

## Thyracont Communication-Protocol for Serial Interface

<b>General Frame</b>	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)

<b>Action</b>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>	<i>16</i>	<i>17</i>	<i>18</i>
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<b>1 Type-query</b>	ID1	ID2	ID3	T	cks	CR
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<b>Type-answer</b>	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" für 3P; 2 or 3 point control);  
 t5: control characteristic ("0" without PI / "1" with PI feedback);  
 t6: special type code ("1" bis "8")

<b>2 Measurement-query</b>	ID1	ID2	ID3	M	cks	CR
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<b>Measurement - answer</b>	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")

<b>3 Logging Data Set -query</b>	ID1	ID2	ID3	V	cks	CR
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<b>Logging Data Set -answer</b>	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

<b>4 Logging Rate -query</b>	ID1	ID2	ID3	R	cks	CR
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<b>Logging Rate -answer</b>	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 set the reading-pointer of logging data to start

<b>4 Logging Rate -Set</b>	ID1	ID2	ID3	r	cks	CR
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<b>Set -answer</b>	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 Faktor

<b>5 Setpoint query</b>	ID1	ID2	ID3	SHPC	1..9	cks	CR
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S: Setpoint; H: Hysteresis

<b>Value-answer</b>	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 Faktor

0

<b>Value-answer</b>	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 Faktor (20 – 800 corresponds to 0.2 bis 8.0)

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

<b>6 Unlock</b>	ID1	ID2	ID3	shpcj	1..9	cks	CR
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<b>Unlock-Confirmation</b>	ID1	ID2	ID3	shpcj	1..9	cks	CR
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s: Setpoint; h: Hysteresis

<b>7 Value-Set</b>	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-Set

<b>7 Value-Set</b>	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"

p: Parameter Set, c: Correction Faktor

<b>7 Value -Set</b>	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 Faktor (20 – 800 corresponds to 0.2 bis 8.0)

3 Stand: 22.10.2014

s: Setpoint; h: Hysteresis

<b>Set- Confirmation</b>	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-Set

<b>Set- Confirmation</b>	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 Faktor

<b>Set- Confirmation</b>	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 Faktor (20 – 800 corresponds to 0.2 bis 8.0)

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

<b>10 Lock Keyboard</b>	ID1	ID2	ID3	K,k	0,1	cks	CR
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<b>Lock Keyb. - Confirmation</b>	ID1	ID2	ID3	K,k	0,1	cks	CR
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BOOLEAN; 0: keyboard active; 1: keyboard locked;

<b>11 Degas</b>	ID1	ID2	ID3	D,d	0,1	cks	CR
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<b>Degas - Confirmation</b>	ID1	ID2	ID3	D,d	0,1	cks	CR
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BOOLEAN; 0: Degas on; 1: Degas off;

<b>12 Filament number query</b>	ID1	ID2	ID3	F	cks	CR
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<b>Filament number answer</b>	ID1	ID2	ID3	F	0,1	cks	CR
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BOOLEAN; 0: Filament 1 on; 1: Filament 2 on;

<b>13 Sensor Transition query</b>	ID1	ID2	ID3	W	cks	CR
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<b>Sensor Transition answer</b>	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

<b>Sensor Transition set</b>	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

<b>Set Confirmation</b>	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

<b>14 Hot / Cold Cathode query</b>	ID1	ID2	ID3	I	cks	CR
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<b>Hot / Cold Cathode answer</b>	ID1	ID2	ID3	I	0,1	cks	CR
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BOOLEAN; 0: Cathode disabled; 1: Cathode enabled;

<b>Hot / Cold Cathode set</b>	ID1	ID2	ID3	i	0,1	cks	CR
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BOOLEAN; 0: Cathode disabled; 1: Cathode enabled;

<b>Set Confirmation</b>	ID1	ID2	ID3	i	0,1	cks	CR
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BOOLEAN; 0: Cathode disabled; 1: Cathode enabled;

<b>15 Display unit query</b>	ID1	ID2	ID3	U	cks	CR
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<b>Display unit answer</b>	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

<b>Display unit set</b>	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

<b>Set Confirmation</b>	ID1	ID2	ID3	u	n1	n2	n3	n4	n5	n6	cks	CR
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UNSIGNED INT with leading zeros;



Parameter Formats:

- 1.) BOOLEAN
- 2.) STRING: 6 chars
- 3.) UNSIGNED INT: 6 digits with leading zeros
- 4.) FLOAT:  
exponential format: 4digits mantissa, 2digits 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 Databit, 1 Stopbit, 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 (f. 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