CURTISS-WRIGHT

Penny & Giles

Valve Position Transducer

VPT351

- **Accurate measurement of valve position**
- **Measurement range of 10-25mm**
- **Hall-effect, non-contacting sensing**
- **Analog output – 0.5-4.5V or 0.2-4.8V**
- **4-20mA output option**
- **PWM output option**
- **Supply voltage – 5Vdc and 9-32Vdc**
- **Choice of output polarities**
- **M18 mounting thread**
- **Working pressure up to 420bar (5880psi)**
- **Burst pressure up to 600bar (8400psi)**
- **Operating temperature -40°C to 85°C**
- **Sealed to IP69k**
- **AMP or Deutsch connector options**
- **Flying lead option**

Modern day safety directives for machines, including on- and off-highway vehicles, require that correct hydraulic valve operation is assured. This means that spool valves often need to be fitted with sensors that can measure the actual valve position and feed this information back to the machine's controlling electronics, which can then determine if the valve is in a safe position for the intended operation. Traditionally, these small-stroke linear sensors have been based around inductive technology but a more cost-effective approach is to use Hall-effect sensing, which is also non-contacting so can achieve equal levels of reliability.

The VPT351 can provide accurate, positional measurement over a span of 10-25mm and is designed specifically for the monitoring of hydraulic valves. The transducer can operate from either a 5V supply or an unregulated supply in the range of 9-32V, so making it suitable for vehicle applications. A choice of output types are available: analog voltage in two spans, 0.5-4.5V or 0.2-4.8V; 4-20mA current loop; or one of three PWM frequencies. Each of the output types can have its full span set to correspond to the selected measurement range, while the polarity of the output is also configurable. The sensor and associated electronics are enclosed within an electromagnetic shield, thereby eliminating influences from adjacent valves or solenoids.

Mounting to the valve block is via a standard M18 thread and an O-ring is fitted to ensure reliable sealing at operating pressures up to 420bar (5880psi), while being able to withstand periods of pressure as high as 600bar (8400psi).

Connection options are over-moulded, industry-standard AMP Superseal or Deutsch DT04 series connectors, or simple flying-leads for customer termination. Dependent on the type of connector used, sealing as high as IP69k can be achieved.

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SPECIFICATIONS

SUPPLY	
SUPPLY VOLTAGE	5Vdc ± 0.5Vdc and 9-32Vdc for same sensor
SUPPLY CURRENT	<25mA (<50mA for 4-20mA output)
OVER VOLTAGE	36Vdc to 60°C
REVERSE POLARITY PROTECTED	To 32Vdc
POWER-ON TIME	<1s
CONNECTIONS	AMP Superseal, Deutsch DT04 or flying leads
OUTPUT	
MEASUREMENT RANGE	10-25mm in 1mm increments
OUTPUT VOLTAGE (0.5-4.5V)	10-90% ±1% of actual 5V supply, 0.5-4.5V ±3% absolute for 9-32V supply
MONOTONIC RANGE (0.5-4.5V)	5-95% of actual 5V supply, 0.25-4.75V absolute for 9-32V supply - nominal
OUTPUT VOLTAGE (0.2-4.8V)	4-96% ±1% of actual 5V supply, 0.2-4.8V ±3% absolute for 9-32V supply
MONOTONIC RANGE (0.2-4.8V)	2-98% of actual 5V supply, 0.1-4.9V absolute for 9-32V supply - nominal
CURRENT OUTPUT RANGE	4-20mA over measurement range ±2%
MONOTONIC RANGE	2-22mA nominal
PWM FREQUENCY	244, 500 or 1000Hz
PWM LEVEL	0-Vsupply ±1% for 5V supply, 0-5V ±3% for 9-32V supply
PWM DUTY CYCLE	10-90% over measurement range
MONOTONIC RANGE	5-95% nominal
PWM RISE/FALL TIME	<15µs typical
OUTPUT LOAD	10kΩ min. to GND, 20-500Ω for 4-20mA output
OUTPUT NOISE	<0.05% FS max., <0.15% FS max. for 4-20mA output
INPUT/OUTPUT DELAY	≤3ms
RESOLUTION	12-bit (0.025% of measurement range)
LINEARITY	Within ±3mm of midpoint <1% FS max., ±3-12.5mm of midpoint <2% FS max.
SHORT-CIRCUIT PROTECTION	Output to GND, output to 5V supply and output to 32V (4-20mA only)
MECHANICAL	
MECHANICAL RANGE	25mm
MAXIMUM OPERATING SPEED	TBD
WEIGHT	<200g
SPRING FORCE	<8N
WORKING PRESSURE	420bar (5880psi)
BURST PRESSURE	600bar (8400psi)
MOUNTING	M18 x 1.5 ISO6149
ENVIRONMENTAL	
OPERATING TEMPERATURE	-40°C to 85°C
STORAGE TEMPERATURE	-40°C to 115°C
VIBRATION	EN 60068-2-64 (31.4gn rms) 20-2000Hz random
SHOCK	3m drop onto concrete
EMC	Directive 2004/108/EC
SALT SPRAY	EN 60068-2-52 severity 2
SEALING	IP69K at sensor body / IP68 with AMP connector / IP67 with Deutsch connector
LIFE & MTTFd	10 million cycles & 173 years

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