


Name: TR 800 Web	Type: Universal Relais	
Edited: (date / name) 15.10.2008 Fu	RS 485 Ziehl protocol description	Drawing no.: 12280-1604-00
	EA-Nr.: 1451	Replace for:
		Page: 1 von 10

RS 485 Ziehl protocol TR 800 – send data without request

Unit RS 485 Address = 0; Mode 0 will be send every 3s. no request must be send.
Unit RS 485 Address = 91; Mode 1 will be send every 3s. no request must be send.
Unit RS 485 Address = 92; Mode 2 will be send every 3s. no request must be send.
Unit RS 485 Address = 93; Mode 3 will be send every 3s. no request must be send.

RS 485 Ziehl protocol TR 800 - master requests data

Start of message	s		
	Or S		
	Or <STX> (= 0x02 Hex)	1 Byte	ASCII
Address of unit	00 .. 99	2 Byte	ASCII
Command	r (read)		
	R (read)	1 Byte	ASCII
Mode *)	0 .. 9	1 Byte	ASCII
Block check (BCC)	EXOR of all transmitted bytes	3 Byte	ASCII
Carriage Return (CR)	<CR>	1 Byte	
Line Feed (LF)	<LF>	1 Byte	
		Sum:	10 Byte
*)			


*)
0 = protocol compatible with TR 600 -> ASCII-data
1 = TR 800 (data and alarm) -> ASCII-data
2 = TR 800 (data and alarm) -> binary data
3 = TR 800 (configuration) -> binary data

Timeout = 2s. If within 2s no character is received, the internal receive buffer is deleted.

RS 485 Ziehl protocol TR 800 – answer mode 0 (compatible with TR 600)

Only 6 sensors und 4 alarms are transmitted.


Start of message	s S <STX> (= 0x02 Hex)	(= Start of message from request) 1 Byte ASCII
Name of unit	TR600	5 Byte ASCII (+ 1 Byte Delimiter ";")
Address of unit	00 .. 99	2 Byte ASCII (+ 1 Byte Delimiter ";")
Mode	0	1 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 1	*)	4 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 2	*)	4 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 3	*)	4 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 4	*)	4 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 5	*)	4 Byte ASCII (+ 1 Byte Delimiter ";")

Name: TR 800 Web	Type: Universal Relais	
Edited: (date / name) 15.10.2008 Fu	RS 485 Ziehl protocol description	Drawing no.: 12280-1604-00
	EA-Nr.: 1451	Replace for:
		Page: 2 von 10

Current value sensor 6	*)	4 Byte	ASCII (+ 1 Byte Delimiter ";")
Alarm 1	0 .. 1	1 Byte	ASCII (+ 1 Byte Delimiter ";")
Alarm 2	0 .. 1	1 Byte	ASCII (+ 1 Byte Delimiter ";")
Alarm 3	0 .. 1	1 Byte	ASCII (+ 1 Byte Delimiter ";")
Alarm 4	0 .. 1	1 Byte	ASCII (+ 1 Byte Delimiter ";")
Alarm 5 no function	0	1 Byte	ASCII (+ 1 Byte Delimiter ";")
Alarm 6 no function	0	1 Byte	ASCII (+ 1 Byte Delimiter ";")
Alarm 7 at error	= Alarm 4 (0 .. 1)	1 Byte	ASCII (+ 1 Byte Delimiter ";")
Error code	00 .. 99	2 Byte	ASCII (+ 1 Byte Delimiter ";")
Block check	EXOR of all transmitted bytes	3 Byte	
Carriage Return (CR)	<CR>	1 Byte	
Line Feed (LF)	<LF>	1 Byte	

= 64 Byte

*)	
Sensor nc:	+980
Sensor short-circuit:	-999
Sensor break:	+999
<u>temperature sensor*2)</u>	
range (thermocouple):	-199 .. +950
<u>Current input *3)</u>	
range:	+000 .. +240
<u>Voltage input *3)</u>	
range:	+000 .. +120
<u>Resistor input *3)</u>	
range:	+000 .. +500
	+000 .. +300
<u>Sensor scaling *3)</u>	
range:	-998 .. +950
<u>difference sensor *3)</u>	
range:	-998 .. +950
*2) depending on sensor type	
*3) output without decimal point	


Name: TR 800 Web	Type: Universal Relais		
Edited: (date / name) 15.10.2008 Fu	RS 485 Ziehl protocol description		Drawing no.: 12280-1604-00
	EA-Nr.: 1451	Replace for:	Page: 3 von 10

RS 485 Ziehl protocol TR 800 - answer mode 1

Start of message	s S <STX> (= 0x02 Hex)	(= Start of message from request) 1 Byte ASCII
Name of unit	TR800	5 Byte ASCII (+ 1 Byte Delimiter ";")
Address of unit	00 .. 99	2 Byte ASCII (+ 1 Byte Delimiter ";")
Mode	1	1 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 1	*)	7 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 2	*)	7 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 3	*)	7 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 4	*)	7 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 5	*)	7 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 6	*)	7 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 7	*)	7 Byte ASCII (+ 1 Byte Delimiter ";")
Current value sensor 8	*)	7 Byte ASCII (+ 1 Byte Delimiter ";")
Alarm 1	0 .. 1	1 Byte ASCII (+ 1 Byte Delimiter ";")
Alarm 2	0 .. 1	1 Byte ASCII (+ 1 Byte Delimiter ";")
Alarm 3	0 .. 1	1 Byte ASCII (+ 1 Byte Delimiter ";")
Alarm 4	0 .. 1	1 Byte ASCII (+ 1 Byte Delimiter ";")
Error code	00 .. 99	2 Byte ASCII (+ 1 Byte Delimiter ";")
Block check	EXOR of all transmitted bytes	3 Byte
Carriage Return (CR)	<CR>	1 Byte
Line Feed (LF)	<LF>	1 Byte

= 92 Byte

<u>Current value sensor *)</u>	
Sensor short-circuit:	+32767
Sensor break:	+32766
Thermocouple poled wrong:	+32765
Overflow:	+32750
Underflow:	+32749
Sensor nc:	+32748
<u>temperature sensor</u>	
range (°C):	-0270.0 .. +1800.0
range (°F):	-000454 .. +003272
<u>Current input</u>	
range:	+000.00 .. +024.00
<u>Voltage input</u>	
range:	+000.00 .. +012.00
<u>Resistor input</u>	
range:	+0000.0 .. +0500.0
	+00.000 .. +30.000
<u>Sensor scaling</u>	
range:	-01.999 .. +09.999
	-019.99 .. +099.99
	-0199.9 .. +0999.9
	-001999 .. +009999


Name: TR 800 Web	Type: Universal Relais	
Edited: (date / name) 15.10.2008 Fu	RS 485 Ziehl protocol description	Drawing no.: 12280-1604-00
	EA-Nr.: 1451	Replace for:
		Page: 4 von 10

RS 485 Ziehl protocol TR 800 - answer mode 2

Start of message	s S <STX>	(= Start of message from request)	(ASCII) (ASCII) = 0x02 Hex
Name of unit	TR800	5 Byte (+ 1 Byte Delimiter ";")	(ASCII)
Address of unit	00 .. 99	2 Byte (+ 1 Byte Delimiter ";")	(ASCII)
Mode	2	1 Byte (+ 1 Byte Delimiter ";")	(ASCII)
Number of the next data bytes (without block check)	28	2 Byte	Unsigned Int16 low / high Byte
Current value sensor 1		2 Byte	Signed Int16 low / high Byte
Decimal point Sensor 1		1 Byte	Unsigned Char
Current value sensor 2		2 Byte	Signed Int16 low / high Byte
Decimal point Sensor 2		1 Byte	Unsigned Char
Current value sensor 3		2 Byte	Signed Int16 low / high Byte
Decimal point Sensor 3		1 Byte	Unsigned Char
Current value sensor 4		2 Byte	Signed Int16 low / high Byte
Decimal point Sensor 4		1 Byte	Unsigned Char
Current value sensor 5		2 Byte	Signed Int16 low / high Byte
Decimal point Sensor 5		1 Byte	Unsigned Char
Current value sensor 6		2 Byte	Signed Int16 low / high Byte
Decimal point Sensor 6		1 Byte	Unsigned Char
Current value sensor 7		2 Byte	Signed Int16 low / high Byte
Decimal point Sensor 7		1 Byte	Unsigned Char
Current value sensor 8		2 Byte	Signed Int16 low / high Byte
Decimal point Sensor 8		1 Byte	Unsigned Char
Alarm status		1 Byte	Unsigned Char
Alarm from sensor		2 Byte	Unsigned Char low / high Byte
Error code		1 Byte	Unsigned Char
Block check	CRC16	2 Byte	Unsigned Int16 low / high Byte

CRC16 Modbus (Polynomial 0xA001) 44 Byte

<u>Current value sensor:</u>		
Sensor short-circuit:	32767 (0x7FFF Hex)	
Sensor break:	32766 (0x7FFE Hex)	
Thermocouple poled wrong:	32765 (0x7FFD Hex)	
Overflow:	32750 (0x7FEE Hex)	
Underflow:	32749 (0x7FED Hex)	
Sensor nc:	32748 (0x7FEC Hex)	
<u>temperature sensor</u>		
range (°C):	-2700 .. 18000	0xF574 .. 0x4560
range (°F):	-454 .. 3272	0xFE3A .. 0x0CC8
<u>Current input</u>		
range:	0 .. 2400	0x000 .. 0x0960
<u>Voltage input</u>		
range:	0 .. 1200	0x000 .. 0x04B0


Name: TR 800 Web	Type: Universal Relais	
Edited: (date / name) 15.10.2008 Fu	RS 485 Ziehl protocol description	Drawing no.: 12280-1604-00
	EA-Nr.: 1451 Replace for:	Page: 5 von 10

<u>Resistor input</u>		
range:	0 .. 5000	0x000 .. 0x1388
	0 .. 30000	0x000 .. 0x7530
<u>Sensor scaling</u>		
range:	-1999 .. 9999	0xF831 .. 0x270F

Decimal point:	xxxx	0
	xxx.x	1
	xx.xx	2
	x.xxx	3

Alarm status:	Alarm 1	bit 0	= 1 if Alarm
	Alarm 2	bit 1	= 1 if Alarm
	Alarm 3	bit 2	= 1 if Alarm
	Alarm 4	bit 3	= 1 if Alarm


Alarm from sensor:	Senor 1	bit 0	= 1 if the sensor triggers an alarm
	Senor 2	bit 1	
	Senor 3	bit 2	
	Senor 4	bit 3	
	Senor 5	bit 4	
	Senor 6	bit 5	
	Senor 7	bit 6	
	Senor 8	bit 7	

Name: TR 800 Web	Type: Universal Relais	
Edited: (date / name) 15.10.2008 Fu	RS 485 Ziehl protocol description	Drawing no.: 12280-1604-00
	EA-Nr.: 1451	Replace for:
		Page: 7 von 10

relay on alarm	Alarm 1	2 Byte	Unsigned Int16	low / high Byte
	:			
	Alarm 2	10 Byte		
	Alarm 3	10 Byte		
	Alarm 4	10 Byte		
Data (scaled value)	Sensor 1	2 Byte	Signed Int16	low / high Byte
Data (not scaled value)	Sensor 1	2 Byte	Signed Int16	low / high Byte
Sensor error	Sensor 1	2 Byte	Unsigned Int16	low / high Byte
	:			
	Sensor 2	6 Byte		
	Sensor 3	6 Byte		
	Sensor 4	6 Byte		
	Sensor 5	6 Byte		
	Sensor 6	6 Byte		
	Sensor 7	6 Byte		
	Sensor 8	6 Byte		
simulated sensor		2 Byte	Unsigned Int16	low / high Byte
Status alarm	Alarm 1	2 Byte	Unsigned Int16	low / high Byte
Status delay alarm on	Alarm 1	2 Byte	Unsigned Int16	low / high Byte
Status delay alarm off	Alarm 1	2 Byte	Unsigned Int16	low / high Byte
Status locked alarm	Alarm 1	2 Byte	Unsigned Int16	low / high Byte
	:			
	Alarm 2	8 Byte		
	Alarm 3	8 Byte		
	Alarm 4	8 Byte		
Status relays		2 Byte	Unsigned Int16	low / high Byte
Error code		2 Byte	Unsigned Int16	low / high Byte
Data- counter		2 Byte	Unsigned Int16	low / high Byte
Block check	CRC16	2 Byte	Unsigned Int16	low / high Byte
CRC16 Modbus (Polynomial 0xA001)				

573 Byte
+ 3 Byte (Delimiter)

576 Byte

Name: TR 800 Web	Type: Universal Relais	
Edited: (date / name) 15.10.2008 Fu	RS 485 Ziehl protocol description	Drawing no.: 12280-1604-00
	EA-Nr.: 1451	Replace for:
		Page: 8 von 10

Values of the register

Sensor Type	
Value	meaning
0	nc
1	Pt 100
2	Pt 1000
3	KTY 83
4	KTY 84
5	Thermocouple B
6	Thermocouple E
7	Thermocouple J
8	Thermocouple K
9	Thermocouple L
10	Thermocouple N
11	Thermocouple R
12	Thermocouple S
13	Thermocouple T
14	Voltage 0 .. 10V
15	Current 0 .. 20mA
16	Current 4 .. 20mA
17	Resistor 500 Ohm
18	Resistor 30 kOhm
19	Difference of two inputs

Wire compensation	
Value	meaning
-1	3-wire
0	0 Ohm
1	0,1 Ohm
:	:
1000	100,0 Ohm

Unit	
Value	meaning
0	°C
1	°F
2	V
3	mA
4	Ohm
5	kOhm
6	%
7	User

Scaling on	
Value	meaning
0	inactive
1	active

Scaling zero point	
Scaling full-scale	
Value	meaning
-1999	
:	
9999	

Scaling Decimal point	
Value	meaning
0	xxxx
1	xxx.x
2	xx.xx
3	x.xxx


Alarm active	
Value	meaning
0	off
1	on
	Alarm value -
	Alarm x on
	Alarm x off
	Alarm x on (night)
	Alarm x off (night)
-9999	
:	
30000	

delay alarm on delay alarm off	
Value	meaning
0	[s]
:	:
9999	[s]

Alarm on error	
Value	meaning
0	off
1	on

Alarm locked	
Value	meaning
0	off
1	on

Relay on alarm	
Value	meaning
0	de-energized
1	energized

Name: TR 800 Web	Type: Universal Relais	
Edited: (date / name) 15.10.2008 Fu	RS 485 Ziehl protocol description	Drawing no.: 12280-1604-00
	EA-Nr.: 1451	Replace for:
		Page: 9 von 10

Data- Sensor 1 .. 8

Data (scaled value)	
Data (not scaled value)	
Value	meaning
-9999	
:	
30000	
32767	Sensor short-circuit:
32766	Sensor break:
32765	Thermocouple poled wrong:
32750	Overflow:
32749	Underflow:
32748	Sensor nc:


Sensor error	
Value	meaning
0	OK
1	Sensor short-circuit
2	Sensor break:
3	
4	Thermocouple connected wrong:

Sensor Simulation

Simulated sensor	
Value	meaning
bit 0	Sensor 1
:	:
bit 7	Sensor 8

Status

Status alarm on	
Status delay alarm on	
Status delay alarm off	
Status locked alarm	
Value	meaning
0	off
bit0	Alarm Sensor 1
bit1	Alarm Sensor 2
bit2	Alarm Sensor 3
bit3	Alarm Sensor 4
bit4	Alarm Sensor 5
bit5	Alarm Sensor 6
bit6	Alarm Sensor 7
bit7	Alarm Sensor 8
bit8	Device error

Name: TR 800 Web	Type: Universal Relais	
Edited: (date / name) 15.10.2008 Fu	RS 485 Ziehl protocol description	Drawing no.: 12280-1604-00
	EA-Nr.: 1451	Replace for:
		Page: 10 von 10

Other

Status relays	
Value	meaning
bit 0	Relays K1
:	
bit 3	Relays K4

Data- counter	
Value	meaning
0	is incremented at each measurement
:	
65535	

Error code	
Value	meaning
0	No error
bit 0	AD-error (Er 8)
	Internal communication error
bit 1	(Er 5)
	Internal communication error
bit 2	(Er 6)
bit 3	EEPROM error (Er 9)