



### XLT1321 and XLT1325 DC/DC linear position sensor technical information

(See datasheets for mechanical specification)

- Measurement range: 25mm (1") to 200mm (8")
- Contactless technology
- Operation up to +125°C
- 6V to 30Vdc input
- 0.5V to 4.5Vdc output



#### Internal circuit features

The sensors input circuitry contains its own linear regulator system that incorporates several features which make it ideal for use in automotive battery-powered systems. In addition to the normal features associated with sensors that contain voltage regulation, such as current limiting and thermal limiting, the sensor is protected against reverse input voltage. The input of the sensor will withstand reverse voltages of 50V. Current flow into the device will be limited to less than 6mA (typically less than 100 $\mu$ A) and no negative voltage will appear at the output, as the sensor protects both itself and the load and therefore provides protection against reverse connected batteries.

The XLT 1321/25 linear inductive sensor series have internal thermal limiting designed to protect the sensor during overload conditions. For continuous normal conditions the maximum temperature rating of 125°C must not be exceeded. It is important to give careful consideration to the thermal resistance from sensor case to ambient during high temperature operation and any additional heat sources mounted nearby must also be considered.

The output circuit contains a high output drive CMOS operational amplifier with a high tolerance to resistive (RL) and capacitive (CL) loads and is therefore suitable for line driver applications as it possess a 25mA dc output drive capability. The output amplifier is stable with capacitive loads up to 780pF. When driving higher capacitive loads, a low value isolation resistor (390 $\Omega$ ) connected in series with the output improves the transient response and the phase margin. The lead length between the sensor and the dc power source and the signal output ( $V_o$ ) and the data acquisition system should be kept below 10m.

#### Wire functions

RED (+Vs): A dc voltage is applied to this wire to power the internal signal conditioning electronics of the sensor. The supply can be a regulated or unregulated voltage supply, providing the level does not exceed that stated in the operating voltage range of the sensor. Permanent damage may result if the supply voltage exceeds the absolute maximum levels. The voltage supply must be capable of supplying 10mA of current, to power the internal electronics plus the maximum output current ( $I_{out}$ ) supplied to the load.

BLACK (0V): This wire is connected to the supply return, 0v or ground of the sensor's external power supply system. The black wire is isolated from the sensors conducting case.

WHITE (Vo): This wire provides a low noise output voltage signal (0.5V to 4.5V) from the sensors output amplifier and is referenced to the sensors black terminal wire. The resistive (RL) and/or capacitive (CL) loads connected to this terminal and the corresponding output current (Iout), must not exceed the limit specified.

### Absolute maximum ratings

Permanent damage may occur if the XLT1321/25 sensor is exposed to any conditions outside its absolute maximum rating.

Supply voltage	(+Vs) +50V	
Operating temperature range	-40°C to +125°C	(Note 1)
Storage temperature range	-40°C to +125°C	
Maximum power dissipation	1W	
Output current (Iout)	<30mA	(Note 2)

### Operating specification

TA= +25°C, +Vs= +12Vdc, RL= 10KΩ, CL= 0pF unless otherwise stated.

♦ see operating characteristics

Parameter	Symbols	Conditions	Min	Typ	Max	Units
Input voltage	+Vs		4.75		30	Vdc
Input current	Is	♦ +Vs = +4.75 to +30Vdc		7	10	mA
Output voltage	Vo		0.5		4.50	Vdc
Sensitivity tolerance (±)		Note 3, 4			1.0	%
Output current	Iout	♦ see derating graph			25	mA
Output resistance		Up to 10Khz			0.10	ohms
Line regulation	ΔVol/Δ+Vs	♦ Δ+Vs = +6v to +30Vdc			0.01	%FS
Output noise/ripple		♦ RL=10K, CL=0pF			0.10	%FS p-p
Power on settlement		♦ within 0.25%FS of final output			200	mS
Under voltage cutout		♦ RL=100K		4.0		Vdc

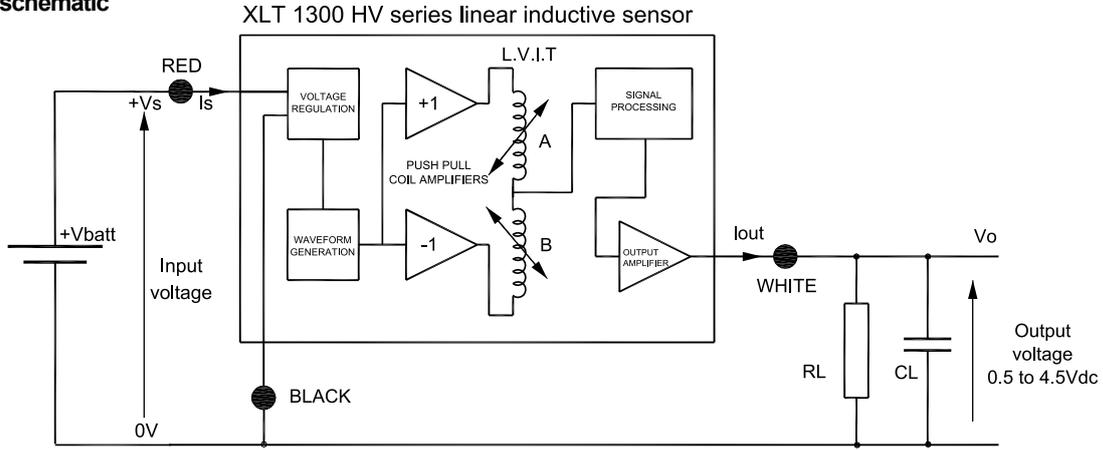
### Performance specification

Parameter	Symbols	Conditions	Min	Typ	Max	Units
Measurement range			25		200	mm
Non-linearity (±)		Note 4		0.2	0.3	%FS
Resolution				INFINITE		
Operating temperature	t°C	♦ Note 1	-40		+125	°C
Thermal drift (±)		♦ Note 5		0.005	0.010	%FS/°C
Frequency response	Bw	♦ Note 6		500		Hz

### Load specification

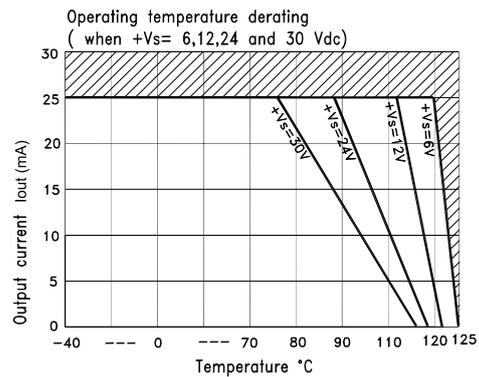
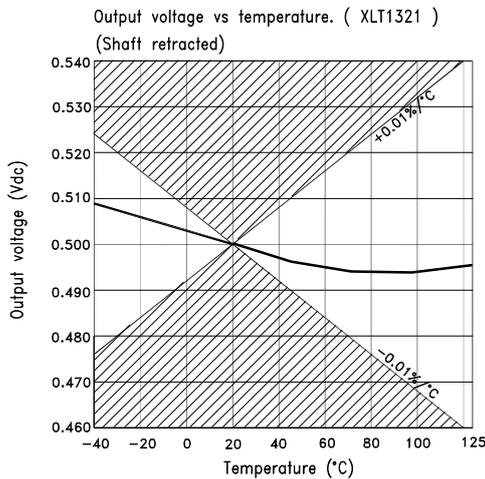
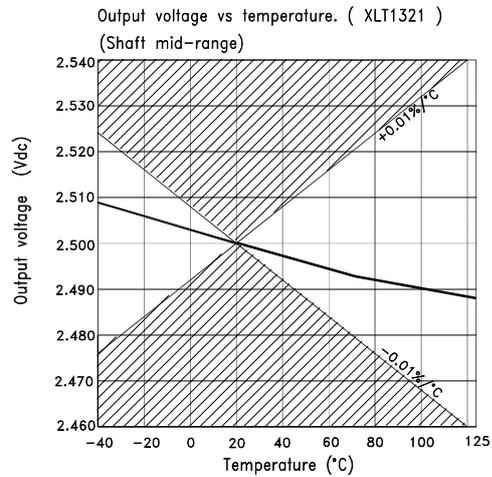
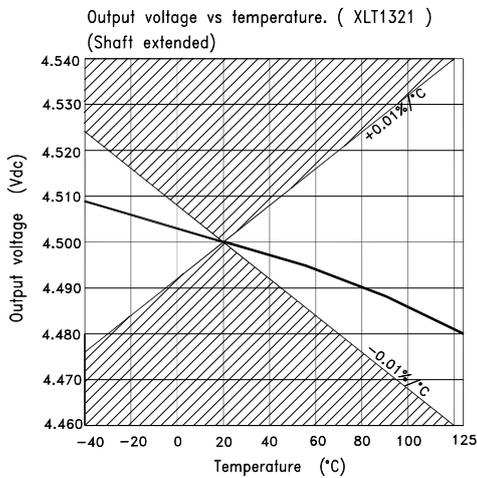
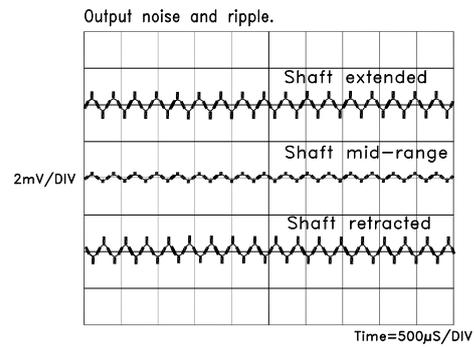
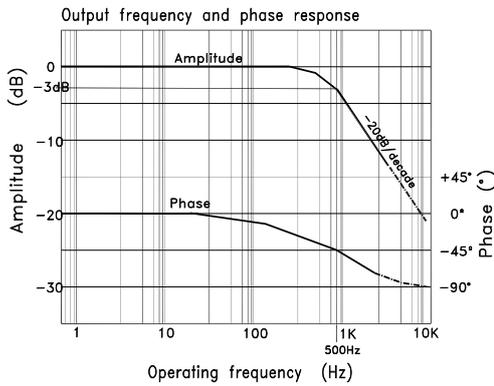
Parameter	Symbols	Conditions	Min	Typ	Max	Units
Load resistance	RL		180			ohms
Load capacitance	CL				780	pF
Lead length					10	m

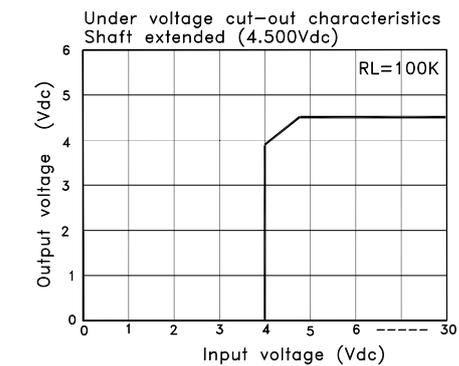
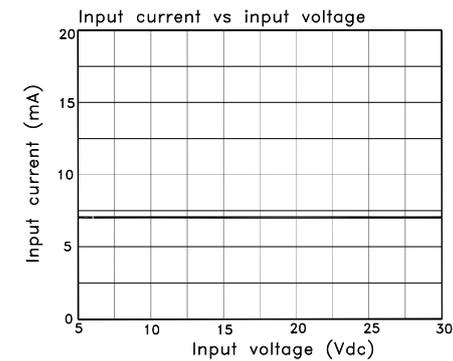
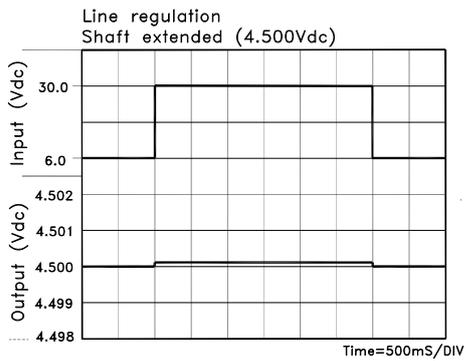
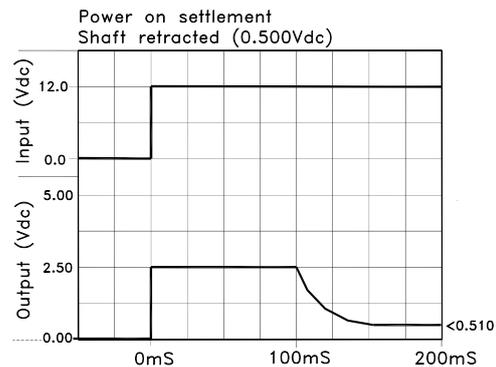
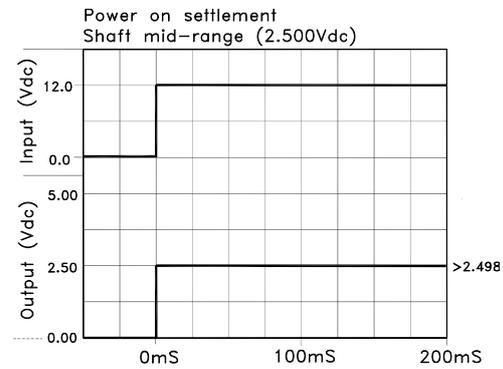
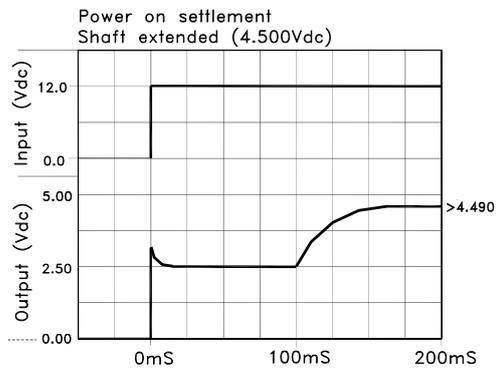
**Connection schematic**



**Operating characteristics**

TA= +25°C, +Vs=+12.0Vdc, RL= 10KΩ, CL= 0pF unless otherwise stated.





## Notes

Note 1: when  $+V_s=+6V_{dc}$  and  $R_L>100K\Omega$ , otherwise see operating temperature derating characteristics.

Note 2: The output current ( $I_{out} = V_o/R_L$ ) can reach 30mA as long as the maximum power dissipation of the sensor is not exceeded.

Note 3: Ideal sensitivity (mV/mm) is calculated from the ideal span voltage of 4000mV (4.5-0.5Vdc), divided by the sensor measurement range in mm.

Note 4: Non-linearity error and sensitivity is calculated from the least squares best fit method.

Note 5: Average thermal drift over  $-40$  to  $+125^{\circ}C$  temperature range.

Note 6: -3dB Bandwidth with a 1st order (-20dB/decade) roll-off.

## Contact details

### Europe

Active Sensors Ltd  
Unit 12, Wilverley Road  
Christchurch, Dorset  
BH23 3RU  
UK



Tel +44 (0)1202 480620  
Fax +44 (0)1202 480664

### North America

Active Sensors Inc.  
8520 Allison Point Blvd Suit 220  
Indianapolis  
IN 46250  
USA



Tel + 317 713 2973  
Fax + 317 713 2950

[sales@activesensors.com](mailto:sales@activesensors.com)

### Additional product information

The information contained in this data sheet on product applications should be used by customers for guidance only. Active Sensors makes no warranty or representation in respect of product fitness or suitability for any particular design application, environment or otherwise except as may subsequently be agreed in the contract for the sale and purchase of products. Additionally, Active Sensors gives no guarantee or warranty for its products in critical control applications, typically in life support systems and the aviation and nuclear industries, where product failure may result in injury, loss of life or catastrophic property damage. Customers should therefore satisfy themselves of the actual performance requirements and subsequently the products suitability for any particular design application and the environment in which the product is to be used. Continual research and development may require change to products and specification without prior notification. © Active Sensors

Doc. Ref: WS-XLT1300TI-1

Page 5/5