

# MACX MCR-SL-RPSSI-I - Power/input signal conditioner



2865955

<https://www.phoenixcontact.com/us/products/2865955>

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Repeater power supply and input signal conditioner, HART-transparent. Transmits supplied or active 0/4 ... 20 mA signals to a load (active or passive). 3-way electrical isolation, SIL 2 in accordance with IEC 61508.

## Your advantages

- Power supply possible via DIN rail connector
- Up to SIL 2 in accordance with EN 61508
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- 3-way electrical isolation
- Terminal point with 250  $\Omega$  resistor to increase HART impedance for low-resistance systems
- Plug-in screw or spring-cage connection technology (Push-in technology), with integrated sockets for HART communicators
- Bidirectional transmission of digital HART communication signals
- Output: 0/4 mA ... 20 mA (active or passive)
- Input: 0/4 mA ... 20 mA (powered or not powered)

## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 2865955       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | C402          |
| Product key                          | DK1111        |
| GTIN                                 | 4046356448314 |
| Weight per piece (including packing) | 182.2 g       |
| Weight per piece (excluding packing) | 126 g         |
| Customs tariff number                | 85437090      |
| Country of origin                    | DE            |

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## Technical data

### Product properties

|                 |                       |
|-----------------|-----------------------|
| Product type    | Repeater power supply |
| Product family  | MACX Analog           |
| Application     | Analog IN             |
| No. of channels | 1                     |

### Electrical properties

|                                                 |                                                                                                                            |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Electrical isolation                            | 3-way isolation                                                                                                            |
| Electrical isolation between input and output   | yes                                                                                                                        |
| Maximum power dissipation for nominal condition | 0.65 W (20 mA, 250 $\Omega$ )                                                                                              |
| Signal transmission behavior                    | In = Out                                                                                                                   |
| Step response (10-90%)                          | < 200 $\mu$ s (for jump 4 mA ... 20 mA, load 600 $\Omega$ )<br>< 600 $\mu$ s (for jump 0 mA ... 20 mA, load 600 $\Omega$ ) |
| Maximum temperature coefficient                 | < 0.01 %/K                                                                                                                 |
| Maximum transmission error                      | < 0.1 % (of final value 20 mA)                                                                                             |
| Transmission error, typical                     | < 0.05 % (of final value 20 mA)                                                                                            |

#### Electrical isolation

|                      |                         |
|----------------------|-------------------------|
| Test voltage         | 2.5 kV AC (50 Hz, 60 s) |
| Overvoltage category | II                      |
| Pollution degree     | 2                       |

#### Electrical isolation Input/output/power supply IEC/EN 61010-1

|                          |                      |
|--------------------------|----------------------|
| Standards/regulations    | IEC/EN 61010-1       |
| Rated insulation voltage | 300 V <sub>rms</sub> |
| Insulation               | Safe isolation       |

#### Electrical isolation Input/output IEC/EN 60079-11

|                          |                      |
|--------------------------|----------------------|
| Standards/regulations    | IEC/EN 60079-11      |
| Rated insulation voltage | 265 V <sub>rms</sub> |

#### Electrical isolation Input/power supply IEC/EN 60079-11

|                          |                      |
|--------------------------|----------------------|
| Standards/regulations    | IEC/EN 60079-11      |
| Rated insulation voltage | 265 V <sub>rms</sub> |

#### Electrical isolation Output/supply IEC/EN 60079-7

|                          |                      |
|--------------------------|----------------------|
| Standards/regulations    | IEC/EN 60079-7       |
| Rated insulation voltage | 265 V <sub>rms</sub> |

### Supply

|                          |                                            |
|--------------------------|--------------------------------------------|
| Designation              | Repeater power supply operation            |
| Nominal supply voltage   | 24 V DC -20 % ... +25 %                    |
| Supply voltage range     | 19.2 V DC ... 30 V DC                      |
| Max. current consumption | < 76 mA (24 V DC / 20 mA / 1000 $\Omega$ ) |

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|                                   |                                    |
|-----------------------------------|------------------------------------|
|                                   | < 55 mA (24 V DC / 20 mA / 250 Ω)  |
| Power dissipation                 | < 1.1 W (24 V DC / 20 mA / 1000 Ω) |
|                                   | < 0.95 W (24 V DC / 20 mA / 250 Ω) |
|                                   | < 1.2 W (24 V DC / 20 mA / 0 Ω)    |
| Power consumption (Output active) | < 1.8 W (20 mA / 1000 Ω)           |
|                                   | < 1.3 W (20 mA / 250 Ω)            |

## Supply

|                          |                                     |
|--------------------------|-------------------------------------|
| Designation              | Signal conditioner operation        |
| Nominal supply voltage   | 24 V DC -20 % ... +25 %             |
| Supply voltage range     | 19.2 V DC ... 30 V DC               |
| Max. current consumption | < 44 mA (24 V DC / 20 mA / 1000 Ω)  |
|                          | < 27 mA (24 V DC / 20 mA / 250 Ω)   |
| Power dissipation        | < 0.75 W (24 V DC / 20 mA / 1000 Ω) |
|                          | < 0.65 W (24 V DC / 20 mA / 250 Ω)  |
|                          | < 0.95 W (24 V DC / 20 mA / 0 Ω)    |

## Input data

### Signal: Repeater power supply operation

|                                 |                                                              |
|---------------------------------|--------------------------------------------------------------|
| Description of the input        | Active current input                                         |
| Number of inputs                | 1                                                            |
| Input signal                    | Current                                                      |
| Current input signal            | 4 mA ... 20 mA                                               |
| Current limitation              | 25 mA                                                        |
| Transmitter supply voltage      | > 21.5 V (20 mA)                                             |
|                                 | > 20.8 V (24 mA)                                             |
| Underload/overload signal range | 0 mA ... 24 mA (Extended transmission range for diagnostics) |

### Signal: Signal conditioner operation

|                                 |                                                              |
|---------------------------------|--------------------------------------------------------------|
| Description of the input        | Passive current input                                        |
| Current input signal            | 0 mA ... 20 mA                                               |
|                                 | 4 mA ... 20 mA                                               |
| Voltage drop                    | < 3.5 V (in input isolating amplifier operation)             |
| Underload/overload signal range | 0 mA ... 24 mA (Extended transmission range for diagnostics) |

## Output data

### Signal: Repeater power supply operation

|                                 |                                                  |
|---------------------------------|--------------------------------------------------|
| Output description              | Current output (active and passive)              |
| Number of outputs               | 1                                                |
| Current output signal           | 4 mA ... 20 mA (active)                          |
|                                 | 4 mA ... 20 mA (14 ... 26 V ext. source voltage) |
| Load/output load current output | < 1000 Ω (20 mA)                                 |
|                                 | < 825 Ω (24 mA)                                  |
| Output ripple                   | < 20 mV <sub>rms</sub>                           |

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|                                          |                                                              |
|------------------------------------------|--------------------------------------------------------------|
| Output behavior in the event of an error | 0 mA (Cable break in the input)                              |
|                                          | ≥ 22.5 mA (Cable short-circuit in the input)                 |
| Underload/overload signal range          | 0 mA ... 24 mA (Extended transmission range for diagnostics) |

## Signal: Signal conditioner operation

|                                          |                                                              |
|------------------------------------------|--------------------------------------------------------------|
| Output description                       | Current output (active and passive)                          |
| Current output signal                    | 0 mA ... 20 mA (active)                                      |
|                                          | 4 mA ... 20 mA (active)                                      |
|                                          | 0 mA ... 20 mA (14 ... 26 V ext. source voltage)             |
|                                          | 4 mA ... 20 mA (14 ... 26 V ext. source voltage)             |
| Load/output load current output          | < 1000 Ω (20 mA)                                             |
|                                          | < 825 Ω (24 mA)                                              |
| Output ripple                            | < 20 mV <sub>rms</sub>                                       |
| Output behavior in the event of an error | 0 mA (Cable break in the input)                              |
|                                          | 0 mA (Cable short-circuit in the input)                      |
| Underload/overload signal range          | 0 mA ... 24 mA (Extended transmission range for diagnostics) |

## Connection data

|                                  |                                             |
|----------------------------------|---------------------------------------------|
| Connection method                | Screw connection                            |
| Stripping length                 | 7 mm                                        |
| Screw thread                     | M3                                          |
| Conductor cross-section rigid    | 0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> |
| Conductor cross-section flexible | 0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> |
| Conductor cross-section AWG      | 24 ... 14                                   |
| Tightening torque                | 0.5 Nm ... 0.6 Nm                           |

## Test socket

|               |      |
|---------------|------|
| Max. diameter | 2 mm |
|---------------|------|

## Ex data

|                       |        |
|-----------------------|--------|
| Ex installation (EPL) | Gc     |
|                       | Div. 2 |

## Interfaces

### Data communication (bypass)

|                     |                  |
|---------------------|------------------|
| HART function       | Yes              |
| Protocols supported | HART-transparent |

## Signaling

|                |                            |
|----------------|----------------------------|
| Status display | Green LED (supply voltage) |
|----------------|----------------------------|

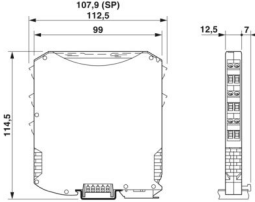
## Dimensions

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|                     |  |                                                                                    |
|---------------------|--|------------------------------------------------------------------------------------|
| Dimensional drawing |  |  |
| Width               |  | 12.5 mm                                                                            |
| Height              |  | 112.5 mm                                                                           |
| Depth               |  | 113.7 mm                                                                           |
| Depth NS 35/7,5     |  | 114.5 mm (Snapped onto DIN rail NS 35/7,5 in accordance with EN 60715)             |

## Material specifications

|                                                  |                 |
|--------------------------------------------------|-----------------|
| Color                                            | gray (RAL 7042) |
| Flammability rating according to UL 94 (Housing) | V0 (Housing)    |
| Housing material                                 | PA 6.6-FR       |

## Environmental and real-life conditions

### Ambient conditions

|                                         |                                                                         |
|-----------------------------------------|-------------------------------------------------------------------------|
| Degree of protection                    | IP20 (not assessed by UL)                                               |
| Ambient temperature (operation)         | -40 °C ... 60 °C (Any mounting position)<br>-40 °C ... 70 °C (Derating) |
| Ambient temperature (storage/transport) | -40 °C ... 80 °C                                                        |
| Permissible humidity (operation)        | 10 % ... 95 % (non-condensing)                                          |

### Altitude range ( $\leq 2000$ m)

|                                 |                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Altitude                        | $\leq 2000$ m (The technical data refers to altitudes $\leq 2000$ m above mean sea level. For altitudes $>2000$ m above mean sea level, refer to the data sheet.) |
| Ambient temperature (operation) | -40 °C ... 60 °C<br>-40 °C ... 70 °C (Derating)                                                                                                                   |
| Rated insulation voltage        | 375 V <sub>PP</sub> (Power supply, input / output)                                                                                                                |

### Altitude range ( $\leq 3000$ m)

|                                 |                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------|
| Height range                    | $> 2000$ m ... 3000 m                                                              |
| Ambient temperature (operation) | -40 °C ... 54 °C<br>-40 °C ... 63 °C (Derating)                                    |
| Rated insulation voltage        | 190 V AC (Power supply, input / output)<br>110 V DC (Power supply, input / output) |

### Altitude range ( $\leq 4000$ m)

|                                 |                                                 |
|---------------------------------|-------------------------------------------------|
| Height range                    | $> 3000$ m ... 4000 m                           |
| Ambient temperature (operation) | -40 °C ... 48 °C<br>-40 °C ... 56 °C (Derating) |
| Rated insulation voltage        | 60 V AC/DC (Power supply, input / output)       |

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## Altitude range ( $\leq 5000$ m)

|                                 |                                           |
|---------------------------------|-------------------------------------------|
| Height range                    | > 4000 m ... 5000 m                       |
| Ambient temperature (operation) | -40 °C ... 42 °C                          |
|                                 | -40 °C ... 49 °C (Derating)               |
| Rated insulation voltage        | 60 V AC/DC (Power supply, input / output) |

## Approvals

### CE

|             |              |
|-------------|--------------|
| Certificate | CE-compliant |
| Note        | and EN 61326 |

### ATEX

|                |                           |
|----------------|---------------------------|
| Identification | Ex II 3 G Ex ec IIC T4 Gc |
| Certificate    | PxCIF08ATEX2865955X       |

### UKCA Ex (UKEX)

|                |                             |
|----------------|-----------------------------|
| Identification | Ex II 3 G Ex nA IIC T4 Gc X |
| Certificate    | PxCIF21UKEX2865955X         |

### IECEX

|                |                    |
|----------------|--------------------|
| Identification | Ex ec IIC T4 Gc    |
| Certificate    | IECEX BVS 08.0016X |

### CCC / China-Ex

|                |                  |
|----------------|------------------|
| Identification | Ex ec IIC T4 Gc  |
| Certificate    | 2022122304115127 |

### UL, USA/Canada

|                |                                       |
|----------------|---------------------------------------|
| Identification | UL 61010 Listed                       |
|                | UL 508 Listed                         |
|                | Class I, Div. 2, Groups A, B, C, D T4 |
|                | Class I, Zone 2, Group IIC T4         |

### Shipbuilding approval

|             |                   |
|-------------|-------------------|
| Certificate | DNV GL TAA000020C |
|-------------|-------------------|

### Safety Integrity Level (SIL, IEC 61508)

|                |                      |
|----------------|----------------------|
| Identification | 2                    |
| Certificate    | IN-AT-AS-MRL-2300149 |

### Systematic Capability

|                |   |
|----------------|---|
| Identification | 3 |
|----------------|---|

### INMETRO

|                |                 |
|----------------|-----------------|
| Identification | Ex ec IIC T4 Gc |
| Certificate    | DNV 18.0136 X   |

### Shipbuilding data

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|             |                                                                                         |
|-------------|-----------------------------------------------------------------------------------------|
| Temperature | B                                                                                       |
| Humidity    | B                                                                                       |
| Vibration   | A                                                                                       |
| EMC         | A                                                                                       |
| Enclosure   | Required protection according to the Rules shall be provided upon installation on board |

## EMC data

|                               |                                                                      |
|-------------------------------|----------------------------------------------------------------------|
| Electromagnetic compatibility | Conformance with EMC directive                                       |
| Noise immunity                | EN 61000-6-2                                                         |
| Note                          | When being exposed to interference, there may be minimal deviations. |

## Noise emission

|                       |              |
|-----------------------|--------------|
| Standards/regulations | EN 61000-6-4 |
|-----------------------|--------------|

## Standards and regulations

|                      |                 |
|----------------------|-----------------|
| Electrical isolation | 3-way isolation |
|----------------------|-----------------|

## GB Standard

|                       |             |
|-----------------------|-------------|
| Standards/regulations | GB/T 3836.1 |
|                       | GB/T 3836.3 |

## Mounting

|               |                   |
|---------------|-------------------|
| Mounting type | DIN rail mounting |
|---------------|-------------------|

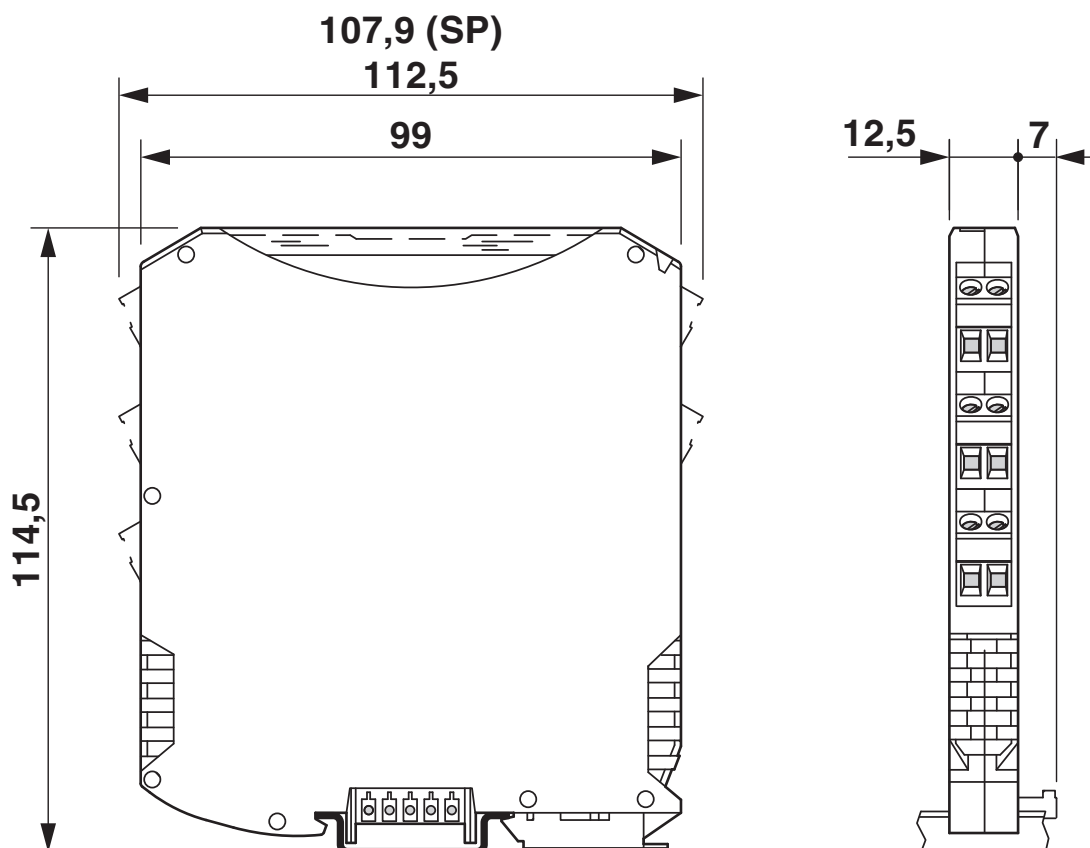
# MACX MCR-SL-RPSSI-I - Power/input signal conditioner

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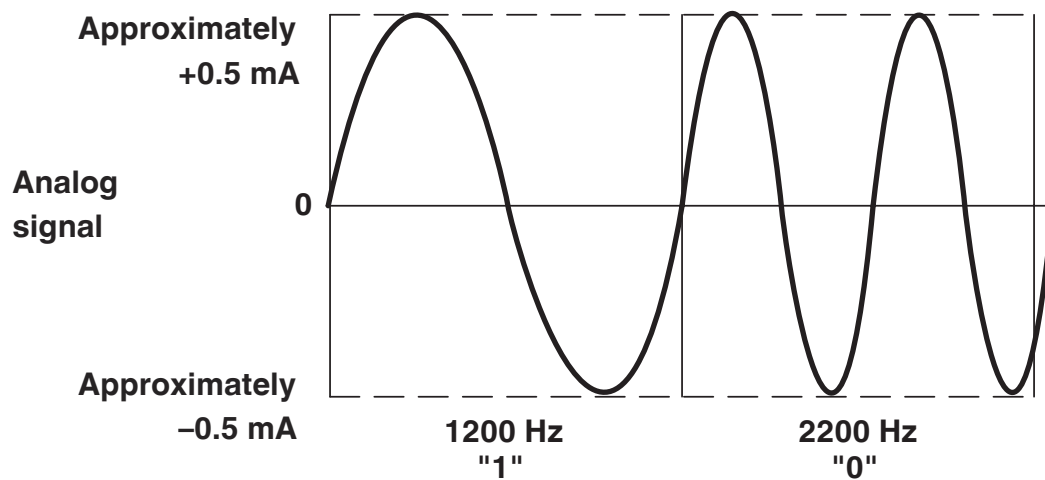
<https://www.phoenixcontact.com/us/products/2865955>

## Drawings

Dimensional drawing



Diagram



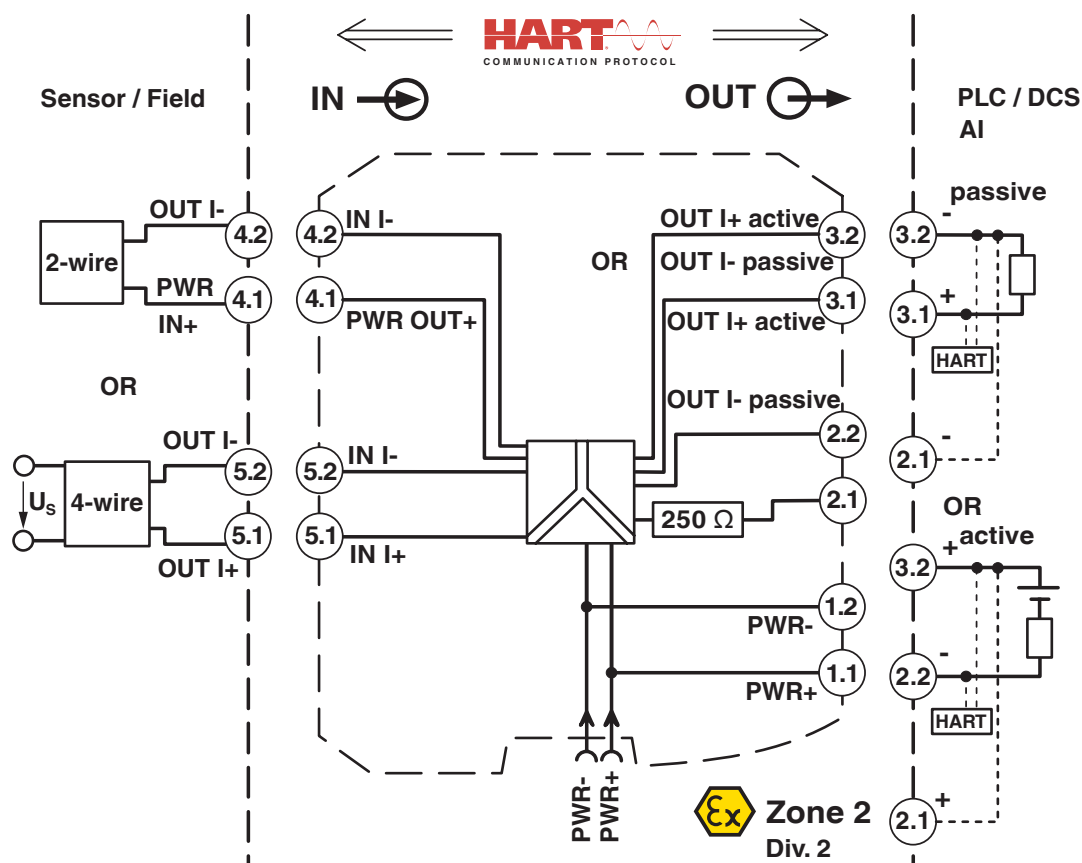
Signal transmission analog and digital at the same time

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Block diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2865955>

### DNV

Approval ID: TAA000020C



### UL Listed

Approval ID: E330267



### cUL Listed

Approval ID: E330267

### TUEV Austria FS

Approval ID: IN-AT-AS-MRL-23-0149



### EAC Ex

Approval ID: TP012 103.01 00078



### IECEx

Approval ID: IECEx BVS 08.0016X



### CCC

Approval ID: 2022122304115127



### cUL Listed

Approval ID: E199827



### UL Listed

Approval ID: FILE E 199827

### INMETRO

Approval ID: DNV 18.0136 X

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-13.0 | 27210120 |
| ECLASS-15.0 | 27210120 |

### ETIM

|          |          |
|----------|----------|
| ETIM 9.0 | EC002653 |
|----------|----------|

### UNSPSC

|             |          |
|-------------|----------|
| UNSPSC 21.0 | 39121000 |
|-------------|----------|

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## Environmental product compliance

### EU RoHS

|                                         |                    |
|-----------------------------------------|--------------------|
| Fulfills EU RoHS substance requirements | Yes                |
| Exemption                               | 6(c), 7(a), 7(c)-I |

### China RoHS

|                                        |                                                                                                                                                                                                                                   |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environment friendly use period (EFUP) | EFUP-50                                                                                                                                                                                                                           |
|                                        | An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required. |

### EU REACH SVHC

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| REACH candidate substance (CAS No.) | Lead(CAS: n/a)                       |
| SCIP                                | 392e4901-0ff2-42fd-ace8-506650da0614 |

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