Applications of analog converters and galvanic isolation

These convert electric signals generated by sensors for measuring physical quantities such as: temperature (RTD thermocouples and PT100 thermal resistors), frequency (proximity, contacts, photoelectric cells), current (HV, Hall sensors), resistance (potentiometers), voltage, pressure, level etc., into standardised electrical signals, adapting them to the I/O of industrial PLC’s, DCS’s, and PC’s (control), or they convert a given analog signal into a different one, adapting it to the inputs/outputs of the control, or allow remote transmission of the signal without interference via galvanic isolation (Fig. 1).

Adaptation between sensor output signal and control input signal

<table>
<thead>
<tr>
<th>Physical quantity measured</th>
<th>Sensor output</th>
<th>Converter input</th>
<th>Converter output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>0 – 60 mV</td>
<td>±60 mV</td>
<td>0 – 5 V</td>
</tr>
<tr>
<td>Frequency</td>
<td>0 – 100 mV</td>
<td>±100 mV</td>
<td>0 – 10 V</td>
</tr>
<tr>
<td>Current</td>
<td>0 – 500 mV</td>
<td>±500 mV</td>
<td>0 – 20 mA</td>
</tr>
<tr>
<td>Resistance</td>
<td>0 – 1 V</td>
<td>±1 V</td>
<td>4 – 20 mA</td>
</tr>
<tr>
<td>Voltage</td>
<td>0 – 5 V</td>
<td>±5 V</td>
<td></td>
</tr>
<tr>
<td>Pressure</td>
<td>0 – 10 V</td>
<td>±10 V</td>
<td></td>
</tr>
<tr>
<td>Level measurement</td>
<td>0 – 5 mA</td>
<td>±5 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 – 10 mA</td>
<td>±10 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 – 20 mA</td>
<td>±20 mA</td>
<td></td>
</tr>
</tbody>
</table>

Remote transmission of the signal

The voltage signals reach a max. distance of 10-20 m, beyond this they lose reliability and become very sensitive to earth and induced interference for this reason, in order to transmit at a distance more than 20 m, a voltage signal must be converted into a current signal and galvanically isolated (Fig. 2).

Current signals exceed 300 m of transmission distance and are less sensitive to induced interference. In order to transmit a current signal at a distance galvanic isolation is required.
Galvanic isolation of the signal:
• electrically isolates and separates the circuit of the sensor from the control and power supply circuits. Thus each circuit operates with reference to its own zero potential which, being isolated from other circuits, cannot be altered by differences in potential always present between different earth references (Figs. 3).

• isolates and separates the various zero potentials between power supply, control and sensors/actuators;
• allows transmission of the signal without errors or interference and with greater reliability;
• the higher the isolation (in KV), the greater the security of transmission where there are zero potentials, electromagnetic interference, transients (lightning, discharges etc.) (Fig. 4).

Galvanic isolation is necessary when:
• the distance between control and sensor/actuator is more than 20 m;
• the earth references are different;
• the zero potentials are high, or potentially high in the case of discharges or earth dispersed currents;
• electromagnetic interference is present;
• the signal cables are wired in conduits with power cables (Fig. 5).

Series and parallel connection of the analogue converter
• To achieve redundancy of a signal or just to duplicate it, you can connect the input of more analogue converters to a single sensor.
• In case of current signals, the input of the converters must be connected in series (Fig. 6).

• In case of voltage signals, the input of the converters must be connected in parallel (Fig. 7).
# Analog converters and isolators

These tables allow you to quickly select only the items, then check if all product’s technical data meet your application requirements.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Isolation</th>
<th>Power supply</th>
<th>Notes</th>
<th>Type</th>
<th>Cat. No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>0...60 / 0...100 / 0...500 mV ±60 / ±100 / ±500 mV 0...1 / 0...2 / 0...5 / 0...10 V ±1 / ±2 / ±5 / ±10 V 0...5 / 0...10 / 0...20 / 4...20 mA ±5 / ±10 / ±20 mA</td>
<td>0...5 / 0...10 / ±5 / ±10 V 0...20 / 4...20 / ±20 mA</td>
<td>3 ways</td>
<td>24 Vdc</td>
<td>(1) (4)</td>
<td>CA-PI/PO1</td>
<td>XSSAPIPO1</td>
<td>81</td>
</tr>
<tr>
<td>0...60 / 0...100 / 0...300 / 0...500 mV 0...1 / 0...10 / 0...20 / 2...20 V 0...5 / 0...10 / 0...20 / 4...20 / ±5 / ±20 mA</td>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(1) (4)</td>
<td>CWUAA 6-0516</td>
<td>X756516</td>
<td>82</td>
</tr>
<tr>
<td>0...60 / 0...100 / 0...300 / 0...500 mV 0...1 / 0...10 / 0...20 / 2...20 V 0...5 / 0...10 / 0...20 / 4...20 / ±5 / ±20 mA 0...10 V</td>
<td>0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24...240 Vac/dc</td>
<td>(1) (5)</td>
<td>CWUAA 6-0517</td>
<td>X756517</td>
<td>82</td>
</tr>
<tr>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(1) (4)</td>
<td>CWNAA 7-0539</td>
<td>X756539</td>
<td>83</td>
</tr>
<tr>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24...240 Vac/dc</td>
<td>(1) (5)</td>
<td>CWNAA 6-0510</td>
<td>X756510</td>
<td>83</td>
</tr>
<tr>
<td>0...10 V</td>
<td>0...10 V</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2) (4)</td>
<td>CWAA 6-0530</td>
<td>X756530</td>
<td>84</td>
</tr>
<tr>
<td>0...10 V</td>
<td>0...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2) (4)</td>
<td>CWAA 6-0531</td>
<td>X756531</td>
<td>84</td>
</tr>
<tr>
<td>0...10 V</td>
<td>4...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2) (4)</td>
<td>CWAA 6-0532</td>
<td>X756532</td>
<td>84</td>
</tr>
<tr>
<td>0...20 mA</td>
<td>0...10 V</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2) (4)</td>
<td>CWAA 6-0533</td>
<td>X756533</td>
<td>85</td>
</tr>
<tr>
<td>0...20 mA</td>
<td>0...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2) (4)</td>
<td>CWAA 6-0534</td>
<td>X756534</td>
<td>85</td>
</tr>
<tr>
<td>0...20 mA</td>
<td>4...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2) (4)</td>
<td>CWAA 6-0535</td>
<td>X756535</td>
<td>85</td>
</tr>
<tr>
<td>4...20 mA</td>
<td>0...10 V</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2) (4)</td>
<td>CWAA 6-0536</td>
<td>X756536</td>
<td>86</td>
</tr>
<tr>
<td>4...20 mA</td>
<td>0...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2) (4)</td>
<td>CWAA 6-0537</td>
<td>X756537</td>
<td>86</td>
</tr>
<tr>
<td>4...20 mA</td>
<td>4...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2) (4)</td>
<td>CWAA 6-0538</td>
<td>X756538</td>
<td>86</td>
</tr>
<tr>
<td>0...20 / 4...20 mA</td>
<td>0...20 / 4...20 mA</td>
<td>2 ways</td>
<td>—</td>
<td>(4)</td>
<td>CWPA 7-0526</td>
<td>X756526</td>
<td>87</td>
</tr>
<tr>
<td>0...20 / 4...20 mA</td>
<td>0...20 / 4...20 mA</td>
<td>2 ways</td>
<td>—</td>
<td>(3) (4)</td>
<td>CWPA 7-0527</td>
<td>X756527</td>
<td>87</td>
</tr>
<tr>
<td>-30...+30 V / -50...+50 mA / -5...+5 A 0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24 Vdc</td>
<td>(6) (7)</td>
<td>LCONALSFDT</td>
<td>X756360</td>
<td>88</td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

1. Programmable input and output signal via DIP switches
2. Single range input and output signal (not programmable), articles generally not in stock but available upon request, for info please contact our sales department
3. Two channels version
4. 1.5 KVac / 60 s two way isolation (input / output) or 1.5 KVac / 60 s three way isolation (input / output / supply)
5. 4 KVac / 60 s three way isolation (input / output / supply)
6. Input and Output signal range programmable via dip-switch and software
7. 2.5 KVac / 60 three way isolation (input / output / supply)
# Analog converters selection table

These tables allow you to quickly select only the items, then check if all product’s technical data meet your application requirements.

## Current converter

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Isolation</th>
<th>Power supply</th>
<th>Notes</th>
<th>Type</th>
<th>Cat. No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>0…50 A ac</td>
<td>adjustable threshold 1…30 A</td>
<td>2 ways</td>
<td>24 Vdc</td>
<td>(3) (4)</td>
<td>CCS-2</td>
<td>XCOS2</td>
<td>93</td>
</tr>
<tr>
<td>0…1 A ac/dc</td>
<td>0…10 V</td>
<td>2 ways</td>
<td>24 Vdc</td>
<td>(2)</td>
<td>WAA7-0540</td>
<td>X756540</td>
<td>94</td>
</tr>
<tr>
<td>0…5 A ac/dc</td>
<td>0…10 V</td>
<td>2 ways</td>
<td>24 Vdc</td>
<td>(2)</td>
<td>WAA7-0541</td>
<td>X756541</td>
<td>94</td>
</tr>
<tr>
<td>0…10 A ac/dc</td>
<td>0…10 V</td>
<td>2 ways</td>
<td>24 Vdc</td>
<td>(2)</td>
<td>WAA7-0542</td>
<td>X756542</td>
<td>94</td>
</tr>
</tbody>
</table>

**Notes**

1. Single I/O version
2. Three programmable output signals
3. Open collector threshold output
4. Threshold output with one changeover relay

## Programmable frequency to analog signal converters

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Isolation</th>
<th>Power supply</th>
<th>Notes</th>
<th>Type</th>
<th>Cat. No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>0…28.8 kHz (21 ranges)</td>
<td>0…10 V</td>
<td>2 ways</td>
<td>24 Vac/dc</td>
<td>(1)</td>
<td>CWNFA-0524</td>
<td>X756524</td>
<td>97</td>
</tr>
</tbody>
</table>

## Auxiliary power supply for sensors and potentiometers

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Isolation</th>
<th>Power supply</th>
<th>Notes</th>
<th>Type</th>
<th>Cat. No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Vdc</td>
<td>10 Vdc</td>
<td>2 Vio</td>
<td></td>
<td></td>
<td>CWCV</td>
<td>7-6184</td>
<td>98</td>
</tr>
</tbody>
</table>

## NPN and PNP signal polarity inverter

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Isolation</th>
<th>Power supply</th>
<th>Notes</th>
<th>Type</th>
<th>Cat. No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPN (17…30 Vdc)</td>
<td>PNP</td>
<td></td>
<td></td>
<td></td>
<td>CNPN/PNP</td>
<td>X0PNPNPNP</td>
<td>99</td>
</tr>
<tr>
<td>PNP (17…30 Vdc)</td>
<td>NPN</td>
<td></td>
<td></td>
<td></td>
<td>CNPN/PNP</td>
<td>X0PNPNPNP</td>
<td>99</td>
</tr>
</tbody>
</table>
### Analog converters selection table

These tables allow you to quickly select only the items, then check if all product’s technical data meet your application requirements.

## Converters for temperature sensors

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Input</th>
<th>Output</th>
<th>Isolation</th>
<th>Power supply</th>
<th>Notes</th>
<th>Type</th>
<th>Cat. No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT100 e PT1000 (2, 3, 4 wires), Thermocouples B, C, E, J, K, N, R, S, T, Potentiometers 0-600 kOhm</td>
<td>Programmable; -200...+2400°C (-328...+4352°F) according to sensor type</td>
<td>0...10 V / -10...+10 V 0...20 mA / 4...+20 mA</td>
<td>3 ways</td>
<td>24 Vdc</td>
<td>(1) (2)</td>
<td>LCONTADFDT</td>
<td>X756340</td>
<td>89</td>
</tr>
<tr>
<td>PT100 e PT1000 (2, 3, 4 wires), Thermocouples B, C, E, J, K, N, R, S, T, Potentiometers 0-600 kOhm</td>
<td>Programmable; -200...+2400°C (-328...+4352°F) according to sensor type</td>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24 Vdc</td>
<td>(2)</td>
<td>LCONTLSFDT</td>
<td>X756370</td>
<td>90</td>
</tr>
<tr>
<td>PT100 3 wire (RTD)</td>
<td>-50...+50°C (-58...+122°F) -50...+100°C (-58...+212°F) -50...+150°C (-58...+302°F) 0...+100°C (+32...+212°F) 0...+150°C (+32...+302°F) 0...+200°C (+32...+392°F) 0...+300°C (+32...+572°F) 0...+400°C (+32...+752°F)</td>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2)</td>
<td>CWPT 6-0816</td>
<td>X756816</td>
<td>91</td>
</tr>
<tr>
<td>PT100 3 wire (RTD)</td>
<td>-50...+50°C (-58...+122°F) -50...+100°C (-58...+212°F) -50...+150°C (-58...+302°F) 0...+100°C (+32...+212°F) 0...+150°C (+32...+302°F) 0...+200°C (+32...+392°F) 0...+300°C (+32...+572°F) 0...+400°C (+32...+752°F)</td>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24...240 Vac/dc</td>
<td>(2)</td>
<td>CWPT 6-0817</td>
<td>X756817</td>
<td>91</td>
</tr>
<tr>
<td>Thermocouples J (FeCuNi) and K (NiCrNi)</td>
<td>-50...+200°C (-58...+392°F) -50...+350°C (-58...+662°F) 0...+200°C (+32...+392°F) 0...+400°C (+32...+752°F) 0...+600°C (+32...+1112°F) 0...+800°C (+32...+1472°F) 0...+1000°C (+32...+1832°F) 0...+1200°C (+32...+2192°F)</td>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24 Vac/dc</td>
<td>(2)</td>
<td>CWTH 6-0844</td>
<td>X756844</td>
<td>92</td>
</tr>
<tr>
<td>Thermocouples J (FeCuNi) and K (NiCrNi)</td>
<td>-50...+200°C (-58...+392°F) -50...+350°C (-58...+662°F) 0...+200°C (+32...+392°F) 0...+400°C (+32...+752°F) 0...+600°C (+32...+1112°F) 0...+800°C (+32...+1472°F) 0...+1000°C (+32...+1832°F) 0...+1200°C (+32...+2192°F)</td>
<td>0...10 V 0...20 / 4...20 mA</td>
<td>3 ways</td>
<td>24...240 Vac/dc</td>
<td>(2)</td>
<td>CWTH 6-0847</td>
<td>X756847</td>
<td>92</td>
</tr>
</tbody>
</table>

### Notes

(1) programmable input and output signals via software
(2) programmable input and output signals via dip-switch
Programmable analog signal converter

- 19 input scales
- 7 output scales
- 1 SPST (NO) alarm contact
- IN/OUT isolation > 3 kV/AC
- Auxiliary supply output for loop-powered sensors
- Input for potentiometer

**OUTPUT STAGE**
The module supplies output single-pole and two-pole signals with the following ranges (see Table 2):
- 0...60 mV ± 60 mV
- 0...100 mV ± 100 mV
- 0...500 mV ± 500 mV
- 0...1 V ± 1 V
- 0...5 V ± 5 V
- 0...10 V ± 10 V
- 0...5 mA ± 5 mA
- 0...10 mA ± 10 mA
- 0...20 mA ± 20 mA
- 4...20 mA

**INPUT STAGE**
The module can manage single-pole and two-pole inputs, choosing from among the ranges (see Table 1):
- 0...60 mV ± 60 mV
- 0...100 mV ± 100 mV
- 0...500 mV ± 500 mV
- 0...1 V ± 1 V
- 0...5 V ± 5 V
- 0...10 V ± 10 V
- 0...5 mA ± 5 mA
- 0...10 mA ± 10 mA
- 0...20 mA ± 20 mA
- 4...20 mA

The input stage provides two auxiliary supply outputs, for feeding loop powered sensor and potentiometer directly from the module (10V e 24V).

Example of connection:

- 2-wire sensor
- 3-wire sensor
- Potentiometer

**GENERAL TECHNICAL DATA**
- Supply voltage: 15...36 Vdc
- Rated current: 100 mA max. @ 24 Vdc
- Auxiliary DC feed output max. current: 10 mA @ 24 Vdc / 30 mA
- Offset error: < 0.1 % FS
- Linearity error: ± 0.5 % FS
- Zero adjustment / Span adjustment: ± 10 % FS
- Transmission frequency: 400 Hz...1 kHz according to full-scale
- Rise time: 150 µs / µs
- Bandwidth: 1 kHz @ -6 dB
- Phase delay: < 10 µs
- I/O / supply isolation: > 3 kV/AC / 60 s
- Continuous voltage isolation: 800 Vac max.
- Reference Standard: EN 60881-1, IEC 61000-3-2
- Overvoltage category: Pollution degree II / 2
- Operating temperature range: -10...+65°C
- Protection degree: IP 20 - IEC 60529
- EMC standards: EN 50081-2, EN 50082-2
- Housing material: polyamide UL 94 V-0
- Approx. weight: 150 g (5.29 oz)
- Mounting information: vertical on rail, allow 5 mm spacing between adjacent component

**NOTES**
The dimensions includes the terminal blocks and the DIN clamp.
(1) The modules in stock are programmed and calibrated with 0...10 V and 0...10 V output.
Modules programmed and calibrated for all other possible configurations can be supplied on request.

**VERSIONS**
Cat. No. XCAPIPO3

**INPUT TECHNICAL DATA**
- Input signal: 19 programmable ranges (see Table 1)
  1 MΩ / 50 Ω
- Max. input voltage: 15 V
- Max. input current: 30 mA

**OUTPUT TECHNICAL DATA**
- Output signal: 7 programmable ranges (see Table 2)
  ≥ 10 KΩ / ≤ 500 Ω
- Max. output voltage: 12 V
- Max. output current: 25 mA

**INPUT/OUTPUT SELECTION TABLE**

<table>
<thead>
<tr>
<th>Input Range</th>
<th>Output Type</th>
<th>OO</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>0...60 mV</td>
<td>0...60 mV</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0...100 mV</td>
<td>0...100 mV</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0...500 mV</td>
<td>0...500 mV</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0...1 V</td>
<td>0...1 V</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0...5 V</td>
<td>0...5 V</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0...10 V</td>
<td>0...10 V</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0...5 mA</td>
<td>0...5 mA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0...10 mA</td>
<td>0...10 mA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0...20 mA</td>
<td>0...20 mA</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4...20 mA</td>
<td>4...20 mA</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OUTPUT TECHNICAL DATA**
- Output signal: 7 programmable ranges (see Table 2)
  ≥ 10 KΩ / ≤ 500 Ω
- Max. output voltage: 12 V
- Max. output current: 25 mA

**NOTES**
The dimensions includes the terminal blocks and the DIN clamp.
(1) The modules in stock are programmed and calibrated with 0...10 V and 0...10 V output.
Modules programmed and calibrated for all other possible configurations can be supplied on request.

**MOUNTING ACCESSORIES**
- Mounting rail type according to EG07015/THS-7.5
- Mounting rail type according to EG07015/G32
- Plug-in jumper: red, white, blue

**BLOCK DIAGRAM**
Programmable analog signal converters

- 3 ways galvanic isolation
- 14 programmable input range
- 3 programmable output range
- Simple programming
- Available version with 24-240 Vac/dc supply voltage

**NOTES**

The dimensions includes the DIN clamp.
(1) Adjustable via rotary-switch
(2) Adjustable via dip-switch
(3) range 16...30 Vdc / 19.2...28.8 Vac
(4) range 16...264 Vdc / 19.2...264 Vac
(5) 3-way isolation: IN/OUT/power supply

**VERSIONS**

<table>
<thead>
<tr>
<th>Cat. No. X756516</th>
<th>Cat. No. X756517</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWUAA 6-0516</td>
<td>CWUAA 6-0517</td>
</tr>
</tbody>
</table>

**INPUT TECHNICAL DATA**

Input signal (1)
0...60 / 0...100 / 0...300 / 0...500 mV
0...5 / 0...10 / 0...20 / 2...20 V
0.../5/0...10/0...20/4...20/±5/±20 mA

Input resistance 330 KΩ with input voltage
100 Ω with input current

**OUTPUT TECHNICAL DATA**

Output signal (2)
0...10 V
0...20 / 4...20 mA

Applicable load
>1 KΩ with output voltage
<400 Ω with output current

**GENERAL TECHNICAL DATA**

Supply voltage
24 Vac/dc
24-240 Vac/dc

Rated current
≤ 35 mA ± 10% @ 24 Vdc
0.1% @ 23°C FS
< 30 Hz
0.02% / K FS

Accuracy
1.5 KVac / 60 s (5)
EN 50081-2, EN 50082-2
IEC 664-1, DIN VDE
III / 2

Temperature coefficient
25 ±10°C
25 ±10°C

Isolation
Power supply 24 Vac/dc

ECM standards
EN 50081-2, EN 50082-2

Protection degree
IP 20
IEC 529, EN60529

Overvoltage category/Pollution degree
II

Connection terminal
6.35 mm² fixed screw type
Noryl UL94V-0

Housing material
Noryl UL94V-0

Mounting information
vertical on rail adjacent without gap

**APPLICATIONS**

Multifunction converters can be used to convert and isolate the most common standard analog signals; the input of the modules can be set up into 14 signal ranges and the output can be set for up to 3 most important analog ranges. The set up is possible by simply switching the position of a dip switch on the side of the module.

The many different input / output combinations offered by multifunction modules allows to reduce inventory for both new and replacement products and provides many signal conversion solutions.

The “3 ways” galvanic isolation assures total isolation between input, output and supply input; this feature, and the “self calibrating signal circuitry”, gives excellent accuracy without any manual adjustment.

If a single signal must provide several output channels it is possible to use many modules connecting their inputs in parallel as long as the signal is voltage, or in series when signal is current.

**NOTES**

The dimensions includes the DIN clamp.
(1) Adjustable via rotary-switch
(2) Adjustable via dip-switch
(3) range 16...30 Vdc / 19.2...28.8 Vac
(4) range 16...264 Vdc / 19.2...264 Vac
(5) 3-way isolation: IN/OUT/power supply

**APPLICATIONS**

Multifunction converters can be used to convert and isolate the most common standard analog signals; the input of the modules can be set up into 14 signal ranges and the output can be set for up to 3 most important analog ranges. The set up is possible by simply switching the position of a dip switch on the side of the module.

The many different input / output combinations offered by multifunction modules allows to reduce inventory for both new and replacement products and provides many signal conversion solutions.

The “3 ways” galvanic isolation assures total isolation between input, output and supply input; this feature, and the “self calibrating signal circuitry”, gives excellent accuracy without any manual adjustment.

If a single signal must provide several output channels it is possible to use many modules connecting their inputs in parallel as long as the signal is voltage, or in series when signal is current.
Programmable analog signal converters

- 1.5 KV, 3 ways, IN/OUT/supply voltage isolation
- 3 programmable input range
- 3 programmable output range
- Simple programming and self-calibrating
- Available version with 24-240 Vac/dc supply voltage

**NOTES**
The dimensions includes the DIN clamp.

1. range 16.8...30 Vdc / 19.2...28.8 Vac
2. range 16.8...264 Vdc / 19.2...264 Vac
3. 3-way isolation: IN/OUT/power supply

**VERSIONS**

<table>
<thead>
<tr>
<th>Supply Voltage</th>
<th>Cat. No. X756539</th>
<th>Cat. No. X756510</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Vac/dc</td>
<td>CWNAA-7-0539</td>
<td>CWNAA-6-0510</td>
</tr>
<tr>
<td>24-240 Vac/dc</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**INPUT TECHNICAL DATA**

- **Input signal**
- **Input resistance**

**OUTPUT TECHNICAL DATA**

- **Output signal**
- **Applicable load**

**GENERAL TECHNICAL DATA**

- **Supply voltage**
- **Rated current**
- **Accuracy**
- **Transmission frequency**
- **Temperature coefficient**
- **Isolation**
- **EDM standards**
- **Reference Standard**
- **Overvoltage category/Pollution degree**
- **Protection degree**
- **Operating temperature range**
- **Connection terminal**
- **Housing material**
- **Approx. weight**
- **Mounting information**

**MOUNTING ACCESSORIES**

- Mounting rail type according to EC60715/ISO5-7.5
- Mounting rail type according to EC60715/ISO3
- Plug-in jumper
- (16 poles, 16 A)

**APPLICATIONS**

Multi-function converters can be used to convert and isolate the most common standard analog signals; the input and the output can be set up into 3 different signal ranges. The set up is possible by simply switching the position of a dip switch on the side of the module. The input / output combinations offered by these modules provide the most common input/output configurations more economically when compared to 14 input / 3 output modules and reduces inventory.

If a single signal must provide several output channels it is possible to use many modules connecting their inputs in parallel as long as the signal is voltage, or in series when signal is current.


<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CWBK 7-0802 Cat. No. X766802</td>
</tr>
<tr>
<td>CWBK 7-0803 Cat. No. X766803</td>
</tr>
<tr>
<td>CWBK 7-0804 Cat. No. X766804</td>
</tr>
</tbody>
</table>
Analog signal converters

- 1.5 kV, 3 ways, IN/OUT/supply voltage isolation
- Fixed value
- Compact dimension, 6.2 mm pitch

**INPUT TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Model</th>
<th>IN: 0...10 V / OUT: 0...10 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat. No. X756530</td>
<td>CWAA 7-0530</td>
</tr>
<tr>
<td>Cat. No. X756531</td>
<td>CWAA 7-0531</td>
</tr>
<tr>
<td>Cat. No. X756532</td>
<td>CWAA 7-0532</td>
</tr>
</tbody>
</table>

**APPLICATIONS**

These converters can be used to convert and isolate the most common standard analog signals; each model is designed for a single input output signal function, and they are the right solution in applications where many modules handling the same signal are used, where they allow a large cost reduction compared with multi function modules. These modules are provided with 3 ways galvanic isolation between input output and supply voltage. If a single signal must provide several output channels it is possible to use many modules connecting their inputs in parallel as long as the signal is voltage, or in series when the signal is current.

For more information, visit www.klinkmann.com.
Analog signal converters

- 1.5 KV, 3 ways, IN/OUT/supply voltage isolation
- Fixed value
- Compact dimension, 6.2 mm pitch

**NOTES**

The dimensions includes the DIN clamp.
(1) range 16.8…30 Vac / 19.2…28.8 Vac
(2) 3-way isolation: IN/OUT/power supply

**VERIONS**

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Description</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>X756533</td>
<td>CWAA 7-0533</td>
<td></td>
</tr>
<tr>
<td>X756534</td>
<td>CWAA 7-0534</td>
<td></td>
</tr>
<tr>
<td>X756535</td>
<td>CWAA 7-0535</td>
<td></td>
</tr>
</tbody>
</table>

**INPUT TECHNICAL DATA**

- Input signal
- Input resistance

**OUTPUT TECHNICAL DATA**

- Output signal
- Applicable load

**GENERAL TECHNICAL DATA**

- Supply voltage 24 Vac/dc
- Rated current
- 24 Vac/dc (1)
- 24 Vac/dc (1)
- 24 Vac/dc (1)
- ≤ 13 mA ± 10%
- ≤ 13 mA ± 10%
- ≤ 13 mA ± 10%
- 0.1% @ 23°C FS
- 0.1% @ 23°C FS
- 0.1% @ 23°C FS
- < 30 Hz
- < 30 Hz
- < 30 Hz
- Temperature coefficient
- 1.5 KVac / 60 s (2)
- 1.5 KVac / 60 s (2)
- 1.5 KVac / 60 s (2)
- Isolation
- 0.02% / K FS
- 0.02% / K FS
- 0.02% / K FS

**APPLICATIONS**

These converters can be used to convert and isolate the most common standard analog signals; each model is designed for a single input output signal function, and they are the right solution in applications where many modules handling the same signal are used, where they allow a large cost reduction compared with multi function modules. These modules are provided with 3 ways galvanic isolation between input output and supply voltage. If a single signal must provide several output channels it is possible to use many modules connecting their inputs in parallel as long as the signal is voltage, or in series when the signal is current.

**BLOCK DIAGRAM**

[Diagram showing input and output connections]

**MOUNTING ACCESSORIES**

- Mounting rail type according to IEC60715/TH35-7.5
- Mounting rail type according to IEC60715/632
- Plug-in jumper
- red (16 poles, 16 A)
- white
- blue
### Analog signal converters

- 1.5 KV, 3 ways, IN/OUT/supply voltage isolation
- Fixed value
- Compact dimension, 6.2 mm pitch

### Versions

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X756536</td>
<td>CWAA 7-0536</td>
<td>IN: 4...20 mA / OUT: 0...10 V</td>
</tr>
<tr>
<td>X756537</td>
<td>CWAA 7-0537</td>
<td>IN: 4...20 mA / OUT: 0...20 mA</td>
</tr>
<tr>
<td>X756538</td>
<td>CWAA 7-0538</td>
<td>IN: 4...20 mA / OUT: 4...20 mA</td>
</tr>
</tbody>
</table>

### Input Technical Data

**Input signal**

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X756536</td>
<td>4...20 mA</td>
</tr>
<tr>
<td>X756537</td>
<td>4...20 mA</td>
</tr>
<tr>
<td>X756538</td>
<td>4...20 mA</td>
</tr>
</tbody>
</table>

**Input resistance**

- 100 Ω

### Output Technical Data

**Output signal**

- 0...10 V
- 0...20 mA
- 4...20 mA

**Applicable load**

- >1 KΩ
- <400 Ω
- <400 Ω

### General Technical Data

**Supply voltage**

- 24 Vac/dc (1)

**Rated current**

- ≤ 13 mA ± 10%

**Transmission frequency**

- < 30 Hz

**Temperature coefficient**

- 0.02% / K FS

**Isolation**

- 1.5 KVac / 60 s

**ECM standards**

- EN 61000-6-2, EN 61000-6-4

**Overvoltage category/Pollution degree**

- III / 2

**Protection degree**

- IP 20

**Operating temperature range**

- -25...+60°C

**Connection terminal**

- 2.5 mm² fixed screw type

**Housing material**

- PPE

**Approx. weight**

- 40 g (1.41 oz)

**Mounting information**

- Vertical on rail adjacent without gap

### Mounting Accessories

- Mounting rail type according to IEC60715/TH6S-7.5
- Mounting rail type according to IEC60715/G32
- Plug-in jumper red (16 poles, 16 A)
- Plug-in jumper white (16 poles, 16 A)
- Plug-in jumper blue (16 poles, 16 A)

### Applications

These converters can be used to convert and isolate the most common standard analog signals; each model is designed for a single input output signal function, and they are the right solution in applications where many modules handling the same signal are used, where they allow a large cost reduction compared with multi function modules. These modules are provided with 3 ways galvanic isolation between input output and supply voltage. If a single signal must provide several output channels it is possible to use many modules connecting their inputs in parallel as long as the signal is voltage, or in series when the signal is current.

### Notes

The dimensions includes the DIN clamp.

(1) range 16.8...30 Vac / 19.2...28.8 Vac

(2) 3-way isolation: IN/OUT/power supply

---

**BLOCK DIAGRAM**

![Block Diagram](image)

**MOUNTING ACCESSORIES**

- CWBK 7-0802 Cat. No. X766802
- CWBK 7-0803 Cat. No. X766803
- CWBK 7-0804 Cat. No. X766804

---

**APPENDIX**

- The dimensions includes the DIN clamp.
- (1) range 16.8...30 Vac / 19.2...28.8 Vac
- (2) 3-way isolation: IN/OUT/power supply

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**www.klinkmann.com**

11 / 2011
Passive galvanic isolators

- Do not require power supply
- Suitable for loop powered sensors
- 2 Ways I/O 500 V isolation
- Single and double channel version
- Compact dimension, 6.2 mm pitch

**NOTES**

The dimensions includes the DIN clamp.

(1) Input voltage must have a value higher than the value calculated with this formula, where Rb is load resistance (see pic.1); for calculation refer to the diagram comparing minimum input voltage with output load and wires resistance values; refer to the diagram (see pic. 2) to define if application conditions allow to get full 20 mA output signal

(2) 2-way isolation: IN/OUT

**APPLICATIONS**

The passive galvanic isolators can isolate the signal generated by loop powered sensors, where the applied load must have a resistance lower than 400 Ω 20 mA, including the cable resistance; the applied input voltage has to be higher than 2.7 V compared with output voltage (see note 2). If above conditions are satisfied, passive isolators reduce cabling costs and eliminate power supplies thereby saving costs. If above conditions are not satisfied, passive module introduces a signal attenuation.

**VERSIONS**

<table>
<thead>
<tr>
<th>Single channel</th>
<th>Double channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat. No. X756526</td>
<td>Cat. No. X756527</td>
</tr>
</tbody>
</table>

**INPUT TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Signal</th>
<th>Single channel</th>
<th>Double channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input signal</td>
<td>0…20 mA, 4…20 mA</td>
<td>0…20 mA, 4…20 mA</td>
</tr>
<tr>
<td>Input current</td>
<td>2.7 + (20 mA x Rb)</td>
<td>2.7 + (20 mA x Rb)</td>
</tr>
<tr>
<td>Input voltage</td>
<td>100 Ω</td>
<td>100 Ω</td>
</tr>
</tbody>
</table>

**OUTPUT TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Signal</th>
<th>Single channel</th>
<th>Double channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
<td>0…20 / 4…20 mA, (max 21 mA)</td>
<td>0…20 / 4…20 mA, (max 21 mA)</td>
</tr>
<tr>
<td>Applicable load</td>
<td>&lt;400 Ω with output current</td>
<td>&lt;400 Ω with output current</td>
</tr>
</tbody>
</table>

**GENERAL TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Property</th>
<th>Single channel</th>
<th>Double channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rated current</td>
<td>12 mA</td>
<td>12 mA</td>
</tr>
<tr>
<td>Accuracy</td>
<td>0.1 FS (23°C)</td>
<td>0.1 FS (23°C)</td>
</tr>
<tr>
<td>Rise time (10…90%)</td>
<td>10 ms</td>
<td>10 ms</td>
</tr>
<tr>
<td>Transmission frequency</td>
<td>30 Hz @ 3 dB</td>
<td>30 Hz @ 3 dB</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>0.02% FS</td>
<td>0.02% FS</td>
</tr>
<tr>
<td>Isolation</td>
<td>1.5 kV/60 s (2)</td>
<td>1.5 kV/60 s (2)</td>
</tr>
<tr>
<td>ECM standards</td>
<td>EN 61000-6-2, EN 61000-6-4</td>
<td>EN 61000-6-2, EN 61000-6-4</td>
</tr>
<tr>
<td>Reference Standard</td>
<td>IEC 664-1, DIN VDE</td>
<td>IEC 664-1, DIN VDE</td>
</tr>
<tr>
<td>Overvoltage category/Pollution degree</td>
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<td>III / 2</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP 20 IEC 529 EN60529</td>
<td>IP 20 IEC 529 EN60529</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-25...+60°C</td>
<td>-25...+60°C</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>1.5 mm² fixed screw type</td>
<td>1.5 mm² fixed screw type</td>
</tr>
<tr>
<td>Housing material</td>
<td>Luranyl</td>
<td>Luranyl</td>
</tr>
<tr>
<td>Approx. weight</td>
<td>35 g (1.24 oz)</td>
<td>35 g (1.24 oz)</td>
</tr>
<tr>
<td>Mounting information</td>
<td>vertical on rail adjacent without gap</td>
<td>vertical on rail adjacent without gap</td>
</tr>
</tbody>
</table>

**MOUNTING ACCESSORIES**

<table>
<thead>
<tr>
<th>Mounting rail type according to</th>
<th>CWBK 7-0802</th>
<th>CWBK 7-0803</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG60715/Th35-7.5</td>
<td>Cat. No. X766802</td>
<td>Cat. No. X766803</td>
</tr>
<tr>
<td>Plug-in jumper</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>(16 poles, 16 A)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Color</td>
<td>red</td>
<td>white</td>
</tr>
<tr>
<td>blue</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BLOCK DIAGRAM**

The block diagram illustrates the operation of the passive galvanic isolator. It shows the input and output signals, the input voltage, and the isolation voltage. The diagram also includes the symbols and connections for the single and double channel versions.

**REFERENCES**

www.klinkmann.com
CWTPR 7-0360 is an analog signal converter that provides high accuracy measurement and that can be connected to a wide range of analogue sensors. Input range and the output thresholds can be modified with a FDT/DTM software and an USB interface. Are available two normally open contact with solid state relay.
Programmable converters for temperature sensors

- For PT100, PT1000 sensors, thermocouples, potentiometers
- 3 ways I/O 2.5 KV isolation
- 145 programmable input ranges via dip-switch and customizable via software FDT/DTM
- 5 programmable output ranges via dip-switch and customizable via software FDT/DTM
- Compact dimension, 6.2 mm pitch

NOTES
The dimensions includes the DIN clamp.
(1) Version with spring-clamp terminals available on request
(2) Input temperature ranges, and output signals, can be set via dip switch, or adjustable via FDT/DTM software.
(3) 5-way isolation: IN / OUT / supply

VERSIONS
With screw terminals (standard)
With spring terminals
Programming tool

INPUT TECHNICAL DATA
Input signal
PT100, PT1000 sensor
potentiometer 0…600kΩ
-200…+1400°C, according to sensor type

OUTPUT TECHNICAL DATA
Output signal
0…10 / -10…+10 V, (max. 10.25 V)
0…20 / 4…20 mA, (max 21 mA)
>2 KΩ with output voltage
<650 Ω with output current

GENERAL TECHNICAL DATA
Supply voltage
24 Vdc (16.8...30 Vdc)
Rated current
19 mA max. @ 24 Vdc
Accuracy
10K/span(K) + 0.2% FS (for RTD) / 10K/span(K) + 0.4% FS (for TE)
24 bit
±0.05% FS — ±0.1% FS (for TE)
<100 ppm/°C
5…500 ms (regolable, default 30 ms)
Isolation
2.5 KVac / 60 s
EN 61000-6-2, EN 61000-6-4
EN 60065-1, DIN VDE
IP 20 IEC 529 EN60529
-40…+70°C
1.5 mm² fixed screw type

MOUNTING ACCESSORIES
Mounting rail type according to EGB6715/TH35-7.5
Mounting rail type according to EGB6715/632
Plug-in jumper
red white blue
CWBK 7-0802 cod. X768802
CWBK 7-0803 cod. X768803
CWBK 7-0804 cod. X768804

APPLICATIONS
CSWTPR 7-0340 is a temperature to analog signal conversion module that provides high accuracy measurement and that can be connected to a wide range of temperature sensors. The module can be used for a temperature range from -200 to + 1,400°C.
With resistive sensors it is possible to select among 2, 3, 4 wire connections. Input and output ranges can be modified with a FDT/DTM software and an USB interface.
### Programmable converter temperature sensor / threshold

- For PT100, PT1000 sensors, thermocouples, potentiometers
- 3 ways I/O 2.5 KV isolation
- 145 programmable input ranges via dip-switch and customizable via software FDT/DTM®
- 2 threshold customizable via software FDT/DTM®
- Compact dimension, 6.2 mm pitch

### Notes

The dimensions includes the DIN clamp.

1. Version with spring-clamp terminals available on request
2. Input temperature ranges can be set via dip switch and adjustable via FDT/DTM software.
Output ranges can be set via FDT/DTM software
3. 3-way isolation: IN/OUT/power supply

### Versions

<table>
<thead>
<tr>
<th>With screw terminals (standard)</th>
<th>With spring terminals</th>
<th>Programming tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cod. X756370</td>
<td>LCONTLSFDT</td>
<td></td>
</tr>
<tr>
<td>Cod. X756894</td>
<td>LCONZBUS</td>
<td></td>
</tr>
</tbody>
</table>

### Input Technical Data

- Input signal: PT100, PT1000 sensor, potentiometer 0...600kΩ, thermocouple B, C, E, J, K, N, R, S, T type
- Temperature range: -200...+1400°C, according to sensor type

### Output Technical Data

- Threshold regulation programmable via software FDT/DTM
- Contact type: 2 NO contact (solid state relay)
- Max. switching voltage / current: 30 Vdc / 100 mA
- Status indication: 2 yellow LED
- Operating mode: limit value, window, tendency, inverting and hold function

### General Technical Data

- Supply voltage: 24 Vdc (16.8...30 Vdc)
- Rated current: 18 mA max. @ 24 Vdc
- Accuracy: 10k/ span(K) + 0.2% FS (for RTD) / 10k/ span(K) + 0.4% FS (for TE)
- Temperature range: -200...+1400°C
- Response time: <100 ppm/°C
- Linearity error: ±0.05% FS (for RTD and thermocouple) / ±0.1% FS (for TE)
- Temperature coefficient: ±100 ppm/°C
- Power supply: ±0.5% FS / ±0.1% FS
- Isolation: 2.5 KVac / 60 s
- TEM standards: EN 61000-6-2, EN 61000-6-4
- Reference Standard: IEC 664-1, DIN VDE
- Overvoltage category / Pollution degree: III / 2
- Protection degree: IP 20 IEC 529 EN60529
- Operating temperature: -40...+70°C
- Connection terminal: 1.5 mm² fixed screw type
- Housing material: PPE
- Approx. weight: 40 g (1.41 oz)
- Mounting information: vertical on rail adjacent without gap

### Mounting Accessories

- Mounting rail type according to IEC60715/TH55-7.5
- Mounting rail type according to IEC60715/G32
- Plug-in jumper: red, white, blue

### Applications

CWTPR 7-0370 is a temperature to analog signal conversion module that provides high accuracy measurement and that can be connected to a wide range of temperature sensors. The module can be used for a temperature range from -200 to +1400°C. With resistive sensors it is possible to select among 2, 3, 4 wire connections.

Input range and the output thresholds can be modified with a FDT/DTM software and an USB interface.

Two normally open contact with solid state relay are available.

---

**CWPR 7-0370**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWBK 7-0802</td>
<td>X766802</td>
</tr>
<tr>
<td>CWBK 7-0803</td>
<td>X766803</td>
</tr>
<tr>
<td>CWBK 7-0804</td>
<td>X766804</td>
</tr>
</tbody>
</table>
Programmable converters for RTD sensors

- Converters for PT100 sensors
- 3 ways galvanic isolation
- 8 programmable input range
- 3 programmable output range
- Simple programming
- Version with 24-240 Vac/dc supply voltage

**NOTES**

- The dimensions includes the DIN clamp.
- (1) Adjustable via rotary-switch
- (2) Adjustable via dip-switch
- (3) They can also be used with 2 wire PT100 sensor, connecting the terminals 1 and 4
- (4) range 16.8…30 Vdc / 19.2…28.8 Vac
- (5) range 16.8…264 Vac / 19.2…264 Vac
- (6) 3-way isolation: IN/OUT/power supply

**INPUT TECHNICAL DATA**

- **Input signal PT100 3 wires (3)**
- **Temperature range**: -50…+50°C (-58…+122°F), -50…+100°C (-58…+212°F), 0…+100°C (+32…+212°F), 0…+150°C (+32…+302°F), 0…+200°C (+32…+392°F), 0…+300°C (+32…+572°F)

- **Supply current**: 0.5 mA

**OUTPUT TECHNICAL DATA**

- **Output signal**: 0…10 V, 0…20 / 4…20 mA
- **Applicable load**: >1 KΩ with output voltage, <400 Ω with output current

**GENERAL TECHNICAL DATA**

- **Supply voltage**: 24 Vac/dc (2) 24-240 Vac/dc (3)
- **Rated current**: ≤ 35 mA ± 10% @ 24 Vdc ≤ 35 mA ± 10% @ 24 Vdc
- **Accuracy**: <0.3% FS <0.3% FS
- **Transmission frequency**: <30 Hz <30 Hz
- **Temperature coefficient**: 0.015% / K FS 0.015% / K FS
- **Isolation**: 1.5 KVac / 60 s (6) 4 KVac / 60 s (6)
- **ECM standards**: EN 50081-2, EN 50082-2 EN 50081-2, EN 50082-2
- **Reference Standard**: IEC 664-1, DIN VDE IEC 664-1, DIN VDE
- **Protection degree**: IP20 IP20
- **Operating temperature range**: -20…+60°C -20…+60°C
- **Connection terminal**: 2.5 mm² fixed screw type 2.5 mm² fixed screw type
- **Housing material**: Noryl UL94V-0 Noryl UL94V-0
- **Approx. weight**: 76 g 85 g (0.00 cu ft)
- **Mounting information**: vertical on rail adjacent without gap vertical on rail adjacent without gap

**MOUNTING ACCESSORIES**

- **Mounting rail type according to EN60715/TH5-7.5**: PR/3/AC, PR/3/AC/2B, PR/3/AS, PR/3/AS/2B
- **Mounting rail type according to EN60715/632**: —

**APPLICATIONS**

The modules convert and isolate signals generated by 3 wire / 2 wire PT100 (RTD) sensors into analog signals; the module can be set into 8 temperature ranges and for up to 3 most important analog ranges. Set up is easily achieved by setting a dip-switch on one side of the module. The modules provide input and output isolation, assuring high signal accuracy, and can be used with isolated and not isolated sensors. Two wire sensors can be used by connecting a jumper wire between 1 and 4 terminal blocks.
Programmable converters for thermocouples

- Converters for sensors with thermocouples J and K type
- 3 ways galvanic isolation
- 8 programmable input range
- 3 programmable output range
- Simple programming
- Version with 24-240 Vac/dc supply voltage

### INPUT TECHNICAL DATA

**Temperature range (1)**
- -50...+200°C (-58...+392°F)
- -50...+350°C (-58...+662°F)
- 0...+400°C (+32...+752°F)
- 0...+600°C (+32...+1112°F)
- 0...+1200°C (+32...+2192°F)

**Supply current**

- Adjustable via rotary-switch

### OUTPUT TECHNICAL DATA

**Output signal (2)**

- 0...10 V
- 0...20 / 4...20 mA

**Applicable load**

- >1 KΩ with output voltage, <400 Ω with output current

### GENERAL TECHNICAL DATA

**Supply voltage**

- 24 Vac/dc (3)
- 24-240 Vac/dc (4)

**Rated current**

- ≤ 35 mA ± 10% @ 24 Vdc
- ≤ 35 mA ± 10% @ 24 Vdc

**Transmission frequency**

- ≤ 50 Hz
- ≤ 50 Hz

**Temperature coefficient**

- 0.015% / K FS
- 0.015% / K FS

**Isolation**

- 1.5 kVac / 60 s (S)
- 4 kVac / 60 s (S)

**ECM standards**

- EN 50081-2, EN 50082-2
- EN 50081-2, EN 50082-2

**Overvoltage category/Pollution degree**

- IIL/2
- IIL/2

**Protection degree**

- IP20
- IP20

**Operating temperature range**

- -20...+60°C
- -20...+60°C

**Connection terminal**

- 2.5 mm² fixed screw type
- 2.5 mm² fixed screw type

**Housing material**

- Nylon UL94V-0
- Nylon UL94V-0

**Approx. weight**

- 65 g (2.30 oz)
- 75 g (2.65 oz)

**Mounting information**

- Vertical on rail adjacent without gap
- Vertical on rail adjacent without gap

### APPLICATIONS

The modules convert and isolate signals generated by thermocouples type J (FeCuNi) or K (NiCrNi) into an analog signal; can be set into 8 temperature input ranges, and can be set for up to 3 most important analog ranges. The set up is possible by setting a dip-switch on one side of the module.

The modules provide input and output isolation, assuring high signal accuracy, and can be used with isolated and not isolated sensors.

### MOUNTING ACCESSORIES

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### NOTES

- (1) Adjustable via rotary-switch
- (2) Adjustable via dip-switch
- (3) range 16.8...30 Vdc / 19.2...28.8 Vac
- (4) range 16.8...264 Vdc / 19.2...264 Vac
- (5) “3-way isolation: IN/OUT/power supply

### BLOCK DIAGRAM

Supply voltage

- 24 Vac/dc

Supply voltage

- 24...240 Vac/dc

---

**versions**

<table>
<thead>
<tr>
<th>Cat. No. X756844</th>
<th>Cat. No. X756847</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWTH 6-0844</td>
<td>CWTH 6-0847</td>
</tr>
</tbody>
</table>

---

**Versions**

- 24 Vac/dc supply voltage
- 24-240 Vac/dc supply voltage

---

**Applications**

The modules convert and isolate signals generated by thermocouples type J (FeCuNi) or K (NiCrNi) into an analog signal; can be set into 8 temperature input ranges, and can be set for up to 3 most important analog ranges. The set up is possible by setting a dip-switch on one side of the module.

The modules provide input and output isolation, assuring high signal accuracy, and can be used with isolated and not isolated sensors.
Current to threshold converters

- For AC current measure
- Adjustable threshold value
- Versions with transistor or relay output
- IN/OUT 3 KV isolation

**NOTES**

The dimensions includes the terminal blocks and the DIN clamp. (1) Isolation referred to conductor being measured, not isolated (naked) and in contact with the wall of the toroid. By using isolated conductors, the isolation value of the conductor is added to isolation of the module.

**APPLICATIONS**

This module converts a current flowing through circuit into a threshold that can be adjusted by the potentiometer; when the current reaches the threshold value, the relay or the transistor switches; the wire must be feed through the hole of the current sensor for current detection.

**VERSIONS**

| Cod. | CCIS-2 |

**INPUT TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. measured current</td>
<td>50 A (AC)</td>
</tr>
<tr>
<td>Max. measured voltage</td>
<td>600 Vac (1)</td>
</tr>
<tr>
<td>Frequency</td>
<td>50…60 Hz</td>
</tr>
<tr>
<td>Sensor’s hole diameter</td>
<td>Ø 13 mm</td>
</tr>
</tbody>
</table>

**OUTPUT TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold regulation</td>
<td>2…40 A ± 10%</td>
</tr>
<tr>
<td>Max. output current</td>
<td>100 mA open collector PNP</td>
</tr>
<tr>
<td>Output status</td>
<td>&quot;high&quot; 24 V (closed) with i &lt; threshold</td>
</tr>
<tr>
<td>Response time</td>
<td>20 ms</td>
</tr>
</tbody>
</table>

**GENERAL TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>24 Vdc ± 10%</td>
</tr>
<tr>
<td>Max rated current</td>
<td>100 mA</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>0…60°C</td>
</tr>
<tr>
<td>Connection terminal</td>
<td>2.5 mm² fixed screw type (14 AWG)</td>
</tr>
<tr>
<td>Housing material</td>
<td>polyamide UL94V-03</td>
</tr>
<tr>
<td>Approx. weight</td>
<td>100 g (3.53 oz)</td>
</tr>
<tr>
<td>Mounting information</td>
<td>vertical on rail adjacent without gap</td>
</tr>
</tbody>
</table>

**MOUNTING ACCESSORIES**

- Profilo d’appoggio a norma IEC60715/TH35
- Profilo d’appoggio a norma IEC60715/532
- Plug-in jumper (16 poles, 16 A) red, white, blue
- PR/3/AC, PR/3/AS
- PR/DIN/AC, PR/DIN/AS, PR/DIN/AL
**Current to analog converters**

- For AC/DC current measurements
- Protected against transients
- Power supplied LED
- 3 output signals available

---

**NOTES**

The dimensions includes the terminal blocks and the DIN clamp.

(1) Do not connect directly to a 400 V line

---

**BLOCK DIAGRAM**

---

**INPUT TECHNICAL DATA**

- Input signal
- Max. input voltage
- Current wire connection

**OUTPUT TECHNICAL DATA**

- Output signal
- Max. output signal
- Applicable load

---

**GENERAL TECHNICAL DATA**

- Supply voltage
- Rated current
- Operating temperature
- Linearity error
- Offset error
- Temperature coefficient
- Response time
- Protection degree
- Connection terminal
- Approx. weight
- Mounting information

---

**APPLICATIONS**

Through a “HALL” sensor they grant AC/DC current measurements.

The presence of current in a circuit indicates not only that power is supplied but also that the circuit is closed and the load connected and active.

It’s also possible to know the work conditions of the circuit.

The module guarantees galvanic isolation between the current conductor and the analog.

---

**VERSIONS**

- Cod. X756540: WAA 7-0540
- Cod. X756541: WAA 7-0541
- Cod. X756542: WAA 7-0542

---

**OUTPUT TECHNICAL DATA**

- Voltage
- Current

---

**MOUNTING ACCESSORIES**

- Mounting rail type according to IEC60715/TH6>7.5
- Mounting rail type according to IEC60715/G32
- Plug-in jumper
- Red: 16 poles, 16 A
- Blue: 16 poles, 16 A
- White: 16 poles, 16 A

---

**APPLICATIONS**

- Range: WAA7-0540

---

**APPLICATIONS**

- Range: WAA7-0541

---

**APPLICATIONS**

- Range: WAA7-0542
Current to analog converters

- For AC/DC current measurements
- Protected against transients
- Power supplied LED
- 3 output signals available

### Versions

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Description</th>
<th>Input Signal</th>
<th>Max. Input Voltage</th>
<th>Current Wire Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>XW000928</td>
<td>SW01vA</td>
<td>0…1 A AC/DC</td>
<td>380 V</td>
<td>2.5 mm² pluggable screw type</td>
</tr>
<tr>
<td>XW000929</td>
<td>SW05vA</td>
<td>0…5 A AC/DC</td>
<td>380 V</td>
<td>2.5 mm² pluggable screw type</td>
</tr>
<tr>
<td>XW000930</td>
<td>SW10vA</td>
<td>0…10 A AC/DC</td>
<td>380 V</td>
<td>2.5 mm² pluggable screw type</td>
</tr>
</tbody>
</table>

### Technical Data

#### Input Technical Data
- Input signal: 0…1 A AC/DC
- Max. input voltage: 380 V
- Current wire connection: 2.5 mm² pluggable screw type

#### Output Technical Data
- Output signal: 0…10 V
- Max. output signal: 11 V
- Applicable load: >2 KΩ

#### General Technical Data
- Supply voltage: 24 Vdc ± 10%
- Rated current: 60 mA
- Linear error: < 0.5%
- Offset error: < 0.5%
- Amplification error: < 0.2%
- Temperature coefficient: < 0.02%/K
- Surge immunity: 200 V
- Response time: 10 ms
- Protection degree: IP20
- Connection terminal: 2.5 mm² pluggable screw type
- Approx. weight: 100 g (3.53 oz)
- Mounting information: vertical on rail adjacent without gap

### Mounting Accessories


### Applications

In 99 mm depth measure is included the space occupied by the terminal block provided with the product. Through a “HALL” sensor they grant AC/DC current measurements. The presence of current in a circuit indicates not only that power is supplied but also that the circuit is closed and the load connected and active. It’s also possible to know the work conditions of the circuit. The module guarantees galvanic isolation between the current conductor and the analog output and, if not connected in series to the controlled current, cannot be damaged by power surges or short circuits.

### Notes

The dimensions includes the terminal blocks and the DIN clamp.

### Article available until sell-out

- XW000928 will be replaced by X756540
- XW000929 will be replaced by X756541
- XW000930 will be replaced by X756542
Current to analog converters

- For AC/DC current measurements
- Protected against transients
- Power supplied LED
- 3 output signals available

**INPUT TECHNICAL DATA**

- **Input signal**: 0…20 A AC/DC
- **Max. input voltage**: 380 V
- **Current wire connection**: Ø 8 mm

**OUTPUT TECHNICAL DATA**

- **Output signal**: 0…10 V
- **Max. output signal**: 11 V
- **Applicable load**: >2 KΩ

**GENERAL TECHNICAL DATA**

- **Supply voltage**: ± 10% 24 Vdc
- **Rated current**: 60 mA
- **Operating temperature**: 0…55°C
- **Linearity error**: < 0.5%
- **Offset error**: < 0.2%
- **Amplification error**: < 0.02%/K
- **Surge immunity**: 200 V
- **Response time**: 10 ms
- **Protection degree**: IP20
- **Connection terminal**: 2.5 mm² pluggable screw type (14 AWG)
- **Approx. weight**: 100 g (3.53 oz)
- **Mounting information**: vertical on rail adjacent without gap

**VERSIONS**

- Cat. No. XW000931: SW20VA
- Cat. No. XW000932: SW50VA

**APPLICATIONS**

In 99 mm depth measure is included the space occupied by the terminal block provided with the product.

- They allow the user to measure AC/DC currents by an “HALL” sensor.
- The presence of current in a circuit indicates not only that power is supplied but also that the circuit is closed and the load connected and active. It is also possible to know the working conditions of the controlled circuit.
- The module guarantees galvanic isolation between the current conductor and the analog output and, if not connected in series to the controlled current, cannot be damaged by power surges or short circuits.

**NOTES**

The dimensions includes the terminal blocks and the DIN clamp.
Frequency to analog signal converters

- Adjustable frequency range 0...28.8 KHz
- 3 programmable analog signal output ranges
- 3 ways I/O 2.5 KV isolation

The dimensions includes the terminal blocks and the DIN clamp.
(1) range 16.8...30 Vdc / 19.2...28.8 Vac
(2) 3-way isolation: IN/OUT/power supply

APPLICATIONS
This module is used to convert a frequency signal, with either sinusoidal or square waveform, into a standard analog signal (e.g., 0...10 V, 0...20 mA, 4...20 mA). A microprocessor provides a high resolution, high stability and accuracy output signal and a dip switch gives the possibility to select a calibrated range of frequency measurement from 0...100 Hz up to 0...28.8 KHz.

INPUT TECHNICAL DATA
- Input signal (range) 0...28.8 KHz adjustable via DIP switch
- Input signal (type) AC/DC 0.6...30 Vpp
- Input resistance 50 KΩ
- Hysteresis 0.5 Vpp or 5 Vpp adjustable via DIP switch

OUTPUT TECHNICAL DATA
- Output signal 0...10 V, (max. 10.6 V)
- 0...20 / 4...20 mA, (max 21 mA)
- Applicable load >1 KΩ with output voltage
- <400 Ω with output current
- Ripple < 5 mVeff

GENERAL TECHNICAL DATA
- Supply voltage 24 Vac/dc
- Rated current 20 mA
- Accuracy 0.1 FS (23°C)
- Linearity error 0.02%
- Ripple 0.1%
- Setting time (accuracy 1%) 200 ms
- Temperature coefficient 70 ppm/K
- Isolation 1.5 kVac / 60 s
- ECM standards EN 61000-6-2, EN 61000-6-4
- Reference Standard IED 664-1, DIN VDE
- Overvoltage category III
- Pollution degree 2
- Protection degree IP 20 IEC 529 EN60529
- Operating temperature range -25...+60°C
- Connection terminal 1.5 mm² fixed screw type
- Housing material PPE
- Approx. weight 70 g (2.47 oz)
- Mounting information vertical on rail adjacent without gap

Ce

NOTES

Versions
- Cat. No. X756524
- CWNFA 6-0524

AC/DC 24V

AC/DC 0.6...30 Vpp

AC/DC 0...10 V, (max. 10.6 V)

0...20 / 4...20 mA, (max 21 mA)

>1 KΩ with output voltage

<400 Ω with output current

< 5 mVeff

Connection terminal 1.5 mm² fixed screw type
Auxiliary supply output for sensors and potentiometers

- Stabilized switching converter
- IN 16.8...20 Vdc / 9...11 Vdc 60 mA
- Suitable to feed potentiometers and sensors

NOTES
The dimensions includes the DIN clamp.
(1) range 16.8...30 Vdc

VERSIONS
With screw connection (standard)
With spring connection

INPUT TECHNICAL DATA
Rated voltage
Current @ Iout max.
Protection fuse

OUTPUT TECHNICAL DATA
Voltage
Maximum current
Continuous current
Load regulation
Ripple @ rated U-I output
Overload / short circuit protection
Output signal
Parallel connection

GENERAL TECHNICAL DATA
Operating temperature range
Input/output isolation
Protection degree
EMC Standards
Surge immunity
Connection terminal
Housing material
Approx. weight
Mounting information

MOUNTING ACCESSORIES
Mounting rail type according to EC60715/TH65-7.5
Mounting rail type according to EC60715/G32
Plug-in jumper

APPLICATIONS
For the highest accuracy of electronic measurements in process control and automation systems, a stable supply source is required to feed reference voltages. Accuracy of position sensors, such as linear or rotary potentiometers, depends greatly on the stability and accuracy of the DC supply of the sensor. For this reason our modules are provided with a calibrated DC output dedicated to feed the sensor for the highest accuracy, and this feature also helps to save space and the cost of an external DC supply source.

NOTES

BLOCK DIAGRAM

EXAMPLE

APPLICATIONS

For the highest accuracy of electronic measurements in process control and automation systems, a stable supply source is required to feed reference voltages. Accuracy of position sensors, such as linear or rotary potentiometers, depends greatly on the stability and accuracy of the DC supply of the sensor. For this reason our modules are provided with a calibrated DC output dedicated to feed the sensor for the highest accuracy, and this feature also helps to save space and the cost of an external DC supply source.
NPN and PNP signal polarity inverter

- Converts a NPN sensor in a PNP sensor and vice versa
- Compact design

**INPUT TECHNICAL DATA**
- Input voltage: 24 Vdc (1)
- Max. current: 200 mA
- Max. frequency: 120 KHz

**GENERAL TECHNICAL DATA**
- Off state current: —
- ECM standards: EN 61000-6-2, EN 61000-6-4
- Reference Standard: IEC 664-1, DIN VDE
- Overvoltage category: II
- Pollution degree: 2
- Operating temperature range: 0...55°C
- Connection terminal: morsetti a vite 2.5 mm2 fissi
- Housing material: Poliammide UL94V-0
- Approx. weight: 20 g (0.71 oz)
- Mounting information: vertical on rail adjacent without gap

**APPLICATIONS**
It converts signal form PNP sensors into NPN signal and vice versa. It allows to adapt the PLC inputs to all sensors on the market, regardless of their output polarity, and it is a great help for maintenance and allows in any case a quick replacement of failed sensors when you need a PNP sensor but you have a NPN type.

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**NOTES**

The dimensions includes the terminal blocks and the DIN clamp.
(1) range 17...30 Vdc