

# MULTILAM plugs Main catalog

Powerline | Industrial connectors



## STÄUBLI ELECTRICAL CONNECTORS

## Long-term solutions – Expert connections



**Stäubli Electrical Connectors is a leading international manufacturer of high-quality electrical contacts and connector systems and solutions for industrial applications. We are part of the Stäubli mechatronics group, the technology leader in connection solutions, robotics and textile machinery.**

**Pioneering contact technology for increased efficiency**

The entire Stäubli Electrical Connectors product range meets market expectations for high performance, the highest number of mating cycles, and long-lasting reliability for safe, durable operation. Our proven **MULTILAM technology** is ideal for all types of connections in industrial applications.

Customers in the **power transmission and**

Stäubli develops, produces, sells and services products for markets with the highest productivity and safety standards. As recognized specialists, our focus is always on solutions and customers. Many new developments got their start here and are now becoming established as worldwide standards.

**distribution** sector rely on our consistent, loss-free transmission performance in all voltage ranges. The **automotive industry** depends on our high-efficiency connections for spot-welding applications in production lines. Harsh conditions in the **transportation sector** require high vibration resistance, maximum reliability, and compact design. These attributes are vitally important for railway and e-mobility applications. The safety

Our customers depend on our expertise and our active support, even when dealing with unusual challenges. With Stäubli, you're entering into a long-term partnership built on reliability, dedication, and exceptional quality in both products and services.

and reliability of our products are essential for **test and measurement technology**.

In the growing field of **alternative energy**, our products have been setting standards since the 1990s. About half of the solar energy generated worldwide is transmitted through safe, long-lasting, high-performance Stäubli connectors.

# Applications and advantages



**Stäubli MULTILAM plugs are produced from gold or nickel-plated brass. A recess serves as a seat for the freely movable MULTILAM contact cage. The spring action of the louvers provides constant pressure in mated condition while guaranteeing excellent electrical properties.** Our MULTILAM plugs are equipped with two different types of MULTILAM: twisted or straight.

They are optimally suitable for use in the following areas of application:

- Machine construction & integrators
- Medical technology
- Automotive industry
- Measurement technology
- Instruction & education
- Lighting technology
- Research & laboratory

# Contents

- Page 6**      **Introduction**
- Stäubli MULTILAM plugs
- Page 7**      **Stäubli MULTILAM plugs**
- Ø 2 mm – Ø 2.5 mm
  - Ø 2.8 mm – Ø 3 mm
  - Ø 4 mm
- Page 14**     **Low voltage lighting installation systems**
- 1-pole connectors
- Page 16**     **Accessories**
- Assembly material
- Page 18**     **Appendix**
- Customized designs
  - Technical information
  - Index

# General information

## Colour code

For those items available in various colours, replace the asterisk “\*” with the appropriate colour code.

|    |              |    |             |
|----|--------------|----|-------------|
| 20 | green-yellow | 26 | violet      |
| 21 | black        | 27 | brown       |
| 22 | red          | 28 | grey        |
| 23 | blue         | 29 | white       |
| 24 | yellow       | 33 | transparent |
| 25 | green        |    |             |

## Changes / Provisos

All data, illustrations and drawings in the catalogue have been carefully checked. They are in accordance with our experience to date, but no responsibility can be accepted for errors.

We also reserve the right to make modifications for design and safety reasons. When designing equipment incorporating our components, it is therefore advisable not to rely solely on the data in the catalogue but to consult us to make sure this information is up to date. We shall be pleased to advise you.

## Copyright

The use of this catalog for any other purpose, in whatever form, without our prior written consent is not permitted.

## RoHS ready

Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

## INTRODUCTION

# Stäubli MULTILAM plugs

**Stäubli MULTILAM plugs are machined from brass, and are gold- or nickel-plated.**

A recess serves as a seat for the freely movable MULTILAM contact cage. It is punched from rigid hard-drawn copper alloy sheet, rolled and formed so that the louvers bulge outward. The spring action of the louvers

provides constant pressure in the mated condition. Our MULTILAM plugs are fitted with two different types of MULTILAM. The outstanding electrical characteristics of MULTILAM connectors are: high current-carrying capacity, minimal contact resistance, low self-heating.

Solid metal pins make Stäubli MULTILAM plugs extremely rugged and crushproof. They are also highly resistant to vibration in the mated condition.



straight



Traditional, straight form, a proven Stäubli design with very good electrical and mechanical properties for a plug connection.





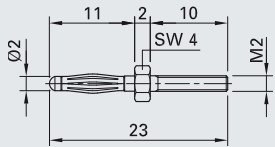

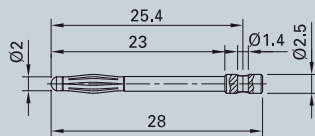

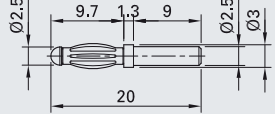

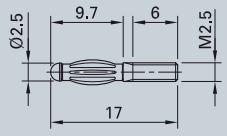
twisted

“Twisted” form with even better electrical and mechanical properties for a plug connection.

### Technical data

|   | MULTILAM version “straight”   |          |          |        |        | MULTILAM version “twisted”  |
|---|---|----------|----------|--------|--------|---|
|   |  |          |          |        |        |  |
| Nominal-Ø                                 | Ø 2 mm  | Ø 2.5 mm | Ø 2.8 mm | Ø 3 mm | Ø 4 mm | Ø 4 mm  |
| Max. rated current                        | 25 A  | 25 A     | 25 A     | 30 A   | 50 A   | 50 A  |
| Contact resistance, gold-plated version   | 0.4 mΩ  | 0.5 mΩ   | 0.5 mΩ   | 0.5 mΩ | 0.3 mΩ | 0.2 mΩ  |
| Contact resistance, nickel-plated version | 2 mΩ  | –        | –        | –      | 0.8 mΩ | 0.4 mΩ  |
| Upper temperature limit                   | 150°C   |          |          |        |        | 150°C   |

# ∅ 2 mm – ∅ 2.5 mm

| Order No.      | Type    | Nominal-∅ | Type of termination | Metal parts / plating | Withdrawal force | Max. temperature | Rated current <sup>1)</sup> | Contact resistance | Assembly material, order separately |  |
|----------------|---------|-----------|---------------------|-----------------------|------------------|------------------|-----------------------------|--------------------|-------------------------------------|--|
|                |         | mm        |                     |                       | N                | °C               | A                           | mΩ                 |                                     |  |
| <b>22.1100</b> | SA200   | 2         | M2                  | CuZn, Au              | ~4               | 150              | 25                          | 0.4                | p. 16                               |   |
| <b>22.1102</b> | SA200N  | 2         | M2                  | CuZn, Ni              | ~4               | 150              | 25                          | 2                  | p. 16                               | <br>     |
| <b>22.6303</b> | SA203   | 2         | Soldering           | CuZn, Ni              | ~4               | 150              | 25                          | 2                  |                                     | <br> |
| <b>22.5118</b> | SA2,5   | 2.5       |                     | CuZn, Au              | ~6               | 150              | 25                          | 0.5                |                                     | <br> |
| <b>22.5117</b> | SA2,5-G | 2.5       | M2,5                | CuZn, Au              | ~6               | 150              | 25                          | 0.5                |                                     | <br> |

<sup>1)</sup> According to connecting method and cross section

# ∅ 2.8 mm – ∅ 3 mm

| Order No. | Type  | Nominal-∅ | Type of termination | Metal parts / plating | Withdrawal force | Max. temperature | Rated current <sup>1)</sup> | Contact resistance | Assembly material, order separately |  |
|-----------|-------|-----------|---------------------|-----------------------|------------------|------------------|-----------------------------|--------------------|-------------------------------------|--|
|           |       | mm        |                     |                       | N                | °C               | A                           | mΩ                 |                                     |  |
| 22.5107   | SA2,8 | 2.8       | M3                  | CuZn, Au              | ~3               | 150              | 25                          | 0.5                | p. 16                               |  |
| 22.1110   | SA300 | 3         | Soldering           | CuZn, Au              | ~5               | 150              | 30                          | 0.5                |                                     |  |
| 22.1111   | SA301 | 3         | M3                  | CuZn, Au              | ~2.5             | 150              | 30                          | 0.5                | p. 16                               |  |

<sup>1)</sup> According to connecting method and cross section



Ø 4 mm



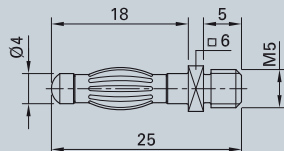
| Order No.               | Type     | Nominal-Ø | Type of termination | Metal parts / plating | Withdrawal force | Max. temperature | Rated current <sup>1)</sup> | Contact resistance | Assembly material, order separately |  |
|-------------------------|----------|-----------|---------------------|-----------------------|------------------|------------------|-----------------------------|--------------------|-------------------------------------|--|
|                         |          | mm        |                     |                       | N                | °C               | A                           | mΩ                 |                                     |  |
| 22.1050                 | SA400    | 4         | M4                  | CuZn, Au              | ~10              | 150              | 50                          | 0.2                | p. 17                               |  |
| 22.1078                 | SA400N   | 4         | M4                  | CuZn, Ni              | ~10              | 150              | 50                          | 0.4                | p. 17                               |  |
| 22.1070                 | SA400-B  | 4         | M4                  | CuZn, Au              | ~5               | 150              | 50                          | 0.3                | p. 17                               |  |
| 24.5062                 | SA400-V  | 4         | M4                  | CuZn, Au              | ~12              | 80               | 50                          | 0.3                | p. 17                               |  |
| 24.0117- <sup>*2)</sup> | SA400-VI | 4         | M4                  | CuZn, Au              | ~12              | 80               | 32                          | 0.3                | p. 17                               |  |

\* Couleurs  
21 22 23 24 25 26 27 28 29

Isolation: PA

<sup>1)</sup> According to connecting method and cross section

<sup>2)</sup> Add the desired colour code instead of "\*\*".

| Order No. | Type   | Nominal-Ø | Type of termination | Metal parts / plating | Withdrawal force | Max. temperature | Rated current <sup>1)</sup> | Contact resistance | Assembly material, order separately |  |
|-----------|--------|-----------|---------------------|-----------------------|------------------|------------------|-----------------------------|--------------------|-------------------------------------|--|
|           |        | mm        |                     |                       | N                | °C               | A                           | mΩ                 |                                     |  |
| 22.1051   | SA401  | 4         | M5/<br>Soldering    | CuZn, Au              | ~5               | 150              | 50                          | 0.3                | p. 16                               |   |
| 22.1091   | SA401N | 4         | M5/<br>Soldering    | CuZn, Ni              | ~5               | 150              | 50                          | 0.8                | p. 16                               | <br>    |
| 22.1052   | SA402  | 4         | M5                  | CuZn, Au              | ~5               | 150              | 50                          | 0.3                | p. 16                               | <br> |

<sup>1)</sup> According to connecting method and cross section

| Order No.      | Type   | Nominal-Ø | Type of termination | Metal parts / plating | Withdrawal force | Max. temperature | Rated current <sup>1)</sup> | Contact resistance | Assembly material, order separately |  |
|----------------|--------|-----------|---------------------|-----------------------|------------------|------------------|-----------------------------|--------------------|-------------------------------------|--|
|                |        | mm        |                     |                       | N                | °C               | A                           | mΩ                 |                                     |  |
| <b>22.1053</b> | SA403  | 4         | M4                  | CuZn, Au              | ~5               | 150              | 50                          | 0.3                | p. 17                               |  |
| <b>22.1076</b> | SA403N | 4         | M4                  | CuZn, Ni              | ~5               | 150              | 50                          | 0.8                | p. 17                               |  |
| <b>22.1054</b> | SA404  | 4         | M3                  | CuZn, Au              | ~8               | 150              | 50                          | 0.3                |                                     |  |
| <b>22.6012</b> | SA404N | 4         | M3                  | CuZn, Ni              | ~12              | 150              | 50                          | 0.8                |                                     |  |
| <b>22.1055</b> | SA405  | 4         | M3                  | CuZn, Au              | ~5               | 150              | 50                          | 0.3                | p. 17                               |  |
| <b>22.6016</b> | SA405N | 4         | M3                  | CuZn, Ni              | ~5               | 150              | 50                          | 0.8                | p. 17                               |  |

<sup>1)</sup> According to connecting method and cross section

| Order No. | Type  | Nominal-Ø | Type of termination | Metal parts / plating | Withdrawal force | Max. temperature | Rated current <sup>1)</sup> | Contact resistance | Assembly material, order separately |  |
|-----------|-------|-----------|---------------------|-----------------------|------------------|------------------|-----------------------------|--------------------|-------------------------------------|--|
|           |       | mm        |                     |                       | N                | °C               | A                           | mΩ                 |                                     |  |
| 22.6205   | SA479 | 4         | M5/<br>Soldering    | CuZn, Au              | ~5               | 150              | 50                          | 0.3                | p. 16                               |  |
| 22.1081   | SA481 | 4         | Soldering           | CuZn, Ni              | ~10              | 150              | 50                          | 0.4                |                                     |  |
| 22.1082   | SA482 | 4         | Soldering           | CuZn, Ni              | ~10              | 150              | 50                          | 0.4                |                                     |  |
| 22.1083   | SA483 | 4         | M3                  | CuZn, Ni              | ~10              | 150              | 50                          | 0.4                | p. 17                               |  |

<sup>1)</sup> According to connecting method and cross section

| Order No.  | Type    | Nominal-Ø | Type of termination | Metal parts / plating | Withdrawal force | Max. temperature | Rated current <sup>1)</sup> | Contact resistance | Assembly material, order separately |  |
|--|---------|-----------|---------------------|-----------------------|------------------|------------------|-----------------------------|--------------------|-------------------------------------|--|
|  |         | mm        |                     |                       | N                | °C               | A                           | mΩ                 |                                     |  |
| 22.1084  | SA484   | 4         | M3                  | CuZn, Ni              | ~10              | 150              | 50                          | 0.4                | p. 17                               |  |
| 22.1085  | SA485   | 4         |                     | CuZn, Ni              | ~10              | 150              | 50                          | 0.4                |                                     |  |
| 22.1086  | SA486   | 4         | M4                  | CuZn, Ni              | ~5               | 150              | 50                          | 0.8                | p. 17                               |  |
| 22.1049  | LS460-P | 4         | Crimping            | CuZn, Au              | ~10              | 150              | 50                          | 0.2                |                                     |  |
| <p>Anti-kink sleeve T-POAG-6, TPE, conductor cross section 6 mm<sup>2</sup>,<br/> <b>Order No. 15.5004-*</b></p> <p>* Colours<br/> <span style="background-color: black; color: white; padding: 2px;">21</span> <span style="background-color: red; color: white; padding: 2px;">22</span> <span style="background-color: yellow; color: black; padding: 2px;">24</span></p> |         |           |                     |                       |                  |                  |                             |                    |                                     |  |

<sup>1)</sup> According to connecting method and cross section



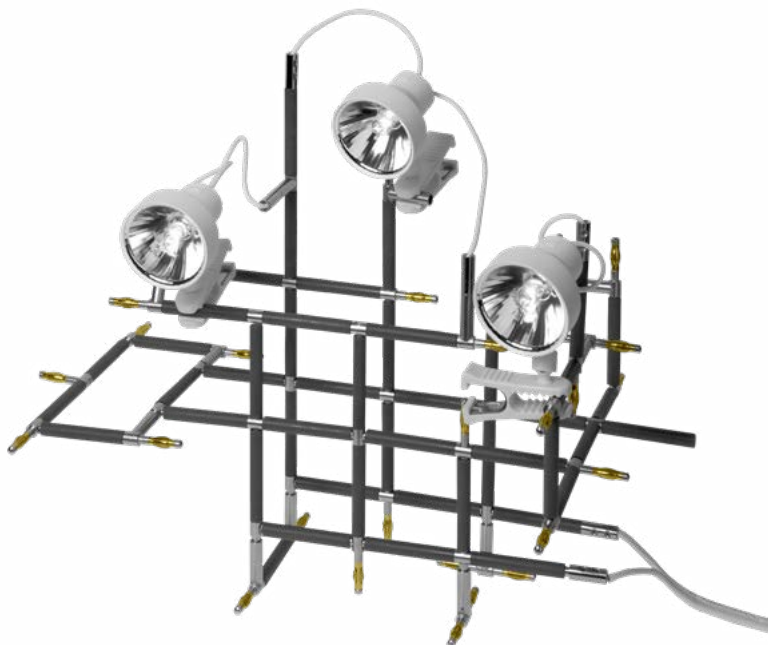
Assembly instructions MA163

[www.staubli.com/electrical](http://www.staubli.com/electrical)

## LOW VOLTAGE LIGHTING INSTALLATION SYSTEMS

# 1-pole connectors

Connectors type SL4F/... Ø 4 mm are suitable for halogen low voltage lighting systems with Ø 4 mm tubular conductors.



| Order No.  | Type   | Nominal-Ø | Type of termination | Metal parts / plating | Withdrawal force | Max. temperature | Rated current <sup>1)</sup> | Contact resistance |  |
|--|--------|-----------|---------------------|-----------------------|------------------|------------------|-----------------------------|--------------------|--|
|  |        | mm        |                     |                       | N                | °C               | A                           | mΩ                 |  |
| 13.0003  | SL4F/G | 4         | Screw connection    | CuZn, Ni              | ~10              | 150              | 50                          | 0.8                |  |
| <p><b>Connecting plug</b>, suitable as power feed from the transformer. Can also be used (in pairs) with cable as a flexible corner connector.</p> |        |           |                     |                       |                  |                  |                             |                    |  |

<sup>1)</sup> According to connecting method and cross section

| Order No.  | Type   | Nominal-Ø | Type of termination | Metal parts / plating | Withdrawal force | Max. temperature | Rated current 1) | Contact resistance |  |
|--|--------|-----------|---------------------|-----------------------|------------------|------------------|------------------|--------------------|--|
|  |        | mm        |                     |                       | N                | °C               | A                | mΩ                 |  |
| 13.0001  | SL4F/2 | 4         |                     | CuZn, Ni              | ~12              | 150              | 50               | 0.8                |  |
| <p><b>In-line coupling plug</b>, suitable for making extensions in lighting systems.</p>           |        |           |                     |                       |                  |                  |                  |                    |  |
| 13.0004  | SL4F/3 | 4         |                     | CuZn, Ni              | ~5               | 150              | 50               | 0.8                |  |
| <p><b>T-plug</b>, suitable as a T-distributor or as a connector for low voltage halogen spots.</p> |        |           |                     |                       |                  |                  |                  |                    |  |
| 13.0005  | SL4F/4 | 4         |                     | CuZn, Ni              | ~5               | 150              | 50               | 0.8                |  |
| <p><b>Cross-plug</b>, suitable as in lighting systems.</p>   |        |           |                     |                       |                  |                  |                  |                    |  |

1) According to connecting method and cross section

ACCESSORIES

# Assembly material

| Order No. | Type      | Designation          | Material           | DIN  | Illustration | To fit MULTILAM plugs |
|-----------|-----------|----------------------|--------------------|------|--------------|-----------------------|
| 22.6601   | MU0,5D/M2 | Nut                  | Brass, gold plated | 439  |              | <b>SA200</b>          |
| 22.6501   | MU0,8D/M2 | Nut                  | Brass, gold plated | 934  |              | <b>SA200N</b>         |
| 22.6503   | U/M2      | U-Washer             | Brass, gold plated | 125  |              | <b>SA200N</b>         |
| 22.6530   | FS/M2     | Serrated lock washer | Spring bronze      | 6798 |              | <b>SA200N</b>         |
| 22.6605   | MU0,5D/M3 | Nut                  | Brass, gold plated | 439  |              | <b>SA2,8</b>          |
| 22.6505   | MU0,8D/M3 | Nut                  | Brass, gold plated | 934  |              | <b>SA2,8</b>          |
| 22.6507   | U/M3      | U-Washer             | Brass, gold plated | 125  |              | <b>SA301</b>          |
| 22.6532   | FS/M3     | Serrated lock washer | Spring bronze      | 6798 |              | <b>SA301</b>          |
| 22.6613   | MU0,5D/M5 | Nut                  | Brass, gold plated | 439  |              | <b>SA401</b>          |
|           |           |                      |                    |      |              | <b>SA401N</b>         |
| 22.6515   | U/M5      | U-Washer             | Brass, gold plated | 125  |              | <b>SA402</b>          |
|           |           |                      |                    |      |              | <b>SA402-H</b>        |
|           |           |                      |                    |      |              | <b>SA479</b>          |



| Order No. | Type       | Designation          | Material             | DIN  | Illustration | To fit MULTILAM plugs   |
|-----------|------------|----------------------|----------------------|------|--------------|---|
| 22.6605   | MU0,5D/M3  | Nut                  | Brass, gold plated   | 439  |              |  <b>SA405</b>      |
| 22.6505   | MU0,8D/M3  | Nut                  | Brass, gold plated   | 934  |              |  <b>SA405</b>      |
| 22.6606   | MU0,5D/M3N | Nut                  | Brass, nickel plated | 934  |              |  <b>SA405N</b>     |
| 22.6522   | MU0,8D/M3N | Nut                  | Brass, nickel plated | 934  |              |  <b>SA405N</b>     |
| 22.6507   | U/M3       | U-Washer             | Brass, gold plated   | 125  |              |  <b>SA483</b>      |
| 22.6532   | FS/M3      | Serrated lock washer | Spring bronze        | 6798 |              |  <b>SA484</b>    |
| 22.6609   | MU0,5D/M4  | Nut                  | Brass, gold plated   | 439  |              |  <b>SA400</b>    |
|           |            |                      |                      |      |              |  <b>SA400N</b>   |
| 22.6509   | MU0,8D/M4  | Nut                  | Brass, gold plated   | 934  |              |  <b>SA400-B</b>  |
|           |            |                      |                      |      |              |  <b>SA403</b>    |
| 22.6511   | U/M4       | U-Washer             | Brass, gold plated   | 125  |              |  <b>SA403N</b>   |
|           |            |                      |                      |      |              |  <b>SA400-V</b>  |
| 22.6533   | FS/M4      | Serrated lock washer | Spring bronze        | 6798 |              |  <b>SA400-VI</b> |
|           |            |                      |                      |      |              |  <b>SA486</b>    |

APPENDIX

# Customized designs

A speciality of Stäubli is to develop individual solutions for special contact requirements in collaboration with the customer. Just ask us. We shall be pleased to advise you.

**Examples:**



# Technical information

**Rated current (IEC 61984)**

Assigned current which the connector can carry continuously (without interruption) and simultaneously through all its wired contacts with the largest specified conductor, at an ambient temperature of 20 °C, without the upper limiting temperature being exceeded.

**Protection against electric shock for unenclosed connectors**

Protection against electric shock is provided by the customer by the enclosure of the equipment in which the connector is mounted. Or its use is limited to very low voltage (SELV – safety extra low voltage).

**Gold plating**

Gold has good electrical conductivity and affords unexcelled corrosion protection. Contact resistance is low and constant. A nickel or copper layer is applied as a diffusion barrier.

**Nickel plating**

In cases where electrical specifications are less demanding, nickel-plated contact elements are used. This process is also frequently used to provide a diffusion barrier prior to gold plating.

**Stäubli MULTILAMs**

are special contact elements developed by Stäubli with outstanding electrical and mechanical properties. The MULTILAM form a contact cage inserted between two contact surfaces.

The MULTILAMs contact the two surfaces at a large number of points, each of which acts as a “bridge” for passage of current.

Most of the Stäubli MULTILAMs are made of hard-drawn copper alloy and are gold-plated. They have high current-carrying capacity in continuous and intermittent operation and perform very reliably over a broad temperature range.

For detailed information, refer to the catalogue: **MULTILAM Technical Overview.**

**Contact resistance**

is the resistance occurring at the point of contact between two surfaces. Its value is calculated with the measured voltage drop and the rated current in new condition. The technical data here stated are mean values.

**Withdrawal force**

is the force required to pull out a connector without influence of a locking or a coupling device. The withdrawal force is determined in a polished steel socket.

# Index

## Sorted by type

| Type       | Order No. | Page   |
|------------|-----------|--------|
| FS/M2      | 22.6530   | 16     |
| FS/M3      | 22.6532   | 16, 17 |
| FS/M4      | 22.6533   | 17     |
| LS460-P    | 22.1049   | 13     |
| MU0,5D/M2  | 22.6601   | 16     |
| MU0,5D/M3  | 22.6605   | 16, 17 |
| MU0,5D/M3N | 22.6606   | 17     |
| MU0,5D/M4  | 22.6609   | 17     |
| MU0,5D/M5  | 22.6613   | 16     |
| MU0,8D/M2  | 22.6501   | 16     |
| MU0,8D/M3  | 22.6505   | 16, 17 |
| MU0,8D/M3N | 22.6522   | 17     |
| MU0,8D/M4  | 22.6509   | 17     |
| SA2,5      | 22.5118   | 7      |
| SA2,5-G    | 22.5117   | 7      |
| SA2,8      | 22.5107   | 8      |
| SA200      | 22.1100   | 7      |
| SA200N     | 22.1102   | 7      |
| SA203      | 22.6303   | 7      |
| SA300      | 22.1110   | 8      |
| SA301      | 22.1111   | 8      |
| SA400      | 22.1050   | 9      |
| SA400-B    | 22.1070   | 9      |
| SA400N     | 22.1078   | 9      |
| SA400-V    | 24.5062   | 9      |
| SA400-VI   | 24.0117-* | 9      |

| Type     | Order No. | Page   |
|----------|-----------|--------|
| SA401    | 22.1051   | 10     |
| SA401N   | 22.1091   | 10     |
| SA402    | 22.1052   | 10     |
| SA403    | 22.1053   | 11     |
| SA403N   | 22.1076   | 11     |
| SA404    | 22.1054   | 11     |
| SA404N   | 22.6012   | 11     |
| SA405    | 22.1055   | 11     |
| SA405N   | 22.6016   | 11     |
| SA479    | 22.6205   | 12     |
| SA481    | 22.1081   | 12     |
| SA482    | 22.1082   | 12     |
| SA483    | 22.1083   | 12     |
| SA484    | 22.1084   | 13     |
| SA485    | 22.1085   | 13     |
| SA486    | 22.1086   | 13     |
| SL4F/2   | 13.0001   | 15     |
| SL4F/3   | 13.0004   | 15     |
| SL4F/4   | 13.0005   | 15     |
| SL4F/G   | 13.0003   | 14     |
| T-POAG-6 | 15.5004-* | 13     |
| U/M2     | 22.6503   | 16     |
| U/M3     | 22.6507   | 16, 17 |
| U/M4     | 22.6511   | 17     |
| U/M5     | 22.6515   | 16     |



■ Stäubli Units    ○ Agents

# Global presence of the Stäubli Group

[www.staubli.com](http://www.staubli.com)