

Japanese
Technology



Protection, Monitoring and Control Components for Low Voltage Equipment

SELECTION GUIDE: INTERNATIONAL EDITION



[Terasaki is the world leader for circuit breakers in switchgear in the marine market]

Terasaki supply circuit breakers which protect people and equipment from electrical faults. Safety and protection are the prime purposes of our products.

We supply products to switchboard builders, shipbuilders and equipment manufacturers. We are global market leaders for switchgear in the marine market. Terasaki have worldwide export experience and the necessary professional skills to support your business.



[Telehouse Data Centre, London. 199 TemPower 2 ACBs, 423 TemBreak 2 MCCBs.]



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TERASAKI PROFILE



Mr. Taizo Terasaki
President

“We want to meet the needs of more customers around the world in our circuit breaker and lifecycle service businesses.”

Mr. Taizo Terasaki, President

Foundation:

October 1, 1923

Established:

April 1, 1980

Capital:

1236640 thousands of yen

President:

Taizo Terasaki

Number of Employees:

1776

Net sales:

36880 million yen

Subsidiaries:

5 domestic (Japan) and 8 overseas

Affiliated companies:

2 domestic

Listing:

Tokyo Stock Exchange (Jasdaq)

[Security code 6637]



Mr. Yasuhiko Terasaki
Late chairman of the company



Mr. Yasutaro Terasaki
Founder of the company

DATA CENTRE:

Telehouse
London, UK



AUTOMOTIVE:

Toyota Manufacturing
Plant, Argentina



NUCLEAR POWER:

Ringhals, Sweden



SOLAR POWER:

South Italy



DESALINATION PLANT:

Spain



MARINE: Oil Tanker
“Belokamenka”,
Russia



ALUMINIUM SMELTER:

ALBA, Bahrain



OIL PRODUCTION:

Sakhalin Island,
Russia



MINING:

BHP Billiton,
Australia



R&D

We are meeting the needs of customers with a complete system of development, design and manufacture based on the know-how we have accumulated with electrics, electronics and control over the decades since our founding.

We have DEKRA (formerly KEMA) -approved test systems and two generators in house to carry out the necessary development tests.

Terasaki realises optimised products through 3D CAD, software development, mould and sheet metal design, structural design and resin flow analysis.



PRODUCTS & SERVICES



Air Circuit Breakers



Moulded Case Circuit Breakers



Din Modular Protection



Automatic Transfer Controller



Contactors



External Display



Asset Management



Retrofit

CAPABILITIES

Safety & Reliability

High MTBF; Low MTTR; temperature monitoring, double control circuits

Approvals

ISO 9001; ISO 14001; OHSAS 18001; Lloyds; BV; GL; GOST; SABS; DEKRA (KEMA); ASTA; IEC 60947-2; IEC 61439; IEC 60898

Asset Management

Retrofits; Preventative Maintenance; Lifecycle Management

Special Protection Solutions

DC; PV; UPS; 1000V AC; Integrated residual protection; 100kA and above



3C Overheating Protection for Contacts, Connections & Conductors



3C
**OVERHEATING
PROTECTION**

3C BENEFITS

- **LOW INVESTMENT** [system is integrated with circuit breakers]
- **FAST INSTALLATION** [breakers are supplied with sensors already fitted]
- **EASY UPGRADE** [the 3C system can be retrofitted to existing installations]
- **FREE EXTENDED WARRANTY ON NEW CIRCUIT BREAKERS**
[when 3C overheating protection is included with the order]



TemCurve Selectivity Analysis Software

TemCurve Lite 3.0

TemCurve Lite Selectivity Software can assist in protection device grading from the transformer primary to the point of final distribution. The software is designed for the Terasaki range of circuit breakers, but also includes a large number of complimentary protection devices such as low and high voltage fuses and relays.

TemCurve Lite 3.0 is FREE

- The software package is now multilingual allowing you to select from: English, Italian, Spanish, Russian, Swedish, Chinese and Japanese language options
- It can output DXF and PDF files
- Latest product developments included: TemBreak 2 Lite MCCBs and TemBreak 2 CBRs.





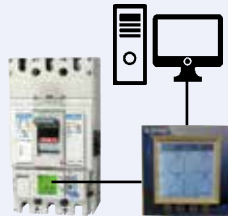
Moulded Case Circuit Breakers

5 Reasons to Use TemBreak 2 MCCBs



1. Electronic Versions with integrated monitoring and communication

Data can be sent to integrated display, local display and Modbus network simultaneously.



*See T2ED on page 22

4. Circuit breaker with integral residual current protection (CBRs) [see page 13]

We offer integrated protection from earth leakage faults, overloads and short-circuits in one device.



2. Smaller 1000A MCCB

It is only 273mm high and 210mm wide - same size as 800A MCCB



Previous 1000A MCCB New 1000A MCCB

5. Direct opening action.

The robust mechanism ensures that the force you apply to the toggle is transmitted directly to the contacts. Direct opening action is recommended by IEC 60204-1, Safety of Machinery: Electrical Equipment for Machinery



3. Superior temperature performance

We offer MCCBs for use up to 50°C without derating from 20A to 1600A



CUSTOMER ENDORSEMENT

“Terasaki Electric have supplied circuit breakers for a number of high resilience projects that we have designed, through the selected switchgear suppliers.

They have always provided excellent support to our projects and we have found them to be a good company to partner with on component supply; the selected products provided the ideal solution for our mission critical environments.

We have no hesitation in including Terasaki Electric devices in our designs.”

Karl Luck, WSP (Engineering Consultancy, UK)



Electronic Protection Including Types with Monitoring and Communication

Electrical Characteristics to IEC 60947-2, EN 60947-2, JIS C 8201-2-1 ANN.1, AS/NZS IEC 60947-2, NEMA AB-1

Frame Reference	Quantity	Unit	Condition	TB2 S/H/L 250			
Model				S250	S250	S250	H250
Type				NE	GE	PE	NE
Number of Poles				3,4	3,4	3,4	3,4
Nominal current ratings	I_n	(A)	50°C	40,125, 160,250	40,125, 160,250	40,125, 160, 250	40,125, 160, 250
Monitoring and Communication				●	●	●	●
Electrical characteristics							
Rated Operational voltage	U_e	(V)	AC 50/60 HZ	690	690	690	690
Rated insulation voltage	U_i	(V)		800	800	800	800
Rated impulse withstand voltage	U_{imp}	(kV)		8	8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	690V AC	7.5	7.5	20	20
			525V AC	25	25	35	45
			440V AC	25	50	50	120
			400/415V AC	36	65	70	125
			220/240V AC	65	85	125	150
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	690V AC	7.5	7.5	15	15
			525V AC	25	25	35	45
			440V AC	25	25	50	80
			400/415V AC	36	36	70	85
			220/240V AC	65	85	125	150
Rated breaking capacity (NEMA)		(kA)	480V AC	25	25	35	45
			240V AC	65	65	125	150
Rated short-time withstand current	I_{cw}	(kA)	0.3 sec	—	—	—	—
Utilisation category				A	A	A	A
Dimensions							
	Height	(mm)		165	165	165	165
	Width	(mm)	3 Pole	105	105	105	105
			4 Pole	140	140	140	140
	Depth	(mm)		103	103	103	103
	Weight	(kg)	3 Pole	2.5	2.5	2.5	2.5
4 Pole			3.3	3.3	3.3	3.3	
Operation							
Endurance	Electrical	cycles	415V AC	10,000			
	Mechanical	cvcles		30,000			



Electronic overload protection is adjustable from 40% to 100% of rated current for **ALL** TemBreak 2 models.

TB2 H/L 400		TB2 E/S 630					
H400	L400	S400	S400	S400	E630	S630	S630
NE	NE	NE	GE	PE	NE	CE	GE
3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4
250, 400	250, 400	250,400	250,400	250,400	630	630	630
●	●	●	●	●	●	●	●
690	690	690	690	690	690 ①	690 ①	690 ①
800	800	800	800	800	800	800	800
8	8	8	8	8	8	8	8
35	50	20	20	20	10 ①	20 ①	20 ①
45	65	30	30	30	15	30	30
120	180	45	65	80	25	45	65
125	200	50	70	85	36	50	70
150	200	85	100	100	50	85	100
35	50	15	15	15	10 ①	15 ①	15 ①
45	65	30	30	30	15	30	30
80	135	45	50	80	25	45	50
85	150	50	50	85	36	50	50
150	150	85	85	85	50	85	85
45	65	25	30	30	15	25	30
150	200	85	100	100	50	85	100
5	5	5	5	5	—	—	—
B	B	B	B	B	A	A	A
260	260	260	260	260	260	260	260
140	140	140	140	140	140	140	140
185	185	185	185	185	185	185	185
140	140	103	103	103	103	103	103
7.1	7.1	4.3	4.3	4.3	5.0	5.0	5.0
9.4	9.4	5.7	5.7	5.7	6.5	6.5	6.5
4,500	4,500						
15,000	15,000						



Selecting a Preset
Characteristic for a 400A
TemBreak 2 MCCB with
Electronic Protection



Electronic Protection Including Types with Monitoring and Communication

Electrical Characteristics to IEC 60947-2, EN 60947-2, JIS C 8201-2-1 ANN.1, AS/NZS IEC 60947-2, NEMA AB-1

Frame Reference	Quantity	Unit	Condition	TB2 H/L 800		TB2 1000			
Model				H800	L800	S800	S800	S1000	S1000
Type				NE	NE	NE	RE	SE	NE
Number of Poles				3,4	3,4	3,4	3,4	3,4	3,4
Nominal current ratings	I_n	(A)	50°C	630,800	630,800	630,800	630,800	1000 ^⑥	1000 ^⑥
Monitoring and Communication				●	●	●	●	●	●
Electrical characteristics									
Rated Operational voltage	U_e	(V)	AC 50/60 HZ	690	690	690	690	690	690
Rated insulation voltage	U_i	(V)		800	800	800	800	800	800
Rated impulse withstand voltage	U_{imp}	(kV)		8	8	8	8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	690V AC	25 ^①	25 ^①	20 ^①	25 ^①	20 ^①	25 ^①
			525V AC	40	45	30	35	30	45
			440V AC	125	180	50	65	45	65
			400/415V AC	125	200	50	70	50	70
			220/240V AC	150	200	85	100	85	100
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	690V AC	20 ^①	20 ^①	20 ^①	20 ^①	15 ^①	20 ^①
			525V AC	34	34	30	30	23	34
			440V AC	94	135	50	50	34	50
			400/415V AC	94	150	50	50	38	50
			220/240V AC	150	150	85	75	65	75
Rated breaking capacity (NEMA)		(kA)	480V AC	40	45	30	35	30	45
			240V AC	150	200	85	100	85	100
Rated short-time withstand current	I_{cw}	(kA)	0.3 sec	10	10	10	10	—	—
Utilisation category				B	B	B	B	A	A
Dimensions									
	Height	(mm)		273	273	273	273	273	273
	Width	(mm)	3 Pole	210	210	210	210	210	210
			4 Pole	280	280	280	280	280	280
	Depth	(mm)		140	140	103	103	103	103
	Weight	(kg)	3 Pole	⑥	⑥	④	④	11.0	11.0
4 Pole			⑦	⑦	⑤	⑤	14.8	14.8	
Operation									
Endurance	Electrical	cycles	415V AC	4,000		4,000			
	Mechanical	cycles		10,000		10,000			
— Not available • Optional ① MCCB cannot be used in IT systems at this voltage ②100KA at 400V ③75KA at 400V ④8.7kg 630A, 9.1kg 800A ⑤11.9kg 630A, 12.3kg 800A									
⑥13.3ka 630A, 14.8ka 800A ⑦16.8ka 630A, 18.8ka 800A ⑧Not fully rated at 50°C. Contact Terasaki									

— Not available • Optional ① MCCB cannot be used in IT systems at this voltage ② 100KA at 400V ③ 75KA at 400V ④ 8.7kg 630A, 9.1kg 800A ⑤ 11.9kg 630A, 12.3kg 800A ⑥ 13.3kg 630A, 14.8kg 800A ⑦ 16.8kg 630A, 18.8kg 800A ⑧ Not fully rated at 50°C. Contact Terasaki



Electronic overload protection is adjustable from 40% to 100% of rated current for **ALL** TemBreak 2 models.

TB2 1250			TB2 1600	
S1250	S1250	S1250	S1600	S1600
SE	NE	GE	SE	NE
3,4	3,4	3,4	3,4	3,4
800, 1250	800, 1250	800, 1250	1250, 1600	1250, 1600
–	–	–	–	–
690	690	690	690	690
800	800	800	800	800
8	8	8	8	8
20 ^①	25 ^①	45 ^①	20 ^①	45 ^①
30	45	65	30	65
45	65	85	45	85
50	70	100/85 ^②	50	100/85 ^②
85	100	125	85	125
15 ^①	20 ^①	34 ^①	15 ^①	34 ^①
23	34	50	23	50
34	50	65	34	65
38	50	75/65 ^③	38	75/65 ^③
65	75	94	65	94
30	45	65	30	65
85	100	125	85	125
15	15	15	20	20
B	B	B	B	B
370	370	370	370	370
210	210	210	210	210
280	280	280	280	280
120	120	120	140	140
19.8	19.8	19.8	27.0	27.0
25.0	25.0	25.0	35.0	35.0
4,000			2,000	
5,000			5,000	

– Not available • Optional ① MCCB cannot be used in IT systems at this voltage ②100KA at 400V ③75KA at 400V ④8.7kg 630A, 9.1kg 800A ⑤11.9kg 630A, 12.3kg 800A ⑥13.3kg 630A, 14.8kg 800A ⑦16.8kg 630A, 18.8kg 800A

MCCBS up to 3200A are available. Contact Terasaki for details.



Electronic overload protection is adjustable from 40% to 100% of rated current for **ALL** TemBreak 2 models.



Adjustable Thermal and Adjustable Magnetic Protection

Electrical Characteristics to IEC 60947-2, EN 60947-2, JIS C 8201-2-1 ANN.1, AS/NZS 3947-2, NEMA AB-1

Frame Reference	Quantity	Unit	Condition	TB2 S125		TB2 S250	
Model				S125	S125	S160	S160
Type				NJ	GJ	NJ	GJ
Number of Poles				3,4	3,4	3,4	3,4
Nominal current ratings	I_n	(A)	50°C	20,32,50, 63,100,125	20,32,50, 63,100,125	20,32,50,63, 100,125,160	50,63,100, 125,160
Electrical characteristics							
Rated Operational voltage	U_e	(V)	AC 50/60 Hz DC	690 250	690 250	690 250	690 250
Rated insulation voltage	U_i	(V)		800	800	800	800
Rated impulse withstand voltage	U_{imp}	(kV)		8	8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	690V AC	6	6	7.5 (5*)	7.5
			525V AC	22	25	25(18*)	25
			440V AC	25	50	25(18*)	50
			400/415V AC	36	65	36 (30*)	65
			220/240V AC	50	85	65 (42*)	85
			250V DC	25	40	40 (30*)	40
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	690V AC	6	6	7.5 (5*)	7.5
			525V AC	22	22	25(18*)	25
			440V AC	25	25	25(18*)	25
			400/415V AC	36/30	36/33	36 (25*)	36
			220/240V AC	50	85	65 (35*)	85
			250V DC	19	40	40 (25*)	40
Rated breaking capacity (NEMA)		(kA)	480V AC	22	25	22(18*)	25
			240V AC	50	85	65(42*)	85
Utilisation category				A	A	A	A
Dimensions							
	Height	(mm)		155	155	165	165
	Width	(mm)	3 Pole	90	90	105	105
			4 Pole	120	120	140	140
	Depth	(mm)		68	68	68	68
	Weight	(kg)	3 Pole	1.1	1.1	1.5	1.5
			4 Pole	1.4	1.4	1.9	1.9
Operation							
Endurance	Electrical	cycles	415V AC	30,000		20,000	
	Mechanical	cvcles		30,000		30,000	

Frame Reference	Quantity	Unit	Condition	TB2 S/H/L 250			TB2 E/S 630	
Model				S250	H250	L250	E400	S400
Type				RJ	NJ	NJ	NJ	CJ
Number of Poles				3,4	3,4	3,4	3,4	3,4
Nominal current ratings	I_n	(A)	50°C	160,250	160,250	160,250	250,400	250,400
Electrical characteristics								
Rated Operational voltage	U_e	(V)	AC 50/60 Hz DC	690 250	690 250	690 250	525 250	690 250
Rated insulation voltage	U_i	(V)		800	800	800	800	800
Rated impulse withstand voltage	U_{imp}	(kV)		8	8	8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	690V AC	20	20	25	—	15
			525V AC	35	45	65	15	22
			440V AC	65	120	180	22	30
			400/415V AC	65	125	200	25	36
			220/240V AC	100	150	200	35	50
			250V DC	40	40	40	25	40
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	690V AC	15	15	20	—	15
			525V AC	35	45	65	15	22
			440V AC	65	80	135	22	30
			400/415V AC	65	85	150	25	36
			220/240V AC	100	150	150	35	50
			250V DC	40	40	40	19	40
Rated breaking capacity (NEMA)		(kA)	480V AC 240V AC	35 100	45 150	65 200	15 35	22 50
Utilisation category				A	A	A	A	A
Dimensions								
	Height	(mm)		165	165	165	260	260
	Width	(mm)	3 Pole	105	105	105	140	140
			4 Pole	140	140	140	185	185
	Depth	(mm)		103	103	103	103	103
	Weight	(kg)	3 Pole	2.4	2.4	2.4	4.2	4.3
			4 Pole	3.2	3.2	3.2	5.6	5.6
Operation								
Endurance	Electrical	cycles	415V AC	10,000			4,500	
	Mechanical	cycles		30,000			15,000	

① MCCB cannot be used in IT systems at this voltage *Applies only to 20A and 32A models – Not available

TB2 S250			TB2 S/H/L 250			
S250	S250		S125	H125	L125	H160
NJ	GJ		RJ	NJ	NJ	NJ
3,4	3,4		3,4	3,4	3,4	3,4
160,200,250	160,200,250		20,32,50,63,100,125			160
690	690	690	690	690	690	690
250	250	250	250	250	250	250
800	800	800	800	800	800	800
8	8	8	8	8	8	8
7.5	7.5	20	20	25	20	25
25	25	35	45	65	45	65
25	50	65	120	180	120	180
36	65	65	125	200	125	200
65	85	100	150	200	150	200
40	40	40	40	40	40	40
7.5	7.5	15	15	20	15	20
25	25	35	45	65	45	65
25	25	65	80	135	80	135
36	36	65	85	150	85	150
65	85	100	150	150	150	150
40	40	40	40	40	40	40
22	25	35	45	65	45	65
65	85	100	150	200	150	200
A	A	A	A	A	A	A
165	165	165	165	165	165	165
105	105	105	105	105	105	105
140	140	140	140	140	140	140
68	68	103	103	103	103	103
1.5	1.5	2.4	2.4	2.4	2.5	2.5
1.9	1.9	3.2	3.2	3.2	3.3	3.3
10,000			30,000			20,000
30,000			30,000			30,000



Thermal protection is adjustable from 63% to 100% of rated current. We can supply MCCBs with thermal protection sealed and fixed at specific values (for example 40A, 80A,300A) by special request.

TB2 E/S 630			TB2 1000		
S400	S400	S400	S800	S800	S800
NJ	GJ	PJ	CJ	NJ	RJ
3,4	3,4	3,4	3,4	3,4	3,4
250,400	250,400	250,400	630,800	630,800	630,800
690	690	690	690	690	690
250	250	250	250	250	250
800	800	800	800	800	800
8	8	8	8	8	8
20	20	20	10 ^①	20 ^①	25 ^①
30	30	30	15 ^①	30	45
45	65	80	30	50	65
50	70	85	36	50	70
85	100	100	50	85	100
40	40	40	50	50	50
15	15	15	10 ^①	20 ^①	20 ^①
30	30	30	15 ^①	30	34
45	50	80	30	50	50
50	50	85	36	50	50
85	85	85	50	85	75
40	40	40	50	50	50
25	30	30	15	30	65
85	100	100	50	85	200
A	A	A	A	A	A
260	260	260	273	273	273
140	140	140	210	210	210
185	185	185	280	280	280
103	103	103	103	103	103
4.2	4.2	4.2	8.5	8.5	8.5
5.6	5.6	5.6	11.5	11.5	11.5
4,500			4,000		
15,000			10,000		



TemBreak 2 Lite

Electrical Characteristics to IEC 60947-2, EN 60947-2, JIS C 8201-2-1 ANN.1, AS/NZS 3947-2, NEMA AB-1

Frame Reference	Quantity	Condition	TB2 Lite 160				
Model			E160	E160	E160	S160	S160
Type			SF	SF	SJ	SCF	SHF
Number of Poles			1	3,4	3,4	3,4	3,4
Nominal current ratings	I_n (A)	50°C	16,20,25,32, 40,50,63,80, 100,125	16,20,25,32, 40,50,63,80, 100,125,160	20,40,63,80, 100, 125,160	16,20,25,32, 40,50,63,80, 100,125,160	16,20,25,32, 40,50,63,80, 100,125,160
Electrical characteristics							
Rated Operational voltage	U_e (V)	AC 50/60 Hz DC	240 –	525 250	525 250	525 250	525 250
Rated insulation voltage	U_i (V)		690	690	690	690	690
Rated impulse withstand voltage	U_{imp} (kV)		8	8	8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu} (kA)	690V AC	–	–	–	–	–
		525V AC	–	6	6	7.5	7.5
		440V AC	–	10	10	15	7.5
		400/415V AC	–	16	16	25	25
		220/240V AC 250V DC	25 –	25 13	25 13	35 20	35 20
Service Breaking Capacity (IEC, JIS, AS/NZS)	I_{cs} (kA)	690V AC	–	–	–	–	–
		525V AC	–	3	3	4	4
		440V AC	–	5	5	7.5	4
		400/415V AC	–	8	8	13	25
		220/240V AC 250V DC	13 –	13 7	13 7	18 10	25 10
Rated breaking capacity (NEMA)	(kA)	480V AC 240V AC	– 25	6 25	6 25	7.5 35	– –
Protection							
Fixed Thermal, fixed magnetic			□	□	–	□	□
Adjustable thermal, fixed magnetic			–	–	□	–	–
Dimensions							
	Height (mm)		130	130	130	130	100
	Width (mm)	3 Pole (4 Pole)	25 (1P)	75, (100)	75, (100)	75, (100)	75, (100)
	Depth (mm)		68	68	68	68	68
	Weight (kg)	3 Pole (4 Pole)	0.3 (1P)	0.8 (1.0)	0.8 (1.0)	0.8 (1.0)	0.8 (1.0)
Endurance							
Electrical	415V		10,000	10,000 ^①			
Mechanical			20,000	20,000			

– Not available □ Standard ① 14,000<125A

Frame Reference	Quantity	Condition	TB2 Lite 160			
Model			S160	S160	S160	S160
Type			SCJ	SHJ	SF	SJ
Number of Poles			3, 4	3, 4	3, 4	3, 4
Nominal current ratings	I_n (A)	50°C	25,40,63,80, 100,125, 160	25,40,63, 80,100, 125,160	16,20,25,32,40,50, 63,80,100,125,160	25,40,63,80, 100,125, 160
Electrical characteristics						
Rated Operational voltage	U_e (V)	AC 50/60 Hz DC	525 250	525 250	690 250	690 250
Rated insulation voltage	U_i (V)		690	690	690	690
Rated impulse withstand voltage	U_{imp} (kV)		8	8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu} (kA)	690V AC	–	–	6	6
		525V AC	7.5	7.5	10	10
		440V AC	15	7.5	25	25
		400/415V AC	25	25	40	40
		220/240V AC 250V DC	35 20	35 20	50 25	50 25
Service Breaking Capacity (IEC, JIS, AS/NZS)	I_{cs} (kA)	690V AC	–	–	3	3
		525V AC	4	4	7.5	7.5
		440V AC	7.5	4	13	13
		400/415V AC	13	25	20	20
		220/240V AC 250V DC	18 10	25 10	25 13	25 13
Rated breaking capacity (NEMA)	(kA)	480V AC 240V AC	7.5 35	– –	10 50	10 50
Protection						
Fixed Thermal, fixed magnetic			–	–	□	–
Adjustable thermal, fixed magnetic			□	□	–	□
Dimensions						
	Height (mm)		130	130	130	130
	Width (mm)	3 Pole (4 Pole)	75, (100)	75, (100)	75, (100)	75, (100)
	Depth (mm)		68	68	68	68
	Weight (kg)	3 Pole (4 Pole)	0.8 (1.0)	0.8 (1.0)	0.8 (1.0)	0.8 (1.0)
Endurance						
Electrical	415V					
Mechanical						

– Not available □ Standard ① 14,000<125A

Frame Reference	Quantity	Condition	TB2 Lite 250		
Model			E250	E250	E250
Type			SCF	SCJ	SF
Number of Poles			3, 4	3, 4	3, 4
Nominal current ratings	I_n	50°C	125,150, 175, 200, 225,250	100,125, 160, 200, 250	125,150, 175, 200, 225,250
Electrical characteristics					
Rated Operational voltage	U_E (V)	AC 50/60 Hz DC	525 250	525 250	525 250
Rated insulation voltage	U_i (V)		690	800	690
Rated impulse withstand voltage	U_{imp} (kV)		8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu} (kA)	690V AC	–	–	–
		525V AC	6	6	7.5
		440V AC	10	10	15
		400/415V AC	16	16	25
		220/240V AC	25	25	35
	250V DC	13	13	15	
Service Breaking Capacity (IEC, JIS, AS/NZS)	I_{cs} (kA)	690V AC	–	–	–
		525V AC	3	3	6
		440V AC	5	5	12
		400/415V AC	8	8	19
		220/240V AC	13	13	27
	250V DC	7	7	12	
Rated breaking capacity (NEMA)	(kA)	480V AC	6	6	10
		240V AC	25	25	35
Protection					
Fixed Thermal, fixed magnetic			☐	–	☐
Adjustable thermal, adjustable magnetic			–	☐	–
Dimensions					
	Height (mm)		165	165	165
	Width (mm)	3 Pole (4 Pole)	105 (140)	105 (140)	105 (140)
	Depth (mm)		68	68	68
Weight	Weight (kg)	3 Pole (4 Pole)	1.5 (1.9)	1.5 (1.9)	1.5 (1.9)
Endurance					
	Electrical	415V	6,000		
	Mechanical		18,000		

– Not available ☐ Standard ① 14,000 < 125A

Frame Reference	Quantity	Condition	TB2 Lite 250		
Model			E250	S250	S250
Type			SJ	SF	SJ
Number of Poles			3, 4	3, 4	3, 4
Nominal current ratings	I_n	50°C	100,125, 160, 200,250	125,150,175, 200,225,250	160,200,250
Electrical characteristics					
Rated Operational voltage	U_E (V)	AC 50/60 Hz DC	525 250	690 250	690 250
Rated insulation voltage	U_i (V)		800	690	800
Rated impulse withstand voltage	U_{imp} (kV)		8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu} (kA)	690V AC	–	4	4
		525V AC	7.5	10	10
		440V AC	15	30	30
		400/415V AC	25	40	40
		220/240V AC	35	85	85
		250V DC	15	25	25
Service Breaking Capacity (IEC, JIS, AS/NZS)	I_{cs} (kA)	690V AC	–	4	4
		525V AC	6	7.5	7.5
		440V AC	12	15	15
		400/415V AC	19	20	20
		220/240V AC	27	43	43
		250V DC	12	13	13
Rated breaking capacity (NEMA)	(kA)	480V AC	10	25	25
		240V AC	35	85	85
Protection					
Fixed Thermal, fixed magnetic			–	☐	–
Adjustable thermal, adjustable magnetic			☐	–	☐
Dimensions					
	Height (mm)		165	165	165
	Width (mm)	3 Pole (4 Pole)	105 (140)	105 (140)	105 (140)
	Depth (mm)		68	68	68
Weight	Weight (kg)	3 Pole (4 Pole)	1.5 (1.9)	1.5 (1.9)	1.5 (1.9)
Endurance					
	Electrical	415V			
	Mechanical				

– Not available ☐ Standard ① 14,000 < 125A



Circuit Breakers with Integral Residual Current Protection (CBR)

Electrical Characteristics to IEC 60947-1, IEC 60947-2, IEC 60947-2 ANNEXB, IEC 60755

Frame Reference	Quantity	Unit	Condition	TB2 S125		
Model				ZE125	ZS125	ZS125
Type				NJ	NJ	GJ
Number of Poles				3,4	3,4	3,4
Nominal current ratings	I_n	(A)	50°C	20,32,50,63, 100,125	20,32,50,63, 100,125	20,32,50,63, 100,125
Electrical characteristics						
Rated Operational voltage	U_e	(V)	AC 50/60 HZ	525	525	525
Rated insulation voltage	U_i	(V)		525	525	525
Rated impulse withstand voltage	U_{imp}	(kV)		8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	525V AC	8	22	25
			440V AC	15	25	50
			400/415V AC	25	36	65
			220/240V AC	35	50	85
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	525V AC	6	22	22
			440V AC	12	25	25
			400/415V AC	19	36/30	36/33
			220/240V AC	27	50	85
Protection						
Adjustable thermal, fixed magnetic, residual/earth leakage				☐	☐	☐
Dimensions						
	Height	(mm)		155	155	155
	Width	(mm)	3 Pole	90	90	90
			4 Pole	120	120	120
	Depth	(mm)		68	68	68
	Weight	(kg)	3 Pole	1.1	1.1	1.1
			4 Pole	1.4	1.4	1.4
Operation						
Endurance	Electrical	cycles	415V AC	30,000		
	Mechanical	cycles		30,000		
– Not available ☐ Standard						

Frame Reference	Quantity	Unit	Condition	TB2 S250		
Model				ZE250	ZS250	ZS250
Type				NJ	NJ	GJ
Number of Poles				3,4	3,4	3,4
Nominal current ratings	I_n	(A)	50°C	160,250	160,250	160,250
Electrical characteristics						
Rated Operational voltage	U_e	(V)	AC 50/60 HZ	525	525	525
Rated insulation voltage	U_i	(V)		525	525	525
Rated impulse withstand voltage	U_{imp}	(kV)		8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	525V AC	10	25	25
			440V AC	15	25	50
			400/415V AC	25	36	65
			220/240V AC	35	65	85
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	525V AC	7.5	25	25
			440V AC	12	25	25
			400/415V AC	19	36	36
			220/240V AC	27	65	85
Protection						
Adjustable thermal, fixed magnetic, residual/earth leakage				☐	☐	☐
Dimensions						
	Height	(mm)		165	165	165
	Width	(mm)	3 Pole	105	105	105
			4 Pole	140	140	140
	Depth	(mm)		68	68	68
	Weight	(kg)	3 Pole	1.5	1.5	1.5
			4 Pole	1.9	1.9	1.9
Operation						
Endurance	Electrical	cycles	415V AC	10,000		
	Mechanical	cycles		10,000		
– Not available ☐ Standard						



Circuit Breakers with Integral Residual Current Protection (CBR)



Residual current protection settings: 30mA, 100mA, 300mA, 500mA, 1000mA and 3000mA.

What is a CBR?

Integral CBR – “circuit breakers... which incorporate the residual current function as an integrated feature”:

IEC 60947-2 Annex B.

In other words a CBR is a moulded-case circuit breaker equivalent of a DIN-modular RCBO – it includes overload, short-circuit and residual current protection inside a single device.

How can a CBR give me a cost advantage?

When CBR is used as the supply connection device and is set to 30 mA, RCBOs are not required on outgoing load circuits for electric shock protection (unless discrimination is required).

The residual current protection provided by the supply connection device covers all load circuits. MCBs may be used to protect load circuits and the installation will still meet the requirements for electric shock protection “RCD”



Moulded Case Products for Special Applications

Switch-Disconnectors



Every frame size includes a switch-disconnector version without integral protection. Internal and external accessories are compatible with switch-disconnector versions.



Circuit Breakers and Switch Disconnectors up to 1000V DC



We have developed special version of MCCBs to protect systems with DC voltages above 250V. Our range extends to 1000V DC and are often used to protect solar energy plants.



Circuit Breakers with $I_{cu}=70kA$ at 690V AC



High performance at the distribution voltages found in marine applications. Terasaki supply more switchgear to ships than any other manufacturer worldwide.



Circuit Breakers and Switch Disconnectors for 800V and 1000V AC



High AC voltages are used to minimise cable costs for installations where long cable runs are necessary. Terasaki supply MCCBs and switch-disconnectors for large solar farms, mines and railways. The latest addition to our range is the VE400-NE which can interrupt 30kA at 800V AC.



Low Instantaneous

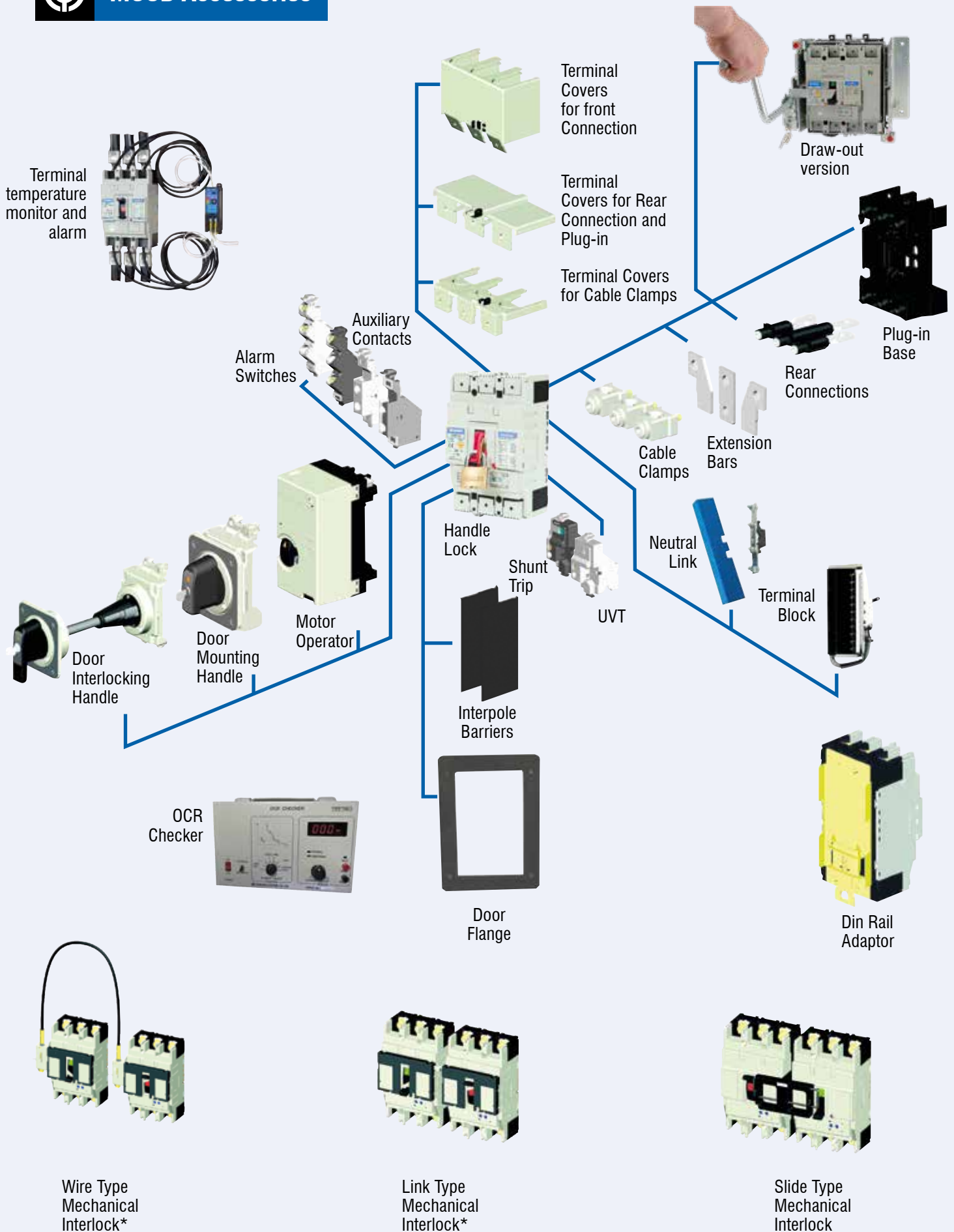


The available short-circuit output of generators is lower than typical transformers. Sometimes MCCBs with sensitive instantaneous protection are necessary for use with generators.





MCCB Accessories



*Compatible with motor operator or either handle.



5 Reasons to use TemPower 2 ACBs



1. Arc flash risk reduction: Safe mode

To minimise the damage that an arc flash can cause to a switchboard, the incoming circuit breaker must be set to detect and clear the arc fault within an optimum timeframe. Safe mode works by automatically implementing a temporary protection setting 'maintenance mode' within the incoming ACB before people can enter the switch room.



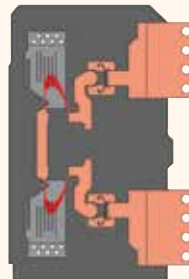
2. Arc flash risk reduction: Remote switching

The TemPower 2 ACB can be configured for remote switching during maintenance. This system uses the principle that "distance is safety" and removes the operator from the proximity of the breaker being operated.



3. Fast interruption by unique "Double Break" system*

The unique "DoubleBreak" main contact system ensures extremely fast interruption of short circuit currents and substantially reduces main contact wear. The internally symmetrical "DoubleBreak" structure means the moving contact is isolated from the supply voltage even when the ACB is reverse connected. TemPower 2 ACBs up to 4000A use DoubleBreak technology.



4. Easy Maintenance

The unique design of TemPower 2 incorporates its isolating clusters and main contacts on the ACB body. The main contacts and isolating clusters may be maintained without having to isolate the switchboard.



5. Replacement of the main contacts*

The fixed and moving contacts can easily be replaced in the field, thus prolonging the life on the circuit breaker. Changing each pole takes around 15 minutes.

*Not available on AR6



CUSTOMER ENDORSEMENT

"The performance of Terasaki's ACBs was proven on site when a main busbar failed in one of the switchrooms. The ACB was reclosed on the short-circuit fault twice during fault diagnosis and is still in operation following a service by Terasaki."

Andy Oswald, BAA
(Airport Operating Company, UK)



Air Circuit Breakers Selection Guide



TemPower 2 ACB

Frame Reference	Quantity	Unit	Condition	AR2			AR3		AR4	AR6
ACB Model				AR208, AR212, AR216	AR208, AR212, AR216, AR220	AR212, AR216, AR220	AR325, AR332	AR316, AR320, AR325, AR332	AR440	AR650, AR663
Type				D	S	H	S	H	SB	S
Number of Poles				3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4
Nominal Current Ratings										
	I_n	A		800,1000,1250, 1600	800,1000,1250, 1600,2000	1250,1600, 2000	2500,3200	1600,2000, 2500,3200	4000	5000,6300
Electrical Characteristics										
Rated Operational Voltage	U_e	V		690	690	690	690	690	690	690
Rated Insulation Voltage	U_i	V		1000	1000	1000	1000	1000	1000	1000
Rated Impulse Withstand Voltage	U_{imp}	kV		12	12	12	12	12	12	12
Ultimate Breaking Capacity	I_{cu}	kA	690V AC	42 ^②	50 ^②	55	65 ^②	85	85 ^②	85 ^②
			440V AC	50	65	80	85	100	100	120
			400/415V AC	50	65	80	85	100	100	120
			250V DC ^①	40	40	40	40	40	40	40
Service Breaking Capacity	I_{cs}	kA	690V AC	32 ^②	50 ^②	55	65 ^②	85	85 ^②	85 ^②
			440V AC	36	65	80	85	100	100	120
			400/415V AC	36	65	80	85	100	100	120
			250V DC ^①	40	40	40	40	40	40	40
Making Capacity	I_{cm}	kA	690V AC	88 ^②	105 ^②	121	143	187	187 ^②	187 ^②
			440V AC	105	143	176	187	220	220	264
			400/415V AC	105	143	176	187	220	220	264
Rated Short-time Withstand Current	I_{cw}	kA	1 Second	50	65	80	85	100	100	120
			3 Seconds	36	50	55	65	75	75	85
Breaking Time		seconds		0.03	0.03	0.03	0.03	0.03	0.03	0.05
Spring Charging Time		seconds		10	10	10	10	10	10	10
Closing Time		seconds		0.08	0.08	0.08	0.08	0.08	0.08	0.08
Utilisation Category				B	B	B	B	B	B	B
Dimensions										
Fixed Type	Height	mm		460	460	460	460	460	–	–
	Width	mm	3 pole	360	360	360	466	466	–	–
	Width	mm	4 Pole	445	445	445	586	586	–	–
	Depth	mm		290	290	290	290	290	–	–
	Weight	kg	3 pole	53	54	54	80	80		
	Weight	kg	4 Pole	59	60	60	92	92		
Drawout Type	Height	mm		460	460	460	460	460	460	460
	Width	mm	3 pole	354	354	354	460	460	460	799
	Width	mm	4 Pole	439	439	439	580	580	580	1034
	Depth	mm		345	345	345	345	345	345	380
	Weight	kg	3 pole Drawout	73	79	79	105	105	126	200
	Weight	kg	4 Pole Drawout	86	94	94	125	125	158	285
Endurance										
Mechanical	Cycles		With maintenance	26000	30000	30000 ^③	20000	20000	15000	10000
Mechanical	Cycles		Without maintenance	12500	15000	15000 ^③	10000	10000	8000	5000
Electrical	Cycles		Without maintenance at 440V AC	11000	12000	12000 ^③	7000	7000	3000	1000
Electrical	Cycles		With maintenance at 440V AC	26000	30000	30000 ^③	20000	20000	15000	10000

Notes

① Special versions are available for use at 600V and 800V DC. Contact us for details

② Not applicable in unearthed (IT) systems

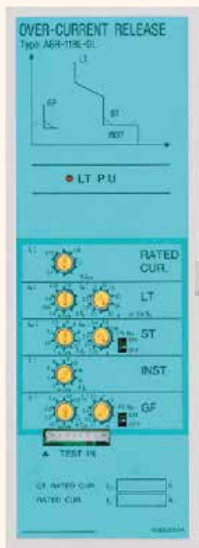
③ AR220S

Mechanical Endurance: with maintenance - 25000
without maintenance - 12000

Electrical Endurance: with maintenance - 25000
without maintenance - 10000



Protection Relay Guide



AGR-11B

Protection Functions

Dial Adjustment

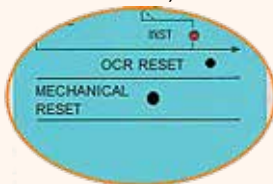
L – Long Time
S – Short Time
I – Instantaneous

Optional Protection Functions

Unrestricted Ground Fault
Neutral Protection

Manual Reset

(Optional AGR-11B-AS,
AGR11BL-GS)



AGR-21B

Protection Functions

LCD Ammeter

L – Long Time
S – Short Time
I – Instantaneous
Pre-Trip (load shedding)
Fault Indication Contacts

Optional Protection Functions

Ground Fault (Unrestricted or Restricted)
Neutral Protection
Communication
Phase Rotation Protection
Generator Protection Curves
IDMT Protection Curves
Field Test



These features are now
available on AGR-31B H



AGR-31B (H)

Protection Functions

Back-Lit Energy Meter

L – Long Time
S – Short Time
I – Instantaneous
Pre-Trip (load shedding)
Fault Indication Contacts

Harmonic Monitoring
Event History
Dual Settings Capability

Optional Protection Functions

Ground Fault (Unrestricted or Restricted)
Neutral Protection
Reverse Power
Zone Interlocking
3C Overheating Protection
Communication
Generator Protection Curves
Phase Rotation Protection
IDMT Protection Curves
Under/Over Frequency
Under/Over Voltage Alarm

Non-Automatic (switch-disconnector) versions without protection are available in every frame size.

TemPower 2 ACBs for 800V, 1000V AND 1150V AC

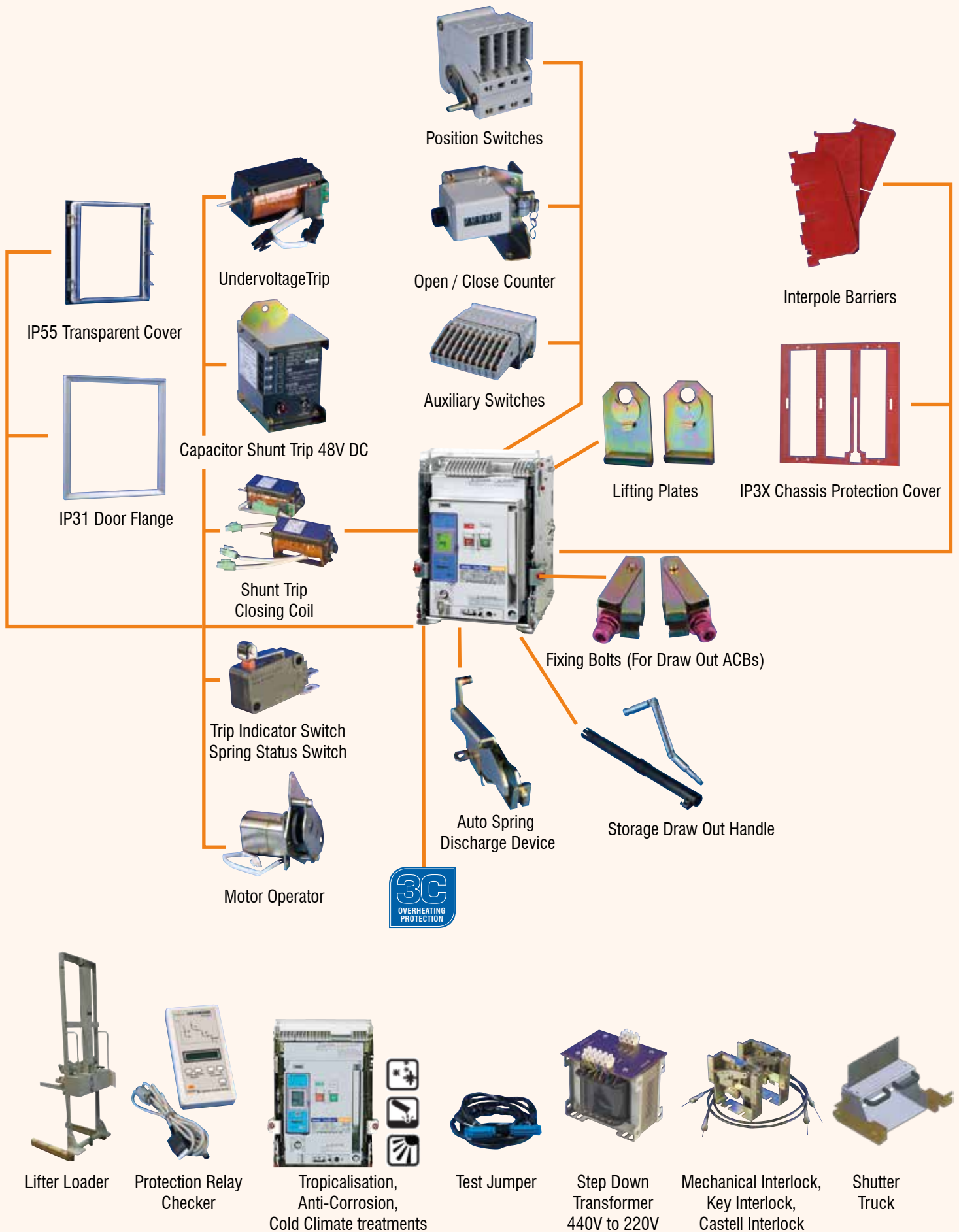
High AC voltages are used to minimise cable costs for installations where long cable runs are necessary. Terasaki supply ACBs for large solar farms, mines and railways. The latest additions to our range are the AR316H-V8, AR320H-V8, AR325H-V8 and AR332H-V8, which can all interrupt 30kA at 800V AC.



TemPower 2 AR332H-V8 ACB

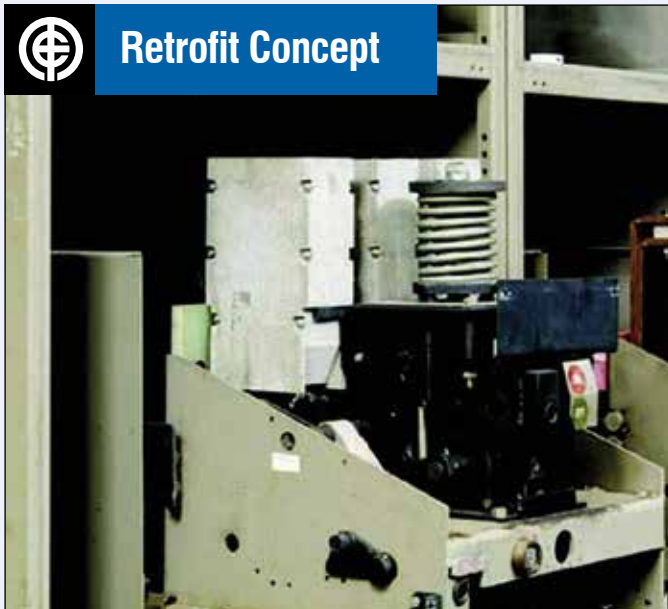


ACB Accessories





Retrofit Concept



Retrofitting refers to the addition of new technology to older systems. Retrofit ACBs can replace ageing, unsafe switches and circuit breakers.

Top 5 reasons to use Retrofit

1. Improve safety and functionality

Modern circuit breakers offer safer interlocks, remote switching and circuit monitoring.

2. Optimise existing plant

Static components in a switchboard (the steelwork and busbar system) can be retained. Only the functional, moving parts (the circuit breakers) are replaced. Retrofitting is typically 80% cheaper than switchboard replacement with minimum downtime.

3. Guaranteed spares availability

Terasaki guarantee spare parts availability for at least 10 years after the withdrawal from sale of a circuit breaker.

4. Modernise the protection system

Old protection relays can be removed and replaced with modern microprocessor protection which is integral to the ACB. It is then easier to interface the ACB with automatic plc controls.

5. Reduce arc flash hazard

Modern ACBs clear short-circuits much faster than older types. This means that the incident arc energy is correspondingly lower.

Retrofit Services

Terasaki's Retrofit Services

We prefer to conduct a site survey for every retrofit project - even if the breaker to be replaced is already on our design database. This ensures that the installation is as quick as possible, with minimum disruption to the client's supply.

Mechanical and electrical interfaces are modelled using state-of-the-art 3-D CAD.

Manufacture, assembly and routine testing is carried out at Terasaki's facility in Glasgow, Scotland. The factory and processes are certified to the ISO 9001 quality management standard.

Some of our Retrofit designs can be installed without a shutdown. Where this is not possible, our team will ensure that disruption is minimised.



Verified Designs

Third Party Technical Report.

Tested to current standard

ASTA tested to IEC 61439 for short-circuit withstand (Icw)
GEC MPact
Ellison
English Electric

Low voltage arc hazard reduction

1. Remove switching using umbilical cord controller
2. Faster opening time reduces incident arc energy. TemPower 2 ACB can be set to open a short-circuit in less than 30 milliseconds (typically at least twice as fast as the device it will replace).

Modern protection

The AGR Protection relay can replace the functions of several devices in an existing switchboard to provide:

- restricted earth fault protection
- overcurrent protection
- data communication to BMS or SCADA
- plc control



We design retrofit ACBs on request. If you are interested in a brand which is not shown below we would be happy to examine it. New designs are continually added to our portfolio. Check the latest list on the Terasaki website: www.terasaki.co.uk

- | | |
|----------------|--------------------|
| • Terasaki | • Mitsubishi |
| • Ellison | • Sace |
| • GEC | • ABB |
| • Merlin Gerin | • Hyundai |
| • Siemens | • AEG |
| • Unelec | • English Electric |
| • Square D | • MEM |
| • Schneider | • Klockner Moeller |
| | • GE Electric |



Retrofit Services

Retrofit Case Study

Terasaki Retrofit Project Reference

Client: Royal Bank of Canada
Project: Retrofit
Location: 71 Queen Victoria Street, London
Retrofit: 24 x Merlin Gerin Selpact 1000A
3 x Merlin Gerin DA 4000A
Type: to TemPower 2

Capability:

- 27 circuit breakers replace by TemPower 2 retrofit ACBs
- Only one week-end shutdown
- No disturbance to switchboard or copperwork
- Safe and fast



Direct Response Engineer Installing Retrofit ACB

REPLACEMENT OF 27 MERLIN GERIN ACBS WITH TERASAKI ACBs

The main electrical incomer to Royal Bank of Canada's UK headquarters in London was tripping spuriously and engineers became worried that a sudden and complete failure of the power supply could result. The faulty device, a Merlin Gerin DA 4000 ACB, was obsolete and irreparable. 26 other Selpact and DA 4000 ACBs in the switchboard were also obsolete.

Engineers had permission to shut down the main power supply for only one weekend – not long enough for the switchboard to be replaced or for any modifications to be made to the copperwork.

Terasaki's Direct Response Service Division had what they needed: a retrofit solution. The Terasaki TemPower 2 retrofit ACBs were designed to match the connections and mountings of the existing ACBs exactly. There was no need to modify the switchboard and all 27 ACBs were replaced safely and quickly.

Retrofit Details

- Merlin Gerin DA 4000 x 3
- Merlin Gerin Selpact x 24
- Building power down: 10:00 Friday
- 27 Terasaki TemPower 2 retrofit ACBs installed
- Building re-energised 12:00 Sunday



DA 4000 ACB:
Access Restricted Due to Nuisance Tripping



Obsolete Merlin Gerin Selpact ACBs



Other Services

Spares Policy (Circuit Breakers)

Terasaki guarantees availability of breaker spare parts for at least 10 years after the breaker's withdrawal from sale. Beyond that period the Direct Response Service Division will continue to support older products in the field carrying out routine maintenance and repairs on-site.

The Direct Response Service Division can provide a recommended spares list, based on the specification of all breakers on site. We usually recommend a combination of "complete" and "component" spares.

Warranty Extension

Terasaki offers one year standard warranty for our breakers. However you can extend it up to 4 or 5 years depending on project requirements.





Monitoring and Communication: T2ED

T2ED is a new Terasaki external display for TemPower 2 ACBs and TemBreak 2 MCCBs. It displays circuit measurements and information about the installed breaker in an easily readable way. T2ED may be used as a stand-alone local display. T2ED is also able to transfer all this information directly to a Modbus network.

Special Features:

View circuit values and breakers data safely from the outside

- Easy direct connection from breaker to T2ED (no need for communication module)
- Easy direct connection from T2ED to Modbus (no need for communication module)
- Analogue, numerical and bar graph views

Host Network / Commercial Gateway



Technical Characteristics:

- Rated voltage: DC24V (Applicable range of voltage: DC18 to DC 31V)
- Consumption (at DC24V): 50mA
- Dimensions
- (96 x 96 x 50) mm
- Serial Interface: RS485
- Protocol: Modbus-RTU
- Transmission method: Two-wire half duplex

Multi-Protection Relay: TemTrip 2

TemTrip2 is a multi-protection relay for medium or low voltage circuit breakers that is capable of indicating via LEDs that the load current is picked up or the breaker trips open and showing various information including the phase current, line voltage and fault current on the LCD.

The relay is available in three types: for generator protection, feeder circuit protection and transformer protection.



		PRR-1H-G	PRR-1H-F	PRR-1H-T
		Generator protection	Feeder circuit	Transformer protection
Adjustable long time-delay trip	LT	○	○	○
Adjustable short time-delay trip	ST	○	○	○
Adjustable instantaneous trip	INST	○	○	○
Adjustable undervoltage trip	UV(27)	○	◆	—
Adjustable overvoltage trip	OV(59)	○	◆	—
Adjustable reverse power trip	RP(67R)	○	—	—
Adjustable ground fault trip	Overvoltage ground	OVGR(64)	○	○
	Directional ground	DGR(67G)	○	○
Ratio differential trip	DIFF(87G)	○	—	—
	(87T)	—	—	○
Pre-trip alarm	(PTA)	○	○	○
	PTA2	○	—	—

○ Standard ◆ Optional

Special Features:

- Multi-protection
- Ground fault detection via zero-phase voltage
- Directional ground fault detection
- Ratio differential characteristic
- Reverse power trip
- Readout of trip/ alarm cause
- Internal clock
- Self-diagnostic



TemContact 2 Contactors

TemContact 2 is a range of magnetic contactors and thermal overload relays. Current ratings from 6A to 800A are available in 9 frame sizes and in 3 or 4 pole versions.

TemContact 2 has upgraded insulation voltage (increased from 690 to 1000V AC) impulse withstand voltage (increased from 6 to 8kV) in contactors over 40A.

Optional Accessories:

- Auxiliary contacts
- Surge absorption unit
- Reversing connection kit
- Mechanical interlock
- Safety cover for front of mechanism
- Overload relays
- Remote mounting kit for overload relay
- Pre-loading resistors for capacitor switching (Any TemContact 2 Contactor can be converted to capacitor duty by adding capacitor unit)
- Mechanical latch
- Remote reset device for overload relays



TemContact 2 Manual Motor Starters

TemContact 2 Manual Motor Starters have integrated short-circuit and overload protection for motors of up to 45kW at 400V AC.

There are three frame sizes, each with three versions which cover the range:

- TMS32S, TMS63S, TMS100S – standard short-circuit performance
- TMS32H, TMS63H, TMS100H – high short-circuit performance
- TMS32HI, TMS63HI, TMS100HI – high short-circuit performance, without overload protection

Optional Accessories:

- Auxiliary switches for front- and side-mounting
- Alarm switches
- Shunt trip
- Undervoltage Trip
- Direct connection adapter for TemContact 2 contactors up to 100A





Contactor Selection Guide 3P



Model	Parameter	Unit	TC-9b	TC-12b	TC-18b	TC-22b	TC-32a	TC-40a	TC-50a	TC-65a
Frame size			22 AF				40 AF		65 AF	
Current and power ratings										
Thermal current	AC1	A	25	25	40	40	50	60	70	100
Switching power	200/240V AC3	kW	2.5	3.5	4.5	5.5	7.5	11	15	18.5
Switching current	200/240V AC3	A	11	13	18	22	32	40	55	65
Switching power	380/440V AC3	kW	4	5.5	7.5	11	15	18.5	22	30
Switching current	380/440V AC3	A	9	12	18	22	32	40	50	65
Switching power	500/550 AC3	kW	4	7.5	7.5	15	18.5	22	30	33
Switching current	500/550 AC3	A	7	12	13	20	28	32	43	60
Switching power	690V AC3	kW	4	7.5	7.5	15	18.5	22	30	33
Switching current	690V AC3	A	6	9	9	18	20	23	28	35
Electrical characteristics										
Rated operational voltage	U_e	V	690				690		690	
Rated insulation voltage	U_i	V	690				1000		1000	
Rated frequency	f	Hz	50/60				50/60		50/60	
Rated impulse withstand voltage	U_{imp}	kV	6				8		8	
Operation										
Maximum operating rate Endurance	AC3	ops/hr	1800				1800		1800	
	Mechanical	million	15				15		12	
	Electrical	million	2.5				2.5		2	
Dimensions										
AC Control	Weight	kg	0.34				0.55		1.05	
	Size (WxHxD)	mm	45 x 73.5 x 86				69 x 83 x 93		79 x 106 x 119	
DC Control	Weight	kg	0.51				0.77		1.3	
	Size (WxHxD)	mm	45 x 73.5 x 104				69 x 83 x 120		79 x 106 x 147	
NEMA size			00	00	0	1	1	1	2	2
Auxiliary Contacts										
Auxiliary Contacts (included as Standard)			1NO 1NC				2NO 2NC		2NO 2NC	

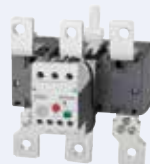
TK Type Thermal Overload relays



Model	Parameter	Unit	TK-32	TK-32	TK-63
Electrical Characteristics					
Rated operational voltage,	U_e	V	690	690	690
Rated insulation voltage	U_i	V	690	690	690
Rated impulse withstand voltage	U_{imp}	kV	6	6	6
Setting range					
Setting range		A	0.1~40	0.1~40	4~65
Trip class			10A,20	10A,20	10A,20
Dimensions					
	Weight	kg	0.17	0.17	0.31/0.33
	Size (WxHxD)	mm	45 x 75 x 90	45 x 75 x 90	55 x 81 x 100



TC-75a	TC-85a	TC-100a	TC-130a	TC-150a	TC-185a	TC-225a	TC-265a	TC-330a	TC-400a	TC-500a	TC-630a	TC-800a
100 AF			150 AF		225 AF		400 AF			800 AF		
110	135	160	160	210	230	275	300	350	450	580	660	900
22	25	30	37	45	55	75	80	90	125	147	190	220
75	85	105	130	150	185	225	265	330	400	500	630	800
37	45	55	60	75	90	132	147	160	200	265	330	440
75	85	105	130	150	185	225	265	330	400	500	630	800
37	45	55	60	70	110	132	147	160	225	265	330	500
64	75	85	90	100	180	200	225	280	350	400	500	720
37	45	55	55	55	110	140	160	200	250	300	400	500
42	45	65	60	60	120	150	185	225	300	380	420	630
690			690		690		690			690		
1000			1000		1000		1000			1000		
50/60			50/60		50/60		50/60			50/60		
8			8		8		8			8		
1800			1200		1200		1200			1200		
12			5		5		5	2.5		2.5		
2			1		1		1	0.5		0.5		
1.9			2.4		5.4		9.2			22.4		
94 x 140 x 137			119 x 158 x 132		138 x 203 x 185		163 x 243 x 205			285 x 312 x 245		
2.8			2.3		5.4		9.2			22.4		
94 x 140 x 172.3			119 x 158.5 x 132		138 x 203 x 185		163 x 243 x 205			285 x 312 x 245		
2	3	3	3	4	4	4	5	5	5	6	6	7
2NO 2NC			2NO 2NC		2NO 2NC		2NO 2NC			2NO 2NC		



TK-95	TK-150	TK-225	TK-400	TK-800
690	690	690	690	690
690	690	690	690	690
6	6	6	6	6
7~100	34~150	64~240	85~400	200~800A
10A,20	10A,20	10A,20	10A,20	10A,20
0.48/0.5	0.67	2.5	2.6	11.5
70 x 97 x 110	95 x 109 x 113	147 x 141 x 184	151 x 171 x 198	860 x 530 x 212



Contactor Selection Guide 4P



Model	Parameter	Unit	TC-6a/4	TC-9a/4	TC-12a/4	TC-18a/4	TC-22a/4	TC-32a/4	TC-40a/4	TC-50a/4	TC-65a/4	TC-75a/4	TC-85a/4
Frame size			18 AF				22 AF	40 AF		85 AF			
Current and power ratings													
Thermal current		A	25	25	25	40	40	50	60	80	100	110	135
Switching power	200/240V AC1	kW	9	9	9	15	15	18	22	30	37	41	51
Switching current	200/240V AC1	A	25	25	25	40	40	50	60	80	100	110	135
Switching power	380/440V AC1	kW	17	17	17	27	27	35	42	56	70	76	95
Switching current	380/440V AC1	A	25	25	25	40	40	50	60	80	100	110	135
Switching power	200/240V AC3	kW	2.2	2.5	3.5	4.5	5.5	7.5	11	15	18.5	22	25
Switching current	200/240V AC3	A	9	11	13	18	22	32	40	55	65	75	85
Switching power	380/440V AC3	kW	3	4	5.5	7.5	11	15	18.5	22	30	37	45
Switching current	380/440V AC3	A	7	9	12	18	22	32	40	50	65	75	85
Electrical characteristics													
Rated operational voltage	U_e	V	690				690	690		690			
Rated insulation voltage	U_i	V	690				690	690		1000			
Rated frequency	f	Hz	50/60				50/60	50/60		50/60			
Rated impulse withstand voltage	U_{imp}	kV	6				6	6		8			
Operation													
Maximum operating rate Endurance	AC3	ops/hr	1800				1800	1800		1800			
	Mechanical	million	15				15	15		12			
	Electrical	million	2.5				1	1		1			
Dimensions													
AC Control	Weight	kg	0.33				0.4	0.59		1.2			
	Size (WxHxD)	mm	45 x 73.5 x 82				47.2 x 80 x 86.8	59 x 83.5 x 94.5		91 x 123.5 x 117.8			
DC Control	Weight	kg	0.5				0.5	0.7		1.29			
	Size (WxHxD)	mm	45 x 73.5 x 97				47.2 x 80 x 113.2	59 x 83.5 x 121		91 x 123.5 x 117.8			
NEMA size			00	00	0	0	1	1	1	2	2	2	3
Aux Contacts													
Aux Contacts (Standard)			—				—	—		—			

Capacitor Unit



Capacitor Unit is connected to the terminals of the contactor to reduce the high inrush current.

Features of the Capacitor Unit (Pre-loading resistor):

- Damping resistor than can limit the inrush current up to $60 \times I_n$ is connector to the mechanism that closed earlier than the main contact of the contactor
- No heat loss by the serial resistor
- Eliminate the switching surge
- Improving the performance of the capacitor system

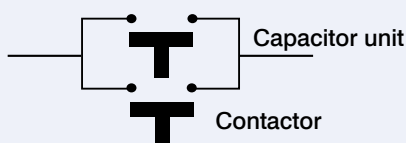


TC-100/4	TC-130a/4	TC-150a/4	TC-185a/4	TC-225a/4	TC-265a/4	TC-330a/4	TC-400a/4	TC-500a/4	TC-630a/4	TC-800a/4
225 AF					400 AF			800 AF		
160	165	250	300	330	360	420	500	650	750	900
57	60	76	87	100	115	135	160	245	255	310
150	155	200	230	260	300	350	420	630	660	800
106	110	142	165	185	215	250	300	450	470	570
150	155	200	230	260	300	350	420	630	660	800
30	37	95	55	75	80	90	125	147	190	220
105	125	150	185	225	265	330	400	500	630	800
55	60	75	90	132	147	160	200	265	330	440
105	120	150	185	225	265	330	400	500	630	800
690					690			690		
1000					1000			1000		
50/60					50/60			50/60		
8					8			8		
1200					1200			1200		
15					15			12		
0.8					0.5			2.5		
5.6					9.9			26.3		
175 x 203 x 185					206 x 243 x 205			346 x 310 x 244		
5.6					9.9			26.3		
175 x 203 x 185					206 x 243 x 205			346 x 310 x 244		
3	3	4	4	4	5	5	5	6	6	7
2N02NC					2N02NC			2N02NC		

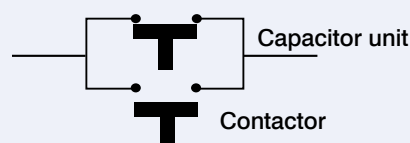
Capacitor Unit

Operation Sequence:

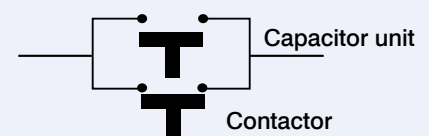
Capacitor unit: **OFF**
Contactor: **OFF**



Capacitor unit: **ON**
Contactor: **OFF**



Capacitor unit: **OFF**
Contactor: **ON**





Manual Motor Starters Selection Guide

In accordance with IEC 60947 - 2 & IEC 60947 - 4 - 1

Manual Motor Starters

Model	Parameter	Unit	Power rating at 400V AC (kW)	TMS -32S TMS -32H TMS -32HI*	Breaking Capacity @ 400/415V AC Icu / Ics (kA) TMS -32S TMS -32H/Hi	Breaking Capacity @ 400/415V AC Icu / Ics (kA) TMS -32H/Hi	TMS -63S TMS -63H TMS -63HI*	Breaking Capacity @ 400/415V AC Icu / Ics (kA) TMS -63S TMS -63H/Hi	Breaking Capacity @ 400/415V AC Icu / Ics (kA) TMS -63H/Hi	TMS -100S TMS -100H TMS -100HI*	Breaking Capacity @ 400/415V AC Icu / Ics (kA) TMS -100S TMS -100H/Hi	Breaking Capacity @ 400/415V AC Icu / Ics (kA) TMS -100H/Hi
Number of poles				3			3			3		
Frame size				32AF			63AF			100AF		

Current and Power

Rated operational current	I_e	(A)	0.02	0.1 ~ <u>0.16</u>	100/100	100/100						
(underlined) and			0.06	0.16 ~ <u>0.25</u>	100/100	100/100						
protection setting range			0.09	0.25 ~ <u>0.4</u>	100/100	100/100						
			0.12	0.4 ~ <u>0.63</u>	100/100	100/100						
			0.25	0.63 ~ <u>1.0</u>	100/100	100/100						
			0.55	1.0 ~ <u>1.6</u>	100/100	100/100						
			0.75	1.6 ~ <u>2.5</u>	100/100	100/100						
			1.5	2.5 ~ <u>4</u>	100/100	100/100						
			2.2	4 ~ <u>6</u>	100/100	100/100						
			3	5 ~ <u>8</u>	100/100	100/100						
			4	6 ~ <u>10</u>	50/38	100/100	6 ~ <u>10</u>	100/100	100/100			
			5.5	9 ~ <u>13</u>	50/38	100/100	9 ~ <u>13</u>	50/38	100/100			
			7.5	11 ~ <u>17</u>	20/15	50/38	11 ~ <u>17</u>	25/19	50/50	11 ~ <u>17</u>	50/38	100/100
			7.5	14 ~ <u>22</u>	15/11	50/38	14 ~ <u>22</u>	25/19	50/50	14 ~ <u>22</u>	50/38	100/50
			11	18 ~ <u>26</u>	15/11	50/38	18 ~ <u>26</u>	25/19	50/50	18 ~ <u>26</u>	50/38	100/50
			15	22 ~ <u>32</u>	15/11	50/38	22 ~ <u>32</u>	25/19	50/50	22 ~ <u>32</u>	50/38	100/50
			18.5	28 ~ <u>40</u>	10/8	40/30	28 ~ <u>40</u>	25/19	50/50	28 ~ <u>40</u>	50/38	100/50
			22				34 ~ <u>50</u>	25/19	50/50	34 ~ <u>50</u>	50/38	100/50
			30				45 ~ <u>63</u>	25/19	50/50	45 ~ <u>63</u>	50/38	100/50
			30				47 ~ 65	25/19	35/27			
			37							55 ~ <u>75</u>	50/38	75/50
			45							70 ~ <u>90</u>	50/38	75/50
			45							80 ~ <u>100</u>	50/38	75/50

Electrical Characteristics

Rated operational voltage	U_e	V		690		690		690
Rated insulation voltage	U_i	V		690		690		1000
Rated frequency	f	Hz		50/60		50/60		50/60
Rated impulse withstand	U_{imp}	kV		6		8		8
Utilisation category	IEC 60 947 - 2 (Breaker)			Cat. A			Cat. A	
	IEC 60 947 - 4 (Motor Starter)			AC 3			AC 3	

Protection

				Thermal magnetic (Except HI = Magnetic only)				
--	--	--	--	--	--	--	--	--

Operation

Endurance	Mechanical			100,000		50,000		50,000
	Electrical			100,000		25,000		25,000
	Max operating frequency per hour			25		25		25
Weight	g			320		360		1000
Handle Type				Rocker	Rotary	Rotary		Rotary
Terminal				Screw		Lug		Lug

Accessories

Optional (auxiliary , alarm contacts)				yes		yes		yes
--	--	--	--	-----	--	-----	--	-----

* TMS-***HI models have no overload protection or protection setting range. Rated operational current, I_e , (underlined) applies to TMS-***HI models



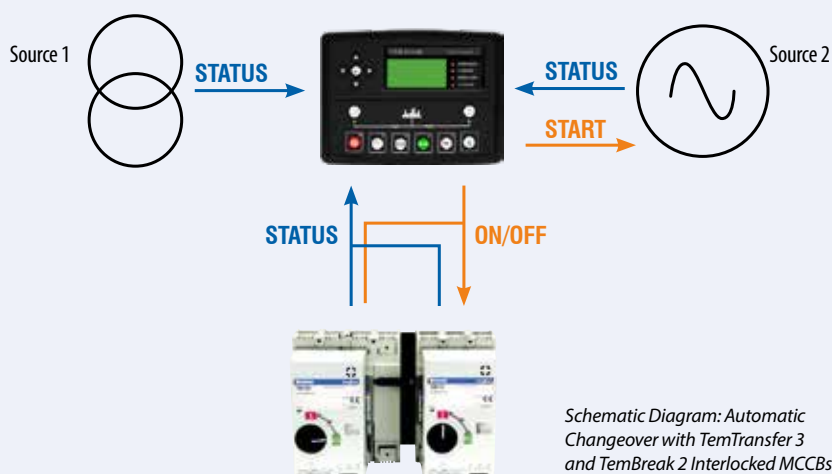
Automatic Transfer Controller

TemTransfer 3 Automatic Changeover Controller for TemPower 2 ACBs, TemBreak 2 MCCBs and TemContact 2 Contactors

TemTransfer 3 is an Automatic Transfer Switch Controller. The TemTransfer 3 will monitor the voltage and frequency of the AC supply from two different sources, which could be from both generator or mains (utility), or a combination of both.

The module will monitor S1 (source 1) and in the event of a failure will issue a start command to S2 (source 2).

The controller (ACC) is designed to monitor the incoming AC mains supply (1 or 3 phases) for under/over voltage and under/over frequency. Should any of the parameters fall out of limit, the module will issue a changeover command. Once the supply is available and producing an output within limits, TemTransfer 3 will control the circuit breaker or contactor and switch the load from Source 1 or Source 2



Earth Leakage Protection Relays

Terasaki TemProtect monitoring and control devices provide earth leakage protection and monitoring for most industrial and commercial applications. They are used to monitor earth currents to protect electrical equipment and personnel against dangers such as electric faults.

TemProtect has been designed to be as flexible as possible to suit a wide range of applications. The range includes Din Rail, Panel or base mount versions, relays suitable for use in AC systems (unaffected by DC components which may be present).

All relays comply with international standards including IEC 60255.

ELR-1E



Flush mounted DIN
96x96x60mm unit

ELRC-1



Relay with built-in
Toroidal Transformer
Space Saving

ELR-3C



DIN rail mounted unit
(DIN 43880 standard)
the three modules width 17.5mm

CTM



Supervision Relay
monitors circuit
breakers tripping circuit

ELR-3B



Residual Current device
and Monitor Type B



- Adjustable tripping current and time delay setting
- Selectable automatic or manual reset facility
- Adjustable time/current multiplier setting
- Test button
- LEDs to indicate the units status

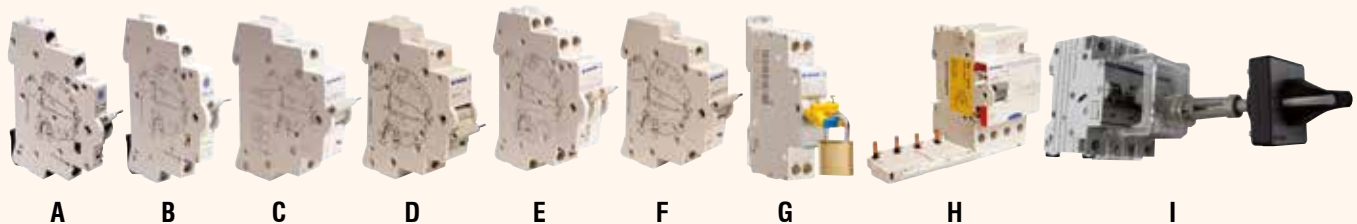


Safety and protection are the prime purposes of Terasaki products. Our range of DIN modular Protection products covers ratings from 0.5A to 125A and includes:

- Circuit breakers for overload and short-circuit protection,
- Residual current devices for the prevention of electric shock and fires,
- Circuit breakers combining overload, short-circuit and residual current protection.

With more than 500 items in the range, there is a solution for most applications.

Accessories



- A** Auxiliary contact 1NO, 1NC. 6A, 230V AC. Not suitable for TD3RCCB
- B** Alarm contact, 1NO, 1NC. 6A, 230V AC. Not suitable for TD3RCCB
- C** RCCB switch. Combined auxiliary contact (1NO, 1NC, 6A, 230V AC) + Alarm contact (1NO, 1NC, 6A, 230V AC)
- D** Shunt trip. RCCB switch (C) must be fitted before fitting the shunt trip to the TD3RCCB
- E** Undervoltage trip. RCCB switch (C) must be fitted before fitting the shunt trip to the TD3RCCB
- F** Overvoltage trip. Rated voltage, U_n , 230V AC. Opens the circuit breaker if supply voltage exceeds 280V AC. RCCB switch (C) must be fitted before fitting the shunt trip to the TD3RCCB
- G** Padlock. Suitable for TD3 M06, M10, XA (open and closed) and for TD31P1M (in open position only)
- H** Residual current block for TD3 M06 and M10
- I** Rotary handle for TD3 ICP



Din Modular Protection Selection Guide



Type B
RCCB



Miniature Circuit Breakers

Type				MCB	MCB	MCB	MCB	MCB
Model	Quantity	Unit		TD3 M06	TD3 M15	TD3 1P1M	TD3 XA	TD3 ICP
Poles (Modules)				1 (1), 2 (2), 3 (3), 4 (4)	1 (1), 2 (2), 3 (3), 4 (4)	1+N (1)	1 (1.5), 2 (3), 3 (4.5), 4 (6)	1 (1), 2 (2), 3 (3), 4 (4)
Electrical Characteristics								
Standard				IEC/EN 60898	IEC/EN 60898 IEC/EN 60947-2	IEC/EN 60898	IEC/EN 60898 IEC/EN 60947-2	UNE EN 20317
Nominal Rated Current	I_n	A		6, 10, 16, 20, 25, 32, 40, 50, 63	0.5*, 1*, 2*, 3*, 4*, 6, 10, 13** 16, 20, 25, 32, 40, 50, 63	6, 10, 16, 20, 25, 32, 40	80, 100, 125	5, 7.5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 63
Rated Voltage	U_e	V		230/400 - 240/415	230/400 - 240/415	230/400 - 240/415	230/400 - 240/415	230/400 - 240/415
Rated Frequency		Hz		50/60	50/60	50/60	50/60	50/60
Breaking Capacity 60898-1	$I_{cn} (I_{cu})$	kA		6	10	6	10 (10)	6
Breaking Capacity 60947-2	$I_{cn} (I_{cu})$	kA		–	15 (7.5)	–	–	–
Protection								
Thermal- Magnetic Characteristic	Type			B, C	B, C, D	B, C	C, D	UNE EN 20317
Connection								
Rigid Conductor	Terminal	mm ²		25	35	16	70	25
Flexible Conductor	Size			16	25	10	35	16
Dimensions								
Per Module	HxDxW	mm		85 x 74 x 17.5	84 x 74 x 17.5	84 x 74 x 17.5	90 x 72 x 26.5	85 x 74 x 17.5

*Only for "D" type ** Only for "C" type

Residual Current Devices and Modular Switches

Type				RCCB			RCCB			RCBO	RCBO	Modular Switch			
Model	Quantity	Unit		TDURCCB			TDURCCB			TD3 RCBO	TDURCBO	TD3 MS			
Poles (Modules)				2 (2)			4 (4)			1+N (1)	1+N (2)	1 (1), 2 (2), 3 (3), 4 (4)			
Electrical Characteristics															
Standard				IEC/EN 61008			IEC/EN 61008			IEC/EN 61009	IEC/EN 61009	IEC EN 60947-3			
Rated Sensitivity	$(I_{\Delta n})$	mA		30	100	300	30	100	300	30	30				
Nominal Rated Current	I_n	A	AC type	25, 40, 63,	40, 63, 100	25, 40, 63	25, 40, 63, 80, 100	25, 40, 63, 100	25, 40, 63, 80, 100	6 - 40	6 - 40	32	63	100	125
	I_n	A	A type	25, 40, 63	–	–	25, 40, 63, 100	–	25, 40, 63, 100	–	–	–			
	I_n	A	Ai type	25, 40, 63	–	–	40	–	40	–	–	–			
	I_n	A	S type	–	–	40, 63	–	–	40	–	–	–			
	I_n	A	B type	–	–	–	40, 63	–	–	–	–	–			
Rated Voltage	U_n	V		230/ 400 - 240/ 415			230/400 - 240/415			230 - 240	230 - 240	230/400 - 240/415			
Breaking Capacity	$I_{cn} (I_m)$	kA		S (0.63) others: (0.8)			S (0.63) others: (0.8)			10	10	–	–	–	–
Energy Withstand (EN 61008)	I^2t	kA²s		> 22.5			> 22.5			–	–	–	–	–	–
Peak Current Withstand (EN 61008)	I_{peak}	kA		> 3			> 3			–	–	–	–	–	–
Short-circuit Withstand Capacity	$I_{cw} (rms)$	kA		–			–			–	–	0.48	0.94	1.2	1.5
Rated Frequency		Hz		50/60			50/60			50/60	50/60	50/60			
Protection															
Thermal-Magnetic Characteristic	Type			–			–			B, C	C	–	–	–	–
Connection															
Rigid Conductor	Terminal	mm²		25			25			16	25	25	50	50	50
Flexible Conductor	Size	mm²		25			25			10	25	16	35	35	35
Dimensions															
Per module	H x D x W	mm		85 x 68 x 17.5 (100A) 87.5x 68 x 18 (25-63A)			85 x 68 x 17.5 (100A) 87.5 x 68 x 18 (25-80A)			115 x 72 x 17.5	88 x 69 x 17.5	83 x 72 x 17.5			



TERASAKI

Innovators in Protection Technology

TERASAKI ELECTRIC (EUROPE) LTD.

80 Beardmore Way, Clydebank Industrial
Estate, Clydebank, Glasgow, G81 4HT,
Scotland (UK) Telephone: 44-141-941-1940
Fax: 44-141-952-9246
Email: marketing@terasaki.co.uk
<http://www.terasaki.com>

TERASAKI MIDDLE EAST

Saif Zone Q3-168, PO Box 120860
Sharjah, UAE
Telephone: 971-56-676-4825
Fax: 976-655-78141
Email: middleeast@terasaki.co.uk
<http://www.terasaki.com>

**TERASAKI ELECTRIC (EUROPE) LTD.
(FILIALE ITALIA)**

Via Ambrosoli, 4A-20053 Rodano, Milano, Italy
Telephone: 39-02-92278300
Fax: 39-02-92278320
Email: info@terasaki.it
<http://www.terasaki.it>

**TERASAKI ELECTRIC (EUROPE) LTD.
(SUCURSAL EN ESPAÑA)**

Pol. Ind. Coll de la Manya, C/Cal Ros dels Ocells
5 08403 Granollers, (Barcelona) España
Telephone: 34-93-879-60-50
Fax: 34-93-870-39-05
Email: terasaki@terasaki.es
<http://www.terasaki.es>

**TERASAKI ELECTRIC (EUROPE) LTD.
(FILIAL SVERIGE)**

Snickarvägen 2, SE-132 38 SALT SJÖ-
BOO, Sweden Telephone: 46-8-556-282-30
Fax: 46-8-556-282-39
Email: info@terasaki.se
<http://www.terasaki.se>

TERASAKI CIRCUIT BREAKERS (S) PTD.

LTD. 17 Tuas Street, Singapore, 638454
Telephone: 65-6744-9752
Fax: 65-6748-7592
Email: tecs@pacific.net.sg

TERASAKI ELECTRIC CO., LTD.

Head Office & Circuit Breaker Division
6-13-47 Kamihigashi, Hirano-ku,
Osaka 547-0002, Japan
Telephone: 81-6-6791-2763
Fax: 81-6-6791-2732
Email: int-sales@terasaki.co.jp
<http://www.terasaki.co.jp>

TERASAKI ELECTRIC (M) SDN, BHD.

Lot 3, Jalan 16/13D, 40000 Shah
Alam, Selangor Darul Ehsan, Malaysia
Telephone: 60-3-5549-3820
Fax: 60-3-5549-3960
Email: terasaki@terasaki.com.my

TERASAKI DO BRASIL LTDA.

Rua Cordovil, 259-Parada De Lucas,
21250-450, Rio De Janeiro-R.J.,
Brazil Telephone: 55-21-3301-9898
Fax: 55-21-3301-9861
Email: terasaki@terasaki.com.br
<http://www.terasaki.com.br>

TERASAKI ELECTRIC (CHINA) LTD.

72 Pacific Industrial Park, Xin Tang
Zengcheng, Guangzhou 511340,
China Telephone: 86-20-8270-8556
Fax: 86-20-8270-8586
Email: terasaki@public.guangzhou.gd.cn

**TERASAKI ELECTRIC GROUP SHANGHAI
REPRESENTATIVE OFFICE**

Room No. 1405-6, Tomson Commercial
Building, 710 Dong Fang Road, Pudong,
Shanghai, 200122, China
Telephone: 86-21-58201611
Fax: 86-21-58201621
Email: terasaki@vip.163.com



www.terasaki.com

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