

State of the art Manufacturing Facilities



Haridwar, Noida Ph-I
& Noida Ph-II Plant



AHA-Series



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Air Circuit Breakers

CS Air Circuit Breakers - AHA Series

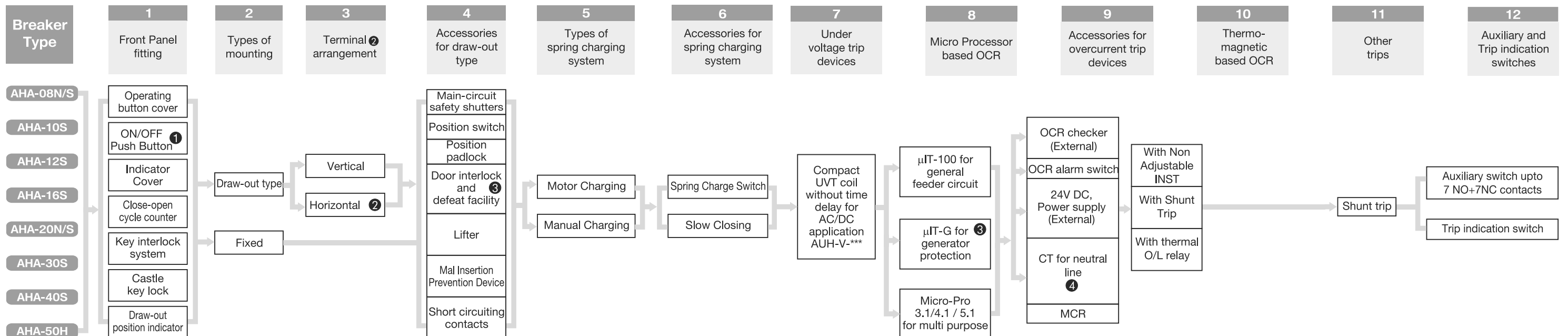
Salient Features

- Available in 3 or 4 pole for entire range
- Only 3 frame sizes in the entire range, 800A to 5000A, resulting in maximum interchangeability and minimum inventory of spares.
- High value of service breaking capacity, 50kA to 85kA, and making capacity, 105kA to 187kA at 415V AC.
- Total breaking time less than 30ms (including arcing time of less than 10ms) & closing time of 40ms.
- Highest values of mechanical and electrical endurance due to robust mechanism design and special sintered metal contacts.
- Neutral pole (in 4 pole) closes early and opens later to prevent transient over voltages in loads connected between live and neutral lines.
- Highest degree of system protection and coordination due to the use of microprocessor based / Intelligent protection releases.
 - μ IT- Standard release
 - MicroPro - multi purpose release with RS485 port & Zone Selectivity feature.
- Most simple to operate and maintain.
- High dielectric strength even in hot and humid conditions due to use of class 'B' and 'F' insulating materials.
- Fibre glass safety shutter for safety of operating personnel.
- Tested for most onerous environmental conditions and approved for marine duty application by Indian Registrar of Shipping.

Technical Specifications

Ampere Frame as per IEC60947-2	AHA 08-20	AHA 08-20	AHA 30	AHA 40	AHA 50
Rated Current (A)	800 & 2000	800, 1000, 1250, 1600, 2000	3200	4000	5000
Nos. of Poles	3/4	3/4	3/4	3/4	3/4
Type	N	S	S	S	H
Rated Ultimate breaking capacity (kA rms) at 415V AC	50kA	65kA	65kA	65kA	85kA
Rated Service breaking capacity (kA rms) at 415 V AC	50kA	65kA	65kA	65kA	85kA
Rated Short time withstand capacity (kA rms) for 1 Sec	50kA	65kA	65kA	65kA	85kA
Rated Making Capacity (kA peak)	105kA	143kA	143kA	143kA	187kA
Total breaking/ closing time (m.sec.)	30/40	30/40	30/40	30/40	30/40
Configuration	Manual Fixed	•	•	-	-
	Electrical Fixed	•	•	-	-
	Manual Drawout	•	•	•	•
	Electrical Drawout	•	•	•	•

* Rated Service breaking capacity (Ics) & rated ultimate breaking capacity (Icu) are same at 415V. For other voltages please contact us. Higher Breaking Capacity ACB's available on request.



OPTIONAL FEATURES AVAILABLE ON REQUEST : ① With Padlock facility ② Horizontal Terminal upto AHA-20S and Vertical Terminal for AHA-30S and above are available as Standard. Additional adaptors for changing to vertical are available as accessories. ③ On request.

④ Required for earth fault protection externally mounted for 3 pole

Overcurrent Release

- Thermal Magnetic Trip Device: **Type TM**
- Microprocessor Based Overcurrent Trip Device: **Type μ IT-100 & μ IT-G**
- Intelligent Release: **Type MicroPro 3.1, 4.1 & 5.1**

Thermal - Magnetic Trip Device TM

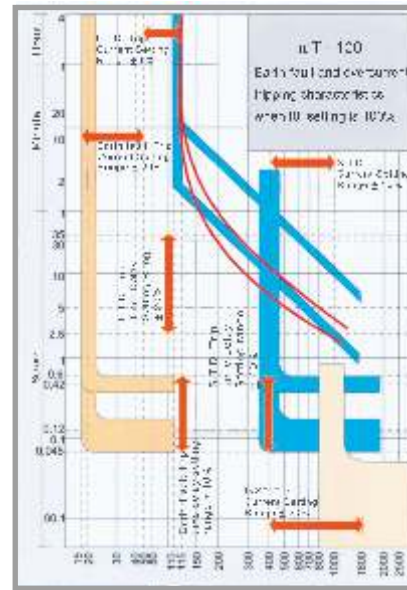
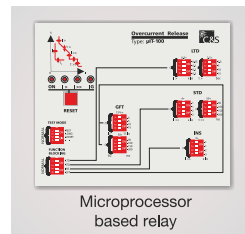
- Direct acting electromagnetic instantaneous trip device with fixed factory set release, settings 3 - 50 kA
- Adjustable overload settings 80% - 120%.
- Provision for remote tripping / electrical reset as optional features with overload relay.

Microprocessor Based Overcurrent Trip Device: Type μ IT-100 & μ IT-G

μ IT is a true RMS sensing overcurrent trip device, requiring no external supply for its basic function. It is available in two types, i.e., μ IT-100 for industrial application and μ IT-G for generator protection.

- Error free and user friendly setting of current and time delay.
- Provides highest degree of system protection co-ordination.
- Self powered by the built in current transformer.
- No mal-operation due to external disturbances.
- Built in operation check function.
- Visual fault discrimination by LEDs.
- Three phase and earth fault in one single compact unit.
- Self monitoring of trip unit with blinking indication.
- Function Blocking facility provided.
- Certified by ERTL for

- Damp Heat Test	IS 9000 - PG4
- Dry Heat Test	IS 9000 - PG3
- Vibration Test	IEC 255 - 4
- Radio Frequency	
- Interference (RFI)	IEC 801 - 3
- Electrostatic Discharge (ESD)	IEC 801 - 2
- Electrical Fast Transient (EFT)	IEC 801 - 4
- Surge	IEC 801 - 5
- Impulse	IEC 255 - 4



Micropro 3.1

C&S introduces a new release Micropro 3.1 in its range of microprocessor based ACB releases. Micropro 3.1 has been specifically designed with LSIG protective functions in a compact unit offering an economical solution for basic applications areas.

Types of protection functions

- Overload Protection
Pick up- 0.4 to 1.1 In and OFF
Delay- 2.5 to 35 Sec
- Short-circuit Protection
Pick up- 1.5 to 9.0Ir
Delay- 50 to 800 msec
- Instantaneous Protection - 3.0 to 10 In and OFF
- Earth fault Protection
Pick up- 0.2 to 0.9In and OFF
Delay- 50 to 800 msec
- Features
Individual Fault indication LED's
Tripping characteristics



Intelligent Release: Type MicroPro

MicroPro is a 3 Phase overcurrent release with in built inverse characteristic for overcurrent and definite tripping characteristic for short circuit and earth fault currents. Inverse characteristic can be selected from the wide range of available settings. The settings can be selected by selecting the positions of the rotary switches / Dip Switches on the front . The new settings become effective as soon as they are changed when the release is powered by the CTs. The microcontroller in the release ensures positive tripping of the MHT coil under any undesired conditions of overload ,short circuit or earth fault by giving the trip command as per the selected set of characteristics. There are Red LEDs in the front for each type of fault indication and on occurrence of overload condition, O/L LED flashes once, every second before the tripping command is issued. If the Overcurrent condition cease to exist before the release trips, LED flashing also stops. A thermal memory is incorporated in the release and when the Overcurrent condition occurs again, it takes into account the earlier overcurrent effect before giving the trip command.

There are three version in MicroPro series

- MicroPro 3.1
- MicroPro 4.1
- MicroPro 5.1



MicroPro 4.1

Protection thresholds and delays are set using the adjustment dials. The running load is displayed in amperes.

Type of Protection

- Overload protection
- Short Circuit current protection
- Instantaneous current protection
- Ground Fault Protection
- Neutral Protection

Other Features

- Zone Selectivity
- Ampere Meter
- Communication: RS 485, Modbus protocol
- LCD display
- LCD display and fault LED retention in case of power failure

MicroPro 5.1

Protection thresholds and delays are set using the keypad. The selected value are momentarily displayed in amperes.

Type of Protection

- Overload protection
- Short Circuit current protection
- Instantaneous current protection
- Ground Fault Protection
- Neutral Protection

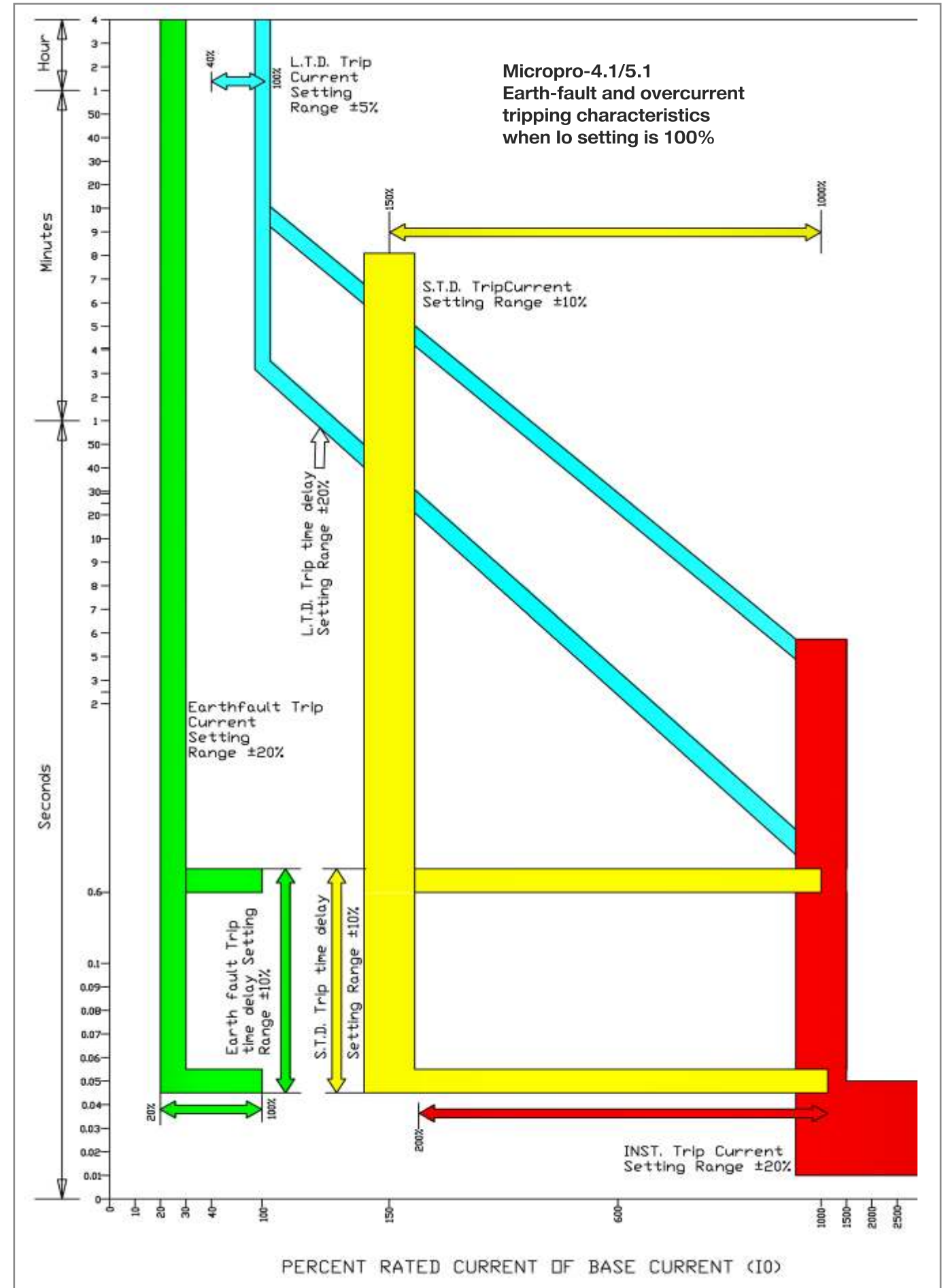
Other Features

- Zone Selectivity
- Ampere Meter
- Communication: RS 485, Modbus protocol
- LCD display
- LCD display and fault LED retention in case of power failure



Micropro with communication		
Type	4.1	5.1
Over Load Protection		
Pick up	0.4-1.0 I _n with OFF in 10 steps: 0.4, 0.5, 0.6, 0.7, 0.8, 0.85, 0.9, 0.95, 1, OFF	0.4-1.0 I _n with OFF in steps of 0.01
Delay	2.5 to 25 sec at 6 Ir in 10 steps: 2.5, 5, 7.5, 10, 12.5, 15, 17.5, 20, 22.5, 25 sec	2.5 to 25 sec at 6 Ir in steps of 0.5 Sec
Short Circuit		
Pick up	1.5-10 I _r in 10 steps: 1.5, 2, 2.5, 3, 4, 5, 6, 8, 9, 10	1.5-10 I _r in steps of 0.1 1.5, 2, 2.5, 3, 4, 5, 6, 8, 9, 10
Delay	Inst - 600 msec in 7 steps: Inst. 0.1, 0.2, 0.3, 0.4, 0.5, 0.6	Inst 100 to 600 msec in steps of 50 msec
Instantaneous		
	2.0-12 I _n with OFF in 10 steps: 2, 3, 4, 5, 6, 8, 9, 10, 12, OFF	2.0-12 I _r in with OFF in steps of 0.5
Earth Fault		
Pick up	0.2-1.0 I _n with OFF in 10 steps: 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, OFF	0.2-1.0 I _n with OFF in 10 steps of 0.01
Delay	Inst-600 msec in 7 steps: Inst. 0.1, 0.2, 0.3, 0.4, 0.5, 0.6	Inst 100 to 600 msec in steps of 50 msec
N Protection		
Pick up	OFF 25%, 50%, 100% I _n	OFF 25%, 50%, 75%, 100% I _n
Cooling time contact	30 min	30, 45, 60 min
Indication, Monitoring & Control		
Power ON LED	Available	Available
Over Load Trip LED	Available	Available
Short Circuit Trip LED	Available	Available
Inst Trip LED	Available	Available
Earth Fault Trip LED	Available	Available
Neutral Protection LED	Available	Available
Remote Alarm/Trip Indication	Through 7 programmable relays (optional)	Through 7 programmable relays (optional)
Trip History	Fault type, current and time for last 16 trip events	Fault type, current and time for last 16 trip events
Zone selectivity	Available	Available
Settings Adjustment by	Knob	Keypad
LCD Display	YES	YES
Measurements		
Load current	Phase, N & E	Phase, N & E
Fault current	OL, SC, Inst, EF & N	OL, SC, Inst, EF & N
Communication		
To remote	All parameters through communication module	All parameters through communication module
Connectivity & protocol	To SCADA system through MODBUS	To SCADA system through MODBUS

- INDICATIONS**
- Inputs** : From The CTs with 200mA rated output one for each phase and one for Neutral current measurement.
 - Output** : Tripping signal for MHT coil in the ACB
 - Red Led** : indications for different types of fault/tripping such as Over load, Short Ckt, Earth Fault, Instantaneous, Neutral.
 - Green Led** : Power On and Healthy voltage to trip MHT
 - LCD display** : For displaying Currents, and faults/relay status



Communication Module

Communication module is an accessory of MicroPro Relay and is an optional module for the customer who needs additional features. The module gets connected to Micropro by two wires through general protocol & through 485 port, can be connected to Master PC. The communication module acts as a master for the MicroPro relay and as a slave to the supervisor PC.

The module can accept 9 different Digital inputs and has two relays inside whose contacts are brought out on the terminals which are D/O types.

There are 3 LEDs on the front indicating status of -

1. Communication between Micro Pro and Comm. Module
2. Communication between Comm. Module and Master PC.
3. Operation of the relay

The module has built in Power supply card. DC supply for the relay can be obtained from this module.



Operation

When connected to MicroPro and Master PC, Communication Module:

- Can read the settings of the MicroPro .
- Can change the settings of the MicroPro as dictated by Master PC.
- Can record following data related to last 16 faults
 - a) The type of fault
 - b) In which phase the fault has occurred
 - c) At, which instant the fault occurred
 - d) Fault current.
- Can record the normal currents IR, IY, IB, IE, and IN
- Operates one of the relays whose contacts are available on the terminals as soon as MicroPro exceeds the threshold of the trip.

Because of the above capabilities all the relevant information related to status of the relay can be furnished to the Master. The information can also be used for zone selectivity interlocking by using the contacts of the relevant relay.

Connections

ZI - D19	:	Di & Do contacts
Master D (+) & Master D (-)	=	To be connected with RS 485/232 converter
M-PRO D(+)&M-PRO D(-)	=	To be connected with Micro Pro relay communication in ACB
ZO / COMMON/DO	=	Zone selectivity
O/P + & GND	=	Output 24 V DC supply can be used for Micro Pro auxiliary supply
230 VI/PL....I/PN...I/PE	=	Input supply 230 V AC for communication module. Phase to be connected to L & neutral at N & earth at E.

Power Supply and Relay Module

The module has relay outputs corresponding to the type of fault occurred in the MicroPro. There are total 7 Relays and contact of each relay is available for feeding to alarm annunciator or any other control .

The module has built in Power supply card and DC supply for the relay can be obtained from this module. If the relay card is not used then the module becomes power supply module. The power supply card is common with Communication module

Operation - PSRM

The PSRM module when connected to Micro pro will get the information of type of fault and in which phase the fault has occurred. Corresponding to this a particular relays will operate and the output contacts of the relay will change the status. Through 3 DIP switches, one can block the function. Blocking ensures that the particular output contact corresponding to the function have no effect even if the function in the relay device is activated. The contacts will remain open if DIP switches are used to block the function. There will be option of providing 4 or 7 relays.

Technical Specifications - PSRM

Auxiliary Supply	Input:	24V DC to 300V DC or 24V AC to 240 V AC
	Output:	24V DC \pm 10%
Relays	Number of relays:	4 or 7 nos.
	Contact rating:	125V AC, 0.6A or 110V DC 0.6A
	Contacts:	1 terminal pair from each relay
Extension functions:	Extension provides operation of relays. Signal for such operation are sent by MicroPro on RS485 serial data communication interface. The relays operate on following faults: 1. Over current [I>] 2. Phase current High set [I>>] 3. Earth Fault [IE>] 4. Neutral Over current [IN>] 5. Circuit Breaker failure [CBF] 6. Pre-trip alarm [W] 7. Spare	
Function blocking:	DIP switches are provided for selectively blocking any of the above functions. 7 Position DIP switch works as follows: Case 1: Number of relays =7: Each position corresponds to one of the above functions and in the same sequence. When a switch is in OFF position, the corresponding function is blocked. This means that relay will not trip when its assigned fault occurs. Case 2: Number of relays =4: The enabled functions are assigned to consecutive relays. Not more than 4 functions can be enabled since there are only 4 relays. For example, if switches 2, 4 and 7 are OFF, then assignment is: I> Relay1 IE> Relay2 CBF Relay3 W Relay4	
Total Terminals: 21	Break-up of terminals is as follows: Power Supply Side: 3 terminals for supply input: L, N, E. 1 terminal blank 2 terminals for 24 V output: + & - . 2 terminals for communication to micro Pro: com+, com-. Relay Module Side: 14 terminals for Relay output. One terminal pair for each of N/O contact of all seven relays.	
Communication Device Type	RS485 Master	
Size:	W x H x D in mm: 119 x 63 x 50	

