

3EX450.X

Bus Controller

Version: **1.00 (September 2006)**

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Chapter 1 • General information

1. Manual history

Version	Date	Comment
1.00	September 2006	First version

Table 1: Manual history

Chapter 2 • General description

The EX450.X modules are used to link a fieldbus system to the B&R System 2005. For configuration purposes, every module is equipped with a diagnostics interface.

1. EX450.X - variants

Model number	Fieldbus station
3EX450.26-1	Interbus master
3EX450.66-1	Profibus DP master
3EX450.66-2	Profibus DP master
3EX450.71-1	CANopen slave
3EX450.72-1	DeviceNet slave
3EX450.76-1	CANopen master
3EX450.77-1	DeviceNet master

Table 2: 3EX450.X variants

Chapter 3 • Technical data

1. Data sheets

1.1 3EX450.26-1

General information	3EX450.26-1
Module type	2005 system module, bus controller, single-width
Power consumption	5.5 W
DPM	2 KB
Max. input data	512 words
Max. output data	512 words
Max. slaves	128
Max. bus segment level	12
Operating temperature	0 - +55°C

Table 3: General information - 3EX450.26-1

Diagnostic interface IF1	3EX450.26-1
Type	1 x RS232
Design	9-pin DSUB
Electrical isolation	No
Status indicators	RxD & TxD LEDs
Baud rate	9600

Table 4: Diagnostics interface IF1: 3EX450.26-1

Fieldbus interface IF2	3EX450.26-1
Type	1 x RS422
Design	9-pin DSUB
Electrical isolation	No
Status indicators	RUN / ERR / RDY / STA
Max. baud rate	500 kBaud
Interface component	IX1

Table 5: Fieldbus interface IF2: 3EX450.26-1

The last 1 kByte of the DPR is used to control the module.

1.2 3EX450.66-1 / 3EX450.66-2

General information	3EX450.66-1	3EX450.66-2
Module type	2005 system module, bus controller, single-width	
Power consumption	5.5 W	
DPR	8 KB	2 KB
Max. input data	3.5 KB	512 bytes
Max. output data	3.5 KB	512 bytes
Max. slaves	125	
Operating temperature	0 - +55°C	

Table 6: General information - 3EX450.66-1 / 3EX450.66-2

Diagnostic interface IF1	3EX450.66-1	3EX450.66-2
Type	1 x RS232	
Design	9-pin DSUB	
Electrical isolation	No	
Status indicators	RxD & TxD LEDs	
Baud rate	9600	

Table 7: Diagnostic interface IF1: 3EX450.66-1 / 3EX450.66-2

Fieldbus interface IF2	3EX450.66-1	3EX450.66-2
Type	1 x RS485	
Design	9-pin DSUB	
Electrical isolation	Yes	
Status indicators	RUN / ERR / STA / RDY	
Baud rates	Depends on the distance	
9.6 kBit/s	Depends on the distance	
19.2 kBit/s	1200 m	
45.45 kBit/s	1200 m	
93.75 kBit/s	1200 m	
187.5 kBit/s	1200 m	
500 kBit/s	400 m	
1500 kBit/s	200 m	
3000 kBit/s	100 m	
6000 kBit/s	100 m	
12000 kBit/s	100 m	
Interface component	ASPC2	

Table 8: Fieldbus interface IF2: 3EX450.66-1 / 3EX450.66-2

The last 1 kByte of the DPR is used to control the module.

1.3 3EX450.71-1

General information	3EX450.71-1
Module type	2005 system module, bus controller, single-width
Power consumption	5.5 W
Max. input data	255 bytes
Max. output data	255 bytes
Min. boot up	Supported
Emergency messages	Supported
Life guarding	Supported

Table 9: General information - 3EX450.71-1

Diagnostic interface IF1	3EX450.71-1
Type	1 x RS232
Design	9-pin DSUB
Electrical isolation	No
Status indicators	RxD & TxD LEDs
Baud rate	9600

Table 10: Diagnostics interface IF1: 3EX450.71-1

Fieldbus interface IF2	3EX450.71-1
Type	CAN interface
Design	9-pin DSUB
Electrical isolation	Yes
Status indicators	RUN / ERR / RDY / STA
Baud rate 20 kBit/s 125 kBit/s 250 kBit/s 500 kBit/s 1000 kBit/s	Depends on the length 1000 m 500 m 250 m 100 m 40 m
Interface component	SJA 1000

Table 11: Fieldbus interface IF2: 3EX450.71-1

1.4 3EX450.72-1

General information	3EX450.72-1
Module type	2005 system module, bus controller, single-width
Power consumption	5.5 W
Max. input data	255 bytes
Max. output data	255 bytes

Table 12: General information - 3EX450.72-1

General information	3EX450.72-1
Operating temperature	0 - +55°C

Table 12: General information - 3EX450.72-1

Diagnostic interface IF1	3EX450.72-1
Type	1 x RS232
Design	9-pin DSUB
Electrical isolation	No
Status indicators	RxD & TxD LEDs
Baud rate	9600

Table 13: Diagnostic interface IF1: 3EX450.72-1

Fieldbus interface IF2	3EX450.72-1
Type	CAN interface
Design	5-pin Phoenix (Combicon)
Electrical isolation	Yes
Status indicators	RUN / NET/ RDY / MOD
Max. baud rate	500 kBaud
Interface component	SJA 1000

Table 14: Fieldbus interface IF2: 3EX450.72-1

1.5 3EX450.76-1

General information	3EX450.76-1
Module type	Logic scanner, add-on module for 5LS251.60-2
Power consumption	5.5 W
DPM	8 KB
Max. input data	3.5 KB
Max. output data	3.5 KB
Max. nodes	126
Min. boot up	Supported
Emergency messages	Supported
Life guarding	Supported
Operating temperature	0 - +55°C

Table 15: General information - 3EX450.76-1

Diagnostic interface IF1	3EX450.76-1
Type	1 x RS232
Design	9-pin DSUB

Table 16: Diagnostic interface IF1: 3EX450.76-1

Diagnostic interface IF1	3EX450.76-1
Electrical isolation	No
Status indicators	RxD & TxD LEDs
Baud rate	9600

Table 16: Diagnostic interface IF1: 3EX450.76-1

Fieldbus interface IF2	3EX450.76-1
Type	CAN interface
Design	9-pin DSUB connector
Electrical isolation	Yes
Status indicators	RUN / ERR / RDY / STA
Baud rate 20 kBit/s 125 kBit/s 250 kBit/s 500 kBit/s 1000 kBit/s	Depends on the length 1000 m 500 m 250 m 100 m 40 m
Interface component	SJA 1000

Table 17: Fieldbus interface IF2: 3EX450.76-1

The last 1 kByte of the DPR is used to control the module.

1.6 3EX450.77-1

General information	3EX450.77-1
Module type	2005 system module, bus controller, single-width
Power consumption	5.5 W
DPM	8 KB
Max. input data	3.5 KB
Max. output data	3.5 KB
Max. slaves	63
Operating temperature	0 - +55°C

Table 18: General information - 3EX450.77-1

Diagnostic interface IF1	3EX450.77-1
Type	1 x RS232
Design	9-pin DSUB
Electrical isolation	No
Status indicators	RxD & TxD LEDs
Baud rate	9600

Table 19: Diagnostic interface IF1: 3EX450.77-1

Fieldbus interface IF2	3EX450.77-1
Type	CAN interface
Design	5-pin Phoenix (Combicon)
Electrical isolation	Yes
Status indicators	RUN / NET/ RDY / MOD
Max. baud rate	500 kBaud
Interface component	SJA 1000

Table 20: Fieldbus interface IF2: 3EX450.77-1

The last 1 kByte of the DPR is used to control the module.

2. Diagnostic interface

The structure of the diagnostic interface IF1 (not modem capable) is identical for all 3EX450.X variants. The signal states of RxD and TxD are displayed with the status LEDs.

RxD LED (yellow): Status of received data

TxD LED (yellow): Status of transfer data

2.1 Pin assignments

PIN	Signal	Description
1	NC	
2	RXD	Receive data
3	TxD	Transmit data
4	NC	
5	GND	Ground
6	NC	
7	NC	
8	NC	
9	NC	
Shield	Ground (mounting rail)	Shield on plug housing

Table 21: Pin assignments - diagnostics cable

2.2 Cable structure

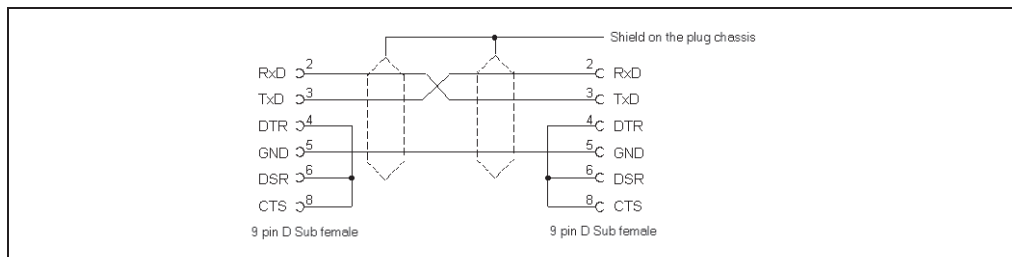


Figure 1: Structure - diagnostics cable

3. Fieldbus interface

3.1 CANopen

Description of the fieldbus interface for the following modules:

- 3EX450.71-1 (CANopen slave)
- 3EX450.76-1 (CANopen master)

3.1.1 Pin assignments

PIN	Signal	Description
2	CAN_L	CAN_L bus line
3	CAN_GND	CAN ground line
7	CAN_H	CAN_H bus line

Table 22: Pin assignments - CANopen cable

3.1.2 Status LEDs

Four LEDs are available for diagnostics:

RUN LED (green): Fieldbus communication status
RDY LED (yellow): CPU module status
ERR LED (red): Communication line error
STA LED (yellow): Master/Slave data exchange

LED	State	LED meaning
RDY	On	Module ready
	Cyclic blinking	Bootstrap loader active
	Irregular blinking	Hardware or system error
	Off	Hardware defect
RUN	On	Communication running
	Cyclic blinking	Communication stopped
	Irregular blinking	Missing or faulty configuration
	Off	No communication
ERR	On	CANopen error
	Off	No error
STA	IN	Module sending data
	Off	Module not sending data

Table 23: Status LED meanings for CANopen

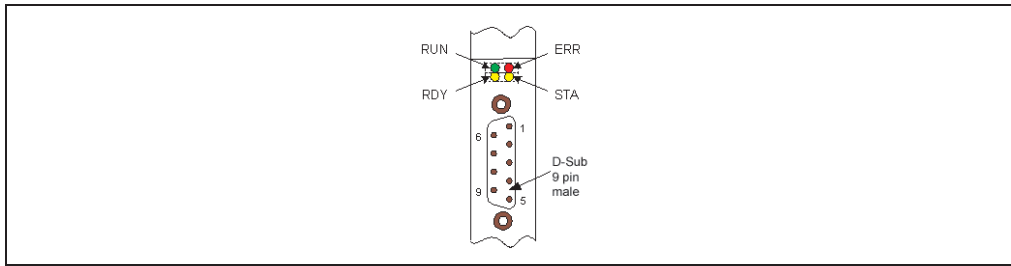


Figure 2: Status LEDs - CANopen

3.2 DeviceNet

Description of the fieldbus interface for the following modules:

- 3EX450.72-1 (DeviceNet slave)
- 3EX450.77-1 (DeviceNet master)

3.2.1 Pin assignments

PIN	Color	Signal	Description
1	Black	V-	Reference potential - DeviceNet power supply
2	Blue	CAN_L	CAN low signal
3		Drain	Shield
4	White	CAN_H	CAN high signal
5	Red	V+	+24V DeviceNet power supply

Table 24: Pin assignments - DeviceNet cable

3.2.2 Status LEDs

Four LEDs are available for diagnostics:

RUN LED (green): Fieldbus communication status
RDY LED (yellow): CPU module status
NET LED (green): Connection error
MOD LED (yellow): Module status

LED	State	LED meaning
RDY	On	Module ready
	Cyclic blinking	Bootstrap loader active
	Irregular blinking	Hardware or system error
	Off	Hardware defect

Table 25: Status LED meanings for DeviceNet

LED	State	LED meaning
RUN	On	Communication running
	Cyclic blinking	Communication stopped
	Irregular blinking	Missing or faulty communication
	Off	No communication
NET	On	Critical connection error
	Blinking	Time monitoring error
	Off	No operating voltage
MOD	On	Device ready
	Blinking	Device in stand-by
	Off	No operating voltage

Table 25: Status LED meanings for DeviceNet

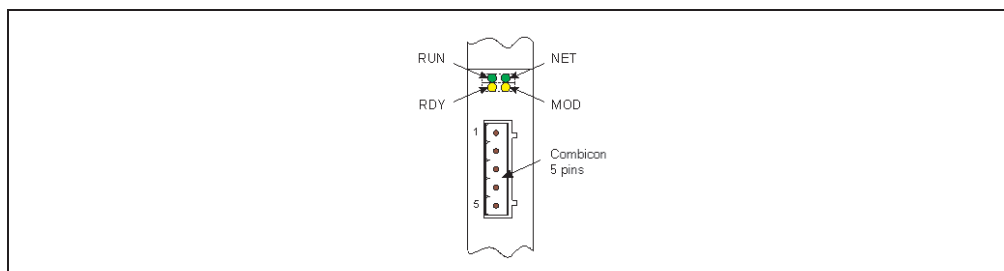


Figure 3: Status LEDs - DeviceNet

3.3 Interbus

3.3.1 Pin assignments

PIN	Signal	Description
S		Ground
1	DO2	Send data line +
2	DI2	Receive data line +
3	GND2	Equalizing conductor
4		
5	Udd	Logic voltage - 5V
6	/DO2	Send data line -
7	/DI2	Receive data line -
8		
9	BCI	Bus connection on

Table 26: Pin assignments - Interbus cable

3.3.2 Status LEDs

Four LEDs are available for diagnostics:

RUN LED (green):	Fieldbus communication status
RDY LED (yellow):	CPU module status
ERR LED (red):	Connection error
STA LED (yellow):	Unused

LED	State	Description
RDY	On	Module ready
	Cyclic blinking	Bootstrap loader active
	Irregular blinking	Hardware or system error
	Off	Hardware defect
RUN	On	Communication running
	Cyclic blinking	Communication stopped
	Irregular blinking	Configuration error
	Off	No communication
ERR	On	Interbus error
	Off	No error
STA	On	Unused
	Off	Unused

Table 27: Status LED meanings for Interbus

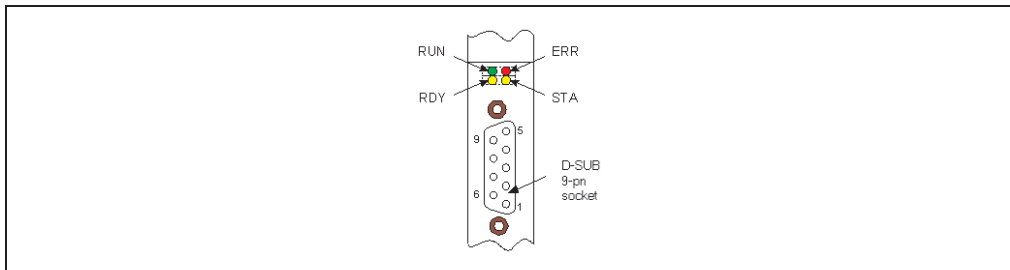


Figure 4: Status LEDs - Interbus

3.4 Profibus DP

Description of the fieldbus interface for the following modules:

- 3EX450.66-1 (Profibus DP master)
- 3EX450.66-2 (Profibus DP master)

3.4.1 Pin assignments

PIN	Signal	Description
S	Ground	
3	RxD/TxD-P	Receive/Send data - P (B connection on the plug)
4	CNTR-A	Repeater control
5	DGND	Data reference potential
6	VP	Supply voltage +
8	RxD / TxD-N	Receive/Send data - N (A connection on the plug)

Table 28: Pin assignments - Profibus DP cable

3.4.2 Status LEDs

Four LEDs are available for diagnostics:

RUN LED (green): Fieldbus communication status
 RDY LED (yellow): CPU module status
 ERR LED (red): Connection error
 STA LED (yellow): Module status

LED	State	Description
RDY	On	Module ready
	Cyclic blinking	Bootstrap loader active
	Irregular blinking	Hardware or system error
	Off	Hardware defect
RUN	On	Communication running
	Cyclic blinking	Communication stopped
	Irregular blinking	Missing or faulty communication
	Off	No communication
ERR	On	Profibus error
	Off	No error
STA	On	Sending data or token
	Off	No token

Table 29: Status LED meanings for Profibus DP

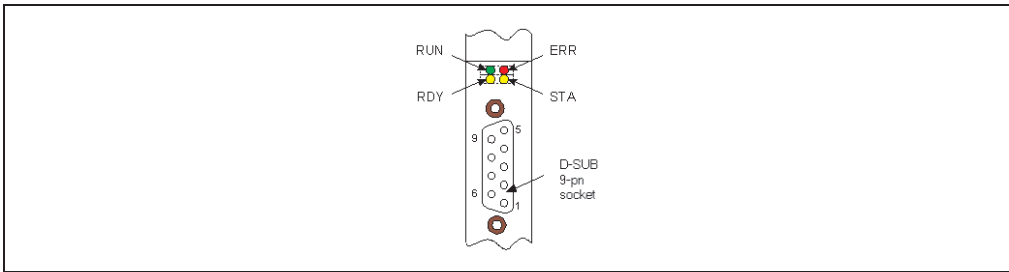


Figure 5: Status LEDs - Profibus DP

3.4.3 Profibus DP cables

Profibus DP cables use terminating resistors at the beginning and end of the bus cable. For baud rates greater than 1.5 Mbaud, special Profibus plugs that allow additional inductivity should be used.

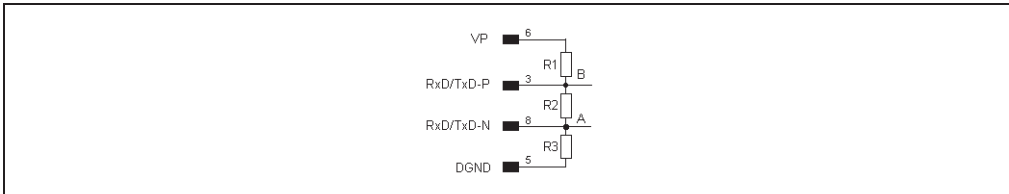


Figure 6: Terminating resistance - Profibus DP cable

The master can be connected anywhere in the Profibus DP network. Up to 32 Profibus devices can be connected to one another in a single segment.

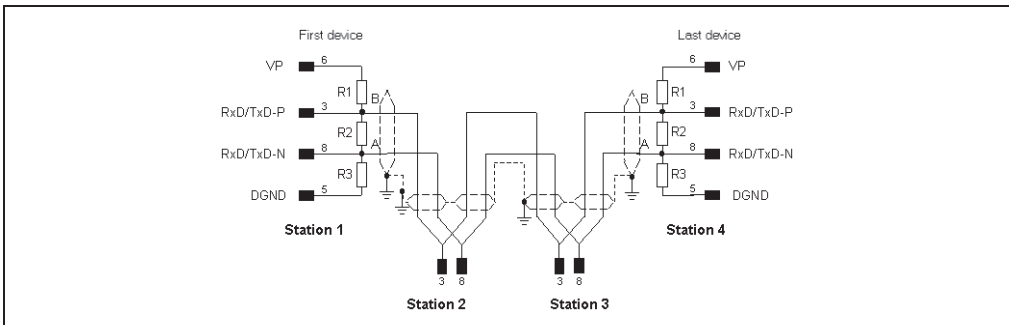


Figure 7: Structure of Profibus DP cable (with 4 stations)

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