imc SPARTAN

configurable • conditioned • capable

Beyond logging to active monitoring, from the lab to the field

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imc SPARTAN at a glance

- Cost effective solution goes beyond logging
- Isolated temperature and voltage/current, plus bridge/strain gauge options, LVDT sensors
- Multiple sample rates and synchronous data processing
- Simultaneous recording of analog, digital, and fieldbus/vehicle bus (e.g., CAN) data
- Up to 500 S/s per channel
- Sophisticated and intuitive triggering system
- Versatile storage options including onboard removable flash media
- Networkable with other imc systems for synchronous acquisition of thousands of channels
- Integrated real-time capabilities for analysis, data reduction and control
- Stand-alone, remote or interactive operation (via Ethernet TCP/IP connection)
- Comprehensive configuration and operation software

imc SPARTAN

Mixed signal testing demands more than just logging

Designed for test engineers, imc SPARTAN integrates many of the elements that are frequently used in conjunction with data loggers to create a complete test platform.

Going beyond data logging means that you have immediate access to integrated signal conditioning, multiple sample rates and trigger conditions, and real-time calculations for synchronous virtual channels.

With its simplified setup and ease of use, imc SPARTAN is ideal across all user levels. By providing an integrated solution with comprehensive provisions, it eliminates the challenges of interfacing and maintaining multiple incompatible systems.

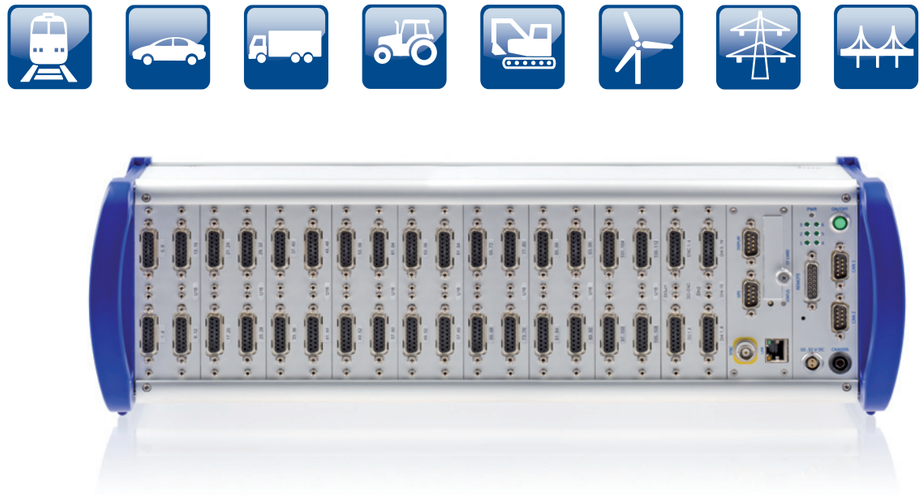
With up to 500 Samples/second per channel, imc SPARTAN offers a dynamic range, well-suited for most physical and mechanical signals. In addition, integrated filtering ensures that high-frequency electrical noise does not interfere with your measurements.

But high quality, precision inputs are only the beginning. The imc SPARTAN system provides onboard storage and stand-alone operations, including integrated backup power and auto-start capability for unattended operations and long-duration measurements.

The optional real-time processing and control capabilities offer yet another time-saving integrated option in the imc SPARTAN system. Ideal for long-duration, autonomous testing, results may be calculated immediately, with a variety of options for measurement dependent output signals, including full implementation of PID control loops.

When operated interactively, imc SPARTAN utilizes the imc STUDIO operating and configuration software. This not only gives you live measurement displays, but optionally provides full test stand automation capabilities, while ensuring compatibility with all other imc data acquisition systems.

imc SPARTAN - a proven measurement system for a wide range of applications



Productive testing with imc SPARTAN

Integrated conditioners are always ready to go

- Integrated signal conditioning offers the convenience of a one-box solution
- Support for all standard process sensors, including temperature (thermocouple, PT100), voltage, current loop (4 - 20 mA) and measurement bridges / strain gauges (full, half and quarter bridge) and LVDT sensors
- All-in-one design ensures the essential I/O is always ready for your testing
- Software-based configurations are easily stored, loaded and modified to meet demands

Maximize your test efficiency

- Real-time data processing while the test is running – so results are immediately available
- Intuitive trigger system stores only the important data for easier post-processing
- Easily switch between interactive, remote or stand-alone operation as your test requires
- Fast transition between measurement setups

Saving your money with a comprehensive solution

- Integrated amplifiers provide a complete solution, incorporating signal conditioning, filtering and digitizers for most static and dynamic measurements
- Synchronous recording of analog, digital and CAN-based signals in one system
- imc's unique breakout connectors provide quick connections for any existing sensor
- Supports automatic sensor recognition and add-on TEDS from imc
- Expandable via distributed synchronous CAN-based measurement modules

Gaining your independence

- Measurement and real-time control in one unit
- Portable design goes from field to test bench as your test requires
- Stand-alone operation with the flip of a software switch when the PC cannot be used
- Includes power-up self-start and internal storage

Securing your investment

- Robust power supply with backup power for uninterrupted operation
- Reliable operation assures data integrity
- Redundant data storage to local drive in parallel with network storage
- Operates optionally in an extreme temperature range (-40 to 85 °C, condensation allowed)

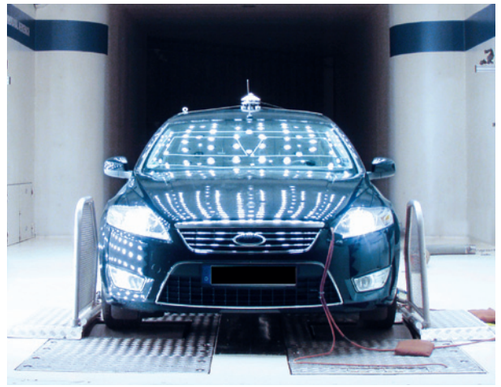
In Practice

Trouble free long-term remote monitoring

The ultimate challenge for any product is its ability to perform throughout its projected lifetime under actual field conditions. This couldn't be more true than for structural testing in civil engineering, where data collection can continue for years. Fortunately, the imc SPARTAN system is well-suited for autonomous operations, including backup power, self-start capability and onboard data storage. Onboard data processing allows the real-time reduction of stored data, including max./min., class counting, statistics or critical event records. This not only preserves storage space, but when used in conjunction with imc LINK for remote data access, it significantly reduces data upload times and bandwidth usage.

Thermal mapping for heat exchanger efficiency

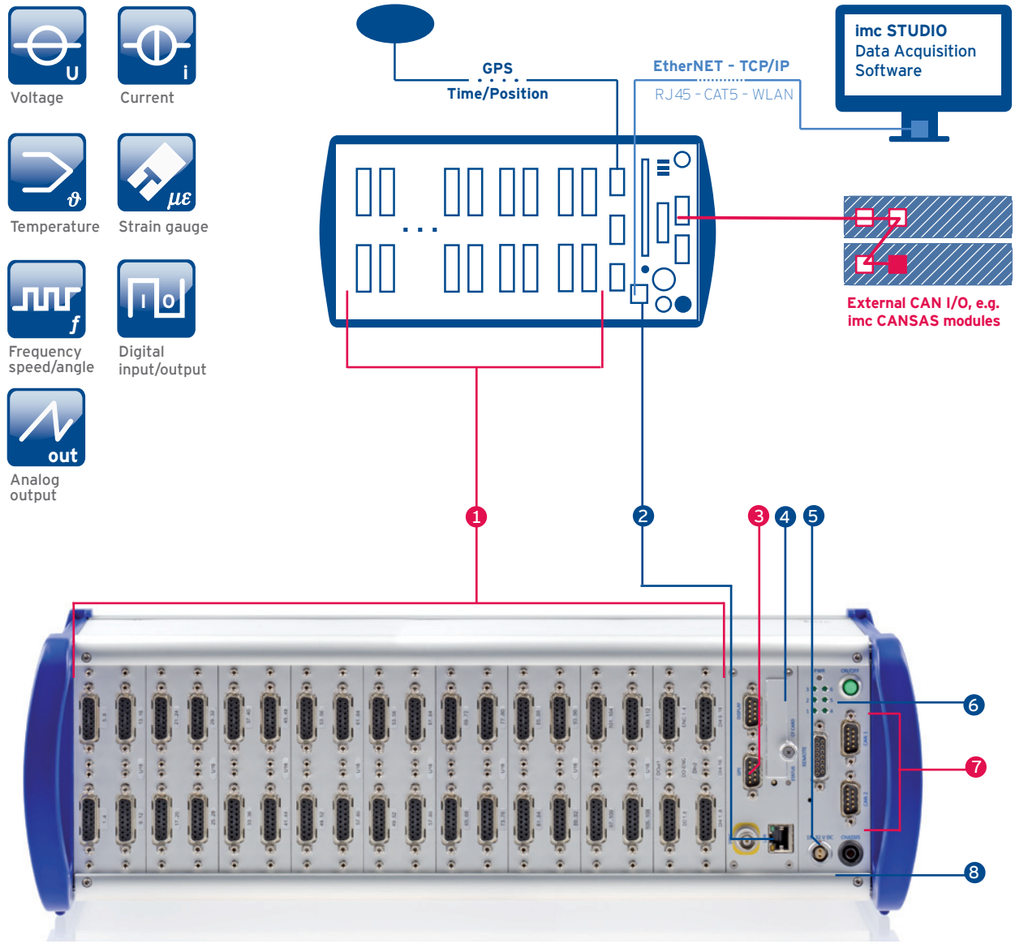
As the demands on the component manufacturer continue to drive increases in manufacturing precision, the need for accurate and thorough data during product development becomes even more important. "In creating stress and thermal maps of new heat exchanger designs, we needed to be able to quickly process a large number of channels into meaningful results." The ability of the imc SPARTAN to synchronously record all of your strain gauges and thermocouples, plus wind speed and ECU information, provides a tremendous productivity advantage; "plus, imc STUDIO automatically controls test cycles and creates all test reports in real time."



Process monitoring and alarms

When it comes to maximizing the data collection capability in most 3rd party "turnkey" test stands, it often helps to have a dedicated data acquisition system to record signals beyond the limited scope of the test stand controller. The imc SPARTAN is a perfect monitoring system: not only recording the data from your analog, digital and, if needed, CAN-based signals, but also providing critical output signals and alarms if conditions exceed testing tolerances. All the while, real-time processing of data and automatic test report generation ensure a quick and easy test analysis.

Comprehensive measurement and test control system



1 Fully conditioned analog inputs, arranged in groups of 16 channels (4 or 8 connectors)	5 Directly synchronize multiple imc systems of any type, for virtually unlimited expansion
2 Ethernet LAN / optional WLAN	6 User configurable status LEDs
3 GPS/external display connections	7 CAN I/O for expansion and integration
4 Onboard removable CF flash storage (covered)	8 Smart power supply (10 - 32 VDC) with UPS

Design Concept

imc SPARTAN architecture

The imc SPARTAN consists of the mainframe chassis with the base unit (available in 5 different sizes), plus one or more factory installed I/O options; the system is shipped to you ready-to-go.

Base system capability

The core of the imc SPARTAN system is designed around the singular concept of putting everything you need into one place:

- TCP/IP Ethernet interface for system configuration and interactive data collection
- Onboard flash storage and optional hard drive data storage
- Optional real-time signal processor and test control with imc Online FAMOS
- GPS (for time and/or position information) and external display connectivity
- Stand-alone startup and power-failure control logic

imc SPARTAN is capable of handling an aggregate data collection rate of 400 kSample/s, with a maximum per channel sample rate of up to 500 Samples/s. This acquisition rate is shared by the active channels in measurement, and the integrated conditioner modules are configurable on a per channel basis.

Input options designed for efficiency

Two basic multi-purpose signal conditioning options exist in the imc SPARTAN system: isolated voltage and temperature and combined voltage and bridge mode/strain gauge with software selectable DC or switchable AC/DC excitations. Each comes in 16 channel blocks, with a variety of available standard connectors. Because of its conditioners, the imc SPARTAN is ready for almost any dynamic signal sensor and integrates sensor conditioning, filtering and digitizing for up to 128 synchronous channels.

In addition, all imc SPARTAN systems may be equipped with one or more fieldbus interfaces, such as CAN, CAN FD, FlexRay, ARINC as well as imc's multi-I/O card, offering digital inputs, encoder/counter inputs and both analog and digital outputs.

Real-time functionality at your fingertips

One of the core concepts of all imc data acquisition and control systems is integrated synchronous control and an extensive array of real-time functionality.

Control signals and simple logic are often handled without the need for any programming, directly through imc's powerful trigger engine. The trigger logic capabilities are a standard part of all imc data acquisition systems, including imc SPARTAN, and are easily accessed through the included configuration and operation software imc STUDIO.

For advanced real-time analysis and control, imc Online FAMOS is optionally available as well, providing the capability of handling tasks ranging from basic statistical operations such as min./max., average and RMS to more demanding calculations such as FFT spectral analysis, signal classification (fatigue analysis) and order tracking. Virtual channels are computed on the fly, in real time.

In addition, imc Online FAMOS extends the capability of your system to easily create PLC-like control logic with minimal specialized knowledge. Incorporating responsive real-time and closed-loop control (incl. PID), the system can thus handle complete test stand automation.

One software for the entire testing process

imc STUDIO – the modular software for measurement, control and automation

Whether you want to use your imc SPARTAN in a "black box" configuration for easy data acquisition, or you want to set up Live-Monitoring on hundreds of channels during prototype testing, or you want to create a complete test stand automation routine with its own control panel – with imc STUDIO, you have full control over the entire measurement process.

Configuration & measurement
imc STUDIO Setup

- Simple measurement device selection
- Clear configuration of all hardware settings
- Intelligent trigger machine
- Flexible, real-time calculations
- Structured project management

Visualization & displays
imc STUDIO Panel (Standard)

- Versatile imc Curve Window configurations (2D/3D)
- Display live video
- Freely customize control & display elements per Drag & Drop
- Create reports
- Data browser for navigating through large volumes of data

Live data analysis
imc Online FAMOS / imc Inline FAMOS

- Analyze and calculate live data streams
- "Immediate results" during the running measurement
- Autarkic in the device (imc Online FAMOS)
- PC based with scalable performance (imc Inline FAMOS)
- Simple syntax

Analysis & documentation
imc FAMOS

- Powerful data analysis and documentation
- Full range of pre-defined calculation functions
- Create multi-layer macros
- Create user-defined GUIs
- Control large amounts of data

Testing sequences
imc STUDIO Sequencer

- Automation of test and evaluation procedures
- Configuration per Drag & Drop
- From sequence control to automated data evaluation and report creation
- imc FAMOS & MATLAB interface

User interface
imc STUDIO Panel (Professional)

- Intelligent instruments (Widgets) and control elements
- Individually customizable GUIs
- Additional application-oriented components for user interfaces
- Full-screen display
- User rights management

Video integration
imc STUDIO Video

- Time-synchronized video and measurement data acquisition
- Pre-trigger function
- Up to 4 simultaneous video cameras
- 2 redundant channels per camera with independent sampling and trigger settings (monitor channels)

Webserver
imc REMOTE

- Configurable homepage for displaying and operating imc measurement devices
- Platform-independent device access with standard internet browser
- Web Design Wizard for creating individual web pages
- Supports https (SSL) for secure connection

Test stand automation
imc STUDIO Automation

- Real-time automation platform
- Graphical design environment for test stands and test setups per Drag & Drop or notation
- imc hardware provides the necessary deterministic timing
- Threshold monitoring in the background

Efficient system integration

- Integration of DLLs
- Scripting engine (.Net)
- Integrated workbench
- Connection to 3rd-party devices
- Implement your own data-stream analysis
- LabVIEW interface (VI's)
- DIAdem interface

Sensor management
imc SENSORS

- Management of any sensor
- Measurement channel configuration from sensor database per Drag & Drop
- Descriptions from TEDS

Remote Testing
imc LINK / imc WEBDEVICES

- Remote connection for imc measurement systems via WiFi or mobile radio
- Automatic measurement data transfer to the PC or server
- Automated evaluations
- GPS data on map background
- Turnkey solutions including IT & serviceIT

imc STUDIO Standard

imc STUDIO Professional

imc STUDIO Developer

imc STUDIO Plug-In

Additional software

imc SPARTAN Details

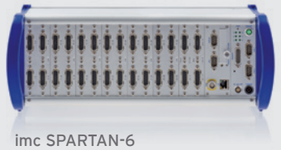
Key: ● Default, ○ Optional

imc SPARTAN general specs and housing types

	imc SPARTAN -2 / 4 / 6 / 8	imc SPARTAN -R
General		
Aggregate sampling rate	400 kSps	
Max. channel sampling rate	500 Sps / chan	
Housing type	portable	19" rack
Max. number of channels configurable	32/64/96/128	112 (128)
Configurable module slots (1 slot = 4 HP)	4/8/12/16	14 (16)
Operating conditions		
Standard operating temp. range	●	●
Extended temp. range (incl. condensation)	○	○
Shock and vibration rating	30g pk (3 ms)	
Connectivity		
Ethernet	100 MBit	
W-LAN (WiFi)	○	○
UMTS/LTE, 3G/4G	○	○
GPS connection port	●	●
Display connection port	●	●
Remote controlled main switch	●	●
Programmable status feedback (LEDs)	●	●
Data storage		
CF card slot (Compact Flash)	●	●
Storage on PC / network drive	●	●
Hard disk (internal)	○	○
Stand-alone capabilities		
PC independent complex trigger functionality	●	●
Onboard real-time data analysis (imc Online FAMOS)	○	○
Autarkic PC-less operation, self start	●	●
Synchronization & clock		
Master-slave between different imc systems	●	●
NTP network based synchronization	●	●
Via external GPS signal	●	●
Via external DCF-77	●	●
Via external IRIG-B & DCF-77 signal	●	●
Pulse counter and process control (digital I/O)		
16 Bit digital in, 8 Bit digital out	●	(●)
4 pulse counter (2 chan quadrature mode)	●	(●)
Fieldbus extensions		
CAN, CAN FD	○	○
LIN	○	○
FlexRay, XCPoE (Master, Slave)	○	○
ARINC, MVB	○	○
Power supply		
DC input 10V to 32V	●	●
Isolated power supply input	●	●
AC/DC adaptor (110 to 230VAC)	●	●
Data integrity upon power fail	●	●
UPS	●	●
Software		
imc STUDIO Standard	○	○
imc REMOTE WebServer	○	○

imc SPARTAN-2
with 2 CAN nodes and standard equipment of pulse counter and digtal I/O

imc SPARTAN-4



imc SPARTAN-6

imc SPARTAN-8
with 2 CAN nodes and standard equipment of pulse counter and digtal I/O

imc SPARTAN module with DSUB-15 connectors

imc SPARTAN module with thermocouple connectors

imc SPARTAN analog amplifier modules

	size		connector		speed		voltage mode				mA	temp		ICP, supply		bridge mode						
module name SPAR/xxx	channels	slots (1 slot = 4 HP)	standard connector	TEDS	max. sampling rate (per channel)	signal bandwidth (-3dB)	isolated voltage mode	min. voltage range (mV)	voltage up to 10 V	voltage up to 50 / 60 V	20 mA shunt plug	Thermocouple (TC)	RTD (PT100)	ICP plug	sensor supply	full bridge	half bridge	quarter bridge	DC excitation	AC excitation (CF)	single SENSE	double SENSE
Voltage & temperature measurement																						
T16	16	2	DSUB-15	●	5 Hz	1 Hz	●	50	●	●	●	●	●		○							
T16-TC-K	16	2	Thermo		5 Hz	1 Hz	●					●										
T16-TC-UNI	16	2	Thermo		5 Hz	1 Hz	●	50	●	●		●										
U16	16	2	DSUB-15	●	500 Hz	200 Hz	●	50	●	●	●	●	●	○	○							
U16-TC-K	16	2	Thermo		500 Hz	200 Hz	●					●										
Bridge & strain gauge measurements																						
B16	16	4	DSUB-15	●	500 Hz	200 Hz		5	●		●			○	●	●	●	●	●		●	
BC16	16	2	DSUB-26-HD		500 Hz	200 Hz		5	●		●				●	●	●	●	●		●	
BCF16	16	4	DSUB-15	●	500 Hz	200 Hz		5	●	●	●			○	(●)	●	●	●	●	●	●	●
LVDT16	16	4	DSUB-15		500 Hz	50 Hz									●	●	●			●		●
LVDTC16	16	2	DSUB-26-HD		500 Hz	50 Hz									●	●	●			●		●

imc SPARTAN DIO, counter, DAC modules

	size	connector	digital I/O		DAC	pulse counter		
module name SPAR/xxx	slots (1 slot = 4 HP)	standard connector	input Bits	output Bits	analog outputs	counter inputs	quadrature mode chan	counter frequency
Multi functional modules								
DI16-DO8-ENC4	2	DSUB-15	16	8		4	2	32 MHz
DI8-DO8-ENC4-DAC4	2	DSUB-15	8	8	4	4	2	32 MHz
Digital I/O modules								
DI-16	1	DSUB-15	16					
DO-16	1	DSUB-15		16				
Analog out modules (DAC)								
DAC-8	1	DSUB-15			8			

imc SPARTAN software options

	Features	Licensing	
Software product	Functionality	License	incl.
Operating software			
imc STUDIO Standard	Operating software, integrated test & measurement suite	PC	○
imc STUDIO Professional / Developer	Customized operation, scripting, application development	PC	○
imc CANSAS	In-situ configuration of imc CANSAS modules		●
imc SENSORS	Sensor data base	PC	○
Real-time data analysis			
imc Online FAMOS	Real-time calculations, immediate results	Device	○
imc Online FAMOS Professional	Real-time control extensions, PID control etc.	Device	○
imc Online FAMOS Kits	Class counting (fatigue analysis), order tracking	Device	○
Post processing			
imc FAMOS Reader	Data visualisation	PC	●
imc FAMOS Standard / Professional / Enterprise	Data visualisation, analysis, reporting, scripting	PC	○
Remote access			
imc LINK	Remote device access, automatic data transfer	PC	○
imc REMOTE	Web Server, secure https device access	Device	○
CAN			
Vector database	Vector database interface	Device	○
ECU protocols	ECU protocol support (KWP 2000, CCP, OBD-2)	Device	○
Development			
LabVIEW™ VI's	LabView VI components		●

Digital I/O
galvanically isolated, configurable to 24V/5V (TTL/CMOS) Level, output: 0.7A sink current

Pulse counter
full analog input conditioning: 500 kHz analog bandwidth, differential input, analog filter, software adjustable threshold levels
Modes: event counter, time, frequency, speed, RPM, differential and absolute angle and displacement

TEDS support
(Transducer Electronic Data Sheet) imc SPARTAN support direct read/write of TEDS sensors, including imc's TEDS Clip.
Connectors: TEDS interfaces require either the ACC/DSUBTEDS-x variants of our connectors

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