SIQUAD DC2HV
SIQUAD DC2HV-P

Characteristics

The SIQUAD ***DC2HV Amplifier*** offers computer-controlled signal conditioning of high voltage or current signals. It has 1 DSP per unit. Signal output is digital via Ethernet and CAN and optional with high precision via analog outputs. Parameter setting is done with the software DaSoft. Signal filtering can be configured from 3..3000 Hz at 20 kS/s sample rate.
The SIQUAD ***Power Measurement Amplifier*** is used to measure electrical power. The input data, Voltage and Current, are measured with 20 kHz per channel. With these results the amplifier computes RMS of voltage and current, frequency, power factor and active and apparent power. For this the amplifier contains a digital signal processor (DSP). The output of the calculated values is available after the first measured period and will be send digitally through Ethernet and CAN.

Technical Data

General	Channels/unit	2, isolated
	AD converter	24 bit / channel
	Sample rate	20 kHz
	Band width	5 kHz
	Analog output optional	± 10 V / 12 mA (short proof) 16 bit resolution
	Digital output	Ethernet, CAN, SPI (internal)
	Input protection	± 1 kV
	Supply voltage	+5 V / 450 mA
	Environmental temperature	0..+50 °C

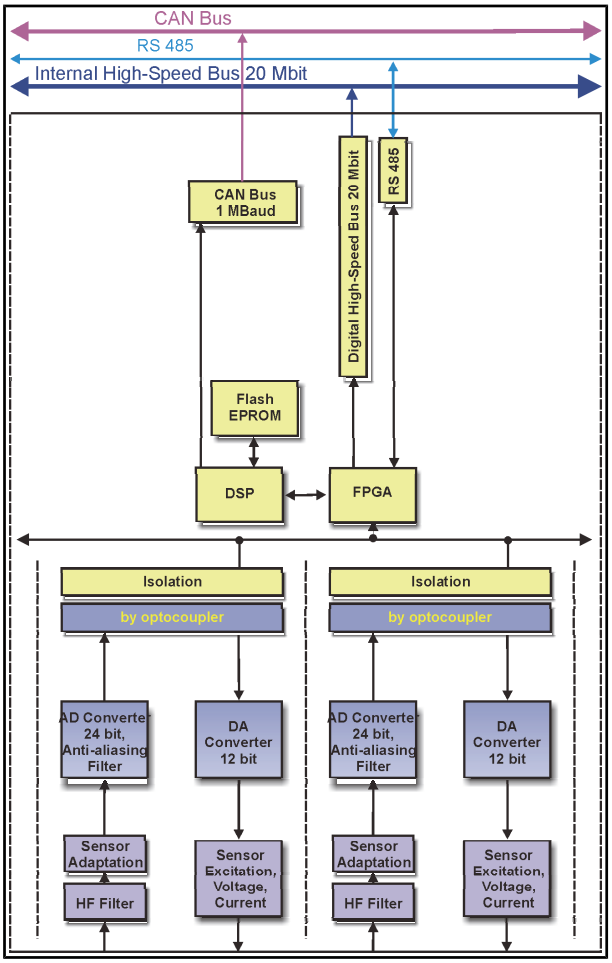
Channel 1 – High voltage input (DC2-HV-P)		
High voltage	Range	10 / 20 / 50 / 100 / 200 / 400 / 800 / 1000 V
	Accuracy	± 0.1 %
	Max. input voltage	1000 V peak
	Input impedance	1 MΩ
	Differential input	Yes
	Max. potential difference between input and ground	500 V peak
	Signal input	Safety banana plugs

Channel 2 – current input (DC2HV-P)		
Signal current	Range	1 A / 5 A
	Accuracy	± 0.1 %
	Max. input current	5 A peak
	Shunt	0,1 Ω (unfused)
	Max. potential difference between input and ground	250 V_{rms}
	Signal input	Safety banana plugs

Channel 2 - Voltage input (DC2HV-P, alternatively)		
Voltage	Range	0.1 / 0.2 / 0.5 / 1 / 2 / 5 / 10 / 20 / 50 / 100 V
	Accuracy	± 0.03 %
	Max. input voltage	100 V peak
	Input impedance	400 kΩ (up to 1V range) 160 kΩ (from 2V range)
	Differential input	Yes
	Max. potential difference between input and ground	250 V_{rms}
	Signal input	BNC, banana plugs

Channel configuration (DC2HV)		
High voltage	Range	10 / 20 / 50 / 100 / 200 / 400 / 800 / 1000 V
	Accuracy	± 0.1 %
	Max. input voltage	1000 V peak
	Input impedance	1 MΩ
	Differential input	Yes

Block Diagram



Dimensions

19“ plug-in unit, 3 U height, 5 U width, depth 160 mm

Ordering Codes

	1.	2.	3.	4.
SIQUAD-DC2HV-BANHV-		-	-	- **P**

1.	**Terminal Channel 2**	
	BANHV	2x safety banana plug
	BAN	Banana plug
	BNC	BNC socket for second voltage input (≤ 100 V)
2.	**Channel configuration**	
	UU	1. Channel – Voltages up to 1000 V 2. Channel – Voltages up to 100 V
	UI	1. Channel – Voltages up to 1000 V 2. Channel – Currents up to 5 A
3.	**Options output**	
	2 AO BNCR	2 analog outputs wired to back panel with BNC sockets
	2 AO BNCF	2 analog outputs wired to front panel 10 U with BNC sockets parallel to input sockets

	1.	2.
SIQUAD-DC2HV -		-

1.	**Terminal**	
	BANHV	2x High Voltage Banana sockets
2.	**Options output**	
	2 AO BNCR	2 analog outputs wired to back panel with BNC sockets
	2 AO BNCF	2 analog outputs wired to front panel 10 U with BNC sockets parallel to input sockets

Functional Principle

The Amplifier acquires both channels with 20 kHz internally and offers the following digital output channels:

Channel 1	Dynamic value of channel 1 (high voltage)
Channel 2	True-RMS U_{RMS} value of channel 1, calculated using following formula: $U_{RMS}=\sqrt{\frac{1}{T}\int_{t_0}^{t_0+T} u^2(t)dt}$
Channel 3	Power factor λ, calculated using following formula: $\lambda=\frac{P}{S}=\cos(\varphi)$
Channel 4	Frequency of channel 1 $f=\frac{1}{T}$ (Resolution: 50 µs)
Channel 5	Dynamic value of channel 2 (current / voltage)
Channel 6	True-RMS I_{RMS} of channel 2, calculated using following formula: $I_{RMS}=\sqrt{\frac{1}{T}\int_{t_0}^{t_0+T} i^2(t)dt}$
Channel 7	Active power P The average of $p(t)=u(t)i(t)$ over the period T is named as active power P: $P=\frac{1}{T}\int_{t_0}^{t_0+T} p(t)dt$
Channel 8	Apparent power S, calculated using following formula: $S=U_{RMS}I_{RMS}$

All calculations are done in the frequency range of 10 to 200 Hz.
All calculated values (channel 2-4, 6-8) will be issued after one period.

Remarks

With an amplifier you can perform power measurements on single phase power. In order to carry out performance measurements on a three-phase system, you need 3 amplifiers (one per phase). The overall result can then be calculated online in the data acquisition software (eg with DAQSoft).
Output of calculated values will start after the first fully acquired period of the input signal.