

## Technical Data

### Analog inputs

- 14 analog measurement channels
- 8 measurement ranges:  $\pm 10V$ ,  $10V \dots \pm 20mV$ ,  $20mV$
- 14 ... 16 bit resolution, as required
- Adjustable 50/60Hz filter

### Analog outputs

- 8 analog voltage or current outputs
- Voltage range:  $\pm 10V$
- Current range:  $0 \dots 25mA$
- 16 bit resolution,  $1/65,000$  of measurement range

### Reference

- Automatic alignment of zero point and full scale

### Emergency OFF

- Enable input, +24V
- Electrically isolated

### 15V power supply (on-board)

- Additional 15V supply

### Board power supply

- Electrically isolated
- Power supply  $18 \dots 36V$ ,  $520mA$  max.

OrderNo. INFO-ADAr 96224

OrderNo. INFO-ADCr\* 96224-ADC

OrderNo. INFO-DACr\* 96224-DAC

\* partial assembly

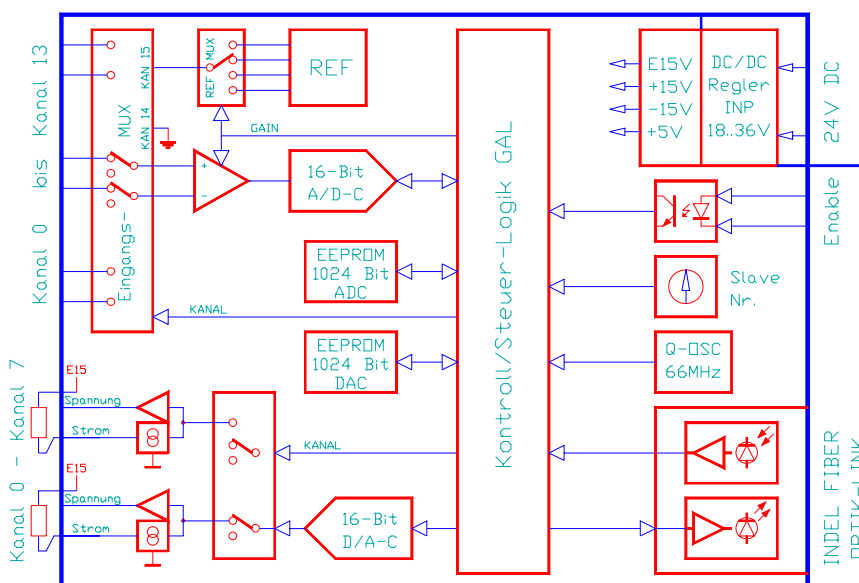


The INFO-ADAr board is the multifunctional analog/digital board in the INFO-Link range.

14 analog inputs and 8 analog outputs are available on the INFO-ADAr board. The analog/digital converter measures voltages, currents and temperatures with 16Bit resolution.

Each channel can be separately configured. The  $\pm 10V$ , or  $0 \dots 25mA$ , outputs allow flow controllers, proportional

valves or shaft speed controllers of motors and frequency converters to be activated. The board does not have any potentiometers for alignments. Offset and gain corrections are saved for inputs and outputs in the on-board EEPROM. The INFO-Master corrects all outputs by the appropriate factors during operation. The ADC part has a board enable; it allows emergency stop functions to be implemented.



## Mode of operation

### Analog digital converter

A measurement is made in two phases: In the first phase, the channel is switched on during a configurable stabilization time. Transient processes are completed during this phase.

In der second phase, the value is measured during the adjustable time.

The measurement time per channel can be adjusted according to the following table.

| Resolution: | Measurement time: |
|-------------|-------------------|
| 16Bit       | 50, 60, 80ms      |
| 15          | 25, 30, 40        |
| 14          | 12.5, 15, 20      |

For the stabilization time, values between 2 ... 99ms can be specified.

The measurement is performed using an integrating process so that interference, e.g. by the power supply (50/60Hz), can be filtered out.

The field bus master automatically measures all selected channels, corrects offset and gain, and converts it to the required unit.

Temperatures are compensated with the compensation temperature (fixed value or from compensation element), linearized and converted directly into °C.

The processed measurement values can be addressed in the field bus master or by the PC via their names.

### Digital analog converter

The INFO-DAC board can output eight voltages of ±10V or currents 0...20mA with a resolution of 16Bit. The channel allocation (voltage or current) is set by a software function.

For the 0...20mA outputs, the DC/DC converter on the board supplies additional +15V so that an external power supply is not needed.

With the standard firmware, one channel per board is transmitted per ms so that all DAC values are updated after 8ms.

Faster refresh rates are available upon request.

## Connector Allocations

|    | d |          | b |          | z |        |
|----|---|----------|---|----------|---|--------|
| 2  | O | + 15 V   | O | - 15 V   | I | + 24 V |
| 4  | O | GND      | O | GND      | I | 0 V    |
| 6  | I | + Vin 0  | I | - Vin 0  |   | Shield |
| 8  | I | + Vin 1  | I | - Vin 1  |   | Shield |
| 10 | I | + Vin 2  | I | - Vin 2  |   | Shield |
| 12 | I | + Vin 3  | I | - Vin 3  |   | Shield |
| 14 | I | + Vin 4  | I | - Vin 4  |   | Shield |
| 16 | I | + Vin 5  | I | - Vin 5  |   | Shield |
| 18 | I | + Vin 6  | I | - Vin 6  |   | Shield |
| 20 | I | + Vin 7  | I | - Vin 7  |   | Shield |
| 22 | I | + Vin 8  | I | - Vin 8  |   | Shield |
| 24 | I | + Vin 9  | I | - Vin 9  |   | Shield |
| 26 | I | + Vin 10 | I | - Vin 10 |   | Shield |
| 28 | I | + Vin 11 | I | - Vin 11 |   | Shield |
| 30 | I | + Vin 12 | I | - Vin 12 |   | Shield |
| 32 | I | + Vin 13 | I | - Vin 13 |   | Shield |

### Connector 1

90° angled  
DIN 41612, Type F-48  
2.8mm pins

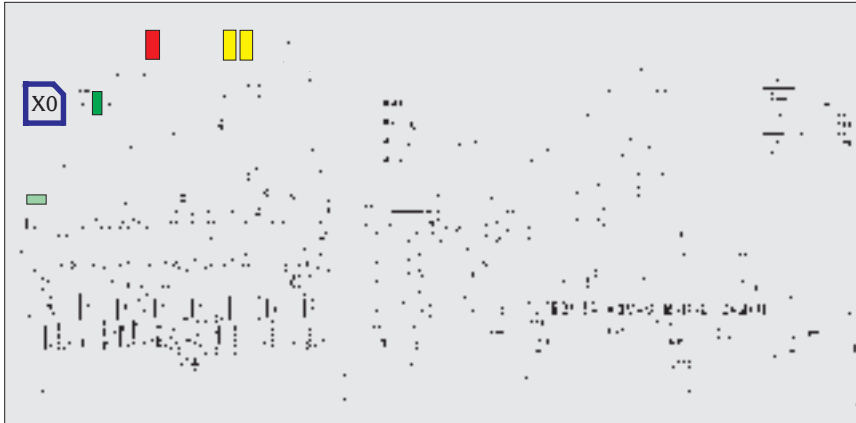
|    | d |          | b |          | z |          |
|----|---|----------|---|----------|---|----------|
| 2  | O | Vout 0   | O | GND      |   | Shield   |
| 4  | O | + 20mA 0 | O | - 20mA 0 |   | Shield   |
| 6  | O | Vout 1   | O | GND      |   | Shield   |
| 8  | O | + 20mA 1 | O | - 20mA 1 |   | Shield   |
| 10 | O | Vout 2   | O | GND      |   | Shield   |
| 12 | O | + 20mA 2 | O | - 20mA 2 |   | Shield   |
| 14 | O | Vout 3   | O | GND      |   | Shield   |
| 16 | O | + 20mA 3 | O | - 20mA 3 |   | Shield   |
| 18 | O | Vout 4   | O | GND      |   | Shield   |
| 20 | O | + 20mA 4 | O | - 20mA 4 |   | Shield   |
| 22 | O | Vout 5   | O | GND      |   | Shield   |
| 24 | O | + 20mA 5 | O | - 20mA 5 |   | Shield   |
| 26 | O | Vout 6   | O | GND      |   | Shield   |
| 28 | O | + 20mA 6 | O | - 20mA 6 |   | Shield   |
| 30 | O | Vout 7   | O | GND      |   | + Enable |
| 32 | O | + 20mA 7 | O | - 20mA 7 |   | - Enable |

### Connector 2

90° angled  
DIN 41612, Type F-48  
2.8mm pins

All alignments have been made during quality checking at INDEL. The values are saved in an on-board EEPROM. The board does not incorporate any potentiometer; there is nothing to align or vary!

## Assembly



### Addressing (blue)

| S1 (X0) | ADC-Addr. | DAC-Addr |
|---------|-----------|----------|
| 0       | 0         | 1        |
| 1       | 1         | 0        |
| ...     | ...       | ...      |
| E       | 14        | 15       |
| F       | 15        | 14       |

### LEDs on receiver module

|            |   |                                    |
|------------|---|------------------------------------|
| LED-red    | = | +5V power supply                   |
| LED-yellow | = | INFO-Link receiver signal R-DAC OK |
| LED-yellow | = | INFO-Link receiver signal R-ADC OK |

### Transmit power jumper (green)

The jumper influences the illumination intensity of the emitting LED and thereby the segment length of the fiberoptic cable to the next board.

| Segment length | Jumper position |
|----------------|-----------------|
| 0 ... 10m      | no jumper       |
| 8 ... 30m      | > 10            |
| 20 ... 50m     | > 30            |

### Enable jumper (light green)

Instead of the +24V on the board enable (pin 30z,32z; connector 1), it is possible to set the jumper J5.

### Temperature measurement

| Type       | Trade name     |
|------------|----------------|
| Type T,U   | Cu-Konst       |
| Type J,L   | Fe-Konst       |
| Type E,K   | Chromel-Alumel |
| Type B,E,R | Platin-Rhodium |

The thermocouples opposite are connected directly to the INFO-ADA. The system linearizes them automatically. Mixed assemblies with any desired, different types are possible.

## Specifications

### Power supply

+18..36V, 520mA max.

### Climatic conditions

- Ambient temperature:
  - Storage: -20...+80°C
  - Operation: 0 ... +45°C
- Board temperature:
  - Operation: 0...+70°C
- Relative air humidity no condensation: 95%

### Analog inputs

- 14 independent, differential msmt. channels. Each channel can be configured as required. Resolution in  $\mu\text{V}$ :
 

| Range             | 16Bit | 15Bit | 14Bit |
|-------------------|-------|-------|-------|
| 0..10V            | 150   | 300   | 600   |
| 0..1V             | 15    | 30    | 60    |
| 0..0,1V           | 1.5   | 3     | 6     |
| 0..25mV           | 0.3   | 0.6   | 1.2   |
| $\pm 10\text{V}$  | 300   | 600   | 1200  |
| $\pm 1\text{V}$   | 30    | 60    | 120   |
| $\pm 0,1\text{V}$ | 3     | 6     | 12    |
| $\pm 25\text{mV}$ | 0.6   | 1.2   | 2.4   |
- Resolution of msmt. time per channel:
  - 16Bit: 80, 60 or 50ms
  - 15Bit: 40, 30 or 25ms
  - 14Bit: 20, 15 or 12.5ms
- plus stabilizing time: 2 ... 99ms per channel.
- Precision: <0.02% of measurement range at 25 degrees
- Drift: 5ppm/ $\Delta\text{K}$
- Max. input voltage:  $\pm 15\text{V}$

### Analog outputs

- 8 outputs:  $\pm 10\text{V}/16\text{Bit}$
- Resolution: 300 $\mu\text{V}/\text{Bit}$
- Current:  $I_{\text{max}} = 5\text{mA}$
- Internal resistance:  $R_i = 1...10\Omega$
- 8 outputs: 0...25mA/15Bit
- Resolution: 0.8 $\mu\text{A}$
- Refresh rate/channel: 1ms
- Precision: 2mV at 25°C
- Drift: 3ppm/ $\Delta\text{K}$

### 15V power supply (on-board)

- $\pm 15\text{V} \pm 10\%$ , 100mA max.

### EMERGENCYOFF

- As long as no 24V are present at the ENABLE input, the board will output 0V on all channels. (Jumper J5 not set.)

### Warm-up time

The optimal stability is reached after approx. 15min operating time.

### Mounting

- Connector DIN 41612, Type F-48
- Mounting in 19" chassis
- 234 x 20 x 100 mm (LxWxD)

## Connections

### Board power supply

For the board power supply, a 3-phase recifier without electrolytic capacitor will suffice. But in order to prevent interference, an electrolytic capacitor of 4,700 ... 10,000 $\mu$ F is recommended. The 24V power supply must pass through a line filter.

### Shielded lines

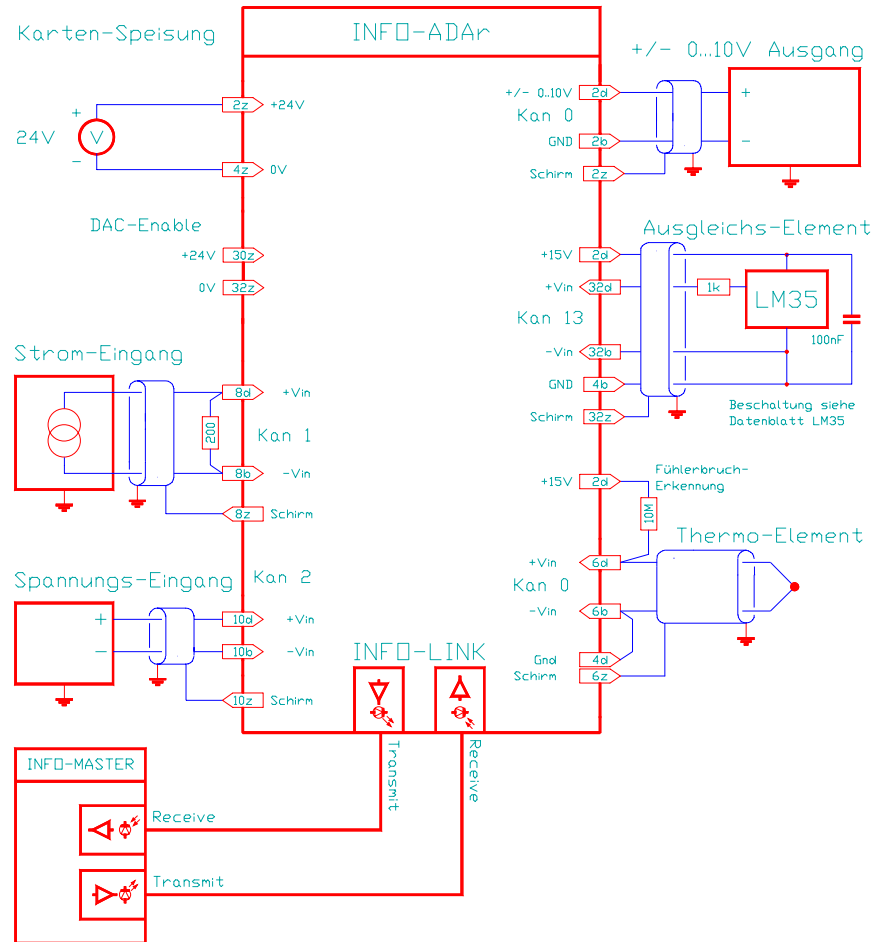
All analog signal lines must be installed with shielded lines. The shield must be connected at both ends. In order to prevent undesired leakage currents through the shielding, it may be necessary to provide a bonding conductor, especially in case of long distances.

### Grounding

The INFO-ADAr board is grounded at the front panel. Make sure that the connection between the rack housing and the control cabinet is conductive. This is best achieved using chromitized mounting bars.

See also INDEL Wiring Guidelines and INDEL Design Guidelines.

## Connection Example

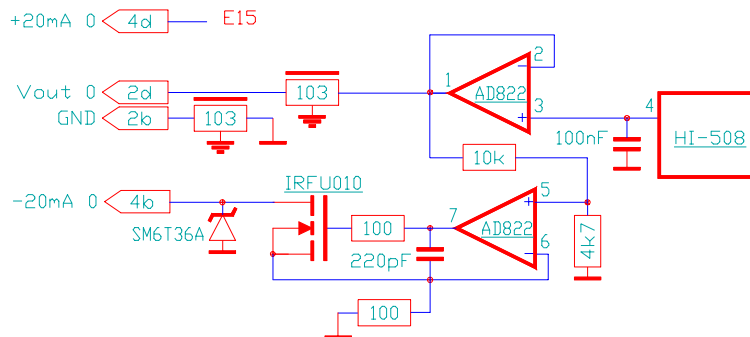


Customized modifications are available as needed.

## Interfaces

## Wiring

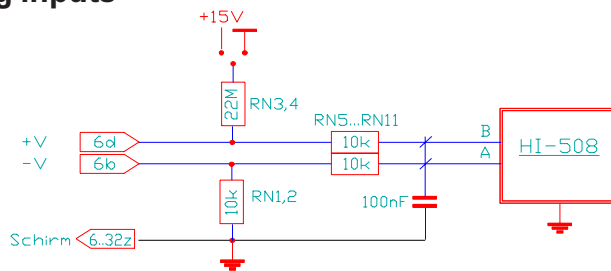
### Analog outputs



### Analog outputs

Wiring of the voltage and current outputs.

### Analog inputs



### Analog inputs

Wiring of the analog inputs. The sensors are connected directly to the pin  $\pm V$ . The plug-in resistor arrays RN1 ... RN4 allow the inputs to be configured according to individual requirements.

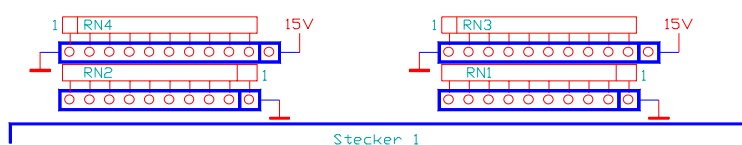
The number of inputs should be limited in the configuration of the board so that there are no open inputs.

The inputs can be wired with the resistor arrays RN3,4 as required to Gnd or +15V. They will thereby always be in a defined state, even when open. As standard, RN3,4 is wired to Gnd.

### Enable input

At the Enable input, 24V must be present to ensure that the board outputs the voltage values.

### Resistor array assembly



Input leads  $\pm V$  wired to Gnd.

### Note

Frequently, the temperature of the connection terminal is measured with temperature transmitters (e.g. LM35). As these are supported by the firmware, it is possible to perform 'low cost' temperature measurements with these temperature sensors.

### Enable input

