ASI-16 V24 - All Sky Imager

Advanced Sky Imaging System - R 2024-11

Software & Hardware Manual

Release Version R 2024-11

Including "Release Notes" for SW v241108n (2024-11-08)

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Change Notes / Release Notes:

v241108n (2024-11-08):

!!!-!!!: New "ASI16-Installer_v24" replaces previous "ASI-Manager" and "Support.exe".
New "ASI-Software" can be installed by using latest "ASI16-Installer_V24", only!
Previous "ASI-Managers" will NOT work to update any newer "ASI Software"!
New "ASI16-Installer_v24" also replaces previous "ASI_DHCP_Fix-It.jar" tool.

IMP: Life data cloudiness values displayed with one decimal place only.

FIX: Sometimes login to ASI GUI has required multiple (>5) tries to enter password.

FIX: Time configuration, interval setting lost after having switched to "Manual Time".

FIX: Time configuration, time was synchronized with NTP server even if deactivated.

FIX: Sometime changes in local ASI settings (capture, locale, ...) cannot be stored.
Sometimes shooting and FTP upload did not run, esp. after parameter change.

FIX: Old "life date" remain displayed in GUI even if "life data" function was disabled.

FIX: Sometimes shooting hang-up or GUI block after running for multiple (5-30) days.

FIX: Wrong internal link for CMS/Agent logo in Web-GUI.

FIX: Manuel reset of FTP connection did not work as should.

v240531n (2024-05-31):

NEW: GUI-Home: Cloud Analysis (CMS FCT) – Display of real-time analysis data.
See § 6.5, page 39.

NEW: Additional Capture/Shooting Template - Intervals: A= 5 Min., and B= 1 Min..
See § 6.8.2, page 44.

NEW: Remote access for ASI-16 V24 via CMS "REM" (VPN) encrypted tunnel.
See § 6.12, page 48.

IMP: Improved Peripheral Controller support for EKO MS-40S Pyranometers.
ASI SW, ASI16-Installer, CRM: Multiple minor improvements and fixes.

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1 Introduction

1.1 Overview

CMS-Schreder "ASI-16 V24" is the latest and most advance total sky imager for scientific and operational meteorology, atmospheric science, climate research and industrial solar energy operations, based on state-of-the-art network and web browser technology, "High Power over Ethernet" for most easy cabling, and a rugged outdoor proof housing.

Its camera head hardware features a robust coated quartz glass dome, 180°/360° fisheye optics, brut 6 megapixel resolution sensor with superb image quality, and an IR-cut filter to avoid degradation of the sensor by long time direct exposure to the sun disk.

ASI-16/55_ADV comes with built-in ventilation and up to 60W airflow heating, to minimize condensation on the glass dome and to quickly remove eventual raindrops and snow. The system has been tested for harsh environments from -40°C up to more than +80°C air temperature. Its double-cover design combined with forced ventilation will minimize risks of damage because of long time exposures to strong direct sun radiation.

Additional environmental sensors provide high precision temperature & humidity data, and (optional) solar irradiance data by a Pyranometer with digital ModBus interface. The integrated datalogger stores numeric data into jpg-image exif data and into csv files.

ASI-16 imaging software presents life stream videos via a user friendly web GUI, captures pre-scheduled all sky JPG pictures, and automatically transfers those JPGs to a network file storage via standard protocols (FTP, FTPS, SFTP). In case of network or network FTP storage down, the imager will temporarily backup JPG's and data on the built-in 4 GB CF memory, and will restart transfers as soon as the network is up again.

Combined with CMS "FCT-19/22 Cloud Analysis Software" (FindClouds Trinity) ASI JPG images are used to calculate cloud coverage ratio, cloud density rations. Calculation of average cloud base height (CBH, with two ASI-16 combined), and cloud movement vector (CMV, direction, relative speed) are available as options. - For further details, limitations and restrictions please refer to the corresponding FCT-nn software documentation.

It's outstanding combination of advanced software and hardware makes CMS ASI-16 indisputably the top choice for atmospheric scientists and for solar energy industrials.

1.2 Intended Use, Qualified Installation

ASI-16 is intended to be used for capturing all-sky images in the visible spectrum, for online or later visual display, inspection and analysis of clouds during daytime. It shall be mounted at an elevated location with a best-possible 180° field of view to the sky and the horizon, and with a minimum of disturbing obstacles (trees, buildings, masts, ...).

1.3 Read This First - Part A - Before start working with an ASI

==========

1.3.1 Your "ALL-IN-ONE" login name and password, for all CMS services:

Your agent (distributor, integrator) has provided your personal "Login-Data".
If you have NOT received your LI/PW data, please contact your agent or CMS.
You NEED your LI/PW to access ASI-16 imagers and all CMS online services.

EXAMPLE, how the login-information from your dealer may look like:

Company Name:	Institute for Climate Research, xyz.	
Login-Name:	20123_3	to log-in to CMS-CRM and CMS-FTP services.
ASI LI-Name:	LI20123_3	to log-in to the ASI-16 imager browser web-gui.
Password:	AB23xy95!	for ASI-16 web-gui, CDS-CRM and CMS-FTP.

The "LI" prefix in the username must be used for ASI Web-GUI login only.
Login to CMS-CRM and CMS-FTP requires username WITHOUT "LI" prefix.
This LI/PW shall be used for CRM, FTP and (LI...) for all your ASI imager systems.
Please carefully note above data. - You need it all time to access CRM and ASI-16.

==========

1.3.2 Step-by-Step Procedures for Initial Client (End-User) Setup:

a) Read "1.3.3 CMS-CRM - Management Platform" on next page.
Login to CMS-CRM, with your all-in-one Client-ID / Password:
URL: https://service.schreder-cms.com/crm/

b) In ./Download/ download, unzip, store and read latest ZIP/RAR, including ...
- ASI-16_V24 software- and hardware-manuals and support documents;
- ASI-16_V24 software installer and tools (ASI16-Installer_V24, Support);

READ this "Operator Manual" to understand **ALL** pre-installation procedures!

ASI is a "network device", requiring a LAN with qualified router & firewall.
Your LAN Router/FW must run a DHCP service to automatically allocate IP's.
Your LAN must have access to a stable NTP time server (e.g. pool.ntp.org).
Your LAN Firewall must allow access to one (or more) S/FTP server(s).
Your LAN Firewall must allow Internet access via some specified ports.
Contact your company IT department for preparation and support!

c) **Log-in to "CMS-CRM", check and/or update/add all pre-set data.**
Read "1.3.3 CMS-CRM - Management Platform" on next pages!
Start with data in ./MyData (=Client), continue with data in ./Imager.

Check and update Imager Location(s) data (Name, GPS, Email).
GPS coordinated (LAT/LON/ELE) MUST be as precise as possible.
GPS data are used for shooting control and analysis software.
When operating multiple ASI, data must be set for/in each imager.

Check and eventually change time zone setting to your local time zone.

Check and - later, after testing - change "Default Data Storage".
We recommend to first keep "CMS Default" and test with CMS-FTP.
When testing was OK, you may change to your own S/FTP server.

Set server data in "MyData", and set Imager to "Client default data storage".
Consider to use two S/FTP servers, the second FTP as "mirror".

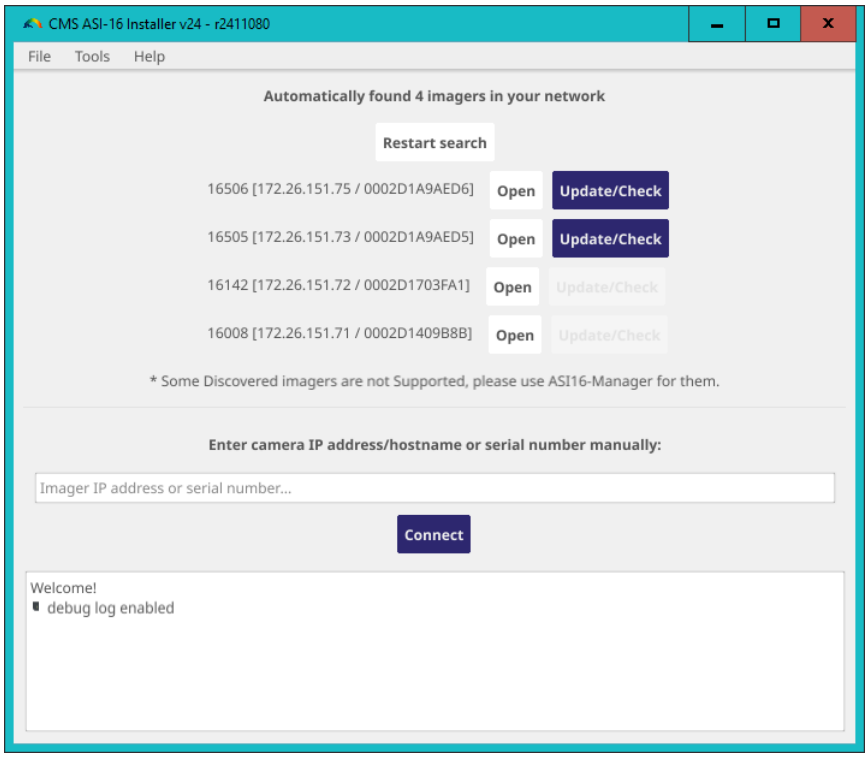
Check and select a "Shooting Template" which matches to intended use.
Notice: "Cloud Motion Analysis" requires fast pic intervals (15 seconds)!
Select your Template in "MyData", and set Imager to ... "Client default.".

TAKE YOUR TIME! - Some CMS-CRM data are critical for ASI operation!

d) LAN Connection: ASI-16 imager requires its IP to be set by a DHCP service.
ASI-16 and your PC shall be connected via a router/FW running DHCP.
Through this router, ASI-16 and the PC must have access to Internet!
DO NOT try to connect ASI-16 directly to your PC (peer-to-peer)!
DO NOT set a "fixed IP" on/via the ASI-16 web-gui user interface!

e) Connect ASI camera to CMS-HPoE-Box (ADV) or PoE-Injector (BAS).
Connect power to CMS-HPoE injector. - Power-On. - **WAIT >2 minutes**!

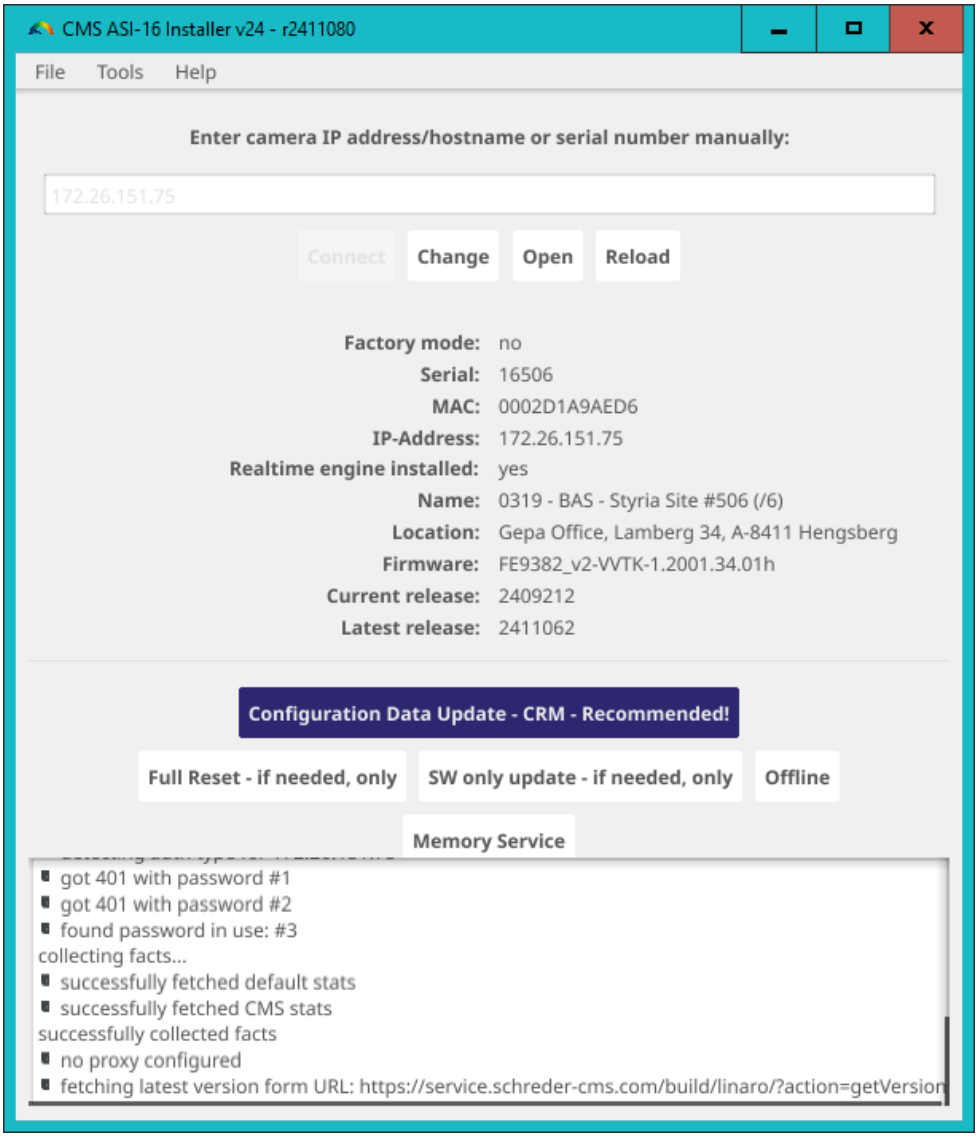
f) Start the latest "ASI16-Installer_V24" and wait till ASI(s) are listed.
If not displayed after max. 30 sec., close ASI16-Installer and re-start.
If still not displayed, find the ASI's IP by using an IP scanner tool.



g) Click on "Update/Check" for the ASI-16 you now want to update.
OR (if not automatically found) enter ASI's IP or SN and click "Check".
Wait 15-30 seconds, till you see a list of ASI data and parameters.

In case of problems refer to detailed explanation later within this manual!

h) Click **"Full Reset - if needed only"**. - Notice and agree to security questions.
This initial setup will , within one run, update ASI to the very latest software and will update all settings to the customized configuration as defined in CMS-CRM.



i) Wait up to 5 minutes, till you see "Installation Fully Completed".

j) Power-off ASI. - Wait >10 seconds. - Power-on ASI. - **WAIT >2 minutes**!

k) On ASI16-Installer_V24, click on "Open", to open ASI Web-GUI.
OR ... : Open Web-Browser and enter IP of the ASI you just updated.

l) Login with "All-in-one" Login Username/Password , as in CMS-CRM.
ASI-Imager Username starts with "LI" followed by your Client ID.

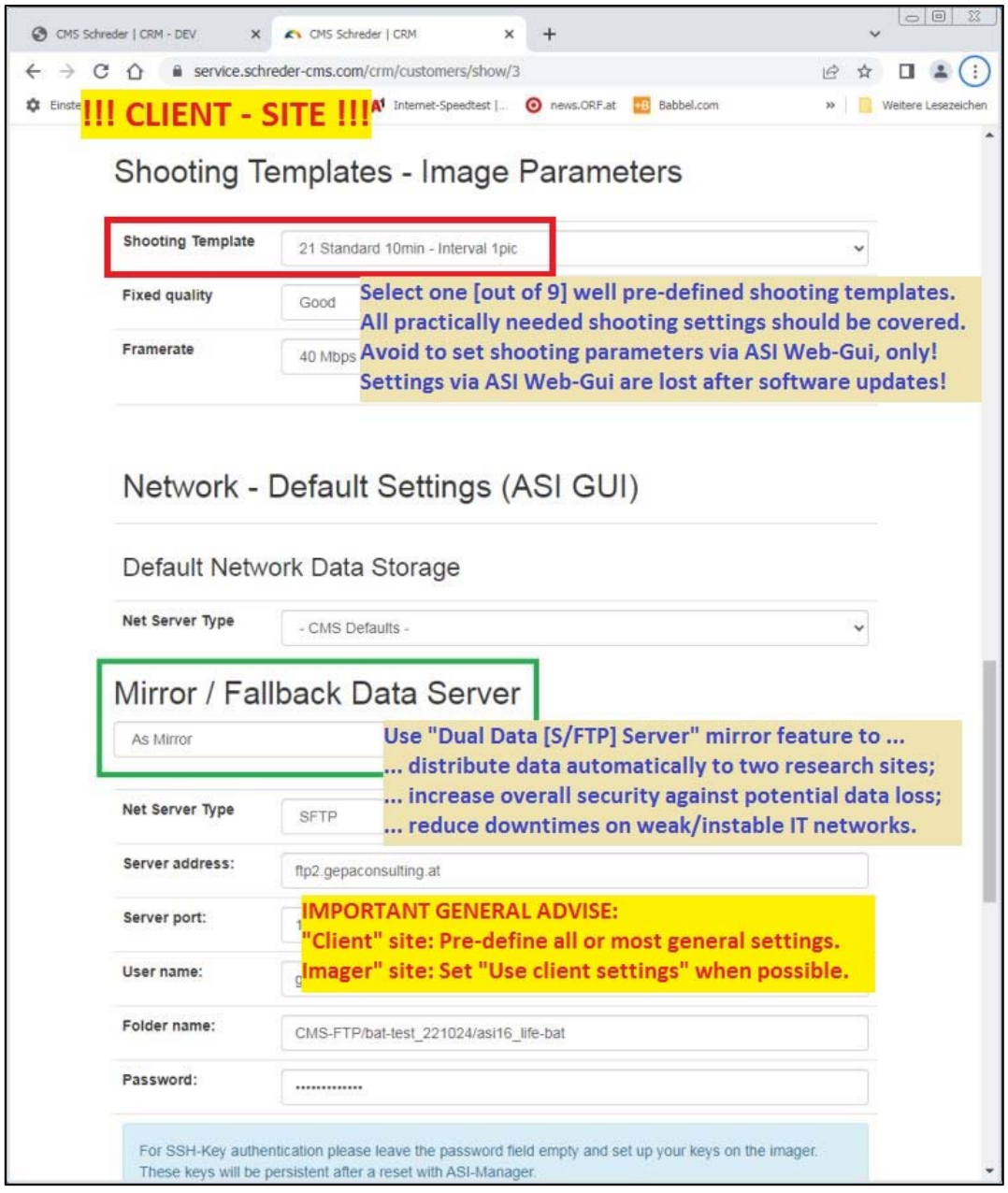
m) After Login to ASI Web-GUI, press <CTRL-F5> about 2-3 times.
<CTRL-F5> refreshes browser cache to download new pages/frames.
Navigate through all ASI-Gui sites, and check all settings.

1.3.3 CMS-CRM - Management Platform for Client and Imager Data:

CMS-CRM is the central and main tool to manage your CMS hardware and software. - It allows to manage, pre-set and safely store all ASI configuration data, to lock and unlock hardware options, to retrieve FCT-19/200 cloud analysis software license keys, and to download all latest software, tools, manuals and (technical & scientific) side documents.

CRM URL: https://service.schreder-cms.com/crm/
Login: Your (all-in-one) Client-ID and Password.

/Clients: Register (create, update) end user customer/client datasets.
Maintain client/customer-specific generic imager parameters.
Maintain "client data" to be used for associated ASI cameras.



/MyData: Maintain your own client/customer-specific generic imager parameters.
Maintain "client data" and templates used for associated ASI cameras.

/Imagers: IMPORTANT! - Data are used by "ASI16-Installer" configuration updates!
License-Key: For FCT-19/22 (FindClouds Trinity) Analysis Software.
Maintain imager-/ site-specific parameters (site name, gps/locale data).
Create additional personalized (ASI imager-specific) sets of LI/PW.
Offline-Package: For ASI-16 SW updates without stable Internet access.
For "Agents": Re-locate "your" imagers to your (new) client/customer.

/Downloads: Software tools, manuals and side documents for ASI-16 imagers.
License-specific SW downloads and documents for FCT (FindClouds ...).

DOWNLOAD IMPORTANT SOFTWARE-TOOLS :

ASI16-Installer: To locate ASI-16 IP's and to update data and software.
To find ASI via "Alias IP" when connected peer-to-peer.
To check camera IP (... DHCP ...) configuration status.
To reset IP status to "Get IP automatically" if required.
For disaster recovery: Access ASI "backup memory".

1.3.4 DATA STORAGE - CMS DEFAULT - CMS FTP/S SERVER:

FTP URL: ftp.schreder-cms.com
Login: Your (all-in-one) Client-ID and Password.

Upon delivery, your ASI will send JPG images to a CMS provided FTP server.
This CMS FTP service is free of charge for a storage capacity up to 10 GByte.
Without special agreement, data on CMS FTP are stored for about 18-24 months.

After having setup your own S/FTP please change settings in CMS-CRM.

Please install a professional FTP client, like FileZilla.
Create a local directory for your CMS-FTP down-loads and up-loads.
For example: C:\CMS-ASI-FTP\ or [YourServer]:\CMS-ASI-FTP\.

/asi16_data: JPG images sent by all "your" ASI-16 imager(s).
To be used before setting up your own FTP/NAS.

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1.4 Read This First - Part B - Network & Electric Setup

After receiving your ASI-16, at very first you shall set it up indoor in an office place!

Usually in most larger organisations / institutes / companies an "IT department" must register the ASI imager MAC-IDs, configure firewall and router rules, maybe has to open ports if you want to use some CMS web-services (CMS DDNS, CMS FTP, online updates, etc.), and (if later on you do not want to use CSM-FTP) setup an internal S/FTP server.

You should setup and test your internal IT/NET infrastructure with your ASI imager running indoor in your office. Move the ASI to its final outdoor location only after IT network setup is completed and all ASI functions are tested to work as expected.

2 Important General Remarks

2.1 This Operator Manual

This Manual is an essential and integrated part of the equipment. The information herein will help to you to maintain the equipment in safe and stable working conditions.

Before starting to work with the equipment you must read and understand this manual.

Keep this manual close to the equipment, during the entire life cycle of the equipment. Any person which intends to works on the equipment, must first read and confirm having understood this manual. In case of that this manual has got lost or damaged, please contact your CMS sales representative or CMS in Austria for receiving a new copy.

Modifications on the equipment and on this manual are subjected to the manufacturer or his authorized representative, only. You shall use original spare parts as supplied or approved by the manufacturer. - What so ever non-authorized modifications and use of what so ever non qualified spare parts will lead into loss of warranty.

2.2 Scope of Delivery: Check of Packaging and Content

Upon receiving the delivery, immediately check the packaging and the content for any visible damages. If so, make pictures for evidence and document in writing, and send your damage claim to your forwarder, to your CMS agent and to CMS in Austria, for qualified damage insurance claims. - Also check completeness of the scope of delivery, and immediately report any eventually missing or damaged components.

The "External T/RH Sensor" comes in a separate box, and MUST (!!!) be connected to the matching 4-pin connector at the bottom side of the "Peripheral Controller" module!

2.3 Identification, Name-Plate, Technical Data

The ASI-16 imager is marked with a "Name-Plate Sticker", indicating the equipment name and model code (ASI-16/52), year and month of manufacturing, serial number (16nnn) and the LAN adapter MAC-ID. This name plate sticker is applied inside the cover hood, and smaller stickers on the "Peripherals Controller Box" and the bottom of the imager head.

CMS ASI-16_V24 Imager System || Technical Data & Specifications || ASI-16/55-Advanced & ASI-16/15-Basic			
Imaging Sensor Chip	1/1.8" Progressive CMOS	LAN Network Type Network Protocols	100 BaseTX Ethernet (RJ-45) - IPv4, IPv6, TCP/IP, HTTP, (HTTPS), FTP, FTPS, SFTP, DHCP, NTP, DNS, DDNS, RTSP/ RTCP, SMTP, PPPoE, SNMP, SSL,
Imaging Sensor Resolution	3096 x 2094, 5 Megapixel		
Useable Resolution	1920x1920 (Fisheye)		
Field of View (useable view)	180° / 360° (150° / 360°)		
Lens, Focal Length, Aperture	Fixed-focal, f=1.47mm, F2.2		
CMS ASI Optical Dome	Strong Quartz Glass, coated	Software Updater, Tools	CMS ASI installer, CMS toolkits
Imager Spectral Range	Visible Spectrum	Data file network upload	S/FTP/S server (file server)
Minimal Illumination	0.18 Lux @ F2.2 (Color)	Realtime video stream	MJPEG, H.265, H.264
WDR Techn., Dynamic Range	WDR PRO (Enh.), 100 dB	Grapic User Interface	Web Browser, WIN-10/.../11
Ventilation, heating (./5n only)	80 m3/h, 60W heating power	Power supply system	[H]PoE (Power over Ethernet)
Environmental Sensor (./5n only) Pyranometer Interface (./5n only)	Temp/RH, Sensirion SHT85 digital, ModBus (RS-485)	Power supply input Power consumption	[CMS-H]PoE, 100V - 240V AC ./5n: 15W/80W; ./1n: 15W;
Internal data backup memory	Industrial MicroSD CF, 4GB	Operating Temperatures	-40°C (-25°C) to +80°C (limited)
Mounting rod dimensions:	DM: 37mm to 40mm (max)	Environmental Protection	IP66, IP65, EN50155,

2.4 Use of Packaging, Waste Disposal, Recycling

Packaging material should be stored and used for later safe transportation and shipping.

Upon end-of-life of whatsoever materials, equipment, components, accessories and wear parts, all such parts must be recycled and/or disposed according to applicable local laws and regulations at the country of operations. - During warranty time, defective spare parts must be returned to CMS, or must be recycled/disposed as above, subject to corresponding notice and advise by CMS or your local CMS agent in advance.

2.5 User/Client Network Requirements - LAN - Network Data Storage

For continuous stable operation, client MUST connect ASI via a LAN/WAN router with DHCP service enabled, and send data to a network attached (S/)FTP(/S) network storage. ASI imager shall be set to "Get IP automatically", getting the IP from LAN DHCP service. Setting ASI to "Fixed IP" will cause problems, especially after each software update!

CMS does NOT warrant stable operation, when connecting ASI without a router and without DHCP service enabled. Except for temporary maintenance, do NOT connect "peer to peer", especially not to a standard office- PC running a standard MS-Win OS.

Network data storage via FTP server:
Initial testing and low data load use: Access to free-of-charge CMS FTP account.
Long-term operation, high data load: Corporate file server or dedicated RAID-5 NAS.
- In most cases such (NAS-) servers already include and/or run a "FTP server " app.
- ASI will upload data via FTP. Client apps can access data via "file share" in real-time.
- In such setup there is no need to regularly download/sync data via a FTP client.

3 Safety Warnings - Safe Installation

3.1 Qualified and Trained Personnel

This equipment must be installed, configured operated and maintained by such personnel ONLY, which has/have all necessary theoretical and practical knowledge, education and training to perform such tasks, especially sensitive and potentially risky or dangerous tasks related to mechanical, electrical and IT-related works.

Before starting to work with the equipment the operator or engineer must fully read and understand this manual. Knowledge of the technology and works involved, and detailed knowledge and understanding of the entire content of this manual is a fundamental requirement for safe and stable long lasting performance of this equipment.

3.2 Critical Out-Door / In-Door Installation

A part of ASI-16 components (Imager Head) is prepared to be installed in harsh out-door environment. But another part of the components (HPoE Injector, DC Power Supply, network router cable) MUST be installed in in a dry indoor-like environment.

Check the below description to identify outdoor-prepared and indoor-only components:

OUT-DOOR PREPARED:

- ASI-16 All Sky Imager
- Rod mounting footer
- 3 screws and rings, M8
- External T/RH Sensor (a)

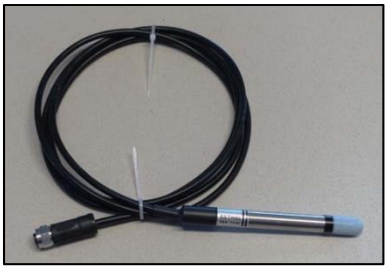
OUTDOOR <-> INDOOR:

Data/Power Cable (HPoE & CAT5)
Standard cable length: 20m
Extension cables: Upon request

IN-DOOR - ONLY !!!

- Special CMS HPoE Injector
- Power Adapter (48VDC / 90W)
- AC Power Cord (100V-240V)

WARNING: Must be installed at dry and safe place with an indoor-like environment.



(a) External T/RH (Temperature - Humidity) Sensor:

ASI-16/n5 comes with an external high precision T/RH sensor. Shall be mounted into a meteorological "Radiation Shield".

NOTE: The CMS standard T/RH sensor "TRH45-STA" is NOT fully resistant against salty sea water, like on a vessel or when mounted close to a seawater shore.

OPTIONAL: T/RH sensor "TRH47-CEP" with enhanced protection against "corrosive environments". - Available upon separate order.

3.3 Specific Safety Risks and Warnings

3.3.1 WARNING! - RISK OF INJURY OR DAMAGE BY ELECTRICITY

Before starting any works, have the DC power adapter disconnected from main power!

3.3.2 WARNING! - RISK OF INJURY DURING MECHANICAL MOUNTING

When working on an elevated platform or a ladder, you must wear qualified personal safety equipment (safety shoes, safety helmet, safety rope, roof railings) and tools.

3.3.3 WARNING! - RISK OF ELECTRICAL DAMAGES AND PERSONAL INJURIES

The components above marked as "INDOOR-ONLY" (special CMS HPoE Injector, Power Adapter, AC Power Cord) must be installed at indoor at a dry and safe place, or inside a water- and humidity-tight electrical cabinet. It MUST NOT be installed at an open outdoor place with the risk of exposure to water (rain, snow, ...) or high (condensing) humidity. - Water or high humidity may cause direct and indirect damage to the equipment and the network, and may lead to injury and even death by electrical shocks.

3.3.4 WARNING! - RISK OF PERSONAL INJURY BY COMPONENTS FALLING DOWN

Mechanical installation of the ASI-16 imager (mounting on an instrumentation mast or an instrumentation platform) must be performed by personnel experienced and trained in such work, and with qualified knowledge about the situation at the installation site. Personnel must ensure to mount the equipment at a stable and safe site, must properly fix and secure the equipment from falling down, even in the case of special environmental conditions (strong winds, tornados, earthquakes, ...). The equipment falling down may cause severe injury and even death.

3.3.5 WARNING! - RISK OF DAMAGE THROUGH LIGHTNING STROKE

Typically the ASI-16 will be installed at an elevated outdoor location, which increases the probability of a direct or indirect lightning stroke. It is technically impossible to protect the equipment from receiving or forwarding the lightning stroke pulse. The equipment DOES NOT INCLUDE any counter measures. - It is subject to the customer's decision to implement qualified measures at the point-of-entry (LAN connection, AC power connection), to protect his own internal or peripheral equipment, and to connect or not-connect the mounting rod/platform to earthing / ground.

3.3.6 WARNING! - RISK OF DATA LOSS - NO "ZERO-TOLERANCE" USE

The equipment is NOT qualified for zero-tolerance applications. Although thoroughly tested, CMS cannot exclude residual risks of short term or long term data losses and/or system down. The equipment MUST NOT be used for super-critical applications.

3.3.7 ADVISE! - TAKE SPECIAL CARE WITH THE GLASS DOME

The "glass dome" is a critical sensitive optical component. Do not touch the dome with any tool, do not let it drop down, and use multiple soft wet tissues without any pressure when cleaning, to avoid scratches. A scratched dome is not subject to warranty replacement!

3.3.8 ADVISE! - Special preparation for use near salty seawater air environment.

When installed near salty sea water, like on a vessel or close to a seawater shore more salt desert/lake, after some weeks or months some (outer) parts of the ASI-16 Imager will start to show corrosion. - To avoid later **severe damage**, especially on all outer electrical connectors, the CLIENT must ensure regular qualified protection treatment and regular check and maintenance. - Later damages because of lake or protection treatment and/or lake of maintenance are NOT covered by warranty!

ADVISE: To reduce the risk of corrosion damages, especially on and inside electrical connectors, IMMEDIATELY after receiving and installing the ASI-16 imager, the CLIENT shall apply **thick layers** of a marine-use qualified **sticky "dielectric grease"** to all connectors and plugs, outside at the screw areas, BUT ALSO INSIDE - AT THE PINS!

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4 CMS Internet Services: CRM - FTP - VPN

CMS-Schreder provides some Internet-based services, which run on a CMS service-server connected via a powerful and fast hub, providing 24/7 supervised operations.

CRM-service (Customer Relation Management) is IMPORTANT for "daily use", as settings directly influence behaviour of ASI software updates / restores via the ASI16-Installer.

Other CMS services (FTP, DDNS, VPN/REM) are provided for customer convenience, only. Those services may help the customer to speed up installation, or enable more easy access via Internet. Later on the customer may continue to use the CMS server services, or the customer may setup his own services on his own network and IT infrastructure.

4.1 How to connect to CMS Internet Services

Before or upon delivery of your imager you should have received an email with your "Personal Username/Password-Set" (LI/PW). - There is ONE individual LI/PW for each CMS agent/client account, or for a client sub-account generated by a CMS agent.

Username:	The CMS account number of the agent/client (for example 20123).
Imager LI Name:	"LI" followed by the same account number (for example LI20123)
Password:	A combination of letters and digits, issued by CMS or by the agent.

This is the "one-for-all" LI/PW to be used for Imagers as well as for Internet Services.

With this LI/PW the customer/agent can access ALL imagers allocated to his account.
NOTICE: An Imager Login Name MUST start with "LI", followed by the account number.

With the same LI/PW you can access CMR to check and manage imager settings.
And you can use it to access your CMS-FTP-storage place through any FTP-Client

4.2 CMS CRM: To check and manage imager and clients settings

Open THIS WEB URL: https://service.schreder-cms.com/crm/

To log-on, enter your "one-for-all" LI/PW (Username=Client_ID, and password).

Now, depending on if you are an "AGENT" or a "CLIENT", at the top line you will see a number of "navigation buttons". - When logged-in as "Client" ("End-User"), on the top bar you will see "MyData", "Imagers" with list of your imagers, and "Downloads.

When logged-in as CMS/EKO "Agent" (distributor, integrator) you also will see "Clients", which allows to you - as Agent- to manage all your client-accounts for existing "clients", add new "clients", and re-locate (setup) client's ASI-16 imagers. - The Client_ID for new clients will be generated automatically upon "UPDATE, and cannot be changed or deleted. Other parameters can be can be changed or added later on, also by the client himself.

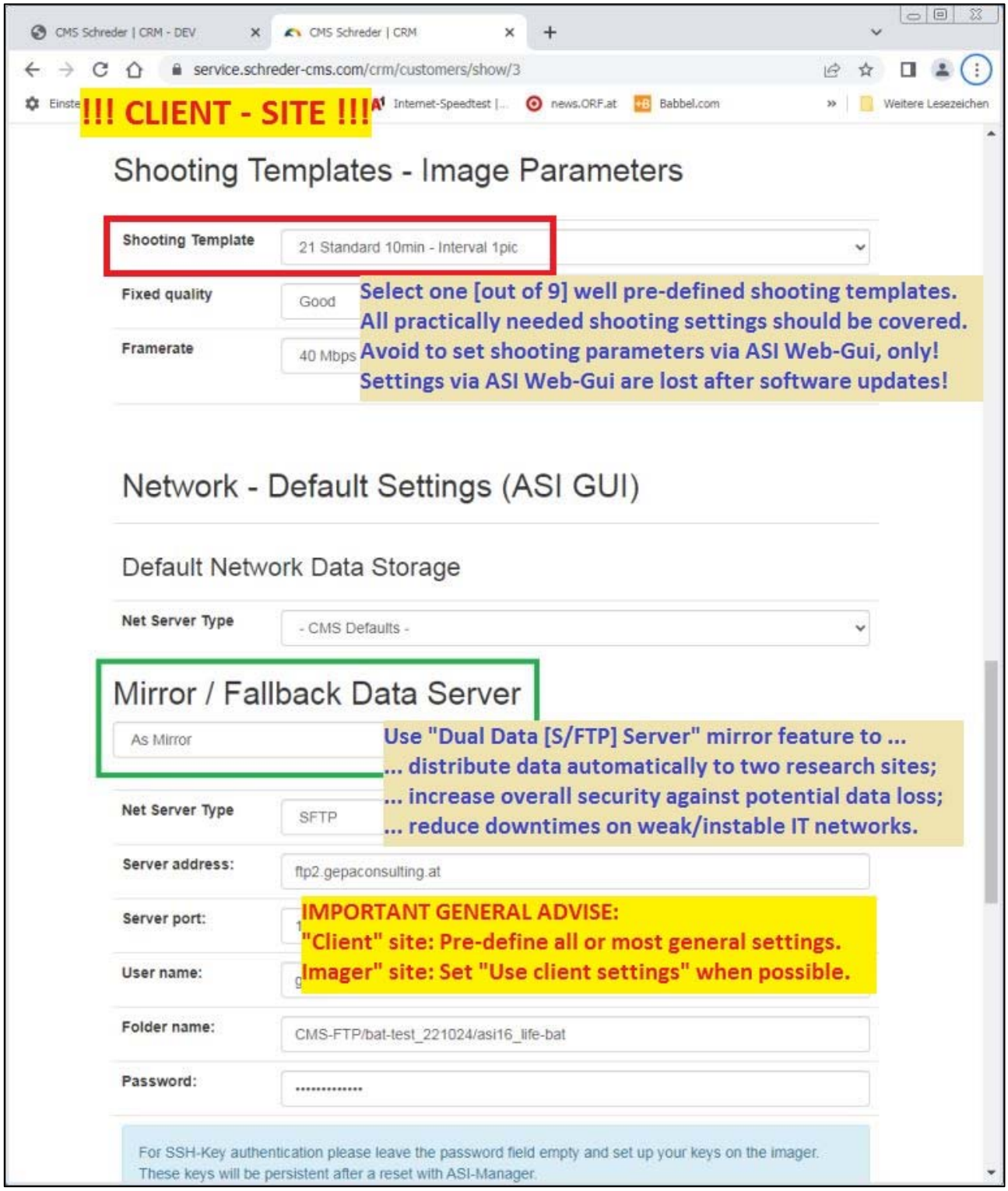
4.2.1 "MyData": To manage data of "your" company / institute / organisation

Company Name, other names, address, email, phone, notes:
Contact data for after sales service and support by your agent and/or by CMS.

Imager Default Data, Shooting Template, ...:
Will be used for default configuration of your ASI imagers, if you run just one ASI.
If you use more than one ASI, you must configure each ASI on the "imager" pages.

Network - Default Settings (for data storage server):
To be used as default configuration of all ASI imagers, if you run one FTP server, only.

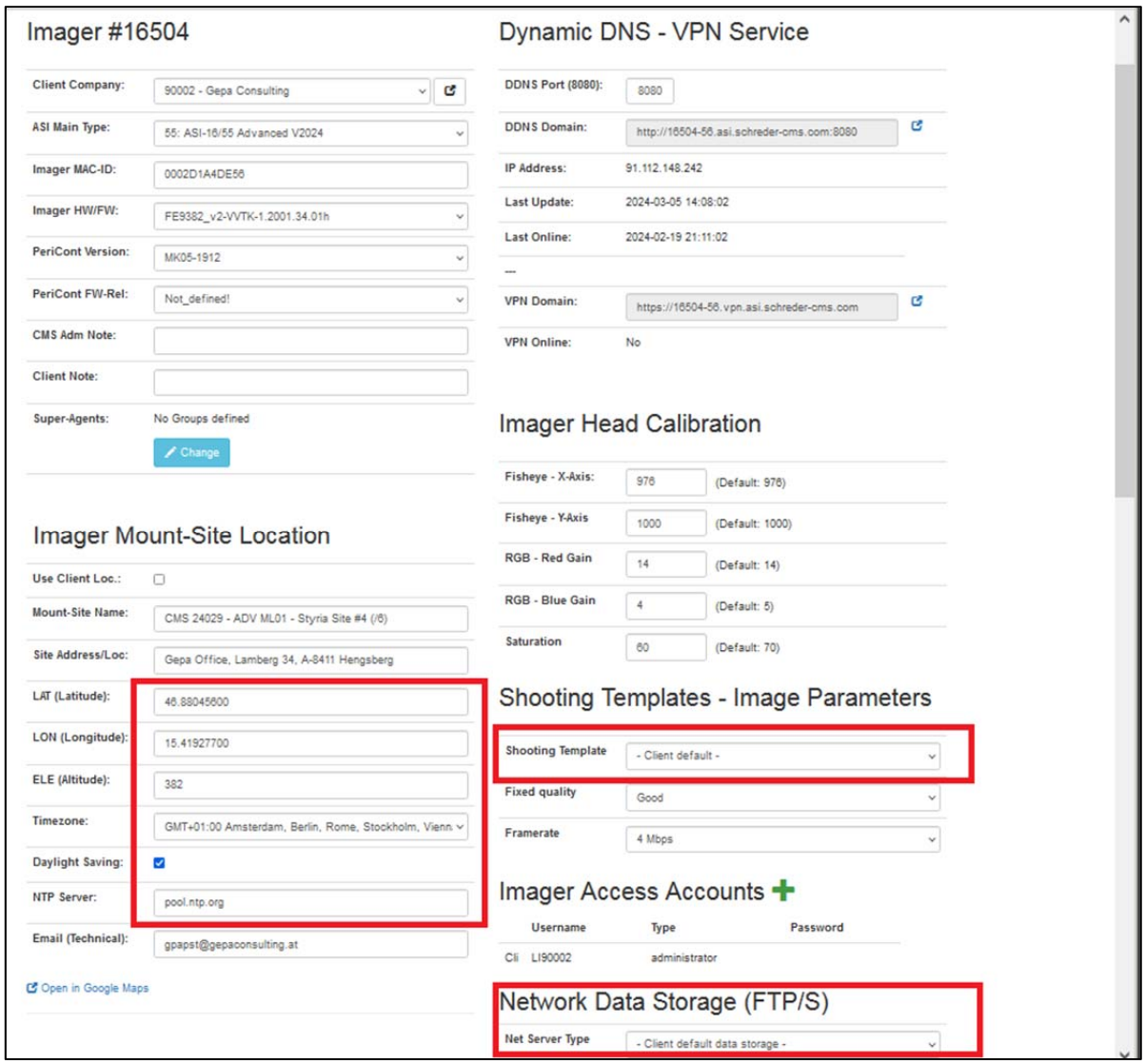
Assigned ASI Imagers: A table of all imagers allocated to your account.
Click on the "Serial Number" to immediately open the corresponding "Imager" site.



Press the green [UPDATE] button to permanently store all your changes.

4.2.2 "Imagers": Configure location, create LI/PW-sets, and more.

To change settings for this imager, permanently. New Settings will be transferred to the imager at the next FULL-RESTORE (!) by using the ASI16-Installer. CRM settings will replace all eventual local changes on the imager via the imager Web-Gui! - New LI/PW and other parameters will be transferred also by an ASI16-Installer FULL-RESTORE !



Client Company: The Client/Customer (or the Agent) allocated to this Imager.
ASI Main Type: Version of ASI Imager Head (11/... Basic, 51/..., 52/..., 55/ ADV),
Imager MAC-ID: The MAC-ID of the imager head, important for your firewalls.
Imager HW/FW: Low level firmware (operating system) of the ASI imager head.
PeriCont Version: Hardware version of the [advanced] "Peripheral Controller" (box).
PeriCont FW Rel.: Original Firmware version of the "Peripheral Controller" (box).
CMS Adm Note: Notes to be entered by CMS Schreder Administrator, only.
Client Note: Notes to be entered by the Agent or the Client.

Imager Mount Site Location: Imager location title and subtitle, GPS, time zone, ...:
GPS coordinates and time zone are important for shooting and analysis.
Uncheck "customer location", to change settings for multiple imagers.

Dynamic DNS: All entries are "read-only", for check and copy/paste only.
Domain: The CMS provided DDNS domain name (URL) of this imager.
The ASI imager will use the Alternate HTTP Port 8080,
If necessary set-up "port translation" on your firewall / router.
IP Address: Latest updated WAN IP address of the ASI imager.
Last Update: Last time the Imager has sent an IP update ping with a NEW IP.
Last Online: Last time the Imager has sent any IP ping (indicating "be-alive").

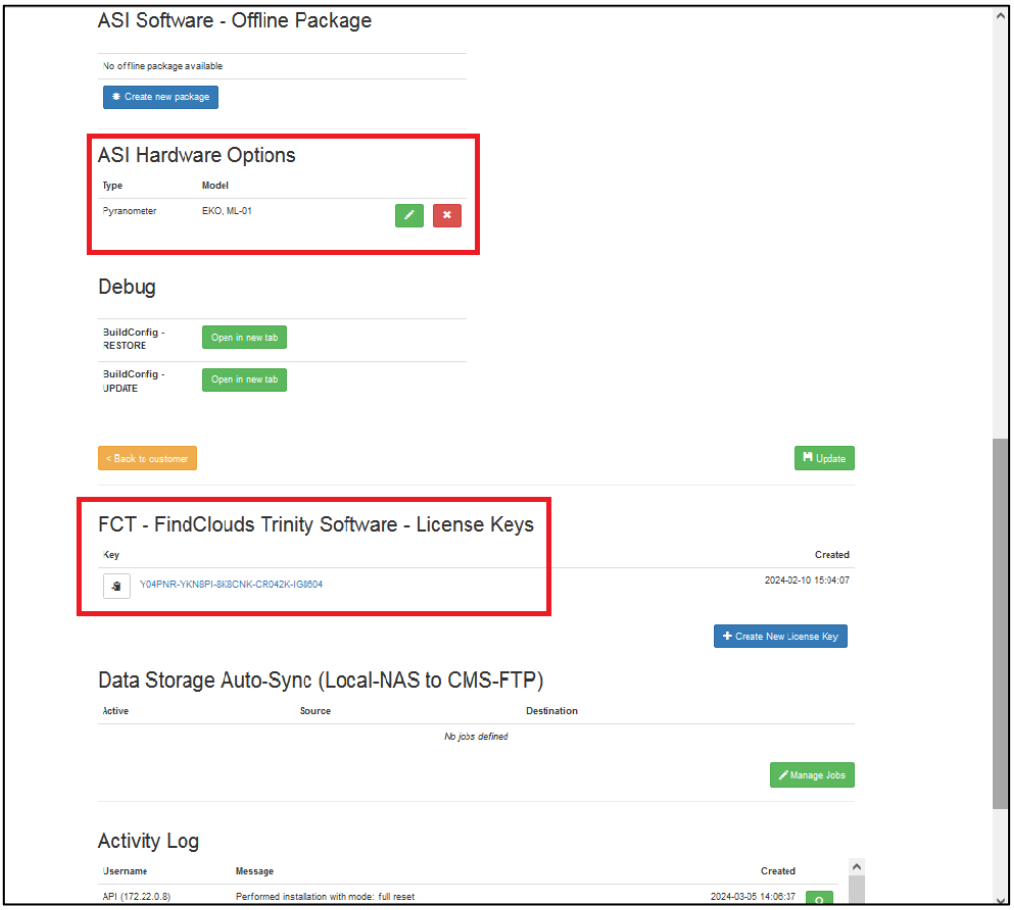
Image Calibration: DO NOT CHANGE any of the settings herein!
CMS has calibrated image sensor data before delivery!
Change of pre-defined settings may reduce image quality!

Shooting template: Select template which matches best to intended use of data.

Image Quality: To select JPG compression level and network bandwidth limit.
As "better" setting, as better image quality, but as larger file size.
For FCT cloud analysis software we recommend to use "good".

Imager Access Accounts: Enter or change up to two additional LI/PW for this imager.
The Username(s) MUST begin with an ALPHA symbol!
New or changed LI/PW can be used AFTER next UPDATE
or RESTORE of the imager by using the latest ASI16-Installer.

Network Data Storage: "Client default data storage" or imager-specific FTP server(s)



ASI Hardware Options: Only available after purchase of "Pyranometer Option".
To select a specific Modbus Pyranometer Model/Version.
Necessary for ASI imager to connect to the Pyranometer.

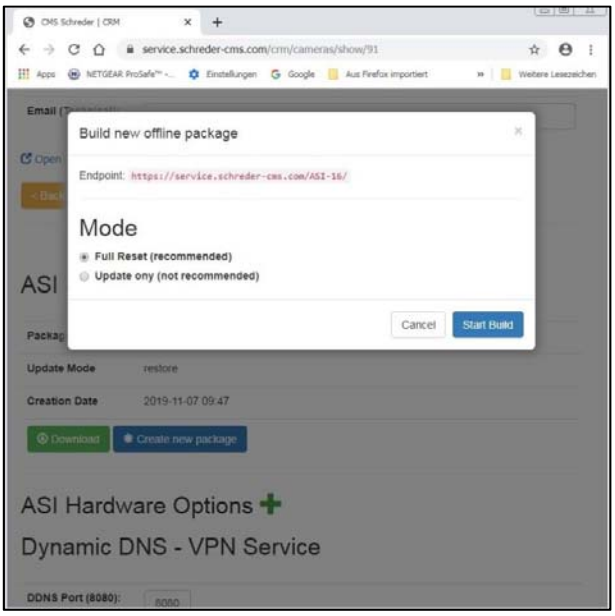
<u>Press the green [UPDATE] button to permanently store your changes.</u>

Offline Package: To generate and download a "software update package".
Only for clients / installations with very strict firewall regulations.
Only for updates, if the ASI16-Installer has no stable internet access.

Step 1: "Create a new package" - Select as needed.

Step 2: "Download" - Download ZIP package to your PC.

Move this ZIP-file to a PC (storage) "within the strong firewall".
Run ASI-Manger on the this PC "within the strong firewall".
Set the ASI Manager to "Enable OFFLINE-Mode in any case".
Select imager via "Update/Check". Start "Install offline".



FCT - FindClouds Trinity Software - License Keys:
Available only after purchase of an FCT analysis software license:
To be entered (copy/paste) into the "FCT camera configuration.
Necessary to enable FCT to analyse images from "this" ASI imager.

Activity Log: Show automated (API) activities, like updates and restores.
Also allows to manually enter multiple remarks with time stamps.
For example to log eventual problems, defects and solutions.

Press the green [UPDATE] button to permanently store your changes.

4.2.3 "Downloads": One-and-only source for CMS software, tools, and manuals:

The "one-and-only" source to get (download) all latest software, tools, release notes and user manuals for CMS-Schreder cloud imaging (ASI) and cloud analysis (FC) products. Content is explained in detail on " https://service.schreder-cms.com/crm/downloads ".

4.3 CMS FTP: To up/download JPG images, docs and software

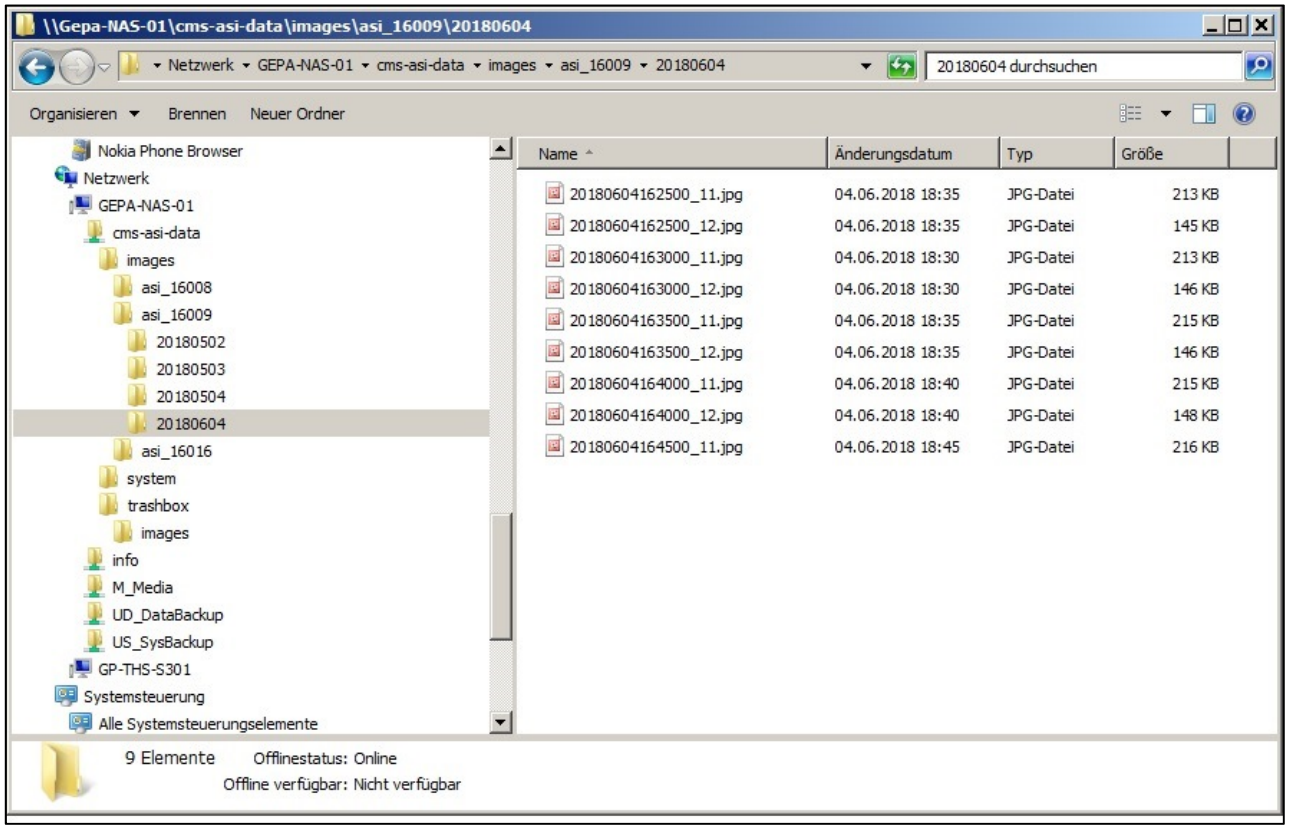
Preparation for using CMS-FTP:

Install and/or use a professional FTP-client, for example FileZilla or PowerCute.

URL: ftp://ftp.schreder-cms.com/
Login: Username/Password : Use your "one-for-all" LI/PW (Client_ID, password).

Your LI/PW will automatically access/open your personal CMS-FTP storage place.

To download JPG images, navigate in the "/asi16_data/" directory structure.
There is a subdirectory for each imager, and below a subdirectory for each day.
For example: .../asi16_data/ asi_16017/ 20161130.



Other directories can be used to store or exchange whatsoever other data.

CMS-FTP must be considered as a "working storage", not as a long time archive.

FTP Data are archived for MAXIMUM 12-18 months, and then relocated or deleted. To avoid data loss, it is you responsibility to download data min. each 8 weeks.

If you want to use CMS-FTP as long-time archive, please contact CMS support.

4.4 CMS DDNS: To access ASI Imagers via WAN (Internet)

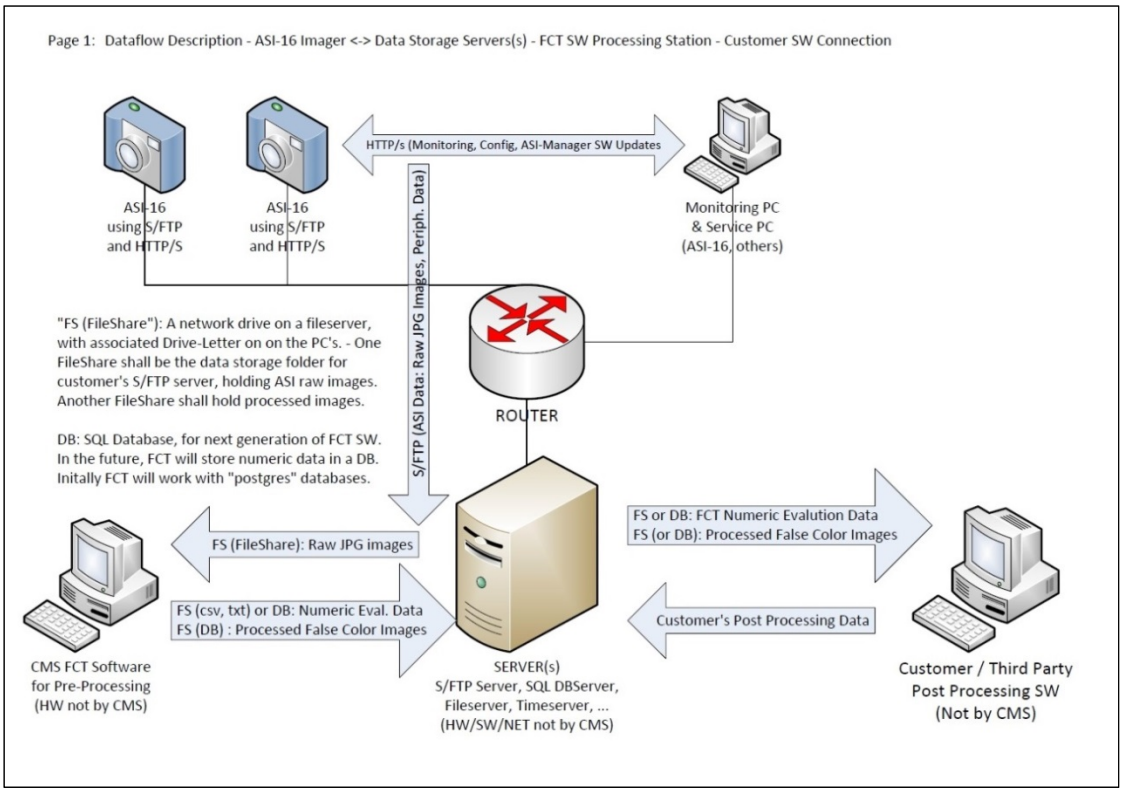
When activated and ports opened in Firewall, CMS-DDNS ("Dynamic DNS") allocates a ASI-unique "Domain Name" (URL) to a static or dynamic WAN-IP. - For example URL "16008-8b.asi.schreder-cms.com:8080" for ASI SN16008.

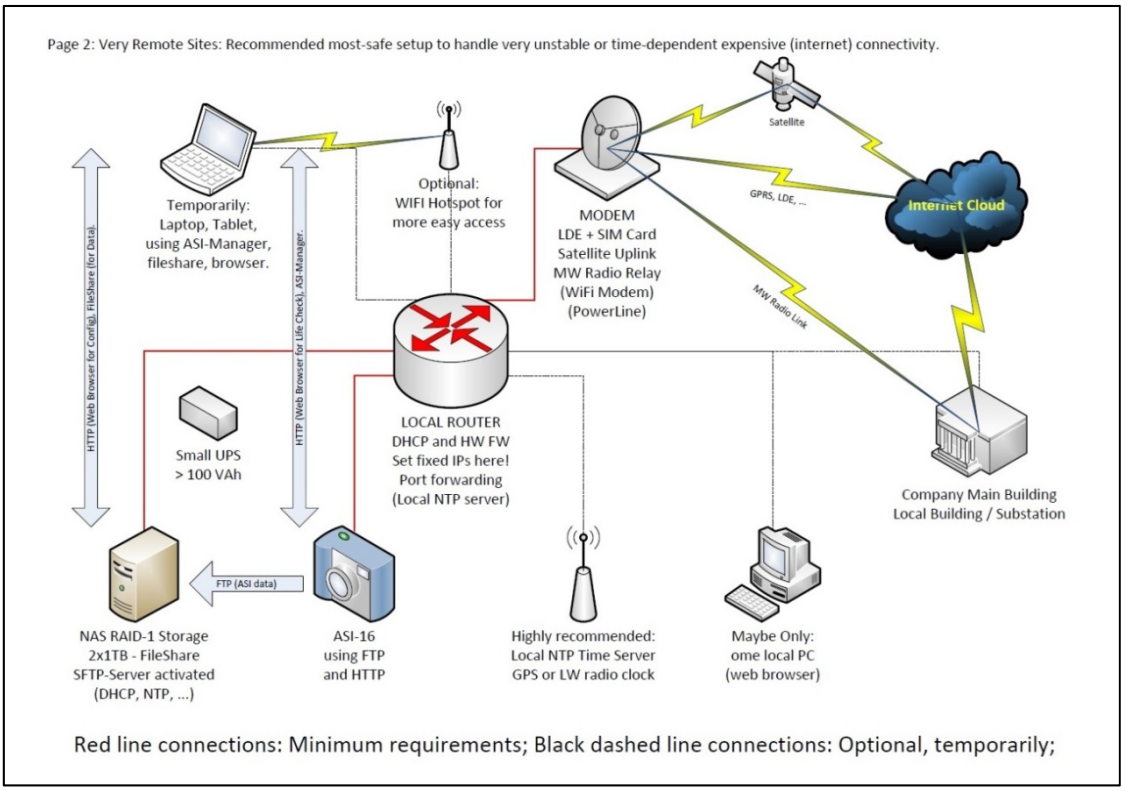
4.5 CMS VPN/REM: To access ASI Imagers without port forwarding

When activated, the ASI establishes an encrypted between ASI-Imager and CMS-Schreder CRM-Server. Then a remote user or CMS support can securely access the ASI via the HTTPS-URL as provided and shown in CMS-CRM.

5 Imager Network and Software - Installation

Before installing a new ASI-16 Imager to an outdoor location, we strongly recommend to run software and LAN network setup, online updates to the latest software, and a pre-test IN-DOOR, in the office! - LAN network configuration and software settings should be tested BEFORE moving the ASI-16 to its final outdoor location.





5.1 IT Administration - LAN (WAN) - Basics (Pre-Requirements)

CMS ASI-16 is a typical "Networking Device", basically comparable to other professional and industrial advanced "IP cameras". All external communication works via TCP/IP, Ethernet LAN/WAN and standard CAT-5 100 MBit (or better) network infrastructure.

ASI required to receive it's IP automatically from a DHCP service running on the LAN

Within the LAN, the imager can be accessed via its (primary and/or alias) IP address.
In the WAN it can be accessed via CMS-DDNS URL, if opened by your IT administrator.

Online configuration, monitoring and online updates work via HTTP (primary port 80, secondary port 8080) or as defined in the Imager Configuration. - We recommend to keep the secondary HTTP port at 8080 and eventually translate this port at the router, as otherwise "online updates" from outside (via WAN and CMS-DDNS-URL) will not work!

5.2 HTTP Access to ASI-16 Imager Homepage

IT Administration should prepare measures, as (a) to open all necessary ports on the firewalls and routers, (b) implement a router rule at the DHCP server to allocate a fixed IP to the imager MAC-ID, (c) implement a router rule for 8080 port forwarding and port translation if the Imager HTTP homepage shall be accessed via WAN / Internet.

5.3 Setup of PC's / LT'S for Monitoring and Configuration

A local PC/LT is necessary for monitoring, configuration and SW updates, ONLY!
Daily operation of an ASI-16 does NOT require any PC with dedicated software.

This PC/LT must be connected to a network router/switch and to the internet. The below standard software (or comparable) must be prepared before working with the ASI-16.

- Install and/or update your web bowser (Firefox, Chrome, Edge).
- Install and/or update Oracle JAVA: https://www.java.com/en/
- Re-check your web browser security settings. The web browser must allow to run plugins, especially run Java and QuickTime Viewer.
- Install a FTP client (e.g. FileZilla, https://filezilla-project.org/download.php). Check for FTP URL and login with your "CMS client account data".
- Copy "ASI16-Installer_V24.exe" to your desktop or any other convenient place.

  All tools and manuals can be downloaded from CMS-CRM/Downloads.

NOTICE: Some Anti-Virus software may block or even delete some ASI-Tools!
In such case add ASI apps to your Antivirus software "Exception List".

5.4 Network Storage (FTP, FTPS, SFTP, others)

The ASI-Imager is designed to automatically send JPG images to a "Network Storage".

To permanently store captures JPG images, ASI must have LAN/WAN access to the (LAN- or WAN-) IP-address or the DNS-URL of a "Network Storage" (FTP or SFTP server).

Upon delivery, every ASI is set up to use the "CMS-FTP-Service", with a customer-specific FTP-Account (ftp://ftp.schreder-cms.com/ - Clients all-in-one Username/Password).

The customer is entitled to use this CMS-provided FTP account free of charge for a storage capacity of up to about 1 GB . - WARNING: CMS cannot guarantee availability and stability of this service, and cannot be held responsible for eventual loss of data. CMS FTP shall not be used as a long-term safe storage place. The customer shall be fully responsible for regular downloads and for clean-up and delete of old data.

Before switching to a customer-internal "Network Storage", customer's IT Administration, shall allocate such comparable services (FTP, ...) and storage capacity at any internal or external file server or NAS which can be accessed by the ASI imager. - The Network Storage must work with a LI-Name and Password. - The password must consider the "limited character set" for non-alpha/numeric characters used in multi-platform web browser interfaces.

5.5 Live Video Stream (viewing, recording):

Life Video Streaming works via Standard Streaming Ports.

We recommend to use Stream-2 for client's streaming applications.

URL: rtsp://[username]:[password]@[ipaddress]:554/live1s2.sdp

5.6 ASI-16/52 Imager - Electrical and Network Hardware Connections

Check the below image and description how to electrically connect ASI components:

(1) Connect the external T/RH sensor. T/RH sensor MUST be connected, as otherwise heating will not work!

(2) Connect one end of the CMS HPoE cable to the ASI-16 HPoE jack at the bottom of the imager. - Before inserting the plug you need to remove the "rod mounting footer".

(3) Connect the other end of the CMS HPoE cable to the CMS HPoE injector. CMS HPoE injector design may vary depending on version.

(4) Use a CAT-5 patch cable (not included) to connect the RJ45 jack on the HPoE injector to your LAN (network) router/switch/port.

(5) Connect 48V DC power supply cable to DC plug on the HPoE injector.

(6) Power-on the AC/DC power supply (connect to 110V/240V AC supply).

(7) Now the fan will start, and LEDs will start to blink.

5.7 HELP: Common IP-Access problems after relocation

Sometimes, against CMS clear advice, at "previous installation sites" the ASI IP-settings might have been changed from "Get IP automatically" (from DHCP service) to "Use fixed IP", with the fixed LAN-IP-settings matching to the "previous" network IP range. - As a result, most likely this ASI Imager cannot be identified in the "new" LAN, at least not by the typical most-easy to use tools (ASI16-Installer, NetScan, ...).

If the ASI16-Installer cannot find the Imager-IP after delivery or relocation, please do not waste time and DIRECTLY proceed with RESETTING (!) the ASI-16 locally set "fixed IP" as described under § 5.8. - In parallel talk to your IT to register the ASI MAC-ID to your firewall and to your DHCP service running on the LAN.

5.8 ASI16-Installer - The All-In-One Toolset for ASI-16 Maintenance

IMPORTANT NOTICE: Before using the ASI16-Installer, please ALWAYS check for the latest version. The latest V24 ZIP/RAR package can be downloaded from CMS-CRM.

"ASI16-Installer_V24" shall be used to identify one or more ASI-16 imagers (imager IP's) on the LAN (network), to open an ASI-16 in a WIN-10/11web browser (Firefox, Chrome, ...), and to restore or update ASI-16 software and CRM configuration data.

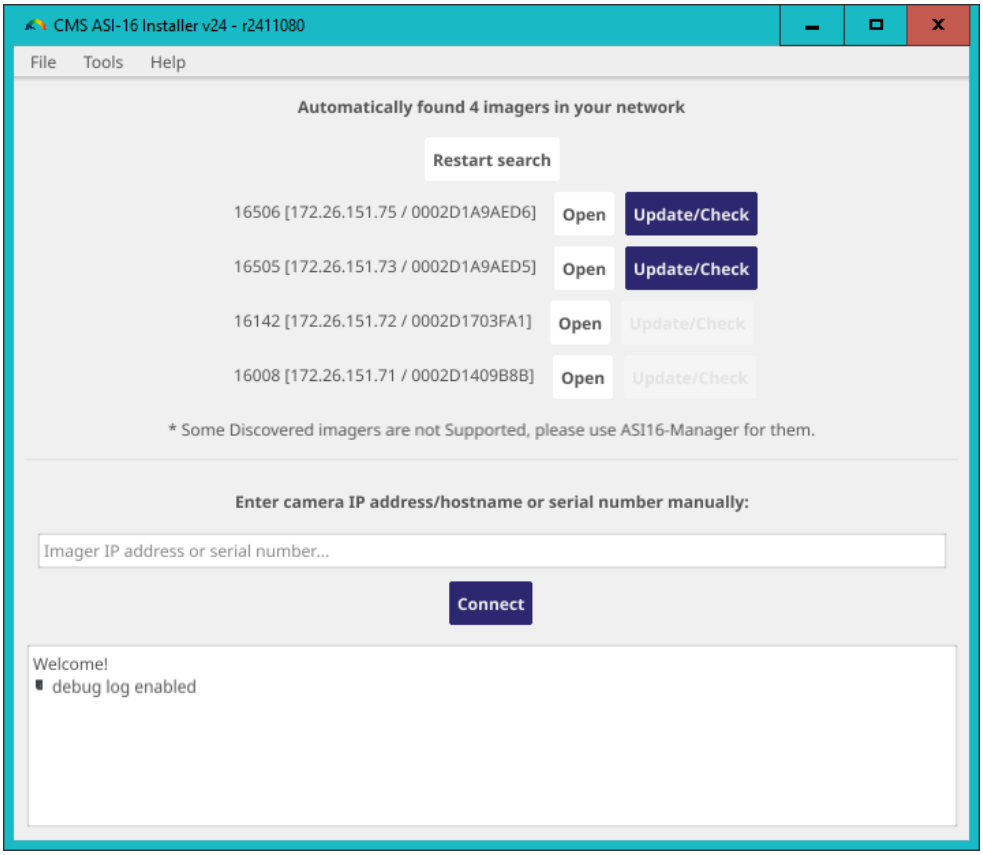
After start the "ASI16-Installer" will search the local LAN for ASI-16 imager devices.

Search may take up to 1 Minute. The "list of imagers" will shows ASI-16 serial number, IP-addresses, MAC-IDs for each device found, and available imager-specific functions.

If the "Auto-Search" feature does not work, try to enter a known valid IP identified through another tool, and/or a remote DDNS/VPN/REM URL, and/or enter the ASI serial number.

Open: Opens ASI-16 Web-Gui in PC web browser, for ALL CMS ASI versions.

Update/... : Show SW status, enable SW updates, restore and IP/CF maintenance.



In most LAN (TCP/IP network) environments the (IP address of an ASI-16 device can be identified automatically. But "auto-detection" may NOT work in networks with very strong or exotic firewall settings, and/or when moving an ASI device with fixed IP settings to another network environment.

In such case check and fix the ASI by using a peer-to-peer connection and use "ASI16-Installer" and/or an advanced "IP/Port Network Scanner", and/or contact your network administrator.

"Check": After entering IP or URL, press "CheckHELP: ASI-IP cannot be identified via "ASI16-Installer"

The "automatic search function" requires the PC and the ASI-16 to have IP's within the same IP subdomain range, for examle a range like "192.168.2.nnn". If the ASI-16 System/Network-Type is set to "Get IP automatically", usually the (router) DHCP service

will allocate corresponding IP addresses, automatically. - But, if the ASI-16 was set to "Use fixed IP ..." in networks with another subdomain range (e.g. "10.0.0.nnn", 172.16.150.nnn), and then the imager is connected to another network with another subdomain range, the ASI-manger search CANNOT identify and work with this "now strange" imager IP!

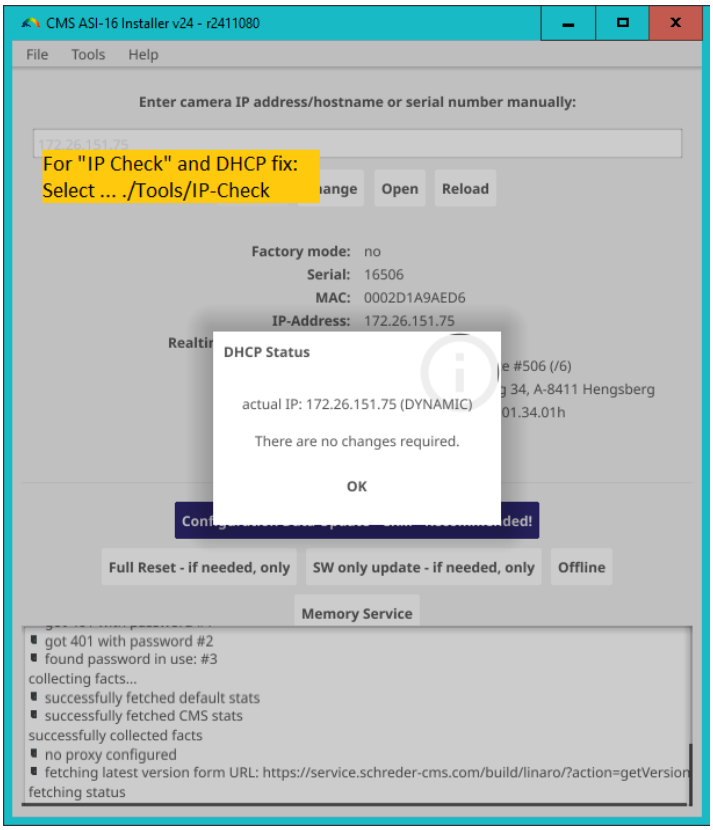
If ASI-16 was set to "fixed LAN IP" in one LAN, it likely cannot be accessed in another LAN. This can happen after moving an ASI to a new location, or you LAN does not run a DHCP service. This tool will reset the LAN properties to "Get IP automatically" (via router DHCP). After reconnection to a router and power-off/on the ASI will receive a valid IP.

You then can find the imager with its new IP via the "CMS-ASI16-Installer".
Or you can search for the camera IP with a "network scanner" tool.

5.8.1 Solving IP Problems: ASI16-Installer "IP Check Feature":

This function will try to reset ASI-16 to "Dynamic IP via DHCP" via its built-in "Alias-IP". Try first to run this tool via standard connection (ASI-16 <-> Router, PC <-> Router.)

If it does not work, connect ASI-16 directly with a cable to your PC/LT, and try again.



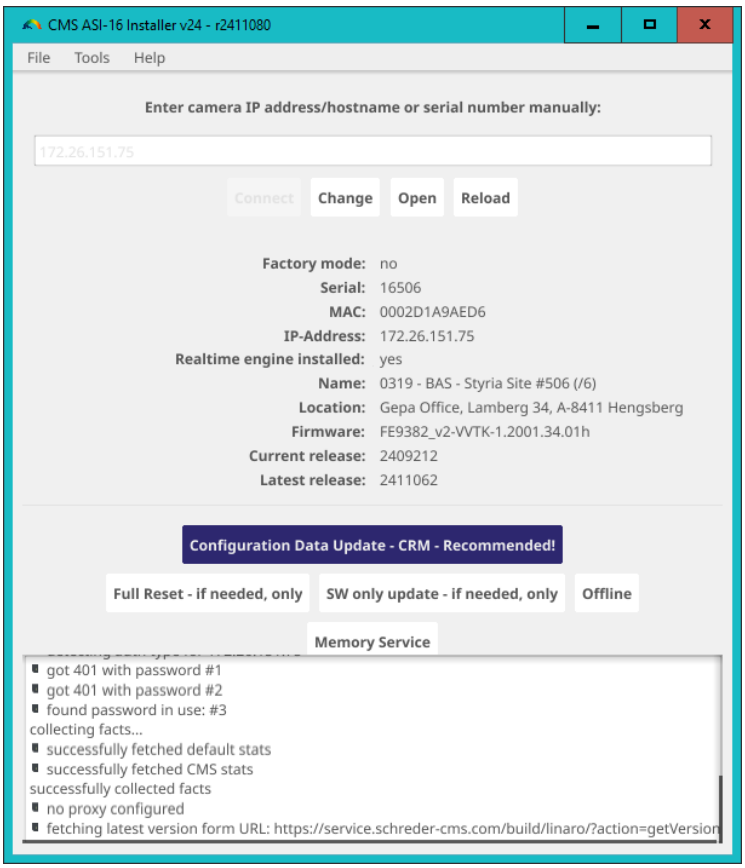
After running this tool you MUST power-off your ASI and re-connect it to the router.

5.8.2 STILL PROBLEMS to access, even via ALIAS-IP and DHCP-Fixit Tool?

Please contact your IT department to check network router and firewall configurations.

5.9 ASI16-Installer - ASI Software/Config - Update & Restore

In ASI16-Installer_V24 click on "open" near the ASI-device you want to update.



NOTICE: For online "Configuration Data Update" or "Full-Reset" or " SW only update", the PC running the ASI16-Installer MUST HAVE a stable connection to the "Internet", AND it must have a stable LAN/WAN connection to the ASI-Imager to be updated. - In case of NO or UNSTABEL connection we recommend to use "Install Offline", as described below.

"Configuration Data Update - CRM - Recommended!":
Transfers and restores ALL configuration data as pre-set and as stored in CMS-CRM.
To be used IMMEDIATELY AFTER imager settings have been changed in CMD-CRM.
Recommended steps: (a) Test new settings via ASI-16 Web-Gui. - (b) When OK implement those new settings to CMS-CRM - (c) Run ASI16-Installer "Configuration Data Update" - (d) Log-in to ASI-16 Web-Gui, press (CTRL-F5), and check all settings.

"Full Reset - if needed only!":
Multi-step firmware clean-up, re-installation of software and CRM configuration data.
(a) Performing a "Deep Factory Reset" to remove eventually corrupted apps and data.
(b) Complete (re-) installation of (latest) ASI software and all CRM configuration data.

- Necessary if, even after multiple power-/OFF/Wait-15sec/ON cycles ASI software shows stability problems, strange behavior, instable FTP uploads and/or slow Web-Gui access.

- Necessary if the client wants to use new features implemented in a new SW release.

WARNING: After a "FULL-RESET" all locally set or changed Login/Password-sets will be deleted and lost! Only data stored in CMS-CRM will remain permanent. So, first go to CMS-CRM and setup your camera-specific data (GPS location, Timezone, Shooting template, FTP-servers, ... eventuall additional LI/PW in addition to your all-in-one CMS LI/PW). - The all-in-one CMS LI/PW will continue to work in any case.

5.10 Step-by-Step Procedures - To perform e.g. a "Full Reset":

a) Login to CMS-CRM, with your all-in-one Client-ID and Password:
URL: https://service.schreder-cms.com/crm/

b) In "CMS-CRM", check and/or update/add all pre-set data.
Start with data in ./MyData, continue with data in ./Imager.

Check and update Imager Location(s) data (Name, GPS, Email).
GPS coordinated (LAT/LON/ELE) MUST be as precise as possible.
GPS data are used for shooting control and analysis software.
When operating multiple ASI, data must be set for/in each imager.

Check and eventually change time zone setting to your local time zone.

Check and - later, after testing - change "Default Data Storage".
We recommend to first keep "CMS Default" and test with CMS-FTP.
When testing was OK, you may change to your own S/FTP server.
Set server data in "MyData", and set Imager to "Client default data storage".
Consider to use two S/FTP servers, the second FTP as "mirror".

Check and select a "Shooting Template" which matches to intended use.
Notice: "Cloud Motion Analysis" requires fast pic intervals (15 seconds)!
Select your Template in "MyData", and set Imager to ... "Client default.".

TAKE YOUR TIME! - Some CMS-CRM data are critical for ASI operation!

c) In ./Downloads/, download latest "ASI V24 Manuals and Software" zip package.
Un-zip package to a convenient location on your PC.

d) LAN Connection: ASI-16 requires its IP to be set by a DHCP service.
ASI-16 and your PC shall be connected via a router/FW running DHCP .
Through this router, ASI-16 and the PC must have access to Internet!
DO NOT try to connect ASI-16 directly to your PC (peer-to-peer)!
DO NOT set a "fixed IP" on/via the ASI-16 web-gui user interface!

e) Start the latest "ASI16-Installer_V24-B" and wait till ASI(s) are listed.
If not displayed after max. 30 sec., close ASI16-Installer and re-start.
If still not displayed, find the ASI's IP by using an IP scanner tool.

f) Click on "Open" to open Web-GUI for the ASI-16 you want to update.

g) In ./Imager/Capture/Shooting, de-activate (uncheck) in "./General".
In ./Imager/Storage/Backup-Management, click "DELETE-Uploads only".
Those settings/action make a "FULL RESET" faster and more safe.

h) Power-off ASI for 15 seconds, power-on, wait about 3 minutes.

i) Close and Re- Start "ASI16-Installer_V24" and wait until your ASI(s) are listed.

k) In "ASI16-Installer", click on "Update/Check" for selected ASI imager.
OR (if not automatically found) enter ASI's IP or SN and click "Check".
Wait 15-30 seconds, till you see a list of data and parameters.

l) In ASI16-Installer, click "FULL RESET", and confirm safety warnings.

p) Wait up to 15 minutes, till you see "Installation Fully Completed".

q) If the FULL RESET process is NOT completed after 15 Minutes, then ...
... close ASI16-Installer, and try sequence again at (k) for 2 times.
... if still not OK, power-off/wait-15sec/power-on an try again 2 times.

r) After "... Fully Completed", wait 5 Min. before opening the ASI-GUI.
ASI-16 needs about 5 Minutes till all processes are fully loaded.

s) Open your ASI-16 Web-GUI, go through all sites, and check settings.
Especially check ./Imager/Capture/Shooting, and apply your settings.
After opening (new) ASI GUI sites, press <CTRL-F5> about 2-3 times.
<CTRL-F5> refreshes browser cache to download new page layouts.

5.11 ASI16-Installer - Advanced Features

"Install offline": SW/Config Updates for ASI Imagers with limited Internet Access.

To be used if the PC/LT acessing the ASI Web-Gui and running ASI16-Installer has NO or an INSTABLE internet access to the CMS server.

a) Log-on to CMS-CRM, open ./Imager/ and select the ASI imager to be updated.

b) In CMS-CRM open "Offline Package"

c) Select "Create a new package" - Select as needed.

d) When done, select "Download".

e) Download the "Offline Package" ZIP file to your PC.

f) Move this ZIP-file to a PC (storage) "within the strong firewall".
Run ASI16 -Installer on this PC "within the strong firewall".

g) Set the ASI Manager to "Enable OFFLINE-Mode in any case".
Select the ASI imager to be update via "Update/Check".

h) Start "Install offline", and select the above described "Offline package ZIP".

i) Proceed similar as with a regular "online installation"..

"Memory Service": Access to the ASI built-in temporary "Backup Memory".

To be used in emergency cases only, if ASI did not have access to the S/FTP server for more than a few days, and so has stored a huge amount of data to the Backup Memory" It allows to rescue those data directly from ASI built-in backup memory, without having to wait a very long time till all such data later on are step-by-step uploaded to FTP server.

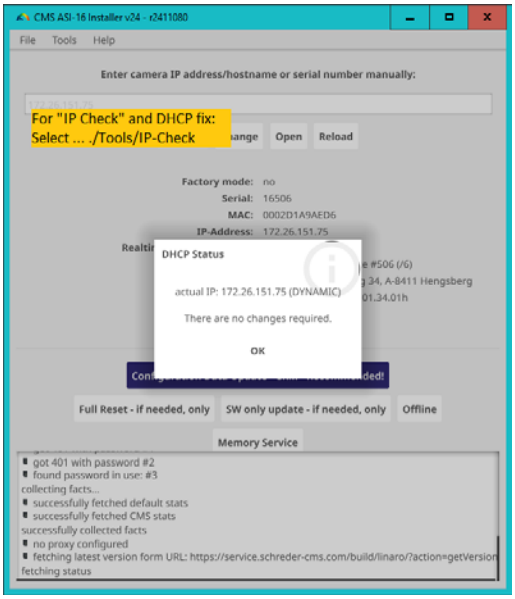
After selecting and downloading data, ALL such data must be DELETED via "Memory Service" . Later on the "Backup Memory" shall be FORMATED by using the respective function in the ASI Web-Gui.

TOP BAR: "File / Settings":

For CMS support and CMS bug analysis only!

Enable initial fact ... : Keep "enabled".
Enable debug log ... : Keep "disabled.

TOP BAR: "Tools / IP Check":



Replacement for previous "DCHP-FixIt" Tool.

If ASI was/is set to "Fixed IP", when confirming the request, it can be used to re-set IP-Configuration to ... ... "Get IP dynamically from DHCP".

After done, ASI must be power-off, wait >15 second, power-on again, and wait >3 min. for full reboot.

To find the ASI under its new allocated dynamic IP, ASI16-Installer must be close and restarted.

TOP BAR: "Tools / check offline package":

To check an ASI Software "Offline Package" previously generated in CMS-CRM.

Will display "package type", allocated ASI Serial Number and Software Version ID.

6 ASI Imager Head Software (Check Configs)

6.1 HELP: How to work best with this Operator Manual Section

When going through this section, in parallel you should have opened an ASI-16 in your web browser, and read and click in parallel. Please navigate by selecting a top navigation bar topic (Home/ Imager/ System/ ...) and then clicking one of the left side topics. - After changing one or more parameters within one page/frame, press <Save>.

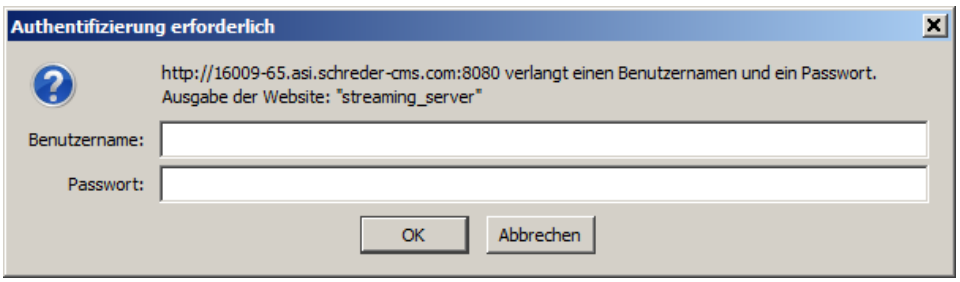
6.2 ASI Imager Web Browser Access - Login Procedure

To access any ASI-16 you always need to log-in via a username and a password.
You have received your "all-in-one" CMS-username/password from your distributor.
This LI/PW allows you to access all your imagers, CMS-FTP and CMS-CRM.

Open your web browser (Firefox, Chrome, Edge). Enter the imager IP or URL.

As soon as requested, please enter your "CMS account" username and password.
You can use one single "CMS client account" login for all your ASI-16 devices.

The Imager Login Name MUST START with "LI", followed by your client account number.
Customer defined Login Names MUST START with at least one Alpha (A-Z) Symbol!



Please wait a while, as the first time login may take some time.

If the browser does not continue, press <F5> to refresh your browser cash, and re-enter Login name (LI) and Password (PW).

Depending on the browser and the LAN network connection, sometimes Login and Password (LI/PW) muss be re-entered up to 5 times till it is finally accepted.

If requested by your browser, please PERMANENTLY allow the installation of some plugins, the access to the website, accept of certificates, and maybe some more requests and warnings. Likely, after such warnings, you must press <F5>, and/or close and re-open your browser and press <F5> again (clear browser cache).

After some time you should see the CMS ASI-16 home page. - Especially when you connect the very first time, it may take more than 30 seconds.

As soon as you can see the ASI main page, we recommend to add this page IP/URL to your "browser favourites", for more easy access in the future.

If you can see the ASI-16 main page, but without an sky image view, then please recheck your browser settings. Likely you browser has blocked one plugin, or a plugin installation has been corrupted, or parts of the configuration has been corrupted during installation.

6.3 ASI-16 Main Page - Home Page - Summary

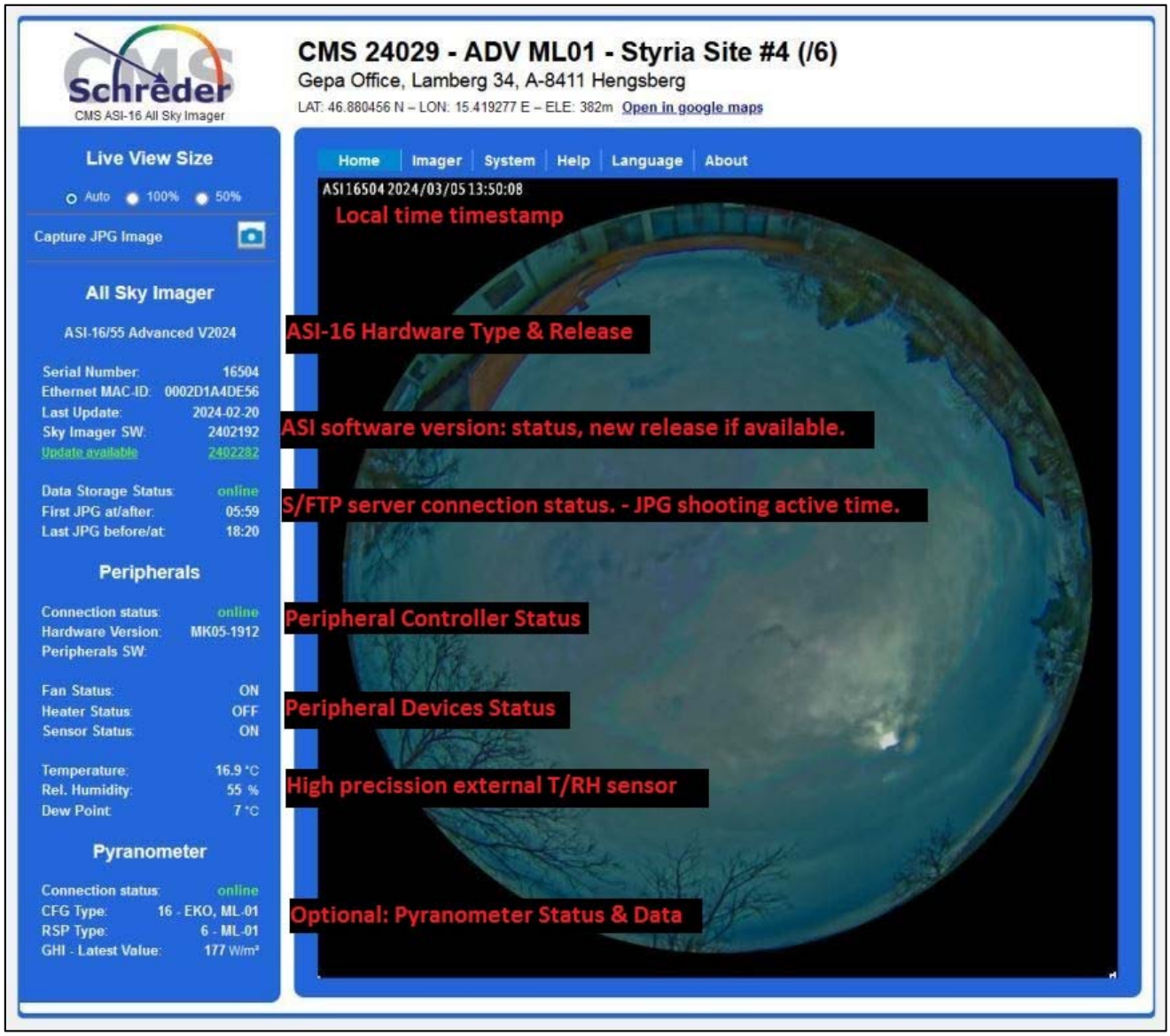
Within a LAN the "ASI-16 Homepage" can be accessed through its LAN IP adress. As soon as the "Home Page" is displayed you should add this page to brrowser "favorits".

NOTICE: Sometimes, depending on web browsers, the screen may hang up or may look corrupted. In such case press [F5] and/or [Ctrl-F5] to refresh and/or clear browser cash. Sometimes, after pressing [Ctrl-F5], if the screen still looks corrupted, you first need to switch to another configuration screen, and then back to the screen requested.

After a reboot or restart it will take up to 5 minutes till all data, especially "peripherals data", will be available. - From time to time press "Ctrl-F5" to refresh web browser display.

6.4 Home Page - Navigation and Data Content

On the top and left side of the screen, the ASI-16 "Home Page" displays the most important real-time data and settings of the imager. On the top it also includes the "navigation bar" to access all sub-pages for configuration and maintenance. And in the centre it includes a "semi-live video-stream" of the camera.



Top Side:

Location Text: Description of Company, Location, and GPS Coordinates
"Google Maps" will display a map with using the GPS data

Navigation Bar: To select sub-folders for configuration and maintenance.

- Home — The Imager Home-page (Main Page)
- Imager — Imager-specific setting and functions
  - Location — Title text, GPS coordinates, timezone settings
  - Capture — Schedules and parameters for JPG image capturing
  - Storage — Network storage settings for JPG storage
  - Peripheral — Peripherals Controller settings, data logger
- System — General System settings and functions
  - Network — IP configuration, DDNS configuration
  - Security — Temporary additional usernames / passwords
  - SD Card — Check and format SD/CF memory
  - Service — Reboot, generate reports, test tools
- Help — The software part of this manual
- Language — Select alternative GUI languages
- About — CMS Schreder reference data

Left Side:

View Control: To change the size of the live video display.

Local Capture: Capture one JPG image for review and local storage

All Sky Imager: Parameters and settings

- Serial Number: The serial number of this imager (camera head)
- Ethernet MAC ID: MAC ID of the ASI imager head ETH adapter.
- Last Update: Date and time of the last software update/restore
- Sky Imager SW: Software version of Imager / PeripheralController
- New SW available: Only displayed when new SW available for update.
- Connection Status: Status of connection to FTP data storage server.
- First JPG at/after: The time at or after the first JPG shot of the day
- Last JPG before/at: The time before or at the last JPG shot of the day

Peripherals: Data and hardware status of Perhipherals Controller.

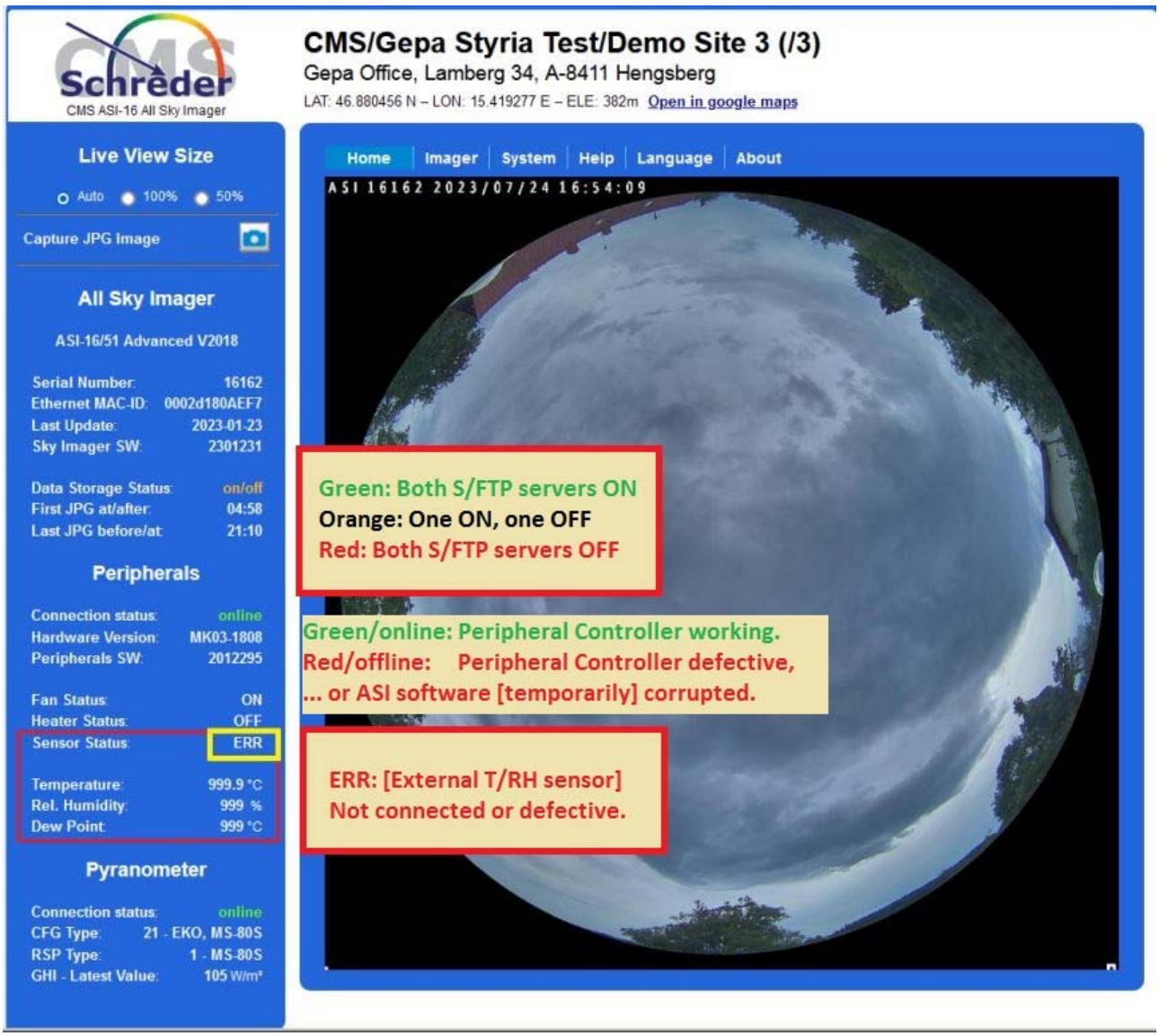
- Connection Status: Status of connection to Peripheral Controller.
- Peripheral SW: Software Version of Peripheral Controller.
- Hardware Version: Harware Version of Peripheral Controller.
- Temperature/ Rel. Humidity/ Dew Point: Data from external T/RH sensor.
- Fan/ Heater/ Sensor Status: OFF / ON / ERR (=Error, blocked, broken).
- NOTICE: High precision data require the T/RH sensor to be mounted in a "radiation shield". - Other ways of mounting will deliver lowe quality

data. BUT, the T/RH sensor MUST be installed and working in any case, as esp. temperature is necessary to control heating and fan.

Pyranometer: Available only after purchase of "Pyranometer Option".

Connection Status: Status of ModBus connection to Pyranometer.
CFG Type: Pyranometer type, as configured in ASI GUI
RSP Type: Pyranometer type, as reported from Pyranometer via ModBus.
Irradiance, last: Latest received irradiance value, no updates on the screen.

Below: Sample ASI Web-Gui, explaining system/hardware error indications:



PROBLEMS and FIXES:

(a) Top navigation bar not visible: Website not fully loaded.

Press <CTRL-F5> to trigger a web browser cache refresh.

(b) Life-image screen is black or blue, and does not display the life-video:

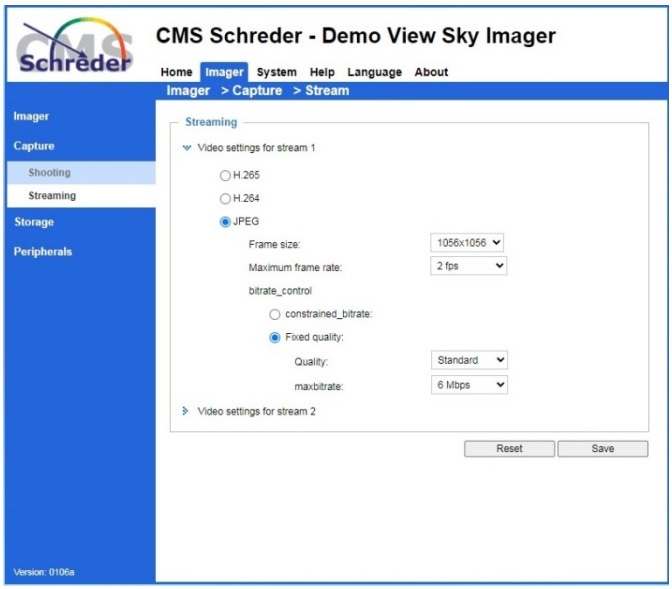


Image streaming settings got changed, sometimes after software RESET.

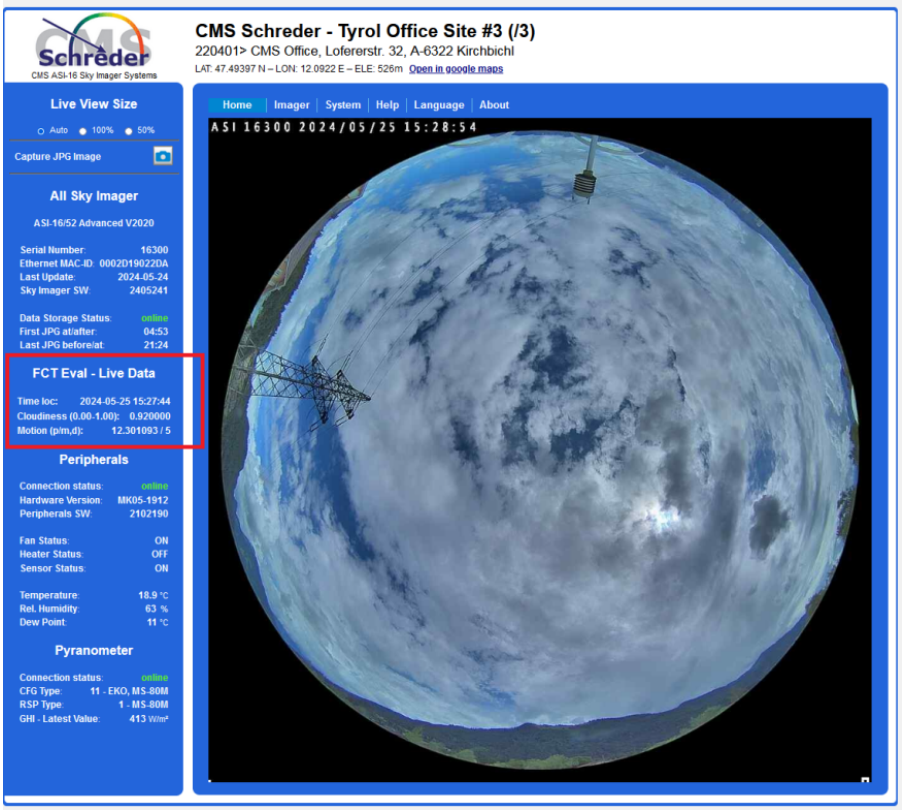
Navigate to ./Imager/Capture/Streaming, select "Video ... stream 1", and select "JPG".

Check and eventually change JPG parameter configuration.

Click on "Save", navigate to ./Home, and press <CTRL-F5> .

6.5 Cloud Analysis (CMS FCT) – Life (realtime) Data Display

Upon separate order CMS can provide “FCT-22 (FindClouds Trinity)”. FCT-22 means an optional modular WIN-based software package for numeric cloud analysis. It can process cloudiness ratio in %, a cloud movement vector, and cloud-base height by triangulation.

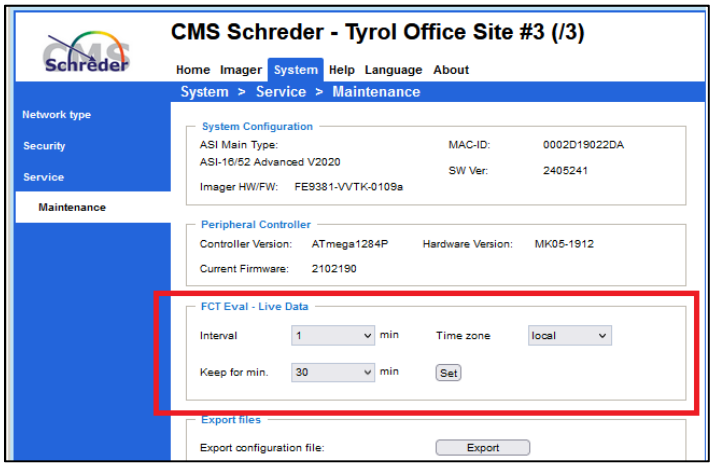


When running “FCT-22” in automated (real-time) mode, resp. latest FCT evaluation life-data can be displayed on the ASI-16 imager homepage.

Hereby operators can easily monitor the FCT SW operations status.

And, it is an enrichment for “Viewers”, when making some ASI home-pages availabel to an (internal or external) public audience, e.g. as special frame or as a link on the operator’s (company’s/ institutes) public homepage.

To activate “FCT Eval – Life Data”, in CMS-CRM and in ASI-GUI the parameter “Interval” must be set to “>=1”. For further details refer to “FCT-22 Setup & Operator Manual”.



Interval: The time interval where ASI is checking the primary FTP folder for new data in “fct-results.txt”.

Time: The last-results time (local or UTC) displayed at the ASI homepage.

Keep for min.: Data will be displayed ONLY if latest “fct-results.txt” data are not older than about “Keep for min”.

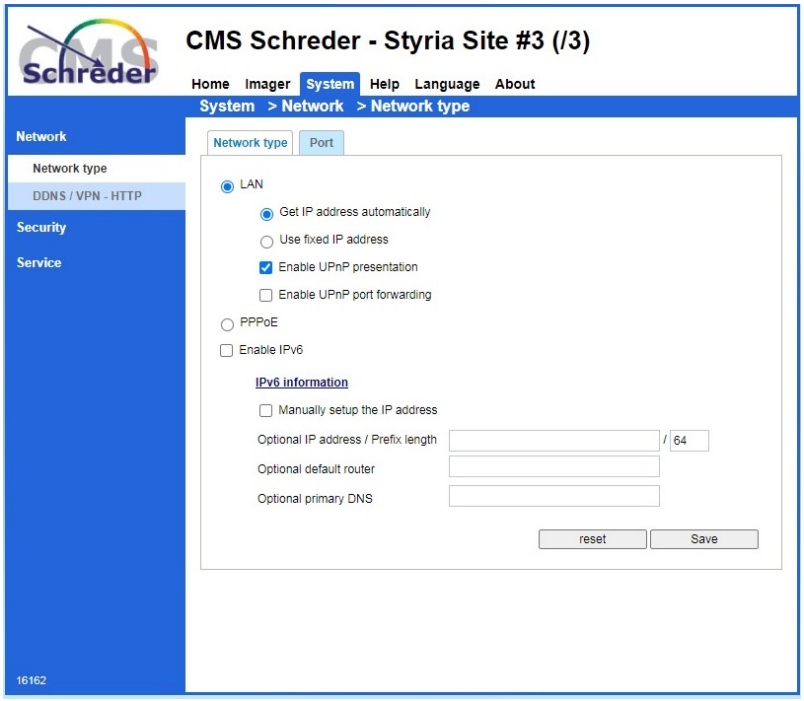
No “FCT Eval …” frame to be shown, if latest data are older, or if the file “fct-results.txt” cannot be detected.

NOTICE:
The FCT-22 raw-image folder must be set/linked to the 1st Data-Storage (S/FTP) server. For further details on working with "shared folders" or use of an FTP client (e.g. WinSCP) please refer to "FCT-22 Setup and Operator Manual", download via CMS CRM.

6.6 Imager Network - LAN Configuration

TOP BAR: System - SIDE BAR: Network / Network Type:

The network settings should follow the regulations of your IT administrator.



We STRONGY RECOMMED to use "dynamic IP allocation, by allocating the ASI fixed LAN IP via the Network DHCP Server (Main Router), by allocation the ASI MAC ID to the requested ASI fixed LAN IP and the ASI receiving its IP from the DHCP server. - We do NOT recommend to set fixed IP's on the ASI imager itself. Such regularly causes confusions when moving an ASI from one sit to another.

By default up delivery all are set to "Get IP address automatically!

Description of the most commonly used setup with "dynamic IP":

- Navigate to /System/ Network/ Network-type.
- Set LAN to "Get IP address automatically".
- Click "Save" at the bottom, and close the web browser.
- Power-off ASI-16 for about 15 seconds, by disconnection DC power supply power cable.
- Start "ASI16-Installer" again, and let it search for ASI imagers.
- Now your (new) ASI-16 Imager should be displayed in the ASI Manager list.
- Click on "open" to login and open the selected new imager in your web browser.
- Proceed with "Login", software update, and with basic system setup.

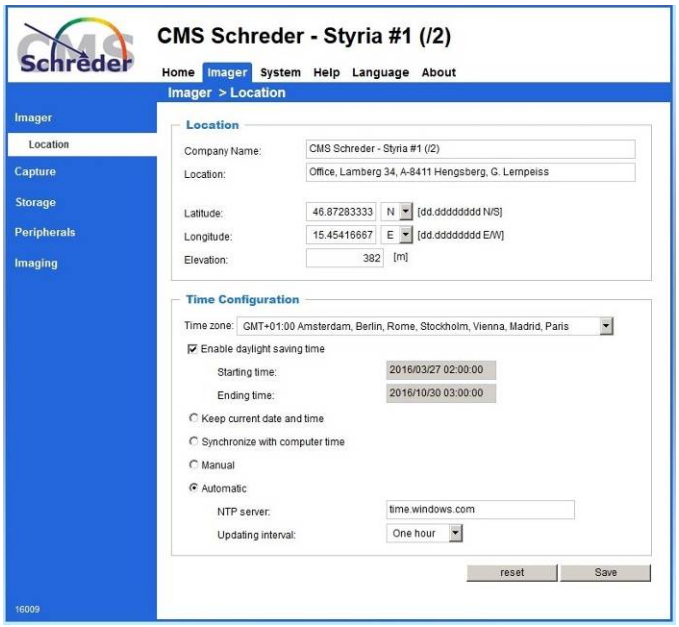
WARNING - Local setting will get lost after each software update/restore!
Register ALL imager settings in CMS-CRM, as soon as possible!

6.7 Imager Location, GPS Coordinates, Time Zone

TOP BAR: Imager - SIDE BAR: Imager/ Location:

Location settings and Time settings MUST be configured according to the installation site. Parameters are used to calculate time of sunrise, sunset for capturing start/stop, and calculation of the position of the solar disc within each individual JPG image.

If you have setup correct data in CMS CRM, those data are transferred to ASI after each ASI16-Installer "FULL RESET". If data in CMS-CRM are NOT correct, you must manually check and correct settings after every "FULL RESET".



Company Name:
A descriptive text, to be displayed on the web page and stored within JPG images.

Location:
A descriptive text, to be displayed on the web page and stored within JPG images.

Latitude, Longitude, Elevation:
GPS coordinates and elevation above sea level, stored with JPG images.

GPS coordinates and elevation are very critical for the operation of the imager and for CMS FCT analysis software.

Enter GPS data with most high precision, minimum "nn.123456" precision.

Email Technical: Email of a person in charge of service and maintenance of this ASI.

Time Configuration: NTP Server - Local time to be used within ASI-16 SW:

ASI-16 must have permanent (!) access to a qualified Time-Server (NTP-Server).
Either a public NTP via Internet, or a local NTP installed inside your network (LAN).

You MUST (!) set the imager to your LOCAL time zone (and - i.a. - "daylight saving").

For analysis-critical " time-stamps" used for and stored into JPG images we recommend to use the Filename-Time-Settings in the JPG-Image-Capturing configuration. For CMS analysis software this parameter MUST be set to "Use GMT".

Time zone: Select the "Time zone" of the location of your ASI-16 site.

Enable daylight ...: To be checked when your country uses "daylight saving".

Time synchronisation: MUST be set to "Automatic".

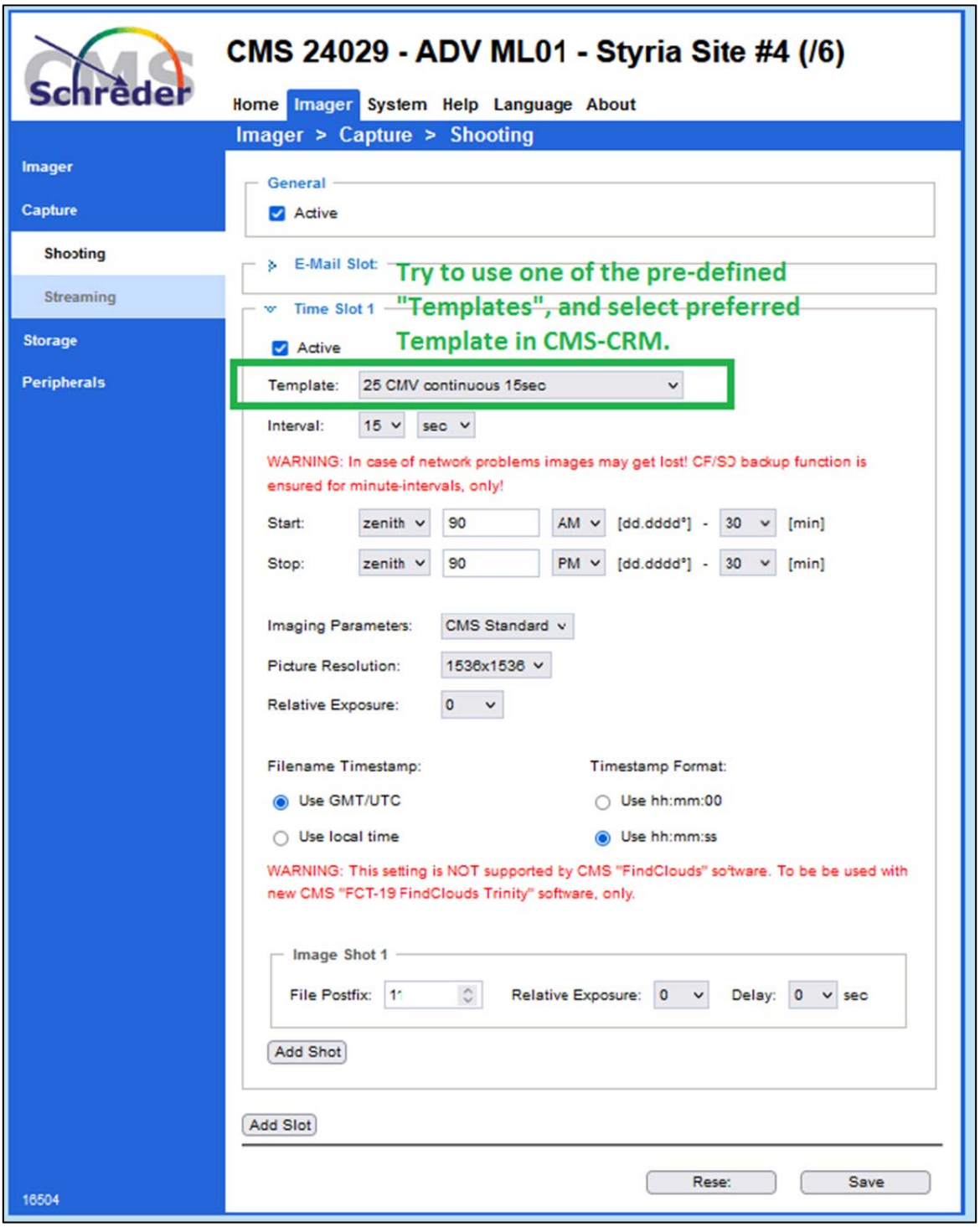
Automatic: Enable imager time to be synchronized with an NTP time server,.
NTP server: Internet URL or IP of a "NTP time server" accessible by the ASI-16.
Updating interval: "One hour", to try time synchronisation once per hour.

WARNING - Local setting will get lost after each software update/restore!
Register ALL imager settings in CMS-CRM, as soon as possible!
After making any change in CMS_CRM, re-run ASI16-Installer and perform a "Configration Data Update" or a "Full Reset"!

6.8 JPG Image Capturing - Shooting

TOP BAR: Imager - SIDE BAR: Capture/ Shooting:

Parameters for automated capturing of JPG images. Images are uploaded immediately to a TPC/IP connected S/FTP server. - Subject and limited to settings and parameters, as soon as there is no access to the S/FTP storage server (LAN/ WAN/ Server down), if possible images are temporarily stored on a built in backup memory, and are uploaded with low priority, step-by-step, as soon as the storage server can be accessed, again.



Scheduler configuration when and how to store JPG images to a file server.

Active: Set "General/ Active" and "Time Slot1/ Active" to enable JPG image storage.

E-Mail Slot: Not fully implemented! -To send JPG's to an email account.

Time Slot 1 (2, ...):
One (or more, up to three) sets of predefined parameters, to capture one, typically two, or up to four JPG images within defined time intervals.

Name: To identify different "Time Slots". The first "time slot" must be "Standard".

Template: Select one (out of total 9) pre-defined shooting configurations.
Templates have been defined based on wishes from multiple clients.
So, most likely one of the templates also will fit to your requirements.
Try to use one of the templates, instead of setting your own configuration.

Do NOT use Template 11/12, as they make NO sense for ASI-16 V24!

Interval: e.g. 15 min:
A set of JPG's will be sent at e.g. 10:00, 10:15, 10:30, 10.45, ...

Start [Zenith]: First JPG image set will be captured at/after sunrise (= zenith/ 90° AM).
Stop [Zenith]: Last JPG image set will be captured before/at sunset (= zenith/ 90° PM).

Zenith Ang.: Recommended default value: 90° == Astronomical sunrise / sunset.
Values < 90°: Some time AFTER sunrise, some time BEFORE sunset.
The time delay varies depending on the location and the day-of-year!
>> 80° in Central Europe and April means a delay of about 1 h 15 min.
DO NOT use Zenith angles values above > 90° or below < 60°!

Pre/post Zenith Time correction: Through the [+/-] parameters you can modify the scheduler, to start/stop capturing up to 1 hour before/after sunrise/sunset time.

Capturing will be done at the per-hour timeslots as defined in "intervals. If, for example, "Interval" is set to 15 min, and actual Start[Zenith] time is 06:07, then the first JPG shot of the day will be captured at 06:15, and NOT at 06:07.

"Zenith control" requires correct settings of local imager time and local GPS coordinates. It may not work for zenith angles above 90°. Minimum allowed zenith angle depends on GPS coordinates and day-of-year. For further details please refer to side documents.

When changing from "zenith" to "time", you can enter fixed start/stop times.

Imager parameters: "CMS Standard". Not to be changed, for CMS software.

Picture resolution: Select resolution for higher or lower quality and JPG file size.

Relative exposure: NOT TO BE USE any more with new ASI-16/51+ or ASI-16/11+.
New generation ASI imager heads use advanced built-in "Wide Dynamic Range" (WDR) algorithms. Therefore change of exposure makes no practical sense, not anymore.

Filename / Timestamp / Format: Parameters to mange automatically generated JPG filenames. - Must NOT be changed when using CMS FCT cloud analysis software!

Image Shot 1/2/...:
Configuration of one or more images to be captured within the respective "Time Slot".
Delay: Relative delay, especially for a 2nd / 3rd shot within one time slot.

NOTICE: Capturing of each individual image will take about 5-10 seconds, because of processing time. Therefore the actual file-time for the first image will 5-10 seconds past

"time interval" time. Additional images will be further delayed by additional 5-10 seconds for each image within one "Time Slot". - Please consider, when setting "interval" to 15 seconds maybe sometimes a second image might get lost.

6.8.1 Template #11 and #12: For first-generation ASI-16 (V2015, V2018) only!

To be used with ASI-16/50, ASI-16/10 (V2015), ASI-16/51, and ASI-1611 (V2018). Includes dual-image shooting packages with changing exposure levels. - Changing exposure levels does not make sense for ASI systems after V2018, as all new version ASI-16 imagers use a built-in advanced wide-dynamic-range (WDR-PRO)algorithms.

6.8.2 Template #21 - V24: For standard "Cloudiness Analysis":

Single image shooting, shooting intervals ... 15 min, 10 min 5 min, or 1 min.

6.8.3 Template #25 for continuous "Cloud Movement Analysis":

"Cloud Movement Analysis" requires images with a time interval of 10-30 seconds. By experience 15 seconds is the best solution for both fast and slow moving clouds.

NOTICE: Will create huge amount of data, therefore requires large storage capacity. We recommend to move data from primary storage to a backup storage, once a month.

6.8.4 Template #26 for "Cloud Movement Analysis" each 10 Minutes:

This config includes three (3) shots with 15sec delay in one 10min interval time slot.

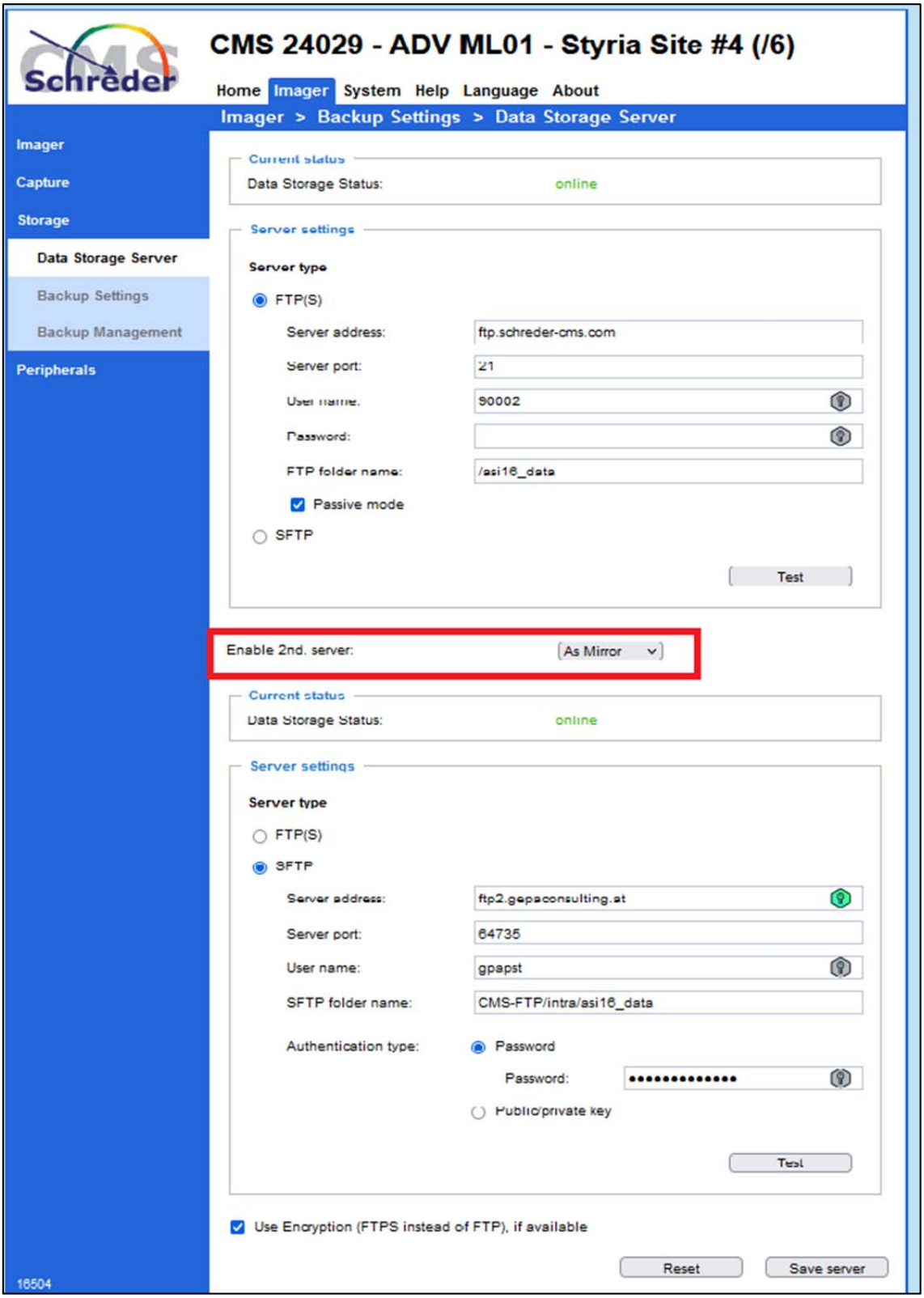
"Cloud Movement Analysis" requires images with a time interval of 10-30 seconds. By experience 15 seconds is the best solution for both fast and slow moving clouds.

Three shots increase probability to get at least one valid set of movement vector data.

6.9 Network Storage Settings for JPG (FTP, NAS, FileShare)

TOP BAR: Imager - SIDE BAR: Storage/ Server Settings:

Captured JPG images will be sent automatically to one (or two) FTP "Network Storage".



The Network Storage (= FTP-server) IP/URL and corresponding login data.

For testing and initial operation you may use the FTP server provided by CMS. Later on you may change to an FTP server of your company. When using the CMS FTP service, you MUST NOT change the pre-defined LI/PW settings!

NOTICE:
After a Software "RESTORE" via ASI16-Installer the Server Settings will be reset to the FTP account data stored in CMS-CRM! -

Button "Test":
To check and verify if the Storage Server can be accessed via the entered settings.
Use the "Test" button BEFORE permanently save settings via "Save server".
With "Test" the Imager will try to send a "test.txt" file to the root of the storage.

A second browser window will pop up and will indicate if the test transmission was successful, or if it failed. If failed, then recheck the settings (IP/URL, LI/PW, ...), and check if the storage is online and can be accessed. Take care of the folder formats used.

Second FTP server: If activated, ASI will support two independent FTP servers.

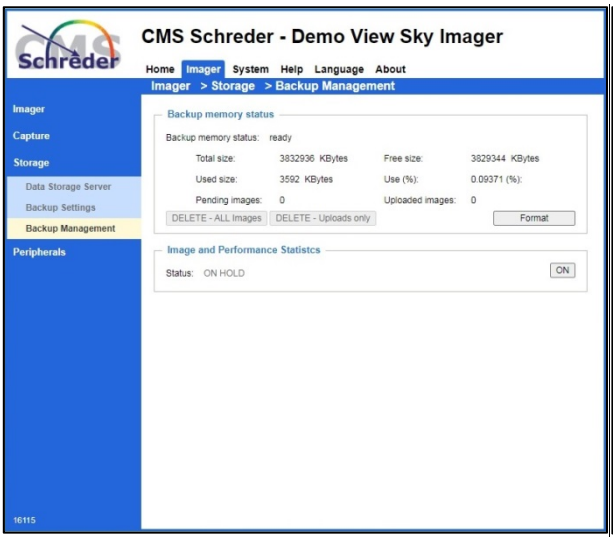
"Mirror":	Data are always sent to BOTH FTP servers, at the same time.
"Fall-back":	Data are sent to 2nd FTP only if 1st FTP server is online.
... Backup:	Backup Memory will be activate if BOTH FTP are offline. Backup data are uploaded to first FTP getting online again.

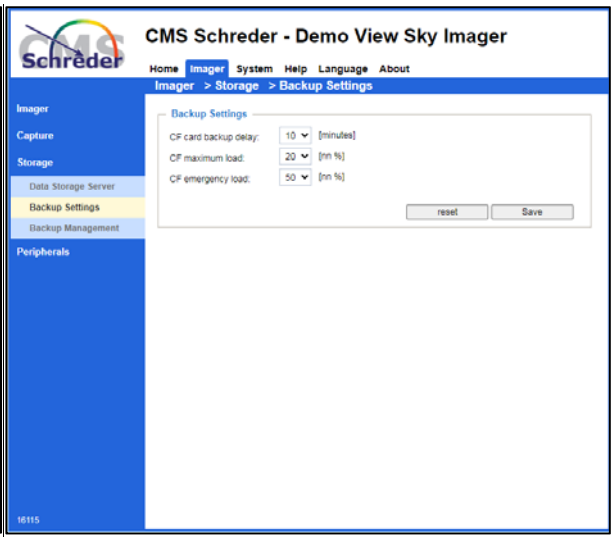
6.10 Backup Storage (Temporary Storage on Flash Memory)

TOP BAR: Imager - SIDE BAR: Storage/ Backup Setting:

In case of a temporary problem with the online "Network Storage" access, like router down or network down or WAN down or storage server down, ASI-16 will temporarily store JPG's within the imager. Later on, as soon as the "Network Storage" is back online for a reasonable time, ASI-16 will transfer temporarily stored images to the network storage.

The low-priority process of sending "backup images" will be merged into the more important high-priority process of capturing and sending "new images". Therefore sending all backup images may take some time, depending on the quantity. Multiple connection breakdowns during the recovery process may eventually cause loss of some images.





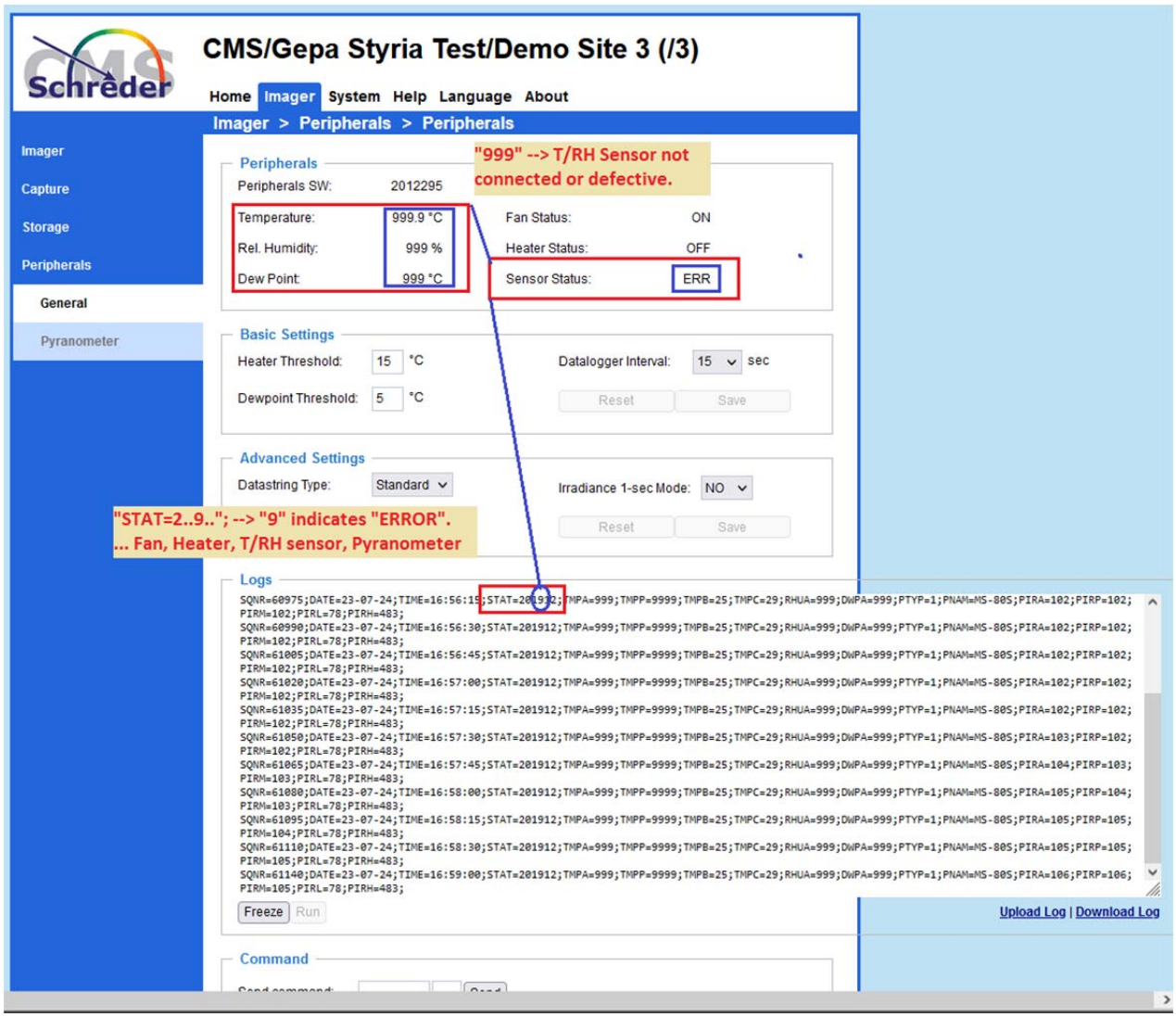
Backup delay:	Initially data are stored in a non-remanent RAM memory. After the delay time data are moved to a remanent CF-memory. In case of a power-down within this period RAM data will be lost.
Maximum load:	Usually all data, even if marked as transferred, will be kept; If this parameter exceeded, transferred data will be deleted;
Emergency load:	If this parameter exceeded, a part of "older data" are deleted, till the CF memory has reached a free capacity of about 50%.. Means: Some "old data" will be lost, newer data will survive.
ADVICE NOTICE:	Regularly check "Backup Storage" status, about once each month! Each month, upon regular check, click "DELETE - Uploaded Only". Each three (3) months, click on "Format" and wait > 10 minutes. After "Format" completed, power-off, wait >1 min., and power-on!

6.11 Peripherals Controller (PeriCon Settings, Data Logger)

TOP BAR: Imager - SIDE BAR: Peripherals / General:

Please refer to Section 7ff, for detailed hardware and software descriptions.

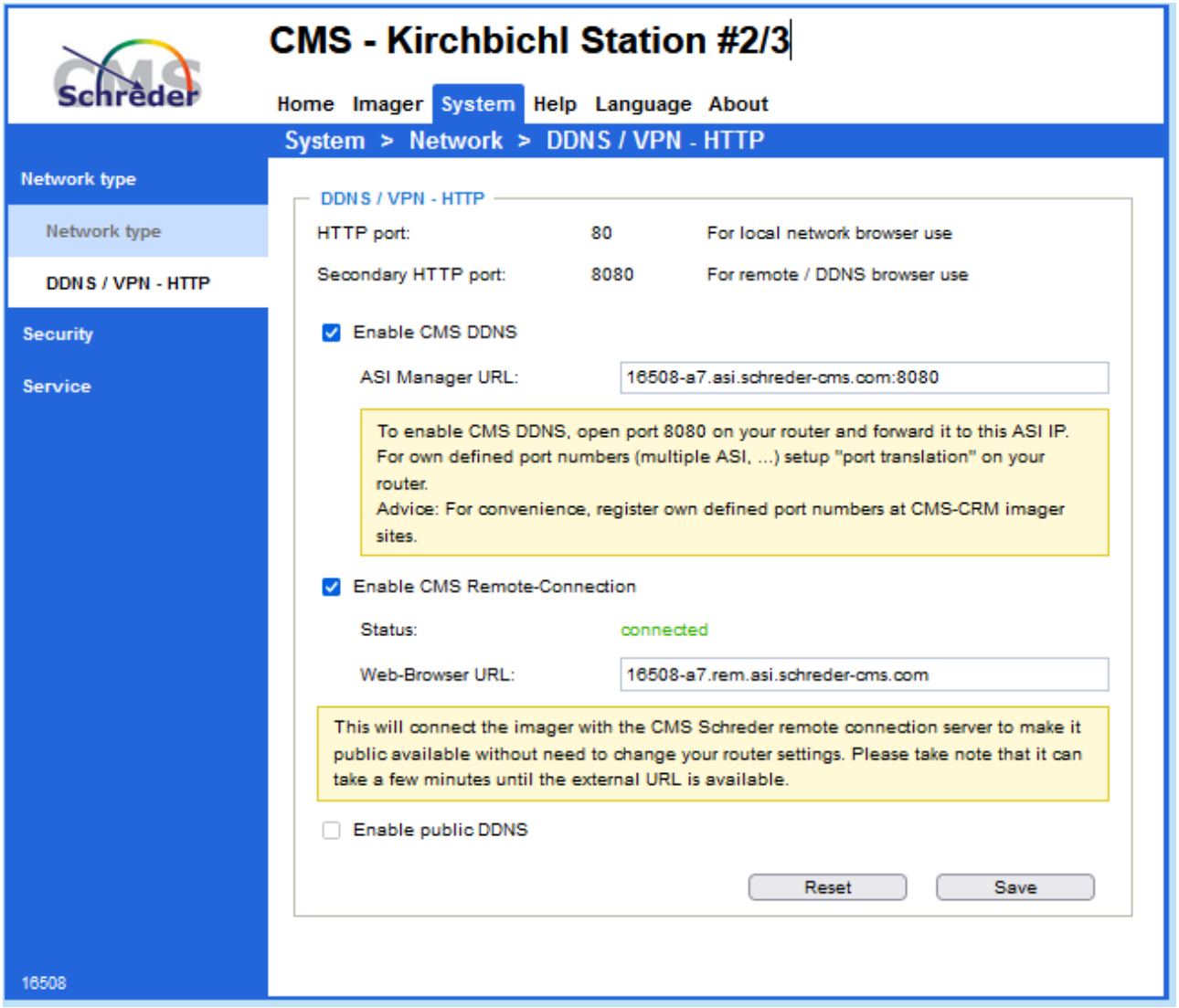
Below screenshot shows a special bug-case scenario (defective T/RH sensor).


CMS/Gepa Styria Test/Demo Site 3 (/3)
Home
Imager
System
Help
Language
About
Imager > Peripherals > Peripherals
Imager
Capture
Storage
Peripherals
General
Pyranometer
Peripherals
Peripherals SW: 2012295
"999" --> T/RH Sensor not connected or defective.
Temperature: 999.9 °C
Rel. Humidity: 999 %
Dew Point: 999 °C
Fan Status: ON
Heater Status: OFF
Sensor Status: ERR
Basic Settings
Heater Threshold: 15 °C
Dewpoint Threshold: 5 °C
Datalogger Interval: 15 sec
Reset
Save
Advanced Settings
Datastring Type: Standard
Irradiance 1-sec Mode: NO
Reset
Save
"STAT=2..9.."; --> "9" indicates "ERROR".
... Fan, Heater, T/RH sensor, Pyranometer
Logs
SQNR=60975;DATE=23-07-24;TIME=16:56:15;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=102;PIRP=102;
PIRM=102;PIRL=78;PIRH=483;
SQNR=60990;DATE=23-07-24;TIME=16:56:30;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=102;PIRP=102;
PIRM=102;PIRL=78;PIRH=483;
SQNR=61005;DATE=23-07-24;TIME=16:56:45;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=102;PIRP=102;
PIRM=102;PIRL=78;PIRH=483;
SQNR=61020;DATE=23-07-24;TIME=16:57:00;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=102;PIRP=102;
PIRM=102;PIRL=78;PIRH=483;
SQNR=61035;DATE=23-07-24;TIME=16:57:15;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=102;PIRP=102;
PIRM=102;PIRL=78;PIRH=483;
SQNR=61050;DATE=23-07-24;TIME=16:57:30;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=103;PIRP=102;
PIRM=102;PIRL=78;PIRH=483;
SQNR=61065;DATE=23-07-24;TIME=16:57:45;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=104;PIRP=103;
PIRM=103;PIRL=78;PIRH=483;
SQNR=61080;DATE=23-07-24;TIME=16:58:00;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=105;PIRP=104;
PIRM=103;PIRL=78;PIRH=483;
SQNR=61095;DATE=23-07-24;TIME=16:58:15;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=105;PIRP=105;
PIRM=104;PIRL=78;PIRH=483;
SQNR=61110;DATE=23-07-24;TIME=16:58:30;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=105;PIRP=105;
PIRM=105;PIRL=78;PIRH=483;
SQNR=61140;DATE=23-07-24;TIME=16:59:00;STAT=201912;TMPA=999;TMPP=9999;TMPB=25;TMPC=29;RHUA=999;DWPA=999;PTYP=1;PNAM=MS-80S;PIRA=106;PIRP=106;
PIRM=105;PIRL=78;PIRH=483;
Freeze
Run
Upload Log | Download Log
Command

6.12 Networking - CMS DDNS (Dynamic Domain-Name) and VPN

TOP BAR: System - SIDE BAR: Network / DDNS - HTTP:

For customers which do not have a fixed (static) WAN IP, or which do not want to formally disclose this fixed static IP, CMS provides a free of charge non-public DDNS-Service. If enabled, ASI-software automatically synchronizes its WAN IP with CMS-DDNS-Server, and CMS-Server will publish the auto-generated URL based on the ASI serial number.



Secondary Port: Must be "8080" if your want to run online-updates via Internet.
For access via Internet, setup a router rule for port forwarding.
In case of multiple ASI within the same LAN, use port translation.

Enable ... DDNS: Please check, if you want to use this CMS-DDNS internet service.
WARNING: If checked, ASI will send messages to the CMS server.

Enable ... Remote: Available with ASI-16 V24 (Serial >= #16501).
When activated, ASI-16 establishes an encrypted tunnel between ASI-Imager and CMS-Schreder CRM-Server. Then a remote user or CMS support can securely access the ASI via the HTTPS-URL as provided and shown in CMS-CRM for this specific ASI imager.

6.13 Security Settings - User Accounts - Name/Password

TOP BAR: System - SIDE BAR: Security/UserAccount:

Each ASI comes with a pre-defined set of User/Password LogIn's, stored in CMS-CRM.

Most important: Your personal CMS "Customer" LI/PW, based on your account ID.
It can be used at any time, at delivery or after any update/restore.

Also, up to you: Your personal LI/PW, as defined by you via the CRM account.
It can be used after entry at CRM and the next update/restore.
Please enter secondary password in CRM, and run "update".

WARNING - Local security Data are lost after each software update/restore

The ASI Web-GUI allows to (temporarily) enter new users with passwords, and/or allows to (temporarily) change user names and passwords an rights. ALL THOSE CHANGES WILL BE LOST after any "software restore" and/or "software update", for example by using the ASI16-Installer tool. - Please take carefully note of Network Settings and Security Data before and software update or restore, or total imager reset! - Use CMS-CRM to setup permanently available Username/Password sets.

6.14 Security Settings - User Accounts - HTTPS

TOP BAR: System - SIDE BAR: Security/HTTPS:

To activate HTTP/S connection protocol. Requires a trustful "SSH Certificate".

WARNING: Do NOT immediately deactivate standard HTTP protocol, without proper testing of a new HTTPS configuration in parallel. A mistake in the HTPS configuration will fully block access to the ASI, which then requires a complicated low-level hardware reset!

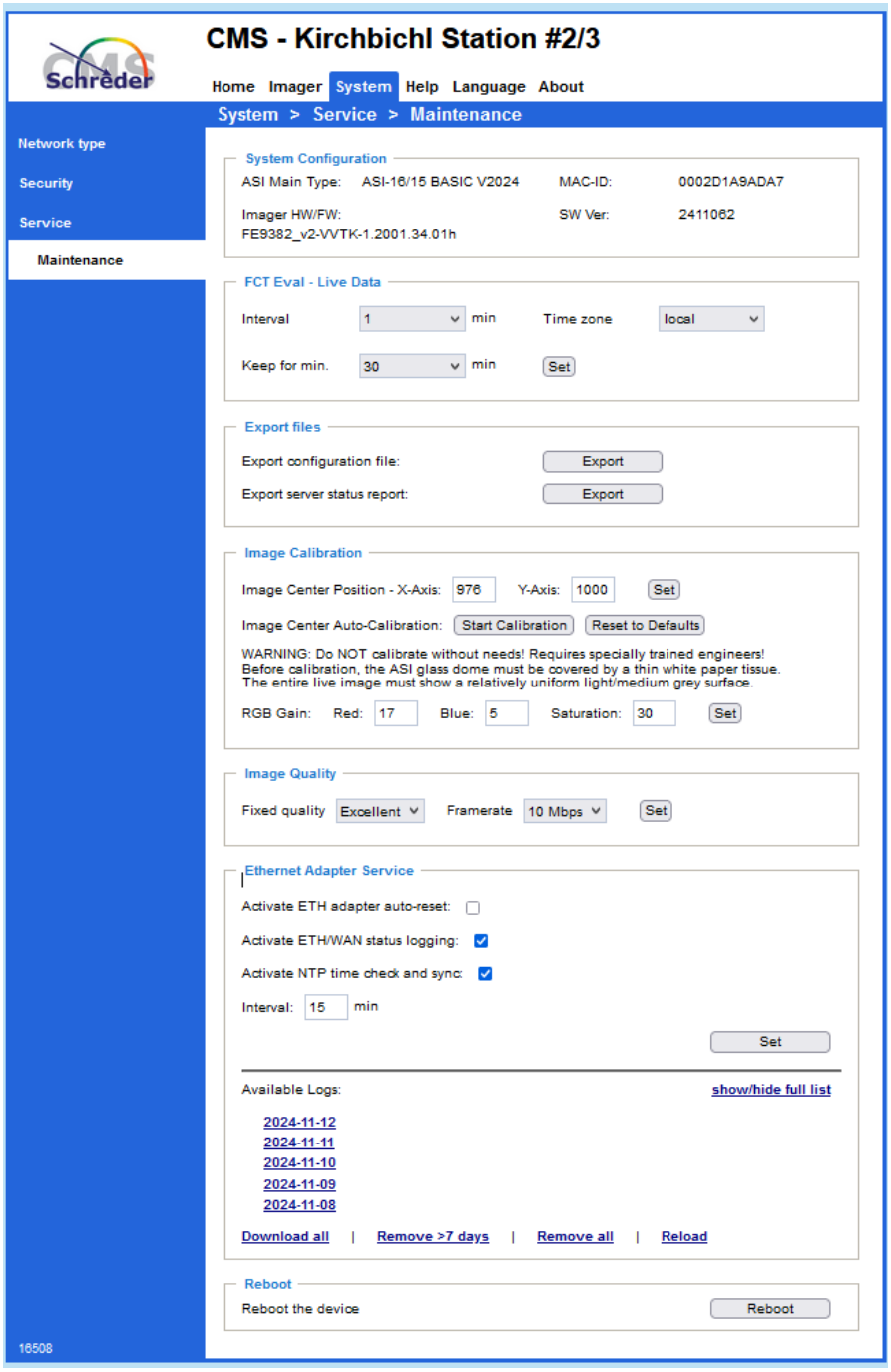
6.15 Security Settings - User Accounts - Name/Password

TOP BAR: System - SIDE BAR: Security/Firewall:

To manage access to this ASI, by blocking or opening specific IP's or IP ranges.
WARNING: Mistakes in this configuration may fully block access to this ASI!

6.16 Service - Maintenance (Reboot, PeriCon Firmware Update)

TOP BAR: System - SIDE BAR: Maintenance:



System Configuration:	Data about ASI imager head hardware and software.
Peripheral Controller:	Data about Peripheral Controller hardware and software.
Export configuration file:	Generate a backup of a part of local configurations
Export server ... report:	Generate a package to help analyse problems or bugs. Please send this package to CMS support, via Email.

Image Calibration: Tools for testing and calibration by CMS, only!
CMS has already optimized settings before delivery.
Approved data are stored in/ taken from CMS-CRM.

Image Quality: To select JPG compression level and network bandwidth limit.
As "better" setting, as better image quality, but as larger file size.
For FCT cloud analysis software we recommend to use "good".

Ethernet Adapter Service: Functions to check and auto-fix some client LAN issues.

... ETH auto-reset: Unmounts and re-mounts the ASI Ethernet interface [15] minutes after FTP-Server or NTP-Server could not be accessed via LAN. Fixes issues where a less stable DHCP server does not re-establish connection after power-down or other network related problems.

... ETH ... logging: Logs LAN/WAN connectivity, to identify issues in client's network.

... NTP ... sync: Check stability of client's NTP server, and re-sync time if necessary.

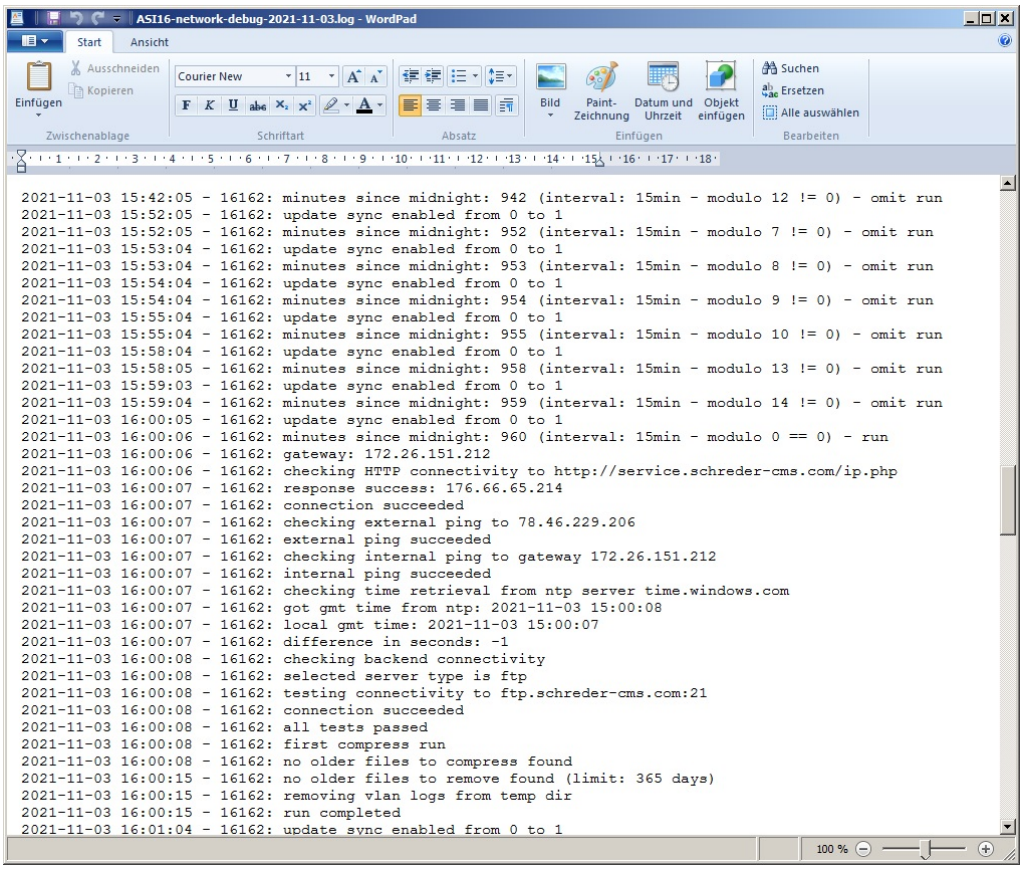
... Interval: Time Interval for all "Ethernet Adapter Services" and log entries.

... Available logs: To download and/or delete one or more "ETH Service" log files.

Reboot: To reboot the ASI imager. - May take up to 5 minutes.

==========

Example of "Ethernet Adapter Service" log file:



7 Peripherals Controller, Hardware / Software

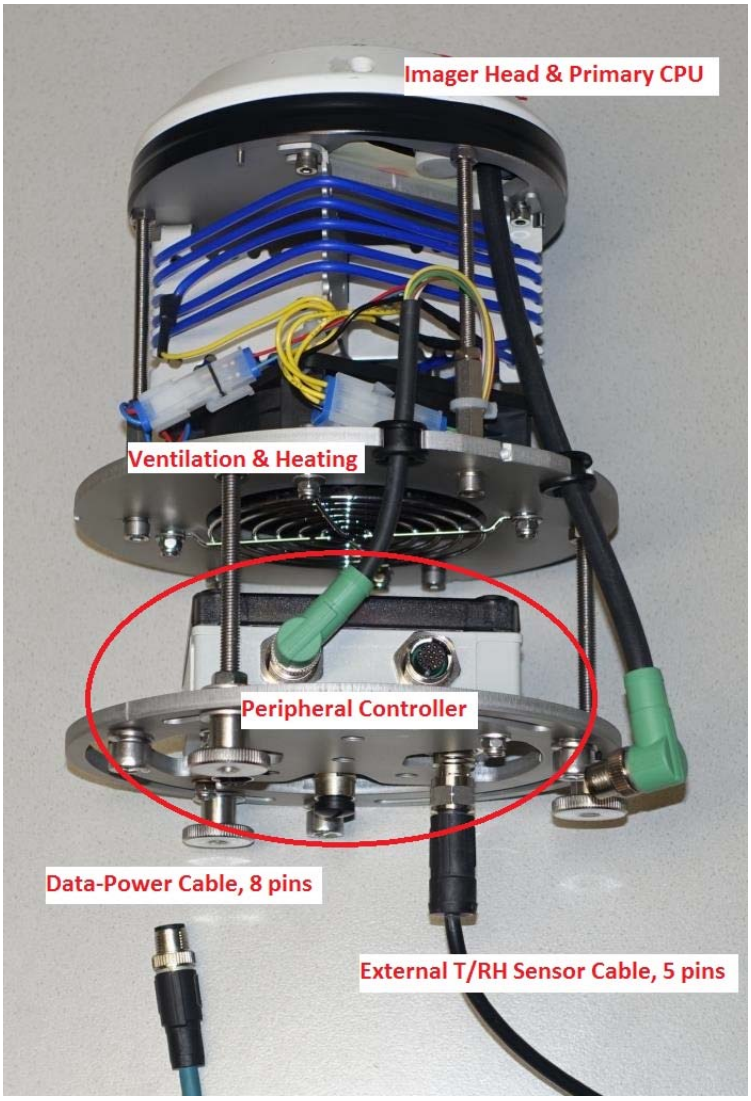
ASI-16/5n (Advanced) incorporates a secondary "Peripherals Controller" (PeriCont), physically and logically separated from the "Main Controller" in the imager camera head.

PeriCont Hardware is mounted in a separate box at the bottom mounting plate.

PeriCont-V2 includes additional optional features, like additional external and internal sensors, advanced heating and power management, and UC-RTC-based timing. For high precision T/RH measurements, TRH sensor now is connected via a 2m cable and mounted into a DM 12 mm stainless steel tube to allow installation into a "Radiation Shield". TRH sensor MUST be connected in any case, as otherwise the heating system will NOT work, and the ASI GUI will indicate a TRH sensor ERROR!

7.1 PeriCont - Hardware and Sensors - Summary

The "Peripheral Controller" with its independent CPU manages power- and data-distribution, multiple internal and external sensors, and controls and supervises functionality of forced ventilation (fan) and ait flow heating. - An internal multi-colour LED indicates the status of all configured components connected to the PeriCont.



7.2 PeriCont - Hardware LED Status Signals

The multi-colour LED is mounted inside the PeriCont box, and is visible from all sides through the semi-transparent cover of the box. In bright sunlight it might be necessary to look relatively close to the ASI imager.

During "boot sequence" long signals indicate three steps. No signal or hanging in one step indicates "no power", or a defect in hardware, or a corrupted firmware. - Reboots wit happen three times after "power-on", after ASI imager reboot, or during and after ASI software updates. - In "run-mode" a reboot may happen about once every hour.

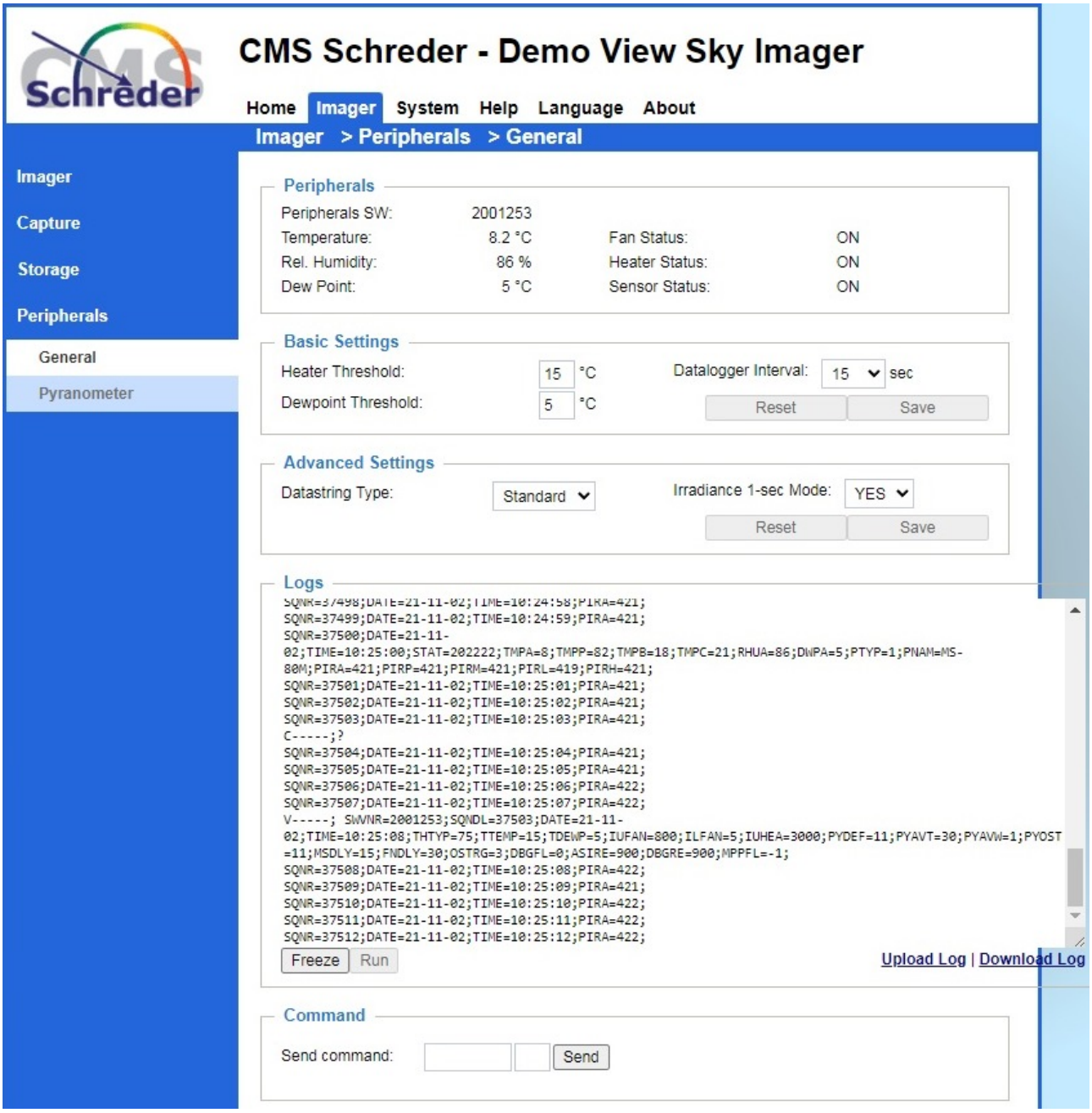
After "boot " the status of internal and external modules is indicated by a SEQUENCE of long and short signals in different colours, which is repeated each about 30 seconds.

Step	Time	Colour	Meaning
Boot 1	long	White	Pre-boot check sequence.
Boot 2	long	Yellow	Internal hardware checks.
Boot 3	long	Green	Driver connectivity check.
Pause	long	dark	.----------
Run 1	long	Green	Summary: All parts OK
		Red	Summary: Some Part(s) on ERROR
Run 2	short	Blue	Ventilation (Fan): Running, OK.
		Red	Ventilation (Fan): Blocked, defective, ERR.
Run 3	short	Blue	Heating: OK, but now heating OFF.
		Yellow	Heating: Heating switched on, ON.
		Red	Heating: Defective, not connected, ERR.
Run 4	short	Green	T/RH Sensor: Connected, working, OK.
		Red	T/RH Sensor: Not connected, defective.
Run 5	short	White	Pyranometer: Not configured (CRM, ASI).
		Green	Pyranometer: Connected, working, OK
		Red	Pyrano: Not connected, defective, ERR.
Pause	long	Dark	.----------
Repeat			Repeat sequence at step "Run 1".

Watch the LED signal especially during and after (outdoor) installation.

7.3 PeriCont - ASI GUI - General Settings

TOP BAR: Imager - SIDE BAR: Peripherals / General:



Peripherals: Data as delivered by the PeriCon. - Please press [F5] for refresh.
The same data also are displayed at the Imager homepage.

Temperature/ Rel. Humidity/ Dew Point: Data from the environmental T/RH sensor.

NOTICE: For high-quality temperture and humdidity data the T/RH sensor MUST be installed into a professional "radiation Shield"!

Fan/ Heater/ Sensor Status: OFF / ON / ERR (ERR = Error, blocked, broken)

Settings: To manged the ON/OFF status of the heater, and datalogger data.

Heater Threshold: Minimum outdoor temperature, to switch on the heater.

Dewpoint Thr...: Minimum dewpoint deviation, to switch on the heater.

Datalogger Int...: Time interval to get PeriCont data updates from PeriCont.

Datastring Type: Amount / variety / length of (system internal) data to be logged.
For debugging, set to "long" and provide the "peridata.csv" file.

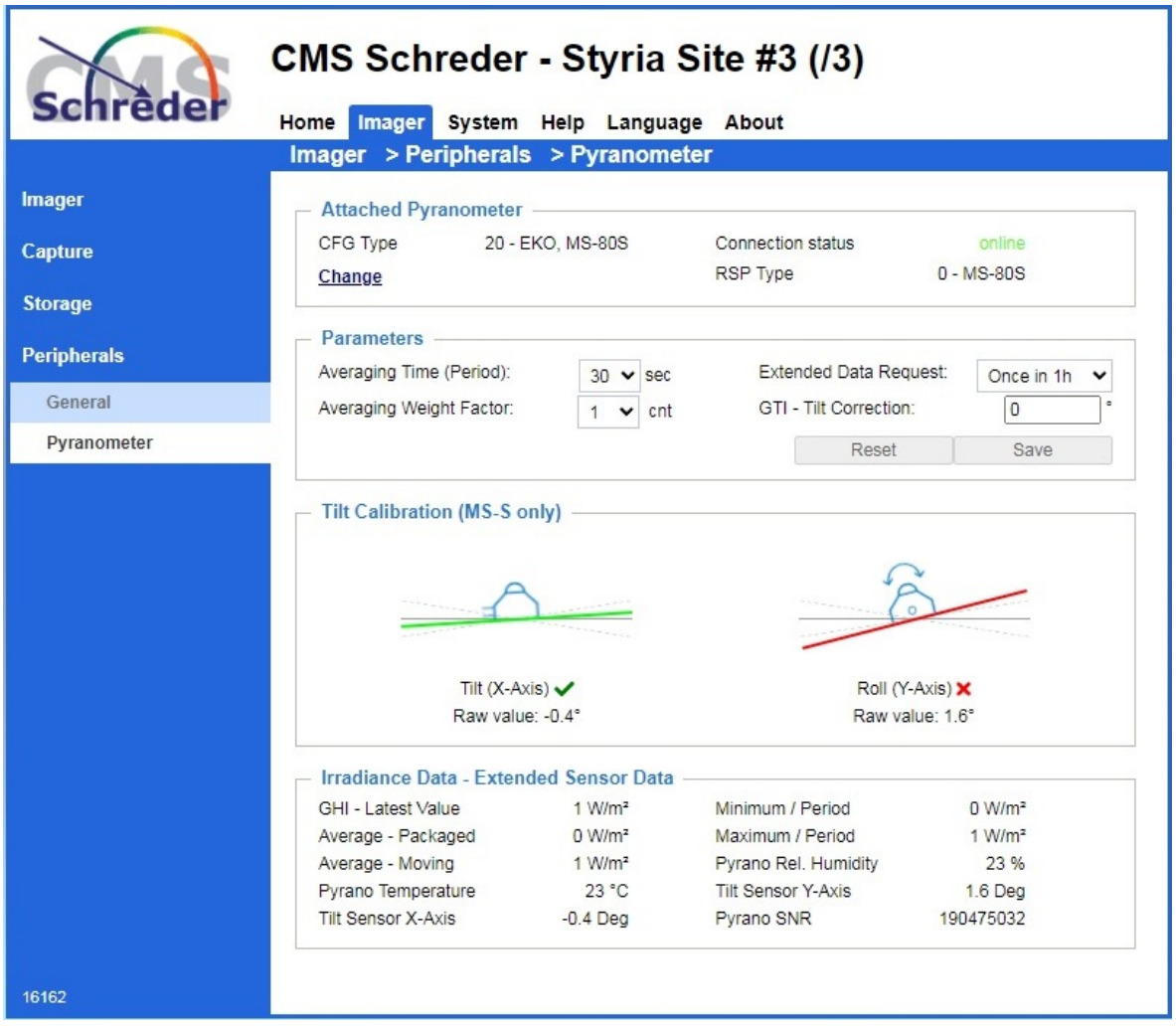
Irradiace 1sec ...: To log Pyranometer data (irradiance) once every second.

Logs: Current data as received from / sent to the PeriCon "Data Logger".
All Data are stored in the "peridata.csv" file, once a day, along with images.
Important data are also stored in the JPG image "EXIF" data structure.

Command: To send special and encrypted command to PeriCon;
(Commands and encryption code upon special request).

7.4 PeriCont - ASI GUI - Pyranometer Configuration / Data

TOP BAR: Imager - SIDE BAR: Peripherals / Pyrano:



Attached Pyranometer:

CFG Type: The type of Pyranometer configured at this moment:
RSP Type: RSP Type: Pyranometer type, as reported from device via ModBus.

Change: To change the type of Pyranometer, mainly for trial purpose.
For permanent storage, please also update settings in CRM.
CFG type MUST match with actually installed Pyrano hardware.
After change of setting ASI must be power-OFF for 15 seconds.

Parameters:

Internally, PeriCont collects irradiance data once very second, eve if not sent to the ASI datalogger. Within each "Averaging Period" PeriCont internally calculates averages, minimum and maximum, and sends it to the datlogger within each "looging period".

Averaging Period: Timeframe for averages, minimum and maximum.

Weight Factor: Set a dynamic priority for "newer" data above "older" data.
Applicable for "moving average", only.

Ext Data Requ.: Interval to send less-important data to the datalogger.
E.g. Pyrano serial number, internal temperature and tilt.

GTI -Tilt correct.: To adjust tilt calibration for GTI (Global Tilted Irradiance).
Frequently used in solar power (PV) applications.

Tilt Calibration: To assist proper mechanical levelling of Pyranometer.
Available only for EKO Pyranometers Type "MS-80S".
Levelling should be within +/- 1° in both axes (X/X).

7.5 Datalogger File - Datafield Codes - Command Codes

ASI-GUI ./Imager/Peripherals/General contains a "Log-Frame" showing the last few minutes of communication between "PeriCont Controller" and "ASI Imager Head".

Entire communication is stored into a "peridata_16snr_yyymmdd.csv" File, one file per days, sent to the network-storage-place, into corresponding day-date-folders along with JPG images. The file at the network storage place is updated once per hour, a few seconds after the full hour. Because of its special structure, this "Peridata.CSV" cannot be directly used for imports into SQL databases or XLS sheets. For such use, CMS provides a "Peridata Converter Tool", which can be downloaded from CMS-CRM/Downloads. The tool automatically generates table-style CSV files. See Sections below

Description of Dataset Identifiers and Command Codes:

RX:	SQNR Dataset:	Sequence ID, "PeriCont Controller" --> "Imager Head":
	SQNR=57326;	Time stamp, seconds after midnight, synced to ASI time;; The timestamp is INVALID for about 3 minutes after reboot;
**)	DATE=19-09-01	Real time clock DATE, Format: "yy-mm-dd"
**)	TIME=18.55:44	Real time clock TIME, Format: "hh:mm:ss"

STAT=201222; Hardware status flags; Format "STAT=mlkjih";

- h = Fan Status, h= Stat * 1;
- i = Heater Status, i= Stat * 10;
- j = T/RH Sensor Status, j = Stat * 100;
- k = Pyranometer Sensor Status, k =Stat * 1000
- l = "0", reserved for future hardware extension;

  - Z=0: "---", does not exist; LED= "Dark"
  - Z=1: "OFF", OK but switched off; LED= "Green" or "Blue";
  - Z=2: "ON", switched on; LED= "Blue" or "Yellow";
  - Z=9: "ERR", defect (shortcut, blocked, broken ...); LED" "Red";

- m = Version of PeriCont Communication Protocol:
  - 1= 2016-01 till 2017-12
  - 2 = 2018-01 till today, including Pyranometer and RTC;

Examples:

202222 =	Fan ON, Heater ON, TRH Sensor OK; Pyrano ON/OK;
209212 =	Fan ON, Heater OFF, TRH Sensor OK; Pyrano ERROR;
200219 =	Fan ERR, Heater OFF, Sensor ON, Pyrano not defined;
200912 =	Fan ON, Heater OFF, TRH Sensor defect or not connected;

	TMPA=5;	Outdoor Temperature, by environmental sensor;
	TMPP=50;	Outdoor Temperature, by env. sensor, as 0.1°C value;
*)	TMPB=19;	Temperature near the air heating coil;
*)	TMPC=16;	Temperature inside the imager (camera) head;
	RHUA=65;	Outdoor Relative Humidity, by environmental sensor;
	UINA=48;	Primary Input Voltage (HPoE line entry point)

	IFAN=204;	Fan sensing current, Fan is ON (mA);
	IHEA=1251;	Heater current, Heater is ON (mA);
	PI..=654;	Pyranometer data, Irradiance in W/m2
+)	PIRA=654;	Non-averaged value of one second ago measurement;
+)	PIRP=654;	"Packaged Average" over averaging period;
+)	PIRM=654;	"Moving Average" over averaging period;
+)	PIRL=650;	Minimum, lowest value within last averaging period;
+)	PIRH=660;	Maximum, highest value within last averaging period;

RX: V----- Parameter Dataset: From "Pericont Controller" to "Imager Head":

	SWVNR=160815;	Software version of PeriCon Firmware;
	TTEMP=15;	Threshold temperature for heater control;
	TDEWP=5;	Threshold dewpoint diff. temperature, heater control;
	UFAN=500;	Upper limit (blocked) for fan current (mA);
	ILFAN=5;	Lower limit (broken) for fan current (mA);
	IUHEA=3000;	Upper limit (shortcut) for heater current (mA);
	MSDLY=15;	Message delay, time between messages (sec);
	FNDLY=30;	Fan delay time, retry to start after "Error" (sec);
	SFLAG=30;	Status-Flag time, update interval status flags (sec);
	OSTRG=3;	Output string format; 1=short; 3= standard; 5=long;
	DBGRE=0;	Debug-Flag, watchdog time; CMS internal use only;
	...	
+)	PYDEF=15;	Pyranometer definition; brand, type, ...;
+)	PYAVT=30;	Pyrano Averaging Time; Seconds;
+)	PYAVW=1;	Pyrano Weighting Factor for Moving Average;

TX: Command - from "Imager Head" to "PeriCont Controller":

B15	Command to set TTEMP to 15°C;
C5	Command to set TDEWP to 5%;
I15	Command to set MSDLY to 15 seconds;
...	Additional commands are hidden (not displayed);

*) Data available with 2nd and later generation ASI hardware / Firmware.
Second generation ASI hardware starts with SN 16020, and higher.

**) Data available with 3nd and later generation ASI PeriCont firmware, only.
Firmware update possible via special cable + PC software, or ASI GUI.

+) Available only when having purchased the "Pyranometer Modbus" Option.
At the moment ASI-16/52 supports EKO pyranometers with Modbus Interface.
ASI-16/51: Later purchase and upgrade possible. No new hardware needed.
ASI-16/52: Hardware upgrade possible by replacing PeriCont controller device.

7.6 "PeriDatConv---.jar" - Peripheral Data Converter Tool

Download the "PeriData Converter Tool" from CMS-CRM, download site.

This tool (semi-automatically) converts raw "peridata_16snr_yyymmdd.csv" files into table-structured "peridata_16snr_yyymmdd_tab.csv" files. Storage locations for raw data and converted data can be selected in the "Configuration Section". When using multiple storage locations for multiple "sites", the user can create and store multiple "profiles". The Configurator automatically detect if the "raw data" root directory contains one or multiple ASI imagers, one ASI imager only, or a "single day" directory. We strongly recommend to allocate the raw data root to the ASI default root "/asi16_data/.

8 ASI-16/5n - Mechanical Installation Guide

8.1 ASI-16/5n Imager - Sample Mast-Mount Designs

8.2 Preparation for Mounting

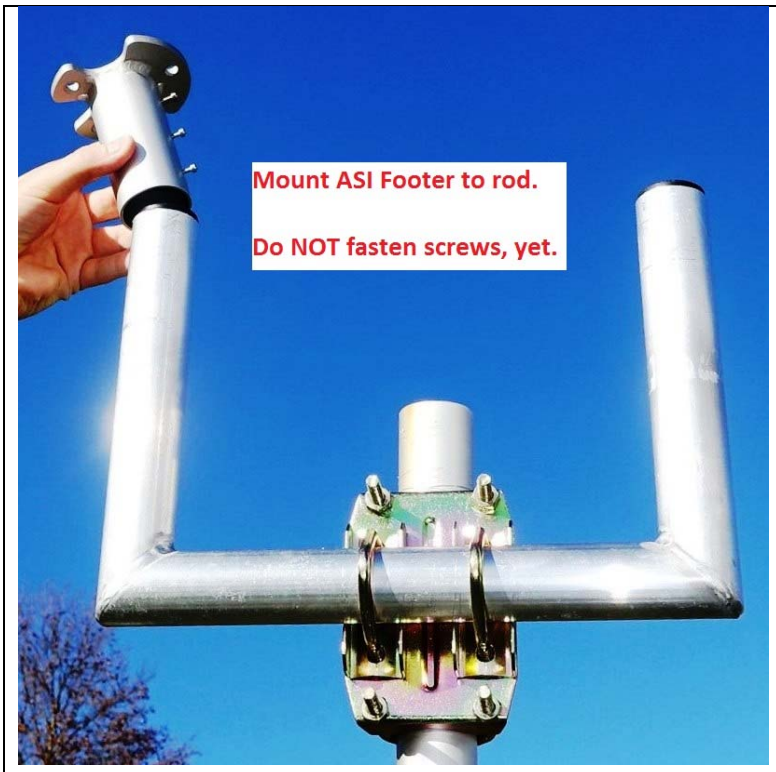
Top Left:
Single-Mast mounding, example.

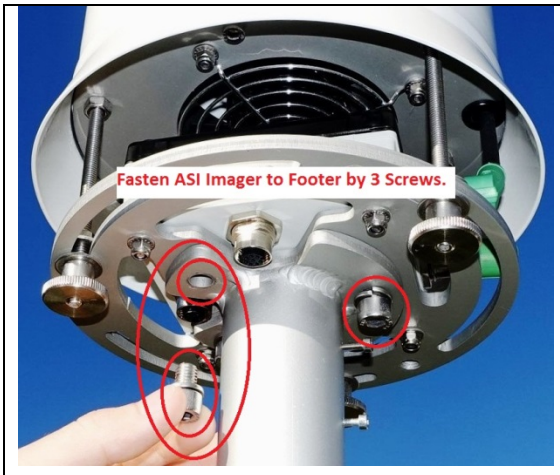
Top Right:
Double-Mast mounting, example.

Right:
Parts and Tools for mounting.

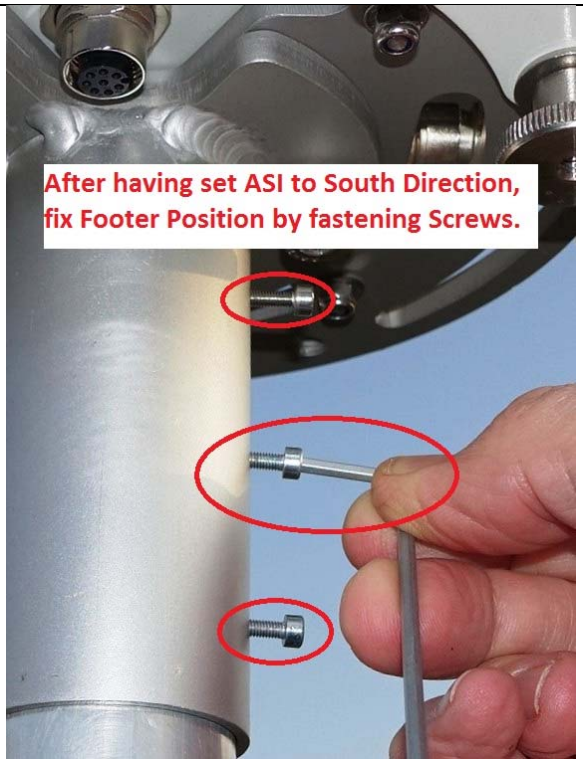
- Allen key for M3 screws
- Allen key for M8 screws
- Compass and small mirror

8.3 Step-by-step Mounting Guide





South Direction Mark.
Check Imager Top Mark.
Use Compass and rotate Imager till
the Mark looks into South Direction.

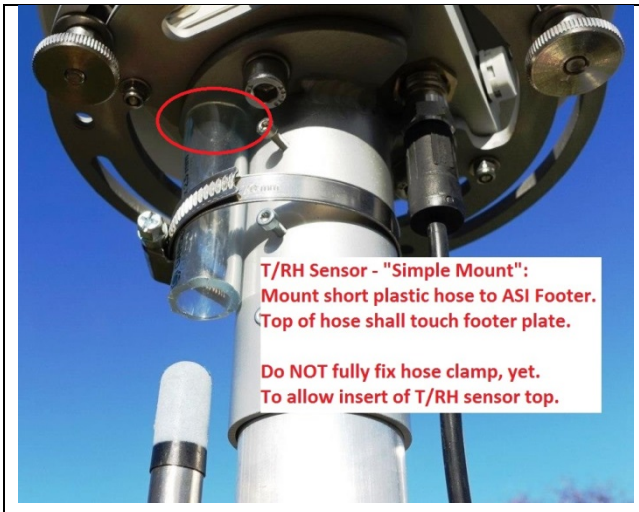

After having set ASI to South Direction,
fix Footer Position by fastening Screws.

Loosen all three bottom hand screws.
Watch Spirit Level at Top of Imager.
Rotate Threaded Nuts to adjust level.
When done, fasten 3 bottom screws.

External T/RH Sensor:
Mount "Radiation Shield" according to
instructions of your Shield Supplier.

Insert T/RH Sensor

Insert T/RH Sensor into
Radiation Shield as shown.
Connect T/RH Sensor Cable
(4-Pin Connector) to Imager.


T/RH Sensor - "Simple Mount":
Mount short plastic hose to ASI Footer.
Top of hose shall touch footer plate.
Do NOT fully fix hose clamp, yet.
To allow insert of T/RH sensor top.

T/RH Sensor "Simple Mount":
Insert T/RH Sensor Head into short Plastic Hose.
Keep blue Sensor Top 3-5 mm below Hose Top End.
When done, fasten Hose Clam.

Connect Power-Data-
Cable (8-pin) to Imager.

	WARNING: The CMS HPoE Injector and the AC/DC Power Supply must be installed an a dry and safe place without the risk of exposure to water or strong (condensing) humidity!
Electrical connection (inside building): 1. Connect HPoE cable to CMS injector. 2. Connect power supply to injector. 3. Connect router LAN cable to injector. 4. Connect power supply to AC power.	Check basic electrical operation: Check imager controller box for illuminated LED(s). Colour and number of LEDs vary, depending of ASI-16 release version. At least one LED must be illuminated.

9 Pyranometer Option - Hardware Installation Guide

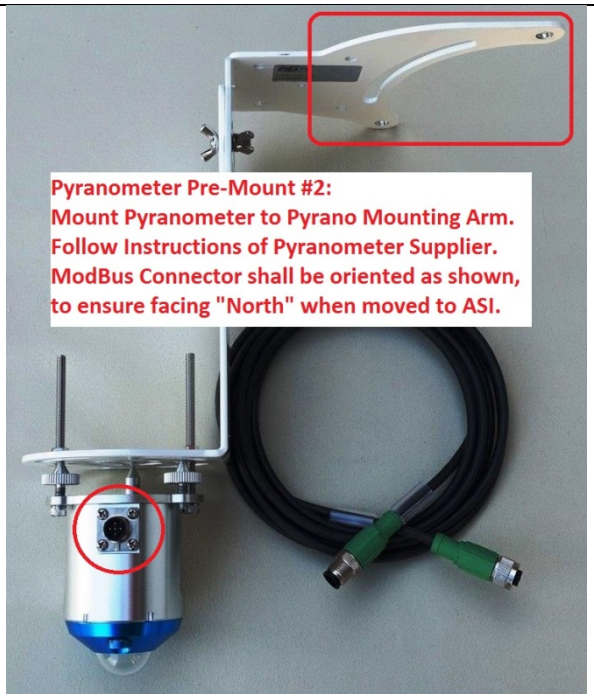
9.1 Pyrano Mounting - Components

Pyranometer Option delivery includes the "Pyrano Mounting Arm" and the ModCable. It does NOT include the Pyranometer itself. An ASI qualified pyranometer can be ordered separately via your local agent, via EKO-Europe or via CMS-SchrederCMS

ASI-16/5nn"Pyranometer Mounting Arm" comes with two non-pre-assembled mounting arm components, and small additional parts (screws, washers) for assembly and mounting the arm onto the ASI body.

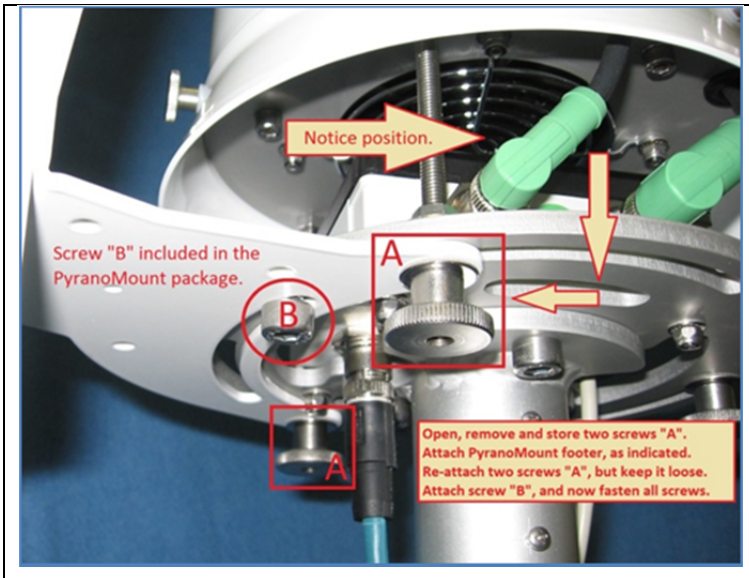
Screws to mount the Pyranometer itself are NOT included. Usual those screws are a part of the Pyranometer supplier scope of supply.

9.2 Mounting the Pyrano Mounting Arm to an ASI-16/5n



When mounting the Pyranometer, consider Northern or Southern hemisphere.

The plug and cable always shall face "away from sun", to avoid heat by exposure to direct sun



The Pyrano mounting arm allows to adjust the pyranometer to variabiable tilt angles for GTO (Global Tilted Irradiance) measurement.

Only ONE (of three) possible ways of mounting the arm will ensures the correct North-South arm orientation , necessary for non 90° tilt angle adjustments, required for GTI measurement.

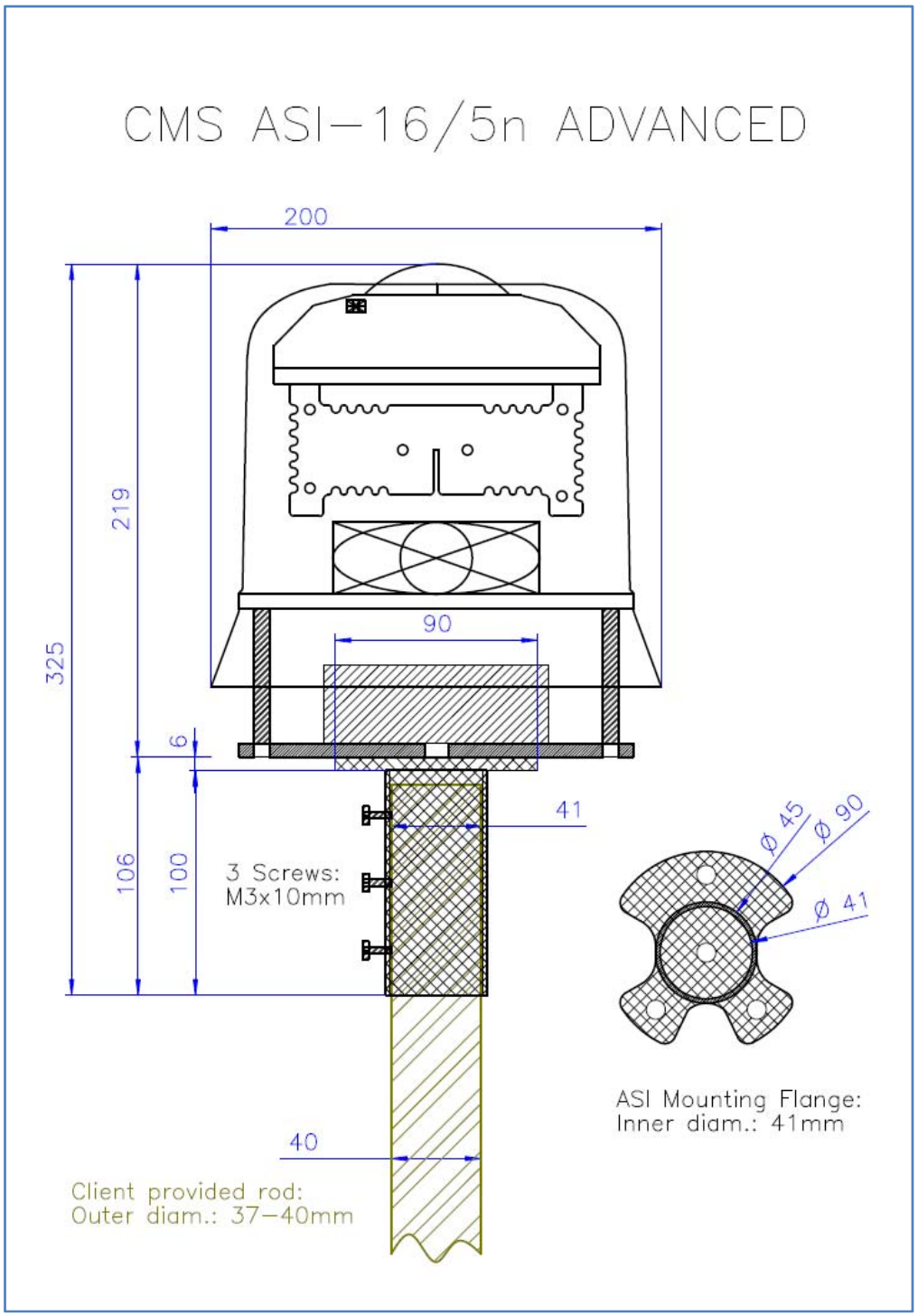
After mounting, use the "liquid Level" to adjust levelling of the Pyranometer!

9.3 xxx:

xxx

10 Mechanical & Electrical Drawings

10.1 ASI-16/5n Mechanical Drawings



11 Service & Maintenance

11.1 ASI-16/5n - Hardware Reset after Severe Faults:

How to repair ASI-16 after severe software corruption?

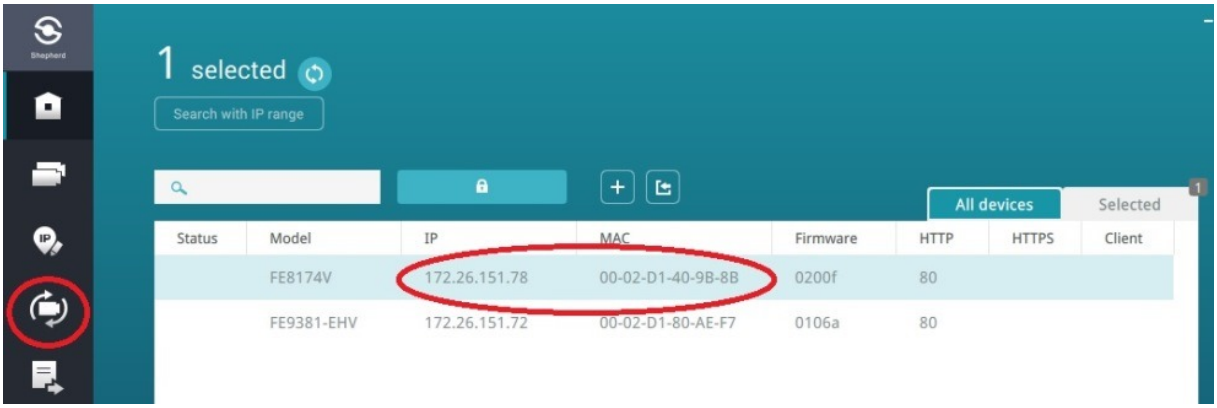
An ASI can be found and accessed via it's IP, but ...

(a) Web Browser shows corrupted screen without data/functions;
(b) ASI16-Installer indicates "Failed to establish HTTP connection", and therefore cannot run ASI16-Installer "FULL RESET";
(c) even after multiple power-off/on cycles and ASI16-Installer FULL RESET still some ASI functions do not perform as should.

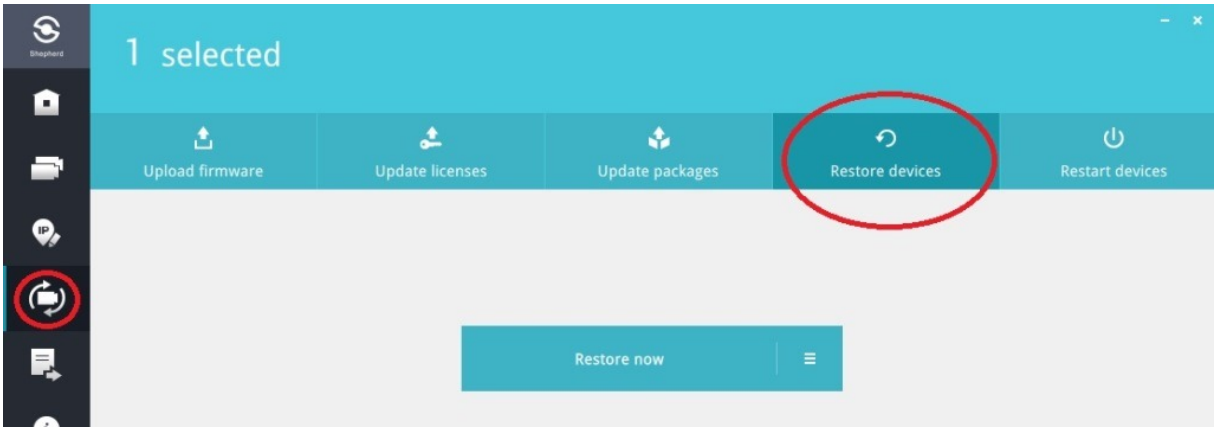
In such cases some core OS/SW modules might have been corrupted.
ASI must be reset to factory state, followed by ASI16-Installer re-install.

(1) Download and install OEM Maintenance tools from below website:
https://www.vivotek.com/shepherd#downloads

(2) Run "Shepherd2.exe", and find your ASI (IP, MAC-IC).



(3) Mark the ASI, click on "Maintenance", and enter your LI/PW.



(4) Select "Restore", start "Restore", and confirm all security questions without making any changes. Keep "Restore" process running for 15 minutes.

(5) Close "Shepherd Tool", and power-off ASI for 30 seconds.

(6) Power-on ASI again, and wait for 5 minutes.

(7) Restart "Shepherd Tool", and re-run steps (2) to (6) once again.

(8) Logon to CMS-CRM: https://service.schreder-cms.com/crm/

(9) In CRM, check/update all CRM-stored imager data.

(10) From CRM, download latest ASI16-Installer version.

(11) Start ASI16-Installer, select Camera and "Update/Check".
Note: ASI SN will NOT be displayed, at that time! https://service.schreder-cms.com/crm/

(12) Start "FULL RESET", and follow standard procedures.

11.2 ASI-16/5n Peripheral Controller - Firmware Upgrade

Firmware Upgrade via "Programming Adapter" and Laptop

This **PeriCon Firmware Upgrade Procedure** is required ==>> (A) in any case for all ASI-16/5n with Serial Numbers above SN 16101, and ==>> (B) in case of a previous PeriCon firmware update (via ASI Web-GUI) was interrupted by mistake, and after next Power-OFF/ON Peripheral Controller does NOT re-start and work anymore, as by (1) NO PeriCon LED blink signals, and (2) NO PeriCon SQNR-Data ("SQNR=12345; DATE=...") listed in ASI Web-GUI under ./Imager/Peripherals/General/[Logs].

(A) Preparations, Requirements:

- "ASI-16 PeriCon-USB Programming Adapter":
To connect the Peripheral Controller to a Laptop.
Cannot be directly plugged into a PC/LT US port.
Requires a standard USB cable as described below.
Supplied as LOAN ONLY by your EKO/CMS agent.
Must be returned to your agent within 2 weeks.

- USB cable, plugs type "Mini-A" to type "2.0 A".

- Laptop with fully loaded battery, running on Windows WIN-7 or later.

- Tools: 6mm hex wrench, if ASI must be taken down from its mounting rod. See 3.2

- For glass dome cleaning: Soft wet tissues, soft dry tissues.

- PeriCon programming software, firmware: ZIP-archive available for download in CMS-CRM.
WIN Software: "UpdateLoader-win32.exe/.ini". Firmware: "ASI-PeriCon_SRn_nnnnn.hex".

(B) Procedure:

1. CMS-CRM/Downloads: Download (a) latest "Release Notes_nnn.pdf", (b) latest "ASI16-Installer_V20.jar", and (c) latest "ASI-PeriCon_Firmware_yymmdd,zip".
Store "ASI16-Installer" to the PC connected to the ASI and Internet via LAN/router/switch.
Store "ASI-Pericon...zip" to the Laptop used outdoor (on site) to update Pericon firmware.
We recommend to unzip the entire "ASI-Pericon...zip" folder directly to the Desktop.

2. Office PC: Run ASI-Software "Full Reset" according to instructions in "Release Notes".

3. Prepare for safe physical access to the ASI-16 imager, outdoor on site or indoor.

3.1 If the ASI can be accessed easily and without any risks of injury (falling down, slipping), then the ASI can remain on place, on the mounting rod. If wanted, remove the outer hood (green circle mark).

3.2 Otherwise the ASI (without rod mounting flange)must be taken down, by taking out the three M8 screws (red square marks) at the mounting plate. The rod mounting flange shall stay on the rod, to avoid later mechanical re-adjustments, after re-mounting the camera.

4. Disconnect Data-Power cable (red mark) and cable to imager head (yellow mark).

5. Connect "PeriCont-USB Programming Adapter" via USB cable to Laptop.

6. Re-connect Data-Power cable, switch-on Laptop and start "UpdateLoader-win32.exe".

7. In "Port" select a serial port marked "FTDIBUS". If it does not appear, connect the adapter to another USB port on the Laptop, wait for driver installation, and try again.

8. In "Firmware-Update" select the "ASI-PeriCon_SRn_nnnnn.hex" file.

9. Double check all other settings, according to screen shots.

10. Click on "Update starten!". After a few seconds the update will start. DO NOT INTERRUPT!!!

12. Wait till "Update finished", and the PeriCon LED's show a white-yellow-green signal sequence.

13. Disconnect Data-Power cable (red mark) and "PeriCont-USB Programming Adapter".

14. Clean glass dome, first by a soft wet tissue, followed by a soft dry tissue.

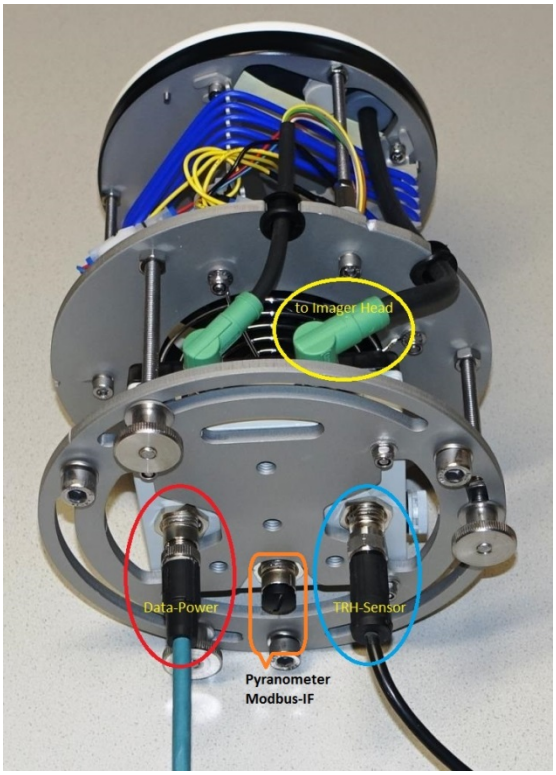
15. Remove insects and/or other large particles from heating coil and fan protection.

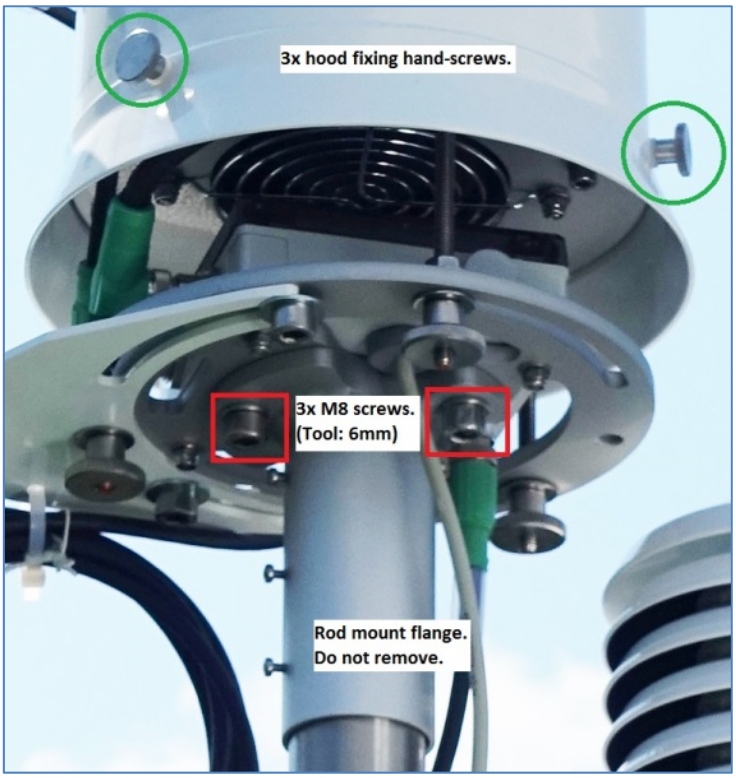
16. Re-mount outer hood.

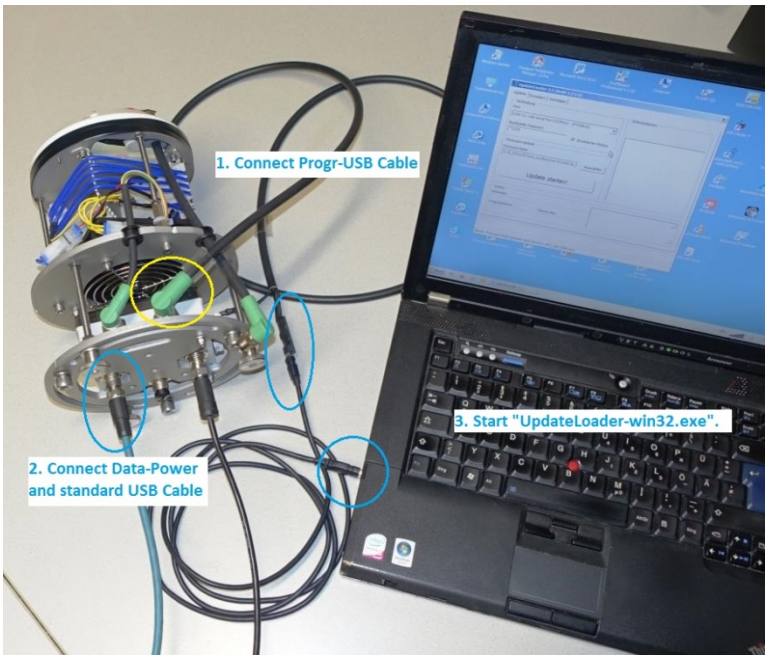
17. Re-connect cable to imager head (yellow mark) and Data-Power cable.

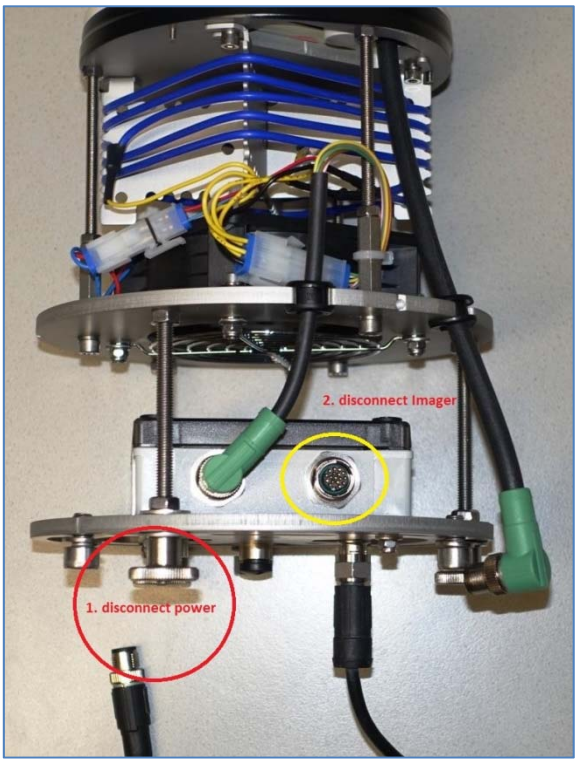
18. (Re-mount ASI to rod mounting flange.)

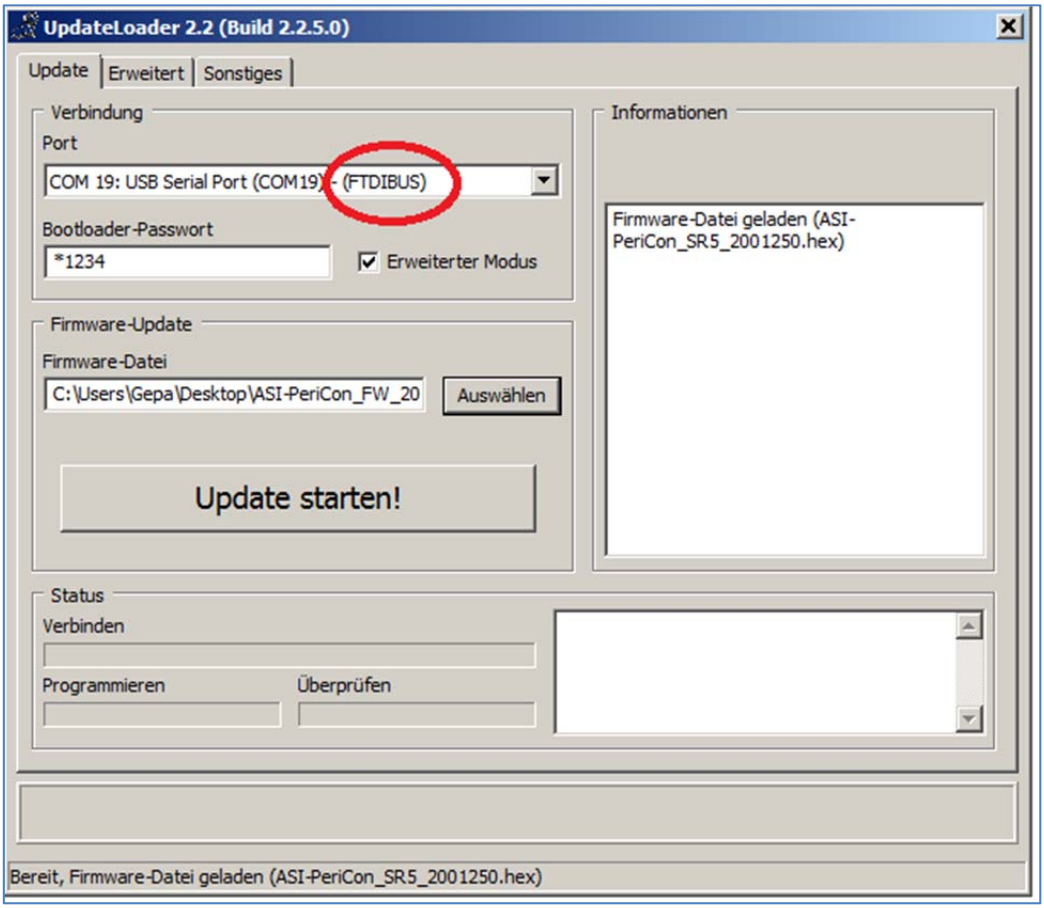
19. Office PC: Check entire functionality and settings via ASI-GUI (browser interface).

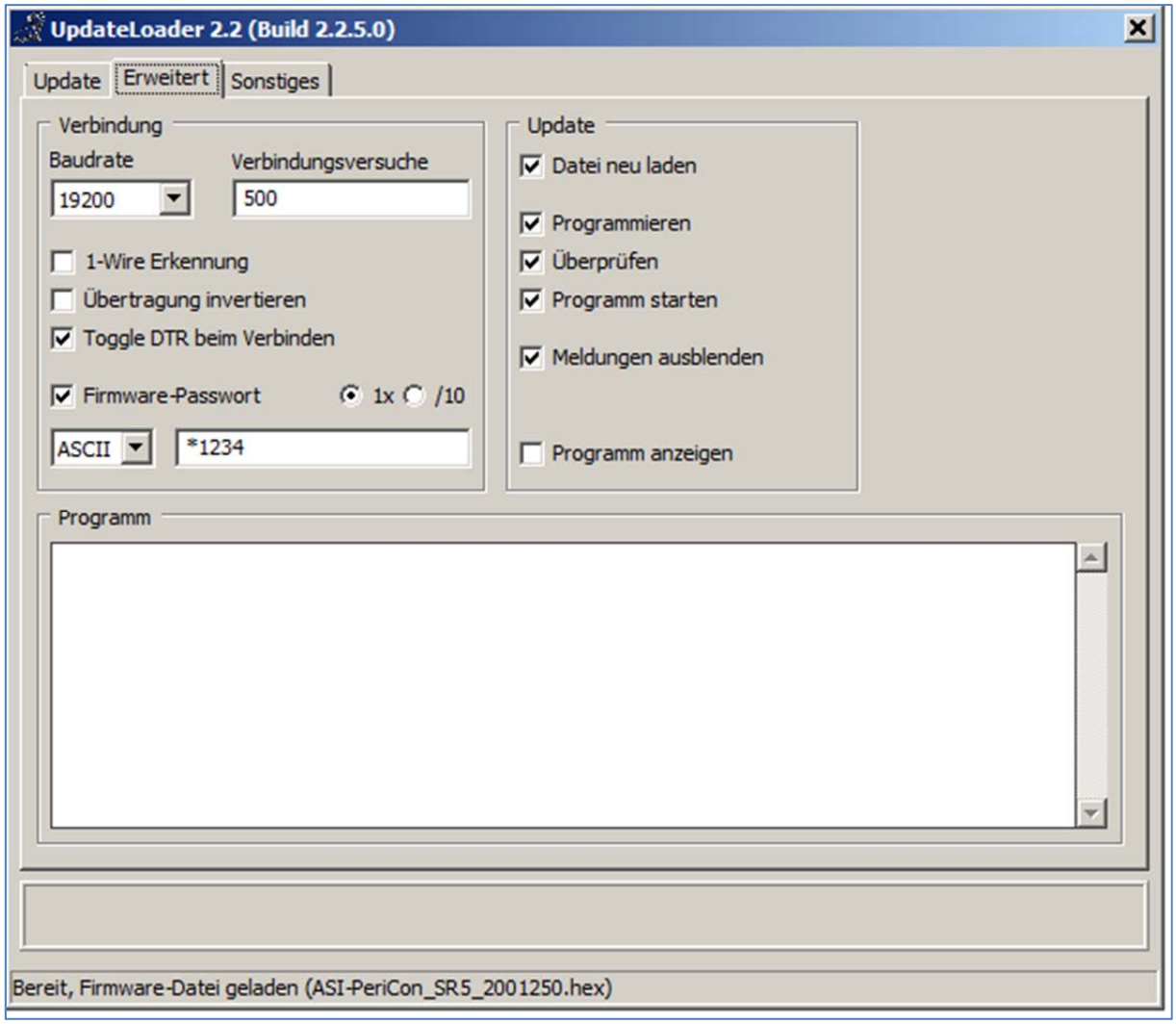



3x hood fixing hand-screws.
3x M8 screws.
(Tool: 6mm)
Rod mount flange.
Do not remove.


1. Connect Progr-USB Cable
2. Connect Data-Power
and standard USB Cable
3. Start "UpdateLoader-win32.exe".


2. disconnect Imager
1. disconnect power


UpdateLoader 2.2 (Build 2.2.5.0)
Update
Erweitert
Sonstiges
Verbindung
Port
COM 19: USB Serial Port (COM19) - (FTDIBUS)
Bootloader-Passwort
*1234
Erweiterter Modus
Firmware-Update
Firmware-Datei
C:\Users\Gepa\Desktop\ASI-PeriCon_FW_20
Auswählen
Update starten!
Informationen
Firmware-Datei geladen (ASI-PeriCon_SR5_2001250.hex)
Status
Verbinden
Programmieren
Überprüfen
Bereit, Firmware-Datei geladen (ASI-PeriCon_SR5_2001250.hex)


UpdateLoader 2.2 (Build 2.2.5.0)
Update
Erweitert
Sonstiges
Verbindung
Baudrate
19200
Verbindungsversuche
500
1-Wire Erkennung
Übertragung invertieren
Toggle DTR beim Verbinden
Firmware-Passwort
1x
/10
ASCII
*1234
Update
Datei neu laden
Programmieren
Überprüfen
Programm starten
Meldungen ausblenden
Programm anzeigen
Programm
Bereit, Firmware-Datei geladen (ASI-PeriCon_SR5_2001250.hex)

11.3 xxxx

xxx.

11.4 Spare Parts - Part Order Numbers - Refer to Price Table for details.

PART DESCRIPTION	ORDER NUMBER
ASI-16/55_V24 ADVANCED	1035.10.01.03
Outer Hood (Outer Cover)	1035.110.90
Hood mounting screw	1035.130.34
Data/Power Cable, 20m	1035.210.15.2
CMS HPoE Injector	1035.160.00
AC Power Supply 48V, 90W	1035.210.11

Imager Head (complete)	1035.110.00.03
Dome and Cover Assembly	1035.110.20.03
Heater Star Assembly	1035.120.20
Ventilation Unit Set (Fan)	1035.130.50
Peripheral Controller	1035.150.00
Multipole Cable (Heat/ Vent)	1035.150.70
T/RH Sensor - standard	1035.150.40
T/RH Sensor - enh. protection	1035.150.47
Rod Mounting Shaft	1035.140.50

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Seller hereby warrants the equipment to be free from defects in materials and workmanship, and the equipment being tested to perform according to material and critical specification, but warranty is limited to environmental and functional and operational restrictions, and limited to qualified installation, configuration and operation strictly according to Seller's instructions and to be performed under Buyer's responsibilities,

Within the limits of what is set forth above and below, Seller agrees to repair or replace, without cost of labour and parts to Buyer, any defective equipment or Buyer-serviceable modules or components, when such defect occurs within a period of twelve (12) months from the date in which Seller's goods have been put into use. The warranty duration is 12 months from installation date but never more than 18 months from invoice date, even if, for any reason, the equipment will not be utilized.

Buyer must immediately notify Seller of any defect, specifying the serial number of the equipment. At Sellers sole decision and notice, Buyer either shall send to Seller the defective item for repair or replacement, delivery at the Buyer's costs, and Seller will perform the repairs or provide a replacement within a reasonable period of time, or Seller will deliver replacement equipment or replacement spare parts and Buyer will perform the repair works. In any case, if not otherwise confirmed by Seller, Buyer shall be obliged to immediately, not later than 2 weeks after notice, return the defective equipment or defective components or modules to Seller, otherwise if Buyer fails to return Seller shall be entitle to charge and Buyer shall be oblige to pay the list price of the replacement parts delivered. Upon effecting such repair or replacement, Seller shall have fulfilled its warranty obligations.

Seller is not responsible for defects resulting from improper use of the equipment, lack of proper maintenance, tampering with the equipment, or by repairs effected by the Buyer which have not been approved by Seller in writing and in advance, or by the Buyer using spare parts not being delivered or approved by Seller, or the Buyer not strictly following Seller's instructions and advise for User repair and service procedures.

Seller will not be liable for any injury to persons or things, or for any direct or indirect commercial damages (loss of revenue or profit) due to the failure of operation or the loss of imager data, or instability or non-reliability of data generated by Sellers software.

Seller does not warrant the compliance of its equipment with the laws of non-EEC countries in which the equipment may be installed. Buyer shall indemnify and hold Seller harmless against any claim by third parties resulting from failure to comply with the aforesaid non-ECC laws and standards.

12.2 Contact

CMS Ing. Dr. Schreder GmbH.
Lofererstrasse 32, A-6322 Kirchbichl, Austria
Tel.: +43 (5332) 77056-00, Fax: +43 (5332) 77056-14,
Email: info@schreder-cms.com, Web: www.schreder-cms.com

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12.5 EC - Declaration of Conformity

EG-Konformitätserklärung

Declaration of EC-conformity

Für das folgend beschriebene Geräte
The following described item

ASI-16/55, ASI-16/15 All Sky Imager

wird hiermit bestätigt, dass es mit den Schutzanforderungen der folgenden Richtlinien übereinstimmt.
herewith is declared to be conform with the safety requirements stated in the EEC-regulation.

EMC Directive 2014/35/EU
RoHS Directive 2011 65 EU

Diese Erklärung gilt für alle Exemplare und verliert ihre Gültigkeit bei mit uns nicht abgestimmten Änderungen.
This specification applies to all specimens and is voided by not with us coordinated changes made.

Zur Beurteilung des Erzeugnisses hinsichtlich der elektromagnetischen Verträglichkeit wurde folgende Normen herangezogen:
For judging the products conformity the following standards have been applied:

EN 61000-6-1:2019
EN 61000-6-3:2011

Die Konformität dieses Produktes ist sichergestellt. Der Hersteller erklärt damit die alleinige Verantwortung für von ihn vertriebene Geräte des oben angegebenen Typs.
The conformity of this product is secured. The manufacturer declares hereby the sole responsebility for appliances mentioned above and produced by the manufacturer himself.

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Stellung im Unternehmen: *Position in Company*	Managing Director

Kirchbichl	01.12.2023	
Ort *place*	Datum *date*	rechtsverbindliche Unterschrift *legal signature*