EN

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the innovative family

ZAG73AN02

PROFIBUS Gateway



Operating Instructions

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EN

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1. Use for Intended Purpose

wenglor's ZAG73AN02 Gateway connects serial devices to the PROFIBUS DP fieldbus.

2. Safety Precautions

2.1. Safety Precautions

- This operating instruction is part of the product and must be kept during its entire service life.
- Read this operating instruction carefully before using the product.
- Installation, start-up and maintenance of this product has only to be carried out by trained personal.
- Tampering with or modifying the product is not permissible.
- Protect the product against contamination during start-up.
- These products are not suited for safety applications.

3. EC Declaration of Conformity

The products are developed, constructed and manufactured according to the directive 2004/108/EC. The following international standards and specifications apply:

EN 61000-6-2:2005+B1:2011-06
EN 61000-6-4:2007+A1:2011

Any additional standards which are applicable for the given application must be observed.

RoHS

4. Technical Data

Electrical Data	
Supply Voltage	18…30 V DC
Voltage Supply of external products	5 V
Temperature Range	–10…50 °C
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Interface	RS-232
Baud Rate PROFIBUS	< 12 MBd
Baud Rate RS-232	< 115200 Bd
Number of Bus Clients	126
Protection Class	III
Mechanical Data	
Housing Material	Plastic
Degree of Protection	IP 65
Connection Mode Supply Voltage	M12×1; 4-pin
Connection Bus Side	M12×1; 4-pin
Output Function	
PROFIBUS DP	yes

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

5. Brief Description

The ZAG73AN02 Gateway for PROFIBUS DP 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.

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

6. Installation and Connection

6.1. Installation Instructions

All applicable electrical and mechanical regulations, standards and safety precautions must be adhered to when installing and operating the Gateway. The Gateway must be protected against mechanical influences.

6.2. Connection

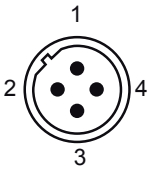


① Scanner
② Power
③ BUS IN
④ BUS OUT

6.2.1. Connecting Supply Power

Supply power is connected via plug 2 – a 4-pin M12x1 plug.

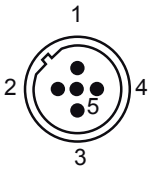
Pin No.	Signal
1	24 V DC
2	
3	–
4	



6.2.2. Connection with Fieldbus Plug

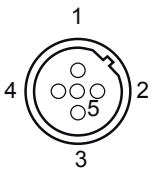
A 4-pin 12x1 B-coded plug with the following standard-compliant pin assignments is used for connection to PROFIBUS (see plug no. 3). In order to connect further users within the fieldbus network, the PROFIBUS signal can be forwarded via the PROFIBUS OUT socket (see socket no. 4).
Pin assignments for PROFIBUS DP plug no. 3

Pin No.	Signal
1	+
2	A
3	–
4	B
5	
Connector Housing	PE



Pin assignments for PROFIBUS DP socket no. 4

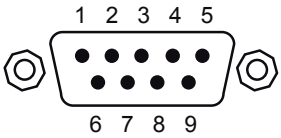
Pin No.	Signal
1	+
2	A
3	–
4	B
5	
Connector Housing	PE



6.2.3. Pin Assignments for the D-Sub 9 Plug Connector

In order to connect sensors or scanners to the Gateway, the Gateway is equipped with a D-Sub 9 plug connector (see plug no. 1).

Pin No.	Function
1	
2	RX
3	TX
4	
5	GND
6	
7	
8	
9	5 V*

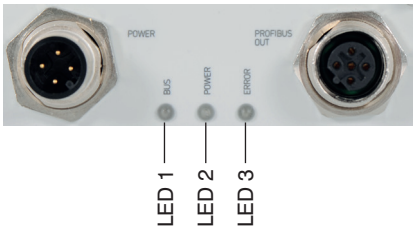


* 5 V auxiliary power can be switched off (see section 7.1).

Sockets that are not used must be provided with caps. Otherwise, the protection class IP65 cannot be guaranteed.

6.3. Status LEDs

There are three LEDs on the Gateway which function as status indicators. LED 1 indicates bus status, LED 2 indicates that supply power is on and LED 3 indicates errors.



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

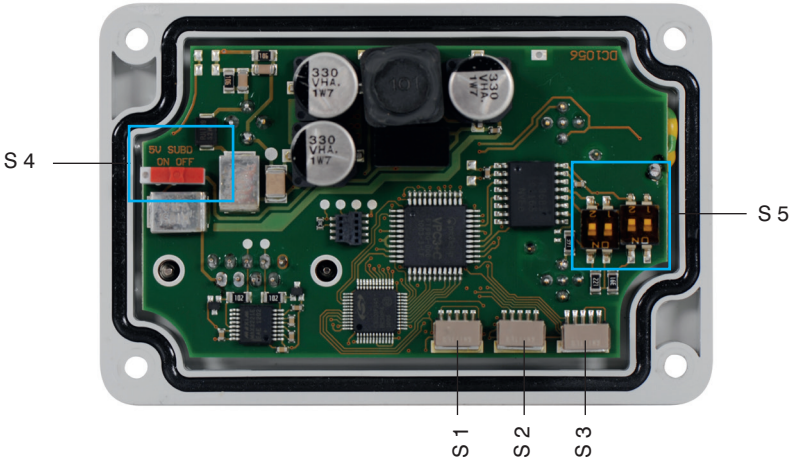
7. Fieldbus Address

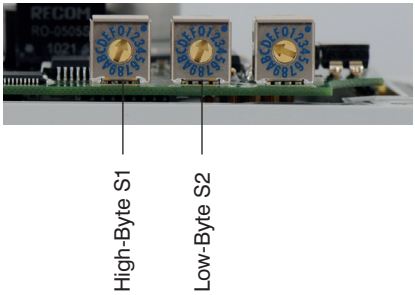
There are two ways to assign an address for PROFIBUS DP. The bus address can be selected manually with two rotary selector switches. The rotary selector switch is inside the Gateway. **In order to access the rotary selector switches, open the Gateway by loosening the 4 screws in its lid, and carefully lift the lid away.**



The Gateway's PCB, with all of its setting options, is on the bottom of the lid. Be sure to observe all common ESD guidelines in order to prevent damage to the device.







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

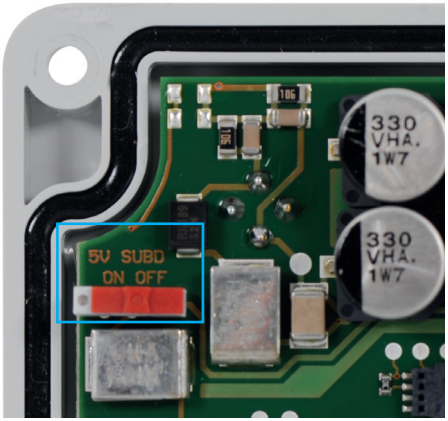
The address can be set to a value of 0 to 125 as shown in the table in the appendix, or assigned directly via the fieldbus. In the latter case, the address is transmitted from the PROFIBUS master with the help of the Set-SlaveAddress command to the Gateway, where it is saved to memory. The address must be set to a value of greater than 125 at the rotary selector switches in order to assign an address via the fieldbus.

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.

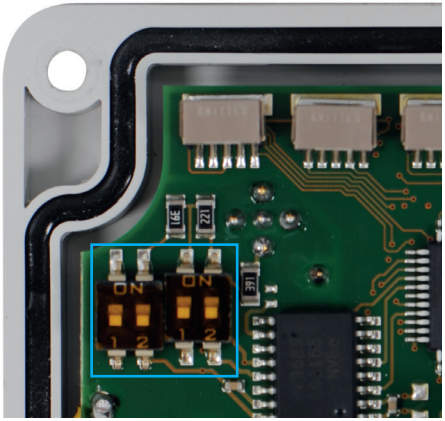
7.1. Optional Activation of 5 V Auxiliary Power

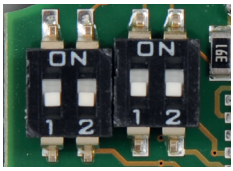
Auxiliary power is required at pin 9 in order to be able to operate certain scanners at the D-Sub plug connector. This is possible with the help of slide switch S4. Auxiliary power is switched off as a default setting upon shipment. 5 V auxiliary power should not be activated during operation of the Gateway. The slide switch should be set to the desired position before initial start-up or after supply power has been disconnected.



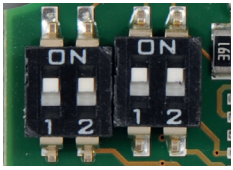
7.2. Activating the Terminating Resistor

If the Gateway is physically the last network user, a terminating resistor must be activated in order to assure correct operation. This is accomplished with the help of DIP switch S5. All DIP switches must be set to “ON” in order to activate the terminating resistor (some Gateways have a protective yellow foil on the DIP switches which has to be removed first). Switching is only permissible in the voltage-free state.

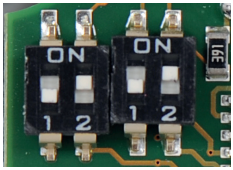




Terminating Resistor
Not Active



Terminating Resistor Active



Impermissible Switch Setting –
No Unequivocal Setting!

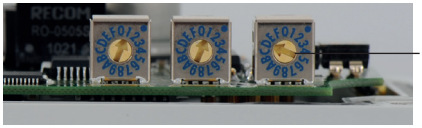
8. RS-232 Baud Rate

The baud rate for the RS-232 port can be set by means of rotary selector switch S3, 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

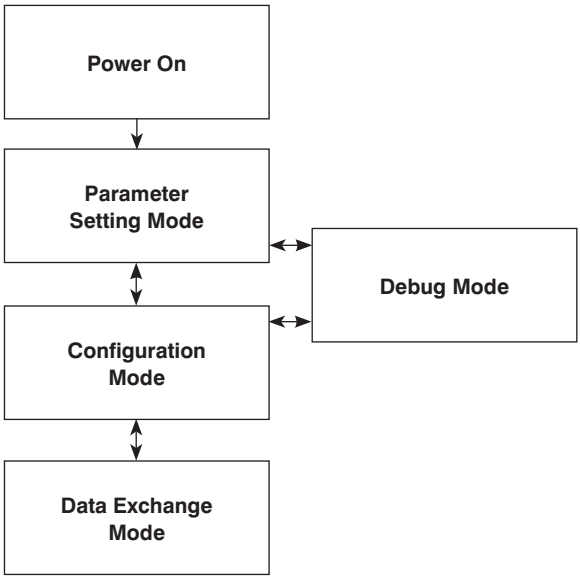
The rotary selector switch has precedence for the baud rate setting.

The rotary selector switches are NOT changed in the data exchange mode, but rather only in the parameter setting or configuration mode.
If an S7 is used, the bus connection must be disconnected to this end.



Baud Rate S3

9. Communications Sequence



10. 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. (**www.wenglor.com → Products → Product search** (Order No.) **→ Product Description File**) **Download the DDBF for the ZA-G73AN02 Gateway un order to take advantage of full functionality.**

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, various parameters can be transmitted to the Gateway (assuming the rotary selector switches (RS-232) are set to “F”).

Byte	Parameters	
0	Station 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	User Parameters
11	Baud rate (RS-232)	
12	Switching output (not active)	
13	RS-232 delay time	
14	Start character	
15	Stop character 1	
16	Stop character 2	

10.1. Transmission Modules

10.1.1. 1 byte-inp./ 1 byte-outp.

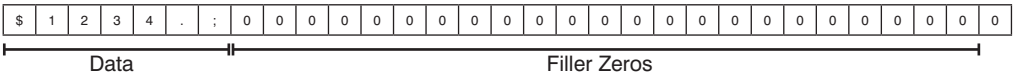
With this module, each byte is transmitted and received individually. This allows for transparent transmission regardless of the connected device. A toggle byte is also transmitted via the PROFIBUS. Actual I/O size thus amounts to 2 bytes.

10.1.2. xx byte-inp./ xx byte-outp.

xx bytes are transmitted with these modules. The modules can also be selected in a consistent variant.

10.1.3. xx byte-inp./ 1 byte-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.



10.2. Parameter Setting Mode

After being switched on, the Gateway is in the parameter setting mode and waits for parameters information from the fieldbus. 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.

10.3. Configuration Mode

A module is selected for data transmission in the configuration mode.

10.4. Data Exchange Mode

This mode is indicated by means of a green bus status LED.
Data can be exchanged via the Gateway in this mode.

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 selected 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 E or A address selected in STEP7®

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

Communication Example:

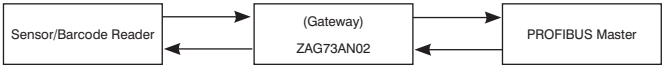
Start character: „/“ (0x2F)
Stop character: „.“ (0x2E)
Data: „wenglor“ or „sensoric“

TB = Toggle-Byte
LE = Längen-Byte

E Base Address

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

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 Base Address

10.4.1. Character Read-Out Delay Time

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 “RS-232 delay time” parameter.
The appropriate delay times are included in the descriptions of the respective sensors.

10.4.2. Start Character

IThe 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.

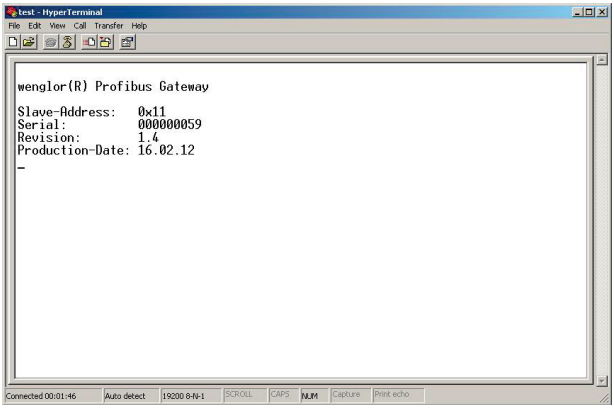
10.4.3. Stop Character

Up to two stop characters can be entered for the connected device to the “stop character” entry field.
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.

11. 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 via the RS-232 port with the following parameter settings: 19.2k 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.



12. Maintenance Instructions

The wenglor Gateway is maintenance-free.

13. 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.

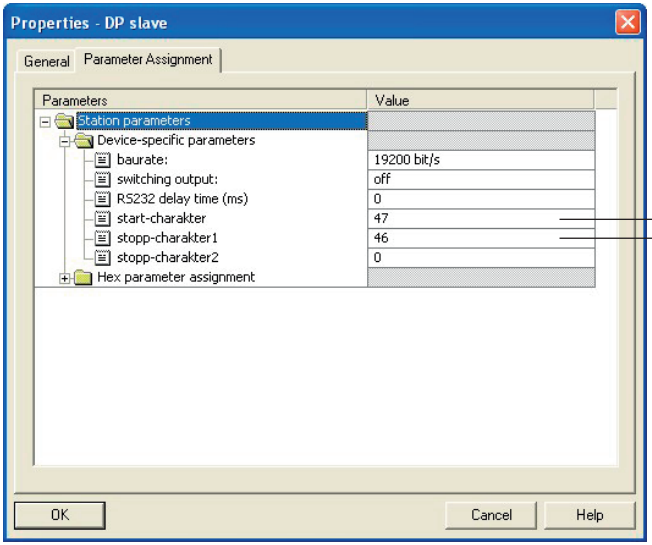
14. Appendix

Sample configuration for a barcode reader:

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

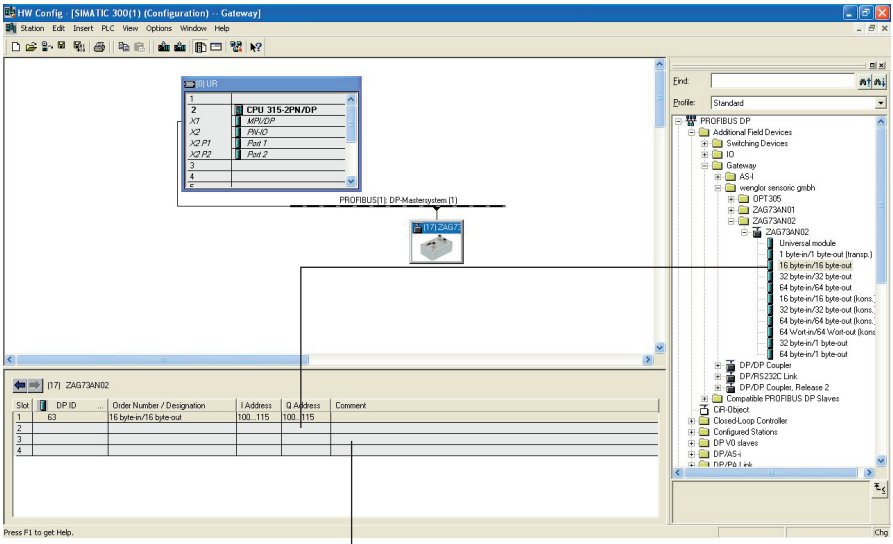
Set the “RS-232 Mode” rotary selector switch to “3”. As an alternative, the switch can also be set to “F” and “38400 bit/s” can be selected via the DDBF under “baud rate”.

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.



Select the desired transmission mode.

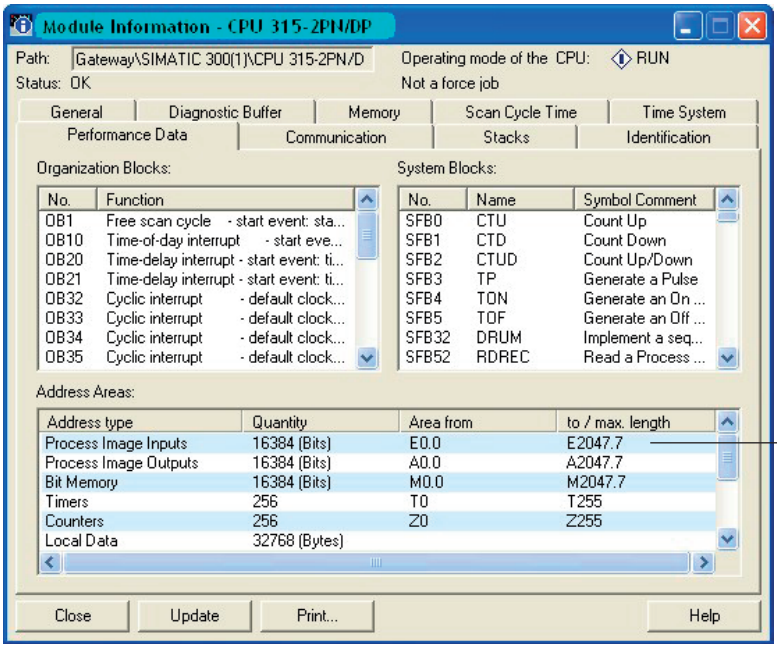
44	,
45	-
46	.
47	/
48	0
49	1



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.

```
L     EB    100
T     AB      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

EN

Decimal Value	Character
32	
33	!
34	„
35	#
36	$
37	%
38	&
39	'
40	(
41	)
42	*
43	+
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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