Intelligent Interface Modules

General Introduction

In measurement, positioning and control applications, it is necessary to monitor and indicate the status of the machine or installation. In order for the signal to be processed by the programmable controller, it must be presented in digital form or converted to one of the standard signals of 0... 20 mA, 4... 20 mA or 0... 10 V.

Murrelektronik can supply a wide range of intelligent interface modules with the additional benefit of opto-isolation of inputs and outputs.

These modules present a number of practical advantages to the user:

- A wide supply voltage range of 21... 30 V DC
- Short-circuit protected solid state or electro-mechanical relay outputs
- Opto-isolation
- LED status indicator
- Mounting on DIN-rail

AD/DA Converter Modules

In order for the analogue signals, for example, from sensors to be accepted and processed by the controller, they must be converted into digital form.

Similarly, the digital output signals from the PLC must sometimes be converted into analogue signals, e.g. to control positioning devices. The programmable control unit works in binary as does the Murrelektronik module. The higher the number of bits, the finer the resolution and the better the control. The signals from the sensors are converted into the correct form for the PLC, processed and presented to the output field devices simply and effectively.

The digital-analogue module converts binary signals into one of the standard signals of 0... 20 mA, 4... 20 mA or 0... 10 V, whereas the analogue-digital module does the reverse.

Analogue Coupler Modules

The analogue signals from sensors and other such measuring devices are usually in one of the standard signal formats of 0... 20 mA, 4... 20 mA or 0... 10 V.

The Murrelektronik analogue coupler modules will accept one of these signals and change it to give an output in any of the 3 forms. The additional benefit is that the inputs and outputs are also opto-isolated.

A common problem occurs when a voltage signal must be transferred over a long distance. In order to minimize the possibility of an incorrect voltage signal being received, it is common practice to convert the voltage into a current signal.

Digital information

Input signal

Output signal

Value

Example: A 4 Bit converter \(2^4 = 16\) levels corresponding to 15 increments. If level 0000 = 0 V and level 1111 = 10 V, each increment will represent 0.666 V per bit.

Example: To convert one signal format into another with electrical isolation.
Intelligent Interface Modules

The frequency to analogue converter from Murrelektronik will convert the sinusoidal output from a tachogenerator, or the pulse train from an encoder, into an analogue value proportional to the RPM.

The output will be one of the standard forms of voltage or current 0…20 mA, 4…20 mA or 0…10 V.
The output is opto-isolated from the input to avoid interference.

Example: To convert a pulse train into analogue voltage and then into digital binary format.

Comparator Modules

The Murrelektronik comparator modules compare to the analogue voltage or current values with internal or external references to overshoot and undershoot these adjustable limits and give up the corresponding output signals.

The desired set point succeeds either above the located module potentiometer or externally above the terminal connection.

With the operating mode window discriminator, stand three outputs for continuation to disposition:

- “under operating point” (this means input signal is underneath the first reference value)
- “in window” (this means input signal is between the reference value)
- “over operating point” (this means input signal is above the second reference value)

Temperature Converter Modules

In industry, most temperature measurements are made with a resistance type thermometer, where the probe is supplied with a constant voltage and the output varies with the change in resistance caused by changes in the temperature.

The most commonly used probe is the PT 100 type.

Connecting the probe to the Murrelektronik MTW module gives the probe the necessary voltage supply and also converts its output to the standard signal forms of 0…20 mA, 4…20 mA or 0…10 V.

The errors due to the cable resistance can be compensated for on the module.

Example: Monitoring and evaluating temperature by means of a PLC.

Example: Method of connection Window Discriminator:

IN 1 and IN 2 must be connected in parallel

Ref 1 defines the lower limit of the window
Ref 2 defines the upper limit of the window

OUT 1 – “under operating point”
OUT 2 – “in window”
OUT 3 – “over operating point”
Intelligent Interface Modules

**MAW, MDW**
Analogue-digital/ digital-analogue converter modules with 6, 8, 10 or 12 Bit resolution. For the direct input of standard analogue signals in digital control systems or the analogue control of equipment via digital signals.

**MUUW, MUIW, MIUW, MIIW, MULTIWANDLER**
The analogue-coupler modules can make differing analogue signals, which occur in the sensor and output circuits (0... 10 V, ± 10 V, 0... 20 mA, 4... 20 mA) work together. The input and output circuits are galvanically separated. With the new MULTIWANDLER all functions can be covered only with the module.

**RM**
Motor protection relays to protect and monitor motors with integrated temperature sensor.
The modules have 2 contacts.

**MUFW, MIFW**
Over long distances, signals can be falsified or damaged due to the cable resistance and other interference. This can be stopped by converting the standard output signals into an equivalent frequency signal. Signal input and output are electrically isolated.

**MFUW, MFIW**
The frequency converter converts frequency signals up to 100 kHz into an equivalent analogue signal (0... 10 V, 0... 20 mA, 4... 20 mA). Herewith, it is possible to process impulse signal chains from i.e. revolution or speed measurements from controllers which do not have the ability to accept rapid number inputs.

**MIB**
The pulse extension modules increase the length of very short impulses which cannot be used as a defined control signal to the controller. Control signals with a lengthened cycle time can then be accepted and processed by slower PLC systems.

**MAK**
The comparator modules are designed to monitor and regulate simple automatic processes.
Two possible applications can be covered:
1. Monitoring an analogue input signal to see if it goes outside pre-defined limits
2. Monitoring an analogue input signal to see if it remains within pre-defined limits
**MTW**

Signals from a PT 100 Sensor are converted using the temperature converter modules into standard output signals (0... 10 V, 0... 20 mA, 4... 20 mA). It is therefore easy to make a cost-effective connection between the process monitoring and the process administration (i.e. PLC).

To stop signal corruption which occurs due to cable resistance, the module allows for 3-wire measurement compensation.

---

**MESCO**

Measuring and monitoring relays to monitor and measure electrical values. They both control and safeguard systems. MESCO modules are used in AC, DC and three phase applications where exact voltages, temperatures, levels and rotational speeds need to be measured.

The terminal block are removable which reduces servicing time.

Double chamber terminals allow 2 wires of differing diameters to be connected.
Intelligent Interface Modules

Analogue-Digital Converter modules

Inputs and outputs galvanically isolated

<table>
<thead>
<tr>
<th>Circuit diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Circuit Diagram" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Art.-No.</th>
<th>Art.-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Bit</td>
<td>0...10 V DC</td>
<td>44061</td>
</tr>
<tr>
<td>8 Bit</td>
<td>0...20 mA</td>
<td>44090</td>
</tr>
<tr>
<td>8 Bit</td>
<td>4...20 mA</td>
<td>44091</td>
</tr>
<tr>
<td>8 Bit</td>
<td>0...10 V DC</td>
<td>44062</td>
</tr>
<tr>
<td>8 Bit + Pol.</td>
<td>±10 V DC</td>
<td>44097</td>
</tr>
<tr>
<td>10 Bit</td>
<td>0...20 mA</td>
<td>44094</td>
</tr>
<tr>
<td>10 Bit</td>
<td>4...20 mA</td>
<td>44095</td>
</tr>
<tr>
<td>10 Bit</td>
<td>0...10 V DC</td>
<td>44063</td>
</tr>
<tr>
<td>10 Bit + Pol.</td>
<td>±10 V DC</td>
<td>44078</td>
</tr>
<tr>
<td>12 Bit</td>
<td>0...20 mA</td>
<td>44100</td>
</tr>
<tr>
<td>12 Bit</td>
<td>4...20 mA</td>
<td>44101</td>
</tr>
<tr>
<td>12 Bit</td>
<td>0...10 V DC</td>
<td>44064</td>
</tr>
</tbody>
</table>

**Technical data**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Supply voltage range: 2 x 21...30 V DC, smoothed (with LED) 21...30 V DC, smoothed (with LED); ±15 V DC at 44078</td>
</tr>
<tr>
<td>- Supply current: 60 mA (no load) in addition to max. 100 mA per digital output 100 mA no load, max. 150 mA (full load)</td>
</tr>
<tr>
<td>- Input signal type: dependent 0...30 V DC log 1 ≥ 16 V, log 0 ≤ 6 V (with LED)</td>
</tr>
<tr>
<td>- Input current type: dependent max. 10 mA Bit</td>
</tr>
<tr>
<td>- Output current: 100 mA Bit (with LED) max. 40 mA at 0...10 V DC; max. 20 mA at 0...20 mA, 4...20 mA</td>
</tr>
<tr>
<td>- Tolerance: ±1 LSB ±1 %</td>
</tr>
<tr>
<td>- Converter cycle time: 80 ms, at 6 Bit adjustable 2.5/150 ms</td>
</tr>
<tr>
<td>- Release input E: log 1 ≥ 16 V, log 0 ≤ 6 V</td>
</tr>
<tr>
<td>- Test insulation voltage: 2.5 kV AC</td>
</tr>
<tr>
<td>- Temperature range: 0...+50 °C</td>
</tr>
<tr>
<td>- Dimensions H x W x D: 86 x 90 (67,5) x 65 mm (6 Bit)</td>
</tr>
</tbody>
</table>

**Notes**

DIN-rail mounting to EN 50022.
Intelligent Interface Modules

Analogue-coupler modules

**M.U.W 6,2** Voltage-Current
**M.I.W 6,2** Current-Voltage
**M.I.W 6,2** Current-Current

Inputs and outputs galvanically isolated

---

**Circuit diagram**

---

**Ordering data**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0...10 V DC / 20 mA</td>
<td>6644205</td>
<td>6644212</td>
<td>6644213</td>
</tr>
<tr>
<td>0...10 V DC / 300 mA</td>
<td>44201</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0...20 mA</td>
<td>6644232</td>
<td>6644226</td>
<td>6644227</td>
</tr>
<tr>
<td>4...20 mA</td>
<td>6644233</td>
<td></td>
<td>6644228</td>
</tr>
<tr>
<td>±0...10 V DC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Technical data**

- **Supply voltage range**: 24 V DC ±20 %, smoothed
- **Supply current**: 50...70 mA
- **Input resistance**: ≥ 200 kOhm for input voltages; 325 Ohm for current input
- **Input frequency**: max. 500 kHz
- **Output load**: R_L ≥ 500 Ohm for output voltages; R_L ≤ 500 Ohm for current output
- **Output current**: max. 20 mA
- **Tolerance**: ≤ 0.3 %
- **Test insulation voltage**: 1.5 kV
- **Temperature range**: 0...+60 °C
- **Mounting method**: DIN-rail mounting to EN 50022
- **Dimensions H x W x D**: 90 x 6,2 x 65 mm (Art.-No. 44201: 86 x 67,5 x 65 mm)

**Description**

The Murrlektronik analogue coupler modules accept input signal formats of 0...10 V, 0...20 mA, 4...20 mA. Due to an integrated current limiter on the output, short-circuit and overload protected.

---

**Notes**

- Coupler module M.I.W - 0/4...20 mA to 0/4...20 mA - without auxiliary supply, Art.-No. 44225 on request.
- To order screw terminal option omit 66 from the part number. Accessories in chapter 3.16
Intelligent Interface Modules

Analogue-coupler modules

**MULTIWANDLER 12,4**
- **INPUT** 0... 5 V DC, 0... 10 V DC
- **INPUT** ±10 V, 0... 20 mA
- **INPUT** 4... 20 mA

**MUUW**
- **INPUT** ±0... 10 V DC

Inputs and outputs and input voltage galvanically isolated

Circuit diagram

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Art.-No.</th>
<th>Art.-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPUT</td>
<td>spring clamp/screw terminals</td>
<td>6644207</td>
</tr>
<tr>
<td>0... 10 V DC</td>
<td>6644207</td>
<td>44202</td>
</tr>
<tr>
<td>0... 20 mA</td>
<td>6644207</td>
<td>44203</td>
</tr>
<tr>
<td>4... 20 mA</td>
<td>6644207</td>
<td>44203</td>
</tr>
<tr>
<td>±0... 10 V DC</td>
<td>6644207</td>
<td>44202</td>
</tr>
</tbody>
</table>

Technical data

- **Supply voltage range**: 24 V DC ±15 %, smoothed
- **Supply current**: approx. 50 mA
- **Input resistance**: approx. 100 kOhm for input voltages, approx. 75 Ohm for current input
- **Input frequency**: max. 25 Hz
- **Output load**: R_L ≤ 400 Ohm for current output
- **Tolerance**: ± 0.5 % ± 1 %
- **Test insulation voltage**: 0.75 kV DC between input and output
- **Temperature range**: -25... +50 °C
- **Mounting method**: DIN-rail mounting to EN 50022
- **Dimensions H x W x D**: 90 x 12,4 x 65 mm / 75 x 22,5 x 102 mm

Description

The Murrelektronik analogue coupler modules accept input signal formats of 0... 10 V, 0... 20 mA, 4... 20 mA. Due to an integrated current limiter on the output, short-circuit and overload protected.

A special characteristic of the MULTIWANDLER Art.-No. 6644207 includes:
- Analogue voltage signal 0... 5 V, 0... 10 V and -10... +10 V as well as current signal 0... 20 mA and 4... 20 mA, these compactable modules can be galvanically isolated in the three normal signals, which means all combinations will be covered with the model
- Isolation prevents interference on the input from appearing at the output. Art.-Nos. 44202 and 44203 have 2 electrically isolated ±15 V DC/25 mA supplies available. The "H" (I+) and "L" (I-) shown on the diagram are only on Art.-No. 44202 and give the input signals.

Notes

Accessories in chapter 3.16.

To order screw terminal option omit 66 from the part number
# Intelligent Interface Modules

## MCVO-Motor protection relay

**RM**

Motor protection relay for monitoring motors with an integrated temperature sensor

### Circuit diagram

![Circuit Diagram](image)

### Ordering data

<table>
<thead>
<tr>
<th>Input voltage</th>
<th>Art.-No.</th>
<th>Art.-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V DC</td>
<td>51010</td>
<td>51015</td>
</tr>
<tr>
<td>230 V AC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Technical data

#### Input (coil)

<table>
<thead>
<tr>
<th>Input voltage/ current</th>
<th>24 V DC ±10 %/ 100 mA</th>
<th>230 V AC +10 % -15 %/ 15 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status indicator</td>
<td>LED green</td>
<td>LED green</td>
</tr>
</tbody>
</table>

#### Technical data

- Max. switched voltage: 250 V AC/ DC
- Max. contact current: 8 A
- Min. load current: 10 mA
- Max. power rating: 2000 VA
- Contact material: Ag Cd 0
- De-energize/ energize delay: < 80 ms/ 25 ms

### Temperature monitoring data

- Total cold resistance (between T1 and T2): \( \leq 1,5 \, \text{kOhm} \)
- Operate (relay de-energize): 2.5...3.6 kOhm
- Reset (relay energize): 1.5...2.3 kOhm
- Fault indicator: LED red
- Reset: with push button or remote reset
- Sensor wire short-circuit protection: \( \leq 20 \, \text{Ohm} \)

### General data

- Mech./ elect. life: 2 \( \times 10^7 \) / load dependent
- Max. switching frequency: 10 Hz
- Test insulation voltage: 3.75 kV AC
- Temperature range: -20...+60 °C
- Mounting method: DIN-rail mounting to EN 50022 or EN 50035
- Dimensions H x W x D: 75 x 22.5 x 102 mm

### Function description

Used with motors that have an integrated PTC temperature sensor to DIN 44081. The sensor is galvanically isolated from the supply and connected to terminals T1 and T2. Minimal changes of temperature will trip the relay. A red LED shows the fault optically. A bridge link X1/ T2 enables fault latching. Via the bridge S1/ T2, remote resetting can be realised.

### Notes

Accessories in chapter 3.16
**Intelligent Interface Modules**

### Analogue-coupler modules

<table>
<thead>
<tr>
<th></th>
<th>MUFW Voltage-Frequency</th>
<th>MIFW Current-Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INPUT 0… 10 V DC</td>
<td>INPUT 0… 20 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inputs and outputs</td>
<td>galvanically isolated</td>
<td></td>
</tr>
</tbody>
</table>

---

**Circuit diagram**

![Circuit diagram](image)

**Ordering data**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPUT (separable)</td>
<td></td>
<td></td>
<td></td>
<td>spring clamp/ screw terminals</td>
</tr>
<tr>
<td>0… 1 kHz (0.5/ 0.25/ 0.125 kHz)</td>
<td>44241</td>
<td>44251</td>
<td>44261</td>
<td>6644245</td>
</tr>
<tr>
<td>0… 10 kHz (5/ 2.5/ 1.25 kHz)</td>
<td>44242</td>
<td>44252</td>
<td>44262</td>
<td>6644245</td>
</tr>
<tr>
<td>0… 100 kHz (50/ 25/ 12.5 kHz)</td>
<td>44243</td>
<td>44253</td>
<td>44263</td>
<td>6644245</td>
</tr>
</tbody>
</table>

**Technical data**

- **Supply voltage range**: 2 x 15…30 V DC, smoothed
- **Supply current**: max. 2 x 60 mA
- **Input resistance**: 100 kOhm, 500 Ohm
- **Output voltage**: supply voltage, 1.5 V, square signal
- **Tolerance**: ±1 %, 0.5 % from end value
- **Test insulation voltage**: 2.5 kV AC, 2 kV AC
- **Temperature range**: 0… +50 °C, -25… +50 °C
- **Mounting method**: DIN-rail mounting to EN 50022
- **Dimensions H x W x D**: 86 x 45 x 65 mm, 90 x 12.4 x 65 mm

---

**Description**

The Murrelektronik Analogue coupler modules MUFW and MIFW convert input signals of 0… 10 V, 0… 20 mA and 4… 20 mA into a proportional frequency. By means of the plug bridges 1… 4 the output frequency range can be adjusted to 1/1, 1/2, 1/4 and 1/8. In order to obtain a galvanic isolation between the input and output, 2 separate voltage supplies are required. The output is short-circuit and overload protected.

The new interface module in narrow MIRO casing is able to be used universally. An analogue voltage or current, these are applied to three inputs, and are galvanically isolated, transformed and stay as square wave voltage (frequency) on all three outputs symmetrical to disposition. The output frequencies are through a 4-pole switch separable in relation to 1:2, 1:4 and 1:8.

---

**Notes**

3.10.9
## Intelligent Interface Modules

### Analogue-coupler modules

<table>
<thead>
<tr>
<th>MFUW</th>
<th>MFIW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency-Voltage</td>
<td>Frequency-Current</td>
</tr>
</tbody>
</table>

Inputs and outputs galvanically isolated

### MFUW, MFIW

<table>
<thead>
<tr>
<th>MFUW</th>
<th>MFIW</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT 0... 1 kHz</td>
<td>INPUT 0... 10 kHz</td>
</tr>
<tr>
<td>INPUT 0... 100 kHz</td>
<td></td>
</tr>
</tbody>
</table>

Analogue-coupler modules

### Technical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>MFUW</th>
<th>MFIW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage range</td>
<td>21... 30 V DC, smoothed</td>
<td>24 V DC ± 20 %</td>
</tr>
<tr>
<td>Supply current</td>
<td>max. 60 mA</td>
<td>max. 80 mA</td>
</tr>
<tr>
<td>Input voltage</td>
<td>15... 30 V (with LED)</td>
<td>10... 30 V</td>
</tr>
<tr>
<td>Input current</td>
<td>2.5... 15 mA</td>
<td>6.2... 23 mA</td>
</tr>
<tr>
<td>Output signal</td>
<td>0... 10 V DC at R_L ≥ 500 Ohm</td>
<td>0... 20 mA at R_L ≤ 500 Ohm</td>
</tr>
<tr>
<td>Response time</td>
<td>max. 2 s</td>
<td>max. 0.5 s</td>
</tr>
<tr>
<td>Tolerance</td>
<td>±1 %</td>
<td>0.5 % from end value</td>
</tr>
<tr>
<td>Test insulation voltage</td>
<td>2.5 kV AC</td>
<td>2.5 kV AC</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0... +50 °C</td>
<td>-25... +50 °C</td>
</tr>
<tr>
<td>Mounting method</td>
<td>DIN-rail mounting to EN 50022</td>
<td></td>
</tr>
<tr>
<td>Dimensions H x W x D</td>
<td>86 x 45 x 65 mm</td>
<td></td>
</tr>
</tbody>
</table>

### Ordering data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>44271</td>
<td>44272</td>
<td>44273</td>
</tr>
<tr>
<td>44281</td>
<td>44282</td>
<td>44283</td>
</tr>
<tr>
<td>44291</td>
<td>44292</td>
<td>44293</td>
</tr>
</tbody>
</table>

### Circuit diagram

![Circuit diagram](image)

### Description

The Murrelektronik analogue coupler modules MFUW and MFIW convert input signals of 0... 1 kHz, 0... 10 kHz and 0... 100 kHz irrespective of the wave form, into output signals of 0... 10 V, 0... 20 mA and 4... 20 mA. By means of the plug bridges 1... 4 the input frequency range can be adjusted to 1/1, 1/2, 1/4 and 1/8. The output is short-circuit and overload protected. An LED indicates that there is an input signal.

The new interface module in narrow MIRU casing is able to be used universally. The frequency, that are applied on the three inputs, will be galvanically isolated, transformed and stay as an analog signal on all three outputs symmetrical to disposition.

### Notes
Intelligent Interface Modules

**Pulse extension modules**

**MIB**

**MIB 6,2 mm**

**Timer**

---

**Ordering data**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5...100 ms</td>
<td>44010</td>
<td></td>
<td></td>
<td>652320</td>
</tr>
<tr>
<td>0.1...1 s</td>
<td>44011</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1...10 s</td>
<td></td>
<td>6652320</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 ms</td>
<td></td>
<td></td>
<td>44012</td>
<td></td>
</tr>
</tbody>
</table>

**Technical data**

- **Supply voltage range**: 19...35 V DC, smoothed 19...29 V DC, smoothed
- **Supply current**: max. 10 mA (no load) max. 0.5 mA (no load) max. 80 mA (full load) max. 105 mA (full load)
- **Input voltage**: 2 x 0...35 V DC, log. 0 ≤ 6 V DC, log. 1 ≥ 16 V DC
- **Control impulse**: min. 0.5 ms
- **Input resistance**: 1.6 k Ohm 4 k Ohm
- **Output voltage**: supply voltage - 1.5 V
- **Output current**: max. 20 mA max. 100 mA
- **Temperature range**: 0...+50 °C 0...+55 °C
- **Mounting method**: DIN-rail mounting to EN 50022
- **Dimensions**: H x W x D 86 x 45 x 65 mm 90 x 6.2 x 65 mm

**Description**

The Murrelektronik pulse extension module lengthens very short pulses in order for them to be recognized as switching signals, which enables e.g. a PLC to act. The module consists of one or two mutually independent pulse extension stages. If further input pulses are received during the duration of the output pulse, then the output will again be triggered. The modules part nos. 44010 and 44011 trigger on a rising input and 44012 triggers on a falling input (see drawings).

The outputs of modules 44010 and 44011 are adjustable within the specified ranges by means of a potentiometer. The output of all the modules are short-circuit and overload protected.

**Notes**

To order screw terminal option omit 66 from the part number.
Intelligent Interface Modules

Comparator modules

Input voltage
Input current

<table>
<thead>
<tr>
<th>MAK</th>
<th>Input signal</th>
<th>MAK</th>
<th>Input signal</th>
<th>MAK</th>
<th>Input signal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Voltage DC</td>
<td></td>
<td>Voltage AC</td>
<td></td>
<td>Current AC/DC</td>
</tr>
</tbody>
</table>

Ordering data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring clamp/screw terminals</td>
<td>6644110</td>
<td>Spring clamp/screw terminals</td>
<td>6644111</td>
<td>Spring clamp/screw terminals</td>
<td>6644115</td>
</tr>
</tbody>
</table>

Technical data

Supply voltage range 19…33 V DC, smoothed
Supply current 30 mA (no load), max. 3,0 A (full load)
Input voltage approx. Input current 2 x 0…30 V DC (IN 1, IN 2) 2 x 0…30 V AC (IN 1, IN 2) 0,2…15 A AC/DC
Input resistance 100 kOhm 50 kOhm < 1,5 mOhm
Time constant approx. 10 ms approx. 200 ms approx. 200 ms
Input hysteresis < 0,5 % from end value, max. 150 mV < 3,5 % from end value, max. 1,05 mV < 5 % from end value
Outputs 3 Transistor outputs, pulse switch
Output current max. 0,7 A per channel, short-circuit protected
Temperature range 0...+50 °C
Mounting method DIN-rail mounting to EN 50022
Dimensions H x W x D 90 x 12,5 x 65 mm

Description

The DC or AC-voltage comparator for analogue voltage, which, i. e. will generate from pressure, temperature, or other sensors. It converts the analogue measured in a digital signal, whereby the transfer point are dependent from the adjustable reference voltage

Characteristics:
- 2 separable measuring channels (no galvanic separation, and only by comparator service)
- 2 operating modes (comparator/ window discrimination)
- adjustable reference voltage (internal/ external) per channel
- adjustable outputs (negated/ not negated) per channel, (only by comparator service)
- compact equipment (12,4 mm)
- higher switched current at output
- output state display through LED
- simple configuration of the modules with DIP-switch

Notes

Refer to application examples on page 3.10.2

The power comparator is used to monitor a current signal regarding the under range or over range limited to an adjusted limit. The comparator works in window discriminator mode, whereby the reference input RF1 is marked under and RF2 is marked over the operating point. It can range in current measured from 0,2...15 A AC/ DC. The current will be galvanic isolated and measured next to no loss, then converted internally in a True RMS voltage, which allows evaluation of different wave forms.

Characteristics :
- measured current AC/ DC, in range from 0,2...15 A
- operating mode window discriminator
- adjustable reference voltage (internal/ external)
- compact equipment (12,4 mm)
- higher switched current at output
- output state display through LED
- simple configuration of the modules with DIP-switch
Intelligent Interface Modules

Temperature modules for PT 100 Sensors

MTW 12,4
2-3 wire

MTW 12,4
4-wire

Ordering data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>±50 °C</td>
<td>6644330</td>
<td>44330</td>
<td>6644340</td>
<td>44340</td>
</tr>
<tr>
<td>-50...150 °C</td>
<td>6644331</td>
<td>44331</td>
<td>6644341</td>
<td>44341</td>
</tr>
<tr>
<td>0...100 °C</td>
<td>6644332</td>
<td>44332</td>
<td>6644342</td>
<td>44342</td>
</tr>
<tr>
<td>0...150 °C</td>
<td>6644333</td>
<td>44333</td>
<td>6644343</td>
<td>44343</td>
</tr>
<tr>
<td>0...200 °C</td>
<td>6644334</td>
<td>44334</td>
<td>6644344</td>
<td>44344</td>
</tr>
<tr>
<td>0...300 °C</td>
<td>6644335</td>
<td>44335</td>
<td>6644345</td>
<td>44345</td>
</tr>
<tr>
<td>0...600 °C</td>
<td>6644336</td>
<td>44336</td>
<td>6644346</td>
<td>44346</td>
</tr>
</tbody>
</table>

Technical data

Supply voltage range 18...30 V DC, smoothed
Supply current max. 80 mA
Cable resistance (without PT 100) for 3- and 4-wire technology max. 100 Ohm
Output signals at 0...10 V DC max. 25 mA, overload protected
at 4...20 mA max. 500 Ohm
at 0...20 mA max. 500 Ohm
Tolerance ±1 % from end value
Temperature range 0...+50 °C
Mounting method DIN-rail mounting to EN 50022
Dimensions H x W x D 90 x 12,4 x 65 mm

Description

The Murelektronik temperature converter module works in conjunction with a temperature sensor PT 100 (DIN 49760) and converts the output from the sensor into a standard signal format of (0...10 V, 0...20 mA or 4...20 mA). The MTW module supplies a constant current to the PT 100 resistor across, which develops a variable voltage. These are then measured and the signal sent to the OUT terminal. All three signals can be used at the same time.

The 2 wire technology allows short distances between the MTW and the PT100 sensor to be covered i.e. <5m. For longer distances, 3 wire technology compensates for the cable resistance. For three wire technology, remove the bridge between 2 and 3. For the greatest accuracy, 4 wire technology compensates for both the outgoing and incoming cables which may have differing resistances or lengths.

Notes

Other temperatures on request.
Phase monitoring relays monitor three phase circuits. They check for phase failure, sequence and symmetry. In the event of phase loss, phase regeneration from motors or transformers is also detected.

Typical applications:
- Protection of three phase motors
- Protection of transformers from unbalanced loading

Notes
* When switching inductive loads, Murrelektronik suppressors should be used in order to increase relay contact life and reliability.

Circuit diagram

Ordering data

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>Art.-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V DC</td>
<td>44530</td>
</tr>
<tr>
<td>230 V AC</td>
<td>44535</td>
</tr>
<tr>
<td>3 x 400 V AC</td>
<td>44507 44517</td>
</tr>
</tbody>
</table>

Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysteresis</td>
<td>2 %</td>
</tr>
<tr>
<td>Programmable</td>
<td>Bridge Z1 / Z2</td>
</tr>
<tr>
<td>Adjustment parameters</td>
<td>Input voltage 380/ 400/ 415 V AC</td>
</tr>
<tr>
<td></td>
<td>Sensitivity 5... 15 %</td>
</tr>
<tr>
<td></td>
<td>Under voltage -5... -20 %</td>
</tr>
<tr>
<td></td>
<td>Over voltage +5... +20 %</td>
</tr>
<tr>
<td></td>
<td>Response delay 0.1... 10 s</td>
</tr>
<tr>
<td></td>
<td>Start up delay 0... 10 s</td>
</tr>
<tr>
<td>Monitoring functions</td>
<td>Phase failure over voltage</td>
</tr>
<tr>
<td></td>
<td>Phase sequence under voltage</td>
</tr>
<tr>
<td></td>
<td>Phase symmetry</td>
</tr>
<tr>
<td>Max. contact voltage</td>
<td>250 V AC</td>
</tr>
<tr>
<td>Max. contact current</td>
<td>8 A *</td>
</tr>
<tr>
<td>Mounting method</td>
<td>DIN-rail mounting to EN 50022</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0... +50 °C</td>
</tr>
<tr>
<td>Dimensions H x W x D</td>
<td>82 x 45 x 100 mm</td>
</tr>
</tbody>
</table>

Function diagram

Description
Phase monitoring relays monitor three phase circuits. They check for phase failure, sequence and symmetry. In the event of phase loss, phase regeneration from motors or transformers is also detected.

Typical applications:
- Protection of three phase motors
- Protection of transformers from unbalanced loading

Voltage monitoring relays monitor AC and DC circuits. Under voltage and over voltage thresholds can be adjusted.

Typical applications:
- Stand by power system monitoring
- Protection of computer systems

Notes
* When switching inductive loads, Murrelektronik suppressors should be used in order to increase relay contact life and reliability.
The current monitoring relays monitor current up to 5 A AC/DC. Dependant on the program, under current or over current can be monitored. Typical applications:
- monitoring electrical loads
- monitoring motor overloads

The impulse monitoring relays work with NAMUR switches to DIN 19234. Dependant on the program, it monitors over and under speed. Additionally, there is an analogue output of 0…20mA. There are 2 LED’s showing wire break and short-circuit. Typical applications:
- Rotational speed monitoring of motors
- Speed indication displays

Notes
* When switching inductive loads, Murrelektronik suppressors should be used in order to increase relay contact life and reliability.
1) no galvanic isolation
MESCO  |  Temperature monitoring relays  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>for PTC-Sensors to DIN 44081</td>
<td></td>
</tr>
</tbody>
</table>

The temperature monitoring relay monitors PTC signals to DIN 44081. An LED shows wire break and short-circuit. Up to 6 sensors can be connected in series. Typical applications:
- Protection of motors and transformers from overheating
- Monitoring heat in substances

### Circuit diagram

![Circuit diagram](image)

<table>
<thead>
<tr>
<th>Ordering data</th>
<th>Art.-No.</th>
<th>Art.-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>24 V DC</td>
<td>44560</td>
</tr>
<tr>
<td>230 V AC</td>
<td>44565</td>
<td></td>
</tr>
</tbody>
</table>

### Technical data

- Hysteresis: 2 %
- Programmable via Z1/Z2: no
- Adjustment parameters:
  - Sensitivity: 0…100 %
- Monitoring functions: temperature
- Measurement voltage: ≤ 2.5 V DC
- Max. contact voltage: 250 V AC
- Max. contact current: 8 A *
- Mounting method: DIN-rail mounting to EN 50022
- Temperature range: 0…+50 °C
- Dimensions H x W x D: 82 x 22.5 x 100 mm

### Function diagram

![Function diagram](image)

**Notes**

* When switching inductive loads, Murrelektronik suppressors should be used in order to increase relay contact life and reliability.