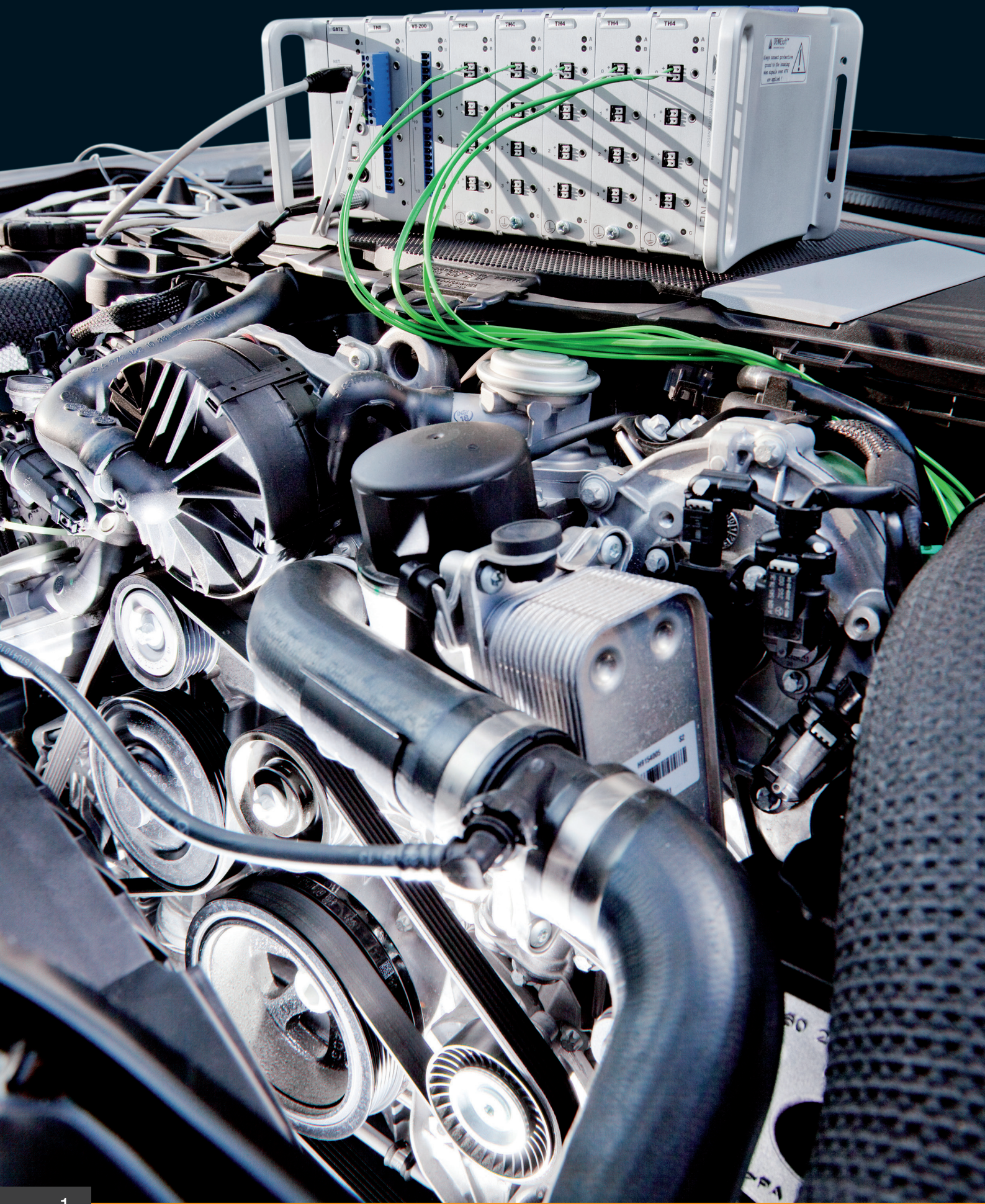
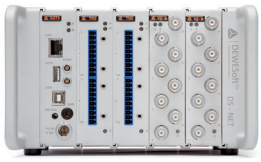
科尚仪器
KingSci Instruments





DS-NET

DS-NET is a measurement and control system designed for many demanding applications, especially in the fields of

- Component Testing
- Engine Testing
- Process Performance Testing
- Structural Monitoring

Key Features

- Medium speed data acquisition up to 10 kS/s/ch
- Application areas
  - Distributed data acquisition, Ethernet based
  - Stand alone data logging
  - Complete instrument running local DEWESoft™ software
  - Customized LabVIEW™ based solution
  - Channel expansion for Dewesoft instruments
- Completely modular and thus very flexible in configuration
- Scalable from two to several thousand channels
- Portable and 19" rack-mount lines
- REAL-TIME performance
- Redundant data storage
- Operating temperature -20° C to +60° C

The DS-NET system is rugged and scalable from e.g. a two channel control unit to a large synchronized measurement grid with thousands of channels. It is as flexible as being a stand alone data logger, a channel expansion of Dewesoft instruments, an Ethernet based distributed measurement system or a full-featured independent data acquisition instrument.

The completely modular architecture ensures always a perfect fit of the system configuration for the application at hand. A wide range of DS-NET modules is available to support almost any type of input and output signals. These multi-function modules can be combined in countless ways and provide top notch data recording and process control.

The system is designed for practical industrial appliance and thus is comprised of all metal housings and robust electronics offering galvanic isolation. Popular connector options enable convenient sensor connection and in combination with the easy-to-use software ensure time saving system setup.

Considering all these facts, DS-NET will serve you many years and is a safe investment.

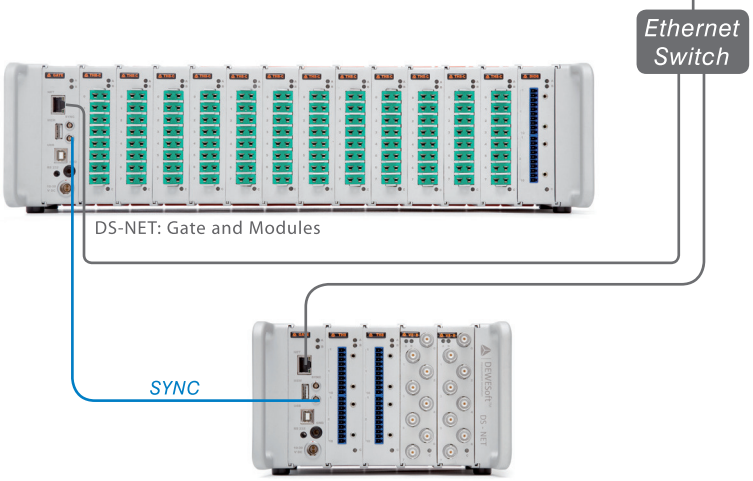
Application areas

Ethernet data acquisition system

DS-NET is a very flexible and compact Ethernet based data acquisition system. There is a portable line as well as a 19" rack-mount line. Both lines offer very precise galvanically isolated signal conditioning and enhanced features and reliability. Usually the DS-NET system is connected to a host computer running DEWESoft™ online data acquisition software. Up to 160 kS/s can be received from a single DS-NET system and then be processed, visualized and stored on the host computer.

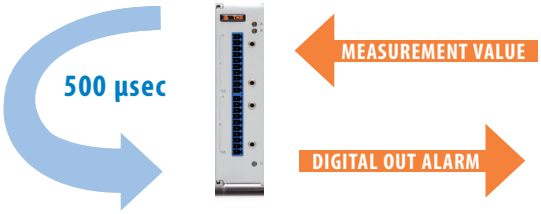
Measurement PC

But DS-NET also offers real-time performance! Since Microsoft Windows® is no real-time operating system it can not guarantee certain reaction times. DS-NET runs its own internal real-time operating system and can handle output and alarm functions directly inside the instrument. Thus accurately defined response times are guaranteed - completely independent of any PC.



Fixed latency time

Alarm handling inside module



Stand alone data logging

Every DS-NET system is ready to be used as a rugged stand-alone data logger - without any additional costs! The logging process is configured by a single click in DEWESoft™ software. Measurement data and calculated values can be stored to a USB memory-stick: up to a limit of 32 GB.

For triggered storing an aggregate sampling rate of max. 160 kS/s and up to 2 million samples per trigger event are the limit.

For continuous storing an aggregate sampling rate of max. 20 kS/s is the limit. Data is stored into files of max. 2 million samples each without any gap between the files.

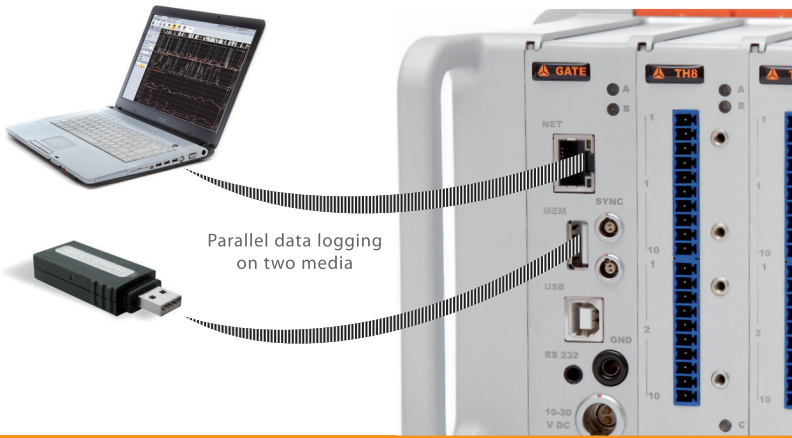
USB sticks can be hot-swapped during measurement without loosing any data thanks to the internal buffer memory.

Data analysis can be done offline in DEWESoft™ software.

Redundancy in data acquisition

The combination of the data logging feature and DEWESoft™ online recording software gives you redundancy in data acquisition for maximum reliability. Both, a USB stick and a measurement PC (via Ethernet), are connected to the DS-NET system in parallel. Data is logged to the USB stick while you are using DEWESoft™ to process, analyze and store the very same data at the same time!

As a result, even if your Ethernet connection should break during a measurement, your data is safe, since it is logged to the USB stick.



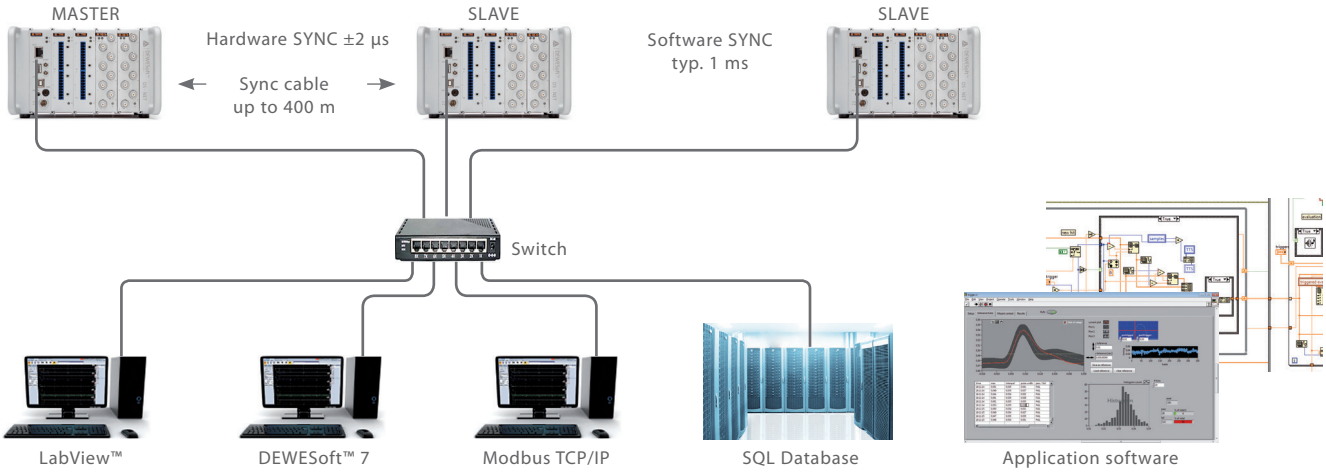
Industrial monitoring – data cloud

Multiple DS-NET systems are connected to an Ethernet LAN so that the measurement data can be processed, analyzed and stored by any computer within the network. For highest data quality all the measurement nodes are synchronized to each other either by hardware for best performance (time skew typ. ±2 µs) or software (time skew typ. 1 ms).

Usually LabVIEW™ software applications are created for each particular installation.

Clients also can read the online values via Modbus TCP/IP and of course data can be stored to your SQL database, even to a remote server over the Internet!

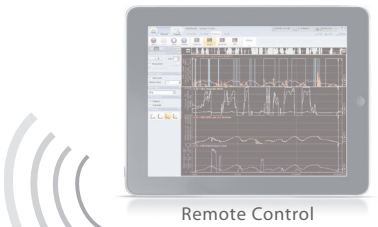
Of course DEWESoft™ software can be used too.

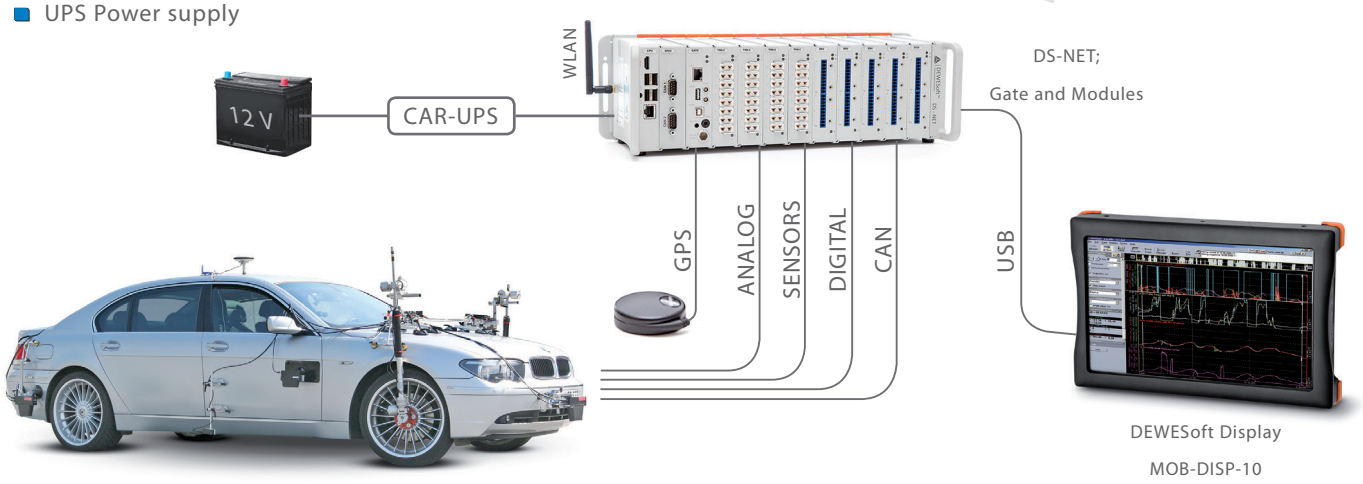


Complete instrument running local DEWESoft™ software

For maximum portability there is a compact CPU module available which adds a full-featured PC to your DS-NET system and turns it into a complete instrument. The CPU module enables you to run DEWESoft™ software locally. Measurement data is stored directly onto the internal flash disk and the local PC can be remote accessed via WLAN! Attach a keyboard and a display to the instrument for full control and to display the measurement data.

- Analog IN
- Digital / Counter In
- CAN BUS
- WLAN
- GPS
- UPS Power supply





System Architecture

Any DS-NET system starts with one DS-GATE as the base and then up to 16 DS-NET-modules can be chosen to complete one system. An optional DS-NET CPU module can be added to include a local computer.

The ingenious mechanic and electronic design of the portable system enable configurations of any number of modules without wasting any space. This way a configuration of e.g. one GATE with 4 modules is exactly 5 slots wide – plus handles on both sides.

Option:
DS-NET CPU

DS-GATE

DS-GATE

The DS-GATE is the central controller for each DS-NET system. It powers and controls the DS-NET-modules and provides an Ethernet TCP/IP interface to a host computer. A 12 MB data buffer guarantees gap-free data transmission.

The DS-GATE has Sync In/Out interfaces to daisy-chain multiple systems and offers a serial interface for GPS or IRIG-B devices. One USB interface is included for direct data logging to a USB memory stick.

Advanced calculations, alarm handling, boolean combinations, etc. can be defined and run within the DS-GATE independent from any PC or Windows operating system. The max. total sampling rate supported by one DS-GATE is 160 kS/s.

Option: DS-NET CPU

The DS-NET CPU adds a full-featured PC to your DS-NET system and turns it into a complete instrument. The CPU module enables you to run DEWESoft™ software locally.

The module includes an Intel® Atom 1.6 GHz CPU with 1 GB RAM and a 64 GB flash disk. It connects to DS-GATE via Ethernet and offers further interfaces like 4x USB, WLAN and DVI.

CPU	Intel® Atom Z530 1.6GHz
RAM	1GB
Hard-disk	64 GB FLASH hard disk MLC
Operating System	Windows XP or Windows 7
Display & Graphics	HDMI output up to 1920 x 1200 HDMI to DVI adapter included DVI to VGA converter included
Networking	1x 1000 BaseT Ethernet
802.11g WLAN	WiFi antenna included
USB	4 USB 2.0 High Speed ports
Operating Temperature	0 to 60° C
Power Consumption	max. 8 W at full CPU load

This module is not available for the rack line.

DS-NET Modules

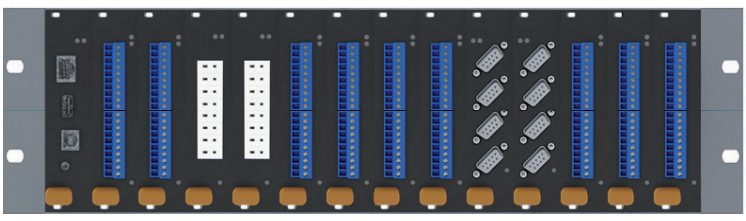
DS-NET modules are available for almost any type of input and output signals.

These modules are intelligent and contain all the setup data that you can easily define within our award winning DEWESoft™ software, for maximum reliability and deterministic control. Basic calculations like minima, maxima, data reduction and filtering are done directly inside each module.

All DS-NET-modules are hot swappable with auto-loading configurations and addressing, making system scalability and serviceability extremely efficient and effective – at system start up or several years down the road.

Ethernet interface	for configuration and data output Protocols: TCP/IP, UDP, PING, ASCII, Modbus TCP/IP Services: DHCP, FTP-Server, FTP-Client, e-mail-send-client (SMTP)
High data rate over Ethernet	160 kS/s total sampling speed per system example: 16 channels with 10 kS/s per channel 80 channels with 2 kS/s per channel
Synchronization and clock	Master Slave principle, IRIG standard, DCF77, AFNOR etc. GPS time and position data NMEA0183, SNTP over Ethernet (all channels synchronized)
12 MB int. data buffer memory	Data buffer for block transfer of measurement data, different logger possibilities, expandable by USB device
PAC functionality	data logger, alarm handling, mathematics, numeric, boolean combinations, functions generator
Module connection	up to 16 DS NET modules via 2 UARTS, Baud rate up to 24 MBaud each UART
Galvanic isolation	all channels and power supply 500 V_{DC}

Fixed installation



The 19“ rack-mount systems have a backplane for one DS-GATE and 13 slots for DS-modules. Filler panels are installed into unused slots.

	ACC2	CFB2	BR4	V8	V8-200	V4	V4-HV	TH4	TH8	DIO8	AO4
Number of Channels	2	2	4	8	8	4	4	4	8	8	4
Data Rates [Hz]	10k	10k	10k	10k	10k	10k	10k	10k	100	10k	10k
Isolation Voltage [V]	500	500	500	500	500	1.2k	1.2k	1.2k	500	500	500
Input Types											
U **Voltage**	■		■	■	■	■	■	■	■		
max. Range	±60V		±10V	±10V	±200V	±10V	±1kV	±80mV	±80mV		
I **Current (0..25 mA)**	■		■	■		■					
Resistance	■		■								
Potentiometer	■		■								
Pt100, Pt1000	■		■								
Thermocouple	■		■					■	■		
Full, half and quarter bridges	■	■	■								
Inductive full and half bridges		■									
LVDT		■									
IEPE/ICP Sensors	■										
Frequency Signal										■	■
PWM **Pulse Width**										■	■
Counter										■	■
Time										■	■
Status	■	■		■						■	■
Output Signal											
U **Voltage (±10 V)**		■									■
I **Current (4..20mA)**											■
Frequency Signal										■	■
PWM **Pulse Width**										■	■
Status	■	■		■						■	■
Connectors											
Screw	■	■	■	■	■	■			■	■	■
BNC				V8-B		V4-B	■				
DSUB			BR4-D								
Thermocouple									TH8-C		
Spring Terminal								■			
Special Modules											
CAN 2	max. 2 modules (4 CAN channels) connected to one DS-NET CPU										
SENSOR power supply	max. 1 module per system										

Note: some measurements may require optional adapters and may not be available dependent on the connectors of the module

DS-NET ACC2
Multiple Input Module

2 universal Analog input channels	voltage: ±60 V, ±10 V, ±1 V, ±100 mV current: 0..25 mA, potentiometer, resistance: 100 kΩ, 4 kΩ, 400 Ω, Pt100 & Pt1000: -200..850 °C, thermocouple types: B, E, J, K, L, T, U, N, R, S bridge: ±2.5 mV/V, ±50 mV/V, ±500 mV/V (@ 2.5 V excitation), IEPE sensors: ±10 V; constant current 4 mA
Resolution	24 bit
Sampling rate	10 kHz per channel (thermocouple 8 Hz)
2 digital I/O channels	input: state, tare, memory reset output: state alarm, threshold voltage: max. 30 V
Signal processing	linearisation, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
TEDS	class 1 and class 2, according IEEE 1541.4
Galvanic isolation	of I/O-signals (each channel), power supply and interface isolation voltage 500 V

DS-NET CFB2
Carrier Frequency and AC/DC Bridge Module

2 Analog input channels	Strain gauge and inductive measuring bridges (full, half, quarter), LVDT, RVDT
DC and carrier frequency (CF) principle	DC excitation, 600 Hz CF excitation, 4.8 kHz CF excitation for bridges
2 Analog output	Voltage ±10 V, 10 kHz
Resolution	24 bit
2 digital I/O channels	input: state, tare, memory reset output: state, alarm, threshold
Signal processing	linearisation, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
Galvanic isolation	of I/O-signals (each channel), power supply and interface isolation voltage 500 V

DS-NET BR4
Multiple Input Module

4 universal Analog input channels	voltage: ±10 V, ±1 V, ±100 mV current: 0..25 mA, potentiometer, resistance: 100 kΩ, 4 kΩ, 400 Ω, Pt100 &Pt1000: -200..850 °C, thermocouple types: B, E, J, K, L, T, U, N, R, S bridge: ±2.5 mV/V, ±50 mV/V, ±500 mV/V (@ 2.5 V excitation)
Resolution	24 bit
Sampling rate	10 kHz per channel (thermocouple 8 Hz)
Signal processing	linearisation, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
Galvanic isolation	of I/O-signals (each channel), power supply and interface isolation voltage 500 V
Option	D-SUB connectors model: DS-NET BR4-D

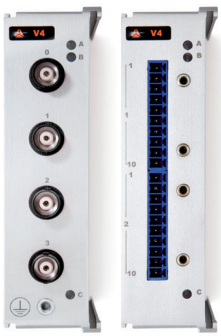
DS-NET V8
Voltage Module

8 galvanically isolated input channels	differential voltage ±10 V , current via shunt 25 mA (V8-SHUNT), common mode voltage: 100 V permanent
Resolution	24 bit
Sampling rate	10 kHz
2 digital I/O channels	input: state, tare, reset output: state alarm max. 30 V
Signal processing	linearisation, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
Galvanic isolation	of I/O-signals (each channel), power supply and interface isolation voltage 500 V
Option	BNC connectors model: DS-NET V8-B

DS-NET V8-200
Voltage Module

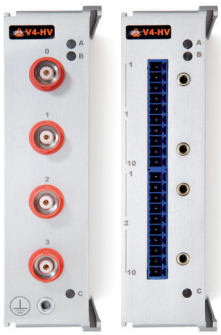
8 galvanically isolated input channels	isolated differential input voltage ±200 V
Resolution	24 bit
Sampling rate	10 kHz
Signal processing	linearisation, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
Galvanic isolation	of I/O-signals (each channel), power supply and interface isolation voltage 500 V

DS-NET V4
High Isolation Voltage Module



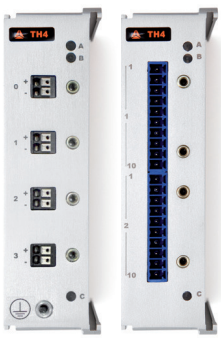
4 galvanically isolated input channels	Voltages at high potential, ranges 100 mV, 1 V, 10 V current via an external shunt
Resolution	24 bit
Sampling rate	10 kHz per channel
Signal processing	linearisation, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
Galvanic isolation	1200 V short-term 5 kVpk

DS-NET V4-HV
High Voltage Module



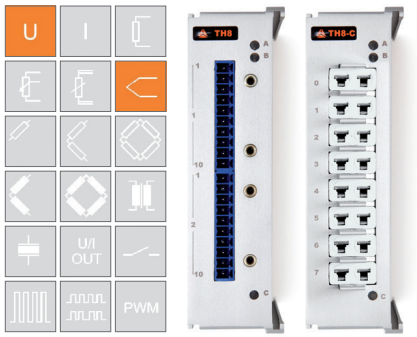
4 galvanically isolated input channels	Voltages, range 40 V, 120 V, 400 V, 1000 V
Resolution	24 bit
Sampling rate	10 kHz per channel
Signal processing	linearisation, digital filter, average, scaling, min/max storage, RMS, arithmetic, alarm
Galvanic isolation	1200 V short-term 5 kVpk

DS-NET TH4
High Isolation Thermocouple Module



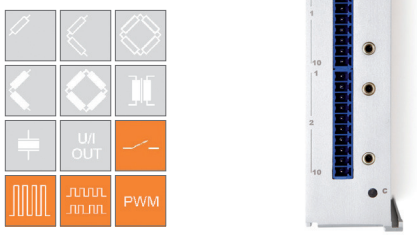
4 galvanically isolated input channels	for non-isolated thermocouples at high potential
Cold junction compensation	internal
Dynamic linearisation	Optimum positioning of interpolation points in selected range, types B, E, J, K, L, T, U, N, R, S programmable
Resolution	24 bit
Sampling rate	10 kHz per channel
Signal processing	digital filter, average, scaling, min/max storage, arithmetic, alarm
Galvanic isolation	1200 V short-term 5 kVpk

DS-NET TH-8
Thermocouple Module



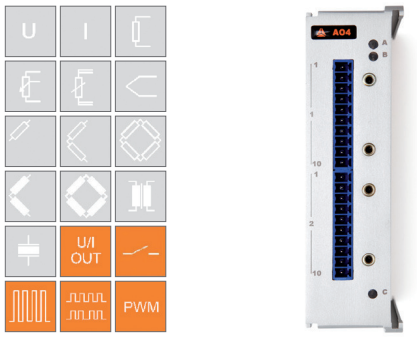
8 galvanically isolated input channels	thermocouples and voltages in the range of ±80 mV, common mode voltage: 100 V permanent
Cold junction compensation	DS-NET TH8-C: internal DS-NET TH8: TH8-CJC connectors available (option)
Dynamic linearisation	Optimum positioning of interpolation points in selected range, types B, E, J, K, L, T, U, N, R, S programmable
Resolution	24 bit
Sampling rate	100 Hz per channel (~8 Hz with activated mains rejection)
Signal processing	digital filter, average, scaling, min/max storage, arithmetic, alarm
Galvanic isolation	of I/O-signals (each channel), power supply and interface isolation voltage 500 V
Options	DS-NET TH8-C: with integrated CJC

DS-NET DIO8
Digital Input/Output Module



8 digital inputs and 8 digital outputs	configurable as counter, frequency, PWM and time inputs, frequency or PWM output, state in or output
State in and outputs	process- and host controlled, programmable threshold
Frequency in and outputs	frequency measurement up to 1 MHz (Chronos method), frequency output up to 10 kHz
Counter	forward/backward counter, quadrature counter with reference zero recognition (reset/enable), up to 1 MHz
PWM in and outputs	measurement of duty cycle and frequency, output with variable frequency and/or duty cycle
Time measurement	
Galvanic isolation	of I/O-signals (group/group), power supply and interface isolation voltage 500 Veff

DS-NET AO4
Analog Output Module



4 galvanically isolated Analog outputs	voltage ±10 V, current 4..20 mA selectable
DAC resolution 16 bit	10 kHz sample rate
4 digital input and 4 digital output channels	configurable as 2 counter, 2 frequency, or 2 PWM inputs, 2 frequency or PWM output, state in- or output, max. 30 V
Frequency in and outputs	frequency measurement up to 1 MHz (Chronos method), frequency output up to 10 kHz
Counter	Forward/backward counter, quadrature counter with reference zero recognition (reset/enable), up to 1 MHz
PWM in and output	measurement of duty cycle and frequency, output with variable frequency and/or duty cycle
Time measurement	
Outputs freely scalable	
Galvanic isolation	of I/O-signals (each channel), power supply and interface isolation voltage 500 V

DS-NET CAN2
CAN Bus Input Module

- 2 high speed CAN interface channel, up to 1MBit/s
- Isolated CAN input 500V
- OBDII, J1939, CAN output
- Supports CAN 2.0B standard
- Functions: send, receive, listen (silent), buffer
- max. 2 modules connected to one DS-NET CPU

DS-NET SUPPLY
Sensor Power Supply Module

4 galvanically isolated DC sensor supply voltages	+5 V +12 V +15 V +24 V
Voltages combinations	the voltages can be can be connected to get any possible voltage combination (e.g. 17 V, 20 V, ...)
Supplied Power	5 W per output voltage
Galvanic isolation	each voltage is galvanically isolated with 1.5 kV

This module is not available for the rack line.
Only one SUPPLY module can be used per DS NET system.

DS-NET WiFi
WiFi Module

The DS-NET WiFi module can connect your DS-NET system to any wireless network. It can even be configured to create a WLAN network, that other computers can connect to via DHCP!

Network Standard	802.11b/g/n
Data Rate	Up to 150Mbps
Interface	1x 10/100 Base-T Ethernet port
Antenna	1x RSMA connector (incl. 2DBi antenna)
Operating Modes	Access Point, Access Point Client, WISP Client, Router
DHCP	Support for client and server
Security	64/128-bit WEP, WPA, WPA2, WPS

DS-CAR-UPS
UPS CAR Power Supply

9 to 36 V_{DC}
Vehicle power supply

Small UPS for in cars usage
12 V car battery input (cigarette lighter),
internal buffer battery 58 Wh (opt. 108 Wh) / 4A, 12 V_{DC}
internal charging and temperature control electronics
1x 2 pin Lemo for DEWE-43, DS-NET, 101-DISP

Optional Connector-Adapters

CFB2-120 Module: CFB2
1 channel quarter bridge completion adapter 120 Ω

CFB2-350 Module: CFB2
1 channel quarter bridge completion adapter 120 Ω

TH8-CJC Module: TH8
4 channel thermocouple adapter with integrated CJC

ACC2-120 Module: ACC2
1 channel quarter bridge completion adapter 120 Ω

BR4-D-120 Module: BR4-D
1 channel quarter and half bridge completion adapter 120 Ω

BR4-CJC Module: BR4
2 channel thermocouple adapter with integrated CJC

ACC2-350 Module: ACC2
1 channel quarter bridge completion adapter 350 Ω

BR4-D-350 Module: BR4-D
1 channel quarter and half bridge completion adapter 350 Ω

ACC2-CJC Module: ACC2
1 channel thermocouple adapter with integrated CJC

BR4-120 Module: BR4
2 channel quarter and half bridge completion adapter 120 Ω

DSUB-BNC Module: BR4-D
1 channel DSUB9 to BNC adapter for voltage input

ACC2-BNC Module: ACC2
1 channel screw to BNC adapter: ICP® input

BR4-350 Module: BR4
2 channel quarter and half bridge completion adapter 350 Ω

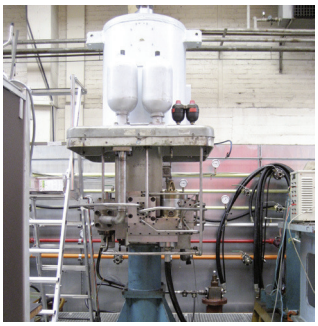
V8-SHUNT Module: V8
4 channel shunt connector for current measurement (25 mA)

DS-NET solutions

DS-NET modules are used to measure, control and analyse applications in all industrial fields. Some real application examples:

Behr Group
Climatic test chamber control

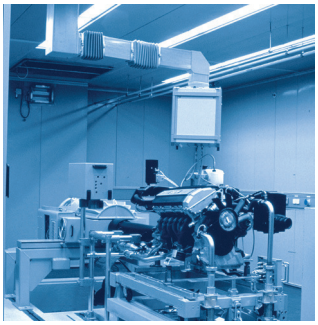
Behr is utilizing the DS-NET I/O modules for the precise measurements required in their highly accurate climatic test chambers. Every Behr test cell has one data server for data collection and control. Depending on the size of the test bed, one or more modules are connected via Ethernet to the control PC running DEWESoft™.



ALSTOM
Test of steam valves for power plants

DS-NET modules are used to evaluate the characteristics of valves with a diameter of up to 6 meters that control a steam pressure of 80 bar. The quantities pressure and displacement has to be measured with a rate of 1000 samples per second very precisely.

Beside the good technical features and the distributed structure the easy configuration was an important item for the customer.



BMW
Combustion engine test bed

Modern test beds must be able to accurately reproduce, acquire and condition sensor signals very close to the sensor with the goal of authentic, fail-safe and reliable data acquisition. Signal conditioning, linearization and scaling are performed directly within the modules.

Based on the fieldbus technology the robust modules can be placed and distributed independently from each other and they can easily be integrated into existing automation systems.

VDZ
Quality inspection of different cements

Measurement of released hydration heat during the dissolving process is a standard procedure to check the quality of cements. The testing takes place in temporally precise timed steps. The hydration heat, measured in calorimeters over period of hours or days is a dimension for the quality. DS-NET modules can record temperature very precisely.

KORSCH AG
Pressing force controlling for pills quality production

The pressure force is the decisive criteria producing pills to ensure the required amount of active ingredients. With the measurement solution of the pressure-force-control there are special requirements on accuracy, fail safety, dynamic and realibility.

The DS-NET modules provide the required functionality.