



TemPowerACB

Double Breaker
- Two Steps Ahead



BCH ELECTRIC LIMITED
we care for you

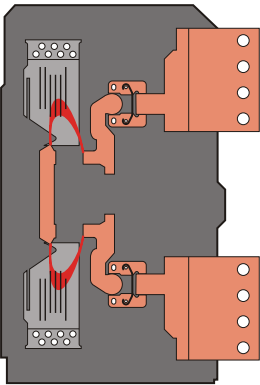


TemPowerACB

The ultimate in performance and compactness

TemPower ACB offers long term cost saving for plant owners and operators over a competing breaker. Robust construction and ease of maintenance make the ACB operational after years of arduous switching and fault breaking service. Three and four pole, fixed and withdrawable version are available in all the range to match specific requirements. Electrical load from 80 A to 6300 A can be protected and switched. Each standard TemPower over current relay has over 200,000 unique time/current curves available to the users

Unique Double Break Structure



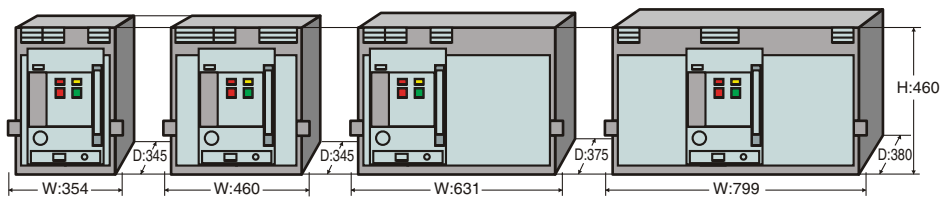
$I_{cw}, 1s = I_{cs} = I_{cu}$ for all TemPower2 ACBs

TemPower2 is "Double Break" ACB, having two breaking contacts per phase. The unique pole structure means that the short time withstand rating ($I_{cw}, 1s$) is equal to the service short circuit breaking capacity (I_{cs}) for all models. Full selectivity is guaranteed up to the full system fault level.

The unique "Double Break" main contact system ensures extremely fast interruption of short circuit currents and substantially reduces main contact wear. The internally symmetrical "Double Break" structure means the moving contact is isolated from the supply voltage even when the ACB is reverse connected. The neutral pole of all "TemPower2" ACBs are of early make/late break design. This eliminates the risk of abnormal line to neutral voltages, which may damage sensitive electronic equipment.

"Double Break" contacts increase service life - Electrical and mechanical endurance ratings are the best available, and exceed the requirements of IEC 60947-2.

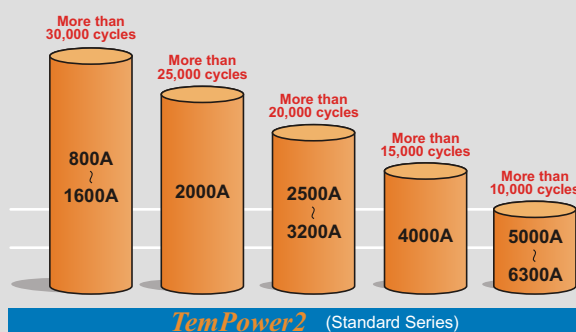
Uniform Dimension



Standard series	800–2000A	2500–4000A	4000A	5000-6300A
High fault series	1250–2000A	1600–3200A	4000A	6300A

With the widest range of ACBs there is a solution from 800 A to 6300 A all with the same front cover dimension and standardized accessories through out the range. Maximum power from minimum volume is the objective for the design specification.

A substantial improvement in life cycles



Note: above figures are the mechanical endurance with maintenance. For details please refer to pages 3 & 4.

L-characteristic for general feeder circuits (Type AGR-11BL, 21BL, 31BL)

Protection functions	
■ Adjustable long time-delay trip characteristics	
LT	
Pick-up current [I_R] (A)	
Time-delay [t_R] (s)	
Time-delay setting tolerance (%)	
■ Adjustable short time-delay trip characteristics	
ST	
Pick-up current [I_{sd}] (A)	
Current setting tolerance (%)	
Time-delay [t_{sd}] (ms) Relay time	
Resettable time (ms)	
Max. total clearing time (ms)	
■ Adjustable instantaneous trip characteristics	
INST or MCR (For AGR-11B, INST only)	
Pick-up current [I_i] (A)	
Current setting tolerance (%)	
■ Adjustable pre-trip alarm characteristics	
PTA	
Pick-up current [I_{p1}] (A)	
Current setting tolerance (%)	
Time-delay [t_{p1}] (s)	
Time-delay setting tolerance (%)	
■ Adjustable ground fault trip characteristics	
GF	
Pick-up current [I_g] (A)	
Current setting tolerance (%)	
Time-delay [t_g] (ms) Relay time	
Resettable time (ms)	
Max. total clearing time (ms)	
Ground fault trip characteristics on line side	
REF (AGR-21B, 31B only)	
Pick-up current [I_{REF}] (A)	
Current setting tolerance (%)	
Time-delay (s)	
■ N-phase protection characteristics	
NP	
Pick-up current [I_N] (A)	
Time-delay [t_N] (s)	
Time-delay setting tolerance (%)	
■ Phase rotation protection characteristics	
NS (AGR-21B, 31B only)	
Pick-up current [I_{NS}] (A)	
Current setting tolerance (%)	
Time-delay [t_{NS}] (s)	
Time-delay setting tolerance (%)	
■ Adjustable earth leakage trip characteristics	
ELT (AGR-31B only)	
Pick-up current [$I_{\Delta R}$] (A)	
Current setting tolerance	
Time-delay [$t_{\Delta R}$] (ms) Relay time	
Resettable time (ms)	
Max. total clearing time (ms)	
■ Undervoltage alarm characteristics	
UV (AGR-31B only)	
Recovery setting voltage (V)	
Recovery voltage setting tolerance (%)	
Setting voltage (V)	
Voltage setting tolerance (%)	
Time-delay (s)	
Time-delay setting tolerance (%)	
■ Control power	

-- : Default setting

Setting range	
$I_N \times (0.8 - 0.85 - 0.9 - 0.95 - 1.0 - \text{NON})$; 6 graduations	
• Non tripping when load current $\leq (I_N \times 1.05)$ • Tripping when $(I_N \times 1.05) < \text{load current} \leq (I_N \times 1.2)$	
$(0.5 - 1.25 - 2.5 - 5 - 10 - 15 - 20 - 25 - 30)$ at 600% of I_R ; 9 graduations	
$\pm 15\% + 150\text{ms} - 0\text{ms}$	
$I_N \times (1 - 1.5 - 2 - 2.5 - 3 - 4 - 6 - 8 - 10 - \text{NON})$; 10 graduations	
$\pm 15\%$	
<u>50</u>	<u>100</u> <u>200</u> <u>400</u> <u>600</u> <u>800</u> ; 6 graduations
25	75 175 375 575 775
120	170 270 470 670 870
$I_N \times (2 - 4 - 6 - 8 - 10 - 12 - 14 - 16 - \text{NON})$; 9 graduations	
$\pm 20\%$	
$I_N \times (0.75 - 0.8 - 0.85 - 0.9 - 0.95 - 1.0)$; 6 graduations	
$\pm 7.5\%$	
$(5 - 10 - 15 - 20 - 40 - 60 - 80 - 120 - 160 - 200)$ at I_{p1} or more; 10 graduations	
$\pm 15\% + 100\text{ms} - 0\text{ms}$	
Note : Set I_g to 1200A or less.	
$I_{CT} \times (0.1 - 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - 1.0 - \text{NON})$; 8 graduations	
$\pm 20\%$	
<u>100</u>	<u>200</u> <u>300</u> <u>500</u> <u>1000</u> <u>2000</u> ; 6 graduations
75	175 275 475 975 1975
170	270 370 570 1070 2070
$I_{CT} \times (0.1 - 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - 1.0 - \text{NON})$; 8 graduations	
$\pm 20\%$	
Inst	
$I_{CT} \times (0.4 - 0.5 - 0.63 - 0.8 - 1.0)$; Factory set to a user-specified value for AGR-11BL.	
• Non tripping when load current $\leq (I_N \times 1.05)$ • Tripping when $(I_N \times 1.05) \leq \text{load current} < (I_N \times 1.2)$	
Tripping at 600% of I_N with LT time-delay [t_R]	
$\pm 15\% + 150\text{ms} - 0\text{ms}$	
$I_N \times (0.2 - 0.3 - 0.4 - 0.5 - 0.6 - 0.7 - 0.8 - 0.9 - 1.0)$; 9 graduations	
$\pm 10\%$	
$(0.4 - 0.8 - 1.2 - 1.6 - 2 - 2.4 - 2.8 - 3.2 - 3.6 - 4)$ at 150% of I_{NS} ; 10 graduations	
$\pm 20\% + 150\text{ms} - 0\text{ms}$	
0.2 - 0.3 - 0.5 - 1 (Medium sensitivity) or 3 - 5 (Low sensitivity)	
Non operate below 50% of $I_{\Delta R}$, Operate between 50% and 100% of $I_{\Delta R}$.	
<u>100</u>	<u>200</u> <u>300</u> <u>500</u> <u>1000</u> <u>2000</u> ; 6 graduations
50	150 250 450 950 1950
250	350 450 600 1150 2150
$V_N \times (0.8 - 0.85 - 0.9 - 0.95)$; 4 graduations	
$\pm 5\%$	
$V_N \times (0.4 - 0.6 - 0.8)$; 3 graduations	
$\pm 5\%$	
0.1 - 0.5 - 1 - 2 - 5 - 10 - 15 - 20 - 30 - 36; 10 graduations	
$\pm 15\% + 100\text{ms} - 0\text{ms}$	
AC100 - 120V) Common DC100 - 125V) Common DC24V) Common	
AC200 - 240V) Common DC200 - 250V) Common DC48V) Common	
Power consumption : 5 VA	

■ Values of I_{CT} and I_N

Type	Applicable	Rated current I_N (A)				
		I_{CT} (A)	$I_{CT} \times 0.5$	$I_{CT} \times 0.63$	$I_{CT} \times 0.8$	$I_{CT} \times 1.0$
AR208S	200	100	125	160	200	
	400	200	250	320	400	
	800	400	500	630	800	
AR212S	400	200	250	320	400	
	800	400	500	630	800	
	1250	630	800	1000	1250	
AR216S	400	200	250	320	400	
	800	400	500	630	800	
	1250	630	800	1000	1250	
	1600	800	1000	1250	1600	

Type	Applicable	Rated current I_N (A)				
		I_{CT} (A)	$I_{CT} \times 0.5$	$I_{CT} \times 0.63$	$I_{CT} \times 0.8$	$I_{CT} \times 1.0$
AR220S	400	200	250	320	400	
	800	400	500	630	800	
	1250	630	800	1000	1250	
	1600	800	1000	1250	1600	
	2000	1000	1250	1600	2000	
AR325S	2500	1250	1600	2000	2500	
AR332S	3200	1600	2000	2500	3200	
AR440SB	4000	2000	2500	3200	4000	
AR440S	4000	2000	2500	3200	4000	
AR650S	5000	2500	3200	4000	5000	
AR663S	6300	3200	4000	5000	6300	

Type	Applicable	Rated current I_N (A)				
		I_{CT} (A)	$I_{CT} \times 0.5$	$I_{CT} \times 0.63$	$I_{CT} \times 0.8$	$I_{CT} \times 1.0$
AR212H	200	100	125	160	200	
	400	200	250	320	400	
	800	400	500	630	800	
	1250	630	800	1000	1250	
AR216H	1600	800	1000	1250	1600	
AR220H	2000	1000	1250	1600	2000	
AR316H	200	100	125	160	200	
	400	200	250	320	400	
	800	400	500	630	800	
AR320H	2000	1000	1250	1600	2000	
	2500	1250	1600	2000	2500	
	3200	1600	2000	2500	3200	
AR420H	800	400	500	630	800	
	2000	1000	1250	1600	2000	
AR440H	4000	2000	2500	3200	4000	
	5000	2500	3200	4000	5000	
AR663H	6300	3200	4000	5000	6300	

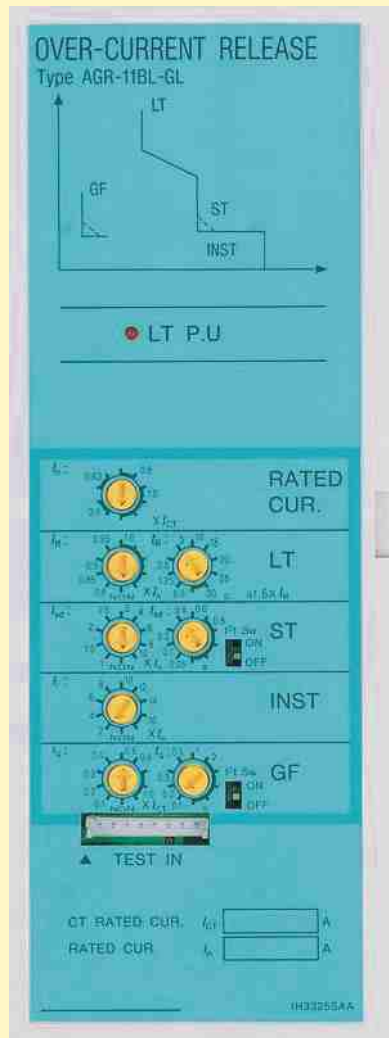


Series	Standard	Standard	High fault	Standard	High fault	High fault	Standard	High fault
AMPERE RATING(A)	800	1250	1250	1600	1600	1600	2000	2000
TYPE	AR208S	AR212S	AR212H	AR216S	AR216H	AR316H	AR220S	AR220H
RATED CURRENT (max) [I_n](A)	800	1250	1250	1600	1600	1600	2000	2000
①②	JIS⑫, IEC, EN, AS	NEMA, ANSI	Marine					
NEUTRAL POLE AMPERES FRAME (A)	800	1250	1250	1600	1600	1600	2000	2000
NUMBER OF POLES	③ ④	③ ④	③ ④	③ ④	③ ④	③ ④	③ ④	③ ④
RATED PRIMARY CURRENT OF OVER-CURRENT RELEASE [I_{CT}] (A)	200	400	200	400	1600	200	400	2000
• for general feeder circuit use	400	800	400	800	400	800	800	
	800	1250	800	1250	1600	1250	1600	2000
RATED CURRENT OF OVER-CURRENT RELEASE (A)	$100 \leq I_n \leq 200$	$200 \leq I_n \leq 400$	$100 \leq I_n \leq 200$	$200 \leq I_n \leq 400$	$800 \leq I_n \leq 1600$	$100 \leq I_n \leq 200$	$200 \leq I_n \leq 400$	$1000 \leq I_n \leq 2000$
• for generator protection use	$200 < I_n \leq 400$	$400 < I_n \leq 800$	$200 < I_n \leq 400$	$400 < I_n \leq 800$		$200 < I_n \leq 400$	$400 < I_n \leq 800$	
[I_n] is generator rated current.	$400 < I_n \leq 800$	$630 < I_n \leq 1250$	$400 < I_n \leq 800$	$630 < I_n \leq 1250$	$800 < I_n \leq 1600$	$400 < I_n \leq 800$	$630 < I_n \leq 1250$	$800 < I_n \leq 1600$
			$630 < I_n \leq 1250$	$800 < I_n \leq 1600$		$1000 < I_n \leq 2000$		
AC RATED INSULATION VOLTAGE [U_i](V. 50/60Hz)	1000	1000	1000	1000	1000	1000	1000	1000
RATED OPERATIONAL VOLTAGE [U_o](V. 50/60Hz)	690	690	690	690	690	690	690	690
AC RATED BREAKING CAP [kA sym rms]/MAKING CAP [kA peak]								
JIS⑫, IEC, EN, AS	AC 690V⑤	50/105	50/105	55/121	50/105	55/121	85/187	50/105
[$I_{cs} = I_{cu}$]	440V	65/143⑥	65/143⑥	80/176	65/143⑥	80/176	100/220	65/143⑥
NEMA	AC 600V	42/96.6	42/96.6	42/96.6	42/96.6	42/96.6	50/115	42/96.6
ANSI	480V	50/115	50/115	55/127	50/115	55/127	80/184	50/115
	240V	65/149.5	65/149.5	80/184	65/149.5	80/184	100/230	65/149.5
⑦	DC 600V⑧	40/40	40/40	40/40	40/40	40/40	40/40	40/40
	250V	40/40	40/40	40/40	40/40	40/40	40/40	40/40
NK ⑨	AC 690V	50/115	50/115	55/128	50/115	55/128	85/201	50/115
	450V	65/153⑥	65/153⑥	80/186	65/153⑥	80/186	100/233	65/153⑥
LR, AB, ⑨	AC 690V	50/115	50/115	55/128	50/115	55/128	85/201	50/115
GL, BV	450V	65/153⑥	65/153⑥	80/186	65/153⑥	80/186	100/233	65/153⑥
RATED IMPULSE WITHSTAND VOLTAGE [U_{imp}](kV)	12	12	12	12	12	12	12	12
RATED SHORT TIME WITHSTAND CURRENT [I_{cw}](kA rms)	65	65	80	65	80	100	65	80
LATCHING CURRENT (kA)	50	50	55	50	55	75	50	55
TOTAL BREAKING TIME (s)	65	65	65	65	65	85	65	65
CLOSING OPERATION TIME	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
SPRING CHARGING TIME (s) max.	10	10	10	10	10	10	10	10
CLOSE TIME (s) max.	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
No. of operating cycles								
Mechanical life with maintenance	30000	30000	30000	30000	30000	25000	25000	30000
without maintenance	15000	15000	15000	15000	15000	12000	12000	15000
Electrical life without maintenance AC460V	12000	12000	12000	12000	12000	10000	10000	12000
AC690V	10000	10000	10000	10000	10000	7000	7000	10000
Draw-Out Body (kg)	⑩ 45 51	45 51	46 52	46 52	46 52	56 68	46 52	46 52
Draw-Out Chassis (kg)	⑩ 28 35	28 35	33 42	30 38	33 42	49 57	33 42	33 42
Total Draw-Out Weight (kg)	⑩ 73 86	73 86	79 94	76 90	79 94	105 125	79 94	79 94
Fixed (kg)	⑩ 53 59	53 59	54 60	54 60	54 60	80 92	54 60	54 60
OUTLINE DIMENSION (mm)								
FIXED TYPE		a 360, b 445, c 460, d 290, e 75	a 360, b 445, c 460, d 290, e 75	a 360, b 445, c 460, d 290, e 75	a 360, b 445, c 460, d 290, e 75	a 360, b 445, c 460, d 290, e 75	a 466, b 586, c 460, d 290, e 75	a 360, b 445, c 460, d 290, e 75
DRAW-OUT TYPE ⑩		a 354, b 439, c 460, d 345, e 40	a 354, b 439, c 460, d 345, e 40	a 354, b 439, c 460, d 345, e 40	a 354, b 439, c 460, d 345, e 40	a 354, b 439, c 460, d 345, e 40	a 460, b 580, c 460, d 345, e 40	a 354, b 439, c 460, d 345, e 40

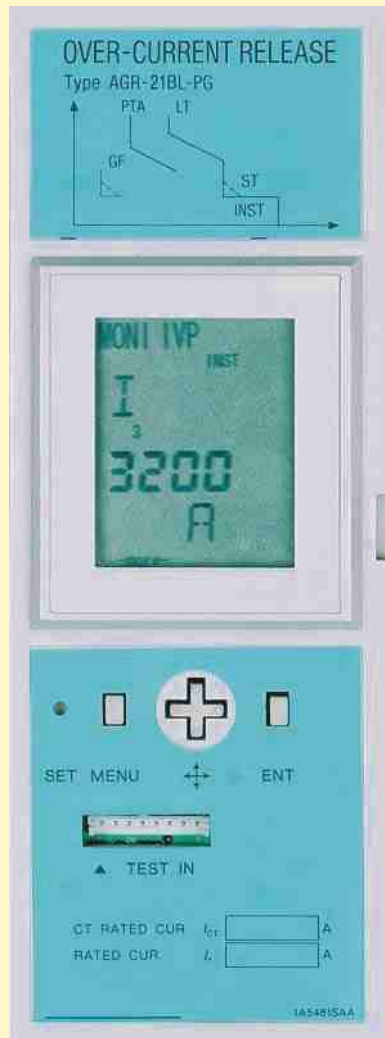
① : Values in open air at 40°C (45 C for marine applications).
 ② : Values of AR208S, AR212S, AR216S for draw-out type with horizontal terminals, Values of the other ACBs for draw-out type with vertical terminals.
 ③ : For 2 pole ACBs use outside poles of 3 pole ACB.
 ④ : 4 poles ACBs without Neutral phases protection can not apply IT earthing system.
 ⑤ : Contact BCH Electric for the details.
 ⑥ : For 500V AC.
 ⑦ : Please contact BCH Electric for DC application.
 ⑧ : 3 poles in series should be applied for 600V DC.
 ⑨ : Applicable to only 3 pole ACBs.
 ⑩ : For vertical terminals or horizontal terminals.
 ⑪ : These weights are based on normal specifications with the OCR and standard accessories.
 ⑫ : Comply with JIS C 8201-2-1 Ann.1 Ann.2
 ⑬ : Being or will be applied.
 ⑭ : Values for ACBs with INST. 100/220kA for ACBs with MCR.
 ※ : Contact BCH Electric for the ratings.
Note: When the INST trip function is set to NON, the MCR function should be enabled, otherwise, the rated breaking capacity is reduced to the rated latching current.

High fault 2000	High fault 2000	Standard 2500	High fault 2500	Standard 3200	High fault 3200	Standard 4000	Standard 4000	High fault 4000	Standard 5000	Standard 6300	High fault 6300
AR320H	AR420H	AR325S	AR325H	AR332S	AR332H	AR440SB	AR440S	AR440H	AR650S	AR663S	AR663H
2000	2000	2500	2500	3200	3200	4000	4000	4000	5000	6300	6300
2000	*	2500	2500	3200	3200	3310	3700	3700	4700	5680	5680
2000	2000	2500	2500	3200	3200	4000	4000	4000	5000	6300	6300
2000	2000	2500	2500	3200	3200	4000	4000	4000	5000	6300	6300
3 4	3	3 4	3 4	3 4	3 4	3 4	3 4	3	3 4	3 4	3 4
2000	800 2000	2500	2500	3200	3200	4000	4000	4000	5000	6300	5000 6300
$1000 \leq I_n \leq 2000$	$400 \leq I_n \leq 800$ $1000 \leq I_n \leq 2000$	$1250 \leq I_n \leq 2500$	$1250 \leq I_n \leq 2500$	$1600 \leq I_n \leq 3200$	$1600 \leq I_n \leq 3200$	$2000 \leq I_n \leq 4000$	$2000 \leq I_n \leq 4000$	$2000 \leq I_n \leq 4000$	$2500 \leq I_n \leq 5000$	$3150 \leq I_n \leq 6300$	$2500 \leq I_n \leq 5000$ $3150 \leq I_n \leq 6300$
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
690	690	690	690	690	690	690	690	690	690	690	690
85/187	75/165	65/143	85/187	65/143	85/187	85/187	75/165	75/165	85/187	85/187	85/187
100/220	120/264 ⑭	85/187 ⑥	100/220	85/187 ⑥	100/220	100/220	100/220	120/264 ⑭	120/264	120/264	135/297
50/115	65/149.5	50/115	50/115	50/115	50/115	50/115	65/149.5	65/149.5	65/149.5	65/149.5	65/149.5
80/184	75/172.5	65/149.5	80/184	65/149.5	80/184	80/184	75/172.5	75/172.5	80/184	80/184	80/184
100/230	120/276	85/195.5	100/230	85/195.5	100/230	100/230	100/230	120/276	100/230	100/230	100/230
40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40
40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40	40/40
85/201	⑬	65/153	85/201	65/153	85/201	⑬	75/179	⑬	85/201 ⑬	85/201 ⑬	85/201 ⑬
100/233	⑬	85/201 ⑥	100/233	85/201 ⑥	100/233	⑬	100/245	⑬	120/287 ⑬	120/287 ⑬	138/322 ⑬
85/201	⑬	65/153	85/201	65/153	85/201	⑬	75/179	⑬	85/201 ⑬	85/201 ⑬	85/201 ⑬
100/233	⑬	85/201 ⑥	100/233	85/201 ⑥	100/233	⑬	100/245	⑬	120/287 ⑬	120/287 ⑬	138/322 ⑬
12	12	12	12	12	12	12	12	12	12	12	12
100	100	85	100	85	100	100	100	100	120	120	135
75	85	65	75	65	75	75	85	85	85	85	85
85	100	85	85	85	85	85	100	100	120	120	120
0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.05	0.05
10	10	10	10	10	10	10	10	10	10	10	10
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
25000	15000	20000	20000	20000	20000	15000	15000	15000	10000	10000	10000
12000	8000	10000	10000	10000	10000	8000	8000	8000	5000	5000	5000
10000	3000	7000	7000	7000	7000	3000	3000	3000	1000	1000	1000
7000	2500	5000	5000	5000	5000	2500	2500	2500	500	500	500
56 68	71	56 68	56 68	56 68	56 68	58 71	71 92	71	125 160	140 180	140 180
49 57	76	49 57	49 57	49 57	49 57	68 87	68 84	76	75 100	80 105	80 105
105 125	147	105 125	105 125	105 125	105 125	126 158	139 176	147	200 260	220 285	220 285
80 92	—	80 92	80 92	80 92	80 92	—	—	—	—	—	—
466 586	—	466 586	466 586	466 586	466 586	—	—	—	—	—	—
460	—	460	460	460	460	—	—	—	—	—	—
290	—	290	290	290	290	—	—	—	—	—	—
75	—	75	75	75	75	—	—	—	—	—	—
460 580	631	460 580	460 580	460 580	460 580	460 580	631 801	631	799 1034	799 1034	799 1034
460	460	460	460	460	460	460	460	460	460	460	460
345	375	345	345	345	345	345	375	375	380	380	380
40	53	40	40	40	40	140	53	53	60	60	60

The TemPower2 series is equipped with an RMS sensing over-current release (OCR) having a wide range of protection functions and capabilities



Standard OCR with adjustment dial
Type AGR-11B.



Standard OCR with LCD- 'Ammeter'
Type AGR-21B,22B.



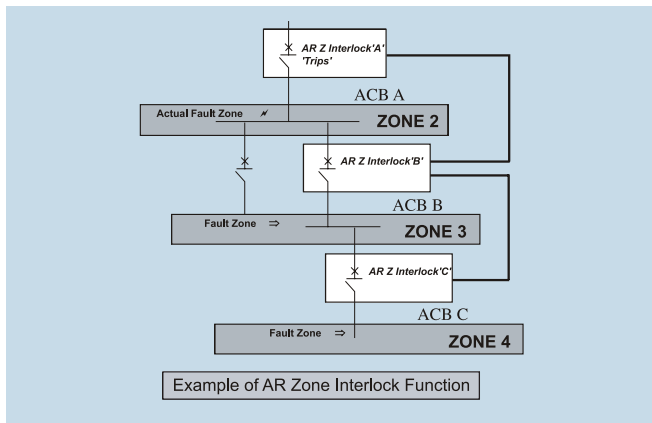
Enhanced OCR with LCD- 'Analyser'
Type AGR-31B.

Backlit LCD installed

Optional Features

- Reverse power trip function (s-characteristic)
- Two channel pre-trip alarm function
- N-phase protection function
- Ground fault trip function
- Earth leakage trip function
- Phase rotation protection function
- External display
- Advanced L.C.D. display, Over Current Relay
- Remote Communications Protocols
- Contact temperature monitoring function

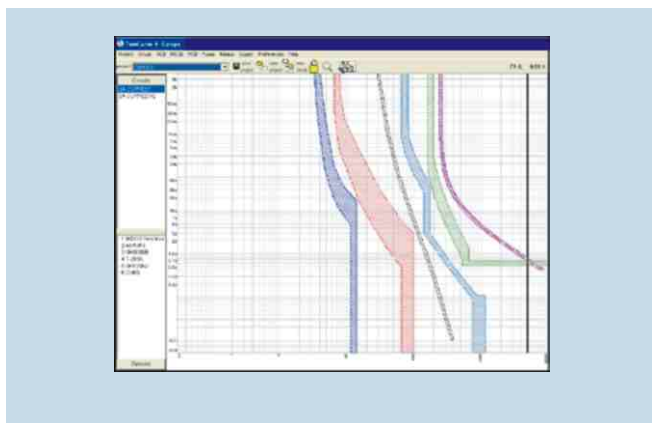
Zone Interlocking



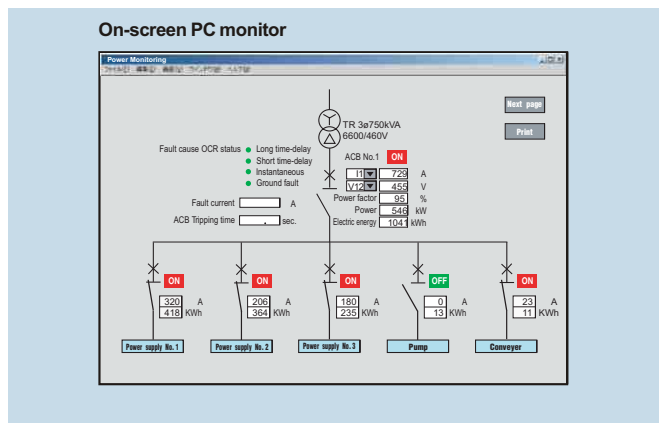
Double Neutrals



TemCurve



Communication facility



Certification

Certification and Authorization

- ASTA, UK
- NK, Japan
- LR, UK
- ABS, USA
- GL, Germany
- BV, France

- ASTA Certification Services
- Nippon Kaiji Kyokai
- Lloyd's Register of Shipping
- American Bureau of Shipping
- Germanischer Lloyd
- Bureau Veritas



BCH ELECTRIC LIMITED

Corporate Office : 1105, New Delhi House, 27, Barakhamba Road, New Delhi-110 001 Tel. : 91-11-23316029/3610/6539/43673100 Fax : 91-11-23715247, 23313465
E-mail : marketing@bchindia.com Website : www.bchindia.com

Registered Office : Block 1E, 216, Acharya Jagadish Chandra Bose Road, Kolkata - 700 017

Works : 20/4, Mathura Road, Faridabad-121 006 (Haryana) Tel. : 0129-4063000/4061026 Fax : 0129-230402