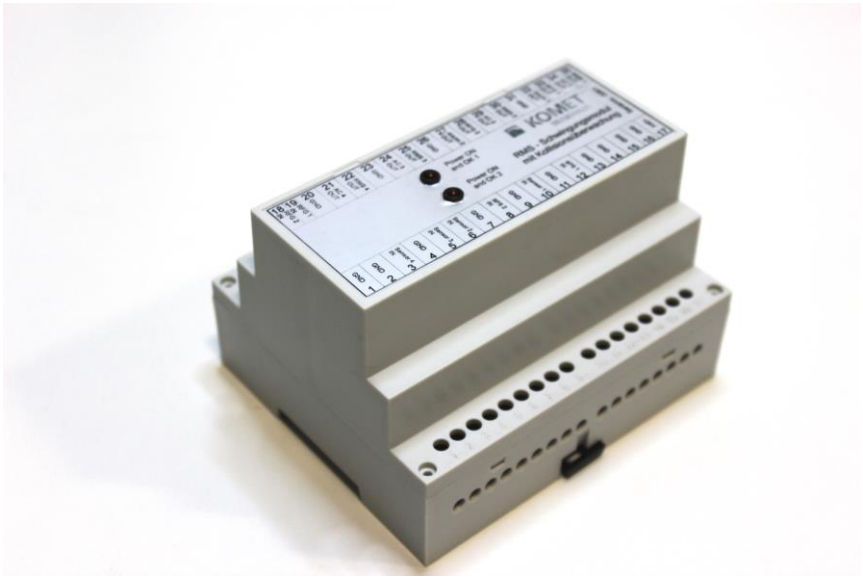
KOMET BRINKHAUS

RMS200 / CD202

TECHNICAL DOCUMENTATION

HARDWARE REVISION 4.2



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1 Product description

This product provides the required operating energy for a vibration sensor and evaluates the signals from the converter. The converter works over multiple channels. The number of channels corresponds to the first number of the device name.

The basic version of the device (RMS200) displays the current acceleration value and the associated RMS signal (RMS: Root mean square, effective value) for each channel, on a separate terminal for each channel.

In addition, a CD202 is able to carry out collision detection.

All devices are pin-compatible. Functions that are not available are not connected in the basic versions. Smooth exchange is possible, without the risk of pins being swapped round.

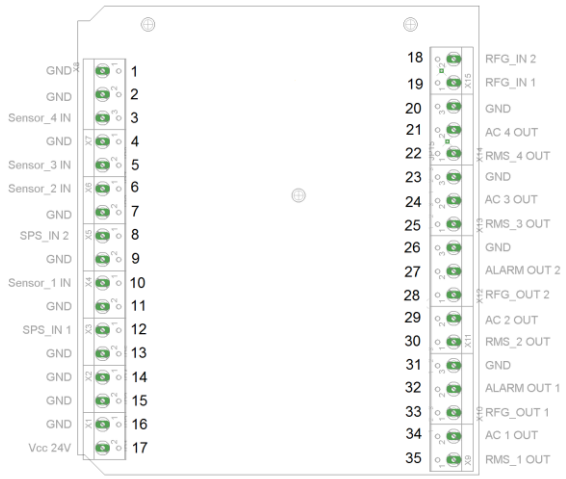
On the CD202, there are two additional outputs on channels 1 and 2. One of the outputs provides a HIGH signal (24 V) by default. The output jumps to LOW (0 V) as soon as a collision is detected. Another output loops through the signal from a third terminal by default. In the event of an alarm, this cable is disconnected by a fast-switching relay.

There are therefore two ways (digital input and disconnecting a safety circuit) in which a collision alarm can be signaled to the machine.

The modules can also be supplied in the RMS400 and CD402 versions. These enable four sensors to be connected. However, the additional channels, 3 and 4, only provide current acceleration value and RMS as outputs. They do not provide collision detection.

The applications of this module include monitoring and documenting vibrations in production plants and production plant emergency shutdown. Similar applications are also possible.

2 Connection assignment



Terminal	Assignment
1	GND
2	GND
3	Sensor_IN 4
4	GND
5	Sensor_IN 3
6	**Sensor_IN 2**
7	GND
8	SPS_IN 2
9	GND
10	**Sensor_IN 1**
11	GND
12	SPS_IN 1
13	GND
14	GND
15	GND
16	GND
17	**Vcc +24 V**

Terminal	Assignment
18	RFG_IN 2
19	RFG_IN 1
20	GND
21	AC_OUT 4
22	RMS_OUT 4
23	GND
24	AC_OUT 3
25	RMS_OUT 3
26	GND
27	ALARM_OUT 2
28	RFG_OUT 2
29	**AC_OUT 2**
30	**RMS_OUT 2**
31	GND
32	ALARM_OUT 1
33	RFG_OUT 1
34	**AC_OUT 1**
35	**RMS_OUT 1**

Terminals marked green provide the basic configuration for all devices (RMSx00, CDx02) in the pin-compatible series.

Terminals marked gray are also connected in the CD202 models.

Terminals marked orange are also connected in the CD402 and RMS400 models.

All GND connections have the same potential.

3 Functional description

3.1 Measurement converter

3.1.1 AC output

This is the input signal (raw signal) from the vibration sensor, which is simply filtered. The permitted range is within the frequency range of approx. 5 – 950 Hz.

The voltage level falls within a range of max. ±10 V here.

3.1.2 RMS output

At the RMS output (root mean square, effective value), the effective value generated by the vibration sensor is calculated and directed to the output as a signal with a peak voltage of 0 – 10 V.

3.2 Collision detection – RFG_OUT_1/2, SPS_IN_1/2, ALARM_OUT_1/2

(CD202/CD402 only)

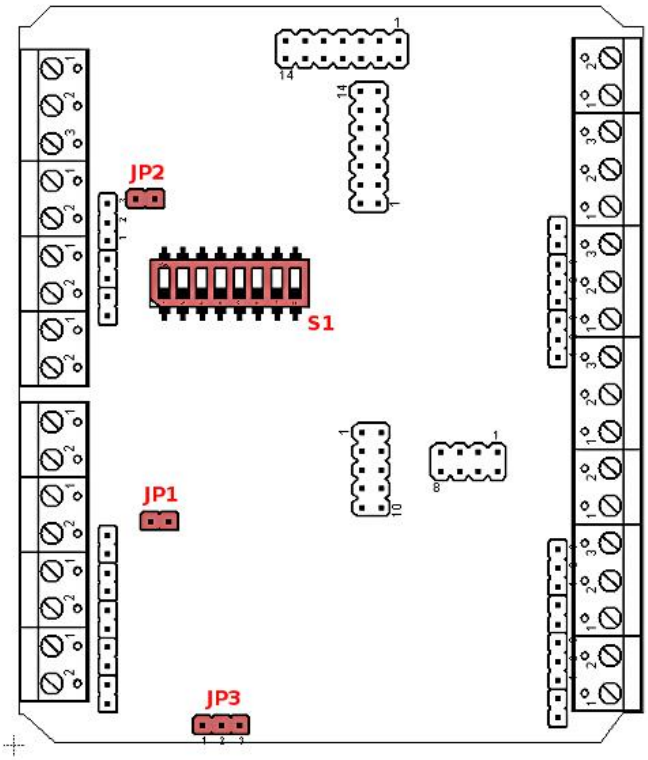
The **RFG_OUT_1/2** output loops through a signal from the **RFG_IN_1/2** terminal by default. In the event of a collision, this cable is disconnected for one second. In parallel with the disconnection of the cable, the **ALARM_OUT_1/2** signal, which is normally active-HIGH (24 V), switches to LOW (0 V) for one second.

In this case, a channel only reports a collision if its activation signal at the **SPS_IN_1/2** terminal is active.

3.2.1 Channel assignment

For the CD202 and CD402 devices, the JP3 jumper is placed in such a way by default that the monitoring channels are evaluated separately.

Channel assignment can be controlled by positioning the **JP3** jumper (on the motherboard):



Jumper position for
evaluating the channels separately

Jumper position for
connecting the channels in parallel

The **JP1** and **JP2** jumpers control which sensor type is connected to each of the channels. **JP1** controls channel 1, and **JP2** controls channel 2. This means:

JP1/2 closed

The sensor is supplied with a constant current of 4 mA. The actual signal is modulated onto the supply voltage by the sensor. The measurement signal is returned to the measurement converter via a high-pass.

(Grob: Default setting for IBIS)

JP1/2 open

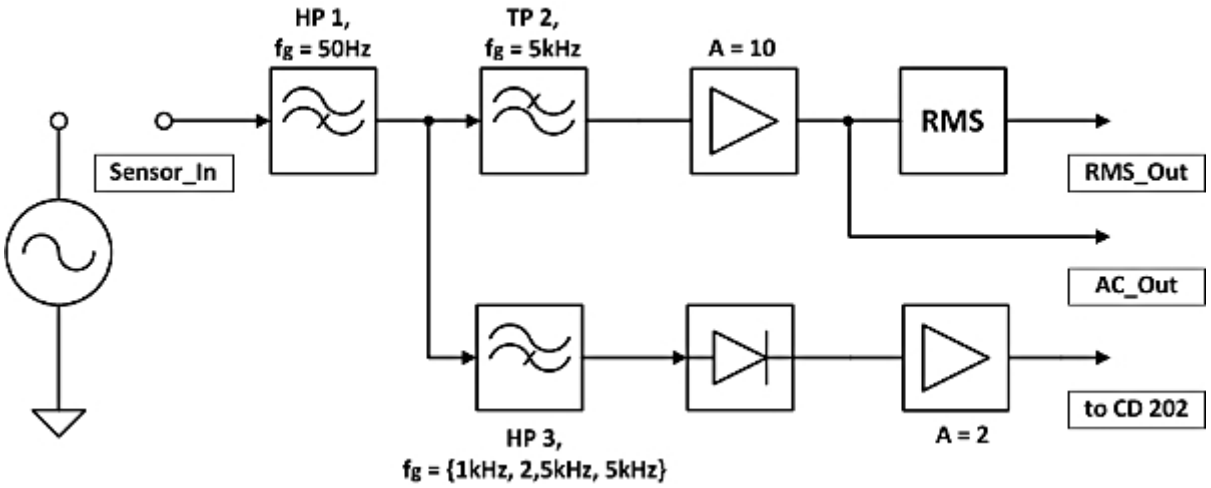
A voltage proportional to the deviation of the sensor is present at the channel input.

(Grob: Default setting for IFM when using a current-to-voltage converter)

By default, **JP1** and **JP2** are open.

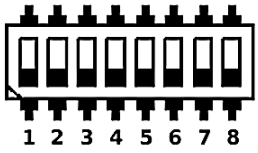
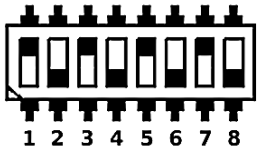
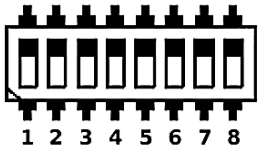
The limit frequency of the downstream HP3 high-pass filter can be set using an 8-pin mini-DIP switch (S1). The output signal of the HP3 high-pass filter functions as a trigger signal for the CD202 collision monitor.

The following graphic shows the signal path for a channel from the RMS200:

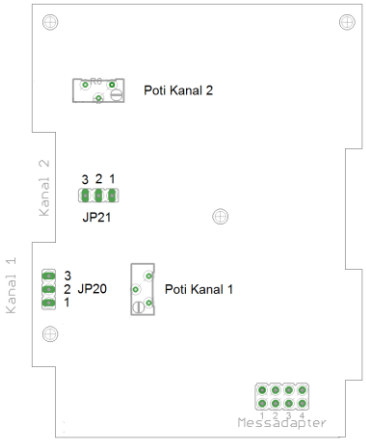


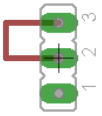
- Signal path and function blocks of the RMS200 -

The assignment of switch positions to their respective limit frequencies is shown in the following table. It should be noted that pins 1-4 are assigned to the first channel and pins 5-8 are assigned to the second channel.

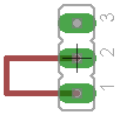
Limit frequencies:	Switch positions
Both channels fg = 5000 Hz	
Both channels fg = 2500 Hz	
Both channels fg = 1000 Hz	

Jumper **JP20/21** (upper circuit board) can be used to select whether **SPS_IN_1/2** signal is active-LOW or active-HIGH. By default, the jumpers are connected in such a way that activation takes place at LOW level.





Jumper position for **LOW**-level activation (default)



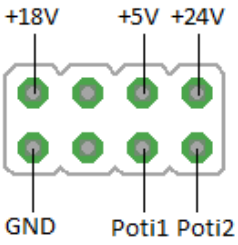
Jumper position for **HIGH**-level activation

Jumpers on the uppermost circuit board

German	English
Poti Kanal 1	Potentiometer for channel 1
Poti Kanal 2	Potentiometer for channel 2
Kanal 1	Channel 1
Kanal 2	Channel 2

The acceleration values at which switching takes place can be set on the circuit board using the 25-coil potentiometers provided (see sketch). Both channels trigger at 4.4 V by default. The acceleration resulting from this trigger threshold depends on the sensor used.

The allocation of potentiometers to channels can be seen on the circuit board. The measuring adapter can be used to set the levels, which requires the housing to be opened.



Allocation of the pin connector for the measuring adapter

A measuring adapter useful for making adjustments and the process for adjusting the thresholds will be described in separate instructions.

4 Remarks regarding rapid machine response

The alarm outputs of the CD202/CD402 can be positioned on an SPS input, which then signals a feed stop via the PLC program in the NC. This is visually appealing and works in principle. This is often a proportionate solution for retrofitting a machine.

However, collision protection, especially for rapid traverse movements, depends on producing necessary motor responses within milliseconds. This cannot yet be guaranteed to the greatest possible extent if deactivation is carried out via the PLC. If possible – for example, because integration is carried out by the machine manufacturer – quicker reaction pathways should be sought. Current Siemens control systems, for example, provide an "AUS3" signal on terminal X122.2. This causes motors to brake immediately by restricting their current limit. Unfortunately, connecting X122.2 to "AUS3" is just one option among many for Siemens systems. However, it is the default setting after the control system has been put into operation.

In general, "braking by restricting the current limit" should be preferred as a response to errors, depending on the capabilities of the converter used. By allowing safety circuits to be disconnected and also allowing outputs to be switched, the CD202/CD402 provides all relevant options for triggering alarm responses of this type, where these exist.

5 Example wiring

Terminal 9: GND, sensor, channel 1

Acceleration sensor, wire 1
(if the sensor guides a ground outwards, the ground is here)

Terminal 10: Sensor_1_IN
Acceleration sensor, wire 2

Terminal 12: SPS_1_IN
+24 V

Terminal 16: 0 V

Terminal 17: +24 V

Terminal 19: RFG_1_IN
Safety circuit which causes emergency stop if disconnected, incoming wire

Terminal 32: Alarm_1_OUT
SPS input

Response to LOW level: Sets a flag which can only be removed if the system is reset or the alarm is acknowledged

When a flag is present:

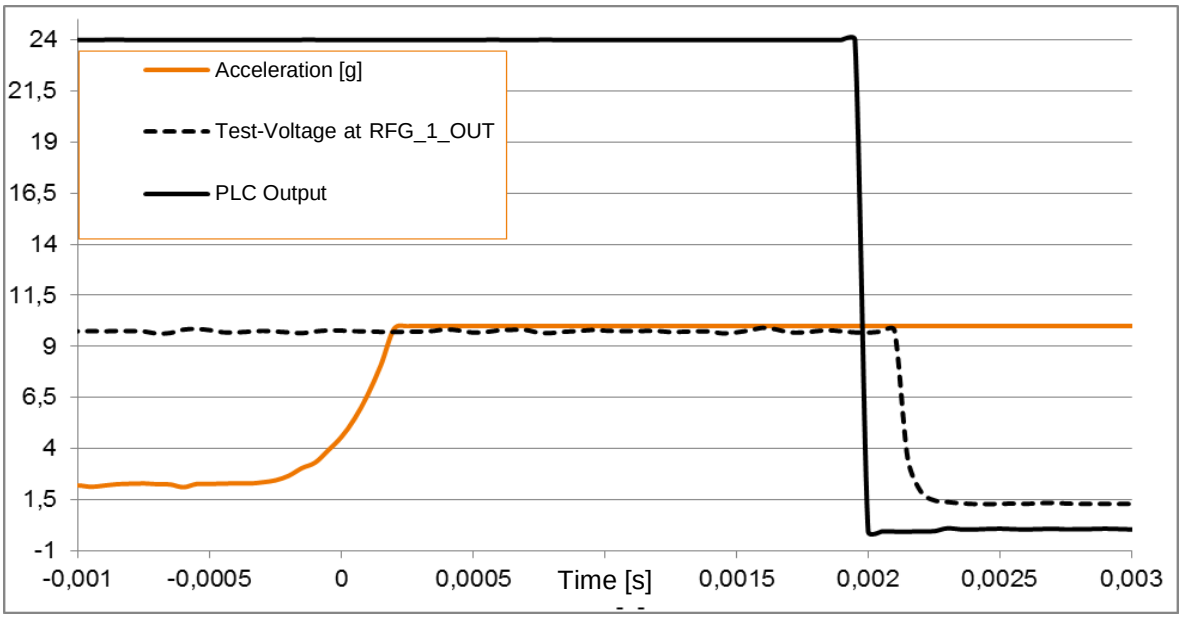
a) Issues a message
" Blocked by collision monitor"
b) Feed lock

Terminal 33: RFG_1_OUT
Safety circuit which causes emergency stop if disconnected, outgoing wire

Terminal 35: RMS_1_OUT
RMS input for an external analysis unit
(e.g. analog ToolScope input)

Jumper 20: Activation of the collision monitor takes place, active-HIGH/active-LOW
Jumper connects positions 2 and 3 (HIGH)

6 Example of collision monitor switching response



7 Technical data

Technical data	Value
Permitted supply voltage:	20 – 36 V DC compared to GND, nominal 24 V DC.
Quiescent current:	Approx. 80 – 90 mA
Max. current consumption:	Approx. 210 mA (4 channels)
Max. power consumption:	Approx. 5 W (4 channels)
Input voltage:	0 – 18 V RMS
Working frequency range:	5 – 950 Hz
Adjustable switching level for alarm:	0 – 18 V DC
Activation of the SPS_ON_1/2 alarm:	+20 – 36 V DC
Alarm duration:	Approx. 1 s
Alarm_OUT_1/2 alarm output No alarm:	24 V DC
Alarm_OUT_1/2 alarm output Alarm signal received:	0 V (for approx. 1 s)
RFG OUT_1/2	Depends on RFG in, nominal 24 V
Maximum current through terminals RFG_IN_1/2	1 A

8 Physical dimensions

Width x depth x height in mm: 105 x 90 x 70

These dimensions refer to housing with a clamping device for mounting on top-hat rails.

The housing is screwed shut on one side with two screws.

To open the housing after removing these screws, lift this side and unclip it from its guide.

To close the housing, follow these steps in reverse order.