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INSTRUCTION AND MAINTENANCE MANUAL FOR TECHTROL FLOW INDICATING TOTALISE. ' TFIT '

CONTENTS

We are glad to know that you are using a reliable ' Techtrol Product ". For proper and safe functioning of the same, we suggest you to go through this Manual carefully before installing our instrument.

INTRODUCTION & WORKING :

Techtrol Flow Indicating Totalise - TFIT is a unit to be used with FLOW Transmitters. Other versions are also available for Pressure, Temperature, Flow transmitters etc. T F I T works on 4 to 20 mA / 1 to 5 VDC input signal from transmitter. This analog input is converted to digital data by A to D Converter. A microprocessor then calibrates the input and controls the output functions of the Display & Relays as per configuration.

FEATURES :

A 16 X 2 Character Dot matrix backlit LCD Display.
B Two character tank identification.
C Level Display as per selected unit I.e. % / mm / cm / Mtr.
D Flow Display as per selected units I.e. M3/m , M3/H , Lt/m , Lt/s
E Volume calculations for Linear, Non-linear Tanks (Vessels) and display in % / Ltrs / KL / m^3.
F Totalise flow unit in Ltrs , M3 , KL
G Four Level alarm generation and display [HH, H, L, LL.]. Alarm set points are programmable.
H Relay outputs 4 nos. independently configurable on alarms or latching type ; set & reset.
I Programming is password protected
J RS232 or RS485 Communication available

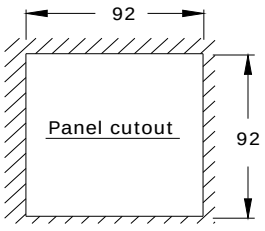
SPECIFICATIONS :

CIRCUITRY	MICROCONTROLLER BASED
INPUT	4-20 mA / 1 to 5 Vdc analog
OUTPUT	Relay out put 4 nos. Contact rating 230VAC, 5A Configurable on one of the four level alarm or on latch mode set & reset **Optional** 1 RS232C / RS485 Output Protocol RTU Modbus 2 HART Communication **Optional** 3 4-20mA Max load 600E
DISPLAY	16 X 2 Character dot matrix LCD Display with backlit
PROGRAMMING	Using 5 function keys Mode,Next (Shift), Up (Increment), Down (Decrement), Enter
PROTECTION	Optical Isolation for Inputs/Outputs Lighting Protection using MOV's
SUPPLY	230VAC/110VAC 50Hz / 60Hz
ENCLOSURE	Panel mounting 96mm x 96mm x 150mm Protection IP41 Wall mounting 160mm x 160mm x 90mm Protection IP65

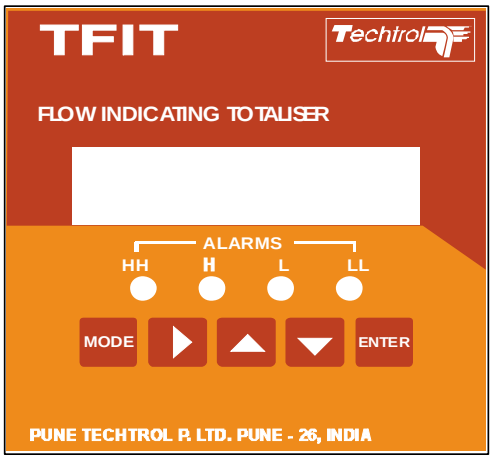
CONSTRUCTION & OPERATION :

MECHANICAL - TFIT is a panel mountable instrument (96mm x 96mm x 150mm) housed in an ABS plastic enclosure. A wall Mounting version is also available in glass polyester enclosure of the size of 160 x 160 x 90 mm.

DISPLAY - The front contains a 2 lines x 16 character dot matrix, LCD Display with Backlit.



Front Panel



KEYS - Five keys are provided for programming & to configure data. These are as follows,

MODE **Mode Key** - Press this key for programme / configure data.

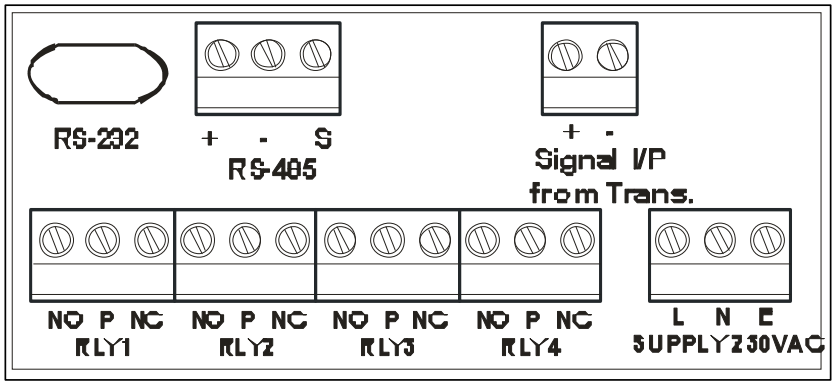
Next (Shift) Key - In program mode this key is used to select next menu or shift right character while entering (modify) the data.

Up (Increment) Key - In programme mode this key is used to increment selected character data

Down (Decrement) Key - Not active

ENTER **Enter Key** - Key is used to enter parameter & go to run mode

Terminal Details on Rear -



FUNCTIONAL & PROGRAMMING DETAILS :

RUN MODE :

In run mode the data on display module can be viewed as in the front column.

Display line 1 -
Display line 2 - 1st 9 character field displays volume data,1 character space & reaming field scrolls .Alarms , Relay 1 , Relay 2 , Relay 3 & Relay 4 on / off status.

LEVEL	T	K	:	0	1		L	:	0	2	0	0	0	m	m
	V	0	5	0	0	0	0	L	t		A	L	:	H	H
LEVEL	T	K	:	0	1		L	:	0	2	0	0	0	m	m
	V	0	5	0	0	0	0	L	t		R	1	:	O	N
LEVEL	T	K	:	0	1		L	:	0	2	0	0	0	m	m
	V	0	5	0	0	0	0	L	t		R	2	:	O	F	F
LEVEL	T	K	:	0	1		L	:	0	2	0	0	0	m	m
	V	0	5	0	0	0	0	L	t		R	3	:	O	N
LEVEL	T	K	:	0	1		L	:	0	2	0	0	0	m	m
	V	0	5	0	0	0	0	L	t		R	4	:	O	N
FLOW	F	:	0	5	4	3	2		L	t	/	s				
	T	:	5	0	0	0	0	2	3	4	2	8		L	t	

PROGRAM MODE :

DISTANCE	T	K	:	0	1		U	:	0	2	0	0	0	m	m
	V	0	5	0	0	0	0	L	t		A	L	:	H	H

MODE Press Mode Key for programming. The display show Menu1.

	E	n	t	e	r		P	a	s	s	_	w	o	r	d	
	P	a	s	W	r	d	:	_	_	_	_	_	_	_		

Menu 0 - This menu is used to enter password.

ENTER Press ENTER key 7 times to go for programming Or 7 Key combinations as selected and go for Programming Menu 1

	E	n	t	e	r		P	a	s	s	_	w	o	r	d	
	P	a	s	W	r	d	:	*	*	*	*	*	*	*		

	W	r	o	n	g	_	P	a	s	s	w	o	r	d		
	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

ENTER No programming facility is avalible sorry?????

Press ENTER key to return to Run mode.

	R	E	T	U	R	N		T	O		R	U	N			

Menu 1 - This menu is used to select display parameters in Run mode

RUN TIME DISPLAY	
Enable DIsable	

Press NEXT to display MENU - 2.

Press ENTER key to select Level display y/n

RUN TIME DISPLAY	
LEVEL DISPLAY	y

UP (INC) key is used to toggle y/n.

Press ENTER key to select Distance display y/n

RUN TIME DISPLAY	
ULLAGE DISPLAY	Y

UP (INC) key is used to toggle y/n.

Press ENTER key to select Flow display y/n

RUN TIME DISPLAY	
FLOW DISPLAY	Y

UP (INC) key is used to toggle y/n.

Press ENTER key to return to next MENU.

Menu 2 - Configure Level Range. Bottom offset, Level Unit, Volume Unit and Tank number.

Press NEXT to Display MENU - 3.

Config.....	
BOF,Units,Tk.No.	

Press ENTER to configure level range in mm.

Config.....	
L Range xxxxx	mm

NEXT (SHIFT) key is used to select digit

UP (INC) / DN (DEC) key is used to modify the digit.

Press **ENTER** key to configure Level bottom offset +ve or -ve for dead level or blanking distance of tank. NEXT & UP keys are used to select.

Config.....	
BOffset _ve	mm

Press **ENTER** key to configure Level bottom offset in mm. **NEXT** & **UP** keys are used to select & modify the digit.

Config.....	
BOffset _0000	mm

Press **ENTER** key to configure Level unit. UP (INC) key is used to toggle the units % / mm / cm / mtrs.

Config.....	
Level Unit	mm

Press ENTER key to configure Volume unit. UP (INC) key is used to toggle the units % / Ltrs / KL / m^3.

Config.....	
Volume Unit	Lt

Press ENTER key to configure Tank No. NEXT, INC & DEC keys are used to select & modify the digits

Config.....	
Tank No:XXXX	

Press ENTER key to return to next MENU.

Menu 2 - Configure Flow parameters if Flow is selected.

Config.....	FLOW
Range unit	Type

Press NEXT to Display MENU - 3.

Config.....	Flow
Flow Unit:	Lts

Press ENTER to configure level range in mm.

Config.....	Flow
Flow Unit:	lm

NEXT (SHIFT) key is used to select digit

UP (INC) key is used to modify the units.

Config.....	Flow
Flow Unit:	M3Im

Press **ENTER** key to configure maximum Flow.

Config.....	Flow
Flow Unit:	M3IH

ENTER Press **ENTER** key to configure maximum Flow.
NEXT, INC & DEC keys are used to select & modify the digits

Configg....	Flow
Flow R:XXXXX	Lt Is

ENTER Press ENTER key to configure totalise Volume unit.
UP (INC) key is used to toggle the units Ltrs / KL / m^3.

Configg....	Flow
To tVol Unit	Lt

ENTER Press ENTER key to configure slave address.
NEXT, INC & DEC keys are used to select & modify the digits

Configg....	Flow
Slave Add: 01	

ENTER Press ENTER key to configure baud rate.
UP (INC) key is used to toggle the units 1200 / 2400 / 4800 / 9600

Configg....	Flow
Baud Rate:	120

Menu 3 - Level Alarms set point values can be programmed using this menu.

Prg Level Alarm	
Set Points &	Hys

Press NEXT key to display Menu 4.

Prg Flow Alarm	
Set Points &	Hys

ENTER Press **ENTER** key to configure Level alarm HH alarm set point in mm .

Prg Level Alarm	
HH SET: XXXXX	mm

NEXT (SHIFT) key is used to select digit

UP (INC) / DN (DEC) key is used to modify the digit.

ENTER Press **ENTER** key to configure Level alarm H alarm set point in mm .NEXT INC & DEC keys are used to select & modify the digits.

Prg Level Alarm	
H SET: XXXXX	mm

ENTER Press **ENTER** key to configure Level alarm L alarm set point in mm .NEXT INC & DEC keys are used to select & modify the digits.

Prg Level Alarm	
L SET: XXXXX	mm

ENTER Press **ENTER** key to configure Level alarm LL alarm set point in mm .NEXT INC & DEC keys are used to select & modify the digits.

Prg Level Alarm	
LL SET: XXXXX	mm

ENTER Press **ENTER** key to configure Level alarm hysteresis in mm .NEXT INC & DEC keys are used to select & modify the digits.

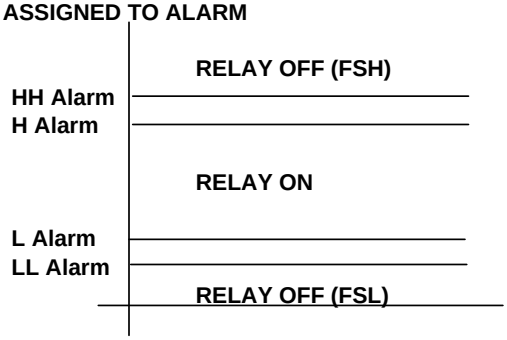
Prg Level Alarm	
L Hys: XX	mm

ENTER Press ENTER key to returns to next MENU.

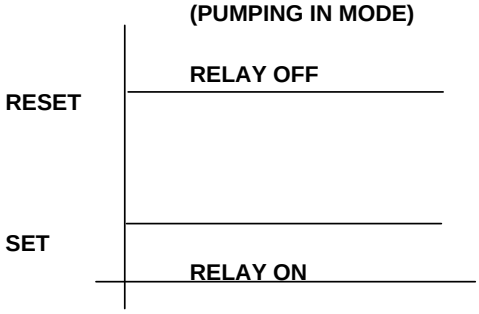
Menu 4 - Using this menu each relay can be configured either on one of the HH / H / L / LL level alarms or can be configured on latch mode by setting set & reset values in mm for Pumping in or Pumping out modes or ON - OFF Valve Operation. If the relay is configured on HH / H alarm, relay is energised in normal mode & de-energised whenever level is ≥ HH / H set point (FSH operation). Hysteresis is applicable for relay pickup. If the relay is configured on L / LL alarm, relay is energised in normal mode & deenergised whenever level is ≤ L / LL set point (FSL operation). Hysteresis is applicable for relay pickup.

If the relay is configured on latch mode & if Set value is > Reset value then the relay is energised when Level is ≥ Set value & de-energised when Level is ≤ Reset value. If Set value is < Reset value then the relay is energised when Level is ≤ Set value & de-energised when Level ≥ Reset value.

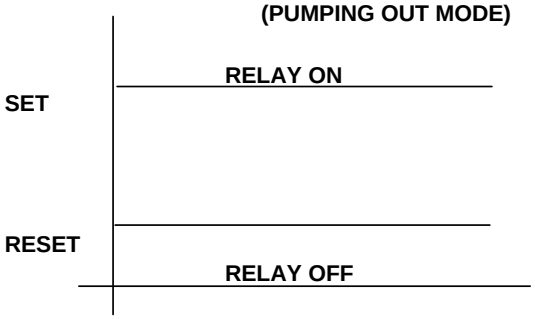
RELAY ASSIGNED TO ALARM



RELAY ASSIGNED TO LATCH
(PUMPING IN MODE)



RELAY ASSIGNED TO LATCH
(PUMPING OUT MODE)



Press NEXT key to display Menu 5.

R	e	l	a	y		P	r	g		?				
P	r	e	s	s		E	N	T	/	N	E	X	T	

ENTER Press ENTER key to configure Relay 1 assigned to Alarm / Latch.

UP (INC) key is used to toggle the Alarm / Latch

R	e	l	a	y		1		o	n					
A	l	a	r	m										

ENTER Press ENTER key to select Relay 1 on alarm. Use UP (INC) key to assign Relay1 on one of the four HH / H / L / LL level alarms.

R	e	l	a	y		1		o	n		A	l	a	r	m
													H	H	

ENTER Press ENTER key to select Relay 2 assigned to latch. Program the Set value in mm.

NEXT (SHIFT) key is used to select digit

UP (INC) / DN (DEC) key is used to modify the digit.

R	e	l	a	y		2		o	n		L	a	t	c	h
				S	e	t	:	x	x	x	x		m	m	

ENTER After set value is programmed you have to reset value. NEXT, INC & DEC keys are used to select & modify the digit.

R	e	l	a	y		2		o	n		L	a	t	c	h
		R	e	s	e	t	:	x	x	x	x		m	m	

ENTER Same logic is followed for remaining three Relays

ENTER Press ENTER key to returns to Run Mode

Menu 4 : For relay programming in FLOW controller and totalise.

Press NEXT key to display Menu 5.

R	e	l	a	y		P	r	g		?				
P	r	e	s	s		E	N	T	/	N	E	X	T	

ENTER Press ENTER key to configure Relay 1 assigned to Alarm / Latch.

UP (INC) key is used to toggle the Alarm / Latch

R	e	l	a	y		1		o	n					
A	l	a	r	m										

ENTER Press ENTER key to select Relay 1 on alarm. Use UP (INC) key to assign Relay1 on one of the four HH / H / L / LL level alarms.

R	e	l	a	y		1		o	n		A	l	a	r	m
													H	H	

ENTER Press ENTER key to select Relay 2 assigned to latch. Program the Set value in mm.

NEXT (SHIFT) key is used to select digit

UP (INC) / DN (DEC) key is used to modify the digit.

R	e	l	a	y		2		o	n		L	a	t	c	h
T	o	t	F	l	o	w	:	x	x	x	x			L	t

ENTER Same logic is followed for remaining three Relays

ENTER Press ENTER key to returns to next menu.

Menu 5 - This is Calibration Menu. In this menu a SHORT link provided internally is used to enable / disable the calibration as a safety measure. If the switch is OFF (disabled) the display menu 5 indicates following message and after a few seconds the next menu will be displayed.

C	a	l		D	l	s	a	b	l	e	d		.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

If the switch is ON (enabled) the display indicates following message and the calibration is continued.

C	a	l		Z	e	r	o		S	p	a	n			
P	r	e	s	s		E	N	T		t	o		s	e	t

Press NEXT key to display MENU 6.

ENTER Press ENTER key to set the input to 4 mA or 1 V to calibrate zero and press enter key to set

C	a	l		Z	e	r	o			x	x	x	x	x	x
P	r	e	s	s		E	N	T		t	o		s	e	t

ENTER Press ENTER key to set the input to 20 mA or 5V to calibrate span and press enter key

C	a	l		S	p	a	n			x	x	x	x	x	x
P	r	e	s	s		E	N	T		t	o		s	e	t

ENTER If ENTER key is pressed the display returns to next MENU.

Menu 6 - This menu is displayed only when Flow is selected
This menu is used to reset the Totalise Flow value

R	e	s	e	t		T	o	t	a	l	l	s	e	r	
Y	.	E	n	t	e	r	,		N	.	N	e	x	t	

Press NEXT key to display MENU 7.

ENTER Press ENTER key to reset the totalised flow.

Menu 7 - This menu is used to enter volume table.

Press NEXT key to display Menu 8.

V	o	l		S	t	r	a	p		E	n	t	?		
P	r	e	s	s		E	N	T		N	E	X	T		

ENTER Press ENTER key to enter strap level intervals.

V	o	l		S	t	r	a	p		E	n	t	r	y	
L		l	n	t	:			x	x	x	x		m	m	

NEXT (SHIFT) key is used to select digit

UP (INC) / DN (DEC) key is used to modify the digit.

ENTER Press ENTER key to enter Volume in Ltrs for any strap level

S	t	r	a	p			L	:	x	x	x	x		m	m
V	o	l	u	m	e	x	x	x	x	x	x		L	t	r

NEXT (SHIFT) key is used to select digit

UP (INC) / DN (DEC) key is used to modify the digit.

MODE Mode key is used to Escape

Menu 8 - This menu is used to change the Pass word

C	h	a	n	g	e		P	a	s	s	w	o	r	d	?
Y	_	E	n	t	e	r	,		N	_	N	e	x	t	

Press SHIFT (NEXT) to display Menu 9

ENTER Press ENTER key to enter old password
Using combination of 7 key stroke, the password can be entered.
Incorrect password will discontinue change password and go to next menu.
Correct old password allow to change and enter new password.

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

E	n	t		N	e	w		P	a	s	s	w	o	r	d
P	a	s	W	r	d	:	_	_	_	_	_	_	_		

Menu 9 - This menu is sued to save programmed data in non-volatile memory. Each time any programmed parameter is modified this menu is required to be executed to retain the modified data.

S	a	v	e		P	r	g		D	a	t	a	?		
P	r	e	s	s		E	N	T		/		N	E	X	T

Press NEXT key to unsaved and return to Run Mode.

R	E	T	U	R	N		T	O		R	U	N

Press ENTER key to SAVE and return to Run Mode.

R	E	T	U	R	N		T	O		R	U	N

10 TROUBLE SHOOTING -

Switch on the Instrument

	Fault / Defect		Cause & Remedy
1	No Back lit & Message appears on Display	a	Check mains & fuses.
2	No change in flow	a	Check flow transmitter / 4 - 20 mA, 1 to 5 V DC
		b	Check if programming is correct .
		c	Check flow Range Value is properly programmed .
3	Alarms generation faulty	a	Check flow Alarm Set points & Hysteresis programmed properly.
4	Relay operation faulty	a	Check Relay Configuration is correct.
		b	Relay is faulty
		c	Fault is due to case 2 and or case 3
5	Volume reading faulty	a	Check Volume strap entry is correct
		b	Fault is due to case 2
6	Totalise Volume reading faulty	a	Check flow unit
		b	Fault is due to case 2
		c	Check totalise flow unit