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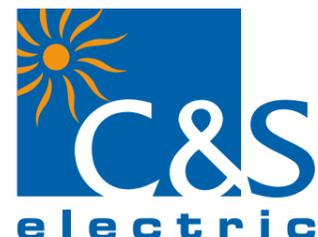
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AHA-Series

An Absolute Solution for Distribution & Protection



RoHS
Compliant

Air Circuit Breakers

We touch your electricity everyday!



Introduction

ACB AHA-Series

- Range: 630A-4000A
- Poles: 3P& 4P
- Three frame size for entire range
- Intelligent release
 - Micropro 3.1
 - Micropro 4.1
 - Micropro 5.1

C&S Air Circuit breaker are available in the current range of 630A to 4000A with choice of option and accessories. Utilization category B & pollution degree 3.

Tested at CPRI/ERTL & Conforms to IS/IEC 60947-2.

CS Air Circuit Breakers - AHA Series

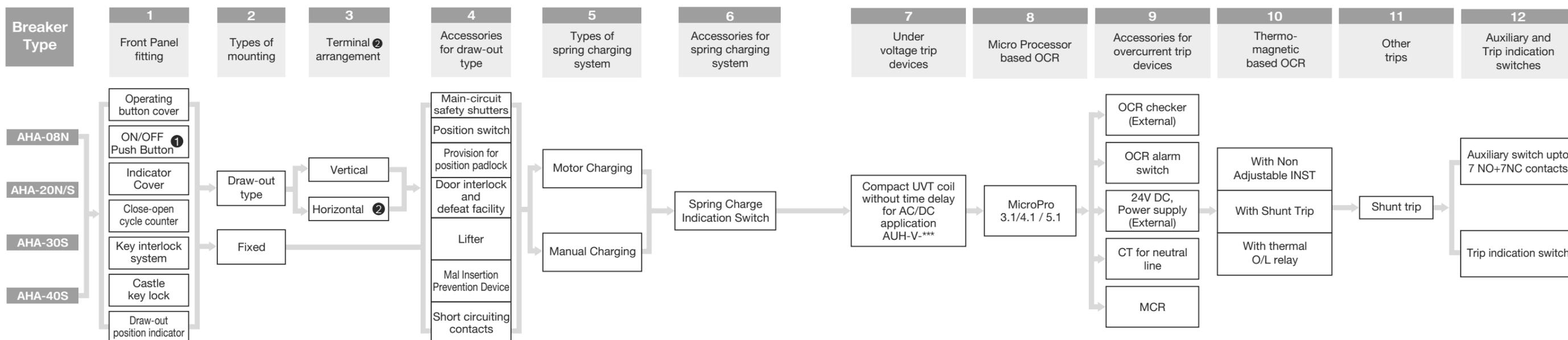
Salient Features

- Available in 3 or 4 pole for entire range
- Only 3 frame sizes in the entire range, 800A to 4000A, resulting in maximum interchangeability and minimum inventory of spares.
- High value of service breaking capacity, 50kA to 65kA, and making capacity, 105kA to 143kA 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.
 - MicroPro 3.1 - Standard release
 - MicroPro 4.1 & 5.1 - 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.

Technical Specifications

Ampere Frame as per IEC60947-2	AHA 08~20	AHA 08~20	AHA 30	AHA 40
Rated Current (A)	800 ~ 2000	800, 1000, 1250, 1600, 2000	3200	4000
Nos. of Poles	3/4	3/4	3/4	3/4
Type	N	S	S	S
Rated Ultimate breaking capacity (kA rms) at 415V AC	50kA	65kA	65kA	65kA
Rated Service breaking capacity (kA rms) at 415 V AC	50kA	65kA	65kA	65kA
Rated Short time withstand capacity (kA rms) for 1 Sec		50kA	65kA	65kA65kA
Rated Making Capacity (kA peak)	105kA	143kA	143kA	143kA
Total breaking/ closing time (m.sec.)	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.

- Thermal Magnetic Trip Device: **Type TM**
- 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 60% - 100%
- Provision for remote tripping.

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

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
- Short-circuit Protection
- Instantaneous Protection
- Ground fault Protection

Features

- Individual Fault indication LED's
- Self powered by built-in current transformer



Microprocessor based relay

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

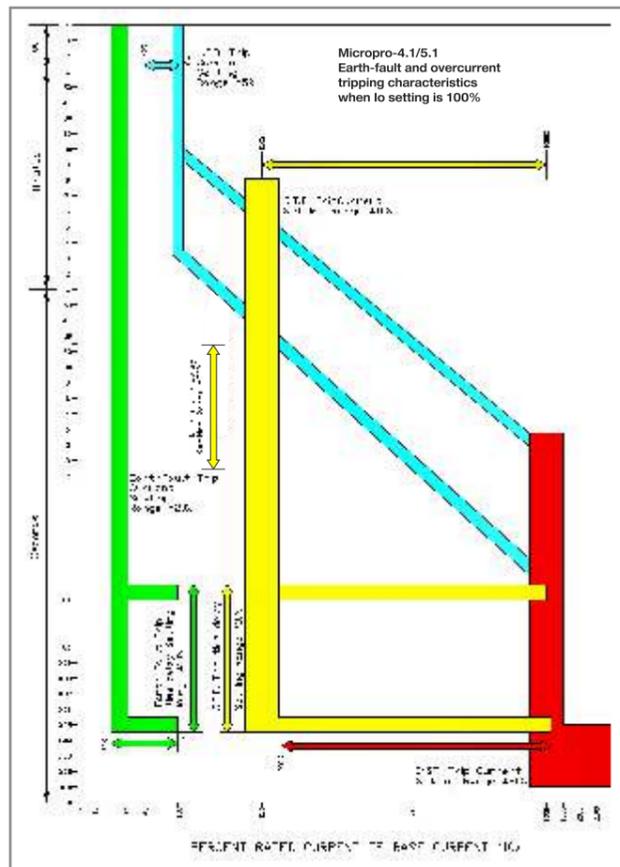
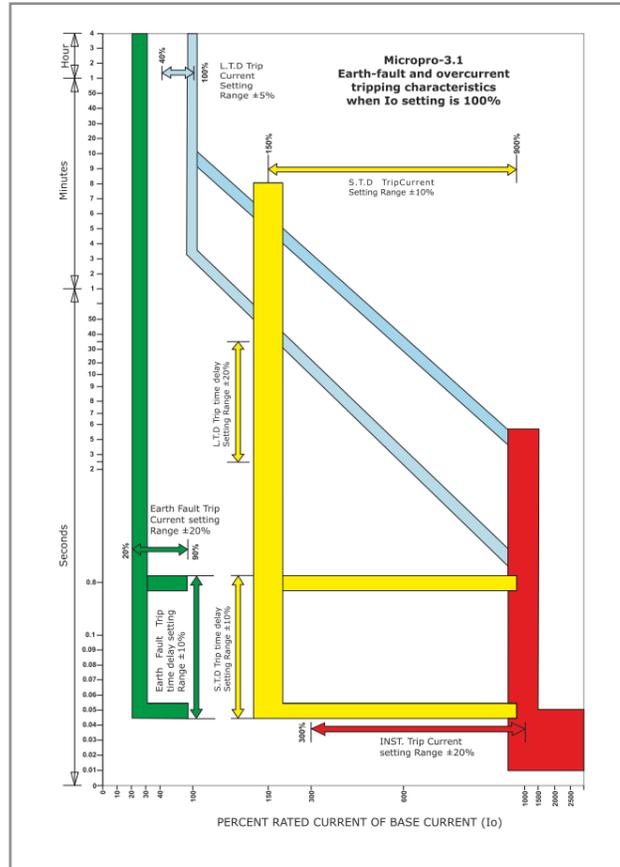


Micropro with communication

Type	3.1	4.1	5.1
Over Load Protection			
Pick up	0.4-1.1 In with OFF in 9 steps: OFF, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1	0.4-1.0 In with OFF in 10 steps: OFF, 0.4, 0.5, 0.6, 0.7, 0.8, 0.85, 0.9, 0.95, 1	0.4-1.0 In with OFF in steps of 0.01
Delay	2.5 - 35 sec at 6 Ir in 14 steps: 2.5, 5, 7.5, 10, 12.5, 15, 17.5, 20, 22.5, 25, 27.5, 30, 32.5, 35 sec	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	1.5-9.0 Ir in 16 steps: 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0	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
Delay	0.05-0.8 sec in 16 steps: 0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80	Inst - 600 msec in 7 steps: Inst. 0.1, 0.2, 0.3, 0.4, 0.5, 0.6	Inst to 600 msec in steps of 50 msec
Instantaneous			
	3.0 - 10 In with OFF in 9 steps: OFF, 3, 4, 5, 6, 7, 8, 9, 10	2.0-12 In with OFF in 10 steps: OFF, 2, 3, 4, 5, 6, 8, 9, 10, 12	2.0-12 In with OFF in steps of 0.5
Earth Fault			
Pick up	0.2-0.9 In with OFF in 9 steps: OFF, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9	0.2-1.0 In with OFF in 10 steps: OFF 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0	0.2-1.0 In with OFF in 10 steps of 0.01
Delay	0.05-0.8 sec in 16 steps: 0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80	Inst-600 msec in 7 steps: Inst. 0.1, 0.2, 0.3, 0.4, 0.5, 0.6	Inst to 600 msec in steps of 50 msec
N Protection			
Pick up	Not Available	OFF 25%, 50%, 100% In	OFF, 25%, 50%, 75%, 100% In
Cooling time contact		30 min	30, 45, 60 min
Indication, Monitoring & Control			
Power ON LED	Available	Available	Available
Over Load Trip LED	Available	Available	Available
Short Circuit Trip LED	Available	Available	Available
Inst Trip LED	Available	Available	Available
Earth Fault Trip LED	Available	Available	Available
Neutral Protection LED	NA	Available	Available
Remote Alarm/Trip Indication	NA	Through 7 programmable relays (optional)	Through 7 programmable relays (optional)
Trip History	NA	Fault type, current and time for last trip events	Fault type, current and time for last 16 trip events
Zone selectivity	NA	Available	Available
Settings Adjustment by	DIP Switches	Knob	Keypad
LCD Display	NA	YES	YES
Measurements			
Load current	NA	Phase, N & E	Phase, N & E
Fault current	NA	OL, SC, Inst, EF & N	OL, SC, Inst, EF & N
Communication			
To remote	NA	All parameters through communication module	All parameters through communication module
Connectivity & protocol	NA	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 such as Over load, Short circuit, Earth fault, Instantaneous, Neutral.
- Green Led** : Power On and Healthy voltage to trip MHT
- LCD display** : For displaying Current and fault/relay status



Communication Module

Communication module is an accessory of MicroPro release 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 release 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 release 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 $I_R, I_Y, I_B, I_E,$ and I_N
- 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

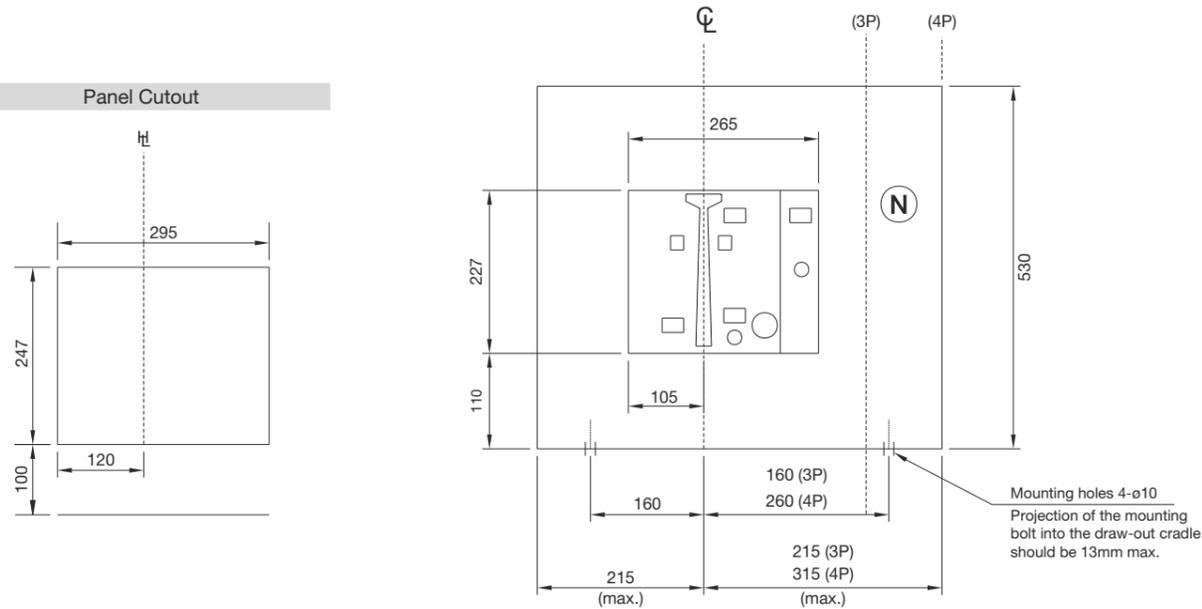
Zi ~ D19	: DI & DO out puts
Master D (+) & Master D (-)	= To be connected with RS 485/232 converter to master PC
M-PRO D(+) & M-PRO D(-)	= To be connected with Micro Pro release for communication to ACB
ZO / COMMON/DO	= Zone selectivity
O/P + & GND	= Output 24 V DC supply can be used for Micro Pro auxiliary supply
230 V I/P L.../P/N.../PE	= Input supply 230 V AC for communication module. Phase to be connected to L & neutral at N & earth at E.

Dimensional Drawings

Dimensions and Panel Mounting Details (AHA-8N / 10N, AHA-16N, 20N, & AHA-20S)

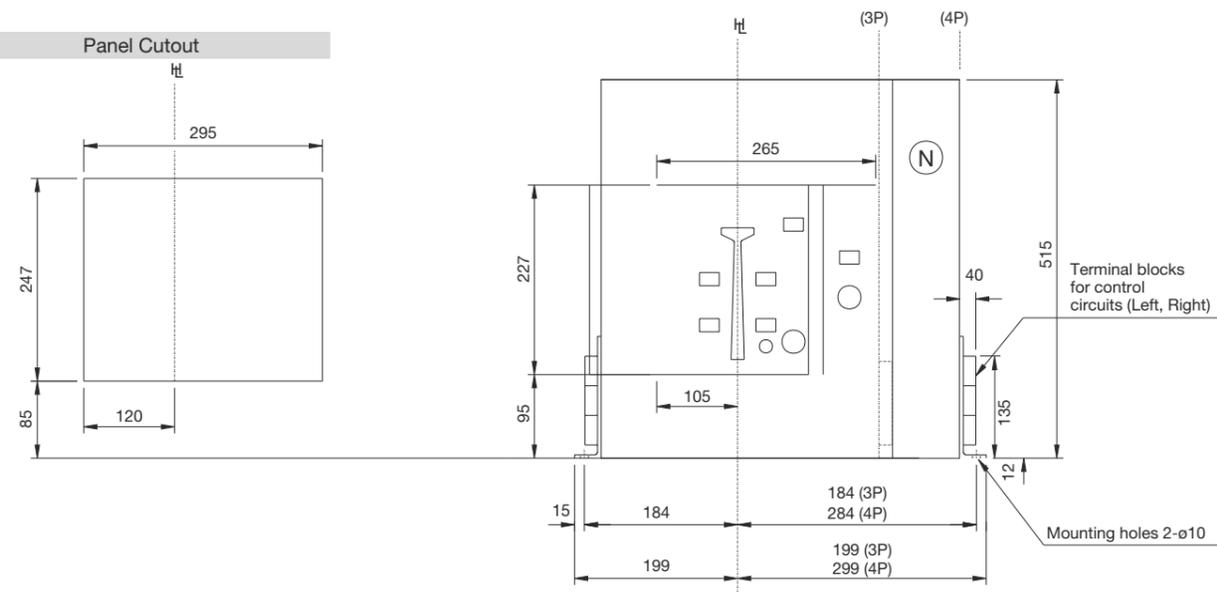
Front View

Drawout Type



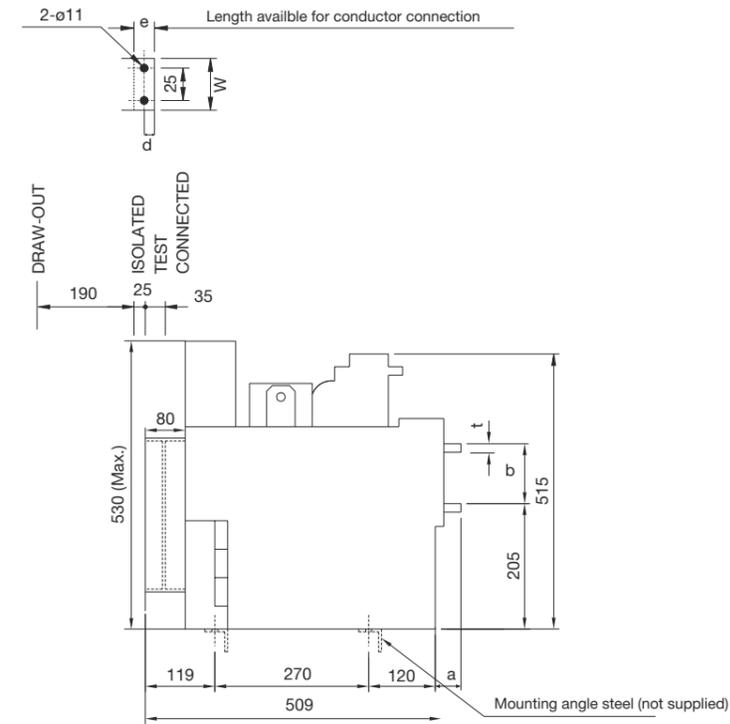
Front View

Fixed Type

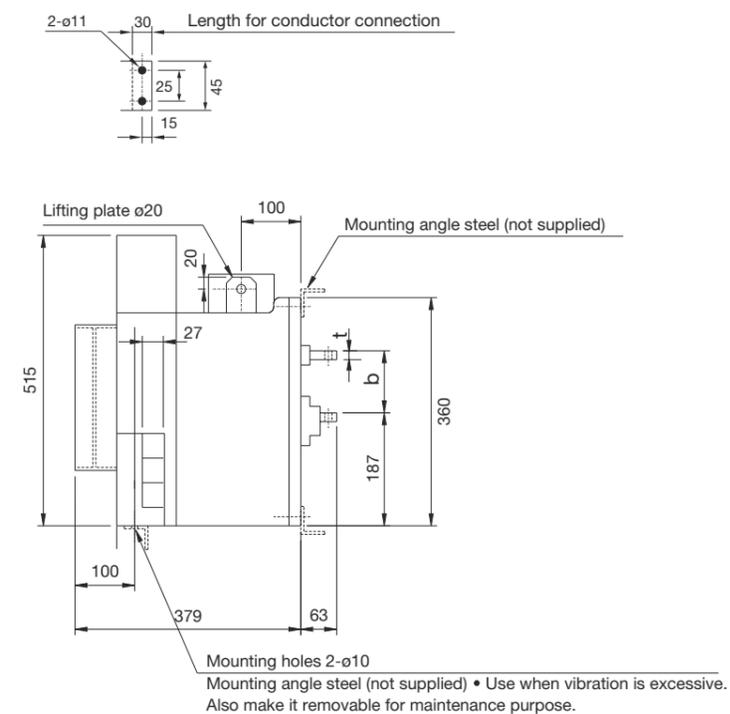


All dimensions in mm

Side View

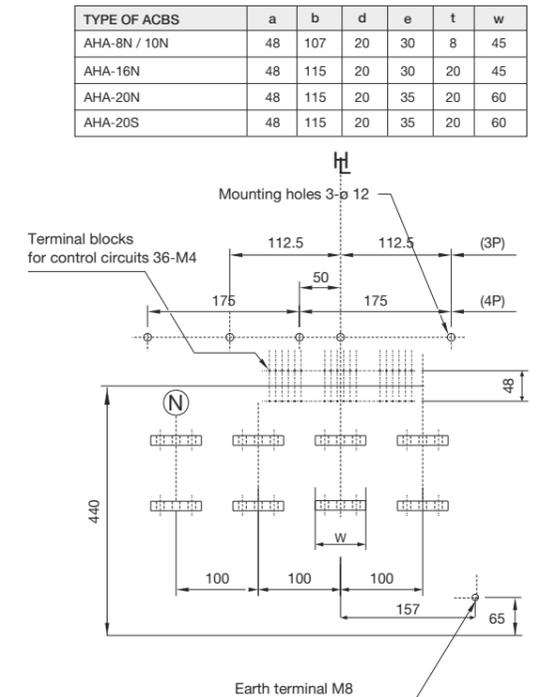


Side View



All dimensions in mm

Rear View



Rear View

TYPE OF ACBS	a	b	d	e	t	w
AHA-8N / 10N	48	107	20	30	8	45
AHA-16N	48	115	20	30	20	45
AHA-20N	48	115	20	35	20	60
AHA-20S	48	115	20	35	20	60

TYPE OF ACBS	b	t	W
AHA-8N / 10N	107	8	45
AHA-16N	115	20	45
AHA-20N	115	20	45
AHA-20S	115	20	55

Dimensional Drawings

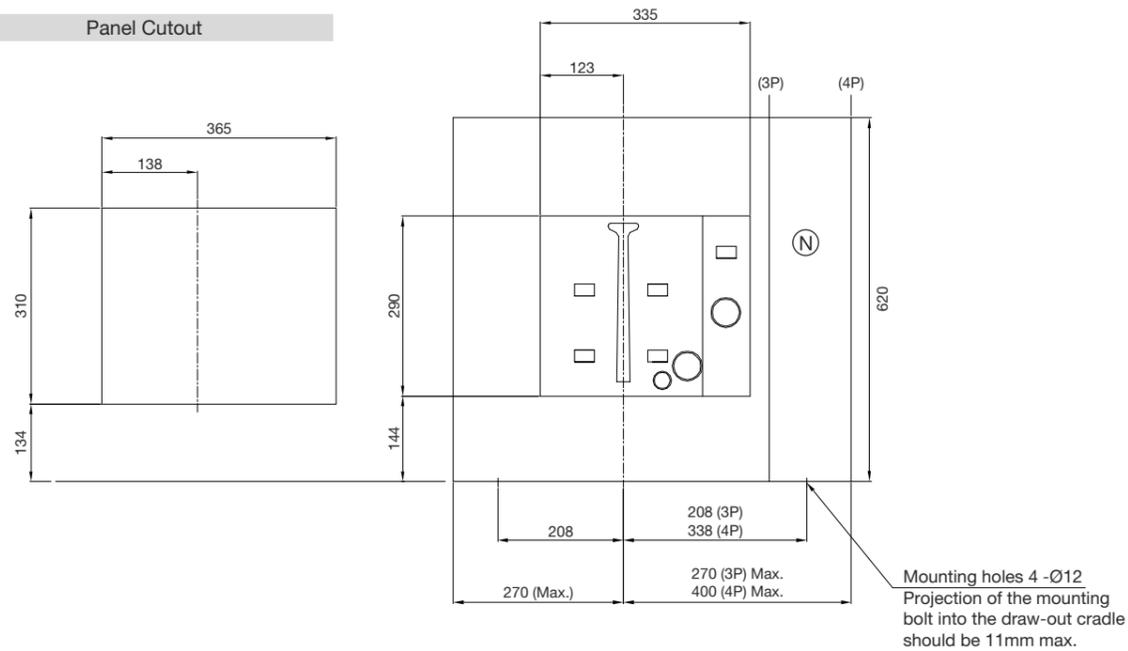
Dimensions and Panel Mounting Details (AHA-30S)

Front View

Drawout Type

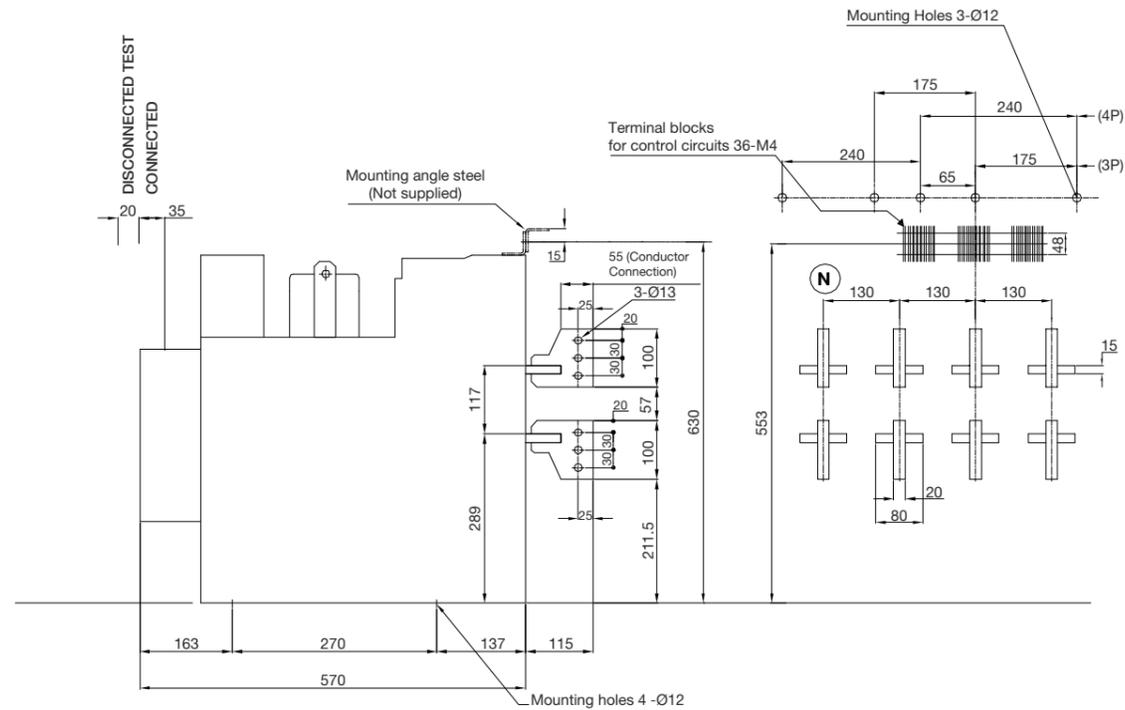
Note: (N) is neutral pole of 4 Pole Breaker

Panel Cutout



Side View

Rear View



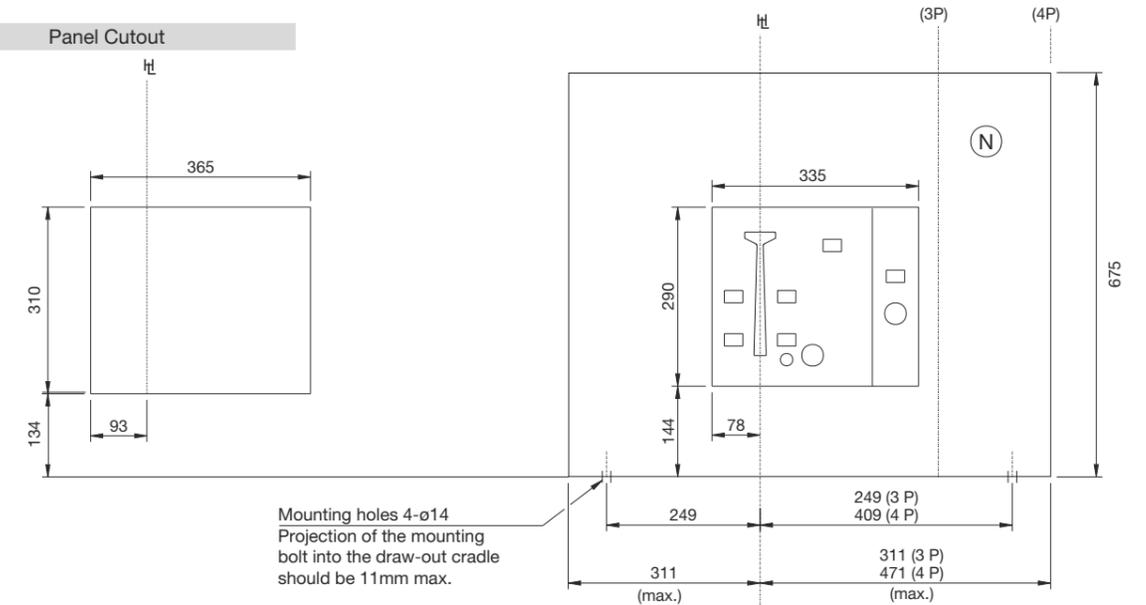
All dimensions in mm

Dimensions and Panel Mounting Details (AHA-40S)

Drawout Type

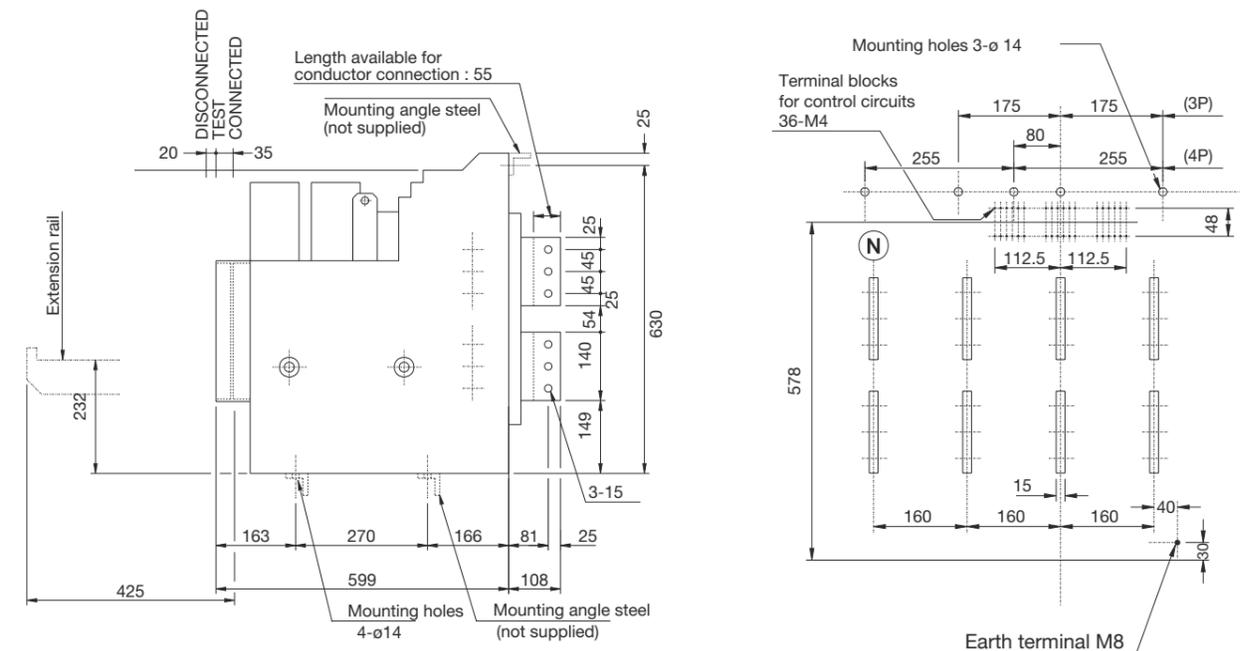
Note: (N) is neutral pole of 4 Pole Breaker

Panel Cutout



Side View

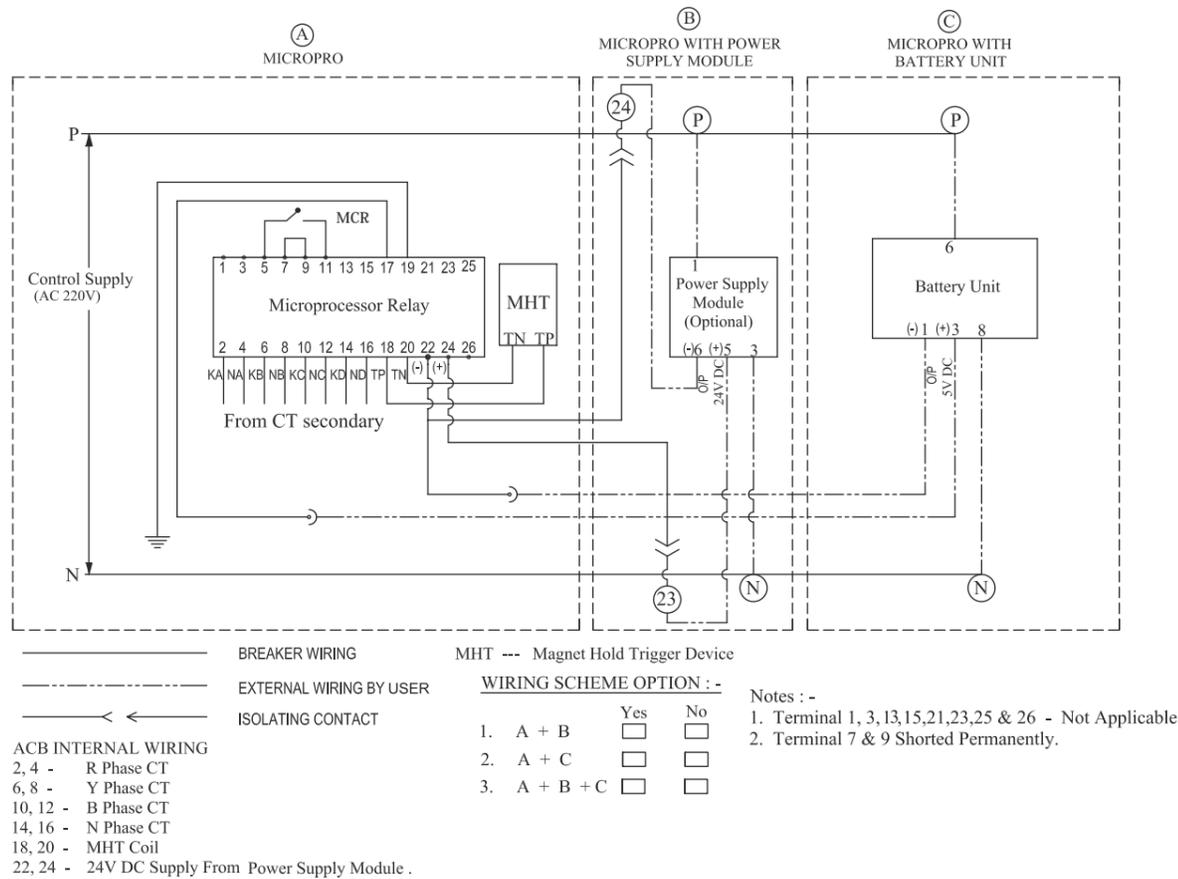
Rear View



All dimensions in mm

Control Circuit Diagram

For micropro 3.1 with Power Supply Module & Battery Unit



Multiple connections for ease of different installation

ACB simplifies the design of switchboard and standardizes the installation of the products.

This offers flexibility for construction of busbar as product is available with different terminal requirement (Horizontal, vertical or mixed connection) meeting varied customer requirement for termination. Such facility allows user to optimize the size of switchboards and busbar connection.

Size of Copper busbars for AHA series of Air circuit breakers

Rated current (A)	Copper busbars		
	Number of busbars	Dimensions in mm	Minimum cross section in sq. mm
630A	2	40 X 5	400
800A	2	50 X 5	500
1000A	2	60 X 5	600
1250A	2	80 X 5	800
1600A	2	100 X 5	1000
2000A	3	100 X 5	1500
2500A	4	100 X 5	2000
3200A	6	100 X 5	3000
4000A	4	200 X 5	4000

For micropro 4.1 / 5.1 with Power Supply Module, Communication Module & Battery Unit

