

PROTECTION RELAY GUIDE



Economy AGR-11B
Dial Adjustment



Standard AGR-21/22B
LCD Ammeter*



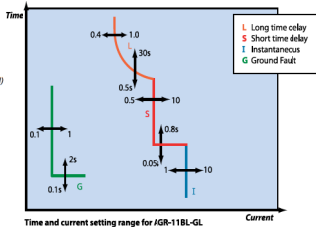
Advanced AGR-31B
Backlit LCD Analyser*

PROTECTION RELAYS	PROTECTION TYPES	PROTECTION AND INDICATION				
		OVER LOAD	SHORT CIRCUIT	GROUND FAULT	FLEETING INDICATION	INDIVIDUAL INDICATION
AGR-B	11B Economy	AL	✓	✓	✓	
	21/22B Standard	GL	✓	✓	✓	
	31B Advanced	PS	✓	✓		✓
		PG	✓	✓	✓	✓

Example of the protection relay coding guide AGR-11B-GL

The *TemPower2* Protection Relay Range is equipped with RMS sensing and has a wide range of protection functions. Options available:

- Ground Fault (Unrestricted and Restricted)
- Earth Leakage
- Pre Trip Alarm
- Neutral Protection
- Individual Contact Indication & LCD
- Spring Charge and Trip Indication
- Undervoltage Alarm
- Reverse Power
- Zone Interlocking
- Contact Temperature Monitoring
- Communication
- Phase Rotation Protection



Safety and protection are the prime purposes of Terasaki products. You care about safety and protection. The people who depend on products you specify care about safety and protection. We call the *TemPower2 ACB* the *Double Breaker*. Throughout this leaflet you will see key features of our *Double Break ACB*. It is one of the world's smallest and offers high specifications with guaranteed reliability.

Please read on and discover the benefits of the *TemPower2 Double Breaker*.



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*Ratings and specifications are subject to change without notice.

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CAF REF 09-P50E



TemPower

Simply two steps ahead

TemPower2 THE DOUBLE BREAKER

Breaking Contacts

TemPower2 is the world's first **DoubleBreak ACB**, having two breaking contacts per phase. The unique pole structure means that the short-time withstand rating (Icw) is equal to the service short-circuit breaking capacity (Ics) for all models.

Packing Density

You can increase switchboard packing density using the smallest one-second rated ACB on the market. The fixed version is 290mm deep, the drawout version is 345mm deep.

Reliability

DoubleBreak contacts increase service life. Electrical and mechanical endurance ratings are the best available, and exceed the requirements of IEC 60 947-2.

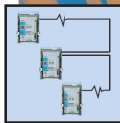
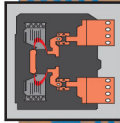
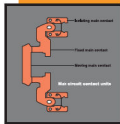
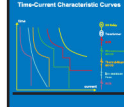
Double Quick Opening

TemPower2 ACBs clear short-circuit faults in less than 50ms. That's twice as fast as most ACBs.

Zone Interlocking

During a fault, considerable thermal and mechanical stresses are placed on the entire system. With the TemPower2 Z Interlock system, the breaker nearest the fault will trip first, irrespective of the short time delay setting.

Time-Current Characteristic Curves



Protection Characteristics

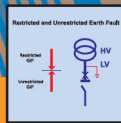
TemPower2 is the only ACB which offers time-current characteristics to 3 different standards:

- IEC 60 947-2 (low voltage circuit breakers)
- IEC 60 255-3 (electrical relays)
- Lloyds Register of Shipping (for marine generator protection)

All models have LSI protection.

Double Neutrals

How do you make a system harmonic proof in the face of increasing triple-N harmonic currents? Terasaki have launched the first Double Neutral ACB. The AH-60DN will carry 10,000A of neutral current.



Reduce Time to Repair

Modular construction means that each pole of the TemPower2 ACB can be replaced in about 15 minutes – by the user. This unique feature will reduce downtime for end-users.

Control and Monitoring Options

Circuit breaker control and monitoring can be implemented either by hard wiring or digital data transmission. The TemPower2 ACB can support Modbus communication protocol.

Double Opening and Closing Coils

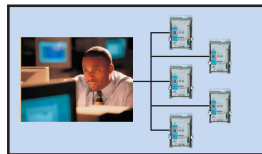
Now you can extend control system redundancy to an ACB. Double coils allow designers to implement back-up tripping and closing systems.

NEW AR440SB and AR6 ACBs

Terasaki are committed to the progressive innovation of the TemPower2 AR ACB. With this in mind we are introducing our new AR440SB 4000A ACB which is based on the A33 frame size, and new AR6 - 5000A and 6300A ACBs. Our new ACBs come with the same excellent performance expected from all Terasaki products; delivering innovative circuit protection with built-in reliability and safety. The introduction of these ACBs provide a solution from 800A to 6300A with the same front cover dimension and standardised accessories.

Double Ground Fault Protection

Restricted and Unrestricted Ground Fault Protection The AGR-B Protection Relay offers Ground Fault Protection on the line/transformer side (Restricted) and load side (Unrestricted) of the ACB.



TemPower2 ACB SELECTION GUIDE



ACB Frame Size	AR 2		AR 3		(NEW) SB	AR 6 (NEW) S
Type	S	H	S	H		
In Rated Current (kA)	800/1250/1600/2000	1250/1600/2000	2500/3200	1600/2000/2500/3200	4000	5000/6300
IN Rated Current (kA) in the Neutral Pole	800/1250/1600/2000	1250/1600/2000	2500/3200	1600/2000/2500/3200	4000	5000/6300
ACB Model	AR208S/AR212S/AR216S/AR220S	AR212H/AR216H/AR220H	AR325S/AR332S	AR318H/AR328H/AR320H/AR332H	AR440SB	AR650S/AR663S
Ics SERVICE BREAKING CAPACITY (kA, symmetrical rms)	65/9V - 65 40/9V 65 400/415V	55 80 85 85	65 85 85	85 100 100	85 100 120	100 120 120
Icstc MAKING CAPACITY (kA, asymmetrical rms)	65/9V - 40/9V 400/415V	105 143 143	121 176 187	143 187 220	187 220 220	220 297 297
Icw SHORT-TIME WITHSTANDING (kA rms)	1 Second 3 Seconds	65 80 85	80 85 100	85 100 100	100 100 120	120 120 120
Endurance Number of operating cycles		50 55 55	65 65 65	75 75 75	85 85 85	85 85 85
Mechanical (With maintenance)	30000	30000	20000	20000	15000	10000
Mechanical (Without maintenance)	15000	15000	10000	10000	8000	5000
Electrical (Without maintenance AC 400V)	12000	12000	7000	7000	5000	3000
Electrical (Without maintenance AC 690V)	10000	10000	6000	6000	4000	2500
Times						
Breaking Time (ms) maximum	0.03	0.03	0.03	0.03	0.03	0.03
Spring Charging Time (ms) maximum	10	10	10	10	10	10
Closing Time (ms) maximum	0.08	0.08	0.08	0.08	0.08	0.08
Dimensions						
Fixed Type (mm)	W pole 360 445 460 290	-----	466 586 460 290	-----	-----	-----
Drawout Type (mm)	W 3 Pole 354 439 460 345	354 439 460 345	354 439 460 345	460 580 460 345	460 580 460 345	800 1035 460 360

These specifications are common throughout the whole range:
 Rated Operational Voltage [U_n] (V/50/60Hz) 490
 AC Rated Insulation Voltage [U_i] (V/50/60Hz) 690
 Rated Impulse Withstand Voltage [U_{imp}] (kV)-12
 Applicable standards:
 IEC 60947-2
 EN 60947-2

1 AR220 - Mechanical (with maintenance) Endurance 20000 Cycles
 - Mechanical (without maintenance) Endurance 10000 Cycles
 - Electrical AC400V (without maintenance) Endurance 7000 Cycles
 - Electrical AC690V (without maintenance) Endurance 7000 Cycles
 2 Used/Used IT Systems use H Type ACBs
 3 Factor clearing coils available for UPS applications

