# Benefits of WAGO Connection Technology

## Gastight Clamping Units – Measurable Contact Quality



Climatic chambers simulate standard atmospheres that could impact long-term constancy of clamping units. All WAGO products meet requirements for the following climatic tests:

- Temperature Cycling Test to IEC/EN 60947-7-1, IEC/EN 60998-2-2
- Industrial Atmospheres to EN ISO 6988, IEC/EN 60068-2-42, IEC/EN 60068-2-60
- Salt Spray Test to IEC/EN 60068-2-11, Marine Applications GL, LR, DNV
- Quick Change of Temperature to IEC/EN 60068-2-14
- Damp Heat, Cyclic (12 + 12 Hours) to IEC/EN 60068-2-30, Marine Applications GL, LR, DNV

Long-term consistency for the low contact resistance of both CAGE CLAMP® and CAGE CLAMP®S results from **gas-tight** clamping units. The spring clamp (acid- and saltwater-proof CrNi spring steel) presses the connected conductor against the current bar (electrolyte copper with lead-free, pure tin coating) within a defined contact zone. The conductor is embedded into the soft tin layer with high contact pressure, securing it against corrosive infiltration.

**The contact pressure**

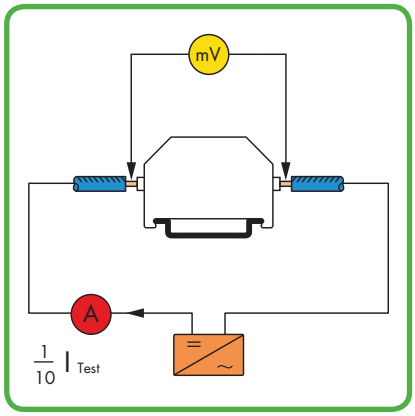
$$P\left[\frac{N}{mm^2}\right] = \frac{\text{Force F [ N ]}}{\text{Area A [mm}^2\text{]}}$$

exerted by CAGE CLAMP® terminations is similar to screw-style terminals.



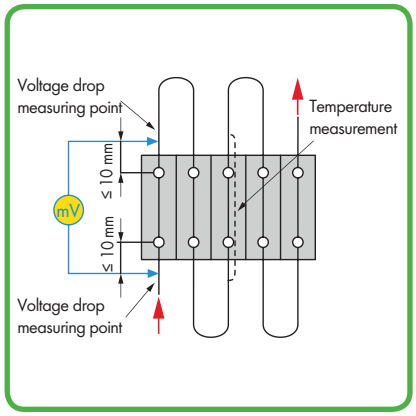
**To best evaluate the quality of a clamping point, WAGO uses the following test procedures:**

The **Voltage Drop Test** evaluates clamping unit quality under stresses such as vibrations, temperature changes and corrosive influences.




Test arrangement: "Voltage Drop Test"

The **Temperature-Rise Test** examines the clamping unit, including the surrounding insulation, at rated current, overcurrent and short-circuit current levels.



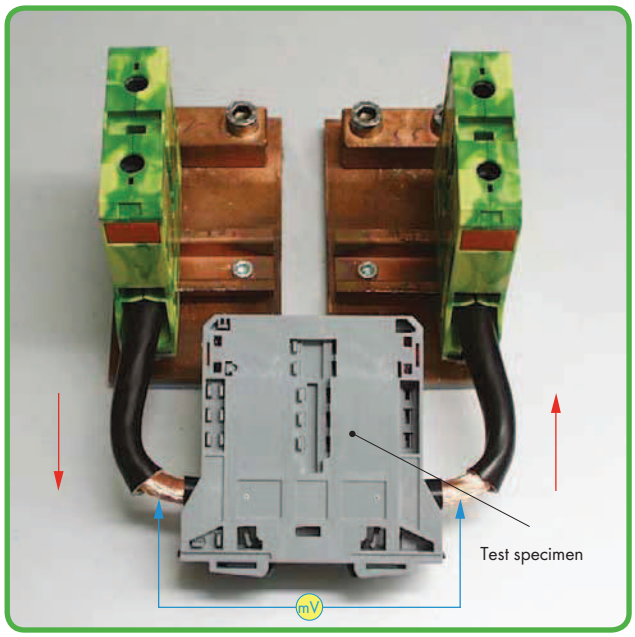

Test arrangement: "Temperature-Rise Test"

# High-Current Carrying Capacity

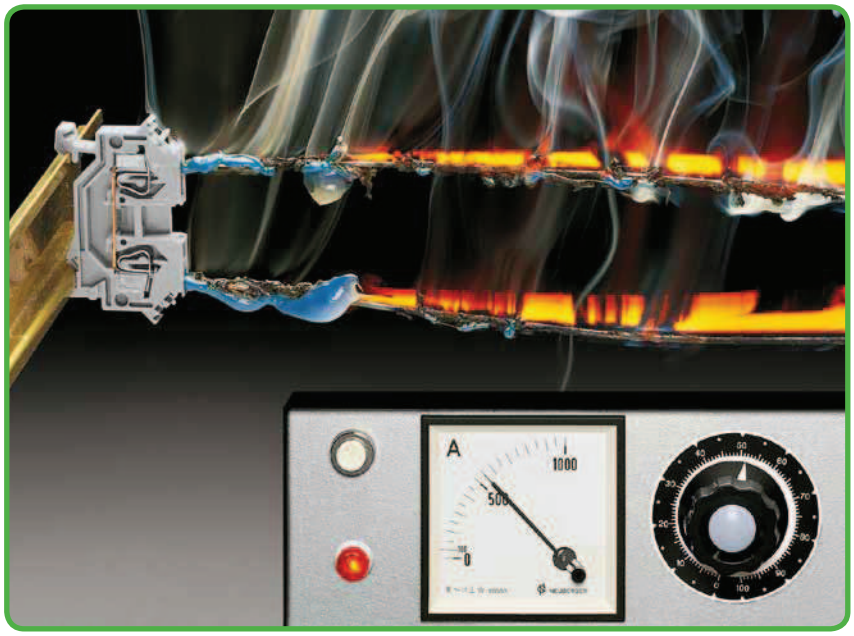
The **short-time withstand capacity** is defined in standards such as IEC/EN 60947-7-1 for through rail-mounted terminal blocks. It is a **current-carrying capacity of 120A per mm² nominal diameter** for the duration of 1 second. **In the case of a 4/0 AWG (95 mm²)** WAGO 285 Series **High-Current Terminal Block, this translates to 11,400A!**

Ground conductor terminal blocks are submitted to the "120A per mm²" test for 3x one second.

The pass criterion for the test is the voltage drop (limit value and constancy). CAGE CLAMP® and CAGE CLAMP®S connections passed this test without damage or reduced functionality.



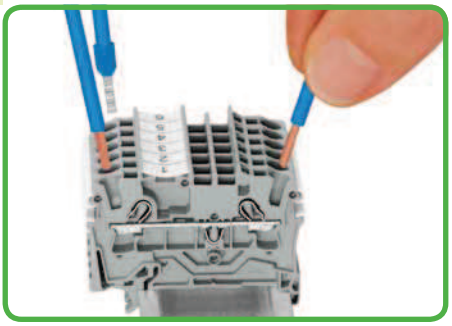

Test arrangement: "Short-Time Current Withstand Test"



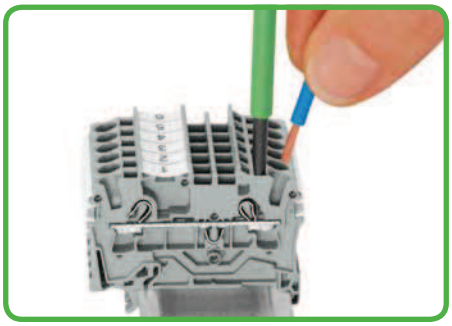

Unrealistic test of a CAGE CLAMP®-equipped,12 AWG (4mm²) rail-mounted terminal block: **Increase of current without time limit.** In such an extreme test – normally, fuse devices would have interrupted the current – **the electrical connection is undamaged.**

# TOPJOB®S Rail-Mounted Terminal Blocks 2000, 2001, 2002, 2004, 2006, 2010 and 2016 Series

## Conductor termination/removal



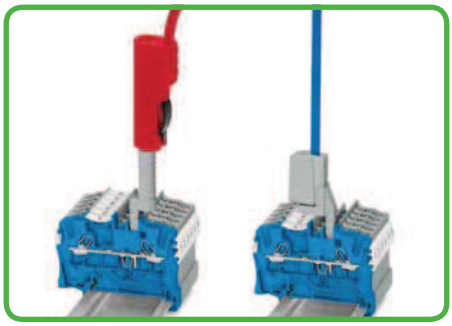
Push-in termination: Solid conductors with cross sections from either one size above, or up to two sizes below, the rated cross section can be pushed in directly – without tools.



With screwdriver: The operation of the clamp remains the same for unprepared fine-stranded conductors or small cross sections that don't allow push-in termination.

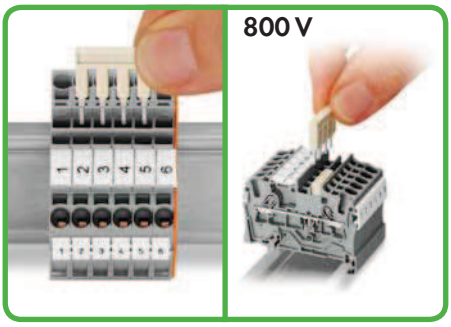
Like the original CAGE CLAMP®, a screwdriver is used for conductor removal with CAGE CLAMP®S.

## Testing



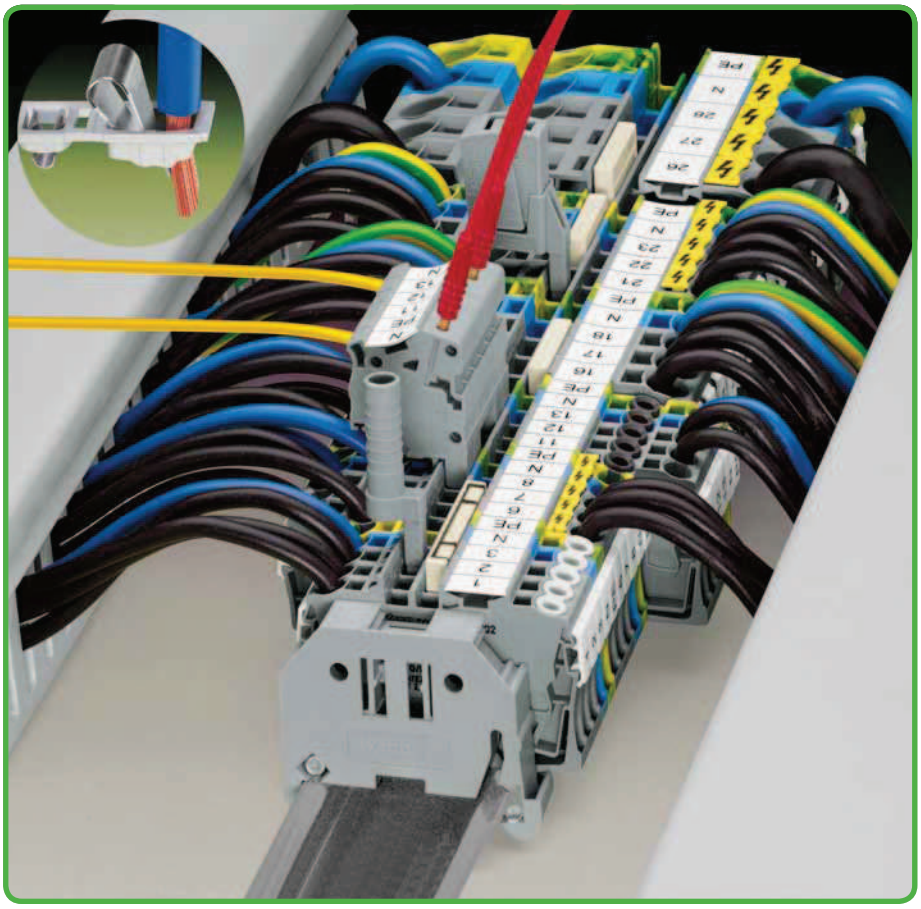
Testing of TOPJOB®S rail-mounted terminal blocks using test plug adapter or testing tap

## Commoning

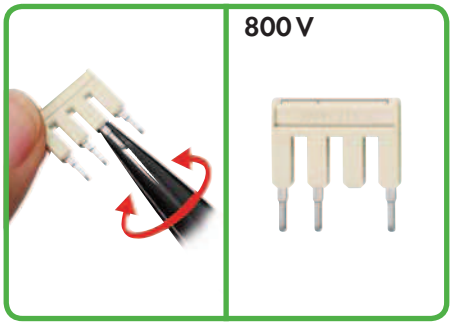



Twin integrated, spring-loaded jumper system allows use of comb-style jumper bars, test plugs and connectors.

Jumper bars rated at 800V (ex works).



## Commoning

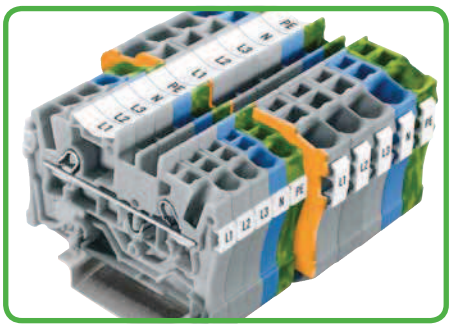



Jumper contacts that are not required can be broken off and removed, the upper-side of the jumper can then be marked accordingly. Applies to 2001, 2002 and 2004 Series.

## Marking

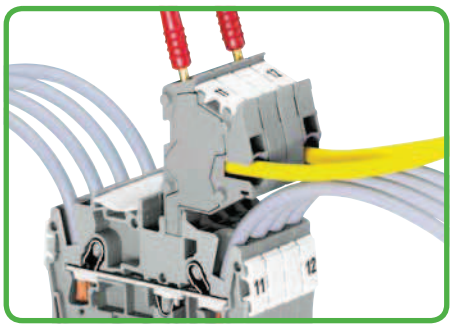


A thermal transfer printer and WAGO "smartDESIGNER" software generate the marking.



TOPJOB®S offers three marking positions for WMB markers, miniature WSB markers or a full-length marking strip.

## Pre-assembled connectors



Pre-assembled connectors with CAGE CLAMP®S connection provide an additional connection option.

**CAGE CLAMP®S clamps the following copper conductors:**



solid | stranded | fine-stranded | tip bonded | with ferrule | with pin terminal

Strip length, see packaging or instructions.

# TOPJOB®S
# Rail-Mounted Terminal Blocks 1.0 (1.5) mm²
# 2000 Series

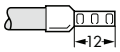
CAGE CLAMP®S

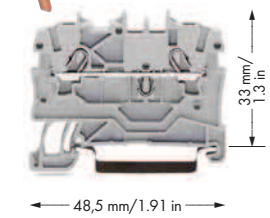
**0.14 - 1.0 (1.5) mm²** ❶ | **AWG 24 - 16**
**800 V/6 kV/3** | **600 V, 10 A**
**$I_N$ 13.5 A (18 A)** | **600 V, 10 A**
**Terminal block width 3.5 mm / 0.138 in**
**9 - 11 mm / 0.39 in**
❷ **Approvals**

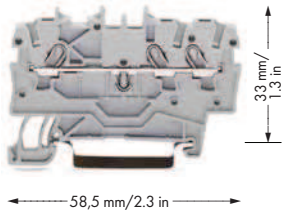
**0.14 - 1.0 (1.5) mm²** ❶ | **AWG 24 - 16**
**800 V/6 kV/3** | **600 V, 10 A**
**$I_N$ 13.5 A (18 A)** | **600 V, 10 A**
**Terminal block width 3.5 mm / 0.138 in**
**9 - 11 mm / 0.39 in**
❷ **Approvals**

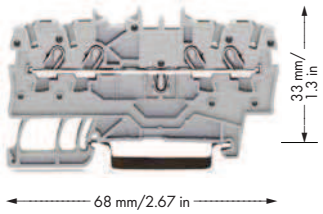
**0.14 - 1.0 (1.5) mm²** ❶ | **AWG 24 - 16**
**800 V/6 kV/3** | **600 V, 10 A**
**$I_N$ 13.5 A (18 A)** | **600 V, 10 A**
**Terminal block width 3.5 mm / 0.138 in**
**9 - 11 mm / 0.39 in**
❷ **Approvals**

❶ Conductor sizes: 0.14 – 1.5 mm² "s + f-st";
Push-in conductor sizes: 0.5 – 1.5 mm² "s" and 0.5 – 1 mm² "insulated ferrule, 12 mm"




| Color | Item No. | Pack. Unit |
|---|---|---|
| **2-conductor through terminal block** | | |
| gray | **2000-1201** | 100 |
| blue | **2000-1204** | 100 |
| orange | **2000-1202** | 100 |
| red | **2000-1203** | 100 |
| black | **2000-1205** | 100 |
| yellow | **2000-1206** | 100 |
| **2-conductor ground terminal block** | | |
| green-yellow | **2000-1207** | 100 |

| Color | Item No. | Pack. Unit |
|---|---|---|
| **3-conductor through terminal block** | | |
| gray | **2000-1301** | 100 |
| blue | **2000-1304** | 100 |
| orange | **2000-1302** | 100 |
| red | **2000-1303** | 100 |
| black | **2000-1305** | 100 |
| yellow | **2000-1306** | 100 |
| **3-conductor ground terminal block** | | |
| green-yellow | **2000-1307** | 100 |

| Color | Item No. | Pack. Unit |
|---|---|---|
| **4-conductor through terminal block** | | |
| gray | **2000-1401** | 100 |
| blue | **2000-1404** | 100 |
| orange | **2000-1402** | 100 |
| red | **2000-1403** | 100 |
| black | **2000-1405** | 100 |
| yellow | **2000-1406** | 100 |
| **4-conductor ground terminal block** | | |
| green-yellow | **2000-1407** | 100 |

## Item-Specific Accessories

**End and intermediate plate,** 0.7 mm thick



orange **2000-1292** 100 (4x25)
gray **2000-1291** 100 (4x25)

**End and intermediate plate,** 0.7 mm thick



orange **2000-1392** 100 (4x25)
gray **2000-1391** 100 (4x25)

**End and intermediate plate,** 0.7 mm thick



orange **2000-1492** 100 (4x25)
gray **2000-1491** 100 (4x25)

## 2000 Series Accessories

Appropriate marking systems: **WMB/Marking Strips**

**Push-in type jumper bar,** insulated, $I_N$ 14 A, light gray



2-way **2000-402** 200 (8x25)
3-way **2000-403** 200 (8x25)
4-way **2000-404** 200 (8x25)
5-way **2000-405** 100 (4x25)
: :
10-way **2000-410** 100 (4x25)

**Push-in type jumper bar,** insulated, $I_N$ 14 A, light gray



1 - 3 **2000-433** 200 (8x25)
1 - 4 **2000-434** 200 (8x25)
1 - 5 **2000-435** 100 (4x25)
: :
1 - 10 **2000-440** 100 (4x25)

**Star point jumper,** insulated,



$I_N$ = $I_N$ terminal block, light gray
1–3–5 **2000-405/011-000**
100 (4x25)

**Protective warning marker,** with high-voltage symbol,



for 5 terminal blocks
yellow **2000-115** 100 (4x25)

**WMB Multi marking system,**



10 strips with 10 markers per card
for 3.5 mm terminal block width,
plain **793-3501** 50 (10x5)

**Marking strips,** plain



11 mm wide,
50m roll
white **2009-110** 1

**Operating tool with partially insulated shaft,**



type 1, (2.5 x 0.4) mm blade
**210-719** 1

Suitable for Ex i applications

**Test plug adapter,** for test plug 4 mm Ø



gray **2009-174** 100 (4x25)

**Insulated ferrules,** extra long,



for TOPJOB®S terminal blocks
see page 195

**Testing tap,** for max. 2.5 mm²/AWG 14



gray **2009-182** 100 (4x25)

❷ Approvals are available online at: www.wago.com.

For technical explanations and abbreviations, see technical section.

# TOPJOB®S
# Through/Ground Conductor and Ex Terminal Blocks 1.5 (2.5) mm²
# 2001 Series

**0.25 - 1.5 (2.5) mm² ❶** | **AWG 22 - 14**
**800 V/8 kV/3** | **600 V, 10 A**
**$I_N$ 18 A (24 A)** | **600 V, 10 A**
**Terminal block width 4.2 mm / 0.165 in**
**9 – 11 mm / 0.39 in**
**❷ Approvals**

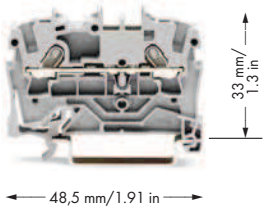
**0.25 - 1.5 (2.5) mm² ❶** | **AWG 22 - 14**
**800 V/8 kV/3** | **600 V, 10 A**
**$I_N$ 18 A (24 A)** | **600 V, 10 A**
**Terminal block width 4.2 mm / 0.165 in**
**9 – 11 mm / 0.39 in**
**❷ Approvals**

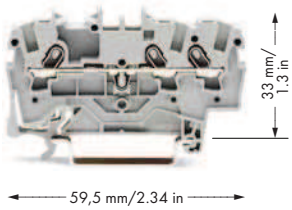
**0.25 - 1.5 (2.5) mm² ❶** | **AWG 22 - 14**
**800 V/8 kV/3** | **600 V, 10 A**
**$I_N$ 18 A (24 A)** | **600 V, 10 A**
**Terminal block width 4.2 mm / 0.165 in**
**9 – 11 mm / 0.39 in**
**❷ Approvals**

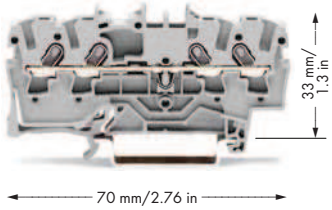


❶ Conductor sizes: 0.25 – 2.5 mm² "s + f-st";
Push-in conductor sizes: 0.5 – 2.5 mm² "s" and
0.75 – 1.5 mm² "insulated ferrule, 12 mm"




| Color | Item No. | Pack. Unit |
|---|---|---|
| **2-conductor through terminal block** | | |
| gray Ex | **2001-1201** | 100 |
| blue Ex | **2001-1204** | 100 |
| orange Ex | **2001-1202** | 100 |
| red Ex | **2001-1203** | 100 |
| black Ex | **2001-1205** | 100 |
| yellow Ex | **2001-1206** | 100 |
| **2-conductor ground terminal block** | | |
| green-yellow Ex | **2001-1207** | 100 |
| **Other terminal blocks with the same profile:** | | |
| Diode | **2001-1211/1000-411** | Volume 1 |

| Color | Item No. | Pack. Unit |
|---|---|---|
| **3-conductor through terminal block** | | |
| gray Ex | **2001-1301** | 100 |
| blue Ex | **2001-1304** | 100 |
| orange Ex | **2001-1302** | 100 |
| red Ex | **2001-1303** | 100 |
| black Ex | **2001-1305** | 100 |
| yellow Ex | **2001-1306** | 100 |
| **3-conductor ground terminal block** | | |
| green-yellow Ex | **2001-1307** | 100 |
| **Other terminal blocks with the same profile:** | | |
| Diode | **2001-1311/1000-411** | Volume 1 |
| LED | **2001-1321/1000-434** | Volume 1 |

| Color | Item No. | Pack. Unit |
|---|---|---|
| **4-conductor through terminal block** | | |
| gray Ex | **2001-1401** | 100 |
| blue Ex | **2001-1404** | 100 |
| orange Ex | **2001-1402** | 100 |
| red Ex | **2001-1403** | 100 |
| black Ex | **2001-1405** | 100 |
| yellow Ex | **2001-1406** | 100 |
| **4-conductor ground terminal block** | | |
| green-yellow Ex | **2001-1407** | 100 |
| **Other terminal blocks with the same profile:** | | |
| Diode | **2001-1411/1000-411** | Volume 1 |
| Diode | **2001-1411/1000-434** | Volume 1 |
| Double-potential | **2001-1441** | Volume 1 |

## Item-Specific Accessories

Separator for Ex e/Ex i applications, see page 30

**End and intermediate plate,** 0.8 mm thick



orange **2002-1292** 100 (4x25)
gray **2002-1291** 100 (4x25)

**End and intermediate plate,** 0.8 mm thick



orange **2002-1392** 100 (4x25)
gray **2002-1391** 100 (4x25)

**End and intermediate plate,** 0.8 mm thick



orange **2002-1492** 100 (4x25)
gray **2002-1491** 100 (4x25)

**Separator,** oversized, 0.8 mm thick



orange **2002-1294** 100 (4x25)
gray **2002-1293** 100 (4x25)

**Separator,** oversized, 0.8 mm thick



orange **2002-1394** 100 (4x25)
gray **2002-1393** 100 (4x25)

**Separator,** oversized, 0.8 mm thick



orange **2002-1494** 100 (4x25)
gray **2002-1493** 100 (4x25)

## 2001 Series Accessories

Appropriate marking systems: **WMB/Marking Strips**

**Push-in type jumper bar,** insulated, $I_N$ 18 A, light gray



2-way **2001-402** 200 (8x25)
3-way **2001-403** 200 (8x25)
4-way **2001-404** 200 (8x25)
: :
10-way **2001-410** 100 (4x25)

**Push-in type jumper bar,** insulated, $I_N$ 18 A, light gray



1 - 3 **2001-433** 200 (8x25)
1 - 4 **2001-434** 200 (8x25)
1 - 5 **2001-435** 100 (4x25)
: :
1 - 10 **2001-440** 100 (4x25)

**Push-in type wire jumper,** insulated, $I_N$ 16 A,
wire size 1.5 mm²/AWG 16



60 mm **2009-412** 100 (10x10)
110 mm **2009-414** 100 (10x10)
250 mm **2009-416** 100 (10x10)

**Insulation stop,**



5 pcs/strip,
0.25 – 0.5 mm²
light gray **2001-171** 200 (8x25)

**Protective warning marker,** with high-voltage symbol,
for 5 terminal blocks



yellow **2001-115** 100 (4x25)

**TOPJOB®S connector,** modular,



for jumper contact slot
gray **2001-511** 100 (4x25)

**Spacer module**

gray **2001-549** 100 (4x25)

**WMB Multi marking system,**



10 strips with 10 markers per card,
stretchable 4 – 4.2 mm
plain **793-4501** 5

**Marking strip,** plain,



11 mm wide,
50m roll
white **2009-110** 1

Suitable for Ex i applications
Ex Suitable for Ex e II applications
550 V, 17 A

**Operating tool with partially insulated shaft,**



type 1, (2.5 x 0.4) mm blade
**210-719** 1

**Insulated ferrules,** extra long,



for TOPJOB®S terminal blocks
see page 195

❷ Approvals are available online at: www.wago.com.

For technical explanations and abbreviations, see technical section.