

dametric 

# VPT-DM1



## VIBRATION, PRESSURE & TEMPERATURE MODULE FOR THE GMS SYSTEM USER MANUAL

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### 1. General

The VPM-DM1 is a measuring module for the Gap Monitor System, GMS, and includes three basic functions, VIM, HPM and OTM. The VIM function includes two channels and measures the low frequency vibration of the refiner bearing. The HPM function excitates and measures four pressure transmitters used for A-chamber pressure, B-chamber pressure, house pressure and inlet pressure. The OTM function uses external PT-100 sensor elements to measure the temperatures of the bearing oil to and from the refiner.

The module is connected to the VIM transducers on the refiner with special shielded and rugged cables. The HPM and OTM functions uses standard wiring cables. Measuring parameters and calibration data are stored in the unit, but can only be modified thru 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. Calibration are done by using The Position Monitor, POM, is calibrated towards the actual POT-sensor (Position Transmitter) that is used. The VIM-function is calibrated using a fixed AC-signal. The HPM uses industrial standard 4-20mA signals during calibration while the OTM function need precision resistors to be calibrated. The module includes limit circuits, which compares each signal to preset 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 thru the CAN-bus interface. See the Parameters paragraph below.

## 2. Technical Specification

Supply voltage:	24 VDC, $\pm 10\%$ .	
Power consumption:	Max. 0.5 A, nominal ?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 <sup>2</sup> cable area.	
Panel indicators:		
ON	Green led indicates the power supply.	
STATUS	Yellow led indicates the status of the communication. The led flashes at app. 1 Hz to indicate that the CAN data is updated.	
ALARM	Red led indicates a sum alarm.	
VIM-1 measurement:	Used in all types of refiners.	
Measures the vibration of the refiner bearing.		
Transducer:	VIM-T2 (piezo-electric accelerometer) excited with 10mA.	
Range:	0 to 25 mm/s.	
Filter 1:	10 Hz to 1000 Hz, active, 12 dB/octave band pass filter to accommodate the vibration specifications standard.	
Filter 2:	A 1/f filter to convert the acceleration vibration signal to a velocity vibration signal, cut-off frequency at 160 Hz.	
Amplitude measurements:	True rms to dc converter.	
Signal check:	A transducer check circuit which detects open loop and short-circuit input. Any fault deactivates the limit-outputs and generates 125 % signal amplitude.	
Calibration:	A specified AC-signal must be applied.	
VIM-2 measurement:	Used in DD-refiners and uses the same specification as VIM-1.	
HPM-A measurement:	Measures the A-chamber pressure.	
Excitation:	0 to 30mA from a voltage source of 19VDC.	
Signal input:	2 wire pressure transmitter.	
Input range:	4 - 20 mA.	
Maximum resistive load:	800 $\Omega$ .	
Scaling:	The function is scaled to engineering units in the GMS software.	
HPM-B measurement:	Measures the B-chamber pressure and uses the same specification as HPM-A.	
HOP measurement:	Measures the refiner house pressure and uses the same specification as HPM-A.	
INP measurement:	Measures the inlet pressure and uses the same specification as HPM-A.	
OTM measurements:	Four separate channels measure the temperatures of the bearing oil.	
Sensor:	Standard PT-100.	
Excitation current:	9mA.	
Range:	0 to 200°C.	
Resolution:	1°C.	
Signal check:	A sensor check circuit which detects open loop and short-circuit input. Any fault deactivates the limit-outputs and generates 255°C signal output.	
Calibration:	Precision resistors must be applied, 100.0 ohm for 0°C, 175.8 ohm for 200°C.	
Outputs bits:	A number of bits are activated (1) or deactivated (0) due to the status of the following signals. The GMS program software reads out this information.	
Alarm signal	<i>state</i>	<i>term</i>
Sum alarm:	deactivated	any enabled function alarm bit is deactivated.
VIM-1 alarm:	active	VIM-1 function is working without any alarms.
VIM-2 alarm:	active	VIM-2 function is working without any alarms.

HPM-A alarm:	active	HPM-A function is working without any alarms.
HPM-B alarm:	active	HPM-B function is working without any alarms.
HOP alarm:	active	HOP function is working without any alarms.
INP alarm:	active	INP function is working without any alarms.
INP alarm:	active	INP function is working without any alarms.
OTM-1 alarm:	active	OTM-1 function is working without any alarms.
OTM-2 alarm:	active	OTM-2 function is working without any alarms.
OTM-3 alarm:	active	OTM-3 function is working without any alarms.
OTM-4 alarm:	active	OTM-4 function is working without any alarms.
VIM-1-1 limit:	deactive	VIM-1 value is higher than the VIM-1/Limit-1 parameter.
VIM-1-2 limit:	deactive	VIM-1 value is higher than the VIM-1/Limit-2 parameter.
VIM-1-3 limit:	deactive	VIM-1 value is higher than the VIM-1/Limit-3 parameter.
VIM-1-4 limit:	deactive	VIM-1 value is higher than the VIM-1/Limit-4 parameter.
VIM-2-1 limit:	deactive	VIM-2 value is higher than the VIM-2/Limit-1 parameter.
VIM-2-2 limit:	deactive	VIM-2 value is higher than the VIM-2/Limit-2 parameter.
VIM-2-3 limit:	deactive	VIM-2 value is higher than the VIM-2/Limit-3 parameter.
VIM-2-4 limit:	deactive	VIM-2 value is higher than the VIM-2/Limit-4 parameter.
HPM-A-1 limit:	deactive	HPM-A value is lower than the HPM-A/Limit-1 parameter.
HPM-A-2 limit:	deactive	HPM-A value is lower than the HPM-A/Limit-2 parameter.
HPM-B-1 limit:	deactive	HPM-B value is lower than the HPM-B/Limit-1 parameter.
HPM-B-2 limit:	deactive	HPM-B value is lower than the HPM-B/Limit-2 parameter.
HOP-1 limit:	deactive	HOP value is higher than the HOP/Limit-1 parameter.
HOP-2 limit:	deactive	HOP value is higher than the HOP/Limit-2 parameter.
INP-1 limit:	deactive	INP value is higher than the INP /Limit-1 parameter.
INP-2 limit:	deactive	INP value is higher than the INP /Limit-2 parameter.
OTM-1-1 limit:	deactive	OTM-1 value is higher than the OTM-1/Limit-1 parameter.
OTM-1-2 limit:	deactive	OTM-1 value is higher than the OTM-1/Limit-2 parameter.
OTM-2-1 limit:	deactive	OTM-2 value is higher than the OTM-2/Limit-1 parameter.
OTM-2-2 limit:	deactive	OTM-2 value is higher than the OTM-2/Limit-2 parameter.
OTM-3-1 limit:	deactive	OTM-3 value is higher than the OTM-3/Limit-1 parameter.
OTM-3-2 limit:	deactive	OTM-3 value is higher than the OTM-3/Limit-2 parameter.
OTM-4-1 limit:	deactive	OTM-4 value is higher than the OTM-4/Limit-1 parameter.
OTM-4-2 limit:	deactive	OTM-4 value is higher than the OTM-4/Limit-2 parameter.
CAN interface:	GMS protocol	

### 3. Parameters

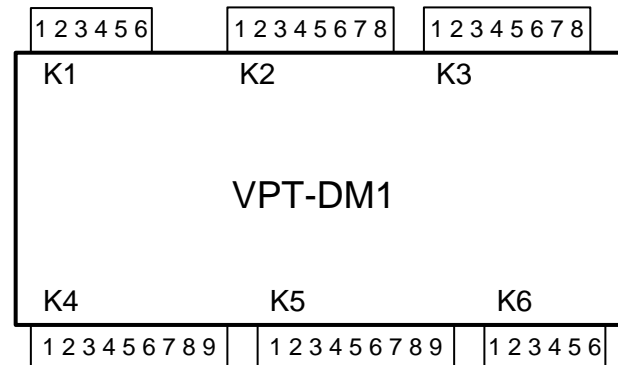
The following parameters are used by the module and are set up by the GMS software:

<i>Name</i>	<i>description</i>	<i>min</i>	<i>max</i>	<i>unit</i>
HPM-A Range:	Sets the range of the HPM-A	0.0	200.0	ton
HPM-B Range:	Sets the range of the HPM-B	0.0	200.0	ton
HOP Range:	Sets the range of the HOP	0.0	20.0	bar
INP Range:	Sets the range of the INP	0.0	20.0	bar
VIM-1/Limit 1:	Sets the value of the VIM1/Limit-1	0.00	25.00	mm/s
VIM-1/Limit 2:	Sets the value of the VIM1/Limit-2	0.00	25.00	mm/s
VIM-1/Limit 3:	Sets the value of the VIM1/Limit-3	0.00	25.00	mm/s
VIM-1/Limit 4:	Sets the value of the VIM1/Limit-4	0.00	25.00	mm/s
VIM-2/Limit 1:	Sets the value of the VIM2/Limit-1	0.00	25.00	mm/s
VIM-2/Limit 2:	Sets the value of the VIM2/Limit-2	0.00	25.00	mm/s
VIM-2/Limit 3:	Sets the value of the VIM2/Limit-3	0.00	25.00	mm/s
VIM-2/Limit 4:	Sets the value of the VIM2/Limit-4	0.00	25.00	mm/s

HPM-A/Limit 1:	Sets the value of the HPM-A/Limit-1	0.0	200.0	ton
HPM-A/Limit 2:	Sets the value of the HPM-A/Limit-2	0.0	200.0	ton
HPM-B/Limit 1:	Sets the value of the HPM-B/Limit-1	0.0	200.0	ton
HPM-B/Limit 2:	Sets the value of the HPM-B/Limit-2	0.0	200.0	ton
HOP/Limit 1:	Sets the value of the HOP/Limit-1	0.0	25.5	bar
HOP/Limit 2:	Sets the value of the HOP/Limit-2	0.0	25.5	bar
INP/Limit 1:	Sets the value of the INP/Limit-1	0.0	25.5	bar
INP/Limit 2:	Sets the value of the INP/Limit-2	0.0	25.5	bar

#### 4. Connection Diagram

##### Conector 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 HPM-A, HPM-B Signals from HPM-A and HPM-B sensors**

K2/1	T+HPA	Positive current input
K2/2	T-HPA	Negative current input
K2/3	Shield	Shield to signal cable for HPM-A
K2/4	T+HPB	Positive current input
K2/5	T-HPB	Negative current input
K2/6	Shield	Shield to signal cable for HPM-B
K2/7	GND	
K2/8	GND	Connect to signal ground.

##### **K3 HOP, INP Signals from HOP and INP sensors**

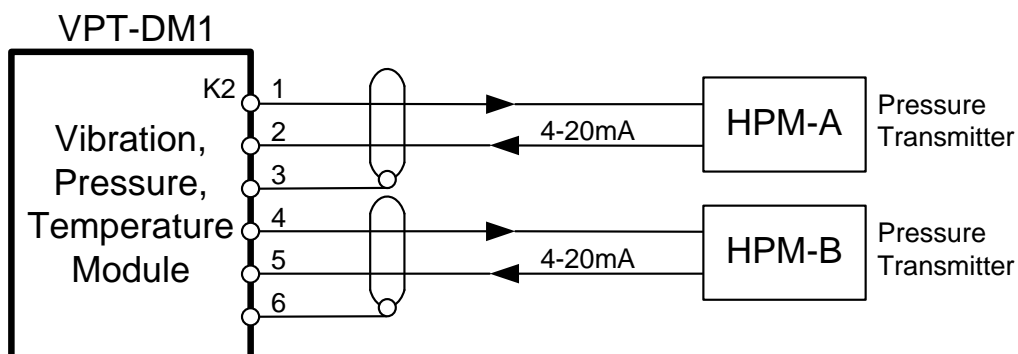
K3/1	T+HOP	Positive current input
K3/2	T-HOP	Negative current input
K3/3	Shield	Shield to signal cable for HOP
K3/4	T+INP	Positive current input
K3/5	T-INP	Negative current input
K3/6	Shield	Shield to signal cable for INP
K3/7	GND	
K3/8	GND	Connect to signal ground.

<b>K4</b>	<b>VIM-1, VIM-2</b>	<b>Signals from the VIM sensors, cable K-VIMS25</b>
K4/1	TE+VIM1	Excitation pos., K-VIMS25/white
K4/2	TS+VIM1	Signal pos., K-VIMS25/brown
K4/3	TS-VIM1	Signal neg., K-VIMS25/green
K4/4	TE-VIM1	Excitation neg., K-VIMS25/yellow
K4/5	TE+VIM2	Excitation pos., K-VIMS25/white
K4/6	TS+VIM2	Signal pos., K-VIMS25/brown
K4/7	TS-VIM2	Signal neg., K-VIMS25/green
K4/8	TE-VIM2	Excitation neg., K-VIMS25/yellow
K4/9	GND	Connect the outer shields of the K-VIMS25 cables.
<b>K5</b>	<b>OTM-1, OTM-2</b>	<b>Signals from the OTM sensors (PT-100)</b>
K5/1	T+OTM1	Positive input OTM-1
K5/2	TS+OTM1	Sense input OTM-1
K5/3	T-OTM1	Negative input OTM-1
K5/4	T+OTM2	Positive input OTM-2
K5/5	TS+OTM2	Sense input OTM-2
K5/6	T-OTM2	Negative input OTM-2
K5/7	Shield	Connect the shield from the OTM sensor cable
K5/8	Shield	See as K5/7
K5/9	GND	Connect to signal ground.
<b>K6</b>	<b>OTM-3, OTM-4</b>	<b>Signals from the OTM sensors (PT-100)</b>
K6/1	T+OTM3	Positive input OTM-3
K6/2	TS+OTM3	Sense input OTM-3
K6/3	T-OTM3	Negative input OTM-3
K6/4	T+OTM4	Positive input OTM-4
K6/5	TS+OTM4	Sense input OTM-4
K6/6	T-OTM4	Negative input OTM-4.

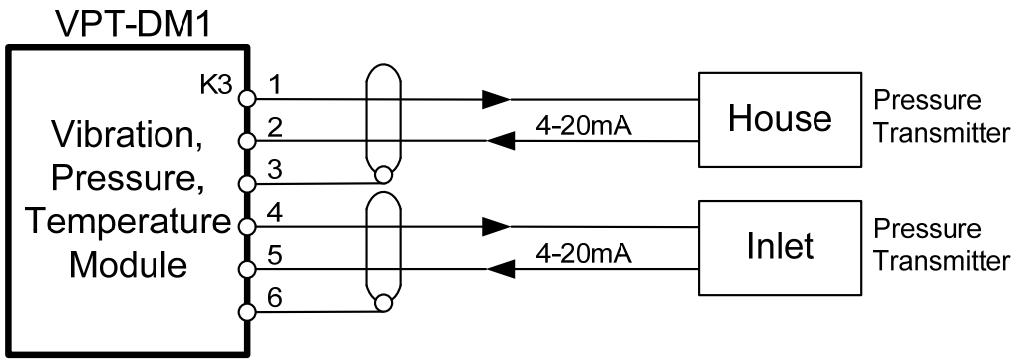
## 5. Cables and transducers

Use standard shielded cable cut to appropriate length at the installation.

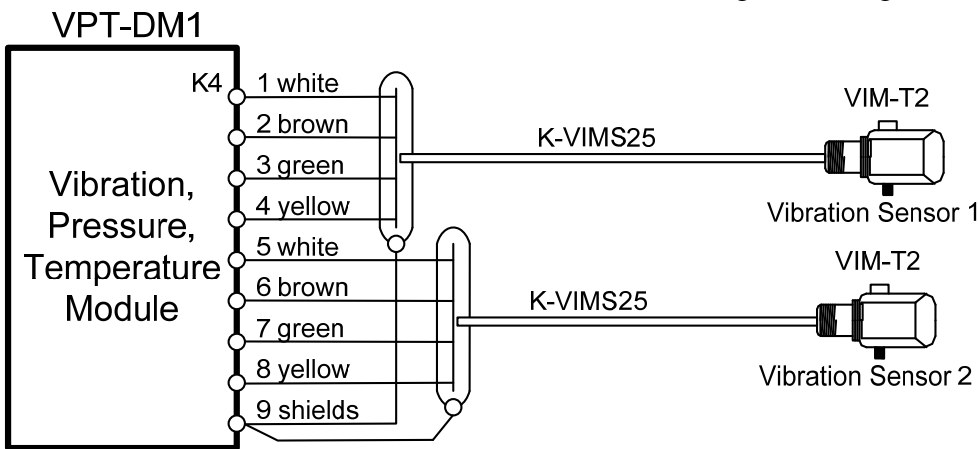
HPM-A is for the A-chamber pressure, HPM-B for the B-chamber.



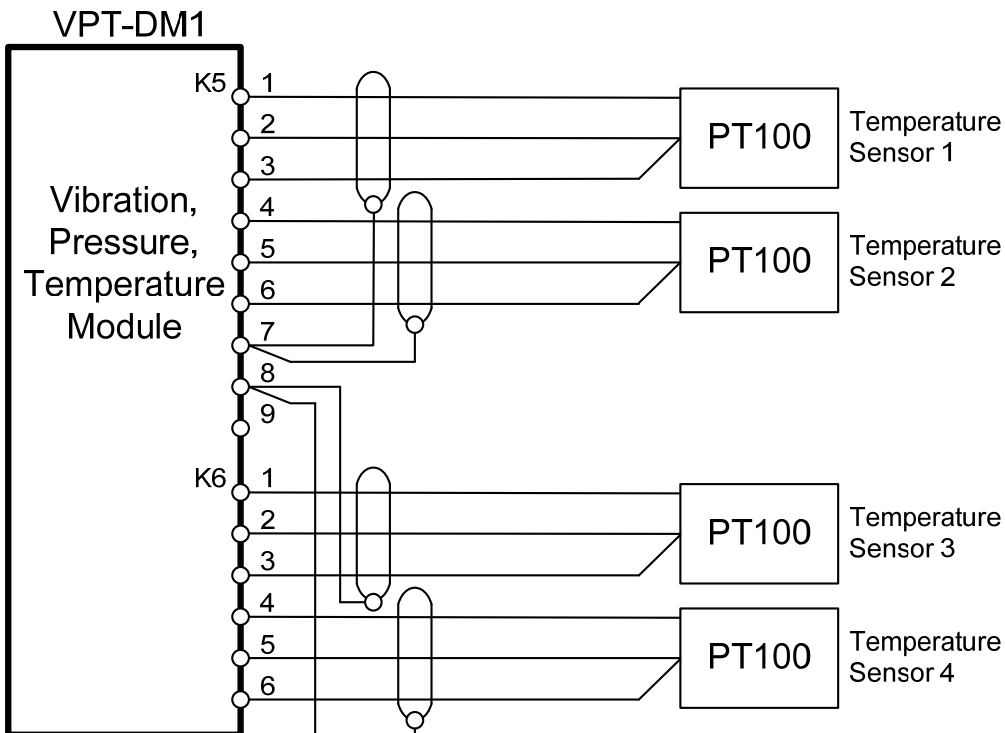
HOP is for the house pressure and INP for the inlet pressure. HOP and INP functions are optional.



VIM. The K-VIMS25 cable is 25 meter long and is cut to an appropriate length at installation. Cut the inner shield and connect the outer shield according to the diagram.



OTM. Use standard shielded cables and cut to appropriate length at the installation.



## 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 unplugging and then plugging-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.

An alarm exists. Note: 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 HPM-A, HPM-B, HOP or INP is alarming.

Are the sensors and the cables properly connected?

Yes: Measure the current to the sensor. Is it within 4-20mA?

Yes: The module is broken, replace it.

No: The sensor or the cable is broken. Change them.

No: Connect properly.

The VIM-X is alarming.

Are the transducer and the cable properly connected?

Yes: The transducer, the cable or the module is broken. Change one of the units in the following order: VIM- transducer, VPT module, cable K-VIMS25.

No: Connect properly.

The OTM-X is alarming.

Are the sensors and the cables properly connected?

Yes: The sensor, the cable or the module is broken. Change one of the units in the following order: Sensor, VPT module, cable.

No: Connect properly.

No function is alarming.

An internal PTM module error exists. Replace the module.

If a Panel-PC with Service Panel is used – use this to identify and to fix any problem.

## 7. Valmet article number

VAL0165084

SKC2037291

## 8. Contact

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