CSA8

Current Sense Amplifier

- ✓ Tap low voltage DC motor supplies for current spikes to get pulses proportional to RPM
- ✓ 2 outputs per input channel: pulse and DC for supply current measurement
- ✓ For high currents external shunt resistors available
- ✓ analog outputs TAD compatible
- ✓ Can be used for other data acquisition systems as well

Current Sense Amplifier CSA8

The CSA8 is a 4-channel current sense amplifier, offering 2 outputs per channel (thus 8 output connectors).

Each channel's **output connector J*n*20** (*n* = channel number 1 .. 4) provides a "**DC**" output, output connector **J*n*40** provides a "**pulse**" output.
Since *PCB revision C*, each output connector can also provide a sum of the DC and pulse signals, see description below.

Each of the 4 input channels features a **1Ω sense resistor** connected to a difference amplifier with a high common mode voltage range.
Thus, the CSA8 inputs can be used for **high *and* low side current measurements** (within the specs, see below).
If the ground (GND) of the CSA8 is somehow connected to the GND of the system under test, the common mode input voltage for high side current measurements is limited to **±18V**.

The internal **1Ω sense resistor** limits the current to a **maximum of 0.4A**.
If any higher currents need to be measured, an external sense resistor / shunt with lower esistance and higher power specifications must be used.
Mind the new resulting resistor value with the internal **1Ω sense resistor** and the **external shunt (R_{ext})** in parallel! Multiply the below gains with the new total resistor value R_{total}:

$$R_{total} = 1 / (1/R_{ext} + 1/1\Omega)$$

Attention:
In case of external shunts with very low resistance, take great care to properly connect the signal current source and the external shunt to the CSA8 inputs to minimize contact resistance.

Signal Outputs

The input difference amplifier has a fixed gain of 2 and is followed by 2 amplifiers, each amplifier output is connected to an individual output connector.

The "**DC-amplifier**" has a fixed **gain of 11** and a **low pass** corner frequency of about 1.6kHz. This output can be used to measure DC and low frequency currents.
The overall gain referred to the input current is:

$$\mathbf{Gain_{DC\text{-}amp\text{-}1R} = 22mV / 1mA}$$

The "**Pulse-amplifier**" has a fixed **gain of 48** and a **high pass** corner frequency of about 16Hz. This output can be used to measure low pulse currents.
The overall gain referred to the input current is:

$$\mathbf{Gain_{Pulse\text{-}amp\text{-}1R} = 96mV / 1mA}$$

Since revision C, the CSA8 offers a **summing amplifier** as a hardware option. Depending on assembly options, each output connector can provide the **sum of DC and pulse amplifiers**, instead of the individual DC or pulse signals.

The following table shows which resistors must be mounted to use sum or signal:

	output connector	
signal	**J*n*20**	**J*n*40**
DC	mount: R*n*26 remove: R*n*27	-
Pulse	-	mount: R*n*46 remove: R*n*47
Sum	mount: R*n*27 remove: R*n*26	mount: R*n*47 remove: R*n*46

n = channel number 1 .. 4

back to TOP

Specifications CSA8 Rev. C		
Power Supply Input	Lemo Coaxial (Lemo Part No.: EPL.00.250.NTN)	use TAS28 DC power adapter
Power Supply Voltage	DC 10V..18V	
Power Supply Curent	0.3A max	
Current Sense Inputs	4 Screw Terminals (pluggable)	
Current Sense Resistor	**1Ω, ±1%**	
Current Sense Input Range	**0.4A DC max.**	
Common Mode Voltage Input Range	**±18V max.**	for high side measurements: value is higher if system-under-test's ground is completely isolated from CSA8 and TAS28 / TASnano / PC
Common Mode Voltage Rejection	> 60dB at DC	
Input Impedance *(without current sense resistor)*	20kΩ ±0.1%	
Noise (BW 20kHz)	≤ 100µA$_{pp}$ rms RTI	
DC Amplifier - Output Connectors	4x Lemo Coaxial (Lemo Part No.: EPL.00.250.NTN)	
DC Amplifier - Overall Gain	22mV / mA	
DC Amplifier - Overall Gain Accuracy	±3% at 25°C ±10°C, including offset	
DC Amplifier - Bandwidth	DC .. 250Hz (-0.1dB) DC .. 1.6kHz (-3dB)	
Amplifier - High Pass Corner Frequency	1.6kHz (-3dB)	
Pulse Amplifier - Output Connectors	4x Lemo Coaxial (Lemo Part No.: EPL.00.250.NTN)	
Pulse Amplifier - Overall Gain	96mV / mA	
Pulse Amplifier - Overall Gain Accuracy	±5% at 25°C ±10°C, including offset	
Pulse Amplifier - Bandwidth	100Hz (-0.1dB) .. 25kHz (-0.1dB) 16Hz (-3dB) .. 150kHz (-3dB)	
Pulse Amplifier - Crosstalk between channels	>80dB at 1kHz	
PCB Dimensions	100mm x 100mm	

back to TOP