

WELCOME TO TEMBREAK 2

EASY SELECTION GUIDE

The TemBreak 2 range of products includes:

- Moulded Case Circuit Breakers (MCCBs)
- Switch-Disconnectors in the same compact moulded case frame sizes as MCCBs
- A comprehensive range of accessories which are common to MCCBs and Switch-Disconnectors. All internal accessories are common to all frame sizes.



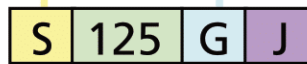
Key to Model and Type Designations

Model Denoted by

Type Denoted by

E	Economical
S	Standard
H	High
L	Limiting*

C	Low breaking capacity
N	Medium breaking capacity
G	High breaking capacity
P	Extra High breaking capacity




Frame rating, In (A)


F	Fixed thermal, fixed magnetic
J	Adjustable thermal, adjustable magnetic
E	Electronic protection
N	No protection

WELCOME TO TEMBREAK 2


EASY SELECTION GUIDE



125



160/250



400/630

MCCBs

	125			160/250			400/630		
	Model	Type	I _{cu} (kA)	Model	Type	I _{cu} (kA)	Model	Type	I _{cu} (kA)
E S H L	E125	NJ	25	E250	NJ	25	E400	NJ	25
	S125	NF	25	S160	NF	25	E630	NE	36
	S125	NJ	36	S160	NJ	36	S400	CJ	36
	S125	GJ	65	S160	GJ	65	S400	NJ	50
				S250	NJ	36	S400	GJ	70
				S250	GJ	65	S400	NE	50
				S250	PE	70	S400	GE	70
							S630	CE	50
							S630	GE	70
	H125*	NJ	125	H160	NJ	125	H400	NJ	125
				H250	NJ	125	H400	NE	125
	L125*	NJ	200	L160	NJ	200	L400	NJ	200
				L250	NJ	200	L400	NE	200

I_n (A)

125
↑
16

250
↑
20

630
↑
250

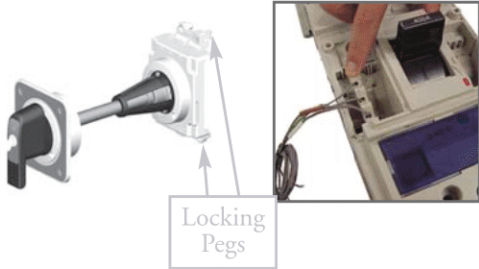
Switch-Disconnectors

125		160/250		400/630	
Model	Type	Model	Type	Model	Type
S125	NN	S160	NN	S400	NN
		S250	NN	S630	NN

Note: All breaking capacities are r.m.s. symmetrical at 415V AC
*250A Frame

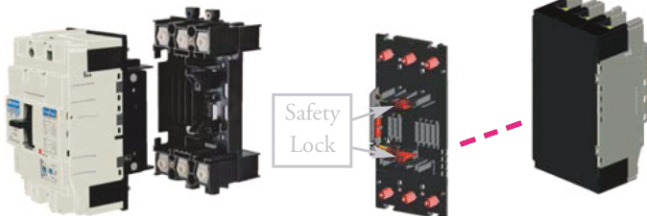
REASONS TO USE TEMBREAK 2

1. FIELD-INSTALLABLE ACCESSORIES



- Accessories can be fitted by the switchboard builder or added by the end-user. All internal accessories are common for TemBreak 2 MCCBs.
- Handles and motor operators can be rapidly fitted using the locking pegs. It takes **less than 10 seconds** to secure a handle or motor to the MCCB – a great time saving compared to alternative products.
- All accessories are endurance tested to the same level as the host MCCB.

2. SAFETY LOCK FOR PLUG-IN VERSIONS

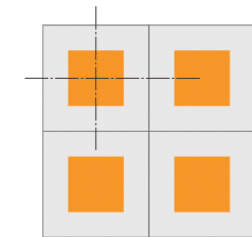


Plug-in MCCB and base

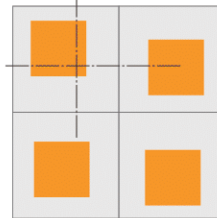
Plug-in connection kit, including safety lock

The plug-in MCCB is locked to the base when the toggle is ON. It cannot be removed unless the toggle is OFF or TRIPPED. The safety lock prevents a trip occurring as the MCCB is being removed from the base.

3. SYMMETRICAL DOOR CUTOUT PATTERNS



Using TemBreak 2 Operating Handles



Using other MCCB Operating Handles

Door cutout patterns for handles are symmetrical, even when breakers are mounted in opposite directions.

4. SUPERIOR TEMPERATURE PERFORMANCE



All TemBreak 2 MCCBs are fully rated for use in tropical environments.

Overheating is the most common cause of failure in electrical switchgear. You can reduce the likelihood of overheating by using switchgear with superior temperature performance.



5. MODULAR SIZES



All current ratings up to 630A can be supplied in 2 sizes: the 250A and 630A sizes.



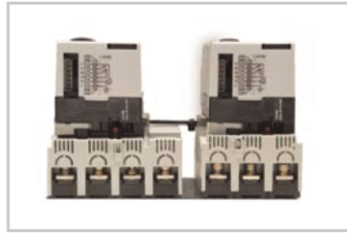
The compact 125A size offers the same features and performance but with reduced dimensions and cost.

REASONS TO USE TEMBREAK 2

6. COMPACT CHANGEOVERS



Changeover Pair with Link Interlock and Motor Operators



Viewed from Below (250A frame)

The mechanical interlock is installed on the front of the MCCB, and is compatible with motor operators and handles. An automatic changeover system can be assembled in a few minutes by a switchboard builder or end-user.

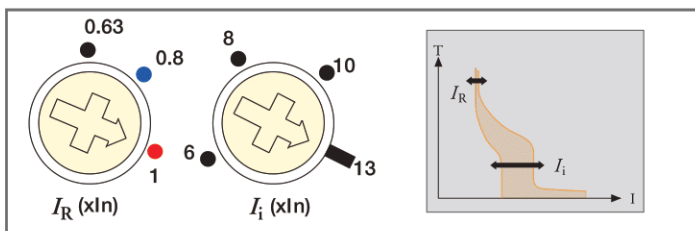
7. DIRECT OPENING



Under the heading “Measures to minimise the risk in the event of failure”, IEC 60204-1 Safety of Machinery-Electrical Equipment of Machinery includes the following recommendation:

“-the use of switching devices having positive (or direct) opening operation.”

8. UNSURPASSED FLEXIBILITY

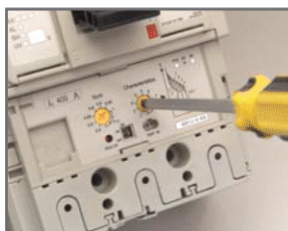


Overload protection is adjustable between 63% and 100% of the rating.

Short-circuit protection is adjustable on all thermal magnetic models.

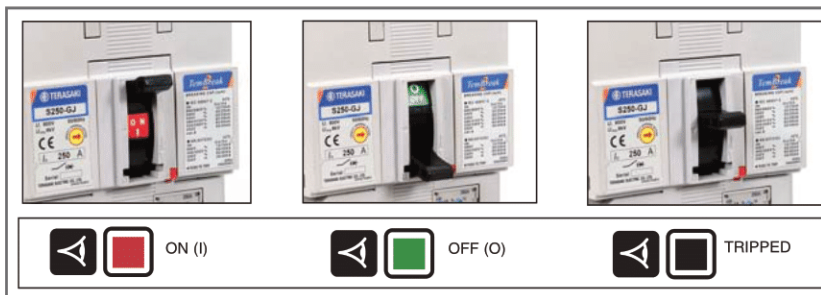
Short-circuit protection settings are suitable for motor starting on all models, including the compact 125A frame.

9. CUSTOMISED TRIPPING TIMES



If you require a characteristic which is not available as a preset on our electronic protection unit, send us the details and we will program a customised characteristic to suit your application. (Within certain limits - contact us for details).

10. VISUAL SAFETY



Coloured indicators display the ON or OFF status. The indicators are fully covered if the breaker trips, and black is the only visible colour.



WELCOME TO TEMBREAK 2

SAFETY PLUS

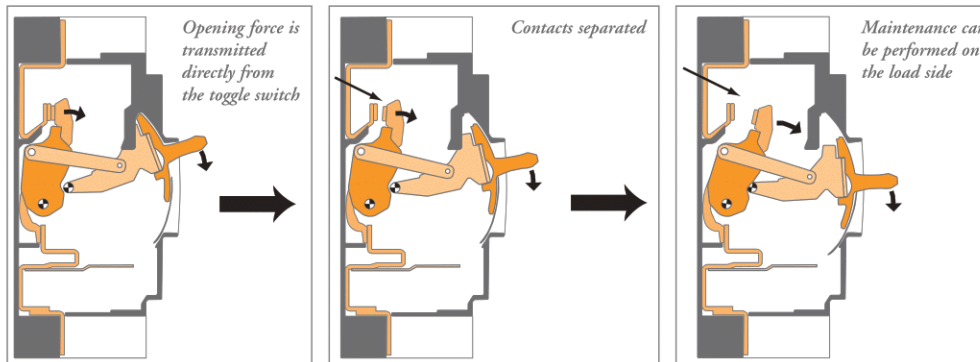
Terasaki have an innovative approach to product design. Our goal is to develop products which not only meet, but exceed recognised standards.

We use our knowledge of related applications to improve circuit breaker designs. For instance, when developing the Direct Opening Action, we applied ideas from a machinery safety standard to the design of the TemBreak 2 switching mechanism.

This proactive development policy confirms our reputation as Innovators in Protection Technology.



Machine Safety



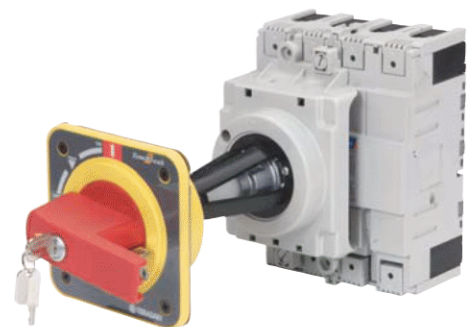
TemBreak 2 MCCBs are marked with IEC symbol indicating Direct Opening Action. (→)

The robust mechanism ensures that the force you apply to the toggle is transmitted directly to the contacts.

Under the heading “Measures to minimise risk in the event of failure”, IEC 60204-1 Safety of Machinery - Electrical Equipment of Machines includes the following recommendation:

“ - the use of switching devices having positive (or direct) opening operation.”

TemBreak 2 MCCBs help you to comply with the world’s most stringent safety standards. It is one of the safest switching devices for machinery.



WELCOME TO TEMBREAK 2

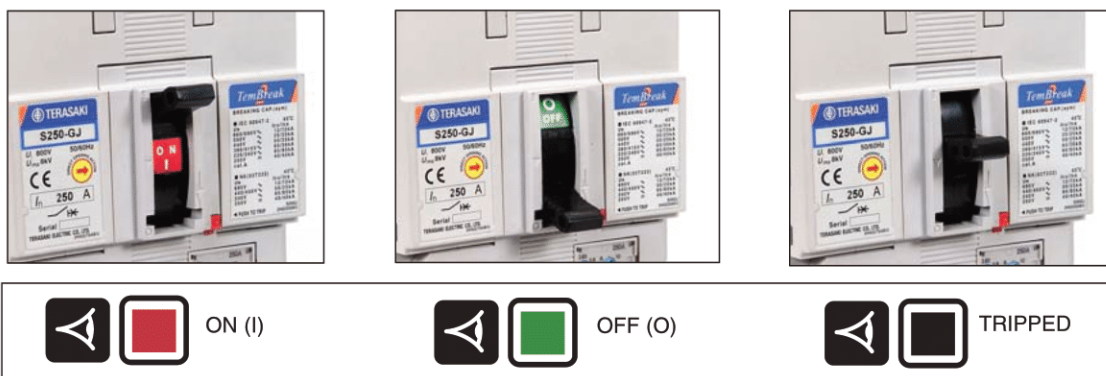
SAFETY PLUS

Visual Safety

You can easily see if a breaker is open, closed or tripped. **SAFETY+** coloured indicators boldly display the ON or OFF status. The indicators are fully covered if a breaker trips, and black is the only visible colour.

This is a *unique* safety feature. You can identify faulty circuits at a glance.

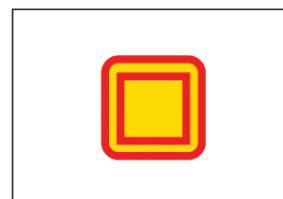
The toggle position always matches the position of the main contacts.



Touch Safety

The risk of touching live parts has been minimised by design. These features reduce the risk of touching live parts:

- There are no exposed metal screws on the front face
- No live parts are exposed when fitting accessories
- Double Insulation



WELCOME TO TEMBREAK 2

EXCEEDING STANDARDS

Safety Plus

TemBreak 2 MCCBs exceed the requirements of recognised standards.

International Compliance

- The TemBreak 2 MCCB complies with the international standard IEC 60947-2
- TemBreak 2 Switch Disconnectors comply with IEC 60947-3
- Accessories comply with IEC 60947-5-1 or IEC 61058-1
- The entire range conforms to the IEC general rules for switchgear, IEC 60947-1
- TemBreak 2 MCCBs comply with JIS C 8201-2-1 Ann.1
- The TemBreak 2 range complies with the EC Low Voltage Directive and all models are CE marked
- TemBreak 2 MCCBs carry the IEC symbol indicating Direct Opening Action as defined by IEC 60947-5-1. IEC 60204-1, Safety of Machinery - Electrical Equipment of Machines recommends that switches used for machinery have Direct Opening Action to minimise risk in the event of failure

Independent Tests

TemBreak 2 circuit breakers have been tested at independent laboratories as well as in Terasaki's own laboratory in Osaka, Japan. Copies of independent test reports are available on request.

Marine Approvals

TemBreak 2 MCCBs are approved by the leading marine approval organisations.

Visit www.terasaki.com for current marine approvals and performance ratings.



WELCOME TO TEMBREAK 2

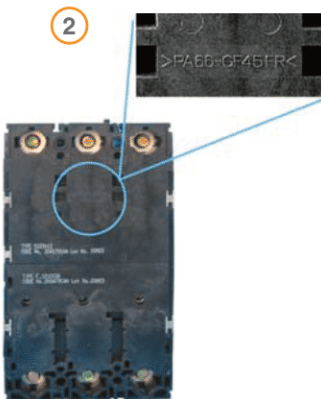
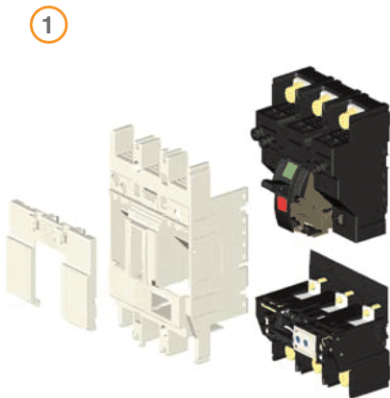
REDUCING ENVIRONMENTAL IMPACT

Longer Life Cycle

It makes good environmental sense to install a product with a long life expectancy. If you install a TemBreak 2 MCCB, you can expect it to stay in service for at least 30,000 mechanical operations (250A Frame). This is 22,000 more operations than recommended by IEC 60947-2, the international standard for circuit breakers.

If a system must be upgraded in future, we have made the following provisions for recycling:

- ① The modular design of TemBreak 2 allows component parts and accessories to be easily disassembled and separately disposed of. Moulded parts do not contain any embedded metal parts.
- ② Materials are clearly marked to allow future identification for easy recycling.



Uses Eco-friendly Materials

The following materials are used in most TemBreak 2 circuit breakers:

- Thermoplastic resin not containing PBBs or PBDEs
- Lead-free solder
- Cadmium-free contacts
- Rohs compliant materials

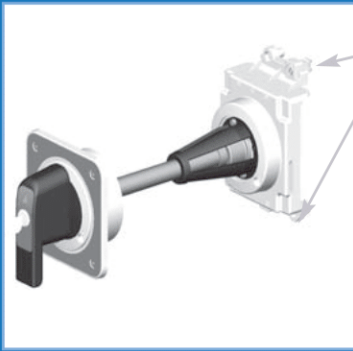
Lighter and Smaller

Components with low weight and volume make life easy for users, but high performance from smaller products also means less material used and less waste produced.

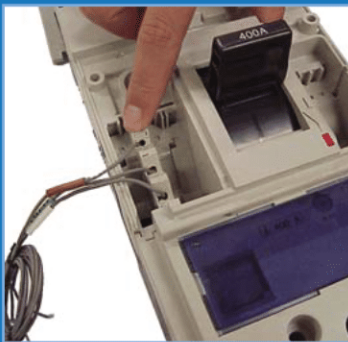
ISO 14001

Terasaki operate an Environmental Management System accredited to ISO 14001:1999. This requires us to monitor and measure the environmental performance of our activities, products and services in order to continually improve such performance.

Further information about this standard can be found on the internet at: www.tc207.org



Locking
Pegs



- Accessories can be fitted by the switchboard builder or added by the end-user. All internal accessories are common for TemBreak 2 MCCBs.
- Handles and motor operators can be rapidly fitted using the locking pegs. It takes **less than 10 seconds** to secure a handle or motor to the MCCB – a great time saving compared to alternative products.
- All accessories are endurance tested to the same level as the host MCCB.

MCCB ELECTRICAL CHARACTERISTICS TO IEC 60947-2, EN 60947-2, JIS C 8201-2-1 ANN.1, AS/NZS 3947-2, NEMA AB-1

Frame	Quantity	Unit	Condition	125	
Model				E125	S125
Number of Poles				3, 4	1
Type				NJ	NF
Nominal current ratings					
	I_n	(A)	50°C	20,32,50, 63,100,125	16,20,25, 32,40,50, 63, 80, 100,125
Electrical characteristics					
Rated operational voltage	U_c	(V)	AC 50/60 Hz DC	500 500	240 -
Rated insulation voltage	U_i	(V)		800	800
Rated impulse withstand voltage	U_{imp}	(kV)		8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	690V AC 525V AC 440V AC 400/415V AC 220/240V AC 250V DC	- 8 15 25 35 25	- - - - 25 -
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	690V AC 525V AC 440V AC 400/415V AC 220/240V AC 250V DC	- 6 12 19 27 19	- - - - 13 -
Rated breaking capacity (NEMA)		(kA)	480V AC 240VAC	8 35	- 25
Protection					
Adjustable thermal, adjustable magnetic				■	
Fixed thermal, fixed magnetic					■
Microprocessor					
Utilisation category				A	A
Installation					
Front connection (FC)				■	■
Attached flat bar (FB)				●	●
Solderless terminal (cable clamp) (FW)				●	●
Rear connection (RC)				●	-
Plug-in (PM)				●	-
Draw- out (DR)				-	-
DIN rail mounting (DA)				●	●
Dimensions	h	(mm)		155	155
	w	(mm)	3 pole, (1 pole) 4 pole	90 120	(30)
	d	(mm)		68	68
Weight	W	(kg)	3 pole, (1 pole) 4 pole	1.1 1.4	(0.45)
Operation					
Direct Opening Action				■	■
Toggle operation				■	■
Variable depth / direct mount operating handle (HB/HP)				●	-
Motor operator (MC)				●	-
Endurance	Electrical Mechanical	cycles cycles	440V AC	←	

RATINGS AND SPECIFICATIONS

					160				
S125	S125	H125	L125	S160	S160	S160	H160	L160	
3, 4 NJ	3,4 GJ	3, 4 NJ	3, 4 NJ	1 NF	3, 4 NJ	3, 4 GJ	3, 4 NJ	3, 4 NJ	
20,32,50, 63,100,125	20,32,50, 63,100,125	20,32,50, 63,100,125	20,32,50, 63,100,125	16,20,25,32, 40,50,63,80, 100,125,160	20,32,50,63, 100,125,160	50,63,100, 125,160	160	160	
690 600 800 8	690 600 800 8	690 600 800 8	690 600 800 8	415 125 800 8	690 600 800 8	690 600 800 8	690 600 800 8	690 600 800 8	
6 22 25 36 50 25	6 25 50 65 85 40	20 45 120 125 150 40	25 65 180 200 200 40	- - - - 25 -	7.5 (5*) 25 (18*) 25 (18*) 36 (30*) 65 (42*) 40 (30*)	7.5 25 50 65 85 40	20 45 120 125 150 40	25 65 180 200 200 40	
6 22 25 36/30 50 19	6 22 25 36/33 85 40	15 45 80 85 150 40	20 65 135 150 150 40	- - - - 19 -	7.5 (5*) 25 (18*) 25 (18*) 36 (25*) 65 (35*) 40 (25*)	7.5 25 25 36 85 40	15 45 80 85 150 40	20 65 135 150 150 40	
22 50	25 85	45 150	65 200	- 25	22 (18*) 65 (42*)	25 85	45 150	65 200	
■ A	■ A	■ A	■ A	■ A	■ A	■ A	■ A	■ A	
■ ● ● ● ● - ● 155 90 120 68 1.1 1.4	■ ● ● ● ● - ● 155 90 120 68 1.1 1.4	■ ● ● ● ● - - 165 105 140 103 2.4 3.2	■ ● ● ● ● - - 165 105 140 103 2.4 3.2	■ ● ● - - - - 165 (35) - 68 (0.5)	■ ● ● ● ● - - 165 105 140 68 1.5 1.9	■ ● ● ● ● - - 165 105 140 68 1.5 1.9	■ ● ● ● ● - - 165 105 140 103 2.5 3.3	■ ● ● ● ● - - 165 105 140 103 2.5 3.3	
■ ■ ● ●	■ ■ ● ●	■ ■ ● ●	■ ■ ● ●	■ ■ - -	■ ■ ● ●	■ ■ ● ●	■ ■ ● ●	■ ■ ● ●	

 30,000
30,000

20,000

 20,000
30,000

*Applies only to 20A and 32A models

MCCB ELECTRICAL CHARACTERISTICS TO IEC 60947-2, EN 60947-2, JIS C 8201-2-1 ANN.1, AS/NZS 3947-2, NEMA AB-1

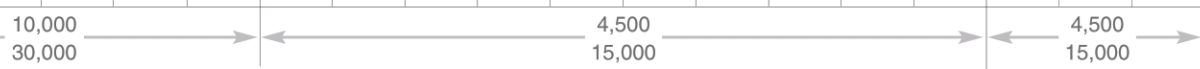
SECTION 2

Frame	Quantity	Unit	Condition	250		
Model				E250	S250	S250
Number of Poles				3, 4	3, 4	3, 4
Type				NJ	NJ	GJ
Nominal current ratings						
	I_n	(A)	50°C	20,32,50,63 100,125,160, 200,250	160,200, 250	160,200, 250
Electrical characteristics						
Rated operational voltage	U_c	(V)	AC 50/60 Hz DC	500 500	690 600	690 600
Rated insulation voltage	U_i	(V)		800	800	800
Rated impulse withstand voltage	U_{imp}	(kV)		8	8	8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	690V AC 525V AC 440V AC 400/415V AC 220/240V AC 250V DC	- 10 15 25 35 25	7.5 25 25 36 65 40	7.5 25 50 65 85 40
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	690V AC 525V AC 440V AC 400/415V AC 220/240V AC 250V DC	- 7.5 12 19 27 19	7.5 25 25 36 65 40	7.5 25 25 36 85 40
Rated breaking capacity (NEMA)		(kA)	480V AC 240VAC	10 35	22 65	25 85
Rated short-time withstand current	I_{cw}	(kA)	0.3 Seconds	-	-	-
Protection						
Adjustable thermal, adjustable magnetic				■	■	■
Fixed thermal, fixed magnetic						
Microprocessor						
Utilisation category				A	A	A
Installation						
Front connection (FC)				■	■	■
Attached flat bar (FB)				●	●	●
Solderless terminal (cable clamp) (FW)				●	●	●
Rear connection (RC)				●	●	●
Plug-in (PM)				●	●	●
Draw- out (DR)				-	-	-
DIN rail mounting (DA)				-	-	-
Dimensions						
	h	(mm)		165	165	165
	w	(mm)	3 pole	105	105	105
		(mm)	4 pole	140	140	140
	d	(mm)		68	68	68
Weight	W	(kg)	3 pole	1.5	1.5	1.5
			4 pole	1.9	1.9	1.9
Operation						
Direct Opening Action				■	■	■
Toggle operation				■	■	■
Variable depth / direct mount operating handle (HB/HP)				●	●	●
Motor operator (MC)						
Endurance						
	Electrical	cycles	415V AC			
	Mechanical	cycles				

RATINGS AND SPECIFICATIONS

				400										630			>630	
S250	H250	H250	L250	E400	S400	S400	S400	S400	S400	S400	H400	H400	L400	L400	E630	S630	S630	>630
3, 4 PE	3, 4 NJ	3, 4 NE	3, 4 NJ	3, 4 NJ	3, 4 CJ	3, 4 NJ	3, 4 NE	3, 4 GJ	3, 4 GE	3, 4 NJ	3, 4 NE	3, 4 NJ	3, 4 NE	3, 4 NE	3, 4 CE	3, 4 GE		
250, 125	160, 250	250, 125	160, 250	250, 400	250, 400	250, 400	250, 400	250, 400	250, 400	250, 400	250, 400	250, 400	250, 400	250, 400	630	630	630	
690 - 800 8	690 600 800 8	690 - 800 8	690 600 800 8	500 500 800 8	690 600 800 8	690 600 800 8	690 - 800 8	690 600 800 8	690 - 800 8	690 600 800 8	690 600 800 8	690 600 800 8	690 600 800 8	690* - 800 8	690* - 800 8	690* - 800 8		
20 35 50 70 125 -	20 45 120 125 150 40	20 45 120 125 150 -	25 65 180 200 200 40	- 15 22 25 35 25	15 22 30 36 50 40	20 30 45 50 85 40	20 30 45 50 85 -	20 30 45 70 100 40	20 30 45 70 100 -	35 45 120 125 150 40	35 45 120 125 150 -	50 65 180 200 200 40	50 65 180 200 200 -	10* 15 25 36 50 -	20* 30 45 50 85 -	20* 30 65 70 100 -		
15 35 50 70 125 -	15 45 80 85 150 40	15 45 80 85 150 -	20 65 135 150 150 40	- 15 22 25 35 19	15 22 30 36 50 40	15 30 45 50 85 40	15 30 45 50 85 -	15 30 45 50 85 40	15 30 50 50 85 -	35 45 80 85 150 40	35 45 80 85 150 -	50 65 135 150 150 40	50 65 135 150 150 -	10* 15 25 36 50 -	15* 30 45 50 85 -	15* 30 50 50 85 -		
35 125	45 150	45 150	65 200	15 35	22 50	25 85	25 85	30 100	30 100	45 150	45 150	65 200	65 200	15 50	25 85	30 100		
-	-	-	-	-	-	-	5	-	5	-	5	-	5	-	-	-		
■ A	■ A	■ A	■ A	■ A	■ A	■ A	■ B	■ A	■ B	■ A	■ B	■ A	■ B	■ A	■ A	■ A		
● ● ● ● ● - -	● ● ● ● ● - -	● ● ● ● ● - -	● ● ● ● ● - -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	● ● ● ● ● ● -	
165 105 140 103 2.5 3.3	165 105 140 103 2.4 3.2	165 105 140 103 2.5 3.3	165 105 140 103 2.4 3.2	260 140 185 103 4.2 5.6	260 140 185 103 4.2 5.6	260 140 185 103 4.2 5.6	260 140 185 103 4.3 5.7	260 140 185 103 4.2 5.6	260 140 185 103 4.3 5.7	260 140 185 103 7.0 9.3	260 140 185 103 7.1 9.4	260 140 185 103 7.0 9.3	260 140 185 103 7.1 9.4	260 140 185 103 5.0 6.5	260 140 185 103 5.0 6.5	260 140 185 103 5.0 6.5		
■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●	■ ■ ●		

TURN TO PAGE 143, SECTION 9, FOR RATINGS AND SPECIFICATIONS OF MCCBs FROM 630A TO 1600A



*MCCB cannot be used in IT systems at this voltage.
 † Refer to Temperature Ratings, Section 6.
 ‡ Contact NHP for details.

SWITCH-DISCONNECTOR ELECTRICAL CHARACTERISTICS TO IEC 60947-3, EN 60947-3, AS/NZS 3947-3

Frame	Quantity	Unit	Condition	125	160	250
Model				S125	S160	S250
Number of Poles				3,4	3,4	3,4
Type				NN	NN	NN
Nominal current ratings						
	I_c	(A)		125	160	250
Electrical characteristics						
Rated operational voltage	U_c	(V)	AC 50/60 Hz	690	690	690
Rated insulation voltage	U_i	(V)	DC	600	600	600
Rated impulse withstand voltage	U_{imp}	(kV)		800	800	800
				8	8	8
Rated short-circuit making capacity	I_{cm}	(kA peak)	0.3 Seconds	3.6	6	6
Rated short-time withstand current	I_{cw}	(kA rms)	AC	2	3	3
Utilisation category to IEC 60947-3			DC	AC-23A DC-22A	AC-23A DC-22A	AC-23A DC-22A
Installation						
Front connection (FC)				■	■	■
Attached flat bar (FB)				●	●	●
Solderless terminal				●	●	●
Rear connection (RC)				●	●	●
Plug-in (PM)				●	●	●
Draw-out (DR)				-	-	-
DIN rail mounting (DA)				●	-	-
Dimensions	h	(mm)		155	165	165
	w	(mm)	3 pole	90	105	105
			4 pole	120	140	140
	d	(mm)		68	68	68
Weight	W	(kg)	3 pole	1.1	1.5	1.5
			4 pole	1.4	1.9	1.9
Operation						
Direct Opening Action				■	■	■
Toggle operation				■	■	■
Variable depth / direct mount operating handle (HB/HP)				●	●	●
Motor operator (MC)				●	●	●
Endurance	Electrical	cycles	415V AC	30,000	20,000	10,000
	Mechanical	cycles		30,000	30,000	30,000

RATINGS AND SPECIFICATIONS

	400	630
	S400	S630
	3,4 NN	3,4 NN
	400	630
	690 600 800 8	690 600 800 8
	9 5 AC-23A DC-22A	9 5 AC-23A DC-22A
	■ ● ● ● ● - - 260 140 185 103 4.2 5.6	■ ● ● ● ‡ - - 260 140 185 103 4.4 5.8
	■ ■ ● ●	■ ■ ● ●
	4,500 15,000	4,500 15,000

‡ Contact us for details.