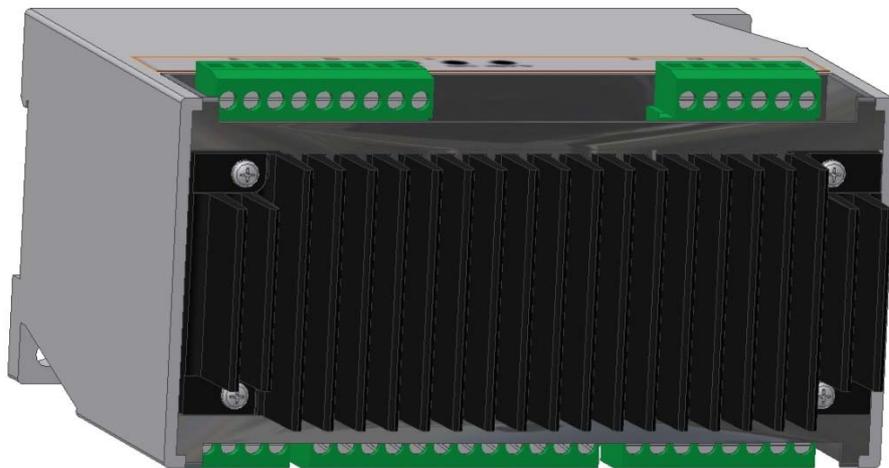




DCM-DM1



Disc Clearance Module for the
GMS Gap Monitoring System

USER MANUAL

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1 General

The DCM-DM1 is a measuring module for the Gap Monitor System, GMS, and includes two functions, DCA and DTM. The DCA function measures the True Disc Clearance by a TDC sensor mounted in the grinding zone. The DTM function measures the temperature inside the TDC sensor. The PT-100 sensor element is placed approximately 3 mm behind the wear surface so it will give a temperature that can be used as a process parameter. The main purpose is however to alarm at a set temperature and thereby protects the TDC sensor from overheating. The module is connected to the TDC sensor on the refiner with special shielded and rugged cables. It also includes analogue and digital outputs for each measuring function as well as a CAN-bus interface to communicate with other GMS modules. Measured data is sent to and received from other GMS modules through a CAN bus interface but can also be read out via analogue and digital outputs to accommodate existing instrument systems. Measuring parameters and calibration data are stored in the unit but can only be modified through the CAN bus and the GMS software. The procedure for sensor calibration, parameter settings and alarm limits adjustments are described in the GMS program manual.

An explanation of the TDC calibration is found in the TDC manual. The workflow of the calibration is built-in inside the GMS software.

The Disc Temperature Module, DTM, is calibrated towards trimmed resistors in a connection box (KB-02) mounted on, or close to, the refiner stand. The function is normally calibrated once during installation of the system and then checked periodically (at least once per year).

The Disc Clearance Monitor, DCM, includes six limit circuits, which compares the signal to preset limit values. The limit-outputs are active when the signal is higher than the adjusted limit values. The GMS software will indicate a green led for an active output or a grey led for a non-active. A set of parameters is used to control the functionality of the unit. The parameters can only be changed through the CAN-bus interface. See the Parameters paragraph below.

2 Technical data

Supply voltage:	24 VDC, $\pm 10\%$.
Power consumption:	Max. 1.2 A.
Module size:	Height=75 mm, Width=150 mm, Depth=110 mm.
Closure:	Polycarbonate (30%GV), DIN-rail mounting.
Connections:	Plug-in screw connectors, max 2.5mm ² cable area.
Panel indicators:	
ON:	A green led indicates the power supply.
STATUS	A yellow led indicates the status of the communication. The led flashes at 1 Hz to indicate that the CAN data is updated.
ALARM:	A red led indicates a sum alarm.
DCA measurement:	Measures the plate gap value in the grinding zone. Handles all types of TDC-sensors for SD- and CD-refiners.
Range:	Linear between 0.00 to 3.00 mm. Indicates non-linear value outside this range.
Calibration:	The sensor must be calibrated to the actual segment plates. Needs to be recalibrated due to segment and sensor wear.
DTM measurement:	Measures the temperature in the TDC sensor by a PT-100 sensor element.
Range:	0 to 225°C. The function is calibrated together with cables and a cable box on the refiner.
Outputs bits:	Several bits are activated (1) or deactivated (0) due to the status of the following signals. The GMS program software reads out this information.
DCA alarm:	An active bit when the DCA is working without any alarms.
DTM alarm:	An active bit when the DTM is working without any alarms.
Sum alarm:	An active bit when both the DCA value is higher than the output bit and the DTM output bit are active.
DCA+++ limit:	An active bit when the DCA value is higher than the DCA +++ limit parameter.
DCA++ limit:	An active bit when the DCA value is higher than the DCA ++ limit parameter.
DCA+ limit:	An active bit when the DCA value is higher than the DCA + limit parameter.
DCA- limit:	An active bit when the DCA value is higher than the DCA - limit parameter.
DCA-- limit:	An active bit when the DCA value is higher than the DCA -- limit parameter.
DTM H limit:	An active bit when the DTM value is lower than the DTM H limit parameter.
DTM M limit:	An active bit when the DTM value is lower than the DTM M limit parameter.
DTM L limit:	An active bit when the DTM value is higher than the DTM L limit parameter.
Digital outputs:	PLC type PNP-outputs that will generate 24VDC when the output is activated. A deactivated output is pulled to 0 VDC by a 10 k Ω resistor.
TDC alarm:	An activated output when the DCA is working without any alarms.
Malfunction alarm:	An activated output when the module is working without any internal alarms.
Sum alarm:	An activated output when the DTM alarm bit are active.
DCA++ limit:	An activated output when the DCA value is higher than the DCA ++ limit parameter.
DCA+ limit:	An activated output when the DCA value is higher than the DCA + limit parameter.
DCA- limit:	An activated output when the DCA value is higher than the DCA - limit parameter.
DCA-- limit:	An activated output when the DCA value is higher than the DCA -- limit parameter.
DTM H limit:	An activated output when the DTM value is higher than the DTM H limit parameter.
DTM M limit:	An activated output when the DTM value is higher than the DTM M limit parameter.
DTM L limit:	An activated output when the DTM value is lower than the DTM L limit parameter.
Digital inputs:	24VDC PLC type inputs, high threshold, low threshold, each input is loaded with a 10 k Ω resistor.
DCA Set Coarse:	An activated input will select the TDC coarse function.
DCA Set Span:	An activated input will select the TDC span function.
DCA Set Zero:	An activated input will select the TDC zero function.
DCA Set:	An activated input will calibrate the selected TDC function.
DIN5:	Not dedicated.
DIN6:	Not dedicated.
Analogue outputs:	Two channels, DCA and DTM, 4-20mA, max load 800 Ω , galvanic isolated.
Sensor:	All types of TDC sensors with temperature measurement.
CAN interface:	GMS protocol.

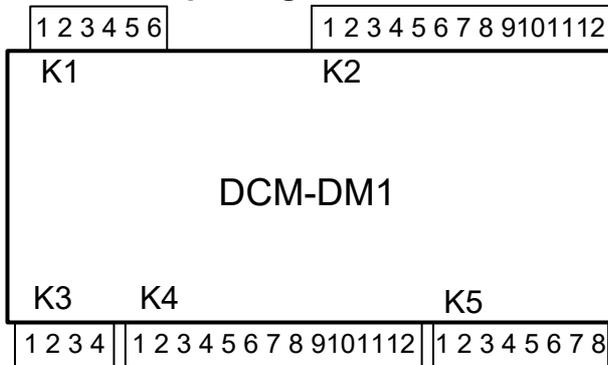
3 Parameters

The following **parameters** are used by the module and are set up by the GMS software:

Name	Description	Default
DCA +++ limit:	Sets the value of the DCA +++ limit	3.00 mm
DCA ++ limit:	Sets the value of the DCA ++ limit	1.20 mm
DCA + limit:	Sets the value of the DCA + limit	1.00 mm
DCA - limit:	Sets the value of the DCA - limit	0.60 mm
DCA -- limit:	Sets the value of the DCA -- limit	0.40 mm
DCA -L limit:	Sets the value of the DCA -L limit	0.50 mm
DTM H limit:	Sets the value of the DTM H limit	200 °C
DTM M limit:	Sets the value of the DTM M limit	180 °C
DTM L limit:	Sets the value of the DTM L limit	100 °C
DCA zero cal:	Sets the value of the TDC zero calibration	0.50 mm
DCA span cal:	Sets the value of the TDC span calibration	1.50 mm
DCA coarse cal:	Sets the value of the TDC coarse calibration	3.80 mm
DCA Filter	Sets the filter of the DCA	2.0 Hz
Refiner speed	Sets according to the main motor speed	1500 rpm

4 Connection diagram

Connection placing



K1 +24VDC, CAN

K1/1	+24VDC	The power supply to the module
K1/2	0VDC	The power ground
K1/3	CAN-H	CAN-interface H-signal (use twisted pair cable for CAN-H and CAN-L)
K1/4	CAN-L	CAN-interface L-signal
K1/5	CAN-R	CAN-interface termination pole (connect to K1/4 to terminate the CAN-bus with 120Ω)
K1/6	GND	Connect to signal ground

K2 TDC-sensor Connect the K-TDC25 cable

K2/1	Measure +	K-TDC25/white
K2/2	Measure -	K-TDC25/brown
K2/3	Ref +	K-TDC25/green
K2/4	Ref -	K-TDC25/yellow
K2/5	Excitation +	K-TDC25/grey
K2/6	Excitation -	K-TDC25/pink
K2/7	Temp +	K-TDC25/blue
K2/8	Shield	K-TDC25/shield. Strip the insulation (~ 3 cm) of the cable at the inlet of the cabinet and interconnect the shield to the signal ground bar.
K2/9	GND	Connect to signal ground.

K3 Analog outputs

K3/1	DCA +	+ 4-20mA, Plate gap distance
K3/2	DCA -	-
K3/3	DTM +	+ 4-20mA, Disc temperature value
K3/4	DTM -	-

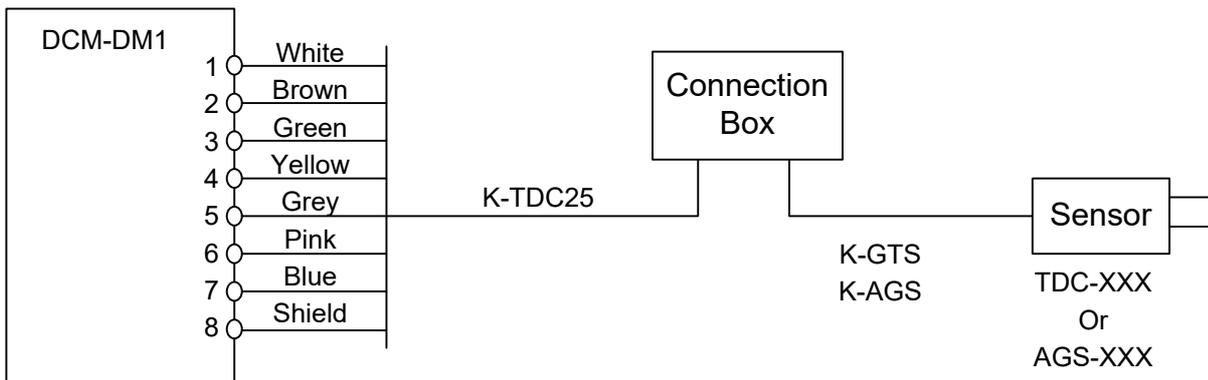
K4 Digital outputs

K4/1	DTM H	DTM Limit H
K4/2	DTM M	DTM Limit M
K4/3	DTM L	DTM Limit L
K4/4	DCA + +	DCA Limit + +
K4/5	DCA +	DCA Limit +
K4/6	DCA -	DCA Limit -
K4/7	DCA - -	DCA Limit - -
K4/8	DCA - L	DCA Limit - L
K4/9	SENSAL	TDC sensor alarm
K4/10	MALFU	DCM malfunction alarm
K4/11	Option	Option output
K4/12	GND	Connect to signal ground.

K5 Digital inputs

K5/1	SET COARSE	+24VDC, Calibrate TDC coarse
K5/2	SET SPAN	+24VDC, Calibrate TDC span
K5/3	SET ZERO	+24VDC, Calibrate TDC zero
K5/4	SET	+24VDC, Calibrate TDC
K5/5	DIN 5	+24VDC, Digital input 5 (not dedicated)
K5/6	DIN 6	+24VDC, Digital input 6 (not dedicated)
K5/7	GND	Connect to signal ground
K5/8	GND	Connect to signal ground.

5 Cables and sensor



The standard installation includes the following articles:

1. K-TDC25: A cable (25 meters long) between the module and the connection box, KB-02 or K-AGS1. The cable length is limited to 25 meters and is cut to an appropriate length at installation.
2. KB-02/K-AGS1: A connection box mounted on or close to the refiner stand. The box includes a switch and some precise resistors for the DTM calibration.
3. K-GTS/K-AGS3: A cable (3 meters long) between the connection box and the sensor. The cable is covered with a metal/plastic tube to withstand the harsh environment but can easily be substituted if broken
4. TDC-XXX, a TDC-sensor. All types of TDC-sensors can be used. The measuring tip is identical for all types of TDC sensors but the casing is optimised for different types of refiners.
Or AGS-XXX, an AGS-sensor. All types of AGS-sensors except the LC-types can be used.

6 Troubleshooting

The green POWER led is not lit.

Check the 24VDC supply at K1/1 and K1/2!

Is the 24VDC between 20 and 28VDC?

Yes: The module is broken, substitute.

No: Check the 24V power supply.

The yellow CAN led is not flashing at app. 1 Hz.

An internal program alarm exists.

Restart the module by first unplug and then plug-in the K1 connector!

Is the CAN led flashing?

Yes: The module is working, report the event and be alert if it repeats.

No: The module is broken, substitute.

The red ALARM led is lit.

A sum alarm exists. A function alarm will only generate a sum alarm if the actual alarm is enabled to the sum alarm.

Check the GMS software for detailed information!

The DCA and the DTM are both alarming.

Is the transducer connected?

Yes: The sensor, cables or the module is broken. Change one the units in the following order: TDC-sensor, DCM module, cable K-GTS, cable K-TDC25.

No: Connect the sensor.

The DCA is NOT alarming but the DTM is alarming.

Change the TDC sensor!

Is the alarm state the same?

Yes: The sensor, cables or the module is broken. Change one the units in the following order: TDC-sensor, DCM module, cable K-GTS, cable K-TDC25.

No function is alarming.

An internal DCM module error exists. Replace the module.

Use the service panel in the Panel-PC to identify and resolve any alarms from the unit.

7 Valmet article number

Valmet article number: VAL0165082

SKC article number: SKC2037318

8 Document revision

Feb. 25, 2016 Removed fax number.

9 Contact

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