

Monitoring Software Manual

InRackCDU (4U-V2)

Oct. 2019



Level: Admin

Rack Name: rpi3

- [SENSORS](#)
- [SETTINGS](#)
- [NOTIFICATIONS](#)
- [SNMP](#)
- [NETWORK](#)
- [UNITS](#)
- [NTP](#)
- [SERVICE](#)
- [LICENSES](#)
- [ABOUT](#)

Over all status

Description	Status	Alarm
Status of rack	OK	●
Status of PSU A	OK	●
Status of PSU B	OK	●
Heat Load	27.9KW +/-7.9%	

Leak and level

Description	Status	Alarm
Server liquid level	OK	●
Server liquid tank	OK	●
Rack leak detection intern	OK	●

Liquid sensors

Description	Status	Value	Value-min	Value-max	Alarm
Facility water temperature SUPPLY	valid	28.5°C	12.0°C	40.0°C	●
Facility water temperature RETURN	valid	27.9°C	15.0°C	50.0°C	●
Server liquid temperature SUPPLY	valid	30.4°C	12.0°C	40.0°C	●
Server liquid temperature RETURN	valid	29.1°C	12.0°C	50.0°C	●
Server pressure	valid	2 mBar	0 mBar	300 mBar	●
Facility pressure	valid	4.6 Bar	0.0 Bar	8.0 Bar	●
Facility liquid flow	valid	2790.0 l/h	0.0 l/h	7000.0 l/h	●

Air sensor

Description	Status	Value	Alarm
Dew point temperature	valid	14.6°C	●
Cabinet temperature	valid	32.2°C	

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1. Introduction

The 4u InRackCDU Monitoring System allows direct monitoring of the below information:

- Status indication of rack
- Status indication of PSU's
- Facilities Liquid Temperature In and Out
- Facilities Liquid Flow Rate
- Facilities Liquid Pressure
- Server Liquid Temperature In and Out
- Server Liquid Pressure
- Server Liquid Level (OK / low)
- Reservoir presence
- Leak Detectors (OK / leak)
- Air temperature inside InRackCDU cabinet
- Calculate dew point
- Calculate Heat rejected to facilities liquid

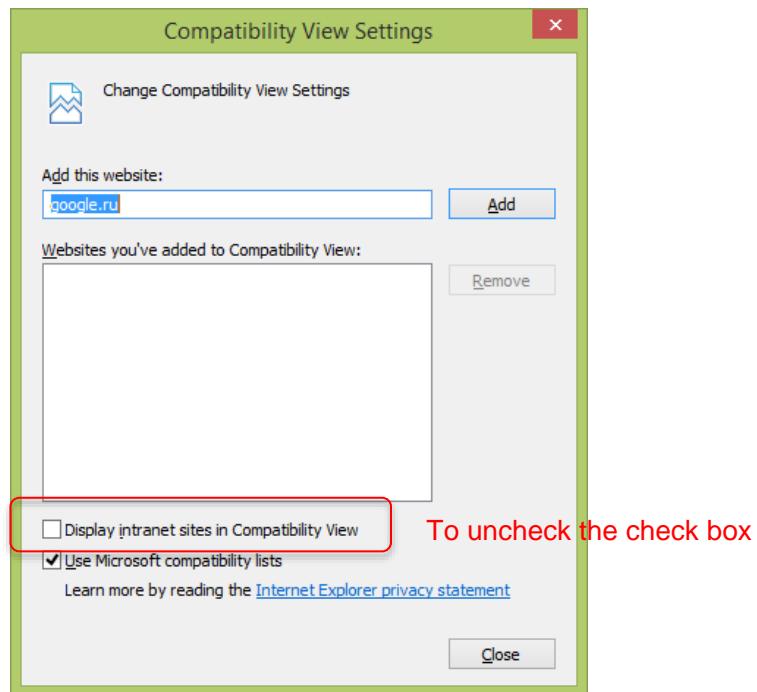
Automatization of this monitoring system can be achieved by a web or Small Network Management Protocol (SNMP). Additionally, for demo and smaller business clients, the monitoring and setup of this, can be achieved by a web interface.

2. Software Requirements Specification

The SW module contains the modules below:

- SNMP module – CLI interface for input/output, which can be automated.
- WEB module (HTML5, CSS3) – GUI for manual input/output.
- TCP/IPv4 and TCP/IPv6 – Transport layer for the other Ethernet modules.
- Measurement module – Sensor input.
- Ethernet bug fixing module – Software update.

Google Chrome is the recommended web browser for the monitoring system. Most other common web browsers can also be used with the exception of Internet Explore in Compatibility mode.



3. Updating Asetek RackCDU Monitoring Software

The firmware update is done in the “Application Update” section of the **SERVICE** page by following below steps:

1. Push “Choose File”
2. Select the FW file
3. Push “Update”

The screenshot shows the Asetek RackCDU Monitoring Software interface. The left sidebar has buttons for Sensors, Settings, Notifications, SNMP, Network, Units, NTP, Service (highlighted in orange), Licenses, and About. The main area has sections for Export/Import customer settings, Application Update, Set Password, GF Sensors, Reboot, and Factory Defaults. The Application Update section is circled with a red circle containing the number 1. Step 1 is "Choose File" which is currently empty. Step 3 is the "UPDATE" button which is also highlighted with a red circle.

Level: Admin Rack Name: cdu29e2bc

SENSORS SETTINGS NOTIFICATIONS SNMP NETWORK UNITS NTP SERVICE LICENSES ABOUT

Export/Import customer settings
cdu29e2bc-2019-09-09.t EXPORT
Choose File No file chosen IMPORT

Application Update
1 Choose File No file chosen 3 UPDATE

Set Password
Password: ***** ADMIN USER

GF SENSORS

FACILITY SUPPLY (cold)	994559620184100022	OK
FACILITY RETURN (hot)	991541220483800192	OK
SERVER SUPPLY (cold)	991541220483800155	OK
SERVER RETURN (hot)	991541220483800161	OK

SAVE

Reboot
Click to reboot the system REBOOT

Factory Defaults
Click to restore factory settings RESET

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After update, please make a reboot.

Check that SW has been updated in the **ABOUT** page by verifying that the software version number is correct.



Level: Admin

Rack Name: rpi3

- SENSORS**
- SETTINGS**
- NOTIFICATIONS**
- SNMP**
- NETWORK**
- UNITS**
- NTP**
- SERVICE**
- LICENSES**
- ABOUT**

<i>General Information</i>	
Rack Name	rpi3
Rack Description	RackCDU4Uv2
General Status	OK
ID Light	OFF
	Click for activate
<i>Build Information</i>	
Hardware Revision	255.255-25
Software version	1.3
Revision Date	10-July-2019
<i>Network Settings</i>	
IP addressing mode	DHCP
System IP	192.168.0.151
Gateway	192.168.0.1
Subnet Mask	255.255.255.0
Primary DNS	192.168.0.240
Secondary DNS	10.100.20.236
IPv6	fe80::ba27:ebff:fec9:1292/64
MAC Address	b8:27:eb:c9:12:92

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Customer settings in below pages are kept unchanged after a firmware update:

- **NOTIFICATION:** Notification and Alarm settings
- **SNMP:** SNMP settings and user credentials
- **NETWORK:** Network settings
- **UNITS:** Units settings
- **NTP:** NTP settings

See how to export and import customer setting in chapter 5 Export / Import user settings

4. Additional Information

4.1 Asetek TCP/IP Discovery Tool

Asetek TCPIP Discovery Tool is a small java application, used to detect RackCDU Monitoring Control Boxes on a local subnet by below steps:

- Open the TCPIP Discovery Tool TCPIP Discoverer.jar from the desktop or type **java -jar TCPIP Discoverer.jar** in a command prompt.
- Click on **Discover Devices** to scan for connected RackCDU Monitoring Control Boxes.
- Click on the name of the desired RackCDU Monitoring Control Box to access the monitoring website.

4.2 Reset Monitoring Control System to Factory Default:

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

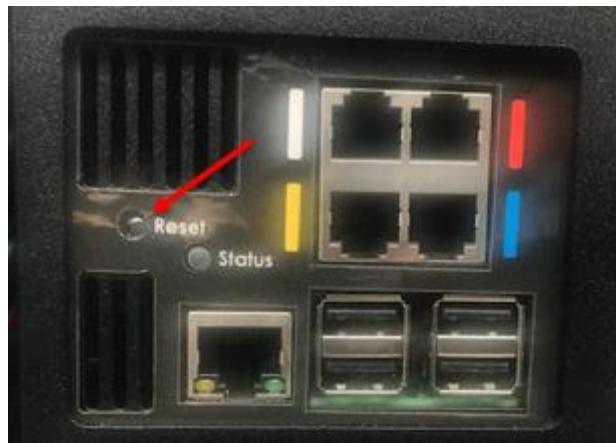
Reset to factory defaults can be made both from website and with a reset button at the rear side if the InRackCDU cabinet.

From website:

- Go to the **SERVICE** page and click on **RESET** button in the **FACTORY DEFAULTS** section.

From hardware:

The reset button is located on the rear side of the 4u InRackCDU.



- Press the reset button between 7 - 15sec to only reset the network to DHCP

- Press the reset button for more than 15sec to reset Passwords, RackName, description, hostname on network, and set network to DHCP.

Customer settings in below pages are kept unchanged after a system reset:

- **NOTIFICATION:** Notification and Alarm settings
- **SNMP:** SNMP settings and user credentials
- **UNITS:** Units settings
- **NTP:** NTP settings

See how to export and import customer setting in chapter 5 Export / Import user settings

4.3 Default IP settings

- Static IP address: 192.168.0.199 – will only be active, if no DHCP has been found.
- Subnet mask: 255.255.255.0
- DHCP: ON

4.4 Default User Credentials

- User – Allowed to view website but is not allowed to access and alter settings menus:
Username: User
Password: user
- Admin – Allowed to view website and to access settings menu to configure the RackCDU Control Monitoring System:
Username: Admin
Password: admin

NOTICE: For normal operation the user login should be used. This will allow reading only from the monitoring system. Admin account should only be used when writing rights are required to adjust settings.

5. Export / Import user settings

Customer settings from below pages can be exported and imported from **SERVICE** page:

- **NOTIFICATION:** Notification and Alarm settings
- **SNMP:** SNMP settings and user credentials
- **NETWORK:** Network settings
- **UNITS:** Units settings
- **NTP:** NTP settings

The screenshot shows the Asetek InRackCDU Monitoring Software interface. At the top, there is a logo for "ASETEK DATA CENTER LIQUID COOLING". Below the logo, the "Level: Admin" and "Rack Name: cdrc91292" are displayed. On the left side, there is a vertical navigation menu with the following items: SENSORS (dark grey), SETTINGS (dark grey), NOTIFICATIONS (orange), SNMP (orange), NETWORK (orange), UNITS (orange), NTP (orange), SERVICE (orange), LICENSES (dark grey), and ABOUT (dark grey). The main content area contains several sections:

- Export/Import customer settings**: A section with a file input field containing "cdrc91292-2019-03-28.t", a "Choose File" button, and "EXPORT" and "IMPORT" buttons.
- Application Update**: A section with a "Choose File" button, a "No file chosen" message, and an "UPDATE" button.
- Set Password**: A section where a password can be entered (represented by asterisks) and saved as "ADMIN" or "USER".
- GF SENSORS**: A section displaying sensor status for Facility Supply (cold), Facility Return (hot), Server Supply (cold), and Server Return (hot). All four entries show "OK" with green circular indicators and orange numerical IDs.
- Reboot**: A section with a "Click to reboot the system" link and a "REBOOT" button.
- Factory Defaults**: A section with a "Click to restore factory settings" link and a "RESET" button.

At the bottom of the main content area, there is a copyright notice: "Copyright © 2019 Asetek® All Rights Reserved".

6. Web page description

Following is a description of the different web pages of the InRackCDU monitoring system.

6.1 Web page – SENSORS

The screenshot shows the Asetek InRackCDU Sensors web interface. On the left is a vertical navigation menu with buttons for Sensors, Settings, Notifications, SNMP, Network, Units, NTP, Service, Licenses, and About. The main content area is divided into several sections:

- Overall status**: Shows the status of the rack, PSU A, PSU B, and Heat Load. The Heat Load is listed as 27.9KW +/-7.9%.
- Leak and level**: Shows the status of server liquid level, server liquid tank, and rack leak detection intern. All are OK.
- Liquid sensors**: A detailed table of facility and server liquid temperature, pressure, and flow measurements. Most values are valid, except for one facility pressure which is 4.6 Bar.
- Air sensor**: Shows the status of dew point and cabinet temperatures. Both are valid.

Each section includes a green circular icon with three dots representing an alarm status.

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This page gives an overview of all the measured values such as:

Overall status

- Status of rack: Overall status of rack. Should any sensors register deviations or irregularities the bullet will turn yellow or red.
- Status of PSU A: Status of PSU A (Place of PSU A, to refer Maintenance Manual)
- Status of PSU B: Status of PSU B (Place of PSU B, to refer Maintenance Manual)
- Heat Load: Calculated heat load based on flow and delta temperature of the facility liquid flow.

Leak and level

- Server liquid level: Indicate if liquid level is adequate or low in the coolant reservoir
- Server liquid tank: Indicator if liquid reservoir is installed or removed from 4u InRackCDU
- Rack leak detection intern: Indicator for liquid leak inside the 4u InRackCDU cabinet.
- Rack leak detection 1 and 2: Indicators for liquid leak detected by external leak sensors. Is included in overview when activated on **NOTIFICATIONS** page.

Liquid sensors

- Facility water temperature SUPPLY: Measure the liquid coming in from the facility line
- Facility water temperature RETURN: Measure the liquid going out to the facility line.
- Server liquid temperature SUPPLY: Measure the liquid going into the server coolers.
- Server liquid temperature RETURN: Measure the liquid going out of the server coolers.

Temperatures can be represented in either Celsius [°C] or Fahrenheit [°F]. This can be changed on the **UNITS** page.

- Server pressure: Measure pressure on the server side of 4u InRackCDU
- Facility pressure: Measure pressure on the facility return side of 4u InRackCDU

The Pressure can be represented in either BAR or PSI. This can be changed on the **UNITS** page.

- Facility liquid flow: Measure Facility liquid flow.

The Flow can be represented in either liter per hour [l/h] or in gallons per minute [GPM](US). This can be changed on the **UNITS** page

Air sensors

- Dew point temperature: Calculated dew point temperature
- Cabinet temperature: Air temperature inside 4u InRackCDU cabinet.

6.2 Web page settings – NOTIFICATIONS



Level: Admin

Rack Name: cdrc91292

SENSORS

SETTINGS

NOTIFICATIONS

SNMP

NETWORK

UNITS

NTP

SERVICE

LICENSES

ABOUT

SNMP Notifications

Description	Alarm/Trap
Send warning notifications	<input type="checkbox"/>
Send alarm notifications	<input type="checkbox"/>

Notification Settings

Description	Alarm/Trap	Attached
Alarm PSU A	<input type="checkbox"/>	
Alarm PSU B	<input type="checkbox"/>	
Alarm Sensor Facility Supply(in)	<input type="checkbox"/>	
Alarm Sensor Facility Return(out)	<input type="checkbox"/>	
Alarm Sensor Server Supply(out)	<input type="checkbox"/>	
Alarm Sensor Server Return(in)	<input type="checkbox"/>	
Liquid Level	<input type="checkbox"/>	
Liquid Tank Sense	<input type="checkbox"/>	
Leak Detection Internal	<input type="checkbox"/>	
Leak Detection Front	<input type="checkbox"/>	<input type="checkbox"/>
Leak Detection Rear	<input type="checkbox"/>	<input type="checkbox"/>
Dew point	<input type="checkbox"/>	

Sensor temperature value alarm settings

Description	Severity	Value minimum	Unit	Trap	Value maximum	Unit	Trap
Facility In Temperatur	Warning	10.0	C°	<input type="checkbox"/>	30.0	C°	<input type="checkbox"/>
Facility In Temperatur	Alarm	10.0	C°	<input type="checkbox"/>	35.0	C°	<input type="checkbox"/>
Facility Out Temperatur	Warning	10.0	C°	<input type="checkbox"/>	55.0	C°	<input type="checkbox"/>
Facility Out Temperatur	Alarm	10.0	C°	<input type="checkbox"/>	80.0	C°	<input type="checkbox"/>
Server In Temperatur	Warning	10.0	C°	<input type="checkbox"/>	40.0	C°	<input type="checkbox"/>
Server In Temperatur	Alarm	10.0	C°	<input type="checkbox"/>	45.0	C°	<input type="checkbox"/>
Server Out Temperatur	Warning	10.0	C°	<input type="checkbox"/>	80.0	C°	<input type="checkbox"/>
Server Out Temperatur	Alarm	10.0	C°	<input type="checkbox"/>	85.0	C°	<input type="checkbox"/>

Sensor Pressure value alarm settings

Description	Severity	Value minimum	Unit	Trap	Value maximum	Unit	Trap
Facility Pressure	Warning	0.0	Bar	<input type="checkbox"/>	5.0	Bar	<input type="checkbox"/>
Facility Pressure	Alarm	0.0	Bar	<input type="checkbox"/>	8.5	Bar	<input type="checkbox"/>
Server Pressure	Warning	0	mBar	<input type="checkbox"/>	200	mBar	<input type="checkbox"/>
Server Pressure	Alarm	0	mBar	<input type="checkbox"/>	300	mBar	<input type="checkbox"/>

Sensor Flow value alarm settings

Description	Severity	Value minimum	Unit	Trap	Value maximum	Unit	Trap
Facility Flow	Warning	0.0	l/h	<input type="checkbox"/>	5.0	l/h	<input type="checkbox"/>
Facility Flow	Alarm	0.0	l/h	<input type="checkbox"/>	20.0	l/h	<input type="checkbox"/>

SAVE **CANCEL**

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SNMP Notifications:

Asetek 4u InRackCDU Monitoring Software Manual

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- Send warnings/alarm notifications: Enables trap generation on the SNMP interface of respectively either warnings or alarms for the sensor thresholds on the bottom of the **NOTIFICATIONS** web page.

Notifications Settings: Enables the individual notifications.

Each sensor has a minimum and maximum limit for respectively warning Traps and alarm Traps. For each of these limits the sensor has an enable checkbox which will arm the given threshold. An exception is the leak and level which only have enable checkboxes. The leak and level are either on or off and therefore have no thresholds. External leak sensors must be enabled and can be individually armed.

Range of a warning must be smaller than the range of the alarm for any given sensor. The Table below shows the generated trap types, as output of the triggered events and the enabled traps.

Triggered Events					
Enabled Traps		No	warning	alarm	Both
	No	-	-	-	-
	Warning	-	Warning	Warning	Warning
	Alarm	-	-	Alarm	Alarm
	Both	-	Warning	Alarm	Alarm

Table – Trap output as function of triggered events and as function of enabled traps.

The thresholds for min and max warnings and alarms will be armed, when set and enabled by the checkbox. A total of 4 Traps can therefore be armed for each sensor (Lower Alarm, Lower Warning, Upper Warning, Upper Alarm). If the measured value is crossing the warning range and below the alarm threshold a warning trap is generated. If the measured value is crossing the alarm threshold an alarm Trap is generated. In **SENSORS** page, 3 values are shown. They are current measured value(**Value**), lower threshold value(**Value-mn**), and upper threshold value(**Value-max**). When the measured value is OK or in warning range, Value-min and Value-max shows warning thresholds, and when the measured value is in alarm range, Value-min and Value-max shows alarm thresholds.

6.3 Web page settings – SNMP



Level: Admin **Rack Name: cdu7e82dd**

SENSORS **SETTINGS** **NOTIFICATIONS** **SNMP** **NETWORK** **UNITS** **NTP** **SERVICE** **LICENSES** **ABOUT**

SNMP Settings for v1 & v2c

Read Community	public
Write Community	private
System Location	RackCDU4UV2
System Contact	ase@asetek.com

SNMP Trap settings v1 & v2c

Enable SNMP Traps:	<input type="checkbox"/>
Trap Community:	TrapComPhr
Trap Manager IP	192.168.0.140

SNMP Settings for v3

SNMPv3 RO User	AseRO
SNMPv3 RO Priv	authPriv
SNMPv3 RO Auth Phrase	ROSecretAuthPhr
SNMPv3 RO Auth Methode	MD5
SNMPv3 RO Priv Phrase	ROSecretPrivPhr
SNMPv3 RO Methode	DES
SNMPv3 RW User	AseRW
SNMPv3 RW Priv	authPriv
SNMPv3 RW Auth Phrase	RWSecretAuthPhr
SNMPv3 RW Auth Methode	MD5
SNMPv3 RW Priv Phrase	RWSecretAuthPhr
SNMPv3 RW Methode	DES

Download MIB

Download **RACKCDUV4_SMI_V2-MIB.MIB** **EXPORT**

SAVE **CANCEL**

SNMP Settings for v1 & v2c:

- Read Community: Community ID for read only users
- Write Community: Community ID for Read and Write able users
- System Location: Information field to identify host, used in traps for logical naming
- System Contact: In case, whom to email.

SNMP Trap settings for v1 & v2c

- Enable SNMP Trap
- Trap Community: Identity for sanity filtering
- Trap Manager IP: IP address of trap server

SNMP settings for v3

Settings for two user groups, one that only has reading rights (RO User), and another that can both read and write (RW User). All settings that may be read or altered are given according to the MIB-file.

- SNMPv3 RO User: User group or single users may be added here
- SNMPv3 RO Priv: Choose between privilege level AuthPriv, AuthNoPriv or noAuthnoPriv
- SNMPv3 RO Auth Phrase: Choose a common passphrase/password for authentication of read only user group members
- SNMPv3 RO Auth Methode: Choose between MD5 or SHA hashing method, to validate authentication phrase
- SNMPv3 RO Priv Phrase: Choose a passphrase for encryption
- SNMPv3 RO Priv Methode: Choose between DES or AES encryption
- SNMPv3 RW user: User group or single users may be added here
- SNMPv3 RW Priv: Choose between privilege level AuthPriv, AuthNoPriv or noAuthnoPriv
- SNMPv3 RW Auth Phrase: Choose a common passphrase/password for authentication of read-write user group members
- SNMPv3 RW Auth Methode: Choose between MD5 or SHA hashing method, to validate authentication phrase
- SNMPv3 RW Priv Phrase: Choose a passphrase for encryption
- SNMPv3 RW Priv Methode: Choose between DES or AES encryption

Download MIB

The latest MIB file can be downloaded to push “EXPORT” button.

Any given phrase and method are stored directly into the configuration file by clicking on SAVE-button, all changes may be canceled and are then not stored.

6.4 Web page settings – NETWORK

Level: Admin Rack Name: rpi3

SENSORS
SETTINGS
NOTIFICATIONS
SNMP
NETWORK
UNITS
NTP
SERVICE
LICENSES
ABOUT

Network Settings

System Name	rpi3
System Location	RackCDU4Uv2
DHCP	<input checked="" type="checkbox"/>
System IP	192.168.0.151
Gateway	192.168.0.1
Subnet mask	255.255.255.0
Primary DNS	192.168.0.240
Secondary DNS	10.100.20.236
IPv6(read-only)	fe80::ba27:ebff:fea9:1292/64

Expert REBOOT SAVE CANCEL

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System name: Should consist of only letters 'a'..'z', digits '0'..'9' and minimum 2 and less than 15 chars to identify the InRackCDU4Uv2. It is also the host name on the network, ex. from above "ping rpi3.local" would be responded from the InRackCDU, as so, it is important that each system has its own unique name pr. network, and not all network applications are case sensitive, so avoid distinguishing names based on the case of letters.

System Location: Simple string, can be set to any string including numbers to identify location of rack

DHCP: The DHCP checkbox, when checked, will enable to Dynamic Host Configuration Protocol which is a standardized network protocol used by servers on the IP network to allocate IP addresses to computers.

System IP: IP address of the RackCDU, in case of DHCP it is the current IP address, in case no DHCP it is a fixed ip address. In case of DHCP is chosen, and no DHCP is offering a valid IP address, the default 192.168.0.199 ip address are applied after 15seconds to the network interface, until either a fixed IP address is given or a DHCP has responded.

Gateway: IP gateway address of the network. The gateway is normally the router of the local TCP/IP network. Given from DHCP or fixed.

Subnet Mask: used as a filter or mask on the TCP/IP network. Given from DHCP or fixed.

Primary DNS: address of the Domain Name System on the network. It is used to translate user friendly names into IP addresses.

Secondary DNS: address of the Domain Name System on the network. Fallback in case primary DNS won't answer

IPv6 (read only): Current IPv6 address, in case IPv6 are being used, please choose "Expert", and the network configuration file is shown and can be altered. It follows standard **Linux SystemD-rules**.

In case things goes wrong: Use the reset procedure, press reset button for 7 seconds, but less than 15 seconds, will make DHCP default and make a system reboot. Or holding the reset button for more than 15 seconds will make factory default.

6.5 Web page settings – Units

The screenshot shows the Asetek InRackCDU Monitoring Software interface. At the top, there is a logo for "ASETEK DATA CENTER LIQUID COOLING". Below the logo, the text "Level: Admin" and "Rack Name: rpi3" are displayed. On the left side, there is a vertical navigation menu with the following items: SENSORS, SETTINGS, NOTIFICATIONS (highlighted in orange), SNMP, NETWORK, UNITS (highlighted in orange), NTP, SERVICE, LICENSES, and ABOUT. The main content area is titled "Unit Settings" and contains four dropdown menus: Temperature Unit (Celsius), Pressure Unit (bar), Flow Unit (l/h), and Fluid (DowCal35). At the bottom right of this section are "SAVE" and "CANCEL" buttons. At the very bottom of the page, the copyright notice "Copyright © 2019 Asetek® All Rights Reserved" is visible.

Temperature Unit: used to change the unit of the web page temperature output. The units can be either Celsius [°C] or Fahrenheit [°F].

Pressure Unit: used to change the unit of the web page pressure output. The units can be either bar or PSI.

Flow unit: used to change the unit of the web page Flow output. The units can be either liter per hour [l/h] or gallonsper minute [GPM] (US).

Fluid: used to select type of coolant on facility side which will impact heat capture calculation.

6.6 Web page – NTP

The screenshot shows the Asetek InRackCDU Monitoring Software interface. At the top, there is a logo for "ASETEK DATA CENTER LIQUID COOLING". Below the logo, the text "Level: Admin" and "Rack Name: rpi3" are displayed. On the left side, there is a vertical navigation menu with the following options: SENSORS, SETTINGS, NOTIFICATIONS, SNMP, NETWORK, UNITS, NTP (which is highlighted in orange), SERVICE, LICENSES, and ABOUT. The main content area is titled "NTP Settings". It contains two input fields: "Time zone" set to "Europe/Copenhagen" and "Local time" set to "2019-07-18 15:23:09". Below these fields is a code editor showing the contents of the ntp.conf file. The code in the ntp.conf file is as follows:

```
# With the default settings below, ntpd will only synchronize your
# clock.
#
# For details, see:
# - the ntp.conf man page
# - http://support.ntp.org/bin/view/Support/GettingStarted
# - https://wiki.archlinux.org/index.php/Network_Time_Protocol_daemon
#
# Associate to public NTP pool servers; see http://www.pool.ntp.org/
```

At the bottom right of the code editor are two buttons: "SAVE" and "CANCEL".

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NTP – (Network Time Protocol) is normally very special in server centers, which demands all possible settings to be selectable. This does not fit with simple GUI interface, as so the ntp-configuration file can be edited directly.

Time zone: Selection of time zone, and the format of the string, can be found at www.iana.org/time-zones/repository/tzdata-latest.tar.gz

Local Time: Is the current time

ntp.conf: There are many good places to find info, about syntax of ntp.conf, one example is https://wiki.archlinux.org/index.php/Network_Time_Protocol_daemon.

6.7 Web page – SERVICE

The screenshot shows the Asetek InRackCDU Monitoring Software interface. On the left, there's a vertical navigation bar with buttons for Sensors, Settings, Notifications, SNMP, Network, Units, NTP, Service, Licenses, and About. The 'Service' button is highlighted. The main content area has several sections: 'Export/Import customer settings' (with a file named 'cduc91292-2019-09-09.t' and buttons for Export and Import), 'Application Update' (with a 'Choose File' button and an 'UPDATE' button), 'Set Password' (with a password input field and 'ADMIN' and 'USER' buttons), 'GF SENSORS' (listing four sensors with their IDs and status as 'OK'), 'Reboot' (with a 'Click to reboot the system' link and a 'REBOOT' button), and 'Factory Defaults' (with a 'Click to restore factory settings' link and a 'RESET' button). At the bottom, it says 'Copyright © 2019 Asetek® All Rights Reserved'.

Export/Import customer settings: Click on Export and a file will be downloaded to the PC. Choose a file from PC and Click restore. This feature is intended to be used as back up, and it is dedicated to one CDU as naming etc. are stored in the file.

Application Update: In case Asetek has released a new firmware. Choose the firmware-file and click Update.

Set Password: Write the password and then choose Admin or User to set the password.

GF SENSORS: In case one or more sensors are to be replaced, the ID of each sensor has to be updated accordingly. The ID should match the ID on the sensor. These are only for Grundfos Sensor types.

Reboot: Click on REBOOT and after a few minutes, the system boots.

Factory Default: Click Reset to reset settings below pages settings:

- System Name: set to “cdu<6-last digits of the mac address>”
- System Description: is set to “RackCDU4Uv2”
- Network:
 - Set to DHCP-client, if a DHCP server is found
 - Ip address is set to 192.168.0.199/24 if no DHCP server is found.
- Hostname on network will default to RackName
- Passwords, Are reset to default as described in 4.4

System will be rebooted afterwards.

Customer settings in below pages are kept unchanged after a RESET:

- **NOTIFICATION:** Notification and Alarm settings
- **UNITS:** Units settings
- **NTP:** NTP settings
- **SERVICE:** Sensor information

See how to export and import customer setting in chapter 5 Export / Import user settings

6.8 Web page – LICENSES



Level: Admin Rack Name: cduc91292

Licenses

Asetek currently uses following licenses in this product:

Component name	Version	License
=		
c acl	2.2.52	GPLv2
Access Control Lists library		
c attr	2.4.47	GPLv2
Commands for Manipulating Filesystem Extended Attributes		
c avahi	0.7	GPLv2.1
Avahi is a system which facilitates service discovery on a local network via the mDNS/DNS-SD protocol suite.		
c bash	4.4	GPLv3
An sh-compatible command language interpreter		
c bzip2	1.0.6	BSD
Very high-quality data compression program		
c check	0.12.0	LGPLv2
A unit testing framework for C		
c coreutils	8.29	GPLv3
Basic file, shell and text manipulation utilities		
c db	6.2.23	GPLv3
Berkeley DB		
c dbus	1.12.8	AFL-2.1 GPLv2
Application message bus system		
c e2fsprogs	1.44.2	GPLv2
filesystem utilities for use with the ext2 filesystem		

[Agreements](#) [Disclaimer](#)

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The list of the open source licenses used in InrackCDU-4Uv2.

Each license can be found on the Agreements side.

6.9 Web page – ABOUT

The about page contains information about the HW and SW revision, network settings and sensor information. The purpose of this page is to give a quick overview of the most important output from the RackCDU.

The screenshot shows the Asetek Data Center Liquid Cooling web interface. On the left is a vertical navigation menu with buttons for Sensors, Settings, Notifications, SNMP, Network, Units, NTP, Service, Licenses, and About. The 'About' button is highlighted. At the top right, it says 'Rack Name: rpi3'. The main content area has three sections: 'General Information', 'Build Information', and 'Network Settings'. In 'General Information', the rack name is rpi3, description is RackCDU4Uv2, status is OK (green bullet), and ID light is OFF (blue dot). There is a link 'Click for activate'. In 'Build Information', hardware revision is 255.255-25, software version is 1.3, and revision date is 10-July-2019. In 'Network Settings', IP addressing mode is DHCP, system IP is 192.168.0.151, gateway is 192.168.0.1, subnet mask is 255.255.255.0, primary DNS is 192.168.0.240, secondary DNS is 10.100.20.236, IPv6 is fe80::ba27:ebff:fec9:1292/64, and MAC address is b8:27:eb:c9:12:92.

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General information:

- Rack Name:
- Rack Description:
- General status: Indicates the general system status. Should any sensors register deviations or irregularities the bullet will turn red.
- ID Light: When activated click on the bluish dot the rack LED status indicator(front and rear) will show a blue light pattern, this way, one particular rack will stand out from the rest.
- Build Information: Show Hardware and software revisions
- Network Settings: Show the current network settings

7. Troubleshooting guide

Alarm Indicator is normally Green color. When trouble, it changes to Yellow(warning) or to Red(Alarm)

Item	Possible causes	Solution
Over all status		
Description	Status	Alarm
Status of rack	OK	
Status of PSU A	OK	
Status of PSU B	OK	
Heat Load	3.9KW +/-9.8%	
Status of rack	One or more alarms on the rack	Find the alarming item and solve it
Status of PSU A/B	PSU not connected to power	Connect PSU to power
	PSU defective	Check the PSU status LED and replace PSU if off.
Leak and level		
Description	Status	Alarm
Server liquid level	OK	
Server liquid tank	OK	
Rack leak detection intern	OK	
Server liquid level	Reservoir needs refill of coolant	Refill reservoir with coolant
Server liquid tank	Reservoir tank not installed	Install reservoir tank.
Rack leak detection intern	Liquid leak in the InRackCDU cabinet.	<p>Checking if fluid is coming out of the drain hose as a verification of liquid leak inside the cabinet.</p> <p>Take lid of InRackCDU and inspect it for eventual leaks and replace the InRackCDU if leaks are confirmed</p>

Liquid sensors						
Description	Status	Value	Alarm-min	Alarm-max	Alarm	
Facility water temperature SUPPLY	valid	23.2°C	15.0°C	35.0°C		
Facility water temperature RETURN	valid	25.6°C	15.0°C	60.0°C		
Server liquid temperature SUPPLY	valid	27.3°C	15.0°C	45.0°C		
Server liquid temperature RETURN	valid	42.9°C	15.0°C	55.0°C		
Server pressure	valid	7 mBar	0 mBar	400 mBar		
Facility pressure	valid	2.3 Bar	0.5 Bar	8.5 Bar		
Facility liquid flow	valid	1512.5 l/h	400.0 l/h	7700.0 l/h		

Facility supply temp.	Temperature of facility water out of normal range.	Ensure temperature of facility water supplied to InRackCDU is within range.
Facility return temp.	Insufficient facility flow rate	Ensure all facility valves are open Check facility flow rate
Server supply temp.		
Server return temp.	Check temperature of liquid cooled components are within normal range.	
Server pressure	Low coolant level in reservoir	Refill reservoir with coolant
	InRackCDU not connected to ambient pressure.	Install ventilation tube on InRackCDU cabinet.
Facility pressure	Check facility valves are open.	Open all facility valves
	Check external facility pump	Ensure external facility pump is operational
Facility liquid flow	Check facility valves are open.	Open all facility valves
	Check external facility pump is operational	Ensure external facility pump is operational

Air sensor						
Description	Status	Value				
Dew point temperature	valid	13.6°C				
Cabinet temperature	valid	29.1°C				

Dew point temp	Server supply temperature below dew point causes risk of condensation on server coolers	Ensure server room temperature and relative humidity is within range. Ensure facility supply temperature is within range.
----------------	---	--

Others		
Not able to find InRackCDU on network		Use Asetek TCPIP Discovery Tool to detect InRackCDU Monitoring Control Boxes on the local subnet.

8. Using RackCDU SNMP Features

8.1 Introducing SNMP – Small Network Management Protocol

The **Small Network Management Protocol – SNMP** is a tool for management of devices connected to a computer network that includes managers (software) communicating with agents (software) installed on the managed devices. Managers are tasked with collecting information such as **status** and in some cases exercising **control** over devices. Agents are responsible for responding to manager requests, as well as sending unsolicited **traps** to managers that report on important device events. SNMP refers to the totality of this scheme as well as to the protocol itself (Walsh, 2008). The RackCDU is an **SNMP agent**.

8.2 Introducing MIB – Management Information Base

The **Management Information Base – MIB** is a file containing strict syntax (called the **Structure of Management Information – SMI**), which is a hierarchical (tree-structured) virtual data base description of objects to be managed. It serves as a contract of information that enable agents and managers to communicate. MIBs are defined as the first step in providing SNMP support – agents are then coded based on MIB content. Managers load or (compile) MIBs into their data base, and this shared knowledge is the basis of useful manager-agent communication.

For setting up the SNMP Manager, enabling it to retrieve and set information in the RackCDU SNMP-agent, a MIB-file is provided. For further information of supported MIB entries see the file (Asetek A/S, 2015).

8.3 SNMP Prerequisites

For accessing the SNMP Agent in the RackCDU, different tools can be used. A standardized SNMP CLI-tool exists on Windows and Linux platforms. Or dedicated standalone SNMP manager packages exist like **iReasoning MIB Browser** or **MG-SOFT MIB Browser**. Common for these tools, is they are able to set and get information in the SNMP agent.

8.4 SNMP CLI commands

The SNMP Command Line Interface **CLI** commands include **snmpwalk**, **snmpset** and **snmpget**.

The SNMP CLI in Linux will be explained in the following.

- **Snmpwalk** - retrieve a subtree of management values using SNMP GETNEXT requests.
- **Snmpget** - communicates with a network entity using SNMP GET requests.
- **Snmpset** - communicates with a network entity using SNMP SET requests.

In the following usage of these CLI-commands for interfacing the RackCDU SNMP Agent are explained.

8.5 Get general system information:

- Syntax: `snmpwalk -v 2c -c {community} {IP address} {OID}`
(e.g. `snmpwalk -v 2c -c public 192.168.0.197 1.3.6.1.2.1`) to get the SNMPv2-MIB system entries.

[Example – type in command prompt]

```
kfj@at1:~ > snmpwalk -v 2c -c public 192.168.0.197 1.3.6.1.2.1
RFC1213-MIB::sysDescr.0 = STRING: "Asetek RackCDU Monitoring System"
RFC1213-MIB::sysObjectID.0 = OID: ASETEK-RACKCDU-SMI-V1-MIB-V16::rackCDU
RFC1213-MIB::sysUpTime.0 = Timeticks: (70991622) 8 days, 5:11:56.22
RFC1213-MIB::sysContact.0 = STRING: "Administrator"
RFC1213-MIB::sysName.0 = STRING: "Asetek RackCDU"
RFC1213-MIB::sysLocation.0 = STRING: "Server Room"
RFC1213-MIB::sysServices.0 = INTEGER: 7
```

8.6 Get RackCDU Software revision information:

- Syntax: snmpwalk -v 2c -c {community} {IP address} {OID}
(e.g. snmpwalk -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.1)

[Example – type in command prompt]

```
kfj@at1:~ > snmpwalk -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.1
ASETEK-RACKCDU-SMI-V1-MIB-V16::name.0 = STRING: "Asetek RackCDU Monitoring Control
Box"
ASETEK-RACKCDU-SMI-V1-MIB-V16::version.0 = STRING: "$Revision: 1.26 $ "
ASETEK-RACKCDU-SMI-V1-MIB-V16::date.0 = STRING: "$Date: 2015/03/27 08:51:01 $"
ASETEK-RACKCDU-SMI-V1-MIB-V16::rackNumber.0 = STRING: "SNMPAGENT      "
ASETEK-RACKCDU-SMI-V1-MIB-V16::description.0 = STRING: "DEMO"
ASETEK-RACKCDU-SMI-V1-MIB-V16::status.0 = INTEGER: error(3)
```

8.7 Get RackCDU measurements:

- Syntax: snmpwalk -v 2c -c {community} {IP address} {OID}
(e.g. snmpwalk -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.3)

[Example – type in command prompt]

```
kfj@at1:~ > snmpwalk -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.3
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureFacilityIn.0 = INTEGER: 218
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureFacilityOut.0 = INTEGER: 251
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureServerIn.0 = INTEGER: 234
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureServerOut.0 = INTEGER: 272
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureAmbient.0 = INTEGER: 336
ASETEK-RACKCDU-SMI-V1-MIB-V16::pressureServer.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::pressureFacility.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::serverLeak.0 = Gauge32: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::serverLevel.0 = Gauge32: 2
ASETEK-RACKCDU-SMI-V1-MIB-V16::flowFacility.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::heatload.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::controllerOut.0 = Gauge32: 1000
```

Get specific value from the RackCDU measurements:

- Syntax: snmpget -v 2c -c {community} {IP address} {OID}
(e.g. snmpget -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.3.100.0)
NOTICE: Don't forget the index (instance sub identifier). SNMP is consistent in requiring an instance for all MIB objects - even scalar objects.

[Example – type in command prompt]

```
kfj@at1:~ > snmpget -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.3.100.0
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureFacilityIn.0 = INTEGER: 218
```

8.8 Setup RackCDU trap notifications:

- Syntax: snmpset -v 2c -c {community} {IP address} {OID} a {receiver IP address}
(e.g. snmpset -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.2.1.1.3.0 a 192.168.0.125) to set the IP address of the receiving host
- Syntax: snmpset -v 2c -c {community} {IP address} {OID} i {1 (disable) | 2 (enable)}
(snmpset -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.2.1.1.2.0 i 2) to enable transmission of the traps
- Syntax: snmpwalk -v 2c -c {community} {IP address} {OID}
(e.g. snmpwalk -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.2) to verify the current settings

[Example – type in the command prompt]

```
kfj@at1:~ > snmpwalk -v 2c -c public 192.168.0.197 1.3.6.1.4.1.39829.1.2
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverNumber.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverNumber.1 = INTEGER: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyEnabled.0 = INTEGER: no(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyEnabled.1 = INTEGER: no(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.0= IpAddress: 192.168.10.0
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.1= IpAddress: 192.168.10.0
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.0 = Hex-STRING: 00
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.1 = Hex-STRING: 00
```

9. Linux bash SNMP test script

A Linux bash script file called **snmp_test** is provided as a tool to set and get SNMP entries in the RackCDU ANMP Agent. For further information about included SNMP please see (Asetek A/S, 2015).

9.1 Using snmpwalk

The snmpwalk command will list the items for OID branches for the RackCDU, e.g.:

```
min@at1:~/snmp > snmpwalk -v 2c -c public 192.168.0.65 1.3.6.1.4.1.39829.1
```

This SNMP command will list the entire branch with all sub branches, of the SNMP capability.

9.2 Using snmpget

The snmpget command will get a desired RackCDU OID entry or leaf, e.g.:

```
min@at1:~/snmp > snmpget -c public -v 2c 192.168.0.65 1.3.6.1.4.1.39829.1.4.93.0  
ASETEK-RACKCDU-SMII-V1-MIB-V16::ipAddr.0 = ipAddress: 192.168.0.65
```

This SNMP command will get the RackCDU IP address.

9.3 Using snmpset

The snmpset command will set a desired RackCDU OID entry or leaf, e.g.:

```
min@at1:~/snmp > snmpset -c public -v 2c 192.168.0.65 1.3.6.1.4.1.39829.1.4.93.0 a 192.168.0.65  
ASETEK-RACKCDU-SMII-V1-MIB-V16::ipAddr.0.0 = ipAddress: 192.168.0.65
```

This SNMP command will set the RackCDU IP address.

To make the change take place a store to flash and a reboot must be performed. This will happen when executing the following snmpset command:

```
min@at1:~/snmp > snmpset -c public -v 2c 192.168.0.65 1.3.6.1.4.1.39829.1.4.99.0 i 2  
ASETEK-RACKCDU-SMII-V1-MIB-V16::ipReboot.0 = INTEGER: reboot(2)
```

The RackCDU will now store the configuration in flash and reboot. Reading the (OID - 1.3.6.1.4.1.39829.1.4.99.0) will now show a 2 indicating the box has been reset. This will indicate the reset operation was successful. This internal variable must be cleared manually after each snmp reset. Otherwise it will be stuck at 2. This means the following snmpget will be 2 if reset was successful and 1 if reset failed.

```
min@at1:~/snmp > snmpget -c public -v 2c 192.168.0.65 1.3.6.1.4.1.39829.1.4.99.0
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipReboot.0 = INTEGER: reboot(2)
```

To clear the **ipReboot** flag back to 1, execute the following snmpset command.

```
min@at1:~/snmp > snmpset -c public -v 2c 192.168.0.65 1.3.6.1.4.1.39829.1.4.99.0 i 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipReboot.0.0 = INTEGER: normal(1)
```

9.4 Preparing the script

Find the RackCDU IP address. This IP should be inserted in the script. In this case the IP is found to be 192.168.0.101, the IP can be found by using the **TCPIP Discoverer.jar**. Other variables can be set as desired or if needed. Those variables are **KEY**, **VER** and **ASETEK_OID**.

Valid settings for IP, KEY, VER & ASETEK OID

- IP - e.g. **192.168.0.101**, which is the IP on which the RackCDU is located.
- KEY - **public**, **private** or any user defined.
- VER - **2c**
- ASETEK_OID - **1.3.6.1.4.1.39829.1**, which is the MIB OID for this product.

```
#!/bin/bash
### snmp_test v1.26 - used to set and get entries in RackCDU

#set IP to ControlBox Address
IP=192.168.0.115

KEY=public
VER=2c
ASETEK_OID=1.3.6.1.4.1.39829.1
...
```


9.5 Calling the script

From a Linux terminal type and execute the following command, and the output will be:

```
kfj@KFJ-TESTPC:~$ ./snmp_test
ASETEK-RACKCDU-SMI-V1-MIB-V16::name.0 = STRING: "Control Box Test"
ASETEK-RACKCDU-SMII-V1-MIB-V16::version.0 = STRING: "$Revision: 1.26 $ "
ASETEK-RACKCDU-SMI-V1-MIB-V16::date.0 = STRING: "$Date: 2015/03/27 08:51:01 $"
ASETEK-RACKCDU-SMII-V1-MIB-V16::rackNumber.0 = STRING: "SnmpAgent"
ASETEK-RACKCDU-SMI-V1-MIB-V16::description.0 = STRING: "Demo Setup"
ASETEK-RACKCDU-SMI-V1-MIB-V16::status.0 = INTEGER: error(3)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverNumber.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverNumber.1 = INTEGER: 1
ASETEK-RACKCDU-SMII-V1-MIB-V16::notifyEnabled.0 = INTEGER: yes(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::notifyEnabled.1 = INTEGER: no(1)
ASETEK-RACKCDU-SMII-V1-MIB-V16::notifyReceiverIPAddress.0 = IpAddress: 192.168.0.212
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.1 = IpAddress: 192.168.0.212
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.0 = STRING: "tEsT0"
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.1 = STRING: "tEsT1"
ASETEK-RACKCDU-SMII-V1-MIB-V16::temperatureFacilityIn.0 = INTEGER: -750
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureFacilityOut.0 = INTEGER: -750
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureServerIn.0 = INTEGER: -750
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureServerOut.0 = INTEGER: -750
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureAmbient.0 = INTEGER: 338
ASETEK-RACKCDU-SMI-V1-MIB-V16::pressureServer.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::pressureFacility.0 = Gauge32: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::serverLeak.0 = Gauge32: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::serverLevel.0 = Gauge32: 2
ASETEK-RACKCDU-SMII-V1-MIB-V16::flowFacility.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::heatload.0 = Gauge32: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::controllerOut.0 = Gauge32: 1000
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipStoreFlash.0 = INTEGER: normal(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::modeOfOperation.0 = INTEGER: agent(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipAddr.0 = IpAddress: 192.168.0.101
ASETEK-RACKCDU-SMI-V1-MIB-V16::priDNS.0 = IpAddress: 10.100.20.235
ASETEK-RACKCDU-SMI-V1-MIB-V16::secDNS.0 = IpAddress: 10.100.20.235
ASETEK-RACKCDU-SMI-V1-MIB-V16::netMask.0 = IpAddress: 255.255.255.0
ASETEK-RACKCDU-SMI-V1-MIB-V16::gateway.0 = IpAddress: 192.168.0.1
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipSrc.0 = INTEGER: dhcp(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipReboot.0 = INTEGER: normal(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainProportional.0 = STRING: "0.128000"
ASETEK-RACKCDU-SMII-V1-MIB-V16::gainIntegral.0 = STRING: "0.051000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainDifferential.0 = STRING: "2.000000"
ASETEK-RACKCDU-SMII-V1-MIB-V16::deltaOutMax.0 = Gauge32: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::limitPwmMax.0 = Gauge32: 100
ASETEK-RACKCDU-SMI-V1-MIB-V16::limitPwmMin.0 = Gauge32: 35
```

```

ASETEK-RACKCDU-SMI-V1-MIB-V16::setpointFacilityOut.0 = INTEGER: 25
ASETEK-RACKCDU-SMI-V1-MIB-V16::controllerOutAlpha.0 = STRING: "0.250000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::fluidHeatCapacity.0 = Gauge32: 4180
ASETEK-RACKCDU-SMI-V1-MIB-V16::heatAverageFactor.0 = Gauge32: 60
ASETEK-RACKCDU-SMI-V1-MIB-V16::harnessVersion.0 = Gauge32: 2
ASETEK-RACKCDU-SMI-V1-MIB-V16::snmpTrapsAlarmEnable.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::snmpTrapsWarningEnable.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinFi.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableFi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxFi.0 = INTEGER: 50
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableFi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinFi.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableFi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxFi.0 = INTEGER: 55
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinFo.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableFo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxFo.0 = INTEGER: 55
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableFo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinFo.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableFo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxFo.0 = INTEGER: 60
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinSi.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableSi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxSi.0 = INTEGER: 45
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableSi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinSi.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableSi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxSi.0 = INTEGER: 50
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableSi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinSo.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxSo.0 = INTEGER: 55
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinSo.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxSo.0 = INTEGER: 60
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinFlow.0 = INTEGER: 41666
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxFlow.0 = INTEGER: 944444
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinFlow.0 = INTEGER: 20833
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableFlow.0 = INTEGER: enabled(2)

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ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxFlow.0 = INTEGER: 972222
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinPressureServer.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxPressureServer.0 = INTEGER: 100
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinPressureServer.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxPressureServer.0 = INTEGER: 300
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinPressureFacility.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxPressureFacility.0 = INTEGER: 3400
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinPressureFacility.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxPressureFacility.0 = INTEGER: 3500
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmEnableLeak.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmEnableLevel.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::name.0.0 = STRING: "Control Box Test"
ASETEK-RACKCDU-SMI-V1-MIB-V16::rackNumber.0.0 = STRING: "SnmpAgent"
ASETEK-RACKCDU-SMI-V1-MIB-V16::description.0.0 = STRING: "Demo Setup"
ASETEK-RACKCDU-SMI-V1-MIB-V16::name.0 = STRING: "Control Box Test"
ASETEK-RACKCDU-SMI-V1-MIB-V16::version.0 = STRING: "$Revision: 1.26 $"
ASETEK-RACKCDU-SMI-V1-MIB-V16::date.0 = STRING: "$Date: 2015/03/27 08:51:01 $"
ASETEK-RACKCDU-SMI-V1-MIB-V16::rackNumber.0 = STRING: "SnmpAgent"
ASETEK-RACKCDU-SMI-V1-MIB-V16::description.0 = STRING: "Demo Setup"
ASETEK-RACKCDU-SMI-V1-MIB-V16::status.0 = INTEGER: error(3)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyEnabled.0.0 = INTEGER: no(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyEnabled.1.0 = INTEGER: no(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.0.0 = IpAddress: 192.168.0.211
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.1.0 = IpAddress: 192.168.0.212
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.0.0 = STRING: "tEsT0"
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.1.0 = STRING: "tEsT1"
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverNumber.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverNumber.1.0 = INTEGER: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyEnabled.0 = INTEGER: no(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyEnabled.1.0 = INTEGER: no(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.0 = IpAddress: 192.168.0.211
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.1.0 = IpAddress: 192.168.0.212
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.0 = STRING: "tEsT0"
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.1.0 = STRING: "tEsT1"
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureFacilityIn.0 = INTEGER: -750
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureFacilityOut.0 = INTEGER: -750

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ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureServerIn.0 = INTEGER: -750
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureServerOut.0 = INTEGER: -750
ASETEK-RACKCDU-SMI-V1-MIB-V16::temperatureAmbient.0 = INTEGER: 338
ASETEK-RACKCDU-SMI-V1-MIB-V16::pressureServer.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::pressureFacility.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::serverLeak.0 = Gauge32: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::serverLevel.0 = Gauge32: 2
ASETEK-RACKCDU-SMI-V1-MIB-V16::flowFacility.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::heatload.0 = Gauge32: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::controllerOut.0 = Gauge32: 1000
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipStoreFlash.0.0 = INTEGER: normal(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::modeOfOperation.0.0 = INTEGER: agent(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipAddr.0.0 = IpAddress: 192.168.0.101
ASETEK-RACKCDU-SMI-V1-MIB-V16::priDNS.0.0 = IpAddress: 10.100.20.235
ASETEK-RACKCDU-SMI-V1-MIB-V16::secDNS.0.0 = IpAddress: 10.100.20.235
ASETEK-RACKCDU-SMI-V1-MIB-V16::netMask.0.0 = IpAddress: 255.255.255.0
ASETEK-RACKCDU-SMI-V1-MIB-V16::gateway.0.0 = IpAddress: 192.168.0.1
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipSrc.0.0 = INTEGER: dhcp(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipReboot.0.0 = INTEGER: normal(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipStoreFlash.0 = INTEGER: normal(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::modeOfOperation.0 = INTEGER: agent(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipAddr.0 = IpAddress: 192.168.0.101
ASETEK-RACKCDU-SMI-V1-MIB-V16::priDNS.0 = IpAddress: 10.100.20.235
ASETEK-RACKCDU-SMI-V1-MIB-V16::secDNS.0 = IpAddress: 10.100.20.235
ASETEK-RACKCDU-SMI-V1-MIB-V16::netMask.0 = IpAddress: 255.255.255.0
ASETEK-RACKCDU-SMI-V1-MIB-V16::gateway.0 = IpAddress: 192.168.0.1
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipSrc.0 = INTEGER: dhcp(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipReboot.0 = INTEGER: normal(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainProportional.0.0 = STRING: "0.128"
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainIntegral.0.0 = STRING: "0.051"
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainDifferential.0.0 = STRING: "2.000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::deltaOutMax.0.0 = Gauge32: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::limitPwmMax.0.0 = Gauge32: 100
ASETEK-RACKCDU-SMI-V1-MIB-V16::limitPwmMin.0.0 = Gauge32: 35
ASETEK-RACKCDU-SMI-V1-MIB-V16::setpointFacilityOut.0.0 = INTEGER: 25
ASETEK-RACKCDU-SMI-V1-MIB-V16::controllerOutAlpha.0.0 = STRING: "0.25"
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainProportional.0 = STRING: "0.128000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainIntegral.0 = STRING: "0.051000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainDifferential.0 = STRING: "2.000000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::deltaOutMax.0 = Gauge32: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::limitPwmMax.0 = Gauge32: 100
ASETEK-RACKCDU-SMI-V1-MIB-V16::limitPwmMin.0 = Gauge32: 35
ASETEK-RACKCDU-SMI-V1-MIB-V16::setpointFacilityOut.0 = INTEGER: 25
ASETEK-RACKCDU-SMI-V1-MIB-V16::controllerOutAlpha.0 = STRING: "0.250000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::fluidHeatCapacity.0.0 = Gauge32: 4180

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ASETEK-RACKCDU-SMI-V1-MIB-V16::heatAverageFactor.0.0 = Gauge32: 60
ASETEK-RACKCDU-SMI-V1-MIB-V16::harnessVersion.0.0 = Gauge32: 2
ASETEK-RACKCDU-SMI-V1-MIB-V16::fluidHeatCapacity.0 = Gauge32: 4180
ASETEK-RACKCDU-SMI-V1-MIB-V16::heatAverageFactor.0 = Gauge32: 60
ASETEK-RACKCDU-SMI-V1-MIB-V16::harnessVersion.0 = Gauge32: 2
ASETEK-RACKCDU-SMI-V1-MIB-V16::snmpTrapsAlarmEnable.0.0 = INTEGER: disabled(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::snmpTrapsWarningEnable.0.0 = INTEGER: disabled(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinFi.0.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableFi.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxFi.0.0 = INTEGER: 50
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableFi.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinFi.0.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableFi.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxFi.0.0 = INTEGER: 55
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFi.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinFo.0.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableFo.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxFo.0.0 = INTEGER: 55
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableFo.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinFo.0.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableFo.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxFo.0.0 = INTEGER: 60
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFo.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinSi.0.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableSi.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxSi.0.0 = INTEGER: 45
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableSi.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinSi.0.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableSi.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxSi.0.0 = INTEGER: 50
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableSi.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinSo.0.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableSo.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxSo.0.0 = INTEGER: 55
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableSo.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinSo.0.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableSo.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxSo.0.0 = INTEGER: 60
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableSo.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinFlow.0.0 = INTEGER: 41666
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableFlow.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxFlow.0.0 = INTEGER: 944444
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableFlow.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinFlow.0.0 = INTEGER: 20833
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableFlow.0.0 = INTEGER: enabled(2)
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Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxFlow.0.0 = INTEGER: 972222
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFlow.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinPressureServer.0.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinEnablePressureServer.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxPressureServer.0.0 = INTEGER: 100
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxEnablePressureServer.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinPressureServer.0.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinEnablePressureServer.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxPressureServer.0.0 = INTEGER: 300
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnablePressureServer.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinPressureFacility.0.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinEnablePressureFacility.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxPressureFacility.0.0 = INTEGER: 3400
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxEnablePressureFacility.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinPressureFacility.0.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinEnablePressureFacility.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxPressureFacility.0.0 = INTEGER: 3500
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnablePressureFacility.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmEnableLeak.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmEnableLevel.0.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::snmpTrapsAlarmEnable.0 = INTEGER: disabled(1)
Asetek-RACKCDU-SMI-V1-MIB-V16::snmpTrapsWarningEnable.0 = INTEGER: disabled(1)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinFi.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinEnableFi.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxFi.0 = INTEGER: 50
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableFi.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinFi.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableFi.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxFi.0 = INTEGER: 55
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFi.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinFo.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinEnableFo.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxFo.0 = INTEGER: 55
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableFo.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinFo.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableFo.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxFo.0 = INTEGER: 60
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFo.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinSi.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMinEnableSi.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxSi.0 = INTEGER: 45
Asetek-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableSi.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinSi.0 = INTEGER: 0
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableSi.0 = INTEGER: enabled(2)
Asetek-RACKCDU-SMI-V1-MIB-V16::alarmMaxSi.0 = INTEGER: 50
```

```

ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableSi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinSo.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxSo.0 = INTEGER: 55
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinSo.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxSo.0 = INTEGER: 60
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinFlow.0 = INTEGER: 41666
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxFlow.0 = INTEGER: 944444
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinFlow.0 = INTEGER: 20833
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxFlow.0 = INTEGER: 972222
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinPressureServer.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxPressureServer.0 = INTEGER: 100
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinPressureServer.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxPressureServer.0 = INTEGER: 300
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinPressureFacility.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxPressureFacility.0 = INTEGER: 3400
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinPressureFacility.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxPressureFacility.0 = INTEGER: 3500
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmEnableLeak.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmEnableLevel.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipStoreFlash.0.0 = INTEGER: normal(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::ipStoreFlash.0.0 = INTEGER: normal(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyEnabled.0.0 = INTEGER: yes(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.0.0 = ipAddress: 192.168.0.212
ASETEK-RACKCDU-SMI-V1-MIB-V16::snmpTrapsAlarmEnable.0.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::snmpTrapsWarningEnable.0.0 = INTEGER: enabled(2)

```

9.6 Snmp_test groups

The script is divided into a number of smaller groups which are described in the following sections. Each group is calling snmpset and then followed by snmpget, which will help to verify the set values are correct.

Product group

The **product group** contains the following 6 items, which can be found using the snmpwalk command:

```
kfj@KFJ-TESTPC:~$ snmpwalk -v 2c -c public 192.168.0.101 1.3.6.1.4.1.39829.1.1
ASETEK-RACKCDU-SMI-V1-MIB-V16::name.0 = STRING: "Control Box Test"
ASETEK-RACKCDU-SMII-V1-MIB-V16::version.0 = STRING: "$Revision: 1.26 $"
ASETEK-RACKCDU-SMI-V1-MIB-V16::date.0 = STRING: "$Date: 2015/03/27 08:51:01 $"
ASETEK-RACKCDU-SMII-V1-MIB-V16::rackNumber.0 = STRING: "SnmpAgent"
ASETEK-RACKCDU-SMI-V1-MIB-V16::description.0 = STRING: "Demo Setup"
ASETEK-RACKCDU-SMII-V1-MIB-V16::status.0 = INTEGER: error(3)
```

The following is a snip from the snmp_test script, which shows the product default setup:

```
...
#####
# product - 1
#####

### set

# Product name - string[]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.1.1.0 s "Asetek RackCDU Monitoring Control Box"

# Software version (RO): string[]
#snmpset -c $KEY -v $VER $IP $ASETEK_OID.1.2.0

# Software revision date (RO): string[]
#snmpset -c $KEY -v $VER $IP $ASETEK_OID.1.3.0

# RackCDU number: string[]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.1.4.0 s "SNMPAGENT"

# RackCDU description: string[]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.1.5.0 s "DEMO"

# RackCDU status: {1:OK, 2:WARNING, 3:ALARM, 5:UNKNOWN}
#snmpset -c $KEY -v $VER $IP $ASETEK_OID.1.6.0

### get
snmpget -c $KEY -v $VER $IP $ASETEK_OID.1.1.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.1.2.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.1.3.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.1.4.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.1.5.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.1.6.0
...
```

Setup group

The **setup group** contains the following 8 items, which can be found using the snmpwalk command:

```
kfj@KFJ-TESTPC:~$ snmpwalk -v 2c -c public 192.168.0.101 1.3.6.1.4.1.39829.1.2
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverNumber.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverNumber.1 = INTEGER: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyEnabled.0 = INTEGER: yes(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyEnabled.1 = INTEGER: no(1)
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.0 = IpAddress: 192.168.0.212
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyReceiverIPAddress.1 = IpAddress: 192.168.0.212
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.0 = STRING: "tEsT0"
ASETEK-RACKCDU-SMI-V1-MIB-V16::notifyCommunity.1 = STRING: "tEsT1"
```

The following is a snip from the snmp_test script, which shows the setup group default setup:

```
#####
# setup - 2
#####

### set

# (RO)
#snmpset -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.0 i 0

# (RO)
#snmpset -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.1 i 0

# Index of notification receiver - [0..1]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.2.0 i 1

# Indicates if this notify entry is enabled or not - [1..2]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.2.1 i 1

# Notification receiver IP address - i.e IP for destination PC
snmpset -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.3.0 a 192.168.10.0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.3.1 a 192.168.10.0

# Notification community to be used by agent to send trap
snmpset -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.4.0 s ""
snmpset -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.4.1 s ""

### get
snmpget -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.1.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.1.1
snmpget -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.2.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.2.1
snmpget -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.3.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.3.1
snmpget -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.4.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.2.1.1.4.1
...
...
```

Measurements group

The **Measurements group** contains the following 12 items, which can be found using the snmpwalk command:

```
kfj@KFJ-TESTPC:~$ snmpwalk -v 2c -c public 192.168.0.101 1.3.6.1.4.1.39829.1.3
ASETEK-RACKCDU-SMII-V1-MIB-V16::temperatureFacilityIn.0 = INTEGER: -750
ASETEK-RACKCDU-SMII-V1-MIB-V16::temperatureFacilityOut.0 = INTEGER: -750
ASETEK-RACKCDU-SMII-V1-MIB-V16::temperatureServerIn.0 = INTEGER: -750
ASETEK-RACKCDU-SMII-V1-MIB-V16::temperatureServerOut.0 = INTEGER: -750
ASETEK-RACKCDU-SMII-V1-MIB-V16::temperatureAmbient.0 = INTEGER: 335
ASETEK-RACKCDU-SMII-V1-MIB-V16::pressureServer.0 = Gauge32: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::pressureFacility.0 = Gauge32: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::serverLeak.0 = Gauge32: 1
ASETEK-RACKCDU-SMII-V1-MIB-V16::serverLevel.0 = Gauge32: 2
ASETEK-RACKCDU-SMII-V1-MIB-V16::flowFacility.0 = Gauge32: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::heatload.0 = Gauge32: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::controllerOut.0 = Gauge32: 1000
```

The following is a snip from the snmp_test script, which shows the measurements default setup:

```
...
#####
# measurements - 3
#####

# temperature Facility in: Fi - [°C]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.100.0

# temperature Facility out: Fo - [°C]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.101.0

# temperature Server in: Si - [°C]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.102.0

# temperature Server out: So - [°C]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.103.0

# obsolete
# temperature Ambient Ta - [°C]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.104.0

# pressure Server: Ps - Milli bar [mbar]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.105.0

# pressure Facility: Pf - Millibar [mbar]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.106.0

# leak Server: Leak - ok(1), leak(2)
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.107.0

# level Server: Level - ok(1), low(2)
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.108.0

# flow facility: flow - Milliliters per second [ml/s]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.109.0

# heatload: E - [Watt]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.110.0

# controller out: Out - [promille]
snmpget -c $KEY -v $VER $IP $ASETEK_OID.3.111.0
...
```

Network group

The **Network group** contains the following 9 items, which can be found using the snmpwalk command:

```
kfj@KFJ-TESTPC:~$ snmpwalk -v 2c -c public 192.168.0.101 1.3.6.1.4.1.39829.1.4
ASETEK-RACKCDU-SMII-V1-MIB-V16::ipStoreFlash.0 = INTEGER: normal(1)
ASETEK-RACKCDU-SMII-V1-MIB-V16::modeOfOperation.0 = INTEGER: agent(1)
ASETEK-RACKCDU-SMII-V1-MIB-V16::ipAddr.0 = IpAddress: 192.168.0.101
ASETEK-RACKCDU-SMII-V1-MIB-V16::priDNS.0 = IpAddress: 10.100.20.235
ASETEK-RACKCDU-SMII-V1-MIB-V16::secDNS.0 = IpAddress: 10.100.20.235
ASETEK-RACKCDU-SMII-V1-MIB-V16::netMask.0 = IpAddress: 255.255.255.0
ASETEK-RACKCDU-SMII-V1-MIB-V16::gateway.0 = IpAddress: 192.168.0.1
ASETEK-RACKCDU-SMII-V1-MIB-V16::ipSrc.0 = INTEGER: dhcp(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::ipReboot.0 = INTEGER: normal(1)
```

The **network group** has some configuration which needs to be set. They are explained in the following sections:

```
...
### network configuration
NW_STORE_FLASH=2 # 1 = nothing, 2 = store flash
NW_MODE_OF_OP=1 # 1 = agent, 2 = master
NW_IP=$IP      # set new IP here
NW_DHCP=2     # 1 = static ip, 2 = dhcp
NW_RESET=1    # 1 = do nothing, 2 = reset
```

NW_STORE_FLASH

The **NW_STORE_FLASH** variable can be either 1 or 2. 1 will reset it back to zero and do nothing more. 2 will initiate a store to FLASH.

The FLASH must be updated after any configuration changes of all the mentioned groups from product group to notifications group. The changes will be stored into FLASH when a 2 is set with snmpset command:

```
min@at1:~/snmp > snmpset -c public -v 2c 192.168.0.65 1.3.6.1.4.1.39829.1.4.91.0 u 1
SNMPv2-SMI::enterprises.39829.1.4.91.0.0 = Gauge32: 1
```

NW_MODE_OF_OP

The **NW_MODE_OF_OP** variable can be either 1 or 2. 1 will configure the Control Box as agent, which means it will monitor only one Server Rack. 2 will configure it as manager, which means it will

be able to find all agents on the sub-net. The manager is able to show information for all connected agents.

NW_IP

The **NW_IP** must be set to the IP address of which the Control Box is required to operate. The IP format is of type IPV4.

NW_DHCP

The **NW_DHCP** variable can be either 1 or 2. 1 will set the Control Box to use a static IP address. 2 will set the ControlBox to use dynamic IP address, which will then be set by the router in the network.

NW_RESET

The **NW_RESET** variable can be either 1 or 2. 1 means the snmp_test script will reset the internal bStoreFlash to 1. 2 means the snmp_test script will set the bStoreFlash to 2. When bStoreFlash is set to 2, the changed configuration is stored into FLASH, and the Control Box is reset.

The following is a snip from the snmp_test script, which shows the network default setup:

```
...
#####
# network      - 4
#####

### set

# the "real" command is moved to bottom of script as the flash must be saved in order to make any changes permanent
# Store settings to Flash - nothing(0), stored(1)
#snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.91.0 u $NW_STORE_FLASH
snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.91.0 u 1

# Mode of operation of ControlBox, can be agent or master - agent(1), master(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.92.0 u $NW_MODE_OF_OP

# IP address of ControlBox eg. 192.168.0.192
snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.93.0 a $NW_IP

# Primary DNS address of ControlBox - xxx.xxx.xxx.xxx
snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.94.0 a 10.100.20.235

# Secondary DNS address of ControlBox - xxx.xxx.xxx.xxx
snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.95.0 a 0.0.0.0
```

```

# netmask of ControlBox - 255.255.255.000
snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.96.0 a 255.255.255.0

# Gateway of ControlBox - xxx.xxx.xxx.xxx
snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.97.0 a 192.168.0.1

# IP address source of ControlBox, eg. static or dhcp - static(1), dhcp(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.98.0 u $NW_DHCP

# reboot - normal(1), reboot(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.4.99.0 u $NW_RESET

### get
snmpget -c $KEY -v $VER $IP $ASETEK_OID.4.91.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.4.92.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.4.93.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.4.94.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.4.95.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.4.96.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.4.97.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.4.98.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.4.99.0
...

```

Controller group

The **controller group** contains the following 8 items, which can be found using the snmpwalk command:

```

kfj@KFJ-TESTPC:~$ snmpwalk -v 2c -c public 192.168.0.101 1.3.6.1.4.1.39829.1.5
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainProportional.0 = STRING: "0.128000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainIntegral.0 = STRING: "0.051000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::gainDifferential.0 = STRING: "2.000000"
ASETEK-RACKCDU-SMI-V1-MIB-V16::deltaOutMax.0 = Gauge32: 1
ASETEK-RACKCDU-SMI-V1-MIB-V16::limitPwmMax.0 = Gauge32: 100
ASETEK-RACKCDU-SMI-V1-MIB-V16::limitPwmMin.0 = Gauge32: 35
ASETEK-RACKCDU-SMI-V1-MIB-V16::setpointFacilityOut.0 = INTEGER: 25
ASETEK-RACKCDU-SMI-V1-MIB-V16::controllerOutAlpha.0 = STRING: "0.250000"

```

The following is a snip from the snmp_test script, which shows the product default setup:

```
...
#####
# controller - 5
#####

### set

# Proportinal Gain - kp [-]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.80.0 s "0.128"

# Integral Gain - ki [-]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.81.0 s "0.051"

# differential Gain - kd [-]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.82.0 s "2.000"

# Max Controller Out Delta [%]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.83.0 u 1

# max pwm output of controller [%]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.84.0 u 100

# min pwm output of controller [%]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.85.0 u 35

# Setpoint for Facility Out Temperature [15 - 50] deg Celcius
snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.86.0 i 25

# Controller Out Alpha - used to filter the controller output [-]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.87.0 s "0.25"

#snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.87.0 i 60
#snmpset -c $KEY -v $VER $IP $ASETEK_OID.5.88.0 u 41

### get

snmpget -c $KEY -v $VER $IP $ASETEK_OID.5.80.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.5.81.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.5.82.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.5.83.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.5.84.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.5.85.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.5.86.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.5.87.0
```

```
#snmpget -c $KEY -v $VER $IP $ASETEK_OID.5.88.0
```

```
...
```

Controller PID settings

The purpose for the controller is to keep the Facility Out Temperature (Fo), at a given set point. The temperature controller uses a PID scheme. Which means a proportional (kp), an integral (ki) and a differential gain (kd) component, is needed by the controller. These gains must all be larger than or equal to zero. If the gain is set to zero, the particular component will have no influence on the output. Otherwise if the gain is large, the influence on the output is also large. The tree parts of the PID controller is used in a weighted sum, to adjust the controller output, making the error minimal. These values can be interpreted in terms of time: kp depends on the present error, ki on the accumulation of past errors, and kd is a prediction of future errors, based on current rate of change.

Controller Max Out Delta setting

The **Max Controller Out Delta** is set to limit the output in each iteration. This value can be in the range [0-100]. The current value is 1, which means the output of each iteration can't exceed the value of one. This limit is set to stabilize the system, as the output should be in the same range as the speed of the valve or a bit below.

Controller Max PWM Output

The **max pwm output of controller** is set to help linearize the flow valve characteristics. When the output is slowly increased it can be seen when the flow stops rising. The output when this happens should be set as the “max pwm output of controller”. Above this point the output will have no effect on the flow.

Controller Min PWM Output

The **min pwm output of controller** is set to help linearize the flow valve characteristics. When the output is slowly decreased it can be found when the flow stops entirely. The point where this happens should be set as the “min pwm output of controller”. Below this point the output will have no effect on the flow, as the flow will be zero. It is okay to set this value a bit lower, as the controller will auto adjust the output to avoid flow is completely cut off. Setting this value too low will make this auto adjust take longer time until it finds the set point for the min flow. **If using a positive displacement pump the flow should always be larger than zero.**

Units group

The **units group** contains the following 3 items, which can be found using the snmpwalk command:

```
kfj@KFJ-TESTPC:~$ snmpwalk -v 2c -c public 192.168.0.101 1.3.6.1.4.1.39829.1.6
ASETEK-RACKCDU-SMI-V1-MIB-V16::fluidHeatCapacity.0 = Gauge32: 4180
ASETEK-RACKCDU-SMI-V1-MIB-V16::heatAverageFactor.0 = Gauge32: 60
ASETEK-RACKCDU-SMI-V1-MIB-V16::harnessVersion.0 = Gauge32: 2
```

The following is a snip from the snmp_test script, which shows the **units group** default setup:

```
...
#####
# units      - 6
#####

### set
# Specific Heat Capacity Cp [ J/Kg*K ]
snmpset -c $KEY -v $VER -I r $IP $ASETEK_OID.6.70.0 u 4180

# Heat load is averaged over HeatAverageFactor seconds [sec]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.6.71.0 u 600

# Harness Version of the physical harness, defines which sensores are mounted
snmpset -c $KEY -v $VER $IP $ASETEK_OID.6.72.0 u 2

### get
snmpget -c $KEY -v $VER $IP $ASETEK_OID.6.70.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.6.71.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.6.72.0
...
```

Notifications group

The **notifications group** contains the following 62 items, which can be found using the snmpwalk command:

```
kfj@KFJ-TESTPC:~$ snmpwalk -v 2c -c public 192.168.0.101 1.3.6.1.4.1.39829.1.7
ASETEK-RACKCDU-SMII-V1-MIB-V16::snmpTrapsAlarmEnable.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::snmpTrapsWarningEnable.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinFi.0 = INTEGER: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinEnableFi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxFi.0 = INTEGER: 50
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxEnableFi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinFi.0 = INTEGER: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinEnableFi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMaxFi.0 = INTEGER: 55
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMaxEnableFi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinFo.0 = INTEGER: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinEnableFo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxFo.0 = INTEGER: 55
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxEnableFo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinFo.0 = INTEGER: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinEnableFo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMaxFo.0 = INTEGER: 60
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMaxEnableFo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinSi.0 = INTEGER: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinEnableSi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxSi.0 = INTEGER: 45
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxEnableSi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinSi.0 = INTEGER: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinEnableSi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMaxSi.0 = INTEGER: 50
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMaxEnableSi.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinSo.0 = INTEGER: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxSo.0 = INTEGER: 55
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinSo.0 = INTEGER: 0
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMaxSo.0 = INTEGER: 60
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMaxEnableSo.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinFlow.0 = INTEGER: 41666
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMinEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxFlow.0 = INTEGER: 944444
ASETEK-RACKCDU-SMII-V1-MIB-V16::warningMaxEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinFlow.0 = INTEGER: 20833
ASETEK-RACKCDU-SMII-V1-MIB-V16::alarmMinEnableFlow.0 = INTEGER: enabled(2)
```

```
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxFlow.0 = INTEGER: 972222
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnableFlow.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinPressureServer.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxPressureServer.0 = INTEGER: 100
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinPressureServer.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxPressureServer.0 = INTEGER: 300
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnablePressureServer.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinPressureFacility.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMinEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxPressureFacility.0 = INTEGER: 3400
ASETEK-RACKCDU-SMI-V1-MIB-V16::warningMaxEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinPressureFacility.0 = INTEGER: 0
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMinEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxPressureFacility.0 = INTEGER: 3500
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmMaxEnablePressureFacility.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmEnableLeak.0 = INTEGER: enabled(2)
ASETEK-RACKCDU-SMI-V1-MIB-V16::alarmEnableLevel.0 = INTEGER: enabled(2)
```

The following is a snip from the snmp_test script, which shows the **notifications group** default setup:

```
...
#####
# notifications - 7
#####

### set

# snmp

# snmpTrapsAlarmEnable - disabled(1), enabled(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.150.0 i 1

# snmpTrapsWarningEnable - disabled(1), enabled(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.151.0 i 1

# Fi

# Set FacilityIn Min Warning level - Degree Celsius [°C]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.154.0 i 0

# enable FacilityIn Min Warning level - disabled(1), enabled(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.155.0 i 2

# Set FacilityIn Max Warning level - Degree Celsius [°C]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.156.0 i 50

# enable FacilityIn Max Warning level - disabled(1), enabled(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.157.0 i 2

# Set FacilityIn Min Alarm level - Degree Celsius [°C]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.158.0 i 0

# enable FacilityIn Min Alarm level - disabled(1), enabled(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.159.0 i 2

# Set FacilityIn Max Alarm level - Degree Celsius [°C]
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.160.0 i 55

# enable FacilityIn Max Alarm level - disabled(1), enabled(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.161.0 i 2

# Fo
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.162.0 i 0
```

```

snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.163.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.164.0 i 55
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.165.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.166.0 i 0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.167.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.168.0 i 60
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.169.0 i 2

# Si
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.170.0 i 0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.171.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.172.0 i 45
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.173.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.174.0 i 0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.175.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.176.0 i 50
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.177.0 i 2

# So
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.178.0 i 0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.179.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.180.0 i 55
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.181.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.182.0 i 0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.183.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.184.0 i 60
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.185.0 i 2

# Flow
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.186.0 i 41666
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.187.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.188.0 i 944444
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.189.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.190.0 i 20833
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.191.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.192.0 i 972222
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.193.0 i 2

# Pressure Server
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.194.0 i 0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.195.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.196.0 i 100
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.197.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.198.0 i 0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.199.0 i 2

```

```

snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.200.0 i 300
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.201.0 i 2

# Pressure Facility
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.202.0 i 0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.203.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.204.0 i 3400
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.205.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.206.0 i 0
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.207.0 i 2
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.208.0 i 3500
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.209.0 i 2

# leak
# enable leak detection - disabled(1), enabled(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.210.0 i 2

# level
# enable low liquid level detection - disabled(1), enabled(2)
snmpset -c $KEY -v $VER $IP $ASETEK_OID.7.211.0 i 2

### get

# snmp
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.152.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.153.0

# Fi
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.154.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.155.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.156.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.157.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.158.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.159.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.160.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.161.0

# Fo
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.162.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.163.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.164.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.165.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.166.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.167.0

```

```
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.168.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.169.0
```

Si

```
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.170.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.171.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.172.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.173.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.174.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.175.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.176.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.177.0
```

So

```
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.178.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.179.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.180.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.181.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.182.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.183.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.184.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.185.0
```

Flow

```
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.186.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.187.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.188.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.189.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.190.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.191.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.192.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.193.0
```

Pressure Server

```
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.194.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.195.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.196.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.197.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.198.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.199.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.200.0  
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.201.0
```

Pressure Facility

```
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.202.0
```

```

snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.203.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.204.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.205.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.206.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.207.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.208.0
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.209.0

# leak
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.210.0

# level
snmpget -c $KEY -v $VER $IP $ASETEK_OID.7.211.0
...

```

There are two enable flags for SNMP traps, one for warnings (snmpTrapsWarningEnable) and one for Alarms (snmpTrapsAlarmEnable). These flags are used to either disable or enable the SNMP trap functionality. Where zero (1) means disabled and one (2) means enabled.

There is a total of 9 sensors. The sensors are 4 Temperature sensors Facility Out (Fo), Facility In (Fi), Server Out (So), Server In (Si). The liquid flow sensor is 1 Facility Flow (Flow). The 2 pressure sensors are Server Pressure (PressureServer) and Facility pressure (PressureFacilty). And last the 2 leak (leak) and level (level) sensors.

10. Appendix. SNMP Trap

Specific: 504 **1. Specific ID**

Message reception date: 24-Sep-19
 Message reception time: 16:33:44,833
 Time stamp: 0 days 00h:26m:19s.50th (157950)
 Message type: Trap (v1)
 Protocol version: SNMPv1
 Transport: IP/UDP

Agent
 Address: 192.168.0.114
 Port: 35496

Manager
 Address: 192.168.0.140
 Port: 162

Community: TrapComPhr
 SNMPv1 agent address: 192.168.0.114
 Enterprise: rackCDU
2. Alarm point
 Bindings (3)
 Binding #1: temperatureFacilityIn.0 *** (Integer32) 300
 Binding #2: eventDescription.0 *** (DisplayString) Apply auxiliary cooling to RackCDU or reduce server work loads [41,70]
 Binding #3: rackNumber.0 *** (DisplayString) cduc91292 [63,64,75,63,39,31,32,39,32 (hex)]

3. Event info.

SNMP Trap Sample

Trap List (Warning)

W./A.	1. Sp. ID	2. Alarm Point.	Trap type	Limit	3. Event Info.	Active Action
Warning	504	Temperature Facility In	Facility supply temperature warning	Min.	Raise facility liquid supply temperature	Facility temperature too low
				Max.	Apply auxiliary cooling to RackCDU or reduce server work loads.	Facility temperature too high
	505	Temperature Facility Out	Facility return temperature warning	Min.	Decrease facility flow	Facility temperature too low
				Max.	Increase facility flow	Facility temperature too high
	506	Temperature Server In	Server supply temperature warning	Min.	Decrease facility flow	Server temperature too low
				Max.	Increase facility flow	Server temperature too high
	507	Temperature Server Out	Server return temperature warning	Min.	Throttle up server workloads	Server temperature too low
				Max.	Throttle down server workloads	Server temperature too high
	508	Pressure Facility	Facility pressure warning	Min.	Check facility pump health	Facility pressure too low
				Max.	Throttle down facility pumps and check for blockage at other locations	Facility pressure too high
	509	Pressure Server	Server pressure warning	Min.	Start some nodes	Server pressure too low
				Max.	Open reservoir seal to allow venting	Server pressure too high
	510	Flow Facility	Facility flow warning	Min.	Increase facility flow	Facility flow too low
				Max.	Decrease facility flow	Facility flow too high

Trap List(Alarm)

W./A.	1. Sp. ID	2. Alarm Point.	Trap type	Limit	3. Event Info.	Active Action
Alarm	517	Temperature Facility In	Facility supply temperature Alarm	Min.	Raise facility liquid supply temperature	Facility temperature too low
				Max.	Apply auxiliary cooling to RackCDU or reduce server work loads.	Facility temperature too high
	518	Temperature Facility Out	Facility return temperature Alarm	Min.	Decrease facility flow	Facility temperature too low
				Max.	Increase facility flow	Facility temperature too high
	519	Temperature Server In	Server supply temperature Alarm	Min.	Decrease facility flow	Server temperature too low
				Max.	Increase facility flow	Server temperature too high
	520	Temperature Server Out	Server return temperature Alarm	Min.	Throttle up server workloads	Server temperature too low
				Max.	Throttle down server workloads	Server temperature too high
	521	Pressure Facility	Facility pressure Alarm	Min.	Check facility pump health	Facility pressure too low
				Max.	Throttle down facility pumps and check for blockage at other locations	Facility pressure too high
	522	Pressure Server	Server pressure warning	Min.	Start some nodes	Server pressure too low
				Max.	Open reservoir seal to allow venting	Server pressure too high
	523	Leak	Alarm Leak	-	Shut down servers and power of PDUs	Shutdown servers and CDU
	524	Level	Tank, liquid level low	-	Refill RackCDU resoir	Refill RackCDU resoir
	525	Flow Facility	Facility flow alarm	Min.	Increase facility flow	Facility flow too low
				Max.	Decrease facility flow	Facility flow too high
	526	Leak Front	Front leak detection alarm	-	Shut down servers and power of PDUs	Shutdown servers and CDU
	527	Leak Rear	Rear leak detection alarm	-	Shut down servers and power of PDUs	Shutdown servers and CDU
	528	Sense Tank	Sense tank detection alarm	-	Shut down servers and power of PDUs	Facility temperature too low
	529	Dew	Dew point detection alarm	-	Shut down servers and power of PDUs	Facility temperature too high
	530	PSU A	Powersupply A detection alarm	-	Replace faulty PSU A	Facility temperature too low
	531	PSU B	Powersupply B dection alarm	-	Replace faulty PSU B	Facility temperature too high