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- Process Indicators
- Protection Relays
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- Timers
- PLCs

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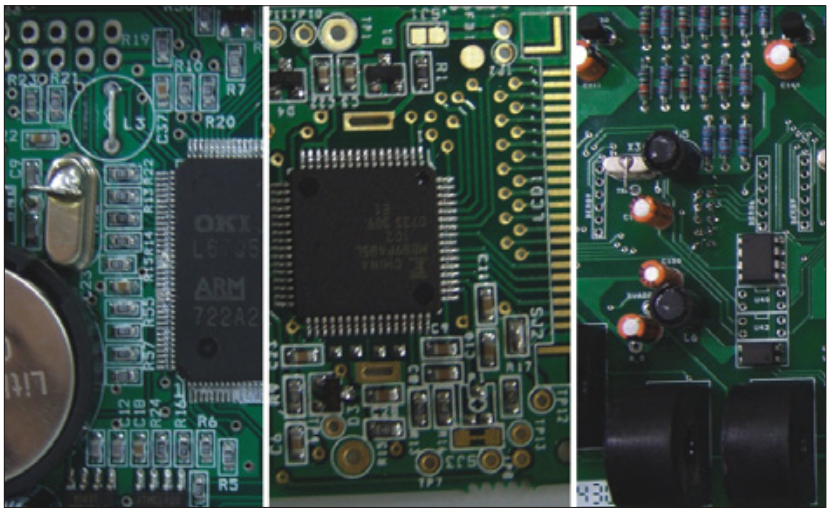

Technology

Time tested technology matured through continuous improvement & innovation

Certification

ISO 9001:2008

CE, UL marking for select products


CERTIFICATE OF COMPLIANCE

ICS

This is to certify that the QUALITY MANAGEMENT SYSTEM of

SELEC CONTROLS PVT. LTD.

Regd. Office: E-125, Area Industrial Estate, Saki Vihar Road, Andheri (East), Mumbai – 400 072, Maharashtra, India.

Factory: Plot No. EL-27/1, Electronic Zone, T. T. C. Industrial Area, M. I. D. C. Mahape, Navi Mumbai – 400 710, Maharashtra, India.

has been assessed by International Certification Services Pvt. Ltd. and registered as complying with the requirements of the following International Standard:

ISO 9001:2008

The Quality Management System applicable to:

Scope: To Design, Manufacture and Supply of Electronic Process Control Instruments like PLC's, Temperature Controllers, Process Indicators, Timers, Counter, Sensors, Meters and Protection Relays.

Registration No. : RQ01/442
Registered Date : 07th January, 2002.
Reassessment Date : 13th January, 2010.
Issue Date : 14th January, 2010.
Expiry Date : 30th December, 2012.

JAS-ANZ

Technical Director
International Certification Services

Accredited by Joint Accreditation System of Australia and New Zealand


ONLINE CERTIFICATIONS DIRECTORY

QUYX2.E233771
Process Control Equipment, Electrical - Component

Process Control Equipment, Electrical - Component

See General Information for Process Control Equipment, Electrical - Component

Selec Controls Pvt. Ltd.
MIDC Industrial Estate, E125/129/133
Saki Vihar Road
Andheri (East)
Mumbai, 400072 India

Temperature controllers, Types PID 500, PID 500-24V, PID 520, PID 520-24V, PR 502, PR 502-24V.

Counters, Types HTC 5400, HT 5042.

The acceptability of this device with a specific end product is dependent upon the following conditions of acceptability:

1. The transducer is intended for panel mounting. Only the front portion of the overall enclosure has been evaluated as the ultimate enclosure.
2. The terminals of the panel mounted device are suitable for field connection. Use wiring rated for at least 75 C.
3. The device is suitable for use in a 50 C ambient.

Marking: Company name, type designation or "E233771" and the Recognized Component Mark.

Last Updated on 2009-02-

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NEW PRODUCTS

Multifunction Meter
Pg 08

Energy Meter
Pg 09

Digital Panel Meter
Pg 06

Digital Timers
Pg 21

Analog Timers
Pg 25

New TC Series
Pg 14

Contents

Appendix

Programmable Logic Controllers

Single Box Solution

Built in:
- *HMI*
- *I/Os*
- *Relays*
- *Analog (including temp. sensor inputs)*
- *24V to drive inputs*

- Upto 47 I/Os
- Upto 6 analog channels

96 x 96

- Upto 8 Digital inputs
- Upto 5 Relays / Digital outputs
- One analog input

48 x 96

	MM3010	MM1010	MM1012	MM1013
DISPLAY	LCD (backlight) 4 line x 16 character	7 segment LED, 3 digit + (4 + 4) digit		
No. of Keys	18 (10 numeric keys)	5		
No. of Configurable Keys	14	4		
DIGITAL SECTION				
• **DIGITAL INPUT** (Refer card selection table for available options)				
No. of Digital Inputs	Dependent on card selections (refer table 1.0 on Page 02)	8	6	8
Input Type	PNP	PNP		
Input Voltage Range	11 - 28V DC (abs. max.: 30V DC)	11 - 28V DC (abs. max.: 30V DC)		
Response Time (Inputs other than fast counter)	Programmable upto I - 255ms from front end (default 10ms)	Programmable upto I - 255ms from front end (default 10ms)		
Isolation	2 kV	2 kV		
Fast Counter Input				
Operating Modes / Frequency	Bidirectional, Unidirectional: 7.5 kHz Quadrature: 2.5 kHz			
Maximum Count	10 digits	——		
• **DIGITAL OUTPUT - Relay** (Refer card selection table for available options)				
No. of Relays	Dependent on card selections (refer table 1.0 on Page 02)	5	4	5
Relay (NO Type) Contact rating	4ch / 8ch: 5 A resistive @ 240V AC 11ch: 3 A resistive @ 240V AC	5 A resistive@240V AC 3A resistive @240V AC (for MM1010-24V only)		
Minimum Switching Time	10 msec	10 msec	20 msec	20 msec
Isolation	2kV	2kV		
• **DIGITAL OUTPUT - Transistor** (Refer card selection table for available options)				
No. of Transistor output	Dependent on card selections (refer table 1.0 on Page 02)	——		
Transistorised Output rating	For 14 Channels: PNP Type: 24V, 100mA	——		
Short Circuit Protection	Yes	——		
Max. Switching Frequency	1kHz	——		
ANALOG SECTION				
• **ANALOG INPUT** (Refer card selection table for available options)				
No of Inputs / Type	Dependent on card selections (refer table 1.0) TC / RTD / 0-20mA / 0-10V	1	2	TC / RTD / 0-10V / 0-20mA (User selectable)
Conversion Time	100msec	100msec		
Resolution	16 bit	16 bit		
• **ANALOG OUTPUT** (Refer card selection table for available options)				
No. of Analog Outputs	2		1	
Output Type	0-20mA / 0 - 10V (factory set)		0-20mA / 0 - 10V (factory set)	
Resolution	14 bit		14 bit	
Conversion Time	20 msec		20 msec	
Linearity Error	0.1%		0.1%	

	MM3010	MM1010	MM1012	MM1013
• **FUNCTIONAL SPECIFICATIONS**				
Programming Method	Windows based software for ladder program & HMI configuration	Windows based software for ladder program & HMI configuration		
Memory	Data memory: 16K Code memory: 351K, Upload memory: 96K	Data memory: 16K Code memory: 223K		
No of Objects	Maximum 5000 (as per memory)	Maximum 5000 (as per memory)		
Minimum Scan Time	200 µsec	200 µsec		
FUNCTION BLOCKS				
Timer	Universal Timer: ON delay, OFF delay, Pulse, Up timer, Down timer (10 ms) , 1 ms timer	ON delay, OFF delay, Pulse timer, Up timer, Down timer, Universal Timer (10 ms), 1 ms timer		
Counter	Up counter, Down counter, Up/down counter (Upto 10 digits)	Up counter, Down counter, Up / down counter (10 digit)		
Other Blocks	PID Control (Autotuning), Analog input, Analog output, Time switch, Communication (Master)	PID Control (Autotuning), Analog input, Analog Output	———	
Communication Ports	Master - RS485; Slave -RS232 / RS485 (selectable via Jumper)	1 RS485 port (slave) (Isolated)		
Communication Protocol	MODBUS RTU	MODBUS RTU		
Memory Retention	10 years	10 years		
RTC	Yes	No		
Supply Voltage	90 - 270V AC/DC, 24V DC, AC@50/60 Hz	90 - 270V AC/DC, 24V DC, AC@50/60 Hz		
Temperature	Operating: 0 to 50°C Storage: -20 to 60°C	Operating: 0 to 50°C Storage: -20 to 60°C		
Humidity (non-condensing)	95% RH	95% RH		
Weight	564 gms	258 gms		
Certifications	CE	CE (For MM1010 only)		
Dimensions	Refer diagram D on page 36	Refer diagram H(V) on page 36		
Ordering Code	Please see overleaf for ordering information	Please see overleaf for ordering information		

There are 4 card slots internal to the unit. These cards are factory fitted but possible to select while ordering. Each card slot has some selectable card types that can be inserted. Detailed information regarding these cards is provided in adjacent table.

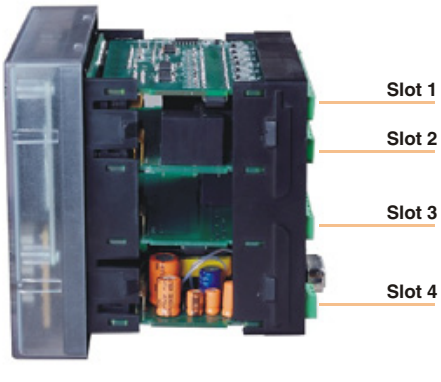


Table 1.0

I/O combinations available		Order Codes
Slot 1 Digital Input Cards	8 Digital Input	DI08
	13 Digital Input	DI13
	19 Digital Input + 1 Quad	DIQ19
Slot 2 Digital output Cards	8 Digital Output (Relay Type)	DR08
	11 Digital Output (Relay Type)	DR11
	14 Transistor Output, PNP, 100mA	DT14
Slot 3 Digital / Analog Mixed I/O Cards	Digital Mixed I/O: 8DI + 4DO	MDI08R04
	6 Channel Analog I/P: AI 06 (Thermocouple/RTD type)	AI06-T/R
	6 Channel Analog I/P: AI 06 (Voltage/current type)	AI06-V/I
	2 Channel Analog I/P: AI 02 (universal input)	AI02
	Analog Mixed I/O: 4AI + 2AO 4AI (Universal I/P) Set internal Jumpers (Default TC/RTD) 2AO (factory set) To be specified while ordering (0-10V/0-20mA)	MAI04O02
Slot 4 Power Supply	90 to 270V AC/DC	270 V
	24V DC	24V DC

Ordering Information (MM3010)

MM3010 — C1 — C2 — C3 — C4

Choose from Legend

Legend

Digital Input Card		Digital Output Card		Digital/Analog Mixed Input Card		Power Supply	
C1	Configuration	C2	Configuration	C3	Configuration	C4	Configuration
DI08	8 Digital Inputs	DR08 Relay type	8 Digital Outputs	MDI08R04 Only relay type O/P available	8 Digital Inputs + 4 Relay Outputs	270 V	90 to 270V AC/DC
DI13	13 Digital Inputs	DR11 Relay type	11 Digital Outputs	AI06- T/R	6 Analog Inputs TC / RTD type	24V DC	24V DC
DIQI9	19 Digital Inputs + 1 Quad	DT14 Transistor type	14 Transistor Outputs, (100mA each)	AI06- V/I	6 Analog Inputs Voltage / Current type		
				AI02	2 Analog Inputs Universal type		
				*MAI04O02	4 Analog Inputs + 2 Analog Outputs		

NOTE

* In case of MAI04O02, type of Analog Input/Output to be specified separately.

INPUTS	OUTPUTS
TC	0-10V
RTD	0-20mA
Voltage	
Current	

Ordering Example

MM3010 - DI13 - DR11 - AI02 - 270V
MM3010 - Digital Inputs: 13 - Digital Outputs: 11 - Analog Inputs : 2 - Supply Voltage : 90 to 270V AC/DC

Ordering Information (MM1010, MM1012 & MM1013)

Order Code	Supply Voltage
MM1010-T/R-24V DC	24V DC
MM1010- T/R-230V	90 to 270V AC/DC
MM1010-V-230V	90 to 270V AC/DC
MM1010-V-24V DC	24V DC
MM1010-I-230V	90 to 270V AC/DC
MM1010-I-24V DC	24V DC
MM1012-230V	90 to 270V AC/DC
MM1012-24V DC	24V DC
MM1012-1-230V	90 to 270V AC/DC
MM1012-1-24V DC	24V DC
MM1012-2-230V	90 to 270V AC/DC
MM1012-2-24V DC	24V DC
MM1013-230V	90 to 270V AC/DC
MM1013-24V DC	24V DC

NOTE

In case of MM1012 type of Analog Input/Output to be specified separately.

INPUTS	OUTPUTS
TC	0-10V (for MM1012-1)
RTD	0-20mA (for MM1012-2)
Voltage	
Current	

Accessories

(to be ordered separately)

Communication cable
Part no. - ACH-001. (9 pin D-type cable)

Windows-based software for ladder programming
Part no. - ACD-003

Four Relay module
Part no. - AR - 04 - 5A - NONC (SPDT)
AR - 04 - 5A - NO (SPST)

Power Supply module
Part no. 1) AP-24V-500mA-NS131

RS485 to RS232 converter
Part no. - AC - RS485 - RS232 - 01 (non isolated)
AC - RS485 - RS232 - ISO (with isolation)

Accessories

	24V DC Power Supply	RS232-485 Converter	4 Relay Module
Supply Voltage	90-270V AC/DC@ 50-60Hz Max. input current 50 mA	90-270V AC/DC@ 50-60Hz Max. input current 50 mA	24V DC, 40 mA for 4 relays, each relay ON at 24V DC, 10 mA
Output	24V DC, maximum current 500 mA		4 relay outputs with NONC Contact rating: 5 A resistive/ 1 A inductive minimum switching time: 10 ms
Transmission Speed		9600 to 115200 BPS	
Transmission Mode		2-wire (half duplex)	
Isolation	2 kV	2 kV	2 kV
Temperature	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	upto 95%	upto 95%	upto 95%
Weight	110 gms	80 gms	130 gms
Dimensions	Refer diagram P(I) on page 37	Refer diagram S on page 37	Refer diagram P(I) on page 37

Ordering Information

Product Name	Order Code
24VDC Power Supply	**AP-24V-500 mA**
RS232-RS485 Converter (with isolation)	**AC-RS485-RS232-ISO**

Product Name	Order Code
RS232-RS485 Converter (without isolation)	**AC-RS485-RS232-01**
4 Relay Module	**AR-4-5A-NO/NC**

FI400

Description	Frequency to current converter
Inputs (factory set)	a) Voltage pulse: 3 to 30 VDC or 3 wire DC proximity switch b) 2 wire Namur proximity switch
Max. Frequency	999, 99.9, 9.99, 0.999 Hz
Accuracy	± 0.5%
Sensor Supply	12V DC, 30 mA
Damping Factor	512, 256, 128, 64, 32, 16, 8 or 4 (selectable by push wheel)
Check Mode	To verify minimum & maximum output values
Output	a) 0-20mA / 4-20mA b) Pulse repeat output (open collector)
Supply Voltage	230 / 110V AC (user selectable), 50/60Hz
Temperature	Operating: 0 to 50°C Storage: -5 to 50°C
Humidity (non-condensing)	upto 95%
Weight	420 gms
Ordering Code	FI400 - Proximity: 3 wire DC proximity input FI400 - Ag 19: 2 wire namur proximity input

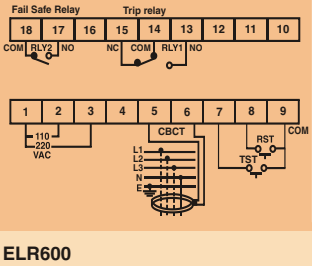
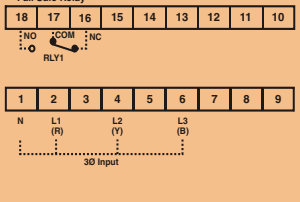
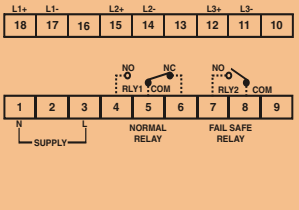
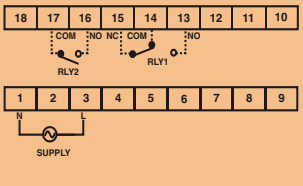
CBCTs for Earth Leakage Relay

Description	CBCT
CT Ratio	1200:1
Sizes (inner diameter)	35mm, 70mm, 120mm

Ordering Information

Inner Diameter (in mm)	Order Code
35	CBCT-35
70	CBCT-70
120	CBCT-120

Protection Relays

	ELR 600	VPR 604	CPR 605	FPR 602
				
Description	**Earth Leakage relay** 3 Ø-4 wire & 1 Ø	**Voltage Protection relay** 3 Ø-4 wire	**Current Protection relay** 3 Ø-4 wire	**Frequency Protection relay** 1 Ø
Output Contact	**1. Trip Relay:** 1 SPDT: NO (5 A@250V AC) NC (3 A@250V AC) **2. Fail Safe Relay:** 1 SPST: NO (10 A @ 250V AC)	**Fail Safe Relay:** 1 SPDT: relay with 7A @ 250 / 30	**1. Normal Relay:** 1 SPDT: NO (5A@250V AC) NC (3A@250V AC) **2. Fail Safe Relay:** 1 SPST: NO (5A @ 250V AC)	**1. Trip Relay:** 1 SPDT: 5A@250V AC/24V DC **2. Fail Safe Relay:** 1 SPST: 5A @ 250V AC/24V DC
Power Consumption	3VA	5VA	11VA	10.5VA
Nominal Values		240V AC	5A	50Hz
TRIP SETTING				
Leakage Current	via CBCT(see accessories on pg 4) 30,100,300,500 mA, 1,3,5,10,20,30 A			
Under Voltage		180V AC to 234V AC (Vn -% (25, 22.5, 20,17.5,15,12.5,10,7.5,5,2.5))		
Over Voltage		246V AC to 300V AC (Vn +% (2.5,5, 7.5,10,12.5,15,17.5,20,22.5,25))		
Over Current			30,40,50,60,70,80,90,100,110, 120 % of phase current	
Under Frequency				40,41,42,43,44,45,46,47,48,49 Hz
Over Frequency				51,52,53,54,55,56,57,58,59,60 Hz
LED Indication	Power ON, Trip, % of leakage / CBCT error	Normal operation,Under/Over voltage condition, Phase reverse condition	Power ON, Tripped condition	Normal operation(frequency within trip setting), Under & Over frequency
Hysteresis		Approx. 2% of trip levels (factory set)	5, 10, 15, 20, 25, 30% of trip current	-0.5 to 2Hz (dependent on under & over frequency trip settings)
Power ON Delay		Approx. 400 ms	Approx. 100 ms	Approx. 100 ms
Trip Time Delay	0 to 9 seconds (adjustable)	0.2 to 10 seconds (adjustable)	0.2 to 10 seconds (adjustable)	0 to 9 seconds (adjustable)
Accuracy	± 5% of F.S. (30,100,300,500 mA,1,3,5A) ± 12% of F.S. (10,20,30 A)	± 0.5% at constant condition	± 0.5% at constant condition	± 0.5% at constant condition
Reset	Below 85% of tripped level & in the presence of CBCT by: 1)Front reset 2)Remote reset 3)On power interruption	Auto reset on removal of fault condition	Auto reset on removal of fault condition	Auto reset on removal of fault condition
Rated Current			5 A	
CBCT Ratio	1200 : 1 (Please see page 4 for compatible CBCT selection)			
Phase Current			5 A, AC (50-60 Hz)	
Supply Voltage **AC: 50 or 60 Hz**	230V AC (± 15%)	240V AC (± 30%)	240V AC (± 25%)	240V AC (± 30%)
Temperature	Storage / Operating: 0 to 50°C	Storage / Operating: 0 to 50°C	Storage / Operating: 0 to 50°C	Storage / Operating: 0 to 50°C
Humidity **(non-condensing)**	95% RH	95% RH	95% RH	95% RH
Weight	190 gms	180 gms	130 gms	100 gms
Dimensions	Refer diagram P(I) on page 37	Refer diagram P(II) on page 37	Refer diagram P(II) on page 37	Refer diagram P(II) on page 37
Terminal Connections				
Ordering Code	**ELR600**	**VPR604**	**CPR605**	**FPR602**

Digital Panel Meters

	MA12 ; MA202; MA302	MA12-DC-75mV MA302-DC-75mV	MA12-AC-20A MA302-AC-20A	MV15 ; MV205; MV305
Description	Digital Ammeter			Digital Voltmeter
Display	4 digit, 7 segment LED Display			3 digit, 7 segment LED display
Display Range	0 to 4960A (scaled as per CT)		24.8A	0 to 516V
Input Range	50mA to 5A AC	75mV at Primary current (external 75mV, 5A DC rated shunt)	20A (Direct type)	50 V to 480V AC
Method	True RMS			True RMS
Accuracy	± 0.5% of F.S.		±0.5% of 20A	± 0.5% of F.S. over rated operating conditions
Measuring Element Drop	0.07V at 5A			0.23W at 480V AC input
Input Impedance	——			1M Ω (± 5%)
CT Primary	5, 10, 20, 30, 40, 50, 60, 75, 80, 100,150, 200, 250, 300, 400, 500, 600, 800,1000, 1200,1500,1600, 2000, 2500, 3000, 4000			
Continuous Max. Input Rating	6.2A AC	6.2A AC	24.8A AC	516V AC
Sampling Rate	3 samples / second			3 samples / second
Supply Voltage	240 VAC, ±20%, 50/60 Hz; 110VAC, ±20%, 50/60 Hz			240V AC, ± 20%, 50/60Hz; 110VAC, ±20%, 50/60 Hz
Power Consumption	3VA maximum			3VA maximum
Temperature	0 to 50°C			0 to 50°C
Humidity (non-condensing)	85% RH			85% RH
Weight	MA12: 170gm, MA202: 180gm, MA302: 180gm			MV15: 170gm,MV205: 180gm, MV305: 180gm

	MF16 ; MF316	MP14 ; MP314
Description	Digital Frequency Meter	Digital Power Factor Meter
Display	4 digit, 7 segment LED Display	4 digit, 7 segment LED Display
Over Range / Under Range Indication	"Ovfr" (Over 99.99 Hz) "Ur" (Under 40.00 Hz)	
Resolution	0.01	0.001
Input Voltage Range	Self Powered	Self Powered
Input Measurement Range / Current Input Measurement	40.00 - 99.99 Hz	0.25 - 6A (AC)
Accuracy	± 0.05 Hz	± 0.5% ± 1 digit
Auxiliary Supply Voltage (Vn), Frequency Range	240 / 110VAC (± 20%), 45 - 65 Hz	240 / 110VAC (± 20%), 50-60 Hz
Supply Variation	0.75 to 1.25 x Vn	0.75 to 1.25 x Vn
Over Voltage	1.5 x Vn continuous, 2 x Vn (3s)	1.5 x Vn continuous, 2 x Vn (3s)
Electrical Connection	1Ø	1Ø 2 wire
Temperature	Operating: -20°C to 60°C ; Storage: -30°C to 80°C	Operating: -20°C to 60°C ; Storage: -30°C to 80°C
Ordering Code	**MF16 ; MF316**	**MP14 ; MP314**

DIMENSIONS: MA12,MV15,MF16,MP14 Refer diagram H(U) on page 36 **; MA302,MV305,MF316,MP314:** Refer diagram Q(II) on page 37;
MA202, MV205: Refer diagram W on page 37

Electrical Panel Meters

- 3 Ø (rms) Voltage
- 3 Ø (rms) Current
- 3 Ø power (Active, Reactive, Apparent)
- 3 Ø Power factor
- Frequency
- Programmable CT Primary

Applicable only for MFM383C

- 3 Ø (rms) Voltage
- 3 Ø (rms) Current
- 3 Ø Power (Active, Apparent)
- 3 Ø Power factor
- Frequency
- Energy
- Programmable CT Primary
- RS485 Communication (MFM383C)

Applicable only for VAF36

- Monitors average value of Voltage, Current & Frequency
- Programmable CT Primary

- Monitors average value of Voltage, Current & Frequency
- Programmable CT Primary

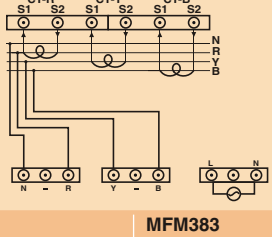
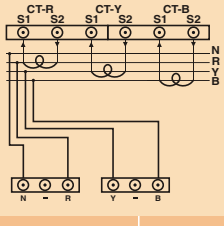
	MFM309	MFM383 / MFM383C	VAF32 & 36	VAF39
Description	Multifunction Meter	Multifunction Meter	V.A.F. Meter	V.A.F. Meter
Display	7 segment LED; Height: 0.5”	Liquid crystal display (with backlight)	VAF32: Liquid crystal display VAF36: Liquid crystal display (backlight)	7 segment LED; Height: 0.5”
Digits	3 rows of 3 digits	3 rows of 3 digits, Bar graph, 8 digits for energy	3 rows of 3 digits, Bar graph	3 rows of 3 digits
Input Type	3 Ø-4 wire & 1 Ø - 2 wire	3 Ø-4 wire & 1 Ø - 2 wire	3 Ø-4 wire & 1 Ø - 2 wire	3 Ø-4 wire & 1 Ø - 2 wire
Rated Input Current	5A max.	5A max.	5A max.	5A max.
Display Scrolling	Auto / Manual	Auto / Manual	Auto / Manual	Auto / Manual
Range		99999999 for energy		
Resolution*	0.01, 0.1, 1 (depending on CT Primary)	0.01, 0.1, 1, Auto shift from 0.1 to 1 for energy (depending on CT Primary)	0.01, 0.1, 1 (depending on CT Primary)	0.01, 0.1, 1 (depending on CT Primary)
Frequency	1) 50Hz 2) 60Hz	1) 50Hz 2) 60Hz	1) 50Hz 2) 60Hz	1) 50Hz 2) 60Hz
CT Primary	5 to 5000 programmable	5 to 5000 programmable	5 to 5000 programmable	5 to 5000 programmable
Burden (max)	0.2VA max per phase	0.2VA max per phase	0.2VA max per phase	0.2VA max per phase
Accuracy	As per table 1	As per table 1	As per table 2	As per table 2
Display Reset		Programmable (for energy)		
Memory		10 years (for energy)		
LED/Parameter Indication	LEDs for all measured parameters	1) LCD for all measured parameters 2) % of current in bar graph form	1) LCD for all measured parameters 2) % of current in bar graph form	LEDs for all measured parameters
Communication		RS485 (MODBUS) (MFM383C only)		
Supply Voltage	90 to 270V AC/DC	90 to 270V AC/DC		
Rated input Voltage $_{(L-N)}$	350V AC	350V AC	VAF32: 170 to 270V AC VAF36: 90 to 270V AC	90 to 270V AC
Temperature	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	85%	85%	85%	85%
Weight	238 gms	250 gms	VAF32 - 180 gms VAF36 - 220 gms	210 gms
Dimensions	Refer diagram Q(II) on page 37	Refer diagram Q(II) on page 37	Refer diagram Q(II) on page 37	Refer diagram Q(II) on page 37
Terminal Connections				
Ordering Code	**MFM309**	**MFM383** **MFM383-C (Communication)**	**VAF32** **VAF36**	**VAF39**

TABLE 1

Measurement	Accuracy (%)	Measurement	Accuracy (%)
Voltage V_{L-N}	±0.5% of F.S. +1 digit	Frequency	± 0.1% of F.S. ± 0.1Hz
Voltage V_{L-L}	±1% of F.S. +1 digit	Active Power	±1% of F.S. +1 digit
Average Voltage$_{L-N}$	±0.5% of F.S. +1 digit	Apparent Power	±1% of F.S. +1 digit
Average Voltage$_{L-L}$	±1% of F.S. +1 digit	Reactive Power	±1% of F.S. ± 2 digits
Current	±1% of F.S. +1 digit	Power Factor & Avg. Pf	±0.01 PF +1 digit
Average current	±1% of F.S. +1 digit	Energy	Class 1

TABLE 2

Parameters	Accuracy	Measurement	Accuracy
Voltage V_{L-N}	±0.5% of F.S.*	Average Current I_{avg}	±1% of F.S.**
Voltage V_{L-L}	±0.5% of F.S.*	Frequency	±0.1 Hz
Average Voltage V_{L-N}	±0.5% of F.S.*	*** + ± 2 digit*** **** + ± 2 digit@50 Hz*** ***** + ± 2 digit@60 Hz***	
Average Voltage V_{L-L}	±0.5% of F.S.*		
Phase current I	±1% of F.S.** ±2% of F.S.***	*Resolution is dependent on the type of parameter and the CT primary value. For further details, refer instruction manual.	

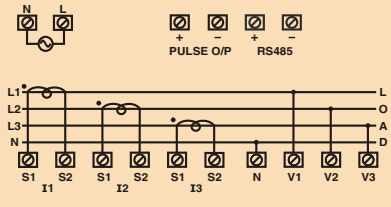
Multifunction Meter

96 x 96

- 3 Ø (True rms) Voltage
- 3 Ø (True rms) Current
- 3 Ø Power (Active, Reactive, Apparent)
- 3 Ø Power Factor
- Frequency
- Energy (Active, Reactive, Apparent)
- Programmable CT/PT primary/secondary
- Modbus RTU Communication (RS485) (Optional)
- Pulse Output

MFM384

Description	Multifunction Meter
Display	Liquid crystal display with backlight
Digits	4 rows of 4 digits, lowest 8 digits for energy display Bargraph representation for current
Input Type	3 Ø - 3/4 wire, 2 Ø - 3 wire, 1 Ø - 2 wire
Rated Input Current	10mA - 5A (6A max) (External CT must be connected for current more than 5A)
Display Scrolling	Automatic / Manual
Resolution*	For energy- 0.01k, 0.1k, 1k, 0.01M, 0.1M, 1M, 10M (depending upon CT ratio X PT ratio) For Power, Voltage & Current- Auto resolution For Power factor - Resolution is 0.001
Frequency	50 or 60Hz
CT Primary	1A or 5A to 10,000A (Programmable for any value) Note : 1A or 5A depends upon the CT secondary
CT Secondary	Programmable between 1A or 5A
PT Primary	100V to 500 kV
PT Secndarty	100 to 500V AC (phase to phase)
Burden (max)	0.5VA max per phase @ 5A
Accuracy	As per table 1 Page No. 09

Display Reset	Programmable (for energy)
Memory Retention	10 years (for energy)
LCD/Parameter Indication	1) LCD for all measured parameters 2) % of current in bar graph form
Supply Voltage	85 to 270V AC
Rated input Voltage (L-N)	19 to 519V AC (phase to phase), 50/60Hz 11 to 300V AC (phase to neutral), 50/60Hz
OUTPUT	**Pulse Output:** Voltage range - 24V DC Current capacity - 100 mA max Pulse Width: 100 ms ± 50 ms.
COMMUNICATION	RS485 MODBUS Communication (Optional)
Temperature	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	85%
Weight	395 gms
Dimensions	Refer diagram Q(III) on page 37
Terminal Connections	
Order code	**1) MFM384** **2) MFM384-C (Communication)**

Automatic Power Factor Controller

96 x 96

APFC336

96x96

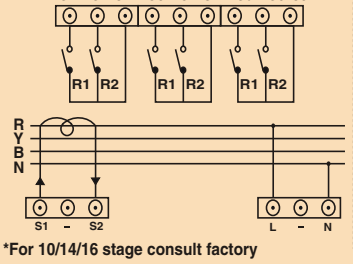
APFC338/310/312/314/316

Description	Automatic Power Factor Controller	
Display	7 segment LED ; Height 0.5"	
Digits	3	4
Input Type	1 Ø - 2 wire	
Nominal Input Current	5 A	
PF Measurement Range	2 % to 120 % of rated current	
Error Indications	CT (Current) absent CT reverse Under Compensation Over Compensation	
Hysteresis	0.01 of Target PF	Programmable: 0.005 to 0.050
Capacitor Switch ON time	30 sec – Fixed	Programmable: 1.0 to 300.0 sec
Capacitor Switch OFF time	30 sec – Fixed	Programmable: 1.0 to 300.0 sec
Operating mode	Automatic/Manual	
Relay Switching Logic	First on First off	
Operating Frequency	45 – 65Hz	
Display Update Rate	2 sec	1 sec

Supply Voltage	90 to 270V AC/DC (AC: 50 or 60Hz)	
Power Consumption	3 VA max @ 230 VAC	
Temperature	**Operating:** 0 to 50°C ; **Storage:** -20 to 75°C	
Humidity (non-condensing)	85%	
Number of Stages*	6	APFC338 - 408 gms APFC310 - 428 gms APFC312 - 446 gms APFC314 - 471 gms APFC316 - 507 gms.
Weight	227 gms	
Dimensions	Refer diagram Q(II) on page 37	Refer diagram G(Y) on page 38

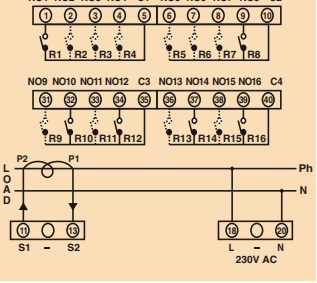
Terminal Connections

APFC336



*For 10/14/16 stage consult factory

APFC 310/314/316



Energy Meter

CE 96 x 96

Applicable only for EM306

NEW

96 x 96

- 3Ø Power (Active, Reactive)
- 3Ø Power Factor
- Energy (Active, Reactive, Apparent)
- Programmable C.T, P.T
- Modbus RTU Communication (RS485)
- Pulse Output

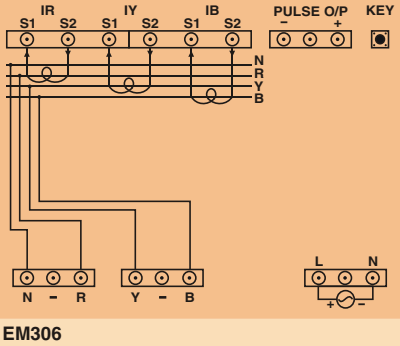
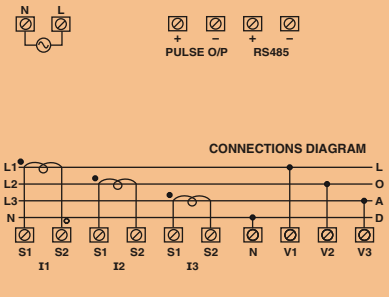
	EM306/EM306C	EM368/EM368C
Description	Energy Meter	Energy Meter
Display	7 segment LED ; Height 1.27mm	LCD display. Height 10.5mm
Digits	6	8
Input Type	3 Ø - 4 wire & 1 Ø - 2 wire	3 Ø - 3/4 wire, 2 Ø - 3 wire, 1 Ø - 2 wire
Rated Input Current	6 A max.	10mA - 5A (6A max) (External CT must be connected for current more than 5A)
Resolution	0.01, 0.1, 1 & 10 (depending on CT primary)	For energy- 0.01k, 0.1k, 1k, 0.01M, 0.1M, 1M, 10M (depending upon CT ratio X PT ratio) For Power - Auto resolution For Power factor - Resolution is 0.001
Frequency	50 Hz	50 or 60 Hz
CT Primary/ Secondary	5, 30, 40, 50, 60, 75, 80, 100, 150, 200, 250,300, 400,500, 600, 800, 1000, 1200, 1500,1600, 2000, 2500, 3000, 4000, 5000	1A or 5A to 10,000A (Programmable for any value) Note : 1A or 5A depends upon the CT secondary
PT Primary/ Secondary	——	100V to 500kV / 100 to 500V AC
Burden	0.5 VA@5A per phase	0.5 VA@5A per phase
Accuracy	Class 1	Class 1 for Active/Apparent energy Class 2 for Reactive energy Class 0.5 for Power
LED Indications	Integration of energy, Resolution is 10, Reverse connected CT warning	Integration of energy, Resolution is 10, Reverse connected CT warning (All Indication on LCD)
Output	**Pulse Output:** Voltage range - 24V DC Current capacity - 100 mA max Pulse Width: 500 ms ± 50 ms.	**Pulse Output:** Voltage range - 24V DC Current capacity - 100 mA max **Pulse Width:** 100 ms ± 50 ms.
Supply Voltage	90 to 270V AC/DC	85 to 270V AC
Temperature	Operating: 0 to 50 °C Storage: -20 to 75 °C	Operating: 0 to 50 °C Storage: -20 to 75 °C
Humidity **(non-condensing)**	85 %	85 %
Communication*	RS485 communication (MODBUS protocol)	RS485 communication (MODBUS protocol)
Weight	225 gms	310 gms
Dimensions	Refer diagram Q(II) on page 37	Refer diagram Q(III) on page 37
Terminal Connections *For EM306-C/EM368-C consult factory		
Order code	**1) EM306** **2) EM306-C (Communication)**	**1) EM368** **2) EM368-C (Communication)**

TABLE 1

Accuracy : (MFM384)	
Measurement	**Accuracy**
Voltage V_{L-N}	±0.5% of Full scale
Voltage V_{L-L}	±0.5% of Full scale
Average Voltage $_{L-N}$	±0.5% of Full scale
Average Voltage $_{L-L}$	±0.5% of Full scale
Current	±0.5% of Full scale
Average current	±0.5% of Full scale

Frequency	±0.1% , For Voltage >20V L-N, For Voltage >35V L-L
Active Power	Class 1
Apparent power	Class 1
Reactive Power	Class 1
Power factor and Avg Power Factor	±0.01
Active energy	Class 1
Reactive energy	Class 1
Apparent energy	Class 1

*Resolution is dependent on the type of parameter and the CT primary value. For further details, refer instruction manual.

Hotrunner Controllers

- *Solid state high speed thyristor control*
- *Soft start*
- *Heater current indication*
- *Earth fault detection*

TC75 (Single Zone, Two Zone, Four Zone, Six Zone, Eight Zone, Twelve Zone)

Description	Hotrunner controllers for accurate mould temperatures
Display	7 segment LED display
Digits	3 digit dual display Upper Display: PV and parameter name Lower Display: SV and parameter value (selectable)
LED Indications	8 LED indications on front panel
Inputs	Thermocouple: J and K type Range: 0 to 537°C (999°F)
Resolution	1° fixed
Control Accuracy	±1°C (1°F) dependent on total thermal system
Temperature Unit	°C or °F (selectable)
Response Time	250 ms
Control Action	Auto and Manual Control functions (Soft start system / Auto tune PID / ON-OFF Control modes)
Main Output	Internal solid state thyristor control Power capability : 15A @ 230V AC
Overload Protection	15A internal fuse
Manual Control	Adjustable from 0-100%, maintains output power within 1% of setpoint
Soft Start	Variable stepping voltage, 18 V to Line voltage
Special Functions	Heater current monitoring Heater current alarm Open triac or heater detection Ground fault detection Boost mode Standby mode
Supply Voltage	230 to 240V AC, -15% to 20% @ 50/60Hz
Power Supply Protection	15A internal fuse
Temperature	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	85%
Weight	1 Zone: 2.8 kg 2 Zone: 4.6 kg 4 Zone: 9.5 kg 6 Zone: 11.9 kg 8 Zone: 15.6 kg 12 Zone: 20.5 kg
Dimensions	Refer table R on page 37

Ordering Information

TC75 — (A) Choose from Legend

Accessories

Connectors

TCHTCN75 Thermocouple & Heater Connector — (A) — (B) Choose from Legend

Cables

TCHTCL75 Thermocouple & Heater Cable — (A) — (C) Choose from Legend

Legend

A		B		C	
Code	Zones	Code	Connector Type	Code	Length of cable
1	Single Zone	M	Male	4	4 meters
2	2 Zone	F	Female	5	5 meters
4	4 Zone			10	10 meters
6	6 Zone			15	15 meters
8	8 Zone			20	20 meters
12	12 Zone				

NOTE: For other configurations, consult factory

PID Temperature Controllers

Full Featured PID Series

PID500 / 110 / 330

- *Heat cool*
- *Ramp soak*
- *Soft start*
- *Heater current monitoring*
- *Remote setpoint*
- *Motorised valve control*
- *RS485 communication*

Profile Controller

- 10 programs, 16 steps each
- Alarm at each step
- Memory during power fail

PID500
48 x 48

PID110
96 x 48

PID330
96 x 96

PR502
48 x 48

Common specifications for PID500 / 110 / 330 & PR502

Description	Advanced PID controller, covers most applications
DISPLAY	Upper: 7 segment red LED Lower: 7 segment green LED
Digits	Upper: 4 digits (process value) Lower: 4 digits (selectable)
LED Indications	Relay ON, Alarm, Manual mode, Tune
INPUT SPECIFICATIONS	
Types	*Thermocouple:* J, K, T, R, S, C, E, B, N, L, U, W, Platinel II *RTD:* PT100 *Signal Inputs (DC):* -5 to 56 mV, 0 to 10 V, 0 to 20 mA
Sampling time	200 ms
Resolution	1 / 0.1° for TC/RTD 1/0.1/0.01/0.001 for analog input
Temperature Unit	°C / °F selectable
Indication Accuracy	
TC / RTD Input	For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1° Cold junction accuracy ± 5°C
Signal Input	±0.5%, ± 1 digit
Control Output (Factory Set)	
Relay	5 A@230V AC or 30V DC
SSR	18V DC, 20mA
Current output	0/4 to 20mA DC (max. load :500E)
Voltage output	0 to 5/10V DC (min. load :10K)
Alarm Output	Max. 2 (max.1 for PR502)
Relay	5A@230V AC or 30V DC
SSR	12V DC (20mA)
Retransmission Output	
Current Output	0/4 to 20mA DC (max. load :500E)
Voltage Output	0 to 5/10V DC (min. load :10K)
Update Rate	100 ms
FUNCTIONAL SPECIFICATIONS	
Control Method	PID or ON/OFF
Hysteresis	0.1 to 99.9°
Proportional Band	0.0 to 400.0°
Integral Time	0 to 3600 sec
Derivative Time	0 to 200 sec
Cycle Time	0.1 to 100 sec
Manual Reset Value	-99.9 to 99.9°
Heat Cool PID	
Control Method	PID
Cycle Time	0.1 to 100 sec
Proportional Gain	0.0 to 400.0°
Deadband	Programmable (SPLL to SPHL)
Alarms	
Modes	Deviation high/low, Absolute high/low, Band, Sensor break
Hysteresis	0.1 to 99.9°
Ramp Soak	
Ramp Rate	1 to 9999 °/hr
Soak Time	0 to 1440 min
Soft Start Time	0 to 999 min
OPTIONAL FEATURES FOR PID500 **Remote set point input**	
Input Type	0 to 20mA DC / 0 to 10V DC
Input Resistance	100 ohm
Range	-5% to 105%
Scale Range	-1999 to 9999 with fixed 1° for TC/RTD and as per resolution selected for analog input
Heater current monitor input	
Input	100mA AC, 50 to 400Hz
Display Scale Range	0 to 999.9
Input Resistance	47 ohms
Accuracy	±0.5% F.S ±1 digit
Alarm mode	LA / HA / BAND
Over load	150 mA (continuous)
Motorised Value Input	
Closed Loop Feedback Input	Potentiometric Voltage Input Range: 0 to 10 VDC Current Input Range: 4 to 20 mADC
Motorised Control Mode	Bounded / Boundless
Manual Motor Control Modes	Rest / Run / Up / Down
Motor Position Indication (in %)	0.0 to 100.0%
Valve Travel Time	0.1 to 240.0 sec
Control Action (fixed)	Output1: Reverse action Output2: Forward Action

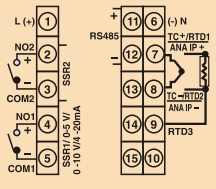
Serial Communication (Applicable for PR502/PID500/PID110/PID330)	
Interface standard	RS485
Communication address	1 to 99, maximum of 32 units per line
Transmission mode	Half duplex
Transmission protocol	MODBUS RTU
Transmission distance	500 m maximum
Transmission speed	9600, 4800, 2400, 1200, 600, 300 bits/sec
FUNCTIONAL SPECIFICATIONS FOR PR502	
No. of Profiles	10

FUNCTIONAL SPECIFICATIONS FOR PR502 (continued)	
No. of Steps	16 each
Ramp / Soak Time Range	0.01 to 99.59 hrs : min
Target Temperature Range	SPLL to SPHL
Supply Voltage AC: 50 or 60 Hz	85 to 270V AC/DC Optional-24V AC/DC
Temperature	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	95% RH
Weight	PID500: 180 gms ; PID110: 230 gms PID330: 330 gms ; PR502: 170 gms
Certifications	CE UL

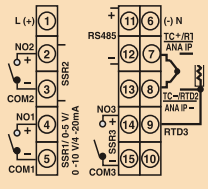
Dimensions — **PID500:** Diagram B, Page 36 ; **PID110:** Diagram H(W), Page 36 ; **PID330:** Diagram G(Y), Page 36 ; **PR502:** Diagram B, Page 36

Terminal Connections

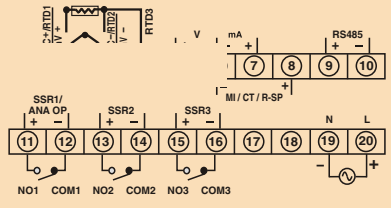
PR502



PID500



PID110/330



Terminal nos same for PID110. For layout consult factory.

Ordering Information

PID500 / PID110 / PID330 — A — B — xx

Choose from Legend

Legend

A — Output 1		B — Output 2		xx — Output 3 / Special functions	
0	Relay	0	Relay	00	Only output 1 & 2
1	18V DC SSR Drive	1	12V DC SSR Drive	01	Output 3 (relay)
2	4-20mA (Current)			02	Output 3 (12V DC SSR drive)
3	0-10V (Voltage)			03	Communication RS485
4	0-5V (Voltage)			04	Output 3 (relay) + Communication RS485
5	0-20mA (Current)			05	Output 3 (12V DC SSR) + Communication RS485
				06	CT Input
				07	Output 3 (relay) + CT Input
				08	Output 3 (12V DC SSR) + CT Input
				09	CT Input+ Communication RS485
				Second Analog Input**	
				10	Valve positioner type
				11	Valve positioner type + Communication RS485
				12	Remote setpoint type
				13	Remote setpoint type+ Communication RS485

For second analog I/P in PID110/330, consult factory.

**Second Analog Input			
Valve positioner type			Remote setpoint type
-P	Potentiometric f/b input	-C	4-20 mA input
-C	4-20 mA f/b input	-V	0-10 V input
-V	0-10 V f/b input		

****NOTE**

1) For 24V AC / DC model, add suffix '-24'.
2) For motoriosed, both the outputs can be Relay only.

Ordering Example

PID500 - 3 - 0 - 01

PID500 - Output 1 (Voltage) - Output 2 (Relay) - Output 3 (Relay)

Ordering Information(for PR502)

PR502 — A — B — x

Choose from Legend

Legend

A — Output 1		B — Output 2		x — Serial Communication	
0	Relay	0	Relay	0	No
1	18V DC SSR Drive	1	12V DC SSR Drive	1	Yes
2	4-20mA (Current)				
3	0-10V (Voltage)				

Ordering Example

PR502 - 3 - 0 - 1

PR502 - Output 1 (Voltage) - Output 2 (Relay) - Serial Communication (Yes)

PID Temperature Controllers

Economy Series

- *High performance*
- *Simple to use*
- *Best value products in PID series*

- 4 digit PV, 4 digit SV
- 2 set point
- Absolute / Deviation alarm

48 x 48

PID528

- 4+4 digit
- Single setpoint
- 10 A relay output 1C/O

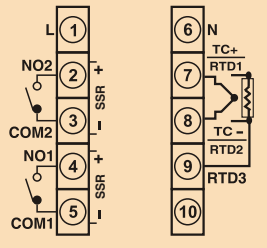
48 x 48

TC518

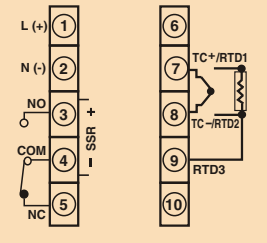
Description	Economical PID	Economical PID
Display	7 segment LED, dual display	7 segment LED, dual display
Digits	4 + 4 digits	4 + 4 digits
LED Indications	Relay ON, Tune	Relay ON, Tune
INPUT SPECIFICATIONS		
Types	Thermocouple (J,K,T,R,S) / RTD (PT100)	Thermocouple (J,K,T,R,S) / RTD (PT100)
Sampling time	250 ms	250 ms
Resolution	1°/0.1°	1°/0.1°
Temperature Unit	Fixed °C	°C / °F selectable
Indication Accuracy**	For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1°	For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1°
Control Output		
Relay	5A@230V AC or 30V DC	10A@230V AC or 30V DC
SSR (optional)	18V DC, 20mA	18V DC, 20mA
Current (optional)	4-20mA DC (consult factory)*	
Auxiliary Output	Max. 1	
Relay	5 A@230V AC or 30V DC	
SSR (optional)	12V DC , 20mA	
Functional Specifications for Control		
Control Method	PID or ON/OFF	PID or ON/OFF
Hysteresis	0.1 to 99.9°	0.1 to 99.9°
Proportional Band	0.0 to 400.0°	0.0 to 400.0°
Integral Time	0 to 3600 sec	0 to 3600 sec
Derivative Time	0 to 200 sec	0 to 200 sec
Cycle Time	0.1 to 100.0 sec	0.1 to 100.0 sec
Manual Reset Value	-99.9 to 99.9°	-99.9 to 99.9°
Dwell (Soak) Timer		
Heat-Cool		
Control Method		
Proportional Band-Cool		
Cycle Time-Cool		
Dead Band		
Functional Specifications for Auxiliary O/P		
Modes	Deviation , Absolute	
Hysteresis	0.1 to 99.9°	
Supply Voltage AC: 50 or 60 Hz	85 to 270V AC/DC, 24V AC/DC optional	85 to 270V AC/DC, 24V AC/DC optional
Temperature	Operating: 0 to 50° Storage: -20 to 75°	Operating: 0 to 50° Storage: -20 to 75°
Humidity (non-condensing)	95% RH	95% RH
Weight	160 gms	160 gms
Certifications	CE UL	CE UL
Dimensions	Diagram B on page 36	Diagram B on page 36

Terminal Connections

PID528



TC518



Ordering Information

PID528

Legend

	A	
Code	**Output 1**	**Output 2**
1	Relay	Relay
2	18V DC SSR Drive	Relay
3	4-20mA	Relay
5	Relay	12V DC SSR Drive
6	18V DC SSR Drive	12V DC SSR Drive

Note: For 24V AC/DC model add suffix **'-24'**

Ordering example

PID528 - 2

PID528 - 18V DC SSR Drive - Relay
Output1 Output2

TC518

Model	Output
TC518	Relay
TC518-SSR	18V DC SSR Drive

***Note:** For 24V AC/DC model, add suffix '-24'

*NOTE: Not for re-transmission **NOTE: Cold junction calibration accuracy in TC mode ± 5°C

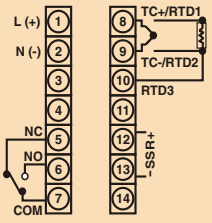
Economic Temperature Controllers

SELEC®

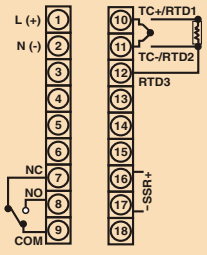
TC544A/244AX/344AX	TC533AX/233AX/333AX	TC513AX/203AX/303AX	DTC221A
• Heat-Cool Control • Dwell timer ranging-OFF, 0 to 9999 min • 1 alarm output - Absolute/deviation	• Programmable inputs • Single setpoint • Temperature unit ℃ / °F selectable	• Programmable inputs • Single setpoint • Temperature unit ℃ / °F selectable	• Programmable inputs • Single setpoint • Temperature unit ℃ / °F selectable
			
CE NEW TC544A/244AX/344AX	CE NEW TC533AX/233AX/333AX	CE NEW TC513AX/203AX/303AX	NEW DTC221A
Economical PID	Economical PID	Economical PID	Economical PID
7 segment LED, dual display	7 segment LED, dual display	7 segment LED, single display	7 segment LED, single display
4 + 4 digits	3 + 3 digits	3 digits	3 digits
Relay ON, Tune, Soak Time	Control output ON	Control output ON	Control output ON
Thermocouple (J,K,T,R,S) / RTD (PT100)	Thermocouple (J,K,T,R,S) / RTD (PT100)	Thermocouple (J,K,T,R,S) / RTD (PT100)	Thermocouple (J,K,T,R,S) / RTD (PT100)
250 ms	250 ms	250 ms	250 ms
0.1/1° for TC/RTD inputs (fixed 1° for R & S type TC input)	Fixed 1° resolution	Fixed 1° resolution	Fixed 1° resolution
℃ / °F selectable	℃ / °F selectable	℃ / °F selectable	℃ / °F selectable
For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1°	For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1°	For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1°	For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1°
5 A @250 VAC / 30 VDC, resistive	10 A@230 VAC or 30 VDC, resistive	10 A@230 VAC or 30 VDC, resistive	10 A@230 VAC or 30 VDC, resistive
12V DC, 50 mA	12V DC, 50 mA	12V DC, 50 mA	12V DC, 50 mA
Max. 1			
5 A@230V AC or 30V DC, resistive			
12V DC, 50 mA (Optional)			
PID or ON/OFF	PID or ON/OFF	PID or ON/OFF	PID or ON/OFF
0.1 to 99.9°	0.1 to 99.9°	0.1 to 99.9°	0.1 to 99.9°
1.0 to 400.0°	1 to 400°	1 to 400°	1 to 400°
0 to 9999 sec	0.0 to 99.9 min	0.0 to 99.9 min	0.0 to 99.9 min
0 to 9999 sec	0 to 200 sec	0 to 200 sec	0 to 200 sec
0.1 to 99.9 sec	0.1 to 99.9 sec	0.1 to 99.9 sec	0.1 to 99.9 sec
-19.9 to 19.9°	-19.9 to 19.9°	-19.9 to 19.9°	-19.9 to 19.9°
OFF, 1 to 9999 min			
PID (with auto-tuning)			
0.0 to 400.0°			
0.1 to 99.9 sec			
SPLL to SPHL (Programmable)			
Deviation, Absolute			
0.1 to 99.9°			
85 to 270V AC/DC, 24V AC/DC optional	85 to 270V AC/DC, 24V AC/DC optional	85 to 270V AC/DC, 24V AC/DC optional	85 to 270V AC/DC, 24V AC/DC optional
Operating: 0 to 50° Storage: -20 to 75°	Operating: 0 to 50° Storage: -20 to 75°	Operating: 0 to 50° Storage: -20 to 75°	Operating: 0 to 50° Storage: -20 to 75°
95% RH	95% RH	95% RH	95% RH
TC544A :142 gms I TC244AX:190 gms TC344AX :252 gms	TC533A/AX: 129 gms, TC233AX: 180 gms TC333AX: 240 gms	TC513A/AX:129 gms, TC203AX:180 gms TC303AX: 240 gms	DTC221A: 180 gms
Diagram U on page 37	Diagram U on page 37	Diagram U on page 37	Diagram U on page 37

Terminal Connections

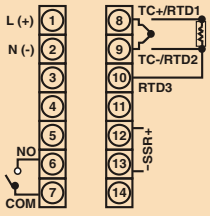
TC203AX/TC233AX



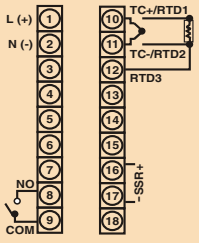
TC303AX/TC333AX



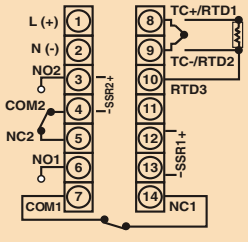
DTC221A



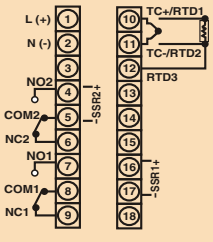
TC303A



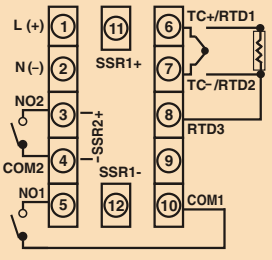
TC244AX



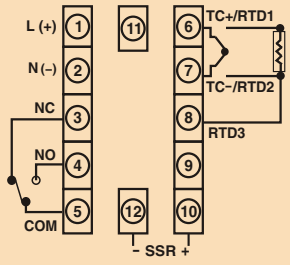
TC344AX



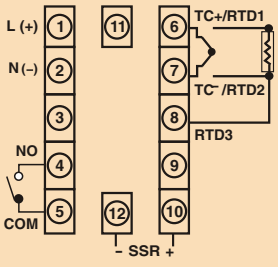
TC544A



TC513AX/TC533AX



TC513A/TC533A



Ordering Information

TC513/TC203/TC303

Part No.	Output 1	
	Relay	SSR (12V DC)
TC513A	▪	
TC513A-1		▪
TC513AX	▪	▪
DTC221A	▪	
DTC221A-1		▪
TC203AX	▪	▪
TC303A	▪	
TC303A-1		▪
TC303AX	▪	▪

TC533/TC233/TC333

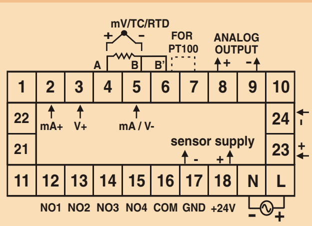
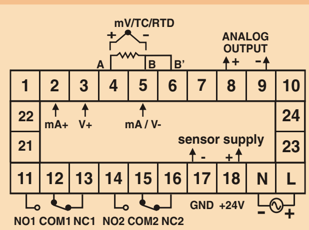
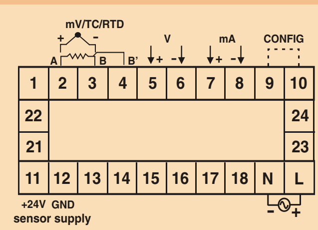
Part No.	Output 1	
	Relay	SSR (12V DC)
TC533A	▪	
TC533AX	▪	▪
TC233AX	▪	▪
TC333AX	▪	▪

TC544/TC244/TC344

Part No.	Output 1		Output 2	
	Relay	SSR (12V DC)	Relay	SSR (12V DC)
TC544A	▪	▪	▪	
TC544A-1	▪	▪		▪
TC244AX	▪	▪	▪	
TC244AX-1	▪	▪		▪
TC344AX	▪	▪	▪	
TC344AX-1	▪	▪		▪

***Note**: For 24V AC/DC model, add suffix '-24'
For TC513A/TC513A-1/TC533A/DTC221A/DTC221A-1/TC303A/TC303A-1 24V models are not available

Process Indicators

	• 4 alarms • Retransmission • Communication	• 2 alarms • Retransmission	• Scalable Indicator
	 48 x 96	 48 x 96	 48 x 96
	PIC1000N	**PIC152N**	**PIC101N**
Description	4 Alarm outputs, Retransmission, Communication	2 Alarm outputs with retransmission.	Very low cost indicator (no output)
Display	4 digit, 7 segment LED : 0.5”	4 digit, 7 segment LED : 0.5”	4 digit, 7 segment LED : 0.5”
LED Indication	Alarm ON (4 Nos)	Alarm ON (2 Nos)	None
Error Indications	Over range/Under range/Open sensor/ TC reverse	Over range/Under range/Open sensor/ TC reverse	Over range/Under range/Open sensor/ TC reverse
Inputs	**Thermocouple:** J, K, T, R, S, C, E, L, U, W, N, B, Platinell II **RTD:** PT100, PT1000 **Signal Inputs (DC):** -5 to 56 mV, 0 to 100 mV, 0 to 10V, 0/4 to 20 mA	**Thermocouple:** J, K, T, R, S **RTD:** PT100 **Signal Inputs (DC):** -5 to 56 mV, 0 to 10V, 0/4 to 20 mA	**Thermocouple:** J, K, T, R, S **RTD:** PT100 **Signal Inputs (DC):** 0 to 56 mV,0 to 10 V, 0/4 to 20 mA
Resolution	Temperature input: 1/0.1°C / °F ; Signal input: 0.001, 0.01, 0.1 & 1.	For Temperature input: 1/0.1°C / °F ; For Signal input: 0.001, 0.01, 0.1 & 1.	For Temperature input: 1/0.1°C / °F ; For Signal input: 0.001, 0.01, 0.1 & 1.
Accuracy	For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1° For Signal inputs: ±0.5% of F.S., ± 1 digit	For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1° For Signal inputs: ±0.5% of F.S., ± 1 digit	For TC inputs: 0.25% of F.S. ±1° For R & S inputs: 0.5% of F.S. ±2° (20 min of warm up time for TC input) For RTD inputs: 0.1% of F.S. ±1° For Signal inputs: ±0.5% of F.S., ± 1 digit
Alarms	4 nos	2 nos	
Alarm Modes	High alarm, Low alarm, Band, Fail output and Fault diagnosis	High alarm, Low alarm, Band, Fail output and Fault diagnosis	
Hysteresis	0.1 to 99.9 °	0.1 to 99.9 °	
Annunciator	Programmable	Programmable	
Reset Action	Automatic or Latched	Automatic or Latched	
Relay Rating	5A @ 250V AC or 24V DC	5A @ 250V AC or 24V DC	
Retransmission Output (Optional)	0/4 to 20 mA DC, 0 to 5V DC, 0 to 10V DC	0/4 to 20 mA DC, 0 to 5V DC, 0 to 10V DC	
Sensor Supply	24V DC, 30 mA	24V DC, 30 mA	24V DC, 30 mA
Communication	RS485 (MODBUS)		
Supply Voltage AC: 50 or 60 Hz	85 to 270V AC/ DC Optional - 24V DC	85 to 270V AC/ DC Optional - 24V DC	85 to 270V AC/ DC Optional - 24V DC
Temperature	Operating:0 to 50°C. Storage:-20 to 75°C.	Operating:0 to 50°C. Storage:-20 to 75°C.	Operating:0 to 50°C. Storage:-20 to 75°C.
Humidity (non-condensing)	95% RH.	95% RH.	95% RH.
Weight	260 gms.	240 gms.	200 gms.
Certifications	CE UL	CE UL	CE UL
Dimensions	Refer diagram H(V) on page 36	Refer diagram H(V) on page 36	Refer diagram H(V) on page 36
Terminal Connections			

Ordering Information

MODELS	RETRANSMISSION OUTPUT	COMMUNICATION
PIC1000-A	X	X
PIC1000-D-1 PIC1000-D-2 PIC1000-D-3 PIC1000-D-4	0-20mA 4-20mA 0-5V 0-10V	X
PIC1000-E PIC1000-E-1 PIC1000-E-2 PIC1000-E-3 PIC1000-E-4	- 0-20mA 4-20mA 0-5V 0-10V	✓

MODELS	RETRANSMISSION OUTPUT
PIC152-A	X
PIC152-B-1	0-20mA
PIC152-B-2	4-20mA
PIC152-B-3	0-5V
PIC152-B-4	0-10V

MODELS
PIC101N

Note: For 24V DC model add suffix **’-24’**

Digital / PID Temperature Controllers
Low Cost

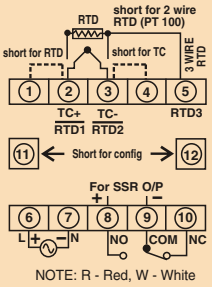
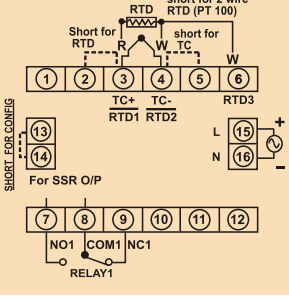
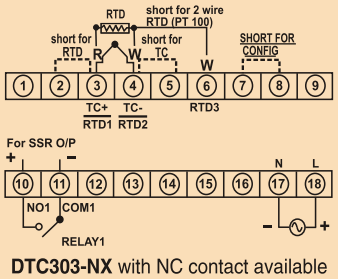
DTC503 / 203 / 303
- *J, K, PT100 (selectable)*
- *ON-OFF / Proportional control*

PID513 / 213 / 313
- *J, K, PT100 (selectable)*
- *PID Control*

48 x 48

72 x 72

96 x 96

	DTC503-N / PID513-N	DTC203 / PID213	DTC303 / PID313
Description	Economical	Economical	Economical
Digits	3 digits	3 digits	3 digits
LED Indication	Output ON	Output ON	Output ON
Input Sensor (Range)	User selectable: J (-99 to 750) / K (-99 to 999) / PT100 (-99 to 850)	User selectable: J (-99 to 750) / K (-99 to 999) / PT100 (-99 to 850)	User selectable: J (-99 to 750) / K (-99 to 999) / PT100 (-99 to 850)
Resolution	Fixed 1°	Fixed 1°	Fixed 1°
Setpoints	1	1	1
Control Modes	**DTC503:** ON/OFF & Time proportional **PID513:** Autotune PID	**DTC203:** ON/OFF & Time proportional **PID213:** Autotune PID	**DTC303:** ON/OFF & Time proportional **PID313:** Autotune PID
Accuracy	±0.25% of F.S. ±1°C	±0.25% of F.S. ±1°C	±0.25% of F.S. ±1°C
Outputs	1 (1 C/O)	1 (1 C/O)	1 (DTC303/PID313: 1 NO, DTC303NX: 1C/O)
Relay Action	A) Heat mode B) Cool mode (for DTC503N only)	A) Heat mode B) Cool mode (for DTC203 only)	A) Heat mode B) Cool mode (for DTC303 only)
Relay Rating	10A @ 230V AC	10A @ 230V AC	10A @ 230V AC
Optional Output Configuration	12V DC, 20mA	12V DC, 20mA	12V DC, 20mA
Supply Voltage AC: 50 or 60 Hz	85 to 270V AC/DC 24V AC/DC (optional)	85 to 270V AC/DC 24V AC/DC (optional)	85 to 270V AC/DC 24V AC/DC (optional)
Temperature	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C
Humidity (non-condensing)	95% RH	95% RH	95% RH
Weight	140 gms	200 gms	210 gms
Certifications			
Dimensions	Diagram B on page 36	Refer diagram C on page 36	Refer diagram G(Z) on page 36
Terminal Connections	 NOTE: R - Red, W - White		 **DTC303-NX** with NC contact available

Ordering Information

Model	Description
DTC503	48 x 48, ON/OFF & Time proportional
DTC203	72 x 72, ON/OFF & Time proportional
DTC303	96 x 96, ON/OFF & Time proportional , with 1 NO relay output
DTC303NX	96 x 96, ON/OFF & Time proportional , with 1 C/O relay output

Model	Description
PID513	48 x 48, Autotune PID
PID213	72 x 72, Autotune PID
PID313	96 x 96, Autotune PID

NOTE

For SSR output models: Add suffix **'SSR'**
For 24V AC/DC models: Add suffix **'24V'**

Digital Temperature Controllers

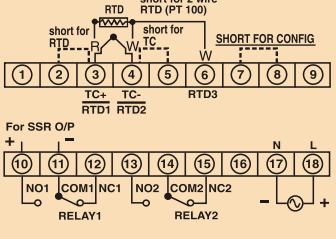
Low Cost

- 2 setpoints
- J, K, PT100 (selectable)
- 0.1°C resolution for RTD
- ON-OFF / Proportional control

96 x 96

DTC324

Programmable, ON/OFF & Time proportional mode
4 digits
Output ON, Alarm ON
User selectable: J (-99 to 750) / K(-99 to 1350) / PT100 (-99 to 850.0)
1° for TC, 1/0.1° for RTD
2
Proportional / ON-OFF (Band/ Hysteresis: 0.1 to 99.9°) Cycle time: 1 to 99 sec.)
±0.25% of F.S. ±1°C
2
A) Heat mode B) Cool mode
Set 1: 10A @ 230V AC Set 2: 5A @ 230V AC
12 VDC, 20 mA
85 to 270 VAC/DC Optional: 24 VAC/DC
Operating: 0 to 50°C ; Storage"- -5 to 50°C.
95% RH
230 gms
Refer diagram G(Z) on page 38

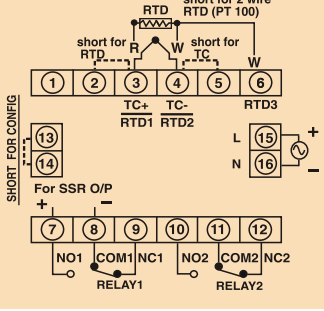


- 2 setpoints
- J, K, PT100 (selectable)
- 0.1°C resolution for RTD
- ON-OFF / Proportional control

72 x 72

DTC204

Programmable, ON/OFF & Time proportional mode
4 digits
Output ON, Alarm ON
User selectable: J (-99 to 750) / K(-99 to 1350) / PT100 (-99 to 850.0)
1° for TC, 1/0.1° for RTD
2
Proportional / ON-OFF (Band/ Hysteresis: 0.1 to 99.9°C) Cycle time: 1 to 99 sec.)
±0.25% of F.S. ±1°C
2
A) Heat mode B) Cool mode
Set 1: 10A @ 230V AC Set 2: 5A @ 230V AC
12V DC, 20 mA
85 to 270V AC/DC Optional: 24V AC/DC
Operating: 0 to 50°C Storage: -5 to 50°C
95% RH
230 gms
Refer diagram C on page 36

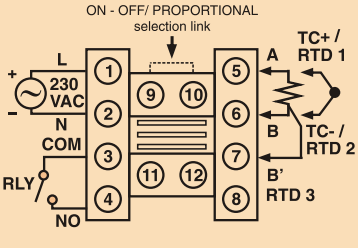


- J / K / PT100 versions
- ON-OFF / Proportional control

48 x 48

TC52

Analog temperature controller
Dial setting
Relay ON, Power ON
J (200 or 400) / K (200 or 400) / PT100 (200 or 400)
1
Time proportional & ON-OFF Control
Setting: ± 3% Repeat: ± 0.5% of F.S.
1
Heat mode
5A@230V AC
230V AC
Operating: 0 to 50°C Storage: -5 to 50°C
95% RH
130 gms
Refer diagram B on page 36



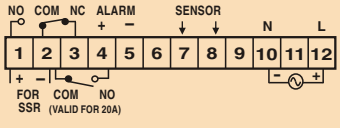
Cooling Controller

- 0.1°C resolution
- Defrost management
- High & low temperature alarm
- 20 A relay output

36 x 72

CH403

Controller for cooling applications
3 digits
Setpoint lock, Defrost, Relay ON, Alarm ON
NTC
1/0.1°
1
ON-OFF (Hysteresis: 0.1 to 9.9°)
±0.25% of F.S. ±1°C
2
Main, High Alarm, Low Alarm
Main output : 10A @ 230V AC or 20A; Alarm output : SSR drive 12V DC, 10mA or Relay 5A @ 230V AC
85 to 270V AC/DC Optional: 24V AC/DC
Operating: 0 to 50°C Storage: -5 to 50°C
95% RH
110 gms
CE UL
Refer diagram F on page 36



Specifications for NTC Sensor (TSP04)

Sensor Type	Thermocouple Range (°C)	Nominal Resistance
NTC probe	-40 to +100	10 K ohms @25°C

Ordering Information

Product Name	Order Code	Description
DTC204	**DTC204-2**	Relay Output
DTC324	**DTC324**	Relay Output
CH403	**CH403-1**	Main O/P : 10A Relay Alarm O/P : 12V DC, 10 mA
	CH403-2	Main O/P : 20A Relay Alarm O/P : None
	CH403-3	Main O/P : 10A Relay Alarm O/P : 5A Relay

Ordering Information (for TC52)

Model	Range	Sensor	Supply
TC52	**200** - 0 to 200°C	**J / K / PT100**	**230**V AC
	400 - 0 to 400°C	**J / K / PT100**	**230**V AC

Ordering Example

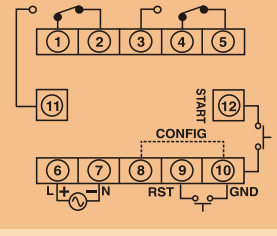
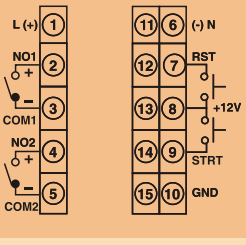
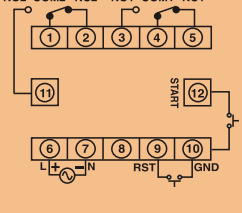
TC52 - 400 - J - 230

TC52 (model) - 0 - 400°C - J Type Thermocouple - 230V AC supply

NOTE

For SSR output models: Add suffix **'SSR'**
For 24V AC/DC models: Add suffix **'24V'**

Digital Timers

	• Low cost • Single setpoint • 2 C/O output	• Multifunction • Multirange • 2 setpoints	• Preset • 2 C/O output
	 48 x 48	 48 x 48	 48 x 48
	XT543	**XT5042**	**XT56N**
Description	Economical, multifunction programmable	Multifunction, dual display	High accuracy, push wheel setting
Display	7 segment LED; Height: 0.5”	Upper: 7 segment red LED; 0.5” Lower: 7 segment green LED ; 0.3”	7 segment LED; Height: 0.3”
Digits	3 digits	Upper: 4 digits Lower: 4 digits	3 digits
Time Setting	Front keypad	Front keypad	Pushwheel
No of Channels			
Operating Modes	ON delay / Interval delay / Cyclic ON first / Cyclic OFF first (refer page 35 for timing diagrams)	ON delay / Interval delay / Cyclic ON first / Cyclic OFF first / Forward-pause-reverse/ instantaneous + delayed / timer / batch (refer page 35 for timing diagrams)	ON delay / Interval
Setpoints	1	2	1
Range	9.99 / 99.9 / 999 sec, 9:59 min:sec 99.9 / 999 min, 9:59 hr:min, 99.9 / 999 hr	99.99 / 999.9 / 9999 sec, 99:59 min:sec, 999.9 / 9999 min, 99:59 hr:min, 999.9 / 9999 hr	9.99 / 99.9 / 999 sec, 99.9 / 999 min, 99.9 hr
Counting Direction	Down	Up / down	Down
Start Input	Gate / pulse start (programmable)	Gate / pulse start (programmable)	Pulse start
Accuracy	±0.5% of F.S. or 50 ms	±0.05% of F.S. or 50 ms	±0.05% of F.S. or 50 ms
Reset	Front, Remote, Power interruption	Front, Remote, Power interruption (programmable)	Front, Remote, Power interruption
Memory		10 years	
Configuration Lock	Via rear terminals	Password protected	
LED Indications	Relay status	Relay status, sec, min & hr	Relay status
Output	2 C/O (DPDT)	2, each 1 NO	2 C/O (DPDT)
Relay Rating	5A @ 230V AC	5A @ 230V AC	5A @ 230V AC
Supply voltage AC: 50 or 60 Hz	85 to 270V AC/DC	85 to 270V AC/DC, 24V DC (optional)	85 to 270V AC/DC
Temperature	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C
Humidity (non-condensing)	95% RH	95% RH	95% RH
Weight	130 gms	175 gms	140 gms
Certifications		CE cULus	CE
Dimensions	Refer diagram B on page 36	Refer diagram B on page 36	Refer diagram B on page 36
Terminal Connections			
Ordering Code	**XT543N**	**XT5042**	**XT56N**

- Preset
- 2 C/O output

72 x 72

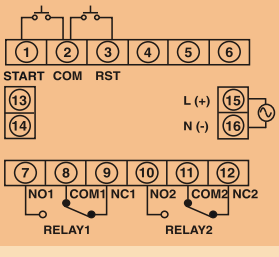
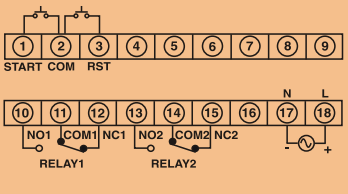
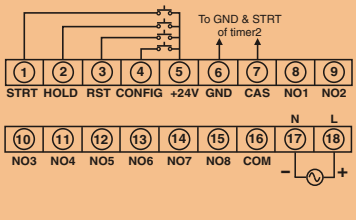
- Preset
- 2 C/O output

96 x 96

PT380 - 8 Channel Sequential Timer

- Flexibility of programming each channel separately
- Sequential / Parallel operation
- Cascade output for channel expansion

96 x 96

	XT264	XT364	PT380
Description	Economical, pushwheel setting	Economical, pushwheel setting	Sequential timer
Display	7 segment LED; Height: 0.5”	7 segment LED; Height: 0.5”	7 segment LED; Height: 0.3”
Digits	3 digits	3 digits	2 + 4 digits
Time Setting	Pushwheel	Pushwheel	Front keypad
No of Channels			8 channels
Operating Modes	ON delay / Interval	ON delay / Interval	ON delay, Interval, Cyclic ON first, Cyclic OFF first (start up delay & no. of cycles programmable for cyclic mode) (refer page 35 for timing diagrams)
Setpoints	1	1	8
Range	9.99 / 99.9 / 999 sec, 99.9 / 999 min, 99.9 hr	9.99 / 99.9 / 999 sec, 99.9 / 999 min, 99.9 hr	99.99, 999.9, 99:59 min:sec, 99:59 hr:min, 999.9 hr
Counting Direction	Down	Down	Up
Start Input	Pulse start	Pulse start	Start, Hold
Accuracy	±0.5% of F.S. or 50 ms	±0.5% of F.S. or 50 ms	±0.5% of setting or 50 ms, whichever is greater
Reset	Front, Remote, Power interruption	Front, Remote, Power interruption	Front, remote, on power interruption
Memory			10 years
Configuration Lock			via rear terminals
LED Indications	Relay status	Relay status	Relay status, Cascade O/P , Time range, ON/OFF time, Timing in progress
Output	2 C/O (DPDT)	2 C/O (DPDT)	8 nos., NO with single common
Relay Rating	5A @ 230V AC	5A @ 230V AC	5A @ 230V AC
Supply voltage AC: 50 or 60 Hz	85 to 270V AC/DC	85 to 270V AC/DC	85 to 270V AC/DC
Temperature	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	95% RH	95% RH	95% RH
Weight	200 gms	230 gms	350 gms
Certifications			
Dimensions	Refer diagram C on page 36	Refer diagram G(Z) on page 38	Refer diagram G(X) on page 36
Terminal Connections			
Ordering Code	**XT264-3**	**XT364-3**	**PT380**

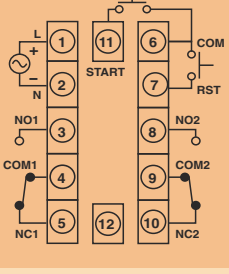
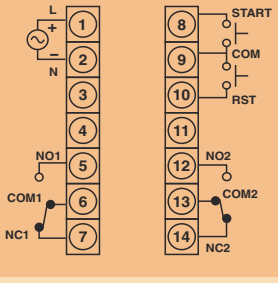
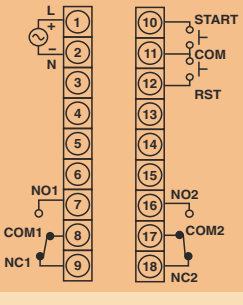
Digital Timers

Multifunction Multi range timers

NEW 48 x 48

NEW 72 x 72

NEW 96 x 96

	XT546	XT246	XT346
Description	Multifunction Dual Display	Multifunction Dual Display	Multifunction Dual Display
Display	7 segment LED, 3+3 digits Height : Upper display : 0.39" Lower display : 0.29"	7 segment LED, 3+3 digits Height : Upper display : 0.56" Lower display : 0.4"	7 segment LED, 3+3 digits Height : Upper display : 0.56" Lower display : 0.4"
Time Setting	Front keypad	Front keypad	Front keypad
Operating Modes	ON delay, Interval, Cyclic ON first, Cyclic OFF first (Refer page 35 for timing diagram)	ON delay, Interval, Cyclic ON first, Cyclic OFF first (Refer page 35 for timing diagram)	ON delay, Interval, Cyclic ON first, Cyclic OFF first (Refer page 35 for timing diagram)
Setpoints	1	1	1
Range	9.99 / 99.9 / 999 sec 9.59 min : sec, 99.9 / 999 min 9.59 hour : min, 99.9 / 999 hour	9.99 / 99.9 / 999 sec 9.59 min : sec, 99.9 / 999 min 9.59 hour : min, 99.9 / 999 hour	9.99 / 99.9 / 999 sec 9.59 min : sec, 99.9 / 999 min 9.59 hour : min, 99.9 / 999 hour
Counting Direction	Down	Down	Down
Start Input	Pulse, Gate (Programmable)	Pulse, Gate (Programmable)	Pulse, Gate (Programmable)
Accuracy	Setting : ±0.05% of set time or 50 ms (whichever is greater) Repeat : ±0.05%	Setting : ±0.05% of set time or 50 ms (whichever is greater) Repeat : ±0.05%	Setting : ±0.05% of set time or 50 ms (whichever is greater) Repeat : ±0.05%
Reset	Front, Remote, Power interruption	Front, Remote, Power interruption	Front, Remote, Power interruption
Memory	10 years	10 years	10 years
Configuration Lock	Through front keypad	Through front keypad	Through front keypad
LED Indications	Relay status, Seconds, Minutes, Hours	Relay status, Seconds, Minutes, Hours	Relay status, Seconds, Minutes, Hours
Output	2:1 C/O (SPDT)	2:1 C/O (SPDT)	2:1 C/O (SPDT)
Relay Rating	5A @ 250V AC	5A @ 250V AC	5A @ 250V AC
Supply voltage AC : 50/60 HZ	85 to 270V AC, 24V AC/DC	85 to 270V AC, 24V AC/DC	85 to 270V AC, 24V AC/DC
Temperature	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	95% RH	95% RH	95% RH
Weight	140 gms	190 gms	240 gms
Certifications			
Dimensions	Refer diagram U on page 37	Refer diagram U on page 37	Refer diagram U on page 37
Terminal Connections			
Ordering Code	**XT546 / XT546-24V**	**XT246 / XT246-24V**	**XT346 / XT346-24V**

22.5mm Din Rail Timers

800 Series

- *Slim, space saving design*
- *Din rail / screw mounting*
- *Finger guards for safety*
- *Wide range of models*

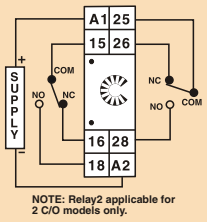
800XU

800XA

800M

800S

800XC

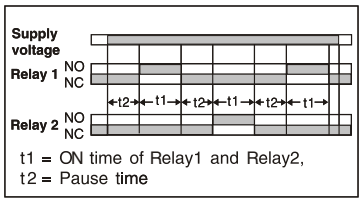
	800XU	800XA	800M	800S	800XC
Description	2 functions, 12 ranges universal voltage	2 functions, 8 ranges universal voltage (economical)	2 functions, 12 ranges	Lowest cost, single range, single function	Cyclic with unequal ON time & OFF time
Modes[+1]	ON delay / Interval	ON delay / Interval	ON delay / Interval	**ON**: ON delay	Cyclic ON first or OFF first
Time Ranges	1 / 3 / 10 / 30 sec / min / hr	3 / 10 / 30 / 60 sec / min	1 / 3 / 10 / 30 sec / min / hr	**30S**: 30 sec, **60S**: 60 sec (factory set)	1 / 10 sec / min / hr for both ON & OFF time
Accuracy	Setting: ± 5% of F.S. ; Repeat: ±0.5% or 50 ms	Setting: ± 5% of F.S. ; Repeat: ±0.5% or 50 ms	Setting: ± 5% of F.S. ; Repeat: ±0.5% or 50 ms	Setting: ± 5% of F.S. ; Repeat: ±0.5%	Setting: ± 5% of F.S., Repeat: ±0.5% or 50 ms
Reset	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms
LED Indications	Power ON, Relay ON	Power ON, Relay ON	Power ON, Relay ON	Power ON, Relay ON	Power ON, Relay ON
Output contacts	2 C/O (DPDT)	2 C/O (DPDT)	2 C/O (DPDT)	**1**: 1 C/O SPDT	2 C/O (DPDT)
Relay rating	5A@230V AC / 24V DC resistive	5A@230V AC / 24V DC resistive	5A@230V AC / 24V DC resistive	5A@230V AC / 24V DC resistive	5A@230V AC / 24V DC resistive
Supply voltage AC: 50 or 60 Hz	20 to 240V AC 12 to 240V DC	20 to 240V AC 12 to 240V DC	**230:** 230V AC	**12**: 12V DC **110:** 110V AC **230**: 230V AC **415:** 415V AC (factory set)	20 to 240V AC 12 to 240V DC
Temperature	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C
Humidity (non-condensing)	95% RH	95% RH	95% RH	95% RH	95% RH
Weight	100 gms	100 gms	100 gms	70 gms	110 gms
Certifications	CE UL	CE UL			CE UL
Dimensions	Refer to diagram L on page 36				
Terminal Connections			 NOTE: Relay2 applicable for 2 C/O models only.		
Ordering Code	**800XU**	**800XA**	**800M-230** Supply Voltage 230V AC	**800S-1-ON-30S-230** 1 C/O, On delay, 30 sec, 230V AC **800S-1-ON-60S-230** 1 C/O, On delay, 60 sec, 230V AC	**800XC**

IMPORTANT INFORMATION

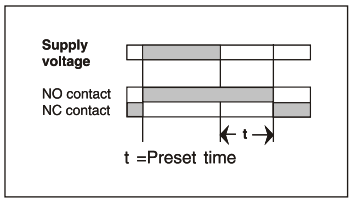
+1 For detailed explanation of timing diagrams, refer to page no. 33 & 34.

Special function timers

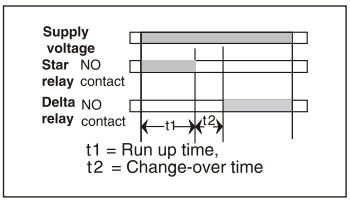
800XMR
Forward - Pause - Reverse timer
Special timer for repetitive forward and reverse motion of motor with intermediate pause timing.



800POD
True power off delay timer



800SD-2 STAR DELTA TIMER
Special timer for star delta changeover.
For star-delta starting of 3 Ø induction motors

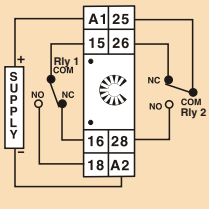
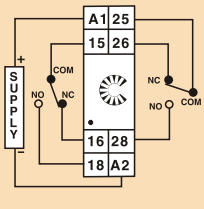
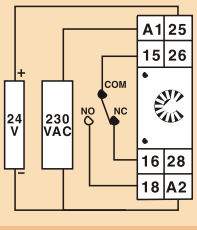
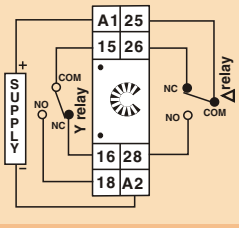



800XMR


800POD


800SQ-A


800SD-2

	800XMR	800POD	800SQ-A	800SD-2
Description	Forward-pause-reverse	True power OFF delay timer	Low cost, 8 ranges, dual voltage	Star delta timer
Modes[+1]	Forward-pause-reverse	True power OFF delay	ON delay / Interval (factory set)	Star-Delta
Time Ranges	1 / 2/ 4 / 8 min (ON time) 10 / 20 / 40 / 80 sec (pause time)	**60**: 60 sec, **180**: 180 sec (factory set)	3 / 10 / 30 / 60 sec / min (factory set)	Runup time range: 30/60 sec Change Over: 50/100 msec
Accuracy	Setting: ± 5% of F.S. ; Repeat: ±0.5% or 50 ms	Setting: ± 10% of F.S. ; Repeat: ±2% or 100 ms	Setting: ± 5% of F.S. ; Repeat: ±0.5%	Setting: ± 5% of F.S. ; Repeat: ±0.5% or 50 ms
Reset	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms
LED Indications	Relay1 ON, Relay2 ON	Power ON	Power ON, Relay ON	Star Relay ON Delta Relay ON
Output contacts	1 C/O each for forward & reverse	2 C/O (DPDT)	1 C/O (SPDT)	1 C/O relay each for star & delta
Relay rating	5 A@230 VAC / 24V DC resistive	2.5 A@250 VAC / 28 VDC resistive	5 A@230 VAC / 24V DC resistive	5 A@230 VAC, resistive
Supply voltage AC: 50 or 60 Hz	20 to 240 VAC 12 to 240 VDC	110 to 240 VAC/DC	**230**: 230 VAC & 24 VAC/DC **110**: 110 VAC & 24 VAC/DC	**230**: 230 VAC, **415**: 415 VAC, **110:** 110 VAC (factory set)
Temperature	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity **(non-condensing)**	95% RH	95% RH	95% RH	95% RH
Weight	100 gms	110 gms	115 gms	90 gms
Certifications		CE cULus	CE cULus	CE cULus
Dimensions	Refer to diagram L on page 36			
Terminal Connections				
Ordering Code	**800XMR**	**800POD-60** Time Range: 60 seconds **800POD-180** Time Range: 180 seconds	**800SQ-A-230** Supply Voltage 230V AC & 24V AC/DC **800SQ-A-110** Supply Voltage 110V AC & 24V AC/DC	**800SD-2-230** Supply Voltage 230V AC **800SD-2-415** Supply Voltage 415V AC **800SD-2-110** Supply Voltage 110V AC

IMPORTANT INFORMATION

+1 For detailed explanation of timing diagrams, refer to page no. 33 & 34 .

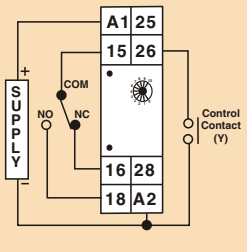
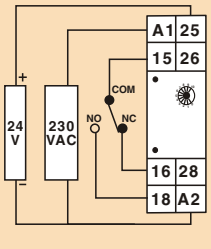
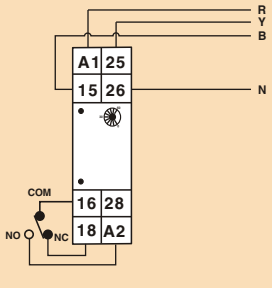
17.5mm Din Rail Timers
642 Series

- *Slim, space saving design*
- *Din rail / screw mounting*
- *Finger guards for safety*

642UX

642SQ

642VTR-3

	642UX	642SQ	642VTR-3
Description	13 functions, 8 ranges Universal voltage	Low cost, 4 ranges, 2 voltages	Under voltage time relay
Modes[+1]	13 functions (ON delay, Interval delay, Pulse output, Repeat cycle equal(OFF first), Repeat cycle equal(ON first), delay on break,Delay on Make with Totalize Delay on make / Delay on break, Interval after break, Interval with Totalize, Interval on Make / Interval on Break, Single shot, Retriggerable single shot)	ON delay / Interval	Under voltage time relay (ON delay) (refer pg 37 for timing diagrams)
Time Ranges	3 / 10 / 30 sec / min, 3 /10 hr	15 / 60 sec, 7.5 / 60 min	5 to 15 min
Accuracy	Setting: ± 5% of full scale ; Repeat: ±0.5% or 50 ms	Setting: ± 5% of full scale ; Repeat: ±0.5% or 50 ms	Setting: ± 5% of full scale ; Repeat: ±0.5% or 50 ms
Reset	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 200 ms
LED Indications	Power ON, Relay ON	Power ON, Relay ON	Power ON, Relay ON
Output contacts	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
Relay rating	5 A@230 VAC / 24V DC resistive	5 A@230 VAC / 24V DC resistive	5 A@230 VAC / 24V DC resistive
Supply voltage AC: 50 or 60 Hz	20 to 240 VAC 12 to 240 VDC	230 VAC & 24 VAC/DC 110 VAC & 24 VAC/DC	3 Ø / 4 w 380-415 VAC, P-P (50/60Hz)
Temperature	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	95% RH	95% RH	95% RH
Weight	80 gms	50 gms	60 gms
Certifications	CE UL	CE UL	
Dimensions	Refer to diagram K on page 36		
Terminal Connections			
Ordering Code	**642 UX**	**642 SQ-230** Supply Voltage 230V AC & 24V AC/DC **642 SQ-110** Supply Voltage 110V AC & 24V AC/DC	**642 VTR-3** Supply Voltage 415V AC (phase to phase)

IMPORTANT INFORMATION

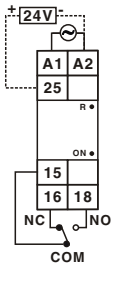
+1 For detailed explanation of timing diagrams, refer to page no. 33 & 34.

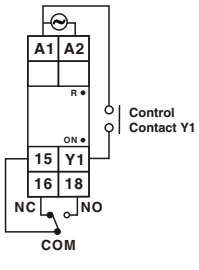
17.5mm Din Rail Timers

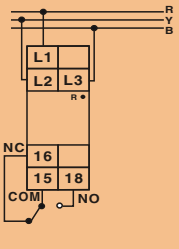
600 Series

- *Slim, space saving design*
- *Din rail mounting*

	600ST	600XU	600PSR
	NEW 	NEW 	**Phase Sequence Relay** NEW 
Description	Single function 10 time ranges	13 functions 10 time ranges	Phase sequence Relay
Modes	On delay	On delay (A), Interval (B) Pulse output (C) Cyclic equal ON first (D) Cyclic equal OFF first (Di) Delay on break (E) Delay with Totalise (Ai) Delay on make/Delay on break(F) Interval after break (H) Interval with totalise (Bi) Single shot (I) Retriggerable Single shot (J) Latching relay (K)	**Phase Failure Trip:** <70% of nominal voltage (<280V AC) **Detect phase Sequence/Phase Reversed:** Yes **Hysteresis:** 2% (factory set) **Response Time:** 100 msec max. **Power On Delay:** 100 msec
Time Ranges	1 / 3 / 10 / 30 Sec/min 1 / 3 hr	1 / 3 / 10 / 30 Sec/min 1 / 3 hr	
Accuracy	Setting: ± 5% of full scale ; Repeat: ±0.5%	Setting: ± 5% of full scale ; Repeat: ±0.5%	±3% of F.S. (F.S. = Full Scale)
Reset	On interruption of power; Reset time < 100 msec	On interruption of power; Reset time < 100 msec	Auto reset on removal of fault condition
LED Indications	Power ON, Relay ON	Power ON, Relay ON	Relay ON
Output contacts	1 C/O (SPDT)	1 C/O (SPDT)	1 C/O (SPDT)
Relay rating	NO/5A, NC/3A @ 250V AC	NO/5A, NC/3A @ 250V AC	NO/5A, NC/3A @ 250V AC
Supply voltage AC : 50/60 HZ	240V AC & 24V AC/DC	20-240V AC/DC	3Ø/3W 280 to 528 VAC P-P
Temperature	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	95% RH	95% RH	95% RH
Weight	71gms	80 gms	74 gms
Certifications	CE	CE	
Dimensions	Refer to diagram V on page 37	Refer to diagram V on page 37	Refer to diagram V on page 37
Terminal Connections			







IMPORTANT INFORMATION

+1 For detailed explanation of timing diagrams, refer to page no. 33 & 34.

Plug / Panel Mount Timers

55 Series

- *Compact size*
- *Plug / panel mounting*
- *Wide range of models*


48 x 48

55XC


48 x 48

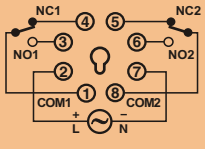
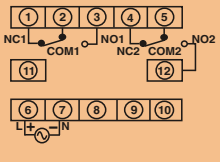
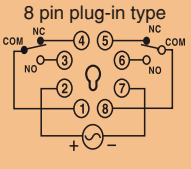
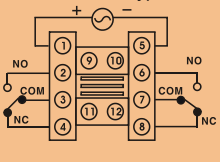
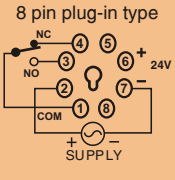
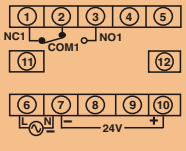
55XU


48 x 48

55M


48 x 48

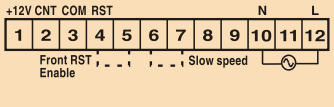
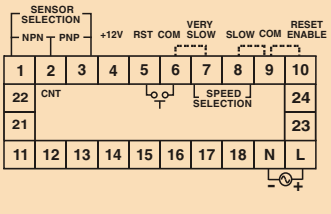
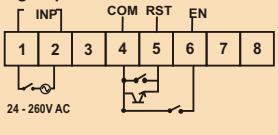
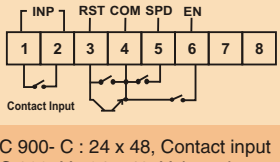
55ES

	55XC	55XU	55M	55ES
Description	Cyclic with unequal ON & OFF time	2 functions, 12 ranges, universal voltage	2 functions, 12 ranges	Low cost, 8 range dual voltage
Modes[+1]	Cyclic ON first or OFF first	ON delay / Interval	ON delay / Interval	ON delay / Interval
Base Type	**P8-** 8 Pin plug **T-** Screw terminal	**P8-** 8 Pin plug **T-** Screw terminal	**P8-** 8 Pin plug **T-** Screw terminal	**P8-** 8 Pin plug **T-** Screw terminal
Time Ranges	1 / 10 sec / min / hr for both ON time & OFF time	1 / 3 / 10 / 30 sec / min / hr	1 / 3 / 10 / 30 sec / min / hr	3 /10 / 30 / 60 sec / min
Accuracy	Setting: ± 5% of F.S. ; Repeat: ±0.5% or 50 ms	Setting: ± 5% of F.S. ; Repeat: ±0.5% or 50 ms	Setting: ± 5% of F.S. ; Repeat: ±0.5% or 50 ms	Setting: ± 5% of F.S. ; Repeat: ±0.5% or 50 ms
Reset	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms	On interruption of power ; Reset time < 100 ms
LED Indications	Power ON, Relay ON	Power ON, Relay ON	Power ON, Relay ON	Power ON, Relay ON
Output contacts	2 C/O (DPDT)	2 C/O (DPDT)	2 C/O (DPDT)	1 C/O (SPDT)
Relay rating	5A@230V AC / 24V DC resistive	5A@230V AC / 24V DC resistive	5A@230V AC / 24V DC resistive	5A@230V AC / 24V DC resistive
Supply voltage AC: 50 or 60 Hz	20 to 240V AC 12 to 240V DC	20 to 240V AC 12 to 240V DC	**230**: 230V AC	**230**: 230V AC & 24V AC/DC **110**: 110V AC & 24V AC/DC
Temperature	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C
Humidity (non-condensing)	95% RH	95% RH	95% RH	95% RH
Weight	80 gms	100 gms	90 gms	80 gms
Certification	CE UL	CE UL		CE UL
Dimensions	Refer to diagram A on page 36			
Terminal Connections	8 pin plug-in type  Terminal type 		8 pin plug-in type  Terminal type 	8 pin plug-in type  Terminal type 
Ordering Code	**55XC** - Base type Base type **P8** - 8 pin plug **T** - Screw Terminal	**55XU** - Base type Base type **P8** - 8 pin plug **P11** - 11 pin plug **T**- Screw Terminal	**55M** - Base type - Supply voltage Base type **P8** - 8 pin plug **T** - Screw Terminal Supply Voltage **230** : 230V AC	**55ES** - Base type - Supply voltage Base type **P8** - 8 pin plug **T** - Screw Terminal Supply Voltage **230** : 230V AC & 24V AC/DC **110** : 110V AC & 24V AC/DC

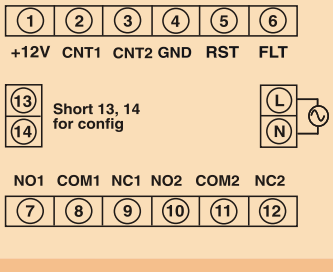
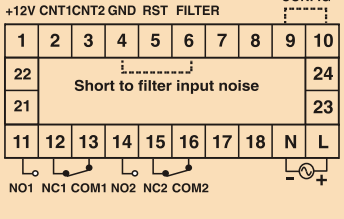
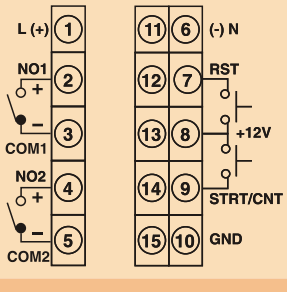
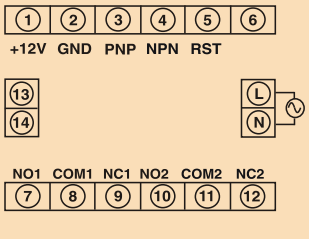
IMPORTANT INFORMATION

+1 For detailed explanation of timing diagrams, refer to page no. 33, 34

Digital Counters
Totalisers

	• 6 digits • Inbuilt sensor supply	• 6 digits • Inbuilt sensor supply	• Self powered • Long battery life • Contact / AC input
	 36 x 72	 48 x 96	 24 x 48
	XC410	**XC10D**	**LXC900**
Description	6 digit totaliser	6 digit totaliser	LCD Counter
Display	Seven segment LED; Height: 0.3”	Seven segment LED; Height: 0.5”	Liquid crystal display, Height: 8 mm
Digits	6 digits	6 digits	8 digits
Sensor Type	NPN / PNP	NPN / PNP	
Input Type	Voltage pulse (3 to 30V DC) from Proximity switches, Solid state devices, Potential free contact encoder	Voltage pulse (3 to 30V DC) from Proximity switches, Encoders, Solid state devices, Potential free contact	**V**: Voltage pulse of 24 to 260V AC **C**: Potential free input
Input Speed	a) 0 to 20Hz b) 0 to 1kHz	a) 3Hz b) 30Hz c) 1kHz	a) 14Hz b) 100Hz
Operating Modes			
Setpoints			
Range	999999 counts	999999 counts	99999999 counts
Counting Direction	Up	Up	Up
Scale Factor			
Accuracy			
Reset	Front, Remote	Front, Remote	Front, Remote
Memory Retention	Yes	Yes	Yes
Sensor Supply	Inbuilt, 12V DC, 30mA	Inbuilt, 12V DC, 30mA	
LED Indications			
Output			
Relay Rating			
Supply voltage AC: 50 or 60 Hz	90 to 270V AC/DC, 24V AC/DC (optional)	90 to 270V AC/DC	Battery powered
Temperature	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	95% RH	95% RH	95% RH
Weight	110 gms	200 gms	40 gms
Certifications	CE UL		CE UL
Dimensions	Refer to diagram F on page 36	Refer to diagram H(V) on page 36	**LXC900**:Refer diagram N on page 36
Terminal Connections			**Voltage Input**  **Contact Input** 
Ordering Code	**XC410**	**XC10D**	LXC 900- C : 24 x 48, Contact input LXC 900- V : 24 x 48, Voltage input

Digital Counters
Programmable / Preset

XC200NX	XC1200	XTC5400	XC22B
• 6 digit counter; 5 digit RPM indicator • 2 setpoints • Programmable input scaling • Up, down, quadrature & bi-Directional	• 6 digit counter; 5 digit RPM indicator • 2 setpoints • Programmable input scaling • Up, down, quadrature & bi-Directional	• Multifunction timer cum counter • 2 configurable setpoints • Programmable input scaling • Batch counting	• Preset counter • Thumbwheel setting • Auto reset • Battery backup
			
72 x 72	48 x 96	48 x 48	72 x 72
Multi function, quadrature input 2 setpoints	Multi function, quadrature input 2 setpoints	Multi-function, multi-range timer counter	4 digit preset counter
Seven segment LED; Height: 0.3”	Seven segment LED; Height: 0.5”	Upper: Seven segment red LED Lower: Seven segment green LED	Seven segment LED; Height: 0.5”
Total: 6 digits Rate: 5 digits	Total: 6 digits Rate: 5 digits	Upper: 4 digits Lower: 4 digits	4 digits
NPN	NPN	NPN / PNP	NPN / PNP
Voltage pulse (3 to 30V DC) from proximity switches, Encoders, Solid state devices, Potential free contact	Voltage pulse (3 to 30V DC) from proximity switches, Encoders, Solid state devices, Potential free contact	Voltage pulse (3 to 30V DC) from proximity switches, Encoders, Solid state devices, Potential free contact	Voltage pulse (3 to 30V DC) from proximity switches, Encoders, Solid state devices, Potential free contact
a) 0 to 30Hz b) 0 to 2.5kHz c) 0 to 5kHz (for up & down mode only)	a) 0 to 30Hz b) 0 to 2.5kHz c) 0 to 5kHz (for up & down mode only)	a) 3Hz b) 30Hz c) 5kHz	a) 0 to 30Hz b) 0 to 2kHz
ON delay / Interval delay / Auto reset / Time pulse repeat	ON delay / Interval delay / Auto reset / Time pulse repeat	**Timer:** ON delay, Interval, Cyclic ON first, Cyclic OFF first, Batch **Counter:** ON delay, Interval, Auto reset, Time pulse Repeat, Batch	ON delay / Interval delay / Auto reset
2	2	2	1
Count: Selectable least count 0.0001, 0.001, 0.01, 0.1 & 1 **Rate:** Auto ranging 4.00 to 99999 RPM or RPH mode	**Count:** Selectable least count 0.0001, 0.001, 0.01, 0.1 & 1 **Rate:** Auto ranging 4.00 to 99999 RPM or RPH mode	**Timer:** 99.99 / 999.9 / 9999 sec 99.59 min:sec, 999.9 / 9999 min 99.59 hr:min, 999.9 / 9999 hr **Counter:** -999 to 9999 counts	9999
Up, Down, Bidirectional, Quadrature	Up, Down, Bidirectional, Quadrature	**Timer:** Down **Counter:** Up / down	Up
0.00001 to 9.99999 x 10^n n= -5, -4, -3, -2, -1, 0, 1, 2	0.00001 to 9.99999 x 10^n n= -5, -4, -3, -2, -1, 0, 1, 2	0.001 to 9.999 x 10^n n= -3, -2, -1, 0, 1, 2	
Rate: 0.05% ± 2 counts	Rate: 0.05% ± 2 counts	**Time:** ± 0.05% of setting **Counter:** ± 0 counts	
Front (user selectable), Remote	Front (user selectable), Remote	Front, Remote, Power interruption	Front, Remote, Auto (optional)
Yes	Yes	Yes	Yes
Inbuilt, 12V DC, 30mA (short circuit protected)	Inbuilt, 12V DC, 30mA (short circuit protected)	12V DC, 30mA (short circuit protected)	Inbuilt, 12V DC, 30mA
Relay 1, Relay 2	Relay 1, Relay 2	Relay1, Relay2, sec, min, hr	Relay ON
2, 2 Relays each 1 C/O	2, 2 Relays each 1 C/O	2, 2 Relays each 1 NO	2 C/O (DPDT)
5A @ 230V AC/ 24V DC	5A @ 230V AC/ 24V DC	5A @ 230V AC	5A @ 230V AC
85 to 270V AC/DC	85 to 270V AC/DC	85 to 270V AC/DC Optional: 24V DC	**230**: 230V AC, **110**: 110V AC
Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -5 to 50°C
95% RH	95% RH	95% RH	95% RH
220 gms	230 gms	170 gms	320 gms
	CE UL	CE UL	
Refer diagram C on page 36	Refer diagram H(V) on page 36	Refer diagram B on page 36	Refer diagram C on page 36
			
XC200NX	**XC1200**	**XTC5400, XTC5400-24** (24V DC)	**XC22B-4-230** : Without memory **XC22B-4-AR-M1-230** : With memory and Auto reset

Rate Indicators

selec®

- Measures upto 9999 RPM
- Inbuilt sensor supply

(72 x 72)

- Measures upto 9999 RPM
- Inbuilt sensor supply

(48 x 96)

- 6 digit count
- 4 digit rate
- Scalable input
- Inbuilt sensor supply

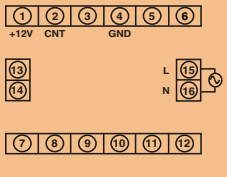
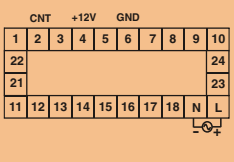
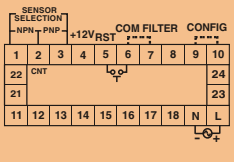
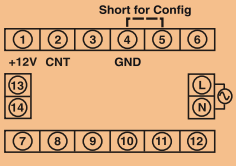
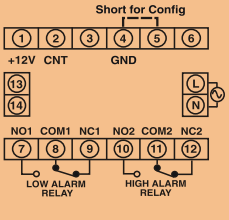
(48 x 96)

- Auto ranging RPM indicator
- Scalable input
- Measures upto 9999 RPM
- Input speed upto 3.5 kHz

(72 x 72)

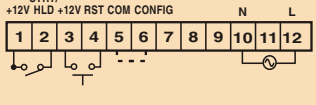
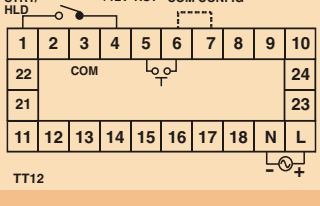
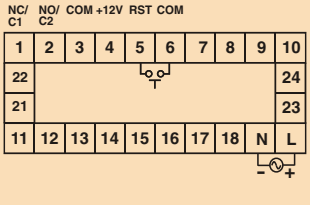
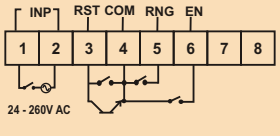
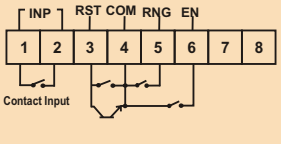
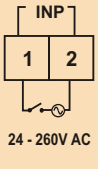
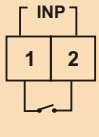
- RPS, RPM, RPH indication
- Scalable input
- High & low alarm
- Programmable alarm delay

(72 x 72)

	RC2100	RC100	RC102C	RC2106	RC2108
Description	Rate indicator	Rate indicator	Rate indicator & totaliser	Rate indicator (scalable input)	Rate switch (with alarm)
Display	Seven segment LED; Height: 0.5"	Seven segment LED; Height: 0.5"	Seven segment LED; Height: 0.5"	Seven segment LED; Height: 0.5"	Seven segment LED; Height: 0.5"
Digits	4 digits	4 digits	**Count:** 6 digits **Rate:** 4 digits	4 digits	4 digits
Sensor Type	PNP / NPN*	PNP	PNP / NPN	PNP	PNP
Input Type	Voltage pulse (3 to 30V DC) from Proximity switches, Encoders, Solid state devices, Potential free contact	Voltage pulse (3 to 30V DC) from Proximity switches, Encoders, Solid state devices, Potential free contact	Voltage pulse (3 to 30V DC) from Proximity switches, Encoders, Solid state devices, Potential free contact	Voltage pulse (3 to 30V DC) from Proximity switches, Encoders, Solid state devices	Voltage pulse (3 to 30V DC) from Proximity switches, Encoders, Solid state devices, Potential free contact
Input Speed	4 to 9999 pulses/min.	4 to 9999 pulses/min.	a) 0 to 30Hz b) 0 to 2.5kHz	Upto 3.5kHz	Upto 3.5kHz
Setpoints					2 (Low alarm & High alarm)
Range	4.00 to 9999 rpm	4.00 to 9999 rpm	**Count:** 9999.99, 99999.9 999999 (user selectable) **Rate:** 4.00 to 9999 RPM	4.00 to 9999 RPM	4.00 to 9999 RPM
Modes					RPS, RPM, RPH (programmable)
Counting Direction	Unidirectional (Up)	Unidirectional (Up)	Unidirectional (Up)	Unidirectional (Up)	Unidirectional (Up)
Scale Factor			0.00001 to 9.99999 x 10^n n= -3, -2, -1, 0, 1, 2	0.001 to 9.999 x 10^n n= -3, -2, -1, 0, 1, 2	0.001 to 9.999 x 10^n n= -3, -2, -1, 0, 1, 2
Hysteresis					0 to 99 (LSD)
Power On Delay					0 to 999 sec
Alarm Delay					0 to 999 sec
Accuracy	Rate: 0.05%	Rate: 0.05%	Rate: 0.05% (±2 counts)	Rate: 0.05% (±1 count)	Rate: 0.05% (±1 count)
Reset			Front, Remote		
Memory			Current count value: 1 year Parameter setting: 10 years	10 years	10 years
Sensor Supply	Inbuilt, 12V DC, ±10%, 30mA	Inbuilt, 12V DC, ±10%, 30mA	Inbuilt, 12V DC, 30mA	Inbuilt, 12V DC, 30mA	Inbuilt, 12V DC, 30mA
LED Indications					Low alarm status, High alarm status
Output					1 C/O (SPDT) each for high & low alarm
Relay Rating					5A @ 230V AC/ 24V DC
Supply voltage AC: 50 or 60 Hz	85 to 270V AC/DC	85 to 270V AC/DC	85 to 270V AC/DC	85 to 270V AC/DC	85 to 270V AC/DC
Temperature	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: 0 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C
Humidity **(non-condensing)**	95% RH	95% RH	95% RH	95% RH	95% RH
Weight	170 gms	180 gms	200 gms	170 gms	200 gms
Certifications			CE UL		
Dimensions	Refer diagram C on page 36	Refer diagram H(V) on page 36	Refer diagram H(V) on page 36	Refer diagram C on page 36	Refer diagram C on page 36
Terminal Connections	 * For NPN configuration please contact factory				
Ordering Code	**RC2100**	**RC100**	**RC102C**	**RC2106**	**RC2108**

Time Measuring Instruments

SELEC®

	TT412 ; TT12	TI103	LT920	LT945
	• 6 digit time totaliser • Selectable least count	• 4 digit time interval meter • Ideal for measuring: MCB trip time Relay changeover time • Least count upto 0.0001 sec	• Self powered • Long battery life • Contact / AC input • Front / Remote reset	• Low cost • Self powered • Long battery life • Contact / AC input
	 36 x 72 48 x 96	 48 x 96	 24 x 48	 48 x 48
Description	Time Totaliser	Time Interval meter	Time Totaliser	Time Totaliser
Display	**TT412** :7 segment LED; Height: 0.3” **TT12 :** 7 segment LED; Height: 0.5”	7 segment LED; Height: 0.5”	Liquid crystal display	Liquid crystal display
Digits	6 digits	4 digits	8 digits	8 digits
Modes		Contact type, Stop watch, Pickup timer, Drop off timer, Pick up/drop off timer		
Range	99999.9 / 999999 / sec / min / hr	a) Autoranging: .0001 to 9999 sec b) Fixed ranges: .9999, 9.999, 99.99, 999.9,9999 sec	a) 9999.59.59 hr:min:sec b) 999999.99 hr	999999.99 hrs
Direction	Up	Up	Up	Up
Input	Mains, Potential free contact, PNP sensor	Potential free contact, 3 to 30V DC from solid state devices	a) 24 to 260V AC b) Contact input	a) Contact input b) 24 to 260V AC (factory set)
Accuracy	0.05%	0.05%	0.05%	0.05%
Reset	Remote (Reset time: 20 ms)	Front, Remote, Auto (programmable)	Front, Remote	No reset
Memory	10 years		5 years	5 years
Configuration Lock	Via rear terminals			
Sensor Supply	12V DC (±10%) @ 30 mA (short circuit protected)	12V DC (±10%) @ 30 mA (short circuit protected)		
Supply voltage	85 to 270V AC/DC (AC: 50/60 Hz)	85 to 270V AC/DC (AC: 50/60 Hz)	Battery powered	Battery powered
Temperature	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -5 to 50°C	Operating: 0 to 50°C Storage: -20 to 75°C	Operating: 0 to 50°C Storage: -20 to 75°C
Humidity (non-condensing)	95% RH	95% RH	95% RH	95% RH
Weight	**TT412:** 90 gms **TT12:** 190 gms	190 gms	30 gms	50 gms
Certification			CE UL	CE UL
Dimensions	**TT412:** Refer diagram F on page 36 **TT12:** Refer diagram H(V) on page 36	Refer diagram H(V) on page 36	**LT920** :Refer diagram N on page 36	Refer diagram M on page 36
Terminal Connections	TT412   TT12		**Voltage Input**  **Contact Input** 	**Voltage Input**  **Contact Input** 
Ordering Code	**TT412** **TT12**	**TI103**	LT920-C : 24 X 48, Contact input LT920-V : 24 X 48, Voltage input	LT 945- C : 48 x 48, contact input LT 945- V : 48 x 48, Voltage input

Accessories

Adapter plates
To fit smaller products into 92 mm x 92 mm size, 69 mm x 69 mm or 48 mm x 48 mm size cutouts
Material: ABS

Model: AP9672
To fit 72 mm x 72 mm product into 92 mm x 92 mm cutout

Model: AP9648
To fit 48 mm x 48 mm product into 92 mm x 92 mm cutout

Model: AP7248
To fit 48 mm x 48 mm product into 69 mm x 69 mm cutout

Model: AP6050

Model: AP4848

SNUBBER CIRCUIT
R - C network to reduce electrical noise
Model: APRC01

TRANSPARENT FULL COVER
Material: Polycarbonate
Size: To fit 48 mm x 48 mm products
Model: ACF4801

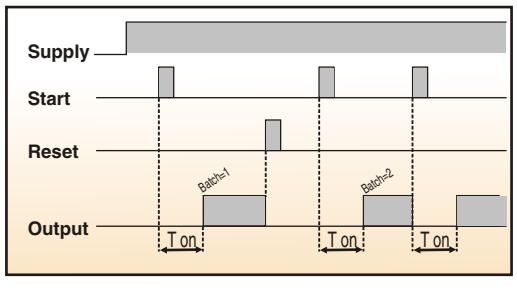
8 PIN SOCKET
Mounting: a) DIN rail mounting b) Surface mounting
Model: AS08

48 x 48 COLLAR CLAMP
Model: ACL4802

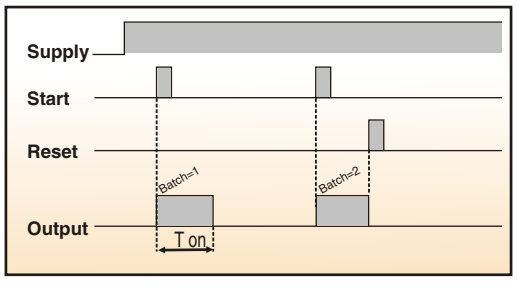
Timing Diagrams for XTC5400

TIMER MODE

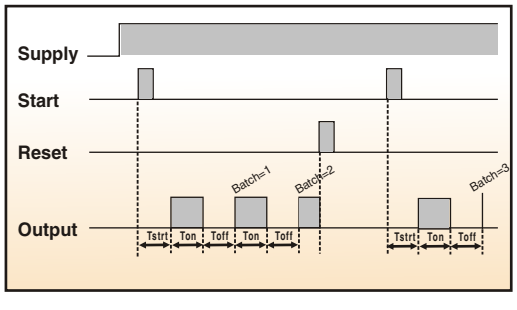
1. ON delay



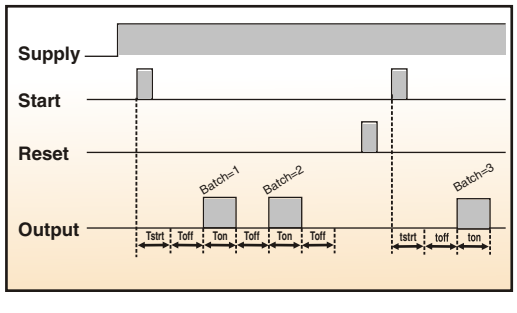
2. Interval



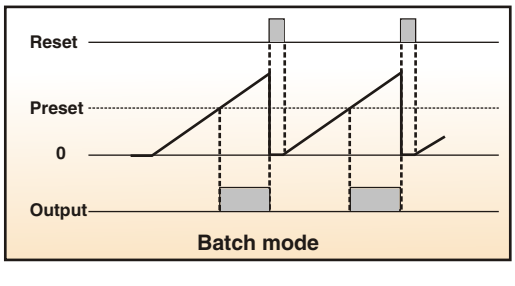
3. Cyclic ON - First



4. Cyclic OFF - First

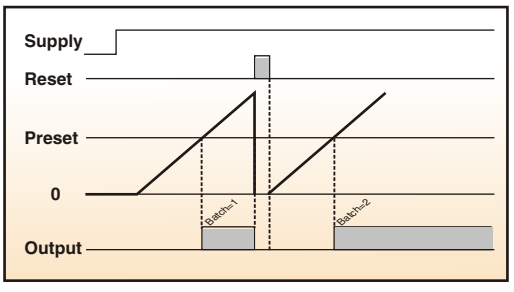


5. Batch mode

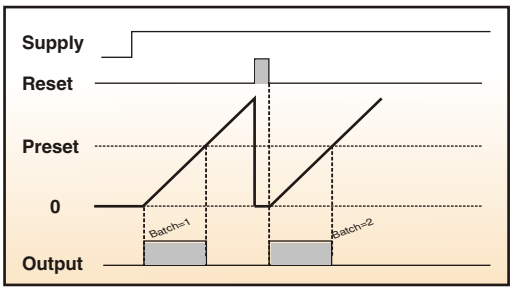


COUNTER MODE

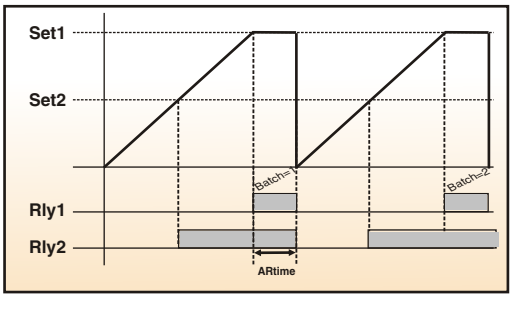
1. ON Delay (OR mode)



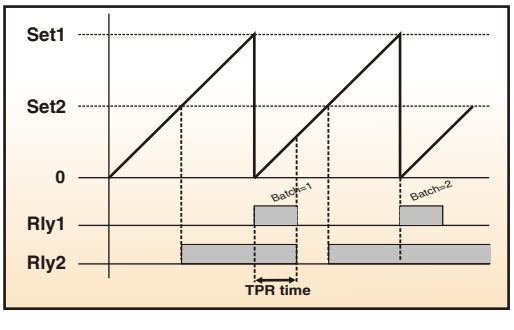
2. Interval (OR mode)



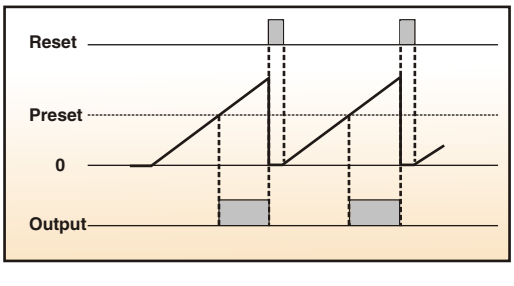
3. Auto Reset (NOR mode)



4. Time Pulse Reset (NOR mode)



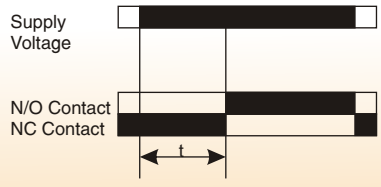
5. Batch mode



Timing Diagrams for 800/642 Series

- **ON Delay:** When input power is applied timing (t) begins, during which the output relay remains de-energized . At the end of the preselected time (t), relay energizes. The output relay is de-energized when power is removed, thus resetting the timer for the next cycle.
- **Reset:** Removing input voltage resets the time delay and output relay.

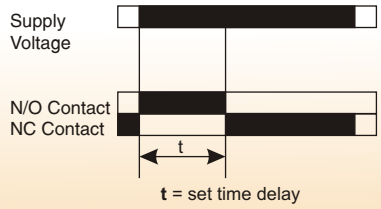
Function: ON Delay



t = set time delay

- **Interval Delay:** Applying the power supply starts the time delay & the output relay gets energized. At the end of the preset time, the contact gets de-energised. The timer is reset when the input power is removed.
- **Reset:** Removing input voltage resets the time delay and output relay.

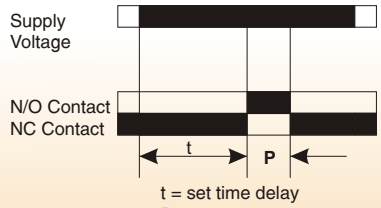
Function: Interval Delay



t = set time delay

- **Pulse Output:** Applying the power supply starts the time delay, during which the output relay remains de-energized. At the end of the preset period, the relay gets energized for a preset time P(P=500ms). At the end of time **P** again relay de-energizes.
- **Reset:** Removing input voltage resets the time delay, output relay and the sequence.

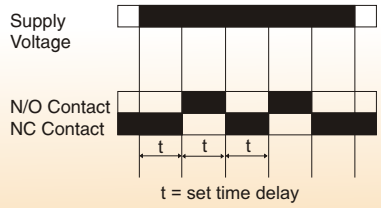
Function: Pulse Output



t = set time delay
P = 500 msec

- **Repeat Cycle Equal (OFF First):** Upon application of input voltage, the output relay remains de-energized and time t begins. At the end of the time t, output relay energizes for set time t. At the end of time t again relay de-energizes and this cycle continues until input voltage is removed.
- **Reset:** Removing input voltage resets the time delay, output relay and the sequence.

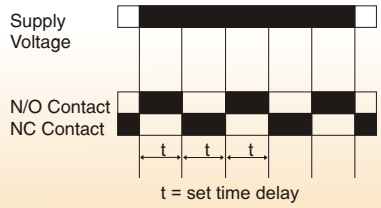
Function: Repeat Cycle Equal (OFF first)



t = set time delay

- **Repeat Cycle Equal (ON First):** Upon application of input voltage, the output relay energizes and Time t begins. At the end of the time t, output relay de-energizes for set time t. At the end of time t again relay energizes and this cycle continues until input voltage is removed.
- **Reset:** Removing input voltage resets the time delay, output relay and the sequence.

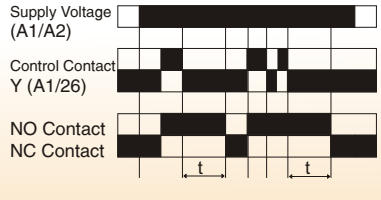
Function: Repeat Cycle Equal (ON First)



t = set time delay

- **Delay on Break:** Input voltage must be applied before and during timing. Upon application of input voltage, the output remains de-energized. On closing the control contact 'Y' the output energizes. The time delay begins when 'Y' is opened. The output remains energized during timing. At the end of the time delay the output de-energizes. The output will energize if 'Y' is closed when input voltage is applied.
- **Reset:** Re-closing the 'Y' contact during timing resets the time delay. Removing input voltage resets the Time delay and output.

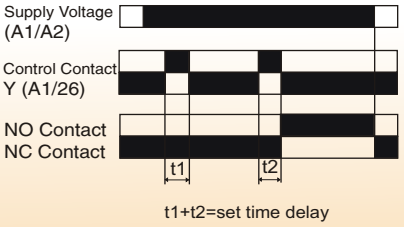
Function: Delay On Break



t = set time delay

- **Delay on Make with Totalize (Time Storage):** Input voltage must be applied before and during timing. The output is de-energized before and during the time delay. Each time the 'Y' contact is closed, the time delay progresses; when it opens, timing stops. When the amount of time 'Y' is closed equals the full time delay, the output energizes and remains energized until reset.
- **Reset**: Removing input voltage resets the time delay and output.

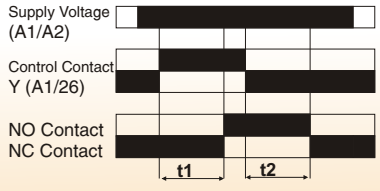
Function: Delay on Make with Totalise (Time Storage):



t1+t2=set time delay

- **Delay on Make / Delay on Break:** Delay on Make time delay t1 and delay on break time delay t2 are same i.e. Upon application of input voltage and the closure of 'Y', t1 begins and the output remains de-energized. At the end of t1, the output energizes. Upon the opening of 'Y' t2 begins. At the end of t2, the output de-energizes.
- **Reset**: If 'Y' is opened during t1, then t1 is reset and the output remains de-energized. And if 'Y' is closed during t2 then t2 is reset and the output remains energized. Removing input voltage resets the time delay and output

Function: Delay on Make / Delay on Break

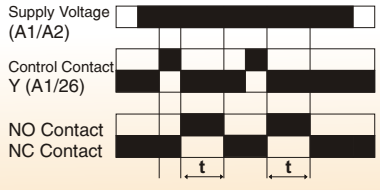


t1 = t2 = **t**

t = Set time delay

- **Interval after Break:** Input voltage must be applied before and during timing. Upon application of input voltage, the output remains de-energized. On opening (after a closure), the control contact 'Y' the output energizes and time delay begins. The output remains energized during timing. At the end of the time delay the output de-energizes.
- **Reset**: Opening (by closing and then opening) the 'Y' contact during timing resets the time delay. Removing input voltage resets the Time delay and output.

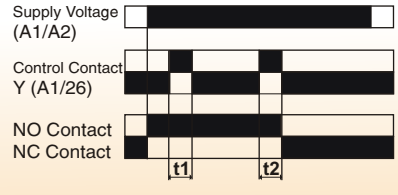
Function: Interval after Break



t = Set time delay

- **Interval with Totalize (Time Storage):** Input voltage must be applied before and during timing. The output is energized before and during the time delay. Each time the 'Y' contact is closed, the time delay progresses; when it opens, timing stops. When the amount of time 'Y' is closed equals the full time delay, the output de-energizes and remains de-energized until reset.
- **Reset**: Removing input voltage resets the time delay and output.

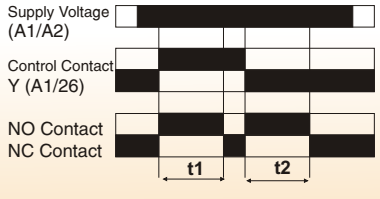
Function: Interval with Totalise (Time Storage):



t1 = t2 = Set time delay

- **Interval on Make / Interval on Break:** Interval on Make time delay t1 and Interval on break time delay t2 are same i.e. t. Upon application of input voltage and the closure of 'Y', t1 begins and the output energizes. At the end of t1, the output de-energizes. Upon the opening of 'Y' t2 begins and the output energizes again. At the end of t2, the output de-energizes.
- **Reset**: If 'Y' is opened during t1, then t1 is reset and the output remains energized. And if 'Y' is closed during t2 then t2 is reset and the output remains energized. Removing input voltage resets the time delay and output

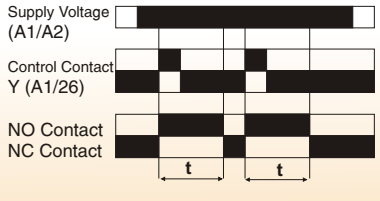
Function: Interval on make / Interval on break



t = Set time delay

- **Single Shot:** Input voltage must be applied before and during timing. Upon momentary or maintained closure of the control contact 'Y' the output energizes and the time delay begins. At the end of the delay the output de-energizes. Opening or re-closing the 'Y' contact during timing has no effect on the time delay.
- **Reset**: Reset occurs when the time delay is complete and the 'Y' contact is open. Removing input voltage resets the time delay and output.

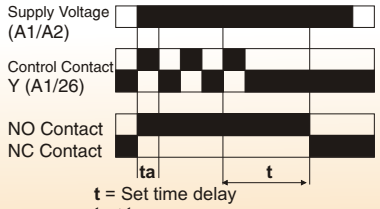
Function: Single Shot



t = Set time delay

- **Retriggerable Single Shot**: Input voltage must be applied before and during timing. Upon momentary or maintained closure of the control contact 'Y' the output energizes and the time delay begins. At the end of the delay the output de-energizes.
- **Reset**: Re-closing 'Y' contact resets the time delay and restarts timing. Removing input voltage resets the time delay and output.

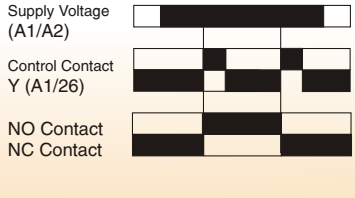
Function: Retriggerable Single Shot



t = Set time delay
ta< t

- **Latching Relay**: By closing control contact **"Y"**of the relay will change it's state and maintain it until power to unit is removed or interrupted.

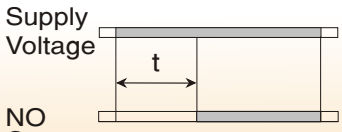
Function: Latching Relay



Timing Diagrams for Digital Timers

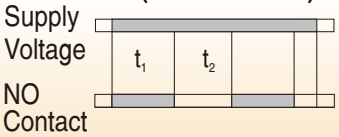
Applicable for XT543 / XI546 / X1246 / X1346

Function : ON delay



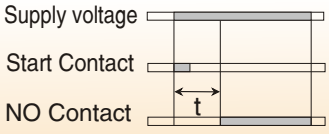
t = Set delay time

Function : Cyclic (ON time first)



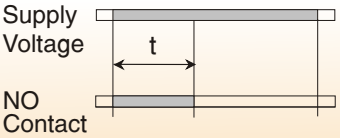
t_1= ON time, t_2 = OFF time

Function : ON delay-pulse start



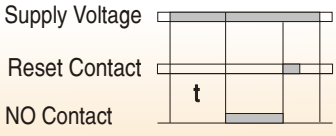
t = Set delay time

Function : Interval delay



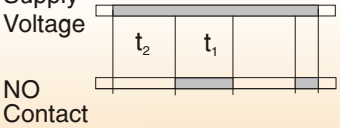
t = Set delay time

Function : Reset



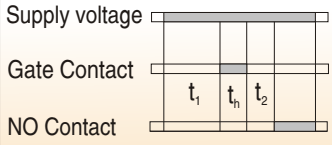
t = Delay time reset

Function : Cyclic (OFF time first)



t_1= ON time, t_2 = OFF time

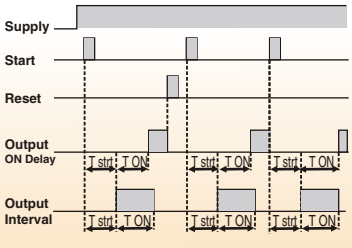
Function: Gate start-ON delay



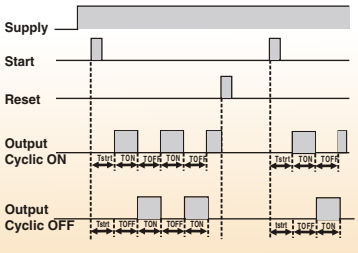
t=delay time = t_1+ t_2, t_h = hold time

Applicable for XT5042 only

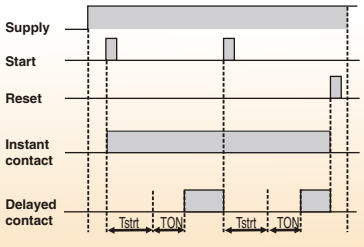
1. ON delay, Interval modes:



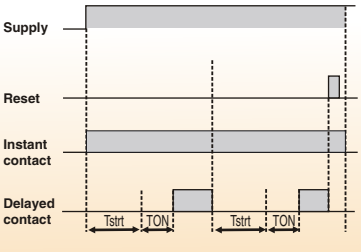
2. Cyclic ON first, Cyclic OFF first modes:



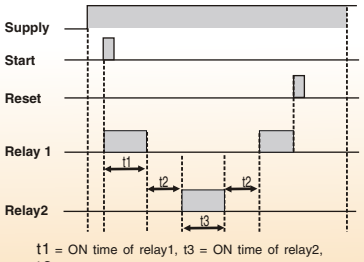
3. Instantaneous + Delayed at start pulse:



4. Instantaneous + Delayed at power ON:

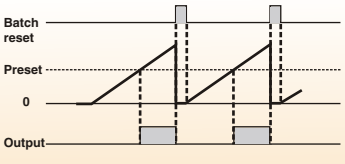


5. Motor reverse mode:



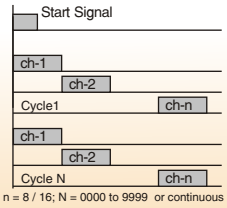
t1 = ON time of relay1, t3 = ON time of relay2,
t2 = Pause time

6. Batch mode



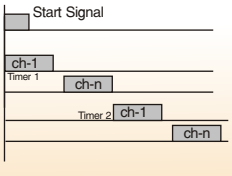
Functions in PT380 only

Serial

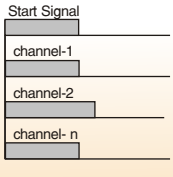


n = 8 / 16; N = 0000 to 9999 or continuous

Serial (with cascading)

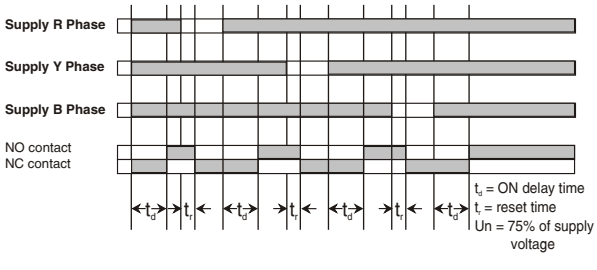


Parallel



642VTR

THREE PHASE MODEL



t_d = ON delay time
t_r = reset time
Un = 75% of supply voltage

Dimensions

Diagram A

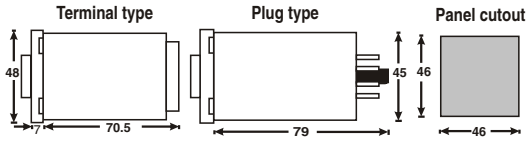


Diagram B

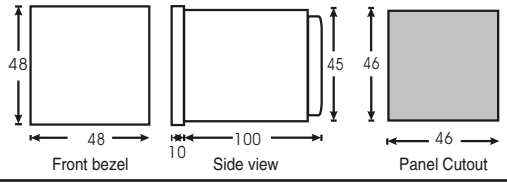


Diagram C

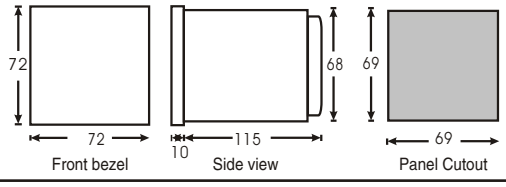


Diagram D

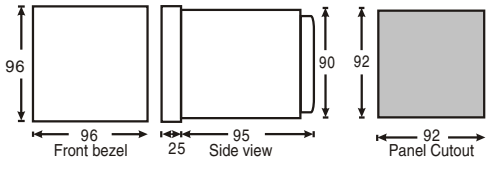


Diagram F

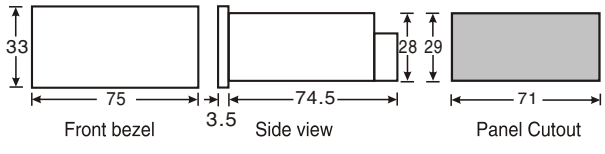
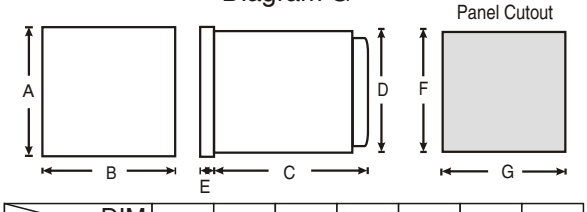
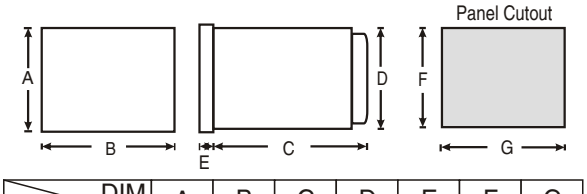


Diagram G



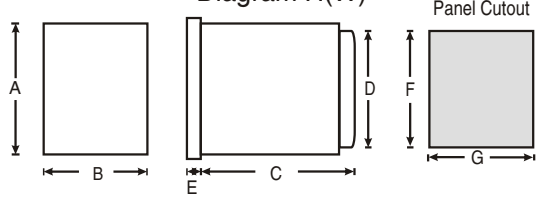
Models \ DIM	A	B	C	D	E	F	G
X	96	96	110	90	10	92	92
Y	97	97	88	90	10	92	92
Z	96	96	70	90	10	92	92

Diagram H



Models \ DIM	A	B	C	D	E	F	G
U	52	102	50	44.8	4.5	46	92
V	50	97.5	88	45	10	46	92

Diagram H(W)



Models \ DIM	A	B	C	D	E	F	G
W	97.5	50	88	91	10	92	46

Diagram - K

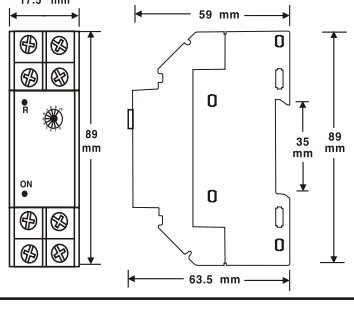


Diagram - L

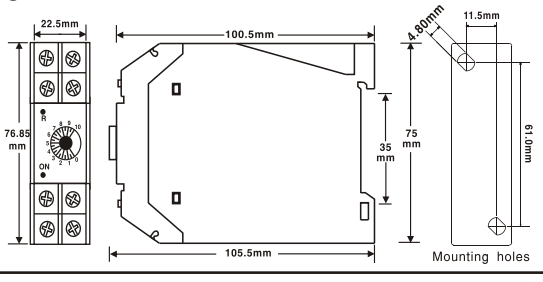


Diagram M

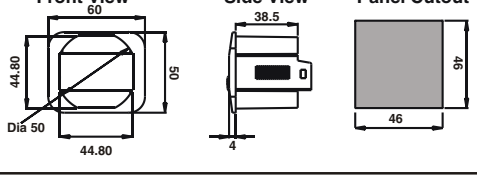


Diagram N

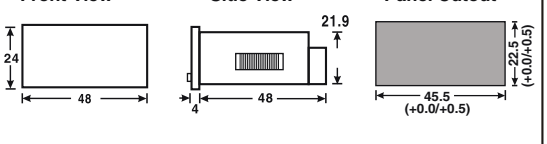
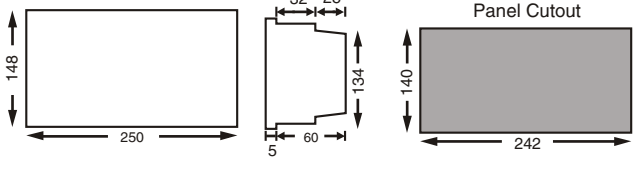


Diagram O



Dimensions

Diagram P(I)

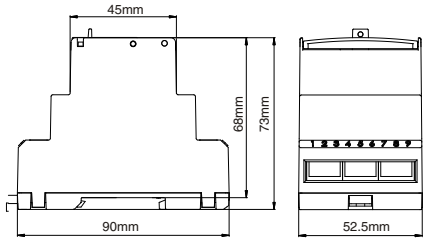


Diagram P(II)

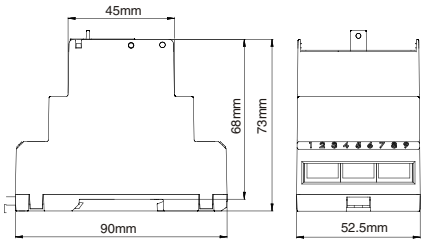
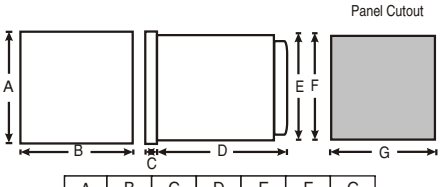
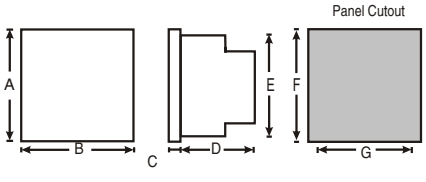


Diagram Q(I)



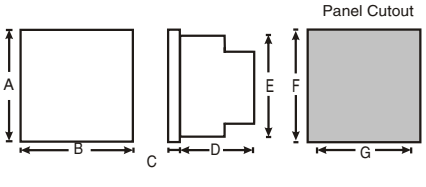
A	B	C	D	E	F	G
96	96	10	60	90	92	92

Diagram Q(II)



A	B	C	D	E	F	G
99	99	5	46	91	92	92

Diagram Q(III)



A	B	C	D	E	F	G
99	99	5	50	90.5	91.5	91.5

Diagram S

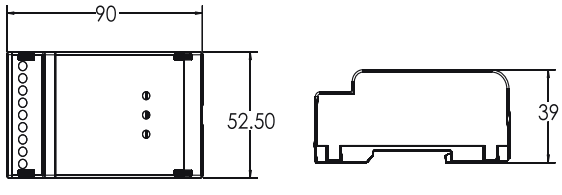


Diagram T

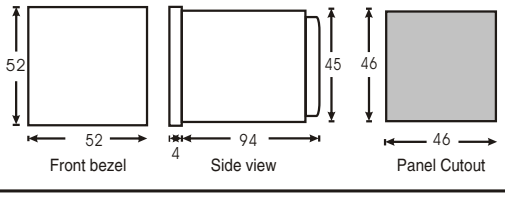
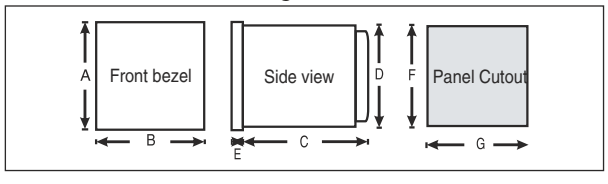
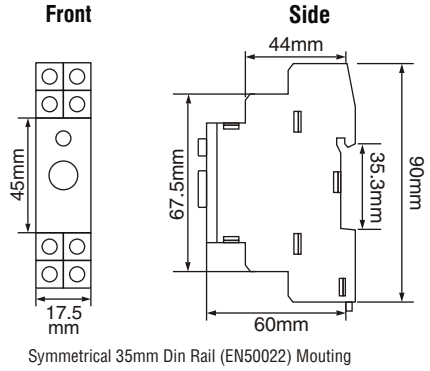


Diagram U



MODELS \ DIM	A	B	C	D	E	F	G
TC/XT 5XX	52	52	94	45	4	46	46
TC/XT 2XX	72	72	83.7	67	4.5	69	69
TC/XT 3XX	96	96	73	90.5	5	92	92

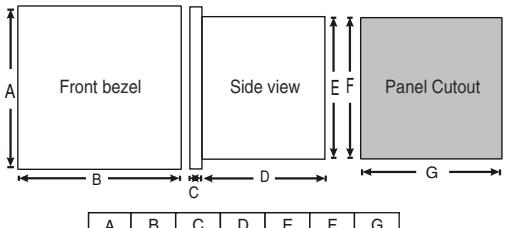
Diagram V



Symmetrical 35mm Din Rail (EN50022) Mouting

Table R	Height	Width	Depth
Zone 1	185.0	95.0	250.0
Zone 2	200.0	145.0	250.0
Zone 4	210.0	300.0	290.0
Zone 6	220.0	385.0	290.0
Zone 8	210.0	590.0	290.0
Zone 12	220.0	690.0	290.0

Diagram W



A	B	C	D	E	F	G
76	76	3.5	50	67.5	67.5	67.5

0910/A014/REV6

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