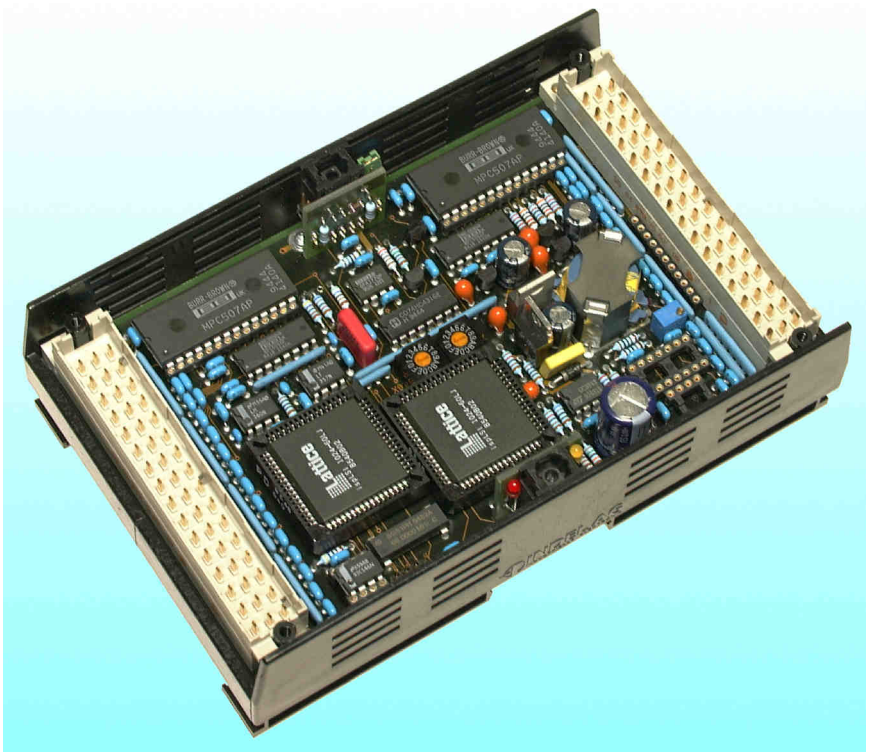
Analogous/Digital Converter

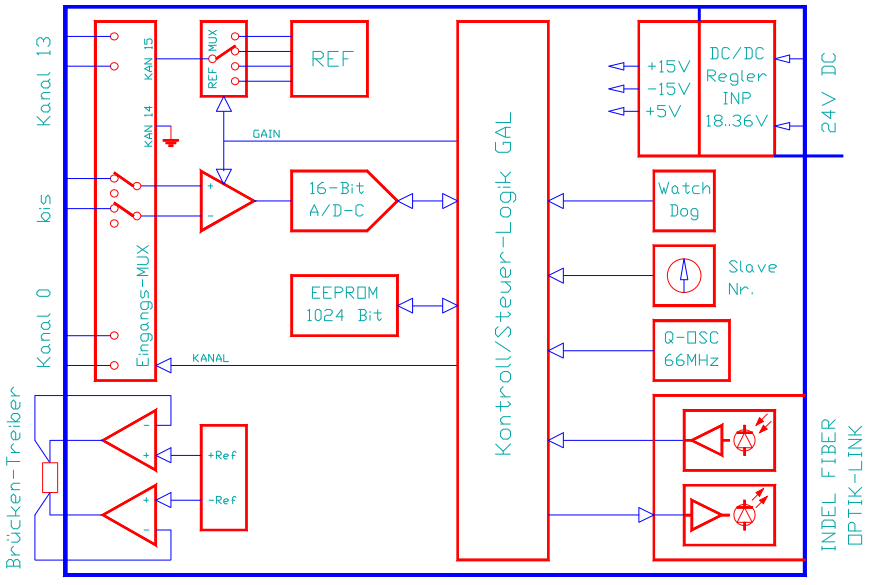
INFO-ADC



Current
Voltage
Temperatures

Technical Data

The INFO-ADC board is the measurement element for the precise measurement of analog quantities.
Up to 14 currents, voltages or temperatures can be measured by an ADC board.
One of the main advantages of the board is the free handling of the channel configuration.
Each channel can be configured for any desired range and any required measurement by a software function.
Volts, amperes, temperatures or compensation elements are supported by the board.
Four precision resistors, with characteristics that have been saved in the on-board EEPROM, are incorporated for the automatic zero point and full-scale alignment.
There are no potentiometers on the board.
The operating system automatically corrects any offset and gain drift for all measurement values by means of reference measurements and the EEPROM data.



Measurement channels
- 14 analog measurement channels
- Eight measurement ranges: ±10V, 10V ... ±20mV, 20mV
- Gain x1,x10,x100,x500

Resolution
- As required 14 ... 16 Bit
- Resolution: 1/65,000 of measurement range with 16Bit

2 bridge drivers
- Range: ± 10V controlled
- Other ranges possible

Reference
- Automatic alignment of zero point and full scale

Filtering
- Adjustable 50/60Hz filter

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

Board power supply
- Electrically isolated
- Power supply 18 ... 36V, 140mA max.

Order No. INFO-ADC 609416300

INDEL AG
INDUSTRIELLE ELEKTRONIK

Mode of Operation

A measurement is made in two phases:
In the first phase, the channel is activated during a configurable stablization time. Transient processes are completed during this phase.
In the second phase, the analog quantity is measured during the selectable measurement time.
The measurement time per channel can be selected according to the following table.

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

For the stabilization time, values between 2 ... 99ms can be specified.
The measurement is performed on the basis of an integrating process so that interference, for example from the mains (50/60Hz), can be filtered out. The measurement per channel lasts as standard for 100ms.
The field bus master automatically measures all selected channels, corrects offset and gain, and converts it to the requir-ed unit.
Temperatures are compensated by the compensation temperature (fixed value or from the compensation element), linearized and converted directly to degrees centigrade.
The processed measurement values can be addressed in the field bus master or by the PC via their names.

The channels 15 and 16 are provided with high-precision reference resistors. During operation, the INFO-Master measures them automatically and thereby corrects the offset and gain drift.
All alignments have been made during quality checking at INDEL. The values are saved in an on-board EEPROM. There are no potentiometers on the board; there is nothing to align or vary!

Connector Allocations

Connector 1

vertical
DIN 41612, Type F-48
2.8mm pins

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

Connector 2

vertical
DIN 41612, Type F-48
2.8mm pins

	d		b			z		
2	I	Gnd	I	+ R 0		I	+ V 0	
4		Shield	I	- R 0		I	- V 0	
6		Shield	I	+ R 1		I	+ V 1	
8		Shield	I	- R 1		I	- V 1	
10		Shield	I	+ R 2		I	+ V 2	
12		Shield	I	- R 2		I	- V 2	
14		Shield	I	+ R 3		I	+ V 3	
16		Shield	I	- R 3		I	- V 3	
18		Shield	I	+ R 4		I	+ V 4	
20		Shield	I	- R 4		I	- V 4	
22		Shield	I	+ R 5		I	+ V 5	
24		Shield	I	- R 5		I	- V 5	
26		Shield	I	+ R 6		I	+ V 6	
28		Shield	I	- R 6		I	- V 6	
30		Shield	I	+ R 7		I	+ V 7	
32		Shield	I	- R 7		I	- V 7	

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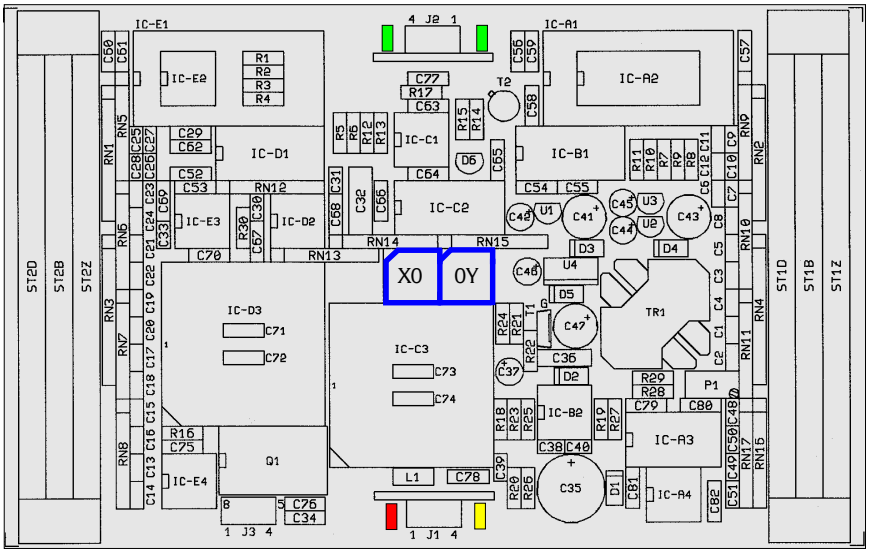
INFO-ADC

Assembly



Addressing (blue)

S2 (X0)	S1 (0Y)	Board
0	0	0
…	…	…
F0	0F	255

Jumpers (green)

The jumpers influence 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

LEDs on receiver module

LED-red = +5V power supply
LED-yellow = INFO-Link receiver signal OK

Temperature sensor

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 operating system linearizes them automatically. Mixed assemblies with any required, different types are possible.

Specifications

Board power supply
- +18 ... 32V, 140mA max.
- Electrically isolated

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

Measurement ranges, resolution
- 14 independent measurement channels
  Each channel can be configured as required.
  Resolution in µV:

Range	16Bit	15Bit	14Bit
0..10V	150	300	600
0..1V	15	30	60
0..0,1V	1.5	3	6
0..20mV	0.3	0.6	1.2
± 10V	300	600	1200
± 1V	30	60	120
± 0,1V	3	6	12
± 20mV	0.6	1.2	2.4

- Max. input voltage: ±15V

Measurement time, resolution

Resolution	Msmt. time per channel
16Bit	80, 60 or 50ms
15Bit	40, 30 or 25ms
14Bit	20, 15 or 12.5m s

- Plus stabilization time: 2 ... 99ms per channel.

Bridge driver
- Controlled bridge driver ±10V for measuring bridges.

Precision and drift
- <0.02% of measuring range at 25 degrees ambient temperature
- Drift: 30ppm/degree change in the ambient temperature

Warm-up time
- The optimal stability of the measurement values is reached after 15min operation.

Connection
- Differential inputs

15V power supply
- 15V ±10%, 100mA max.

Mounting
- Connector DIN 41612, Type F-48
- Mounting on 35mm DIN bar
- 105 x 165 x 45mm (WxDxH)

Connections

Board power supply

For the board power supply, a 3-phase rectifier without electrolytic capacitor will suffice. But to prevent interference, an electrolytic capacitor of 4,700 … 10,000µF is recommended.
The 24V power supply must pass through a line filter.

Shielded lines

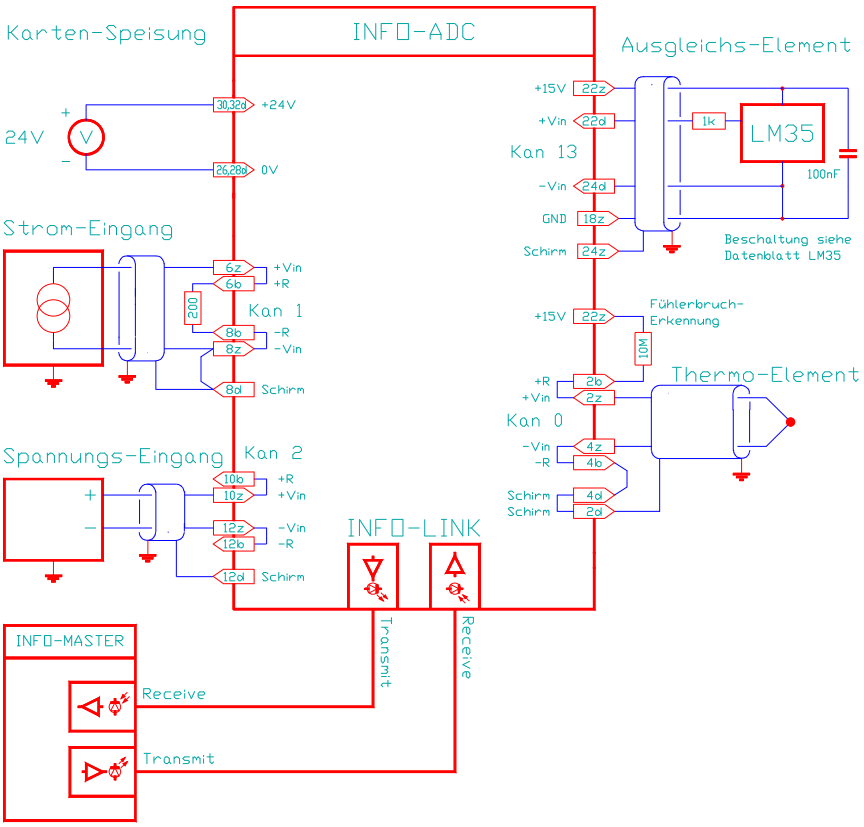
All analog signal lines must be shielded. The shield must be connected at both ends.
In order to prevent undesired leakage currents through the shield, it may be necessary to provide a bonding conductor, especially in case of long distances.

Grounding

The INFO-ADC is grounded through the housing. Make sure that the mounting bar has very good contact with the mounting plate or the chassis to allow interference to be discharged.

See also INDEL Wiring Guidelines and INDEL Design Guidelines.

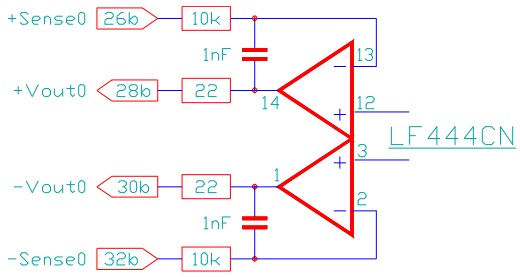
Connection Example



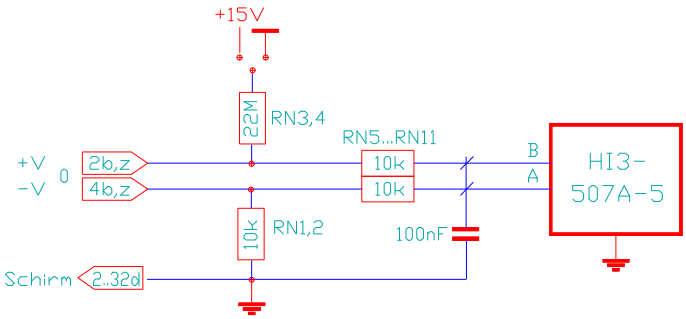
Customized modifications area available as needed.

Interfaces

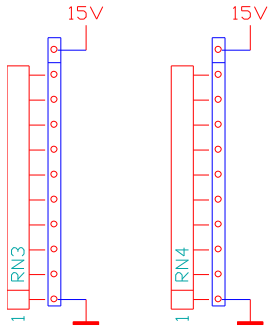
Bridge driver



Analog inputs



Resistor array assembly



Input lines ±V wired to Gnd.

Wiring

Bridge driver

For pressure, proportioning, strain gauges and other measuring bridges, two controlled bridge drivers ±10V are available.
Other voltage values are available upon request.

Inputs

Wiring of the analog inputs. The sensors are connected directly to the pin ±V.
The plug-in resistor arrays RN1 ... RN11 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.

Note

Frequently, the temperature of the connection terminal is measured by 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.