wenglor
the innovative family

Interface protocol
for Profibus Gateway ZAG73AN01

Table of Contents

1 Use for Intended Purpose

The wenglor fieldbus gateway connects serial devices to the Profibus DP fieldbus.

2 Safety Precautions

- These instructions are an integral part of the product and must be kept on hand for the entire duration of its service life.
- Read the operating instructions carefully before using the product.
- This fieldbus gateway is not suitable for safety applications!
- Installation, initial start-up and maintenance of the product should only be carried out by qualified personnel. Protect the device against mechanical influences.
- Tampering with or modifying the product is impermissible.
- Protect the fieldbus gateway against contamination during initial start-up.

3 Brief Description

The DP ZAG73AN01 fieldbus gateway for Profibus allows for easy connection of sensors and scanners to a Profibus DP fieldbus. The gateway establishes communication between Profibus DP and a serial port (RS 232).
The gateway can also be used as a power supply for sensors and scanners at the same time. Parameters can be set either via the fieldbus, or with the help of coding switches.

Important:
Only one sensor/scanner can be connected at a time.

4 Installation and Connection

4.1 Installation Instructions

All applicable electrical and mechanical regulations, standards and safety precautions must be adhered to when installing and operating the fieldbus gateway.
The gateway must be protected against mechanical influences.
The fieldbus gateway must be installed to a switchbox, or at least to a top-hat rail, such that grounding of the device can be assured.

The fieldbus gateway is intended for mounting to a 35 mm top-hat rail.

4.2 Connection

4.2.1 Connecting Supply Power

The supply power terminals are located underneath the 9-pin fieldbus plug.

Pin no.	Signal	Function
1	24 V DC	Supply power
2		
3		
4	GND	Reference potential

4.2.2 Connection with Fieldbus Plug

The connection for the Profibus DP is at the side of the gateway. This connection consists of a 9-pin subminiature socket connector.

Connector Pin Assignments for the Profibus DP Plug

Pin no.	Signal	Function
1		
2		
3	B	Non-inverted Profibus signal
4	RTS	Control signal / repeater (electrically isolated)
5	GND	Reference potential
6	5 V	5 V supply port (electrically isolated)
7		
8	A	Inverted Profibus signal
9		

4.2.3 Screw-Terminal Assignments

8 screw terminals are located on the top, to which the various sensors or scanners can be connected.

Connection to corresponding supply power must be assured.

Pin no.	Function	Device Types		
		4-pin	8-pin	Scanner
5	24 V for sensor	•	•	
6	GND	•	•	•
7	5 V for sensor			•
8	Chassis GND			•
9	Teach-in (to sensor)	•		
10	Switching output (from sensor)	•	•	•
11	RxD 232		•	•
12	TxD 232		•	•

Sensors with 4-pin plugs are not equipped with a separate RS 232 port.
These are connected to the switching output (TxD), or to teach (RxD).
Negative and positive switching sensors are recognized automatically.

For connection, a wenglor Connection cable with the order number ZAS74AN01 is available. The maximum cable length of our Connecting Cable ZAS74V501with Voltage Supply of 5 V via Profibus Gateway should be:

FIS-0002	3m cable length
FIS-0003	3m cable length
FIS-0004	3m cable length
FIS-6300-01xx	2m cable length
FIS-6300-11xx	2m cable length
FIS-6300-31xx	1m cable length

4.3 Status LEDs

Three light emitting diodes (LEDs) are located on the front. LED 1 indicates bus status, LED 2 indicates that supply power is on and LED 3 indicates errors.

LED	Display	Status
Error	Off	Status OK
Error	Red	Internal error
Power	Green	Supply power on
Power	Off	No supply power
Bus status	Green	Data exchange mode
Bus status	Yellow	Parameter setting or diagnosis mode

5 Fieldbus Address

There are two ways to assign an address for Profibus DP. The bus address can be selected manually with two rotary selector switches, or assigned directly via the fieldbus. In the latter case, the address is transmitted from the Profibus master with the help of the SetSlaveAddress command to the gateway, where it is saved to

memory. The address must be set to a value of greater than 125 at the rotary selector switches in order to assign an address via the fieldbus.

S1 corresponds to the high byte, and S2 to the low byte of the Profibus DP ID.

The address can be set to a value of 0 to 125 as shown in the table in the appendix.

The rotary selector switches have precedence over address assignment via the fieldbus. This means that if an address of between 0 and 125 is selected with the switches, the address cannot be changed by the master.

In order to reset the internally stored address (to address 126), all three rotary selector switches must be turned to 0.

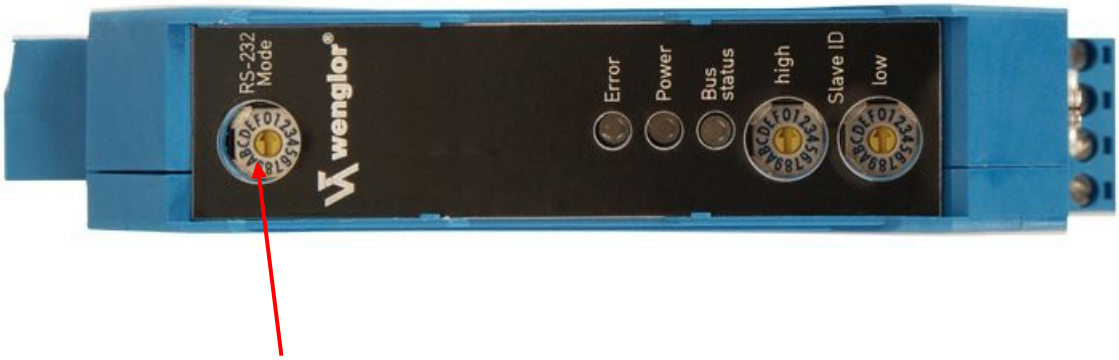
6 RS 232 Baud Rate

The baud rate for the RS 232 port can be set by means of the rotary selector switches, or via the fieldbus. Transmission takes place with the parameters 8N1.

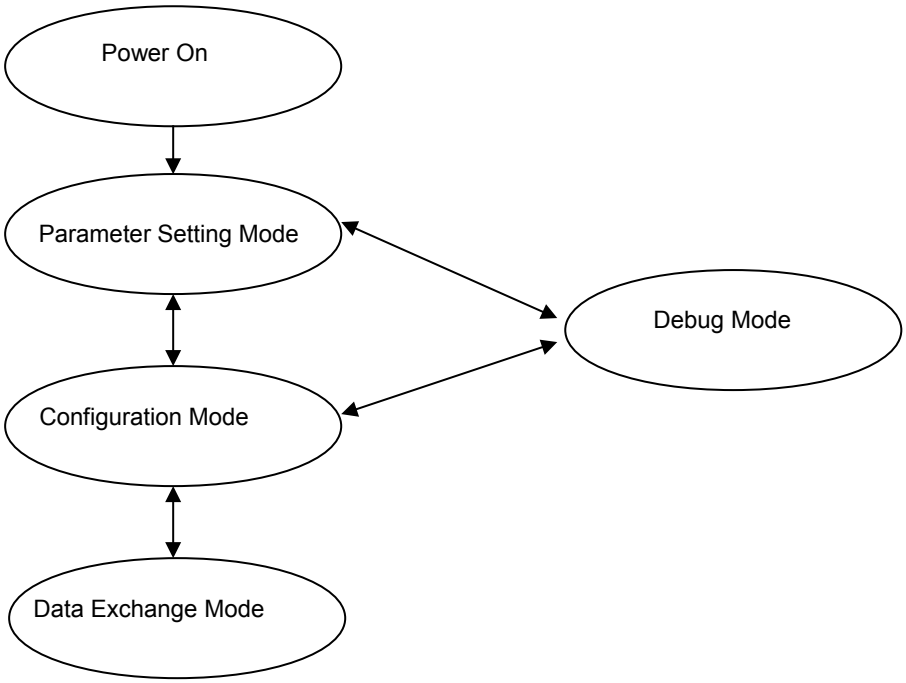
Switch Setting	Baud Rate
1	115.2 k
2	57.6 k
3	38.4 k
4	19.2 k
5	9.6 k
D	Debug mode
F	Setting via fieldbus

The rotary selector switch has precedence for the baud rate setting.

Changes made at the rotary selector switch are ***not*** accepted in the data exchange mode, but rather only in the parameter setting and configuration modes.
If an Siemens S7® is used, the bus connection must be interrupted to this end.



7 Communications Sequence



8 Device Database File (DDBF)

The DDBF represents a unique description of the Profibus DP slave in the form of a device data sheet. The current DDBF can be downloaded on the Internet from our website at www.wenglor.com.

During planning, the gateway is assigned to a master as a slave. The DDBF is selected to this end.

After selecting one of the various transmission modules, a variety of parameters can be transmitted to the gateway (assuming the rotary selector switches (RS 232) are set to “F”).

Byte	Parameter	
0	Stations status	Default parameters
1	WD_fact_1	
2	WD_fact_2	
3	Min Tsdr	
4	ID number (high byte)	
5	ID number (low byte)	
6	Group_ID	
7	0	
8	0	
9	0	
10	0	
11	Baud rate (RS 232)	User parameters
12	Switching output	
13	RS 232 delay time	
14	Start character	
15	Stop character 1	
16	Stop character 2	

8.1 Transmission Modules

8.1.1 1 byte inp. / 1 byte outp.

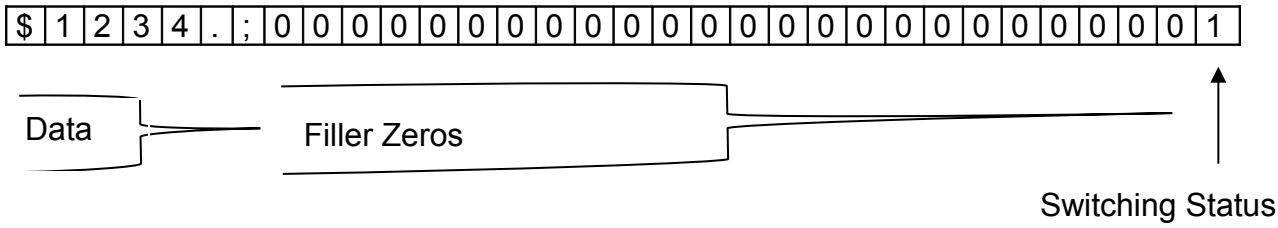
With this module, each byte is transmitted and received individually. This allows for transparent transmission regardless of the connected device. A toggle byte is also transmitted via the Profibus. Actual I/O size thus amounts to 2 bytes.

8.1.2 xx byte-inp. / xx bye-outp.

xx bytes are transmitted with these modules.
The modules are also available in a consistent variant.

8.1.3 xx byte-inp./ 1 bye-outp.

With this module, a data packet with a total size of xx bytes is always transmitted from the sensor/scanner, and 1 byte is received. The missing bytes are filled in with 0x00. The last byte represents the switching status of the sensors/scanner, if it is connected and has been selected in the DDBF.



If no sensor is connected, a 1 is always transmitted. In order to be able to evaluate the switching status correctly, it must switch to 0.

8.2 Parameter Setting Mode

After being switched on, the fieldbus gateway is in the parameter setting mode and waits for parameters information from the fieldbus. These default parameters are included in the DDBF at byte positions 0 through 6. The default parameters are included in the DDBF at byte positions 0 through 6. The user parameters are included in the DDBF at byte positions 7 through 16.

8.3 Configuration Mode

Special, variable parameters (user parameters) can be defined in the configuration mode. These user parameters are included in the DDBF at byte positions 7 through 16.

8.4 Data Exchange Mode

Data can be exchanged via the gateway in this mode. The mode is indicated by means of a green bus LED.

The gateway processes data with the start and stop characters entered previously via the DDBF. These start and stop characters are deleted for transmission to a Profibus master. A toggle byte and a length byte with the length of the user data are appended to the data at the first two places.
The length byte is omitted in the case of “1 byte-outp.”.

When transmitted from the Profibus master, the toggle byte and the length byte are deleted, and the start and stop characters are added.

The toggle byte is increased by one for each transmission. Upon reaching 255 (0xFF), it changes back to 0.

Data transmission begins as of the I or the O address selected in Step7®.

The universal mode provided by STEP7® is not compatible with the described product.

Communication example:

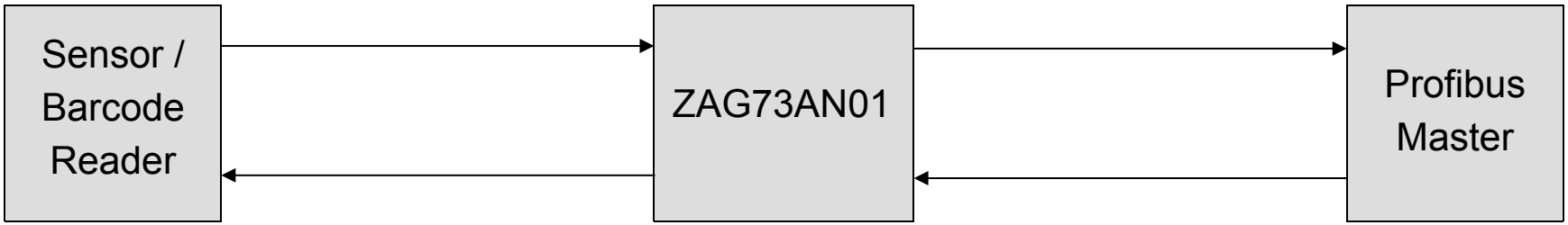
Start character: “**/**” (0x2F)
Stop character: “**.**” (0x2E)
Data: “**wenglor**” or “**sensoric**”

TB = toggle byte
LE = length byte

/	w	e	n	g	l	o	r	.
2F	77	65	6E	67	6C	6F	72	2E

E-Basic address

TB	LE	w	e	n	g	l	o	r
01	07	77	65	6E	67	6C	6F	72



/	s	e	n	s	o	r	i	c	.
2F	73	65	6E	73	6F	72	69	63	2E

TB	LE	s	e	n	s	o	r	i	c
01	08	73	65	6E	73	6F	72	69	63

A-Basic address

8.4.1 Transmission of Switching Output Status

Not only data, but rather the status of the switching output can also be transmitted via the gateway. The sensor's switching output must be connected to the appropriate terminal at the gateway to this end. Now, either "on" or "off" can be selected in the parameters list under the "switching output" setting. This function is not available for modules with "1 byte-outp.".

8.4.2 Character Read-Out Delay Time (to the sensor)

For certain sensors, for example the WM03NCT2, a brief delay time must be included between the individual characters, which are transmitted to them.
This delay time can be entered as a value within a range of 0 to 20 ms via the "232 delay time" parameter. The appropriate delay times are included in the descriptions of the respective sensors.

8.4.3 Start Character

The start character of the connected device is specified in the "start character" entry field. The start character must be entered as a decimal number. A table is included in the appendix.

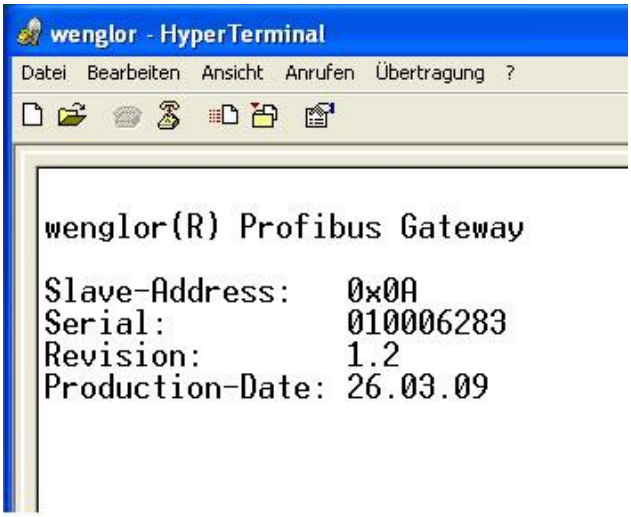
8.4.4 Stop Character

Up to two stop characters can be entered for the connected device to the “stop character” entry fields. If only one stop character is used, the “stop character 2” entry field is left blank. The stop characters must be entered as decimal numbers. A table is included in the appendix.

9 Debug Mode

If the baud rate selector switch is set to “D” during operation in the parameter setting or configuration mode, the gateway is switched to the debug mode.
Data exchange with a sensor is not possible in this mode. All data are transmitted only as far as the gateway, where they are then processed. The gateway can only be accessed with the RS 232 port with the following parameter settings: 19.2 k 8N1.

Device data can be queried with this setting after activating the “d” key. The screenshot shows a device data read-out in the hyper-terminal.



10 Technical Data

Fieldbus Baud Rate up to 12 MBaud (auto-detect)

Baud Rate [kbit/s]	Cable Length [m]
9.6	1200
19.2	1200
45.45	1200
93.75	1200
187.5	1000
500	400
1500	200
3000	100
6000	100
12000	100

11 Maintenance Instructions

The wenglor fieldbus gateway is maintenance-free.

12 Proper Disposal

wenglor sensoric gmbh does not accept the return of unusable or irreparable products. Respectively valid national waste disposal regulations apply to product disposal.

13 EC Declaration of Conformity

The EC declaration of conformity can be found on our website at www.wenglor.com in download area.

50 V

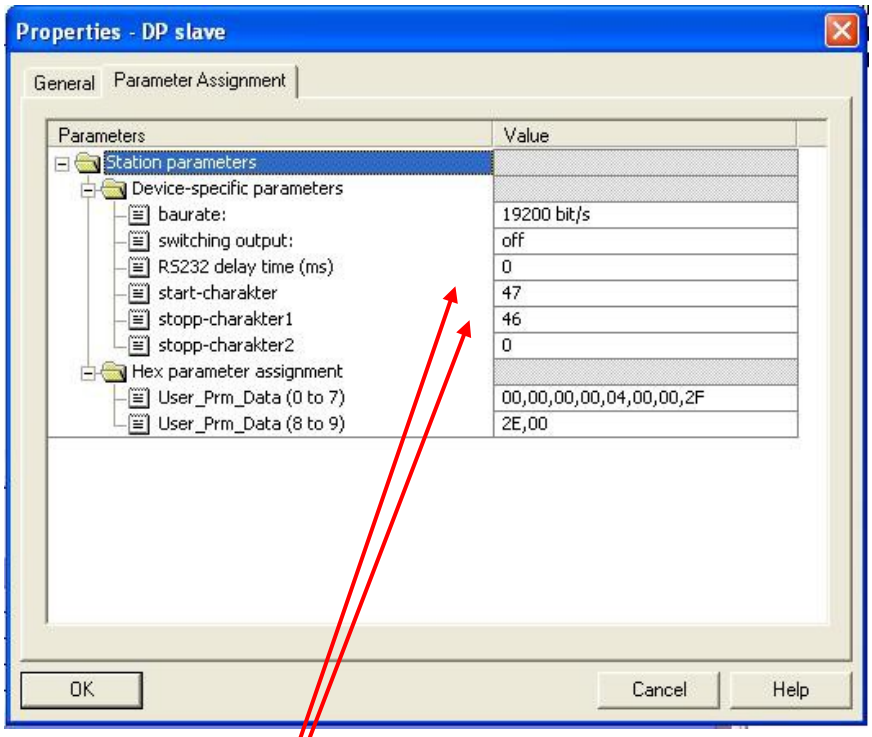
14 Appendix

Sample configuration for a barcode reader:

A barcode reader with 38.4 k Baud, start character “/” and stop character “.” will be connected.

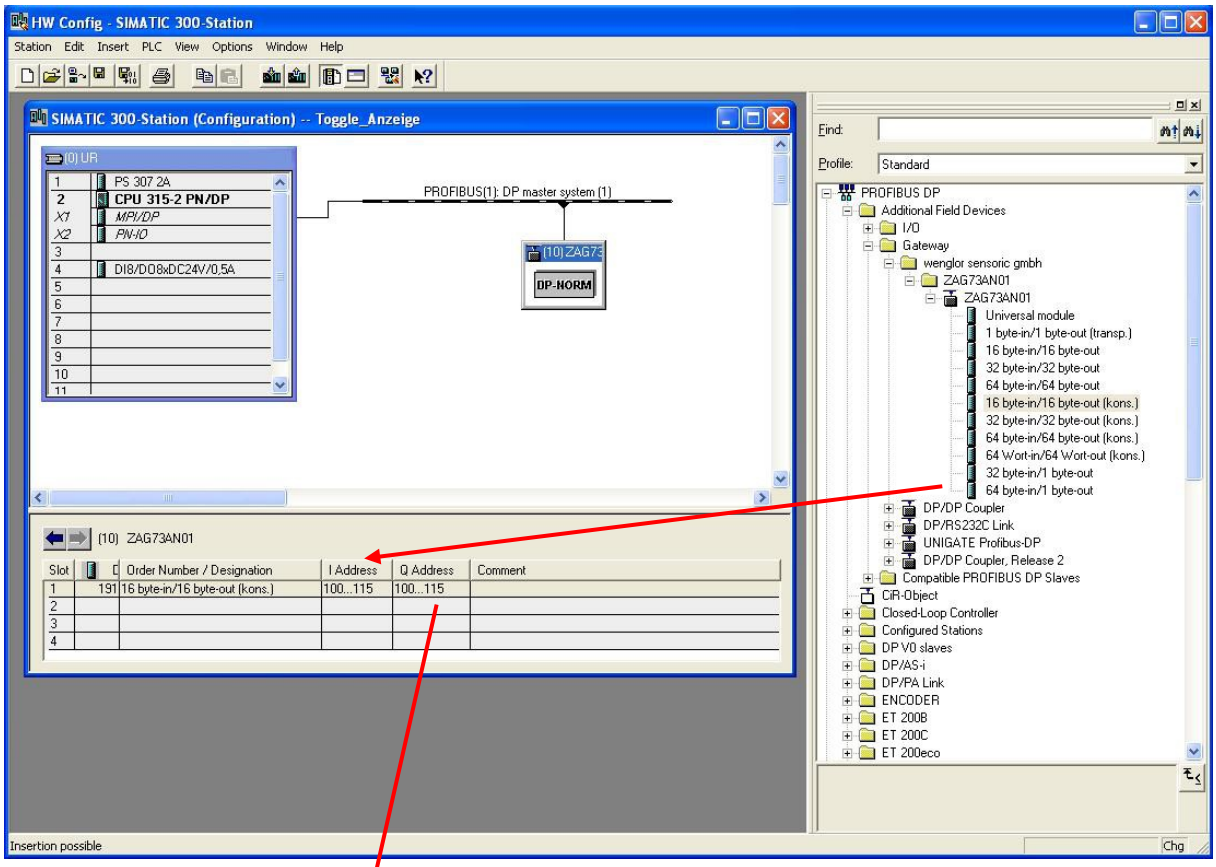
Set the “RS-232 Mode” rotary selector switch to “3”. As an alternative, the switch can also be set to “F” and “38400 bit/s” can be selected via the DDBF under “baud rate”.

Enter the corresponding decimal values for the start and stop characters from the table in the appendix. “stop character 2” is left blank, because there isn’t a second stop character in this case.

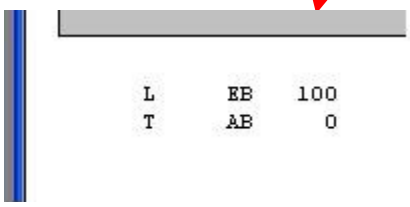


44	,	76
45	-	77
46	.	78
47	/	79
48	0	80
49	1	81

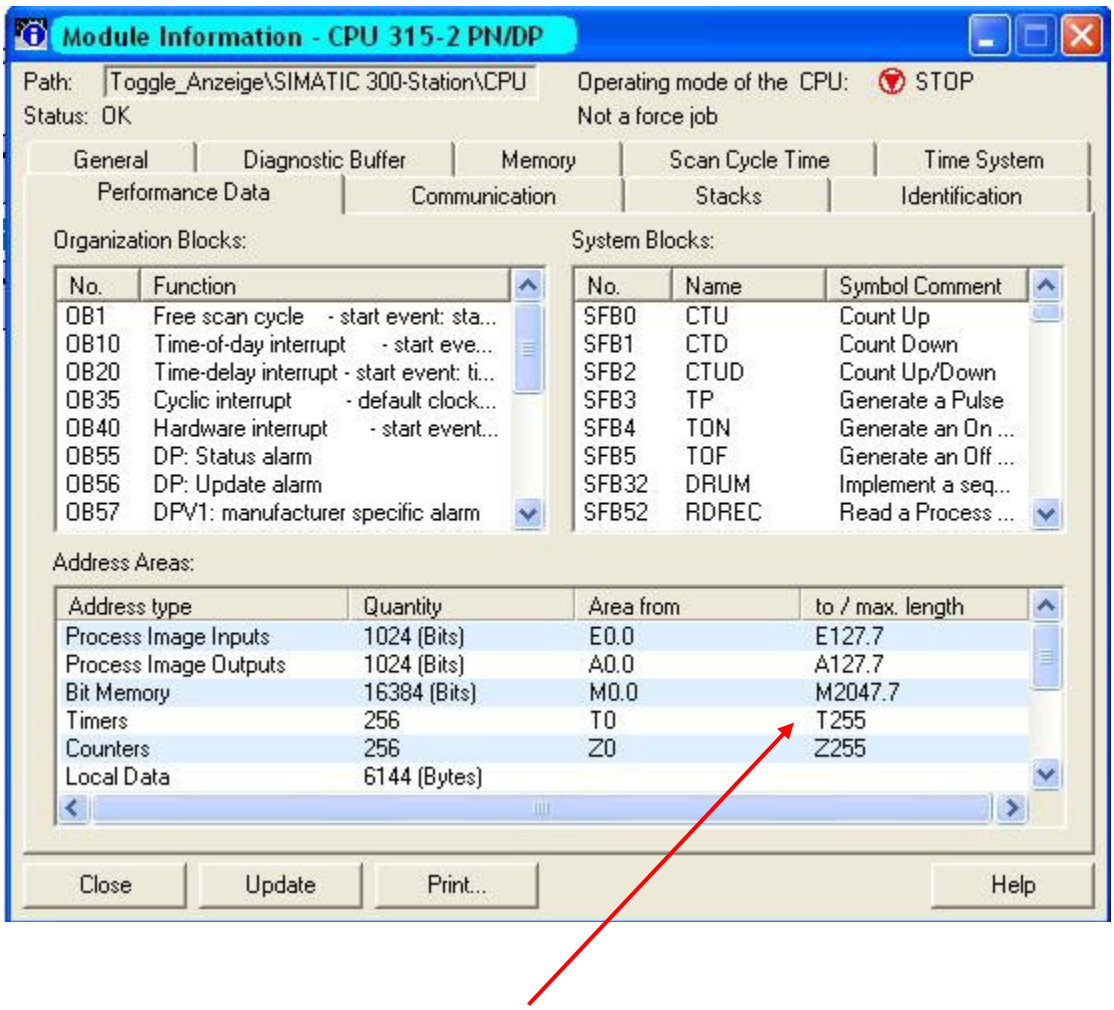
Select the desired transmission mode.



Change the I/O addresses and update them in OB1 if necessary.



In the example shown here, the toggle byte is read out to a DO module with address 0.



Attention: Observe maximum I/O values for the target CPU!

In the case of consistent I/O modules, starting addresses as of 256 are suggested. Depending upon the utilized CPU, these have to be changed manually.

S1	S2	Address
0	0	0
0	1	1
0	2	2
0	3	3
0	4	4
0	5	5
0	6	6
0	7	7
0	8	8
0	9	9
0	A	10
0	B	11
0	C	12
0	D	13
0	E	14
0	F	15
1	0	16
1	1	17
1	2	18
1	3	19
1	4	20
1	5	21
1	6	22
1	7	23
1	8	24
1	9	25
1	A	26
1	B	27
1	C	28
1	D	29
1	E	30
1	F	31
2	0	32
2	1	33
2	2	34
2	3	35
2	4	36
2	5	37
2	6	38
2	7	39
2	8	40
2	9	41

S1	S2	Address
2	A	42
2	B	43
2	C	44
2	D	45
2	E	46
2	F	47
3	0	48
3	1	49
3	2	50
3	3	51
3	4	52
3	5	53
3	6	54
3	7	55
3	8	56
3	9	57
3	A	58
3	B	59
3	C	60
3	D	61
3	E	62
3	F	63
4	0	64
4	1	65
4	2	66
4	3	67
4	4	68
4	5	69
4	6	70
4	7	71
4	8	72
4	9	73
4	A	74
4	B	75
4	C	76
4	D	77
4	E	78
4	F	79
5	0	80
5	1	81
5	2	82
5	3	83

S1	S2	Address
5	4	84
5	5	85
5	6	86
5	7	87
5	8	88
5	9	89
5	A	90
5	B	91
5	C	92
5	D	93
5	E	94
5	F	95
6	0	96
6	1	97
6	2	98
6	3	99
6	4	100
6	5	101
6	6	102
6	7	103
6	8	104
6	9	105
6	A	106
6	B	107
6	C	108
6	D	109
6	E	110
6	F	111
7	0	112
7	1	113
7	2	114
7	3	115
7	4	116
7	5	117
7	6	118
7	7	119
7	8	120
7	9	121
7	A	122
7	B	123
7	C	124
7	D	125

Decimal Value	Character
32	
33	!
34	„
35	#
36	$
37	%
38	&
39	'
40	(
41	)
42	*
42	+
44	,
45	–
46	.
47	/
48	0
49	1
50	2
51	3
52	4
53	5
54	6
55	7
56	8
57	9
58	:
59	;
60	<
61	=
62	>
63	?

Decimal Value	Character
64	@
65	A
66	B
67	C
68	D
69	E
70	F
71	G
72	H
73	I
74	J
75	K
76	L
77	M
78	N
79	O
80	P
81	Q
82	R
83	S
84	T
85	U
86	V
87	W
88	X
89	Y
90	Z
91	[
92	\
93	]
94	^
95	_

Decimal Value	Character
96	`
97	a
98	b
99	c
100	d
101	e
102	f
103	g
104	h
105	i
106	j
107	k
108	l
109	m
110	n
111	o
112	p
113	q
114	r
115	s
116	t
117	u
118	v
119	w
120	x
121	y
122	z
123	{
124	|
125	}
126	~
127	⌂

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