MPGAMMA

STEEL FACTOR

# VENTILATION SYSTEMS AND CABLE PASSAGE SYSTEMS

EN

MPGAMMA deals with the design and production of stainless steel cabinets and boxes for electrical enclosures from 1997.

The high **know-how** and the constant **training** have allowed the realization of a product of maximum quality, monitoring the different phases of processing and paying particular attention to the quality of each material used.

MPGAMMA products are the result of a perfect balance between **tradition**, **innovation**, **excellence** and **high specialization** of production techniques, responding to the strictest requirements of the different countries in which they are exported.

All the working phases until the shipment of the finished product are precisely studied and verified in our Reggio Emilia headquarter, guaranteeing a 100% **Made in Italy** product, synonymous of care, precision and design.

# QUALITY
# TECHNOLOGY
# EXPERIENCE

# QUALITY SERVICE

- Product customisation, drilling and pre-processing.
- Special products according to design.
- High fl exibility.
- Fast delivery.
- Wide stock availability.
- Direct distribution throughout the country and abroad.
- We can meet any customer requirement.

# QUALITY ORGANISATION

- Production in accordance with international UNI EN ISO 9001 standards.
- Total quality process management.
- Qualification of personnel.
- Broad and flexible production programme.
- Fully automated manufacturing systems.
- Cutting-edge production technology.
- Qualifi ed welding personnel in accordance with UNI EN ISO 14732:2013 and UNI EN ISO 9606-1:2013.

# QUALITY PRODUCTS

- Stainless steel AISI 304L DIN 1.4307 EN X 2 CrNi 18-09 AISI 316L DIN 1.4404 EN X 2 CrNiMo 17-12-2.
- High-fi nish TIG, MIG, CMT welding.
- Welding process qualifi ed in accordance with 15614-1:2012 WPQR (Welding Procedure Qualifi cation Record).
- Accessories entirely made of stainless steel.
- Scratch-proof protection of the sheet metal and protective packaging.
- Compliance with the latest hygiene guidelines in the food industry.


MPGAMMA
STEEL FACTOR

# INDEX

# ACCESSORIES MPGAMMA
## A HIGHLY SPECIALIZED LINE

To meet even the most specific needs, MP Gamma offers numerous accessories to match your stainless steel cabinets and boxes for electrical panels.
The company's design service can make use of a wide range of products, which integrate the basic offer with complete solutions, customizable and turnkey.

In order to always guarantee excellent quality and high specialization in each project, MP Gamma signed an important partnership with the best companies in the industry, considered a global point reference: Alfaelectric for ventilation units, LAPP Italia for skintops and Detas for simplify passage and management of the cables.

Thanks to a team of experienced designers and operators, this choice represents an opportunity, and at the same time a guarantee, for customers who want customized and certified solutions, tailor-made for their own plants.

QUALITATIVE EXCELLENCE

TAILOR-MADE PROJECTS

EXCLUSIVE PARTNERSHIPS

## ALFAELECTRIC

*Quality, attention to detail and technological excellence.*

These are the pluses of Alfaelectric, the company from Carate Brianza (MB) specialist in ventilation systems, and accessories for switchboards/ electrical cabinets.
The partnership with MP Gamma concerns all ventilation accessories and in particular the T-FAN models, characterized by modern design, and small footprint, high performance, quick assembly, easy maintenance and optimal protection of the electrical cabinets.
Mpgamma has engineered the brand new protection caps IP56 and UL Type 12 protection, 4x HPS series while the ACC series protection caps are intended for use with MPGamma's own ventilation systems.

## DETAS

*A very long technical experience.*

Thanks to the DetasUltra division, the Detas Group of Rezzato (BS) represents excellence in cable management in electrical panels and electrical /electronic equipment.
To MP Gamma they supplies all multidiameter cable routing systems and in particular DES (Detas Entry System), the solution designed for simplify the use of pre-terminated cables, improve performance (watertight, tearproof, etc ...) and optimize costs.

## LAPP ITALIA

*Accessories that make the difference.*

This is how the products of Lapp Italia are defined, the company from Desio (MB) specialized in cables, pre-wired cables, cable glands, connectors and accessories for numerous industrial applications
MP Gamma is equipped with SKINTOP®, the line of metric cable glands, in stainless steel, or nickel-plated brass, with thread for superior performance and suitable for any application.


MPGAMMA
STEEL FACTOR

# CERTIFIED QUALITY

The certifications obtained to date guarantee customers a product that meets the recognized specific standards.
MPGamma collaborates with the main certifying bodies, such as TÜV and UL and operates through a quality management system in accordance with the UNI EN ISO 9001:2015 international standards, which is certified by DNV-GL Italy.
All products can be employed in accordance with the CEI EN 60529, CEI EN 60204, CEI EN 60439, CEI EN 62208 regulations and meet the required security standards established in the national laws and provisions (DLGS 81/08).
Furthermore, upon request, products which will be installed in potentially explosive environments can come with the ATEX declaration of conformity (ATEX Directive 2014/34/EU).
The team of professional welders is qualified according to the UNI EN ISO14732: 2013 and UNI EN ISO9606-1: 2013 standards.
Thanks to the innovative approach to product certification, it is possible to guarantee the robustness performances protected by the TÜV and cULus marks also on custom realizations.

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

sts servizi e tecnologie di saldatura CERTIFICAZIONI

CERTIFIED AND COMPLIANT PRODUCTS

## STANDARD UL 508A - UL 50 ENCLOSURE TYPE

MPGamma's products are certified with the C-UL-US Listing, a logo that applies to countries such as USA and Canada. Among UL (Underwrite Laboratory) regulations, the one that applies to enclosures is the UL 508A and 50 which is valid for the American market.
The CSA regulations (Canadian Standard Association) C22.2 No 14-2005 and C22.2 No 94- M91 are harmonized with the UL 508A and 50 standards and are valid for the Canadian market.

NEMA established standards to define the safety performance level (i.e. the Ingress protection rating) of electrical enclosures. Below is a list of NEMA's enclosure types:

| Type | 1 | 12 | 4 | 4X |
|---|---|---|---|---|
| Access to hazardous parts | x | x | x | x |
| Falling dirt | x | x | x | x |
| Dripping and light splashing water | | x | x | x |
| Circulating dust, lint, fibers and flyings | | x | x | x |
| Settling dust, lint, fibers and flyings | | x | x | x |
| Oil and coolant seepage | | x | | |
| Hosedown and splashing water | | | x | x |
| Ingress of water (rain, hail, snow) | | | x | x |
| Windblown dust and flyings | | | x | x |
| Ingress of water | | | x | x |
| Corrosive agents | | | | x |

The compliance with UL508A and 50 standards does not require the application of a serial number and has no certifying value. It solely means that the manufacturer has autonomously verified that his own productive standards are compliant with the reference standards.
It is therefore impossible to self-certify a type; you can only make a declaration. Only the official UL serial number (to be applied inside the enclosure) and the file number authenticate the certification. UL types and IP indexes are not equatable.

ATEX 214/34/UE DIRECTIVE

MPGamma's products can be employed in potentially explosive environments according to the ATEX 2014/34/EU directive (acronym for ATmosphères EXplosibles).
The enclosures can be empty or wired, employable both in electric environments and in presence of potentially explosive dusts and gases.
For any further information, contact our technical department.

## SPECIFIC MARKING TABLE

| Mark | Meaning | Description |
|---|---|---|
|  | Specific marking for protection against explosions | |
| II | Equipment group | II: surface electrical equipment |
| 2 | Product category | Equipment and protection systems guaranteeing a high degree of protection. |
| 3 | Product category | Equipment and protection systems guaranteeing a normal degree of protection. |
| GD | Type of explosive atmo-sphere | G: gases<br>D: dusts<br>GD: gases and dusts |
| Zona | 1,21 | 1: Area in which an explosive gas atmosphere is likely to occur in normal operation.<br>21: Area in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation. |
| Zona | 2,22 | 2: An area in which an explosive gas atmosphere is not likely to occur in normal operation and, if it occurs, will only exist for a short time.<br>22: An area in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only. |

EN 62208 - EN 60529

The higher-performing an empty enclosure is, the better it protects what it contains. The TÜV SÜD certification body guarantees the high protection degree of our products.

## IP PROTECTION DEGREE

The IP code (International Protection Rating) refers to the degree of protection provided by electrical enclosures against the intrusion of solid foreign objects and water and is classified in degrees.
The first two digits of the code are mandatory and refer to:
1st digit, protection against the ingress of solid foreign objects and protection against the operator's access to hazardous parts. 2nd digit, protection against the harmful ingress of water.

## IK RESISTANCE DEGREE

The IK code relates to the resistance degree provided by enclosures for electrical equipment against external mechanical impacts, ensuring robustness and safety. This code is made up of two digits that refer to the value in joule of the impact energy. The IK code marking guarantees product quality and trustworthiness.

## IP PROTECTION DEGREE ACCORDING TO EN 60529 AND ISO 20653

## IK MECHANICAL IMPACT RESISTANCE DEGREE ACCORDING TO EN 62208

| IP DEGREE: 1ST DIGIT INGRESS OF SOLID FOREIGN OBJECTS | |
|---|---|
| 0 | No protection |
| 1 | Protected against solid objects up to 50mm |
| 2 | Protected against solid objects up to 12mm in diameter |
| 3 | Protected against solid objects up to 2.5mm in diameter |
| 4 | Protected against solid objects up to 1mm in diameter |
| 5 | Protected against dust |
| 6 | Totally protected against dust |

| IP DEGREE: 2ND DIGIT INGRESS OF SOLID FOREIGN OBJECTS | |
|---|---|
| 0 | No protection |
| 1 | Protected against dripping water (vertically falling drops) |
| 2 | Protected against dripping water (tilted) |
| 3 | Protected against rain falling at up to 60° from vertical |
| 4 | Protected against water splashes |
| 5 | Protected against water jets from all directions |
| 6 | Protected against heavy seas |
| 7 | protected against the effects of temporary immersion |
| 8 | protected against the effects of continuous immersion |
| 9K | Protected against high pressure water jets or water vapor from all directions |

| IK DEGREE: PROTECTION AGAINST EXTERNAL MECHANICAL IMPACTS | | |
|---|---|---|
| IK00 | No protection | |
| IK01 | Protected against 0.15J impact | 0,25 Kg 5,6 cm |
| IK03 | Protected against 0.35J impact | 0,25 Kg 14 cm |
| IK05 | Protected against 0.7J impact | 0,25 Kg 28 cm |
| IK06 | Protected against 1J impact | 0,25 Kg 40 cm |
| IK07 | Protected against 2J impact | 0,5 Kg 40 cm |
| IK08 | Protected against 5J impact | 1,7 Kg 30 cm |
| IK09 | Protected against 10J impact | 5 Kg 20 cm |
| IK10 | Protected against 20J impact | 5 Kg 40 cm |

### ADDITIONAL LETTERS**

**A** Protected against access to hazardous parts with back of hand

**B** Protected against hazardous parts with fingers

**C** Protected against tools interfering with hazardous parts

**D** Protection against wire from entering hazardous parts

** Additional letter describing the protection of people. Used only if the protection against the access to dangerous parts is higher than that indicated by the first digit, or if it is indicated only by the protection against access to dangerous parts and the first digit is replaced by an X.

# RESISTANCE OF AISI 304L / AISI 316L BOXES TO CORROSION

| | 430 Type ferritic Cr steel | 304 Type austenitic Cr-Ni | 316 Type austenitic Cr-Ni-Mo steel |
|---|---|---|---|
| Acetylene (commercial) | ● | ● | ● |
| Vinegar | ● | ● | ● |
| Vinegar (vapours) | ● | ● | ● |
| Acetone 100% at 100° | ● | ● | ● |
| Acetic acid up to 20% | ● | ● | ● |
| Boric acid 5% | ● | ● | ● |
| Butyric acid 5% | ● | ● | ● |
| Hydrocyanic acid 100% | ○ | ● | ● |
| Citric acid % | ● | ● | ● |
| Hydrochloric acid (all concentrations) | ○ | ○ | ○ |
| Chromic acid 5% | ● | ● | ● |
| Hydrofluoric acid (all concentrations) | ○ | ○ | ○ |
| Phosphoric acid 5% | ● | ● | ● |
| Lactic acid 5% | ● | ● | ● |
| Linoleic acid 100% up to 100°C | ● | ● | ● |
| Malic acid 10-40% up to 50°C | | ● | ● |
| Muriatic acid (commercial) | ○ | ○ | ○ |
| Nitric acid up to 10% at 80°C | ● | ● | ● |
| Oleic acid 100% | ● | ● | ● |
| Oxalic acid 5% | ● | ● | ● |
| Picric acid (all concentrations) | ● | ● | ● |
| Wet sulfhydric acid 100% (hydrogen sulphide) | ○ | ● | ● |
| Boiling sulphuric acid 5% | ○ | ○ | ○ |
| Fuming sulphuric acid (oleum) 50°C | ● | ● | ● |
| Sulphurous acid 100% | ○ | ● | ● |
| Stearic acid 100% up to 100°C | ● | ● | ● |
| Tartaric acid 10% at 100°C | ● | ● | ● |
| Soft water | ● | ● | ● |
| Hydrogen dioxide 10-30% | ● | ● | ● |
| White spirit | ● | ● | ● |
| Ethyl alcohol (all concentrations) | ● | ● | ● |
| Methyl alcohol 100% | ● | ● | ● |
| Melted aluminium | ○ | ○ | ○ |
| Ammonia 100% (dry) | ● | ● | ● |
| Acetic anhydride 100% | ○ | ● | ● |
| Carbon dioxide 100% (dry) | ● | ● | ● |
| Sulphur dioxide 90% | ○ | ○ | ● |
| Aniline 100% | ● | ● | ● |
| Tanning bath | | ● | ● |
| Chromium plating bath | | ● | ● |

| | 430 Type ferritic Cr steel | 304 Type austenitic Cr-Ni | 316 Type austenitic Cr-Ni-Mo steel |
|---|---|---|---|
| Fixing bath | ○ | ● | ● |
| Developer bath | ● | ● | ● |
| Gasoline | ● | ● | ● |
| Cold and hot benzol | ● | ● | ● |
| Sodium bicarbonate (all concentrations) | ● | ● | ● |
| Beer | | ● | ● |
| Sodium disulphate 15% at 85°C | ○ | ○ | ○ |
| Carbon bisulphide 100% | ● | ● | ● |
| Hot borax 5% | ● | ● | ● |
| Butane | ● | ● | ● |
| Boiling coffee | ● | ● | ● |
| Saturated chlorine water | ○ | ○ | ● |
| Camphor | ● | ● | ● |
| Sodium carbonate 5% up to 65°C | ● | ● | ● |
| Hot and cold sodium citrate (all concentrations) | | ● | ● |
| Chloroform 100% | ● | ● | ● |
| Ammonium chloride 1% | ● | ● | ● |
| Ferric chloride 5-50% | ○ | ○ | ○ |
| Ferrous chloride 10-20% | ○ | ○ | ○ |
| Magnesium chloride up to 20% | ● | ● | ● |
| Mercury chloride 10% | ○ | ○ | ○ |
| Nickel chloride 10-30% | ○ | ○ | |
| Potassium chloride 1-5% | ● | ● | ● |
| Sodium chloride 5% (not agitated) | ● | ● | ● |
| Zinc chloride | | ● | ● |
| Sulphur chloride 100% at boiling temperature | ○ | ● | ● |
| Coca cola (pure syrup) | ● | ● | ● |
| Ether 100% | ● | ● | ● |
| Formaldehyde 100% | ● | ● | ● |
| Ammonium phosphate 10% | ● | ● | ● |
| Sodium phosphate at all concentrations | ● | ● | ● |
| Furfurol 100% at boiling temperature | ● | ● | ● |
| Wet chloride gas | ○ | ○ | ○ |
| Coke-oven gas | ● | ● | ● |
| Gelatine | ● | ● | ● |
| Glycerol at all concentrations | ● | ● | ● |
| Ethyl glycol 100% | ● | ● | ● |
| Glucose | ● | ● | ● |
| Shellac | ● | ● | ● |
| Ammonium hydroxide up to 40% | ● | ● | ● |

| | 430 Type ferritic Cr steel | 304 Type austenitic Cr-Ni | 316 Type austenitic Cr-Ni-Mo steel |
|---|---|---|---|
| Calcium hydroxide up to 10% up to 100°C | ● | ● | ● |
| Magnesium hydroxide 10% up to 100°C | ● | ● | ● |
| Potassium hydroxide up to 50% | ● | ● | ● |
| Sodium hydroxide up to 20% | ● | ● | ● |
| Calcium hypochlorite 100% | ○ | ● | ● |
| Sodium hypochlorite 100% | ○ | ● | ● |
| Milk (fresh or acid) | ● | ● | ● |
| Yeast | | ● | ● |
| Mayonnaise | | ● | ● |
| Molasses | ● | ● | ● |
| Mustard | | ● | ● |
| Ammonium nitrate 10-50% | ● | ● | ● |
| Sodium nitrate 10-40% | ● | ● | ● |
| Hot and cold mineral oil | ● | ● | ● |
| Hot and cold vegetable oil | ● | ● | ● |
| Hot and cold paraffin | ● | ● | ● |
| Sodium perborate 10% up to 100°C | ● | ● | ● |
| Hydrogen peroxide 10% | ● | ● | ● |
| Sodium peroxide 10% up to 100°C | | ● | ● |
| Melted lead | ○ | ● | ● |
| Propane | ● | ● | ● |
| Soap | ● | ● | ● |
| Sugar syrup at all concentration | ● | ● | ● |
| Whey | ● | ● | ● |
| Sodium silicate up to 100% up to 100°C | ● | ● | ● |
| Aluminium sulphate 10% | ● | ● | ● |
| Ammonium sulphate 10% | ● | ● | ● |
| Ferric sulphate 10% | ● | ● | ● |
| Ferrous sulphate 10-40% | ● | ● | ● |
| Magnesium sulphate 10-40% | ● | ● | ● |
| Nickel sulphate 30% | | ● | ● |
| Potassium sulphate 10% up to 100°C | ● | ● | ● |
| Copper sulphate 10% | ● | ● | ● |
| Sodium sulphate 10% | ● | ● | ● |
| Zinc sulphate 10% | ● | ● | ● |
| Sodium sulphide 10% | ○ | ● | ● |
| Concentrated orange juice | | ● | ● |
| Concentrated lemon juice | | ● | ● |
| Carbon tetrachloride 10% | ○ | ○ | |
| Sodium thiosulphate 10-60% up to 100°C | | ● | ● |

| | 430 Type ferritic Cr steel | 304 Type austenitic Cr-Ni | 316 Type austenitic Cr-Ni-Mo steel |
|---|---|---|---|
| Toluol | ● | ● | ● |
| Trichloroethylene 100% up to 100°C | ● | ● | ● |
| Paints | ● | ● | ● |
| Wine | | ● | ● |
| Whisky | | ● | ● |
| Melted zinc | ○ | ○ | ○ |
| Melted sulphur | ● | ● | ● |

● No corrosion in optimal conditions of use in contact with the substances considered.

● Possibility of corrosion when in contact with the substances considered.

○ Corrosion when in contact with the substances considered


MPGAMMA
STEEL FACTOR

# INTERNAL PANEL VENTILATION AND TEMPERATURE CONTROL SYSTEM

# T-FAN | Filter Fans

**High performance, fast mounting and easy maintenance**

## Modern design

A positive visual impact is given by the up-to-date design of the grills and the minimal external projection. All molded parts are made of highly resistant and self-extinguishing ABS, UL94 VO grade. The standard color is RAL 7035.

## Easy maintenance

Easy maintenance thanks to openable front grill. Replacement of soiled filter mat takes only few seconds and it doesn't require tools.

## Wide range of air flow ratings

The range of air flow ratings goes from 26 to 700m3/h

## Optimal enclosure protection

The special configuration of the grill, the foam seal gasket and the filter mat ensure an IP54 protection degree towards the enclosure.

## Quick electrical connection

ATV are fitted with spring terminals for a faster and safer wiring. Default terminals position is above the fan but it can easily be changed at the bottom of the fan according to wiring needs without tools thanks to Fan Quick Lock system.

## Fan Quick Lock (FQL)

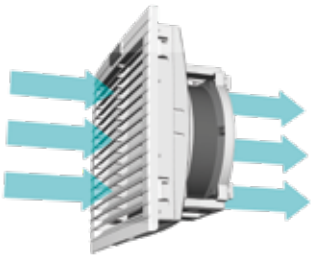
Default air flow direction is from the outside towards the inside of the enclosure. If needed the user can easily reverse the direction thanks to Fan Quick Lock system, without tools.

## Fast installation

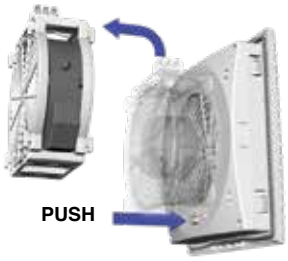
Installation is fast thanks to the simple square cutout on the enclosure and to the snap-in fixing system. No screws are needed.

# FAN QUICK LOCK (FQL)

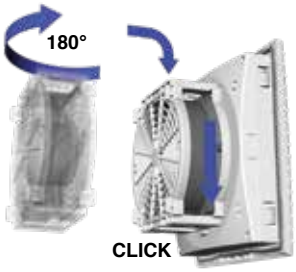
## Reverse Air Flow



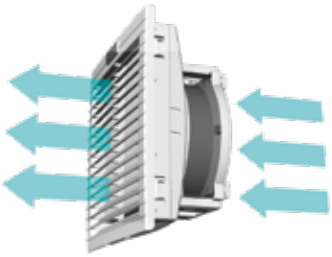
STANDARD AIR FLOW DIRECTION




FIRST STEP

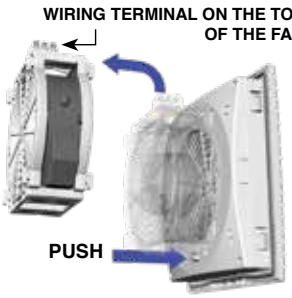



SECOND STEP

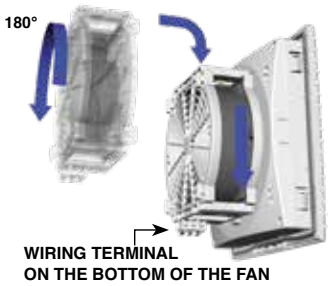


REVERSE AIR FLOW DIRECTION

## Terminal top/bottom inversion



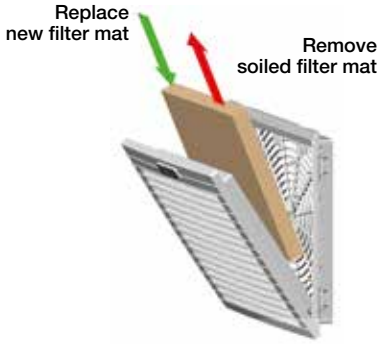

FIRST STEP




SECOND STEP

# EASY MAINTENANCE Fast filter mat replacement (FMR)

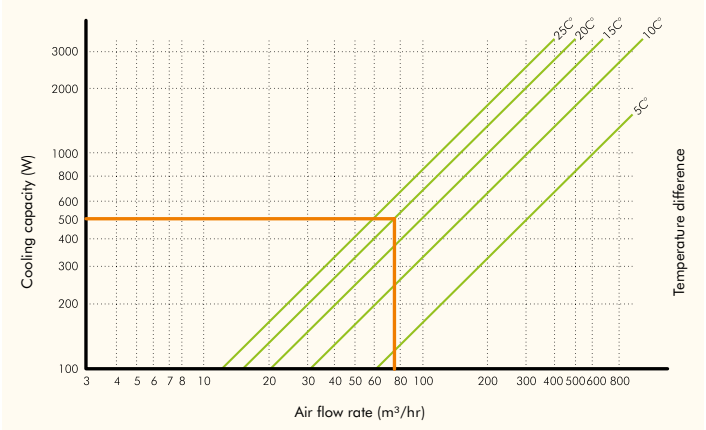
FRONT GRILL OPENING




FILTER MAT REPLACEMENT


FRONT GRILL CLOSING

## COOLING PERFORMANCE DIAGRAM



# **ATV 11** - Filter fans 26 m3/hr

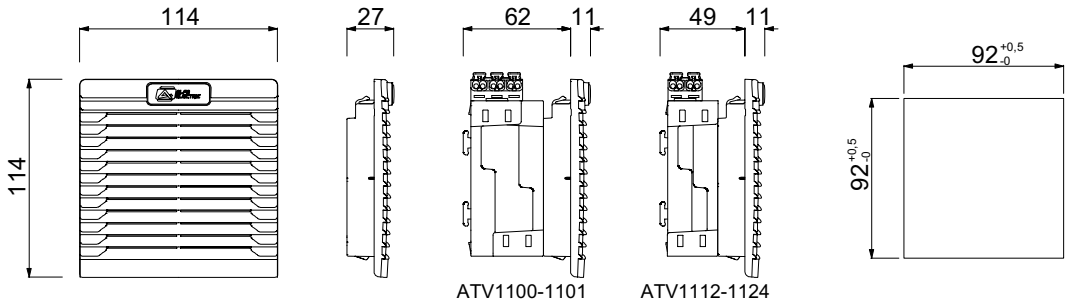


| Features | Unit | ATV1000U_MPX | ATV1100U_MPX | ATV1101U_MPX | ATV1112U_MPX | ATV1124U_MPX |
|---|---|---|---|---|---|---|
| Air flow rate (free blow) | m3/h | - | 26 (30) | | 26 | |
| Air flow rate with exit filter | m3/h | - | 15 (18) | | 15 | |
| Power supply | V/Hz | - | 230 / 50-60 | 115 / 50-60 | 12DC | 24DC |
| Dimensions HxWxD | mm | 114x114x27 | 114x114x73 | | 114x114x60 | |
| Power consumption | W | - | 13 (12) | | 3 | 4 |
| Current consumption | A | - | 0.10 (0.08) | 0.14 (0.12) | 0.25 | 0.16 |
| Overcurrent protection | - | - | impedance | | | |
| Electrical connection | - | - | 3-poles spring terminals * | | 2-poles spring terminals * | |
| Duty cycle | - | - | 100% | | | |
| Operating temperature | °C (°F) | -10 / +70 (+14/+158) | | | | |
| Protection degree / Class | - | IP54 | IP54 / Class I | | | |
| Noise level | dB(A) | - | 30 (35) | | 35 | |
| Flow direction | - | - | reversible, default factory setting outside-in | | | |
| Bearing | - | - | ball | | | |
| Filter mat EN779 | - | G2 | G2 | | | |
| Service life (at 40°C) | hr | - | 50 000 | | | |
| Material | - | ABS UL94V-0 color RAL7035 | | | | |
| Wall thickness | mm | 1.2 - 2.4 | | | | |
| Gasket | - | foam seal gasket | | | | |
| Weight (with packaging) | kg | 0.09(0.11) | 0.41(0.46) | | 0.20(0.25) | |
| Package dimensions H x W x D | mm | 125x125x35 | 125x125x80 | | | |
| Mounting | - | fast clip-on | | | | |
| Conformity/Certifications | - | CE | | | | |

* 0.5-2.5mm²

| **Versions** | |
|---|---|
| UL-code ending | U |
| EMC-code ending | X_MPX |

| **Accessories** | | |
|---|---|---|
| Filter mat, standard type | ATVF1_MPX | |
| Filter mat, high efficency | ATVF1X_MPX | |
| Thermostat 0-60°C, NO contact | - | THV2_MPX |
| Hood for IP56 | HPS115U | |

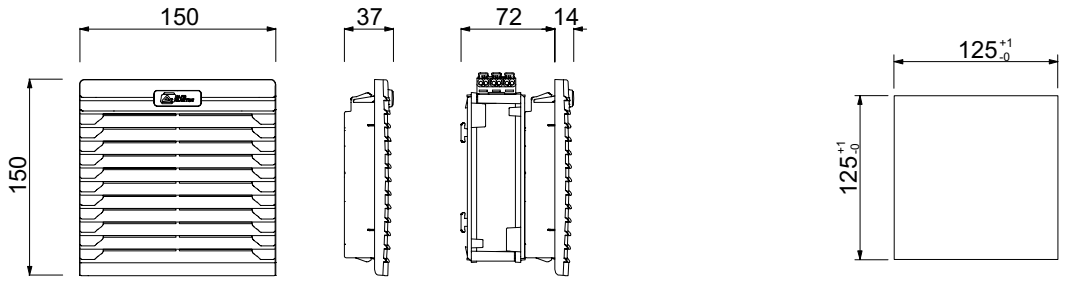


# **ATV 22** - Filter fans 58 m3/hr

| Features | Unit | ATV2000U_MPX | ATV2200U_MPX | ATV2201U_MPX | ATV2224U_MPX | ATV2248U_MPX |
|---|---|---|---|---|---|---|
| Air flow rate (free blow) | m3/h | - | 58(64) | | 58 | |
| Air flow rate with exit filter | m3/h | - | 43(48) | | 43 | |
| Power supply | V/Hz | - | 230 / 50-60 | 115 / 50-60 | 24DC | 48DC |
| Dimensions HxWxD | mm | 150x150x37 | 150x150x86 | | | |
| Power consumption | W | - | 22 (21) | | 9 | 13 |
| Current consumption | A | - | 0.14(0.12) | 0.26(0.24) | 0.37 | 0.27 |
| Overcurrent protection | - | - | impedance | | | |
| Electrical connection | - | - | 3-poles spring terminals * | | 2-poles spring terminals * | |
| Duty cycle | - | - | 100% | | | |
| Operating temperature | °C (°F) | -10 / +70 (+14/+158) | | | | |
| Protection degree / Class | - | IP54 | IP54 / Classe I | | | |
| Noise level | dB(A) | - | 43 (49) | | 45 | |
| Flow direction | - | - | reversible, default factory setting outside-in | | | |
| Bearing | - | - | ball | | | |
| Filter mat EN779 | - | G3 | | | | |
| Service life (at 40°C) | hr | - | 50 000 | | | |
| Material | - | ABS UL94V-0 color RAL7035 | | | | |
| Wall thickness | mm | 1.2 - 2.4 | | | | |
| Gasket | - | foam seal gasket | | | | |
| Weight (with packaging) | kg | 0.18(0.23) | 0.76(0.83) | | 0.48(0.55) | |
| Package dimensions H x W x D | mm | 165x165x45 | 165x165x90 | | | |
| Mounting | - | fast clip-on | | | | |
| Conformity/Certifications | - | CE | | | | |

* 0.5-2.5mm²

| **Versions** | | | | | | |
|---|---|---|---|---|---|---|
| UL-code ending | U | | | | | |
| EMC-code ending | X_MPX | | | | | |
| **Accessories** | | | | | | |
| Filter mat, standard type | ATVF2_MPX | | | | | |
| Filter mat, high efficency | ATVF2X_MPX | | | | | |
| Thermostat 0-60°C, NO contact | - | THV2_MPX | | | | |
| Hood for IP56 | HPS150U | | | | | |

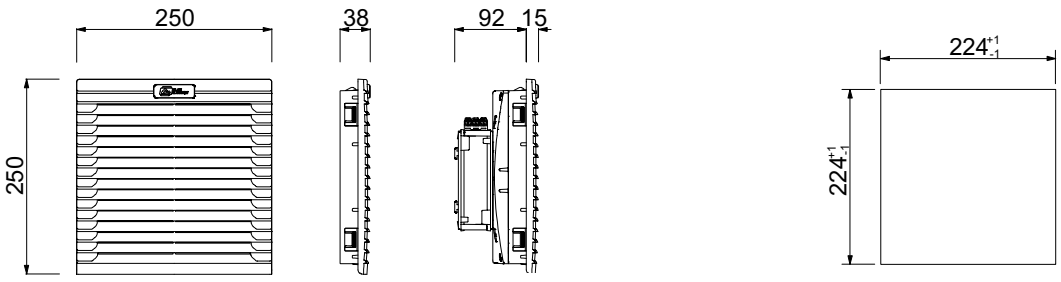


# **ATV 42** - Filter fans 125 m3/hr

| Features | Unit | ATV4000U_MPX | ATV4200U_MPX | ATV4201U_MPX | ATV4224U_MPX | ATV4248U_MPX |
|---|---|---|---|---|---|---|
| Air flow rate (free blow) | m3/h | - | 125 (135) | | 125 | |
| Air flow rate with exit filter | m3/h | - | 102 (112) | | 102 | |
| Power supply | V/Hz | - | 230 / 50-60 | 115 / 50-60 | 24DC | 48DC |
| Dimensions HxWxD | mm | 250x250x38 | 250x250x107 | | | |
| Power consumption | W | - | 22 (21) | | 9 | 13 |
| Current consumption | A | - | 0.14 (0.12) | 0.26 (0.24) | 0.37 | 0.27 |
| Overcurrent protection | - | - | impedance | | | |
| Electrical connection | - | - | 3-poles spring terminals * | | 2-poles spring terminals * | |
| Duty cycle | - | - | 100% | | | |
| Operating temperature | °C (°F) | -10 / +70 (+14/+158) | | | | |
| Protection degree / Class | - | IP54 | IP54 / Class I | | | |
| Noise level | dB(A) | - | 43 (49) | | 45 | |
| Flow direction | - | - | reversible, default factory setting outside-in | | | |
| Bearing | - | - | ball | | | |
| Filter mat EN779 | - | G3 | | | | |
| Service life (at 40°C) | hr | - | 50 000 | | | |
| Material | - | ABS UL94V-0 color RAL7035 | | | | |
| Wall thickness | mm | 1.2 - 2.4 | | | | |
| Gasket | - | foam seal gasket | | | | |
| Weight (with packaging) | kg | 0.52(0.62) | 1.30(1.50) | | 1.00(1.20) | |
| Package dimensions H x W x D | mm | 270x270x47 | 270x270x165 | | | |
| Mounting | - | fast clip-on | | | | |
| Conformity/Certifications | - | CE | | | | |

* 0.5-2.5mm²

| Versions | | | | | | |
|---|---|---|---|---|---|---|
| UL-code ending | U | | | | | |
| EMC-code ending | X_MPX | | | | | |
| **Accessories** | | | | | | |
| Filter mat, standard type | ATVF4_MPX | | | | | |
| Filter mat, high efficency | ATVF4X_MPX | | | | | |
| Thermostat 0-60°C, NO contact | - | THV2_MPX | | | | |
| Hood for IP56 | HPS250U | | | | | |

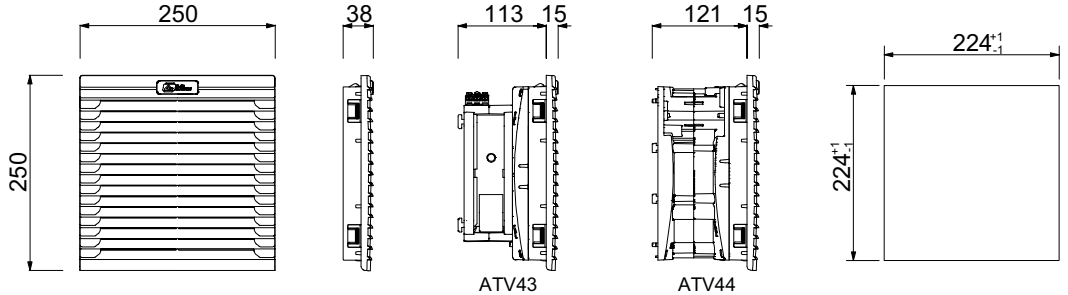


# **ATV 43 - ATV 44** - Filter fans 255-410 m3/hr

| Features | Unit | ATV4000U_MPX | ATV4300U_MPX | ATV4301U_MPX | ATV4324U_MPX | ATV4348U_MPX | ATV4400U_MPX | ATV4401U_MPX |
|---|---|---|---|---|---|---|---|---|
| Air flow rate (free blow) | m3/h | - | 255 (290) | | 255 | | 410 (445) | |
| Air flow rate with exit filter | m3/h | - | 202 (235) | | 202 | | 280 (302) | |
| Power supply | V/Hz | - | 230 / 50-60 | 115 / 50-60 | 24DC | 48DC | 230 / 50-60 | 115 / 50-60 |
| Dimensions HxWxD | mm | 250x250x38 | 250x250x128 | | | | 250x250x136 | |
| Power consumption | W | - | 40 (38) | | 26 | 33 | 70 (90) | |
| Current consumption | A | - | 0.17 (0.16) | 0.34 (0.32) | 1.08 | 0.68 | 0.40 (0.38) | 0.80 (0.76) |
| Overcurrent protection | - | - | thermal | | impedance | | thermal | |
| Electrical connection | - | - | 3-poles spring terminals * | | 2-poles spring terminals * | | 3-poles spring terminals * | |
| Duty cycle | - | - | 100% | | | | | |
| Operating temperature | °C (°F) | -10 / +70 (+14/+158) | | | | | | |
| Protection degree / Class | - | IP54 | IP54 / Class I | | | | | |
| Noise level | dB(A) | - | 53 (58) | | 61 | | 65 (68) | |
| Flow direction | - | - | reversible, default factory setting outside-in | | | | | |
| Bearing | - | - | ball | | | | | |
| Filter mat EN779 | - | G3 | | | | | | |
| Service life (at 40°C) | hr | - | 50 000 | | | | | |
| Material | - | ABS UL94V-0 color RAL7035 | | | | | | |
| Wall thickness | mm | 1.2 - 2.4 | | | | | | |
| Gasket | - | schiuma | | | | | | |
| Weight (with packaging) | kg | 0.52(0.62) | 1.72(1.92) | | 1.53(1.73) | | 2.74(2.94) | |
| Package dimensions H x W x D | mm | 270x270x47 | 270x270x165 | | | | | |
| Mounting | - | fast clip-on | | | | | | |
| Conformity/Certifications | - | CE | | | | | | |

* 0.5-2.5mm²

| Versions | | | | | | | |
|---|---|---|---|---|---|---|---|
| UL-code ending | U | | | | | | |
| EMC-code ending | X_MPX | | | | | | |
| **Accessories** | | | | | | | |
| Filter mat, standard type | ATVF4_MPX | | | | | | |
| Filter mat, high efficency | ATVF4X_MPX | | | | | | |
| Thermostat 0-60°C, NO contact | - | THV2_MPX | | | | | |
| Hood for IP56 | HPS250U *(valid for codes ATV4300-4301-4324-4348)* | | | | HPS325U *(valid for codes ATV4400-4401)* | | |

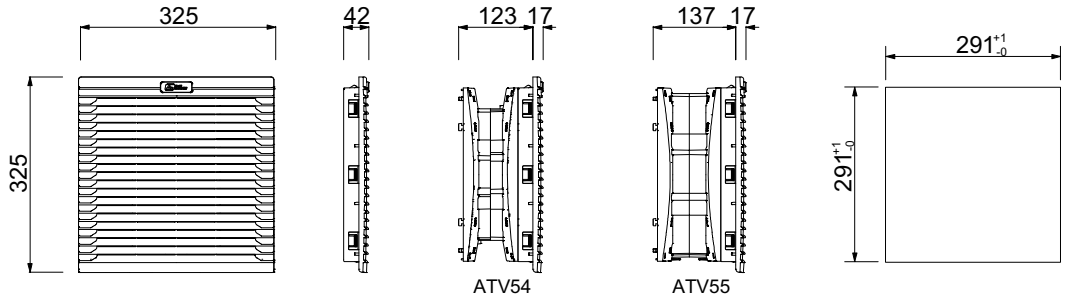


# **ATV 54 - ATV 55** - Filter fans 550-700 m3/hr

| Features | Unit | ATV5000U_MPX | ATV5400U_MPX | ATV5401U_MPX | ATV5500U_MPX |
|---|---|---|---|---|---|
| Air flow rate (free blow) | m3/h | - | 550 (620) | | 700 (770) |
| Air flow rate with exit filter | m3/h | - | 405 (450) | | 520 (575) |
| Power supply | V/Hz | - | 230 / 50-60 | 115 / 50-60 | 230 / 50-60 |
| Dimensions HxWxD | mm | 325x325x42 | 325x325x140 | | 325x325x154 |
| Power consumption | W | - | 70 (90) | | 130 (180) |
| Current consumption | A | - | 0.40 (0.38) | 0.80 (0.76) | 0.55 (0.81) |
| Overcurrent protection | - | - | thermal | | |
| Electrical connection | - | - | 3-poles spring terminals * | | 3-poles spring terminals* |
| Duty cycle | - | - | 100% | | |
| Operating temperature | °C (°F) | -10 / +70 (+14/+158) | | | |
| Protection degree / Class | - | IP54 | IP54 / Class I | | |
| Noise level | dB(A) | - | 65 (68) | | 72 (73) |
| Flow direction | - | - | reversible, default factory setting outside-in | | |
| Bearing | - | - | ball | | |
| Filter mat EN779 | - | G3 | | | |
| Service life (at 40°C) | hr | - | 50 000 | | |
| Material | - | ABS UL94V-0 color RAL7035 | | | |
| Wall thickness | mm | 1.2 - 2.4 | | | |
| Gasket | - | foam seal gasket | | | |
| Weight (with packaging) | kg | 0.90(1.04) | 3.00(3.25) | | 3.55(3.80) |
| Package dimensions | mm | 340x340x50 | 340x340x180 | | |
| Mounting | - | fast clip-on | | | |
| Conformity/Certifications | - | CE | | | |

* 0.5-2.5mm²

| **Versions** | | | | | |
|---|---|---|---|---|---|
| UL-code ending | | U | | | - |
| EMC-code ending | | X_MPX | | | |
| **Accessories** | | | | | |
| Filter mat, standard type | | ATVF5_MPX | | | |
| Filter mat, high efficency | | ATVF5X_MPX | | | |
| Thermostat 0-60°C, NO contact | | - | THV2_MPX | | |
| Hood for IP56 | | HPS325U | | | |



# **ATVF** - Ventilation accessories

**Spare filter mats for filter fans**
Standard filter mats for filter fans and filter only units. To keep high performance it is necessary to periodically check the level of filter mat clogging and, if necessary, replace it with a new one. These filters are made of self-extinguishing synthetic fibres with a progressive filtering capacity.

| Code | Description | Pcs in 1 pack |
|---|---|---|
| ATVF1_MPX | Filtro per ATV11 | 10 |
| ATVF2_MPX | Filtro per ATV22 | 10 |
| ATVF4_MPX | Filtro per ATV42-43-44 | 10 |
| ATVF5_MPX | Filtro per ATV54-55 | 10 |

**High efficiency spare filter mats for filter fans**
High efficiency filter mats are used in is very fine dust environments. However, air flow rates is substantially reduced and should be accounted for when selecting the filter fan.

| Code | Description | Pcs in 1 pack |
|---|---|---|
| ATVF1X_MPX | Filtro per ATV11, alta efficienza | 10 |
| ATVF2X_MPX | Filtro per ATV22, alta efficienza | 10 |
| ATVF4X_MPX | Filtro per ATV42-43-44, alta efficienza | 10 |
| ATVF5X_MPX | Filtro per ATV54-55, alta efficienza | 10 |

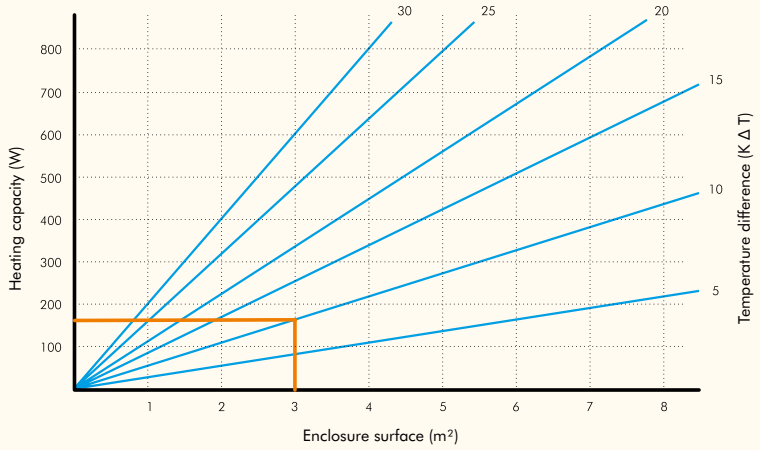
# Anticondensation Heaters

**Application**
Enclosure heaters are often necessary to prevent failures or corrosion caused by low temperatures or high humidity inside the enclosure. Such conditions are likely to occur when ambient temperature is low and the equipment inside the enclosure is not powered or fails to dissipate enough heat to keep enclosure temperature above the minimum threshold. Outdoor enclosures, for instance, are almost always in such conditions.

**Safety**
According to the type of heater, surface temperature is limited either by a PTC or by an over temperature safety switch. This allows a safe operation and a self-adjusted heating power. All heaters are in Class II, except FSHT, FPH, FMHT and FMHTS series in Class I.

**Fast installation**
Installation is fast and simple. All units are designed for fast mounting on 35mm DIN EN 50022 rail.

## HEATING PERFORMANCE DIAGRAM



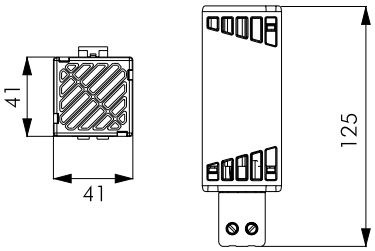
# **STHT** - Heaters 25-150W

### TOUCH SAFE PTC HEATERS

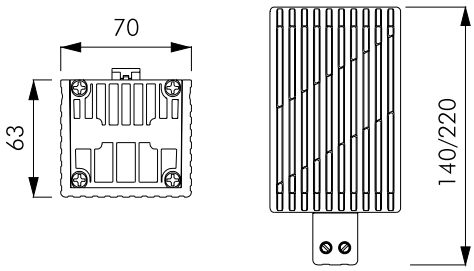
Optimized design to achieve lower surface temperature and increased heat transfer efficiency. A thermo-resistant plastic shield surrounds the unit to prevents direct contacts with high temperature internal parts.

| Features | Unità | STHT25_MPX | STHT50_MPX | STHT75_MPX | STHT100_MPX | STHT150_MPX |
|---|---|---|---|---|---|---|
| Heating Capacity* | W | 25 | 50 | 75 | 100 | 150 |
| Power supply | V | 120-240V AC o DC | | | | |
| Inrush current | A | 2.5 | 3.5 | 4 | 5 | 9.5 |
| Delayed fuse (advised) | A | 4 | 4 | 6.3 | 8 | 10 |
| Heating element type | - | PTC resistor, self regulating | | | | |
| Electrical connections | - | 2 screw terminals for stranded or rigid wire 2.5 mm² | | | | |
| Protection class | - | Class II | | | | |
| Protection degree EN60529 | - | IP20 | | | | |
| Operating temperature | °C (°F) | -45/+70 (-49/+158) | | | | |
| Storage temperature | °C (°F) | -45/+80 (-49/+176) | | | | |
| Radiator | - | Extruded aluminium profile, with plastic cover | | | | |
| Mounting | - | Clip for mounting on DIN rail 35 mm EN50022 | | | | |
| Installation position | - | Best efficiency in vertical position | | | | |
| Dimensions HxWxD | mm | 125x41x41 | | 140x63x70 | | 220x63x70 |
| Weight (with packaging) | kg | 0.16 (0.19) | | 0.42 (0.46) | | 0.66 (0.72) |
| Conformity/Certifications | - | CE-UL c UL us File n. E301228 | | | | |
| *at 20°C (68°F) ambient temperature | | | | | | |
| **Accessories** | | | | | | |
| Thermostat NC 0-60°C | | THR2_MPX | | | | |
| Double thermostat NC 0-60°C NO 0-60° | | THRV22_MPX | | | | |

STHT25-50




STHT75-100-150

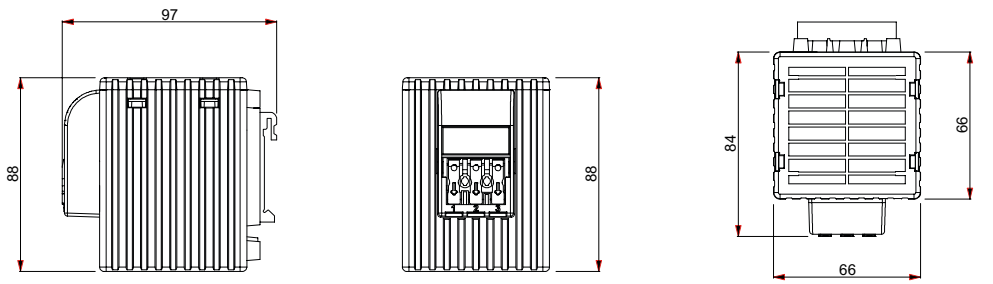


# **TMX** - Fan heaters 150-400W

### FAN ASSISTED PTC HEATERS

Super compact and light weight fan assisted heaters. Self-regulating PTC element. Touch safe. Spring terminal.

| Features | Unit | TMX150_ MPX | TMX150.10_ MPX | TMX250_ MPX | TMX250.10 _MPX | TMX300_ MPX | TMX300.10 _MPX | TMX400_ MPX | TMX400.10 _MPX |
|---|---|---|---|---|---|---|---|---|---|
| Heating Capacity* | W | 150 | 150 | 250 | 250 | 300 | 300 | 400 | 400 |
| Power supply | V/Hz | 230/50-60 | 115/50-60 | 230/50-60 | 115/50-60 | 230/50-60 | 115/50-60 | 230/50-60 | 115/50-60 |
| Delayed fuse (advised) | A | 6.3 | 10 | 6.3 | 10 | 6.3 | 10 | 6.3 | 10 |
| Electrical connection | - | Spring terminals | | | | | | | |
| Protection class | - | Class II | | | | | | | |
| Protection degree EN60529 | - | IP20 | | | | | | | |
| Operating temperature | °C (°F) | -40/+70 (-40/+158) | | | | | | | |
| Storage temperature | °C (°F) | -40/+70 (-40/+158) | | | | | | | |
| Air flow rate | $m^3/h$ | 30 (free flow) | | | | | | | |
| Mounting | - | Clip for mounting on DIN rail 35 mm EN50022 | | | | | | | |
| Installation position | - | Best efficiency in vertical position | | | | | | | |
| Dimensions HxWxD | mm | 88x66x97 | | | | | | | |
| Weight (with packaging) | kg | 0.36 (0.4) | | | | | | | |
| Conformity/Certifications | - | CE-UL c𝑹𝑳us File n. E301228 | | | | | | | |
| *at 20°C (68°F) ambient temperature | | | | | | | | | |
| **Accessories** | | | | | | | | | |
| Thermostat NC 0-60°C | | THR2_MPX | | | | | | | |
| Double thermostat NC 0-60°C NO 0-60° | | THRV22_MPX | | | | | | | |

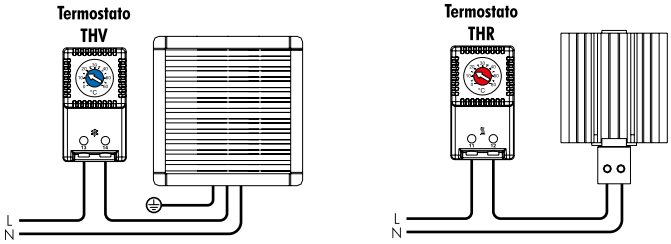



Connection:
1 Heater (phase)
2 Neutral
3 Fan (phase)

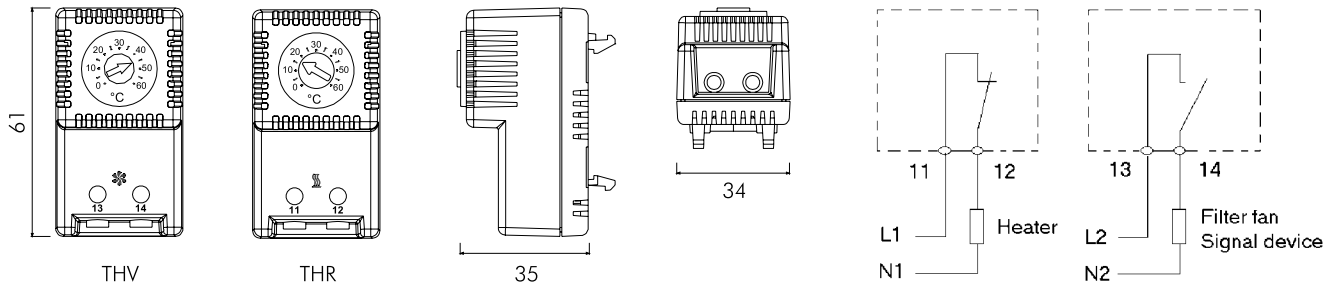
# **THV - THR** - Thermostats

Compact Thermostat for DIN 35 mm. rail mounting. Based on bimetallic junction, provides high capacity NO or NC contact.
Two versions available.

| | | |
|---|---|---|
| THVxx | NO Contact | Typically used for controlling ventilation devices |
| THRxx | NC Contact | Typically used for controlling heaters |



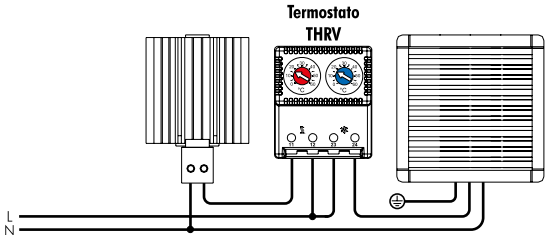

| Features | Unit | THR1_MPX | THR2_MPX | THR3_MPX | THV1_MPX | THV2_MPX | THV3_MPX |
|---|---|---|---|---|---|---|---|
| Contact function | - | NC | NC | NC | NA | NA | NA |
| Temperature setting range | °C | -10/+50 | 0/+60 | +20/+80 | -10/+50 | 0/+60 | +20/+80 |
| Precision | °C | ±4 | | | | | |
| Hysteresis | °C | 7 | | | | | |
| Max switching current | | | | | | | |
| 250Vac resistive load (inductive load) | A | 10 (1.6) | | | | | |
| 125Vac resistive load (inductive load) | A | 15 (2.5) | | | | | |
| Max. switching power in Vdc | W | 30 | | | | | |
| Temperature sensor type | - | Thermostatic bimetal | | | | | |
| Contact type | - | Snap action | | | | | |
| Contact resistance | mOhm | < 10 | | | | | |
| Service life | cycles | > 100 000 | | | | | |
| Electrical connections | - | 2-pole terminal for 2.5 mm² wire | | | | | |
| Casing | - | PA6, UL94 V0 self-estinguishing, light grey RAL 7035 | | | | | |
| Protection degree EN60529 | - | IP20 | | | | | |
| Operating temperature | °C (°F) | -25/+80 (-13/+176) | | | | | |
| Storage temperature | °C (°F) | -45/+80 (-49/+176) | | | | | |
| Mounting | - | Clip for mounting on DIN rail 35 mm EN50022 | | | | | |
| Installation position | - | Variable | | | | | |
| Conformity/Certifications | - | CE-UL cULus File n. E348803 | | | | | |
| Dimensions HxWxD | mm | 61x34x35 | | | | | |
| Weight (with packaging) | kg | 0.048 (0.055) | | | | | |



# **THRV - THVV** - Double-thermostats

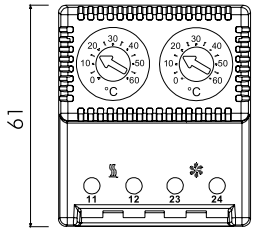
Compact double thermostat for DIN 35 mm. rail mounting. Based on bimetallic junction, provide high capacity and separated NO and NC contacts in different combinations. Three versions available.

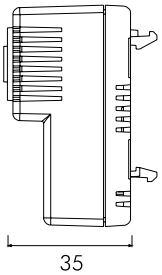
| | | |
|---|---|---|
| THRV13 | NC | NO |
| THRV22 | NC | NO |
| THVV22 | NO | NO |

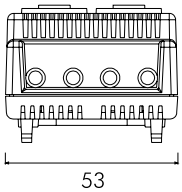


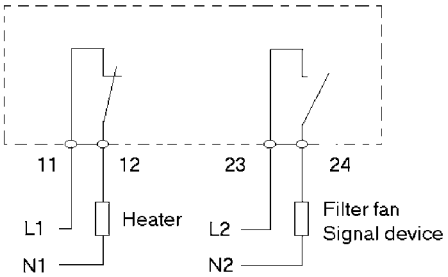


| Features | Unit | THRV13_MPX | | THRV22_MPX | | THVV22_MPX | |
|---|---|---|---|---|---|---|---|
| Contact function | - | NC | NA | NC | NA | NA | NA |
| Temperature setting range | °C | -10/+50 | +20/+80 | 0/+60 | 0/+60 | 0/+60 | 0/+60 |
| Precision | °C | ±4 | | | | | |
| Hysteresis | °C | 7 | | | | | |
| Max switching current | | | | | | | |
| 250Vac resistive load (inductive load) | A | 10 (1.6) | | | | | |
| 125Vac resistive load (inductive load) | A | 15 (2.5) | | | | | |
| Max. switching power in Vdc | W | 30 | | | | | |
| Temperature sensor type | - | Thermostatic bimetal | | | | | |
| Contact type | - | Snap action | | | | | |
| Contact resistance | mOhm | < 10 | | | | | |
| Service life | cycles | > 100 000 | | | | | |
| Electrical connections | - | 2-pole terminal for 2.5 mm² wire | | | | | |
| Casing | - | PA6, UL94 V0 self-estinguishing, light grey RAL 7035 | | | | | |
| Protection degree EN60529 | - | IP20 | | | | | |
| Operating temperature | °C (°F) | -25/+80 (-13/+176) | | | | | |
| Storage temperature | °C (°F) | -45/+80 (-49/+176) | | | | | |
| Mounting | - | Clip for mounting on DIN rail 35 mm EN50022 | | | | | |
| Installation position | - | Variable | | | | | |
| Conformity/Certifications | - | CE-UL cULus File n. E348803 | | | | | |
| Dimensions HxWxD | mm | 61x53x35 | | | | | |
| Weight (with packaging) | kg | 0.080 (0.090) | | | | | |



# LEDLAMP 32

**SLIM, HIGH EFFICENCY ENCLOSURE LED LAMP WITH MOTION SENSOR**

Wide voltage range from 20VDC up to 265VAC in a single model.
Spring terminal. More units can be connected together in a chain.
Fixing clips in each model permit to rotate the lamp according to lighting needs.
Magnet fixing or screw fixing. Motion sensor or switch ON/OFF available.

SPRING TERMINAL

MOTION SENSOR OR ON / OFF SWITCH

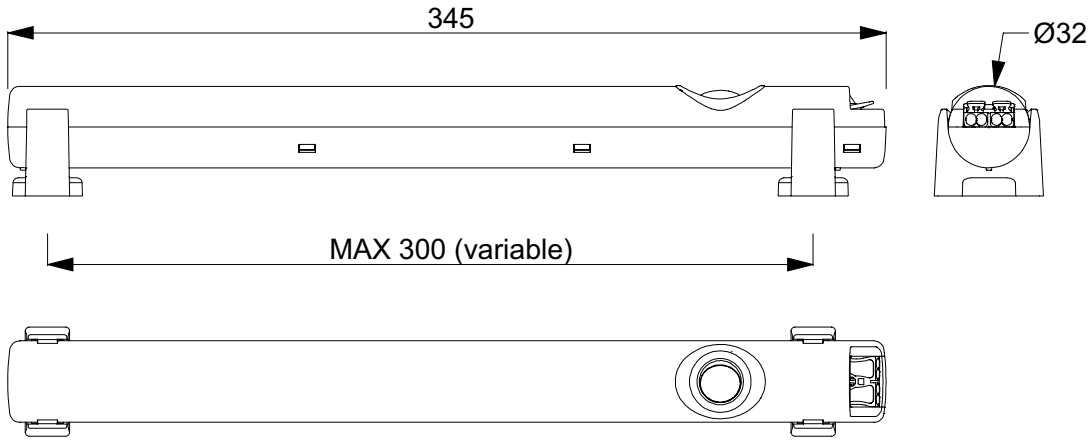
CLIP FIXING WITH MAGNET OR SCREW

ORIENTABLE

| Features | Unit | LEDLAMP3200_MPX | LEDLAMP3210_MPX |
|---|---|---|---|
| Power supply | V/Hz | 24-48 VDC / 100-240 VAC 50-60 Hz | |
| Luminosity | Lm | 400 | |
| Lamp type | - | LED | |
| Power consumption | W | 2,5 | |
| Service life (@ 20°C) | hr | 60.000 | |
| Switch | - | on/off switch | Motion sensor* |
| Electrical connection | - | 2-poles spring terminals ** | |
| Casing | - | Plastic | |
| Protection degree / Class | - | IP20 / Class II | |
| Operating temperature | °C (°F) | -30 / +60 (-22 / +140) | |
| Storage temperature | °C (°F) | -40 / +85 (-40 / +185) | |
| Mounting | - | screw fixing | screw fixing |
| Installation position | - | Variable | |
| Dimensions | mm | Ø32x345 | |
| Weight (with packaging) | kg | 0.155 (0.205) | 0.155 (0.205) |
| Package dimensions | mm | 415x50x43 | |
| Conformity/Certifications | - | CE, cULus File n° E301228 | |

* 5min switched on after last detection

** 0.5-2.5mm

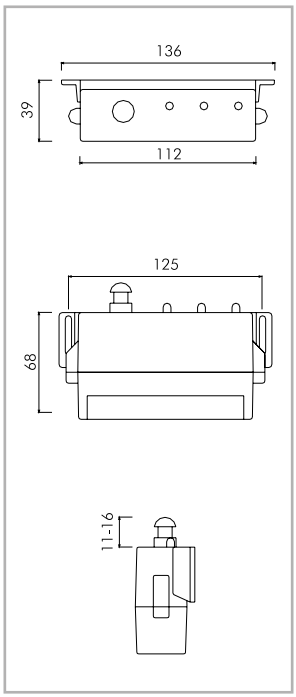


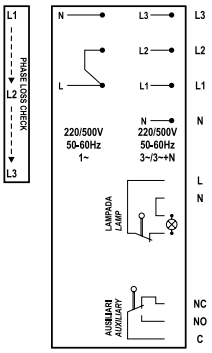
# FS_MPX

## FLASHING SAFETY DEVICE

The flashing safety devices series FS prevents accidents, alerting the operator that the electrical system is live. The FS devices are suitable for connection to three or single- phase lines. FS is also a phase-loss and phase-sequence control device: in case of failure, it points out the missing phase. The device functions can be increased with auxiliary contacts that allow to switch-on the lamp when opening the cabinet door or to control other equipment inside the cabinet (air conditioner, etc.)

| Features | | Unit | FS | FSL | FSLA |
|---|---|---|---|---|---|
| Power supply | | V/Hz | 1ph 115-230/50-60 or 3ph 400/50-60 | | |
| FUNCTIONS | Power on, Phase sequence, Phase loss | Yes/No | Yes | Yes | Yes |
| | Signal | - | n° 3 LEDs, red | n° 3 LEDs, red | n° 3 LEDs, red |
| | Contact for lamp | Yes/No | No | Yes | Yes |
| | Contact type | - | - | NC | NC |
| | Max current | A | - | 5 | 5 |
| | Service life | Cycles | - | > 25.000 | > 25.000 |
| | Auxiliary Contact | Yes/No | No | No | Yes |
| | Contact type | - | - | - | Change over |
| | Max current | A | - | - | 5 |
| | Service life | Cycles | - | - | > 25.000 |
| Probe extension | | mm | Adjustable 11-16 | | |
| Casing | | - | Poly-carbonate, Yellow | | |
| Connection on terminals | | mm2 | n. 6x4 | n. 8x4 | n. 11x4 |
| Mounting | | - | Adjustable fixing bracket 125 mm interlock | | |
| Protection degree EN60529 | | - | IP20 | | |
| Protection class | | - | I | | |
| Operating/Storage temperature | | °C(°F) | -10 +70 (+14 +158)/-20 +80(-4 +176) | | |
| Installation position | | - | Variable | | |
| Dimensions HxWxD | | mm | 34x112x68 (+16) | | |
| Weight (with packaging) | | kg | 0.15 (0.25) | | |
| Package dimensions HxWxD | | mm | 46x145x88 | | |
| Conformity/Certifications | | - | CE | | |




# FIN_MPX

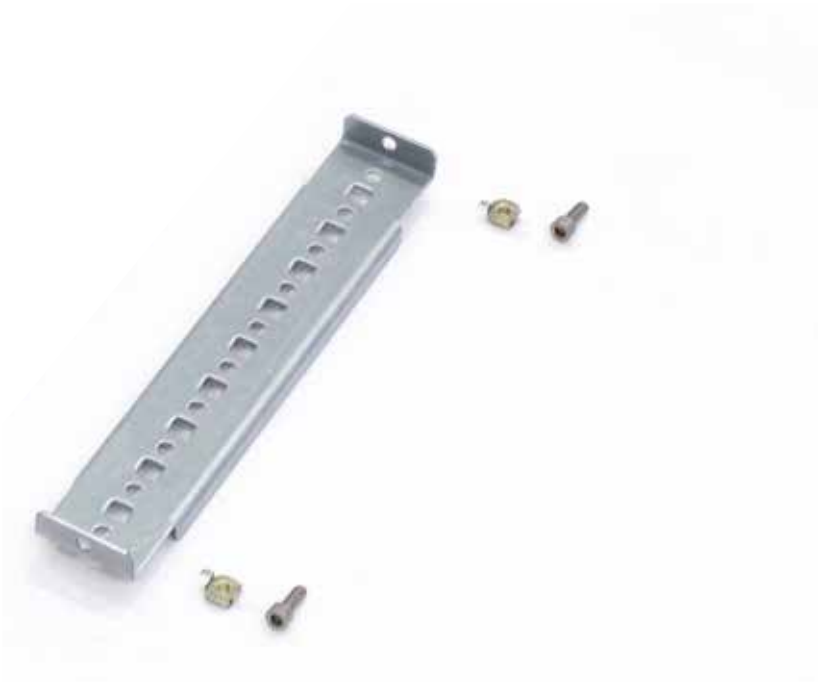
## DOOR LIMIT SWITCH

| Features | Unit | FINCOR | FINRIP |
|---|---|---|---|
| Contacts type | - | Zb type snap action (1NO+1NC) | |
| Rated current at 230V(400V) AC15 | A | 3.1(1.9) | |
| Protection degree EN60529 | - | IP65 | |
| Protection Class | - | II | |
| Operating temperature | °C (°F) | -25/+70 (-13/+158) | |
| Rated insulation voltage Ui | V | 690 | |
| Service life | Cycles | > 25.000 | |
| Cable inlet | - | PG13,5 cable gland | |
| Mechnical lock | Yes/No | No | Yes |
| Dimensions HxWxD | mm | 75x31x31 | 91x31x39 |
| Weight (with packaging) | kg | 0.04 (0.10) | 0.05 (0.11) |
| Conformity/Certifications | - | CE EN60947-5-1, IEC 947-5-1 | |

Required on most enclosures for safety and operation of auxiliary circuits, such as switching on lamps or switching off ventilation/air conditioning when the door is open. FIN Limit switches can be equipped with the optional bracket FINSTAFF for fixing and positioning.

# ACCESSORIES FOR FS_MPX AND FIN_MPX

## SECURITY SUPPORT FOR CABLE RACEWAY FOR CABINETS “SCS/SPD/EMP”



| CODE | FEATURES |
|---|---|
| SAC060_600 | CEILING LIGHT FIXTURE SUPPORT BRACKET STEEL L=600 |
| SAC060_800 | CEILING LIGHT FIXTURE SUPPORT BRACKET STEEL L=800 |
| SAC060_1000 | CEILING LIGHT FIXTURE SUPPORT BRACKET STEEL L=1000 |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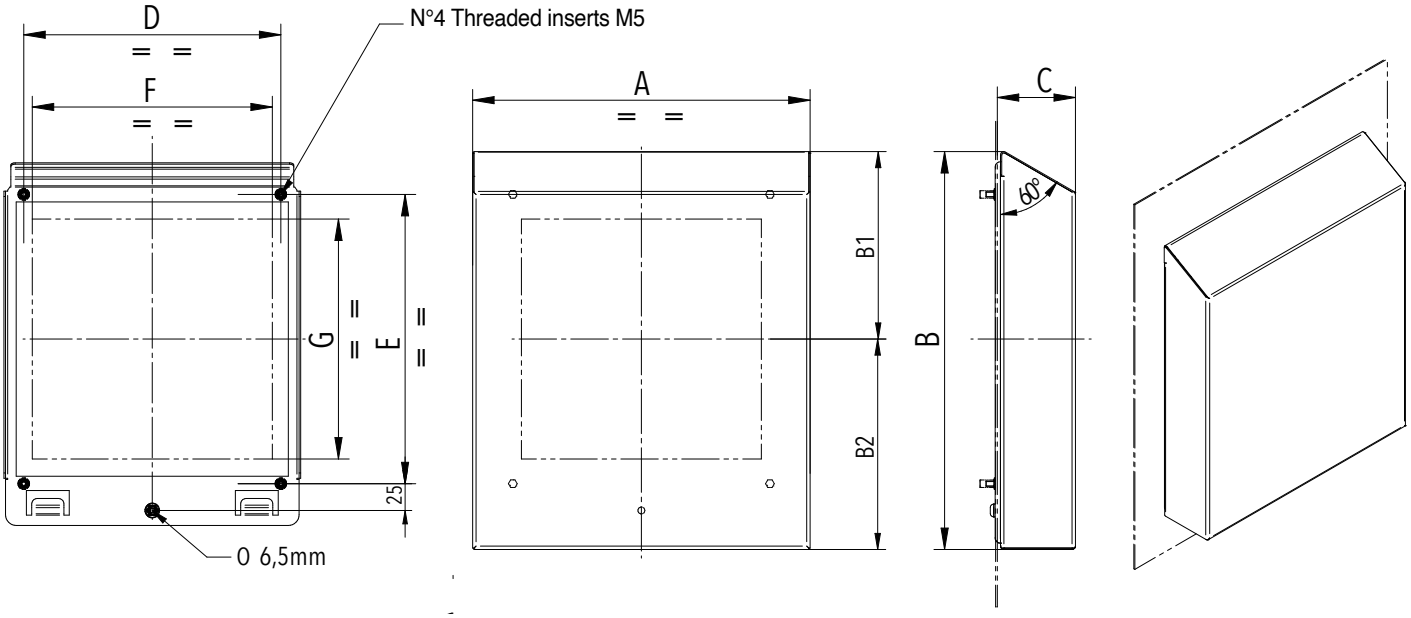
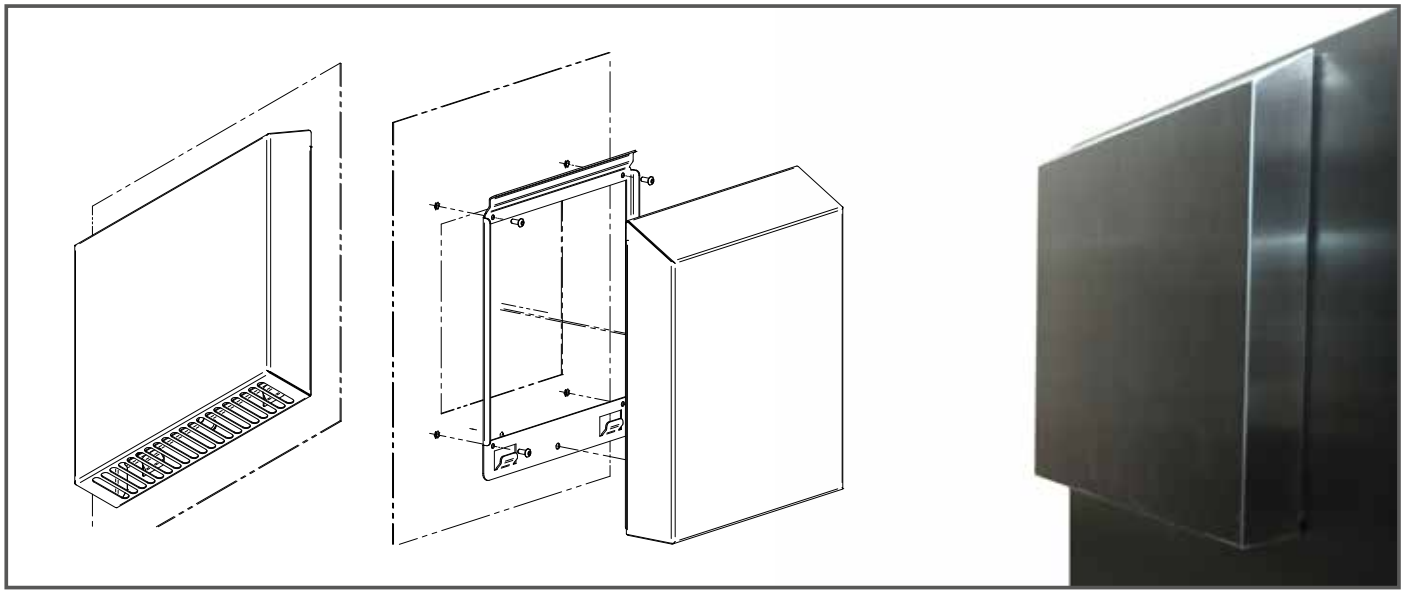
# PROTECTION CAP IN STAINLESS STEEL IP56 AND cULus TYPE 4X FOR FILTERS AND THERMOSTAT

# PROTECTION CAP IN STAINLESS STEEL FOR FILTERS

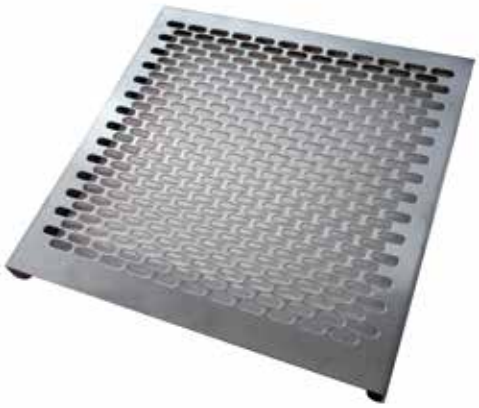
**IP 56 UL TYPE 1,12,4,4X**

| CODE | WIDHT (A) | HEIGHT (B)=(B1+B2) | DEPTH (C) | WHEELBASE D x E | PANEL CUT F x G | ASSOCIATED VENTILATION | VENTILATION GRID | IP GRADE | NEMA TYPE |
|---|---|---|---|---|---|---|---|---|---|
| HPS115U | 180 | 235=(106+129) | 55 | 105 x 135 | 92 x 92 | SERIE ATV11 | 115 x 115 | IP56 | TYPE 12, TYPE 4X |
| HPS150U | 215 | 270=(125+145) | 62 | 140 x 170 | 125 x 125 | SERIE ATV22 | 150 x 150 | IP56 | TYPE 12, TYPE 4X |
| HPS250U | 315 | 370=(175+195) | 70 | 240 x 270 | 224 x 224 | SERIE ATV42<br>SERIE ATV43<br>SERIE ATV44 | 250 x 250 | IP56 | TYPE 12, TYPE 4X |
| HPS325U | 390 | 445=(210+235) | 75 | 315 x 345 | 291 x 291 | SERIE ATV54<br>SERIE ATV55 | 325 x 325 | IP56 | TYPE 12, TYPE 4X |





# GRID IN STAINLESS STEEL
# FOR ATV SERIES VENTILATION UNIT



| CODICE | DESCRIZIONE ARTICOLO |
|---|---|
| C_ATV1000_MPX* | GRID IN STAINLESS STEEL FOR ATV1 SERIES |
| C_ATV2000_MPX* | GRID IN STAINLESS STEEL FOR ATV2 SERIES |
| C_ATV4000_MPX** | GRID IN STAINLESS STEEL FOR ATV4 SERIES |
| C_ATV5000_MPX** | GRID IN STAINLESS STEEL FOR ATV5 SERIES |

* MINIMUM PACKAGE 10 PIECES

** MINIMUM PACKAGE 4 PIECES

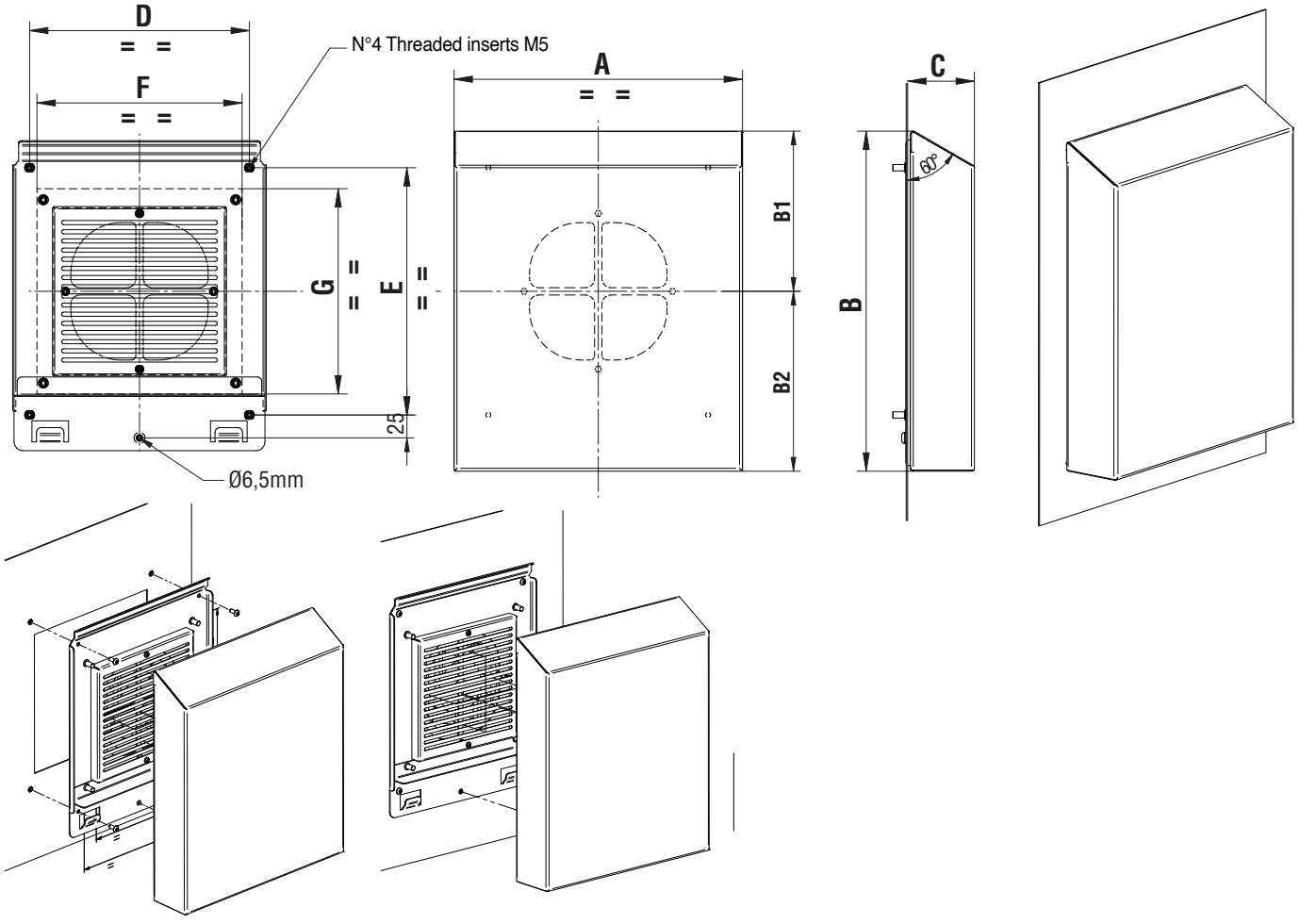
# LABYRINTH FILTER SYSTEMS WITH STAINLESS STEEL GUARD AND RELATED VENTILATION SYSTEMS IP 56

The filtering systems completely in stainless steel AISI 304L (Wnr 1.4307) with labyrinth spray protection device are mounted on the outside of the structure, allowing the replacement of the fi ltering grid without entering the panel.

They can all be coupled with the MPGAMMA ventilation systems (the fans must be mounted inside the panel).

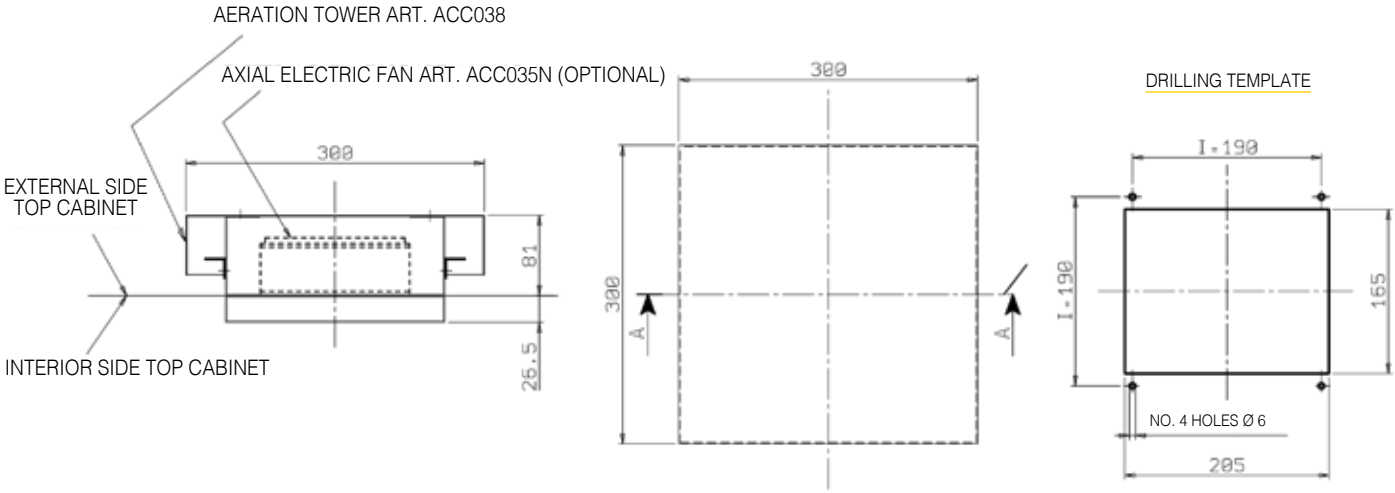
They are supplied in kits with drilling template and, on request, drilling on the hardware is made at the factory.

| CODE | WIDHT (A) | HEIGHT (B)=(B1+B2) | DEPTH (C) | WHEELBASE D x E | PANEL CUT F x G | ASSOCIATED VENTILATION | VENTILATION GRID | IP GRADE |
|---|---|---|---|---|---|---|---|---|
| ACC014N | 215 | 270=(125+145) | 62 | 140 x170 | 125 x 125 | ACC015N | 120 x 120 | IP56 |
| ACC036N | 315 | 370=(175+195) | 70 | 240 x 270 | 224 x 224 | ACC035N | Ø150 | IP56 |



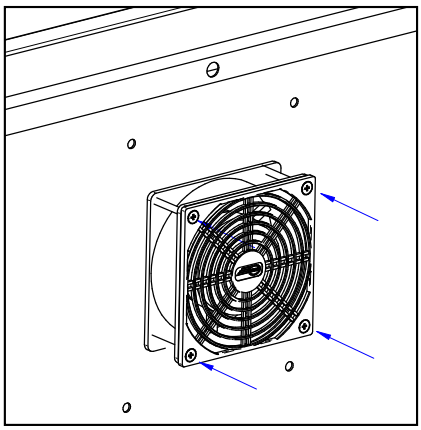
# AERATION TOWER

| CODE | DESCRIPTION |
|---|---|
| ACC038 | STAINLESS STEEL LABYRINTH AERATION TOWER W=300 H=300 D=80 |




# AXIAL ELECTRIC

| CODE | DESCRIPTION |
|---|---|
| ACC015N | AXIAL ELECTRIC FAN 230V 50/60 HZ DIM.120X120 |
| ACC015N_115VAC | AXIAL ELECTRIC FAN 115VAC 50/60 HZ DIM.120X120 |
| ACC015N_24V DC | AXIAL ELECTRIC FAN 24V DC 50/60 HZ DIM.120X120 |
| ACC035N | AXIAL ELECTRIC FAN 230V 50/60 HZ DIAM.150 |
| ACC035N_115VAC | AXIAL ELECTRIC FAN 115VAC 50/60 HZ DIAM.150 |
| ACC035N_24VDC | AXIAL ELECTRIC FAN 24V DC 50/60 HZ DIAM.150 |



CODE ACC015N-ACC035N

# ADVICE ABOUT APPLICATIONS

We do not usually recommend to assemble at the factory the filtering system on the structure because, as any protruding accessory, it can be damaged during transport.

As far as the factory arrangement is concerned, it is advisable to drill the door (lower costs and shorter delivery time) rather than the sides.

A complete heat exchange system is usually composed of two filtering units or one filtering unit and one aeration tower and, if needed, a fan. One filter must be mounted at the bottom and another at the top, possibly at the opposite sides of the panel. We recommend to mount the fan on the filter at the bottom so as to let the air flow into from below, put the panel slightly in over pressure and make the heat exchange easier thanks to the heating of the air which obviously tends to go upwards and to exit from the filter placed on the top (or from the tower).

Sometimes this kind of application does not give goods results as some heat pockets may create due to the positioning of the appliances on the wiring plate; in this case the number of filters and fans must be increased or a conditioning system chosen from the wide range offered by MPGAMMA.

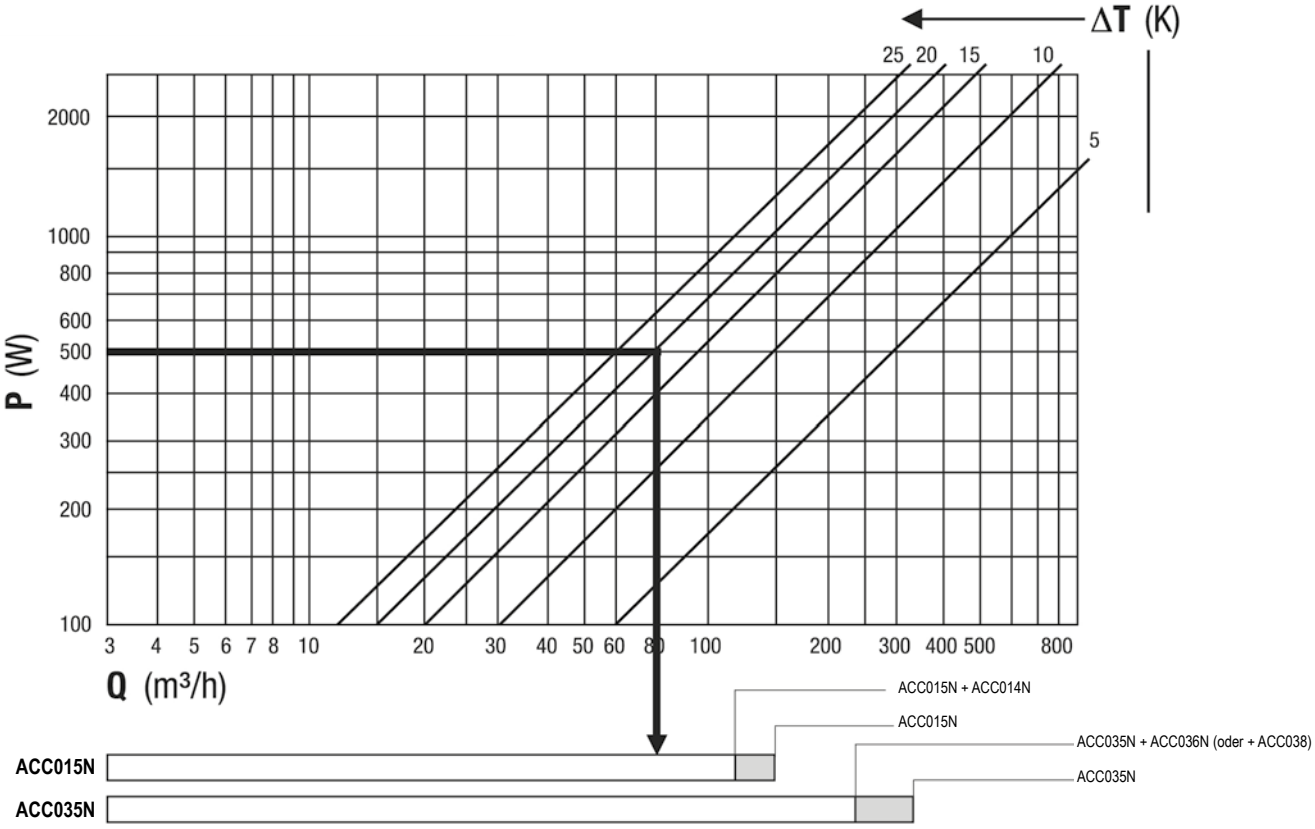
If the most warming devices are positioned at the top of the panel, we recommend to add a fan on the filter at the top (or on the tower) suitably set so as to discharge hot air.

To reverse the air flow of a fan you shall turn it symmetrically.

The ventilation systems which can be matched with the MPGAMMA stainless steel filters are available in several voltages and flow rates and do not need additional drilling besides that for the filters.

The filter-fan coupling (with filtering element in good cleaning conditions) reduces the air flow of 25-30% on average.

# DIAGRAM OF A SELECTION OF VENTILATION FLOW GROUPS WITH FILTER




The max capacities are referred to standard filters.

**ΔQ = Vantilation capacity**
**ΔP = Power dissipation in the cabinets**
**ΔT = Temperature difference**

**Example:**

| | | |
|---|---|---|
| Power dissipation | 500 W | Unit of choice |
| Temperature difference | 20 K | **ACC015N+ACC014N** |
| Necessary air flow capacity | 80 m3/h | |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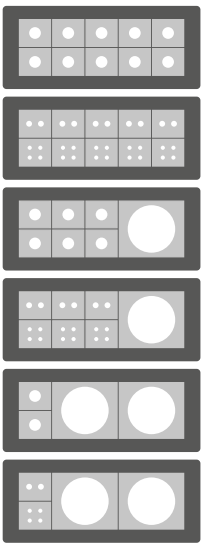
solutions around the cable

# INTEGRATED SYSTEM FOR MULTIDIAMETER HEADED AND NON HEADED CABLE PASSAGE IP66 - UL TYPE 4X

# DES 24

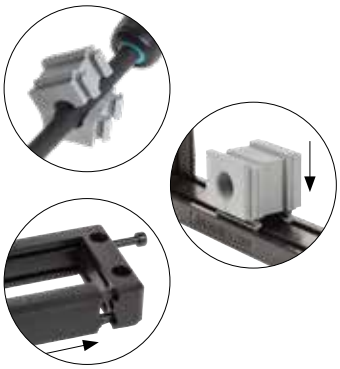
## *Splittable frame for pre-terminated cables*

- Multiple possible configurations in one frame size
- Frame screws in AISI304 Stainless Steel
- Integrated gasket
- Strain relief according to EN 62444
- Sturdy construction IK10
- Up to IP66

| Model / Code | Some possible configurations | Cut-out [mm] | Pcs / pack |
|---|---|---|---|
| DES-24_MPX |  | 108 x 39 | 10 |
| KIT_DES4 | Set of 4 mounting screws in AISI304 | | 10 |

The DES 24 cable entry system consists of a splittable frame designed to accommodate small (SPP), multiple (X) or large (SPG) inserts for cables in the same frame. Future cable size changes can be easily accommodated.

Thanks to the robust construction, the DES 24 is a long lasting product.



## *Technical data*

**Material:** PP+GF

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +155°C (static)

**Features:** halogens and silicones free

## *Related products*

Inserts SPG and SPG M

Inserts SPP and SPP K

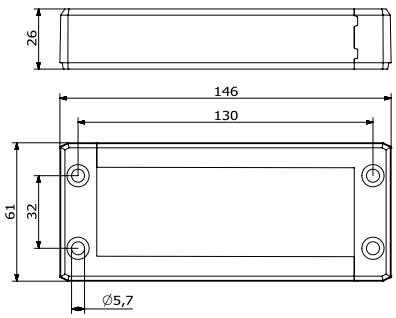
Inserts SPP 2x

Inserts SPP 4x

Flap frame

ydraulic punch driver HY360

**Dimensions** [mm]

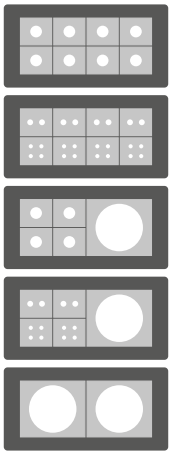



**Product also available as ATEX execution**

# DES 16

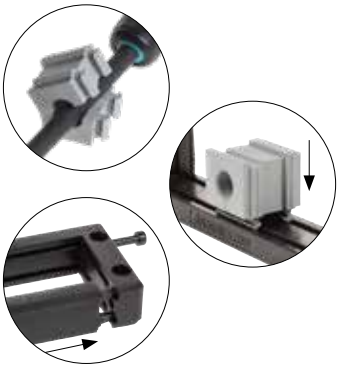
## *plittable frame for pre-terminated cables*

- Multiple possible configurations in one frame size
- Frame screws in AISI304 Stainless Steel
- Integrated gasket
- Strain relief according to EN 62444
- Sturdy construction IK10
- Up to IP66

| Model / Code | Some possible configurations | Cut-out [mm] | Pcs / pack |
|---|---|---|---|
| DES-16_MPX |  | 86 x 39 | 10 |
| KIT_DES4 | Set of 4 mounting screws in AISI304 | | 10 |

The DES 16 cable entry system consists of a splittable frame designed to accommodate small (SPP), multiple (X) or large (SPG) inserts for cables in the same frame. Future cable size changes can be easily accommodated.

Thanks to the robust construction, the DES 16 is a long lasting product.



## *Technical data*

**Material:** PP+GF

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +155°C (static)

**Features:** halogens and silicones free

## *Related products*

Inserts SPG and SPG M

Inserts SPP and SPP K

Inserts SPP 2x

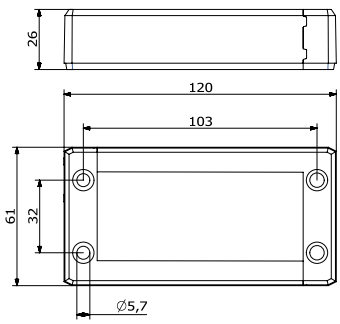
Inserts SPP 4x

Flap frame

ydraulic punch driver HY360

**Product also available as ATEX execution**

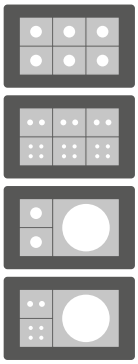
**Dimensions** [mm]



# DES 10

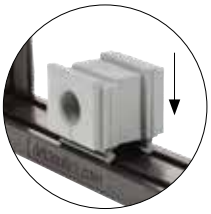
## *Splittable frame for pre-terminated cables*

- Multiple possible configurations in one frame size
- Frame screws in AISI304 Stainless Steel
- Integrated gasket
- Strain relief according to EN 62444
- Sturdy construction IK10
- Up to IP66

| Model / Code | Some possible configurations | Cut-out [mm] | Pcs / pack |
|---|---|---|---|
| DES-10_MPX |  | 63 x 39 | 10 |
| KIT_DES4 | Set of 4 mounting screws in AISI304 | | 10 |

The DES 10 cable entry system consists of a splittable frame designed to accommodate small (SPP), multiple (X) or large (SPG) inserts for cables in the same frame. Future cable size changes can be easily accommodated.

Thanks to the robust construction, the DES 10 is a long lasting product.



## *Technical data*

**Material:** PP+GF

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +155°C (static)

**Features:** halogens and silicones free

## *Related products*

Inserts SPG and SPG M

Inserts SPP and SPP K

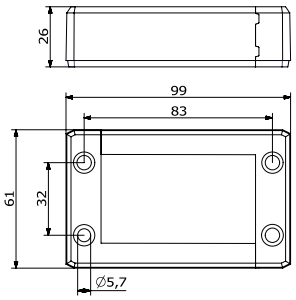
Inserts SPP 2x

Inserts SPP 4x

Flap frame

ydraulic punch driver HY360

**Dimensions** [mm]

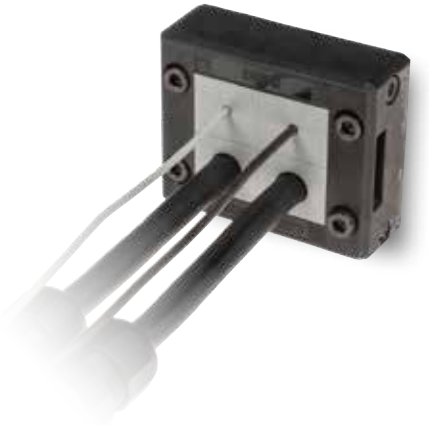


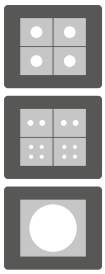

**Product also available as ATEX execution**

# DES Q

## *Splittable frame for pre-terminated cables*

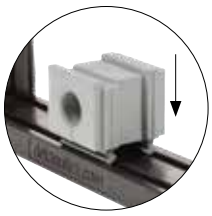
- Multiple possible configurations in one frame size
- Frame screws in AISI304 Stainless Steel
- Integrated gasket
- Strain relief according to EN 62444
- Sturdy construction IK10
- Up to IP66



| Model / Code | Some possible configurations | Cut-out [mm] | Pcs / pack |
|---|---|---|---|
| DES-Q_MPX |  | 40 x 39 | 10 |
| KIT_DES4 | Set of 4 mounting screws in AISI304 | | 10 |

The DES Q cable entry system consists of a splittable frame designed to accommodate small (SPP), multiple (X) or large (SPG) inserts for cables in the same frame. Future cable size changes can be easily accommodated.

Thanks to the robust construction, the DES Q is a long lasting product.



## *Technical data*

**Material:** PP+GF

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +155°C (static)

**Features:** halogens and silicones free

## *Related products*

Inserts SPG and SPG M

Inserts SPP and SPP K

Inserts SPP 2x

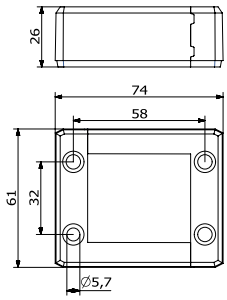
Inserts SPP 4x

Flap frame

ydraulic punch driver HY360

**Product also available as ATEX execution**

**Dimensions** [mm]



# DES COVER

## *Closing plates for DES series*

- ▶ Fast installation
- ▶ Gasket included
- ▶ IP54

| Model | Dimensions [mm] | | Pcs /pack |
|---|---|---|---|
| | L1 | L 2 | |
| DES-COVER-24_MPX | 146 | 130 | 10 |
| DES-COVER-16_MPX | 120 | 103 | 10 |
| DES-COVER-10_MPX | 99 | 83 | 10 |
| DES-COVER-Q_MPX | 74 | 58 | 10 |

| | | |
|---|---|---|
| KIT_DES4 | Set of 4 mounting screws in AISI304 | 10 |

Thanks the DES COVER plates it is possible to protect unused openings avoiding contact with the outer environment.

## *Technical data*

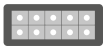
**Material:** PP+GF

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +155°C (static)

**Features:** halogens and silicones free

## *Related products*

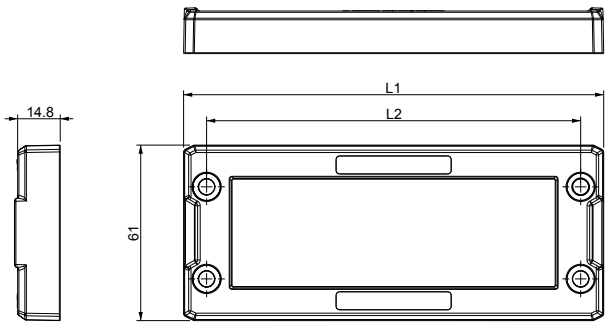
 DES 24

 DES 16

 DES 10

 DES Q

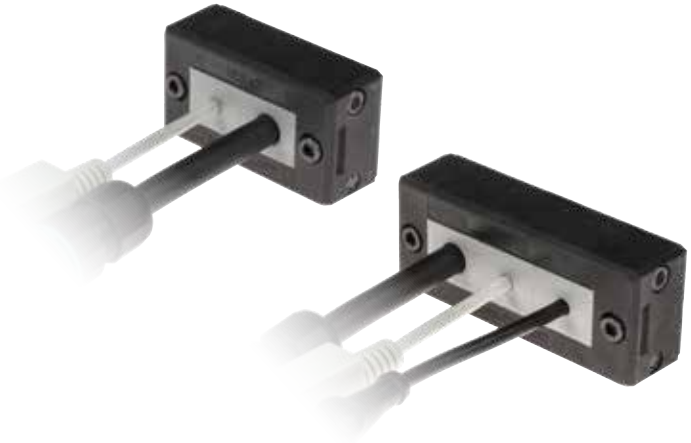
**Dimensions** [mm]

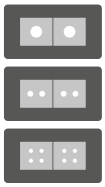
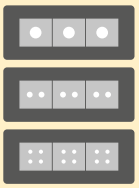


# DES L2/L3

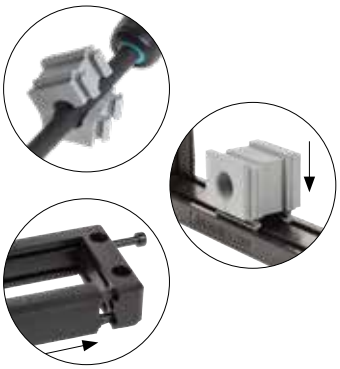
## *Splittable frame for pre-terminated cables*

- Multiple possible configurations in one frame size
- A small number of cables can be easily accommodated.
- Frame screws in AISI304 Stainless Steel
- Integrated gasket
- Strain relief according to EN 62444
- Sturdy construction IK10
- Up to IP66



| Model / Code | Some possible configurations | Cut-out [mm] | Pcs / pack |
|---|---|---|---|
| DES-L2_MPX |  | 40 x 18 | 10 |
| DES-L3_MPX |  | 63 x 18 | 10 |
| KIT_DES2 | Set of 2 mounting screws in AISI304 | | 10 |

he DES L2 and L3 splittable frames enable pre- terminated cables from 2 to 16mm in diameter to pass through enclosure walls, providing strong strain relief and water protection.



## *Technical data*

**Material:** PP+GF

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +155°C (static)

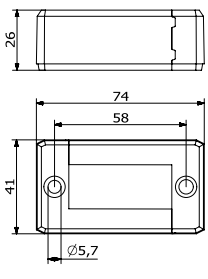
**Features:** halogens and silicones free

## *Related products*

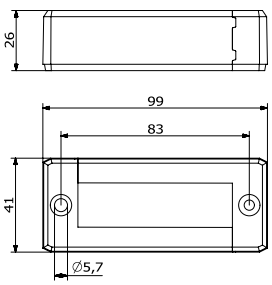
- Inserts SPP and SPP K
- Inserts SPP 2x
- Inserts SPP 4x

**Dimensions** [mm]

**DES L2**




**DES L3**

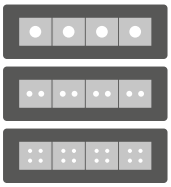
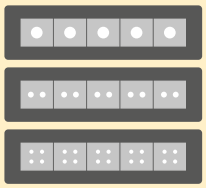


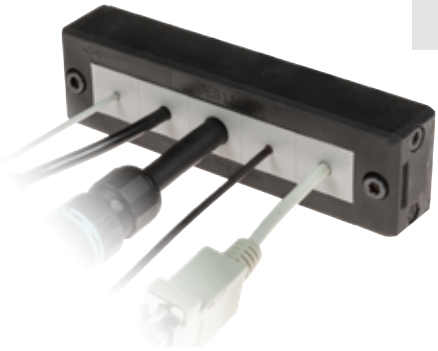

**Product also available as ATEX execution**

# DES L4/L5

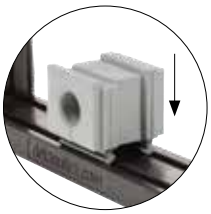
## *Splittable frame for pre-terminated cables*

- Multiple possible configurations in one frame size
- A small number of cables can be easily accommodated.
- Frame screws in AISI304 Stainless Steel
- Integrated gasket
- Strain relief according to EN 62444
- Sturdy construction IK10
- Up to IP66

| Model / Code | Some possible configurations | Cut-out [mm] | Pcs / pack |
|---|---|---|---|
| DES-L4_MPX |  | 86 x 18 | 10 |
| DES-L5_MPX |  | 108 x 18 | 10 |
| KIT_DES2 | Set of 2 mounting screws in AISI304 | | 10 |



The DES L4 and L5 splittable frames enable pre- terminated cables from 2 to 16mm in diameter to pass through enclosure walls, providing strong strain relief and water protection.



## *Technical data*

**Material:** PP+GF

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +155°C (static)

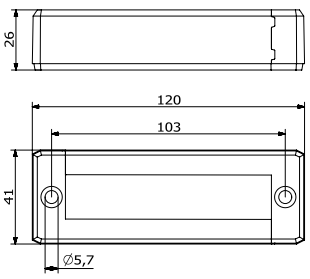
**Features:** halogens and silicones free

## *Related products*

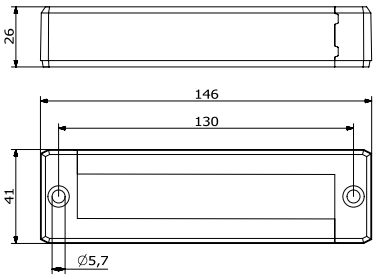
- Inserts SPP and SPP K
- Inserts SPP 2x
- Inserts SPP 4x

**Dimensions** [mm]

**DES L4**




**DES L5**




**Product also available as ATEX execution**

# SPP

## *DES inserts - small: single, double and quadruple*

- Inserts for cables from 2 to 16 mm in diameter
- "Blind" version available
- Grey and black colours available
- UL94V0 for both colours

The SPP inserts enable several cables from 2 to 16mm in diameter to be installed in the DES

The 2X and 4X versions enable multiple cables to be installed.

| Model / Code | Ø Cable [mm] | Model / Code | Pcs / pack |
|---|---|---|---|
| | | | |
| SPP-0G_MPX | "blind" | SPP-0B_MPX | 10 |
| SPP-2G_MPX | 2-3 | SPP-2B_MPX | |
| SPP-3G_MPX | 3-4 | SPP-3B_MPX | |
| SPP-4G_MPX | 4-5 | SPP-4B_MPX | |
| SPP-5G_MPX | 5-6 | SPP-5B_MPX | |
| SPP-6G_MPX | 6-7 | SPP-6B_MPX | |
| SPP-7G_MPX | 7-8 | SPP-7B_MPX | |
| SPP-8G_MPX | 8-9 | SPP-8B_MPX | |
| SPP-9G_MPX | 9-10 | SPP-9B_MPX | |
| SPP-10G_MPX | 10-11 | SPP-10B_MPX | |
| SPP-11G_MPX | 11-12 | SPP-11B_MPX | |
| SPP-12G_MPX | 12-13 | SPP-12B_MPX | |
| SPP-13G_MPX | 13-14 | SPP-13B_MPX | |
| SPP-14G_MPX | 14-15 | SPP-14B_MPX | |
| SPP-15G_MPX | 15-16 | SPP-15B_MPX | |
| SPP-16G_MPX | 16 | SPP-16B_MPX | |
| | | | |
| SPP-2x2G_MPX | 2X2 | SPP-2x2B_MPX | 10 |
| SPP-2X3G_MPX | 2X3 | SPP-2X3B_MPX | |
| SPP-2X4G_MPX | 2X4 | SPP-2X4B_MPX | |
| SPP-2X5G_MPX | 2X5 | SPP-2X5B_MPX | |
| SPP-2X6G_MPX | 2X6 | SPP-2X6B_MPX | |
| SPP-2X7G_MPX | 2X7 | SPP-2X7B_MPX | |
| SPP-2X8G_MPX | 2X8 | SPP-2X8B_MPX | |
| | | | |
| SPP-4X2G_MPX | 4X2 | SPP-4X2B_MPX | 10 |
| SPP-4X3G_MPX | 4X3 | SPP-4X3B_MPX | |
| SPP-4X4G_MPX | 4X4 | SPP-4X4B_MPX | |
| SPP-4X5G_MPX | 4X5 | SPP-4X5B_MPX | |
| SPP-4X6G_MPX | 4X6 | SPP-4X6B_MPX | |

## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +110°C (static)

**Features:** halogens and silicones free

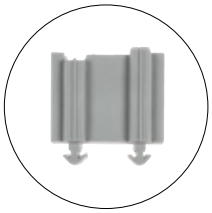
## *Related products*

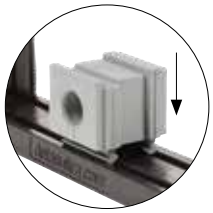
DES 24 DES L5 DES PRED

DES 16 DES L4 DES PRED 90

DES 10 DES L3 DES CLICK

DES Q DES L2





**Product also available as ATEX execution**

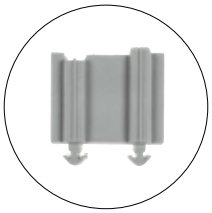
# SPP K

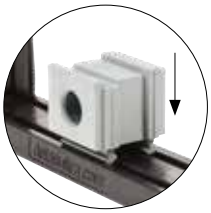
## *DES inserts with extended range - non split*

- Extended range inserts for **non-terminated cables**
- Diameters from 2.5 to 14 mm
- “Blind” insert pierceable available
- Grey and black colours available
- UL94V0 for both colours

| Model / Code | Ø Cable [mm] | Model / Code | Pcs / pack |
|---|---|---|---|
| ○ | | ● | |
| SPP-K0G_MPX | senza foro | SPP-K0B_MPX | |
| SPP-K1G_MPX | 2.5/7 | SPP-K1B_MPX | |
| SPP-K2G_MPX | 5/10 | SPP-K2B_MPX | 10 |
| SPP-K3G_MPX | 7.5/11.5 | SPP-K3B_MPX | |
| SPP-K4G_MPX | 10/14 | SPP-K4B_MPX | |

The SPP K inserts enable non-terminated cables to be accommodated in the DES splittable frames. Each insert has an extended range. The “blind” insert, properly pierced, enables cables from 1 to 16mm in diameter to pass through the frame.





## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +110°C (static)

**Features:** halogens and silicones free

## *Related products*

DES 24 DES L5 DES PRED

DES 16 DES L4 DES PRED 90

DES 10 DES L3 DES CLICK

DES Q DES L2

**Product also available as ATEX execution**

# SPG

## *DES insert - large*

- SPG: inserts for **pre-terminated cables** from 17 to 35 mm in diameter
- SPG K0: inserts for **non-terminated cables**
- "Blind" version available
- Grey and black colours available
- UL94V0 for both colours

**SPG K0**

The SPG inserts enable several cables from 17 to 35 mm in diameter to be installed in the DES splittable frames.

| Model / Code | Ø Cable [mm] | Model / Code | Pcs / pack |
|---|---|---|---|
| SPG-0G_MPX | "blind" | SPG-0B_MPX | |
| SPG-K0G_MPX | "blind" pierceable Ø max. 32 | SPG-K0B_MPX | |
| SPG-17G_MPX | 17-18 | SPG-17B_MPX | |
| SPG-18G_MPX | 18-19 | SPG-18B_MPX | |
| SPG-19G_MPX | 19-20 | SPG-19B_MPX | |
| SPG-20G_MPX | 20-21 | SPG-20B_MPX | |
| SPG-21G_MPX | 21-22 | SPG-21B_MPX | |
| SPG-22G_MPX | 22-23 | SPG-22B_MPX | |
| SPG-23G_MPX | 23-24 | SPG-23B_MPX | 10 |
| SPG-24G_MPX | 24-25 | SPG-24B_MPX | |
| SPG-25G_MPX | 25-26 | SPG-25B_MPX | |
| SPG-26G_MPX | 26-27 | SPG-26B_MPX | |
| SPG-27G_MPX | 27-28 | SPG-27B_MPX | |
| SPG-28G_MPX | 28-29 | SPG-28B_MPX | |
| SPG-29G_MPX | 29-30 | SPG-29B_MPX | |
| SPG-30G_MPX | 30-31 | SPG-30B_MPX | |
| SPG-31G_MPX | 31-32 | SPG-31B_MPX | |
| SPG-32G_MPX | 32-33 | SPG-32B_MPX | |
| SPG-33G_MPX | 33-34 | SPG-33B_MPX | |
| SPG-34G_MPX | 34-35 | SPG-34B_MPX | |

## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +110°C (static)

**Features:** halogens and silicones free

## *Related products*

DES 24
DES 16
DES 10
DES Q
DES PRED 63
DES PRED 90-50

**Product also available as ATEX execution**

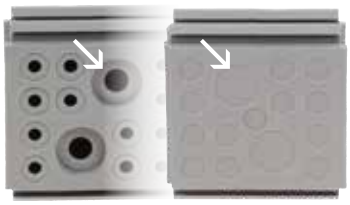
# SPG M / SPP M

## *DES insert - double membrane - large and small*

- For high number of **non- terminated cables**
- Grey and black colours available
- UL94V0 for both colours
- Increased strain relief acc. to EN62444

| Model / Code | Ø Cable [mm] | Model / Code | Pcs / pack |
|---|---|---|---|
| SPG-M14G_MPX |  | 12 – max. 6.5<br>2 – max. 12 | 10 |
| SPG-M14B_MPX |  | | |
| SPP-M4G_MPX |  | 4 – max. 6 | |
| SPP-M4B_MPX |  | | |

Double membrane



The SPG M and SPP M inserts enable a high number of cables to be installed in the DES splittable frames.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +110°C (static)

**Features:** halogens and silicones free

## *Related products*

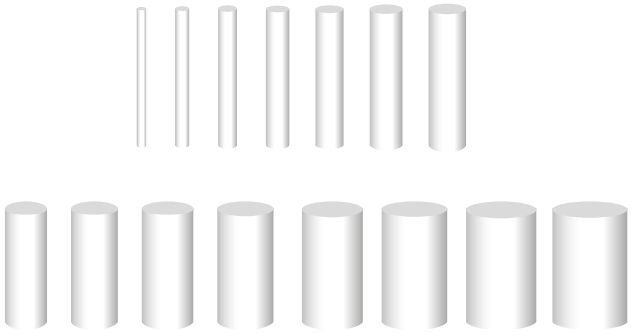
| | | |
|---|---|---|
| DES 24 | DES L5 | DES PRED |
| DES 16 | DES L4 | DES PRED 90 |
| DES 10 | DES L3 | DES CLICK |
| DES Q | DES L2 | |

**Product also available as ATEX execution**

# ISP

## *Plugs for SPP series*

▶ Plastic plugs for SPP inserts, from 2 to 16 mm in diameter



| Model / Code | Ø Cable [mm] | Length [mm] | Pcs / pack |
|---|---|---|---|
| ISP-2_MPX | 2 | 30 | 20 |
| ISP-3_MPX | 3 | | |
| ISP-4_MPX | 4 | | |
| ISP-5_MPX | 5 | | |
| ISP-6_MPX | 6 | | |
| ISP-7_MPX | 7 | | |
| ISP-8_MPX | 8 | 25 | |
| ISP-9_MPX | 9 | | |
| ISP-10_MPX | 10 | | |
| ISP-11_MPX | 11 | | |
| ISP-12_MPX | 12 | | |
| ISP-13_MPX | 13 | | |
| ISP-14_MPX | 14 | | |
| ISP-15_MPX | 15 | | |
| ISP-16_MPX | 16 | | |

The ISP plugs fit perfectly into the SPP insert hole restoring the water protection property of the DES splittable frames. These plugs range from 2 to 16mm in diameter.

## *Technical data*

**Material:** PA

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +155°C (static)

**Features:** halogens and silicones free

## *Related products*

SPP

SPP 2x

SPP 4x

# DES-PM 24

## *Cable entry plates for non-terminated cables*

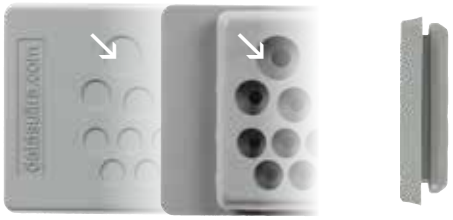
- For high number of cables
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)

| Model / Code | Cable nr. - Ø cables [mm] | Dimensions [mm] Cut-out | Plate | Pcs / pack |
|---|---|---|---|---|
| **DES-PM24-12G_MPX** | **12** - max. **15** | **112 x 36** max. **+0.5** | **144 x 46** | **10** |
| **DES-PM24-14G_MPX** | **14** - max. **12.1** | | | |
| **DES-PM24-17G_MPX** | **5** - max. **10.5**<br>**12** - max. **12.6** | | | |
| **DES-PM24-18G_MPX** | **4** - max. **6.5**<br>**5** - max. **10.5**<br>**5** - max. **12.6**<br>**4** - max. **16.1** | | | |
| **DES-PM24-20G_MPX** | **13** - max. **6.5**<br>**7** - max. **12.1** | | | |
| **DES-PM24-26G_MPX** | **16** - max. **6.5**<br>**4** - max. **12.1**<br>**4** - max. **16.1**<br>**2** - cavo **ASI** | | | |
| **DES-PM24-42G_MPX** | **1** - max. **4.7**<br>**12** - max. **5**<br>**17** - max. **6.4**<br>**12** - max. **7.2** | | | |
| **DES-PM24-48G_MPX** | **48** - max. **6.5** | | | |
| **DES-PM24-50G_MPX** | **33** - max. **5.3**<br>**9** - max. **6.4**<br>**8** - max. **8.3** | | | |

The DES-PM 24 is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane



## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +105°C (static)

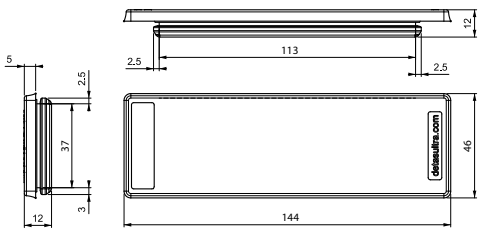
**Features:** halogens and silicones free

**Wall thickness:** from 1.5 to 2.5 mm

## *Related products*

Hydraulic punch driver HY360

**Dimensions** [mm]



# DES-PM 24

## *Cable entry plates for non-terminated cables*

- For high number of cables
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)

| Model / Code [redacted] | Cable nr. - Ø cables [mm] | Dimensions [mm] Cut-out | Plate | Pcs / pack |
|---|---|---|---|---|
| **DES-PM24-12B_MPX** | **12** - max. **15** | **112 x 36** max. **+0.5** | **144 x 46** | **10** |
| **DES-PM24-14B_MPX** | **14** - max. **12.1** | | | |
| **DES-PM24-17B_MPX** | **5** - max. **10.5**<br>**12** - max. **12.6** | | | |
| **DES-PM24-18B_MPX** | **4** - max. **6.5**<br>**5** - max. **10.5**<br>**5** - max. **12.6**<br>**4** - max. **16.1** | | | |
| **DES-PM24-20B_MPX** | **13** - max. **6.5**<br>**7** - max. **12.1** | | | |
| **DES-PM24-26B_MPX** | **16** - max. **6.5**<br>**4** - max. **12.1**<br>**4** - max. **16.1**<br>**2** - cavo **ASI** | | | |
| **DES-PM24-42B_MPX** | **1** - max. **4.7**<br>**12** - max. **5**<br>**17** - max. **6.4**<br>**12** - max. **7.2** | | | |
| **DES-PM24-48B_MPX** | **48** - max. **6.5** | | | |
| **DES-PM24-50B_MPX** | **33** - max. **5.3**<br>**9** - max. **6.4**<br>**8** - max. **8.3** | | | |

The DES-PM 24 is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane

## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +105°C (static)

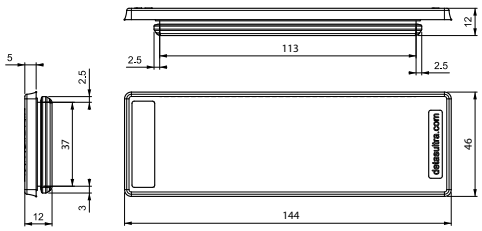
**Features:** halogens and silicones free

**Wall thickness:** from 1.5 to 2.5 mm

## *Related products*

Hydraulic punch driver HY360

**Dimensions** [mm]



# DES-PM S

## *Cable entry plates for non-terminated cables*

- For several number of cables in a limited space
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)

| Model / Code | Cable nr. - Ø cables [mm] | Dimensions [mm] Cut-out A1xA2 | Plate L1xL2 | Pcs / pack |
|---|---|---|---|---|
| **DES-PM-S46-7G_MPX** | **2** - max. **6.5**<br>**5** - max. **8.3** | **46 x 18** max. **+0.5** | **64 x 28** | **10** |
| **DES-PM-S46-9G_MPX** | **8** - max. **6.5**<br>**1** - max. **12.1** | | | |
| **DES-PM-S86-11G_MPX** | **2** - max. **6.5**<br>**9** - max. **8.35** | **85 x 16** max. **+0.5** | **103 x 28** | **10** |
| **DES-PM-S86-17G_MPX** | **16** - max. **6.5**<br>**1** - max. **12.1** | | | |
| **DES-PM-S112-21G_MPX** | **16** - max. **6.5**<br>**4** - max. **8.3**<br>**1** - max. **12.1** | **112 x 18** max. **+0.5** | **130 x 28** | **10** |

The DES-PM S is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane

## *Technical data*

**Material:** TPE

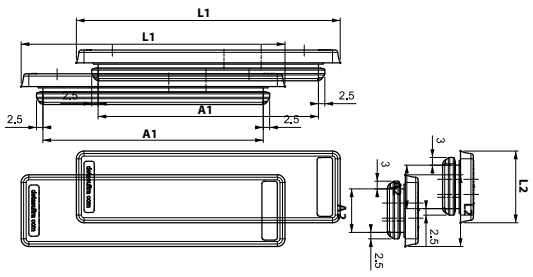
**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

**Wall thickness:** from 1.5 to 2.5 mm

**Dimensions** [mm]



# DES-PM S

## *Cable entry plates for non-terminated cables*

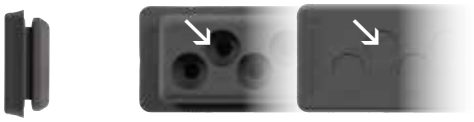
- For several number of cables in a limited space
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)

| Model / Code [redacted] | Cable nr. - Ø cables [mm] | Dimensions [mm] Cut-out A1xA2 | Plate L1xL2 | Pcs / pack |
|---|---|---|---|---|
| **DES-PM-S46-7B_MPX** | **2** - max. **6.5**<br>**5** - max. **8.3** | **46 x 18** max. **+0.5** | **64 x 28** | **10** |
| **DES-PM-S46-9B_MPX** | **8** - max. **6.5**<br>**1** - max. **12.1** | | | |
| **DES-PM-S86-11B_MPX** | **2** - max. **6.5**<br>**9** - max. **8.35** | **85 x 16** max. **+0.5** | **103 x 28** | **10** |
| **DES-PM-S86-17B_MPX** | **16** - max. **6.5**<br>**1** - max. **12.1** | | | |
| **DES-PM-S112-21B_MPX** | **16** - max. **6.5**<br>**4** - max. **8.3**<br>**1** - max. **12.1** | **112 x 18** max. **+0.5** | **130 x 28** | **10** |

The DES-PM S is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane



## *Technical data*

**Material:** TPE

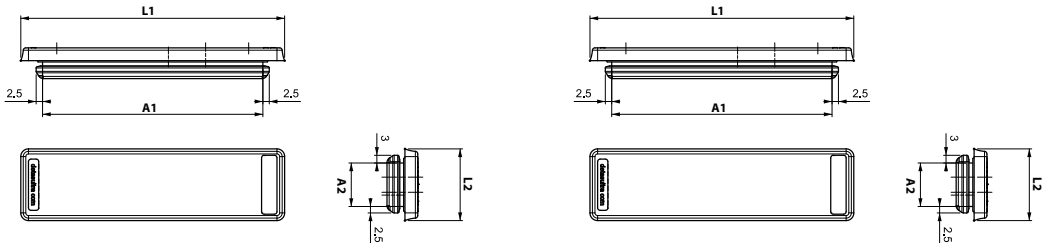
**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

**Wall thickness:** from 1.5 to 2.5 mm

**Dimensions** [mm]



# DES-PM M

## *Round cable entry plates for non-terminated cables*

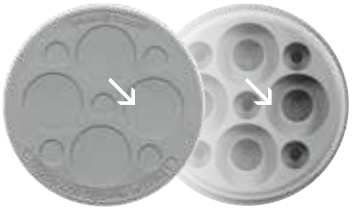
- For several number of cables
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)
- Metric sized

| Model / Code | Cable nr. - Ø cables [mm] | Dimensions [mm] Ø Cut-out | Ø Plate | Pcs / pack |
|---|---|---|---|---|
| DES-PM-M25-4G-T1_MPX | 4 - max. 8 | min.: 25<br>max.: 26<br>consigl.: 25.5 | 34 | 10 |
| DES-PM-M25-6G-T1_MPX | 4 - max. 5.2<br>2 - max. 9.4 | | | |
| DES-PM-M32-10G-T1_MPX<br>DES-PM-M32-10G-T2_MPX | 6 - max. 5.2<br>2 - max. 6.4<br>2 - max. 9.4 | min.: 32<br>max.: 33<br>consigl.: 32.5 | 40 | 10 |
| DES-PM-M50-9G-T1_MPX | 5 - max. 7<br>4 - max. 18.3 | min.: 50<br>max.: 51<br>consigl.: 50.5 | 62 | 10 |
| DES-PM-M50-11G-T1_MPX | 7 - max. 7<br>3 - max. 11.4<br>1 - max. 22 | | | |
| DES-PM-M50-12G-T1_MPX<br>DES-PM-M50-12G-T2_MPX | 10 - max. 9<br>2 - max. 11.4 | | | |
| DES-PM-M50-15G-T1_MPX | 2 - max. 6<br>4 - max. 7.2<br>4 - max. 9.7<br>5 - max. 12 | | | |
| DES-PM-M50-17G-T1_MPX | 5 - max. 5.5<br>5 - max. 6.5<br>3 - max. 9.7<br>4 - max. 11.4 | | | |
| DES-PM-M50-20G-T1_MPX | 16 - max. 6.5<br>4 - max. 9.7 | | | |

The round metric DES-PM M is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane



Type 1 Type 2

## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

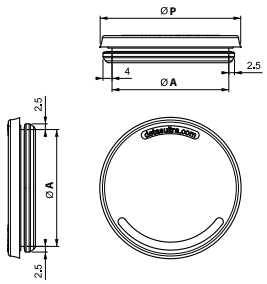
**Type 1:** wall thickness from 1.5 to 2.5 mm

**Type 2:** wall thickness from 2.8 to 4 mm

## *Related products*

Hydraulic punch driver HY360

**Dimensions** [mm]



# DES-PM M

## *Round cable entry plates for non-terminated cables*

- For several number of cables
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)
- Metric sized

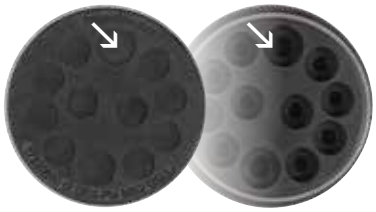
| Model / Code ● | Cable nr. - Ø cables [mm] | Dimensions [mm] Ø Cut-out | Ø Plate | Pcs / pack |
|---|---|---|---|---|
| **DES-PM-M25-4B-T1_MPX** | **4** - max. **8** | min.: **25**<br>max.: **26**<br>consigl.: **25.5** | **34** | **10** |
| **DES-PM-M25-6B-T1_MPX** | **4** - max. **5.2**<br>**2** - max. **9.4** | | | |
| **DES-PM-M32-10B-T1_MPX**<br>**DES-PM-M32-10B-T2_MPX** | **6** - max. **5.2**<br>**2** - max. **6.4**<br>**2** - max. **9.4** | min.: **32**<br>max.: **33**<br>consigl.: **32.5** | **40** | **10** |
| **DES-PM-M50-9B-T1_MPX** | **5** - max. **7**<br>**4** - max. **18.3** | min.: **50**<br>max.: **51**<br>consigl.: **50.5** | **62** | **10** |
| **DES-PM-M50-11B-T1_MPX** | **7** - max. **7**<br>**3** - max. **11.4**<br>**1** - max. **22** | | | |
| **DES-PM-M50-12B-T1_MPX**<br>**DES-PM-M50-12B-T2_MPX** | **10** - max. **9**<br>**2** - max. **11.4** | | | |
| **DES-PM-M50-15B-T1_MPX** | **2** - max. **6**<br>**4** - max. **7.2**<br>**4** - max. **9.7**<br>**5** - max. **12** | | | |
| **DES-PM-M50-17B-T1_MPX** | **5** - max. **5.5**<br>**5** - max. **6.5**<br>**3** - max. **9.7**<br>**4** - max. **11.4** | | | |
| **DES-PM-M50-20B-T1_MPX** | **16** - max. **6.5**<br>**4** - max. **9.7** | | | |

The round metric DES-PM M is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Type 1 Type 2

Double membrane



## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

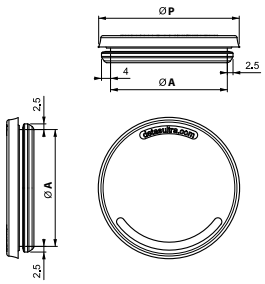
**Type 1:** wall thickness from 1.5 to 2.5 mm

**Type 2:** wall thickness from 2.8 to 4 mm

## *Related products*

Hydraulic punch driver HY360

**Dimensions** [mm]



# DES-PDM 24

## *Cable entry plates with internal frame*

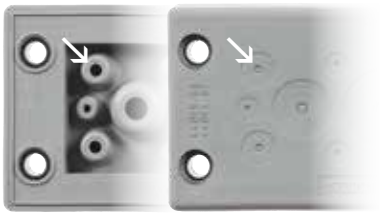
- For high number of non- terminated cables
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)

| Model / Code | Cable nr. - Ø cables [mm] | Dimensions [mm] Cut-out | Dimensions [mm] Plate | Pcs / pack |
|---|---|---|---|---|
| DES-PDM24-14G_MPX | 10 - 2.8 / 6.5<br>4 - 14.5 / 22 | 112 x 36 | 148.6 x 59.6 | 10 |
| DES-PDM24-15G_MPX | 15 - 6.8 / 12 | | | |
| DES-PDM24-16G_MPX | 8 - 2.8 / 6.5<br>4 - 4.4 / 9.7<br>2 - 8.6 / 16.2<br>2 - 14.5 / 22 | | | |
| DES-PDM24-17G_MPX | 6 - 2.8 / 6.5<br>6 - 4.6 / 10.2<br>5 - 8.6 / 16.2 | | | |
| DES-PDM24-25G_MPX | 12 - 2.8 / 6.5<br>7 - 4.4 / 9.7<br>6 - 6.8 / 12 | | | |
| DES-PDM24-32G_MPX | 21 - 2.8 / 6.5<br>8 - 4.6 / 10.2<br>3 - 6.8 / 12 | | | |
| DES-PDM24-42G_MPX | 42 - 2.8 / 6.5 | | | |
| KIT_DES4 | Set of 4 mounting screws in AISI304 | | | 10 |

The DES-PDM 24 is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance

Double membrane



## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

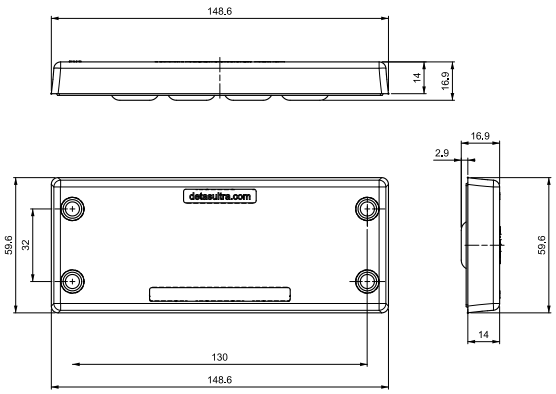
**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

## *Related products*

Hydraulic punch driver HY360

**Dimensions** [mm]

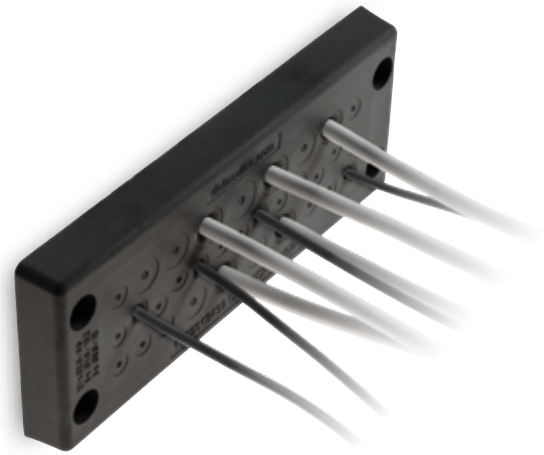



**Product also available as ATEX execution**

# DES-PDM 24

## *Cable entry plates with internal frame*

- For high number of non-terminated cables
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)

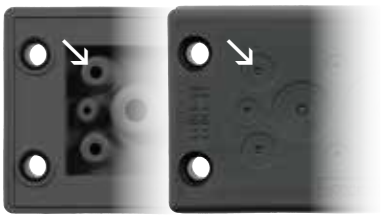


| Model / Code [redacted] | Cable nr. - Ø cables [mm] | Dimensions [mm] Cut-out | Dimensions [mm] Plate | Pcs / pack |
|---|---|---|---|---|
| DES-PDM24-14B_MPX | 10 - 2.8 / 6.5<br>4 - 14.5 / 22 | 112 x 36 | 148.6 x 59.6 | 10 |
| DES-PDM24-15B_MPX | 15 - 6.8 / 12 | | | |
| DES-PDM24-16B_MPX | 8 - 2.8 / 6.5<br>4 - 4.4 / 9.7<br>2 - 8.6 / 16.2<br>2 - 14.5 / 22 | | | |
| DES-PDM24-17B_MPX | 6 - 2.8 / 6.5<br>6 - 4.6 / 10.2<br>5 - 8.6 / 16.2 | | | |
| DES-PDM24-25B_MPX | 12 - 2.8 / 6.5<br>7 - 4.4 / 9.7<br>6 - 6.8 / 12 | | | |
| DES-PDM24-32B_MPX | 21 - 2.8 / 6.5<br>8 - 4.6 / 10.2<br>3 - 6.8 / 12 | | | |
| DES-PDM24-42B_MPX | 42 - 2.8 / 6.5 | | | |
| KIT_DES4 | Set of 4 mounting screws in AISI304 | | | 10 |

The DES-PDM 24 is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane



## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

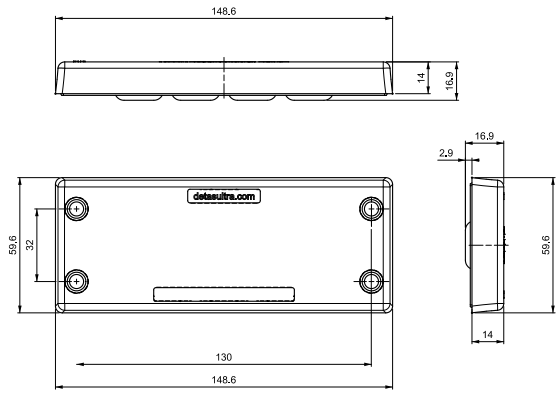
**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

## *Related products*

Hydraulic punch driver HY360

**Dimensions** [mm]




**Product also available as ATEX execution**

# DES-PDM S

## *Cable entry plates with internal frame*

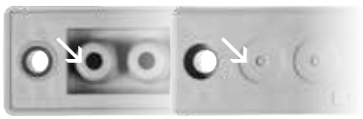
- For several number of non-terminated cables in a limited space
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)

| Model / Code | Cable nr. - Ø cables [mm] | Dimensions [mm] Cut-out | Plate | Pcs / pack |
|---|---|---|---|---|
| DES-PDM-S112-7G_MPX | 7 - 6.8 / 12 | 112x18 | 150x32 | 10 |
| DES-PDM-S112-7B_MPX | 7 - 6.8 / 12 | 112x18 | 150x32 | 10 |
| KIT_DES2 | with Black Dacromet finishing | | | 10 |

The DES-PDM S is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane



## *Technical data*

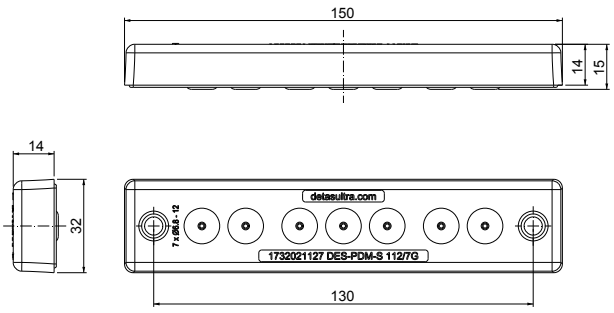
**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

**Dimensions** [mm]




**Product also available as ATEX execution**

# DES-PDM Q

## *Cable entry plates with internal frame*

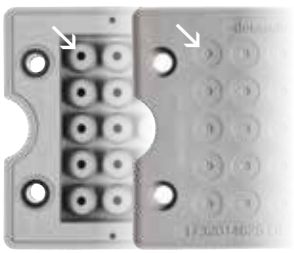
- For several number of non- terminated cables in a limited space
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)

| Model / Code | Cable nr. - Ø cables [mm] | Dimensions [mm] Cut-out | Plate | Pcs / pack |
|---|---|---|---|---|
| DES-PDM-Q-13G_MPX | 8 - 2.8 / 6.5<br>4 - 4.6 / 10.2<br>1 - 14.5 / 22 | 46 x 46 | 74x60 | 10 |
| DES-PDM-Q-17G_MPX | 10 - 2.8 / 6.5<br>4 - 4.6 / 10.2<br>2 - 6.8 / 12<br>1 - 8.6 / 16.2 | | | |
| DES-PDM-Q-25G_MPX | 25 - 2.8 / 6.5 | | | |
| DES-PDM-Q-13B_MPX | 8 - 2.8 / 6.5<br>4 - 4.6 / 10.2<br>1 - 14.5 / 22 | 46 x 46 | 74x60 | 10 |
| DES-PDM-Q-17B_MPX | 10 - 2.8 / 6.5<br>4 - 4.6 / 10.2<br>2 - 6.8 / 12<br>1 - 8.6 / 16.2 | | | |
| DES-PDM-Q-25B_MPX | 25 - 2.8 / 6.5 | | | |

The DES-PDM Q is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane



## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

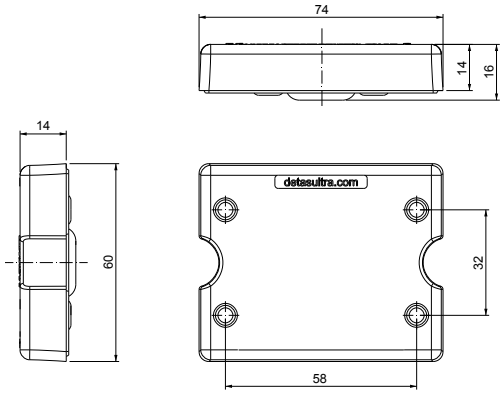
**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

## *Related products*

Hydraulic punch driver HY360

**Dimensions** [mm]




**Product also available as ATEX execution**

# DES-PDM M

## *Round cable entry plates with internal frame and locknut*

- For several number of non-terminated cables
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66-68)
- Metric sized

| Model / Code | Cable nr. - Ø cables [mm] | Thread x1.5 | Dimensions Ø P [mm] | Pcs / pack |
|---|---|---|---|---|
| DES-PDM-M32-4G_MPX | 3 - 2.6 / 6.5<br>1 - 5.5 / 12.5 | M32 | 46 | 10 |
| DES-PDM-M32-4-2G_MPX | 4 - 3.5 / 8.8 | | | |
| DES-PDM-M32-7G_MPX | 7 - 2.6 / 6.5 | | | |
| DES-PDM-M40-8G_MPX | 4 - 2.6 / 6.5<br>4 - 4 / 10.2 | M40 | 54 | 10 |
| DES-PDM-M50-8G_MPX | 5 - 4.6 / 10.2<br>3 - 6.8 / 12.5 | M50 | 64 | 10 |
| DES-PDM-M50-10G_MPX | 7 - 2.8 / 6,5<br>2 - 4.6 / 10.2<br>1 - 14.5 / 22 | | | |
| DES-PDM-M50-12G_MPX | 4 - 2.8 / 6.5<br>8 - 4.6 / 10.2 | | | |
| DES-PDM-M50-19G_MPX | 19 - 2.8 / 6.5 | | | |
| DES-PDM-M63-9G_MPX | 1 - 2.6 / 6<br>3 - 4.6 / 10.2<br>4 - 8.6 / 16.2<br>1- 10.9 / 20 | M63 | 77 | 10 |
| DES-PDM-M63-13G_MPX | 4 - 2.8 / 6<br>4 - 4.6 / 10.2<br>5 - 9. 5 / 16.2 | | | |
| DES-PDM-M63-14G_MPX | 14 - 5 / 10 | | | |
| DES-PDM-M63-35G_MPX | 35 - 2.6 / 5.5 | | | |

The round metric DES-PDM M is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane

## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

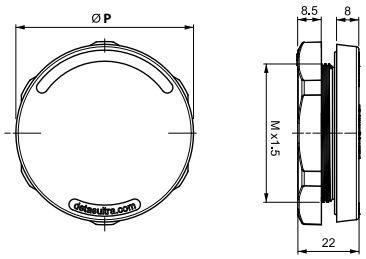
**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

## *Related products*

Hydraulic punch driver HY360

**Dimensions** [mm]




**Product also available as ATEX execution**

# DES-PDM M

## *Round cable entry plates with internal frame and locknut*

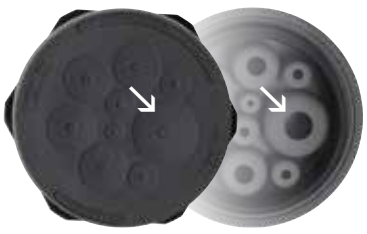
- For several number of non-terminated cables
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66-68)
- Metric sized

| Model / Code ● | Cable nr. - Ø cables [mm] | Thread x1.5 | Dimensions Ø P [mm] | Pcs / pack |
|---|---|---|---|---|
| DES-PDM-M32-4B_MPX | 3 - 2.6 / 6.5<br>1 - 5.5 / 12.5 | M32 | 46 | 10 |
| DES-PDM-M32-4-2B_MPX | 4 - 3.5 / 8.8 | | | |
| DES-PDM-M32-7B_MPX | 7 - 2.6 / 6.5 | | | |
| DES-PDM-M40-8B_MPX | 4 - 2.6 / 6.5<br>4 - 4 / 10.2 | M40 | 54 | 10 |
| DES-PDM-M50-8B_MPX | 5 - 4.6 / 10.2<br>3 - 6.8 / 12.5 | M50 | 64 | 10 |
| DES-PDM-M50-10B_MPX | 7 - 2.8 / 6,5<br>2 - 4.6 / 10.2<br>1 - 14.5 / 22 | | | |
| DES-PDM-M50-12B_MPX | 4 - 2.8 / 6.5<br>8 - 4.6 / 10.2 | | | |
| DES-PDM-M50-19B_MPX | 19 - 2.8 / 6.5 | | | |
| DES-PDM-M63-9B_MPX | 1 - 2.6 / 6<br>3 - 4.6 / 10.2<br>4 - 8.6 / 16.2<br>1- 10.9 / 20 | M63 | 77 | 10 |
| DES-PDM-M63-13B_MPX | 4 - 2.8 / 6<br>4 - 4.6 / 10.2<br>5 - 9. 5 / 16.2 | | | |
| DES-PDM-M63-14B_MPX | 14 - 5 / 10 | | | |
| DES-PDM-M63-35B_MPX | 35 - 2.6 / 5.5 | | | |

The round metric DES-PDM M is an innovative alternative to standard cable glands on electrical, electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

Double membrane



## *Technical data*

**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

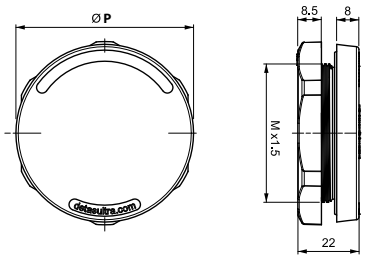
**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

## *Related products*

Hydraulic punch driver HY360

**Dimensions** [mm]




**Product also available as ATEX execution**

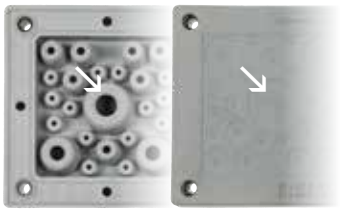
# DES-PDM KN

## *Cable entry plate - large frame*

- For up to 72 non-terminated cables
- High retaining force thanks to the double membrane
- Cost efficient solution
- High IP grade (IP65-66)

| Model / Code | Cable nr. - Ø cables [mm] | Dimensions [mm] Cut-out | Plate | Pcs / pack |
|---|---|---|---|---|
| DES-PDM-KN-72G_MPX | 42 - 2.8 / 6.5<br>21 - 4.6 / 10.2<br>6 - 8.6 / 16.2<br>3 - 14.5 / 22 | 192 x 62 | 221 x 90 | 1 |
| DES-PDM-KN-72B_MPX | 42 - 2.8 / 6.5<br>21 - 4.6 / 10.2<br>6 - 8.6 / 16.2<br>3 - 14.5 / 22 | 192 x 62 | 221 x 90 | 1 |

Double membrane



The DES-PDM KN is an innovative alternative to standard cable glands on electrical,

electronic and telecommunication cabinets and equipment.

The cable is pushed through the front membrane, whilst the second membrane increases the strain relief and liquid resistance.

## *Technical data*

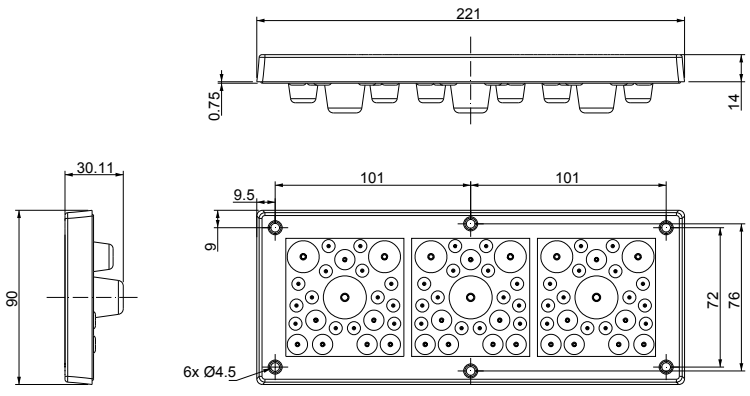
**Material:** TPE

**Flammability:** self-extinguishing acc. to UL94-V0

**Temperature:** -40°C… +105°C (static)

**Features:** halogens and silicones free

**Dimensions** [mm]

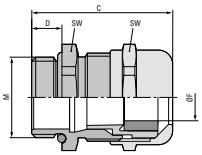



**Product also available as ATEX execution**

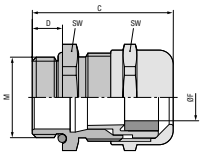
LAPP

# CABLE GLANDS = SKINTOP
# INOX
# ATEX
# UL
# NICKEL PLATED BRASS
# IP 68
# INCREASED HYGIENE

# SKINTOP® MS-M / SKINTOP® MSR-M



SKINTOP® MS-M



SKINTOP® MSR-M

**INFO**

- SKINTOP® MS-M sizes 75 x 1.5 to 110 x 2
  with innovative double lamella gasket for easier assembling of cables with large diameters.
- With IP69 approval! Proven to withstand the most demanding cleaning procedures for industrial machinery with high-pressure cleaners and hot water!

## Benefits

- Maximum reliability
- Optimum strain relief
- Wide, variable clamping ranges

## Application range

**SKINTOP® MS-M**

- In areas where mechanical and chemical stability are critical
- Chemical industry
- Measurement and control technology
- Machine and equipment manufacturing
- Plant engineering

**SKINTOP® MSR-M**

- With reducing seal insert, to seal cables with smaller outer diameters

## Norm references / Approvals

- UL File Nr. E79903

## Product Make-up

- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000441
ETIM 5.0/6.0 Class-Description: Cable screw gland

**Caution**
Refer to Appendix T21 for the installation dimensions and torques

**Material**
Body: nickel-plated brass
Insert: polyamide
Sealing: CR
O-ring: NBR

**Protection rating**
IP 68 - 10 bar
IP 69 (M12 - M63)
NEMA Type 1, 4x, 6, 12

**Temperature range**
Dynamic: -25°C up to + 100°C
Fixed: -40°C to +100°C

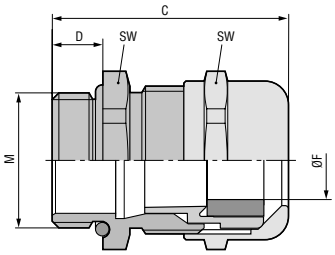
| Article number | Article designation / size | Ø F mm | SW wrench size mm | Overall length C mm | Thread length D mm | Pieces / PU |
|---|---|---|---|---|---|---|
| **SKINTOP® MS-M** | | | | | | |
| MS-M-M12_MPX | M 12 x 1,5 | 3.5 - 7.0 | 16 | 26.5 | 6.5 | 100 |
| MS-M-M16_MPX | M 16 x 1,5 | 4.5 - 10.0 | 20 | 33.0 | 7 | 100 |
| MS-M-M20_MPX | M 20 x 1,5 | 7 - 13.0 | 24 | 37.0 | 8.5 | 50 |
| MS-M-M25_MPX | M 25 x 1,5 | 9 - 17.0 | 29 | 38.5 | 8 | 25 |
| MS-M-M32_MPX | M 32 x 1,5 | 11 - 21.0 | 36 | 45.5 | 9 | 25 |
| MS-M-M40_MPX | M 40 x 1,5 | 19 - 28.0 | 45 | 48.0 | 9 | 10 |
| MS-M-M50_MPX | M 50 x 1,5 | 27 - 35.0 | 54 | 55.5 | 10 | 5 |
| MS-M-M63_MPX | M 63 x 1,5 | 34 - 45.0 | 67 | 67.0 | 15 | 5 |
| MS-M-M63PLUS_MPX | M 63 x 1,5 plus | 44 - 55.0 | 75 | 65.5 | 15 | 5 |
| MS-M-M75_MPX | M 75 x 1,5 | 58 - 68.0 | 95 | 105.0 | 15 | 1 |
| MS-M-M90_MPX | M 90 x 2 | 66 - 78.0 | 115 | 135.5 | 20 | 1 |
| MS-M-M110_MPX | M 110 x 2 | 86 - 98.0 | 135 | 154.0 | 25 | 1 |
| **SKINTOP® MSR-M** | | | | | | |
| 53112100 | M 12 x 1,5 | 2 - 5.0 | 16 | 26.5 | 6.5 | 100 |
| 53112110 | M 16 x 1,5 | 2 - 7.0 | 20 | 33.0 | 7 | 100 |
| 53112120 | M 20 x 1,5 | 5 - 10.0 | 24 | 37.0 | 8.5 | 50 |
| 53112130 | M 25 x 1,5 | 6 - 13.0 | 29 | 38.5 | 8 | 25 |
| 53112140 | M 32 x 1,5 | 7 - 15.0 | 36 | 45.5 | 9 | 25 |
| 53112150 | 40 x 1,5 | 15 - 23.0 | 45 | 48.0 | 9 | 10 |
| 53112160 | 50 x 1,5 | 22 - 29.0 | 54 | 55.5 | 10 | 5 |
| 53112170 | M 63 x 1,5 | 28 - 39.0 | 67 | 61.3 | 15 | 5 |
| 53112511 | M 75 x 1,5 | 53 - 63.0 | 95 | 105.0 | 15 | 1 |

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

# SKINTOP® MS-M-XL / SKINTOP® MSR-M-XL

SKINTOP® MS-M-XL

SKINTOP® MSR-M-XL




**INFO**

- With IP69 approval! Proven to withstand the most demanding cleaning procedures for industrial machinery with high-pressure cleaners and hot water!

## Benefits

- Especially for thick walls
- Maximum reliability
- Optimum strain relief
- Wide, variable clamping ranges

## Application range

**SKINTOP® MS-M-XL**

- With long connection thread for applications involving a thicker wall
- In areas where mechanical and chemical stability are critical
- Chemical industry
- Measurement and control technology
- Machine and equipment manufacturing

**SKINTOP® MSR-M-XL**

- With reducing seal insert, to seal cables with smaller outer diameters

## Norm references / Approvals

- UL File Nr. E79903

## Product Make-up

- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000441
ETIM 5.0/6.0 Class-Description: Cable screw gland

**Caution**
Refer to Appendix T21 for the installation dimensions and torques

**Material**
Body: nickel-plated brass
Insert: polyamide
Sealing: CR
O-ring: NBR

**Protection rating**
IP 68 - 10 bar
IP 69
NEMA Type 1, 4x, 6, 12

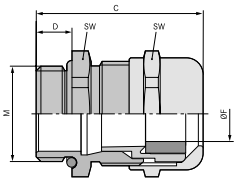
**Temperature range**
Dynamic: -25°C up to + 100°C
Fixed: -40°C to +100°C

| Article number | Article designation / size | Ø F mm | SW wrench size mm | Overall length C mm | Thread length D mm | Pieces / PU |
|---|---|---|---|---|---|---|
| **SKINTOP® MS-M-XL** | | | | | | |
| MS-M-XL-M12_MPX | M 12 x 1,5 | 3.5 - 7.0 | 16 | 32.0 | 12 | 100 |
| MS-M-XL-M16_MPX | M 16 x 1,5 | 4.5 - 10.0 | 20 | 38.0 | 12 | 50 |
| MS-M-XL-M20_MPX | M 20 x 1,5 | 7 - 13.0 | 24 | 41.0 | 12 | 50 |
| MS-M-XL-M25_MPX | M 25 x 1,5 | 9 - 17.0 | 29 | 42.5 | 12 | 25 |
| MS-M-XL-M32_MPX | M 32 x 1,5 | 11 - 21.0 | 36 | 51.5 | 15 | 25 |
| MS-M-XL-M40_MPX | M 40 x 1,5 | 19 - 28.0 | 45 | 54.5 | 15 | 10 |
| MS-M-XL-M50_MPX | M 50 x 1,5 | 27 - 35.0 | 54 | 60.5 | 15 | 5 |
| **SKINTOP® MSR-M-XL** | | | | | | |
| MSR-M-XL-M12_MPX | M 12 x 1,5 | 2 - 5.0 | 16 | 32.0 | 12 | 100 |
| MSR-M-XL-M16_MPX | M 16 x 1,5 | 2 - 7.0 | 20 | 38.0 | 12 | 50 |
| MSR-M-XL-M20_MPX | M 20 x 1,5 | 5 - 10.0 | 24 | 41.0 | 12 | 50 |
| MSR-M-XL-M25_MPX | M 25 x 1,5 | 6 - 13.0 | 29 | 42.5 | 12 | 25 |
| MSR-M-XL-M32_MPX | M 32 x 1,5 | 7 - 15.0 | 36 | 51.5 | 15 | 25 |
| MSR-M-XL-M40_MPX | M 40 x 1,5 | 15 - 23.0 | 45 | 54.5 | 15 | 10 |
| MSR-M-XL-M50_MPX | M 50 x 1,5 | 22 - 29.0 | 54 | 60.5 | 15 | 5 |

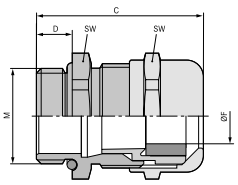
Photographs and graphics are not to scale and do not represent detailed images of the respective products.

# SKINTOP® MS-M ATEX / SKINTOP® MSR-M ATEX

SKINTOP® MS-M ATEX




SKINTOP® MSR-M ATEX




## Benefits

- Cold impact resistance
- High strain relief
- Wide, variable clamping ranges
- Maximum reliability

## Application range

**SKINTOP® MS-M ATEX**

- Devices, machines and apparatus of enhanced safety protection type „e“, dust ignition proof „t“
- Equipment group II / Category 2G+1D
- For mobile applications in offshore and marine industries
- Chemical and petrochemical industry

**SKINTOP® MSR-M ATEX**

- With reducing seal insert, to seal cables with smaller outer diameters

## Product features

**SKINTOP® MS-M ATEX**

- SKINTOP® MS-M-XL ATEX is similar to the SKINTOP® MS-M ATEX, but has an extended connection thread for thick walls

## Norm references / Approvals

**SKINTOP® MS-M ATEX**

- UL File Nr. E79903

## Product Make-up

- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000441
ETIM 5.0/6.0 Class-Description: Cable screw gland

**Caution**
Refer to the instruction leaflet for the installation dimensions and torques

**Certifications**
CE 0637 Ex II 2G
Ex eb IIC Ex II 1D
Ex ta IIIC
IECEx IBE 13.0026X

**Material**
Body: nickel-plated brass
Insert: polyamide
Sealing: CR
O-ring: NBR

**Tests**
DIN EN 60079-0
DIN EN 60079-7
DIN EN 60079-31

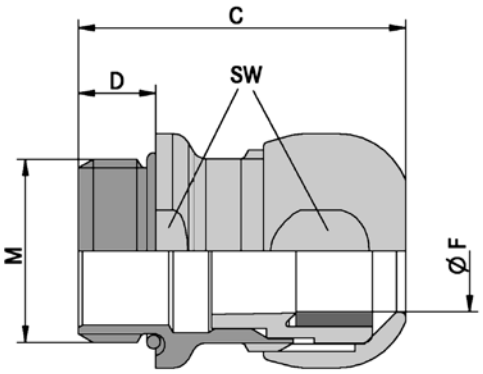
**Protection rating**
IP 68 - 10 bar
IP 66
NEMA Type 1, 4x, 6, 12

**Temperature range**
-30°C to +90°C

| Article number | Article designation / size | Ø F mm | SW wrench size mm | Overall length C mm | Thread length D mm | Pieces / PU |
|---|---|---|---|---|---|---|
| **SKINTOP® MS-M ATEX** | | | | | | |
| MS-M-M12-ATEX_MPX | M 12 x 1,5 | 3.0 - 7.0 | 16 | 26.5 | 6.5 | 100 |
| MS-M-M16-ATEX_MPX | M 16 x 1,5 | 4.5 - 10.0 | 20 | 33.0 | 7 | 100 |
| MS-M-M20-ATEX_MPX | M 20 x 1,5 | 7.0 - 13.0 | 24 | 37.0 | 8.5 | 50 |
| MS-M-M25-ATEX_MPX | M 25 x 1,5 | 9.0 - 17.0 | 29 | 38.5 | 8 | 25 |
| MS-M-M32-ATEX_MPX | M 32 x 1,5 | 11.0 - 21.0 | 36 | 45.5 | 9 | 25 |
| MS-M-M40-ATEX_MPX | M 40 x 1,5 | 19.0 - 28.0 | 45 | 48.0 | 9 | 10 |
| MS-M-M50-ATEX_MPX | M 50 x 1,5 | 26.0 - 35.0 | 54 | 55.5 | 10 | 5 |
| MS-M-M63-ATEX_MPX | M 63 x 1,5 | 34.0 - 45.0 | 67 | 67.0 | 15 | 5 |
| MS-M-M63PLUSATEX_MPX | M 63 x 1,5 plus | 44.0 - 55.0 | 75 | 65.5 | 15 | 1 |
| **SKINTOP® MS-M-XL ATEX** | | | | | | |
| MS-M-XL-M12-ATEX_MPX | M 12 x 1,5 | 3.0 - 7.0 | 16 | 26.0 | 12 | 100 |
| MS-M-XL-M16-ATEX_MPX | M 16 x 1,5 | 4.5 - 10.0 | 20 | 33.0 | 12 | 100 |
| MS-M-XL-M20-ATEX_MPX | M 20 x 1,5 | 7.0 - 13.0 | 24 | 37.0 | 12 | 50 |
| MS-M-XL-M25-ATEX_MPX | M 25 x 1,5 | 9.0 - 17.0 | 29 | 38.5 | 12 | 25 |
| MS-M-XL-M32-ATEX_MPX | M 32 x 1,5 | 11.0 - 21.0 | 36 | 45.5 | 15 | 25 |
| MS-M-XL-M40-ATEX_MPX | M 40 x 1,5 | 19.0 - 28.0 | 45 | 48.0 | 15 | 10 |
| MS-M-XL-M50-ATEX_MPX | M 50 x 1,5 | 26.0 - 35.0 | 54 | 55.5 | 15 | 5 |
| **SKINTOP® MSR-M ATEX** | | | | | | |
| MSR-M-M12-ATEX_MPX | M 12 x 1,5 | 2.0 - 5.0 | 16 | 26.5 | 6.5 | 100 |
| MSR-M-M16-ATEX_MPX | M 16 x 1,5 | 4.0 - 7.0 | 20 | 33.0 | 7 | 100 |
| MSR-M-M20-ATEX_MPX | M 20 x 1,5 | 5.0 - 10.0 | 24 | 37.0 | 8.5 | 50 |
| MSR-M-M25-ATEX_MPX | M 25 x 1,5 | 6.0 - 13.0 | 29 | 38.5 | 8 | 25 |
| MSR-M-M32-ATEX_MPX | M 32 x 1,5 | 7.0 - 15.0 | 36 | 45.5 | 9 | 25 |
| MSR-M-M40-ATEX_MPX | M 40 x 1,5 | 16.0 - 23.0 | 45 | 48.0 | 9 | 10 |
| MSR-M-M50-ATEX_MPX | M 50 x 1,5 | 19.0 - 29.0 | 54 | 55.5 | 10 | 5 |
| MSR-M-M63-ATEX_MPX | M 63 x 1,5 | 32.0 - 39.0 | 67 | 67.0 | 15 | 5 |

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

# SKINTOP® INOX / SKINTOP® INOX-R




**INFO**
- Stainless steel version with compact design
- For use in the splash zone in the food production

## Benefits
- Corrosion-resistant
- Sea water-resistant
- Smooth surfaces - no edges
- Compact design
- Wide, variable clamping ranges

## Application range
- Onshore and offshore applications
- Bottling plants and breweries
- Food industry (product-free zone, splash zone)

## Norm references / Approvals
- ECOLAB®
  Industry standard in the field of professional cleaning and disinfection in the food and beverage industry
- DIN EN 1672-2
  Guideline for the design of machinery
- DIN EN ISO 14159
  Security of machinery Hygienic requirements for the design of machinery
- NSF/ANSI 169
  Hygienic design for machinery and components

## Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000441
ETIM 5.0/6.0 Class-Description: Cable screw gland

**Material**
Body: stainless steelV4A (1.4404 / 316L)
Insert: polyamide
Sealing: silicone
O-Ring: silicone

**Protection rating**
IP 68 - 10 bar (M12 - M20)
IP 68 - 5 bar (M25 - M50)
IP 69
NEMA Type 1, 2, 4x, 6, 12

**Temperature range**
-40°C to +100°C

| Article number | Article designation / size | Ø F mm | SW wrench size mm | Overall length C mm | Thread length D mm | Pieces / PU |
|---|---|---|---|---|---|---|
| **SKINTOP® INOX** | | | | | | |
| SKIN-INOX-M12_MPX | M 12 x 1,5 | 4-7 | 16 | 29.3 | 6.5 | 5 |
| SKIN-INOX-M16_MPX | M 16 x 1,5 | 6-10 | 20 | 32.4 | 7 | 5 |
| SKIN-INOX-M20_MPX | M 20 x 1,5 | 7-13 | 24 | 35.5 | 8 | 5 |
| SKIN-INOX-M25_MPX | M 25 x 1,5 | 9-17 | 29 | 39.2 | 8 | 5 |
| SKIN-INOX-M32_MPX | M 32 x 1,5 | 11-21 | 36 | 44.6 | 9 | 5 |
| SKIN-INOX-M40_MPX | M 40 x 1,5 | 19-28 | 45 | 51.2 | 9 | 5 |
| SKIN-INOX-M50_MPX | M 50 x 1,5 | 27-35 | 54 | 56.2 | 10 | 5 |
| **SKINTOP® INOX-R** | | | | | | |
| SKIN-INOX-R-M12_MPX | M 12 x 1,5 | 3-5 | 16 | 29.3 | 6.5 | 5 |
| SKIN-INOX-R-M16_MPX | M 16 x 1,5 | 5-7 | 20 | 32.4 | 7 | 5 |
| SKIN-INOX-R-M20_MPX | M 20 x 1,5 | 6-10 | 24 | 35.5 | 8 | 5 |
| SKIN-INOX-R-M25_MPX | M 25 x 1,5 | 7-13 | 29 | 39.2 | 8 | 5 |
| SKIN-INOX-R-M32_MPX | M 32 x 1,5 | 8-15 | 36 | 44.6 | 9 | 5 |
| SKIN-INOX-R-M40_MPX | M 40 x 1,5 | 15-23 | 45 | 51.2 | 9 | 5 |
| SKIN-INOX-R-M50_MPX | M 50 x 1,5 | 22-29 | 54 | 56.2 | 10 | 5 |

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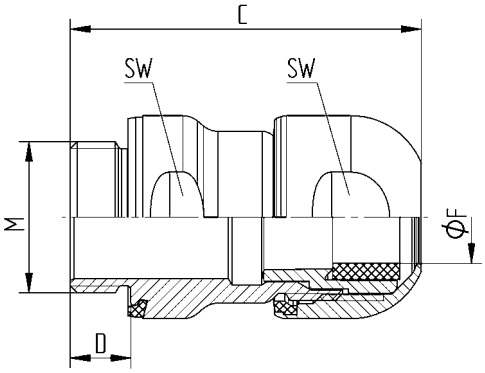
# SKINTOP® HYGIENIC / SKINTOP® HYGIENIC-R




**INFO**
- New: Available up to size M40x1,5
- Ideal for hygienic critical areas - resistant, edge-free, robust and reliable
- No gaps, voids or outer lying thread - so no risk of contamination of food machines, facilities or components

## Benefits
- Hygienic Design for ideal cleaning results
- Smooth surfaces and no edges prevent the accumulation of fluids and formation of micro-organisms

## Application range
- Food machinery, equipment and components
- For use in **product zone**
- Pharmaceutical industry

## Norm references / Approvals
- EHEDG (TYPE EL Class I AUX) Hygienic design for machinery and components
- ECOLAB® Industry standard in the field of professional cleaning and disinfection in the food and beverage industry
- FDA 21 CFR 177.2600 Special sealing element for food and beverage industry in North America
- DIN EN 1672-2 Guideline for the design of machinery
- DIN EN ISO 14159 Security of machinery Hygienic requirements for the design of machinery
- NSF/ANSI 169 Hygienic design for machinery and components

## Product Make-up
- Material and shape provide an easy and safe cleaning
- By the blue coloring of the sealing material clearly distinguishable from foodstuffs
- One complete assembly is easily mounted from the outside
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Note
- Installation wrench for very high packing density on request

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000441
ETIM 5.0/6.0 Class-Description: Cable screw gland

**Certifications**
UL approval for M32x1,5 and M40x1,5 pending

**Material**
Body: stainless steel - V4A (1.4404 / 316L)
Insert: polyamide
Sealing: special elastomer

**Protection rating**
IP 68 - 10 bar
IP 69
NEMA Type 1, 2, 4x, 6, 12

**Temperature range**
-20°C to +100°C

| Article number | Article designation / size | Ø F mm | SW wrench size mm | Overall length C mm | Thread length D mm | Pieces / PU |
|---|---|---|---|---|---|---|
| **SKINTOP® HYGIENIC** | | | | | | |
| SKIN-HYG-M12_MPX | M 12 x 1,5 | 4-6 | 16 | 38.4 | 6.5 | 5 |
| SKIN-HYG-M16_MPX | M 16 x 1,5 | 6,5-9 | 20 | 41.4 | 7 | 5 |
| SKIN-HYG-M20_MPX | M 20 x 1,5 | 9-12 | 24 | 46.4 | 8 | 5 |
| SKIN-HYG-M25_MPX | M 25 x 1,5 | 11,5-15,5 | 29 | 48.9 | 8 | 5 |
| SKIN-HYG-M32_MPX | M 32 x 1,5 | 16-20 | 36 | 56.0 | 9 | 5 |
| SKIN-HYG-M40_MPX | M 40 x 1,5 | 22-27 | 45 | 62.0 | 9 | 5 |
| **SKINTOP® HYGIENIC-R** | | | | | | |
| SKIN-HYG-R-M12_MPX | M 12 x 1,5 | 3-4,5 | 16 | 38.4 | 6.5 | 5 |
| SKIN-HYG-R-M16_MPX | M 16 x 1,5 | 4,5-7 | 20 | 41.4 | 7 | 5 |
| SKIN-HYG-R-M20_MPX | M 20 x 1,5 | 7-10 | 24 | 46.4 | 8 | 5 |
| SKIN-HYG-R-M25_MPX | M 25 x 1,5 | 9-12,5 | 29 | 48.9 | 8 | 5 |
| SKIN-HYG-R-M32_MPX | M 32 x 1,5 | 12,5-16,5 | 36 | 56.0 | 9 | 5 |
| SKIN-HYG-R-M40_MPX | M 40 x 1,5 | 18-23 | 45 | 62.0 | 9 | 5 |

Other sizes are available upon request.
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# SKINDICHT® SM-M / SKINDICHT® SM-PE-M

SKINDICHT® SM-M

SKINDICHT® SM-PE-M

## Benefits

**SKINDICHT® SM-PE-M**

- Cutting edges cut through the insulating layer, thus guaranteeing an optimum EMC contact
- Suitable for all metric glands used in earthing and EMC applications

## Application range

**SKINDICHT® SM-M**

- Used when a gland has to be countered, or in through-holes on thin-walled housings

**SKINDICHT® SM-PE-M**

- For lacquered, anodised or powder-coated housings.

## Product Make-up

- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000940
ETIM 5.0/6.0 Class-Description: Locknut for cable screw gland

**Material**
Nickel-plated brass

**Temperature range**
-60°C to +200°C

| Article number | Article designation / size | Thickness (mm) | SW wrench size mm | Outer Ø (mm) | Pieces / PU |
|---|---|---|---|---|---|
| **SKINDICHT® SM-M** | | | | | |
| SM-M-M6_MPX | M 6 x 1 | 3.2 | 10 | 11.1 | 100 |
| SM-M-M8_MPX | M 8 x 1 | 4.0 | 13 | 14.4 | 100 |
| SM-M-M10_MPX | M 10 x 1 | 5.0 | 17 | 19.1 | 100 |
| SM-M-M12_MPX | M 12 x 1,5 | 3.0 | 15 | 16.5 | 100 |
| SM-M-M16_MPX | M 16 x 1,5 | 3.0 | 19 | 20.9 | 100 |
| SM-M-M20_MPX | M 20 x 1,5 | 3.5 | 24 | 26.4 | 100 |
| SM-M-M25_MPX | M 25 x 1,5 | 4.0 | 30 | 33.0 | 100 |
| SM-M-M32_MPX | M 32 x 1,5 | 4.0 | 36 | 39.6 | 100 |
| SM-M-M40_MPX | M 40 x 1,5 | 5.0 | 46 | 50.6 | 50 |
| SM-M-M50_MPX | M 50 x 1,5 | 5.0 | 60 | 65.0 | 50 |
| SM-M-M63_MPX | M 63 x 1,5 | 5.0 | 70 | 77.0 | 25 |
| SM-M-M75_MPX | M 75 x 1,5 | 8.0 | 85 | 95.0 | 1 |
| SM-M-M90_MPX | M 90 x 2 | 10.0 | 102 | 114.0 | 1 |
| SM-M-M110_MPX | M 110 x 2 | 12.0 | 124 | 135.0 | 1 |
| **SKINDICHT® SM-PE-M** | | | | | |
| SM-PE-M-M12_MPX | M 12 x 1,5 | 4.7 | 15 | 17.3 | 100 |
| SM-PE-M-M16_MPX | M 16 x 1,5 | 4.7 | 19 | 21.9 | 100 |
| SM-PE-M-M20_MPX | M 20 x 1,5 | 4.7 | 24 | 27.7 | 100 |
| SM-PE-M-M25_MPX | M 25 x 1,5 | 5.2 | 30 | 34.6 | 50 |
| SM-PE-M-M32_MPX | M 32 x 1,5 | 5.7 | 36 | 41.5 | 50 |
| SM-PE-M-M40_MPX | M 40 x 1,5 | 6.5 | 46 | 53.1 | 25 |
| SM-PE-M-M50_MPX | M 50 x 1,5 | 6.5 | 60 | 69.3 | 10 |
| SM-PE-M-M63_MPX | M 63 x 1,5 | 7.0 | 70 | 80.8 | 10 |
| SM-PE-M-M75_MPX | M 75 x 1,5 | 8.0 | 85 | 95.0 | 1 |
| SM-PE-M-M72_MPX | M 72 x 2 | 10.0 | 85 | 98.0 | 1 |
| SM-PE-M-M90_MPX | M 90 x 2 | 10.0 | 102 | 114.0 | 1 |
| SM-PE-M-M110_MPX | M 110 x 2 | 12.0 | 124 | 135.0 | 1 |

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# SKINDICHT® SM-M INOX

**INFO**
- Metric threaded, stainless steel counter nut

## Application range
- Used when a gland has to be countered, or in through-holes on thin-walled housings

## Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000940
ETIM 5.0/6.0 Class-Description: Locknut for cable screw gland

**Material**
Stainless steel 303

**Temperature range**
-60°C to +200°C

| Article number | Article designation / size | Thickness (mm) | SW wrench size mm | Outer Ø (mm) | Pieces / PU |
|---|---|---|---|---|---|
| **SKINDICHT® SM-M INOX** | | | | | |
| SM-M-M12-INOX_MPX | M 12 x 1,5 | 2.8 | 17 | 16.5 | 10 |
| SM-M-M16-INOX_MPX | M 16 x 1,5 | 2.8 | 19 | 20.9 | 10 |
| SM-M-M20-INOX_MPX | M 20 x 1,5 | 3.0 | 24 | 26.7 | 10 |
| SM-M-M25-INOX_MPX | M 25 x 1,5 | 3.5 | 30 | 33.0 | 10 |
| SM-M-M32-INOX_MPX | M 32 x 1,5 | 4.0 | 36 | 39.0 | 10 |
| SM-M-M40-INOX_MPX | M 40 x 1,5 | 5.0 | 46 | 50.0 | 10 |
| SM-M-M50-INOX_MPX | M 50 x 1,5 | 5.0 | 55 | 60.0 | 10 |
| SM-M-M63-INOX_MPX | M 63 x 1,5 | 6.0 | 70 | 78.0 | 10 |

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# SKINDICHT® BL-M

## Benefits
- For closing pre-threaded holes

## Application range
- Machine and equipment manufacturing
- Electric motor manufacturing

## Product features
- Assembling with screwdriver

## Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000032
ETIM 5.0/6.0 Class-Description: Plug for cable screw gland

**Certifications**
UL pending

**On request**
Fitted with FKM O-ring (-20°C to +200°C)

**Material**
Body: nickel-plated brass
O-ring: NBR

**Protection rating**
IP 54
IP 68 (with O-ring)

**Temperature range**
With O-ring: -20°C to +100°C
Without O-ring: -60°C to +200°C

| Article number | Article designation / size | Overall length C mm | Thread length D mm | Outer Ø (mm) | Pieces / PU |
|---|---|---|---|---|---|
| **SKINDICHT® BL-M** | | | | | |
| BL-M-M12_MPX | M 12 x 1,5 | 7.5 | 5 | 14.0 | 100 |
| BL-M-M16_MPX | M 16 x 1,5 | 8.0 | 5 | 18.0 | 100 |
| BL-M-M20_MPX | M 20 x 1,5 | 9.5 | 6 | 22.0 | 100 |
| BL-M-M25_MPX | M 25 x 1,5 | 11.0 | 7 | 28.0 | 100 |
| BL-M-M32_MPX | M 32 x 1,5 | 12.0 | 8 | 35.0 | 50 |
| BL-M-M40_MPX | M 40 x 1,5 | 13.0 | 9 | 44.0 | 25 |
| BL-M-M50_MPX | M 50 x 1,5 | 15.0 | 9 | 54.0 | 10 |
| BL-M-M63_MPX | M 63 x 1,5 | 16.0 | 10 | 70.0 | 10 |
| BL-M-M75_MPX | M 75 x 1,5 | 17.0 | 11 | 80.0 | 1 |
| **SKINDICHT® BL-M con O-ring** | | | | | |
| BL-M-M12-OR_MPX | M 12 x 1,5 | 7.5 | 5 | 14.0 | 100 |
| BL-M-M16-OR_MPX | M 16 x 1,5 | 8.0 | 5 | 18.0 | 100 |
| BL-M-M20-OR_MPX | M 20 x 1,5 | 9.5 | 6 | 22.0 | 100 |
| BL-M-M25-OR_MPX | M 25 x 1,5 | 11.0 | 7 | 28.0 | 100 |
| BL-M-M32-OR_MPX | M 32 x 1,5 | 12.0 | 8 | 35.0 | 50 |
| BL-M-M40-OR_MPX | M 40 x 1,5 | 13.0 | 9 | 44.0 | 25 |
| BL-M-M50-OR_MPX | M 50 x 1,5 | 15.0 | 9 | 54.0 | 10 |
| BL-M-M63-OR_MPX | M 63 x 1,5 | 16.0 | 10 | 70.0 | 10 |

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# SKINDICHT® HYGIENIC BL-M


**INFO**
- Ideal for hygienic critical areas - resistant, edge-free, robust and reliable
- No gaps, voids or outer lying thread - so no risk of contamination of food machines, facilities or components

## Benefits
- For closing pre-threaded holes
- Assembling with a wrench

## Application range
- Food machinery, equipment and components
- For use in **product zone**
- Pharmaceutical industry

## Norm references / Approvals
- NSF/ANSI 169
  Hygienic design for machinery and components
- ECOLAB®
  Industry standard in the field of professional cleaning and disinfection in the food and beverage industry
- FDA 21 CFR 177.2600
  Special sealing element for food and beverage industry in North America
- DIN EN 1672-2
  Guideline for the design of machinery
- DIN EN ISO 14159
  Security of machinery Hygienic requirements for the design of machinery

## Product Make-up
- Material and shape provide an easy and safe cleaning
- By the blue coloring of the sealing material clearly distinguishable from foodstuffs
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000032
ETIM 5.0/6.0 Class-Description: Plug for cable screw gland

**Material**
Body: stainless steel - V4A (1.4404 / 316L)
Sealing: special elastomer (FKM)

**Protection rating**
IP 68 - 10 bar

**Temperature range**
-20°C to +100°C

| Article number | Article designation / size | SW wrench size mm | Overall length C mm | Thread length D mm | Outer Ø (mm) | Pieces / PU |
|---|---|---|---|---|---|---|
| **SKINDICHT® HYGIENIC BL-M** | | | | | | |
| BL-M-HYG-M12-OR_MPX | M 12 x 1,5 | 16 | 16.9 | 6.5 | 18.8 | 5 |
| BL-M-HYG-M16-OR_MPX | M 16 x 1,5 | 20 | 17.9 | 7 | 22.8 | 5 |
| BL-M-HYG-M20-OR_MPX | M 20 x 1,5 | 24 | 19.9 | 8 | 26.8 | 5 |
| BL-M-HYG-M25-OR_MPX | M 25 x 1,5 | 29 | 20.7 | 8 | 31.8 | 5 |

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## SKINDICHT® BL-M hex.

### Benefits
- For closing pre-threaded holes
- High degree of protection

### Application range
- Machine and equipment manufacturing
- Electric motor manufacturing

### Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

### Note
- Dummy plug made of stainless steel on request

### Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000032
ETIM 5.0/6.0 Class-Description: Plug for cable screw gland

**On request**
Fitted with FKM O-ring (-20°C to +200°C)

**Material**
Body: nickel-plated brass
O-ring: NBR

**Protection rating**
IP 68 - 5 bar

**Temperature range**
-20°C to +100°C

| Article number | Article designation / size | SW wrench size mm | Overall length C mm | Thread length D mm | Outer Ø (mm) | Pieces / PU |
|---|---|---|---|---|---|---|
| **SKINDICHT® BL-M hex.** | | | | | | |
| BL-M-HEX-M12-OR_MPX | M 12 x 1,5 | 16 | 8.0 | 5 | 17.8 | 50 |
| BL-M-HEX-M16-OR_MPX | M 16 x 1,5 | 20 | 8.0 | 5 | 22.0 | 50 |
| BL-M-HEX-M20-OR_MPX | M 20 x 1,5 | 24 | 9.5 | 6 | 26.4 | 50 |
| BL-M-HEX-M25-OR_MPX | M 25 x 1,5 | 29 | 11.0 | 7 | 31.9 | 50 |
| BL-M-HEX-M32-OR_MPX | M 32 x 1,5 | 36 | 12.0 | 8 | 39.6 | 25 |
| BL-M-HEX-M40-OR_MPX | M 40 x 1,5 | 45 | 13.0 | 8 | 49.5 | 25 |
| BL-M-HEX-M50-OR_MPX | M 50 x 1,5 | 54 | 15.0 | 9 | 59.0 | 10 |
| BL-M-HEX-M63-OR_MPX | M 63 x 1,5 | 67 | 16.0 | 10 | 73.5 | 10 |

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## SKINDICHT® BL-M ATEX

### Benefits
- High degree of protection
- Cold impact resistance

### Application range
- Equipment group II / Category 2G+1D
- Devices, machines and apparatus
- For mobile applications in offshore and marine industries
- Chemical and petrochemical industry

### Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

### Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000032
ETIM 5.0/6.0 Class-Description: Plug for cable screw gland

**Certifications**
CE 0637 Ex II 2G
Ex eb IIC Ex II 1D
Ex ta IIIC
IECEx IBE 13.0029X

**Material**
Body: nickel-plated brass
O-ring: NBR

**Tests**
DIN EN 60079-0
DIN EN 60079-7
DIN EN 60079-31

**Protection rating**
IP 68 - 5 bar

**Temperature range**
-30°C to +90°C

| Article number | Article designation / size | SW wrench size mm | Thread length D mm | Outer Ø (mm) | Pieces / PU |
|---|---|---|---|---|---|
| **SKINDICHT® BL-M ATEX** | | | | | |
| BL-M-ATEX-M12-OR_MPX | M 12 x 1,5 | 16 | 5 | 17.8 | 50 |
| BL-M-ATEX-M16-OR_MPX | M 16 x 1,5 | 20 | 5 | 22.0 | 50 |
| BL-M-ATEX-M20-OR_MPX | M 20 x 1,5 | 24 | 6 | 26.4 | 50 |
| BL-M-ATEX-M25-OR_MPX | M 25 x 1,5 | 29 | 7 | 31.9 | 50 |
| BL-M-ATEX-M32-OR_MPX | M 32 x 1,5 | 36 | 8 | 39.6 | 25 |
| BL-M-ATEX-M40-OR_MPX | M 40 x 1,5 | 45 | 8 | 49.5 | 25 |
| BL-M-ATEX-M50-OR_MPX | M 50 x 1,5 | 54 | 9 | 59.0 | 10 |
| BL-M-ATEX-M63-OR_MPX | M 63 x 1,5 | 67 | 10 | 73.5 | 10 |

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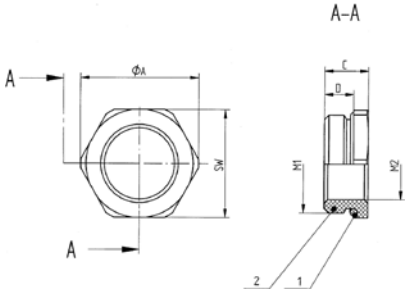
# SKINDICHT® MR-M hex.




## Benefits

- Enables the use of cable glands with smaller connection threads than the existing threaded holes
- With guide notch for O-ring
- Assembling with a wrench

## Application range

- Machines
- Devices
- Housings

## Product Make-up

- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000441
ETIM 5.0/6.0 Class-Description: Cable screw gland

**On request**
FKM O-ring
-20 °C to +200 °C

**Material**
Body: nickel-plated brass
O-ring: NBR

**Temperature range**
-20°C to +100°C

| Article number | Thread, male M1 | Thread, female M2 | SW wrench size mm | Ø A (mm) | Overall length C mm | Thread length D mm | Pieces / PU |
|---|---|---|---|---|---|---|---|
| **SKINDICHT® MR-M hex.** | | | | | | | |
| MR-M-HEX-M16-M12_MPX | 16 x 1,5 | 12 x 1,5 | 18 | 20.2 | 8.5 | 5.5 | 50 |
| MR-M-HEX-M20-M16_MPX | 20 x 1,5 | 16 x 1,5 | 22 | 24.4 | 9.0 | 6 | 50 |
| MR-M-HEX-M25-M16_MPX | 25 x 1,5 | 16 x 1,5 | 28 | 31.2 | 10.0 | 6.5 | 50 |
| MR-M-HEX-M25-M20_MPX | 25 x 1,5 | 20 x 1,5 | 28 | 31.2 | 10.0 | 6.5 | 50 |
| MR-M-HEX-M32-M16_MPX | 32 x 1,5 | 16 x 1,5 | 36 | 40.0 | 11.5 | 8 | 25 |
| MR-M-HEX-M32-M20_MPX | 32 x 1,5 | 20 x 1,5 | 36 | 40.0 | 11.5 | 8 | 25 |
| MR-M-HEX-M32-M25_MPX | 32 x 1,5 | 25 x 1,5 | 36 | 40.0 | 11.5 | 8 | 25 |
| MR-M-HEX-M40-M25_MPX | 40 x 1,5 | 25 x 1,5 | 43 | 47.5 | 12.5 | 8.5 | 10 |
| MR-M-HEX-M40-M32_MPX | 40 x 1,5 | 32 x 1,5 | 43 | 47.5 | 12.5 | 8.5 | 10 |
| MR-M-HEX-M50-M40_MPX | 50 x 1,5 | 40 x 1,5 | 54 | 58.0 | 14.0 | 10 | 5 |
| MR-M-HEX-M63-M50_MPX | 63 x 1,5 | 50 x 1,5 | 67 | 74.0 | 14.0 | 9.5 | 5 |
| MR-M-HEX-M75-M63_MPX | 75 x 1,5 | 63 x 1,5 | 80 | 90.0 | 17.0 | 11 | 1 |
| **SKINDICHT® MR-M, blank brass, with hexagon** | | | | | | | |
| MR-M-HEX-M80-M63_MPX | 80 x 2 | 63 x 1,5 | 85 | 93.5 | 23.0 | 15 | 1 |

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# SKINDICHT® MR-M ATEX

## Benefits
- Enables the use of cable glands with smaller connection threads than the existing threaded holes
- With guide notch for O-ring
- Assembling with a wrench

## Application range
- Equipment group II / Category 2G+1D
- Devices, machines and apparatus
- For mobile applications in offshore and marine industries
- Chemical and petrochemical industry

## Norm references / Approvals
- DIN EN 60079-0
  DIN EN 60079-7
  DIN EN 60079-31

## Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC000441
ETIM 5.0/6.0 Class-Description: Cable screw gland

**Certifications**
CE 0637 Ex II 2G
Ex eb IIC
Ex II 1D Ex ta IIIC
IECEx IBE 13.0028X

**Material**
Body: nickel-plated brass
O-ring: NBR

**Temperature range**
-30°C to +90°C

| Article number | Thread, male M1 | Thread, female M2 | Overall height (mm) | SW wrench size mm | Thread length D mm | Outer Ø (mm) | Pieces / PU |
|---|---|---|---|---|---|---|---|
| **SKINDICHT® MR-M ATEX** | | | | | | | |
| MR-M-ATEXM16-M12_MPX | 16 x 1,5 | 12 x 1,5 | 10.5 | 17 | 5 | 19.0 | 50 |
| MR-M-ATEXM20-M16_MPX | 20 x 1,5 | 16 x 1,5 | 13 | 22 | 6 | 24.5 | 50 |
| MR-M-ATEXM25-M20_MPX | 25 x 1,5 | 20 x 1,5 | 15 | 27 | 7 | 30.1 | 25 |
| MR-M-ATEXM32-M25_MPX | 32 x 1,5 | 25 x 1,5 | 16.5 | 34 | 8 | 37.2 | 25 |
| MR-M-ATEXM40-M32_MPX | 40 x 1,5 | 32 x 1,5 | 16.5 | 41 | 8 | 45.6 | 10 |
| MR-M-ATEXM50-M40_MPX | 50 x 1,5 | 40 x 1,5 | 19.5 | 50 | 10 | 55.3 | 5 |
| MR-M-ATEXM63-M50_MPX | 63 x 1,5 | 50 x 1,5 | 18.5 | 65 | 8.5 | 71.3 | 5 |

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# SKINDICHT® O-Ring NBR metric

## Application range

- For sealing the housing reliably to protect against oils, dust, and water at the connection thread of a gland or other similar parts

## Note

- O-rings with thickness of 1.5 mm are recommended for optimum sealing of the converter SKINDICHT® ZSE-M12/16/20 x 1.5
- Delivery will be made in the largest possible packing unit (bulk goods), minimum order quantity is one packing unit

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC001181
ETIM 5.0/6.0 Class-Description: Sealing ring

**Colour delivered**
Black

**Material**
NBR

**Temperature range**
-20°C to +100°C

| Article number | Article designation / size | Inner Ø (mm) | Cable thickness (mm) | Pieces / PU |
|---|---|---|---|---|
| **O-ring NBR metrico SKINDICHT®** | | | | |
| ORING-NBR-M12-1_MPX | M 12 x 1,5 | 9.0 | 1.5 | 100 |
| ORING-NBR-M12-2_MPX | M 12 x 2,0 | 9.0 | 2 | 100 |
| ORING-NBR-M16-2_MPX | M 16 x 2,0 | 13.0 | 2 | 100 |
| ORING-NBR-M20-1_MPX | M 20 x 1,5 | 17.0 | 1.5 | 100 |
| ORING-NBR-M20-2_MPX | M 20 x 2,0 | 17.0 | 2 | 100 |
| ORING-NBR-M25-2_MPX | M 25 x 2,0 | 22.0 | 2 | 100 |
| ORING-NBR-M32-2_MPX | M 32 x 2,0 | 28.0 | 2 | 50 |
| ORING-NBR-M40-2_MPX | M 40 x 2,0 | 36.0 | 2 | 50 |
| ORING-NBR-M50-2_MPX | M 50 x 2,0 | 46.0 | 2 | 25 |
| ORING-NBR-M63-2_MPX | M 63 x 2,0 | 57.0 | 2 | 25 |

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

# SKINDICHT® O-ring FKM metric

## Application range

- For sealing the housing reliably to protect against oils, acids, and chemicals at the connection thread of a gland or other similar parts under extreme conditions

## Note

- Delivery will be made in the largest possible packing unit (bulk goods), minimum order quantity is one packing unit

## Technical data

**Classification ETIM 5/6**
ETIM 5.0/6.0 Class-ID: EC001181
ETIM 5.0/6.0 Class-Description: Sealing ring

**Colour delivered**
Green

**Material**
FKM

**Temperature range**
-20°C to +200°C

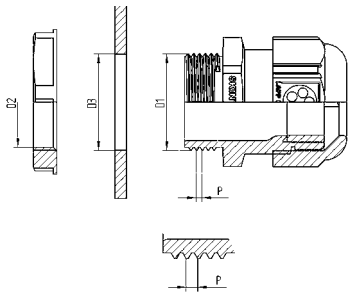
| Article number | Article designation / size | Inner Ø (mm) | Cable thickness (mm) | Pieces / PU |
|---|---|---|---|---|
| **SKINDICHT® O-ring FKM metrico** | | | | |
| ORING-FKM-M12-2_MPX | M 12 x 2,0 | 9.0 | 2 | 100 |
| ORING-FKM-M12-1_MPX | M 12 x 1,5 | 9.0 | 1.5 | 100 |
| ORING-FKM-M16-2_MPX | M 16 x 2,0 | 13.0 | 2 | 100 |
| ORING-FKM-M20-2_MPX | M 20 x 2,0 | 17.0 | 2 | 100 |
| ORING-FKM-M20-1_MPX | M 20 x 1,5 | 17.0 | 1.5 | 100 |
| ORING-FKM-M25-2_MPX | M 25 x 2,0 | 22.0 | 2 | 100 |
| ORING-FKM-M32-2_MPX | M 32 x 2,0 | 28.0 | 2 | 50 |
| ORING-FKM-M40-2_MPX | M 40 x 2,0 | 36.0 | 2 | 50 |
| ORING-FKM-M50-2_MPX | M 50 x 2,0 | 46.0 | 2 | 25 |
| ORING-FKM-M63-2_MPX | M 63 x 2,0 | 57.0 | 2 | 25 |

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

# Thread and hole dimensions – technical data for installation

## Metric thread to EN 60423 (for screw connections to IEC 62444)

| Nominal size | Ø D1 | P | Ø D2 | Hole Ø D3 |
|---|---|---|---|---|
| M6 x 1 | 6 | 1 | 5,2 | 6,0 + 0,2 |
| M8 x 1 | 8 | 1 | 7,1 | 8,0 + 0,2 |
| M10 x 1 | 10 | 1 | 9,1 | 10,0 + 0,2 |
| M12 x 1,5 | 12 | 1,5 | 10,6 | 12,0 + 0,2 |
| M16 x 1,5 | 16 | 1,5 | 14,6 | 16,0 + 0,2 |
| M20 x 1,5 | 20 | 1,5 | 18,6 | 20,0 + 0,2 |
| M25 x 1,5 | 25 | 1,5 | 23,6 | 25,0 + 0,2 |
| M32 x 1,5 | 32 | 1,5 | 30,6 | 32,0 + 0,3 |
| M40 x 1,5 | 40 | 1,5 | 38,6 | 40,0 + 0,3 |
| M50 x 1,5 | 50 | 1,5 | 48,6 | 50,0 + 0,4 |
| M63 x 1,5 | 63 | 1,5 | 61,6 | 63,0 + 0,4 |
| M75 x 1,5 | 75 | 1,5 | 73,6 | 75,0 + 0,5 |
| M90 x 2 | 90 | 2 | 88,8 | 90,0 + 0,5 |
| M110 x 2 | 110 | 2 | 108,8 | 110,0 + 0,5 |



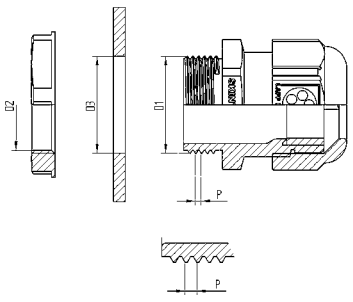

D1 = External-Ø
D2 = Core Ø internal thread
D3 = Hole Ø
P = Pitch

## Metric thread to DIN 13 part 6 and 7 (for screw connections to DIN 89 280)

| Nominal size | Ø D1 | P | Ø D2 | Hole Ø D3 |
|---|---|---|---|---|
| M18 x 1,5 | 18 | 1,5 | 16,4 | 18,3 – 0,2 |
| M24 x 1,5 | 24 | 1,5 | 22,4 | 24,3 – 0,2 |
| M30 x 2 | 30 | 2 | 27,8 | 30,3 – 0,2 |
| M36 x 2 | 36 | 2 | 33,8 | 36,3 – 0,2 |
| M45 x 2 | 45 | 2 | 42,8 | 45,4 – 0,3 |
| M56 x 2 | 56 | 2 | 53,8 | 56,4 – 0,3 |
| M72 x 2 | 72 | 2 | 69,8 | 72,5 – 0,4 |
| M80 x 2 | 80 | 2 | 77,8 | 80,5 – 0,4 |
| M105 x 2 | 105 | 2 | 102,8 | 105,5 – 0,4 |

## PG thread to DIN 40430

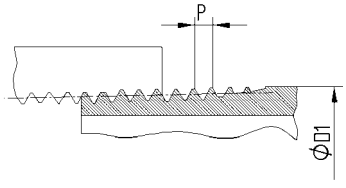
| Nominal size | Ø D1 | P | Ø D2 | Hole Ø D3 |
|---|---|---|---|---|
| PG 7 | 12,5 | 1,27 | 11,3 | 12,8 – 0,2 |
| PG 9 | 15,2 | 1,41 | 13,9 | 15,5 – 0,2 |
| PG 11 | 18,6 | 1,41 | 17,3 | 18,9 – 0,2 |
| PG 13,5 | 20,4 | 1,41 | 19,1 | 20,7 – 0,2 |
| PG 16 | 22,5 | 1,41 | 21,2 | 22,8 – 0,2 |
| PG 21 | 28,3 | 1,588 | 26,8 | 28,6 – 0,2 |
| PG 29 | 37,0 | 1,588 | 35,5 | 37,4 – 0,3 |
| PG 36 | 47,0 | 1,588 | 45,5 | 47,4 – 0,3 |
| PG 42 | 54,0 | 1,588 | 52,5 | 54,4 – 0,3 |
| PG 48 | 59,3 | 1,588 | 57,8 | 59,7 – 0,3 |




D1 = External-Ø
D2 = Core Ø internal thread
D3 = Hole Ø
P = Pitch

## NPT thread to ANSI B1.20.2

| Nominal size | Ø D1 | P | Hole Ø D3 |
|---|---|---|---|
| NPT 1/4" | 13,7 | 1,41 | 14,1 – 0,2 |
| NPT 3/8" | 17,1 | 1,41 | 17,4 – 0,2 |
| NPT 1/2" | 21,3 | 1,81 | 21,6 – 0,2 |
| NPT 3/4" | 26,7 | 1,81 | 27,0 – 0,2 |
| NPT 1" | 33,4 | 2,21 | 33,7 – 0,2 |
| NPT 1 1/4" | 42,2 | 2,21 | 42,5 – 0,2 |
| NPT 1 1/2" | 48,3 | 2,21 | 48,7 – 0,2 |
| NPT 2" | 60,3 | 2,21 | 60,7 – 0,2 |




D1 = External-Ø
D3 = Hole Ø
P = Pitch

## Tightening torques* for SKINTOP® metric cable glands

Table of recommended tightening torques (domed cap nut, connection thread) for metric SKINTOP® glands to achieve ingress protection and category A strain relief according to IEC 62444. For more information regarding the protection rating, see the product page.

| Nominal size | Tightening torque in Nm | |
|---|---|---|
| | Plastic | Metal |
| M6 x 1 | - | 1,5 |
| M8 x 1 | - | 3 |
| M10 x 1 | - | 6 |
| M12 x 1,5 | 1,5 | 8 |
| M16 x 1,5 | 3,0 | 10 |
| M20 x 1,5 | 6,0 | 12 |
| M25 x 1,5 | 8,0 | 12 |
| M32 x 1,5 | 10,0 | 18 |
| M40 x 1,5 | 13,0 | 18 |
| M50 x 1,5 | 15,0 | 20 |
| M63 x 1,5 | 16,0 | 20 |
| M63 x 1,5 plus | - | 25 |
| M75 x 1,5 | - | 30 |
| M90 x 2 | - | 70 |
| M110 x 2 | - | 90 |

*NOTE: The values in the table above constitute the tightening torques for fittings and the maximum tightening torques for domed cap nuts under normal climatic conditions.
Note that lower torques must be used with different cable insulation materials; otherwise, the cable insulation may be damaged.
For ATEX screw connections, see the corresponding operating instructions for the respective tightening torques (operating instructions can be found in the delivery bag).

## Tightening torques* for SKINTOP® PG cable glands

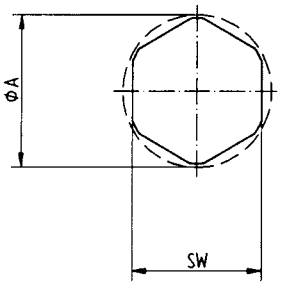
| Nominal size | Tightening torques for fittings in Nm | | Tightening torques for domed cap nuts in Nm | |
|---|---|---|---|---|
| | Plastic | Metal | Plastic | Metal |
| PG 7 | 3,0 | 6,25 | 1,7 | 6,25 |
| PG 9 | 4,0 | 6,25 | 2,5 | 6,25 |
| PG 11 | 4,0 | 6,25 | 2,5 | 6,25 |
| PG 13,5 | 4,0 | 6,25 | 2,5 | 6,25 |
| PG 16 | 6,0 | 7,5 | 3,3 | 7,5 |
| PG 21 | 8,0 | 10,0 | 5,0 | 10,0 |
| PG 29 | 13,0 | 10,0 | 5,0 | 10,0 |
| PG 36 | 13,0 | 10,0 | 5,0 | 10,0 |
| PG 42 | 13,0 | 10,0 | 5,0 | 10,0 |
| PG 48 | 13,0 | 10,0 | 5,0 | 10,0 |

*NOTE: The values in the table above constitute the tightening torques for fittings and the maximum tightening torques for domed cap nuts under normal climatic conditions.
Note that lower torques must be used with different cable insulation materials; otherwise, the cable insulation may be damaged.
For ATEX screw connections, see the corresponding operating instructions for the respective tightening torques (operating instructions can be found in the delivery bag).

## Installation dimensions and wrench sizes for cable glands

Diameter A indicates the installation space required for the relevant hexagon. This diameter corresponds to the width of the hexagon across corners plus an installation tolerance.

| SW | Ø A | SW | Ø A | SW | Ø A |
|---|---|---|---|---|---|
| 9 | 10,4 | 27 | 30,6 | 50 | 58,3 |
| 11 | 12,5 | 28 | 31,8 | 53 | 60,0 |
| 13 | 14,9 | 29 | 32,5 | 54 | 61,0 |
| 14 | 16,0 | 30 | 34,0 | 55 | 62,0 |
| 15 | 17,1 | 32 | 36,2 | 57 | 64,4 |
| 16 | 18,2 | 33 | 37,2 | 60 | 67,5 |
| 17 | 19,4 | 36 | 40,5 | 64 | 72,3 |
| 18 | 20,4 | 37 | 41,5 | 65 | 73,1 |
| 19 | 22,0 | 39 | 44,0 | 66 | 74,5 |
| 20 | 22,7 | 40 | 45,2 | 67 | 74,5 |
| 21 | 23,9 | 41 | 46,1 | 75 | 83,9 |
| 22 | 25,0 | 42 | 47,0 | 95 | 105,0 |
| 24 | 27,3 | 45 | 51,2 | 115 | 127,0 |
| 25 | 28,3 | 46 | 52,5 | 135 | 150,0 |
| 26 | 29,5 | 47 | 52,5 | | |



# Definition of protection ratings to DIN EN 60529 (VDE 0470-1: 2014-09)

The protection ratings are indicated by a code that is always made up of the same two identification letters IP and the code numbers for the degree of protection.

## Degrees of protection against solid foreign bodies

| First code number | Short description | Definition |
|---|---|---|
| 0 | Not protected | |
| 1 | Protected against solid foreign bodies 50 mm diameter and above | The object probe, sphere of 50mm diameter, shall not fully penetrate. |
| 2 | Protected against solid foreign bodies 12.5 mm diameter and above | The object probe, sphere of 12.5 mm diameter, shall not fully penetrate. |
| 3 | Protected against solid foreign bodies 2.5 mm diameter and above | The object probe, sphere of 2.5 mm diameter, shall not penetrate at all. |
| 4 | Protected against solid foreign bodies 1.0 mm diameter and above | The object probe, sphere of 1.0 mm diameter, shall not penetrate at all. |
| 5 | Protected against dust | Intrusion of dust is not completely prevented but dust shall not penetrate in a quantity that would interfere with the satisfactory operation of the device or impair safety. |
| 6 | Dust-tight | No penetration of dust. |

## Degrees of protection against water

| Second code number | Short description | Definition |
|---|---|---|
| 0 | Not protected | |
| 1 | Protected against drops of water | Vertically falling drops shall have no harmful effects. |
| 2 | Protected against drops of water if the housing is tilted by up to 15°. | Vertically falling drops shall have no harmful effects if the housing is tilted by up to 15° on either side of the vertical. |
| 3 | Protected against spraying water | Water sprayed at an angle of up to 60° on either side of the vertical shall have no harmful effects. |
| 4 | Protected against splashing water | Water splashed against the housing from any direction shall have no harmful effects. |
| 5 | Protected against jets of water | Water projected in jets against the housing from any direction shall have no harmful effects. |
| 6 | Protected against powerful jets of water | Water projected in powerful jets against the housing from any direction shall have no harmful effects. |
| 7 | Protected against the effects of temporary immersion in water | Water must not penetrate in quantities causing harmful effects when the housing is temporarily immersed in water under standardised pressure and time conditions. |
| 8 | Protected against the effects of permanent immersion in water | Water must not penetrate in quantities causing harmful effects when the housing is continually immersed in water under conditions that must be agreed upon between the manufacturer and the user. However, the conditions must be more difficult than for number 7. |
| 9 | Protected against high-pressure and steam-jet cleaning (with high temperatures) | Water projected against the housing from any direction under very high pressure shall have no harmful effects |

**NOTE**: Starting from September 2014 the description of degree of protection IP 69K has changed to IP 69, all test basics remain the same according to DIN EN 60529 (VDE 0470-1 : 2014-09) - Degrees of protection provided by enclosures (IP Code).

**FOR EXAMPLE:** Identification letters IP **65**

**Second code number:** Protection against liquids.

**First code number:** Protection against contact with and penetration of foreign bodies.

# Table 23-1: substitution PG/metric

At the turn of the Millennium, the old, familiar PG thread was replaced by the metric thread. On 31 December 1999, the DIN 46320 standard for PG thread connections was withdrawn.

It was replaced by the European Standard IEC 62444 for metric threads – means that with the year 2000, only cable glands with metric connection threads have to be used.

The changeover affects not only cable glands, but also all housing systems and appliances into which cables must be inserted.

Sizes PG 7 to PG 48 were replaced by metric sizes M 12 to M 63.
Additional sizes have been adopted into the European Standard, covering a range M 6 to M 110.

The ZVEI (Zentralverband Elektrotechnik und Elektroindustrie e. V. –
the German Federation of Electrotechnical and Electrical Industries) draws attention to the fact that the European safety standard IEC 62444 must be applied as from March 2001 at the latest; furthermore, the present test standard VDE 0619 for glands with PG thread will be withdrawn in March 2001.

IEC 62444 is a safety standard, and no longer a construction standard with the function of defining dimensions, like DIN 46319 or DIN 46320. This means that the functions required by a cable gland can be realised without restrictions applied by prescribed forms, such as:

- strain relief
- degree of protection
- impact strength
- temperature range.

With our cable glands SKINTOP® and SKINDICHT®, we have transposed the requirements of IEC 62444. Our metric SKINTOP® glands combine all the features of the proven SKINTOP® series: easy, fast, permanent installation, optimal strain relief, protection against vibration, variable clamping range and sealing according to Protection Class IP 68.

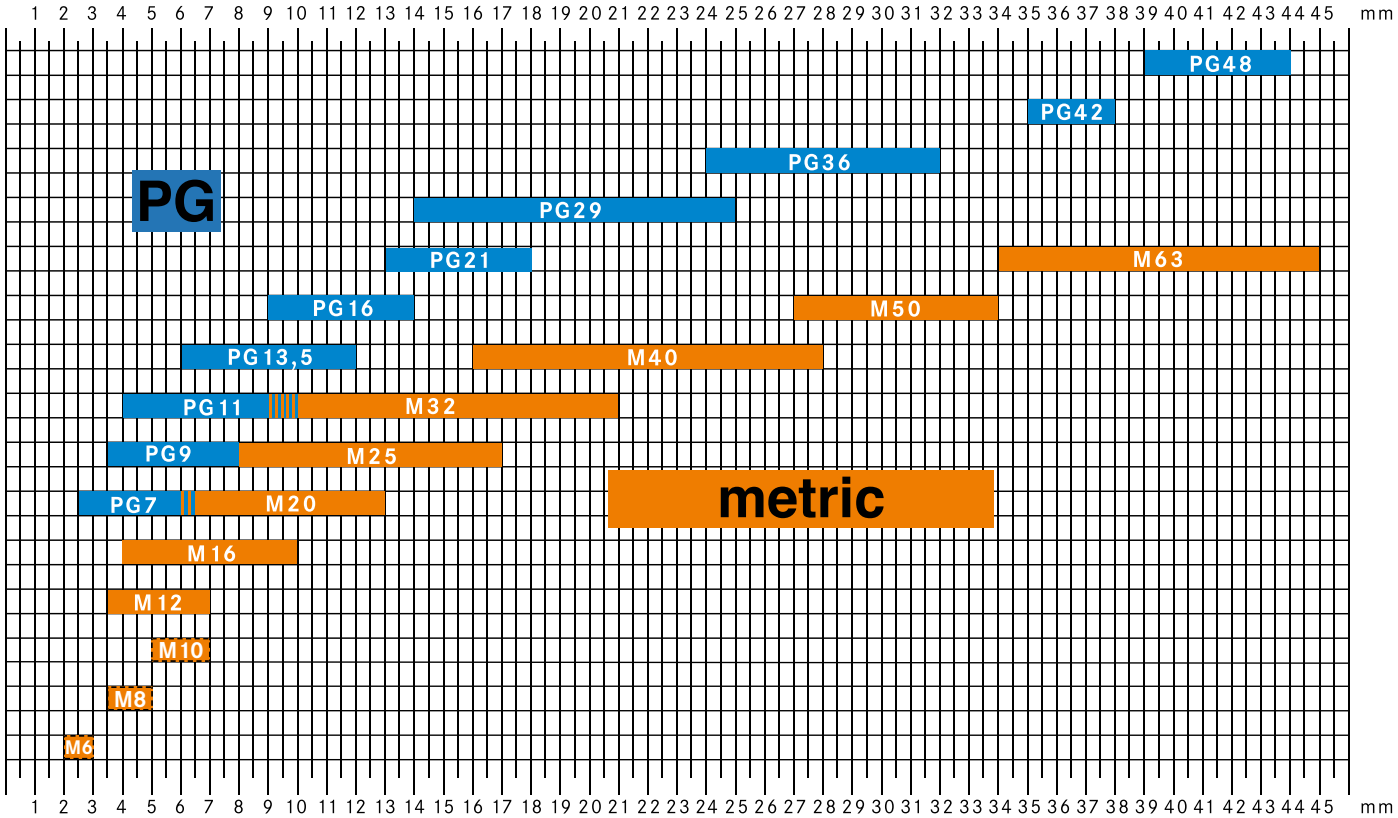
Naturally, we can also supply you with the corresponding supplementary components, such as:

- SKINTOP® GMP-GL-M counter nuts
- SKINDICHT® SM-M counter nuts
- SKINTOP® SD-M dust seal
- SKINTOP® DV-M sealing plugs
- plugs made of metal or plastic material;
- O-rings
- adapters

and many more.

## Table of clamping ranges PG/metric

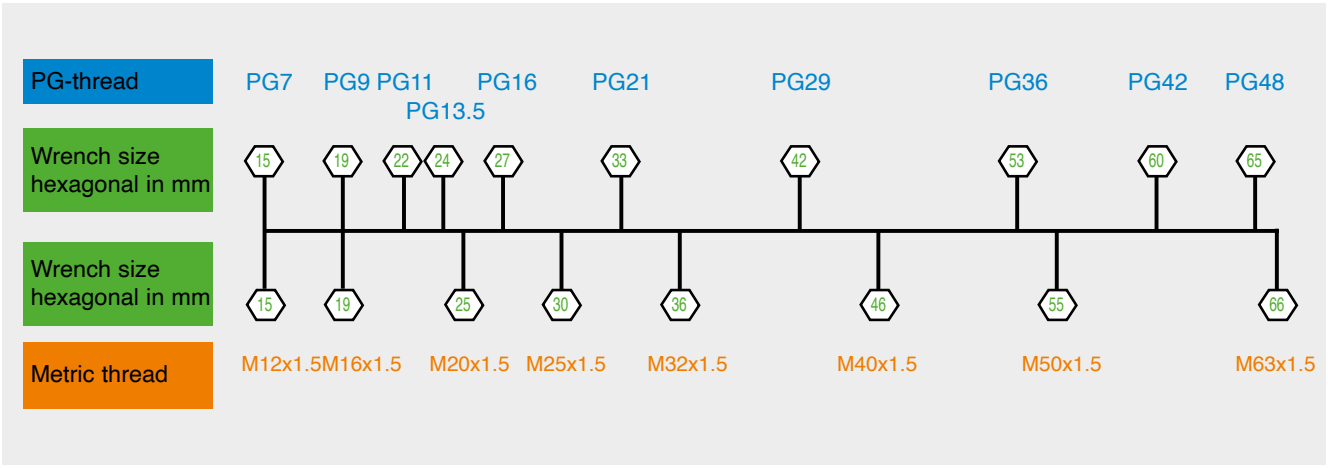
**SKINTOP® ST** and **SKINTOP® ST-M** and **SKINDICHT® MINI**



## Table 23-1: substitution PG/metric

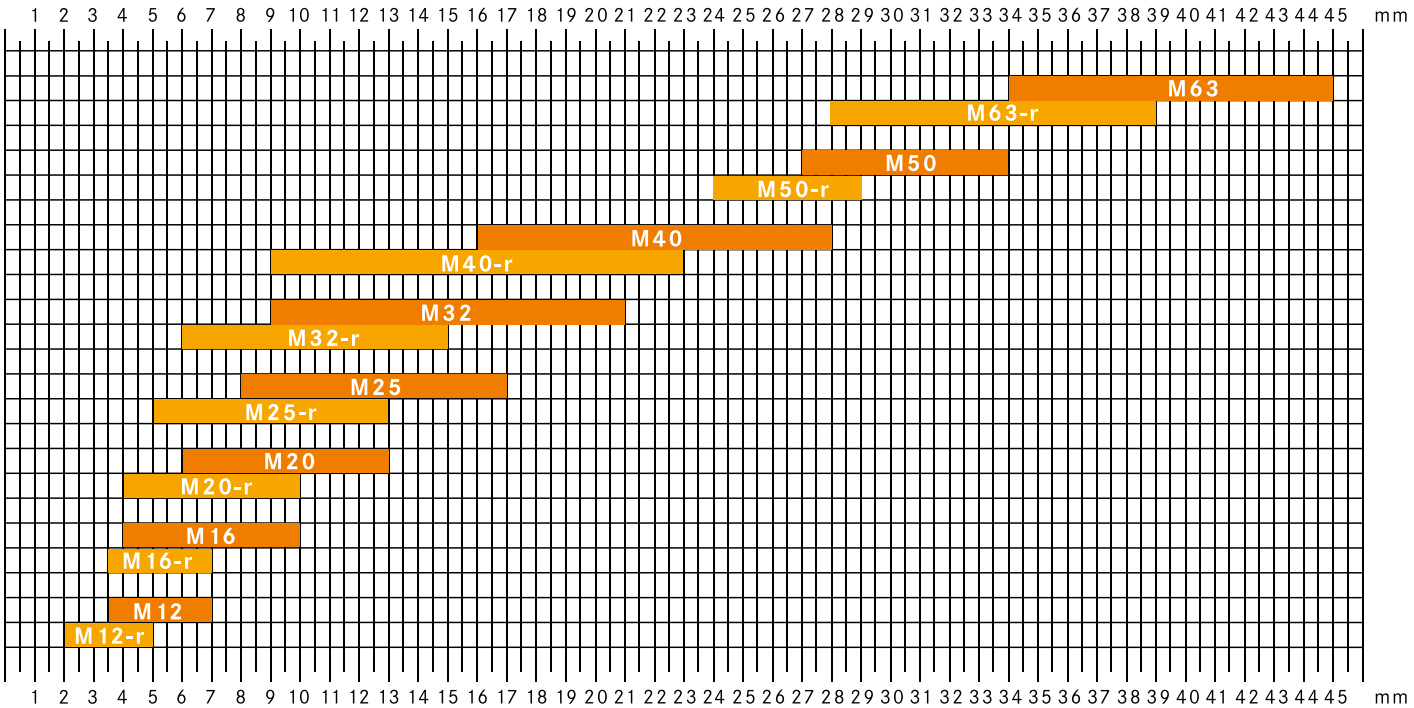
### Comparison and classification of cable glands spanner size PG/metric

**SKINTOP® ST** and **SKINTOP® ST-M**




### Clamping ranges SKINTOP® metric

**SKINTOP® ST M** and **SKINTOP® STR-M**



# Table 23-2: EMC Optimized screening for use of cable glands

## Optimized screening

In industrial environments, motors, controls and automatic welding machines can seriously impair electromagnetic compatibility (EMC). Particular problems are caused in industrial installations by long cable runs for power supply or data transmission between individual components; appropriate preventive measures are therefore essential.

Due to the antenna radiation effect of such cables, radio interference can be picked up and the useful signal (for example, temperature sensor or shaft encoder) blanketed. Result: functional disturbances of the connected equipment – from undetected false readings to the breakdown of an entire production line. Conversely, cables can function as transmitters causing radio interference. Installation of electronic components in an earthed switch cabinet and the simultaneous use of screened cables has proved to be an effective countermeasure. In practice, however, the location of the cable duct frequently constitutes a weak point in the switch cabinet. Insufficient contact between the cable screening and the metal housing often destroys the desired screening effect.

It is here that the SKINTOP® and SKINDICHT® cable glands from LAPP prove their worth. The newly developed SKINTOP® MS-SC-M and SKINTOP® MS-M BRUSH in particular are distinguished by their excellent EMC characteristics in addition to ease of handling. It enables the use of various different cable designs within a large diameter range.

## Screening concepts

With the interference phenomena typically found in the industrial environment, we must distinguish principally between cable-linked and field-linked interference. Field-linked interference emissions which, for example, are radiated directly from a circuit board or, conversely, exercise an effect upon it, can be effectively checked by installing electrical or electronic assemblies in closed metal housings such as switch cabinets. If the housing does not have any particularly large apertures, a Faraday shield is produced which affords efficient protection against electro-magnetic interferences. In practice, this type of screening is generally extremely expensive and is hardly practicable in the case of moving machine components. An alternative solution is provided by cables with screening braid. In this case, the quality of the screen effect depends to a great extent on the texture and thickness of the braiding. In addition, optimum attachment of the the cable screening to the housing must be ensured by suitable mechanical elements in order to prevent penetration of the interference conducted on the cable screening. Of decisive importance is the derivation resistance, i.e. the resistance which a guide wave “sees” upon the cable screening when it meets the point of intersection cable/housing.

## Practical requirements

Thus, in terms of EMC, we have a series of practical requirements for optimum contact:

- The connection between the cable screening and the housing potential must be of low impedance. To ensure this, the contact surfaces must be as large as possible. Under ideal conditions the cable screening, together with the housing wall, constitute a closed connection and form a continuation of the housing, without permitting any openings to be formed.
- The connection must be of low induction. This means that the cable screening must be led to the housing wall via the shortest possible path and with the widest possible cross-section. Preferably a type of contact should be chosen which completely surrounds the internal conductor. The procedure frequently practised, namely first leading the cable into the housing and placing the screening somewhere inside the housing, whereby the screen braiding is often extended by means of a thin cable strand, makes effective screening almost impossible.
- For practical application, simplicity of handling and installation are desirable. An electrician must be able to carry out installation without difficulty.

## SKINTOP® and SKINDICHT®

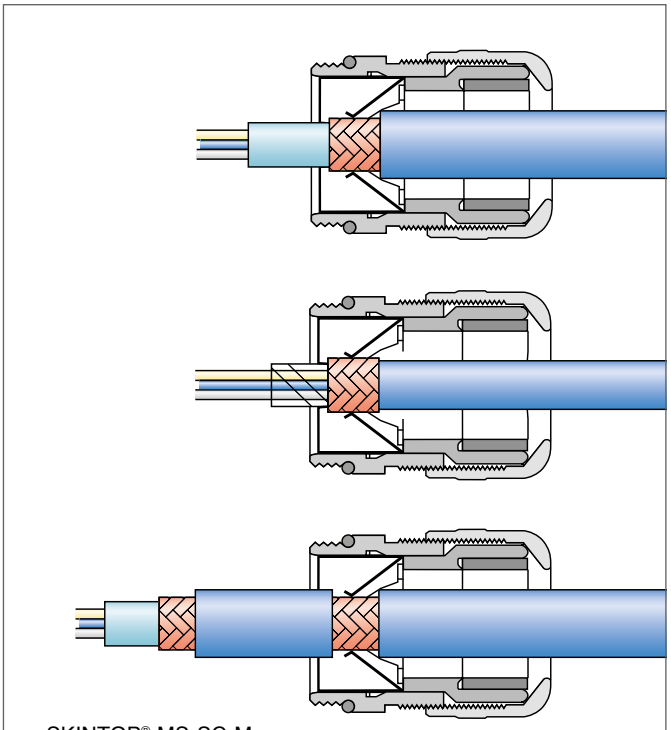
The cable glands SKINTOP® and SKINDICHT® guarantee, in addition to perfect mechanical contact, the necessary low impedance and low induction connection. These glands, which are simple to install, are available in different versions and sizes. With SKINDICHT® SHVE-M, the cable screen is pressed between an earthing sleeve and a conical seal, thus permitting 360° contact over a wide area. In the case of SKINTOP® MS-SC-M, the contact is produced by means of cylindrically arranged contact springs, the SKINTOP® MS-M BRUSH offers a 360° contact with a EMC BRUSH. Only the cable sheathing in the area of the contact springs must be removed, and it is not necessary to open the screen braiding.

For the sake of clarity, this article focuses upon the cable gland SKINTOP® MS-SC-M. In a number of tests, excellent screening properties were demonstrated. Since the appropriate standard for cable glands does not define a particular set-up of test equipment, two possible measuring procedures and their evaluation are described below:

## Derivation impedance, derivation attenuation

As a characteristic quantity for evaluating the quality of a cable connection to the wall of the housing (reference potential), the derivation resistance RA is documented via the frequency. This provides information as to what extent charges on the cable screening can be derived against the potential of the housing. To determine the screen attenuation factor of a cable, the derivation attenuation is calculated: the potential at the derivation resistance is related to the maximum available potential in a 50 W reference system. The derivation attenuation is obtained as follows:

aA (in dB) = 20 log (2RA/(2RA + 50 W)).



SKINTOP® MS-SC-M

# Table 23-2: EMC Optimized screening for use of cable glands

| | Triaxial Method | Measurement of the derivation impedance |
|---|---|---|
| Application | Pairs of connectors and screened cables | Cable glands |
| Measurement | Screen attenuation mass from which the interaction impedance is calculated | Derivation impedance is determined directly |
| Reference to later application | Description of the screening efficiency: how effectively is the re-radiation of irradiation suppressed by field-linked interferences. | Description of how effectively interferences on the screening can be derived to an earthing mass (e.g. wall of switch cabinet) |

## Triaxial Method

In the Triaxial Method, measurement is carried out in accordance with the German Defence Equipment Standard VG 95373 Pt 40 or 41.

These set-ups, using a coaxial structure in a graduated tube (hence the term triaxial), are designed for a male/female socket pair, or employ a piece of cable of defined length for the purpose of qualifying a cable. The values of the screen attenuation mass aS and the coupling impedance ZK are determined for evaluation of the screening effect of the connectors depending upon their material characteristrics and their construction, according to the formula:

aS = 20 log (50 W/ZK).

A precondition for measurement according to these standards is a solid sheathing of the supply cable used (generally by means of a tube). However, this results in screen attenuation values of almost 100 dB; for practical applications on a switch cabinet wall, depending upon the conditions, these can be achieved only with difficulty or not at all.

## Comparison of both methods

In order to provide by means of the measured values a description of practical use of the a/m products, the measurement procedure of the derivation impedance and conversion into screen attenuation have been used.

## Measurement Results

Measurements were made in example upon glands of type SKINTOP® MS-SC-M in various sizes with screened cables ÖLFLEX® CLASSIC CY in diameters of 6–22 mm, by both methods, in order to test and compare the validity of the results for cable glands obtained by each method.

Measuring the derivation impedance: in order to determine the derivation impedance, the cable glands were in each case connected to a piece of cable of approx. 10 cm length. At frequencies up to 10 MHz, all glands reveal a derivation impedance of <1W. This results in attenuation values of 30–50 dB (assuming a 50 W reference system). The amplitudes of high-frequency spurious components which are located in this freqency range are thus reduced at least by the factor 30, maximum by the factor 300. Only at frequencies above 3–4 MHz does the achievable attenuation sink to values <40 db (factor 100). At higher frequencies (100 MHz), derivation impedance values in the range of 5–10 W are obtained. The measurement values confirm the assumed favourable EMC characteristics. Even up to high frequencies, low derivation impedance – or high derivation attenuation values can be obtained. Thus together with effective cable screening, optimum protection against cable-conducted interference signals can be achieved.

## Triaxial measurement

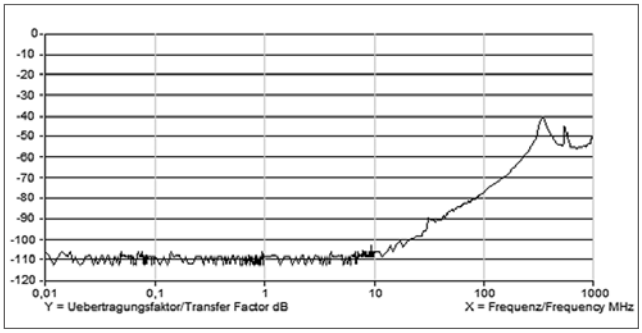
Measurements were performed as described above, in accordance with the German Defence Equipment Standard VG 95373, Procedure KS 01 B. The DC resistance of the glands equals 1 mW; this produces screening attenuation values which, depending upon the size and type of the gland, can amount to >100 dB.

## Comparison of results

The results reveal a clear difference between derivation attenuation and the screening attenuation in a system with identical components cable/gland. The curve for derivation attenuation is shifted upwards by approx. 40 dB almost parallel to the screening attenuation curve, i. e. shifted to lower attenuation values. Nevertheless, these values are more meaningful with regard to cable-conducted interference, because in reality, attenuation values of between 80 and 100 dB can hardly be achieved.

## Conclusion

The different measurement methods give different values for the attenuation rate and, with these values, different characteristics are expressed. On the one hand, the value “screening attenuation” expresses how effectively the re-radiation or the irradiation is suppressed by field-linked interferences (Triaxial Method); the value “derivation attenuation”, on the other hand, expresses how effectively interferences on the screening can be derived to an earthing mass (measurement of derivation impedance). This means that attenuation values cannot be simply compared without reservation. It can however be assumed that values for “derivation attenuation” are more meaningful for glands, because the results of the Triaxial Method (screen attenuation) are dependent on the screening of the supply cable used.




Source: Authors Dr.-Ing. U. Bochtler, Dipl.-Ing. M. Jacobsen, Botronic – Bochtler Electronic GmbH, Stuttgart

# Chemical resistance of plastics

| Reagent | Concentration | at +°C % | Polyamide PA 6 | Polyamide PA 6.6 | Polyamide PA 12 | Thermoplastic polyurethane PU | Polypropylene PP | Polyethylene HD-PE | Polyethylene LD-PE | Polystyrene PS | Nitrile butadiene rubber NBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Exhaust gases containing carbon dioxide | all | 60 | | | | | | ⛒ | ⛒ | | |
| Exhaust gases, containing $SO_2$ | low | 60 | | | | | | ⛒ | ⛒ | | |
| Acetaldehyde | 40 % | 20 | ✖ | ✖ | ⛒ | | ⛒ | | | | 20 °C ⛒ |
| Acetone | 100 % | 20 | ⛒ | ⛒ | ⛒ | ✖ | ⛒ | ✖ | ✖ | | ✖ |
| Acrylic acid | 100 % | > 30 | ✖ | ✖ | ✖ | | | | | | ✖ |
| Alums, aqueous | diluted | 40 | | | | | ⛒ | ⛒ | ⛒ | ⛒ | 20 °C ⛒ |
| Allyl alcohol | 96 % | 20 | ✖ | ✖ | ⛒ | ⛒ | ⛒ | ⛒ | 20 % ⛒ | | |
| Aluminium chloride, aqueous | diluted | 40 | | | | | ⛒ | ⛒ | ⛒ | ⛒ | 20 °C ⛒ |
| Aluminium sulphate, aqueous | diluted | 40 | | | | | ⛒ | ⛒ | ⛒ | ⛒ | 20 °C ⛒ |
| Formic acid, aqueous | 10 % | 20 | ✖ | ✖ | ⛒ | | ⛒ | ⛒ | | ⛒ | |
| Ammonia, aqueous | saturated | 20 | 20 % ⛒ | 20 % ⛒ | 20 % ⛒ | | ⛒ | ⛒ | ⛒ | 25 % ⛒ | |
| Ammonium chloride, aqueous | saturated | 60 | | | | 3 % ✖ | ⛒ | ⛒ | ⛒ | | 20 °C ⛒ |
| Ammonium nitrate, aqueous | diluted | 40 | | | | | ⛒ | ⛒ | ⛒ | ⛒ | 20 °C ⛒ |
| Ammonium sulphate, aqueous | diluted | 40 | | | | | ⛒ | ⛒ | ⛒ | | ✖ |
| Aniline, pure | 100 % | 20 | ✖ | ✖ | ✖ | | ⛒ | ⛒ | ⛒ | ✖ | |
| Aniline hydrochloride, aqueous | saturated | | | | | | ⛒ | ✖ | ✖ | | |
| Benzaldehyde, aqueous | saturated | 20 | pure ✖ | pure ✖ | pure ✖ | | ⛒ | | | ✖ | ✖ |
| Benzine | 100 % | 20 | ⛒ | ⛒ | ⛒ | | ✖ | ⛒ | ✖ | ✖ | ⛒ |
| Benzoic acid, aqueous | all | 40 | 20 % ✖ | 20 % ✖ | | | ⛒ | ⛒ | ⛒ | ⛒ | ✖ |
| Benzole | 100 % | 20 | ⛒ | ⛒ | ⛒ | | ✖ | ✖ | ✖ | ✖ | ✖ |
| Bleaching liquor | 12.5 Cl | 20 | ✖ | ✖ | ✖ | 3 % ✖ | ⛒ | ⛒ | ⛒ | ⛒ | ✖ |
| Drilling oil | all | 20 | ✖ | ✖ | ✖ | | ✖ | ✖ | ✖ | ✖ | ✖ |
| Chrome alum, aqueous | diluted | 40 | | | | | ⛒ | ⛒ | ⛒ | | 20 °C ⛒ |
| Cyclohexanol | – | 20 | ⛒ | ⛒ | ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | ⛒ |
| Diesel fuel | | 85 | ⛒ | ⛒ | ⛒ | 20 °C ⛒ | 20 °C ⛒ | 20 °C ⛒ | 20 °C ⛒ | | |
| Ferric chloride, aqueous, neutral | 10 % | 20 | ⛒ | ⛒ | ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | ⛒ |
| Glacial acetic acid | 100 % | 20 | | | | | ⛒ | ⛒ | ⛒ | | ✖ |
| Acetic acid | 10 % | 20 | ✖ | ✖ | ⛒ | 3 % ✖ | ⛒ | ⛒ | ⛒ | ✖ | |
| Ethyl alcohol, aqueous | 10 % | 20 | 40 vol % ⛒ | 40 vol % ⛒ | 40 vol % ⛒ | | | ⛒ | | ⛒ | |
| Ethylene chloride | 100 % | 20 | | | | | ✖ | ✖ | ✖ | | ✖ |
| Ethylene oxide | 100 % | 20 | | | | | ✖ | | | | |
| Ethyl ether | 100 % | 20 | | | | | ✖ | | | | ✖ |
| Potassium ferrocyanide, aqueous | saturated | 60 | | | | | ⛒ | ⛒ | ⛒ | | |
| Fluorine | 50 % | 40 | pure ✖ | pure ✖ | pure ✖ | ✖ | ✖ | ✖ | | | |
| Formaldehyde, aqueous | diluted | 40 | pure ⛒ | pure ⛒ | pure ✖ | | 40 % ⛒ | 40 % ⛒ | 40 % ⛒ | 30 % ⛒ | 20 °C ✖ |
| Glucose, aqueous | all | 50 | | | | | ⛒ | ⛒ | ⛒ | | |
| Urea, aqueous | to 10 % | 40 | 20 % ⛒ | 20 % ⛒ | 20 % ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | |
| Flame-retardant hydraulic fluid | | 80 | ⛒ | ⛒ | ⛒ | | | | | | |
| Hydraulic oils H and HL (DIN 51524) | | 100 | ⛒ | ⛒ | ⛒ | | | | | | |
| Hydroxylamine sulphate, aqueous | to 12 % | 30 | | | | | ⛒ | | | | |
| Caustic potash, aqueous | 50 % | 20 | ⛒ | ⛒ | ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | |
| Potassium bromide, aqueous | all | 20 | 10 % ⛒ | 10 % ⛒ | 10 % ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | |
| Potassium chloride, aqueous | 10 % | 20 | ⛒ | ⛒ | ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | ⛒ |
| Potassium dichromate, aqueous | 40 % | 20 | 5 % ✖ | 5 % ✖ | 5 % ✖ | | ⛒ | ⛒ | ⛒ | | ⛒ |
| Potassium nitrate, aqueous | all | 20 | 10 % ⛒ | 10 % ⛒ | 10 % ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | ⛒ |
| Potassium permanganate, aqueous | saturated | 20 | | | | | ⛒ | | | ⛒ | |
| Hydrosilicofluoric acid, aqueous | to 30% | 20 | ✖ | ✖ | | | ⛒ | ⛒ | ⛒ | | |

⛒ Highly resistant ✖ Limited resistance ✖ Not resistant

The information is given to the best of our knowledge and experience, however, it must be regarded as being for guidance purposes only. In many cases, a final judgement can only be made by performing tests under actual working conditions.

# Chemical resistance of plastics

| Reagent | Concentration | at +°C % | Polyamide PA 6 | Polyamide PA 6.6 | Polyamide PA 12 | Thermoplastic polyurethane PU | Polypropylene PP | Polyethylene HD-PE | Polyethylene LD-PE | Polystyrene PS | Nitrile butadiene rubber NBR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbon dioxide, dry | 100 % | 60 | | | | | ⛒ | ⛒ | ⛒ | 50 °C ⛒ | 20 °C ⛒ |
| Carbonic acid | 100 % | 60 | ⛒ | ⛒ | ⛒ | | | | | | 20 °C ⛒ |
| Cresylic acid, aqueous | to 90 % | 20 | pure ✖ | pure ✖ | | | ⛒ | ⛒ | ✖ | ✖ | ✖ |
| Coolant DIN 53521 | | 120 | ✖ | ✖ | | | | | | | |
| Copper chloride, aqueous | saturated | 20 | | | | | ⛒ | ⛒ | ⛒ | | ⛒ |
| Copper sulphate, aqueous | saturated | 60 | | | | | ⛒ | ⛒ | ⛒ | | 20 °C ⛒ |
| Magnesium carbonate, aqueous | saturated | 100 | | | | | ⛒ | | | 50 °C ⛒ | |
| Magnesium chloride, aqueous | saturated | 20 | 10 % ⛒ | 10 % ⛒ | 10 % ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | ⛒ |
| Methyl alcohol | 100 % | 20 | ⛒ | ⛒ | ⛒ | | 40 °C ⛒ | ⛒ | ⛒ | ⛒ | ⛒ |
| Methylene chloride | 100 % | 20 | ✖ | ✖ | ✖ | | ✖ | ✖ | ✖ | | |
| Lactic acid, aqueous | to 90 % | 20 | 10 % ⛒ | 10 % ⛒ | 10 % ⛒ | 3 % ✖ | ⛒ | ⛒ | ⛒ | 80 % ⛒ | ⛒ |
| Mineral oil | | | ⛒ | ⛒ | ⛒ | | 20 °C ⛒ | 20 °C ⛒ | 20 °C ⛒ | | |
| Sodium chlorate, aqueous | saturated | 20 | 10 % ✖ | 10 % ✖ | 10 % ✖ | | ⛒ | ⛒ | ⛒ | | |
| Sodium hydroxide, aqueous | 10 % | 20 | ⛒ | ⛒ | ⛒ | 3 % ✖ | ⛒ | ⛒ | ⛒ | ⛒ | |
| Nickel chloride, aqueous | saturated | 20 | 10 % ✖ | 10 % ✖ | 10 % ✖ | | ⛒ | | | ⛒ | ⛒ |
| Nickel sulphate, aqueous | saturated | 20 | 10 % ✖ | 10 % ✖ | 10 % ✖ | | ⛒ | ⛒ | ⛒ | | ⛒ |
| Nitroglycerin | diluted | 20 | | | | | | ✖ | ✖ | | |
| Oil and grease | | 20 | ⛒ | ⛒ | ⛒ | | ✖ | | | | |
| Oleic acid | – | 20 | ⛒ | ⛒ | ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | ✖ |
| Oxalic acid | all | 20 | 10 % ✖ | 10 % ✖ | 10 % ✖ | 3 % ✖ | ⛒ | ⛒ | ⛒ | ⛒ | ✖ |
| Ozone | pure | | ✖ | ✖ | ✖ | | ✖ | ✖ | ✖ | | |
| Petroleum | 100 % | 80 | ⛒ | ⛒ | ⛒ | | 20 °C ⛒ | 20 °C ⛒ | 20 °C ✖ | ✖ | |
| Phosgene, gaseous | 100 % | 20 | | | | | ✖ | ✖ | ✖ | | |
| Phosphoric acid, aqueous | diluted | 20 | 10 % ✖ | 10 % ✖ | 10 % ✖ | 3 % ✖ | ⛒ | ⛒ | ⛒ | 86 % ⛒ | ✖ |
| Phosphorus pentoxide | 100 % | 20 | | | | | ⛒ | | | | |
| Mercury | pure | 20 | ⛒ | ⛒ | ⛒ | | ⛒ | ⛒ | ⛒ | ⛒ | ⛒ |
| Nitric acid, aqueous | 50 % | 20 | ✖ | ✖ | ✖ | 3 % ✖ | ✖ | ✖ | ✖ | 30 % ⛒ | ✖ |
| Hydrochloric acid, aqueous | 30 % | 20 | 20 % ✖ | 20 % ✖ | 20 % ✖ | 3 % ✖ | ⛒ | ⛒ | ⛒ | 15 % ⛒ | ✖ |
| Lubricating grease, ester oil base | | 110 | ✖ | ✖ | | | | | | | |
| Polyphenyl ester base | | 110 | ⛒ | ⛒ | ⛒ | | | | | | |
| Lubricating grease, silicone oil base | | 110 | ⛒ | ⛒ | ⛒ | | | | | | |
| Carbon disulphide | 100 % | 20 | ⛒ | ⛒ | ⛒ | | ⛒ | ✖ | ✖ | ✖ | ✖ |
| Sodium sulfide, aqueous | diluted | 40 | | | | | ⛒ | ⛒ | ⛒ | | |
| Sulphuric acid, aqueous | 10 % | 20 | ✖ | ✖ | ✖ | 3 % ✖ | 50 % ⛒ | 50 % ⛒ | 50 % ⛒ | ⛒ | ✖ |
| Sea water | | 40 | ⛒ | ⛒ | ⛒ | 20 °C ⛒ | ⛒ | ⛒ | ⛒ | ⛒ | 20 °C ⛒ |
| Soap solution, aqueous | all | 20 | diluted ⛒ | diluted ⛒ | diluted ⛒ | ⛒ | ⛒ | ⛒ | | ⛒ | |
| Carbon tetrachloride | 100 % | 20 | ⛒ | ⛒ | ⛒ | | ✖ | ✖ | ✖ | ✖ | |
| Toluene | 100 % | 20 | ⛒ | ⛒ | ⛒ | ✖ | | ✖ | ✖ | ✖ | ✖ |
| Trichloroethylene | 100 % | 20 | ✖ | ✖ | ✖ | | ✖ | ✖ | ✖ | | |
| Vinyl acetate | 100 % | 20 | | | | | ⛒ | | | | |
| Hydrogen | 100 % | 60 | 20 °C ⛒ | 20 °C ⛒ | 20 °C ⛒ | | ⛒ | ⛒ | ⛒ | | 20 °C ⛒ |
| Xylene | 100 % | 20 | ⛒ | ⛒ | ⛒ | | ✖ | ✖ | ✖ | ✖ | ✖ |
| Zinc chloride, aqueous | diluted | 60 | 10 % ✖ | 10 % ✖ | | | ⛒ | ⛒ | ⛒ | 50 °C ⛒ | 20 °C ⛒ |
| Zinc sulphate, aqueous | diluted | 60 | | | | | ⛒ | ⛒ | ⛒ | | 20 °C ⛒ |
| Zinc chloride, aqueous | diluted | 40 | | | | | ⛒ | ⛒ | ⛒ | ✖ | 20 °C ⛒ |
| Citric acid | to 10 % | 40 | 20 °C ⛒ | 20 °C ⛒ | 20 °C ⛒ | 3 % ✖ | ⛒ | ⛒ | ⛒ | ⛒ | 20 °C ⛒ |

⛒ Highly resistant ✖ Limited resistance ✖ Not resistant

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