rittmeyer
KNOW-HOW
FROM EXPERIENCE

RIFLEX M1®

The Automation and Remote Control for Water and Energy Management

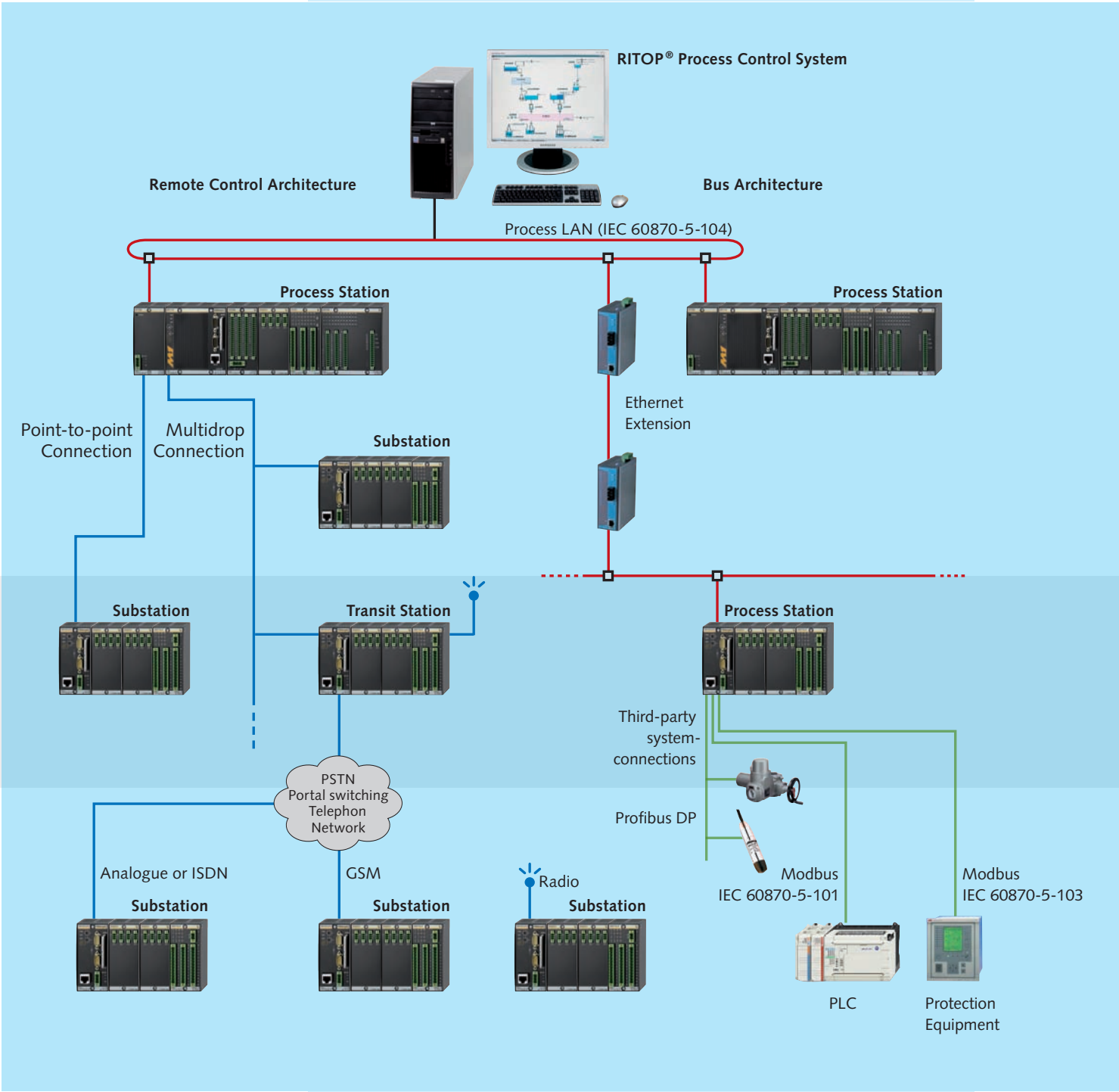
PERFORMANCE • SCALABILITY • OPEN COMMUNICATION • COMPATIBILITY • INDUSTRY PACKAGES

The Automation and Remote Control RIFLEX M1

The RIFLEX M1 automation and remote control system is part of the instrumentation and control technology of Rittmeyer.
It exchanges data with the process and carries out tasks for control, adjustment, alarm and local data storage. Data is exchanged with other process stations and the higher-level control system via the process LAN or remote control connections. Engineering is performed by means of efficient tools whereby extensive industry packages are available.

Communication – Logical and Systematic

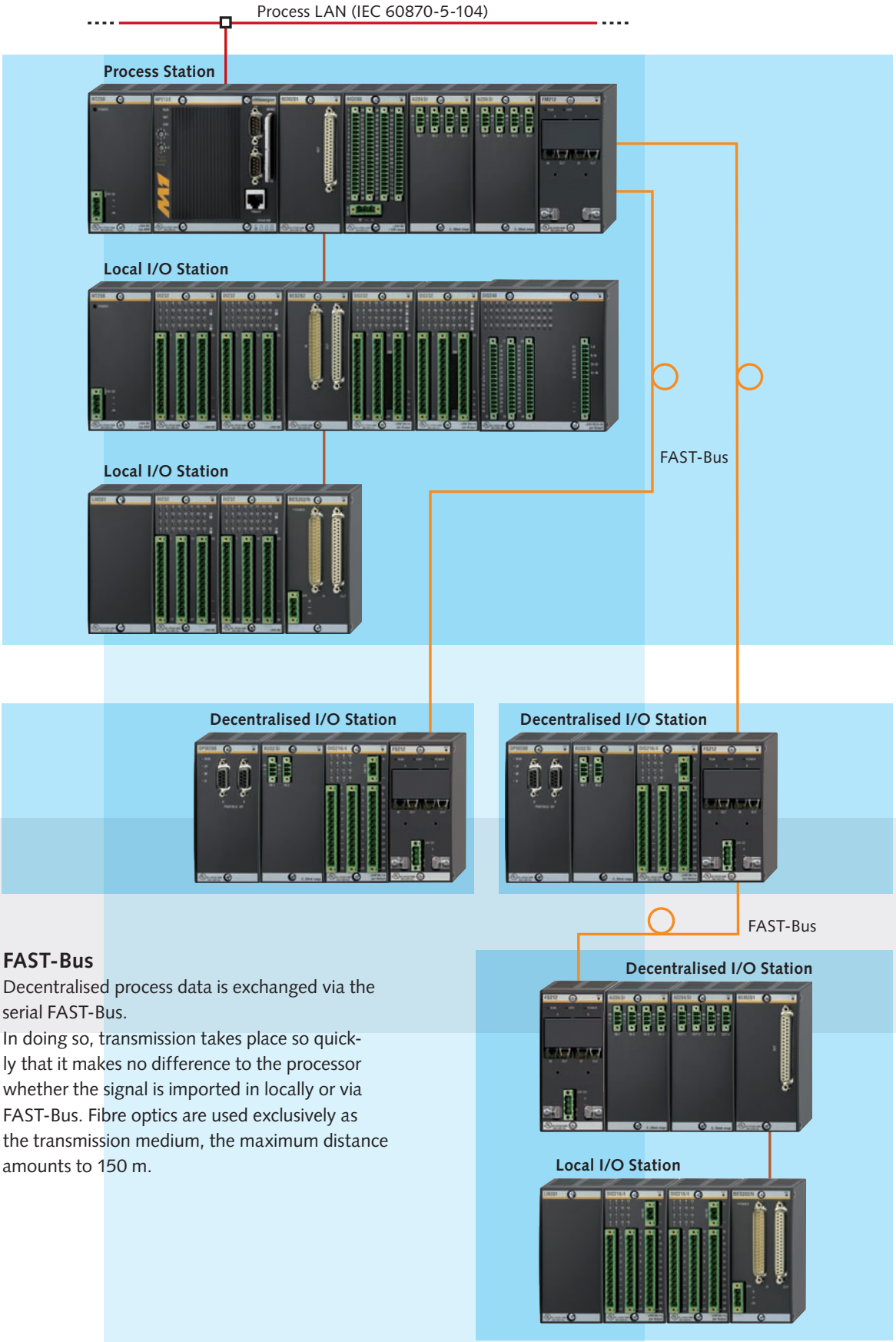
The various parts of a plant are often geographically distributed. RIFLEX M1 interconnects these with the consequent utilisation of all available transmission possibilities and paths.



Station Design

Modular and freely combinable – flexible utilisation

RIFLEX M1 stations are modular and can be freely combined for all plant sizes. Whether small or large, local or distributed – RIFLEX M1 is scalable and expandable and ensures that only those modules are utilised that are really needed. This guarantees efficient system design.



FAST-Bus

Decentralised process data is exchanged via the serial FAST-Bus.
In doing so, transmission takes place so quickly that it makes no difference to the processor whether the signal is imported in locally or via FAST-Bus. Fibre optics are used exclusively as the transmission medium, the maximum distance amounts to 150 m.

Hardware Modules

A variety of possibilities for all cases

Rittmeyer offers a wide spectrum of innovative and proven hardware modules. Continuous further development ensures that in the future the RIFLEX M1 products will continue to optimally fulfil the demands set on them.

Processor Modules

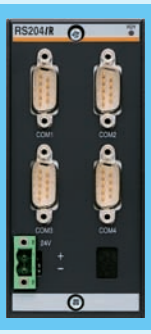
RMMP213.E08 (.E16)
Processor
Pentium/133MHz
8MB RAM (16MB RAM)

RMME203.E
Processor
386/33MHz
8MB RAM

RMME203.EN
Processor
386/33MHz
8MB RAM
power pack 17W

Communication Modules

RMDPM200
Profibus-DP
Master



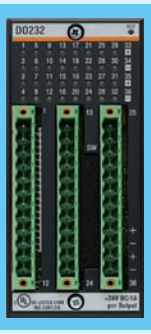
RMRS204.R
Interface Board
1xRS232,
3xRS232/422/485

Power Supply Modules

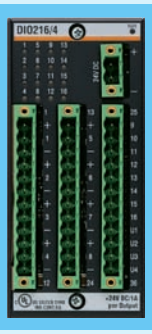
RMNT250(.048)
Supply Module
24V, 45W
(48V, 45W)

Digital Input/Output Modules

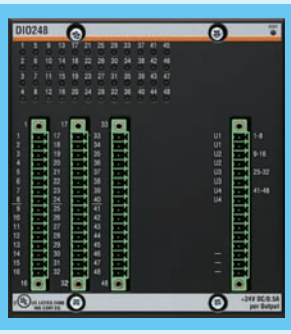
RMDI232 (.48)
Digital Input
Module, 32 Bit
24V (48V) DC



RMDO232 (.48)
Digital Output
Module, 32 Bit
24V (48V) DC



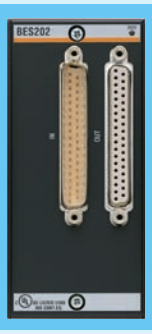
RMDIO216.4
Digital In/Output
Module, 16 Input,
16 Output, 24V DC
In/Out per channel
selectable



RMDIO248
Digital In/Output Module
16 Input, 16 Output, 16 In/Output
24V DC

Bus Extensions

RMBEM201
Bus Extension
Master



RMBES202
Bus Extension
Slave
max. 0.5m

RMBES202.N
Bus Extension
Slave
max. 0.5m
power pack 17W

Analogue Input/Output Modules

RMAI202
Analogue Input
Module
2-ch. 0/4..20mA
16Bit, channels
electr. isolated

RMAI204
Analogue Input
Module
4-ch. 0/4..20mA
16Bit, channels
electr. isolated

RMAO202
Analogue Output
Module
2-ch. 0/4..20mA
16Bit, channels
electr. isolated

RMAO204
Analogue Output
Module
4-ch. 0/4..20mA
16Bit, channels
electr. isolated

RMAIO288
Analogue 8xIn/8xOut
In: ± 10 V,0/4..20mA
or PT100, 14Bit
Out: +/-10V, 14Bit

FAST-Bus Extensions

RMFM212 (211)
FAST-Bus Master
LWL 2x (LWL 1x)

RMFS211 (.N)
FAST-Bus Slave
LWL 1x
max. 150m
(power pack 17W)

RMFS212 (.N)
FAST-Bus Slave
LWL 2x
max. 150m
(power pack 17W)

Refer to the data sheets for further details

Software Functions Data Processing

Practice proven in daily use

The data processing in RIFLEX M1 corresponds to the latest technological developments. The specially developed industry functions in the form of macros are entirely focused on tasks for water and energy management.

Function Blocks
Approximately 80 function blocks are available for the basic processing.

Categories	Some Examples
Logical-static	And/Or gate, JK flip-flop, summary alarm, …
Logical-dynamic	Delay, impulse relay, priority control, …
Arithmetic-logical	Limit value, signal selection, signal switchover, counter, …
Arithmetic-static	Total, product, amount, scaling, trigonometric functions, fuzzy, …
Arithmetic-dynamic	Filter, gradient, integrator, PID controller, load controller, …
Local data storage	Recording, floating average, tracer, …
Actuation of control units	Actuating circuit controller, availability, …
Alarm	Summary alarm formation, acknowledgement, lamp actuation, ...
System functions	Time handling, type converter, lamp check, …

Macros
Medium scale integrated function blocks:
– made of function blocks
– carry out a clearly defined function
– tried and field proven
– efficient reusability
Used for:
– branch functions
– general functions

Some Examples

Water Supplies:
– Reservoir management automation
– Reservoir level automation
– Control logic for pumps with prioritisation

Gas Supplies:
– Load management for reserves management and fulfilment of option amounts
– Storage calculations and management
– Conversion from Bm3 to Nm3 and kWh
– Load factor calculation

Electricity Supplies:
– Control and monitoring of switches, switch carriages and earthing isolators
– Load management (connection and disconnection of load groups)
– Integration of field control and protection technology

Sewage Plants/ Canal Networks:
– Function blocks for units and measurements
– Control modules for rake systems, biological cleaning, filter systems, sludge treatment
– Function blocks for rain storage reservoirs, sewage pumping plants, measuring points

Hydroelectric Plants:
– Headwater level / quantity controller
– Outlet distribution for weirs and machines
– Position, discharge and output controller
– Turbine governor
– Sequential control for machine automation
– Thermo-mechanical protection
– Management automation for storage reservoir
– Operating position/operating mode administration
– Alarm processing for local machine panels

Processing Structures
Processing of the function blocks and macros is
– cyclic: up to 10 ms (Pentium CPU), up to 100 ms (386 CPU)
– calendar cyclic
– spontaneous due to change of one/several variables

Software Functions Communication

Simply better connected

The communication possibilities of RIFLEX M1 are based on Rittmeyers many years of experience in system design. The various systems can easily be interlinked and third-party systems can be integrated without problem. The perfect combination of all components offers the highest security and saves both time and money.

Process LAN (Ethernet, IEC 60870-5-104)

Medium	Bit Rate(s) Bit per s	Distance up to ...
Ethernet cable (copper)	10 M	100 m
Fibre optics single mode	10 M	15 km
Fibre optics multimode	10 M	2 km
Signal ground cable (xDSL)	64 K ... 4.6 M	4 ... 8 km

Interfaces to third-party systems

Protocol Type	Physical Interface			Bit Rate(s) Standard Value Bit per s	Distance up to ...
	RS-232	RS-485	Ethernet		
Standard Protocols					
Modbus Master, Slave	x	x		9'600	10 m / 1200 m
Profibus DP, Master		x		9.6 k ... 12 M	200 m at 1,5 Mbps
IEC 60870-5-101	x			2'400 ... 9'600	< 20 km
IEC 60870-5-103		x		9'600 ... 19'200	10 m/1200 m
IEC 60870-5-104			x	10 M	«unlimited»
Rittmeyer Specific Protocols					
RIDAT 2-connection	x			2'400	10 m
RUP	x			4'800 ... 19'200	10 m
Measuring instrument connection (MxI)	x			9'600	10 m

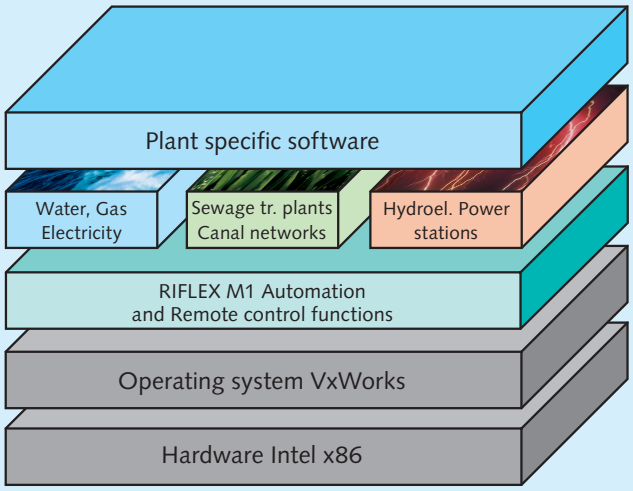
Remote Control Media

Medium	Topology		Bit Rate(s) Standard Value Bit per s	Distance up to ...
	Point-to-point	Multidrop		
Private cable, conductive	x	x	1'200 ... 19'200	≤20 km
Leased lines	x	x	1'200	≤20 km
Fibre optics single mode	x	x	19'200	12 km
Fibre optics multimode	x	x	19'200	1,1 km
Fixed telephone network analogue	x		2'400 ... 14'400	«unlimited»
Telephone ISDN	x		64'000	«unlimited»
Telephone cableless (GSM)	x		9'600	«unlimited»
Cableless (GPRS)	x		12'000 / 48'000	«unlimited»
Infranet	x		2'400	«unlimited»
Private line national	x	x	2'400 ... 9'600	«unlimited»
Radio	x	x	9'600	< approx. 5 km

Efficient tools and methods

Standardised tools and methods proved in practice enable continuous and object orientated Engineering. In this way, even complex systems can be parameterised quickly without error and verified on-line via the process LAN or the telecontrol connections. Migration of existing user programs is possible by means of any number of releases.

Software Design



→ Rittmeyer Industry Packages

User friendly programming

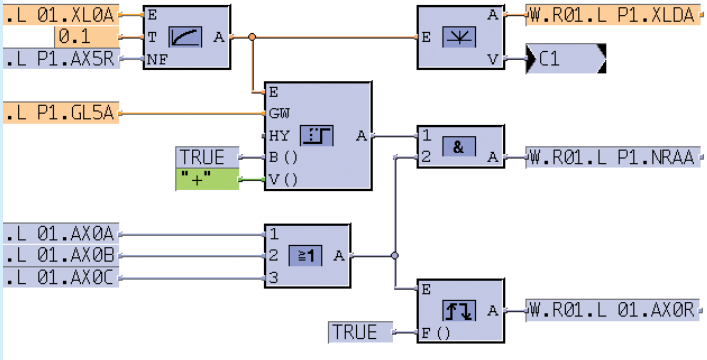
A convenient programming tool is available for producing the plant-specific software. This tool, based on the IEC 1131-3 (EN 61131-3) standard, distinguishes itself through its unique user-friendliness and its object-orientated structure. The comprehensive toolbox enables fast and efficient planning, programming, supervision, commissioning and documentation of even the most complex automation tasks.

The convincing functionality is given by:

- the centrally managed signal list that is produced for example in MS Excel and guarantees continuity between the automation system and the process control system
- the Rittmeyer function block library
- comfortable entry of links in the function block editor
- comprehensive plausibility tests
- additional comments by means of texts or graphics as a practical supplement to the presented function structure

On-line Test and Diagnosis

Comprehensive diagnosis possibilities are an important prerequisite in order to guarantee the safe and reliable operation of a control system in the rugged environment of water and energy management. Various diagnostic aids are available for this. The on-line test enables tracking of the signals in the function block language. On-line test and diagnosis can take place via process LAN, local/serial connection or via remote control.



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Supplementary Technical Information

Hardware

Product standard	on the basis of DIN EN 61131-2 Programmable Controller or DIN EN 60950 (Supply Module NT250)
Temperature	0 .. 60°C operation; -25 .. +70°C storage
Relative humidity	5 .. 95 % at 25°C, non-condensing
CE Marking, EMC Guideline	EU Directive 89/336/EWG: EMV, Application Area Industry EN 50081-2: Requirements for emitted interference in integrated condition (EN 55011 Class A) EN 50082-2: Requirements for noise immunity
Protection class	IP 20 according to IEC 529 (Protection against contact with standard test probes)

Software

Time synchronisation	DCF 77, GPS, SNTP
Time integration	Variables with time stamp, resolution 1 ms (5 ms for RME203)
Real-time operating system	VxWorks from Wind River

Five convincing arguments in favour of RIFLEX M1:

Performance
Powerful processors ensure fast and reliable reactions.

Scalability
RIFLEX M1 can be optimally designed for every task.

Open Communication
Wide range of standard protocols enabling the connection of third-party systems and equipment and increasing flexibility.

Compatibility
RIFLEX M1 is totally compatible with the previous controllers.

Industry Packages
Contain the experience and proficiency of Rittmeyer in the processes for water and energy management.

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