Part 5 Hardware Software

Mini-curso Lidar Ceilometer

Henrique M. J. Barbosa
Instituto de Física – USP
hbarbosa@if.usp.br
http://www.fap.if.usp.br/~hbarbosa

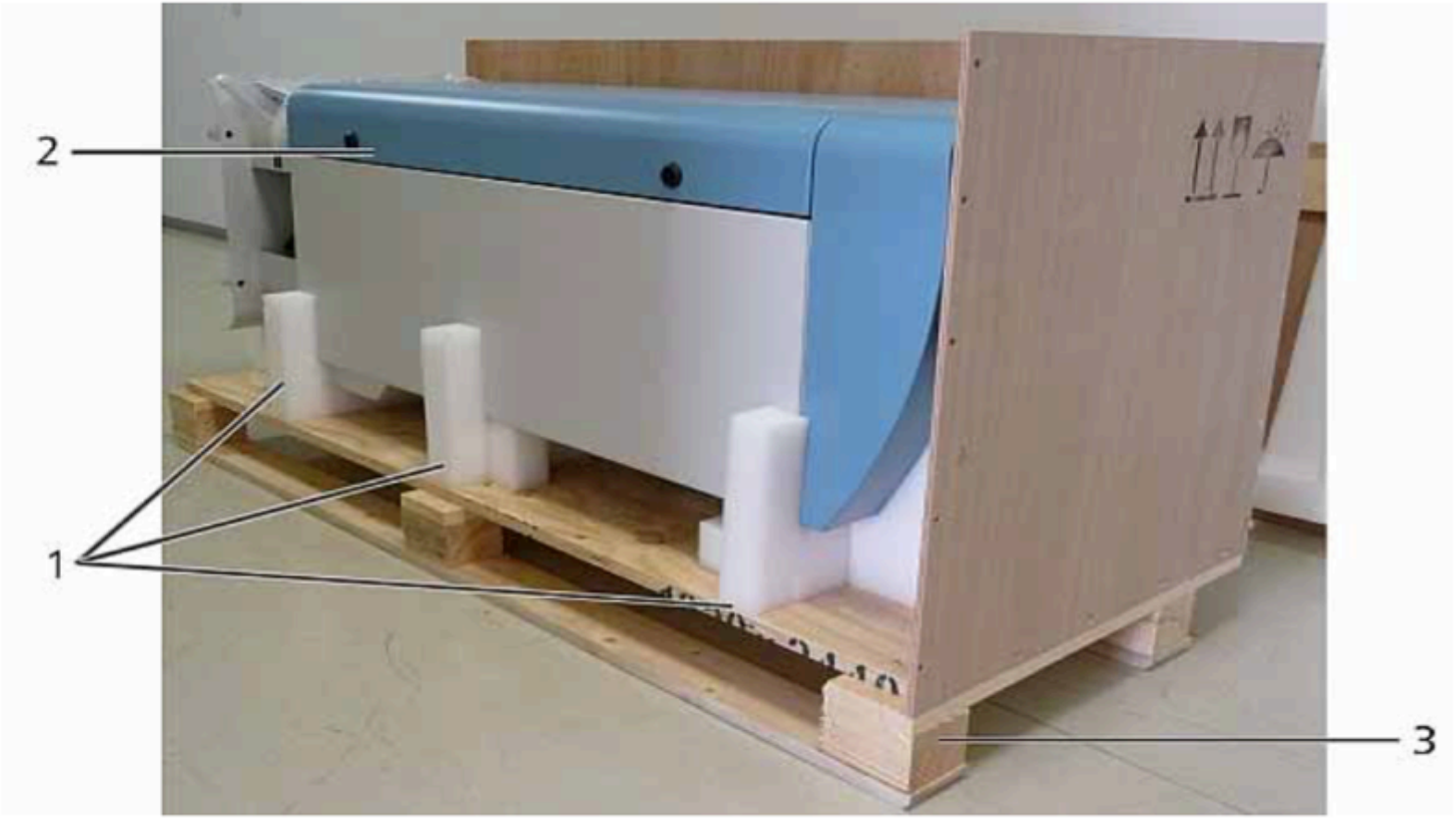
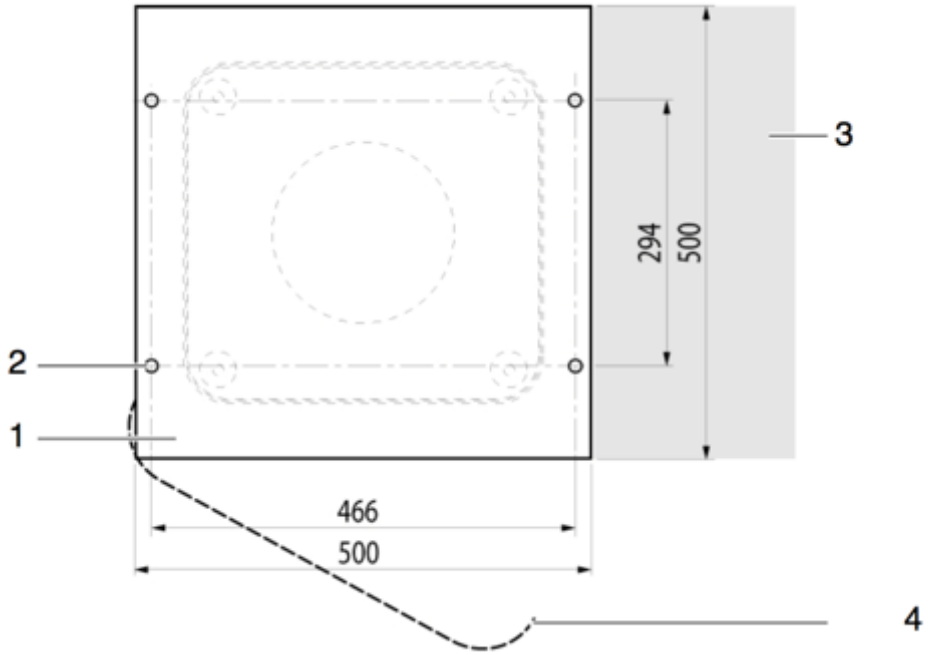


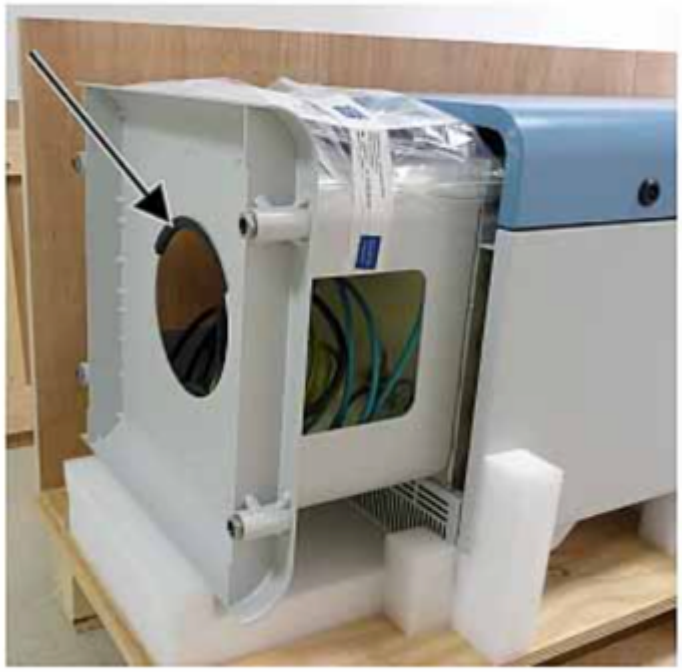
Fig. 6: The CHM 15k with styrofoam packing pads

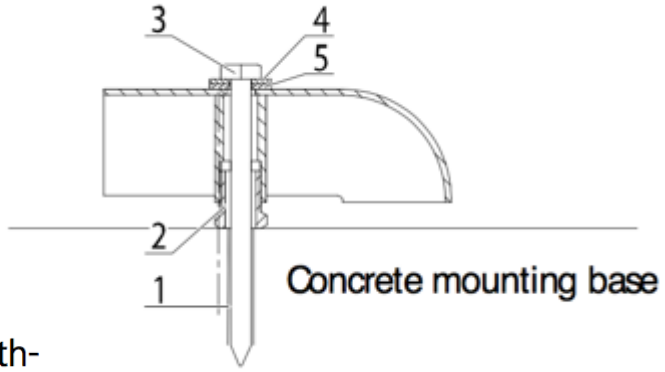
1 Styrofoam packing pads

2 CHM 15k

3 Pallet

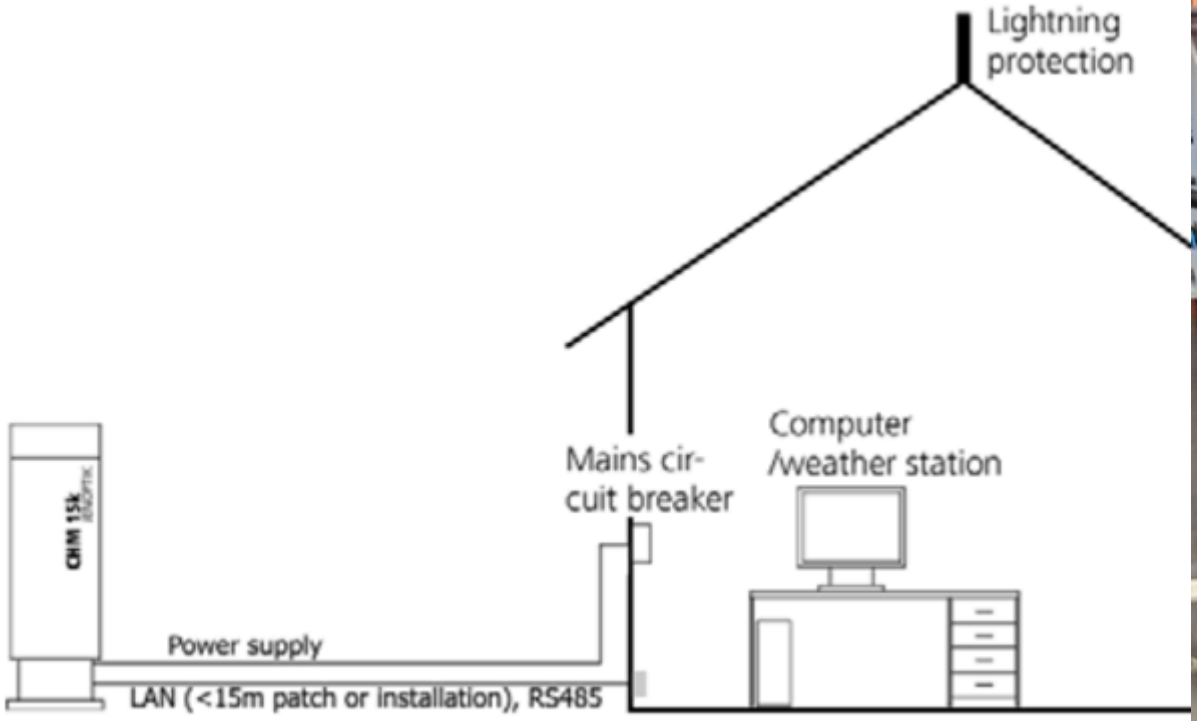




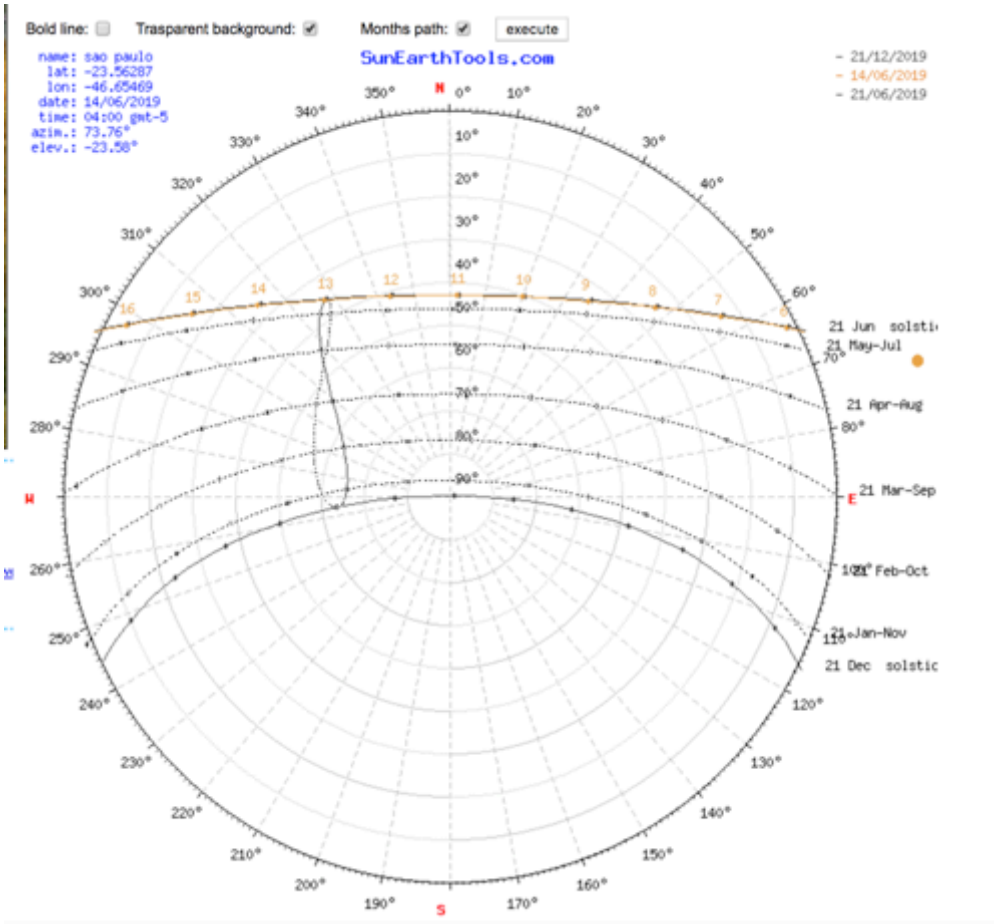


1. 10 mm² grounding cable (1-pole, green-yellow), 3 meters.
2. Data cable (RS 485); A (+) conductor: green, B (-) conductor: red, earth-ground: cable shield, 3 meters.
3. Data cable (LAN); The cable is equipped with a standard RJ45 plug to connect to a remote computer, hub or switch, standard length 5 or 10m.
4. 230 V supply (power supply: neutral conductor: blue; conductor: brown; grounding conductor: green-yellow), 3 meters.

Requirements to be met by Owner/Operator	
Lightning protection	External lightning protection to DIN V VDE 0185-3
Grounding	Grounding system to DIN V VDE 0185-3
Requirements for outdoor installation	- Circuit breaker to cut low-voltage power supply, installed near the CHM 15k - Within easy reach - Clearly marked as a part of CHM 15k - Back-up fuse matched to wire cross-section ≥ 6 A, B or C



The angle of insolation must be less or equal 15 degrees against the vertical line. Please ask for a suiable adapter plates.



https://www.sunearthtools.com/dp/tools/pos_sun.php

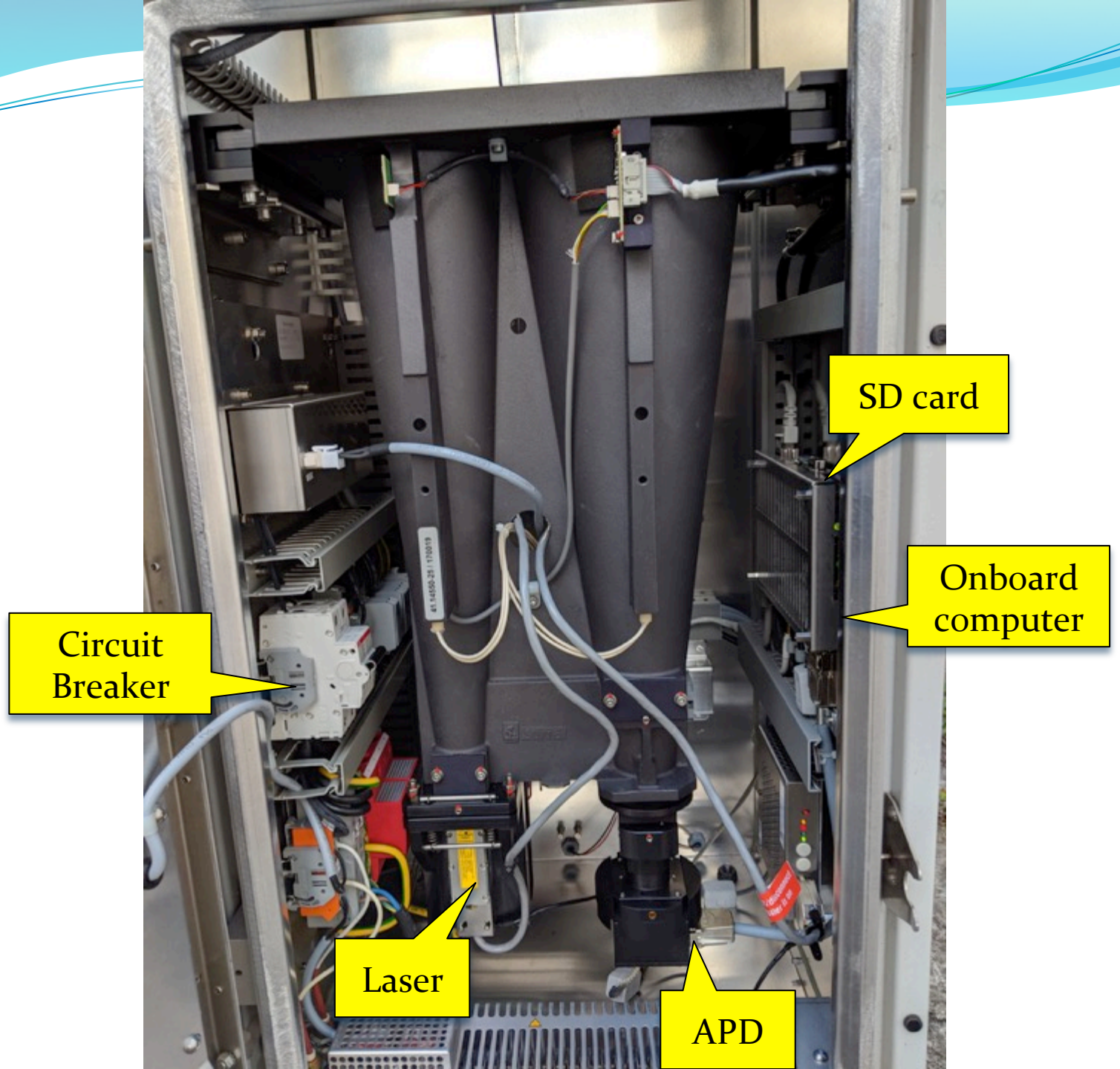
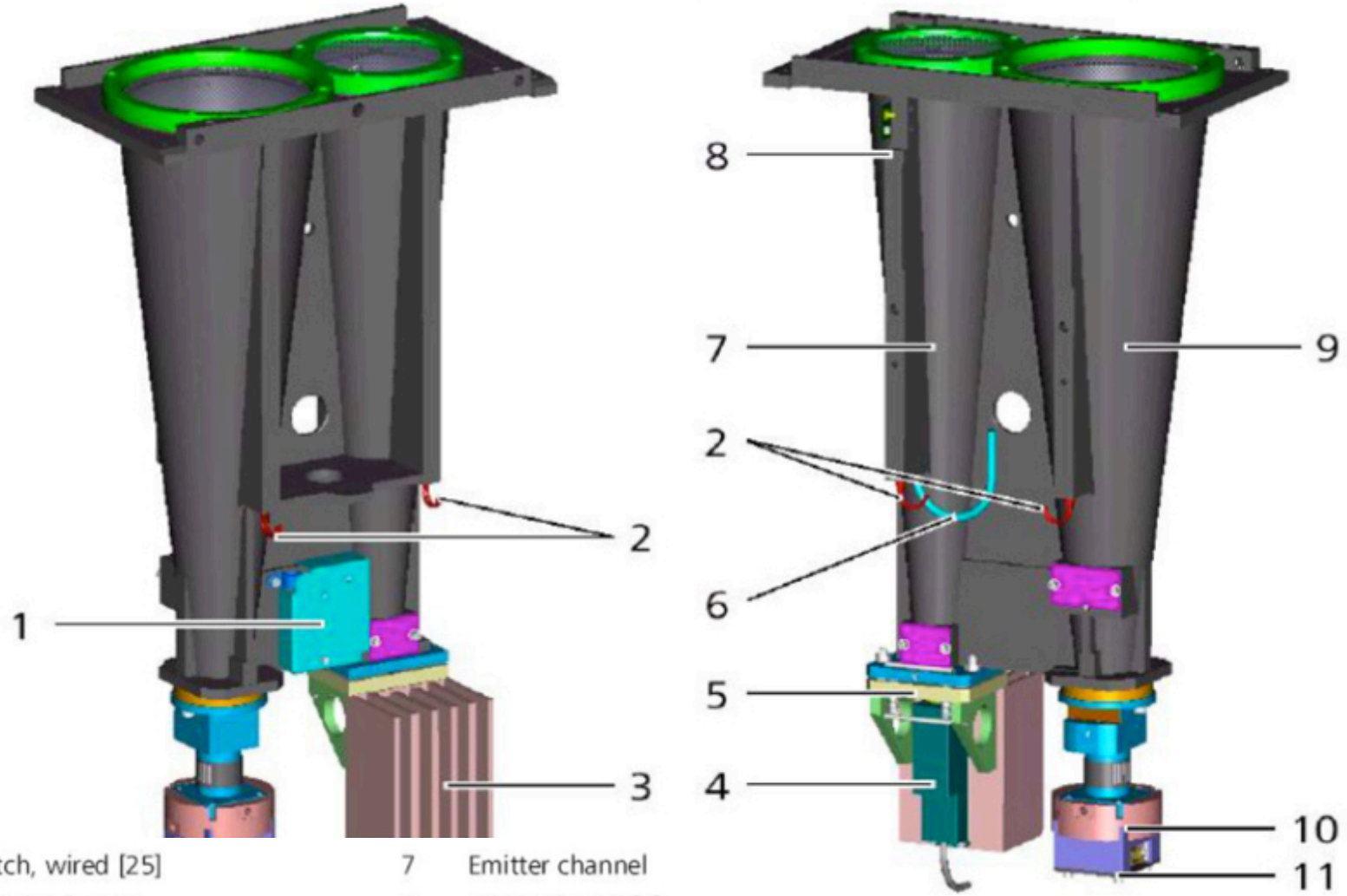
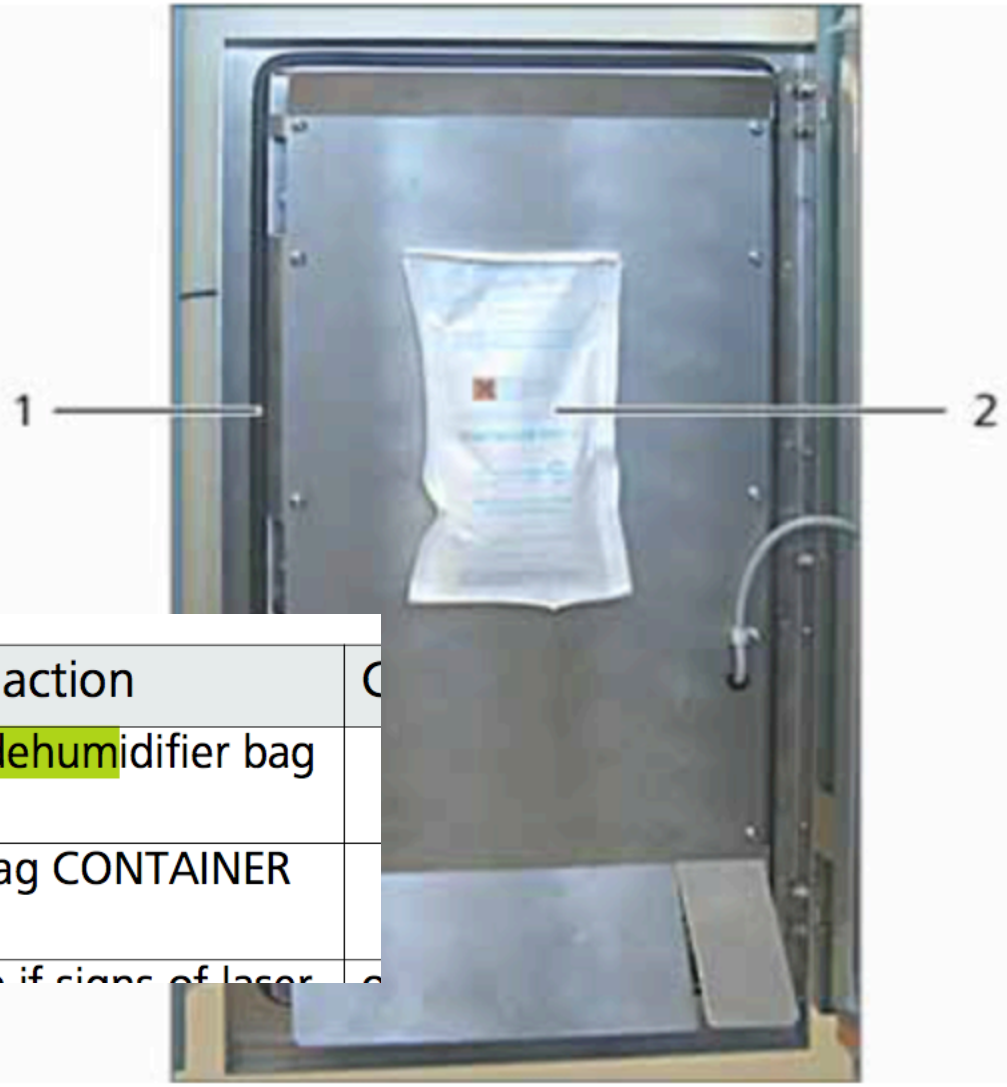

SD card
Onboard computer
Circuit Breaker
Laser
APD

Figure 6 and Figure 7 show the setup of essential laser optic module components and cross-sectional views of the emitter and the receiver channel.



1	Switch, wired [25]	7	Emitter channel
2	Cartridge heater	8	Trigger board [6]
3	Heat sink	9	Receiver channel
4	Laser head [59]	10	APD alignment unit
5	Laser head alignment unit	11	APD unit [29]
6	Laser optic module cable [15] with thermo sensor		

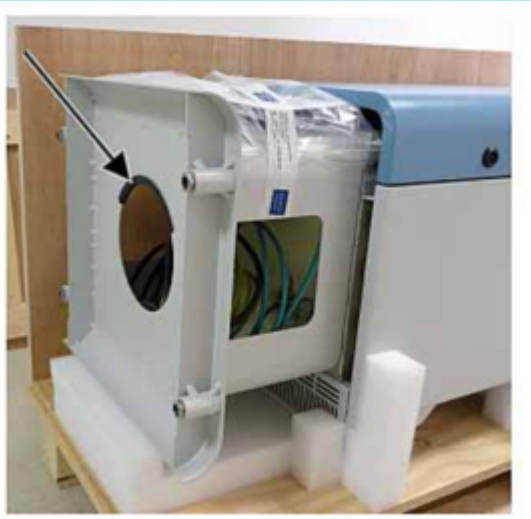
Humidity



Interval	Preventive maintenance action	C
regular checks	check of intactness of air dehumidifier bag CONTAINER DRI II"	
at least once a year	Replace air dehumidifier bag CONTAINER DRI II"	
Three- to	Replace laser optic module if signs of laser	c

Fig. 28: Air dehumidifier bag (2) and rubber seal (1).

RS485



System state query via RS485

Operating state of the CHM 15k at the time of delivery:

- Automatic output of standard data telegram
- RS485 ID number 16
- Baud rate 9,600
- Measuring time: 30 seconds

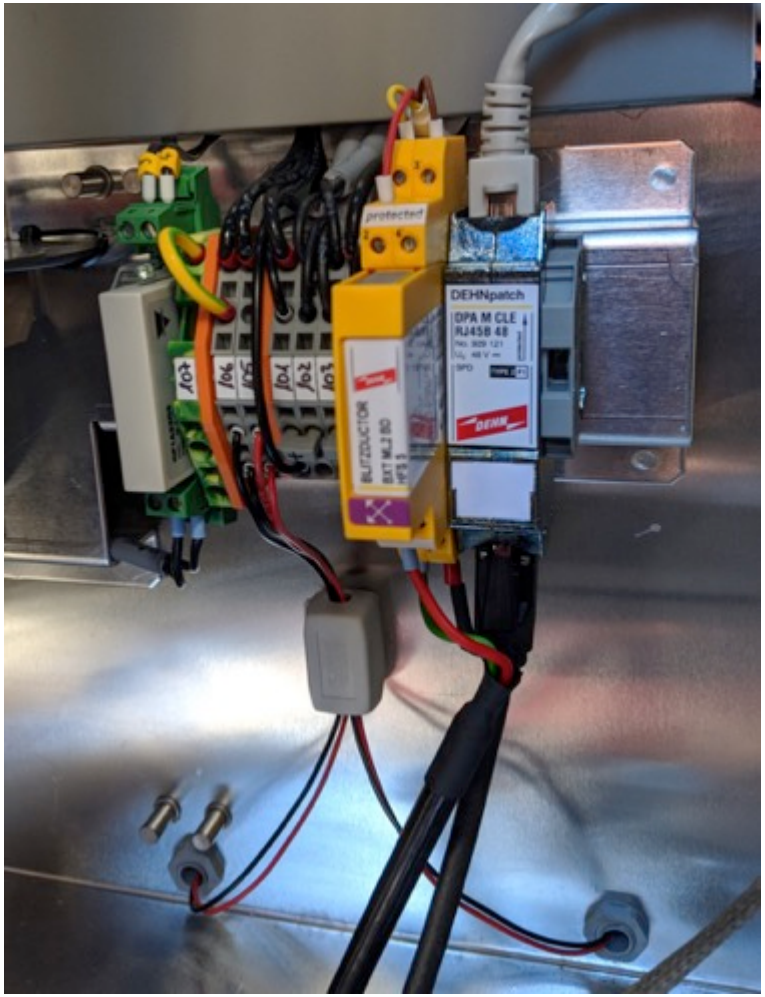
JO-DataClient

NOTE

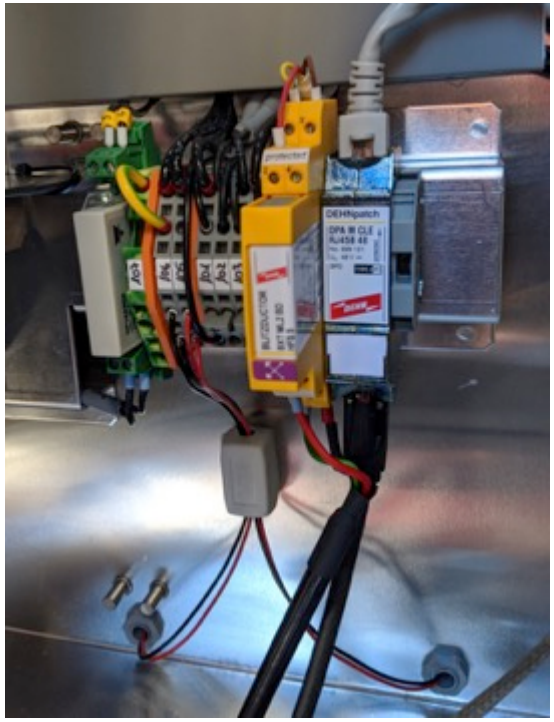
The RS 485 half-dublex interface does not allow sending and receiving data on at the same time. Accordingly, the interface has its own automatic switching mechanism. This explains why you cannot send other

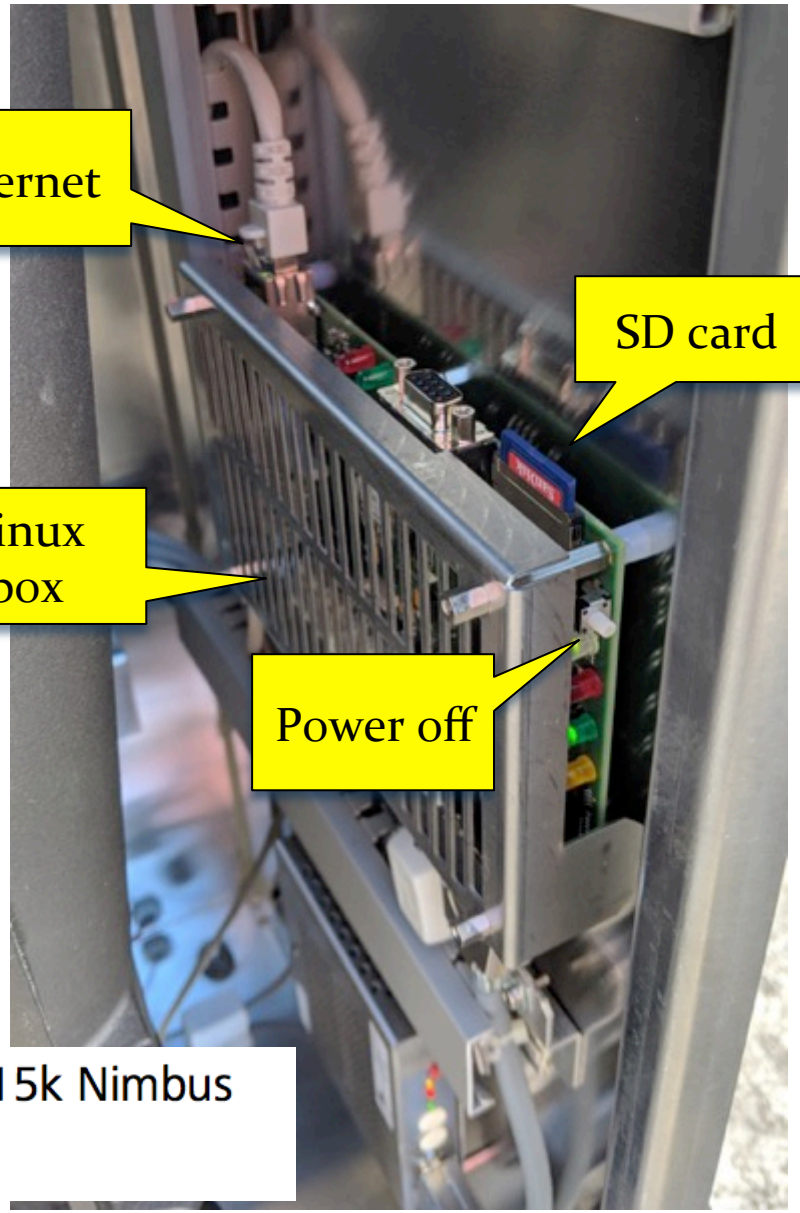
RS485

2. Data cable (RS 485); A (+) conductor: green, B (-) conductor: red, earth-ground: cable shield, 3 meters.



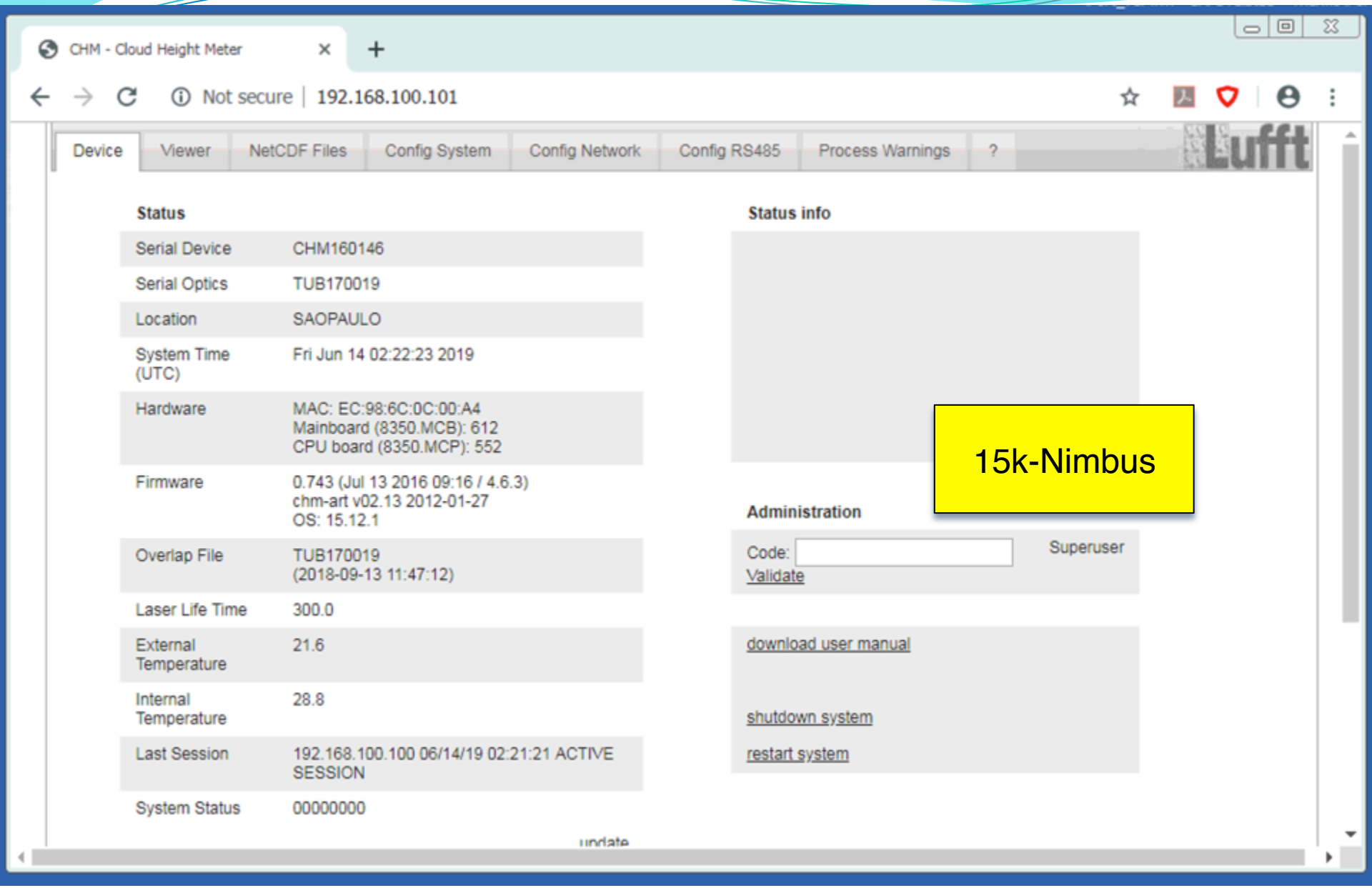
Via HTTP Browser





a pre-configured fixed service address to the CHM 15k Nimbus

- 192.168.100.101, Subnet 255.255.255.0


CHM - Cloud Height Meter
Not secure | 192.168.100.101
Device
Viewer
NetCDF Files
Config System
Config Network
Config RS485
Process Warnings
?
Lufft
Status
Serial Device CHM160146
Serial Optics TUB170019
Location SAOPAULO
System Time (UTC) Fri Jun 14 02:22:23 2019
Hardware MAC: EC:98:6C:0C:00:A4
Mainboard (8350.MCB): 612
CPU board (8350.MCP): 552
Firmware 0.743 (Jul 13 2016 09:16 / 4.6.3)
chm-art v02.13 2012-01-27
OS: 15.12.1
Overlap File TUB170019
(2018-09-13 11:47:12)
Laser Life Time 300.0
External Temperature 21.6
Internal Temperature 28.8
Last Session 192.168.100.100 06/14/19 02:21:21 ACTIVE SESSION
System Status 00000000
update
Status info
15k-Nimbus
Administration
Code:
Superuser
Validate
download user manual
shutdown system
restart system

CHM - Cloud Height Meter

Not secure | 192.168.100.101

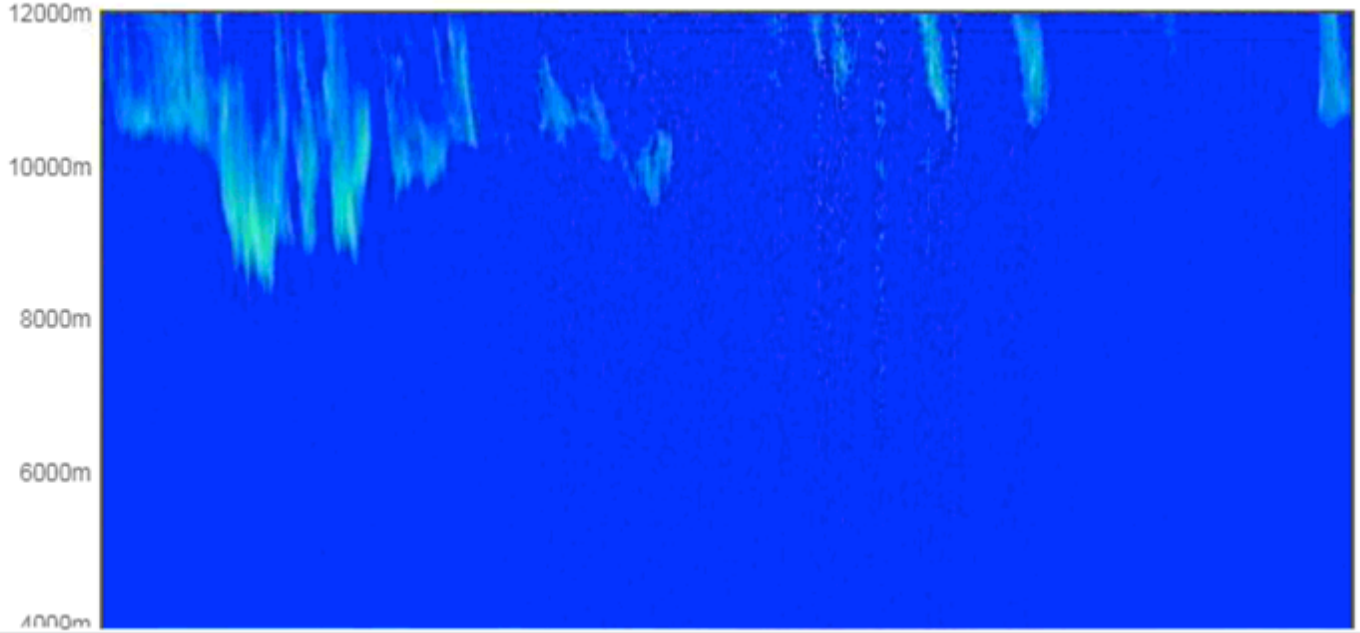
Device | Viewer | NetCDF Files | Config System | Config Network | Config RS485 | Process Warnings | ?

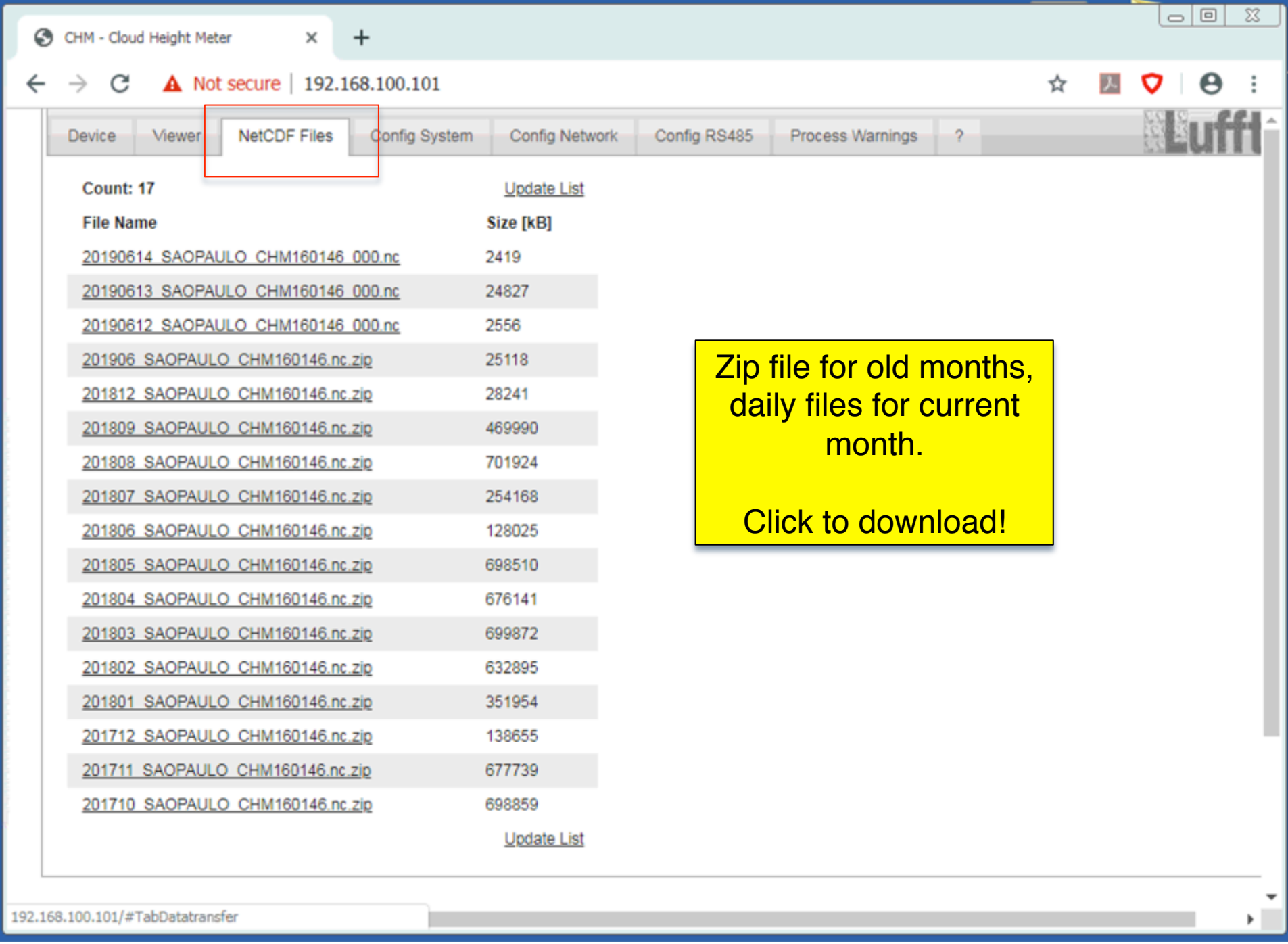
Luffi

current values (02:34:30) update

	Layer 1	Layer 2	Layer 3
cloud base height [m]	-	-	-
cloud penetration depth [m]	-	-	-
aerosol layer [m]	270	1633	2098
cloud cover	5		

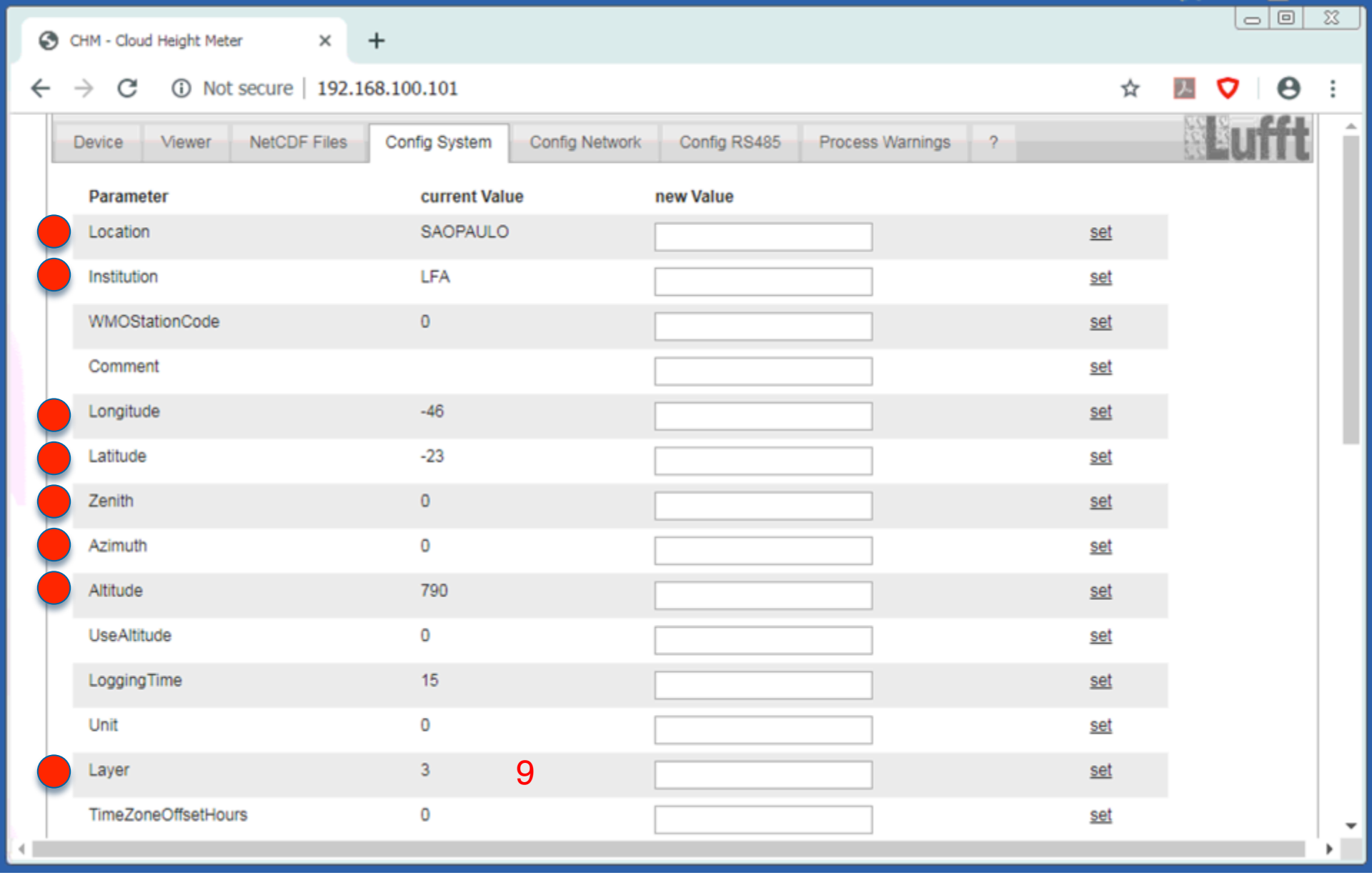
range corrected back scatter / 24h (02:33:22) update

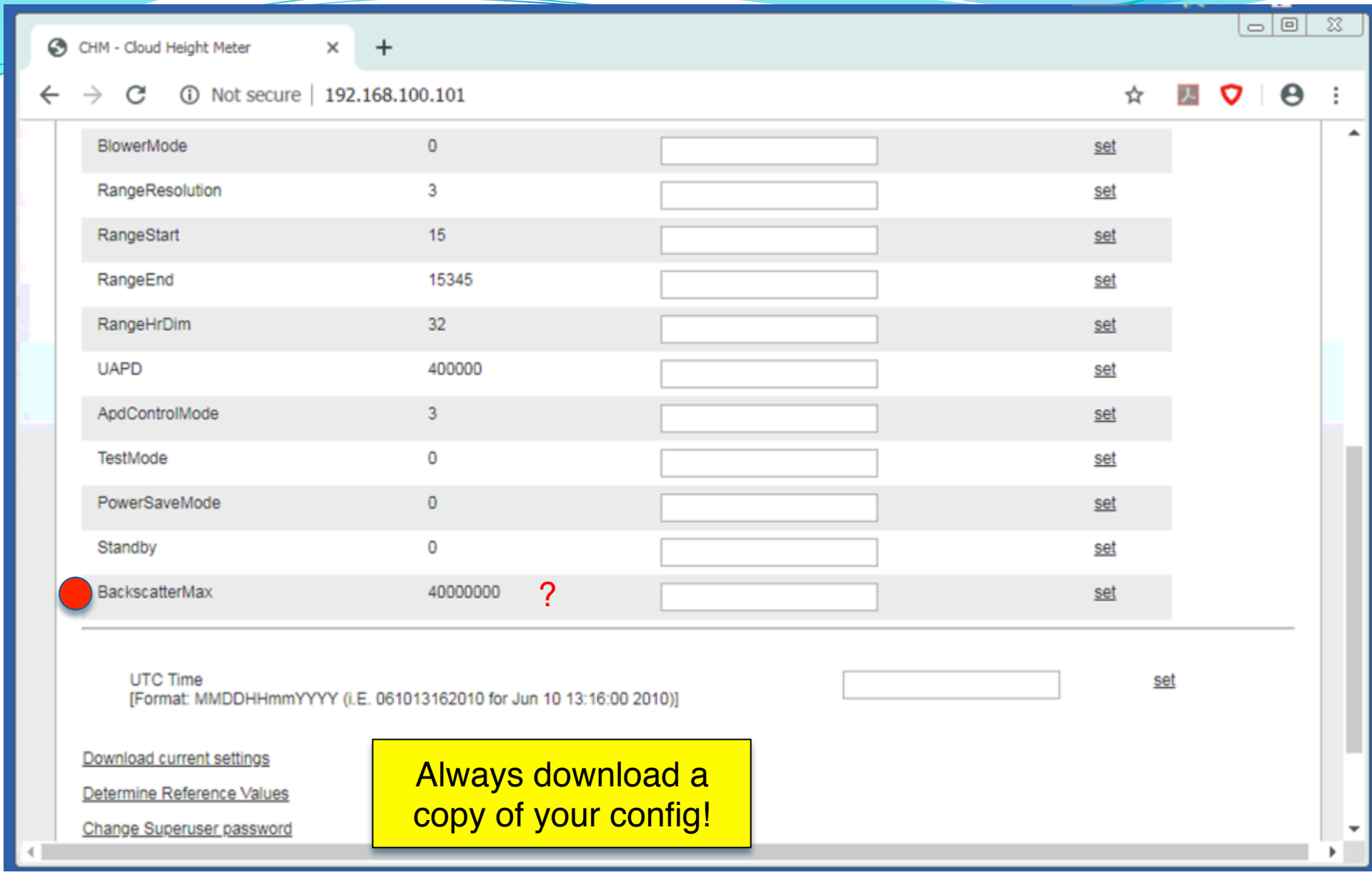


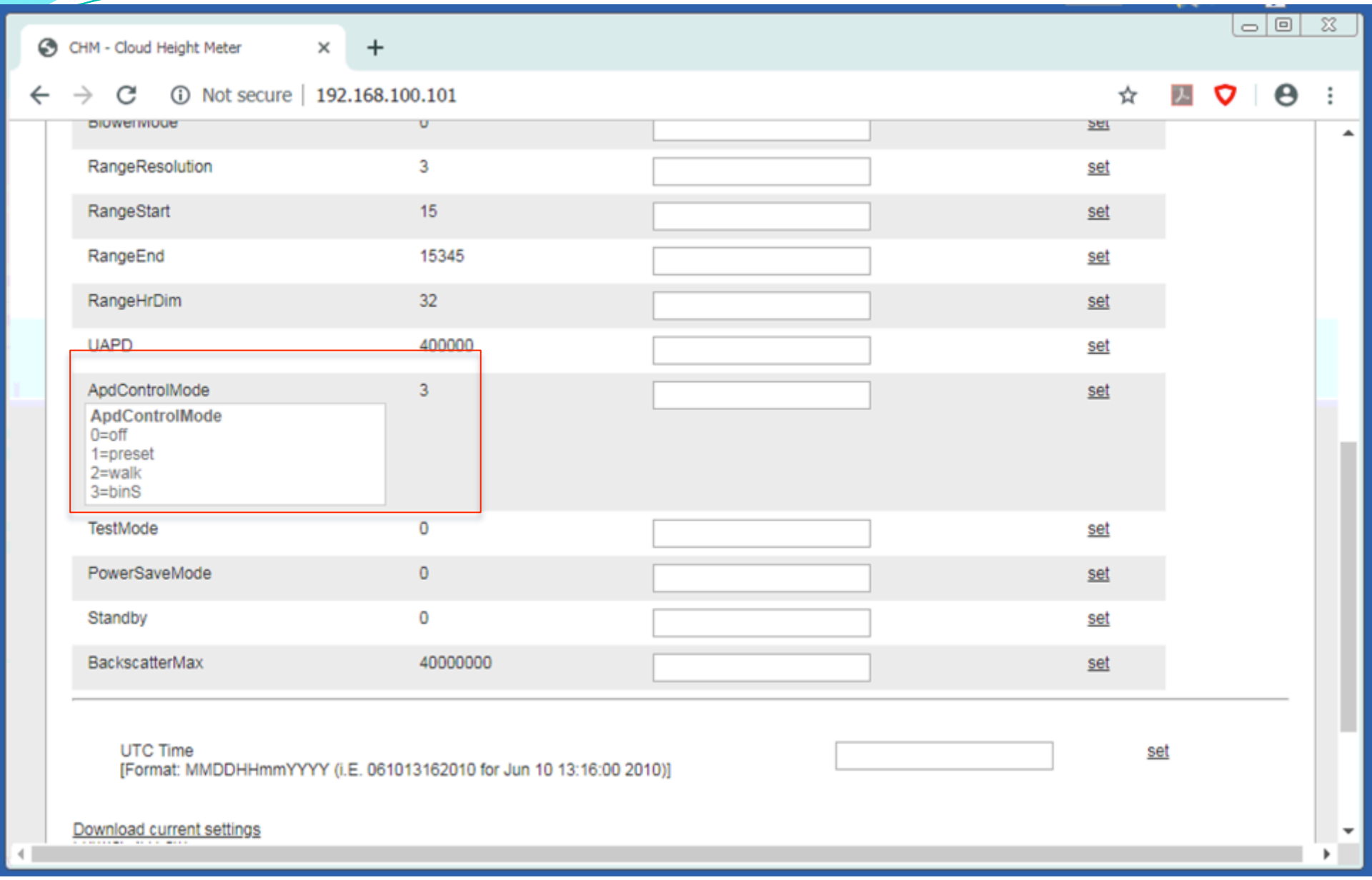

CHM - Cloud Height Meter
Not secure | 192.168.100.101
Device
Viewer
NetCDF Files
Config System
Config Network
Config RS485
Process Warnings
?
Count: 17
Update List
File Name
Size [kB]
20190614_SAOPAULO_CHM160146_000.nc 2419
20190613_SAOPAULO_CHM160146_000.nc 24827
20190612_SAOPAULO_CHM160146_000.nc 2556
201906_SAOPAULO_CHM160146.nc.zip 25118
201812_SAOPAULO_CHM160146.nc.zip 28241
201809_SAOPAULO_CHM160146.nc.zip 469990
201808_SAOPAULO_CHM160146.nc.zip 701924
201807_SAOPAULO_CHM160146.nc.zip 254168
201806_SAOPAULO_CHM160146.nc.zip 128025
201805_SAOPAULO_CHM160146.nc.zip 698510
201804_SAOPAULO_CHM160146.nc.zip 676141
201803_SAOPAULO_CHM160146.nc.zip 699872
201802_SAOPAULO_CHM160146.nc.zip 632895
201801_SAOPAULO_CHM160146.nc.zip 351954
201712_SAOPAULO_CHM160146.nc.zip 138655
201711_SAOPAULO_CHM160146.nc.zip 677739
201710_SAOPAULO_CHM160146.nc.zip 698859
Update List
Zip file for old months, daily files for current month.
Click to download!
192.168.100.101/#TabDatatransfer

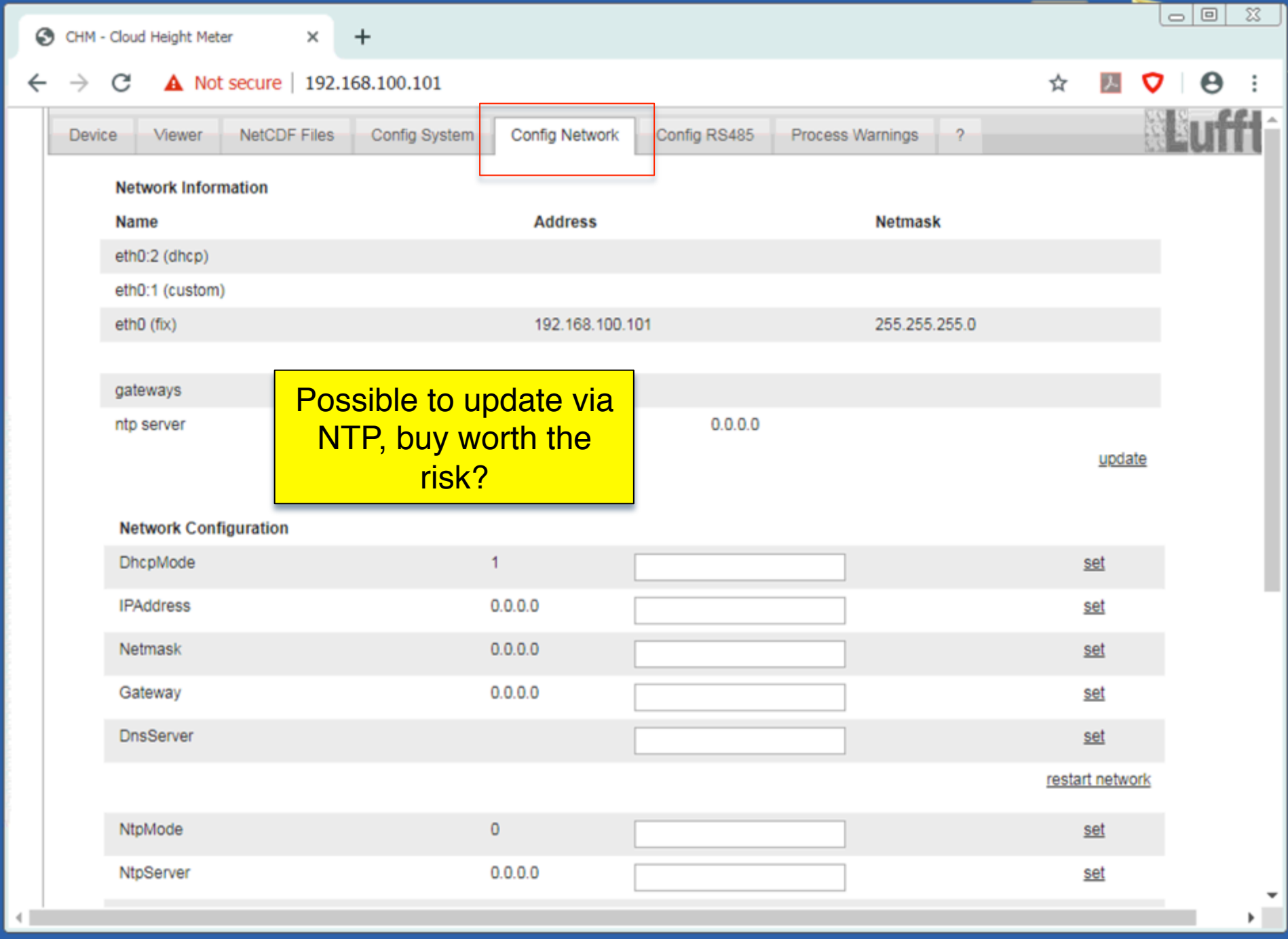
8.1 List of configurable instrument parameters

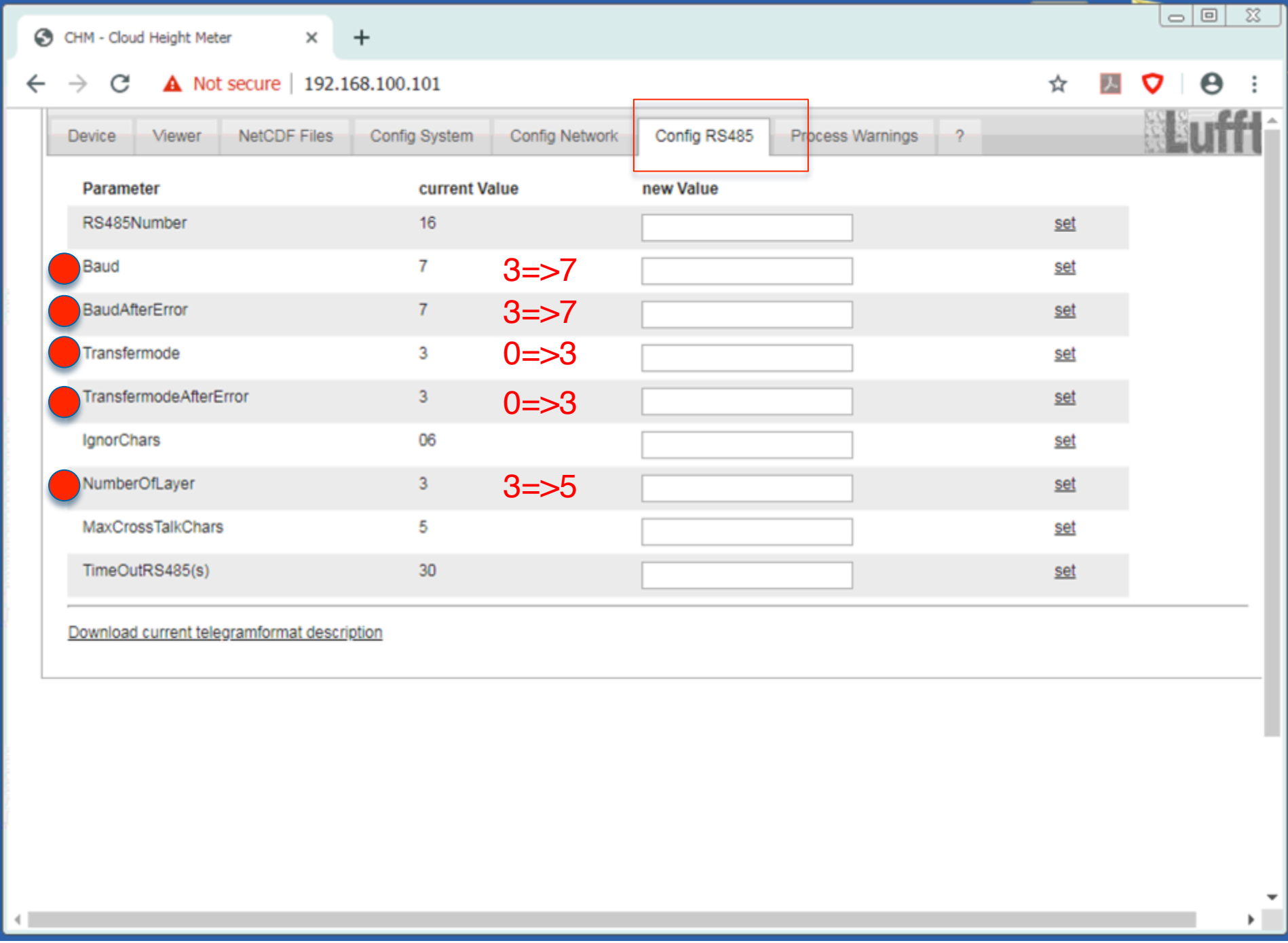
Parameter name	short cmd	standard value	range / short description
AFDmode*	AFD	0	0; 1, switch on, ftp data transfer
Altitude(m)	ALT	0	0 – 9999, unit is always meter!
ApdControlMode*	ACM	3	0 – 3, APD modes, only change if you know how to do
Azimuth	AZT	0	0-360 degree x 100 (handled as integer)
Baud	BAU	3	2 – 7 (4.800 – 115.200 Baud)
BaudAfterError*	BAE	3	2 – 7 (4.800 – 115.200 Baud)
BlowerMode	BLM	0	0 – 4
CHMTest	CHT	0	0; 1
DateTime			DD.MM.YYYY;hh:mm:ss (8.1.6)
DeviceType	DVT	CHM15k	unit type, eg. {CHMxk, PLC,...}
dt(s)	DTS	15	logging & reporting time: 5 – 600 s
DeviceName (old: FabName)*	SRN	CHMyyxxxx	CHM + serial № of the CHM instrument
Gateway	GAT	0.0.0.0	set/ query static gateway address
IgnoreChars*	ICH	06	8Bit-ASCII-Codes


CHM - Cloud Height Meter
Not secure | 192.168.100.101
Device
Viewer
NetCDF Files
Config System
Config Network
Config RS485
Process Warnings
?
Lufft
Parameter
current Value
new Value
Location
SAOPAULO
set
Institution
LFA
set
WMOStationCode
0
set
Comment
set
Longitude
-46
set
Latitude
-23
set
Zenith
0
set
Azimuth
0
set
Altitude
790
set
UseAltitude
0
set
LoggingTime
15
set
Unit
0
set
Layer
3
set
TimeZoneOffsetHours
0
set

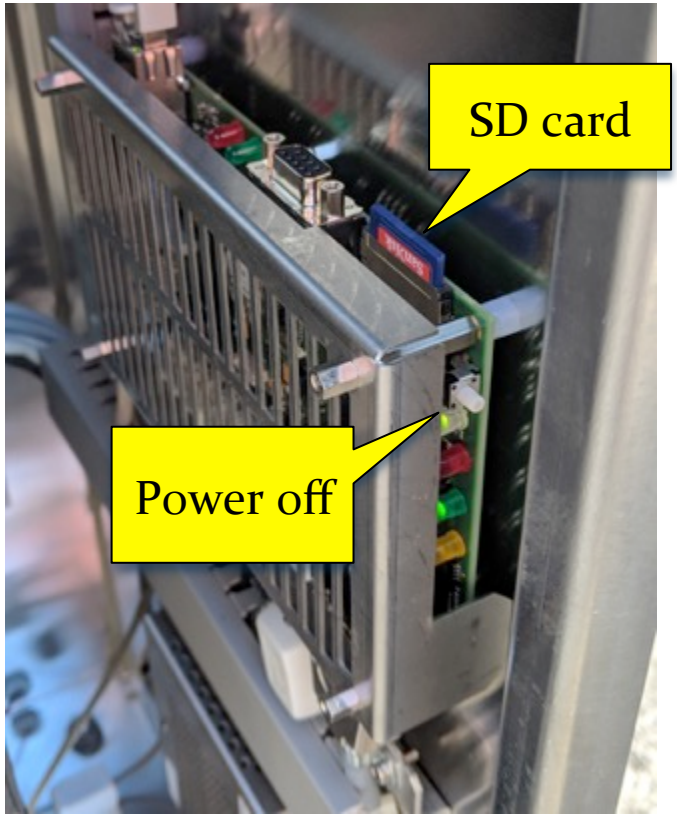

CHM - Cloud Height Meter
Not secure | 192.168.100.101
BlowerMode 0 set
RangeResolution 3 set
RangeStart 15 set
RangeEnd 15345 set
RangeHrDim 32 set
UAPD 400000 set
ApdControlMode 3 set
TestMode 0 set
PowerSaveMode 0 set
Standby 0 set
BackscatterMax 40000000 ? set
UTC Time
[Format: MMDDHHmmYYYY (i.E. 061013162010 for Jun 10 13:16:00 2010)]
set
Download current settings
Determine Reference Values
Change Superuser password
Always download a copy of your config!

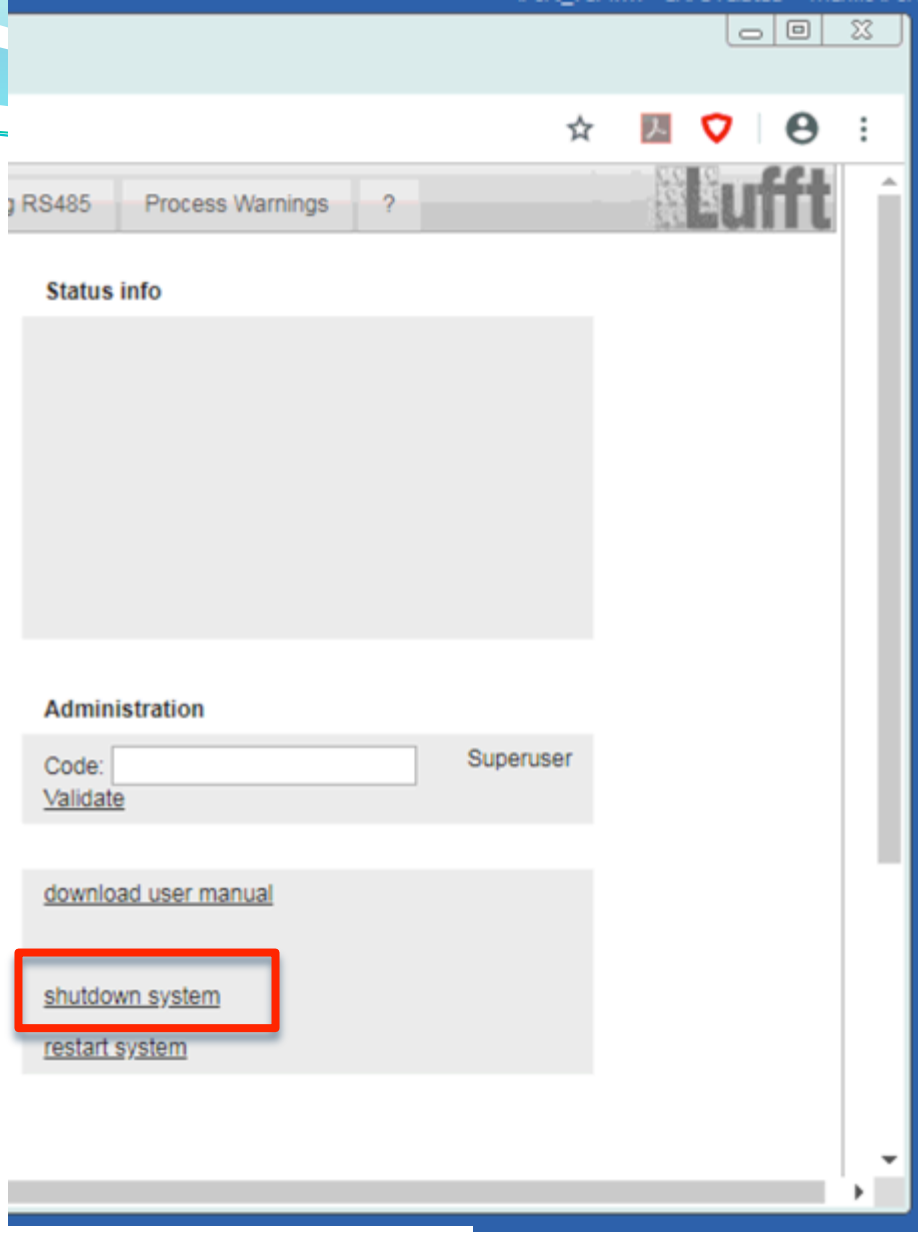

CHM - Cloud Height Meter
Not secure | 192.168.100.101
RangeResolution 3 set
RangeStart 15 set
RangeEnd 15345 set
RangeHrDim 32 set
UAPD 400000 set
ApdControlMode 3 set
ApdControlMode
0=off
1=preset
2=walk
3=binS
TestMode 0 set
PowerSaveMode 0 set
Standby 0 set
BackscatterMax 40000000 set
UTC Time
[Format: MMDDHHmmYYYY (i.E. 061013162010 for Jun 10 13:16:00 2010)]
set
Download current settings


CHM - Cloud Height Meter
Not secure | 192.168.100.101
Device
Viewer
NetCDF Files
Config System
Config Network
Config RS485
Process Warnings
?
Lufft
Network Information
Name
Address
Netmask
eth0:2 (dhcp)
eth0:1 (custom)
eth0 (fix)
192.168.100.101
255.255.255.0
gateways
ntp server
0.0.0.0
update
Possible to update via NTP, buy worth the risk?
Network Configuration
DhcpMode
1
set
IPAddress
0.0.0.0
set
Netmask
0.0.0.0
set
Gateway
0.0.0.0
set
DnsServer
set
restart network
NtpMode
0
set
NtpServer
0.0.0.0
set


CHM - Cloud Height Meter
Not secure | 192.168.100.101
Device
Viewer
NetCDF Files
Config System
Config Network
Config RS485
Process Warnings
?
Parameter
current Value
new Value
RS485Number 16 set
Baud 7 3=>7 set
BaudAfterError 7 3=>7 set
Transfermode 3 0=>3 set
TransfermodeAfterError 3 0=>3 set
IgnorChars 06 set
NumberOfLayer 3 3=>5 set
MaxCrossTalkChars 5 set
TimeOutRS485(s) 30 set
Download current telegramformat description

Shutdown





2. Service trained persons may also open the inner housing door and press the white “shut down” button at the main controller (check service manual for details)

Software (install from USB drive)

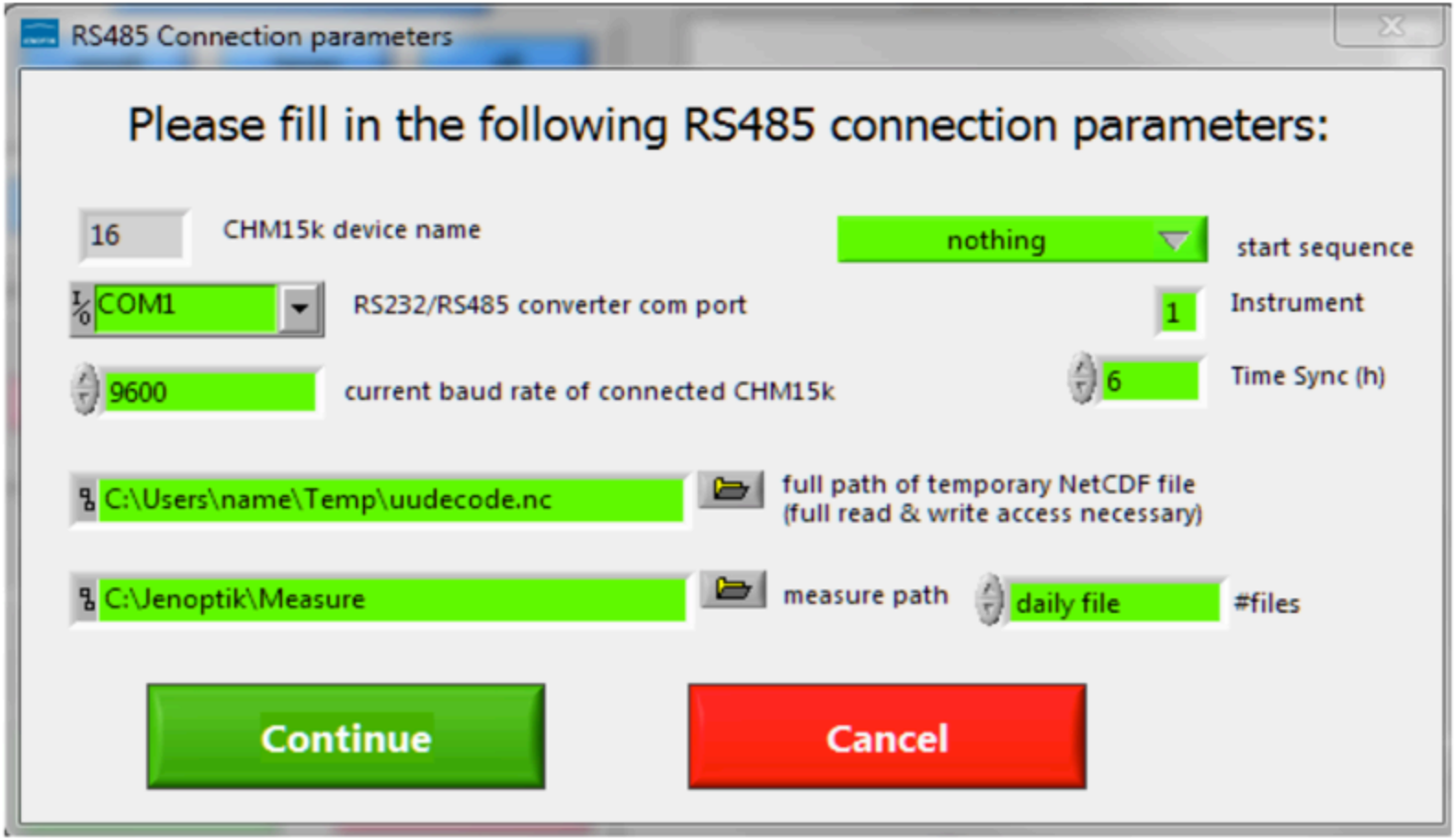
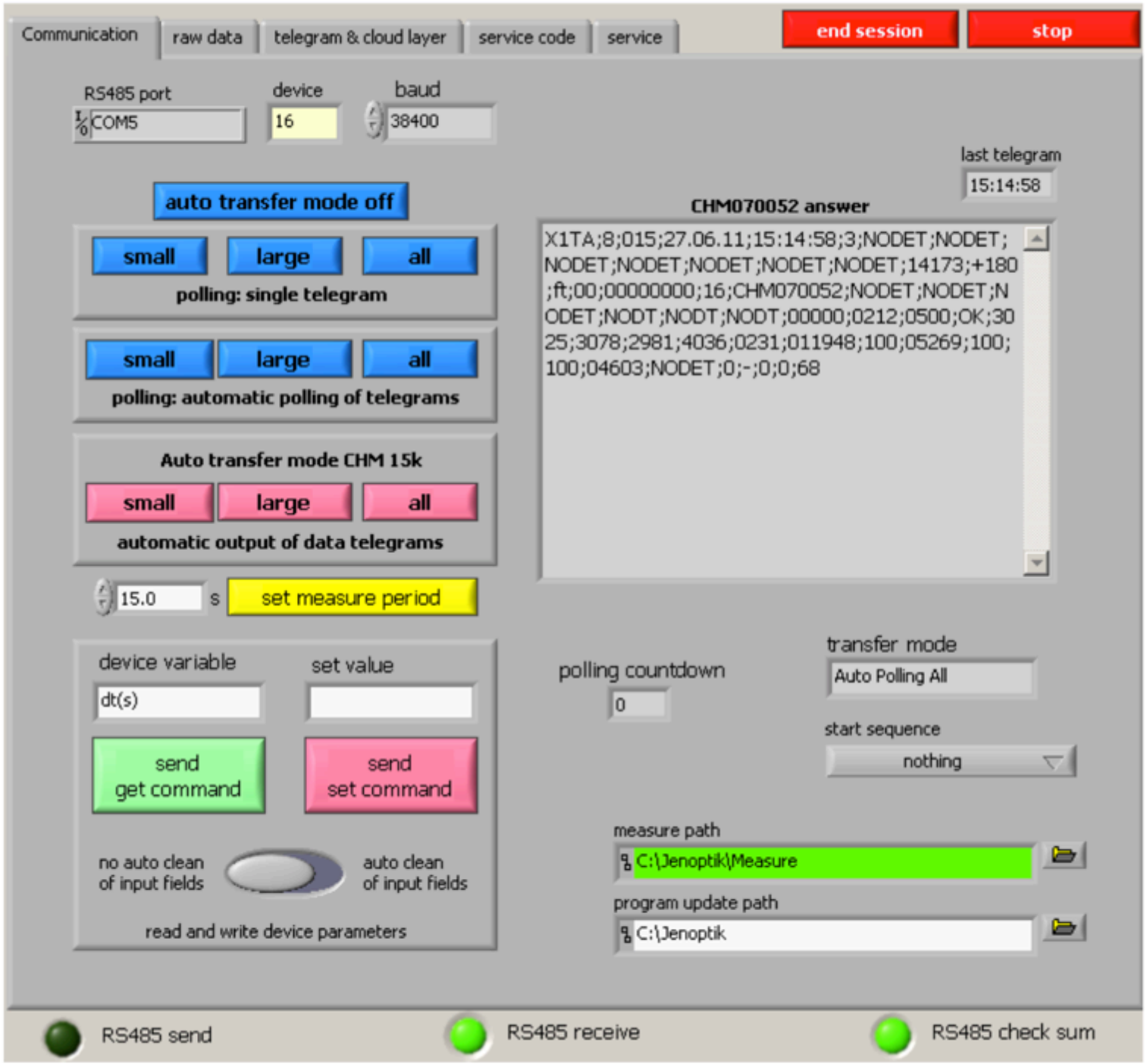
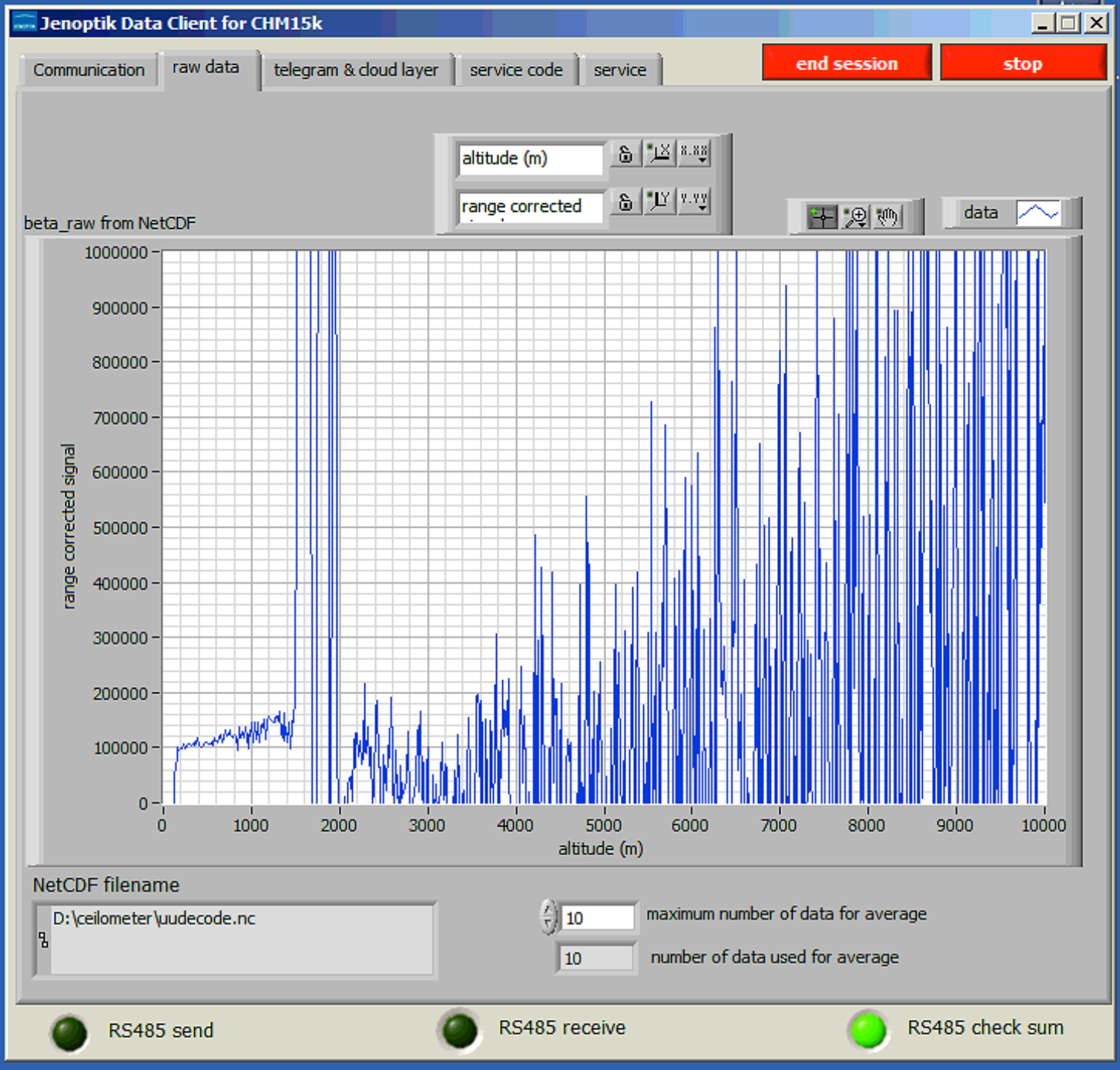
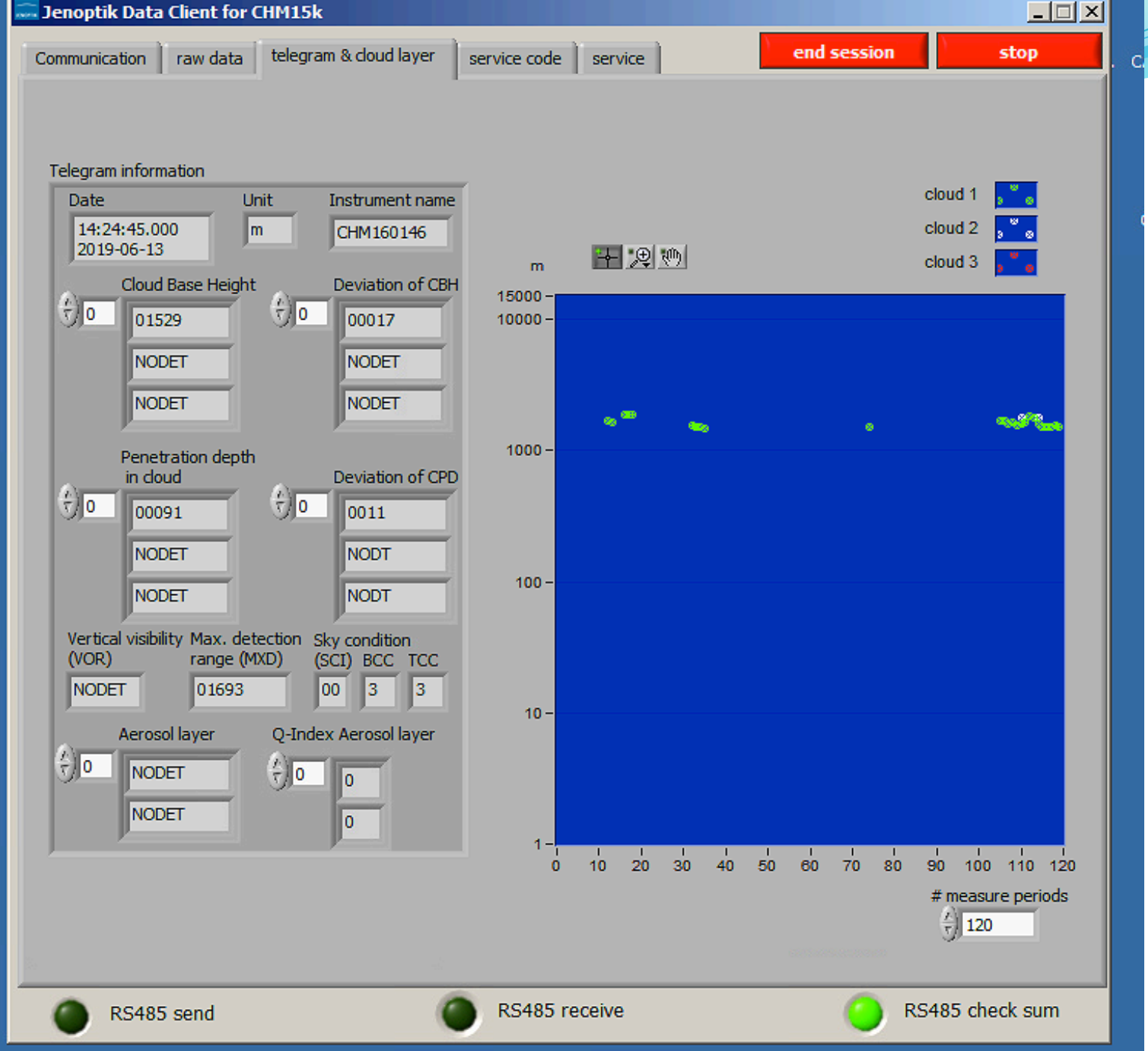
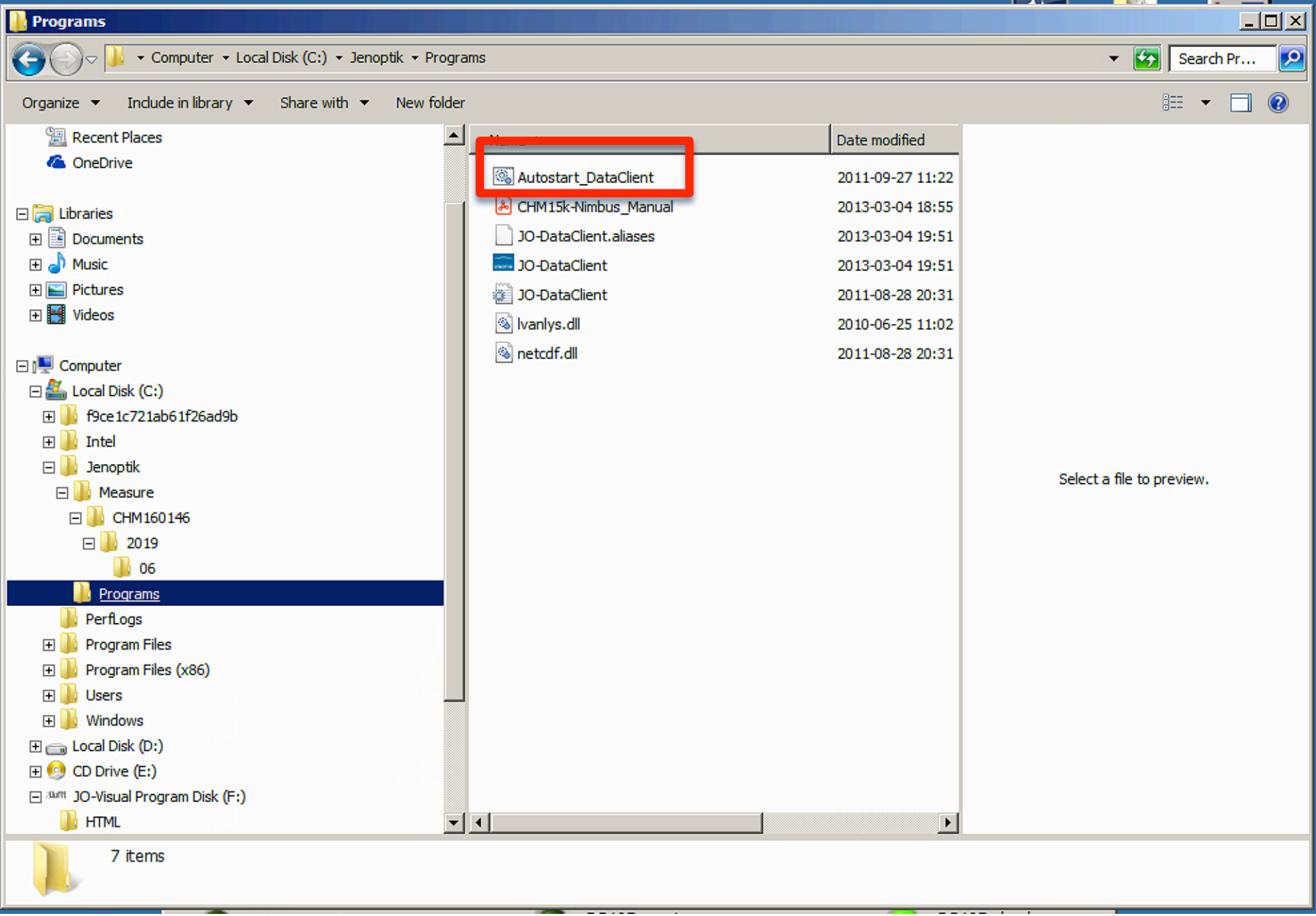


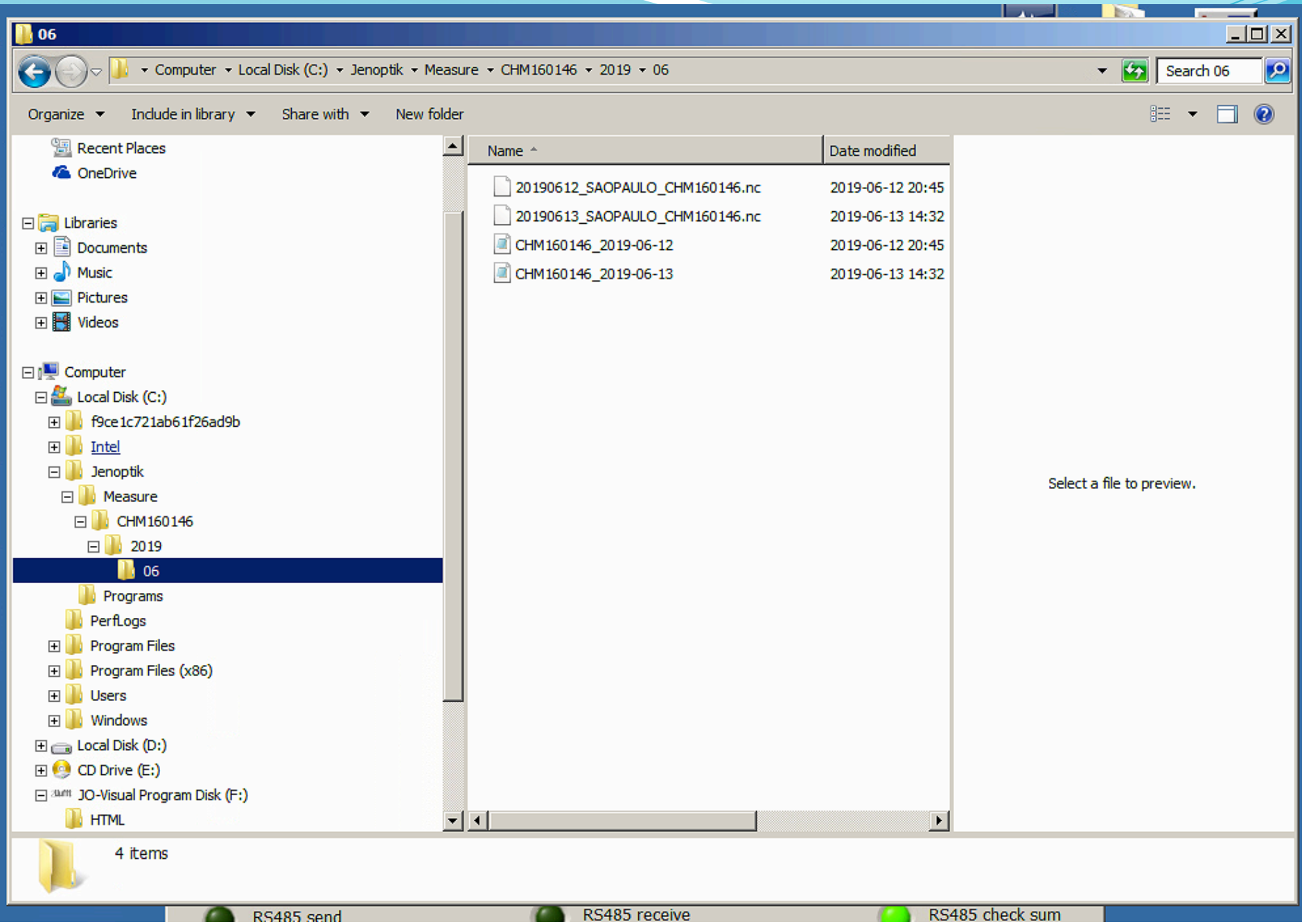
Fig. 29: Start dialog window DataClient


Communication
raw data
telegram & cloud layer
service code
service
end session
stop
RS485 port
COM5
device
16
baud
38400
last telegram
15:14:58
auto transfer mode off
small
large
all
polling: single telegram
small
large
all
polling: automatic polling of telegrams
Auto transfer mode CHM 15k
small
large
all
automatic output of data telegrams
15.0
s
set measure period
CHM070052 answer
X1TA;8;015;27.06.11;15:14:58;3;NODET;NODET;
NODET;NODET;NODET;NODET;NODET;14173;+180
;ft;00;00000000;16;CHM070052;NODET;NODET;N
ODET;NODT;NODT;NODT;00000;0212;0500;OK;30
25;3078;2981;4036;0231;011948;100;05269;100;
100;04603;NODET;0;-;0;0;68
device variable
dt(s)
set value
send
get command
send
set command
polling countdown
0
transfer mode
Auto Polling All
start sequence
nothing
no auto clean
of input fields
auto clean
of input fields
read and write device parameters
measure path
C:\Jenoptik\Measure
program update path
C:\Jenoptik
RS485 send
RS485 receive
RS485 check sum


Jenoptik Data Client for CHM15k
Communication
raw data
telegram & cloud layer
service code
service
end session
stop
altitude (m)
range corrected
data
beta_raw from NetCDF
range corrected signal
altitude (m)
NetCDF filename
D:\ceilometer\uudecode.nc
10
maximum number of data for average
10
number of data used for average
RS485 send
RS485 receive
RS485 check sum


Jenoptik Data Client for CHM15k
Communication
raw data
telegram & cloud layer
service code
service
end session
stop
Telegram information
Date
14:24:45.000
2019-06-13
Unit
m
Instrument name
CHM160146
Cloud Base Height
0
01529
NODET
NODET
Deviation of CBH
0
00017
NODET
NODET
Penetration depth in cloud
0
00091
NODET
NODET
Deviation of CPD
0
0011
NODT
NODT
Vertical visibility (VOR)
NODET
Max. detection range (MXD)
01693
Sky condition
(SCI) BCC TCC
00 3 3
Aerosol layer
0
NODET
NODET
Q-Index Aerosol layer
0
0
0
cloud 1
cloud 2
cloud 3
m
15000
10000
1000
100
10
1
0 10 20 30 40 50 60 70 80 90 100 110 120
measure periods
120
RS485 send
RS485 receive
RS485 check sum


Programs
Computer ▸ Local Disk (C:) ▸ Jenoptik ▸ Programs
Search Pr...
Organize
Include in library
Share with
New folder
Recent Places
OneDrive
Libraries
Documents
Music
Pictures
Videos
Computer
Local Disk (C:)
f9ce1c721ab61f26ad9b
Intel
Jenoptik
Measure
CHM160146
2019
06
Programs
PerfLogs
Program Files
Program Files (x86)
Users
Windows
Local Disk (D:)
CD Drive (E:)
JO-Visual Program Disk (F:)
HTML
Date modified
Autostart_DataClient
2011-09-27 11:22
CHM15k-Nimbus_Manual
2013-03-04 18:55
JO-DataClient.aliases
2013-03-04 19:51
JO-DataClient
2013-03-04 19:51
JO-DataClient
2011-08-28 20:31
lvanlys.dll
2010-06-25 11:02
netcdf.dll
2011-08-28 20:31
Select a file to preview.
7 items


06
Computer ▸ Local Disk (C:) ▸ Jenoptik ▸ Measure ▸ CHM160146 ▸ 2019 ▸ 06
Search 06
Organize
Include in library
Share with
New folder
Recent Places
OneDrive
Libraries
Documents
Music
Pictures
Videos
Computer
Local Disk (C:)
f9ce1c721ab61f26ad9b
Intel
Jenoptik
Measure
CHM160146
2019
06
Programs
PerfLogs
Program Files
Program Files (x86)
Users
Windows
Local Disk (D:)
CD Drive (E:)
JO-Visual Program Disk (F:)
HTML
Name
Date modified
20190612_SAOPAULO_CHM160146.nc
2019-06-12 20:45
20190613_SAOPAULO_CHM160146.nc
2019-06-13 14:32
CHM160146_2019-06-12
2019-06-12 20:45
CHM160146_2019-06-13
2019-06-13 14:32
Select a file to preview.
4 items
RS485 send
RS485 receive
RS485 check sum

Adapt autostart => Start Menu