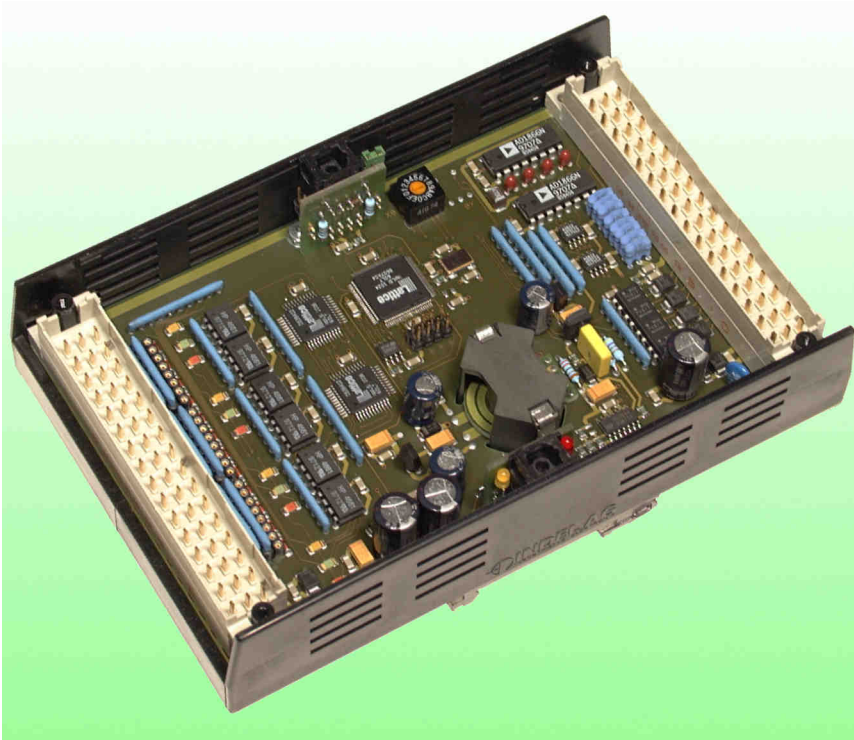


# 4-Axis Position Control

# INFO-4KP



## Technical Data

The INFO-4KP is the field bus node for high-precision and very fast positioning and control tasks. The board incorporates four complete, independent channels. The positioning board is a pure peripheral board, i.e. the control algorithms requiring much computing power are performed by the firmware in the INFO-Master. The firmware also performs the conversion of increments into degrees, meters or mm and ensures reference

travels accurate to one increment.

**An INFO-PPC Master with the PowerPC RISC-CPU controls up to 64 axes in addition to performing the entire machine control function.**

The board is suitable for controlling servo controllers, frequency converters or for reading handwheels. On board is a DC/DC converter for resolvers and proximity switches.

### Sampling rate

- Standard:
  - 64 axes 4ms
  - 32 axes 2ms
  - 16 axes 1ms
  - 8 axes 0.5ms
- Ramp profiles, e.g. sine ramp.

### 4 incremental inputs

- RS422, TTL or 15 ... 24V
- max. 2.5MHz counting frequency

### 4 zero point inputs

- RS422, TTL or 15 ... 24V
- Reference travel accurate to one increment

### 4 DAC outputs

- for analog controller control
- $\pm 10V$  with 0.3mV resolution

### 4 outputs

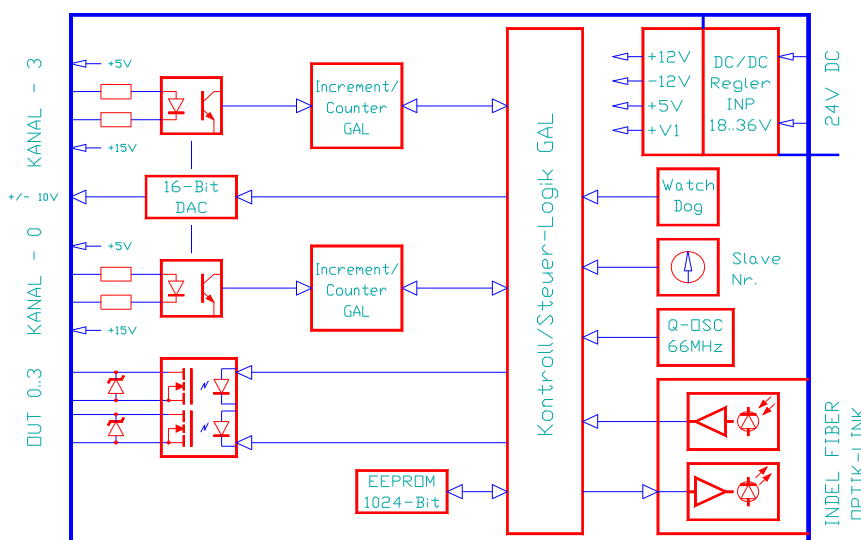
- Controller enable
- 24V/10mA individually isolated

### 5V supply

- for resolver
- 400mA max.

### 15V supply

- for 4 proximity switches
- 4 x 20mA max.



OrderNo INFO-4KP 609416100

## Software

The position control software of the INFO-Power PC Master independently controls up to 64 axes simultaneously. This software can be controlled in **any** required programming language.

The axis parameters (control weights, norm factors, preselection values, etc.) are written via the INCO-DLL into the field bus master. The preselection values are indicated in the user-specific units such as degrees, meters or mm.

The INFO-PPC Master controls and monitors the entire ramp and constant runs, brakes to the accuracy of an increment at the required point and maintains this point up to the next run command. In addition, the resolution of the encoder is extended by a software function by means of the four-quadrant method to 32-bit. Each axis is sampled every 500µs, and the control intervals last 4, 2, 1 or 0.5ms, depending on the number of axes. Speed changes during running, multiple axis trajectory runs (pull mode) are just as possible as premature termination or EMERGENCY OFF. Of course, it is also at all times possible to read the current position.

Other modes:

- Start-up mode (without fault monitoring)
- Control and simulation mode (without feedback, open-loop control)
- Automatic normalization (always between 0 ... 360 degrees)
- Automatic zeroing after each run
- Endless turning
- DAC/increment mode (pure DAC output ± 10V) and 16-bit encoder path measurement
- DAC/path mode (pure DAC output ± 10V) and path measurement with conversion to meters, mm or degrees

## Connector Allocations

	d		b		z	
2	O	+ Vout 0	O	+ Vout 0		Screen
4	O	- Vout 0	O	- Vout 0		Screen
6	O	+ Vout 1	O	+ Vout 1		Screen
8	O	- Vout 1	O	- Vout 1		Screen
10	O	+ Vout 2	O	+ Vout 2		Screen
12	O	- Vout 2	O	- Vout 2		Screen
14	O	+ Vout 3	O	+ Vout 3		Screen
16	O	- Vout 3	O	- Vout 3		Screen
18	O	KC0	O	KE0		Gnd
20	O	KC1	O	KE1	-	12 V
22	O	KC2	O	KE2	+	12 V
24	O	KC3	O	KE3		Gnd
26		0V	I	IN0	I	cIN0
28		0V	I	IN1	I	cIN1
30		+ 24 V	I	IN2	I	cIN2
32		+ 24 V	I	IN3	I	cIN3

### Connector 1

vertical  
DIN 41612, Type F-48  
2.8mm pins

	d		b		z	
2		Screen	I	- A 0	I	+ A 0
4		Screen	I	- B 0	I	+ B 0
6		Gnd	O	+ 15 V	O	+ 5 V
8		Screen	I	- N 0	I	+ N 0
10		Screen	I	- A 1	I	+ A 1
12		Screen	I	- B 1	I	+ B 1
14		Gnd	O	+ 15 V	O	+ 5 V
16		Screen	I	- N 1	I	+ N 1
18		Screen	I	- A 2	I	+ A 2
20		Screen	I	- B 2	I	+ B 2
22		Gnd	O	+ 15 V	O	+ 5 V
24		Screen	I	- N 2	I	+ N 2
26		Screen	I	- A 3	I	+ A 3
28		Screen	I	- B 3	I	+ B 3
30		Gnd	O	+ 15 V	O	+ 5 V
32		Screen	I	- N 3	I	+ N 3

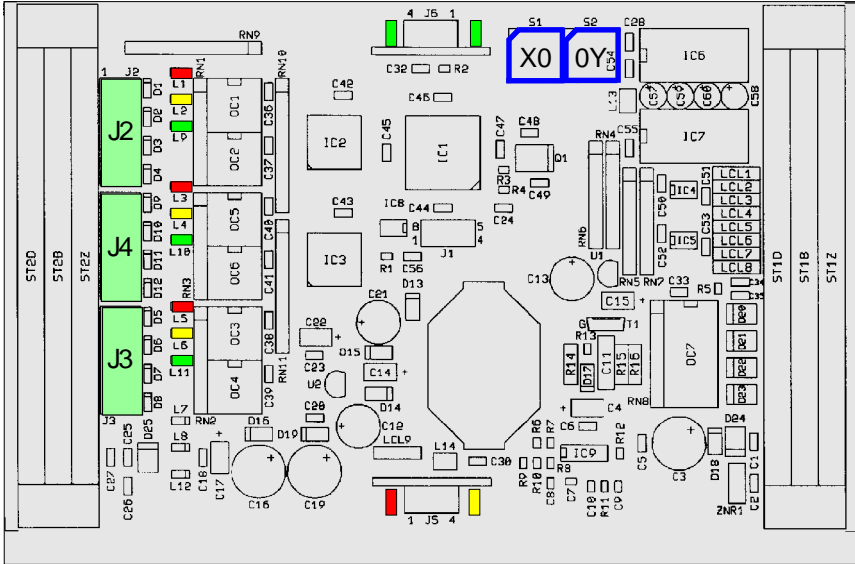
### Connector 2

vertical  
DIN 41612, Type F-48  
2.8mm pins

# 4-Axis Position Control

# INFO-4KP

## Assembly



### Addressing (blue)

S1 (X0)	Axis	The address switch S2
0	0 to 3	is not mounted as standard.
...		
F	60 to 63	

### LED

Per channel, 3 LEDs are mounted, which signal the following functions:

red	=	Motor control active
yellow	=	Motor turns forwards
green	=	Synchpulse input

### LEDs on receiver module

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

### Jumper (green)

The jumpers influence the light intensity of the emitting LED and thereby the segment length of the fiber cable up to the next board.

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

### Mounting fields (light green)

The encoder inputs can be configured with resistor arrays for different encoder types; e.g. RS232, TTL, 15V.

Customized modifications are available as required.

Type 4KP-94161A is 100% pin-compatible with 4KP-94161.

## Specifications

### Power supply

+18 ... 32V, 450mA with 24V.

### Climatic conditions

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

### Increment and zero pulse inputs

- Requires A,B tracks
- 4-fold resolution
- Input frequency max. 2.5MHz
- 14-bit counter
- Software-implemented extension to 64-bit floating point path measurement
- Zero pulse input positive active, min. 400µs
- RS422 with 330Ω termination
- +5V with 2.5V switching point
- +15V with 5V switching point

### DAC outputs

- ±10V/16-bit
- Resolution 300µV/bit
- Precision better than 10mV
- Offset and gain correction in EEPROM (no pots)
- Offset drift max. -1.8mV/degree
- Gain drift max. ±0.15%/degree
- Internal gain, offset drift and error of the motor end stage are automatically balanced by a software function in position control.

### Enable outputs

- Outputs:  $V_{off}=48V$ ,  $I_{on}=10mA$

### 5/15V supply (on board)

- 5V +10%,-5%, 400mA max.
- 15V ±10%, 20 ... 80mA max.

### Mounting

- Connectors DIN41612, Type F-48
- 35mm DIN bar mounting
- Dimensions:
  - 165 x 105 x 45 mm (LxWxH)

## Connections

### Board power supply

For the board power supply, a 3-phase rectifier without electrolytic capacitor is sufficient. But to avoid malfunctions, an electrolytic capacitor of 4700 ... 10,000µF is recommended.

The 24V power supply must pass through a line filter.

### Screened lines

It is essential to connect the encoder with screened lines and wherever possible with differential signals (RS422).

The DAC output must also be connected with screened lines to the motor power section.

Always install the screens to the motor controller and to the encoder on both sides. To prevent undesirable current leakage through the screening, it may be necessary to also provide a potential equalization conductor, particularly in case of long distances or different supplies.

If a frequency converter is applied, its motor cables should if possible be installed so as to be screened.

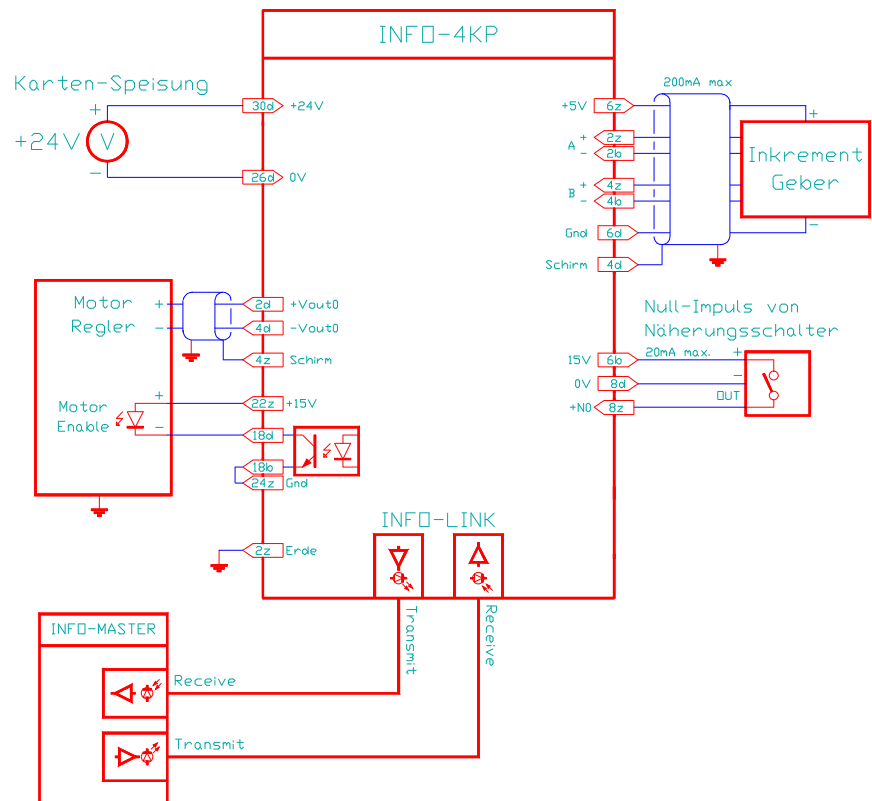
### Encoder power supply

The DC/DC converter on the board also provides the +5V power supply to the encoder. This eliminates the need for a special supply for these encoders. As a zero pulse generator, proximity switches can be used, which are also supplied from the board with 15V.

### Grounding

Grounding of the 4KP is through the casing. The motor controller must be separately grounded. Take care to ensure that the mounting bar has very good contact to the mounting plate or to the chassis to ensure that interference is discharged. The encoder are frequently mounted directly on the motor. It is essential to ground also this motor encoder combination as otherwise the motor current will interfere with the encoder electronics.

## Connection example



### Additional inputs and outputs

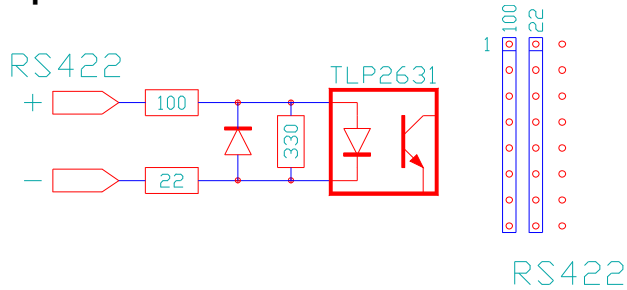
The additional inputs and outputs must always be wired inside the control cabinet (max. length 1m). Otherwise they must be provided with screening.

See also INDEL wiring guidelines and INDEL design guidelines.

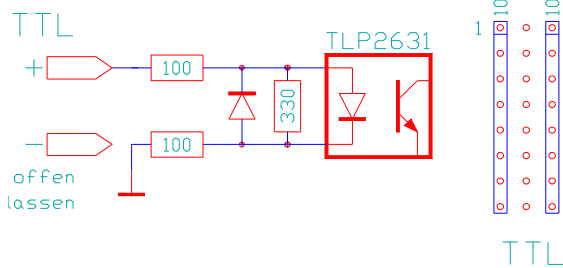
## Interfaces

## Wiring

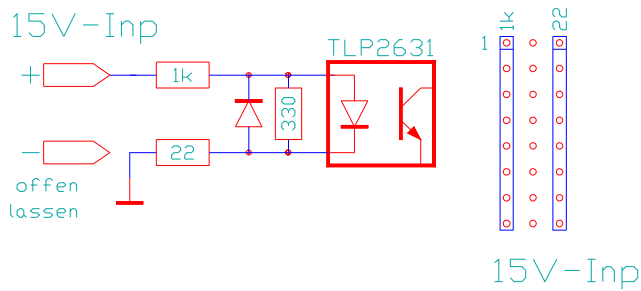
### RS422 inputs



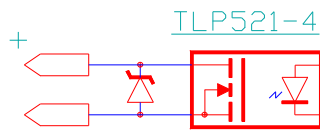
### TTL inputs



### 15V inputs



### Enable outputs



### Encoder

The inputs of the encoder and zero pulses can be configured for RS422, TTL or 15V inputs. The board incorporates three mounting fields for this purpose, in which the resistor arrays can be plugged. In this case, two encoder and all zero pulses must have the same input configurations.

- J2 Encoder channels 0 and 1
- J3 Encoder channel 2 and 3
- J4 Zero pulse channel 0 ... 3

### Enable outputs

The enable outputs are potential-free. The typical current loading is 10mA, the maximum no-load voltage 48V.