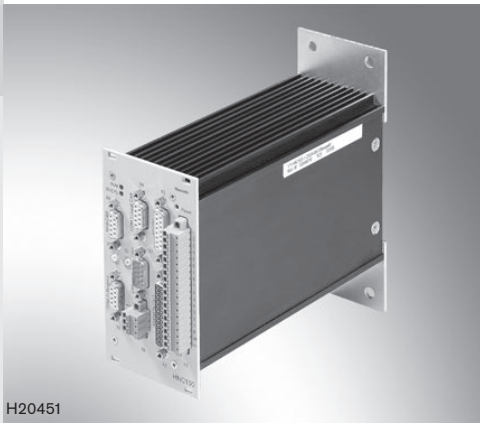
Rexroth
Bosch Group

Digital axis control HNC 100

RE 30131-Z/04.07 1/12
Peplaces: 05.02

Interconnection diagrams

Component series 2X



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General notes, guidelines

Place of installation

- Don't install the HNC next to power electronics (e.g. frequency converters)
- Install the power supply unit as close as possible to the HNC.

Power supply

Operating voltage range: 18 - 36 VDC;
Residual ripple content
< 1,5 Vpp; *I* = 1 A

Input fuse: F 1,25 A (recommendation)

- Establish the connection between the power supply unit and the HNC.
- Install the supply and return conductors (+24 V/GND) together.

Supply of external components

- Digital position measuring systems (24 V or 5 V)

  Encoder interface:

  5 V_{ENC} (internal 5 VTTL-voltage; I_{max} = 150 mA per axis)

  24 V_{ENC} (voltage from X6 via network filter; Imax = 200 mA per axis)
- Analog components such as pressure cells must be supplied externally.

Make sure that the wire cross-section is sufficient for supplying the components. In particular the GND cables have to be generously dimensioned. If required, use several wires for Vcc and GND.

The use of sensors with 24 V supply often makes higher demands on the voltage quality. The power supply unit must in any case meet the requirements of the most sensitive component.

In the case of applications with several HNCs and several analog sensors, it is useful to separate the supply to the HNC and to the sensors. The potentials of separate power supplies must be connected in any case.

Information on cabling and the use of separate power supply units can be found in the application notes on the HNC100-1-2x (available on request at support.nc-systems@)boschrexroth.com)

Grounding

- The HNC can be grounded in terms of HF by connecting the aluminum backpanel of the housing with the backpanel of the control cabinet by means of screws (4 x M4).

Shielding

- Only use cables with copper braiding shields as signal cables.
- The shield should usually be connected on the HNC side only. Connect the shield on a large contact area to the metallized plug housing (by clamping it under the cable grip). Exceptions to this are special encoder types, see application example of SSI encoders.
- Only use cables with the actual number of wires required. If necessary, connect the remaining wires to GND on both ends.

Cabling

- Separate signal and load cables physically and do not lay them in parallel.
- Do not route signal cables through strong magnetic fields.
- Whenever possible install signal cables without interruptions. Do not install intermediate terminals.

  (AD/DA socket X2; the use of SUBCON connectors made by Phoenix simplifies the cabling work)
- Power cables consisting of 2 individual wires (voltage supply) should be laid in parallel or twisted.

Interference suppression of the system

The following measures should be taken on the system.

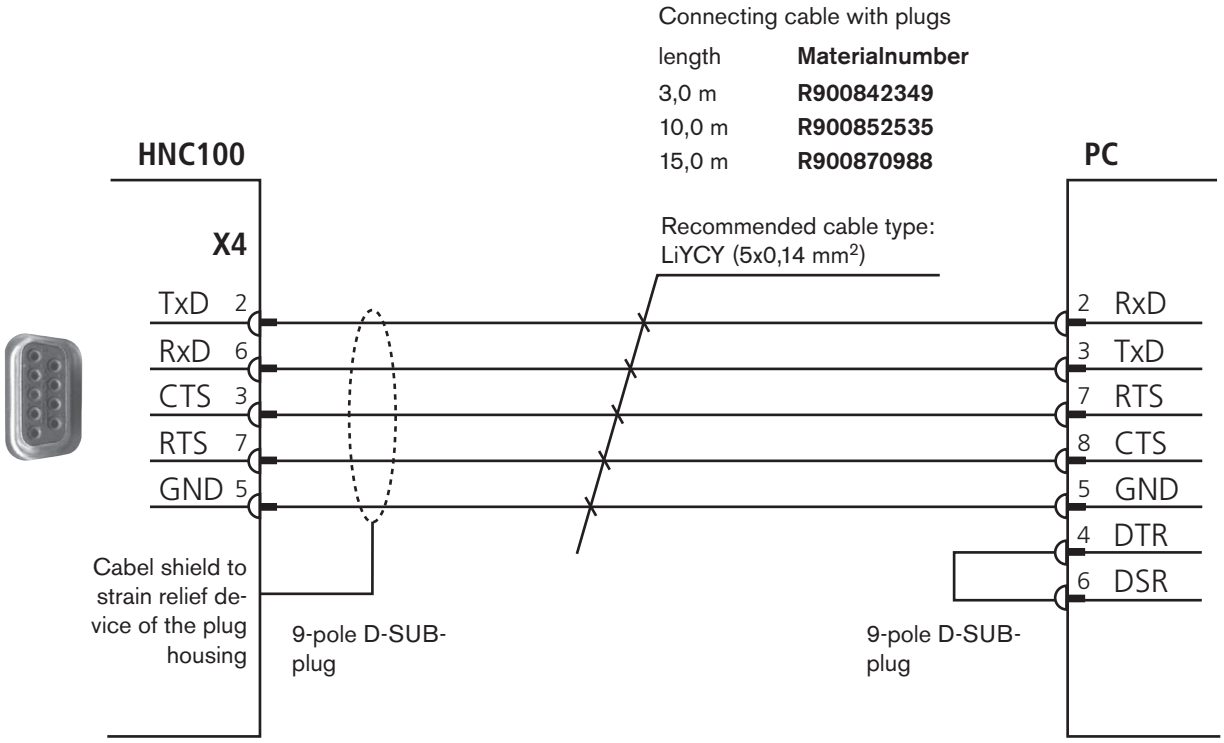
Connected inductivities:

- DC: Anti-parallel free-wheeling diode in parallel to the actuator winding
- AC: Type-related R/C combination in parallel to the actuator winding

Electric motors:

- R/C combinations from each motor winding to ground Frequency converter (FC)
- Input filter in the voltage supply of the FC
- Shielding and separate installation of the motor control cable
- Output filter for motor cables
- Large-area contact between FC housing and backpanel of the control cabinet

Connecting cable V24 HNC100 - V24 PC



VT-HNC100-1-2X/…-08-… Connector pin assignment (one axis)

X4	COM / local CAN
Pin 1	CAN_GND
2	TxD
3	CTS
4	24 VN
5	0 VN
6	RxD
7	RTS
8	CAN_H
9	CAN_L

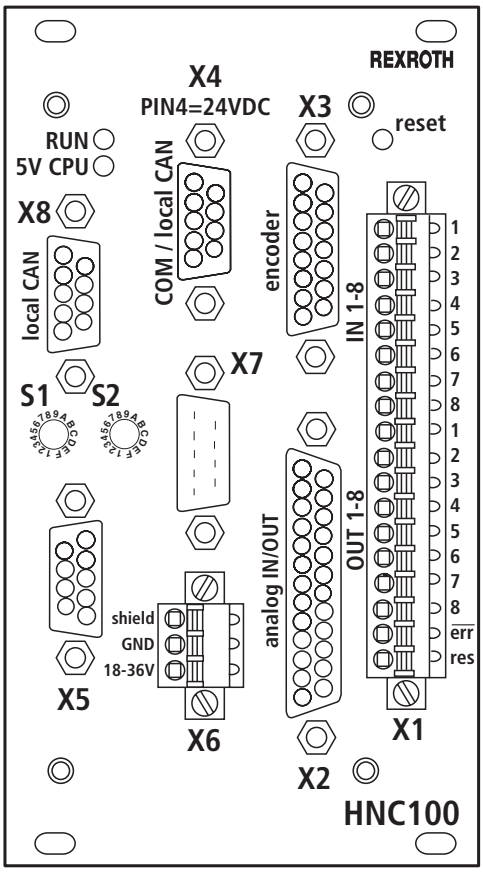
X5	communication with higher-level control		
Pin	**Profibus DP**	**INTERBUS-S (OUT)**	**SERCOS**
1	n.c.	DO 2	via optical fibre adapter
2	n.c.	DI 2	
3	RxD/TxD-P	GND 2	
4	CNTR-P	n.c.	
5	DGND	U_{dd}	
6	VP	/DO 2	
7	n.c.	/DI 2	
8	RxD/TxD-N	n.c.	
9	n.c.	BCI	

X6	voltage supply
Pin 1	shield
2	GND
3	18 - 36 VDC

X7	communication with higher-level control		
Pin	**CANopen**	**inductive**	**INTERBUS-S (IN)**
1	n.c.	Supply 1 +	DO1
2	CAN_L	Supply 1 –	DI1
3	CAN_GND	Signal 1 +	GND1
4	n.c.	Signal 1 –	n.c.
5	n.c.	Supply 2 +	n.c.
6	n.c.	Supply 2 –	/DO1
7	CAN_H	Signal 2 +	/DI1
8	n.c.	Signal 2 –	n.c.
9	n.c.	Sync IN/OUT	n.c.

X8	local CAN
Pin 1	CAN_GND
2	res
3	res
4	res
5	res
6	res
7	res
8	CAN_H
9	CAN_L

S1, S2	address, baudrate CAN								
S2	S2	S2	S2	S1	S1	S1	S1	
Bdr	Bdr	Bdr	Adr	Adr	Adr	Adr	Adr	baudrate
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	
0	0	0	x	x	x	x	x	10 kbit/s
0	0	1	x	x	x	x	x	20 kbit/s
0	1	0	x	x	x	x	x	50 kbit/s
0	1	1	x	x	x	x	x	125 kbit/s
1	0	0	x	x	x	x	x	250 kbit/s
1	0	1	x	x	x	x	x	500 kbit/s
1	1	0	x	x	x	x	x	800 kbit/s
1	1	1	x	x	x	x	x	1000 kbit/s



X1	digital I/O
Pin	
1	IN1
2	IN2
3	IN3
4	IN4
5	IN5
6	IN6
7	IN7
8	IN8
9	OUT1
10	OUT2
11	OUT3
12	OUT4
13	OUT5
14	OUT6
15	OUT7
16	OUT8
17	/error
18	res

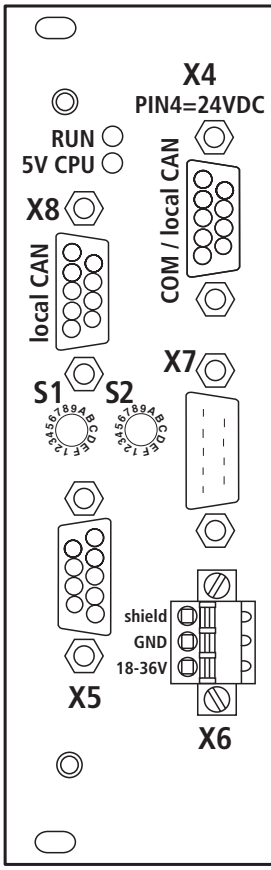
X2	analog IN / OUT	
Pin		
1	U_{in} 1 +	I_{in} 1 –
2	U_{in} 1 –	
3	U_{in} 2 +	I_{in} 2 –
4	U_{in} 2 –	
5	U_{in} 3 +	I_{in} 3 –
6	U_{in} 3 –	
7	U_{in} 4 +	I_{in} 4 –
8	U_{in} 4 –	
9	I_{out} 2	
10	U_{out} 2	
11	analog_GND	
12	U_{ref} = +10 V	
13	U_{ref} = –10 V	
14	I_{out} 1	
15	U_{out} 1	
16	U_{out} 3	
17	U_{out} 4	
18		I_{in} 1 +
19		I_{in} 2 +
20		I_{in} 3 +
21		I_{in} 4 +
22	U_{imp} 1	
23	U_{imp} 2	
24	U_{imp} 3	
25	U_{imp} 4	

X3	encoder	
Pin	incremental	SSI
1	/Ua 2	
2		Clock
3	Ua 0	
4	/Ua 0	
5	Ua 1	Data
6	/Ua 1	/Data
7		/Clock
8	Ua 2	
9	res	
10	0 VN	
11	res	
12	5 VTTL (max. 150 mA)	
13	res	
14	24 VN (max. 200 mA)	
15	res	

VT-HNC100-2-2X/...-16-... Connector pin assignment (two axis)

X4	COM / local CAN
Pin 1	CAN_GND
2	TxD
3	CTS
4	24 VN
5	0 VN
6	RxD
7	RTS
8	CAN_H
9	CAN_L

X5	Communication with higher-level control	
Pin	**Profibus DP**	**INTERBUS-S (OUT)**
1	n.c.	DO 2
2	n.c.	DI 2
3	RxD/TxD-P	GND 2
4	CNTR-P	n.c.
5	DGND	U_{dd}
6	VP	/DO 2
7	n.c.	/DI 2
8	RxD/TxD-N	n.c.
9	n.c.	BCI

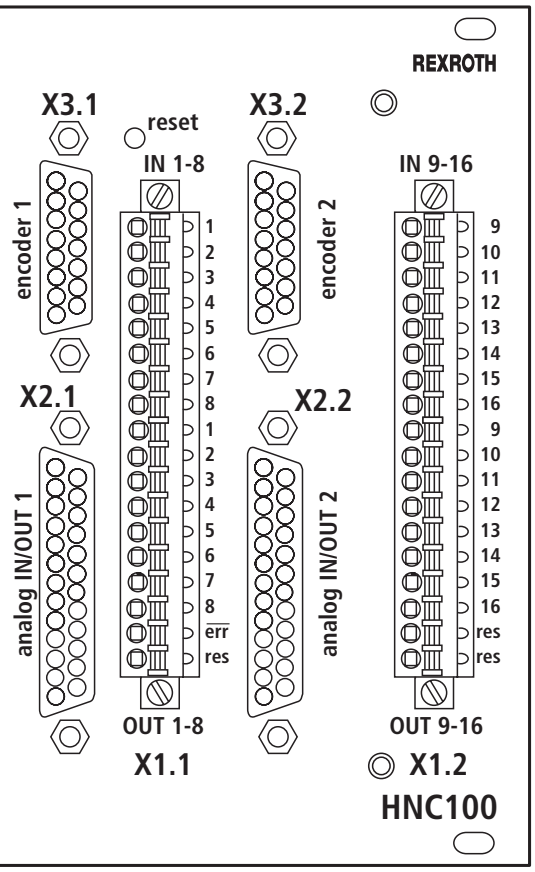


X6	Voltage supply
Pin 1	Shield
2	GND
3	18 - 36 VDC

X7	Communication with higher-level control		
Pin	**CANopen**	**inductiv**	**INTERBUS-S (IN)**
1	n.c.	Supply 1 +	DO1
2	CAN_L	Supply 1 –	DI1
3	CAN_GND	Signal 1 +	GND1
4	n.c.	Signal 1 –	n.c.
5	n.c.	Supply 2 +	n.c.
6	n.c.	Supply 2 –	/DO1
7	CAN_H	Signal 2 +	/DI1
8	n.c.	Signal 2 –	n.c.
9	n.c.	Sync IN/OUT	n.c.

X8	local CAN
Pin 1	CAN_GND
2	res
3	res
4	res
5	res
6	res
7	res
8	CAN_H
9	CAN_L

S1, S2 address, baudrate CAN								
S2	S2	S2	S2	S1	S1	S1	S1	
Bdr	Bdr	Bdr	Adr	Adr	Adr	Adr	Adr	baudrate
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	
0	0	0	x	x	x	x	x	10 kbit/s
0	0	1	x	x	x	x	x	20 kbit/s
0	1	0	x	x	x	x	x	50 kbit/s
0	1	1	x	x	x	x	x	125 kbit/s
1	0	0	x	x	x	x	x	250 kbit/s
1	0	1	x	x	x	x	x	500 kbit/s
1	1	0	x	x	x	x	x	800 kbit/s
1	1	1	x	x	x	x	x	1000 kbit/s



X1.1		digital I/O
Pin	1	IN1
	2	IN2
	3	IN3
	4	IN4
	5	IN5
	6	IN6
	7	IN7
	8	IN8
	9	OUT1
	10	OUT2
	11	OUT3
	12	OUT4
	13	OUT5
	14	OUT6
	15	OUT7
	16	OUT8
	17	/error
	18	res

X1.2		digital I/O
Pin	1	IN9
	2	IN10
	3	IN11
	4	IN12
	5	IN13
	6	IN14
	7	IN15
	8	IN16
	9	OUT9
	10	OUT10
	11	OUT11
	12	OUT12
	13	OUT13
	14	OUT14
	15	OUT15
	16	OUT16
	17	res
	18	res

X2.1		analog IN / OUT	
Pin	1	U_{in} 1 +	I_{in} 1 –
	2	U_{in} 1 –	
	3	U_{in} 2 +	I_{in} 2 –
	4	U_{in} 2 –	
	5	res	
	6	res	
	7	res	
	8	res	
	9	res	
	10	res	
	11	analog_GND	
	12	U_{ref} = +10 V	
	13	U_{ref} = –10 V	
	14	I_{out} 1	
	15	U_{out} 1	
	16	U_{out} 3	
	17	res	
	18		I_{in} 1 +
	19		I_{in} 2 +
	20	res	
	21	res	
	22	U_{imp} 1	
	23	U_{imp} 2	
	24	res	
	25	res	

X2.2		analog IN / OUT	
Pin	1	U_{in} 3 +	I_{in} 3 –
	2	U_{in} 3 –	
	3	U_{in} 4 +	I_{in} 4 –
	4	U_{in} 4 –	
	5	res	
	6	res	
	7	res	
	8	res	
	9	res	
	10	res	
	11	analog_GND	
	12	U_{ref} = +10 V	
	13	U_{ref} = –10 V	
	14	I_{out} 2	
	15	U_{out} 2	
	16	U_{out} 4	
	17	res	
	18		I_{in} 3 +
	19		I_{in} 4 +
	20	res	
	21	res	
	22	U_{imp} 3	
	23	U_{imp} 4	
	24	res	
	25	res	

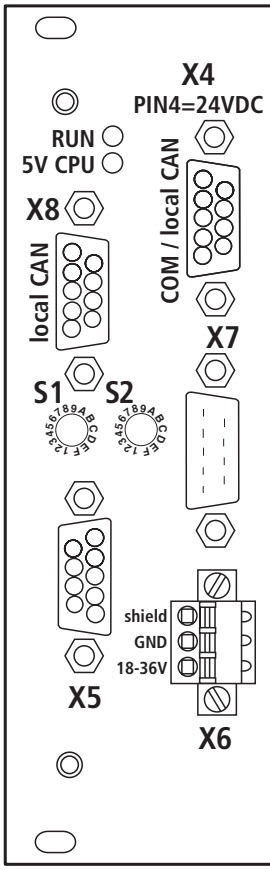
X3.1 encoder 1		
Pin	incremental	SSI
1	/Ua 2	
2		Clock
3	Ua 0	
4	/Ua 0	
5	Ua 1	Data
6	/Ua 1	/Data
7		/Clock
8	Ua 2	
9	res	
10	0 VN	
11	res	
12	5 VTTL (max. 150 mA)	
13	res	
14	24 VN (max. 200 mA)	
15	res	

X3.2 encoder 2		
Pin	incremental	SSI
1	/Ub 2	
2		Clock
3	Ub 0	
4	/Ub 0	
5	Ub 1	Data
6	/Ub 1	/Data
7		/Clock
8	Ub 2	
9	res	
10	0 VN	
11	res	
12	5 VTTL (max. 150 mA)	
13	res	
14	24 VN (max. 200 mA)	
15	res	

VT-HNC100-2-2X/...-24-... Connector pin assignment (one axis)

X4	COM / local CAN
Pin 1	CAN_GND
2	TxD
3	CTS
4	24 VN
5	0 VN
6	RxD
7	RTS
8	CAN_H
9	CAN_L

X5	Communication with higher-level control	
Pin	**Profibus DP**	**INTERBUS-S (OUT)**
1	n.c.	DO 2
2	n.c.	DI 2
3	RxD/TxD-P	GND 2
4	CNTR-P	n.c.
5	DGND	U_{dd}
6	VP	/DO 2
7	n.c.	/DI 2
8	RxD/TxD-N	n.c.
9	n.c.	BCI

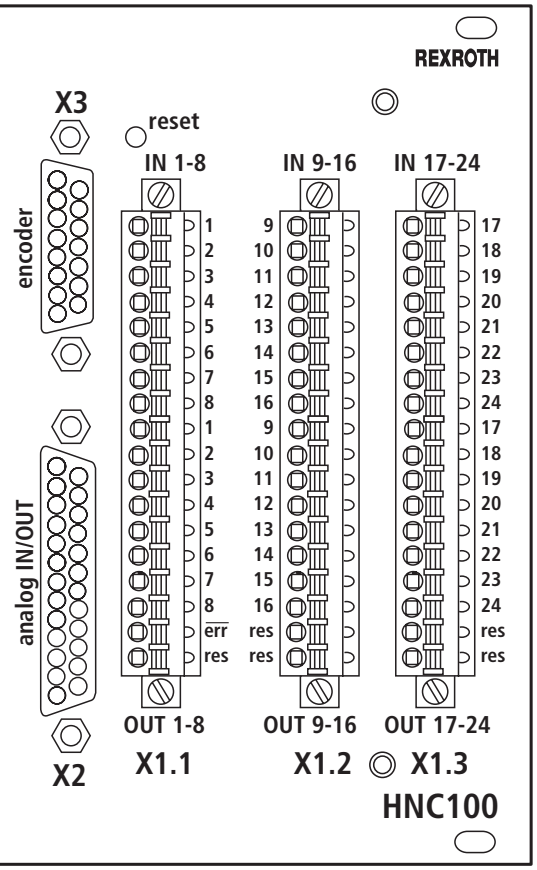


X6	Voltage supply
Pin 1	Shield
2	GND
3	18 - 36 VDC

X7	Communication with higher-level control		
Pin	**CANopen**	**inductiv**	**INTERBUS-S (IN)**
1	n.c.	Supply 1 +	DO1
2	CAN_L	Supply 1 –	DI1
3	CAN_GND	Signal 1 +	GND1
4	n.c.	Signal 1 –	n.c.
5	n.c.	Supply 2 +	n.c.
6	n.c.	Supply 2 –	/DO1
7	CAN_H	Signal 2 +	/DI1
8	n.c.	Signal 2 –	n.c.
9	n.c.	Sync IN/OUT	n.c.

X8	local CAN
Pin 1	CAN_GND
2	res
3	res
4	res
5	res
6	res
7	res
8	CAN_H
9	CAN_L

S1, S2 address, baudrate CAN								
S2	S2	S2	S2	S1	S1	S1	S1	
Bdr	Bdr	Bdr	Adr	Adr	Adr	Adr	Adr	baudrate
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	
0	0	0	x	x	x	x	x	10 kbit/s
0	0	1	x	x	x	x	x	20 kbit/s
0	1	0	x	x	x	x	x	50 kbit/s
0	1	1	x	x	x	x	x	125 kbit/s
1	0	0	x	x	x	x	x	250 kbit/s
1	0	1	x	x	x	x	x	500 kbit/s
1	1	0	x	x	x	x	x	800 kbit/s
1	1	1	x	x	x	x	x	1000 kbit/s



X1.1		digital I/O
Pin	1	IN1
	2	IN2
	3	IN3
	4	IN4
	5	IN5
	6	IN6
	7	IN7
	8	IN8
	9	OUT1
	10	OUT2
	11	OUT3
	12	OUT4
	13	OUT5
	14	OUT6
	15	OUT7
	16	OUT8
	17	/error
	18	res

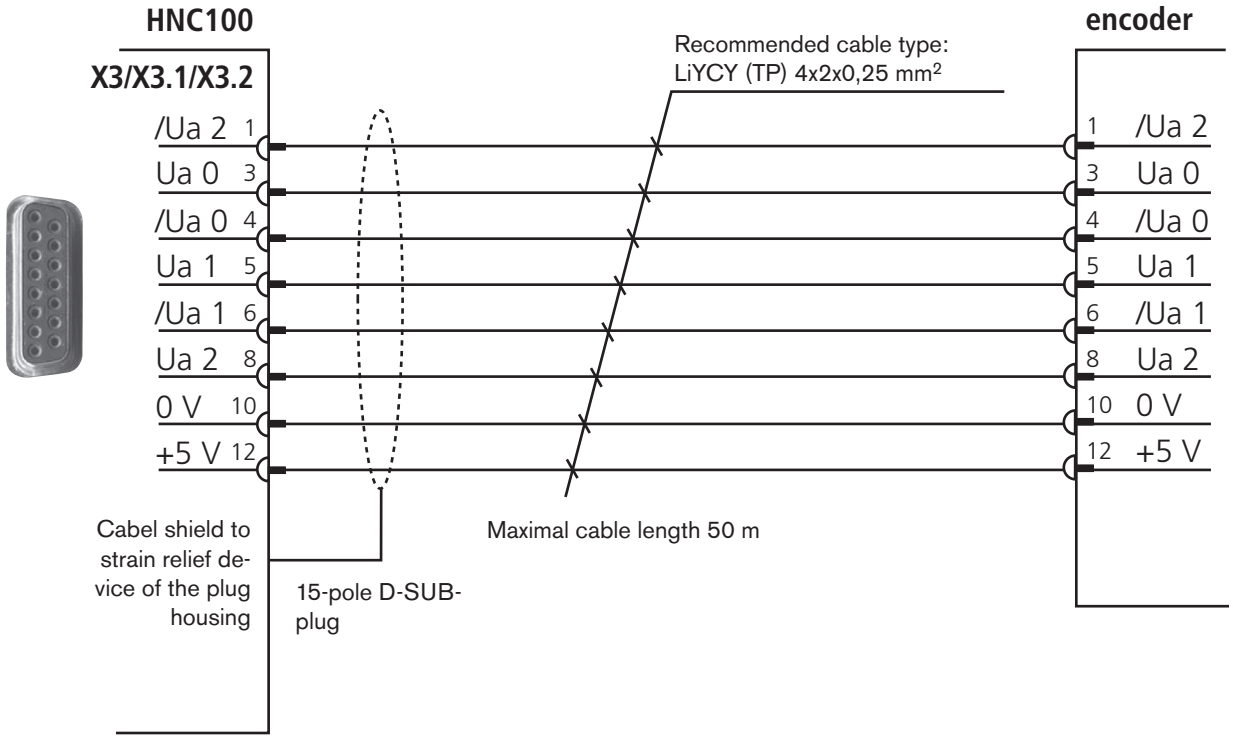
X1.2		digital I/O
Pin	1	IN9
	2	IN10
	3	IN11
	4	IN12
	5	IN13
	6	IN14
	7	IN15
	8	IN16
	9	OUT9
	10	OUT10
	11	OUT11
	12	OUT12
	13	OUT13
	14	OUT14
	15	OUT15
	16	OUT16
	17	res
	18	res

X1.3		digital I/O
Pin	1	IN17
	2	IN18
	3	IN19
	4	IN20
	5	IN21
	6	IN22
	7	IN23
	8	IN24
	9	OUT17
	10	OUT18
	11	OUT19
	12	OUT20
	13	OUT21
	14	OUT22
	15	OUT23
	16	OUT24
	17	res
	18	res

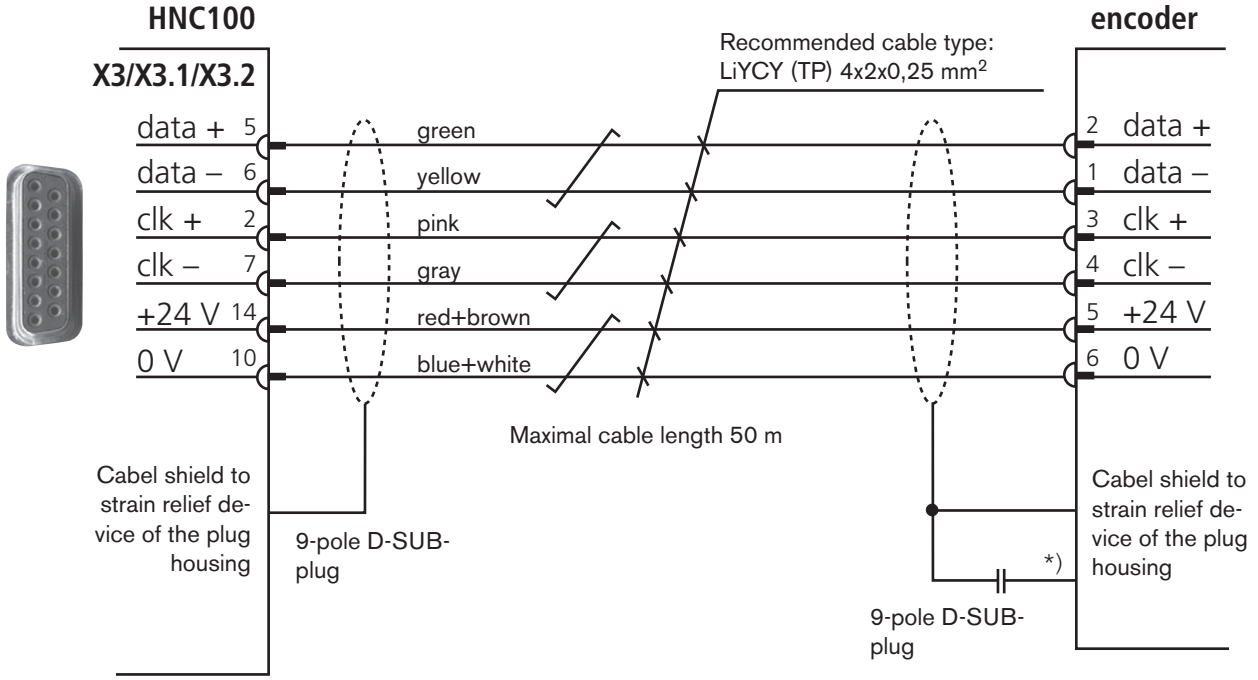
X2		analog IN / OUT	
Pin	1	U_{in} 1 +	I_{in} 1 –
	2	U_{in} 1 –	
	3	U_{in} 2 +	I_{in} 2 –
	4	U_{in} 2 –	
	5	U_{in} 3 +	I_{in} 3 –
	6	U_{in} 3 –	
	7	U_{in} 4 +	I_{in} 4 –
	8	U_{in} 4 –	
	9	I_{out} 2	
	10	U_{out} 2	
	11	analog_GND	
	12	U_{ref} = +10 V	
	13	U_{ref} = –10 V	
	14	I_{out} 1	
	15	U_{out} 1	
	16	U_{out} 3	
	17	U_{out} 4	
	18		I_{in} 1 +
	19		I_{in} 2 +
	20		I_{in} 3 +
	21		I_{in} 4 +
	22	U_{imp} 1	
	23	U_{imp} 2	
	24	U_{imp} 3	
	25	U_{imp} 4	

X3	encoder	
Pin	incremental	SSI
1	/Ua 2	
2		Clock
3	Ua 0	
4	/Ua 0	
5	Ua 1	Data
6	/Ua 1	/Data
7		/Clock
8	Ua 2	
9	res	
10	0 VN	
11	res	
12	5 VTTL (max. 150 mA)	
13	res	
14	24 VN (max. 200 mA)	
15	res	

Application example HNC100 - INC-encoder

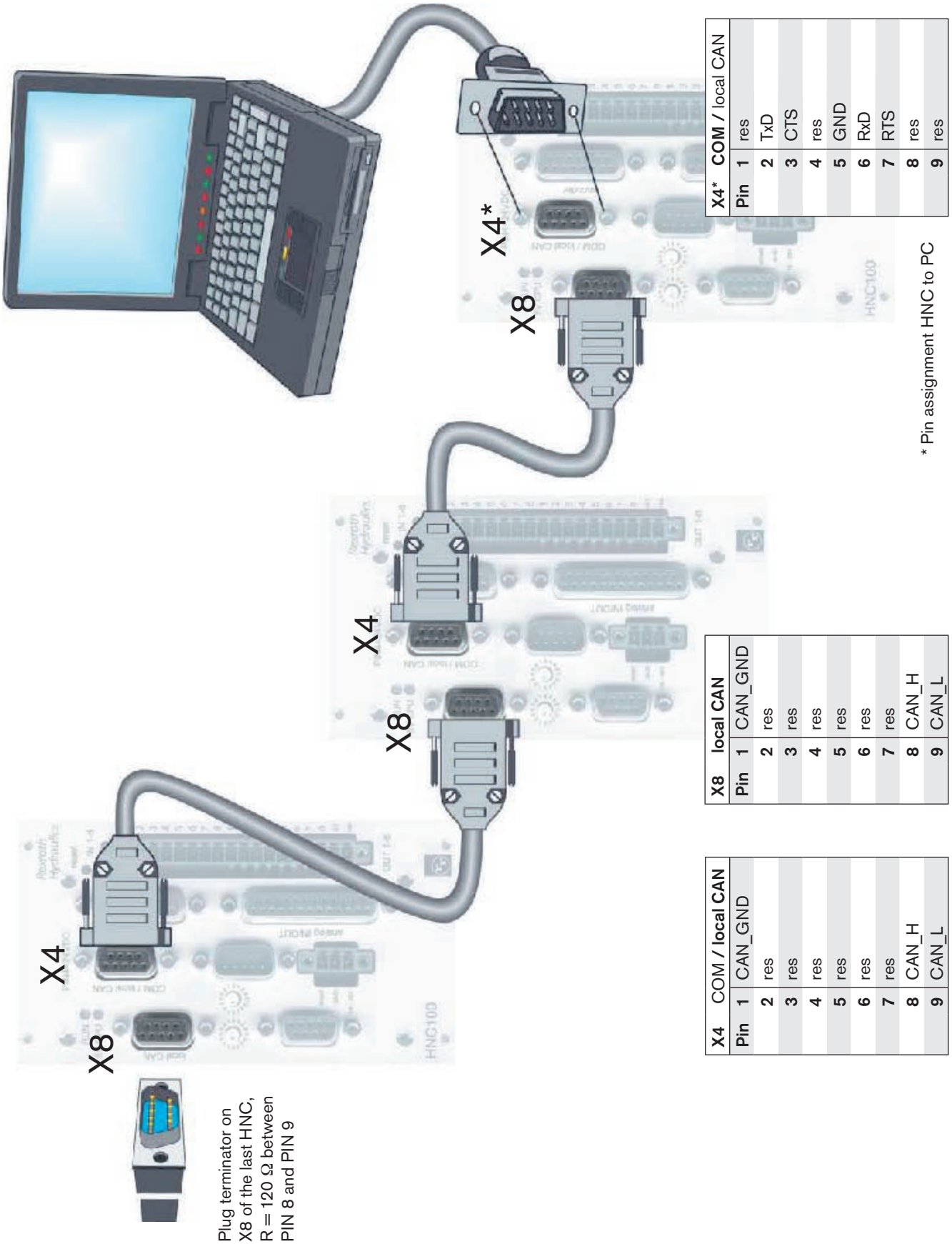


Application example HNC100 - SSI-encoder



*) If the control cabinet and system reference potentials are identical, the shield must be connected on both ends. If they are different, the shield should be connected via a C = 47 - 680 nF on the encoder side.

Application example: Local CAN



X4*	COM / local CAN
Pin 1	res
2	TxD
3	CTS
4	res
5	GND
6	RxD
7	RTS
8	res
9	res

* Pin assignment HNC to PC

X8	local CAN
Pin 1	CAN_GND
2	res
3	res
4	res
5	res
6	res
7	res
8	CAN_H
9	CAN_L

X4	COM / local CAN
Pin 1	CAN_GND
2	res
3	res
4	res
5	res
6	res
7	res
8	CAN_H
9	CAN_L

Field bus systems

General

The HNC100 is used as slave in conjunction with any field bus system. Guidelines with regard to wiring, cable selection and bus terminal can be found in the documentation of the relevant master assembly.

Profibus-DP

HNC100 COM2 X5	
Pin	**Profibus-DP**
1	n.c.
2	n.c.
3	RxD/TxD-P
4	CNTR-P
5	DGND
6	VP
7	n.c.
8	RxD/TxD-N
9	n.c.

Further technical support, standardization:

Profibus user organization (PNO) DIN19245

CANopen

HNC100 aux X7	
Pin	**CANopen**
1	n.c.
2	CAN_L
3	CAN_GND
4	n.c.
5	n.c.
6	n.c.
7	CAN_H
8	n.c.
9	n.c.

Further technical support, standardization:

CiA (CAN in Automation) EN 50325-4 (DS-301)

Interbus S

HNC100 X7	
X7: auxilliary	
Pin	**INTERBUS-S IN**
1	DO 1
2	DI 1
3	GND 1
4	n.c.
5	n.c.
6	/DO 1
7	/DI 1
8	n.c.
9	n.c.

IN interface

HNC100 X5	
X5: COM2	
Pin	**INTERBUS-S OUT**
1	DO 2
2	DI 2
3	GND 2
4	n.c.
5	U_{dd}
6	/DO 2
7	/DI 2
8	n.c.
9	BCI

OUT interface

Further technical support, standardization:

INTERBUS-S Club DIN 19258, EN 50254, IEC 61158

SERCOS

Coupling via optical fibre adapter

Further technical support, standardization:

Interessengemeinschaft Sercos e.V. (IGSev)

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