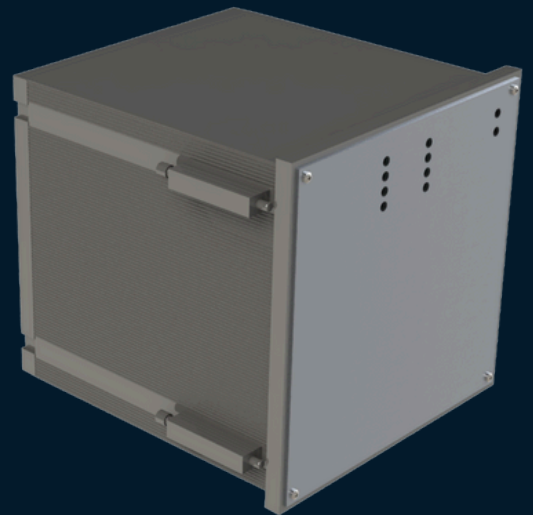


## RELAYS

---

# TRANSFORMER PROTECTION THERMAL IMAGE RELAY



# RELAYS

## Description

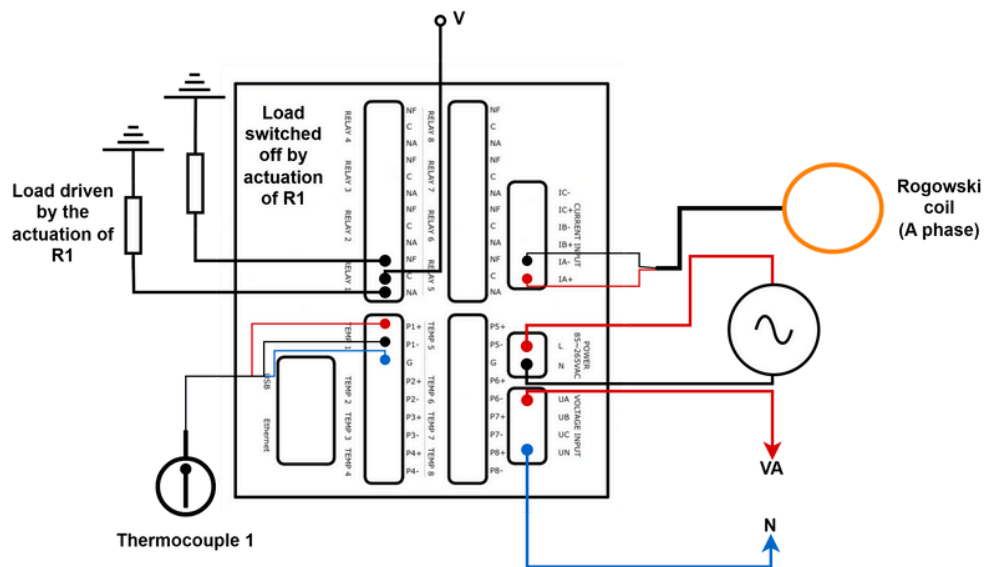
The thermal image relay for transformers protection was developed to integrate transformers with smart grids.

Through this system, important information from the network and the transformer is sent in real-time to the customer, enabling remote management of data such as: voltage, current, passing power, energy, temperature, overload, etc.

This information can also be processed to predict the asset's lifespan and assess technical and non-technical losses, in addition to having a relay module for product parameterization and operation as part of the protection system.

## Features

- Configurable relay module for integration into the protection system;
- Monitoring of transformer parameters (voltage and current);
- Internal temperature measurement;
- Analysis of transformer lifespan loss.



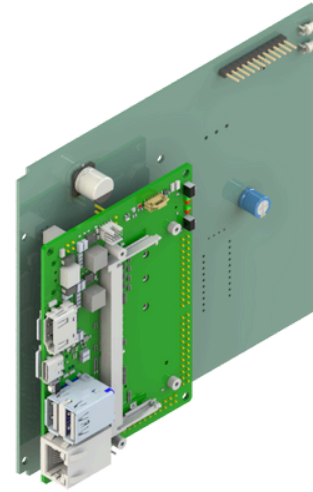
---

# RELAYS

---

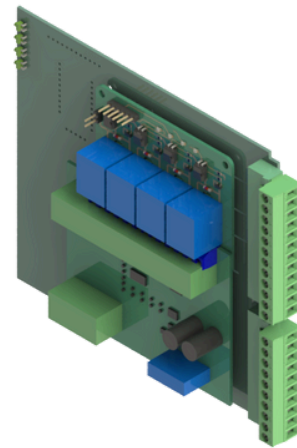
## Processing module (CPU)

Responsible for integrating all other circuits, which are physically attached to this board, into a single system. The board receives all measurement data, processes it, and can send control commands according to the parameterization conditions. Additionally, it integrates the system's input and output communication interfaces to connect the equipment with the system.



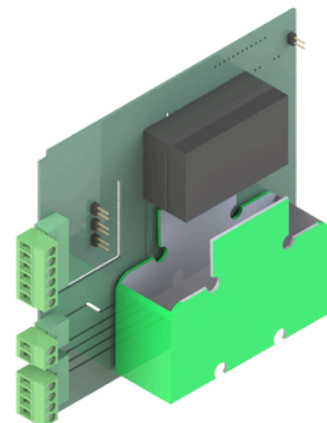
## Relay and thermal measurement module

Featuring support for 4 to 8 relays on the temperature board, along with the signal inputs from the thermocouples, these relays can operate based on conditions parameterized via software through commands sent by the comparator of the main processing unit. These commands can trigger alarms or trips under specific conditions determined after protection studies.

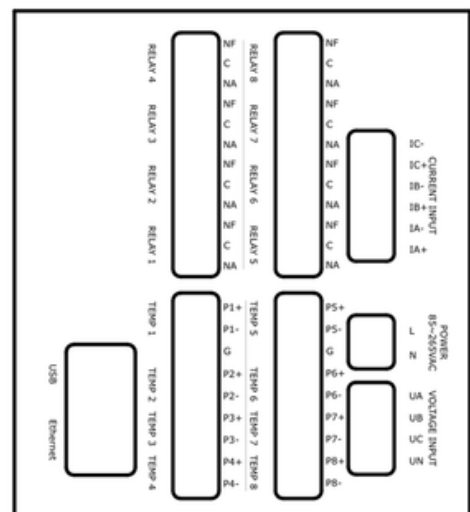
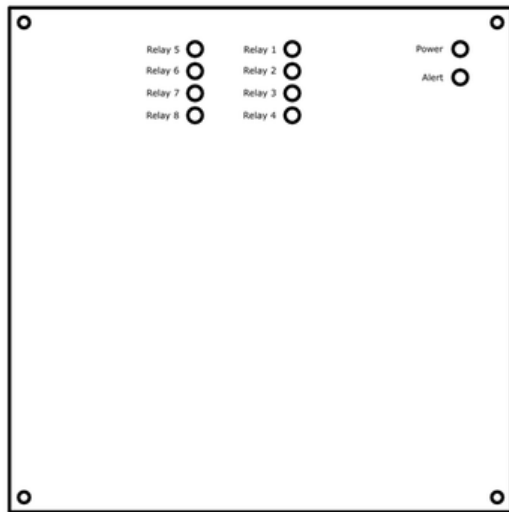


## Electrical measurement module

Coupled to the processing circuit, the HVEX Acquisition board interfaces between the sensors and the measurement of electrical parameters (voltage and current), sending this data for processing.



# RELAYS



|   |  |
|---|--|
| POWER                                       | Power supply                                   |
| L   | Power supply phase terminal                    |
| N   | Power supply Neutral terminal                  |
| CURRENT INPUT                               | Current input identification                   |
| IA+, IB+, IC+                               | Current input terminals IA, IB, IC             |
| IA-, IB-, IC-                               | Current input terminals IA, IB, IC             |
| VOLTAGE INPUT                               | Voltage input identification                   |
| UA, UB, UC, UN                              | Voltage input terminals UA, UB, UC and neutral |
| TEMP 1, 2, 3, 4, 5, 6, 7, 8                 | Temperature sensors identification 1 to 8      |
| P1+, P2+, P3+, P3+, P4+, P5+, P6+, P7+, P8+ | Thermocouples positive terminals 1 to 8        |
| P1-, P2-, P3-, P4-, P5-, P6-, P7-, P8-      | Thermocouples negative terminals 1 to 8        |
| G   | Thermocouple common grounding terminal         |
| RELAY 1, 2, 3, 4, 5, 6, 7, 8                | Relay terminals identification 1 to 8          |
| NF  | Corresponding relay Normally Closed contact    |
| C   | Corresponding relay Common contact             |
| NA  | Corresponding relay Normally Open contact      |
| USB   | USB port identification                        |
| Ethernet                                    | Ethernet port identification                   |

# RELAYS

## Web supervisory platform

- Customer, user, and installation management;
- Intuitive interface, consolidating information for the administrator;
- BI tools;
- Platform for data monitoring and alarm/trip parameterization.

## Benefits

- Low measurement cost;
- Improved analysis quality by reducing the sample space for data collection, clearly defining transformer overload, expected performance, and potential reallocation of productive resources;
- Configurable relays according to DNP3 variables assigned to meters, with control over conditioned alarms.

Through communication, it is possible to obtain technical data via a web interface for asset mapping. The online platform provides consolidated data in a graphical format to facilitate user analysis.

| # | Identification | Status | Variable                 | Reading Value | Conditional  |
|---|----------------|--------|--------------------------|---------------|--------------|
| 1 | Test           | ACTIVE | VARIABLE/CHO_TEMPERATURE | 22.8          | GREATER_THAN |

| Start Date | End Date   |
|------------|------------|
| 16/10/2024 | 16/10/2024 |

| Relay   | Status      | Alarms            |
|---------|-------------|-------------------|
| Relay 2 | not working | watching 0 alarms |
| Relay 3 | not working | watching 0 alarms |
| Relay 1 | working     | watching 1 alarms |
| Relay 4 | not working | watching 0 alarms |

---

## Technical Specifications

---

|              |              |
|--------------|--------------|
| Power supply | 85 - 265 VAC |
|--------------|--------------|

---

|                |   |
|----------------|---|
| Voltage inputs | 4 |
|----------------|---|

---

|                     |              |
|---------------------|--------------|
| Voltage input range | 30 ~ 600 VAC |
|---------------------|--------------|

---

|                              |    |
|------------------------------|----|
| Voltage measurement accuracy | 2% |
|------------------------------|----|

---

|                        |               |
|------------------------|---------------|
| Overvoltage Capability | CAT III 1000V |
|------------------------|---------------|

---

|            |             |
|------------|-------------|
| Insulation | IEC 61010-1 |
|------------|-------------|

---

|               |   |
|---------------|---|
| Current input | 3 |
|---------------|---|

---

|                     |               |
|---------------------|---------------|
| Current sensor type | Rogowski coil |
|---------------------|---------------|

---

|                      |                                 |
|----------------------|---------------------------------|
| Current sensor ratio | 333 mV / kA; 85 mV / kA (60 Hz) |
|----------------------|---------------------------------|

---

|                              |      |
|------------------------------|------|
| Current measurement accuracy | 0,5% |
|------------------------------|------|

---

|                    |   |
|--------------------|---|
| Temperature inputs | 8 |
|--------------------|---|

---

|                         |                    |
|-------------------------|--------------------|
| Temperature sensor type | Thermocouple PT100 |
|-------------------------|--------------------|

---

|                         |               |
|-------------------------|---------------|
| Temperature input range | -50 ~ +450 °C |
|-------------------------|---------------|

---

|                       |          |
|-----------------------|----------|
| Withstand temperature | < 500 °C |
|-----------------------|----------|

---

|                                  |    |
|----------------------------------|----|
| Temperature measurement accuracy | 1% |
|----------------------------------|----|

---

|        |       |
|--------|-------|
| Relays | 4 / 8 |
|--------|-------|

---

|                     |         |
|---------------------|---------|
| Relay contact types | NC / NO |
|---------------------|---------|

---

---

## Technical Specifications

---

|           |   |
|-----------|---|
| USB ports | 2 |
|-----------|---|

---

|                |   |
|----------------|---|
| Ethernet ports | 1 |
|----------------|---|

---

|                        |      |
|------------------------|------|
| Communication protocol | DNP3 |
|------------------------|------|

---

|            |   |
|------------|---|
| Connection | RJ45 Ethernet cable (external router support) |
|------------|---|

---

### **Electromagnetic compatibility tests**

---

|                         |                         |
|-------------------------|-------------------------|
| Electrostatic discharge | CATIV 600V IEC61000-4-2 |
|-------------------------|-------------------------|

---

|                   |                           |
|-------------------|---------------------------|
| Radiated immunity | CATIII 1000V IEC61000-4-3 |
|-------------------|---------------------------|

---

|     |                         |
|-----|-------------------------|
| EFT | CATIV 600V IEC61000-4-4 |
|-----|-------------------------|

---

|                   |                         |
|-------------------|-------------------------|
| Outbreak immunity | CATIV 600V IEC61000-4-5 |
|-------------------|-------------------------|

---

|                             |                          |
|-----------------------------|--------------------------|
| Conducted Disorder Immunity | CATIII 600V IEC61000-4-6 |
|-----------------------------|--------------------------|

---

|                         |                    |
|-------------------------|--------------------|
| Magnetic field immunity | 0,5mT IEC61000-4-8 |
|-------------------------|--------------------|

---

We provide solutions for improvement of electrical energy generation, transmission and distribution efficiency, quality and reliability. With a highly specialized and experienced team in research, development and innovation, HVEX develops tailor-made solutions for Brazilian and foreign markets. Wide range of products with solutions focused on signal transduction, measurement, monitoring and protection.



Driving Innovation



☎ 35 3622-2699

✉ [contato@hvex.com.br](mailto:contato@hvex.com.br)

🌐 [www.hvex.com.br](http://www.hvex.com.br)

📍 R. Ismael Pinto de Noronha, 86,  
Nossa Sra. de Fatima, Itajubá-MG