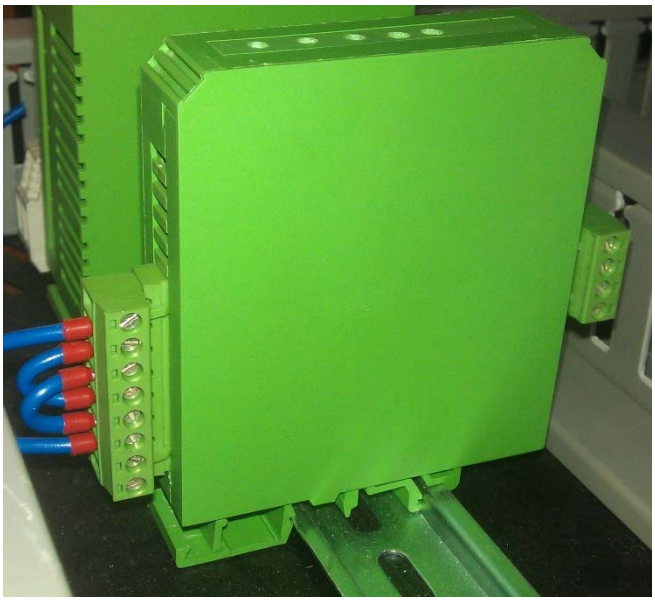
ST100 Data sheet

12/19/2016

General

The ST100 is a high speed isolated signal transmitter. It was designed with the goal of providing protection between sensors (typically current transformers and voltage transducers) on high voltage power lines and data collection equipment. Other isolated signal transmitters on the market are only capable of transmitting DC signals. The ST100 is capable of transmitting signals up to 10 kHz while providing 5,000 Vrms of isolation between the input and the output.



Specifications

Input characteristics

Parameter	Comments	Min.	Typ.	Max.	Units
Input voltage range		-10		+10	V
Input current		-200		+200	mA
Input impedance	Input impedance can be selected with jumpers. 0.1% accuracy.		50, 100, 200, 1G		Ω
Input frequency	The – 3dB cutoff frequency			10	kHz
Supply voltage			24		Vdc
Supply current			42	53	mA

Output characteristics

Parameter	Comments	Min.	Typ.	Max.	Units
Output voltage		-10		+10	V
Output gain	Adjustable in increments that increase with the gain. At a gain of 0.1, 1 and 10 the gain can be adjusted in increments of 0.001, 0.01 and 0.1 respectively.	0.0001		10,000	V/V
Output offset	Adjustable in 5 mV increments.	-2.6		+2.6	V
Output impedance	For signals up to 10 kHz		1	3	Ω
Maximum source current	Maximum sustained current that can be drawn from the output			10	mA

Isolation characteristics

Parameter	Comments	Min.	Typ.	Max.	Units
Isolation voltage	The withstand voltage between input and output for a minimum on 1 second duration.		5000		Vrms

Performance

Parameter	Comments	Min.	Typ.	Max.	Units
Gain error	Variation in output gain with respect to signal peak to peak amplitude for signals with amplitudes between +/- 250 mV to 10 V and frequencies up to 1 kHz. Above 1 kHz the gain drops off to -3 dB at 10 kHz.	-0.2		+0.2	%
Offset error	Variation in output offset with respect to signal peak to peak amplitude for signals with amplitudes between +/- 250 mV to 10 V and frequencies up to 10 kHz.		+/- 0.5	+/- 1.5	%
Noise cutoff frequency	The ST100 acts as a low pass filter with a cut off frequency of at 10 kHz after which it drops off at around 20 dB/decade, attenuating high frequency noise.		10		kHz

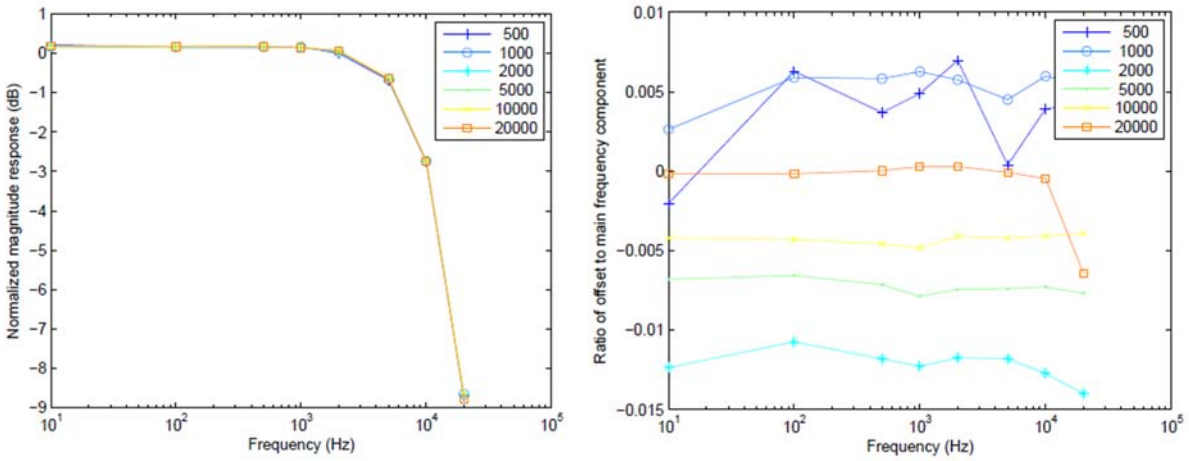


Figure 1: (Left) Magnitude response of the ST100. Different input signal voltages are shown in mV peak to peak. (Right) Offset error of the ST100 as a ratio of the peak to peak input signal voltage. Different signal voltages are shown in mV peak to peak.

Calibration

The gain and offset on the ST100 can be programmed using push buttons and LEDs, shown in Figure 2. Options include:

- adjust the gain and offset
- adjust the gain and offset and saving the values
- restore the gain and offset from the saved values
- restore unity gain and zero offset

Normal operation

Action	Green LED	Red LED
No action	—	

Adjust gain and offset

Action	Green LED	Red LED
Press and hold B1 to adjust gain. The Green LED is on and the Red LED flashes.	—	- - - -
Hold B1 until both LEDs are on constantly.	—	—
Adjust the gain with the up and down buttons.	—	—
Press and hold B1 to adjust offset. The Green LED is on constantly and the RED LED repeatedly flashes twice quickly in a row.	—	- - - - -
Hold B1 until both LEDs are on constantly.	—	—
Adjust the offset with the up and down buttons.	—	—
Press and hold B1 to return to normal operation. The Green LED is on constantly and the RED LED repeatedly flashes twice quickly in a row.	—	- - - - -
Hold B1 until only the Green LED is on. The ST100 is now in normal operation.	—	

Restore unity gain and zero offset

Action	Green LED	Red LED
Press and hold B1 and B2 to restore unity gain and zero offset. The Red and Green LEDs flash in sink.	- - - -	- - - -
Hold B1 and B2 until only the Green LED is on. The ST100 is now in normal operation.	—	

Adjust gain and offset and save values

Action	Green LED	Red LED
Press and hold B1 and B3 to adjust gain. The Green LED flashes and the Red LED is on constantly.	- - - -	—
Hold B1 and B3 until both LEDs are on constantly.	—	—
Adjust the gain with the up and down buttons.	—	—
Press and hold B1 to adjust offset. The Green repeatedly flashes twice quickly in a row and the RED LED is on constantly.	- - - - -	—
Hold B1 until both LEDs are on constantly.	—	—
Adjust the offset with the up and down buttons.	—	—
Press and hold B1 to return to normal operation. The Green repeatedly flashes twice quickly in a row and the RED LED is on constantly.	- - - - -	—
Hold B1 until only the Green LED is on. The ST100 is now in normal operation.	—	

Restore gain and offset from saved values

Action	Green LED	Red LED
Press and hold B2 and B3 to restore the saved custom gain and offset. The Red and Green LEDs alternate flashing.	- - - -	- - - -
Hold B2 and B3 until only the Green LED is on. The ST100 is now in normal operation.	———	

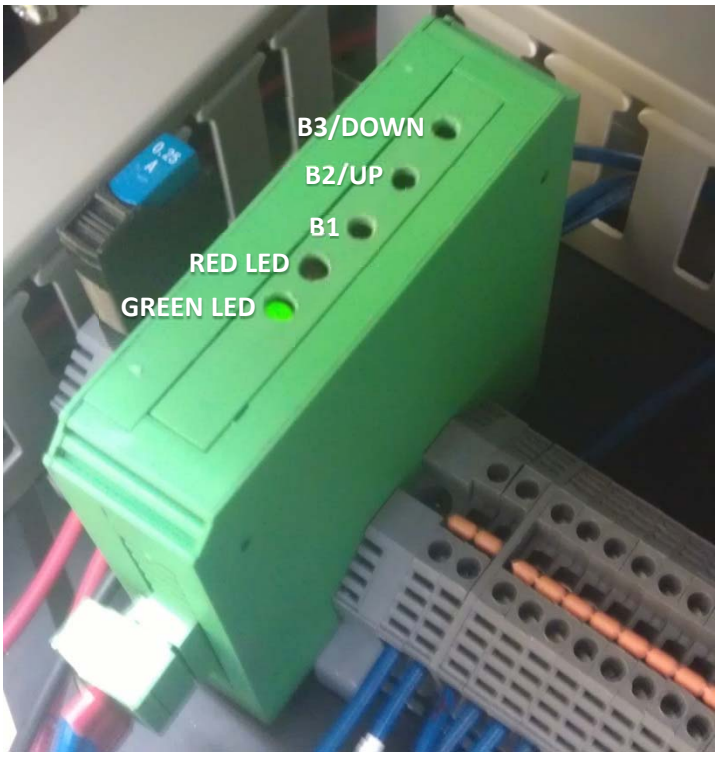
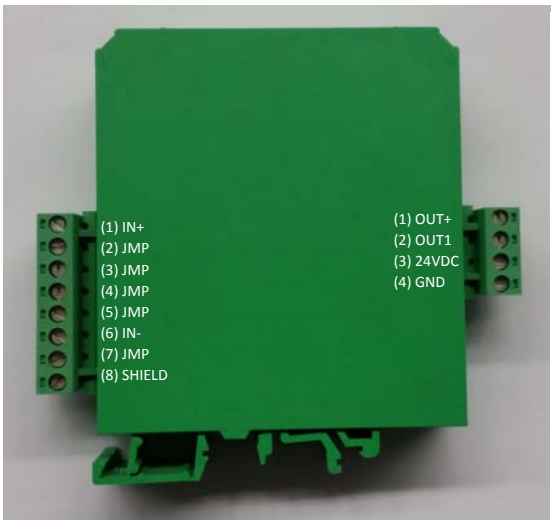


Figure 2: Button and LED locations on the ST100.

Wiring

The input impedance can be selected with jumper on the input connector for input current signals. There are two 100 Ω resistors that can be connected in parallel, individually or in series for 50, 100 and 200 Ω input impedance respectively. For input voltage signals no jumpers are used for an input impedance over 1 GΩ. This is illustrated in Figure 3.

Figure 4 shows how to ground the input signal with and without a shielded cable. When using a shielded cable, ground the negative output of the sensor to the shield and connect the shield to the SHIELD terminal on the input connector. When not using a shielded cable, use a jumper between terminals 7 and 8 to connect the negative signal input to the SHIELD terminal.



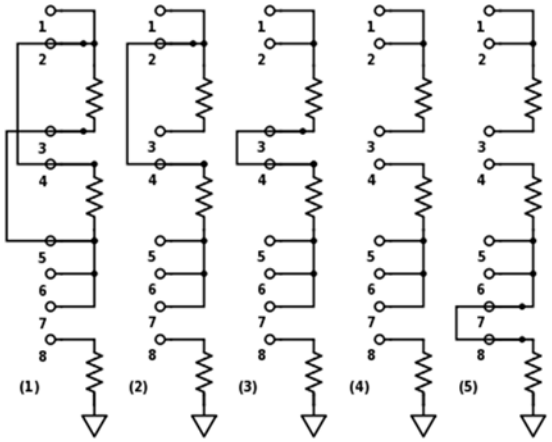


Figure 3: (Left) Input and output connectors. (Right) Wiring of input jumpers for (1) 50 Ω, (2) 100 Ω, (3) 200 Ω and (4) 1 GΩ input impedance. Jumper (5) is wired to ground the negative input when there is no shield on the input line.

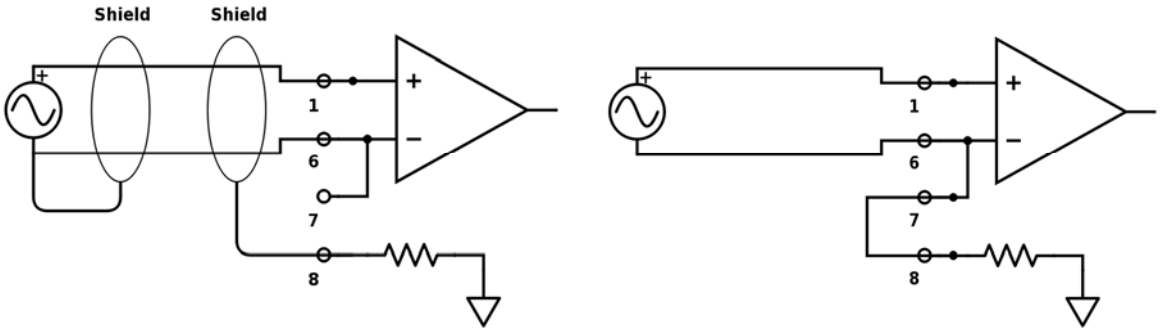


Figure 4: (Left) Wiring of sensor to Shield input with a shielded cable. (Right) Wiring of sensor to Shield input without a shielded cable.