

# Data sheet

# CTM V4

## Product description

The CTM V4 version contains a special monitoring strategy that is less complex to adapt thanks to new self-learning corrections in the event of process fluctuations (SAS)

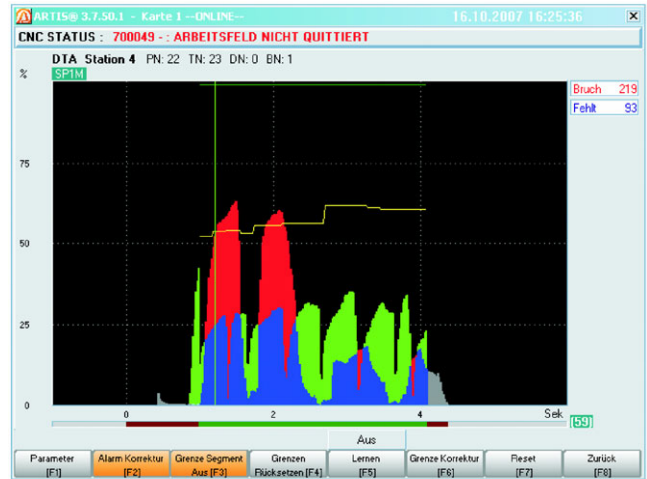
## New key functions

(Visualisation window)

1. **Reset limits,**  
to reset limits to their original values
2. **Learn,**  
to relearn signal pattern for selected process numbers

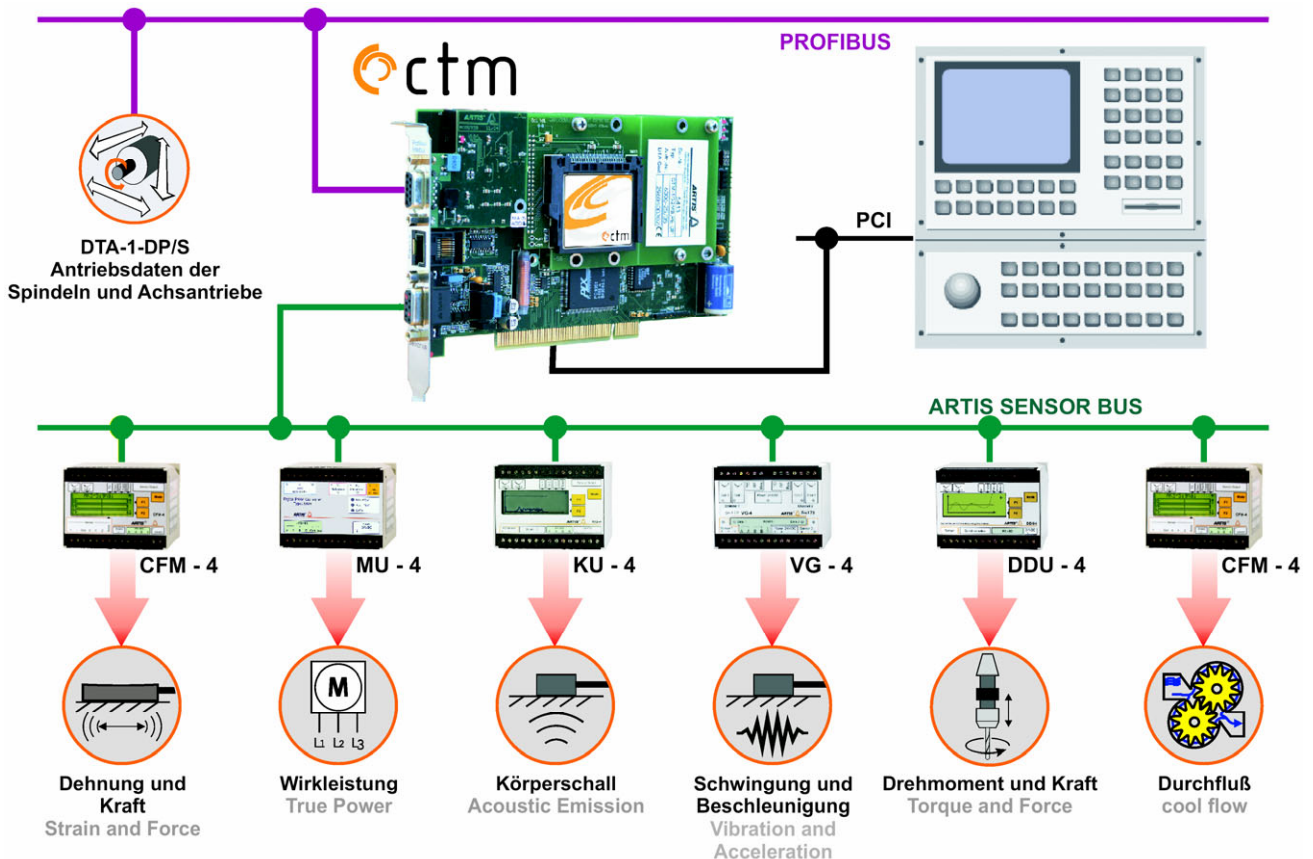
## Alarm signal

3. **Alarm correction**  
to adjust alarm
4. **Limit segment off**  
to switch off monitoring for this segment
5. **Limit correction.**  
to recalculate segment limits
6. **Reset,**  
to delete alarm signal



- 3 4 1 2 5 6

## CTM system with optional sensors



## Data sheet CTM V4

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### New or extended functions (to be activated optionally)

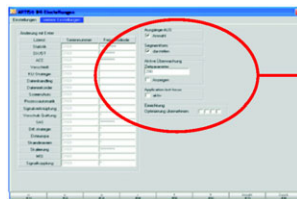
- Recording process data on the hard disk
- Extended DX/DT strategy for monitoring individual machining processes
- Extended AC strategy - adaptive process control for constant tool strain and shortening cycle times
- New strategy for evaluating structure-borne noise by means of additional limits to be activated, multiple learning
- Screenshot function for the specific recording of visualisations
- Process automation for adapting dynamic limits
- Signal combination: imminent alarm reset
- Data handling: copying function for learning cutting data
- Activation of the "wear" function
- Statistics with automatic function

### System requirements

- PC with sufficient free PCI slots for the requisite CTM V4 cards.
- Computing power > 266MHz, RAM > 64 MB
- Windows 95/ 98/ 2000/ NT/ ME/ XP operating system
- Free memory on hard disk > 10 MB, with statistics program > 50 MB

The system requirements for the use of the CTM V4 card are described in detail in the CTM V4 manual.

### Further settings



### Technical specifications

Card	Euroformat PCI card approx. 100 x 160 mm
Weight	approx. 280g
Power consumption	1A (5V DC), transient starting current up to 3,5A
Memory size	128MB for recording approx. 16 h/channel Total monitoring time (including learning cuts) upgradeable to 512 MB
Interfaces	Profibus DP (12 Mbit/s) RS 485 (Sensorbus) RS 232 (service interface)

If a parallel interface (24 V-DC) is required instead of profibus DP, for 2 channels one assembly each IO - 4, Article No. 0103835, is also required.

Languages included in the basic package: German, English, French, Dutch, Italian, Polish, Portuguese, Spanish and other language packages

Colour setting for red-green weakness

### Scope of delivery

- CTM card
- CD with manuals
- Software on diskettes / CD
- ELF file
- GSD files
- Examples of integration

Parameters	Meaning	Page	Group
Outputs OFF	Selection of outputs OFF on visualisation page	System	Further settings
Segment form	Selection of segment display	System	Further settings
Active monitoring	It is possible to set a minimum monitoring time. For short G1 signals, e.g. shorter than 200 ms, the outputs are switched off.	System	Further settings
Application lost focus	This function closes visualisation when it is switched to background mode. Useful for small computer capacity, e.g. Bosch control panel.	System	Further settings
Setup	When the parameter setting is selected, it is copied to the respective monitoring channels.	System	Further settings

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### **Monitoring DX/DT (option)**

In addition to the manual, automatic adjustment, a new semi-automatic signal adjustment has been integrated in the DX/DT monitoring strategy. This makes it possible to take action to correct signal amplitude while machining. In addition, a recorded amplitude is stored, meaning that it is no longer necessary to reset the amplitude when the same tools are used.

### **Adaptive Control AC (option)**

Missing and blunt tool evaluation is now also possible with an active AC control in the same monitoring channel. This ensures that monitoring and control in the same channel is possible. The AC optimises the feed with the result that the tool is always subjected to an even load. This ensures optimal utilisation and constant quality.

### **Data recorder (option)**

This further development of the CTM system is used to collect process data and make them accessible to another application in file form. The process data include information recorded once before commencement of the process and continuously at intervals of 10 ms. In this way the channel configurations and process numbers are stored at the beginning of the process. In the course of an ongoing process control-specific data, such as rpm, positions, cutting speeds and sensor data such as forces, torques, vibrations, etc. are then stored. After the end of the process the files are sent to the control PC and saved as a file. The file can subsequently be read in by an evaluation program and further processed.

### **Wear monitoring (option)**

The "Wear monitoring" function can be activated as an option.

### **KU strategy (option)**

A new monitoring strategy has been integrated for structure-borne noise, DTA and effective power. This monitoring facility can be installed as a supplement to standard monitoring. Here an additional limit is used, which counts the interference peaks in the process. Counting these limit infringements means that these peaks do not immediately trigger alarms as a result of shavings or chips on the tool. However, if multiple malfunctions occur (adjustable), this results in a shutdown. The fracture limit can also be activated in order to trigger an immediate reaction in the event of a tool break. The limit for the counting function can be set as relative (comparable to the break or stage limit) and as absolute (comparable to the overload limit) to the learning curve.

### **Data handling (option)**

This function stores the alarm outputs, among other values, on the basis of cutting numbers. An additional parameter has been integrated for this purpose. This makes it possible to switch a process 'On' or 'Off' for monitoring (alarm outputs).

This function can be used for every channel, every sensor and every number combination. The statuses of the alarm outputs for the individual cuts are clearly shown in a table. The status of the alarm outputs can also be specifically changed here.

A copy function has been integrated in the learning cut administration. This makes it possible to duplicate existing setting parameters onto other new combinations, enabling the user to store specific additional numbers by copying additional processes. This facilitates handling when there are a large number of programs or workpieces being used with the same or similar tools.

### **Screenshot (option)**

The screenshot option enables you to store specific visualisation images (e.g. in the event of an alarm) via the interface. When this function is activated by the PLC, a current JPEG image is stored in the CTM directory.

### **Process automation (option)**

Following a tool change the dynamic limits (e.g. upper fracture limit) can now be reset to the original values. This is transmitted for each channel via the interface using one bit on the CTM card. This means that with dynamic limits monitoring is again adapted to actual machining after a tool change.

This function permits multiple learning and re-learning. Multiple learning means that fluctuations in machining (dimension, hardness fluctuations) are averaged over several machining processes.

Dynamic limits for break monitoring can also be actively applied as of this version. This means that in the event of tool wear the fracture limit is averaged over several machining processes and adapted. This constant automatic adjustment prevents malfunction at the upper fracture limit.

## **Annex / Explanations on Data Sheet CTM V4**

### **Signal combination (option)**

With signal combination an imminent alarm is reset for multivariable evaluation. This ensures secure monitoring as the alarm outputs are active again after the automatic reset. For example, vibrations and torque can be combined using this option.

### **SAS (option)**

The SAS function contains two principal new functions:

- 1. Simplified operating concept thanks to a new design of the user interface:**  
The new visual design facilitates easy handling of the CTM software.

New function keys on the user interface make complex parameter settings superfluous.

- 2. A new strategy has been integrated for better monitoring:**

This involves the automatic detection of process fluctuations and reacts with self-adjusting segmentation and adaptation.

Dynamic calculations are used to react automatically to the changed machining situation.

This considerably reduces setting work.

- 3. Automatic zero setting**

The 'AUTO' value now makes an automatic calculation of zero setting. An assessment is made as to whether a zero setting is necessary and at which point it makes sense to do this. After the zero setting routine the amplitude is recalculated. If no zero setting can be used, monitoring is automatically set without a zero setting.

### **Scaling (option)**

An activation code is necessary for the 'Scale' mode. This function can be used with the CFM – 4 and DTA.

An activation code is necessary for the 'Scale' mode in KU – 4. In the standard mode amplitude is post-scaled with zero setting switched on.

### **Simple interface M S I (option)**

With this simple interface (activation code MSI) the number of processes to be monitored is set with

counting. Once the number has been reached, the machining number starts again at one. This is removed at the end of machining.

### **Removal at the end of machining**

This function makes automatic removal at the end of monitoring possible. This suppresses sporadic interference (peaks) at the end of machining thus reducing false alarms. The time is calculated automatically depending on the duration of machining, but max. 100 ms. The value calculated is entered in the 'Duration' field. In another field you can switch between 'Manual' and 'Automatic'. For calculation, as for 'Duration' the parameter setting is included for the 'Ts', 'Zero setting', 'Start delay' and 'Trigger'.

### **Setting reworking in the process**

It is possible to switch to 'reworking' during machining monitoring. The reworking function is then just as active as previous reworking. This means makes it possible for the operator to influence predictable problems (cooling agent pressure loss) and consequent faulty messages. In this way problems with faulty messages and downtimes of the production machine can be considerably reduced.

### **Information on monitoring active**

On the output side of the interface there is a bit that displays the feed status per channel in monitoring. As soon as visualisation starts, the feed bit is ON and as soon as it stops, it is OFF. It does not integrate visualisation, but sends feedback as to whether monitoring is active.

### **Data backup on server directory**

In many companies data are now stored on servers. These also include the data from the CTM card. Although CTM visualisation offers the possibility of using any directory for backup purposes, selection of the directory is difficult. An automatically selected directory means that any different directory has to be newly selected for each data backup / restore.

In order to simplify this procedure an entry has been made in the INI file, where a directory name can be entered.

### **Minimising the visualisation window**

A field for minimising is actively integrated in the upper right-hand corner of the window (next to the cross). This function is possible at all operating levels of the CTM software.