

# BITORON-12

## MV indoor switchgears

Rated upto 2500A-31.5kA-12kV

### Adaptation of New Standard

IEC 62271-200 for Bitoron 12

Metalclad, arc resistant switchgears



## bitoron 12

### the evaluative, arc resistant switchgear

#### Safety at works:

##### ■ switch- disconnecter and earthing switch

The load break switch is filled with SF6 gas, having exceptional isolating properties and arc extinguishing particularities. Optimal security is ensured by means of a " sealed for life " concept and seal tightness is always checked in the factory. The choice of an ideal operational speed allows a short arcing time.

All non-ferrous components of the switch are free of halogen, resistant to the ultra violet and ozone, reinforced with fiberglass and manufactured according to the class UL 94 V0.

By using a fuse combination, the load break switch will be completed with the fuse holders and a second earthing switch. Both earthing switches are mechanically linked and so they are opening and closing at the same time.

When a fuse is blowing, switch off mechanism through a hitting bolt opens the three phases of the load break switch simultaneously.

##### ■ SF6 / Vacuum Circuit breaker

a compact modular circuit breaker  
& tested solution for both withdrawable & fixed installation  
3.3 kV to 12 kV  
630A to 2500A, 20-31.5 kA  
with metallic protection shutter on cradle  
racking in/out operation possible with the cubicle door closed

##### conformity standards

IEC 62271-1 : common specifications for high voltage switchgear and controlgear standards  
IEC 62271-100 : high voltage AC circuit breaker  
IEC 62271-200 : AC metal enclosed switchgear  
IEC 60529 : degree of protection

##### operating safety

as for switch-units, accidental over-pressures are eliminated by opening of the safety membrane.

##### internal arc withstand of the cubicles

All bitoron-12 switchboards comply with the five criteria relative to internal arc classification (IAC) as defined in IEC recommendation 62271-200. To ensure complete safety of people, any internal overpressure is directed upward the cubicles, towards the arc chamber.

## bitoron 12

### MV switchgear assemblies

630-2500A, 16-25kA 3.3 to 12 kV system

bitoron-12 is an indoor metal-enclosed switchgear designed in conformity with IEC recommendations for the protection of life and property as well as easy of installation, operation and protecting the environment bitoron-12 meet all the following recommendations and specifications:

- IEC 62271-200, 62271-103, 62271-102, 62271-1, 62271-100

Adaptations for compliance with national standards and corporate specifications are available as well. The switching devices are of the metalclad. Bitoron-12's design takes into account three categories of user's requirements:

- reliability necessary for continuity of power supply
- simple installation, operation and maintenance,
- safety of operating personnel

#### Classification for bitoron-12

Service Continuity	LSC2B
Partitioning	PM
Accessibility Code	AFLR
Internal Arc	31.5 kA x 1s

#### ■ Loss of Service Continuity : LSC2B

The main busbar and circuit-breaker/cable compartments are physically and electrically segregated. This is the category for equipment that enables access to the circuit-breaker/cables compartment with the main busbars energized.

#### ■ Partition Metallic: PM

This covers switchgears with continuous metallic partitions intended to be earthed, between opened accessible compartments and live parts of the main circuit. Metallic partitions or metallic parts of them shall be connected to the earthing point of the switchgear.

#### ■ Accessibility Code: AFLR

A: Accessibility type A restricted to authorized personnel only. Distance of indicators are 300 from the panel.

FLR: access from the front (F), from the sides (L) and from the rear (R).

#### ■ Internal Arc: 31.5 kA x 1s

I (Test Current)=31.5 kA

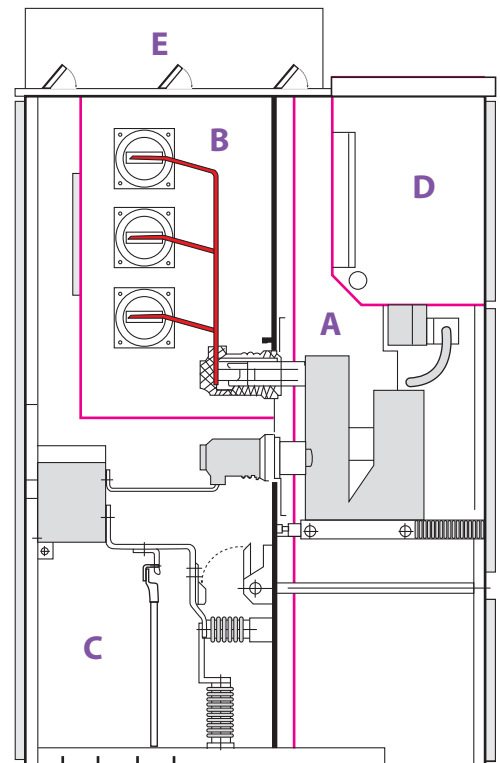
t (Internal arc duration)=1s

In accordance to IEC 62271-200, internal arc classification IAC A FLR 31.5kA x 1s, our bitoron -12 switchgear offers maximum possible personal protection.

The bitoron-12 range is made up of modular units containing fixed and/or withdrawable metal-enclosed SF6 and/or vacuum switchgears :

- SF6 fused switch disconnecter
- SF6 circuit breakers
- Vacuum circuit breakers
- Contactor
- Disconnecter.

bitoron 12 units are used for the medium voltage section in MV/LV transformer substations in public distribution systems and medium voltage consumer or distribution substations upto 12 kV.



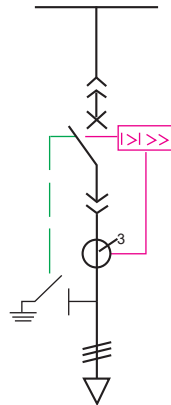
Compartmented Switchgear to IEC 62271-200

- A = Switching Compartment
- B = Busbar Compartment
- C = Cable Connection Compartment
- D = LV Compartment
- E = Arc Chamber (with pressure relief flap)

#### General technical data

bitoron-12			
rated voltage	kV	7.2	12
rated power-frequency withstand voltage, 1mn	kV	20	28
rated lightning impulse withstand voltage	kV	60	75
frequency	Hz	50/60	
rated current of busbars	A	800-1250-2500	
<b>rated current of the</b>			
- switch-fuse unit	A	800-1250	
- SF6 circuit breaker	A	630-1250-2500	
- vacuum circuit breaker	A	630-1250-2500	
<b>short time withstand current of the :</b>			
- switch fuse unit	kA	25	25
- SF6 circuit breaker	kA	20-25	
- vacuum circuit breaker	kA	20-31.5	
<b>rated short-circuit breaking current of the:</b>			
- SF6 circuit breaker	kA	20/25	
- vacuum circuit breaker	kA	25/31.5	
auxiliary voltage	V	DC 24/48/110/220	
		AC 110/220	

## Switchgear selections : bitoron 12W



Protection cubicle with drawout vacuum circuit breaker

### Application

: Protection of feeders, transformers and MV- equipment

### Standard equipment

- withdrawable circuit breaker interlocking between circuit breaker & cradle position makes operation safer;
- current transformers
- 4 racked in/out position contacts
- cable supporting
- door interlock
- low voltage compartment
- trip coil - block of 4 O/C contacts

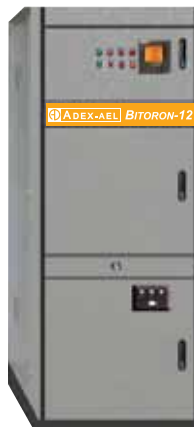
### Options

- voltage detector
- key interlock on load break switch
- key interlock on earthing switch
- no door interlock
- floor plans
- short circuit indicator
- sets of VT and double core CT
- metering (A, V, F, kwh, kVARh etc.)
- shunt trip
- close coil
- block auxiliary contacts on load break switch
- block aux contacts on earthing switch
- motor operation : 24-48-110 V AC/DC
- press button control - distance control
- switching counter - automatic recloser
- under voltage release

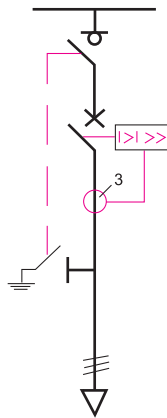
Operating voltages : 24-48-110V AC/DC & 220V AC  
Please consult us for other options and dimensions.

Technical data :				Common characteristics according to IEC 60 056			
rated voltage	kV	7.2	12	short-time withstand current	IK for tk=3s	(kA) rms	Ik=Isc
rated current	A	630-1250-2500	630-1250-2500	rated peak withstand current	Ip	peak(kA)	Ip= 2.5 & 2.6 Ik
short time current (maximum)	kA	25	25	rated short circuit making current		peak(kA)	= 2.5 & 2.6 Isc
short time current duration	sec	1	1	operating times	opening	ms	< 50
operating sequence		0-3mn - CO - 3mn - CO			breaking	ms	< 60
		0-0.3s - CO - 3mn - CO			closing	ms	< 65
		0-0.3s - CO -15s - CO		mechanical endurance	class		M2
cubicle dimensions:					no. of operations with maintenance		25000
width	mm	850	850	electrical endurance	class		E2
depth	mm	1200/1500	1200/1500		no. of operations		25kA
height	mm	2000	2000	capacitive current braking			100
height (with arc chamber)	mm	2300	2300				C1 class
<b>Specifications to be indicated for circuit breaker :</b> <ul style="list-style-type: none"> <li>- short circuit capacity</li> <li>- rated current</li> <li>- rated voltage</li> <li>- capacity to be secured</li> </ul>							

## Switchgear selections: bitoron 12V



BITORON-12



Protection cubicle with SF6  
Isolator & vacuum circuit breaker

**Application :** Protection of feeders, transformers and MV- equipment

### Standard equipment

- three phase load break switch according to IEC 62271-103 SF6 - insulation interlocked earthing switch
- vacuum circuit breaker with integrated protection relay, current transformers & open release
- cable supporting
- door interlock
- low voltage compartment

### Options

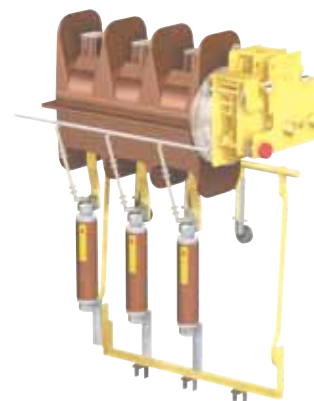
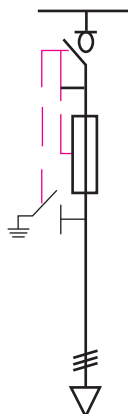
- voltage detector
- key interlock on load break switch
- key interlock on earthing switch
- no door interlock
- floor plans
- short circuit indicator
- sets of VT and double core CT
- metering
- shunt trip
- close release
- block auxiliary contacts on load break switch
- block auxiliary contacts on earthing switch
- motor operation : 24-48-110V AC/DC
- press button control
- distance control
- switching counter
- automatic recloser
- under voltage release

operating voltages : 24-48-110V AC/DC & 220V AC  
Please consult us for other options and dimensions.

Technical data :			
rated voltage	kV	7.2	12
rated current	A	630-1250	630-1250
short time current (maximum)	kA	25	25
short time current duration	sec	1	1
operating sequence	0-3mn - CO - 3mn - CO		
	0-0.3s - CO - 3mn - CO		
	0-0.3s - CO -15s - CO		
cubicle dimensions:			
width	mm	850	850
depth	mm	1200/1500	1200/1500
height	mm	2000	2000
height (with arc chamber)	mm	2300	2300

Common characteristics according to IEC 60 056			
short-time withstand current	IK for tk=3s	(kA) rms	Ik=Isc
rated peak withstand current	Ip	peak(kA)	Ip= 2.5 & 2.6 Ik
rated short circuit making current		peak(kA)	= 2.5 & 2.6 Isc
operating times	opening	ms	< 50
	breaking	ms	< 60
	closing	ms	< 65
mechanical endurance	class		M2
	no. of operations with maintenance		25000
electrical endurance	class		E2
	no. of operations		25kA 100
capacitive current braking			C1 class
<b>Specifications to be indicated for circuit breaker :</b>			
- short circuit capacity			
- rated current			
- rated voltage			
- capacity to be secured			

## Switchgear selections: bitoron 12SF



Transformer protection cubicle  
with SF6 insulated fused load break switch and  
interlocked earth switch

**Application** : Transformer protection and MV- equipment protection

**Standard equipment**

- three phase fused load break switch according to IEC 62271-105
- earthing switch with interlock
- socle for DIN HRC fuses
- cable supporting
- 3pole fuse trip
- door interlock
- low voltage compartment
- switch off mechanism through hitting bolt

**Options**

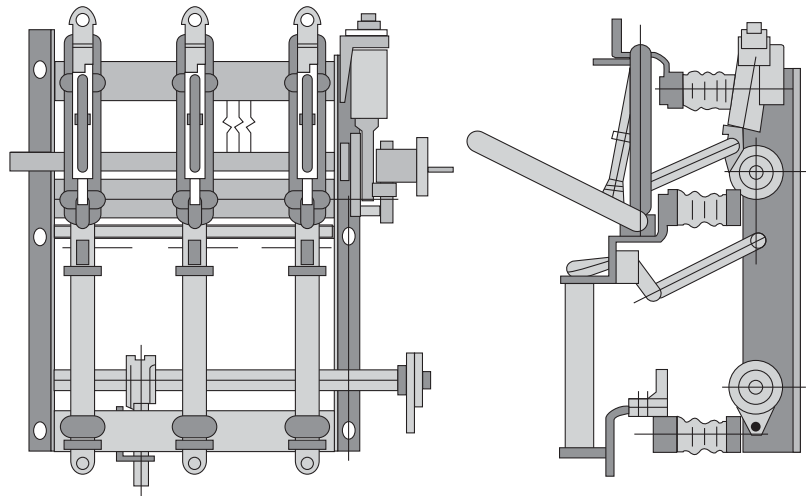
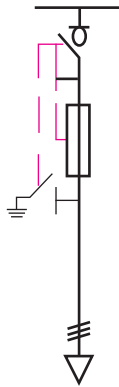
- capacitive voltage detector
- key interlock on load break switch
- key interlock on earthing switch
- floor plans
- short circuit indicator
- DIN HRC fuses and/or spare fuses
- metering
- shunt trip
- close release
- block auxiliary contacts on load break switch
- block auxiliary contacts on earthing switch
- motor operation : 24-48-110 V AC/DC
- press button control
- distance control
- sets of VT and/or CT

operating voltages : 24-48-110 V AC/DC & 220V AC  
Please consult us for other options and dimensions.

Technical data :			
rated voltage	kV	7.2	12
rated current	A	800-1250	800-1250
short time current	kA	25	25
short time current duration	sec	1	1
cubicle dimensions:			
width	mm	750	750
depth	mm	1050/1475	1050/1475
height	mm	2000	2000
height (with arc chamber)	mm	2300	2300

Fuse selection table					
kVA/kV	5	6	10	11	12
100	25A	20A	16A	10A	10A
125	31.5A	25A	16A	16A	16A
160	40A	31.5A	20A	16A	16A
200	50A	40A	25A	20A	20A
250	63A	50A	31.5A	25A	25A
315	75A	63A	40A	31.5A	31.5A
400	100A	75A	50A	40A	40A
500	100A	100A	63A	50A	50A
630			75A	63A	63A
800			100A	75A	75A
1000			100A	100A	100A

## Switchgear selections: bitoron 12AF



Transformer protection cubicle  
with Air insulated type fused load break  
switch and interlocked earth switch

**Application** : Transformer protection and MV- equipment protection

**Standard equipment**

- three phase fused load break switch according to IEC 62271-105
- interlock earthing switch
- socle for DIN HRC fuses
- cable supporting
- 3 pole fuse trip
- door interlock
- low voltage compartment
- switch off mechanism through hitting bolt

**Options**

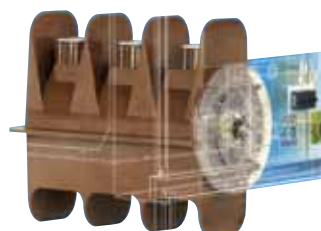
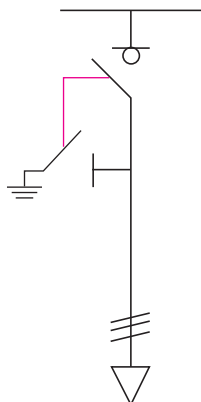
- capacitive voltage detector
- key interlock on load break switch
- key interlock on earthing switch
- floor plans
- short circuit indicator
- DIN HRC fuses and/or spare fuses
- metering
- block auxiliary contacts on load break switch
- block auxiliary contacts on earthing switch
- sets of VT and/or CT

operating voltages : 24-48-110 V AC/DC & 220V AC  
Please consult us for other options and dimensions.

Technical data :			
rated voltage	kV	7.2	12
rated current	A	800-1250	800-1250
short time current	kA	25	25
short time current duration	sec	1	1
cubicle dimensions:			
width	mm	850	850
depth	mm	1200/1500	1200/1500
height	mm	2000	2000
height (with arc chamber)	mm	2300	2300

Fuse selection table					
kVA/kV	5	6	10	11	12
100	25A	20A	16A	10A	10A
125	31.5A	25A	16A	16A	16A
160	40A	31.5A	20A	16A	16A
200	50A	40A	25A	20A	20A
250	63A	50A	31.5A	25A	25A
315	75A	63A	40A	31.5A	31.5A
400	100A	75A	50A	40A	40A
500	100A	100A	63A	50A	50A
630			75A	63A	63A
800			100A	75A	75A
1000			100A	100A	100A

## Switchgear selections: **bitoron 12A**



Incoming cubicle with load break switch and interlocked earth switch

### Application

: Incoming cable connection, isolation etc

### Standard equipment

- three phase load break switch according to IEC 62271-103, SF6 - insulation
- interlocked earthing switch with making capacity upto 63kA
- cable supporting
  - door interlock
- low voltage compartment

### Options

- capacitive voltage detector
- key interlock on load break switch
- key interlock on earthing switch
- no door interlock
- floor plans
- short circuit indicator
- block auxiliary contacts on load break switch
- block auxiliary contacts on earthing switch
- press button control
- distance control

Please consult us for other options and dimensions.

<b>Technical data :</b>			
rated voltage	kV	7.2	12
rated current	A	800-1250	800-1250
short time current	kA	25	25
short time current duration	sec	1	1
cubicle dimensions :			
width	mm	850	850
depth	mm	1200/1500	1200/1500
height	mm	2000	2000
height (with arc chamber)	mm	2300	2300



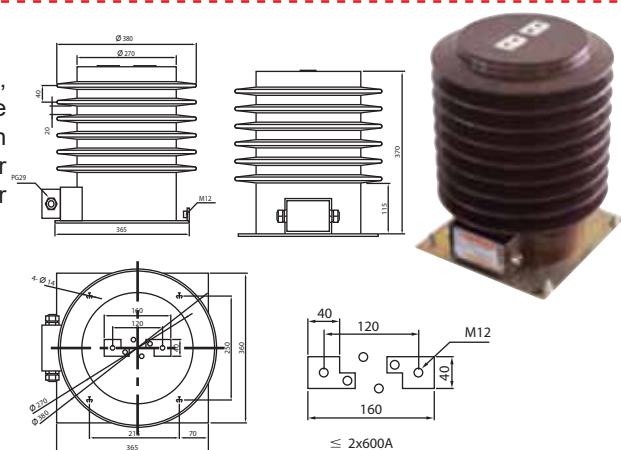
## Outdoor Current Transformer

### 36kV Single phase epoxy resin type

Epoxy resin casting insulation and fully enclosed support construction, encloses the primary & secondary windings and annular core in the epoxy resin casting body. The product has large periphery insulation creepage distance, withstanding dirtiness and dampness. Be suitable for measuring electric capacity, current and protective relaying in the power system of 36kV (up to 40.5 kV).

**Technical Data:**

- > Rated insulation level : 36/70/170 kV
- > Rated frequency : 50/60Hz
- > Installation site : Outdoor
- > Technical standard : IEC 60044-2, (IEC 61869-1&3)



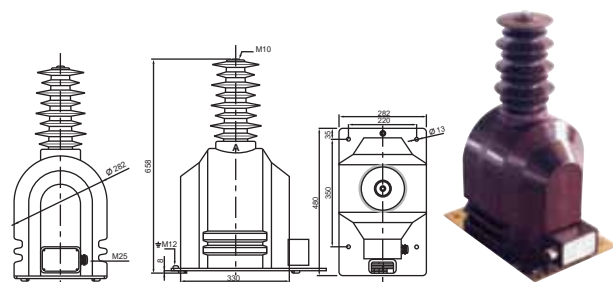
### 36kV Single phase epoxy resin type

Epoxy resin material casting and single pole insulated voltage transformer, is widely used for measuring voltage, electric energy and protective relaying in the electric system with the frequency 50Hz/60Hz and highest voltage for equipment 36 kV (up to ~40.5 kV).

The iron core adopts advanced cold-rolled silicon steel sheet. High voltage outgoing line of primary winding is fetched out from top of the product; outgoing line of secondary winding is fetched out from transverse side of the product.

**Technical Data:**

- > Installation site : Outdoor
- > Burden power factor :  $\cos \phi = 0.8$  (lagging)
- > Rated frequency : 50/60Hz
- > Technical standard : IEC 60044-2, (IEC 61869-1&3)



## Indoor Current Transformer

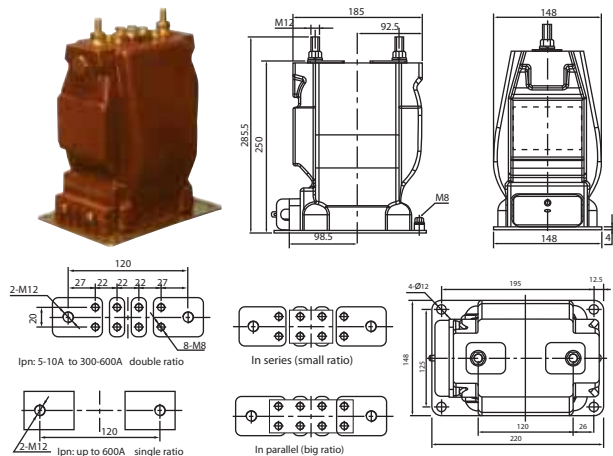
### 12kV Single phase epoxy resin type

Epoxy resin casting insulation and fully enclosed support construction, encloses primary & secondary windings and annular core in the epoxy resin casting body.

The product has two secondary windings (one measuring winding and one protective winding). It is widely used for measuring current, electric energy and protective relaying in the power system with the rated frequency 50/60Hz and highest voltage for equipment 7.2/12kV.

**Technical Data:**

- > Rated Installation level : 12/28/75kV
- > Rated frequency : 50/60Hz
- > Installation site : Indoor
- > Technical standard : IEC 60044-1, (IEC 61869-1&2)



## Indoor Voltage Transformer

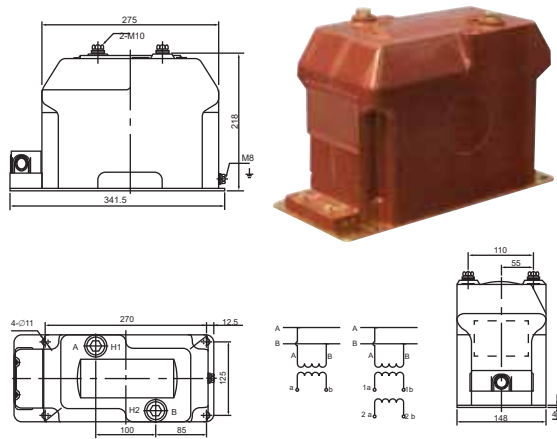
### 12kV Single phase epoxy resin type

Epoxy resin casting and double pole insulated fully enclosed construction, is used indoor for measuring voltage, electric energy and protective relaying in the electric system with the frequency 50/60Hz and highest voltage for equipment 12kV.

The product has the feature of high reliability, low magnetism of core, large creepage distance of external insulation and maintenance free etc.

**Technical Data:**

- > Installation site : Indoor
- > Rated frequency : 50/60Hz
- > Load power factor :  $\cos \phi = 0.8$  (lagging)
- > Technical standard accords with : IEC 60044-2, (IEC 61869-1&3)



Remarks: Upon request we are glad to offer transformers according to other standards or with non-standard technical specifications.

## Protection, control and monitoring

A complete range of digital & microprocessor based protection and monitoring units are designed for the operation of machines and electrical distribution networks of industrial installations and utility substations for all levels of voltage. It consists of a complete range but with simple and reliable solutions, suited to the following applications:

- Protection of substations (incomers and feeders)
- Protection of transformers
- Protection of motors
- Protection of busbars.



### Functions

#### Protection

	ANSI code
Phase overcurrent	50/51
Earth fault, sensitive earth fault	50N/51N
Breaker failure	50BF
Negative sequence/ unbalance	46
Directional phase overcurrent	67
Directional earth fault	67N/67NC
Active overpower	32P
Thermal overload	49RMS
Phase undercurrent	37
Locked rotor, excessive starting time	48/51LR
Starts per hour	66
Ruminant undervoltage	27R
Phase-to-phase undervoltage	27
Phase-to-neutral undervoltage	27S
Phase-to-phase overvoltage	59
Neutral voltage displacement	59N
Negative sequence overvoltage	47
Recloser (4 cycles)	79
Thermostat / Buchholz	
Temperature monitoring	38/49T

#### Network and machine diagnosis

Tripping current  $I_1, I_2, I_3, I_0$   
 Tripping context  
 Unbalance ratio / negative sequence current  $I_i$   
 Phase angle  $\phi_0, \phi_1, \phi_2, \phi_3$   
 Disturbance recording  
 Thermal capacity used  
 Waiting time after overload tripping  
 Running hours counter / operating time  
 Starting current and time  
 start inhibit time delay, number of starts before inhibition

#### Switchgear diagnosis

Cumulative breaking current  
 Trip circuit supervision  
 Number of operations, operating time, charging time  
 CT/VT supervision  
 Control and monitoring  
 Circuit breaker / contactor control (2)  
 Logic discrimination

#### Additional modules

8 temperature sensor outputs - MET 148 module  
 1 low level analog output - MSA141 module  
 Logic inputs and outputs - MES108 module (4-wire) module  
 RS485 interface - ACE949-2 (2-wire) or ACE959 (4 wire) module.

#### Phase overcurrent

ANSI code : 50/51

phase overcurrent protection is three-pole. It picks-up when one, two or three of the currents reaches the set point. It is time delayed.

#### Earth fault

ANSI code : 50N/51N

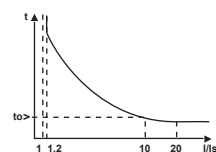
It picks-up when earth fault current reaches the set point. It is time delayed.

The time delay may be definite (definite, DT) or IDMT (standard inverse, SIT very inverse VIT, extremely inverse EIT, ultra inverse UTT, RI).

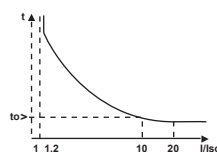
the protection comprises two units ;  
 -IDMT or definite time low set unit,  
 -Instantaneous or time-delayed, definite time high set unit

#### IDMT protection

IDMT protection operates in according with IEC 60255-3 and BS 142 standards



IDMT protection principle

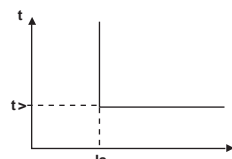


IDMT protection principle

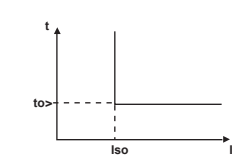
#### Definite time protection

$I_s$  is in the set point expressed in A and  $t_{>}$  is the protection time delay

$I_{so}$  is the set point expressed in A and  $t_{>}$  is the protection time delay



Definite time protection principle



Definite time protection principle

All other protections , metering & controls like differential transformer protections (87), distance (21) relay, temperatures alarm & trip, DC failure etc are available on request

## Multifunction Energy meters for billing



CIRWATT is a family of multi-function energy meters capable of satisfying the most demanding requirements of energy measurement systems. Other features to highlight are quality, accuracy, security and reliability.

Including new technology in its measuring circuitry has allowed CIRCUTOR to develop highly responsive new equipment and to include additional functions for the control and management of measuring.

The CIRWATT family offers a complete range of electrical energy meters adapted to its type of applications.

### TYPES

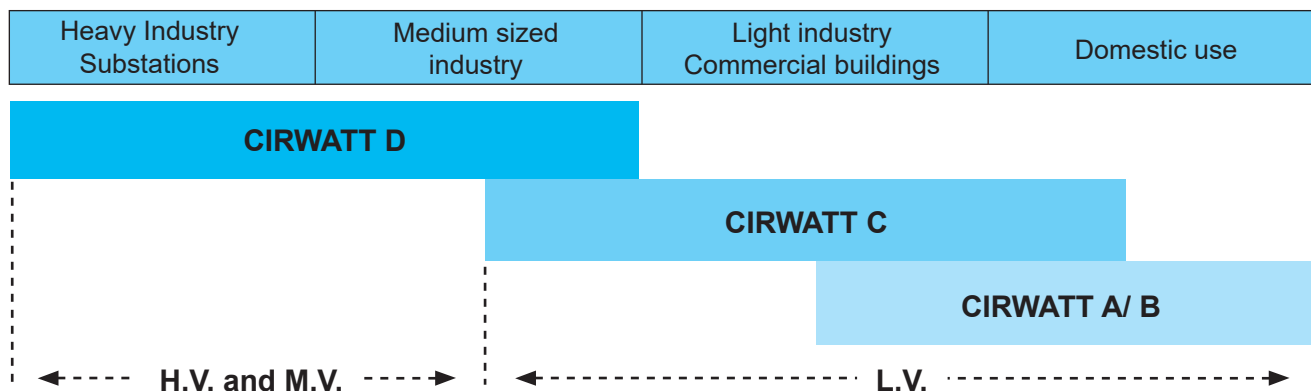
High accuracy, 4 quadrant measurement and advanced programming plus flexible communications for the most demanding of requirements. The best solution for large consumers: generation, substations and heavy industry.

A balance between cost and benefits without compromising maximum quality. Ideal, both for industry and commercial buildings.

Latest generation domestic use energy meters. The last word in measurement, high performance and ease of reading. Anti-fraud protection included.



### APPLICATION



### APPLICATIONS

The meter can be read remotely and several readings from different meters may be performed at the same time. This allows different CIRWATT energy meters to be connected via RS-485 and data to be received via a PC or from a central data system. Data may also be received via a Modem using an RS-485 converter to Ethernet TCP/IP, etc.

#### Remote reading



## Multifunction Energy meters for billing



CIRWATT D

Technical features	Heavy industry - CIRWATT D		
	402-D ( /5/1 A)	405-D ( /5/1 A)	410-T5-D ( /5, /1 A)
Type	402-MTxA-xxD	405-MTxA-xxD 405-NTxA-xxD 405-QTxA-xxD	410-MTxA-xxD 410-NTxA-xxD 410-QTxA-xxD
Quadrants	4	4	4
Active energy accuracy	0.2S	0,5S	1
Reactive energy accuracy	0.5	1	2
Rated voltages	M 3 x 63.5/110 V A.C.	M 3 x 63.5/110 V A.C. N 3 x 127/220 V A.C. Q 3 x 230/400 V A.C.	M 3 x 63,5/110 V A.C. N 3 x 127/220 V A.C. Q 3 x 230/400 V A.C.
In (I b)	/5 A /1 A	/5 A /1 A	/5 A /1 A
I <sub>max</sub>	10 A (2 A)	10 A (2 A)	10 A (2 A) Contracts
3	3	3	
Tariffs	9	9	9
Profiles	10	10	10
Regulated market	Yes	Yes	Yes
Free market	Yes	Yes	Yes
Consumers	Type 1, 2, 3, 4	Type 2, 3, 4	Type 3, 4
Optical port	Yes	Yes	Yes
Port 1	RS-232	RS-232	RS-232
Port 2	RS-232 or RS-485	RS-232 or RS-485	RS-232 or RS-485
Hourly load curve	213 days	213 days	213 days
2nd programmable curve	5 120 records	5 120 records	5 120 records
Nr. of bill summaries	64	64	64
Nr. of events	512	512	512



CIRWATT C

	Medium sized industry		Domestic use	
	CIRWATT C		CIRWATT A/B	
	410-T5-C ( /5, /1 A)	410-D1-C (Direct)	210-A (Direct)	210-B (Direct)
Type	410-UTxA-xxC 410-UTxA-xxC	410-UD1A-xxC 410-UD1A-xxC	210-A	210-B
Quadrants	2	2	2	2
Active energy accuracy	1	1	1	1
Reactive energy accuracy	2	2	-	-
Rated voltages	Multi-range 3x57.7/100 V up to 3x230/400 V A.C.	Multi-range 3 x 57.7/100 V up to 3 x 230/400 V A.C.	127 V or 230 V A.C.	127 V or 230 V A.C.
In (I b)	5 A	10 A	10 A	10 A
I <sub>max</sub>	10 A	100 A	60 / 120 A	60 / 120 A
Contracts	2	2	1	1
Tariffs	9	9	2	4
Profiles	10	10	4	4
Regulated market	Yes	Yes	Yes	Yes
Free market	Yes	Yes	Yes	Yes
Consumers	Type 4	Type 4	Type 5	Type 5
Optical port	Yes	Yes	Yes	Yes
Port 1	RS-232 or RS-485	RS-232 or RS-485	-	RS-232
Port 2	No	No	-	-
Hourly load curve	213 days	213 days	-	-
2nd programmable curve	Optional	Optional	-	365 days (30 min)
Nr. of bill summaries	64	64	-	16
Nr. of events	512	512	64	64



CIRWATT A/B

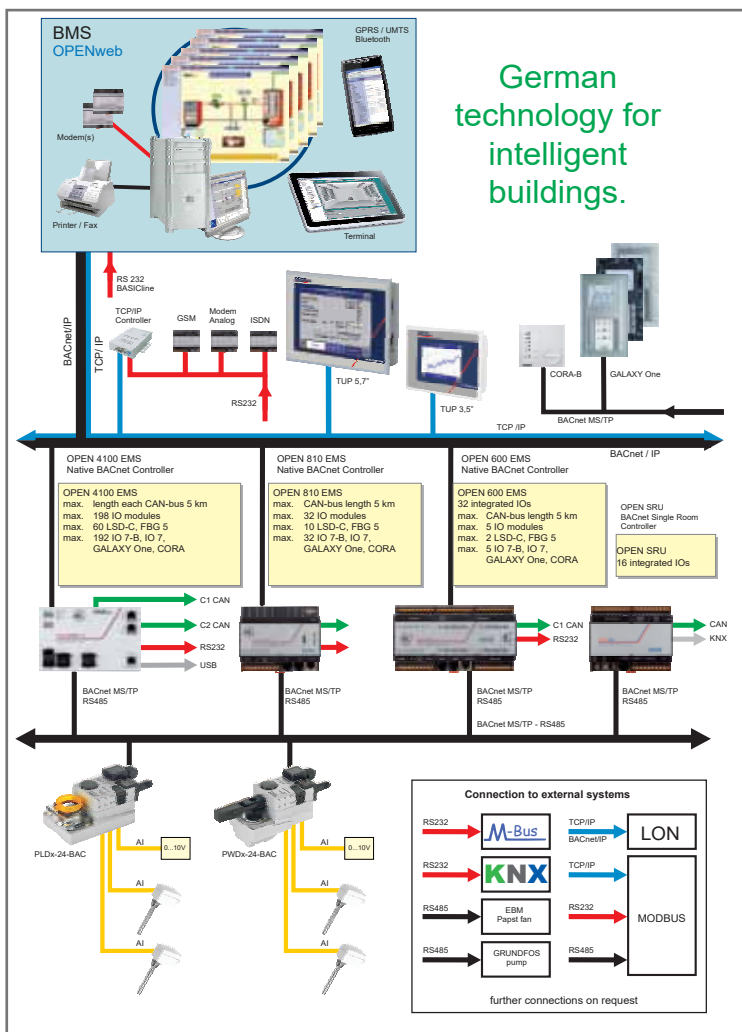
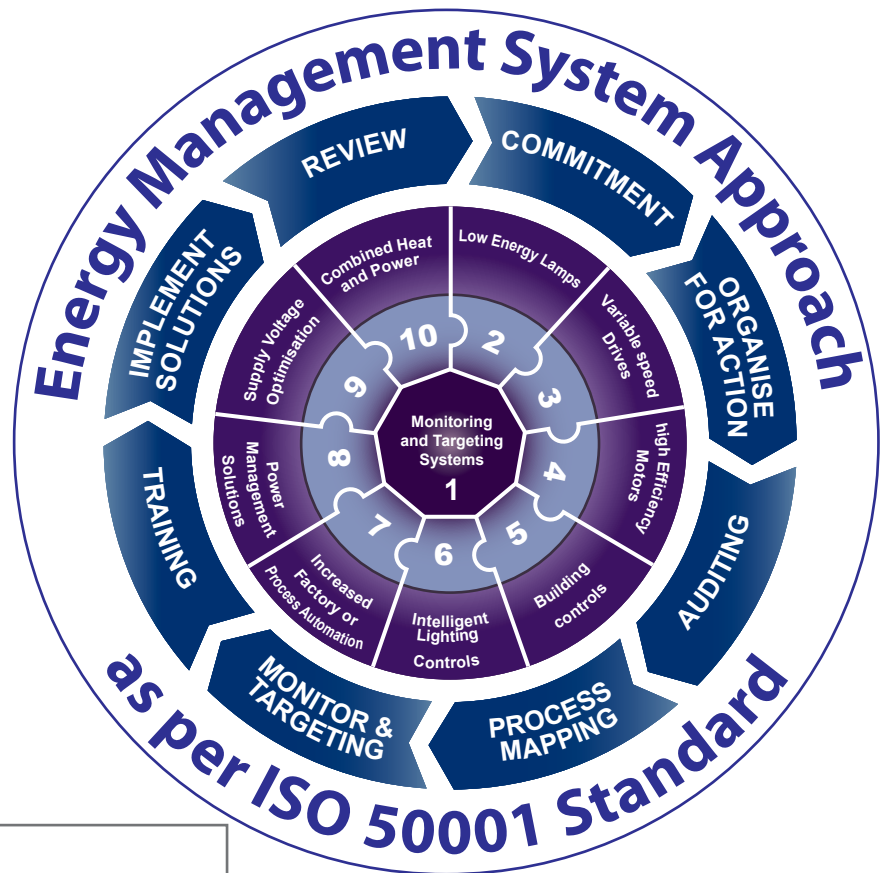


# Protection, automation, metering & measurement-PAMM

is responsible for e<sup>3</sup> (electrical energy efficiency)

A complete system solution for Metering & Measurement:-

1. The meter can be read remotely & data can be received via a pc or from a central data system.
2. Prepayment solution using a recharging card.
3. Readings of different types of consumption at the same time (electricity, water & gas).
4. Power control with programmable CUTOFF RELAY & Communications with PLC is possible in Multifunction electronic energy meters.



Complete solution for:-

- > HVAC control
- > lighting control
- > parking management
- > high level integration (HLI)

Building Management system (BMS) for:-

- > commercial building
- > hotel
- > hospital
- > shopping mall
- > educational Institute

Home automation:-

- > anti theft control
- > automatic gate control
- > access control
- > temperature control
- > lighting control

all are via GSM/GPRS mobile network

## SM system analyzers

### Introduction

SM Series analyzers are highly accurate measuring stations which control and supervise the main electrical parameters in three or four wire, single-phase and/or three-phase systems (in L.V. or M.V.)

Measuring is in true effective value (TRMS), using three voltage inputs and neutral with external current transformer connection shaving  $f/5A$  or  $f/1A$  secondaries (current inputs are insulated in ITF types).

In addition to displaying and transmitting all measured or calculated electrical parameters through communications, SM analyzers include a meter function being able to store the systems consumed and generated energy within the SQMs internal memory without the need of an auxiliary power supply.



Panel mounted equipment

SM system analyzers may include an hourly time slots, according to type, using a preset program. This system obtains a kWh total for each of the preset tariffs. These analyzers, like the single tariff analyzers, record active, inductive reactive, capacitive reactive and apparent power for each of the preset periods.

The whole series has a built in power demand meter in which calculates integrated demand in a preset period. This sliding integration may be carried out for a selected parameter: three-phase current, three-phase active power, three-phase apparent power or current per phase.

The expandable or modular equipment may be supplied with additional functions from a selected expansion card or from the type of SM selected. They have the option for analogue I/O (multi-converter function), digital I/O (central alarm function or impulse generation / kWh) which may be linked to any measured or calculated electrical parameter.

Due to the large volume of information from each of the SM system analyzers, the equipment has communication output. Connection topology and system protocols are varied (RS-232, RS-485, RTB modem, GSM modem, Radio (Modbus RTU, Profi bus DP and Metasys N2) and Ethernet (Web or XML)).



DIN rail mounted equipment

## SM system analyzers

### Three-phase system analyzers

	PANEL					DIN RAIL			
	96 x 96 mm					3 modules	8 modules		
	SM-96SP	SM-NRG96	SM-96	SM-144	SMk	SM-MINI	SM-BC3	SM-BD	SM-BDM
MEASURING FEATURES	-  +					-  +			
Single-phase	•								
Phase-phase voltage		•	•	•	•	•	•	•	•
True effective value (TRMS)	•	•	•	•	•	•	•	•	•
Quadrants	2	4	2	2	4	4	2	4	4
Power demand (Pd)		•	•	•	•	•	•	•	•
Neutral current		•	•	•	•	•	•	•	•
Leakage current				•					
THD Measuring (V , A)	•	•	•	•	•	•	•	•	•
Harmonic decomposition		•	•	•	•	•	•	•	•
Energy meter (kWh, kvarh C, kvarh L)	•	•	•	•	•	•	•	•	•
Multi-tariff					•			•	
Analogue inputs (0/4...20mA)				•					
Analogue outputs (0/4...20mA)				•	•			•	•
Digital inputs				•					
Digital outputs	•	•	•	•	•	•	•	•	•
ASSEMBLY FEATURES									
Display	LCD	LCD	LED	LED	LED/LCD	LCD	LCD	LCD	LCD
Screen saver		•	•	•		•	•		•
Password protection		•	•	•		•	•		•
COMMUNICATIONS FEATURES									
RS-232			•	•	•			•	•
RS-485	•	•	•	•	•	•	•	•	•
Ethernet			•	•					
COMMUNICATIONS PROTOCOL									
Modbus RTU	•	•	•	•	•	•	•	•	•
Profibus DP				•					
Johnson Controls			•	•	•			•	
XML (Ethernet types only)				•					

Measured or calculated, according to type

After 5 years of continuous Research, Development and Testing, **ADEX R & D team** has developed and validated quality performance of these range of products.



## ADEX ENGINEERING LTD.

**Corporate Office:**

374 Tejgaon I/A (4<sup>th</sup> & 5<sup>th</sup> Floor)  
Dhaka-1208, Bangladesh.  
Tel: +88-02 - 55029737, 55029738  
E-mail: [info@adexbd.com](mailto:info@adexbd.com)

**Chattogram Office:**

bti Kanchan, Flat - A2, House - 25  
Road - 2, O.R Nizam Road R/A  
GEC Circle, Chattogram – 4000  
Phone: +88 01713 436281  
E-mail: [adex\\_ctg@adexbd.com](mailto:adex_ctg@adexbd.com)

**Sylhet Office:**

Natun Bridge, Shayestagonj  
Station Road, Hobigonj  
Mobile: +88 01708 499990  
E-mail: [adex\\_sylhet@adexbd.com](mailto:adex_sylhet@adexbd.com)

**Khulna Office:**

Mirza Cottage  
119 Sonadanga Thana Road  
Mojid Saroni, Sonadanga, Khulna  
Mobile: +88 01709 632890  
E-mail: [adex\\_khulna@adexbd.com](mailto:adex_khulna@adexbd.com)

**Bogura Office:**

Rimu & Tanvir Monjil (1<sup>st</sup> Floor)  
House - 2, Road - 1, Masjid Line  
Upashahor Bazar, Bogura  
Mobile: +88 01729 212188  
E-mail: [adex\\_bogura@adexbd.com](mailto:adex_bogura@adexbd.com)

**Cumilla Office:**

32/ka Tri-Ratno (3<sup>rd</sup> Floor)  
Islampur, Fousdari Chowmohoni  
Judge Court Road, Cumilla  
Mobile: +88 01708 499990  
E-mail: [adex\\_comilla@adexbd.com](mailto:adex_comilla@adexbd.com)

**Factory:**

**Unit-1:** Holding No. 3060/3798  
West Dogri, Bhawal Mirzapur  
**Unit-2:** J.L No. 6, Mouja: Dogri  
Union: Mirzapur, Gazipur, Bangladesh  
E-mail: [ael\\_works@adexbd.com](mailto:ael_works@adexbd.com)