



**PRODUCT
CATALOGUE**

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MIKROSAFE

SOFTWARE

INTRODUCTION

Mikrosafe is an integrated software suite, specially designed for monitoring and control of electrical protection and energy consumption in commercial and industrial buildings. It is a powerful data management and reporting tool to help users track and analyze the status and energy performance of electrical installations. Central to this system is its library of user-friendly functions, working seamlessly across various different connected devices.

This software supports Mikro's range of protective relays, digital power meters and power factor regulators that are network enabled. Through this network, data is polled regularly and reports can be generated in the chart form, Excel or PDF format for data analysis. In order to simplify the visualisation of device status and power consumption, Mikrosafe employs the use of single line diagrams and overview diagrams to represent the actual device network architecture. The users may be alerted via email and/or SMS, in the event of trips, connection failures or other alarms.

FEATURES

- Supports devices that comply with Modbus-RTU and Modbus-TCP standard
- Logs data from devices at specific time interval
- Provides analysis of energy trend in the forms of graphs, charts and reports
- Provides cost estimation based on tariff group or meter group
- Displays overview diagram of device communication and architecture
- Shows actual single line diagram with device location
- Sends SMS and/or email alert when device trips or default
- Provides user and role access control with login password
- Easy setup and user-friendly system
- Offers high performance & reliable communication

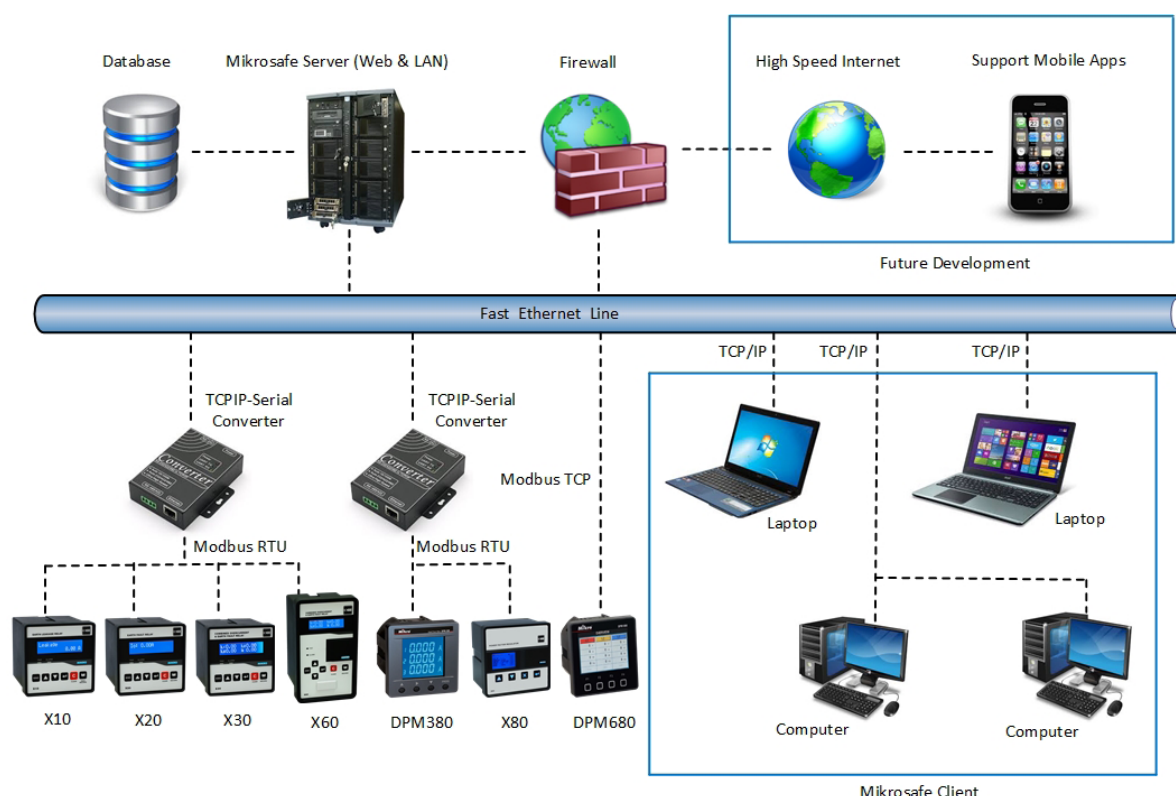
MINIMUM SYSTEM REQUIREMENTS

Database & Server Software

- Operating System (OS): Windows 7 SP1 32-bit / 64-bit
- Processor: 2 GigaHertz (GHz)
- RAM: 8 Gigabyte (GB)
- Hard disk space: 500 GB
- Graphics card: Direct X9 or later with WDDM 1.0 driver
- Display: 1024 x 768

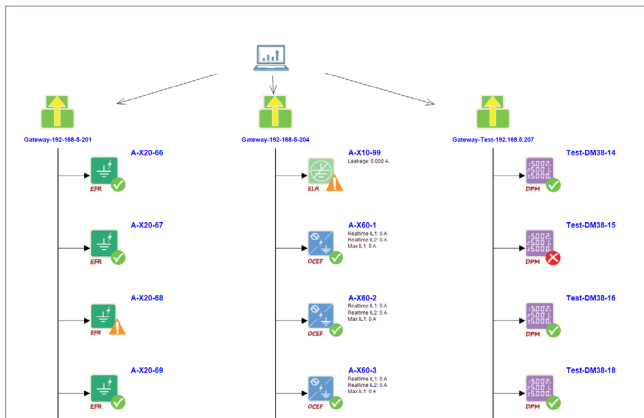
Client Software

- Operating System (OS): Windows 7 SP1 32-bit / 64-bit
- Processor: 1 GigaHertz (GHz)
- RAM: 4 Gigabyte (GB)
- Hard disk space: 250GB
- Graphics card: DirectX 9 or later with WDDM 1.0 Driver
- Display: 1024 x 768



DEVICES & COMMUNICATION LAYOUT

Pic 1



Pic 2

- An overview of physical connection diagram of a building shows clearly how the devices are attached to different communication controllers and device connection status. (Pic 1)
- Each device detail parameters can be seen by double-clicking on the specific device icon. (Pic 2)

SYSTEM SECURITY

Pic 3

Pic 4

- System is protected with password for security purposes. (Pic 3)
- Different users have different access rights to gain access to different system modules. (Pic 4)

NOTIFICATION ALERT

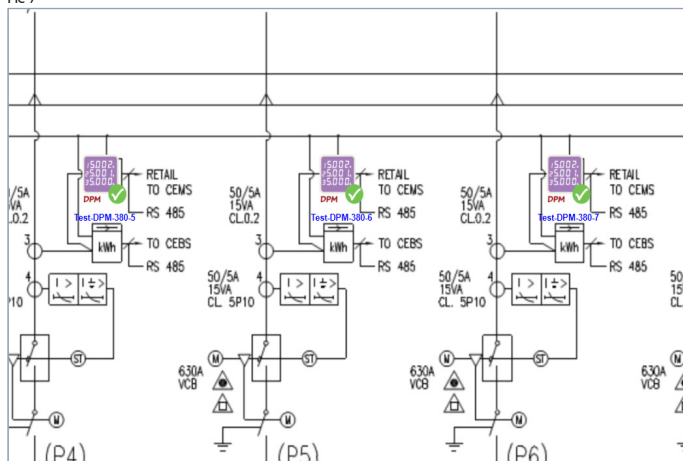
Pic 5

Pic 6

- Automated sending of emails and SMS alert in the event of operational failure or faults. (Pic 5)
- All alerts will be prompted and remain in the system for attention until the issue is solved and kept as history. (Pic 6)

DIAGRAM VIEW

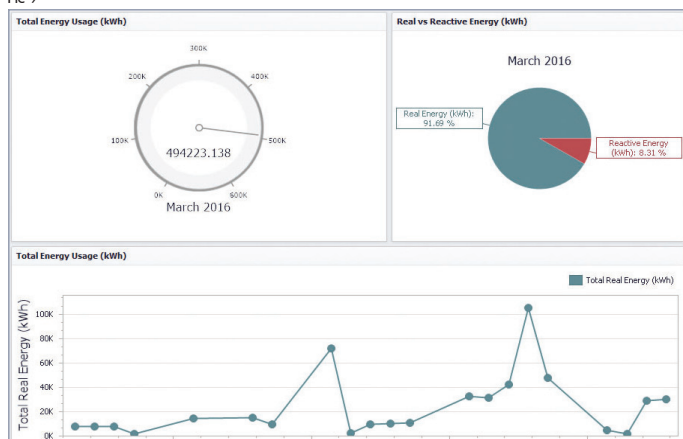
Pic 7



- User can upload the original building diagram with the designated devices allocation. This provide a clearer picture for analysis purpose. (Pic 7)
- User can double-click on the specific device icon from the diagram to gain access to more details. (Pic 8)

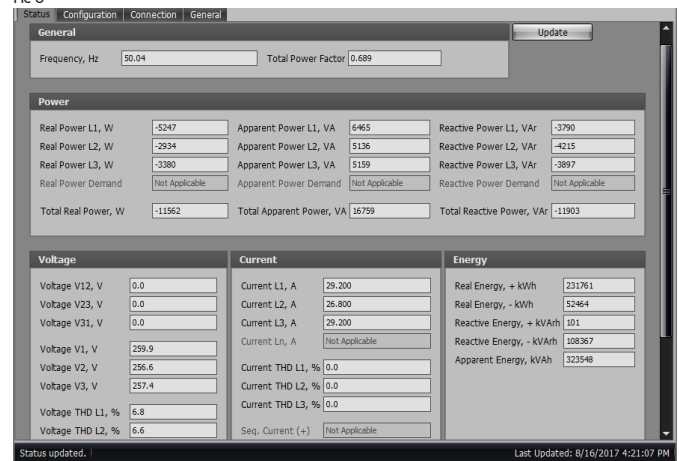
ENERGY MANAGEMENT & MONITORING

Pic 9

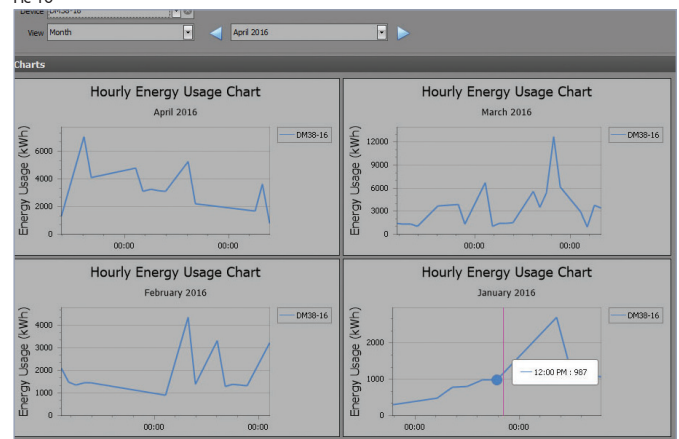


- Energy trend analysis chart and graph can be generated based on previous recorded energy data at specific time interval. (Pic 9)
- By having daily/monthly basis energy usage comparison chart, energy efficiency consumption trends can be seen easily and cost can be controlled in an efficient manner and allow to move towards a green building future. (Pic 10)

Pic 8



Pic 10



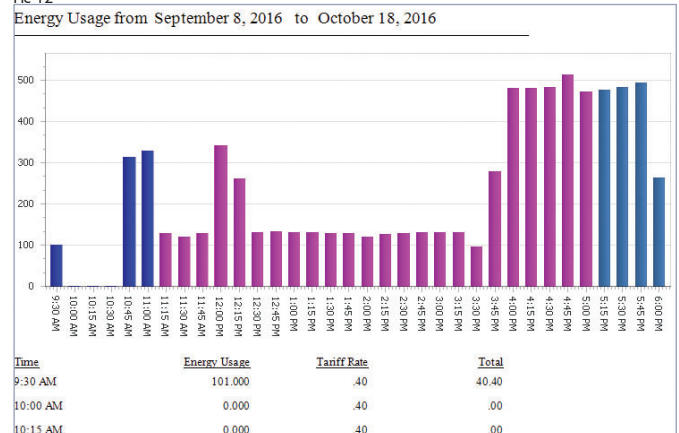
REPORTING

Pic 11

Time Stamp	Frequency	Real Energy (+)	Real Energy (-)	Reactive Energy (+)	Reactive Energy (-)	Apparent Energy	Current L1	Current L2	Current L3
8/14/2017 12:01:47 PM	50.03	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:06:50 PM	50.01	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:11:53 PM	50.04	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:16:56 PM	50.03	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:21:59 PM	50.01	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:27:02 PM	50.02	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:32:05 PM	50.04	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:37:08 PM	50.01	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:42:11 PM	49.95	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:47:14 PM	49.95	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:52:17 PM	50.01	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 12:57:20 PM	50.03	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 1:02:23 PM	49.98	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 1:07:26 PM	49.98	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
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8/14/2017 1:22:35 PM	49.97	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 1:27:38 PM	49.95	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 1:32:41 PM	49.92	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
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8/14/2017 1:57:56 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 2:02:59 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 2:08:02 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 2:13:05 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 2:18:08 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 2:23:11 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
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8/14/2017 3:49:02 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
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8/14/2017 4:09:14 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
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8/14/2017 4:24:23 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 4:29:26 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
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8/14/2017 4:54:41 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
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8/14/2017 5:04:47 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 5:09:50 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 5:14:53 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 5:19:56 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
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8/14/2017 5:30:02 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
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8/14/2017 5:55:17 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000
8/14/2017 6:00:20 PM	49.94	280038.000	-21783.000	268.000	-4767.000	301871.000	0.000	0.000	0.000

- Analyzes devices' parameters individually between a specific time interval is available. Data can be sorted by ascending or descending order on any parameters and export to Excel spreadsheet for printing is also possible. (Pic 11)
- Energy usage based on tariff settings is provided for cost estimation reporting. (Pic 12)

Pic 12





X60

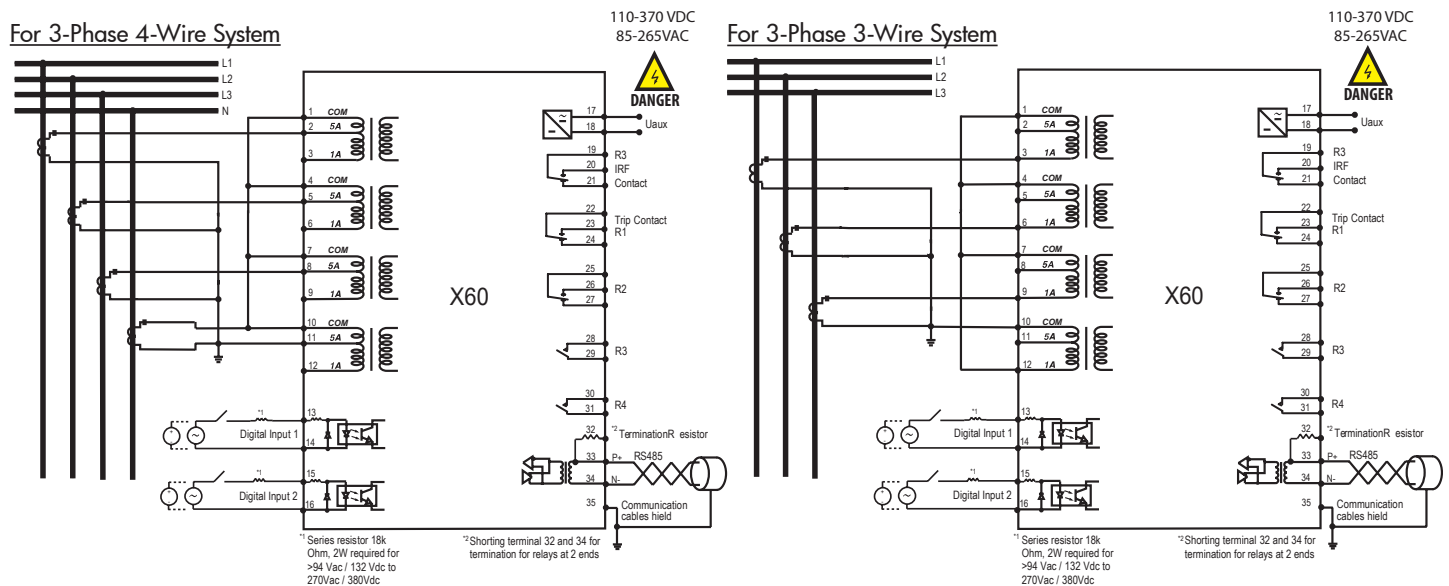
COMBINED OVERCURRENT & EARTH FAULT RELAY



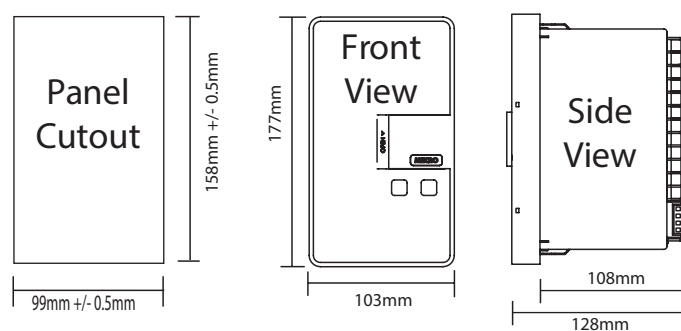
FEATURES

- Multifunction numerical relay
- 2 x 16 digits LCD Display
- Three-phase, three stages setting for phase overcurrent
- Two stages setting for earth fault
- IDMT and definite time
- Thermal overload protection
- Two independent group of protection settings
- Trip circuit supervision
- Circuit breaker failure protection
- RS232 and RS485 MODBUS-RTU communication
- Event, fault and alarm records with timestamp
- Multifunction programmable output contacts
- Multifunction programmable digital input
- Complies with IEC 60255 standard
- ANSI Code: 49RMS, 50P, 50N, 51P, 51N, CLP, 50BF, 74TC
- Compatible with Mikrosafe Software

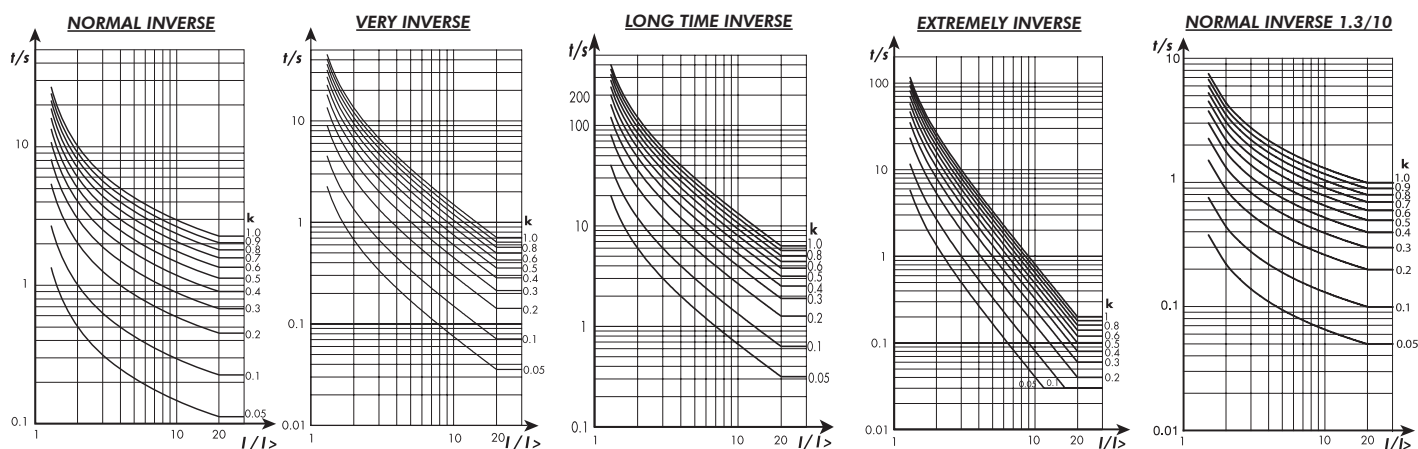
TYPICAL APPLICATION DIAGRAM



CASE DIMENSION



IDMT GRAPH



TECHNICAL DATA

AUXILIARY SUPPLY

Model X60-OCEF-240AD

Rated voltage	: 100~240V AC or 140~340V DC
Operating voltage	: 85~265V AC or 110~370V DC
Rated frequency	: 50 or 60 Hz
Operating frequency	: 45 ~ 65 Hz
Power consumption	: 8VA max

CURRENT INPUTS

Rated current, I_n , I_{on}	: 1 or 5 A by connection
Frequency	: 50 or 60 Hz nominal
Burden	: < 0.025 VA (1 A) : < 0.3 VA (5 A)
Thermal withstand	: 4 x I_n continuous : 40 x I_n for 2s : 100 x I_n for 1s

DIGITAL INPUTS

Input type	: Optically isolated
Rated voltage	: 20~380V DC or 50~270V AC

OUTPUT CONTACTS

Trip Contact Relay R1, R2, R3, R4, IRF Contact Relay R5

Rated voltage	: 250V AC / DC
Continuous carry	: 5A
Expected electrical life	: 100,000 operations at rated load
Expected mechanical life	: 5 X10 ⁶ operations

INDICATORS

Display	: 2 x16 LCD Display
Alarm	: Yellow indicator
Trip	: Red indicator

RECORDS

Fault record	: Up to 50 records, non-volatile
Event record	: Up to 250 records, non-volatile
Alarm record	: Up to 30 records, non-volatile

SETTING RANGES

Earth CT primary	: 1 to 10,000 A
Line CT primary	: 1 to 10,000 A
Frequency	: 50 or 60 Hz
Phase Overcurrent	
I>	: 0.1 to 25 x I_n (Recommended up to 2 x I_n for IDMT delay) *(Variable Steps)

I> Delay type

: IDMT or definite time

tl> : 0 to 100 s *(Variable Steps)

I> IDMT curve

ktl : NI, VI, EI, LTI, NI 1.3/10

ktl : 0.01 to 1.00 (Step 0.01)

I>> : 0.5 to 40 x I_n *(Variable Steps)

tl>> : 0 to 100 s *(Variable Steps)

I>>> : 0.5 to 40 x I_n *(Variable Steps)

I>>> Sample : Yes or No

tl>>> : 0 to 100 s *(Variable Steps)

Earth Fault

I> : 0.02 to 2 x I_{on} (Recommended up to 0.5 x I_{on} for IDMT delay) *(Variable Steps)

I> Delay type

: IDMT or definite time

tl> : 0 to 100 s *(Variable Steps)

I> IDMT curve

ktl : NI, VI, EI, LTI, NI 1.3/10

ktl : 0.01 to 1.00 (Step 0.01)

I>> : 0.1 to 10 x I_{on} *(Variable Steps)

tl>> : 0 to 100 s *(Variable Steps)

Thermal Overload

I> : 0.1 to 3 x I_n *(Variable Steps)

T> : 1 to 200 minutes (Step 1)

k : 1 to 1.5 (Step 0.01)

θ Trip : 50 to 200% (Step 1%)

θ alarm : 50 to 200% (Step 1%)

*Variable Steps: 0.1-1.00: Step 0.01; 1.00-20: Step 0.1; >20: Step 1

MEASUREMENT RANGES

Phase Current Secondary:

5 A input : 0 to 200A

1 A input : 0 to 40A

Earth Current Secondary:

5 A input : 0 to 50 A

1 A input : 0 to 10 A

ENVIRONMENTAL CONDITIONS

Pollution degree	: 2
Operating temperature	: -10 °C to 55 °C
Storage temperature	: -20 °C to 70 °C
Humidity	: 5% to 95%, non-condensing

MECHANICAL

Mounting type	: Panel mounting
Dimension(mm)	: 103(W) x 177(H) x 128(D)
Enclosure protection	: IP54 at panel
Approximate weight	: 1.2 kg

ACCURACY

Current accuracy	: ± 3% of the set value or 20mA secondary
Timing accuracy	: ± 5% or ± 30ms

ORDERING INFORMATION

MODEL

X60-OCEF-240AD

DESCRIPTION

For 50/60 Hz, auxiliary voltage 85 ~ 265V AC or 110 ~ 370V DC



X30

COMBINED OVERCURRENT & EARTH FAULT RELAY

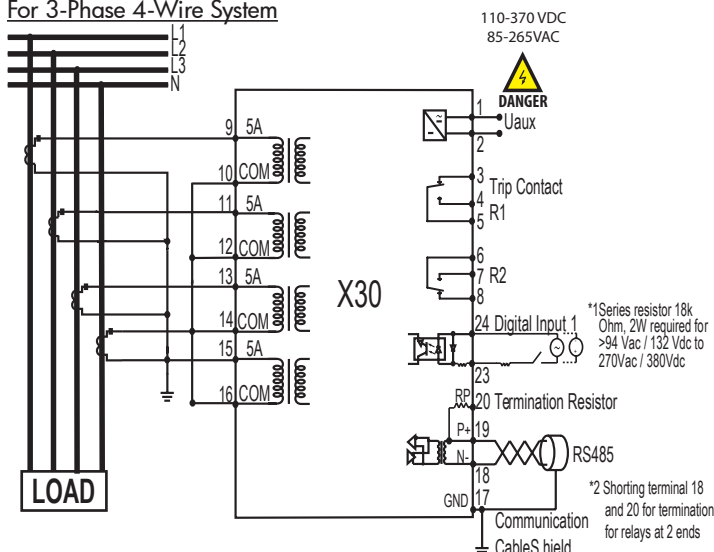


FEATURES

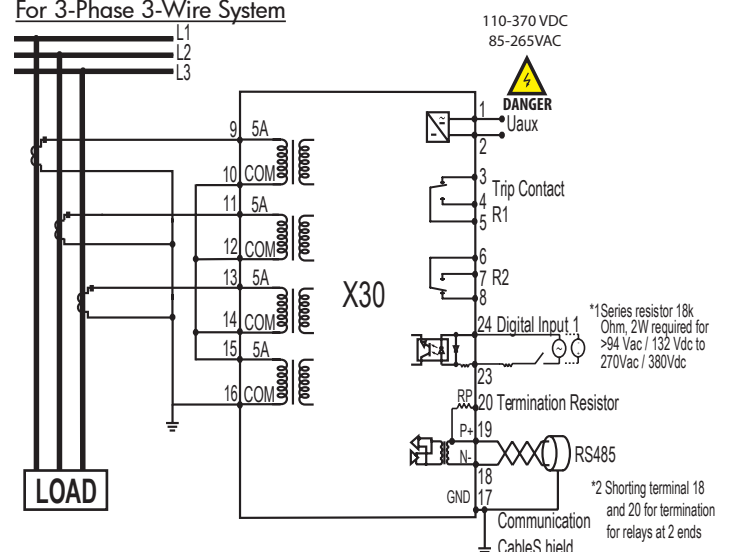
- Multifunction numerical relay
- 2 x 16 digits LCD Display
- Three-phase, three stages setting for phase overcurrent
- Two stages setting for earth fault
- IDMT and definite time
- Thermal overload protection
- Two independent group of protection settings
- Trip circuit supervision
- Circuit breaker failure protection
- RS485 MODBUS-RTU communication
- Event, fault, and alarm records with timestamp
- Multifunction programmable output contacts
- Multifunction programmable digital input
- Complies with IEC 60255 standard
- ANSI Code: 49RMS, 50P, 50N, 51P, 51N, CLP, 50BF, 74TC
- Compatible with Mikrosafe Software

TYPICAL APPLICATION DIAGRAM

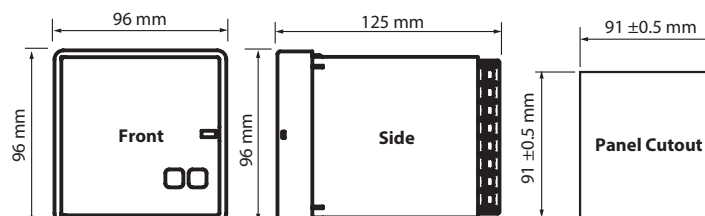
For 3-Phase 4-Wire System



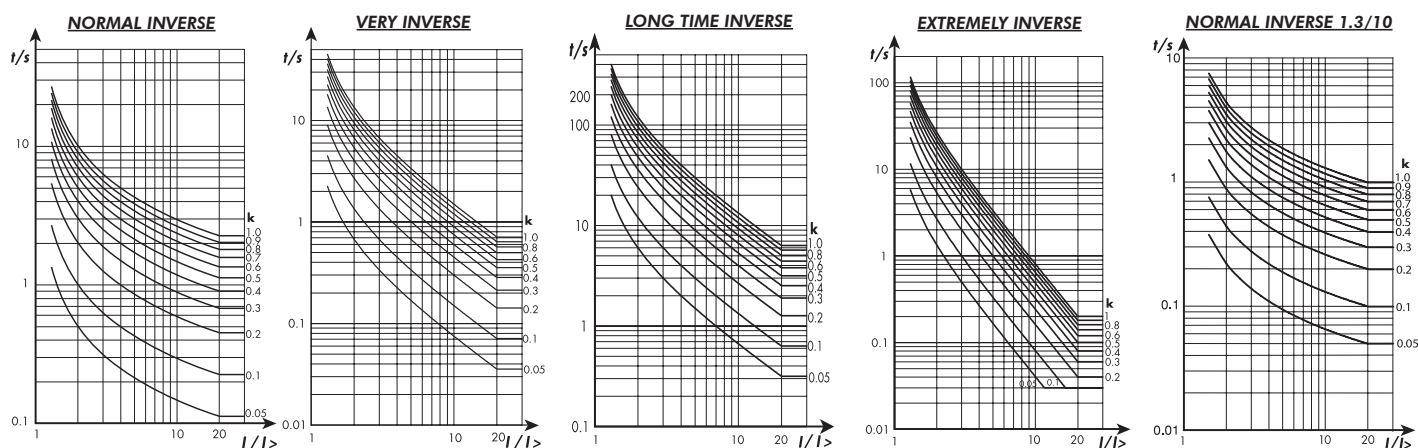
For 3-Phase 3-Wire System



CASE DIMENSION



IDMT GRAPH



TECHNICAL DATA

AUXILIARY SUPPLY

Model X30-OCEF-240AD
 Rated voltage : 100~240V AC or 140~340V DC
 Operating voltage : 85~265V AC or 110~370V DC
 Rated frequency : 50 or 60 Hz
 Operating frequency : 45 ~ 65 Hz
 Power consumption : 6VA max

CURRENT INPUTS

Rated current, I_n , I_{on} : 5 A
 Frequency : 50 or 60 Hz nominal
 Burden : < 0.3 VA
 Thermal withstand : 4 x I_n continuous
 : 25 x I_n for 2s

DIGITAL INPUTS

Input type : Optically isolated
 Rated voltage : 20~380V DC or 50~270V AC

OUTPUT CONTACTS

Trip Contact Relay R1, R2
 Rated voltage : 250V AC / DC
 Continuous carry : 5A
 Expected electrical life : 100,000 operations at rated load
 Expected mechanical life : 5 X10⁶ operations

INDICATORS

Display : 2 x16 LCD Display
 Alarm : Yellow indicator
 Trip : Red indicator

RECORDS

Fault record : Up to 50 records, non-volatile
 Event record : Up to 250 records, non-volatile
 Alarm record : Up to 30 records, non-volatile

SETTING RANGES

Earth CT primary : 1 to 10,000 A
 Line CT primary : 1 to 10,000 A
 Frequency : 50 or 60 Hz
Phase Overcurrent
 $I_{>}$: 0.1 to 20 x I_n (Recommended up to 2 x I_n for IDMT delay) *(Variable Steps)

Delay type

$t_{>}$: IDMT or definite time
 : 0 to 100 s *(Variable Steps)
 $I_{>}$ IDMT curve : NI, VI, EI, LTI, NI 1.3/10
 k_{tI} : 0.01 to 1.00 (Step 0.01)
 $I_{>>}$: 0.5 to 20 x I_n *(Variable Steps)
 $t_{>>}$: 0 to 100 s *(Variable Steps)
 $I_{>>>}$: 0.5 to 20 x I_n *(Variable Steps)
 $I_{>>>}$ Sample : Yes or No
 $t_{I>>>}$: 0 to 100 s *(Variable Steps)

Earth Fault

$I_{o>}$: 0.02 to 2 x I_{on} (Recommended up to 0.5 x I_{on} for IDMT delay) *(Variable Steps)
 $I_{o>}$ Delay type : IDMT or definite time
 $t_{I_o>}$: 0 to 100 s *(Variable Steps)
 $I_{o>}$ IDMT curve : NI, VI, EI, LTI, NI 1.3/10
 k_{tI_o} : 0.01 to 1.00 (Step 0.01)
 $I_{o>>}$: 0.1 to 10 x I_{on} *(Variable Steps)
 $t_{I_o>>}$: 0 to 100 s *(Variable Steps)

Thermal Overload

$I_{\theta >}$: 0.1 to 3 x I_n *(Variable Steps)
 T_{θ} : 1 to 200 minutes (Step 1)
 k : 1 to 1.5 (step 0.01)
 θ Trip : 50 to 200% (Step 1%)
 θ alarm : 50 to 200% (Step 1%)

*Variable Steps: 0.1-1.00: Step 0.01; 1.00-20: Step 0.1; >20: Step 1

MEASUREMENT RANGES

Phase Current Secondary:
 5 A input : 0 to 200A
Earth Current Secondary:
 5 A input : 0 to 50 A

ENVIRONMENTAL CONDITIONS

Pollution degree : 2
 Operating temperature : -10 °C to 55 °C
 Storage temperature : -20 °C to 70 °C
 Humidity : 5% to 95%, non-condensing

MECHANICAL

Mounting type : Panel mounting
 Dimension(mm) : 96(W) x 96(H) x 125(D)
 Enclosure protection : IP54 at panel
 Approximate weight : 0.8 kg

ACCURACY

Current accuracy : ± 3% of the set value or 20mA secondary
 Timing accuracy : ± 5% or ± 30ms

ORDERING INFORMATION

MODEL

X30-OCEF-240AD

DESCRIPTION

For 50/60 Hz, auxiliary voltage 85 ~ 265V AC or 110 ~ 370V DC



X20

EARTH FAULT RELAY



FEATURES

- Multifunction numerical relay
- 2 x 16 digits LCD Display
- Low-set Earth Fault
- High-set Earth Fault
- Definite time for low-set and high-set
- Five selectable IDMT characteristic curves
- Two independent group of protection settings
- RS485 MODBUS-RTU communication
- Event, fault and alarm records with timestamp
- Multifunction programmable output contacts
- Internal relay failure
- Multifunction programmable digital input
- Complies with IEC 60255 standard
- ANSI Code: 50N, 51N
- Compatible with Mikrosafe Software

TECHNICAL DATA

AUXILIARY SUPPLY

Model X20-EFR-240AD	
Rated voltage	: 100~240V AC or 140~340V DC
Operating voltage	: 85~265V AC or 110~370V DC
Rated frequency	: 50 or 60 Hz
Operating frequency	: 45 ~ 65 Hz
Power consumption	: 6VA max

Current Inputs

Rated current, I_{on}	: 5 A
Frequency	: 50 or 60 Hz nominal
Burden	: < 0.3 VA
Thermal withstand	: 4 x I_n continuous
	: 25 x I_n for 10s

DIGITAL INPUTS

Input type	: Optically isolated
Rated voltage	: 20~380V DC or 50~270V AC

OUTPUT CONTACTS

Trip Contact Relay R1, R2, IRF Contact Relay R3	
Rated voltage	: 250V AC / DC
Continuous carry	: 5A
Expected electrical life	: 100,000 operations at rated load
Expected mechanical life	: 5 x 10 ⁶ operations

RECORDS

Fault record	: Up to 50 records, non-volatile
Event record	: Up to 250 records, non-volatile
Alarm record	: Up to 30 records, non-volatile

SETTING RANGES

Earth CT primary	: 1 to 10,000 A
Frequency	: 50 or 60 Hz
Earth fault	
$I_{o>}$	: 0.02 to 2 x I_{on} (Recommended up to 0.5 x I_{on} for IDMT delay) *(Variable Steps)

$I_{o>}$ Delaytype IDMT or definite time

$t_{lo>}$	: 0 to 100 *(Variable Steps)
$I_{o>}$ IDMT curve	: NI, VI, EI, LTI, NI 1.3/10
k_{tlo}	: 0.01 to 1.00 (Step 0.01)
$I_{o>>}$	: 0.1 to 10 x I_{on} *(Variable Steps)
$t_{lo>>}$	: 0 to 100 s *(Variable Steps)

*Variable Steps: 0.1-1.00: Step 0.01; 1.00-20: Step 0.1; >20: Step 1

MEASUREMENT RANGES

Earth current secondary:	0 to 50A
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ENVIRONMENTAL CONDITIONS

Pollution degree	: 2
Operating temperature	: -10 °C to 55 °C
Storage temperature	: -20 °C to 70 °C
Humidity	: 5% to 95%, non-condensing

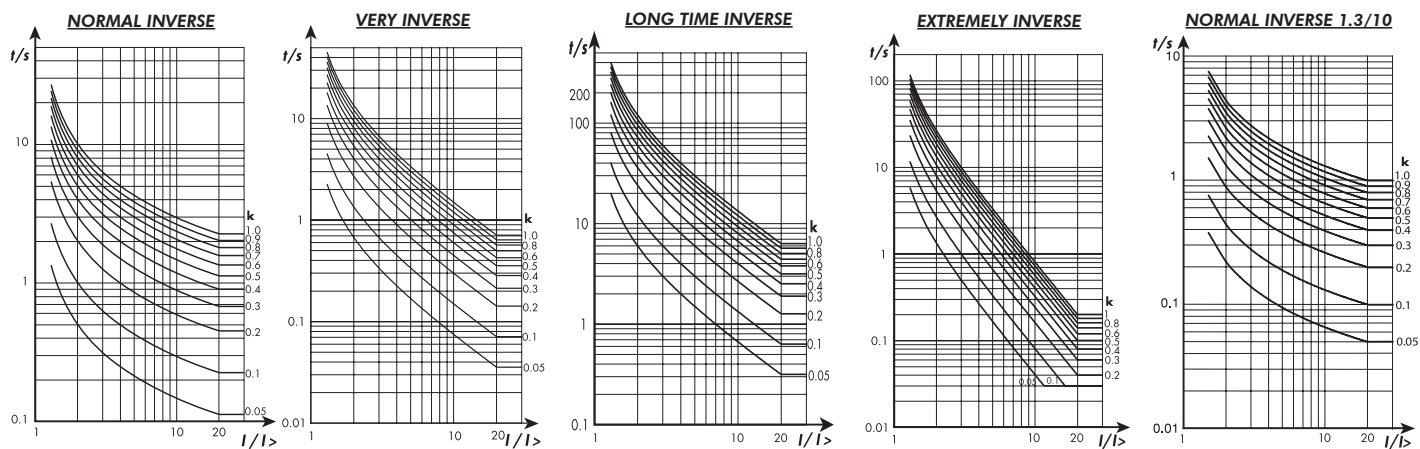
MECHANICAL

Mounting type	: Panel mounting
Dimension(mm)	: 96(W) x 96(H) x 125(D)
Enclosure protection	: IP54 at panel
Approximate weight	: 0.7 kg

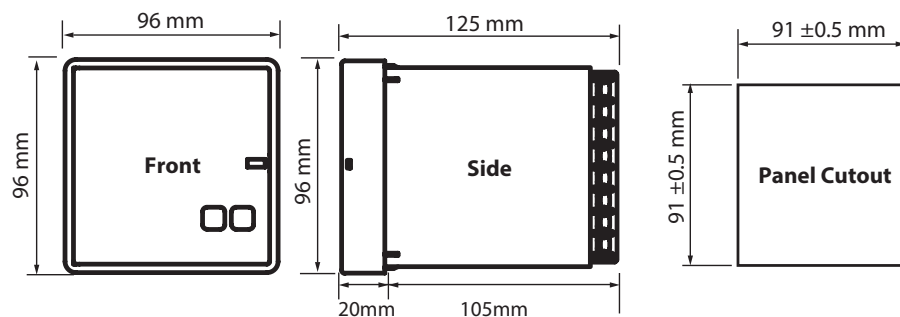
ACCURACY

Current accuracy	: ± 3% of the set value or 20mA secondary
Timing accuracy	: ± 5% or ± 30ms

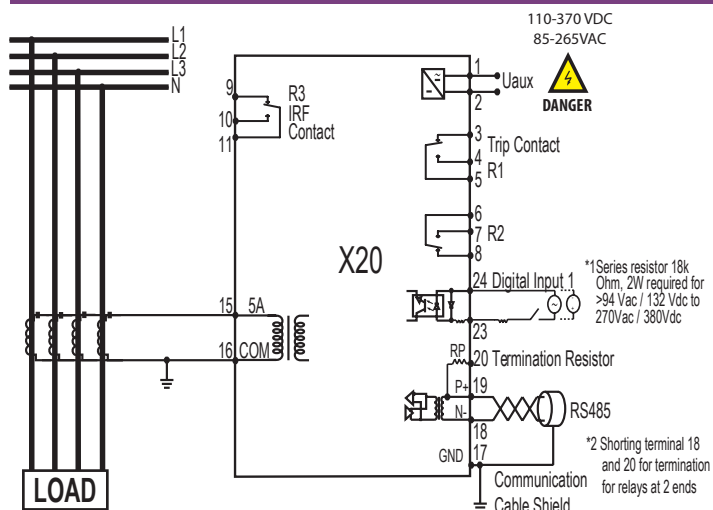
IDMT GRAPH



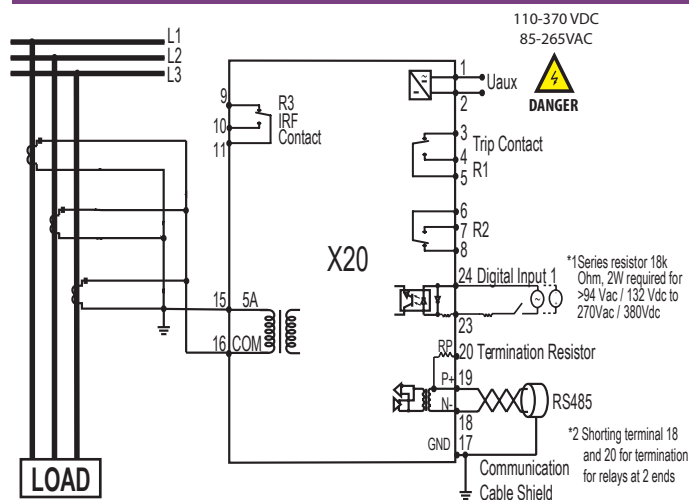
CASE DIMENSION



TYPICAL APPLICATION DIAGRAM 1



TYPICAL APPLICATION DIAGRAM 2



ORDERING INFORMATION

MODEL
X20-EFR-240AD

DESCRIPTION
For 50/60 Hz, auxiliary voltage 85 ~ 265V AC or 110 ~ 370V DC



X10

EARTH LEAKAGE RELAY



FEATURES

- Numerical earth leakage relay
- Programmable TRUE RMS or fundamental detection
- Programmable sensitivity and time delay setting
- Two independent group of protection settings
- Programmable pre-fault alarm threshold
- Programmable alarm setting
- Detection of no connection to ZCT
- 2 x 16 digits LCD Display
- Real-time leakage current display
- Event, fault and alarm records with timestamp, non-volatile
- Multifunction programmable digital input
- Multifunction programmable output contacts
- RS485 MODBUS-RTU Communication
- Protection against nuisance tripping
- Compatible with Mikrosafe Software

TECHNICAL DATA

AUXILIARY SUPPLY

X10-ELR-240AD	
Rated voltage	: 100~240V AC or 140~340V DC
Operating voltage	: 85~265V AC or 110~370V DC
Rated frequency	: 50 or 60 Hz
Power consumption	: 6VA max

DIGITAL INPUTS

Input type	: Optically isolated
Rated voltage	: 20~380V DC or 50~270V AC

OUTPUT CONTACTS

Trip Contact Relay R1, R2, IRF Contact Relay R3	
Rated voltage	: 240V AC
Contact arrangement	: Change-over
Continuous carry	: 5A
Expected electrical life	: 100,000 operations at rated load
Expected mechanical life	: 10 x 10 ⁶ operations

INDICATORS

Display	: 2 x 16 LCD Display
Alarm	: Yellow Indicator
Trip	: Red Indicator

RECORDS

Fault record	: Up to 50 records, non-volatile
Event record	: Up to 250 records, non-volatile
Alarm record	: Up to 30 records, non-volatile

SETTING RANGES

Sensitivity setting	: 30mA, 0.05-1.00 (Step=0.05A)
	: 1.00-10.0A (Step=0.25A)
Time delay setting	: Instantaneous, 0.1-3.0s (Step=0.1s)

ZERO-PHASE CURRENT TRANSFORMERS

To operate with Mikro's ZCT series of current transformer

ENVIRONMENTAL CONDITIONS

Pollution degree	: 2
Operating temperature	: -10 °C to 55 °C
Storage temperature	: -20 °C to 70 °C
Humidity	: 5% to 95%, non-condensing

MECHANICAL

Mounting type	: Panel mounting
Dimension(mm)	: 96(W) x 96(H) x 125(L)
Enclosure protection	: IP54 at panel
Approximate weight	: 0.6 kg (Excluding ZCT)

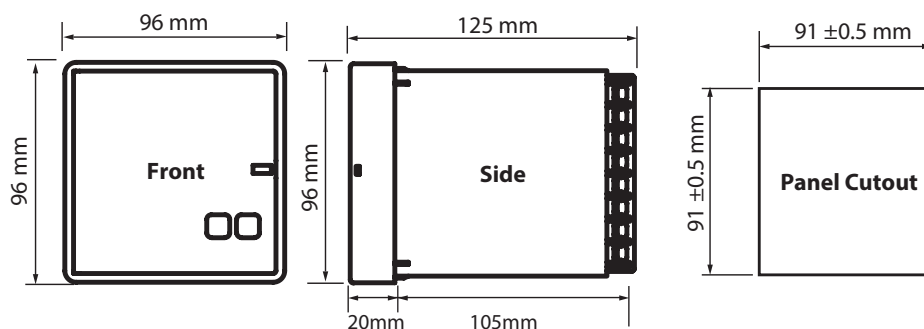
STANDARDS

IEC 60947-2 Annex M

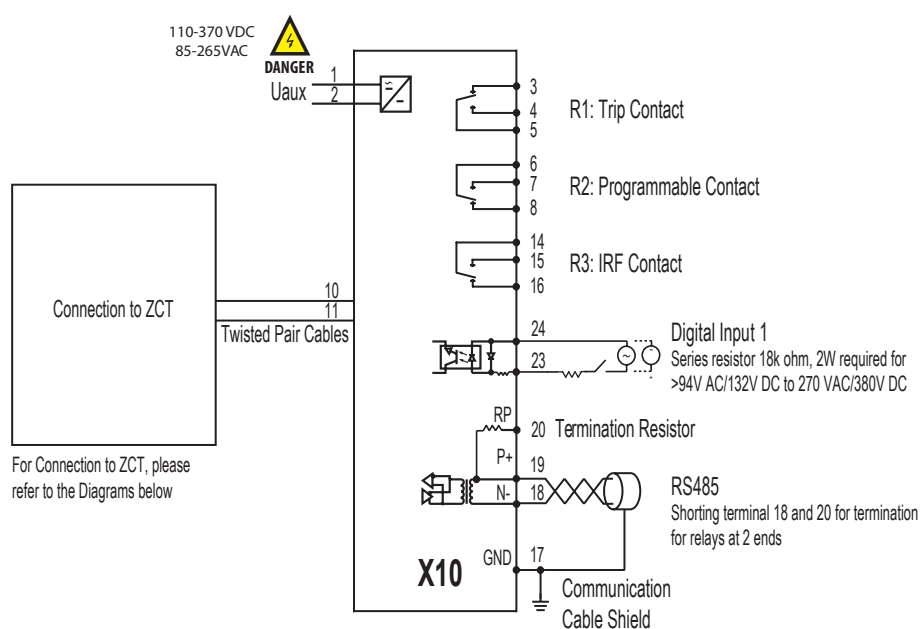
ACCURACY

Sensitivity accuracy	: -15% to 0%
Timing accuracy	: ± 5%

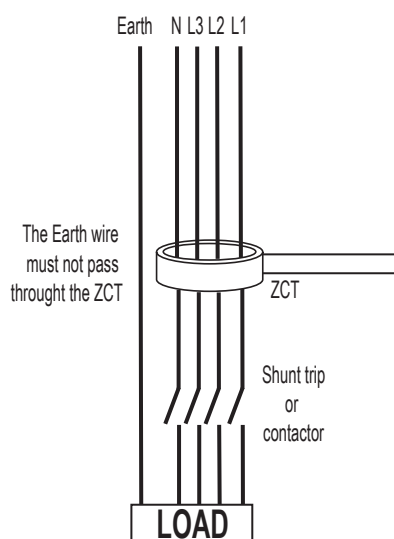
CASE DIMENSION



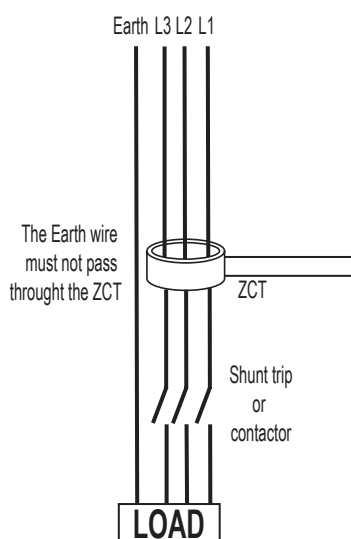
TYPICAL APPLICATION DIAGRAM



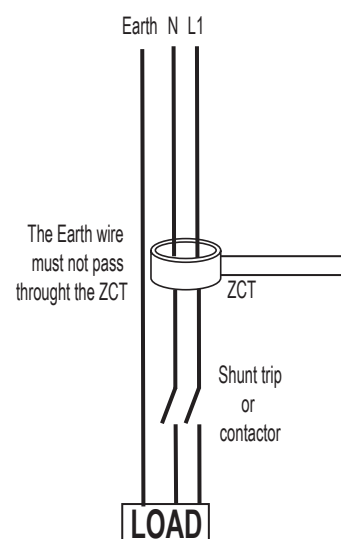
For 3-Phase 4-Wire System



For 3-Phase 3-Wire System



For Single Phase System



ORDERING INFORMATION

MODEL
X10-ELR-240AD

DESCRIPTION
For 50/60 Hz, auxiliary voltage 85 ~ 265V AC or 110 ~ 370V DC



X80

POWER FACTOR REGULATOR

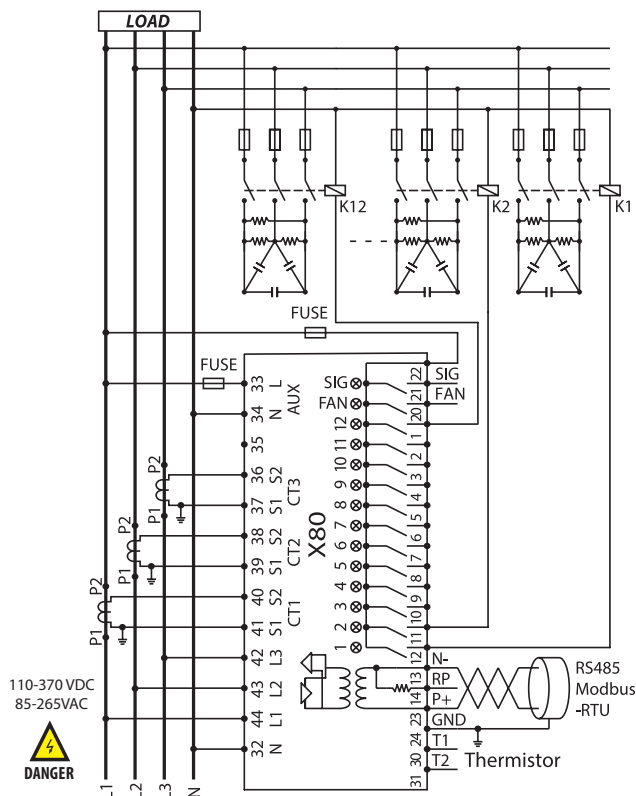


FEATURES

- 2 inch, 64 x 128 dot matrix LCD Display with backlighting
- Three phase and single phase detection of reactive power
- 12 (or 8 for 8 step model) output with two additional independent contact for signal alarm output and fan output
- Three phase compensation mode
- 5 different switching program mode
- Automatic detection of C/K and rated step value
- No Voltage Release
- Measurement parameters
 - Active, reactive and apparent power
 - Temperature
 - Phase voltage and phase current
 - Frequency
 - Up till 31st order Harmonics measurement in graphical or table format
 - Power Factor and Displacement Power Factor (Cos φ)
- Various configurable alarm settings
- Alarm linked signal contact
- Programmable fan control
- Modbus-RTU communication
- Fixed step for hybrid switching
- Compatible with Mikrosafe Software

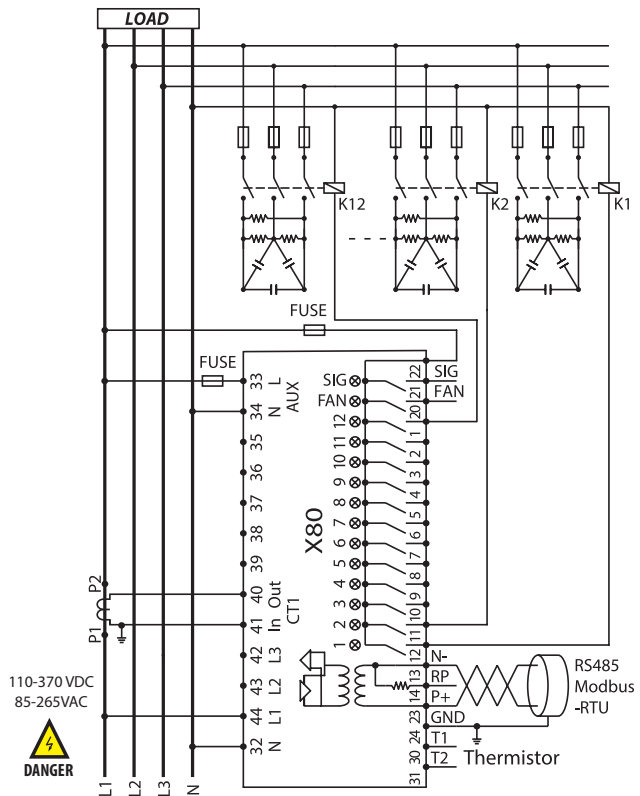
TYPICAL APPLICATION DIAGRAM

X80 Connection diagram for 3 Phase 12 Step model



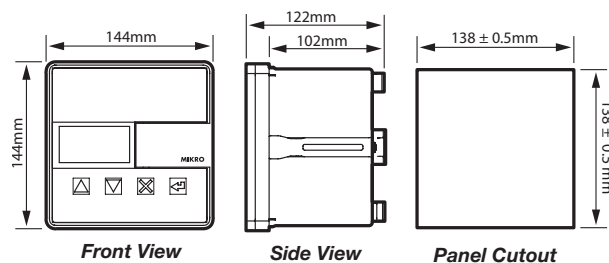
X80 PFR120P3-230-50

X80 Connection diagram for 1 Phase 12 Step model



X80 PFR120P1-230-50

CASE DIMENSION



TECHNICAL DATA

CURRENT INPUT (EACH PHASE)

Nominal current	: 5 A
Operating limits	: 0.01 - 10 A
Rated frequency	: 50 Hz or 60 Hz

VOLTAGE INPUT

(EACH PHASE with respect to neutral)	
Nominal voltage	: 230V AC
Operating limits	: 0 - 277 V L-N
Consumption	: 0.05 VA
Rated frequency	: 50 Hz or 60 Hz
Category	: III

THERMISTOR INPUT

Thermistor temperature range	: 0 - 100 °C
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AUXILIARY

Auxiliary Input voltage range	: 85 - 265V AC
Consumption	: 10VA max
Rated frequency	: 50 Hz or 60 Hz

OUTPUT CONTACTS

Number of outputs	: 14 (model dependent)
Contact arrangement	: NO contact type
Contact rating	: 5A
Expected electrical life	: 100,000 operations at rated current
Expected mechanical life	: 5 x 10 ⁶ operations

CONTROL RANGE

Target power factor	: 0.80 Inductive - 0.80 Capacitive
C/K setting	: 0.03 - 1.20 / Automatic detect
Sensitivity	: 5 - 240s
Switching program	: Automatic / manual / four-quadrant / rotational / linear
Rated step coefficient	: 0 / 1 / 2 / 3 / 4 / 5 / 6 / 8 / 12 / 16 / Fixed
Detection mode	: L1 / L2 / L3 / max Load / three phase
Fan setting	: Fixed on / output on / temperature / none
Signal contact	: Linked to 10 different programmable alarm / none

ALARM SETTING RANGE

% THDI	: 20% - 300% / OFF
Over voltage	: 253 - 264V / OFF
Under voltage	: 195 - 204V / OFF
Over current	: 5.50 - 7.00A / OFF
Under current	: 0.01 - 0.15A / OFF
Under compensate	: On / OFF
Over compensate	: On / OFF
*CT polarity error	: On / OFF
Step error	: On / OFF
Temperature	: 36 - 70 °C / OFF

*Only available for single phase model

DISPLAY

% THDI and THDV	: 0% - 500%
Harmonics resolution	: Up till 31st Harmonics
Active power	: 0 - 3000 W
Reactive power	: 0 - 3000 VAR
Apparent power	: 0 - 3000 VA
Voltage	: 0 - 300V AC
Current	: 0.00 - 10.0 A rms
Temperature	: 0 - 100 °C
Frequency	: 45 - 65 Hz
Power factor	: -1.00 - 1.00
Displacement power factor	: -1.00 - 1.00 (CAP / IND)

MECHANICAL

Mounting type	: Panel mounting
Dimension(mm)	: 144 (W) x 144 (H) x 122 (L)
Enclosure protection	: IP54 at the panel
	: IP20 at the body
Approximate weight	: 1.2 kg (for three phase model)
	: 1 kg (for single phase model)

ENVIRONMENT CONDITIONS

Temperature	: -10 °C to + 55 °C
Humidity	: 5% to 95%, non-condensing
Pollution degree	: 2
Dielectric withstand	: IEC 61010-1

ELECTROMAGNETIC COMPATIBILITY (EMC)

Part 6-2: Generic standards	: IEC 61000-6-2
Immunity for industrial environment	
Part 6-4: Generic standards	: IEC 61000-6-4
Emission standard for industrial environment	

ORDERING INFORMATION

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>MODEL</u>	<u>DESCRIPTION</u>
X80 PFR120P3-240-50	: 12 Step, 3 Phase, 240V AC, 50Hz Model	X80 PFR120P3-240-60	: 12 Step, 3 Phase, 240V AC, 60Hz Model
X80 PFR120P1-240-50	: 12 Step, 1 Phase, 240V AC, 50Hz Model	X80 PFR120P1-240-60	: 12 Step, 1 Phase, 240V AC, 60Hz Model
X80 PFR80P3-240-50	: 8 Step, 3 Phase, 240V AC, 50Hz Model	X80 PFR80P3-240-60	: 8 Step, 3 Phase, 240V AC, 60Hz Model
X80 PFR80P1-240-50	: 8 Step, 1 Phase, 240V AC, 50Hz Model	X80 PFR80P1-240-60	: 8 Step, 1 Phase, 240V AC, 60Hz Model



MPC100

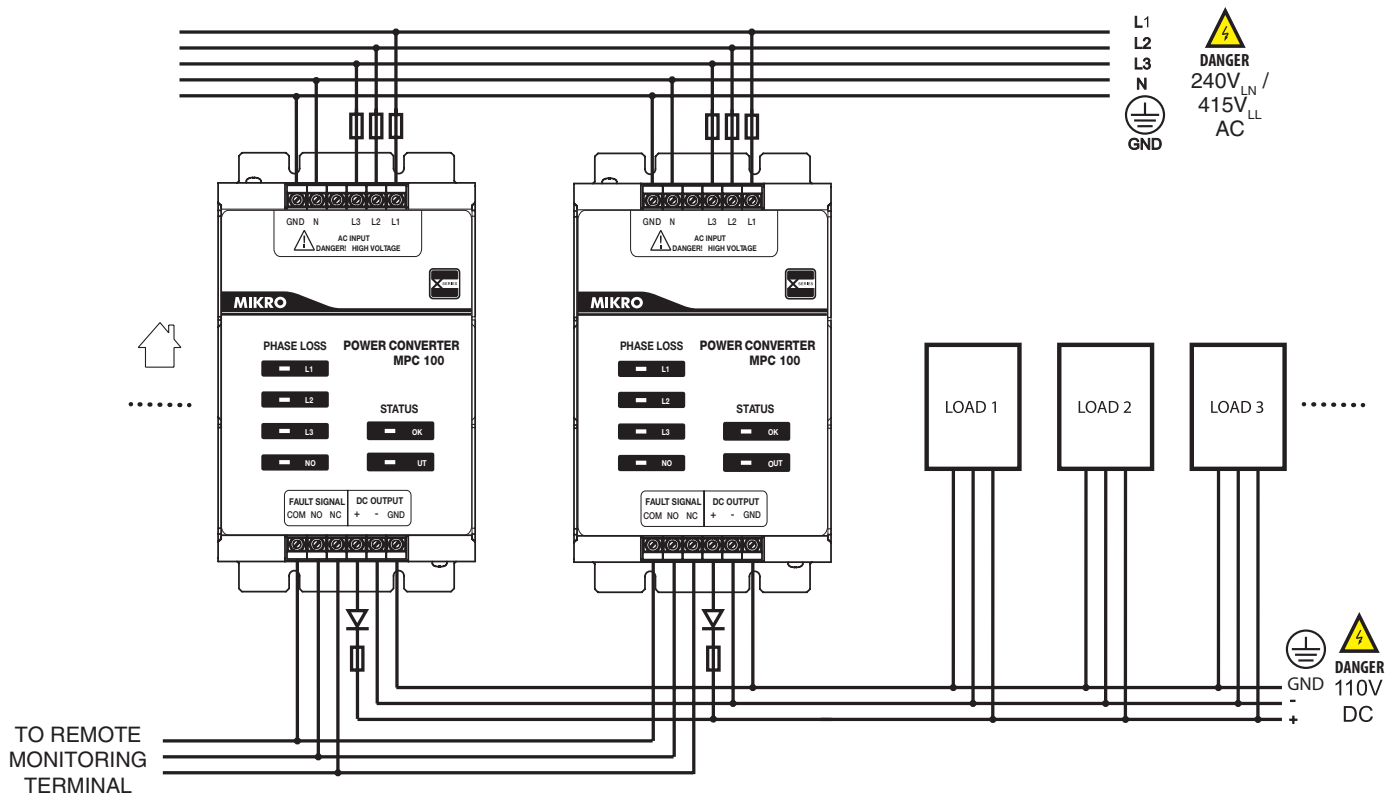
POWER CONVERTER



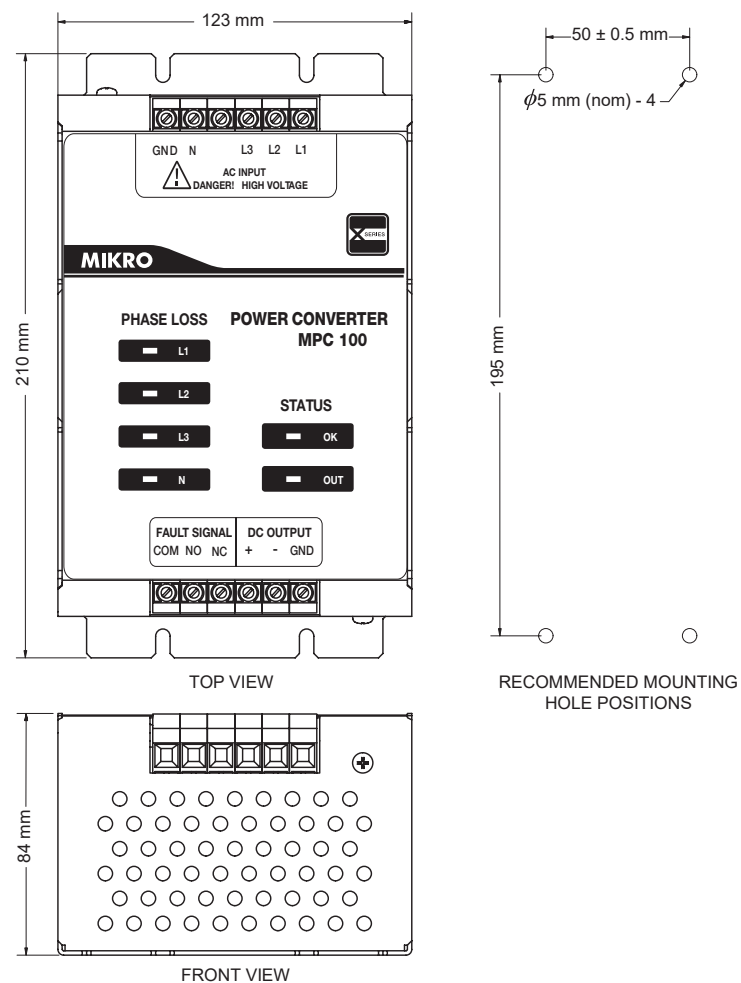
FEATURES

- Supplies industry standard service 110V DC output up to 100W
- Robust service continuity, immune against phase loss and neutral disconnection
- Tolerant to line overvoltage up to 480V AC rms
- Flexible input from DC to AC 65Hz
- Individual phase loss and neutral discontinuity indication to aid diagnostics
- Dry contact output for remote signalling
- Basic insulation between the 3-phase & neutral input and the DC output for safety
- Ideal substitute for backup batteries in service power system
- Suitable for powering protection relays, smart meters and circuit breaker strikers

TYPICAL APPLICATION DIAGRAM



CASE DIMENSION



TECHNICAL DATA

INPUT

Rated current	: 1A rms
No load current	: 100mA rms (max)
Rated phase voltage	: 230V rms (nom)
Phase voltage limits	: 170V rms to 276V rms
Maximum line voltage	: 480V rms for 10s
Rated frequency	: 50Hz / 60Hz

ENVIRONMENT

Overvoltage category	: III
Pollution degree	: 2
Operating temperature	: -5 °C to +55 °C
Storage temperature	: -20 °C to +70 °C
Humidity	: 95 % (max) , non-condensing

OUTPUT

Nominal voltage	: 110V DC
Voltage limits	: 100V DC to 115V DC
Nominal current	: 0.9A DC
Maximum current	: 1.3A DC for 10s
Rated power	: 100W

MECHANICAL

Dimension (mm)	: 123 (W) x 210 (H) x 84(L)
Enclosure protection	: IP20
Weight	: 1.5 kg (approx)

FAULT SIGNAL

Phase loss threshold	: 160V rms (max)
Output availability threshold	: 80V DC (max)
Fault signal contact voltage	: 30V DC / 250V AC
Fault signal contact current	: 1A DC / 3A AC

STANDARD COMPLIANCE

EMC	: IEC 61000-6
Safety	: IEC 61950-1
Environment	: IEC 60068-2

ORDERING INFORMATION

MODEL
MPC100

DESCRIPTION
3 Phase Power Converter



Mikro Sdn Bhd (423468-T)
Lot 1, Jalan TP7/7, Sime UEP Industrial Park,
40400 Shah Alam, Selangor, Malaysia.

www.itmikro.com

