

Digital SSI Converter

DIGICON/V2

Type: DK/SI Version 2



Digitronic Automationsanlagen GmbH

Steinbeisstraße 3 · D - 72636 Frickenhausen · Tel. (+49)7022/40590-0 · Fax -10
Auf der Langwies 1 · D - 65510 Hünstetten-Wallbach · Tel. (+49)6126/9453-0 · Fax -42
Internet: <http://www.digitronic.com> · E-Mail: mail@digitronic.com

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.

UP-date

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

Qualified personal only

Commissioning and operation of the device may only be carried out by qualified personal. Qualified personal are persons, authorized with commissioning, grounding and labeling devices, systems and electrical circuits according to the applicable standards of security

Liability

(1) The salesperson is liable for any damages for which he or the rightful owner is responsible up to the amount of the actual salesprice. Liability concerning missed profits, failed-to-appear savings, indirect damages and consequential damage is excluded.

(2) The liability restrictions above are not valid concerning assured characteristics and damages, which are caused by intention or coarse negligence.

Protection

The device DIGICON/V2 and this instruction manual are protected by copyright. All rights are reserved. Neither the device DIGICON/V2, nor this document may be copied as a whole or partially, photocopied, reproduced, translated or transferred to electronic media of any kind or into machine readable format without prior written permission by the company Digitronic Automationsanlagen GmbH.

Note: The products of Digitronic are so well constructed that they will not be effected by the millenium.

Note: This device fulfills the following norms according to electromagneticalcompatibility: EN 55011, EN 55022, EN 55024 Teil 2, EN 50082 Teil 2, ENV 50140, VDE 0843 Teil 2, VDE 0843 Teil 4, VDE 0871, VDE 0875 Teil 3 ("N"), VDE 0875 Teil 11, VDE 0877 Teil 2, IEC 801 Teil 3, IEC 801 Teil 2, IEC 801 Teil 4, IEC 801 Teil 5.

Note: This device fulfills the following norms according to electromagneticalcompatibility: EN 55011, EN 55022, EN 55024 Teil 2, EN 50082 Teil 2, ENV 50140, VDE 0843 Teil 2, VDE 0843 Teil 4, VDE 0871, VDE 0875 Teil 3 ("N"), VDE 0875 Teil 11, VDE 0877 Teil 2, IEC 801 Teil 3, IEC 801 Teil 2, IEC 801 Teil 4, IEC 801 Teil 5.



(c) Copyright 1992 - 2004 / Datei: DKSIV2E.DOC

Digitronic Automationsanlagen GmbH
Auf der Langwies 1
D-65510 Hünstetten - Wallbach
Tel. (+49)6126/9453-0 Fax. (+49)6126/9453-42
Internet: <http://www.digitronic.com> / E-Mail: mail@digitronic.com

Table of content

1. Introduction	3
2. Assembly.....	4
3. Operation	4
4. Dimensions	4
5. Pin allocation.....	5
5.1. Pin allocation: Supply voltage	5
5.2. Pin allocation: SSI Input (Master).....	5
5.3. Pin allocation: Incremental output 1 (4 edge switches / SSI increment).....	5
5.4. Pin allocation: Incremental output 2 (1 edge switch / SSI increment).....	5
6. DIP - switch configuration	6
6.1. DIP Switch 1 + 2 (Clock frequency)	6
6.2. DIP Switch 3 (Test Error Bit).....	6
6.3. DIP Switch 4 (Abs./Relativ Mode).....	6
7. Connetion examples	7
7.1. Connection example: Default.....	7
7.2. Connection example: Listening mode.....	7
8. Device-options Balluff - BTL5	8
8.1. DIP Switch 3 (24 or 25 Bit).....	8
8.2. Status LED	8
9. Technical Data	9

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 $\pm 20\%$
- Power absorption: 200mA in lost motion
- For SSI signals with 24BIT, frequency $\geq 144\text{KHz}$
- 2 * incremental output for single/quadrupel evaluation
- Listening Mode
- Cycle time < 500 μsec
- 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

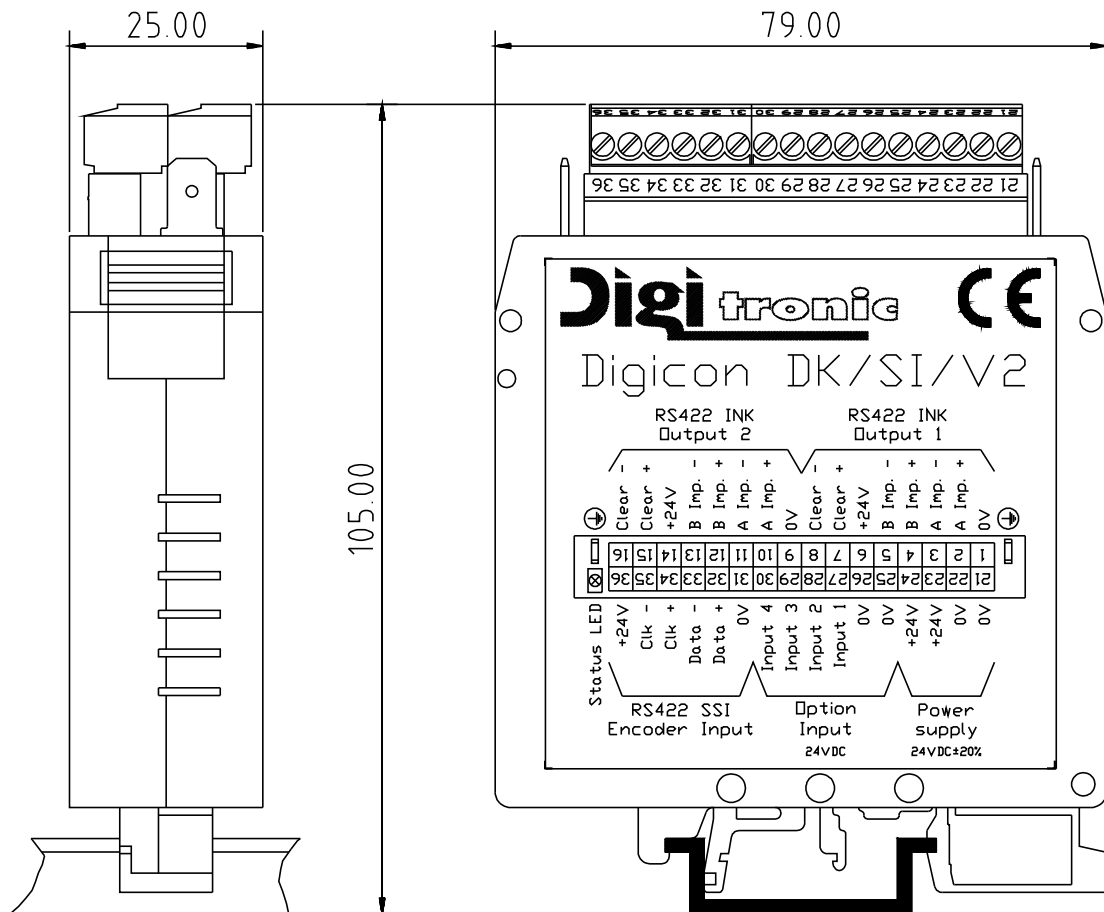
The device is snapped onto the "EN carrier rail" in the switchboard (see chapter "4. Dimensions" on page 4). The grounding pins and the cable mantling have to be put on the shortest way possible onto a serial grounding pin next to the device. Through the grounded assembly board and its electrical connection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

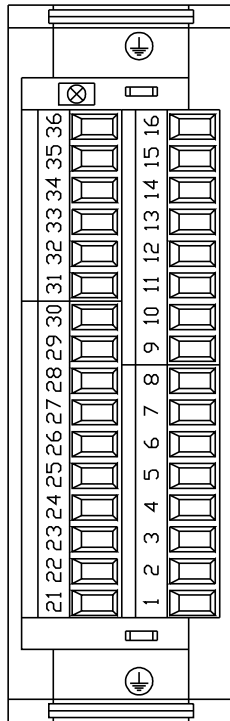
4. Dimensions



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

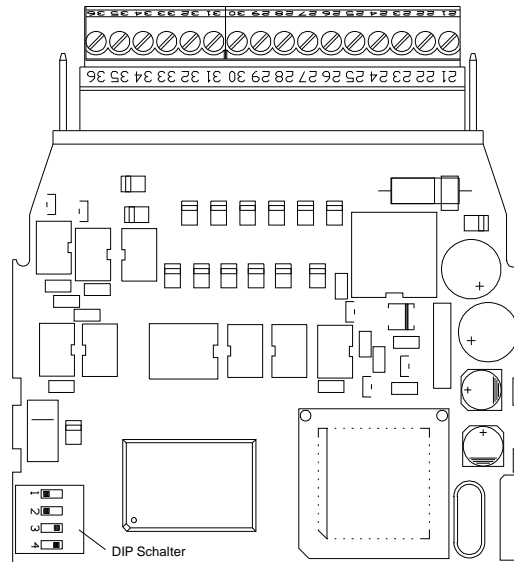
Note: Pins 21, 22, 25, 26, 31, 1 and 9 are interconnected.
Pins 23 and 24 are interconnected.

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)

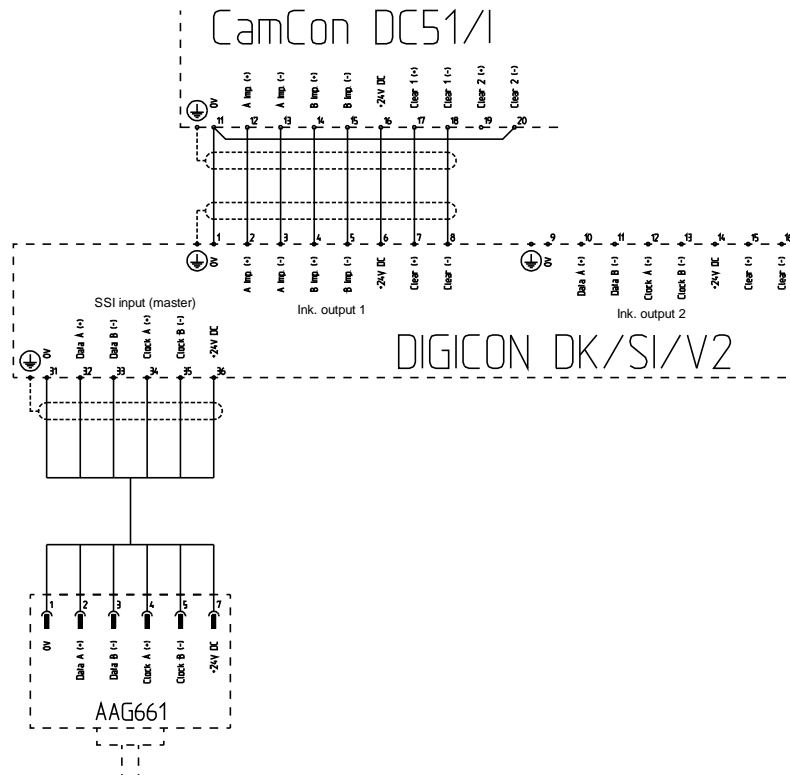
If this DIP switch is set to OFF, the absolute mode is activated, i.e. upon activation the read SSI value is sent as an incremental pulse chain to set the connected controller to this value. Is the DIP switch activated, only the changes of the SSI value since the activation are sent to the controller as incremental impulses.

For synchronisation with the connected controller, DIGICON sends a CLEAR impulse (C-Output active) about 10 sec. after its activation in absolute and in relative mode!

7. Connection examples

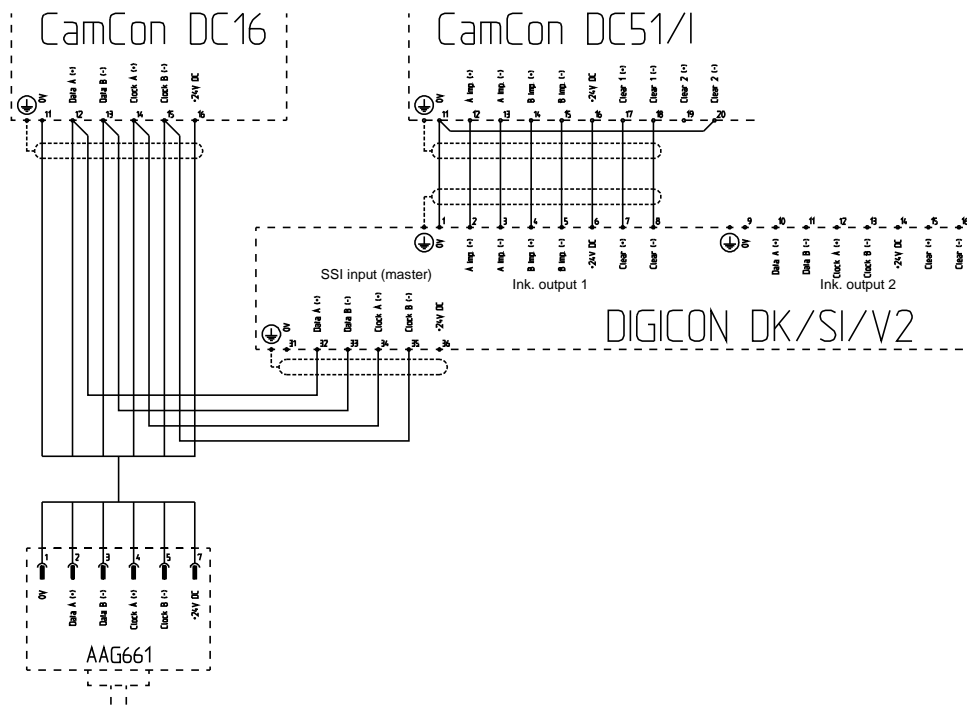
7.1. Connection example: Default

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 magnet sensor of a Balluff BTL5 wayrecorder leaves the scanning range, the recorder sets the "Out of Range" Bit (Bit3) in the SSI datasignal. The DIGICON anyhow regards 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 Balluff 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 impulses getting lost or being put out twice.

The DIGICON with this option can be ordered with the order 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-S112-M0300-P-S32 **1** = 24Bit) sensor is read in. If the DIP - Switch is OFF, a 25 Bit BTL5 (e.g. type BTL5-S172-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 measuring system. |
| 3. | 2 x Flashing | Status Error respective SSI Stopbit error.
Possible cause: broken wire or defect measuring 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 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, continuous 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 carrier rail according to EN 50 022, row assembly possible.
Disemby	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.