

This interface description is not binding and may differ depending on the individual application.

1. Profibus interface between screwdriver control and higher order control (MMI / Optional)

- Input signals screwdriver control
- Output signals screwdriver control
- Profibus-DP connection

1.1 Input signals

1.1.1 Start screwdriver

	Function	Profibus-DP	Format
Start	eStart	X	0/1

Starts the screwing sequence

The screwing sequence can be started when

- automatic mode is selected.
- no faults are active.
- a valid screwing program was selected with the program selection.
- the screwdriver is loaded or unloaded in accordance with the selected screwing program.

1.1.2 Program selection

	Function	Profibus-DP	Format	
Program selection Bit 0	eProgBit0	X	0/1	PG no. +1
Program selection Bit 1	eProgBit1	X	0/1	PG no. +2
Program selection Bit 2	eProgBit2	X	0/1	PG no. +4
Program selection Bit 3	eProgBit3	X	0/1	PG no. +8
Program selection Bit 4	eProgBit4	X	0/1	PG no. +16
Program selection Bit 5	eProgBit5	X	0/1	PG no. +32
Program selection Bit 6	eProgBit6	X	0/1	PG no. +64

eProgBit0 ... eProgBit3 or eProgBit6 pre-selects the screwing program for the next screwing cycle in binary form.

A program number < 1 or > 50 is invalid.

1.1.3 Screw selection

	Function	Profibus-DP	Format	
Screw selection Bit 0	eVeBit0	X	0/1	VE no. +1
Screw selection Bit 1	eVeBit1	X	0/1	VE no. +2
Screw selection Bit 2	eVeBit2	X	0/1	VE no. +4

eVeBit0 ... eVeBit2 selects the screw for the next process "Marshalling" in binary form.

1.1.4 Acknowledge fault

	Function	Profibus-DP	Format
Acknowledge fault	eAckStoer	X	0/1

1.1.5 Request home position

	Function	Profibus-DP	Format
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Request home position	eGstAnf	X	0/1
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1.1.6 Programmable Customer Input

	Function	Profibus-DP	Format	available
KDE1	eKde1	X	0/1	≥ 1.28

eKde1 is connected to the command WAIT E in the screw driving program.

1.2 Output signals

1.2.1 Fault

	Function	Profibus-DP	Format
Fault	aStoer	X	0/1

aStoer is switched on when there is a fault on the screwdriver.

As soon as the fault has been eliminated, the output is switched off.

1.2.2 Home position

	Function	Profibus-DP	Format
Home position	aGst	X	0/1

aGst is switched on when

- The strokes of the screwdriver have reached the pre-defined position in which it is itself at right angles to the work piece (robot, positioning system) or
- the work piece can be moved at right angles to the screwdriver (production line with work piece carriers).

1.2.3 Ready

	Function	Profibus-DP	Format
Ready	aSb	X	0/1

aSb is switched on when the screwdriver can be started by switching on the customer's input eStart.

1.2.4 OK

	Function	Profibus-DP	Format
OK	aIO	X	0/1

aIO is

- switched off as soon as the screwing process is started.
- switched on again when the screwing process is ended and the screw connection is OK.

1.2.5 NOK

	Function	Profibus-DP	Format
NOK	aNIO	X	0/1

aNIO is

- switched off as soon as the screwing process is started.
- switched on again when the screwing process is ended and the screw connection is NOT OK.

1.2.6 Fill level control

	Function	Profibus-DP	Format
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Fill level control	aFSK	X	0/1
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aFSK is switched on when the min. fill level in the feed device goes below the default setting.

1.2.7 Automatic Mode

	Function	Bus	Format
Automatic Mode	aAuto	X	0/1

„aAuto“ is activ when the controller is running in the automatic mode.

1.2.8 Torque OK

	Function	Profibus-DP	Format
Torque OK	aM_IO	X	0/1

aM_IO is

- switched off as soon as the screwing process is started.
- switched on again when the screwing process is ended and the default settings for the torque have been observed.

1.2.9 Depth OK

	Function	Profibus-DP	Format
Depth OK	aT_IO	X	0/1

aT_IO is

- switched off as soon as the screwing process is started.
- switched on again when the screwing process is ended and the default settings for the depth have been observed.

1.2.10 Angle OK

	Function	Profibus-DP	Format
Angle OK	aW_IO	X	0/1

aW_IO is

- switched off as soon as the screwing process is started.
- switched on again when the screwing process is ended and the default settings for the angle have been observed.

1.2.11 Time monitoring OK

	Function	Profibus-DP	Format
Time monitoring OK	aZ_IO	X	0/1

aZ_IO is

- switched off as soon as the screwing process is started.
- switched on again when the screwing process is ended and the default settings for time monitoring have been observed.

1.2.12 Screw measurement

	Function	Profibus-DP	Format
SM Bit0	aSmBit0	X	0/1
SM Bit1	aSmBit1	X	0/1
SM Bit2	aSmBit2	X	0/1

aSmBit0 .. aSmBit2 displays in binary code with which screw the screwdriver is loaded.

1.2.13 Torque

	Function	Profibus-DP	Format
Torque	aM	X	-32768 ... 32767

aM displays the torque reached in cNm (1cNm = 0.01Nm).

As soon as the OK or NOK signal is active, the valid value is entered.
Otherwise 0 is entered in the variable.

1.2.14 Depth

	Function	Profibus-DP	Format
Depth	aT	X	-32768 ... 32767

aT displays the depth reached in 1/10 mm.

As soon as the OK or NOK signal is active, the valid value is entered.
Otherwise 0 is entered in the variable.

1.2.15 Angle

	Function	Profibus-DP	Format
Angle	aW	X	-32768 ... 32767

aW displays the angle reached in degrees.

As soon as the OK or NOK signal is active, the valid value is entered.
Otherwise 0 is entered in the variable.

1.2.16 Time

	Function	Profibus-DP	Format
Time	aZ	X	-32768 ... 32767

aZ displays the duration of the screwing process in ms.

As soon as the OK or NOK signal is active, the valid value is entered,
Otherwise 0 is entered in the variable.

1.2.17 Programmable Customer Output

	Function	Profibus-DP	Format	available
KDA1	aKda1	X	0/1	≥ 1.28

aKda1 is connected to the command SET A and RST A in the screw driving program.

Profibus-DP connection

1.3 Properties of DP slave:

1.3.1 CPB 021

GSD – file:	HIL_0a12.GSD of 27.11.2009 13:10
DP slave type:	NETX DP/DPS
Transmission rate:	12 Mbit/s
Profile:	DP

Table 1: Properties of DP slave CPB 021

1.4 Node configuration Profibus master

1.4.1 CPB 021

DP code	Designation	
64	16 byte In	Output data SR1
128	8 Byte Out	Input data SR1
64	16 byte In	Output data SR2
128	8 Byte Out	Input data SR2

Table 2: Node configuration Profibus master CPB 021

1.5 Input signals of the screwdriver control

Signal designation	Function	Data type	Format	Addr. Spindle 1	Addr. Spindle 2	Description
Start	eStart	bool	0/1	0.0	8.0	see section: 1.1.1
Program selection Bit 0	eProgBit0	bool	0/1	0.1	8.1	see section: 1.1.2
Program selection Bit 1	eProgBit1	bool	0/1	0.2	8.2	
Program selection Bit 2	eProgBit2	bool	0/1	0.3	8.3	
Program selection Bit 3	eProgBit3	bool	0/1	0.4	8.4	
Program selection Bit 4	eProgBit4	bool	0/1	0.5	8.5	
Program selection Bit 5	eProgBit5	bool	0/1	0.6	8.6	
Program selection Bit 6	eProgBit6	bool	0/1	0.7	8.7	
Screw selection Bit 0	eVeBit0	bool	0/1	1.0	9.0	see section: 1.1.3
Screw selection Bit 1	eVeBit1	bool	0/1	1.1	9.1	
Screw selection Bit 2	eVeBit2	bool	0/1	1.2	9.2	
Acknowledge fault	eAckStoer	bool	0/1	1.3	9.3	see section: 1.1.4
Request home position	eGstAnf	bool	0/1	1.4	9.4	see section: 1.1.5
res		bool	0/1	1.5	9.5	
res		bool	0/1	1.6	9.6	
res		bool	0/1	1.7	9.7	
KDE1	eKde1	bool	0/1	2.0	10.0	see section: 1.1.6
KDE2	eKde2	bool	0/1	2.1	10.1	
KDE3	eKde3	bool	0/1	2.2	10.2	
KDE4	eKde4	bool	0/1	2.3	10.3	
res	Res4	int	-32768 ... 32767	4	12	
res	Res6	int	-32768 ... 32767	6	14	

Table 3: Input signals of the screwdriver control Profibus DP

1.6 Output signals of the screwdriver control

Signal designation	Function	Data type	Format	Addr. Spindle 1	Addr. Spindle 2	Description
Fault	aStoer	bool	0/1	0.0	16.0	see section: 1.2.1
Home position	aGst	bool	0/1	0.1	16.1	see section: 1.2.2
Ready	aSb	bool	0/1	0.2	16.2	see section: 1.2.3
OK	aIO	bool	0/1	0.3	16.3	see section: 1.2.4
NOK	aNIO	bool	0/1	0.4	16.4	see section: 1.2.5
Fill level control	aFSK	bool	0/1	0.5	16.5	see section: 1.2.6
Automatic mode	aAuto	bool	0/1	0.6	16.6	see section: 1.2.7
res		bool	0/1	0.7	16.7	
Moment OK	aM_IO	bool	0/1	1.0	17.0	see section: 1.2.8
Depth OK	aT_IO	bool	0/1	1.1	17.1	see section: 1.2.9
Angle OK	aW_IO	bool	0/1	1.2	17.2	see section: 1.2.10
Time monitoring OK	aZ_IO	bool	0/1	1.3	17.3	see section: 1.2.11
SM Bit0	aSmBit0	bool	0/1	1.4	17.4	see section: 1.2.12
SM Bit1	aSmBit1	bool	0/1	1.5	17.5	
SM Bit2	aSmBit2	bool	0/1	1.6	17.6	
res		bool	0/1	1.7	17.7	
Moment	aM	int	-32768 ... 32767	2	18	see section: 1.2.13
Depth	aT	int	-32768 ... 32768	4	20	see section: 1.2.14
Angle	aW	int	-32768 ... 32768	6	22	see section: 1.2.15
Time	aZ	int	-32768 ... 32769	8	24	see section: 1.2.16
SM_SL	aSmSl	bool	0/1	10.0	26.0	
SM_SR	aSmSr	bool	0/1	10.1	26.1	
KDA1	aKda1	bool	0/1	10.2	26.2	see section: 1.2.17
KDA2	aKda2	bool	0/1	10.3	26.3	
KDA3	aKda3	bool	0/1	10.4	26.4	
KDA4	aKda	bool	0/1	10.5	26.5	
res	res	int	-32768 ... 32769	12	28	
res	res	int	-32768 ... 32769	14	30	

Table 4: Output signals of the screwdriver control Profibus DP

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