

Thyracont Communication Protocol V1 for Serial Interface

General Frame	Address	Code	Data	cks	CR
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Address: 3 digits, decimal;
 Address code: ID1/ID2/ID3 for 001 ... 999 (Address for RS232 is "001")

Code: Ordered Action, uppercase letter f. reading, small letter f. writing

Data: Data to be transmitted; the data field can also be empty, depending on Code

cks: Checksum (hex), defined as sum over bytes from fields "Address", "Code" and "Data", modulo 64 plus 64.

CR: Carriage Return (0Dh, 13d)

Action	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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1) Type - Query	ID1	ID2	ID3	T	cks	CR
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Type - Answer	ID1	ID2	ID3	T	t1	t2	t3	t4	t5	t6	cks	CR
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STRING

t1 ... t6: 6x char / string characterizing instrument type:
 t1/t2/t3: instrument name (e.g. VD9, V8U);
 t4: controller type ("2" for 2P / "3" for 3P; 2 or 3 point control);
 t5: control characteristic ("0" without PI / "1" with PI feedback);
 t6: special type code ("1" to "8")

2) Measurement - Query	ID1	ID2	ID3	M	cks	CR
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Measurement - Answer	ID1	ID2	ID3	M	m1	m2	m3	m4	exp1	exp2	cks	CR
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FLOAT

m1 ... exp2: 0 ... 9 / mantissa and exponent of measurement; value in mbar
 (query initiates answer or passive "listening mode")

Example - Query	0	0	1	M	^	CR
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Example - Answer	0	0	1	M	9	8	2	1	2	2	V	CR
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mantissa: 9821, exponent: 22 → 982.1 mbar (for conversion see Parameter Formats)

3) Logging Data Set - Query	ID1	ID2	ID3	V	cks	CR
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Logging Data Set - Answer	ID1	ID2	ID3	V	m1	m2	m3	m4	exp1	exp2	t1	t2	t3	t4	t5	t6	t7	t8	cks	CR
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FLOAT
 m1 ... exp2: 0 ... 9 / mantissa and exponent of logging data; value in mbar;
 t1 ... t8: logging time in seconds
 The answer for end of logging data is "99999999999999" in the fields m1...t8

4) Logging Rate - Query	ID1	ID2	ID3	R	cks	CR
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Logging Rate - Answer	ID1	ID2	ID3	R	m1	m2	m3	m4	exp1	exp2	cks	CR
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FLOAT reading logging rates; m1 ... exp2: 0 ... 9 / mantissa and exponent of time; time in s; this reading sets the reading-pointer of logging data to start

Logging Rate - Set	ID1	ID2	ID3	r	cks	CR
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Set - Answer	ID1	ID2	ID3	r	m1	m2	m3	m4	exp1	exp2	cks	CR
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FLOAT writing logging rates; m1 ... exp2: 0 ... 9 / mantissa and exponent of time; time in s

S: Setpoint; H: Hysteresis; P: Parameter Set; C: Correction Factor

5) Setpoint - Query	ID1	ID2	ID3	SHPC	1...9	cks	CR
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S: Setpoint; H: Hysteresis

Value - Answer	ID1	ID2	ID3	S,H	m1	m2	m3	m4	exp1	exp2	cks	CR
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FLOAT m1 ... exp2: 0 ... 9 / mantissa and exponent of value; value in mbar

P: Parameter Set; C: Correction Factor

Value - Answer	ID1	ID2	ID3	P,C	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros n1 ... n6: 1 ... 9 / Parameter Set (1 to 9), Correction Factor (20 ... 800 corresponds to 0.2 ... 8.0)

s: Setpoint; h: Hysteresis; p: Parameter Set; c: Correction Factor; j: Adjustment Smartline (0: unlock min-adjust, 1: unlock max-adjust)

6) Unlock	ID1	ID2	ID3	shpcj	1...9	cks	CR
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Unlock - Confirmation	ID1	ID2	ID3	shpcj	1...9	cks	CR
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s: Setpoint; h: Hysteresis

7) Value - Set	ID1	ID2	ID3	s,h	m1	m2	m3	m4	exp1	exp2	cks	CR
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FLOAT
m1 ... exp2: 0 ... 9 / mantissa and exponent of value; value in mbar

s: Setpoint; h: Hysteresis

Set - Confirmation	ID1	ID2	ID3	s,h	m1	m2	m3	m4	exp1	exp2	cks	CR
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FLOAT
m1 ... exp2: 0 ... 9 / mantissa and exponent of value; value in mbar

j: Adjustment Smartline Value

7) Value - Set	ID1	ID2	ID3	j	m1	m2	m3	m4	exp1	exp2	cks	CR
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FLOAT
max-adjust: VSP/VSM/VSH: m1 ... exp2= "100023", VSR: m1 ... exp2= atm. pressure [mbar] in format FLOAT;
min-adjust: m1 ... exp2=" 000000"

j: Adjustment Smartline Value

Set - Confirmation	ID1	ID2	ID3	j	m1	m2	m3	m4	exp1	exp2	cks	CR
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FLOAT
m1 ... exp2: 0 ... 9 / mantissa and exponent of value; value in mbar

p: Parameter Set, c: Correction Factor

7) Value - Set	ID1	ID2	ID3	p,c	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros
n1 ... n6: 1 ... 9 / Parameter Set (1 to 9), Correction Factor (20 ... 800 corresponds to 0.2 ... 8.0)

p: Parameter Set, c: Correction Factor

Set - Confirmation	ID1	ID2	ID3	p,c	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros
n1 ... n6: 1 ... 9 / Parameter Set (1 to 9), Correction Factor (20 ... 800 corresponds to 0.2 ... 8.0)

9) Start/Stop Control	ID1	ID2	ID3	A,a	0,1	cks	CR
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Start/Stop - Confirmation	ID1	ID2	ID3	A,a	0,1	cks	CR
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BOOLEAN
0: control off, 1: control on

10) Lock Keyboard	ID1	ID2	ID3	K,k	0,1	cks	CR
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Lock Keyb. - Confirmation	ID1	ID2	ID3	K,k	0,1	cks	CR
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BOOLEAN
0: keyboard active, 1: keyboard locked

11) Degas	ID1	ID2	ID3	D,d	0,1	cks	CR
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Degas - Confirmation	ID1	ID2	ID3	D,d	0,1	cks	CR
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BOOLEAN
0: Degas on, 1: Degas off

12) Filament Number - Query	ID1	ID2	ID3	F	cks	CR
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Filament Number - Answer	ID1	ID2	ID3	F	0,1	cks	CR
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BOOLEAN 0: Filament 1 on, 1: Filament 2 on

13) Sensor Transition - Query	ID1	ID2	ID3	W	cks	CR
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Sensor Transition - Answer	ID1	ID2	ID3	W	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros n1 ... n6: "0": no transition, "1": transition

Sensor Transition - Set	ID1	ID2	ID3	w	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros n1 ... n6: "0": no transition, "1": transition

Set - Confirmation	ID1	ID2	ID3	w	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros n1 ... n6: "0": no transition, "1": transition

14) Hot / Cold Cathode - Query	ID1	ID2	ID3	I	cks	CR
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Hot / Cold Cathode - Answer	ID1	ID2	ID3	I	0,1	cks	CR
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BOOLEAN 0: Cathode disabled, 1: Cathode enabled

Hot / Cold Cathode - Set	ID1	ID2	ID3	i	0,1	cks	CR
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BOOLEAN; 0: Cathode disabled, 1: Cathode enabled

Set - Confirmation	ID1	ID2	ID3	i	0,1	cks	CR
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BOOLEAN 0: Cathode disabled, 1: Cathode enabled

15) Display Unit - Query	ID1	ID2	ID3	U	cks	CR
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Display Unit - Answer	ID1	ID2	ID3	U	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros n1 ... n6: "0": mbar, "1": Torr, "2": hPa

Display Unit - Set	ID1	ID2	ID3	u	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros n1 ... n6: "0": mbar, "1": Torr, "2": hPa

Set - Confirmation	ID1	ID2	ID3	u	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros n1 ... n6: "0": mbar, "1": Torr, "2": hPa

6 Effective: 03.08.2020

Parameter Formats:

1.) BOOLEAN

2.) STRING: 6 chars

3.) UNSIGNED INT: 6 digits with leading zeros

4.) FLOAT:

exponential format: 4 digits mantissa, 2 digits exponent

mantissa: no leading zeros, decimal point after first digit (i.e. 1200 means 1.200)

exponent: offset 20 (i.e. exponent = 23 means $\times 10^{e3}$)

FLOAT-values are transmitted by definition in the following units:

pressure in mbar, time in s, temperatures in °C

Sampling Rate: 100ms max.

Time between query and answer/confirmation: 10ms max.

Data Format: 9600 Baud, 8 data bits, 1 stop bit, no parity

instrument	type		set of orders	remarks
VD81	V8U001		1,2,3,4,15,16	
VD83	V8U003		1,2,3,4,5-7(C,c),15,16	
VD84	V8U004		1,2,3,4,5-7(C,c),15,16	
VD85	V8U005		1,2,3,4,5-7(C,c),15,16	
VD81M	V D 81 _ _		2	2: no query, "listening mode"
VD83M	V D 83 _ _		2	2: no query, "listening mode"
VD84M	V D 84 _ _		2	2: no query, "listening mode"
VD85M	V D 85 _ _		2	2: no query, "listening mode"
VD6	V D 6 X X X		1,2,5,6,7,9,10	
VD9	V D 9 X X X		1,2,5,6,7,9,10	X X X: type code (for explanation see Code T: type query) 7: without Adjustment
DC1S	D C 1 3 2 1		1,2,5,6,7,9	7: Setpoint only
DC1	D C 1 _ _ _		1,2	
DC1P	D C 1 P _ _		1,2	
VSP (Smartline2)	V S P 2 0 6		1,2,5,6,7	5,6,7: without Hysteresis and Parameter
VSR (Smartline2)	V S R 2 0 5		1,2,5,6,7,13	5,6,7: without Hysteresis and Parameter
VSM (Smartline1/2)	V S M 2 0 7		1,2,5,6,7,13,14	5,6,7: without Hysteresis and Parameter
VSH (Smartline1/2)	V S H 2 0 8		1,2,5,6,7,11,12,13,14	5,6,7: without Hysteresis and Parameter