

# EICT

## Installation and set-up guide

### DESCRIPTION

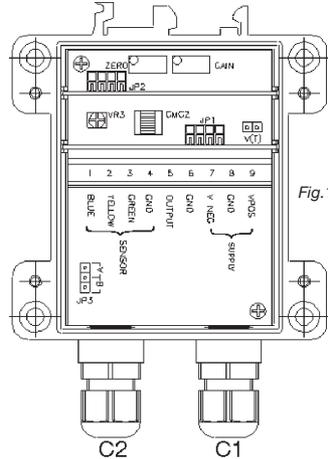
Models **EICT** & **EICTM** are specialist driver/signal conditioning units for Penny + Giles' **ICT** and **SLT** range of linear displacement transducers. These modules incorporate a high performance circuit that drives the transducer and provides a choice of output signals, with zero and gain adjustment for simple user configuration. The module can be supplied in a choice of enclosures, with sealing to IP66 (**EICT**) or IP68 (**EICTM**) protection. For the full product specifications, refer to the **EICT/EICTM** data sheets in the relevant transducer product brochure.

### MOUNTING

- The **EICT** module has a dual mounting option. It can be mounted on a bulkhead within 10m of the transducer, by using 4 x M5 cap head screws, 28mm long (minimum) through the mounting holes that are located under the housing lid. The recommended screw tightening torque is 4Nm. Alternatively, the rear box detail is suitable for mounting on a DIN EN50022 or EN50035 rail.
- EICT module is rated to IP66 environmental protection.**
- The **EICTM** module can only be mounted on a bulkhead exactly as the **EICT** module.
- EICTM module is rated to IP68 environmental protection.**
- The user should also ensure that the rubber seal is properly located in the lid groove prior to re-fitting the lid after setup. Recommended tightening torque for the lid screws is 2Nm.

### WIRING NOTES

- These modules will only drive the **ICT** or **SLT** transducers correctly when an appropriate Sensor Calibration Module Card (**SCMC**) is fitted on header **JP1**. The **SCMC** is supplied within the packaging for the displacement transducer.
- EICT module** - The supply, transducer and output connections are routed through two IP66 rated cable glands that can accommodate cable diameters of between 2.5 and 6mm.
- EICTM module** - The supply, transducer and output connections are routed through two IP68 rated cable glands that can accommodate cable diameters of between 3 and 8mm.
- The user should ensure that the cable glands are tightened sufficiently to ensure cables are clamped and sealed.
- Users should also ensure adequate sealing of the opposite end connections on supply, transducer and output cables to ensure moisture cannot migrate down the inside of the cables into the **EICT/EICTM** module.
- Connections are made to a screw terminal block on the **EICT/EICTM** circuit board.
- The enclosure is not connected internally to ground, so it can be mounted on a chassis carrying a voltage potential other than 0Vdc.
- If in doubt about wiring to ground, consult your systems engineer.
- It is essential that Steps 1 to 7 are completed before connecting a power supply to the EICT/EICTM. Incorrect connections may destroy the EICT/EICTM on power up.**



### Step 1

Remove the four retaining screws to release the lid from the enclosure base. Note the position of the gasket in the lid. Identify the Sensor Calibration Module Card (**SCMC**) supplied with the transducer. Insert the **SCMC** card into position **JP1**. (See Fig.1)



**Important note: Do not remove the Sensor Calibration Module Card (SCMC) after the calibration procedure, to ensure proper function of the sensor system!**

### Step 2

Refer to the Power Supply Voltages v Output Options Matrix chart below to establish the **MAXIMUM** and **MINIMUM** power supply voltage parameters.

CONFIGURATION	PERMISSIBLE SUPPLY VOLTAGE RANGE	POSSIBLE OUTPUT SIGNALS	EXPLANATORY NOTES	
EICT/EICTM ONLY (NO OPTION CARD FITTED)	VPOS = +10 to +60Vdc	+0.5 to +4.5Vdc	The 60Vdc supply voltage is permissible ONLY when NO option card is fitted	
EICT/EICTM WITH CM (CURRENT) OPTION CARD FITTED	VPOS = +10 to +30Vdc	4-20mA	Current is sourced to ground with a compliance voltage of VPOS -4V	
EICT/EICTM WITH VM (VOLTAGE) OPTION CARD FITTED	VPOS = +10 to +30Vdc (SEE NOTE A BELOW)	-10 to 0Vdc	An internal negative rail generator enables output voltages of zero and below to be achieved.	
		-5 to +5Vdc		
EICT/EICTM WITH VM (VOLTAGE) OPTION CARD FITTED	VPOS = +13.5 to +30Vdc (SEE NOTE A BELOW)	-2.5 to +2.5Vdc		The supply voltage must be at least +13.5V to obtain these output voltages
		0 to +5Vdc		
		-10 to +10Vdc		
EICT/EICTM WITH PWM (PULSE WIDTH MODULATION) OPTION CARD FITTED	VPOS = +10 to +30Vdc	TTL level signal with 10-90% duty cycle	Logic High = 4.5Vdc ±0.5Vdc Logic Low = <0.4Vdc Output frequencies can be selected from 100Hz, 130Hz, 310Hz and 1KHz	

### Note A - Dual supply:

- The **EICT/EICTM**, with or without option cards fitted, requires only a single supply voltage connected between **GND** and **VPOS**.  
When the **VM** (Voltage Module) option card is used, an internal negative rail generator enables zero and negative output voltages to be achieved.
- In some situations an external negative supply in the range -10V to -30Vdc may be available (e.g. where the **EICT** is being used to replace an earlier model of signal conditioner). It is permissible to connect this voltage to **VNEG**, in which case the internal negative supply generator on the **VM** option card will be disabled and current will be drawn from the external supply.
- To obtain outputs of -10Vdc or -7.5Vdc, the external negative supply should be at least -13.5Vdc.

### Note B - Adjustment range:

- Zero pot approximately 20 turns. Adjustment range = -10% to +60% of nominal sensor range.
- Gain pot approximately 20 turns. Adjustment range = +40% to +110% of nominal sensor range.
- Minimum sensor range is 50% of nominal sensor range.

Unscrew the cable glands **C1** & **C2**. (See Fig.1). See note [4] regarding cable diameters.

**Single Supply** - Pass the power supply cable through gland **C1** into 'SUPPLY' zone on the **EICT/EICTM** board. Connect the power supply lead carrying the most POSITIVE potential (e.g. +24Vdc) to Terminal 9 [**VPOS**]. Connect the power lead carrying 0V to Terminal 8 [**GND**].

**Dual Supply** - As Single Supply, BUT, connect most negative power lead (e.g. -15V) to Terminal 7 [**VNEG**]. See note [1] for 4-20mA output.

A power supply cable screen can be connected to Terminal 6 [**GND**]. This is recommended but optional. Consult your systems engineer if other options required. *Firmly tighten cable gland lock nut C1.*



### Step 3

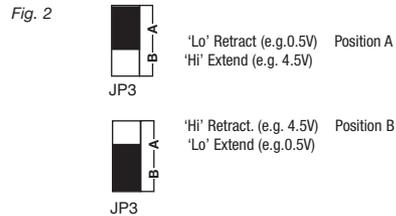
Pass the transducer cable through gland **C2** into 'SENSOR' zone on **EICT/EICTM** board. Connect the transducer to the terminals on the **EICT/EICTM** board, as indicated below and shown in Fig.1 & Fig. 5.

Terminal 1 - <b>BLUE</b>	[Coil -ve]
Terminal 2 - <b>YELLOW</b>	[Coil +ve]
Terminal 3 - <b>GREEN</b>	[Case] See Note [2]
Terminal 4 - <b>Screen</b>	[Cable Screen] See Note [2]

If a connector option is required, either fitted to the transducer cable by a connector adapter kit or any other connector system, refer to Notes [3], [4] & [5]. *Firmly tighten cable gland lock nut C2.*

### Step 4 - Setting output Hi/Lo position

Locate jumper on header **JP3** on **EICT/EICTM** board (see Fig.1). This determines the 'sense' of the voltage/current output with respect to the transducer core position. Locate the jumper in the required position (See Fig. 2). The **EICT/EICTM** is factory set with **JP3** in position 'A'.



### Step 5 - selecting output type before power-up

Locate **JP2** on **EICT/EICTM** board (see Fig.1). If the required signal output is 0.5 - 4.5Vdc or 4 - 20 mA or TTL level (i.e. no Voltage Module (VM) output option card is fitted), fit the jumper into position on header **JP2** (across terminals 1 & 2). The **EICT/EICTM** is factory set with the jumper fitted in this position. **Proceed to Step 7.**

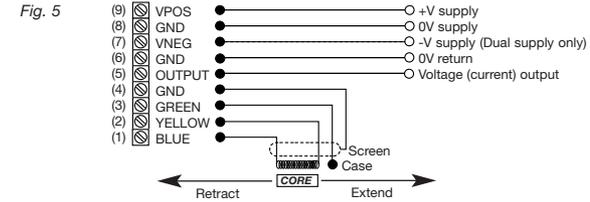
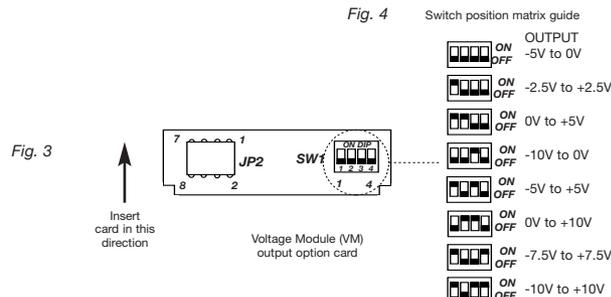
### Step 6 - configuring the VM voltage option card (optional)

If the required **VOLTAGE** signal output is anything other than 0.5 - 4.5Vdc (An additional Voltage Module (VM) output option card is required) then remove jumper from header **JP2** and store on **V(T) LINK PARK** terminals. (see Fig.1) Select the Voltage Module (VM) output option card and locate the **DIP** switch (**SW1**) on the card. (See Fig. 3) Select the required sensor output voltage, using the Switch Position Matrix Guide (see Fig.4), and set the **DIP** switch positions accordingly.

Insert connector of Voltage Module (VM) output option card into position on header **JP2**. **Proceed to Step 7.**



**Important note:** If a Current Module (CM) or Pulse Width Modulation (PWM) output option card is to be fitted, **do not** attempt to insert the card now. Proceed with Steps 5, 7, 8 & 9 as for 0.5 - 4.5Vdc output requirement, as if **NO** output option card is fitted. Then, proceed to Step 10 or 11.



### Step 7 - Monitoring the output

Connect a DMM to :-  
Terminal 5 (**OUTPUT**) +V Output  
Terminal 6 (**GND**) (0V) Ground  
Set DMM range to measure output voltage.

### Step 8 - Setting transducer Lo position with Zero

Move the transducer core to the fully 'Lo' position (See Step 4 and Fig. 2) and power up the **EICT/EICTM**. Adjust **ZERO** trim pot until the required output voltage is achieved on the DMM display. (0.5Vdc if no output option cards are fitted in **JP2**)

**For Dual Supply option:** Output over the full range, relative to ground ('**GND**' 0V) will appear on Terminal 5 '**OUTPUT**'. (e.g. In the case of a -10V to 0 to +10V range, the output can be trimmed to -10V using the **ZERO** trim pot.)

### Step 9 - Setting transducer Hi position with Gain

Move the transducer core to the fully 'Hi' position and adjust **GAIN** trim pot until required output voltage is achieved. (4.5Vdc if no output option cards are fitted in **JP2**)

**For Dual Supply option:** Output over the full range, relative to ground ('**GND**' 0V) will appear on Terminal 5 '**OUTPUT**'. (e.g. In the case of a -10V to 0 to +10V range, the output can be trimmed to +10V using the **GAIN** trim pot.)

**NOTE:** When trimming use '**ZERO**' trim pot to set the most negative end and '**GAIN**' trim pot to set the most positive end of the output signal.

### Step 10 - Fitting the Current option (CM) card

When the Current Module (**CM**) output option card is selected, ensure steps 5, 7, 8 & 9 have been completed. **Switch off** the power supply to **EICT/EICTM**. There are no user-configurable options on the Current Module (**CM**) output option card.

Remove jumper from header **JP2** and store on **V(T) LINK PARK** terminals. (see Fig.1) Insert the Current Module (**CM**) output option card into position **JP2**. Change DMM (already connected between terminals 5 & 6) range settings to measure a 4 - 20mA current output. Power up the **EICT/EICTM**. Check that the output is 4 - 20mA over the stroke of the transducer core.

If adjustment is required :-

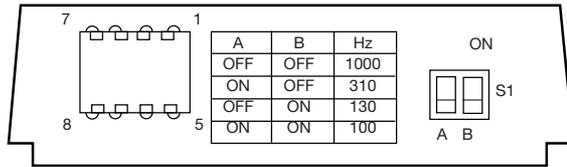
- Move transducer core to the fully 'Lo' position (See Step 4 and Fig. 2). Adjust **ZERO** trim pot until the required output current (4mA) is achieved.
- Move transducer core to the fully 'Hi' position and adjust **GAIN** trim pot until required output current (20mA) is achieved.

### Step 11 - Setting the Pulse Width Modulation (PWM) card

When the Pulse Width Modulated (**PWM**) output option card is selected, ensure steps 5, 7, 8 & 9 have been completed. **Switch off** the power supply to **EICT/EICTM**. Locate the **DIP** switch on the **PWM** card, (See Fig.6.) and select the required output frequency using the matrix table printed on the **PWM** card and set the **DIP** switch positions accordingly.

Insert connector of **PWM** card onto the vacant pins of header **JP2**. Monitor the **PWM** output (Terminal 5) with respect to GND (Terminal 6) using an oscilloscope. Power up the **EICT/EICTM**. Check that output has 10-90% duty cycle over the the required displacement of the transducer, adjust zero and gain trim pots if necessary. (Equivalent to 0.5 to 4.5Vdc output).

Fig. 6



### Step 12 - Final setup

- After configuration, switch off the power to **EICT/EICTM**. Remove DMM or oscilloscope connections. Replace the lid using screws removed, ensuring all gaskets are present and in the correct place. Recommended tightening torque for the lid screws is 2Nm.
- Optional, but recommended - use an indelible pen to mark the configuration settings you have selected, in the appropriate label area shown on the **EICT/EICTM** housing cover. (EICT type; Voltage output range [if applicable]; transducer type)
- The transducer and **EICT/EICTM** are now ready for use. Refer to **EICT/EICTM** technical data sheet/brochure for full specification, mounting options and dimensions.

### Additional Notes:

- Current Module (**CM**) (4 - 20mA) and Pulse Width Modulation (**PWM**) 'set-up' is unaffected by Dual Supply option. Continue to follow set-up guide steps.
- Recommended connections, but optional. Consult your Systems Engineer should other options be required.
- Make a note of, and check, the transducer cable colour codes (see Fig. 5) relative to the assigned connector termination identities, to enable the **EICT/EICTM** to be correctly connected.
- Cable diameter must be between 2.5 and 6.0mm diameter to maintain IP66 rating of the **EICT** housing. Cable diameter must be between 3.0 and 8.0mm diameter to maintain IP68 rating of the **EICTM** housing. Make off cable elements to the connector.
- Rapid integrity check for connector and/or transducer.**  
**EICT/EICTM** must be disconnected from the transducer to carry out following check!  
 Using a DMM, set to the resistance range: (See Fig. 5 for transducer cable colour coding)
  - Measure between connector terminals assigned to transducer 'yellow' and 'blue'. Value should lie between 40Ω and 170Ω.
  - Measure between connector terminals assigned to transducer 'green' and 'yellow' and/or 'blue'. Value should be 'open circuit'.
  - Measure between connector terminal assigned to 'green' and the transducer body. Value should be 'short circuit'.
  - 'Screen', if used - Connector terminal assigned to 'screen' should be 'open circuit' to all the other connector terminations and transducer body unless otherwise specified by your Systems Engineer.
- Any problems or questions should be e-mailed to sales@pennyandgiles.com

For technical assistance contact your local distributor or Penny+Giles at

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