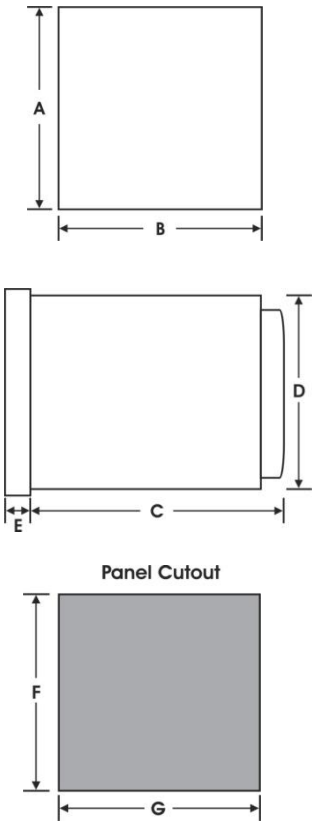
DIGITAL TIMER : TDMF

FEATURES	• Dual Set point • ON Delay / Interval / Cyclic on first / Cyclic off first / Instantaneous + delayed at start pulse / Instantaneous + delayed at power on/ Motor reverse • Time range: 0.01sec to 9999 hours • Output Contacts 2 NO (SPST) • Front Panel reset • Up/Down counting • Battery backup • High Reliability	**TIME RANGES** 0 - 99.99 Sec 0 - 999.9 Sec 0 - 9999 Sec 0 - 99.59 Min:Sec 0 - 999.9 Min 0 - 9999 Min 0 - 99.59 Hr:Min 0 - 999.9 Hr 0 - 9999 Hr (Programmable by keys)
OPERATING MODES	**Relay1:** ON Delay, Interval, Cyclic on first, Cyclic off first, Instantaneous +delayed at start pulse, Instantaneous + delayed at power on, Motor reverse. **Relay2:** ON Delay, Interval, Cyclic on first, Cyclic off first, Batch, NC (Applicable for TDMF-48 only). (Configurable by keys)	
SUPPLY	**SUPPLY VOLTAGE**	85 to 270V AC , 50 – 60Hz / 24V AC/DC* (Recommended fuse : 1A, 230V AC Fast blow)
	POWER CONSUMPTION	4VA Max
	INRUSH CURRENT	Max. 2A@240V AC for 20ms / 5A@24VDC
INPUT SPECIFICATIONS	**DISPLAY**	7 segment LED(Red), Height : Upper display : 0.28"(48x48) Lower display : 0.28"(48x48)
	TIME SETTING	Programmable by keys
	DIGITS	Dual Display, 4 digits
	START INPUT	Pulse Start : upon contact closure (15ms minimum), Gate Start
	SENSOR SUPPLY	12V DC, 30mA (Short circuit protected)
	ACCURACY	±0.05% of Set Time or 50msec (whichever is greater) Repeat : ±0.05%
	RESET	Front, Remote, On interruption of power Reset time < 100msec
OUTPUT SPECIFICATIONS	**OUTPUT CONTACT**	2 : NO (SPST for TDMF-48), 2 :1C/O (SPDT for TDMF-72 &TDMF-96) Contact set1: Instantaneous, Contact set2: Delayed contact.
	CONTACT RATING	5A@250V AC
	INDICATION	LED Status Indicator : Relay1, Relay2, Sec, Min, Hr.
ISOLATION	Supply Terminals – Contacts : 1.5KV, 1min Contact Set1 – Contact Set2 : 1.5KV, 1min Supply Terminal – Start/Reset : 1.5KV, 1min Start/Reset – Contacts : 1.5KV, 1min	
ENDURANCE	**RELAY**	MECHANICAL: 10,000,000 ops. Minimum (1800 ops. /hr.) ELECTRICAL: 100,000 ops. Minimum (1200 ops. /hr.)
AMBIENT CONDITIONS	**OPERATING AMBIENT**	0 to 55°C
	STORAGE AMBIENT	-5°C to 50°C
	HUMIDITY	95% RH non condensing
GENERAL SPECIFICATIONS	**TERMINATIONS**	Screw type, for 2.5mm sq. wire
	MOUNTING	Panel Mount
	PROTECTION LEVEL	IP20



DIM / MODELS	A	B	C	D	E	F	G
TDMF-48	48	48	110	46	4	46	46
TDMF-72	72	72	115	68	10	69	69
TDMF-96	96	96	75	90	10	92	92

Dimensions

All dimensions in mm

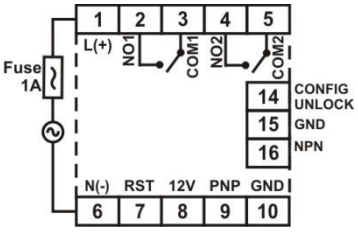
ORDERING INFORMATION

TDMF – 48 – Z

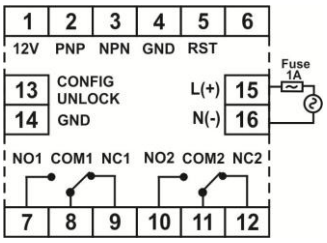
DESIGN NAME	SIZE	SUPPLY VOLTAGE	WEIGHT
TDMF	48 : 48mm x 48mm	Z : 85 to 270V AC , 50 – 60Hz 24V : 20V to 30V AC(50 – 60Hz)/DC	150 gms
	72 : 72mm x 72mm		210 gms
	96 : 96mm x 96mm		230 gms

TERMINAL CONNECTIONS

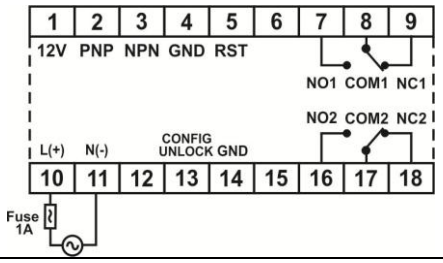
TDMF-48



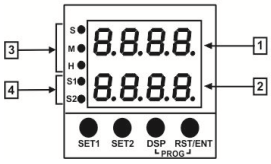
TDMF-72



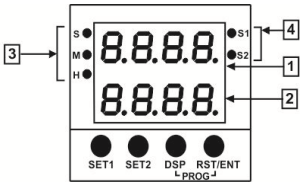
TDMF-96



Front Panel Description



TDMF-48

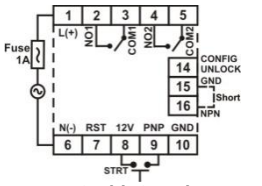


TDMF-72/96

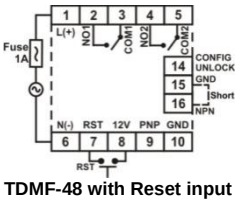
1	Current Value Display.
2	Display selectable as Batch, Set1, Set2,Timer2,Blank.
3	Time Range indication. Led Blinks to show timing in progress.
4	Output Status - S1:Relay1, S2:Relay2.

KEYS	FUNCTIONS
● SET1	1. To enter into time setting mode for set point1. 2. To view preset time of set point1. 3. In time setting mode, with every press of this key, next digit towards right starts blinking. 4. To exit from RST & BRST display.
● SET2	1. To enter into time setting mode for set point2. 2. To view preset time of set point2. 3. Decrements value of blinking digit in time setting mode.
● DSP	1. Increments value of blinking digit in time setting mode. 2. Scrolls to next option in configuration mode. 3. Programming of lower display options. 4. Display batch value.
● RST/ENT	1. Scrolls to next configuration parameter & stores previous parameter setting in configuration mode. 2. Front panel reset. 3. Batch reset. 4. To exit time setting mode.

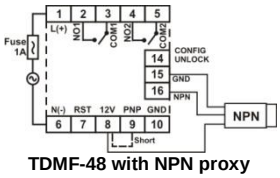
Input Connections



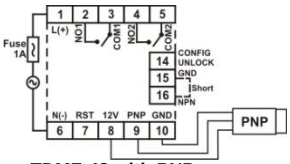
TDMF-48 with Start input



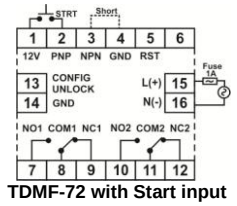
TDMF-48 with Reset input



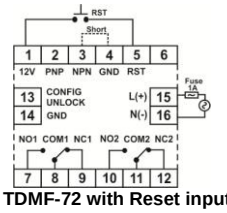
TDMF-48 with NPN proxy



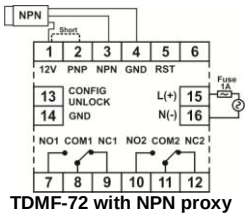
TDMF-48 with PNP proxy



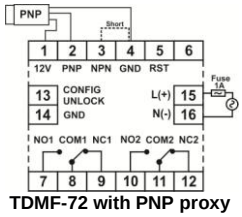
TDMF-72 with Start input



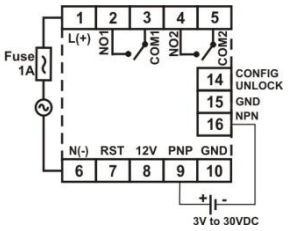
TDMF-72 with Reset input



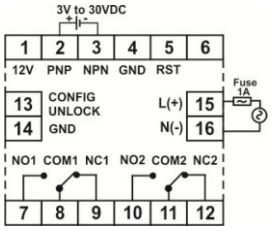
TDMF-72 with NPN proxy



TDMF-72 with PNP proxy



TDMF-48 with External DC input



TDMF-72 with External DC input

Note 1: TDMF-96 has same i/p connections as that of TDMF-72 timer. Refer terminal connections above for more information.
Note 2: Color code for proximity sensors.–
Brown/Red --->+12V, Black/Green--->CNT, Blue/Black--->GND.

Configuration Scheme

Note: Press **ENT** key after every change in configuration mode options for memory storage. If no key is pressed till 1 minute, unit will auto exit from configuration mode.

Press **DSP+RST/ENT** keys simultaneously to enter / exit configuration mode.

Configuration Lock Default:1234

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
LOCY	1234	Enter valid lock id to enter configuration mode.
	Note: Selected Digit blinks.	Press **SET1** to select digit & **SET2/DSP** to change value of Selected digit.

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
rLI.n	ON Press **DSP** key INt Press **DSP** key Cy.ON Press **DSP** key Cy.OF Press **DSP** key Id-S Press **DSP** key Id-P Press **DSP** key n-r Press **DSP** key	**Relay1 operating mode:** On delay, Interval, Cyclic on first, Cyclic off first, Instantaneous+ delayed at startup, Instantaneous+ delayed at power on, Motor reverse Note: Refer waveforms for details.

Press **ENT** key to program pause time range (applicable only for motor reverse mode).

Time range for Pause time Default:999.9 sec

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
PS-S	99.99 Press DSP key 999.9 Press DSP key 9999 Press DSP key 99.59 Press DSP key 999.9 Press DSP key 9999 Press DSP key 99.59 Press DSP key 999.9 Press DSP key 9999 Press DSP key	Time ranges: 99.99 sec,999.9 sec,9999sec
PS-n		99.59 min:sec,999.9 min, 9999 min
PS-H		99.59 hr: min,999.9 hr, 9999 hr

Press **ENT** key to program start time range (Not applicable for motor reverse mode).

Time range for start time Default:999.9 sec

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
St-S	99.99 Press **DSP** key 999.9 Press **DSP** key 9999 Press **DSP** key 99.59 Press **DSP** key 999.9 Press **DSP** key 9999 Press **DSP** key 99.59 Press **DSP** key 999.9 Press **DSP** key 9999 Press **DSP** key	Time ranges: 99.99 sec,999.9 sec,9999sec
St-n		99.59 min: sec, 999.9 min ,9999 min
St-H		99.59 hr: min, 999.9 hr ,9999 hr

Press **ENT** key to program on time range.

Time range for on time Default:999.9 sec

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
ON-S	99.99 Press **DSP** key 999.9 Press **DSP** key 9999 Press **DSP** key 99.59 Press **DSP** key 999.9 Press **DSP** key 9999 Press **DSP** key 99.59 Press **DSP** key 999.9 Press **DSP** key 9999 Press **DSP** key	Time ranges: 99.99 sec,999.9 sec,9999sec
ON-n		99.59 min: sec, 999.9 min ,9999 min
ON-H		99.59 hr: min, 999.9 hr ,9999 hr

Press **ENT** key to program Off time range (applicable only for cyclic mode).

Time range for Off time — Default:999.9 sec

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
OF-S	99.99 → 999.9 → 9999 → 99.59 → 999.9 → 9999 → 99.59 → 999.9 → 9999 → (Press **DSP** key)	Time ranges: 99.99 sec,999.9 sec,9999sec
OF-M		99.59 min:sec,999.9 min, 9999 min
OF-H		99.59 hr: min,999.9 hr, 9999 hr

Press **ENT** key to program Relay2 function.
(Not valid for instantaneous delayed & motor reverse mode).

Relay2 function — Default:Timer2

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
rLy2	tmr2 → nC → btCH → (Press **DSP** key)	Relay2 function: Relay2 will function as either Timer (for set point 2) or NC contact for Relay1/Batch. Note: Relay2 NC mode is applicable only for TDMF-48. Short com1 and com2 terminals in NC mode TDMF-72/96 have Timer2 & Batch mode only.

Press **ENT** key to program Relay2 mode.

Note: Valid only if Relay2 is functioning as timer. (For set point2)

rL2.m	ON → INt → Cy.ON → Cy.OF → (Press **DSP** key)	Relay2 modes: On delay, Interval, Cyclic on first, Cyclic off first

Press **ENT** key to program start time range (for set point2).

Time range for start time — Default:999.9 sec

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
St-S	99.99 → 999.9 → 9999 → 99.59 → 999.9 → 9999 → 99.59 → 999.9 → 9999 → (Press **DSP** key)	Time ranges: 99.99 sec,999.9 sec,9999sec
St-M		99.59 min:sec, 999.9 min ,9999 min
St-H		99.59 hr: min, 999.9 hr ,9999 hr

Press **ENT** key to program On time range (for set point2).

Time range for On time — Default:999.9 sec

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
On-S	99.99 → (Press **DSP** key) 999.9 → 9999 → 99.59	Time ranges: 99.99 sec,999.9 sec,9999sec
On-M	99.59 → 999.9 → 9999	99.59 min:sec,999.9 min, 9999 min
On-H	99.59 → 999.9 → 9999	99.59 hr: min,999.9 hr, 9999 hr

Press **ENT** key to program Off time range (for set point2).

Time range for Off time — Default:999.9 sec

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
OF-S	99.99 → (Press **DSP** key) 999.9 → 9999 → 99.59	Time ranges: 99.99 sec,999.9 sec,9999sec
OF-M	99.59 → 999.9 → 9999	99.59 min:sec,999.9 min, 9999 min
OF-H	99.59 → 999.9 → 9999	99.59 hr: min,999.9 hr, 9999 hr

Press **ENT** key to program counting direction.

Counting direction — Default: Down

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
dIrn	dOWN ⇄ (Press **DSP** key) UP	Direction: Down: When down counting selected timing starts from set point value & ends at 0. Up: When up counting selected timing starts from 0 & ends at set point value.

Press **ENT** key to program Start input type.

Start — Default: Pulse

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
StrT	PULS ⇄ (Press **DSP** key) GATE	Start: Pulse: When this mode selected timing starts at momentary closure of switch connected to PNP/NPN i/p of timer. (Refer **i/p connections** for more information). Gate: When this mode selected timing starts at power on. Timing halts when switch connected to PNP/NPN i/p of timer is closed & resumes when switch is opened (Refer **i/p connections** for more information).

Press **ENT** key to program Front panel batch reset.

Front panel batch reset — Default: Yes

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
FPbr	YES ⇄ (Press **DSP** key) NO	Front panel batch reset: Yes: If selected, front panel batch value reset is enabled through front panel. No: If selected, front panel batch value reset is disabled through front panel.

Press **ENT** key to program batch reset (Displayed only if FPBR is No).

Batch reset — Default: No

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
b.rSt	YES ⇄ (Press **DSP** key) NO	Batch reset: Yes: If selected, front panel batch value is reset immediately. No: If selected, front panel batch value is not resettled.

Press **ENT** key to program Front Panel Reset.

Front Panel Reset — Default: Yes

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
FPn	YES ⇄ (Press **DSP** key) ⇄ no (Press **DSP** key)	Front Panel reset: Yes: If selected, timer can be reset from front panel. No: If selected, timer can't be reset from front panel.

Press **ENT** key to program Power On Reset.

Power On Reset — Default: Yes

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
Pon	YES ⇄ (Press **DSP** key) ⇄ no (Press **DSP** key)	Power on reset: Yes: If selected, timer is reset after resumption of power. No: If selected, timer can't be reset after resumption of power. This resumes timing, relay status same as before under power failure.

Press **ENT** key to program Lock.

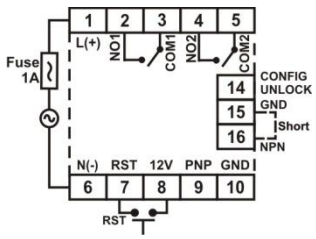
Lock — Default: No

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
LOCK	YES ⇄ (Press **DSP** key) ⇄ no (Press **DSP** key)	Power on reset: Yes: If selected, configuration mode is entered on entering correct password lock. No: If selected, configuration mode is entered without need of password lock.

Press **ENT** key to program Lock id

Lock id — Default:1234

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
Id	1234	Lock id:0000 to 9999 Set Lock id as password for configuration lock. Press SET1 to select digit & Press SET2/DSP to change value of selected digit. If lock id is forgotten, refer following connections lock through hardware.



Press **ENT** key to program Reset Default

Reset all parameters to default. — Default: No

UPPER DISPLAY	LOWER DISPLAY	DESCRIPTION
dFLt	YES ⇄ (Press **DSP** key) ⇄ no (Press **DSP** key)	Reset all parameters to default: When selected as Yes all parameters are factory reset. All set points are set to 0.

Programming timer

Temporary display
Lower display shows parameter name for 1 sec & then value.

To program set points-Press SET1 key to select digit. Press SET2 / DSP key to increment/decrement selected digit value. Press ENT key to exit set point programming & to store value.

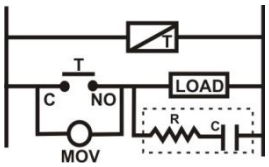
To program lower display options-Press SET2/DSP key to select specific lower display option. Press ENT key to exit programming.

To select reset option-Press SET2/DSP key to select specific reset option. Press ENT key for 1.5 sec to exit programming.

Programming for Set point1

Press key	Lower display
Press SET1 key for 1.5 sec to enter in Set point1 programming. Left most digit starts blinking. Pressing SET1 key shifts blinking digit towards right side on display. Select digit to be modified using SET2/DSP key. On no key activity Set point1 programming is quit. **Note:** For cyclic mode keep start time, on time & off time more than or equal to 100ms.	For Relay1 in On delay/Interval/id-s/id-p mode. Start time 1-St 1234 * Press **ENT** key On time 1-On 1234 * Press **ENT** key Exit Set point1 programming For Relay1 in Cyclic mode. Start time 1-St 1234 * Press **ENT** key On time 1-On 1234 * Press **ENT** key Off time 1-OF 1234 * Press **ENT** key Cycle CyCL 0000 * Press **ENT** key Exit Set point1 programming * Blinking digit.

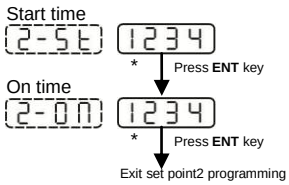
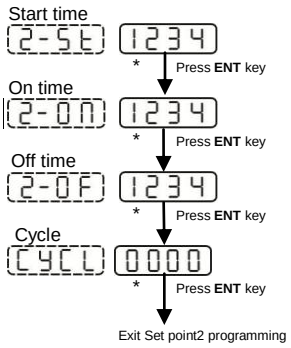
LOAD CONNECTION



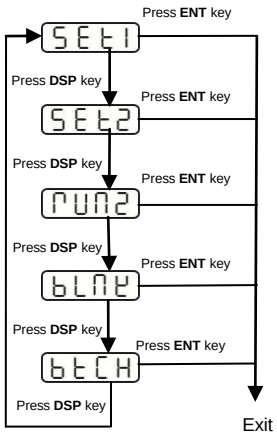
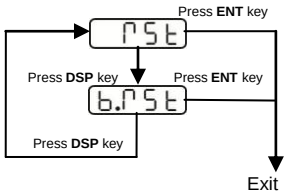
Note : For inductive load , use of snubber and MOV, as shown below, is recommended

(Specifications subject to change as development is a continuous process)

Programming for Set point2 (not applicable when Relay2 in NC mode)

Press key	Lower display
Press SET2 key for 1.5 sec to enter in Set point2 programming. Left most digit starts blinking. Pressing SET1 key shifts blinking digit towards right side on display. Select digit to be modified using SET2/DSP key. On no key activity Set point2 programming is quit. **Note:** For cyclic mode keep start time, on time & off time more than or equal to100ms.	For Relay2 in On delay/Interval mode.  For Relay2 in Cyclic mode. 

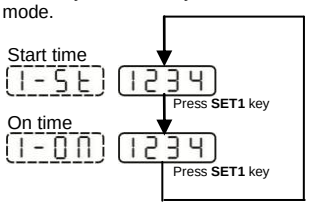
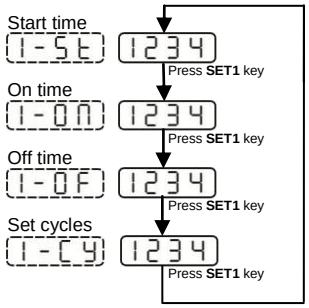
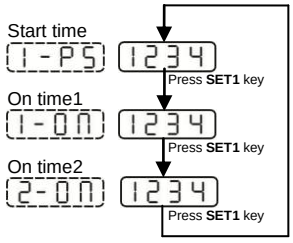
Programming for Lower display options

Press key	Lower display
Press DSP key for 1.5 sec to enter in lower display programming. Press DSP key repeatedly scrolls options on lower display. Press ENT key to exit lower display programming mode.	
Note: SET1 /RUN2 are not displayed when Relay1 in instantaneous+ delayed/motor reverse mode or Relay2 in batch/NC mode.	
Press ENT/Reset key for 1.5 sec to Enter/Exit reset / Batch reset programming. When Reset long pressed Lower display starts blinking with either Reset or Batch reset option. Press DSP key to scroll reset/batch reset options. Press Set1 key to exit while RST / BRST are blinking on display.	

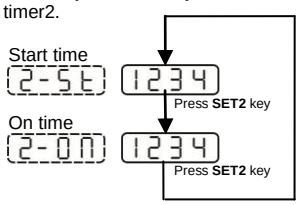
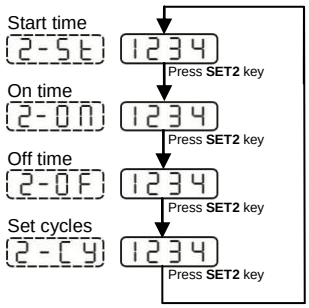
View Parameters

Temporary display
Lower display shows parameter name for 1 sec & then value.

Viewing Set point1 parameters

Press key	Lower display
Press SET1 key (short pressed<1.5 sec) to view first parameter. Again press SET1 key to view next parameter. So simultaneously pressing SET1 key results in viewing of set parameter value. Under no key pressed view parameter mode exits automatically after 5 seconds.	For Relay1 in On delay/Interval/id-s/id-p mode.  For Relay1 in Cyclic mode  For Relay1 in motor reverse mode 

Viewing Set point2 parameters

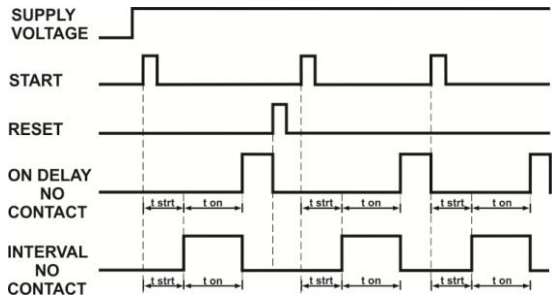
Press key	Lower display
Press SET2 key (short pressed<1.5 sec) to view first parameter. Again press SET2 key to view next parameter. So simultaneously pressing SET2 key results in viewing of set parameter value. Under no key pressed view parameter mode exits automatically after 5 seconds.	For Relay2 in On delay/Interval mode as timer2.  For Relay2 in Cyclic mode as timer2  For Relay2 in Batch mode. 

Viewing batch value

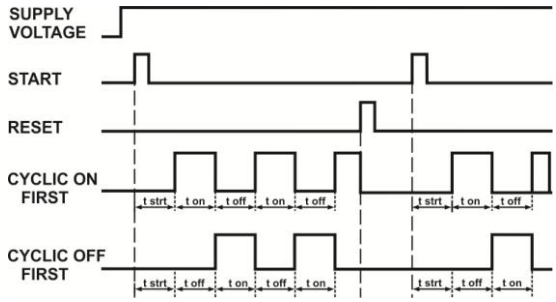
Press key	Lower display	
Press DSP key momentarily to read batch value. If no key pressed within 5 sec, view from batch is exit.	4 Digit batch	6 Digit batch
Note: In 6 digit batch, two digits of 2 MSDs are displayed on upper display & remaining digits are displayed on lower display. In case of 6 digit batch value lower display LSD dp blinks to show that batch value is exceeded.	bt CH 1234	bt CH 12 Upper Display 3456 Lower Display

Mode of operation

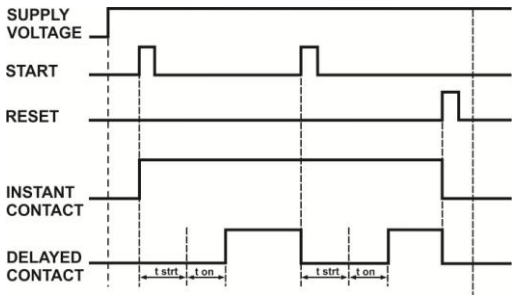
1.On delay, Interval modes



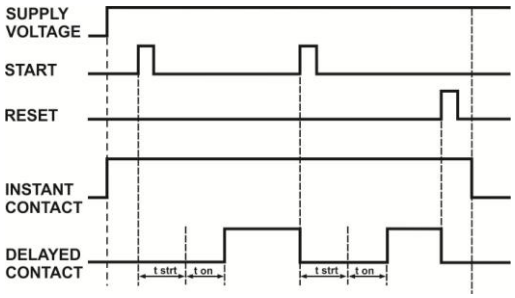
2.Cyclic on first, Cyclic off first modes



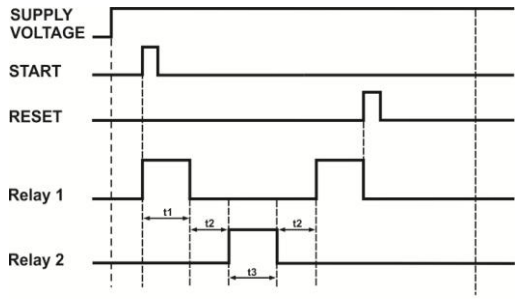
3.Instantaneous + delayed at start pulse



4.Instantaneous + delayed at power on

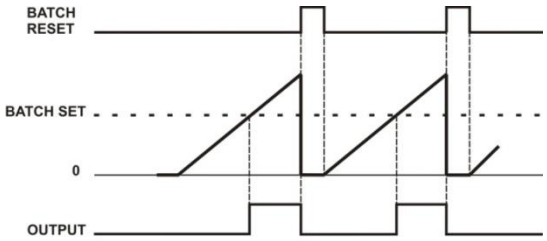


5.Motor reverse mode



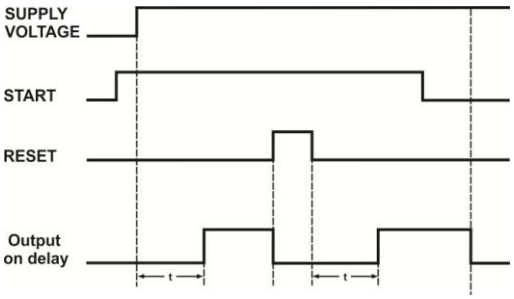
t1 = on time of relay1, t3 = on time of relay2,
t2 = pause time

6.Batch mode

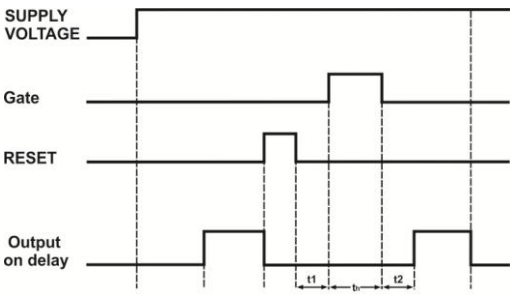


BATCH MODE

7.Application of continuous start & reset in on delay mode



8.Application of gate start in on delay mode



$t_1 + t_2 = t$ (set time), t_h = hold time