing the Pump in case the removal of the Pump is required for maintenance of the Pump or other parts of the cooling circuit. The Liquid Cooling Circuit does not have to be drained in case the removal of the Pump is required to replace the Cathode Fan.*

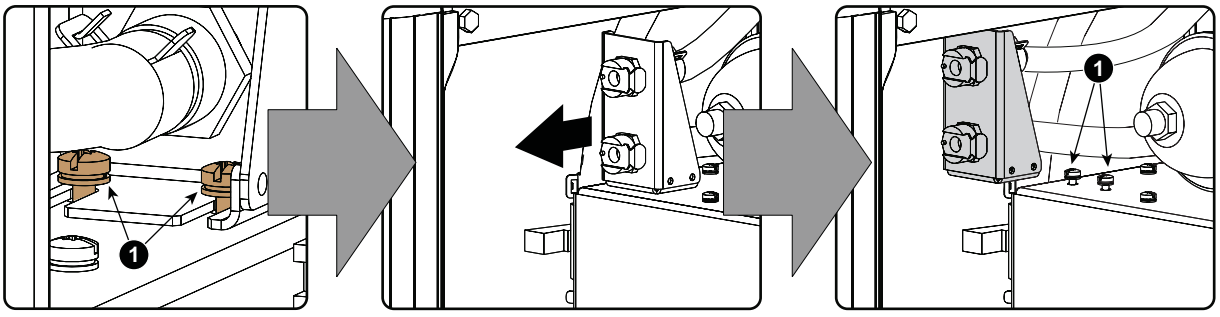


Image 11-32

2. Release the Manifold of the Liquid Cooling Circuit by loosening the two hexagon socket head cap screws (reference 2 image 11-33). Use a 3 mm Allen wrench.

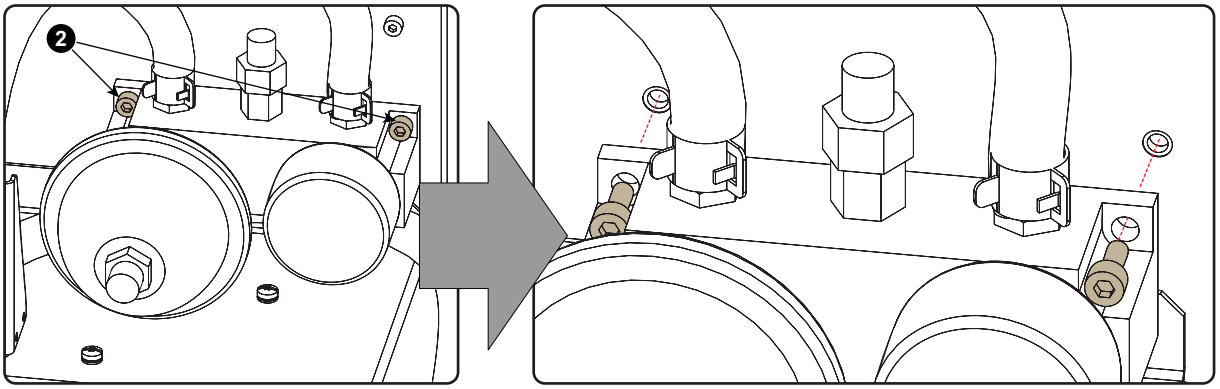


Image 11-33

3. Cut the two cable ties (reference 1 image 11-34) which fasten the valve of the Liquid Cooling circuit and the cable tie (reference 2 image 11-34) which fasten the tube at the air outlet channel (reference 3 image 11-34) of the Cathode Fan.

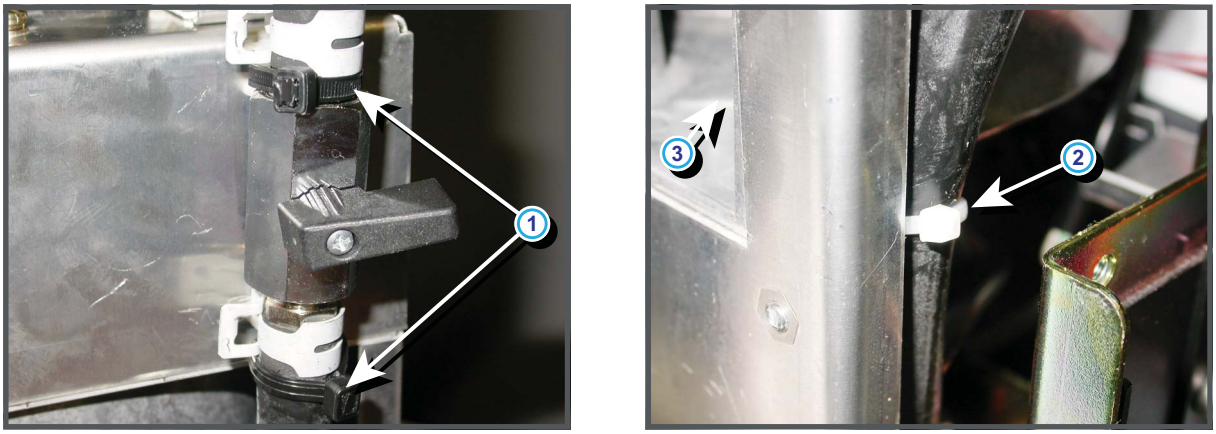


Image 11-34

4. Loosen the two screws (reference 3 image 11-35) a few turns which secure the Pump as illustrated.

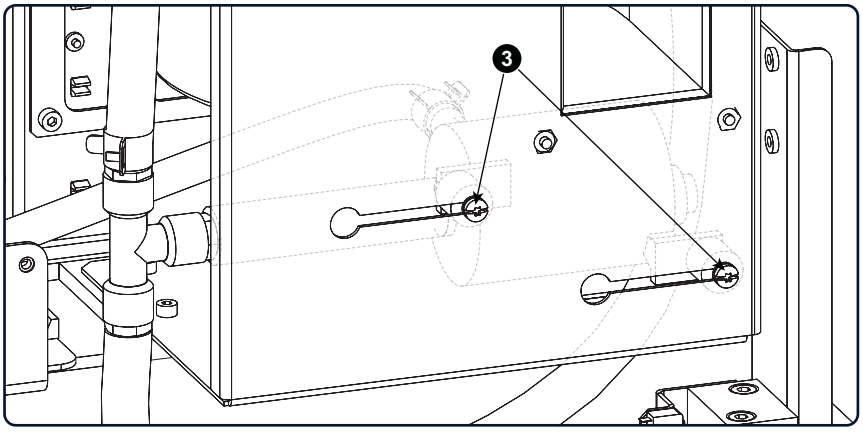


Image 11-35

5. Gently pull the Pump with tubing out of its compartment as illustrated.
   Note: *The Mains Input Filter must be removed prior to removing the Pump. Otherwise, the Mains Input Filter gets in the way of the Pump's tubing.*

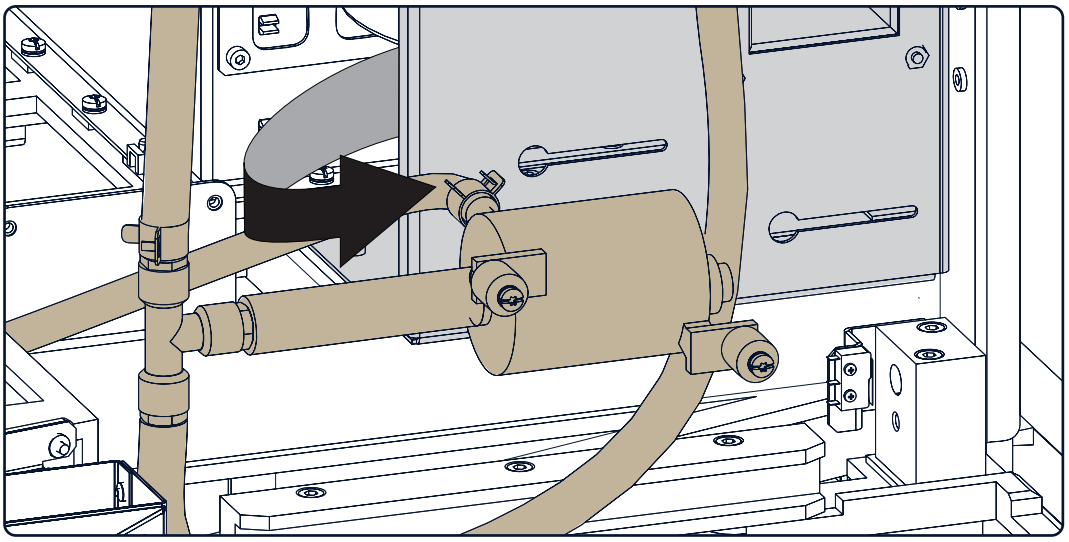


Image 11-36

6. Disconnect the wire unit (reference 1 image 11-37) of the Pump.

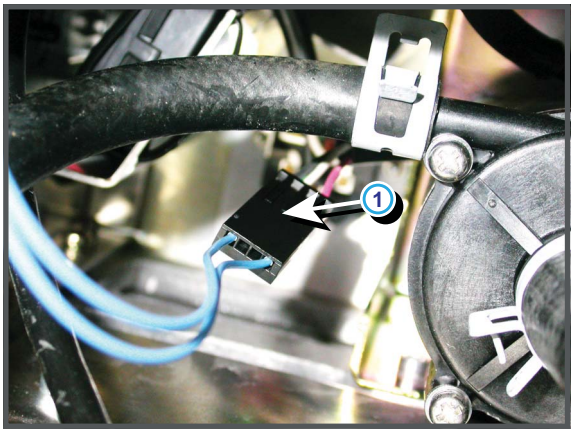


Image 11-37

The Pump is now accessible for maintenance or for replacement.

11.12 Installing the Pump

Necessary tools

- T20 Torx driver (short).
- 3 mm Allen wrench.

Necessary parts

3 cable ties (to fixate the tubing).

How to install the Pump of the Liquid Cooling Circuit?

1. Connect the wire unit (reference 1 image 11-38) of the Pump.

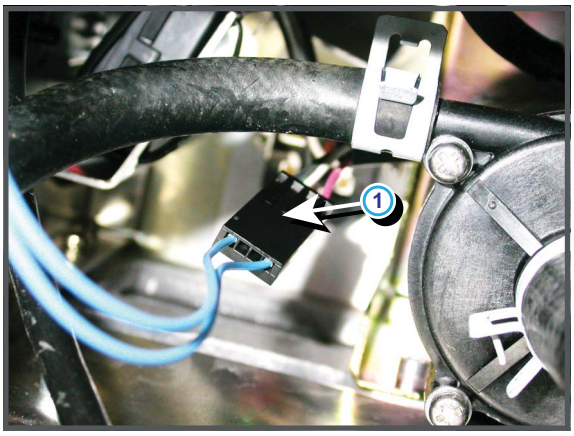


Image 11-38

2. Place the Pump in its mounting position as illustrated. Make sure that both feet of the Pump are equipped with a rubber absorber, plain washer and fixation screw.

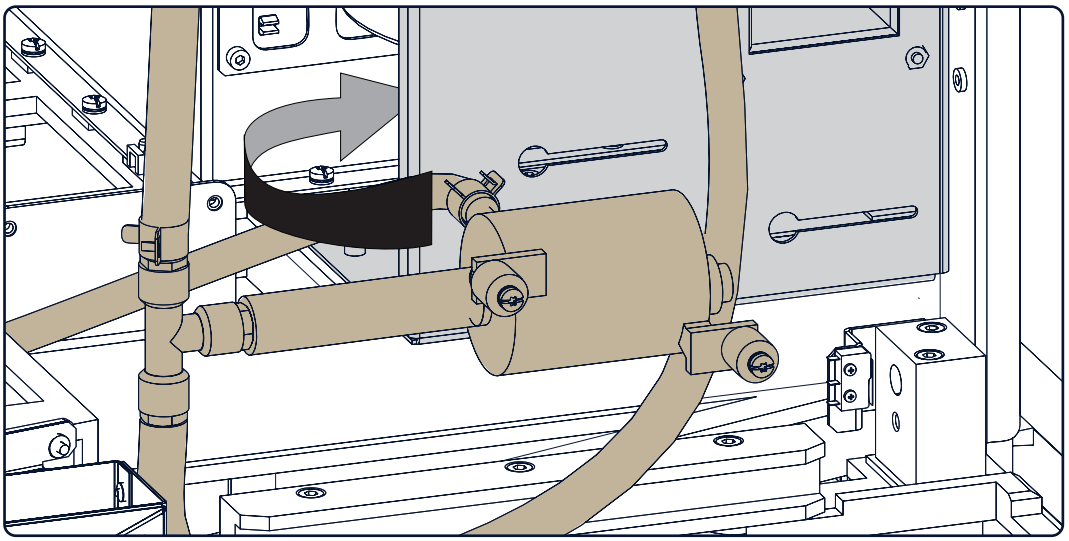


Image 11-39

3. Fasten the two screws (reference 3 image 11-40) of the Pump. Use a T20 Torx driver. The plain washers and fixation screws must be captured by the provided slots in the metal mounting plate as illustrated.

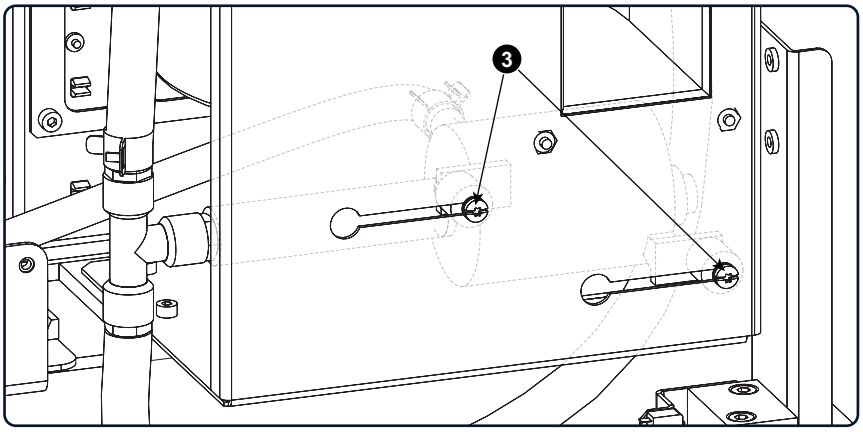


Image 11-40

4. Install the Manifold of the Liquid Cooling Circuit. Use a 3 mm Allen wrench to fasten the two screws (reference 2 image 11-41) of the Manifold.

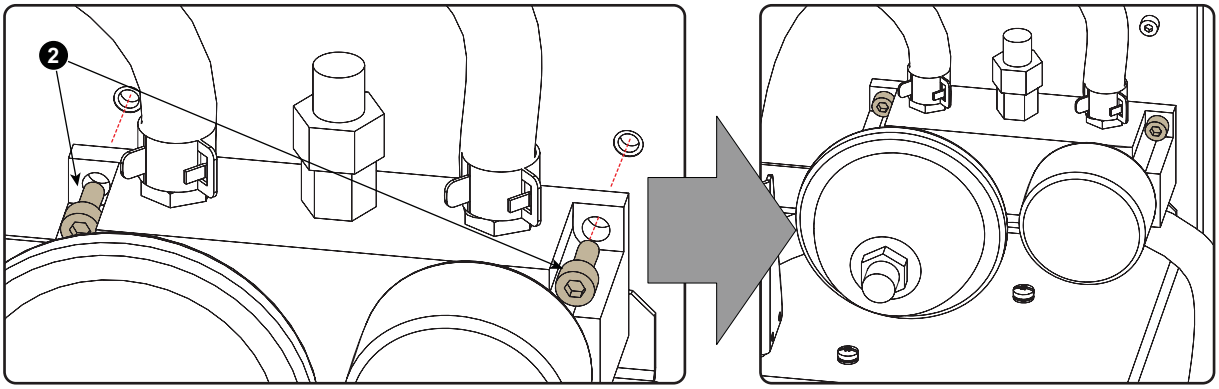


Image 11-41

5. Install the bracket of the INLET and OUTLET valves of the Liquid Cooling Circuit. Use a (short) T20 Torx driver to fasten the two screws (reference 1 image 11-42) of the bracket.

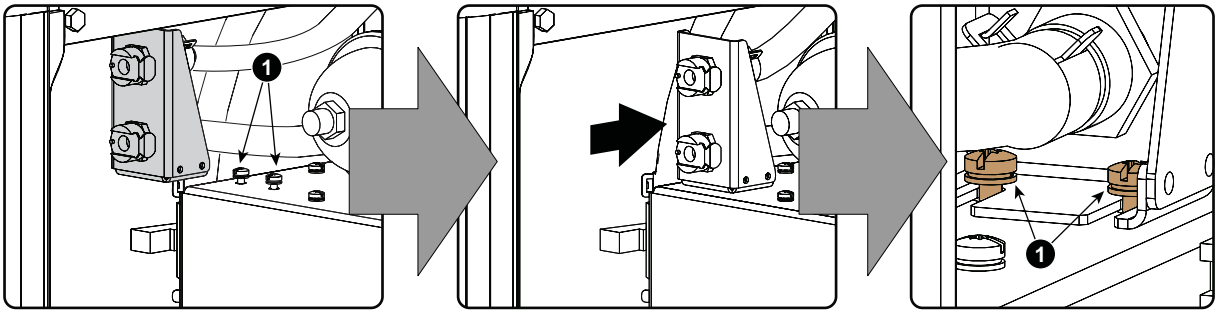


Image 11-42

6. Secure the valve of the Liquid Cooling Circuit with two cable ties (reference 1 image 11-43) as illustrated.
7. Attach the tube (reference 2 image 11-43) of the Liquid Cooling Circuit with a cable tie to the assembly of the Cathode Fan (reference 3 image 11-43).

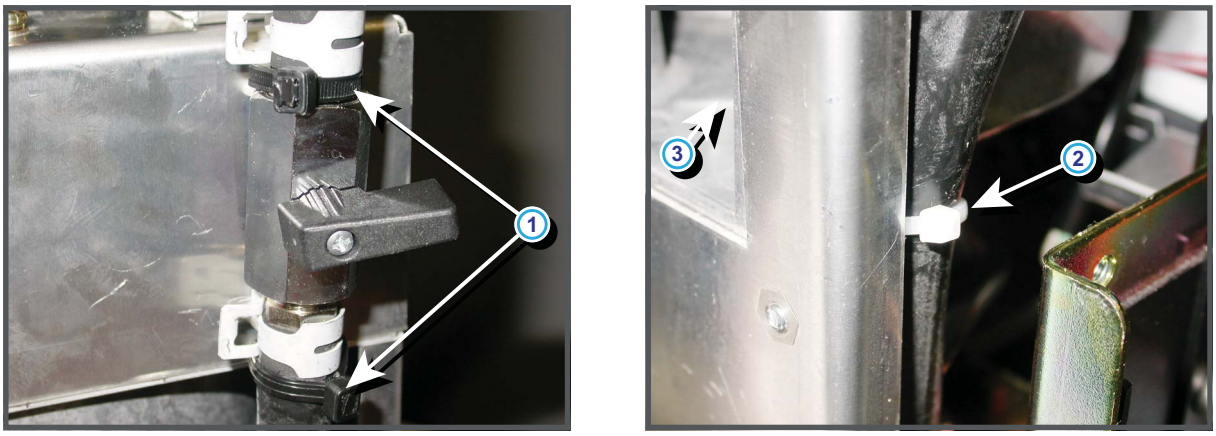


Image 11-43

After the Pump is installed, the Mains Input Filter, the Card Cage cover, the Input & Communication unit, the Sealed Light Processor, and Lamp House has to be reinstalled. See the corresponding chapters of the involved parts for detailed installation instructions.

Prior to inserting the Lamp House check if the Liquid Cooling Circuit is filled and pressurized. See procedure "Filling the Liquid Cooling Circuit", page 192.

11.13 Cleaning the Pump

What can happen?

Due to crystallization inside the Pump, the rotor can be jammed. This crystallization can be easily removed and the Pump can be reused again. In most cases it will be sufficient to clean the Pump instead of replacing it with a new one. However, note that the bearings of the Pump are subject to wear. Because of that the complete Pump (Pump house included) has to be replaced every 4 years.

This procedure assumes that the Liquid Cooling Circuit is drained (see "Draining the Liquid Cooling Circuit", page 190) and that the Pump is removed from its mounting location (see "Removal of the Pump", page 204).

Necessary tools

- PH2 Phillips screwdriver.
- Soft cloths.
- Cotton swabs (Q-tips, ear buds).

How to clean the Pump?

1. Remove the four screws (reference 1 image 11-44) which fasten the Pump house to the Pump motor. Use a PH2 Phillips screwdriver.
   Tip: *Lay a cloth underneath the Pump to absorb the remaining liquid in the pump house.*
2. Slide the Pump house (reference 2 image 11-44) with hose backwards. Use a cloth to absorb the remaining cooling liquid. Now the Pump rotor (reference 3 image 11-44) and the inner side of the Pump motor (reference 4 image 11-44) are visible.

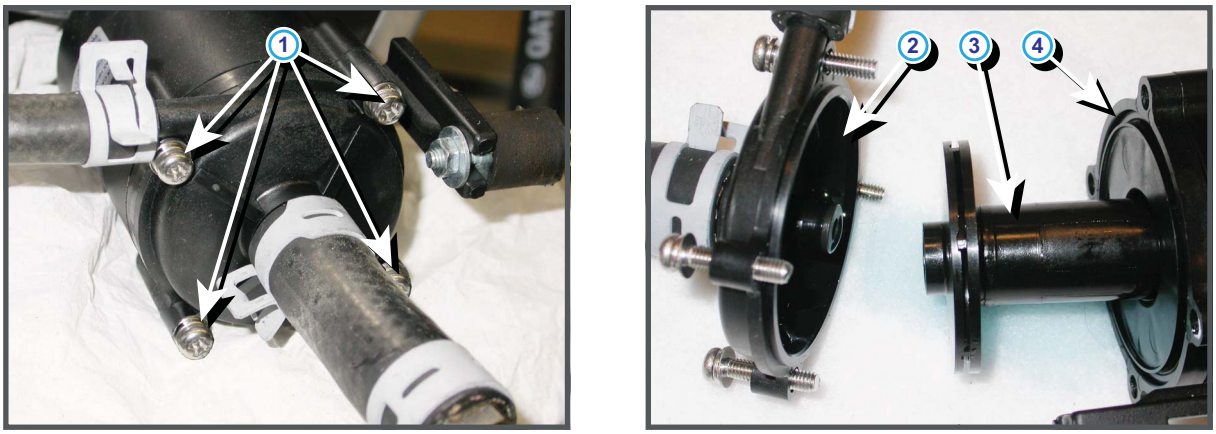


Image 11-44

3. Take the Pump rotor between thumb and finger and slide it out of the Pump motor.

Image 11-45

4. Clean the Pump house, the Pump rotor and the Pump motor with a clean soft cloth. Use cotton swabs to clean the bearing inside the Pump motor and Pump house.
   Caution: *The bearings of the Pump are fragile. Be careful when cleaning.*
5. Reinsert the rotor and try to turn it smoothly. If not successful stop this procedure and replace the Pump completely. See "Replacement of the complete Pump", page 214.
6. Slide the Pump house with hose back on the Pump motor.
   Caution: *Make sure the sealing ring of the Pump motor is not damaged and is on its place.*
7. Fasten the four screws (reference 1 image 11-44) of the Pump house crosswise using a PH2 Phillips screwdriver.

Reinstall the Pump (see "Installing the Pump", page 207) and refill the Liquid Cooling Circuit (see "Filling the Liquid Cooling Circuit", page 192) in case the pump is successfully cleaned. If cleaning is not possible, replace the pump completely. See "Replacement of the complete Pump", page 214.

11.14 Replacement of the Pump motor and rotor

When replacing the Pump motor and Pump rotor?

In case of an electrical failure of the Pump you can replace the Pump motor and Pump rotor without replacing the Pump house. This way you do not have to cut the hoses from the Pump house which simplify the replacement procedure. However, note that the bearings of the Pump are subject to wear. Because of that the complete Pump (Pump house included) has to be replaced every 4 years.

You have to order a complete Pump but you only have to use the Pump motor and Pump rotor.

This procedure assumes that the Liquid Cooling Circuit is drained (see "Draining the Liquid Cooling Circuit", page 190) and that the Pump is removed from its mounting location (see "Removal of the Pump", page 204).

Necessary tools

- PH2 Phillips screwdriver.
- 7 mm open-end wrench.
- Cloths.
- Cotton swab.

How to replace the Pump motor and Pump rotor?

1. Remove the four screws (reference 1 image 11-46) which fasten the Pump house to the Pump motor. Use a PH2 Phillips screwdriver.
   Tip: *Lay a cloth underneath the Pump to absorb the remaining liquid in the pump house.*
2. Slide the Pump house (reference 2 image 11-46) with hose backwards. Use a cloth to absorb the remaining cooling liquid. Now the Pump rotor (reference 3 image 11-46) and the inner side of the Pump motor (reference 4 image 11-46) are visible.

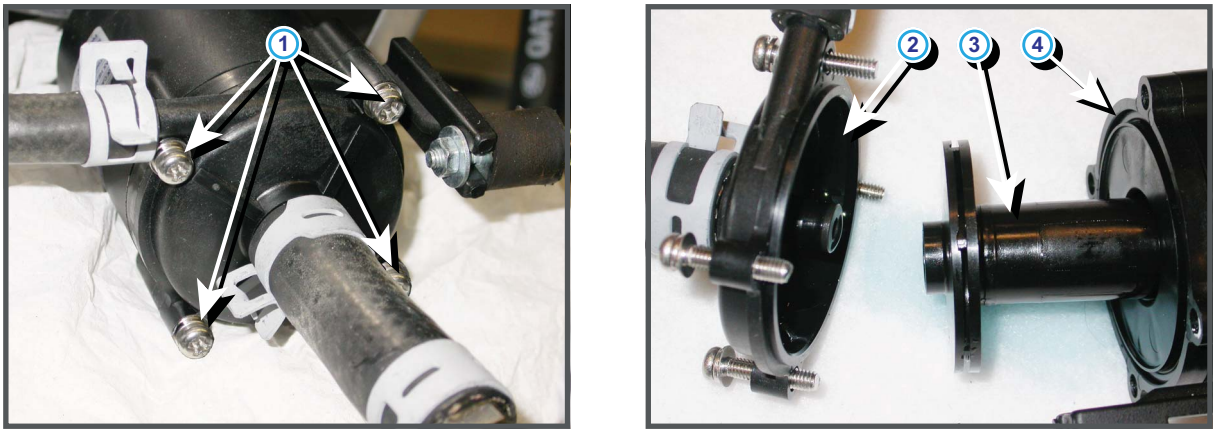


Image 11-46

3. Replace the Pump motor and Pump rotor.

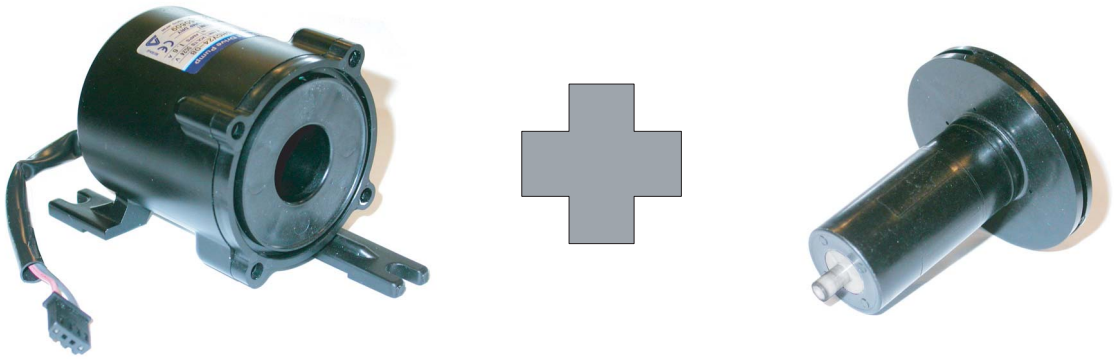


Image 11-47

4. Clean the Pump house with a clean soft cloth. Use cotton swabs to clean the bearing of the Pump house.

5. Slide the Pump house with hose on the new pump motor.
   Caution: *Make sure that the new Pump motor is provide with a new rotor and a new sealing ring.*
6. Fasten the four screws (reference 1 image 11-46) of the Pump house crosswise using a PH2 Phillips screwdriver.
7. Reinstall the rubber vibration rings (feet, reference 3 image 11-48) of the old Pump motor upon the new Pump motor. Use a T20 Torx driver and a 7 mm open-end wrench.

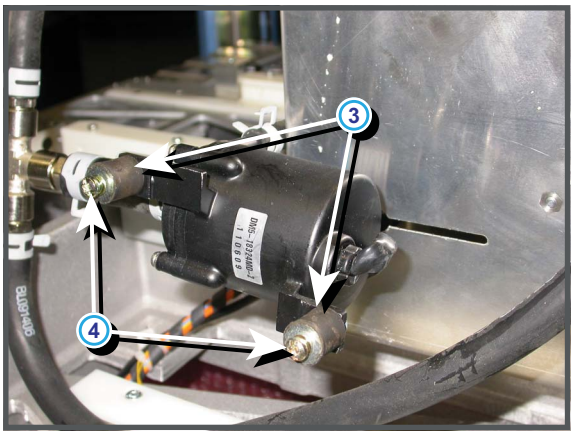


Image 11-48

Reinstall the Pump (see "Installing the Pump", page 207) and refill the Liquid Cooling Circuit, then expel all air from the circuit and finally pressurize the cooling circuit. See "Filling the Liquid Cooling Circuit", page 192.

11.15 Replacement of the complete Pump

This procedure assumes that the Liquid Cooling Circuit is drained (see "Draining the Liquid Cooling Circuit", page 190) and that the Pump is removed from its mounting location (see "Removal of the Pump", page 204).

Necessary tools

- PH2 Phillips screwdriver.
- 7 mm open-end wrench.
- Cloths.
- Universal plier.
- Knife.
- T20 Torx driver.

How to replace the complete Pump of the Liquid Cooling Circuit?

1. Cut both hoses (reference 1 image 11-49) from the Pump house. Cut just next to the clip (reference 2 image 11-49) to have a minimal loss in length of the hose.

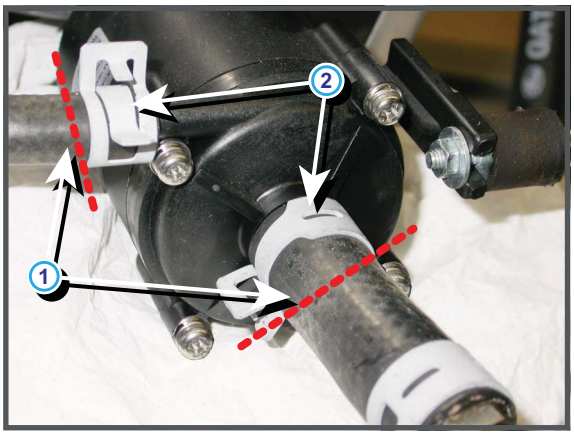


Image 11-49

2. Remove both clips (reference 2 image 11-49) from the Pump house. Use an universal plier to push both clip tongs to each other in order to open the clip.
   Note: *It is almost impossible to remove first the clip and then to pull off the hose.*
3. Provide both hoses with a clip and push the hoses over their respective nipple of the Pump house. Note that the thick nipple is the input side of the Pump house and has to be connected with the thick hose that comes from the pressure vessel. The small nipple is the output side of the Pump house and has to be connected with the hose that comes from the Sealed Light Processor.
4. Slide the clip (reference 2 image 11-49) of both hoses over the connection. Use an universal plier to push both clip tongs to each other in order to open the clip and to move the clip over the connection.
5. Reinstall the rubber vibration rings (feet, reference 3 image 11-50) of the old Pump upon the new Pump. Use a T20 Torx driver and a 7 mm open-end wrench.

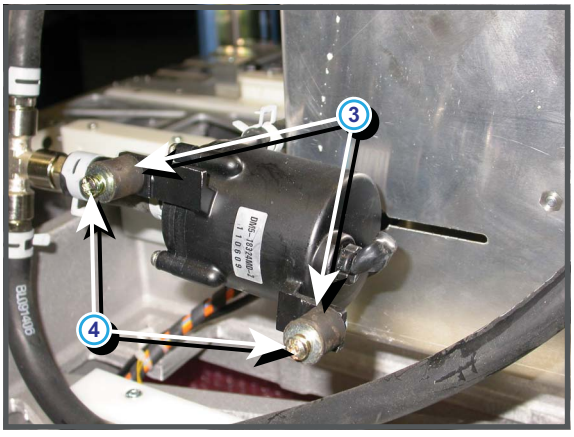


Image 11-50

Reinstall the Pump (see "Installing the Pump", page 207) and refill the Liquid Cooling Circuit, then expel all air from the circuit and finally pressurize the cooling circuit. See "Filling the Liquid Cooling Circuit", page 192.

11.16 Replacement of the Heat Exchanger

To replace the Heat Exchanger, the projector front cover has to be removed and the Liquid Cooling Circuit has to be drained. This procedure assumes that the projector front cover is already removed and the Liquid Cooling Circuit drained. See procedure "Draining the Liquid Cooling Circuit", page 190.

Necessary tools

- Set of cutting pliers.
- Set of universal pliers.
- 3 mm Allen Wrench.
- Electric drill with a 4 mm bit.

Necessary parts

- 6 aluminium blind rivets (D=3,2 mm & L=7,4 mm)
- Cable tie.

How to replace the Heat Exchanger of the Liquid Cooling Circuit?

1. Release the temperature sensor (reference 1 image 11-51) by cutting the cable tie.
2. Disconnect the wires units (reference 2 image 11-51) from the four fans and guide all wire units through the cable gland away from the Heat Exchanger assembly.

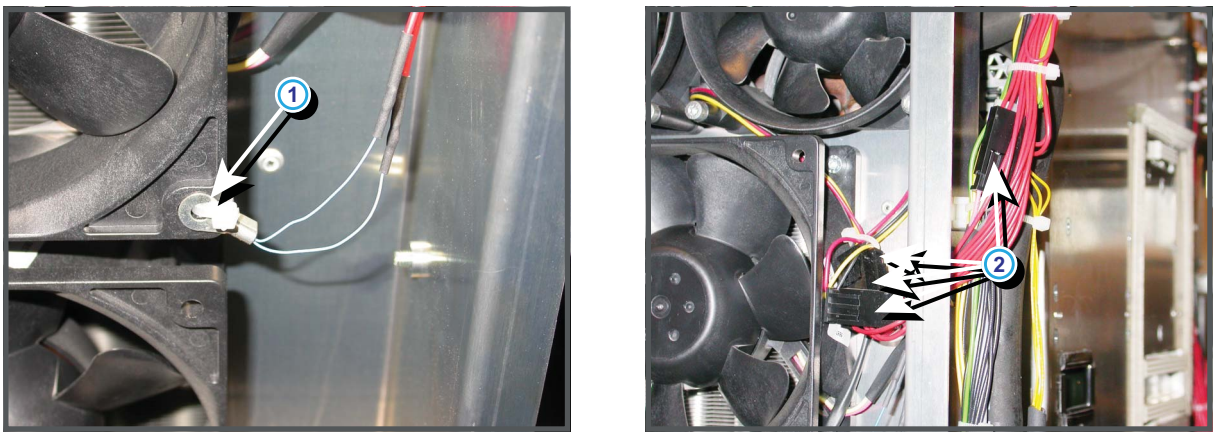


Image 11-51

3. Release the Heat Exchanger assembly from the projector by loosening the six hexagon socket head cap screws (reference 3). Three at the top and two at the bottom of the assembly. Use a 3 mm Allen wrench.
   Note: *The Heat Exchanger assembly remains attached to the projector with the tubes of the Liquid Cooling Circuit.*

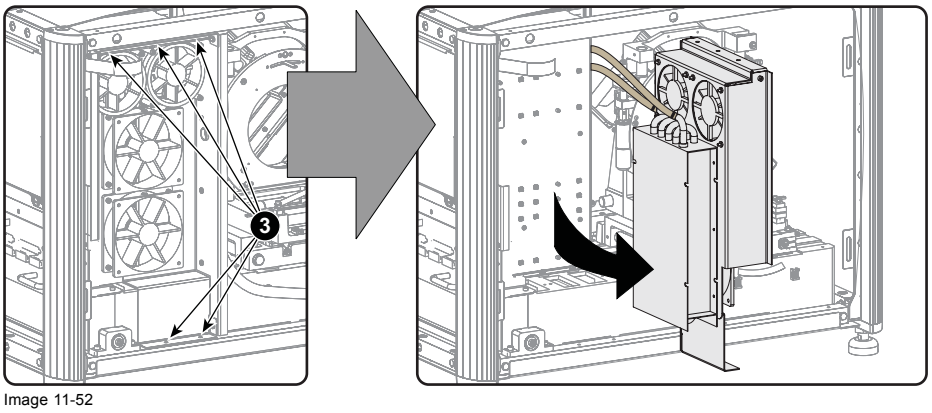


Image 11-52

4. Remove the tubes (reference 4 & 5) from the Heat Exchanger.

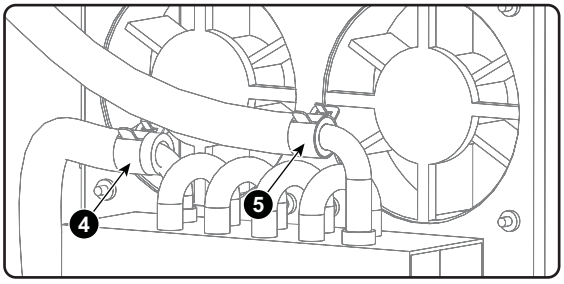


Image 11-53

5. Separate the Heat Exchanger from the fan assembly by drilling out the six blind rivets (reference 6 & 7) which fasten the Heat Exchanger. Use a 4 mm bit.

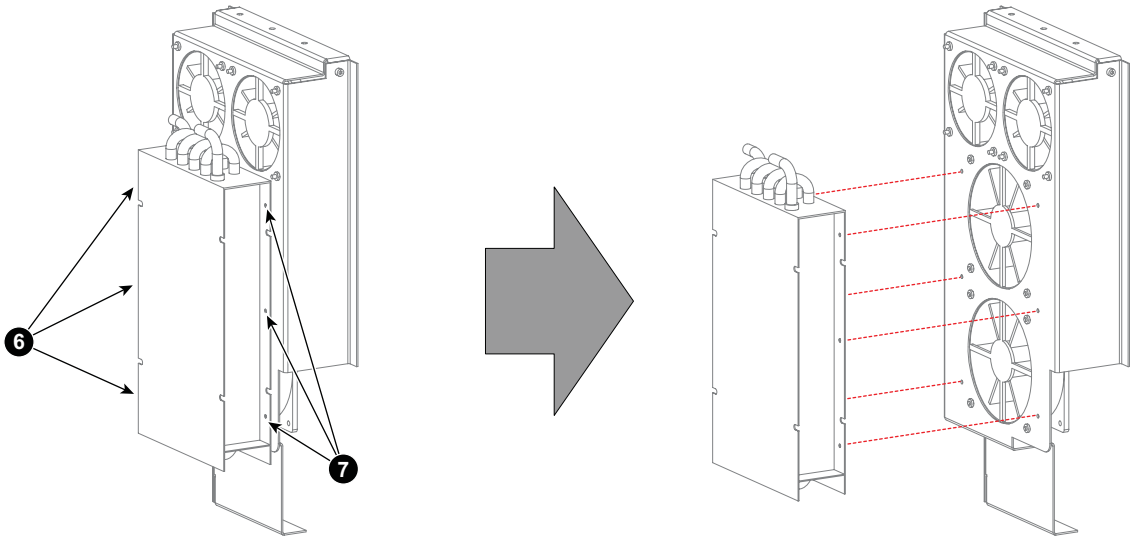


Image 11-54

6. Install a new Heat Exchanger upon the fan assembly using six blind rivets (D=3,2 mm & L=7,4 mm).
7. Reconnect the tubes (reference 4 & 5 image 11-53) of the Liquid Cooling Circuit with the new Heat Exchanger. Make sure to place a clip upon each tube prior to connecting. Use an universal plier to push both clip tongs to each other in order to open the clip and to move the clip over the connection.
8. Reinstall the Heat Exchanger assembly. Fasten the assembly with three screws at the top and two screws at the bottom (reference 3 image 11-52).
9. Guide wire units of the fans through the cable gland and reconnect them with the four fans. See reference 2 image 11-51.
10. Reinstall the temperature sensor as illustrated in image 11-51 (reference 1).

Proceed with refilling the Liquid Cooling Circuit, then expel all air from the circuit and finally pressurize the cooling circuit. See "Filling the Liquid Cooling Circuit", page 192.

12. LENSES AND LENS HOLDER

About this chapter

This chapter describes how to replace the complete Lens Holder or single parts of the Lens Holder like the DC motors for lens shift. Note that the focus and shift functionality are built into the Lens Holder. The DC motor for the zoom functionality is built into the Lens. Included in this chapter are the adjustment procedures for the Lens Holder (Scheimpflug) and Lens cleaning procedure.

CAUTION: Never transport the projector with the Lens mounted on it! Always remove the Lens before transporting the projector.

Overview

- Introduction
- Available lenses
- Lens selection
- Lens installation
- Lens removal
- Cleaning the lens
- Adjusting the Lens Holder
- Removal of the Lens Holder
- Installation of the Lens Holder
- Replacement of the vertical shift motor
- Replacement of the horizontal shift motor
- Replacement of the focus motor
- Replacement of the Lens Signal Distribution board

12.1 Introduction

Lenses and Lens Holder

Next to securing the Lens, the Lens Holder makes it possible to shift, tilt and swing the lens plane with respect to the DMD plane of the projector. This adjustment mechanism ensures that the projected image can be perfectly focused on the screen. The motors required for horizontal and vertical shift and to zoom are built-in in the Lens Holder. The Lens Holder always has an electrical socket for the focus functionality of the motorized Lens.

Parts identification of the Lens Holder

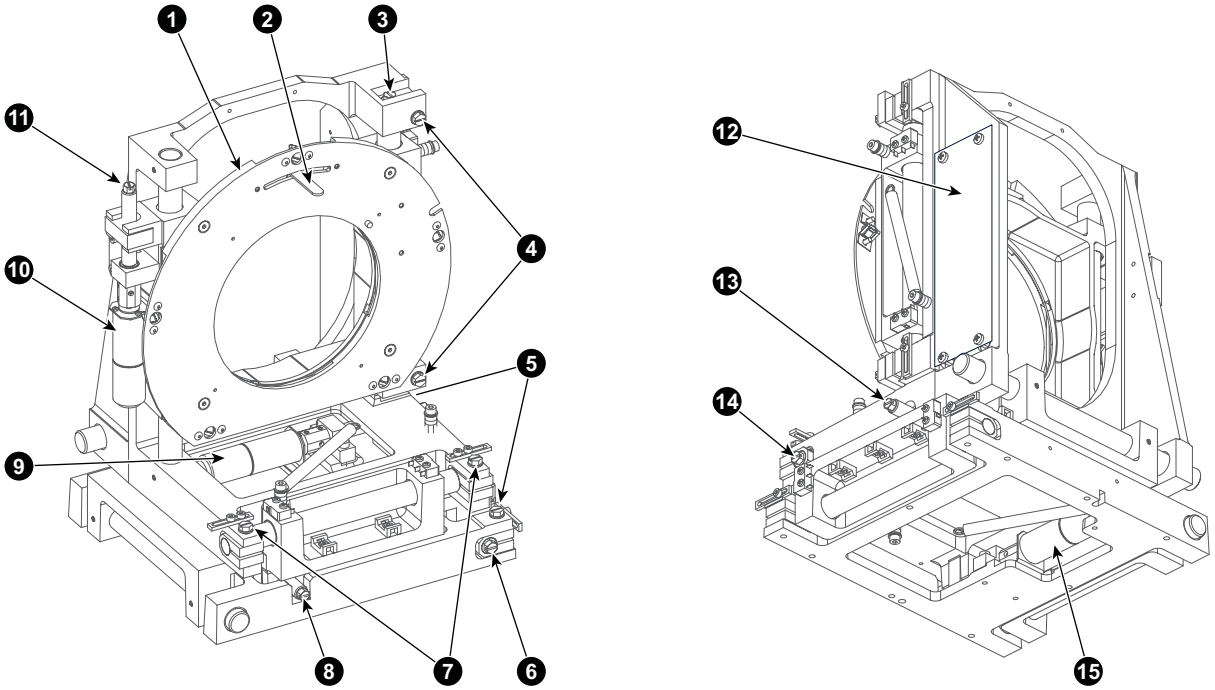


Image 12-1
1 Lens Holder front plate.
2 Lens lock handle.
3 Adjustment screw to swing the Lens Holder front plate (Scheimpflug).
4 Lock screws of the swing mechanism.
5 Lock screws of the rotate mechanism.
6 Adjustment screws to rotate the Lens Holder front plate.
7 Lock screws of the tilt mechanism.
8 Adjustment screw for manual focus adjustment.
9 Lens Holder horizontal shift motor.
10 Lens Holder vertical shift motor.
11 Adjustment screw for manual vertical shift adjustment.
12 Lens Signal Distribution board.
13 Adjustment screw for manual horizontal shift adjustment.
14 Adjustment screw to tilt the Lens Holder front plate (Scheimpflug).
15 Lens Holder zoom motor.

CAUTION: The adjustment screws the motorized vertical shift, horizontal shift and focus adjustment may only be used in case the corresponding motor fails. Always turn these adjustment screws very slowly!

Location of the Lens Holder motors

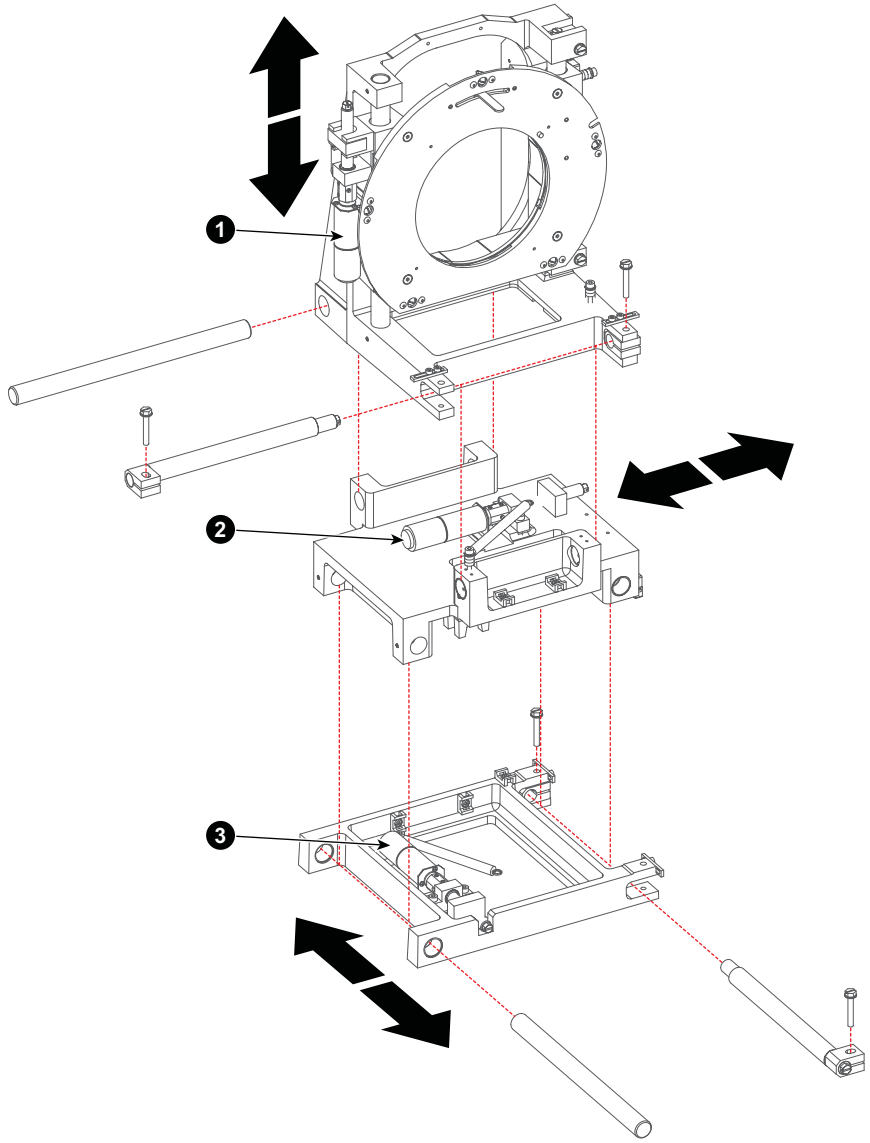


Image 12-2
1 Lens Holder vertical shift motor.
2 Lens Holder horizontal shift motor.
3 Lens Holder zoom motor.

12.2 Available lenses

Which lenses are available for my projector?

The table below is subject to changes and was last updated on 01/06/2012. Consult my.barco.com for the most recent information about available lenses.

Product Number	Zoom range	Image
R9855958	1,25 – 1,45	image 12-3
R9855942	1,45 – 2,05	image 12-4
R9855943	1,6 – 2,35	image 12-5
R9855963	1,6 – 2,35	image 12-6
R9855945	1,8 – 2,8	image 12-7
R9855964	1,8 – 2,8	image 12-8
R9855946	2,15 – 3,6	image 12-9
R9855947	2,8 – 5,5	image 12-10
R9856294	1,49 – 2,05	image 12-11
R9856297	1,61 – 2,31	image 12-12
R9856300	1,82 – 2,86	image 12-13

Image 12-3
R9855958

Image 12-4
R9855942

Image 12-5
R9855943

Image 12-6
R9855963

Image 12-7
R9855945

Image 12-8
R9855964

Image 12-9
R9855946

Image 12-10
R9855947

Image 12-11
R9856294

Image 12-12
R9856297

Image 12-13
R9856300

12.3 Lens selection

Which lens do I need?

1. Go to my.barco.com on https://my.barco.com
2. Login on my.barco.com.
   If you are not yet registered click on **Sign up for my.barco.com** and follow the instructions. With the created login and password, it is possible to enter the my.barco.com.

   When your login is correct, the my.barco.com start page is displayed.
3. Click the **Support** tab, then **Digital cinema calculator** (on the left of the screen) and select the appropriate lens calculator.

   The lens calculator (see screenshot, image 12-14) will be displayed.

   The lens calculator allows you to have an overview of which lenses are suitable for your specific projector setup. Just make your selection of parameters and all possible configurations are displayed.

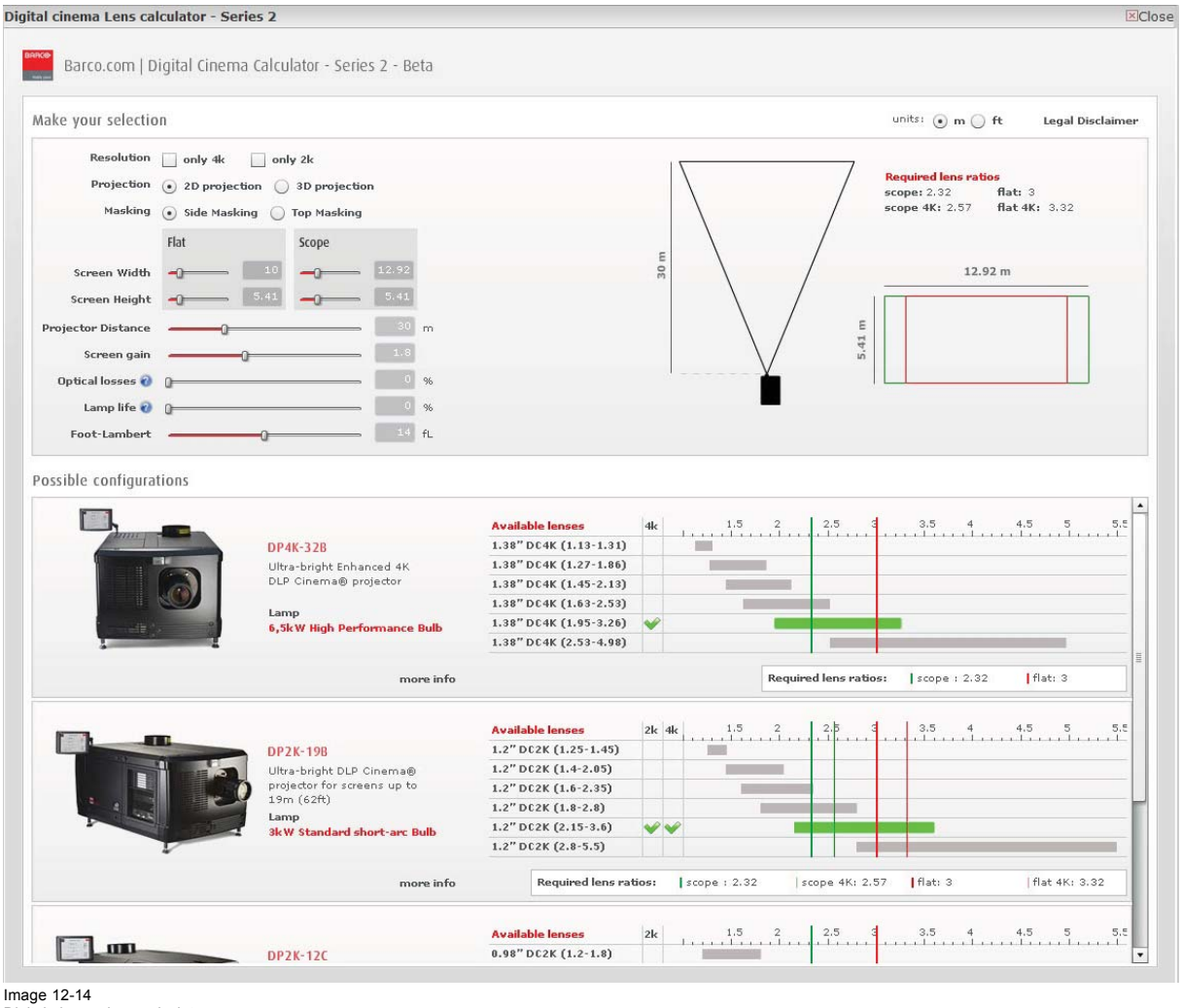


Image 12-14
Digital cinema lens calculator

Due to production tolerances the real distances can differ by 2% from the calculated values.

For critical situations (fixed installs that use the lens at one of its extreme zoom positions) this should be taken into account.

12.4 Lens installation

How to install a Lens into the projector Lens Holder?

1. Remove the foam rubber in the opening of the Lens Holder if not removed yet.
2. Take the Lens out of its packing material and remove the Lens caps on both sides.
3. Place the Lens Holder in the “unlocked” position by moving the Lens lock handle (A) to the left as illustrated.

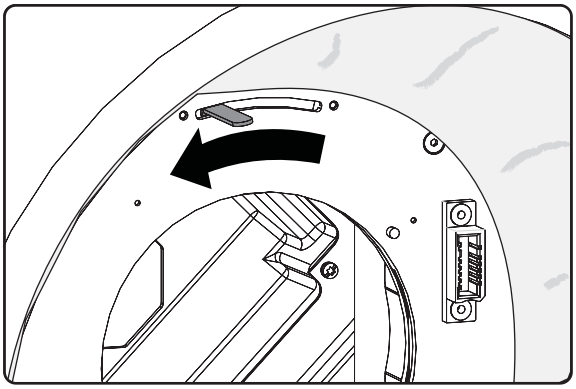


Image 12-15

4. Ensure that the Lens Holder stands in the On-Axis position (horizontal and vertical mid position).
   Note: *The Lens Holder is placed default in the On-Axis position at factory.*
5. Gently insert the Lens into the Lens Holder.

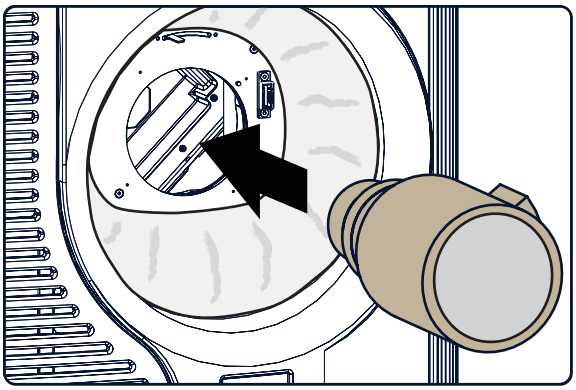


Image 12-16

6. Make sure that:
   a) the pin P on the Lens Holder matches with the sleeve in the Lens.
   b) in case of a motorized Lens, the lens connector matches the electrical socket S on the Lens Holder.
   Warning: *Do not release the Lens yet, as the Lens may fall out of the Lens Holder.*
7. Secure the Lens in the Lens Holder by sliding the Lens lock handle to the right as illustrated. Ensure the Lens touches the front plate of the Lens hHolder.

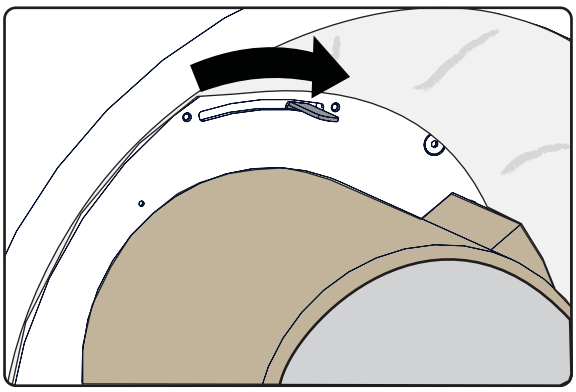


Image 12-17

8. Check if the Lens is really secured by trying to pull the lens out of the Lens Holder.

CAUTION: Never transport the projector with a Lens mounted in the Lens Holder. Always remove the Lens before transporting the projector. Neglecting this can damage the Lens Holder and Prism.

12.5 Lens removal

How to remove a lens from the projector Lens Holder?

1. Support the Lens with one hand while you unlock the Lens Holder by sliding the lock handle to the left (unlock position) as illustrated.
2. Gently pull the Lens out of the Lens Holder.

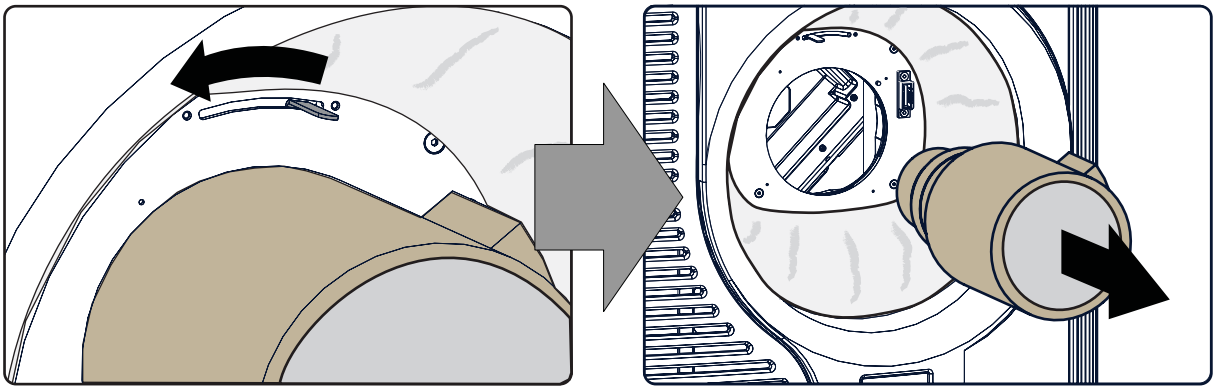


Image 12-18

It's recommended to place the Lens caps of the original Lens packaging, back on both sides of the removed Lens to protect the optics of the Lens.

It's recommended to place the foam rubber of the original projector packaging, back in the Lens opening to prevent intrusion of dust. Note that this foam rubber is packed in a plastic bag to prevent the dust, emitted by the foam, from entering the projector.

12.6 Cleaning the lens

To minimize the possibility of damage to optical coatings, or scratches to lens surfaces, we have developed recommendations for cleaning. FIRST, we recommend you try to remove any material from the lens by blowing it off with clean, dry deionized air. DO NOT use any liquid to clean the lenses.

Necessary tools

Toraysee™ cloth (delivered together with the lens kit). Order number : R379058.

How to clean the lens ?

1. Always wipe lenses with a CLEAN Toraysee™ cloth.
2. Wipe lenses in a one single direction.
   Warning: *Do not wipe back and forwards across the lens surface as this tends to grind dirt into the coating.*
3. Do not leave the cleaning cloth in either an open room or lab coat pocket, as doing so can contaminate the cloth.
4. If smears occur when cleaning lenses, replace the cloth. Smears are the first indication of a dirty cloth.

CAUTION: Do not use fabric softener when washing the cleaning cloth or softener sheets when drying the cloth.

Do not use liquid cleaners on the cloth as doing so will contaminate the cloth.

Other lenses can also be cleaned safely with this Toraysee™ cloth.

12.7 Adjusting the Lens Holder

Why adjusting the Lens Holder?

The Lens Holder has to be adjusted so that the “sharp focus plane” of the projected image falls together with the plane of the screen (Fp1→Fp2). This is achieved by changing the distance between the DMD plane and the lens plane (Lp1→Lp2). The closer the lens plane comes to the DMD plane the further the sharp focus plane will be. It can happen that you won’t be able to get a complete focused image on the screen due to a tilt (or swing) of the lens plane with respect to the DMD plane. This is also know as Sheimpflug’s law. To solve this the lens plane must be placed parallel with the DMD plane. This can be achieved by turning the Lens Holder to remove the tilt (or swing) between lens plane and DMD plane (Lp3→Lp4).

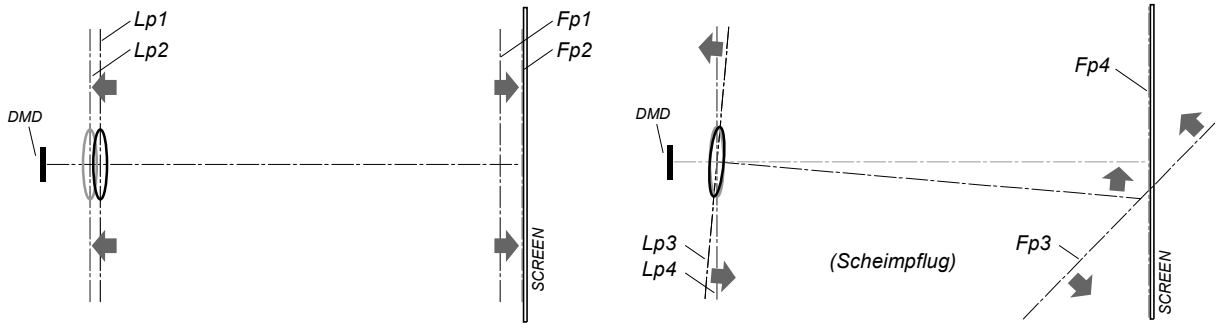


Image 12-19

The Lens Holder has three adjustment mechanisms. The first mechanism allows to shift the Lens back and forward, the second mechanism allows to tilt the Lens and the third mechanism allows to swing the Lens. Note that all three adjustment mechanisms stand in relation with each other. So, a change to one of them will also effect the adjustment result of the two others. Therefore, all three adjustment points have to be alternately and repeatedly adjusted until the projected image is completely focused on the screen.

Scheimpflug principle

The "plane of sharp focus" can be changed so that any plane can be brought into sharp focus. When the DMD plane and lens plane are parallel, the plane of sharp focus will also be parallel to these two planes. If, however, the lens plane is tilted with respect to the DMD plane, the plane of sharp focus will also be tilted according to geometrical and optical properties. The DMD plane, the principal lens plane and the sharp focus plane will intersect in a line below the projector for downward lens tilt.

Necessary tools

- 8 mm nut driver.
- Flat blade stubby screw driver 40 x 6,5.
- White paper sheet.

How to set up the projector for Lens Holder adjustment?

1. Install the projector in its final position in the projection room.

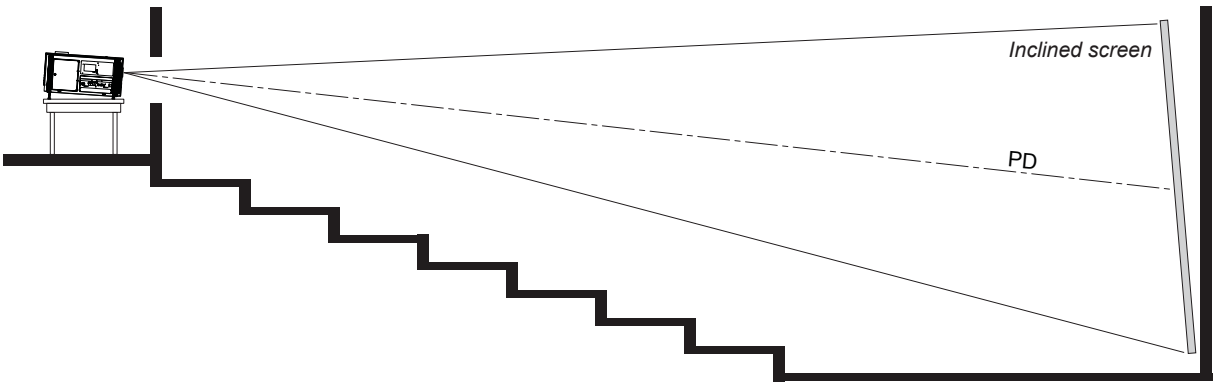


Image 12-20

2. Remove the front and left cover of the projector.
3. Install an 1,2" DC2K Zoom Lens which throw ratio covers the projection distance PD.
4. Switch on the projector and project the internal green focus pattern on the screen.
5. Adjust with the Lens zoom and Lens shift controls for optimal image matching on the screen.
   Tip: *For optimal image quality is recommended to tilt the projector forward to obtain an on-axis projection instead of shifting the image downwards.*

6. Adjust the Lens focus until the centre (F) of the projected pattern is most sharp on the screen.

How to adjust the Lens Holder?

1. Loosen (not remove) the four lock screws (reference A, B, C and D of image 12-21) of the Lens Holder adjustment mechanism. Use for that a 8 mm nut driver. As a result, the Swing (reference S) and the Tilt (reference T) mechanisms of the Lens Holder come loose for adjustment.

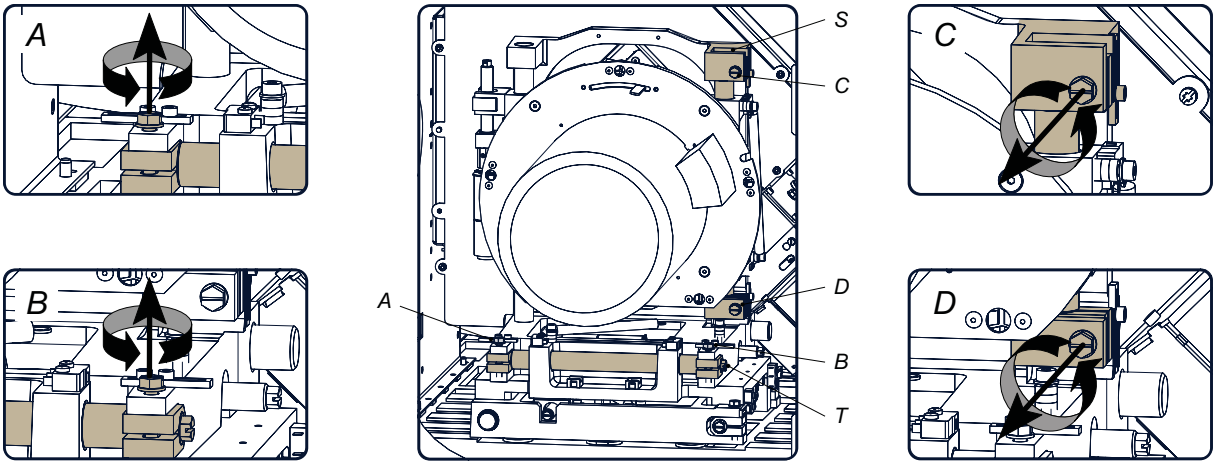


Image 12-21

2. Adjust the Lens focus until the centre (F) of the projected pattern is most sharp on the screen.

Image 12-22

3. Adjust the screw S (bit by bit) of the Lens Holder swing mechanism until the mid left and mid right of the projected pattern is most sharp on the screen. Use for that a 40 x 6,5 flat blade stubby screw driver.

   Tip: *Use a white paper to search for the "sharp focus plane" at the left or right side of the projected pattern. Turn the adjustment screw a bit and check if the sharp focus plane has come closer to the screen. If not, turn the adjustment screw in the opposite direction and check again.*

   Note: *A simultaneous readjustment of the focus will be necessary to get the mid left and mid right of the projected pattern equally focused as the centre.*

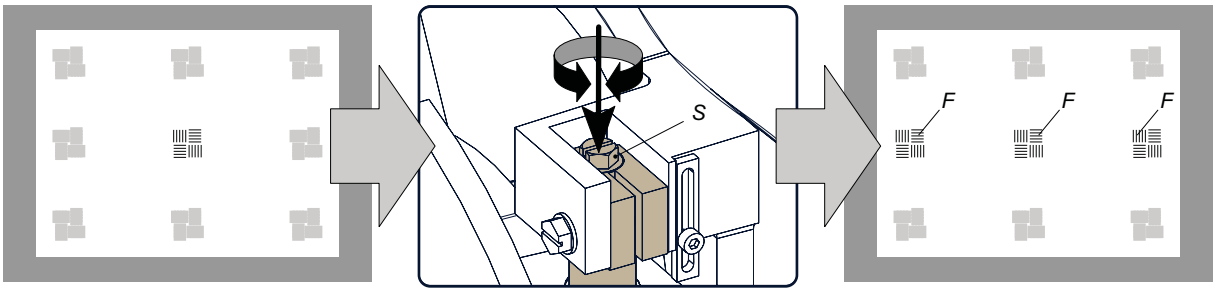


Image 12-23

4. Adjust the screw T (bit by bit) of the Lens Holder tilt mechanism until the mid top and mid bottom of the projected pattern is most sharp on the screen. Use for that 8 mm nut driver or a flat screw driver.

   Tip: *Use a white paper to search for the "sharp focus plane" at the top or bottom side of the projected pattern. Turn the adjustment screw a bit and check if the sharp focus plane has come closer to the screen. If not, turn the adjustment screw in the opposite direction and check again.*

   Note: *A simultaneous readjustment of the focus will be necessary to get the mid left and mid right of the projected pattern equally focused as the centre.*

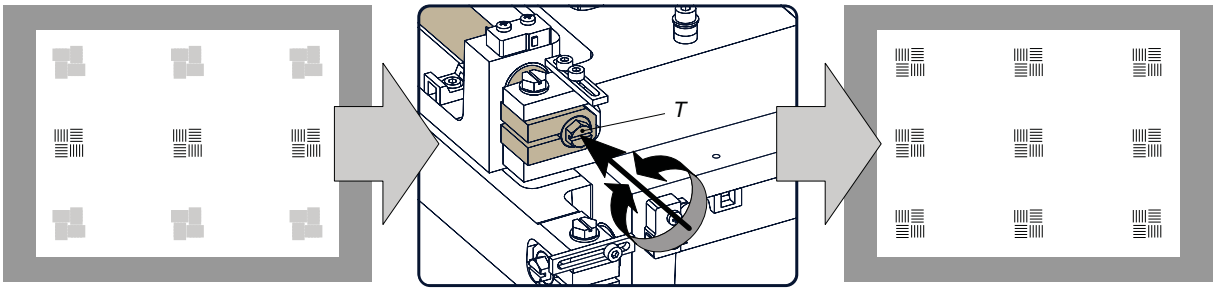


Image 12-24

5. Repeat from step 2 until the projected focus pattern is as sharp as possible in the centre, left, right, top and bottom of the screen.
6. Fasten the four lock screws (reference A, B, C and D of image 12-25) of the Lens Holder adjustment mechanism. Use for that a 8 mm nut driver. As a result, the positions of the Swing and Tilt mechanisms are secured.

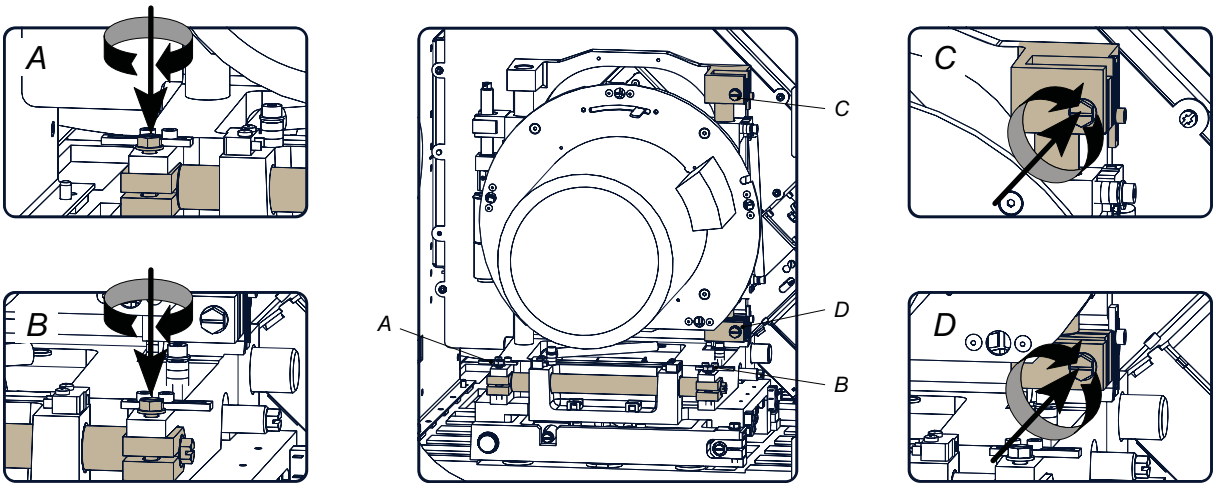


Image 12-25

7. Reinstall the front and side cover of the projector.

12.8 Removal of the Lens Holder

To remove the Lens Holder you have the remove the Lens, the front cover, the Sealed Light Processor and the bottom cover first. This procedure assumes that these parts are already removed.

Necessary tools

- 3 mm Allen wrench.
- T20 Torx screwdriver.

How to remove the Lens Holder?

1. Disconnect the flat cable (reference 1) from the Lens Signal Distribution board and detach the flat cable from the top of the Lens Holder (reference 2).

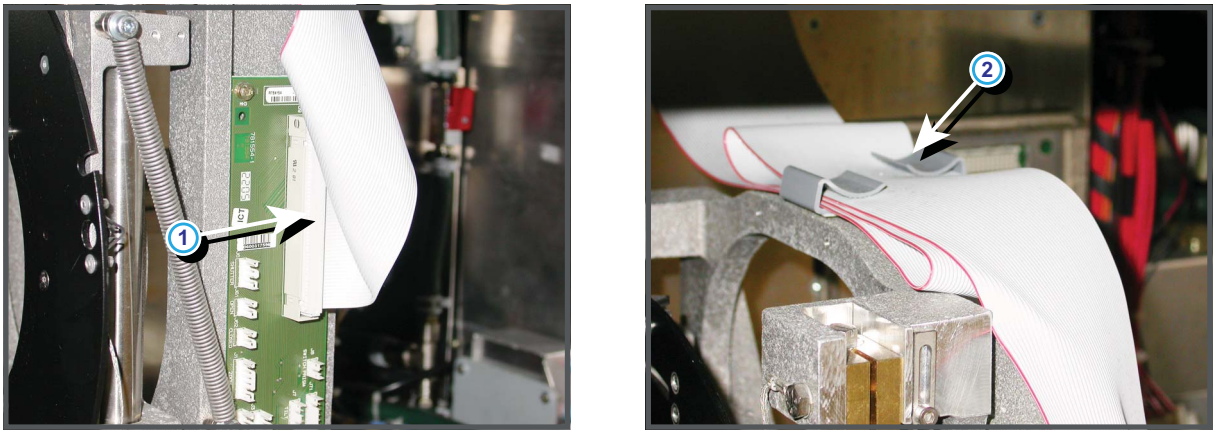


Image 12-26

2. Loosen the GND wire lug (reference 3) from the projector chassis. Use a T20 Torx screwdriver.

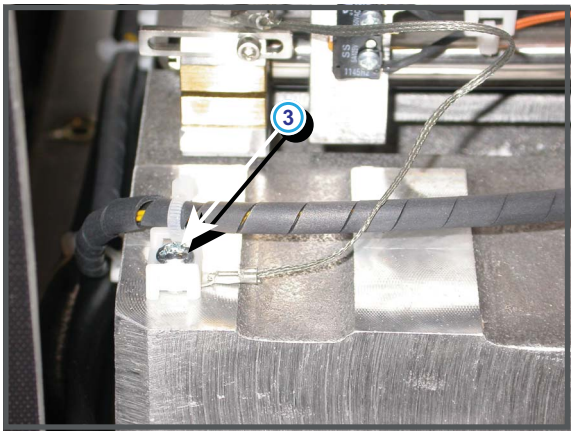


Image 12-27

3. Remove the 8 hexagon socket head cap screws (reference 1) which are located at the bottom of the projector base and secure the Lens Holder. Use a 3 mm Allen wrench.

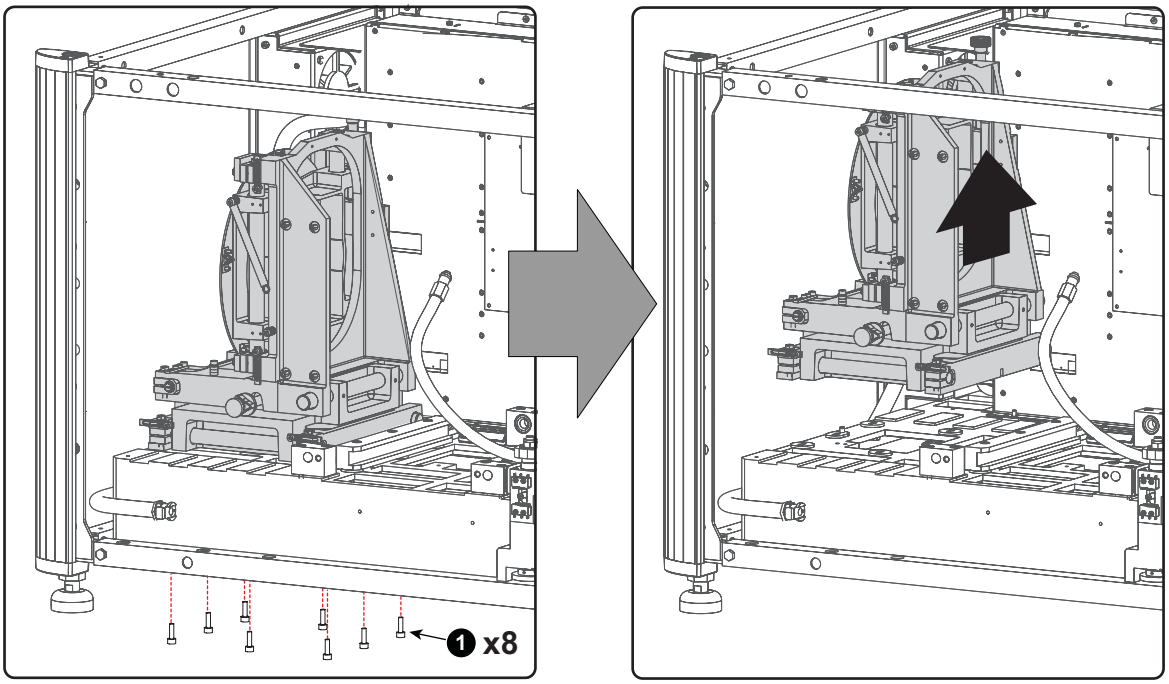


Image 12-28

4. Lift up the Lens Holder and remove it from the projector base.

12.9 Installation of the Lens Holder

Necessary tools

3 mm Allen wrench.

How to install the Lens Holder

1. Place the Lens Holder in its position on the projector base.
   Note: *Make sure that the positioning pin (reference 2 image 12-29) on the projector base matches the positioning hole of the Lens Holder.*
2. Fasten the Lens Holder with 8 hexagon socket head cap screws (reference 1 image 12-29). Use a 3 mm Allen wrench.

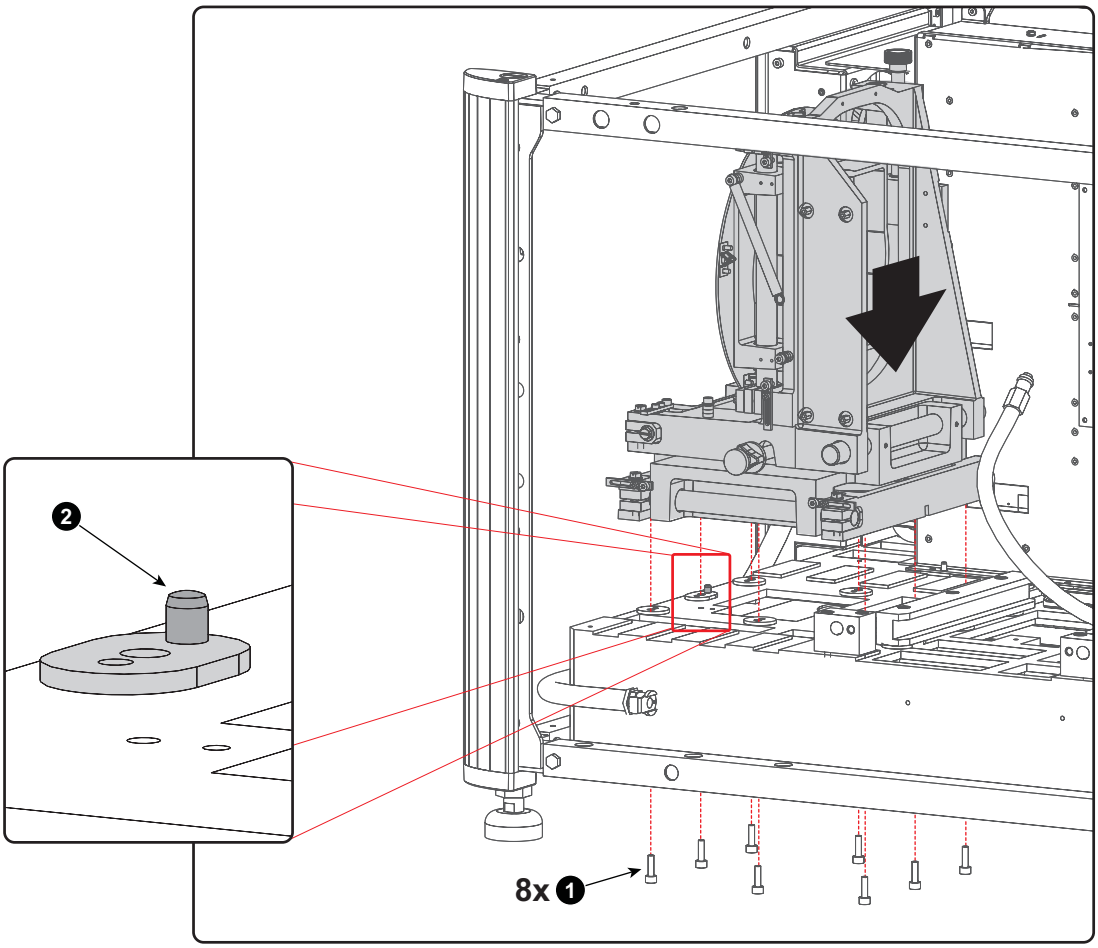


Image 12-29

3. Reconnect the flat cable (reference 1 image 12-30) with the Lens Signal Distribution board and secure the flat cable on top of the Lens Holder (reference 2 image 12-30).

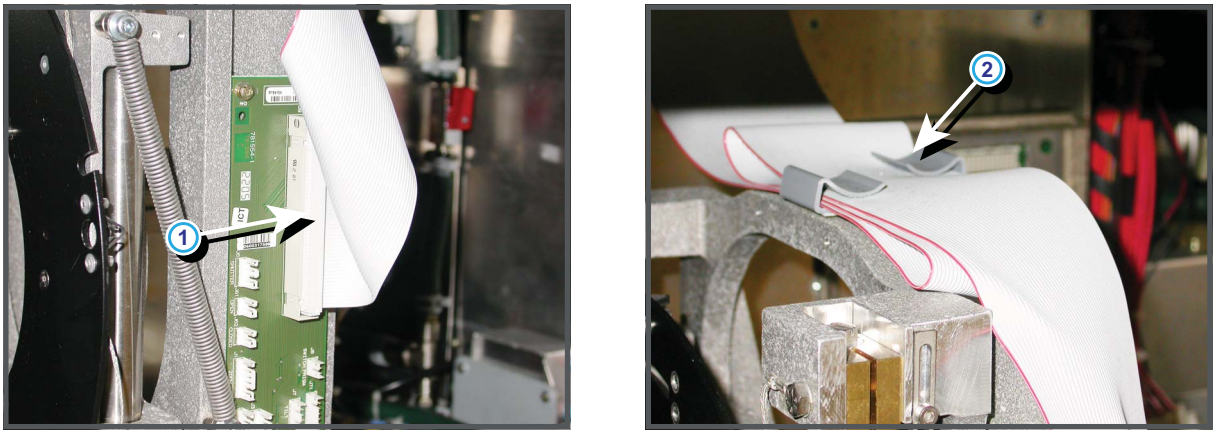


Image 12-30

4. Connect the GND wire lug (reference 3) with the projector chassis as illustrated. Use a T20 Torx screwdriver.

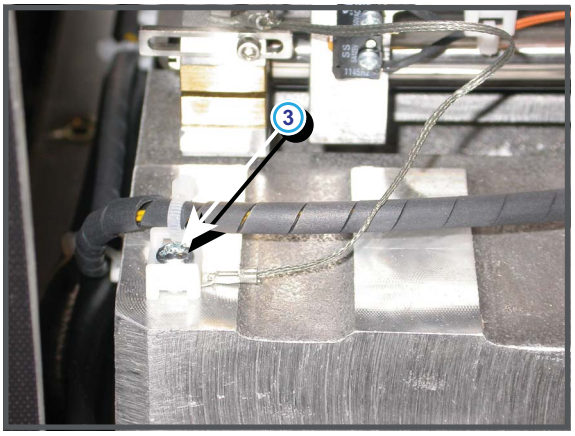


Image 12-31

Proceed with reinstalling the bottom cover, the Sealed Light Processor and the Lens of the projector. See corresponding installation procedures.

The Lens Holder has to be adjusted after installation. See procedure "Adjusting the Lens Holder", page 229.

12.10 Replacement of the vertical shift motor

It is not necessary to remove the Lens Holder from the projector chassis to replace the vertical shift motor.

This procedure assumes that the Lens Holder is removed from the projector chassis.

Necessary tools

- 7 mm nut driver or open-end wrench.
- 2 mm Allen wrench.
- PH0 Phillips screwdriver.

How to replace the vertical shift motor of the Lens Holder?

1. Disconnect the wire unit (reference 2) of the vertical shift motor from the Lens Signal Distribution board.

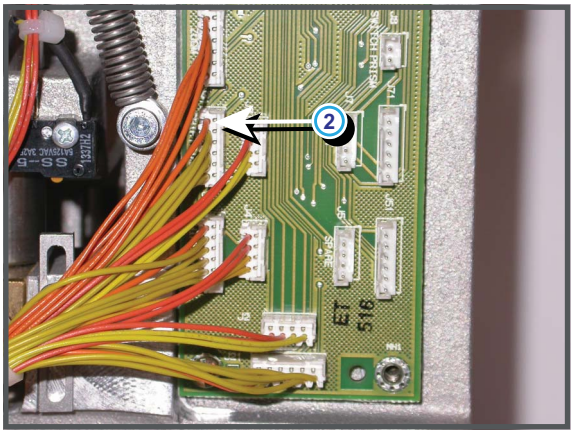


Image 12-32

2. Slowly rotate the axis (reference 1 image 12-33) of the vertical shift motor until the set screw (reference 2 image 12-33) is accessible. Use a 7 mm nut driver or open-end wrench.
3. Loosen the set screw (reference 2 image 12-33) a few turns and remove the motor with wire unit.

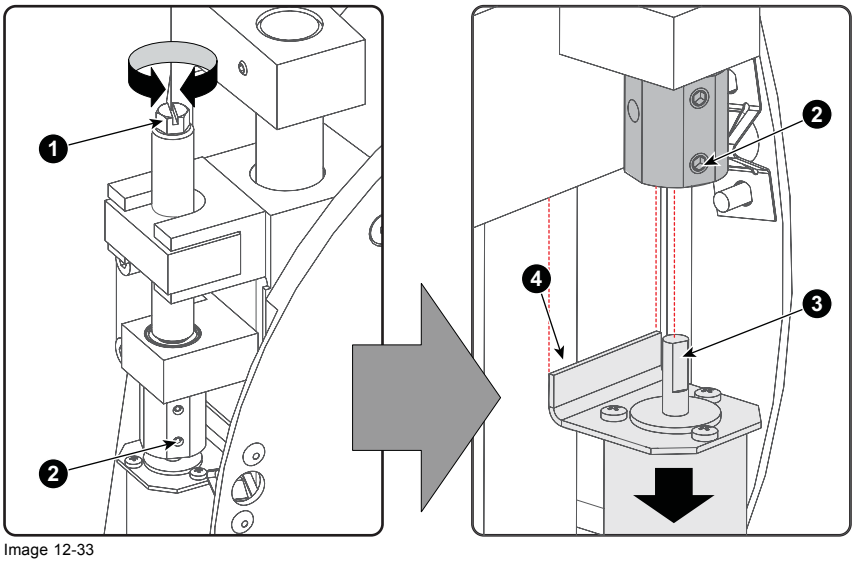


Image 12-33

4. Remove the bracket (reference 4 image 12-34) from the motor and reinstall it on the new motor. Use a PH0 Phillips screwdriver for the three screws (reference 5 image 12-34).

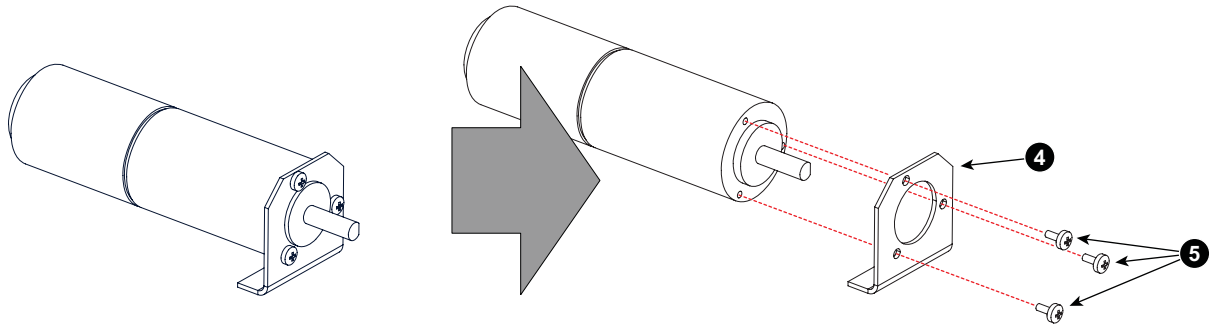


Image 12-34

5. Guide the wire unit of the new motor into position and connect the wire unit with the Lens Signal Distribution board (reference 2 image 12-33).

6. Place the new motor in position and fasten the axis of the motor with the set screw (reference 2 image 12-33).
   Caution: *Make sure the plain surface (reference 3 image 12-33) on the axis of the motor is facing the set screw. The small side of the bracket (reference 4 image 12-33) must mate with the frame of the Lens Holder.*

12.11 Replacement of the horizontal shift motor

It is not necessary to remove the Lens Holder from the projector chassis to replace the horizontal shift motor.

This procedure assumes that the Lens Holder is removed from the projector chassis.

Necessary tools

- 7 mm nut driver or open-end wrench.
- 2 mm Allen wrench.
- PH0 Phillips screwdriver.

How to replace the horizontal shift motor of the Lens Holder?

1. Disconnect the wire unit (reference 4 image 12-35) of the horizontal shift motor from the Lens Signal Distribution board.

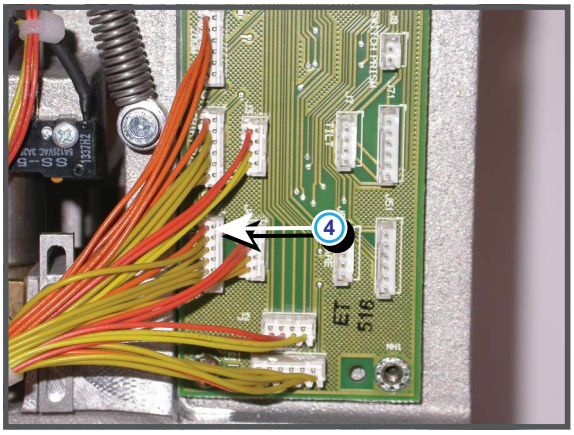


Image 12-35

2. Slowly rotate the axis (reference 1 image 12-36) of the vertical shift motor until the set screw (reference 2 image 12-36) is accessible. Use a 7 mm nut driver or open-end wrench.
3. Loosen the set screw (reference 2 image 12-36) a few turns and remove the motor with wire unit.
   Note: *In some cases the gap where the wire unit of the motor comes out can be to small for the plug of the wire unit. Release the two lock screws of the Lens Holder tilt mechanism (Scheimpflug adjustment) and rotate the tilt axis to increase the gap. This operation requires a readjustment of the Lens Holder. See "Adjusting the Lens Holder", page 229, for more information of the tilt axis and adjustment.*

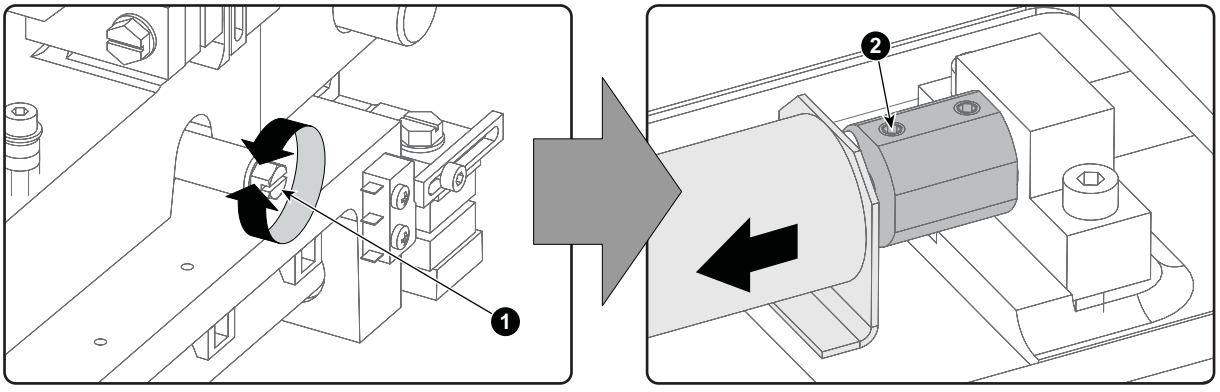


Image 12-36

4. Remove the bracket (reference 4 image 12-37) from the motor and reinstall it on the new motor. Use a PH0 Phillips screwdriver for the three screws (reference 5 image 12-37).

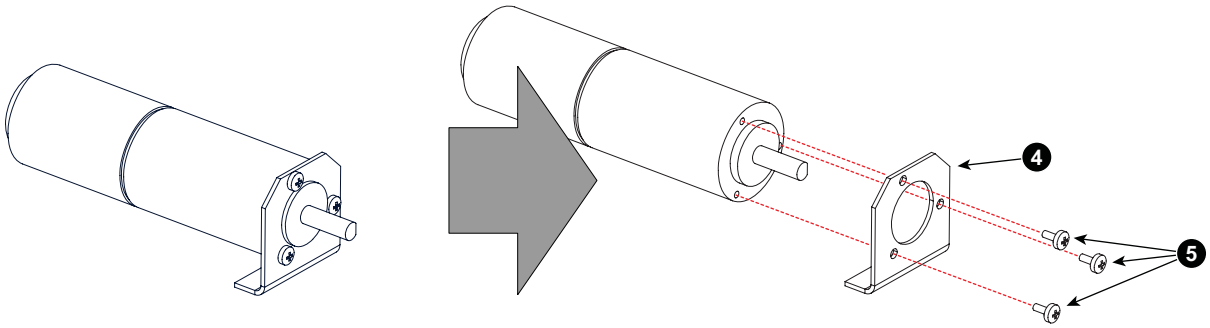


Image 12-37

5. Guide the wire unit of the new motor into position and connect the wire unit with the Lens Signal Distribution board (reference 4 image 12-35).

6. Place the new motor in position and fasten the axis of the motor with the set screw (reference 2 image 12-38).
   Caution: *Make sure the plain surface (reference 3 image 12-38) on the axis of the motor is facing the set screw. The small side of the bracket (reference 4 image 12-38) must mate with the frame of the Lens Holder.*

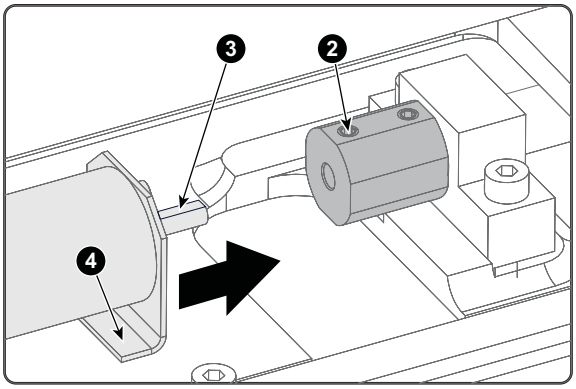


Image 12-38

12.12 Replacement of the focus motor

To replace the focus motor of the Lens Holder the Lens Holder has to be removed from the projector. This procedure assumes that the Lens Holder is already removed from the projector chassis.

Necessary tools

- 7 mm nut driver or open-end wrench.
- 2 mm Allen wrench.
- Set of cutting pliers.
- PH0 Phillips screwdriver.

Necessary parts

3 cable ties.

How to replace the focus motor of the Lens Holder?

1. Disconnect the wire unit (reference 7 image 12-39) of the focus motor from the Lens Signal Distribution board.

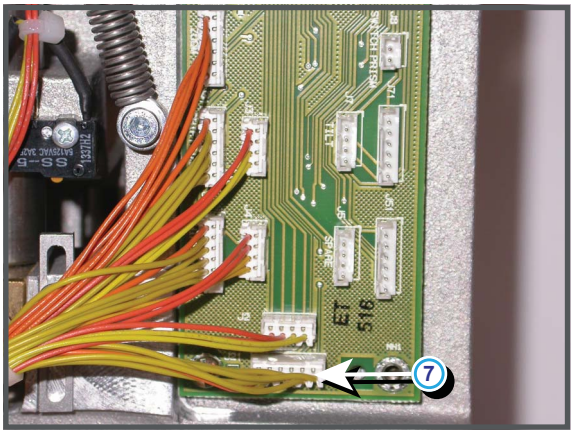
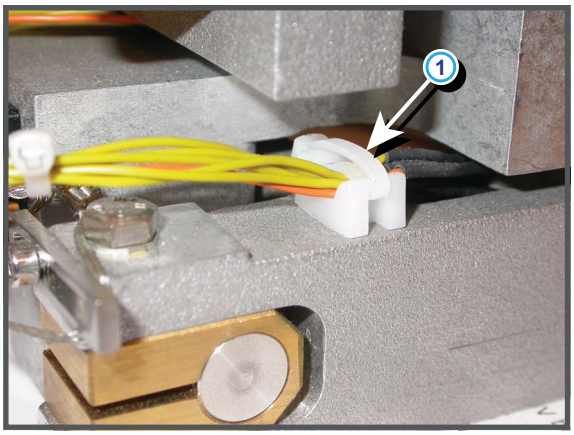


Image 12-39

2. Cut the cable ties (reference 1 & 2 image 12-40) which fasten the wire unit of the focus motor.



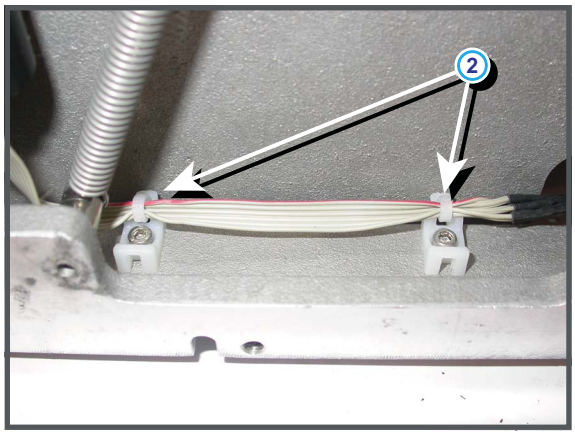


Image 12-40

3. Slowly rotate the axis (reference 1 image 12-41) of the focus motor until the set screw (reference 2 image 12-41) is accessible. Use a 7 mm nut driver or open-end wrench.
   Note: *You have to turn the Lens Holder to access the focus motor at the bottom side of the Lens Holder.*
4. Loosen the set screw (reference 2 image 12-41) a few turns and remove the motor with wire unit.

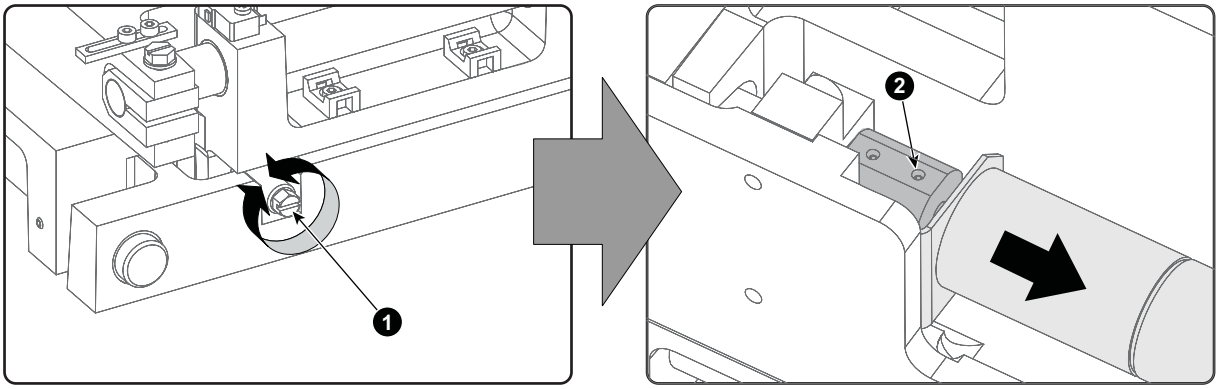


Image 12-41

5. Remove the bracket (reference 4 image 12-42) from the motor and reinstall it on the new motor. Use a PH0 Phillips screwdriver for the three screws (reference 5 image 12-42).

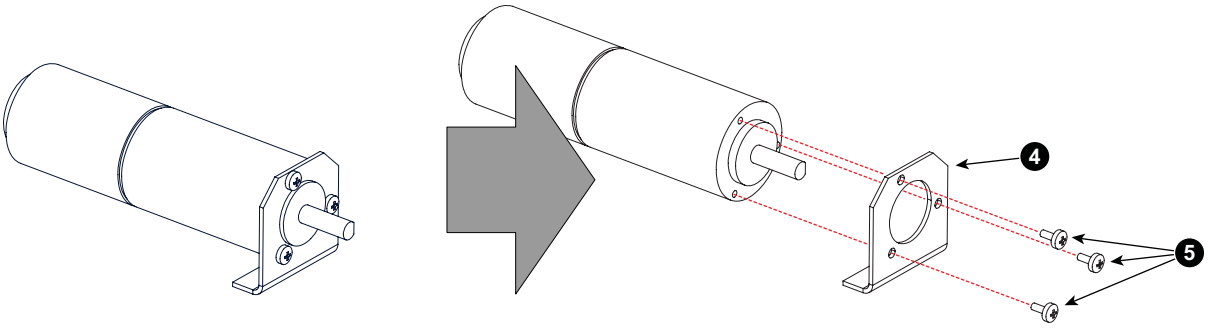


Image 12-42

6. Guide the wire unit of the new motor into position and connect the wire unit with the Lens Signal Distribution board (reference 7 image 12-39).
7. Secure the wire unit of the focus motor with three cable ties as illustrated in image 12-40.
8. Place the new motor in position and fasten the axis of the motor with the set screw (reference 2 image 12-43).
   Caution: *Make sure the plain surface (reference 3 image 12-43) on the axis of the motor is facing the set screw. The small side of the bracket (reference 4 image 12-43) must mate with the frame of the Lens Holder.*

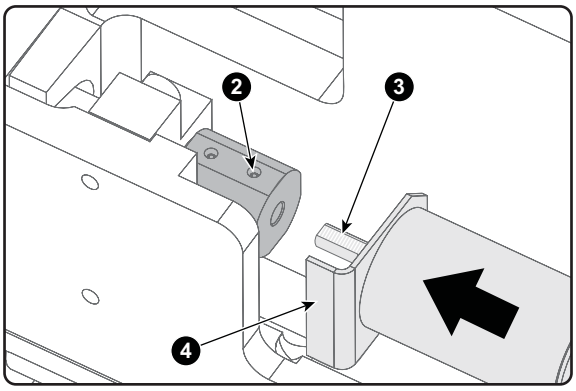


Image 12-43

12.13 Replacement of the Lens Signal Distribution board

To replace the Lens Signal Distribution board from the Lens Holder the Sealed Light Processor has to be removed first. This procedure assumes that the Sealed Light Processor is already removed.

Necessary tools

T10 Torx screwdriver.

How to replace the Lens Signal Distribution board?

1. Disconnect the flat cable and all other wire units (reference 1 to 8 image 12-44) from the Lens Signal Distribution board.
   Note: *The wire units of the Dowser are already disconnected because the Sealed Light Processor is removed.*

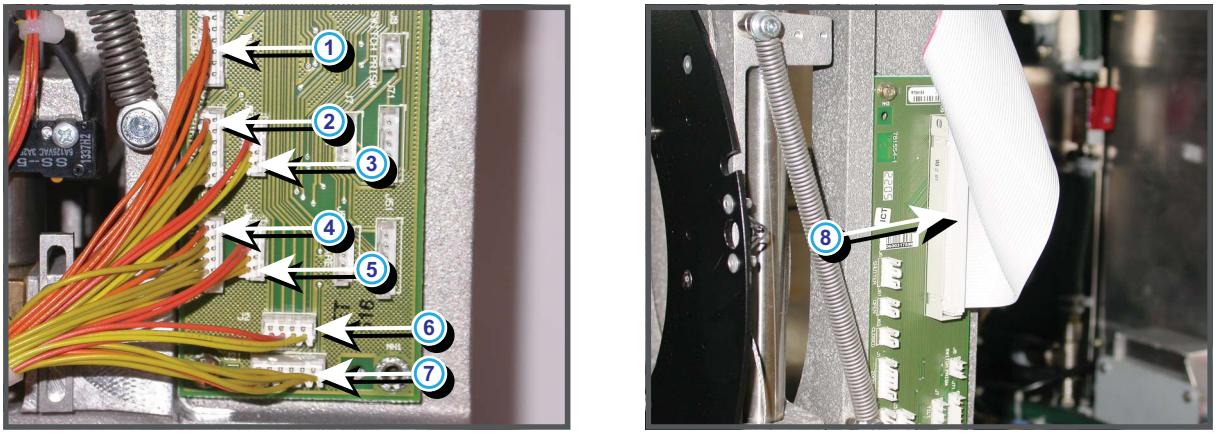


Image 12-44

2. Remove the Lens Signal Distribution board from the Lens Holder by loosening the four Torx screws (reference 1 image 12-45). Use a T10 Torx screwdriver.

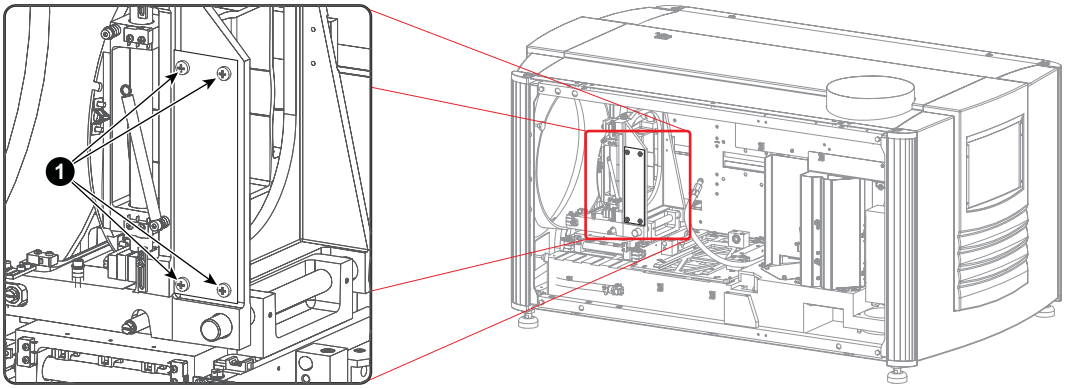


Image 12-45

3. Install a new Lens Signal Distribution board and fasten the board with four Torx screws.
4. Reconnect the other wire units (reference 1 to 7 image 12-44) with the Lens Signal Distribution board.
   - Reference 1 image 12-44: Connection with zoom motor.
   - Reference 2 image 12-44: Connection with vertical shift motor.
   - Reference 3 image 12-44: Connection with vertical end stop switches.
   - Reference 4 image 12-44: Connection with horizontal motor.
   - Reference 5 image 12-44: Connection with horizontal end stop switches.
   - Reference 6 image 12-44: Connection with focus end stop switches.
   - Reference 7 image 12-44: Connection with focus motor.
5. Reconnect the flat cable (reference 8 image 12-44) with Lens Signal Distribution board.

13. CARD CAGE

About this chapter

This chapter gives a brief introduction of the Card Cage and how to access the Card Case and the boards which are housing in this cage. The diagnostic LEDs of each board are described in this chapter as well. Futhermore, the board replacement procedures are included.

Overview

- Introduction
- Card Cage diagnostic
- Removal of the Card Cage cover
- Installation of the Card Cage cover
- Authorization to clear security warning on DP-3000
- Replacement of a Card Cage board

13.1 Introduction

Introduction of the Card Cage

The Card Cage is located at the right side of the projector, behind the Control Panel. The upper compartment of the Card Cage is sealed with a cover. This sealed compartment has five slots wherein the three power boards and two TI Cinema boards fit. The lower compartment has one slot wherein the Input & Communication unit fits. The power boards have board to board connectors with the Card Cage Power Backplane. The two TI Cinema boards and the Input & Communication unit have board to board connectors with the Card Cage Signal Distribution Backplane. Both backplanes are connected with each other via board to board connectors.

The Power Backplane extends a few centimeters above the Card Cage housing. This part of the Power Backplane is used to connect power and control signals to other electronic parts (fans, sensors, pump, switches, etc.) inside the projector.

CAUTION: The Card Cage cover may only be removed by qualified service personnel. Opening the Card Cage will result in an authorization request upon startup.

Parts location

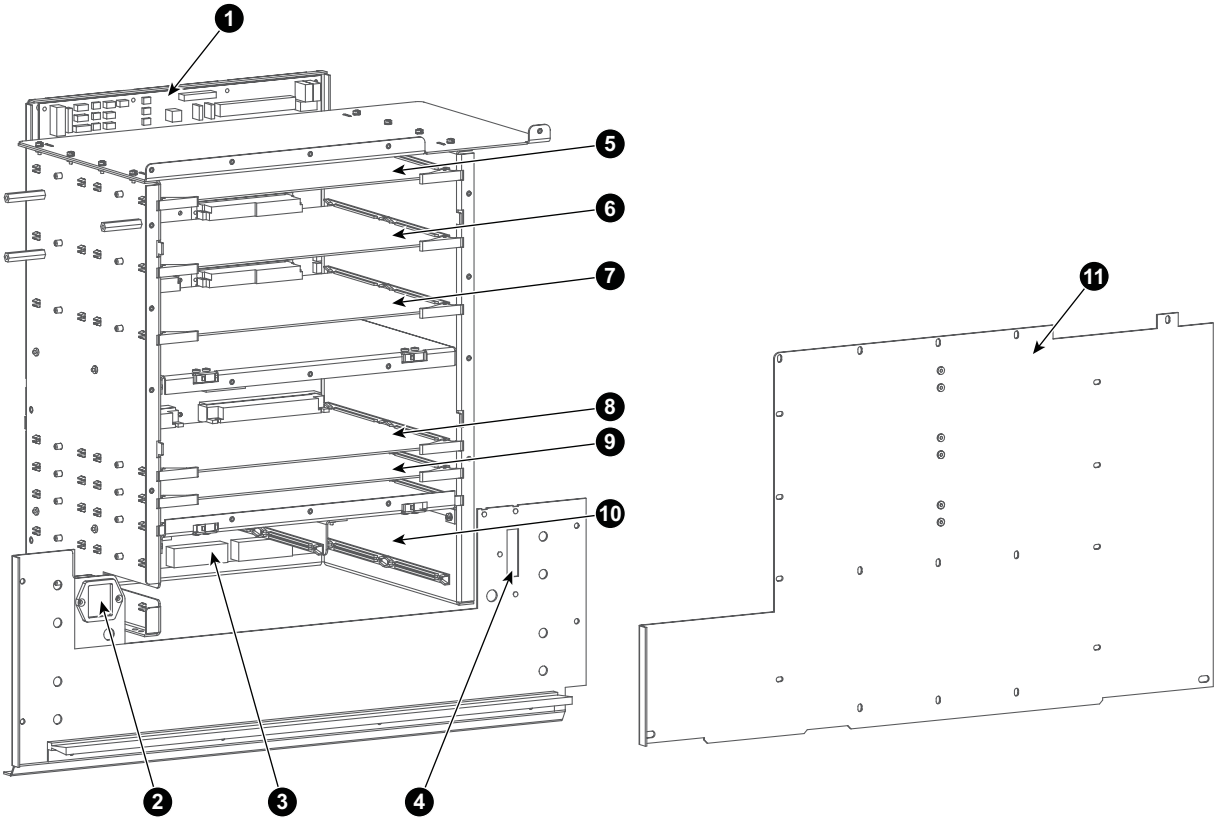


Image 13-1
1 Power Backplane.
2 Power input socket for projector electronics (not for the xenon lamp).
3 Signal Distribution Backplane.
4 Connection for Rack Control (Power Unit)
5 SMPS CTRL board.
6 SMPS PFC board.
7 SMPS DCDC board.
8 TI Cinema Processor board.
9 TI Cinema Interface board (with GORE protection)
10 Slot for the Input & Communication unit.
11 Card Cage cover.

13.2 Card Cage diagnostic

General

The Card Cage boards provide numerous LED indicators to provide various types of information about the system. These are defined per Card Cage board in the next sub-chapters. Note that these LED's are only visible when the Card Cage cover is removed.

SMPS CTRL board

The main function of the SMPS CTRL board (reference 1 image 13-2) is to monitor the temperature on different locations inside the projector and to drive the fans, the TEC's (Peltiers) and the pump dependent on these measured values. In case one of the cooling elements appears to be insufficient which result in a too high Lamp House temperature or DMD temperature then the DIMM PC on the "Input & Communication unit" will send a command to the LPS modules, located in the Power Unit, to shutdown. In case the DIMM PC fails then the SMPS CTRL board will shutdown the LPS modules (second protection level).

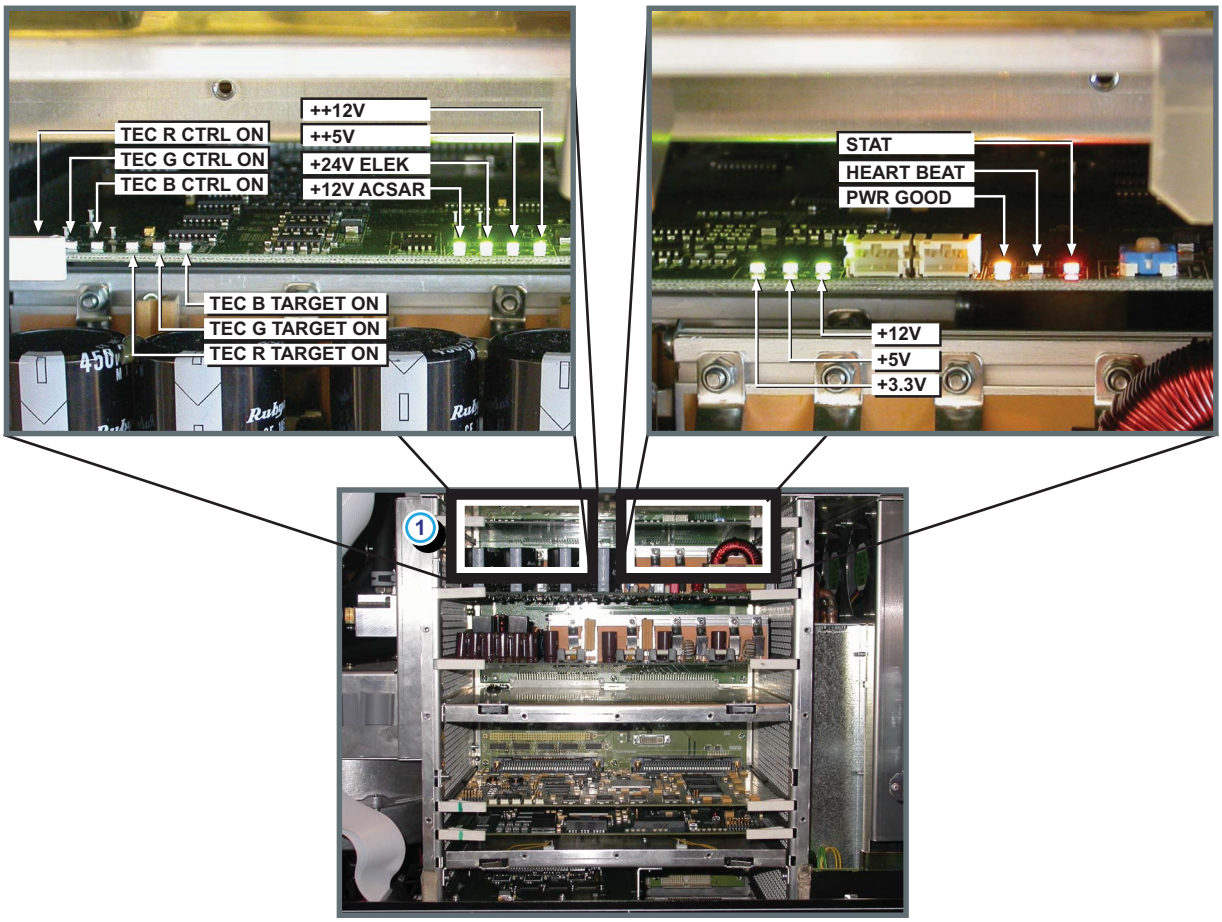


Image 13-2

LED	Description
TEC B TARGET ON (Yellow)	Indicates that the TEC for the blue channel is active. Note that the TEC voltage comes from the +12V TEC on the SMPS DCDC board.
TEC G TARGET ON (Yellow)	Indicates that the TEC for the green channel is active. Note that the TEC voltage comes from the +12V TEC on the SMPS DCDC board.
TEC R TARGET ON (Yellow)	Indicates that the TEC for the red channel is active. Note that the TEC voltage comes from the +12V TEC on the SMPS DCDC board.
++12V (Green)	Indicates that the ++12V standby supply is present on the SMPS CTRL board. Note that the ++12V standby supply is generated on the SMPS PFC board and enters the SMPS CTRL board via the Power Backplane.
++5V (Green)	Indicates that the ++5V standby supply is present on the SMPS CTRL board. Note that the ++5V standby supply is generated on the SMPS PFC board and via the Power Backplane enters the SMPS CTRL board.
+24V_ELEK	Indicates that the +24V_ELEK supply is present on the SMPS CTRL board. Note that the +24V_ELEK supply is generated on the SMPS DCDC board and enters the SMPS CTRL board via the Power Backplane. The +3.3V, the +5V and the +12V power supplies are derived from the +24V_ELEK.

LED	Description
+12V_ACSAR	Indicates that the +12V_ACSAR supply is present on the SMPS CTRL board. Note that the +12V_ACSAR supply is generated on the SMPS DCDC board and enters the SMPS CTRL board via the Power Backplane. The + 12V_ACSAR is currently not used but available for future expansion.
STAT (Red)	Indicates the status of the SMPS CTRL board.
HEART BEAT	Indicates the heart beat of the SMPS CTRL board.
POWER GOOD (Yellow)	Indicates that the measured values of the +3.3V, the +5V and the +12V power supplies are within tolerance. Note that these three voltages are derived from the +24V_ELEK.
+3.3V	Indicates that the +3.3V supply is within tolerance. Note that the +3.3V is derived from the +24V_ELEK on the SMPS CTRL board.
+5V	Indicates that the +5V supply is within tolerance. Note that the +5V is derived from the +24V_ELEK on the SMPS CTRL board.
+12V	Indicates that the +12V supply is within tolerance. Note that the +12V is derived from the +24V_ELEK on the SMPS CTRL board.

SMPS PFC board (Power Factor Corrector)

The main function of this board (reference 2 image 13-3) is to reduce the line current distortion and to improve the power factor. The SMPS PFC board also generates the ++5V and the ++12V standby supplies. Futhermore, the supply voltages for the four fan groups are generated on this board as well.

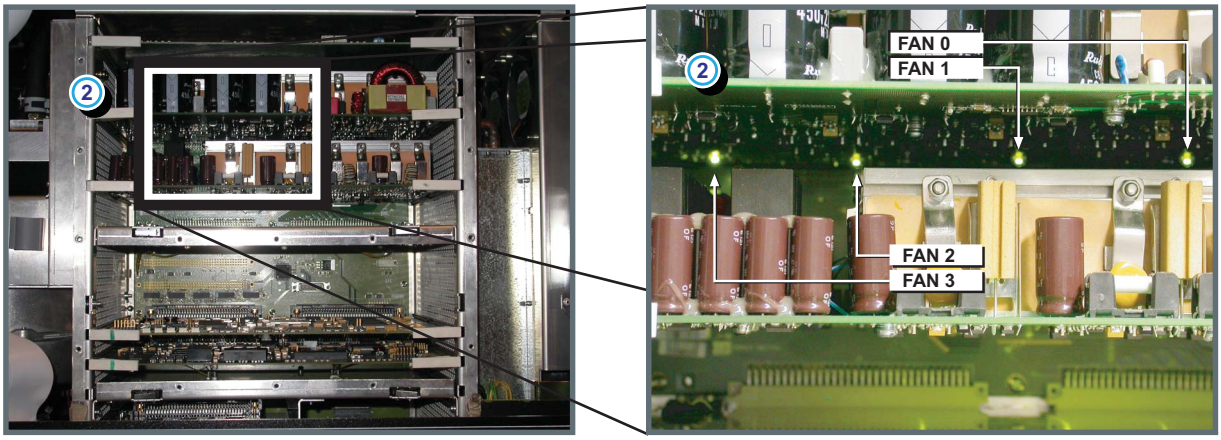


Image 13-3

LED	Description
FAN_0 (Green)	Indicates that the supply voltage for the Outlet Fan in the heat exhauster on top of the projector is present.
FAN_1 (Green)	Indicates that the supply voltage for the Anode Fan of the lamp anode cooling is present.
FAN_2 (Green)	Indicates that the supply voltage for the Cathode Fan of the lamp cathode cooling is present.
FAN_3 (Green)	Indicates that the supply voltage for all fans (except for the Outlet Fan, the Anode Fan and the Cathode Fan) is present.

SMPS DCDC board

This board (reference 3 image 13-4) generates the supply voltages for the projector electronics, for the pump of the liquid cooling circuit, for the thermoelectric cooling (TEC). The +12V_ACSAR is also generated on this board, but has currently no use (future expansion).

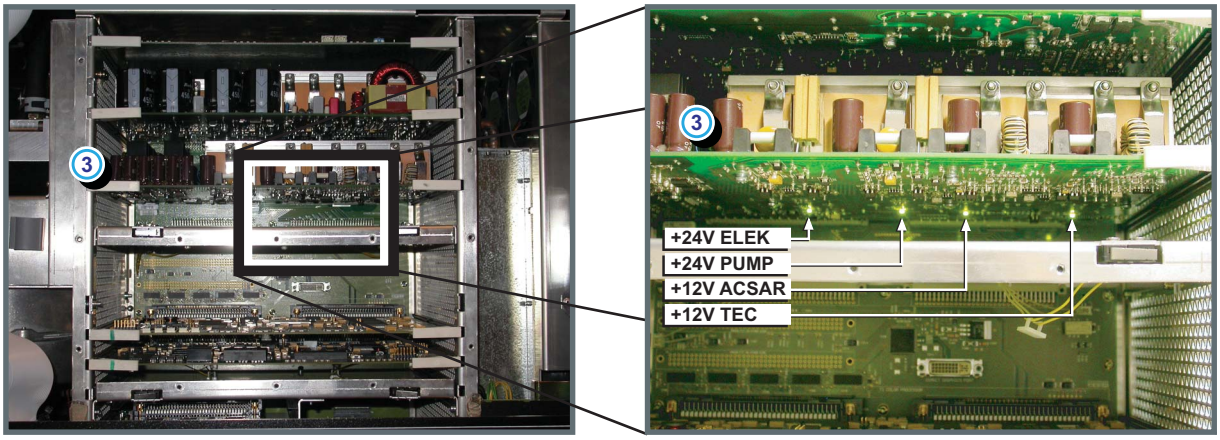


Image 13-4

LED	Description
+24V ELEK (Green)	Indicates that the +24V supply voltage for the projector electronics is present.
+24V PUMP (Green)	Indicates that the +24V supply voltage for the pump of the liquid cooling circuit is present.
+12V ACSAR (Green)	Indicates that the +12V supply voltage for future expansion is present.
+12V TEC (Green)	Indicates that the +12V supply voltage for the TEC's (Peltier element) is present.

TI Cinema Processor board

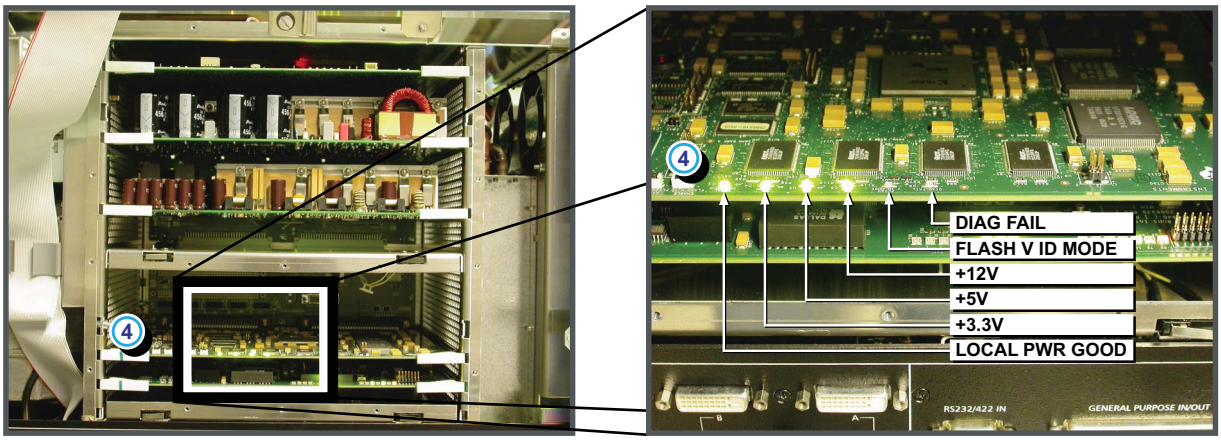


Image 13-5

LED	Description
LOCAL PWR GOOD (Green)	Indicates the on-board 1.8V DC and 1.5V DC regulators are operating properly. OFF = FAIL ; ON = OK
+3.3V	Indicates presence of external 3.3V DC supply. OFF = FAIL ; ON = OK
+5V	Indicates presence of external 5V DC supply. OFF = FAIL ; ON = OK
12V	Indicates presence of external 12V DC supply. OFF = FAIL ; ON = OK
FLASH V ID MODE	Indicates that FLASH memory is in an unprotected state. OFF = Protected ; ON = Unprotected • FLASH memory protection is not being used, therefore, this LED has no meaning. • In certain Series-0 Pre-Production Processor boards (with MSN numbers starting with "0123"), FLASH protection of some sectors was used. Updating the FLASH on these boards required using the "TEMP UNPROTECT" button which would unprotect the FLASH and illuminate this LED.
DIAG FAIL	Indicates that built-in diagnostic test failed. See System Status for details on which test failed. OFF = OK ; ON = FAIL

TI Cinema Interface board

The TI Cinema Interface board is enclosed with a GORE protection. There are no diagnostic LED's visible on this board

13.3 Removal of the Card Cage cover

To remove the Card Cage cover, you have to remove the right cover of the projector first. This procedure assumes that the right cover of the projector is already removed.

CAUTION: The Card Cage cover may only be removed by qualified service personnel. Opening the Card Cage will result in an authorization request upon startup.

Necessary tools

- Flat screwdriver.
- T20 Torx screwdriver.
- T10 Torx screwdriver.
- PH1 Phillips screwdriver.

How to remove the cover of the Card Cage?

1. Release the two retaining screws which fasten the Control Panel to the projector chassis. Use for that a flat screwdriver.

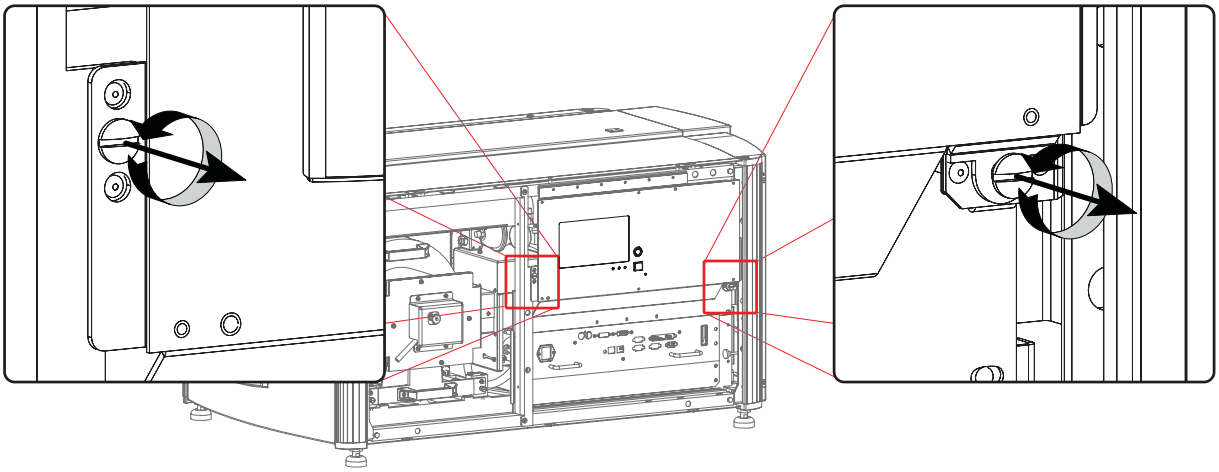


Image 13-6

2. Pivot the Control Panel upwards and lock the position with the provided support as illustrated.

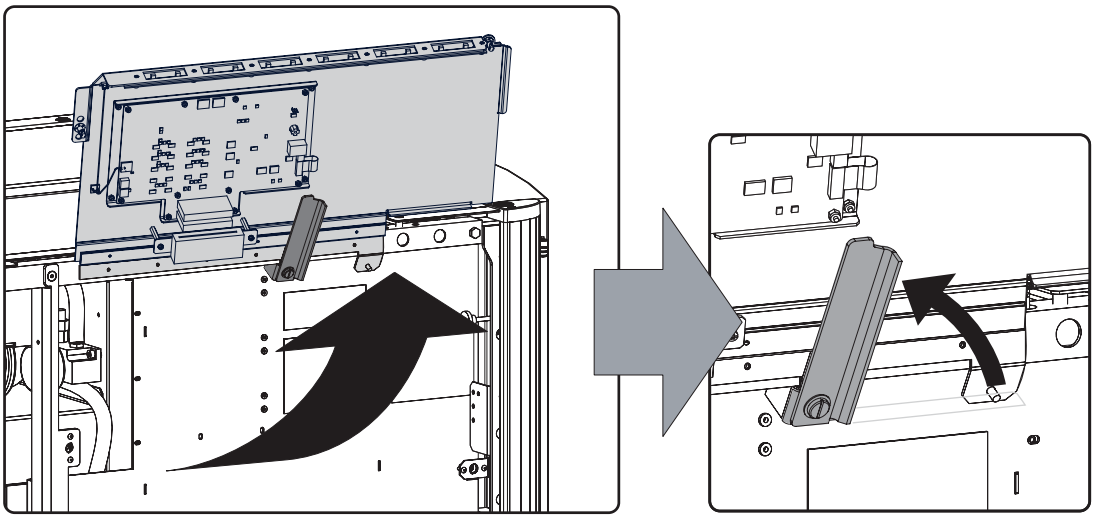


Image 13-7

3. Loosen the 21 screws which fasten the Card Cage cover. Use a T10 Torx driver for the upper 14 screws (reference 3 image 13-8), a T20 Torx driver for the two screws (reference 1 image 13-8) at the bottom corners and a PH1 Phillips screwdriver for the 5 black screws (reference 2 image 13-8) at the bottom center.
4. Remove the Card Cage cover away from the Card Cage.

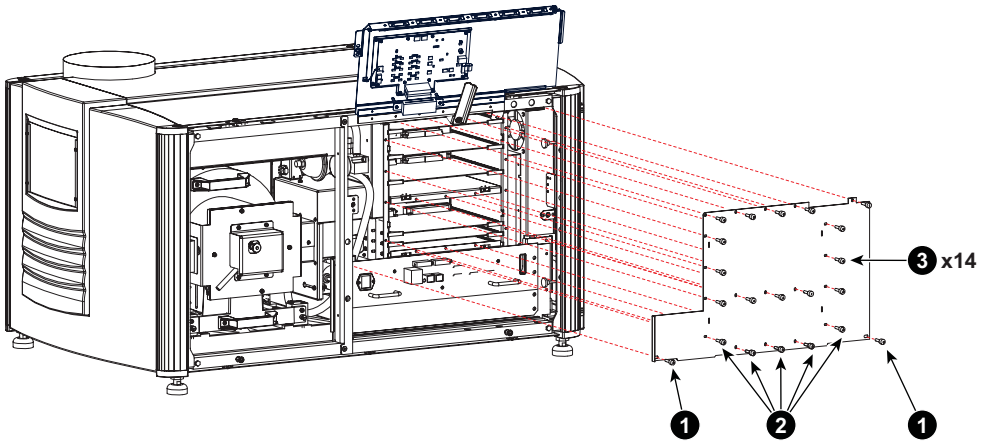


Image 13-8

13.4 Installation of the Card Cage cover

Necessary tools

- Flat screwdriver.
- T20 Torx screwdriver.
- T10 Torx screwdriver.
- PH1 Phillips screwdriver.

How to install the cover of the Card Cage?

1. Check if the handles of all boards are completely sunken in the Card Cage.
2. Place the Card Cage cover into position. Make sure that the four small vertical slots of the cover fits upon the corresponding pins of the Card Cage.
   Caution: *Do not damage the four micro switches of the security enclosure while positioning the Card Cage cover.*
3. Fasten the Card Cage cover with 21 screws in total:
   - 5 x M2 black Phillips screws PH1 for the bottom center of the cover. (reference 1 image 13-9)
   - 2 x M3 Torx screws T20 for the bottom corners of the cover. (reference 2 image 13-9)
   - 14 x M2 Torx screws T10 for the upper part of the cover. (reference 3 image 13-9)

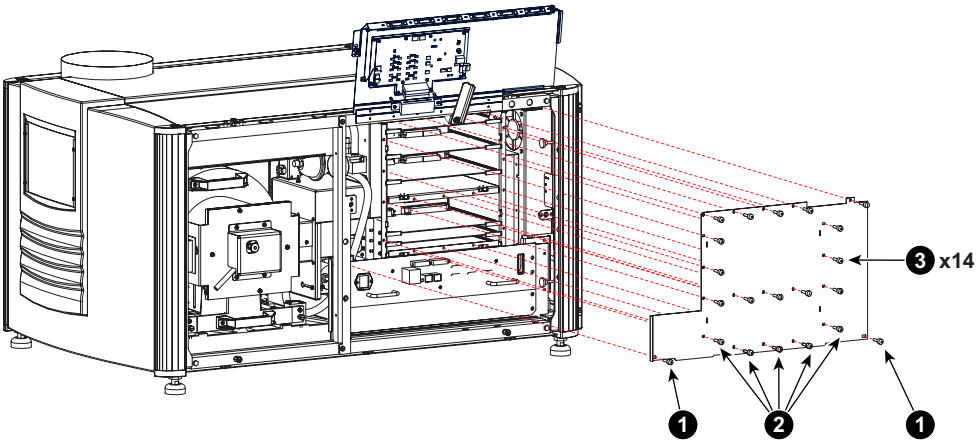


Image 13-9

4. Lower and secure the Control Panel. Use a flat screw driver to fasten the two screws at the bottom corners of the Control Panel.

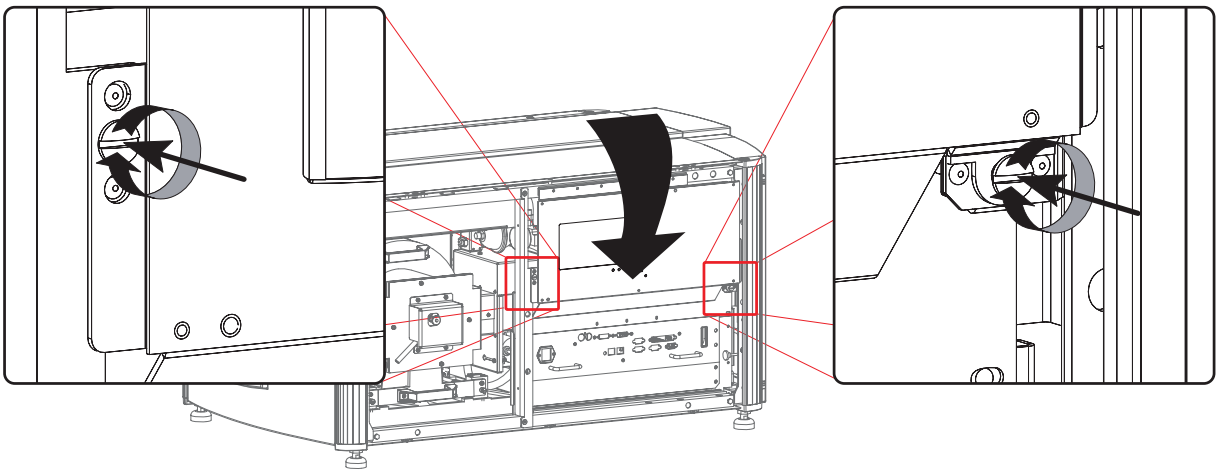


Image 13-10

5. Reinstall the right side cover of the projector.
6. Execute the authorization process to clear the security warning. See procedure "Authorization to clear security warning on DP-3000", page 251.

13.5 Authorization to clear security warning on DP-3000

The authorization to clear the security warning on the DP-3000 digital projector has to be done after all covers of the projector are correct installed.

Necessary tools

- Security key (Dallas iButton®).
- Authorization pin code (8 digits).

Authorization procedure to clear security warning on DP-3000

1. Start up the projector (standby mode).
2. Initiate authorization by holding the security key in the security socket D.

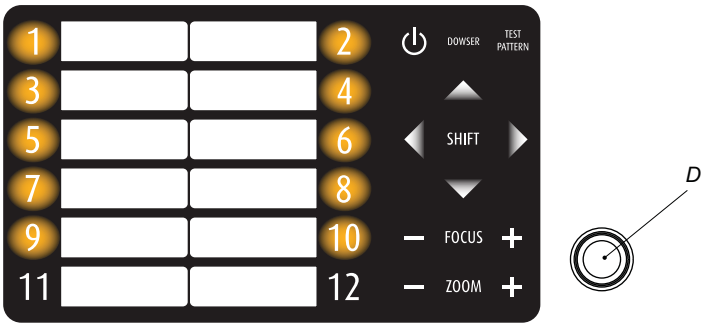


Image 13-11

The backlight color of the numeric keys 1 to 10 changes to orange.

3. Start entering the pin code within 5 seconds.

   The backlight color of the numeric keys 1 to 10 changes temporally to green in case the code is correct. Otherwise the backlight color changes for a few seconds to red. Finally the backlight color changes back to blue (normal operation color).

Restart the procedure in case of an invalid attempt. Maximum five (5) attempts are permitted.

13.6 Replacement of a Card Cage board

CAUTION: Handle the TI Cinema Interface board which is enclosed with a security kit (black housing around the board) with care. Note that the security kit is very sensitive. A small scratch will permanently disable the TI Cinema Interface board. Never try to dismantle the security kit. Consult Barco in case of damage. The security kit is needed to protect the decrypting key.

CAUTION: Remove the mains power from projector and wait at least 2 minutes before replacing one of the power boards (SMPS PFC and SMPS DCDC). Neglect will result in electrical damage of the input circuitry of the power boards.

Before swapping the TI Cinema Interface board, try to make a copy of the created macro files, so you can restore them later in the new TI Cinema Interface board. See chapters “Cloning” and “Restoring” in the user guide of the Communicator software.

To replace one of the Card Cage boards the cover of the Card Cage has to be removed first. This procedure assumes that the cover of the Card Cage is already removed. See procedure "Removal of the Card Cage cover", page 248. Note that opening the Card Cage will result in an authorization request upon startup.

How to replace one of the Card Cage boards?

1. Do you wan to remove one of the TI Cinema boards?
   If yes, detach the wire unit (reference 1image 13-12) of the TI Cinema Interface board from the inner side of the Card Cage.

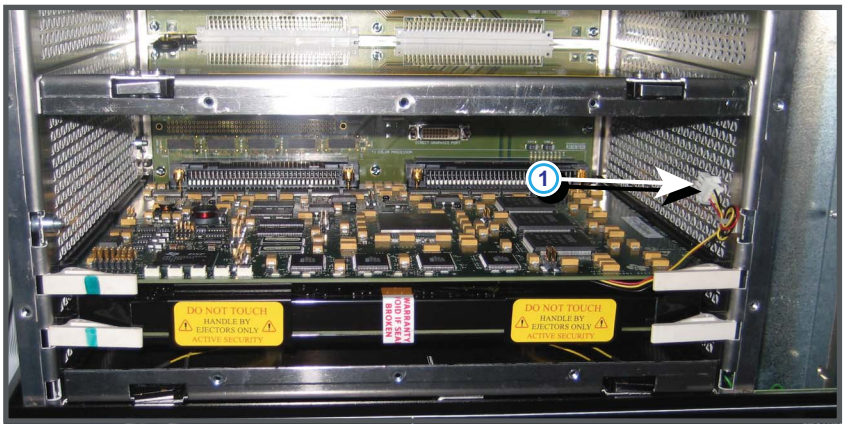


Image 13-12

2. Unlock and pull out the board which you wan to remove from the Card Cage.
   Caution: *Make sure that the projector is at least 2 minutes removed from the mains power before removing on of the Power Boards.*

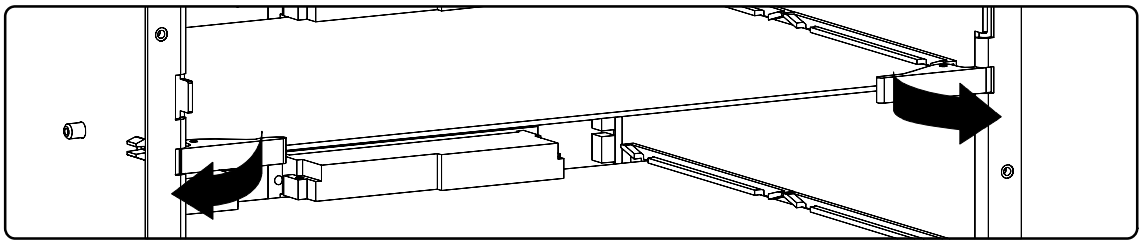


Image 13-13

3. Insert the new board in the Card Cage. The handles of the board must be completely sunken in the Card Cage. Otherwise, the Card Cage cover will not fit and because of that disables the authorization process.
   Caution: *Make sure that the projector is at least 2 minutes removed from the mains power before inserting a new Power Board.*
4. Did you replace one of the TI Cinema boards?
   If yes, attach the wire unit (reference 1image 13-12) of the TI Cinema Interface board with the cable clamp inside the Card Cage.

Check the version of the TI software. Download the latest version of the “TI software release” from the secured Barco web site https://My.Barco.com and update the TI firmware of all TI boards. See chapter "Updating TI Boards", page 255.

At startup the projector will request an authorization because of the removal of the Card Cage cover. See procedure "Authorization to clear security warning on DP-3000", page 251.

14. UPDATING TI BOARDS

About this chapter

If one of the TI boards, such as the Formatting Interface Board; the TI Interface Board; or the TI Processor Board, is replaced with a new one then the TI firmware must be updated. This chapter contains the procedures for updating the TI firmware.

Overview

- Installation of the Update Package
- Start up the update program
- Make a serial connection (RS232)
- Make an Ethernet connection (10/100 BASE-T)
- Installation of the new software release
- Logging of the operation
- Special functions
- Factory Install Options
- Recovery option - Stay in Boot option

14.1 Installation of the Update Package

How to install?

1. Download the Update package from the secured Barco web site and copy this file (.zip format) into a new directory.
2. Unzip the package file into this directory.

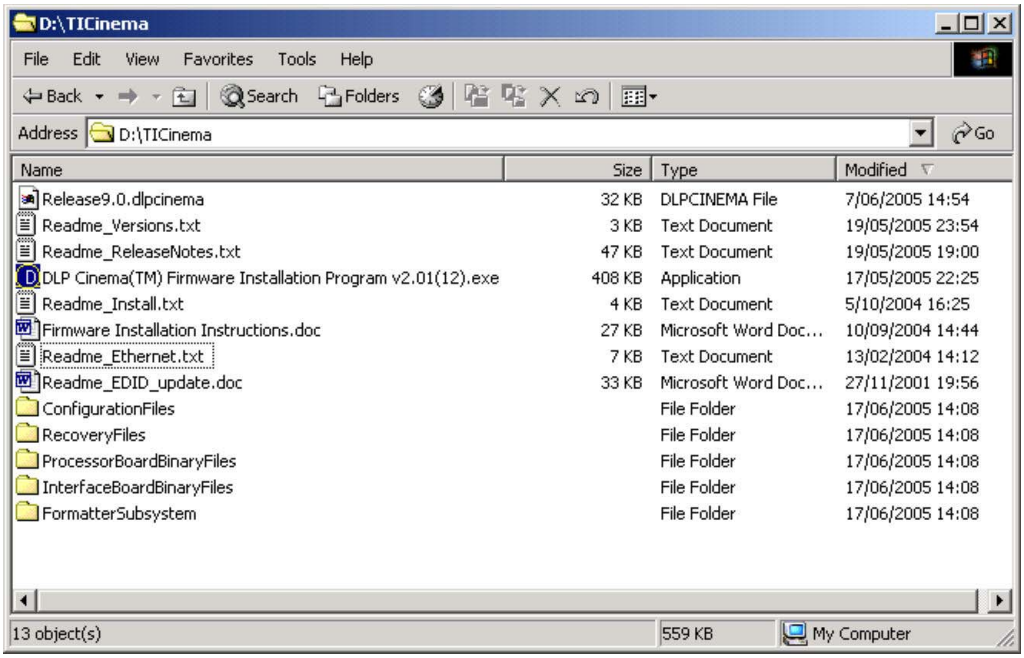


Image 14-1
Unzipped package file

The directory contains:

- An update program file (.exe)
- Software update file (.dlpcinema)
- read me and instruction files (.txt and .doc)
- a configuration files directory containing configuration files.
- a recovery files directory containing recovery files.
- a processor board binary files directory with binary files for the processor board.
- an interface board binary files directory with binary files for the interface board.
- a formatter sub system directory.

14.2 Start up the update program

How to start up ?

1. Browse to the installation directory of the TI update software.
2. Double click on *DLP Cinema(TM) Firmware Installation Program v2.01(12).exe* to start up the update program.
   Note: *The version indication in the startup file can be different for other releases.*

   The start up window will be displayed.

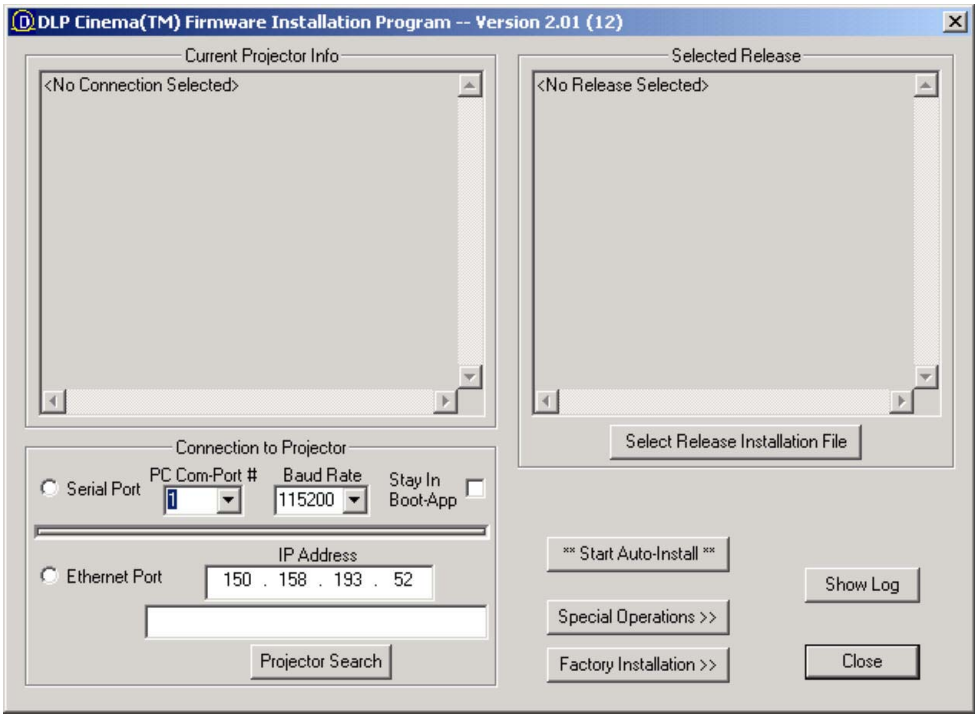


Image 14-2
Start up of update program

14.3 Make a serial connection (RS232)

Necessary parts

A fully wired straight serial cable

Software connection

1. Connect the local PC with the RS232 port of the Input & Communication unit.
2. Select first the PC com-port by clicking on the combo box just below *PC com-port #* (1).

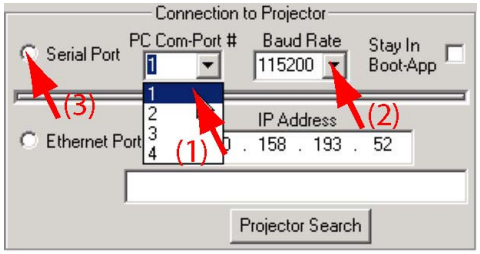


Image 14-3
Serial connection setup

3. Select the baud rate by clicking on the combo box just below *Baud Rate* (2).
4. Check the radio button in front of *Serial Port* (3).

   The connection will be established. A login message will be displayed. Click **OK** to continue.
5. Enter the userid and password.

Image 14-4
Login window

Defaults are:

- User Id: Service
- Password: Heal Thyself

Both are case sensitive.

When correct, the *Current Projector Info* of the selected projector will be filled out.

14.4 Make an Ethernet connection (10/100 BASE-T)

A crossed or non crossed Ethernet cable can be used. the projector switched automatically for the correct cable.

The PC's IP Address MUST be within the same subnet as the projector's IP Address in order for communication to be possible. This requires checking the PC's and projector's Subnet-Mask settings.

IP address examples

First example

- PC IP Address : 192.168.100.5
- PC Subnet Mask : 255.255.255.0
- Projector IP Address : 192.168.100.2
- Projector Subnet Mask: 255.255.255.0

Result : Communication possible. PC address is in the subnet range of the projector's IP address.

Second example

- PC IP Address : 10.16.236.100
- PC Subnet Mask : 255.255.255.0
- Projector IP Address : 192.168.100.2
- Projector Subnet Mask: 255.255.255.0

Result : No communication possible. PC address is not in the subnet range of the projector's IP address.

Third example

- PC IP Address : 192.168.200.1
- PC Subnet Mask : 255.255.255.0
- Projector IP Address : 192.168.100.2
- Projector Subnet Mask: 255.255.255.0

Result : No communication possible. PC address is not in the subnet range of the projector's IP address. The third group in the PC IP address and Projector IP address must be the same.

Fourth example

- PC IP Address : 192.168.200.1
- PC Subnet Mask : 255.255.0.0
- Projector IP Address : 192.168.100.2
- Projector Subnet Mask: 255.255.0.0

Remark : Communication possible. PC address is in the subnet range of the projector's IP address. The third group in the IP¨ addresses can be any value as the third group in the subnet mask is 0.

Software connection

1. Connect the local PC with one of the Ethernet ports (100/10 BASE-T) of the Input & Communication unit.
2. Click in the IP address input field and fill out directly the IP address of the projector (1a).
   Note: *The IP address must be the TI/Cinema IP address. To read out that address, look for the Cinema IP address via the touch panel or look for the TI IP address via the Communicator software.*

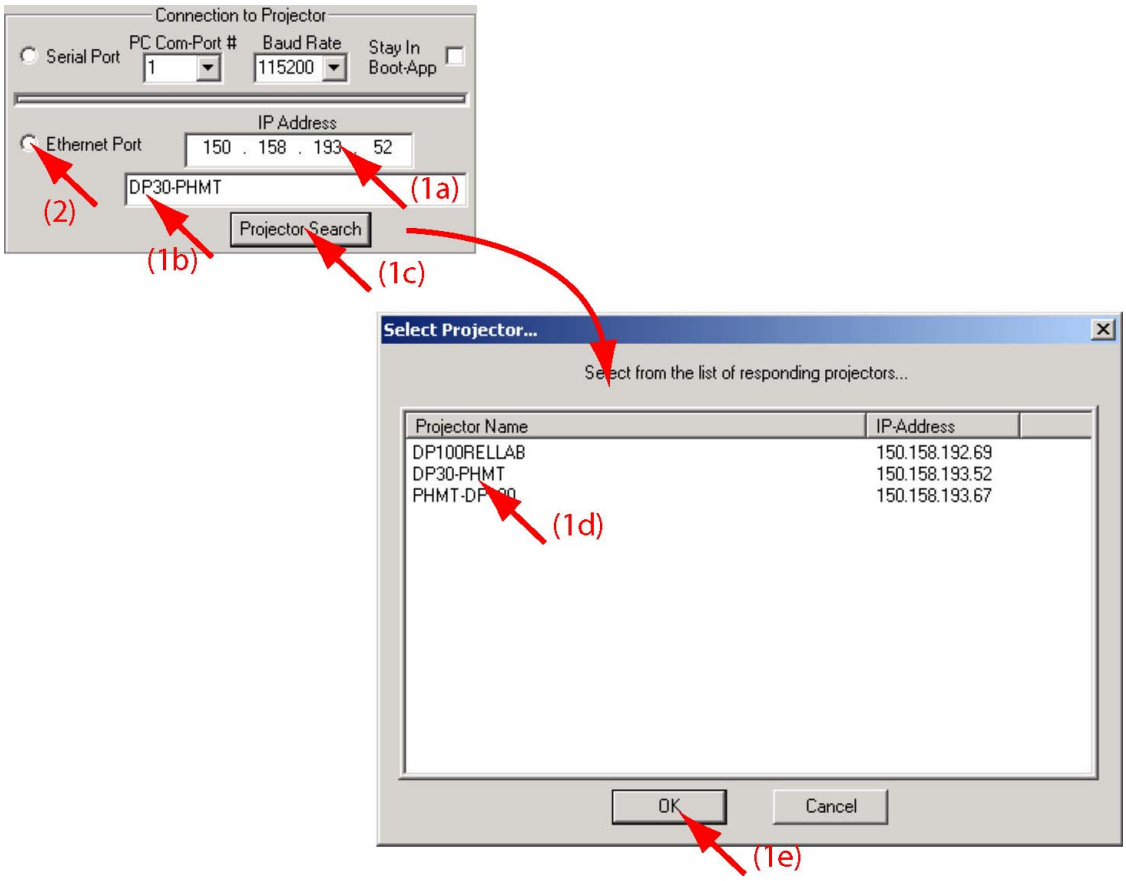


Image 14-5
Make Ethernet connection

Or,
click in the host name input field just below the IP address and fill out the host name of the projector to perform a DNS-lookup (requires the local network to be configured to support this) (1b).
Or,
click on **Projector Search** (1c).

The projector scans the network and build up a list of available projectors with host name and IP address (only possible for projectors on the local subnet AND that have Release 5.1 or later installed).

3. Select the desired projector out of the list (1d) and click **OK** (1e).

   The IP address and host name will be filled out.

4. Check the radio button in front of *Ethernet Port* (2).

   The program will prompt the user to login to the projector.

5. Enter the userid and password.
   Defaults are:
   - UserId: Service
   - Password: Heal Thyself

   Both are case sensitive.

   When correct, the *Current Projector Info* of the selected projector will be filled out.

14.5 Installation of the new software release

How to install ?

1. Click on **Select Release Installation File** (1).

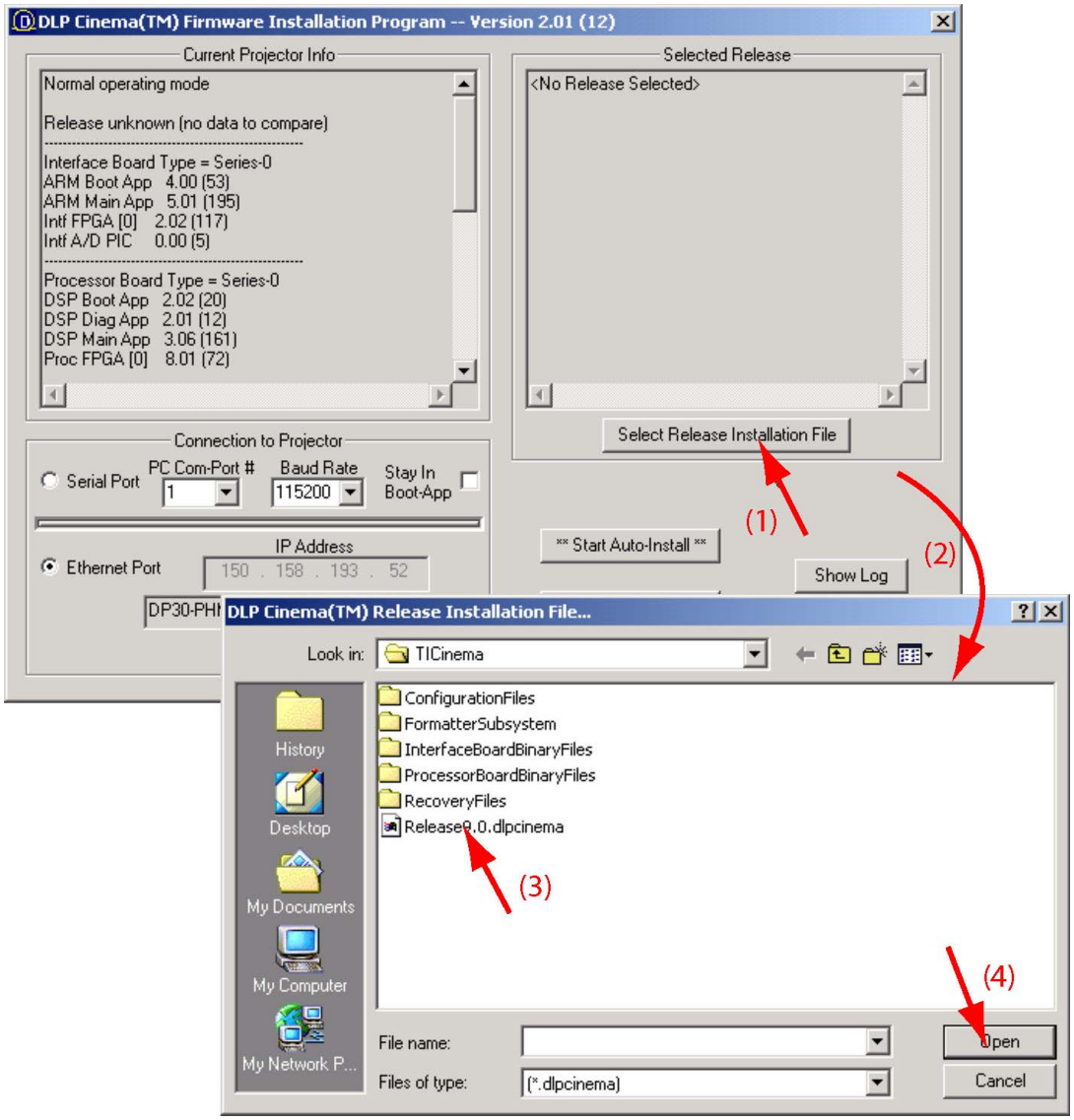


Image 14-6
Select Release file

A browser window opens (2).

2. Browse to the directory that contains the Release to be installed.
   Note: *The release files are indicated as .dlpcinema .*

3. Click on the file to select (3) and click **Open** (4).

Or,
double click on the file (3).

The content of the file will be displayed in *Selected release* (5) after a validation. A comparison with the actual loaded software is possible.

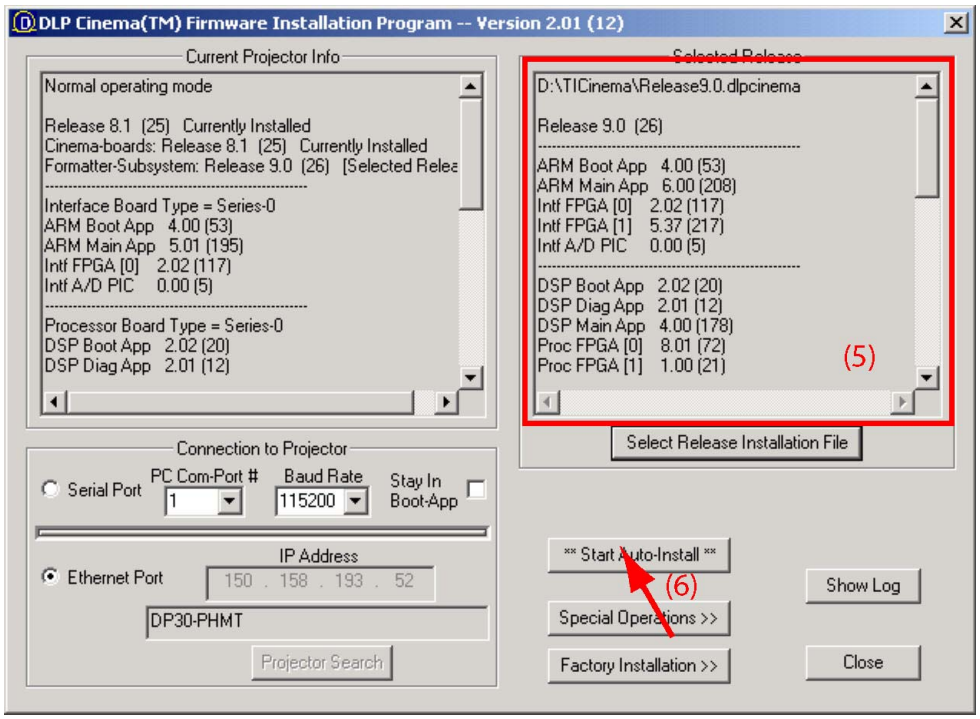


Image 14-7
Start auto-install

4. Click on Start Auto-Install (6).

   The verification and installation process will be started. It installs anything that does not exactly match the release.

   It includes also the resetting of the projector and the re-connection to verify the installation.

   A success or error dialog box will be displayed when completed.

CAUTION: Do not reset or switch off the projector during an installation operation. A reset during some operations may leave the affected board in the projector in a non-functional state, requiring factory recovery.

In case of failures, always send a copy of this log file to your Barco representative.

CAUTION: Log files are not saved automatically. A Dump log to file has to be done.

14.6 Logging of the operation

What is possible?

The program maintains a log of all operations performed.

To show this log, click on **Show Log**.

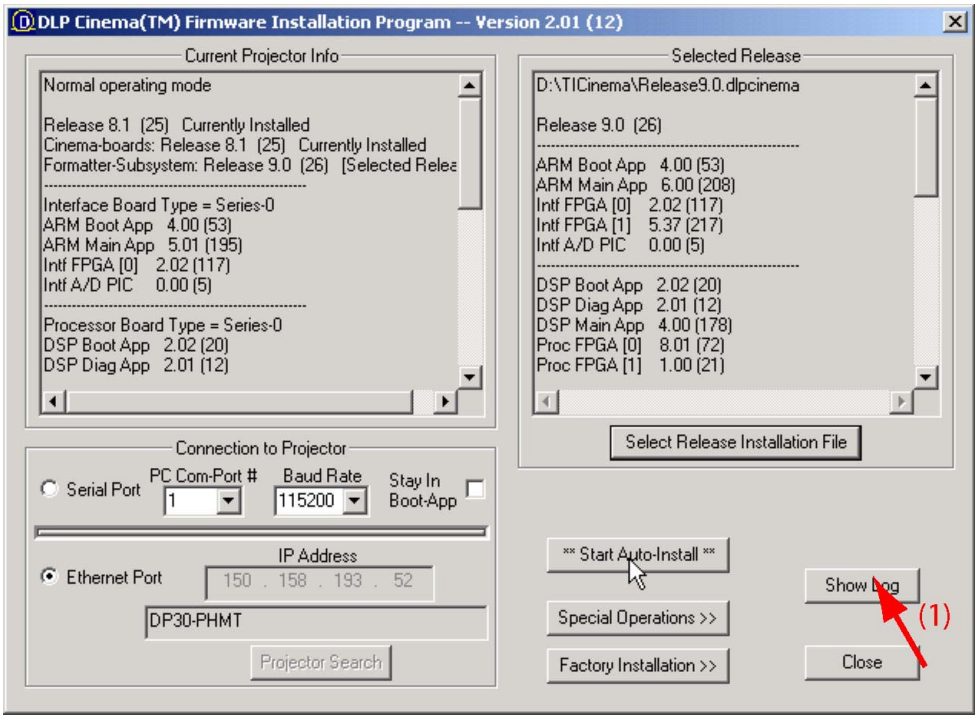


Image 14-8
Show logging started

The log window opens.

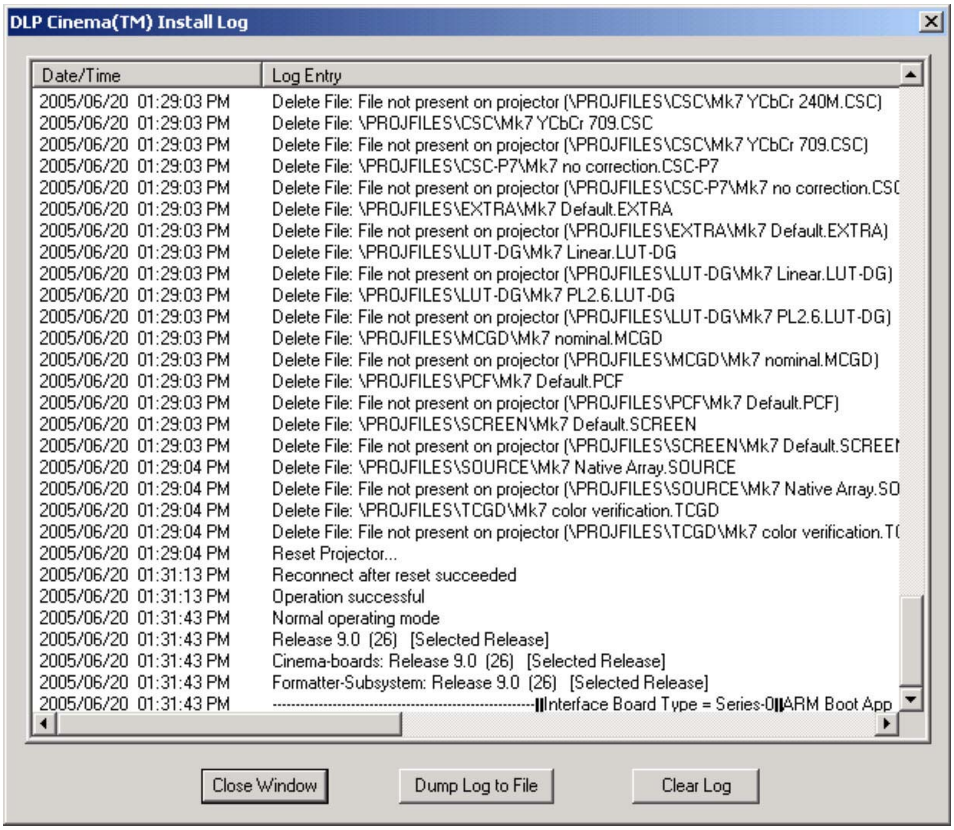


Image 14-9
Log info

By clicking on one of the buttons, the following is possible with the log:

- **Dump to file** : the log will be dumped into a file on the hard disk. A name and location will be asked first.
- **Clear log** : the log will be cleared. All information will be removed.

Log files are not saved automatically to disk. To save the file execute a *Dump to file*.

14.7 Special functions

Overview

To select a special installation and/or verification function, click on **<<Special Operations>>**. Before clicking on Special Operations, a connection to the projector must be present and a release file must be selected.

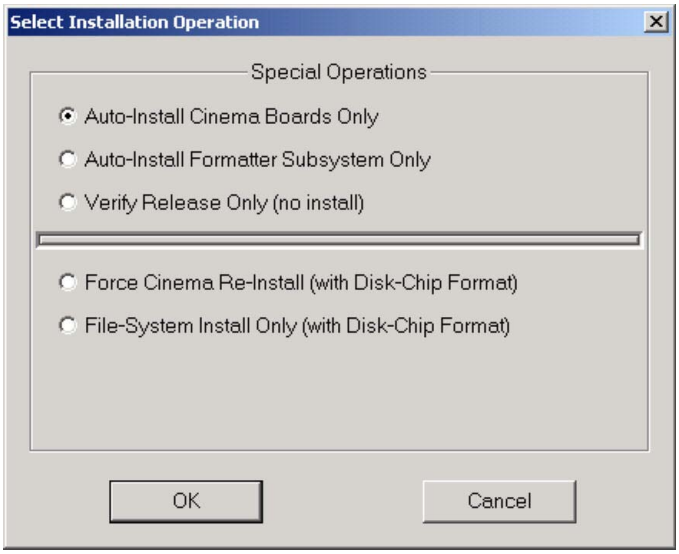


Image 14-10
Special operations

Auto-Install Cinema Boards Only	will only verify and install components related to the Interface and Processor boards. Use only if cinema boards are replaced (interface board, processor board)
Auto-Install Formatter Subsystem Only	will only verify and install components related to the Formatter subsystem. Use only when the engine was replaced.
Verify Release Only	will check all components of a Release supported by this program. No changes will be made to the projector.
Force Cinema Re-Install (see note)	will reinstall all Cinema components (Disk-Chip and flash) whether or not they are up to date. This rarely needed and is intended for special recovery purposes only.
Fill-System Install Only (see note)	will format the Disk-Chip and install all files (no other flash components are touched). This is intended for special file-system recovery only.

Note : with these options you will loose all default MACRO, PCF and SCREEN files. These options should not be used.

14.8 Factory Install Options

CAUTION: Never use these options in the field. Only for factory use.

Overview

These options are intended for factory use for brand new boards.

For special factory-install operations, select **Factory Installation >>** to open the dialog window to select the function to perform. Before click on **Factory Installation**, a connection to the projector must be present and a release file must be selected.

14.9 Recovery option - Stay in Boot option

Problem

The main software of the interface board can get corrupt when the projector was reset while a software update was busy. In that case the projector might be in a state where it tries to load the main software continuously, but it fails as the software is corrupt.

It is possible to force the projector to load only its boot application and not to start its main application. This is called Stay in Boot.

The Stay in Boot option can be activated only when connected via a Serial connection (RS232/RS422).

How to activate

1. Check Stay in Boot App.

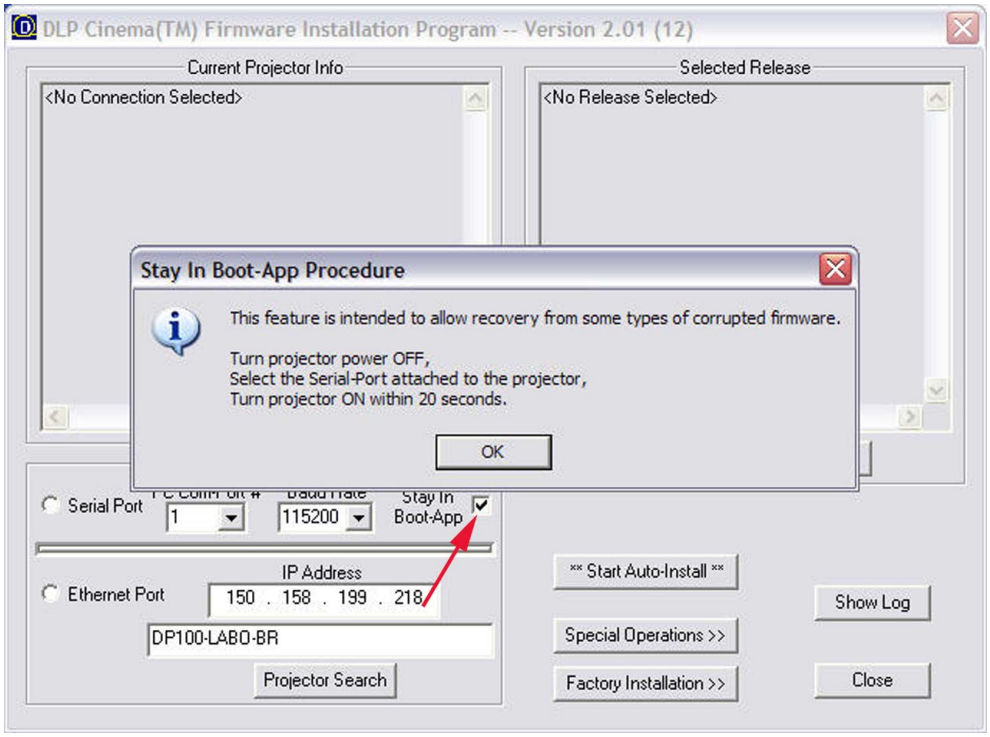


Image 14-11
Stay in boot mode

A message will be displayed to indicate that a recovery will take place.

2. Click **OK** to continue.

   When the boot application is successfully started, a message will be displayed. The current projector info will indicated that the boot application is running.

3. Click on **Select Release Installation file** and select the release file.

   The content of the file will be displayed.

4. Click on **Start Auto Install**.

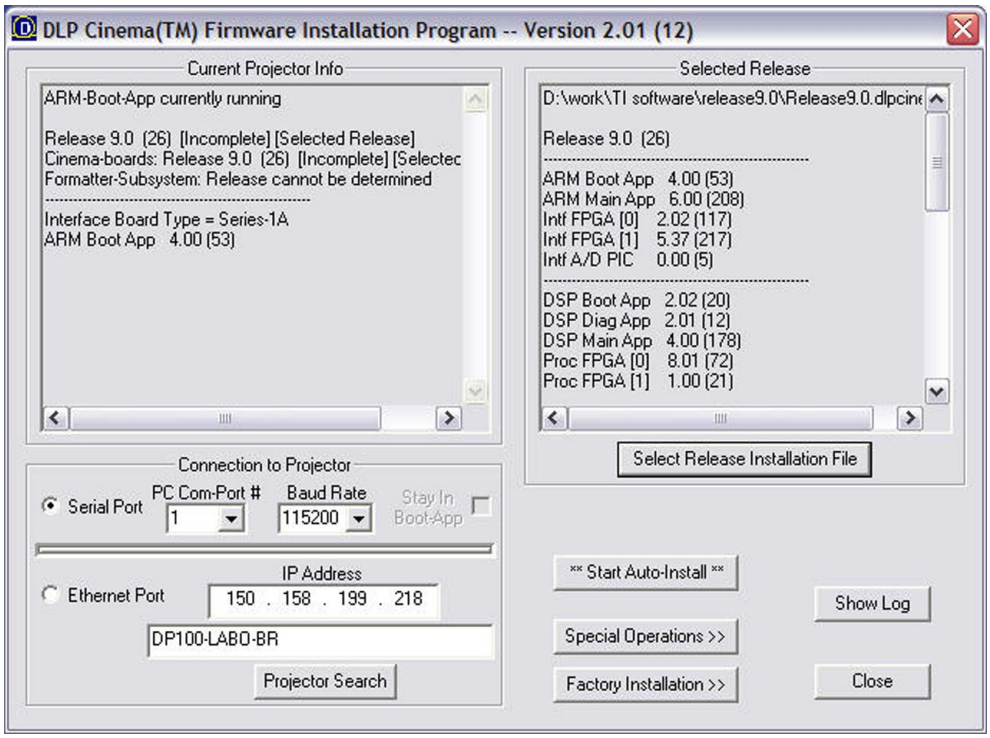


Image 14-12
Start auto install of ARM application

The verification and installation process will be started. It installs the ARM_main_app.

15. INPUT & COMMUNICATION UNIT

About this chapter

This chapter describes the functionality of the Input & Communication unit. It includes block diagrams and board replacement procedures.

Overview

- Introduction
- Control ports of the DP-3000 digital projector
- Data source input ports of the DP-3000 digital projector
- About General Purpose Inputs & Outputs (GPIO)
- Removal of the Input & Communication unit
- Installation of the Input & Communication unit
- Replacement of the DVI input board
- Replacement of the GPIO board
- Replacement of the DIMM PC

15.1 Introduction

Introduction of the Input & Communication unit

The Input & Communication unit is located at the right side of the projector below the Control Panel and can be removed from the projector like a drawer (after removal of the Card Cage cover!). The communication interface is the largest board of the assembly and is located at the bottom of the drawer. This board contains a DIMM PC, an Ethernet card and a General Purpose Input/Output board (GPIO). The DIMM PC function as main controller of the projector. The communication board has two board to board connectors, which fit directly into the signal backplane of the Card Cage. Furthermore, two grey flat cables join the Control Panel with the Communication Interface.

The “DATA INPUT” board (DVI & HDSDI) is mounted with spacers upon the communication board and has its own board to board connector, which fits directly into the signal backplane of the Card Cage.

Parts location

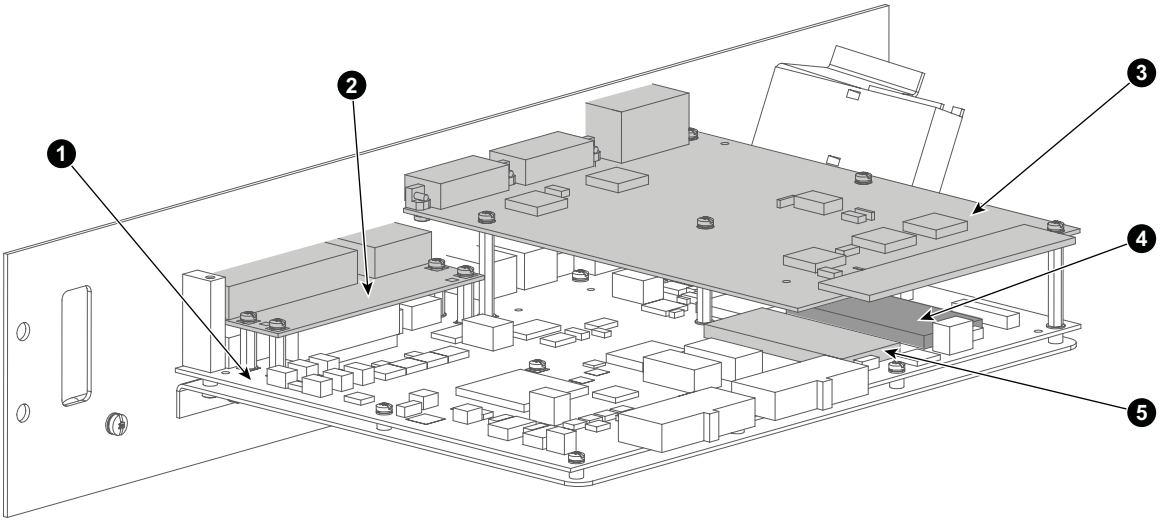


Image 15-1
1 Communication input interface board.
2 RS232/422 + General purpose IN/OUT board.
3 DVI input board.
4 DIMM PC.
5 Ethernet card.

Block diagram communication board

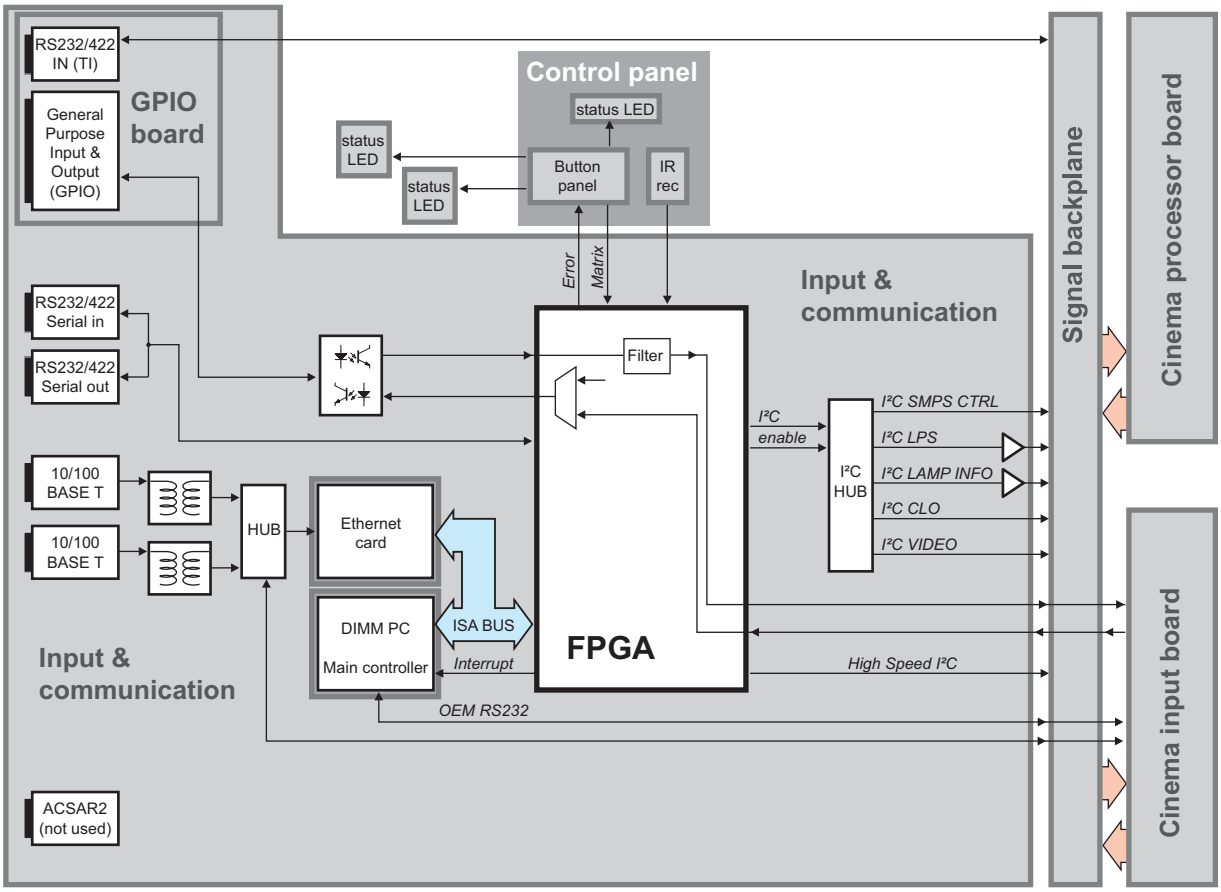


Image 15-2

Block diagram data input board (DVI & HDSDI)

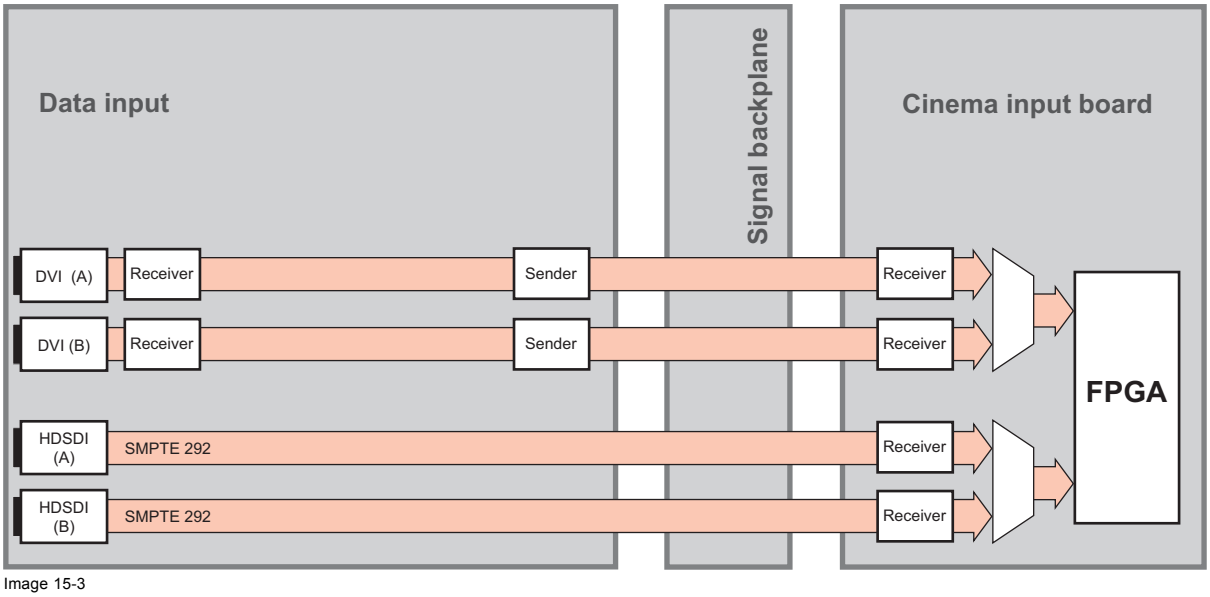


Image 15-3

15.2 Control ports of the DP-3000 digital projector

Location of the control ports

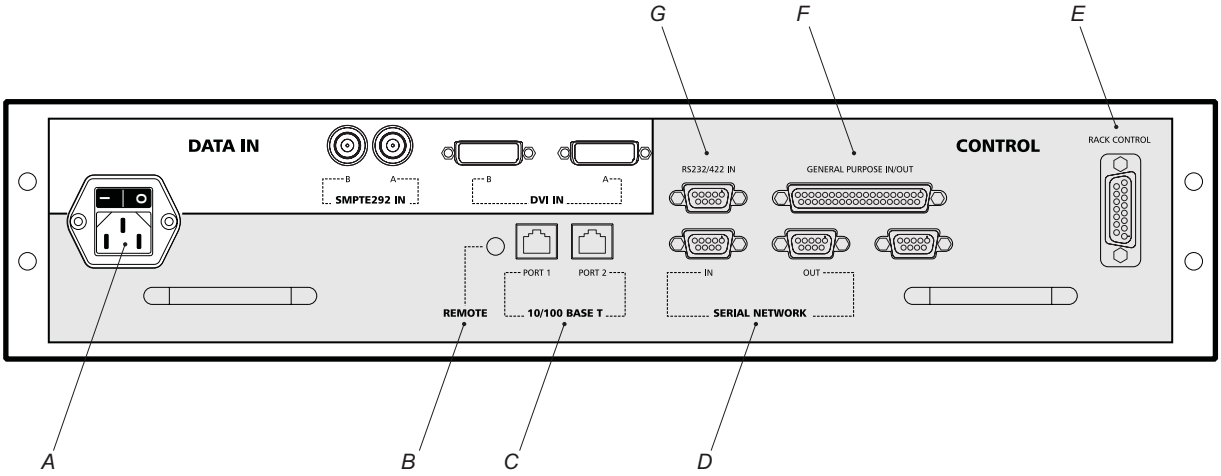


Image 15-4
A Power input socket + ON/OFF switch of the projector head.
B Mini-jack socket for wired remote control.
C Ethernet ports 1 & 2.
D RS232/RS422 serial communication ports.
E Power unit (rack) control port.
F General purpose input/output port (GPIO).
G RS232/RS422 communication port for the TI boards.

Power input & ON/OFF switch

The front panel of the input & communication unit is provided with a power input socket (type IEC/EN 60320-1 C14) and a power ON/OFF switch (reference A of image 15-4). This power input socket provides power to all the electronic boards of the projector head. Note that these electronic boards consumes in total about 400 watt. This power can be extracted from the separated power unit, which has an dedicated power output socket for the projector head. A power cord, delivered with the projector, has to be installed between the power unit and the projector head. See chapter "Connecting the power unit with the projector head", page 81. Note that this dedicated power output socket on the separated power unit is protected by a non resettable fuse of 250V - T 10A H.

Wired remote control

If desired the optional remote control unit can be wired and plugged into the 3,5 mm mini jack socket (reference B of image 15-4) on the communication interface.

Ethernet network communication

The DP-3000 digital projector can be connected to a LAN (local area network) using one of the 10/100 base T ports (reference C of image 15-4) on the communication interface. Once connected to the LAN, users are capable of accessing the projector from any location, inside or outside (if allowed) their company network using the control software (Communicator touch panel). This toolset locates the projector on the network in case there is a DHCP server or the user can insert the correct IP-address of the projector to access the projector. Once accessed, it is possible to check and manipulate all the projector settings. Remote diagnostics, control and monitoring of the projector can then become a daily and very simple operation. The network connectivity permits to detect potential errors and consequently improve the time to servicing.

As there is a need to daisy chain projectors when they are in Ethernet network, an Ethernet switch is build in, the incoming network is hereby available for the internal PC and for the next device in the chain. In this way a 'star' network interconnection can be avoid. The switch used is a stand alone 10/100Mbit Ethernet switch. This assures no influence on the network speed. Whenever a slow (10Mbit) device is connected the speed between the 100Mbit devices remains 100Mbit.

Both Ethernet ports are equipped with a yellow and a green LED. The yellow LED lights up in case the port is connected with a 100Mbit network. The green LED blinks in case there is network activity.

The connectors used for both Ethernet ports are of the type RJ45, which is compatible with standard RJ45 cable connector. Straight (most common) as well as cross linked network cables can be used. The 2 ports are functionally identical. Both ports are connected via the projector hub (Auto sensing enabled).

RS232/422 serial communication

The communication interface of the DP-3000 supports RS232 and RS422 serial communication (reference D of image 15-4). You can use the RS232/RS422 input port to connect a local PC to your DP-3000 digital projector. This way you can configure and control your DP-3000 digital projector from your local PC.

Do not forget to set the projector's baud rate (default = 115200) to match that of the computer.

The communication interface has also an active RS232/RS422 loop through output port. Whenever the projector has no power, a passive loop through is created from the RS232/RS422 input port to the RS232/RS422 output port. So, the following projector in the daisy chain will still receive his RS232/RS422 commands.

Advantages of using RS232/RS422 serial communication:

- easy adjustment of the projector via PC (or MAC).
- allow storage of multiple projector configurations and set ups.
- wide range of control possibilities.
- address range from 0 to 255.
- sending data to the projector (update).
- copying data from the projector (backup).

RS232

An Electronic Industries Association (EIA) serial digital interface standard specifying the characteristics of the communication path between two devices using either D-SUB 9 pins or D-SUB 25 pins connectors. This standard is used for relatively short-range communications and does not specify balanced control lines. RS-232 is a serial control standard with a set number of conductors, data rate, word length and type of connector to be used. The standard specifies component connection standards with regard to computer interface. It is also called RS-232-C, which is the third version of the RS-232 standard, and is functionally identical to the CCITT V.24 standard. Logical '0' is > + 3V, Logical '1' is < - 3V. The range between -3V and +3V is the transition zone.

RS422

An EIA serial digital interface standard that specifies the electrical characteristics of balanced (differential) voltage, digital interface circuits. This standard is usable over longer distances than RS-232. This signal governs the asynchronous transmission of computer data at speeds of up to 920,000 bits per second. It is also used as the serial port standard for Macintosh computers. When the difference between the 2 lines is < - 0.2V that equals with a logical '0'. When the difference is > +0.2V that equals to a logical '1'..

POWER UNIT CONTROL (RACK CONTROL)

This 25 pins D-SUB connector (reference E of image 15-4) must be connected, using a data cable which is delivered with the projector, with the power unit of the DP-3000 digital projector. Through this connection the projector can communicate with the power unit.

GENERAL PURPOSE IN/OUT (GPIO)

This female 37 pins D-SUB connector (reference F of image 15-4) can be used to send or receive trigger signals from other devices. These input/output pins can be programmed by macros created via the Communicator touch panel. See user's guide of the Touch panel, section Macro editor, for more information about this functionality. For more information on how to connect with the GPIO pins see chapter "About General Purpose Inputs & Outputs (GPIO)", page 275.

RS232/RS422 communication port for the TI boards

This female 9 pins D-SUB connector (reference G of image 15-4) is only used for service purposes. Do not use this connector to communicate with the projector.

15.3 Data source input ports of the DP-3000 digital projector

Location of the data source input ports

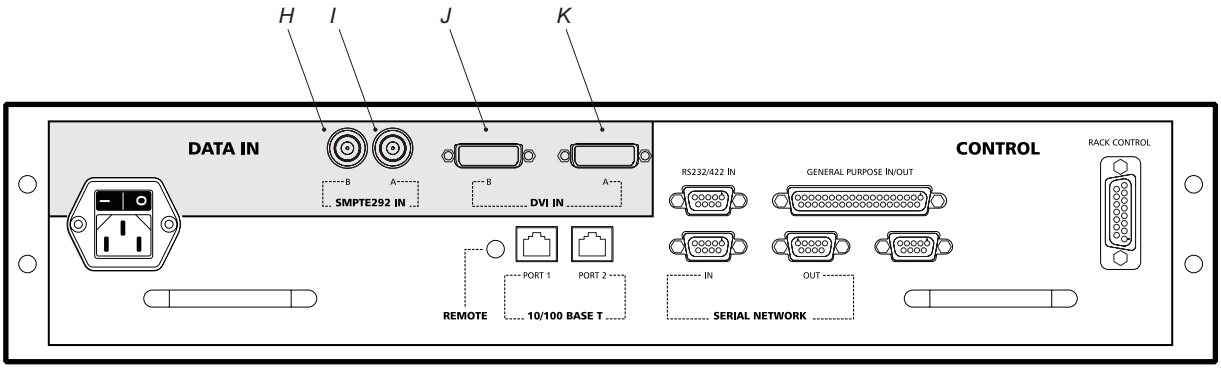


Image 15-5
H HDSDI input port for channel B.
I HDSDI input port for channel A.
J DVI input port for channel B.
K DVI input port for channel A.

SMPTE 292 IN

The two BNC connectors (reference H & I of image 15-5) accept HD-SDI signals which comply with the SMPTE 292 standard. It is likely that for “Cinema” inputs, these two BNC connectors will be used in a dual 292 configuration. These BNC connectors can, however, also be used as two separate, individually selectable, SMPTE 292 ports.

SMPTE

Society of Motion Picture and Television Engineers - A global organization, based in the United States, that sets standards for baseband visual communications. This includes film as well as video standards.

DVI IN

A DVI source can be applied upon the DVI connectors (reference J & K of image 15-5). The DVI connectors can be combined to one DVI input with two channels.

DVI

Digital Visual Interface is a display interface developed in response to the proliferation of digital flat panel displays.

The digital video connectivity standard that was developed by DDWG (Digital Display Work Group). This connection standard offers two different connectors: one with 24 pins that handles digital video signals only, and one with 29 pins that handles both digital and analog video. This standard uses TMDS (Transition Minimized Differential Signal) from Silicon Image and DDC (Display Data Channel) from VESA (Video Electronics Standards Association).

DVI can be single or dual link.

15.4 About General Purpose Inputs & Outputs (GPIO)

General Purpose inputs

Eight (8) opto-isolated general purpose inputs are available. These inputs are used to trigger the execution of macro files. For more explanation about the association of a macro to a GPI, consult the user guide of the Communicator touch panel.

Input voltage

The inputs can be directly driven from a TTL or CMOS output.

- Minimum voltage : V_{min} = 3,3 V
- Maximum voltage : V_{max} = 24 V

External power supply

When interfacing with contact closure outputs, an external power supply needs to be provided. Depending upon the configuration a suitable pull-up resistor needs to be added as well.

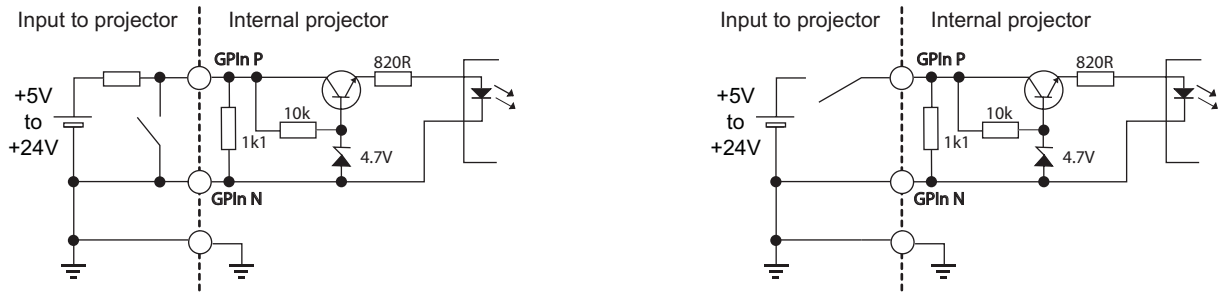


Image 15-6
Left diagram: with pull-up resistor. Right diagram: without pull-up resistor.

Cables

When long cable connections are required the use of shielded cables with twisted pairs is recommended. One twisted pair is to be assigned to each GP Input pair.

How to make the connection

When the power supply used to provide the DC voltage is isolated from ground (for example in the case of an AC adapter) it is recommended that the minus pole of that power supply is connected to ground (or to the projector chassis). This will avoid high common mode voltages at the projector GP Inputs. If that same power supply is used for other parts of the system, take care not to create ground loops. In any case when shielded cables are used that shield should be connected to the projector chassis.

General Purpose outputs

Eight (8) opto-isolated outputs are available, where seven are general purpose and one for a fixed purpose. The seven general purpose outputs can be controlled via software while the fixed output provides the status of the system. When this output is closed (current is flowing), then the system is OK.

About an output

The output can generate a falling edge, rising edge, toggle or continuous toggle.

- **Generate Falling Edge** – generate a falling edge on the external GPO port if the present state of the output is high. If the present state of the external GPO is low, no edge will be generated.
- **Generate Rising Edge** – generate a rising edge on the external GPO port if the present state of the output is low. If the present state of the external GPO is high, no edge will be generated.
- **Generate Toggle** – generate a toggle on the external GPO port. If the present state of the output is low, a rising edge will be generated, followed by a falling edge. If the present state of the output is high, a falling edge will be generated, followed by a rising edge. The rate of toggle will be the vertical sync rate (edge transition at each vsync).
- **Generate Continuous Toggle** - This command will generate a continuous toggle of the external GPO port. This toggle will continue until a *Generate Falling Edge*, *Generate Rising Edge*, or *Generate Toggle* command is received. The rate of toggle will be the vertical sync rate (edge transition at each vsync).

Output transistor

- Maximum output driving voltage : V_{max} = 70 V
- Maximum current : I_{max} = 30 mA
- Maximum power dissipation : 120 mW

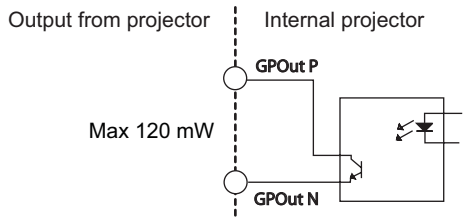

Output from projector
Internal projector
GPOut P
Max 120 mW
GPOut N

Image 15-7

15.5 Removal of the Input & Communication unit

To remove the Input & Communication unit the cover of the Card Cage has to be removed first. Because the two grey flat cables, which make a connection between the communication board and the Control Panel, passes behind the extension of the Card Cage cover. This procedure assumes that the Control Panel is turned open and that the Card Cage cover is already removed. See "Removal of the Card Cage cover", page 248.

Necessary tools

- 5,5 mm nut driver.
- PH2 Phillips screwdriver.

How to remove the Input & Communication unit?

1. Disconnect the power cord (reference 1 image 15-8), the “RACK CONTROL” cable (reference 2 image 15-8) and all other cables from the Input & Communication unit.

Image 15-8

2. Remove the cable clamp (reference 3 image 15-8) from the power input socket.

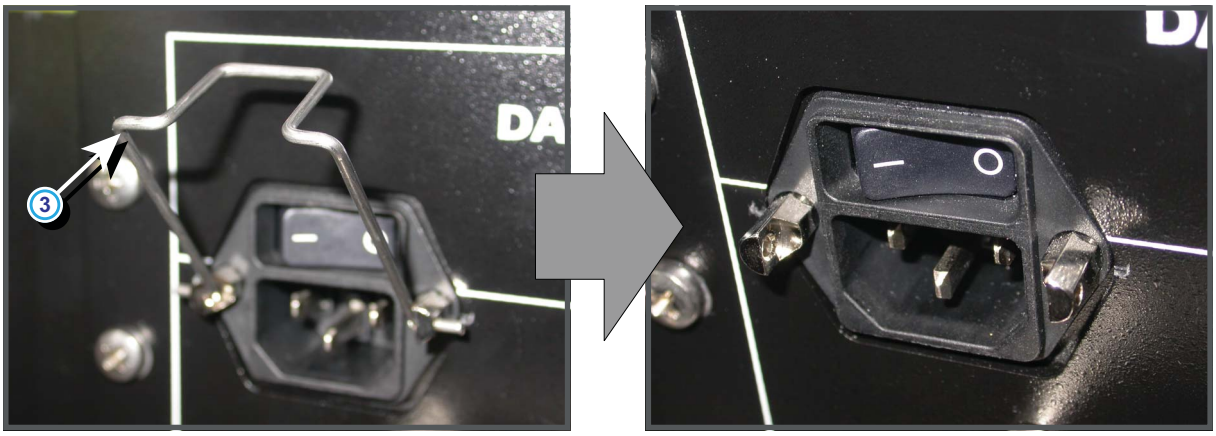


Image 15-9

3. Disconnected the two grey flat cables (reference 4) from the Control Panel and release the screws (reference 5) of the ferrite block assembly.
   Note: *In case the flat cables has to be replaced you must reuse the ferrite block which is mounted around the flat cables.*

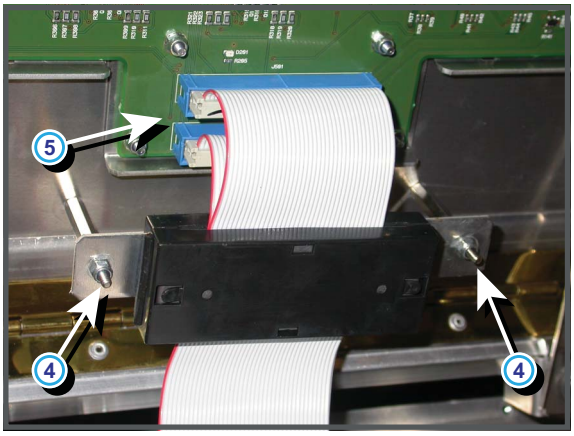


Image 15-10

4. Remove the two grey flat cables from the flat cable holders (reference 6 image 15-11).

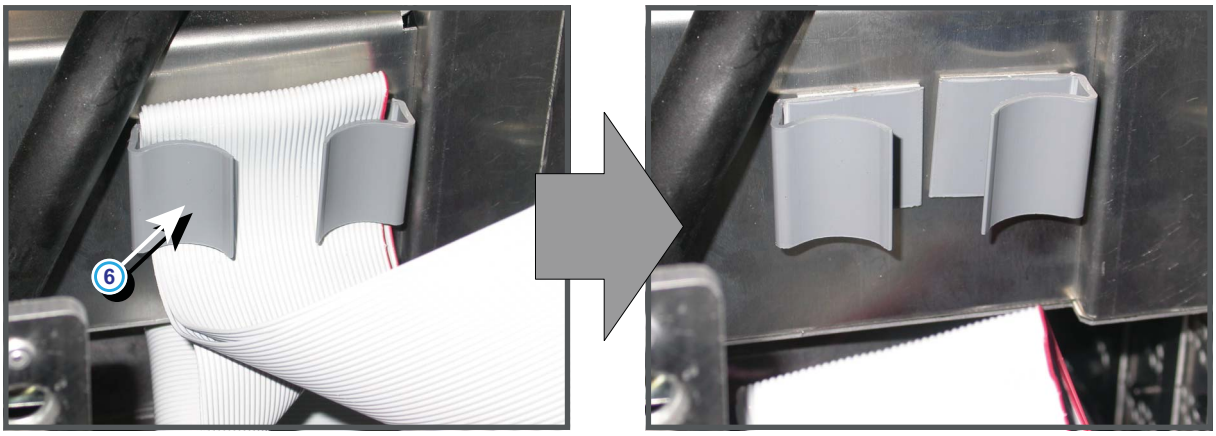


Image 15-11

5. Release the four screws, which fasten the Input & Communication unit, as illustrated. Use a PH2 Phillips screwdriver.

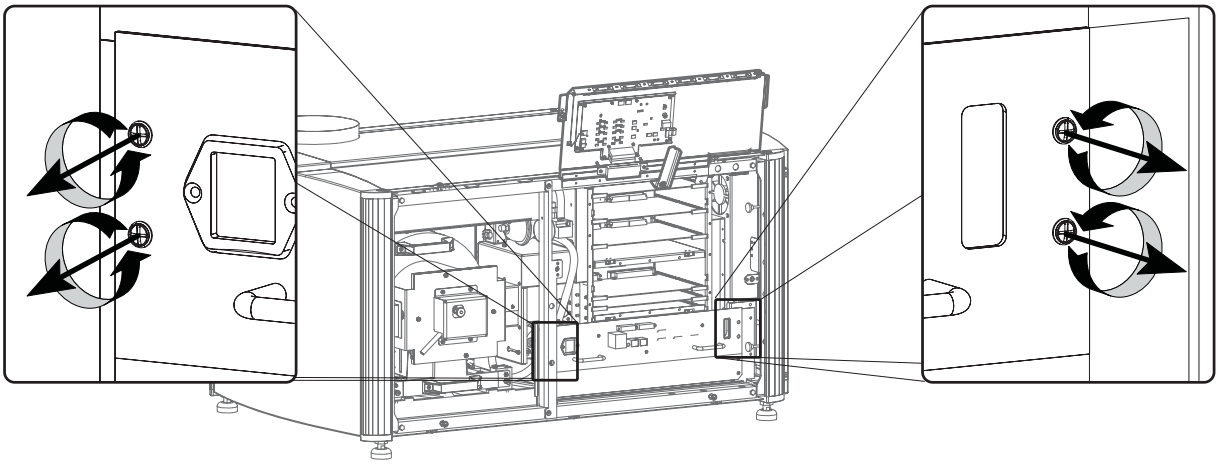


Image 15-12

6. Pull out the Input & Communication unit.
   Caution: *Pay attention not to damage the two grey flat cables, which are attached to the communication board.*

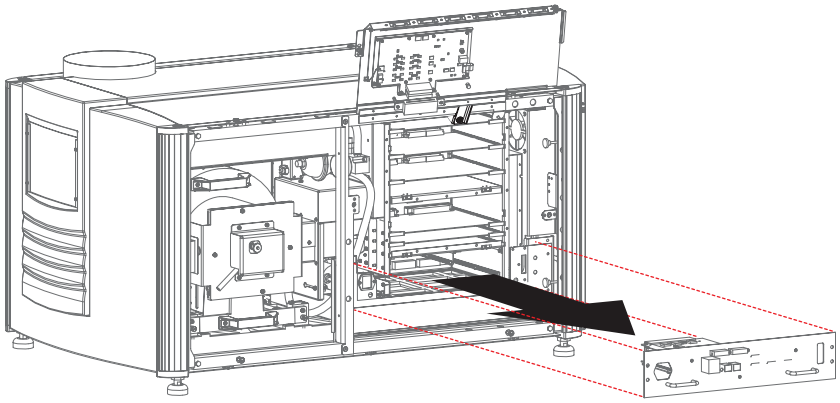


Image 15-13

15.6 Installation of the Input & Communication unit

To install the Input & Communication unit the Card Cage cover has to be removed. Because the two grey flat cables, which make a connection between the communication board and the Control Panel, passes behind the extension of the Card Cage cover.

Necessary tools

- 5,5 mm nut driver.
- PH2 Phillips screwdriver.

How to install the input & communication unit?

1. Gently insert the Input & Communication unit into its slot.
   Caution: *Pay attention not to damage the two grey flat cables, which are attached to the communication board.*

   Caution: *Ensure that the Input & Communication unit is completely inserted. The front cover of the unit must touch the projector chassis.*

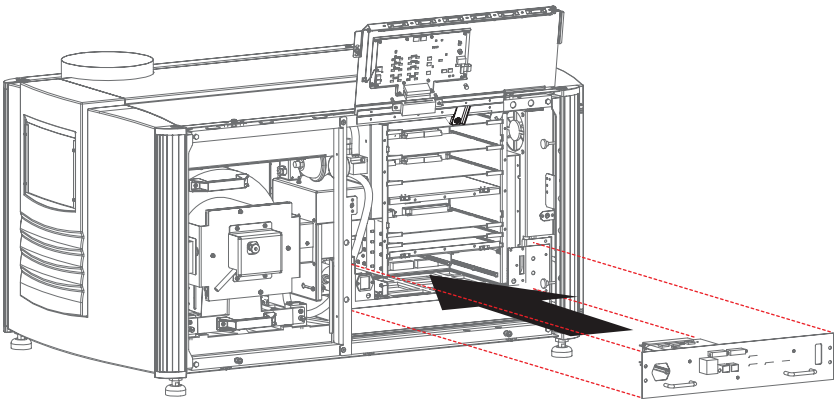


Image 15-14

2. Fasten the Input & Communication unit with four screws as illustrated. Use a PH2 Phillips screwdriver to fasten the four M4 x 15 cross head screws.

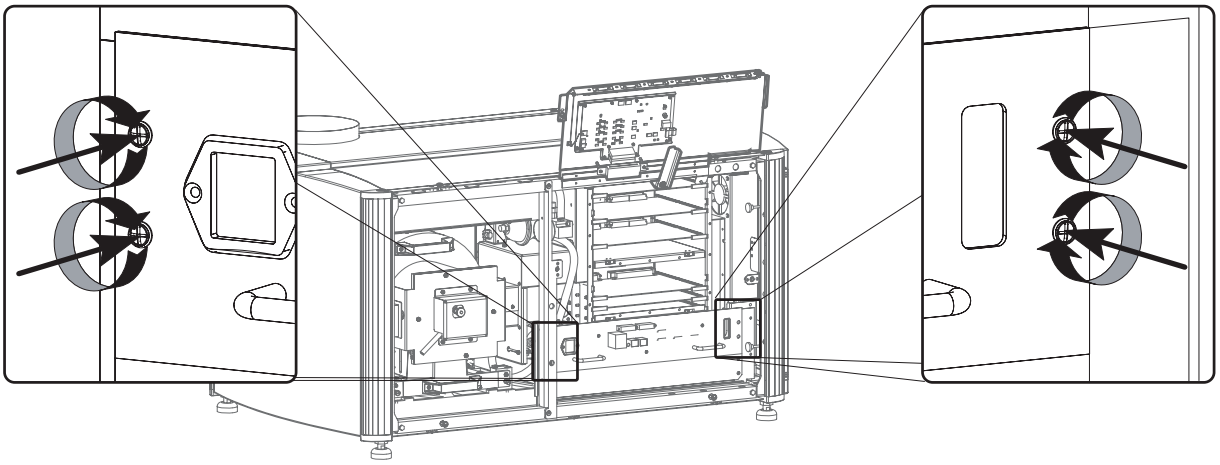


Image 15-15

3. Reconnect the two grey flat cables (reference 5 image 15-16) with the Control Panel and fasten the ferrite block assembly with two nuts (reference 4 image 15-16). Use a 5,5 mm nut driver the fasten the nuts.

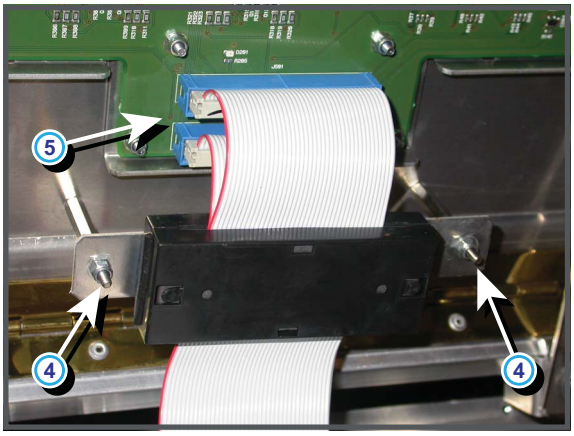


Image 15-16

4. Place the two grey flat cables into the flat cable holders (reference 6 image 15-17) as illustrated.

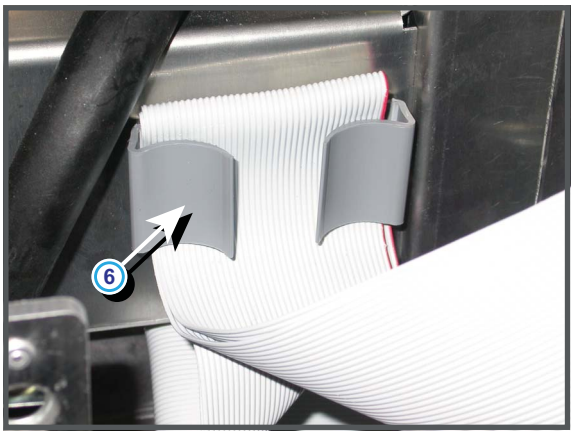


Image 15-17

5. Reinstall the cable clamp (reference 3 image 15-18) of the power socket.

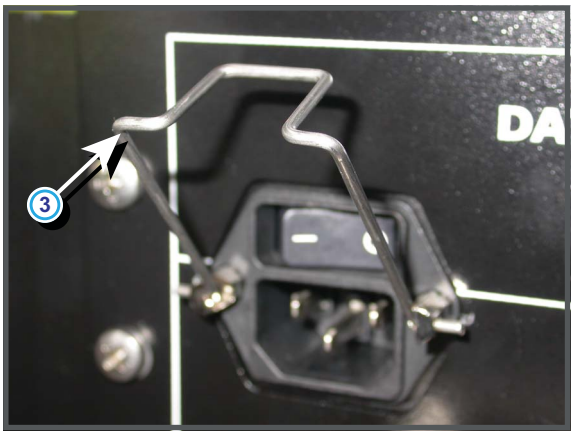


Image 15-18

6. Reconnect the power cord (reference 1 image 15-19), the “RACK CONTROL” cable (reference 2 image 15-19) and all other data source cables.

Image 15-19

After the installation of the Input & Communication unit the Card Cage cover has to be installed. See procedure "Installation of the Card Cage cover", page 250.

15.7 Replacement of the DVI input board

To replace the DVI input board the “Input & Communication unit” has to be removed from the projector.

Necessary tools

- Small Phillips screwdriver.
- 5 mm nut driver.
- TX10 Torx screwdriver.

How to replace the DVI input board?

1. Remove the screw ref A image 15-20 above the two BNC sockets at the front side of the DVI input board.
2. Remove the four screws ref B image 15-20 of the DVI sockets at the front side of the DVI input board.
3. Remove the four Phillips screws ref C image 15-20 at the front side of the DVI input board.

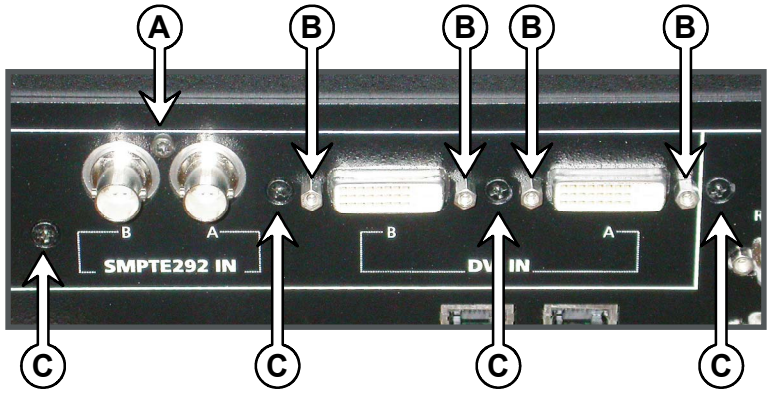


Image 15-20

4. Remove the five Torx screws, which fasten the DVI board with the communication interface, and remove the board.

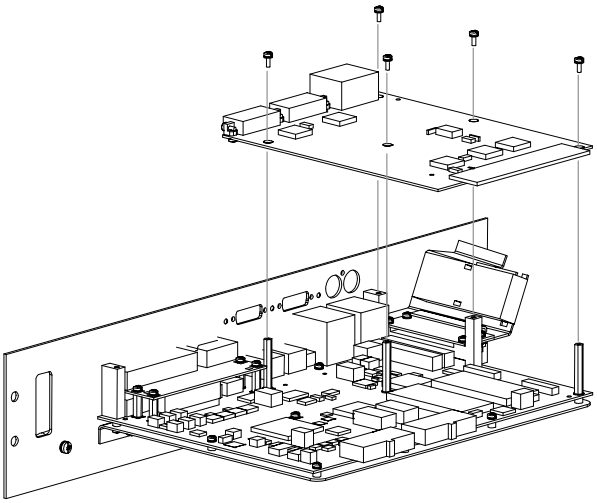


Image 15-21

5. Reverse this procedure to reinstall the DVI input board.

15.8 Replacement of the GPIO board

To replace the GPIO board the “Input & Communication unit” has to be removed from the projector.

Necessary tools

TX10 Torx screwdriver.

How to replace the GPIO board

1. Release the four screws, which fasten the GPIO board with the communication interface, as illustrated.

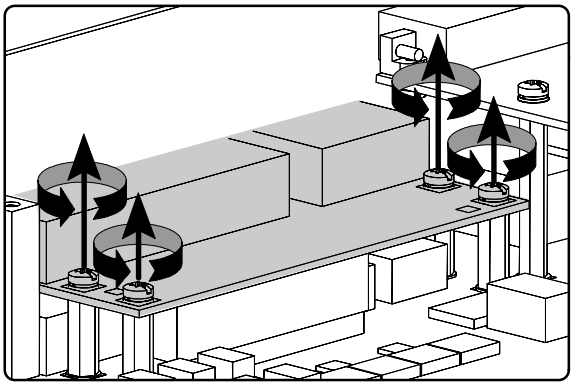


Image 15-22

2. Replace the GPIO board and fasten the board.

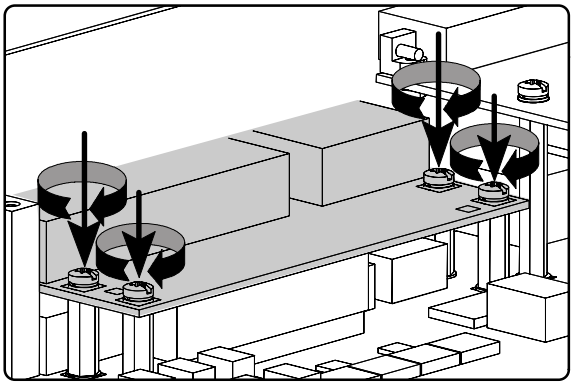


Image 15-23

15.9 Replacement of the DIMM PC

The DIMM PC is located on the communication board. Before you can remove the DIMM PC you have to remove the input & communication unit from the projector first.

CAUTION: Electrostatic Sensitive Device (ESD). To avoid equipment damage from electrostatic discharge, use static control precautions in servicing this equipment. Field service or maintenance personnel should be properly grounded before servicing. Wear an ESD wristlet when servicing this equipment. The use of antistatic gloves is recommended.

Necessary tools

No tools.

How to replace the DIMM PC?

1. Gently pull open the latches of the DIMM PC socket unitl the DIMM PC jumps up.
2. Remove the DIMM PC out of the socket.
   Note: *The bottom of the DIMM PC is glued to the communication board for transport reasons. So, be carefully while removing. The glue becomes redundant once the projector is installed.*
3. Insert a new DIMM PC into the socket on the communication board.
   Tip: *Ensure there is no dust in the socket on the communication board. Use compressed air to blow out the dust.*
4. Press down the DIMM PC

16. CONTROL PANEL

About this chapter

This chapter describes the Control Panel of the projector. It contains replacement procedures for the Local Keypad, the Button module and the Status Lights on the rear projector corners.

Overview

- Introduction
- Local keypad of the DP-3000 digital projector
- Replacement of the Button module
- Replacement of the Local Keypad
- Replacement of the Status Lights

16.1 Introduction

Introduction

The Control Panel is located at the right side of the projector in front of the Card Cage. The Control Panel can pivot upwards away from the Card Cage. The mains parts of the Control Panel are the Button model and the Local Keypad.

Parts location of the Control Panel

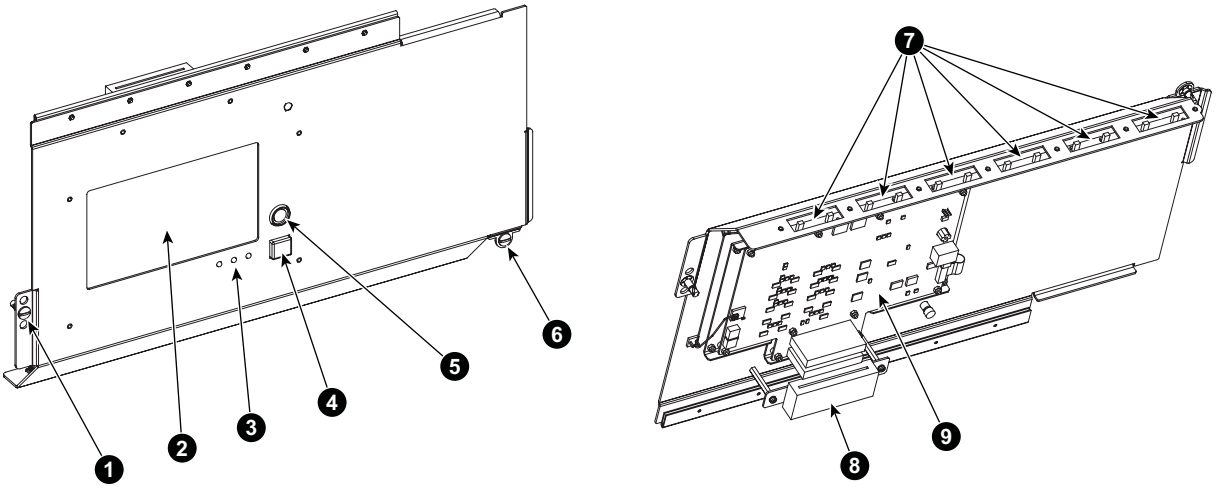


Image 16-1
1 Fixation screw.
2 Local Keypad.
3 Status LED's.
4 Infra red receiver.
5 Socket for security key (Dallas® button).
6 Fixation screw.
7 Backlight.
8 Ferrite and support for flat cables.
9 Button module.

16.2 Local keypad of the DP-3000 digital projector

Identification of the keys

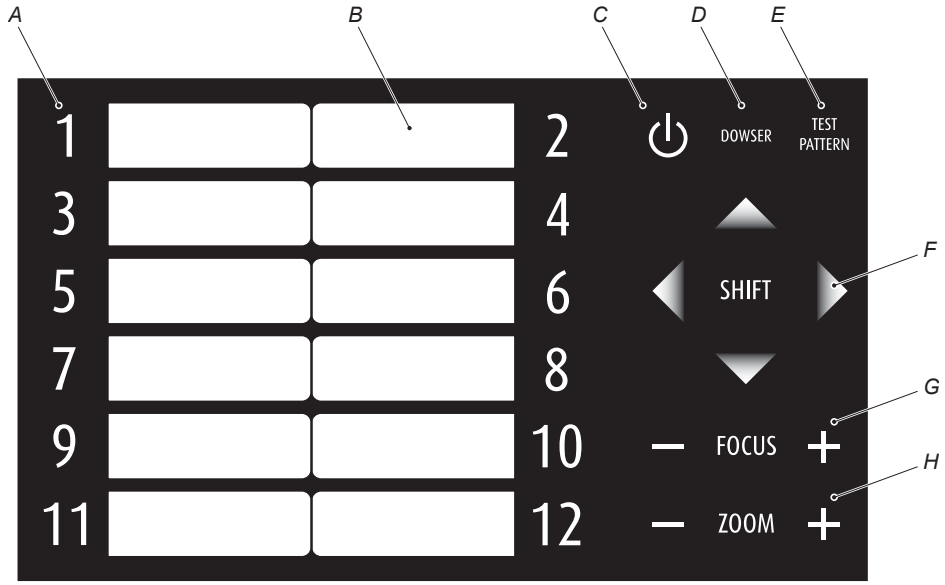


Image 16-2
A Numeric keyboard.
B Marker area for macro name.
C Standby/Operation switch.
D Dowser Open/Close switch.
E Test Pattern toggle switch.
F Lens holder shift left/right & up/down keys.
G Lens focus keys.
H Lens zoom keys.

Numeric keys: All the numeric keys (A) of the local keypad have a blue backlight during normal operation. Only when the authorization process is activated with the security key, then the backlight color of the numeric keys 1 to 10 changes to orange. Each key can be linked to a macro which allows you to setup the projector to your requirements with one push on a button. Note that each numeric key has a marker area (B) where you can write down the name of the macro.

Standby key: Standby key (C) switches ON or OFF the lamp and lamp electronics. The lamp cooling fans remain active for about 5 minutes. The speed of the other fans is reduced. The backlight color of the standby key remains red in standby mode and changes to green in operation mode.

Dowser key: The dowser key (D) opens or closes the dowser. The backlight color of the dowser key is green when the dowser is open and red when the dowser is closed.

Pattern key: The pattern key (E) gives you direct access key to the internal test patterns of the projector.

Shift keys: The shift keys (F) allows you to shift the lens up/down or left/right. This functionality is only available in case of a motorized lens shift

Focus keys: The focus keys (G) allows you to focus the projected image on the screen. This functionality is only available in case of a motorized lens and lens holder.

Zoom keys: The zoom keys (H) allows you to zoom in or out the projected image on the screen. This functionality is only available in case of a motorized lens and lens holder.

Projector status LED's and IR-receiver

There are three LED's and an IR-receiver located below the local keypad. The IR-receiver makes it possible to use a remote control unit (optional) to send the same commands to the projector as the local keypad. The red LED (ref A of image 16-3) marked with "IR" lights up in case the projector receives an infra red signal from a remote control unit. The green LED (ref B of image 16-3) marked with "OK" lights up when the received infra red signal is acknowledge by the projector. The bicolored LED (ref C of image 16-3) marked with the standby symbol lights up red when the projector head is starting up and changes to green when the electronic boards of the projector head are operational.

A status light is built-in on both corners on the rear top of the projector head (ref E of image 16-3). In normal operation mode, meaning NO errors, the color of the status lights is GREEN. In case an ERROR occurs the color of the status lights changes to RED. Refer to the Communicator touch panel for the type of error. Note that when the maximum lamp run time is exceeded, the status lights will light up green. As long as the status lights are flashing, the device is still booting up and not ready for use.

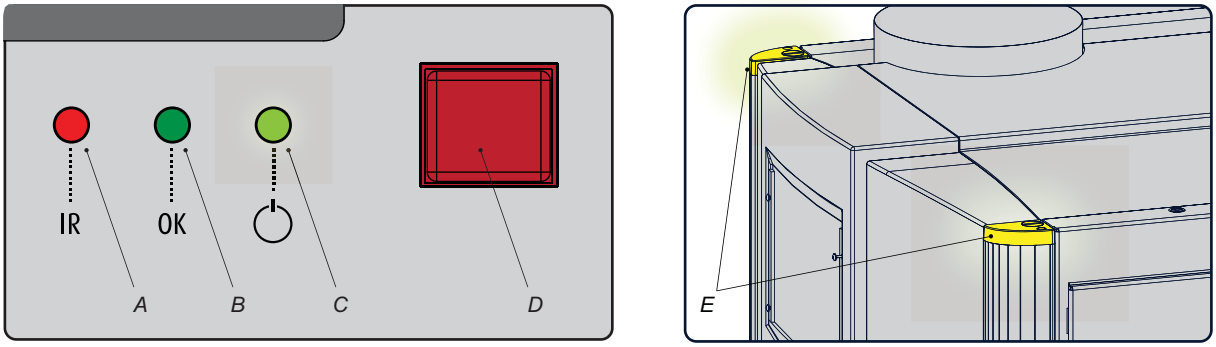


Image 16-3
A Infra red signal received.
B Received infra red signal is OK.
C Power status of projector head.
E Projector fault status.

16.3 Replacement of the Button module

To replace the Button module the right cover of the projector has to be removed. This procedure assumes that the right cover is already removed.

Necessary tools

- Flat screw driver.
- 5,5 mm nut driver.

How to replace the Button module of the Control Panel?

1. Release the two retaining screws which fasten the Control Panel to the projector chassis. Use for that a flat screwdriver.

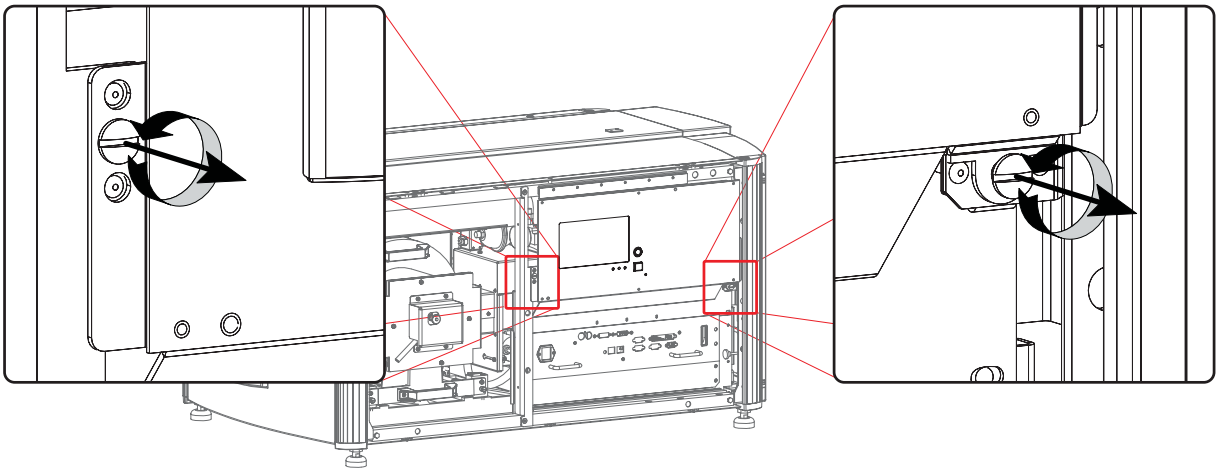


Image 16-4

2. Pivot the Control Panel upwards and lock the position with the provided support as illustrated.

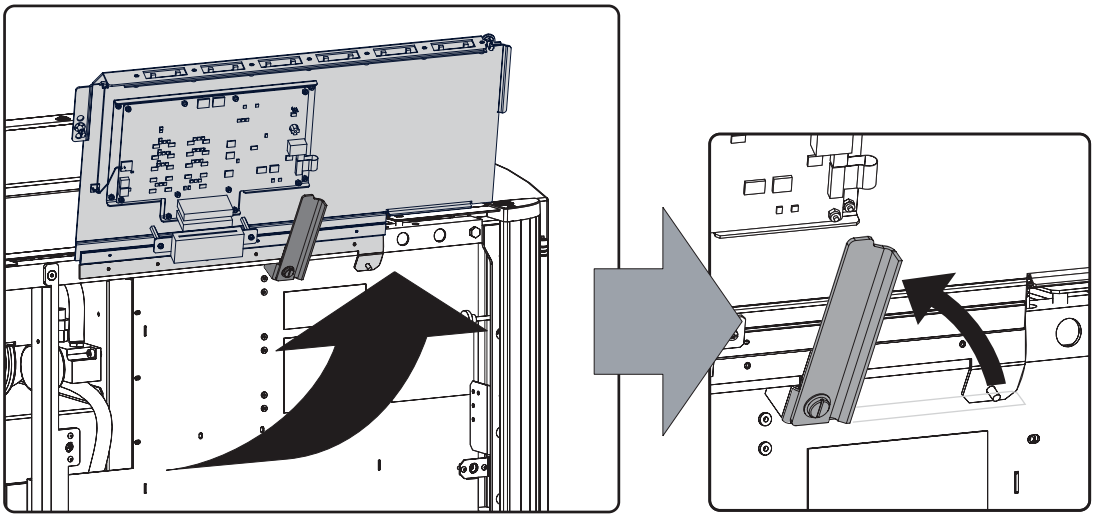


Image 16-5

3. Disconnect the two flat cables (reference 1image 16-6) from the Button module.

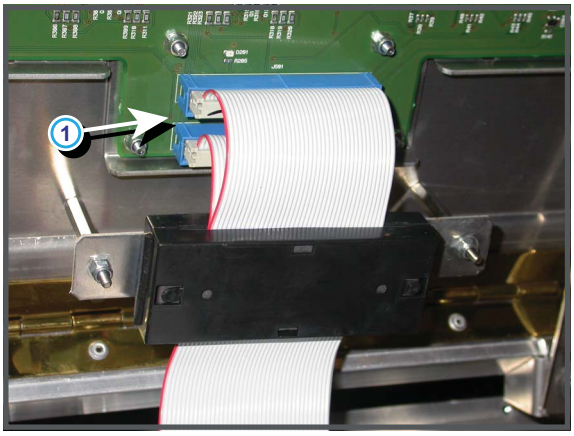
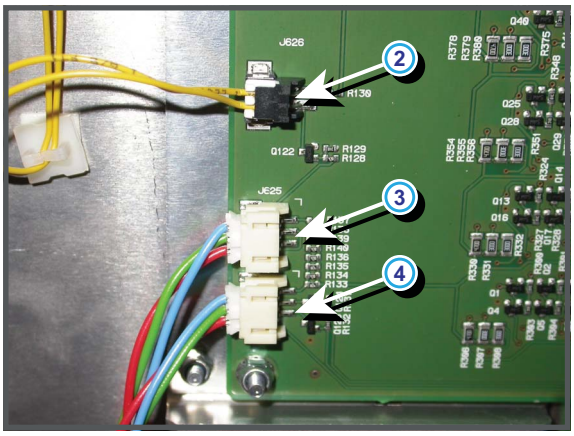


Image 16-6

4. Disconnect the four remaining wire units (reference 2, 3, 4 and 5 image 16-7) from the Button module.



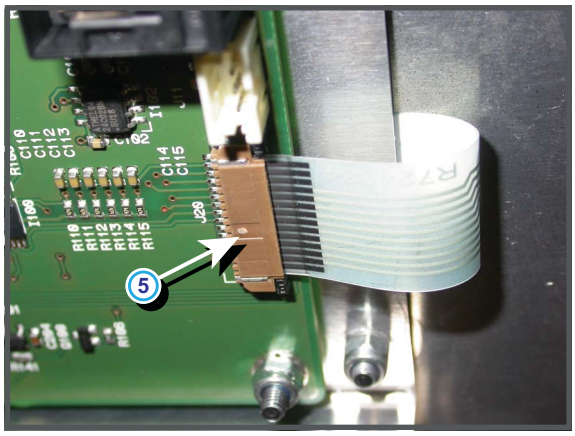


Image 16-7

5. Replace the Button module. Use a 5,5 mm nut driver to loosen the 10 nuts (reference 1 image 16-8) which fasten the Button module.

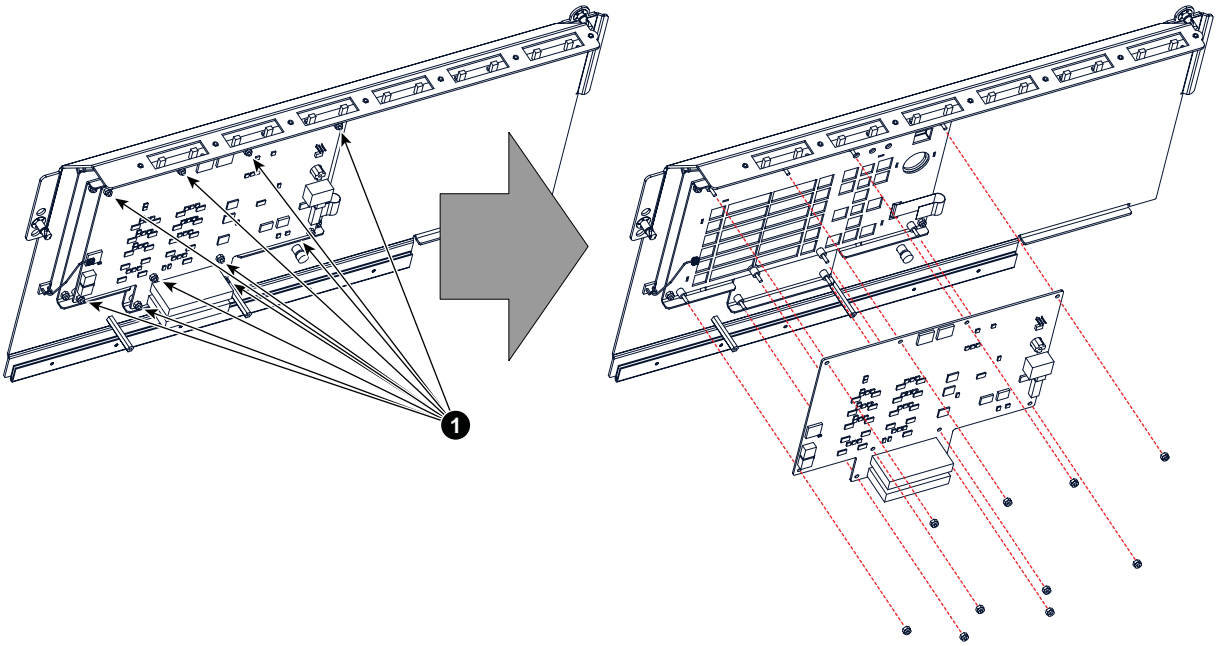


Image 16-8

6. Reconnect the four wire units (reference 2, 3, 4 and 5 image 16-7) with the Button module.
7. Reconnect the two flat cables (reference 1image 16-6) with the Button module.
8. Lower and secure the Control Panel. Use a flat screw driver to fasten the two screws at the bottom corners of the Control Panel.

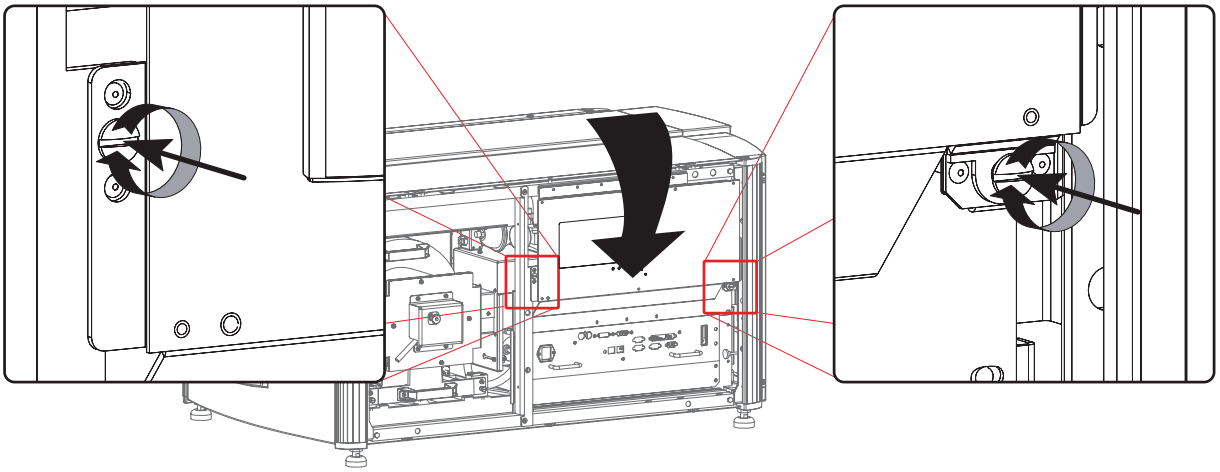


Image 16-9

16.4 Replacement of the Local Keypad

To replace the Local Keypad the right cover of the projector has to be removed. This procedure assumes that the right cover is already removed.

Necessary tools

- Flat screw driver.
- 5,5 mm nut driver.

How to replace the Local Keypad of the Control Panel?

1. Release the two retaining screws which fasten the Control Panel to the projector chassis. Use for that a flat screwdriver.

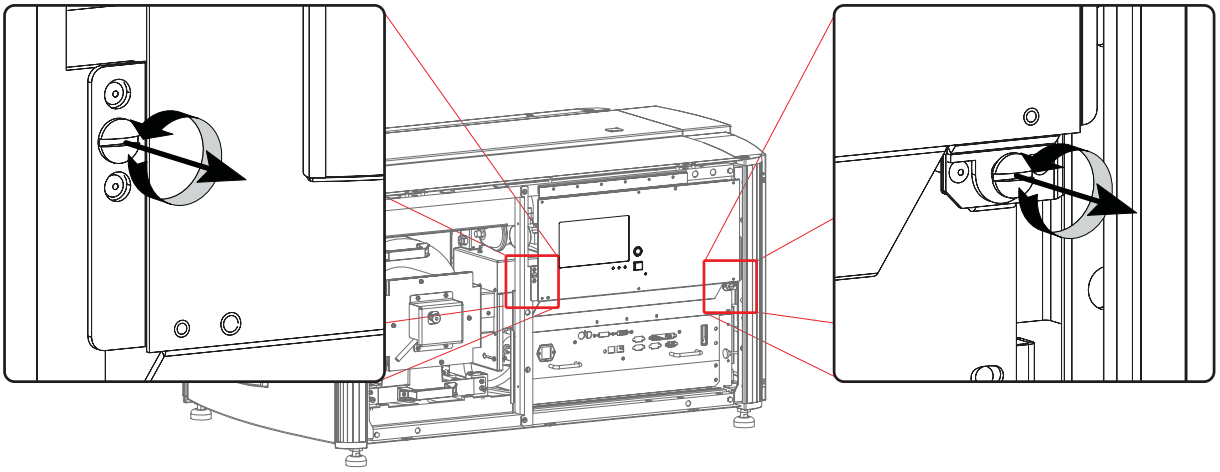


Image 16-10

2. Pivot the Control Panel upwards and lock the position with the provided support as illustrated.

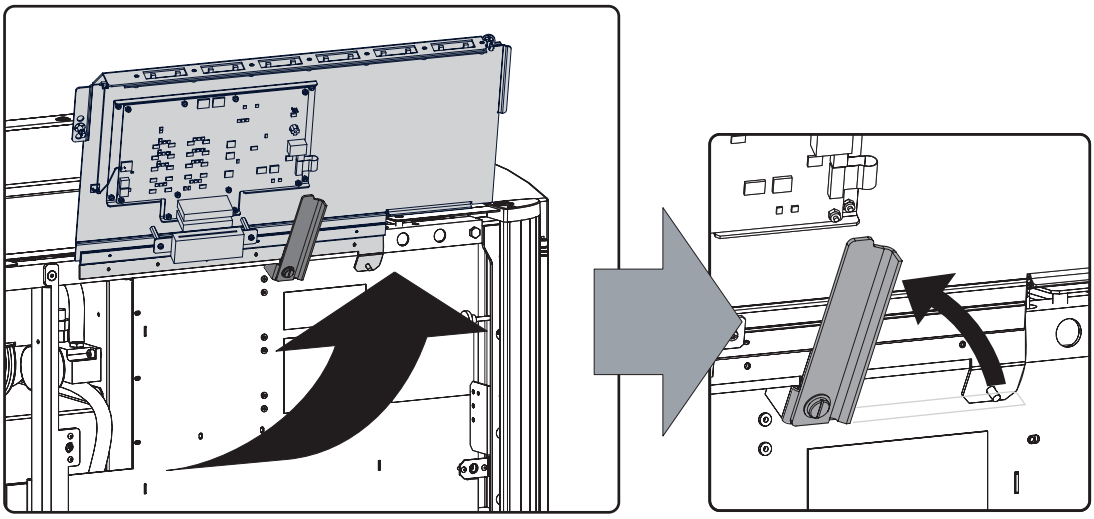


Image 16-11

3. Disconnect the two flat cables (reference 1image 16-12) from the Button module.

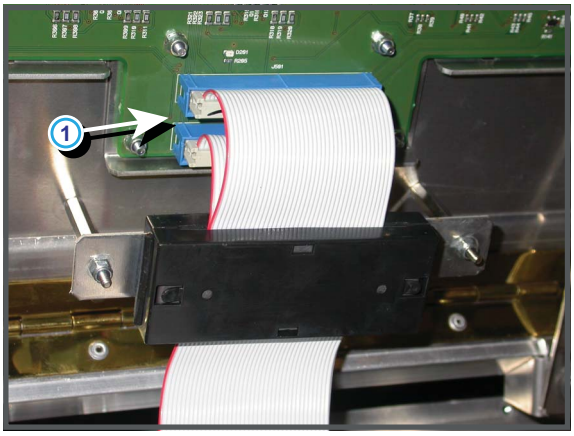
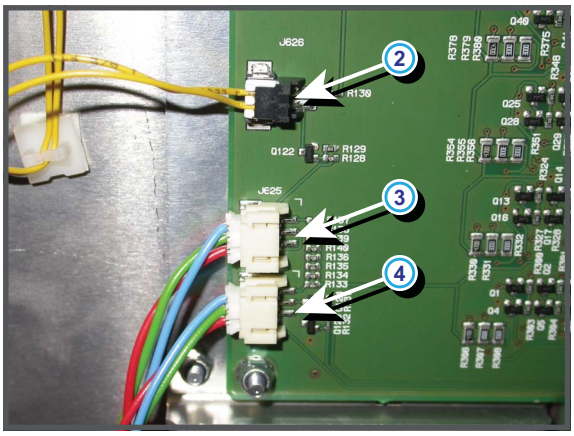


Image 16-12

4. Disconnect the four remaining wire units (reference 2, 3, 4 and 5 image 16-13) from the Button module.



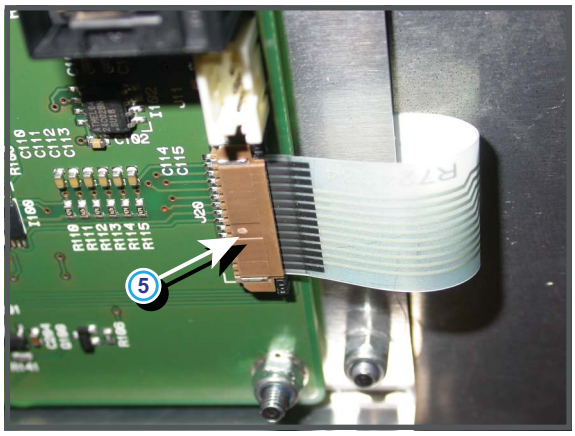


Image 16-13

5. Remove the Button module assembly from the Control Panel. Use a 5,5 mm nut driver to loosen the 4 nuts (reference 1 image 16-14) which fasten the assembly. Note that there are washers (reference 2 image 16-14) located between the Button module assembly and the Control Panel.

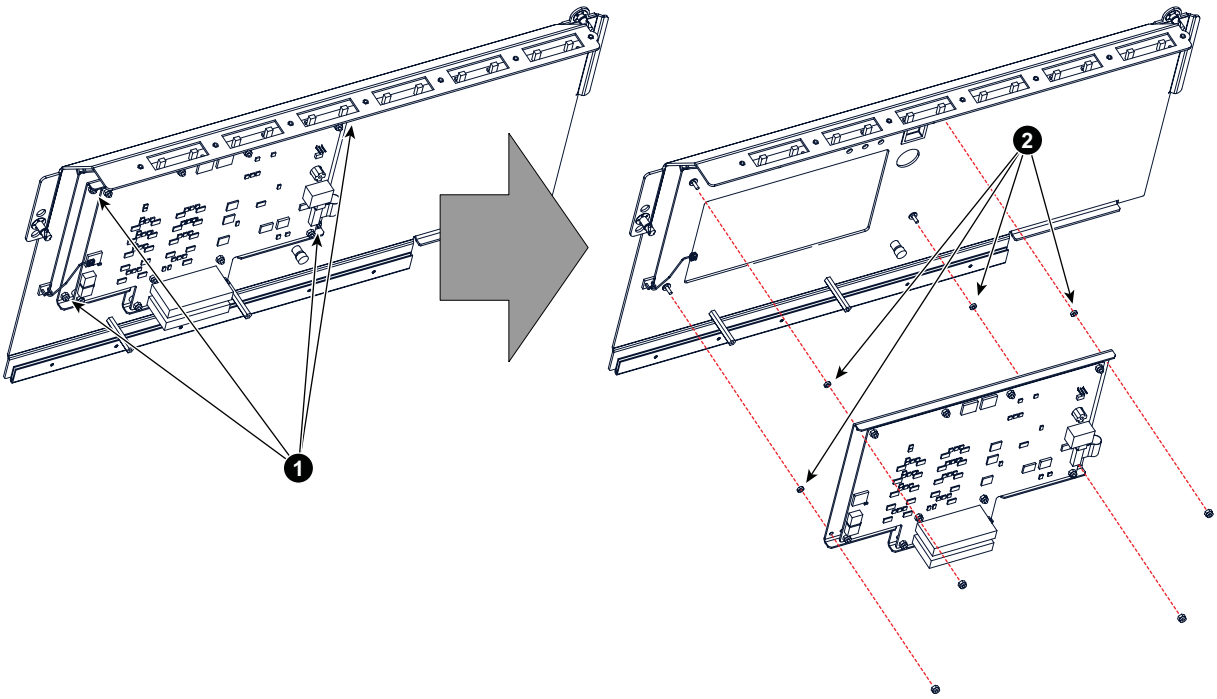


Image 16-14

6. Peel off the Local Keypad from its support plate.

7. Stick a new Local Keypad upon the support plate. Make sure to position the new Local Keypad correctly within the marks upon the support plate.

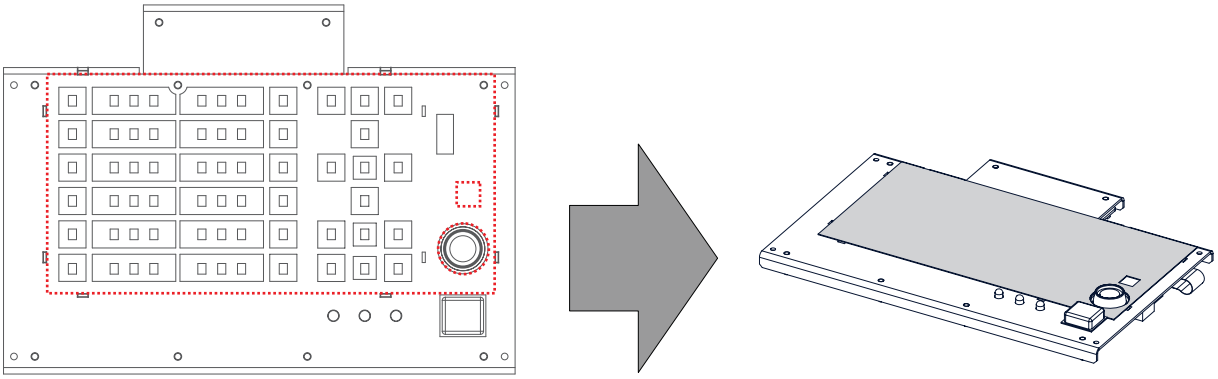


Image 16-15

8. Reinstall the Local Keypad assembly. Fasten with 4 nuts (reference1 image 16-14). Make sure to place four washers (reference 2 image 16-14) between the assembly and the Control Panel.
9. Reconnect the four wire units (reference 2, 3, 4 and 5 image 16-13) with the Button module.
10. Reconnect the two flat cables (reference 1image 16-12) with the Button module.
11. Lower and secure the Control Panel. Use a flat screw driver to fasten the two screws at the bottom corners of the Control Panel.

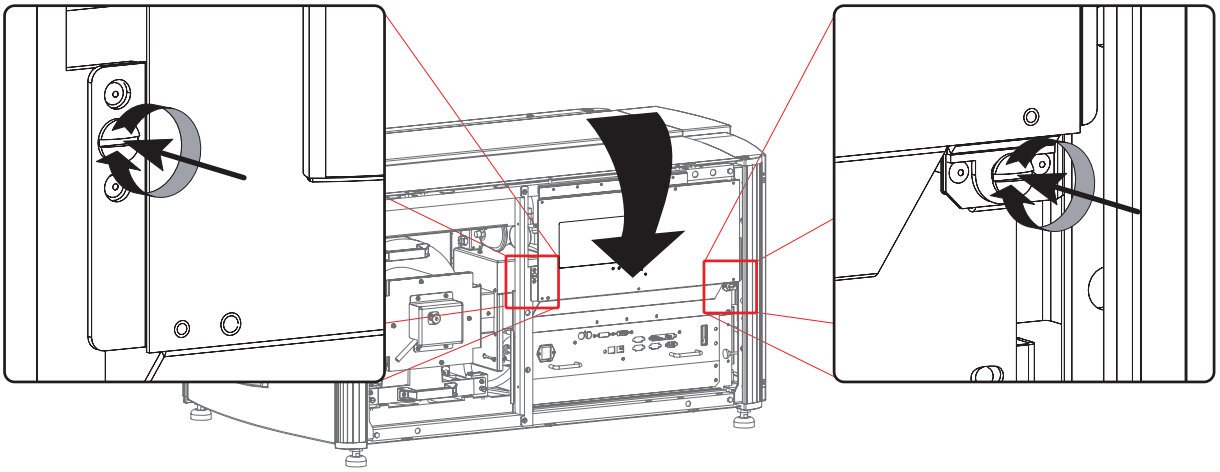


Image 16-16

16.5 Replacement of the Status Lights

Necessary tools

- Flat screw driver.
- 3 mm Allen wrench.
- T10 Torx driver.

How to replace the Status Light of the projector rear corner?

1. Remove the big plastic screw (reference 1image 16-17). Use a big flat screw driver.
2. Remove the hexagons socket head cap screw (reference 2 image 16-17) which fasten the Status Light corner assembly. Use a 3 mm Allen wrench.
3. Pull out the Status Light corner assembly (reference 3 image 16-17) which fasten the Status Light corner assembly).
4. Disconnect the wire unit from the Status Light module.
5. Remove the plastic corner cap from the Status Light module (reference 4image 16-17) by loosen the screw (reference 5image 16-17) at the bottom of the Status Light module. Use a T10 Torx driver.

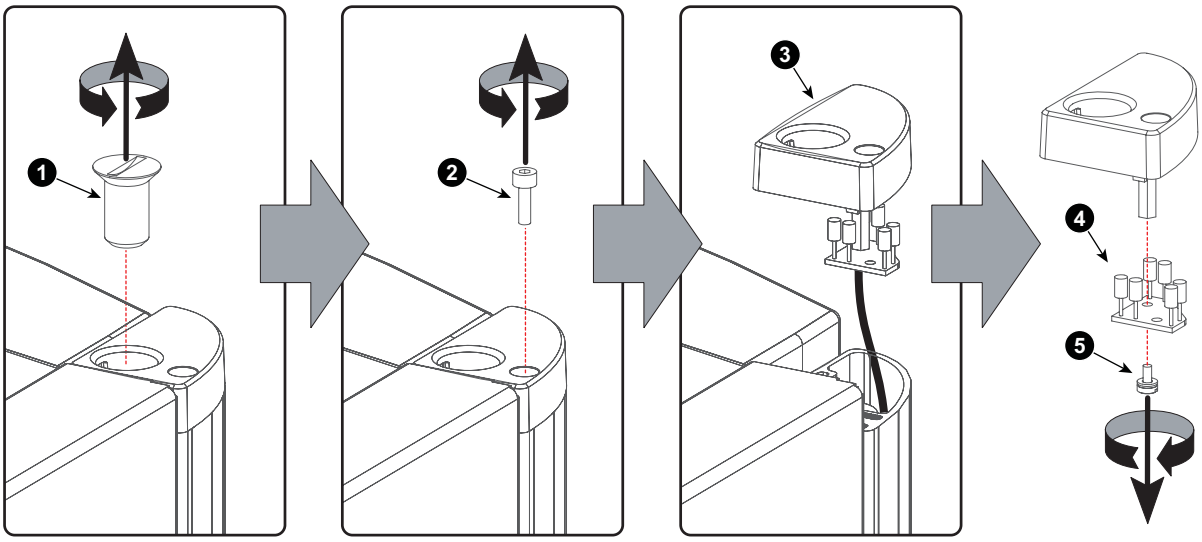


Image 16-17

6. Reverse this procedure to install a new Status Light module.

17. COMMUNICATOR TOUCH PANEL

Overview

- Introduction
- Installing the touch panel interface
- Reposition the touch panel interface

17.1 Introduction

Communicator Touch Panel for digital cinema projectors

The Communicator Touch Panel is designed for multi-user command and control, the Communicator enables users to learn quickly and operate efficiently - using an elegant and flexible Touch Panel interface. The interface's commonality means that operators can intuitively use any model in the product line, without restriction, and its user-friendly nature translates directly into a short and enjoyable learning curve.

Image 17-1

Flexible Touch Panel interface

The Touch Panel interface can be mounted upon a swivel arm which easily fits on top of the DP-3000 projector. One central locking mechanism of the swivel arm allows an instant fixation of the Touch Panel interface in any position.

The Touch Panel interface can also be installed further away from the DP-3000 projector. For that you can use a serial (RS232) cable up to 10 meter or an Ethernet cable up to 50 meter to realize a direct data communication between the DP-3000 projector and the Communicator Touch Panel.

The Touch Panel interface can also be connected with a Local Area Network (LAN) just like the DP-3000 projector. In this case both devices can communicate with each other as well.

The Touch Panel interface requires a voltage supply +12 VDC and 1,5 ampere. Note that the DP-3000 projector has a 12 VDC output which can be used to power up the Touch Panel interface. Nevertheless, the use of a separate +12 VDC adaptor (1,5 ampere minimum) is required in case the Touch Panel interface is installed more then a few meters away from the DP-3000 projector.

17.2 Installing the touch panel interface

Necessary tools

- 17 mm wrench.
- 10 mm wrench.

How to install the touch panel interface upon the DP-3000 projector?

1. Assemble the mounting plate and the swivel arm together as illustrated. First the nut (N) upon the rod of the mounting plate, then the lock washer (L), and then fasten mounting plate and swivel arm together. When arm is mounted, turn nut (N) against the arm to secure the position.

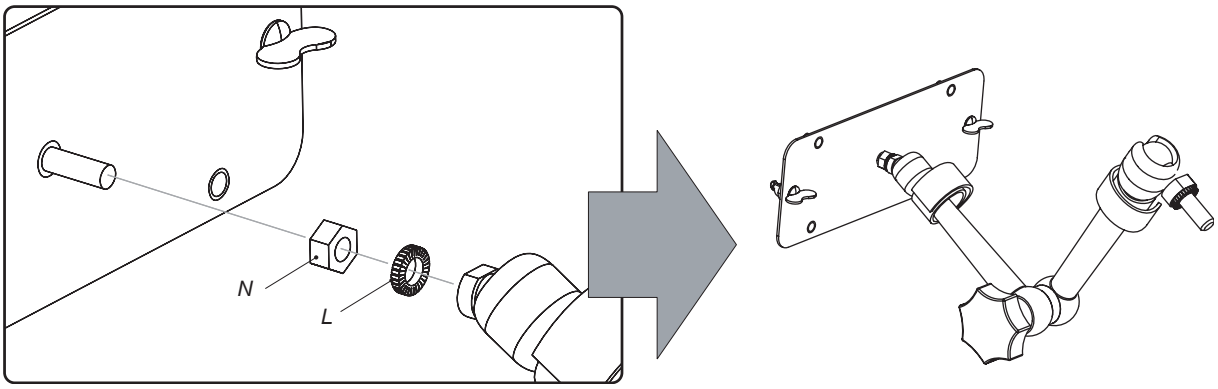


Image 17-2

2. Place the touch panel interface upon the mounting plate of the swivel arm and fasten the two wing nuts (W) as illustrated.

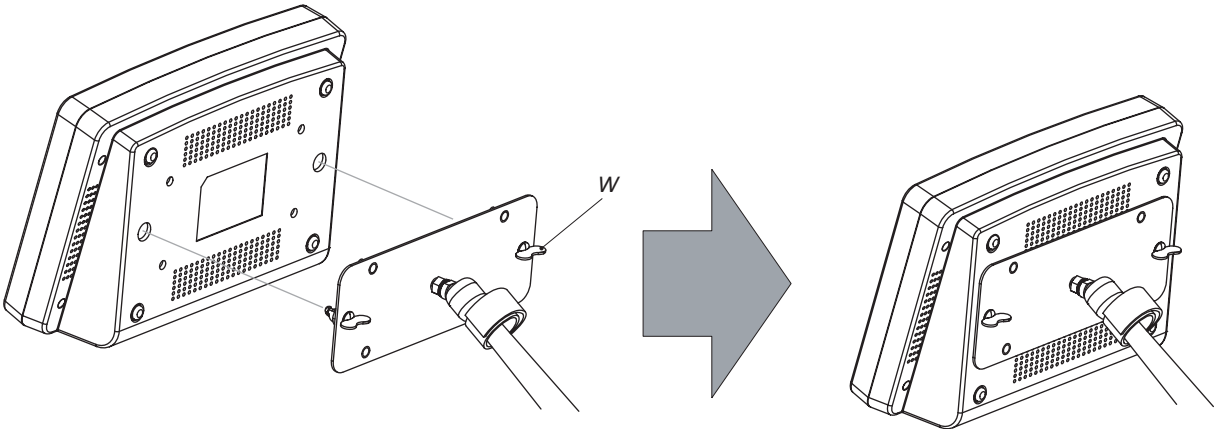


Image 17-3

3. On one of the back corners of the projector, turn out the screw of the hook light.

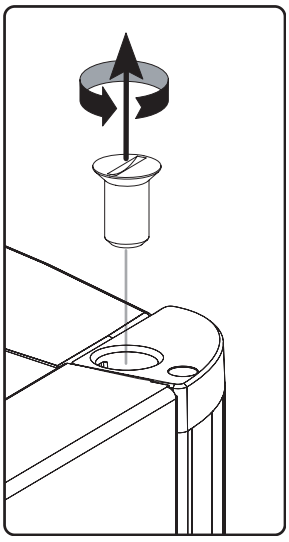


Image 17-4

4. Turn in the adapter piece (A) between projector and swivel arm. Slide a washer (B) over the base of the swivel arm and insert the base of the swivel arm into the mounting hole of the adapter.

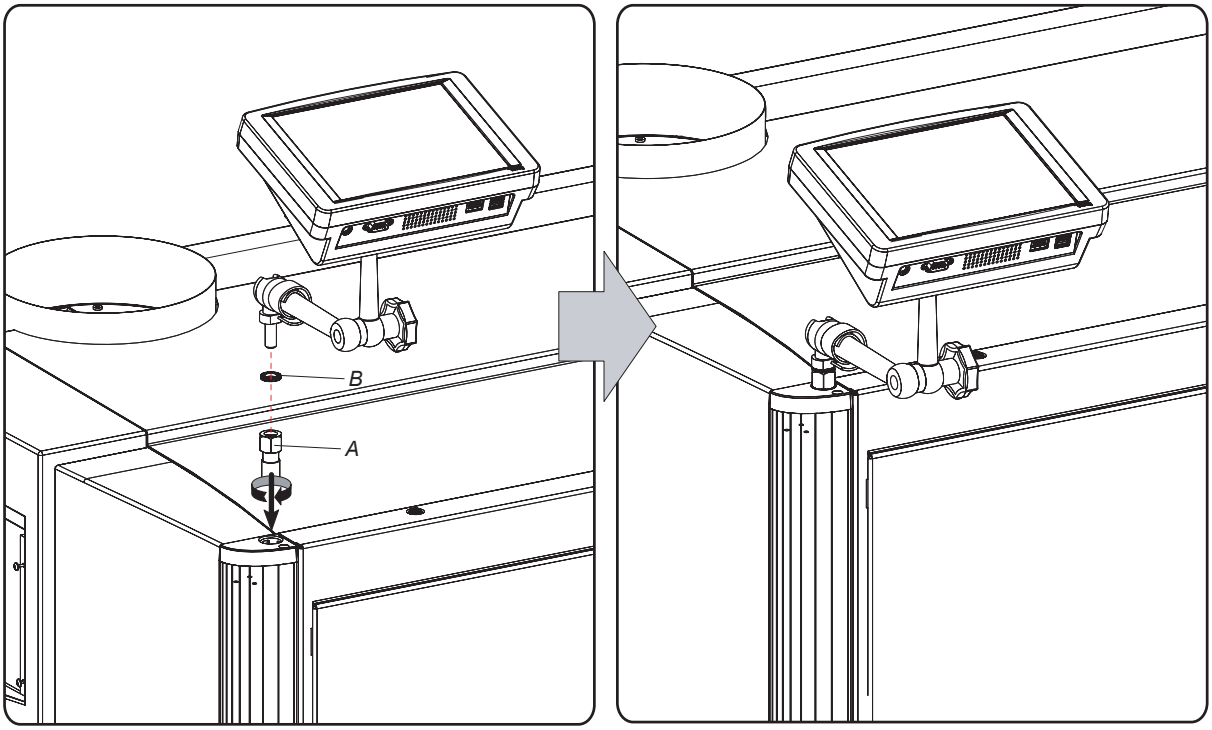


Image 17-5

5. Insert the secondary side of the adapter into the power socket. Use the correct power cord to power the adapter.
   Plug the SUB-D plug of the RS232 cable into the SUB-D socket of the touch panel. Plug the other end into the RS232IN connector on the communication panel of the projector.
   Plug one end of the Ethernet cable into the RJ45 socket of the touch panel and the other end into one of the Ethernet ports of the projector (Port 1 or Port 2).

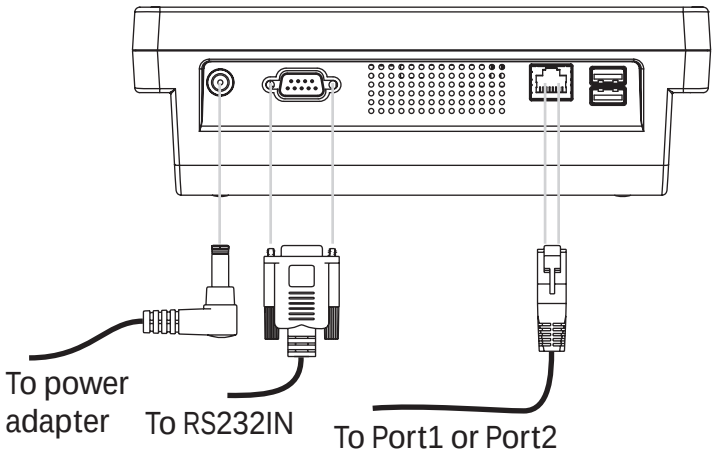


Image 17-6

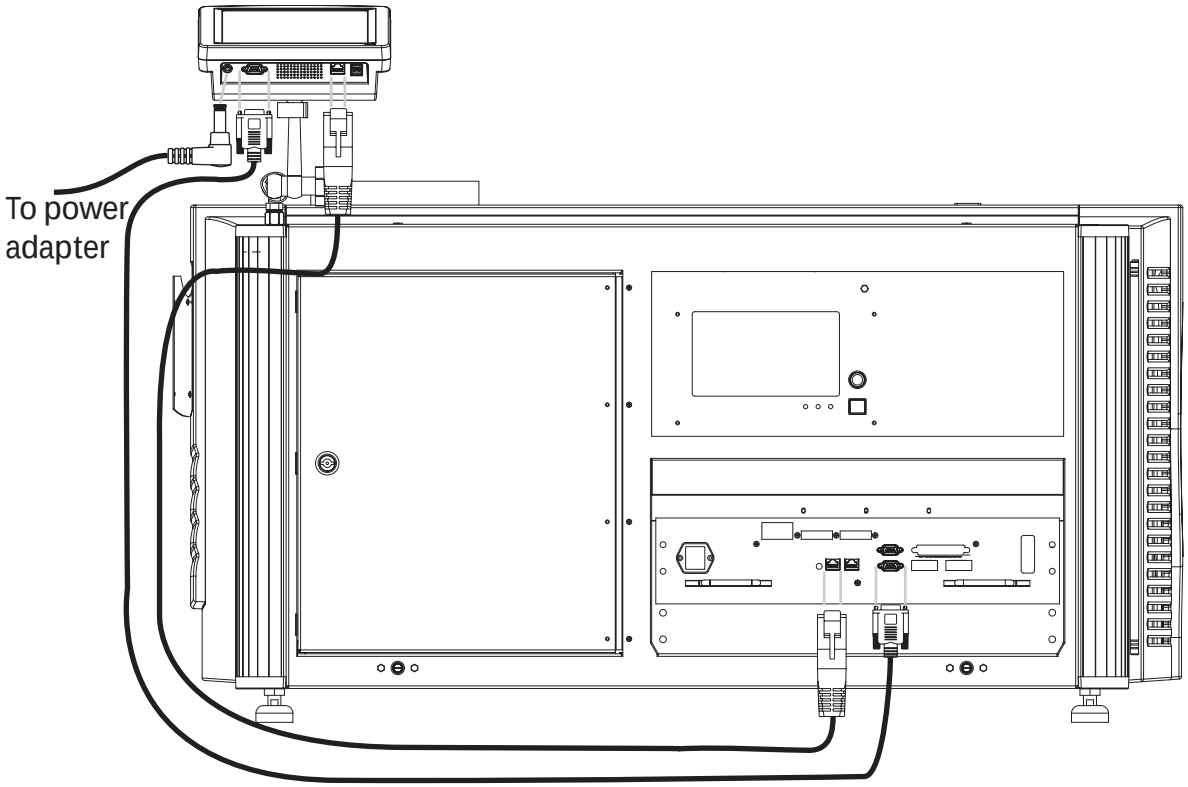


Image 17-7

6. Fasten the plug of the power adapter cord together with the with the SUB-D plug of the RS232 cable as illustrated. Use for that one cable tie.

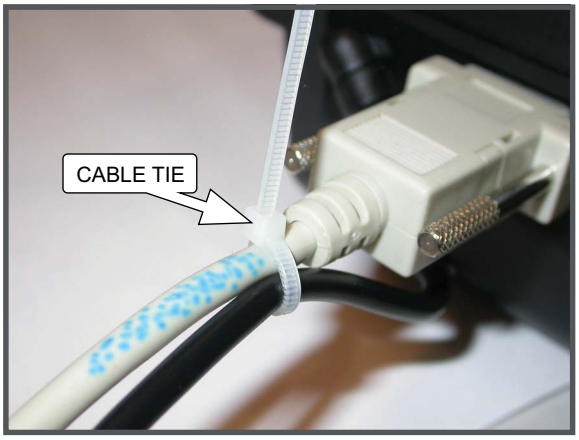


Image 17-8

17.3 Reposition the touch panel interface

How to reposition the touch panel interface?

1. Hold fast the touch panel interface.
2. Release the central swivel clamp by turning the big black knob (K) counterclockwise.

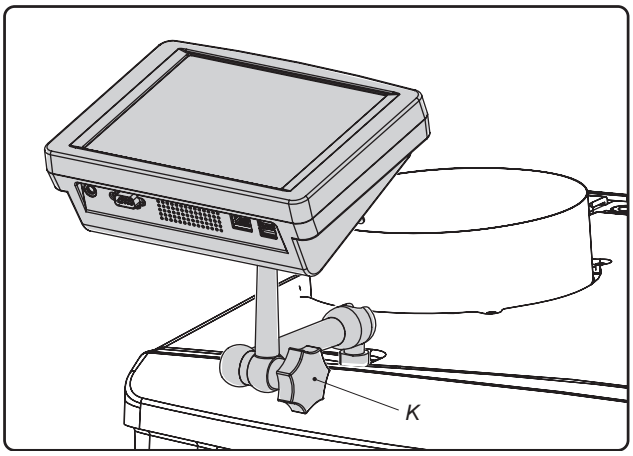


Image 17-9

3. Move the touch panel interface into the desired position.
4. Fasten the central swivel clamp by turning the big black knob clockwise.

CAUTION: Never release the central swivel lock without supporting the Touch Panel interface.

18. FAN REPLACEMENT PROCEDURES

About this chapter

This chapter contains the replacement procedures of all fans in the projector. Note that the fans of the Power Unit can not be replaced. The Lamp Power Supply module has to be replaced as a whole.

Overview

- Replacement of the Anode Fan
- Replacement of the Cathode Fan
- Replacement of the Outlet Fan
- Replacement of the Cold Mirror Top Fan
- Replacement of the Cold Mirror Bottom Fan
- Replacement of the SPG Fan
- Replacement of the Card Cage Fans

18.1 Replacement of the Anode Fan

Where is the Anode Fan located?

The Anode Fan (reference 1 image 18-1) is located at the bottom of the projector, underneath the optical base. You can see a part of the Anode fan via the compartment of the Lamp House. The Anode Fan has to be accessed via the projector bottom. The outlet of the Anode Fan is provided with an extension (reference 2 image 18-1) which guide the fresh air upwards to the anode of the xenon lamp. This extension and the Anode Fan have to be removed as a whole from the projector. Note that the outlet extension contains a temperature sensor (reference 3 image 18-1) which has to be disconnected prior to removing the Anode Fan.

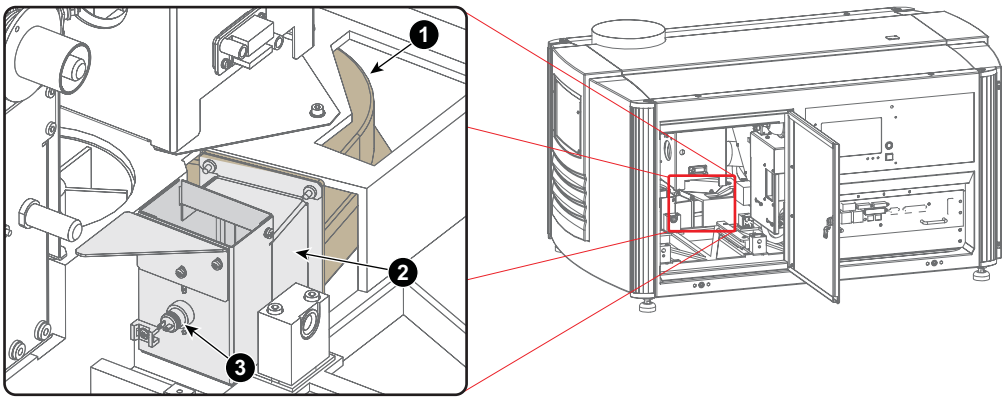


Image 18-1

To replace the Anode Fan, the Lamp House, left cover, the bottom cover and the Sealed Light Processor unit have to be removed first. This procedure assumes that the Lamp House, the left cover, bottom cover and the Sealed Light Processor unit are already removed from the projector.

Necessary tools

- Side cutter.
- T20 Torx driver.
- 3 mm Allen wrench.

How to remove the Anode fan?

1. Remove the temperature sensor (reference 1 image 18-2) from the Anode Fan outlet channel by pulling off the winglet (reference 2 image 18-2) from the sensor. Note that there is an O-ring (reference 3 image 18-2) present on the sensor. Do not loose this O-ring.

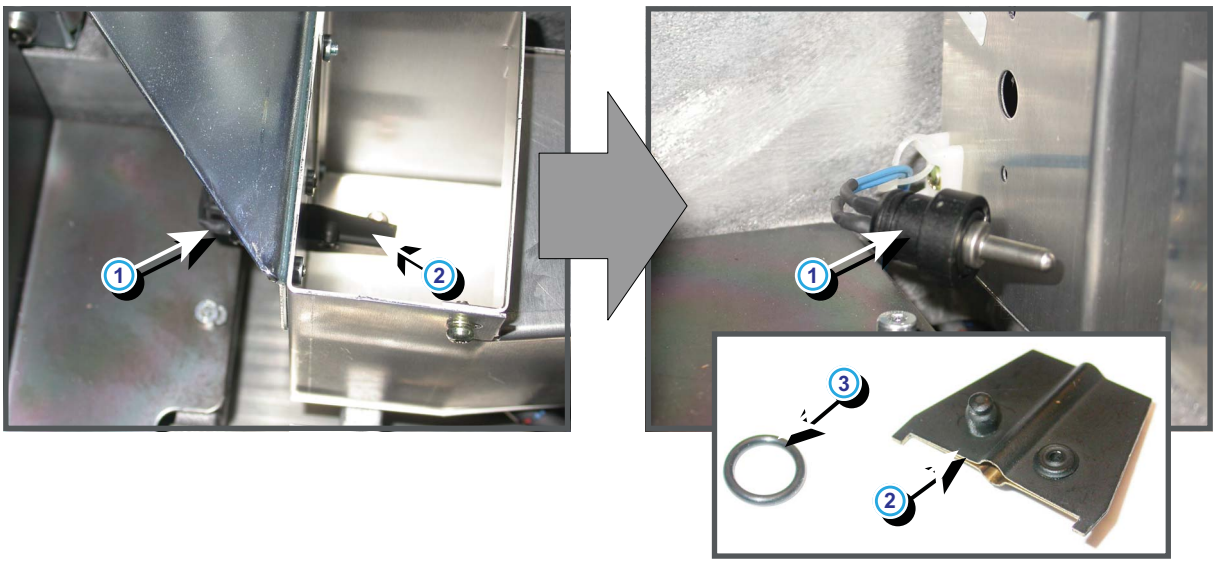


Image 18-2

2. Remove the two cable ties which fasten the wire unit of the Anode Fan. One cable tie is accessible from the projector bottom (reference 4 image 18-3) and the other cable tie is accessible via the Lamp House compartment (reference 5 image 18-3).

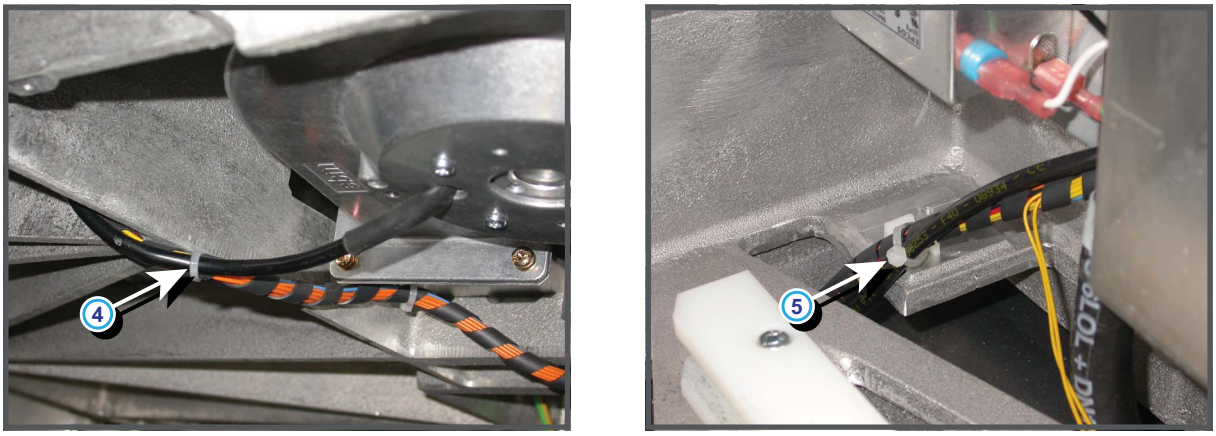


Image 18-3

3. Disconnect the wire unit (reference 6 image 18-4) of the Anode Fan.

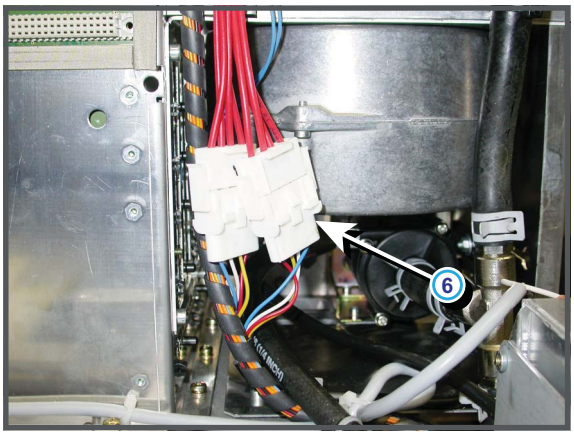


Image 18-4

4. Loosen the two screws at the bottom of the outlet channel. use a T20 Torx driver.

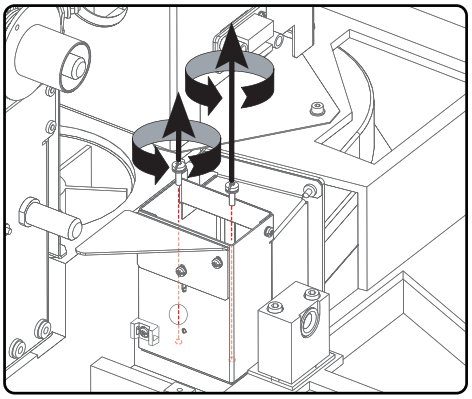


Image 18-5

5. Loosen the four hexagon socket head cap screws which fasten the Anode Fan assembly. One screw is accessible via the Lamp House compartment, the other three screws are accessible via the compartment of the Sealed Light Processor unit.

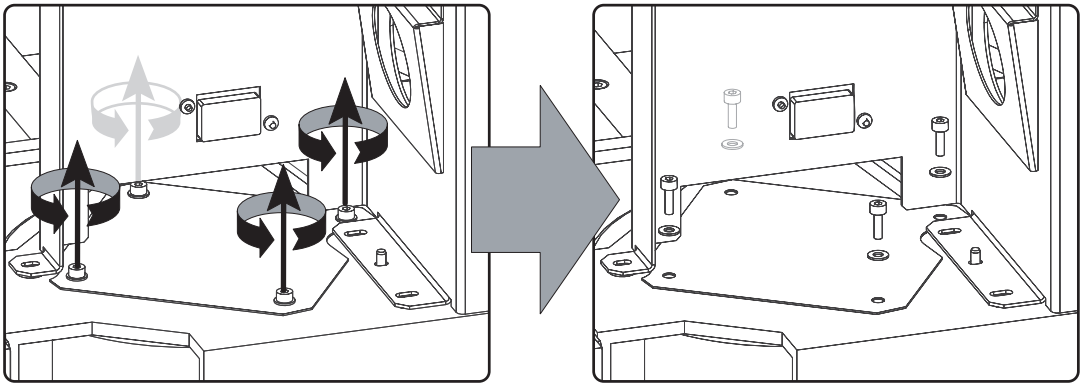


Image 18-6

6. Remove the Anode fan from the projector.

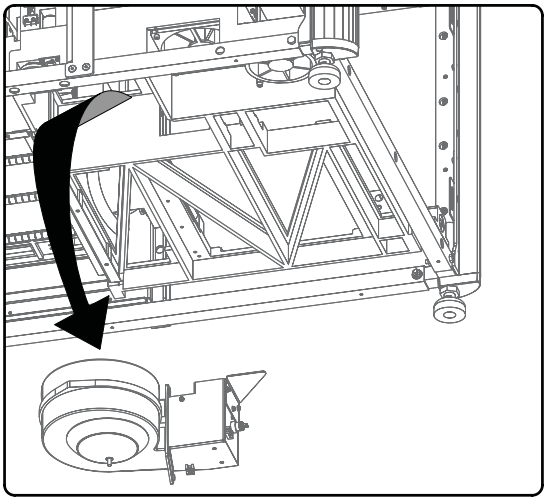


Image 18-7

7. Remove the air channel outlet extension from the Anode Fan by loosen the four Torx screws (reference 1 image 18-8). Use a T20 Torx driver. Do not loosen the washers (reference 2 image 18-8).

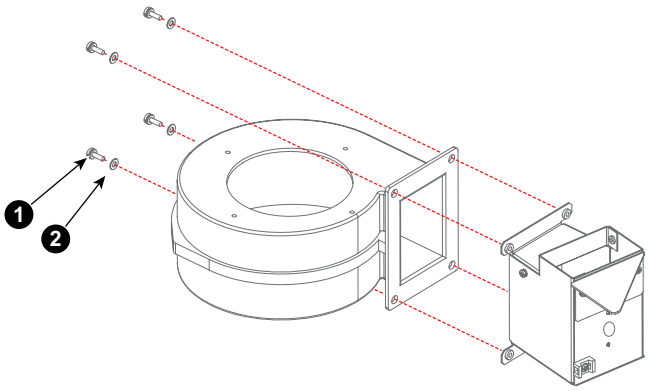


Image 18-8

How to install the Anode Fan?

1. Install the air channel outlet extension on the Anode Fan with four Torx screws (reference 1 image 18-9). Use a T20 Torx driver. Provide each screw with a washer (reference 2 image 18-9).

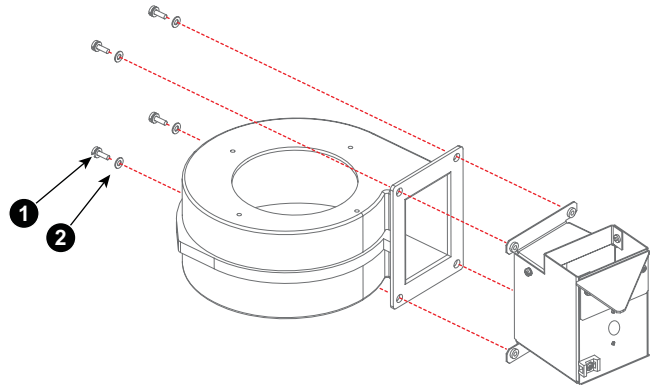


Image 18-9

2. Place the Anode fan assembly in its position.

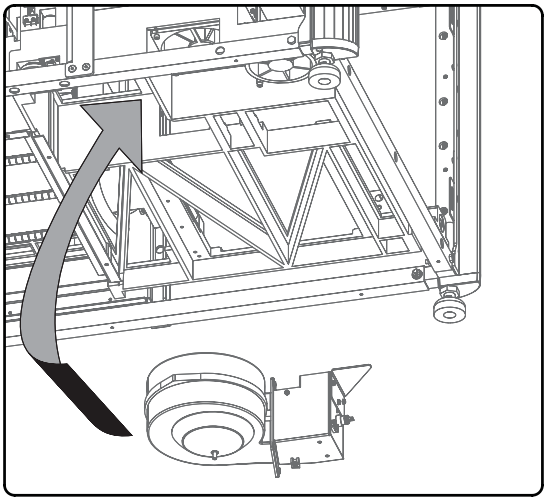


Image 18-10

3. Fasten the Anode fan assembly with four hexagon socket head cap screws (reference 3 image 18-11) and washers (reference 4 image 18-11). One screw has to be inserted via the Lamp House compartment, the other three screws can be inserted via the compartment of the Sealed Light Processor unit.
   Caution: *Make sure that the metal grid (reference 5 image 18-11) is correctly placed.*

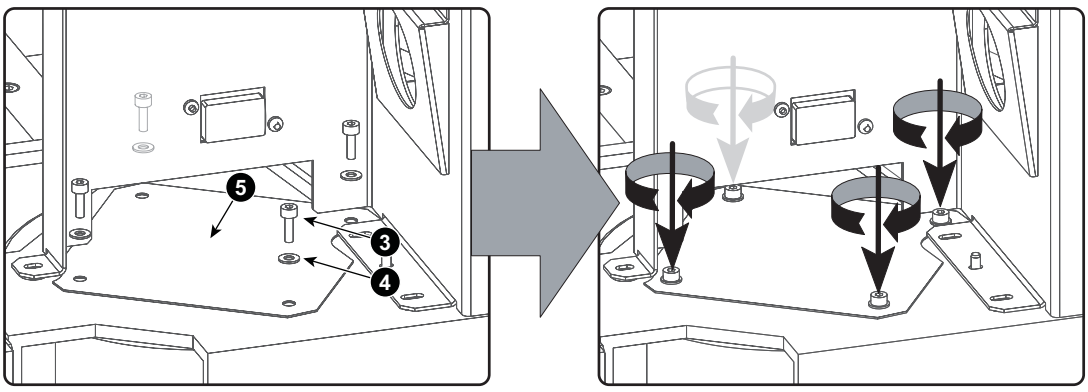


Image 18-11

4. Insert the two screws at the bottom of the outlet channel. use a T20 Torx driver.

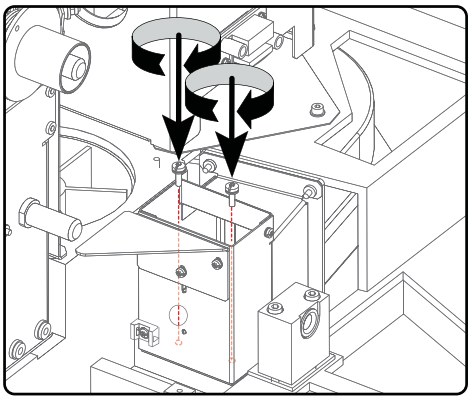


Image 18-12

5. Connect the wire unit (reference 6 image 18-13) of the Anode Fan.

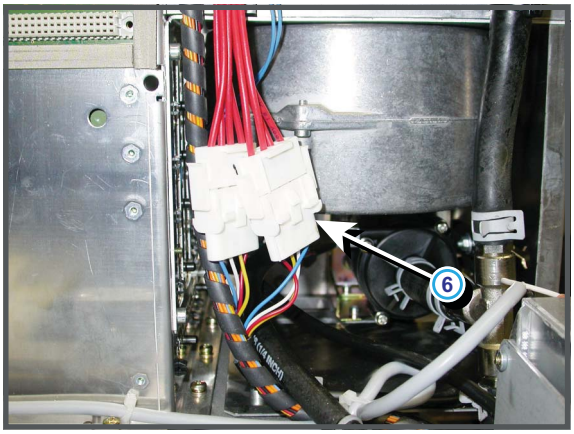
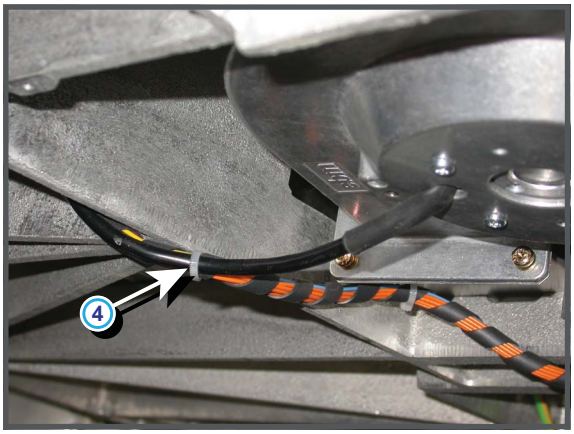


Image 18-13

6. Fasten the wire unit of the Anode Fan with two cable ties as illustrated.



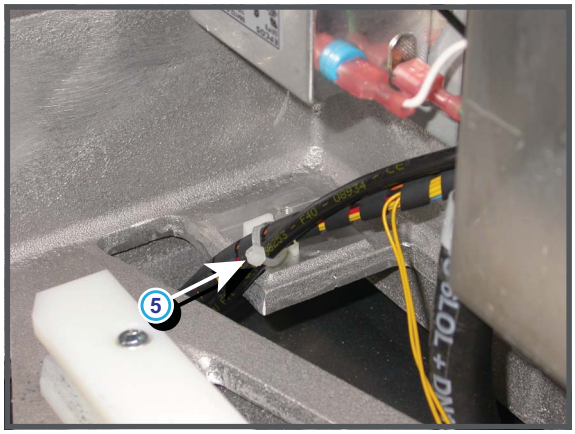


Image 18-14

7. Install the temperature sensor (reference 1 image 18-15) on the Anode Fan outlet channel by pushing the winglet (reference 2 image 18-15) upon the sensor. Make sure that there is an O-ring (reference 3 image 18-15) present on the sensor.

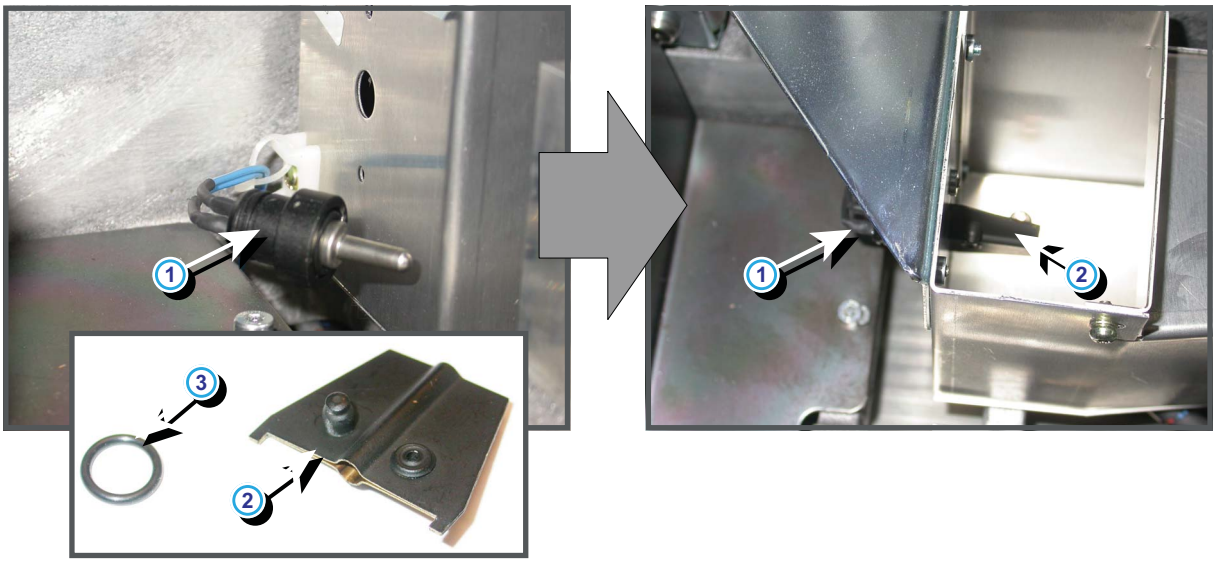


Image 18-15

18.2 Replacement of the Cathode Fan

Where is the Cathode Fan located?

The Cathode Fan (reference 1) is located above the Pump of the Liquid Cooling System (reference 2) and between the compartment of the Lamp House and the Card Cage. To replace the Cathode Fan, the Pump has to be removed from its location first. It is not needed to drain the Liquid Cooling Circuit.

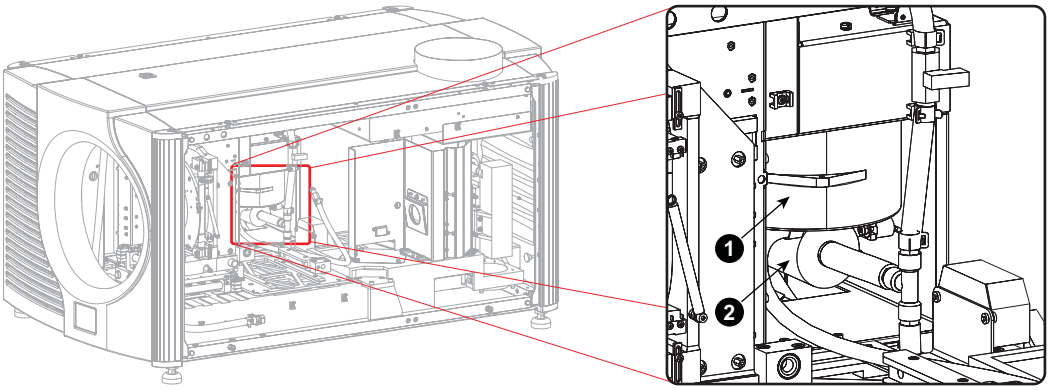


Image 18-16

To replace the Cathode Fan, the Pump of the Liquid Cooling Circuit has to be removed first. This procedure assumes that the Pump is already removed. See chapter "Removal of the Pump", page 204.

Necessary tools

- T20 Torx driver.
- 3 mm Allen wrench.
- 5 mm open-end wrench.

How to replace the Cathode Fan?

1. Disconnect the wire unit (reference 1) of the Cathode Fan.

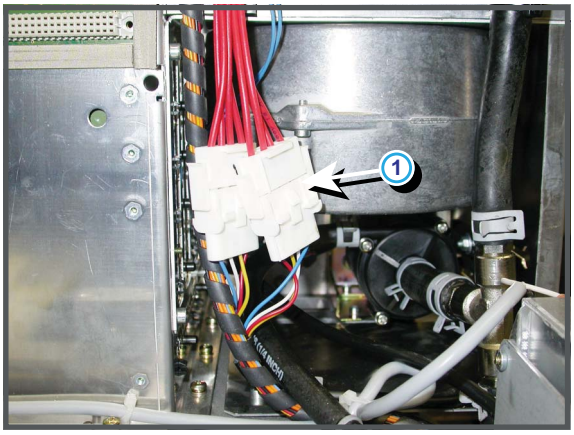


Image 18-17

2. Release the Cathode Fan assembly from the projector base by loosening the three screws (reference 1) at the bottom, the two screws (reference 2) at the left, the two screws (reference 3) at the top and the two screws at the left (reference 4) of the Cathode fan assembly. Use a T20 Torx driver for the screws at the top and a 3 mm Allen wrench for the other screws.

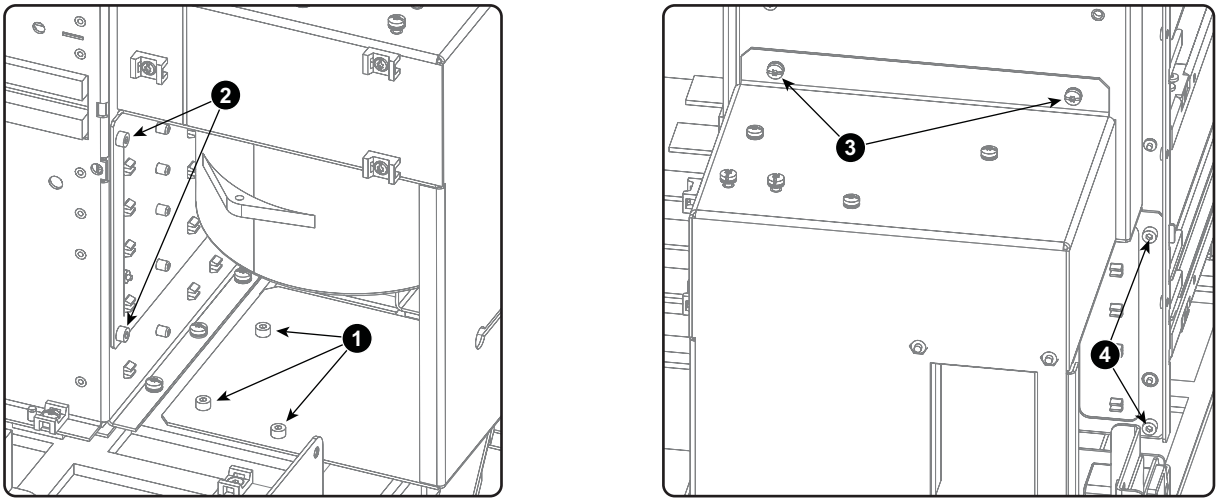


Image 18-18

3. Remove the Cathode Fan assembly from the projector.

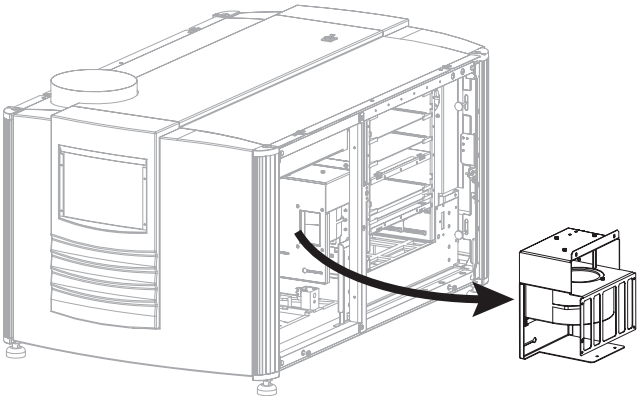


Image 18-19

4. Disassemble the Cathode Fan assembly. Use a T20 Torx driver to loosen the three screws (reference 5) at the top and a 3 mm Allen wrench to loosen the four screws (reference 6) at the fan outlet.

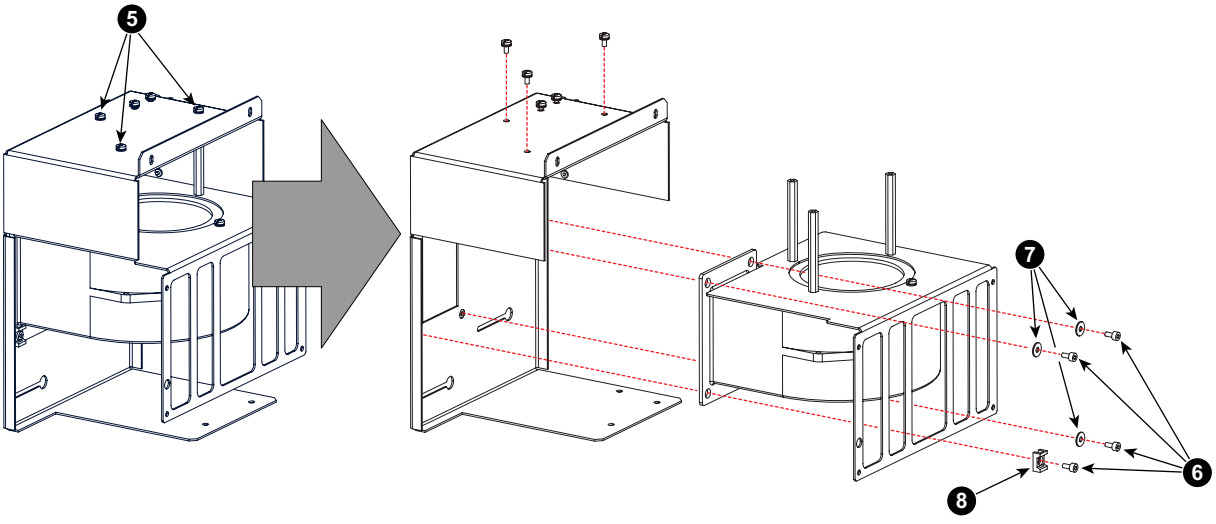


Image 18-20

5. Remove the mounting plate from the Cathode Fan. Use a 5 mm open-end wrench to loosen the three spacers (reference 9) and use a T20 Torx driver to loosen the remaining screw (reference 10).

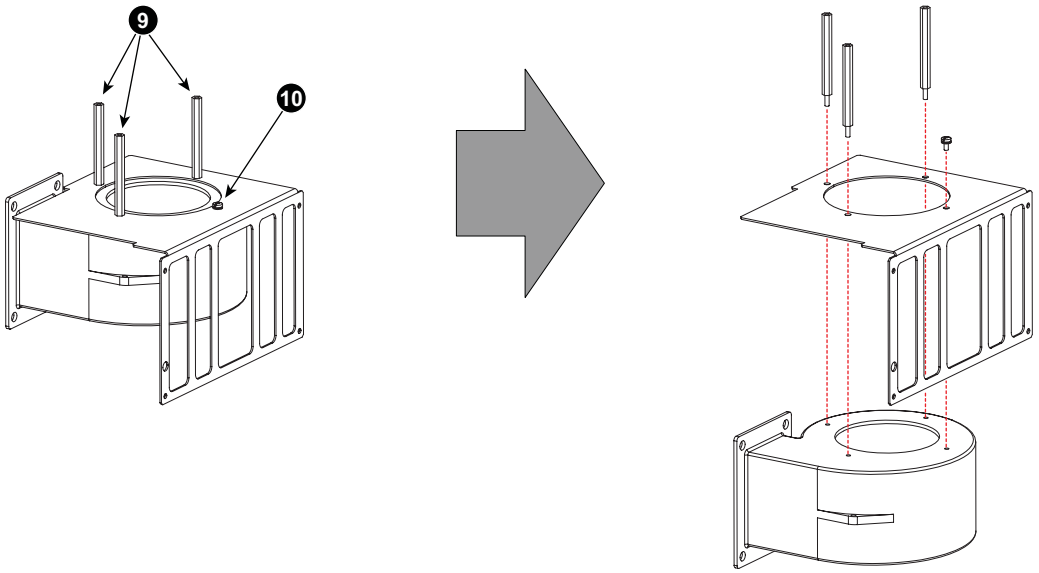


Image 18-21

6. Install a new Cathode Fan on the mounting plate. Use three spacers (reference 9) and one Torx T20 screw (reference 10) to fasten the Cathode Fan.

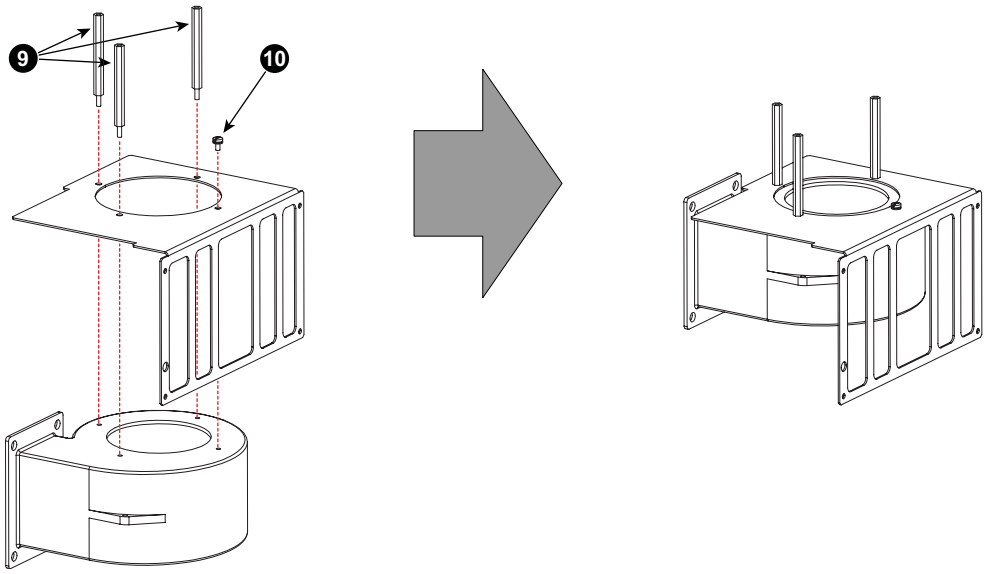


Image 18-22

7. Reassemble the Cathode Fan assembly as illustrated. Use three Torx screws T20 (reference 5) to fasten the top of the assembly. Use four hexagon socket head cap screws (reference 6) to fasten the outlet of the Cathode Fan. Three provided with a plain washer (reference 7) and one with a cable tie holder (reference 8).

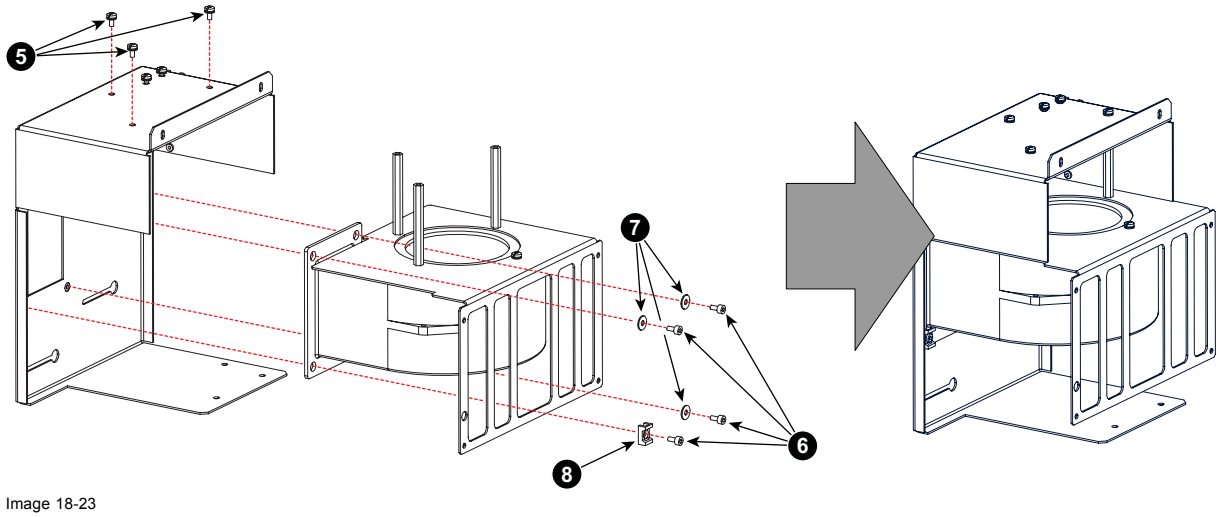


Image 18-23

8. Place the Cathode Fan assembly in its mounting position in the projector.

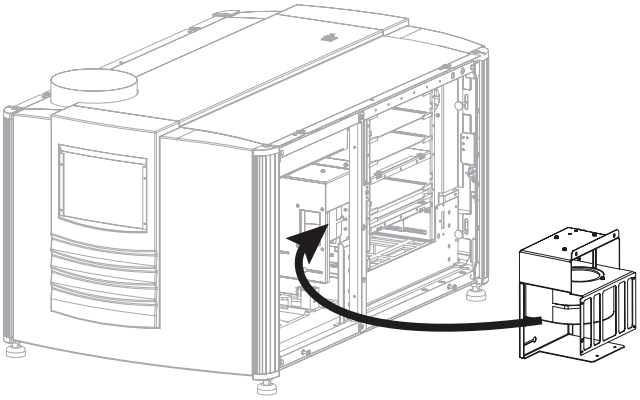


Image 18-24

9. Secure the Cathode Fan assembly with three screws (reference 1 image 18-18) at the bottom, two screws (reference 2 image 18-18) at the left, two screws (reference 3 image 18-18) at the top and two screws at the left (reference 4 image 18-18) of the Cathode fan assembly. Use a T20 Torx driver for the screws at the top and a 3 mm Allen wrench for the other screws.

10. Reconnect the wire unit (reference 1 image 18-17) of the Cathode Fan.

After the Cathode Fan assembly is installed, the Pump of the Liquid Cooling Circuit has to be reinstalled. See corresponding chapter "Installing the Pump", page 207, for detailed installation instructions.

18.3 Replacement of the Outlet Fan

Where is the Outlet Fan located?

The Outlet Fan is located inside the air exhaust channel above the Lamp House compartment.

To remove Outlet Fan assembly from the projector, the left cover, the right cover, the rear cover, the top cover and the Lamp House has to be removed first. This procedure assumes that the left cover, the right cover, the rear cover, the top cover and the Lamp House are already removed from the projector.

Necessary tools

- Side cutter.
- T10 Torx driver.
- T20 Torx driver.

Necessary parts

Cable ties.

How to replace the Outlet Fan of the air exhaust?

1. Disconnect the wire tree, which is attached to the housing of the Outlet Fan assembly, from the Power Backplane. Use a side cutter to cut the cable tie (reference 1image 18-25) which fasten the wire tree the projector. The wire three exist in three wire units:
   a) the wire unit of the Cold Mirror top fan (reference 2image 18-25).
   b) the airflow switch inside the exhaust channel of the Outlet Fan assembly (reference 3image 18-25).
   c) the wire unit of the Outlet Fan (reference 4image 18-25).

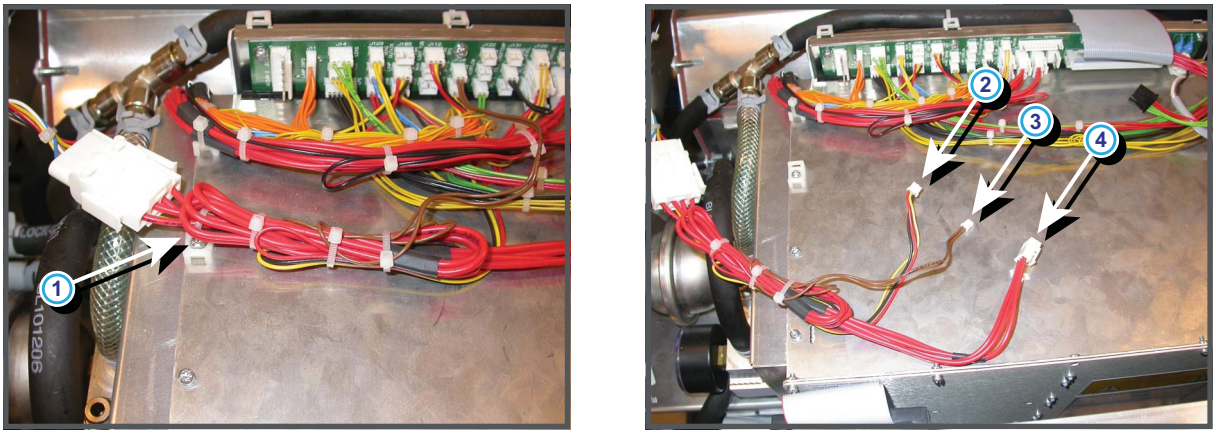


Image 18-25

2. Remove the Outlet Fan assembly from the projector by loosening the six screws (reference 5 image 18-26) on top of the assembly. Use a T20 Torx driver.
   Note: *To remove the assembly slide the assembly a few mm away from the rear of the projector and then lift it up.*

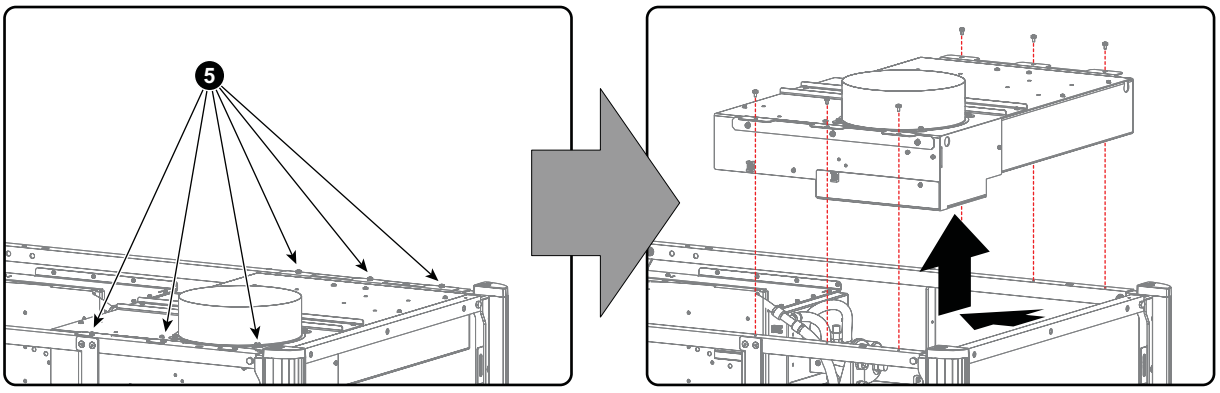


Image 18-26

3. Cut all cable ties which fasten the wire units to the Outlet Fan assembly as illustrated.

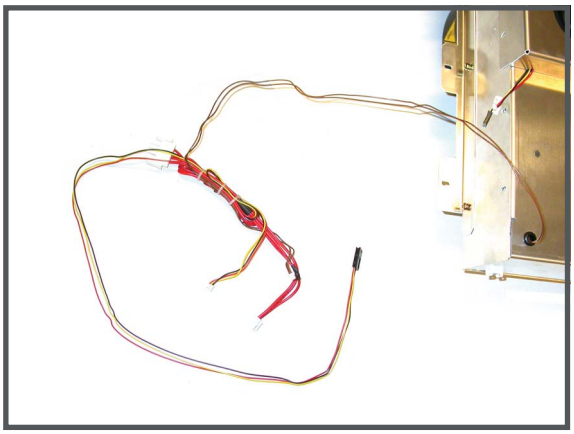


Image 18-27

4. Remove the 19 indicated Torx screws. Use a T10 Torx driver.
   a) 7 screws on top of the Outlet Fan assembly (reference 6 image 18-28).
   b) 5 screws at the left side of the Outlet Fan assembly (reference 7 image 18-28).
   c) 3 screws at the front side of the Outlet Fan assembly (reference 8 image 18-29).
   d) 4 screws at the bottom side of the Outlet Fan assembly (reference 9 image 18-29).

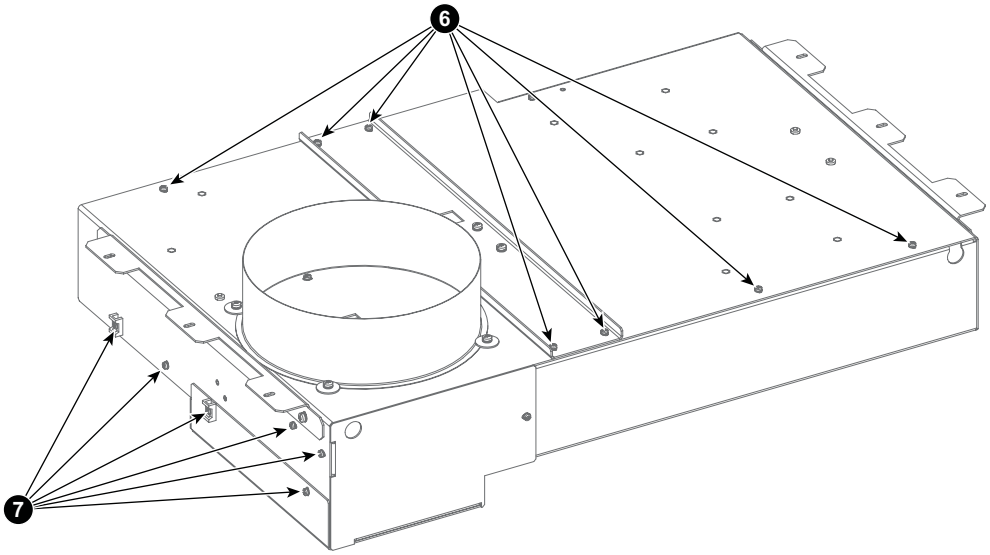


Image 18-28

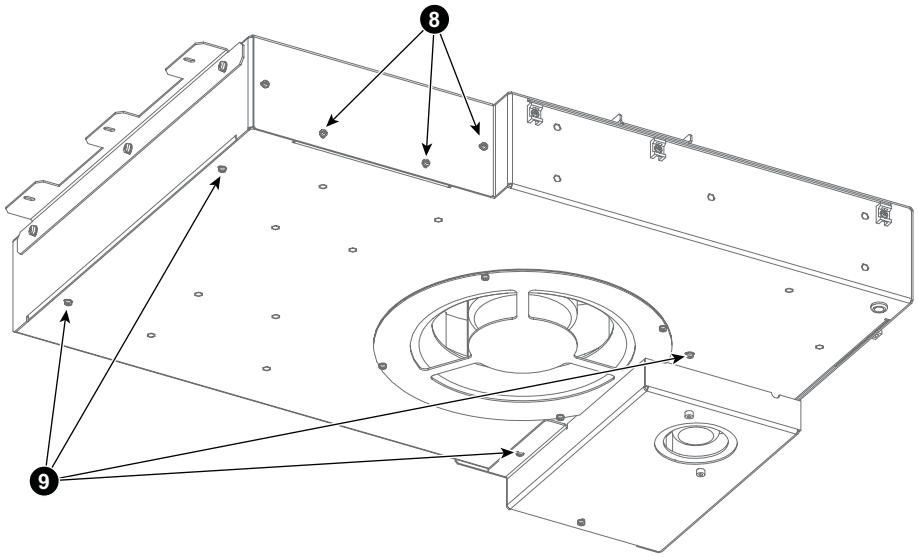


Image 18-29

5. Open the assembly.
   Caution: *The two parts of the Outlet Fan assembly are still connected with each other via the wire unit (reference 10 image 18-30) of the airflow switch. Do not damage this wire unit while separating the two parts of the Outlet Fan assembly.*

   Note: *Inside the Outlet Fan assembly there are three triangle shaped foam blocks (reference 11 image 18-30).*

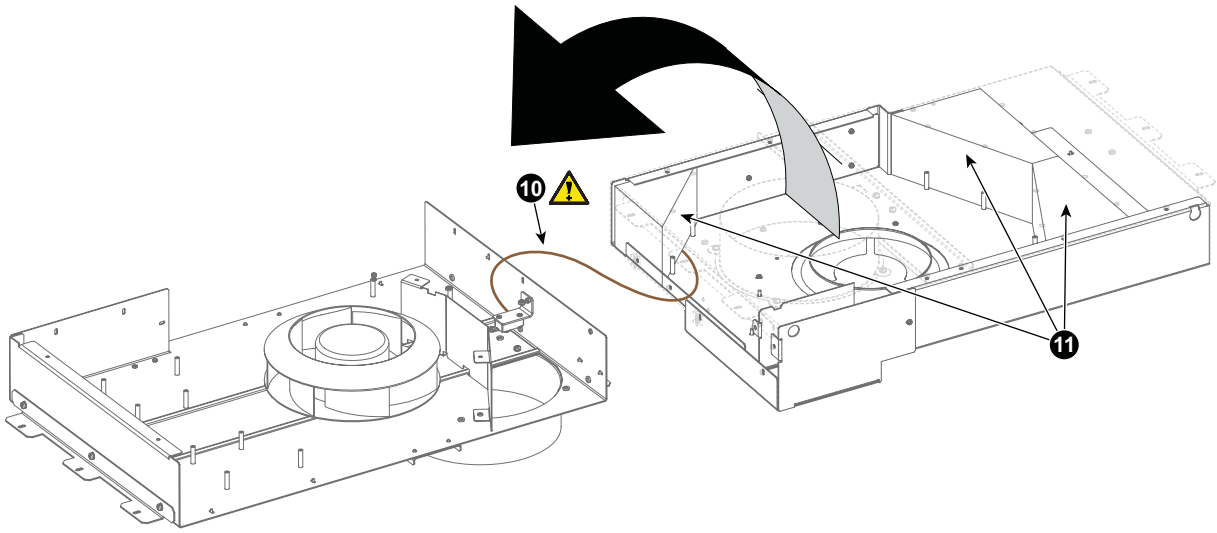


Image 18-30

6. Replace the Outlet Fan as illustrated. Use a T20 Torx driver to loosen/fasten the four screws (reference 12 image 18-31).
   Note: *The wire unit (ref 13image 18-31) of the Outlet Fan is guided through the opening of the housing and through the fixation plate.*

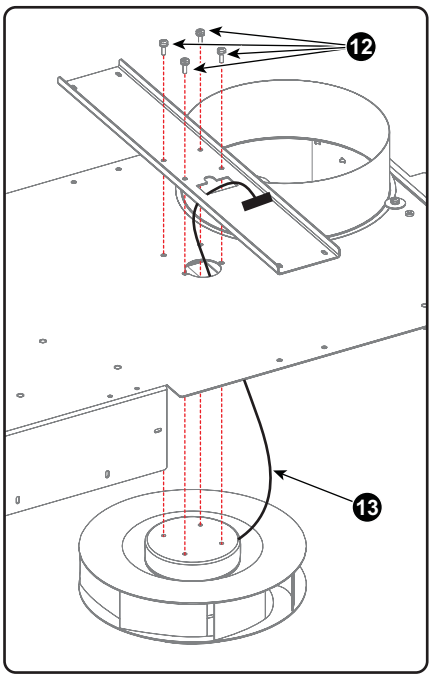


Image 18-31

7. Assembly the two parts of the Outlet Fan assembly back together. Use in total 19 T10 Torx screws:
   a) 7 screws on top of the Outlet Fan assembly (reference 6 image 18-28).
   b) 5 screws at the left side of the Outlet Fan assembly (reference 7 image 18-28).
   c) 3 screws at the front side of the Outlet Fan assembly (reference 8 image 18-29).
   d) 4 screws at the bottom side of the Outlet Fan assembly (reference 9 image 18-29).

   Caution: *Do not damage the wire unit (reference 10 image 18-30) of the airflow switch and make sure that the three foam blocks (reference 11 image 18-30) are placed as illustrated in image 18-30.*

8. Attach the wire units with cable ties (reference 15 & 16 image 18-32) to the Outlet Fan assembly.

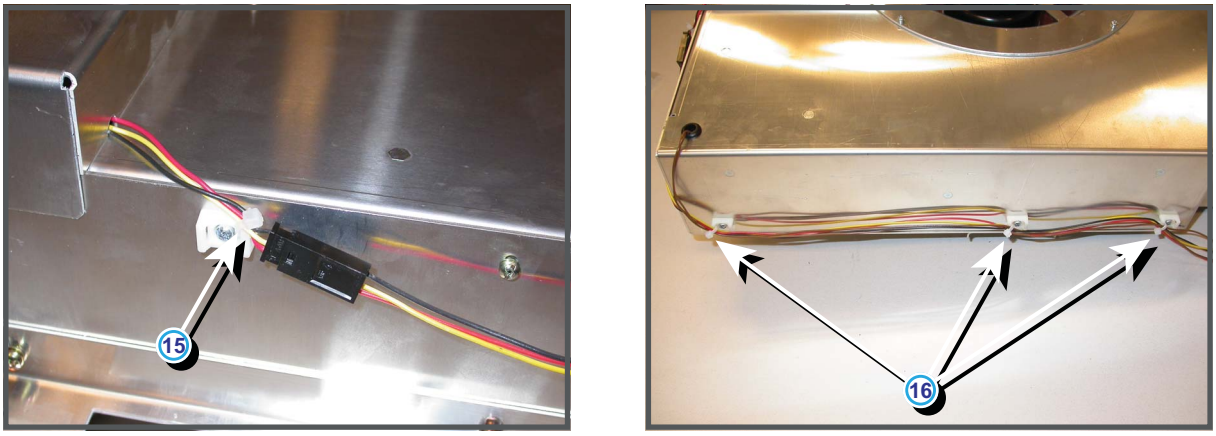


Image 18-32

9. Reinstall the Outlet Fan assembly on top of the projector. Use a T20 Torx driver to fasten the six Torx screws (reference 5) as illustrated.

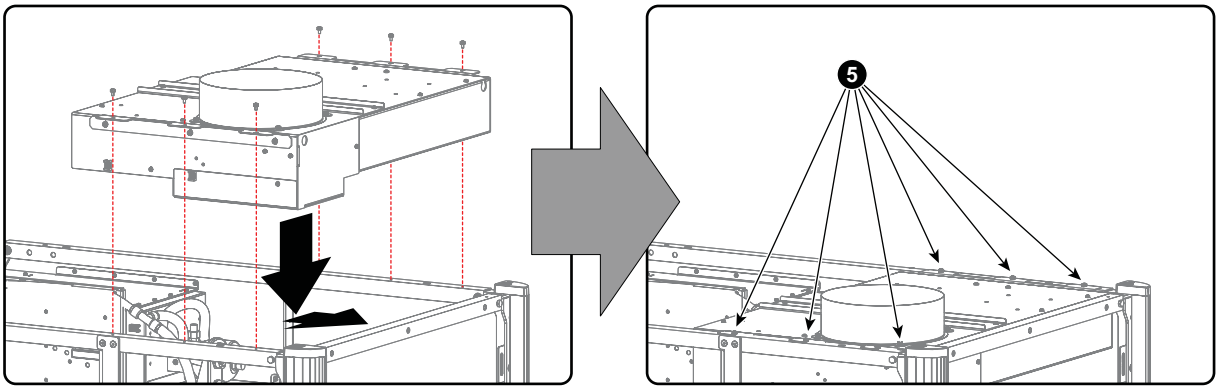


Image 18-33

10. Reconnect the three wire units with the Power Backplane.
    a) the wire unit of the Cold Mirror top fan (reference 2 image 18-34).
    b) the airflow switch inside the exhaust channel of the Outlet Fan assembly (reference 3 image 18-34).
    c) the wire unit of the Outlet Fan (reference 4 image 18-34).

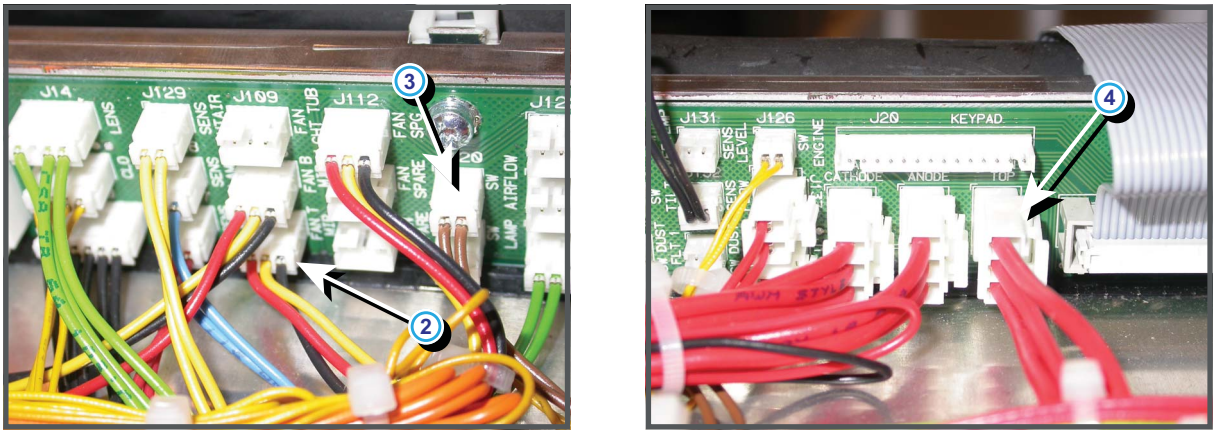
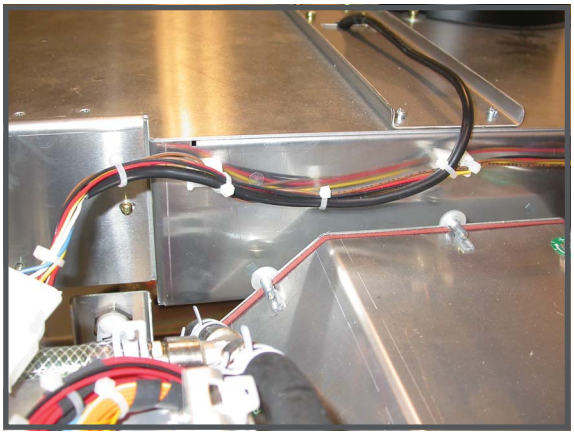


Image 18-34

11. Fasten the wire three with cable ties as illustrated.



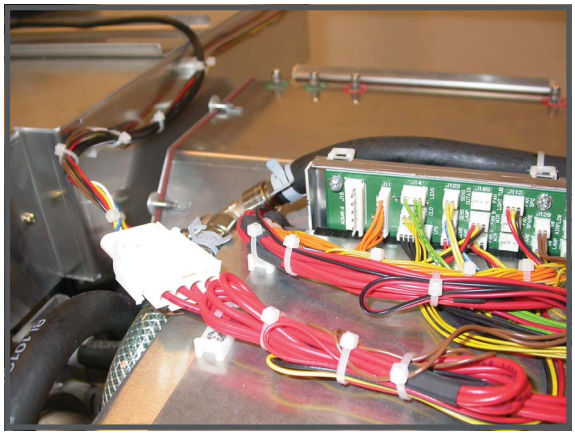


Image 18-35

18.4 Replacement of the Cold Mirror Top Fan

To replace the Cold Mirror Top Fan, the left cover, the right cover, the rear cover and the Lamp House have to be removed first. This procedure assumes that the left cover, the right cover, the rear cover and the Lamp House are already removed from the projector.

Necessary tools

- Side cutter.
- T10 Torx driver.
- 3 mm Allen wrench.

Necessary parts

Cable tie.

How to replace the Cold Mirror Top Fan?

1. Disconnect the wire unit of the fan.

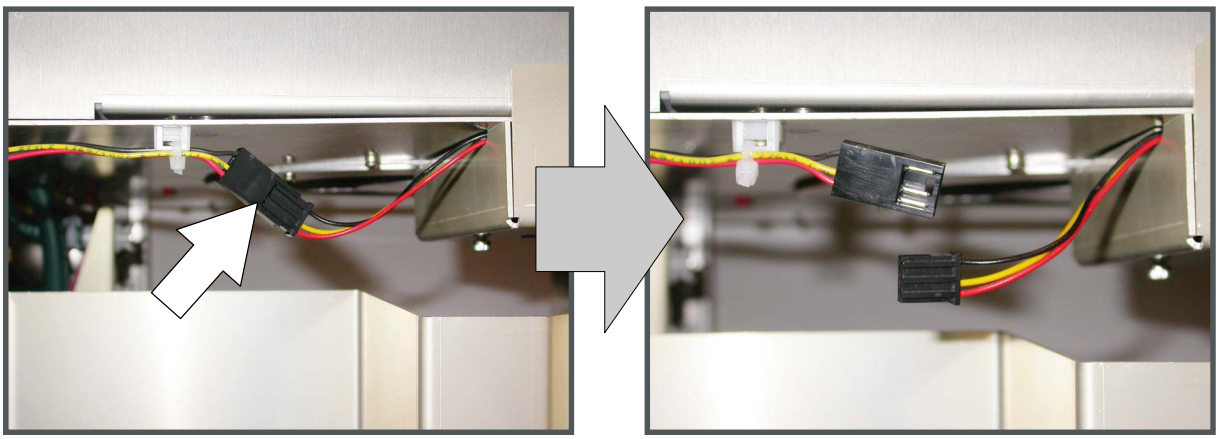


Image 18-36

2. Release the three screws (A, B & C) of the fan cover as illustrated. Use a T10 Torx driver.
   Caution: *Do not touch the Cold Mirror.*

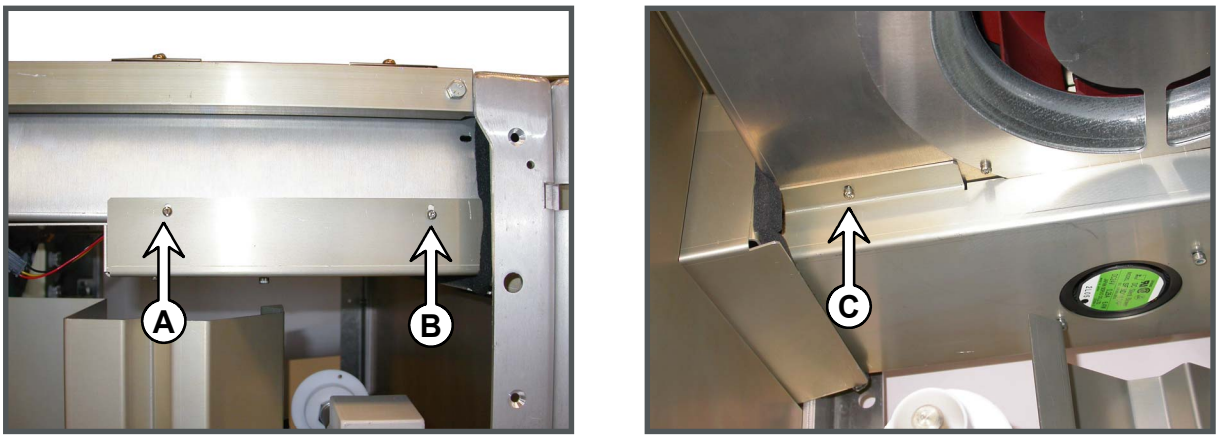


Image 18-37

3. Release the two screws (D & E) as illustrated. Use a 3 mm Allen wrench.
   Caution: *Do not touch the Cold Mirror.*

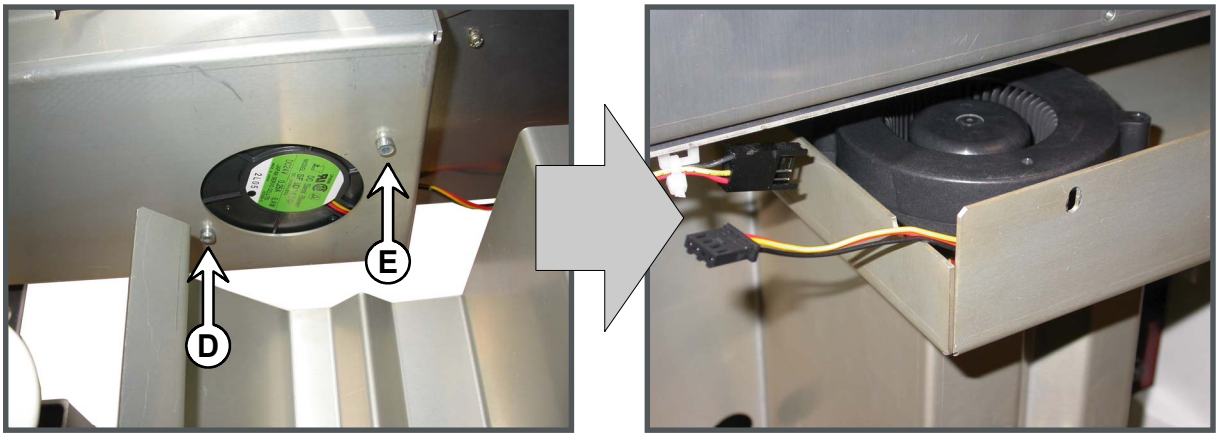


Image 18-38

4. Replace the fan inside the fan cover and fasten the fan cover with the screws D & E as illustrated.
   Caution: *Ensure that the wire unit is placed in the recess at the side of the fan cover.*

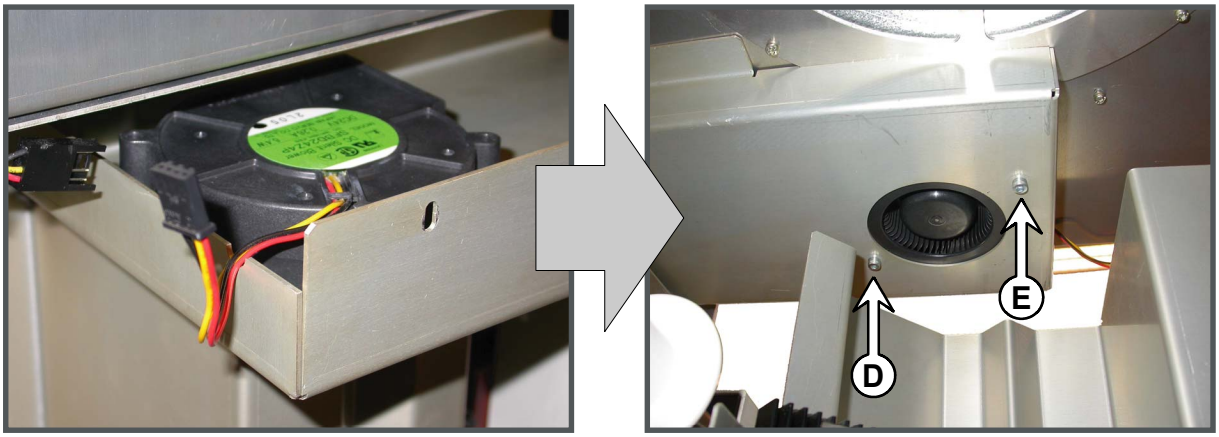


Image 18-39

5. Secure the fan cover with the three screws (A, B & C) as illustrated.

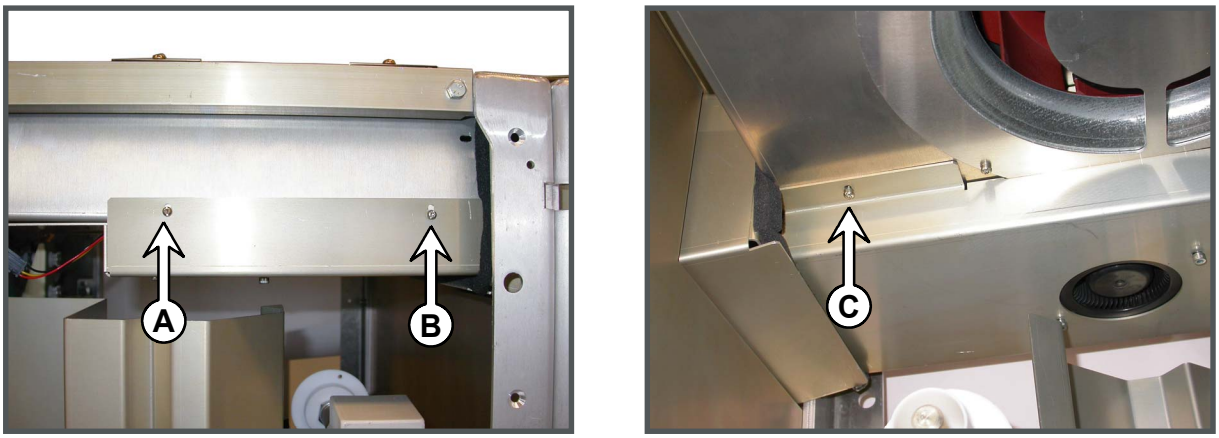


Image 18-40

6. Reconnect the wire unit of the fan.

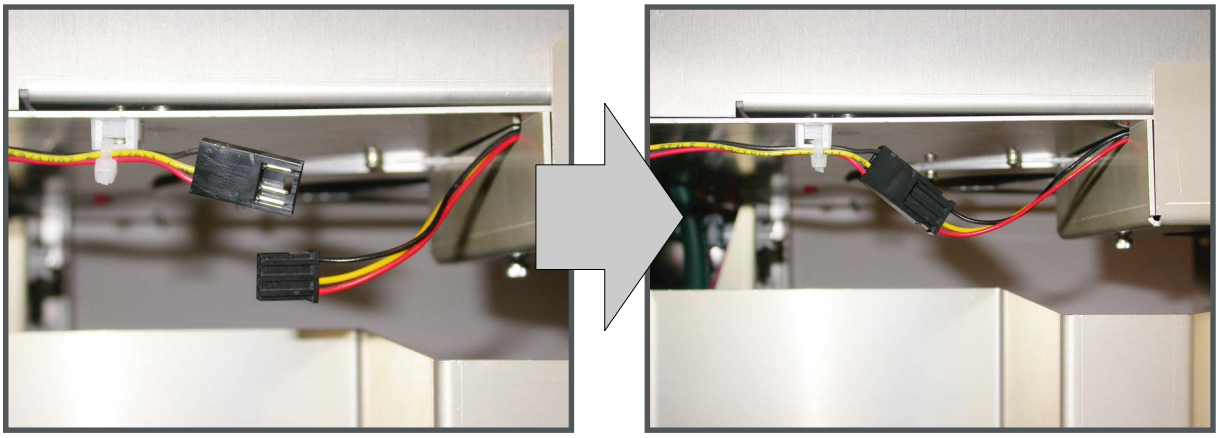


Image 18-41

18.5 Replacement of the Cold Mirror Bottom Fan

To replace the Cold Mirror Bottom Fan, the left cover and the bottom cover have to be removed first. This procedure assumes that the left cover and the bottom cover are already removed from the projector.

Necessary tools

- 3 mm Allen wrench.
- Side cutter.

How to replace the Cold Mirror Bottom Fan?

1. Disconnect the wire unit (reference 1 image 18-42) of the Cold Mirror Bottom Fan. Cut the cable ties to release the wire unit.

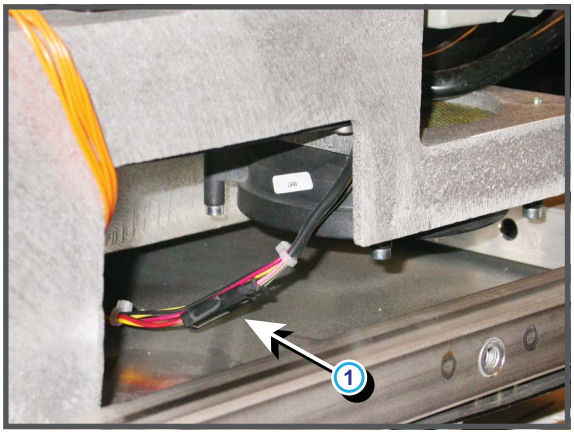


Image 18-42

2. Remove the Cold Mirror Bottom Fan from the projector by releasing the four hexagon socket head cap screws (reference 2 image 18-43). Use a 3 mm Allen wrench.

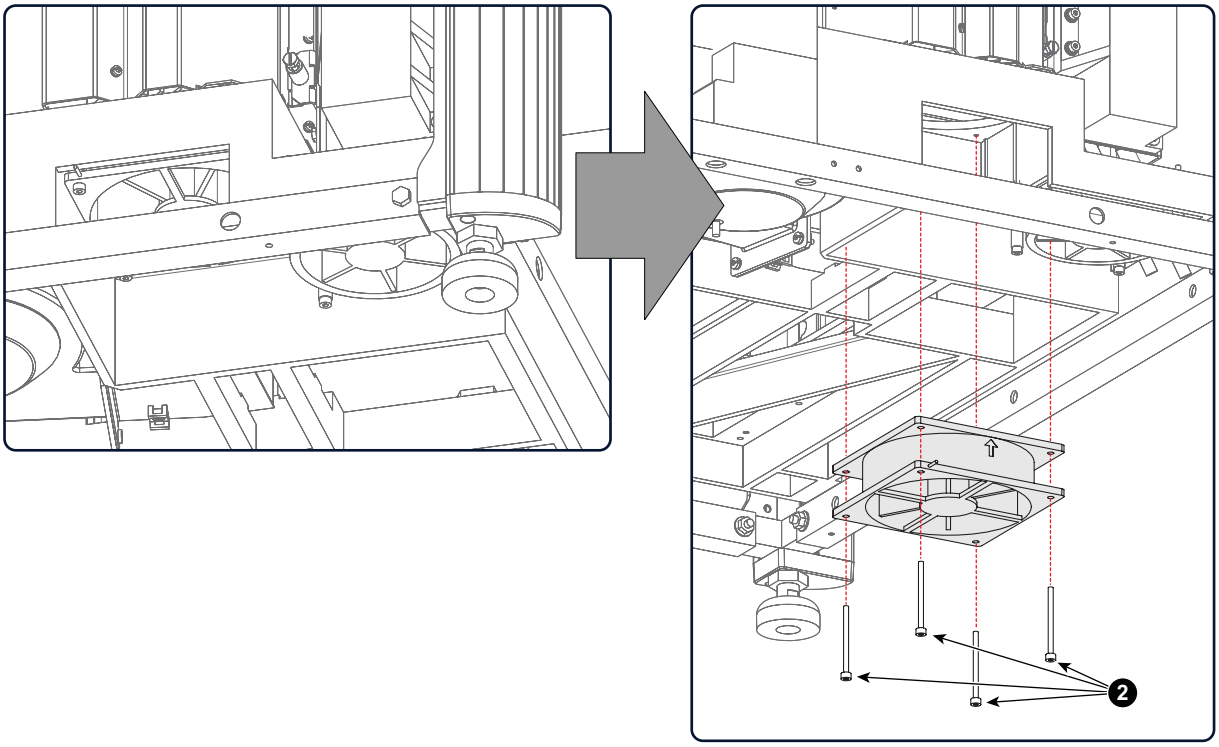


Image 18-43

3. Install a new Cold Mirror Bottom Fan. Fasten with the four hexagon socket head cap screws (reference 2 image 18-43).
   Caution: *Make sure that the airflow of the Cold Mirror Bottom Fan is upwards.*
4. Reconnect the wire (reference 1 image 18-42) unit of the Cold Mirror Bottom Fan. Use two cable ties to join the wire units together as illustrated in image 18-42.

18.6 Replacement of the SPG Fan

To replace the SPG Fan, the left cover and the bottom cover have to be removed first. This procedure assumes that the left cover and the bottom cover are already removed from the projector.

Necessary tools

- 3 mm Allen wrench.
- Side cutter.

How to replace the Fan of the Start Pulse Generator?

1. Disconnect the wire unit (reference 1 image 18-44) of the SPG Fan. Cut the cable ties to release the wire unit.

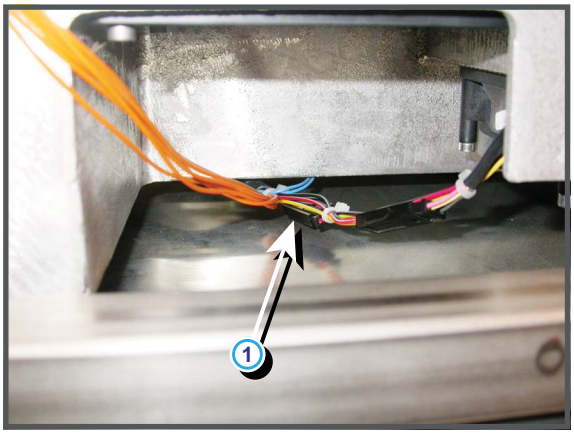


Image 18-44

2. Remove the SPG Fan from the projector by releasing the four hexagon socket head cap screws (reference 2 image 18-45). Use a 3 mm Allen wrench.

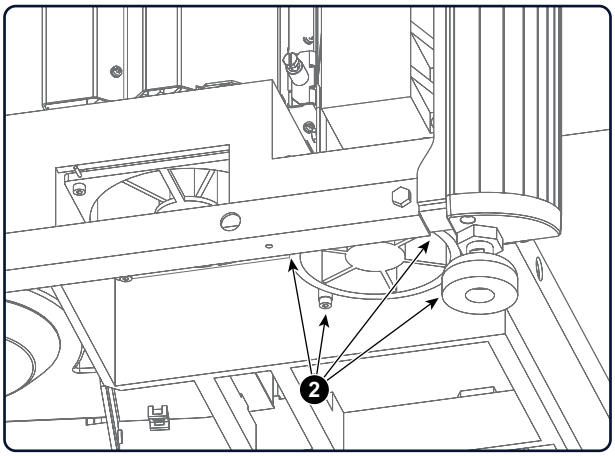


Image 18-45

3. Install a new SPG Fan. Fasten with the four hexagon socket head cap screws (reference 2 image 18-45).
   Caution: *Make sure that the airflow of the SPG fan is upwards.*
4. Reconnect the wire unit (reference 1 image 18-44) of the SPG Fan. Use two cable ties to join the wire units together as illustrated in image 18-44.

18.7 Replacement of the Card Cage Fans

Where are the Card Cage Fans located?

The four fans of the Card Cage are located at the front of the projector, behind the Front Dust Filter. Sometimes these fans are referred to as the “elcabox fans” or the “SMPS fans”. Note that there are two types of Card Cage Fans. Two small fans (upper) and two big fans (lower).

To replace one or more of the Card Cage Fans, the projector front cover has to be removed. This procedure assumes that the projector front cover is already removed. Futhermore, this procedure describes how to replace the lowest fan of all Card Cage Fans. Nevertheless, the same procedure is applicable upon all four Card Cage Fans.

Necessary tools

3 mm Allen wrench.

How to replace one of the fans of the Card Cage?

1. Disconnect the wire (reference 2 image 18-46) unit from the Card Cage Fan which you wan to replace.
   Note: *One fan is equipped with a temperature sensor (reference 1 image 18-46). Remove this temperature sensor prior to removing the fan in case you wan to replace this fan. Reinstall the temperature sensor afterwards the new fan is installed.*

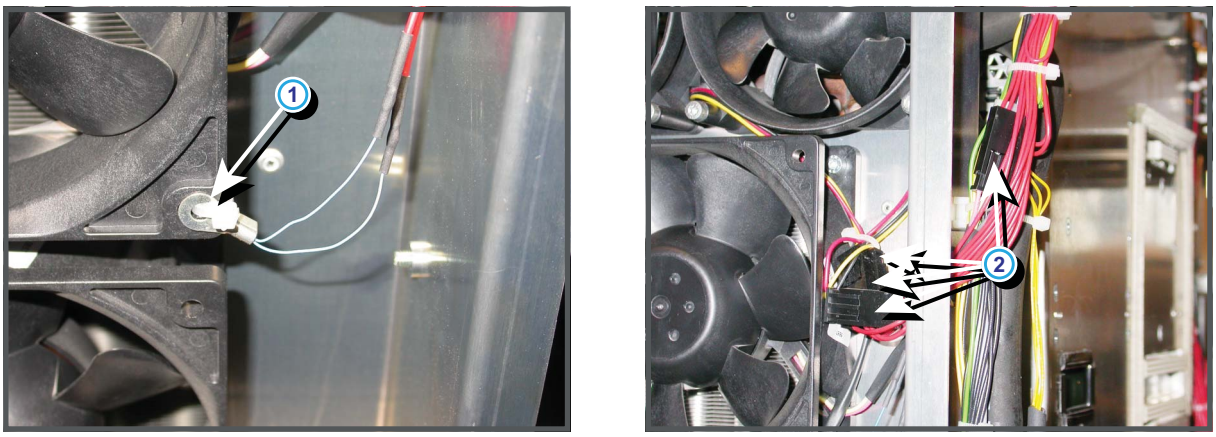


Image 18-46

2. Loosen the four screws (reference 3 image 18-47) which fasten the Card Cage Fan. Use a 3 mm Allen wrench.

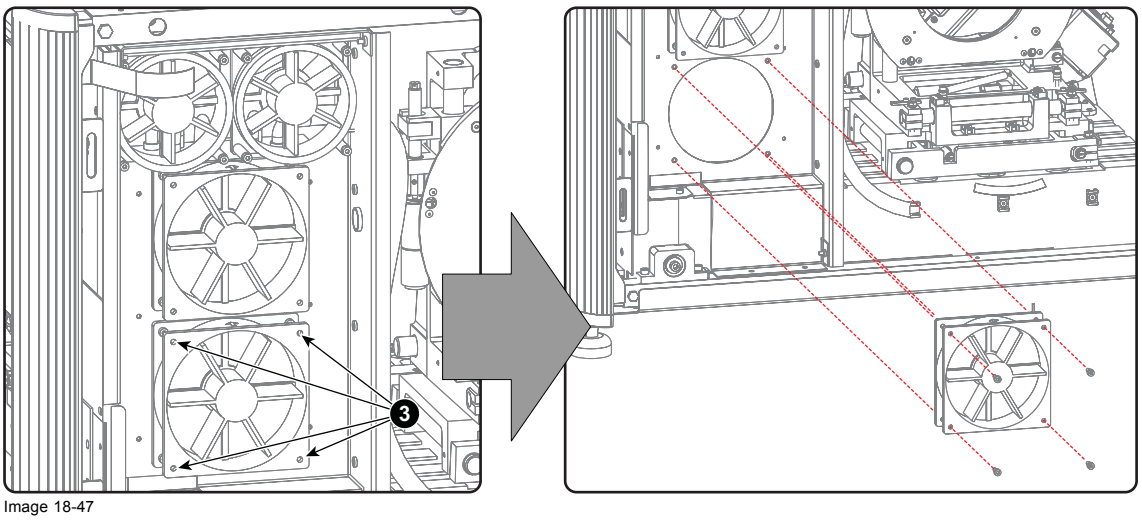


Image 18-47

3. Install a new fan. Make sure that the air flow of the fan is towards the Card Cage.
4. Reconnect the wire unit with the new Card Cage Fan.

CAUTION: One of the Card Cage Fans is equipped with a temperature sensor. Remove the temperature sensor prior to removing the fan and reinstall the temperature sensor upon the new Card Cage Fan.

19. PROJECTOR COVERS

About this chapter

Most maintenance and servicing procedures demand removing one or more of the projector covers to gain access to the parts to maintain or to service. To avoid redundancy, all procedures about cover removing or installing are grouped together in this chapter. The maintenance and servicing procedures also refer to this chapter if required. The procedures in this chapter describe, with detailed step by step actions and illustrations, how to remove or install the projector covers.

WARNING: Always switch off the projector and unplug the power cord at the projector side before removing one of the covers, unless otherwise stated.

Overview

- Removal of the right cover
- Removal of the left cover
- Removal of the front cover
- Removal of the rear cover
- Removal of the top cover
- Removal of the bottom cover
- Installation of the bottom cover
- Installation of the top cover
- Installation of the rear cover
- Installation of the front cover
- Installation of the left cover
- Installation of the right cover
- Cleaning the dust filters
- Cleaning the exterior of the projector

19.1 Removal of the right cover

Necessary tools

- Flat screwdriver.
- Lamp door lock key.

How to remove the right cover of the projector?

1. Unlock the door of the Lamp House using an adapted lock key as illustrated. It's not necessary to open the Lamp House door.

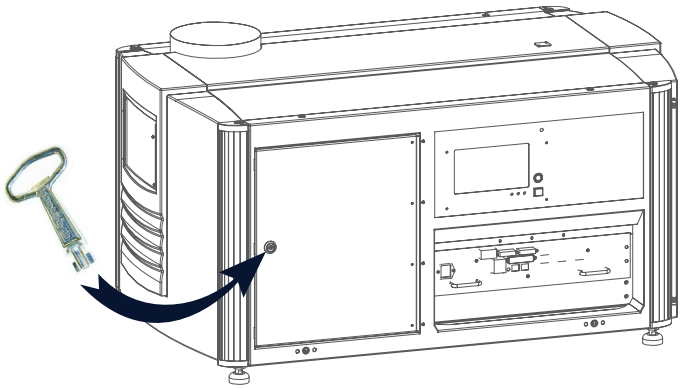


Image 19-1

2. Release the four retaining screws as illustrated. Use a flat screw driver.

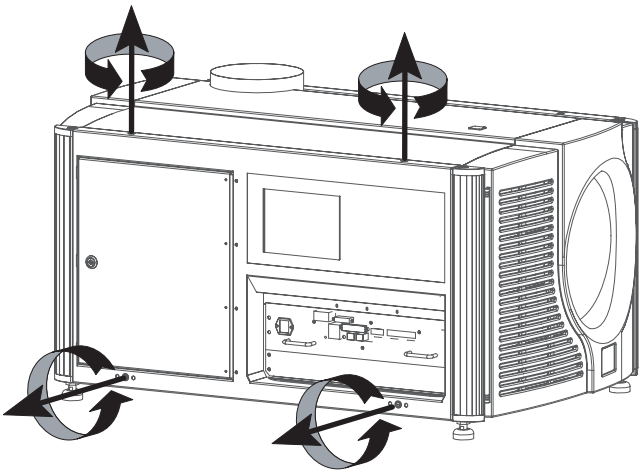


Image 19-2

3. Remove the side cover.

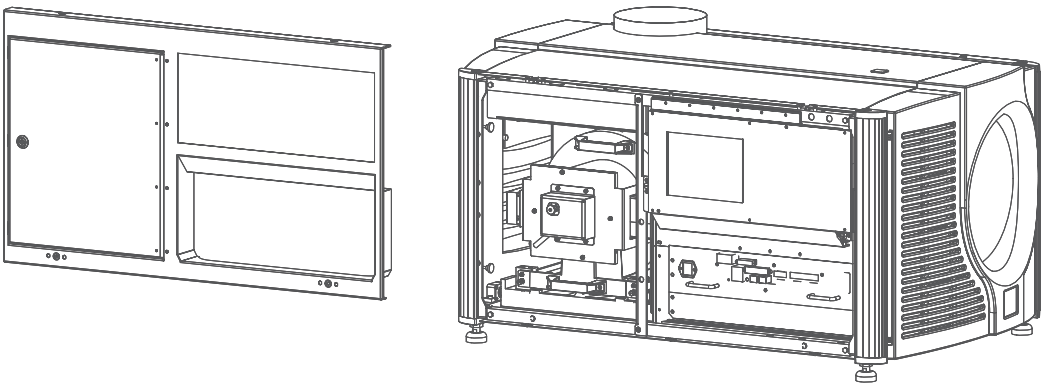


Image 19-3

19.2 Removal of the left cover

Necessary tools

Flat screwdriver.

How to remove the left cover of the projector?

1. Release the four retaining screws as illustrated. Use a flat screw driver.

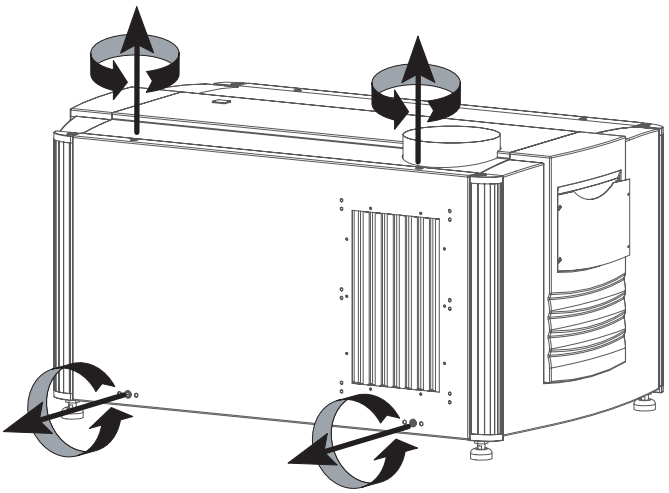


Image 19-4

2. Remove the side cover.

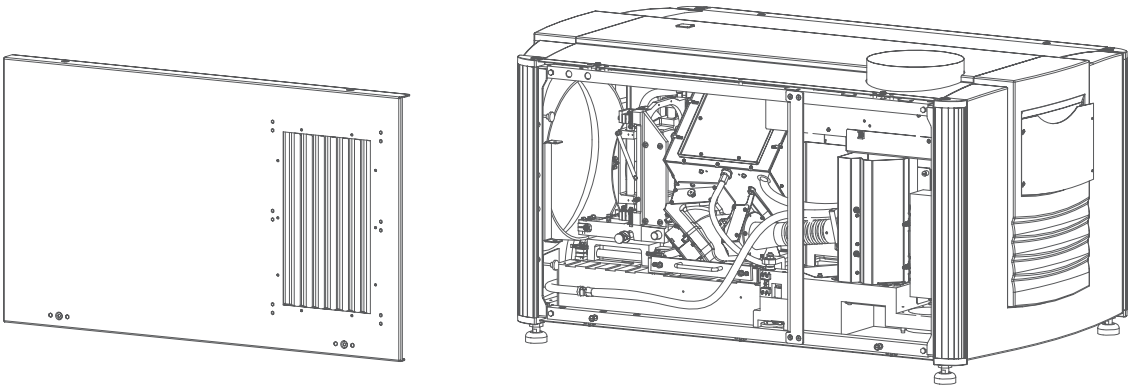


Image 19-5

19.3 Removal of the front cover

To remove the front cover you have to remove the left and right cover first.

Necessary tools

No tools.

How to remove the front cover of the projector?

1. Remove the black dust cap from the lens holder by pulling out the five knobs (N) as illustrated. Note that the dust cap remains attached to the front cover.

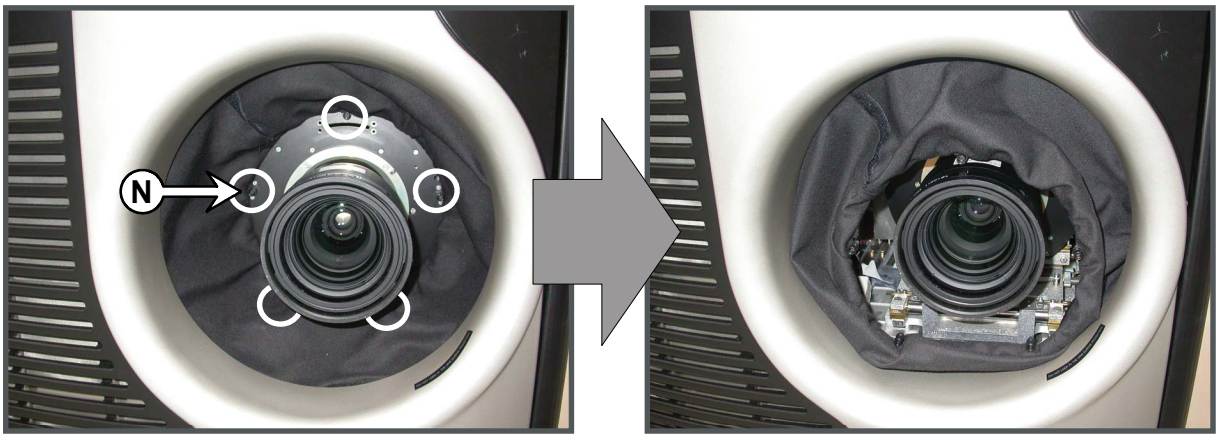


Image 19-6

2. Release the four thumbscrews (two on each side) as illustrated.

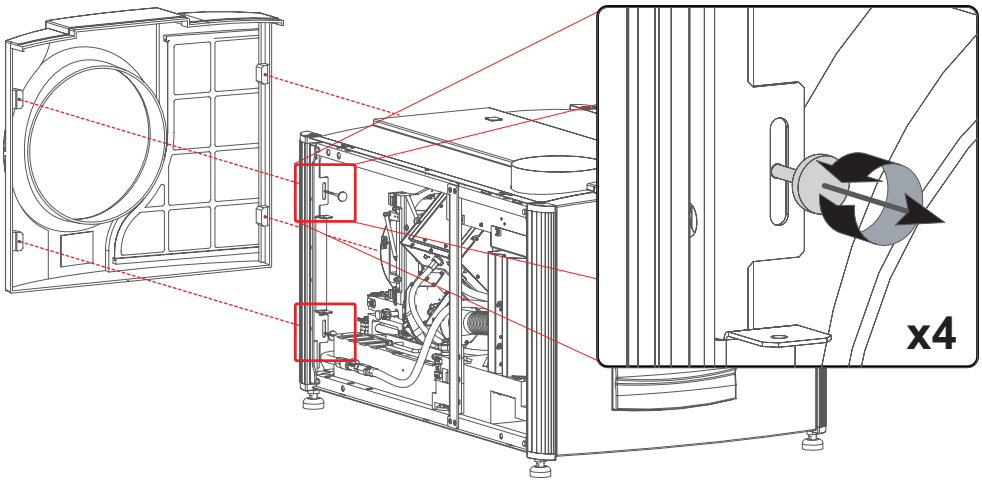


Image 19-7

3. Remove the front cover.

19.4 Removal of the rear cover

To remove the rear cover you have to remove the left and right cover first.

Necessary tools

No tools.

How to remove the rear cover of the projector?

1. Release the four thumbscrews (two on each side) as illustrated.

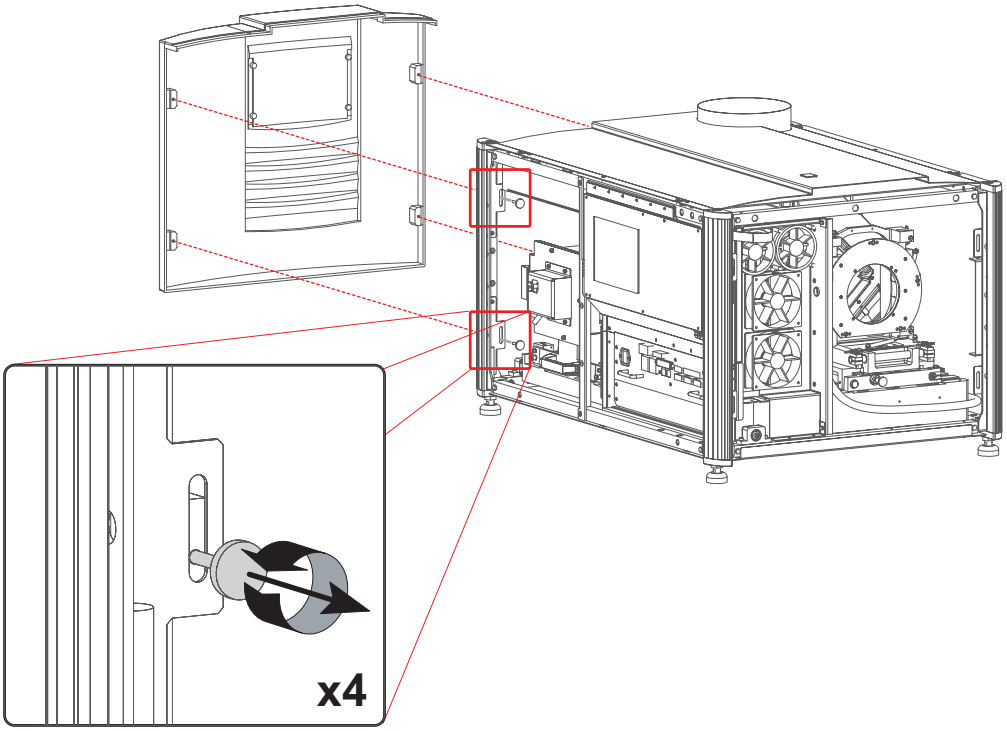


Image 19-8

2. Remove the rear cover.

19.5 Removal of the top cover

To remove the top cover you have to remove the side covers first.

Necessary tools

No tools.

How to remove the top cover of the projector?

1. Disconnect the hot air outlet of the projector from the exhaust system.
2. Lift up the top cover after removing the right, the left, the front and the rear cover.

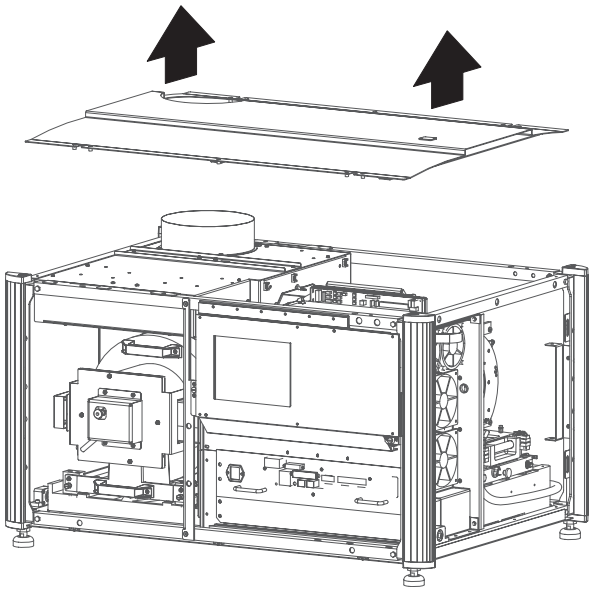


Image 19-9

19.6 Removal of the bottom cover

Necessary tools

Flat chubby screwdriver.

How to remove the bottom cover of the projector?

1. Release the ten hexagon head screws as illustrated, using a flat chubby screwdriver.

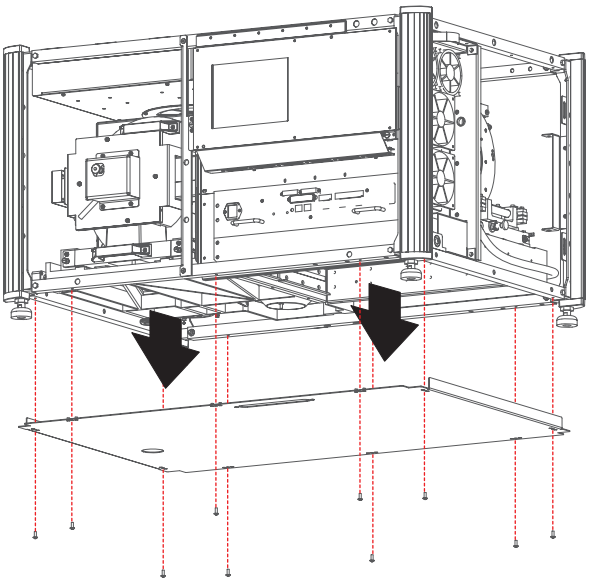


Image 19-10

2. Lower the bottom cover.

CAUTION: Do not damage the power cables, which are leading through a hole in the bottom cover.

Turn the four feet 10 cm out to have easy access to the bottom of the projector. Pay attention, as feet can be completely removed!

19.7 Installation of the bottom cover

Necessary tools

Flat chubby screwdriver.

How to install the bottom cover of the projector?

1. Place the bottom cover into position and fasten with ten (10) screws using a flat chubby screwdriver.

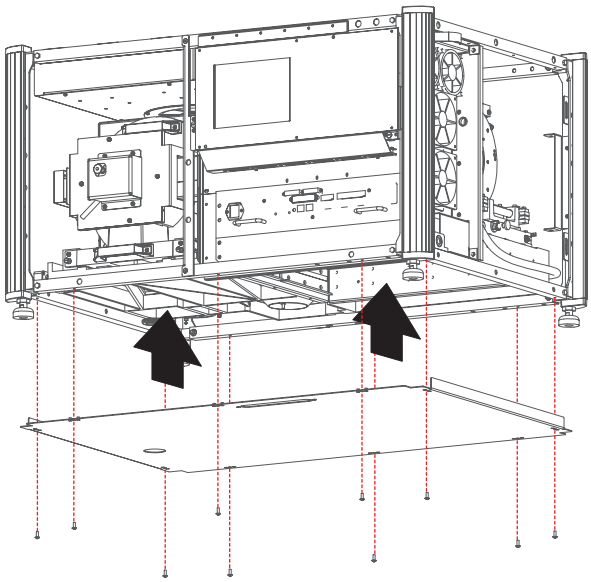


Image 19-11

CAUTION: Do not damage the power cables, which are leading through a hole in the bottom cover.

19.8 Installation of the top cover

Install the front and rear cover prior to installing the top cover. The side covers have to be installed after the top cover is installed.

Necessary tools

No tools.

How to install the top cover of the projector?

1. Make sure that the front, rear and both side covers are not installed yet.
2. Place the top cover into position.

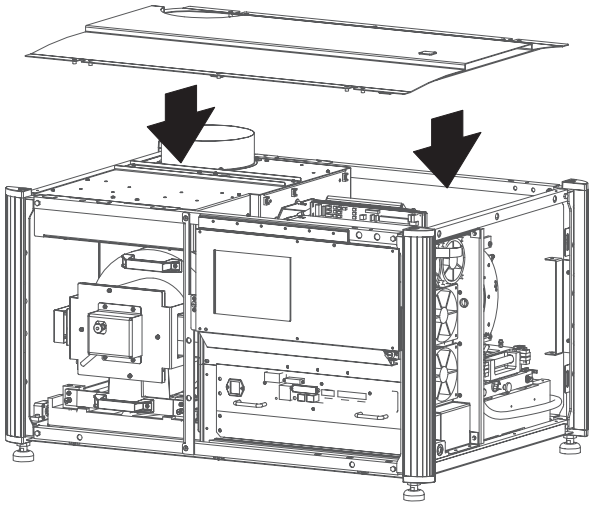


Image 19-12

3. Reconnect the wire unit of the connector mounted on the top cover with the Power Backplane.
4. Reconnect the hot air outlet of the projector with the exhaust system.

The top cover will be secured after the front and rear cover are installed.

19.9 Installation of the rear cover

The rear cover can not be installed if the side covers are installed.

Necessary tools

No tools.

How to install the rear cover of the projector?

1. Place the rear cover into position and fasten with four thumbscrews as illustrated.

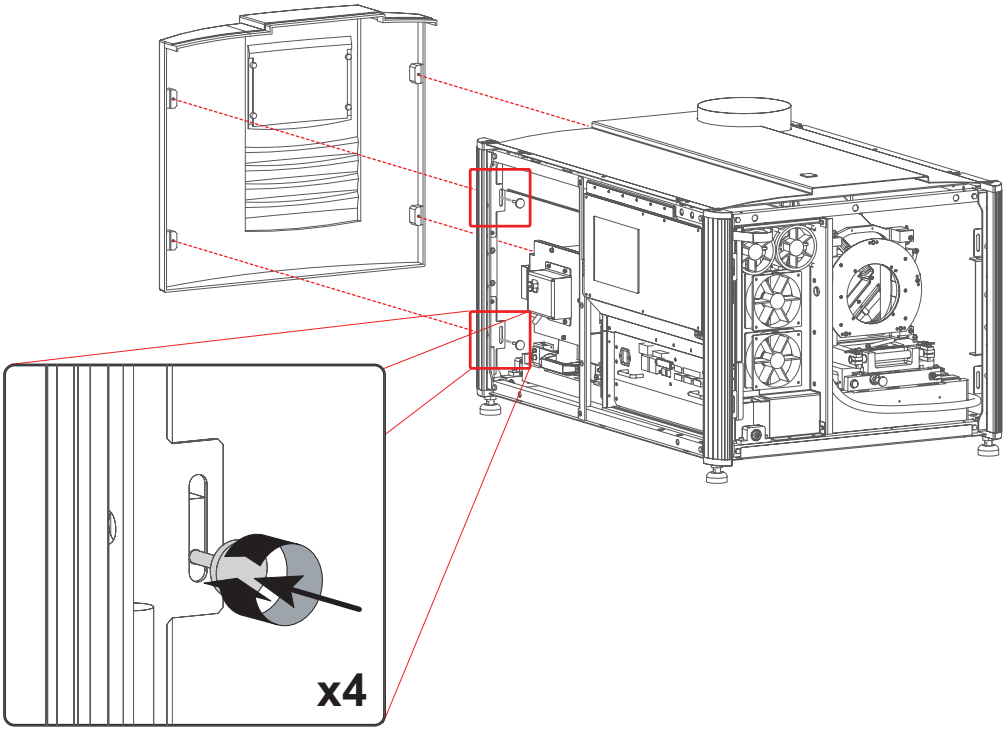


Image 19-13

19.10 Installation of the front cover

The front cover can not be installed if the side covers are installed.

Necessary tools

No tools.

How to install the front cover of the projector?

1. Place the front cover into position and fasten with four thumbscrews as illustrated.

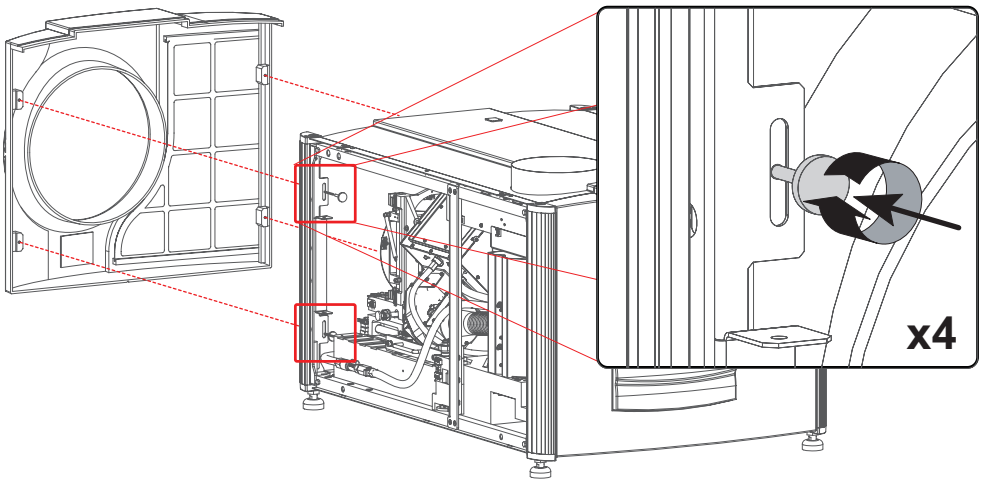


Image 19-14

2. Attach the dust cap to the lens holder by pushing in the five knobs (N) as illustrated.

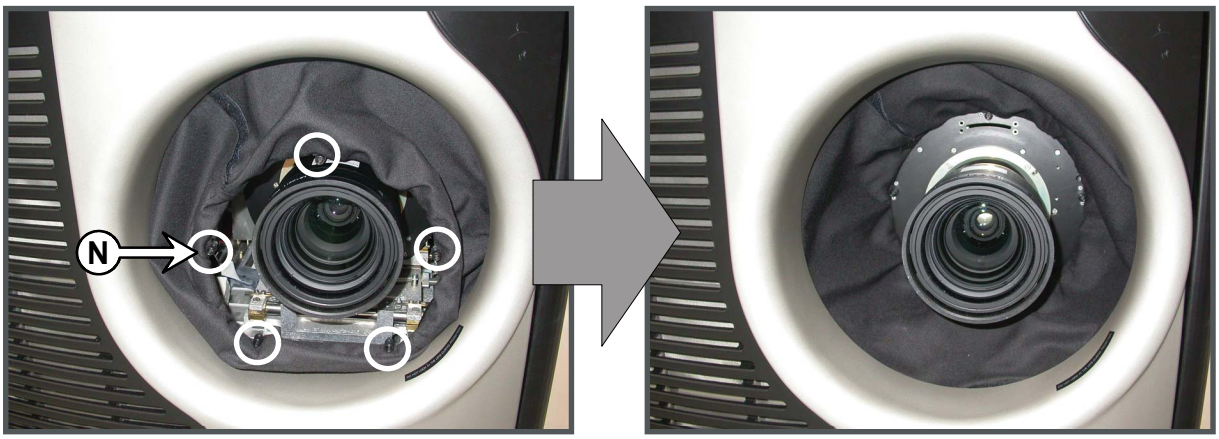


Image 19-15

19.11 Installation of the left cover

Ensure that the top, the front and the rear cover are installed before installing the left cover.

Necessary tools

- Flat screwdriver.
- Lamp house door lock key.

How to install the left cover of the projector?

1. Place the left cover into position.
2. Secure the left cover by fastening the four screws as illustrated.

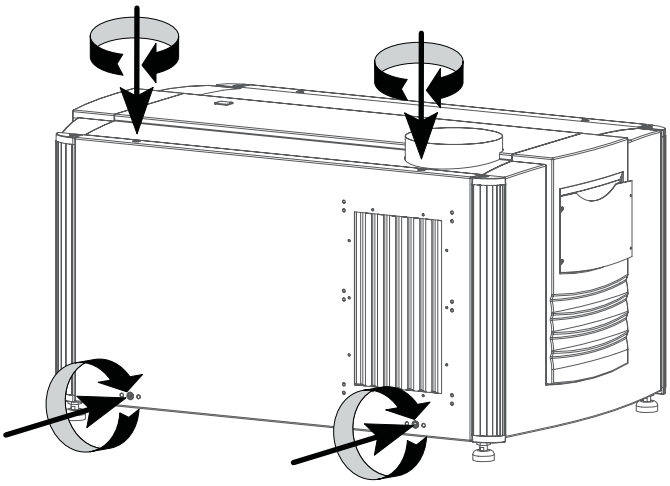


Image 19-16

19.12 Installation of the right cover

Ensure that the top, the front and the rear cover are installed before installing the right cover.

Necessary tools

Flat screwdriver.

How to install the right cover of the projector?

1. Check if the lock of the Lamp House door stands in the unlock position.
2. Place the left cover into position.
3. Secure the right cover by fastening the four screws as illustrated.

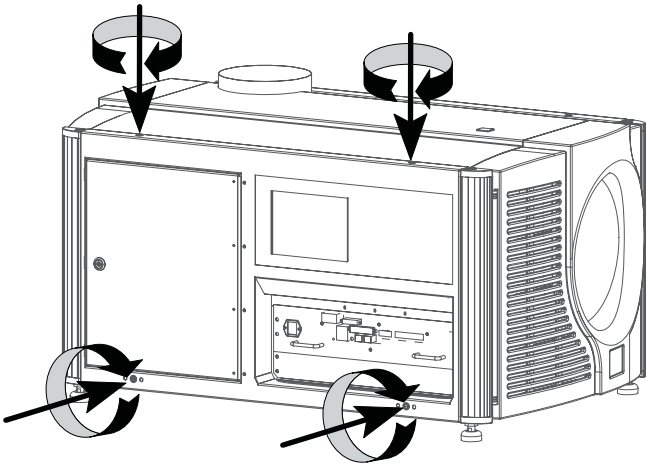


Image 19-17

4. Lock the Lamp House door.

19.13 Cleaning the dust filters

Clean the dust filters of the projector head monthly. More frequent cleaning is required in case the projector head is installed in a dusty or otherwise contaminated area. If the dust filters are not regularly cleaned, the air flow inside the projector could be disrupted and cause overheating. Overheating may lead to the projector shutting down by itself.

Necessary tools

- Vacuum cleaner.
- Compressed air.

How to clean the dust filters of the projector head?

1. Switch off the projector.
2. Take the front filter by its decorative bar H and remove the front filter F from the projector head as illustrated.

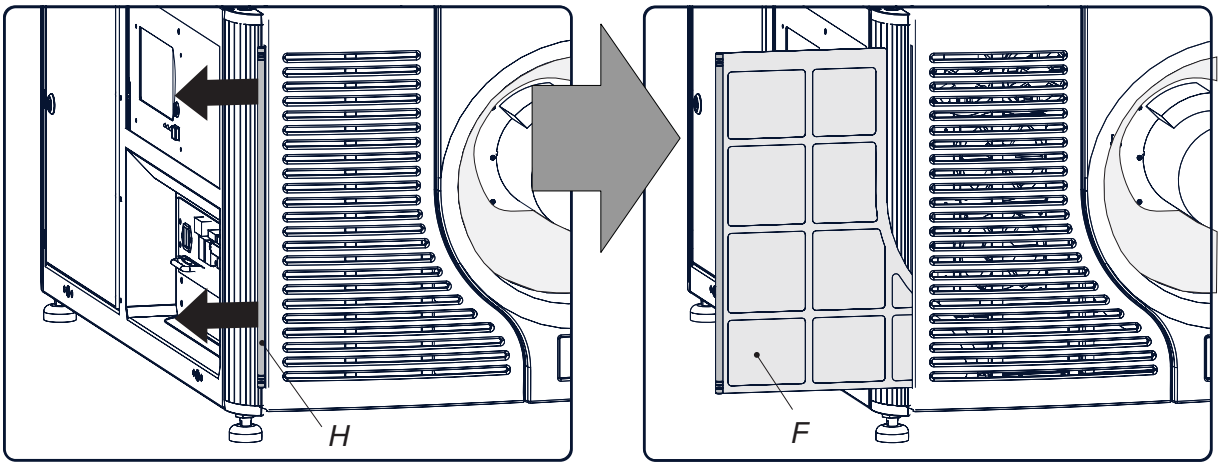


Image 19-18

3. Remove the left side cover of the projector head.
4. Remove the dust filter G from the inner side of the left cover C as illustrated.

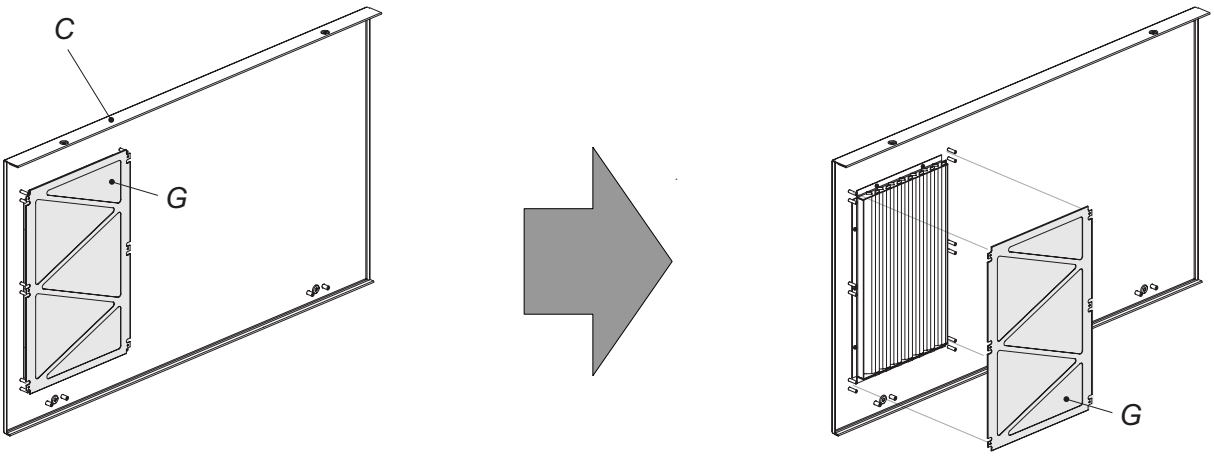


Image 19-19

5. Remove the dust from the filters with a vacuum cleaner.
6. Blow stubborn dust away with compressed air in another room our outside.
7. Reinstall both filters.
8. Reinstall the side cover of the projector head.

Clean the air inlet and outlet of the power unit with a vacuum cleaner as well, while you are cleaning the dust filters of the projector head.

19.14 Cleaning the exterior of the projector

Necessary tools

- Damp cloth.
- Mild detergent solution.

How to clean the exterior of the projector head?

1. Switch off the projector and unplug the power cord.
2. Clean the housing of the projector with a damp cloth. Stubborn stains may be removed with a cloth lightly dampened with a mild detergent solution.

A. ANAMORPHIC LENS AND HOLDER

About this chapter

This chapter describes how to mount and align an anamorphic lens in the anamorphic lens holder. Procedures are also given to replace the motors inside the anamorphic lens holder.

Overview

- Mounting the anamorphic lens in its holder
- Alignment of the Anamorphic Lens position
- Anamorphic lens holder locking motor replacements
- Anamorphic lens holder rotation motor replacements
- Anamorphic lens holder shift motor replacements

A.1 Mounting the anamorphic lens in its holder

How to proceed

1. Loosen the 2 screws (A) squeezing the lens holder rings around the installed lens.

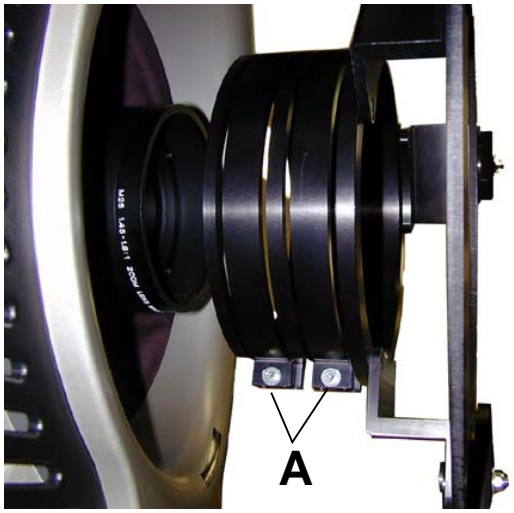


Image A-1
Loosen lens fixation

2. Carefully, slide the anamorphic lens (covers removed) into the lens holder to the end.

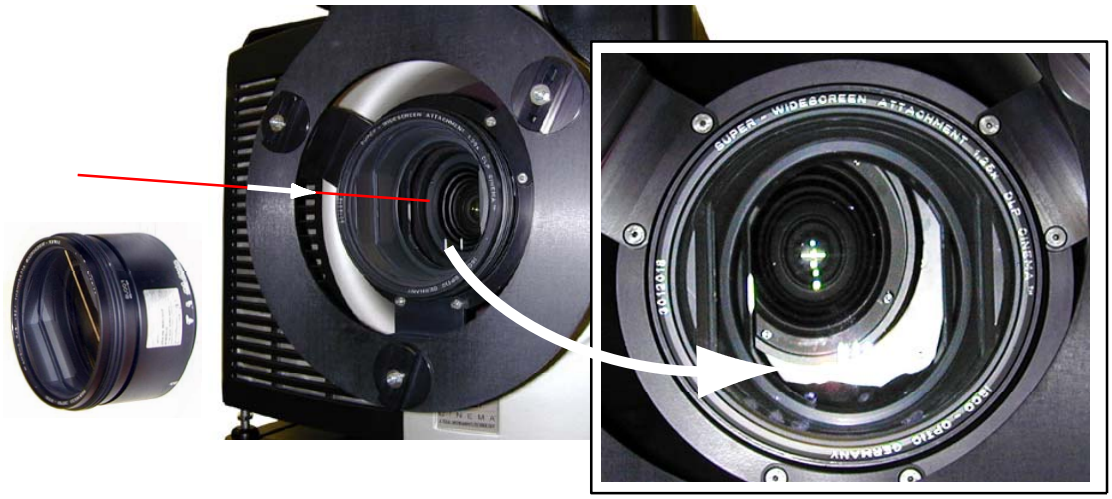


Image A-2
Lens mounting

3. Turn the anamorphic lens in the lens holder in such a way the visual rectangular shape inside the lens is vertical orientated.
   Tip: *The above adjustment is a coarse adjustment. The final adjustment of the anamorphic lens position has to be performed while displaying a picture (horizontal display of the picture top side)*

4. Secure the lens in its holder by tightening the 2 screws (A).

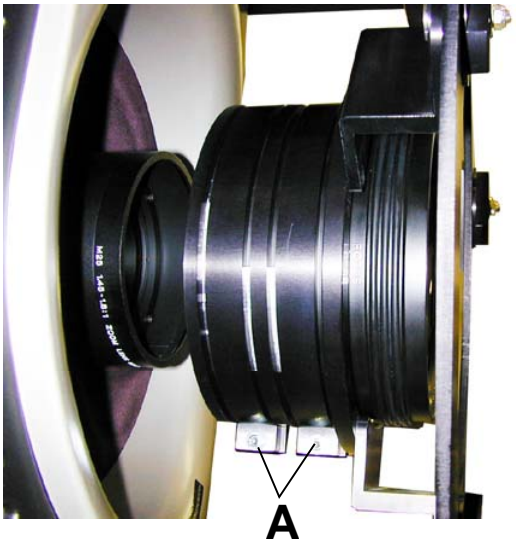


Image A-3
Lens securing

A.2 Alignment of the Anamorphic Lens position

What has to be aligned?

As the position of the anamorphic lens is 5 mm in front of the installed prime lens, for each new installed prime lens this alignment has to be repeated.

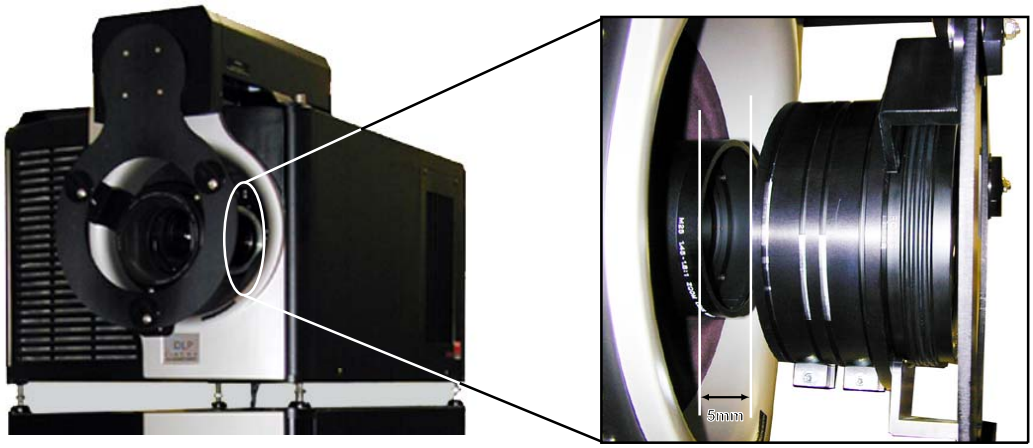


Image A-4
Anamorphic lens position with respect to the installed prime lens

Overview

- Removing the Anamorphic lens holder driver cover
- Distance between Anamorphic and Prime lens
- Remounting the Anamorphic lens holder driver cover
- Image centering on Anamorphic lens
- Horizontal alignment of the image top line

A.2.1 Removing the Anamorphic lens holder driver cover

How to remove!

1. Remove the 5 screws (A), securing the cover to frame.

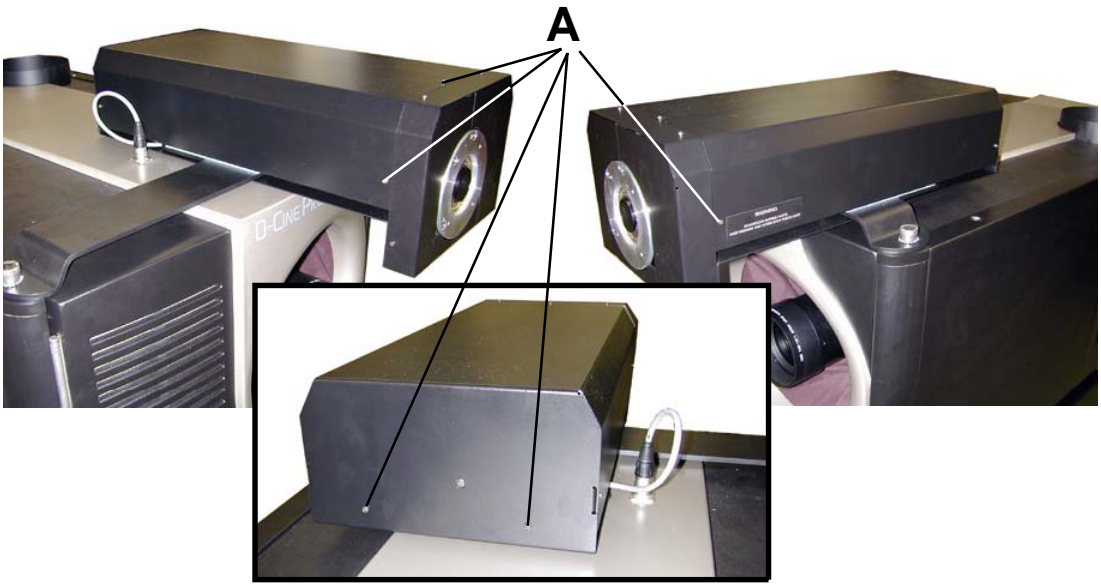


Image A-5
Removal cover securing screws

2. Slide the cover backwards to remove.

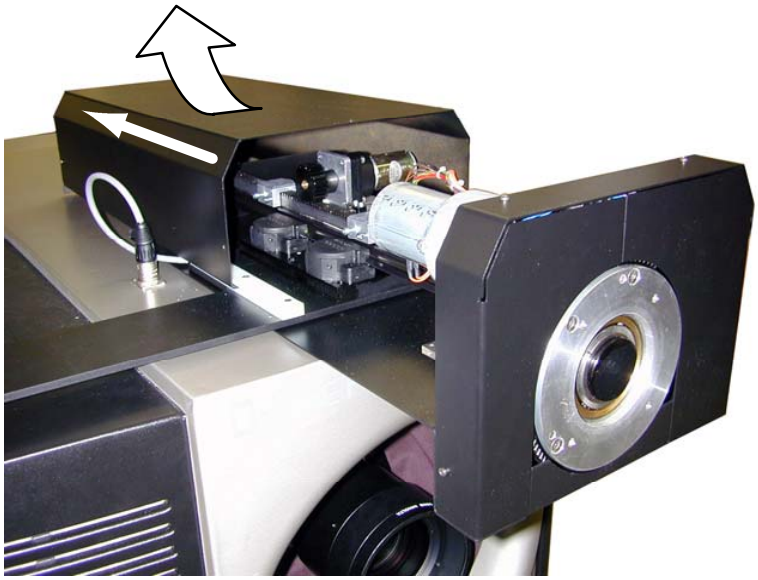


Image A-6
Cover removal

A.2.2 Distance between Anamorphic and Prime lens

How to proceed!

1. Loosen the securing screws (B) of the rail lock, blocking the SHIFT IN range of the lens driver unit, on the rack rail and move the lock (A) to the left (away from the end course switch)

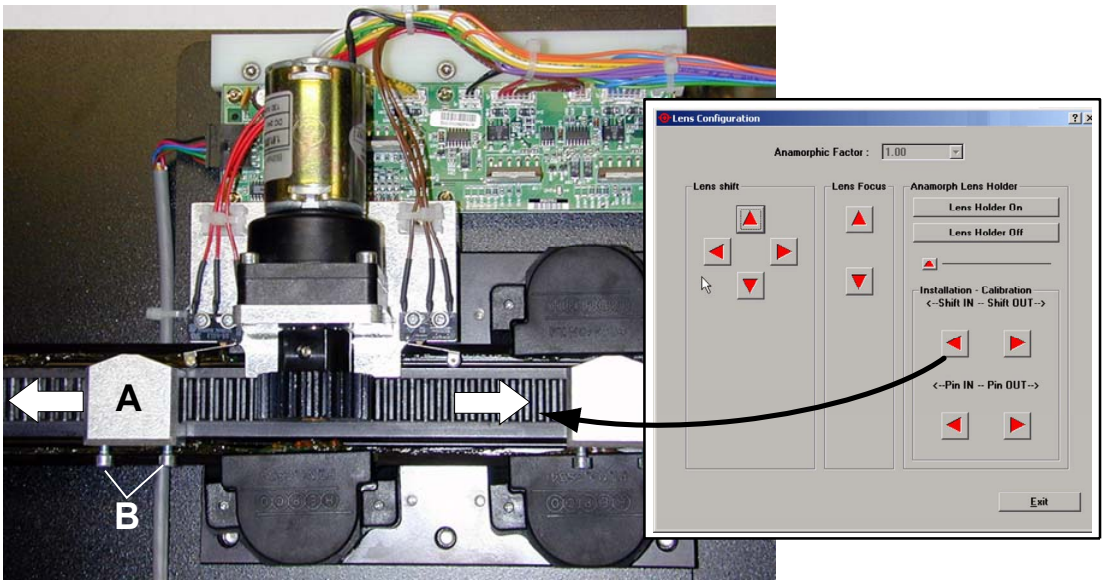


Image A-7
Calibration anamorphic lens

2. Using the D-Cine Communicator, click the **SHIFT IN** arrow button till the rear of the anamorphic lens is 5 mm in front of the prime lens (image A-4).
3. Put back the rail lock as follows:
   - Slide the rail lock (B) to the right till the lever (C) of the end course switch enables the switch.

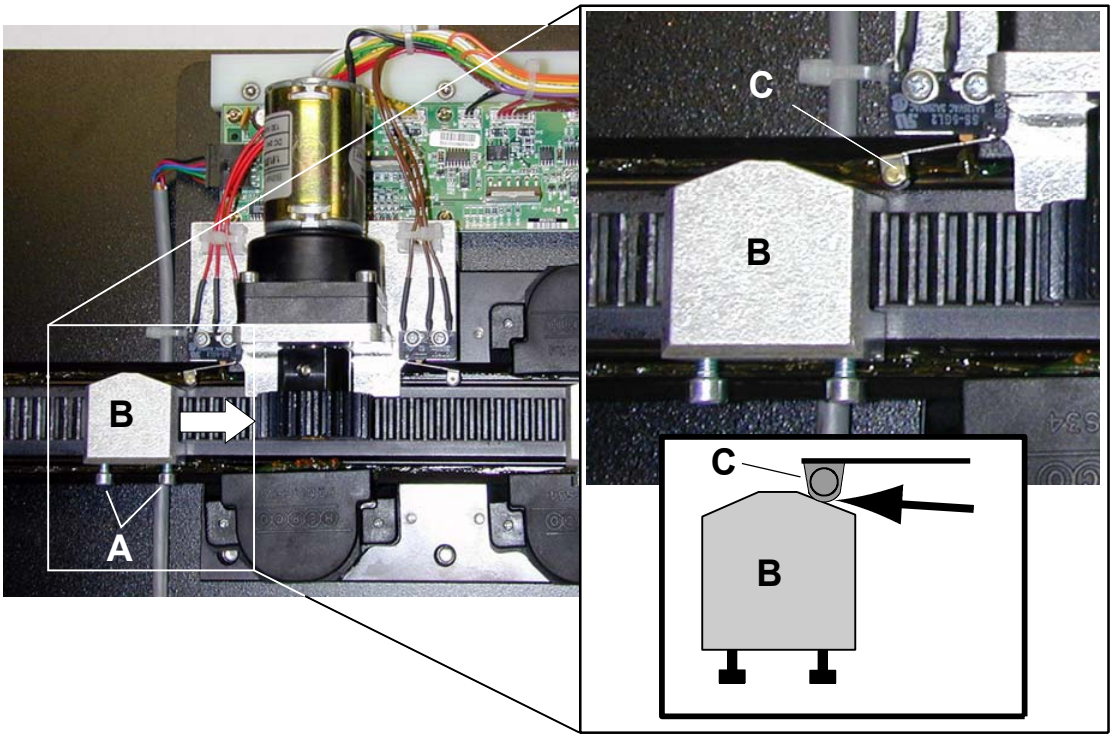


Image A-8
Securing the position of the rail lock

   - Secure the position of the rail lock by tightening the rail lock screws (B).
4. Check the previous alignment by moving the lens driver unit OUT and IN, using the D-Cine Communicator **SHIFT OUT** and **SHIFT IN** arrow button.

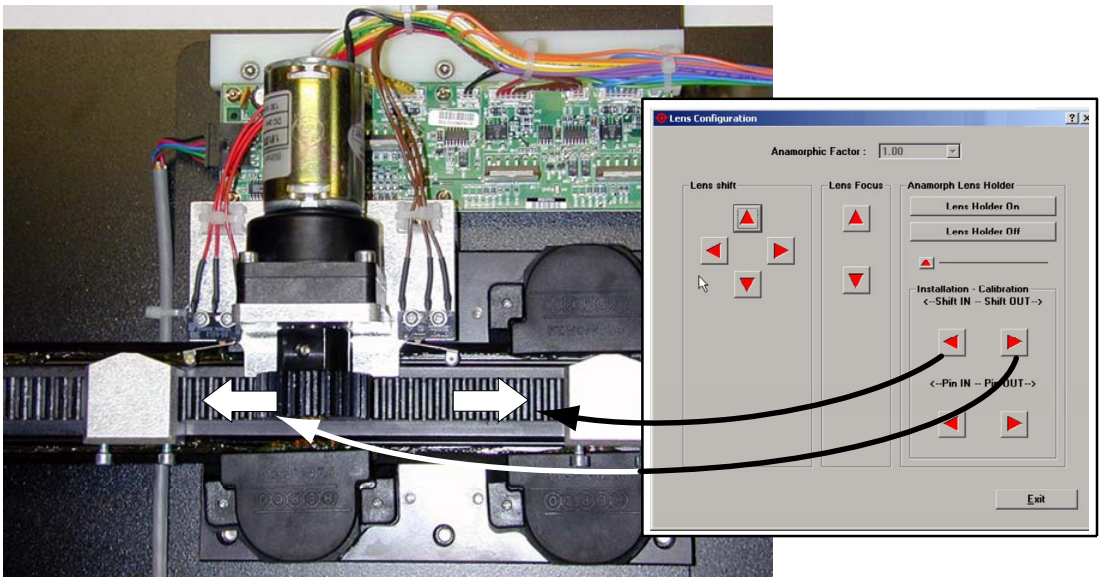


Image A-9
Check lens calibration

The calibration is correct if the lens driver unit stops with the anamorphic lens 5 mm in front of the prime lens. If not, repeat the calibration procedure.

A.2.3 Remounting the Anamorphic lens holder driver cover

How to proceed

1. Place the bottom of the cover from the rear side into the cover guides (A).

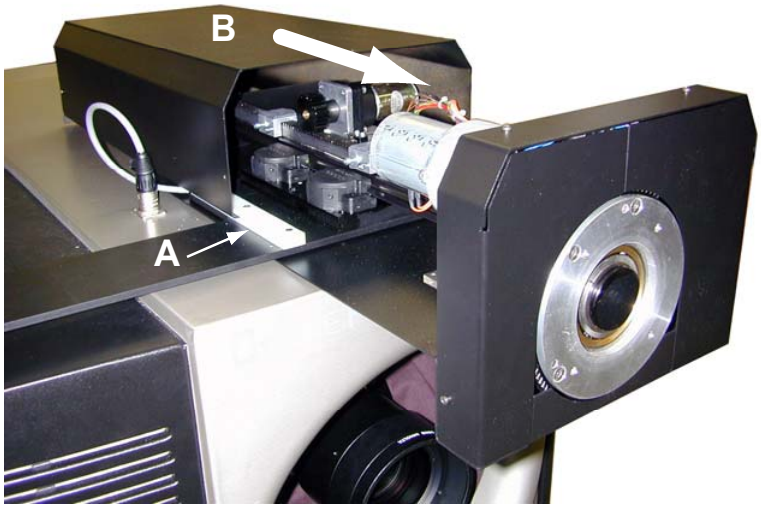


Image A-10

2. Move the cover to the front.
3. Secure the cover with 5 screws (image A-5).

A.2.4 Image centering on Anamorphic lens

How to proceed

1. Start image projection.
2. D-Cine Communicator, in the “Control Interface Set Up”, click **Test Pattern** to display the shortcuts of the predefined test patterns.

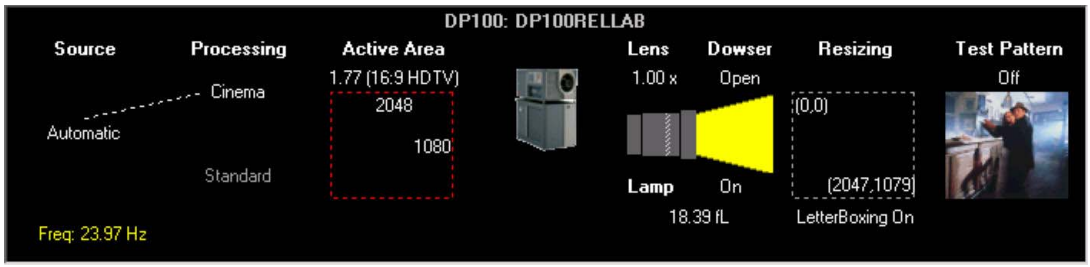


Image A-11
Set up interface

3. Click the shortcut, displayed with a square white label.

   A Full white test pattern replaces the previous projected image.

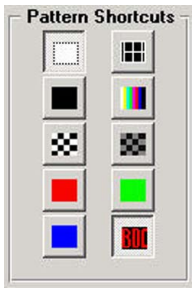


Image A-12
Test pattern shortcuts

4. Loosen the nut on each lens centering guide (B).

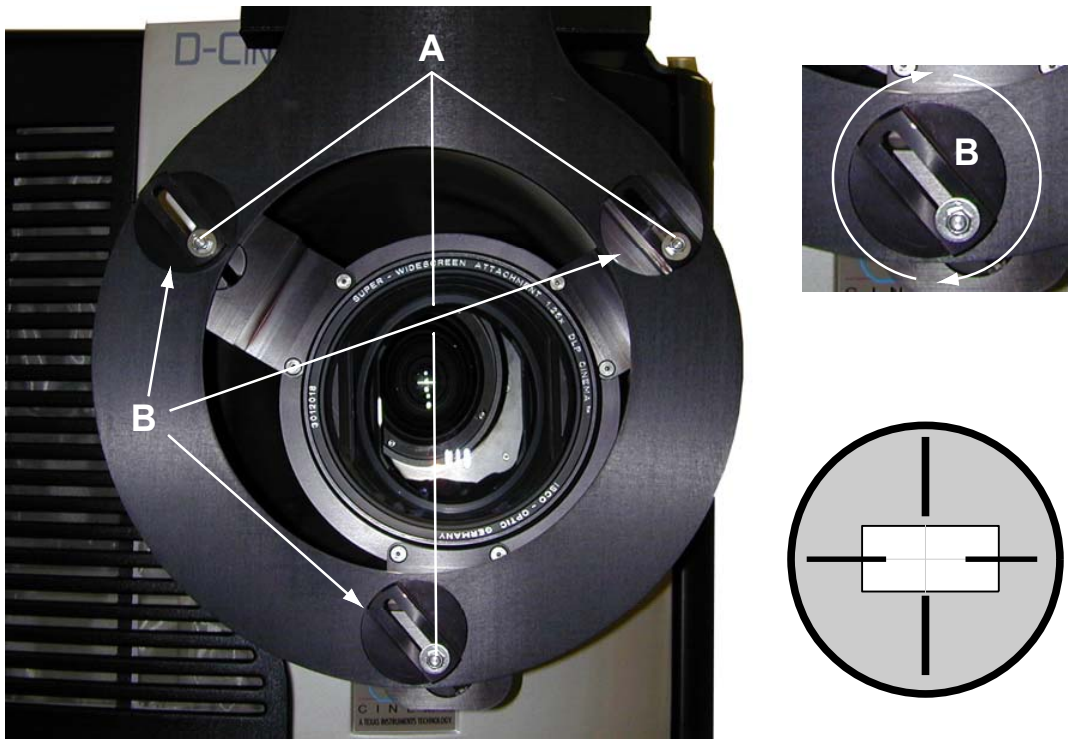


Image A-13

5. Move the lens support, previously putting the lens centering guides (B) in the desired direction, till the lens spot is in center of the lens.
6. Secure the position of the lens holder by tightening the respective nuts (A).

A.2.5 Horizontal alignment of the image top line

How to proceed!

After image centering, proceed to the horizontal alignment of the image top line (fine adjustment of the anamorphic lens in its holder)

1. Loosen the 2 screws (A), squeezing the lens holder rings around the lens.

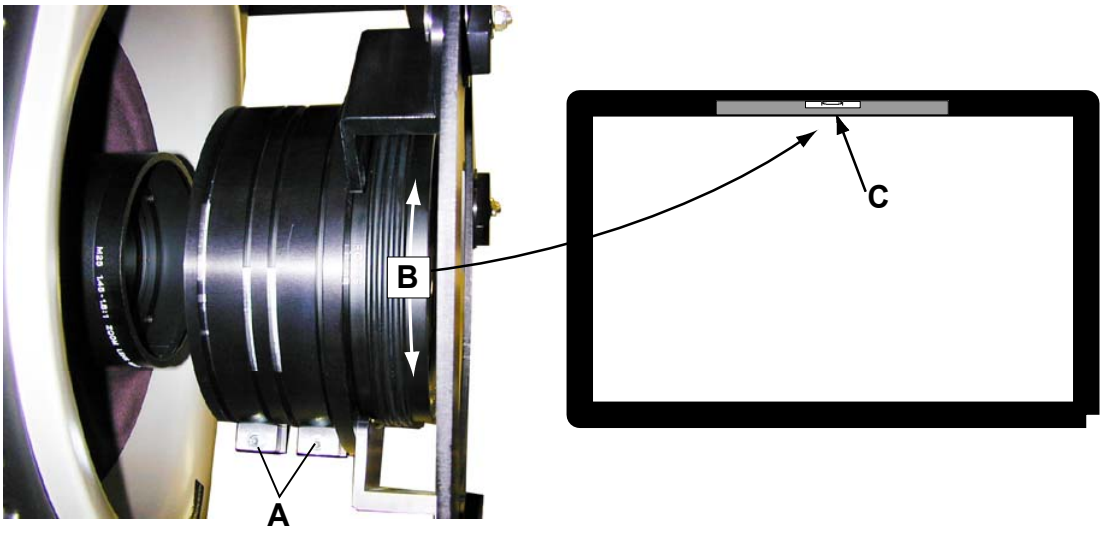


Image A-14
Fine alignment anamorphic lens position in its holder

2. Slightly, rotate (B) the lens in its holder until the image top line (C) runs horizontally.
3. Secure the position of the lens by tightening the lens fixation screws (A).

A.3 Anamorphic lens holder locking motor replacements

Order information

Order number	Description
R846905K	Anamorphic lens holder locking motor

Overview

- Preparations to remove the motor
- Removing the motor
- Preparation of the new motor
- Mounting the motor

Before starting

Remove the anamorphic lens holder driver cover to get access to the motors. When the motor is replaced, remount this cover.

A.3.1 Preparations to remove the motor

Preparations

1. Check if the fixation screw on the axle is accessible.
   If yes, go to step 3
   If no, continue with the next step.
2. Turn the axle with the hand or by using a small tool until the screw is accessible from the top side.
3. Switch off the power of the projector and unplug from the wall outlet.
4. Cut the wire ties.
5. Unplug the plug from the driver module (plug with green wires)

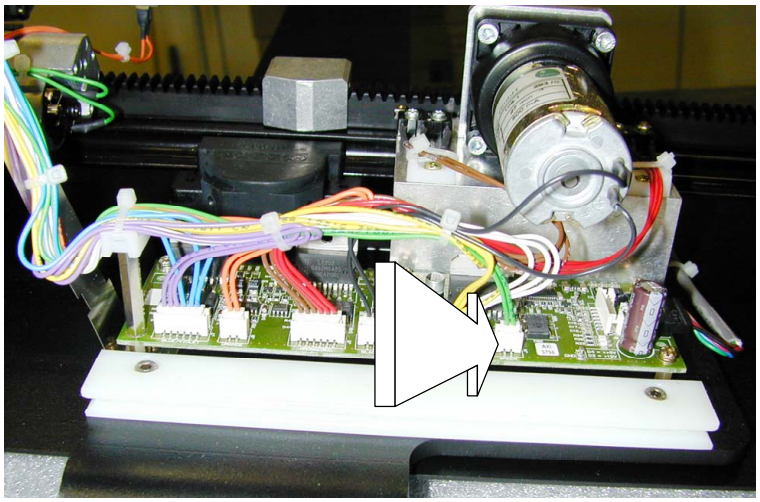


Image A-15
Remove plug with green wires

A.3.2 Removing the motor

Necessary tools

Allen key 3mm

How to remove ?

1. Turn out the hexagon socket set screw (A).

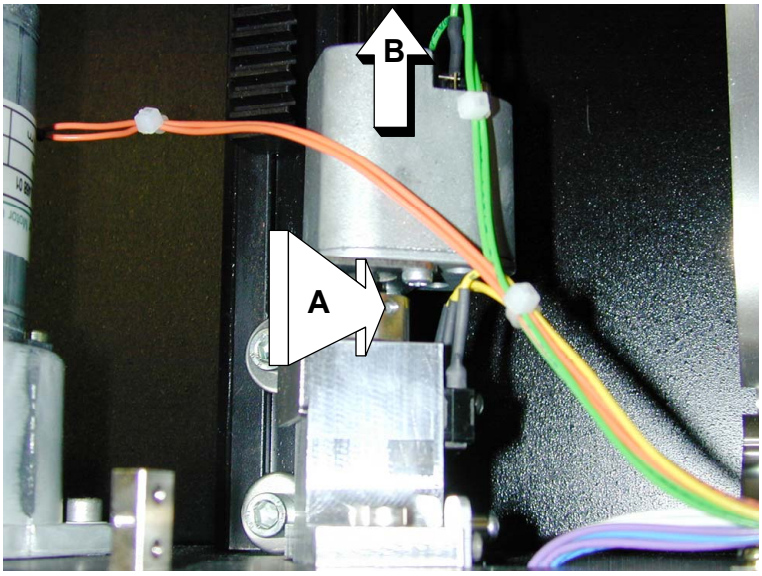


Image A-16

2. Slide the motor backwards (B).

A.3.3 Preparation of the new motor

Motor check

1. Check if the flat side of the axle is turn upwards so that it can be inserted.

   If the axle is not in the correct position, turn it with the hand or with a small tool until it is in its correct position.

A.3.4 Mounting the motor

Necessary tools

Allen key 3mm

How to mount ?

1. Slide the axle into its socket (A).

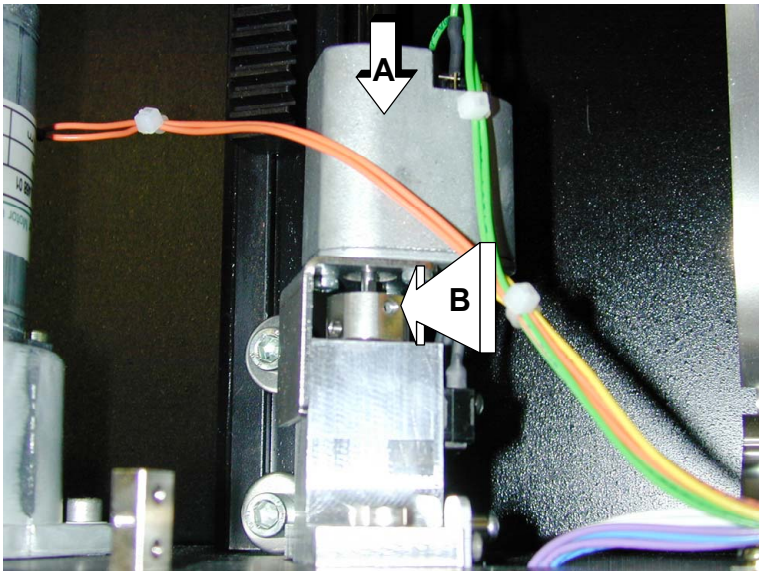


Image A-17

Ensure that the L-shape support plate is on the correct side.

2. Turn in the new hexagon socket set screw (B).
3. Plug the motor plug (green wires) into the socket on the motor driver board (image A-15).
4. Tie the cables together as before.

A.4 Anamorphic lens holder rotation motor replacements

Order information

Order number	Description
R846906K	Anamorphic lens holder rotation motor

Overview

- Removing the Anamorphic lens holder front cover
- Removing the motor
- Mounting the motor
- Remounting the Anamorphic lens holder front cover

Before starting

Remove the anamorphic lens holder driver cover to get access to the motors. When the motor is replaced, remount this cover.

A.4.1 Removing the Anamorphic lens holder front cover

How to remove ?

1. Remove the 4 screws, securing the front cover.

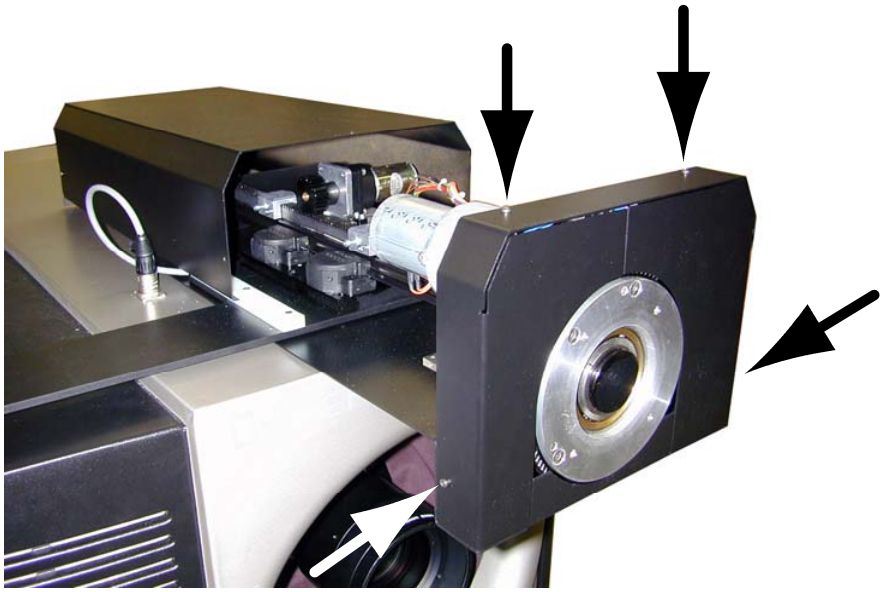


Image A-18

2. Take off the front cover.

A.4.2 Removing the motor

Necessary tools

- Nut driver 5mm
- Allen key 5mm

How to remove ?

1. Cut the wire ties and unplug the orange wires from the motor driver board.

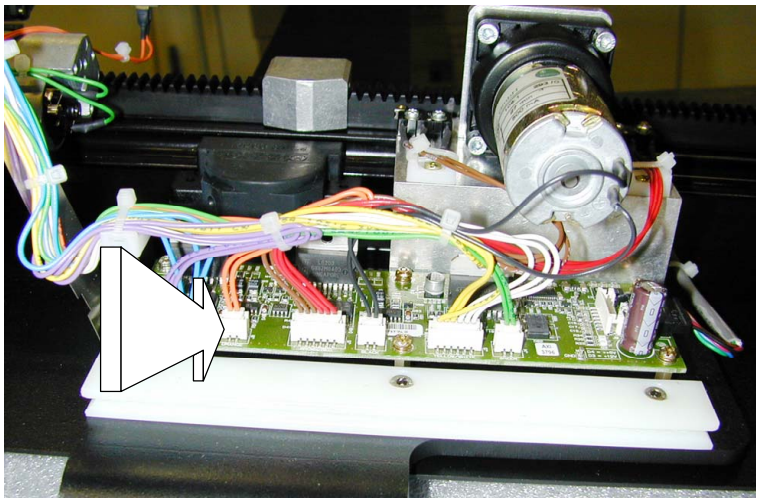


Image A-19
Plug out the orange wires

2. Remove the lock nut on the axle side (A).

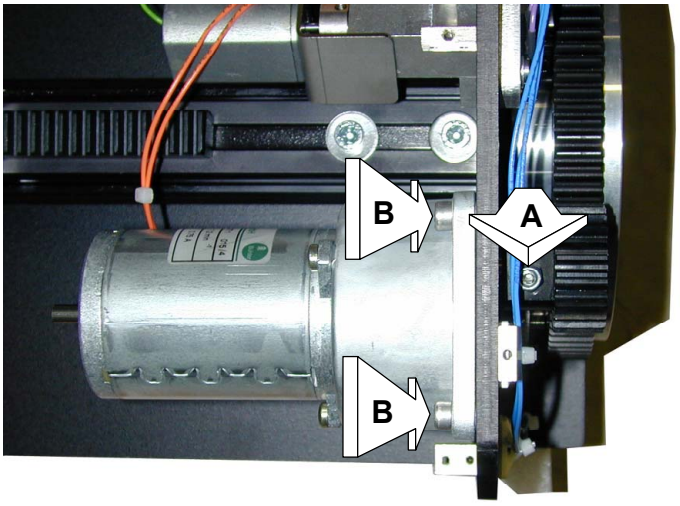


Image A-20
Removing the motor

3. Turn out the hexagon socket head cap screw fixing the gear wheel to the axle (A).
4. Slide off the gear wheel and the spacer.
5. Turn out the 4 hexagon socket head screws (B) fixing the motor to the frame (2 on top and 2 at the bottom).
6. Side out the motor.

A.4.3 Mounting the motor

How to mount ?

1. Slide the axle of the new motor with the flat side trough the axle hole so that the fixation holes matches the holes in the frame.
2. Turn in the 4 fixation screws.
3. Slide the new spacer motor- gear wheel over the axle so that the hole matches the flat side of the axle.

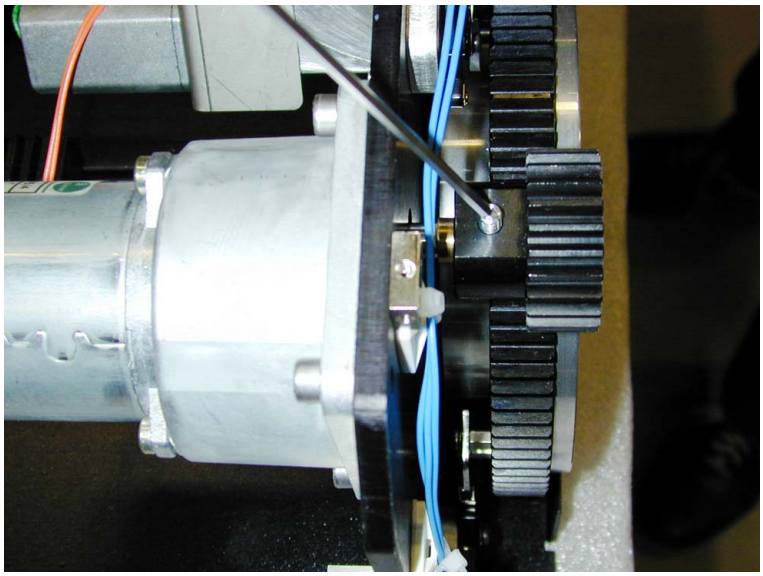


Image A-21
Mounting new motor

4. Slide the new gear wheel over the spacer so that the fixation hole in the gear wheel matches the hole in the spacer and that the teeth of new gear wheel matches the teeth of the existing gear wheel.
5. Fixate this position by turning in a new hexagon socket set screw with cup point.
6. Secure this position by turning on a nut on the hexagon socket set screw.
7. Plug the connector into its socket on the motor driver board.
8. Tie the wires together as before.

A.4.4 Remounting the Anamorphic lens holder front cover

How to mount ?

1. Slide the front cover on its place.

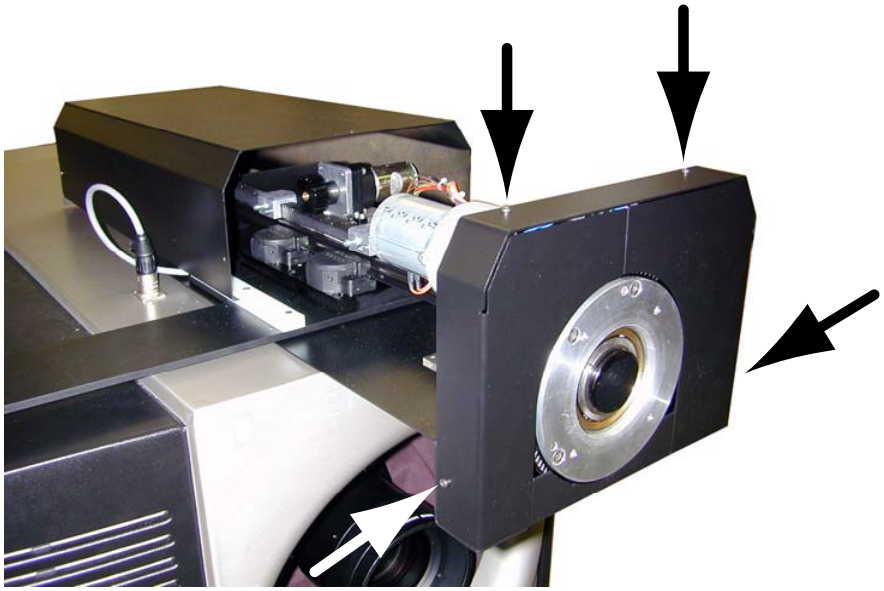


Image A-22
Mounting the front cover

2. Turn in the 4 screws, securing the front cover.

A.5 Anamorphic lens holder shift motor replacements

Order information

Order number	Description
R846907K	Anamorphic lens holder shift motor

Overview

- Preparations to remove the motor
- Removing the motor
- Preparation before inserting the new motor
- Mounting the motor

Before starting

Remove the anamorphic lens holder driver cover to get access to the motors. When the motor is replaced, remount this cover.

A.5.1 Preparations to remove the motor

Preparations

1. Check if the gear fixation screw is on top of the axle.
   If yes, go to step 6
   If no, continue with the next step.

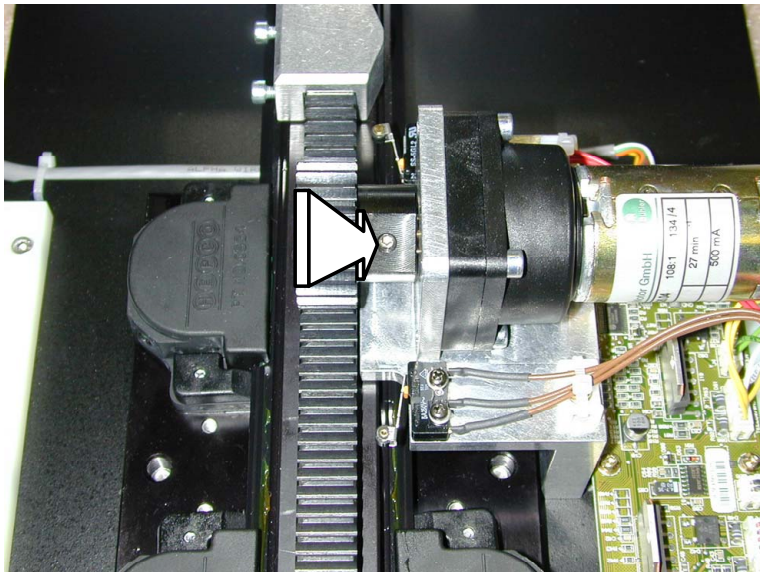


Image A-23

2. Connect a PC to the DP100 and start the DCine communicator software.
3. Select tab *Projector Setup* and click on *Lens config*.
4. Click on the arrow down just below the lens holder buttons to expand the lens calibration window.

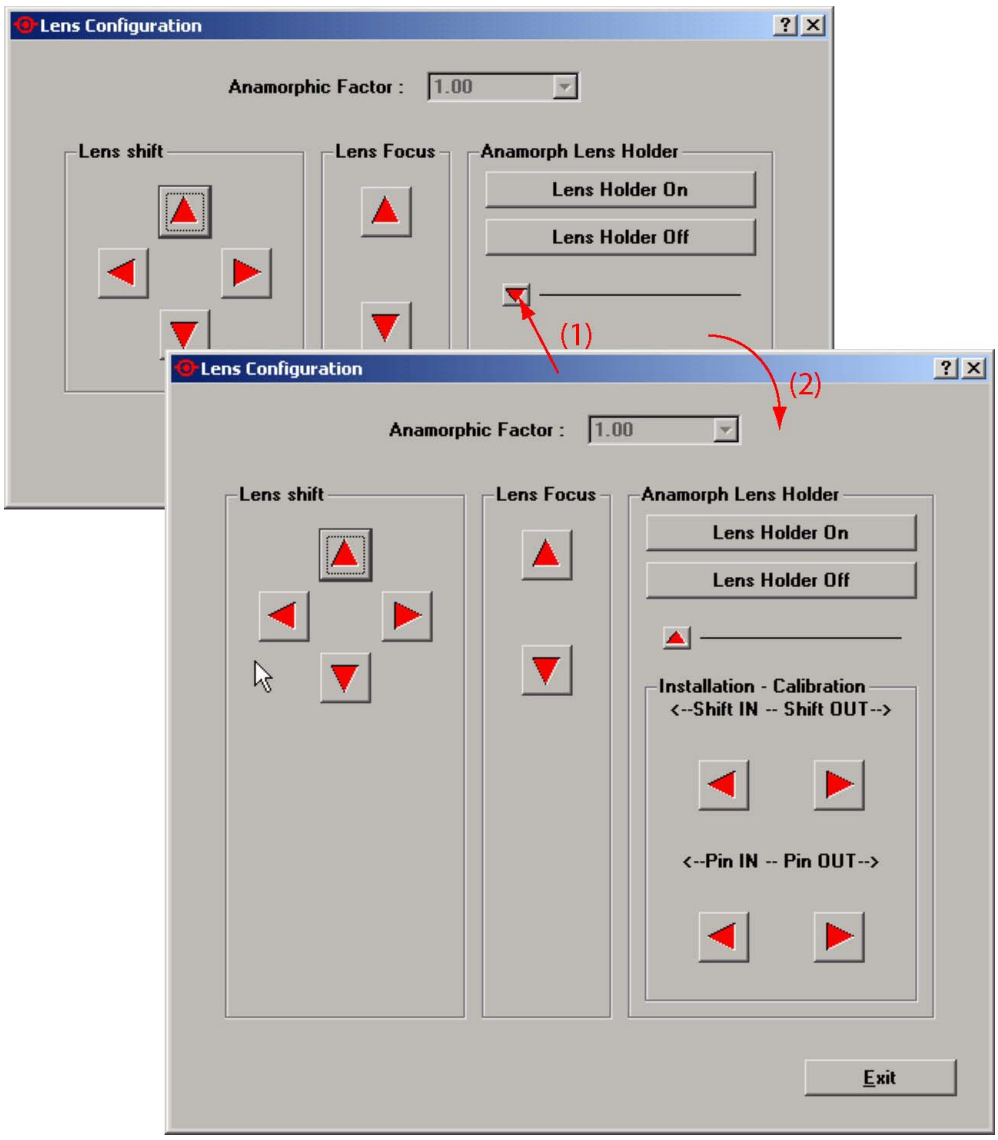


Image A-24

5. Click on the *Shift out* or *Shift in* button until the fixation screw is on top.
6. Switch off the power of the projector and unplug from the wall outlet.
7. Cut the wire ties.
8. Unplug the plug from the driver module (plug with black wires).

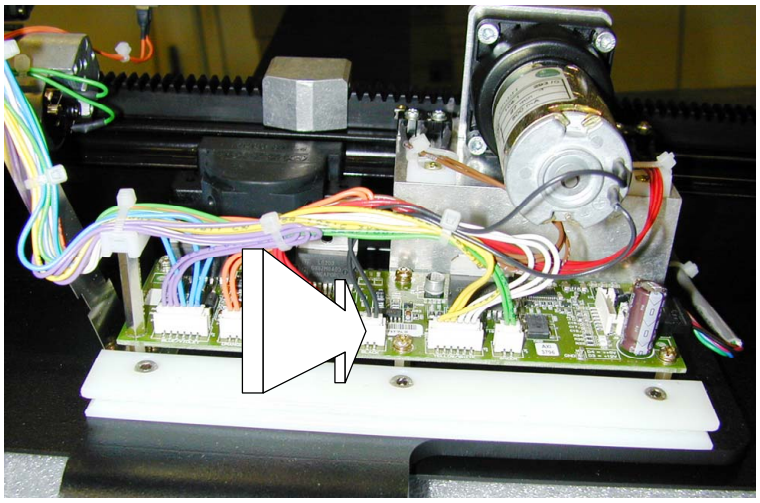


Image A-25

A.5.2 Removing the motor

Necessary tools

- Allen key 5mm
- Allen key 4mm

How to remove ?

1. Turn out the hexagon socket set screw.
2. Slide off the gear wheel.
3. Take off the spacer.
4. Turn out the 4 hexagon socket screws holding the motor to the support (2 on top and 2 at the bottom).

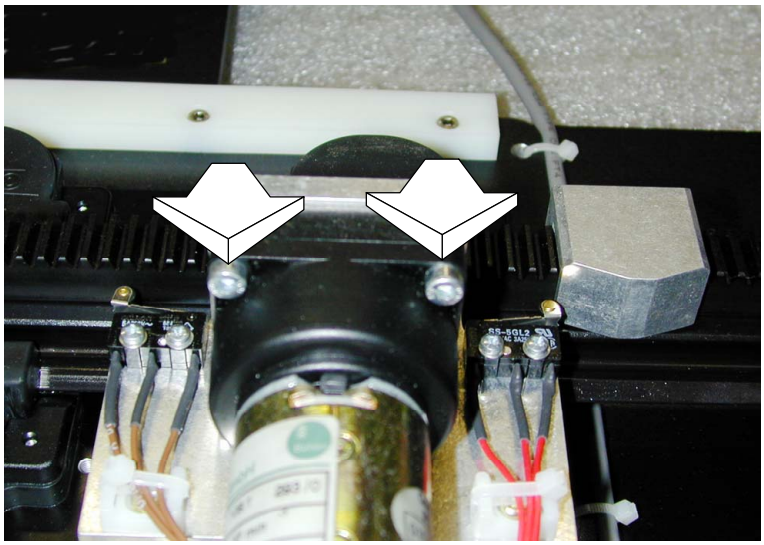


Image A-26

A.5.3 Preparation before inserting the new motor

Motor check

1. Check if the flat side of the axle is turned to the upper side.
2. If not, connect the plug of the motor into the its socket.
   If yes, skip this procedure.
3. Switch on the projector and use the DCine communicator software to turn the motor axle.
4. Connect a PC to the DP100 and start the DCine communicator software.
5. Select tab *Projector Setup* and click on *Lens config*.
6. Click on the arrow down just below the lens holder buttons to expand the lens calibration window.

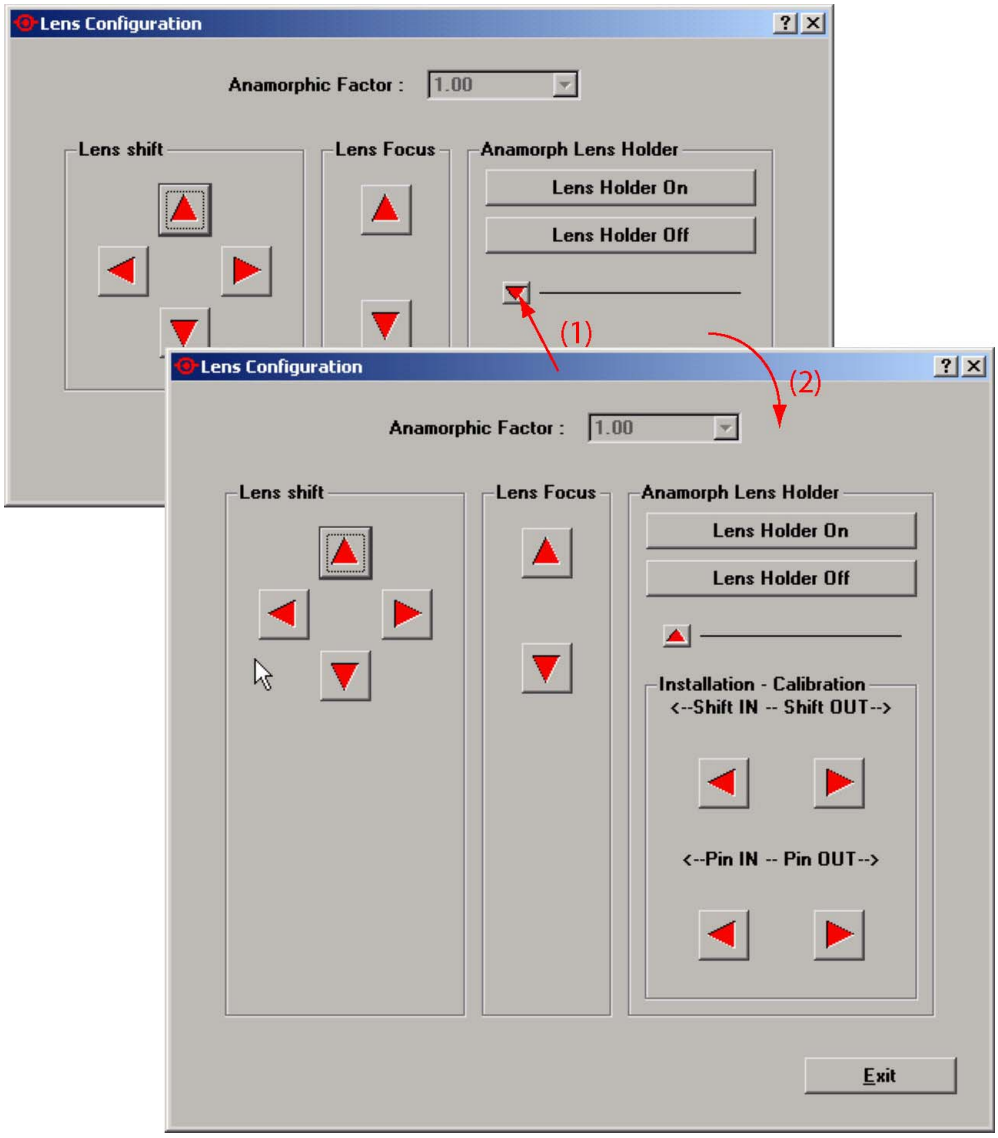


Image A-27

7. Click on the *Shift out* or *Shift in* button until the flat side of the axle is to the upper side.

A.5.4 Mounting the motor

How to mount ?

1. Place the motor against the support.

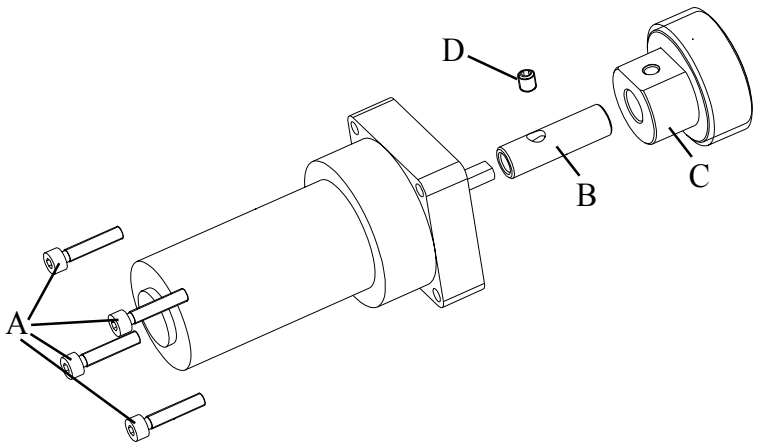


Image A-28

2. Fixate this position with the 4 new hexagon socket head cap screws (M4 x 20) (A).
3. Slide a new spacer over the motor axle (B). The hole of the spacer must match the flat side of the axle.
4. Slide the new gear wheel (C) over the axle so that the fixation hole matches the hole in the spacer and the teeth of the gear wheel matches the teeth of the tooth rack.
5. Turn in a new hexagon socket set screw with cup point (D) and fixate this position.
6. Plug the motor plug into the socket.
7. Tie the cables together as before.

B. PIN CONFIGURATIONS

Overview

- Pin configuration of the Input & Communication ports

B.1 Pin configuration of the Input & Communication ports

RS232/422 Serial communication ports

Image B-1
A Pin numbering male D-SUB 9 pins connector.
B Pin numbering female D-SUB 9 pins connector.

RS232/422 input port	
Pin	**Description**
1	DCD : Data Carrier Detect
2	RXD- : Receive Data
3	TXD- : Transmitted Data
4	DTR : Data Terminal Ready [RS232] TXD+ : Transmitted Data [RS422]
5	GND : Ground
6	DSR : Data Set Ready [RS232] RXD+ : Received Data [RS422]
7	RTS : Request To Send
8	CTS : Clear To Send
9	RI : Ring Indicator

RS232/422 output port	
Pin	**Description**
1	— (not connected) —
2	RXD- : Receive Data
3	TXD- : Transmitted Data
4	DTR : Data Terminal Ready [RS232] TXD+ : Transmitted Data [RS422]
5	GND : Ground
6	DSR : Data Set Ready [RS232] RXD+ : Received Data [RS422]
7	— (not connected) —
8	— (not connected) —
9	— (not connected) —

10/100 Base-T network ports

Pin	Description
1	TXD+
2	TXD-
3	RXD+
4	++2,5VA
5	++2,5VA
6	RXD-
7	—
8	GNDM

Remote input port

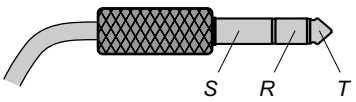


Image B-2
S Sleeve (shield).
R Ring.
T Tip.

Pin	Description
S	GND
T	RC5 in
R	n.c. or GND

General purpose input/output port (GPIO)

Pin	Description	Pin	Description
1	GPIN 1 P	20	GPIN 1 N
2	GPIN 2 P	21	GPIN 2 N
3	GPIN 3 P	22	GPIN 3 N
4	GPIN 4 P	23	GPIN 4 N
5	GPIN 5 P	24	GPIN 5 N
6	GPIN 6 P	25	GPIN 6 N
7	GPIN 7 P	26	GPIN 7 N
8	GPIN 8 P	27	GPIN 8 N
9	GPOUT 1 P	28	GPOUT 1 N
10	GPOUT 2 P	29	GPOUT 2 N
11	GPOUT 3 P	30	GPOUT 3 N
12	GPOUT 4 P	31	GPOUT 4 N
13	GPOUT 5 P	32	GPOUT 5 N
14	GPOUT 6 P	33	GPOUT 6 N
15	GPOUT 7 P	34	GPOUT 7 N
16	Projector Good P	35	Projector Good N
17	— (not connected) —	36	— (not connected) —
18	TCODE+	37	TCODE-
19	TCODE SHIELD		

RS232/422 input port for TI boards

Pin	Description
1	TRSE+ : Request To Send (RTS)
2	RXE- : Receive Data (RD, RX or RXD)
3	TXE- : Transmitted Data (TD, TX or TXD)
4	TXE+ : Data Terminal Ready (DTR)
5	GND : Ground
6	RXE : Data Set Ready (DSR)
7	RTSE- : Request To Send (RTS)
8	CTSE : Clear To Send (CTS)
9	CTSE+ : Clear To Send (CTS)

SMPTE 292 input ports

SMPTE 292 IN Channel A	
Pin	**Description**
1	Input A HD-SDI
2	GND

SMPTE 292 IN Channel B	
Pin	**Description**
1	Input B HD-SDI
2	GND

DVI input ports

Pin	Description	Pin	Description
1	RX2–	13	— (not connected) —
2	RX2+	14	+5V
3	RX2 Shield	15	GND
4	— (not connected) —	16	Hot Plug Detect
5	— (not connected) —	17	RX0–

Pin	Description	Pin	Description
6	DDC Clock	18	RX0+
7	DDC Data	19	RX0 Shield
8	— (not connected) —	20	— (not connected) —
9	RX1–	21	— (not connected) —
10	RX+	22	TMDS Clock Shield
11	RX1 Shiled	23	TMDS RXC+
12	— (not connected) —	24	TMDS RSC-

GLOSSARY

DVI

Digital Visual Interface is a display interface developed in response to the proliferation of digital flat panel displays.

The digital video connectivity standard that was developed by DDWG (Digital Display Work Group). This connection standard offers two different connectors: one with 24 pins that handles digital video signals only, and one with 29 pins that handles both digital and analog video. This standard uses TMDS (Transition Minimized Differential Signal) from Silicon Image and DDC (Display Data Channel) from VESA (Video Electronics Standards Association).

DVI can be single or dual link.

RS232

An Electronic Industries Association (EIA) serial digital interface standard specifying the characteristics of the communication path between two devices using either D-SUB 9 pins or D-SUB 25 pins connectors. This standard is used for relatively short-range communications and does not specify balanced control lines. RS-232 is a serial control standard with a set number of conductors, data rate, word length and type of connector to be used. The standard specifies component connection standards with regard to computer interface. It is also called RS-232-C, which is the third version of the RS-232 standard, and is functionally identical to the CCITT V.24 standard. Logical ’0’ is > + 3V, Logical ’1’ is < - 3V. The range between -3V and +3V is the transition zone.

RS422

An EIA serial digital interface standard that specifies the electrical characteristics of balanced (differential) voltage, digital interface circuits. This standard is usable over longer distances than RS-232. This signal governs the asynchronous transmission of computer data at speeds of up to 920,000 bits per second. It is also used as the serial port standard for Macintosh computers. When the difference between the 2 lines is < - 0.2V that equals with a logical ’0’. When the difference is > +0.2V that equals to a logical ’1’..

Scheimpflug principle

The "plane of sharp focus" can be changed so that any plane can be brought into sharp focus. When the DMD plane and lens plane are parallel, the plane of sharp focus will also be parallel to these two planes. If, however, the lens plane is tilted with respect to the DMD plane, the plane of sharp focus will also be tilted according to geometrical and optical properties. The DMD plane, the principal lens plane and the sharp focus plane will intersect in a line below the projector for downward lens tilt.

SMPTE

Society of Motion Picture and Television Engineers - A global organization, based in the United States, that sets standards for baseband visual communications. This includes film as well as video standards.

INDEX

A

Access 90
  Power Unit base 90
Adaptation ring 109
Adapters 109
  Anode 109
Adaptors 110
  Cathode 110
Adjust 145, 155, 171, 174, 176–177, 229
  Cold Mirror 145
  Convergence 171
  Fold Mirror 174
  Lens Holder 229
  Light Pipe Zoom Lens 176
  Notch Filter 177
  Rod 155
  Scheimpflug 229
Air exhaust 316
  Fan 316
    Replace 316
Align 126
  Arc 126
  Stabilizing magnet 126
Alignment 352
  Image top line 352
Anamorphic lens 343–344
  Mounting in its support 344
Anamorphic lens holder 343, 353, 358, 363
  Motor replacements 353, 358, 363
    Locking motor 353
    Rotation motor 358
    Shift motor 363
Anamorphic lens position 346
  Alignment 346
Anode adaptation 109
Anode Fan 306, 316
  Replace 306, 316
Anode support 109
Authorization 251
  Security warning 251

B

Block diagram 17
Board 252
  Replace 252
Bottom cover 333–334
  Install 334
  Remove 333
Button module 291
  Replace 291

C

Calibrate 201
  Cooling circuit 201
Card cage 245
  Diagnostic 245
Card Cage 243–244, 326
  Fan 326
  Introduction 244
Card Cage cover 248, 250
  Install 250
  Remove 248
Cathode Fan 312
  Replace 312
Clean 138–139, 147, 178–179, 210, 340
  Cold Mirror 147
  Dust filters 340
  Notch Filter 178
  Prism 179
  Pump 210
  Reflector 139
  UV blocker 138
cleaning 228
  lens 228
Cleaning 341
  Exterior 341
Cold Mirror 141, 143, 145, 147
  Adjust 145
  Clean 147
  Replace 143
Cold Mirror Bottom Fan 324
  Replace 324
Cold Mirror Top Fan 321
  Replace 321
Communication interface 92
  Power Unit 92
  Replace 92
Connect 81, 84
  Power LPS 81
  Power net 84
Control Panel 287
Control ports 272
Convention 10, 14
  Orientation 10, 14
Convergence 171
  Adjust 171
Cooling circuit 188–190, 192, 195, 197, 199, 201
  Calibrate 201
  Drain 190
  Exclude 189
    Light Processor 189
  Expel air 197
  Fill 192
  Light Processor 189
    Exclude 189
  Pressure 188
  Pressurize 199
  Refresh 195
Cooling Circuit. 184
  Introduction 184
Covers 327

D

Diagnostics 160, 186
DIMM PC 285
  Replacement 285
Distance 348
  Anamorphic/Prime lens 348
Dowser 180
Drain 190
  Cooling circuit 190
Dust filters 340
  Clean 340
DVI input 274
DVI input board 283
  Replacement 283

E

elcabox 326
  Fan 326
Error code name 37–50, 52–73
  ++12v - voltage high 37
  ++12v - voltage low 37
  ++5v - voltage high 37
  ++5v - voltage low 37
  +12v - voltage high 38
  +12v - voltage low 38
  +24v - voltage high 38
  +24v - voltage low 38
  +3.3v - voltage high 37

+3.3v - voltage low 37
+5v - voltage high 37
+5v - voltage low 38
airflow - not ok 38
ambient - temperature high 39
ambient - temperature low 39
ambient - temperature too high 39
Cold Mirror bottom fan - speed high 40
Cold Mirror bottom fan - speed low 40
Cold Mirror top fan - speed high 41
Cold Mirror top fan - speed low 41
dmd blue - temperature high 42
dmd blue - temperature low 42
dmd blue - temperature too high 42
dmd blue - temperature too low 42
dmd green - temperature high 43
dmd green - temperature low 43
dmd green - temperature too high 43
dmd green - temperature too low 43
dmd red - temperature high 42
dmd red - temperature low 43
dmd red - temperature too high 42
dmd red - temperature too low 42
efib - command/parameter error 44
efib - flash mailbox download error 44
efib - flash update error 44
efib - i2c failed 43
efib - modular formatter architecture error 45
efib - modular formatter blue link communication error 46
efib - modular formatter green link communication error 45
efib - modular formatter red link communication error 46
efib - modular formatter sequence error 45
efib - modular formatter/dmd mismatch error 45
efib - sequence data error 45
efib - system failure 44
elcabox - temperature high 46
elcabox - temperature low 46
elcabox fan1 - speed high 47
elcabox fan1 - speed low 47
elcabox fan2 - speed high 48
elcabox fan2 - speed low 48
elcabox fan3 - speed high 48
elcabox fan3 - speed low 49
elcabox fan4 - speed high 49
elcabox fan4 - speed low 49
engine - not connected 50
lamp - read run time failed 50
lamp - read run time limits failed 52
lamp - run time exceeds maximum 52
lamp - run time too high - soon no startup 52
lamp - run time too high - startup blocked 53
lamp - run time warning 52
lamp anode fan - speed high 53
lamp anode fan - speed low 53
lamp anode fan - voltage high 54
lamp anode fan - voltage low 54
lamp cathode fan - speed high 54
lamp cathode fan - speed low 55
lamp cathode fan - voltage high 55
lamp cathode fan - voltage low 55
lamp house - not connected 56
lamp house - temperature high 57
lamp house - temperature low 57
lamp house - temperature too high 56
lamp top fan - speed high 57
lamp top fan - speed low 58
lamp top fan - voltage high 58
lamp top fan - voltage low 59
lens focus position - requested target not reached 59
lens horizontal shift position - requested target not reached 60
lens vertical shift position - requested target not reached 60
lens zoom position - requested target not reached 60
lps - at least one could not be detected 63
lps - communication failed 61
lps - not detected 62
other fans - voltage high 73
other fans - voltage low 73
pfc - temperature high 64
pfc - temperature low 64
pulse generator fan - speed high 65
pulse generator fan - speed low 65
rack - temperature high 66
rack - temperature low 66
sealing fan - speed high 66
sealing fan - speed low 67
smps - i2c failed 67
smps1 primary - temperature high 67
smps1 primary - temperature low 67
smps1 secondary - temperature high 68
smps1 secondary - temperature low 68
smps2 primary - temperature high 68
smps2 primary - temperature low 68
smps2 secondary - temperature high 69
smps2 secondary - temperature low 69
tec - voltage high 69
tec - voltage low 69
tec blue - not connected 70
tec blue - temperature high 70
tec blue - temperature too high 71
tec green - not connected 71
tec green - temperature high 71
tec green - temperature too high 71
tec red - not connected 71
tec red - temperature high 72
tec red - temperature too high 72
ti - security error, please authorize 73
ti - system status = fail 72
ti - system status read failed 73
ti-boards - interface board security enclosure error 72
water - flow not ok 73
Ethernet 272
Expel air 197
Cooling circuit 197
Exterior 341
Cleaning 341

F

Fan 305, 326
Card Cage 326
elcabox 326
Replace 305
SMPS 326
Fill 192
Cooling circuit 192
Flowchart 36
Troubleshooting 36
Focus motor 240
Fold Mirror 174
Adjust 174
Front cover 330, 337
Install 337
Remove 330

G

General 9
General Purpose I/O 273, 275
GPIO 273, 275
GPIO board 284
Replacement 284

H

HD-SDI input 274
Heat Exchanger 216
Replace 216
Horizontal shift motor 238

I

Image centering 351
  Anamorphic lens 351
Input & communication 277, 280
  Remove 277, 280
Input & Communication 269–270
  Introduction 269–270
Input ports 274
Install 88, 96, 116, 121, 131, 153, 181, 207, 214, 234, 236, 238, 240, 242, 250, 301, 334–339
  Bottom cover 334
  Card Cage cover 250
  Focus motor 240
  Front cover 337
  Horizontal shift motor 238
  Lamp 116
  Lamp house 121
  Left cover 338
  Lens Holder 234
  Lens Signal Distribution 242
  Light Sensor 181
  LPS 88
  LPS rack 96
  Pump 207
  Pump (complete) 214
  Rear cover 336
  Right cover 339
  Rod 153
  Top cover 335
  Touch panel 301
  UV blocker 131
  Vertical shift motor 236
Integration Rod 149–151
  Diagnostic 151
  Introduction 150
Introduction 76, 100, 106, 142, 150, 184, 220, 244, 270, 288
  Card Cage 244
  Input & Communication 270
  Integration Rod 150
  Lens 220
  Lens holder 220
  Liquid Cooling 184
  SPG 100
IR-receiver 289

K

Keypad 289

L

Lamp 105, 108, 113, 123–124
  Realignment 124
  Remove 113
  Reset 123
  Supported 108
Lamp house 105, 111, 135
  Reflector 135
  Remove 111
Lamp House 138–139
  Reflector 139
    Clean 139
  UV blocker 138
    Clean 138
Lamp info module 128
  Replace 128
Left cover 329, 338
  Install 338
  Remove 329
lens 228
  cleaning 228
Lens 225, 227
  Install 225
  Removal 227
Lens holder 219
Lens Holder 229, 232, 234
  Adjust 229
  Install 234
  Remove 232
lens selection 224
Lens Signal Distribution 242
Lenses 219, 222
  Available 222
Light Pipe Zoom Lens 176
  Adjust 176
Light Processor 157–158, 161, 164
  Install 164
  Introduction 158
  Remove 161
Light Sensor 181
Liquid Cooling 183–184
  Introduction 184
Local keypad 289
Local Keypad 294
  Replace 294
Location 11, 15
  Main components 11, 15
LPS 79, 86, 88
  Diagnostic 79
  Install 88
  Remove 86
LPS rack 96
  Install 96

M

Main components 11, 15
  Location 11, 15
Mains Filter 94
  Power Unit 94
  Replace 94
Maintenance 27–29, 32–33
  1 year 29
  10 year 33
  4 year 32
  6 month 28
  Lamp change 27
Maintenance program 25–26
  1 Month 26
Motor 354–357, 360–361, 364, 366–368
  Mount 361
  Mounting 357, 367–368
    Preparation 367
  Preparation 356
  Preparations 364
  Remove 354–355, 360, 366
    Preparations 354
Mounting 362
  Anamorphic lens holder front cover 362

N

Notch Filter 177–178, 182
  Adjust 177
  Clean 178
  Replace 182

O

ON/OFF switch 272
Orientation 10, 14
  Convention 10, 14

P

Pin configurations 369
Ports 370
  Pins 370
Position 304
  Touch panel 304

Power input 272
Power Unit 75, 92, 94
  Communication interface 92
  Mains Filter 94
Power Unit base 90
  Access 90
Power unit control 273
Pressure 188
  Cooling circuit 188
Pressurize 199
  Cooling circuit 199
Prism 179
  Clean 179
Pump 204, 207, 210, 214
  Clean 210
  Install 207
  Remove 204
  Replace 214
Pump motor 212
Pump rotor 212

R

Rack control 273
Realignment 124
  Lamp 124
Rear cover 331, 336
  Install 336
  Remove 331
Reflector 135, 139
  Clean 139
  Replace 135
Refresh 195
  Cooling circuit 195
Remote control 272
Remounting 350
  Anamorphic lens holder driver cover 350
Remove 86, 102–103, 111, 113, 152, 181, 204, 214, 232, 236, 238, 240, 242, 248, 328–333
  Bottom cover 333
  Card Cage cover 248
  Focus motor 240
  Front cover 330
  Horizontal shift motor 238
  Lamp 113
  Lamp house 111
  Left cover 329
  Lens Holder 232
  Lens Signal Distribution 242
  Light Sensor 181
  LPS 86
  Pump 204
  Pump (complete) 214
  Rear cover 331
  Right cover 328
  Rod 152
  SPG 102–103
  Top cover 332
  Vertical shift motor 236
Removing 347, 359
  Anamorphic lens holder driver cover 347
  Anamorphic lens holder front cover 359
Replace 128, 135, 143, 180–181, 212, 214, 216, 252, 291, 294, 297, 305–306, 312, 316, 321, 324–325
  Air exhaust 316
  Anode Fan 306
  Button module 291
  Card Cage board 252
  Cathode Fan 312
  Cold Mirror 143
  Cold Mirror Bottom Fan 324
  Cold Mirror Top Fan 321
  Dowser 180
  Fan 305
  Heat Exchanger 216
  Lamp info module 128
  Light Sensor 181
  Local Keypad 294
  Outlet Fan 316
  Pump (complete) 214
  Pump motor 212
  Pump rotor 212
  Reflector 135
  Shutter 180
  SPG Fan 325
  Status Lights 297
Replace Notch Filter 182
Reset 123
  Lamp 123
Right cover 328, 339
  Install 339
  Remove 328
Rod 151–153, 155
  Adjust 155
  Diagnostic 151
  Install 153
  Remove 152
RS232 272
RS422 272

S

Safety 5–6
  Instructions 6
Scheimpflug 229
Serial communication 272
Shutter 180
SMPS 326
  Fan 326
SMPTE 292 274
Spare parts 20
SPG 99–103
  Introduction 100
  Remove 102–103
  Troubleshooting 101
SPG Fan 325
  Replace 325
Start Pulse Generator 99
Status LED 289
Status Lights 297
  Replace 297
Supported 108
  Lamps 108

T

TI Boards 255
  Update 255
TI update 258–259, 261, 263, 265–267
  Connection 258–259
    Ethernet 259
    Serial 258
  Factory install options 266
  Installation 261
  Logging 263
  Special functions 265
  Stay in Boot 267
Top cover 332, 335
  Install 335
  Remove 332
Touch panel 299, 301, 304
  Install 301
  Position 304
Touch Panel 300
  Introduction 300
Trouble shooting 35, 37
  Checklist 37
Troubleshooting 36, 101
  First level 36
  Flowchart 36
  SPG 101

U

Update 255–257
  Program 257
    Start up 257
  TI boards 256
    Install package 256
  TI Boards 255
UV blocker 138
  Clean 138

V

Vertical shift motor 236