



# RackCDU (InRackCDU)

## Maintenance Manual

### History:

Date:	Notes:	Revision:
21-Dec.-2016	First Release	1.0

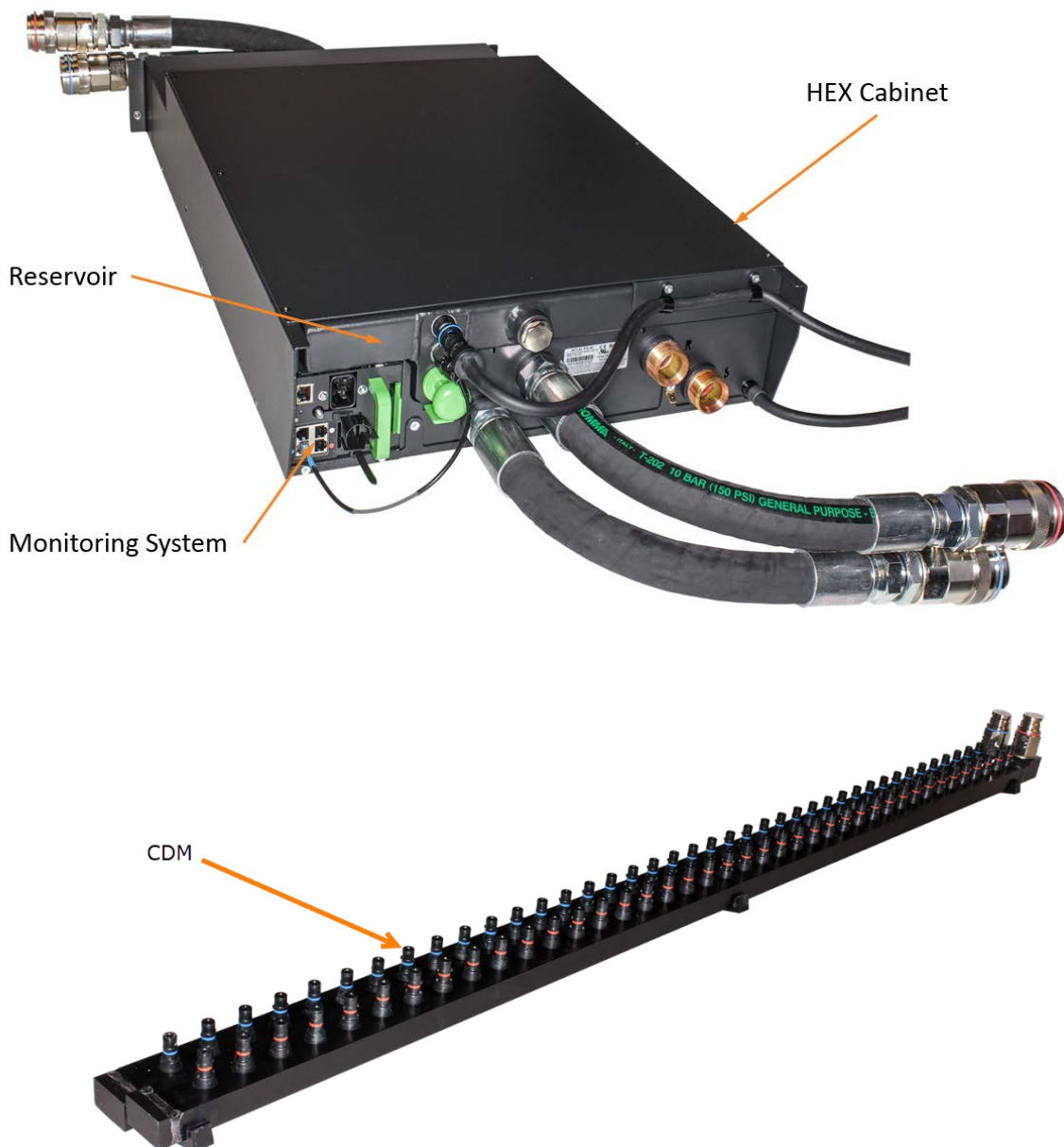
This document contains a guide for servicing the InRackCDU systems and replacing defective hardware

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## 1. Introduction

The InRackCDU is divided into four service packages: HEX Cabinet, Reservoir, Monitoring system and Coolant Distribution Manifolds (CDM). This is done in order to secure the best possible maintenance, as each package can be shipped individually to Asetek for reparation or replacement. The Maintenance Manual provides information on how to detach each of the four (two for JP/APAC markets) service packages.

**Please note: for reinstallation-guidelines refer to “Operating Manual RackCDU V3 Horizontal HEX”.**



## 2. Important information

Before installing and starting up a device, please observe the safety instructions listed in the following section. This will help you to avoid making serious errors that could impair your health, damage the device and endanger the data base.

### 2.1. Safety instructions

The following safety instructions are also provided in the manual "Safety Notes and Regulations".

This device meets the relevant safety regulations for IT equipment. If you have any questions about whether you can install the server in the intended environment, please contact your sales outlet or our customer service team.

#### Before starting up

- If the device is brought in from a cold environment, condensation may form both inside and on the outside of the device. Wait until the device has acclimatized to room temperature and is absolutely dry before starting it up. Material damage may be caused to the device if this requirement is not observed.

#### Installation and operation

- This device must only be connected to properly grounded power outlets or connected to the grounded rack internal power distribution system with tested and approved power cords.
- Ensure that the power sockets on the device and the properly grounded power outlets are easily accessible.
- Route the cables in such a way that they do not create a potential hazard (make sure no-one can trip over them) and that they cannot be damaged. When connecting the server, refer to the relevant instructions in this manual.
- Make sure that no objects (e.g. jewelry, paperclips etc.) or liquids can get inside the server (risk of electric shock, short circuit).
- In emergencies (e.g. damaged casing, controls or cables, penetration of liquids or foreign bodies), contact the system administrator or your customer service team. Only disconnect the system from the mains power supply if there is no risk of harming yourself.
- Do not damage or modify internal cables or devices. Doing so may cause a device failure, fire, or electric shock and will void the warranty and exempt the manufacturer from all liability.
- The circuit boards and soldered parts of internal options are exposed and can be damaged by static electricity. To ensure reliable protection, if you are wearing an earthing band on your wrist when working with this type of module, connect it to an unpainted, non-conducting metal part of the system.
- Do not touch the circuitry on boards or soldered parts. Hold the metallic areas or the edges of the circuit boards.

- Install the screw removed during installation/detaching internal options in former device/position. To use a screw of the different kind can cause a breakdown of equipment.
- The installation indicated on this document is sometimes changed to the kind of possible options without notice.
- RackCDU installation and maintenance use stepladder. Do be careful not to fall from stepladder.
- Only Monitoring Box and Reservoir Tank are defined as spare part, so in case of any trouble about RackCDU (for ex, Leakage in Cabinet or some Sensor Error), RackCDU itself must be replaced.
- When leakage is detected by Leak Sensor, leaked Coolant or Facility water is pooled in the cabinet. Before the cabinet is full with the leakage, leakage goes out through the drain tube on the floor, so Servers does not get any leakage from the cabinet and prepared floor pan should be considered against drained leakage.

### In case of spill of server coolant

Server coolant is an electrically conductive liquid: LOOK FIRST FOR ANY POTENTIAL CONTACT BETWEEN THE LIQUID AND POWER CONNECTORS. AVOID CONTACT WITH COOLANT IF A POTENTIAL FOR ELECTRICAL SHOCK DUE TO COOLANT WETTING POWER CONNECTORS IS OBSERVED until power is turned off to the wet connectors!

### Eye/Face Protection

Server coolant may cause slight temporary eye irritation. Use safety glasses (with side shields) to prevent any accidental eye contact with liquid. If eye contact occur, immediately flush with plenty of water. Get to medical attention, if any discomfort continue.

### Skin Protection

Prolonged contact is essentially nonirritating to skin. However, hand protection is recommended in the form of gloves chemically resistant to the material including gloves with barrier materials of Butyl rubber, Natural rubber ("latex"), Neoprene, Nitrile/butadiene rubber ("nitrile" or "NBR"), Polyethylene, Ethyl vinyl alcohol laminate ("EVAL"), Polyvinyl alcohol ("PVA"), or Polyvinyl chloride ("PVC" or "vinyl"). If gloves are not worn, wash hands with plenty of water following clean up.

### Small Spills

Small spills of less than a cup may be cleaned up with towels or other absorbent materials. Absorb the spilled liquid and wring into bucket. Fill bucket with tap water and pour into sink drain. Refill bucket and rinse towels. Empty bucket and wring towels. Fill bucket half full then return to spill area and rinse area with towels and clean water, wringing rinse water back into bucket. Dump this rinse water into a sink drain and wring towels. Allow cloth towels to dry and then wash. Dry and incinerate paper towels. Flush bucket with plenty of fresh water to clean.

### Moderate Spills

For spills where enough liquid is present to collect a reasonable amount in a container, liquid may be collected with a clean wet/dry vacuum or it may be collected with towels or other absorbent material and wrung into a bucket. Collected liquid should be transferred to a sealable container and this container should be sealed and marked as containing "Enhanced Propylene Glycol". Dispose of waste and residues in accordance with local authority requirements. (Collected liquid may be disposed of by taking to a recycling center for glycol or anti-freeze. Alternatively they may be disposed of in an incinerator or other thermal destruction device.) Do not dump quantities over 1 quart into any sewers on the ground or into any body of water! Dilute any quantities less than 1 quart by at least 5 to 1 before dumping into sanitary sewers.






After collecting the spill, return to the spill area with half a bucket of fresh water and rinse area with towels and clean water, wringing rinse water back into bucket. Dump this rinse water into a sink drain and wring towels. Allow cloth towels dry and then wash. Dry and incinerate paper towels. Flush liquid collection equipment with plenty of fresh water to clean.

### 3. Tools

**In case of stopping facility water, connecting/disconnecting of water tube from RackCDU must be done by customers, not by servicemen**


#### 3.1. Tools at Facility Site

The following tools are needed for setup and maintenance. It should therefore be provided by the facility site, if the service engineer asks for it.

Equipment	Spec	Representation/Note
Wet/dry vacuum cleaner	More than 8 liter capacity used for collecting eventual liquid spillage.	
Funnel	A small end opening of 18 mm or less	
Wrench	41 mm for mounting facility tubes.  8mm for CDM locking mechanism(no need for JP/APAC market)	
Bucket	More than 4 litter capacity  To exchange Reservoir Tank	
Step ladder	Over 1m Height	
PC	Can be connect to network which RackCDU is connecting	To check the status of RackCDU

### 3.2. Tools for service engineer

The following tools are needed to be prepared by service engineer.

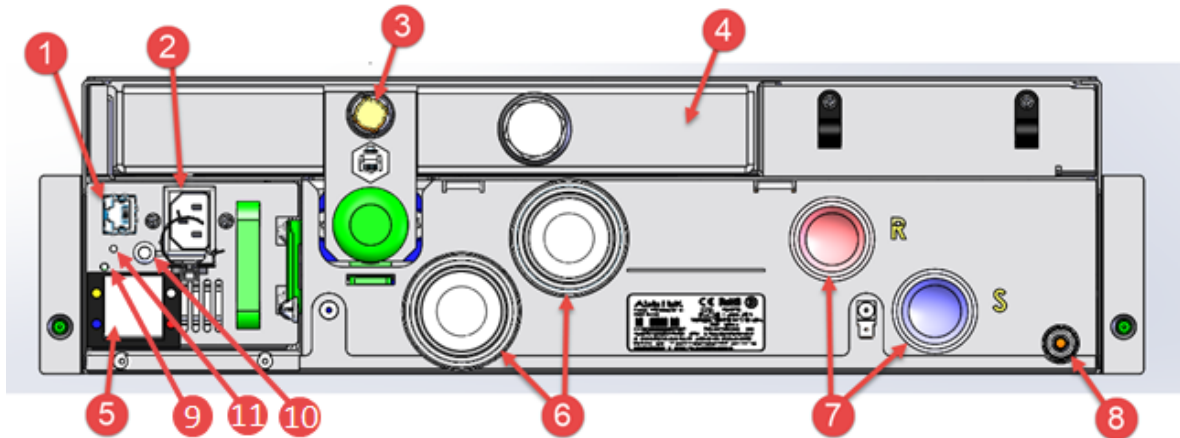
Equipment	Spec	Representation/Note
Wrench	22mm for opening / closing reservoir filling plug.	
Scale	-	To check the level of coolant in reservoir when filling.
Laptop PC	-	-
Network Cable terminating with RJ45 connector	-	-



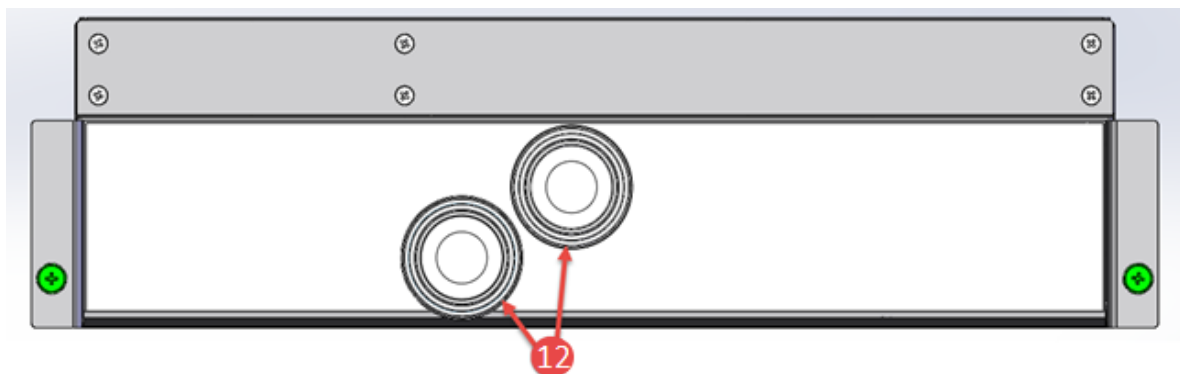
## 4. HEX cabinet

The HEX cabinet has a front and a rear side both with connections for CDMs, however the front connections are optional. It is designed to mount horizontally in the top 3U spaces of a rack.

**HEX cabinet Rear View**



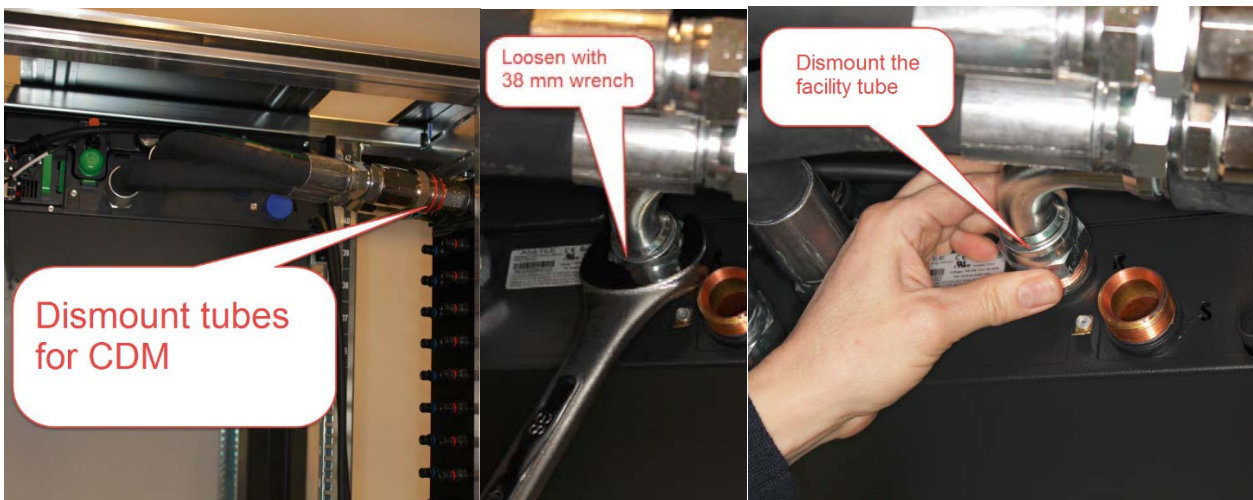
**HEX cabinet Front View**



Number	Specification
1	RJ45 Standard network connector Link LED(Green) : "On" when connected to network and ready to use Active LED(Orange) : "Brink" as data are accepted
2	C14 Power connector for monitoring system
3	Quick connector for ventilation tube
4	Reservoir
5	Connector for monitoring system
6	Standard rear connections for CDMs
7	Facilities Supply & Return line connectors
8	Connector for drain lines
9	LED Indicator : Red="Alarm", Orange="Waring", Green="OK"
10	ID Indicator
11	Reset Switch (refer Monitoring System User Guide to reset)
12	Optional front connectors for CDMs

#### 4.1. How to detach the HEX cabinet

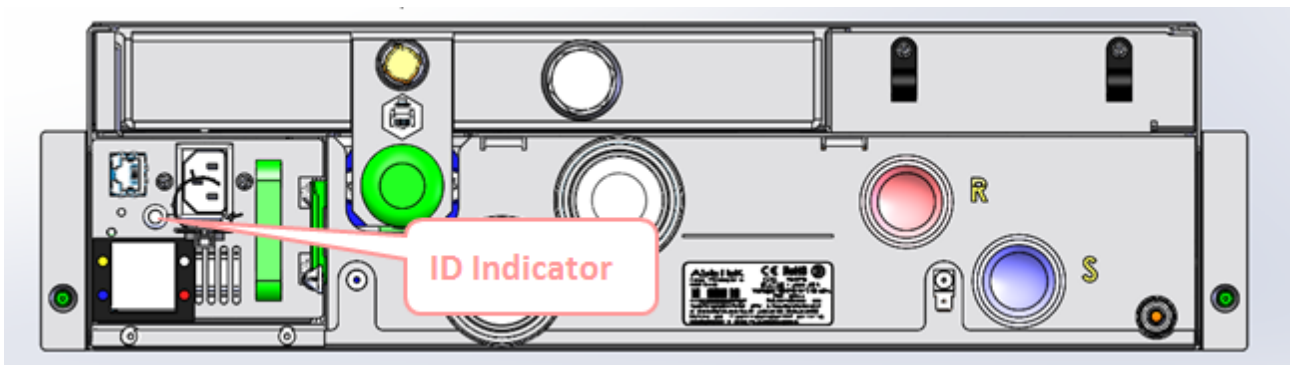
In order to remove the HEX cabinet from the rack, start by dismantling the tubes from the CDM. Facility water supply should be prepared with a check valve and a drain, in order to stop the facility water supply to the RackCDU and drain the coolant from the tube sets before being disconnected from RackCDU. Then loosen the facility tubes with a 41 mm wrench and dismount them. Afterwards loosen the screws (Phillips number 2) highlighted in green on the picture above. The HEX cabinet weighs approximately 53 kg and it can therefore be advantageously to use a lifting device to dismount the cabinet.



In addition, the reservoir and monitoring system should be detached from the HEX cabinet as well, please refer to section 6. [Reservoir](#) and section 7. [Monitoring system](#).

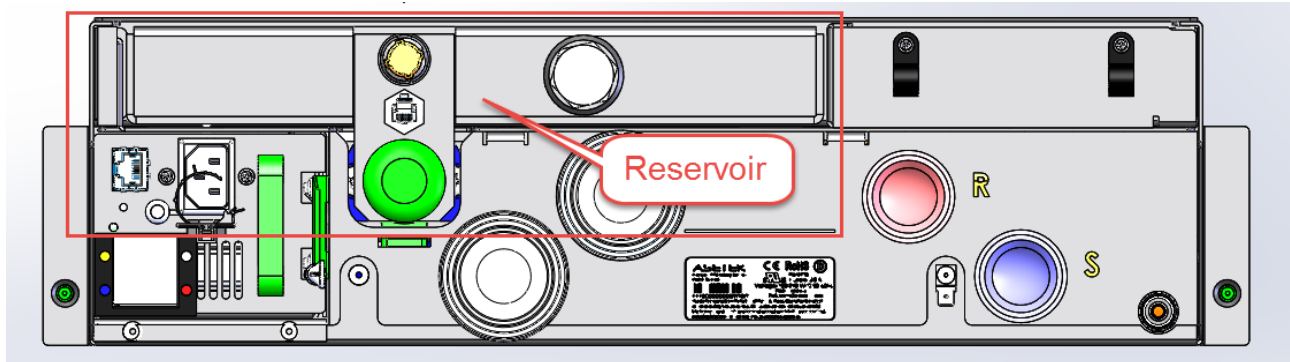
#### 5. ID Indicator

When working in a datacenter environment, switch on the ID indicator on rear side of RackCDU for easy identification. Press the ID Indicator on rear side, or use the RackCDU monitoring system Web , in order to switch on (in blue) the system identification LEDs.



## 6. Reservoir

On the top rear side of the HEX cabinet is a reservoir for the cooling liquid, which provide server coolant for more than 5 years of operation.



### 6.1. How to detach the reservoir

The reservoir can be detached without powering off the server nodes and the servers can be operated in 1 hour without having the reservoir connected. In order to detach the reservoir, first remove the level sensor connector and the venting tube. The next step is to push the lever beneath the reservoir and pull out the reservoir using the green handle.



## 6.2. Refilling reservoir

As the liquid cooling system runs, liquid gradually permeates through the rubber tubing and plastic parts in the system.

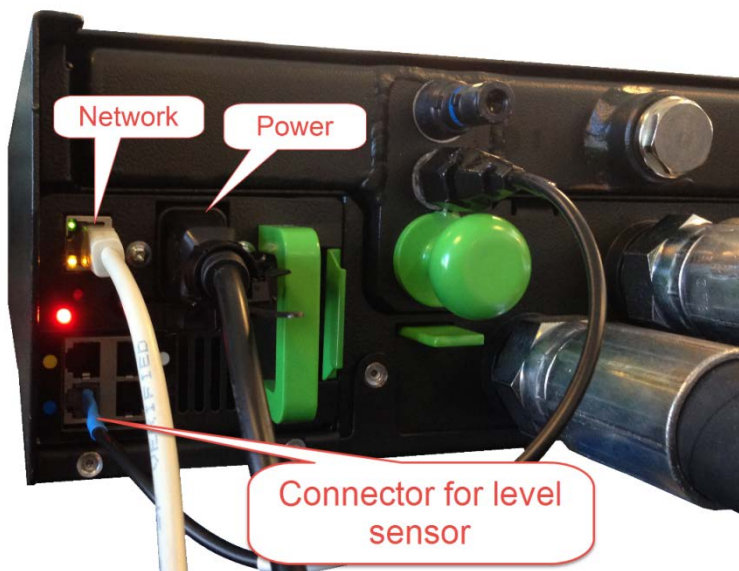
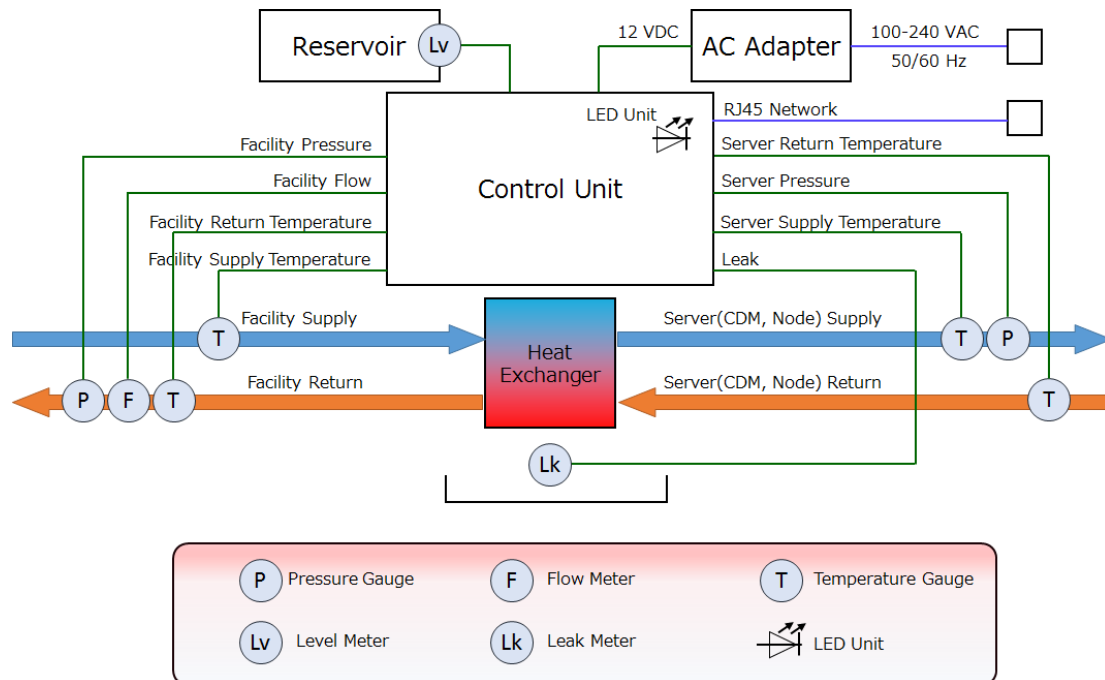
Should the reservoir need refilling an alarm in the monitoring system will turn go off. The reservoir is estimated to run 5 years of operation before refilling is required. The RackCDU must be filled with manufacturer provided server coolant. Using water or other types of coolant will damage the server system.

Unscrew the plug from filling port at the top of the reservoir with a 22 mm wrench and apply cooling liquid with the use of a small funnel until the reservoir is filled 1 cm from the top of the filling port. Keep the reservoir in an upright position when performing the refilling.



## 7. Monitoring system

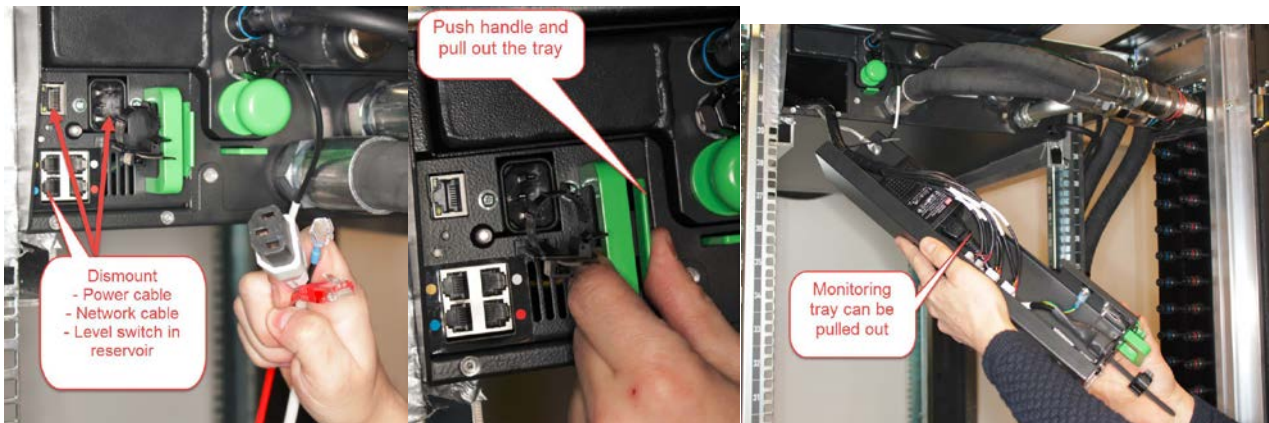
The RackCDU includes a monitoring system that provides information on liquid temperatures, pressures and flow rates as well as alerts for problems including leak detection and low coolant via Web UI. The hardware is located on the left rear side of the HEX cabinet and can be disconnected without powering off server nodes. The monitoring system requires a network, power and level sensor connection.



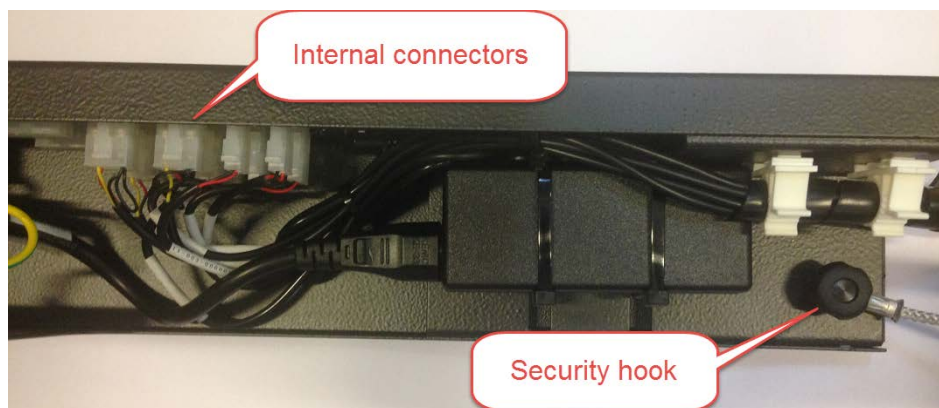


### 7.1. How to detach the monitoring box

In order to detach the monitoring box, unplug the power, network and level sensor cable. Then push the green handle and pull out the tray. Make sure to detach all external cables before pulling out the tray.



When the tray is out, first detach the internal connectors and then unlock the security hook.





When reinstalling the monitoring box, make sure to reattach the internal connectors by matching the label on the print (as highlighted on the picture above) with the label on the wires.

## 7.2. Update Firmware for RackCDU Monitoring System

Before you begin you will need to have a copy of the new firmware on a laptop computer and know the network address of the RackCDU monitoring system that you want to update. If you do not know the network address of the RackCDU Monitoring system you can discover it using Asetek's RackCDU TCPIP Discoverer software, see section 6.3 Determining the Network Address of a RackCDU Monitoring System.

Firmware updates may be accomplished from either Windows or Linux operating systems. Trivial File Transport Protocol TFTP is used to move the new firmware from the computer to the RackCDU. The commands used are different between Windows and Linux systems. Both command sets are below.

The DOS command "tftp" is used to transfer the new firmware into the monitoring system.

### 7.2.1. Work Steps when Updating Firmware from a Windows PC:

In the example used here the "WebAgent.Hex" file is saved in a folder named "c:\test" and the RackCDU Monitoring box has the network address 192.168.0.45.

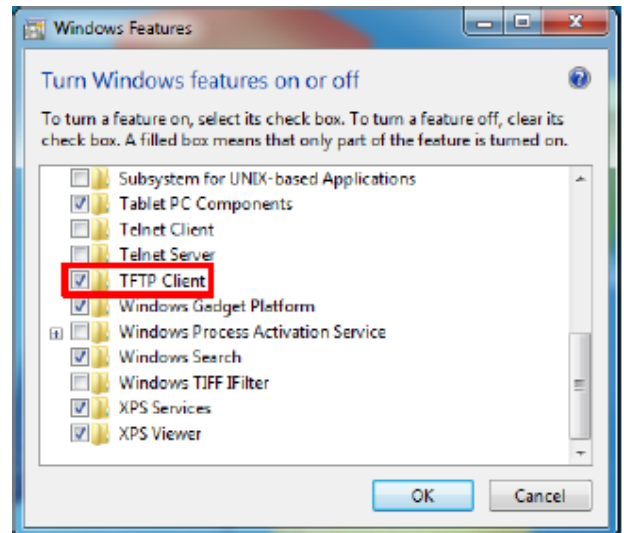
1. Save the file "WebAgent.hex" in a folder on a laptop.
2. Make sure that TFTP is enabled in Windows. Do this by opening the Control Panel and navigating to **Control Panel\Programs\Programs and Features** and selecting **Turn Windows features on or off**. In the left navigation menu make sure that **TFTP Client** is checked.
3. Connect the network port of this laptop to the network port of the RackCDU, or to the network to which the monitoring box is connected.
4. Open a Windows Command Prompt window.
5. Navigate to the **folder** where the file "WebAgent.hex" is saved using the "change directory" command "cd". In this example type:

```
cd..  
cd..  
cd test
```

6. Once in the directory containing the file called "WebAgent.hex", type the "tftp" command. In this example type:

```
tftp -i 192.168.0.45 put WebAgent.hex WebAgent.hex
```

7. After about 15 second the "Transfer successful" will appear.
8. Close the command prompt.
9. Confirm that the firmware has been updated by using a web browser to open the RackCDU monitoring page and checking the software revision on About screen





```
Administrator: Kommandoprompt
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. Alle rettigheder forbeholdes.
C:\WINDOWS\system32>cd..
C:\Windows>cd..
C:\>cd test
C:\test>dir
Volume in drive C is Windows
Volume Serial Number is 0CF0-DE94

Directory of C:\test

21/10/2013  12:50    <DIR>          .
21/10/2013  12:50    <DIR>          ..
21/10/2013  12:50               1,297,366 WebAgent.hex
                1 File(s)              1,297,366 bytes
                2 Dir(s)  149,025,402,880 bytes free

C:\test>tftp 192.168.0.45 put WebAgent.hex WebAgent.hex
Transfer successful: 1297366 bytes in 13 second(s), 99797 bytes/s
C:\test>
```

### 7.2.2. Work Steps when Updating Firmware Update a Linux Computer:

In the example used here the "WebAgent.Hex" file is saved in a folder named "c:\test" and the RackCDU Monitoring box has the network address 192.168.0.118.

1. Save the file "WebAgent.hex" in a folder on the Linux computer.
2. Connect the network port of this computer to the network port of the RackCDU, or to the network to which the monitoring box is connected.
3. From the Linux command line
4. Navigate to the **folder** where the file "WebAgent.hex" is saved using "change directory" commands.
5. From the directory where the "WebAgent.hex" file is stored type:

```
tftp  
connect 192.168.0.118  
binary  
put WebAgent.hex
```

6. Linux will respond with a message that tells you the number of bytes sent and the time spent sending them
7. Open the RackCDU web site and confirm that the firmware has been updated by looking at the software version number on the About tab.

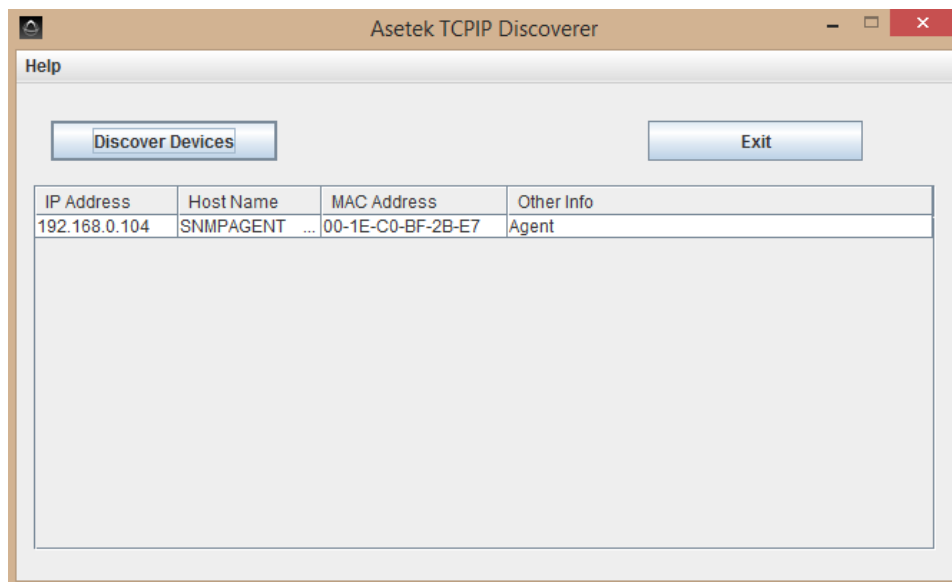
```
xfj@atl:~/Skrivebord > tftp  
tftp> ?  
Commands may be abbreviated.  Commands are:  
  
connect      connect to remote tftp  
mode         set file transfer mode  
put          send file  
get          receive file  
quit         exit tftp  
verbose      toggle verbose mode  
trace        toggle packet tracing  
status       show current status  
binary       set mode to octet  
ascii        set mode to netascii  
rexmt        set per-packet retransmission timeout  
timeout      set total retransmission timeout  
?            print help information  
tftp> connect 192.168.0.118  
tftp> binary  
tftp> put WebAgent.hex  
Sent 1043608 bytes in 18.4 seconds  
tftp> █
```

### 7.3. Determining the Network Address of a RackCDU Monitoring System

If the RackCDU Monitoring is getting its network address assigned to it by a DHCP server, the address assigned by the DHCP server can be discovered using Asetek TCPIP Discoverer software. Asetek TCPIP Discoverer is a Java application that can run on any PC with Java installed. This PC must be connected to the same network as the DHCP server and the RackCDU Monitoring System.

#### 7.3.1. Work Steps:

1. Connect a PC with Java and the TCPIP Software (TCPIP Discoverer.jar) on it to the network with the DHCP server and the RackCDU Monitoring system on it.
2. Open the program TCPIP Discover.jar from the desktop or at the Command line type:  
**java -jar TCPIP Discoverer.jar.**
3. Click the “Discover Devices” button to scan for connected RackCDU monitoring system.
4. The program will automatically find all the control boxes on the same subnet.

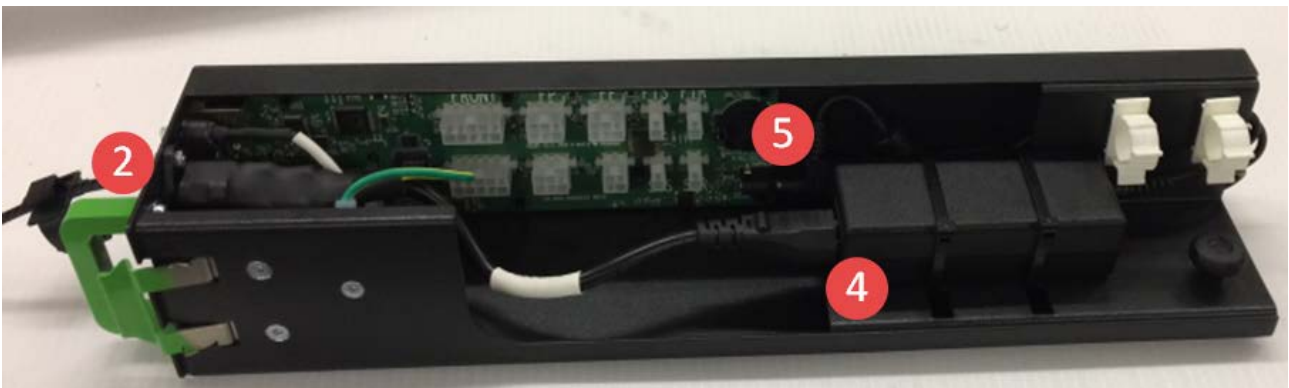


#### 7.4. Trouble Shooting the RackCDU Monitoring System

When the RackCDU monitoring system is functioning properly LED Indicator near AC Inlet should be illuminated in Green, and the web interface should be viewable by pointing a web browser at the network address of the monitoring box.

If the LED is off and the web page from the monitoring box does not display: begin by checking the power system for the RackCDU.

1. Check that the power cord for the monitoring box is fully plugged into a power strip and that the strip is on.
2. Check that the power cord is fully plugged into the socket near the network port.
3. Detatch the Monitoring system from Cabinet
4. Check that the cable from the power code to power supply and it is fully connected.
5. Check that the cable from the power supply to monitoring system and it is fully connected.

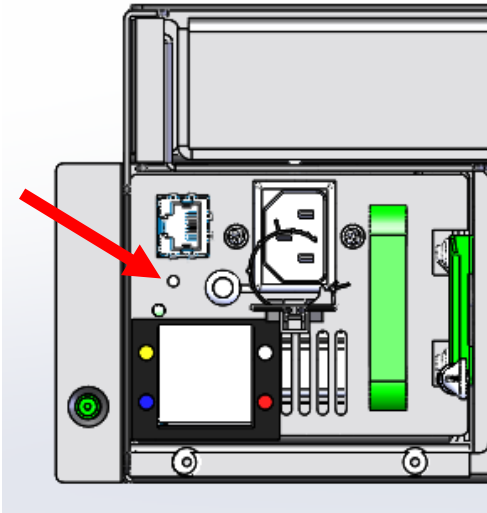


If the LED Light is on but the web page from the monitoring box does not display, begin by checking the network address of the monitoring system using TCPIP Discoverer. If you are unable to determine the network address by using the TCPIP Discoverer program it may be necessary to reset the monitoring box.

### 7.5. Resetting the Monitoring System

Press the button marked reset button for about 5 – 10 seconds. See picture below for location.

**WARNING:** This will reset all settings to factory default including the IP settings!



## 8. Coolant Distribution Manifolds (CDM)

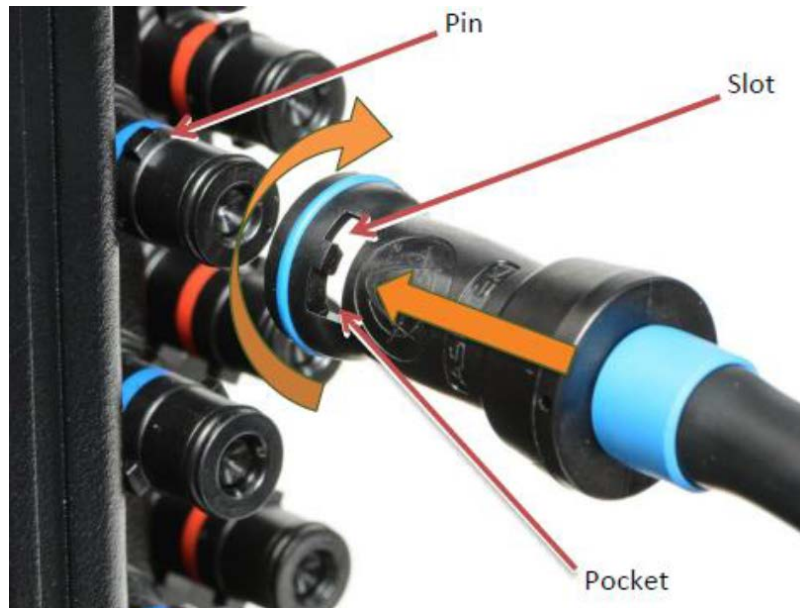
The CDMs is an individual part from the HEX cabinet, which is connected by flexible tubes named CDM tubes. Disconnecting CDM's will stop liquid flow to the server nodes connected to that individual CDM and therefor the server nodes must be powered off.

### 8.1. How to detach the CDM

In order to detach the CDM first dismount the two CDM tubes which are fixed to the HEX cabinet by pulling back the ring highlighted on the picture below and thereafter pull back the entire tube.



Then disconnect the server tubes by pushing it towards the CDM and twist it counterclockwise until it stops, then release the tube and it will be pushed off the CDM by the springs inside both components.



A locking mechanism for the CDM is located at the top of the CDM as shown by the green arrow on the below picture .

Detach the entire CDM from the rack by unscrewing the 2 screws in the locking mechanism with an 8mm wrench and then lift the CDM upwards 14mm to release the screws on the rear side of the CDM from the socket and then away from the rack, as shown by the orange arrows on the picture below. The CDM weighs approximately 10 kg.

