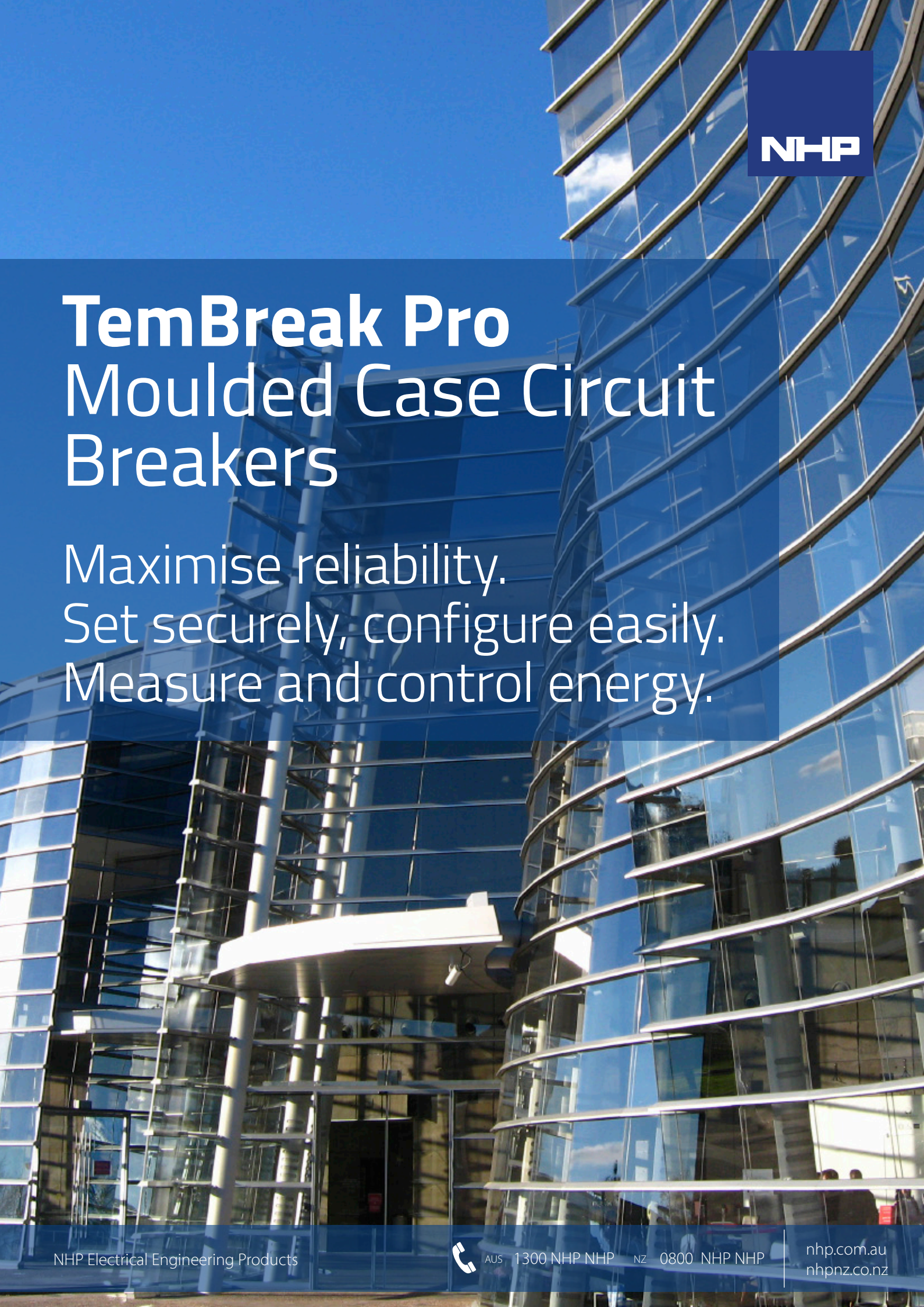


TemBreak Pro
Moulded Case Circuit Breakers

Maximise reliability.
Set securely, configure easily.
Measure and control energy.

NHP Electrical Engineering Products

AUS 1300 NHP NHP NZ 0800 NHP NHP

nhp.com.au
nhpnz.co.nz

Maximise reliability. Set securely, configure easily. Measure and control energy.

TemBreak Pro is a range of high performance Moulded Case Circuit Breaker (MCCBs) designed to protect the electrical systems of today and connect to the information systems of tomorrow

- Very broad range of MCCBs which have frame sizes from 160A up to 3200A
- A mixed blend of trip unit technologies including Thermal Magnetic (TM), Basic Electronic (BE) and 'SMART', digitally connected metering types
- Breaking capacities (Icu) from 25kA – 200kA
- Face plate labels are colour coded to trip unit technology types
- Suits 400-690VAC installation and has specific models of 1000VAC and DC applications

Visit nhp.com.au/TembreakPro for more information and videos on the P model

TemBreak Pro

Terasaki's complete Moulded Case Circuit Breaker range packed with innovations and a new clean look

P160H (70kA)

P250H (70kA)

P630H (70kA)

B800H (70kA)

B1250HL (85kA)

XS2000HL (85kA)

Ten performance levels to suit your application

E (25kA)
F (36kA)
N (50kA)
M (65kA)
H (70kA)
HL (85kA)
G (100kA)
S (110kA)
P (125kA)
R (200kA)

Non - Auto Option

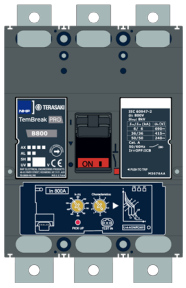
D (Switch)

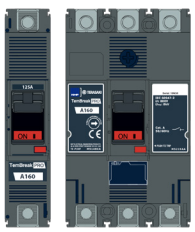
Four model types make up the complete range*

A Model (basic applications 160-250AF)
P Model (mid to advanced applications 160-630AF)
B Model (high amps and kA ratings 160-1600AF)
XS Model (highest amp ratings 2000-3200AF)

All I_{cu} kA figures shown are at 415VAC, AF = Amp Frame size

*This is the general TemBreak Pro range. Specialist MCCBs such as VS 1000VAC MCCBs and DC MCCBs are also available.





		16A	63A	100A	125A	160A	250A	400A	630A	800A	1000A	1250A	1600A	2000A	2500A	3200A
XS model 2000-2500-3200A Trip Units: BE, NN	Level HL–85kA													■	■	■
	Level D – Switch													■	■	■
B model 160-250-400-630A 1P / 3P / 4P Trip Units: TM, BE, BEG, SE, SX, FF, NN	Level R – 200kA					■	■	■		■						
	Level P – 125kA					■	■	■		■						
	Level G – 100kA									■						
	Level HL – 85kA											■	■			
	Level H – 70kA									■	■	■	■			
	Level N – 50kA									■	■	■	■			
	Level F – 36kA									■						
	Level E–25kA-1P*	■	■	■	■	■										
	Level D – Switch							■	■	■	■	■	■			
P model 160-250-400-630A 3P / 4P Trip Units: TM, BE, BEG, SE, FF, NN	Level S – 110kA							■	■							
	Level H – 70kA	■	■	■	■	■	■	■	■							
	Level N – 50kA	■	■	■	■	■	■	■	■							
	Level F – 36kA	■	■	■	■	■	■	■	■							
	Level E – 25kA	■	■	■	■	■	■	■	■							
	Level D – Switch	■	■	■	■	■	■	■	■							
A model 125-160-250A 1P / 3P / 4P Trip Units: TM, TF, FF, NN	Level F – 36kA	■	■	■	■	■	■									
	Level E – 25kA	■	■	■	■	■	■									
	Level E – 25kA-1P*	■	■	■	■											
	Level D – Switch	■	■	■	■											

*25mm pole pitch for 'A model' and 35mm pole pitch for 'B model'

New P model MCCBs 160AF – 630AF

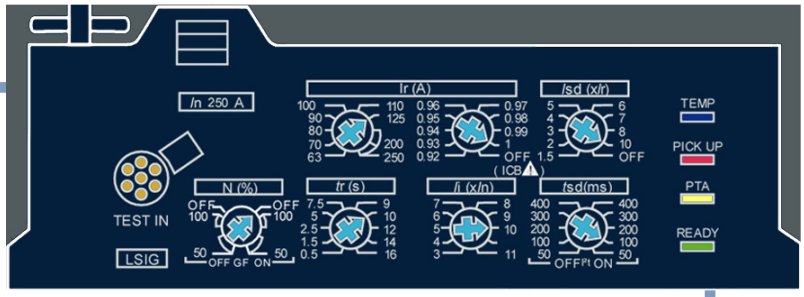
NHP and Terasaki are proud to launch the new 'P model' range of TemBreak Pro MCCBs which introduces many new innovations and complements the existing 'A', 'B' and 'XS' TemBreakPro models.

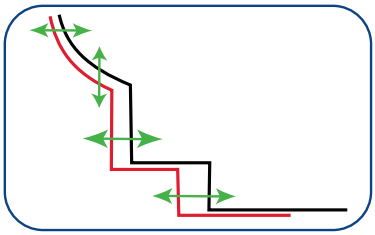
New unified amp frame size dimensions

P160AF

P250AF

P400/P630 AF





NEW basic electronic trip unit offers the highest level of setting flexibility

NEW digital connectivity to control and monitor the status of the MCCB over a communications network

Interface with an external PLC or control systems to remotely operate (Open/Close) the TemBreak Pro MCCBs and read back the open , closed and trip status.

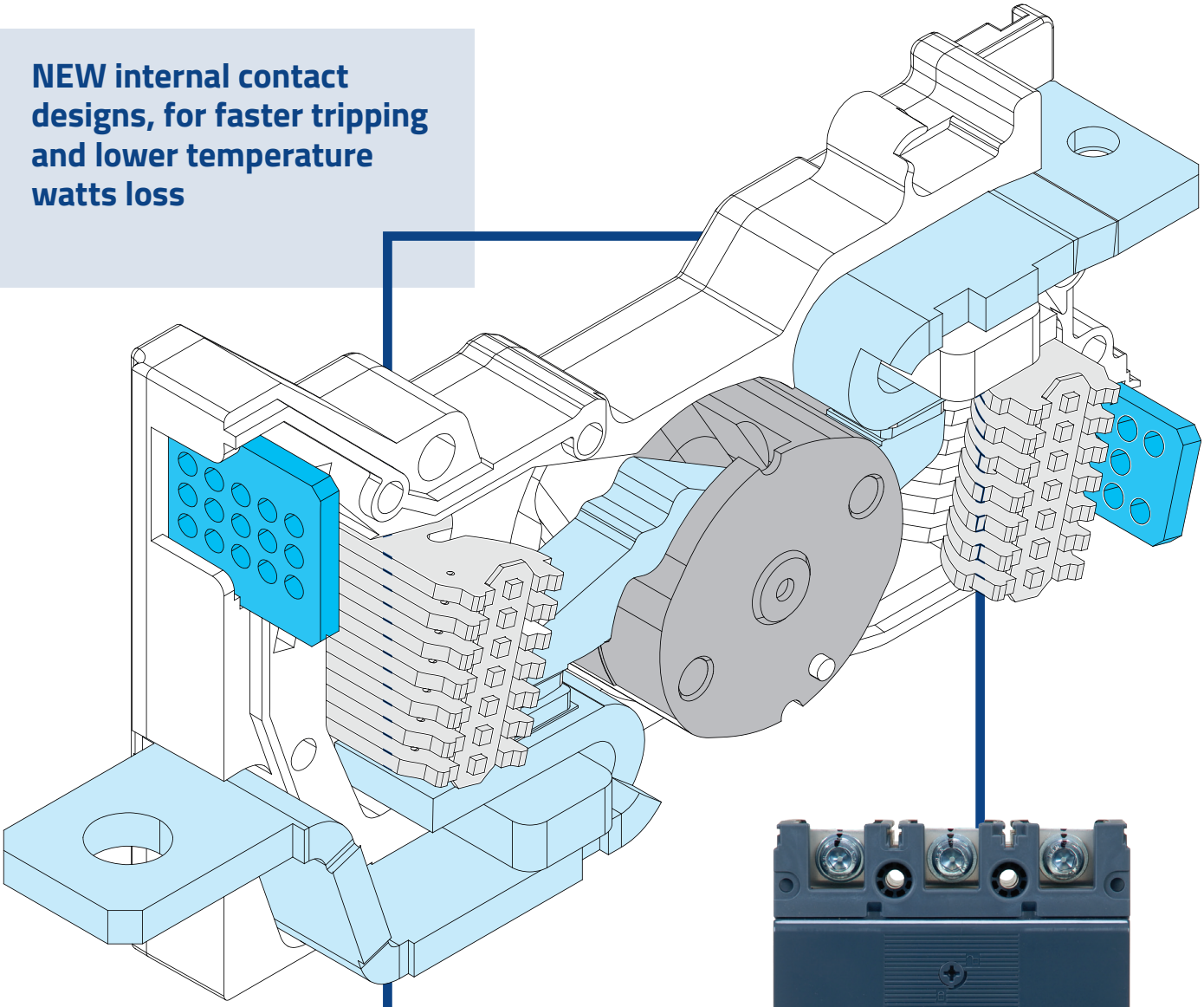
UWP 3.0

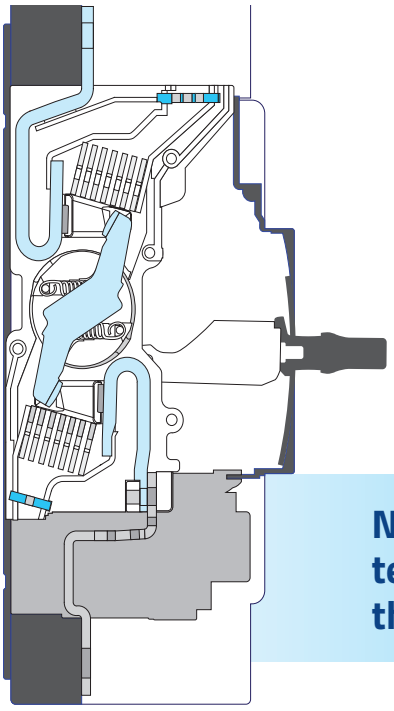
LV switchboard with Terasaki TemBreak Pro MCCBs

Remote open and close TemBreak Pro MCCBs from outside the Switchroom using a touchscreen or HMI

NEW super compact 160AF with energy monitoring and communications

NEW internal contact designs, for faster tripping and lower temperature watts loss





NEW increased design temperature up to 50°C reduces the costs of switchboards

Easy selection

Colour coded labels to help identify a trip unit technology type and application fit

TemBreak Pro is an extensive range with amp frame sizes from 160AF to 3200AF!

To simplify selection of TemBreak Pro MCCBs, please use the three colour coded label groups.

White label
Thermal Magnetic

- Min 160AF Max 800AF
- Thermal Magnetic trip units
- Economical and space saving
- Light commercial range

Grey label
Basic Electronic

- Min 160AF Max 3200AF
- Basic Electronic trip units
- Suits more complicated power reticulation
- Small hospitals / government buildings etc.

Blue label
SMART Electronic

- Min 160AF Max 1000AF
- SMART Electronic trip units
- Suits applications requiring data
- Data centres / critical infrastructure

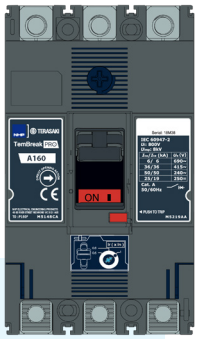
TemBreak Pro
White label range

White label TemBreak Pro range – 800A Max Amp rating, Thermal Magnetic trip units. A mix of A, B and P models

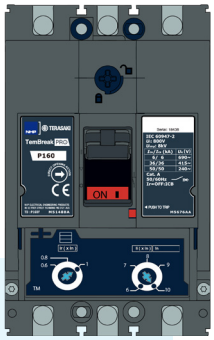
Most economical and space saving, best suited to:

- Small light and power Main Distribution Boards and Distribution Boards for contractors
- Light commercial, small offices, consulting suites, shopping centers etc.
- Low to mid level kA performance levels ratings
- A mix of pole pitches which only suit specific chassis

- A160-E-FF
- 1Pole 125A
- 25kA
- 25mm pole pitch



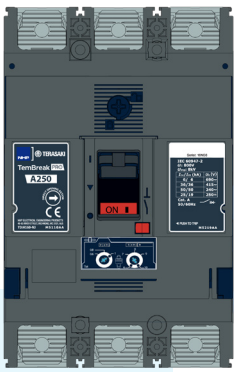
- A160-E/F-TF
- 3/4 Pole 160A
- 25/36kA
- 25mm pole pitch



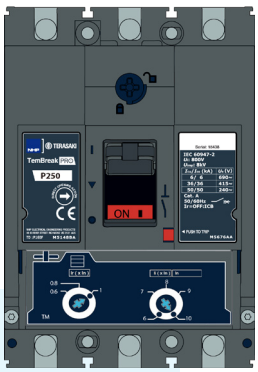
- P160-F/N/H-TM
- 3/4 Pole 250A
- 36/50/70kA
- 30mm pole pitch

- P160-F-FF
- 2 Pole 125A
- 36kA
- 30mm pole pitch

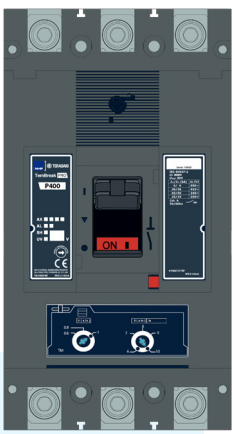
- B160-E-FF
- 1Pole 160A
- 25kA
- 35mm pole pitch



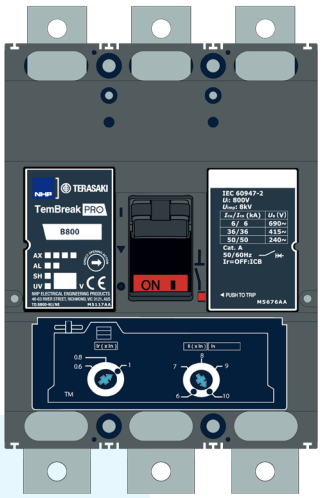
- A250-E/F-TM
- 3/4 Pole 250A
- 25/36kA
- 35mm pole pitch



- P250-F/N/H-TM
- 3/4 Pole 250A
- 36/50/70kA
- 35mm pole pitch



- P400/630-E/F/N/H-TM
- 3/4 Pole
- 400A/630A
- 25/36k/50/70kA



- B800-E/F/N-TM
- 3 / 4 Pole
- 800A
- 36/50kA

Trip unit technology
Thermal Magnetic TemBreak Pro MCCBs – White label

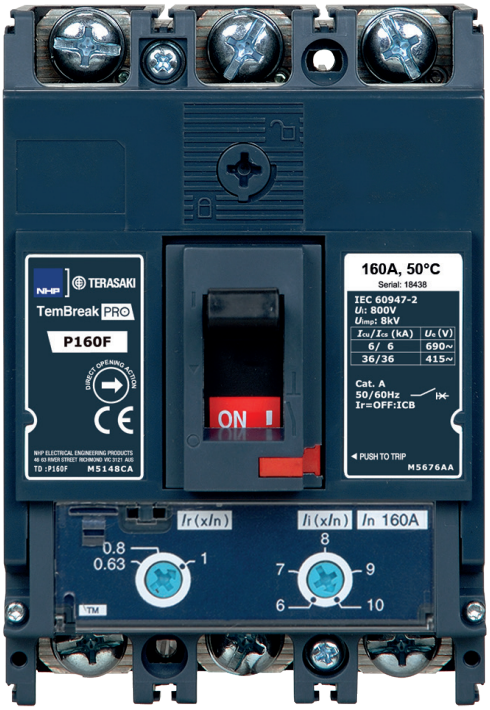
Thermal Magnetic (TM) technologies

Type 'FF' – Fixed thermal / Fixed magnetic characteristics (only used in the A and B model single pole)

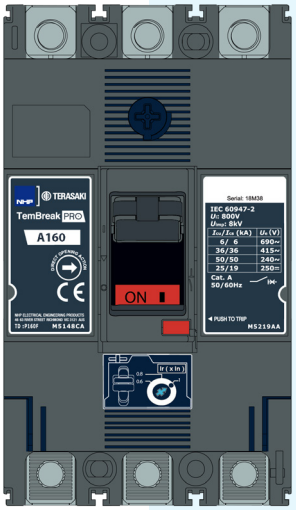
Type 'TF' – Adjustable thermal and fixed magnetic characteristics (only used in the A model 160A)

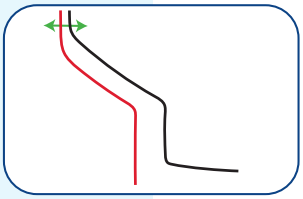
Type 'TM' – Adjustable thermal and adjustable magnetic characteristics (applies to all other TM TemBreak Pro)

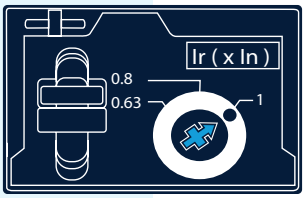
Type 'FM' – Fixed thermal and adjustable magnetic characteristics (applies to all other TM TemBreak Pro)



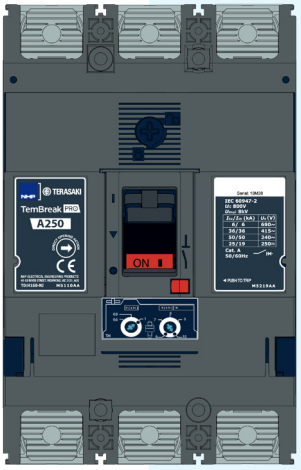
A160-TF (Adj T + Fixed M)

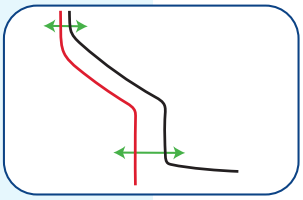


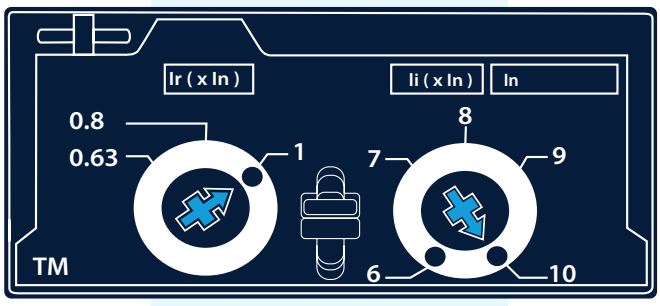




A250-TM (Adj T + Adj M)







Features of TemBreak Pro MCCBs with adjustable TM trip units

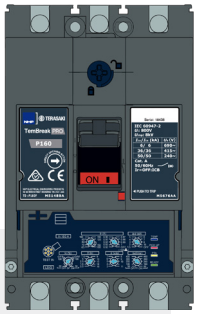
- Settings accessible by a rotary dial
- Thermal element and Magnetic element adjustment dials in A250 model, P models and B models
- P model below 630A are calibrated at 50°C for superior performance in hot environments
- Possible adjustment of the protection of neutral pole on 4-pole versions (neutral pole)

TemBreak Pro
Grey label range

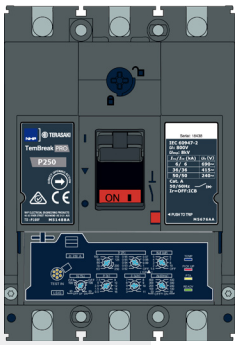
Grey label TemBreak Pro range – 3200A Max Amp rating, Basic Electronic trip units. A mix of B, P and XS models

Mix of flexibility and economy for more complex power reticulation, which best suits:

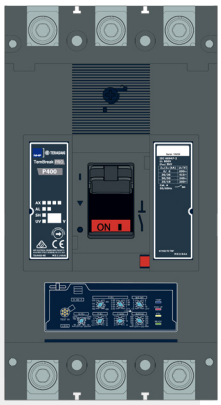
- Large main distribution boards for contractors
- Small hospitals / clinics, government, council, retail and commercial buildings
- Achieve selectivity to AS3000
- Perfect for 'Safety Services' protection requirements to AS3000
- Helps with optimising cable sizing
- Type 2 co-ordination motor starting applications



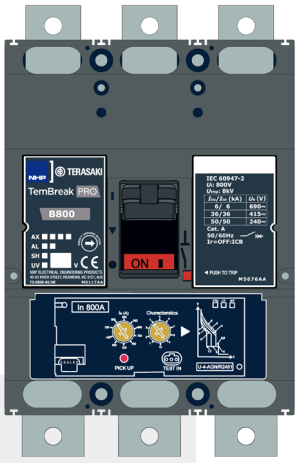
- P160-F/N/H-BE
- 3/4 pole 160A
- 36/50/70kA
- 30mm pole pitch



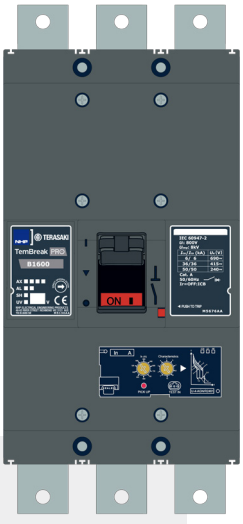
- P250-F/N/H-BE
- 3/4 pole 250A
- 36/50/70kA



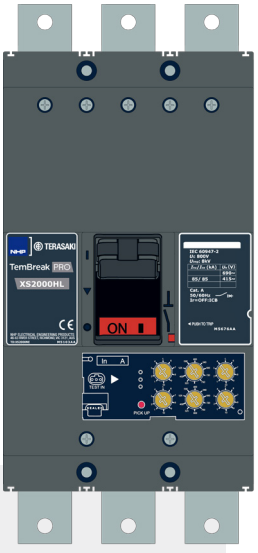
- P400/630-F/N/H-BE
- 3/4 pole 400/630A
- 36/50/70kA



- B800/1000-N/H-BE
- 3/4 pole 800/1000A
- 50/70kA



- B1250/1600-N/H-BE
- 3/4 pole 400/630A
- 50/70kA



- XS2000/2500/3200HL
- 3/4 pole 2000/2500/3200A
- 85kA

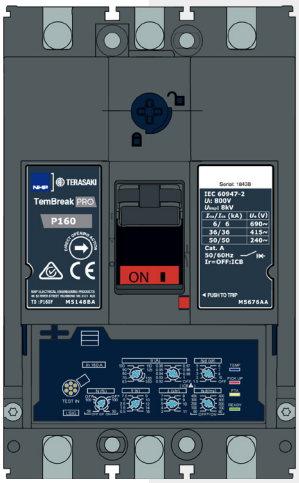
Trip unit technology
Basic Electronic TemBreak Pro MCCBs – Grey label

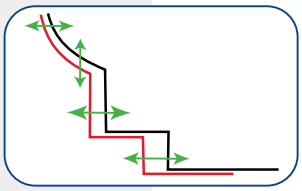
Basic Electronic (BE) technologies

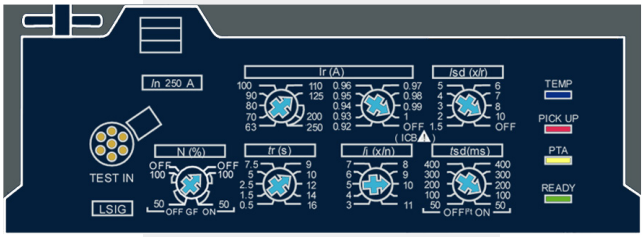
Type 'P_BE' – for P and XS models have multiple rotary dials for fully adjustable LSI settings

Type 'B_BE' – for B model have two dials to select from a range of pre-set LSI protection curves

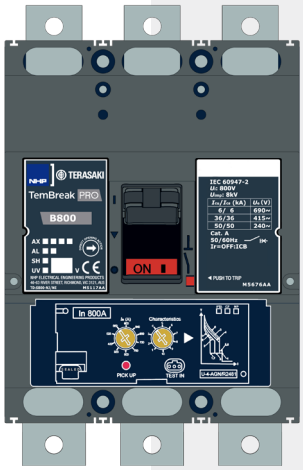
P160-P_BE (multi dial)

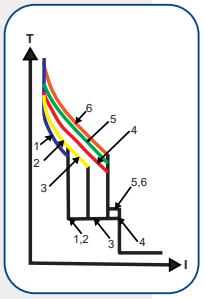


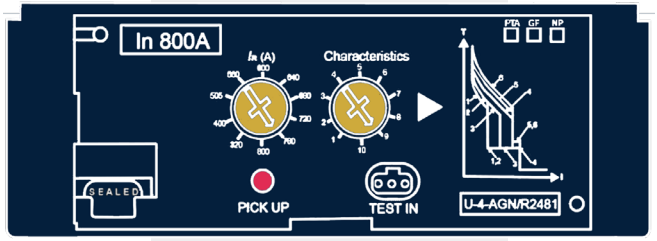




B800-B_BE (Two dial)







Features of TemBreak Pro MCCBs with adjustable BE trip units

- LSI or LSIG protection setting by rotary dial
- LED signaling overload alarm (>I_r) and an over temperature alarm LED for P models
- Signaling the trip unit LED status (Ready) and PTA overload pre-warning LED for P models
- Possible adjustment of the protection of neutral pole on 4-pole versions

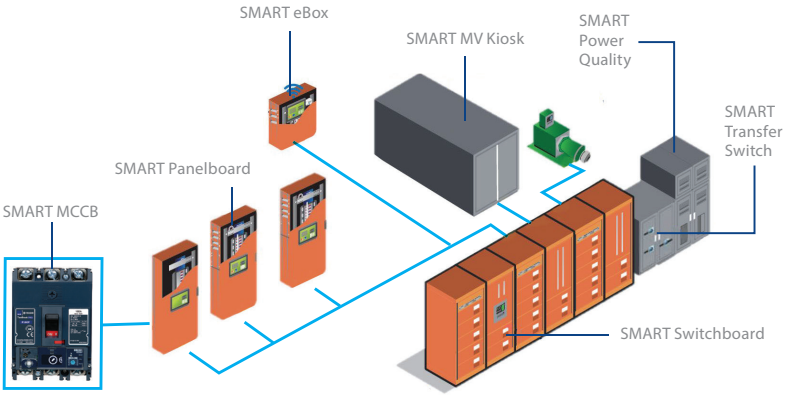
TemBreak Pro
Blue label range

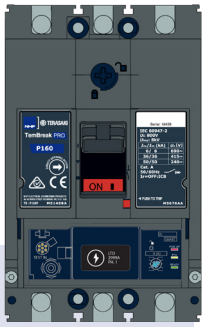
Blue label TemBreak Pro – 1000A Max Amp rating, SMART metering type Electronic trip units. A mix of B and P model breakers

High technology trip unit MCCB range for more complex power reticulation systems requiring data connectivity, best suited to:

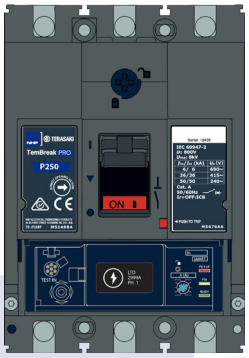
- Large main distribution boards and main switchboards
- Major hospitals and data centres
- Government and defence facilities
- Easy BMS / SCADA integration
- Helps with optimising cable sizing
- Load analysis and real time data monitoring
- Achieve AS3000 selectivity requirements with highly adjustable LSI setting

Blue label TemBreak Pro MCCBs with integrated metering and communications ready technology take SMART power distribution to the next level. Create the perfect energy management system which meets the requirements of the NCC Section J by connecting TemBreak Pro SMART trip unit MCCBs to the NHP SMART eBox.

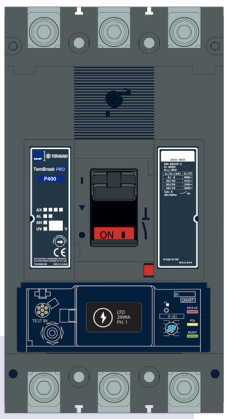




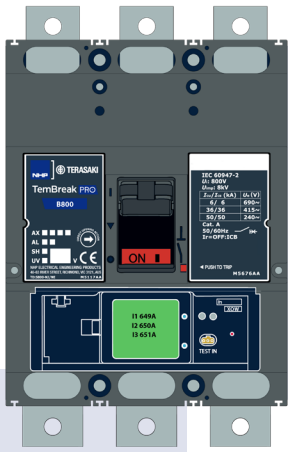
- P160-F/N/H-SE
- 3/4 pole 160A
- 36/50/70kA
- 30mm pole pitch



- P250-F/N/H-SE
- 3/4 pole 250A
- 36/50/70kA



- P400/630-F/N/H-SE
- 3/4 pole 400/630A
- 36/50/70kA



- B800/1000-N/H-SE
- 3/4 pole 800/1000A
- 50/70kA

Trip unit technology
SMART Electronic TemBreak Pro MCCBs – Blue label

SMART Electronic (SE) technologies

P and B models have fully adjustable LSI with energy metering and communications.

Type 'P_SE' – P models with fully adjustable LSI, OLED display, energy meter and communications

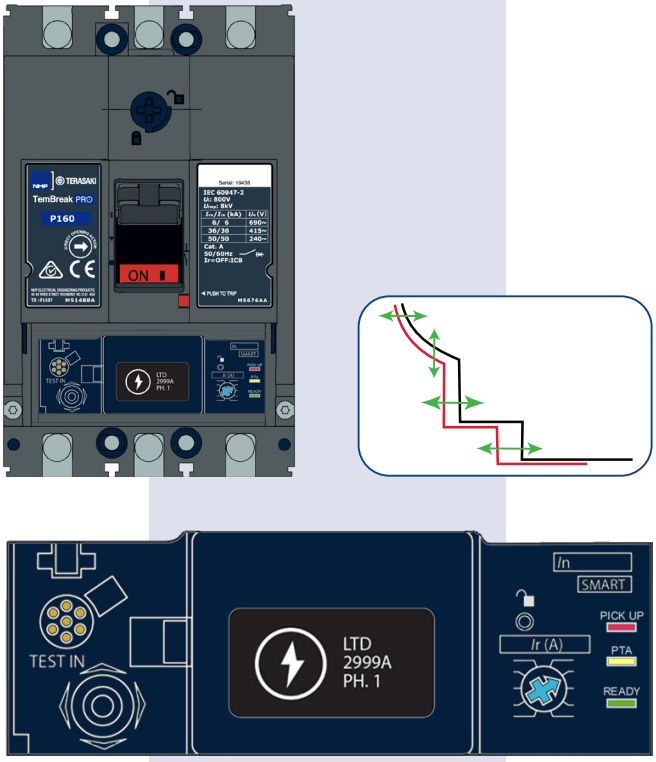
Type 'B_SX' – B models with fully adjustable LSI, LCD technology, ammeter and communications

Type 'B_SE' – B models with fully adjustable LSI, LCD technology, energy meter and communications

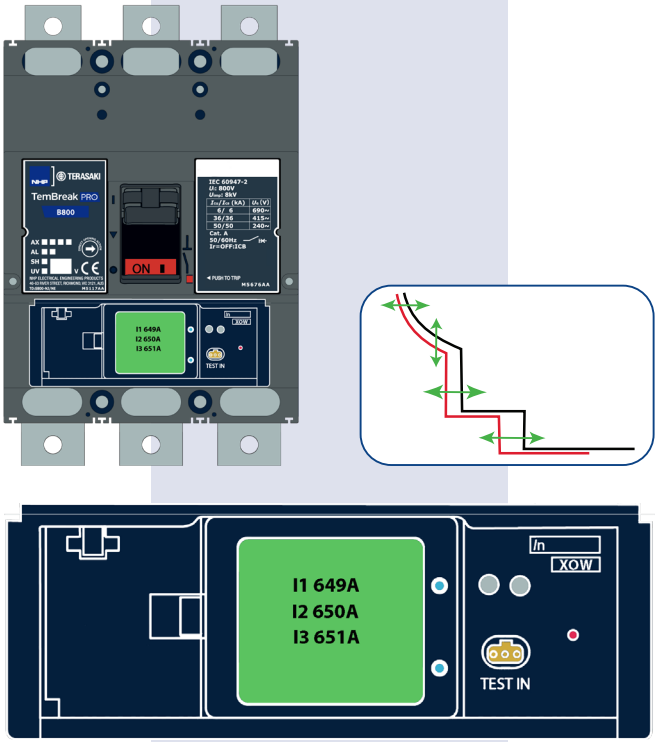
Features of TemBreak Pro MCCBs with adjustable P_SE / B_SX trip units

- LSI or LSIG protection setting adjustments by rotary dial and or digital menu
- LED signaling overload alarm (>I_r) for P models
- Signaling the trip unit LED status (Ready) and PTA overload pre-warning LED for P models
- Possible adjustment of the protection of neutral pole on 4-pole versions
- Measurements such as voltage, current, power, THD, frequency and power factor available
- MODBUS RTU, Ethernet IP and MODBUS TCP communications options available

P160-P_SE (OLED type)



B800-B_SX / B_SE (LCD type)



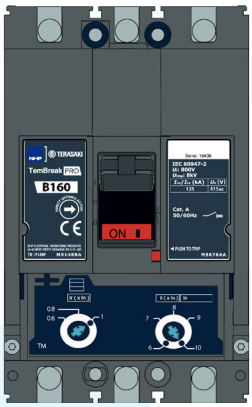
TemBreak Pro special MCCBs from 160A to 3200A

High I_{cu} kA rating MCCBs

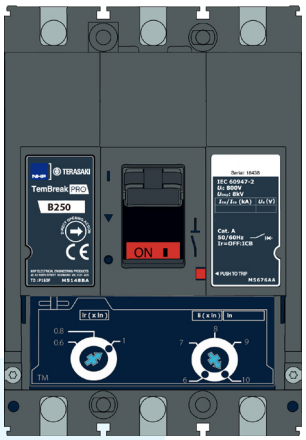
Non-automatics (switches)

High I_{cu} kA rating MCCBs

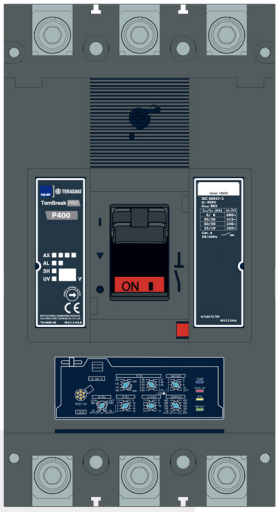
- 160A – 800A amp ratings, 3 and 4 pole
- Performance levels
  G (100kA) / S (110kA) / P (125kA) / R (200kA)
- Mix of Thermal Magnetic, Basic Electronic and SMART trip units



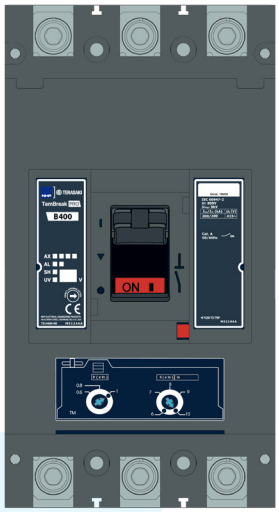
- B160-P/R-TM
- 3/4 Pole 160A
- 125/200kA



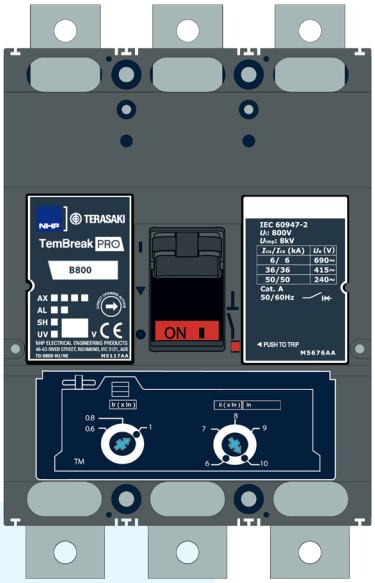
- B250-P/R-TM/BE
- 3/4 Pole 250A
- 125/200kA



- P400/630-S-TM/BE/SE
- 3/4 Pole 400A/630A
- 110kA



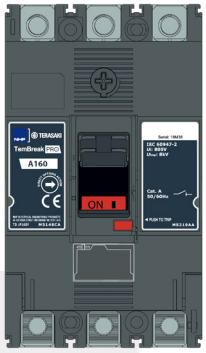
- B400-P/R—BE
- 3/4 Pole 400A
- 125/200kA



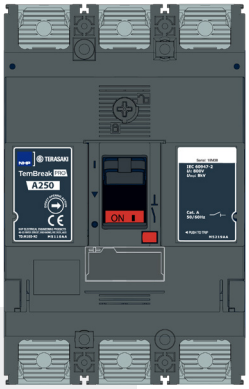
- B800-G/P/R—TM/BE/SE
- 3 / 4 Pole 800A
- 100/125/200kA

Non-automatics (switches)

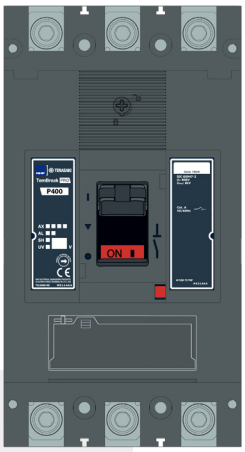
- 160A-3200A amp ratings, 3 and 4 pole
- No trip unit, just to be used as an isolator
- AC23 and DC23 ratings for motor starting use.
  No over-current protection (isolator only)
- Wide range of accessories for application flexibility
- Accepts standard MCCB internal and external accessories



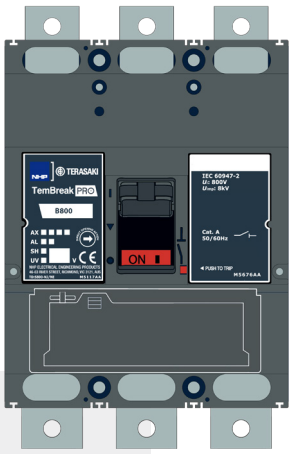
- A160-D-NN
- P160-D-NN
- 3/4 Pole
- 160A



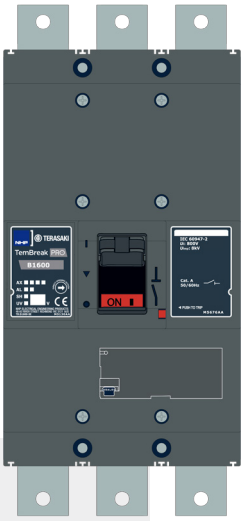
- A250-D-NN
- P250-D-NN
- 3/4 Pole
- 250A



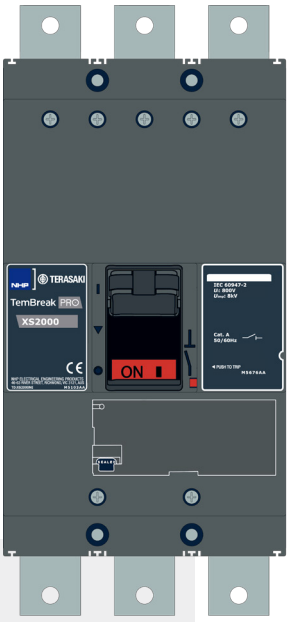
- P400-D-NN
- 630-D-NN
- 3/4 Pole
- 400A/630A



- B800-D-NN
- B1250-D-NN
- 3/4 Pole
- 800A/1000A



- B1250-D-NN
- B1600-D-NN
- 3 / 4 Pole
- 1250A/1600A



- XS2000-D-NN
- XS2500/3200-D-NN
- 3 / 4 Pole
- 2000A-3200A

TemBreak Pro part number structure

The TemBreak Pro MCCB part number structure is made up of eight components that clearly define the specification for ease of ordering

Example part number

P160-F-2-3-160-BE

or

B800-N-3-800-TM

Model

The TemBreak Pro range consists of four model types: ***A, B, P and XS***. The right model type is determined by the required performance characteristics.

Amp frame

The TemBreak Pro range has eleven amp rating frame types. They are: *160, 250, 400, 630, 800, 1000, 1250, 1600, 2000, 2500* and *3200*. These models are spread across the '***white***, '***grey***' and '***blue***' trip unit or frame size groups.

kA rating

The TemBreak Pro range has ten short circuit performance levels and a non-auto / switch option. They are: ***D*** (Switch), ***E*** (25kA), ***F*** (36kA), ***N*** (50kA), ***M*** (65kA), ***H*** (70kA), ***HL*** (85kA), ***G*** (100kA), ***S*** (110kA), ***P*** (125kA) and ***R*** (200kA).

Pole pitch

The pole pitch selection only applies to the 160AF of A, P and B models. For 250A models and above, this specification is not necessary. P/B160 models offers (1) 25mm, (2) 30mm or (3) 35mm pole pitches. Pole pitch is important if fitting the MCCBs to a fixed chassis.

Number of poles

The TemBreak Pro range has four pole types. They are *1P, 2P, 3P and 4P*. These models are spread across the range.

Trip rating

The TemBreak Pro range offers three broad trip unit ratings which vary depending on the trip unit technology and the MCCB frame size. Please refer to the main technical characteristics data table for a list of the available trip units.

Trip technology

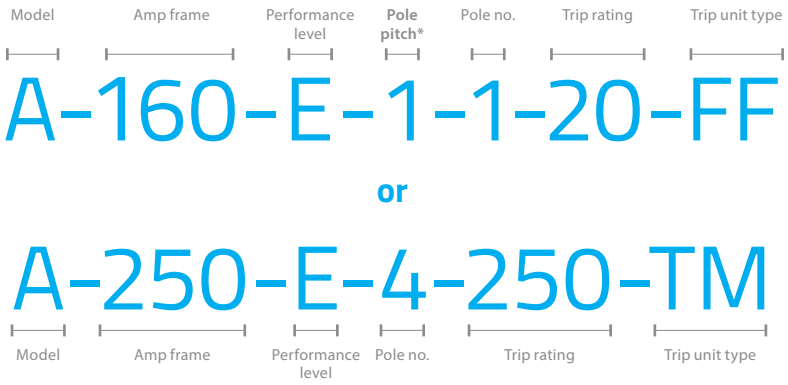
Trip unit technologies are: ***Thermal Magnetic*** (TM), ***Basic Electronic*** (BE) and ***SMART Electronic*** (SE or SX). Within these three trip unit technologies, there are specification variations. Please refer to the main technical characteristics for more information.

Special options

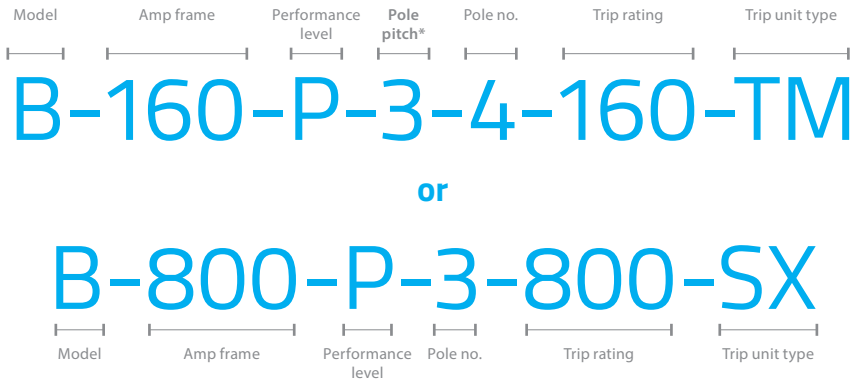
The trip unit options selection only applies to B model types that have electronic trip units MCCBs. Please refer to the main technical characteristics data table for a list of the available trip unit options for further details.

Note: Trip units are not supplied as separate components. MCCBs come with trip units installed and tested.

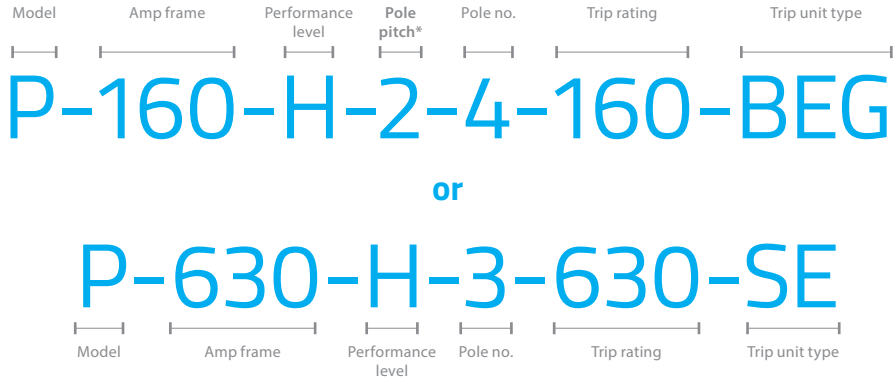
Example part numbers – A Model



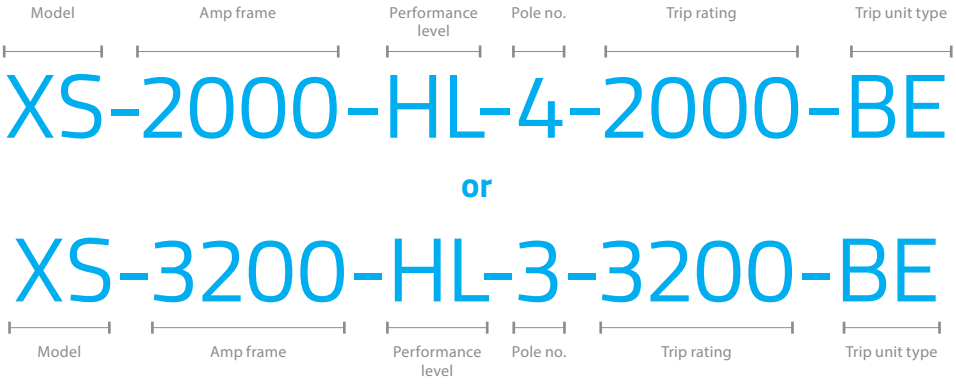
Example part numbers – B Model



Example part numbers – P Model



Example part numbers – XS Model



*Pole pitch selection only applies to the 160 amp frame of A , P and B models.

1 (25mm)
2 (30mm)
3 (35mm)

TemBreak Pro range product highlights

Tembreak Pro – Powering today, connecting tomorrow

TemBreak PRO is a range of robust and reliable moulded-case circuit breakers and switch-disconnectors that have been designed with extensive user-feedback from all sectors taken into account to deliver a superior product range.

TemBreak PRO can power and protect the electrical systems of today, and connect to the information systems of tomorrow.

POWERING TODAY
CONNECTING TOMORROW

Optimise your installation

Basic power requirements

Small light and power Main Distribution Boards – cost and space saving options with the Thermal Magnetic A160 / A250 models

Complex power reticulation

Large Main Distribution Boards achieve AS3000 Safety Services and Selectivity requirements while optimising cable sizes with the highly flexible, yet simple to use Basic Electronic trip unit.

Motor control centres

Super small P160 frame size is available with Thermal Magnetic, Basic Electronic or SMART Electronic trip units optimizing physical size and Type 2 co-ordination.

Arduous environments

Deliver maximum power at ambient temperatures up to 50°C so there is no need to oversize your MCCB design, reducing overall cost.

Tiny but mighty P160

P160 frame size with basic electronic trip unit, just 30mm pole pitch – ultimate performance for selectivity and type 2 coordination in a super small footprint!

Instantaneous only setting **(ICB)** for AS3000 safety services requirement as standard in the basic electronic trip unit.

The TemBreak Pro 'Universal' BE Trip unit!

When it comes to trip units, TemBreak Pro has all the options, but there is one trip unit model that is the best friend of all switchboard builders, contractors, consultants and end users! That is the Basic Electronic (BE) with fully adjustable LSI protection. This amazing trip unit is available on 'P model' MCCBs with frame sizes 160A – 630A.

Ensuring selectivity – extremely adjustable LSI settings

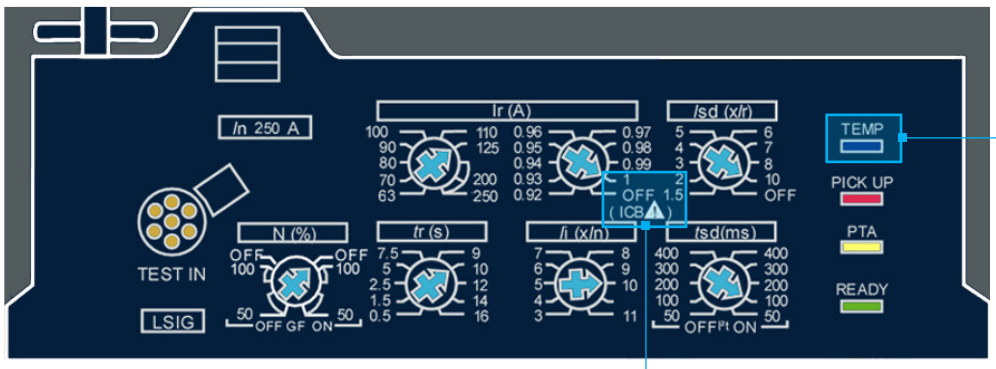
Very granular pick up current and time delay setting adjustments ensuring selectivity studies are a breeze for consultants!

Ideal for motor starting applications

Both the overload (L) and short time short circuit (S) settings can be independently disabled, making the basic electronic trip unit perfect for motor starting applications.

Pre-trip alarm function

The BE has a Pre trip alarm function as standard which is ideal for basic load shedding requirements.



Temperature alarm
Monitors the internal temperature of the MCCB. The alarm will trigger and the LED will illuminate a solid for measured temperatures >105°C

Safety Services to AS3000 ICB setting
By turning the overload (L) setting to 'OFF', the MCCB now becomes a 'short circuit trip only' device, also known as an 'Instantaneous circuit breaker (ICB)'. This is perfect for use in safety services applications where overload protection is not permitted as per AS3000.

Product reliability

Mechanical and electrical endurance

Tembreak Pro goes far beyond the standards when it comes to both electrical and mechanical endurance figures.

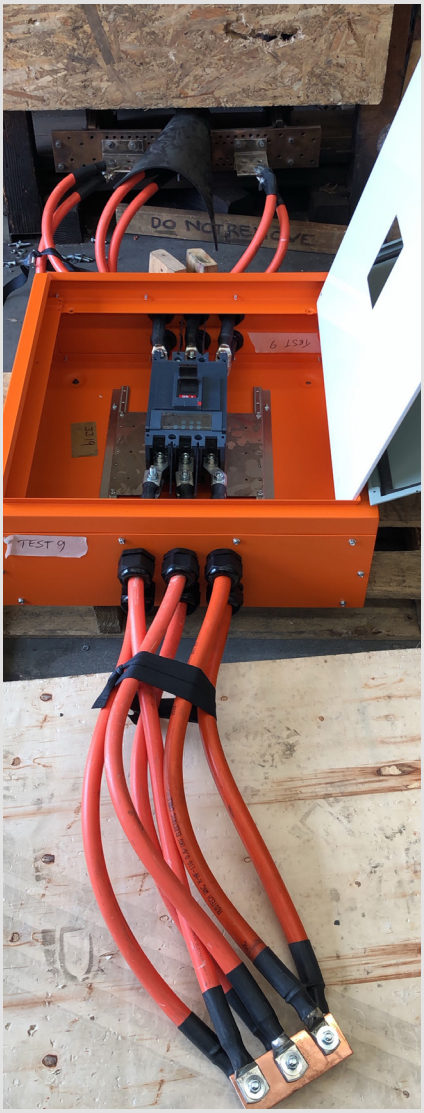
The P160 MCCB offers 50,000 mechanical endurance operations and 30,000 electrical endurance operations, which is more than double that of many other MCCBs on the market.

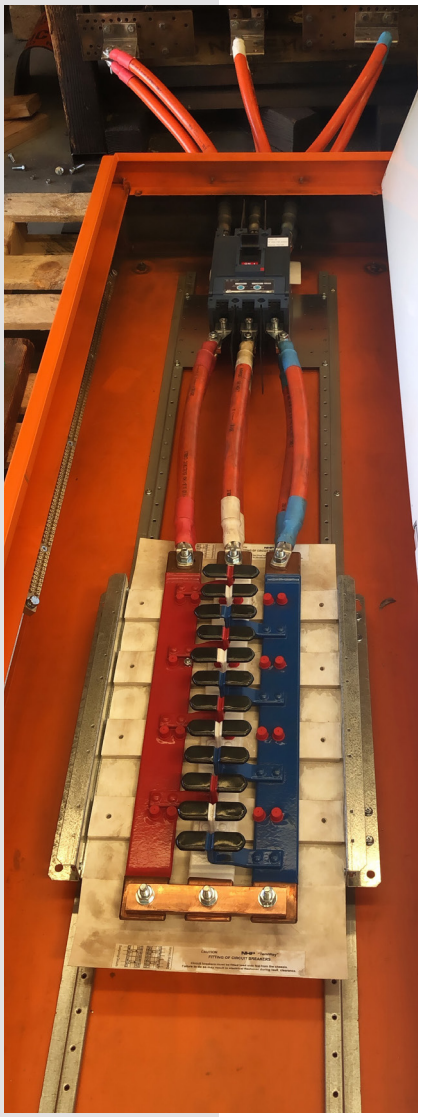
Local testing by NHP at the TUV test station

NHP has worked closely with Terasaki to undertake short circuit, selectivity, cascade and temperature rise testing of TemBreak Pro MCCBs at Australian third party test stations.

Furthermore, NHP and CUBIC have tested TemBreak Pro within the CUBIC modular system for AS/NZS61439 compliance.

TemBreak Pro third party testing by NHP and Terasaki at TUV Heidelberg Victoria





TemCom PRO (TPCM)

The TemCom PRO communication module (TPCM) enables Modbus RTU Communication with the TemBreak PRO Smart Electronic (P_SE) MCCBs via serial RS-485 connection.

The communication module allows remote access to information including instantaneous and historic energy and power measurements, status indicators, and detailed trip and alarm history, as well as remote reading and writing of configuration and protection settings.

It also has two digital inputs that allow for the change of state status (ie an alarm contact on an external monitoring relay) to be visible within the TemCom's memory registers.

Communication protocols

Terasaki TemBreak Pro MCCBs with SMART trip units (P_SE and B_SX) offer the following communication protocol options

Modbus RTU comms module (RS485 serial network)

1) Direct connection to Modbus RTU serial master
2) Up to 32 devices per daisy-chain
3) Full read/write access

Modbus TCP comms module (Ethernet network)

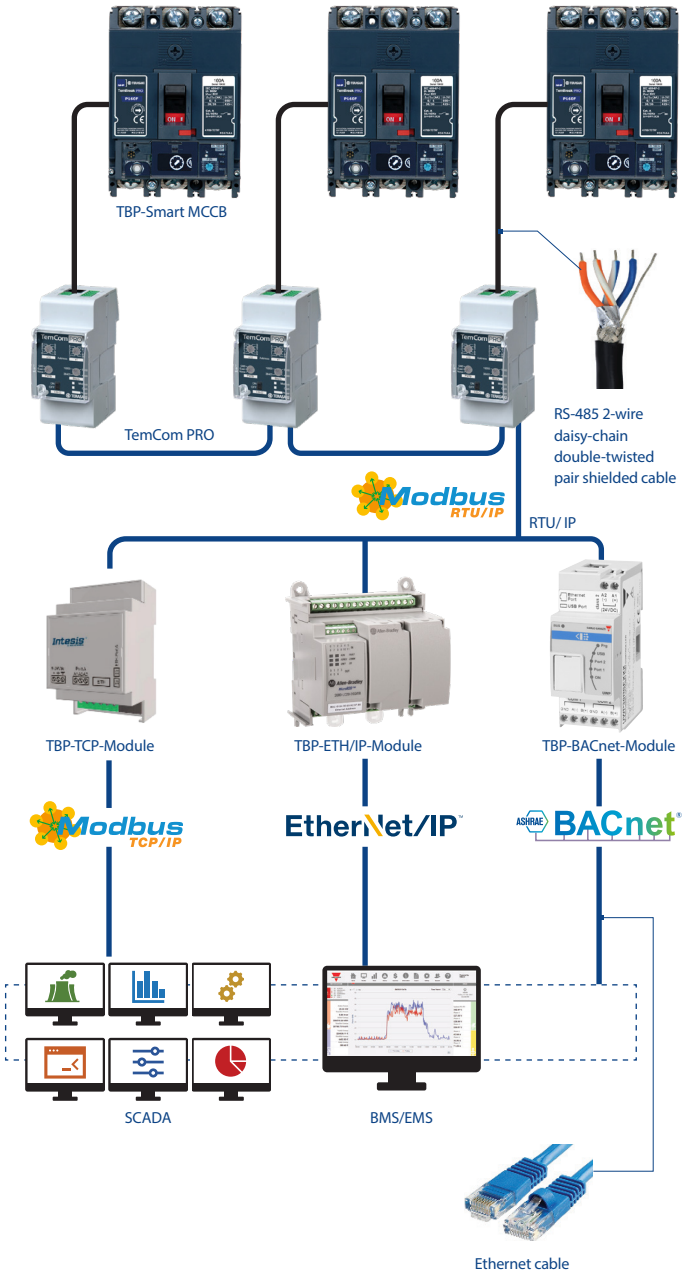
1) TemBreak Pro TCP module provides smooth integration into a Modbus TCP over Ethernet network
2) No programming or data mapping required!
3) Up to 32 devices per TCP module

Ethernet IP comms module (Ethernet network)

1) TemBreak Pro Ethernet/IP module provides smooth integration into a Ethernet/IP network
2) No programming or data mapping required!
3) Up to 32 devices per Ethernet/IP module

BacNet / IP comms module (Ethernet network)

1) TemBreak Pro UWP 3.0 BacNet module provides smooth integration into a BacNet over Ethernet network
2) No programming or data mapping required!
3) Up to 32 devices per TCP module



Digital connectivity

BMS and SCADA integration

From the super small160A frame size up to the large 1000A frame size, TemBreak Pro SMART (P_SE and B_SX) trip units can integrate into BMS platforms with ease.

Energy management and NCC Section J compliance

TemBreak Pro SMART (P_SE and B_SX) trip units monitor voltage, current, energy, power factor, THD and more.

Furthermore, the TemBreak Pro SMART (P_SE/B_SX) trip units are fully integrated into the 'NHP SMART eBox' energy management system (EMS) which satisfies the National Construction Code (NCC) section J8.3c requirements.

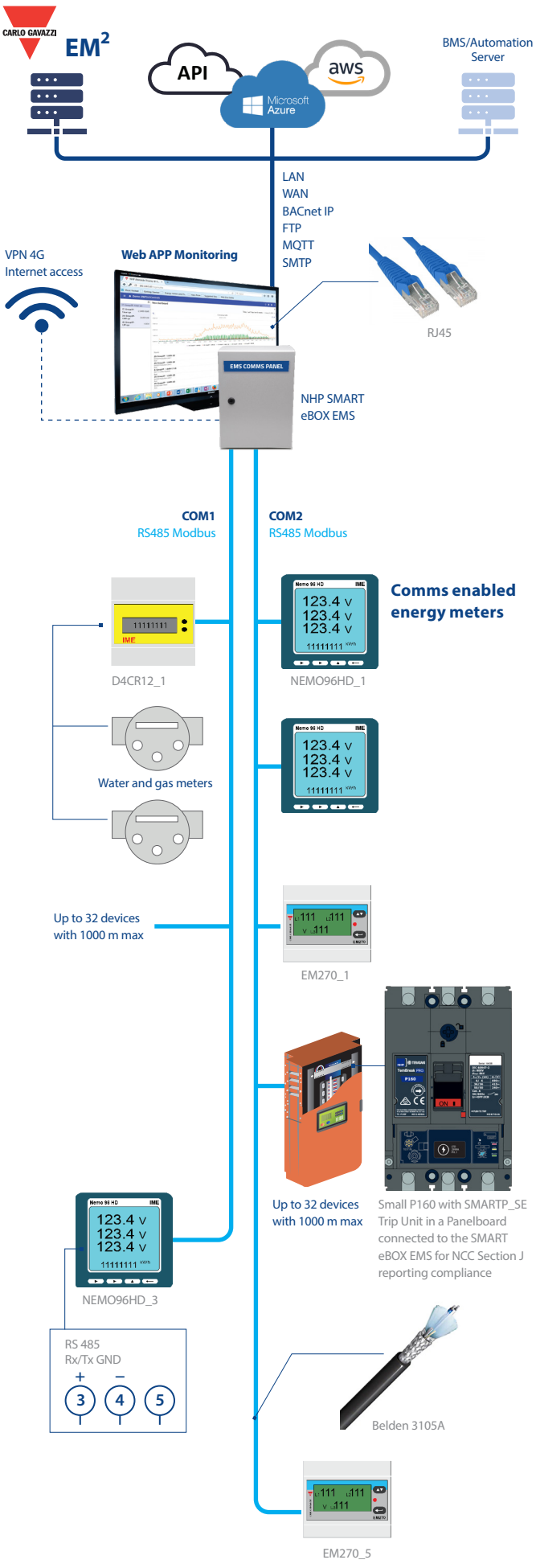
Compliance to the NCC Section J8

The National Construction Code (NCC) is managed by the Australian Building Codes Board (ABCB) and it sets the minimum performance-based requirements for new and refurbished buildings. Section J8 outlines energy monitoring requirements.

Part J8.3c dictates that energy measurements must be centralised by a single user interface where the energy data can be stored and easily accessed.

Section J8.3c can be complied with by simply monitoring energy consumption using a TemBreak Pro MCCB with a SMART electronic trip unit connected to the NHP SMART eBOX.

Centralisation of devices for large/multi-site installations



Easy design

TemCurve 6 and PowerCAD

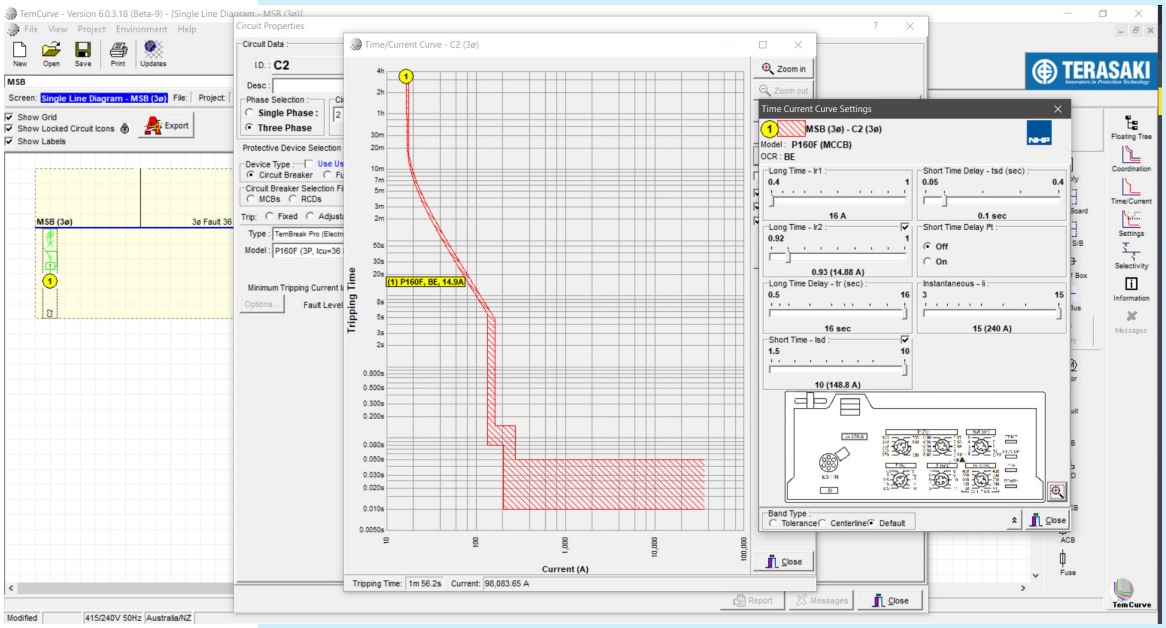
Selectivity and protection studies are easy with TemCurve 6 or PowerCAD.

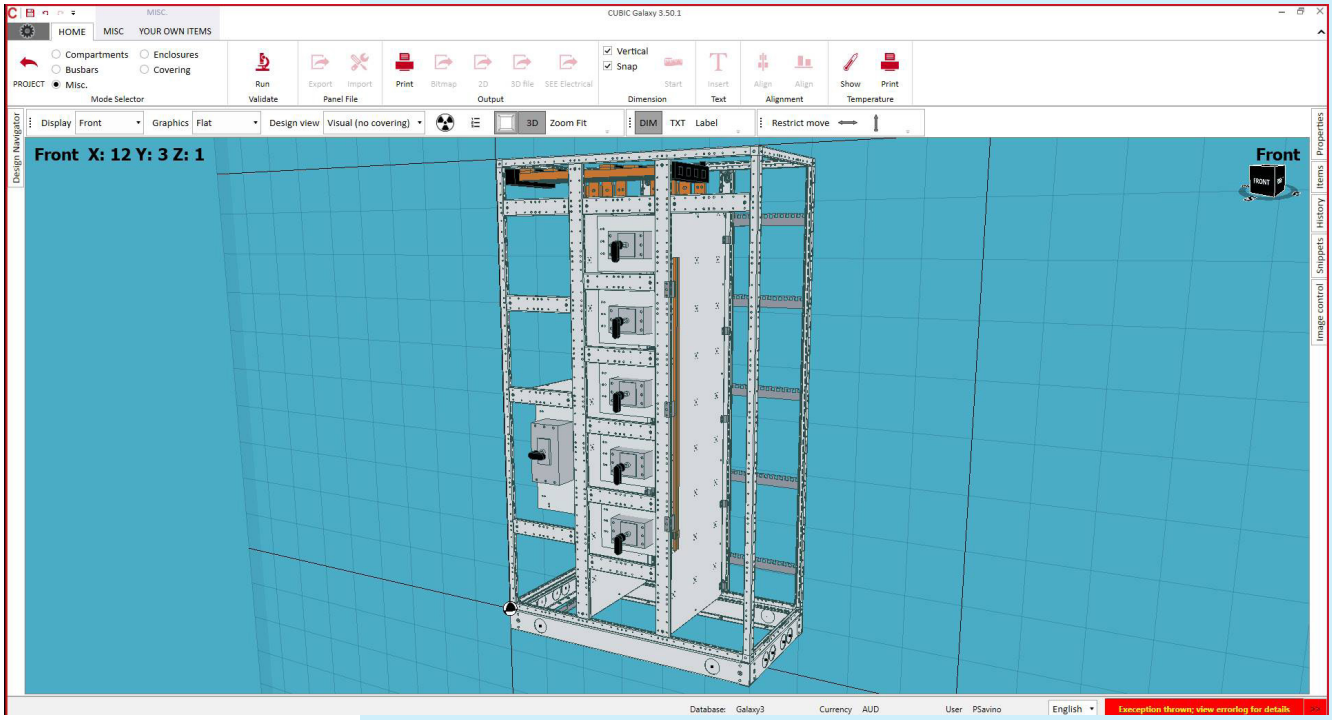
TemBreak Pro device libraries are already available!

Switchboard designs with CUBIC Galaxy software

For accredited CUBIC switchboard partners, TemBreak Pro design models are fully available for the latest 3D version of the CUBIC Galaxy switchboard design software.

Furthermore, NHP has created 3D Revit models for a range of the CUBIC Switchboard designs, making it easy for architecture and engineering professionals to quickly size a CUBIC Switchboard for a proposed switch room layout.





Crystal clear display

The TemBreak PRO SMART protection relay deploys the most advanced display technology in switchgear today. The rotatable and removable OLED screen delivers a clear view of circuit measurements, internal settings and event logs and allows easy configuration of settings and alarms.

Latest OLED screen technology
Read clearly from distances and angles.

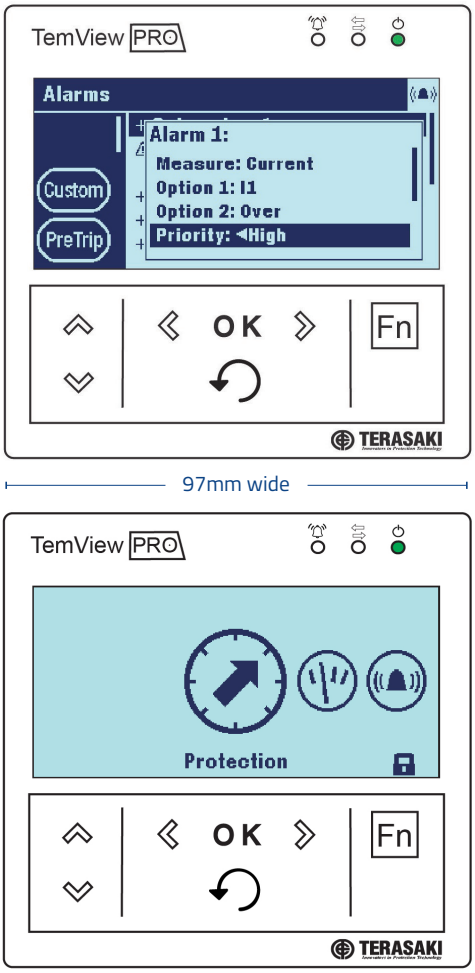
Mounting angle flexibility
Read upright, regardless of MCCB orientation. View can be soft-rotated.

Security
Prevent unauthorised parameter changes. OLED display is removable. Furthermore, protection settings are password protected.

TemView Pro panel mount display
The TemView Pro is a panel mount display that can be installed externally on a switchboard door to show all the data available from the SMART trip units in P type 160A to 630A*.

Soft rotatable text direction

Maximum security – removable display



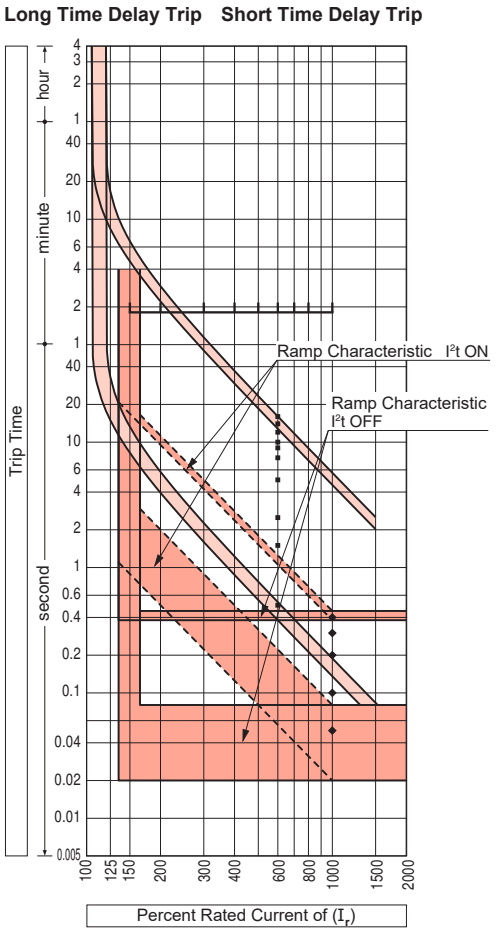
TemView Pro – external display

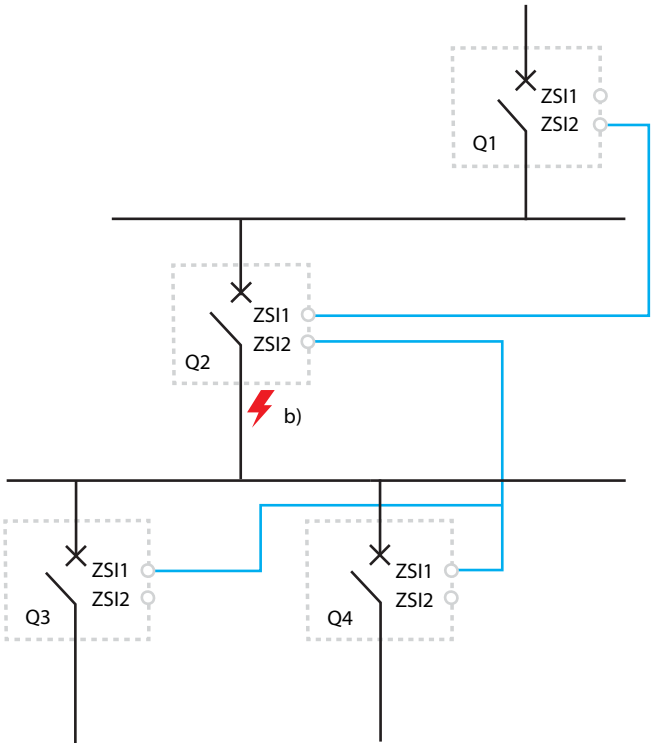
The TemView PRO can read and write program parameters, display and erase measurements, plus program alarms for a connected TemBreak PRO P model SMART Electronic MCCB.

The TemView easily mounts on a panel and the front of the display is protected by a transparent cover and sealed to obtain an IP65 protection when installed in a suitable distribution switchboard. The LCD display is backlit for easy reading in low light conditions.

Super charge the SMART trip unit with the TemView Pro! TemView Pro allows more data variables to be displayed and more alarms to be configured over and above the SMART trip unit alone!

Zone interlocking protection





Protect your switchboard

Zone selectivity is where SMART protection trip units exchange control signals to ensure that only the breaker directly upstream of the fault point will open. Compatible with TemPower 2 ACB.

Reduced let through energy

By using a zone interlocked protection scheme during a 'short time delay' short circuit, the breaker closest to the fault will ignore its time delay settings and a trip will occur as quickly as possible.

Example

Q1 is a Terasaki AR ACB. Q2, Q3 and Q4 are TemBreak Pro SMART trip unit MCCBs. The blue lines are the 'signaling communication links'.

A low level short circuit occurs below Q2. Both Q1 and Q2 can see the fault. Q3 and Q4 signal that they do not see the fault. Q2 signals to Q1 that it can see the fault. Q1 does not try and trip instantly, it waits according to its short circuit time delay settings and allows Q2 to trip as quickly as possible. This minimises the fault current let through energy therefore reducing the level of possible damage to the switchboard.

Accessories

TemBreak Pro has a wide range of accessory solutions for your electrical installation.

- Shunt trips and under voltage trips
- Motors
- Handles
- Alarm and auxiliary contacts
- Terminal covers
- Lock off devices

Easy to install
Fit motors or handles in under two minutes.

Simple operation
Attach interlocks to the front of the MCCB for reduced depth and fast assembly.

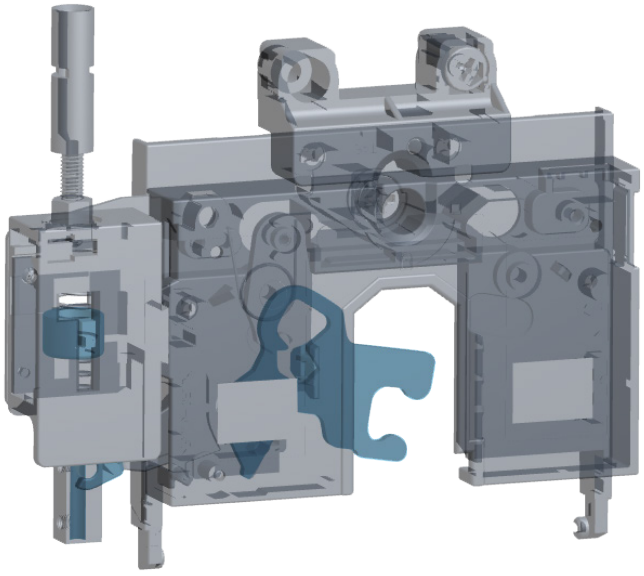
Reliable
Choose the optimal cable-clamp or extension bar for your conductor to ensure reliable terminations.

Safe and secure
Protect terminals with covers and barriers. Secure the MCCB with locks for toggles, handles and motors.

Cost effective
Stock one type of auxiliary switch, alarm switch, shunt trip and under voltage trip to fit all frame sizes.

Mechanical Interlocks

Mechanical interlocks ensure that only one MCCB can be turned on at any one time in transfer switch applications.



Front Mounting Type (link and wire styles)

The P model has an all new, metal infused, front mounting mechanical interlock that has been designed for easy installation while remaining super strong! Link and wire styles are available.

Rear Beam Type (800AF +)

The B and XS models use the traditional and extremely robust walking beam type mechanical interlocks.

Transfer switches

A transfer switch is used to change between supplies (typically mains to generator) in a power distribution system. NHP offers both basic and manual transfer switch options. Furthermore, there are two transfer switch technology architectures to choose between when using TemBreak Pro MCCBs:

1) TemBreak Pro circuit breaker to Socomec Load Break Switch technology architecture transfer switch

2) TemBreak Pro circuit breaker to TemBreak Pro circuit breaker technology architecture transfer switch

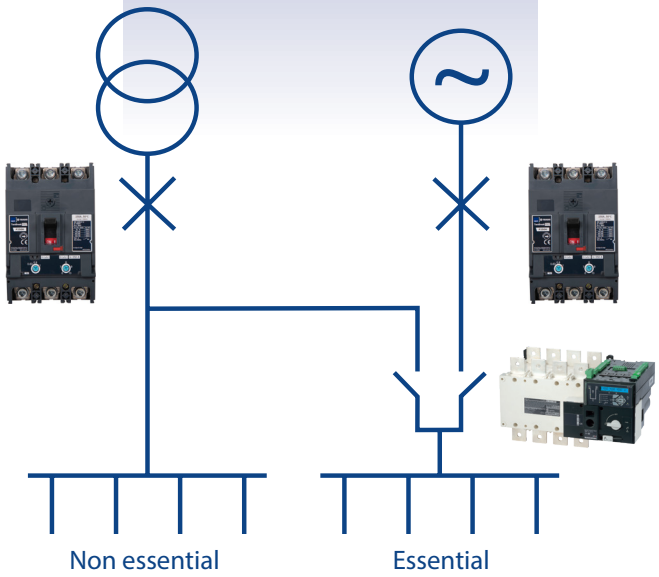
TemBreak Pro Circuit Breaker to Socomec Load Break Switch technology architecture transfer switch

Circuit breaker to Socomec Load break switch technology architecture requires a basic TemBreak Pro MCCB (from each power source) to be feeding a Socomec ATyS transfer switch. The Socomec ATyS is based on proven load break switch technology and consists of two integrally interlocked load break switches, motor operated or by solenoids, with controllers built into a single housing creating an automatic transfer switch (ATS).

From a best of engineering approach, the circuit breaker to Socomec load break switch architecture is recommended because:

- There are no restrictions on the type of TemBreak Pro MCCBs that can be used, so the best suited model can be used to optimally protect the system.
- Since the ATS consists of load break switches only, there is no effect on the system selectivity-grading or cascade-backup.
- The circuit breakers are less likely to prematurely fail due to excessive levels of mechanical operation or opening and closing onto higher fault currents.
- The use of this type of system frees up the circuit breakers for maintenance in installations without compromising the operation or installation of the ATS. The breakers typically installed are without a motor operator or interlocking, and are easier to access for testing and/or replacement.

Using a Socomec load break switch based ATS, mechanical interlocking and electrical wiring is built into the ATS, so there is no setup or ongoing maintenance required for these units, apart from periodic operation being recommended.

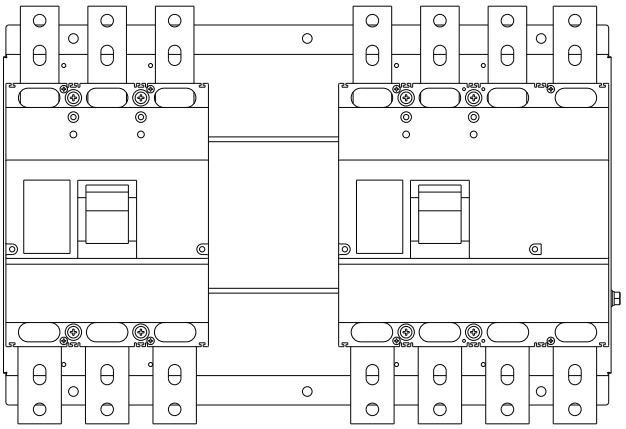


Above: TemBreak Pro Circuit Breaker to Socomec Load Break Switch technology architecture transfer switch

TemBreak Pro Circuit Breaker to Circuit Breaker technology architecture transfer switch

A circuit breaker to circuit breaker technology architecture transfer switch uses two TemBreak Pro MCCBs with the addition of motor operators and an external Socomec C55 or C65 controller to assist with automated remote operation.

NHP offers TemBreak Pro MCCB to MCCB transfer switches with manual changeover or automatic changeover.



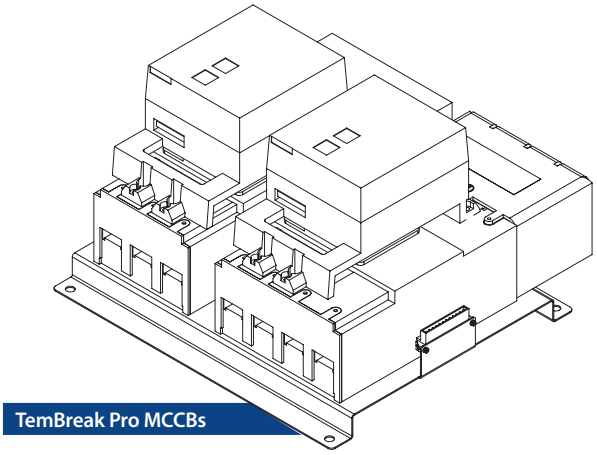
Manual transfer switch

Two mechanically interlocked MCCBs mounted on a pan. Handles can be added.

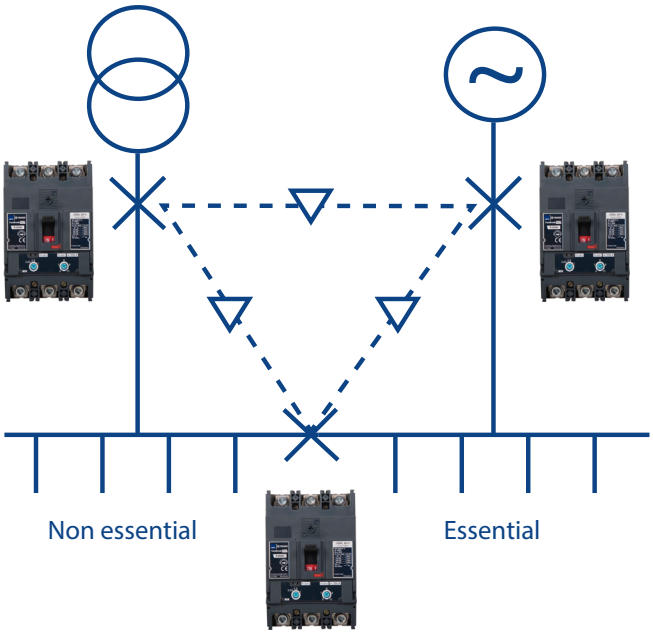
Basic transfer switch

Two motor driven, mechanically interlocked MCCBs mounted on a pan. To be wired to the control interface panel (CIP) and the Socomec C55/C65 external controller to allow automatic transfer logic.

Using MCCBs for transfer switching is popular due to the fact that the circuit breakers provide an all in one protection and switching function needed for all incoming supplies. This solution is usually cost effective and is commonly used, however, it can also introduce some technical issues into the power distribution system, such as difficulty optimising the protection, downgrading Cascade or Selectivity and more mechanical wear on the circuit breakers.



TemBreak Pro MCCBs



Above: Circuit breaker to circuit breaker technology architecture transfer switch

Socomec C55 controller

Tembreak Pro 'P' model with Socomec ATyS co-ordination table

TemBreak PRO MCCBs can be used to provide upstream overload and short circuit back-up protection for downstream load break and ATyS transfer switches. Select an upstream MCCB based on the short circuit level of back-up required. Loadbreak or ATyS transfer switches can be used in various prospective fault current level applications as the upstream MCCB reduces the peak let through current.

Example: An SLB250 can be used in a 50 kA application if there is an upstream P250N 50 kA MCCB.

MCCBs are to have a trip unit equivalent or larger in size to the load break switch ampere rating.

Socomec	Rated Current	P160F	P160N	P160H	P250F	P250N	P250H	P400F	P400N	P400H	P400S	P630F	P630N	P630H	P630S
		36kA	50kA	70kA	36kA	50kA	70kA	36kA	50kA	70kA	110kA	36kA	50kA	70kA	110kA
ATyS_M	40 A	36	50	70	36	50	70	15	15	15	15	12	12	12	12
	63 A	36	50	70	36	50	70	15	15	15	15	12	12	12	12
	80 A	36	50	70	36	50	70	15	15	15	15	12	12	12	12
	100 A	36	50	70	36	50	70	15	15	15	15	12	12	12	12
	125 A	36	50	70	36	50	70	15	15	15	15	12	12	12	12
	160 A	36	50	70	36	50	70	15	15	15	15	12	12	12	12
ATyS	125 A	36	50	70	36	50	70	18	18	18	18	16	16	16	16
	160 A	36	50	70	36	50	70	18	18	18	18	16	16	16	16
	200 A	36	50	70	36	50	70	18	18	18	18	16	16	16	16
	250 A	36	50	70	36	50	70	36	50	70	110	30	30	30	30
	315 A	36	50	70	36	50	70	36	50	70	110	30	30	30	30
	400 A	36	50	70	36	50	70	36	50	70	110	30	30	30	30
	500 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	630 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	800 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	1000 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	1250 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	1600 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	2000 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	2500 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	3200 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110

Tembreak Pro 'P' model with Socomec SCO co-ordination table

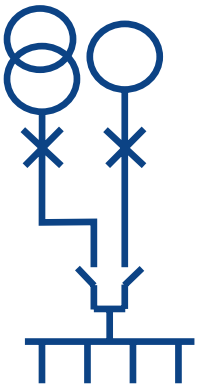
Socomec	Rated Current	P160F	P160N	P160H	P250F	P250N	P250H	P400F	P400N	P400H	P400S	P630F	P630N	P630H	P630S
		36kA	50kA	70kA	36kA	50kA	70kA	36kA	50kA	70kA	110kA	36kA	50kA	70kA	110kA
SCO	125 A	36	50	70	36	50	70	18	18	18	18	16	16	16	16
	160 A	36	50	70	36	50	70	18	18	18	18	16	16	16	16
	200 A	36	50	70	36	50	70	18	18	18	18	16	16	16	16
	250 A	36	50	70	36	50	70	36	50	70	110	30	30	30	30
	315 A	36	50	70	36	50	70	36	50	70	110	30	30	30	30
	400 A	36	50	70	36	50	70	36	50	70	110	30	30	30	30
	500 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	630 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	800 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	1000 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	1250 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	1600 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	2000 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	2500 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110
	3200 A	36	50	70	36	50	70	36	50	70	110	36	50	70	110

Example calculation for Transfer Switches, Load Break Switches and Change Over Switches

When selecting a circuit breaker for co-ordination with a product that has a rated short circuit withstand rating (Icw), it is important to verify that the prospective short-circuit current can be limited to less than the fault level the product can withstand. The reference tables in this brochure provides suggestions for circuit breakers for back-up protection, however the customer can also verify the circuit breaker selection using the following calculations.

Example site installation:

- 3 phase 415V transformer
- Circuit breaker upstream protection
- 3 phase 250A ATyS
- 50kA prospective fault current level at ATyS



ATyS - Characteristics (according to IEC 60947, AS/NZS 60947)

Thermal current I_{th} (40°C)	**125 A**	**160 A**	**250 A**	**400 A**	**630 A**	**800 A**	**1000 A**
Rated insulation voltage U_i (V)	800	800	800	800	1000	1000	1000
Rated impulse withstand voltage U_{imp} (kV)	8	8	8	8	12	12	12
Overload capacity							
Rated short-time withstand current 1s I_{cw} (kA rms)	7	7	9	9	13	26	35
Rated peak withstand current (kA peak) [1]	20	20	30	30	45	55	80
Prospective short-circuit current (kA rms) [1]	100	100	50	18	70	50	100
Associated fuse rated (A) [1]	125	160	250	400	630	800	1000

1) For a rated operating voltage U_e = 400 V AC

Using the given short circuit current (Isc), the value is plotted on the maximum let through peak current curve (Ipeak) shown in Figure 1.

At the short circuit current of 50kA, the maximum let through peak current of a standard 250A TemBreak PRO P250, with a 250A TM trip unit is less than 20kA.

Comparing this to the rated peak withstand current of 30kA for the ATyS, this is sufficient protection at a prospective fault current of 50kA. It is essential that the maximum let through peak current is less than the rated peak withstand current of the ATyS.

It is also very important to consider the maximum let through energy of the circuit breaker by looking at curves provided by the manufacturer.

At a 50kA fault, the P250 gives a maximum let through energy I^2t of 2.5×10^6 A^2S. This is compared to the ATyS's maximum let through energy calculation below.

Icw @ 1s = 9kA

$(Icw\ @\ 1s)^2 \times 1s = (9 \times 10^3)^2 = 81 \times 10^6\ A^2S$

This demonstrates that the ATyS can withstand a higher let through energy than the P250 will release during a 50kA fault current.

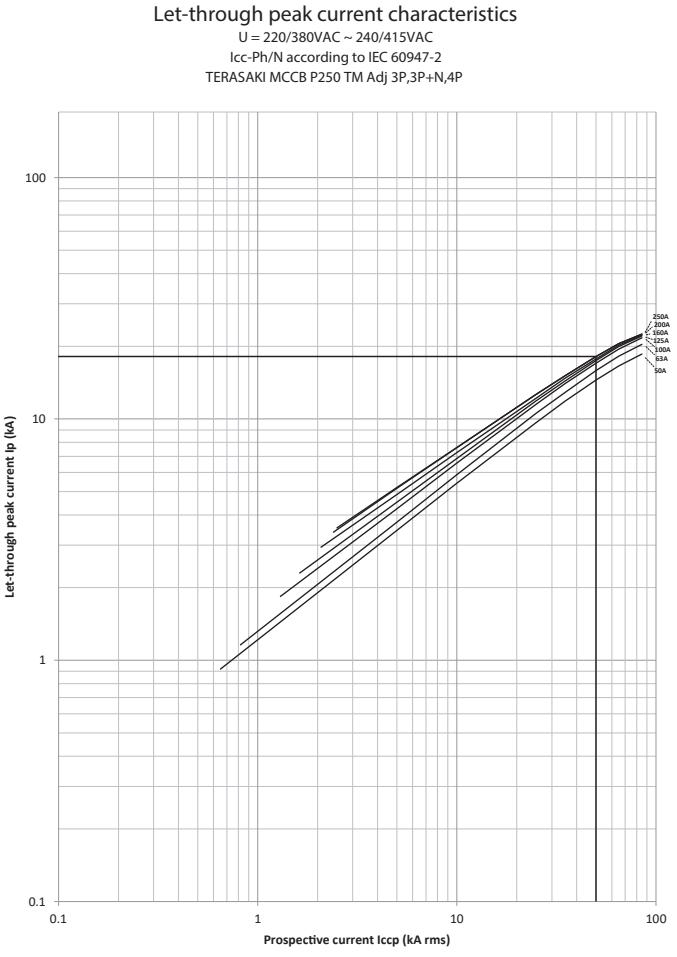


Figure 1


TERASAKI
TemBreak PRO
P250N
ON
250A
Serial: 18438
IEC 60947-2
Ue: 800V
Uimp: 8kV
Icu/Ics (kA)
Ue (V)
6/ 6
690~
36/36
415~
50/50
415~
Cat. A
50/60Hz
Ir=OFF:ICB
PUSH TO TRIP
M5676AA
M5148AA
In 250 A
TEST IN
TEMP
PICK UP
OFF
PTA
READY


JAPAN
DOHA2019

TemBreak Pro range performance data

World class moulded case circuit breakers

General breaking capacity ratings

415VAC
690VAC
1000VAC

Tabulated data

160AF	250AF	400AF	630AF	800AF
1000AF	1250AF	1600AF	2000AF	3200AF

Trip units

Thermal Magnetic
Basic Electronic
SMART Electronic

Range for general application : 400 / 415 VAC

Code	kA	Rating				
		160	**250**	**400**	**630**	**800**
E	**25**	A160E - TF A160E - FF B160E - FF	A250E - TM	P400E - TM	P630E - TM	
F	**36**	A160F - TF P160F - TM P160F - BE P160F - BEG P160F - SE	A250F - TM P250F - TM P250F - BE P250F - BEG P250F - SE	P400F - TM P400F - BE P400F - BEG P400F - SE	P630F - TM P630F - BE P630F - BEG P630F - SE	B800F - TM
N	**50**	P160N - TM P160N - BE P160N - BEG P160N - SE	P250N - TM P250N - BE P250N - BEG P250N - SE	P400N - TM P400N - BE P400N - BEG P400N - SE	P630N - TM P630N - BE P630N - BEG P630N - SE	B800N - TM B800N - BE B800N - SX B800N - SE
H	**70**	P160H - TM P160H - BE P160H - BEG P160H - SE	P250H - TM P250H - BE P250H - BEG P250H - SE	P400H - TM P400H - BE P400H - BEG P400H - SE	P630H - TM P630H - BE P630H - BEG P630H - SE	B800H - TM B800H - BE B800H - SX B800H - SE
HL	**85**					
G	**100**					B800G - TM B800G - BE B800G - SX B800G - SE
S	**110**			P400S - TM P400S - BE P400S - BEG P400S - SE	P630S - TM P630S - BE P630S - BEG P630S - SE	
P	**125**	B160P - TM	B250P - TM B250P - BE B250P - SE	B400P - BE		B800P - BE B800P - SX B800P - SE
R	**200**	B160R - TM	B250R - TM	B400R - BE		B800R - BE B800R - SX B800R - SE
D	**Switch**	A160D - NN P160D - NN	A250D - NN P250D - NN	P400D - NN	P630D - NN	B800D - NN

Range for 690 VAC applications

kA	Rating		
	125	**400**	**800**
70	L125 - PJ	L400 - PE	L800 - PE

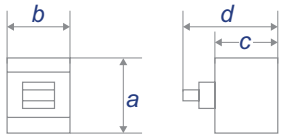
1000	1250	1600	2000	2500	3200
B1000N - BE B1000N - SX B1000N - SE	B1250N - BE	B1600N - BE			
B1000H - BE B1000H - SX B1000H - SE	B1250H - BE	B1600H - BE			
	B1250HL - BE	B1600HL - BE	XS2000HL - BE	XS2500HL - BE	XS3200HL - BE
B1000D - NN	B1250D - NN	B1600D - NN	XS2000D - NN	XS2500D - NN	XS3200D - NN

Range 1000 / 1100 VAC applications

kA Rating

	125	250	400	630	800	1250
10	VS125 - GJ	VS250 - GJ				
18			VS400 - NE			
20				VS630 - NE	VS800 - NE	
30					VS800 - GE	VS1250 - NE

160 AF

Model	Symbol	Unit	Condition	A160E FF	A160E TF	A160F TF	A160D NN	P160F FF
Utilisation Category	-	-	-	A	A	A	B	A
Frame	-	-	-	1	3	3, 4	3, 4	2
Available Trip Units - Rating	*In*	(A)	-	16, 20, 25	25, 40	25, 40	160	15, 20
				32, 40, 50	63, 80	63, 80	-	30, 40, 50
				63, 80, 100	100, 125	100, 125	-	60, 75
				125	160	160	-	100, 125
Electrical Characteristics								
Rated Maximum Operational Voltage	*Ue*	(V)	AC 50 / 60 Hz	240	525	690	690	690
		(V)	DC	-	250	250	250	250
Rated Insulation Voltage	*Ui*	(V)	-	690	690	690	690	800
Rated Impulse Withstand Voltage	*Uimp*	(kV)	-	8	8	8	8	8
Ultimate Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Icu*	(kA)	690 V AC	-	-	6	-	6
			400 / 415 V AC	-	25	36	-	36
			240 V AC	25	35	50	-	50
DC Voltage	*Icu*	(kA)	250 V DC	-	20	25	-	25
			125 V DC	10	30	35	-	-
Service Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Ics*	(kA)	690 V AC	-	-	3	-	6
			400 / 415 V AC	-	13	20	-	36
			220 / 240 V AC	13	18	25	-	50
DC Voltage	*Ics*	(kA)	250 V DC	-	10	13	-	19
			125 V DC	5	15	20	-	-
Short-Time Withstand Current	*Icw*	(kA)	0.3 sec.	-	-	-	2	-
			1 sec.	-	-	-	-	-
Protection Function	**Key**							
Switch (Non-Auto)		■	Standard	-	-	-	■	-
FF (Fixed Thermal - Fixed Magnetic)				■	-	-	-	■
TF (Adjustable Thermal - Fixed Magnetic)				-	■	■	-	-
TM (Adjustable Thermal - Adjustable Magnetic)				-	-	-	-	-
Electronic - Basic (BE / BEG)				-	-	-	-	-
Electronic - Smart (SE / SX)				-	-	-	-	-
Installation	**Key**							
Front Connection (FC)		■	Standard	■	■	■	■	■
Extension Bar (FB)		□	Optional	□	□	□	□	□
Cable Tunnel Clamp (FW)		-	Not available	□	□	□	□	□
Rear Connection (RC)				-	□	□	□	□
Plug-In (UPX)				-	-	-	-	-
Plug-In (PM)				-	-	-	-	-
DIN Rail Adapter				-	□	□	□	□
Reverse Connection of Supply Possible				Yes	Yes	Yes	Yes	Yes
Dimensions 	*a*	(mm)	-	130	130	130	130	130
	b	(mm)	1 pole	25	-	-	-	-
	b	(mm)	2 pole					60
	b	(mm)	3 pole	-	75	75	75	-
	b	(mm)	4 pole	-	100	100	100	-
	c	(mm)	-	68	68	68	68	68
	d	(mm)	-	95	95	95	95	95
Weight	*W*	(kg)	1 pole	0.3	-	-	-	-
			2 pole					0.7
			3 pole	-	0.8	0.8	0.8	-
			4 pole	-	-	1	1	-
Operation Options	**Key**							
Toggle Operation		■	Standard	■	■	■	■	■
Extension Handle or Direct Mount		□	Optional	-	□	□	□	-
Motor Operation TPMC		-	Not available	-	□	□	□	-
Endurance	Electrical	Cycles	415 V AC	10000	10000	10000	10000	10000
	Mechanical	Cycles	-	20000	20000	20000	20000	20000

Notes: (*) Rating for Plug-in is 125 A.

	P160F TM	P160N TM	P160H TM	P160F BE / BEG	P160N BE / BEG	P160H BE / BEG	P160D NN	P160F SE	P160N SE	P160H SE	B160E FF	B160P TM	B160R TM
	A	A	A	A	A	A	B	A	A	A	A	A	A
	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3 , 4	3, 4	3, 4	3, 4	1	3, 4	3, 4
	20, 32	20, 32	20, 32	40	40	40	160	40	40	40	16, 20, 25	20, 32,	20, 32,
	50, 63	50, 63	50, 63	100	100	100	-	100	100	100	32, 40, 50	50, 63	50, 63
	100, 125	100, 125	100, 125	160 (*)	160 (*)	160 (*)	-	160 (*)	160 (*)	160 (*)	63, 80, 100	100, 125	100, 125
	160 (*)	160 (*)	160 (*)	-	-	-	-	-	-	-	125, 160	160	160
	690	690	690	690	690	690	690	690	690	690	240	690	690
	250	250	250	-	-	-	250	-	-	-	-	250	250
	800	800	800	800	800	800	800	800	800	800	690	800	800
	8	8	8	8	8	8	8	8	8	8	8	8	8
	6	6	6	6	6	6	-	6	6	6	-	20	25
	36	50	70	36	50	70	-	36	50	70	-	125	200
	50	85	85	50	85	85	-	50	85	85	25	150	200
	25	40	40	-	-	-	-	-	-	-	-	40	40
	-	-	-	-	-	-	-	-	-	-	15	-	-
	6	6	6	6	6	6	-	6	6	6	-	15	20
	36	50	50	36	50	50	-	36	50	50	-	80	135
	50	85	85	50	85	85	-	50	85	85	19	85	150
	19	40	40	-	-	-	-	-	-	-	-	150	150
	-	-	-	-	-	-	-	-	-	-	8	40	40
	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	2	-	-	-	-	-	-
	-	-	-	-	-	-	■	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	■	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
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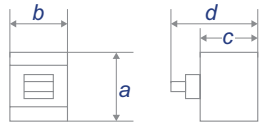
	□	□	□	□	□	□	□	□	□	□	-	-	-
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	130	130	130	130	130	130	130	130	130	130	165	165	165
	-	-	-	-	-	-	-	-	-	-	35	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
	90	90	90	90	90	90	90	90	90	90	-	105	105
	120	120	120	120	120	120	120	120	120	120	-	140	140
	68	68	68	68	68	68	68	68	68	68	68	103	103
	95.5	95.5	95.5	95.5	95.5	95.5	95.5	95.5	95.5	95.5	92	127	127
	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-		-	-
	1	1	1	1	1	1	1	1	1	1	0.3	2.4	2.4
	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	-	3.2	3.2
	■	■	■	■	■	■	■	■	■	■	■	■	■
	□	□	□	□	□	□	□	□	□	□	-	□	□
	□	□	□	□	□	□	□	□	□	□	-	□	□
	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	20000	30000	30000
	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	30000	30000	30000

250 AF

Model	Symbol	Unit	Condition	A250E TM	A250F TM	A250D NN	P250F TM	P250N TM
Utilisation Category	-	-	-	A	A	B	A	A
Number of Poles	-	-	-	3, 4	3, 4	3, 4	3, 4	3, 4
Available Trip Units - Rating	*In*	(A)	-	100, 125	160	250	50, 63	50, 63
				160, 200	200	-	100. 125	100. 125
				250	250	-	160, 200	160, 200
				-	-	-	250	250
Electrical Characteristics								
Rated Maximum Operational Voltage	*Ue*	(V)	AC 50 / 60 Hz	525	690	690	690	690
		(V)	DC	250	250	250	250	250
Rated Insulation Voltage	*Ui*	(V)	-	690	690	690	800	800
Rated Impulse Withstand Voltage	*Uimp*	(kV)	-	8	8	8	8	8
Ultimate Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Icu*	(kA)	690 V AC	-	4	-	6	6
			400 / 415 V AC	25	36	-	36	50
			240 V AC	35	85	-	50	85
DC Voltage	*Icu*	(kA)	250 V DC	15	25	-	25	40
			125 V DC	25	40	-	-	-
Service Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Ics*	(kA)	690 V AC	-	2	-	6	6
			400 / 415 V AC	19	20	-	36	50
			220 / 240 V AC	27	43	-	50	85
DC Voltage	*Ics*	(kA)	250 V DC	12	13	-	19	40
			125 V DC	20	20	-	-	-
Short-Time Withstand Current	*Icw*	(kA)	0.3 sec.	-	-	3	-	-
			1 sec.	-	-	-	-	-
Protection Function	**Key**							
Switch (Non-Auto)		■	Standard	-	-	■	-	-
FF (Fixed Thermal - Fixed Magnetic)				-	-	-	-	-
TF (Adjustable Thermal - Fixed Magnetic)				-	-	-	-	-
TM (Adjustable Thermal - Adjustable Magnetic)				■	■	-	■	■
Electronic - Basic (BE / BEG)				-	-	-	-	-
Electronic - Smart (SE / SEX)				-	-	-	-	-
Installation	**Key**							
Front Connection (FC)		■	Standard	■	■	■	■	■
Extension Bar (FB)		□	Optional	□	□	□	□	□
Cable Tunnel Clamp (FW)		-	Not available	□	□	□	□	□
Rear Connection (RC)				□	□	□	□	□
Plug-In (UPX)				-	-	-	□	□
Plug-In (PM)				-	-	-	□	□
Reverse Connection of Supply Possible				Yes	Yes	Yes	Yes	Yes
Dimensions 	*a*	(mm)	-	165	165	165	165	165
	b	(mm)	3 pole	105	105	105	105	105
	b	(mm)	4 pole	140	140	140	140	140
	c	(mm)	-	68	68	68	68	68
	d	(mm)	-	95	95	95	95	95.5
Weight	*W*	(kg)	3 pole	1.5	1.5	1.5	1.2	1.2
			4 pole	1.9	1.9	1.9	2	2
Operation Options	**Key**							
Toggle Operation		■	Standard	■	■	■	■	■
Extension Handle or Direct Mount		□	Optional	-	□	□	□	□
Motor Operation TPMC		-	Not available	-	□	□	□	□
Endurance	Electrical	Cycles	415 V AC	6000	6000	6000	10000	10000
	Mechanical	Cycles	-	18000	18000	18000	30000	30000

	P250H TM	P250F BE / BEG	P250N BE / BEG	P250H BE / BEG	P250D NN	P250F SE	P250N SE	P250H SE	B250P TM	B250P BE	B250P SE	B250R TM
	A	A	A	A	B	A	A	A	A	A	A	A
	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4
	50, 63	40	40	40	250	40	40	40	250	40	40	250
	100. 125	100	100	100	-	100	100	100	-	125	125	-
	160, 200	160	160	160	-	160	160	160	-	160	160	-
	250	250	250	250	-	250	250	250	-	250	250	-
	690	690	690	690	690	690	690	690	690	690	690	690
	250	250	250	250	250	250	250	250	250	250	250	250
	800	800	800	800	800	800	800	800	800	800	800	800
	8	8	8	8	8	8	8	8	8	8	8	8
	6	6	6	6	-	6	6	6	20	20	20	25
	70	36	50	70	-	36	50	70	125	125	125	200
	85	50	85	85	-	50	85	85	150	150	150	200
	40	-	-	-	-	-	-	-	40	40	40	40
	-	-	-	-	-	-	-	-	-	-	-	-
	6	6	6	6	-	6	6	6	15	15	15	20
	70	36	50	70	-	36	50	70	85	85	85	150
	85	50	85	85	-	50	85	85	150	150	150	150
	40	-	-	-	-	-	-	-	40	40	40	40
	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	3.6	-	-	-	-	-	-	-
	-	-	-	-	■	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
	■	-	-	-	-	-	-	-	■	-	-	■
	-	■	■	■	-	-	-	-	-	■	-	-
	-	-	-	-	-	■	■	■	-	-	■	-
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	□	□	□	□	□	□	□	□	□	□	□	□
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	165	165	165	165	165	165	165	165	165	165	165	165
	105	105	105	105	105	105	105	105	105	105	105	105
	140	140	140	140	140	140	140	140	140	140	140	140
	68	68	68	68	68	68	68	68	103	103	103	103
	95.5	95.5	95.5	95.5	95.5	95.5	95.5	95.5	127	127	127	127
	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	2.4	2.4	2.4
	2	2	2	2	2	2	2	2	3.2	3.2	3.2	3.2
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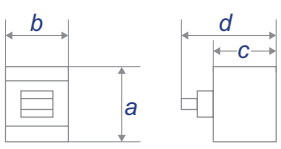
	□	□	□	□	□	□	□	□	-	□	□	□
	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000

400 AF

Model	Symbol	Unit	Condition	P400E TM	P400F TM	P400N TM	P400H TM	P400F BE / BEG	P400N BE / BEG
Utilisation Category	-	-	-	A	A	A	A	B	B
Number of Poles	-	-	-	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4
Nominal Current Ratings	*In*	(A)	50 °C	250	250	250	250	250 A	250 A
				400	400	400	400	400 A	400 A
Electrical Characteristics									
Rated Maximum Operational Voltage	*Ue*	(V)	AC 50 / 60 Hz	690	690	690	690	690	690
		(V)	DC	250	250	250	250	-	-
Rated Insulation Voltage	*Ui*	(V)	-	800	800	800	800	800	800
Rated Impulse Withstand Voltage	*Uimp*	(kV)	-	8	8	8	8	8	8
Ultimate Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Icu*	(kA)	690 V AC	-	7	12	12	7	12
			525 V AC	-	-	-	-	-	-
			440 V AC	-	-	-	-	-	-
			400 / 415 V AC	25	36	50	70	36	50
			240 V AC	35	50	85	100	50	85
DC Voltage	*Icu*	(kA)	250 V DC	25	25	50	50	-	-
Service Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Ics*	(kA)	690 V AC	-	7	12	12	7	12
			525 V AC	-	-	-	-	-	-
			440 V AC	-	-	-	-	-	-
			400 / 415 V AC	25	36	50	70	36	50
			240 V AC	35	50	85	100	50	85
DC Voltage	*Ics*	(kA)	250 V DC	25	25	50	50	-	-
Short-Time Withstand Current	*Icw*	(kA)	0.4 sec	-	-	-	-	5	5
			1 sec.	-	-	-	-	-	-
Protection Function	**Key**								
Switch (Non-Auto)		■	Standard	-		-	-	-	-
TM (Adjustable Thermal - Adjustable Magnetic)				■	■	■	■	-	-
Electronic - Basic (BE / BEG)				-	-	-	-	■	■
Electronic - Smart Ammeter (SX)									
Electronic - Smart Energy (SE)				-	-	-	-	-	-
Installation	**Key**								
Front Connection (FC)		■	Standard	■	■	■	■	■	■
Extension Bar (FB)		□	Optional	□	□	□	□	□	□
Cable Tunnel Clamp (FW)		-	Not available	□	□	□	□	□	□
Rear Connection (RC)				□	□	□	□	□	□
Plug-In (UPX)				□	□	□	□	□	□
Plug-In (PM)				□	□	□	□	□	□
Reverse Supply Connection	Possible to 440V			Yes	Yes	Yes	Yes	Yes	Yes
Dimensions	*a*	(mm)	-	260	260	260	260	260	260
	b	(mm)	3 pole	140	140	140	140	140	140
	b	(mm)	4 pole	185	185	185	185	185	185
	c	(mm)	-	103	103	103	103	103	103
	*d*	(mm)	-	151	151	151	151	151	151
Weight	*W*	(kg)	3 pole	4.3	4.3	4.3	4.3	4.3	4.3
			4 pole	5.7	5.7	5.7	5.7	5.7	5.7
Operation Options	**Key**								
Toggle Operation		■	Standard	■	■	■	■	■	■
Extension Handle or Direct Mount		□	Optional	□	□	□	□	□	□
Motor Operation TPMC		-	Not available	□	□	□	□	□	□
Endurance	Electrical	Cycles	415 V AC	6000	6000	6000	6000	6000	6000
	Mechanical	Cycles	-	15000	15000	15000	15000	15000	15000

	P400H BE/BEG	P400D NN	P400S TM	P400S BE/BEG	P400F SE	P400N SE	P400H SE	P400S SE	B400P BE	B400R BE	B400P SX	B400R SX	B400P SE	B400R SE
	B	B	A	B	B	B	B	B	B	B	B	B	B	B
	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3,4	3,4	3,4	3,4	3,4	3,4
	250 A	-	250	250 A	250 A	250 A	250 A	250 A	250 A	250 A	250 A	250 A	250 A	250 A
	400 A	400 A	400	400 A	400 A	400 A	400 A	400 A	400 A	400 A	400 A	400 A	400 A	400 A
	690	690	690	690	690	690	690	690	690	690	690	690	690	690
	-	-	250	-	-	-	-	-	-	-	-	-	-	-
	800	800	800	800	800	800	800	800	800	800	800	800	800	800
	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	12	-	12	12	7	12	12	12	35	50	50	50	50	50
	-	-	-	-	-	-	-	-	45	65	65	65	65	65
	-	-	-	-	-	-	-	-	120	180	180	180	180	180
	70	-	110	110	36	50	70	110	125	200	200	200	200	200
	100	-	125	125	50	85	100	125	150	200	200	200	200	200
	-	-	50	-	-	-	-	-	-	-	-	-	-	-
	12	-	12	12	7	12	12	12	35	50	50	50	50	50
	-	-	-	-	-	-	-	-	45	65	65	65	65	65
	-	-	-	-	-	-v	-	-	80	135	135	135	135	135
	70	-	110	110	36	50	70	110	125	150	150	150	150	150
	100	-	125	125	50	85	100	125	150	150	150	150	150	150
	-	-	50	-	-	-	-	-	-	-	-	-	-	-
	5	-	-	5	5	5	5	5	5	5	5	5	5	5
	-	5	-	-	-	-	-	-	-	-	-	-	-	-
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	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	260	260	260	260	260	260	260	260	260	260	260	260	260	260
	140	140	140	140	140	140	140	140	140	140	140	140	140	140
	185	185	185	185	185	185	185	185	185	185	185	185	185	185
	103	103	103	103	103	103	103	103	140	140	140	140	140	140
	151	151	151	151	151	151	151	151	182	182	182	182	182	182
	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
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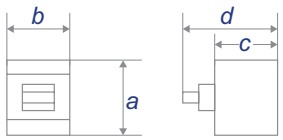
	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000

630 AF

Model	Symbol	Unit	Condition	P630E TM	P630F TM	P630N TM	P630H TM
Utilisation Category	-	-	-	A	A	A	A
Number of Poles	-	-	-	3, 4	3, 4	3, 4	3, 4
Nominal Current Ratings	*In*	(A)	50 °C	630*	630*	630*	630*
Electrical Characteristics							
Rated Maximum Operational Voltage	*Ue*	(V)	AC 50 / 60 Hz	690	690	690	690
		(V)	DC	250	250	250	250
Rated Insulation Voltage	*Ui*	(V)	-	800	800	800	800
Rated Impulse Withstand Voltage	*Uimp*	(kV)	-	8	8	8	8
Ultimate Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Icu*	(kA)	690 V AC	-	7	12	12
			400 / 415 V AC	25	36	50	70
			240 V AC	35	50	85	100
DC Voltage	*Icu*	(kA)	250 V DC	25	25	50	50
Service Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Ics*	(kA)	690 V AC	-	7	12	12
			400 / 415 V AC	25	36	50	70
			240 V AC	35	50	85	100
DC Voltage	*Ics*	(kA)	250 V DC	25	25	50	50
Short-Time Withstand Current	*Icw*	(kA)	1 sec.	-	-	-	-
Protection Function	**Key**						
Switch (Non-Auto)		■	Standard	-		-	-
TM (Adjustable Thermal - Adjustable Magnetic)		□	Optional	■	■	■	■
Electronic - Basic (BE / BEG)		-	Not available	-	-	-	-
Electronic - Smart (SE)				-	-	-	-
Installation	**Key**						
Front Connection (FC)		■	Standard	■	■	■	■
Extension Bar (FB)		□	Optional	□	□	□	□
Cable Tunnel Clamp (FW)		-	Not available	□	□	□	□
Rear Connection (RC)				□	□	□	□
Plug-In (UPX)				□	□	□	□
Plug-In (PM)				□	□	□	□
Reverse Supply Connection	Possible to 440 V			Yes	Yes	Yes	Yes
Dimensions	*a*	(mm)	-	260	260	260	260
	b	(mm)	3 pole	140	140	140	140
	b	(mm)	4 pole	185	185	185	185
	c	(mm)	-	103	103	103	103
	d	(mm)	-	151	151	151	151
Weight	*W*	(kg)	3 pole	5	5	5	5
			4 pole	6.6	6.6	6.6	6.6
Operation Options	**Key**						
Toggle Operation		■	Standard	■	■	■	■
Extension Handle or Direct Mount		□	Optional	□	□	□	□
Motor Operation TPMC		-	Not available	□	□	□	□
Endurance	Electrical	Cycles	415 V AC	4000	4000	4000	4000
	Mechanical	Cycles	-	15000	15000	15000	15000



* Thermal magnetic trip units calibrated at 30 °C.

	P630F BE / BEG	P630N BE / BEG	P630H BE / BEG	P630D NN	P630S TM	P630S BE / BEG	P630F SE	P630N SE	P630H SE	P630S SE
	A	A	A	B	A	A	A	A	A	A
	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4
	630 A	630 A	630 A	630 A	630	630 A	630 A	630 A	630 A	630 A
	690	690	690	690	690	690	690	690	690	690
	-	-	-	-	250	-	-	-	-	-
	800	800	800	800	800	800	800	800	800	800
	8	8	8	8	8	8	8	8	8	8
	7	12	12	-	12	12	7	12	12	12
	36	50	70	-	110	110	36	50	70	110
	50	85	100	-	125	125	50	85	100	125
	-	-	-	-	50	-	-	-	-	-
	7	12	12	-	12	12	7	12	12	12
	36	50	70	-	110	110	36	50	70	110
	50	85	100	-	125	125	50	85	100	125
	-	-	-	-	50	-	-	-	-	-
	-	-	-	7.6	-	-	-	-	-	-
	-	-	-	■	-	-	-	-	-	-
	-	-	-	-	■	-	-	-	-	-
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	-	-	-	-	-	-	■	■	■	■
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	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	260	260	260	260	260	260	260	260	260	260
	140	140	140	140	140	140	140	140	140	140
	185	185	185	185	185	185	185	185	185	185
	103	103	103	103	103	103	103	103	103	103
	151	151	151	151	151	151	151	151	151	151
	5	5	5	5	5	5	5	5	5	5
	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
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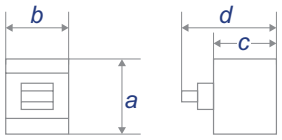
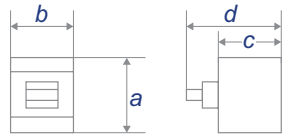
	□	□	□	□	□	□	□	□	□	□
	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000

800 AF

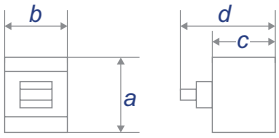
Model	Symbol	Unit	Condition	B800F TM	B800N TM	B800H TM	B800N BE / BEG
Utilisation Category	-	-	-	A	A	A	B
Number of Poles	-	-	-	3, 4	3, 4	3, 4	3, 4
Nominal Current Ratings	*In*	(A)	50 °C	630	630	630	630
				800	800	800	800
Electrical Characteristics							
Rated Maximum Operational Voltage	*Ue*	(V)	AC 50 / 60 Hz	690	690	690	690
		(V)	DC	250	250	250	-
Rated Insulation Voltage	*Ui*	(V)	-	800	800	800	800
Rated Impulse Withstand Voltage	*Uimp*	(kV)	-	8	8	8	8
Ultimate Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Icu*	(kA)	690 V AC	10*	20*	25*	25*
			415 / 400 V AC	36	50	70	50
			220 / 240 V AC	50	85	100	85
DC Voltage	*Icu*	(kA)	250 V DC	50	50	50	85
Service Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Ics*	(kA)	690 V AC	10*	20*	20*	20*
			415 / 400 V AC	36	50	50	50
			220 / 240 V AC	50	85	75	85
DC Voltage	*Ics*	(kA)	250 V DC	50	50	50	-
Short-Time Withstand Current	*Icw*	(kA)	0.3 sec.	-	-	-	10
Protection - Over Current Release	**Key**						
Switch (Non-Auto)		■	Standard	-	-	-	-
TM (Adjustable Thermal - Adjustable Magnetic)		□	Optional	■	■	■	-
Electronic - Basic		-	Not available	-	-	-	■
Electronic - Smart - Ammeter (SX)				-	-	-	-
Electronic - Smart (SE)				-	-	-	-
Installation	**Key**						
Front Connection (FC)		■	Standard	■	■	■	■
Extension Bar (FB)		□	Optional	□	□	□	□
Rear Connection (RC)		-	Not available	□	□	□	□
Plug-In (PM)				□	□	□	□
Draw-Out (DR)				□	□	□	□
Reverse Supply Connection	Possible to 440 V			Yes	Yes	Yes	Yes
Dimensions	*a*	(mm)	-	273	273	273	273
	*b*	(mm)	3 pole	210	210	210	210
	b	(mm)	4 pole	-	280	280	280
	c	(mm)	-	103	103	103	103
	d	(mm)	-	145	145	145	145
Weight	*W*	(kg)	3 pole (630 / 800 A)	8.5 / 8.5	8.5 / 8.5	8.5 / 8.5	8.5 /8.5
			4 pole (630 / 800 A)	-	11.5 / 11.5	11.5 / 11.5	11.5 / 11.5
Operation Options	**Key**						
Toggle Operation		■	Standard	■	■	■	■
Extension Handle or Direct Mount		□	Optional	□	□	□	□
Motor Operation TPMC		-	Not available	□	□	□	□
Endurance	Electrical	Cycles	415 V AC	4000	4000	4000	4000
	Mechanical	Cycles	-	10000	10000	10000	10000

	B800H BE / BEG	B800D NN	B800G TM	B800G BE	B800P BE	B800R BE	B800H SX	B800H SX	B800P SX	B800H SE	B800P SE
	B		A	B	B	B	B	B	B	B	B
	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4
	630	-	630	630	630	630	630	630	630	630	630
	800	800	800	800	800	800	800	800	800	800	800
	690	690	690	690	690	690	690	690	690	690	690
	-	-	-	-	-	-	-	-	-	-	-
	800	800	800	800	800	800	800	800	800	800	800
	8	8	8	8	8	8	8	8	8	8	8
	25*	-	25*	25*	25*	25*	25*	25*	25*	25*	25*
	70	-	100	100	125	200	70	70	125	70	125
	100	-	125	125	150	200	100	100	150	100	150
	100	-	50	-	-	-	-	-	-	-	-
	20*	-	20	20*	20*	20*	20*	20*	20*	20*	20*
	50	-	50	50	94	150	50	50	94	50	94
	75	-	125	125	150	150	75	75	150	75	150
	-	-	50	-	-	-	-	-	-	-	-
	-	10	-	10	10	10	10	10	10	10	10
	-	■	-	-	-	-	-	-	-	-	-
	-	-	■	-	-	-	-	-	-	-	-
	■	-	-	■	■	■	-	-	-	-	-
	-	-	-	-	-	-	■	■	■	-	-
	-	-	-	-	-	-	-	-	-	■	■
	■	■	■	■	■	■	■	■	■	■	■
	□	□	□	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□	□	□
	□	□	-	□	-	-	□	□	-	□	-
	□	□	-	□	-	-	□	□	-	□	-
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	273	273	273	273	273	273	273	273	273	273	273
	210	210	210	210	210	210	210	210	210	210	210
	280	280	280	280	280	280	280	280	280	280	280
	103	103	103	103	140	140	103	103	140	103	140
	145	145	145	145	182	182	145	145	182	145	182
	8.7 / 9.1	8.7 / 9.1	8.5 / 8.5	8.7 / 9.1	13.3 / 14.8	13.3 / 14.8	8.7 / 9.1	8.7 / 9.1	13.3 / 14.8	8.7 / 9.1	13.3 / 14.8
	11.9 / 12.3	11.9 / 12.3	11.5 / 11.5	11.9 / 12.4	16.8 / 18.8	16.8 / 18.9	11.9 / 12.3	11.9 / 12.3	16.8 / 18.8	11.9 / 12.3	16.8 / 18.8
	■	■	■	■	■	■	■	■	■	■	■
	□	□	□	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	□	□	□
	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000

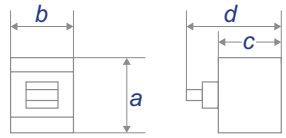
1000 AF

Model	Symbol	Unit	Condition	B1000N BE	B1000H BE	B1000H SX	B1000H SE	B1000D NN
Utilisation Category	-	-	-	A	A	A	A	B
Number of Poles	-	-	-	3, 4	3, 4	3, 4	3, 4	3, 4
Nominal Current Ratings	*In*	(A)	50 °C	1000	1000	1000	1000	1000
Electrical Characteristics								
Rated Maximum Operational Voltage	*Ue*	(V)	AC 50 / 60 Hz	690	690	690	690	690
		(V)	DC	-	-	-	-	-
Rated Insulation Voltage	*Ui*	(V)	-	800	800	800	800	800
Rated Impulse Withstand Voltage	*Uimp*	(kV)	-	8	8	8	8	8
Ultimate Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Icu*	(kA)	690 V AC	20*	25*	25*	25*	-
			415 / 400 V AC	50	70	70	70	-
			220 / 240 V AC	85	100	100	100	-
DC Voltage			250 V DC	-	-	-	-	-
Service Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Ics*	(kA)	690 V AC	15*	20*	20*	20*	-
			415 / 400 V AC	38	50	50	50	-
			220 / 240 V AC	65	75	75	75	-
DC Voltage			250 V DC	-	-	-	-	-
Short-Time Withstand Current	*Icw*	(kA)	0.3 sec.	-	-	-	-	10
			1 sec.	-	-	-	-	-
Protection - Over Current Release	**Key**							
Switch (Non-Auto)		■	Standard	-	-	-	-	■
Electronic - Basic		□	Optional	■	■	-	-	-
Electronic - Smart - Ammeter (SX)		-	Not available	-	-	■	-	-
Electronic - Smart (SE)				-	-	-	■	-
Installation	**Key**							
Front Connection (FC)				■	■	■	■	■
Extension Bar (FB)		■	Standard	■	■	■	■	■
Cable Tunnel Clamp (FW)		□	Optional	-	-	-	-	-
Rear Connection (RC)		-	Not available	□	□	□	□	□
Plug-In (PM)				-	-	-	-	-
Draw-Out (DR)				-	-	-	-	-
Reverse Supply Connection	Possible to 440 V			Yes	Yes	Yes	Yes	Yes
Dimensions 	*a*	*(mm)*	-	273	273	273	273	273
	b	*(mm)*	3 pole	210	210	210	210	210
	b	*(mm)*	4 pole	280	280	280	280	280
	c	*(mm)*	-	103	103	103	103	103
	d	*(mm)*	-	145	145	145	145	145
Weight	*W*	*(kg)*	3 pole	11	11	11	11	11
			4 pole	14.8	14.8	14.8	14.8	14.8
			3 pole (630 A)	-	-	-	-	-
			4 pole (630 A)	-	-	-	-	-
Operation Options	**Key**							
Toggle Operation		■	Standard	■	■	■	■	■
Extension Handle or Direct Mount		□	Optional	□	□	□	□	□
Motor Operation TPMC		-	Not available	□	□	□	□	□
Endurance	Electrical	Cycles	415 V AC	4000	4000	4000	4000	4000
	Mechanical	Cycles	-	10000	10000	10000	10000	10000

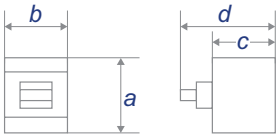
1250 AF

Model	Symbol	Unit	Condition	B1250N BE	B1250D NN	B1250HL BE
Utilisation Category	-	-	-	B	B	B
Number of Poles	-	-	-	3	3	3
Nominal Current Ratings	*In*	(A)	50 °C	1250	1250	1250
Electrical Characteristics						
Rated Maximum Operational Voltage	*Ue*	(V)	AC 50 / 60 Hz	690	690	690
		(V)	DC	-	-	-
Rated Insulation Voltage	*Ui*	(V)	-	800	800	800
Rated Impulse Withstand Voltage	*Uimp*	(kV)	-	8	8	8
Ultimate Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Icu*	(kA)	690 V AC	20*	-	45*
			415 / 400 V AC	50	-	85
			220 / 240 V AC	85	-	125
DC Voltage			250 V DC	-	-	-
Service Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Ics*	(kA)	690 V AC	15*	-	34*
			415 / 400 V AC	38	-	65
			220 / 240 V AC	65	-	94
DC Voltage			250 V DC	-	-	-
Short-Time Withstand Current	*Icw*	(kA)	0.3 sec.	15	15	15
Protection - Over Current Release	**Key**	■	Standard			
Switch (Non-Auto)		□	Optional	-	■	-
Electronic - Basic		-	Not available	■	-	■
Installation	**Key**					
Front Connection (FC)		■	Standard	■	■	■
Extension Bar (FB)		□	Optional	■	■	■
Cable Tunnel Clamp (FW)		-	Not available	-	-	-
Rear Connection (RC)				□	□	□
Plug-In (PM)				□	□	□
Draw-Out (DR)				-	-	-
Reverse Supply Connection	Possible to 440 V			Yes	Yes	Yes
Dimensions 	*a*	(mm)	-	370	370	370
	b	(mm)	3 pole	210	210	210
	b	(mm)	4 pole	280	280	280
	c	(mm)	-	120	120	120
	d	(mm)	-	171	171	171
Weight	*W*	(kg)	3 pole	19.8	19.8	19.8
			4 pole	25	25	25
			3 pole (630 A)	-	-	-
			4 pole (630 A)	-	-	-
Operation Options	**Key**					
Toggle Operation		■	Standard	■	■	■
Door Mounted (HS, HP) / Breaker Mounted Handle (HB)		□	Optional	□	□	□
Motor Operation (MC)		-	Not available	□	□	□
Endurance	Electrical	Cycles	415 V AC	4000	4000	4000
	Mechanical	Cycles	-	5000	5000	5000

1600 AF

Model	Symbol	Unit	Condition	B1600N BE	B1600D NN	S1600HL BE
Utilisation Category	-	-	-	B	B	B
Number of Poles	-	-	-	3, 4	3, 4	3, 4
Nominal Current Ratings	*In*	(A)	50 °C	1600	1600	1600
Electrical Characteristics						
Rated Maximum Operational Voltage	*Ue*	(V)	AC 50 / 60 Hz	690	690	690
		(V)	DC	-	-	-
Rated Insulation Voltage	*Ui*	(V)	-	800	800	800
Rated Impulse Withstand Voltage	*Uimp*	(kV)	-	8	8	8
Ultimate Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Icu*	(kA)	690 V AC	20*	-	45*
			415 / 400 V AC	50	-	85
			220 / 240 V AC	85	-	125
DC Voltage			250 V DC	-	-	-
Service Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Ics*	(kA)	690 V AC	15*	-	34*
			415 / 400 V AC	38	-	65
			220 / 240 V AC	65	-	94
DC Voltage			250 V DC	-	-	-
Short-Time Withstand Current	*Icw*	(kA)	0.3 Seconds	20	20	20
Protection - Over Current Release	**Key**	■	Standard			
Switch (Non-Auto)		□	Optional	-	■	-
Electronic - Basic		-	Not available	■	-	■
Installation	**Key**					
Front Connection (FC)		■	Standard	■	■	■
Extension Bar (FB)		□	Optional	■	■	■
Cable Tunnel Clamp (FW)		-	Not available	-	-	-
Rear Connection (RC)				□	□	□
Plug-In (PM)				-	-	-
Draw-Out (DR)				-	-	-
Reverse Supply Connection	Possible to 440V			Yes	Yes	Yes
Dimensions 	*a*	(mm)	-	370	370	370
	b	(mm)	3 pole	210	210	210
	b	(mm)	4 pole	280	280	280
	c	(mm)	-	140	140	140
	d	(mm)	-	191	191	191
Weight	*W*	(kg)	3 pole	27	27	27
			4 pole	35	35	35
			3 pole (630 A)	-	-	-
			4 pole (630 A)	-	-	-
Operation Options	**Key**					
Toggle Operation		■	Standard	■	■	■
Door Mounted (HS, HP) / Breaker Mounted Handle (HB)		□	Optional	□	□	□
Motor Operation (MC)		-	Not available	□	□	□
Endurance	Electrical	Cycles	415 V AC	4000	4000	4000
	Mechanical	Cycles	-	5000	5000	5000

2000 AF - 3200 AF

Model	Symbol	Unit	Condition	XS2000HL BE	XS2500HL BE	XS3200HL BE	XS2000D NN	XS2500D NN
Utilisation Category	-	-	-	B	B	B	B	B
Number of Poles	-	-	-	3 , 4	3 , 4	3	3	3
Nominal Current Ratings	*In*	(A)	50 °C	2000	2500	3200	2000	2500
Electrical Characteristics								
Rated Maximum Operational Voltage	*Ue*	(V)	AC 50 / 60 Hz	690	690	690	690	690
		(V)	DC	-	-	-	-	-
Rated Insulation Voltage	*Ui*	(V)	-					
Rated Impulse Withstand Voltage	*Uimp*	(kV)	-	8	8	8	8	8
Ultimate Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Icu*	(kA)	690 V AC	42	42	42	-	-
			415 / 400 V AC	85	85	85	-	-
			380 V AC	100	100	100	-	-
			220 V AC	125	125	125	-	-
Service Breaking Capacity (IEC, JIS, AS/NZS) AC Voltage	*Ics*	(kA)	690 V AC	42	42	42	-	-
			690 V AC	42	42	42	-	-
			415 / 400 V AC	64	64	64	-	-
			380 V AC	75	75	75	-	-
			220 V AC	94	94	94	-	-
Short-Time Withstand Current	*Icw*	(kA)	0.3 Seconds	42	42	-	42	42
			0.5 Seconds	-	-	38	-	-
Protection - Over Current Release	**Key**							
Switch (Non-Auto)		■	Standard	-	-	■	■	■
Magnetic Only DC		□	Optional	□	□	-	-	-
Electronic - Basic		-	Not available	■	■	-	-	-
Installation	**Key**							
Front Connection (FC)		■	Standard	□	-	-	□	-
Rear Connection (RC)		□	Optional	■	■	■	■	■
Plug-In (PM)		-	Not available	-	-	-	-	-
Draw-Out (DR)				-	-	-	-	-
Reverse Supply Connection	Possible to 440V			Yes	Yes	Yes	Yes	Yes
Dimensions 	*a*	(mm)	-	450	450	450	450	450
	b	(mm)	3 pole	320	320	320	320	320
	b	(mm)	4 pole	429	429	429	429	429
	c	(mm)	-	185	185	185	185	185
	d	(mm)	-	245	245	245	245	245
Weight	*W*	(kg)	3 pole	54	62.5	62.5	54	62.5
			4 pole	57	78.2	78.2	57	78.2
Operation Options	**Key**							
Toggle Operation		■	Standard	■	■	■	■	■
Door Mounted (HS, HP) / Breaker Mounted Handle (HB)		□	Optional	□	□	□	□	□
Motor Operation (MC)		-	Not available	□	□	□	□	□
Endurance	Electrical	Cycles	415 V AC	500	500	500	500	500
	Mechanical	Cycles	-	2500	2500	2500	2500	2500

Selectivity and Cascading

Two common terminologies relating to general power back-up and system protection are Selectivity (Discrimination) and Cascading (Back-up).

In general terms, Selectivity is used to improve system reliability and to ensure a continuous supply of power to as high a degree as possible for critical systems. Cascading on the other hand is where an upstream breaker is used to "back-up" a lower kA breaker installed downstream to clear a fault current, and is generally applied to non-critical load applications, or where economics plays a significant part in system design.

Selectivity

Selectivity, also known as 'discrimination', is associated with continuity of supply. The concept of selectivity is to ensure the device immediately upstream of the fault, interrupts the fault. This maintains a continuous supply to parts of the system that are fault free.

Cascading (or Back-up)

Cascading can be utilised when the potential fault that a down-stream device has to interrupt is larger than its breaking capacity. It involves the co-ordination of two devices in series being used to interrupt the fault as opposed to the downstream device alone.

The technique of cascading is used in applications where the protective devices are feeding non-essential loads.

The reason being, that in order for an upstream device to cascade with or 'back-up' a downstream device it may have to trip.

The technique is a recognised method for fault interruption, being stated in standards such as AS60947-2 (IEC 60947-2) for circuit breakers and AS61439 for switchboard assemblies.

Cascade/Selectivity tables

The Selectivity and Cascade tables are shown in the following pages.

These tables are verified according to AS/NZS 60947.

Cascade table
MCCB to MCB/RCBO

Cascade tables

Cascading refers to a design verified combination of circuit breakers where both breakers have been verified to work safely in short circuit level higher than the downstream I_{cu} ratings. Whenever there is a dash "-" this means the combination can be safely used **ONLY** up to the lower I_{cu} rating of both devices.

Cascade table @ 230/240-400/415 VAC

Upstream MCCBs				A160E FF, TF	A160F TF	P160F TM, FF, BE, SE	P160N TM, BE, SE	P160H TM, BE, SE	A250E TM	A250F TM
Downstream MCB, C or D curve		kA (rms 415V)		25	36	36	50	70	25	36
			Amps (A)	16 – 160	25 – 160	15 – 160	20 – 160	20 – 160	100 – 250	160 – 250
DTCB6	MCB	6	2 – 63	25	36	36	36	36	20	20
DTCB10	MCB	10	0.5 – 63	25	36	36	50	50	25	36
DTCB10H	MCB	16	80 – 125	25	36	36	50	70	25	36
DTCB15	MCB	15	0.5 – 63	25	36	36	50	50	25	36

Upstream MCCBs				P250F TM, BE, SE	P250N TM, BE, SE	P250H TM, BE, SE	P400E TM, BE, SE	P400F TM, BE, SE	P400N TM, BE, SE	P400H TM, BE, SE	P400S TM, BE, SE
Downstream MCB, C or D curve		kA (rms 415V)		36	50	70	25	36	50	70	110
			Amps (A)	40 – 250	40 – 250	40 – 250	250 – 400	250 – 400	250 – 400	250 – 400	250 – 400
DTCB6	MCB	6	2 – 63	36	36	36	-	-	-	-	-
DTCB10	MCB	10	0.5 – 63	36	50	50	25	36	50	50	50
DTCB10H	MCB	16	80 – 125	36	50	50	25	36	50	50	50
DTCB15	MCB	15	0.5 – 63	36	50	50	25	36	50	50	50

Upstream MCCBs				A160E FF, TF	A160F TF	P160F TM, FF, BE, SE	P160N TM, BE, SE	P160H TM, BE, SE	A250E TM	A250F TM
Downstream RCD, C curve		kA (rms 415V)		25	36	36	50	70	25	36
			Amps (A)	16 – 160	25 – 160	15 – 160	20 –160	20 – 160	100 – 250	50 – 250
DSRCBH 6 kA	RCBO	6	6 – 40	25	36	36	36	36	25	36
DSRCBS_CAN	RCBO	6	6 – 32	25	36	36	36	36	20	20
DSRCBH 10 kA	RCBO	10	6 – 40	25	36	36	36	36	25	36
DSRCB_A DSRCB_P	RCBO	10	6 – 40	25	36	36	50	50	25	36
DSRCB_AI	RCBO	6	6 – 40	25	36	36	50	50	25	36

Upstream MCCBs				P250F TM, BE, SE	P250N TM, BE, SE	P250H TM, BE, SE	P400E TM, BE, SE	P400F TM, BE, SE	P400N TM, BE, SE	P400H TM, BE, SE	P400S TM, BE, SE
Downstream RCD, C curve		kA (rms 415V)		36	50	70	25	36	50	70	110
			Amps (A)	40 – 250	40 – 250	40 – 250	250 – 400	250 – 400	250 – 400	250 – 400	250 – 400
DSRCBH 6 kA	RCBO	6	6 – 40	36	36	36	-	-	-	-	-
DSRCBS_CAN	RCBO	6	6 – 32	36	36	36	-	-	-	-	-
DSRCBH 10 kA	RCBO	10	6 – 40	36	36	36	25	36	36	36	36
DSRCB_A DSRCB_P	RCBO	10	6 – 40	36	36	36	25	36	36	36	36
DSRCB_AI	RCBO	6	6 – 40	36	36	36	25	36	36	36	36

Cascade table
MCCB to MOD6 MCB, RCBO

Cascade table @ 230/240-400/415 VAC

Upstream MCCBs				**A160E FF, TF**	**A160F TF**	**P160F TM, FF, BE, SE**	**P160N TM, BE, SE**	**P160H TM, BE, SE**	**A250E TM**	**A250F TM**
Downstream RCD, C curve		**kA (rms 415V)**		**25**	**36**	**36**	**50**	**70**	**25**	**36**
			Amps (A)	16 – 160	25 – 160	15 – 160	20 –160	20 – 160	100 – 250	50 – 250
MOD6 MCB	MCB	**6**	6 – 63	25	25	25	25	25	20	20
M6 RCBS_CAN	RCBO	**6**	6 – 32	25	25	25	25	25	20	20
MOD6 RCBO1_AL	RCBO	**6**	10 – 32	25	25	25	25	25	20	25
MOD6 RCBO2	RCBO	**6**	6 – 40	25	25	25	25	25	25	25

Upstream MCCBs				**P250F TM, BE, SE**	**P250N TM, BE, SE**	**P250H TM, BE, SE**	**P400E TM, BE, SE**	**P400F TM, BE, SE**	**P400N TM, BE, SE**	**P400H TM, BE, SE**	**P400S TM, BE, SE**
Downstream MCB, C or D curve		**kA (rms 415V)**		**36**	**50**	**70**	**25**	**36**	**50**	**70**	110
			Amps (A)	40 – 250	40 – 250	40 – 250	250 – 400	250 – 400	250 – 400	250 – 400	250 – 400
MOD6 MCB	MCB	**6**	6 – 63	25	25	25	-	-	-	-	-
M6 RCBS_CAN	RCBO	**6**	6 – 32	25	25	25	-	-	-	-	-
MOD6 RCBO1_AL	RCBO	**6**	10 – 32	25	25	25	-	-	-	-	-
MOD6 RCBO2	RCBO	**6**	6 – 40	25	25	25	-	-	-	-	-

Cascade table
MCCB to MCCB, Upstream Electronic MCCB

			160 A			250 A				400 A						630 A				800 A, 1000 A							1250 A, 1600 A			
CASCADE @ 240 / 415 VAC			**P160F**	**P160N**	**P160H**	**P250F**	**P250N**	**P250H**	**B250P**	**P400F**	**P400N**	**P400H**	**P400S**	**B400P**	**B400R**	**P630F**	**P630N**	**P630H**	**P630S**	**B800N**	**B800H**	**B800G**	**B800P**	**B800R**	**B1000N**	**B1000H**	**B1250N**	**B1250HL**	**B1600N**	**B1600HL**
Downstream MCCB Trip unit[1]: TM, BE, SX, SE	**Frame**	**I_{cu} kA**	**36**	**50**	**70**	**36**	**50**	**70**	**125**	**36**	**50**	**70**	**110**	**125**	**200**	**36**	**50**	**70**	**110**	**50**	**70**	**100**	**125**	**200**	**50**	**70**	**50**	**85**	**50**	**85**
A160E (1Pole)	160A 25 mm pole centres	**25**	36	36	36	36	36	36	70	36	36	36	36	36	36	36	36	36	36	-	-	-	-	-	-	-	-	-	-	-
A160E		**25**	36	36	36	36	36	36	70	36	36	36	36	36	36	36	36	36	36	-	-	-	-	-	-	-	-	-	-	-
A160F		**36**	-	50	70	-	50	70	85	-	50	50	50	70	70	-	50	50	50	-	-	-	-	-	-	-	-	-	-	-
ZS125M	125A 160A 30 mm pole centres	**65**	-	-	70	-	-	70	125	-	-	70	110	125	150	-	-	70	70	-	70	70	-	-	-	-	-	-	-	-
P160F		**36**	-	50	50	-	50	50	70	-	50	50	50	70	70	-	50	50	50	50	50	50	-	-	-	-	-	-	-	-
P160N		**50**	-	-	70	-	-	70	85	-	-	70	70	85	85	-	-	70	70	-	-	-	-	-	-	-	-	-	-	-
P160H		**70**	-	-	-	-	-	-	110	-	-	-	85	110	110	-	-	-	85	-	-	-	-	-	-	-	-	-	-	-
B160P	250 AF 35 mm pole centres	**125**	-	-	-	-	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B160F (1Pole)		**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A250E		**25**	-	-	-	36	50	70	85	36	50	70	70	70	70	36	50	70	70	50	50	50	50	50	50	50	-	-	-	-
A250F		**36**	-	-	-	-	50	70	85	-	50	70	70	70	70	-	50	70	70	50	50	50	50	50	50	50	-	-	-	-
P250F		**36**	-	-	-	-	50	50	70	-	50	50	50	70	70	-	50	50	50	-	50	50	50	50	50	50	-	-	-	-
P250N		**50**	-	-	-	-	-	70	85	-	-	70	70	85	85	-	-	70	70	-	70	70	-	70	-	70	-	-	-	-
P250H		**70**	-	-	-	-	-	-	110	-	-	-	85	110	110	-	-	-	85	-	-	85	-	-	-	-	-	-	-	-
B250P		**125**	-	-	-	-	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-	-	-	150	-	-	-	-	-	-
ZS250M		**65**	-	-	-	-	-	70	125	-	-	70	110	125	150	-	-	70	70	-	70	70	70	70	-	70	-	-	-	-
P400E	400A 630A	**25**	-	-	-	-	-	-	-	-	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
P400F		**36**	-	-	-	-	-	-	-	-	50	50	50	50	50	-	50	50	50	50	50	50	50	50	50	50	50	50	50	50
P400N		**50**	-	-	-	-	-	-	-	-	-	70	70	70	70	-	-	70	70	-	70	70	70	70	-	70	-	70	-	70
P400H		**70**	-	-	-	-	-	-	-	-	-	-	110	110	110	-	-	-	110	-	-	-	110	110	-	-	-	-	-	85
P400S		**110**	-	-	-	-	-	-	-	-	-	-	-	125	150	-	-	-	-	-	-	-	125	125	-	-	-	-	-	-
B400P		**125**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630E		**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630F		**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630N		**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630H		**70**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630S		**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B800F	630A 800A 1000A	**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B800N		**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B800H		**70**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B800P		**125**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1000N		**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1000H		**70**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1250N	1250A 1600A	**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1250HL		**85**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1600N		**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1600HL		**85**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1) Downstream MCCB trip units can be TM, TF, FF, BE, BEG, SX, or SE types, unless it is specifically stated as being for one type only.

Cascade table
MCCB to MCCB, Upstream Thermal Magnetic MCCB

			160 A						250 A						400 A					630 A					800 A			
CASCADE @ 240 / 415 VAC			A160E_TF	A160F_TF	P160F_TM	P160N_TM	P160H_TM	B160P_TM	A250E_TM	A250F_TM	P250F_TM	P250N_TM	P250H_TM	B250P_TM	P400E_TM	P400F_TM	P400N_TM	P400H_TM	P400S_TM	P630E_TM	P630F_TM	P630N_TM	P630H_TM	P630S_TM	B800F_TM	B800N_TM	B800H_TM	B800G_TM
Downstream MCCB Trip unit[1]: TM, BE, SX, SE	**Frame**	I_{cu} kA	25	36	36	50	70	125	25	36	36	50	70	125	25	36	50	70	110	25	36	50	70	110	36	50	70	100
A160E (1Pole)	160A 25 mm pole centres	**25**	-	-	36	36	36	70	-	36	36	36	36	70	-	36	36	36	36	-	36	36	36	36	-	-	-	-
A160E		**25**	-	-	36	36	36	70	-	36	36	36	36	70	-	36	36	36	36	-	36	36	36	36	-	-	-	-
A160F		**36**	-	-	-	50	70	85	-	-	-	50	70	85	-	-	50	50	50	-	-	50	50	50	-	-	-	-
ZS125M	125A 160A 30 mm pole centres	**65**	-	-	-	-	70	125	-	-	-	-	70	125	-	-	-	70	85	-	-	-	70	85	-	-	70	70
P160F		**36**	-	-	-	50	50	70	-	-	-	50	50	70	-	-	50	50	50	-	-	50	50	50	-	-	50	50
P160N		**50**	-	-	-	-	70	85	-	-	-	-	70	85	-	-	-	70	70	-	-	-	70	70	-	-	-	-
P160H		**70**	-	-	-	-	-	110	-	-	-	-	-	110	-	-	-	-	85	-	-	-	-	85	-	-	-	-
B160P 20-125A	250 AF 35 mm pole centres	**125**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B160P 160A		**125**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B160F (1Pole)		**25**	-	-	-	-	-	-	-	-	-	-	50	85	-	36	36	50	50	-	36	36	50	36	-	36	36	-
A250E		**25**	-	-	-	-	-	-	-	-	36	50	70	85	-	36	50	70	70	-	36	50	70	70	-	-	50	50
A250F		**36**	-	-	-	-	-	-	-	-	-	50	70	85	-	36	50	70	70	-	36	50	70	70	-	-	50	50
P250F		**36**	-	-	-	-	-	-	-	-	-	50	50	70	-	-	50	50	50	-	-	50	50	50	-	-	50	50
P250N		**50**	-	-	-	-	-	-	-	-	-	-	70	85	-	-	-	70	70	-	-	-	70	70	-	-	70	70
P250H		**70**	-	-	-	-	-	-	-	-	-	-	-	110	-	-	-	-	85	-	-	-	-	85	-	-	-	85
B250P		**125**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZS250M		**65**	-	-	-	-	-	-	-	-	-	-	70	125	-	-	-	70	85	-	-	-	70	85	-	-	70	70
P400E	400A 630A	**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	36	36	-	36	36	36	36	-	36	36	36
P400F		**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	50	50	-	-	50	50	50	-	50	50	50
P400N		**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	70	-	-	-	70	70	-	-	70	70
P400H		**70**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110	-	-	-	-	110	-	-	-	70
P400S		**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110	-	-	-	-	-	-	-	-	-
B400P		**125**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630E		**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630F		**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630N		**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630H		**70**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P630S		**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1) Downstream MCCB trip units can be TM, TF, FF, BE, BEG, SX, or SE types, unless it is specifically stated as being for one type only.

Selectivity table
MCCB to MCB

Selectivity tables

The tables below cover for Thermal Magnetic and Electronic upstream MCCBs, in conjunction with Din-T Thermal Magnetic downstream MCBs.

The tables provide data to help with conducting selectivity studies and should be used with the study to ensure selectivity is maintained at Long Time and Short Time levels (time/current curve comparison).

Whenever there is a dash "-" refer to the selectivity study.

Selectivity table @ 230/240-400/415 VAC

Upstream MCCBs			**A160E, F FF / TF**	**P160F, N, H FF, TM**	**P160F BE, SE**			**P160N, H BE, SE**			**A250E TM**		**A250F TM**	
Downstream MCB, C or D curve		**kA (rms 415V)**	**25, 36**	**36, 50, 70**	**36**			**50, 70**			**25**		**36**	
		Amps (A)	16 – 160	15 - 160	40	100	160	40	100	160	100 - 160	250	125 – 160	250
DTCB6	MCB	**6**	2 - 20	-	-	36	36	36	36	36	36	-	20	-	20
			25 – 32	-	-	36	36	36	36	36	36	-	20*	-	20*
			40 - 63	-	-	-	36	36	-	36	36	-	20*	-	20*
DTCB10	MCB	**10**	0.5 - 32	-	-	36	36	36	50	50	50	-	20*	-	20*
			40 – 63	-	-	-	36	36	-	50	50	-	20*	-	20*
DTCB10H	MCB	**16**	80	-	-	-	36	36	-	50	50	-	15*	-	15*
			100	-	-	-	-	36	-	-	50	-	15*	-	15*
			125	-	-	-	-	36	-	-	50	-	15*	-	15*
DTCB15	MCB	**15**	0.5 - 20	-	-	36	36	36	50	50	50	-	20*	-	20*
			25 – 32	-	-	36	36	36	50	50	50	-	20*	-	20*
			40 - 63	-	-	-	36	36	-	50	50	-	20*	-	20*

Upstream MCCBs			**P250F, N, H TM**		**P250F BE, SE**			**P250N BE, SE**			**P250H BE, SE**			**P400E TM**	**P400F TM, BE, SE**	**P400N, H, S TM, BE, SE**
Downstream MCB, C or D curve		**kA (rms 415V)**	**36, 50, 70**		**36**			**50**			**70**			**25**	**36**	**50, 70, 110**
		Amps (A)	50 – 63 – 100	250	40	100	160-250	40	100	160 – 250	40	100	160 – 250	400	400	400
DTCB6	MCB	**6**	2 - 20	15*	36	36	36	36	36	36	36	36	36	-	-	-
			25 - 32	15*	36	36	36	36	36	36	36	36	36	-	-	-
			40 – 63	15*	-	36	36	-	36	36	-	36	36	-	-	-
DTCB10	MCB	**10**	0.5 – 16	15*	36	36	36	50	50	50	50	50	50	25	36	50
			20 – 32	15*	36	36	36	50	50	50	50	50	50	25	36	50
			40 – 63	15*	-	36	36	-	50	50	-	50	50	25	36	50
DTCB10H	MCB	**16**	80	-	-	36	36	-	50	50	-	50	50	25	36	50
			100	-	-	-	36	-	-	50	-	-	50	25	36	50
			125	-	-	-	36	-	-	50	-	-	50	25	36	50
DTCB15	MCB	**15**	0.5 - 20	15*	36	36	36	50	50	50	50	50	50	25	36	50
			25 – 32	15*	36	36	36	50	50	50	50	50	50	25	36	50
			40 - 63	15*	-	36	36	-	50	50	-	50	50	25	36	50

Notes:

1) Values given with an asterisk (X*) were achieved with the I_i setting at maximum.
2) These figures applies for 1P MCB only.

Selectivity table
MCCB to RCBO

Selectivity tables

The tables below cover for Thermal Magnetic and Electronic upstream MCCBs, in conjunction with Din-Safe Thermal Magnetic downstream RCBOs.

The tables provide data to help with conducting selectivity studies and should be used with the study to ensure selectivity is maintained at Long Time and Short Time levels (time/current curve comparison).

Whenever there is a dash "-" refer to the selectivity study.

Selectivity table @ 230/240-400/415 VAC

Upstream MCCBs				**A160E FF / TF**	**A160F TF**	**P160F, N, H TM**	**P160F, P160N, P160H BE, SE**			**P160F, P160N, P160H BE, SE**			**A250E TM**		**A250F TM**	
Downstream MCB, C or D curve		**kA (rms 415V)**		**25**	**36**	**36, 50, 70**	**36**			**50, 70**			**25**		**36**	
			Amps (A)	16 – 160	25 – 160	160	40	100	160	40	100	160	100 – 160	250	125 - 160	250
DSRCBH (6 kA)	RCBO	**6**	2 - 20	-	-	-	36	36	36	36	36	36	-	25*	-	25*
			25 – 32	-	-	-	36	36	36	36	36	36	-	25*	-	25*
			40	-	-	-	-	36	36	-	36	36	-	25*	-	25*
DSRCBS_CAN	RCBO	**6**	6 – 16	-	-	-	36	36	36	36	36	36	-	20*	-	20*
			20 – 25	-	-	-	36	36	36	36	36	36	-	20*	-	20*
			32	-	-	-	36	36	36	36	36	36	-	20*	-	20*
DSRCBH (10 kA)	RCBO	**10**	2 - 20	-	-	-	36	36	36	36	36	36	-	25*	-	36*
			25 – 32	-	-	-	36	36	36	36	36	36	-	25*	-	36*
			40	-	-	-	-	36	36	-	36	36	-	25*	-	36*
DSRCB_A DSRCB_P	RCBO	**10**	2 - 20	-	-	-	36	36	36	50	50	50	-	25*	-	36*
			25 – 32	-	-	-	36	36	36	50	50	50	-	25*	-	36*
			40	-	-	-	-	36	36	-	50	50	-	25*	-	36*
DSRCB_AI	RCBO	**6**	2 - 20	-	-	-	36	36	36	50	50	50	-	25*	-	36*
			25 – 32	-	-	-	36	36	36	50	50	50	-	25*	-	36*
			40	-	-	-	-	36	36	-	50	50	-	25*	-	36*

Upstream MCCBs				**P250F, P250N, P250H TM**		**P250F, P250N, P250H BE, SE**			**P400E TM, BE, SE**	**P400F, N, H, S TM, BE, SE**
Downstream MCB, C or D curve		**kA (rms 415V)**		**36, 50, 70**		**36, 50, 70**			**25**	**36 – 110**
			Amps (A)	50 – 160	250	40	100	160 – 250	250 – 400	250 – 400
DSRCBH (6 kA)	RCBO	**6**	2 - 20	-	36*	36	36	36	-	-
			25 – 32	-	36*	36	36	36	-	-
			40	-	36*	-	36	36	-	-
DSRCBS_ CAN	RCBO	**6**	6 – 16	-	36*	36	36	36	-	-
			20 – 25	-	36*	36	36	36	-	-
			32	-	36*	36	36	36	-	-
DSRCBH (10 kA)	RCBO	**10**	2 - 20	-	36*	36	36	36	25*	36*
			25 – 32	-	36*	-	36	36	25*	36*
			40	-	36*	36	36	36	25*	36*
DSRCB_A DSRCB_P	RCBO	**10**	2 - 20	-	36*	36	36	36	25*	36*
			25 – 32	-	36*	36	36	36	25*	36*
			40	-	36*	-	36	36	25*	36*
DSRCB_AI	RCBO	**6**	2 - 20	-	36	36	36	36	25*	36*
			25 – 32	-	36	36	36	36	25*	36*
			40	-	36	-	36	36	25*	36*

Notes:

1) Values given with an asterisk (X*) were achieved with the I_1 setting at maximum.
2) These figures applies for 1P MCB only.

Selectivity table
MCCB to MOD6 MCB, RCBO

Selectivity tables

The tables below cover for Thermal Magnetic and electronic upstream MCCBs, in conjunction with MOD6 Thermal Magnetic downstream MCBs and RCBOs.

The tables provide data to help with conducting selectivity studies and should be used with the study to ensure selectivity is maintained at Long Time and Short Time levels (time/current curve comparison).

Whenever there is a dash "-" refer to the selectivity study.

Selectivity table @ 230/240-400/415 VAC

Upstream MCCBs				**A160E FF / TF**	**A160F TF**	**P160F, N, H TM**	**P160F, P160N, P160H BE, SE**			**A250E TM**		**A250F TM**	
Downstream MCB, RCD, C curve		**kA (rms 415V)**		**25**	**36**	**36, 50, 70**	**36, 50, 70**			**25**		**36**	
			Amps (A)	16 – 160	25 – 160	160	40	100	160	100 – 160	250	160	250
MOD6 MCB	MCB	**6**	2 - 20	-	-	-	25	25	25	-	20*	-	20*
			25 – 32	-	-	-	25	25	25	-	20*	-	20*
			40	-	-	-	-	25	25	-	20*	-	20*
			50	-	-	-	-	25	25	-	20*	-	20*
			63	-	-	-	-	25	25	-	20*	-	20*
M6RCBS_CAN	RCBO	**6**	6 – 16	-	-	-	25	25	25	-	20*	-	20*
			20 – 25	-	-	-	25	25	25	-	20*	-	20*
			32	-	-	-	25	25	25	-	20*	-	20*
MOD6RCBO1_AL	RCBO	**6**	10 - 20	-	-	-	25	25	25	-	20	-	20
			25	-	-	-	25	25	25	-	20	-	20
			32	-	-	-	25	25	25	-	20	-	20
MOD6 RCBO2	RCBO	**6**	6 - 20	-	-	-	25	25	25	-	20	-	20
			25 – 32	-	-	-	25	25	25	-	20	-	20
			40	-	-	-	25	25	25	-	20	-	20

Upstream MCCBs				**P250F, P250N, P250H TM**					**P250F, P250N, P250H BE, SE**			**P400 TM, BE, SE**
Downstream MCB, RCD, C curve		**kA (rms 415V)**		**36, 50, 70**					**36, 50, 70**			**25 – 110**
			Amps (A)	50	63	100	125 - 160	250	40	100	160 – 250	250 – 400
MOD6 MCB	MCB	**6**	2 - 20	-	-	-	-	15*	25	25	25	-
			25 – 32	-	-	-	-	15*	25	25	25	-
			40	-	-	-	-	15*	-	25	25	
			50	-	-	-	-	15*	-	25	25	-
			63	-	-	-	-	15*	-	25	25	-
M6RCBS_CAN	RCBO	**6**	10 – 16	-	-	-	-	25*	25	25	25	-
			20 – 25	-	-	-	-	25*	25	25	25	-
			32	-	-	-	-	25*	25	25	25	-
MOD6RCBO1_AL	RCBO	**6**	10 - 20	-	-	-	-	25*	25	25	25	-
			25	-	-	-	-	25*	25	25	25	-
			32	-	-	-	-	25*	25	25	25	-
MOD6 RCBO2	RCBO	**6**	6 - 20	-	-	-	-	25*	25	25	25	-
			25 – 32	-	-	-	-	25*	25	25	25	-
				-	-	-	-	25*	25	25	25	-

Notes:

1) Values given with an asterisk (X*) were achieved with the I_i setting at maximum.
2) These figures applies for 1P MCB only.

Selectivity table
MCCB to MCCB

Selectivity tables

The tables below cover for electronic upstream MCCBs, in conjunction with Thermal Magnetic and Electronic downstream MCCBs, unless specifically stated.

The tables provide data to help with conducting selectivity studies and should be used with the study to ensure selectivity is maintained at Long Time and Short Time levels (time/current curve comparison).

Whenever there is a dash "-" refer to the selectivity study.

ELECTRONIC MCCBs			250 A			400 A							630 A					800 A, 1000 A							1250 A, 1600 A					2000 - 3200 A
SELECTIVITY @ 240 / 415 VAC			**P250F**	**P250N**	**P250H**	**P400E**	**P400F**	**P400N**	**P400H**	**P400S**	**B400P**	**B400R**	**P630E**	**P630F**	**P630N**	**P630H**	**P630S**	**B800N**	**B800H**	**B800G**	**B800P**	**B800R**	**B1000N**	**B1000H**	**B1250N**	**B1250H**	**B1250HL**	**B1600N**	**B1600HL**	**XS2000HL XS2500HL XS3200HL**
Downstream MCCB Trip unit[1]: TM, BE, SX, SE	**Trip unit (A)**	**I_{cu} kA**	**36**	**50**	**70**	**25**	**36**	**50**	**70**	**110**	**125**	**200**	**25**	**36**	**50**	**70**	**110**	**50**	**70**	**100**	**125**	**200**	**50**	**70**	**50**	**70**	**85**	**50**	**85**	**85**
A160E_FF, 1P	16 – 125	**25**	25	25	25	25	25	25	25	25	17	17	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
A160E_TF	25 – 125	**25**	25	25	25	25	25	25	25	25	17	17	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	160		20	20	20	25	25	25	25	25	17	17	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
A160F_TF	25 – 125	**36**	30	30	30	25	25	25	25	25	17	17	25	36	36	36	36	30	30	30	30	30	36	36	36	36	36	36	36	36
	160		20	20	20	25	25	25	25	25	17	17	25	36	36	36	36	30	30	30	30	30	36	36	36	36	36	36	36	36
ZS125M	20 – 125	**65**	-	-	-	6	6	6	6	6	65	65	25	30	30	30	30	50	65	65	65	65	50	65	50	65	65	50	65	65
P160F	20 – 125	**36**	30	30	30	25	36	36	36	36	36	36	25	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
	160		20	20	20	25	36	36	36	36	36	36	25	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
P160N	20 – 125	**50**	30	30	30	25	36	50	50	50	50	50	25	36	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	160		20	20	20	25	36	50	50	50	50	50	25	36	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
P160H	20 – 125	**70**	30	30	30	25	36	50	50	50	50	50	25	36	50	70	70	50	70	70	50	50	50	70	50	70	70	50	70	70
	160		20	20	20	25	36	50	50	50	50	50	25	36	50	70	70	50	50	50	50	50	50	70	50	70	70	50	70	70
B160P	20 – 125	**125**	-	-	-	25	25	25	25	25	125	125	25	25	25	25	25	50	50	50	125	125	50	70	50	70	70	50	85	85
	160		-	-	-	5	5	5	5	5	125	125	25	25	25	25	25	50	50	50	125	125	50	70	50	70	70	50	85	85
B160E_FF, 1P	16 – 125	**25**	10	10	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	160		-	-	-	10	10	10	10	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
A250E	100 – 160	**25**	10	10	10	10	10	10	10	10	5	5	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	200 – 250		-	-	-	5	5	5	5	5	5	5	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
A250F	100 – 160	**36**	10	10	10	15	15	15	15	15	10	10	25	30	30	30	30	30	30	30	25	25	30	30	30	30	30	36	36	36
	200 – 250		-	-	-	5	5	5	5	5	5	5	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	36	36	36
P250F	40 – 160	**36**	25	25	25	25	25	25	25	25	10	10	25	36	36	36	36	36	36	36	25	25	36	36	36	36	36	36	36	36
	250		-	-	-	10	10	10	10	10	10	10	25	36	36	36	36	36	36	36	25	25	36	36	36	36	36	36	36	36
P250N	40 – 160	**50**	25	25	25	25	25	25	25	25	10	10	25	36	50	50	50	36	36	36	25	25	50	50	50	50	50	50	50	50
	250		-	-	-	10	10	10	10	10	10	10	25	36	50	50	50	36	36	36	25	25	50	50	50	50	50	50	50	50
P250H	40 – 160	**70**	25	25	25	25	25	25	25	25	10	10	25	36	50	70	70	36	36	36	25	25	50	70	50	70	70	50	70	70
	250		-	-	-	10	10	10	10	10	10	10	25	36	50	70	70	36	36	36	25	25	50	70	50	70	70	50	70	70
B250P_TM	160 – 250	**125**	-	-	-	5	5	5	5	5	125	125	25	25	25	25	25	50	50	50	125	125	50	70	50	70	70	50	85	85
B250P_BE/SE	40 – 160	**125**	-	-	-	5	5	5	5	5	125	125	25	25	25	25	25	36	36	36	125	125	50	50	50	70	70	50	85	85
	250		-	-	-	5	5	5	5	5	125	125	25	25	25	25	25	36	36	36	125	125	50	50	50	70	70	50	85	85
ZS250M	160	**65**	-	-	-	5	5	5	5	5	5	5	25	25	25	25	25	36	36	36	65	65	50	65	50	65	65	50	65	65
	250		-	-	-	5	5	5	5	5	5	5	25	25	25	25	25	36	36	36	65	65	50	65	50	65	65	50	65	65

Notes:

1) Downstream MCCB trip units can be TM, TF, FF, BE, BEG, SX, or SE types, unless it is specifically stated as being for one type only.
2) Upstream MCCB trip unit are to be electronic, BE, BEG, SX or SE types.

Selectivity table
MCCB to MCCB

(continued from previous page)

Selectivity tables

The tables below cover for electronic upstream MCCBs, in conjunction with Thermal Magnetic and Electronic downstream MCCBs, unless specifically stated.

The tables provide data to help with conducting selectivity studies and should be used with the study to ensure selectivity is maintained at Long Time and Short Time levels (time/current curve comparison).

Whenever there is a dash "-" refer to the selectivity study.

ELECTRONIC MCCBs			250 A			400 A							630 A					800 A, 1000 A							1250 A, 1600 A					2000 - 3200 A
SELECTIVITY @ 240 / 415 VAC			**P250F**	**P250N**	**P250H**	**P400E**	**P400F**	**P400N**	**P400H**	**P400S**	**B400P**	**B400R**	**P630E**	**P630F**	**P630N**	**P630H**	**P630S**	**B800N**	**B800H**	**B800G**	**B800P**	**B800R**	**B1000N**	**B1000H**	**B1250N**	**B1250H**	**B1250HL**	**B1600N**	**B1600HL**	**XS2000HL XS2500HL XS3200HL**
Downstream MCCB Trip unit[1]: TM, BE, SX, SE	**Trip unit (A)**	**I_{cu} kA**	**36**	**50**	**70**	**25**	**36**	**50**	**70**	**110**	**125**	**200**	**25**	**36**	**50**	**70**	**110**	**50**	**70**	**100**	**125**	**200**	**50**	**70**	**50**	**70**	**85**	**50**	**85**	**85**
P400E	250	**25**	-	-	-	-	-	-	-	-	-	-	10	10	10	10	10	25	25	25	25	25	25	25	25	25	25	25	25	25
	400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	25	25	25	25	25	25	25	25	25	25	25
P400F	250	**36**	-	-	-	-	-	-	-	-	-	-	10	10	10	10	10	25	25	25	25	25	30	30	36	36	36	36	36	36
	400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	25	25	25	30	30	36	36	36	36	36	36
P400N	250	**50**	-	-	-	-	-	-	-	-	-	-	10	10	10	10	10	25	25	25	25	25	30	30	36	36	36	50	50	50
	400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	25	25	25	30	30	36	36	36	50	50	50
P400H	250	**70**	-	-	-	-	-	-	-	-	-	-	10	10	10	10	10	25	25	25	25	25	30	30	36	36	36	50	50	70
	400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	25	25	25	30	30	36	36	36	50	50	70
P400S	250	**110**	-	-	-	-	-	-	-	-	-	-	10	10	10	10	10	25	25	25	25	25	30	30	36	36	36	50	50	85
	400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	25	25	25	30	30	36	36	36	50	50	85
B400P	250	**125**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	36	36	25	25	50	50	50	70	70	50	50	85
	400			-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	36	36	25	25	50	50	50	70	70	50	50	85
P630E		**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	25	25	25	36
P630F		**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	36	36	36	36	36
P630N	630	**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	36	36	50	50	36
P630H		**70**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	36	36	50	70	36
P630S		**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	85	36
B800F		**36**	-	-	-	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	36
B800N	630	**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	36
B800H	800	**70**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	36
B800P		**125**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	36
B1000N	1000	**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-
B1000H		**70**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-
B1250N	1250	**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-
B1250HL		**85**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	-
B1600N	1600	**50**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1600HL		**85**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1) Downstream MCCB trip units can be TM, TF, FF, BE, BEG, SX, or SE types, unless it is specifically stated as being for one type only.
2) Upstream MCCB trip unit are to be electronic, BE, BEG, SX or SE types.

Type 2 Coordination
50 kA @ 415 V, Circuit Breakers

For direct on line motor starting

Circuit breaker	Terasaki Tembreak Pro
Contactor	Sprecher+Schuh CA7 / CA9
Overload relay	Sprecher+Schuh CEP7 Electronic
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (Iq) :	50 kA (rms symetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination

Component selection table

Motor		Circuit breaker	Contactor	Overload relay		C/b instant trip amps and motor FLC	
Motor kW	**Motor amp ratings @ 400v**	**Mouled case circuit breaker**	**Contactor type**	**Overload relay (electronic)**	**Ampere setting range**	**C/B instant trip amps (± 20%)**	**Minimum trip amp multiple of motor FLC**
0.18	0.6	P160N2 / 20A TM	CA7-30	CEP 7 EEBB *	0.2 – 1.0	240	320
0.25	0.85	P160N2 / 20A TM	CA7-30	CEP 7 EEBB *	0.2 – 1.0	240	225
0.37	1.1	P160N2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	174
0.55	1.5	P160N2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	128
0.75	1.9	P160N2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	101
1.1	2.7	P160N2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	71.1
1.5	3.6	P160N2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	53.3
2.2	4.9	P160N2 / 20A TM	CA7-30	CEP 7 EEDB *	3.2 – 16	240	39.2
3	6.5	P160N2 / 20A TM	CA7-30	CEP 7 EEED	5.4 – 27	240	29.5
4	8.5	P160N2 / 20A TM	CA7-30	CEP 7 EEED	5.4 – 27	240	22.6
5.5	11.5	P160N2 / 20A TM	CA7-30	CEP 7 EEED	5.4 – 27	240	16.7
7.5	15.5	P160N2 / 32A TM	CA7-30	CEP 7 EEED	5.4 – 27	384	19.8
11	22	P160N2 / 32A TM	CA7-30	CEP 7 EEED	5.4 – 27	384	14.0
15	29	P160N2 / 50A TM	CA7-43	CEP 7 EEFD	9 – 45	600	16.6
18.5	35	P160N2 / 63A TM	CA7-43	CEP 7 EEFD	9 – 45	756	17.3
22	41	P160N2 / 63A TM	CA7-55	CEP 7 EEFD	9 – 45	756	14.8
30	55	P160N2 / 100A TM	CA7-72	CEP 7 EEGE	18 – 90	1200	17.5
37	66	P160N2 / 100A TM	CA7-85	CEP 7 EEGE	18 – 90	1200	14.5
45	80	P160N2 / 160A TM	CA9-116	CEP 7 EEHJ	30 – 150	1600	16.0
55	97	P250N / 160A TM	CA9-146	CEP 7 EEHJ	30 – 150	2080	17.2
75	132	P250N / 250A TM	CA9-190	CEP 7 EEJJ	40 – 200	2750	16.7
90	160	P400N / 250A BE	CA9-265	CEP 7 EEJJ *	40 – 200	3000	15.0
110	195	P400N / 400A BE	CA9-265	CEP 7 EEJJ *	40 – 200	4800	20.9
132	230	P400N / 400A BE	CA9-305	CTKIT400A	80 – 400	4800	17.7
150	260	P630N / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	22.7
160	280	P630N / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	21.0
185	325	P630N / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	18.1
200	350	P630N / 630A BE	CA9-460	CTKIT400A	80 – 400	6930	16.8
220	385	B800N / 630A BE	CA9-580	CTKIT400A	80 – 400	7560	16.7
250	430	B800N / 630A BE	CA9-580	CTKIT600A	120 – 600	7560	14.9
315	540	B800N / 800A BE	CA9-750	CTKIT600A	120 – 600	9600	15.1
355	610	B1000N / 1000A BE	CA9-750	CTKIT800A	160 – 800	10000	13.9
400	690	B1250N / 1250A BE	CA9-860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250N / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250N / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	15.0

Notes:

A) Recommended circuit breaker size based on the following starting conditions:
Starting currents approx. 7.5…8 x motor FLC. Start time approx.5 sec.
Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10mS, that will vary by motor make.
** Motor Starters 132kW and above, Kit utilises separate 5P10-5A Current Transformers with 193-EE*Z overload
* Overloads Separately mounted from contactor - 90 and 110kW starters, may use the CTKIT400A

B) Other
1) CEP7-EE overload add-on modules are available for: Profibus, DeviceNet, Ethernet, Ground Fault, Remote reset, Jam protection, Thermistor protection.
Only one module can be fitted at any one time on a CEP7-EE overload.

c) Note
1) Set circuit breaker Ir to 1 (=I_n), and Overload is set to motor FLC

Type 2 Coordination
50 kA @ 415 V, Circuit Breakers

For direct on line motor starting

Circuit breaker	Terasaki Tembreak Pro
Contactor	Sprecher+Schuh CA7 / CA9
Overload relay	Allen-Bradley 193-E3 Electronic E300 w-Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (Iq) :	50 kA (rms symetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination

Component selection table

Motor		Circuit breaker	Contactor	Overload relay		C/b instant trip amps and motor FLC	
Motor kW	**Motor amp ratings @ 400v**	**Mouled case circuit breaker**	**Contactor type**	**Overload relay (electronic)**	**Earth Leakage**	**C/B instant trip amps (± 20%)**	**Minimum trip amp multiple of motor FLC**
0.18	0.6	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	320
0.25	0.85	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	225
0.37	1.1	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	174
0.55	1.5	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	128
0.75	1.9	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	101
1.1	2.7	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	71.1
1.5	3.6	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	53.3
2.2	4.9	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	39.2
3	6.5	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	29.5
4	8.5	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	22.6
5.5	11.5	P160N2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	P160N2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	P160N2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
15	29	P160N2 / 50A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	600	16.6
18.5	35	P160N2 / 63A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	756	17.3
22	41	P160N2 / 63A TM	CA7-55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	P160N2 / 100A TM	CA7-72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	P160N2 / 100A TM	CA7-85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	P160N2 / 160A TM	CA9-116	193 E3-63-24D-IG-200A- # -ETR	Int.	1600	16.0
55	97	P250N / 160A TM	CA9-146	193 E3-63-24D-IG-200A- # -ETR	Int.	2080	17.2
75	132	P250N / 250A TM	CA9-190	193 E3-63-24D-IG-200A- # -ETR	Int.	2750	16.7
90	160	P400N / 250A BE	CA9-265	193 E3-63-24D-IG-200A- # -ETR	Int.	3000	15.0
110	195	P400N / 400A BE	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	4800	20.9
132	230	P400N / 400A BE	CA9-305	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P630N / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	22.7
160	280	P630N / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	21.0
185	325	P630N / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630N / 630A BE	CA9-460	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	B800N / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	16.7
250	430	B800N / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	14.9
315	540	B800N / 800A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1000N / 1000A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	10000	13.9
400	690	B1250N / 1250A BE	CA9-860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250N / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250N / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

Notes:

A) Recommended circuit breaker size based on the following starting conditions:
Starting currents approx. 7.5…8 x motor FLC. Start time approx.5 sec.
Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10mS, that will vary by make.
Motor Starters 132kW & above, require external 5P10-5A Current Transformers

B) E/L
– Int- Internal Ground Fault torroid in Sensing module – 500mA to 5 Amp
* to use External toroid, and/or Thermistor protection, -GP42- Control module is required
– Ext- External Ground Fault torroid via 193-CBCT – 20mA to 5 Amp

c) Other
1) 24D denotes 24V DC control voltage
– # - Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru
If Power and Voltage momitoring is required, change Sensing module to VIG versions

Type 2 Coordination
50 kA @ 415 V, Circuit Breakers

For direct on line motor starting

Circuit breaker	Terasaki Tembreak Pro
Contactor	Sprecher+Schuh CA7 / CA9
Overload relay	Allen-Bradley 193-EE Electronic
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (Iq) :	50 kA (rms symetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination

Component selection table

Motor		Circuit breaker	Contactor	Overload relay		C/b instant trip amps and motor FLC	
Motor kW	**Motor amp ratings @ 400v**	**Mouled case circuit breaker**	**Contactor type**	**Overload relay (electronic)**	**Ampere setting range**	**C/B instant trip amps (± 20%)**	**Minimum trip amp multiple of motor FLC**
0.18	0.6	P160N2 / 20A TM	100-C30	193- EEBB *	0.2 – 1.0	240	320
0.25	0.85	P160N2 / 20A TM	100-C30	193- EEBB *	0.2 – 1.0	240	225
0.37	1.1	P160N2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	174
0.55	1.5	P160N2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	128
0.75	1.9	P160N2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	101
1.1	2.7	P160N2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	71.1
1.5	3.6	P160N2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	53.3
2.2	4.9	P160N2 / 20A TM	100-C30	193- EEDB *	3.2 – 16	240	39.2
3	6.5	P160N2 / 20A TM	100-C30	193- EEED	5.4 – 27	240	29.5
4	8.5	P160N2 / 20A TM	100-C30	193- EEED	5.4 – 27	240	22.6
5.5	11.5	P160N2 / 20A TM	100-C30	193- EEED	5.4 – 27	240	16.7
7.5	15.5	P160N2 / 32A TM	100-C30	193- EEED	5.4 – 27	384	19.8
11	22	P160N2 / 32A TM	100-C30	193- EEED	5.4 – 27	384	14.0
15	29	P160N2 / 50A TM	100-C43	193- EEFD	9 – 45	600	16.6
18.5	35	P160N2 / 63A TM	100-C43	193- EEFD	9 – 45	756	17.3
22	41	P160N2 / 63A TM	100-C55	193- EEFD	9 – 45	756	14.8
30	55	P160N2 / 100A TM	100-C72	193- EEGE	18 – 90	1200	17.5
37	66	P160N2 / 100A TM	100-C85	193- EEGE	18 – 90	1200	14.5
45	80	P160N2 / 160A TM	100-E116	193- EEHJ	30 – 150	1600	16.0
55	97	P250N / 160A TM	100-E146	193- EEHJ	30 – 150	2080	17.2
75	132	P250N / 250A TM	100-E190	193- EEJJ	40 – 200	2750	16.7
90	160	P400N / 250A BE	100-E265	193- EEJJ *	40 – 200	3000	15.0
110	195	P400N / 400A BE	100-E265	193- EEJJ *	40 – 200	4800	20.9
132	230	P400N / 400A BE	100-E305	CTKIT400A	80 – 400	4800	17.7
150	260	P630N / 630A BE	100-E400	CTKIT400A	80 – 400	6930	22.7
160	280	P630N / 630A BE	100-E400	CTKIT400A	80 – 400	6930	21.0
185	325	P630N / 630A BE	100-E400	CTKIT400A	80 – 400	6930	18.1
200	350	P630N / 630A BE	100-E460	CTKIT400A	80 – 400	6930	16.8
220	385	B800N / 630A BE	100-E580	CTKIT400A	80 – 400	7560	16.7
250	430	B800N / 630A BE	100-E580	CTKIT600A	120 – 600	7560	14.9
315	540	B800N / 800A BE	100-E750	CTKIT600A	120 – 600	9600	15.1
355	610	B1000N / 1000A BE	100-E750	CTKIT800A	160 – 800	10000	13.9
400	690	B1250N / 1250A BE	100-E860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250N / 1250A BE	100-E1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250N / 1250A BE	100-E1060	CTKIT1000A	200 – 1000	15000	15.0

Notes:

A) Recommended circuit breaker size based on the following starting conditions:
Starting currents approx. 7.5…8 x motor FLC. Start time approx.5 sec.
Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10mS, that will vary by motor make.
** Motor Starters 132kW and above, Kit utilises separate 5P10-5A Current Transformers with 193-EE*Z overload
* Overloads Separately mounted from contactor - 90 and 110kW starters, may use the CTKIT400A

B) Other
1) 193-EE overload add-on modules are available for: Profibus, DeviceNet, Ethernet, Ground Fault, Remote reset, Jam protection, Thermistor protection
Only one module can be fitted at any one time on a 193-EE overload.

c) Note
2) Set circuit breaker set to Ir, and Overload is set to motor FLC

Type 2 Coordination
50 kA @ 415 V, Circuit Breakers

For direct on line motor starting

Circuit breaker	Terasaki Tembreak Pro
Contactor	Allen-Bradley 100-C / 100-E
Overload relay	Allen-Bradley 193-E3 Electronic E300 w-Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (Iq) :	50 kA (rms symetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination

Component selection table

Motor		Circuit breaker	Contactor	Overload relay		C/b instant trip amps and motor FLC	
Motor kW	**Motor amp ratings @ 400v**	**Mouled case circuit breaker**	**Contactor type**	**Overload relay (electronic)**	**Earth Leakage**	**C/B instant trip amps (± 20%)**	**Minimum trip amp multiple of motor FLC**
0.18	0.6	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	320
0.25	0.85	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	225
0.37	1.1	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	174
0.55	1.5	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	128
0.75	1.9	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	101
1.1	2.7	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	71.1
1.5	3.6	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	53.3
2.2	4.9	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	39.2
3	6.5	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	29.5
4	8.5	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	22.6
5.5	11.5	P160N2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	P160N2 / 32A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	P160N2 / 32A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
15	29	P160N2 / 50A TM	100-C43	193 E3-63-24D-IG-60A - # -ETR	Int.	600	16.6
18.5	35	P160N2 / 63A TM	100-C43	193 E3-63-24D-IG-60A - # -ETR	Int.	756	17.3
22	41	P160N2 / 63A TM	100-C55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	P160N2 / 100A TM	100-C72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	P160N2 / 100A TM	100-C85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	P160N2 / 160A TM	100-E116	193 E3-63-24D-IG-200A- # -ETR	Int.	1600	16.0
55	97	P250N / 160A TM	100-E146	193 E3-63-24D-IG-200A- # -ETR	Int.	2080	17.2
75	132	P250N / 250A TM	100-E190	193 E3-63-24D-IG-200A- # -ETR	Ext.	2750	16.7
90	160	P400N / 250A BE	100-E265	193 E3-63-24D-IG-200A- # -ETR	Ext.	3000	15.0
110	195	P400N / 400A BE	100-E265	193 E3-63-24D-IG-200A - # -ETR	Ext.	4800	20.9
132	230	P400N / 400A BE	100-E305	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P630N / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	22.7
160	280	P630N / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	21.0
185	325	P630N / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630N / 630A BE	100-E460	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	B800N / 630A BE	100-E580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	16.7
250	430	B800N / 630A BE	100-E580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	14.9
315	540	B800N / 800A BE	100-E750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1000N / 1000A BE	100-E750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	10000	13.9
400	690	B1250N / 1250A BE	100-E860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250N / 1250A BE	100-E1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250N / 1250A BE	100-E1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

Notes:

A) Recommended circuit breaker size based on the following starting conditions:
Starting currents approx. 7.5…8 x motor FLC. Start time approx.5 sec.
Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10mS, that will vary by motor make.
Motor Starters 132kW and above, require external 5P10-5A Current Transformers

B) E/L
– Int- Internal Ground Fault torroid in Sensing module – 500mA to 5 Amp
* to use External toroid, and/or Thermistor protection, -GP42- Control module is required
– Ext- External Ground Fault torroid via 193-CBCT – 20mA to 5 Amp

c) Other
2) 24D denotes 24V DC control voltage
– # – Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru
If Power and Voltage momitoring is required, change Sensing module to VIG versions

Type 2 Coordination
70 kA @ 415 V, Circuit Breakers

For direct on line motor starting

Circuit breaker	Terasaki Tembreak Pro
Contactor	Sprecher+Schuh CA7 / CA9
Overload relay	Sprecher+Schuh CEP7 Electronic
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (Iq) :	70 kA (rms symetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination

Component selection table

Motor		Circuit breaker	Contactor	Overload relay		C/b instant trip amps and motor FLC	
Motor kW	**Motor amp ratings @ 400v**	**Mouled case circuit breaker**	**Contactor type**	**Overload relay (electronic)**	**Ampere setting range**	**C/B instant trip amps (± 20%)**	**Minimum trip amp multiple of motor FLC**
0.18	0.6	P160H2 / 20A TM	CA7-30	CEP 7 EEBB *	0.2 – 1.0	240	320
0.25	0.85	P160H2 / 20A TM	CA7-30	CEP 7 EEBB *	0.2 – 1.0	240	225
0.37	1.1	P160H2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	174
0.55	1.5	P160H2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	128
0.75	1.9	P160H2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	101
1.1	2.7	P160H2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	71.1
1.5	3.6	P160H2 / 20A TM	CA7-30	CEP 7 EECB *	1.0 – 5.0	240	53.3
2.2	4.9	P160H2 / 20A TM	CA7-30	CEP 7 EEDB *	3.2 – 16	240	39.2
3	6.5	P160H2 / 20A TM	CA7-30	CEP 7 EEED	5.4 – 27	240	29.5
4	8.5	P160H2 / 20A TM	CA7-30	CEP 7 EEED	5.4 – 27	240	22.6
5.5	11.5	P160H2 / 20A TM	CA7-30	CEP 7 EEED	5.4 – 27	240	16.7
7.5	15.5	P160H2 / 32A TM	CA7-30	CEP 7 EEED	5.4 – 27	384	19.8
11	22	P160H2 / 32A TM	CA7-30	CEP 7 EEED	5.4 – 27	384	14.0
15	29	P160H2 / 50A TM	CA7-43	CEP 7 EEFD	9 – 45	600	16.6
18.5	35	P160H2 / 63A TM	CA7-43	CEP 7 EEFD	9 – 45	756	17.3
22	41	P160H2 / 63A TM	CA7-55	CEP 7 EEFD	9 – 45	756	14.8
30	55	P160H2 / 100A TM	CA7-72	CEP 7 EEGE	18 – 90	1200	17.5
37	66	P160H2 / 100A TM	CA7-85	CEP 7 EEGE	18 – 90	1200	14.5
45	80	P160H2 / 160A TM	CA9-116	CEP 7 EEHJ	30 – 150	1600	16.0
55	97	P250H / 160A TM	CA9-146	CEP 7 EEHJ	30 – 150	2080	17.2
75	132	P250H / 250A TM	CA9-190	CEP 7 EEJJ	40 – 200	2750	16.7
90	160	P400H / 250A BE	CA9-265	CEP 7 EEJJ *	40 – 200	3000	15.0
110	195	P400H / 400A BE	CA9-265	CEP 7 EEJJ *	40 – 200	4800	20.9
132	230	P400H / 400A BE	CA9-305	CTKIT400A	80 – 400	4800	17.7
150	260	P630H / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	22.7
160	280	P630H / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	21.0
185	325	P630H / 630A BE	CA9-400	CTKIT400A	80 – 400	6930	18.1
200	350	P630H / 630A BE	CA9-460	CTKIT400A	80 – 400	6930	16.8
220	385	B800H / 630A BE	CA9-580	CTKIT400A	80 – 400	7560	16.7
250	430	B800H / 630A BE	CA9-580	CTKIT600A	120 – 600	7560	14.9
315	540	B800H / 800A BE	CA9-750	CTKIT600A	120 – 600	9600	15.1
355	610	B1000H / 1000A BE	CA9-750	CTKIT800A	160 – 800	10000	13.9
400	690	B1250HL / 1250A BE	CA9-860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250HL / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250HL / 1250A BE	CA9-1060	CTKIT1000A	200 – 1000	15000	15.0

Notes:

A) Recommended circuit breaker size based on the following starting conditions:
Starting currents approx. 7.5…8 x motor FLC. Start time approx.5 sec.
Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10mS, that will vary by motor make.
** Motor Starters 132kW and above, Kit utilises separate 5P10-5A Current Transformers with 193-EE*Z overload
* Overloads Separately mounted from contactor - 90 and 110kW starters, may use the CTKIT400A

B) Other
1) CEP7-EE overload add-on modules are available for: Profibus, DeviceNet, Ethernet, Ground Fault, Remote reset, Jam protection, Thermistor protection
Only one module can be fitted at any one time on a CEP7-EE overload.

c) Note
3) Set circuit breaker set to I_r, and Overload is set to motor FLC

Type 2 Coordination
70 kA @ 415 V, Circuit Breakers

For direct on line motor starting

Circuit breaker	Terasaki Tembreak Pro
Contactor	Allen-Bradley 100-C / 100-E
Overload relay	Allen-Bradley 193-E3 Electronic E300 w-Ethernet/IP
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (Iq) :	70 kA (rms symetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination

Component selection table

Motor		Circuit breaker	Contactor	Overload relay		C/b instant trip amps and motor FLC	
Motor kW	**Motor amp ratings @ 400v**	**Mouled case circuit breaker**	**Contactor type**	**Overload relay (electronic)**	**Earth Leakage**	**C/B instant trip amps (± 20%)**	**Minimum trip amp multiple of motor FLC**
0.18	0.6	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	320
0.25	0.85	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	225
0.37	1.1	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	174
0.55	1.5	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	128
0.75	1.9	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	101
1.1	2.7	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	71.1
1.5	3.6	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	53.3
2.2	4.9	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	39.2
3	6.5	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	29.5
4	8.5	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	22.6
5.5	11.5	P160H2 / 20A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	P160H2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	P160H2 / 32A TM	CA7-30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
15	29	P160H2 / 50A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	600	16.6
18.5	35	P160H2 / 63A TM	CA7-43	193 E3-63-24D-IG-60A - # -ETR	Int.	756	17.3
22	41	P160H2 / 63A TM	CA7-55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	P160H2 / 100A TM	CA7-72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	P160H2 / 100A TM	CA7-85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	P160H2 / 160A TM	CA9-116	193 E3-63-24D-IG-200A- # -ETR	Int.	1600	16.0
55	97	P250H / 160A TM	CA9-146	193 E3-63-24D-IG-200A- # -ETR	Int.	2080	17.2
75	132	P250H / 250A TM	CA9-190	193 E3-63-24D-IG-200A- # -ETR	Int.	2750	16.7
90	160	P400H / 250A BE	CA9-265	193 E3-63-24D-IG-200A- # -ETR	Int.	3000	15.0
110	195	P400H / 400A BE	CA9-265	193 E3-63-24D-IG-200A - # -ETR	Int.	4800	20.9
132	230	P400H / 400A BE	CA9-305	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P630H / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	22.7
160	280	P630H / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	21.0
185	325	P630H / 630A BE	CA9-400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630H / 630A BE	CA9-460	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	B800H / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	16.7
250	430	B800H / 630A BE	CA9-580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	14.9
315	540	B800H / 800A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1000H / 1000A BE	CA9-750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	10000	13.9
400	690	B1250HL / 1250A BE	CA9-860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250HL / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250HL / 1250A BE	CA9-1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

Notes:

A) Recommended circuit breaker size based on the following starting conditions:
Starting currents approx. 7.5…8 x motor FLC. Start time approx.5 sec.
Premium efficiency motors include a current spike ranging 15 - 22 x FLC for 3 - 10mS, that will vary by motor make.
Motor Starters 132kW and above, require external 5P10-5A Current Transformers

B) E/L
– Int- Internal Ground Fault torroid in Sensing module – 500mA to 5 Amp
* to use External toroid, and/or Thermistor protection, -GP42- Control module is required
– Ext- External Ground Fault torroid via 193-CBCT – 20mA to 5 Amp

c) Other
2) 24D denotes 24V DC control voltage
– # – Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru
If Power and Voltage momitoring is required, change Sensing module to VIG versions

Type 2 Coordination
70 kA @ 415 V, Circuit Breakers

For direct on line motor starting

Circuit breaker	Terasaki Tembreak Pro
Contactor	Allen-Bradley 100-C / 100-E
Overload relay	Allen-Bradley 193-EE Electronic
Rated operational voltage	400 / 415V AC
Motor types	Premium Efficiency class: IE3
Rated conditional AC current (Iq) :	70 kA (rms symetrical)
Coordination type (AS / NZS 60947.4.1 - 2015)	Type 2 coordination

Component selection table

Motor		Circuit breaker	Contactor	Overload relay		C/b instant trip amps and motor FLC	
Motor kW	**Motor amp ratings @ 400v**	**Mouled case circuit breaker**	**Contactor type**	**Overload relay (electronic)**	**Ampere setting range**	**C/B instant trip amps (± 20%)**	**Minimum trip amp multiple of motor FLC**
0.18	0.6	P160H2 / 20A TM	100-C30	193- EEBB *	0.2 – 1.0	240	320
0.25	0.85	P160H2 / 20A TM	100-C30	193- EEBB *	0.2 – 1.0	240	225
0.37	1.1	P160H2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	174
0.55	1.5	P160H2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	128
0.75	1.9	P160H2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	101
1.1	2.7	P160H2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	71.1
1.5	3.6	P160H2 / 20A TM	100-C30	193- EECB *	1.0 – 5.0	240	53.3
2.2	4.9	P160H2 / 20A TM	100-C30	193- EEDB *	3.2 – 16	240	39.2
3	6.5	P160H2 / 20A TM	100-C30	193- EEED	5.4 – 27	240	29.5
4	8.5	P160H2 / 20A TM	100-C30	193- EEED	5.4 – 27	240	22.6
5.5	11.5	P160H2 / 20A TM	100-C30	193- EEED	5.4 – 27	240	16.7
7.5	15.5	P160H2 / 32A TM	100-C30	193- EEED	5.4 – 27	384	19.8
11	22	P160H2 / 32A TM	100-C30	193- EEED	5.4 – 27	384	14.0
15	29	P160H2 / 50A TM	100-C43	193- EEFD	9 – 45	600	16.6
18.5	35	P160H2 / 63A TM	100-C43	193- EEFD	9 – 45	756	17.3
22	41	P160H2 / 63A TM	100-C55	193- EEFD	9 – 45	756	14.8
30	55	P160H2 / 100A TM	100-C72	193- EEGE	18 – 90	1200	17.5
37	66	P160H2 / 100A TM	100-C85	193- EEGE	18 – 90	1200	14.5
45	80	P160H2 / 160A TM	100-E116	193- EEHJ	30 – 150	1600	16.0
55	97	P250H / 160A TM	100-E146	193- EEHJ	30 – 150	2080	17.2
75	132	P250H / 250A TM	100-E190	193- EEJJ	40 – 200	2750	16.7
90	160	P400H / 250A BE	100-E265	193- EEJJ *	40 – 200	3000	15.0
110	195	P400H / 400A BE	100-E265	193- EEJJ *	40 – 200	4800	20.9
132	230	P400H / 400A BE	100-E305	CTKIT400A	80 – 400	4800	17.7
150	260	P630H / 630A BE	100-E400	CTKIT400A	80 – 400	6930	22.7
160	280	P630H / 630A BE	100-E400	CTKIT400A	80 – 400	6930	21.0
185	325	P630H / 630A BE	100-E400	CTKIT400A	80 – 400	6930	18.1
200	350	P630H / 630A BE	100-E460	CTKIT400A	80 – 400	6930	16.8
220	385	B800H / 630A BE	100-E580	CTKIT400A	80 – 400	7560	16.7
250	430	B800H / 630A BE	100-E580	CTKIT600A	120 – 600	7560	14.9
315	540	B800H / 800A BE	100-E750	CTKIT600A	120 – 600	9600	15.1
355	610	B1000H / 1000A BE	100-E750	CTKIT800A	160 – 800	10000	13.9
400	690	B1250HL / 1250A BE	100-E860	CTKIT1000A	200 – 1000	15000	18.5
450	770	B1250HL / 1250A BE	100-E1060	CTKIT1000A	200 – 1000	15000	16.6
500	850	B1250HL / 1250A BE	100-E1060	CTKIT1000A	200 – 1000	15000	15.0

Notes:

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* Overloads Separately mounted from contactor - 90 and 110kW starters, may use the CTKIT400A

B) Other
1) 193-EE overload add-on modules are available for: Profibus, DeviceNet, Ethernet, Ground Fault, Remote reset, Jam protection, Thermistor protection
Only one module can be fitted at any one time on a 193-EE overload.

c) Note
4) Set circuit breaker set to I_r, and Overload is set to motor FLC

Type 2 Coordination
70 kA @ 415 V, Circuit Breakers

For direct on line motor starting

Circuit breaker	Terasaki Tembreak Pro
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0.55	1.5	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	128
0.75	1.9	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	101
1.1	2.7	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	71.1
1.5	3.6	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	53.3
2.2	4.9	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	39.2
3	6.5	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	29.5
4	8.5	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	22.6
5.5	11.5	P160H2 / 20A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	240	16.7
7.5	15.5	P160H2 / 32A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	19.8
11	22	P160H2 / 32A TM	100-C30	193 E3-63-24D-IG-30A - # -ETR	Int.	384	14.0
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22	41	P160H2 / 63A TM	100-C55	193 E3-63-24D-IG-60A - # -ETR	Int.	756	14.8
30	55	P160H2 / 100A TM	100-C72	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	17.5
37	66	P160H2 / 100A TM	100-C85	193 E3-63-24D-IG-100A - # -ETR	Int.	1200	14.5
45	80	P160H2 / 160A TM	100-E116	193 E3-63-24D-IG-200A- # -ETR	Int.	1600	16.0
55	97	P250H / 160A TM	100-E146	193 E3-63-24D-IG-200A- # -ETR	Int.	2080	17.2
75	132	P250H / 250A TM	100-E190	193 E3-63-24D-IG-200A- # -ETR	Ext.	2750	16.7
90	160	P400H / 250A BE	100-E265	193 E3-63-24D-IG-200A- # -ETR	Ext.	3000	15.0
110	195	P400H / 400A BE	100-E265	193 E3-63-24D-IG-200A - # -ETR	Ext.	4800	20.9
132	230	P400H / 400A BE	100-E305	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	4800	17.7
150	260	P630H / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	22.7
160	280	P630H / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	21.0
185	325	P630H / 630A BE	100-E400	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	18.1
200	350	P630H / 630A BE	100-E460	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	6930	16.8
220	385	B800H / 630A BE	100-E580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	16.7
250	430	B800H / 630A BE	100-E580	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	7560	14.9
315	540	B800H / 800A BE	100-E750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	9600	15.1
355	610	B1000H / 1000A BE	100-E750	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	10000	13.9
400	690	B1250HL / 1250A BE	100-E860	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	18.5
450	770	B1250HL / 1250A BE	100-E1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	16.6
500	850	B1250HL / 1250A BE	100-E1060	193 E3-GP42-24D-I-30A -E3T -ETR	Ext.	15000	15.0

Notes:

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B) E/L
– Int- Internal Ground Fault torroid in Sensing module – 500mA to 5 Amp
* to use External toroid, and/or Thermistor protection, -GP42- Control module is required
– Ext- External Ground Fault torroid via 193-CBCT – 20mA to 5 Amp

c) Other
2) 24D denotes 24V DC control voltage
– # – Specify Contactor mount, or E3T / T for separate DIN mount, or P for Pass Thru
If Power and Voltage momitoring is required, change Sensing module to VIG versions


ON I
In 630 A
SMART
Isd (x Ir)
OFF PICK UP
PTA
Ir (A)
READY
630A
TEST IN

TemBreak Pro trip unit

TemBreak PRO trip units can handle overcurrent protection, measurement and circuit configuration – all in one device.

All TemBreak Pro MCCBs have built-in trip units (not removable) which ensures quality control and guarantees performance.

The communications, configuration and display modules allow remote access to these functions.

- **Save energy**
- **Measurements:** voltage, current, power, energy, power factor, frequency, demand, THD.
- **"Set and forget"**
- **Adjust to the nearest ampere**
- **Easy product interaction**

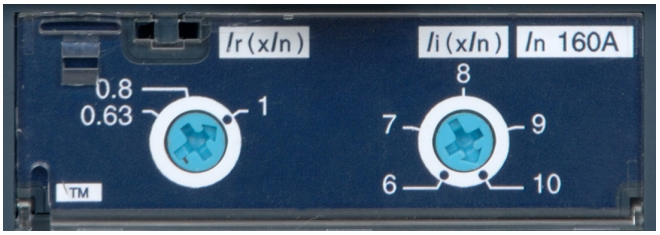
TemBreak Pro **White label Thermal Magnetic**

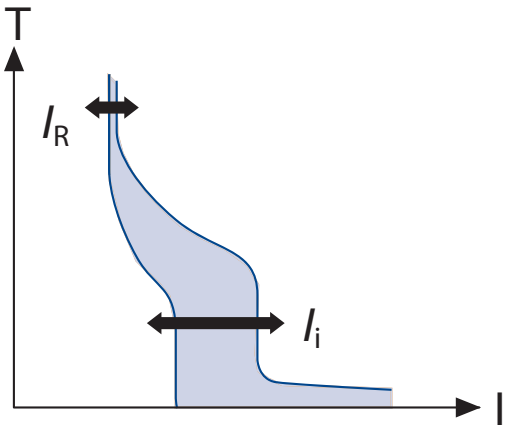
TemBreak PRO Moulded Case Circuit Breakers with a white label are available with Thermal Magnetic trip units in ratings from 20 A to 800 A.

The trip units are easy to adjust, as they come as standard with a thermal current adjustment dial I_r and a magnetic/ instantaneous adjustment dial I_i.

Simply select the current rating via a dial adjustment. An adjustable magnetic characteristic allows short circuit protection to be matched to the load and supply characteristics, for example motor inrush currents or generator short circuit currents.

Lowering the short circuit tripping threshold can allow a higher earth-loop impedance in an installation and provide end-of-cable protection with the correct disconnection times.





Thermal Magnetic trip unit type codes

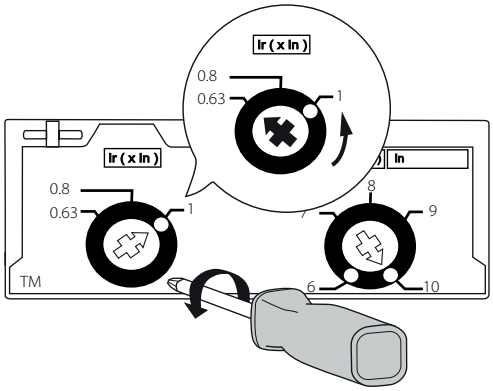
The trip unit type codes are imbedded into the part numbers of the MCCBs.

TF	Adj Thermal with Fix Magnetic
FF	Fix Thermal with Fix Magnetic
TM	Adj Thermal with Adj Magnetic

Thermal element adjustment

I_r is the thermal element adjustment dial and is used to set the rated current to match the conductor rating. I_R can be set between 0.63 and 1.0 times I_N.

The thermal element adjustment is continuously adjustable (no increments).



Magnetic element adjustment

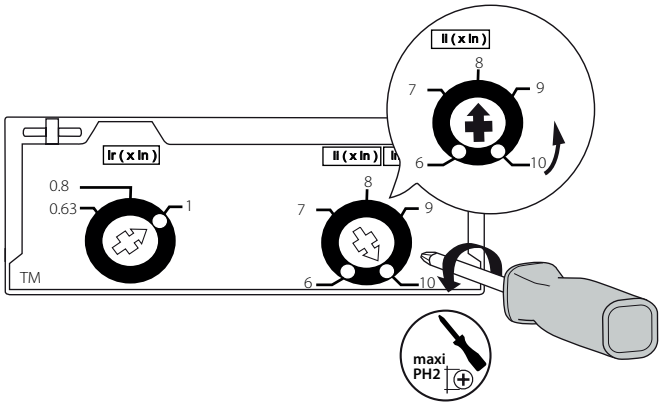
Ii is the magnetic element adjustment dial and is used to set the short circuit tripping threshold to suit the application. There are 2 setting dial types.

- MCCBs have a continuously adjustable magnetic setting, with no increments, shown as being a range.

  eg. 6 – 12 x I_n

- MCCBs have adjustments of set increments, such as those shown.

  eg. 6 – 8 – 10 – 13 x I_n



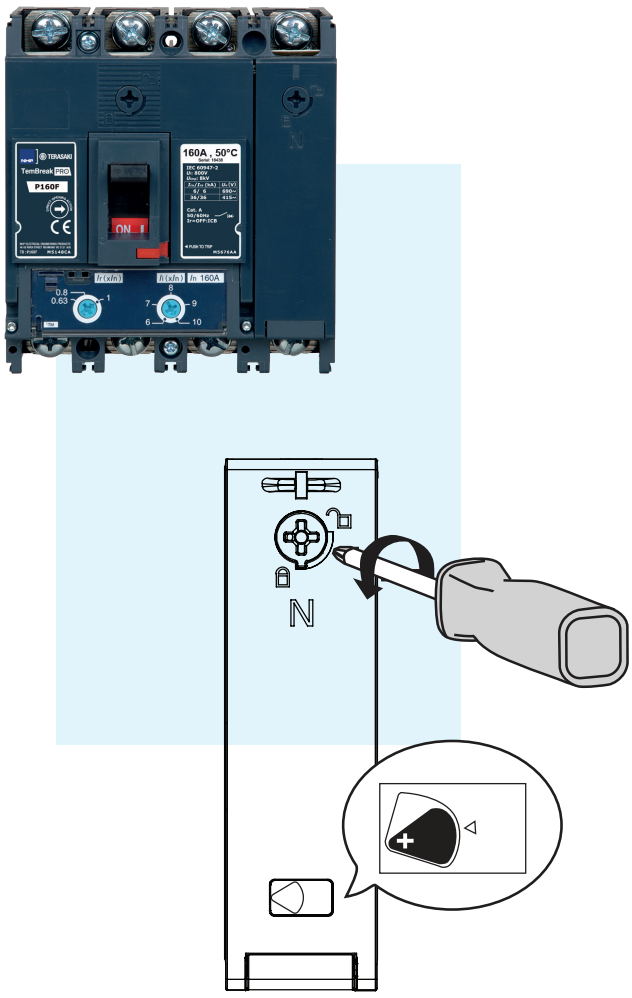
Neutral pole protection - Thermal Magnetic

Neutral pole protection is available as standard with 4 pole Thermal Magnetic MCCBs (P160, P250, P400 and P630).

A selector switch is provided in the N-pole which allows the thermal Long Time Delay to be switched OFF or ON.

N-pole instantaneous (I_i) tripping will remain ON at all times. In general, the thermal and magnetic elements in the neutral pole are related to the settings in the phase poles as follows:

	Phase trip threshold	Neutral trip threshold	N pole switch
Thermal trip	I_r (adjustable)	I_N (adjustable)= I_n	ON / OFF Switch
Magnetic trip	I_i (adjustable)	I_i (adjustable)	ON at all times



Neutral pole protection

B800, B1000, B1250, B1600 MCCBs

- B800 Thermal Magnetic 4 pole MCCBs offer N-pole protection as an option

The neutral pole time delay characteristic is identical to the main phases overload characteristic.

Thermal Magnetic settings

MCCB Type	kA Rating Code	Rated Current I_n (A)	Adjustable Thermal	Thermal Adjustment I_R	Adjustable Magnetic	Magnetic Adjustment in Set Increments	Magnetic Trip Current I_i (A) (Range Min-Max or Increment Values)
L125	PJ	20, 32, 50, 63, 100, 125	✔	0.63 to 1.0	✔	—	6 – 12 x I_n
A160_FF	E	16 – 125	—	—	—	—	Fixed 13 x I_n
A160_TF	E, F	25, 40	✔	0.63 to 1.0	—	—	Fixed 600 A magnetic
		63, 80	✔	0.63 to 1.0	—	—	Fixed 1000 A magnetic
		100, 125	✔	0.63 to 1.0	—	—	Fixed 1500 A magnetic
		160	✔	0.63 to 1.0	—	—	Fixed 1600 A magnetic
P160_FF	F	15 – 125	—	—	—	—	15 A to 100 A: 12 x I_N, 125 A: 13 x I_n
P160	F, N, H	20, 32, 50, 100, 125	✔	0.63 to 1.0	✔	✔	6 – 8 – 10 – 12 x I_n
		63	✔	0.8 to 1.0	✔	✔	6 – 8 – 10 – 12 x I_n
		160	✔	0.63 to 1.0	✔	✔	6 – 7 – 8 – 9 – 10 x I_n
B160_FF	E	16 – 160	—	—	—	—	Fixed 12 x I_n
B160	P, R	20, 32, 50, 63, 100, 125	✔	0.63 to 1.0	✔	—	6 – 12 x I_n
		160	✔	0.63 to 1.0	✔	—	6 – 13 x I_n
A250	E	100, 125, 160	✔	0.63 to 1.0	✔	✔	6 – 7 – 8 – 9 – 10 – 11 – 13 x I_n
		250	✔	0.63 to 1.0	✔	✔	5 – 6 – 7 – 8 – 9 – 10 – 11 x I_n
A250	F	160	✔	0.63 to 1.0	✔	✔	6 – 7 – 8 – 9 – 10 – 11 – 13 x I_n
		250	✔	0.63 to 1.0	✔	✔	5 – 6 – 7 – 8 – 9 – 10 – 11 x I_n
P250	F, N, H	50, 63, 100, 125, 160	✔	0.63 to 1.0	✔	✔	6 – 8 – 10 – 13 x I_n
		250	✔	0.63 to 1.0	✔	✔	6 – 7 – 8 – 9 – 10 x I_n
B250	P, R	250	✔	0.63 to 1.0	✔	—	6 – 10 x I_n
P400	E, F, N, H, S	250, 400	✔	0.63 to 1.0	✔	✔	5 –6 – 7 – 8 – 9 – 10 x I_n
P630	E, F, N, H, S	630	✔	0.63 to 1.0	✔	✔	4 –5 – 6 – 7 – 8 x I_n
B800	F, N, H	630, 800	✔	0.63 to 1.0	✔	—-	5 – 10 x I_n

Thermal Magnetic features

Protection Relay Features	Protection Relay	TM	TM	TM	TM	TM	TM	TM
	MCCB Cat No Prefix	A160 P160	A160	P160	A250 P250	P400	P630	B800
	MCCB Cat No OCR Code	FF	TF	TM	TM	TM	TM	TM
OCR Sealing	Sealable hinged clear OCR cover	—	✔	✔	✔	✔	✔	✔
Protection	Adjustable T	—	✔	✔	✔	✔	✔	✔
	Adjustable M	—	—	✔	✔	✔	✔	✔
	Adjustable N (4P)	—	—	✔	✔	✔	✔	✔
	Adjustable L	—	—	—	—	—	—	—
	Thermal memory / hot - cold start	—	—	—	—	—	—	—
	Adjustable S	—	—	—	—	—	—	—
	Adjustable I	—	—	—	—	—	—	—
	Instantaneous only ICB	—	—	—	—	—	—	—
	Fixed G	—	—	—	—	—	—	—
	Adjustable G	—	—	—	—	—	—	—
	ZSI	—	—	—	—	—	—	—
Alarms	Fixed PTA	—	—	—	—	—	—	—
	Adjustable PTA	—	—	—	—	—	—	—
	Temperature	—	—	—	—	—	—	—
	Custom	——	—	—	—	—	—	—
Contacts	PTA	—	—	—	—	—	—	—
	OAC	—	—	—	—	—	—	—
	SS	—	—	—	—	—	—	—
	AUX	—	O	O	O	O	O	O
	AL	—	O	O	O	O	O	O
Comms	TemCom PRO comms module	—	—	—	—	—	—	—
Display	TemView PRO remote display	—	—	—	—	—	—	—
Tools	TemTest PRO OCR checker	—	—	—	—	—	—	—
Monitoring	Autotest	—	—	—	—	—	—	—
	Event log	—	—	—	—	—	—	—
Measurement	U, V, I, P, E, PF, F, THD, DEMAND	—	—	—	—	—	—	—

✔ = Standard O = Optional — = Not available

Abbreviation key

Protection	**T**	Thermal overload protection
	M	Magnetic short circuit protection
	L	Electronic overload protection, time delayed
	S	Electronic short circuit protection, time-delayed
	I	Electronic short circuit protection, instantaneous
	ICB	Instantaneous only Circuit Breaker
	G	Electronic ground-fault protection, time delayed
	N	Neutral pole protection,
	ZSI	Zone selective interlocking, compatible with TemPower 2 ACB • Alarms: PTA Pre-Trip
	PTA	Pre-trip alarm, time delayed
Contacts	**OAC**	OAC Assignable alarm output contact
	AUX	AUX Status output contact
	AL	AL Trip alarm output contact
	SS	SS Smart switch digital outputs

Measurement	**U**	Phase voltage
	V	Line voltage
	I	Line current
	P	Power
	E	Energ
	PF	Power factor
	F	Frequency
	THD	Total harmonic distortion
	DEMAND	Periodic maxima for current, real power, apparent power and reactive power

TemBreak Pro
Grey label
Basic Electronic

TemBreak PRO Moulded Case Circuit Breakers with a grey label are available with Basic Electronic trip units.

P Model Basic Electronic MCCBs 16A to 630A: P_BE

P model Basic Electronic MCCBs with trip unit type P_BE offer flexibility via individual setting capability for Long Time, Short Time and Instantaneous and Ground Fault characteristics, as well as many other standard or optional features. Settings include instantaneous-only, while standard LED indicators are: trip unit over temperature, PTA, ready and pick-up.

B Model Basic Electronic MCCBs 16A to 1600A: B_BE

B model Basic Electronic MCCBs with trip unit type B_BE provide LSI overload protection for overloads and short circuits. The trip unit consist of a standard 2 dial type (yellow coloured dials) and feature a base current adjustment dial, and the choice of up to 10 standard characteristic curves (B400_BE to B1600_BE), or 8 dials for 250AF MCCBs (B250_BE). 2 dial electronic MCCBs include as standard, an instantaneous only characteristic which can assist in some grading or motor start applications. Ground fault protection is optional, and 4 pole versions include neutral pole protection as standard.

XS Model Basic Electronic MCCBs 2000A to 3200A: XS_BE

XS model Basic Electronic MCCBs with trip unit type XS_BE consist of a flexible 5 dial type, which allow adjustment of all parts of the characteristic curve Long Time, Short Time and Instantaneous settings. Ground fault protection is available for current ratings 2000A/2500A.

Basic Electronic trip unit type code

The trip unit type codes are imbedded into the part numbers of the MCCBs.

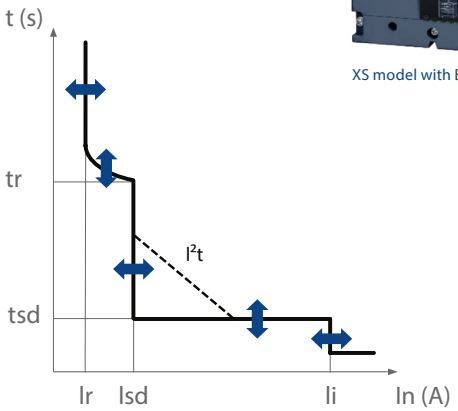
BE	basic electronic
BEG	basic electronic + ground fault protection

B model with BE trip unit

P model with BEG trip unit

P model with BE trip unit

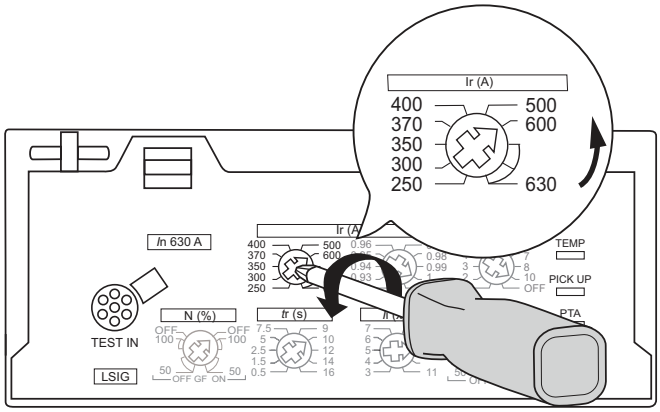
XS model with BE trip unit



LSI / LSIG adjustment (P model shown)

Settings can be performed using a Philips head or flat blade screwdriver as shown to the right.

The settings are adjustable in set increments, as per the dial markings on the trip unit facia.



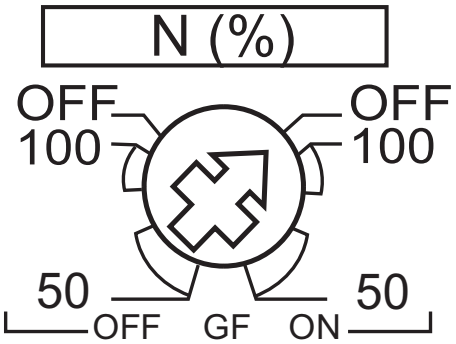
Neutral pole protection – Basic Electronic

Neutral pole protection – P160, P250, P400 and P630 MCCBs

Neutral pole protection is available as standard with 4 pole basic electronic MCCBs.

It is particularly useful when the cross-section of the neutral conductor is reduced in relation to the phase conductors. Neutral protection uses the Long Time delay, Short Time delay and Instantaneous protection parameters.

Note that for 4 pole "BE" LSIG MCCBs that have both ground fault and neutral pole protection, the standard GF dial is replaced with the dial type shown on the right, which can switch GF OFF and ON, and set NP protection levels between 50% and 100%, or to OFF.

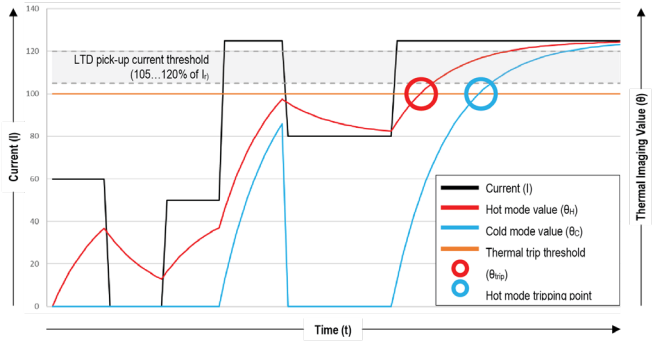


Thermal imaging – Basic Electronic

P160, P250, P400 and P630 basic electronic MCCBs have a thermal imaging function.

This function models the heating and cooling of electrical conductors. It allows the MCCB to protect conductors against current overload taking into account the thermal state of these conductors.

- In the presence of current, electronic trip units model the heating of conductors.
- In the absence of current, the electronic trip units model the cooling of the conductors.



Basic Electronic features

Protection Relay Features	Protection Relay	BE	BE	BE	BE	BE
	MCCB Cat No Prefix	P160, P250, P400, P630	P160, P250, P400, P630	B250	B400, B800, B1000, B1250, B1600	XS2000HL XS2500HL XS3200HL
	MCCB Cat No OCR Code	BE	BEG	BE	BE	BE
	MCCB OCR type designation	P_BE	P_BEG	B_BE	B_BE	XS_BE
	Number of dials	6	7	2	2	5 (7 for GF)
OCR Sealing	Sealable hinged clear OCR cover	✔	✔	O	✔	O
Protection	Neutral protection N (4P)	✔	✔	O	O	—
	Adjustable N (4P)	✔	✔	—	—	—
	Fixed characteristic curve selection	—	—	✔	✔	—
	Adjustable L	✔	✔	✔	✔	✔
	Thermal memory / hot-cold start	O	O	—	—	—
	Adjustable S	✔	✔	—	—	✔
	Adjustable I	✔	✔	—	—	✔
	Instantaneous only ICB	✔	✔	✔	✔	—
	Fixed G	—	—	—	O	O
	Adjustable G	—	✔	—	—	—
	ZSI	—	—	—	—	—
Alarms	Fixed PTA	✔	✔	✔	✔	—
	Adjustable PTA	—	—	—	—	✔
	Temperature	✔	✔	—	—	—
	Custom	—	—	—	—	—
Contacts	PTA	✔	✔	O	O	O
	OAC	✔	✔	—	—	—
	SS	—	—	—	—	—
	AUX	O	O	O	O	O
	AL	O	O	O	O	O
Comms	TemCom PRO comms module	—	—	—	—	—
Display	TemView PRO remote display	—	—	—	—	—
Tools	TemTest PRO OCR checker	O	O	—	—	—
	TNS2 OCR checker	—	—	✔	✔	✔
Monitoring	Autotest	—	—	—	—	—
	Event log	—	—	—	—	—
Measurement	U, V, I, P, E, PF, F, THD, DEMAND	—	—	—	—	—
Contact status	ON OFF TRIP status via comms	—	—	—	—	—

✔ = Standard O = Optional — = Not available

Abbreviation key

Protection	**T**	Thermal overload protection
	M	Magnetic short circuit protection
	L	Electronic overload protection, time delayed
	S	Electronic short circuit protection, time-delayed
	I	Electronic short circuit protection, instantaneous
	ICB	Instantaneous only Circuit Breaker
	G	Electronic ground-fault protection, time delayed
	N	Neutral pole protection,
	ZSI	Zone selective interlocking, compatible with TemPower 2 ACB • Alarms: PTA Pre-Trip
	PTA	Pre-trip alarm, time delayed
Contacts	**OAC**	OAC Assignable alarm output contact
	AUX	AUX Status output contact
	AL	AL Trip alarm output contact
	SS	SS Smart switch digital outputs

Measurement	**U**	Phase voltage
	V	Line voltage
	I	Line current
	P	Power
	E	Energ
	PF	Power factor
	F	Frequency
	THD	Total harmonic distortion
	DEMAND	Periodic maxima for current, real power, apparent power and reactive power

Basic Electronic settings for P model

MCCB models and trip unit ampere ratings

	Trip Unit Ratings					
MCCB Types	40 A	100 A	160 A	250 A	400 A	630 A
P160	✔	✔	✔	—	—	—
P250	✔	✔	✔	✔	—	—
P400	—	—	—	✔	✔	—
P630	—	—	—	—	—	✔

OCR adjustments grouped by adjustment type

Figures in **BOLD** represent factory default settings

L - Long Time Protection	I_r (Tripping Between 1.05 and 1.20 x I_r)	
I_r1 (A) I_n =	40 A trip unit	16 – 18 – 20 – 22 – 25 – 28 – 32 – 34 – 37 – **40**
	100 A trip unit	40 – 45 – 50 – 57 – 63 – 72 – 80 – 87 – 93 – **100**
	160 A trip unit	63 – 70 – 80 – 90 – 100 – 110 – 125 – 135 – 150 – **160**
	250 A trip unit	90 – 100 – 110 – 125 – 140 – 160 – 180 – 200 – 225 – **250**
	400 A trip unit	160 – 180 – 200 – 225 – 250 – 300 – 350 – 370 – **400**
	630 A trip unit	250 – 300 – 350 – 370 – 400 – 500 – 600 – **630**
I_r2 fine tuning		0.92 - 0.93 - 0.94 - 0.95 - 0.96 - 0.97 - 0.98 - 0.99 – **1.0** – OFF
t_r (precision -21% / + 1%)		t_r (s) 6 x I_r 0.5 - 1.5 - 2.5 - **5** - 7.5 – 09 / 10 / 12 – 14 – 16

S - Short Time Protection	I_{sd} (Accuracy: -10 % to +10%)				
Setting I_{sd} = I_r x ...	OFF - 1.5 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - **10**				
t_{sd} (ms) to 10 x I_r and I^2t OFF	50	**100**	200	300	400
t_{sd} (ms) to 10 x I_r and I^2t ON	50	**100**	200	300	400
Non-trip time (ms)	20	80	180	280	380
Maximum breaking time (ms)	80	150	250	350	450

I - Instantaneous Protection	I_i (Accuracy: -15 % to +15%)
I_n = 40 A; 100 A: I_i (x I_n)	3 – 4 – 5 – 6 – 7 – 8 – 10 – 12 – **15**
I_n = 160 A; 250 A: I_i (x I_n)	3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 - **11**
I_n = 250 (400 / 630 AF) A; 400 A: I_i (x I_n)	3 – 4 – 5 – 6 – 7 – 8 – 10 – 11 - **12**
I_n = 630 A: I_i (x I_n)	3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 – **11**
Delay (ms)	fixed
Non-trip time (ms)	10
Maximum breaking time (ms)	50

Setting the Neutral (4P Only)	
Neutral protection (I_r, I_{sd}) ... x	OFF - 50 % - **100 %**
Neutral Instantaneous protection I_i	Same as the phases
Delay	Same as t_r, and instant t_{sd}

G - Protection Ground Fault	I_g (Accuracy: -10 % to +10 %)
I_g = I_n x ...	OFF or **ON:** 40 % for I_n = 40 A; 20 % I_n > 40 A
Delay (ms)	200 (fixed); I^2t activated according I_{sd} I^2t
Time non-trip (ms)	180
Maximum breaking time (ms)	250

For B model and XS model settings, please refer to the NHP Circuit Protection Hand Book.

TemBreak Pro **Blue label SMART Electronic**

TemBreak PRO Moulded Case Circuit Breakers with a blue label are available with SMART Electronic trip units.

P model SMART Electronic MCCBs 16A to 630A: P_SE

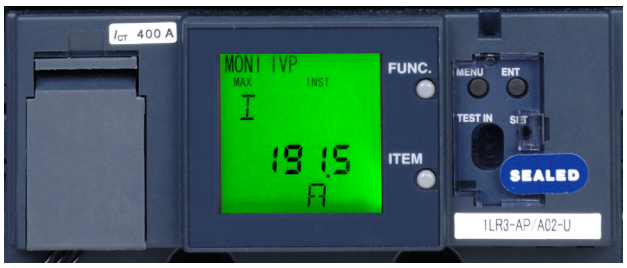
P model SMART Electronic MCCBs with trip unit type P_SE, in addition to protecting against overloads and short circuits, offer flexibility via individual setting capability for Long Time, Short Time, Instantaneous and Ground Fault characteristics, as well as a host of other standard or optional features. This allows for improved selectivity combinations between MCCBs or other circuit breaker types, plus a wide range of electrical measurement and communication functions via the P_SE SMART Metering MCCB range.

P_SE SMART trip unit

B model SMART Electronic MCCBs 100A to 1000A: B_SE and B_SX

B model SMART Electronic MCCBs with trip unit type B_SE or B_SX, 400AF to 1000AF consists of a meter built into the MCCB and offers flexible adjustment of the characteristic curve Long Time, Short Time and Instantaneous settings. Settings are entered via a menu system in the integral meter.

Trip unit P_SE, B_SE and B_SX offer industrial communication options.

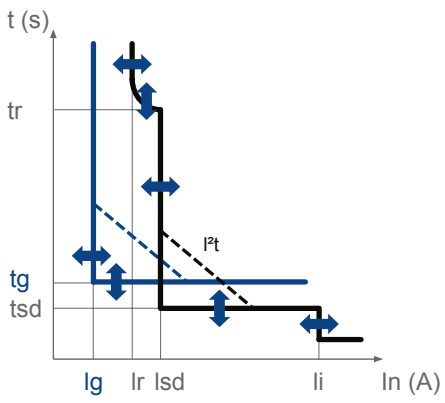


B_SE / B_SX SMART trip unit

SMART Electronic trip unit type code

The trip unit type codes are imbedded into the part numbers of the MCCBs.

SE	SMART electronic (energy meter type)
SX	SMART electronic (amp meter type in B model only)



SMART Electronic features

Protection Relay Features	Protection Relay	LSIG SMART	LSI + amp meter	LSIG + energy-meter
	MCCB Cat No Prefix	P160, P250, P400, P630	B400, B800, B1000	B250, B400, B800, B1000
	MCCB Cat No OCR Code	SE	SX	SE
	MCCB OCR type designation	P_SE	B_SX	B_SE
	Number of dials	1 or 2 dials and display	Display only	Display only
OCR Sealing	Sealable hinged clear OCR cover	✔	✔	✔
Protection	Neutral protection N (4P)	✔	O	✔
	Adjustable N (4P)	✔	✔	✔
	Fixed characteristic curve selection	—	—	—
	Adjustable L	✔	✔	✔
	Thermal memory / hot-cold start	✔	✔	✔
	Adjustable S	✔	✔	✔
	Adjustable I	✔	✔	✔
	Instantaneous only ICB	—	—	—
	Fixed G	—	—	—
	Adjustable G	✔	—	✔
	ZSI	✔	—	✔
Alarms	Fixed PTA	—	—	—
	Adjustable PTA	✔	✔	✔
	Temperature	✔	—	—
	Custom	✔	—	✔
Contacts	PTA	✔	—	—
	OAC	✔	—	—
	SS	O	—	—
	MCCB ON OFF TRIP status via comms	O	—	—
	AUX	O	O	O
	AL	O	O	O
Comms	TemCom PRO comms module	O	—	—
	Communications direct from MCCB	—	—	✔
Display	Display built into MCCB	✔	✔	✔
	T2ED remote display	—	—	O
	TemView PRO remote display	O	—	—
Tools	TemTest PRO OCR checker	O	—	—
	TNS2 OCR checker	—	O	O
Monitoring	Autotest	✔	—	—
	Event log	✔	—	✔
Measurement	U, V, I, P, E, PF, F, THD, DEMAND	✔	—	✔
	Line current I	✔	✔	✔

✔ = Standard O = Optional — = Not available

Abbreviation key

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	M	Magnetic short circuit protection
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	G	Electronic ground-fault protection, time delayed
	N	Neutral pole protection,
	ZSI	Zone selective interlocking, compatible with TemPower 2 ACB • Alarms: PTA Pre-Trip
	PTA	Pre-trip alarm, time delayed
Contacts	**OAC**	OAC Assignable alarm output contact
	AUX	AUX Status output contact
	AL	AL Trip alarm output contact
	SS	SS Smart switch digital outputs

Measurement	**U**	Phase voltage
	V	Line voltage
	I	Line current
	P	Power
	E	Energ
	PF	Power factor
	F	Frequency
	THD	Total harmonic distortion
	DEMAND	Periodic maxima for current, real power, apparent power and reactive power

SMART Electronic settings for P model

MCCB models and trip unit ampere ratings

	Trip Unit Ratings					
MCCB Types	40 A	100 A	160 A	250 A	400 A	630 A
P160	✔	✔	✔	—	—	—
P250	✔	✔	✔	✔	—	—
P400	—	—	—	✔	✔	—
P630	—	—	—	—	—	✔

OCR adjustments grouped by adjustment type

Figures in **BOLD** represent factory default settings

L - Long Time Protection	I_r (Tripping Between 1.05 and 1.20 x I_r)	
I_r1 (A) I_n =	40 A trip unit	16 – 18 – 20 – 22 – 25 – 28 – 32 – 34 – 37 – **40**
	100 A trip unit	40 – 45 – 50 – 57 – 63 – 72 – 80 – 87 – 93 – **100**
	160 A trip unit	63 – 70 – 80 – 90 – 100 – 110 – 125 – 135 – 150 – **160**
	250 A trip unit	90 – 100 – 110 – 125 – 140 – 160 – 180 – 200 – 225 – **250**
	400 A trip unit	160 – 180 – 200 – 225 – 250 – 300 – 350 – 370 – **400**
	630 A trip unit	250 – 300 – 350 – 370 – 400 – 500 – 600 – **630**
I_r2 fine tuning		0.92 - 0.93 - 0.94 - 0.95 - 0.96 - 0.97 - 0.98 - 0.99 – **1.0** – OFF
t_r (precision -21% / + 1%)		t_r (s) 6 x I_r 0.5 - 1.5 - 2.5 - **5** - 7.5 – 09 / 10 / 12 – 14 – 16

S - Short Time Protection	I_{sd} (Accuracy: -10% to +10%)				
Setting I_{sd} = I_r x ...	OFF - 1.5 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - **10**				
t_{sd} (ms) to 10 x I_r and I^2t OFF	50	**100**	200	300	400
t_{sd} (ms) to 10 x I_r and I^2t ON	50	**100**	200	300	400
Non-trip time (ms)	20	80	180	280	380
Maximum breaking time (ms)	80	150	250	350	450

I - Instantaneous Protection	I_i (Accuracy: -15% to +15%)
I_n = 40 A; 100 A: I_i (x I_n)	3 – 4 – 5 – 6 – 7 – 8 – 10 – 12 – **15**
I_n = 160 A; 250 A: I_i (x I_n)	3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 - **11**
I_n = 250 (400 / 630 AF) A; 400 A: I_i (x I_n)	3 – 4 – 5 – 6 – 7 – 8 – 10 – 11 - **12**
I_n = 630 A: I_i (x I_n)	3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 – **11**
Delay (ms)	fixed
Non-trip time (ms)	10
Maximum breaking time (ms)	50

Setting the Neutral (4P Only)	
Neutral protection (I_r, I_{sd}) ... x	OFF - 50% - **100%**
Neutral Instantaneous protection I_i	Same as the phases
Delay	Same as t_r, and instant t_{sd}

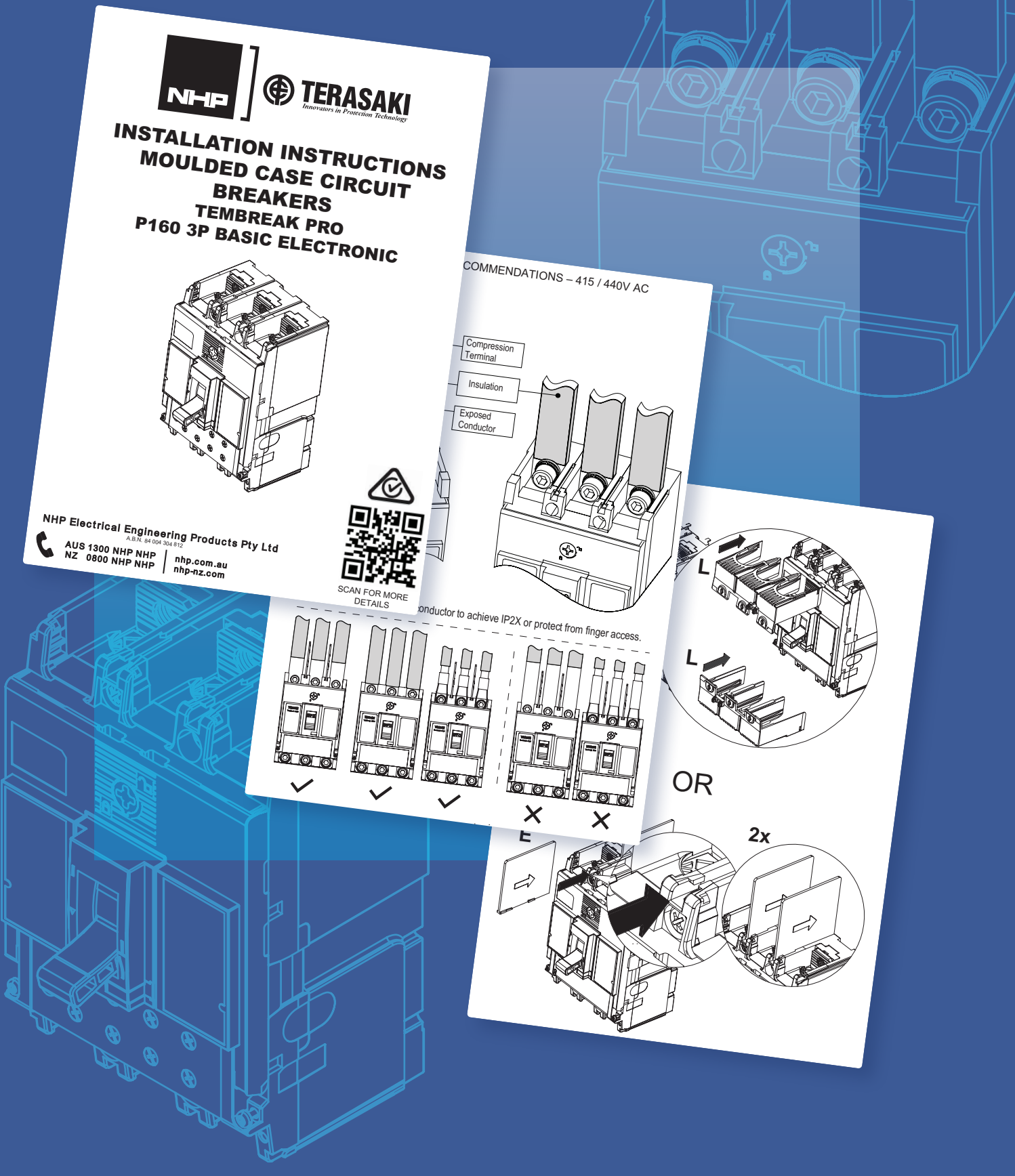
G - Protection Ground Fault	I_g (Accuracy: -10% to +10%)
I_g = I_n x ...	OFF or **ON:** 40% for I_n = 40 A; 20% I_n > 40 A
Delay (ms)	200 (fixed); I^2t activated according I_{sd} I^2t
Time non-trip (ms)	180
Maximum breaking time (ms)	250

For B model, please refer to the NHP Circuit Protection Hand Book.

New NHP Terasaki user manuals

TemBreak PRO

New NHP Terasaki installation manuals



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