GEM**CPU**

GENIOR MODULAR TOOL AND PROCESS MONITORING SYSTEM

Illustration similar

**Model variants:**
GEM**CPU**DP/F for connection to Profibus and Fanuc/Focas (left) and GEM**CPU**PN for connection to Profinet (right), further model variants available (see below)

Modular System

GENIOR MODULAR is an autonomous, intelligent monitoring system with a modular structure. The different fieldbus interfaces of the GENIOR MODULAR system guarantee monitoring solutions for different machine designs. GEM**CPU** monitoring modules are available for Profibus (including FANUC/Focas) and Profinet connection, as well as in the EtherNet/IP version and for the Siemens 828D controller. The system collects measurement data digitally via the fieldbus interface or, together with appropriate measuring transducer modules, for special monitoring tasks, also via external sensors.

Fig. below: Mounting a GEM**CPU**DP/F monitoring module with four external software modules (plug-ins) on a standard mounting rail.
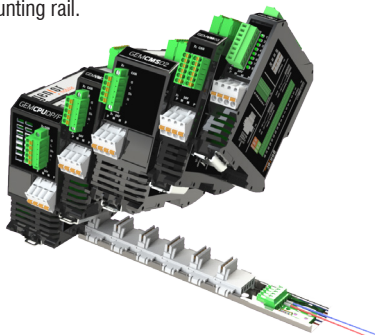
Properties

- Monitoring system for machines and systems
- Breakage monitoring, detection of missing tools, tool wear evaluation and Adaptive Control (AC)
- Different interface variants: Profibus, Profinet, parallel wiring, FANUC/Focas, EtherNet/IP
- Different monitoring strategies: e.g. automatic limits, dx/dt, gear hobbing
- Monitoring of:
  ... up tp 10 channels (GEM**CPU**DP/F, GEM**CPU**PN, GEM**CPU**IP)
  ... up to 2 channels (GEM**CPU**S828)
- Signal sampling rate configurable between 2 - 20 ms
- Sensorless monitoring: up to 16 digital CNC signals
- Monitoring with additional (arbitrary) sensors: connection of up to 8 additional software modules per GEM**CPU** module
- Automatic adaptation of the limits to the measurement signal without operator intervention
- Expert Mode: individual adjustments possible manually
- Connection to the data management system C-THRU 4.0: cyclic transfer of machining data for further evaluations
- Plug-ins: Software modules for data evaluation in the production environment
- MultiView: up to 8 modules can be displayed in one visualization

GENIOR MODULAR MONITORING MODULE

ARTICLE NUMBERS

O830Z510004	GEM**CPU**DP/F for Profibus / Focas
O830Z510006	GEM**CPU**PN for Profinet
O830Z510007	GEM**CPU**S828 for Siemens S828
O830Z510008	GEM**CPU**IP for EtherNet/IP

TECHNICAL DATA

DIMENSIONS	see drawing
STANDARD IP ADDRESS	192.168.214.60
WEIGHT	243 g
MATERIAL	Polyamide PA 6.6
STORAGE TEMPERATURE	-20 °C ... +60 °C
OPERATING TEMPERATURE	0 °C ... +55 °C
UL-CLASSIFICATION	VO (UL94)
DEGREE OF PROTECTION	IP30
ATMOSPH. REL. HUMIDITY	5 – 85%, no condensation
INSTALLATION	DIN EN 60715 standard mounting rail
CONTACTING	Spring terminals, in-rail bus connector
SUPPLY VOLTAGE	24 V DC (± 20 %)
NOM. CURRENT CONSUMPTION	max. 500 mA
PROCESSOR	Quad core 800 MHz
HARD DISK	2 GB MSATA SLC Fail safe

CONNECTIONS

CONNECTIONS	DP/F	PN	S828	EtherNet/IP
WIRE CROSS SECTION	0.2...1.5 mm^2			
10/100 BASE T ETHERNET	√	√	√	√
PROFIBUS UP TO 12 MBITS/S	√	–	–	–
FANUC/FOCAS	√	–	–	–
PROFINET	–	√	√	
ETHERNET/IP	–	–	–	√
USB HOST	√	√	√	√
CAN	√	√	√	√

LICENSE KEYS please order separately

OCMZ5100004	Activation of sensorless torque monitoring
OCMZ5100005	Activation of a further monitoring channel
OCMZ5100003	Activation of AC control
OCMZ5100002	Activation of wear monitoring
OCMZ5100007	Activation of the data importer
OCMZ5100008	Activation of the monitoring strategy gear hobbing

Product matrix

Software tools and various software modules for data evaluation (plug-ins) complete the GENIOR MODULAR product matrix. The modularity of the system allows easy extension and integration of these external software modules into the MultiView visualization and into process monitoring with GENIOR MODULAR.

For example, intelligent modules that monitor and display the status of machines and components provide a reliable database for preventive maintenance or help to avoid production downtimes and machine stoppages by effectively detecting collisions and stopping the travel axes quickly.

Event memories allow the logged shut-down events to be traced. The stored data may be taken over into SQL databases and be transformed there with the help of various evaluation systems into usable information. This information helps to draw conclusions about future developments and serves as a basis for future decisions.

SOFTWARE MODULES please order separately

|		
O830Z710308	GEM**FM**01	Force, strain and coolant flow, ±10 V, 4...20 mA
O830Z910301	GEM**TP**01	True power
O830Z910304	GEM**TP**	True power
O830Z711101	GEM**AM**01	Acoustic emission
O830B2300004	GEM**CMS**	Machine protection and detection of collisions
O830Z710102	GEM**VM**01	Vibration and acceleration
O830Z910101	GEM**AMS**	Machine protection and temperature monitoring
O830ZA00101	GEM**VM**	Machine monitoring, vibration and temperature
O830Z910302	GEM**TF**01	Torque and axial force
O830Z910303	GEM**IO**01	Input-/output converter
O830Z915002	GEM**GP**	Universal monitoring module
O830ZA00501	GEM**DS**	Spindle growth
O830ZA05000	GEM**WR**	Monitoring module for the 2.4 GHz WRS radio system
Conformity	CE, UKCA	

GENIOR MODULAR MONITORING MODULE

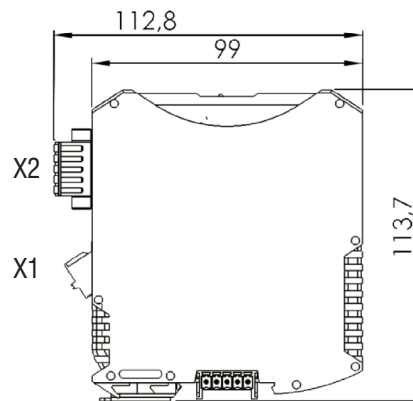**GEMCPUDP/F**

GEMCPUPN / GEMCPUIP / GEMCPUS828

GEMCPUDP/F / GEMCPUPN / GEMCPUIP / GEMCPUS828
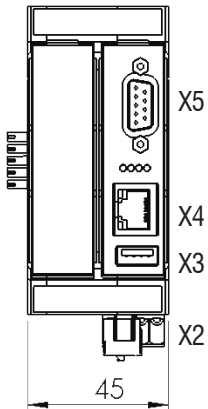
Front view
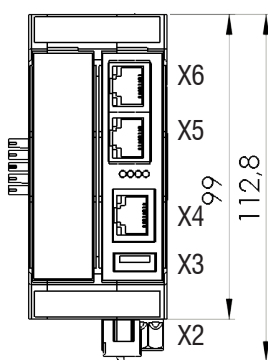
Front view

View from the right side

Software tools

Collected data on monitored machining processes and machine status can be converted into intelligent data (information) using various software tools, which can be stored locally or on network devices for further evaluation such as analyses, trend curve statistics or reports.

GEMBOARD

GEMBOARD is a display tool that provides a remote overview of the status (e.g. alarms) of all GEM**CPU** monitoring modules in the production environment during operation and also allows the adjustment of module settings.

Fingerprint

Fingerprint uses defined signals to monitor machine components. If defined limit values are violated, the software generates an alarm and thus enables timely intervention by service personnel. In addition to real-time monitoring, Fingerprint also creates a database for predictive maintenance.

GEM DataManager

GEM DataManager is a software tool that cyclically transfers raw data from active GEMCPU monitoring modules to a server or PC for further use.

CTHRU4.0

This database management system for ARTIS tool, process and machine condition monitoring permits detailed and traceable monitoring of each individual machining step. The **C-THRU** Report Generator with its individually combinable filter options is used for this purpose. It allows evaluation of the machining processes, provides information on processes and thus makes extensive fault diagnosis possible. Consistent process monitoring and continuous documentation with **C-THRU**4.0 help to optimize the use of resources.

C-Analyse

The web-based information system **C-Analyse** is used to select the stored C-THRU4.0-SQL data. It visualizes states, filters data and allows to link them arbitrarily. The report function is used to create user-specific reports for specific time periods (daily, weekly, etc.).

GENIOR MODULAR MONITORING MODULE

Expert Mode

The GENIOR MODULAR tool and process monitoring system operates mainly automatically, as the limits adapt themselves automatically to the signals.

Special operating conditions sometimes make it necessary to intervene in the automatic monitoring and to adapt certain parameters selectively to the conditions. This is possible with the GENIOR MODULAR Expert Mode.

This can be used for instance to:

- influence limits
- select/deselect monitoring methods
- hide signal parts
- determine process types (short vs. long process)
- adapt the feed rate to different machining stages (Adpative Control)
- individually adapt the basic settings provided in the delivery state
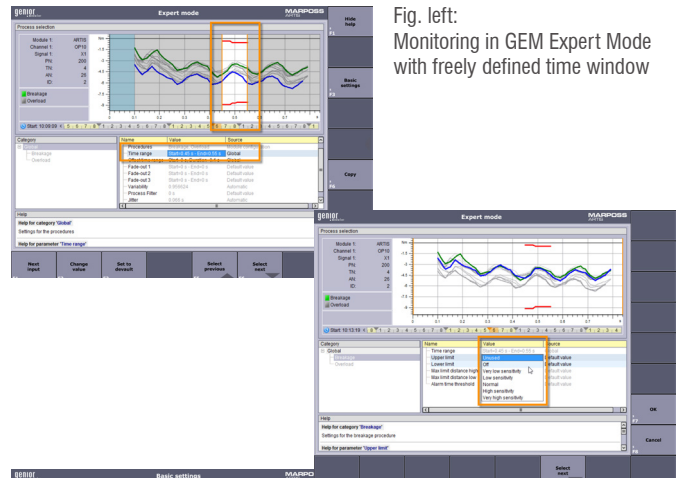
Fig. left:
Monitoring in GEM Expert Mode with freely defined time window
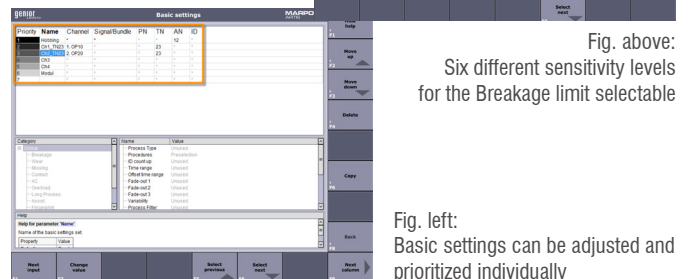
Fig. above:
Six different sensitivity levels for the Breakage limit selectable

Fig. left:
Basic settings can be adjusted and prioritized individually

Fig. right:
Monitoring with static limits
① Learning
② Signal increase
⑤, ⑧ Breakage
④, ⑦ Wear
③, ⑥ Missing

Fig. left:
Monitoring with dynamic limits
① Learning
② upper spike limit
③ lower spike limit
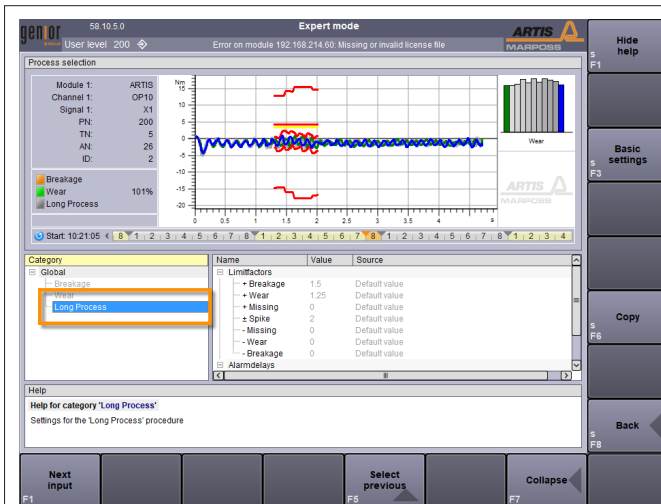
Fig. above: Machining processes with a process duration > 3 minutes can be monitored by the monitoring method **Long Process**.