# Digital SSI Converter

# DIGICON/V2

Type: DK/SI Version 2

# Digitronic Automationsanlagen GmbH

**Notification**

This handbook corresponds with the unit version of 14.6.1999. The company Digitronic Automationsanlagen GmbH reserves the right to implement changes that result in an improvement of the quality and the functions of the device at any time and without any announcements.
This instructions manual was created with a maximum of care, but mistakes are not out of the question. We are thankful for any comments, regarding possible mistakes in the instruction manual.

**Update**

You can also obtain this instruction manual on the Internet at **http://www.digitronic.com** in the latest version as PDF file.

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**Note:** This device fulfills the following norms: DIN EN 61000-6-2, DIN EN 61000-4-2, DIN EN 61000-4-4, DIN EN 61000-4-5, DIN EN 61000-4-8 and DIN EN 55011 and RoHS 2 (2011/65/EU)..

**Table of content**

**1. Introduction**

DIGICON DK/SI/V2 converts the RS422 SSI signals of your absolute measuring system into incremental signals of a RS422 level. These you can then connect to the incremental input of e.g. a position controller. DIGICON DK/SI/V2 links the advantage of an absolute activation point with the ability to initiate an external Clear signal.

**Features:**

- Supply voltage: 24V DC ±20%

- Power absorption: 200mA in lost motion

- For SSI signals with 24BIT, frequency ≥ 144KHz

- 2 * incremental output for single/quadrupel evaluation

- Listening Mode

- Cycle time < 500µsec

- Transmitter level  SSI: RS422 (clock, data),  incremental outputs: RS422 (A,B,C)

- Connections: IP20 standard screw-pins

- Assembly: clip-on assembly on symmetrical carrier rail according to EN 50 022, row assembly

- Cover type: cover corresponds with IP20

- Operating temperature: 0°C to + 55° C

- Weight: about 500g

    Balluf BTL5 Option

## 2. Assembly

The device is snapped onto the "EN carrier rail" in the switchboard (see chapter "4. Dimensions" on page 4). The grounding pins and the cable mantling have to be put on the shortest way possible onto a serial grounding pin next to the device. Through the grounded assembly board and its electrical connection to the EN carrier rail, the disturbances are optimally grounded onto the cover. All cable connections have to be realized in a cold state !

## 3. Operation

Connect DIGICON to the measuring system and the controller according to the pin allocation. See also chapter 5. Pin allocation on page 5. After activation DIGICON receives its voltage supply, and it, in turn, supplies the measuring system. DIGICON has an activation delay of about 10 sec. Connected devices (e.g. PLC) have to consider this !

If DIGICON is operated in the absolute mode (see chapter 6.3. DIP Switch 4 (Abs./Relativ Mode) on page 6), it sends out a clear signal after the activation of the current and then starts counting up to value of the connected measuring system. This process may take up to 120 sec. with a long wiring and low frequency, so it has to be considered by your activation logic.
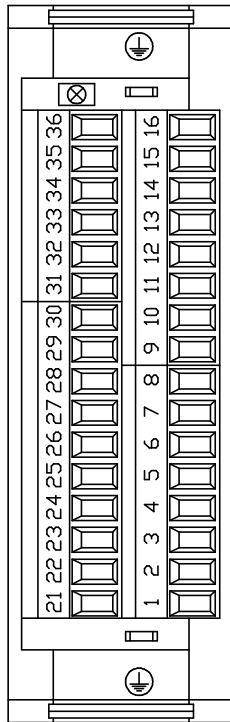
## 4. Dimensions
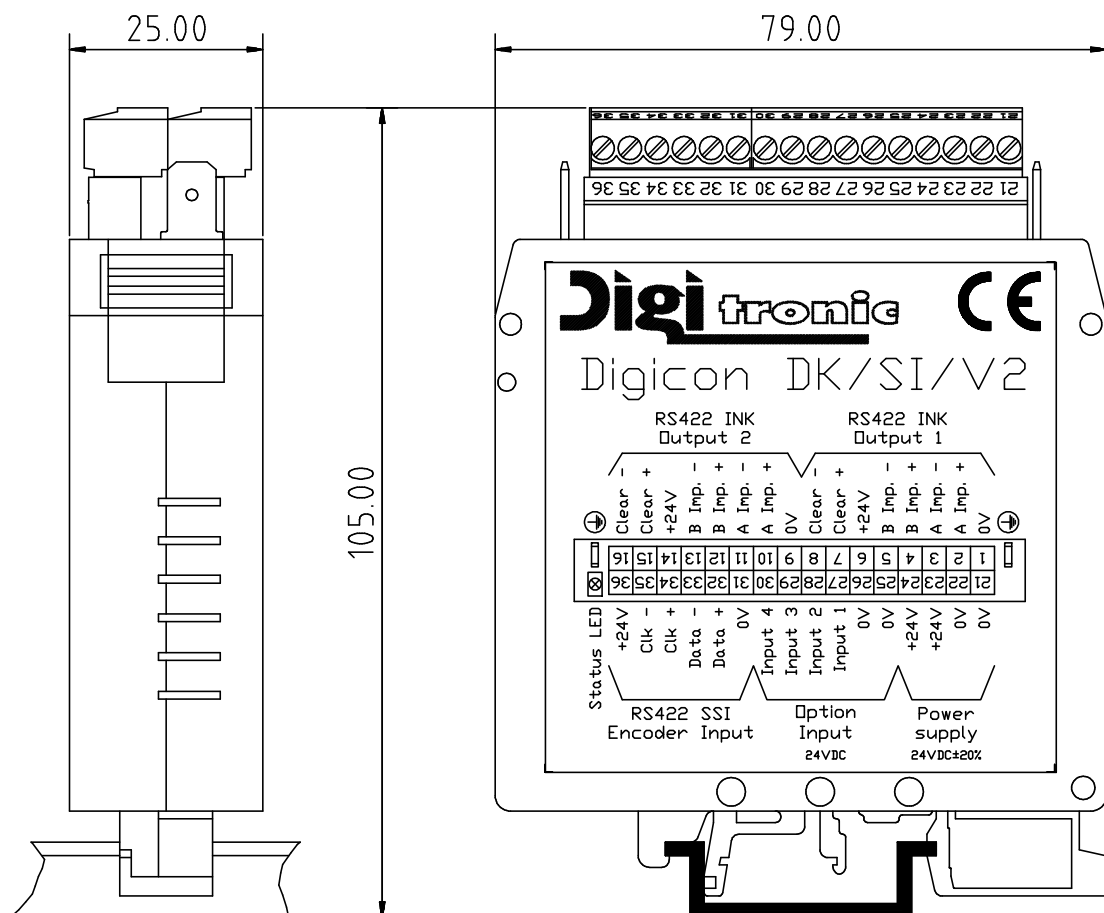


The following carrier rails can be used for the assembly of the cover:

NS 35 / 7.5 (DIN 50022)
NS 35 / 15 (DIN 50022)
NS 32 (DIN 50035)

## 5. Pin allocation

### 5.1. Pin allocation: Supply voltage

| Pin | Description |
|-----|-------------|
| 21 | 0V supply voltage |
| 22 | 0V supply voltage |
| 23 | + 24V supply voltage |
| 24 | + 24V supply voltage |
| 25 | 0V |
| 26 | 0V |
| 27 | Input 1 |
| 28 | Input 2 |
| 29 | Input 3 |
| 30 | Input 4 |

### 5.2. Pin allocation: SSI Input (Master)

| Pin | Description |
|-----|-------------|
| 31 | 0V measuring system supply |
| 32 | Data A (+) of the measuring system's RS422 |
| 33 | Data B (-) of the measuring system´s RS422 |
| 34 | Clock A (+) of the measuring system´s RS422 |
| 35 | Clock B (-) of the measuring system´s RS422 |
| 36 | + 24 VDC supply voltage of the measuring system |

### 5.3. Pin allocation: Incremental output 1   (4 edge switches / SSI increment)

| Pin | Description |
|-----|-------------|
| 1 | 0V supply voltage |
| 2 | A impulse (+) RS422 |
| 3 | A impulse (-) RS422 |
| 4 | B impulse (+) RS422 |
| 5 | B impulse (-) RS422 |
| 6 | + 24 VDC supply voltage |
| 7 | Clear (+) RS422 |
| 8 | Clear (-) RS422 |

### 5.4. Pin allocation: Incremental output 2   (1 edge switch / SSI increment)

| Pin | Description |
|-----|-------------|
| 9 | 0V supply voltage |
| 10 | A impulse (+) RS422 |
| 11 | A impulse (-) RS422 |
| 12 | B impulse (+) RS422 |
| 13 | B impulse (-) RS422 |
| 14 | + 24 VDC supply voltage |
| 15 | Clear (+) RS422 |
| 16 | Clear (-) RS422 |

**Note:**      Pins 21, 22, 25, 26, 31, 1 and 9 are interconnected.
Pins 23 and 24 are interconnected.

## 6. DIP - switch configuration

DIGICON can be configured for many different applications through the DIP switch of the device.

To change the DIP switch setting, you have to open the device. You can open the cover in the center with a screwdriver.

**Attention:**   Please take care not to damage the board or the other devices with the screwdriver.
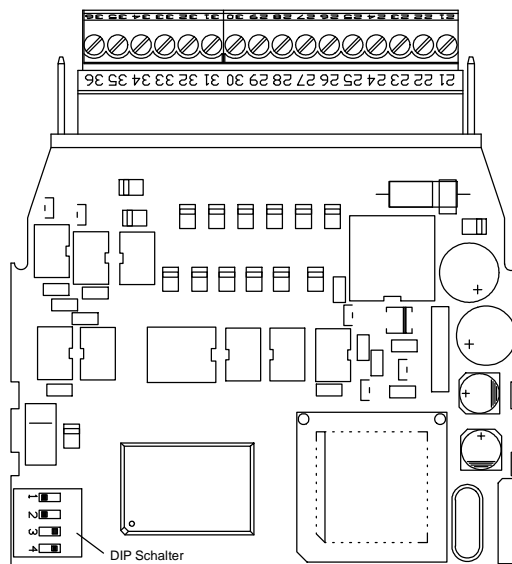


The factory setting (default): switch 1 + 2 = OFF and 3 + 4 = ON.

### 6.1. DIP Switch 1 + 2 (Clock frequency)

| DIP Switch 1 | DIP Switch 2 | SSI - Clock | Inc. frequency outp. 1 | Inc. frequency outp. 2 |
|--------------|--------------|-------------|------------------------|------------------------|
| OFF | OFF | 576 KHz (default) | 288 KHz | 72 KHz |
| ON | OFF | 288 KHz | 144 KHz | 36 KHz |
| OFF | ON | 144 KHz | 72 KHz | 18 KHz |
| ON | ON | Listening Mode. | 144 KHz | 36 KHz |

DIGICON does not create the clock for the measuring system, if both DIP switches are set to ON, but it uses the externally generated signal. This may not exceed 600KHz. The cycle time is also generated by the master control and cannot be influenced by DIGICON ! Very long cycle times can cause considerable delays (delay time) in the incremental branch.

### 6.2. DIP Switch 3 (Test Error Bit)

If this DIP switch is set to ON (default = ON), the incremental output is frozen (no impulses), as soon as an error (stop bit not found or cable damage) is detected at the SSI input. If the DIP switch is set to OFF, the evaluation with the error bit is deactivated.

### 6.3. DIP Switch 4 (Abs./Relativ Mode)

If this DIP switch is set to OFF, the absolute mode is activated, i.e. upon activation the read SSI value is sent as an incremental pulse chain to set the connected controller to this value. Is the DIP switch activated, only the changes of the SSI value since the activation are sent to the controller as incremental impulses.
For synchronisation with the connected controller, DIGICON sends a CLEAR impulse (C-Output active) about 10 sec. after its avtivation in absolute and in relative mode!

## 7. Connetion examples

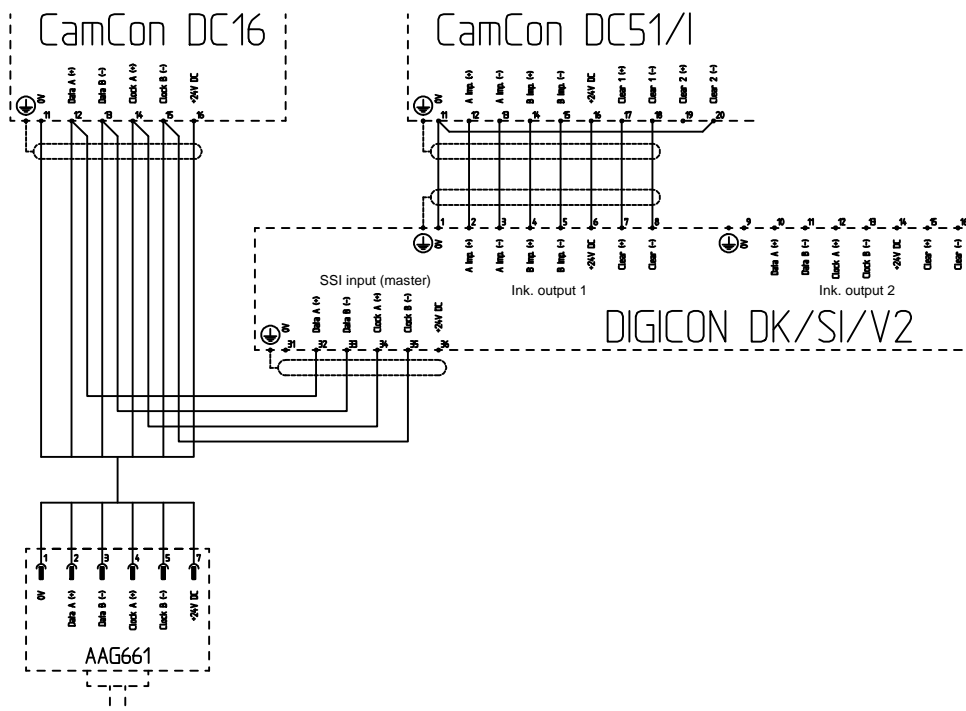### 7.1. Connection example: Default

DIP switch 1 = OFF  or  DIP switch 2 = OFF
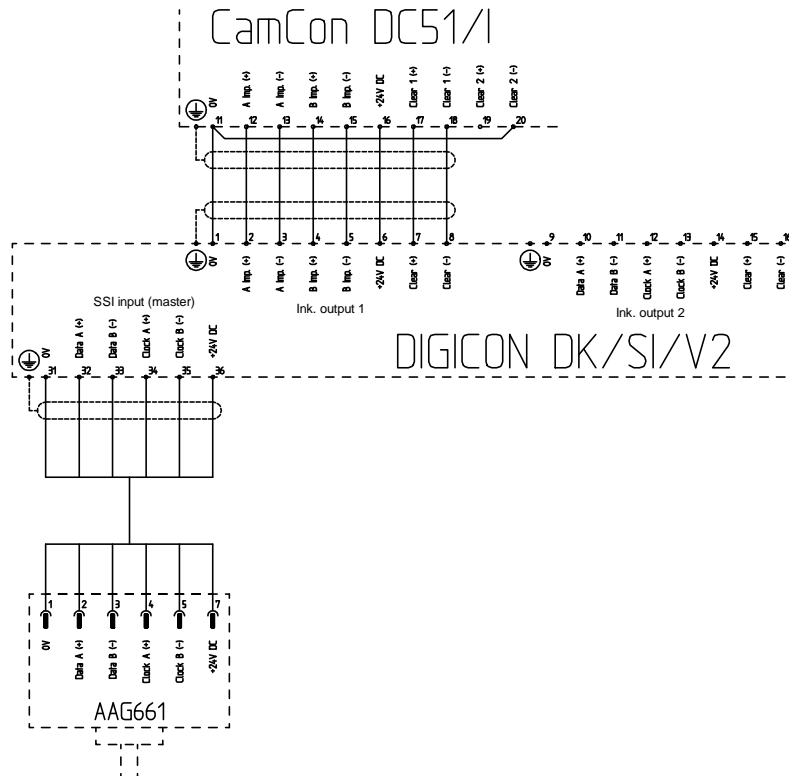


### 7.2. Connection example: Listening mode

DIP switches 1 and 2 = ON

## 8. Device-options Balluff - BTL5

If the magnetsesnor of a Balluf BTL5 wayrecorder leaves the scanning range, the recorder sets the "Out of Range" Bit (Bit3) in the SSI datasignal. The DIGICON anyhow reagrds this Bit as a "normal" databit, meaning a change of the actual value that the device is sending via the incremental interface.

As an option, the DIGICON DK/SI/V2 can be equipped with a special software for the way recorders of the Balluf series, that supervises the "Out of Range" Bit and interrupts the output of incremental impulses, if necessary. If the magnet sensor is moved back into the scanning range, the output of impulse continues, without any impuls getting lost or being put out twice.

The DIGICOn with this option can be ordered with the orderr No. "DK/SI/V2/BTL5".

### 8.1. DIP Switch 3 (24 or 25 Bit)
With the BTL5 option, the DIP Switch 3 has a changed function.

If this DIP - Switch is ON (default = ON), a 24 Bit BTL5 (e.g.: BTL5-S1*12*-M0300-P-S32 *1* = 24Bit) sensor is read in. If the DIP - Switch is OFF, a 25 Bit BTL5 (e.g. type BTL5-S1*72*-M0250-P-S32 *7* = 25Bit) is read in.

Attention:    If this Dip - Switch is not adjusted correctly, the "Out of Range" Bit will not be supervised.

### 8.2. Status LED

The status LED reports four kinds of actual status:

| | | |
|---|---|---|
| 1. | Shines | Status OK or ready for service |
| 2. | 1 x Flashing | Status Error respective SSI Startbit error. Possible cause: broken wire or defect measuriung system. |
| 3. | 2 x Flashing | Status Error respective SSI Stopbit error. Possible cause: broken wire or defect measuriung system or not set correctly. (24 or 25 Bit). |
| 4. | 3 x Flashing | Status Error respective Out of Range. Cause: the BTL5's magnet left the the scanning range. |

## 9. Technical Data

Supply voltage........................... 24 VDC +/- 20% via the voltage supply of the controllers, connected at the outputs
Power absorption ..................... 100 mA without load.
Display .................................... 1 x LED "ready for operation"

SSI input.................................. 1 * synchronous serial (SSI) RS422, one-sided galvanically separated
Transmitting depth ................... 24 Bit.
Monoflop time .......................... 25µs.
Clock SSI input........................ 144, 288, 576 KHz or external (max. 600KHz).
SSI cycle time ......................... 120µsec - 450µsec, or external synchronized

Control inputs........................... 4 * 24V PNP inputs for options.

Outputs.................................... 2 * incremental output RS422  (A,B,C).

Incremental Output 1 ............... 4 flank switches / SSI-increment,
Pulse frequency Output 1.......... 72KHz, 144KHz, 288KHz

Incremental Output 2 ............... 1 flank switch / SSI-increment,
Pulse frequency Output 2......... 18KHz, 36KHz, 72KHz

Cycle time ............................... synchronous to SSI read-in: 120µsec - 450µsec or external

Cover....................................... hardly ignitable Thermoplast plastic, continous temperature up to 100°C
Connections ............................. plug block pins
Connection cable ..................... covered cable, max. length between measuring system and DIGICON 300 meters according to set Clock frequency.
Assembly.................................. comfortable snap-on assembly onto symmetrical carrierer rail according to EN 50 022, row assembly possible.
Disembly .................................. by pulling back the snap clip.
Dimensions .............................. see chapter 4. Dimensions.
Cover type................................ Cover corresponds with IP20.
Operating temperature.............. 0° to + 55° C.
Weight...................................... about 500g.