

DECK
Monitoring

PRODUCT
AND SERVICE
GUIDE

Plan Your Monitoring

Solar monitoring solutions can include a diverse range of software and hardware products along with a host of services for system planning and engineering, installation, and more. In order to provide integrators and installers with a flexible range of solutions, DECK Monitoring has developed a business model that allows our customers to combine products and services into monitoring packages that suit their specific project needs. Plan your system with options from these three categories:

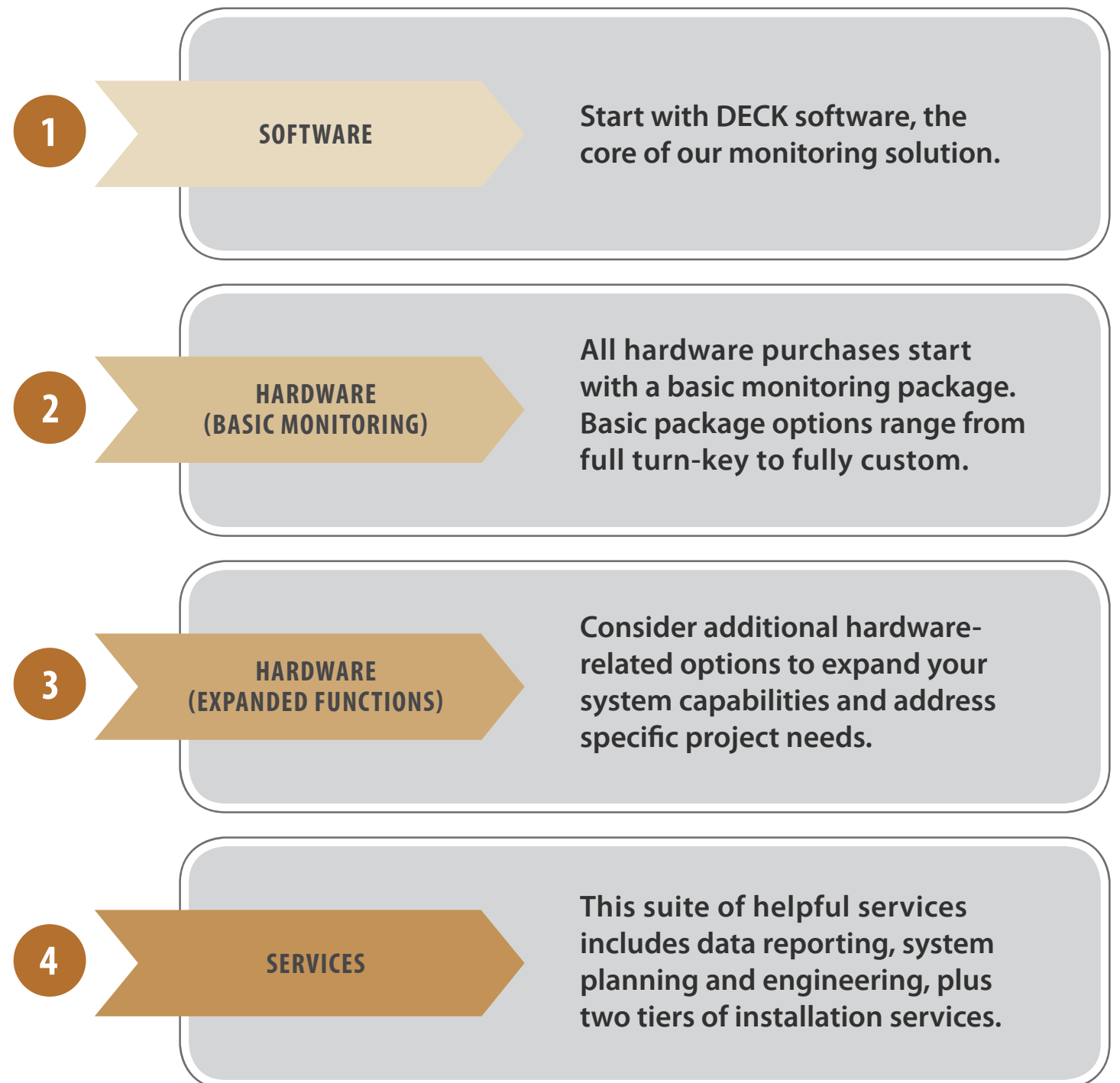
DECK Monitoring develops and provides advanced software to manage and promote your data through interactive web pages.

DECK Monitoring provides procurement and fulfillment services for monitoring system hardware. This includes expert support for hardware installation.

DECK Monitoring offers a suite of optional managed services to help with system planning, installation and management.



System Planning Overview



DECK recommends...

DECK is committed to providing a flexible range of monitoring solutions in order to accommodate the full spectrum of project types you may encounter as a commercial integrator. As we provide this wide range of options, we also reach out to share our knowledge of best practices, so that you can make the right choices for each of your monitoring projects.

We have distilled our years of monitoring experience into three key recommendations to help you achieve smooth workflow and optimal performance in your monitoring projects. We encourage all customers (especially new customers) to consider these recommendations to avoid common errors and delays.

Basic Monitoring: It's Better in a Box

DECK has prepared a full suite of basic package options that are mounted and pre-wired in weatherproof enclosures, ready for quick installation. These include 4 versions of our "All-in-One Box" and our complete off-the-shelf solution "AutoBOX." These popular offerings save time and money on installation and provide peace of mind knowing your hardware has been wired and configured by monitoring experts.

Get up and Running with Help from OTIS

Installing web-based monitoring systems demands computer skills in IT, networking, and configuration. These skills fall beyond the scope of most standard installation procedures. If you would like assistance for your installation, consider OTIS (On-site Technical Installation Support). This surprisingly affordable service sends an experienced DECK monitoring technician to your project site to provide oversight and support for your monitoring installation. A DECK technician can help you avoid common errors and delays, keeping your installation on time and within budget.

Expedited Standard Packages

We have drawn upon our years of experience to develop a suite of pre-engineered monitoring packages that can be deployed to a wide range of projects with minimal lead time and cost. For an expedited monitoring experience, talk to your DECK sales rep to see if one of these standard offerings can be a fit for your project needs.

software overview

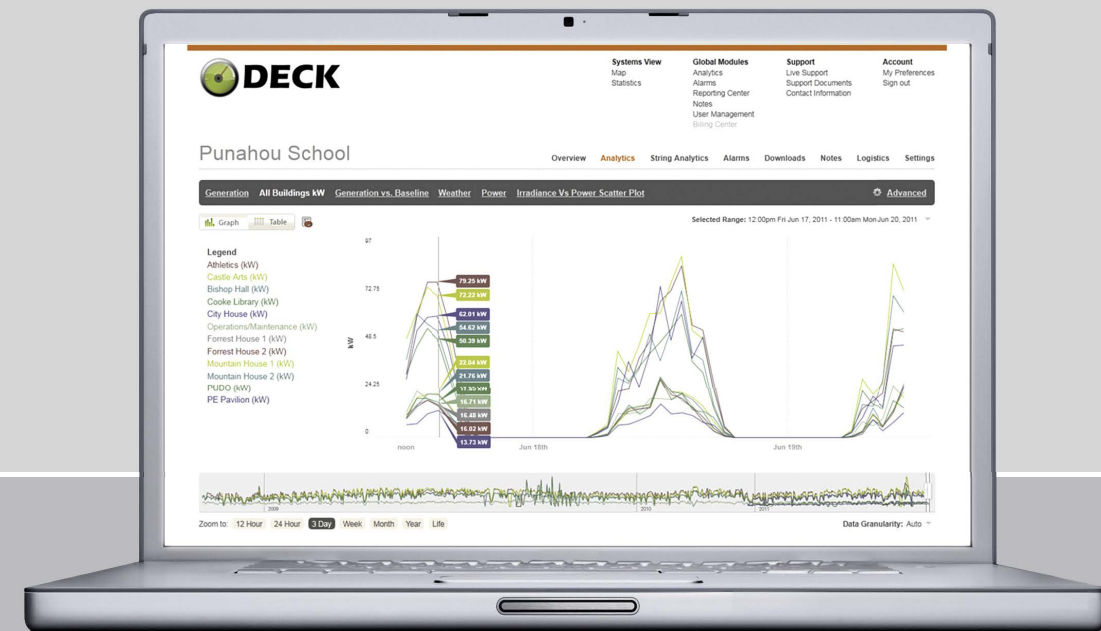
Every project gets two personalized web interfaces: the public *Dashboard*...



Dashboard

- Accessible from any computer
- Customization options include placing your company logo and photos, company promotional copy, project description and images, and choice of color to match company branding
- Includes sub-page for expanded graphing tool
- Includes sub-page for animated *How Solar Works* educational feature
- Optional *Project Details* sub-page for your copy and image slideshow
- Optional *About* sub-page for your copy and image slideshow
- Equivalency feature includes fifteen formula options
- Ideal for touchscreen displays in building lobby (*kiosk, wall-mount, or desktop options available*)

...and the secure private *Energy Intelligence Admin Panel*.

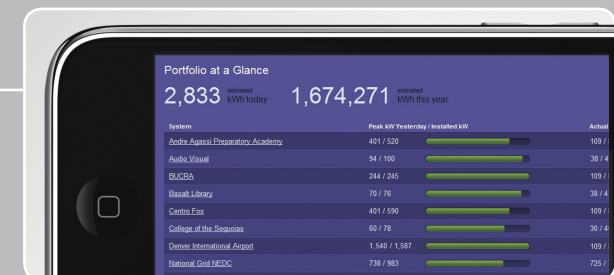


Admin Panel

- Secure password-protected web interface
- See entire portfolio of monitored systems at a glance
- Customizable performance alarms send email notifications to your O&M provider and any other designated team members
- Intensive analytics suite provides actionable and easy-to-understand insights into system performance
- Generate system performance reports quickly and easily

Statistics Overview

Manage your systems on the go with this suite of analytic displays that can be accessed from any mobile device... comes standard with every project!



software extensions

Lock in today's low rates by extending your DECK software contracts to 10, 15, or 20 years total. You will automatically receive all software upgrades and full customer benefits over the entire term of your contract.

This option allows you to bundle the full term of monitoring into the initial project budget so that discounts and incentives may be applied to your true total cost. This avoids unnecessary out-of-pocket expense after the first five years of the contract.

5-YEAR EXTENSION

5 yrs
standard with
basic package
purchase

+5

20 yrs

10 years total software access

10-YEAR EXTENSION

5 yrs
standard with
basic package
purchase

+5

+5

20 yrs

15 years total software access

15-YEAR EXTENSION

5 yrs
standard with
basic package
purchase

+5

+5

+5

20 yrs

20 years total software access

Please note that extended service contracts are purchased on a per node basis: each reporting point in your system (generation meter, inverter, zone meter, smart combiner, weather station, etc) can extend a DECK software contract independently of the other devices.

hardware overview

STEP
1

start with basic monitoring

All DECK monitoring hardware purchases start with a basic monitoring package. This package includes a revenue grade meter, a gateway device, and CTs appropriately sized for your system.

There are 3 options for a basic monitoring hardware purchase:

- **Standard Order:** hardware devices are packed separately; customer is responsible for mounting and wiring at time of installation
- **All-in-One Box:** hardware items are mounted and pre-wired inside a weatherproof UL-listed enclosure; custom orders available
- **AutoBOX:** 'off-the-shelf' offering for fastest deployment; basic package hardware in enclosure, featuring auto-activation & added features

STEP
2

get inverter data

Inverter monitoring provides AC/DC current and voltage, along with inverter fault codes... highly recommended.

STEP
3

weather stations provide valuable irradiance data

Get the best data to benchmark system performance.

STEP
4

consider granular monitoring options

DC side monitoring gives you the deepest level of insight into your system performance.

STEP
5

consider wireless communication needs

Avoid costs associated with trenching and running wires.

STEP
6

choose interactive display monitors

We offer a range of pre-configured touchscreen display monitors: kiosk, desktop, or wall mount.

!

Find details and specs for these hardware options on the following pages. For prices and manufacturer cut sheets, contact a DECK sales agent.

STEP
1

basic monitoring hardware

Each basic monitoring package from DECK includes all the hardware devices necessary for basic monitoring of your PV system: one revenue grade meter, one gateway device (prepares data for web transmission), and CTs sized to your project specs. DECK research has shown these devices to be reliable, cost-effective options that are guaranteed to work with our software. All basic monitoring hardware comes with full access to DECK support resources, including detailed installation guides, responsive phone support, and manufacturer's warranty protection.

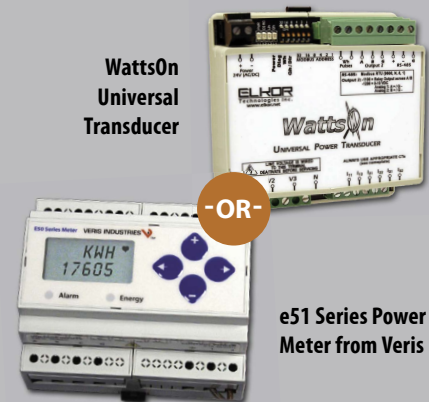
COMMUNICATIONS GATEWAY

- Industrial temperature range -30° to 70° C
- Pushes out data via port 80
- DHCP/IP addressing
- 120 AC to 24 DC power adapter included
- Onboard nonvolatile memory



REVENUE GRADE METER

- Provides per-phase and cumulative information including volts, amps, real power, reactive power, apparent power, Watt-hours, VAR-hours, VA-hours, power factor and frequency
- Digital communication via RS-485 (Modbus RTU)
- ANSI C12.20 certified
- "Revenue grade" accuracy: 0.5% or better



DECK will source the more appropriate meter to match your project specs.

SPLIT CORE CURRENT TRANSFORMERS

- Available in various sizes to fit your specific project needs
- Split core CTs provide easy installation
- Up to 2000 maximum amps per phase (speak with a DECK rep if larger size is needed)



basic package options

Every basic monitoring package from DECK receives the same hardware devices seen on the previous page. In addition, each basic monitoring option provides access to the full suite of DECK software features, including project Dashboard, private Admin Panel, and access to all DECK support resources.

Our three basic monitoring package options are distinguished from one another by the range of pre-configuration services provided:

BASIC PACKAGE

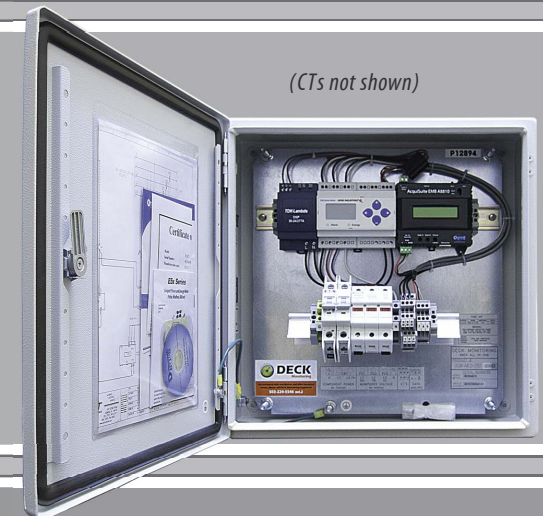
- Hardware devices packed separately
- All wiring and configuration must be done by customer during the installation
- Recommended for customers who are *very confident* in their ability to correctly wire all devices and establish web communications



(CTs not shown)

ALL-IN-ONE BOX PACKAGE

- Hardware devices pre-mounted in a weather-proof enclosure
- Hardware devices are pre-wired and pre-configured for communication with DECK data servers
- Saves time and money on installation... ideal for customers who do not have extensive experience installing monitoring systems



(CTs not shown)

AUTOBOX PACKAGE

- Hardware devices pre-mounted in a weather-proof enclosure
- Hardware devices are pre-wired and pre-configured for communication with DECK data servers
- Package is available off the shelf for absolute minimum lead time
- Package includes auto-activation for fastest overall deployment
- Package will soon include additional standard features with package pricing... ask your DECK account executive for details

all-in-one box: pre-wired, pre-configured, UL listed

Our popular “All-in-One Box” delivers basic monitoring hardware mounted, pre-wired, and pre-configured in a weatherproof NEMA-4 enclosure. You’ll save time and money on your installation service, and you’ll have peace of mind knowing that wiring and configuration tasks have been completed by monitoring experts.



Save time and money on installation when you get your hardware pre-installed in a UL-listed enclosure.

“ALL-IN-ONE BOX” CORE PACKAGE

- UL-listed — NEMA type 4 enclosure
- 15.75" (W) x 15.75" (H) x 5.875" (D)
- 90-304VAC to 24VDC power supply included (2-wire with no ground)
- Includes core package hardware mounted and pre-wired inside
- Miscellaneous mounting hardware, wire, and DIN rail
- Fused & standard terminal blocks for power and CTs
- Quick connects for easy external connections

ADDITIONAL OPTIONS

- **With CDMA cellular modem** — For sites without access to wired web network. CDMA service provider is Verizon.
- **With GSM cellular modem** — For sites without access to wired web network. GSM service providers include AT&T and T-Mobile.
- **High Voltage Power Supply** — 320VAC–575VAC (3-wire including ground)

AutoBOX: a comprehensive solution off the shelf

Here at DECK we are always looking for ways to make monitoring easier for solar integrators. Our latest innovation is the AutoBOX: this monitoring package has streamlined the deployment process to provide our quickest order-to-activation solution ever.

We are continuing to develop this product into a comprehensive off-the-shelf offering that includes local irradiance data and other features in one affordable package price. Talk to your DECK account executive to get the latest details on AutoBOX features and availability.

Available off the shelf for our shortest lead time ever!

Auto-activation gets your system up and running more quickly than any other DECK monitoring package.



We are developing a suite of standard enhanced features for the AutoBOX offering... contact a DECK rep for details.

“AUTOBOX” CORE PACKAGE

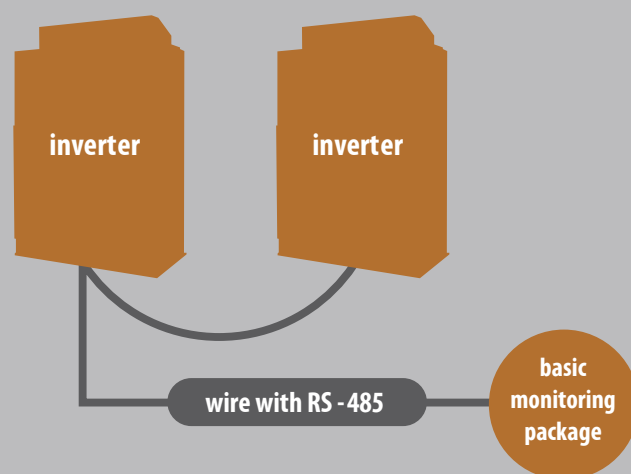
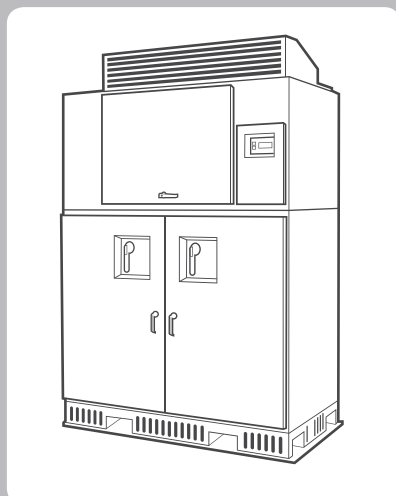
- UL-listed — NEMA type 4 enclosure
- 15.75" (W) x 15.75" (H) x 5.875" (D)
- 90-304VAC to 24VDC power supply included (2-wire with no ground)
- Includes core package hardware mounted and pre-wired inside
- Miscellaneous mounting hardware, wire, and DIN rail
- Fused & standard terminal blocks for power and CTs
- Quick connects for easy external connections

STEP
2

get inverter data

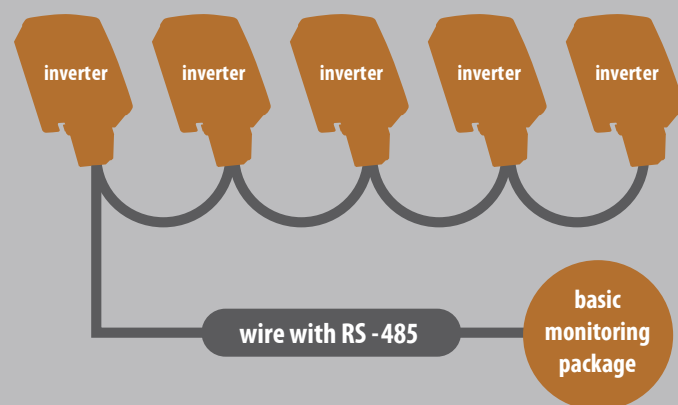
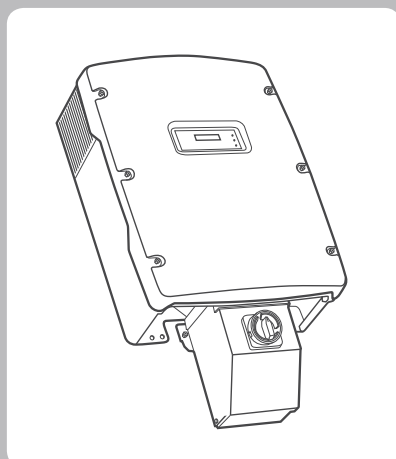
Inverter configuration solutions from DECK provide crucial information directly from your inverters. This includes AC and DC current and voltage, as well as inverter fault codes and more. DECK software is compatible with most major inverter brands, including large central inverters over 30kW as well as smaller string inverters under 30kW. For a full updated list of compatible inverters, contact a DECK sales agent.

OVER 30 kW



DECK monitoring solutions
are compatible with most
major inverter brands.

UNDER 30 kW

STEP
3weather stations provide
valuable irradiance data

All DECK systems come standard with a live weather feed from the closest public weather station to your project location (often an airport). But only your own weather station can provide accurate local *irradiance data*. This data is crucial to determine optimal generation numbers for your system... you can then graph your actual performance against these numbers for the best insight into system productivity.

WEATHER STATION

Weather stations consist of various environmental sensors along with hardware for mounting the unit.

We offer 2 sensor packages:

Deluxe Package

- Global solar irradiance sensor
- Module-mountable irradiance sensor for plane-of-array monitoring
- Back-of-panel mountable cell temperature sensor
- Ambient air temperature sensor
- Wind speed and direction sensors

Standard Package

- Adjustable irradiance sensor for global or plane-of-array monitoring
- Back-of-panel mountable cell temperature sensor
- Ambient air temperature sensor

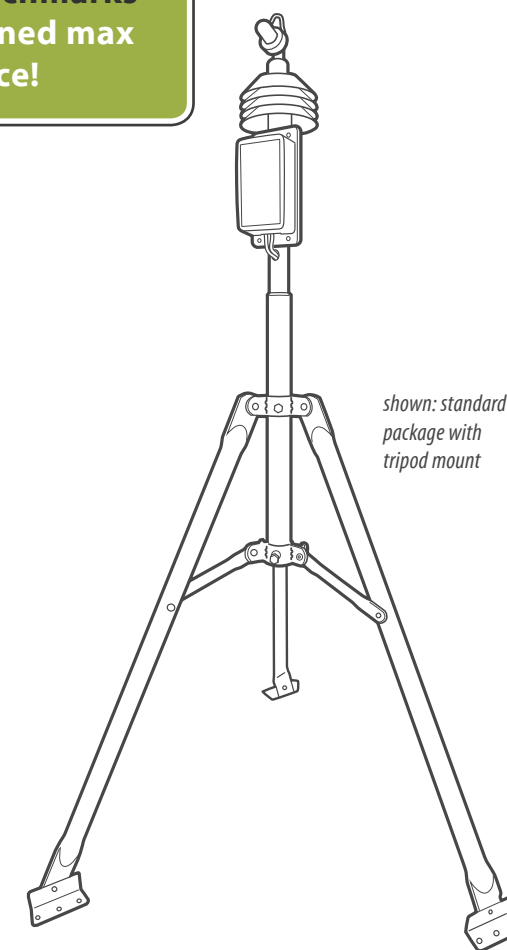
Power Requirements (both units)

- 10 to 30 VDC at 50mA

Mounting Options (both units)

- Aluminum tripod
- Articulated wall/roof mount (permanent install only)

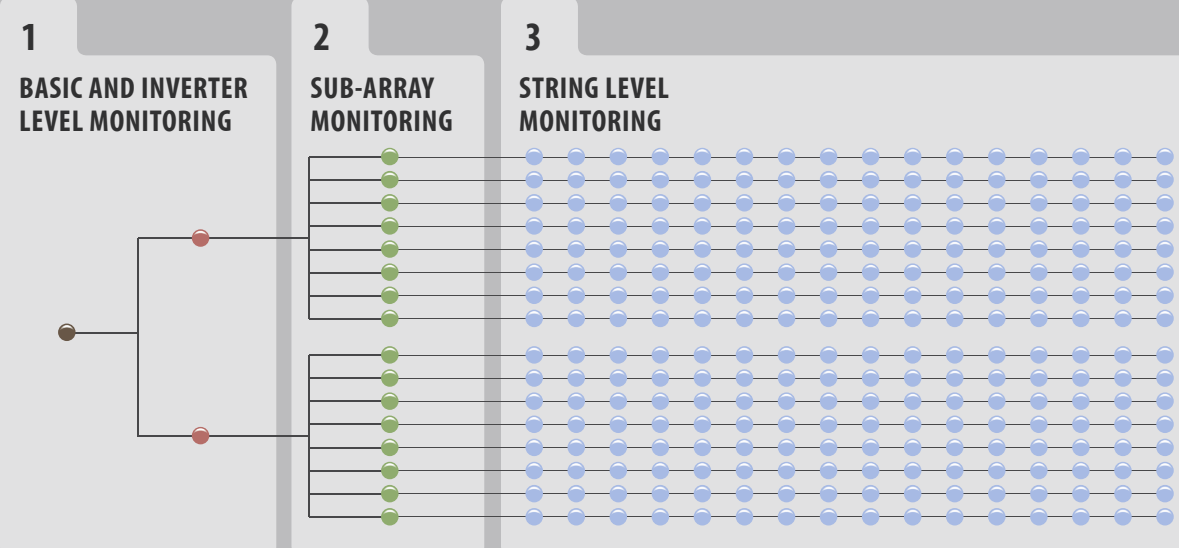
Irradiance data lets you
create the most accurate
performance benchmarks
to achieve sustained max
performance!



STEP
4

consider granular monitoring options

You can't effectively manage a large PV system if you can only see data from one generation meter. Systems over 30kW should consider granular monitoring to provide insight into performance among various hardware devices and all sections of the array. Granular monitoring requires added hardware as well as software for each reporting node. Your DECK sales rep can help you plan a granular monitoring package to fit your project needs.



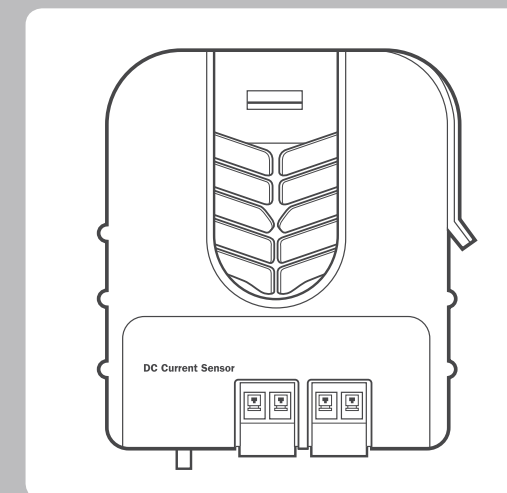
- 1 BASIC MONITORING:** The most basic level of monitoring receives data from just one reporting node, the generation meter. This level of monitoring is often all that is needed for smaller projects such as residential PV systems. The DECK core package comes standard with one-node reporting. For commercial systems, inverter monitoring is typically added to provide insight into inverter performance through the web interface.
- 2 SUB-ARRAY MONITORING:** Sub-array (zone) level monitoring breaks out your array into several independently reporting zones. If you have a problem area in your array, that zone will show a dip in production relative to neighboring zones, alerting you to an issue that might have gone unnoticed in a system with basic monitoring only. When you do have a problem, you'll be able to use zone data to locate the trouble area more quickly, saving time and money.
- 3 STRING MONITORING:** String level monitoring provides highly accurate granular insight into system performance. As the diagram above shows, each string in your system becomes an independently reporting node, allowing you to detect and locate underperforming areas of the system with the highest degree of accuracy. String monitoring is the best way to catch performance issues small enough to go undetected in gross generation data (but which can add up to thousands of dollars' worth of lost production over time). This level of monitoring granularity is highly recommended for larger systems to help ensure optimum performance across all areas of the array.

sub-array monitoring

You will need a separate zone meter (DC transducer) for each zone in your system... a DECK sales agent can help you plan a zone map to match your specific system needs. Each meter requires a separate data reporting charge.

DC TRANSDUCER

- Factory calibrated switch-selectable amp ranges (20/40/80, or 50/100/200)
- Output: 4-20mA
- Supply current: 35mA max (power source not included)
- Self-gripping iris for easy installation
- Bracket can be installed in 3 different configurations for added flexibility
- Status LED ensures easy set-up for proper wiring

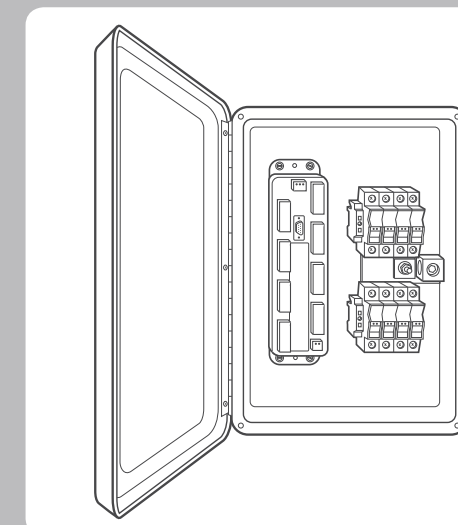


string monitoring

DECK can help you source the appropriate smart combiner hardware needed to meter all strings in your system. Plan your total map of strings and combiners, then add the appropriate additional data reporting charges. A DECK sales agent can help you plan the system map and build an accurate quote.

SMART COMBINERS

- UL-listed enclosure
- Modbus communication
- 600 VDC or 1000 VDC models (power source not included)
- Designed for 4 to 16 input channels using the 8-channel Obvius SCM monitoring units (option for 1 or 2 SCM's)
- 90C output terminals
- NEMA-3, 3R, 4 & 4X rated enclosure options
- Steel or fiberglass enclosure
- Many configuration options to best fit with your specific combiner construction (*DECK sales reps can help plan*)

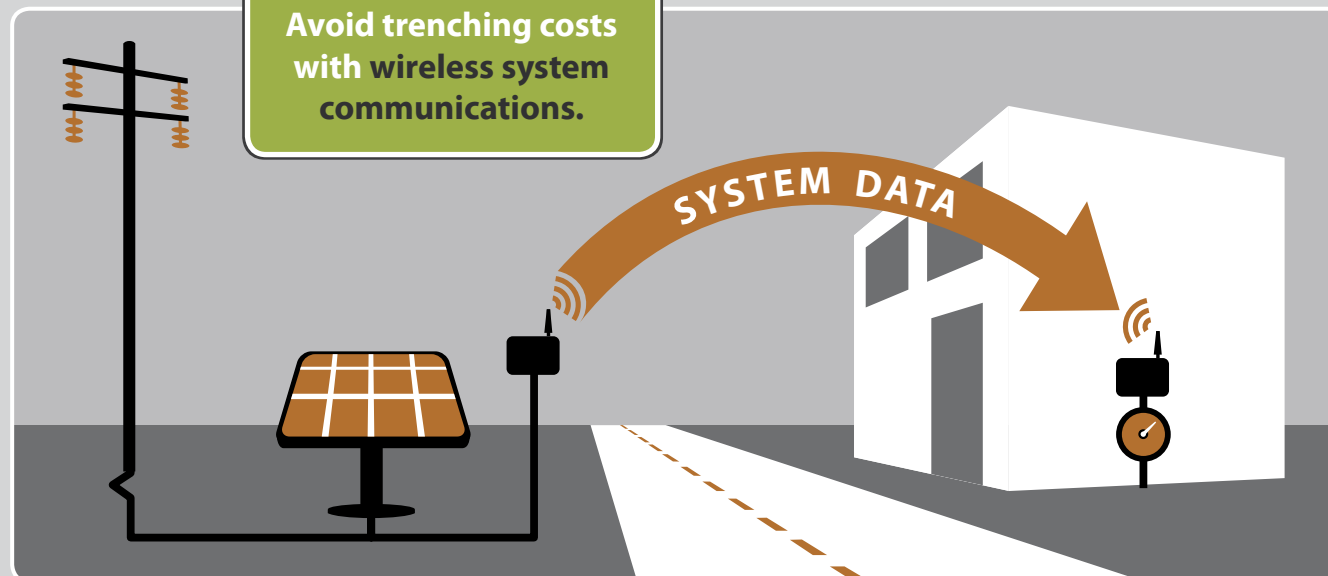


STEP
5

consider wireless communication needs

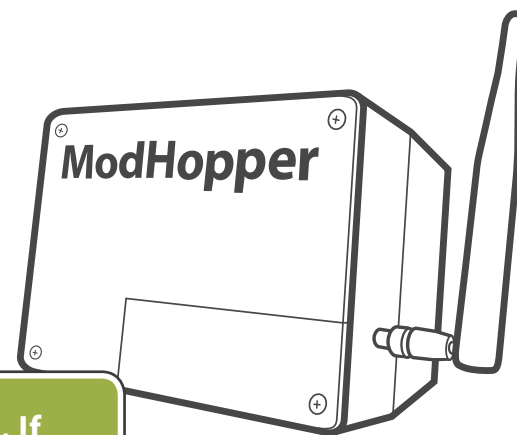
Wireless system communication may be desirable in many circumstances. Perhaps your array is separated from your metering hardware by a road or some other barrier... or perhaps the cost of trenching to a remote location is prohibitively high. If your system requires wireless communications, we can source the right hardware for the job.

Avoid trenching costs with wireless system communications.



R9120-5 MODHOPPER WIRELESS TRANSCEIVERS

- Wirelessly transmit and receive Modbus data up to 3000 ft with minor obstructions (14 miles line-of-sight with proper installation)
- Connect up to 128 RS-485 Modbus RTU devices to any Modbus RTU network
- 256-bit AES encryption for superior security
- No PC or software configuration needed
- Accepts Modbus or standard pulse inputs



DECK also offers wireless internet solutions. If you are unable to get a local internet connection at your project site, speak with a DECK sales rep about including a cellular internet modem.

STEP
6

choose interactive displays

Many system hosts enjoy having one or more touchscreen or kiosk displays at their facility. These interactive displays are ideal green PR tools for businesses with high foot traffic. They are powerful learning tools in educational environments, and they help everyone become more conscientious about energy use and conservation campaigns. A kiosk can also act as a great sales tool for integrators, allowing them to show off their full portfolio of DECK-monitored Dashboards.

TOUCHSCREEN LCD MONITOR

- Available in many sizes: 19" (desktop), 22" (desktop), 32" (wall mount), 42" (wall mount)
- High contrast display
- Comes with PC computer pre-configured with kiosk software for 'plug and play' start up.
- Touchscreen system requires 2 standard electric outlets and standard ethernet web connection

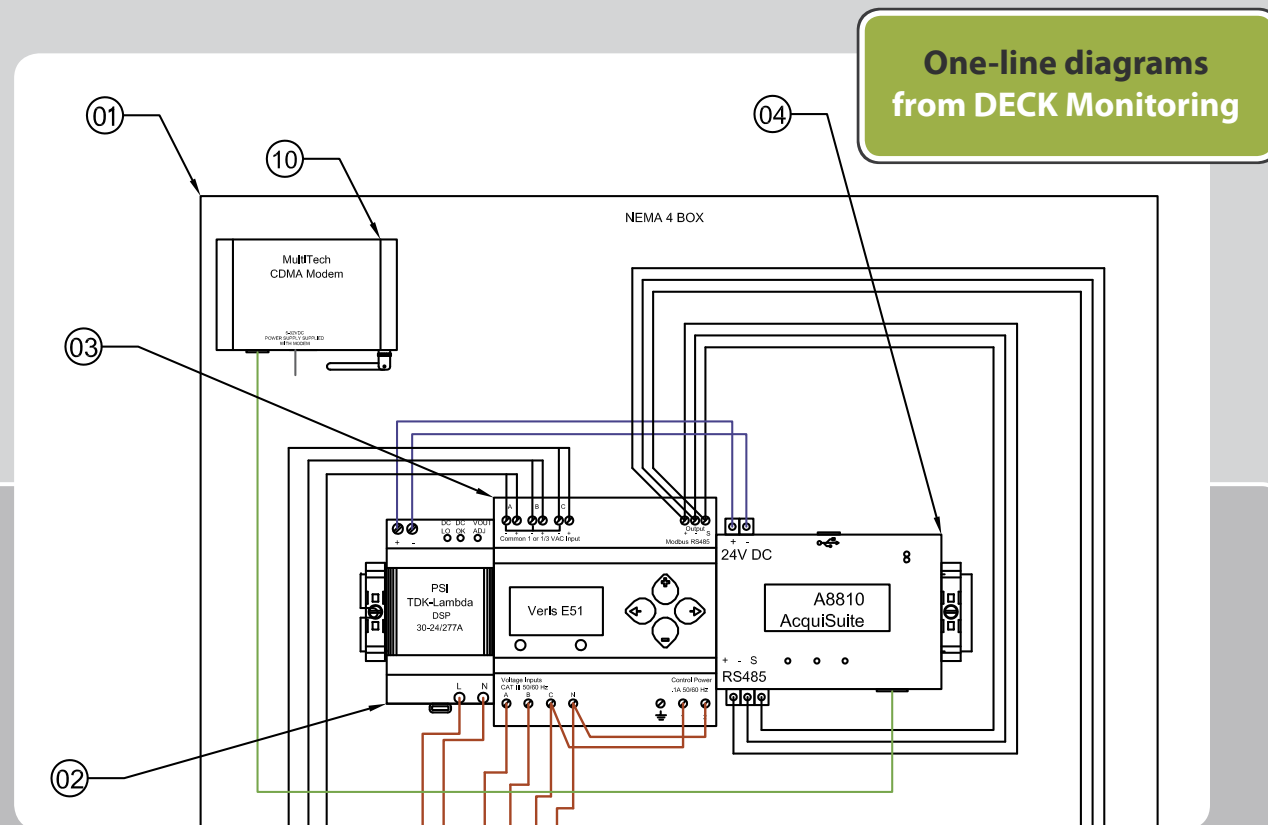


KIOSK WITH 19" TOUCHSCREEN MONITOR

- 16 gauge steel body
- Powdercoat finish available in many colors
- Option to have logo printed on kiosk body
- Can be anchored to ground
- Comes with PC computer that is pre-wired and pre-configured with kiosk software for 'plug and play' start up.
- Kiosk system requires one standard electric outlet and standard ethernet web connection



engineering services



engineering review and system planning

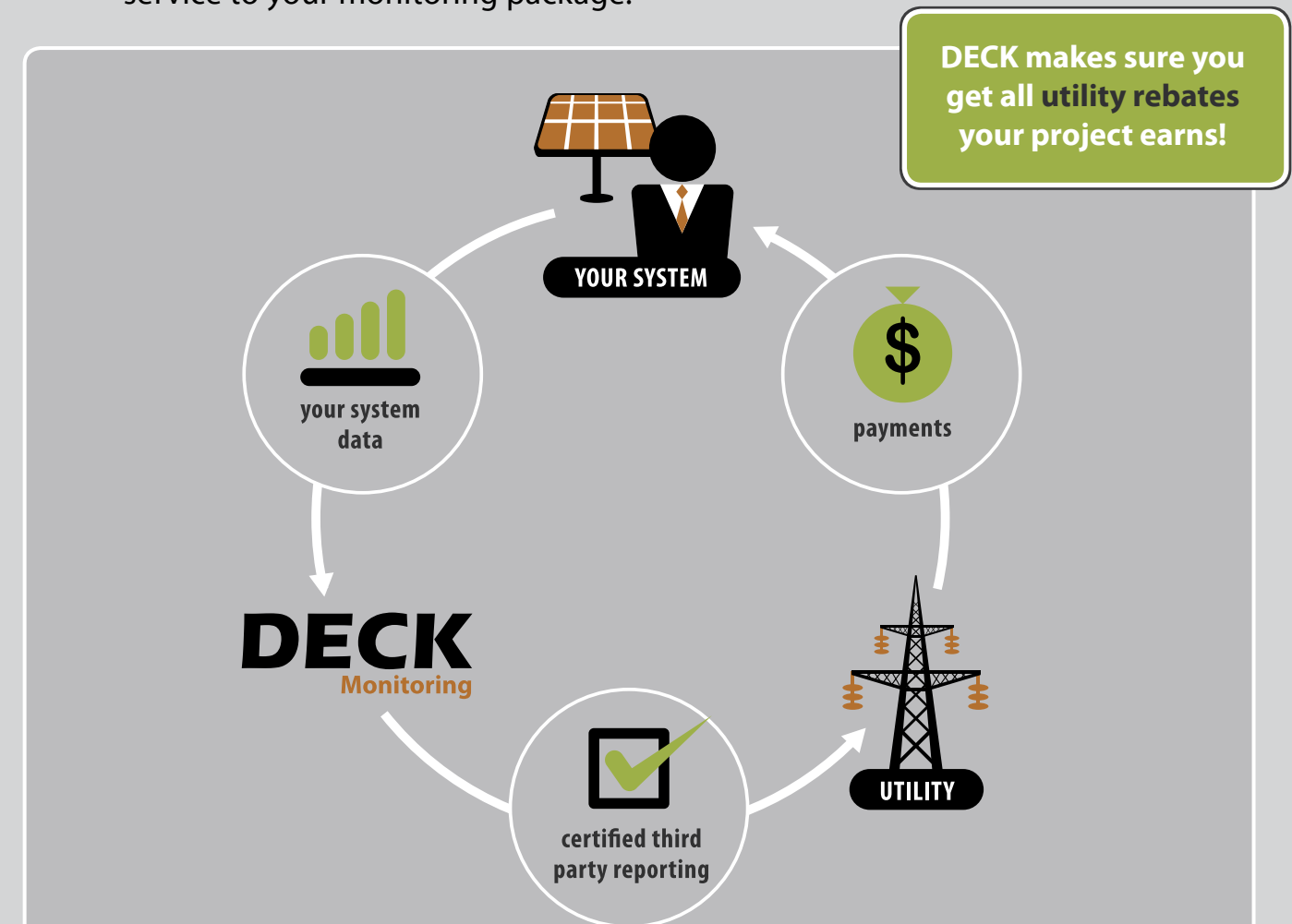
DECK has designed and deployed thousands of monitoring systems. Our experienced team can help you plan a monitoring system to meet almost any special needs and circumstances.

If you are purchasing one of our pre-engineered monitoring solutions you will receive a standard one-line diagram to aid with installation. If your project calls for hardware devices and/or metering capabilities beyond standard DECK options, you may request a custom review from our engineering department. Our system designers will verify that all hardware devices will function together correctly in your planned system. You will be advised of any special needs your system may have with regard to power sources, wireless communications, etc. Our designers will also create a detailed one-line diagram of your system to help guide your installation.

managed services

data reporting service

Many incentive programs require certified third-party data reporting to utilities and other organizations. Automated reporting services from DECK are a hassle-free solution. If you need certified reporting, add this optional service to your monitoring package.



- ▶ Many PV systems require certified third-party data reporting in order to collect utility rebates or to satisfy other certification needs for local, state and federal agencies.
- ▶ If your project requires data reporting service, DECK is the easy choice. Our automated service means no hassles for you, and we satisfy virtually every certification standard in the industry.

For a list of the major certifications we cover, visit www.deckmonitoring.com/solutionsSoftware.php

meet OTIS: on-site technical installation support



get by with a little help from your friends

Over the years DECK has supported thousands of monitoring installations. We have recognized many common problems that installers face with wiring, network communications, and other I.T. issues. Now you can benefit from our installation expertise: you may choose to have an expert DECK support technician come to your project location to provide oversight and support for your monitoring installation.

Your DECK advisor will be able to provide advice, instructions and expertise to help troubleshoot potential issues with modbus, data acquisition servers, and internet connectivity. This service will help you avoid common errors and keep your installation on time and within budget. OTIS service from DECK is also a great opportunity for less experienced installers to receive expert training for monitoring installation.

A DECK support technician is not a replacement for a professional installer... you must contract with a licensed and competent electrician for every installation!

let DECK do the install for you



complete installation in one easy step (...choose the date!)

DECK Monitoring is pleased to offer full installation service to make your solar monitoring experience even more easy and hassle-free. This surprisingly affordable service is available anywhere in the continental U.S. and Puerto Rico.

Installation service lets you avoid dealing with computer communication issues such as router configuration and wireless transceivers, and it's a convenient option when your project pipeline becomes overcrowded. Our experienced and licensed professionals keep your project free from avoidable complications and delays, while you get to focus on what you do best.

You also get peace of mind knowing that expert installation protects against complications down the road. We even include two onsite follow-up visits, if needed, at no additional charge. There is no better way to ensure the long term stability of the system you rely upon to monitor your solar investment!

Built by solar integrators,
for solar integrators:

staff with decades of solar
industry experience

•
company culture devoted
to customer service

•
industry-leading tech
support resources

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