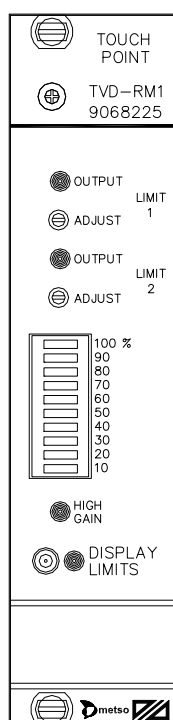


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TVD – RM1

VAL0100516 / SKC9068225



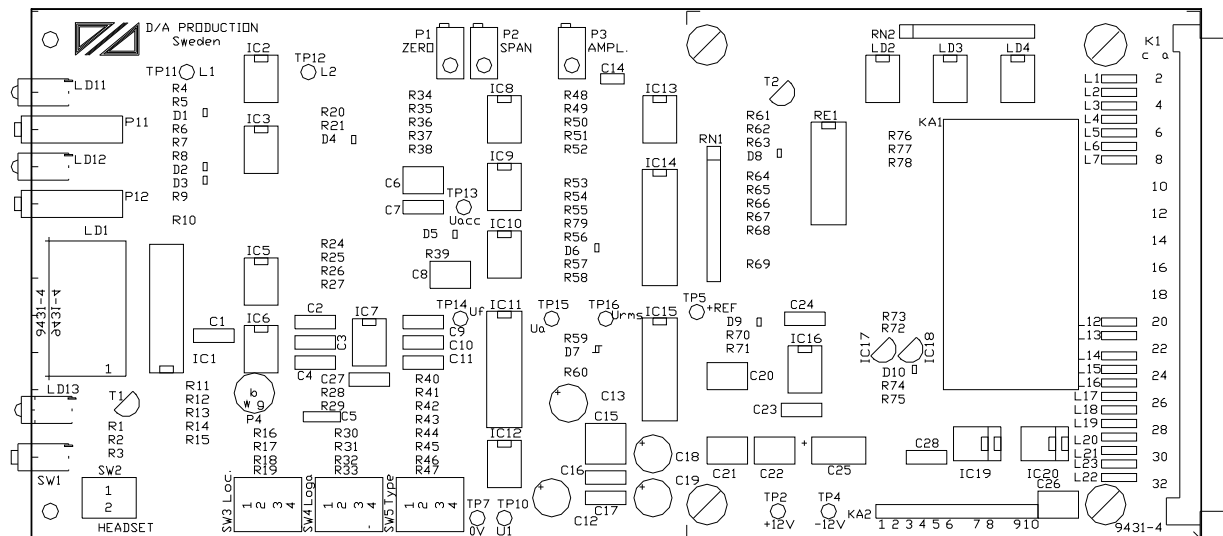
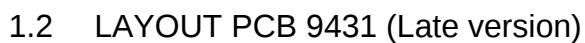
TOUCH POINT VIBRATION MONITOR FOR THE RMS-SD SYSTEM USERS MANUAL



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1.1 Layout PCB 9179 (Early version)



2 DESCRIPTION OF OPERATION

The TVD-RM1 unit measures the wide frequency vibration signals induced when the refiner plates touches during rotation in the idling mode, and in the production mode.

The unit monitors a low impedance piezo-electric accelerometer-transducer. There are two alternate mountings of the transducer. If a TDC-sensor measuring device is used, the TVD-transducer is mounted on the TDC-sensor. The alternative is to mount the transducer on one of the bolts for the segment holder. The TDC-sensor location gives a more accurate signal response, and is needed when attached on a CD-zone.

The accelerometer is fed with a constant current excitation, and returns a superimposed voltage signal proportional to the acceleration amplitude. The frequency is in the range of 1 to 50.000 Hz. The monitor includes following functions:

- An adjustable ac-voltage amplifier for absolute calibration of the unit.
- A 200 to 40.000 Hz bandpass-filter.
- An average ac to dc-converter to measure the vibration amplitude.
- Internal zero and span level-adjustments to 1V (0%) and 5V (100%).
- Isolated 4-20 mA output current.
- A 10 led-bar display for quick on board signal read-out.
- An analog output intended for headset.
- An analog output for TVD-signal evaluation device.
- A 1-5 V voltage output for RMS enhanced display unit.
- A 4-pole dip-switch attenuator to compensate for alternate locations of the transducer.
- A 4-pole dip-switch for setting of the attenuation in the low-amplification mode (production). This is selected by the digital input, DI+LOGA.
- A transducer check circuit which detects open-loop and short-circuit input. Any fault deactivates the limit-outputs and generates a 125 % signal amplitude both on the display and the current output.
- Two limit circuits, which compares the signal to two limit values. The limits are adjustable from 0 to 100% of the signal amplitude. Each limit-output is active when the signal is lower than the adjusted limit value, and is indicated by the front panel led's. A not active output initiates a 2 % hysteresis before returning to active. The output is opto-isolated from the unit, and drives a P-channel power transistor. The transistor is connected to the +rail of the system power supply.
- A RMS-system interface that permits readouts of the measured level and the adjusted limit-values to the LDU-RM1 unit or the DCU-RM1 unit.
- A dc/dc power unit, which converts and isolates the 24 VDC system power supply to the internal +12V and -12V dc-voltages.

3 TECHNICAL SPECIFICATION

Article no:	TVD-RM1 / VAL0100516 / SKC9068225		
Power supply:	+24 VDC, $\pm 10\%$, max 0.19 A		
Internal supply:	± 12 VDC, isolated from the power supply		
Board dimension:	L=220 mm, W=100 mm, T=30 mm (6 HE)		
Panel adjustments:	LIMIT - 1, LIMIT - 2: 15-turn potentiometers		
Panel indicators:	LIMIT OUTPUT-1, LIMIT OUTPUT-2: green led's HIGH GAIN: yellow led SIGNAL: 10 led bar-display		
Panel switch:	DISPLAY LIMITS: push-button switch		
Transducer type:	TVD-T1,-T2,-T2S, piezo-electric accelerometer		
Transducer excitation:	10 mA constant current, U=20 VDC		
Short circuit trip resistance:	315 Ω		
Open loop trip resistance:	2.95 k Ω		
Amplifier input impedance:	50 k Ω		
AC-signal amplification:	0.1 - 20, internally adjustable		
Filter type:	Active, 12 dB/octave		
Filter cut-off frequencies:	Hp=200 Hz, Lp=40.000 Hz		
Transducer location atten.:	4-pole dip-switch		
Low gain attenuator:	4-pole dip-switch		
Amplitude measurement:	Average ac to dc converter		
Internal zero level:	+1.0 V $\pm 0.5\%$		
Internal full-span level:	+5.0 V $\pm 0.5\%$		
External digital outputs:	Opto-isolated P-channel FET transistor connected to positive rail of the RMS system voltage. Max. current, 0.1 A		
DO+TVD1	Digital output	LIMIT 1	to PLC
DO+TVD2	Digital output	LIMIT 2	to PLC
The limits are activated when the TVD value is lower than the adjusted limit. It is no hysteresis when changing from the active to the inactive state. It is 2 % hysteresis when changing from the inactive to the active state. The led in the front of the unit indicates an activated output.			
Analog output 1:	Galvanically isolated current, 4-20 mA, $\pm 1\%$, (daughter board). Load: 0 - 800 Ω , Isolation voltage: max 500V		
Analog output 2:	Voltage output for headset		
Analog output 3:	Voltage output for TVD-signal evaluation device		
RMS-unit interface:	Yes		

4 SETTINGS

4.1 Low Gain attenuation

The digital input, DI+LOGA, will activate the attenuator.

A NOT activated input is indicated by a led in the panel front "High Amplification".

Use SW3 on the 9179 type board

Use SW4 on the 9431 type board

/1	/2	/3	/4	Attenuation in % of full span	
off	off	off	off	0	
on	off	off	off	84	
off	on	off	off	91	Default setting
off	off	on	off	96	
off	off	off	on	97	
on	on	on	on	98	

4.2 Transducer Location setting

This attenuator is to be adjusted depending of the placement of the transducer on the refiner. It is also dependent of which type of sensor being used, type of refiner and the rotation speed. The correct setting has to be established upon testing, but until then, the marked settings can serve as guidelines. 66% is the default setting.

Use SW4 on the 9179 type board

Use SW3 on the 9431 type board

/1	/2	/3	/4	Sensitivity in % of full span	
off	off	off	off	100	Sensor type
on	off	off	off	79	
off	on	off	off	66	TVD-T2 on the plate-holder bolt
on	on	off	off	56	
off	off	on	off	50	TVD-T2S on the ConFlo
off	off	off	on	34	TVD-T1 on the TDC-sensor
on	on	on	on	21	TVD-T2S on the RGP

4.3 Headset volume

SW2	/1	/2	volume	
	off	off	100 %	Default setting
	on	off	67 %	
	off	on	33 %	
	on	on	25 %	

5 ADJUSTMENTS

The adjustment of the alarm limits is done on this unit, but the reading of the limits must be done on the indicator unit (LDU-RM1 or DCU-RM1/2) of the RMS-system.

For adjustments, see the CALIBRATION MANUAL for the RMS-system, RMS-SD1 or RMS-CD1.

6 FACTORY ADJUSTMENTS

This adjustment is done by the supplier, and is usually not necessary after delivery.

If necessary, however, this must be done by qualified personnel only.

The potentiometers are located on the upper part of the board, and are reached from the top.

The DIP-switches, SW3 and SW4, must all be set in the OFF position.

6.1 Zero

- Connect the transducer without any vibration signal applied.
- Connect a DVM (+ to TP10, - to TP7) to the board.
- Adjust the potentiometer P2 (ZERO), until the DVM reads $+1.0 \pm 0.005$ VDC.

6.2 Internal level

- Disconnect the accelerometer transducer.
- Connect an ac-signal across a 2.2 k Ω resistor at the transducer input.
Amplitude = 100 mVrms, Frequency= 5000 Hz.
- Connect a DVM (+ to TP14, - to TP7) to the board.
- Adjust the potentiometer P1 (S-SPAN), until the DVM reads 400 ± 5 mVrms.

6.3 Span

- Disconnect the accelerometer transducer.
- Connect an ac-signal across a 2.2 k Ω resistor at the transducer input.
Amplitude = 100 mVrms, Frequency= 5000 Hz.
- Connect a DVM (+ to TP10, - to TP7) to the board.
- Adjust the potentiometer P3 (SPAN), until the DVM reads $+5.0 \pm 0.005$ VDC.

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