RM 200

Modular I/O system

Plug-in I/O modules

Suitable for CANopen / PROFIBUS-DP / MODBUS

Modules for numerous sensors and signals

2, 4 or 8 channels, depending on module version

Flexible plant design

Simple commissioning

PROFILE

The input/output modules with communication ports for CANopen or PROFIBUS-DP provide a high degree of flexibility when designing new plants. The compact, plug-in modules can be combined into cost-effective, de-centralized I/O islands. Due to the modular concept, type and number of the I/Os can be matched optimally to the requirements. Subsequent system extensions present no problems.

FEATURES

✔ *Broad range of available sensor and signal modules*

✔ *Standard fieldbus interfaces supported*

✔ *Cost-effective module size*

✔ *Well defined galvanic isolation concept*

✔ *Modules with configurable multi-functions*

✔ *Easy module exchange by plug-in cable terminals*

✔ *Configuration without special tools*

✔ *High signal resolution*

✔ *High accuracy*

✔ *Small housing size*

✔ *Flexible and easy to extend*

✔ *Optimized connection to KS98+*

APPLICATION

- Data acquisition
- Remote I/O
- I/O extension

DESCRIPTION

CONSTRUCTION

RM 200 consists of a basic module (housing) for „top hat" rail mounting, with 3, 5 or 10 sockets.

The left-hand socket is always reserved for the bus coupler module (CANopen / PROFIBUS-DP / MODBUS).
The remaining sockets can be used for the required number of I/O modules (insertion with system power „off") or dummy panels. The modules clip into the connectors of the basic module, and can be removed easily with simple tools.

Power supply

The system supply of 24 VDC is connected to the bus coupler module, that also provides galvanic isolation. The I/O modules and the internal communication circuits are supplied with 24 VDC via the motherboard.

Internal communication

An internal bus connects the I/O modules with the bus coupler module, where the statuses/values of the connected I/Os are continuously updated and stored. The stored data also contains information about the type and diagnostic results of the relevant I/O module. The scanning cycle depends on the type and number of inserted modules and the bus load.

Galvanic isolation

In the bus coupler module, the bus system (CAN / PROFIBUS / RS485 / RS232), the internal communication circuits are galvanically isolated from each other and from the 24 VDC system supply.

Furthermore, the I/O modules provide galvanic isolation for the internal system bus and for the I/O circuits. Analog inputs/outputs of the individual modules are galvanically connected, but are isolated from all the other modules. Exception for the RM 224-0, RM 224-2 and RM 225: their inputs are isolated from each other.

The eight digital outputs of the RM 251 are combined into two groups with four outputs each. The groups are galvanically isolated from each other and from the remaining electronics. The eight digital inputs of the RM 242 are grouped together to two inputs each which are galvanically isolated from each other.

Sensor energization

Transmitter supply

Analog input modules (RM 222-x) provide 24 VDC for energizing external two-wire transmitters. Module versions with standardized voltage input signals also provide a stable 5 VDC reference for connecting to potentiometers used as voltage dividers.

Digital inputs

The RM 241 provides 24 VDC for operating proximity switches as well as NPN or PNP transistors.

Fig.1 : RM 200 in an application with KS 98+
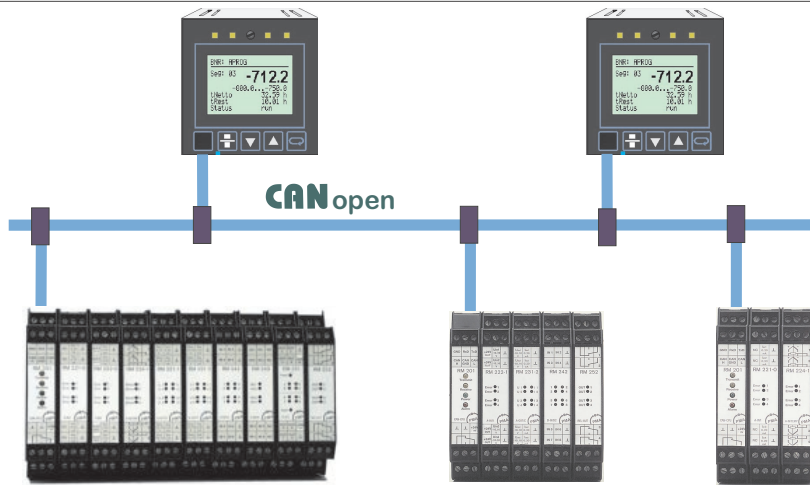
Input circuit monitoring

Analog input signals are monitored for short circuit, open circuit, or polarity depending on module type. If triggered, the monitor's output has two selectable alternative states:
the highest permissible value or the smallest possible value.

Electrical connections

The signal leads are connected to staggered terminal levels at top and bottom of the module. The screw terminal blocks are plug-in units, and a connecting diagram is printed on the module front.

Configuration

Available as an accessory, the Engineering Set ES/RM 200 contains a complete description plus the EDS and GSD files required for linking the equipment to a CANbus or PROFIBUS network (maximum version with Standard Mapping of the variables).The set also contains example programs for SIMATIC STEP7 (Siemens) environment.

Standard field-bus configurators such as ProCANopen (Vector) or SIMATIC STEP7 (Siemens) are supported.

Connection to KS98+

If the RM 200 is used as an I/O extension for the multi-function unit KS 98+ via CANbus, parameter adjustment and configuration are done by means of additional functions in the Engineering Tool ET/KS 98plus. In this case, a CAN configurator is not needed!

TECHNICAL DATA

SYSTEM

Basic module

Internal scanning cycle of the I/O modules:

ts = 10...400ms (depending on the type and number of connected inserted I/O modules and the bus load).

Number of module sockets:

1 bus coupler module plus...

RM 211	RM 212	RM 213
2 sockets for I/O modules	4 sockets for I/O modules	9 sockets for I/O modules

Restrictions:

It can be inserted per basic module:

- max. 16 analog inputs
  (e.g. 4x RM 221-x or RM 224-1 or 8x RM 224-0 or 4x RM 225)
  A strain gage input (RM 225) occupies two analoginputs !
- max. 16 analog outputs
  (e.g. 4x RM 231-x)

There are no restrictions for digital I/O modules.

Dummy panel RM 214

Slot covers for keeping protection degree IP20.

BUS COUPLER MODULES

Bus coupler module RM 201

Full CAN controller according to CAN specification V2.0A; physical coupling according to ISO 11898.

Cycle time on the CANbus:

Depends on the selected transmission speed, and on the number and type of inserted I/O modules (PDOs).

Transmission speed:

10 / 20 / 50 / 100 / 125 / 500 / 800 / 1000 kBit/s; adjustable with DIP switches or via automatic selection.

Bus cable length

depending on baudrate (10kBd…1MBd):
≤1000/1000/1000/500/250/100/50/25 m

Address configuration:

addresses 1...127, adjustable with DIP switches; ≤42 using the default mapping

Terminating resistor:

fitted, can be activated with a jumper.

CAN protocol:

CANopen Slave, supports DS301 V3.0 (communication profile) and DSP404-12 (measuring devices and closed loop controllers)

Process data objects (PDOs):

Receive: ≤5
Transmit: ≤10, of which max. 5 can be requested per RTR (Remote Transmit Request)

EDS file:

Maximum version; component part of the Engineering Set ES/RM 200; not necessary in conjunction with KS98+.

Alarm output:

Relay: 1 potential-free changeover contact
Function: configurable (node guarding)
– *Max. working voltage for protective insulation: 150V*
Contact rating:
AC: ≤ 5A, 750 W;
DC: ≤ 5A, 120V, 120 W

Galvanic isolation:

Supply voltage, CANbus and logic circuits are galvanically isolated from each other.

Indicator LEDs:

1 x green (power);
1 x red (alarm);
2 x yellow (Transmit, Receive)

supported modules:

RM 221-x, RM 222-x, RM 224-x, RM 231-x, RM 24x, RM 25x
not supported: RM 225

Fig.2 : Basic module RM 213 with 10 sockets for I/O modules

Bus coupler RM 201-1

supported modules:
RM 221-x, RM 222-x, RM 225,
RM 231-x, RM 24x, RM 25x
not supported: RM 224-x
Further properties as RM 201.

Bus coupler module RM 202

PROFIBUS-DP to EN 50 170

Cycle time on the PROFIBUS:
Depends on the selected transmission speed and number of I/O modules.

Transmission speed
9600 bit/s up to 12 Mbit/s via automatic selection

Bus cable length:
≤1000 … 100m, depending on baudrate

Address configuration:
address 1...126, adjustable with DIP switches.

Terminating resistor: external

GSD file:
component part of the Engineering Set ES/RM 200

Galvanic isolation:
Supply voltage, PROFIBUS and logic circuits are galvanically isolated from each other.

Indicator LEDs:
1 x green (power);
1 x yellow (data exchange)
1 x yellow (diagnosis)

Bus coupler module RM 203-x

Serial interface with MODBUS RTU protocol.
RM 203-0: RS 485 interface
RM 203-1: RS 232 interface

Transmission speed:
600 / 1200 / 2400 / 4800 / 9600 / 19200 / 38400 Baud; adjustable with DIP switches.
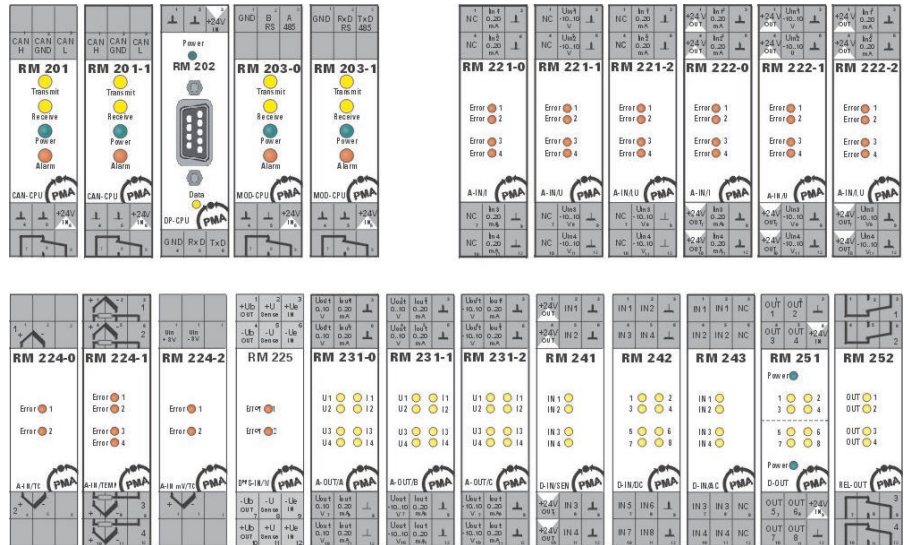
Byte format:
Adjustable with DIP switches:

Data bits	Parity	Stop bits
8	nonr	1
8	none	2
8	even	1
8	odd	1

Bus cable length:
RS 232: ≤ 3 m
RS 485: ≤ 1200 m

Fig.4 : Display Elements and Connections of RM 200 modules

Address configuration:
addresses 1...127, adjustable with DIP switches

Alarm output:
Relay: 1 potential-free changeover contact
Function: configurable (node guarding)
– *Max. working voltage for protective insulation: 150V*
Contact rating:
AC: ≤ 5A, 750 W;
DC: ≤ 5A, 120V, 120 W

Galvanic isolation:
Supply voltage, MODBUS and logic circuits are galvanically isolated from each other.

Indicator LEDs:
1 x green (power);
1 x red (alarm);
2 x yellow (Transmit, Receive)

ANALOG INPUT MODULES

General

Measurement cycle:
≤100 ms for all channels of a module

Digital filter:
1st-order filter, configurable mean-value generation according to the difference equation:
$y(t+ts) = \alpha\, x(t) + (1-\alpha)\, y(t)$
$(\alpha = 0{,}004...1{,}0)$

A/D converter:
successive approximation

Input span monitoring:
Error message in case the upper limit is exceeded by more than
> 20 digits (resolution 12 bit)
> 160 digits (resolution 16 bit)

Temperature drift: ≤0,08%/10K

Indicator LEDs:
1 x red per channel (error signal)

Galvanic isolation:
Between inputs, logic circuits, and internal supply (except RM 222-x)
Inputs are galvanically connected, except for RM 224-0, RM 224-2, RM 225.

Standard signals without TPS (I, U) (RM 221-x)

Number of channels: 4 (differential input)
(Differential inputs for RM 221-2 on request)

Measuring ranges:
selectable per channel
RM 221-0 (I):   4 x 0/4...20 mA
RM 221-1 (U):   4 x 0...10 / -10...10 V
RM 221-2 (U/l): 2 x 0/4...20 mA, and
                 2 x 0...10 / -10...10 V

Resolution: 12 bits
0/4...20mA: 5,1 / 4,1 μA/digit;
0...10V / -10...10V: 2,5 / 5 mV/digit;

Filter: 2nd-order analog filter
Limiting frequency: fg = 100 Hz

Characteristic: linear
deviation: ≤0,15%

Input resistance:
Current: approx. 47Ω; Voltage: >730 kΩ (with ground reference)

Sensor monitoring:
Broken or short-circuited leads:
with 4...20 mA signals
Wrong polarity: with 0/4...20 mA and 0...10 V

Interface:

Data format: INT; value ranges for
Current: 0/16.000...20.000
Voltage: 0...10.000 or
-10.000...10.000
Engineering unit: mA (I); V (U)
Decimals: 3

**Standard signals with TPS
(I, U, potentiometer) (RM 222-x)**

Number of channels: 4 (single ended)

Measuring ranges:

selectable per channel
RM 222-0 (I):   4 x 0/4...20 mA
RM 222-1 (U):   4 x 0...10 / -10...10 V
RM 222-2 (U/I): 2 x 0/4...20 mA and
                 2 x 0...10 / -10...10 V

Two-wire transmitter supply (TPS):

Channels intended for current input can
provide a transmitter supply voltage at
„+24V OUT".
Voltage: Us = 24 VDC ±10%
(short-circuit proof)
Max. load: I ≤ 25 mA per channel
Fused: 200 mA (sum current of all
channels).
For more details, see „*Standard signals
without TPS*" (RM 221-x) !

Potentiometer measurement:

(voltage-divider circuit)
Channels intended for voltage input can
be configured in pairs for potentiometer
measurement.
Uconst: Us = 5 VDC (output instead of
+24V OUT); short-circuit proof
Current limiting: 20mA
Max. load: ≤20mA (distributable among
the module's 4 channels,
e.g. 4 x1000 Ω 2 x 500 Ω, 1 x 250 Ω)
Resolution: 2,5 mV/digit (0,05%)

**Temperature input TC/Pt 100
(RM 224-1)**

Number of channels: 4

Sensors: selectable per channel

- Pt100:
  in two or three-wire connection
  Measuring range:Pt 100: -200...850°C
- Thermocouples: to DIN IEC 584

Type		Measuring range*
L	Fe-CuNi	-200/-120...900°C
J	Fe-CuNi	-210/-120...900°C
K	NiCr-Ni	-270/-130...1300°C
N	Nicrosil-Nisil	-196/-109...1300°C
S	PtRh-Pt10%	-50/12...1760°C
R	PtRh-Pt13%	-50/+13...1760°C
B	PtRh-Pt6%	25/50...1820°C
T	Cu-CuNi	-200/-130...400°C
W(C)	W5Re/W26Re	0/50...2299°C
E	NiCr-CuNi	-270/-130...1000°C

  * related to 0/50°C terminal temperature

Characteristic: temperature-linear
Conformity error: negligible

Temperature compensation(TC):

internal, can be switched off (not for
KS98+, RM 202, RM 203-x)
Remaining error of CJC: ≤ ±0,4% (after
warming-up phase of 20 min)

Resolution: 16 bits
Pt 100: ≤0,02 K/digit
TC type E, J, K, L, T, N: ≤0,04 K/digit
TC type S, R, B: ≤0,15 K/digit
TC type W: ≤0,09 K/digit

Error:
Pt 100: ≤ ±1 K
TC type E, J, K, L, T, N, W: ≤ ±1K
TC type S, R, B: ≤ ±2K

Filter:
2nd-order analog filter.
Limiting frequency: fg = 10 Hz
Input resistance: >1MΩ

Sensor monitoring:
For break and wrong polarity
(RTD: break compensation line: only
temperature indication of ≤-150°C)
Permissible voltage difference between
inputs: ≤ 4 VACeff.

Interface:
Data format: INT
Value range: 10 x measuring span
Engineering unit: °C, (°F, K selectable
for RM 201)
Decimals: 1
Special feature with TC types S, R, B,
and W with engineering unit °F:
value range = (10 x meas. span – 2000)

**Thermocouple input TC
(RM 224-0)**

*Number of channels: 2;
galvanic isloated*

Sensors: selectable per channel

- Thermocouples: to DIN IEC 584
  Types see RM 224-1

Characteristic: temperature-linear
Conformity error: negligible

Temperature compensation:

internal, can be switched off (not for
KS98+, RM 202, RM 203-x)
Remaining error of CJC: ≤ ±0,15%

Resolution: 16 bits
TC type E, J, K, L, T, N: ≤0,04 K/digit
TC type S, R, B: ≤0,15 K/digit
TC type W: ≤0,09 K/digit

Error:
TC type E, J, K, L, T, N, W: ≤ ±1K
TC type S, R, B: ≤ ±2K

Filter:
2nd-order analog filter.
Limiting frequency: fg = 10 Hz
Input resistance: >1MΩ

Sensor monitoring:
For break and wrong polarity
Permissible voltage difference between
inputs: ≤ 380 VAC / 50Hz, 500 VDC

Interface:
Data format: INT
Value range: 10 x measuring span
Engineering unit: °C, (°F, K selectable for
RM 201)
Decimals: 1
Special feature with TC types S, R, B,
and W with engineering unit °F:
value range =(10 x meas. span – 2000)

**Millivolt-/thermocouple input
(RM 224-2)**
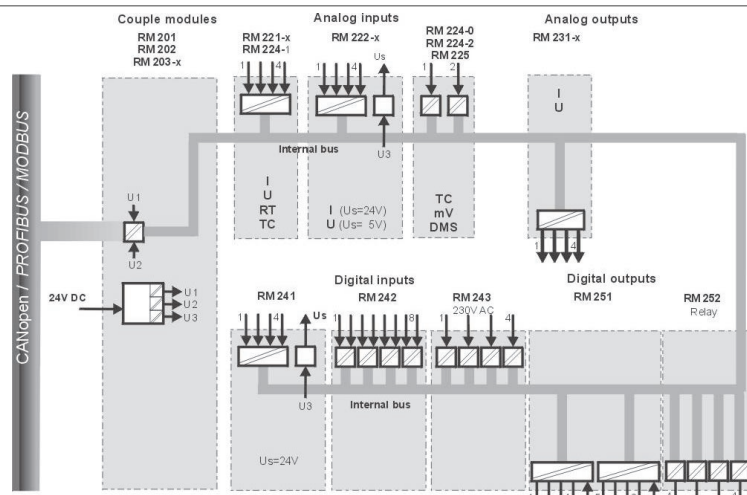
*Number of channels: 2;
galvanic isloated*

Filter:
2nd-order analog filter.
Limiting frequency: fg = 10 Hz

Channel 1: Millivolt input

Range: -3000 … 3000 mV
Input impedance: ca. 200 MΩ diff.

Fig. 4 : Galvanic isolation in the system

Screened type of wires for sensors

Resolution: 16 bits

Characteristic: linear

Error:

With 100 kΩ sensor output resistance:
linearity: ≤ 0.05%
temperature: ≤ 0.05%
with 1 MΩ ensor output resistance:
linearity: ≤ 0.5%
temperature: ≤ 0.4%

Interface:

Data format: INT
Value range: -30,000 … 30,000
Decimals: 1
Unit: mV

Channel 2: Thermocouple input

Properties:

As RM 224-0

**Strain Gage input
(RM 225)**

Direct connection of transducers with
strain gage resistance in Wheatstone
bridges,
6-wire connection.
bridge excitation: integrated

Number of channels: 2

Input measuring range:

-4 mV/V ... +4 mV/V
Sensor types: 1, 2, 3 and 3.3 mV/V

Filter: analog filter: low pass

limiting frequency: fg = 50 Hz

*Input impedance: >10 M*Ω

Resolution: 18 Bit

(optional 16 bit for RM 202, RM 203-x)

Accuracy: better than 0.05 % at 25 °C

Characteristic: linear

Linearity: ≤0.01 %
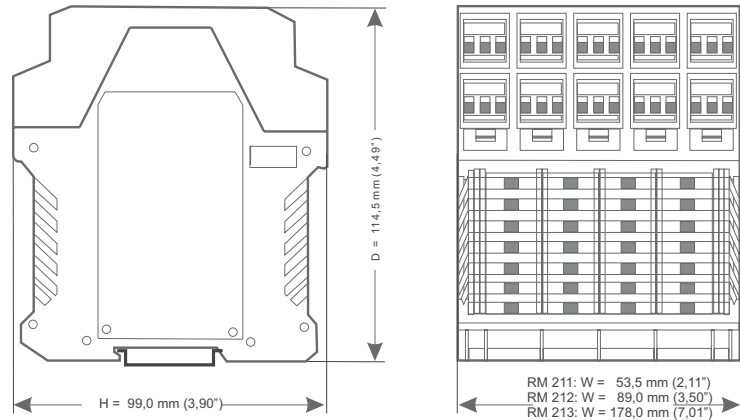
temperature: ≤0.05 % / 10K of span

Configuration:

The functions calibration (zero and span)
and tare are selectable via fieldbus.

Cycle time: 5 Hz.

Fig.5 : RM 200 Mounting Dimensions; basic modules (shown: RM 212)

D = 114,5mm (4,49")

H = 99,0 mm (3,90")

RM 211: W = 53,5 mm (2,11")
RM 212: W = 89,0 mm (3,50")
RM 213: W = 178,0 mm (7,01")

ANALOG OUTPUT MODULES

Standard signals I,U
(RM 231-x)

Number of channels: 4

Signal ranges: selectable per channel
RM 231-0:   4 x 0/4...20 mA or 0...10V
RM 231-1:   4 x 0/4...20 mA or
                    2 x –10...+10V / 2 x 0...10V
RM 231-2:   4 x 0/4...20 mA or
                    4 x –10...+10V
All outputs are short-circuit proof.

Resolution: 12 bits

0/4...20mA: 5,1 / 4,1 µA/digit;
0...10V / -10...10V: 2,5 / 5 mV/digit;

Node guarding

Behaviour at communication failure:
configurable
– Fail safe: output is set to 0V/0mA
– Hold: retain last value

Characteristic: linear

overall error: ≤0,25% (0...10V); ≤0,6%
(-10...10V); ≤0,63% (0...20mA) of
measurement range.

Permissible load:

Current output: ≤ 500 Ω
Voltage output: ≥ 1000 Ω
Load effect: 0,1%/100Ω
Temperature drift: ≤0,01%/10K
Cycle time: ≤50 ms after change of
value; <5 s with constant value

Interface:

Data format: INT
Value ranges for
0...20mA = 0...20.000
4...20mA = 0...16.000
0...10V = 0...10.000
–10...10V = -10.000...10.000
Decimals: 3

Galvanic isolation:

Outputs from logic circuits and internal
supply.
Outputs are galvanically connected.

Indicator LEDs:

4 x 2 x yellow
(indication of selected signal range U or
I)

DIGITAL INPUT MODULES

RM 24X

24 VDC logic (RM 241, RM 242)

RM 241: Number of channels: 4

Input:: Logic signals, contacts or 3-wire
sensors (NPN or PNP transistors);
selectable via DIP-switches

RM 242: Number of channels: 8 inputs

Signal level: according to IEC 61131

„Low": -3...5 VDC
„High": 15...30 VDC

Sensor energization (only RM 241):

Us = 24 VDC ±10%; short-circuit proof
Max. load: I ≤ 25mA / channel
Fused: 200 mA (sum current of all
channels)

Measurement cycle:

≤10 ms for all channels

Operating sense: configurable *(only
RM 201)*

Input resistance: 6,8kΩ

Filter: analog, fg = 1 kHz
Surge voltage protection: fitted

Galvanic isolation:

RM 241: Inputs from logic circuits.
RM 242: In groups of 2 from logic
circuits and internal supply.

Indicator LEDs:

4 x or 8 x yellow (signal status)

230 VAC logic (RM 243)

Number of channels: 4

Signal level:

„Low": 0...50 VAC
„High": 90...250 VAC

Measurement cycle:

≤10 ms for all channels

Operating sense: configurable (only RM 201)

Input resistance: 240 kΩ
Filter: ≤50 ms input delay
Surge voltage protection: fitted

Galvanic isolation

Inputs from logic, between inputs

Indicator LEDs:

4 x yellow (signal status)

DIGITAL OUTPUT MODULES

RM 25X

Node guarding

Behaviour at communication failure configurable:
– Fail safe: outputs 0/1 (selectable)
– Hold: retain last value

24 VDC logic (RM 251)

Number of channels: 8 (2 groups of 4 channels); suitable for switching loads with 12 and 24 VDC.

Control voltage:

Uc = 2 x 24 VDC; separated according to groups.
Permissible range: 8...34 VDC
Forward resistance: ≤400 mΩ
(≤200 mΩ typical); voltage drop ≤1,2V
Leakage current:
approx. 30 μA (non-conducting)
Load current:
Depends on ambient temperature:
At 25°C: ≤1,5A / channel; ≤3A / group
At 50°C: ≤1,0A / channel; ≤2A / group

Lead break and short circuit

detected and made available as a status signal on the bus. Outputs are switched off in pairs (1/2; 3/4;...) or set to default (selectable). Effect to outputs can be switched off.

Protective circuits:

Fitted as standard against short circuit, surge voltage, and wrong polarity; thermal current limiting.

Free-wheel diode for inductive loads:

must be provided externally

Cycle time: ≤10 ms for all channels

Operating sense: configurable (only RM 201)

Galvanic isolation

Logic from output group, groups among each other

Indicator LEDs:

8 x yellow (signal status)
2 x green (external control voltage)

Relays (RM 252)

Number of channels: 4 relays
Contacts: potential-free change-over
Contact rating:
AC: ≤ 1250 W, 250 V, 5A
DC: ≤ 120 W, 120 V, 5A
RC suppressor circuit:
must be provided externally

Cycle time: ≤10 ms for all channels

Operating sense: configurable (only RM 201)

Galvanic isolation:

Relays from logic circuits and internal supply

Indicator LEDs:
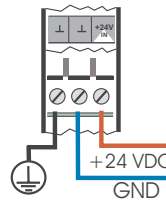
4 x yellow (signal status)

POWER SUPPLY

The basic module is energized via its bus coupler module..
Supply voltage: 24 VDC ±10%
Current consumption: ≤1,5A (basic module RM 213 with all I/O modules fitted)
Influence power supply: negligible
– *The GND of the 24V power supply has to be connected to protective earth (PE).*

+24 VDC
GND

ENVIRONMENTAL CONDITIONS

Permissible temperature:
Operation: 0...50 °C (32...122 °F)
Storage and transport: -20...70 °C (-4...158 °F)
Climatic category:
KUF according to DIN 40 040
Relative humidity: ≤75% yearly average, no condensation
Electromagnetic compatibility:
To DIN EN 50 081, Part 1, and DIN EN 50 082, Part 2
Shock and vibration:
To DIN 40046 IEC 60068-2-6

Electrical connection:

COMBICON plug-in screw terminals for leads of ≤2,5mm²

Mode of protection:

IP20 (basic module with all I/O modules)

Housing:

Material: polyamide PA 6.6
Flammability class: V0 to UL 94

Mounting:

Basic module: on 35 mm „top hat" rails to DIN EN 50 022
I/O modules: into sockets in the basic module, and arrested. Insertion and removal of I/O modules only with power switched off!
Mounting position: vertical
Overall dimensions (W x H x D):
RM 211: 53,5 x 99,0 x 114,5 mm
RM 212: 89,0 x 99,0 x 114,5 mm
RM 213: 178,0 x 99,0 x 114,5 mm
or
RM 211: 2,09 x 3,90 x 4,49 inch
RM 212: 3,50 x 3,90 x 4,49 inch
RM 213: 7,01 x 3,90 x 4,49 inch

Weight:
RM 211: 87 g (3,07 oz.)
RM 212: 127 g (4,48 oz.)
RM 213: 232 g (8,18 oz.)
Other modules: approx. 100 g (3,53 oz.)

ACCESSORIES

Engineering Set ES/RM 200 (description & diskette with EDS and GSD files)

Ordering Data for RM 200 modules

Bus coupler modules

RM 201	bus coupler module CANopen (excl. RM 225)	**9 4 0 7**	**7 3 8**	**2 0 1 0 1**
RM 201-1	bus coupler module CANopen (excl. RM 224-x)	**9 4 0 7**	**7 3 8**	**2 0 1 1 1**
RM 202	bus coupler module PROFIBUS-DP	**9 4 0 7**	**7 3 8**	**2 0 2 0 1**
RM 203-0	bus coupler module MODBUS RTU, RS 485	**9 4 0 7**	**7 3 8**	**2 0 3 0 1**
RM 203-1	bus coupler module MODBUS RTU, RS 232	**9 4 0 7**	**7 3 8**	**2 0 3 1 1**

Basicmodules

RM 211 Basic module 3 sockets	**9 4 0 7**	**7 3 8**	**2 1 1 0 1**
RM 212 Basic module 5 sockets	**9 4 0 7**	**7 3 8**	**2 1 2 0 1**
RM 213 Basic module 10 sockets	**9 4 0 7**	**7 3 8**	**2 1 3 0 1**
RM 214 Dummy panel	**9 4 0 7**	**7 3 8**	**2 1 4 0 1**

Analog Inputs

RM 221-0 Analog inputs 4 x I	**9 4 0 7**	**7 3 8**	**2 2 1 0 1**
RM 221-1 Analog inputs 4 x U	**9 4 0 7**	**7 3 8**	**2 2 1 1 1**
RM 221-2 Analog inputs 2 x I, 2 x U	**9 4 0 7**	**7 3 8**	**2 2 1 2 1**
RM 222-0 Analog inputs 4 x I, supply	**9 4 0 7**	**7 3 8**	**2 2 2 0 1**
RM 222-1 Analog inputs 4 x U/potentiom., supply	**9 4 0 7**	**7 3 8**	**2 2 2 1 1**
RM 222-2 Analog inputs 2 x I, 2 x U/potentiom., supply	**9 4 0 7**	**7 3 8**	**2 2 2 2 1**
RM 224-0 Analog inputs 2 x TC, galvanic isolated	**9 4 0 7**	**7 3 8**	**2 2 4 0 1**
RM 224-1 Analog inputs 4 x TC, Pt100, all types	**9 4 0 7**	**7 3 8**	**2 2 4 1 1**
RM 224-2 Analog inputs 1 x mV, 1 x TC, galvanic isolated	**9 4 0 7**	**7 3 8**	**2 2 4 2 1**
RM 225 Analog inputs 2 x strain gage, galvanic isolated	**9 4 0 7**	**7 3 8**	**2 2 5 0 1**

Analog Outputs

RM 231-0 Analog outputs 4 x I/U (+10V)	**9 4 0 7**	**7 3 8**	**2 3 1 0 1**
RM 231-1 Analog outputs 4 x I / 2 x U(+10V), 2 x U(±10V)	**9 4 0 7**	**7 3 8**	**2 3 1 1 1**
RM 231-2 Analog outputs 4 x I/U (±10V)	**9 4 0 7**	**7 3 8**	**2 3 1 2 1**

Digital Inputs

RM 241 Digital inputs 4 x 24V DC	**9 4 0 7**	**7 3 8**	**2 4 1 0 1**
RM 242 Digital inputs 8 x 24V DC	**9 4 0 7**	**7 3 8**	**2 4 2 0 1**
RM 243 Digital inputs 4 x 230V AC	**9 4 0 7**	**7 3 8**	**2 4 3 0 1**

Digital Outputs

RM 251 Digital outputs 8 x 24V DC/0,5A	**9 4 0 7**	**7 3 8**	**2 5 1 0 1**
RM 252 Digital outputs 4 x Relays, 230V AC, 5A	**9 4 0 7**	**7 3 8**	**2 5 2 0 1**

Accessories

Engineering Sets (not necessary in conjunction with KS98+)

ES/RM 200 D	**9 4 0 7**	**9 9 9**	**1 0 3 1 1**
ES/RM 200 E	**9 4 0 7**	**9 9 9**	**1 0 3 0 1**

Documentation

Datasheet D	**9 4 9 8**	**7 3 7**	**3 7 8 3 3**
Datasheet E	**9 4 9 8**	**7 3 7**	**3 7 8 1 3**