

TemBreak^{PRO}

P Model Moulded Case Circuit Breaker

Thermal Magnetic Trip Unit from 160A up to 630A

USER MANUAL



Version
1.6.0

Using this manual

Safety Precautions

Authorised Personnel Only

The product or system described in this documentation must be installed, operated and maintained by qualified personnel only. NHP or Terasaki accept no responsibility for the consequences of the use of this equipment by unqualified personnel.

A qualified person is one with the necessary skills and knowledge of the construction and operation of the installation of electrical equipment and has been trained to identify and avoid risks.

Appropriate use of NHP / Terasaki products

NHP / Terasaki products are intended to be used only for the applications described in the catalogue and technical documentation, which is dedicated to them. If products and components from other manufacturers are used, they must be recommended or approved by NHP or Terasaki.

Appropriate use of NHP / Terasaki products during transport, storage, installation, assembly, commissioning, operation and maintenance is necessary to ensure safe operation and without any problems.

The permissible ambient conditions must be met. The information contained in the technical documentation must be observed.

Publication of responsibility

The contents of this document have been reviewed to ensure that the reliability of the information is correct at time of publication.

NHP or Terasaki are not responsible for printing or damage resulting from errors. NHP or Terasaki reserve the right to make corrections and changes needed in subsequent edition.

Warnings and notes

This documentation contains safety instructions that you must follow for your personal safety and to prevent damage to property.

Safety instructions, referring to your personal safety are reported in the literature by a safety alert symbol.

Safety warning symbols and the words below are classified according to the degree of risk.



WARNING: Indicates an imminently hazardous situation which, if it cannot be avoided, will result in death or serious injury.



WARNING: Indicates a potentially hazardous situation which, if it cannot be avoided, can result serious injury or death.



WARNING: Indicates a potentially hazardous situation which, if it cannot be avoided, may cause minor or moderate injury.



Notice: Indicates a warning of property damage and can also indicate important operating and especially useful information on the product, that it should pay particular attention to efficient and safe operation.

Summary of Changes

This section highlights the details of changes made since the previous issue of this document.

The versioning convention used to track changes in this document follows the structure Vx.y.z where:

x: Major revision, where extensive changes are made which is generally incompatible with the previous version. Such changes may include new products and/or features, or removal of information which is no longer relevant or applicable to the previous version

y: Minor revision, where changes made do not change the overall scope of the previous version, but may include additional information which complements or corrects the previous version, or provides additional clarity on an existing topic.

z: Patch version, where small changes are made to correct minor errors or adjust existing text, charts, figures and/or images, and which do not add or remove information from the previous version. Example changes may include spelling corrections, image re-sizing and adjustments, updated images, etc.

| Version | Publication date | Changes | By |
|---------|------------------|---|--------|
| V 1.0.0 | 21-Apr-2021 | Initial release | D.NAT |
| V 1.0.1 | 26-Apr-2021 | Spelling and formatting | D.NAT |
| V 1.1.0 | 29-Apr-2021 | Added Troubleshooting section | D.NAT |
| V 1.2.0 | 13-May-2021 | Clearance distance corrections | N.ALEX |
| V 1.3.0 | 28-May-2021 | Label Identification section added, product information correction, Temperature Rating tables aligned headings with TD-001-EN, I ² t Curves updated in image quality, added references and links to, TD-001-EN, TD-002-EN, TD-003-EN, & Type2_TBpro_MotorStartTables-TD-001-EN | N.ALEX |
| V 1.4.0 | 20-August-2021 | Correction to P160 Information table data, correction to P400 magnetic dial settings, added resistance watts loss, fixed typo on Part Number Break Down, rewording in Clearance section links to Installation Manuals added | N.ALEX |
| V 1.5.0 | 20-Jan-2022 | Changed watts loss and temperature tables to match TD-001-EN, Further clarification on thermal dial adjustment calibration points. | N.ALEX |
| V 1.6.0 | Jan-2025 | Added link to MCCB Catalogue, edited format of product information tables, added internal links to other sections, corrections made to descriptions of Shunt and UVT terminals, additional Shunt and UVT data, added additional data for Shunt and UVT wiring, description changes to the clearances section layout, added Pressure Trip section, improved dimensions, added handle dimensions, document naming convention changed , NZ website address updated, added Installation Manuals to Accessories | N.ALEX |

Table of Contents

| | | | |
|---|-----------|--|-----------|
| Using this manual | 2 | Troubleshooting | 38 |
| Safety Precautions | 2 | Annex A – Dimensions | 39 |
| Summary of Changes | 3 | P160 Dimensions | 39 |
| Table of Contents | 4 | P160 with Rear Connect | 40 |
| Introduction | 5 | P160 with HB Handle | 41 |
| Who Should Use This Manual? | 5 | P160 with HP Handle | 42 |
| Additional resources | 5 | P160 with HS Handle | 43 |
| Terminology and Abbreviations | 7 | P250 Dimensions | 44 |
| Product Information | 8 | P250 with Rear Connect | 45 |
| Part Number Break Down | 9 | P250 with HB Handle | 46 |
| Available MCCBs in the TemBreak <i>PRO</i> range: | 10 | P250 with HP Handle | 47 |
| Label Identification | 11 | P250 with HS Handle | 48 |
| P160_TM Information | 12 | P400 Dimensions | 49 |
| P250_TM Information | 13 | P400 with Rear Connect | 50 |
| P400_TM Information | 14 | P630 Dimensions | 51 |
| P630_TM Information | 15 | P630 with Rear Connect | 52 |
| Internal Accessories | 16 | P400 / P630 with HB Handle | 53 |
| Auxiliary & Alarm Switches | 16 | P400 / P630 with HP Handle | 54 |
| Auxiliary Contacts | 16 | P400 / P630 with HS Handle | 55 |
| Alarm Contacts | 16 | Annex B – Trip Curves | 56 |
| Auxiliary and Alarm Data | 16 | P160F / N / H | 56 |
| Shunt Trip | 17 | P250F / N / H | 57 |
| Under Voltage Trips | 18 | P400E / F / N / H / S | 58 |
| Under Voltage Trips (With Time Delay) | 18 | P630E / F / N / H / S | 59 |
| Installation | 19 | Annex C – I²t Let Through Curves | 60 |
| Precautions | 19 | P160F / N / H | 60 |
| Mounting Angles | 19 | P250F / N / H | 61 |
| Direction of Power Supply | 19 | P400E / F / N / H / S | 62 |
| Clearances | 20 | P630E / F / N / H / S | 63 |
| Internal Accessory Mounting Locations | 22 | Annex D – Peak Let Through Curves | 64 |
| P160 internal accessories combination | 22 | P160F / N / H | 64 |
| P250 internal accessories combination | 23 | P250F / N / H | 65 |
| P400/630 internal accessories combination | 24 | P400E / F / N / H / S | 66 |
| Alarm, Shunt & UVT Installation | 25 | P630E / F / N / H / S | 66 |
| Standard Alarm & Auxiliary installation | 25 | Annex E – Watts Loss | 67 |
| Shunt & UVT installation | 26 | Impedance Watts Loss | 67 |
| Protection Settings | 27 | Resistance Watts Loss | 68 |
| Trip Curve | 27 | Annex F – Temperature Derating | 69 |
| Thermal protection | 28 | Front & Rear Connect | 69 |
| TM – Adjusting I _r (Current) | 28 | Plug-in Connect | 70 |
| FF – Fixed I _r (Current) | 29 | Annex G – Wiring Diagrams & Terminal Designations | 71 |
| Labelling of Calibrated Points | 29 | Internal Accessories | 71 |
| Magnetic Protection | 30 | | |
| TM – Adjusting I _i (Current) | 30 | | |
| FF – Fixed I _i (Current) | 31 | | |
| Pressure Trip | 31 | | |
| Neutral Protection | 33 | | |
| Temperature Ratings | 34 | | |
| Commissioning | 35 | | |
| Thermal Setting (I _r) | 35 | | |
| Magnetic Setting (I _i) | 36 | | |
| Neutral Protection Setting (N) | 37 | | |

Introduction

This user manual describes the TemBreak *PRO* Thermal Magnetic (**P_TM**) MCCB features and instructions for use, and provides information for commissioning and configuring.

Some additional features may require the use of additional products and accessories to achieve full utilization of that feature. Refer the respective User Manual in the TemBreak *PRO* series for additional information on the respective product.



Notice: Not all MCCBs in the TemBreak *PRO* series are identical. This document specifically covers the P_TM series MCCB only. Refer to the respective TemBreak *PRO* User Manual (e.g. B_SE, P_SE, etc.) for information and instructions on other models in the TemBreak *PRO* range.

Who Should Use This Manual?

This manual aims to provide users, electricians, panel builders and maintenance personnel, with the technical information required for commissioning and operation of the NHP / Terasaki TemBreak *PRO* P_TM MCCB.

Users of this document must have at minimum a basic understanding of electrical circuit protection topics including (but not limited to):

- Power distribution and reticulation
- Circuit protection devices
- Fault currents
- Arc faults
- Temperature rise and thermal derating of switchgear

Additional resources

The following resources contain additional information which should be read in conjunction with this document.

| Resource | Description |
|---|--|
| NHP/Terasaki TemBreak <i>PRO</i> P_TM Installation Instructions TemBreak-Pro-Moulded-Case-Circuit-Breakers-P160-3-Pole-Thermal-Magnetic-Installation-Manual TemBreak-Pro-Moulded-Case-Circuit-Breakers-P160-4-Pole-Thermal-Magnetic-Installation-Manual TemBreak-Pro-Moulded-Case-Circuit-Breakers-P250-3-Pole-Thermal-Magnetic-Installation-Manual TemBreak-Pro-Moulded-Case-Circuit-Breakers-P250-4-Pole-Thermal-Magnetic-Installation-Manual TemBreak-Pro-Moulded-Case-Circuit-Breakers-P400-3-Pole-Thermal-Magnetic-Installation-Manual TemBreak-Pro-Moulded-Case-Circuit-Breakers-P400-4-Pole-Thermal-Magnetic-Installation-Manual TemBreak-Pro-Moulded-Case-Circuit-Breakers-P630-3-Pole-Thermal-Magnetic-Installation-Manual TemBreak-Pro-Moulded-Case-Circuit-Breakers-P630-4-Pole-Thermal-Magnetic-Installation-Manual | Information on installing, mounting, and wiring the TemBreak <i>PRO</i> Thermal Magnetic MCCB. |
| NHP/Terasaki Mechanical Interlock Installation Instructions TemBreak-PRO-Mechanical-Link-Interlock-Installation-User-Manual TemBreak-PRO-Mechanical-Cable-Interlock-P160-P250-P400-P630-User-Manual | Information on installing and mounting the mechanical link and cable interlocks. |
| NHP/Terasaki External Mount Handle Installation Instructions TemBreak-PRO-HS-External-Handle-For-P160-P250-P400-P630-User-Manual TemBreak-PRO-HP-External-Handle-Installation-For-P160-P250-User-Manual TemBreak-PRO-HP-External-Handle-Installation-For-P400-P630-User-Manual | Information on installing and mounting the HS and HP external mount handles. |

Introduction

Additional resources

| Resource | Description |
|---|--|
| NHP/Terasaki HB Direct Mount Handle Installation Instructions TemBreak-PRO-HB-External-Handle-Installation-For-P160-P250-User-Manual TemBreak-PRO-HB-External-Handle-Installation-For-P400-P630-User-Manual | Information on installing and mounting the HB direct mount handles. |
| NHP/Terasaki Motor Operator MCCB Installation Instructions TemBreak-PRO-Motor-Operator-Installation-P160-P250-User-Manual TemBreak-PRO-Motor-Operator-Installation-P400-P630-User-Manual | Information on installing, mounting, and wiring to a MCCB motor operator. |
| NHP Terasaki Rear Connection Tags Installation Instructions TemBreak-PRO-Rear-Tags-ZS125-ZS250-A250-P250-B160-B250-Installation-Manual | Information on installing and terminating to rear connection tags. |
| NHP Terasaki Plug-in Base Installation Instructions TemBreak-PRO-Plug-in-Base-Installation-P160-P400-P630-User-Manual | Information on installing and terminating to Plug-in base. |
| Technical Catalogue NHP-Moulded-Case-Circuit-Breaker-Technical-Catalogue | TemBreak PRO Catalogue, containing part numbers, product data, dimensions, and more to assist with product selection. |
| Technical Data – Temperature and Watts Loss TemBreak-PRO-Moulded-Case-Circuit-Breaker-Temperature-and-Watts-Loss-Technical-Catalogue | Temperature and Watts Loss tables for TemBreak <i>PRO</i> Moulded Case Circuit Breakers. |
| Technical Data – Cascading and Selectivity TemBreak-PRO-Moulded-Case-Circuit-Breaker-Cascading-and-Selectivity-Technical-Catalogue | Cascading and Selectivity tables for TemBreak <i>PRO</i> Moulded Case Circuit Breakers with Din-T, Din-Safe, & MOD6 MCBs/RCBOs |
| Technical Data – Coordination TemBreak-PRO-Moulded-Case-Circuit-Breaker-and-Socomec-Component-Ordering-Technical-Catalogue | Socomec Backup Tables with TemBreak <i>PRO</i> Moulded Case Circuit Breakers |
| Technical Data – Type 2 Coordination Type-2-Coordination-for-TemBreak-Pro-Technical-Catalogue | Type 2 Coordination for Premium Efficiency Motor Starters with TemBreak <i>PRO</i> Moulded Case Circuit Breakers |

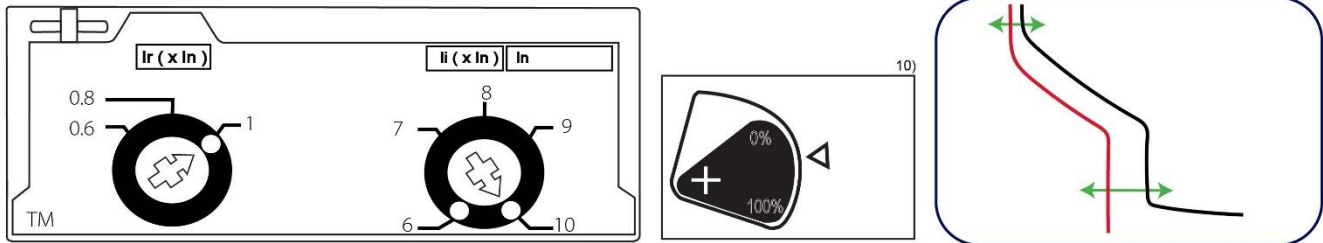
Introduction

Terminology and Abbreviations

| Abbreviation | Description | Abbreviation | Description |
|---------------------------|--|-------------------------|--|
| ACP | Auxiliary Communications port: Plug for Smart auxiliary / alarm contact block | MIP | Maintenance Interface Port: Plug for temporary connection to OCR testing, servicing, and maintenance tools |
| AL | Alarm: An auxiliary contact indicating trip status | N | Neutral |
| ASCII | American Standard Code for Information Interchange | NP | Neutral Protection |
| AX or AUX | Auxiliary: Auxiliary contact indicating open / closed | OAC | Optional Alarm Contact: Connection connector optional alarm output contact |
| BE | Basic Electronic Trip Unit (dial type, LSI and LSIG) | OCR | Over Current Relay |
| CCW | Connected Components Workbench software | P or PTA | Pre-trip Alarm |
| CIP ^{1 2} | ¹ Communication Interface Port: Plug for control power and data for use with the TPED remote display and TPCM communication module ² Common Industrial Protocol | PDU | Protocol Data Unit |
| CRC | Cyclic Redundancy Check – error-detecting code used at the end of each Modbus message | PELV | Protected Extra Low Voltage (earthed system) |
| dec | Decimal (base-10) numbering system | PTA | Pre-Trip Alarm: is a programmable output contact to advise when a trip may be imminent. |
| DINT | Signed Double Integer datatype (4 bytes or 32 bits in length) | RTU | Remote Terminal Unit |
| EIPM | TemBreak <i>PRO</i> Ethernet/IP Module | S or STD | Short Time Delay Protection |
| FF | Fixed Thermal and Fixed Magnetic | SE | Smart Energy Trip Unit |
| FM | Fixed Thermal and Adjustable Magnetic | SELV | Separated Extra Low Voltage |
| G or GF | Ground Fault Protection | SN | Solid Neutral |
| hex | Hexadecimal (base-16) numbering system | SSID | Service Set Identifier (name of the Wi-Fi wireless network) |
| I or INST | Instantaneous Protection | STR | String datatype |
| IEC | International Electrotechnical Commission | TCP | Transmission Control Protocol |
| IEEE | Institute of Electrical and Electronics Engineers | TF | Adjustable Thermal and Fixed Magnetic |
| I_g | Ground Fault Protection Current | THD | Total Harmonic Distortion |
| I_i | Instantaneous Protection Current | TM | Adjustable Thermal Magnetic |
| I_n | Rated Current | TPCM | TemCom <i>PRO</i> Communication Module |
| I_N | Neutral Protection Current | TPED | TemView <i>PRO</i> External Display |
| INT | Signed Integer datatype (2 bytes or 16 bits in length) | t_r | LTD Time delay |
| IP | International Protection (Ingress Protection) | t_{sd} | STD Time delay |
| I_r | LTD Protection Current | t_{tsp} | Thermal Self-Protection Time delay |
| I_{sd} | STD Protection Current | UDINT | Unsigned Integer (2 bytes or 16-bits in length) |
| I_{tsp} | Thermal Self-Protection Current | UINT | Unsigned Integer (2 bytes or 16 bits in length) |
| L or LTD | Long Time Delay Protection | ULINT | Unsigned Long Integer datatype (8 bytes or 64 bits in length) |
| LCD | Liquid Crystal Display (LCD) | URLs | Uniform Resource Locator (address of an Internet website) |
| LED | Light Emitting Diode | WORD | 2 bytes or 16-bits of data |
| LINT | Signed Long Integer datatype (8 bytes or 64 bits in length) | ZSI | Zone Selective Interlocking (zone selectivity) |
| LSI | Long Time, Short Time and Instantaneous Protection | θ | Thermal imaging value |
| LSIG | Long Time, Short Time, Instantaneous and Ground Fault Protection | θ_c | Cold start mode thermal imaging value |
| MCCB | Moulded Case Circuit Breaker | θ_H | Hot start mode thermal imaging value |
| microSD | Micro Secure Digital | θ_{trip} | Thermal imaging value tripping threshold |

Product Information

The TemBreak *PRO* P model Thermal Magnetic MCCB with trip unit type P_TM and P_FF offers protection against overloads and short circuits. The TM type features adjustable protection settings via preset rotary switches, providing adjustable thermal and magnetic tripping curves. This allows for improved selectivity combinations between MCCBs or other circuit breaker types. The FF type features non-adjustable fixed thermal and fixed magnetic tripping curves.



Features (TM – adjustable)

- Settings accessible by a rotary dial
- Thermal element & Magnetic element adjustment dials
- Possible adjustment of the protection of neutral pole on 4-pole versions (neutral pole positioned to the right)
- 4-pole thermal magnetic MCCBs, will include Neutral pole protection as standard.
- Switched Neutral (4P only) with early make/late break design which reduces the risk of abnormal line to neutral voltages that may damage sensitive electronic equipment.
- Magnetic Only versions available.

Features (FF – fixed)

- Non-adjustable thermal & non-adjustable magnetic trip curves
- 2 Pole for AC and DC applications

Frame Sizes

- P160
 - P250*
 - P400*
 - P630*
- (*TM only)

Protection Functions

- Thermal – Long Time Delay
- Magnetic – Instantaneous
- Neutral Protection (4P only)

Product Information

Part Number Break Down

| | | | | | | | |
|----------|------------|----------|----------|----------|------------|-----------|----------|
| P | 160 | F | 2 | 4 | 160 | BE | G |
| a) | b) | c) | d) | e) | f) | g) | h) |

a) Model Type

| | |
|----|--|
| A | Basic applications (160...250 A) |
| P | Mid to advanced applications (160...630 A) |
| B | High current, high kA applications (160...1600 A) |
| ZS | Earth Leakage applications (125...250 A) |
| XS | Highest current applications (2000...3200 A) |

b) Ampere Frame

| |
|--------|
| 125 A |
| 160 A |
| 250 A |
| 400 A |
| 630 A |
| 800 A |
| 1000 A |
| 1250 A |
| 1600 A |
| 2000 A |
| 2500 A |
| 3200 A |

c) Short Circuit Break Capacity I_{cu} (kA)

| | |
|----|--------|
| R | 200 kA |
| L | 150 kA |
| P | 125 kA |
| S | 110 kA |
| G | 100 kA |
| HL | 85 kA |
| H | 70 kA |
| M | 65 kA |
| N | 50 kA |
| F | 36 kA |
| E | 25 kA |
| D | Switch |

d) Pole Pitch Size (mm) ¹⁾

| | |
|---|----|
| 1 | 25 |
| 2 | 30 |
| 3 | 35 |

e) No. of Poles

| | |
|---|---------------|
| 1 | ⁷⁾ |
| 2 | ⁸⁾ |
| 3 | |
| 4 | |

f) Trip Unit Rating (I_n)

I_n x A

g) Trip Unit Type

| | |
|----|---|
| TF | Adj Thermal Fix Magnetic ⁴⁾ |
| FF | Fix Thermal Fix Magnetic |
| TM | Adj Thermal Adj Magnetic |
| SX | Smart Ammeter ⁵⁾ ⁶⁾ |
| BE | Basic Electronic ⁶⁾ |
| SE | Smart Energy ⁶⁾ |
| NN | Non-Auto Switch |

h) Trip Unit Option

| | |
|----|------------------------------|
| G | Ground Fault ²⁾ |
| N | Neutral ²⁾ |
| P | Pre-Trip Alarm ³⁾ |
| SN | Solid Neutral ⁹⁾ |



Notice: Not all combinations are possible. Confirm part number combination with NHP for availability.

- 160AF only
- For P_SE versions these features are standard and therefore are not added to the end of the part number.
- PTA is standard with P electronic models and therefore P is not added to the end of the part number.
- Only available in A & ZS models
- Only available in B models
- Not available in A and ZS models
- Only available in A and B models (FF Only Trip Unit)
- Not available in A and B models (FF Only Trip Unit)
- ZS Models

Product Information

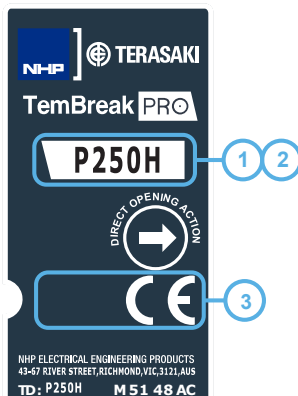
Available MCCBs in the TemBreak *PRO* range:




| Rating Short Circuit Break Capacity (kA) | | Frame Size | | | | | | | | | | |
|--|--------|---|---|---|---|---|---|-------------------------------|-------------------------------|---------------------------------|---------------------------------|---------------|
| | | 160 | 250 | 400 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 |
| E | 25 | A160E – TF A160E – FF B160E – FF | A250E – TM | P400E-TM | P630E – TM | | | | | | | |
| F | 36 | A160F – TF P160F – FF 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 | B1000N – BE B1000N – BEG B1000N – SX B1000N – SE | B1250N – BE B1250N – BEG | B1600N – BE B1600N – BEG | | | |
| 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 – BEG B800H – SX B800H – SE | B1000H – BE B1000H – BEG B1000H – SX B1000H – SE | B1250H – BE B1250H – BEG | | | | |
| HL | 85 | | | | | | | B1250HL – BE B1250HL – BEG | B1600HL – BE B1600HL – BEG | XS2000HL – BE XS2000HL – BEG | XS2500HL – BE XS2500HL – BEG | XS3200HL – BE |
| G | 100 | | | | | B800G – TM B800G – BE B800G – BEG 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 B400P – BEG | | B800P – BE B800P – BEG B800P – SX B800P – SE | | | | | | |
| R | 200 | B160R – TM | B250R – TM | B400P – BE B400P – BEG | | B800R – BE B800R – BEG B800R – SX B800R – SE | | | | | | |
| D | Switch | A160D – NN P160D – NN | A250D – NN P250D – NN | P400D – NN | P630D – NN | B800D – NN | B1000D – NN | B1250D – NN | B1600D – NN | XS2000D – NN | XS2500D – NN | |

Product Information

Label Identification


The label on the MCCB features information to aid in product identification.



| | Description | Notes | | | | | | | | | | | | | | | | | | |
|--------------|--------------------------|--|------------|----------------|--------|-------------|--------------|-----------|------------|--------------------|--------|-------------|--------------|------------|------------|--------|--------|------|--------------|------------|
| 1 | Circuit Break Identifier | Identifies the model type, ampere frame, and I _{cu} rating. | | | | | | | | | | | | | | | | | | |
| 2 | Trip unit type | <div>The trip unit type is indicated by the colour of the label.</div> <div><div><p>White label – Thermal-magnetic type trip unit</p><table><tr><td>Trip Units</td><td>FF, TF, FM, TM</td></tr><tr><td>Models</td><td>A, P, B, ZS</td></tr><tr><td>Ampere Frame</td><td>125 – 800</td></tr></table></div><div><p>Grey label – electronic or non-auto type trip unit. To distinguish between the two, electronic trip units will have the “I_{cu}” letter and non-auto will use the letter “D”, Switch.</p><table><tr><td>Trip Units</td><td>BE, BEG, BEGN , NN</td></tr><tr><td>Models</td><td>A, P, B, XS</td></tr><tr><td>Ampere Frame</td><td>160 – 3200</td></tr></table></div><div><p>Blue Label – SMART electronic type trip unit</p><table><tr><td>Trip Units</td><td>SX, SE</td></tr><tr><td>Models</td><td>P, B</td></tr><tr><td>Ampere Frame</td><td>160 – 1000</td></tr></table></div></div> | Trip Units | FF, TF, FM, TM | Models | A, P, B, ZS | Ampere Frame | 125 – 800 | Trip Units | BE, BEG, BEGN , NN | Models | A, P, B, XS | Ampere Frame | 160 – 3200 | Trip Units | SX, SE | Models | P, B | Ampere Frame | 160 – 1000 |
| Trip Units | FF, TF, FM, TM | | | | | | | | | | | | | | | | | | | |
| Models | A, P, B, ZS | | | | | | | | | | | | | | | | | | | |
| Ampere Frame | 125 – 800 | | | | | | | | | | | | | | | | | | | |
| Trip Units | BE, BEG, BEGN , NN | | | | | | | | | | | | | | | | | | | |
| Models | A, P, B, XS | | | | | | | | | | | | | | | | | | | |
| Ampere Frame | 160 – 3200 | | | | | | | | | | | | | | | | | | | |
| Trip Units | SX, SE | | | | | | | | | | | | | | | | | | | |
| Models | P, B | | | | | | | | | | | | | | | | | | | |
| Ampere Frame | 160 – 1000 | | | | | | | | | | | | | | | | | | | |
| 3 | Certifications | Identifies the additional localised certifications of the product, in addition to the international product standard, IEC 60947-2 / AS/NZS IEC 60947-2. For additional certifications please contact NHP. | | | | | | | | | | | | | | | | | | |


Product Information

P160_TM Information

| Frame / Model | Attribute | Unit | Condition | P160F_FF | P160F_TM | P160N_TM | P160H_TM |
|--|------------|-----------------------|--------------|------------------------------------|-----------------------------|-----------------------------|-----------------------------|
| Number of Poles | | | | 2 | 3, 4 | 3, 4 | 3, 4 |
| Nominal current ratings | I_{CT} | (A) | 50°C | 15, 20, | 20, 32, | 20, 32, | 20, 32, |
| Trip unit ratings | | | Calibration | 30, 40, 50, 60, 75, 100, 125 | 50, 63, 100, 125, 160 | 50, 63, 100, 125, 160 | 50, 63, 100, 125, 160 |
| Electrical characteristics | | | | | | | |
| Rated maximum operational voltage | U_e | (V) | AC 50/60 Hz | 690 | 690 | 690 | 690 |
| | | (V) | DC | 250 | 250 | 250 | 250 |
| Rated insulation voltage | U_i | (V) | | 800 | 800 | 800 | 800 |
| Rated impulse withstand voltage | U_{imp} | (kV) | | 8 | 8 | 8 | 8 |
| Selectivity category | | | | A | A | A | A |
| Rated short time withstand current | I_{cw} | (kA) | 0.4 sec | — | — | — | — |
| Ultimate breaking capacity (IEC, JIS, AS/NZS) | I_{cu} | (kA) | 690 Vac | 6 | 6 | 6 | 6 |
| | | | 400 /415 Vac | 36 | 36 | 50 | 70 |
| | | | 240 Vac | 50 | 50 | 85 | 85 |
| | | | 250 Vdc | 25 | 25 | 40 | 40 |
| DC Voltage | | | | | | | |
| Service breaking capacity (IEC, JIS, AS/NZS) | I_{cs} | (kA) | 690 Vac | 6 | 6 | 6 | 6 |
| | | | 400 /415 Vac | 36 | 36 | 50 | 50 |
| | | | 240 Vac | 50 | 50 | 85 | 85 |
| | | | 250 Vdc | 19 | 19 | 40 | 40 |
| DC Voltage | | | | | | | |
| Protection - Over Current Release types | | Std Standard | | | | | |
| Fixed thermal magnetic | | Opt Optional | | Std | — | — | — |
| Adjustable thermal, adjustable magnetic | | — Not Available | | — | Std | Std | Std |
| | | M Req Module Required | | | | | |
| Installation (Std / Opt / —) | | | | | | | |
| Front connection (FC) | | | | Std | Std | Std | Std |
| Extension bar (FB) | | | | Opt | Opt | Opt | Opt |
| Cable tunnel clamp (FW) | | | | Opt | Opt | Opt | Opt |
| Rear Connection (RC) | | | | Opt | Opt | Opt | Opt |
| DIN rail adaptor | | | | Opt | Opt | Opt | Opt |
| Withdrawable mechanism | | | | — | Opt | Opt | Opt |
| Plug-in | | | | — | Opt | Opt | Opt |
| Reverse supply connection possible to 440V | | | | Yes | Yes | Yes | Yes |
| Dimensions  | H | (mm) | | 130 | 130 | 130 | 130 |
| | W | (mm) | 1 pole | — | — | — | — |
| | | | 2 pole | 60 | — | — | — |
| | | | 3 pole | — | 90 | 90 | 90 |
| | | | 4 pole | — | 120 | 120 | 120 |
| | D | (mm) | | 68 | 68 | 68 | 68 |
| | T | (mm) | | 95.5 | 95.5 | 95.5 | 95.5 |
| Weight | W | (kg) | 1 pole | — | — | — | — |
| | | | 2 pole | 0.7 | — | — | — |
| | | | 3 pole | — | 1.0 | 1.0 | 1.0 |
| | | | 4 pole | — | 1.3 | 1.3 | 1.3 |
| Operation options (Std / Opt / —) | | Std Standard | | | | | |
| Toggle operation | | Opt Optional | | Std | Std | Std | Std |
| Extension handle TP-HS/HP or Direct mount T2HB | | — Not Available | | — | Opt | Opt | Opt |
| Motor operation TP-MC | | | | — | Opt | Opt | Opt |
| Endurance | Electrical | Cycles | 415 Vac | 30000 | 30000 | 30000 | 30000 |
| | Mechanical | Cycles | | 50000 | 50000 | 50000 | 50000 |

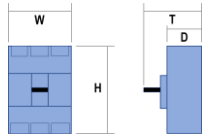
Product Information

P250_TM Information

| Frame / Model | Attribute | Unit | Condition | P250F_TM | P250N_TM | P250H_TM |
|--|---|--------|--------------|----------------------|----------------------|----------------------|
| Number of Poles | | | | 3, 4 | 3, 4 | 3, 4 |
| Nominal current ratings | I_{CT} | (A) | 50°C | 50, 63 | 50, 63 | 50, 63 |
| Trip unit ratings | | | Calibration | 100, 125 160, 250 | 100, 125 160, 250 | 100, 125 160, 250 |
| Electrical characteristics | | | | | | |
| Rated maximum operational voltage | U_e | (V) | AC 50/60 Hz | 690 | 690 | 690 |
| | | (V) | DC | 250 | 250 | 250 |
| Rated insulation voltage | U_i | (V) | | 800 | 800 | 800 |
| Rated impulse withstand voltage | U_{imp} | (kV) | | 8 | 8 | 8 |
| Selectivity category | | | | A | A | A |
| Rated short time withstand current | I_{cw} | (kA) | 0.4 sec | — | — | — |
| Ultimate breaking capacity (IEC, JIS, AS/NZS) | I_{cu} | (kA) | 690 Vac | 6 | 6 | 6 |
| | | | 400 /415 Vac | 36 | 50 | 70 |
| | | | 220 /240 Vac | 50 | 85 | 85 |
| | | | 250 Vdc | 25 | 40 | 40 |
| DC Voltage | | | | | | |
| Service breaking capacity (IEC, JIS, AS/NZS) | I_{cs} | (kA) | 690 Vac | 6 | 6 | 6 |
| | | | 400 /415 Vac | 36 | 50 | 50 |
| | | | 220 /240 Vac | 50 | 85 | 85 |
| | | | 250 Vdc | 19 | 40 | 40 |
| DC Voltage | | | | | | |
| Protection - Over Current Release types | Std Standard Opt Optional — Not Available | | | | | |
| Fixed thermal magnetic | M Req Module Required | | | — | — | — |
| Adjustable thermal, adjustable magnetic | | | | Std | Std | Std |
| Installation (Std / Opt / —) | | | | | | |
| Front connection (FC) | Std Standard Opt Optional — Not Available | | | Std | Std | Std |
| Extension bar (FB) | | | | Opt | Opt | Opt |
| Cable tunnel clamp (FW) | | | | Opt | Opt | Opt |
| Rear Connection (RC) | | | | Opt | Opt | Opt |
| DIN rail adaptor | | | | — | — | — |
| Withdrawable mechanism | | | | Opt | Opt | Opt |
| Plug-in | | | | Opt | Opt | Opt |
| Reverse supply connection possible to 440V | | | | Yes | Yes | Yes |
| Dimensions  | H | (mm) | | 165 | 165 | 165 |
| | W | (mm) | 1 pole | — | — | — |
| | | | 2 pole | — | — | — |
| | | | 3 pole | 105 | 105 | 105 |
| | | | 4 pole | 140 | 140 | 140 |
| | D | (mm) | | 68 | 68 | 68 |
| | T | (mm) | | 95.5 | 95.5 | 95.5 |
| Weight | W | (kg) | 1 pole | — | — | — |
| | | | 2 pole | — | — | — |
| | | | 3 pole | 1.5 | 1.5 | 1.5 |
| | | | 4 pole | 2.0 | 2.0 | 2.0 |
| Operation options (Std / Opt / —) | | | | | | |
| Toggle operation | Std Standard Opt Optional — Not Available | | | Std | Std | Std |
| Extension handle TP-HS/HP or Direct mount T2HB | | | | Opt | Opt | Opt |
| Motor operation TP-MC | | | | Opt | Opt | Opt |
| Endurance | Electrical | Cycles | 415 Vac | 10000 | 10000 | 10000 |
| | Mechanical | Cycles | | 30000 | 30000 | 30000 |


Product Information

P400_TM Information

| Frame / Model | Attribute | Unit | Condition | P400E_TM | P400F_TM | P400N_TM | P400H_TM | P400S_TM |
|--|---|-----------------------|--------------|----------|----------|----------|----------|----------|
| Number of Poles | | | | 3, 4 | 3, 4 | 3, 4 | 3, 4 | 3, 4 |
| Nominal current ratings | I_{CT} | (A) | 50°C | 250 | 250 | 250 | 250 | 250 |
| Trip unit ratings | | | Calibration | 400 | 400 | 400 | 400 | 400 |
| | | | | | | | | |
| Electrical characteristics | | | | | | | | |
| Rated maximum operational voltage | U_e | (V) | AC 50/60 Hz | 690 | 690 | 690 | 690 | 690 |
| | | (V) | DC | 250 | 250 | 250 | 250 | 250 |
| Rated insulation voltage | U_i | (V) | | 800 | 800 | 800 | 800 | 800 |
| Rated impulse withstand voltage | U_{imp} | (kV) | | 8 | 8 | 8 | 8 | 8 |
| Selectivity category | | | | A | A | A | A | A |
| Rated short time withstand current | I_{cw} | (kA) | 0.4 sec | — | — | — | — | — |
| Ultimate breaking capacity | I_{cu} | (kA) | 690 Vac | — | 7 | 12 | 12 | 12 |
| (IEC, JIS, AS/NZS) | | | 400 /415 Vac | 25 | 36 | 50 | 70 | 110 |
| | | | 220 /240 Vac | 35 | 50 | 85 | 100 | 125 |
| | | | 250 Vdc | 25 | 25 | 50 | 50 | 50 |
| DC Voltage | | | | | | | | |
| Service breaking capacity | I_{cs} | (kA) | 690 Vac | — | 7 | 12 | 12 | 12 |
| (IEC, JIS, AS/NZS) | | | 400 /415 Vac | 25 | 36 | 50 | 70 | 110 |
| | | | 220 /240 Vac | 35 | 50 | 85 | 100 | 125 |
| | | | 250 Vdc | 25 | 25 | 50 | 50 | 50 |
| DC Voltage | | | | | | | | |
| Protection - Over Current Release types | | Std Standard | | | | | | |
| Fixed thermal magnetic | Opt Optional | | | — | — | — | — | — |
| Adjustable thermal, adjustable magnetic | — Not Available | | | Std | Std | Std | Std | Std |
| | | M Req Module Required | | | | | | |
| Installation (Std / Opt / —) | | | | | | | | |
| Front connection (FC) | Std Standard Opt Optional — Not Available | | | Std | Std | Std | Std | Std |
| Extension bar (FB) | | | Opt | Opt | Opt | Opt | Opt | |
| Cable tunnel clamp (FW) | | | Opt | Opt | Opt | Opt | Opt | |
| Rear Connection (RC) | | | Opt | Opt | Opt | Opt | Opt | |
| DIN rail adaptor | | | — | — | — | — | — | |
| Withdrawable mechanism | | | Opt | Opt | Opt | Opt | Opt | |
| Plug-in | | | Opt | Opt | Opt | Opt | Opt | |
| Reverse supply connection possible to 440V | | | | Yes | Yes | Yes | Yes | Yes |
| Dimensions  | H | (mm) | | 260 | 260 | 260 | 260 | 260 |
| | W | (mm) | 1 pole | — | — | — | | |
| | | | 2 pole | — | — | — | | |
| | | | 3 pole | 140 | 140 | 140 | 140 | 140 |
| | | | 4 pole | 185 | 185 | 185 | 185 | 185 |
| | D | (mm) | | 103 | 103 | 103 | 103 | 103 |
| | T | (mm) | | 151 | 151 | 151 | 151 | 151 |
| Weight | W | (kg) | 1 pole | — | — | — | | |
| | | | 2 pole | — | — | — | | |
| | | | 3 pole | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| | | | 4 pole | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 |
| Operation options (Std / Opt / —) | | | | | | | | |
| Toggle operation | Std Standard | | | Std | Std | Std | Std | Std |
| Extension handle TP-HS/HP or Direct mount T2HB | Opt Optional | | | Opt | Opt | Opt | Opt | Opt |
| Motor operation TP-MC | — Not Available | | | Opt | Opt | Opt | Opt | Opt |
| Endurance | Electrical | Cycles | 415 Vac | 6000 | 6000 | 6000 | 6000 | 6000 |
| | Mechanical | Cycles | | 15000 | 15000 | 15000 | 15000 | 15000 |

Product Information

P630_TM Information

| Frame / Model | Attribute | Unit | Condition | P630E_TM | P630F_TM | P630N_TM | P630H_TM | P630S_TM |
|--|------------|-----------------------|--------------|----------|----------|----------|----------|----------|
| Number of Poles | | | | 3, 4 | 3, 4 | 3, 4 | 3, 4 | 3, 4 |
| Nominal current ratings | I_{CT} | (A) | 30°C | 630 | 630 | 630 | 630 | 630 |
| Trip unit ratings | | | Calibration | | | | | |
| | | | | | | | | |
| Electrical characteristics | | | | | | | | |
| Rated maximum operational voltage | U_e | (V) | AC 50/60 Hz | 690 | 690 | 690 | 690 | 690 |
| | | (V) | DC | 250 | 250 | 250 | 250 | 250 |
| Rated insulation voltage | U_i | (V) | | 800 | 800 | 800 | 800 | 800 |
| Rated impulse withstand voltage | U_{imp} | (kV) | | 8 | 8 | 8 | 8 | 8 |
| Selectivity category | | | | A | A | A | A | A |
| Rated short time withstand current | I_{cw} | (kA) | 0.4 sec | — | — | — | — | — |
| Ultimate breaking capacity (IEC, JIS, AS/NZS) | I_{cu} | (kA) | 690 Vac | — | 7 | 12 | 12 | 12 |
| | | | 400 /415 Vac | 25 | 36 | 50 | 70 | 110 |
| | | | 220 /240 Vac | 35 | 50 | 85 | 100 | 125 |
| | | | 250 Vdc | 25 | 25 | 50 | 50 | 50 |
| DC Voltage | | | | | | | | |
| Service breaking capacity (IEC, JIS, AS/NZS) | I_{cs} | (kA) | 690 Vac | — | 7 | 12 | 12 | 12 |
| | | | 400 /415 Vac | 25 | 36 | 50 | 70 | 110 |
| | | | 220 /240 Vac | 35 | 50 | 85 | 100 | 125 |
| | | | 250 Vdc | 25 | 25 | 50 | 50 | 50 |
| DC Voltage | | | | | | | | |
| Protection - Over Current Release types | | Std Standard | | | | | | |
| Fixed thermal magnetic | | Opt Optional | | — | — | — | — | — |
| Adjustable thermal, adjustable magnetic | | — Not Available | | Std | Std | Std | Std | Std |
| | | M Req Module Required | | | | | | |
| Installation (Std / Opt / —) | | | | | | | | |
| Front connection (FC) | | | | Std | Std | Std | Std | Std |
| Extension bar (FB) | | | | Opt | Opt | Opt | Opt | Opt |
| Cable tunnel clamp (FW) | | | | Opt | Opt | Opt | Opt | Opt |
| Rear Connection (RC) | | | | Opt | Opt | Opt | Opt | Opt |
| DIN rail adaptor | | | | — | — | — | — | — |
| Withdrawable mechanism | | | | Opt | Opt | Opt | Opt | Opt |
| Plug-in | | | | Opt | Opt | Opt | Opt | Opt |
| Reverse supply connection possible to 440V | | | | Yes | Yes | Yes | Yes | Yes |
| Dimensions  | H | (mm) | | 260 | 260 | 260 | 260 | 260 |
| | W | (mm) | 1 pole | — | — | — | | |
| | | | 2 pole | — | — | — | | |
| | | | 3 pole | 140 | 140 | 140 | 140 | 140 |
| | | | 4 pole | 185 | 185 | 185 | 185 | 185 |
| | D | (mm) | | 103 | 103 | 103 | 103 | 103 |
| | T | (mm) | | 151 | 151 | 151 | 151 | 151 |
| Weight | W | (kg) | 1 pole | — | — | — | | |
| | | | 2 pole | — | — | — | | |
| | | | 3 pole | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| | | | 4 pole | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| Operation options (Std / Opt / —) | | | | | | | | |
| Toggle operation | | Std Standard | | Std | Std | Std | Std | Std |
| Extension handle TP-HS/HP or Direct mount T2HB | | Opt Optional | | Opt | Opt | Opt | Opt | Opt |
| Motor operation TP-MC | | — Not Available | | Opt | Opt | Opt | Opt | Opt |
| Endurance | Electrical | Cycles | 415 Vac | 4000 | 4000 | 4000 | 4000 | 4000 |
| | Mechanical | Cycles | | 15000 | 15000 | 15000 | 15000 | 15000 |

Internal Accessories

Internal accessories include Auxiliary and Alarm contacts, Shunt Trip and Undervoltage Trip (UVT) modules, which may be installed under the front cover of the MCCB in various combinations to provide additional functionality and connection with external control circuits.

For information regarding installation of the internal accessories, see [Internal Accessory Mounting Locations](#)

Auxiliary & Alarm Switches



Auxiliary Contacts

An auxiliary contact can be installed to indicate whether an MCCB is Open (both OFF and Tripped positions) or Closed (ON). Auxiliary contacts come in either general purpose or micro-switch type, with some combinations pre-wired or with terminals. Each contact type is provided as a single change-over switching arrangement (1x C/O).

| Part Number | Description | Contact Type | Connection Type | Conductor | | | |
|---------------|-------------|-----------------|-----------------|--------------------|---------------------|--------------------|--------|
| | | | | Minimum | Maximum | Size | Length |
| T2AX00LML3SWA | Auxiliary | General purpose | Pre-wired | N/A | | 0.5mm ² | 700mm |
| T2AX00LML3STA | Auxiliary | General purpose | Terminal | 0.5mm ² | 1.25mm ² | N/A | |
| T2AX00LML3RWA | Auxiliary | Micro-switch | Pre-wired | N/A | | 0.5mm ² | 700mm |

Alarm Contacts

An alarm contact can be installed to indicate whether an MCCB is in the Tripped or Not Tripped position (ON, OFF). Alarm contacts come in either general purpose or micro-switch type, with some combinations pre-wired or with terminals. Each contact type is provided as a single change-over switching arrangement (1x C/O).

| Part Number | Description | Contact Type | Connection Type | Conductor | | | |
|---------------|-----------------------|-----------------|-----------------|--------------------|---------------------|--------------------|--------|
| | | | | Minimum | Maximum | Size | Length |
| T2AL00LML3SWA | Alarm; left side only | General purpose | Pre-wired | N/A | | 0.5mm ² | 700mm |
| T2AL00LML3STA | Alarm; left side only | General purpose | Terminal | 0.5mm ² | 1.25mm ² | N/A | |
| T2AL00LML3RWA | Alarm; left side only | Micro-switch | Pre-wired | N/A | | 0.5mm ² | 700mm |

Auxiliary and Alarm Data

The below information applies to both auxiliary and alarm accessories.

| General purpose contact | | | | | | Micro-switch contact | | | |
|-------------------------|----------------|----------------|-----------|----------------|----------------|----------------------|-----------|----------------|--------------|
| AC (V) | | | DC (V) | | | Minimum Load | DC (V) | | Minimum Load |
| Volts (V) | Amperes (A) | | Volts (V) | Amperes (A) | | | Volts (V) | Amperes (A) | |
| | Resistive Load | Inductive Load | | Resistive Load | Inductive Load | | | Resistive Load | |
| 480 | — | — | 250 | — | — | 100 mA @ 15 Vdc | 30 | 0.1 | 1 mA @ 5 Vdc |
| 250 | 3 | 2 | 125 | 0.4 | 0.05 | | | | |
| 125 | 3 | 2 | 30 | 3 | 2 | | | | |

For information regarding wiring and terminal designations, see [Annex G](#)

Internal Accessories

Shunt Trip



A shunt (normally de-energized) can be installed to trip the MCCB by applying voltage to the shunt coil.

| Part Number | Rated voltage | | Connection Type | Conductors | |
|--------------|---------------|-----------|----------------------|--------------------|---------------------|
| | AC (V) | DC (V) | | Minimum | Maximum |
| T2SH00LA10T | 110 | — | Cage Clamp | 0.5mm ² | 1.25mm ² |
| T2SH00LA20T | 200...240 | — | Cage Clamp | | |
| T2SH00LA40T | 380...450 | — | Cage Clamp | | |
| T2SH00LD01T | — | 12 | Cage Clamp | | |
| T2SH00LD02T | — | 24 | Cage Clamp | | |
| T2SH00LD04T | — | 48 | Cage Clamp | | |
| T2SH00LD10T | — | 100...120 | Cage Clamp | | |
| T2SH00LD20T | — | 200...240 | Cage Clamp | | |
| | | | | Size | Length |
| T2SH00LA10WA | 110 | — | Pre-wired cage clamp | 0.5mm ² | 500mm |
| T2SH00LA20WA | 200...240 | — | Pre-wired cage clamp | | |
| T2SH00LA40WA | 380...450 | — | Pre-wired cage clamp | | |
| T2SH00LD01WA | — | 12 | Pre-wired cage clamp | | |
| T2SH00LD02WA | — | 24 | Pre-wired cage clamp | | |
| T2SH00LD04WA | — | 48 | Pre-wired cage clamp | | |
| T2SH00LD10WA | — | 100...120 | Pre-wired cage clamp | | |
| T2SH00LD20WA | — | 200...240 | Pre-wired cage clamp | | |

| Rated voltage | AC (V) | | | DC (V) | | | | |
|-------------------------|----------------------------------|-----------|-----------|------------------------------------|-------|------|-----------|-----------|
| | 100...120 | 200...240 | 380...450 | 12 | 24 | 48 | 100...120 | 200...240 |
| Excitation current (mA) | 16.0 | 16.0 | 6.8 | 160.0 | 124.0 | 32.0 | 14.0 | 12.0 |
| Rated voltage range | 85% to 110% of the rated voltage | | | 75 % to 125 % of the rated voltage | | | | |
| Actuation Time | <30ms | | | <30ms | | | | |



Notice: The rated voltage range is from 85% to 110% of the rated voltage for AC and 75 % to 125 % for DC. Ensure that the voltage does not drop or exceed the voltage range when shunt is actuated.

Internal Accessories

Under Voltage Trips



A UVT (normally energized) can be installed to trip the MCCB removing voltage from the UVT coil.

| Part Number | Rated voltage | | Compatible MCCB | | Connection Type | Notes | Conductors | |
|---------------|---------------|-----------|-----------------|-----|----------------------|---------------|--------------------|---------------------|
| | AC (V) | DC (V) | 3P | 4P | | | Minimum | Maximum |
| T2UV00LA10NT | 100...120 | — | All | All | Cage Clamp | Instantaneous | 0.5mm ² | 1.25mm ² |
| T2UV00LA20NT | 200...240 | — | All | All | Cage Clamp | Instantaneous | | |
| T2UV00LA40NT | 380...450 | — | All | All | Cage Clamp | Instantaneous | | |
| T2UV00LD02NT | — | 24 | All | All | Cage Clamp | Instantaneous | | |
| T2UV00LD10NT | — | 100...120 | All | All | Cage Clamp | Instantaneous | | |
| T2UV00LD20NT | — | 200...240 | All | All | Cage Clamp | Instantaneous | | |
| | | | | | | | Size | Length |
| T2UV00LA10NWA | 100...120 | — | All | All | Pre-wired cage clamp | Instantaneous | 0.5mm ² | 500mm |
| T2UV00LA20NWA | 200...240 | — | All | All | Pre-wired cage clamp | Instantaneous | | |
| T2UV00LA40NWA | 380...450 | — | All | All | Pre-wired cage clamp | Instantaneous | | |
| T2UV00LD02NWA | — | 24 | All | All | Pre-wired cage clamp | Instantaneous | | |
| T2UV00LD10NWA | — | 100...120 | All | All | Pre-wired cage clamp | Instantaneous | | |
| T2UV00LD20NWA | — | 200...240 | All | All | Pre-wired cage clamp | Instantaneous | | |

| Rated Voltage | AC (V) | | | DC (V) | | |
|-------------------------------|-----------|-----------|-----------|--------|-----------|-----------|
| | 100...120 | 200...240 | 380...450 | 24 | 100...120 | 200...240 |
| Power supply requirement (VA) | 1.3 | 1.1 | 2.0 | | | |
| Excitation current (mA) | | | | 22.0 | 9.0 | 3.7 |
| Actuation Time | <50ms | | | <50ms | | |

For information regarding wiring and terminal designations, see [Annex G](#)

Under Voltage Trips (With Time Delay)

A UVT (normally energized) can be installed to trip the MCCB removing voltage from the UVT coil

| Part Number | Rated voltage | | Compatible MCCB | | Connection Type | Notes | Conductors | |
|--------------|---------------|-----------|-----------------|------------|-----------------|------------------|--------------------|---------------------|
| | AC (V) | DC (V) | 3P | 4P | | | Minimum | Maximum |
| T2UV00LA10DS | 100...110 | — | All | P160 / 250 | Cage Clamp | Time Delay 500ms | 0.5mm ² | 1.25mm ² |
| T2UV00LA24DS | 230...240 | — | All | P160 / 250 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LA40DS | 380...415 | — | All | P160 / 250 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LA45DS | 440...450 | — | All | P160 / 250 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LD02DS | — | 24 | All | P160 / 250 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LD10DS | — | 100...110 | All | P160 / 250 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LD24DS | — | 230...240 | All | P160 / 250 | Cage Clamp | Time Delay 500ms | | |
| | | | | | | | Minimum | Maximum |
| T2UV00LA10DL | 110 | — | Not Compatible | P400 / 630 | Cage Clamp | Time Delay 500ms | 0.5mm ² | 1.25mm ² |
| T2UV00LA24DL | 230...240 | — | | P400 / 630 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LA40DL | 380...415 | — | | P400 / 630 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LA45DL | 440...450 | — | | P400 / 630 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LD02DL | — | 24 | | P400 / 630 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LD10DL | — | 110 | | P400 / 630 | Cage Clamp | Time Delay 500ms | | |
| T2UV00LD24DL | — | 230 | | P400 / 630 | Cage Clamp | Time Delay 500ms | | |

| Rated Voltage | AC (V) | | | | DC (V) | | |
|-------------------------------|-------------|-----------|-----------|-----------|-------------|-----------|-----------|
| | 100...110 | 230...240 | 380...415 | 440...450 | 24 | 100...110 | 230...240 |
| Power supply requirement (VA) | 1.3 | 1.1 | 1.7 | 2.0 | | | |
| Excitation current (mA) | | | | | 22.0 | 8.1 | 3.7 |
| Actuation Time | 500 ± 300ms | | | | 500 ± 300ms | | |

For information regarding wiring and terminal designations, see [Annex G](#)

Installation

Precautions



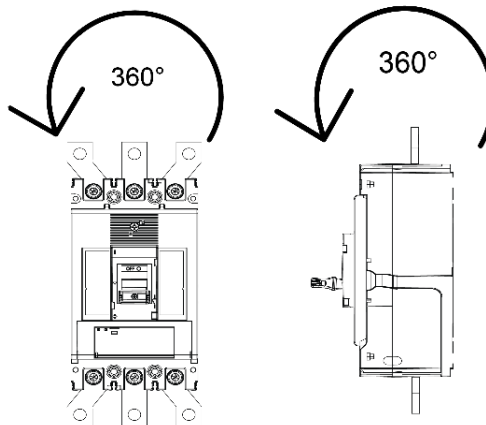
WARNING: To prevent electrical shock and damage to equipment, disconnect and isolate power source upstream of the MCCB before installing or servicing the MCCB including its connected accessories.



Notice: To ensure correct performance, and integrity of equipment, the installation instructions and recommendations provided herein shall be respected. Refer to the respective user manual and installation instructions provided with the MCCB and associated accessories.

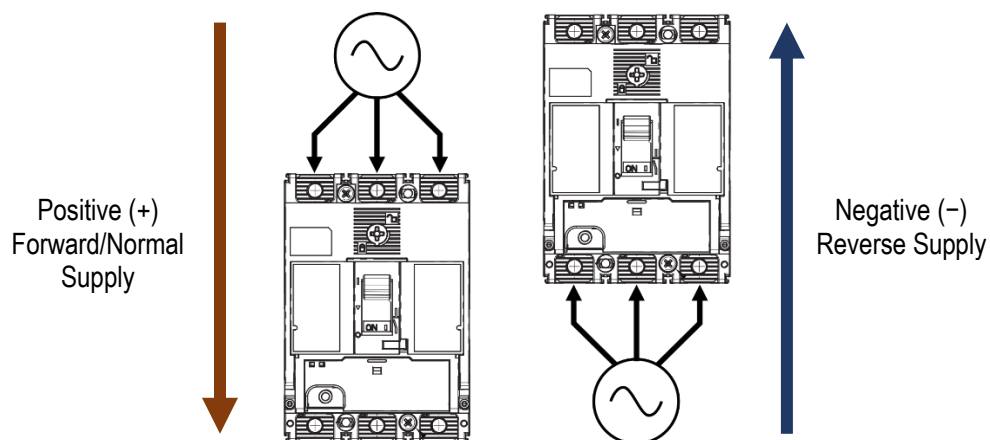
Mounting Angles

TemBreak *PRO* MCCBs may be mounted at any angle without affecting performance.



Direction of Power Supply

Power supply may be fed in either direction with respect to the MCCB without affecting performance.



Installation

Clearances

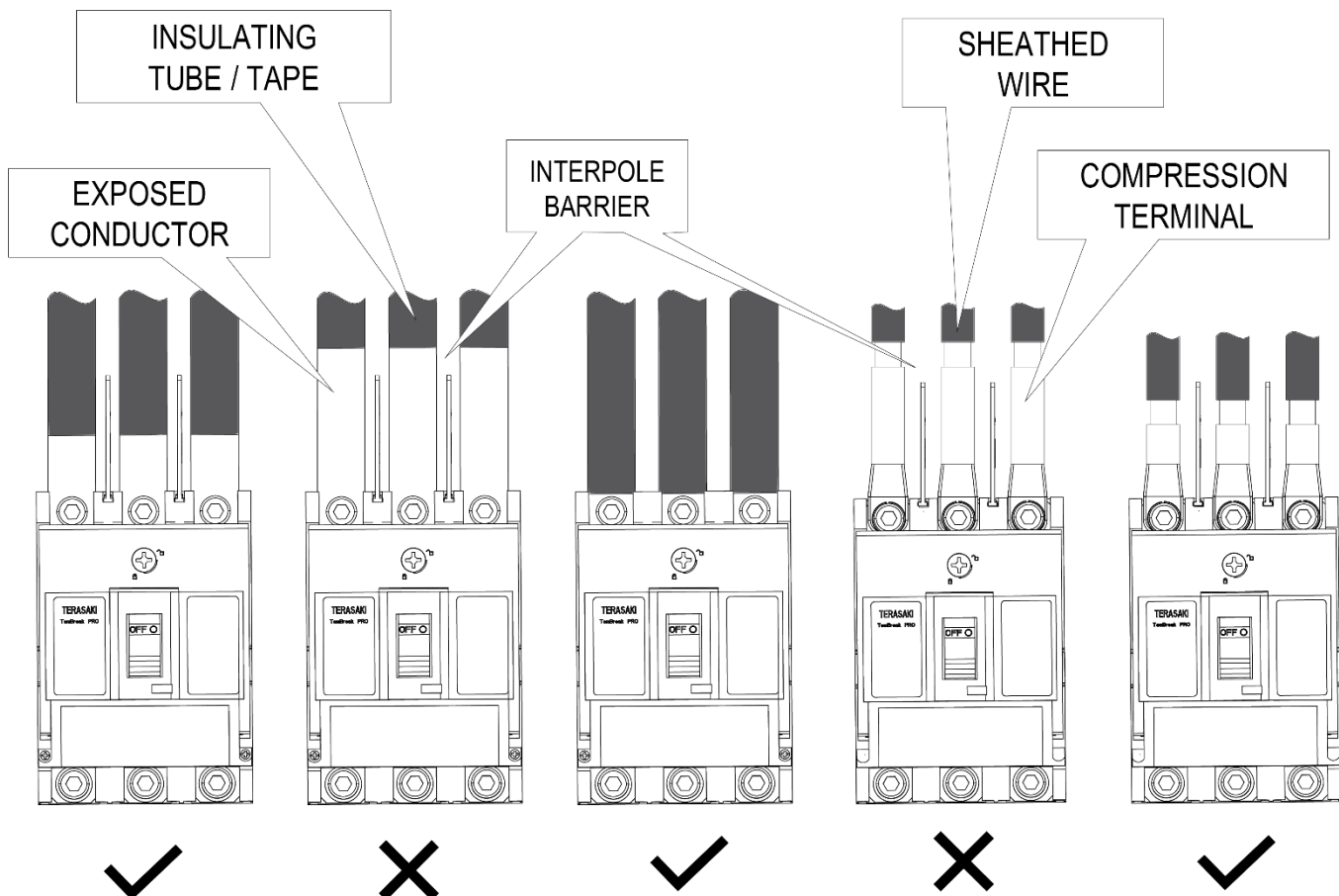


WARNING: Exposed conductors including terminals at attached busbars must be insulated to avoid possible short-circuit or earth faults due any foreign matter coming into contact with the conductors.

Phase to Phase and Earth

Interruption of large currents during fault or normal switching operation produces ionised gases and arcing materials which expelled from the vents at the top of the MCCB for P160/P250, and top and bottom for P400/P630. These ionised gases are highly conductive, concentrated, and at an elevated temperature when it exits the MCCB via the arc vents. Care must be taken to avoid an arcing fault from occurring due to the presence of concentrated ionised gases creating a conductive path between exposed conductors. Incoming conductors must therefore be insulated the full length up to the terminal opening of the MCCB, ensuring bare conductors are not exposed directly to concentrated ionised gases. This also applies to the attached busbars supplied as part of the MCCB.

Interpole barriers or terminal covers may be used to achieve creepage and clearance requirements. Conductors must not impede the flow of ionised gas and allow it to clear and disperse safely. Interpole barriers are supplied as standard with Terasaki MCCBs for the line side only. 2 barriers with 3P MCCBs and 3 with 4P MCCBs. In cases where two different MCCB types are installed one above the other, the insulation distance between the two models should be as for the lower model.



Installation

Insulating Distance

When earth metal is installed within proximity of the breakers, the correct insulating distance must be maintained, (refer to Minimum Clearance). This distance is necessary to allow the exhausted arc gases to disperse. This could include the mounting plate or side panel within a switchboard.

Minimum Clearance

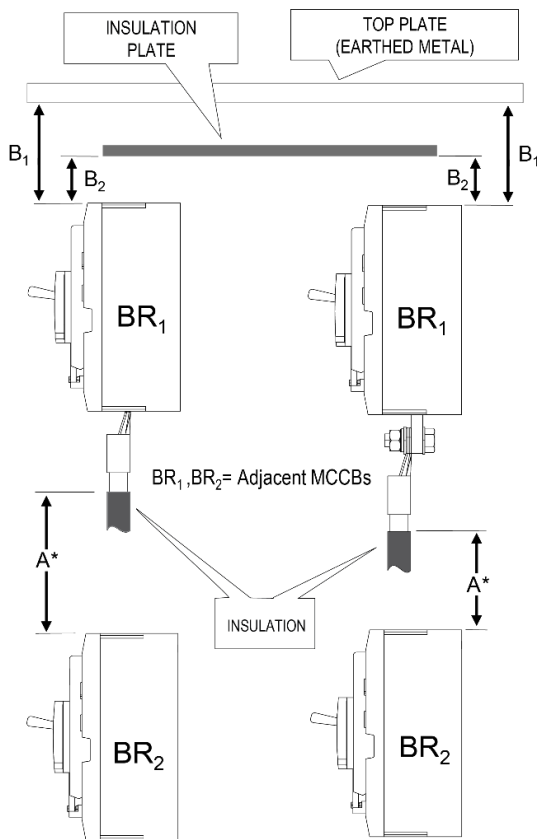
Below illustrates the minimum clearance that must be maintained.



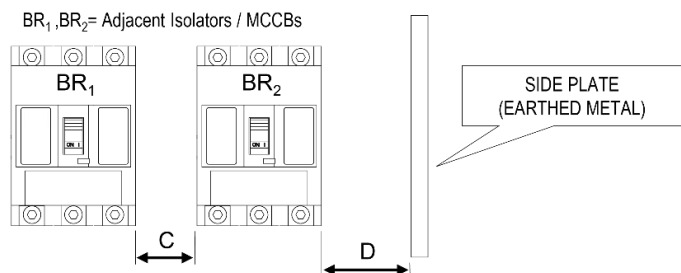
WARNING: Ensure that the exposed conductors are insulated until it overlaps the moulded case breaker at the terminal, or the terminal cover.

| Dim. | Description |
|----------------|--|
| A | Distance from lower breaker to open charging part of terminal on upper breaker (front connection) or the distance from lower breaker to upper breaker end (rear connection and plug-in type) |
| B ₁ | Distance from breaker end to ceiling (earthed metal) |
| B ₂ | Distance from breaker end to insulator |
| C | Clearance between breakers |
| D | Distance from breaker side to side plate (earthed metal) |
| E | Length of insulation over exposed conductors. |

| MCCB Cat. No. | Distances (mm) | | | | |
|-----------------------|----------------|----------------|----------------|---|----|
| | A | B ₁ | B ₂ | C | D |
| P160F | 50 | 10 | 10 | 0 | 25 |
| P160N / H / D | 75 | 45 | 25 | 0 | 25 |
| P250F | 50 | 40 | 30 | 0 | 25 |
| P250N / H / D | 80 | 80 | 30 | 0 | 25 |
| P400E / F / N / H / D | 100 | 80 | 60 | 0 | 80 |
| P400S | 120 | 120 | 80 | 0 | 80 |
| P630E / F / N / H / D | 100 | 80 | 60 | 0 | 80 |
| P630S | 120 | 120 | 80 | 0 | 80 |



*distance from conductor insulation to downstream MCCB



Installation

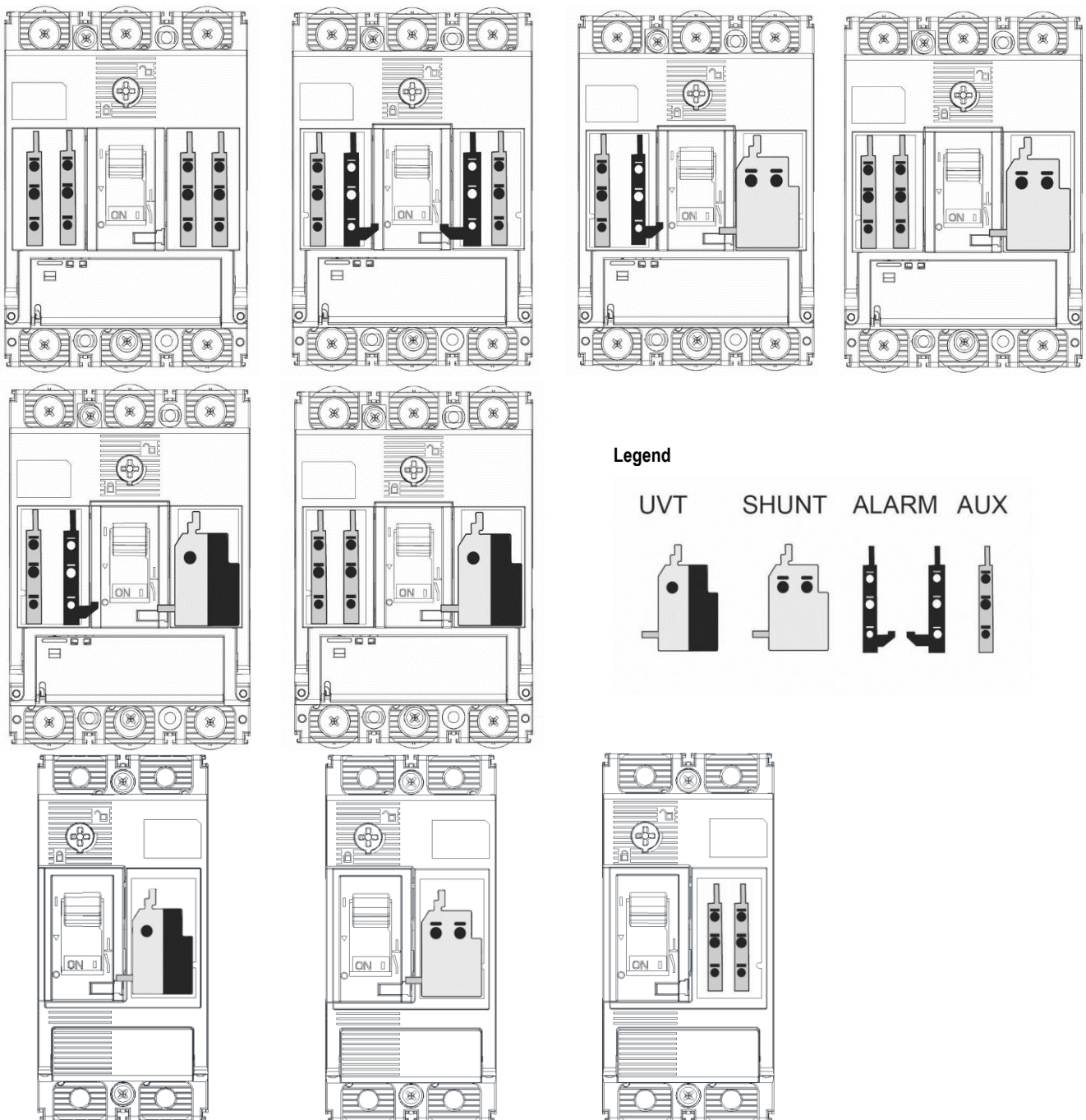
Internal Accessory Mounting Locations

P160, P250 and P400/630 frame sizes have different internal mounting locations for auxiliary contacts, alarm contacts, shunts and, UVTs.

Left-side and right-side mounting locations are independent and accept unique combinations. For example, shunts and UVTs may only be mounted on the right side, whereas auxiliary and alarm contacts may be mounted on either left or right side.

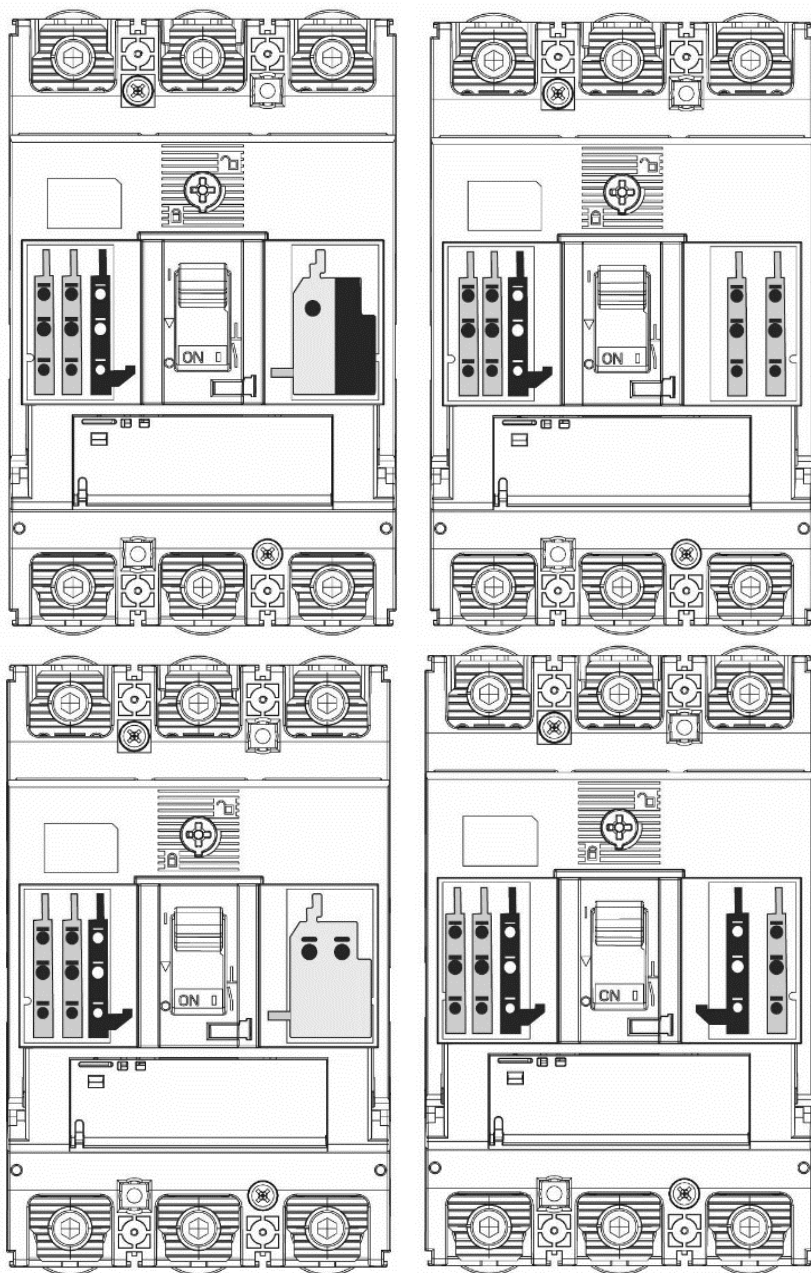
Refer to the following illustrations for each frame size listing the various possible internal accessories combinations.

P160 internal accessories combination

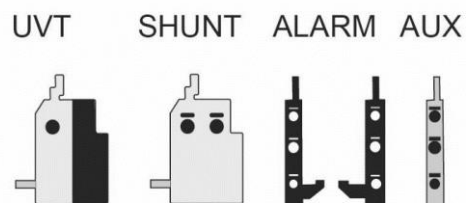


Installation

P250 internal accessories combination

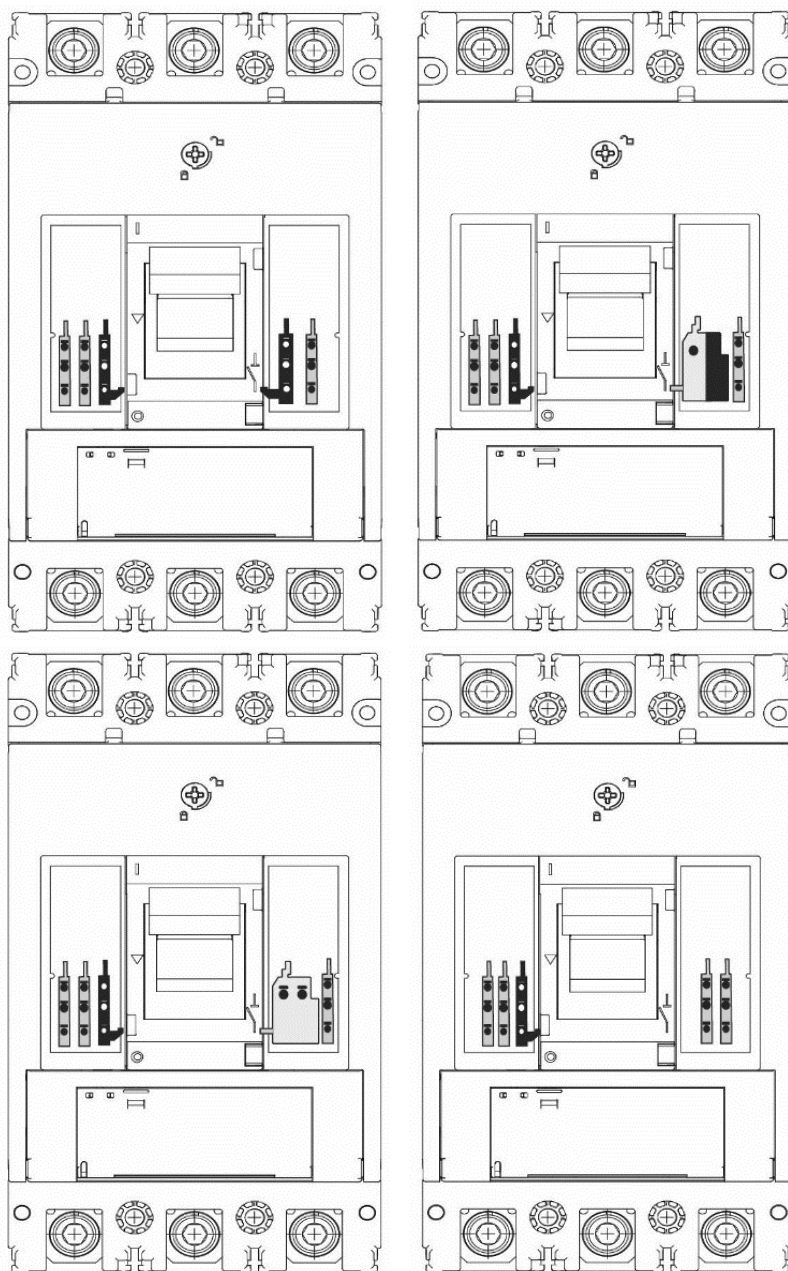


Legend

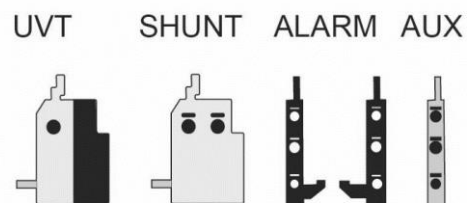


Installation

P400/630 internal accessories combination



Legend



Notice: Only 2 internal accessories can be mounted on the right-hand side of a P400 and P630 MCCB. Under no circumstances can 3 or more be installed.

Examples:

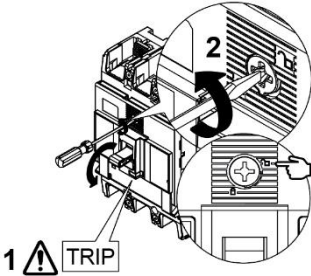
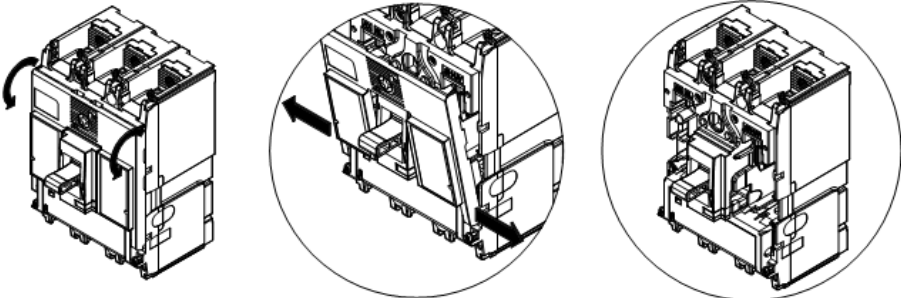
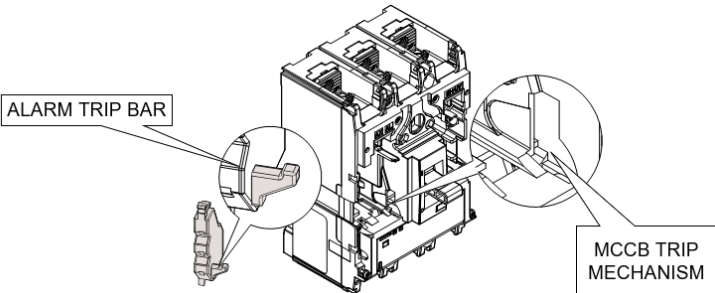
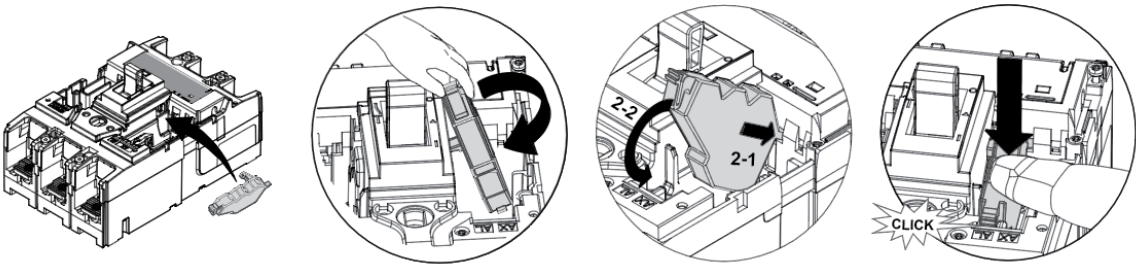
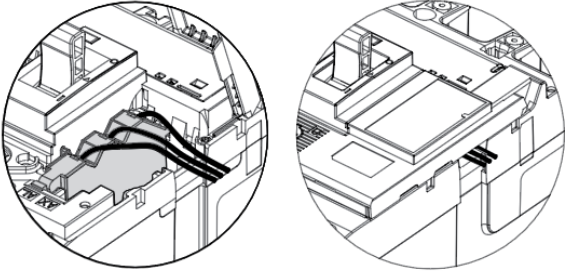
- 2 AUX
- 1 Alarm and 1 AUX
- 1 Shunt and 1 AUX
- 1 UVT and 1 AUX

Installation

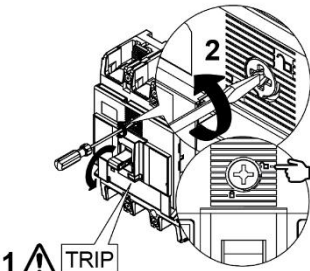
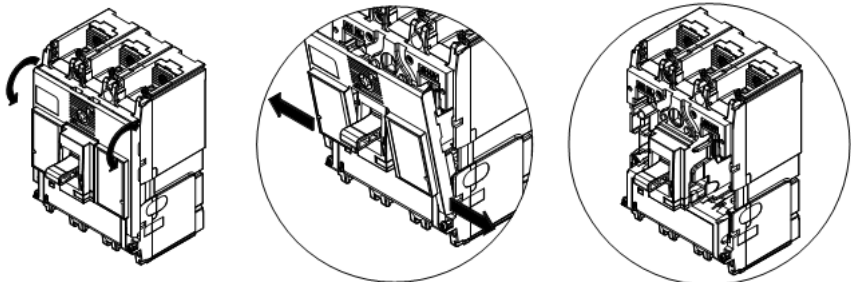
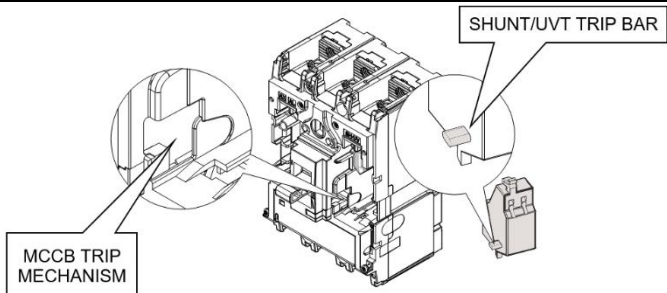
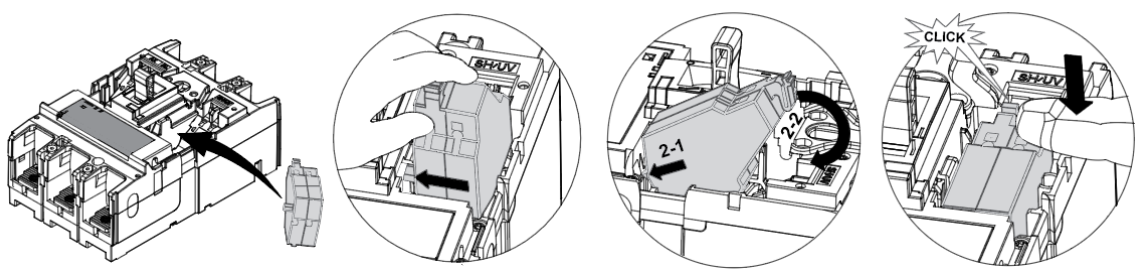
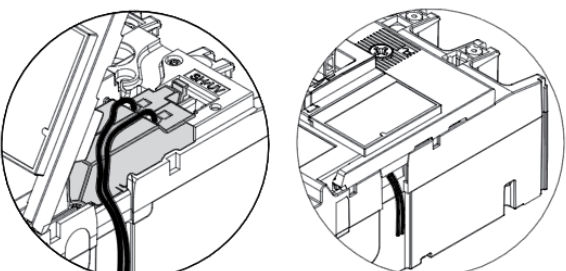
Alarm, Shunt & UVT Installation

The alarm, shunt and UVT have a trip bar that needs to interact with the MCCBs trip mechanism. As such they must be installed in a specific way. Refer to the supplied Installation Instructions for the respective accessories for further detail.

Standard Alarm & Auxiliary installation

| Action | Note |
|--|--|
| 1 Switch the Smart MCCB to the Tripped Position. |  |
| 2 Open the front cover of the MCCB. |  |
| 3 Locate the alarm's trip bar into the MCCB trip mechanism slot. |  |
| 4 The alarm will need to be rolled into place, follow the images to the right. |  |
| 5 Run the wires out the left-hand side of the MCCB, through the allocated groves. |  |

Shunt & UVT installation

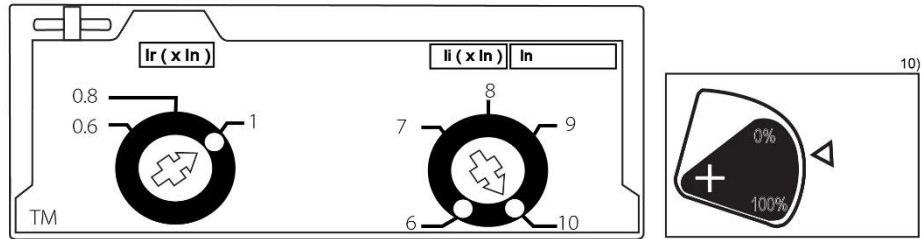
| Action | Note |
|--|--|
| 1 Switch the Smart MCCB to the Tripped Position. |  |
| 2 Open the front cover of the MCCB. |  |
| 3 Locate the shunt or UVT's trip bar into the MCCB trip mechanism slot. |  |
| 4 The shunt or UVT will need to be rolled into place, follow the images to the right. |  |
| 5 Run the wires out the right-hand side of the MCCB, through the allocated groves. |  |

Protection Settings

Trip Curve

The TemBreak *PRO* P_TM thermal magnetic trip unit protects against overcurrent and short circuit faults for many types of electrical distribution systems. The P_TM OCR has protective characteristics according to the requirements of the standard AS/NZS IEC 60947-2.

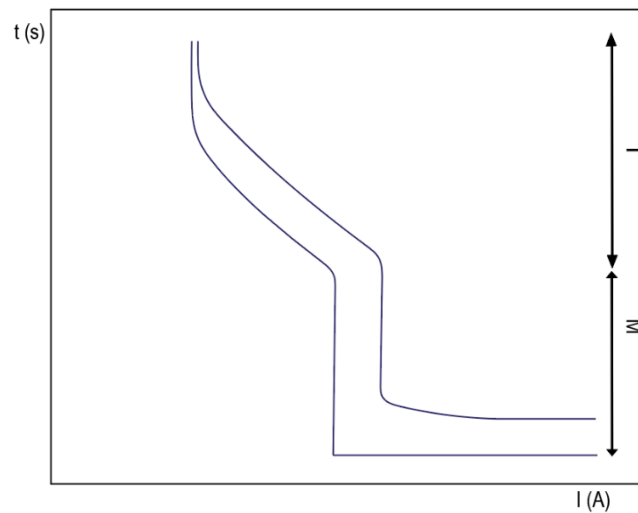
The P_TM OCR consists of a standard 2 dial type (blue coloured dials) which features thermal adjustment and magnetic adjustment. 4P MCCBs also feature a third dial for neutral protection adjustment.



List of Protection Functions

| Abbreviation | Description | Protection against | Symbol | Definition |
|--------------|-------------|----------------------------------|--------|-------------------------------|
| T | Thermal | Low level current overload | I_r | Threshold thermal protection |
| M | Magnetic | High level current short-circuit | I_i | Threshold magnetic protection |

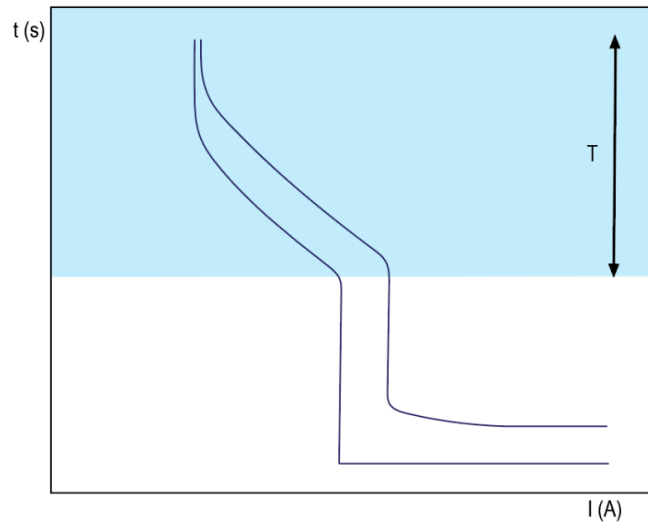
Time-current curve



Protection Settings

Thermal protection

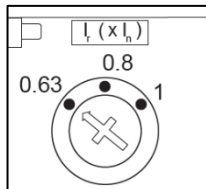
The thermal protection is designed to protect against current overloads or surges in power distribution or motor control applications. Thermal protection is an inverse-time protection, labeled as I_r .



TM – Adjusting I_r (Current)

The thermal protection trip range is: $0.63 - 1.0 \times I_n$ according to standard AS / NZS / IEC 60947-2. The thermal protection is calibrated to 50°C , with the exception of the P630 frame which is calibrated to 30°C .

The I_r trip threshold is adjusted using the I_r dial on the front of the MCCB: It is continuously adjustable between $0.63 \times I_n$ to $1.0 \times I_n$, with reference labels of 0.63, 0.8 and 1.0 on the I_r dial.



| Thermal Protection Settings (I_r) | | |
|---------------------------------------|-----------------------------|------------------------------|
| Rating (I_n) | Dial Range ($\times I_n$) | Adjustable Current Range (A) |
| 20 A | 0.63 ... 1.0 | 12.5 ... 20 |
| 32 A | 0.63 ... 1.0 | 20 ... 32 |
| 50 A | 0.63 ... 1.0 | 32 ... 50 |
| 63 A | 0.80* ... 1.0 | 50 ... 63 |
| 100 A | 0.63 ... 1.0 | 63 ... 100 |
| 125 A | 0.63 ... 1.0 | 80 ... 125 |
| 160 A | 0.63 ... 1.0 | 100 ... 160 |
| 200 A | 0.63 ... 1.0 | 125 ... 200 |
| 250 A | 0.63 ... 1.0 | 160 ... 250 |
| 400 A | 0.63 ... 1.0 | 250 ... 400 |
| 630 A | 0.63 ... 1.0 | 400 ... 630 |



Notice: P630_TM MCCB thermal protection is calibrated to 30°C



Notice: The adjustable range of P160_63TM is 0.8 – 1.0

Protection Settings

Thermal protection

FF – Fixed I_r (Current)

The thermal protection of the FF type OCR is fixed to the rated current of the MCCB (I_n). The options for the various MCCB rated currents and the associated thermal trip threshold currents are as follows:

| Thermal Protection Settings (I_r) | |
|---------------------------------------|----------------------------------|
| Rated (I_n) | Thermal trip threshold (I_r) |
| 15 A | 15 A |
| 20 A | 20 A |
| 30 A | 30 A |
| 40 A | 40 A |
| 50 A | 50 A |
| 60 A | 60 A |
| 75 A | 75 A |
| 100 A | 100 A |
| 125 A | 125 A |

Labelling of Calibrated Points

I_r dial of the MCCB has been calibrated for points 0.63, 0.8 & 1 x I_n .

I_r calibration points are marked as follows:

Red: 1.0 x I_n

Blue: 0.8 x I_n

Black: 0.63 x I_n



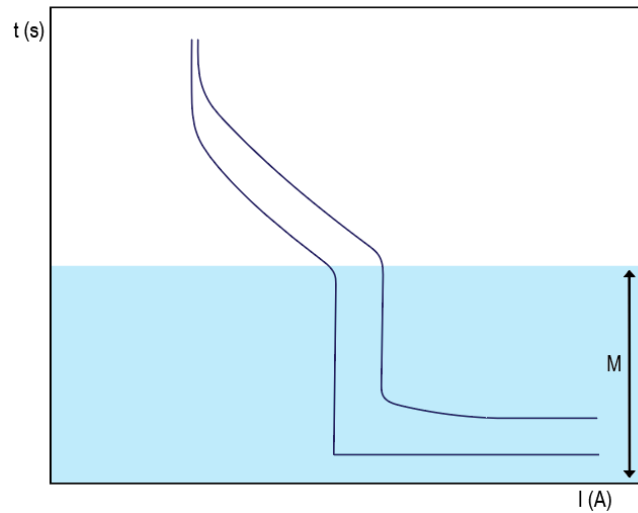
WARNING: Setting I_r dial outside of the calibrated zone (0.63 - 1) may cause unpredictable behaviour of the MCCB.

Protection Settings

Magnetic Protection

The magnetic protection is designed to protect against fast high current faults such as short circuits, labeled as I_i . P_TM MCCBs are available in magnetic only for instantaneous trip exclusively.

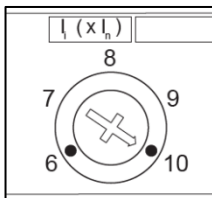
I_i has incremental adjustments dependent on frame size and I_n .



TM – Adjusting I_i (Current)

I_i is the magnetic element adjustment dial and is used to set the short circuit tripping threshold to suit the application. I_i adjustments are performed in set increments, such as those shown represented for example: 6 – 8 – 10 – 13 x I_n .

The I_i trip threshold is adjusted using the I_i dial on the front of the MCCB: It is adjustable in set increments as multiples of I_n . For example, 6 – 7 – 8 – 9 – 10 x I_n .



Notice: Only calibrated multiple increments are labelled on the I_i dial. Dial positions between these labelled positions are not defined.

Example: dial position between 8 and 9. The I_i threshold current is set to a value which is greater than 8 x I_n and less than 9 x I_n , but does not have a defined I_i value.

Protection Settings

Magnetic Protection

FF – Fixed I_i (Current)

The magnetic protection of the FF type OCR is fixed to a multiple the rated current of the MCCB (I_n) where $I_i = 12 \times I_n$. The options for the various MCCB rated currents and the associated magnetic trip threshold currents are as follows:

| Magnetic Protection Settings (I_i) | |
|--|-----------------------------------|
| Rated (I_n) | Magnetic trip threshold (I_i) |
| 15 A | 180 A |
| 20 A | 240 A |
| 30 A | 360 A |
| 40 A | 480 A |
| 50 A | 600 A |
| 60 A | 720 A |
| 75 A | 900 A |
| 100 A | 1200 A |
| 125 A | 1500 A |

Pressure Trip

The TemBreak PRO P model 400 and 630 Thermal Magnetic MCCBs have a built-in Pressure Trip feature. This Pressure Trip assists the instantaneous coil in reducing the total clearing time of the MCCB in fault levels beyond the MCCB's maximum instantaneous settings.

Total clearing time of the MCCB beyond the instantaneous settings vary based on the frame size and fault level, see table below.

| MCCB | Trip Unit Ratings (I_n) | Total Clearance Time | | | | | |
|---------|-----------------------------|----------------------|-------|------|------|------|-------|
| | | 15kA | 25kA | 36kA | 50kA | 70kA | 110kA |
| P400_TM | 250 400 | <12ms | <10ms | | | | |
| P630_TM | 630 | <12ms | <10ms | | | | |

Protection Settings

Magnetic Protection

Adjusting I_i (Current)

Multiple increments shown on the label differ depending on the MCCB frame size and OCR rating. The below tables provide the available increments which may be set per MCCB and OCR combination, and the resulting I_i current threshold.

| Magnetic Protection (I_i) settings | | | |
|--|------------------|--------------------------|---|
| MCCB | Rating (I_n) | Dial position (x I_n) | I_i current (A) |
| P160 | 20 A | 6 – 8 – 10 – 12 | 120 – 160 – 200 – 240 |
| | 32 A | 6 – 8 – 10 – 12 | 196 – 256 – 320 – 384 |
| | 50 A | 6 – 8 – 10 – 12 | 300 – 400 – 500 – 600 |
| | 63 A | 6 – 8 – 10 – 12 | 378 – 504 – 630 – 756 |
| | 100 A | 6 – 8 – 10 – 12 | 600 – 800 – 1000 – 1200 |
| | 125 A | 6 – 8 – 10 – 12 | 750 – 1000 – 1250 – 1500 |
| | 160 A | 6 – 7 – 8 – 9 – 10 | 960 – 1120 – 1280 – 1440 – 1600 |
| P250 | 50 A | 6 – 8 – 10 – 13 | 300 – 400 – 500 – 650 |
| | 63 A | 6 – 8 – 10 – 13 | 378 – 504 – 630 – 819 |
| | 100 A | 6 – 8 – 10 – 13 | 600 – 800 – 1000 – 1300 |
| | 125 A | 6 – 8 – 10 – 13 | 750 – 1000 – 1250 – 1625 |
| | 160 A | 6 – 8 – 10 – 13 | 960 – 1280 – 1600 – 2080 |
| | 200 A | 6 – 8 – 10 – 13 | 1200 – 1600 – 2000 – 2400 |
| | 250 A | 6 – 7 – 8 – 9 – 10 | 1500 – 1750 – 2000 – 2250 – 2500 |
| P400 | 250 A | 6 – 7 – 8 – 9 – 10 | 1500 – 1750 – 2000 – 2250 – 2500 |
| | 400 A | 6 – 7 – 8 – 9 – 10 | 2400 – 2800 – 3200 – 3600 – 4000 – 4400 |
| P630 | 630 A | 4 – 5 – 6 – 7 – 8 | 2520 – 3150 – 3780 – 4410 – 5040 |

Protection Settings

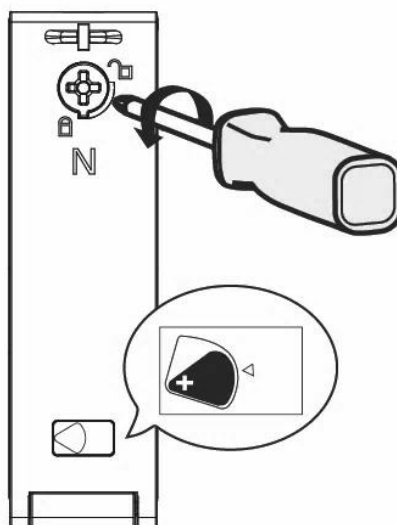
Neutral Protection

Neutral protection is available with 4P P_{TM} MCCBs as standard. It is particularly useful when the cross-section of the neutral conductor is reduced in relation to the phase conductors.

When enabled via the provided selector switch, neutral protection provides both thermal and magnetic protection of the Neutral pole, which follows the parameters I_r and I_i as adjusted for the main phases.

When disabled, only thermal protection of the Neutral pole is disabled. Magnetic protection of the Neutral pole is always enabled, regardless of the position of the selector switch.

| | Neutral Protection selector position | |
|---------------------|--------------------------------------|-------------|
| | OFF | ON |
| Thermal protection | $I_N = \text{disabled}$ | $I_N = I_r$ |
| Magnetic protection | I_i | I_i |



Protection Settings

Temperature Ratings

The P_TM MCCB is fitted with a thermomagnetic trip unit which has its thermal element set for a specific calibration temperature. The P_TM MCCBs have been calibrated for operation at 50°C for all frame sizes except for the P630_TM which is calibrated to 30°C.



Notice: Due to the nature of thermal protection, it is not possible to set I_r to an exact value. Ambient temperatures and conductor temperatures will have an effect. The P_TM MCCBs have been calibrated for operation at 50°C.
Exception P630_TM calibrated to 30°C

For ambient temperatures other than 50°C, with the maximum setting, the variation of thermal current threshold is given in the tables as follows:

Refer to [Annex F – Temperature Calibration Tables](#) for details on temperature deratings.

Commissioning

Thermal Setting (I_r)



WARNING: Risk of nuisance tripping.
Only qualified personnel are to set the protection levels. Failure to respect these instructions may cause death, serious injuries or equipment damage.



WARNING: Setting I_r dial outside of the calibrated zone (0.63 - 1) may cause unpredictable behaviour of the MCCB.

| Action | Note / Illustration |
|--|--|
| <p>1 Switch the MCCB to the OFF Position. Open the transparent flap in order to access the max I_r adjustment dial.</p> | |
| <p>2 Using a PH1, PH2 or PZ2 size screwdriver, rotate the I_r adjustment dial to the desired value of I_r in Amperes.</p> <p>I_r calibration points are marked as follows: Red: $1.0 \times I_n$ Blue: $0.8 \times I_n$ Black: $0.63 \times I_n$</p> | <p>Note: The adjustments for I_r are continuous and not discrete.</p> |



Notice: Due to the nature of thermal protection, it is not possible to set I_r to an exact value. Ambient temperatures and conductor temperatures will have an effect. The P_TM MCCBs have been calibrated for operation at 50°C.
Exception P630_TM calibrated to 30°C

Commissioning

Magnetic Setting (I_i)



WARNING: Risk of nuisance tripping.
Only qualified personnel are to set the protection levels. Failure to respect these instructions may cause death, serious injuries or equipment damage.

| Action | Note / Illustration |
|---|---------------------|
| <p>Switch the MCCB to the OFF Position.</p> <p>1 Open the transparent flap in order to access the max I_i adjustment dial</p> | |
| <p>Using a PH1, PH2 or PZ2 size screwdriver, rotate the I_i adjustment dial to the required multiple of I_n.</p> <p>2</p> | |

Commissioning

Neutral Protection Setting (N)



WARNING: Risk of nuisance tripping.
Only qualified personnel are to set the protection levels. Failure to respect these instructions may cause death, serious injuries or equipment damage.

| Action | Note / Illustration |
|--|--|
| <p>1</p> <p>Switch the MCCB to the OFF Position. Open the transparent flap in order to access the 4th Pole Neutral adjustment dial.</p> | |
| <p>2</p> <p>Using a PH1, PH2 or PZ2 size screwdriver, rotate the Neutral protection adjustment dial to 0% or 100%. 0% = OFF 100% = ON</p> | <p>Note: N-pole instantaneous (li) tripping will remain ON at all times.</p> |

Troubleshooting

In the event of a problem when using the TemBreak *PRO* system, this section provides advice on how to resolve issues.

| | Problem description | Possible cause | Remedial advice |
|---|---|---|--|
| 1 | Abnormal voltage on load side | Excessive wear of contacts | Replace MCCB. |
| | | Foreign matter interfering with contacts or contact surfaces | |
| 2 | Failure in ON position | Reset operation not conducted after tripping operation. | Perform reset operation. |
| 3 | Failure in RESET position | UVT not energised | Apply voltage to UVT |
| | | Circuit breaker service life ended due to large number of switching cycles using SHT or UVT | Replace MCCB |
| | | Fault of tripping mechanism | |
| 4 | Nuisance tripping while rated current not reached | Vibration and/or shock | Dampen vibration of MCCB and review installation requirements |
| | | High proportion of high frequency distortion in load current. | Decrease distortion content of load circuit |
| | | Electromagnetic induced interference (from nearby conductors or external radio sources) | Review nearby sources of conducted and radiated emissions (e.g. radio sources, high-speed switching devices including variable frequency drives) |
| | | Excessive surge | Isolate and mitigate surge source (e.g. surge protection devices) |
| | | Erroneous connection of control circuit for SHT or UVT | Verify control wiring and supply to SHT and UVT |
| 5 | Nuisance tripping due to starting current | Excessive inrush starting current due to load type | Review INST and STD protection settings for load type where applicable |
| | | Switching operation of star-delta motor starter, incorrect wiring | Verify and correct any issues with star-delta starter wiring with respect to the motor windings and phase sequence. Refer to motor and/or starter manufacturer |
| | | Short-circuit in motor (e.g. windings, starter circuit) | Verify and correct any issues with motor wiring. Inspect and verify motor winding insulation. Refer to motor manufacturer |
| | | Erroneous connection of control circuit for SHT or UVT | Verify control wiring and supply to SHT and UVT |
| 6 | No trip at pickup current | Failure in selectivity/coordination with upstream circuit breaker or fuse | Review selectivity/coordination study and protection parameters of each device |
| | | Incorrect protection settings | Review enabled protection settings ensuring correct pickup current and time-delay for load type. (e.g. LTD, STD, INST pickup currents and time delays) |

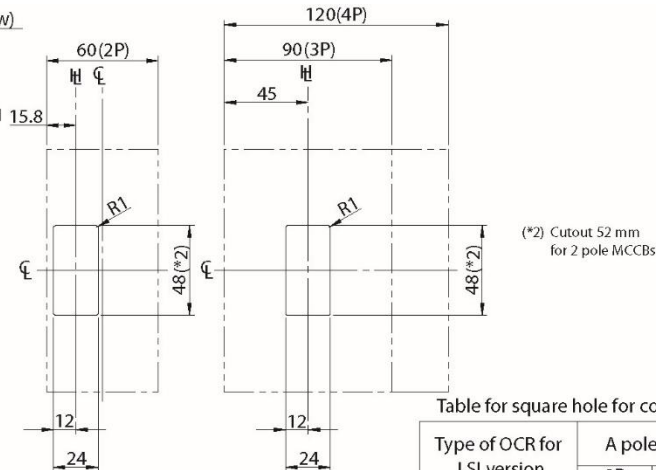
Annex A – Dimensions

P160 Dimensions

Panel cutout (top view)

for Cutout B

Panel cutout dimensions shown give an allowance of 1.0 mm or more around the handle escutcheon



Preparation of conductor

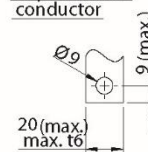
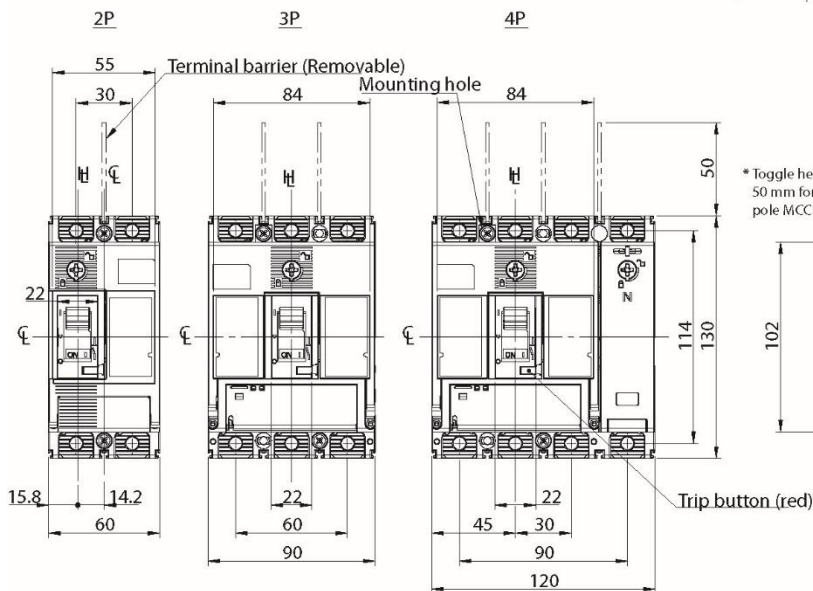
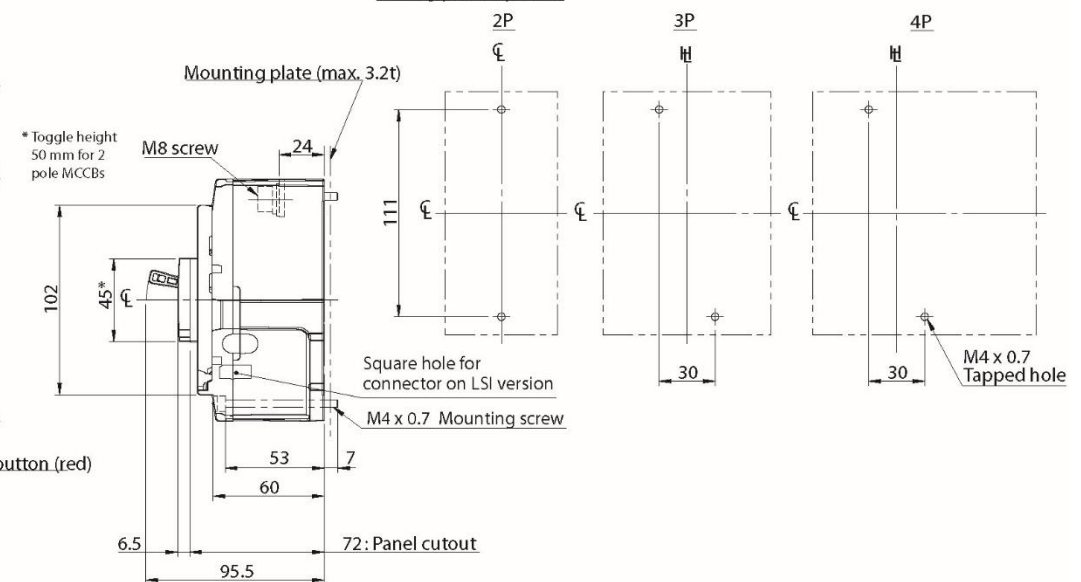


Table for square hole for connector on LSI version

| Type of OCR for LSI version | A pole (PAP) | | C/N pole (ECP) | |
|-----------------------------|--------------|------|----------------|----|
| | 3P | 4P | 3P | 4P |
| LSI | Hole | Hole | no | no |
| LSIG | Hole | Hole | Hole | no |



Drilling plan (top view)



Annex A – Dimensions

P160 with Rear Connect

Panel cutout dimensions
shown give an allowance
of 1.0 mm or more around
the handle escutcheon

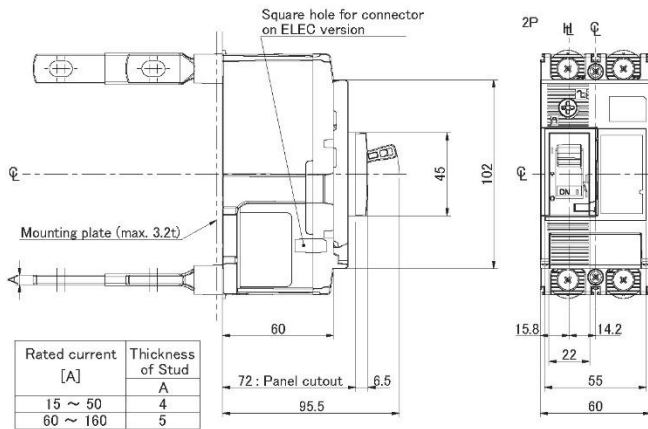
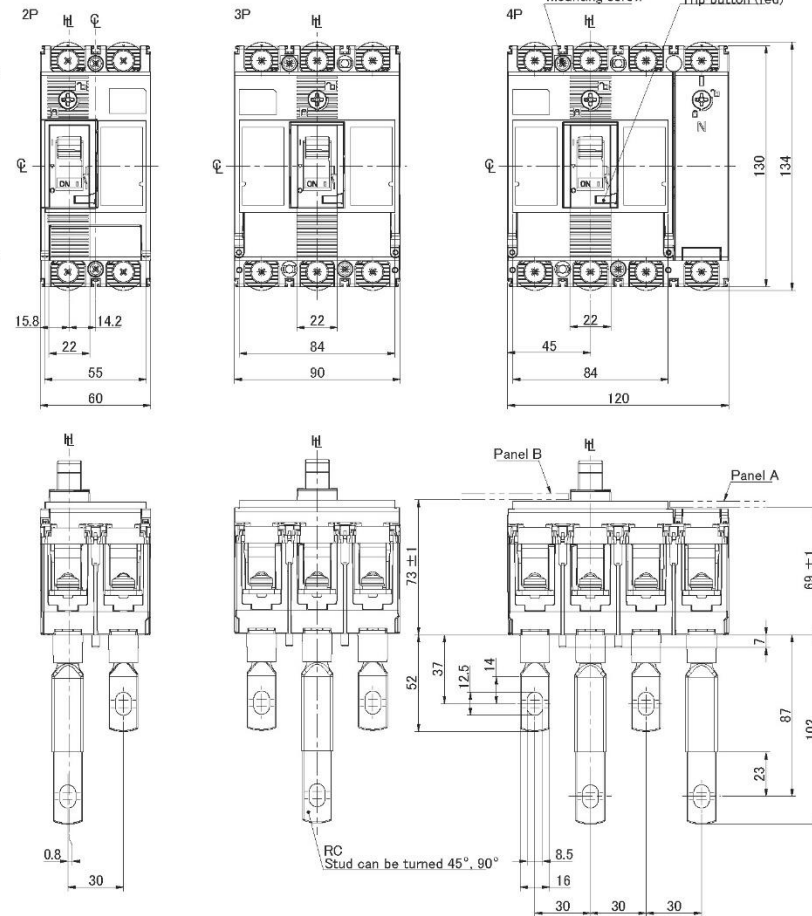
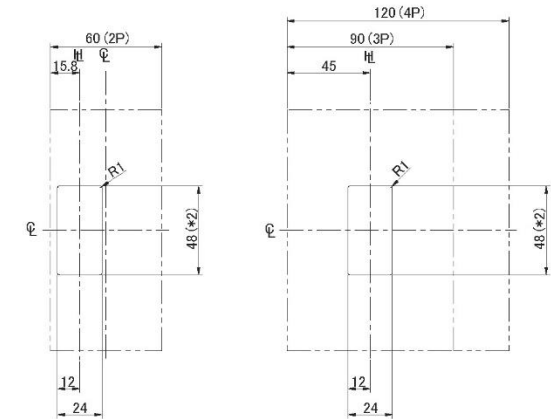


Table for square hole for connector on ELEC version

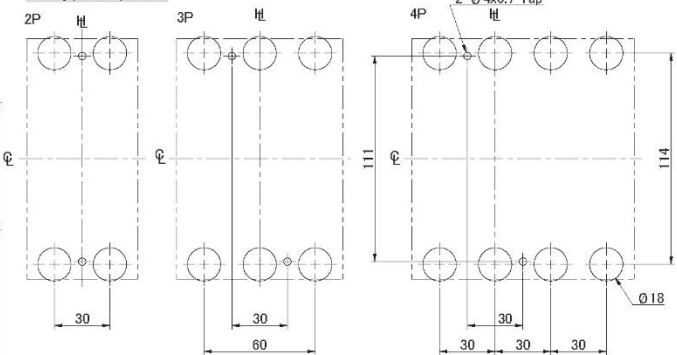
| Type of OCR for ELEC version | A pole (PAP) | |
|---------------------------------|--------------|------|
| | 3P | 4P |
| LSI | Hole | Hole |
| LSIG | Hole | Hole |



Panel cutout (top view) for Cutout B

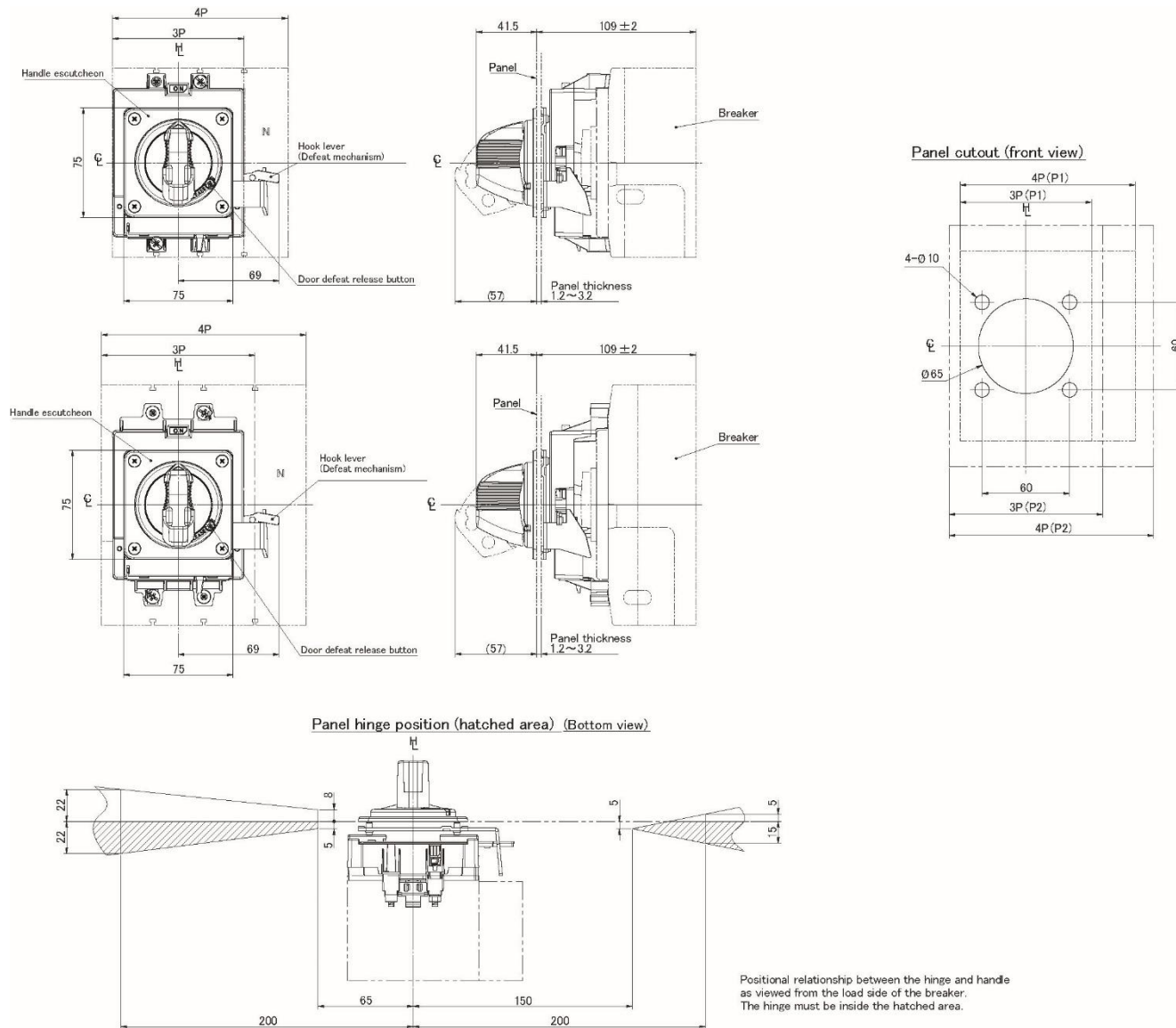


Drilling plan (top view)



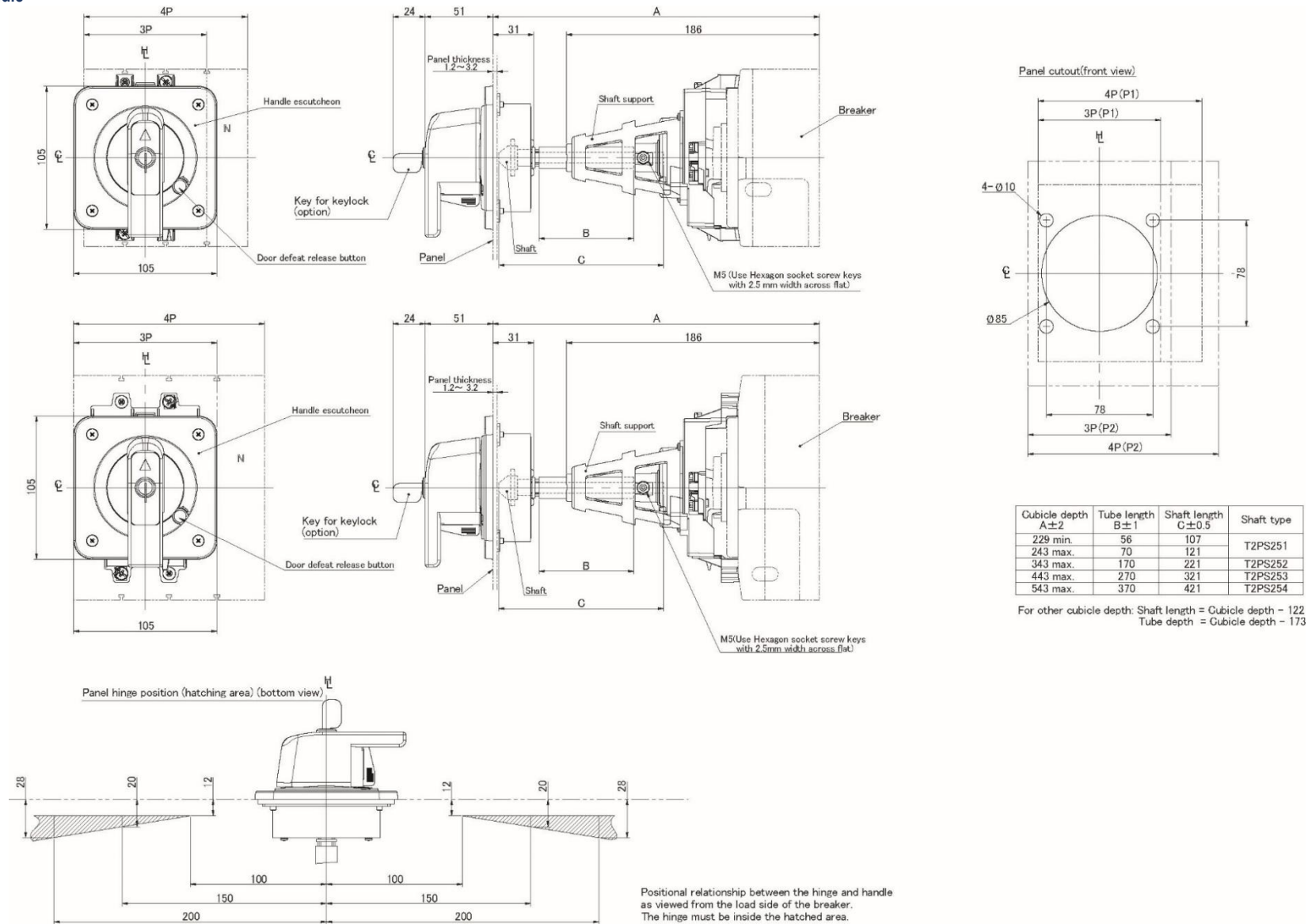
Annex A – Dimensions

P160 with HB Handle



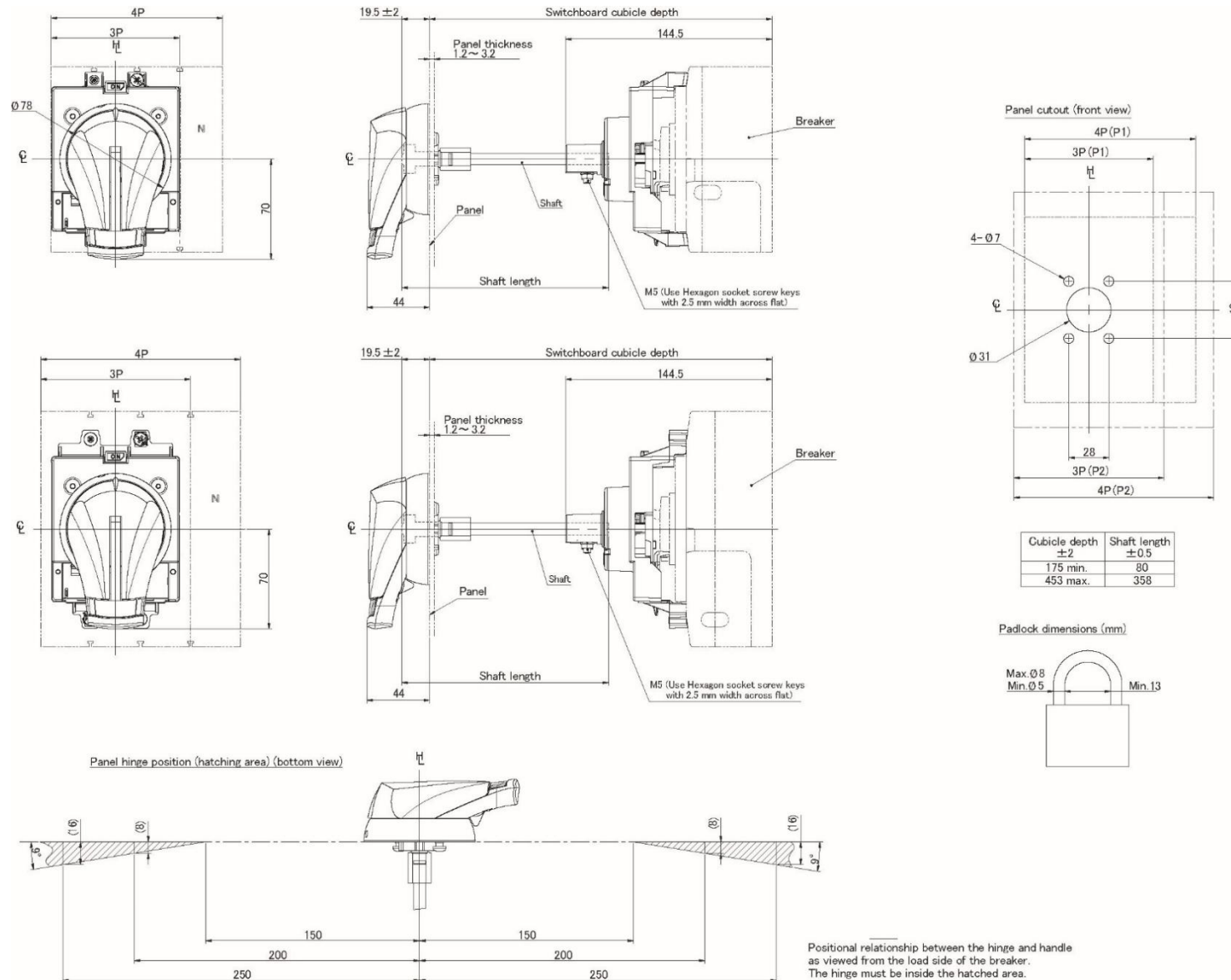
Annex A – Dimensions

P160 with HP Handle



Annex A – Dimensions

P160 with HS Handle



P250 Dimensions

for Cutout B

Panel cutout dimensions shown
give an allowance of 1.0 mm or more
around the handle escutcheon

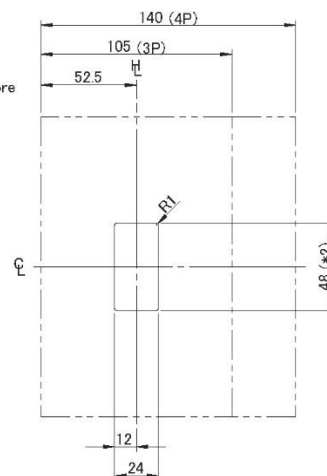
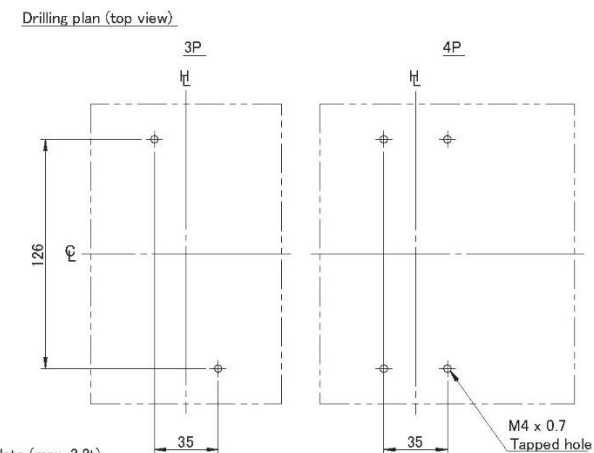
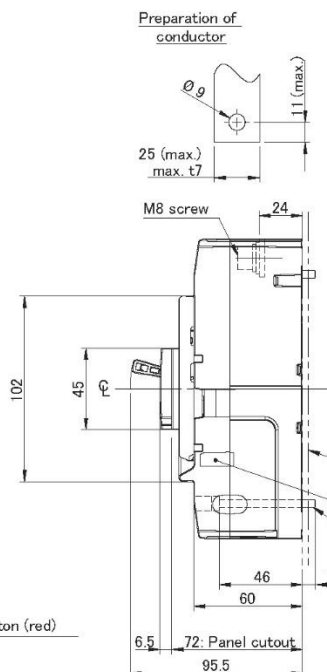
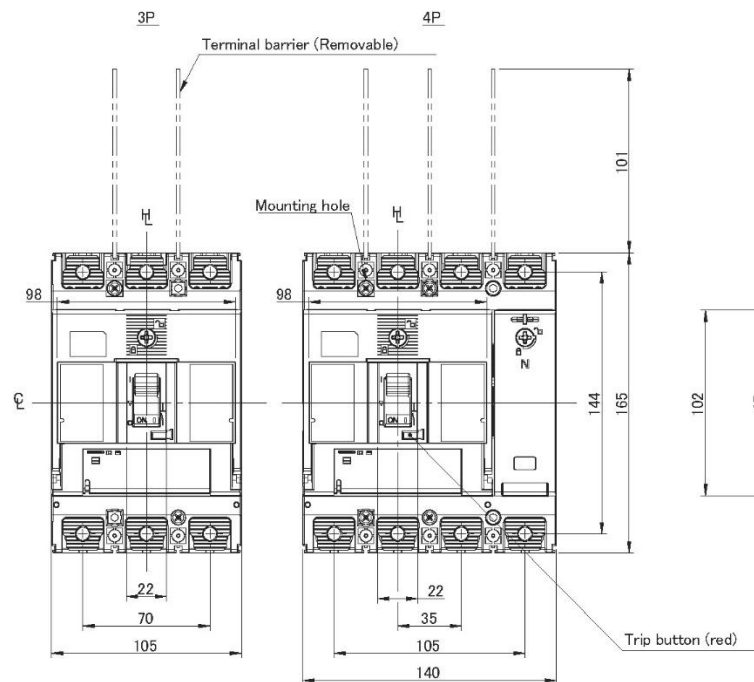


Table for square hole for connector on LSI version

| Type of OCR for LSI version | A pole (PAP) | | C/N pole (ECP) | |
|--------------------------------|--------------|------|----------------|----|
| | 3P | 4P | 3P | 4P |
| LSI | Hole | Hole | no | no |
| LSIG | Hole | Hole | Hole | no |

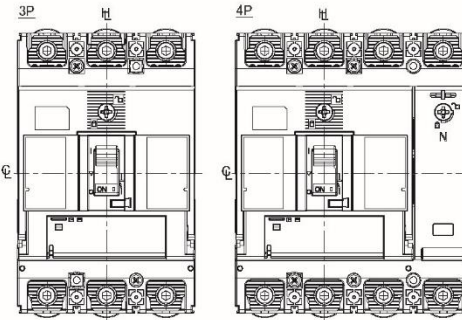
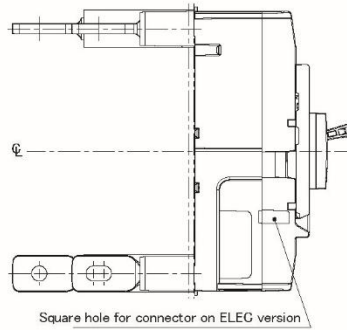


Annex A – Dimensions

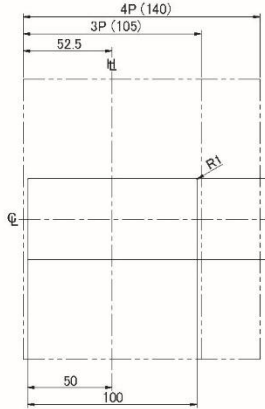
P250 with Rear Connect

Table for square hole for connector on ELEG version

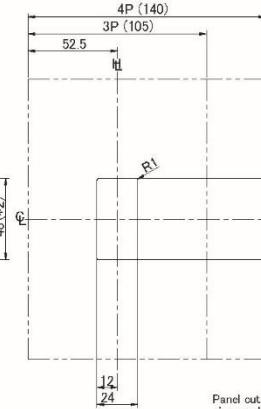
| Type of OCR for ELEG version | A pole (PAP) | |
|------------------------------|--------------|------|
| | 3P | 4P |
| LSI | Hole | Hole |
| LSIG | Hole | Hole |



Panel cutout (front view) for Cutout A

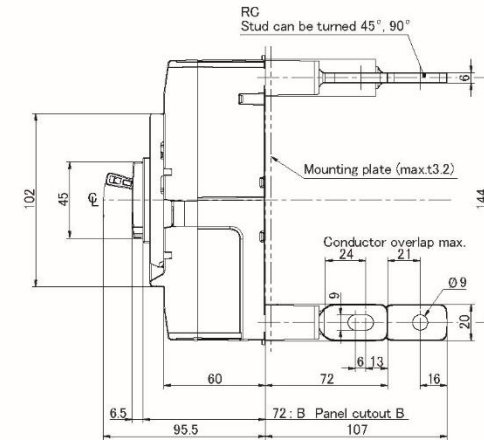
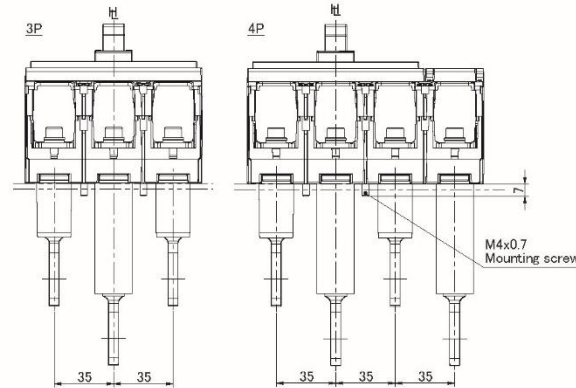
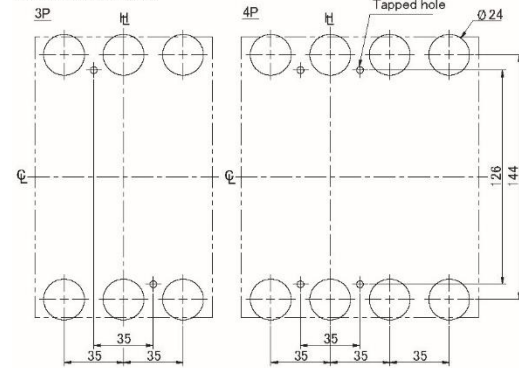


Panel cutout (front view) for Cutout B



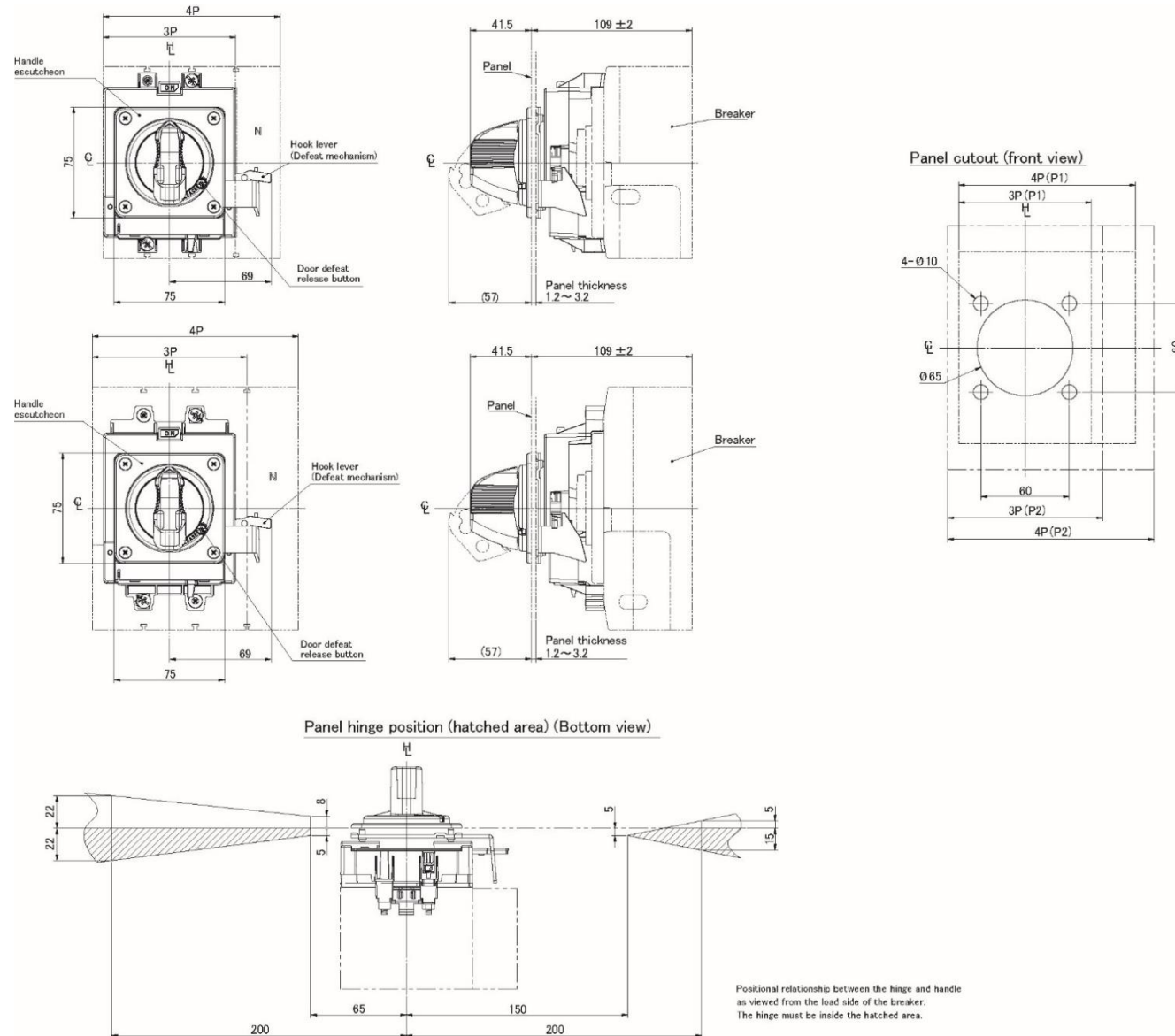
Panel cutout dimensions shown give an allowance of 1.0 mm or more around the handle esoutecheon

Drilling plan (front view)



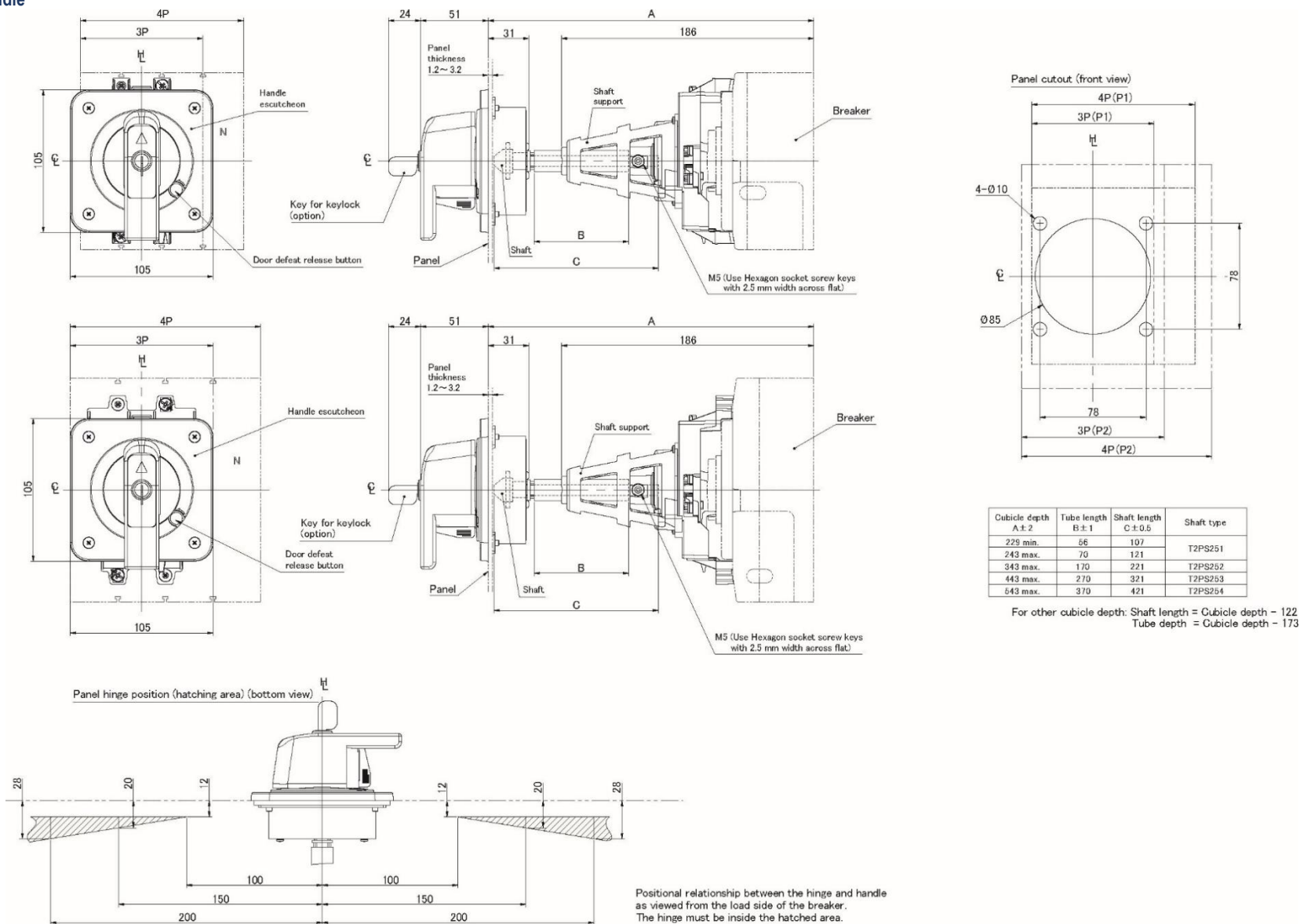
Annex A – Dimensions

P250 with HB Handle



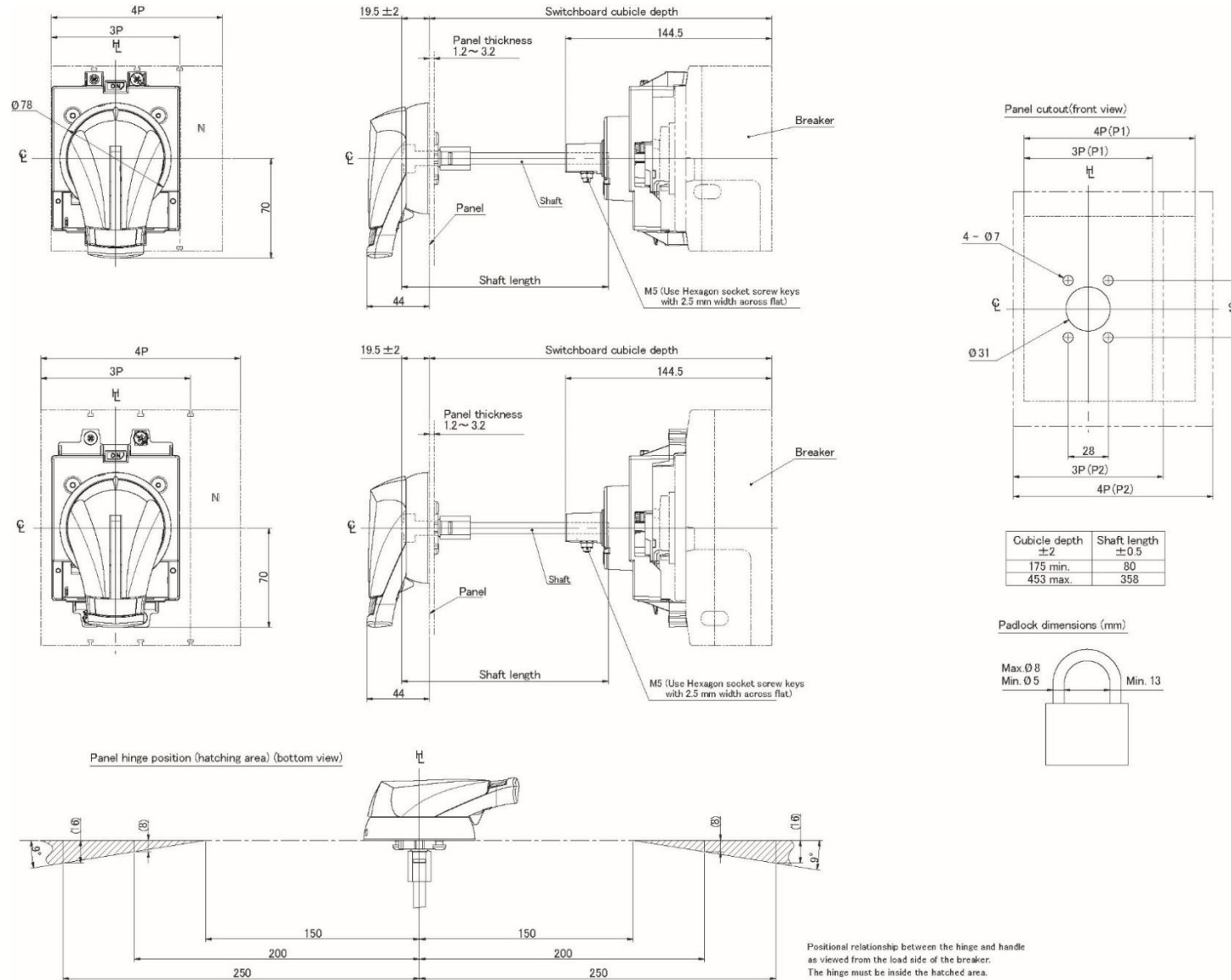
Annex A – Dimensions

P250 with HP Handle



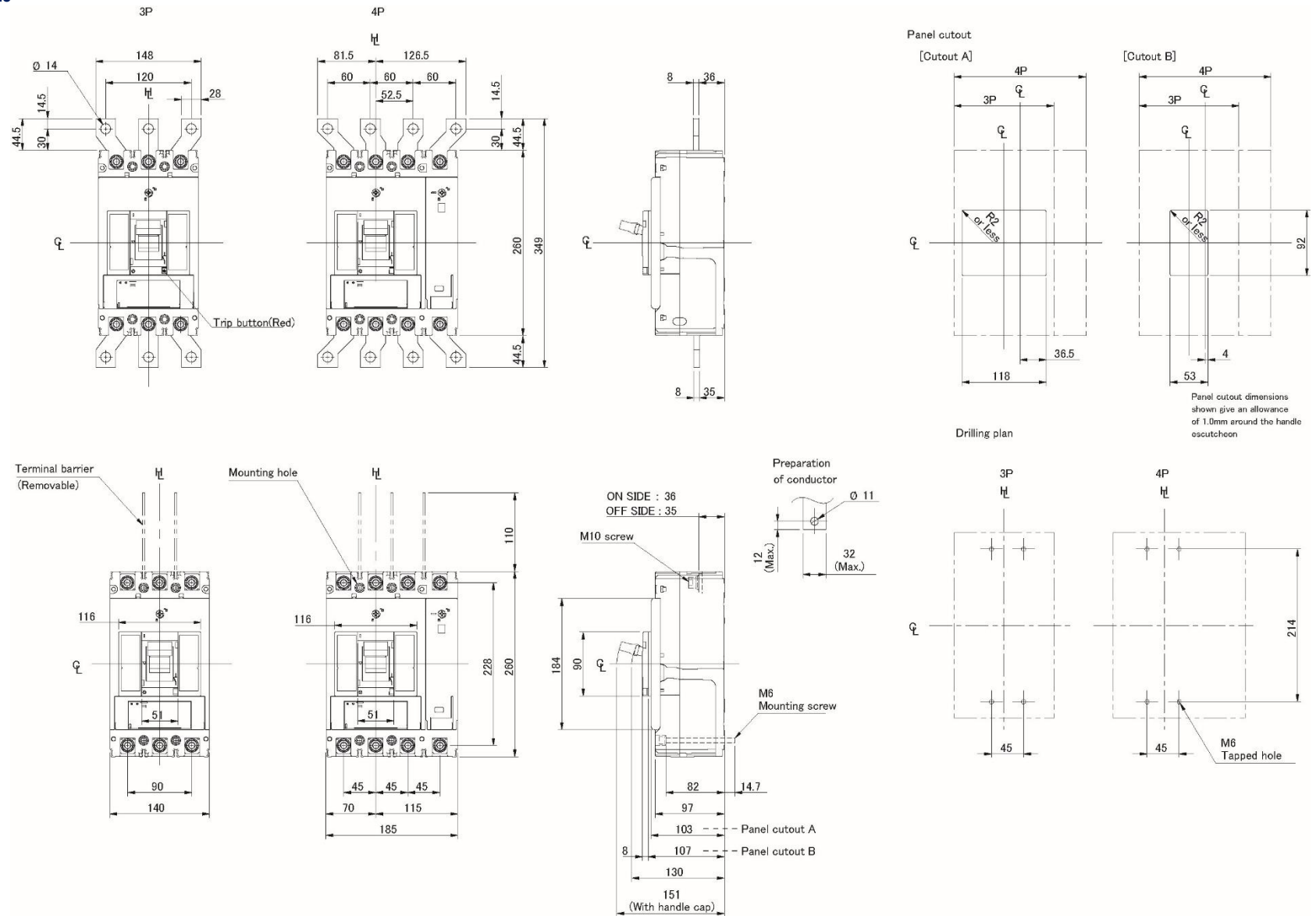
Annex A – Dimensions

P250 with HS Handle



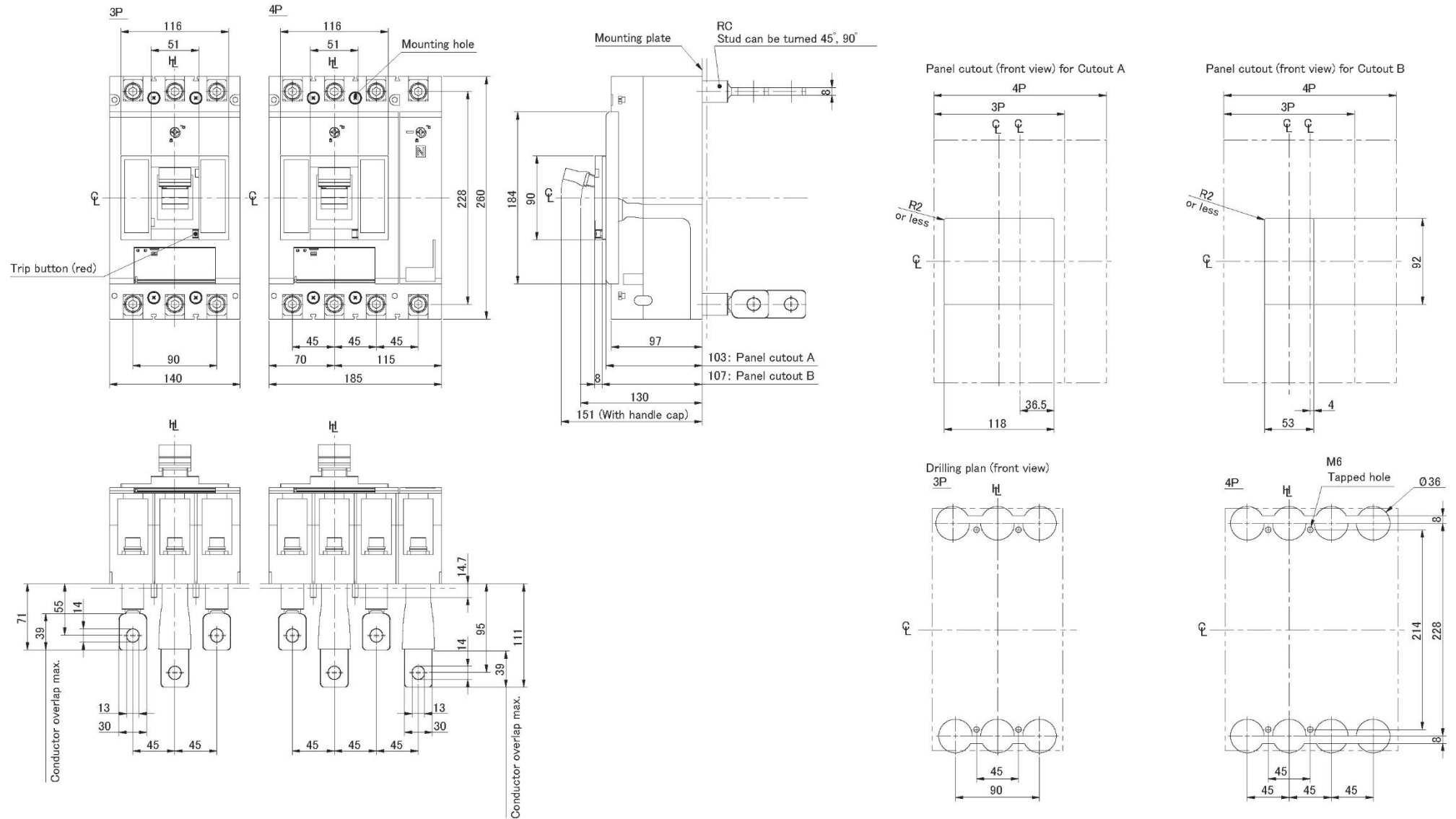
Annex A – Dimensions

P400 Dimensions



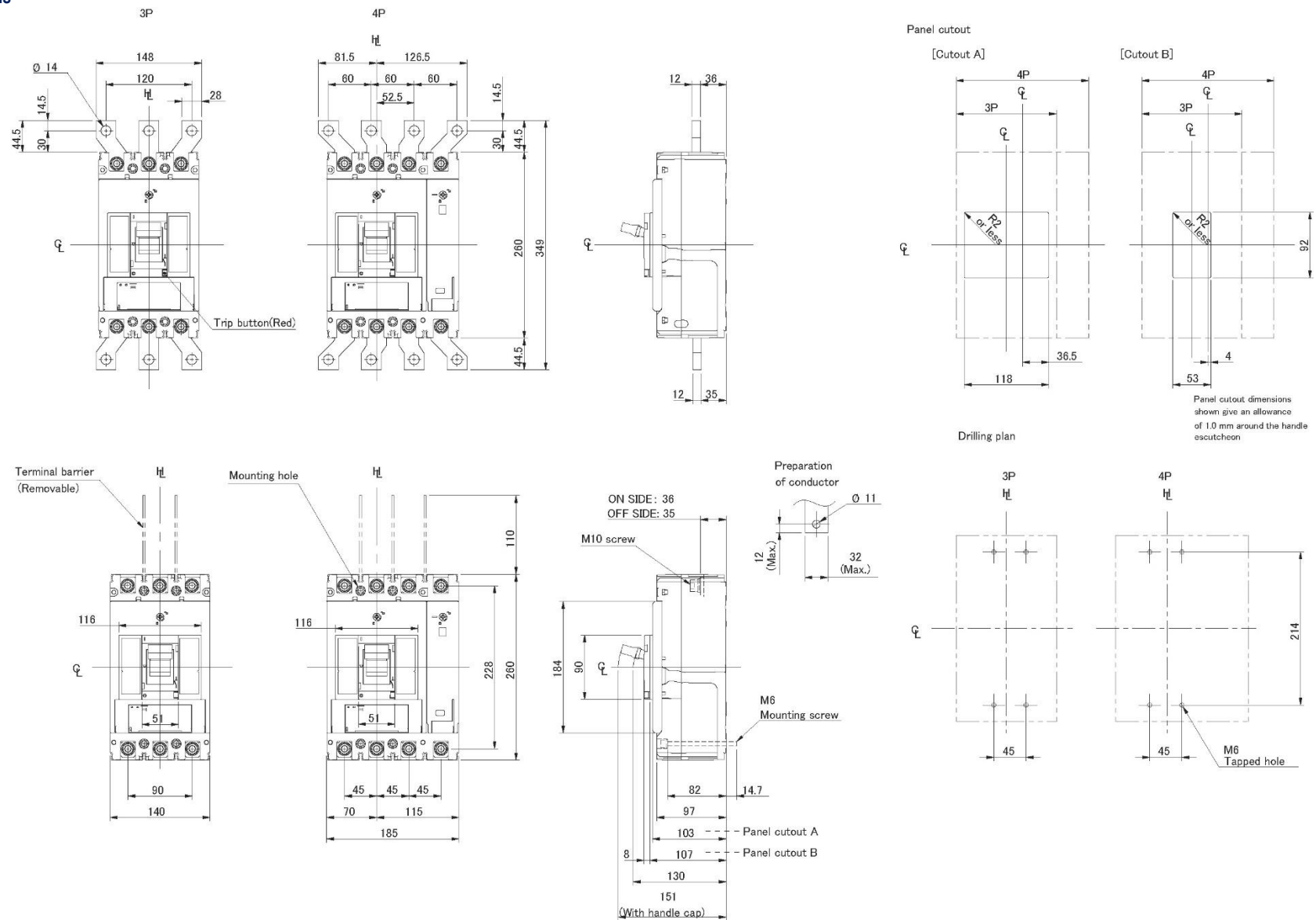
Annex A – Dimensions

P400 with Rear Connect



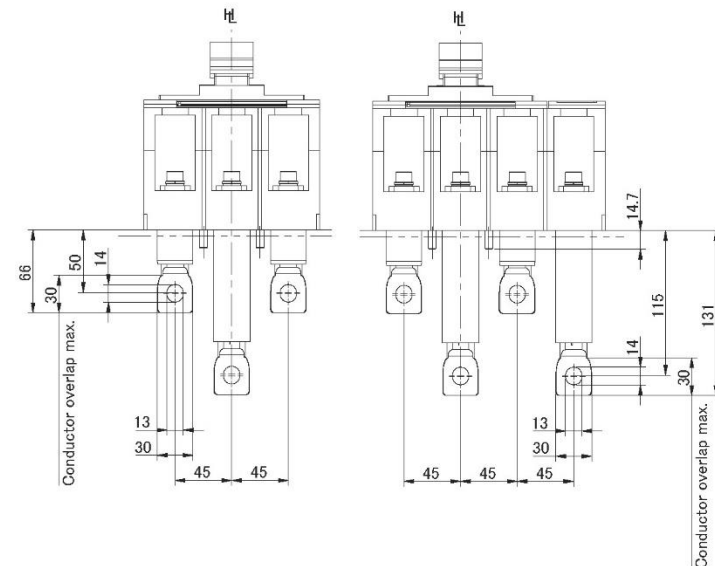
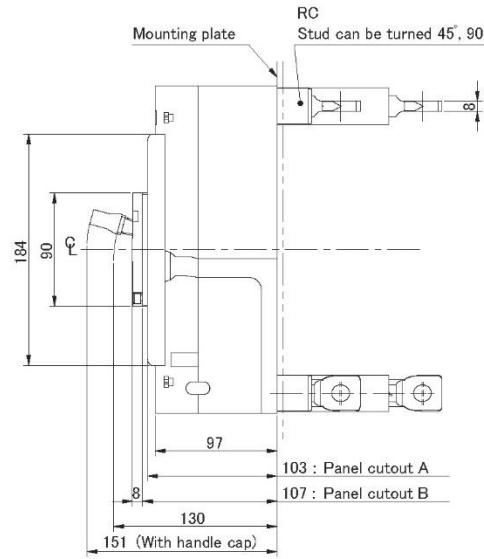
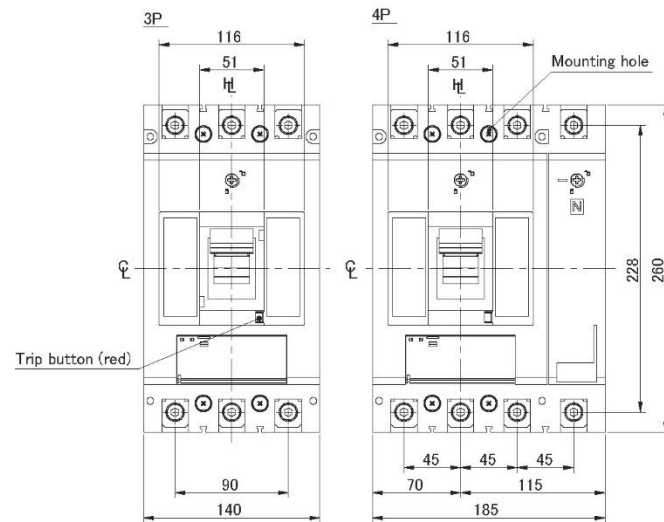
Annex A – Dimensions

P630 Dimensions

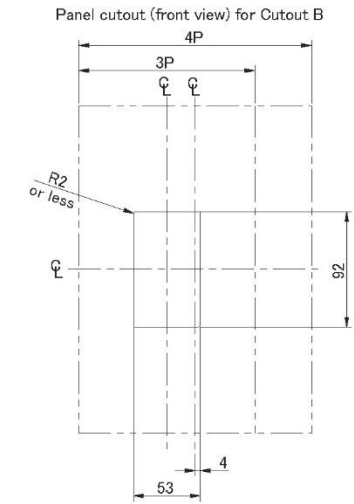
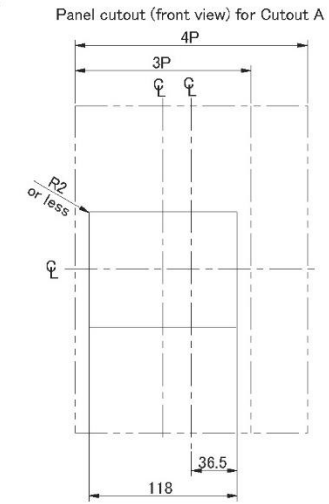


Annex A – Dimensions

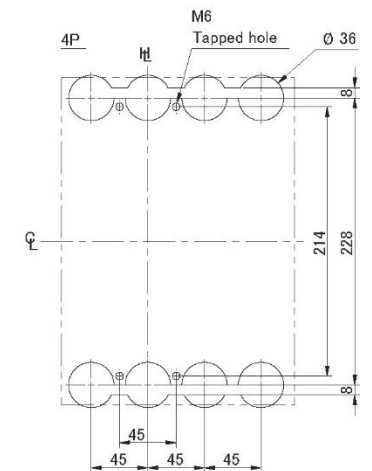
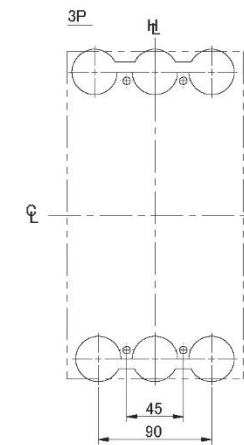
P630 with Rear Connect



Panel cutout dimensions shown give an allowance of 1.0mm around the handle escutcheon

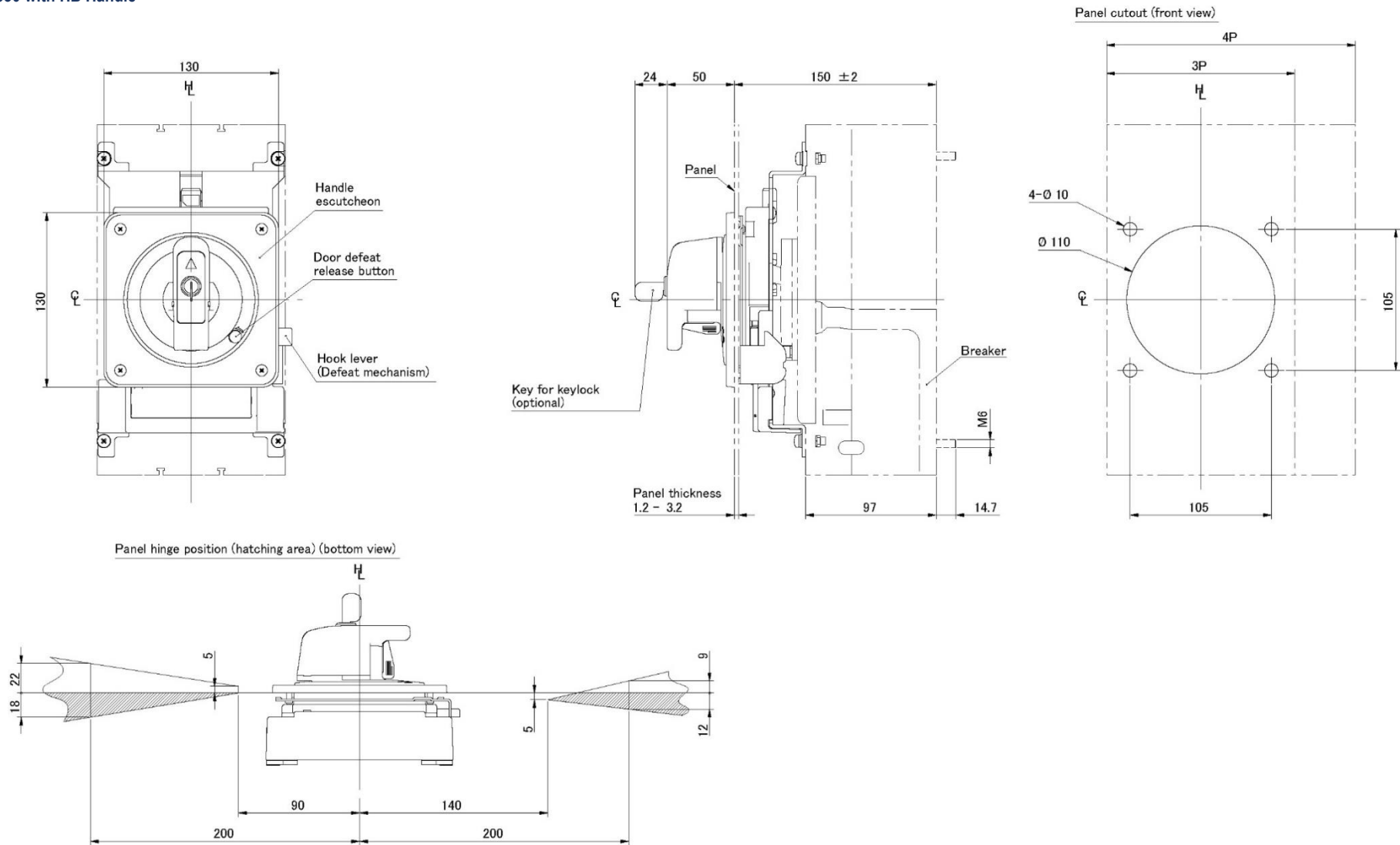


Drilling plan (front view)



Annex A – Dimensions

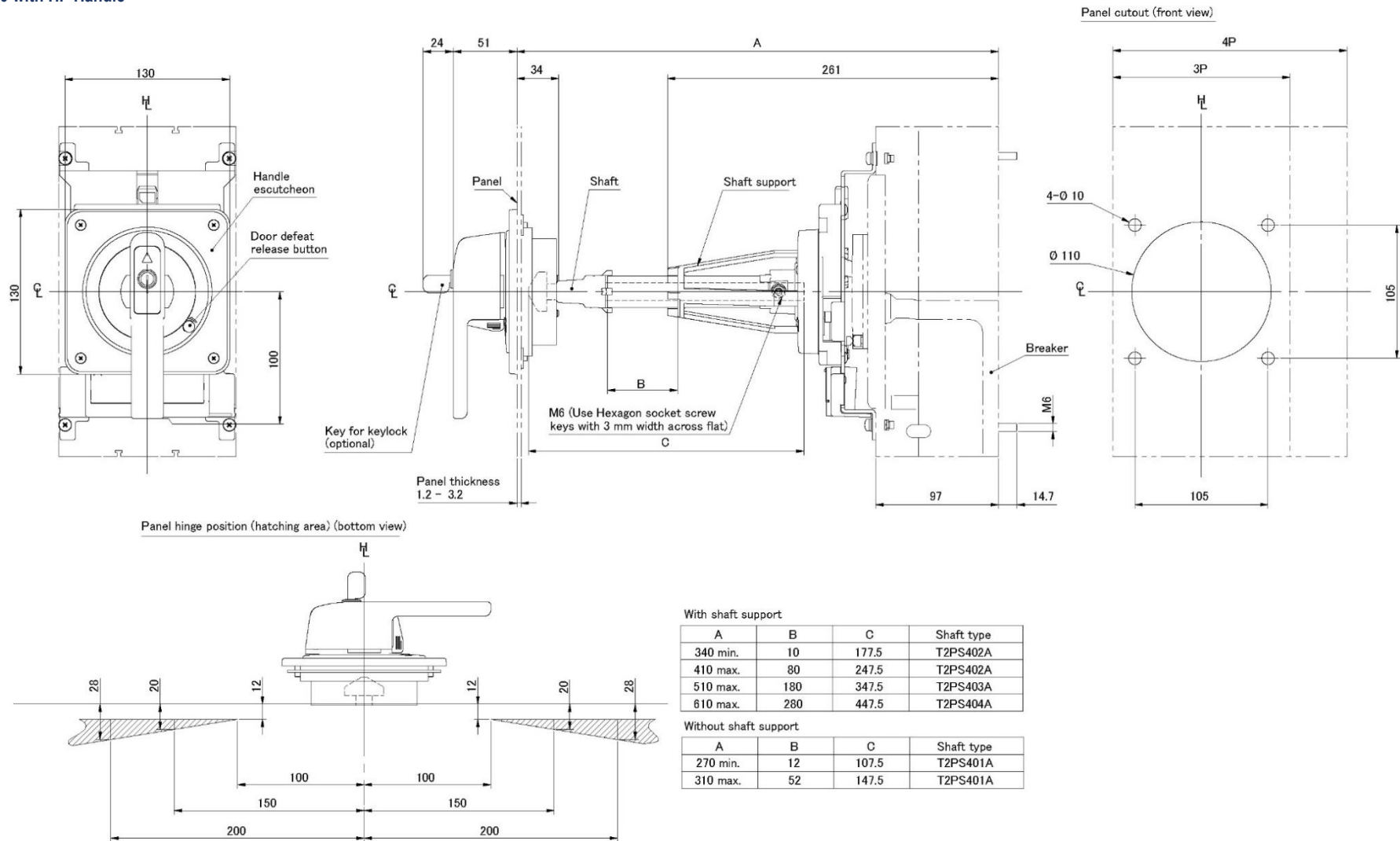
P400 / P630 with HB Handle



Positional relationship between the hinge and handle as viewed from the load side of the breaker.
The hinge must be inside the hatched area.

Annex A – Dimensions

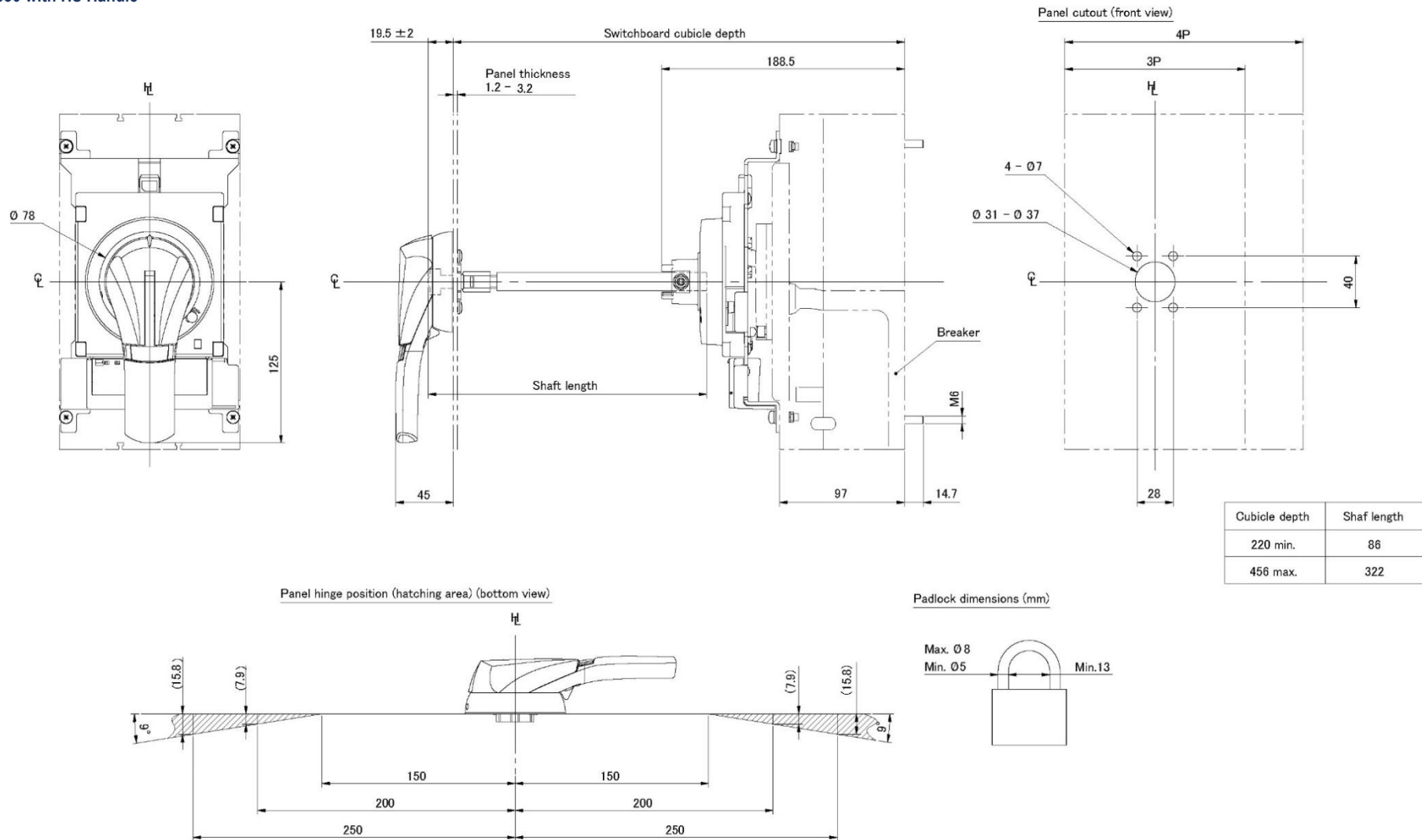
P400 / P630 with HP Handle



Positional relationship between the hinge and handle as viewed from the load side of the breaker.
The hinge must be inside the hatched area.

Annex A – Dimensions

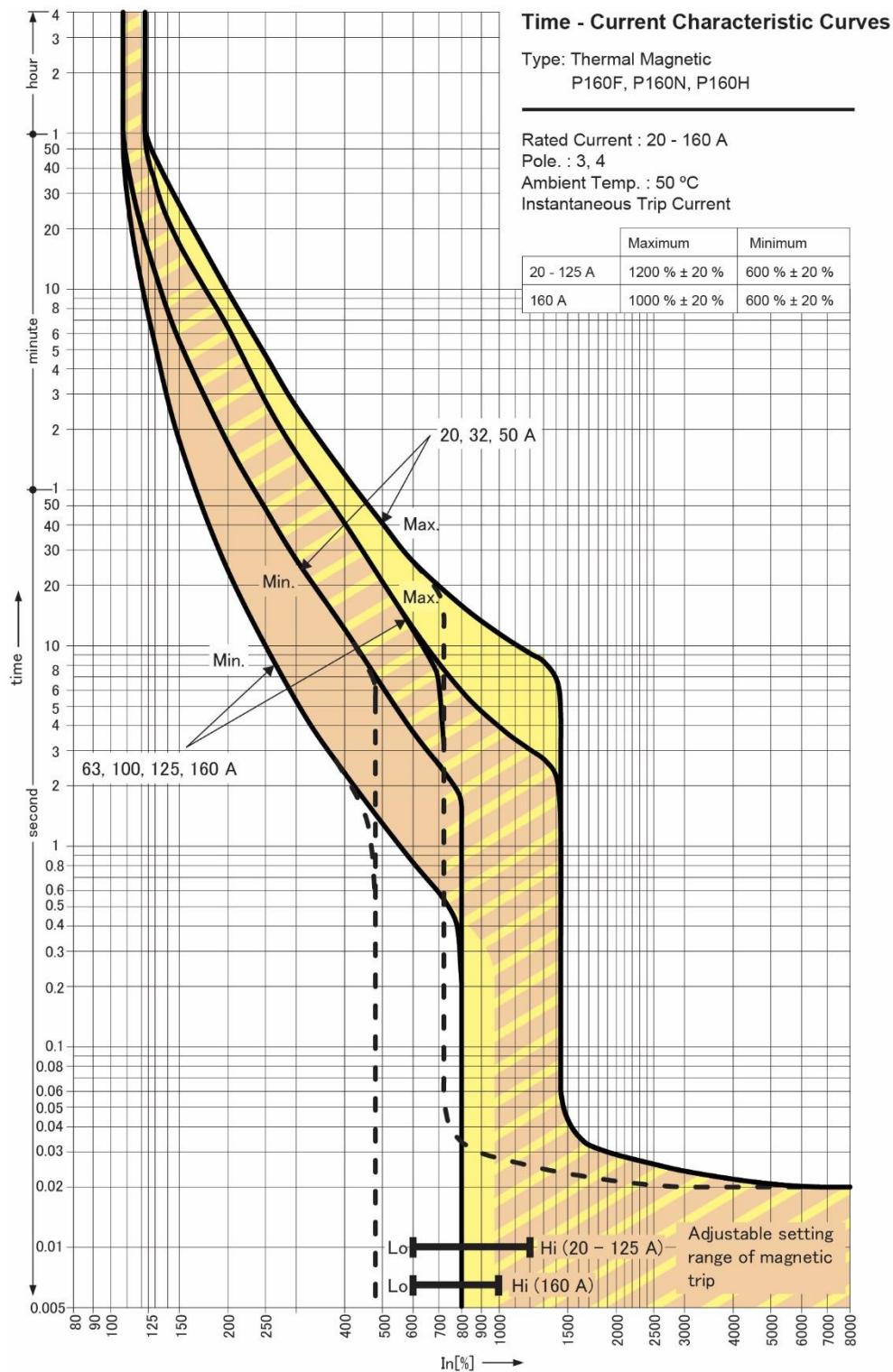
P400 / P630 with HS Handle



Positional relationship between the hinge and handle as viewed from the load side of the breaker.
The hinge must be inside the hatched area.

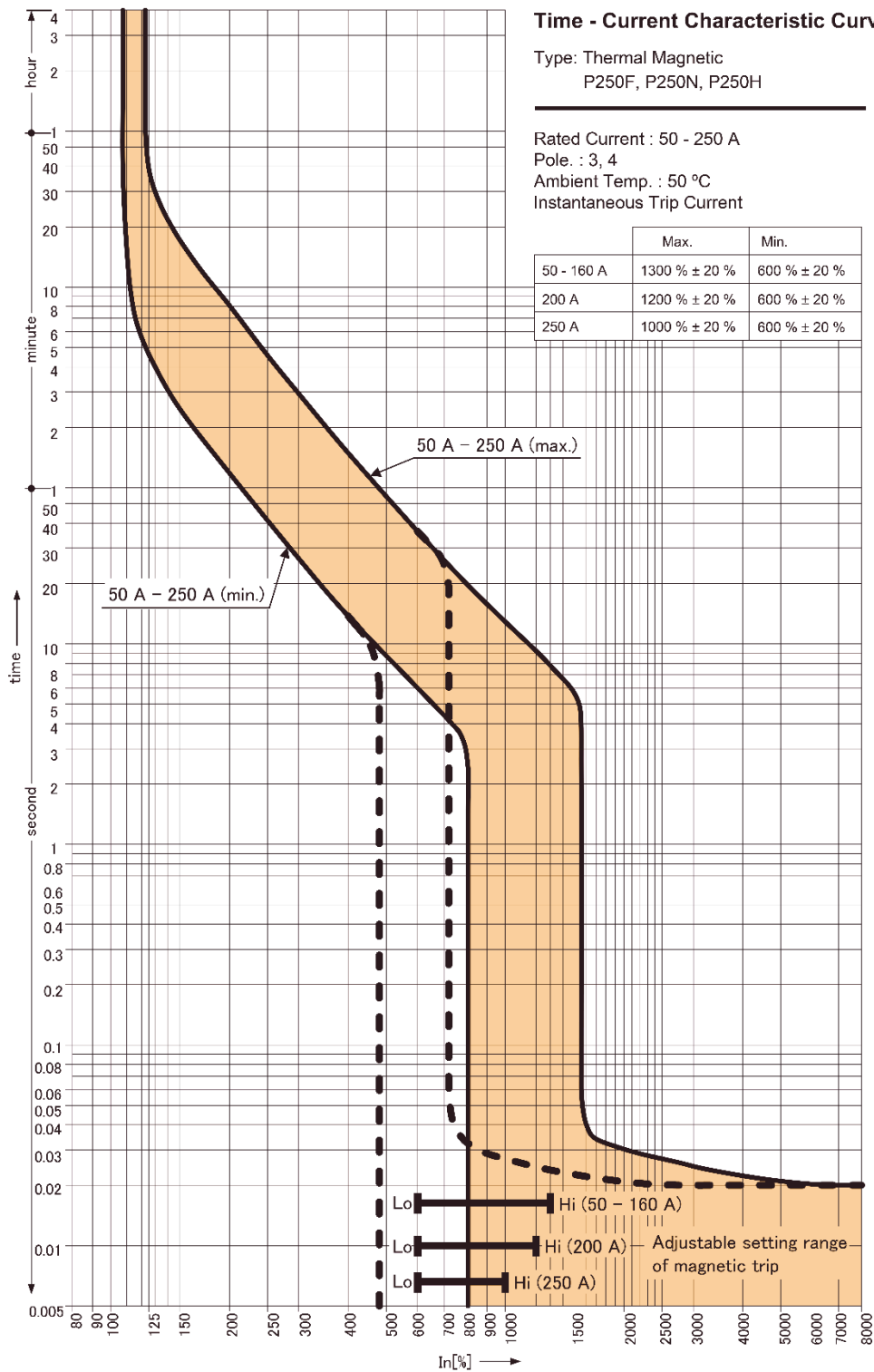
Annex B – Trip Curves

P160F / N / H



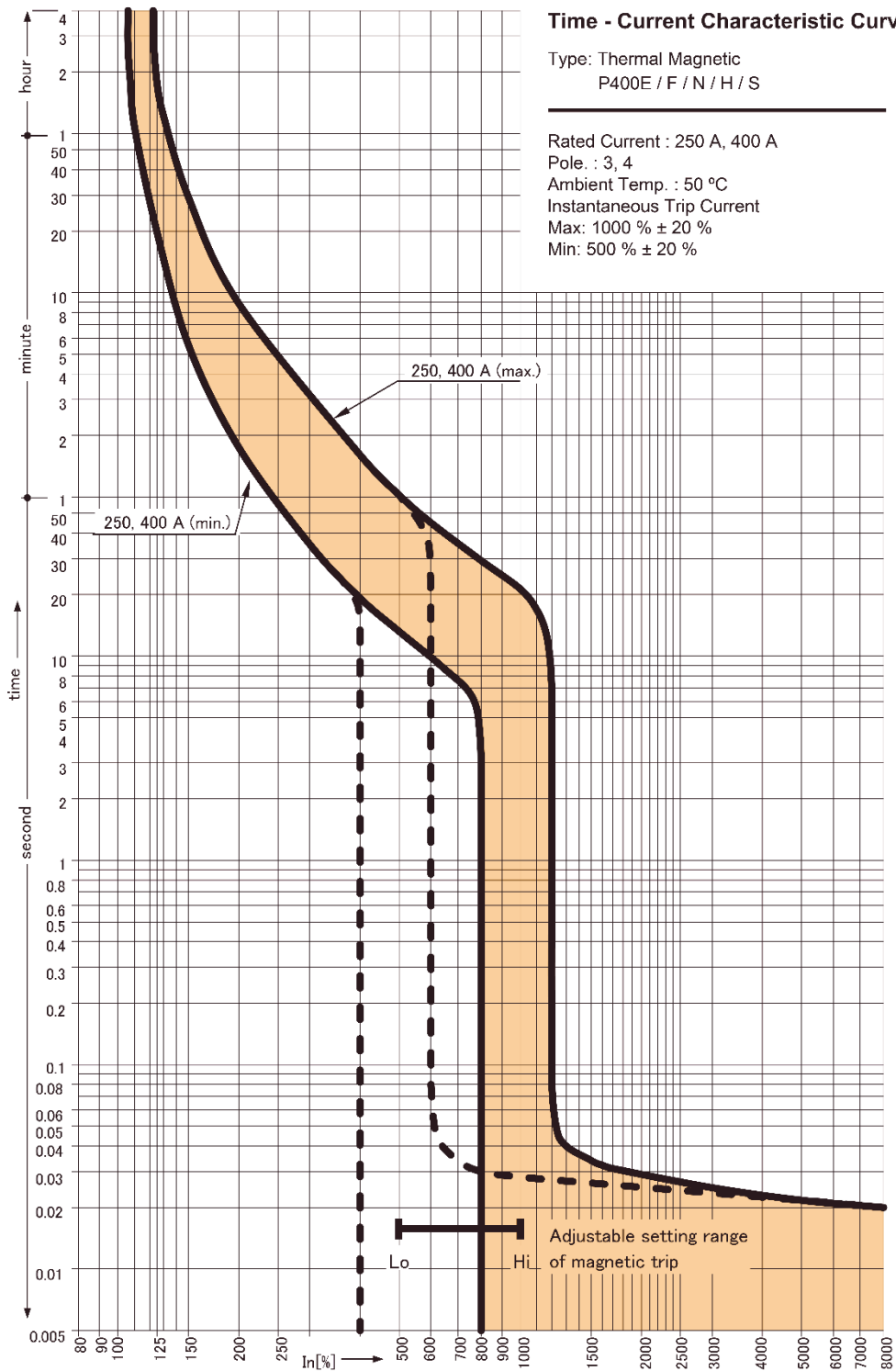
Annex B – Trip Curves

P250F / N / H



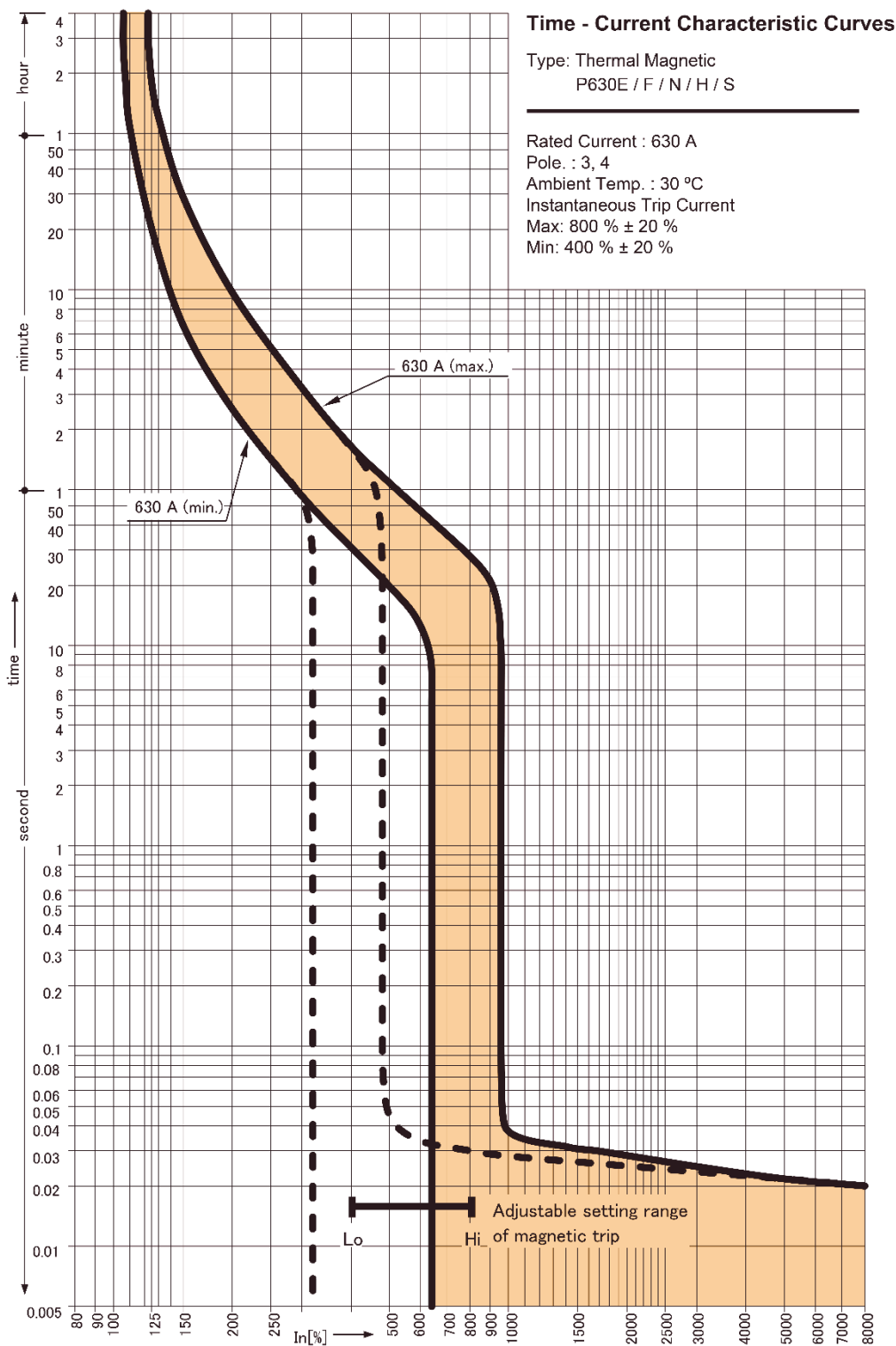
Annex B – Trip Curves

P400E / F / N / H / S



Annex B – Trip Curves

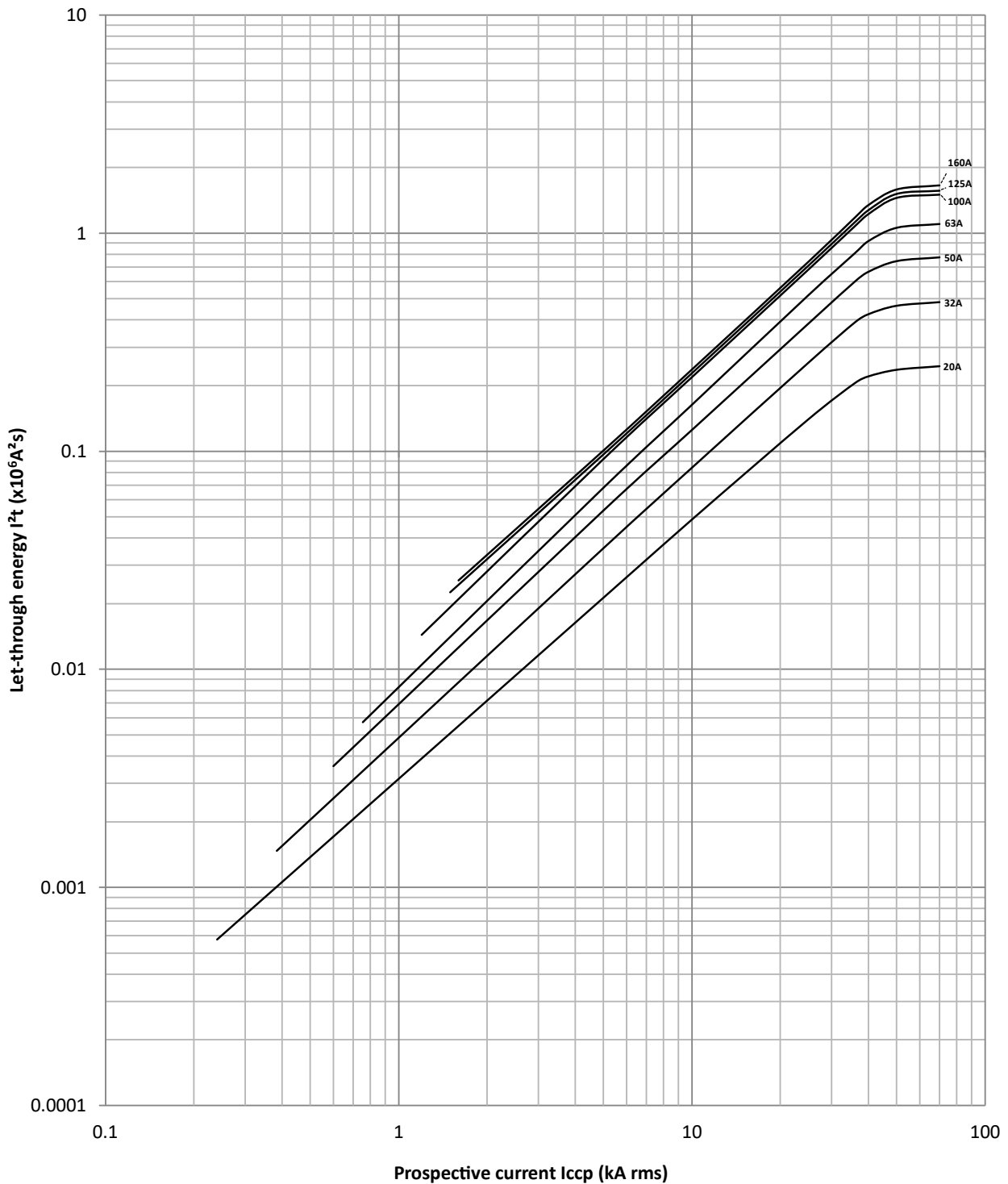
P630E / F / N / H / S



Annex C – I²t Let Through Curves

P160F / N / H

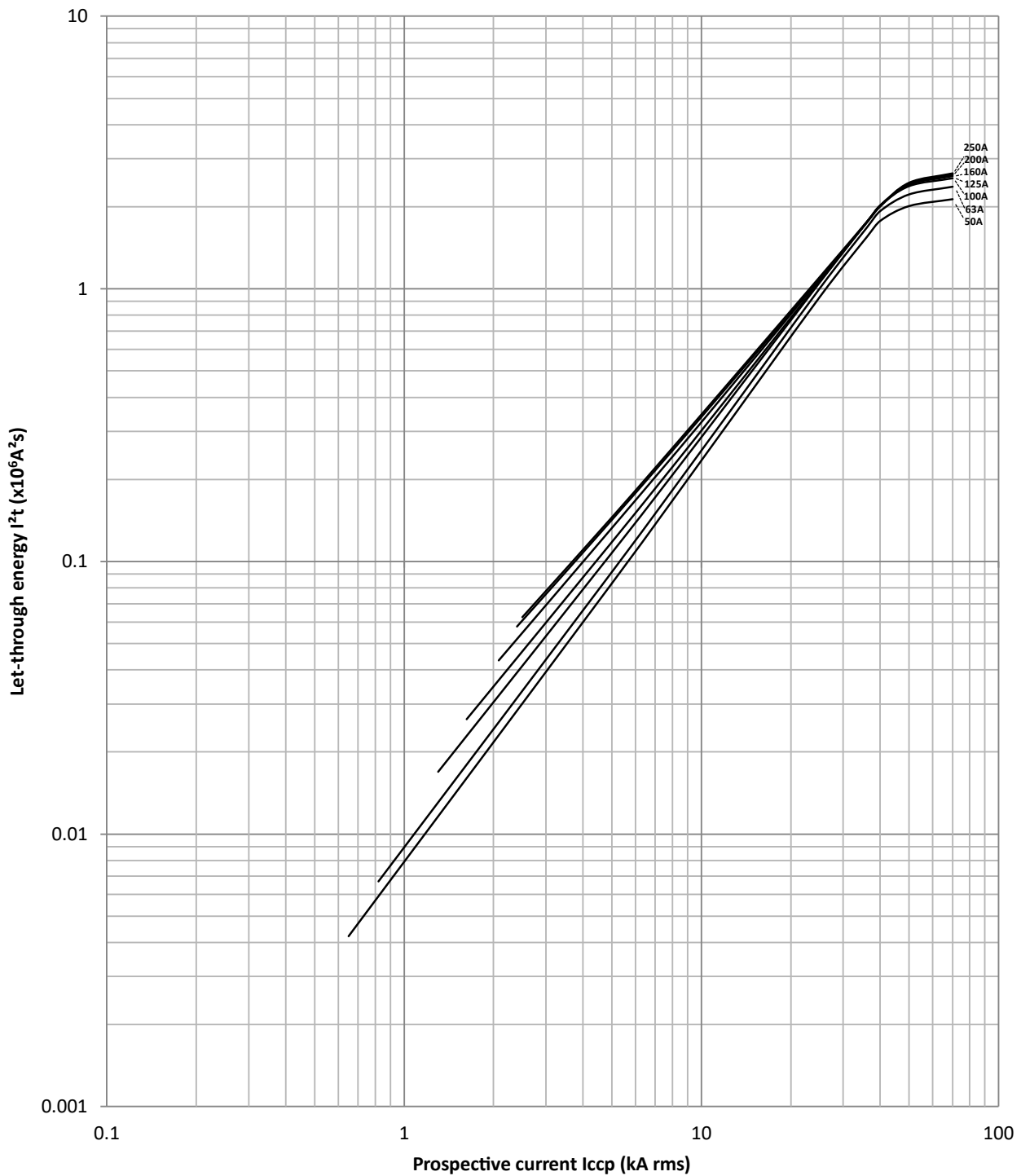
Let-through energy characteristics U = 380 ~ 415VAC



Annex C – I²t Let Through Curves

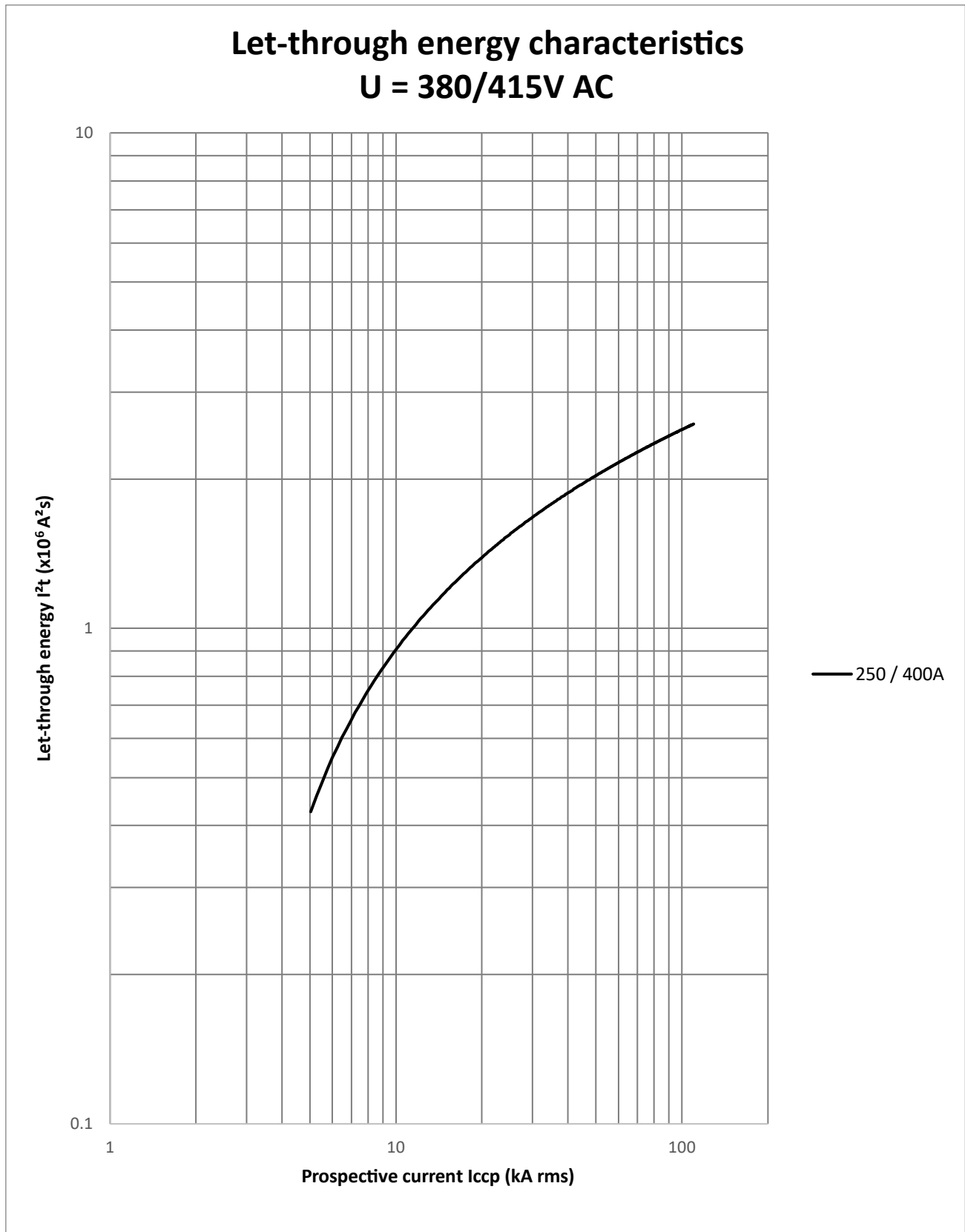
P250F / N / H

Let-through energy characteristics U = 380VAC ~415VAC



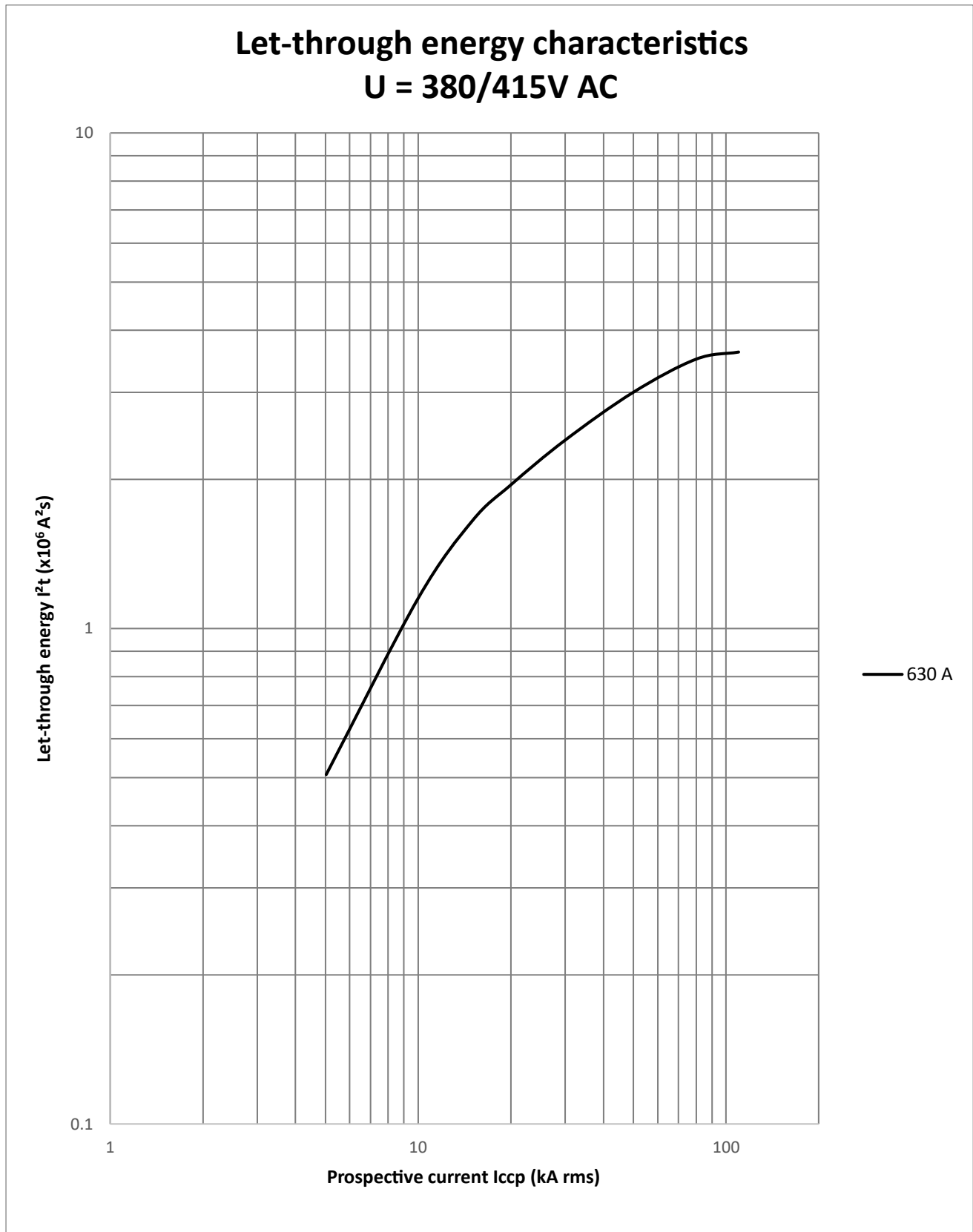
Annex C – I²t Let Through Curves

P400E / F / N / H / S



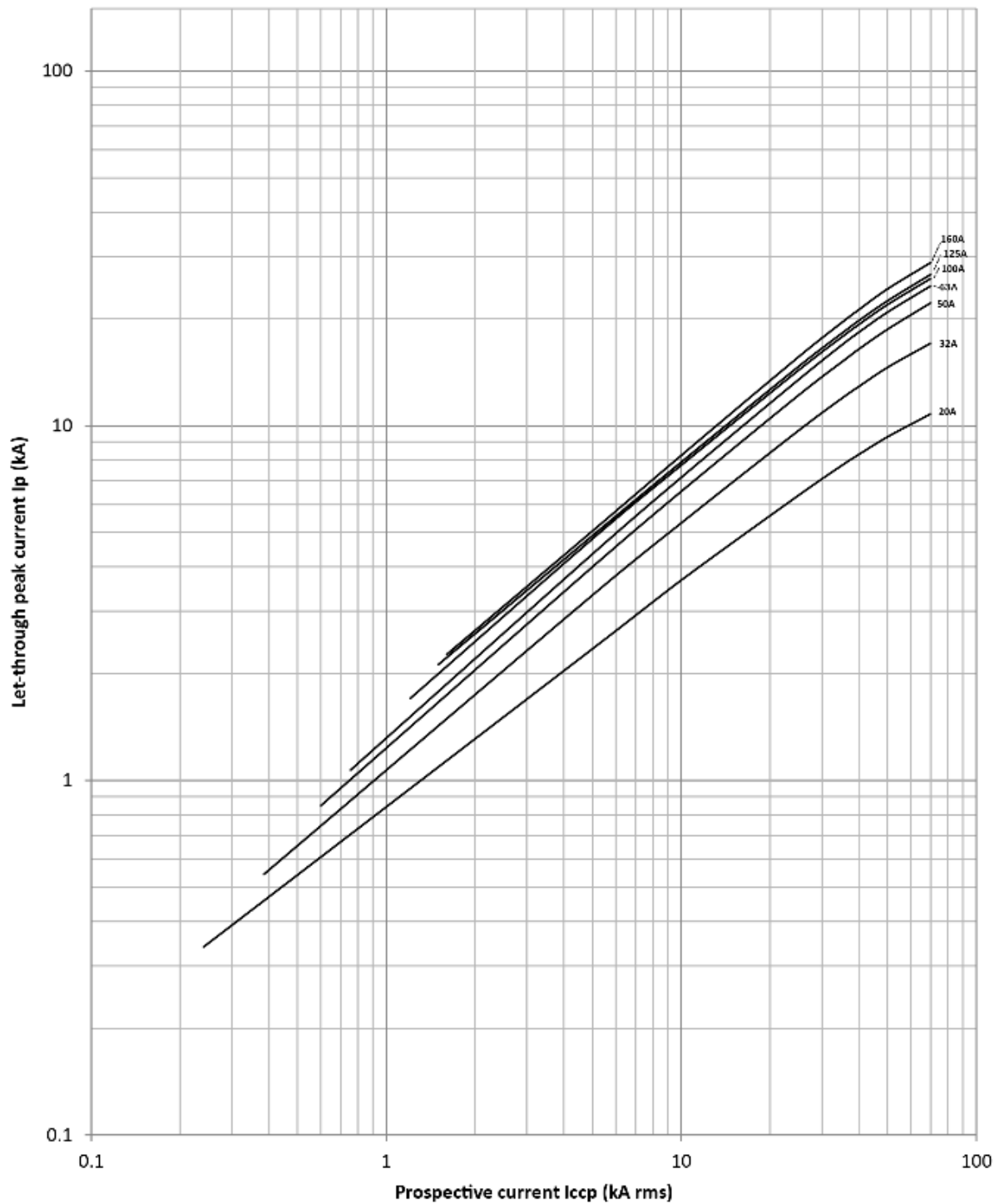
Annex C – I²t Let Through Curves

P630E / F / N / H / S



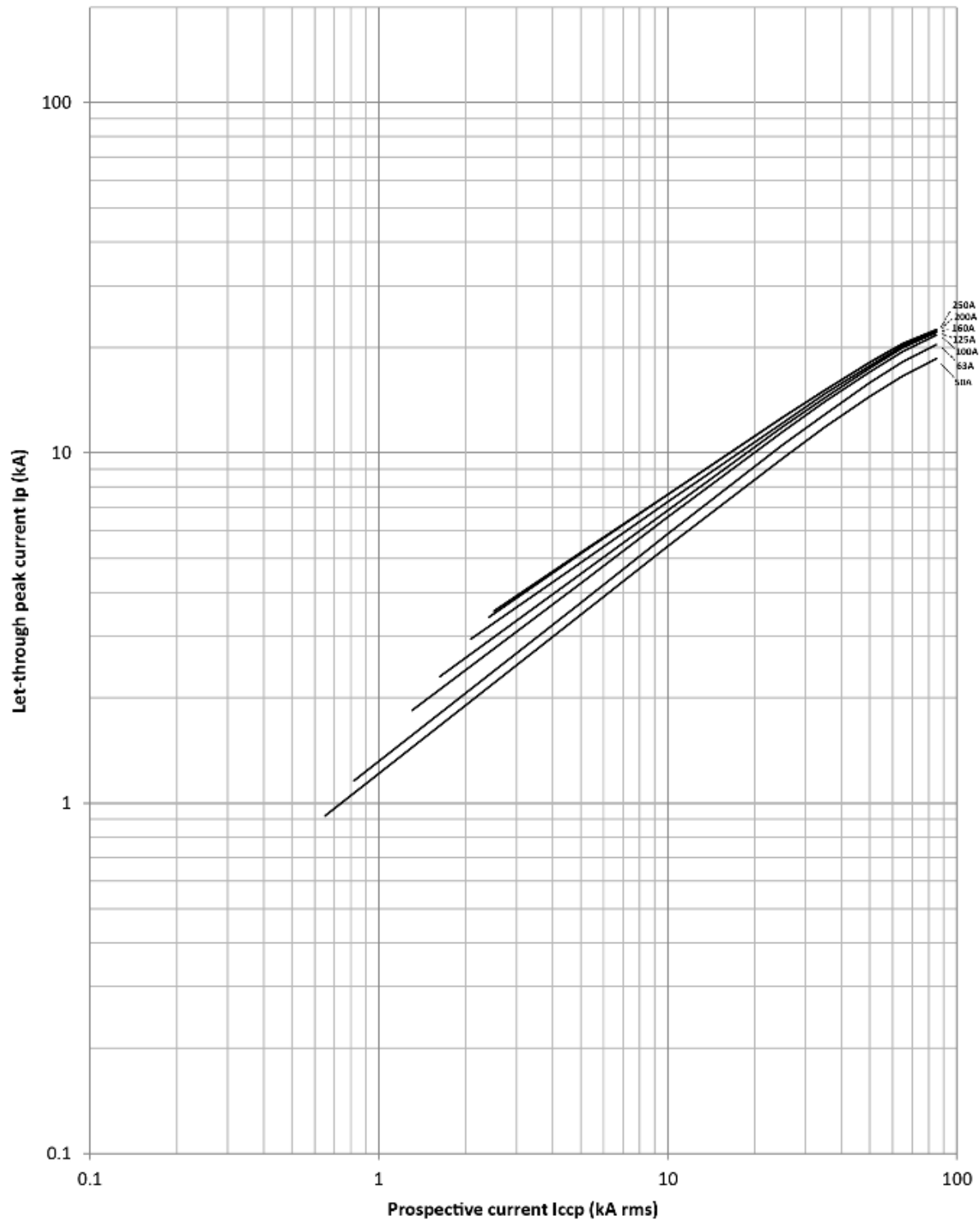
Annex D – Peak Let Through Curves

P160F / N / H



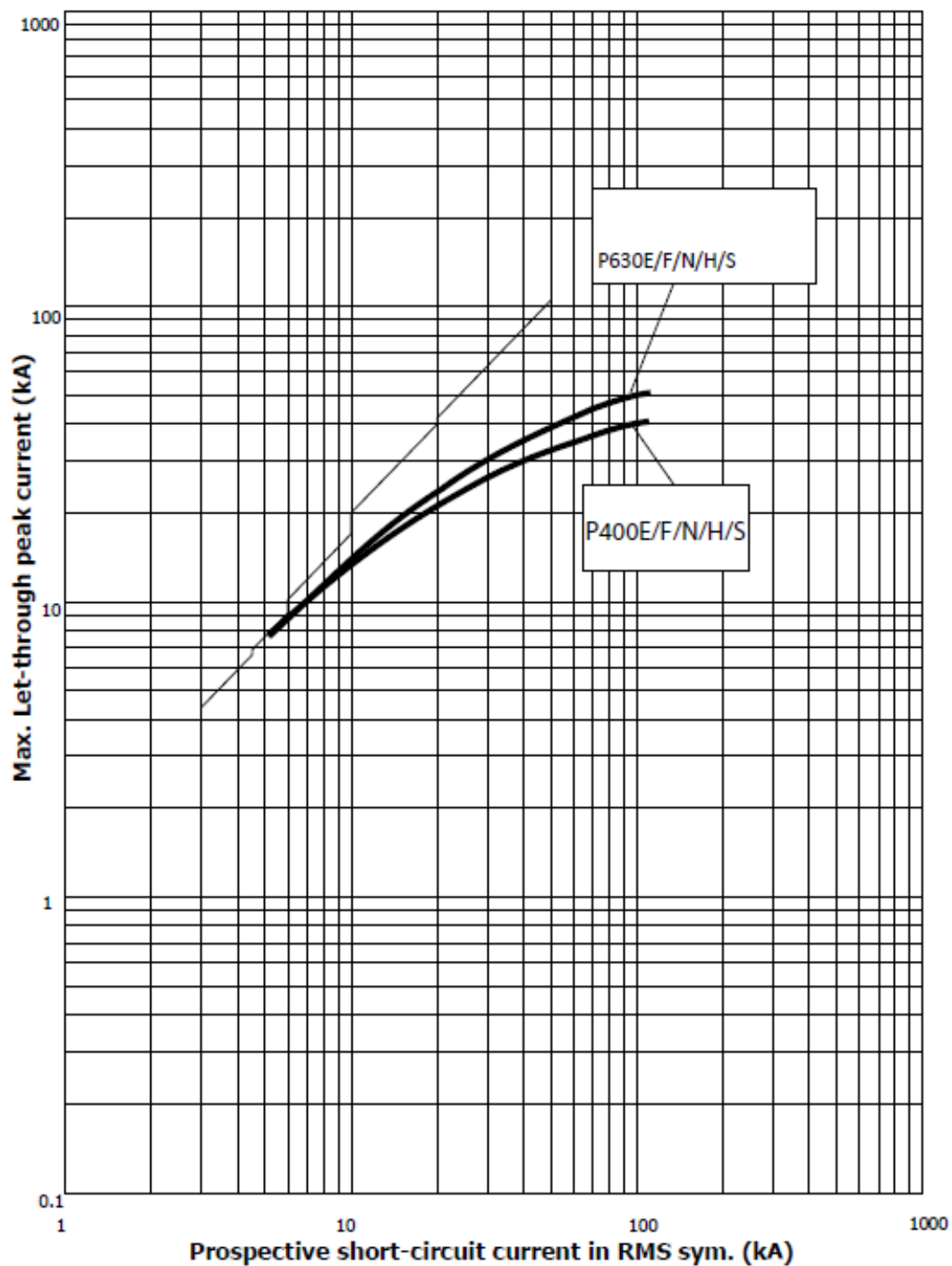
Annex D – Peak Let Through Curves

P250F / N / H



Annex D – Peak Let Through Curves

P400E / F / N / H / S
P630E / F / N / H / S



Annex E – Watts Loss

Impedance Watts Loss

| Frame | Rating In (A) | Impedance per pole (mΩ) | Watts Loss per pole Based from Impedance (W) | Pole numbers | Watts Loss per product Based from Impedance (W) |
|----------|------------------|----------------------------|---|-----------------|--|
| P160F_FF | 16 | 14.80 | 5 | 2P | 10 |
| | 20 | 13.83 | 8.3 | | 16.6 |
| | 30 | 6.67 | 9 | | 18 |
| | 40 | 3.88 | 9.3 | | 18.6 |
| | 50 | 2.00 | 7.5 | | 15 |
| | 60 | 0.65 | 3.5 | | 7 |
| | 75 | 0.70 | 5.9 | | 11.8 |
| | 100 | 0.45 | 6.7 | | 13.4 |
| | 125 | 0.46 | 10.7 | | 21.4 |
| P160_TM | 20 | 20.75 | 8.3 | 3/4P | 24.9 |
| | 32 | 8.79 | 9.0 | | 27 |
| | 50 | 3.00 | 7.5 | | 22.5 |
| | 63 | 0.88 | 3.5 | | 10.5 |
| | 100 | 0.67 | 6.7 | | 20.1 |
| | 125 | 0.68 | 10.7 | | 32.1 |
| | 160 | 0.55 | 14.1 | | 42.3 |
| P250_TM | 50 | 2.00 | 5.0 | 3/4P | 15 |
| | 63 | 1.17 | 4.7 | | 14.1 |
| | 100 | 0.60 | 6.0 | | 18 |
| | 125 | 0.60 | 9.3 | | 27.9 |
| | 160 | 0.38 | 9.7 | | 29.1 |
| | 200 | 0.30 | 12.0 | | 36 |
| | 250 | 0.27 | 16.9 | | 50.7 |
| P400_TM | 250 | 0.36 | 22.3 | 3/4P | 66.9 |
| | 400 | 0.27 | 42.4 | | 127.2 |
| P630_TM | 630 | 0.16 | 62.3 | 3/4P | 186.9 |

Annex E – Watts Loss

Resistance Watts Loss

| Frame | Rating In (A) | Resistance per pole (mΩ) | Watts Loss per pole Based from Resistance (W) | Pole numbers | Watts Loss per product Based from Resistance (W) |
|----------|------------------|-----------------------------|--|-----------------|---|
| P160F_FF | 16 | Contact NHP | Contact NHP | 2P | Contact NHP |
| | 20 | | | | |
| | 30 | | | | |
| | 40 | | | | |
| | 50 | | | | |
| | 60 | | | | |
| | 75 | | | | |
| | 100 | | | | |
| | 125 | | | | |
| P160_TM | 20 | 12.23 | 4.89 | 3/4P | 14.67 |
| | 32 | 6.562 | 6.72 | | 20.16 |
| | 50 | 1.74 | 4.35 | | 13.05 |
| | 63 | 0.44 | 1.75 | | 5.25 |
| | 100 | 0.335 | 3.35 | | 10.05 |
| | 125 | 0.34 | 5.31 | | 15.93 |
| | 160 | 0.275 | 7.04 | | 21.12 |
| P250_TM | 50 | 0.995 | 2.49 | 3/4P | 7.47 |
| | 63 | 0.595 | 2.36 | | 7.08 |
| | 100 | 0.3 | 3.00 | | 9 |
| | 125 | 0.3 | 4.69 | | 14.07 |
| | 160 | 0.19 | 4.86 | | 14.58 |
| | 200 | 0.145 | 5.80 | | 17.4 |
| | 250 | 0.135 | 8.44 | | 25.32 |
| P400_TM | 250 | 0.281 | 17.6 | 3/4P | 52.8 |
| | 400 | 0.193 | 30.9 | | 92.7 |
| P630_TM | 630 | 0.092 | 36.5 | 3/4P | 109.5 |

Annex F – Temperature Derating

Front & Rear Connect

| Calibration Temperature: 45°C | | | | | | | | |
|-------------------------------|---------------------------|----------------------|-------------------|------|------|------|------|---------------|
| MCCB Type | Connection type | Rated I _n | Rated Current (A) | | | | | |
| | | | 45°C | 50°C | 55°C | 60°C | 65°C | 70°C |
| P160F_FF | Front Conn. Rear Conn. | 15A | 15 | 13 | 12 | 11 | 9 | Not Available |
| | | 20A | 20 | 18 | 17 | 16 | 15 | |
| | | 30A | 30 | 28 | 27 | 25 | 24 | |
| | | 40A | 40 | 37 | 35 | 32 | 29 | |
| | | 50A | 50 | 47 | 44 | 40 | 37 | |
| | | 60A | 60 | 57 | 53 | 50 | 46 | |
| | | 75A | 75 | 72 | 69 | 65 | 62 | |
| | | 100A | 100 | 96 | 93 | 89 | 85 | |
| | | 125A | 125 | 121 | 118 | 115 | 111 | |

| Calibration Temperature: 50°C | | | | | | | |
|-------------------------------|---------------------------|----------------------|-------------------|------|------|------|------|
| MCCB Type | Connection type | Rated I _n | Rated Current (A) | | | | |
| | | | 50°C | 55°C | 60°C | 65°C | 70°C |
| P160_TM | Front Conn. Rear Conn. | 20A | 20 | 19 | 19 | 18 | 17 |
| | | 32A | 32 | 31 | 30 | 29 | 28 |
| | | 50A | 50 | 47 | 45 | 42 | 39 |
| | | 63A | 63 | 59 | 54 | 49 | 43 |
| | | 100A | 100 | 97 | 93 | 89 | 85 |
| | | 125A | 125 | 121 | 118 | 115 | 110 |
| | | 160A | 160 | 156 | 151 | 146 | 142 |
| P250_TM | | 50A | 50 | 49 | 47 | 45 | 44 |
| | | 63A | 63 | 60 | 57 | 54 | 50 |
| | | 100A | 100 | 96 | 92 | 88 | 83 |
| | | 125A | 125 | 121 | 117 | 113 | 109 |
| | | 160A | 160 | 154 | 148 | 141 | 134 |
| | | 200A | 200 | 190 | 180 | 170 | 159 |
| | | 250A | 250 | 242 | 233 | 224 | 215 |
| P400_TM | 250A | 250 | 244 | 238 | 233 | 226 | |
| | 400A | 400 | 392 | 384 | 376 | 368 | |

| Calibration Temperature: 30°C | | | | | | | | | | | |
|-------------------------------|---------------------------|----------------------|-------------------|------|------|------|------|------|------|------|------|
| MCCB Type | Connection type | Rated I _n | Rated Current (A) | | | | | | | | |
| | | | 30°C | 35°C | 40°C | 45°C | 50°C | 55°C | 60°C | 65°C | 70°C |
| P630_TM | Front Conn. Rear Conn. | 630A | 630 | 615 | 600 | 577 | 560 | 540 | 520 | 500 | 479 |

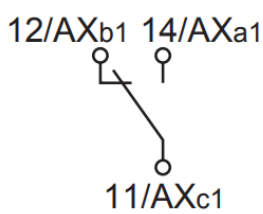
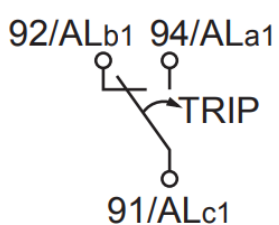



Annex F – Temperature Derating

Plug-in Connect

| Calibration Temperature: 50°C | | | | | | | |
|-------------------------------|-----------------|----------------------|--------------------------|--------------------------|------|------|------|
| MCCB Type | Connection type | Rated I _n | Rated Current (A) | | | | |
| | | | 50°C | 55°C | 60°C | 65°C | 70°C |
| P160_TM | Plug-in Conn. | 20A | 20 | 19 | 19 | 18 | 17 |
| | | 32A | 32 | 31 | 30 | 29 | 28 |
| | | 50A | 50 | 47 | 45 | 42 | 39 |
| | | 63A | 63 | 59 | 54 | 49 | 43 |
| | | 100A | 100 | 97 | 93 | 89 | 85 |
| | | 125A | 125 | 121 | 118 | 115 | 110 |
| | | 160A | Not Available in Plug-in | | | | |
| P250_TM | | 50A | 50 | 49 | 47 | 45 | 44 |
| | | 63A | 63 | 60 | 57 | 54 | 50 |
| | | 100A | 100 | 96 | 92 | 88 | 83 |
| | | 125A | 125 | 121 | 117 | 113 | 109 |
| | | 160A | 160 | 154 | 148 | 141 | 134 |
| | | 200A | 200 | 190 | 180 | 170 | 159 |
| | | 250A | 250 | 242 | 233 | 224 | 215 |
| P400_TM | | 250A | 250 | 244 | 238 | 233 | 226 |
| | | 400A | 400 | 392 | 384 | 376 | 368 |
| P630_TM | | | 630A | Not Available in Plug-in | | | |

Annex G – Wiring Diagrams & Terminal Designations

Internal Accessories

| Accessory | Terminal Designations | Notes | | |
|-----------|---|--|--|--|
| | | MCCB Status "Closed" | MCCB Status "Open" | MCCB Status "TRIP" |
| Auxiliary |  | MCCB Status "Closed" | MCCB Status "Open" | MCCB Status "TRIP" |
| | | 11/AXc-14/AXa "Closed" 11/AXc-12/AXb "Open" | 11/AXc-14/AXa "Open" 11/AXc-12/AXb "Closed" | 11/AXc-14/AXa "Open" 11/AXc-12/AXb "Closed" |
| Alarm |  | MCCB Status "Closed" | MCCB Status "Open" | MCCB Status "TRIP" |
| | | 91/ALc-94/ALa "Open" 91/ALc-92/ALb "Closed" | 91/ALc-94/ALa "Open" 91/ALc-92/ALb "Closed" | 91/ALc-94/ALa "Closed" 91/ALc-92/ALb "Open" |
| Shunt |  | Shunt trips are continuous rated and do not make use of an anti-burn out switch. Terminals are not polarity sensitive. | | |
| UVT (AC) |  | Terminals are not polarity sensitive. | | |
| UVT (DC) |  | Terminals are not polarity sensitive. | | |



P Model MCCB Thermal Magnetic 160A to 630A User Manual

Version

1.6.0

Published

22nd January 2025

