

# HumaStar 100

# HumaStar 200

# HumaStar 300SR

## | LIS ASTM Interface Manual

## Version 5



## Revision list

Revision	Date	Description	Editor
1	2012/07/01	First revision	Mathias Kamprath
2	2013/08/30	References to HI software added	Mathias Kamprath
3	2016/09/21	Review of folder structure. Correction of file encoding. Example for results transmission added	Mathias Kamprath
4	2016/12/12	Correction of input file P record definition	Mathias Kamprath
5	2019/03/11	Test names note in Process description	Mathias Kamprath

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## The LIS ASTM interface

The type of LIS actually implemented by the HumaStar 100/200/300SR software is based on a file exchange between the host computer and the analyser. These text files are encoded on the basis of the ASTM standard, containing the minimum needed data regarding the tests to be executed on the sample. The ASTM files are typically exchanged through the LAN.

## Sequence of operation

1. Connect the analyzer and the host computer on a LAN.
2. Create on the host computer the text file containing the work list in ASTM format (see example).
3. Copy the work list file from the host computer to the **ASTM Input Folder** of the analyzer (see LIS folder path).
4. The analyzer recognizes the work list **ASTM Input File** in the **Input Folder**, creates the **samples** defined in the work list input file and opens a work list **works heet** with the name of the **ASTM Input File**.
5. The **ASTM Input File** is deleted from the **Input Folder** and moved to the **ASTM Process Folder**.
6. The operator of the analyzer goes to the **SAMPLES** tab and assigns a position on the sample plate to the newly created samples.
7. The operator of the analyzer goes to the **WORKLIST** tab and selects the newly created **ASTM work sheet**.
8. The operator checks that all the tests defined in the **ASTM works heet** can be executed (reagents and samples on-board) and then press the **SCHEDULE** button.
9. The analyzer runs the tests and produces the results. As soon as the results come out, they are added to the **ASTM Process File**.
10. The operator checks the results and can eventually repeat the tests until all the results are valid.
11. When all the results are completed and valid, the operator deletes the tests that must not be transferred to the host computer (leave only one test, if the test has been repeated). Invalid tests are anyway not transferred, while **all** the valid tests are anyway transferred.
12. The operator then presses on the **ASTM work sheet** the **APPROVE** button to validate the work sheet. The sheet can be validated even if not all the tests have been successfully executed.
13. The work-sheet button becomes **APPROVED** and the **ASTM Process File** is moved from the **ASTM Process Folder** to the **ASTM Output Folder**.
14. The software of the host computer detects the new **ASTM Output File** in the **Output Folder** and decodes the results.

## Features

Every LIS work list loaded in the Input Folder will create a separate work sheet.

Several LIS work sheets can be executed at the same time.

Several host computers can load at the same time LIS work sheets onto the analyzer.

## LIS ASTM work list folders

The LIS ASTM work list folders are placed in the following folder:

- **Windows XP:**  
\\Documents and Settings\\All Users\\Application data\\HI\\Human\\LIS\\ASTM.
- **Windows Vista / Windows Seven / Windows 10:**  
\\ProgramData\\HI\\Human\\LIS\\ASTM.

Inside this \\LIS\\ASTM folder, there are two sub-folders:

- The Input Folder ("\\Input Worklist").
- The Process Folder ("\\Process Worklist").

The Output Folder ("\\Output Worklist") will be created when the results are approved for the first time.

## Process description

The Input Files must be moved in the input folder. They are ASCII text files, formatted in the ASTM standard, with the extension .astm (any extension can fit, but it is preferable to use the .astm extension).

The software scans continuously the input folder. When it finds an input file, it creates a new work sheet in the HI work list tab (with the same name as the Input File), creates the new samples in the HI samples tab with the same ID defined in the Input File and moves the file to the Process folder.

**The test name in the downloaded file must exactly match the name of the same test in the analyzer settings. E.g. "Xyz" in the download file does not match "XYZ" in the analyzer settings. As a result, this test request is not included in the work sheet on the analyzer.**

When the operator finds a new work sheet on the work list tab, he must assign the positions on the samples tray, place the samples on board, check if the requested reagents are on board and then **schedule** the work sheet in the work list tab.

During the work sheet execution, the Process File is continuously updated with the results of the completed tests. When all the tests of the work sheet are completed, the operator must validate all the tests, repeat wrong tests if necessary and finally press the **APPROVE** button, placed on the work sheet header to allow the transfer of the Process File into the Output Folder. Once the file has been moved to the Output File, the **APPROVE** button is transformed to **APPROVED**.

This procedure allows the LIS software to eventually track the execution progression in the Process File or else get directly the final results in the Output File.

**It is absolutely necessary, that all the input files have different names. Otherwise they can be overwritten and some previous data can be lost.**

## ASTM standard input files encoding

H REPEAT\_DELIMITER ('|') COMPONENT\_DELIMITER ESCAPE\_DELIMITER |||||

P | Sequence Number || ID | Department (optional) | FamilyName (optional) | Name (optional) | BirthDay | Type (optional) |||||

C | Sequence Number || Comments (all line optional) |

O | Sequence Number || Method Name | Is Urgent (true/false) ||||| Nature (Serum/Urine) |||||

L || N

Repeat delimiter ID defined on the first field of the header (second character) (default '|').  
The field Birthday in the P record is mandatory. If not known, use e. g. 20160101.

## ASTM standard output files encoding

H REPEAT\_DELIMITER ('|') COMPONENT\_DELIMITER ESCAPE\_DELIMITER ||| Software^version |||| Host || P | 1 | DATE

P | Sequence Number || ID | Department (optional) | FamilyName (optional) | Name (optional) | BirthDay (optional) | Type (optional) |||||

C | Sequence Number || Sample.Comment |

O | Sequence Number || Method Name | Priority (true/false) ||||| Nature (Serum/Urine) |||||

R | Sequence Number | Method Name ||||| Test Result |||| Test Completion Date |

L || N

## Examples

### Example of ASTM work list input file

```
H|\^&|||HS100^V1.0|||Host||P|1|20160920
P|1||00004|Department1|Mustermann|Max|20000101|MALE|
C|1|||
O|1||Alb|False|||Serum|||
O|2||Amy|False|||Serum|||
O|3||Bilda|False|||Serum|||
O|4||Bilta|False|||Serum|||
O|6||Chol|False|||Serum|||
P|2||00005|Department2|Musterfrau|Minna|20010202|FEMALE|
C|2|||
O|1||CK|False|||Serum|||
O|2||CK-MB|False|||Serum|||
O|3||Cl|False|||Serum|||
O|4||CreaA|False|||Serum|||
O|6||Glu|False|||Serum|||
P|3||00006|Department3|FamilyName|Name|20020303|MALE|
C|3|||
O|1||LDH|False|||Serum|||
O|2||LDL|False|||Serum|||
O|4||C3|False|||Serum|||
O|5||C4|False|||Serum|||
O|6||Hba1C|False|||Serum|||
L|N
```

### Example of ASTM results output file

This example fits to the above input file. The work list was simply scheduled and approved, i. e. no measurement took place.

```
H|\^&|||Sphera^V1.0|||Host||P|1|20160920091032
P|1||00004|Department1|Mustermann|Max|20000000|MALE|
C|1|||
O|1||Alb|False|||Serum|||
R|1|Alb|g/dl|||-9900000000|||00010101000000|
O|2||Amy|False|||Serum|||
R|1|Amy|U/l|||-9900000000|||00010101000000|
O|3||Bilda|False|||Serum|||
R|1|Bilda|mg/dl|||-9900000000|||00010101000000|
O|4||Bilta|False|||Serum|||
R|1|Bilta|mg/dl|||-9900000000|||00010101000000|
O|6||Chol|False|||Serum|||
R|1|Chol|mg/dl|||-9900000000|||00010101000000|
P|2||00005|Department2|Musterfrau|Minna|20010000|FEMALE|
C|2|||
O|1||CK|False|||Serum|||
R|1|CK|U/l|||-9900000000|||00010101000000|
O|2||CK-MB|False|||Serum|||
R|1|CK-MB|U/l|||-9900000000|||00010101000000|
O|3||Cl|False|||Serum|||
R|1|Cl|mmol/L|||-9900000000|||00010101000000|
O|4||CreaA|False|||Serum|||
R|1|CreaA|mg/dl|||-9900000000|||00010101000000|
O|6||Glu|False|||Serum|||
R|1|Glu|mg/dl|||-9900000000|||00010101000000|
P|3||00006|Department3|FamilyName|Name|20020000|MALE|
C|3|||
O|1||LDH|False|||Serum|||
R|1|LDH|U/l|||-9900000000|||00010101000000|
O|2||LDL|False|||Serum|||
R|1|LDL|mg/dl|||-9900000000|||00010101000000|
O|4||C3|False|||Serum|||
R|1|C3|mg/dl|||-9900000000|||00010101000000|
O|5||C4|False|||Serum|||
R|1|C4|mg/dl|||-9900000000|||00010101000000|
O|6||Hba1C|False|||Serum|||
R|1|Hba1C|mmol/mol Hb|||-9900000000|||00010101000000|
L|N
```

### Example for usage of special characters

In this example there is a special character "ü" used in the FamilyName in the work list input file.

P|2||00005|Department2|Müller|Lieschen|20010202|FEMALE||||||||||||||||||||

The corresponding results output file cannot correctly operate this special character.

P|2||00005|Department2|Müller|Lieschen|20010000|FEMALE||||||||||||||||||||

To avoid this situation, don't use special characters. The following work-around is possible in this example.

P|2||00005|Department2|Mue|ller|Lieschen|20010202|FEMALE||||||||||||||||||||||||||||||

## **Additional notes**