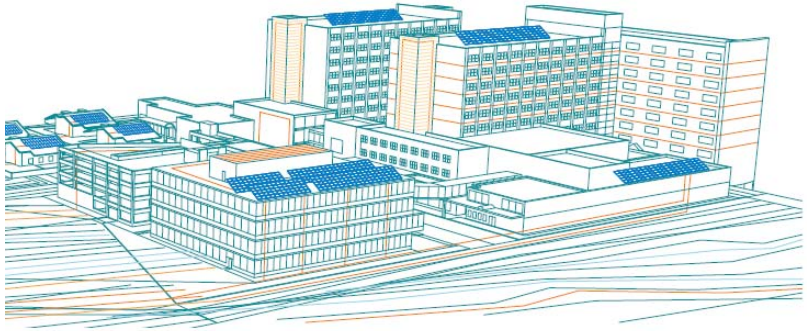
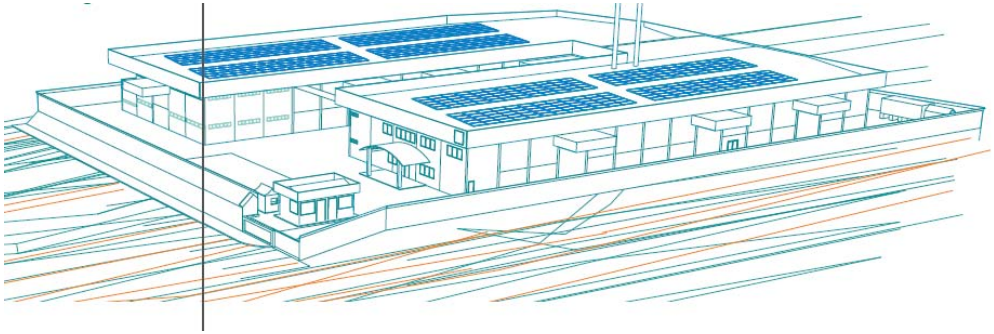
ABB Oy Jukka A Mäkinen 27.03.2015

ABB solarsystems
ISY kevätkokous

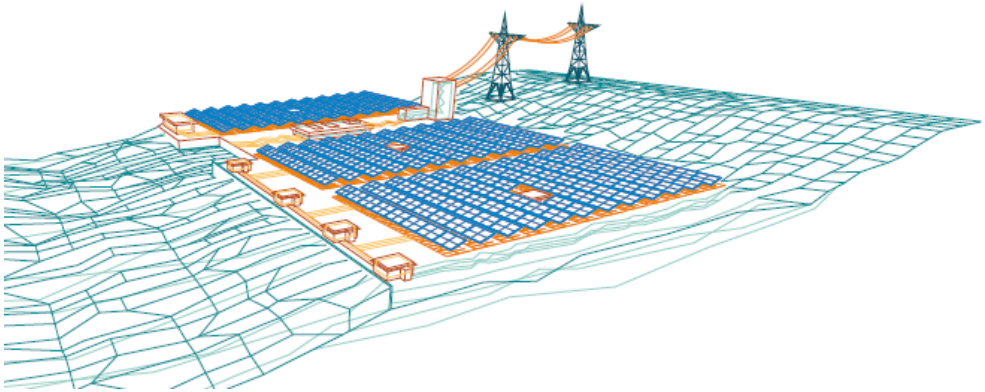
Aurinkosähköjärjestelmät



Useita pieniä järjestelmiä lähellä kulutuspistettä



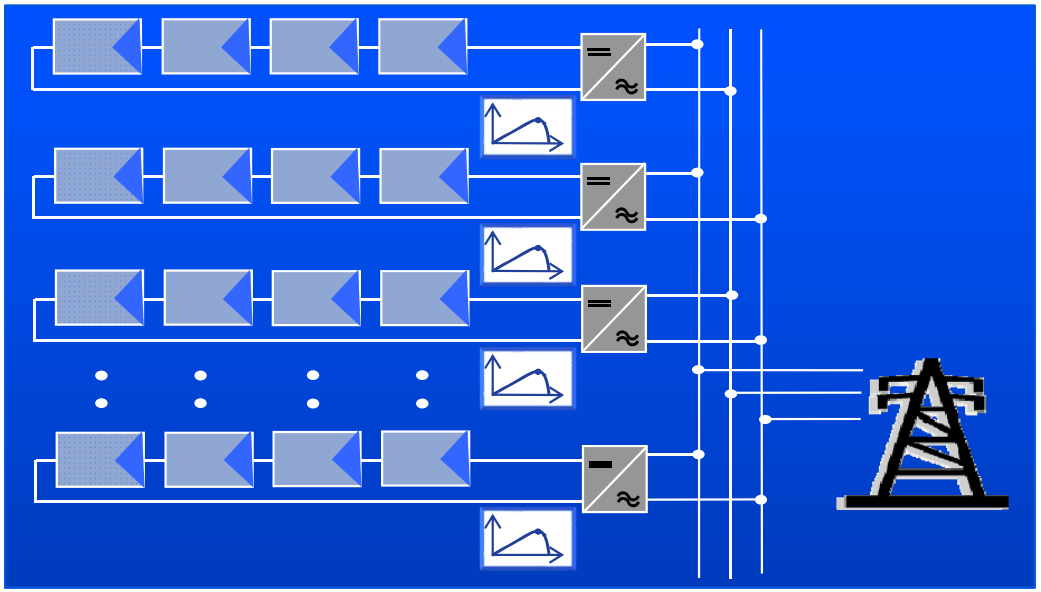
Keskisuuria järjestelmiä kulutuspisteissä



Isoja järjestelmiä kaukana kulutuksesta

Luottamuksellista

Aurinkosähköjärjestelmät
String-invertterit



Inverters' Power range	2kW – 33.0kW
Inverter type	Single phase (max 6kW) Three phase (max 33.0kW)
Technology	Transformerless HF Isolated
Installation type	Outdoor
Independent channels	1 (uo to 2.5kW) 2 (power ≥3kW, except for TRIO-5.8 & PRO-33)

UNO-2.5-I-OUTD
UNO-2.0-I-OUTD

PVI-3.0-TL-OUTD
PVI-3.6-TL-OUTD
PVI-4.2-TL-OUTD

PVI-3.8-I-OUTD
PVI-4.6-I-OUTD

PVI-5000-TL-OUTD
PVI-6000-TL-OUTD

TRIO-5.8-TL-OUTD
TRIO-7.5-TL-OUTD
TRIO-8.5-TL-OUTD

PVI-12.0-I-OUTD
PVI-10.0-I-OUTD

PVI-12.5-TL-OUTD
PVI-10.0-TL-OUTD

TRIO-20.0-TL-OUTD
TRIO-27.6-TL-OUTD

PRO-33.0-TL-OUTD

Single Phase

0kW | 2kW | 3kW | 4kW | 5kW | 6kW

Three Phase

7kW | 8kW | 9kW | 10kW | 12kW | 20kW | 27.6kW | 33.0kW

Luottamuksellista

String invertterit

Solar inverters

ABB string inverters
UNO-2.0/2.5-I-OUTD
2 to 2.5 kW

The UNO-2.0-I and UNO-2.5-I are packed with ABB's proven high performing technology. The smallest of ABB's outdoor range, these products are the right size for the average rooftop installation.

The high speed and precise MPPT algorithm enables more real-time power tracking and improved energy harvesting.

Efficiency of up to 96.3%
Despite the isolated operation, the UNO-2.0-I and UNO-2.5-I feature an efficiency of 96.3%. The wide input voltage range makes the inverter suitable to low power installations with reduced string size.

In addition to its new look, this inverter has new features including a special built-in heat sink compartment and front panel display system.

This rugged outdoor inverter has been designed as a completely sealed unit to withstand the harshest environmental conditions.

Highlights
- Single phase output
- High frequency isolated topology
- Each inverter is set on specific grid codes which can be selected in the field
- Wide input range
- Flat efficiency curves ensure high efficiency at all output levels ensuring consistent and stable performance across the entire input voltage and output power range

Power and productivity for a better world™ ABB

Solar inverters

ABB string inverters
TRIO-5.8/7.5/8.5-TL-OUTD
5.8 to 8.5 kW

The all-in-one, residential, three-phase TRIO-5.8, 7.5 and 8.5 kW inverters deliver performance, ease of use and installation, monitoring and control. With their 98% peak efficiency and wide input voltage range, these new residential TRIO inverters mean flexible installations and powerful output.

Commercial grade engineering at residential scale
These new additions to the TRIO family are small, light and built smart. The topology of the larger, commercial TRIO inverters has been redesigned to ensure that the TRIO-5.8/7.5/8.5 models also enjoy high conversion efficiency across a wide range of input voltages. Optional integrated Dataloggers and smart grid functionality, remote firmware updating and elegantly simple sliding front covers make these all-in-one devices easy to install and maintain. In short, they are commercial grade engineering at residential scale.

Inverters packed with powerful features
The double maximum power point tracker (MPPT) gives maximum installation flexibility for an optimal energy production (TRIO-7.5/8.5 models). The new generation inverters can integrate power control, monitoring functionalities, and environmental sensor inputs, all without requiring external components.

A compact Ethernet expansion card provides data logging functionality for monitoring the main parameters of the plant as well as advanced O&M operations both locally (with the integrated webserver) and remotely (with the AV Plant Portfolio Manager portal), via a LAN connection.

The outer cover with its natural cooling mechanism qualifies at IP65 environmental protection level for external use. It provides for maximum reliability and ease of installation, with a sliding front panel giving access to the connection and configuration area without requiring the complete removal of the cover.

Highlights
- True three-phase bridge topology for DC/AC output converter
- Transformerless topology
- Two independent MPPT channels for TRIO-7.5/8.5 allows optimal energy harvesting from two sub-arrays oriented in different directions (one MPPT channel for TRIO-5.8)
- Flat efficiency curves ensure high efficiency at all output levels ensuring consistent and stable performance across the entire input voltage and output power range
- Wide input voltage range
- Remote inverter upgrade
- Reactive power management

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Luottamuksellista

ABB

String invertterit

Solar inverters

ABB string inverters
TRIO-20.0/27.6-TL-OUTD
20 to 27.6 kW

The three-phase commercial inverter offers more flexibility and control to installers who have large installations with varying aspects or orientations.

The dual input section containing two, independent Maximum Power Point Tracking (MPPT), allows optimal energy harvesting from two sub-arrays oriented in different directions.

The TRIO features a high speed and precise MPPT algorithm for real power tracking and improved energy harvesting.

High efficiency at all output levels
Flat efficiency curves ensure high efficiency at all output levels ensuring consistent and stable performance across the entire input voltage and output power range.

This device has an efficiency rating of up to 98.2%.

The very wide input voltage range makes the inverter suitable for installations with reduced string size.

In addition to its new look, this inverter has new features including a special built-in heat sink compartment and front panel display system. The unit is free of electrolytic capacitors, leading to a longer product lifetime.

Highlights of the improved design – first time shown at Intersolar 2014
- True three-phase bridge topology for DC/AC output converter
- Transformerless topology
- Each inverter is set on specific grid codes which can be selected in the field
- Detachable wiring box to allow an easy installation
- Wide input range
- 'Electrolyte-free' power converter to further increase the life expectancy and long term reliability

Power and productivity for a better world™

Solar inverters

ABB string inverters
PRO-33.0-TL
33 kW

ABB string inverters cost-efficiently convert the direct current (DC) generated by solar modules into high quality three-phase alternating current (AC) that can be fed into the power distribution network (ie grid). Designed to meet the needs of the entire supply chain – from system integrators and installers to end users – these transformerless, three-phase inverters are designed for de-centralized photovoltaic (PV) systems installed in commercial and industrial systems up to megawatt (MW) sizes.

A new inverter from the world's leading power technology company
ABB, a global leader in power and automation technologies, brings decades of experience, technology leadership and application knowhow from renewable energies to this new string inverter. Such experience and technology ensures high quality, safe and reliable solar inverters are delivered every time.

High power package for de-centralized PV systems
ABB's three-phase PRO-33 string inverter is designed for medium and large de-centralized PV systems either on large-scale commercial and industrial rooftops or ground-mounted PV plants. The inverter offers cost-efficiency in a high power, wall-mountable package with very high conversion efficiency. The all-in-one design with built-in and monitored PV plant protection devices reduces the need of costly external devices.

The single maximum power point (MPP) tracker and optimized MPPT window are suitable for the majority of PV plant designs. The high maximum DC input voltage of up to 1100 V increases PV system design flexibility giving extra margin in cold temperatures and allows more PV modules to be connected in series to reduce cabling costs.

Highlights
- Compact, high power wall-mountable package
- High maximum DC input voltage of up to 1100 V
- Configurable all-in-one design
- Advanced grid support functions
- Safe and intuitive user interface
- Robust enclosure, with IP65 rating suitable for outdoor installation

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Luottamuksellista

String invertterit | tuotannon seuranta

Solar inverters

ABB monitoring and communications
VSN300 Wifi Logger Card

The VSN300 Wifi Logger Card is a new, advanced expansion board for ABB's UNO and TRIO string inverters which provides residential and commercial users with an advanced and cost-effective solution for monitoring and controlling their photovoltaic system.

The VSN300 Wifi Logger Card is easy to install, for new and most existing string inverters by using the inverter's internal expansion slot.

The built-in IP networking connectivity and innovative Wi-Fi commissioning techniques enable this card to be easily configured for most Wi-Fi networks and access points without installing any additional external devices.

Complete, remote and local monitoring with Wifi Logger Card and new free mobile app.
Users have a complete remote and local monitoring experience when combining VSN300 Wifi Logger Card with ABB's new free mobile app; "Plant Viewer for Mobile". It is available for both iOS and Android based devices.

The local web server in VSN300 Wifi Logger Card adds the ability to use a standard web browser to access inverter data.

The Wi-Fi Certified™ mark assures interoperability, security, easy installation, and reliability. With innovative commissioning and upgrade features, the VSN300 Wifi Logger Card provides the best user experience for ABB's customers.

Not only is the VSN300 Wifi Logger Card suitable for most of ABB's string inverters currently deployed, it takes advantage of the Hyperlink bus found in new inverters for obtaining real-time data that can be used for grid control power management.

Pow

Solar inverters

ABB monitoring and communications
VSN700 Data Logger
VSN700-01/ VSN700-03/VSN700-05

The high-performance VSN700 Data Logger provides simple and quick commissioning with device discovery and automatic IP addressing as well as remote management features.

This SunSpec compliant data logger records data and events from inverters, energy meters, weather stations, and other photovoltaic plant devices and acts as an Internet gateway to send the data securely and reliably to the Aurora Vision® Plant Management Platform for performance monitoring, condition monitoring and data reporting.

The VSN700 Data Logger is also available integrated in turnkey solutions, such as VSN730 System Monitor.

Three performance levels
The VSN700 Data Logger is available in three performance levels to fit anyone's budget and functionality:

VSN700-01 Data Logger is available to those residential customers who only need to monitor up to five (5) single-phase inverters.

VSN700-03 Data Logger is a cost-optimized logger for small commercial installations up to ten (10) single and three phase string inverters and one weather station (VSN800).

VSN700-05 Data Logger provides both customer data management and inverter command and control for commercial and utility PV system operation, as well as SCADA integration.

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Solar inverters

ABB monitoring and communications
VSN800 Weather Station

The VSN800 Weather Station automatically monitors site meteorological conditions and photovoltaic panel temperature in real-time, transmitting sensor measurements to the Aurora Vision® Plant Management Platform.

The VSN800 contains the essential environmental sensor set needed for solar monitoring.
The expanded sensor set enables plant management across a broad range of plant sizes.

VSN800 is a companion to the VSN700 Data Logger, the VSN730 System Monitor, or the VSN750 Plant Manager where it is fully compatible and integrates seamlessly with the Aurora Vision® Plant Management Platform.

Shipped preconfigured and ready for installation requiring no special tools
The VSN800 Weather Station is delivered ready for installation and when used requires the installer to mechanically mount the modules on a user-supplied mast, connect power and communication, and initialize the automatic system commissioning process from the VSN700. No special software, or on-site calibration is required.

The all-in-one weather station reduces the installation, support and maintenance cost as well as improves the robustness and manageability of the PV plant monitoring solution.

The basic sensor set provides data needed to calculate a performance ratio allowing a plant operator to track solar array performance against expected energy production

The advanced sensor set improves monitoring of weather conditions that can effect energy production. The extra irradiance sensor for mounting at the plane of the array allows more accurate measurement of irradiance that is incident in the plane of the solar panels.

Wind speed & direction sensor gives the operator information about how the wind may be cooling the panels and some indication of how much dust may be accumulating on the panels.

Highlights
- Two models offered for basic and advanced sensor sets
- VSN800-12 includes a basic sensor set: ambient temperature, solar irradiance, and back of module temperature
- VSN800-14 includes a additional advanced sensors: plane of array irradiance and wind direction and speed
- Sensors, data acquisition unit, and RS-485 communication all in a single unit

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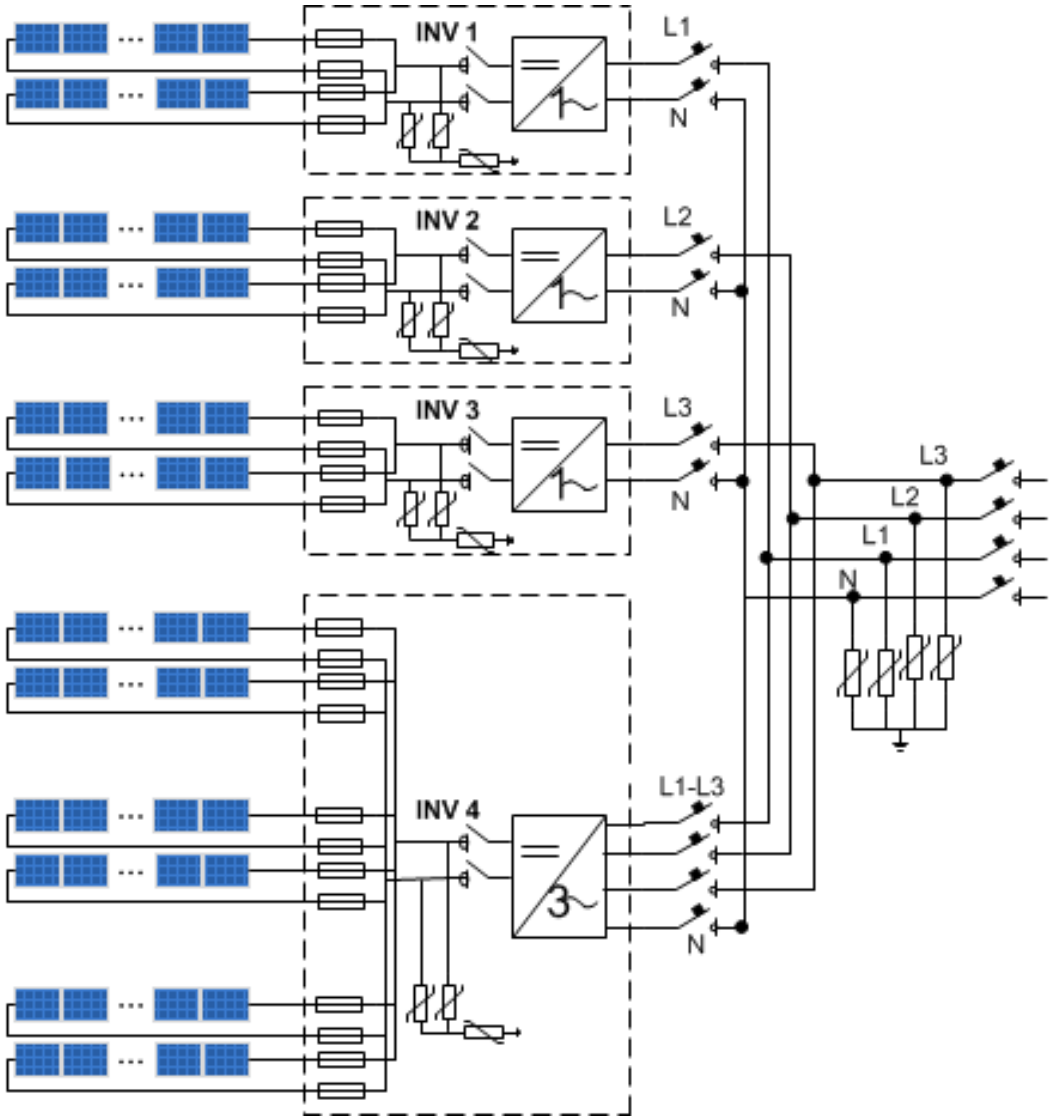
Luottamuksellista

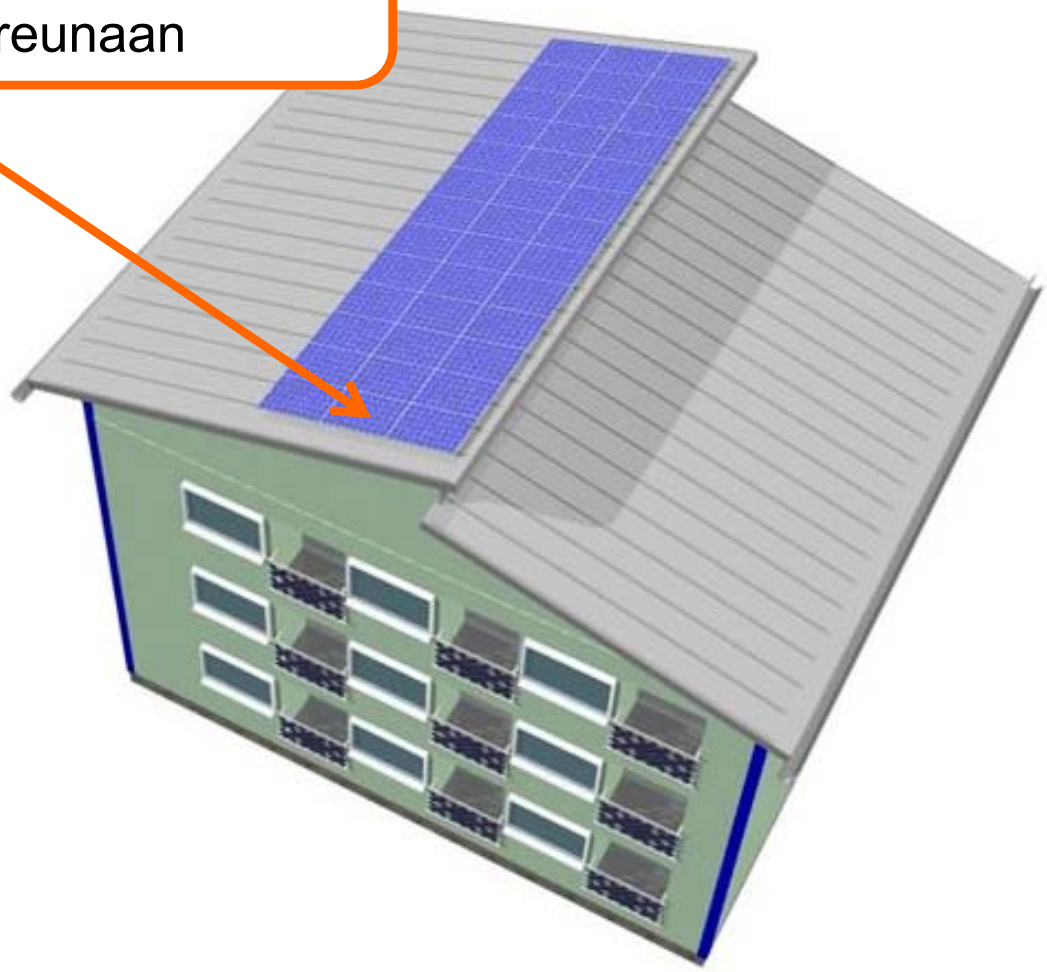
String invertterit
Rakennuksiin integrointi – toimistotalo järjestelmä



Luottamuksellista

String invertterit 1 x ABB Trio 8,5 kW_{peak}

Konesaumakatto, asennus katon kaltevuuden mukaan, kokonaan tuetulle alueelle, katon yläreunaan



13 x 4 m; 13 x 3 x 225 W = 8.775 kW_{peak}

Luottamuksellista

Aurinkosähköjärjestelmät
Rakennuksiin integrointi - lisäarvoa

- Rakennus toimii tukirakenteena – **tukirakenteita ei tarvita, kustannusten minimointi**
- Perinteisten julkisivu- ja pintamateriaalien korvaaminen – **kustannusten minimointi**
- Kulutushuippujen leikkaaminen (jäähdytys- ja ilmastointi kojeet jne.) **- siirtotarpeen pieneneminen**
- Varjostus aurinkopanelirakenteilla lasijulkisivuissa tai varjostuslipoissa – **rakennuksen jäähdytystarpeen pienentäminen**
- Ympäristö ja energiansäästö näkökanta **- positiivinen imago**

Luottamuksellista

Central invertterit

Solar inverters

ABB central inverters
PVS800
100 to 1000 kW

ABB central inverters raise reliability, efficiency and ease of installation to new levels. The inverters are aimed at system integrators and end users who require high performance solar inverters for large photovoltaic (PV) power plants. The inverters are available from 100 kW up to 1000 kW, and are optimized for cost-efficient multi-megawatt power plants.

World's leading inverter platform

The ABB central inverters have been developed on the basis of decades of experience in the industry and proven technology platform. Unrivalled expertise from the world's market and technology leader in frequency converters is the hallmark of the this solar inverter series.

Based on ABB's highly successful platform and the most widely used frequency converters on the market – the inverters are the most efficient and cost-effective way to convert the direct current (DC) generated by solar modules into high-quality and CO_2-free alternating current (AC) that can be fed into the power distribution network.

Solar inverters from ABB

ABB central inverters are ideal for large PV power plants but are also suitable for large-sized power plants installed in commercial or industrial buildings. High efficiency, proven components, compact and modular design and a host of life cycle services ensures ABB central inverters provide a rapid return on investment.

Highlights

- High total performance
- Modular and compact product design
- Extensive DC and AC side protection
- Full grid support functionality
- Fast and easy installation
- Complete range of industrial-type data communication options, including remote monitoring
- Life cycle service and support through ABB's extensive global service network

Power and productivity for a better world™ ABB

Solar inverters

ABB inverter station
PVS800-IS
1.75 to 2 MW

The ABB inverter station is compact turnkey solution designed for large-scale solar power generation. It houses all equipment that is needed to rapidly connect the ABB central inverters to a medium voltage (MV) transformer station.

Turnkey solution for photovoltaic (PV) power plants

The ABB inverter station design capitalizes on ABB's long experience in the development and manufacture of secondary substations for electrical authorities and major end-users worldwide in conventional power transmission installations.

A station houses two ABB central inverters and embedded auxiliary power-, monitoring- and air filtration systems. It enables easy and rapid connection to a MV transformer station. Depending on the size of the PV power plant, several ABB inverter stations can be used to meet the capacity need.

Proven design with long operating life

The housing is based on a standard, insulated, steel-framed 20-feet shipping container. The total package weighs only 10 tons. The optimized sea container solution secures cost-effective and safe transportability to the site. The station's optimized air circulation and filtering system together with thermal insulation enables operation in harsh temperature and humidity environments. The inverter station is designed for at least 25 years of operation.

Highlights

- Proven technology and reliable components
- Standard and robust design
- Protected working interior
- Modular and redundant system
- Easy connection to a MV station
- Extendable manufacturing footprint with fast deliveries
- Embedded auxiliary power distribution system
- Double-stage air pre-filtering for reduced maintenance
- Life cycle service and support through ABB's extensive global service network

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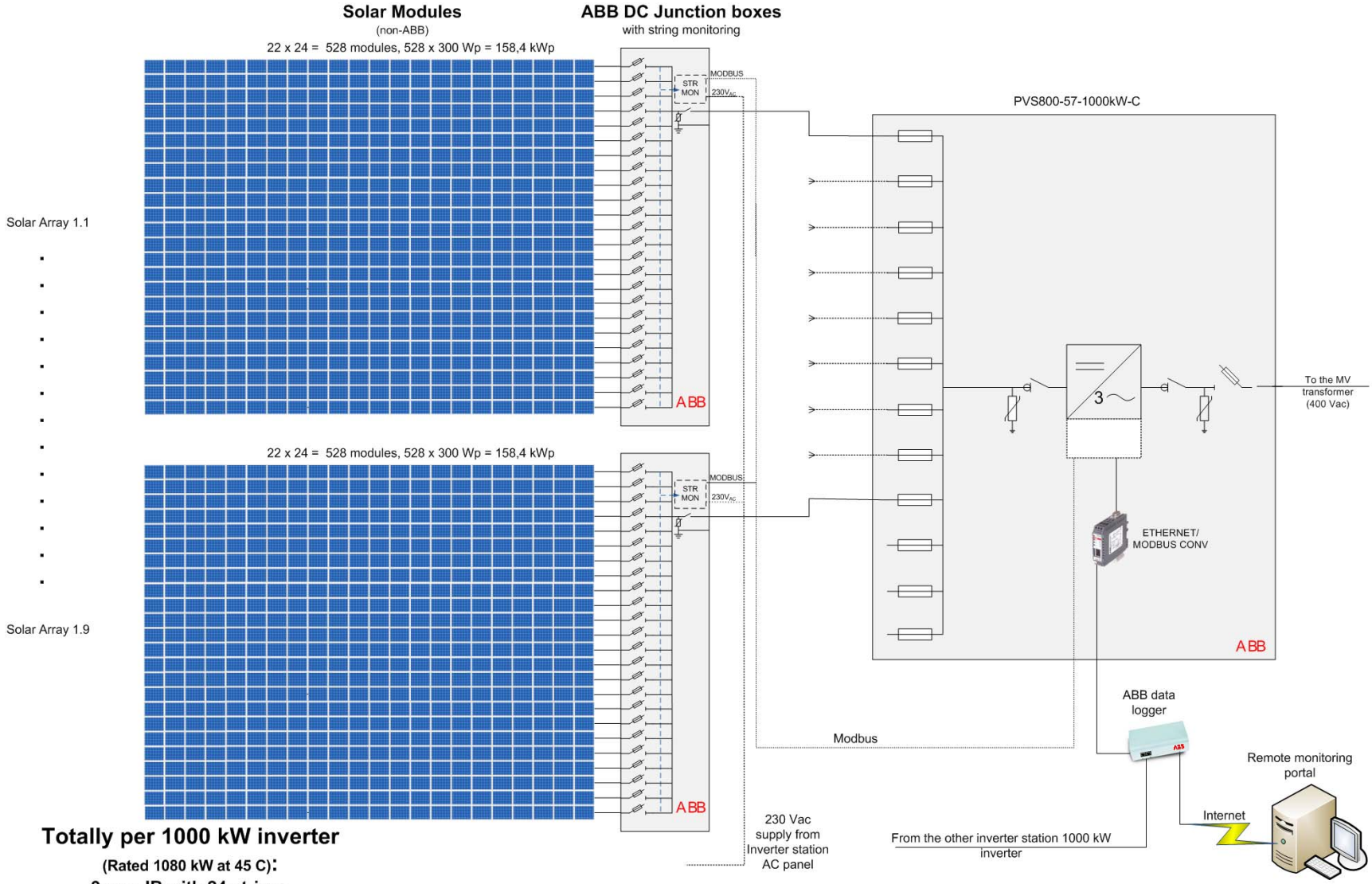
Luottamuksellista

ABB

Central invertterit
Centralized topology – aurinkovoimalaitos 2 (3)



Luottamuksellista

Central invertterit
PVS800-IS – inverter station

Air intakes double stage G4 filtering system
F7 as an option for heavy-duty usage

Fast on site added
weather protection hoods

Standard 20’ HC form factor
suitable for standard trailer

C4 class surface coating
C5 as an option for near
coastal usage

Sand removal doors

Easy cabling

Animal protection

- Auxiliary power supply system to support both MV and IS stations
- Over voltage / current protetions
- 3~ 6A feeding terminal to MV substation
- 6kVA embedded transformer as an option
- Embedded MV substation alarm/trip load control

Luottamuksellista

Central invertterit
PVS800-IS Layout

800 x1000 (w x h) free space reservation for post installations (e.g. monitoring).

600 x 1300 (w x h) free space for additional post installations (e.g. for UPS)
Power supply and earthing points ready installed.

Safety exit door

Optional air cooler for extreme hot temperatures (project specific option)

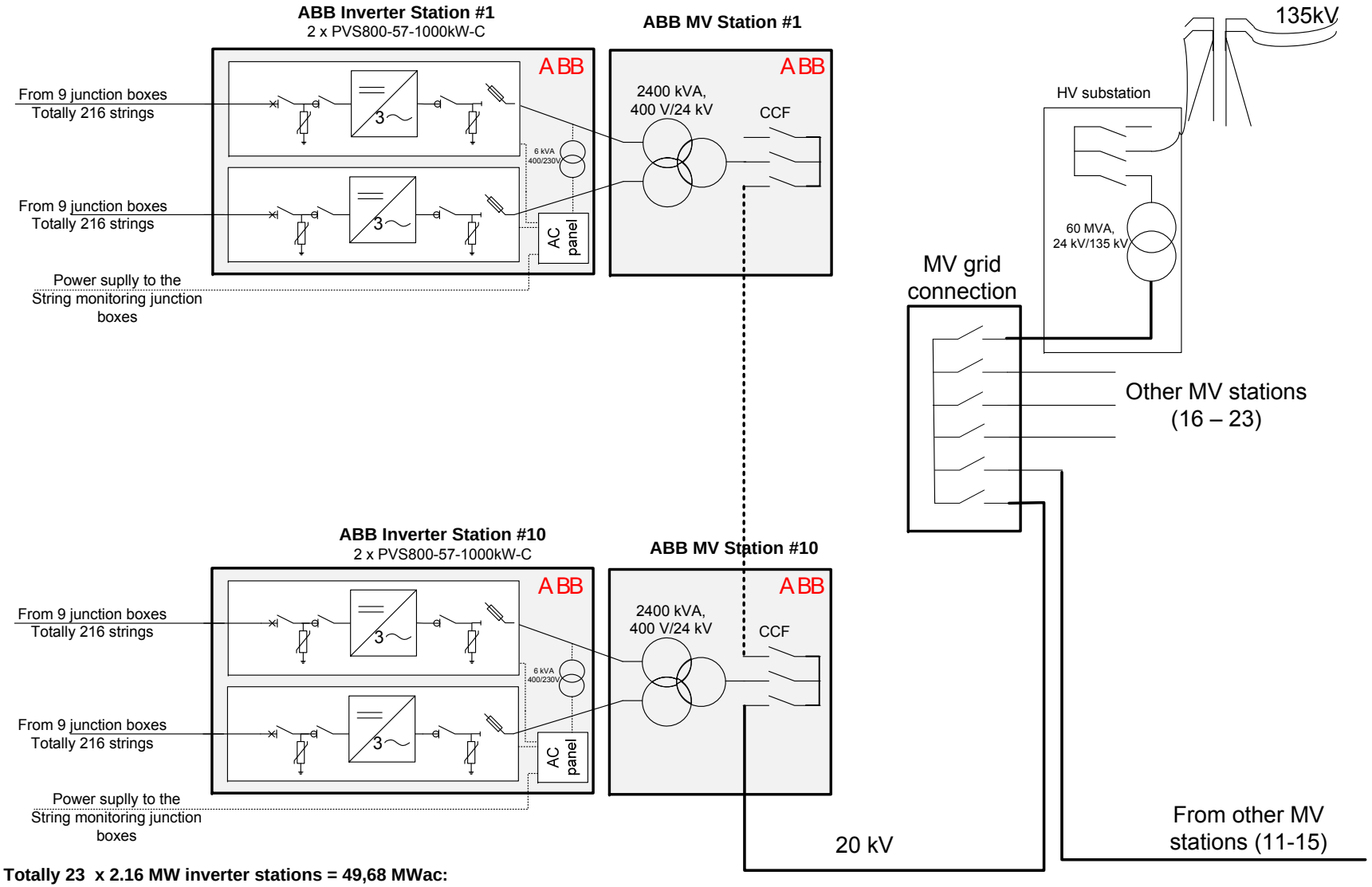
2 x PVS800 central inverters

Proper working interior

Cabling tunnel for post assembled cables

Luottamuksellista

Central invertterit
Centralized topology – aurinkovoimalaitos 3 (3)



Totally 23 x 2.16 MW inverter stations = 49,68 MWac:

JB's: 9*2*23= 414 pcs of 24 string boxes = 9936 strings
=> 22 * 9936 modules = 218592 modules
= 218592 * 300 Wp = 65,5776 MWp

Sizing ratio 1,32

Luottamuksellista

Esimerkkitoteutuksia maailmalta

Germany, 91 MWp and 145 MWp

Luottamuksellista

Esimerkkitoteutuksia maailmalta

Mexico, San Luis Potosi: 1,2 MW PV plant

- System description
  - PV plant: 1,2 MW
  - Application: parking lot shading structure
  - Installation Grid connection: 13.2 kV grid
  - Solar modules: poly-csi

- Solution
  - 5 pcs of PVS800-0250kW-A
  - ABB's junction boxes
  - ABB MV step-up transformer with switchgear for grid connection
  - Commissioning: October 2012

Customer:

Property management of ABB for the ABB manufacturing Plant in San Luis Potosi, Mexico

Luottamuksellista

Esimerkkitoteutuksia maailmalta

Finland, Pitäjänmäki: 181 kWp PV plant

- System description
  - PV plant: 181 kWp
  - Application: factory flat roof
  - Grid connection: LV grid, 400 V
  - Solar modules: poly-cSi

Customer:

Property management of ABB factory in Helsinki

- Solution
  - PVS800: 1 x 120 kW
  - PVS300: 7 pcs
  - Commissioning: June 2010

Luottamuksellista

Aurinkosähkö

- PV järjestelmän mitoitus perustuu, budjettiin, varattuun tilaan tai jäähdytyksen kompensointiin
- Retrokohteissa katon pinta pitää olla äskettäin uusittu tai uusia se ennen PVtä.
- Kannattaa olla vaalea katto että PV tuotto on optimaalinen -> paneelit ei lämpene liikaa.
- Lumikuorma + PV voi ylittää katon kantokyvyn; lumien poisto katoilta pitää suunnitella etukäteen ettei telineet haittaa.
- Kiinteä asennus etelään, kallistus 30-45 astetta, PVsize työkalulla voi laskea vuosituoton
- Invertterit kytketään verkon kanssa rinnakkain, kohteen omistajan pitää aina tehdä kirjallinen ilmoitus verkkoyhtiölle

- TEM energiatukea voi saada hankkeelle; yritykset ja yhteisöt
- Voimalaitos-luokan aurinkosähköjärjestelmät voidaan toteuttaa string tai central inverttereillä

Luottamuksellista

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