Penny+Giles

A Curtiss-Wright Company

UCM UNIVERSAL SIGNAL CONDITIONING MODULE

Innovation In Motion

INNOVATION IN MOTION

The new Penny+Giles model UCM is a low powered Universal Conditioning Module designed to operate with a wide range of LVDTs, RVDTs and other analogue inductive transducer types. The set-up is simple and flexible, allowing user adjustment of excitation voltage and frequency, operating mode, span output and zero position, as well as configuration for multiple unit synchronisation.

Choice of outputs

The UCM has a low current requirement of less than 10mA and can be synchronised with up to 50 modules in one network for multiple channel measurement systems. The UCM provides a simple 0.5 to 4.5Vdc analogue signal output. By using additional plug-in module cards, a variety of different voltage ranges, a current output or a digital PWM output can be obtained. The module normally operates from an unregulated 10 - 30Vdc supply.

Rugged protection in hostile conditions

The UCM module is housed in a rugged die-cast aluminium alloy housing, suitable for harsh environmental conditions and electrically noisy installations, with EMC Immunity to 100V/m. The housing features an impressive environmental performance, with dust and fluid protection to IP68 and submersion to 2m.

Simple installation

The UCM housing is designed to be mounted on a bulkhead close to the transducer, by using M5 screws through the mounting holes that are located under the housing lid. The supply, output and transducer connections are routed through two IP68 rated cable glands that can accommodate cable diameters of between 3 and 8mm. Connections are made to screw terminal blocks on the UCM board.

EMC Directive 2004/108/EC
The product detailed in this document has been tested to the requirements of EN 61000-4-2 (Immunity).

Quality Assurance
Penny+Giles are accredited to BS EN ISO9001:2000 Quality is at the heart of all our systems, ensuring the reliability of our products from initial design to final dispatch.

Certificate No. LRQ 0924881

ROHS Directive 2002/95/EC
The product detailed in this document complies with the ROHS (Restriction of use of certain Hazardous substances in Electrical and Electronic Equipment) directive 2002/95/EC

Performance assured

The Penny + Giles product development process includes exhaustive qualification testing to ensure that the performance specifications published in our product brochures and technical data sheets are backed by real-life test evidence. This is our assurance to you that our designs have been tested at these parameters. The specification data published for the UCM module is based on tests with a transducer that was fitted with a 0.5m length cable.

User adjustment

The UCM module has the following user-enabled features that allow flexible set-up to suit a variety of applications:

- Transducer excitation voltage – selected by jumper JP5
- Transducer excitation frequency – selected by jumper JP1
- Ratiometric or Differential mode – selected by jumper JP6
- Master/Slave synchronisation – selected by jumper JP2
- Extended voltage range – by using plug-in **VM** output option card
- Optional current output – by using plug-in **CM** output option card
- Optional PWM output – by using plug-in **PWM** output option card
- Zero and Gain adjustment to set-up transducer minimum and maximum outputs

UCM FOR INDUCTIVE TRANSDUCERS

PERFORMANCE
ELECTRICAL

Power requirement

Supply voltage range	**Vdc**	10 to 30 unregulated (limited to 13.5 minimum on certain ranges – see output options table)
Supply current	**mA**	10 maximum (plus transducer current). Additional 9mA with **VM** card fitted, additional 2.6mA (plus output current) with **CM** card fitted or additional 3mA with **PWM** card fitted
Reverse polarity protection		Yes
Misconnection		Any terminal can be connected to ground without damage. Any terminal (except transducer primary excitation output) can be connected to positive supply without damage.

Transducer Excitation

Options		Module is designed to operate 4, 5 or 6 wire differential LVDTs, ratiometric LVDTs and 3 wire inductive half bridge transducers (or RVDT equivalents). Can also be configured to work with potentiometers
Primary voltage	**Vrms**	1 or 3 (link selectable)
Primary frequency	**Hz**	2.5k, 5k or 10k (link selectable)
Primary impedance	Ω	>50 @ 1Vrms or >150 @ 3Vrms

Signal Input (Transducer sensitivity range)

Voltage range	**mVrms**	60 to 5000
Primary/secondary phase shift	°	<±45 in differential mode. No restriction in ratiometric mode
Circuit loading on transducer secondary coils	Ω	>70k any connection

Signal Output – UCM only

Output voltage range	**Vdc**	0.5 to 4.5
Output current - sourcing	**mA**	<1
Output current - sinking	**µA**	<20
Output impedance	Ω	<1
Output load	Ω	>5k resistive to 0V line (when **CM** module is fitted, should be between 20Ω and 400Ω for best linearity)
Line regulation		<0.001% span/Volt
Temperature stability	**ppm/°C**	<200
Power on settlement time	**mS**	<100 to within 0.25% of final reading
Non-linearity (circuit only)	**%**	<±0.01 full stroke
Output filter		3 pole low pass
Frequency response	**Hz**	250 (-3dB)
Output ripple and noise	**mVrms**	<3
Output adjustment range		
Zero		Electrical null may be set anywhere within the output range
Gain (span)		Coarse adjustment by links, fine adjustment by potentiometer
Gain/Zero interaction		Non interactive if zero adjusted first

Signal Output – option cards

VM card	**Vdc**	0 to 5 & -5 to 0, 0 to 10 & -10 to 0, ±2.5, ±5, ±7.5, ±10
CM card	**mA**	4 to 20
PWM card		TTL level compatible signal with a 10 - 90% duty cycle. User selectable frequencies of 100, 130, 310 and 1000Hz. Logic signals: LOW <0.4Vdc HIGH 4.5 ±0.5Vdc
Synchronisation		Up to 50 modules can be synchronised in one network
LVDT/RVDT cable length		25m maximum (best linearity is achieved with lowest acceptable input frequency when using longer cables)

OUTPUT OPTIONS

Output option	Supply voltage range Vdc Single or (Dual) supply	UCM	UCM with VM card	UCM with CM card	UCM with PWM card
0.5 - 4.5Vdc	10 - 30 or ± (10 - 30)	✔	N/A	N/A	N/A
0 - 5Vdc	10 - 30 or ± (10 - 30)	N/A	✔	N/A	N/A
0 - 10Vdc	13.5 - 30 or ± (13.5 - 30)	N/A	✔	N/A	N/A
±2.5Vdc	10 - 30 or ± (10 - 30)	N/A	✔	N/A	N/A
±5Vdc	10 - 30 or ± (10 - 30)	N/A	✔	N/A	N/A
±7.5Vdc	13.5 - 30 or ± (13.5 - 30)	N/A	✔	N/A	N/A
±10Vdc	13.5 - 30 or ± (13.5 - 30)	N/A	✔	N/A	N/A
4 - 20mA	10 - 30 or ± (10 - 30)	N/A	N/A	✔	N/A
PWM	10 - 30	N/A	N/A	N/A	✔
Slope reversal		✔	✔	✔	✔

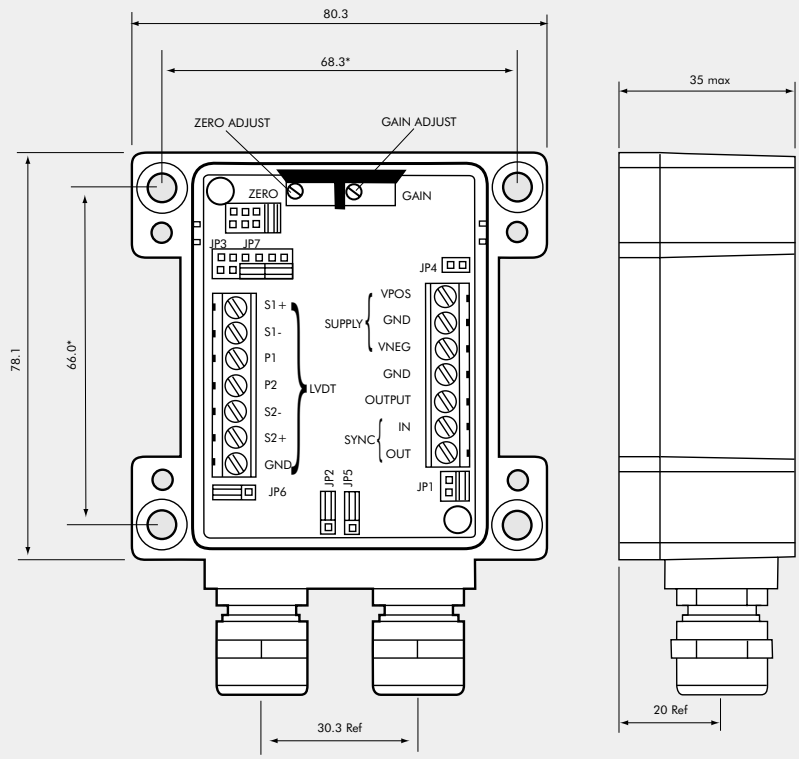
MECHANICAL

Enclosure		Powder coated aluminium alloy
Weight	**g**	320 maximum
Mounting		Bulkhead mounting via M5 fixing holes
Cable exit		Via glands – cable diameter must be between 3.0 and 8.0mm diameter to seal to IP68

ENVIRONMENTAL

Operational temperature range	**°C**	-40 to +85
Storage temperature range	**°C**	-40 to +100
Protection class		IP68 to 2m for 1 hour duration – subject to user cable diameters 3-8mm and securely locked in glands
EMC Immunity level EN61000-4-2		>100 V/m with 1m maximum distance to sensor

DIMENSIONS

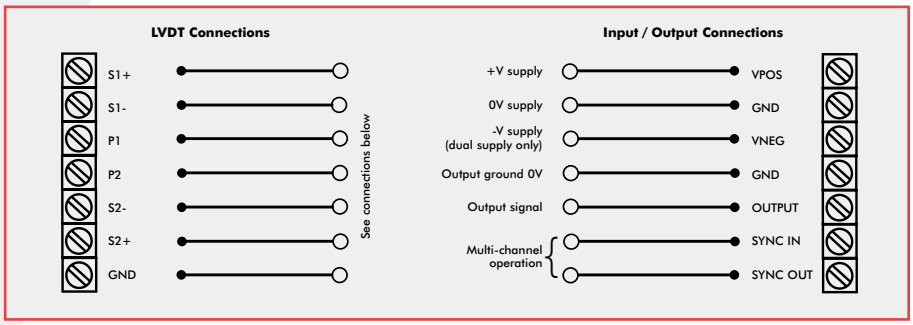


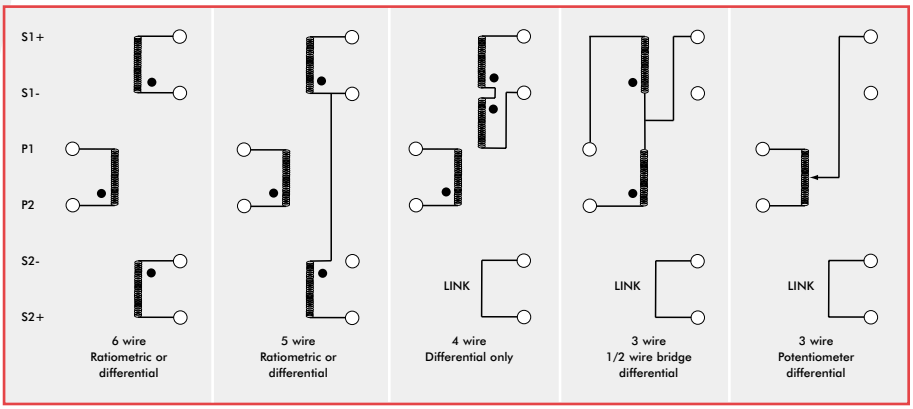
*Bulkhead fixing dimensions
Enclosure provided with four fixing holes to accept M5 screw x 28mm long minimum

Cable glands Cable must be between 3.0 and 8.0mm diameter to maintain IP68 rating of the enclosure. Ensure glands are fully tightened.

ELECTRICAL CONNECTIONS

Screw terminals





● **indicates winding start**

AVAILABILITY

Normally available from stock

ORDERING CODE

UCM Module with basic 0.5 to 4.5Vdc output, IP68 protected metal housing

ACCESSORIES

order separately

VM Voltage Module card to provide an extended range of voltage outputs (see output options table)
CM Current Module card to provide 4-20mA output
PWM Pulse Width Modulation card to provide TTL level signal with 10-90% duty cycle

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Doc Ref: UCM 07/08

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