

# General Purpose AC/DC EMI Filter with High Attenuation Performance



- Rated currents from 1 to 30 A
- High performance filter attenuation
- High differential-mode attenuation
- Optional medical versions (B type)
- Optional safety versions (A type)
- Optional enhanced performance versions
- Optional overvoltage protection (Z type)



## Performance indicators

Attenuation performance



Rated current [A]



## Approvals



## Features and benefits

- FN 2030 filters are designed for easy and fast chassis mounting
- The FN 2030 filters are also available as B versions with no Y-capacitors for medical applications as well as A versions with low capacitance for safety critical applications with a requirement for low leakage currents
- FN 2030 filters offer an optimized filter range for high performance AC and DC applications, in same compact size (M, N1 types)
- All filters provide an exceptional conducted attenuation performance, based on chokes with high permeable core material and excellent thermal behavior
- The higher inductivity versus amperage offers increased attenuation performance with same form factor compared to FN 2010 and FN 2020 filter series
- All FN 2030 filters can be delivered with optional surge pulse protection (Z type).
- Various terminal options allow you to select the desired connection style

## Technical specifications

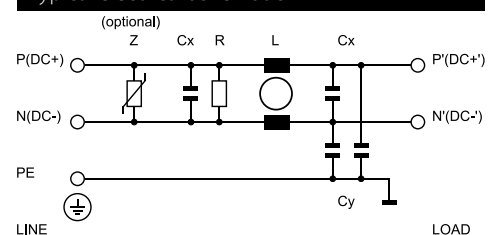
|                                                  |                                                                                                                                                                   |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rated voltage*</b>                            | 250 VAC, 50/60 Hz; 250 VDC                                                                                                                                        |
| <b>Operating frequency</b>                       | DC to 400 Hz                                                                                                                                                      |
| <b>Rated currents</b>                            | 1 to 30 A @ 40°C max.                                                                                                                                             |
| <b>High potential test voltage</b>               | P → PE 2000 VAC for 2 sec (equiv. cap <88 nF)<br>P → PE 2550 VDC for 2 sec (equiv. cap >88 nF)<br>P → PE 2500 VAC for 2 sec (B types)<br>P → N 1100 VDC for 2 sec |
| <b>Temperature range (operation and storage)</b> | -25°C to +100°C (25/100/21)                                                                                                                                       |
| <b>Certified to</b>                              | UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)                                                                                    |
| <b>Flammability corresponding to</b>             | UL 94 V-2 or better                                                                                                                                               |
| <b>Surge pulse protection (Z type)</b>           | Helps compliance to IEC61000-4-5 (Differential Mode only)                                                                                                         |
| <b>MTBF @ 40°C/230 V (Mil-HB-217F)</b>           | 2,200,000 hours (1 to 10 A types)<br>1,200,000 hours (12 to 30 A types)                                                                                           |

\*maximum RMS operating voltage at rated frequency or the maximum DC operating voltage

## Typical application

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Medical equipment
- Electronic data processing equipment
- Office automation and datacom equipment
- Various noisy applications requiring high filter performance

## Typical electrical schematic



## Filter selection table

| Filter*                     | Rated current<br>@ 40°C (25°C) | Leakage current**<br>@ 250 VAC/50 Hz<br>(@ 120 VAC/60 Hz) | Inductance<br>L | Capacitance |      | Resistance<br>R | Input/Output<br>connections                                                         |                                                                                     |                                                                                     | Weight<br>[g] |
|-----------------------------|--------------------------------|-----------------------------------------------------------|-----------------|-------------|------|-----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------|
|                             |                                |                                                           |                 | Cx          | Cy   |                 |                                                                                     |                                                                                     |                                                                                     |               |
|                             | [A]                            | [mA]                                                      | [mH]            | [µF]        | [nF] | [kΩ]            |  |  |  |               |
| FN 2030-1-..                | 1 (1.1)                        | 0.31 (0.18)                                               | 20              | 0.22        | 2.2  | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 58            |
| FN 2030-3-..                | 3 (3.4)                        | 0.47 (0.27)                                               | 14              | 0.33        | 3.3  | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 87            |
| FN 2030-4-..                | 4 (4.5)                        | 0.47 (0.27)                                               | 14              | 0.33        | 3.3  | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 92            |
| FN 2030-6-..                | 6 (6.7)                        | 0.66 (0.38)                                               | 8               | 0.47        | 4.7  | 680             | -06                                                                                 | -07                                                                                 |                                                                                     | 100           |
| FN 2030-8-..                | 8 (8.9)                        | 0.66 (0.38)                                               | 8               | 0.47        | 4.7  | 680             | -06                                                                                 | -07                                                                                 |                                                                                     | 170           |
| FN 2030-10-..               | 10 (11.2)                      | 0.66 (0.38)                                               | 8               | 0.47        | 4.7  | 680             | -06                                                                                 | -07                                                                                 |                                                                                     | 196           |
| FN 2030-12-..               | 12 (13.4)                      | 0.79 (0.45)                                               | 4               | 1.0         | 10   | 330             | -06                                                                                 | -07                                                                                 |                                                                                     | 185           |
| FN 2030-16-..               | 16 (17.9)                      | 0.79 (0.45)                                               | 4               | 1.0         | 10   | 330             | -06                                                                                 | -07                                                                                 |                                                                                     | 225           |
| FN 2030-20-..               | 20 (22.4)                      | 0.79 (0.45)                                               | 4               | 1.0         | 10   | 330             | -06                                                                                 |                                                                                     | -08                                                                                 | 285           |
| FN 2030-30-08               | 30 (33.5)                      | 0.79 (0.45)                                               | 2               | 1.0         | 10   | 330             |                                                                                     |                                                                                     | -08                                                                                 | 326           |
|                             |                                |                                                           |                 |             |      |                 |                                                                                     |                                                                                     |                                                                                     |               |
| FN 2030 A-1-..              | 1 (1.1)                        | 0.07 (0.04)                                               | 20              | 0.22        | 0.47 | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 58            |
| FN 2030 A-3-..              | 3 (3.4)                        | 0.07 (0.04)                                               | 14              | 0.33        | 0.47 | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 87            |
| FN 2030 A-4-..              | 4 (4.5)                        | 0.07 (0.04)                                               | 14              | 0.33        | 0.47 | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 92            |
| FN 2030 A-6-..              | 6 (6.7)                        | 0.07 (0.04)                                               | 8               | 0.47        | 0.47 | 680             | -06                                                                                 | -07                                                                                 |                                                                                     | 100           |
| FN 2030 A-8-..              | 8 (8.9)                        | 0.07 (0.04)                                               | 8               | 0.47        | 0.47 | 680             | -06                                                                                 | -07                                                                                 |                                                                                     | 170           |
| FN 2030 A-10-..             | 10 (11.2)                      | 0.07 (0.04)                                               | 8               | 0.47        | 0.47 | 680             | -06                                                                                 | -07                                                                                 |                                                                                     | 196           |
| FN 2030 A-12-..             | 12 (13.4)                      | 0.07 (0.04)                                               | 4               | 1.0         | 0.47 | 330             | -06                                                                                 | -07                                                                                 |                                                                                     | 185           |
| FN 2030 A-16-..             | 16 (17.9)                      | 0.07 (0.04)                                               | 4               | 1.0         | 0.47 | 330             | -06                                                                                 | -07                                                                                 |                                                                                     | 225           |
| FN 2030 A-20-..             | 20 (22.4)                      | 0.07 (0.04)                                               | 4               | 1.0         | 0.47 | 330             | -06                                                                                 |                                                                                     | -08                                                                                 | 285           |
| FN 2030 A-30-08             | 30 (33.5)                      | 0.07 (0.04)                                               | 2               | 1.0         | 0.47 | 330             |                                                                                     |                                                                                     | -08                                                                                 | 326           |
|                             |                                |                                                           |                 |             |      |                 |                                                                                     |                                                                                     |                                                                                     |               |
| FN 2030 B-1-..              | 1 (1.1)                        | 0.00                                                      | 20              | 0.22        |      | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 58            |
| FN 2030 B-3-..              | 3 (3.4)                        | 0.00                                                      | 14              | 0.33        |      | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 87            |
| FN 2030 B-4-..              | 4 (4.5)                        | 0.00                                                      | 14              | 0.33        |      | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 92            |
| FN 2030 B-6-..              | 6 (6.7)                        | 0.00                                                      | 8               | 0.47        |      | 680             | -06                                                                                 | -07                                                                                 |                                                                                     | 100           |
| FN 2030 B-8-..              | 8 (8.9)                        | 0.00                                                      | 8               | 0.47        |      | 680             | -06                                                                                 | -07                                                                                 |                                                                                     | 170           |
| FN 2030 B-10-..             | 10 (11.2)                      | 0.00                                                      | 8.45            | 0.47        |      | 680             | -06                                                                                 | -07                                                                                 |                                                                                     | 196           |
| FN 2030 B-12-..             | 12 (13.4)                      | 0.00                                                      | 4               | 1.0         |      | 330             | -06                                                                                 | -07                                                                                 |                                                                                     | 185           |
| FN 2030 B-16-..             | 16 (17.9)                      | 0.00                                                      | 4               | 1.0         |      | 330             | -06                                                                                 | -07                                                                                 |                                                                                     | 225           |
| FN 2030 B-20-..             | 20 (22.4)                      | 0.00                                                      | 4               | 1.0         |      | 330             | -06                                                                                 |                                                                                     | -08                                                                                 | 285           |
| FN 2030 B-30-08             | 30 (33.5)                      | 0.00                                                      | 2               | 1.0         |      | 330             |                                                                                     |                                                                                     | -08                                                                                 | 326           |
|                             |                                |                                                           |                 |             |      |                 |                                                                                     |                                                                                     |                                                                                     |               |
| <b>Enhanced performance</b> |                                |                                                           |                 |             |      |                 |                                                                                     |                                                                                     |                                                                                     |               |
| FN 2030 N1-1-06             | 1 (1.1)                        | 5.34 (3.08)                                               | 20              | 0.22        | 68   | 1000            | -06                                                                                 |                                                                                     |                                                                                     | 65            |
| FN 2030 M-3-06              | 3 (3.4)                        | 3.69 (2.28)                                               | 14              | 0.33        | 47   | 1000            | -06                                                                                 |                                                                                     |                                                                                     | 110           |
| FN 2030 M-4-06              | 4 (4.5)                        | 3.69 (2.28)                                               | 14              | 0.33        | 47   | 1000            | -06                                                                                 |                                                                                     |                                                                                     | 110           |
| FN 2030 M-6-06              | 6 (6.7)                        | 3.69 (2.28)                                               | 8               | 0.47        | 47   | 680             | -06                                                                                 |                                                                                     |                                                                                     | 120           |
| FN 2030 N1-8-06             | 8 (8.9)                        | 5.34 (3.08)                                               | 8               | 0.47        | 68   | 3680            | -06                                                                                 |                                                                                     |                                                                                     | 200           |
| FN 2030 N1-10-06            | 10 (11.2)                      | 5.34 (3.08)                                               | 8               | 0.47        | 68   | 680             | -06                                                                                 |                                                                                     |                                                                                     | 200           |
| FN 2030 N1-12-06            | 12 (13.4)                      | 5.34 (3.08)                                               | 4               | 1.0         | 68   | 330             | -06                                                                                 |                                                                                     |                                                                                     | 210           |
| FN 2030 M-16-06             | 16 (17.9)                      | 3.69 (2.28)                                               | 4               | 1.0         | 47   | 330             | -06                                                                                 |                                                                                     |                                                                                     | 265           |
| FN 2030 M-20-..             | 20 (22.4)                      | 3.69 (2.28)                                               | 4               | 1.0         | 47   | 330             | -06                                                                                 |                                                                                     | -08                                                                                 | 326           |
| FN 2030 M-30-08             | 30 (33.5)                      | 3.69 (2.28)                                               | 2               | 1.0         | 47   | 330             |                                                                                     |                                                                                     | -08                                                                                 | 346           |

\* To compile a complete part number, please replace the -.. with the required I/O connection style. For surge pulse protection, please add Z (e.g. FN 2030Z-10-06, FN 2030BZ-20-08). The different letters code the used Cy values in the filter type (A = 0.47nF; M = 47nF; N1 = 47nF)

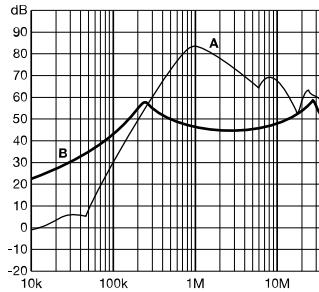
\*\* Maximum leakage under usual AC operating conditions (acc. IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level. Leakage current for DC application is 0 mA

## Typical filter attenuation

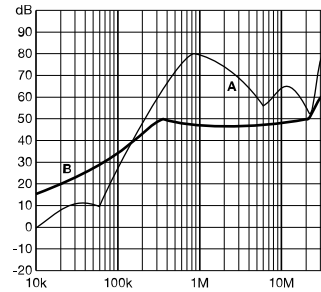
Per CISPR 17; A=50  $\Omega$ /50  $\Omega$  sym; B=50  $\Omega$ /50  $\Omega$  asym

### Standard Types

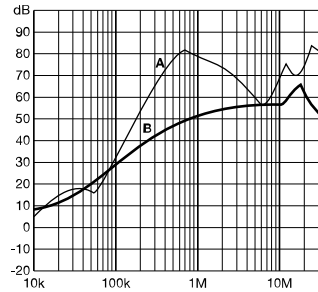
1 to 4 A types



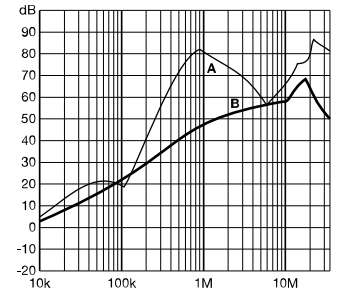
6 to 10 A types



12 to 20 A types

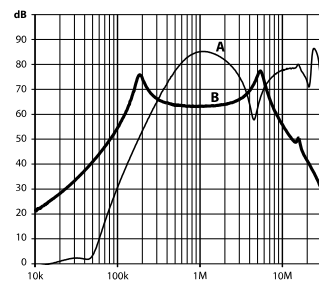


30 A types

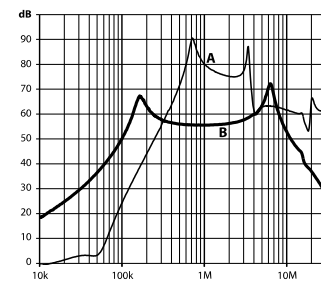


### Enhanced Performance Types

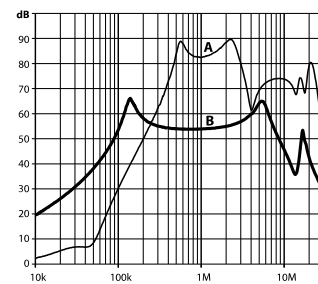
1 A types



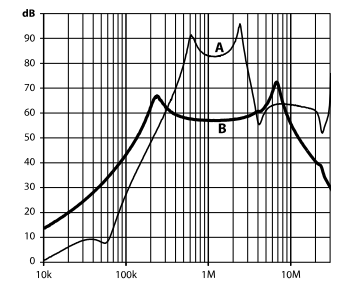
3 A types



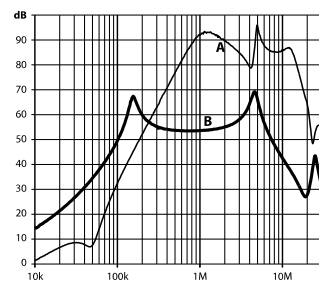
4 A types



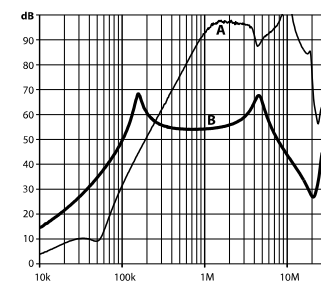
6 A types



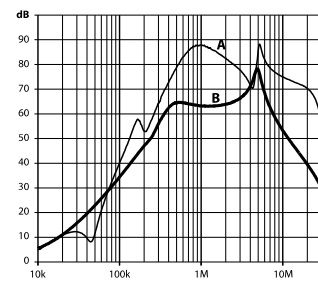
8 A types



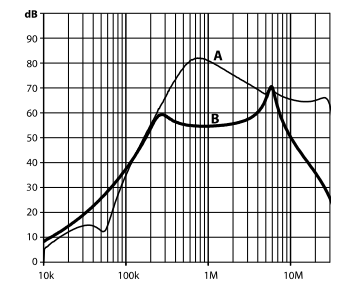
10 A types



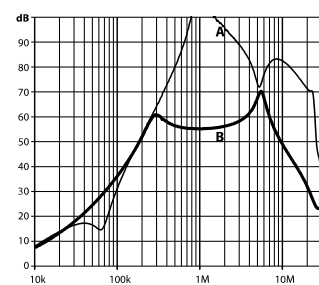
12 A types



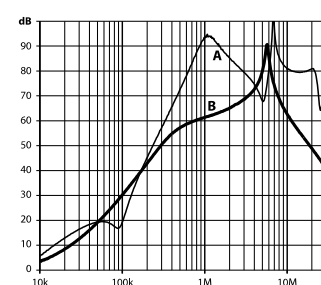
16 A types



20 A types

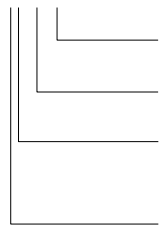


30 A types



## Product selector

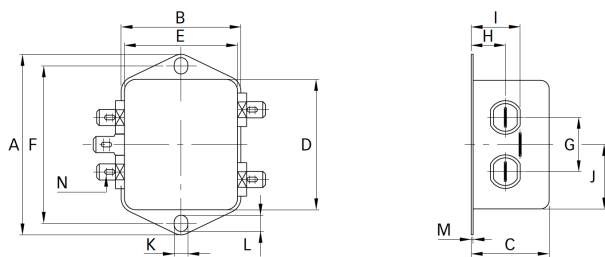
FN 2030-xy-xx-yy



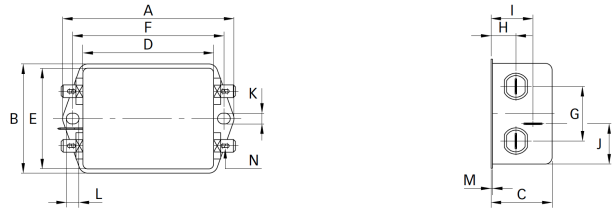
|         |                                       |
|---------|---------------------------------------|
| 06      | Faston 6.3 × 0.8 mm (spade/soldering) |
| 07      | Wire leads                            |
| 08      | Studs (M4 screws)                     |
| 1 to 60 | Rated current                         |
| Blank   | Standard version                      |
| Z       | With surge protection                 |
| Blank   | Standard version                      |
| A       | Safety version                        |
| B       | Medical version                       |
| N1/M    | High performance version              |

## Mechanical data

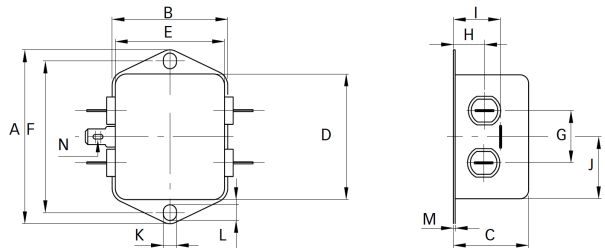
Connection style -06, 1 A types



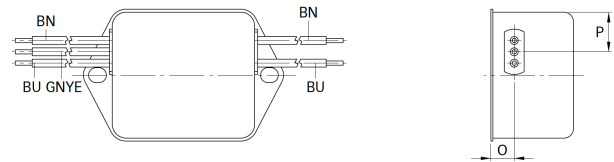
Connection style -06, 8 to 20 A types



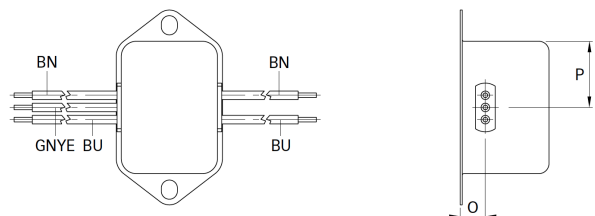
Connection style -06, 3 to 6 A types



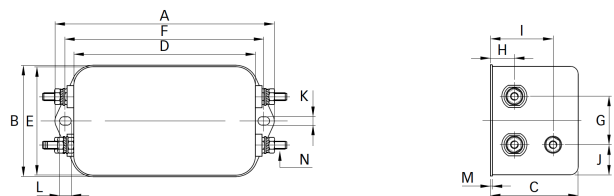
Connection style -07, 8 to 16 A types (same dimensions as style -06)



Connection style -07, 1 to 6 A types (same dimensions as style -06)



Connection style -08, 20 and 30 A types



Dimensions

|                         | 1 A       | 3 A       | 4 A       | 6 A       | 8 A       | 10 A      | 12 A      | 16 A      | 20 A      | 30 A      | Tolerances |
|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| A                       | 64        | 71        | 71        | 71        | 85        | 85        | 85        | 85        | 85        | 85        | ±0.5       |
| B                       | 35        | 46.6      | 46.6      | 46.6      | 54        | 54        | 54        | 54        | 54        | 54        | ±0.5       |
| C                       | 24.3      | 22.3      | 22.3      | 22.3      | 30.3      | 30.3      | 30.3      | 40.3      | 40.3      | 40.3      | ±0.5       |
| D                       | 43.5      | 50.5      | 50.5      | 50.5      | 64.8      | 64.8      | 64.8      | 64.8      | 64.8      | 64.8      | ±0.5       |
| E                       | 32.5      | 44.5      | 44.5      | 44.5      | 49.8      | 49.8      | 49.8      | 49.8      | 49.8      | 49.8      | ±0.5       |
| F                       | 54        | 61        | 61        | 61        | 75        | 75        | 75        | 75        | 75        | 75        | ±0.3       |
| G                       | 21        | 21        | 21        | 21        | 27        | 27        | 27        | 27        | 27        | 27        | ±0.2       |
| H                       | 9.3       | 10.8      | 10.8      | 10.8      | 12.3      | 12.3      | 12.3      | 12.3      | 12.3      | 12.3      | ±0.5       |
| I                       | 15.3      | 16.8      | 16.8      | 16.8      | 20.8      | 20.8      | 20.8      | 29.8      | 29.8      | 29.8      | ±0.5       |
| J                       | 21.8      | 25.25     | 25.25     | 25.25     | 19.9      | 19.9      | 19.9      | 11.4      | 11.4      | 11.4      | ±0.5       |
| K                       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       |            |
| L                       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       |            |
| M                       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       |            |
| Connection style -06    |           |           |           |           |           |           |           |           |           |           |            |
| N                       | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 |           |            |
| Connection style -07    |           |           |           |           |           |           |           |           |           |           |            |
| O                       | 8.3       | 8.3       | 8.3       | 8.3       | 8.3       | 8.3       | 8.3       | 8.3       |           |           | ±0.5       |
| P                       | 21.8      | 14        | 14        | 14        | 14.9      | 14.9      | 14.9      | 14.9      |           |           | ±0.5       |
| AWG type wire           | AWG 20    | AWG 20    | AWG 20    | AWG 18    | AWG 18    | AWG 18    | AWG 16    | AWG 16    |           |           |            |
| Wire length             | 140       | 140       | 140       | 140       | 140       | 140       | 140       | 140       |           |           | +5         |
| Connection style -08    |           |           |           |           |           |           |           |           |           |           |            |
| N                       |           |           |           |           |           |           |           |           | M4        | M4        |            |
| Recommended torque (Nm) |           |           |           |           |           |           |           |           | 1.2 - 1.3 | 1.2 - 1.3 |            |

All dimensions in mm; 1 inch = 25.4 mm  
Tolerances according: ISO 2768-m/EN 22768-m



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