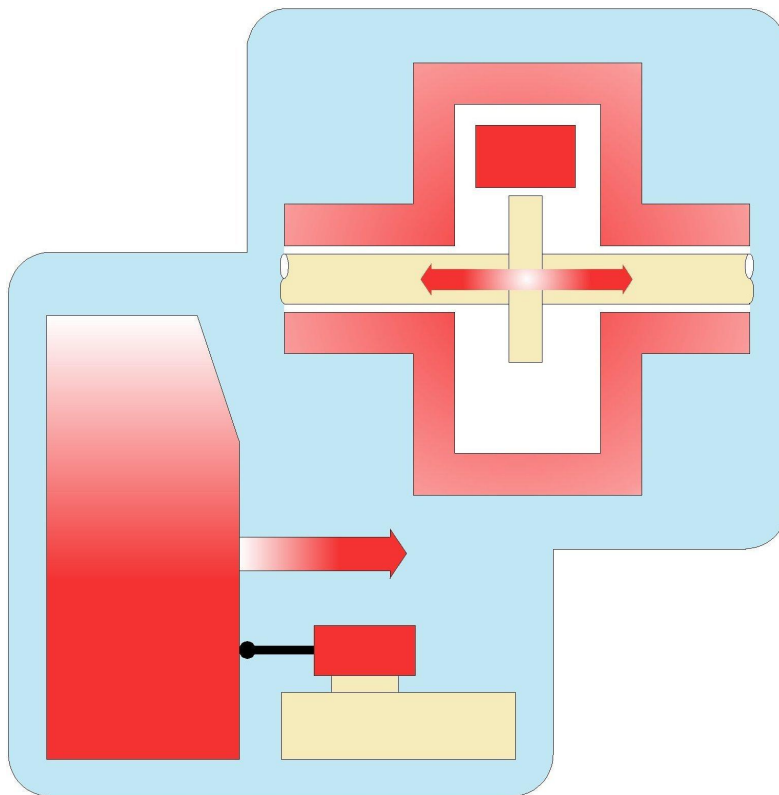


MMS 6418

Absolute-/ Relative Expansion Measuring Amplifier



- Part of the MMS 6000 machine monitoring system
- For connection of inductive displacement sensors PR 9350 to measure absolute expansions, channel 1
- For connection of inductive displacement sensors PR 6418/.. to measure relative expansions, channel 2
- Signal frequency range channel 1 up to 100 Hz / channel 2 up to 10 Hz
- Zero point adjustment and zero shift independently from the chosen measuring range via laptop computer
- Sensor supply balanced to ground to suppress disturbances in industrial environments
- RS 232 interface for configuration and reading out measuring results
- RS 485 interface for connection to the epro MMS 6800 analysis and diagnosis system or to host computers

Applications:

The **MMS 6418** dual channel measuring amplifier measures relative expansions with the help of inductive displacement transducers.

Channel 1: Half bridge circuit or differential transformer. Channel 2: Differential transformer. Each measuring channel may operate separately.

Channel 1 of the **MMS 6418** measuring amplifier permits measurement of static as well as of dynamic quantities such as e.g. displacements,

angles, forces, torsions or any physical quantity, that can be measured with inductive transducers.

Channel 2 is left for measurements of static relative expansions.

Measurements of displacements and relative expansions serve the construction of turbine protection systems. They provide signals for analysis and diagnosis systems to be further processed in field bus

systems and networks. Such cards of the **MMS 6000** family are suitable to build up systems for increasing performance, efficiency and safety of operation and to extend the machines' life times.

Application fields of the **epro** measuring amplifiers are steam, gas and water turbines, compressors, fans, centrifuges and other turbo machinery.

Technical data:

Sensor inputs:

Two independent inputs. Channel 1 half bridge circuit or differential transformer. Channel 2 differential transformer. The signal inputs are differential inputs, galvanically isolated from the system supply, they are open circuit and short circuit proof.

Channel 1 absolute expansion

max. input voltage:

3.6 V

(protected against over voltages)

Nominal input voltage range:

2.5V_{rms}

Input impedance:

200 kOhm

Measuring ranges:

Depending on sensor type

Measuring frequency range:

0....100 Hz -3dB

Channel 2 relative expansion

max. input voltage:

30 V_{rms}

(protected against over voltage)

Nominal input voltage range:

PR 6418/01 15...300 mV_{rms}

PR 6418/02 15...400 mV_{rms}

Input impedance:

approx. 200 kOhm

Measuring ranges:

PR 6418/01 ±10 mm

PR 6418/02 ±20 mm

Measuring frequency range:

0....10 Hz -3dB

Sensor supply channel 1:

The card includes a separate, buffered output to supply inductive sensors (type PR 9350/..).

Carrier frequency:

4.75 kHz

Nominal supply voltage:

4 V_{rms}

Permissible load:

120....600 Ohm

The outputs are balanced to ground, open-circuit and short-circuit proof.

Control inputs:

Logical binary inputs

Sensor supply channel 2:

The card includes a separate, buffered output to supply inductive sensors (type PR 6418/..).

Carrier frequency:

1963 Hz

Nominal supply voltage:

30 V_{rms}

Permissible load:

150 mA; Impedance 200 Ohm

250 mA; Impedance 125 Ohm

The output is balanced to ground, open-circuit and short-circuit proof.

Control inputs:

Logical binary inputs

Optocoupler mode:

„Pre-alarm (ALERT)", open circuit or closed circuit mode

„Main alarm (DANGER)", open circuit or closed circuit mode

Channel disable or module blocking

Limit value multiplier for changing alarm limits during run-up and run-down of the machine. The multiplier is adjustable in the range:

1.000....4.999

24 V logic

Input resistance:

> 10 kOhm

Key pulse input:

1 pulse per revolution for analysis purposes of the system:

24 V logic

Input resistance:

> 30 kOhm

Pulse duration:

min. 10µs (edge-triggered)

Synchronization:

Each channel has an input and an output for the synchronization signal thus permitting both - star and daisy chain configuration.

channel 1

4 V_{rms} : 4750 Hz

channel 2:

3 V_{rms} : 1963 Hz

Measuring modes:

General:

Each channel has to be configured individually via the available interface. The configuration may be changed any time during operation.

Measuring modes for the dual channel mode:

Channel 1:

Measurement of absolute expansions with inductive sensors of type PR 9350/.

Channel 2

Measurement of relative expansions with inductive sensors of type PR 6418/ /.

Programmable measuring parameters:

- | | | |
|--------------------------|-------------------------------|---|
| - Measuring range | - Warning and alarm limits | - Channel identification by means of KKS numbers or freely selectable designations. |
| - Measuring unit | - Shifting of measuring range | |
| - Transducer sensitivity | - Hysteresis | |

Limit supervision:

For channel 1 (absolute expansion) there are 4 alarm limits, adjustable independently from each other (±VA and ±HA). Each of the pre alarms (Alert) and main alarms (Danger) are controlling one optocoupler output.

For channel 2 (relative expansion) there are 4 alarm limits, to be adjusted independently from each other (±VA and ±HA). Each alarm operates on an individual optocoupler output. Supervision of the limit values may be disabled with an external digital signal or via the Channel-Clear function in case of a module error.

The alarms are output via potential-free optocoupler outputs at the 48-pole connecting strip at the rear of the card.

Having loaded a new parameter configuration to the module, the alarm outputs remain blocked for a delay time of 15 sec.

Adjustment range limit values:

5....100% of f.s.d.

Resolution and reproducibility:

1‰ of f.s.d.

Delay time:

0-1-2-3-4-5-6 sec. adjustable

Switching characteristics:

rising signal level

Switching hysteresis channel 1:

configurable
(only at falling signal levels)

Switching hysteresis channel 2:

configurable
(negative alarm at increasing signal level, positive alarm at falling signal level)

Outputs:

via potential-free optocoupler outputs at the rear connector

U_{max} = 48 V dc

I_{max} = 100 mA

Module and sensor supervision:

The internal module supervision comprises the following functions:

- Transducer signal within a predefined good range
- Wiring between sensor and module (interruption, short-circuit of sensor supply)
- System supply voltage within predefined limits
- Configuration and parameter setting OK
- Measuring values within measuring range

- Operating temperature of the module
 - System watchdog
- During the change from the error to the ok-state and after power-on of the module, all functions of the module are blocked for a delay time of 15s (alarm enable after a delay time of 60s).
A green LED on the module front indicates the "Channel clear" state. During an error state, this LED is switched off, during the delay period it flashes.

The states for both channels are output to the connecting strip at the rear via optocouplers for the purpose of galvanical isolation.

$$\begin{aligned} U_{\max} &= 48 \text{ V DC} \\ I_{\max} &= 100 \text{ mA} \end{aligned}$$

Reasons for module disturbances can be read out in detail via the communication interface. This permits technicians to remove the reason for the fault immediately.

Signal outputs at the connecting strip:

Connecting strip:

according to type F48M, DIN41612 communication interface RS485
One current output per channel, proportional to the chosen variable and measuring range

Nominal range:

0/4...20 mA
open circuit and short-circuit proof

Permissible burden:

≤ 500 Ohm

Resolution:

16 bit

Accuracy:

±1% of the measuring range
One voltage output per channel, proportional to chosen variable and measuring range.

Nominal range:

0...+10 V
open circuit and short-circuit proof

Load resistance:

≥10 kOhm

Resolution:

9 bit

Accuracy:

±1% of the measuring range
One voltage output per channel, proportional to the sensor signal.

Channel 1 absolute expansion frequency range:

0 Hz...200 Hz (± 20% - 3 dB)

Channel 2 relative expansion frequency range:

0 Hz...10 Hz

Operating elements at the module front:

Two sensor signal outputs, independently from each other, one for each channel:

Range:
PR 6418/01 15...300 mV_{eff}
PR 6418/02 15...400 mV_{eff}
Load resistance: ≥100 kOhm
Internal resistance: 1 kOhm

2 for channel 2
positive pre-alarm (ALERT) and main alarm (DANGER)
negative pre-alarm (ALERT and main alarm (DANGER)

Channel 1 absolute expansion

Measuring signal proportional to sensor signal, to be tapped at SMB socket.

Range: ±12 V
Load resistance: ≥100 kOhm
Internal resistance: 1 kOhm

2 green LED's:

indicate "Channel Clear" separately for channel 1 and 2.

1 Mini DIN diode socket:

RS232 interface for connection of a computer for configuration and data interchange with the module.

Channel 2 relative expansion

Measuring signal proportional to sensor signal, to be tapped at SMB socket.

4 red LED's:

2 for channel 1
positive pre-alarm (ALERT) and main alarm (DANGER)
negative pre-alarm (ALERT and main alarm (DANGER)

Handle:

To pull out and insert the module and for labelling purposes.

Power supply:

Redundant supply input via two supply inputs, decoupled via diodes. At least one supply input is required for the supply of the module.

Supply voltage:

18...24...31.2 V DC
according to IEC 654-2,
class DC4

Power consumption:

max. 20 W (max. 840 mA at 24 V)
Switch on-peak:
(with connected transducer PR 6418)
app. 3 A, 10 ms

Other supply voltages can be realized with additional system power supplies.

System design:

At stand-alone operation, unlimited number of modules.

Max. 31 modules / 62 channels may be operated at one RS 485 bus.

If more modules / channels are necessary, e.g. with an MMS 6815, another RS 485 bus must be installed.

Environmental conditions:

Protection class:

Module: IP 00 according to DIN 40050
Front plate: IP21 according to DIN40050

Climate conditions:

according to DIN 40040 class KTF
operating temperature range:
0...+65°C

Temperature range for storage and transport:

-30...+85°C

Permissible relative humidity:

5...95%, non condensing

Permissible vibration:

according to IEC 68-2, part 6

Vibration amplitude:

0.15 mm in range 10...55 Hz

Vibration acceleration:

16.6 m/s² in range 55...150 Hz

Permissible shock:

according to IEC 68-2, part 29
peak value of acceleration:

98 m/s²

nominal shock duration:

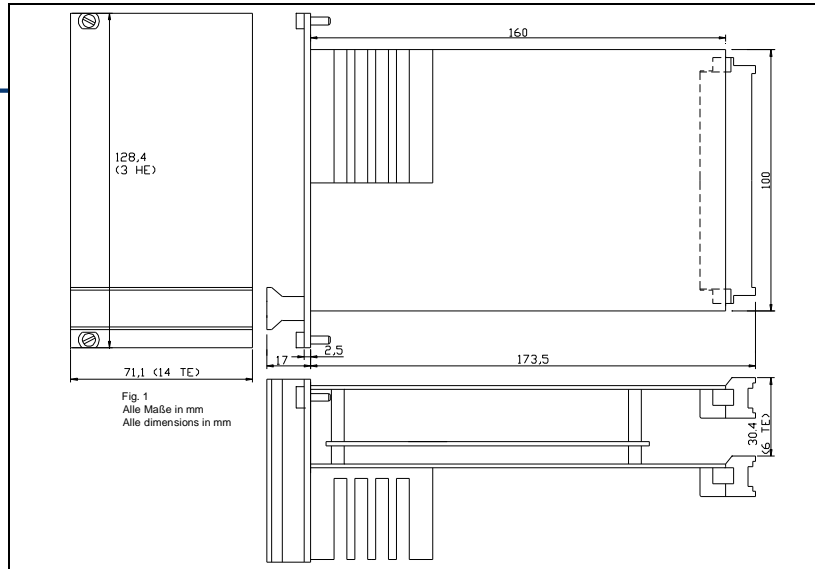
16 ms

EMC resistance:

according to EN50081-1 / EN50082-2

Mechanical dimensions:

PCB/EURO card format acc. to DIN 41494 (100 x 160 mm)
 Width: 71,1 mm (14 TE)
 Height: 128,4 mm (3 HE)
 Length: 160,0 mm
 Net weight: app. 740 g
 Gross weight: app. 890 g
 incl. standard export packing
 Packing volume: app. 4,5 dm³
 Space requirements:
 6 modules (12 channels) fit into each 19" rack



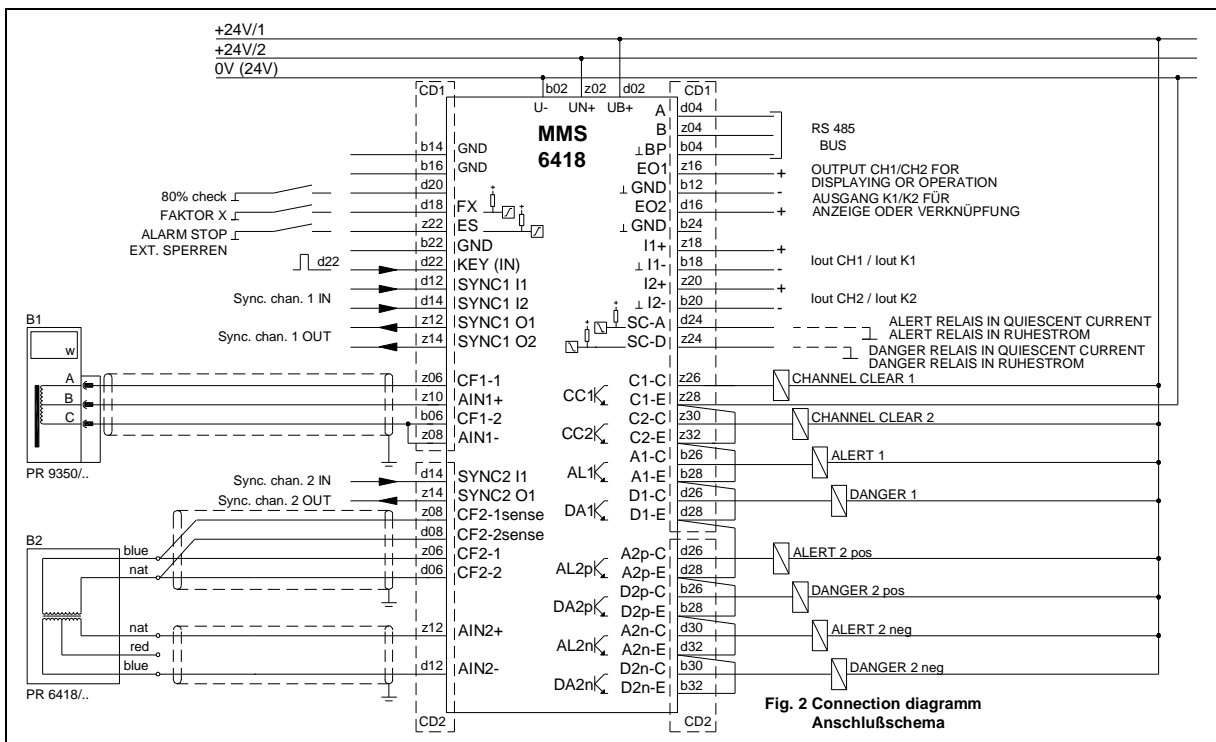
Requirements on configuration PC:

Configuration of modules is made via the RS 232 interface on the module front or via the RS 485 bus by means of a computer (laptop) with the following minimum specifications:

Processor:
 486 DX, 33 MHz
Interfaces:
 one free RS 232 interface (COM 1 or COM 2) with FIFO type 156550 UART

Capacity of fixed disk:
 min. 5 MB
Required working memory:
 min. 620 KB
Operating system:
 MS DOS Version 6.22 or higher or WIN@ 95/98 or NT 4.0

Connection diagram:



Order number:

MMS 6418 Measuring amplifier for inductive sensors, absolute / relative expansion..... **9100-00050**

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