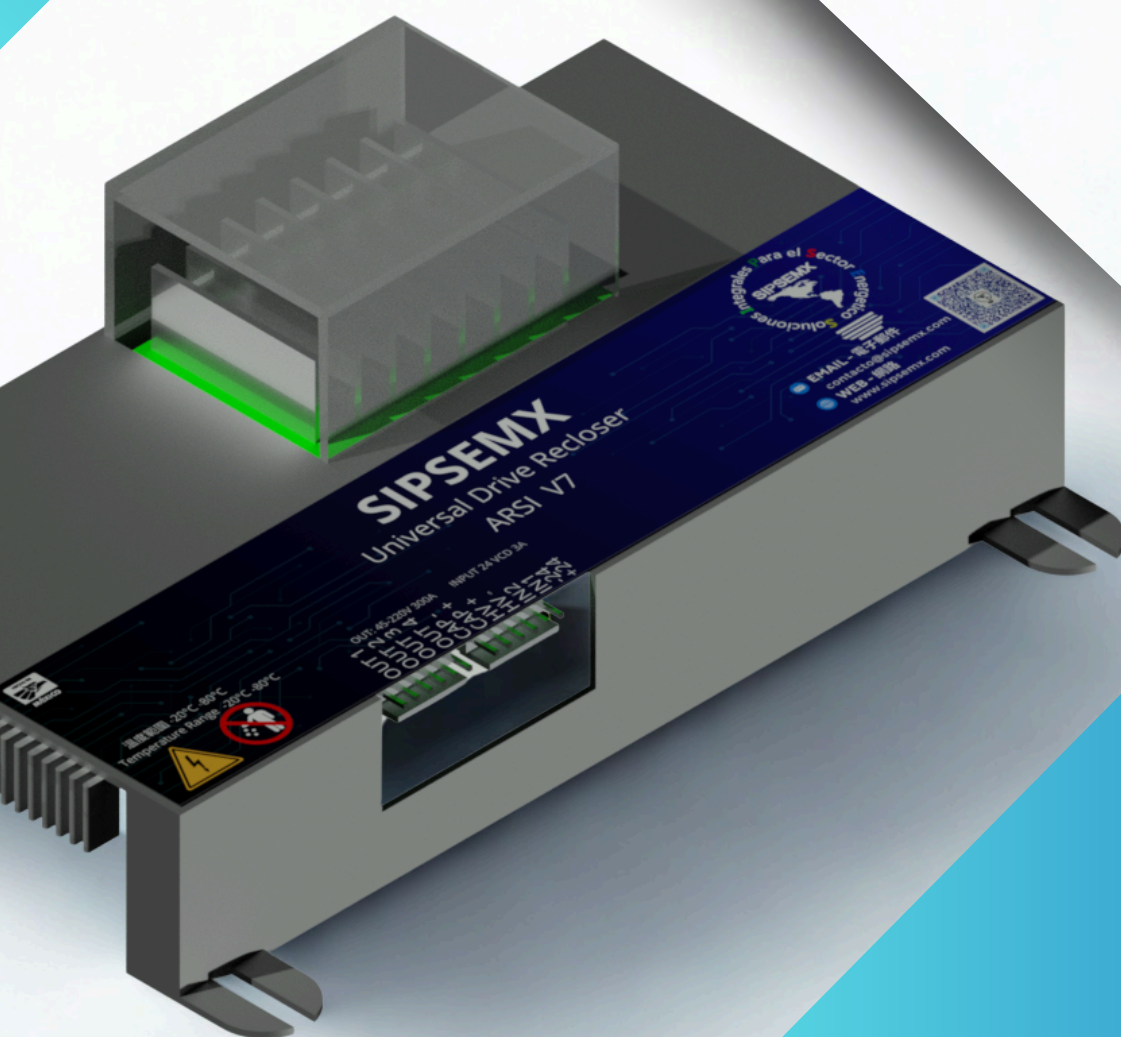




ARSI V7 DATASHEET



Presented By
SIPSEMX

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DATASHEET ARSI

Intelligent electronic device capable of executing open and close commands in medium-voltage (15–38 kV) switching equipment, circuit breakers, and reclosers equipped with magnetic, solenoid, or motor actuators. It operates through power outputs and an adjustable source depending on the equipment to be controlled, with switching times (on/off) < 130 ns.

1. Scope and target audience

This manual describes the installation, configuration, operation, testing, and maintenance of the trip board used to operate opening and closing actuators in medium-voltage reclosers/switches. It is intended for engineering, testing, operation, and maintenance technical personnel.

2. Security

WARNING: Before operating, disconnect all power sources (AC/DC, batteries) and discharge the system capacitors.

- Comply with lockout/tagout (LOTO) procedures.
- Use PPE: dielectric gloves, safety glasses, etc.
- Verify absence of voltage and correct polarity.
- Prevent discharges caused by dv/dt and back EMF in coils.

3. References and abbreviations

- IEC/IEEE 62271 111 (IEEE C37.60) — Restorers.
- IEC 61000 4 x — EMC (immunity, surges, etc.).
- dv/dt: voltage derivative over time.
- EMI/EMC: interference/compatibility.
- UVLO/OVP: low/high voltage.

4. System description

The system consists of a trip circuit for controlling actuators (closing and opening operations) with high-voltage capacitor charging, designed to supply fast and controlled operating energy.

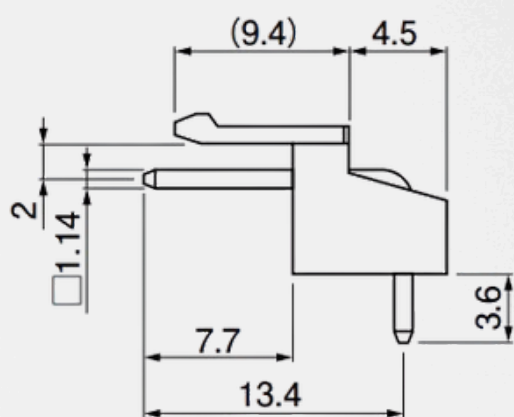
Functional Architecture:

- Adjustable DC supply (45–220 Vdc): powers the capacitor charging circuit and defines the trigger level.
- HV Capacitor Charger: Current/power control (e.g., 80 W), Vcap and I monitoring, and pre-charge/ready-to-fire logic. Max charge 500 mA
- Power stage: Power semiconductors with < 130 ns switching, capable of 40 A continuous and 160 A pulses < 100 ms.
- Reconfigurable outputs (3 channels): independent polarity assignment (+/–) and near-instant reversal to perform the opposite action.
- Transient suppression: snubber/TVS networks and free wheeling path for back EMF.
- Control interface: 2 digital inputs (Opening/Close).
- Protections: UVLO/OVP/OCF, temperature and interlocks (door, AC/BAT OK); 1300 V insulation.
- Remote control/SCADA: integration via dry contacts/inputs, compatible with RTU/IED.



5. Connectors and pinout

- Current rating: 10 A AC/DC (AWG #16)
- Voltage rating: 250 V AC/DC
- Temperature range: -24°C to +85°C (including temperature rise in applying electrical current)
- Contact resistance: initial value/ 10 MΩ max
After environmental tests/ 20 MΩ max
- Insulation resistance: 1,000 MΩ min
- Applicable wire: AWG #22 to #16



Averages expressed
in mm

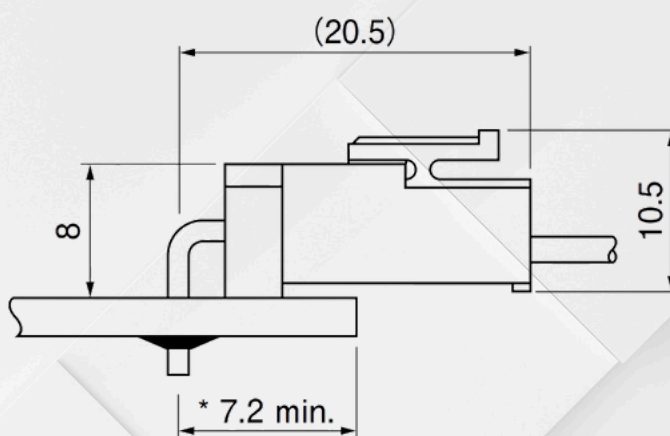
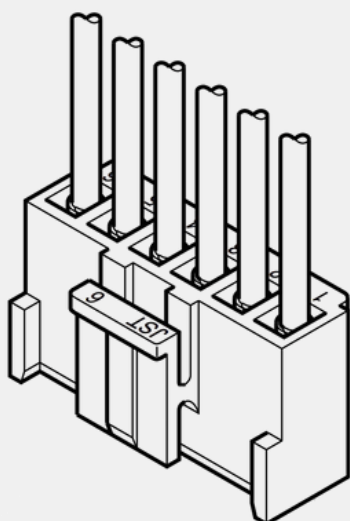
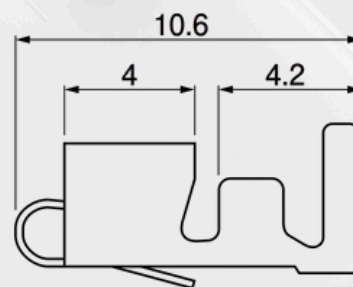
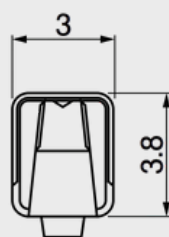


Figure 1: Connection dimensions



6. Mechanical installation

- Fastening with M4 screws (according to design).
- Maintain separation between power and signal circuits.
- Ensure proper cable securing inside the cabinet.

7. Electrical connections

- 1. Connect power and/or battery according to the diagram.
- 2. Wire COIL_CLOSE and COIL_OPEN respecting polarity and conductor gauge.
- 3. Verify ground/PE and shielding.
- 4. Connect Capacitor. Do not exceed 80W < 3 for less than 3 minutes

8. Start-up (checklist)

- Check the actuator connection. Exceeding a current of 160 A can cause permanent damage.
- Check the capacitor charge at the selected voltage.
- Check the power polarity.

9. Configuration

- Limit current and pulse time parameters.
- Dead time between opposing maneuvers: [1-2] ms (reference).
- Reclose timings (instant/delayed).

10. Operation

- Closing: apply a controlled 20ms pulse until operation is confirmed.
- Opening: apply a controlled 20ms pulse until operation is confirmed.
- Immediate counteraction: comply with minimum dead time.

11. Test procedures

12. Capacitor charging

- 1) Set Vcap to [150] Vdc.
- 2) Measure charging and ripple time.
- 3) Record charging power.

Voltage supply	24-26VCD
Capacitor charging	45-200VCD
Control inputs	24VCD
Output current	pulse ≤ 100 ms @ 150A
Power output	45-200VCD
Power Output Capacitor charge	80 W
Temperature range	-30°C a 80°C

Table 1 Shooting card characteristics



For the capacitor charging voltage adjustment, the potentiometer of the power supplies must be adjusted evenly, that is, both supplies should be progressively increased in parallel to avoid excessive stress on either one.

NOTE: The capacitor must be discharged and preferably disconnected from the trip board. Each supply should be regulated separately: first connect one supply, adjust it to the desired voltage, disconnect it, and then repeat the same with the other. Once both supplies are regulated, they can be connected together to the trip board along with the capacitor.

On the capacitor side, we add a 10 k Ω chassis resistor to keep the capacitor as stable as possible and prevent irregular voltage rise.

To speed up charging, we decrease the ceramic resistor with the lower value. In other words, the 27 k Ω resistor remains fixed, and the variable one is the other. The typical range of values we use goes from 5.6 Ω to 22 Ω .

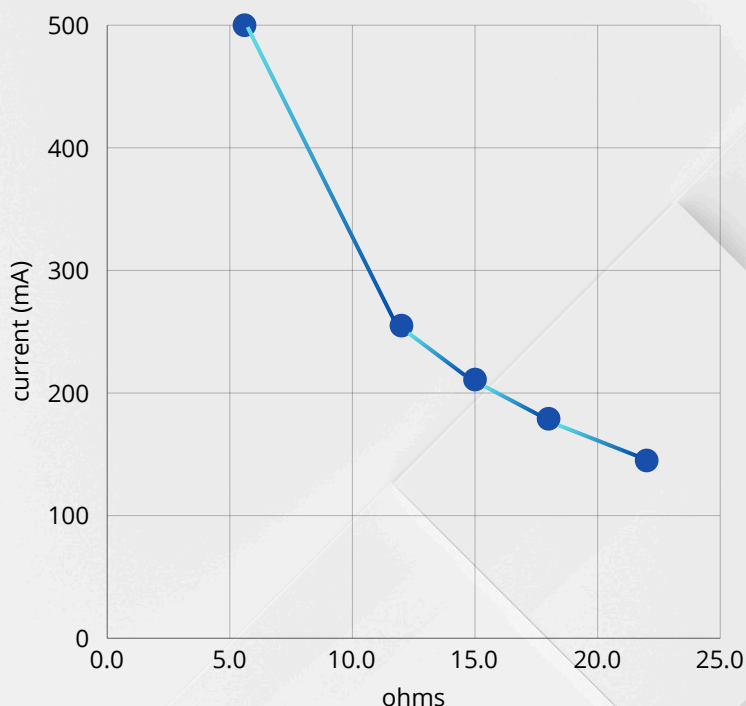
➤ With a 5.6 Ω resistor, we obtain an output current of about 500 mA.

➤ With a 22 Ω resistor, the output current is about 145 mA.

It is recommended to adjust the resistor depending on the target capacitor voltage. This ensures that the charging power is limited to 70 W, preventing damage to the power supplies.

ohms	current (mA)	power (W)	voltage cap
5.6	500	65	130
12	255	33.15	130
15	211	27.43	130
18	179	23.27	130
22	145	18.85	130

Table 2 Relationship between resistance and current.



Graph 1 Relationship between resistance and current.

EJEMPLO:

If the charging voltage is 190 VDC, it is recommended to change the ceramic resistor to a 7.5 ohm resistor to avoid exceeding the 70W that both sources can supply.

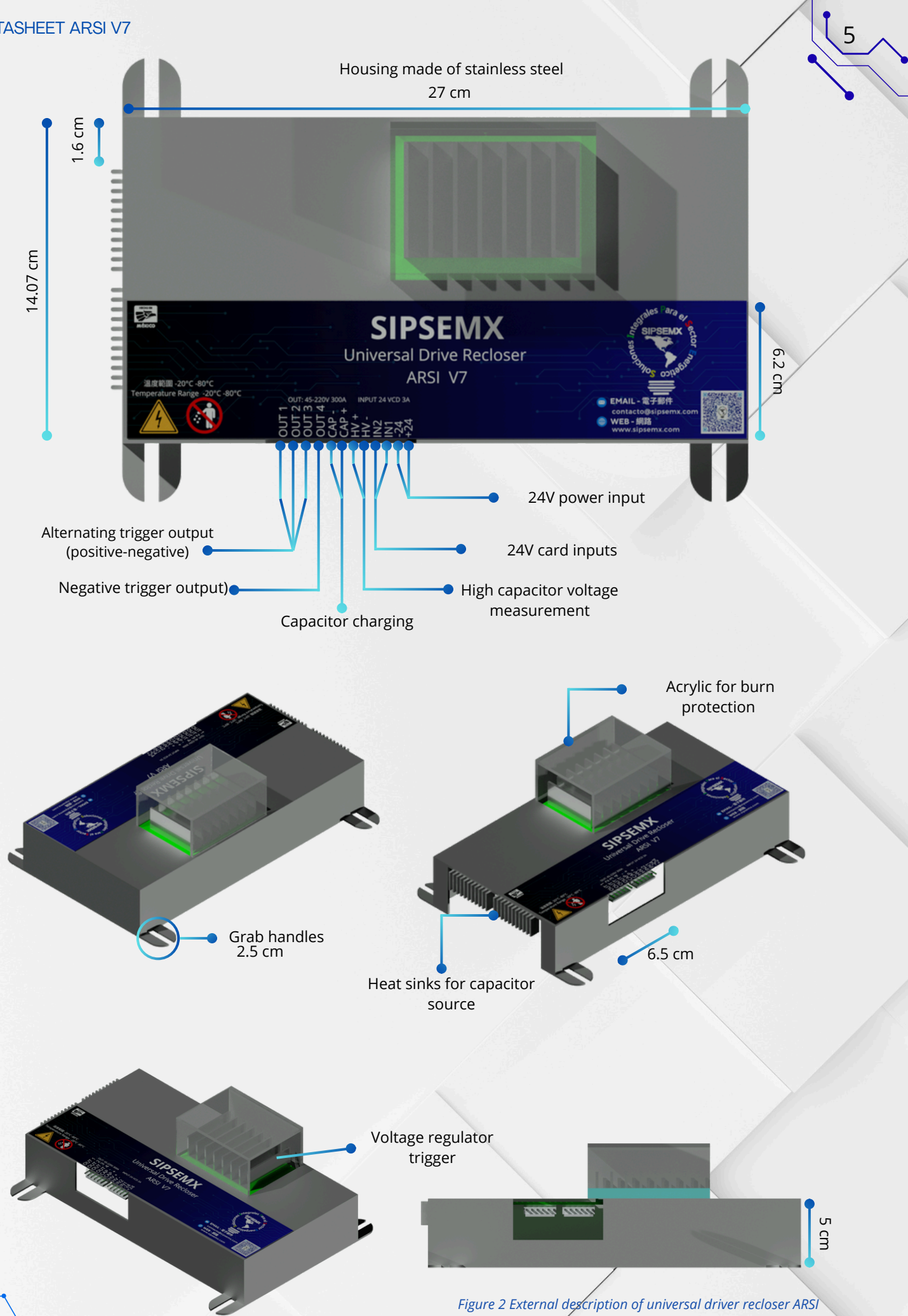


Figure 2 External description of universal driver recloser ARSI

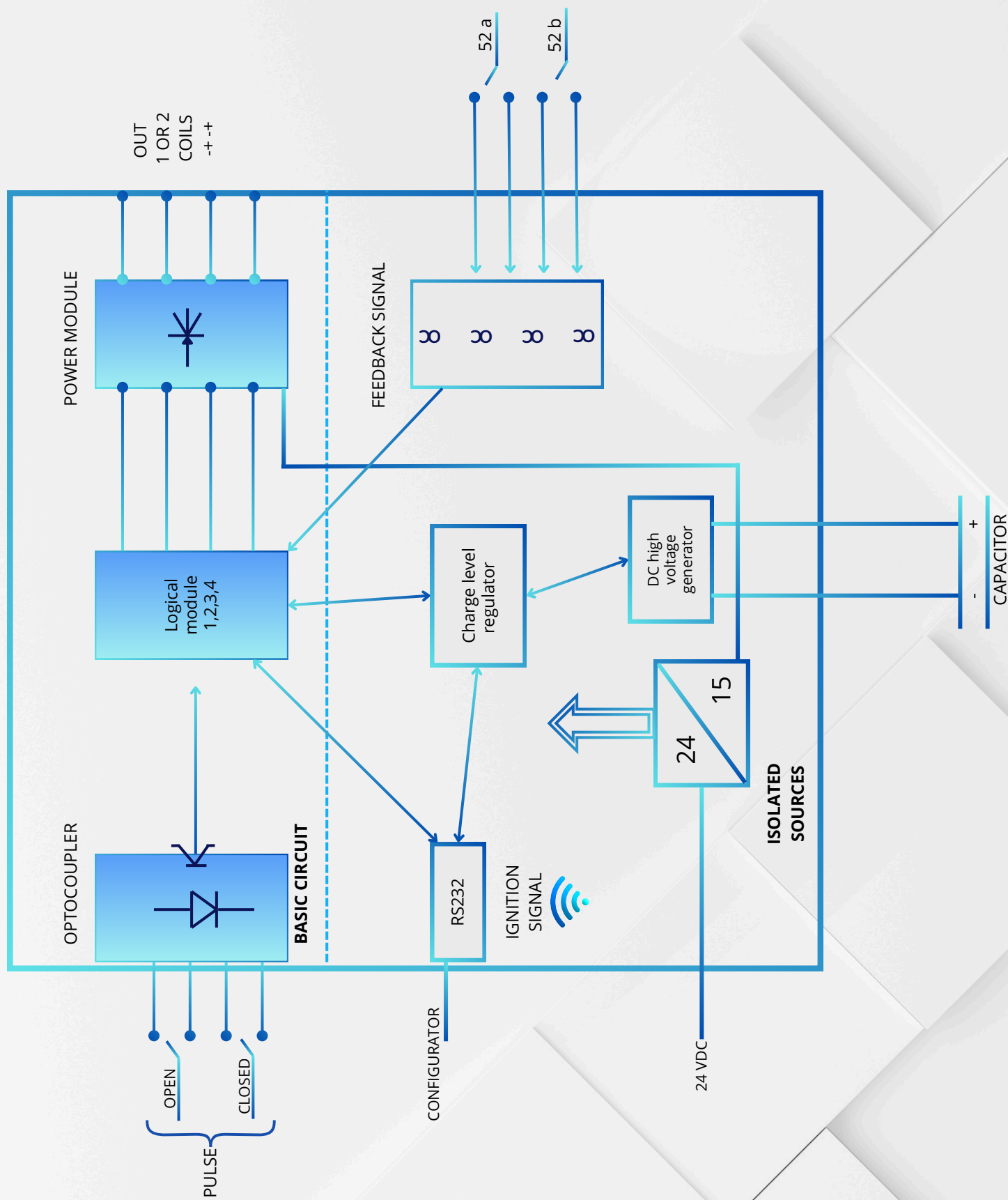


Figure 3: Connection dimensions

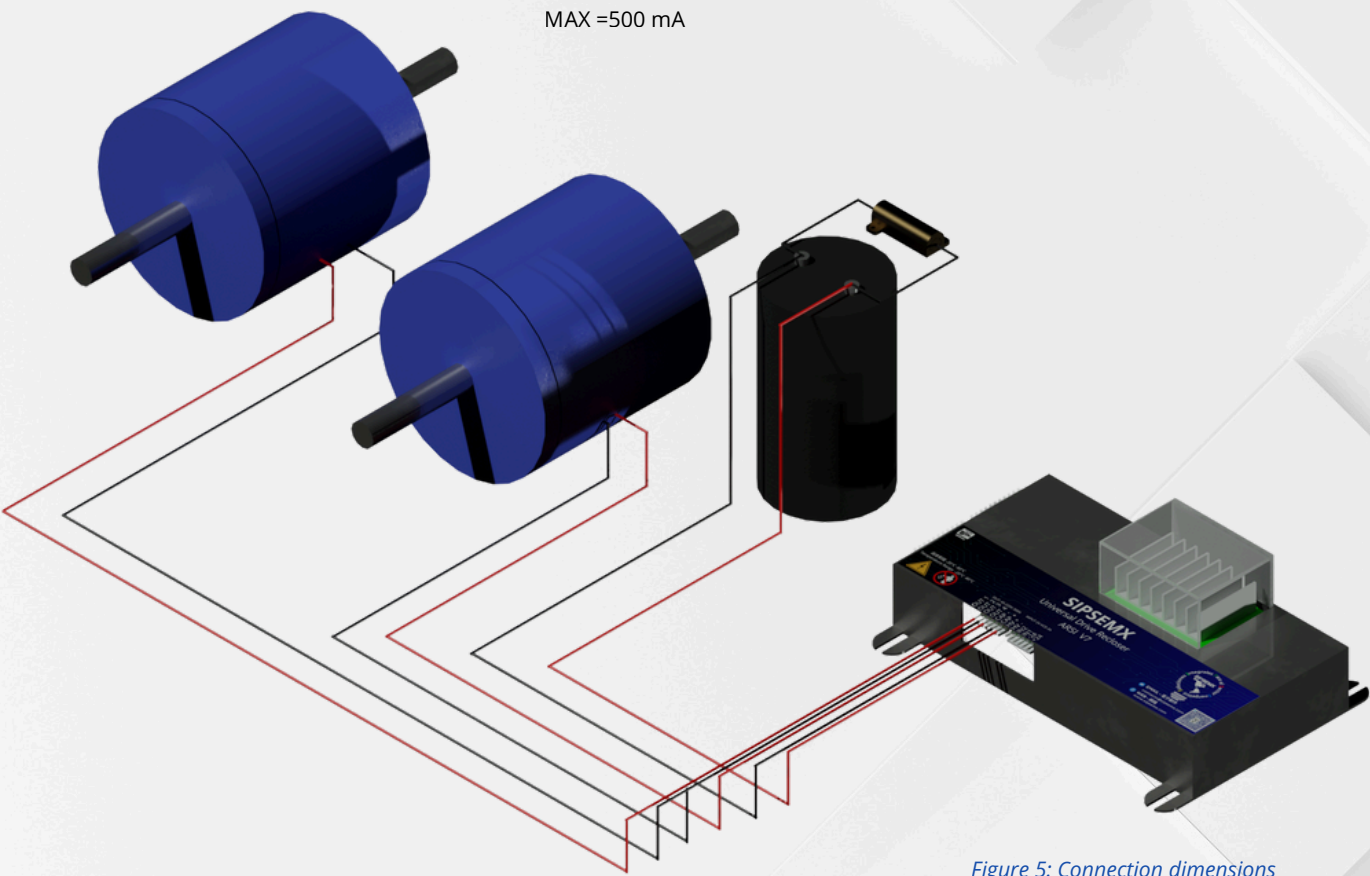
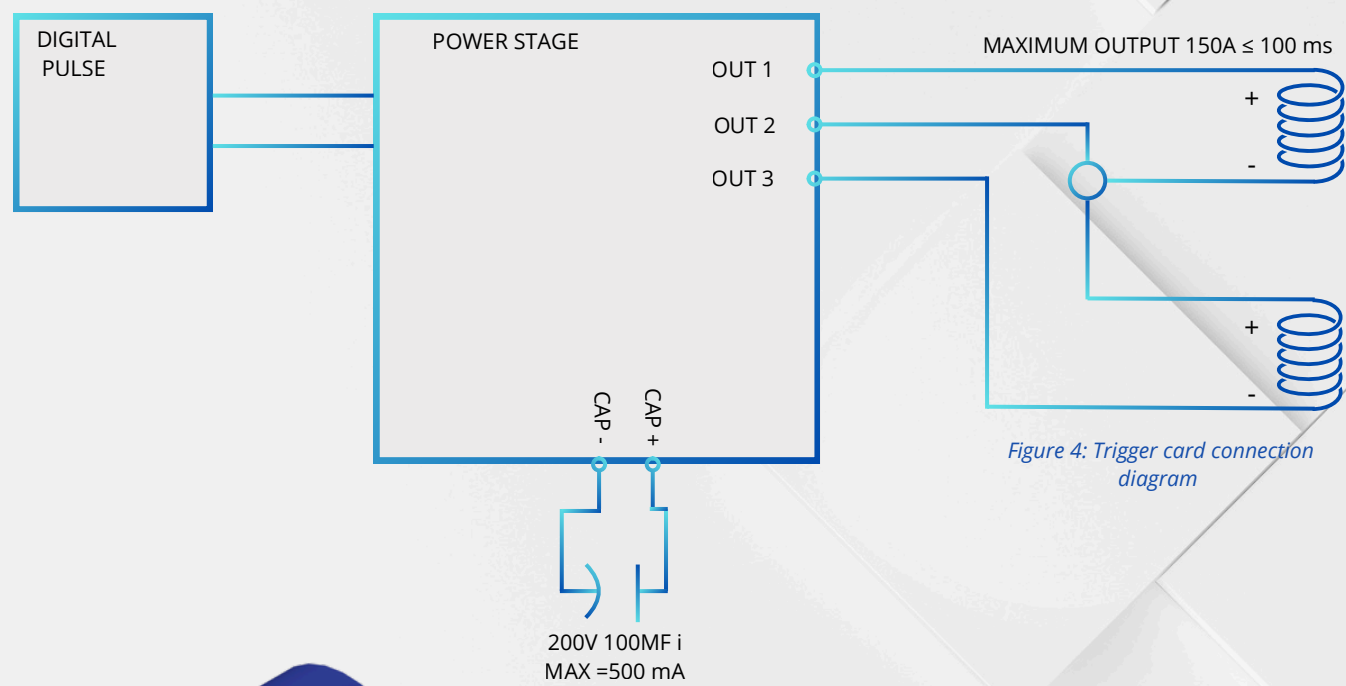
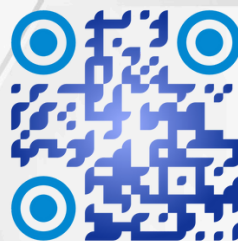


Figure 5: Connection dimensions

- OUT 1 — HIGH VOLTAGE OUTPUT
- OUT 2 — HIGH VOLTAGE OUTPUT
- OUT 3 — HIGH VOLTAGE OUTPUT
- CAP + — CAPACITOR POSITIVE
- CAP - — CAPACITOR NEGATIVE
- IN 1 — DIGITAL INPUT 1
- IN 2 — DIGITAL INPUT 2
- 24 — 24 GND POWER SUPPLY
- +24 — 24 VDC POWER SUPPLY





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