

We touch your **electricity** everyday!

## AH-Series



# CS Air Circuit Breakers - AH Series

## Salient Features

- Available in 3 or 4 pole for entire range and also fixed / draw-out version.
- Only 4 frame sizes in the entire range, 630A to 6300A, resulting in maximum interchangeability and minimum inventory of spares.
- High value of service breaking capacity, 45kA to 100kA, and making capacity, 94.5kA to 220kA 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.
  - $\mu$ IT - Standards release
  - MicroPro - multi purpose release with RS485 port & ZSI 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.
- No thermal derating for D.C. Application.
- Tested for most onerous environmental conditions and approved for marine duty application by Indian Registrar of Shipping.

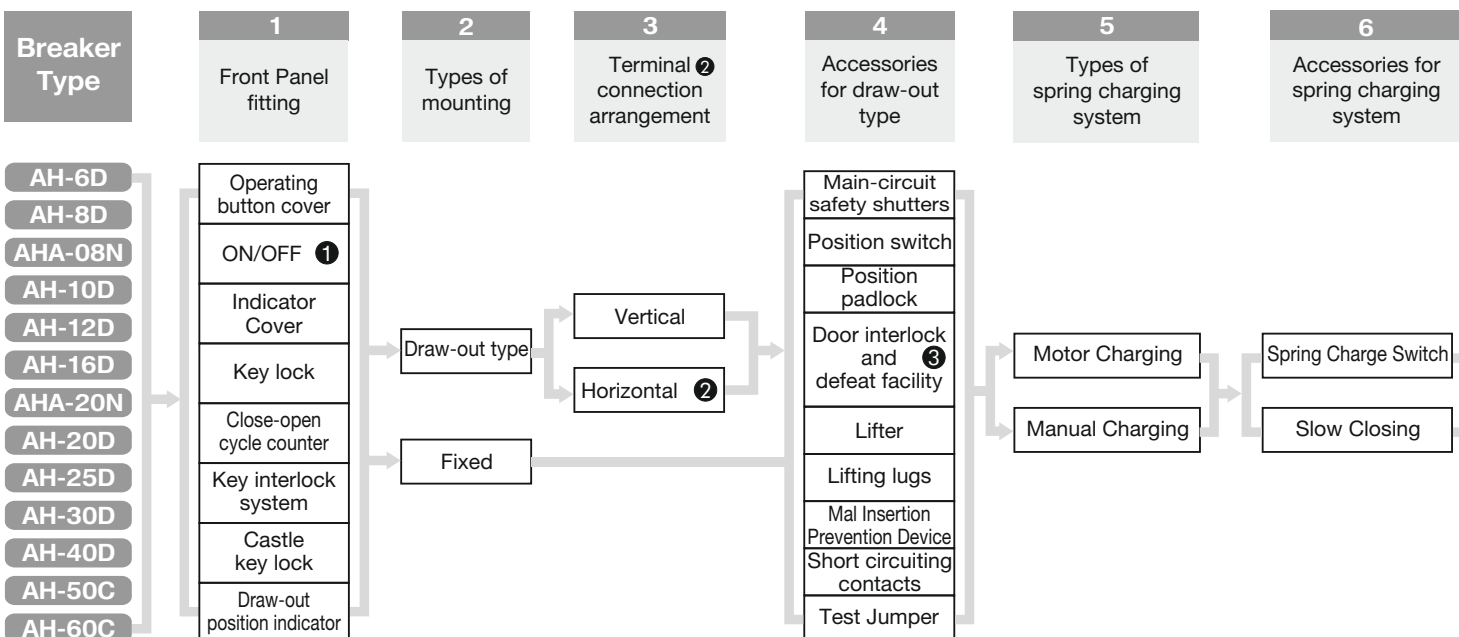
## Technical Specifications

Amperes Frame (based on IEC, BS or IS) TYPE (number of poles 3 & 4)	630 AH-6D	800 AH-8D	800 AHA-08N	1000 AH-10D	1250 AH-12D	1600 AH-16D	2000 AHA-20N
* Rated Ultimate Breaking Capacity/Rated Making Capacity (Icu, RMS/Icm, Peak) kA 415V AC	50/105	50/105	50/105	55/121	55/121	55/121	55/121
* Rated Service Breaking Capacity/Rated Making Capacity (Ics, RMS/Icm, Peak) kA 415V AC	45/94.5	45/94.5	50/105	50/105	50/105	50/105	50/105
250V DC	40/40	40/40	40/40	40/40	40/40	40/40	40/40
Short time current Icw kA for 1 sec. (3 sec.) RMS	45 (25)	45 (25)	50 (25)	50 (25)	50 (25)	50 (45)	50 (45)
Total breaking time/closing time (m.sec.)	30/40	30/40	30/40	30/40	30/40	30/40	30/40

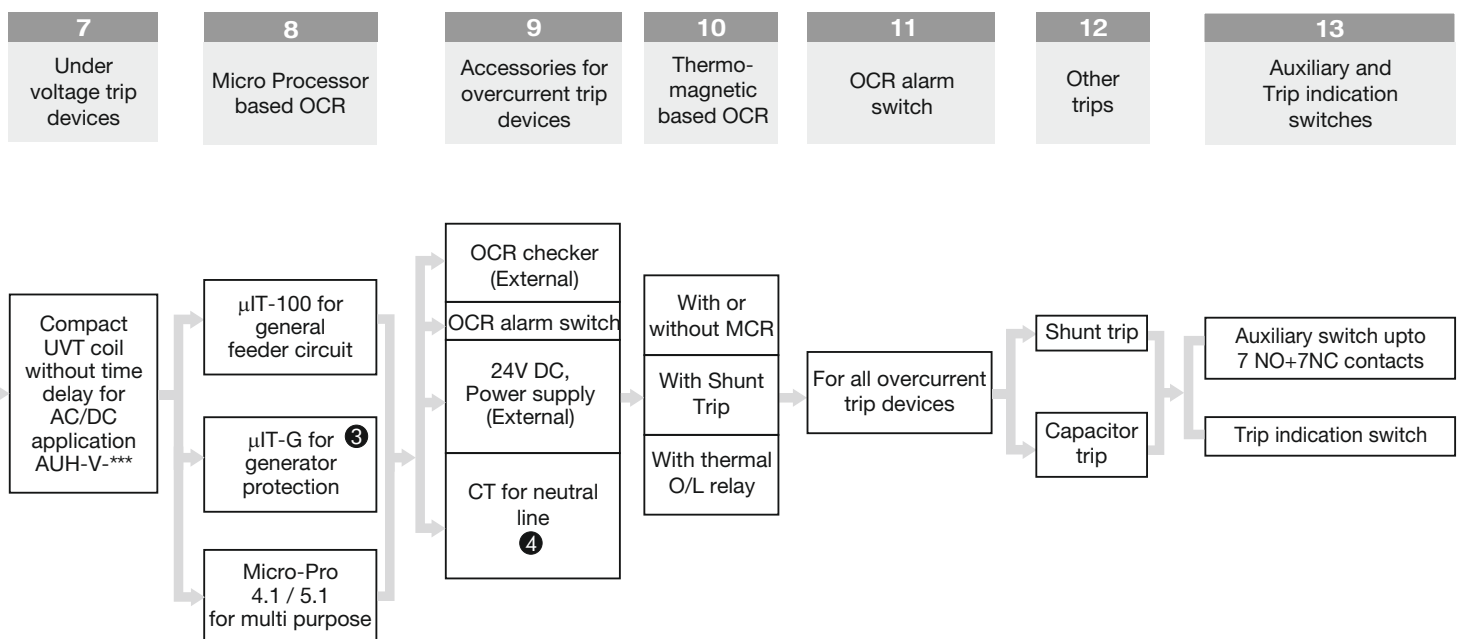
  

Amperes Frame (based on IEC, BS or IS) TYPE (number of poles 3 & 4)	2000 AH-20D	2500 AH-25D	3200 AH-30D	4000 AH-40D	5000 AH-50C	6300 AH-60C
* Rated Ultimate Breaking Capacity/Rated Making Capacity (Icu, RMS/Icm, Peak) kA 415V AC	60/132	65/143	75/165	100/200	100/200	120/264
* Rated Service Breaking Capacity/Rated Making Capacity (Ics, RMS/Icm, Peak) kA 415V AC	50/105	50/105	65/143	85/187	85/187	100/220
250V DC	40/40	40/40	40/40	40/40	40/40	40/40
Short time current Icw kA for 1 sec. (3 sec.) RMS	50(50)	50(50)	65(65)	85(70)	85(70)	100(70)
Total breaking time/closing time (m.sec.)	30/40	30/40	30/40	30/40	30/40	30/40

\* Rated Service breaking capacity (Ics) & rated ultimate breaking capacity (Icu) are same except 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 AH-25D and Vertical Terminal for 30D and above ③ Required for earth fault protection externally mounted for 3 pole \* Dimensions for 4000A fixed break



are available as Standard. Additional adaptors for changing to vertical are available as accessories. ③ On request.  
 er available on request.

# Overcurrent Release

- Thermal Magnetic Trip Device: **Type TM**
- Microprocessor Based Overcurrent Trip Device: **Type  $\mu$ IT-100 &  $\mu$ IT-G**
- Intelligent Release: **Type MicroPro Relay 4.0 & 4.1**

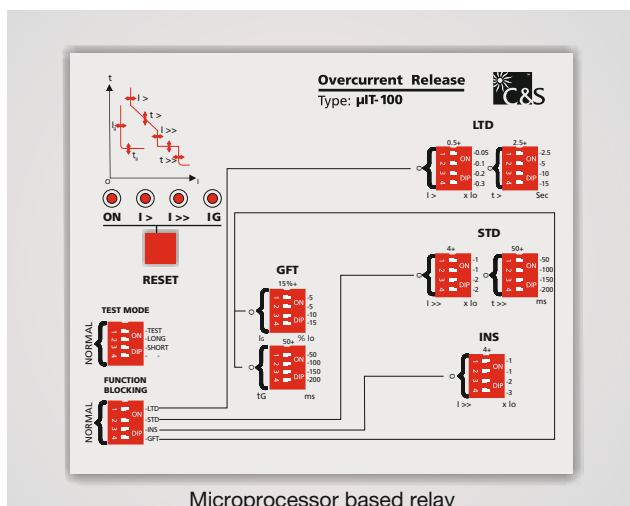
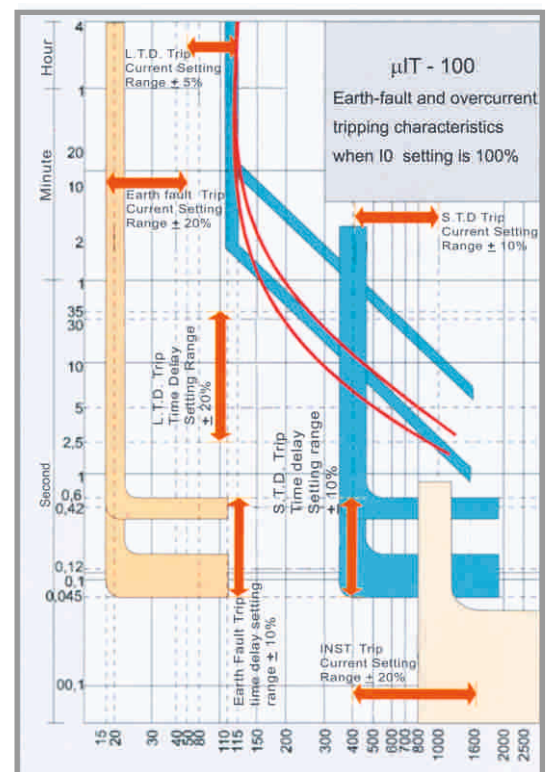
## Thermal - Magnetic Trip Device TM

- 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 $\mu$ IT-100 & $\mu$ IT-G

$\mu$ 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.,  $\mu$ IT-100 for industrial application and  $\mu$ 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



## Intelligent Release: Type MicroPro

MicroPro is a 3 Phase time overcurrent relay 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 on the front .The new settings become effective as soon as they are changed when the relay is powered by the CTs. The microcontroller in the relay 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 5 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 relay trips, LED flashing also stops. A thermal memory is incorporated in the relay and when the Overcurrent condition occurs again, the relay takes into account the earlier overcurrent effect before giving the trip command.

There are two version of MicroPro 4 series

- 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

# Intelligent Release Characteristics

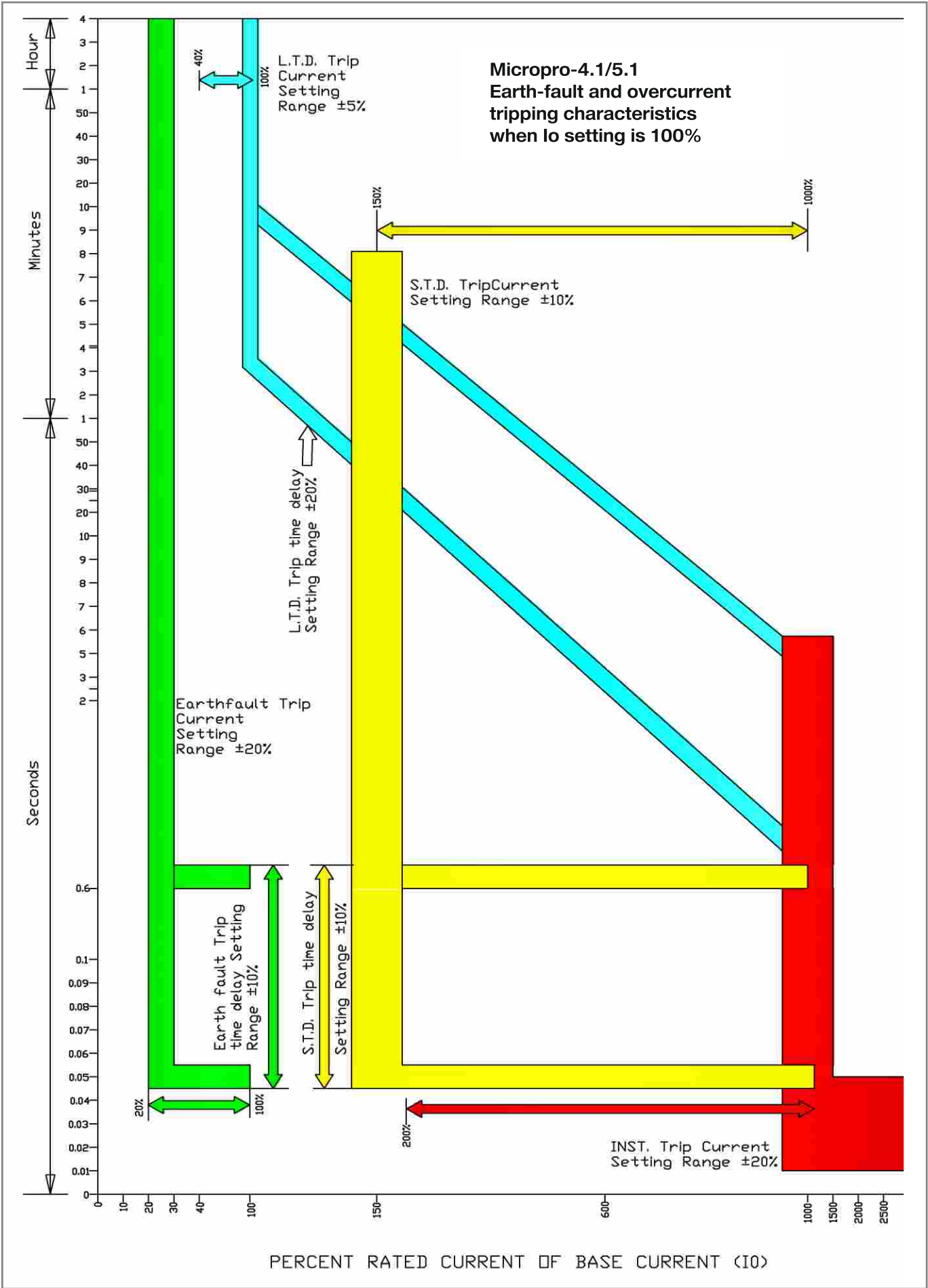
## Micropro with communication

Type	4.1	5.1
<b>Over Load Protection</b>		
Pick up	0.4-1.0 In 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 In 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
<b>Short Circuit</b>		
Pick up	1.5-10 Ir in 10 steps: 1.5, 2, 2.5, 3, 4, 5, 6, 8, 9, 10	1.5-10 Ir 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
<b>Instantaneous</b>		
	2.0-12 In with OFF in 10 steps: 2, 3, 4, 5, 6, 8, 9, 10, 12, OFF	2.0-12 Ir In with OFF in steps of 0.5
<b>Earth Fault</b>		
Pick up	0.2-1.0 In 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 In 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
<b>N Protection</b>		
Pick up	OFF, 50%, 100% In	OFF, 25%, 50%, 75%, 100% In
Cooling time contact	-	30, 45, 60 min
<b>Indication, Monitoring &amp; Control</b>		
Power ON LED	Available	Available
Over Load Flashing LED	Available	Available
Over Load Trip LED	Available	Available
Short Circuit Trip LED	Available	Available
Earth Fault Trip LED	Available	Available
LCD Display	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
<b>Measurements</b>		
Load current	Phase, N & E	Phase, N & E
Fault current	OL, SC, Inst, EF & N	OL, SC, Inst, EF & N
<b>Communication</b>		
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	<b>Inputs</b>	: From The CTs with 200mA rated output one for each phase and one for Neutral current measurement.
	<b>Output</b>	: Tripping signal for MHT coil in the ACB
	<b>Red Led</b>	: indications for different the types of the fault/tripping such as Over load, Short Ckt, Earth Fault, Instantaneous, Neutral.
	<b>Green Led</b>	: Power On and Healthy voltage to trip MHT
	<b>LCD display</b>	: For displaying Currents, and faults/relay status



# Intelligent Release Tripping Curve



## 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

Z1 ~ D19	: Di & Do outputs
Master D (+) & Master D (-)	= To be connected with RS 485/232 converter
M-PROD (+) & M-PROD (-)	= To be connected with Micro Pro relay communication in ACB
ZO / COMMON/DO	= Zone selectivity
O/P + & GND	= 24 V DC supply can be used for Micro Pro supply
230 V I/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.





# Intelligent Release-MicroPro 4.1/5.1 Accessories (Optional)

## 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

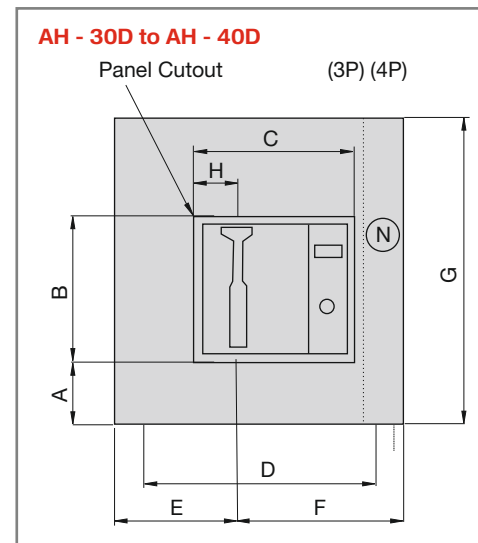
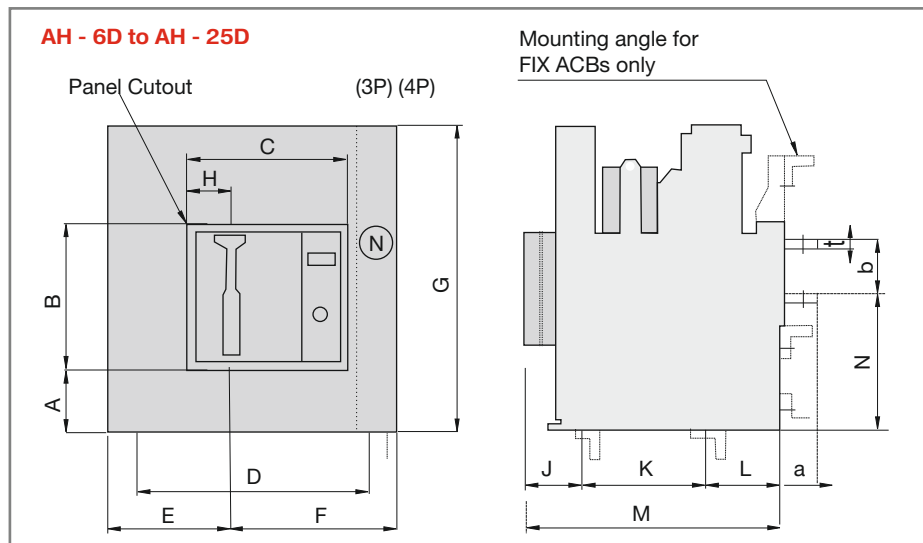
The PSRM module when connected to Micro pro will get the information of type of fault and in which phase the fault has occurred. Corresponding to this a particular relays will operate and the output contacts of the relay will change the status. Through 3 DIP switches, one can block the function. Blocking 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: <b>Case 1: Number of relays =7:</b> 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. <b>Case 2: Number of relays =4:</b> 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: <b>Power Supply Side:</b> 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-. <b>Relay Module Side:</b> 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	

# Dimensional Drawings & Terminal Arrangements

## Dimension Details

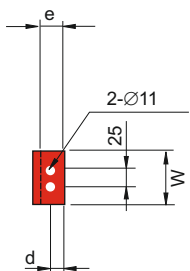


Outline Dimensions and Panel Mounting Details (in mm)

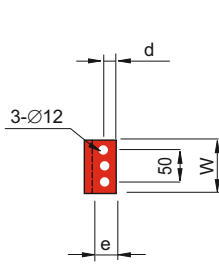
Type of ACBs	A	B	C	D		E		F		G	H	J		
				3P	4P	3P	4P	3P	4P			3P	4P	
D/O (6D-16D) & (AHA-20N)	98	247	295	316	416	215	215	215	332	505	120	122	122	2
FIX (6D-16D) & (AHA-20N)	80	247	295	368	468	199	199	199	299	487	120	100	100	
D/O (20D-25D)	134	308	363	416	546	270	270	270	400	655	138	163	163	2
FIX (20D-25D)	110	308	363	466	596	248	248	248	378	575	138	100	100	
D/O (30D-40D)	134	308	363	498	658	311	311	311	471	655	93	163	163	2
FIX (30D)	110	308	363	548	708	289	289	289	449	575	93	100	100	
D/O (50C-60C)	141	285	180	590	780	373.5	373.5	373.5	563.5	685	90	125	125	2

## Terminal Arrangements

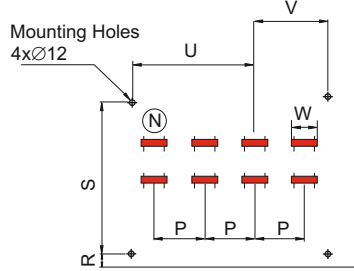
AH - 6D~16D



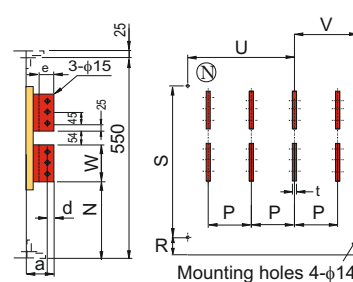
AH - 20D~25D



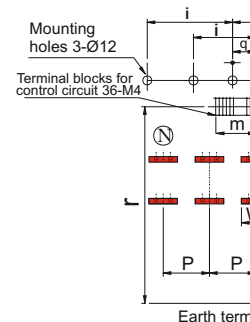
AH - 6D ~ 25D (Fixed)



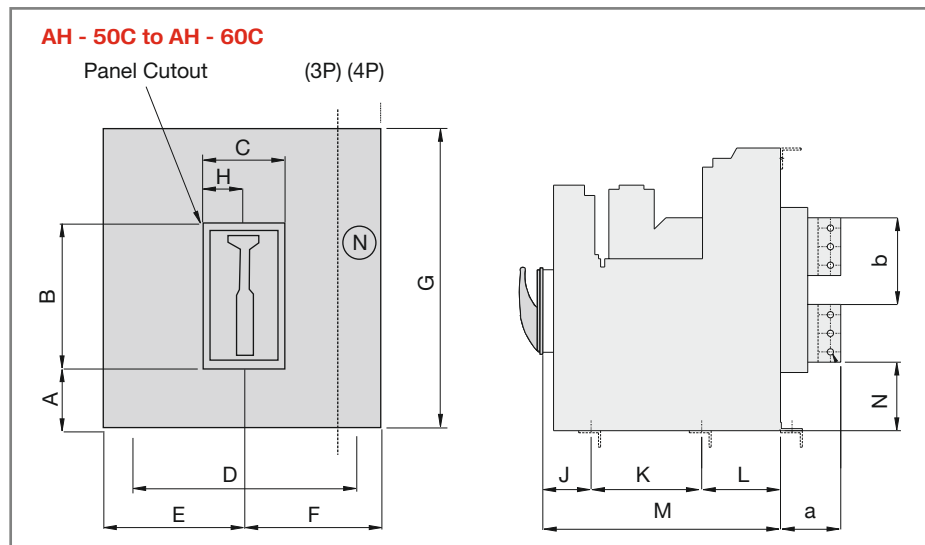
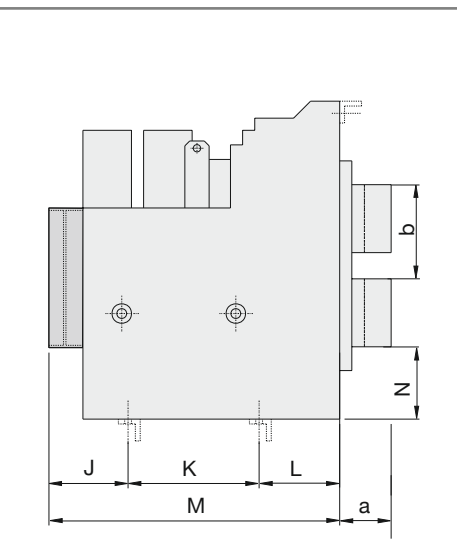
AH - 30D (Fixed)



AH - 6D ~ 25D (Draw-Out)

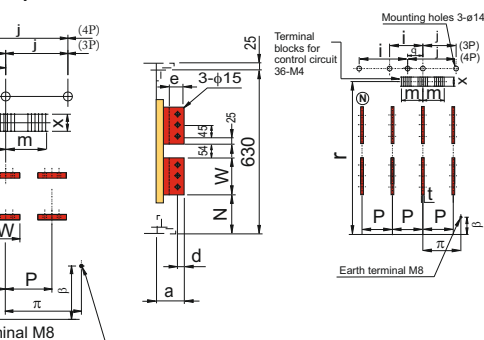


Type of ACBs AH	a	b	d	e	t	W	m	i		j		q	x	p	b	r
								3P	4P	3P	4P					
D/O(6D,8D)&(AHA-08N)	46.8	107	20	30	8	45	112.5	112.5	175	112.5	175	50	48	157	65	440
FIX (6D,8D)&(AHA-08N)	60	107	15	30	8	45	-	-	-	-	-	-	-	-	-	-
D/O (10D, 12D)	46.8	107	20	30	12	50	112.5	112.5	175	112.5	175	50	48	157	65	440
FIX (10D, 12D)	60	107	15	30	12	45	-	-	-	-	-	-	-	-	-	-
D/O (16D)	46.8	115	20	35	20	55	112.5	112.5	175	112.5	175	50	48	157	65	440
D/O (AHA-20N)	46.8	115	20	35	20	60	112.5	112.5	175	112.5	175	50	48	157	65	440
FIX (16D) & (AHA-20N)	60	115	15	30	20	45	-	-	-	-	-	-	-	-	-	-
D/O (20D-25D)	60	117	25	50	15	80	112.5	175	240	175	240	65	48	213	150	553
FIX (20D-25D)	80	117	20	35	15	80	-	-	-	-	-	-	-	-	-	-
D/O (30D)	106	194	25	55	15	140	112.5	175	255	175	255	80	48	200	30	578
FIX (30D)	119	194	25	55	15	140	-	-	-	-	-	-	-	-	-	-
D/O (40D)	106	194	25	55	22	140	112.5	175	255	175	255	80	48	200	30	578
D/O (50C-60C)	146	210	25	55	16	140	112.5	225	320	225	320	95	48	246	30	619.5

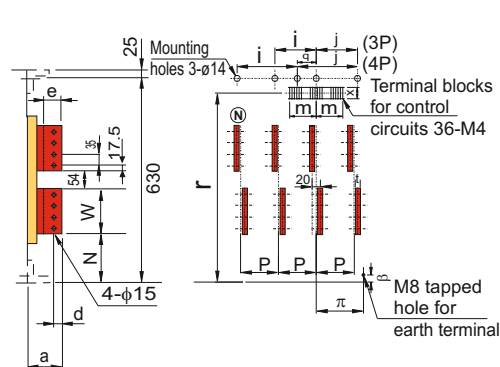


K		L		M	N	P		R		S		U		V	
3P	4P	3P	4P			3P	4P	3P	4P	3P	4P	3P	4P	3P	4P
270	270	117	117	509	205	100	100	-	-	-	-	-	-	-	-
-	-	-	-	379	187	100	100	15	15	334	334	154	254	154	154
270	270	137	137	570	289	130	130	-	-	-	-	-	-	-	-
-	-	-	-	396	269	130	130	15	15	480	480	198	328	198	198
270	270	166	166	599	149	160	160	-	-	-	-	-	-	-	-
-	-	-	-	422	129	160	160	40	40	480	480	236	396	236	236
268	268	191	191	584	166	190	190	-	-	-	-	-	-	-	-

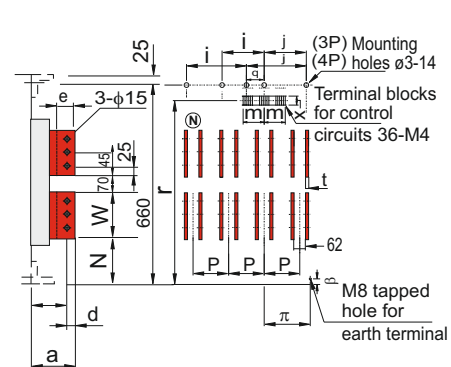
**AH - 30D Drawout**



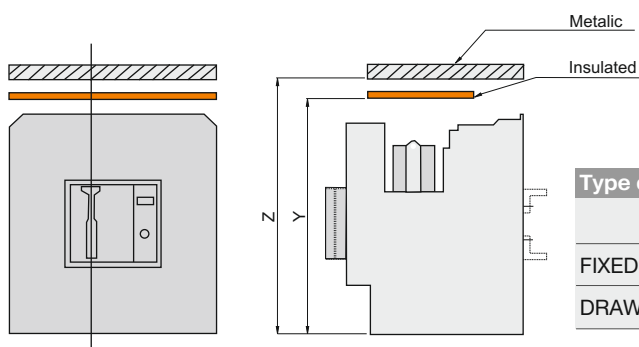
**AH - 40D Drawout**



**AH - 50C & 60C Drawout**



## BARRIER CLEARANCE ABOVE ARC CHUTE



Type of ACBs	6D - 16D		AHA-20N		20D - 25D		30D - 40D		50C - 60C	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
FIXED	530	550	530	550	660	715	690	745	-	-
DRAWOUT	550	570	550	590	680	735	710	765	820	885

## AH-Series

### State of the art Manufacturing Facilities



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



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