

DIGITAL INDUSTRIES SOFTWARE

Simcenter SCADAS Mobile and Lab Eight-channel Input Module for Voltage, ICP[®] and Charge for Quasi-Static measurements

Simcenter/VC8-QS/2406/20240625

Product Information Sheet

Summary

The VC8-QS supports eight channel signal conditioning and signal processing for voltage sources and ICP or piezoelectric sensors in a single Simcenter SCADAS Mobile or Simcenter SCADAS Lab slot, dedicated for quasi-static measurements.

Providing extended charge input ranges and low time constant (τ), VC8-QS is an optimized input module for charge accelerometers, force/torque cells, and charge (engine combustion) pressure sensors.

BENEFITS

- Extension of standard analyzer functions
- Additional functions work in realtime and offline

FEATURES

- Features
- Online and offline resampling
- Online and offline trigonometric operations
- Online and offline classification of time data
- Pulse to frequency conversion
- IIR and FIR filtering
- Running average of time data

The VC8-QS offers the unique combination of ultra-low power consumption, 204.8 kHz 24-bits analog to digital conversion, and a spurious free dynamic range of 150 dB and a maximum bandwidth of 92 kHz.

Signal conditioning

Each input channel has a voltage amplifier input with ICP supply and a charge amplifier input for direct interfacing to ICP and piezoelectric sensors.

VC8-QS supports smart sensors according to IEEE 1451.4 to read the Transducer Electronic Data Sheet (TEDS) with essential information including sensor type, sensitivity, calibration date, coordinates etc.

The ultra-low-noise charge input supports full-scale ranges from $\pm 1\ 000\text{pC}$ to $\pm 31\ 600\text{pC}$ full scale. A digital high-pass filter can be switched on to eliminate pyroelectric noise.

Analogue to digital conversion

The VC8-QS uses low-power high performance 204.8 kHz 24-bit sigma-delta analogue to digital converters. A 4-pole analogue anti-alias filter precedes each ADC. A wide range of digital decimation filters reduces the bandwidth in steps of 2 and 2.5.

Example for spark plug pressure sensor



Product Information Sheet

General information		VC8-QS specifications
Product name	SCL-VC8-QS, SCM-VC8E-QS	
Description	Simcenter SCADAS Mobile and Lab Eight-channel Input Module for Voltage, ICP®, TEDS and Charge for Quasi-Static measurements	
Input ranges differential input	-	
Input ranges charge input	±1,000pC; ±3,160 pC; ±10,000pC, ±31,600pC	
Input ranges V/ICP input	±316 mV, ±1 V, 3.16 V, ±10 V	
Transducer connector	Eight (8) Microdot connector for sensor input	
Supported transducers		
	AC, DC, ICP and charge coupled sensors	
	Voltage and ICP sensors	
	Piezoelectric charge sensors	
A/D Converter		
Max. sampling rate	204.8 kHz, can be downsampled in steps of 2 and 2.5	
Max. bandwidth (filter off, -3 dB)	92 kHz	
ADC Architecture	24-bit Sigma Delta ADC	
Coupling	DC, AC, ICP and Charge in single ended mode	
Filter		
High Pass Filter	Software selectable high pass filter with 0.015Hz (charge mode only); 0.5 Hz, 7 Hz, 25Hz and 60Hz cut off frequencies.	
AC Coupling	0.015 Hz±6%, 0.5Hz±2%, 5Hz±2%; Time constant (τ) 10.4 s at 0.015 Hz, 0.3 s at 0.5 Hz, 0.03 s at 5 Hz	
Decimation filter	Reduces bandwidth prior to signal processing; bandwidth can be down-sampled in steps of 2 and 2.5.	
Analog anti-alias filter	4-pole Equal Time Delay filter with 164 kHz cut-off frequency and 0.01 dB flatness, 150 dB/oct digital filter with 100 dB alias protection provides an alias free bandwidth of 92 kHz	
Transducer identification		
TEDS	TEDS class 1 (ICP sensors) supported according to IEEE 1451.4 Maximum TEDS cable length is 80 m	
Power		
Power consumption/power budget	During normal operation, no overload and ICP supply switched on: 5.25 W	

Product Information Sheet

Power feedback	<p>LED on the module front panel, providing information on connection, power status and any sensor supply overload/underload. During system booting and startup, the LED on channel 1 will be used to indicate module status (active) using a different LED color and/or blinking pattern.</p> <table border="1"> <tr> <td> <p>LED Modes ICP: Green Charge: Blue TEDS reading: Yellow blinking</p> </td> <td> <p>Alarm Overload: Red ICP error: Yellow/Red blinking TEDS listen mode: Green or Blue blinking</p> </td> </tr> </table>		<p>LED Modes ICP: Green Charge: Blue TEDS reading: Yellow blinking</p>	<p>Alarm Overload: Red ICP error: Yellow/Red blinking TEDS listen mode: Green or Blue blinking</p>
<p>LED Modes ICP: Green Charge: Blue TEDS reading: Yellow blinking</p>	<p>Alarm Overload: Red ICP error: Yellow/Red blinking TEDS listen mode: Green or Blue blinking</p>			
ICP sensor supply	3.5 mA±15 % from 28 V isolated source, over the SCADAS Mobile operating temperature range.			
Input impedance				
ICP mode (AC)	1 MΩ ±1% 112 pF			
Slew rate				
V/ICP (single ended)	20V/μs			
Charge input	20V/μs			
Signal to noise ratio (SNR)	Charge input (typical)	Single ended input (typical)		
±10 V	-	107 dB		
±3.16 V		106 dB		
±1 V		101 dB		
±0.316 V		107 dB		
±31,600pC	105 dB	-		
±10,000pC	98 dB			
±3,160pC				
±1,000pC				
Measured between 10Hz to 20KHz, with 32k block size, 16 averages				
Spurious Free Dynamic Range (SFDR)	Charge input (typical)	Single ended input (typical)		
±10 V	-	150 dB		
±3.16 V		148 dB		
±1 V		140 dB		
±0.316 V		150 dB		
±10,000 pC	148 dB	-		
±3,160 pC	140 dB			
±1,000 pC				
±316 pC				
Measured between 100Hz to 20KHz, with 32k block size, 16 averages				
Crosstalk	Charge input (typical)	Single ended input (typical)		

Product Information Sheet

±10 V		108 dB
±3.16 V	-	117 dB
±1 V		120 dB
±0.316 V		
±10,000 pC	104 dB	
±3,160 pC	110 dB	-
±1,000 pC	115 dB	
±316 pC	118 dB	
Tested at 1.5kHz frequency		
Amplitude accuracy		
	At 1 kHz better than +/- 0.1% at 23 °C	
Gain drift		
	< ± 0.1 % between 5 °C and 40 °C	
Residual offset		
	For DC coupled modes	
	Better than 0.1% at 22°C ± 2°C	
Total Harmonic Distortion (THD)	Charge input (typical)	Single ended input (typical)
±10 V		
±3.16 V	-	98 dB
±1 V		
±0.316 V		91 dB
±10,000 pC		
±3,160 pC	98 dB	-
±1,000 pC		
±316 pC	91 dB	
At 1 kHz frequency, 25.6 kHz bandwidth, measured with a block size of 6400 Hz		
Offset drift	Charge input and AC/ICP voltage	Single ended input DC(typical)
±10 V		
±3.16 V	N/A	< ± 0.1 % between 5 °C and 40 °C
±1 V		
±0.316 V		
±10,000 pC		
±3,160 pC	N/A	-
±1,000 pC		

Product Information Sheet

	±316 pC		
Phase match between any two channels (at 9.9 kHz)		Charge input (typical)	Single ended input (typical)
±10 V			
±3.16 V		-	0.3°
±1 V			
±0.316 V			
±10,000 pC			
±3,160 pC		0.3°	-
±1,000 pC			
±316 pC			
Protection			
Input protection	28 Vrms continuously without damage, charge input up to: ±180,000 pC		
Sensor check	ICP sensor check for open loop and short circuit detection. ICP cable check checking the sensor bias voltage continuously for open loop and short circuit with indication by LED in the front panel.		
ESD protection	According to EN61000-4-2, level 2 and ISO10605		
EMC protection	Comply with CE-EMC directive, when installed in a SCADAS Mobile frame		
Overload detection and indication	Analog overload detection at the input is combined with digital overload detection after the ADC; overloads are indicated on the front panel LED and transmitted to the host.		
Shock protection	MIL-STD-810G specified in MIL-STD-810G method 516.5, Shock Amplitude: 60 gpk.		
Vibration protection	MIL-STD-810G method 514.5, procedure 1, Category 24: RMS 7.694 g		
Ambient operating temperature range	-20 °C to +55 °C		
Storage temperature range	-20 °C to +70 °C		
Housing			
Dimensions	One SCADAS slot (CAMAC)		
Connector and pinning layout			
	Connector type: Chassis: microdot 10-32		
	Mating connector: microdot 10-32		

Ordering information

Support of Simcenter SCADAS Frames and Modules may be restricted in specific Simcenter Testlab application workbooks.

Please check with your local representative for full details.

SCM-VC8-QS: Simcenter SCADAS Mobile 8-channel enhanced 24-bit ICP/TEDS/Charge input module with low time constant for quasi-static measurement

SCL-VC8-QS: Simcenter SCADAS Lab 8-channel enhanced 24-bit ICP/TEDS/Charge input module with low time constant for quasi-static measurement

