

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

Please be informed that the data shown in this PDF document is generated from our online catalog. Please find the complete data in the user documentation. Our general terms of use for downloads are valid.



Ex i repeater power supply and input signal conditioner, HART-transparent. Transmits supplied or active 0/4 ... 20 mA signals from the Ex area to a load (active or passive) in the safe area. 3-way electrical isolation, SIL 2 in accordance with IEC 61508, with Push-in connection

## Your advantages

- 0/4 mA ... 20 mA input, intrinsically safe, [Ex ia], powered and not powered
- Measuring transducer supply voltage > 16 V
- Output: 0/4 mA ... 20 mA, active up to 1000  $\Omega$  load or passive
- Bidirectional HART signal transmission
- Error indication according to NAMUR NE 43
- SIL 2 according to IEC/EN 61508
- Installation in Ex zone 2 permitted
- 3-way electrical isolation
- Power supply possible via DIN rail connector
- Plug-in connection terminals, push-in connection technology
- Housing width: 12.5 mm
- Minimal power dissipation
- High transmission accuracy

## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 2924016       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | C430          |
| Product key                          | DK1211        |
| GTIN                                 | 4046356338066 |
| Weight per piece (including packing) | 176 g         |
| Weight per piece (excluding packing) | 160 g         |
| Customs tariff number                | 85437090      |
| Country of origin                    | DE            |

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

## 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  |
| 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   |
| Temperature coefficient, typical              | < 0.004 %/K  |
| Maximum transmission error                    | < 0.1 % (of final value 20 mA)   |
| Transmission error, typical                   | < 0.05 % (of final value 20 mA)  |
| Reverse polarity protection                   | yes  |

### 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           |

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

|                                   |                                    |
|-----------------------------------|------------------------------------|
| Max. current consumption          | < 76 mA (24 V DC / 20 mA / 1000 Ω) |
|                                   | < 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, intrinsically safe                     |
| Number of inputs                  | 1  |
| Input signal                      | Current  |
| Current input signal              | 4 mA ... 20 mA   |
| Current limitation                | 25 mA  |
| Transmitter supply voltage        | > 16 V (20 mA)   |
|                                   | > 15.3 V (22.5 mA)   |
| Polarization and surge protection | Yes  |
| Underload/overload signal range   | 0 mA ... 24 mA (Extended transmission range for diagnostics) |

### Signal: Signal conditioner operation

|                                 |  |
|---------------------------------|--|
| Description of the input        | Passive current input, intrinsically safe                    |
| 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)                                 |

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

|  |  |
|--|--|
|  | < 825 $\Omega$ (24 mA)                                       |
| Output ripple                            | < 20 mV <sub>rms</sub>                                       |
| Output behavior in the event of an error | 0 mA (Cable break in the input)                              |
|  | $\geq$ 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 $\Omega$ (20 mA)                                      |
|  | < 825 $\Omega$ (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   | Push-in connection  |
| Stripping length  | 10 mm   |
| 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 flexible (2 conductors with same cross section) | 0.25 mm <sup>2</sup> ... 0.34 mm <sup>2</sup> (TWIN ferrule without plastic sleeve) |
|   | 0.5 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> (TWIN ferrule with plastic sleeve)      |
| Conductor cross-section AWG   | 24 ... 14   |
|   | 24 ... 22 (TWIN ferrule without plastic sleeve)                                     |
|   | 20 ... 16 (TWIN ferrule with plastic sleeve)  |

## Ex data

|                       |          |
|-----------------------|----------|
| Ex installation (EPL) | Gc       |
|                       | Div. 2   |
| Ex i circuits (EPL)   | [Ga]     |
|                       | [Da]     |
|                       | [Ma]     |
|                       | [Div. 1] |

## Safety data: Repeater power supply operation

|   |          |
|---|----------|
| Max. output voltage U <sub>o</sub>            | 25.2 V   |
| Max. output current I <sub>o</sub>            | 93 mA    |
| Max. output power P <sub>o</sub>              | 587 mW   |
| Safety-related maximum voltage U <sub>m</sub> | 253 V AC |
|   | 125 V DC |

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

|  |  |
|--|--|
| I (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$      | 40 mH / 4.8 $\mu$ F  |
| IIA (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$    | 26 mH / 2.9 $\mu$ F  |
| IIB (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$    | 14 mH / 820 nF   |
| IIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$    | 3 mH / 107 nF  |
| IIA (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$     | 26 mH / 470 nF, 20 mH / 570 nF, 1 mH / 630 nF, 0.5 mH / 720 nF, 0.1 mH / 1.1 $\mu$ F, 0.005 mH / 2.9 $\mu$ F |
| IIB/III (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 16 mH / 370 nF, 500 $\mu$ H / 510 nF, 200 $\mu$ H / 660 nF, 100 $\mu$ H / 820 nF                             |
| IIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$     | 2.2 mH / 47 nF, 2 mH / 49 nF, 1 mH / 63 nF, 500 $\mu$ H / 80 nF, 200 $\mu$ H / 107 nF                        |
| I (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$       | 37 mH / 0.54 $\mu$ F, 0.35 mH / 1 $\mu$ F, 0.009 mH / 2.9 $\mu$ F, 0.001 mH / 4.15 $\mu$ F                   |

## Safety data: Signal conditioner operation

|                                      |               |
|--------------------------------------|---------------|
| Input voltage $U_i$                  | $\leq 30$ V   |
| Input current $I_i$                  | $\leq 150$ mA |
| Max. internal inductance $L_i$       | negligible    |
| Max. internal capacitance $C_i$      | negligible    |
| Safety-related maximum voltage $U_m$ | 253 V AC      |
|                                      | 125 V DC      |

## Interfaces

### Data communication (bypass)

|                     |                   |
|---------------------|-------------------|
| HART function       | HART transparency |
| Protocols supported | HART              |

## Signaling

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

## Dimensions

|                     |  |
|---------------------|--|
| Dimensional drawing |  |
| Width               | 12.5 mm  |
| Height              | 107.9 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) |

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

## 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 (≤ 2000 m)

|                                 |  |
|---------------------------------|--|
| Altitude                        | ≤ 2000 m (The technical data refers to altitudes ≤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 (≤ 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 (≤ 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)       |

### Altitude range (≤ 5000 m)

|                                 |   |
|---------------------------------|---|
| Height range                    | > 4000 m ... 5000 m                             |
| Ambient temperature (operation) | -40 °C ... 42 °C<br>-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 |

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

## ATEX

|                |                                     |
|----------------|-------------------------------------|
| Identification | ⊕ II (1) G [Ex ia Ga] IIC           |
|                | ⊕ II (1) D [Ex ia Da] IIIC          |
|                | ⊕ II 3(1) G Ex ec [ia Ga] IIC T4 Gc |
|                | ⊕ I (M1) [Ex ia Ma] I               |
| Certificate    | BVS 08 ATEX E 054X                  |

## IECEX

|                |                         |
|----------------|-------------------------|
| Identification | [Ex ia Ga] IIC          |
|                | [Ex ia Da] IIIC         |
|                | Ex ec [ia Ga] IIC T4 Gc |
|                | [Ex ia Ma] I            |
| Certificate    | IECEX BVS 08.0016X      |

## CCC / China-Ex

|                |                         |
|----------------|-------------------------|
| Identification | [Ex ia Ga] IIC          |
|                | [Ex ia Da] IIIC         |
|                | Ex ec [ia Ga] IIC T4 Gc |
| Certificate    | 2022122316115973        |

## UL, USA/Canada

|                |   |
|----------------|---|
| Identification | UL 61010 Listed   |
|                | Class I, Div. 2, Groups A, B, C, D T4                                   |
|                | Class I, Div. 2, Groups IIC, IIB, IIA T4                                |
|                | Associated apparatus for use in Class I, Division 1, Groups A,B,C,D     |
|                | Associated apparatus for use in Class II, Div.1 Groups E,F,G            |
|                | Associated apparatus for use in Class III, Division 1                   |
|                | Associated apparatus for use in Class I, Zone 0,1,2, Groups IIC,IIB,IIA |
| Certificate    | Ⓢ C.D.-No 83104549  |

## Shipbuilding approval

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

## Safety Integrity Level (SIL, IEC 61508)

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

## Systematic Capability

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

## KC-s

|                |                 |
|----------------|-----------------|
| Identification | [Ex ia] IIC/IIB |
| Certificate    | 17-KA4BO-0400X  |

## INMETRO

|  |                |
|--|----------------|
|  | [Ex ia Ga] IIC |
|--|----------------|

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

|                |                         |
|----------------|-------------------------|
| Identification | [Ex ia Da] IIC          |
|                | Ex ec [ia Ga] IIC T4 Gc |
|                | [Ex ia Ma] I            |
| Certificate    | DNV 18.0136 X           |

## Shipbuilding data

|             |   |
|-------------|---|
| 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 |
|-----------------------|--------------|

## Electromagnetic HF field

|  |                          |
|--|--------------------------|
| Designation  | Electromagnetic RF field |
| Standards/regulations                                  | EN 61000-4-3             |
| Typical deviation from the measuring range final value | 1 %                      |

## Fast transients (burst)

|  |                         |
|--|-------------------------|
| Designation  | Fast transients (burst) |
| Standards/regulations                                  | EN 61000-4-4            |
| Typical deviation from the measuring range final value | 1 %                     |

## Conducted interference

|  |                         |
|--|-------------------------|
| Designation  | Conducted interferences |
| Standards/regulations                                  | EN 61000-4-6            |
| Typical deviation from the measuring range final value | 1 %                     |

## Standards and regulations

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

## GB Standard

|                       |             |
|-----------------------|-------------|
| Standards/regulations | GB/T 3836.1 |
|                       | GB/T 3836.3 |
|                       | GB/T 3836.4 |

## Mounting

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

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

## Drawings

Dimensional drawing



Diagram



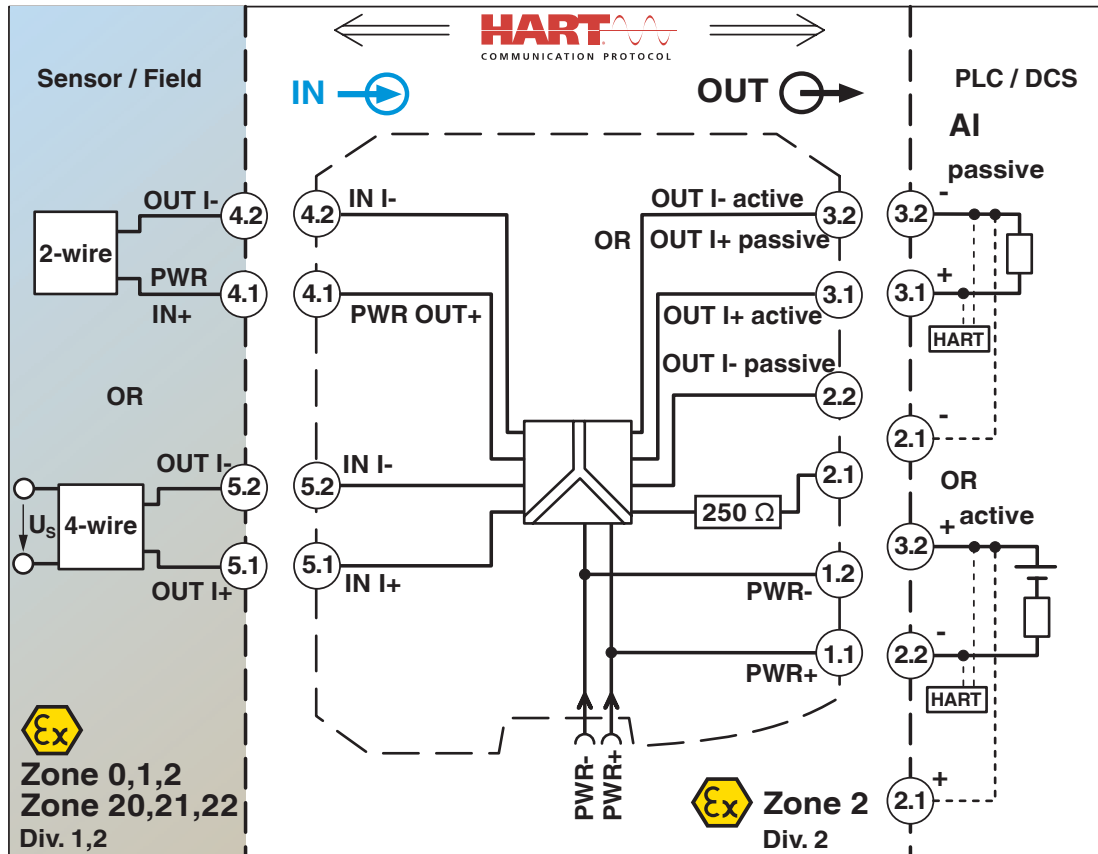
Signal transmission analog and digital at the same time

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply

2924016

<https://www.phoenixcontact.com/us/products/2924016>

Block diagram



# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2924016>

**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



**IECEx**

Approval ID: IECEx BVS 08.0016X



**CCC**

Approval ID: 2022122316115973



**cUL Listed**

Approval ID: E199827



**UL Listed**

Approval ID: E199827



**ATEX**

Approval ID: BVS 08 ATEX E 054X

**INMETRO**

Approval ID: DNV 18.0136 X



**KC-s**

Approval ID: 17-KA4BO-0400X

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

## Classifications

### ECLASS

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

### ETIM

|           |          |
|-----------|----------|
| ETIM 10.0 | EC002653 |
|-----------|----------|

### UNSPSC

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

# MACX MCR-EX-SL-RPSSI-I-SP - Repeater power supply



2924016

<https://www.phoenixcontact.com/us/products/2924016>

## 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: 7439-92-1)   |
|                                     | 2,2',6,6'-tetrabromo-4,4'-isopropylidenediphenol(CAS: 79-94-7) |
| SCIP                                | 8681b086-bdb1-4186-9b6d-692b6a09dbe2                           |

Phoenix Contact 2026 © - all rights reserved  
<https://www.phoenixcontact.com>

Phoenix Contact USA  
586 Fulling Mill Road  
Middletown, PA 17057, United States  
(+717) 944-1300  
[info@phoenixcon.com](mailto:info@phoenixcon.com)