



# MSR System



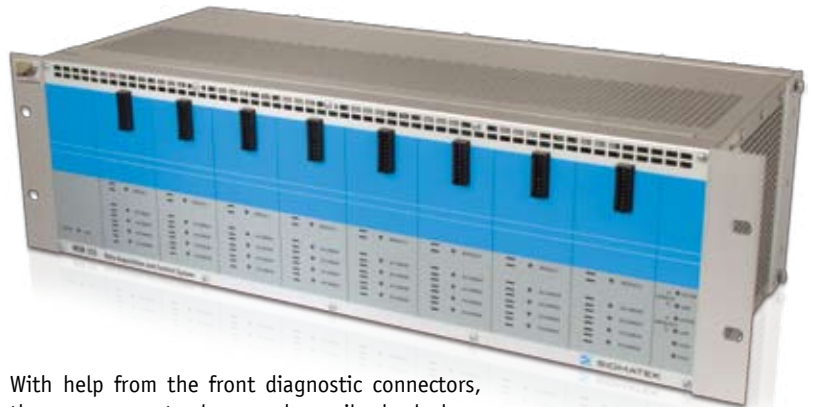
# Measure, Control, Regulate in a New Dimension

## MSR System with VARAN

Through its modularity, the innovative MSR system from SIGMATEK is optimally suited for the most varied tasks in measuring and regulation technology. With its strong performance and the highest possible data security, the real-time VARAN bus provides the perfect communication system for the decentralized use of the MSR system.

### Modular Construction

The MSR system is modularly constructed. The module carrier in 19" format with 3 RU can have up to 8 base modules mounted, each of which can be equipped with 24 digital channels or 8 analog channels. A flexible configuration is therefore produced, with up to 192 digital or 64 analog in- and outputs per rack. As the CPU, a Compact-IPC can be used.



With help from the front diagnostic connectors, the measurement values can be easily checked.

### Digital and Analog Measuring Modules



MSR 311 Digital module

The digital module has 24 back-readable digital outputs, which can be defined in groups with 4 channels as digital in- or outputs.

The analog module is a multifunction module which, in itself, is modularly constructed. The base module is equipped with up to 4 signal-conditioning insert modules with 2 channels each.

Currently, insert modules for analog outputs (voltage), analog inputs (voltage and current), temperature measurement, counters, incremental encoders, SSI, DMS full bridges and a carrier module for Dataforth 8B signal-conditioning modules are available.



The modular construction of the analog module: The MSR 211 base module can be equipped with up to 4 signal conditioning modules as required by the application.

## Flexible Configuration

The MSR system can be configured as desired for any application, so that all required measurement categories can be recorded and processed. The various channels of the measurement modules can be assembled specifically for the application

to record various measurements (4..20 mA, +/- 10V, etc.) Extraordinary flexibility is achieved through the optional use of 8B signal conditioning modules from Dataforth.

## Strong Performance

The system is designed for the highest performance measurement and regulation tasks. The isochronous cycle time of the system is 200  $\mu$ s. Within this time, all measurement values of a fully

equipped system can be read, the value settings output and up to 20 PID regulators with 5 kHz calculated. Data can be collected through an oversampling function with up to 40 kSamples/s.

## Decentralized Configuration with the Fast VARAN Bus

The system is standardly equipped with the real-time VARAN Ethernet system, which allows a very flexible topology and provides high performance.

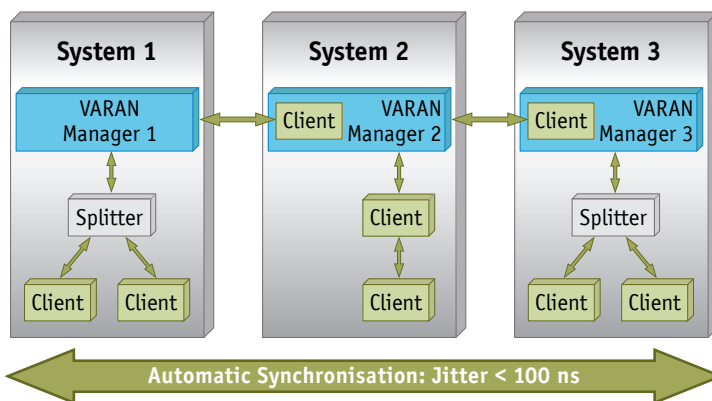
The data of a module carrier equipped with 64 channels can be transmitted to the real-time system in less than 50  $\mu$ s.

## High Data Security

With the real-time VARAN bus, the perfect communication system for decentralized use of the MSR system is provided. VARAN supplies all measurement values in the entire system, which can be synchronously collected and processed with the highest possible data security. All data in the MSR system can therefore be easily accessed by a

higherlevel data management system. The initial start-up is also easily performed through VARAN, since the measuring modules are identified automatically during runtime. An insensitivity to disruptions is ensured through galvanic isolation of the measurement modules.

## Perfect Synchronicity



With the VARAN multi manager concept, any number of systems can be operated in complete synchronicity. Problems caused by the drifting apart of signals from the individual subsystems are therefore systematically prevented.

## Maximum Precision

The MSR system meets the highest system standards for measurement precision. The analog base module is equipped with an 18-bit A/D converter: Therewith, an analog measurement precision of 0.02% of the measurement range's end value is

ensured over the entire operating temperature range. The frequency measurement error is less than 40 ppm over the entire measurement range of 0.1 Hz to 1 MHz.

## Integrated Sensor Supply

Sensors can be electrically powered by the MSR system over the connector cable directly. 100 mA at 24 V per channel is therefore provided. All

measurement signals are connected over Lemo FGG Push-Pull connector plugs.

## Tailor-made MSR System

Thanks to the modular design, the user can configure the MSR system individually and specific to

the respective application.



Interface module



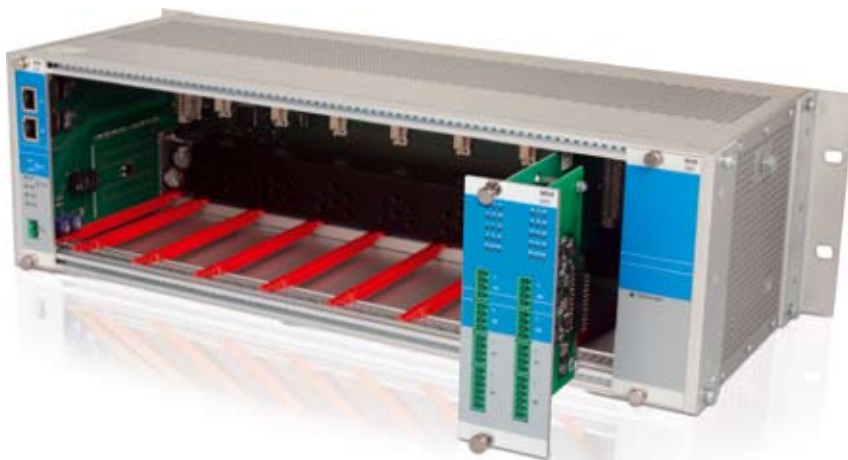
Analog measuring module



Digital measuring module



Fan module



In the robust aluminum housing, space is provided for up to 8 measuring modules as well as an interface and fan module.

The flexible and modular construction allows the MSR system to be configured as needed.



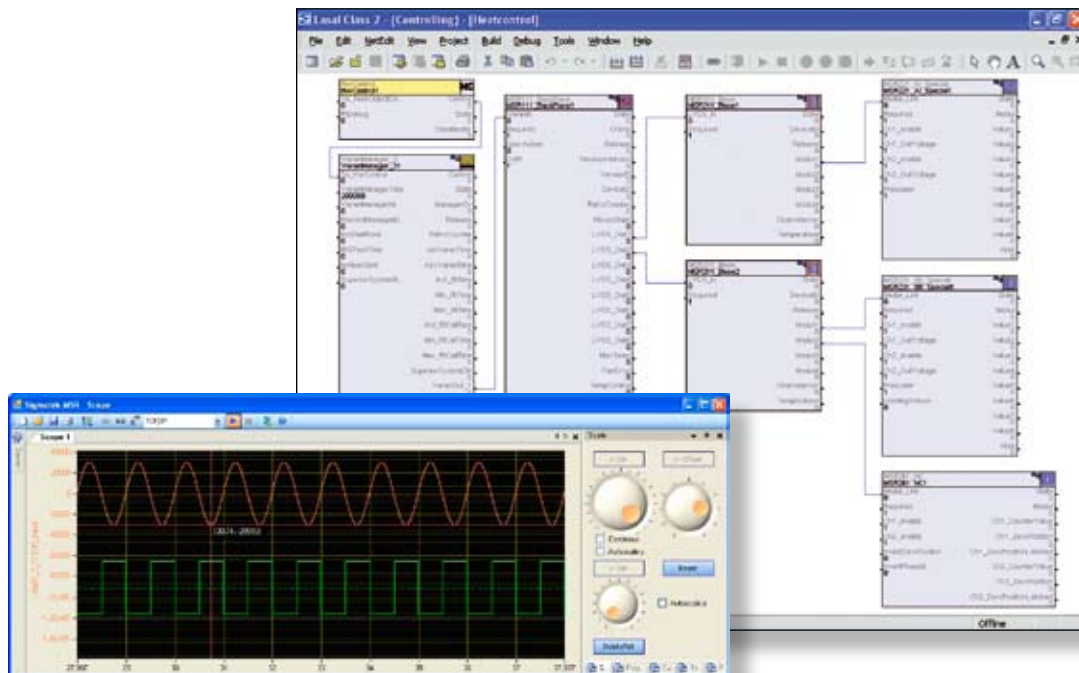
## Comfortable and Simple

# LASAL Software Tool

## Programming with LASAL

The object oriented programming tool LASAL connects the object oriented creation of program modules with an clear graphic display, in which

the program sections and their relationships to one another are shown.



## Simple Integration

The MSR system is equipped with an Ethernet interface, over which all data can be exchanged between the MSR system and the higher-level

computer system. For communication, Windows DLLs and virtual instruments (VIs) for LabView from National Instruments are available.

## Simulation in Real Time

Through the Real-time Embedded Coder and an import function in LASAL, models from Matlab/

Simulink can be loaded directly into the system and processed in real time.

# Modular, Precise and Flexible

# Facts and Data

## Highlights

- **Flexible:** decentralized measurement acquisition
- **Modular:** up to 192 digital or 64 analog I/Os
- **High precision:** 25  $\mu$ s conversion time per channel (40 kHz), 18-bit resolution
- **Guaranteed data security:** through the Ethernet-based VARAN-Bus
- **Fast:** Bus cycle time from 200  $\mu$ s (Jitter < 100 ns)



## General System Data

<b>Operating temperature range</b>	0 - 60 °C
<b>Storage temperature range</b>	-30 - +85 °C
<b>Base module</b>	MSR 111: 19" module carrier for 8 measuring modules (digital and/or analog base modules) MSR 121: Interface module (VARAN-Bus module) MSR 131: Fan module MSR 311: Digital module, 24 channels in groups of 4 can be used as in- or outputs MSR 211: Analog base module for 4 signal conditioning modules

## Signal Conditioning Module

The MSR 211 analog base module can be equipped with up to 4 signal conditioning modules. The

following modules are therefore available to choose from:

Type	Function	Measurement range	Resolution	Precision
MSR 221	2-channel voltage measurement	+/- 10 V	18 bits	0.02 % of EV *
MSR 222	2-channel current measurement	0 (4) - 20 mA	18 bits	0.02 % of the EV *
MSR 223	2-channel PT100 temperature measurement	-200 - +250 °C	18 bits	0.25 K
MSR 251	2-channel counter / SSI	0.1 Hz - 1 MHz / SSI	32 bits	< 40 ppm
MSR 261	2-channel incremental encoder	-	16 bits	-
MSR 281	2-channel DMS full bridge	3 mV/V	18 bits	0.05 % of EV *
MSR 231	2-channel module carrier for Dataforth 8B signal conditioning modules	Various	18 bits	Depending on the 8B module used
MSR 241	2-channel analog output module	+/- 10 V	16 bits	0.025 % EV *

\* EV = Measurement range end value



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