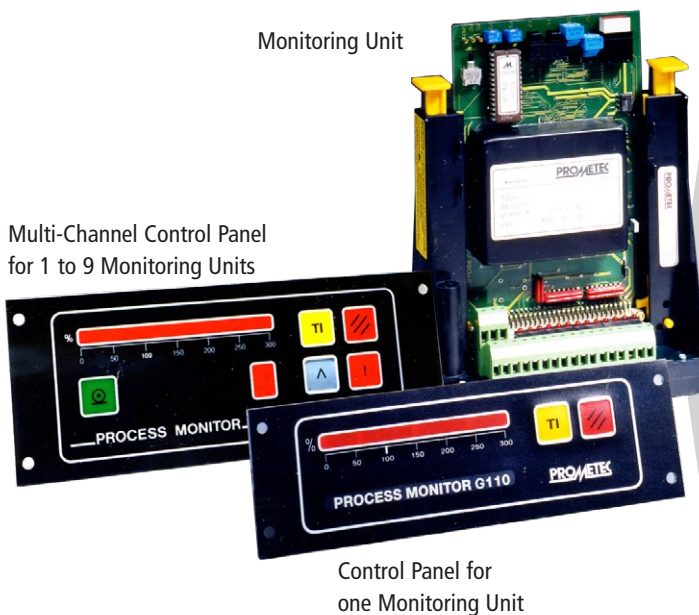


PROCESS MONITOR G90, G 100, G 110

*For NC grinding machines, grinding or dressing
Fast collision and spark-in detection (gap control)
monitoring process degenerations and dressing processes*



- **Machine operator assistance** to enhance **process reliability**
- **Damage minimization** on NC grinding machines, grinding wheels and dressing tools through ultra-fast collision detection (< 5 ms)
- **Reduced reject rates and production cost**
- **Improved quality** through reliable grinding and dressing process control
- **Reduced cycle time** and hence piece costs through the use of contact detection (response time < 5 ms) to shorten air grinding or air-dressing time, with increased machine availability
- Detection of abnormal process states
- Detection of incorrect dressing strokes, minimizing number of strokes required, non-productive times and grinding-wheel costs
- Identification of rejects by subsequent detection of grinding wheel score marks (signal drop)
- **Air-cut detection** for grinding and dressing
- Use with conventional and CBN wheels

System Characteristics

The PROCESS MONITOR G 90, G 100 and G 110 are single-channel systems for monitoring NC grinding machines during the grinding or dressing processes.

A number of units are used in parallel for systems with multiple grinding stations. A multichannel control panel for 1 to 9 monitoring units is available for this purpose.

However, you can also use the units without a control panel. In this configuration, there is no analog measuring signal display and the key functions (Teach-In, Reset) are controlled via the PLC. The control panel can also be used as a display.

Signal value monitoring for the sensor signal is via a number of static thresholds (see table on reverse side) related to the maximum signal level (100 %) for anormal monitoring cycle. This signal level is determined automatically on the first workpiece of each batch and standardized at 100 %; the corresponding signal gain factor for each monitoring cycle is then saved.

In a further teach-in procedure, the work value beneath the signal level curve is determined on the second workpiece and set at 100 %. Two additional static thresholds (LIMIT A and B) monitor the work value for impermissible deviations in either direction.

The teach-in function can also be inactivated, allowing the use of fixed gain factors.

The thresholds LIMIT 1 to 4 react to signal level violations after adjustable response times. Suitable default values are set for thresholds and response times. You can alter these within relevant ranges on the monitoring unit itself.

In order to avoid false alarms due to relatively loud machine noises, for example during fast traverses, all thresholds on the PROCESS MONITOR G 100 and G 110, with the exception of the collision threshold, can be inactivated. Collision monitoring continues via a special signal amplifier for the rapid traverse mode.

On PROCESS MONITOR G 110, you can also select a second sensor for rapid traverse monitoring automatically.

The table on the reverse side shows the range of monitoring functions available with the PROCESS MONITOR G 90, G 100, or G 110. Please note that the PROCESS MONITOR G 90 and G 100 have data storage for a single monitoring cycle, while the PROCESS MONITOR G 110 can store two monitoring cycles for two different machining cycles within a parts program. Apart from collision detection, which is always activated, 2 or 3 functions can be selected from the available range and signal outputs assigned by adjusting the monitoring unit.

Suitable sensors

The acoustic emission (AE) sensor is fitted with a single screw (M6) at a suitable point on the grinding machine recommended or determined by PROMETEC. It is extremely robust and is coolant- and oil-proof, as is the preamplifier (IP 68, Lx Wx H= 98 x 64 x 34 mm), which can also be mounted in the machine environment. The AE signal is detected up to frequencies through 100 kHz and conditioned in the preamplifier filter circuits to obtain an optimum signal-to-noise ratio. In rare cases, residual noise may need to be compensated during air-grinding by means of a plug-in board (option) in the preamplifier unit.

The monitoring units can also be coupled with an effective power sensor (longer response time of >30 ms) and appropriate zeroing.

The PROCESS MONITOR G 110 has 2 signal inputs for acoustic emission and active power sensors respectively. Toggling between the two is either monitoring-cycle-dependent, PLC-controlled or triggered by the PLC "rapid traverse" signal.

Technical Data

Printed-circuit board in Euroboard standard size PC format, easy fitting via two securing screws or on 35 mm top hat rail in switch cabinet

Dimensions (holder + board)
W x H x D = 63x139x195 mm

Simple minimized interface to PLC:

4 voltage-free outputs (optocouplers) for signal functions (I_{max} = 45 mA)

3 additional fast-acting break contacts for LIMIT 0 and 1-1 (I_{max} = 100 mA, U_{max} = 50 V)

Control panel very small, easily understood and operated with high operational and handling reliability, featuring analog threshold and signal displays with reset and teach-in keys

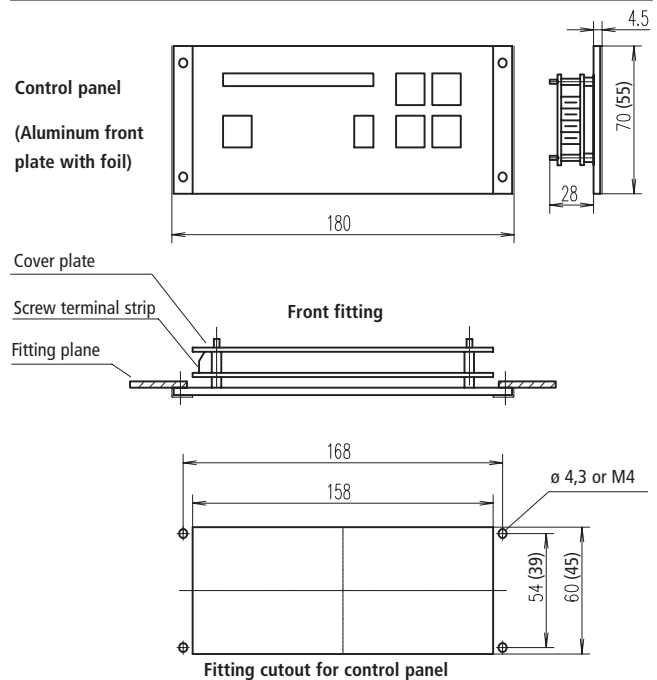
Dimensions W x H x D = 178x55x30 mm, Multi-channel control panel 178x70x30 mm

Supply voltage Monitoring unit 24 V= (±20%, max. 0.5 A)
Control panel 24 V= (±20%, max. 0.1 A)

Part numbers
G 110: **0.91.174.A03**
G 110 Control panel: **0.55.224.G110**
G 100: **0.91.175.A03**
G 100 Control panel: **0.55.225.G100**
G 90: **0.91.177.A03**
G 90 Control panel: **0.55.227.G90**
Board holder for x 90-110: **0.89.361.A01**
optional:
G 110 as sub-unit: **0.91.164.A03SUB**
G 100 as sub-unit: **0.91.165.A03SUB**
G 90 as sub-unit: **0.91.167.A03SUB**
Multichannel control panel: **0.55.231.H100**

Function table

Monitoring functions	G 110	G 100	G 90
Number of monitoring cycles	2	1	1
Collision detection during rapid traverse via special threshold, LIMIT 0	•	•	
Collision detection via fixed threshold at 300%, LIMIT 1-1	•	•	•
Collision detection with adjustable threshold 100-300%, LIMIT 1-2	•		
Process degeneration via adjustable threshold >100 % and response time 5 ms – 1 s, LIMIT 2-1	•	•	•
Process degeneration (dressing process monitoring) adjustable threshold <100 % and response time 5 ms–1s, LIMIT 2-2	•	•	•
Contact detection via adjustable threshold <100 %, LIMIT 4-1	•	•	•
Air cut detection via adjustable threshold <100 %, LIMIT 4-2	•	•	•
Process degeneration via work value with adjustable threshold >100 %, LIMIT A	•	•	•
Process degeneration via work value with adjustable threshold >100 %, LIMIT B	•	•	•
Optional switching to second signal input	•		



All measurements in Millimeters. Please note that dimensions in brackets refer to the single channel version and that drawing for this is not to scale.