



TVD-M2 / TVD-M3

TOUCHPOINT VIBRATION MONITOR



USERS MANUAL

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1. TECHNICAL SPECIFICATION

Article number:	Dametric	Valmet	SKC
TVD-M2	TVD-M2	VAL0123130	SKC9826773
TVD-M3	TVD-M3	VAL0308989	--
Power supply:			
TVD -M2	115 to 230 VAC, +5%/-10%, 48-62 Hz		
TVD -M3	24 VDC, $\pm 10\%$		
Power consumption:	Max 20VA		
Temperature limit:	0 to +70 °C		
Enclosure:	Polycarbonate box, aluminum front,		
Size	Width = 150, height = 75, depth = 110 mm		
Sealing:	IP20		
Mounting:	DIN-rail or two 4-mm screws		
Weight:	0.9 kg		
Transducer:	VIM-T2, TVD-T1, TVD-T2 or TVD-T2S.		
Amplifier:	Voltage input		
Sensitivity	100mVrms = 100%		
Highpass filter:	200Hz		
Lowpass filter:	Selectable, 10kHz or 40kHz (depending on transducer)		
Front display:	Led bar graph, scaled 0 - 100%, 5 % per led		
	Led, yellow indicating active alarm limit outputs		
	Led, green, indicating active production input		
	Led, green, indicating power on		
Location attenuator:	Adjustable in 16 steps between 100 and 21 % of normal gain		
Production attenuator			
Level:	Adjustable to 0-50% of normal gain by use of a single turn potentiometer		
Freq. response:	See 4.4		
Control input:	A closed input initiates the production attenuator. The input must be galvanically isolated.		
Signal output:	Galvanically isolated analogue current signal, 4-20 mA, low pass filtered to 1Hz, max 800 Ω load		
Headset output:	Audio signal for headset, 3.5mm phono contact		
Alarm limit 1,2:	Adjustable, 0 to 100 %, single turn potentiometers		
Alarm output 1,2:	1-pole toggling relay contact, max. 230Vac, 1A, 200W		
Connection:	Detachable screw connectors		
CE approval:	EN50081-2:1993, EN50082-2:1995, 89/336/EEC.		

2. DESCRIPTION

The TVD-M2/M3 monitors are used together with a vibration transducer to measure the touch point vibrations in a pulp refiner.

The unit will work in the calibration mode or in the production mode. In the calibration mode the unit has the highest sensitivity to detect the touch point without unnecessary plate wear.

In production mode, the unit will work with lower gain and will then work as a part in the plate clash protection system. The modes are selected by an input logic signal.

The amplifier excites the transducer with a constant current. The transducer includes a built in signal conditioner, and the signal output is superimposed on the feeding constant current. The transducer signal is amplified, filtered and then monitored on both the front display and on the current signal output.

The front display consists of a 20-segment led ramp and normally indicates the touch point signal level.

The signal level is constantly compared with two adjustable alarm limit levels. The output is deactivated when the signal level exceeds the limit level, which is adjustable by one turn potentiometers.

If any of the limit push buttons is pressed, the corresponding alarm limit is displayed on the internal led ramp and also monitored on the external analogue output.

The signal can be attenuated for production mode by a closing of an input. A single turn potentiometer and a 4-pole dipswitch set attenuation and frequency response.

The signal can be attenuated for compensation of different transducer location, different type of refiners and also the refiner main motor speed. A 4-pole dipswitch sets the attenuation.

The signal level is also amplified to a headset output. The headset is connected to a phono contact on the top of the unit. The headset is used to listen to the actual touch point sound. The audible signal is not affected by the dip-settings for transducer location or production gain.

The unit works together with four different type of transducers.

The VIM-T2 for touch point frequencies between 200Hz and 10kHz.

The TVD-T1 for touch point frequencies between 200Hz and 40kHz. This transducer is mounted on the TDC-transducer and is normally used in the CD-refiners.

The TVD-T2 for touch point frequencies between 200Hz and 40kHz. The TVD-T2 is mounted on one of the bolts for the plate holder.

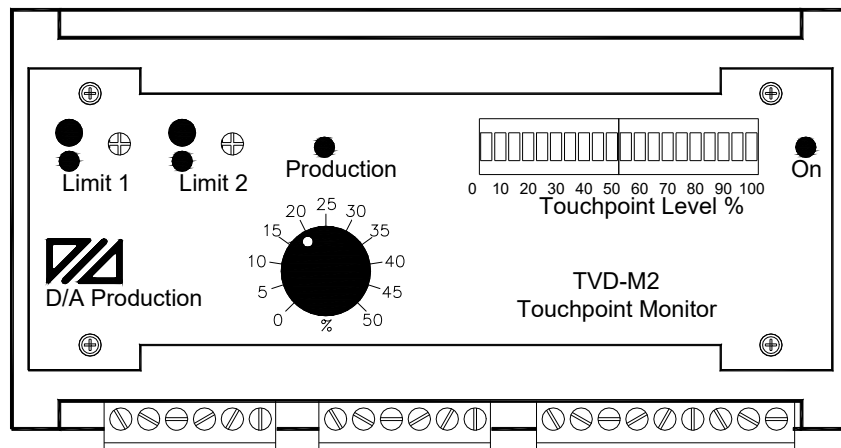
The TVD-T2S has the same mounting method and frequency range as the VIM-T2 but has ten times higher sensitivity. This transducer is normally used in the Conflo refiner.

There are two types of cables to be used between the unit and the transducers. The VIM-T2 uses the cable K-VIMS25 while all other transducers use the cable K-TVDS25.

The TVD-M2 includes an AC/DC power unit, which converts and isolates the 115/230 VAC power supply to the internal +12V and -12V DC-voltages.

The TVD-M3 is powered from a 24VDC source and includes a DC/DC converter for the internal supplies.

3. HANDLING



The 20 bar graph display indicates the Touch Point Vibration Signal or the alarm limit levels when any of the push buttons is activated.

Limit 1.

- Push the switch to read the limit level on the bar display and adjust the corresponding potentiometer to a chosen limit level.
- The yellow led diode is lit when the signal level is lower than the limit level.

Limit 2.

- Same function as limit 1.
- If both limits are used, this limit level is normally adjusted to a higher level than limit 1.

Production Attenuator.

- This potentiometer is used to change the attenuation during the production mode. Usually the signal level will increase while the segment plates wears. The potentiometer is used to adjust the touch point signal to a desirable level. Limit 1 can then be used as a warning level while limit 2 can be used for interlocking.
- The potentiometer has no effect in the calibration mode.

Production Indication.

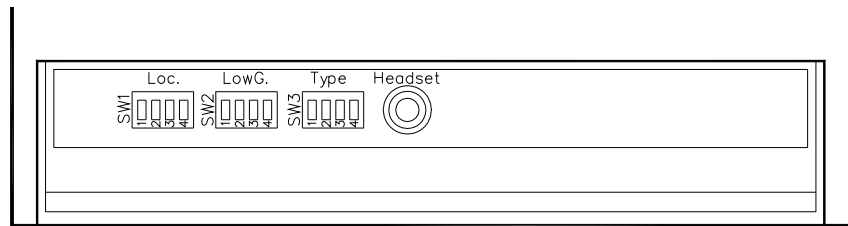
- This green led indicates that the production input is activated and that the unit works with lower sensitivity.

Power supply.

- This green led is lit when the unit is powered.

4. SETTINGS

The dipswitches are located at the top of the unit and should be adjusted during the installation.



4.1 Transducer location setting

This setting is to be adjusted depending of the placement of the transducer, the type of refiner and also the main motor rotation speed. The correct setting has to be established upon testing, but the examples can serve as guidelines. The default setting at delivery is 66%.

SW1	/1	/2	/3	/4	% sensitivity	Transducer location (* default setting)
	off	off	off	off	100	VIM-T2 on a ROP 24, > 1200rpm
	on	off	off	off	75	VIM-T2 on a ROP 32/36, > 1200 rpm
	off	on	off	off	66 *	VIM-T2, TVD-T2 mounted on the plate holder bolt
	off	off	on	off	50	TVD-T2S on a Conflo refiner
	off	off	off	on	33	TVD-T2S on a RGP refiner, < 1200 rpm
	on	on	on	on	20	TVD-T1 on the TDC-sensor
						TVD-T2S on a RGP refiner, > 1200 rpm

4.2 Production mode adjustment

The digital input, DI+PROD, is activated during the production mode, and will activate an attenuator and a filter in the unit. An activated input is indicated by a led in the front panel, marked "Production".

4.2.1 Frequency response

The dipswitch SW2 sets the frequency response during the production mode. The response can be seen in the graphs on the following page. The high pass filter can be set in the range of 0.3 to 19 kHz, and is used to reduce the low frequency signals during production. The higher frequency setting, the higher the attenuation will be at lower frequencies. The setting has to be established upon testing, and is dependent of the type of the plates and the rotation speed.

SW2	/1	/2	/3	/4	frequency in kHz.	(* Default setting)
	off	off	off	off	0.3	
	on	off	off	off	2	VIM-T2, TVD-T2S
	off	on	off	off	4 *	" "
	off	off	on	off	6	" "
	off	off	off	on	8	" "
	on	on	on	on	19	TVD-T1, TVD-T2

The settings together with the transducer type setting are shown in graph 4.4.1 and 4.4.2.

4.2.2 Gain

The gain is adjusted with a single-turn potentiometer in the front of the unit, and can be set between 5 and 50% of the normal gain. Adjust the potentiometer to the maximum gain and the lower the gain during production.

4.3 Transducer Type setting

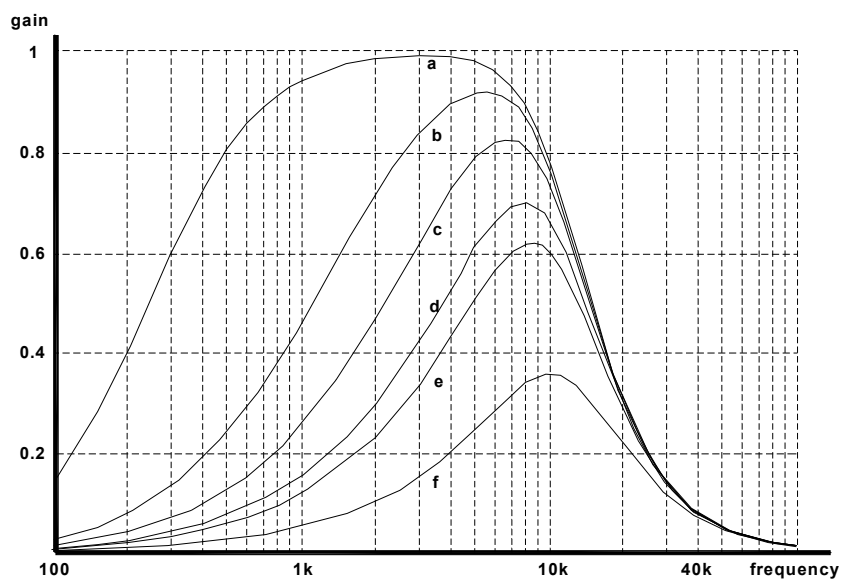
The low-pass filter must be set according to the transducer.

SW3	/1	/2	/3	/4	kHz	Type
	off	off	off	off	10	TVD-T2S, VIM-T2 (Default setting)
	on	on	off	off	15	Not used
	off	off	on	on	35	Not used
	on	on	on	on	40	TVD-T1, TVD-T2

4.4 Low gain filter response

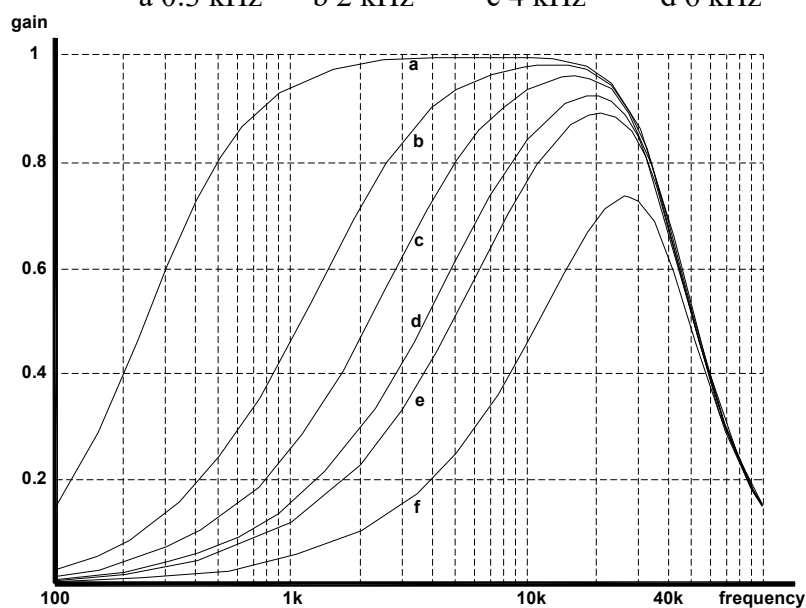
4.4.1 With 10 kHz transducer type setting

a 0.3 kHz b 2 kHz c 4 kHz d 6 kHz e 8 kHz f 19 kHz



4.4.2 With 40 kHz transducer type setting

a 0.3 kHz b 2 kHz c 4 kHz d 6 kHz e 8 kHz f 19 kHz



5. CONNECTION

The cables are connected to the detachable screw connectors at the bottom of the unit.

5.1 K1 - POWER SUPPLY

TVD-M2:

115-230 VAC Mains Voltage

Live K1/1

Neutral K1/6

TVD-M3:

24VDC Mains Voltage

Plus K1/1

Minus K1/4

5.2 K2 - ALARM OUTPUTS

Function	normally closed	normally open	com
Limit 1	K2/1	K2/2	K2/3
Limit 2	K2/4	K2/5	K2/6

Explanation. The above describes the state of a not active output.

When the output is active (the led is lit and the touch point level is lower than the limit level)

the normally open contact is closed to the common contact.

5.3 K3 - LOGIC INPUT, TRANSDUCER, SIGNAL OUTPUT, GROUND

K3/1-2 Logic input, production

K3/1 Close this input to initiate production mode

K3/2 The input must be free from foreign potential

K3/3-5 Transducer signals K-TVDS25, K-VIMS25

K3/3 Transducer + white + brown

K3/4 Transducer - green + yellow

K3/5 Transducer, cable shield see below

K-TVDS25: Connect the shield to K3/5.

K-VIMS25: Isolate the inner shield. Connect the outer shield to K3/5

K3/6-8 Signal current output

K3/6 + 4-20 mA

K3/7 common

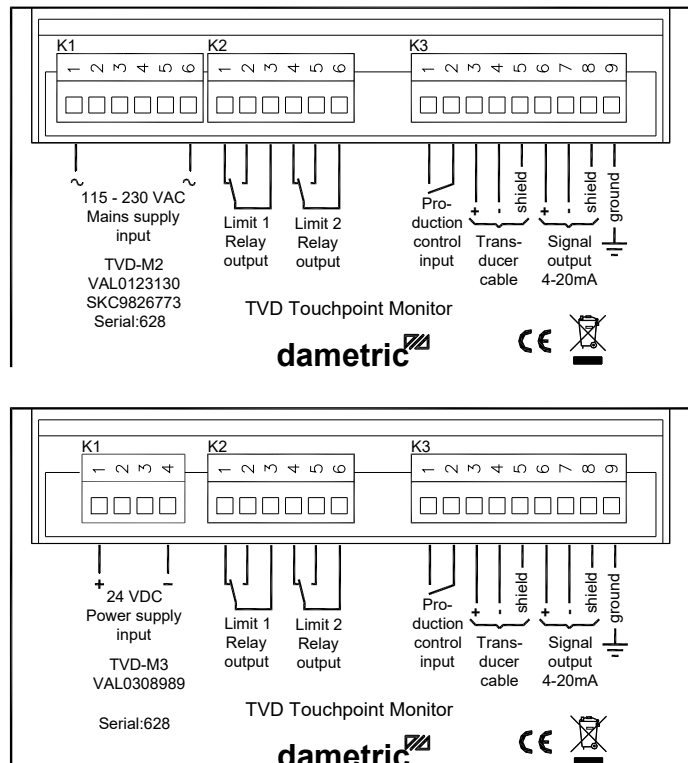
K3/8 cable shield

K3/9 Ground

K3/9 Connect this pin direct to the protective ground close to the unit. Use a copper wire with an area of 2.5 mm².

5.4 K4 – HEADSET

Connect the cable from the headset (IR-HS) direct to the phono-contact in the upper part of the unit. It is also possible to connect the cable K-HS5 between the headset and the unit



6. TROUBLE SHOOTING

Symptom

Possible failure

Action

The ON led is not lit

No power attached

Check the main supply voltage at K1.

Check the main supply jumper at K1.

If the supply and jumpers are correct, the unit is defective.

Note. The unit is protected against over voltage by PTC-resistors. If these are activated, the mains power supply must be shut off for at least 2 minutes.

The LED ramp is constantly indicating 100%

Transducer fault or cable fault

Is the cable connected to the transducer?

Check the transducer and the cable.

At normal conditions, the nominal voltage across the transducer is about 10.5Vdc.

(+ to K3/3, - to K3/4). If the voltage is below 6.0V or above 15V, the unit is defective.

7. CONTACT

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