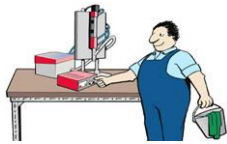




# **Communication signals between screwdriver control (SGS20x0) and higher order control (MMI)**

## **Profinet IO**



## 8 Description of the controller

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### Table of contents

Table of contents.....	2
1. Input signals to SGS20x0 .....	4
1.1. Start .....	4
1.2. Program selection.....	4
2. Output signals from SGS20x0 .....	5
2.1. Fault .....	5
2.2. Homeposition .....	5
2.3. Ready .....	5
2.4. OK .....	5
2.5. NOK.....	6
2.6. Fill level control .....	6
2.7. Automatic Mode.....	6
2.8. Torque OK.....	6
2.9. Depth OK .....	6
2.10. Time monitoring OK .....	7
2.11. Screw measurement.....	7
2.12. State.....	7
2.13. Result.....	7
2.14. Time .....	8
2.15. Depth .....	8
3. ProfiNet - connection .....	9
3.1. Properties .....	9
3.2. Node configuration Profinet-IO-Master .....	9
3.3. Input signals to SGS20x0 .....	9
3.4. Output signals from SGS20x0 .....	10
3.4.1. State.....	11
3.4.2. Result.....	13
Table directory .....	14



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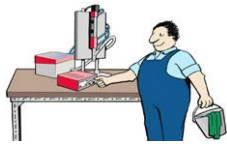
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STÖGER AUTOMATION GmbH points out that this interface description is not binding and may differ depending on the individual application.



## 8 Description of the controller

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### 1. Input signals to SGS20x0

#### 1.1. Start

	Function	Format
Start	eStart	0/1

Starts the screwing sequence.

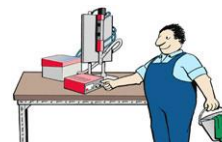
The screwing sequence can be started when:

- 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.

#### 1.2. Program selection

	Function	Format	
Program selection Bit 0	eProgBit0	0/1	PG-No. +1
Program selection Bit 1	eProgBit1	0/1	PG-No. +2
Program selection Bit 2	eProgBit2	0/1	PG-No. +4
Program selection Bit 3	eProgBit3	0/1	PG-No. +8

eProgBit0 ... eProgBit3 preselects the screwing program for the next screwing cycle in binary form. A program number < 1 or > 15 is invalid.



## 2. Output signals from SGS20x0

### 2.1. Fault

	Function	Format
Fault	aStoer	0/1

“aStoer” is switched on if there is a fault on the unit. As soon as the fault has been resolved, the output is switched off.

### 2.2. Homeposition

	Function	Format
Homeposition	aGst	0/1

“aGst” is switched on when the stroke of the spindle has reached the predetermined position in which it can be moved transversely to the workpiece (robot, positioning system) or the workpiece transversely to the screwdriver (production line with workpiece carriers). Otherwise collisions might happen!

### 2.3. Ready

	Function	Format
Ready	aSb	0/1

“aSb” is switched on when the spindle can be started by switching on the customer input “eStart”.

### 2.4. OK

	Function	Format
OK	aIO	0/1

“aIO” is switched off as soon as a cycle is started and is switched on again when the cycle is finished and the screw connection is OK.



## 8 Description of the controller

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### 2.5. NOK

	Function	Format
NOK	aNIO	0/1

“aNIO” is switched off as soon as a cycle is started and is switched on again when the cycle has ended and the screw connection is NOT OK.

### 2.6. Fill level control

	Function	Format
Fill level control	aFSK	0/1

“aFSK” is switched on when the min. fill level in the feed device goes below the default setting.

### 2.7. Automatic Mode

	Function	Format
Automatic mode	aAuto	0/1

“aAuto” is always present when the controller is in automatic mode.

### 2.8. Torque OK

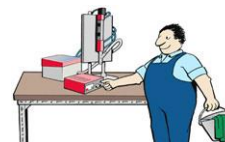
	Function	Format
Torque OK	aM_IO	0/1

“aM\_IO” is switched off as soon as the screwing process is started and is switched on again when the screwing process is ended and the default settings for the torque have been observed.

### 2.9. Depth OK

	Function	Format
Depth OK	aT_IO	0/1

“aT\_IO” is switched off as soon as the screwing process is started and is switched on again when the screwing process is ended and the default settings for the depth have been observed.

**2.10. Time monitoring OK**

	Function	Format
Time monitoring OK	aZ_IO	0/1

“aZ\_IO” is switched off as soon as the screwing process is started and is switched on again when the screwing process is ended and the default settings for time monitoring have been observed.

**2.11. Screw measurement**

	Function	Format
SM Bit0	aSmBit0	0/1
SM Bit1	aSmBit1	0/1

“aSmBit0 .. aSmBit1” displays in binary code with which screw the screwdriver is loaded.

**2.12. State**

	Function	Format
State	aSts	0...255

“aSts” shows the state of the spindle. For details, see table 5 paragraph 3.4.1

**2.13. Result**

	Function	Format
Result	aErg	0...255

“aErg” shows the result of the screw setting. For details, see table 6 paragraph 3.4.2



## 8 Description of the controller

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### 2.14. Time

	Function	Format
Time	aZ	-32768 .. 32767

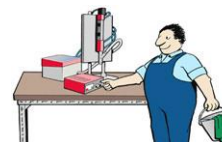
“aZ” displays the duration of the screwing process in ms. As soon as the OK or NOK signal is active, the valid value is entered, otherwise 0 is entered in the variable.

### 2.15. Depth

	Function	Format
Depth	aT	-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.





### 3. ProfiNet - connection

#### 3.1. Properties

GSD – file:	GSDML-V2.25-#Siemens-PreConf_SGS20x0-20141215-144611.xml
DP-Slave-Typ	S7-1200 CPU1214C V4.0

Table 1 Properties

#### 3.2. Node configuration Profinet-IO-Master

Designation	Function	
2 Byte output	SR1 Output data	
8 Byte input	SR1 Input data	
2 Byte output	SR1 Output data	
8 Byte input	SR1 Input data	

Table 2 Node configuration Profinet-IO-Master

#### 3.3. Input signals to SGS20x0

Signal designation	Function	Data-type	Format	Address Spindle 1	Address Spindle 2	Description
Start	eStart	Bool	0/1	I0.0	I2.0	s. ref.: 1.1
Programselection Bit 0	eProgBit0	Bool	0/1	I0.1	I2.1	s. ref.: 1.2
Programselection Bit 1	eProgBit1	Bool	0/1	I0.2	I2.2	s. ref.: 1.2
Programselection Bit 2	eProgBit2	Bool	0/1	I0.3	I2.3	s. ref.: 1.2
Programselection Bit 3	eProgBit3	Bool	0/1	I0.4	I2.4	s. ref.: 1.2

Table 3 Input signals to SGS20x0

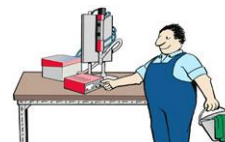


## 8 Description of the controller

### 3.4. Output signals from SGS20x0

Signal designation	Function	Data-type	Format	Address Spindle 1	Address Spindle 2	Description
Fault	aStoer	Bool	0/1	O0.0	O8.0	s. ref.: 2.1
Home position	aGst	Bool	0/1	O0.1	O8.1	s. ref.: 2.2
Ready	aSb	Bool	0/1	O0.2	O8.2	s. ref.: 2.3
OK	aIO	Bool	0/1	O0.3	O8.3	s. ref.: 2.4
NOK	aNIO	Bool	0/1	O0.4	O8.4	s. ref.: 2.5
Fill level control	aFSK	Bool	0/1	O0.5	O8.5	s. ref.: 2.6
Automatic	aAuto	Bool	0/1	O0.6	O8.6	s. ref.: 2.7
Res		Bool	0/1	O0.7	O8.7	
Torque OK	aM_IO	Bool	0/1	O1.0	O9.0	s. ref.: 2.8
Depth OK	aT_IO	Bool	0/1	O1.1	O9.1	s. ref.: 2.9
Res		Bool	0/1	O1.2	O9.2	
Time monitoring OK	aZ_IO	Bool	0/1	O1.3	O9.3	s. ref.: 2.10
SM Bit0	aSmBit0	Bool	0/1	O1.4	O9.4	s. ref.: 2.11
SM Bit1	aSmBit1	Bool	0/1	O1.5	O9.5	s. ref.: 2.11
Res		Bool	0/1	O1.6	O9.6	
Res		Bool	0/1	O1.7	O9.7	
State (see 3.4.1)	aSts	Int	0...255	O2	O10	s. ref.: 2.12
Result (see 3.4.2)	aErg	Int	0...255	O3	O11	s. ref.: 2.13
Time	aZ	Int	-32768..32767	O4	O12	s. ref.: 2.14
Depth	aT	Int	-32768..32767	O6	O14	s. ref.: 2.15

Table 4 Output signals from SGS20x0 in ProfiNet



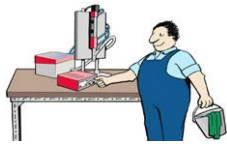
### 3.4.1. State

Details for status byte aSts

WK / WC      Waiting come (waiting for a signal to be switched on)

WG / WG      Waiting goes (waiting for a signal to be switched off)

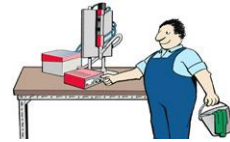
K_STS_***	Int	0	Off / No status
K_STS_START_WK	Int	1	Waiting for Start!
K_STS_KEINE_SCHRAUBE_GELADEN	Int	2	No Screw loaded
K_STS_KEINE_MUTTER_GELADEN	Int	3	No nut loaded
K_STS_KEIN_STIFT_GELADEN	Int	4	No Pin loaded
K_STS_SCHRAUBER_LAEUFT	Int	5	screwdriver is running
K_STS_SETZEINHEIT_LAEUFT	Int	6	Setting system / Insertion unit is running
K_STS_VE_LAEUFT	Int	7	Escapement is running
K_STS_NOT_AUS	Int	8	Emergency stop
K_STS_STOERUNG	Int	9	Fault
K_STS_START_WG	Int	10	Switch off start
K_STS_ZH_WK_E	Int	11	Waiting on jaw stroke inserted
K_STS_SDH_WK_E	Int	12	Waiting on screwdriver stroke inserted
K_STS_DKA_WK	Int	13	Waiting on torque control
K_STS_INTERN_BUSY	Int	14	Intern busy
K_STS_ZH_WG_A	Int	15	Waiting on jaw stroke extended going
K_STS_ZH_WK_A	Int	16	Waiting on jaw stroke extended
K_STS_SDH_WK_A	Int	17	Waiting on screwdriver stroke extended
K_STS_APA_WK_SB	Int	18	Waiting for screwdriver ready
K_STS_AW<MIN	Int	19	Parameterset < min
K_STS_AW>MAX	Int	20	Parameterset > max
K_STS_APA_ECHO_NIO	Int	21	Programselection echo not ok
K_STS_VSR_WG_A	Int	22	Waiting for vacuum tube
K_STS_VSR_WK_E	Int	23	Waiting for vacuum tube inserted
K_STS_SR_AW_VE	Int	24	No feeding selected
K_STS_SR_GELADEN	Int	25	Screwdriver is loaded
K_STS_VE_WK_FRG_BL	Int	26	Waiting for deliver release
K_STS_AW_VE<MIN	Int	27	Escapement selection < min
K_STS_AW_VE>MAX	Int	28	Escapement selection > max
K_STS_ZN_WK_E	Int	29	Waiting for centering pin inserted
K_STS_ZN_WG_E	Int	30	Waiting for centering pin inserted going
K_STS_ZN_WK_A	Int	31	Waiting for centering pin extended



## 8 Description of the controller

K_STS_ZN_WG_A	Int	32	Waiting for centering pin extended going
K_STS_ZYKL_FORTS_WK	Int	33	Waiting for continue cycle
K_STS_ZYKL_FORTS_WG	Int	34	Waiting for continue cycle going
K_STS_AUSSTOSSEN	Int	35	Discharge
K_STS_AZ_WG_E	Int	36	Waiting for stop cylinder inserted going
K_STS_AZ_WK_A	Int	37	Waiting for stop cylinder extended
K_STS_AZ_WG_A	Int	38	Waiting for stop cylinder extended going
K_STS_AZ_WK_E	Int	39	Waiting for stop cylinder inserted
K_STS_KLZ_WG_E	Int	40	Waiting for jaw cylinder inserted going
K_STS_KLZ_WK_A	Int	41	Waiting for jaw cylinder extended
K_STS_KLZ_WG_A	Int	42	Waiting for jaw cylinder extended going
K_STS_KLZ_WK_E	Int	43	Waiting for jaw cylinder inserted
K_STS_BR_LAEUFT	Int	44	Screw brake is running
K_STS_BR_STOER	Int	45	Screw brake fault
K_STS_ABL_WK_FRG	Int	47	Waiting for start enable
K_STS_ES_WG_E	Int	50	Waiting for push-in device inserted going
K_STS_ES_WK_A	Int	51	Waiting for push-in device extended
K_STS_ES_WG_A	Int	52	Waiting for push-in device extended going
K_STS_ES_WK_E	Int	53	Waiting for push-in device inserted
K_STS_VE_STOER	Int	102	Escapement fault
K_STS_VE_WK_ELK	Int	103	Waiting for entry control - escapement
K_STS_VE_WK_SM	Int	104	Waiting for screw - escapement
K_STS_VE_WK_E	Int	105	Waiting for escapement inserted
K_STS_VE_WK_A	Int	106	Waiting for escapement extended
K_STS_WE_STOER	Int	151	Distributor fault
K_STS_ZUF_STOER	Int	202	Feeding fault

Table 5 Details of „state“ byte

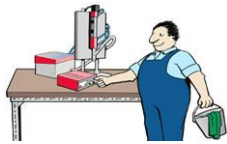


### 3.4.2. Result

Details for result byte aErg

K_SR_ERG_BUSY	Int	0	Busy
K_SR_ERG_IO	Int	1	Result OK
K_SR_ERG_NB	Int	2	Emergency stop during initialising
K_SR_ERG_M_NIO	Int	3	Torque not OK
K_SR_ERG_T_NIO	Int	4	Depth not OK
K_SR_ERG_MT_NIO	Int	5	Torque and depth not OK
K_SR_ERG_RMS_NIO	Int	6	Return indicator screwdriver stroke not OK
K_SR_ERG_RMK_NIO	Int	7	Return indicator, screwdriver head not OK
K_SR_ERG_DKA_NIO	Int	8	Torque control not OK
K_SR_ERG_NA	Int	9	Emergency stop during screwing
K_SR_ERG_SZMIN_NIO	Int	10	Screwtime min not OK
K_SR_ERG_AMK_NIO	Int	11	Jaw stroke extend message not OK
K_SR_ERG_START0	Int	12	Screwing until start = 0
K_SR_ERG_T_P	Int	13	Screw depth exceeded
K_SR_ERG_M_T_P_NIO	Int	14	Torque and screw depth exceeded not OK
K_SR_ERG_VSR_E_NIO	Int	15	Vacuum tube inserted not OK
K_SR_ERG_VSR_A_NIO	Int	16	Vacuum tube extended not OK
K_SR_ERG_ZN_E_NIO	Int	17	Centering pin inserted not OK
K_SR_ERG_ZN_A_NIO	Int	18	Centering pin extended not OK
K_SR_ERG_ES_A_NIO	Int	19	Push-in device extended not OK
K_SR_ERG_ES_E_NIO	Int	20	Push-in device inserted not OK

Table 6 Details of „result“ byte



## 8 Description of the controller

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### Table directory

Table 1 Properties .....	9
Table 2 Node configuration Profinet-IO-Master .....	9
Table 3 Input signals to SGS20x0.....	9
Table 4 Output signals from SGS20x0 in ProfiNet .....	10
Table 5 Details of „state“ byte.....	12
Table 6 Details of „result“ byte.....	13