

---

## Protocol for Data Exchange with SYSTRONIK Measuring Instruments:

The need to define a platform-independent communication protocol for a host of different devices increases along with the features that modern devices offer in terms of rationalizing the acquisition and management of data. The corresponding interfaces change at an appropriately fast rate.

### The following criteria should be considered:

- Different types of devices
- Different versions as far as equipment is concerned
- Language-independence
- Interface independence
- Not bound to a transport protocol
- Limited overhead, implementable with 8 bit microcontrollers
- Partly self-explanatory
- Easy extensibility according to current requirements
- Different protocol extent allowed starting with a minimum equipment
- Valid in the future
- Fixed point for storing and requesting the protocol definition

### The functions:

A catalog function is available in order to determine the type of device and the functions the device provides. The entries listed in the catalog can be used in further queries.

The following control characters are used (HEX values in brackets):

- NL(0x0D+0x0A)      new line or record
- FF(0x0C)            new page or further data to follow
- EOF(0x1A)          end of file or data block

### **CAT functions**

This request calls the CATALOG function. These CAT functions should always be available ([optional]):

- INFO1[;len]
- DESCR1[;len]
- DATA1[;len]

INFO query: for example,

- Device type { gas analysis computer }
- Device name { Eurolyzer }
- Equipment variant
- Version SW/HW date
- DeviceNumber1
- DeviceNumber2
- Data interface { HW1.1, IrOBEX, COM1, 9600 }
- maximum block length received

DESCR1 description { measured values }  
further DESCR may follow

---

DESCR1 request: example,

```
{RecordNo; Format(f=float, s=string, u1..4=unsigned, i1..4=integer,  
d=date(DD.MM.YY), t=time(HH:MM:SS)); RecordName[; Unit]}
```

```
1;d;Date;gr  
2;t;Time  
3;i1;Unit-no.  
4;u1;Status1  
5;f;Temp1;°C  
6;f;Temp2;°C  
7;f;Temp1;°F  
8;f;Temp2;°F  
9;f;diffTemp;°C
```

All record numbers defined once are defined for the future with this number. DESCR1 contains all records the measuring instrument can generate with this equipment. All identifier definitions are international (English).

Only those records are transmitted which are currently available in the set of DESCR1. for example,

DATA1 query:

```
26;12.3  
27;43.0  
60;Natural gas  
1;08.12.03  
2;14:12:01
```

In the case of PC readout programs, the data can be stored, for example, in data files after acquisition via any interface by means of a proprietary Systronik DLL or fetched by means of direct DLL calls.

### **Final specification:**

DESCR1 query:

```
{RecordNo; Format(f=float, s=string, u1..4=unsigned, i1..4=integer,  
d=date(DD.MM.YY), t=time(HH:MM:SS)); RecordName[; Unit]}
```

```
1;d;Date;gr  
2;t;Time  
3;i1;Unit-no  
4;u1;Status1  
5;f;Temp1;°C  
6;f;Temp1;°F  
7;f;Temp2;°C  
8;f;Temp2;°F  
9;f;diffTemp;°C
```

10;f;diffTemp; °F  
11;f;Pressure;Pa  
12;f;Pressure;hPa  
13;f;Pressure;kPa  
14;f;Pressure;MPa  
15;f;Pressure;mm H2O  
16;f;Pressure;m H2O  
17;f;Pressure;mm Hg  
18;f;Pressure;ln H2O  
19;f;Pressure;ln Hg

20;f;Pressure;PSI  
21;f;rh;%  
22;f;absH;g/m<sup>3</sup>  
23;f;absH;g/kg  
24;f;dewP;°C  
25;f;dewP;°F  
26;f;O2;%  
27;f;CO;ppm  
28;f;CO;mg/m<sup>3</sup>  
29;f;CO;mg/kwh

30;f;CO;mg/MJ  
31;f;CO;%  
32;f;CO2;ppm  
33;f;CO2;mg/m<sup>3</sup>  
34;f;CO2;mg/kWh  
35;f;CO2;mg/MJ  
36;f;CO2;%  
37;f;H2;ppm  
38;f;H2;mg/m<sup>3</sup>  
39;f;H2;mg/kWh

40;f;H2;mg/MJ  
41;f;H2;%  
42;f;NO;ppm  
43;f;NO;mg/m<sup>3</sup>  
44;f;NO;mg/kWh  
45;f;NO;mg/MJ  
46;f;NOx;ppm  
47;f;NOx;mg/m<sup>3</sup>  
48;f;NOx;mg/kWh  
49;f;NOx;mg/MJ

50;f;NO2;ppm  
51;f;NO2;mg/m<sup>3</sup>  
52;f;NO2;mg/kWh  
53;f;NO2;mg/MJ  
54;f;SO2;ppm

55;f;SO2;mg/m <sup>3</sup>	
56;f;SO2;mg/kWh	
57;f;SO2;mg/MJ	
58;f;CO-referable;ppm	(CO referring to O <sub>2</sub> )
59;f;NO-referable;ppm	(NO referring to O <sub>2</sub> )
60;f;NOx-referable;ppm	(NOx referring to O <sub>2</sub> )
61;f;Emission-referable;ppm	(EB – emission referring to O <sub>2</sub> )
62;f;Efficiency;%	
63;f;Efficiency-Hi;%	(Eta efficiency)
64;f;Losses;%	
65;f;Excess-air	(Lambda)
66;f;O2ref;%	
67;s;Fuel	
68;f;CO2max;%	(Fuel constant)
69;f;HiHg	“ “ “
70;f;C	“ “ “
71;f;D	“ “ “
72;f;A2	“ “ “
73;f;B	“ “ “
74;s;Meas.type	
75;u1;Smoke-No.1	
76;u1;Smoke-No.2	
77;u1;Smoke-No.3	
78;s;Oilderivate	
79;i1;Mem.-Pointer	
80;i1;Identifier	(Customer or facility number)
81;u3;Temp-boiler;°C	
82;u3;Temp-boiler;°F	
83;f;COmax	
84 ;f ;Temp1-Min ;°C	
85 ;f ;Temp1-Min ;°F	
86 ;f ;Temp1-Max ;°C	
87 ;f ;Temp1-Max ;°F	
88 ;f ;Temp2.Min ;°C	
89 ;f ;Temp2.Min ;°F	
90 ;f ;Temp2-Max ;°C	
91;f ;Temp2-Max ;°F	
92;f;Pressure-Min;Pa	
93;f;Pressure-Min;hPa	
94;f;Pressure-Min;kPa	
95;f;Pressure-Min;MPa	
96;f;Pressure-Min;mm H2O	
97;f;Pressure-Min;m H2O	
98;f;Pressure-Min;mm Hg	
99;f;Pressure-Min;ln H2O	

100;f;Pressure-Min;In Hg		
101;f;Pressure-Min;PSI		
102;f;Pressure-Max;Pa		
103;f;Pressure-Max;hPa		
104;f;Pressure-Max;kPa		
105;f;Pressure-Max;MPa		
106;f;Pressure-Max;mm H2O		
107;f;Pressure-Max;m H2O		
108;f;Pressure-Max;mm Hg		
109;f;Pressure-Max;In H2O		
110;f;Pressure-Max;In Hg		
111;f;Pressure-Max;PSI		
112;f;Emission-referable;g/m <sup>3</sup>		
113;f;GIG;%		// Toxicity Index CENELEC
114;f;GIG;%		// Toxicity Index GASTEC
115;u1;Prg.-Status	<i>Extended 2006-07-13</i>	
116;f;Flow;m/s	<i>Extended 2006-12-06</i>	Flow speed
117;f;Volume;m <sup>3</sup> /s	<i>Extended 2006-12-19</i>	Flue gas volume
118;f; CO cross-section;ppm	<i>Extended 2008-06-03</i>	CO measured with multi-hole probe
119;f;SO <sub>2</sub> -referable;ppm	<i>Extended 2008-09-05</i>	SO <sub>2</sub> referring to O <sub>2</sub>
120;f;Temp3;°C	<i>Extended 2009-02-12</i>	
121;f;Temp3;°F	<i>Extended 2009-02-12</i>	
122;f;Flow loss;%	<i>Extended 2009-02-12</i>	Flow loss
123;f;Sheath loss;%	<i>Extended 2009-02-12</i>	Surface loss sheath
124;f;Extra loss;%	<i>Extended 2009-02-12</i>	Additional loss
125;f;Diameter;mm	<i>Extended 2009-02-12</i>	e.g. chimney diameter
126;f;Diameter;cm	<i>Extended 2009-02-12</i>	
127;f;Diameter;m	<i>Extended 2009-02-12</i>	
128;f;Diameter;In	<i>Extended 2009-02-12</i>	
129;f;Power;kW	<i>Extended 2009-02-12</i>	e.g. burner capacity
130;f;Volume;l/s	<i>Extended 2009-05-07</i>	Volume in Liter/sec
131;f;Battery Status;%	<i>Extended 2009-05-07</i>	
132;f;CO-referable; mg/kWh	<i>Extended 2010-01-29</i>	
133;f;Volume;m <sup>3</sup> /h	<i>Extended 2010-03-17</i>	
134;f;Emission-referable;mg/m <sup>3</sup>	<i>Extended 2010-05-11</i>	
135;f; CO-referable;mg/m <sup>3</sup>	<i>Extended 2010-12-09</i>	
136;f; CO-referable;mg/MJ	<i>Extended 2010-12-09</i>	
137;f; NO-referable;mg/m <sup>3</sup>	<i>Extended 2010-12-09</i>	
138;f; NO-referable;mg/kWh	<i>Extended 2010-12-09</i>	
139;f; NO-referable;mg/MJ	<i>Extended 2010-12-09</i>	
140;f; SO <sub>2</sub> -referable;mg/m <sup>3</sup>	<i>Extended 2010-12-09</i>	
141;f; SO <sub>2</sub> -referable;mg/kWh	<i>Extended 2010-12-09</i>	
142;f; SO <sub>2</sub> -referable;mg/MJ	<i>Extended 2010-12-09</i>	
143;f; NO <sub>x</sub> -referable;mg/m <sup>3</sup>	<i>Extended 2010-12-09</i>	
144;f; NO <sub>x</sub> -referable;mg/kWh	<i>Extended 2010-12-09</i>	
145;f; NO <sub>x</sub> -referable;mg/MJ	<i>Extended 2010-12-09</i>	

146;f; O2-Rs;%	<i>Extended 2011-02-24</i>	O2 in ,annular gap'
147;f; CO-Rs; ppm	<i>Extended 2011-05-31</i>	CO in ,annular gap'
148;f; Draft-Rs; hPa	<i>Extended 2011-05-31</i>	Draft in ,annular gap'
149;f; Tair-Rs; °C	<i>Extended 2011-09-06</i>	TAmbient in ,annular gap'

200;f; Pressure Data Array;Pa	<i>Extended 2010-08-30</i>
-------------------------------	----------------------------

240;s;Producer	<i>Extended 2006-11-16</i>
241;s;Device	
242;s;SW-Version	
243;s;SW-Release	
244;s;Factory-ID	
245;s;Op.-time	
246;d;Next service	
247;d;Leasing	

**UK SALES & SERVICE**

**BlueLine**

**INSTRUMENTS.co.uk**

Unit 15 East Lane Cuddington Northwich Cheshire CW8 2QQ  
Tel: 01606 30840 Email: [service@bluelineinstruments.co.uk](mailto:service@bluelineinstruments.co.uk)