

**HumaLyte Plus 3**  
**HumaLyte Plus 5**  
**| LIS Interface Manual**



**Human**

Diagnostics Worldwide

## Revision list

Revision	Date	Description	Editor
1	2013/03/28	First revision	Mathias Kamprath

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## 1. Data transmission to host computer

The HumaLyte Plus allows to send data to a laboratory information system (LIS) via the RS-232 port.

Two options are available:

1. Each time when a result is printed, the data is automatically send to the RS-232 port.
2. The operator can also send the data manually by touching the **Send** key in the **Service** menu.

## 2. LIS connection

### 2.1. RS-232 setup

The HumaLyte Plus has a built-in RS-232 interface for data exchange via the RS-232 port.

The settings are as following:

Baudrate	19200
Parity	N
Data bits	8
Stop bits	1
Protocol	None

### 2.2. Connecting cable

The LIS must be connected to the RS-232 port of the HumaLyte Plus with a serial cable, having the following connections:

LIS		HumaLyte Plus	
Sub-D 9		Sub-D 9	
2	-----	2	
3	-----	3	
5	-----	5	

### 3. Data format

The data format describes a single test result output to the RS-232 port.

Field	Length [byte]	Description																											
Sequence Number	3	The test sequence number with leading ASCII characters "0" (48 dec / 30 hex). Starts with "001" upto "200".																											
Spaces	2	Two ASCII characters " " (32 dec / 20 hex).																											
ID Number	18	The test ID number with leading ASCII characters "0" (48 dec / 30 hex). Defaults to "000000000000000000" if not specified.																											
Spaces	2	Two ASCII characters " " (32 dec / 20 hex).																											
Flag Byte	1	Each of the eight bits of the flag byte indicates a different flag information. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>a</td> <td>0 or 1</td> <td>0 = K electrode passed STD 1 = K electrode failed STD</td> </tr> <tr> <td>b</td> <td>0 or 2</td> <td>0 = Na electrode passed STD 2 = Na electrode failed STD</td> </tr> <tr> <td>c</td> <td>0 or 4</td> <td>0 = Cl electrode passed STD 4 = Cl electrode failed STD</td> </tr> <tr> <td>d</td> <td>0 or 8</td> <td>0 = Ca electrode passed STD 8 = Ca electrode failed STD</td> </tr> <tr> <td>e</td> <td>0 or 16</td> <td>0 = pH electrode passed STD 16 = pH electrode failed STD</td> </tr> <tr> <td>f</td> <td>0 or 32</td> <td>0 = AB electrode passed STD 32 = AB electrode failed STD</td> </tr> <tr> <td>g</td> <td>0 or 64</td> <td>Not described</td> </tr> <tr> <td>h</td> <td>0 or 128</td> <td>0 = No error(s) 128 = An error affecting all test results, such as aspiration abnormal or bubbles inside the sample.</td> </tr> </tbody> </table>	Bit	Value	Description	a	0 or 1	0 = K electrode passed STD 1 = K electrode failed STD	b	0 or 2	0 = Na electrode passed STD 2 = Na electrode failed STD	c	0 or 4	0 = Cl electrode passed STD 4 = Cl electrode failed STD	d	0 or 8	0 = Ca electrode passed STD 8 = Ca electrode failed STD	e	0 or 16	0 = pH electrode passed STD 16 = pH electrode failed STD	f	0 or 32	0 = AB electrode passed STD 32 = AB electrode failed STD	g	0 or 64	Not described	h	0 or 128	0 = No error(s) 128 = An error affecting all test results, such as aspiration abnormal or bubbles inside the sample.
Bit	Value	Description																											
a	0 or 1	0 = K electrode passed STD 1 = K electrode failed STD																											
b	0 or 2	0 = Na electrode passed STD 2 = Na electrode failed STD																											
c	0 or 4	0 = Cl electrode passed STD 4 = Cl electrode failed STD																											
d	0 or 8	0 = Ca electrode passed STD 8 = Ca electrode failed STD																											
e	0 or 16	0 = pH electrode passed STD 16 = pH electrode failed STD																											
f	0 or 32	0 = AB electrode passed STD 32 = AB electrode failed STD																											
g	0 or 64	Not described																											
h	0 or 128	0 = No error(s) 128 = An error affecting all test results, such as aspiration abnormal or bubbles inside the sample.																											
K Result	Not fixed	Result of the K test. Format: 9.99 <sup>1)</sup> .																											
Space	1	The ASCII character " " (32 dec / 20 hex).																											
Na Result	Not fixed	Result of the Na test. Format: XX9.99 <sup>1)</sup> .																											
Space	1	The ASCII character " " (32 dec / 20 hex).																											
Cl Result	Not fixed	Result of the Cl test. Format: XX9.99 <sup>1)</sup> .																											
Space	1	The ASCII character " " (32 dec / 20 hex).																											
Ca Result	Not fixed	Result of the Ca test. Format: 9.99 <sup>1)</sup> .																											
Space	1	The ASCII character " " (32 dec / 20 hex).																											
pH Result	Not fixed	Result of the pH test. Format: 9.99 <sup>1)</sup> .																											
Spaces	3	Three ASCII characters " " (32 dec / 20 hex).																											
AB Result	Not fixed	Result of the AB test. Format: 9.9 <sup>1)</sup> .																											
Newline	2	The carriage return ASCII character (13 dec / 0D hex), followed by the line feed ASCII character (10 dec / 0A hex).																											

1) Formatting:

Placeholder	Characters
-------------	------------

X	Space, 0 - 9
9	0 - 9
.	.

## 4. Transmission examples

In the examples space, carriage return and line feed characters are shown as following:

Space	□
Carriage Return	<CR>
Line Feed	<LF>

### 4.1. Single result transmission while test result printing

```
002□□00000000000000000000□□032□7.45□174.1□126.0□1.45□6.90□□□0.0<CR><LF>
```

### 4.2. Transmission of results by Send function

Ten tests had been performed in this example.

```
001□□00000000000000000000□□160□6.86□136.1□100.5□1.13□7.47□□□0.0<CR><LF>
002□□00000000000000000000□□032□7.45□174.1□126.0□1.45□6.90□□□0.0<CR><LF>
003□□0000000000000000000003□□160□0.97□153.8□101.6□1.21□7.41□□□0.0<CR><LF>
004□□0000000000000000000004□□160□-0.43□138.7□101.5□0.99□7.42□□□0.0<CR><LF>
005□□0000000000000000000005□□032□7.63□174.8□126.8□1.44□6.92□□□0.0<CR><LF>
006□□0000000000000000000006□□032□7.48□174.4□126.8□1.50□6.97□□□0.0<CR><LF>
007□□0000000000000000000007□□032□0.81□□16.6□□12.0□0.28□7.23□□□0.0<CR><LF>
008□□0000000000000000000008□□032□0.70□□17.3□□□9.3□0.24□7.24□□□0.0<CR><LF>
009□□0000000000000000000009□□032□0.66□□16.1□□□9.2□0.24□7.24□□□0.0<CR><LF>
010□□0000000000000000000010□□032□0.64□□16.7□□□9.9□0.25□7.24□□□0.0<CR><LF>
```