Instruction & Maintenance Manual

Techtrol
Innovating Level Controls Since 1984

Techtrol Universal Indicating Controller - 'TUIC'

'TUIC' can be used in conjunction with any 2 wire X'mitter with 4-20mA o/p for remote display & control.

Pre-Installation Check

- ☑ Ensure that no physical damage is caused to **'TUIC'** due to incorrect handling.
- ☑ Wire **'TUIC'** as per wiring Diagram (Fig. 1)
- ☑ Connect '**X'mitter/Calibrator'** o/p (4-20mA) to terminal **'CH1'** of **'TUIC'** with multimeter (mA) in series.
- ☑ Switch on supply & observe intialising message on **'TUIC'**
- ☑ At i/p of 4mA, **'TUIC'** will display lowest value.
- ☑ Increase i/p gradually from 4 to 20mA & observe increase in displayed value to its maximum.

Wall Mtg. IP65

Panel Mtg. IP41

Ex-P Wall Mtg. Gr IIA & IIB

Installation

Panel Mounted : Identify mounting location and prepare 92 x 92mm **'cutout'** on panel. Mount **'TUIC'** from front and secure it in place through fixing clamps.

**Wall Mounted :** Mount **'TUIC'** on identified location and secure it on four mounting holes.

During installation, please ensure :

- ☑ Mounting surface should be flat and without vibrations.
- ☑ Mounting location should be away from high voltage cables, contactors.
- ☑ The ambient temperature around **'TUIC'** location should be maintained below 60ºC
- ☑ **'TUIC'** should be protected from direct sunlight by using sun shield.

CC 110   4xØ6.35   CC169.5
CC140   CC 259.5
Wall mtg.
Size : 160 x160Wx90 H
Ø8.5, 4NOS
92
92
Panel mtg.
Size : 96L x 96W x 150D
Ex-P Wall mtg.
Size : 275Lx185Wx150H
All dimensions in mm

Termination and Wiring Diagram

- ☑ During wiring of **'TUIC'**, supply should be kept **'OFF'** for human safety and prevention of accidents.
- ☑ Connect 230VAC to supply terminal of **'TUIC'**. In case of **'24VDC'**, ensure correct polarity.
- ☑ Connect **'X'mitter'** o/p to **'CH1'** terminal of **'TUIC'**. Ensure distance between **'X'mitter'** & **'TUIC'** does not exceed 600 Ohm. (Max load)
- ☑ Whenever **'Re-transmission'** of **'TUIC'** is provided, it is **'Isolated type'**.
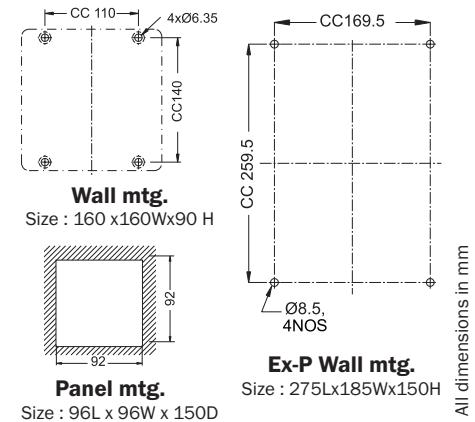
Fig. 1

Termination of TUIC (Panel mtd.)

Termination of TUIC (Wall mtd.)
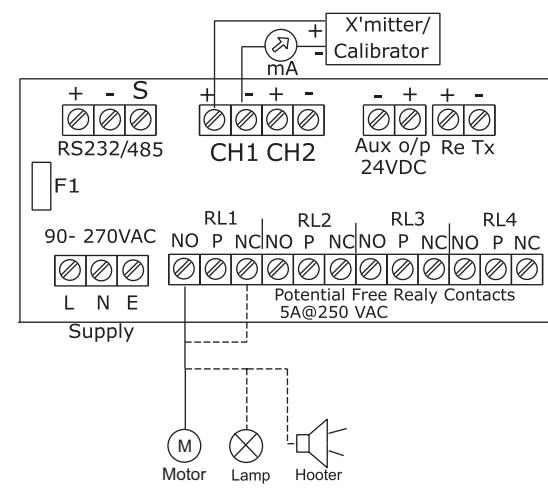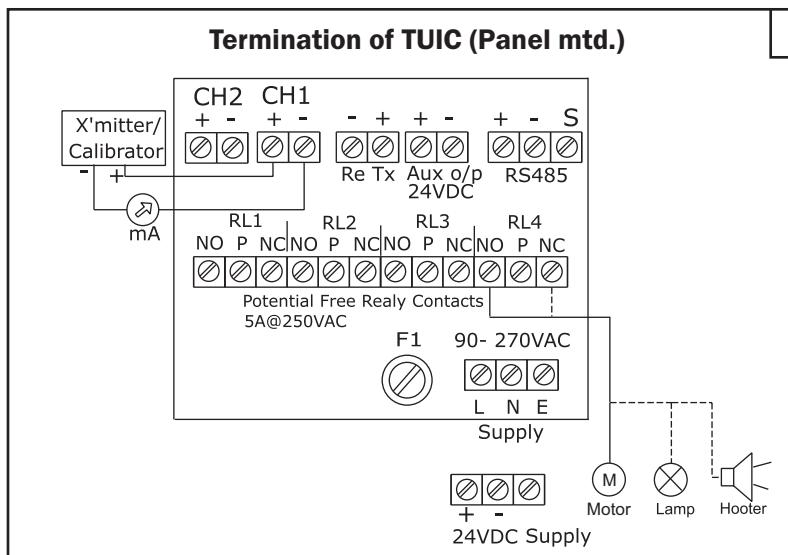
Precautions

- ☑ Ensure **'TUIC'** is duly earthed and located in areas having ambient temperature < 60 C..
- ☑ During wiring of **'TUIC'**, supply should be kept **'OFF'** for human safety and prevention of accidents.
- ☑ Wiring should run away from high voltage cables, contactors and inductive loads.
- ☑ Ensure wall mtg.**'TUIC'** is closed properly with its cover & gasket. Cable should be full tight in gland ensuring no gap.
- ☑ Before switching on supply, ensure wiring is correct and completed as per **'Wiring Diagram'**.
- ☑ Use suitable snubber in case of inductive load across contactor / relay coil .

Programming

'**TUIC'** is programmed through keys on front panel, in conjunction with display for parameters. Correct programming is essential for obtaining accuracy, reliable performance & control.

Key Functions

MODE - To enter in **'Program Mode'** & configure data or **'Escape'** from **'Volume strap entry'**.

NEXT (SHIFT) - To select **'Next Menu'** or shift to **'right digit'**.

UP (INCREMENT) - To select **'Previous Menu'** or **'Increment'** selected digit value.

DOWN (DECREMENT) - To **'Decrement'** of selected digit value.

ENTER - To **'Enter'** parameter & move to next parameter programming **'or'** go to **'Run Mode'** after **'Saving'**.

Note : While programming if any parameters are not required to be set, press 'ENTER' to move to next parameter.

Programming Steps	Display

1.   '**TUIC'** has two modes -
 RUN : (Normal Operating)
 In **'Run Mode'** data can be viewed on display are operating values, as shown in adjacent column.
	Tank No. Level Display Level Unit
	 `T : 0 1   L : 0 2 0 0 0   m m`
	 `V : 0 0 0 0 2 0 0   L t`
	 Volume Display Volume Unit

2. **PROGRAM MODE : (Programming)** In **'Program Mode'** operator can use keypad in conjunction with display to set parameters.	
2.1 **MODE** Press **'MODE'** key for programming and display shows message **'Enter Pass-Word'.**	`E n t e r   P a s s _ w o r d` `P a s W r d : _ _ _ _`
3. **Enter Pass-word** To program parameters, it is required to enter correct **'Pass- word'**. '**TUIC'** is programmed by pressing **'ENTER'** key four times.	
3.1 **ENTER** Press **'ENTER'** key four times and observe **'four stars'** on display.	`E n t e r   P a s s _ w o r d` `P a s W r d : * * * *`
If wrong **'Pass-word'** is entered it will automatically return to **'Run Mode'**.	`E n t e r   P a s s _ w o r d` `W r o n g   P a s s _ w o r d`

	Programming Steps		Display

| 4. | | Select display parameters in **'Run mode'** |

Display:

R	u	n		T	i	m	e		D	i	s	p	l	a	y
E	n	a	b	l	e	/	D	i	s	a	b	l	e	.	.
R	u	n		T	i	m	e		D	i	s	p	l	a	y
L	e	v	e	l		D	i	s	p	l	a	y			y

4.1 [▲] Press **'UP'** key to toggle between **'y or n'**.

4.2 [ENTER] Press **'ENTER'** to select & display **'Menu 1'**.

5. **Menu-1 Configure 'Level range',**
'Bottom offset' (+ve / -ve), 'Re-Tx O/P prog'.

'L-Range' is measuring range. **'Bottom offset'** is
dead level or blanking distance in mm.
'Re-Tx prog'- I/P signal is re-transmitted
against programmed level for further use.
(All above parameters are to be feed in 'mm')

M	e	n	u	1	.	.	.	.							
L	e	v	e	l	,	4	_	2	0		p	r	o	g	

5.1 [ENTER] Press **'ENTER'** to go inside **'Menu -1'**.
Modify level range using **'UP', 'DOWN'** & **'NEXT'** key

M	e	n	u	1	.	.	.	.							
L		R	a	n	g	e	x	x	x		m	m			

5.2 [ENTER] Press **'ENTER'** to configure **'Bottom offset'**.

M	e	n	u	1	.	.	.	.							
B	o	t	t	.	o	f	f	s	e	t	:		+	v	e

5.3 [▲] Use **'UP'** key to select **'+ve or -ve Bottom offset'**.

5.4 [ENTER] Press **'ENTER'** to configure **'Bottom offset'** value.
Modify digit value using **'UP', 'DOWN'** & **'NEXT'** key

M	e	n	u	1	.	.	.	.							
B	o	t	t	o	m	:	+	x	x	x	x		m	m	

5.5 [ENTER] Press **'ENTER'** to program
'Re-transmission O/P' 4 - 20mA.

R	e	T	x		O	/	p		P	r	o	g	.	.	.
4	m	A		a	t	:	0	0	0	0	0			m	m

5.6 [ENTER] Press **'ENTER'** to enter level against
'4mA at : _ _ _ _ _ mm'
Modify digit value using **'UP', 'DOWN'** & **'NEXT'** key

5.7 [ENTER] Press **'ENTER'** to enter level against
'20mA at : _ _ _ _ _ mm'
Modify digit value using **'UP', 'DOWN'** & **'NEXT'** key

R	e	T	x		O	/	p		P	r	o	g	.	.	.
2	0	m	A	a	t	:	0	2	0	0	0			m	m

5.8 [ENTER] Press **'ENTER'** to display **'Menu 2'**.

6 **Menu 2 - Configure 'Unit', 'Tank no'**
& 'Communication data'.

Select units for **'Level'** & **'Volume'**.
Program **'Tank identification number'**
and communication data. In case of **'RS485',**
protocol documents are provided with manual.

M	e	n	u	2	.	.	.	.							
U	n	i	t	,	T	k	.	N	o	.	C	o	m	m	u

	Programming Steps	**Display**

6.1	Press **'ENTER'** to select unit for level.														

Display 6.1:

M	e	n	u	2	.	.	.	.							
L	e	v	e	l		U	n	I	t				m	m	

6.2   Press **'UP'** key to select unit **'% / mm / cm / M '.**

6.3   [ENTER]   Press **'ENTER'** to select unit for volume.

M	e	n	u	2	.	.	.	.							
V	o	l	u	m	e		U	n	i	t				L	t

6.4   [▲]   Use **'UP'** key, to select unit **'Lt/KL/Ton/%/gallon'**

6.5   [ENTER]   Press **'ENTER'** to configure **'Tank No'.**
Modify digit value using **'NEXT', 'UP'** & **'DOWN'** key

M	e	n	u	2	.	.	.	.							
T	a	n	k		N	o	:			0	1				

6.6   [ENTER]   Press **'ENTER'** key to configure **'Slave Add'.**
Modify digit value using **'UP', 'DOWN'** & **'NEXT'** key

M	e	n	u	2	.	.	.	.							
S	l	a	v	e		A	d	d	:	5	5				

6.7   [ENTER]   Press **'ENTER'** key to configure **'Baud Rate'.**

M	e	n	u	2	.	.	.	.							
B	a	u	d		R	a	t	e	:			9	6	0	0

6.8   [▲]   Use **'UP'** key to change **'Baud Rate'**
(1200/2400/4800/9600).

6.9   [ENTER]   Press **'ENTER'** key to display **'Menu 3'.**

7   **Menu 3 - Configure Set /**
Reset values of each relay
Program Set / Reset values for each relay
according to application.

M	e	n	u	3	.	.	.	.							
R	e	l	a	y		P	r	o	g	r	a	m	i	n	g

7.1   [ENTER]   Press **'ENTER'** to program set value of Relay 1.
Modify digit value using **'UP', 'DOWN'**
& **'NEXT'** key, else press **'ENTER'** to escape
& go to next parameter setting.

R	e	l	a	y		1									
			S	e	t	:	x	x	x	x	x		m	m	

7.2   [ENTER]   Press **'ENTER'** to modify **'Reset'** value.
Modify digit value using **'UP', 'DOWN'**
& **'NEXT'** key, else press **'ENTER'** to escape
& go to next parameter setting.

R	e	l	a	y		1									
	R	e	s	e	t	:	x	x	x	x	x		m	m	

Follow same programming steps to enter set and reset values for remaining relays.

7.3   [ENTER]   Press **'ENTER'** key to display **'Menu - 4'.**

Note : Relays can be set as-
1) **'Set Value' >'Reset Value'** - Relay will energize,
   when **'Level'** is >/= to **'Set Value'** & de-energizes when
   'Level' is </= to **'Reset Value'.**
2) **'Reset Value' > 'Set Value'** - Relay will energize when
   'Level' is </= to **'Set Value'** & de-energizes, when
   'Level' is >/= to **'Reset Value'**

Programming Steps	**Display**

8   Menu 4 - Volume Strap Table (Level to Volume conversion) for linear & non - linear tanks.

Program **'Volume'** entries corresponding to fixed level intervals as per your tanks strap table. Start with **'0 mm'** level and proceed to higher values as incremented in the strap table. The volume between two level intervals is linearly interpolated. To achieve better accuracy, it is advised to reduce the level intervals.

```
M e n u 4 . . . .
V o l u m e   S t r a p . . .
```

8.1 [ENTER] Press **'ENTER'** to configure **'Level intervals'**.
Modify digit value using **'UP', 'DOWN'** & **'NEXT'** key

```
V o l . S t r a p   E n t r y
L i n t :   0 0 0 0 0   m m
```

8.2 [ENTER] Press **'ENTER'** to program **'Volume'** for **'first level interval'**.
Modify digit value using **'UP', 'DOWN'** & **'NEXT'** key

```
S t r a p   L : 0 0 0 0 0   m m
V o l     : 0 0 0 0 0 0
```

8.3 [ENTER] Press **'ENTER'** to configure **'Volume'** for **'next level interval'.**
Modify digit value using **'UP', 'DOWN'** & **'NEXT'** key

```
S t r a p   L : 0 0 1 0 0   m m
V o l     : 0 0 0 1 0 0
```

8.4 [ENTER] Enter volume strap for whole range.
Add one more extra strap entry after max level.

8.5 [MODE] Press **'MODE'** to escape and display next **'Menu 5'**
Note : Each volume entry is automatically saved in nonvolatile memory.

9   Menu 5 - Change of Password? :

```
M e n u 5 . . . .
C h a n g e   P a s s W o r d ?
```

9.1 [ENTER] Press **'ENTER'** to feed **'Old Password'**
If incorrect password, display will show **'Menu-6'**.

```
E n t   O l d   P a s s W o r d
P a s W r d : _ _ _ _
```

9.2 [ENTER] Press **'ENTER'** to enter **'New Password'**.
Enter **'New Password'** using four key combination and display shows next **'Menu-6'.**

```
E n t   O l d   P a s s W o r d
P a s W r d : _ _ _ _
```

10   Menu 6 - This menu is used to save programmed data in nonvolatile memory.
Each time any programmed parameter is modified, this menu is required to be executed to **'Save'** modified data.

10.1 [ENTER] Press **'ENTER'** key to **'SAVE'** programmed value and return to **'Run Mode'. 'or '**

```
M e n u 6 . . . .
S a v e   P r o g . D a t a   ?
```

10.2 [▶] Press **'NEXT'** key and display returns to **'Run Mode' 'without saving'**.

```
T : 0 1   L : 0 2 0 0 0   m m
V : 0 0 0 0 0 2 0 0   L t
```

☑ Check and tighten all loose electric connections.

☑ Clean **'TUIC'** internally to ensure, it is free from metallic particles and dust

☑ After maintenance, ensure wall mtg. **'TUIC'** is closed properly with its cover & gasket. There is no gap between **'cable OD' & 'cable gland ID'.**

Troubleshooting

SL	Faults/Defects	Cause	Solution
1	No Display	a. Improper supply or loose connection. b. Wrong polarity in case of 24VDC supply. c. Fuse (supply) blown.	a. Check supply & tighten loose connection. b. Connect 24VDC supply with correct polarity (refer Fig-1) c. Check supply is within limit. Replace fuse (F1) (500mA for 230VAC), (250mA for 24VDC).
2	No change in display value.	a. No change in signal from X'mitter. b. Wrong connection c. Fuse inside 'TUIC' is blown.	a. Check wiring (fig -1),(X'mitter problem) b. Connect X'mitter with correct polarity c. Open Encl. and replace fuse (100mA)
3	Fluctuation in display value	a. O/P of 'X'mitter' is fluctuating. b. Turbulence in liquid.	a. Check & tighten loose connections if any. b. Install X'mitter at turbulent free location. c. Use stiil well / Ex.cage to minimize turbulence.
4	Display appears faded	a. Fading due to direct exposure of LCD display to sunlight.	a. Provide proper shed ('TUIC' should be protected from direct sunlight)
5	Incorrect relay operation.	a. Incorrect relay setting.	a. Recheck & program 'TUIC' with correct set / reset values.
6	Re-transmission current not proper.	a. Incorrect programming of Re-transmission. b. Improper wiring.	a. Check programmed values. b. Refer Fig1
7	Communication failure in Rs485	a. Termination wrong polarity. b. Slave address & baud rate of 'TUIC' not matching with those values in PC. c. Loose terminal connection.	a. Check and correct wiring b. Check and re-program with correct values. c. Tighten the terminals.
8	Volume display incorrect.	a. Wrong volume strap entry	a. Check strap entry. (Refer Menu 4 prog.)
9	Keypad does not operate	a. Wrong use of keys b. Rough handling of keys / misalignment of keypad - PCB.	a. Refer ' Key Functions'. b. Contact factory.

Area Representative / Distributor :

We reserve the right to modify design and specifications without prior notice.

MAN/TUIC/Rev 05/01-14

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