Application note
"Wiring LV-servoTEC S2“

Short version: In this application document, the user is given information regarding proper wiring specifically regarding the:

- EMERGENCY OFF function with protective door monitoring and
- EMERGENCY OFF function without protective door monitoring

The application document also indicates the:

- Assignment of the wiring for motor and return systems
- Connections of the supply voltages
- Circuitry of the in- and outputs
- As well as different device views

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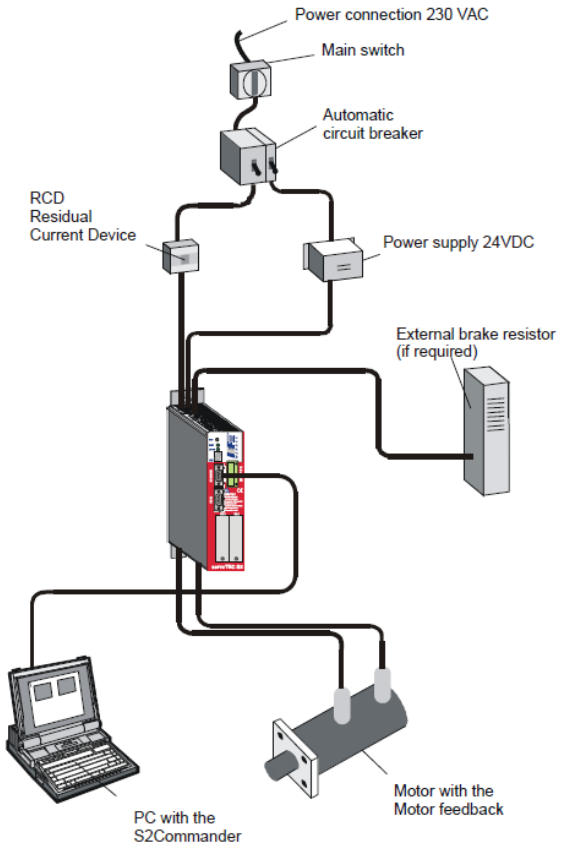
1 Modifications

Document modifications and life cycle

Document Code	Date	Generation and modification
APP5010_EN_1117810_PAC_Wiring_LV-servoTEC_S2_R1a.doc	October 2013	Release of this English application document. Translation of original German documentation: “APP5010_DE_1076281_PAC_Verdrahtung_servoTEC_S2_R1i.doc”

2 Overview

2.1 Overall setup LV-servoTEC S2



Comment:

A collection of the connection cables, including the order information, is available in the sections:

2.2	Connection cable LV-servoTEC S2 – LV-servoTEC S2-adapter
6.1	Motor cable
6.2.1	Resolver cable
6.2.2.1	Encoder cable
6.2.2.2	EnDat cable
8.1	CANopen bus cable
8.2	Profibus DP cable

Figure 1: LV-servoTEC S2 Setup

2.2 Block wiring diagram without I/O-adapter

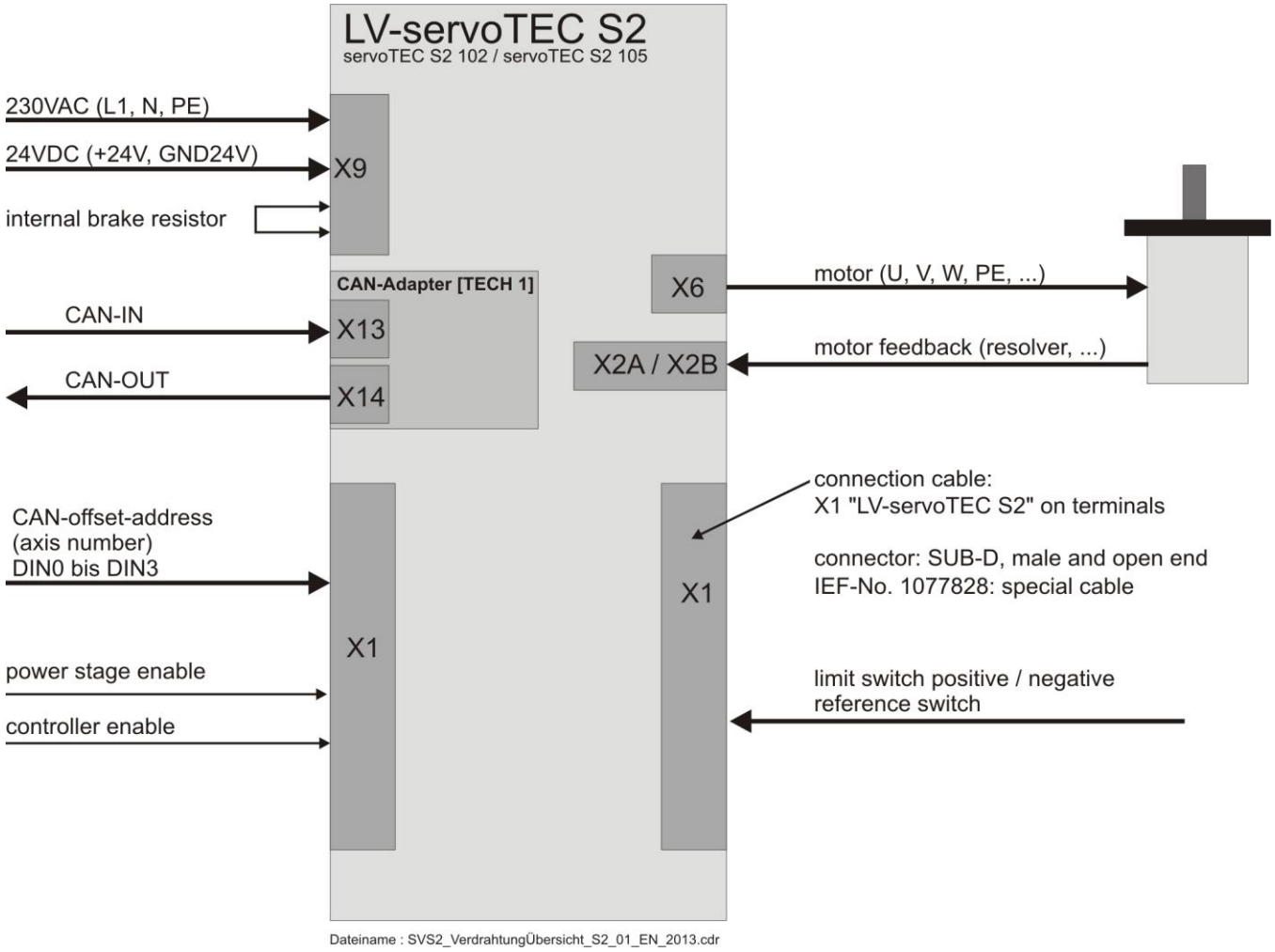


Figure 2: Block wiring diagram without I/O-adapter

2.3 Block wiring diagram with I/O-adapter

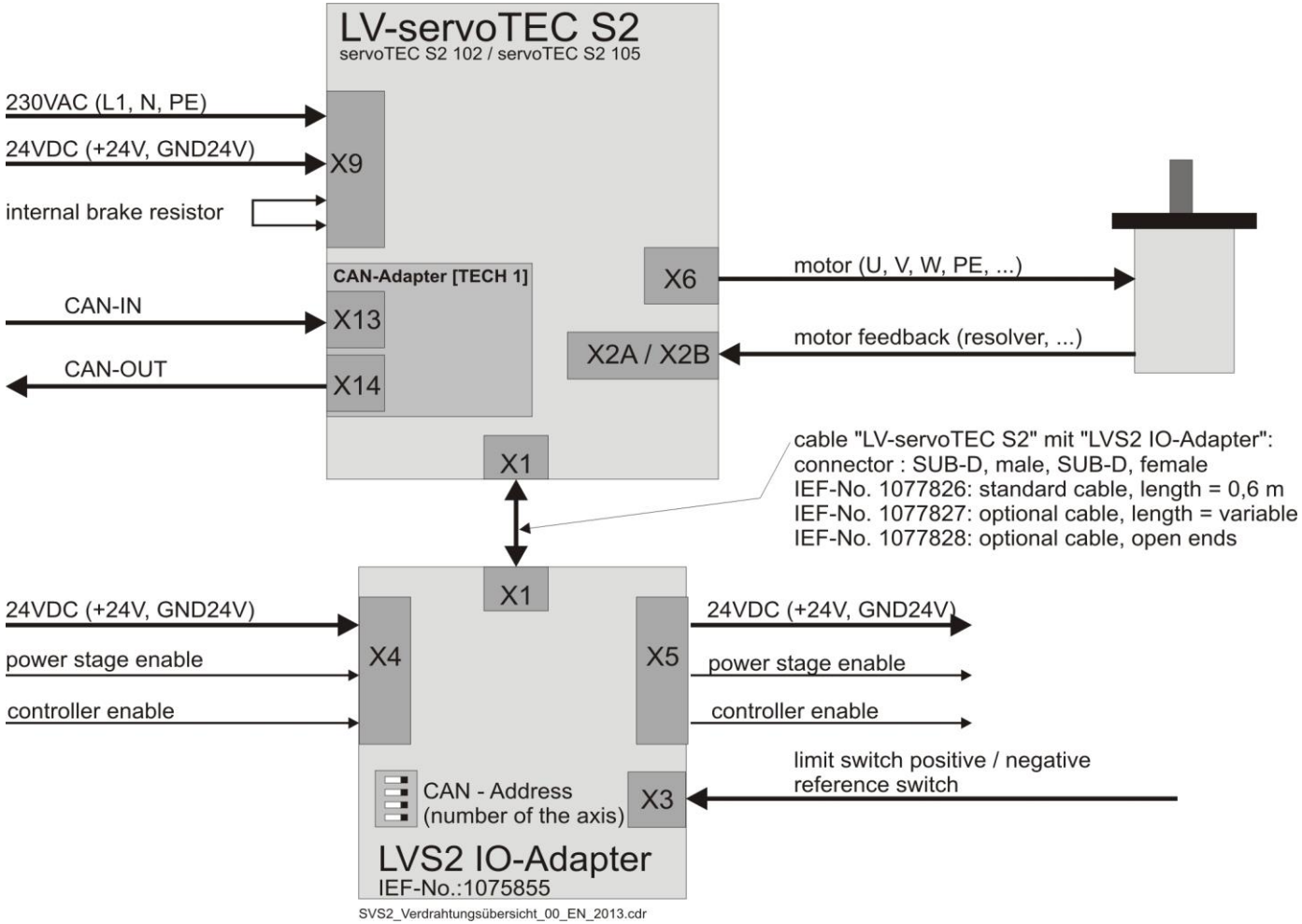


Figure 3: Block wiring diagram with I/O-adapter

3 Wiring principle "EMERGENCY OFF" and "Protective Door"

For information on the wiring principle "EMERGENCY OFF" and "Protective door", see the application document:

“APP5016_EN_1117813_PAC_OpeningProtectiveDoor_servoTEC_S2_R1a.doc”

4 Device views

4.1 Views LV-servoTEC S2 1xx

4.1.1 Front view

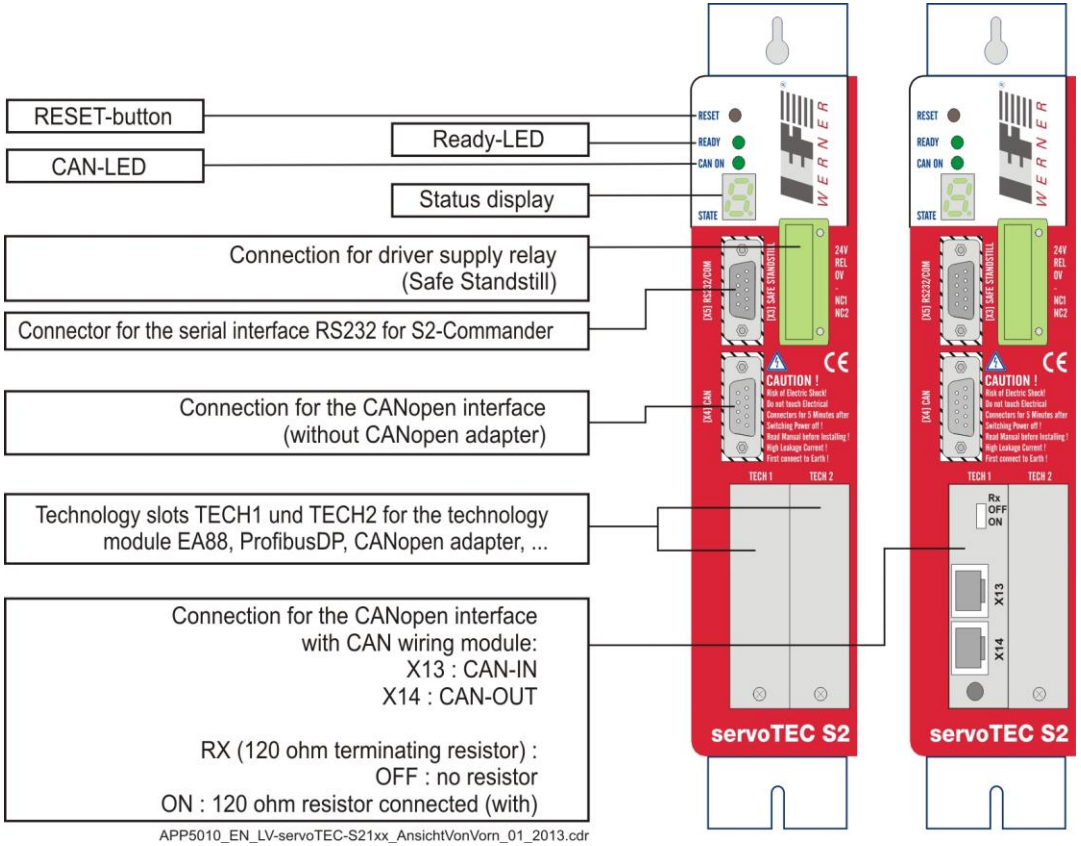
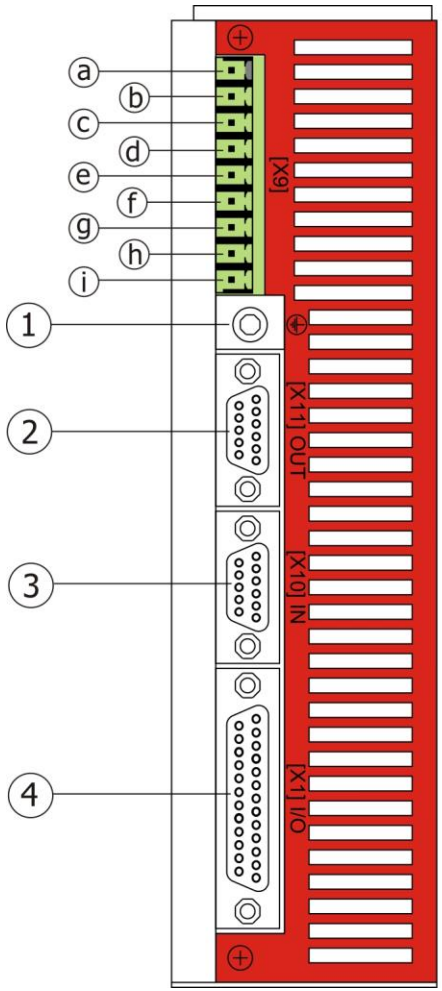


Figure 4: Front view

4.1.2 Top view



a	L: Connection for the mains phase 230 VAC
b	N: Connection for the mains neutral conductor
c	ZK+: positive DC link voltage
d	ZK-: negative DC link voltage
e	BR-INT: Connection for the brake chopper
f	BR-CH: Connection for the brake chopper
g	PE: Connection for the ground conductor from mains
h	+24V: Connection for the 24 VDC
i	GND 24V: Connection for the GND 24VDC
1	Connection for the shield
2	[X11]: Incremental encoder output
3	[X10]: Incremental encoder intput
4	[X1]: I/O Interface

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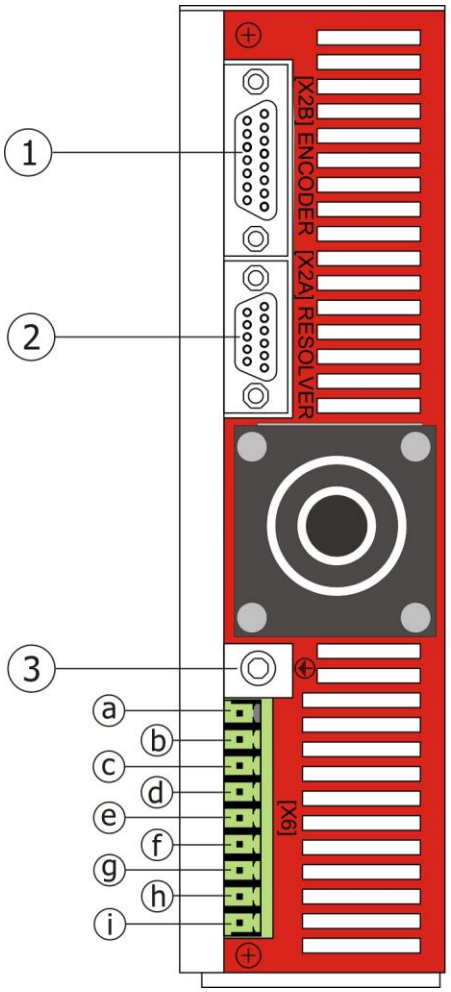
Figure 5: Top view

4.1.3 Bottom view



1	[X2B]: Connection for the encoder
2	[X2A]: Connection for the resolver
3	Connection for the outer shield from the motor cable
a	BR-: Connection for the holding brake
b	BR+: Connection for the holding brake
c	PE: Connection for the inner shield for the holding brake and the temperature sensor
d	-MTdig: Connection for the motor temperature sensor
e	+MTdig: Connection for the motor temperature sensor
f	PE: Connection for the motor ground conductor
g	W: Connection for the motor phase 3
h	V: Connection for the motor phase 2
i	U: Connection for the motor phase 1

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Figure 6: Bottom view

4.2 Views LV-servoTEC S2 3xx

4.2.1 Front view

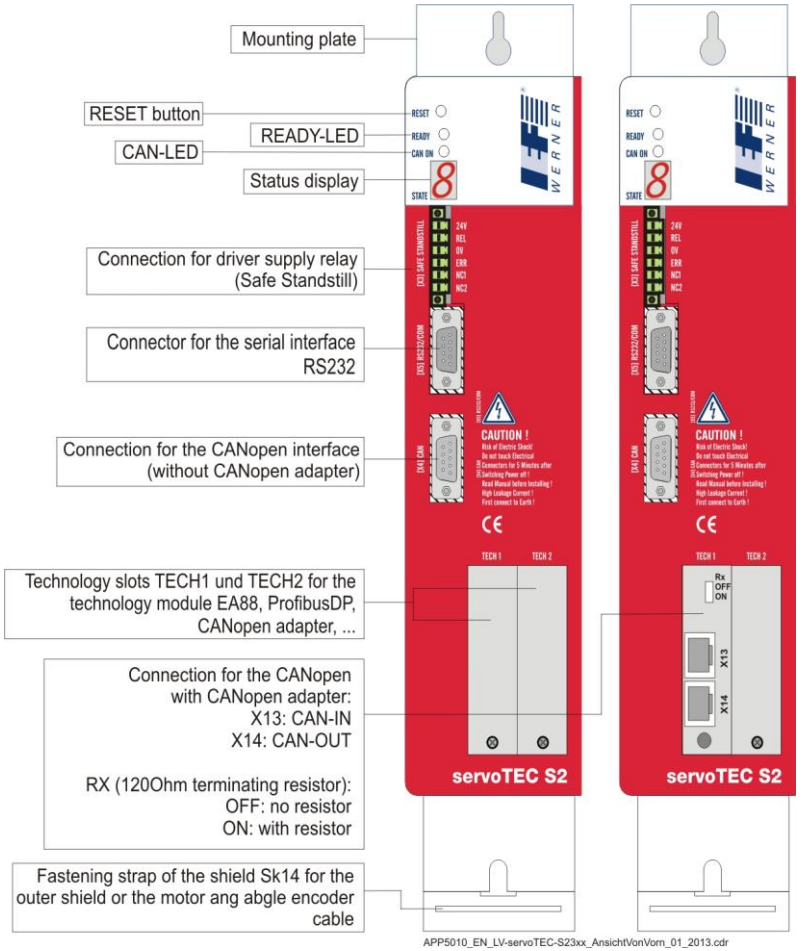
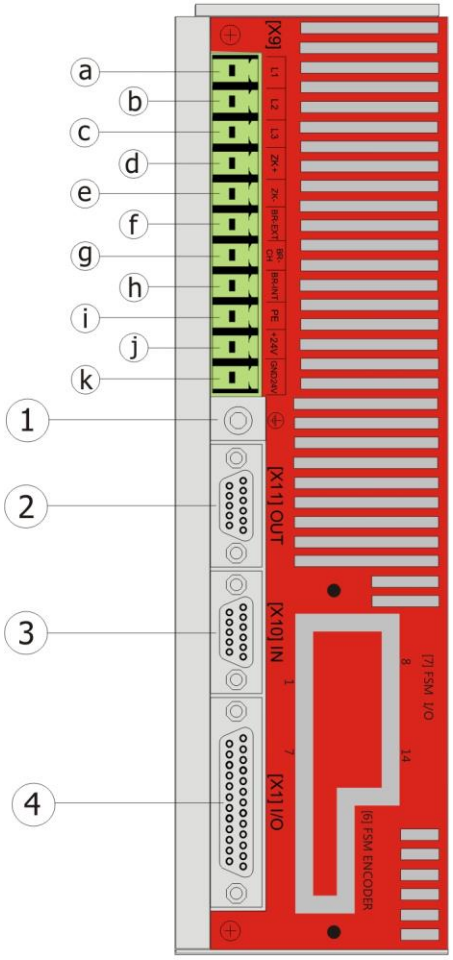


Figure 7: Front view

4.2.2 Top view



a	L1: Connection for 400VAC mains phase
b	L2: Connection for 400VAC mains phase
c	L3: Connection for 400VAC mains phase
d	ZK+: Positive DC link voltage
e	ZK-: Negative DC link voltage
f	BR-EXT: Connection of external brake chopper
g	BR-CH: Connection of brake chopper
h	BR-INT: Connection of internal brake chopper
i	PE: Connection for the shield
j	+24V: 24VDC connection
k	GND 24V: GND 24V connection
1	Shield connection
2	[X11]: Incremental encoder output
3	[X10]: Incremental encoder intput
4	[X1]: I/O communication

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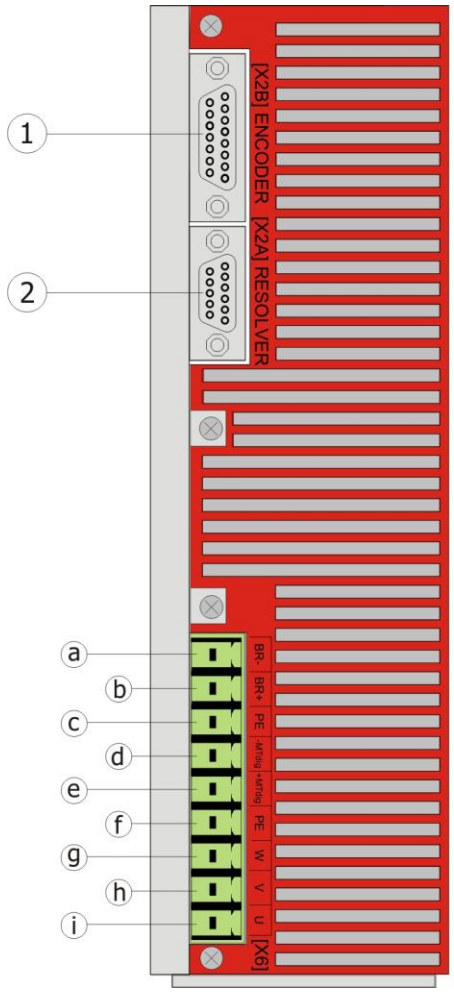
Figure 8: Top view

4.2.3 Bottom view



1	[X2B]: Connection for the encoder
2	[X2A]: Connection for the resolver
a	BR-: Holding brake (motor) connection
b	BR+: Holding brake (motor) connection
c	PE: Inner shield connection
d	-MTdig: Motor temperature sensor connection
e	+MTdig: Motor temperature sensor connection
f	PE: Motor ground conductor connection
g	W: Motor phase 3 connection
h	V: Motor phase 2 connection
i	U: Motor phase 1 connection

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Figure 9: Bottom view

5 Supply 230VAC / 24VDC

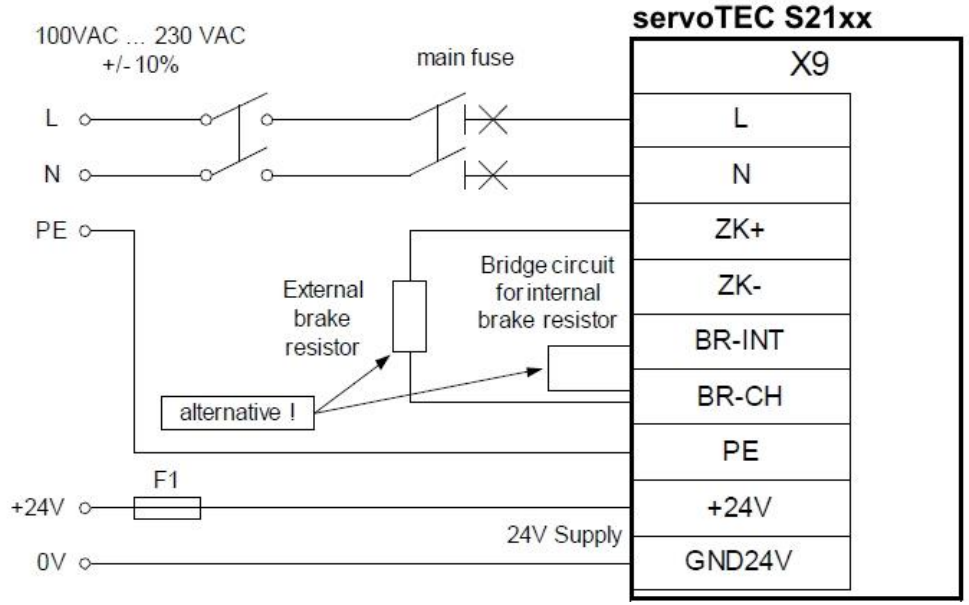


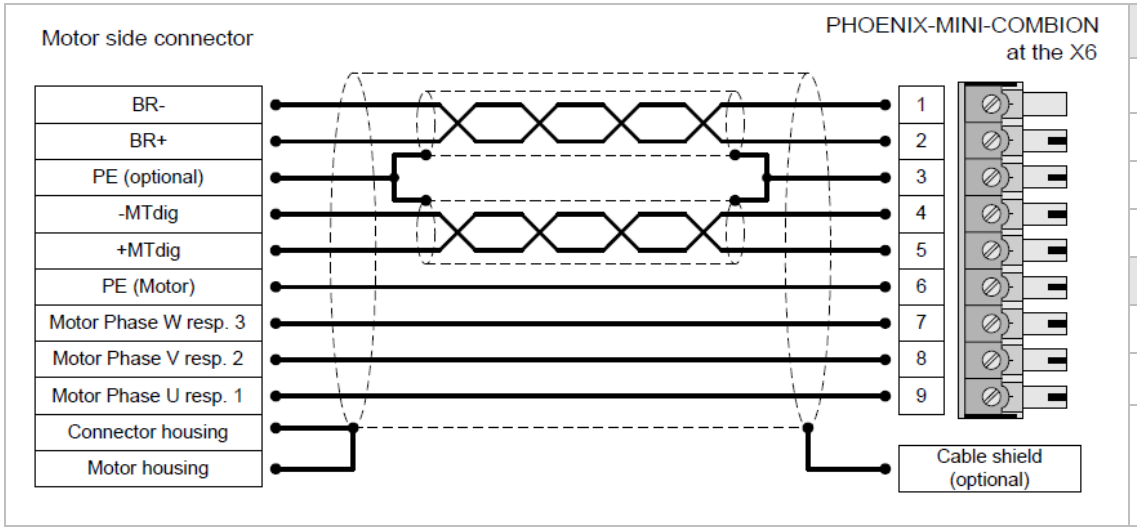
Figure 10: Supply

NOTE: If the machine is equipped with an EMERGENCY OFF system and (or) with a protective door monitoring system, the 230VAC-wiring must be implemented according to the application document “APP5016_EN_1117813_PAC_OpeningProtectiveDoor_servoTEC_S2.pdf”.

The pin "X9.BR-CH" must be wired (bridge or external brake resistor).

6 Motor and return systems

6.1 Motor

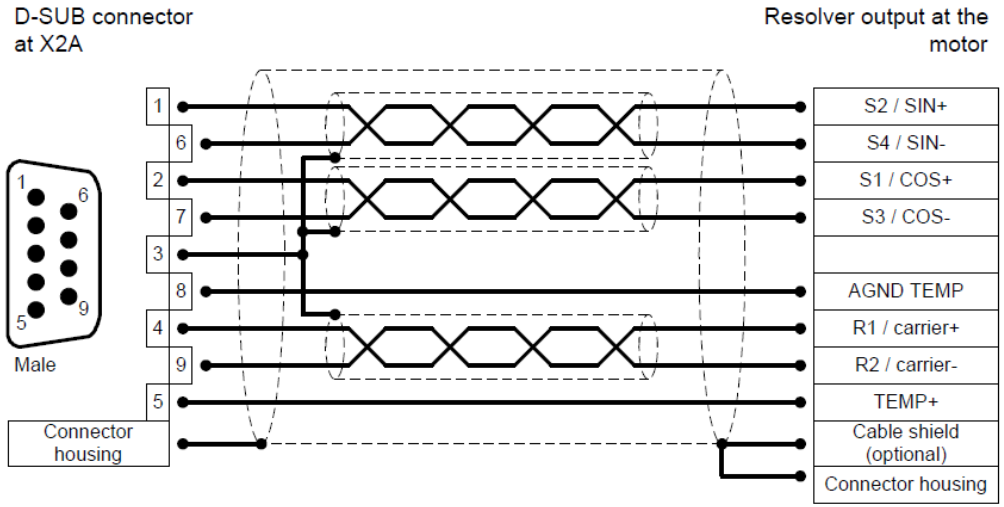


Motor cable for LV-servoTEC S2 1xx	Item no.
Bilateral plug	1071240
Open on motor-side	1071062
For euroLINE 32 KLA	1072986
For euroLINE 85 KL	1072987
Motor cable for LV-servoTEC S2 3xx:	**Item no.**
Bilateral plug	1071061
Open on motor-side	1071241

Figure 11: Motor connections

6.2 Return system

6.2.1 X2A resolver



Resolver cable	Item no.
Standard length (3 meter)	1068626
Special length	1068625

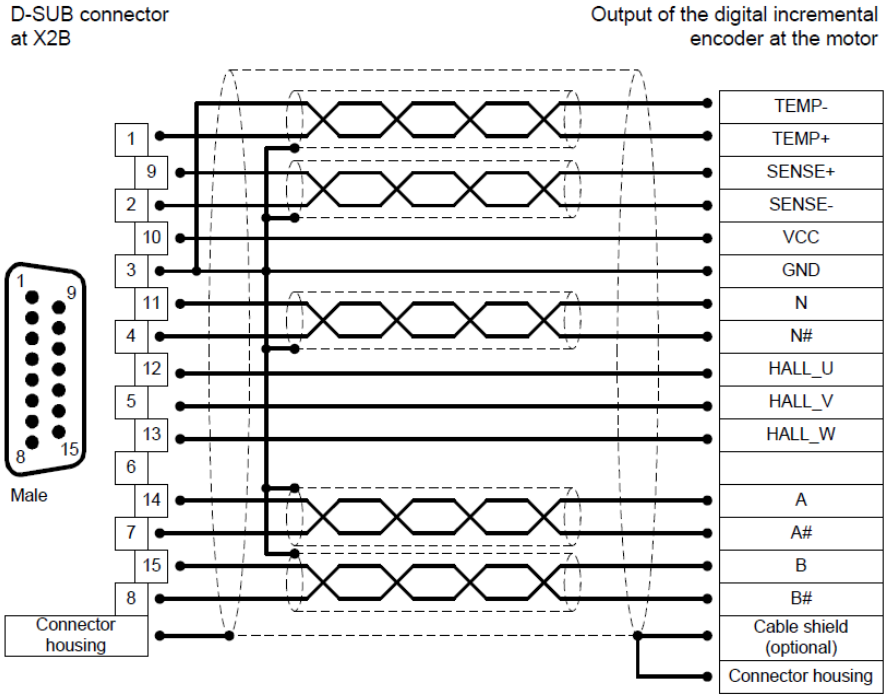
Figure 12: X2A resolver

6.2.2 X2B encoder

6.2.2.1 Digital incremental encoder

For example:

- IEF euroLINE-axis



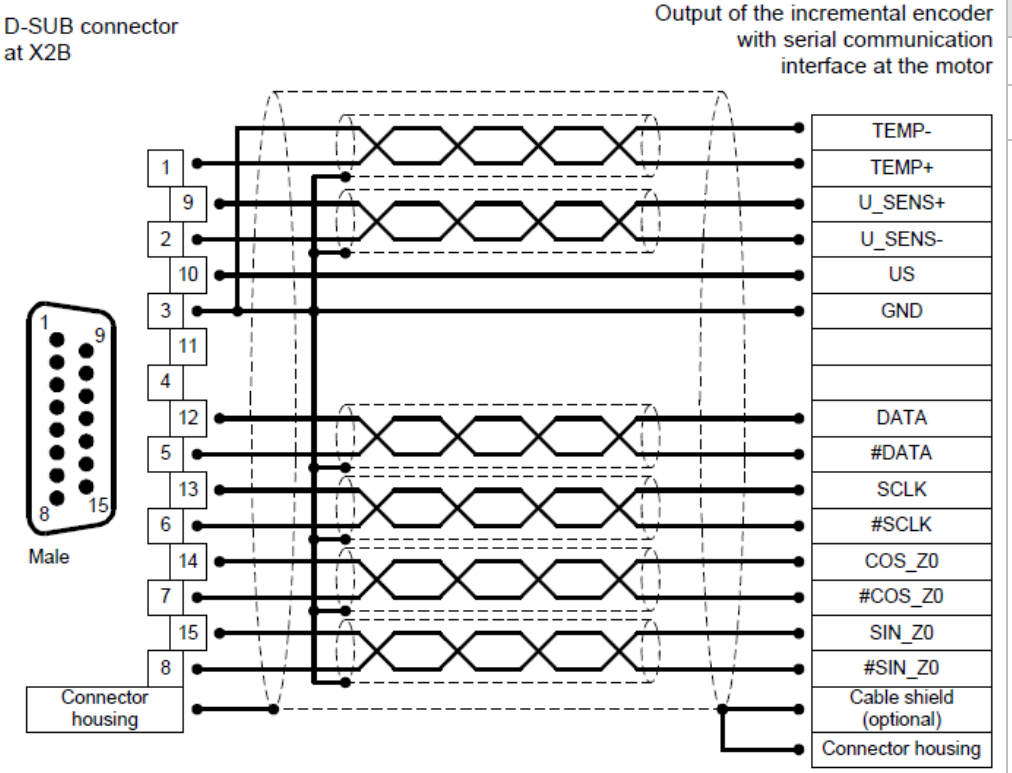
Encoder cable für LV-servoTEC S2 1xx		Item no.
For euroLINE 32 KLA	(from 0 to 3 meter)	1072665
	from 3 to 5 meter)	1072666
	(from 5 to 10 meter)	1072667
For euroLINE 85 KL	special length	1072704

Figure 13: Digital incremental encoder

6.2.2.2 Incremental encoder with serial interface

For example:

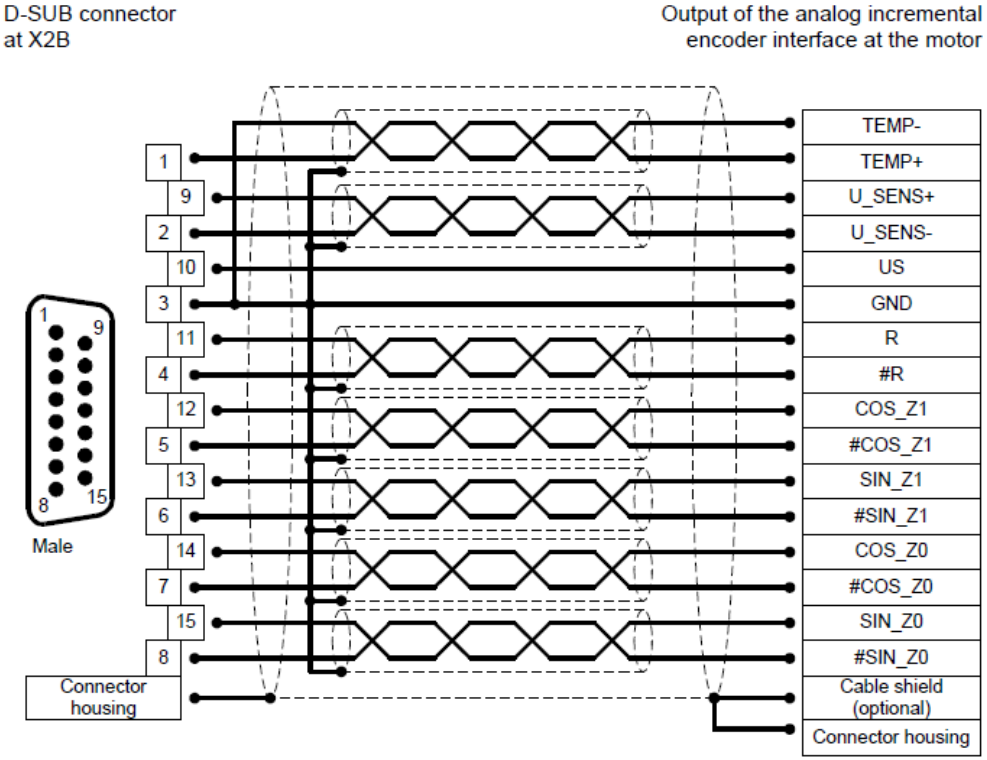
- EnDat
- HIPERFACE



EnDat cable	Item no.
Standard length (3 meter)	1068628
Special length	1068627

Figure 14: Incremental encoder with serial interface

6.2.2.3 Analogue incremental encoder



Analogue incremental encoder	Item no.
	No item numbers specified

Figure 15: Analogue incremental encoder

7 Connection I/O

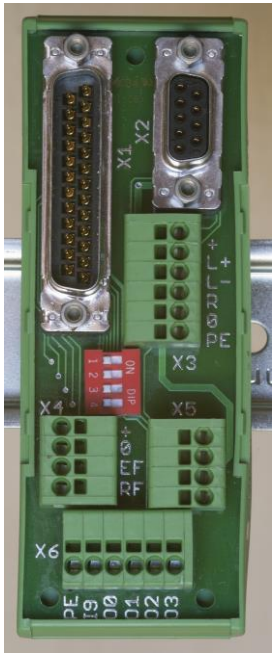
7.1 X1 without I/O-adapter

Pin-No.		Designation	Specification
1		AGND	Shield for analogue signals, AGND
	14	AGND	Reference potential for analogue signals
2		AIN0	Target value input 0, differential, up to 30V input voltage
	15	#AIN0	
3		AIN1	Target value inputs 1 and 2, single ended, maximum 30V input voltage
	16	AIN2	
4		+VREF	Reference output for target value potentiometer
	17	AMON0	Analogue monitor output 0
5		AMON1	Analogue monitor output 1
	18	+24V	24V-infeed guided out
6		GND24	Reference potential for digital IOs
	19	DIN0	
7		DIN1	

Pin-No.		Designation	Specification
	20	DIN2	
8		DIN3	
	21	DIN4	End stage release
9		DIN5	Input controller release
	22	DIN6	Limit switch 0 (limit switch negative)
10		DIN7	Limit switch 1 (limit switch positive)
	23	DIN8	Reference switch
11		DIN9	
	24	DOUT0 / READY	Output operational readiness
12		DOUT1	Output freely programmable
	25	DOUT2	Output freely programmable
13		DOUT3	Output freely programmable

7.2 X1 with I/O-adapter

X1 : Connection I/O adapter LV-servoTEC S2	
Connection	**Assignment**
6	GND
7	Digital input 1 (address 2^1)
8	Digital input 3 (address 2^3)
9	Digital input 5 (controller release)
10	Digital input 7 (limit switch pos.)
11	Digital input 9
12	Digital output 1
13	Digital output 3
19	Digital input 0 (address 2^0)
20	Digital input 2 (address 2^2)
21	Digital input 4 (end stage release)
22	Digital input 6 (limit switch neg.)
23	Digital input 8 (reference switch)
24	Digital output 0 (ready)
25	Digital output 2



Dimensions I/O-adapter (LxWxH) 110x40x40
Attachment on standard rail in the control cabinet

X2 : Limit switch connection via 9-pin. SUB-D	
Connection	**Assignment**
1	Limit switch positive
2	Limit switch negative
3	Reference switch
7	+24V
9	GND

X3 : Limit switch connection via open cable end	
Connection	**Assignment**
+	24V
L+	Limit switch positive
L-	Limit switch negative
R	Reference switch
0	GND
PE	PE

S1 : Slider offset address	
Switch	**Function**
1	Address 2^0
2	Address 2^1
3	Address 2^2
4	Address 2^3

X6 : digital in- and outputs of the LV-servoTEC S2	
Connection	**Assignment**
PE	PE
I9	Digital input 9
O0	Digital output 0, ready
O1	Digital output 1
O2	Digital output 2
O3	Digital output 3

X4 / X5 : Forwarding at several cylinders	
Connection	**Assignment**
+	+24V
0	GND
EF	End stage release
RF	Controller release

Figure 16: X1 with I/O adapter

7.3 Principle circuit diagram with I/O-adapter

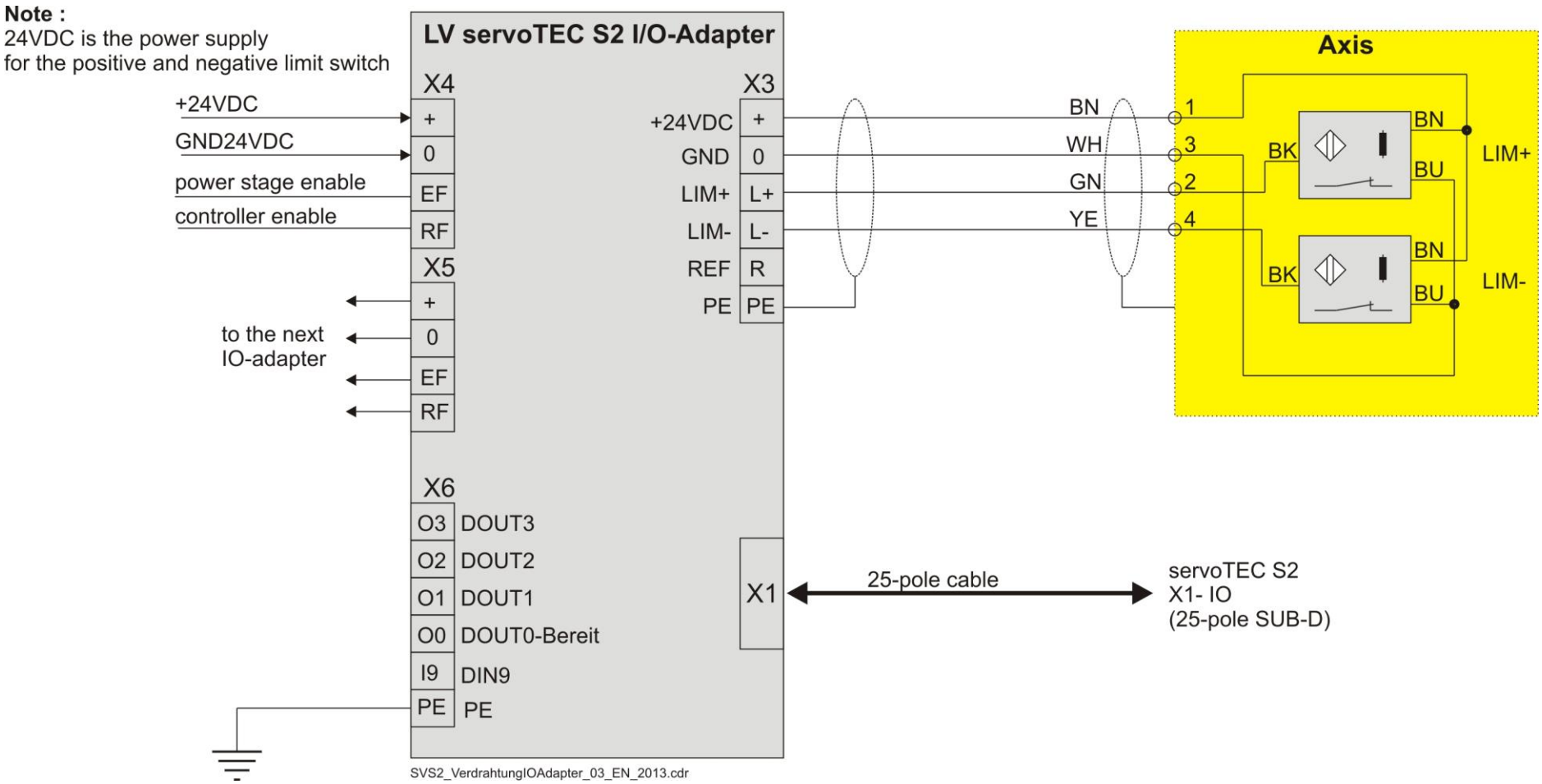


Figure 17: Principle circuit diagram with I/O adapter

7.4 Limit switch cable

Wiring of the limit switches is possible using the following cables:

IEF order number	Length	Execution
231542	3 m (standard)	Plug - open end
231543	Special length	Plug - open end
1077589	3 m (standard)	Plug - plug
1077587	Special length	Plug - plug

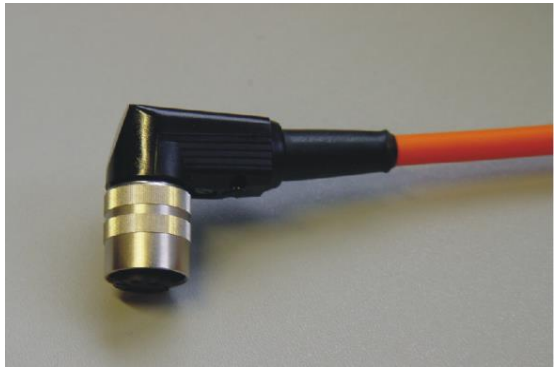
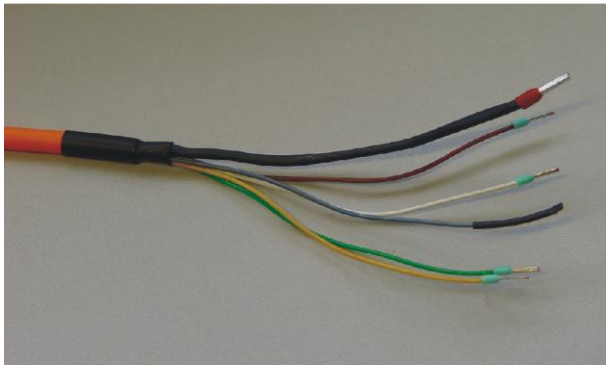
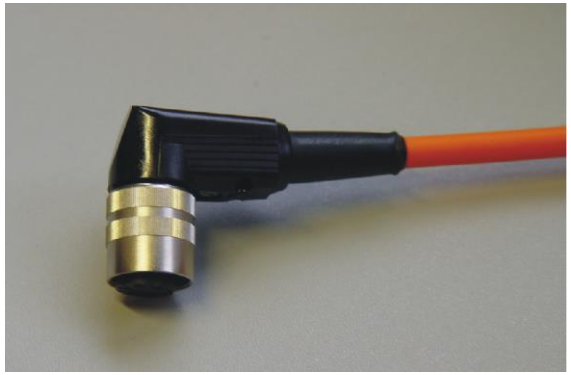
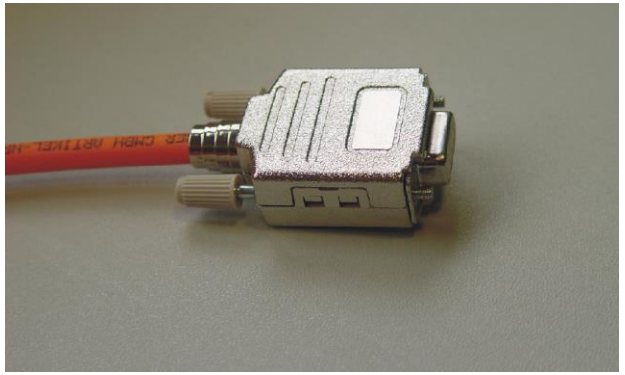





Figure 18: Limit switch cable

8 Fieldbus wiring

8.1 CAN-bus with PA-CONTROL

8.1.1 LV-servoTEC S2 without wiring module

8.1.1.1 Plug assignment CAN-Bus X4 at the LV-servoTEC S2

Plug assignment CAN-bus X4	Pin number		Designation	Specification
	1			Not assigned
		6	GND	CAN-GND, galvanically connected to GND in the controller
	2		CAN-LOW	CAN-low signal line
		7	CAN-high	CAN-high signal line
	3		GND	CAN-GND, galvanically connected to GND in the controller
		8		Not assigned
	4			Not assigned
		9		Not assigned
	5		Shield	Connection for cable shield

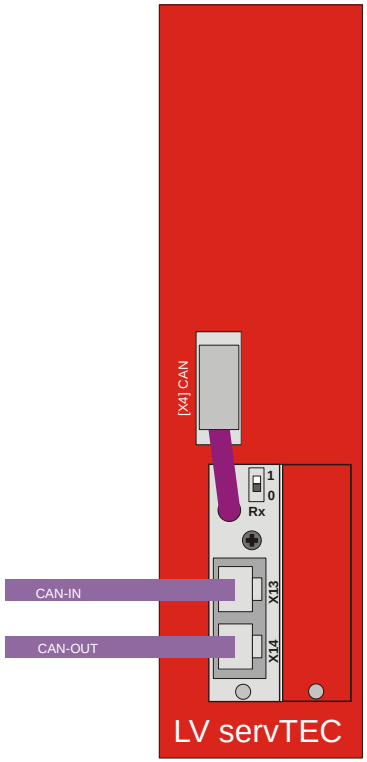
8.1.2 LV-servoTEC S2 with CAN-wiring module

8.1.2.1 Plug assignment CAN wiring module

X13: CAN-IN	Connection	Assignment
	1	CAN-high
	2	CAN-low
	3	CAN-GND
	4	Internally assigned
	5	Internally assigned
	6	Not assigned
	7	Internally assigned
	8	Internally assigned

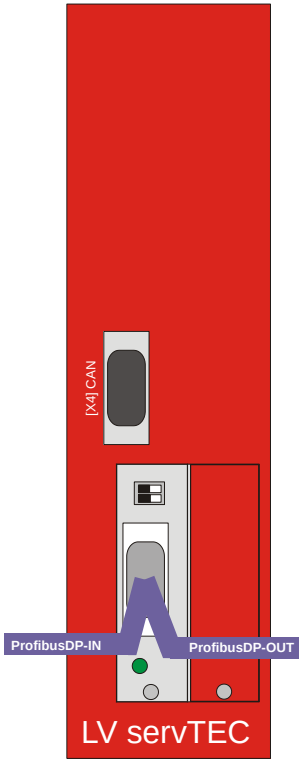
X14: CAN-OUT	Connection	Assignment
	1	CAN-high
	2	CAN-low
	3	CAN-GND
	4	Internally assigned
	5	Internally assigned
	6	Not assigned
	7	Internally assigned
	8	Internally assigned

8.1.2.2 CAN-BUS cable when using the CAN wiring module



List of the CAN-cables for LV-servoTEC S2:				
Plug	**Plug**	**End resistor**	**Length [m]**	**IEF-item number**
RJ45	9 pin SUB-D socket	none	Special length	1076706
RJ45	9 pin SUB-D socket	on SUB-D	Special length	1076707
RJ45	9 pin SUB-D pin	none	Special length	1076708
RJ45	Open ends	none	Special length	1076709
RJ45	RJ45	none	Special length	1076710
RJ45	Fieldbus plug	none	Special length	1076711
RJ45	M12 plug	none	Special length	1076712
RJ45	M12 socket	none	Special length	1076713

8.2 Profibus-DP with PLC (Siemens S7, ...)

	No standard cable defined yet