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CEILOMETER CHM 15K „NIMBUS“
AND
VISUALIZATION SOFTWARE JO-VISUAL

Measuring clouds, aerosol height profiles and visibility

The “NIMBUS” series is the second generation of proven CHM 15k ceilometers measuring aerosol height profiles using the LIDAR technique. They determine cloud base heights, penetration depths, mixing layer height and vertical visibility. Within their operating range of up to 15 kilometers (50 000 feet), they reliably detect multiple cloud layers and cirrus clouds. The “NIMBUS” series is equipped with an integrated controller offering improved range resolution and a comfortable web interface.

High optical sensitivity for exact results

Accurate results in day- and nighttime are obtained by

- a solid state laser source with long lifetime
- small bandwidth filters
- a highly sensitive photo receiver

Reliable operation in any climate

The CHM 15k series is prepared to work throughout the year and in any climate. Due to their double case structure combined with a window blower and an automatic heating system, the ceilometers are not interfered with fogging, precipitation, freezing or overheating.

Benefits

- Great measuring range up to 15 km (50 000 ft)
- Enhanced multiple cloud layer detection
- Simple and eye-safe routine operation
- Service-friendly modular device setup
- Various data telegrams, including raw data
- GUI software for device control and display of measured backscatter data in NetCDF format

Specifications

Measuring parameters

Measuring principle	Optical (LIDAR)
Measuring range (CBH)[1]	5 m ... 15 000 m (16 ft ... 50 000 ft)
Accuracy[2]	± 5 m (± 16 ft)
Range resolution	5 m (16 ft)
Sampling rate	100 MHz
NetCDF raw data resolution	15 m (full range, compact file sizes) 5 m (5 m to 150 m range)
Time to measure	2 s ... 600 s (programmable)
Targets	Aerosols, clouds
Quantities to be measured	- CBH[1], preset: 3 layers; maximum 9 layers - Cloud penetration depth - Cloud amount and sky condition index - Vertical visibility (VOR) - Height of aerosol layer - Aerosol backscatter profiles
Light source	Nd:YAG solid-state laser, wavelength 1064 nm

[1] CBH - Cloud Base Height *[2] measured on hard target in 10 km distance*

Interfaces and software for data output and device configuration

Standard interface	RS485, LAN
Optional interfaces	RS232 or Modem V.21, V.22, V.22bis
Communication	LAN Port: Web-Interface Serial Port: Jenoptik DataClient Software or standard terminal programs
Optional software	Jenoptik Visual Software for convenient visualizing measured results

Electrical parameters

Power supply	standard: 230 V(AC), ±10 % optional: 110 VAC, 115 VAC, ±10 %
Power consumption	250 W (standard) 800 W (in maximum heating mode)
UPS functionality (optional)	Internal backup battery for electronics, > 1 hrs

Operating safety

Environmental requirements	ISO 10109-11
Laser protection class	1M according to IEC 60825-1:2007
Internal protection class	IP 65
EMC	Class B, IEC 61326-1
Electrical safety	IEC 61010-1
Certifications	CE

Dimensions

Enclosure dimensions all over (L × W × H)	500 mm × 500 mm × 1550 mm
Packaging dimensions for transport (L x W x H)	650 mm × 800 mm × 1670 mm
Weight	70 kg (complete system) 9.5 kg (measuring unit only, spare parts)

Operating conditions

Temperature	-40 °C ... +55 °C
Relative humidity	0 % ... 100 %
Wind	55 ms^{-1}

The data telegrams in detail

1 - Standard data telegram
Output interval, date, time, detected cloud layers, penetration depths, vertical visibility, max. detection range, local altitude, unit (m/ft), system status, precipation index, checksum

2 - Extended data telegram
Standard telegram combined with additional status messages and device specific parameters

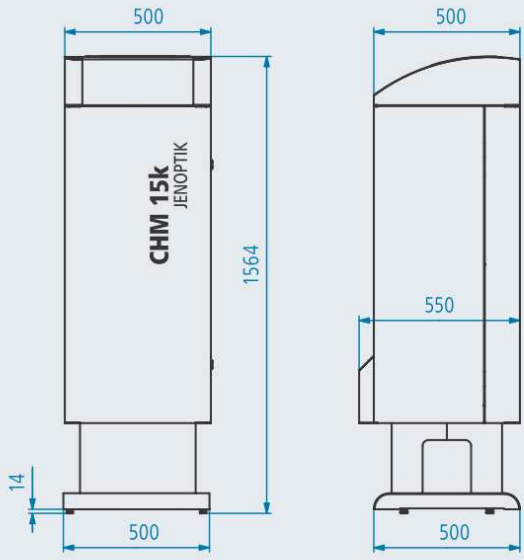
3 - Raw data telegram
Extended telegram with measured raw data (in NetCDF format)

4 - CHM 15k data telegram
Output interval, date, time, unit, sky condition index, total cloud cover, cloud layers, cloud penetration depths, VOR, max. detection range, quality index aerosol layer, aerosol layer heights, status, checksum

5 - CHM 15k raw data telegram
CHM 15k data telegram with raw data

Exemplary data telegram (standard)
...; 29.05.06; 05:25; 00330; 01913; 07725; 0150; 0112; 0772; 01968; 08498; +060; m; 11111111; ...

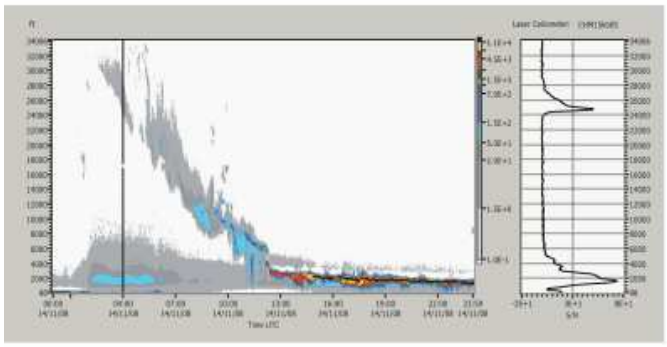
Dimensions CHM 15k



It is our policy to constantly improve the design and specifications. Accordingly, the details represented herein cannot be regarded as final and binding.

Visualization Sorftware JO-VISUAL

for Ceilometer CHM 15k



Comfortable offline visualization of previously saved raw data or telegram files

The JO-Visual software provides an easy to use graphical user interface for advanced visualization of data measured by the CHM 15k ceilometer. The software is designed to work seamlessly in conjunction with the terminal software JO-DataClient for CHM 15k on the client computer.

Previously saved raw data in NetCDF format are comfortably visualized in an intensity timeplot, which can be stored as a .png image file. The cloud information from telegram files are also visualized. Scaling parameters, NetCDF file information and system parameters can be set or displayed in a convenient way. CHM 15k device status information and temperature profiles are also easily plotted.

JO-Visual is based on LabView software from National Instruments and requires a LabView Runtime Engine (included as part of the software delivery).

Features summary

- CHM 15k NetCDF raw data visualization
- Various tools for selecting image details and comfortable data display
- Image storage in .png file format
- Display of CHM 15k status and temperature information
- Graphical cloud information display

Description and Specifications

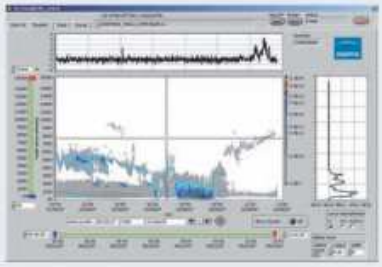
Start Inf:
NetCDF file info, scaling and units

Single-window operation

JO-Visual uses a user interface organized in tabs for convenient single-window operation of the visualization software.

NetCDF file information and scaling parameters

The "Start inf" tab allows to conveniently retrieve NetCDF file information and change the color scale, timing and units for data visualization in the "Timeplot" tab.



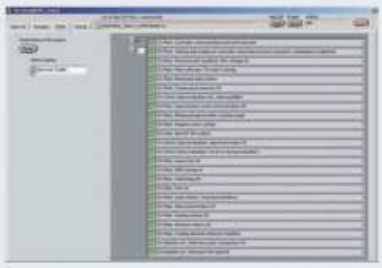
Timeplot:
Visualization of measured intensity

Backscatter intensity timeplots

The "Timeplot" tab shows an intensity plot of the measured data. Various parameters can be selected to adjust the visualization to your needs and quickly provide a visualization of relevant information. Changed parameters, as for example scaling information, are stored in an initialization file for future usage.

Status information and temperature profiles

The "State" tab allows users to get status information about the system state from stored NetCDF files. Information include general system information about the CHM 15k and actions performed during measurement as well as laser parameters (e.g. number of laser pulses) or the chronological profiles for inside-, outside- or detector temperature.



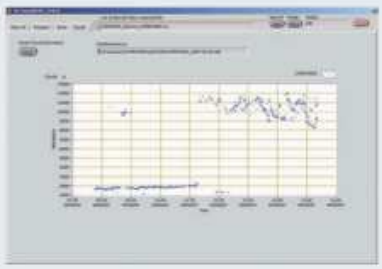
State:
Information on device state and temperatures

Cloud information display

Cloud information included in the data telegram files are visualized conveniently in the "Cloud" tab of JO-Visual.

JO-Visual and JO-DataClient

The JO-Visual software is designed to work seamlessly in conjunction with the folder structure (of NetCDF raw data and data telegrams) created by the terminal software JO-DataClient for CHM 15k on the client computer.



Clouds:
Display of cloud information

Computer Requirements	
Operating System	Microsoft Windows 2000 / XP
CPU	Intel Pentium IV or AMD Athlon, 1 GHz
Memory (RAM)	512 MB (minimum)
Free hard drive space	70 MB
LabView runtime engine	7.1 (included in delivery)

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