3VA and 3VM
Molded Case Circuit Breakers
Introduction
Low Voltage & Products
Consistent product portfolio for the IEC market

Industrial applications
- Process automation
- Factory automation

Infrastructure and buildings
- Industrial buildings
- Infrastructure
- Commercial buildings
- Residential buildings

Switching and control devices
- MCB, RCD, fuses, SPD, AFDD
- Switching and control devices

Distribution boards

Medium & Low Voltage Partnering System
- SIMOPRIME & Sivacon S8

Unrestricted © Siemens AG 2018
**Low-Voltage Power Distribution Products**

**SENTRON-Products**

<table>
<thead>
<tr>
<th>SENTRON Air Circuit Breakers</th>
<th>SENTRON Fuse Switch Disconnectors</th>
<th>SENTRON Switch Disconnectors with Fuses</th>
</tr>
</thead>
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<td>3NP1: 160 - 630A</td>
<td>3KL/3KF: 63 – 800A</td>
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<tr>
<td>3WT8: 630 - 4000 A</td>
<td>3NJ4: 160 - 1250A</td>
<td>3NJ4: 160 - 1250A</td>
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**SENTRON Molded Case Circuit Breakers**

<table>
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<th>SENTRON Main and Emergency STOP Switches</th>
<th>SENTRON Power Monitoring Devices</th>
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<tbody>
<tr>
<td>3VA1: 16 - 1000A</td>
<td>3LD2: 16 – 250A</td>
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<tr>
<td>3VA2: 25 - 1600A</td>
<td>3KD: up to 1600A</td>
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<td>3VM1: 16 - 630A</td>
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<td>3VL: 16 - 1600A</td>
<td>7KM</td>
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<td>3VT: 16 - 1600A</td>
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</table>

**Product Cancellation**

- **3NL1: 160 - 630A**
- **3NP1: 160 - 630A**
- **3NP2: 160 - 630A**
- **3NJ4: 160 - 1250A**
- **3KL/3KF: 63 – 800A**
- **3NJ62: 63 - 630A**

Product Cancellation
- **October 2019**
- **October 2020**
3VA and 3VM Product Overview

3VA – Line according to IEC 60947

3VA1 breakers are equipped with Thermal Magnetic Trip Unit (TMTU)
3VA2 breakers are equipped with Electronic Trip Units (ETU)
3VA and 3VM
Molded Case Circuit Breakers
3VA molded case circuit breaker
Welcome to the World of 3VA!

- Rotary double contact system
- Compact and packed with innovations
- Optimized connectivity
- Excellent selectivity
- Power metering according to IEC 61557-12
- Large ETU display
- Integrated voltage tab
- PROFINET
- Communication
- Modbus RTU
- Modbus TCP
- Profibus DP
- Very high breaking capacity up to 150 kA
- S0 interface
3VA molded case circuit breaker

3VA1 breakers are equipped with Thermal Magnetic Trip Unit (TMTU)
3VA2 breakers are equipped with Electronic Trip Units (ETU)
3VA1 molded case circuit breaker

The world's smallest molded case circuit breaker with up to 70 kA and $I_{cs} = 100\% I_{cu}$.
3VA1 molded case circuit breaker

Highlights

Line / generator / starter protection

• Compact design
  (3VA1 frame size 160A É 48% smaller than 3VL160X)
• Rated currents from 16A up to 630A
• Breaking capacity classes from 16 kA to 70 kA @ 415 V AC
• Thermal-magnetic trip unit
• 1- to 4-pole breakers available
  (1- and 2-pole in frame size 160 A)
• "Real" switch disconnector up to 630A\(^1\) according to IEC 60947-3 also available in MCCB design
• Complete and uniform accessory platform across all 3VA molded case circuit breakers

---

\(^1\) LBS 630A planned for Q4 2018
## 3VA1 Frame Sizes and Rated Currents

<table>
<thead>
<tr>
<th>Rated Current in A</th>
<th>3VA10 100 A</th>
<th>3VA11 160 A</th>
<th>3VA12 250 A</th>
<th>3VA13 400 A</th>
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</table>
Labelling of 3VA Breakers

1. Breaker type
2. Approbations
3. Rated current
4. Knowledge Manager
5. Serial number
6. Rated current
7. Product version
8. Trip unit type and order no.
9. Size and breaking capacity class
10. Name plate
3VA1 molded case circuit breaker
Trip Units
3VA1 molded case circuit breaker
Trip unit overview

### Line / Generator protection / Switch disconnectors

- **Line protection TM210, TM220, TM240**
- **Switch disconnector SD100**
- **Starter protection TM110M and TM120M**
- **Neutral protection available for 4-pole breakers:** 0%, 50%, and 100%
- **Usable for AC and DC networks**
- **No derating up to 50°C**

#### Switch Disconnector

- **SD100**

#### Line Protection: FTFM

- **Fixed Thermal, Fixed Magnetic**

#### Line Protection: ATFM

- **Adjustable Thermal, Fixed Magnetic**

#### Line Protection: ATAM

- **Adjustable Thermal, Adjustable Magnetic**

#### Motorstarter Protection FM / AM

- **Fixed Magnetic / Adjustable Magnetic**
3VA2 molded case circuit breaker (up to 1000A)
Overview / Technical Data
3VA2 molded case circuit breaker

- Rated currents 25 A – 1000 A
- Short-circuit breaking capacity 55 kA – 150 kA @ 415 V
- Communication via Ethernet (Modbus TCP), Modbus RTU, PROFIBUS, PROFINET
- Metering function according to IEC 61557-12
- Line, motor, starter and generator protection

- Rated currents 800 A – 1600 A
- Short-circuit breaking capacity 55 kA – 110 kA @ 415 V
- Communication via Ethernet (Modbus TCP), Modbus RTU, PROFIBUS, PROFINET *
- Metering function according to IEC 61557-12
- Line, motor, starter protection and non-automatic air circuit breaker
3VA2 molded case circuit breaker up to 1000 A

Highlights

Line / generator / motor / starter protection

- Rated currents 100 A – 1000 A
- Four breaking capacity classes
- Selective protection with a nominal current ratio of 1:2.5
- Electronic trip units (ETU 3-series, ETU 5-series, ETU 8-series)
- ETU 8-series with integrated metering function
- Communication via Ethernet (Modbus TCP), Modbus RTU, PROFIBUS, PROFINET
- Complete and uniform accessory platform across all 3VA molded case circuit breakers
# Molded Case Circuit Breaker 3VA2 up to 1000A

## Frames and Rated Currents

<table>
<thead>
<tr>
<th>3VA2</th>
<th>3VA20 100 A</th>
<th>3VA21 160 A</th>
<th>3VA22 250 A</th>
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</table>
3VA2 molded case circuit breaker (up to 1000A)
Trip Units
# 3VA2 molded case circuit breaker up to 1000A

## Electronic Trip Units

### ETU 3er-series
- Rotary switch with absolute values in Amps

### Line / generator protection:
- ETU320 LI
- ETU330 LIG
- ETU350 LSI

### Line Protection
- ETU340 fuse characteristic (ELISA)

### Motor protection:
- ETU350M LSI

### Starter protection:
- ETU310M I

### ETU 5er-series
- Display with menu
- Optional communication available
- Optional external N-CT

### Line / generator protection:
- ETU550 LSI
- ETU560 LSIG

### Motor protection:
- ETU550M LSI

### Starter protection:
- –

### ETU 8er-series
- Display with menu
- Power metering
- Optional communication available
- Optional external N-CT

### Line / generator protection:
- ETU850 LSI
- ETU860 LSIG

### Motor protection:
- ETU860M

### Starter protection:
- –
3VA molded case circuit breaker (up to 1000A)
Accessories
3VA molded case circuit breaker
Extensive and flexible accessories

1. Test devices
2. powerconfig software
3. Communication
4. Internal accessories
5. Locking and interlocking
6. Motor operator
7. Manual operators
8. Knowledge Manager
9. Residual current devices
10. Plug-in
11. Draw-out
12. DIN rail adapter
13. Connection technology
Internal accessories for 3VA1 and 3VA2 up to 1000A
Manifold functions and easy installation

Leading changeover switch (LCS_HQ + LCS_HP)
High switching capacity and compact size
see contact sequence diagrams 3VA Manual

Universal release (UNI)

Undervoltage release (UVR)

Shunt trip (STL)
Left

Shunt trip (STF)
Flexible
(Flexible use for 3VA2 only)

Short circuit alarm switch
(SAS_HQ, for 3VA1 only)
Compact size

Electrical alarm switch
(EAS_HQ, for 3VA2 only)
Compact size

Cylinder lock adapter

Electronic component (COM060)
Communication

Electronic component (24 V module)
Power supply

Trip alarm switch (TAS_HQ + TAS_HP)
High switching capacity and compact size

Auxiliary switch (AUX_HQ + AUX_HP)
High switching capacity and compact size
## Motor operators for 3VA up to 630A

### Front Mounted Motor Operator MO320
- Motorized remote control of 3VA MCCBs
- The MO320 front-mounted motor operator is available for all 3VA MCCBs up to 630A
- Available for several standardized voltage levels

### Side Mounted Motor Operator MO310
- Motorized remote control of 3VA1 MCCBs
- The MO310 front-mounted motor operator is available for all 3VA MCCBs up to 160A
- Available for several standardized voltage levels

### Stored Energy Operator SEO520
- Remote control of 3VA2 MCCBs through charged springs (ON/OFF)
- Communications capable and non communications capable
- The SEO520 front-mounted motor operator is available for all 3VA2 MCCBs up to 250A
- Available for several standardized voltage levels
Manual operators
Overview

Front Mounted Rotary Operator

Door Mounted Rotary Operators

Supplementary Handle

Rotary operator with shaft stub

Illumination Kit

Sidewall Mounted Rotary Operator
3VA Plug In Units and Withdrawable Units

Plug In Units
Available for:
- 3VA11 – 3VA14
- 3VA20 – 3VA24

Withdrawable Units
Available for:
- 3VA12 – 3VA14
- 3VA20 – 3VA24
3VA molded case circuit breaker
Extensive and flexible accessories

1. Test devices
2. powerconfig software
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6. Motor operator
7. Manual operators
8. Knowledge Manager
9. Residual current devices
10. Plug-in
11. Draw-out
12. DIN rail adapter
13. Connection technology
The 3VA27 molded case circuit breaker
800 A up to 1,600 A
The 3VA27 molded case circuit breaker
Overview / Technical Data
3VA2 molded case circuit breaker

- Rated currents 25 A – 1000 A
- Short-circuit breaking capacity 55 kA – 150 kA @ 415 V
- Communication via Ethernet (Modbus TCP), Modbus RTU, PROFIBUS, PROFINET
- Metering function according to IEC 61557-12
- Line, motor, starter and generator protection

- Rated currents 800 A – 1600 A
- Short-circuit breaking capacity 55 kA – 110 kA @ 415 V
- Communication via Ethernet (Modbus TCP), Modbus RTU, PROFIBUS, PROFINET *
- Metering function according to IEC 61557-12
- Line, motor, starter protection and non-automatic air circuit breaker
The 3VA27 molded case circuit breaker
Overview

Depending upon the application, the 3VA27 molded case circuit breaker takes over the line/motor/starter protection within the low voltage power distribution and provides a supplement to the existing 3VA IEC portfolio.

The 3VA27 is designed for applications with the following requirements:

- Circuit breakers for AC according to IEC 60947-2
- Non-automatic air circuit breakers in circuit breaker design according to IEC 60947-3
- Integration option in switchboards according to IEC 61439
- High breaking capacity up to 110 kA (Icu at 415 V)
- Communication capability
- Metering function according to IEC 61557-12
- Available with toggle lever or stored energy mechanism
One molded case circuit breaker – two possible operating mechanisms

Two operating mechanisms are available for the 3VA27, having no influence on the current limiting contact system of the 3VA27.

3VA27 with stored energy mechanism
(motor operator capability)\(^1\)

3VA27 with toggle operating mechanism
\(\checkmark\) typically for molded case circuit breakers tripping is indicated by the "trip position"
### 3VA27 technical specifications
Integration of the 3VA27 into the Siemens 3VA2 portfolio

#### Cu (415 V)

<table>
<thead>
<tr>
<th>Class</th>
<th>3VA20</th>
<th>3VA21</th>
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![Graph showing current ratings for different classes](image-url)
The 3VA27 molded case circuit breaker
Trip Units
Electronic trip units and metering functions of the 3VA27 3/6-series ETU overview

<table>
<thead>
<tr>
<th>ETU 3 series</th>
<th>ETU 6 series</th>
<th>Metering function</th>
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</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Image of ETU 3 series" /></td>
<td><img src="image2.jpg" alt="Image of ETU 6 series" /></td>
<td><img src="image3.jpg" alt="Image of Metering function" /></td>
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</tbody>
</table>

- LI, LSI, LSIG protection function
- Adjustable N-conductor protection
- Rotary coding switch in 3VA design
- Tripping characteristics with selective design for the 3WL and 3VA family
- Operation in temperature range of -25°C to +70°C

- LSI, LSIG protection function
- Adjustable N-conductor protection
- Display & modular expandable functionalities:
  - Fine-tuning for increased selectivity requirements
  - Communication-capable
  - Metering function (basic & advanced)
  - Enhanced protection functions for customized applications and specialized network requirements
  - Improved ground fault detection (residual current protection Rc, ground fault protection at the neutral point G_ret)
  - Interactive I / O functionalities
- Operation in temperature range of -25°C to +70°C
The 3VA27 molded case circuit breaker
Accessories
3VA27 total overview
Exploded view

1. Test and inspection devices
2. powerconfig software
3. Display DSP800
4. Interlocking system (guide frame)
5. Locking/interlocking mechanism - 3VA27 with stored energy mechanism
6. Motorized operating mechanism and accessories - 3VA27 with stored energy mechanism
7. Auxiliary and alarm switches / auxiliary release
8. Interlocking system for fixed-mounted circuit breakers
9. Electronic trip units (ETU)
10. Sliding bars
11. Manual operators
12. Connection equipment for fixed-mounted circuit breaker
13. Locking system with guide frame
14. Communication modules (usable for fixed mounting and withdrawable circuit breakers)
15. Position signaling switch for guide frame
16. Connection technology with guide frame
3VA27 Internal Accessories

- Undervoltage release (UVR)
- Closing coil (CC) Shunt trip (ST)
- Motorized operating mechanism
- Operating cycles counter

- Auxiliary switch (AUX)
- External auxiliary switch (AUX)
- Tripped signaling switch (TAS)
- Tripped signaling switch (S24)
- Tripped signaling switch (UVR/ST)
- Ready-to-close signaling switches (RTC)
- Leading changeover switch (S26)
- Stored energy mechanism status switch (S21)
- Position signaling switch (PSS)
3VA27 Internal Accessories
Mounting Example

1. Closing coil (CC) (for stored energy mechanism version only)
2. Undervoltage release (UVR) / Shunt trip (ST2)
3. Shunt trip (ST)
3VA27 total overview
Exploded view

1. Test and inspection devices
2. powerconfig software
3. Display DSP800
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15. Position signaling switch for guide frame
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3VA2 molded case circuit breaker
Communication
Integration of 3VA molded case circuit breaker into three system concepts: TIA, TIP, TBS

Totally Integrated Power (TIP): Low-voltage power distribution as the fundament for TIA and TBS

Totally Integrated Automation (TIA) for production plants

Totally Building Solution (TBS) for commercial buildings and infrastructure
High transparency regarding usage data and system states

1) COM100 breaker data server

3VA-line max. length 20m

Ethernet (MODBUS TCP) → PROFIBUS → COM800

3VA-line (up to 8 breakers with COM800 breaker data server)

3VA2 molded case circuit breaker

SIMATIC S7

PROFINET

Scalance Switch 1)

DSP800

KM PAC Switched Ethernet PROFINET / PROFIBUS DP and Modbus RTU expansion modules

1) COM100 breaker data server / one breaker

Software powerconfig / powermanager

MindSphere
Communication
Integration in DSP800 external display

Maximum of 8 circuit breakers, including a maximum of 3 x 3VA27 circuit breakers with ETU650/ETU660 and COM43

1) available from Siemens
3VM molded case circuit breakers
3VM molded case circuit breakers
Overview/Technical Data
3VM molded case circuit breaker
Portfolio overview
3VM molded case circuit breaker

Highlights

**Line / starter protection / switch disconnector**

- Compact design
- Rated current from 16 A up to 630 A
- Breaking capacity from 16 kA to 55 kA @415V AC
- Thermal-magnetic trip units
- 1- to 4-pole breakers available (1- and 2-pole in frame size 160 A)
- "Real" switch disconnector up to 630 A\(^1\) according to IEC 60947-3 in MCCB design
- Complete and uniform accessory platform across all 3VM frames

\(^1\) LBS 630A Planned for 2019
### 3VM molded case circuit breakers
#### Sizes and rated currents

<table>
<thead>
<tr>
<th>Frame</th>
<th>3VM10 100 A</th>
<th>3VM11 160 A</th>
<th>3VM12 250 A</th>
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<th>3VM14 630A</th>
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3VM molded case circuit breakers
Trip Units
3VM molded case circuit breaker
Trip unit overview

Line / Generator protection / Switch disconnectors

- Line protection TM210 and TM220
- Switch disconnecter SD100
- Starter protection TM110; TM120M
- Neutral protection available for 4-pole breakers: 0% and 100%
- Usable for AC and DC networks
- No derating up to 50°C
3VM molded case circuit breakers
Accessories
3VM molded case circuit breakers
All important accessory components

1. Knowledge Manager
2. Internal accessories
3. Locking
4. Manual operators
5. Residual current device
6. Plug-in technology
7. DIN rail adapter
8. Connection technology
3VA / 3VM
Molded Case Circuit Breakers
General
3VA / 3VM molded case circuit breaker
Labeling front side

1. Breaker type
2. Approbations
3. Rated current (3VA only)
4. Knowledge Manager
5. Serial number
6. Rated current
7. Product version
8. Trip unit type and order no.
9. Size and breaking capacity class
10. Name plate
### Comprehensive 3VA2 CAx data support

**Digital data support**

#### 12 different CAx data types – overview

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*Unrestricted © Siemens AG 2018*
3VA / 3M Moulded Case Circuit Breaker: Configurator
Knowledge Manager

Scanning of the QR code provides MLFB-based technical information of the 3VA molded case circuit breaker

- Direct connection to the Service & Support Portal
- Siemens Industry Support App
- QR-Reader i-nigma

Patent in process