**PRODUCT DESCRIPTION**

The YR40.241 is a redundancy module, which can be used to build 1+1 and N+1 redundant systems. It is equipped with two input channels, which can be connected to power supplies with up to 20A output current and one output, which can carry nominal currents up to 40A. The module is suitable for power supplies with constant current overload behavior as well as any kind of "Hiccup" overload behavior. In addition to the YR40.241, the YR40.242 is also available which is cost-optimized and suitable for all DIMENSION power supplies except the QT20 and QT20D series.

The novelty of this redundancy module is the utilization of mosfets instead of diodes for the decoupling of the two input channels. This reduces the heat generation and the voltage drop between input and output. The redundancy module does not require an additional auxiliary voltage and is self-sufficient even in case of a short circuit across the output.

Due to the low power losses, the unit is very slender and only requires 36mm width on the DIN rail. Large connection terminals allow for a safe and fast installation with a large international approval package. This unit is suitable for nearly every application.

**SHORT-FORM DATA**

- **Input voltage**: DC 12-28V ±30%
- **Input voltage range**: 8.4-36.4Vdc
- **Input current**:
  - 2x 0-20A continuous
  - 2x 20-32.5A for 5 seconds
- **Output current**:
  - 0-40A continuous for 5 seconds
  - 40-65A at cont. overload or short circuit
  - 65A at cont. overload or short circuit
- **Input to output voltage drop**:
  - typ. 72mV
  - typ. 112mV
  - typ. 140mV
- **Power losses**:
  - typ. 700mW input: 2x10A
  - typ. 2.65W input: 1x20A
  - typ. 6.3W input: 2x20A
- **Temperature range**:
  - -40°C to +70°C operational, no derating req.
- **Dimensions**: 36x124x127mm*) WxHxD
- **Weight**: 340g / 0.75lb
  - *) plus, 4mm in depth for the screw terminal

**ORDER NUMBERS**

- **Redundancy Module**: YR40.241 12-28V Standard unit
- **Accessory**:
  - ZM2.WALL Wall/panel mount bracket
  - ZM11.SIDE Side mount bracket

**MAIN APPROVALS**

For details and the complete approval list, see chapter 14.

- UL 508
- UL 60950-1
- IECEx
- ATEX
- Marine

Jul. 2021 / Rev. 1.5 DS-YR40.241-EN
All parameters are specified at 24V, 40A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted
INDEX

1. Intended Use ....................................................... 3
2. Installation Instructions ...................................... 3
3. Input and Output Characteristics ....................... 5
4. Power Losses...................................................... 6
5. Lifetime Expectancy and MTBF ......................... 7
6. Terminals and Wiring .......................................... 8
7. Functional Diagram............................................ 9
8. Front Side and User Elements ............................. 9
9. EMC .................................................................... 10
10. Environment ..................................................... 11
11. Protection Features ......................................... 12
12. Safety Features ............................................... 12
13. Dielectric Strength .......................................... 12
14. Approved, Fulfilled or Tested Standards............ 13
15. Regulatory Product Compliance ...................... 14
16. Physical Dimensions and Weight ..................... 15
17. Accessories .................................................... 16
17.1. ZM2.WALL - Wall-Mounting Bracket ....... 16
17.2. ZM11.SIDE - Side Mounting Bracket ......... 16
18. Application Notes ............................................ 17
18.1. Recommendations for Redundancy.............. 17
18.2. Inductive and Capacitive Loads................ 17
18.3. Sideward Installation Clearances ............ 17
18.4. 1+1 Redundancy up to 20A ...................... 18
18.5. N+1 Redundancy, Example with 60A ....... 18
18.6. Mounting Orientations ............................. 19

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TERMINOLOGY AND ABBREVIATIONS

PE and symbol PE is the abbreviation for Protective Earth and has the same meaning as the symbol ☼.
Earth, Ground This document uses the term “earth” which is the same as the U.S. term “ground”.
t.b.d. To be defined, value or description will follow later.
DC 24V A figure displayed with the AC or DC before the value represents a nominal voltage with standard tolerances (usually ±15%) included. 
E.g.: DC 12V describes a 12V battery disregarding whether it is full (13.7V) or flat (10V)
24Vdc A figure with the unit (Vdc) at the end is a momentary figure without any additional tolerances included.
may A key word indicate flexibility of choice with no implied preference
shall A key word indicate a mandatory requirement
should A key word indicate flexibility of choice with a strongly preferred implementation

1+1 Redundancy Use of two identical power supplies in parallel to provide continued operation following most failures in a single power supply. The two power supply outputs should be isolated from each other by utilizing diodes or other switching arrangements. E.g. two 10A power supplies are needed to achieve a 10A redundant system.

N+1 Redundancy Use of three or more identical power supplies in parallel to provide continued operation following most failures in a single power supply. All power supply outputs should be isolated from each other by utilizing diodes or other switching arrangements. 
E.g.: To achieve a 40A redundant system, five 10A power supplies are needed in a N+1 redundant system.
1. INTENDED USE

This device is designed for installation in an enclosure and is intended for commercial use, such as in industrial control, process control, monitoring and measurement equipment or the like. Do not use this device in equipment where malfunction may cause severe personal injury or threaten human life.

The redundancy module can be used with any type of power supply as long as the maximum output current ratings are not exceeded. It is suitable for power supplies with continuous overload current as well as any kind of intermittent (Hiccup) overload behavior.

2. INSTALLATION INSTRUCTIONS

**WARNING** Risk of electrical shock, fire, personal injury or death.
- Turn power off before working on the device and protect against inadvertent re-powering.
- Do not open, modify or repair the device.
- Use caution to prevent any foreign objects from entering into the housing.
- Do not use in wet locations or in areas where moisture or condensation can be expected.
- Do not touch during power-on, and immediately after power-off. Hot surface may cause burns.

Obey the following installation instructions:

This device may only be installed and put into operation by qualified personnel.

This device does not contain serviceable parts. The tripping of an internal fuse is caused by an internal defect.

If damage or malfunction should occur during installation or operation, immediately turn power off and send unit to the factory for inspection.

Install the device in an enclosure providing protection against electrical, mechanical and fire hazards.

Do not ground or earth the positive output pole which could prevent redundancy in case of a ground failure. Ground the negative output pole, when needed.

Use only power supplies with a negligible output ripple voltage in the low frequency range between 50Hz and 10kHz when used in marine applications according to the GL regulations.

Install the device onto a DIN rail according to EN 60715 with the input terminals on the top of the device. Other mounting orientations require a reduction in output current.

Make sure that the wiring is correct by following all local and national codes. Use appropriate copper cables that are designed for a minimum operating temperature of 60°C for ambient temperatures up to +45°C, 75°C for ambient temperatures up to +60°C and 90°C for ambient temperatures up to +70°C. Ensure that all strands of a stranded wire enter the terminal connection.

Unused screw terminals should be securely tightened.

The device is designed for pollution degree 2 areas in controlled environments. No condensation or frost is allowed.

The enclosure of the device provides a degree of protection of IP20.

The input must be powered from a PELV or SELV source or an “Isolated Secondary Circuit” in order to maintain a SELV or PELV output.

Check correct input polarity. The device will not operate when input voltage is reversed.

The device is designed as “Class of Protection III” equipment according to IEC 61140.

A PE (ground) connection is not required. However, connecting the chassis ground terminal to ground can be beneficial to gain a high EMI immunity.

The device is designed for convection cooling and does not require an external fan. Do not obstruct airflow and do not cover ventilation grid!

The device is designed for altitudes up to 6000m (19685ft). See additional requirements in the product datasheet for use above 2000m (6560ft).
Keep the following minimum installation clearances: 40mm on top, 20mm on the bottom, 5mm left and right side. Increase the 5mm to 15mm in case the adjacent device is a heat source. When the device is permanently loaded with less than 50%, the 5mm can be reduced to zero. Under special circumstances clearances can be reduced. See details in the product datasheet.

The maximum surrounding air temperature is +70°C (+158°F). The operational temperature is the same as the ambient or surrounding air temperature and is defined 2cm below the device.

The device is designed to operate in areas between 5% and 95% relative humidity.

**Installation Instructions for Hazardous Location Areas**

The device is suitable for use in Class I Division 2 Groups A, B, C, D locations and for use in Group II Category 3 (Zone 2) environments.

Hazardous Location classification: ATEX: EPS 11 ATEX 1 312 X, II 3G EX ec IIC T4 Gc

**WARNING EXPLOSION HAZARDS!**

Substitution of components may impair suitability for this environment. Do not disconnect the device unless power has been switched off or the area is known to be non-hazardous.

A suitable enclosure must be provided for the end product which has a minimum protection of IP54 and fulfils the requirements of the EN 60079-0.
3. **Input and Output Characteristics**

- **Number of inputs**: 2
- **Number of outputs**: 1
- **Input voltage**: nom. DC 12-28V ±30%
- **Input voltage range**: 8.4-36.4Vdc
- **Voltage drop, input to output**: typ. 140mV at 2x20A, see Fig. 3-1
  - typ. 72mV at 2x10A, see Fig. 3-1
  - typ. 112mV at 1x20A, see Fig. 3-2
- **Input current**: nom. 2x 0-20A continuous
  - nom. 2x 20-32.5A for 5 seconds
  - max. 2x 32.5A at continuous overload or short circuit
- **Peak input current**: max. 1000A for max. 1ms per input
- **Output current**: nom. 40A continuous
  - nom. 40-65A for 5 seconds
  - max. 65A at continuous overload or short circuit
- **Reverse current**: max. 1mA at 24V, per input, -40°C to +70°C
- **Reverse voltage**: max. 40Vdc voltage applied to the output, continuously allowed
- **Output capacitance**: typ. 320µF

Note: Ensure that the continuous output current does not exceed 65A. Check the short-circuit current of the power sources and if the power source can deliver more than 65A together, use an appropriate fuse on the output.

---

**Fig. 3-1** Input to output voltage drop when both inputs draw current
(typical 1+1 redundant case, when the output voltages of the two units are equal)

**Fig. 3-2** Input to output voltage drop when only one input draws current

Jul. 2021 / Rev. 1.5 DS-YR40.241-EN

All parameters are specified at 24V, 40A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted.
4. POWER LOSSES

**DC 24V**

<table>
<thead>
<tr>
<th>Losses</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power losses</td>
<td>typ. 2.15W input: 2x10A</td>
</tr>
<tr>
<td></td>
<td>typ. 6.3W input: 2x20A</td>
</tr>
<tr>
<td></td>
<td>typ. 2.6W input: 1x20A, (only one input is connected to input voltage)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standby losses</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>typ.</td>
<td>0.35W at no output current, (only one input is connected to input voltage)</td>
</tr>
<tr>
<td>typ.</td>
<td>0.7W at no output current, (both inputs are connected to input voltages)</td>
</tr>
</tbody>
</table>

**Fig. 4-1  Power losses when both inputs draw equal current**

**Fig. 4-2  Power losses when only one input is used**

**Note:** As soon as voltage is applied on input 2, an additional 0.35W will be consumed. It is not relevant, whether this channel contributes to the output current or not.
5. Lifetime Expectancy and MTBF

The redundancy module has two input channels which are completely independent from each other. Each control circuit, auxiliary voltage source, or other circuitry in the module are designed separately for each input. The dual input redundancy module can be considered as two single redundancy modules combined together in one housing. The only common point is the circuit trace that ties the two separate circuits together at the output.

The MTBF figures below are for the entire dual input module. If the MTBF number of only one path is needed, simply double the value from the table.

<table>
<thead>
<tr>
<th>Input / output current conditions</th>
<th>Input: 2x10A Output: 20A</th>
<th>Input: 2x20A Output: 40A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime expectancy*)</td>
<td>649 000h *)</td>
<td>246 000h *)</td>
</tr>
<tr>
<td></td>
<td>at 24V and 40°C</td>
<td>at 24V and 40°C</td>
</tr>
<tr>
<td></td>
<td>1 835 000h *)</td>
<td>696 000h *)</td>
</tr>
<tr>
<td></td>
<td>at 24V and 25°C</td>
<td>at 24V and 25°C</td>
</tr>
<tr>
<td>MTBF**) SN 29500, IEC 61709</td>
<td>3 386 000h</td>
<td>2 706 000h</td>
</tr>
<tr>
<td></td>
<td>at 24V 40°C</td>
<td>at 24V 40°C</td>
</tr>
<tr>
<td></td>
<td>5 667 000h</td>
<td>4 686 000h</td>
</tr>
<tr>
<td></td>
<td>at 24V 25°C</td>
<td>at 24V 25°C</td>
</tr>
<tr>
<td>MTBF**) MIL HDBK 217F</td>
<td>116 000h</td>
<td>97 000h</td>
</tr>
<tr>
<td></td>
<td>Ground Fixed GF40 (24V and 40°C)</td>
<td>Ground Fixed GF25 (24V and 25°C)</td>
</tr>
<tr>
<td></td>
<td>155 000h</td>
<td>128 000h</td>
</tr>
<tr>
<td></td>
<td>Ground Fixed GF25 (24V and 25°C)</td>
<td>Ground Benign GB40 (24V and 40°C)</td>
</tr>
<tr>
<td></td>
<td>612 000h</td>
<td>522 000h</td>
</tr>
<tr>
<td></td>
<td>Ground Benign GB40 (24V and 40°C)</td>
<td>Ground Benign GB25 (24V and 25°C)</td>
</tr>
<tr>
<td></td>
<td>813 000h</td>
<td>687 000h</td>
</tr>
</tbody>
</table>

*) The Lifetime expectancy shown in the table indicates the minimum operating hours (service life) and is determined by the lifetime expectancy of the built-in electrolytic capacitors. Lifetime expectancy is specified in operational hours and is calculated according to the capacitor's manufacturer specification. The manufacturer of the electrolytic capacitors only guarantees a maximum life of up to 15 years (131 400h). Any number exceeding this value is a calculated theoretical lifetime which can be used to compare devices.

**) MTBF stands for Mean Time Between Failure, which is calculated according to statistical device failures, and indicates reliability of a device. It is the statistical representation of the likelihood of a unit to fail and does not necessarily represent the life of a product. The MTBF figure is a statistical representation of the likelihood of a device to fail. A MTBF figure of e.g. 1 000 000h means that statistically one unit will fail every 100 hours if 10 000 units are installed in the field. However, it can not be determined if the failed unit has been running for 50 000h or only for 100h.
### 6. TERMINALS AND WIRING

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>Solid wire</td>
<td>0.5-6mm²</td>
</tr>
<tr>
<td>Stranded wire</td>
<td>0.5-4mm²</td>
</tr>
<tr>
<td>American Wire Gauge</td>
<td>20-10 AWG</td>
</tr>
<tr>
<td>Max. wire diameter</td>
<td>2.8mm (including ferrule)</td>
</tr>
<tr>
<td>Wire stripping length</td>
<td>7mm / 0.275inch</td>
</tr>
<tr>
<td>Screwdriver</td>
<td>3.5mm slotted or Pozidrive No 2</td>
</tr>
<tr>
<td>Recommended tightening torque</td>
<td>0.8Nm, 7lb.in</td>
</tr>
</tbody>
</table>

To connect the chassis to ground, use a ring-type terminal (ring cable lug) which is suitable for a M4 screw and connect it to the chassis ground terminal on top of the unit.

**Instructions:**

a) The external circuitry of all terminals must meet the safety requirements stipulated by IEC/EN/UL 60950-1: SELV.
b) Use appropriate copper cables that are designed for minimum operating temperatures of:
   - 60°C for ambient up to 45°C and
   - 75°C for ambient up to 60°C and
   - 90°C for ambient up to 70°C minimum.
c) Follow national installation codes and installation regulations!
d) Ensure that all strands of a stranded wire enter the terminal connection!
e) Screws of unused terminal compartments should be securely tightened.
f) Ferrules are allowed.
g) Do not connect or disconnect the wires from the terminals below -25°C (-13°F).
7. Functional Diagram

Fig. 7-1 Functional diagram

8. Front Side and User Elements

Fig. 8-1 Front side

- **A** Output Terminals (screw terminals)
- **B** Chassis Ground Terminals
  To be connected on the top side of the housing with a ring-type terminal (ring cable lug) which is suitable for a M4 screw. Connection of the chassis is optional and not required since the unit fulfils the requirements according to protection class III.
- **C** Input Terminals for Input 1 (screw terminals)
- **D** Input Terminals for Input 2 (screw terminals)
9. EMC

The redundancy module is suitable for applications in industrial environment as well as in residential, commercial and light industry environment without any restrictions. A detailed EMC report is available on request.

<table>
<thead>
<tr>
<th>EMC Immunity</th>
<th>According generic standards: EN 61000-6-1 and EN 61000-6-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge</td>
<td>EN 61000-4-2 Contact discharge Air discharge 8kV 15kV Criterion A</td>
</tr>
<tr>
<td>Electromagnetic RF field</td>
<td>EN 61000-4-3 80MHz-2.7GHz 20V/m Criterion A</td>
</tr>
<tr>
<td>Fast transients (Burst)</td>
<td>EN 61000-4-4 Input lines Output lines 2kV 2kV Criterion A</td>
</tr>
<tr>
<td>Surge voltage on input lines</td>
<td>EN 61000-4-5 + → - +/- → Chassis ground 500V 1kV Criterion A</td>
</tr>
<tr>
<td>Surge voltage on output lines</td>
<td>EN 61000-4-5 + → - +/- → Chassis ground 500V 1kV Criterion A</td>
</tr>
<tr>
<td>Conducted disturbance</td>
<td>EN 61000-4-6 0.15-80MHz 20V Criterion A</td>
</tr>
<tr>
<td>Power-frequency magnetic field * )</td>
<td>EN 61000-4-8 50Hz 30A/m Criterion A</td>
</tr>
</tbody>
</table>

**Criterions:**

A: Redundancy module shows normal operation behavior within the defined limits.

**Notes:**

*) A test is not applicable according to EN 61000-6-2, since the device does not contain components susceptible to magnetic fields, e.g. hall elements, electrodynamic microphones, etc.

**EMC Emission**

According generic standards: EN 61000-6-3 and EN 61000-6-4

- Conducted emission: IEC/CISPR 16-1-2, IEC/CISPR 16-2-1 limits for DC power ports according EN 61000-6-3 fulfilled *)
- Radiated emission: EN 55011, EN 55032 Class B

This device complies with FCC Part 15 rules.
Operation is subjected to following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

*) For information only, not mandatory for EN 61000-6-3. Provided, that power sources connected on the inputs fulfill the requirements too.

**Switching frequency**

The internal auxiliary supply is generated with a boost converter.
The switching frequency is typ. 16kHz.
10. Environment

### Operational temperature
-40°C to +70°C (-40°F to 158°F)

### Storage temperature
-40 to +85°C (-40°F to 185°F) for storage and transportation

### Humidity
5 to 95% r.H. IEC 60068-2-30

### Vibration sinusoidal
2-17.8Hz: ±1.6mm; 17.8-500Hz: 2g
2 hours / axis IEC 60068-2-6

### Shock
30g 6ms, 20g 11ms
3 bumps / direction, 18 bumps in total IEC 60068-2-27

### Altitude
0 to 2000m (0 to 6560ft) without any restrictions
2000 to 6000m (6560 to 20000ft) reduce output power or ambient temperature, see Fig. 10-2

### Altitude derating
2.5A/1000m or 5°C/1000m
> 2000m (6500ft), see Fig. 10-2

### Over-voltage category
not applicable

Degree of pollution
2 IEC 62103, EN 50178, not conductive

*Operational temperature is the same as the ambient temperature and is defined as the air temperature 2cm below the unit.

**Do not energize while condensation is present

***Tested in combination with DIN rails according to EN 60715 with a height of 15mm and a thickness of 1.3mm and standard mounting orientation.

### Overload and Short Circuit
A... Tamb < 70°C
B... Tamb < 60°C
C... Tamb < 50°C

### Altitude and Output Current
A... 0 to 2000m (0 to 6560ft)
B... 2000 to 6000m (6560 to 20000ft)
C... > 2000m (6500ft)

---

Fig. 10-1  Output current vs. ambient temp.

Fig. 10-2  Output current vs. altitude
11. PROTECTION FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output over-current protection</td>
<td>not included</td>
</tr>
<tr>
<td>Reverse input polarity protection</td>
<td>included</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
</tr>
<tr>
<td>Penetration protection</td>
<td>&gt; 3.6mm</td>
</tr>
<tr>
<td>Over-temperature protection</td>
<td>not included</td>
</tr>
<tr>
<td>Input transient protection</td>
<td>not included</td>
</tr>
<tr>
<td>Output transient protection</td>
<td>included</td>
</tr>
<tr>
<td>Internal input fuse</td>
<td>not included</td>
</tr>
</tbody>
</table>

12. SAFETY FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input / output separation</td>
<td>no galvanic separation</td>
</tr>
<tr>
<td>Class of protection</td>
<td>III</td>
</tr>
<tr>
<td>PE resistance</td>
<td>&lt; 0.1Ohm</td>
</tr>
<tr>
<td>Mosfet between input and output</td>
<td>PE (Protective Earth) or chassis connection not required</td>
</tr>
</tbody>
</table>

13. DIELECTRIC STRENGTH

The input and output voltages have the same reference, are floating and have no ohmic connection to ground. Type and factory tests are conducted by the manufacturer. Field tests may be conducted in the field using the appropriate test equipment which applies the voltage with a slow ramp (2s up and 2s down). Connect input/output terminals together before conducting the test.

When testing, set the cut-off current settings to the value in the table below.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type test</td>
<td>60s 500Vac</td>
</tr>
<tr>
<td>Factory test</td>
<td>5s 500Vac</td>
</tr>
<tr>
<td>Field test</td>
<td>5s 500Vac</td>
</tr>
<tr>
<td>Cut-off current setting</td>
<td>&gt; 2mA</td>
</tr>
</tbody>
</table>
# 14. Approved, Fulfilled or Tested Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Certificate Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL 508</td>
<td>Listed equipment for category NMTR - Industrial Control Equipment</td>
</tr>
<tr>
<td>IEC 60950-1</td>
<td>CB Scheme Certificate</td>
</tr>
<tr>
<td>UL 60950-1</td>
<td>Recognized component for category QGQ - Information Technology Equipment (ITE)</td>
</tr>
<tr>
<td>ATEX</td>
<td>Agency Certificate (Bureau Veritas)</td>
</tr>
<tr>
<td>IECEx</td>
<td>IECEx Certificate</td>
</tr>
<tr>
<td>CSA Class I Div 2</td>
<td>CSA Certificate</td>
</tr>
<tr>
<td>Marine (DNV)</td>
<td>DNV Certificate</td>
</tr>
<tr>
<td>Marine (ABS)</td>
<td>ABS Design Assessment Certificate</td>
</tr>
<tr>
<td>IEC 60068-2-60</td>
<td>Manufacturer’s Declaration (Online Document)</td>
</tr>
</tbody>
</table>

- **UL Certificate**
  - Listed equipment for category NMTR - Industrial Control Equipment
  - Applicable for US and Canada
  - E-File: E198865

- **IEC 60950-1**
  - General safety requirements for Information Technology Equipment (ITE)

- **UL 60950-1**
  - Recognized component for category QGQ - Information Technology Equipment (ITE)
  - Applicable for US and Canada
  - E-File: E137006

- **ATEX**
  - EN 60079-0 Explosive atmospheres - General requirements
  - EN 60079-7 Equipment protection by type of protection "e"
  - Temperature Code: T4
  - Type of Protection: ec

- **IECEx**
  - IECEx Certificate
  - IEC 60079-0 Explosive atmospheres - General requirements
  - IEC 60079-7 Equipment protection by type of protection "e"
  - Temperature Code: T4
  - Type of Protection: ec

- **Class I Div 2**
  - CSA Certificate
  - Power Supplies for Hazardous Location
  - Applicable for Canada and US
  - CSA Class: 5318-01 (Canada), 5318-81 (USA)
  - Temperature Code: T4
  - Groups: A, B, C and D

- **Marine (DNV)**
  - DNV Certificate
  - DNV Type approved product

- **Marine (ABS)**
  - ABS (American Bureau of Shipment) assessed product

- **IEC 60068-2-60**
  - Environmental Tests, Flowing Mixed Gas Corrosion Test
  - Test Ke - Method 4
  - H2S: 10ppb
  - NO2: 200ppb
  - Cl2: 10ppb
  - SO2: 200ppb
  - Test Duration: 3 weeks, which simulates a service life of 10 years.

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Jul. 2021 / Rev. 1.5 DS-YR40.241-EN
All parameters are specified at 24V, 40A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted
Manufacturer’s Declaration (Online Document)
Airborne Contaminants Corrosion Test
Severity Level: G3 Harsh
H2S: 100ppb
NOx: 1250ppb
Cl2: 20ppb
SO2: 300ppb
Test Duration: 3 weeks, which simulates a service life of 10 years

Paint Wetting Impairment Substances Test (or LABS-Test)
Tested for Zone 2 and test class C1 according to VDMA 24364-C1-L/W for solvents and water-based paints

15. REGULATORY PRODUCT COMPLIANCE

EU Declaration of Conformity
The CE mark indicates conformance with the
- EMC directive
- ATEX directive
- RoHS directive

REACH Directive
Manufacturer’s Statement
EU-Directive regarding the Registration, Evaluation, Authorization and Restriction of Chemicals

WEEE Directive
Manufacturer’s Statement
EU-Regulation on Waste Electrical and Electronic Equipment
Registered in Germany as business to business (B2B) products.

KC Korean Certificate
KC Registration
Korean registration of Broadcasting and Communication Equipment

EAC TR Registration
EAC Certificate
EAC EurAsian Conformity - Registration Russia, Kazakhstan and Belarus
8504408200, 8504409000
16. Physical Dimensions and Weight

| Weight | 340g / 0.75lb |
| DIN rail | Use 35mm DIN rails according to EN 60715 or EN 50022 with a height of 7.5 or 15mm. The DIN rail depth must be added to the unit depth (127mm) to calculate the total required installation depth. |
| Installation clearances | See chapter 2 |

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**Fig. 16-1 Front view**

**Fig. 16-2 Side view**

Weight: 340g / 0.75lb
DIN rail: Use 35mm DIN rails according to EN 60715 or EN 50022 with a height of 7.5 or 15mm. The DIN rail depth must be added to the unit depth (127mm) to calculate the total required installation depth.

Installation clearances: See chapter 2.

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Fig. 16-1 Front view

Fig. 16-2 Side view

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Weight: 340g / 0.75lb
DIN rail: Use 35mm DIN rails according to EN 60715 or EN 50022 with a height of 7.5 or 15mm. The DIN rail depth must be added to the unit depth (127mm) to calculate the total required installation depth.

Installation clearances: See chapter 2.

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All parameters are specified at 24V, 40A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted.
17. ACCESSORIES

17.1. ZM2.WALL - WALL-MOUNTING BRACKET

This standard bracket is used to mount the YR40.241 redundancy module onto a flat surface without utilizing a DIN rail.

![ZM2.WALL - Wall mounting bracket](image1)

![Assembled wall mounting bracket](image2)

17.2. ZM11.SIDE - SIDE MOUNTING BRACKET

This bracket is used to mount the YR40.241 redundancy module sideways with or without utilizing a DIN rail. The two aluminum brackets and the black plastic slider of the unit have to be detached, so that the steel brackets can be mounted.

For sideway DIN rail mounting, the removed aluminum brackets and the black plastic slider need to be mounted on the steel bracket.

![ZM11.SIDE - Side mounting bracket](image3)

![Side mounting with DIN rail brackets](image4)
18. APPLICATION NOTES

18.1. RECOMMENDATIONS FOR REDUNDANCY

Recommendations for the configuration of redundant power systems:
- Use separate input fuses for each power supply.
- Use three-phase power supplies to gain functional safety if one phase fails.
- When single-phase power supplies are utilized connect them to different phases or mains circuits if possible.
- Set the power supply in "Parallel-Use" mode if this feature is available.
- It is desirable to set the output voltages of all power supplies to the same value.

18.2. INDUCTIVE AND CAPACITIVE LOADS

The unit is designed to supply any kind of loads, including unlimited capacitive and inductive loads.

18.3. SIDEWARD INSTALLATION CLEARANCES

The minimum clearance recommendations are defined in chapter 2.
Normally, the following installation clearance are recommended: 40mm on top, 20mm on the bottom, 5mm on the left and right sides when the device is loaded permanently with more than 50% of the rated power. Increase this clearance to 15mm in case the adjacent device is a heat source (e.g. another power supply).

The clearance between the power supplies and the redundancy module can be reduced to zero under the following conditions:
- 1+1 redundancy application with maximum 20A output current.
- The power supplies are from the PULS DIMENSION series.
- The redundancy module is placed between the two power supplies.
- The output voltage is set to the same level on both power supplies.
18.4. 1+1 REDUNDANCY UP TO 20A

1+1 Redundancy up to 20A requires two 20A power supplies and one YR40.241 redundancy module.

Note: Use separate mains systems for each power supply whenever it is possible.

18.5. N+1 REDUNDANCY, EXAMPLE WITH 60A

N+1 Redundancy up to 60A requires four 20A power supplies and two YR40.241 redundancy modules.

Note: Use separate mains systems for each power supply whenever it is possible.
18.6. MOUNTING ORIENTATIONS

Mounting orientations other than input terminals on the bottom and output on the top require a reduction in continuous output power or a limitation in the maximum allowed ambient temperature. The amount of reduction influences the lifetime expectancy of the power supply. Therefore, two different derating curves for continuous operation can be found below:

**Curve A1**  
Recommended output current.

**Curve A2**  
Max allowed output current (results in approximately half the lifetime expectancy of A1).

![Fig. 18-3 Mounting Orientation A (Standard orientation)](image)

![Fig. 18-4 Mounting Orientation B (Upside down)](image)

![Fig. 18-5 Mounting Orientation C (Table-top mounting)](image)

![Fig. 18-6 Mounting Orientation D (Horizontal cw)](image)

![Fig. 18-7 Mounting Orientation E (Horizontal ccw)](image)

All parameters are specified at 24V, 40A output current, 25°C ambient and after a 5 minutes run-in time unless otherwise noted.