

cobas[®] 8000 data manager

Host Interface Manual



cobas[®]
Life needs answers

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Roche Diagnostics Ltd
CH-6343 Rotkreuz
Switzerland
www.roche.com

Revision history

Manual version	Software version	Revision date	Main changes
1.00.00 (revision 1)	1.00.00	August 2009	First version
1.00 r2	1.00.01	December 2009	Updated with enhancements and corrections. (Revision 2)
1.01 (revision 1)	1.01.00	June 2010	Support for e602, calibration results, result query, order query, EP-17A.
1.01 (revision 2)	1.01.00	June 2010	Branding and trademark corrections.
1.01 (revision 3)	1.01.01	August 2010	Enhanced support for acknowledgement messages.
1.01 (revision 4)	1.01.01	September 2010	Revised description of Analytical Unit ID, and other minor revisions.
1.02 (revision 1)	1.02.00	March 2011	<ul style="list-style-type: none"> • Further enhanced support for acknowledgement messages. • Full Analytical Unit ID editing permitted. • Support for c702
1.02.03 (revision 1)	1.02.03	August 2011	<ul style="list-style-type: none"> • Sequence mode: identifying samples by sequence number. • Caution as regards serum index tests.
1.02.05 (revision 1)	1.02.05	March 2012 (preliminary draft)	<ul style="list-style-type: none"> • Data added to quality control and calibration results to improve traceability. (HL7 only.)

☞ For a fuller list of changes in this version, and for guidance about changes to the interface, see *Upgrading to version 1.02.05 with HL7* on page E-106.



Check the changes to the host interface before performing the upgrade

Before you upgrade from an earlier version, check everything in the list of difference to the previous versions. Make sure that the host can correctly read the messages from, and construct messages for, the *data manager*.

Editor's note

Every effort has been made to ensure that the information contained in this manual is accurate at the time of printing.

Roche Diagnostics Ltd. reserves the right to make any further required changes to software without prior notice. Such changes may not immediately be reflected in this document.

Intended use This document is intended for the users of cobas® 8000 data manager application, Version 1.02.05.

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Feedback Every effort has been made to ensure that this guide fulfils its intended purpose as mentioned above. All feedback on any aspect of this guide is welcome and will be

considered during updates. Please contact your Roche representative, should you have any such feedback.



Complies with the IVD Directive 98/79/EC.

Contact addresses

Manufacturer



Roche Diagnostics Ltd.
CH-6343 Rotkreuz
Switzerland
www.roche-diagnostics.com

US Distribution

Roche Diagnostics Corporation
9115 Hague Road
PO Box 50457
Indianapolis, IN 46250-0457
USA

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Using this manual

The cobas® 8000 data manager is a core component of the cobas® 8000 modular analyzer series, which supports several analytical modules. The analytical modules installed may vary from installation to installation. The functionality available may depend in some cases on which modules are currently installed.

Conventions used in this manual

Following are symbols and conventions used in this manual.

Symbols The following symbols may be used to draw your attention to important information:

Symbol	Meaning
	Cross reference
	Note

Abbreviations The following abbreviations are used:

Abbreviation	Definition
A	
ADC	apparent diffusion coefficient
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ASTM	ASTM International, originally known as the American Society for Testing and Materials (ASTM), in particular the LIS2-A2 standards E1381-91 (Specification for Low-Level Protocol to Transfer Messages Between Clinical Laboratory Instruments and Computer Systems) and E1394-91 (Standard Specifications for Transferring Information Between Clinical Instruments and Computer Systems).
C	
cc	cubic centimeter
Cl	Chlorine
CLSI	Clinical and Laboratory Standards Institute (formerly NCCLS)
COI	Cut-off index
CU	Control Unit
D	
<i>data manager</i>	Used as a synonym for cobas® 8000 data manager.
DIL	Diluent
E	
EC	European community
e.g.	<i>exempli gratia</i> – for example
E.I.U.	essential information upload
EMF	electromotive force
EP17-A	Protocols for Determination of Limits of Detection and Limits of Quantitation; Approved Guideline (NCCLS standard)

Abbreviation	Definition
F	
FIFO	First in first out
H	
HIS	Hospital Information System
HL-7	Health Level 7
I	
i.e.	<i>id est</i> – that is to say
IS	Internal Standard (ISE module)
ISE	ion selective electrode
K	
K	Potassium
L	
LIS	Laboratory Information System
LoB	Limit of Blank
LoD	Limit of Detection
LoQ	Limit of Quantitation
LLD	liquid level detection
N	
n/a	not applicable
Na	sodium
NB	<i>Nota bene</i> (note well)
NCCLS	National Committee for Clinical Laboratory Standards (former name for CLSI)
Q	
QC	Quality control
R	
REF	Reference solution for ISE module
S	
SD	standard deviation
SID	Sample ID
SOP	Standard operating procedure
STAT	short turn-around time
T	
TCP/IP	Transmission Control Protocol/Internet Protocol
TS	Test Selection
U	
UTF-8	8-bit Unicode Transformation Format
W	
WAM	Work Area Manager
X	
XML	Extensible Markup Language
XSLT	Extensible Stylesheet Language
XSLT	Extensible Stylesheet Language Transformation

Safety information classification

Safety messages are classified according to ANSI Z535.6. The following classifications are used, according to the level of seriousness of the hazard:

The safety alert symbol by itself (without a signal word) is used to promote awareness to hazards which are generic or to direct the reader to safety information provided elsewhere in the document.

The following symbols and signal words are used for specific hazards:



Warning

Indicates a potentially dangerous situation which, if ignored, may lead to fatal or severe injuries.



Caution

Indicates a potentially dangerous situation which, if ignored, may lead to injuries and/or damage to property.

NOTICE

Notice

Indicates a message not related to personal injury.

According to ANSI Z536.6 there is an additional hazard level: DANGER. Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury. This level is not used in Roche Diagnostics Operator's Manuals. In line with the Roche Diagnostics Product Risk Management Policy, a risk of this degree or level of hazard seriousness is not accepted.

Safety information

System safety

Failure to observe the following safety information may result in incorrect results, data corruption, and data losses.



Incorrect or corrupt data resulting from incorrect operation, the use of wrong components, or poor security measures

- Use only computers, monitors, printers, and accessories recommended by the manufacturer.
- Service your computer regularly (defragment the hard disk; and check for system error entries in the event display).
- Install and run a firewall and anti-virus software; keep them up-to-date. This will require third-party software.



Incorrect or corrupt data due to unauthorized access

Access to your data and the configuration should only be granted to authorized experts.

Data security



Data loss

Back up your data at regular intervals (ideally every day).

Maintenance



Data loss or damage to the system due to power failure.

Ensure regular maintenance of the uninterruptible power supply.

Laboratory workflows



Incorrect results due to lack of calibration and quality control

Interrupt the analysis of patient samples if you change the reagent until the instrument has been recalibrated and quality-controlled.



Incorrect results due to expired calibration and quality controls

Perform regular quality controls and calibrations.



Incorrect results due to incorrect entry

Ensure that manually entered data is correct.



Danger of samples being mixed up due to use of tubes not labeled with barcodes

If possible, always use primary and secondary tubes labeled with barcodes in connection with barcode readers, and instruct the laboratory staff as to correct handling.



Danger of samples being mixed up due to incorrect assignment of the barcode to the tube

Ensure that assignment of the barcode to the tube is correct during aliquoting. Use the SOP function to alert the laboratory staff to this obligation. For details of the SOP function, see the *cobas® 8000 modular analyzer series Operator's Manual*.



Incorrect results due to lack of knowledge of the Standard Operating Procedures

Use the SOP function of the system to give laboratory staff access to written instructions (SOP) while they work. For details of the SOP function, see the *cobas® 8000 modular analyzer series Operator's Manual*.

**Incorrect results due to incomplete patient data**

Patient results can only be correctly validated if all relevant patient data is stored in the system. In case of incomplete transmission of patient data through the HIS Hospital Information System, tests may have to be repeated.

**Unreliable validation due to unauthorized changes to the validation and calculation rules.**

The manufacturer shall not be liable for any consequences whatsoever resulting from subsequent, unauthorized modifications to accepted medical validation and calculation rules included in the system upon customer request.

Third-party software**Malfunctions and incorrect results due to third-party software**

The installation of third-party software that has not been approved by Roche Diagnostics may lead to malfunctions. Do not install any unapproved software.

Introduction

A

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Overview

This section gives a basic overview of the purpose and scope of this manual.

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1

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Purpose and scope

This document details the specifications for the cobas® 8000 data manager host interface. This interface regulates data transmissions between the *data manager* and the hospital and laboratory information system.

Therefore, this manual gives programmers a description of the basic operational features of the *data manager*, in order to enable them to connect to a host system, such as Laboratory Information Systems, Hospital Information Systems or Work Area Manager.

Questions concerning this document should be referred to Technical Support. Please refer to the *cobas® 8000 modular analyzer series Operator's Manual* for more detailed information on the use of cobas® 8000 data manager.

The main part of this document consists of a series of tables that show the information needed to successfully interface to the system. The basic concept of data transfer in this interface is the exchange of data and control frames between the host system and the analyzer.

Who this manual is for

This manual is written for:

- Developers of Hospital Information Systems / Laboratory Information Systems (HIS/LIS), who need to create programs that connect to the cobas® 8000 data manager.
- Authorized Roche Diagnostics personnel who need to configure or troubleshoot the host communications of the cobas® 8000 data manager.

Content

This document gives the reader a basic understanding of the system operation with a host, and describes the following:

- Basic System Architecture
- Sample Processing
- Sample Types
- Rerun Modes
- Test Selections
- Operational Modes
- Types of messages sent and received
- ASTM and HL7 protocol support

System architecture

Overview of the cobas® 8000 data manager and cobas® 8000 instrument

This chapter describes the basic system architecture of the cobas® 8000 modular analyzer series, and the role that cobas® 8000 data manager plays in it. This includes how samples are identified and handled, and how test information is supplied by the host.

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Overview

The cobas® 8000 data manager is an integral part of the cobas® 8000 modular analyzer series. The cobas® 8000 modular analyzer series performs medical tests on sample material taken from patients. It measures the concentration of certain compounds or other substances in the samples. It sends the results of the medical tests back to the host, which could be a Laboratory Information System (LIS) or Work Area Manager (WAM).

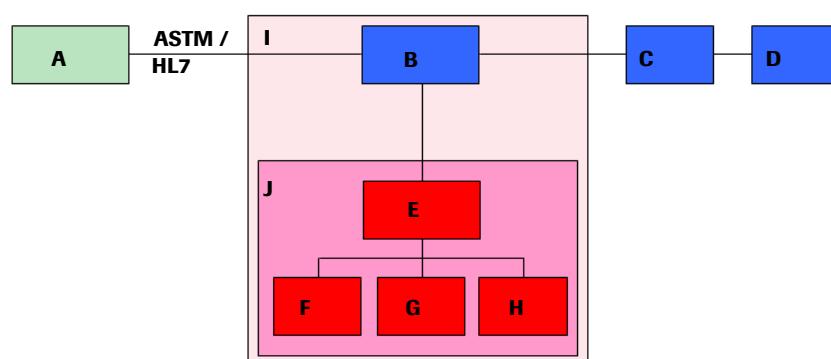
This section provides an overview of the basic architecture of the cobas® 8000 modular analyzer series, and discusses some specialized items of interest pertaining to the analytical system.

System overview

The cobas® 8000 modular analyzer series consists of two types of devices:

- The *data manager*. This is software which runs on a PC. It allows operators to view and edit the results of analysis, allows remote operator interaction with the system, including configuration. The *data manager* also handles communication with an external host system such as a LIS.
- An instrument that consists of:
 - Several analytical modules, that physically measure the samples using various reagents
 - A *Control Unit*. This is software, running on a PC, that controls the operation of the analytical modules. This has a graphical user interface that an operator or administrator can use to control and configure the instrument and its modules.

The *data manager* is also connected to Roche Diagnostics' e-services via cobas® link.



A Host (LIS, WAM etc.)

B cobas® 8000 data manager

C cobas® link

D Roche Diagnostics e-services

E cobas® 8000 Control Unit

F cobas® 8000 analytical modules

G cobas® 8000 analytical modules

H cobas® 8000 analytical modules

I cobas® 8000 modular analyzer series

J cobas® 8000 instrument

Figure A-1 Overview of the cobas® 8000 data manager system

Overview of modules

The cobas® 8000 modular analyzer series supports several types of analyzer modules, as outlined below. Each installation may contain one, none, or several of each type of module.

- ISE module* The ISE module, or Ion-Sensitive-Diode module, performs clinical chemistry tests for analyzing levels of the electrolytes Na, Cl, and K.
- C-module* The C-modules, c502, c701, and c702, perform clinical chemistry tests using photometry.
- E-module* The E-module, e602 or Elecsys, performs immunological tests.

LIS communications

The LIS and *data manager* can communicate by

- HL7 over a TCP/IP network connection
- ASTM over a TCP/IP network connection
- ASTM over a serial connection

- Details*
- ☞ For details of how to select a connection, see *Starting and stopping the host connection* on page B-21.
 - ☞ For details of the connections, see *Host communication settings and cables* on page B-47.
 - ☞ For details of the HL7 protocol used, see Chapter 8 *HL7 protocol* and Chapter 9 *HL7 text content*.
 - ☞ For details of the ASTM protocol used, see Chapter 6 *ASTM protocol (LIS2 - A2)* and Chapter 7 *ASTM text content (LIS2 - A2)*.



HL7 over a network connection gives best performance

Using HL7 over a network connection gives the best performance. Especially for existing ASTM host implementations, an ASTM connection over a network also gives an acceptable outcome.

However, the serial interface via ASTM is performance-limited and is not recommended for the cobas® 8000 modular analyzer series and high-throughput systems. Even though smaller instruments will still work via ASTM over serial connection, this might lead to potential conflicts of query / request download and result upload.

Network connection is required for systems with more than two C-701 (including ISE) modules, where the number of samples per hour and tests per sample is very high.

- Text encoding* Messages are sent using UTF-8 encoding.

Sample types

The **cobas® 8000 data manager** supports the use of several types of samples, including serum, urine, cerebrospinal Fluid, and supernatant. For full information on supported sample types, see the *cobas® 8000 modular analyzer series Operator's Manual*.

Where required, the sample type is passed in the communication between the HIS/LIS and *data manager*.

Processing samples

Sample material is supplied to the instrument in so-called sample containers.

Sample cups, tubes and racks

Sample containers are available in different shapes: tubes or cups. These are mounted, if necessary, on sample tubes of a standard 16mm size. The sample tubes are placed in racks, which hold up to 5 sample tubes each. These racks allow the instrument to automate the movement and processing of the samples.

If necessary, the sample's actual container or cup size is indicated in communications between the HIS/LIS and the *data manager*.

Dilution

As part of the pre-analytical process, some samples are diluted before being loaded onto the instrument, or are automatically diluted by the instrument before testing. Depending on the tests and the results, some samples are diluted before the tests are repeated. Where necessary, the sample's dilution factor is passed in communications between the LIS and the *data manager*.

Introducing sample tubes and racks

The sample tubes are placed in 5-position racks, which laboratory staff place in the instrument.

There are different kinds of color-coded racks for routine samples, STAT (Short Turn Around Time) samples, Quality Control samples, and so on. Complete information on the types of tubes used, and the types of racks they are mounted in, is given in the *cobas® 8000 modular analyzer series Operator's Manual*.

Routine sample racks

Routine sample tubes or cups are placed on gray barcoded racks, which are then loaded into the loader located on the side of the **cobas® 8000 instrument**. This loader consists of two trays, each of which can hold up to 15 5-position racks. Each tray feeds into a buffer area of the same size. This gives a theoretical maximum of (5 tubes x 15 racks x 2 trays x 2 in the loading and waiting area =) 300 waiting tubes.

STAT sample racks

STAT sample tubes are placed on red barcoded racks, then loaded onto the STAT port, beside the loader. These racks take a higher priority in the **cobas® 8000 instrument** than the racks on the loader.

Other sample racks

Other rack types, such as for Quality Control samples, Calibration samples, and manual rerun samples, have their own rack types, which are introduced in the same way as routine sample racks.

Barcodes

The cobas® 8000 modular analyzer series reads the barcode of each sample immediately after the tube is put into the instrument. It identifies the sample from the combination of the barcode and the sample type (serum, urine etc.). Therefore if any two samples have the same sample type, they must have different barcodes, even if they are for the same patient, or they are put onto the instrument at different times.

Barcodes All the racks are passed one-by-one to the input buffer, which feeds them sequentially into the system. The cobas® 8000 instrument reads the sample's barcode, which contains an alphanumeric string up to 22-characters long. The instrument, host and *data manager* use the barcode string as a unique identifier for the sample, called the sample ID (SID).

Missing barcodes By default, if the cobas® 8000 instrument cannot read a sample's barcode, it generates an error. The operator of the cobas® 8000 instrument can manually enter information identifying the sample and its sample ID. For more information on this, see the *cobas® 8000 modular analyzer series Operator's Manual*.

Sequence numbers On request, Roche Diagnostics service personnel can reconfigure the cobas® 8000 modular analyzer series instrument to give each sample a sequential number instead of a barcode. By default the first sample is then 1, the next 2, and so on up to 60,000. The number of the first sample is configurable.

- ☞ For more information on how to use this function, see Chapter 14 *Identifying patient samples by sequence number*.

MODULAR PRE-ANALYTICS

If a MODULAR PRE-ANALYTICS is used, the samples may lack barcodes. In this situation, the cobas® 8000 instrument identifies the sample by its position on the rack, and the rack identifier. The host needs to identify the sample from this information, and send the Test Selection, including the rack ID and the sample's position on the rack, as well as the sample ID.

- ☞ For more information on how to use this function, see *Using a MODULAR PRE-ANALYTICS* on page E-41.
- ☞ To configure the cobas® 8000 instrument to process samples coming from a MODULAR PRE-ANALYTICS without barcodes, enable the option on the Control Unit in Utility > System > Data Manager > Test Selection Inquiry Settings > *Test Selection Ask in Barcode Read Error*. This is described in *Test Selection Ask in Barcode Read Error* on page B-38.

Test selection

The instructions telling the cobas® 8000 instrument which test to perform on each sample (the Test Selection) can come from several sources, depending on the configuration of the system:

- The host (LIS or WAM), prior to the sample being loaded onto the cobas® 8000 instrument. (“Batch Download”.)
- The host, in response to a query (Test Selection Information Inquiry) initiated by the cobas® 8000 instrument via *data manager*. (“Realtime Download”.)
- The cobas® 8000 instrument, as a result of a manually-programmed Test Selection on the cobas® 8000 instrument by the operator. The test results can be uploaded to the host.

- The **cobas® 8000 data manager**, as a result of a manually-programmed Test Selection on *data manager* by the operator. The test results can be uploaded to the host.

As users can reconfigure the **cobas® 8000 instrument** and *data manager*, the host must be able to send test selections in response to a query, and handle results from tests that it has not ordered. Also, it is best to allow a “Batch Download” host configuration, which downloads test selections without waiting for a query.

 For more details about the order of messages, see Chapter 3 *Sample Processing*.

Repeat, rerun, and reflex tests

In many cases, the results of a test need to be checked, and in some cases this check leads to an order of further tests. The cobas® 8000 data manager can be configured to order such add-on tests automatically. Also, medical staff operating the Control Unit or the *data manager* might order add-on tests manually. The LIS can also order any of these kinds of tests, if required.

- ☞ For details of how to set repeat, rerun or reflex tests, see the **cobas® 8000 modular analyzer series Operator's Manual**.

Repeat test

Test measurement is done again under the same conditions. A test result will be verified by repetition of the test by the same methods or a reference method. This may be done on the cobas® 8000 instrument manually, or on the *data manager* automatically.

Rerun test

Test measurement is done again under different conditions. Typically a dilution factor is changed automatically or manually. This may be ordered by the instrument or *data manager* automatically.

Reflex test

Request to perform additional test(s), based on sample test results by customer-defined algorithms. The *data manager* may be configured to order the extra tests automatically. Also the LIS/HIS can send orders for Reflex tests via *data manager* to the cobas® 8000 instrument, if corresponding rules are programmed at the LIS.



Use reflex rules either only on the *data manager* or only on the host

Reflex rules should only be entered either at the *data manager* or at the host. Do not use Reflex Rules on both the *data manager* and the host. Using reflex rules on both may cause abnormal instrument behavior.

Request for rerun or reflex tests

The Control Unit can be configured so that after it completes a test, it automatically sends an inquiry to *data manager*, asking for rerun tests.

► **To enable requests for rerun or reflex tests**

- 1 On the *Start* page, set automatic rerun for routine and STAT samples to “Yes”.
- 2 Navigate to Utilities > Application, and make sure that for the relevant test the checkbox *Automatic Rerun* is selected.
- 3 Navigate to Utility > System > Data Manager > Test Selection Inquiry Settings, and make sure *Automatic Rerun Test Selection* is selected.

Handling multiple test results

Results for the original test and the rerun are reported separately to the LIS. The database on the *data manager* stores all the results for a test, including the original result and any results for a repeated or rerun test.

Interface description

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Sample Processing

Samples and message flow

This chapter explains how samples are processed in the cobas® 8000 data manager, and shows the message flow between the cobas® 8000 instrument, cobas® 8000 data manager and the host.

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Batch and realtime processing

This section gives an overview of the message flow between the **cobas® 8000** instrument, *data manager* and the host, when they send each other information about samples.

Batch and realtime and the *data manager*

For each sample, the *data manager* must have a list of tests to do on the sample. This is a “Test selection”.

The *data manager* can send a message to the host to ask for a test selection for a sample. This message is called a “test selection inquiry” or a “query message”.

Batch and realtime messages

- | | |
|-------------------------|---|
| <i>Batch message</i> | The host can, at any time, send an unsolicited test selection message for a sample, even if the <i>data manager</i> has not previously sent a query message for that sample. An unsolicited test selection message is called a <i>Batch message</i> , <i>Batch order</i> , <i>Batch test selection</i> , or <i>Batch download</i> . |
| <i>Realtime message</i> | When a host sends a test selection in response to a query message, this message is called a <i>Realtime message</i> , <i>Realtime order</i> , <i>Realtime test selection</i> or <i>Realtime download</i> . |

Batch and realtime modes

Host systems handle messages test selection downloads in one of three ways:

- *Batch mode*: all test selection downloads are batch downloads.
- *Realtime mode*: and all test selection downloads are realtime downloads.
- *Mixed mode*: the host can send either batch or realtime test selection downloads.

- | | |
|----------------------|--|
| <i>Batch mode</i> | A host in batch mode does not respond to test selection queries, and all test selections are batch downloads. The host has to download the test selections for the samples before they arrive at the analyzer’s Barcode Reader. This configuration is not recommended if auto-rerun or reflex tests are needed. |
| <i>Realtime mode</i> | A host in realtime mode always waits for a test selection query. All test selection download messages are a reaction to previous inquiry and have to be downloaded within a timeout. Configure the <i>data manager</i> so that it sends a test selection inquiry: <ul style="list-style-type: none">• whenever the <i>data manager</i> receives a test selection request from the cobas® 8000 modular analyzer series,or• whenever an operator enters a manual test selection for a sample at the <i>data manager</i>. However the <i>data manager</i> is configured, it always accepts batch downloads without an error message. |
| <i>Mixed mode</i> | A host in mixed mode can either batch test selection downloads or realtime downloads in response to a test selection query. |

To work with mixed mode, configure the *data manager* to send a query to the host when:

- the *data manager* receives a test selection request from the Analyzer, and
- it can not find any open test selections for the sample in its internal database.

Therefore, if the operator has previously input a manual test selection, or if the host has previously sent via batch download a test selection for that sample, then the *data manager* will not send a query to the host. In mixed mode, some test selections may be batch downloads, and some may be realtime downloads.

Configuring the data manager for the host modes

To work in these modes, some settings have to be configured in *data manager* under **Service > Service-related configuration > Interface Options**.

- For details of setting the modes, see *Inquiring for the test selections* on page B-27.

The **cobas® 8000 instrument** also has a similar configuration. It can also be independently configured so that it always sends a query to *data manager*, whether or not there is any information on the sample in its internal database.

- For information on this setting, see *Test Selection Inquire Always* on page B-37.

No parameter is passed to the host to indicate which mode *data manager* and **cobas® 8000 instrument** are configured in. Also, it is possible for operators with configuration privileges to reconfigure *data manager* and the instruments to use a different mode. If the mixed mode is requested, the host must support in parallel batch and realtime downloads.

- Detailed examples of the order of messages in specific cases is given in *Message flow batch download from host* on page B-14, and *Message flow for TS Inquiry from instrument / data manager* on page B-16.

Multiple test selection messages

In realtime mode or the mixed mode, it is possible that the *data manager* will have test selections for a certain sample ID in its internal database, and then receive further test selections from the host for the same sample ID. In this situation, the *data manager* adds the new test selections from the host to those in its internal database. The patient data is overwritten, if patient data is sent with the new test selections.



Do not re-use sample IDs

It is important for the host not to reuse a sample ID for different samples. Every sample must have a unique sample ID.

If the *data manager* has no test selections for a sample ID in its internal database, and receives none from the host in the specified time or receives an empty test selection, then the data manager sends an empty test selection to the **cobas® 8000 modular analyzer series**. This informs the **cobas® 8000 modular analyzer series** about this status.

Identifying samples on the instrument

Samples are placed on the loader, either in 2 trays each with up to 15 5-position racks, or inserted into the STAT port. Each rack is passed on to the input buffer, which consists of two trays. The trays feed racks onto the system sequentially until they are empty.

Barcodes and sample IDs

By default, the cobas® 8000 instrument reads the barcodes on the sample tubes, and uses the number on the barcode as a sample ID. The sample ID uniquely identifies the sample in the databases of the Control Unit and the *data manager*, and uniquely identifies the sample in messages to and from the host.

Samples missing a barcode

If the sample tube's barcode is missing or unreadable, the cobas® 8000 instrument generates an error, and the instrument operator gives the sample a barcode or sample ID. There is no interaction in this case with the *data manager* or the host. See the information in the *Barcode read error* window in cobas® 8000 instrument, described in the *cobas® 8000 modular analyzer series Operator's Manual*.

- ☞ For a general overview of barcodes and Test Selection queries, see *Processing samples* on page A-11.

One exception to this rule is when working with aliquoted samples from **MODULAR PRE-ANALYTICS**. Then the connected host needs to know the original Sample ID, and the Rack ID and position of the correspondent aliquoted sample.

- ☞ For a description of how to implement a connection to a **MODULAR PRE-ANALYTICS**, see *Using a MODULAR PRE-ANALYTICS* on page E-41.

Sequence numbers

If it is not possible to use barcodes, the cobas® 8000 modular analyzer series instrument can give each sample a number. This number increases by 1 for each sample. The host must then know the sequence of samples, and respond with the test orders.

- ☞ To learn how to use this functionality, see Chapter 14 *Identifying patient samples by sequence number*.

Returning results to the host

This section describes important aspects of how the *data manager* can be configured to pass test results back to the host.

Passing results automatically to the host

The *data manager* can be configured to simply “pass through” the result information that the cobas® 8000 instrument sends to it. This is called *pass-through mode*.

In this mode, *data manager* automatically validates patient results, and then passes them immediately to the host, including any flags. Otherwise, *data manager* waits for an operator to release the results before passing them up to the host. This option can be set independently for patient, quality control, and calibration results. Even if calibration results are not passed to the host, they are available from the TraceDoc.

- ☞ To see how to set “pass-through mode”, see *Pass through results automatically to the host* on page B-29.

System time and result handling

The *data manager* uploads results to the host as soon as they arrive from the instrument, and have passed any technical validation.

- ☞ If results are not being sent to host immediately after they are available, check your Result Upload Settings in the Control Unit. See *Configuring the uploading of results* on page B-39.

If the host system time is ahead of the *data manager* system time there is a delay in result upload. In this case, once the order is sent from the host to *data manager*, the *data manager* creates the order with a time in the future. When the sample is loaded on the instrument it will query and it will run the tests. However the *data manager* will only upload the results to the host once the time associated with the order has passed.

EP-17A and the result abnormal flags

As well as the numerical result and any qualitative result, such as “positive” or “negative”, the *data manager* also passes “result abnormal” flags, which state whether the result is unusually high or low, or otherwise needs attention.

These flags follow the ASTM and HL7 standards, except for an enhancement for specific values defined according to the CLSI EP-17A standard.

The EP-17 flags

The *data manager* provides three flags, *Limit of Blank*, *Limit of Detection*, and *Limit of Quantitation*, which follow the CLSI standard EP-17A. The meanings of these are given, in brief, below. Note that these values are not part of the ASTM nor the HL7 definitions for the report abnormal flags, but an enhancement provided by the *data manager*.

- ☞ For complete details of the EP-17A standards, if required, see *NCCLS Protocols for Determination of Limits of Detection and Limits of Quantitation; Approved Guideline*. NCCLS document EP17-A (ISBN 1-56238-551-8). NCCLS, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898 USA, 2004.

Limit of Blank

The “limit of blank” (LoB) is the highest value we expect to see in a series of results on a sample that contains no analyte. This is calculated as the 95th percentile value from at least 60 measurements of analyte-free samples over several independent series.

Limit of Detection

The “limit of detection” (LoD) is determined based on the limit of blank and the standard deviation of low concentration samples. The limit of detection is the lowest actual concentration at a level such that the 5th percentile of the distribution of the sample concentration measurements equals the limit of blank.

The limit of detection corresponds to the lowest analyte concentration which can be detected (value above the limit of blank with a probability of 95 %).

Limit of Quantitation

The “limit of quantitation” (LoQ) is the lowest actual concentration at which the analyte is reliably detected and at which the uncertainty of the observed test result is less than or equal to the goal set by the laboratory, or by the manufacturer of the method. Depending on the analyte and the goal, it may be equal to or higher than the limit of detection.

This provides laboratories with a more sophisticated way of defining the lowest level of meaningful quantitation of an analyte, in the case of analytes for which the simple limit of detection measurement is inadequate for any reason.

Configuring the EP-17 flags

The EP-17A limits for each analyte are configurable in the *data manager*. For details, see the *cobas® 8000 Operators Manual*.

- ☞ For details of the flags passed to the host in ASTM, see *Result Record* on page C-27.
- ☞ For details of the flags passed to the host in HL7, see *Observation Result Segment - OBX (for patient results)* on page D-22.

Communication types

This section discusses the different types of communications between the host and *data manager*.

Communication and message types

This section describes the types of messages that the *cobas® 8000 data manager* sends to the host and receives from the host, and the types of communication those messages occur in.

List of messages

The message types by the *cobas® 8000 data manager* host interface are described below from the host's viewpoint. That means the host, such as a LIS or Work Area Manager (WAM), will receive information from the connected *data manager* and send information to the *data manager*.

	Message type	Direction
Results	Receive patient results	<i>data manager</i> to host
	Receive patient results (realtime)	<i>data manager</i> to host in response to a result query
	Receive quality control results	<i>data manager</i> to host
	Receive calibration results	<i>data manager</i> to host
Inquiry	Receive test selection inquiry	<i>data manager</i> to host
Test selections	Send test selections (batch)	host to <i>data manager</i>
	Send test selection (realtime)	host to <i>data manager</i>
	Receive test selection (realtime)	<i>data manager</i> to host in response to an order query
Query	Send result queries	host to <i>data manager</i>
	Send order queries	host to <i>data manager</i>
Masking	Send a command to mask or unmask tests (only HL7)	host to <i>data manager</i>

Communication scenarios

This section describes the types of communication scenarios that occur between the host and the *data manager*.

- Realtime test selection download** The host sends a realtime test selection download in response to a *data manager* test selection query. After receiving the test selection download, the *data manager* replies with the relevant patient results once they are available and released.

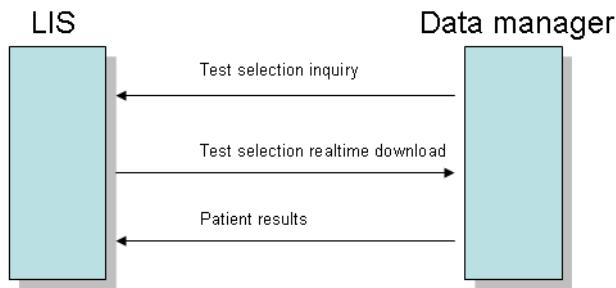


Figure B-1 Communication scenario for a realtime test selection download

- Batch test selection download** The host can send a batch test selection download at any time. After receiving the test selection download, the *data manager* uploads the relevant patient results once they are available and released.

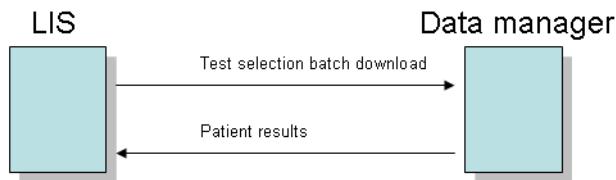


Figure B-2 Communication scenario for a batch test selection download

- Result query** The host can send a result query at any time. The *data manager* replies with the relevant patient results, if any. If the sample ID does not exist, or if there are no results, the *data manager* does not reply.

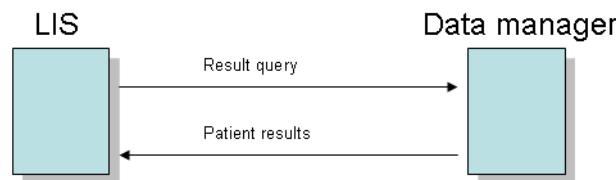


Figure B-3 Communication scenario for a result query

- Order query** The host can send an order query, the *data manager* replies with the relevant test selection describing the order.

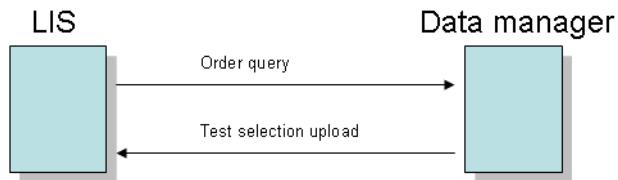


Figure B-4 Communication scenario for an order query

Only orders on the data manager are returned. The *data manager* cannot return details of orders that are only on the Control Unit. If the sample ID does not exist, the *data manager* replies, but without any test selections.

- Other message scenarios**
- The host can send a masking or unmasking request at any time, independent of other communication. (Only supported in HL7.)
 - The *data manager* can send quality control or calibration results independently of other messages.

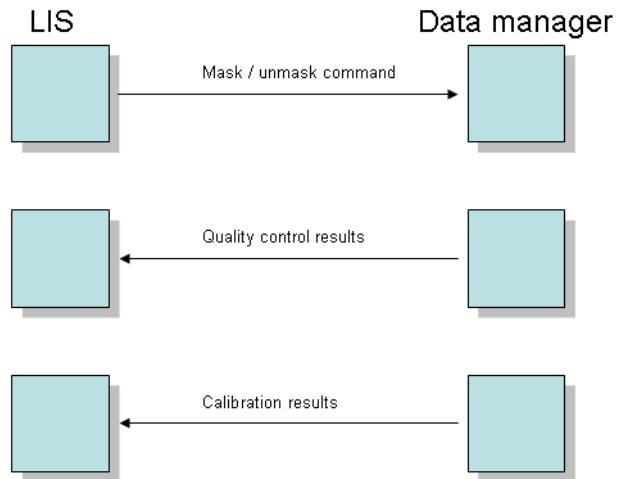


Figure B-5 Communication scenarios for independent messages

Details of message types

This section describes the important types of message in a little more detail.

Query message

The cobas® 8000 data manager sends a query message to the connected host for a sample's test selection. The host must respond with a realtime test selection download message, detailing the tests to be performed on the sample.

Sending test selections

The host can send test selections to the *data manager* at any time (unsolicited test selections or “batch mode”). The received test selections are stored in the *data manager* database.

When the cobas® 8000 data manager’s **Send query to LIS** option is selected, it may send a test selection inquiry to the host. This depends on the *data manager*’s interface settings.

- ☞ To see how to set these options, see *Inquiring for the test selections* on page B-27.

The query sent to the host contains always the rack ID and the sample’s position on the rack and may also contain the sample identifier and specimen information if provided by the cobas® 8000 instrument.



You must request all three types of serum index tests together.

The order sent by host has to request either all 3 serum index tests (Lipemic, Icteric, Hemolytic), or none. Otherwise the test is not performed, and the following alarm is displayed on the Control Unit: **994-000013 ‘Data Manager Communication Error, The orders of the serum index tests (L/H/I) are illegal’**. It is easier to create a test profile for all three tests. See the cobas® 8000 modular analyzer series *Operators Manual* for details on test profiles.

Sending patient test results

For results to be sent to the host, they must first pass validation. Validation adds information, including the validator’s name, used reference values and flags.

Validation can be done manually or automatically. The manual validation is done by the user on the *data manager*. Automatic validation is done in two ways: on a system level, by setting **Pass-through mode** for patient results, or on a test level by configuring the test for automatic validation.

- ☞ The term “pass-through mode” only refers to sending results to the host and is not related in retrieving test selection information from the host. For more information, see *Pass through results automatically to the host* on page B-29.
- ☞ For details of setting a test to automatic validation, see the cobas® 8000 modular analyzer series *User’s Manual*.

Result query

The host can send a result query message to the cobas® 8000 data manager to inquire for all the measurement test results for a given sample. The cobas® 8000 data manager replies with a Send result message.

The host can ask for all test results for a sample, or only for all that sample’s results whose status is “final”.

Order query

The host can send an order query message to the cobas® 8000 data manager to inquire for all the test selections, with or without results, that include a given sample. The cobas® 8000 data manager replies with a Send test selection message.

The host may ask for all test selections for a sample, or only for open orders with no results for that sample. The *data manager* sends only the orders that are available to it, at the status they have at the *data manager* (as opposed to the status or availability at the Control Unit.)

Sending quality control results

The measured quality control results are sent from the *data manager* to the host. To send quality control results automatically to the host, enable QC pass-through mode.

 For more information, see *Pass through results automatically to the host* on page B-29.

Calibration Data Results

The *data manager* can send unsolicited calibration data results to the connected host. The *data manager* can send photometric, ISE and Elecsys calibration result types.

Masking

The host can send an instruction to the *data manager* to mask results from a certain test on a certain submodule. There are two different types of masking supported:

- Patient masking. If activated, only patient samples are masked. Quality control and calibration are still performed.
- Test masking, where the entire test is masked, and no patient sample, quality control or calibration tests are performed.

The host can also send an instruction to remove masking from masked tests.



Masking messages are only available in HL7

Message flow batch download from host

The following diagram shows an example of message flow (from top down) for ASTM communications for a batch order of three test applications in the rerun mode.

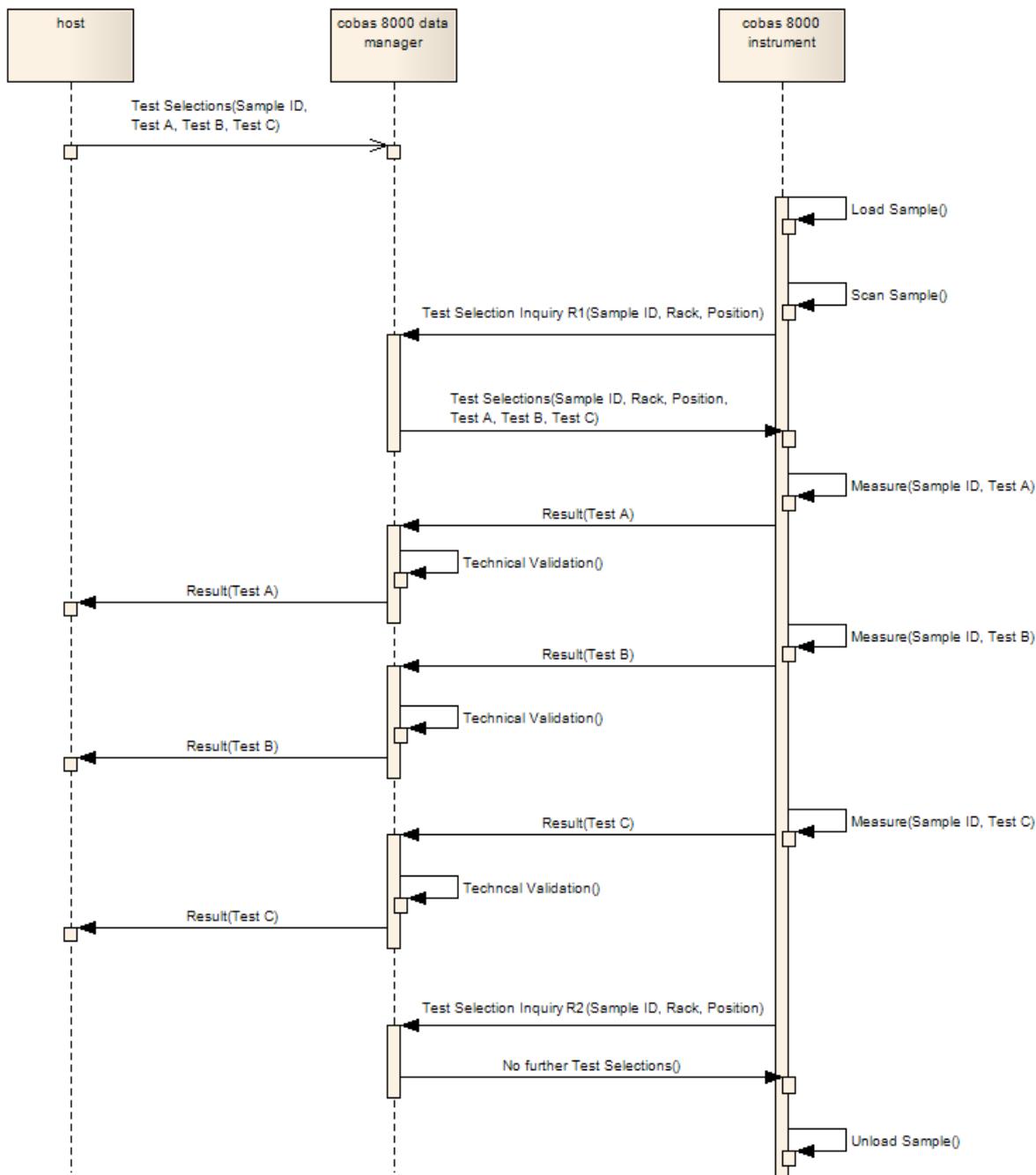


Figure B-6 ASTM messages for a batch order of three samples

The host sends unsolicited orders to the *data manager*, which waits for a Test Selection inquiry from the Control Unit. When the **cobas® 8000** modular analyzer series has read the barcodes of the samples, it sends a Test Selection inquiry to the

data manager, which then replies with the details of the Test Selection. The **cobas® 8000** modular analyzer series performs the tests on the first sample, according to the instructions in the test Selection, and sends every measured result to the *data manager*, which performs technical validation, and then sends the results immediately to the host (assuming pass-thorough mode is enabled). The **cobas® 8000** modular analyzer series performs the required tests on the other samples, and sends the results automatically to the *data manager*, which handles them in the same way as the first.

This workflow means that once the Control Unit is ready, the test data is sent to *data manager* without delay, and the data is returned to the host as soon as possible.

Message flow for TS Inquiry from instrument / data manager

The following diagram shows an example of message flow for a test selection download from the host in response to a Test Selection inquiry from the Control Unit via *data manager*, in rerun mode.

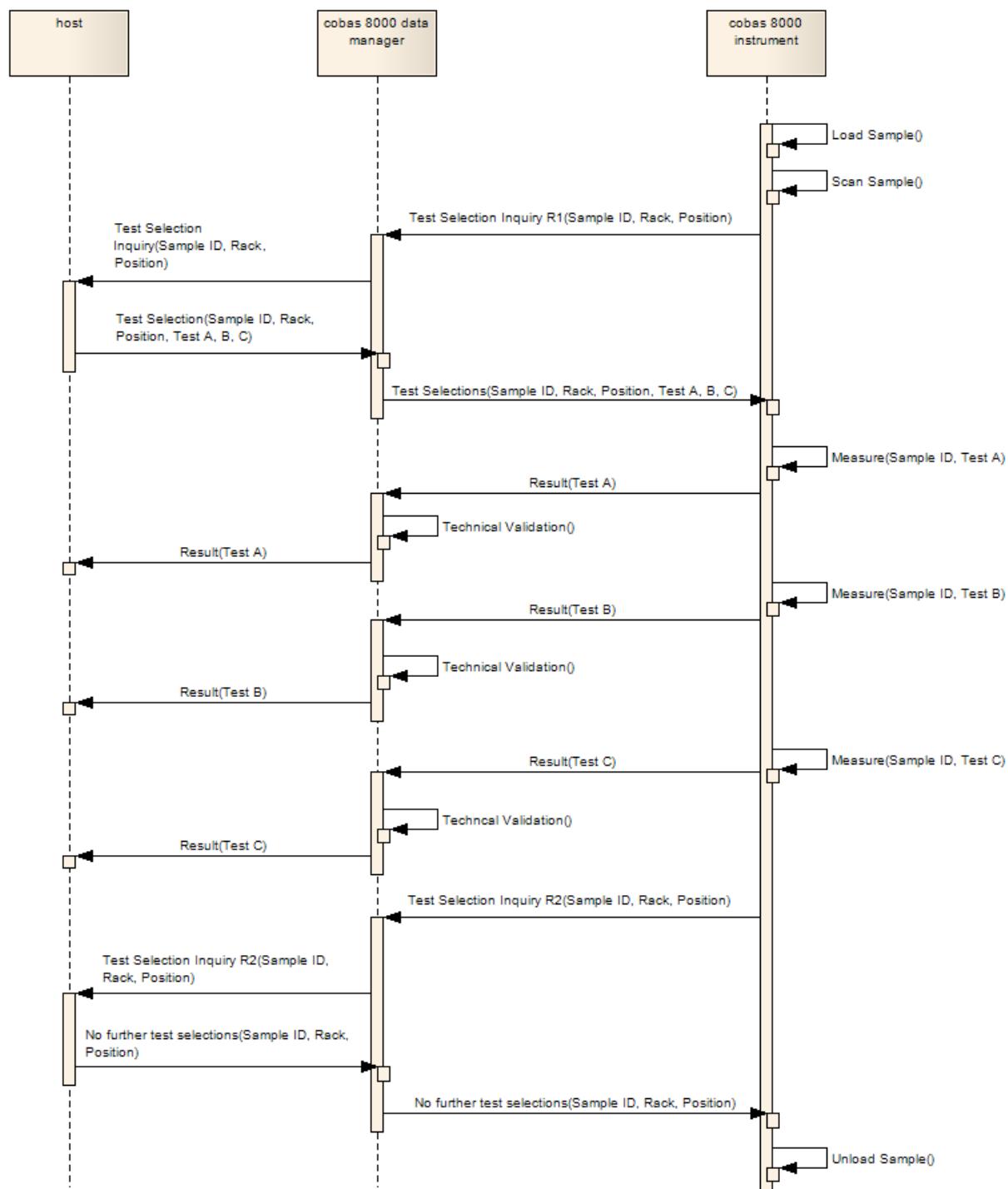


Figure B-7 Message flow for a Test Selection Inquiry from instrument / data manager

Here, the barcode reader at the instrument reads the sample ID before the Test Selection data has been downloaded to the *data manager*. Once the host replies with the test selection data, the workflow proceeds as normal, with the results being processed and returned to the host as fast as possible. After the instrument has completed all the tests, it inquires for any rerun/reflex tests, if the instrument is in rerun/reflex mode, and the function “**Automatic Rerun Test Selection**” is activated at the Control Unit. In the example above, no rerun/reflex tests were required.

Message flow for batch sample, upload by sample

The following diagram shows an example of message flow (from top down) for:

- the host sends a batch order of three tests
- the Control Unit is in the rerun mode
- the Control Unit uploads results by sample
- the *data manager* option **Send query to LIS** is off.

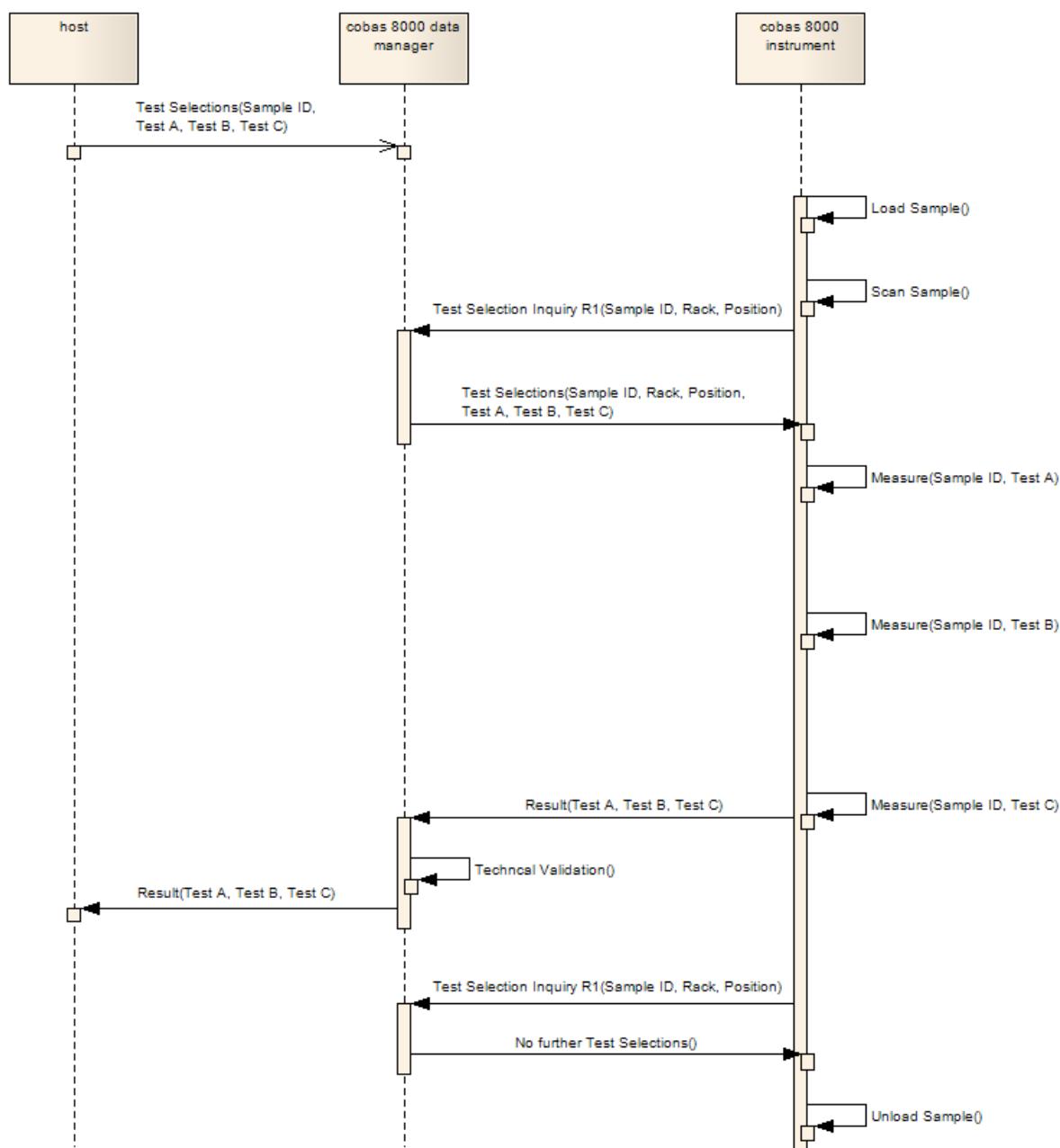


Figure B-8 Batch download, with upload by sample

Host Communication Settings

Setting up data manager and Control Unit for host communications

This chapter describes how to set up *data manager* and the Control Unit to enable host communications.

In this chapter

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Starting and stopping the host connection

This section explains how to start and stop the host connection on a configured cobas® 8000 data manager system.

Starting and stopping the connection

Control and configuration of the host connection is done in **c8000 DM Service > Service-related configuration > Interface options**.

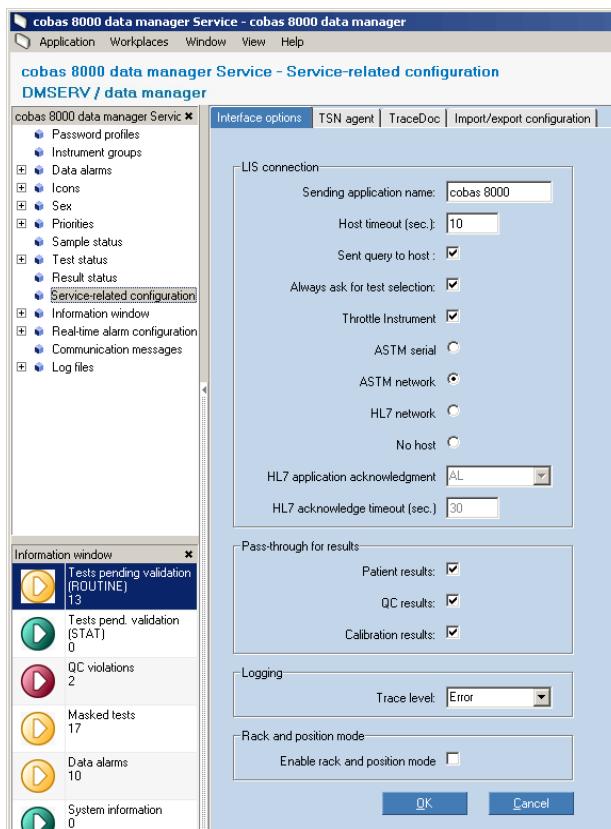


Figure B-9 data manager: Service-related configuration > Interface options

► To connect to a host

- 1 In **c8000 DM Service > Service-related configuration > Interface options**, select your communication protocol (HL7 network, ASTM network, ASTM serial), and select **OK**. The *data manager* opens the requested connection to the host.
- 2 The *data manager* remembers this setting, and reopens the connection on restart.



► To stop a host connection

- 1 In **c8000 DM Service > Service-related configuration > Interface options**, select **No host**, and then click **OK**. The *data manager* closes any host connection.



Using the **data manager** without a host connection

You can still use the *data manager* even when you have stopped the host connection. Messages are then transferred as files. In this case, service personnel can access the messages in **C:/data/in** and **C:/data/out**. HL7 files end with the suffix **.hl7**, and ASTM files end with **.dat**.

Configuring the *data manager*

This section describes the steps you need to take to set up and configure the host interface in the *data manager* and the Control Unit.

► To set up the *data manager* for host communications

- 1 If you can, first complete the host interface questionnaire. This collects useful information for the next steps. You can obtain the questionnaire from your Authorized Roche Diagnostics personnel or technical support.
- 2 Make sure the necessary cables and network settings for host communication are available and configured. This is described in Chapter 5 *Physical layer specifications*.
 - ☞ For details of how the cables and network must be configured, see *Text encodings* on page B-47 and *Host communication settings and cables* on page B-47.
- 3 Log into the *data manager* as a user with configuration privileges, who can see the **Service-related configuration** workplace.
- 4 Navigate to **c8000 DM Service > Service-related configuration > Interface options**.
- 5 Work through the sections of this manual that describe the settings in the **Interface options** tab. Make sure the settings meet your needs.
 - ☞ For details of the interface options for the *data manager*, see *Configuring the data manager host interface options* on page B-24.
- 6 Log onto the Control Unit, and make sure its settings meet your needs.
 - ☞ For details of how the Control Unit must be configured, see *Configuring the Control Unit* on page B-33. This continues from the previous section.
- 7 Start host communications on the *data manager* in **c8000 DM Service > Service-related configuration > Interface options**.
 - ☞ For details of starting and stopping host communications, see *Starting and stopping the host connection* on page B-21.
- 8 The *data manager* is now configured for host communications.



Configuring the *data manager* host interface options

When configuring the host interface, ensure that the settings in **c8000 DM Service > Service-related configuration > Interface options** implement the functionality that you need. You can work through all these sections in turn to prepare the *data manager* for host communications.

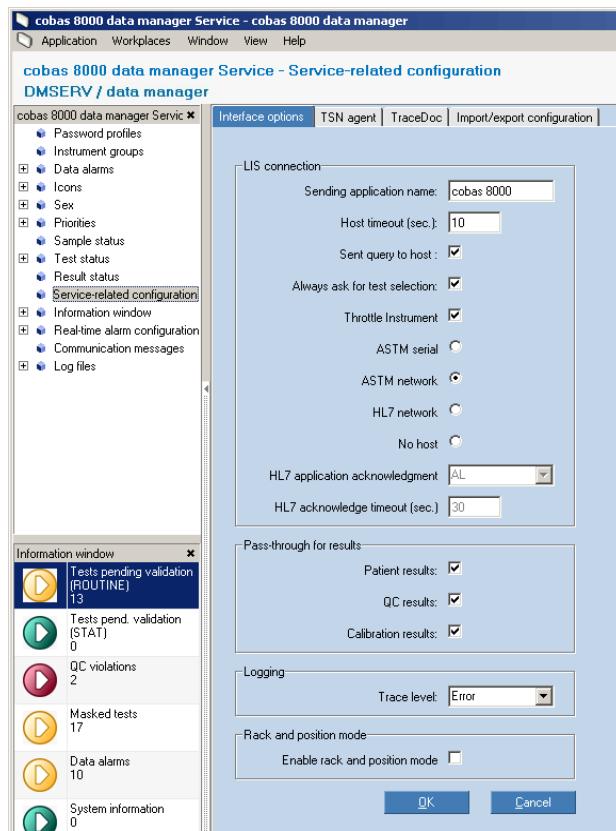


Figure B-10 data manager: Service-related configuration > Interface options

Identifying the *data manager* application to the host

In the header of every message, the *data manager* sends an identification string to the host. The user can edit this string in **c8000 DM Service > Service-related configuration > Interface options**.

Sending application name

This field holds the name that the *data manager* uses to identify itself. In ASTM this is the Sender Name or ID, and in HL7, the Sending Application. The *data manager* sends this to the host in the header of each message, in ASTM H-5 or HL7 MSH-3. The default is `cobas 8000`.



Do not enter ASTM or HL7 reserved characters in the sending application name

Make sure that users never enter characters that are reserved in either communication protocol.

Reserved characters in ASTM are:

- | Field delimiter = vertical bar [ascii 124]
- \ Repeat delimiter = backslash [ascii 92]
- ^ Component delimiter = caret [ascii 94]
- & Escape character = ampersand [ascii 38]

Reserved characters in HL7 are:

- | Field delimiter = vertical bar [ascii 124]
- ~ Repeat delimiter = tilde [ascii 126]
- ^ Component (or sub-field) delimiter = caret [ascii 94]
- \ Escape character = backslash [ascii 92]
- & Sub-component (or sub-sub-field) delimiter = ampersand [ascii 38]

Setting the test selection inquiry timeout

This section describes how to determine the best setting for the timeout on test selection inquiry (TSREQ) messages sent to the host. This is configurable in **c8000 DM Service > Service-related configuration > Interface options**.

- LIS Timeout** This is the timeout between *data manager* and the host, in seconds. More specifically, it is the timeout to the test selection inquiry for realtime communications and for Routine, STAT and Rerun samples. See time range **E** below in Figure B-11.

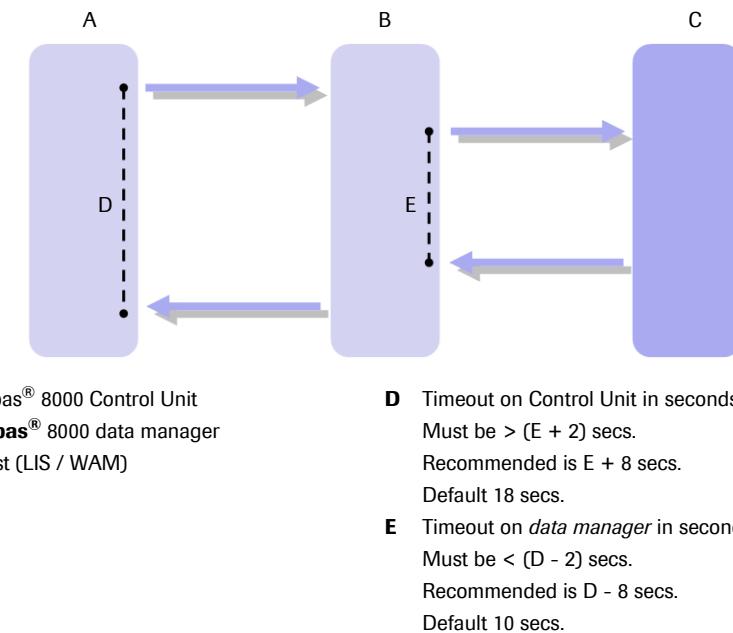


Figure B-11 Timeouts on Control Unit and *data manager*.

The default setting here on *data manager* is 10 seconds, and the timeout on the Control Unit is by default 18 seconds. Depending on the communication speed, the *data manager* timeout should be at least 2 seconds shorter than the Control Unit timeout. However, 8 seconds shorter is recommended. This gives enough time for a message to make the round-trip from the Control Unit to the host and back.



Optimum response time is less than 1.5 seconds

The host must send a test selection to *data manager* in response to a test selection inquiry on average in less than 1.5 seconds. If it takes the host longer to reply to inquiries, the performance of the system will gradually degrade.

In addition, for optimum performance, the host must send the low-level ASTM protocol ACK control characters within 10 milliseconds.

If the *data manager*'s inquiry for a test selection times out, then *data manager* sends an empty Test Selection message to the Control Unit, indicating that there are no Test Selections for that sample.

Inquiring for the test selections

This section describes how you can configure the test selection inquiry messages. This is configurable in **c8000 DM Service > Service-related configuration > Interface options**.

The options *Send query to LIS* and *Always inquire for test selection* configure the *data manager* to work with hosts in realtime, batch or mixed mode.

- ☞ For details of host in batch, realtime or mixed mode, see *Batch and realtime and the data manager* on page B-5.

The table below shows how the query and inquiry settings interact with each other.

Send query to LIS	Always Inquire	Behavior
Y	Y	The host may send unsolicited test selections, nevertheless the <i>data manager</i> always sends an inquiry message to the host. (Host in Realtime mode)
Y	N	The host may send unsolicited test selections. The <i>data manager</i> sends a query to the host : <ul style="list-style-type: none"> • if it has no open test selections for the sample. • if the Control Unit queries the <i>data manager</i> for rerun tests. (Host in "Mixed" mode)
N	Y	Not possible
N	N	Host has to send unsolicited test selections, the <i>data manager</i> never sends a query to the host. (Host in Batch mode)

Send query to LIS

With *Send query to LIS* selected, when the Control Unit send a query to the *data manager*, then the *data manager* check its database for relevant test orders. If it finds none, it queries the host for test orders.

Always inquire for test selection

With *Always inquire for test selection* selected, whenever the *data manager* receives an inquiry from the Control Unit, then the *data manager* always sends an inquiry to the host for tests, even if it already has test orders for that sample in its database.

Always inquire for test selection can only be enabled if *Send query to LIS* is also selected.

Choosing the connection protocol

These options set the communication protocol used in messages between the host and *data manager*, and start and stop communications.

ASTM Serial

The **ASTM Serial** option specifies serial communications over the ASTM protocol.

- ☞ For technical details of the ASTM protocol, see Chapter 6 *ASTM protocol (LIS2 - A2)*.
- ☞ For details of the data fields *data manager* supports over the ASTM protocol, see Chapter 7 *ASTM text content (LIS2 - A2)*.

ASTM Network

The **ASTM Network** option specifies TCP/IP communications over the ASTM protocol.

- ☞ For technical details of the ASTM protocol, see Chapter 6 *ASTM protocol (LIS2 - A2)*.
- ☞ For details of the data fields *data manager* supports over the ASTM protocol, see Chapter 7 *ASTM text content (LIS2 - A2)*.

HL7 Network

The **HL7 Network** option specifies TCP/IP communications over the HL7 protocol.

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- ☞ For technical details of the HL7 protocol, see Chapter 8 *HL7 protocol*.
- ☞ For details of the data fields *data manager* supports over the HL7 protocol, see Chapter 9 *HL7 text content*.

No host If the *data manager* is running without a host, select **No host**.

Changing the communication protocol

Consult your Authorized Roche Diagnostics service personnel before changing the communication protocol.

- ☞ For details of the cables and other low-level settings required by communication protocols, see *Host communication settings and cables* on page B-47.
- ☞ For details of configuring the Control Unit for communications, see *Configuring the Control Unit* on page B-33.



To change the communication protocol

To change the connectivity type (Network / Serial) further configuration might be necessary. This will be set up by Authorized Roche Diagnostics service personnel.

Configuring HL7 Acknowledgement handling

The *data manager* supports a limited range of the HL7 application acknowledgement messages. For result messages sent to the host, the user can set the level of acknowledgement that the *data manager* should request from the host. These settings apply to patient, quality control and calibration results. This is configurable in **c8000 DM Service > Service-related configuration > Interface options**.

- ☞ For more details on HL7 application acknowledgement messages, see Chapter 10 *HL7 Acknowledgement handling*.

Code	Meaning	Required host action
AL	Always	Send an acknowledgement to every message.
SU	Success	Send an Accept (AA) acknowledgement if the message is successfully processed, otherwise send no acknowledgement.
ER	Error	Send an Error (AE) acknowledgement if the message could not be processed successfully, otherwise send no acknowledgement.
NE	Never	Never send an acknowledgement.

HL7 Application Acknowledgement

From the **HL7 Application Acknowledgement** drop-down list, choose the level of application acknowledgement that the *data manager* should request from the host.

HL7 acknowledge timeout (secs.)

In the **HL7 acknowledge timeout (secs.)** field, enter the timeout required. This field is used only with the **AL** and **SU** options. The default is 60 seconds.

Uploading messages one-by-one (Throttle instrument)

In production environments, navigate to **c8000 DM Service > Service-related configuration > Interface options**, and select **Throttle instrument**. Turn this off if the *data manager* is connected to the Control Unit but not to a host, for example if only auto-printing reports.

Throttle instrument tells the **cobas® 8000 data manager** to upload result report messages from the instrument one at a time. Then, if **Test selection priority mode** is selected on the instrument's Control Unit (mandatory), the instrument prioritizes Test Selection queries over a queue of result report messages. This means that test selection queries are not lost.

With **Throttle instrument** selected, the *data manager* uploads a result report message from the instrument, and then sends it to the host. The *data manager* then waits:

- *ASTM serial or network connection.* The *data manager* waits up to 10 seconds for the final low-level acknowledgement from the host before sending an acknowledgment to the instrument.
- *HL7 network connection with application acknowledgement set to AL or SU.* The *data manager* waits up to 10 seconds for the high-level acknowledgement from the host before sending an acknowledgment to the instrument.
- *HL7 network connection with application acknowledgement set to ER or NE.* In this case, the *data manager* sends an acknowledgment to the instrument immediately after sending the result report message to the host. If the message cannot be sent to the host, the acknowledgment is sent to the instrument at the latest after 10 seconds.

Pass through results automatically to the host

You can configure the *data manager* to automatically validate all results, and pass them immediately to the host, including any flags. This is configurable in **c8000 DM Service > Service-related configuration > Interface options**.

<i>Patient results</i>	To forward all patient results automatically to the host, select Pass-through mode > Patient Results . Otherwise, the <i>data manager</i> validates the results according to its validation settings. If selected, this option overrides any manual and automatic validation settings in the <i>data manager</i> . If this checkbox is not selected, data manager will only forward patient results which pass automatic validation. More precisely, the <i>data manager</i> will evaluate the patient results according its internal automatic validation settings specified in the Configuration workplace in Test/Reference Ranges. If the results fulfill these conditions, data manager sends the results automatically to the host. Otherwise, the results will be held back for manual validation, and the <i>data manager</i> waits for an operator to release the results before passing them up to the host. ☞ For details on configuring validation in the <i>data manager</i> , see the <i>cobas® 8000 modular analyzer series Operator's Manual</i> .
<i>QC results</i>	If the host does the QC analysis, select Pass-through mode > QC Results . If the <i>data manager</i> does the QC analysis, unselect it. With the QC results checkbox selected, quality control results are forwarded to the host automatically. Then the host can do QC analysis: Westgard, Rilibäk etc. If this checkbox is not selected, the QC results are not forwarded to the host, and QC analysis is done by data manager. ☞ For more details on the configuration of quality control analysis, see the Data Manager section of the <i>cobas® 8000 modular analyzer series Operator's Manual</i> .
<i>Calibration results</i>	With the Calibration results checkbox selected, calibration results are forwarded to the host automatically. ☞ For more details on the configuration of calibration settings, see the <i>cobas® 8000 modular analyzer series Operator's Manual</i> .

Setting logging levels

You can configure what information the *data manager* logs about host communications in **c8000 DM Service > Service-related configuration > Interface options**, from the **Trace level** drop-down menu. In increasing quantity of information, the options are **No logging**, **Error**, **Warning**, **Information**, **Debug**. For troubleshooting, **Information** is recommended. In a production environment, **Error** or **No logging** is recommended. Use other settings only if requested by Roche Diagnostics technical support.

Rack and position mode

To process samples using the rack ID and position of the tube, navigate to **c8000 DM Service > Service-related configuration > Interface options**, and enable the option **Enable rack and position mode**.

- ☞ For a more detailed description of how to implement this option, and other related options, see *Using a MODULAR PRE-ANALYTICS* on page E-41, and *Handling batch test selections with strict rack and position* on page E-43.

Identifier of the analytical unit sent to host

The *data manager* holds a unique ID for each module in your cobas® 8000 modular analyzer series configuration. This ID is editable.

Viewing and editing the ID

You can freely edit the analytical unit IDs in the *data manager* in **Workplaces > System Configuration > Instrument** > [Select instrument] > [Shortcut menu] > **Edit instrument** > [field] **ID for Host**.

Instrum...	Name	Instru..	Def ...	Locati...	Serial No.	Instrument ID for host	Barc...	Rac...
0	DataManage	DM	Hitachi	LAB1	DM-00-0000	DM#DM#0#0	<input type="checkbox"/>	
1	MU1	c8000	Hitachi	LAB1	0000-07	MU1#c8000#0#0	<input checked="" type="checkbox"/>	5
2	ISE	ISE	Hitachi	LAB1	ISE#0800-09	MU1#ISE#1#0	<input checked="" type="checkbox"/>	5
3	ISE(1)	ISE	Hitachi	LAB1	ISE#0800-09#1	MU1#ISE#1#1	<input checked="" type="checkbox"/>	5
4	ISE(2)	ISE	Hitachi	LAB1	ISE#0800-09#2	MU1#ISE#1#2	<input checked="" type="checkbox"/>	5
5	C7-1	c701	Hitachi	LAB1	c701#0800-08	MU1#c701#1#0	<input checked="" type="checkbox"/>	5
6	C7-1(A)	c701	Hitachi	LAB1	c701#0800-08#1	MU1#c701#1#1	<input checked="" type="checkbox"/>	5
7	C7-1(B)	c701	Hitachi	LAB1	c701#0800-08#2	MU1#c701#1#2	<input checked="" type="checkbox"/>	5
8	c502	c502	Hitachi	LAB1	c502#0900-04	MU1#c502#2#0	<input checked="" type="checkbox"/>	5
9	c502(A)	c502	Hitachi	LAB1	c502#0900-04#1	MU1#c502#2#1	<input checked="" type="checkbox"/>	5
10	e602	e602	Hitachi	LAB1	e602#0900-07	MU1#e602#3#0	<input checked="" type="checkbox"/>	5
11	e602(1)	e602	Hitachi	LAB1	e602#0900-07#1	MU1#e602#3#1	<input checked="" type="checkbox"/>	5
12	e602(2)	e602	Hitachi	LAB1	e602#0900-07#2	MU1#e602#3#2	<input checked="" type="checkbox"/>	5

Figure B-12 The analytical unit IDs (or instrument ID for host) in the *data manager*



This field is used by both result and masking messages (HL7)

In HL7, this field is used by both result and masking messages. If you edit this field, make sure the host is updated so that it reads the new identifier in result upload message, and it sends the new identifier in masking messages, if used.

Using the ID

The *data manager* sends the ID in ASTM in:

- In ASTM Result record, Field 14, component 3. It identifies the module and instrument that performed the test.

- In the ASTM calibration records M(PCR) Field 6, M(ICR) Field 5, M(ECR) Field 7. It identifies the module and instrument that performed the test.

The *data manager* sends the ID in HL7 in:

- In HL7 segment OBX-18, component 3. It identifies the module and instrument that performed the test. For calibration results from an ISE module, the analytical unit ID is the only component in the field.

The *data manager* reads the ID in HL7 in:

- In HL7 segment ECD-5, component 3. Here it identifies the module and instrument to perform masking on.

Default value The whole field is freely editable. The default values follow the format:

Instrument#ModuleType#Position#SubModule

Instrument	<i>String</i>	Currently default to MU1, which identifies the first cobas® 8000 modular analyzer series connected to the data manager. In future, there may be more analyzers connected.
ModuleType	<i>String</i>	c502, c701, e602, ISE, c702, DM or c8000.
Position	<i>Number</i>	The position of the module on the cobas® 8000 modular analyzer series, as an integer.
Submodule	<i>Number</i>	0, 1 or 2

Examples of default values:

MU1#e602#1#1

MU1#c8000#0#0

The reserved values in ASTM or HL7 cannot be used: | or ^ or \ or ~ or &. Otherwise, any unique string can be used as the identifier, for example, the serial number of the module, such as:

1048-12

In such a case an HL7 OBX segment, this might look like:

```
OBX|1||991||109.1|mmol/L|^TECH~^NORM~^CRIT~^USER||||C|||20101012074509
|bmuser^DMUSER||63|ISE^1^1048-12^3|20101012074525|
```

In an ASTM Result record, this might look like:

```
R|1|^^^999/1/not|2.3^|mmol/L|0.5 - 7.5^TECH\^NORM\^CRIT\^USER|N||F||
bmsrv^DMROUTINE|20100711163455|20100711163455|ISE^2^1048-12^4|
```



The Analytical Unit ID is unique

To uniquely identify the module or analytical unit that performed the test, it is recommended to use the analytical unit ID and nothing else.

Getting a trace file from the *data manager*

Authorized Roche Diagnostics service personnel can collect a set of log files to send with an issue report.

To get a host communication file

Instead of a whole issue report, it is possible to obtain the communication logs on their own.

► How to get a *data manager* host communication trace file

- 1 Navigate to c:\data\log
- 2 Select all the logs in the folder, which may include:
 - astm-serial.log
 - hl7-network.log
 - astm-network.log
 - ASTM-message.log
 - HL7-message.log
- 3 If you are sending them to a support engineer, save them in a zip archive or similar convenient compressed format.

■
The important files for the host communication in c:\data\log are: `ASTM-message.log` and `HL7-message.log`. These files contain the host communication messages between the data manager and the host, correspondent to the used protocol (ASTM or HL7). These files may also contain a datestamp in the filename. Logs from the current day do not have a timestamp.

Other useful logs

Log information on the communication between the *data manager* and the Control Unit is in: `c:\data\log\InstrumentAdapter\All.yyyy-mm-dd.log`

Configuring the Control Unit

This section tells you how to configure the Control Unit for communication with *data manager* and the host (LIS / WAM). A user with appropriate permissions needs to be logged into the Control Unit to change these settings.

Enabling communication to *data manager*

► To enable the Control Unit to communicate with *data manager*

- 1 Navigate to the initial screen: Overview > System Overview



A Data Manager button

Figure B-13 The Control Unit screen at Overview > System Overview

- 2 In the section Module Overview, select the button Data Manager (**A**). The Data Manager Host Communication dialog appears.

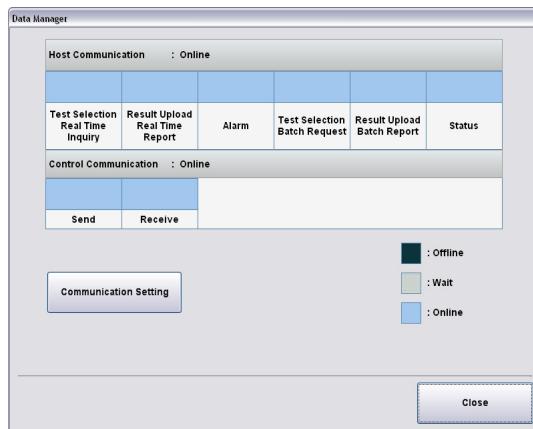


Figure B-14 The Data Manager Host Communication Status dialog on the Control Unit, at Overview > System Overview > Module Overview > Data Manager

This dialog shows the status of the communications with the *data manager*, and what communication channels are currently online.

- 3 To activate communications between the Control Unit and the *data manager*, select the button Communication Setting. The Communication Setting dialog appears.

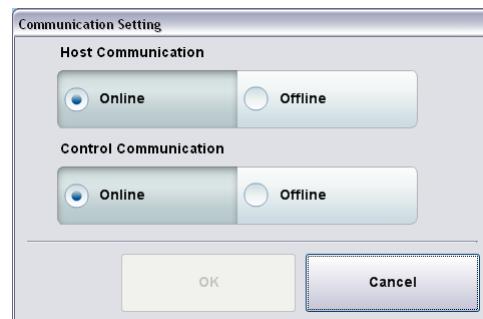


Figure B-15 The Communication Setting dialog on the Control Unit, at Overview > System Overview > Module Overview > Data Manager > Communication Setting

- 4 Activate communications by setting the Host Communications and Control Communications both to Online. Then select OK, to return to the Data Manager Host Communication dialog.

If every setting in the Data Manager Host Communication dialog is not light blue, meaning “Online”, check the network connections, or contact your technical support.

Configuring the Control Unit's communications with *data manager*

To configure the settings that control the Control Unit's communications with *data manager*, go to Utility > System > Data Manager Settings > Communication Settings.

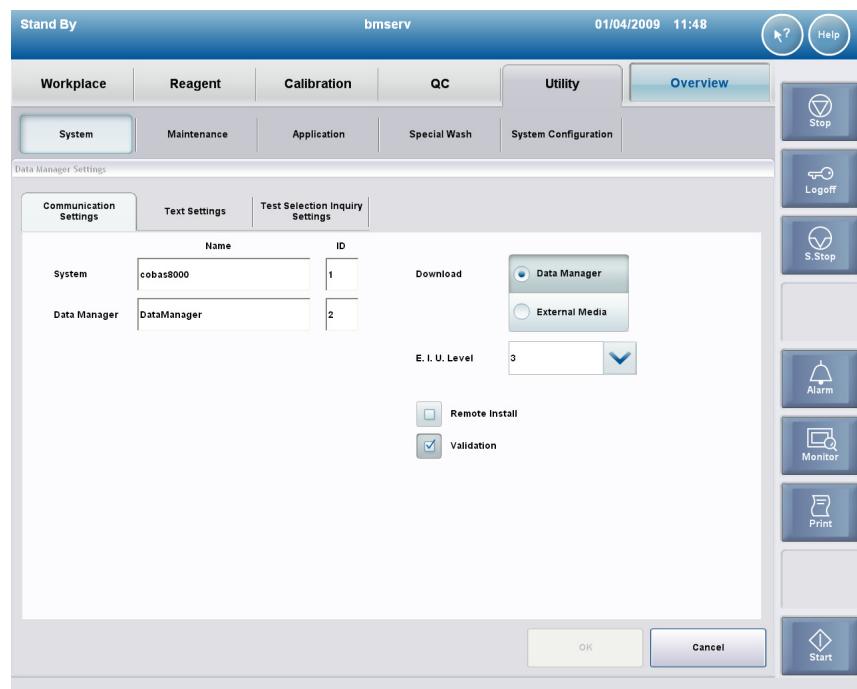


Figure B-16 Utility > System > Data Manager Settings > Communication Settings

In a production environment, set:

	Name	ID
System	cobas8000	1
Data Manager	DataManager.	2

Keep your current settings for the other options, unless Authorized Roche Diagnostics service personnel or technical support instruct you otherwise.

Authorized Roche Diagnostics service personnel can reconfigure the E.I.U. level (Essential Information Upload). **E.I.U. Level** determines which kind of data (for example, "Get Log Data") can be sent to the *data manager* via a pipe upload to be stored and further used for troubleshooting (for example, including into the issue report).

For further details of these settings, see the Control Unit's online help.

Configuration of text settings

To configure the settings of text information sent to *data manager*, go to **Utility > System > Data Manager Settings > Text Settings**.

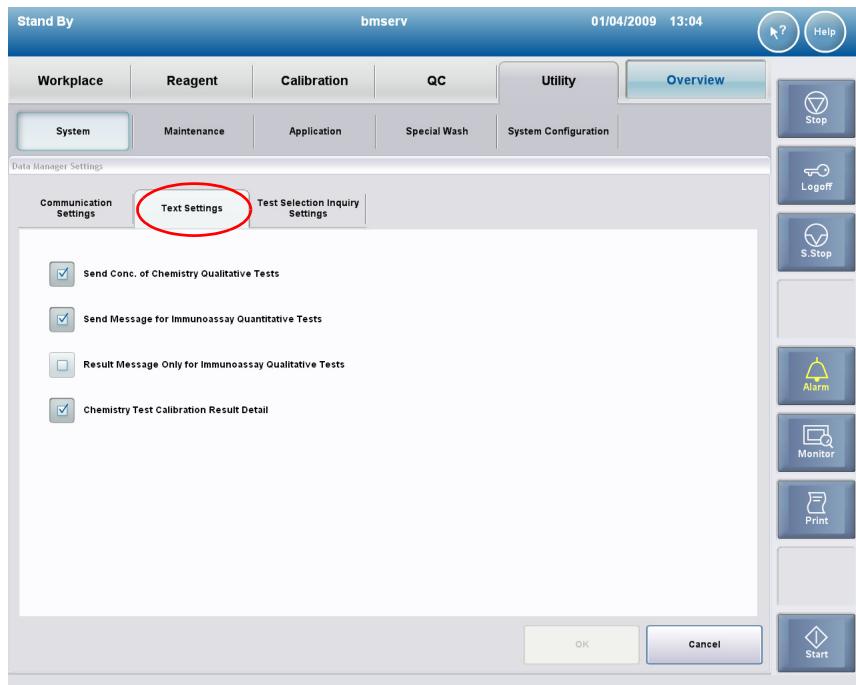


Figure B-17 Mandatory settings in Utility > System > Data Manager Settings > Text Settings

Send conc. of chemistry qualitative tests

In a production environment, select **Send conc. of chemistry qualitative tests**.

Send message for Immunoassay Quantitative tests

In a production environment, select **Send message for Immunoassay Quantitative tests**.

Result message only for Immunoassay Qualitative tests

In a production environment, clear the **Result message only for Immunoassay Qualitative tests** checkbox.



Unselect ‘Result message only’ to get all data

To get all data in a production environment, the option **Result message only for Immunoassay Qualitative tests** must be unselected.

Chemistry Test Calibration Result Detail

In a production environment, select **Chemistry Test Calibration Result Detail**.

Further details

For further details of these options, see the Control Unit’s online help.

Test selection inquiry settings

The Control Unit can be configured as regards how and when it sends inquiries about samples, (in other words, Test Selection Inquiries) in **Utility > System > Data Manager Settings > Test Selection Inquiry Settings**.

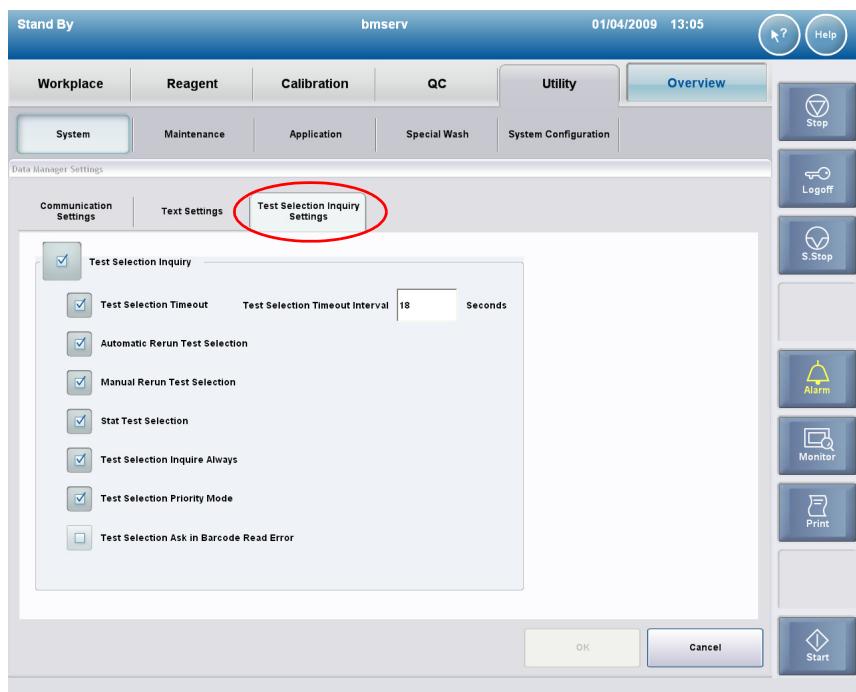


Figure B-18 Test Selection Inquiry Settings tab in the Data Manager Settings section of the Control Unit, in Utility > System > Data Manager.

Test Selection Inquiry In a production environment, select **Test Selection Inquiry**.

Test Selection Timeout In a production environment, select **Test Selection Timeout**.

Default is 18 seconds. In production environments, it is recommended to use the default, and handle host communications timeouts on the *data manager*.

- ☞ For details of how the *data manager* handles timeouts from the host and Control Unit, see *Setting the test selection inquiry timeout* on page B-26.

Automatic Rerun Test Selection In a production environment, select **Automatic Rerun Test Selection**.

Automatic Rerun Test Selection must be checked, if Rerun and/or Reflex Orders from *data manager* or host are used.

- ☞ To enable requests for rerun / reflex tests, other settings have to be done, see *Request for rerun or reflex tests* on page A-14.

Manual Rerun Test Selection In a production environment, select **Manual Rerun Test Selection**.

, the **Manual Rerun Test Selection** must be checked, if Rerun and Reflex Orders are used.

STAT Test Selection In a production environment, select **STAT Test Selection**.

Test Selection Inquire Always In a production environment, select **Test Selection Inquire Always**.

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- Test Selection Priority Mode* In a production environment, select **Test Selection Priority Mode**.
- Test Selection Ask in Barcode Read Error* If your sample tubes have barcodes, keep **Test Selection Ask in Barcode Read Error** unselected.
- When **Test Selection Ask in Barcode Read Error** is unselected, an unreadable barcode triggers an error on the analyzer. See *cobas® 8000 modular analyzer series Operator's Manual* for details on how the analyzer operator will handle a barcode read error.
- Only select this option if you are using samples without a barcode, for example if using aliquots from a **MODULAR PRE-ANALYTICS**.
-  For a more detailed description of how to implement this option, see *Using a MODULAR PRE-ANALYTICS* on page E-41.
- When **Test Selection Ask In Barcode Read Error** is selected, rerun by gray racks (racks for 1st run) is not permitted, as the analyzer cannot tell if this is the first or second presentation of the rack.
- When the barcode readers are deactivated on the **cobas® 8000 modular analyzer series instrument**, this option is hidden.
-  The barcode readers are deactivated, for example, when identifying samples by sequence number. For details, see Chapter 14 *Identifying patient samples by sequence number*.
- Further details* For further details of these options, see the Control Unit's online help.

Configuring the uploading of results

This section describes how to configure the rules for uploading results. These are set in **Utility > System > Result Upload Settings**.

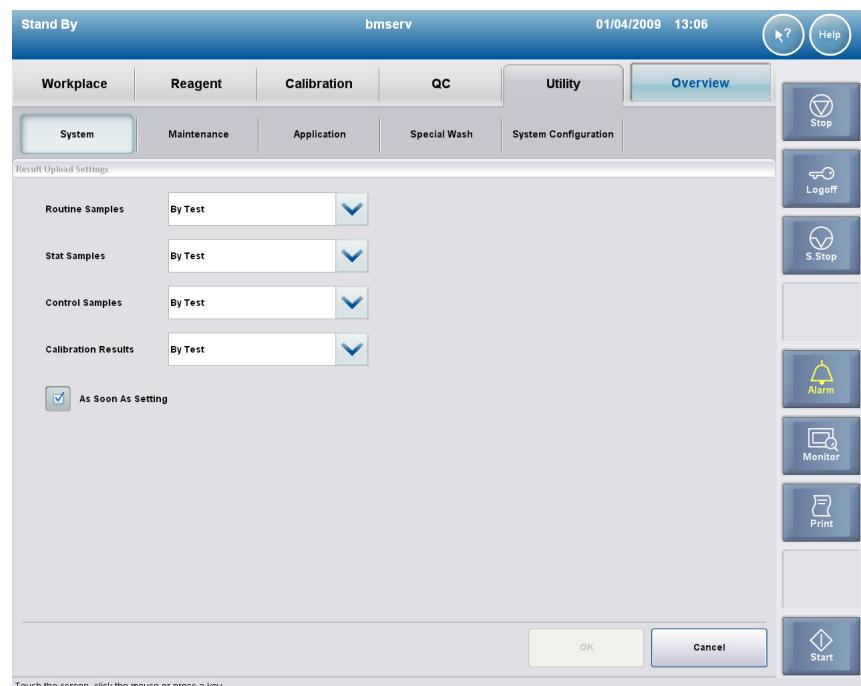


Figure B-19 Utility > System > Result upload settings

Upload by test or sample You can set the Control Unit to upload results *by sample* or *by test*. Other options are not supported in version 1.02.

- **By test** means that the Control Unit uploads each result as soon as it is ready.
- **By sample** means that the Control Unit waits until all the results for a sample are ready, and then uploads all of them together.



Other options are not supported in version 1.02.05

In version 1.02.05, only the options **By test** and **By sample** are supported.

► To configure how the Control Unit uploads results

- 1 Navigate to Utility > System > Result Upload Settings.
- 2 From the drop-down list for type of result you want to configure, select “By Test” or “By Sample”. You can separately configure Routine sample results, STAT sample results, or Quality control sample results. Calibration results can only be uploaded “By Test”.
- 3 Check the **As Soon As Setting** checkbox.



Getting a trace file from the Control Unit

Authorized Roche Diagnostics service personnel can access trace files on the Control Unit. The communication trace file records data sent from or received by the Control Unit. This information is particularly useful for support or debugging purposes. The Control Unit saves this information internally, and can print it out to a PDF file or a physical printer.

The Communication Trace file options are available from the **Print > Utility > Communication Trace**.

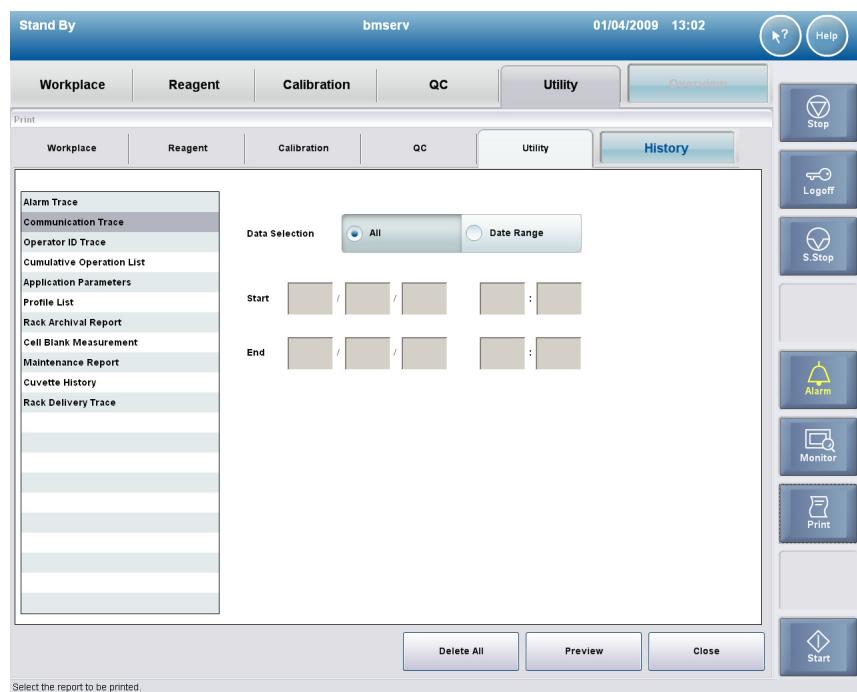


Figure B-20 Print > Utility > Communication Trace

► **To get a communication trace file from the Control Unit**

- 1 From the buttons on the right of the Control Unit screen, select Print. The Utility screen displays.
- 2 From the list on the left of the Utility screen, select Communication Trace. The Communication Trace options screen displays.

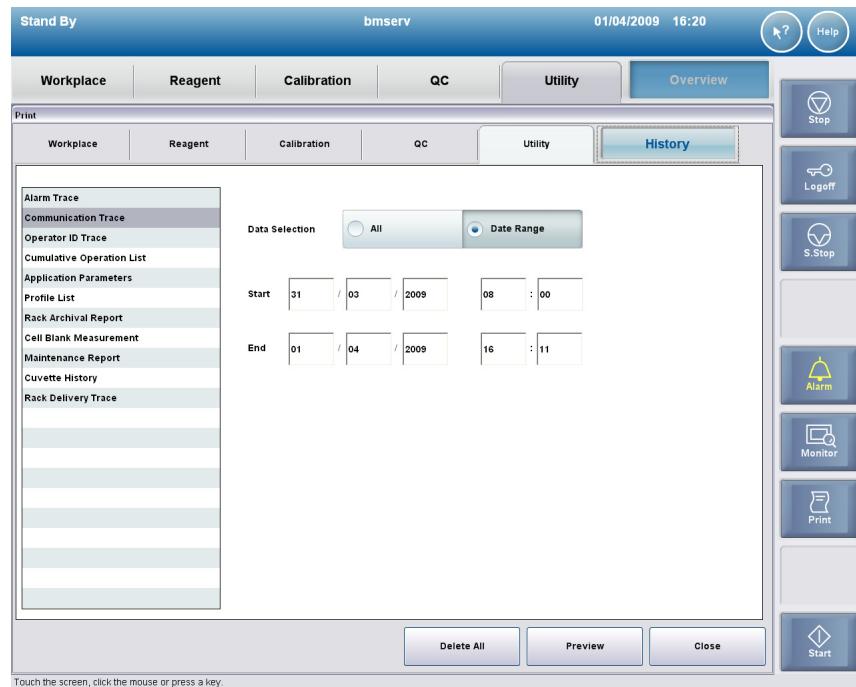


Figure B-21 Print > Utility > Communication Trace with a Date Range selected

- 3 Select the radio button Date Range.
- 4 Consider the date and time range for which you want to see the Communication Trace. Then enter the start date and time, and the end date and time, for the Communication Trace data you wish to collect.
- 5 Select the button Preview. It may take a few seconds for the Control Unit to generate the file.
- 6 To display the file in the Control Unit, select the History tab.

4 Host Communication Settings

cobas® 8000 data manager

cobas® 8000 instrument

Getting a trace file from the Control Unit

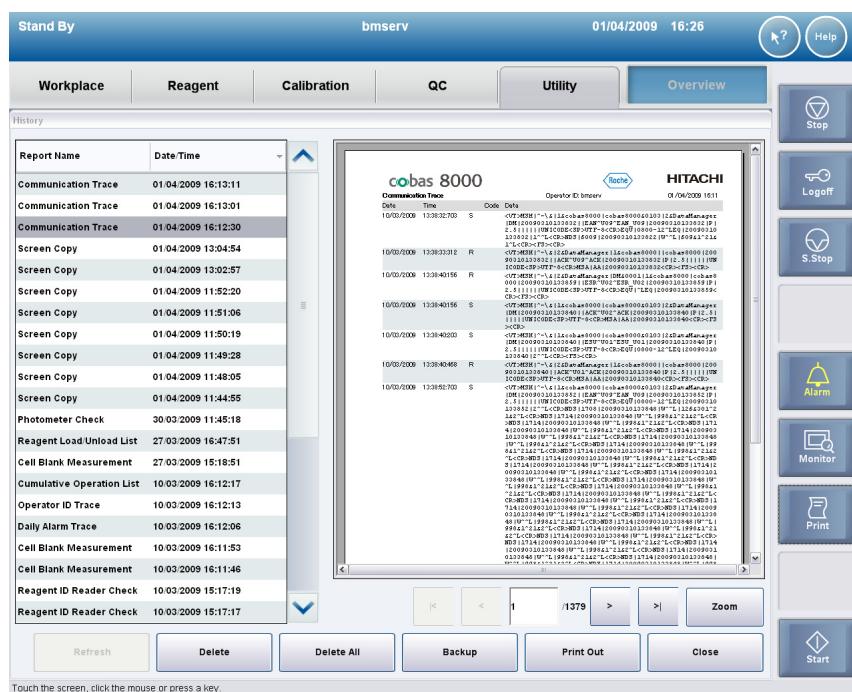


Figure B-22 Print > Utility > Communication Trace > Preview > History > Communication Trace

- 7** On the left of the screen, in the list of Reports, select the Communication Trace Report that you created. It displays in the main window on the right.
 - 8** You can view the Report in a number of ways.

Button	View
Zoom	Zooms in or zooms out of view in the main window on the right. There are 3 different levels of zoom.
Backup	Saves to a PDF file.
Print Out	Prints out to a physical printer.



When to use trace files

Due to the trace file size, it is recommended that the Communication Trace report not be routinely used. When enabled for troubleshooting purposes, it is recommended that the print buffer be printed prior to printing this report, as the size of it might overwrite other buffered printouts.



Sending a trace file

If you are sending a trace file by email to support engineers, be aware it can be very large. Compress it to, for example, a zip file, and consider if possible putting on a shared drive from where it can be downloaded. You can also save it to a memory stick or similar device, as with any other file.

Identifying patient samples by sequence number

By default, the patient samples are identified by a sample ID, which is encoded on the barcode on the sample tube. One alternative in the situation where samples lack barcodes, is to configure the instrument to number the samples in sequence: starting with 1 or another number, and increasing the number by 1 for each sample, up to a maximum of 60,000.

The Roche Diagnostics service personnel can configure this on the cobas® 8000 modular analyzer series instrument, the Control Unit, and on the *data manager*. This requires a dedicated configuration tool.

To implement this, ask for assistance from the Roche Diagnostics service personnel, and refer to the relevant service bulletins from August 2011, and the cobas® 8000 modular analyzer series *Service Manual* from version 1.02.04 (available 2012).

- ☞ For details of how to identify patient samples by sequence number, see Chapter 14 *Identifying patient samples by sequence number*.

Chart of configuration settings

This chart shows the possible configuration settings of specific options.

data manager sequence number support installed	Control Unit STAT / Routine barcode reader	Control Unit TS Ask in Barcode read Error	Barcode mode	Sequence Mode	Aliquots without barcodes from MODULAR PRE- ANALYTICS
Installed	ON	ON	OK	Not working	OK
		OFF	OK	Not working	Not working
	OFF	N/A	Not working	OK	Not working
Not Installed	ON	ON	OK	Not working	OK
		OFF	OK	Not working	Not working
	OFF	N/A	Not working	Not working	Not working

Table B-1

Table describing setup of *data manager* infrastructure to work in different modes

Other combinations are not supported.

To set these options:

- Sequence mode in *data manager*, Control Unit, and the cobas® 8000 modular analyzer series instrument: ask the authorized Roche Diagnostics service personnel to implement this.
- STAT / Routine barcode reader on Control Unit: on the Control Unit, navigate to **Utility > System > Barcode Settings > Routine/Stat**.
- Test selection ask in barcode read error on the Control Unit:
eye For details, see *Test Selection Ask in Barcode Read Error* on page B-38.

Physical layer specifications

Cables and low-level protocol configuration

This chapter explains how to configure the base and low-level communication protocol, and gives restrictions on which cables to use.

In this chapter

Chapter 5

Text encodings	B-47
Host communication settings and cables	B-47
Network connection	B-48
Serial connection	B-49

Text encodings

The data within the message has to be Unicode encoded as UTF-8 characters. UTF-8 and ASCII is similar between 32-127. If characters are used outside this range care should be taken, and only UTF-8 encoding is supported.



The host needs to handle UTF-8

In situations where the *data manager* operators will be able to enter UTF-8 characters, the host will have to support UTF-8, or be able to recognize and translate from UTF-8. If necessary, it is possible to prevent operators from entering UTF-8 characters by running the *data manager* in pass-through mode.

- ☞ For the UTF-8 codes of common Western European characters, see *Western European characters in UTF-8* on page E-112.

Host communication settings and cables

This section describes the cables required for a network or a serial connection, and where they have to be connected at the *data manager*'s machine.

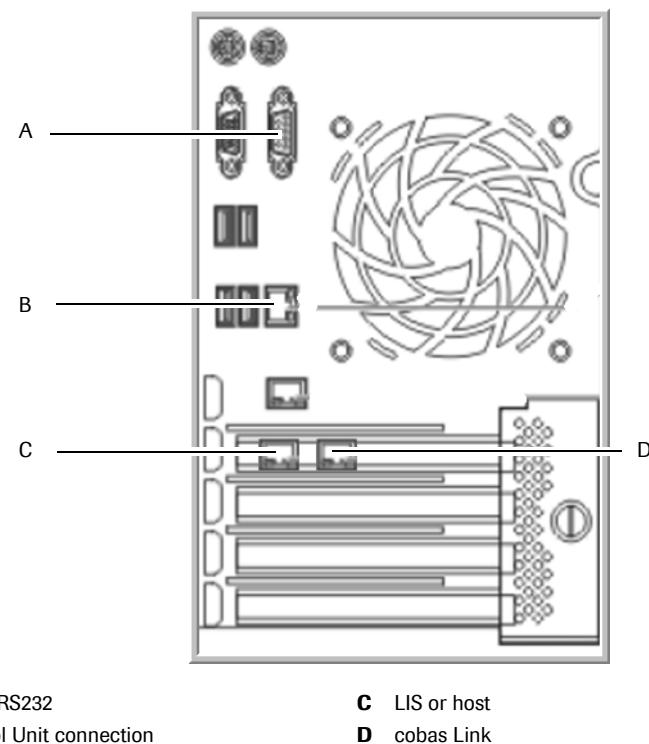


Figure B-23 Cables for connecting the PC running *data manager*

The cables should be connected as above.

Network connection

An ethernet cable Cat.5e or better can be used for the connection to the customer host system. Cat.5e is currently defined in TIA/EIA-568-B, and provides performance of up to 100 MHz, and is frequently used for both 100 MBit/s and 1000BASE-T Gigabit Ethernet networks. A crossover cable and straight-through cable are both supported.



Figure B-24 Cat.5e ethernet cable

By default the *data manager* works as a TCP/IP client, so the connected system (cobas® IT firewall or host) must act as the TCP/IP server. To configure the *data manager* can act as a TCP/IP server, please consult your Roche Diagnostics service personnel, or see the cobas® 8000 data manager *Service Manual*.

With cobas® IT firewall

When using cobas® IT firewall with *data manager*, these defaults are recommended:

- The IP address (172.20.1.31), the Subnetmask (255.255.255.0) and the default gateway (172.20.1.1) are fixed
- For ASTM, the TCP port number is fixed to 50001
- For HL7, the TCP port number is fixed to 50002

If there is a non-Roche firewall between the *data manager* and host, the firewall must not block the TCP-port for ASTM and HL7 (by default 50001 or 50002 respectively).

Ethernet standard

All network and hardware devices between the host and *data manager* must support at least 100MBit/s, including the firewall, routers, switches, cables and network adapters.

If either the host or *data manager* run on a PC which is connected to a network via a serial-to-network adapter, the connection is not a supported network connection, but performs as a serial connection.

☞ For details of serial connections, see *Serial connection* on page B-49.



Restart the host task and driver after network problems

If problems occur on the network, or the network connection is lost for some reason, for example if the firewall is rebooted, you may need to restart the host connection on the *data manager* and the driver on the host, in order to establish the network connection again.

☞ For details of restarting the host connection on the *data manager*, see *Starting and stopping the connection* on page B-21.

Serial connection

For a serial connection, use a cable RS232c, configured as follows.

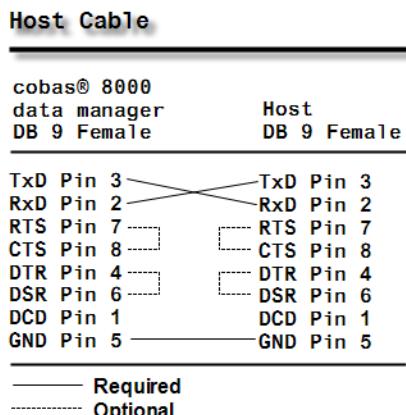


Figure B-25 Typical serial host interface connection cable for cobas® 8000 data manager

The dashed line indicates that the cable might have these bridges, if the communication partners are using these signals.



For serial connection, short shielded cable required.

For a serial connections, use a shielded RS232c cable, not longer than 15m.

Communication settings

The following diagram shows the recommend default communication settings.

Item	Recommend default communication settings
Communication Port	1
Electrical Signal	In accordance with EIA-232-D-1986
Cable Length	Maximum 15m
Communication speed (Baud rate)	19200
Parity	N
Databits	8
Stopbits	1



Some sites might reconfigure the communication settings

The default settings are as given, and these are recommended for best performance. If a host or LIS cannot use these parameters, it may be possible in certain cases for Authorized Roche Diagnostics service personnel to reconfigure the communication settings on individual sites according to individual requirements.



HL7 over a serial connection is not supported

ASTM over a serial connection is supported, but not HL7. For HL7, a network connection is required.

**Network connection is recommended**

For either ASTM or HL7 protocol, a fast network connection (100 MBit/s or faster) between the *data manager* and the host is highly recommended.

ASTM Reference

C

6	<i>ASTM protocol (LIS2 - A2)</i>	<i>C-3</i>
7	<i>ASTM text content (LIS2 - A2)</i>	<i>C-13</i>

ASTM protocol (LIS2 - A2)

This chapter presents the lower layers of the ASTM protocol, as used by cobas® 8000 data manager.

In this chapter

Chapter 6

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Background to the ASTM protocol

The ASTM (American Society of Testing and Materials) provides a standard for communication between automatic analyzers and host computers for standards E1381-91 (Specification for Low-Level Protocol to Transfer Messages Between Clinical Laboratory Instruments and Computer Systems) and E1394-91 (Standard Specifications for Transferring Information Between Clinical Instruments and Computer Systems). The basic specifications of the standards are regulated on X12 of ANSI.

Communication processing layers

The communication process between the *data manager* and the host is divided into four layers as shown below.

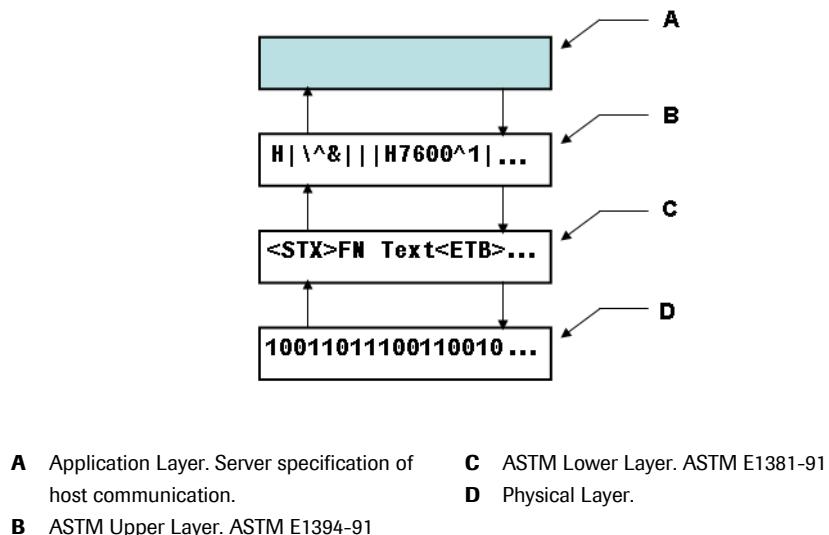


Figure C-1 Host Communication Processing Layers

Details of the ASTM protocol can be found in the *Annual Book of ASTM Standards*. Copyright American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

- ASTM E1381-91 Low Level Protocol
Specification for Low Level Protocol to Transfer Messages Between Clinical Laboratory Instruments and Computer Systems
- ASTM E1394-91 High Level Protocol
Standard Specification for Transferring Information Between Clinical Instruments and Computer Systems

ASTM lower layer

ASTM lower layer receives messages for a transmission request from the upper layer. These messages are then split into frames and sent to a communication medium to be transmitted to other parties. ASTM lower layer also constructs frames received from a communication medium to recreate messages to be transferred to the ASTM upper layer as reception messages.



ASTM frame maximum size 240 char + 7 control char

For one frame, maximum of 240 characters for text, plus 7 characters for frame control characters.

Messages equal to or less than 240 characters are transmitted as one final frame. Messages greater than 240 characters are split into frames that have character lengths that fall within the 240-character limit. The only or final remaining frame becomes the last frame and is indicated by <ETX>. All others are intermediate (middle) frames and are indicated by <ETB>.

Configuration and communication procedures for transmission and reception of frames are explained in the following sections.

ASTM frame	Item	Method	Explanation
	Frame Configurations	For Middle Frame <STX> FN text <ETB> C1 C2 <CR><LF> For Last Frame <STX> FN text <ETX> C1 C2 <CR><LF>	<ul style="list-style-type: none"> Control character (characters enclosed in <>): <STX> is control character (HEX 02) <ETB> is control character (HEX 17) <CR> is control character (HEX 0D) <LF> is control character (HEX 0A) <ETX> is control character (HEX 03) FN: FN is a single ASCII number. FN indicates the sequence number for a frame (the frame number modulus 8). Frames of a single transmission phase are consecutively numbered beginning with 1, so FN runs from 1 to 7, then continues with 0, 1, and so on. Text: the data content of a frame (maximum 240 characters). Records are sub-divided into intermediate (middle) frames with 240 or fewer characters. Text is part of a split message. C1 and C2: When 1 byte resulting from adding each byte, FN to <ETB> for the middle frame and FN to <EXT> for the last frame, is expressed in hexadecimal, the upper character (161) is C1 and the lower character (160) is C2. Characters used are '0' to '9' or 'A' to 'F'.
	Frame Character Configuration of Text	Characters other than <SOH><STX><ETX> <EOT><ENQ><ACK> <DLE><NAK><SYN> <ETB><CR><LF> <DC1><DC2><DC3>< DC4>	<SOH> is control character (HEX 01) <EOT> is control character (HEX 04) <ENQ> is control character (HEX 05) <ACK> is control character (HEX 06) <DLE> is control character (HEX 10) <NAK> is control character (HEX 15) <SYN> is control character (HEX 16) <DC1> ~ <DC4> are control characters (HEX 11 ~ 14)
	Maximum Length of the Frame	247 characters	For one frame, maximum of 240 characters for text, plus 7 characters for frame control characters. Messages equal to or less than 240 characters are transmitted as one final frame. Messages greater than 240 characters are split into frames that have character lengths that fall within the 240-character limit. The only or final remaining frame becomes the last frame and is indicated by <ETX>. All others are intermediate (middle) frames and are indicated by <ETB>.

ASTM syntax

The structure of the sentences to be transferred, according to ASTM Communication Regulation, is explained in this section. Between the analyzer and the host, various data such as Test Requests and Results are transferred back and forth. All of these data conform to this syntax.

Message	A message is constructed with an arrangement of several records (refer to the next item). It is the smallest unit of information transferred between a host and an analyzer. Messages begin with a 'Message Header Record' that indicates the beginning of a message and end with a 'Message Termination Record' that indicates the end of a message.
Record	A record is constructed from several fields and expresses a single purpose (such as to specify result reports or test requests). A record may be repeated or used singularly in a message. Code that indicates the purpose of a record is noted in the first character of that record.
Field	A field is the ASTM's smallest element to construct information. Attributes for a field (name, format, and meanings) are defined in units in a record.

Coding rules for the messages

This section deals with message coding rules as well as special characters, such as delimiters, used to develop messages provided by records and fields.

End of record character

The ASCII CR character (HEX 0D) is always used to indicate the end of a record.

Field delimiter = vertical bar ‘|’



Field delimiter ‘|’ supported, but no others

The field delimiter ‘|’ is supported in the current version of cobas® 8000 data manager (version 1.02). Other field delimiters are not supported.

A Field delimiter is a character used to separate fields that are next to each other in a record. This is also a delimiter for the first Record ID (character that appears in the beginning of a record) and the next field. According to the 2nd character that appears in the Message Header Record (record that appears in the front of a message), a Field delimiter can be defined with an optional character through the Message Header Record; however, the *data manager* requires a vertical bar ‘|’.

Repeat delimiter = backslash ‘\’



Repeat delimiter ‘\’ supported, but no others

The repeat delimiter ‘\’ is supported in the current version of cobas® 8000 data manager (version 1.02). Other repeat delimiters are not supported.

When a field is constructed by the same data repeated several times, it is referred to as a Repeated Field. The delimiter between the repeated items for the Repeated Field is called the Repeat delimiter. Repeat delimiters can be defined with an optional character through the Message Header Record; however, the *data manager* requires a backslash '\'.

Component delimiter = caret '^'



Component delimiter '^' supported, but no others

The component delimiter '^' is supported in the current version of **cobas®** 8000 data manager (version 1.02). Other component delimiters are not supported.

When a field is constructed by several elements, it is referred to as a Component Field. The delimiter between these elements is the Component delimiter. The Component delimiter can be defined with an optional character through the Message Header Record; however, the *data manager* requires a caret '^'.

Escape character = ampersand '&'



Escape character '&' not supported

The escape character is not supported in the current version of **cobas®** 8000 data manager (version 1.02). This character is reserved for future use.

An Escape character is to be provided to indicate a delimiter for the fields that include general text. When this character occurs in a relevant field, the next character holds a special meaning (discussed below). An Escape character can be defined with an optional character through the Message Header Record, however, the *data manager* requires an ampersand '&'.

Special characters with escape character



Special characters not supported

The special escape sequences are not supported with special character in the current version of **cobas®** 8000 data manager (version 1.02). This character is reserved for future use.

The following escape sequence (starting with & and ending with &) is defined. When this sequence is detected in a field, it is changed to a corresponding character and deleted.

Escape sequences other than these are skipped and treated as NULL values.

&F&	Indicates field delimiter
&S&	Indicates component delimiter
&R&	Indicate Repeat delimiter
&E&	Indicates Escape

Message transmission phases

To establish which system sends and which system receives information and to assure the actions of sender and receiver are well coordinated, there are three distinct phases in transferring information.

- Establishment phase
- Transfer phase
- Termination phase

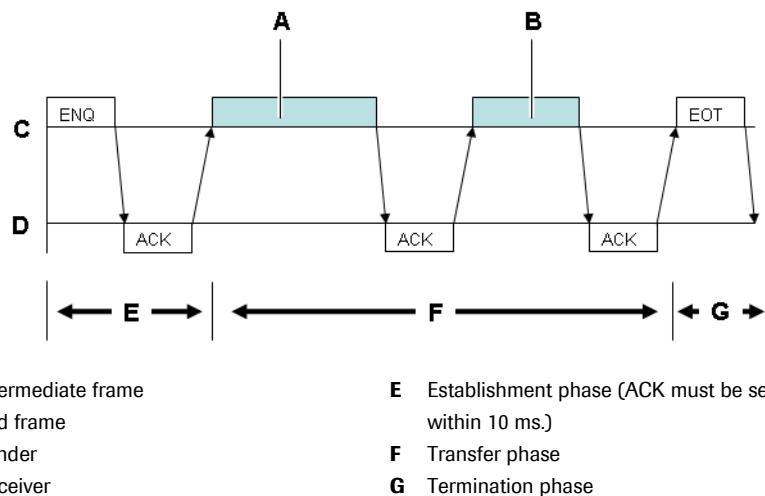


Figure C-2 Message Transaction Phases



Acknowledge must be received from the host within 10 ms

The host must send an ACK reply to *data manager* within 10 ms. Otherwise the performance of the system degrades and cannot reach its maximum throughput.

Within the transfer phase, all records of the corresponding message are grouped into longer frames to increase speed. The records are separated through a [CR] character. Therefore, to obtain pure ASTM records again, the receiver must concatenate all the frames and wait for a [EOT] character. Then, the receiver can process the frame and split it into different records using the [CR] as the separator.

Checksum calculation / message frame

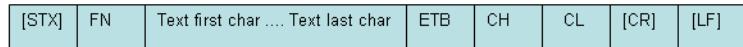


Figure C-3 The intermediate frame



Figure C-4 The end frame

[STX]	The ASCII code 2, indicating the beginning of a frame transmission.
FN	The frame number modulus 8. Frames of a single Transmission Phase are consecutively numbered beginning with 1. So FN runs from 1 to 7, continues with 0, 1, and so on. Use ASCII codes for the digits '0' to '7' (48-55).
Text	The data content of a frame (max. 240 characters). Records are sub-divided into intermediate frames with 240 characters.
	Maximum is indicated by [ETB]. The only or last remaining frame is indicated by [ETX]. Different records must be sent in different frames.
[ETB]	The ASCII code 23 (17hex), indicating the end of the text block of an intermediate frame.
[ETX]	The ASCII code 3, indicating the end of the text block of an end frame.
CH, CL	Represents the high nibble (= most significant 4 bit) respectively, the low nibble (=least significant 4 bit) of the 8-bit checksum. CH and CL are represented as two digits of hex numbers. The checksum is the modulus 8 of the sum of ASCII values of the frame characters starting with and including 'FN' and completing with [ETX] respectively [ETB].

*Example for Checksum
calculation*

[STX]1Test[ETX]

Character	Value (hex)	Sum
[STX]	02h	00h
'1'	31h	31h
'T'	+54h	85h
'e'	+65h	EAh
's'	+73h	15Dh
't'	+74h	1D1h
[ETX]	+03h	1D4h
		= 1D4h
		Mod 100h
		= D4h

Thus the message to be sent is:

[STX]1Test[ETX]D4[CR][LF]

ASTM text content (LIS2 - A2)

ASTM field definitions

This section describes all the ASTM fields used in messages transferred between cobas® 8000 data manager and the host HIS/LIS system.

In this chapter

Chapter 7

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Message Header Record	C-19
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ISE calibration analytical data	C-38
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Record levels

The following table shows the Standard Record types and levels specified by the protocol ASTM E1394-91.

- ☞ For details of ASTM E1394-91, see the information given in *Communication processing layers* on page C-5.

Level	Record Name	Identifier
0	Message Header Record	H
1	Patient Information Record	P
2	Test Order Record	O
3	Result Record	R
1 ... 3	Comment Record	C
1 ... 3	Manufacturer Specific Record	M
0	Message Termination Record	L
1	Request Information Record	Q

Messages used in host communication

The following section shows detailed descriptions of each of message sent between the host and *data manager*, and the ASTM records used in each.

Communication text	Communication Direction	Realtime Communication (a)	Batch Communication
Test Selection Information	Host to <i>data manager</i>	o	o
Order Query	Host to <i>data manager</i>	x	o
Result Query	Host to <i>data manager</i>	x	o
Test Selection Inquiry	<i>data manager</i> to Host	x	o
Patient Sample Analytical Data	<i>data manager</i> to Host	o	o
Control Sample Analytical Data	<i>data manager</i> to Host	o	o
Calibration Analytical Data	<i>data manager</i> to Host	o	x

(a) o = available, x = not available

Messages transmitted by the *data manager*

Messages transmitted from *data manager* to the host are shown in the table below. In the following charts:

- [] Square brackets indicate an optional segment. (0 - 1 times)
- { } Curly brackets indicate a segment or group of segments that may be repeated. (1 - n times.)

The identifier is set in the Comment or Special Instruction Field (H-11) in the Message Header Record with the reason for the message.

Messages	Syntax / Records	Comment or Special Instructions	Reasons
Inquiry for requested tests	H Q L	TSREQ	Inquiry is made for the requested test just after a rack has passed the ID reader.
Test Selection Information	H P O C L	TSUPL	Test selection upload for a sample as answer to an order query.
Result report	H P O C { R {C} } L	RSUPL RSUPL^REAL RSUPL^BATCH	Reports on the result at the point when the results for the sample have been accumulated, or when the results for the sample have been requested by the host. Transmits results of the selected sample(s) by instruction at the analyzer. First transmission of QC results, from <i>data manager</i> to host. Manual or repeat upload of QC results. Upload of patient sample results in reply to a result query.
Photometry Calibration Result Report	H M-PCR L	PCUPL^REAL	Reports at the point when the photometry calibration results are output.
ISE Calibration Result Report	H M-ICR L	ICUPL^REAL	Reports at the point when the ISE calibration results are output.
Elecsys Calibration Result Report	H M-ECR L	ECUPL^REAL	Reports at the point when the Elecsys calibration results are output.

Messages transmitted by the host

The *data manager* can receive the following message from a connected LIS.

Messages	Syntax / Records	Comment or Special Instructions	Reasons
Test Selection Information	H P O [C] L	TSDWN	Test selection download for a sample as an answer to a test selection inquiry or as unsolicited test selections send in batch mode by the host
Result Query	H Q L	RSREQ	Inquiry for test results for a given sample ID, sent from host.
Order Query	H Q L	TSREQ	Inquiry for a given sample ID's test selections known to the <i>data manager</i> , sent from host.

Record description

Field attributes

Types of attributes held by a field are explained below.

Attribute	Description
Field	The number of the field in the record.
Reference	The paragraph in the ASTM definitions that describes the field. See NCCLS. <i>Specification for Transferring Information Between Clinical Laboratory Instruments and Information Systems: Approved Standard, Second Edition</i> . NCCLS document LIS2-A2 [ISBN 1-56238-550-X]. NCCLS, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898 USA, 2004.
Value	<p>This shows either:</p> <ul style="list-style-type: none"> • The precise text to be sent. • The format of the field. <p>The format of the field can take one of the following values:</p> <ul style="list-style-type: none"> • <i>Character</i>: A single character. • <i>String</i>: A character string. • <i>Number</i>: A numeric value. Positive (+) or negative (-) is indicated before the numeric value. If it is not indicated, it is treated as positive (+). <p>If a decimal point is not included, the numeric value is treated as an integer. There are no restrictions for placing ‘0’ in the front and for ‘0s’ placed at the end of numbers with decimal points.</p> <ul style="list-style-type: none"> • <i>Date</i>: Always use the 4-digit Gregorian year. The format is YYYYMMDD (YYYY is the 4-digit Gregorian year, MM is the month, DD is the day). For example, September 5, 2009 is indicated 20090905. • <i>Time</i>: Military time. (24 hour) The format is HHMMSS (HH is the hour, MM is the minute, and SS is the second). • <i>DateTime</i>: A combination of Date and Time. The format is: YYYYMMDDHHMMSS. • <i>Complex</i>: A field in which multiple data components are combined, separated by a component delimiter. Each component may take one of the other formats.
Host	If sent from the host or LIS, this field is either: <ul style="list-style-type: none"> • R, required • O, optional
DM	If sent from <i>data manager</i> , this field is either: <ul style="list-style-type: none"> • R, required (in other words, always sent) • O, optional
Length / Max. Size	If used, the maximum number of characters supported in the field.
Description	A description of the field, including use and permitted values. In the case of complex fields, this includes a description of individual components.

Text encodings

The data within the message has to be Unicode encoded as UTF-8 characters. For characters from decimal 32 to 127 also ASCII can be used. Characters from 0 to 31 are control characters and therefore not allowed within the ASTM fields.



The host needs to handle UTF-8

In situations where the *data manager* operators will be able to enter UTF-8 characters, the host will have to support UTF-8, or be able to recognize and translate from UTF-8. If necessary, it is possible to prevent operators from entering UTF-8 characters by running the *data manager* in pass-through mode.

Escaping characters as defined for the delimiter characters is not supported (see Header Record, field no. 2). You should bear in mind, that future versions of cobas® 8000 data manager may implement further fields or manufacturer-defined records.

Message Header Record

This record occurs at the front of every message, and shows the sender and receiver and other important general information about the message.

The Host and DM columns indicate whether the data is Required or Optional when sent from the Host or *data manager* respectively.

```
H|^&|12345||cobas 8000^1.02||||host|TSREQ|P|1|20101026142034|
H|^&|12345||cobas 8000^1.02||||host|TSUPL|P|1|20101026142034|
H|^&|12345||cobas 8000^1.02||||host|RSUPL|P|1|20101026142034|
H|^&|12345||cobas 8000^1.02||||host|RSUPL^REAL|P|1|20101026142034|
H|^&|12345||cobas 8000^1.02||||host|RSUPL^BATCH|P|1|20101026142034|
H|^&|12345||cobas 8000^1.02||||host|PCUPL^REAL|P|1|20101026142034|
H|^&|12345||cobas 8000^1.02||||host|ICUPL^REAL|P|1|20101026142034|
H|^&|12345||cobas 8000^1.02||||host|ECUPL^REAL|P|1|20101026142034|
H|^&|12345||host||||cobas 8000^1.02|TSDWN|P|1|20101026142034|
H|^&|12345||host||||cobas 8000^1.02|RSREQ|P|1|20101026142034|
H|^&|12345||host||||cobas 8000^1.02|TSREQ|P|1|20101026142034|
```

Field	Ref.	Value	Host	DM	Description
1	6.1	H	R	R	Fixed value, identifying Header record
2	6.2	^\&	R	R	Delimiter definitions. Fixed values: <ul style="list-style-type: none"> • Field delimiter = vertical bar [ascii 124] • \ Repeat Delimiter = backslash [ascii 92] • ^ Component Delimiter = caret [ascii 94] • & Escape character = ampersand [ascii 38]
3	6.3	String	O	R	Message Control Identifier to uniquely identify the message. The cobas® 8000 data manager sends the internal message ID as integer number; the host can send any string or number for message identification or leave this field empty.
4	6.4	Field contains no data.			

Field	Ref.	Value	Host	DM	Description																				
5	6.5	Complex	-	R	<p>Sender ID. From <i>data manager</i>: <i>Sender^Version</i></p> <ul style="list-style-type: none"> • <i>Sender</i> is ID for the <i>data manager</i> installation, by default: cobas 8000 • To edit the Sender ID, see <i>Configuring the data manager host interface options</i> on page B-24. • <i>Version</i> is the <i>data manager</i> version (numeric value). 																				
		O	-		Sender ID. If sent, used only for tracing purposes.																				
6	6.6	<i>Field contains no data.</i>																							
7	6.7	<i>Field contains no data.</i>																							
8	6.8	<i>Field contains no data.</i>																							
9	6.9	<i>Field contains no data.</i>																							
10	6.10	String	O	R	<p>Receiver ID. Fixed value. Sent from <i>data manager</i>, is:</p> <ul style="list-style-type: none"> • Host <p>Sent from host, it should match the value sent from the <i>data manager</i> in H-5. By default, this is cobas 8000. It is used only for tracing purposes.</p>																				
11	6.11	Complex	R	R	<p>Identifier for the message type and purpose. Format is two strings: <i>Type^Mode</i>.</p> <table> <tbody> <tr> <td>TSREQ</td><td>Test selection request, from <i>data manager</i> to host, or from host to <i>data manager</i>.</td></tr> <tr> <td>TSDWN</td><td>Test selection download, from host to <i>data manager</i>.</td></tr> <tr> <td>TSUPL</td><td>Test selection upload, from <i>data manager</i> to host.</td></tr> <tr> <td>RSREQ</td><td>Result request, from host to <i>data manager</i>.</td></tr> <tr> <td>RSUPL</td><td>Result upload, from <i>data manager</i> to host.</td></tr> <tr> <td>RSUPL^REAL</td><td>First transmission of QC results, from <i>data manager</i> to host (or Patient results in a realtime or batch upload, except as an answer to a result request).</td></tr> <tr> <td>RSUPL^BATCH</td><td> <ul style="list-style-type: none"> • Repeat transmission of QC results, from <i>data manager</i> to host. • Patient sample result upload from <i>data manager</i> to host in reply to a result query. </td></tr> <tr> <td>PCUPL^REAL</td><td>Photometry calibration report, from <i>data manager</i> to host.</td></tr> <tr> <td>ICUPL^REAL</td><td>ISE calibration report, from <i>data manager</i> to host.</td></tr> <tr> <td>ECUPL^REAL</td><td>Elecsys calibration report, from <i>data manager</i> to host.</td></tr> </tbody> </table>	TSREQ	Test selection request, from <i>data manager</i> to host, or from host to <i>data manager</i> .	TSDWN	Test selection download, from host to <i>data manager</i> .	TSUPL	Test selection upload, from <i>data manager</i> to host.	RSREQ	Result request, from host to <i>data manager</i> .	RSUPL	Result upload, from <i>data manager</i> to host.	RSUPL^REAL	First transmission of QC results, from <i>data manager</i> to host (or Patient results in a realtime or batch upload, except as an answer to a result request).	RSUPL^BATCH	<ul style="list-style-type: none"> • Repeat transmission of QC results, from <i>data manager</i> to host. • Patient sample result upload from <i>data manager</i> to host in reply to a result query. 	PCUPL^REAL	Photometry calibration report, from <i>data manager</i> to host.	ICUPL^REAL	ISE calibration report, from <i>data manager</i> to host.	ECUPL^REAL	Elecsys calibration report, from <i>data manager</i> to host.
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ECUPL^REAL	Elecsys calibration report, from <i>data manager</i> to host.																								
12	6.12	P	O	R	Processing ID, fixed value P, meaning production.																				
13	6.13	1	O	R	Protocol version, fixed value 1. (Meaning LIS2-A2.)																				
14	6.14	DateTime	O	R	Time and date the message was created.																				

Patient Information Record

This record is used to transfer patient demographic data, such as age and sex.

P|1||SH25111965M||Doe^John||19651125|M|

P|1|||||^||||

Field	Ref.	Value	Host	DM	Description
1	7.1	P	R	R	Fixed value, identifying a Patient record.
2	7.2	1	R	R	Sequence number, fixed value, showing that only one Patient record is supported per message.
3	7.3	<i>Field contains no data.</i>			
4	7.4	<i>String</i>	O/R	O/R	Laboratory-assigned patient identifier. Max length 16 characters. This field is mandatory only if some patient demographic data is sent, in other words, if one or more of fields 6, 8, or 9 contain data. If fields 6, 8 and 9 are empty, this field is blank.
5	7.5	<i>Field contains no data.</i>			
6	7.6	<i>Complex</i>	O	O	Patient surname and first name, in separate string components: <i>Surname^Firstname</i> Each component has a max length of 30 characters.
7	7.7	<i>Field contains no data.</i>			
8	7.8	<i>Date</i>	O	O	Patient's birthdate. (YYYYMMDD)
9	7.9	<i>Character</i>	O	O	Patient sex: <ul style="list-style-type: none">• M Male• F Female• U Unknown. Any other value defaults to unknown, and is returned to the host as U.

All following patient record fields contain no data.



The *data manager* supports only M, F, or U for patient sex.

For male patients, the host must send M, for females, F. Otherwise the wrong reference range might be applied. The *data manager* reads any other value as U, and applies the reference ranges for a patient of unknown sex.

Make sure the host sends only M, F, or U, as required. Each new configuration must be tested to ensure the correct data transfer between the *data manager* and the host.

Order Record

This record holds information regarding the analysis request and sample information. It is sent to the *data manager* within test selection message, and to the host within result message.

Order record in TS Download message

O|1|500169|^50017^3^^S1^SC|^^^8706^|R|||||A||||1|||||||O

Order record in Result Upload message

O|1|10005|0^110005^2^^S1^SC^not|^^^989^1\^^^990^1\^^^991^1|R|
20100429161525|20100429161525||||N||||1|||||||F|

Order record in Quality Control result message

O|1|HBCN^611490^1|0^30001^2^^QC^SC^not|^^^870^1|R|||||Q||||4|
|||||||F|

Order record with sequence number in TS Download

O|1||1013^50101^3^^S1^SC^not|^^^8571^1\^^^8413^1\^^^8706^1\R|
20110715093311|20110715093311||||A||||1|||||||O

Order record with sequence number in Result Upload

O|1||1013^50101^3^^S1^SC^not|^^^8413^1\^^^8571^1\^^^8706^1\R|201107150
93311|20110715093311||||N||||1|||||||F|

Field	Ref.	Value	Host	DM	Description
1	8.4.1	o	R	R	Fixed value, identifying an Order record.
2	8.4.2	1	O	R	Sequence number, fixed value, showing that only one Order record is supported per Patient record.
3	8.4.3	String, or for QC, Complex	R/O	R	<p>Identifier for the sample, (sample ID). For patient results, this is the sample's barcode (string of max. 22 characters padding not allowed). This field is required, when using barcodes. If the patient sample is identified by the sequence number in O-4.1, this field must be empty.</p> <ul style="list-style-type: none"> ⦿ For details of sequence numbers, see Chapter 14 <i>Identifying patient samples by sequence number</i>. <p>For Quality Control material, <i>Name^Lot^ID</i></p> <ul style="list-style-type: none"> • <i>Name</i> Control name, for example, PNU. (String) • <i>Lot</i> Control lot (Number) • <i>ID</i> Control identifier (a unique control ID contained in <i>data manager</i>). (Number) <p>Ordering test selections for QC is not possible from host.</p>

Field	Ref.	Value	Host	DM	Description
4	8.4.4	Complex or <i>Number</i>	R	O/R	<p>Instrument sample identifier, with additional information for identifying the sample.</p> <p><i>Sequence_Number^Rack_ID^Position^^Rack_Type^Container^Diluted</i></p> <p>This field is optional in a message sent in response to an order or result query. Otherwise the field is mandatory.</p> <p>Note: When samples are identified by sequence number, in a Test selection upload from the <i>data manager</i> to the host in response to an order query, this is:</p> <ul style="list-style-type: none"> • <i>Number</i> field, contains the sequence number.
4.1		<i>Number</i>	O	R	<p><i>Sequence_Number</i></p> <p>For patient samples identified by sample ID (default), and QC samples, the <i>data manager</i> sends 0 (zero) in this field, and ignores any value the host sends.</p> <p>For patient samples identified by sequence number, this contains the sequence number. (Max. value = 60,000.) If the host sends a sample ID in O-3, the <i>data manager</i> ignores any value in this field.</p> <p>This field was previously known as "Sample number."</p>
4.2		<i>Number</i>	R/O	R/O	<p><i>Rack_ID</i></p> <p>ID of the sample rack with space for 5 samples. Not sent with result records with manually-entered results. Optional for messages from host to <i>data manager</i>, if the sample is identified by sequence number.</p>
4.3		<i>Number</i>	R/O	R/O	<p><i>Position</i></p> <p>Sample's position on the rack. Value 1 to 5. Not sent with result records with manually-entered results. Optional for messages from host to <i>data manager</i>, if the sample is identified by sequence number.</p>
4.4		<i>Component contains no data.</i>			
4.5		<i>String</i>	R	R	<p><i>Rack_Type</i></p> <p>A two character code, identifying the rack type.</p> <ul style="list-style-type: none"> • S1 Serum / Plasma • S2 Urine • S3 Cerebrospinal Fluid • S4 Supernatant • S5 Other fluids • S6 Whole blood • S7 Oral fluids (Saliva) • S8 Reserved • S9 Reserved • SA Reserved • QC Quality Control <p>(Note, that this field does not support the \$0 used in the Query record.)</p>
4.6		<i>String</i>	R	R	<p><i>Container</i></p> <p>A two-character code, identifying the container.</p> <ul style="list-style-type: none"> • MC Micro Cup • SC Standard Cup • (No value) Default (Information available at the instrument is used.)
4.7		<i>String</i>	R	R	<p><i>Diluted</i></p> <p>A flag indicating if the sample is diluted or not.</p> <ul style="list-style-type: none"> • not Normal sample • pre-diluted Prediluted sample • (No value) Normal sample

Field	Ref.	Value	Host	DM	Description
5	8.4.5	Complex	O	R/O	<p>Testcode with dilution factor.</p> <p>^^^^Testcode^Dilution</p> <p>If the host has no pending test, the host must send a Test Selection Download message with this field empty. In a test selection upload, if the <i>data manager</i> has no information on tests, it will leave this field empty.</p> <p>You can send multiple tests codes in one message by repeating this field, for example:</p> <pre>O 1 1234 0^00083^5^^S1^SC ^^^989^1\^^^990^1\^^^991^1 S 2010 1026152611 20101026152611 A 1 O </pre> <p>For serum index tests, you must send all three test types together (lipemic, icteric, and hemolytic), or send a test profile that contains all three. Otherwise the test will not be run.</p> <p>☞ For more details on sending serum index orders, see <i>Sending test selections</i> on page B-12.</p> <p>5.1 <i>First component contains no data.</i></p> <p>5.2 <i>Second component contains no data.</i></p> <p>5.3 <i>Third component contains no data.</i></p> <p>5.4 Number R R Testcode The fourth component contains the code to identify the test (in other words, the application code or analyte tested for). The maximum length is 5 digits: the <i>data manager</i> takes the last 5 digits and strips any leading zeros. The host can download the test numbers of calculated tests, if the test is programmed on the <i>data manager</i>. For details, see the cobas® 8000 modular analyzer series <i>Operator's Manual</i>.</p> <p>5.5 String (or number) O O Dilution Dilution factor. Sent also by the <i>data manager</i> if available, but the host has to take the dilution from the Result record for the test. The dilution factor is sent as a string:<ul style="list-style-type: none">• By the host in the Order Record, field 5, component 5.• By the <i>data manager</i> in the Result Record, field 3, component four, in the second part.Permitted values are:<ul style="list-style-type: none">• For an ISE module, the only value that can be used is: 1• For a C-module: Dec, Inc, 1• For an E-module: 1, 2, 5, 10, 20, 50, 100, 400The value 1 means no dilution. If the host sends an empty field, this defaults to 1.</p>
6	8.4.6	String	R	O/R	<p>Priority.</p> <ul style="list-style-type: none">• R Routine• S STAT <p>STAT samples must be placed in the STAT racks.</p> <p>This field is empty in a result or test selection upload message sent in response to an order or result query. Otherwise the field is mandatory.</p>
7	8.4.7	DateTime	O	O	Date and time of order creation
8	8.4.8	DateTime	O	O	Date and time of sample collection
9	8.4.9	Field contains no data.			
10	8.4.10	Field contains no data.			
11	8.4.11	Field contains no data.			

Field	Ref.	Value	Host	DM	Description
12	8.4.12	Character	R	R	<p>Action code. This is the action to take in response to the message.</p> <p>From the host:</p> <ul style="list-style-type: none"> • A Add or rerun test • R Add or rerun test • C Cancel test (The test can only be canceled before it has been downloaded to the cobas® 8000 modular analyzer series instrument.) <p>From the <i>data manager</i>:</p> <ul style="list-style-type: none"> • N Patient result • Q Quality Control result • O Order query response (test selection upload)
13	8.4.13	<i>Field contains no data.</i>			
14	8.4.14	<i>Field contains no data.</i>			
15	8.4.15	<i>Field contains no data.</i>			
16	8.4.16	Character	R	O/R	<p>Specimen type.</p> <p>The specimen type must match the second character of the rack type (field O-4.5), except for QC samples. Optional only when sent to the host in response to an order or result query. Otherwise mandatory.</p> <p>Note that depending on the version and the modules of the cobas® 8000 modular analyzer series, not all these types may be available on any particular system.</p> <ul style="list-style-type: none"> • 1 Serum / Plasma • 2 Urine • 3 Cerebrospinal Fluid • 4 Supernatant • 5 Other fluids • 6 Whole blood • 7 Oral fluids (Saliva) • 8 Reserved • 9 Reserved • A Reserved <p>For QC samples, the host should disregard any value in O-16.</p>
17	8.4.17	<i>Field contains no data.</i>			
18	8.4.18	<i>Field contains no data.</i>			
19	8.4.19	<i>Field contains no data.</i>			
20	8.4.20	<i>Field contains no data.</i>			
21	8.4.21	<i>Field contains no data.</i>			
22	8.4.22	<i>Field contains no data.</i>			
23	8.4.23	<i>Field contains no data.</i>			
24	8.4.24	<i>Field contains no data.</i>			
25	8.4.25	<i>Field contains no data.</i>			
26	8.4.26	Character	R	R	<p>Report type, indicating source of message.</p> <ul style="list-style-type: none"> • O Sent from host. • F Sent from <i>data manager</i> / cobas® 8000 modular analyzer series.

Comment Record (following Order Record)

Record to transfer comments. This record is transmitted by the host (within test selection message) or the *data manager* (within result message or test selection upload). These comments are visible at the Control Unit.

C | 1 | L | Comment1^Comment2^Comment3^Comment4^Comment5 | G



Special format of cobas® 8000 data manager comment records

The format of the comment record is not totally in accordance with the LIS2-A2 standard, in order to keep backwards-compatibility with the cobas® 6000 comment record. The cobas® 6000 comment record was used to transfer patient demographic data.

Field	Ref.	Value	Host	DM	Description
1	10.1	C	R	R	Record Identifier, fixed value.
2	10.2	Number	R	R	Sequence number. Set to 1, as only one comment is permitted after an order record.
3	10.3	Character	R	R	Comment source. A single-character code. From the host, this is always set to L. From the cobas® 8000 modular analyzer series, it is set to I.
4	10.4	Complex	O	O	The format (when sent after an order record): <i>comment1^comment2^comment3^comment4^comment5</i> • comment1 String with up to 30 characters • comment2 String with up to 25 characters • comment3 String with up to 20 characters • comment4 String with up to 15 characters • comment5 String with up to 10 characters In HL7, this data is passed in SPM-14.
5	10.5	G	R	R	Code for qualifying the comment record type. Following an order record, this is a fixed value, G, indicating an order comment.

Result Record

The *data manager* uses the result record to upload the details of test results.

A quantitative patient result:

```
R|1|^^^999/1/not|2.3^|mmol/L|0.5 - 7.5^TECH\^NORM\^CRIT\^USER|N||F||bmsrv^DMROUTINE|20100711163455|20100711163455|ISE^2^MU1#ISE#1#2^4|
```

A qualitative patient result:

```
R|1|^^^101/1/not|1^2.68|mmol/L|^TECH/\^NORM/\^CRIT/\^USER|N||F||bmsrv^DMROUTINE|20090311163455|20090311163455|ISE^2^MU1#ISE#1#2^4^104|
```

For an automatically-validated result, the operator is written as “SYSTEM”:

```
R|3|^^^991/Inc/not|5.5|mmol/L|4.0 - 44.0^TECH\2.0 - 22.0^NORM\3.0 - 33.0^CRIT\1.0 - 11.0^USER|N||F||bmserv^SYSTEM|20100718164600|20100729161525|ISE^2^MU1#ISE#1#2^4|
```

For an automatically-validated QC result:

```
R|1|^^^870/1/not|17.30|g/dL||||F||bmserv^SYSTEM|20100718164500|20100729165317|22^1^MU1#c502#2#1^9^0^Current|
```

This shows a result below the EP-17A level of detection:

```
R|1|^^^989/1/not|2.1|mmol/L|^TECH\9 - 144^NORM\^CRIT\^USER|LoD||F||bmserv^SYSTEM|20100621084348|20100621084404|ISE^1^MU1#ISE#1#1^3^28|
```

Field	Ref.	Value	Host	DM	Description
1	9.1	R		R	Record identifier for Result record, fixed value.
2	9.2	Number		R	Sequence number The first result relating to the preceding Order record takes the sequence number 1. The sequence number increments by one for each further result for that Order record.
3	9.3	Complex		R	Test request ^^^Testcode/Dilution/Pre-dilution Note that the fourth component is separated into three parts with a forward-slash separator /.
3.1		<i>This component contains no data</i>			
3.2		<i>This component contains no data</i>			
3.3		<i>This component contains no data</i>			
3.4			R	Testcode	Number Identifier (or application code) for the test (analyte searched for), used by the cobas® 8000 modular analyzer series. (Max. 5 digits)
			R	Dilution	String Dilution factor, as sent by the cobas® 8000 modular analyzer series instrument. Permitted values are: <ul style="list-style-type: none">• For an ISE module, the only value that can be used is: 1• For a C-module test: Dec, Inc, 1• For an E-module test: 1, 2, 5, 10, 20, 50, 100, 400
			O	Pre-dilution	String Indicates whether sample is pre-diluted: <ul style="list-style-type: none">• pre-diluted• not

Field	Ref.	Value	Host	DM	Description
4	9.4	Complex		R	<p>Measurement value.</p> <p>The measurement values are only transmitted for patient and QC results.</p> <p><i>ReportableResult^AdditionalResultValues</i></p>
					Quantitative results:
	4.1	Number		R	<p><i>ReportableResult</i> The result. A missing result is sent as 7 spaces. (ASCII 32 / 0x20).</p>
	4.2	Number		O	<p><i>AdditionalResultValues</i></p> <p><i>Empty or a qualitative flag.</i></p>
					Qualitative results:
	4.1	Number		R	<p><i>ReportableResult</i></p> <ul style="list-style-type: none"> For C-module and ISE module: an integer code from -2 to 3 inclusive. For E-module: an integer code -1, 0, 1. <p>The codes can be configured on the cobas® 8000 instrument, under Utility > Application > Range, see <i>cobas® 8000 modular analyzer series Operator's Manual</i> for details</p>
	4.2	Number		R	<p><i>AdditionalResultValues</i></p> <p>The quantitative value, like <i>value</i> for a quantitative result.</p> <p>For E-module qualitative results this contains <i>COI</i>.</p>
5	9.5	String		R	Units in which result is measured. (for example, mmol/L, etc.)
6	9.6	Complex		O	<p>For patient results, reference ranges, if defined. Empty for QC results.</p> <p>Patient results example:</p> <p>0.5 - 7.5^TECH\3.3 - 5.1^NORM\^CRIT\^USER</p> <p>These take the format:</p> <p><i>RangeDefinitionString^TypeOfRange</i></p>
	6.1	String		O	<p>The <i>RangeDefinitionString</i> string component can consist of the any of the following:</p> <ul style="list-style-type: none"> Two numbers (with or without decimal points) separated by space-hyphen-space, for example, <p>0.5 - 7.5</p> <p>Note that either or both of these number may potentially be negative, for example,</p> <p>-10 - -7</p> <ul style="list-style-type: none"> A “greater than” or “less than” value, for example, <p>< 0.1</p> <ul style="list-style-type: none"> A comma-separated string of permissible values, for example, <p>Y, N, U</p> <p>-,+,-+</p>
	6.2	String		O/R	<p>The <i>TypeOfRange</i> string component can consist of any of four values.</p> <ul style="list-style-type: none"> TECH Hard-coded value to indicate “Technical Range” NORM Hard-coded value to indicate “Normal Range” CRIT Hard-coded value to indicate “Critical Range” USER Hard-coded value to indicate “User-defined Range” <p>These four values can occur in the same record as a repeat field, for example:</p> <p>0.5 - 7.5^TECH\3.3 - 5.1^NORM\^CRIT\^USER</p> <p>Note that the different ranges are separated with the repeat delimiter, a backslash “\”. If a range is not defined, the <i>RangeDefinitionString</i> is blank.</p>

Field	Ref.	Value	Host	DM	Description
7	9.7	String		O	<p>Result abnormal flags for patient results. This is empty for manually-edited results.</p> <p>HH Above high critical value H Above high normal value N Normal L Below low normal value LL Below low critical value A Alphanumeric result out of normal range AA Alphanumeric result out of critical range LoB Below the Limit of Blank LoD Below the Limit of Detection LoQ Below the Limit of Quantitation No data signifies that no validation against ranges has been performed.</p> <p>If more than one flag is triggered, only the most extreme flag is sent. The EP-17 flags, LoB, LoD, and LoQ take precedence over the others.</p> <p>☞ For further details on the EP-17A flags, see <i>EP-17A and the result abnormal flags</i> on page B-8.</p>
8	9.8	<i>Field contains no data.</i>			
9	9.9	Character		R	<p>Result status. This can take:</p> <ul style="list-style-type: none"> • F = First run result, or QC result • C = Corrected result • M = Manually edited result • X = Calculated test, but test could not be calculated (for example, divided by zero)
10	9.10	<i>Field contains no data.</i>			
11	9.11	Complex		R	<p>Active operators in the format: <i>Instrument operator^Datamanager operator</i></p>
11.1		String		R	<ul style="list-style-type: none"> • <i>Instrument operator</i> This is the username the operator used to log into the Control Unit. Empty in the case of a manual or calculated result.
11.2		String		R	<ul style="list-style-type: none"> • <i>Datamanager operator</i> This is the username the operator used to log into the <i>data manager</i>. If the result is automatically validated, or the <i>data manager</i> is in pass-through mode, this reads SYSTEM.
12	9.12	DateTime		O	<p>Pipetting time. This is considered to be the time the test started. (Format: YYYYMMDDhhmmss.)</p> <p>Note: For manual and calculated tests, this field is empty.</p>
13	9.13	DateTime		R	<p>Completion time. This is the time the result is available (in other words, time of validation at the <i>data manager</i>). (Format: YYYYMMDDhhmmss.)</p>

Field	Ref.	Value	Host	DM	Description
14	9.14	Complex		R	Identifier of the measurement unit or module that performed the test. <i>ModuleType^SubModule^AnalyticalUnitID^InstrumentID^CalID^Bottle^SBNo</i>
14.1		String		R	<i>ModuleType</i> • c502, c701, e602, ISE, c702, for results from measuring modules, or manual results entered on behalf of a specific module. • DM for results calculated on the <i>data manager</i> , and for manual results entered on the <i>data manager</i> , but cannot be attributed to a module. • c8000 for results from the cobas® 8000 modular analyzer series that cannot be mapped to an actual measuring submodule, for example, sample short.
14.2		Number		R	<i>SubModule</i> • 1 or 2, for result from a submodule. • 0 (zero) otherwise.
14.3		String		R	<i>AnalyticalUnitID</i> Identifier for the module, as sent to the host. This setting is configurable in the cobas® 8000 data manager in the definition of the module, under the heading ID sent to Host (meaning the identifier that the instrument sends to the host). The default value is: <i>Instrument#ModuleType#Position#SubModule</i> Example: MU1#c502#2#1 ☞ For details, see below, <i>Identifier of the analytical unit sent to host</i> on page B-30.
14.4		Number		R	<i>InstrumentID</i> Instrument number in <i>data manager</i> (A specific identifier inside the <i>data manager</i> which identifies a module. This is a number which has no relationship to the internal position of the module in the machine.)
14.5		Number		R	<i>CalID</i> Calibration ID. Identifier of the calibration the result refers to, set in the Control Unit. Sent only if available. It is empty for results that do not have a calibration, for example, calculated and manual results.
14.6		String		R	<i>Bottle</i> Used Reagent Set. • Current • Standby • (or empty)
14.7		Number		<i>SBNo</i>	Reserved field, only for QC measurements, otherwise empty. An integer showing the standby bottle number, if used. The standby bottles are numbered sequentially, starting with 1. Reserved field, only for QC measurements, otherwise empty.

Comment Record (following Result Record)

Record to transfer comments regarding the measured result. This record is transmitted by the *data manager*, either by adding a comment to a result, or by passing on an instrument comment received from the Control Unit. The first record is an instrument flag, and is mandatory.

For a test that did not generate any instrument alarms, the instrument flag is:

C|1|I|0|I|

This is: "C-one-i-zero-i".

An instrument alarm flag is, for example:

C|1|I|23^ISE Sample range over|I|

A comment from the *data manager* is, for example:

C|2|L|Second comment^DMROUTINE^20101026164339|G|

C|3|L|Test done on instrument^DMROUTINE^20101026164238|G|



Special format of cobas® 8000 data manager comment records

The format of the comment record is not totally in accordance with the LIS2-A2 standard, in order to keep backwards-compatibility with the cobas® 6000 comment record.

Field	Ref.	Value	Host	DM	Description
1	10.1	C		R	Record Identifier, fixed value.
2	10.2	Number		R	Sequence number. The first comment relating to the preceding Result record takes the sequence number 1. The sequence number increments by one for each further comment for that Result record. Multiple comment records for a result record are permitted.
3	10.3	Character		R	Comment source: <ul style="list-style-type: none">• I Result flag, from the instrument or the <i>data manager</i>.• L The comment was added on the <i>data manager</i>.

Field	Ref.	Value	Host	DM	Description
4	10.4	<i>Complex</i>		O	This field contains the main part of the comment record. The contents of this field depend on what type of comment the record is sending. The comment type is specified in field 5 below.
Comment Type I					
If the instrument has returned an error flag, the details of the flag are returned in this field.					
					<i>Flag^Description</i>
4.1		<i>Number</i>			<i>Flag</i> Number showing error status (or alarm status) <ul style="list-style-type: none"> • 0 means no error • a number >0 is an error number.
For details of the error flags, see Chapter 11 <i>Data Alarms</i> .					
4.1		<i>String</i>			<i>Desc</i> Description of error flag (blank if no error)
Comment Type G after result record					
<i>Test^User^Date</i>					
4.1		<i>String</i>			<i>Text</i> Comment text
4.2		<i>String</i>			<i>User</i> User who entered the comment
4.3		<i>Datetime</i>			<i>Date</i> Creation date and time in datetime format
5	10.5	<i>Character</i>		R	Code for qualifying the comment record type. Comments sent by <i>data manager</i> can have the following types: <ul style="list-style-type: none"> • <i>I</i> Result flag • <i>G</i> Result text comment created in <i>data manager</i>. The content of the comment is passed in field 4.

Query Record (Request Information Record)

The *data manager* and the host both use the Query Record, or Request Information Record, to request a sample's open test selections, in a test selection inquiry message or a order query message (H-11 is TSREQ). It is also used to request test results in a Result Query message (H-11 is RSREQ).

From *data manager* to host:

```
Q|1|^123^0^10001^2^^S1^SC^R1||ALL||||||R|O||  
Q|1|^*****0^10001^2^^S1^SC^R1||ALL||||||R|O||
```

From host to *data manager*:

```
Q|1|^S1^10001|||||||  
Q|1|^S2^10001|||||||O|  
Q|1|^10003|||||||
```

From *data manager* to host with sample identified by sequence number:

```
Q|1|^1013^50101^3^^S1^SC^R1||ALL||||||R|O|
```

From host to *data manager* with sample identified by sequence number:

```
Q|1|^S1^1031|||||||F|
```

Field	Ref.	Value	Host	DM	Max Size	Description
1	11.1	Q	R	R	1	Record identifier, fixed value.
2	11.2	1	R	R	1	Sequence number. Fixed value, showing that only one query record per message is supported.
3	11.3	Complex	R	R		Query parameters that identify the required information.
From host to <i>data manager</i> (result or order query):						
3.1	The first component contains no data.					
3.2	String	R	-	2	<i>Rack_Type</i>	The rack type as assigned to a specific specimen type on <i>data manager</i> . Depending on the version and modules installed, not all of these types may be available on any particular system. S1 Serum S2 Urine S3 Cerebrospinal Fluid S4 Supernatant S5 Other fluids S6 Whole blood S7 Oral Fluids (Saliva) S8 Reserved S9 Reserved SA Reserved S0 A rack with no specimen assigned. (Only supported for queries sent by the <i>data manager</i> .)

Field	Ref.	Value	Host	DM	Max Size	Description
3.3		String	R/-	-	22	<p><i>Sample_ID</i></p> <p>This is the barcode label attached to the sample tube, if used, or the system's sample ID.</p> <p>This must be blank if Q-3.4 contains the sequence number.</p>
3.4		Number	R/-	-	5	<p><i>Sequence_Number</i></p> <p>If the sample is identified by sample ID (default), the <i>data manager</i> ignores the value of this field.</p> <p>If the sample is identified by sequence number, this contains the sample's sequence number. (Max. value = 60,000.)</p> <p>☞ To learn how to use this, see Chapter 14 <i>Identifying patient samples by sequence number</i>.</p> <p>Previously, this field was known as "Sample Number."</p>

The further components contain no data.

From *data manager* to host: (test selection query)

From *data manager* to host in a test selection query message:

 ^*Sample_ID*^*Sequence_Number*^*Rack_ID*^*Position*^*Rack_Type*^*Container*^ *QueryType*

3.1 *The first component contains no data.*

3.2 *The second component contains no data.*

3.3 String - R/O 22 *Sample_ID* This is the barcode label attached to the sample tube.

This is blank if Q-3.4 contains the sequence number.

3.4 Number - R 5 *Sequence_Number* If the sample is identified by sample ID (default), always set to 0 (zero).

If the sample is identified by sequence number, this contains the sample's sequence number. (Max. value = 60,000.)

☞ To learn how to use this, see Chapter 14 *Identifying patient samples by sequence number*.

Previously, this field was known as "Sample Number."

3.5 String - R 5 *Rack_ID* Identifier of the rack sent by cobas® 8000 instrument.

3.6 Number - R 1 *Position* The sample's position on the rack sent by the instrument. Takes the value 1 to 5.

3.7 *The seventh component contains no data.*

3.8 String - R 2 *Rack_Type* The rack type as assigned to a specific specimen type on *data manager*. Depending on the version and modules installed, not all of these types may be available on any particular system.

S1 Serum

S2 Urine

S3 Cerebrospinal Fluid

S4 Supernatant

S5 Other fluids

Field	Ref.	Value	Host	DM	Max Size	Description
					S6	Whole blood
					S7	Oral Fluids (Saliva)
					S8	Reserved
					S9	Reserved
					SA	Reserved
					S0	A rack with no specimen assigned. (Only supported for queries sent by the <i>data manager</i> .)
3.9		<i>String</i>	-	O	2	<i>Container</i> A two-character code: MC Micro cup SC Standard cup An empty value defaults to standard cup.
3.10		<i>String</i>	-	R	2	<i>QueryType</i> A two-character code: R1 Query for 1st measurement R2 Rerun query
4	11.4	<i>Field contains no data.</i>				
5	11.5	ALL	-	R	3	Subselection criteria, fixed value
6	11.6	<i>Field contains no data.</i>				
7	11.7	<i>Field contains no data.</i>				
8	11.8	<i>Field contains no data.</i>				
9	11.9	<i>Field contains no data.</i>				
10	11.10	<i>Field contains no data.</i>				
11	11.11	<i>Field contains no data.</i>				
12	11.12	<i>Character</i>	-	R	1	• R for Routine samples • S for STAT samples (Short Turn-Around Time)
13	11.13	<i>Character</i>	-	R	1	The request information status code. If sent from the <i>data manager</i> to the host: • ○ (capital letter O) for “Request for test selections”. <i>Character</i> O - 1 The request information status code. If sent from the host to the <i>data manager</i> in a result inquiry: • F = send final results • (empty) = send all results If sent from the host to the <i>data manager</i> in an order inquiry: • ○ = (capital letter O) send only open orders with no results • (empty) = send all orders

Photometric Calibration Result M(PCR)

The *data manager* sends calibration data from the C-module (or photometric module) in the manufacturer-defined Photometric Calibration Result M(PCR) record.

```
M|1|PCR|bmserv|^^^8685|MU1#c701#1#1|16|0|22851^4^22866^2^0^\\24786^-361
^24149^-362^0^\\^^^^^\\^^^^^\\^^^^^\\^^^^^|
```

Field	Ref.	Value	Host	DM	Max Size	Description
1	14	M	-	R	1	Record type ID, fixed value signifying manufacturer record.
2	14	Number	-	R	6	Sequence Number: This record appears as the next layer of the Message Header Record. For one record, the field value is '1'; for specifying several, sequence numbers starting from 1 are assigned.
3	14	PCR	-	R	3	Record Type Sub ID. Set to 'PCR'.
4	14	String	-	R	6	ID of the operator who performed the calibration at the analyzer.
5	14	Complex	-	R		Test Code (Application code). ^^^Testcode The Test Code is a number type. The maximum range of test code is 5 digits.
6	14	String	-	R	20	ID of the analytical unit (module) the test belongs to. ☞ For details, see <i>Identifier of the analytical unit sent to host</i> on page B-30.
7	14	Number	-	R	3	Calibration alarm. ☞ For details, see <i>Chapter 11 Data Alarms</i> .
8	14	Number	-	O	6	Standard deviation value data.
9	14	Complex	-	R		Repeat field of number types. Repeated from STD1 to STD6 for as many as there are. Format: First Initial Absorbance^First Absorbance^Second Initial Absorbance^Second Absorbance^Data Alarm^Prozone Value Number R 6 First Initial Absorbance Number R 6 First Absorbance Number R 6 Second Initial Absorbance Number R 6 Second Absorbance Number R 3 Data Alarm ☞ For details, see <i>Chapter 12 Instrument alarms</i> . Number - 6 Prozone Value Blank: not sent by the cobas® 8000 modular analyzer series. Reserved for future use.

The following fields contain no data.

ISE Calibration Result Record - M(ICR)

The *data manager* sends calibration data from the ISE module in the manufacturer-defined ISE Calibration Result M(ICR) record.

```
M|1|ICR|bmserv|MU1#ISE#1#1|Valid|Valid|Valid|0^0^0^0^0^0^0^0^0^0^0|1^2^3
^4^5^6^7^8^9^10|1^2^3^4^5^6^7^8^9^10|-32.7^-34.7^-28.4^-30.2^50.4^
131.5^147.7^0.0^49.9^-4.7|-34.2^-45.5^-24.8^-34.5^56.3^4.76^4.70^0.0^
56.2^-0.17|136.4^138.5^130.6^134.1^-44.9^89.0^100.3^0.0^-45.1^0.7|
```

Field	Ref.	Value	Host	DM	Max Size	Description
1	14	M		R	1	Record type ID, fixed value signifying manufacturer record.
2	14	Number		R	6	Sequence Number: This record appears as the next layer of the Message Header Record. For one record, the field value is '1'; for specifying several, sequence numbers starting from 1 are assigned.
3	14	ICR		R	3	Record Type Sub ID: set to 'ICR'.
4	14	String		R	6	Operator ID: ID of the operator who performed the calibration at the Control Unit or analyzer.
5	14	String		R	20	Analytical unit ID: ID of the analytical unit (module) the test belongs to. ☞ For details, see <i>Identifier of the analytical unit sent to host</i> on page B-30.
6	14	String		O	7	Na Calibration Alarm: Na test calibration status. • Valid = the calibration was successful. • Invalid = the calibration was unsuccessful.
7	14	String		O	7	K Calibration Alarm: K test calibration status. • Valid = the calibration was successful. • Invalid = the calibration was unsuccessful.
8	14	String		O	7	Cl Calibration Alarm: Cl test calibration status. • Valid = the calibration was successful. • Invalid = the calibration was unsuccessful.
9	14	Complex		R		Na Data Alarm: Na test data alarm. ☞ For details, see <i>ISE data alarms</i> on page C-37.
10	14	Complex		R		K Data Alarm: K test data alarm. ☞ For details, see <i>ISE data alarms</i> on page C-37.
11	14	Complex		R		Cl Data Alarm: Cl test data alarm. ☞ For details, see <i>ISE data alarms</i> on page C-37.
12	14	Complex		R		Na Data: Na test calibration analytical data. ☞ For details, see <i>ISE calibration analytical data</i> on page C-38.
13	14	Complex		R		K Data: K test calibration analytical data. ☞ For details, see <i>ISE calibration analytical data</i> on page C-38.
14	14	Complex		R		Cl Data: Cl test calibration analytical data. ☞ For details, see <i>ISE calibration analytical data</i> on page C-38.

ISE data alarms

The data alarms from the ISE calibration is passed in the following fields.

Na (Sodium)	Field 9
K (Potassium)	Field 10
Cl (Chlorine)	Field 11

Each of these fields is a complex type, and contains 10 number type components.

Each component is a *Number* type, max. length 3.

Internal standard solution electromotive force data alarm^
Low solution electromotive force data alarm^
High solution electromotive force data alarm^
Calibrator solution electromotive force data alarm^
Slope for display data alarm^
Internal standard solution concentration data alarm^
Calibrator solution concentration data alarm^
Carryover rate alarm^
Calculation slope value alarm^
Numbers for compensation data alarm

ISE calibration analytical data

The analytical data from the ISE calibration is passed in the following fields.

Na (Sodium)	Field 12
K (Potassium)	Field 13
Cl (Chlorine)	Field 14

Each of these fields is a complex type and contains 10 number type components.

Each component is a *Number* type, max. length 6.

Internal standard solution electromotive force data^
Low solution electromotive force data^
High solution electromotive force data^
Calibrator solution electromotive force data^
Slope for display data^
Internal standard solution concentration data^
Calibrator solution concentration data^
Carryover rate^
Calculation slope value^
Numbers for compensations data

E-module (immunology) Calibration Result Record - M(ECR)

The *data manager* sends calibration data from the Elecsys immunology E-module in the manufacturer-defined E-module Calibration Result M(ECR) record.

Example

```
M|1|ECR|bmserv|^^^1|LotCalibration|MUL#e602#2#1|157328||0|158941|O|I^O
^M^O^S^O^R^1.074^D^O^L^^F^O^Y^O^B^O^936.337^888.767\39609.680
^39716.950|||||20101018175819|
```

Field	Ref.	Value	Host	DM	Max Size	Description
1	14	M		R	1	Record type ID, fixed value 'M' signifying manufacturer record.
2	14	Number		R	6	Sequence Number: This record appears as the next layer of the Message Header Record. For one record, the field value is '1'; for specifying several, sequence numbers starting from 1 are assigned.
3	14	ECR		R	3	Record Type Sub ID: set to 'ECR'.
4	14	String		R	6	Operator ID: ID of the operator who performed the calibration at the analyzer.
5	14	Complex		R		Test Code (Application Code), the number identifying the analyte. ^^^ <i>TestCode</i> The TestCode is a Number type, max. length 5.
6	14	String		R	24	Calibration method. Permitted values: <ul style="list-style-type: none">• NoCalibration• LotCalibration• ContainerCalibration• InheritedLotCalibration• InheritedItemCalibration• UserModifiedCalibration• UnmaskedCalibration• FailedCalibration
7	14	String		O	20	ID of the analytical unit (module) the test belongs to. ☞ For details, see <i>Identifier of the analytical unit sent to host</i> on page B-30.
8	14	Number		O	8	e Pack Lot No. (Reagent lot number). 1 to 99999999
9	14	Field contains no data.				
10	14	Number		O	1	Expired e Pack Flag <ul style="list-style-type: none">• 0 Calibration performed with "Not Expired e Pack"• 1 Calibration performed with "Expired e Pack"
11	14	String		R	8	Calibrator Lot No: although a string type, possible values are 1 to 99999999.
12	14	Character		O	1	Result Status: <ul style="list-style-type: none">• O OK (Capital letter O)• F Failed

Field	Ref.	Value	Host	DM	Max Size	Description
13	14	<i>Complex</i>		O		<p>Result Characteristics. Format:</p> $\text{CharacteristicID}^{\wedge} \text{Value}^{\wedge} \text{Detail}$ <p>This field is often repeated. Each record describes whether a certain calibration characteristic was violated or not. For some characteristics, the actual value is provided. In some cases, the value is empty, depending on whether a test is qualitative or quantitative.</p>
13.1		<i>Character</i>		O		<p><i>CharacteristicID</i> This can take one of the following values:</p> <ul style="list-style-type: none"> I Missing Values M Monotony of Curve S Minimum Signal R Calibrator Factor D Deviation of Duplicate Measurement F Minimum Acceptance Difference Y System Error L Slope B Min./Max. Signal
13.2		<i>Number / Character</i>		O	<i>Value</i>	<p><i>Value</i> can have one of the following values:</p> <ul style="list-style-type: none"> • a numeric value, showing the actual value of the result. • O, (Capital letter O) meaning no violation or no failure. • F, meaning a violation or failure.
13.3		-			<i>Detail</i>	<p><i>Details</i> are the details for each calibrated level, but this is not supported in the <i>data manager</i>.</p>
14	14	<i>Complex</i>		R		<p>Calibration signal values repeated for two levels.</p> <p>Format:</p> $<\text{Signal1Level1}>^{\wedge} <\text{Signal2Level1}> \backslash <\text{Signal1Level2}>^{\wedge} <\text{Signal2Level2}>$ <p>Each value is the numeric value sent by the analyzer.</p>
15	14	<i>Field contains no data.</i>				
16	14	<i>Field contains no data.</i>				
17	14	<i>Field contains no data.</i>				
18	14	<i>Field contains no data.</i>				
19	14	<i>DateTime</i>		O	14	Date and time measurement was performed (YYYYMMDDHHMMSS).

Message Termination Record

Use this as the final record in every message, to show that the message is completed.

L | 1 | N

Field	Ref.	Value	Host	DM	Description
1	12.1	L	R	R	Record Identifier, fixed value
2	12.2	1	R	R	Sequence number, fixed value, as there is only ever one termination record in a message.
3	12.3	N	R	R	Termination code. In this case a fixed value, N, meaning normal termination.

HL7 Reference

D

8	<i>HL7 protocol</i>	<i>D-3</i>
9	<i>HL7 text content</i>	<i>D-7</i>
10	<i>HL7 Acknowledgement handling</i>	<i>D-43</i>

HL7 protocol

This chapter presents the lower layers of the HL-7 protocol, as used by cobas® 8000 data manager.

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HL7 protocol lower level

This chapter gives a low-level description of the HL7 protocol used to communicate with cobas® 8000 data manager.

Overview of HL7

HL7 or “Health Level 7” is one of the most comprehensive and widely-used protocols in the healthcare environment. Nevertheless, the standard is so wide and complex that cobas® 8000 data manager uses only a subset.

The HL7 Standard currently addresses the interfaces among various systems that send or receive patient admissions/registration, discharge or transfer (ADT) data, queries, resource and patient scheduling, orders, results, clinical observations, billing, master file update information, medical records, scheduling, patient referral, and patient care. It does not try to assume a particular architecture with respect to the placement of data within applications but is designed to support a central patient care system as well as a more distributed environment where data resides in departmental systems.

The cobas® 8000 data manager implementation of HL7 is based on v2.5.

Physical communication

The standard HL7 refers to the highest level of the Open System Interconnection (OSI) model of the International Standards Organization (ISO). The HL7 Standard is primarily focused on the issues that occur within the seventh, or application, level. These are the definitions of the data to be exchanged, the timing of the exchanges, and the communication of certain application-specific errors between the applications. This chapter gives some recommendations for how to use HL7 with cobas® 8000 data manager.

Minimal Layer Protocol

Data framing is done using the Minimal Layer Protocol (MLP) defined in the HL7 standard, (sometimes referred to as MLLP, Minimal Lower Layer Protocol).

HL7 messages are enclosed by special characters to form a block. The format is as follows:

<start_block>data<end_block><CR>

<start_block>	Start Block character (1 byte)
	ASCII <VT>, in other words, <0x0B>. This should not be confused with the ASCII characters SOH or STX.
data	Data (variable number of bytes)
	This is the HL7 data content of the block. The data can contain any displayable ASCII characters and the carriage return character, <CR>.
<end_block>	End Block character (1 byte)
	ASCII <FS>, in other words, <0x1C>. This should not be confused with the ASCII characters ETX or EOT.
<CR>	Carriage Return (1 byte)
	The ASCII carriage return character, in other words, <0x0D>.

The values used are <VT> for the start block and <FS> for the end block.



Figure D-1

The HL7 data framed according to the HL7 standard.

HL7 text content

HL7 field definitions

This section describes all the HL7 fields used in messages sent to or from cobas® 8000 data manager.

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HL7 messages

This section describes the types of HL7 message transferred by the host or *data manager*. In the following charts:

- [] Square brackets indicate an optional segment. (0 - 1 times.)
- { } Curly brackets indicate a segment or group of segments that may be optionally repeated. (1 - n times.)
-  For more details on message flow and how messages follow each other, see *Communication scenarios* on page B-10.

Messages sent only by the *data manager*

Only *data manager* sends the following types of message.

Message	Segments	Message Type	Description
Inquiry for sending test selections	MSH QPD RCP	TSREQ	Inquiry for test selections is made after a rack has passed the ID reader.
Result report	MSH PID SPM SAC { OBR TQ1 OBX TCD { [SID] } ^(a) { NTE } } ^(b)	OUL^R22 OUL^R22^REAL OUL^R22^BATCH	Reports on the sample results. QC results passed through <i>data manager</i> on reception Manual upload of QC results. Upload of patient sample results in reply to a result query.
Calibration data	MSH { SPM OBR OBX SID }	OUL^R22^PCUPL OUL^R22^ICUPL OUL^R22^ECUPL	Reports calibration results.

(a) For messages containing patient results from the ISE module, no SID segment is sent.

(b) There may be multiple OBR Segments per PID Segment, and multiple SID and NTE Segments per OBX Segment. However, you may only have one OBX Segment per OBR.

Messages transmitted only by the host

The host can send the following types of message.

Message	Segments	Message Type	Description
Result Query	MSH QPD RCP	RSREQ	Inquiry for test results for a given sample ID sent by the host.
Order Query	MSH QPD RCP	TSREQ	Inquiry for all test selections for a given sample ID sent by the host.
Masking	MSH EQU { ECD }	EAC^U07	Instructs <i>data manager</i> to mask or unmask certain tests.

Messages sent by either *data manager* or the host

The *data manager* and a connected LIS can send an Acknowledge message, depending on their HL7 settings.

Either can send a test selection information message.

Message	Segments	Message Type	Description
Acknowledge	MSH MSA	ACK	HL7 Application Acknowledge for incoming orders
Test Selection Information (from host)	MSH PID SPM SAC [{ [TQ1] ^(a) OBR }]	OML^O33	Test selection sent by the host for a sample as answer to a test selection inquiry or as unsolicited order.
Test Selection Information (from <i>data manager</i> if sample found)	MSH SPM [SAC] [{ [TQ1] ^(b) OBR }]	OML^O33	Test selection sent by the <i>data manager</i> as response to an order query.
Test Selection Information (from <i>data manager</i> if sample not found)	MSH SPM	OML^O33	Test selection sent by the <i>data manager</i> as response to an order query.

(a) TQ1 Segments must be identical for all OBR Segments.

(b) TQ1 Segments must be identical for all OBR Segments.

HL7 Segment description

This section describes the content of the HL7 fields used in communications between the host and the cobas® 8000 data manager.

HL7 field attributes

Types of attributes held by a field in an HL7 message are explained below.

Attribute	Description
Field	The segment header, and the number of the field in the segment.
Value	<p>This shows either:</p> <ul style="list-style-type: none"> • The precise text to be sent. • The format of the field. <p>The format of the field can take one of the following values:</p> <ul style="list-style-type: none"> • <i>Character</i>: A single character. • <i>String</i>: A character string. • <i>Number</i>: A numeric value. Positive (+) or negative (-) is indicated before the numeric value. If it is not indicated, it is treated as positive (+). <p>If a decimal point is not included, the numeric value is treated as an integer. There are no restrictions for placing '0' in the front or for multiple '0' placed at the end of numbers with decimal points.</p> <ul style="list-style-type: none"> • <i>Date</i>: Always use the 4-digit Gregorian year. The format is YYYYMMDD (YYYY is the 4-digit Gregorian year, MM is the month, DD is the day). For example, September 5, 2009 is indicated 20090905. • <i>Time</i>: 24-hour military time. The format is HHMMSS (HH is the hour, MM is the minute, and SS is the second). • <i>DateTime</i>: A combination of Date and Time. The format is: YYYYMMDDHHMMSS. • <i>Complex</i>: A field in which multiple data components are combined, separated by the component delimiter. Each component may take one of the other formats.
Host	If sent from the host or LIS, this field is either:
	<ul style="list-style-type: none"> • R, required • O, optional
DM	If sent from <i>data manager</i> , this field is either:
	<ul style="list-style-type: none"> • R, required (always sent) • O, optional
Description	A description of the field, including use and permitted values. In the case of complex fields, this includes a description of individual components.

Text encodings

The data within the message has to be Unicode encoded as UTF-8 characters. For characters from decimal 32 to 127 also ASCII can be used. Characters from 0 to 31 are control characters and therefore not allowed within the HL-7 fields.



The host needs to handle UTF-8

In situations where the *data manager* operators will be able to enter UTF-8 characters, the host will have to support UTF-8, or be able to recognize and translate from UTF-8. If necessary, it is possible to prevent operators from entering UTF-8 characters by running the *data manager* in pass-through mode.

Escaping the characters as defined for the delimiter characters is not supported (see Header Segment, field no. 2).

Message Header Segment - MSH

This segment occurs at the front of every message, and shows the sender and receiver and other important general information about the message.

Host and DM columns indicate whether the data is Required or Optional when sent from the Host or *data manager* respectively.

```
MSH|^~\&|cobas 8000||host||20090402173655||OUL^R22|13007||2.5||||ER||  
UNICODE UTF-8|
```

Field	Value	Host	DM	Description
MSH-1		R	R	Field separator, fixed value = vertical bar [124]
MSH-2	^~\&	R	R	Delimiter definitions, fixed value: <ul style="list-style-type: none"> • ^ Component (or sub-field) delimiter = caret [94] • ~ Repeat delimiter = tilde [126] • \ Escape character = backslash [92] (not supported) • & Sub-component (or sub-sub-field) delimiter = ampersand [38] A carriage return (ASCII 13) marks the end of each segment.
MSH-3	String	-	R	Sending application, by default: cobas 8000 (eye) To edit this, see <i>Identifying the data manager application to the host</i> on page B-25. O - Sending identifier, if sent used only for tracing information
MSH-4	<i>Field contains no data.</i>			
MSH-5	String	-	R	Receiving application, fixed value: host
		O	-	Receiving identifier, sent by host for tracing information
MSH-6	<i>Field contains no data.</i>			
MSH-7	DateTime	O	O	Date and time message sent
MSH-8	<i>Field contains no data.</i>			

Field	Value	Host	DM	Description
MSH-9	Complex	R	R	<p>Message Type. This is the code that defines the message type, according to the HL7 standard:</p> <ul style="list-style-type: none"> • TSREQ • RSREQ • OML^O33 • OUL^R22 • EAC^U07 • OUL^R22^PCUPL (C-module, or Photometric, Calibration Result) • OUL^R22^ICUPL (ISE Calibration Result) • OUL^R22^ECUPL (E-module, or Immunology, Calibration Result) • ACK <p>In specific circumstances, the following message type codes are sent by the <i>data manager</i>:</p> <ul style="list-style-type: none"> • OUL^R22^REAL (first transmission of the QC results) • OUL^R22^BATCH (repeat transmission of QC results) • OUL^R22^BATCH (patient sample results as a reply to result query)
MSH-10	String	R	R	Message Control ID that uniquely identifies the message, for example, a sequence number or GUID string (as autogenerated by Microsoft programs to uniquely identify objects etc.).
MSH-11	<i>Field contains no data.</i>			
MSH-12	2.5	O	R	Version ID for HL7 version used, fixed value string.
MSH-13	<i>Field contains no data.</i>			
MSH-14	<i>Field contains no data.</i>			
MSH-15	<i>Field contains no data.</i>			
MSH-16	String	O	R	<p>Application Acknowledgement Type. This field defines the conditions under which the receiver has to respond with an acknowledgement message.</p> <p>This field may contain:</p> <ul style="list-style-type: none"> • AL Always send an acknowledgement message. • SU Send an acknowledgement message only after the message has been successfully processed. • ER Send in error/reject conditions only. • NE Never send an acknowledgement. <p> The <i>data manager</i> does not support all these options in all situations. For details see Chapter 10 <i>HL7 Acknowledgement handling</i>.</p>
MSH-17	<i>Field contains no data.</i>			
MSH-18	UNICODE UTF-8	O	R	String defining the character set. Fixed value.
<i>Further MSH fields contain no data.</i>				

Message Acknowledgement Segment - MSA

The host and the *data manager* use the message acknowledgement segment in a acknowledgement message.

MSA|AE|38764|ORA-20001: Validation error|

MSA|AA|38764||

Field	Value	Host	DM	Description
MSA-1	String	R	R	<p>Acknowledgement code</p> <ul style="list-style-type: none"> • AA Accept. This acknowledges the message is valid and was successfully processed. • AE Error. This indicates that the message sent was not valid in format or content, and could not be processed. • AR Reject. The <i>data manager</i> currently does not send this acknowledgement code. <p>For details of acknowledgement handling, see <i>HL7 acknowledgement messages</i> on page D-45.</p>
MSA-2	String	R	R	<p>Message Control ID, from MSH-10 segment of the message that the <i>data manager</i> is acknowledging.</p>
MSA-3	String	O	O	<p>Text message providing potentially useful diagnostic information. This can be generated from various sources, including errors passed from databases or the operating system. The same message is written to the log, where there may be further information.</p> <p>For details of logging, see <i>Setting logging levels</i> on page B-30.</p>

Patient Identification Segment - PID

The *data manager* uses the patient identification segment to send patient information in a Result Report message. The host uses the patient identification segment to send patient information in a test selection download message.

PID|1|SH25111965M|||Doe^John||19651125|M

PID|1||||^|||

Field	Value	Host	DM	Description
PID-1	1	O	R	Set ID, fixed value number.
PID-2	String	O/R	O/R	<p>Patient ID.</p> <p>This field is mandatory only if some patient demographic data is sent, in other words, if one or more of fields 5, 7, or 8 contain data.</p>
PID-3	<i>Field contains no data.</i>			
PID-4	<i>Field contains no data.</i>			
PID-5	Complex	O	O	<p>Patient last name and first name: Two string components, each max. 30 characters long:</p> <p><i>Last_name^First_name</i></p>
PID-6	<i>Field contains no data.</i>			

Field	Value	Host	DM	Description
PID-7	Date	O	O	Date of birth (YYYYMMDD)
PID-8	String	O	O	Sex of patient <ul style="list-style-type: none"> • M Male • F Female • U Unknown. Any other value defaults to unknown, and is returned to the host as U.



The data manager supports only M, F, or U for patient sex.

For male patients, the host must send M, for females, F. Otherwise the wrong reference range might be applied. The *data manager* reads any other value as U, and applies the reference ranges for a patient of unknown sex.

Make sure the host sends only M, F, or U, as required. Each new configuration must be tested to ensure the correct data transfer between the *data manager* and the host.

Specimen Segment - SPM for patient and quality control results

The *data manager* uses the specimen segment to send information about the specimen in a Result Report message, and in a test selection upload message. The host uses the specimen segment to send information about the specimen in a test selection download message.

- ☞ For the use of the Specimen segment SPM with calibration results, see *Specimen Segment - SPM for calibration results* on page D-18.

When identifying the sample by sample ID (default):

```
SPM||10005||S1||not||||P|||^_____| |||20100503142217|||||||SC|
```

When identifying the sample by sequence number:

```
SPM||^1031||S1||not||||P|||^_____| |||20110715085411|||||||SC|
```

For a quality control result:

```
SPM||PNU^123456^301^20111213||S1||not||||Q|||^_____| |||20111203142217|||  
|||||||SC|
```

Field	Value	Host	DM	Description
SPM-1	<i>Field contains no data.</i>			
SPM-2	<p><i>String</i></p> <p>For QC or sequence numbers: <i>Complex</i></p>	R	R	<p>Patient results when using sample IDs (default)</p> <p>For Patient Results, the number or alphanumeric string read from sample's barcode, (string of max. 22 characters padding not allowed).</p> <p>Note this is a simple string field in this situation.</p> <p>Patient results when the sample is identified by sequence number</p> <p><i>SPM-2.1 String</i> - - <i>SampleID</i> If the sample is identified by sequence number, and a sequence number is sent in SPM-2.2, this is empty.</p> <p><i>SPM-2.2 Number</i> R R <i>Sequence_Number</i> If the sample is identified by sequence number, this contains the sequential number. (Max. value = 60,000.) If the host sends a sample ID in SPM-2.1, the <i>data manager</i> ignores this component.</p> <p>☞ For details of sequence numbers, see <i>Identifying patient samples by sequence number</i> on page E-45.</p>

Field	Value	Host	DM	Description
Quality control material				
For Quality Control material, <i>Name^Lot^ID^ExpDate</i>				
SPM-2.1	String	O/R	R	<p><i>Name</i> For Quality Control results, the control name, for example; PNU.</p>
SPM-2.2	Number	-	O/R	<i>Lot</i> Control lot. QC only: not used for patient results.
SPM-2.3	Number	-	O/R	<i>ID</i> Control identifier (a unique control ID contained in <i>data manager</i>). QC only: not used for patient results.
SPM-2.4	Date		O/R	<i>ExpDate</i> Expiry date of control lot. Format:YYYYMMDD. Ordering test solutions for QC is not possible from host.
				☞ For details of how the sample identifier SPM-2 is used with calibration result messages, see <i>Specimen Segment - SPM for calibration results</i> on page D-18.
SPM-3	<i>Field contains no data.</i>			
SPM-4	String	R	R	<p>Specimen Type This is a code that identifies the type of specimen. This field is blank for calibration results</p> <ul style="list-style-type: none"> S1 Serum / Plasma S2 Urine S3 Cerebrospinal Fluid S4 Supernatant S5 Other fluids S6 Whole blood S7 Oral fluids (Saliva) S8 Reserved for future use S9 Reserved for future use SA Reserved for future use <p>Depending on the version and modules installed, not all of these types may be available on any particular system.</p> <p>For QC samples, the host should disregard any value in this field.</p>
SPM-5	<i>Field contains no data.</i>			
SPM-6	String	O	O	<p>Specimen Additives.</p> <ul style="list-style-type: none"> • <i>not</i> Not a prediluted sample • <i>pre-diluted</i> Prediluted sample • Empty in a test selection upload in response to an order query.
SPM-7	<i>Field contains no data.</i>			
SPM-8	<i>Field contains no data.</i>			
SPM-9	<i>Field contains no data.</i>			
SPM-10	<i>Field contains no data.</i>			
SPM-11	Character	O	O	<p>Specimen role. This is a code that identifies what purpose the specimen is used for.</p> <ul style="list-style-type: none"> • <i>P</i>, meaning patient result. • <i>Q</i>, meaning quality control result. (Only sent by <i>data manager</i>) • Empty in a test selection upload in response to an order query.
SPM-12	<i>Field contains no data.</i>			

Field	Value	Host	DM	Description
SPM-13	<i>Field contains no data.</i>			
SPM-14	Complex	O	O	<p>Specimen description in format:</p> <p><i>C1^C2^C3^C4^C5</i></p> <ul style="list-style-type: none"> • <i>C1</i> Sample Comment 1. String with up to 30 characters • <i>C2</i> Sample Comment 2. String with up to 25 characters • <i>C3</i> Sample Comment 3. String with up to 20 characters • <i>C4</i> Sample Comment 4. String with up to 15 characters • <i>C5</i> Sample Comment 5. String with up to 10 characters <p>These comments are visible on the Control Unit.</p> <p>In ASTM this data is transferred in the Comment Record that follows the Order record.</p>
SPM-15	<i>Field contains no data.</i>			
SPM-16	<i>Field contains no data.</i>			
SPM-17	DateTime	O	O	Specimen collection date / time. (YYYYMMDDHHMMSS)
SPM-18	<i>Field contains no data.</i>			
SPM-19	<i>Field contains no data.</i>			
SPM-20	<i>Field contains no data.</i>			
SPM-21	<i>Field contains no data.</i>			
SPM-22	<i>Field contains no data.</i>			
SPM-23	<i>Field contains no data.</i>			
SPM-24	<i>Field contains no data.</i>			
SPM-25	<i>Field contains no data.</i>			
SPM-26	<i>Field contains no data.</i>			
SPM-27	String	O	R	<p>Container type.</p> <ul style="list-style-type: none"> • SC Standard cup • MC Micro cup

Specimen Segment - SPM for calibration results

The *data manager* uses the specimen segment in a calibration result message to send information about the specimen.

SPM||1^888888^901^1^2011130|||||C^P|

- ☞ For details of the use of the Specimen segment (SPM) with patient and quality control results, see *Specimen Segment - SPM for patient and quality control results* on page D-15.

Field	Value	Host	DM	Description
SPM-1	<i>Field contains no data.</i>			
SPM-2	<i>Complex</i>	-	O/R	<p>Identifier for the sample.</p> <p>For C-module and E-module calibration materials, <i>Level^Lot^Code^Count^ExpDate</i></p>
SPM-2.1	<i>Number</i>		O/R	<i>Level</i> Calibrator level
SPM-2.2	<i>Number</i>		O/R	<i>Lot</i> Calibrator lot
SPM-2.3	<i>Number</i>		O/R	<i>Code</i> Calibrator material code
SPM-2.4	<i>Number</i>		O/R	<i>Count</i> The calibrator bottle count number
SPM-2.5	<i>Date</i>		O/R	<i>ExpDate</i> Expiry date of control lot. Format: YYYYMMDD. This is a required field, except for ISE calibration results, when it is always empty. It is not possible to order test selections for calibration material from the host.
SPM-3	<i>Field contains no data.</i>			
SPM-4	<i>Field contains no data.</i>			
SPM-5	<i>Field contains no data.</i>			
SPM-6	<i>Field contains no data.</i>			
SPM-7	<i>Field contains no data.</i>			
SPM-8	<i>Field contains no data.</i>			
SPM-9	<i>Field contains no data.</i>			
SPM-10	<i>Field contains no data.</i>			
SPM-11	<i>Complex</i>	-	R	<p>Specimen role. This is a code that identifies what purpose the specimen is used for.</p> <p>C^P C-module (Photometric) Calibration</p> <p>C^I ISE module Calibration</p> <p>C^E E-module (Immunological) Calibration</p>
SPM-12	<i>Field contains no data.</i>			
SPM-13	<i>Field contains no data.</i>			
SPM-14	<i>Field contains no data.</i>			
SPM-15	<i>Field contains no data.</i>			
SPM-16	<i>Field contains no data.</i>			
SPM-17	<i>DateTime</i>	-	O	Specimen collection date / time. (YYYYMMDDHHMMSS) <i>Further SPM fields contain no data for calibration results.</i>

Specimen Container Detail Segment - SAC

The *data manager* uses the specimen container detail (SAC) segment to identify the location of the sample's container in a result report or in a test selection request message.

The host uses the specimen container detail (SAC) segment to identify the location of the sample's container in a test selection download message. The host sends this information if it has it, for example if a pre-analytic system is being used, or if it has received it from the *data manager*, for example in the response to a query.

SAC|||||||50042|2|

Field	Value	Host	DM	Description
SAC-1	<i>Field contains no data.</i>			
SAC-2	<i>Field contains no data.</i>			
SAC-3	<i>Field contains no data.</i>			
SAC-4	<i>Field contains no data.</i>			
SAC-5	<i>Field contains no data.</i>			
SAC-6	<i>Field contains no data.</i>			
SAC-7	<i>Field contains no data.</i>			
SAC-8	<i>Field contains no data.</i>			
SAC-9	<i>Field contains no data.</i>			
SAC-10	String	O	O	Rack ID as displayed on the Control Unit. (Uploaded to host only if known to <i>data manager</i> .)
SAC-11	String	O	O	Position in rack. (Last known position, where available.)

Observation Request Segment - OBR

The *data manager* uses the observation request segment in a result report message or a test selection upload message. The host uses the observation request segment in a test selection download message.

OBR|1|||989^|||||||A
OBR|4|||8717^Inc||||||A

Field	Value	Host	DM	Description
OBR-1	Number	O	O	Set ID. The first segment is 1, then increments by 1 for each subsequent OBR segment.
OBR-2	<i>Field contains no data.</i>			
OBR-3	<i>Field contains no data.</i>			
OBR-4	Complex	R	R	Universal service identifier (identifies the test or analyte tested for, often called the "testcode" or "application code"). If sent from the host, it also includes the dilution factor. <i>Testcode^Dilution</i>

Field	Value	Host	DM	Description
OBR-4.1	Number	R	R	<p><i>Testcode</i></p> <p>Test code (application code), that identifies the test. The host can download the test numbers of calculated tests, if the test is programmed on the <i>data manager</i>. For details, see the cobas® 8000 modular analyzer series <i>Operator's Manual</i>.</p> <p>For serum index tests, you must send all three test types together (lipemic, icteric, and hemolytic), or send a test profile that contains all three. Otherwise the test will not be run.</p> <p>☞ For more details on sending serum index orders, see <i>Sending test selections</i> on page B-12.</p>
OBR-4.2	String	O	-	<p><i>Dilution</i></p> <p>Dilution factor. This is only sent from the host to the <i>data manager</i>.</p> <p>Permitted values are:</p> <ul style="list-style-type: none"> • For an ISE module, the only permitted factor is 1, meaning no dilution. • For a C-module (photometry): Dec, Inc, 1 • For an E-module (immunoassay): 1, 2, 5, 10, 20, 50, 100, 400 <p>No dilution can also be indicated with an empty code.</p>
OBR-5	<i>Field contains no data.</i>			
OBR-6	<i>Field contains no data.</i>			
OBR-7	<i>Field contains no data.</i>			
OBR-8	<i>Field contains no data.</i>			
OBR-9	<i>Field contains no data.</i>			
OBR-10	<i>Field contains no data.</i>			
OBR-11	String	R	-	<p>Action code sent by host:</p> <ul style="list-style-type: none"> • A Add test, or rerun test if it already exists. • R Rerun test (NB: different from HL7 definitions), or add test, if it does not exist. • C Cancel test
<i>The other OBR fields contain no data.</i>				

Timing Quantity Segment - TQ1

The *data manager* uses this segment in a test selection message (optionally) and in a result report message. The host uses this segment in a test selection messages (optionally).

TQ1|1|||||||R|

Field	Value	Host	DM	Description
TQ1-1	1	O	R	Set ID. Fixed value number.
TQ1-2	<i>Field contains no data.</i>			
TQ1-3	<i>Field contains no data.</i>			
TQ1-4	<i>Field contains no data.</i>			
TQ1-5	<i>Field contains no data.</i>			
TQ1-6	<i>Field contains no data.</i>			
TQ1-7	<i>Field contains no data.</i>			

Field	Value	Host	DM	Description
TQ1-8	<i>Field contains no data.</i>			
TQ1-9	String	R	R	Priority <ul style="list-style-type: none">• S STAT sample. STAT samples must be placed on a STAT rack.• R Routine sample (default)

Observation Result Segment - OBX (for patient results)

This section describes how the *data manager* uses the observation result segment (OBX) in a result report message to send the results of patient tests.

- ⦿ For details of how the *data manager* uses OBX with quality control results, see *Observation Result Segment - OBX (for QC results)* on page D-26.
- ⦿ For details of how the *data manager* uses OBX with calibration results, see *Observation Result Segment - OBX (for calibration results)* on page D-29.

Patient result examples

```
OBX|1||990||0.99|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||C|||201010200959
05|bmserv^SYSTEM||128|ISE^2^MU1#ISE#1#2^4|20101020095921|
OBX|3||8717||1^-0.02|mmol/L|^TECH~^NORM~^CRIT~^USER||||C|||20101019175
614|bmserv^SYSTEM||77|c701^1^MU1#c701#1#1^6|20101019180627|
```

A Result Segment for a result below the EP-17A level of detection.

```
OBX|1||989||2.1|mmol/L|^TECH~12 - 144^NORM~^CRIT~^USER|LoD|||F|||20100
621084348|bmserv^SYSTEM||28|ISE^1^MU1#ISE#1#1^3|20100621084404|
```

Field	Value	Host	DM	Description
OBX-1	Number		R	Set ID. The first segment in a set has the value 1. For each subsequent segment in the set, this value increments by 1.
OBX-2	Field contains no data.			
OBX-3	Number		R	The test code. (Observation identifier, or Application code) This identifies the test or analyte which this message relates to.
OBX-4	Field contains no data.			
OBX-5	Complex		R	<p>Result value</p> <p>The result values are only transmitted for patient and QC results.</p> <p><i>ReportableResult</i>[^]<i>AdditionalResultValues</i></p> <p>Quantitative results:</p> <ul style="list-style-type: none"> • <i>ReportableResult</i> The result. A missing result is sent as 7 spaces. (ASCII 32 / 0x20). • <i>AdditionalResultValues</i> Empty or a qualitative flag. <p>Qualitative results:</p> <ul style="list-style-type: none"> • <i>ReportableResult</i> <ul style="list-style-type: none"> For C-module and ISE module: an integer code from -2 to 3 inclusive. For E-module: an integer code -1, 0, 1. <p>The codes can be configured on the cobas® 8000 instrument, under Utility > Application > Range, see <i>cobas® 8000 modular analyzer series Operator's Manual</i> for details.</p> <ul style="list-style-type: none"> • <i>AdditionalResultValues</i> <ul style="list-style-type: none"> The quantitative result, like <i>value</i> for a quantitative result. For E-module qualitative results this contains COI.
OBX-6	String.		R	Units of measurement used for measuring the result

Field	Value	Host	DM	Description
OBX-7	Complex		R	<p>Reference ranges, if defined. For patient results, this consists of two strings:</p> <p><i>RangeDefinitionString</i>^<i>TypeOfRange</i></p> <p>These can occur as a repeated field, for example:</p> <p>0.5 - 7.5^TECH~3.3 - 5.1^NORM~^CRIT~^USER</p> <p>If a range is not defined, the <i>RangeDefinitionString</i> is blank.</p> <p>A required field for patient results.</p>
OBX-7.1	String		O	<p>The <i>RangeDefinitionString</i> string component can consist of the any of the following:</p> <ul style="list-style-type: none"> Two numbers (with or without decimal points) separated by space-hyphen-space, for example, <p>0.5 - 7.5</p> <p>Note that either or both of these number may potentially be negative, for example,</p> <p>-10 - -7</p> <ul style="list-style-type: none"> A “greater than” or “less than” value, for example, <p>< 0.1</p> <ul style="list-style-type: none"> A comma-separated string of permissible values, for example, <p>Y, N, U</p> <p>-,+,-+</p>
OBX-7.2	String		O/R	<p>The <i>TypeOfRange</i> string component can consist of any of four values.</p> <ul style="list-style-type: none"> TECH Hard-coded value to indicate “Technical Range” NORM Hard-coded value to indicate “Normal Range” CRIT Hard-coded value to indicate “Critical Range” USER Hard-coded value to indicate “User Range” <p>Note that the different ranges are separated with the repeat delimiter, a tilde “~”. If a range is not defined, the <i>RangeDefinitionString</i> is blank.</p> <p>☞ For QC and calibration results, see <i>Observation Result Segment - OBX (for QC results)</i> on page D-26 or <i>Observation Result Segment - OBX (for calibration results)</i> on page D-29.</p>

Field	Value	Host	DM	Description
OBX-8	<i>String</i>		O	<p>Abnormal flags. This gives a code that identifies if the result is normal or abnormal.</p> <p>This field is blank for manually-edited and QC results.</p> <ul style="list-style-type: none"> HH Above high critical value H Above high normal value N Normal L Below low normal value LL Below low critical value A Alphanumeric result out of normal range AA Alphanumeric result out of critical range LoB Below the Limit of Blank. (Enhancement to HL7.) LoD Below the Limit of Detection. (Enhancement to HL7.) LoQ Below the Limit of Quantitation. (Enhancement to HL7.) No data signifies that no validation against ranges has been performed. <p>If more than one flag is triggered, only the most extreme flag is sent. The EP-17 flags, LoB, LoD, and LoQ take precedence over the others.</p> <p> For further details on the EP-17A flags, see <i>EP-17A and the result abnormal flags</i> on page B-8.</p>
OBX-9	<i>Field contains no data.</i>			
OBX-10	<i>Field contains no data.</i>			
OBX-11	<i>String</i>		R	<p>Result status</p> <ul style="list-style-type: none"> • F First run result, or QC or calibration result • C Corrected result • M Manually-edited result • X Calculated test, but test could not be calculated (for example, divided by zero)
OBX-12	<i>Field contains no data.</i>			
OBX-13	<i>Field contains no data.</i>			
OBX-14	<i>DateTime</i>		R	<p>Pipetting time, in other words, the time that is considered to be when the test was started.</p> <p><i>Note:</i> For manually-performed and calculated tests, this field is empty.</p>
OBX-15	<i>Complex</i>		R	<p>Active operators in the format:</p> <p><i>Instrument operator^Datamanager operator</i></p> <p>Each component is a string.</p> <ul style="list-style-type: none"> • <i>Instrument operator</i> This is the username the operator used to log into the Control Unit. Empty in the case of a manual or calculated result. • <i>Datamanager operator</i> This is the username the operator used to log into the <i>data manager</i>. If the result is automatically validated, or the <i>data manager</i> is in pass-through mode, this reads SYSTEM.
OBX-16	<i>Field contains no data.</i>			
OBX-17	<i>Number</i>		O	<p>Calibration ID as an integer number. This is a unique identifier of the calibration that the result refers to as it is sent by the instrument.</p> <p>Sent only if available. It is empty for results that do not have a calibration, for example, calculated and manual results.</p>

Field	Value	Host	DM	Description
OBX-18	<i>Complex</i>		R	Measurement unit ID, identifying the module that performed the test. <i>ModuleType^SubModule^AnalyticalUnitID^InstrumentID^Bottle^SBNo</i>
OBX-18.1	<i>String</i>		R	<p><i>Module Type</i></p> <p>One of the following:</p> <ul style="list-style-type: none"> c502, Results from the specified measuring module, or manual results entered on behalf of that module. c701, e602, ISE, or c702 <p><i>DM</i></p> <p>Results calculated on the <i>data manager</i>, and for manual results entered on the <i>data manager</i>, but cannot be attributed to a module.</p> <p>c8000 Results from the cobas® 8000 modular analyzer series that cannot be mapped to an actual measuring submodule, for example, sample short.</p>
OBX-18.2	<i>Number</i>		R	<p><i>SubModule</i></p> <ul style="list-style-type: none"> • 1 or 2, for result from a submodule. • 0 (zero) otherwise.
OBX-18.3	<i>String</i>		R	<p><i>Analytical UnitID</i></p> <p>Identifier for the module, as sent to the host. This setting is configurable in the cobas® 8000 data manager. Default: <i>Instrument#ModuleType#Position#SubModule</i> Example: MU1#c502#2#1</p> <p> For details, see <i>Identifier of the analytical unit sent to host</i> on page B-30.</p>
OBX-18.4	<i>Number</i>		R	<p><i>Instrument ID</i></p> <p>Instrument number in <i>data manager</i> (A specific identifier inside the <i>data manager</i> which identifies a module. This is a number which has no relationship to the internal position of the module in the machine.)</p>
OBX-19	<i>DateTime</i>		R	Time at which result is available.

Observation Result Segment - OBX (for QC results)

This section describes how the *data manager* uses the observation result segment (OBX) in a result report message to send the results of quality control tests.

- ⦿ For details of how the *data manager* uses OBX with patient results, see *Observation Result Segment - OBX (for patient results)* on page D-22.
- ⦿ For details of how the *data manager* uses OBX with calibration results, see *Observation Result Segment - OBX (for calibration results)* on page D-29.

QC result example OBX|1||8685||121|U/L|120^TARGET~25^SD||||F|||2011019111907|bmserv^SYSTEM||76|c701^1^MU1#c701#1#1^6^Standby^1|2011019112922|

Field	Value	Host	DM	Description
OBX-1	Number		R	Set ID. The first segment in a set has the value 1. For each subsequent segment in the set, this value increments by 1.
OBX-2	Field contains no data.			
OBX-3	Number		R	The test code. (Observation identifier, or Application code) This identifies the test or analyte which this message relates to.
OBX-4	Field contains no data.			
OBX-5	Complex		R	<p>Result value</p> <p>The result values are only transmitted for patient and QC results.</p> <p><i>ReportableResult</i>[^]<i>AdditionalResultValues</i></p> <p>Quantitative results:</p> <ul style="list-style-type: none"> • <i>ReportableResult</i> The result. A missing result is sent as 7 spaces. (ASCII 32 / 0x20). • <i>AdditionalResultValues</i> Empty or a qualitative flag. <p>Qualitative results:</p> <ul style="list-style-type: none"> • <i>ReportableResult</i> <p>For C-module and ISE module: an integer code from -2 to 3 inclusive.</p> <p>For E-module: an integer code -1, 0, 1.</p> <p>The codes can be configured on the cobas® 8000 instrument, under Utility > Application > Range, see <i>cobas® 8000 modular analyzer series Operator's Manual</i> for details.</p> • <i>AdditionalResultValues</i> <p>The quantitative result, like <i>value</i> for a quantitative result. For E-module qualitative results this contains COI.</p>
OBX-6	String		R	Units of measurement used for measuring the result
OBX-7	Complex		R	<p>Reference ranges, if defined. For quality control results, this consists of two strings:</p> <p><i>RangeDefinition</i>[^]<i>TypeOfRange</i></p> <p>These occur as a repeated field, for example:</p> <p>120^TARGET~25^SD</p>
OBX-7.1	Number		O	The <i>RangeDefinition</i> is a decimal or integer value.
OBX-7.2	String		O/R	<p>The <i>TypeOfRange</i> string components consist of:</p> <ul style="list-style-type: none"> • TARGET Hard-coded value to indicate "Expected target value" • SD Hard-coded value to indicate "Standard deviation" <p>Note that the different ranges are separated with the repeat delimiter, a tilde "~". If a range is not defined, the <i>RangeDefinition</i> is blank.</p>
OBX-8	Field contains no data.			

Field	Value	Host	DM	Description
OBX-9	<i>Field contains no data.</i>			
OBX-10	<i>Field contains no data.</i>			
OBX-11	<i>String</i>	R		Result status • F For QC result
OBX-12	<i>Field contains no data.</i>			
OBX-13	<i>Field contains no data.</i>			
OBX-14	<i>DateTime</i>	R		Pipetting time, in other words, the time that is considered to be when the test was started. <i>Note:</i> For manually-performed and calculated tests, this field is empty.
OBX-15	<i>Complex</i>	R		Active operators in the format: <i>Instrument operator^Datamanager operator</i> Each component is a string. • <i>Instrument operator</i> This is the username the operator used to log into the Control Unit. Empty in the case of a manual or calculated result. • <i>Datamanager operator</i> This is the username the operator used to log into the <i>data manager</i> . If the result is automatically validated, or the <i>data manager</i> is in pass-through mode, this reads SYSTEM.
OBX-16	<i>Field contains no data.</i>			
OBX-17	<i>Number</i>	O		Calibration ID as an integer number. This is a unique identifier of the calibration that the result refers to as it is sent by the instrument. Sent only if available. It is empty for results that do not have a calibration, for example, calculated and manual results.

Field	Value	Host	DM	Description
OBX-18	<i>Complex</i>		R	Measurement unit ID, identifying the module that performed the test. <i>ModuleType^SubModule^AnalyticalUnitID^InstrumentID^Bottle^SBNo</i>
OBX-18.1	<i>String</i>		R	<i>Module Type</i> One of the following: c502, Results from the specified measuring module, c701, or manual results entered on behalf of that e602, module. ISE, or c702 <i>DM</i> Results calculated on the <i>data manager</i> , and for manual results entered on the <i>data manager</i> , but cannot be attributed to a module. c8000 Results from the cobas® 8000 modular analyzer series that cannot be mapped to an actual measuring submodule, for example, sample short.
OBX-18.2	<i>Number</i>		R	<i>SubModule</i> • 1 or 2, for result from a submodule. • 0 (zero) otherwise.
OBX-18.3	<i>String</i>		R	<i>Analytical UnitID</i> Identifier for the module, as sent to the host. This setting is configurable in the cobas® 8000 data manager. Default: <i>Instrument#ModuleType#Position#SubModule</i> Example: MU1#c502#2#1 ☞ For details, see <i>Identifier of the analytical unit sent to host</i> on page B-30.
OBX-18.4	<i>Number</i>		R	<i>Instrument ID</i> Instrument number in <i>data manager</i> (A specific identifier inside the <i>data manager</i> which identifies a module. This is a number which has no relationship to the internal position of the module in the machine.)
OBX-18.5	<i>String</i>		R	<i>Bottle (for QC)</i> Used Reagent Set. • Current • Standby • (or empty)
OBX-18.6	<i>Number</i>		R	<i>SBNo</i> An integer showing the standby bottle number, if used. The standby bottles are numbered sequentially, starting with 1.
OBX-19	<i>DateTime</i>		R	Time at which result is available.

Observation Result Segment - OBX (for calibration results)

The *data manager* uses the observation result segment in a result report message to send the results of calibration results.

- ⦿ For details of OBX with patient results, see *Observation Result Segment - OBX (for patient results)* on page D-22.
- ⦿ For details of OBX with QC results, see *Observation Result Segment - OBX (for QC results)* on page D-26.

Calibration result examples

Photometric Calibration Result Segment:

```
OBX|1||8685||0^3&4&22851&2&22866&|||16|||F||||bmserv||75|c701^1^MU1#c7
01#1#1^6^Standby^1|20111019091421|
```

ISE Calibration Result Segment:

```
OBX|1||989||Type-A^0&0&0&0&0&0&0&0^32.7&-34.7&-28.4&-30.2&50.4&
131.5&147.7&0.0&49.9&-4.7|||Valid|||F||||bmserv||37|ISE^1^MU1#ISE#1#1
^7|20100316105741|
```

Immunological Calibration Result Segment:

```
OBX|1||1||Valid^false^false^false^1.074^false^^false^false^39609.680&3
9716.950^~^~|||LotCalibration|||F||||bmserv||25|e602^1^MU1#e602#2#1^9
^Current|20101018175819|
```

Field	Value	Host	DM	Description
OBX-1	Number		R	Set ID. The first segment in a set has the value 1. For each subsequent segment in the set, this value increments by 1.
OBX-2	Field contains no data.			
OBX-3	Number		R	The test code. (Application code) This identifies the test or analyte which this message relates to.
OBX-4	Field contains no data.			
OBX-5	String		R	Measurement values <ul style="list-style-type: none"> ⦿ For photometric calibration results, see <i>Measurement of C-module photometric Calibration Results</i> on page D-31. ⦿ For ISE calibration results, see <i>Measurement of ISE Calibration Results</i> on page D-32. ⦿ For Immunological calibration results, see <i>Measurement of E-module immunological Calibration Results</i> on page D-33.
OBX-6	Field contains no data (for calibration results).			
OBX-7	Field contains no data.			
OBX-8	String		O	Calibration alarm flags. <ul style="list-style-type: none"> ⦿ For details see <i>Calibration alarm flags</i> on page D-34.
OBX-9	Field contains no data (for calibration results).			
OBX-10	Field contains no data.			
OBX-11	F		O	Result status. <ul style="list-style-type: none"> • F For calibration result
OBX-12	Field contains no data.			
OBX-13	Field contains no data.			
OBX-14	Field contains no data (for calibration results).			
OBX-15	String		R	This is the username the operator used to log into the Control Unit.
OBX-16	Field contains no data.			

Field	Value	Host	DM	Description										
OBX-17	Number		O	Calibration ID as an integer number. This is a unique identifier of the calibration that the result refers to as it is sent by the instrument. Sent only if available.										
OBX-18	Complex		R	<p>For ISE module: Analytical unit ID, identifying the module that performed the test. ☞ The components and values are the same as for patient and QC results, see <i>Identifier of the analytical unit sent to host</i> on page B-30.</p>										
	Complex		R	<p>For C-module (photometric) or E-module (immunological): Measurement unit ID, identifying the module that performed the test.</p>										
				<i>ModuleType^SubModule^AnalyticalUnitID^InstrumentID^Bottle^SBNo</i>										
OBX-18.1	String		R	<p>Module One of the following: Type</p> <table> <tr> <td>c502,</td> <td>Results from the specified measuring module,</td> </tr> <tr> <td>c701,</td> <td>or manual results entered on behalf of that module.</td> </tr> <tr> <td>e602,</td> <td></td> </tr> <tr> <td>ISE, or</td> <td></td> </tr> <tr> <td>c702</td> <td></td> </tr> </table> <p>DM Results calculated on the <i>data manager</i>, and for manual results entered on the <i>data manager</i>, but cannot be attributed to a module.</p> <p>c8000 Results from the cobas® 8000 modular analyzer series that cannot be mapped to an actual measuring submodule, for example, sample short.</p>	c502,	Results from the specified measuring module,	c701,	or manual results entered on behalf of that module.	e602,		ISE, or		c702	
c502,	Results from the specified measuring module,													
c701,	or manual results entered on behalf of that module.													
e602,														
ISE, or														
c702														
OBX-18.2	Number		R	<p>SubModule</p> <ul style="list-style-type: none"> • 1 or 2, for result from a submodule. • 0 (zero) otherwise. 										
OBX-18.3	String		R	<p>AnalyticalUnitID Identifier for the module, as sent to the host. This setting is configurable in the cobas® 8000 data manager. Default: <i>Instrument#ModuleType#Position#SubModule</i> Example: MU1#c502#2#1 ☞ For details, see <i>Identifier of the analytical unit sent to host</i> on page B-30.</p>										
OBX-18.4	Number		R	Instrument number in <i>data manager</i> (A specific identifier inside the <i>data manager</i> which identifies a module. This is a number which has no relationship to the internal position of the module in the machine.)										
OBX-18.5	String		O	<p>Bottle Used Reagent Set.</p> <p>(R for QC)</p> <ul style="list-style-type: none"> • Current • Standby • (or empty) <p>Reserved field for C-module (photometric) and E-module (immunology) results, empty for ISE results.</p>										
OBX-18.6	Number		R	<p>SBNo An integer showing the standby bottle number, if used. The standby bottles are numbered sequentially, starting with 1.</p> <p>Reserved field, only for C-module (photometric) measurements, otherwise empty.</p>										
OBX-19	DateTime		R	Time at which result is available.										

Measurement of C-module photometric Calibration Results

For a Photometric Calibration Result from a C-module, the measurement result field (OBX-5) contains the following components.

SD^STD

Subcomponent	Description
<i>SD</i>	<i>Number</i> Standard deviation value data.
<i>STD</i>	<i>Complex</i> Absorbance values, (number types). Format: <i>Absorbance&</i> <i>FirstAbsorbance&</i> <i>FirstInitialAbsorbance&</i> <i>SecondAbsorbance&</i> <i>SecondInitialAbsorbance&</i> <i>Prozone Value</i>

Complete example C-module calibration result message

The following is a complete example of a calibration from a C-module (photometry).

```
MSH|^~\&|cobas 8000||host||20101019091421||OUL^R22^PCUPL|||2.5||||ER||
UNICODE UTF-8|
SPM||1^999999^901^1^20120131|||||||C^P|
OBR||1|||8685|
OBX|1|||8685||0^3&4&22851&2&22866&|||16|||F||||bmserv||75|c701^1^MU1#c7
01#1^6^Current|20101019091421|
SID|||
SPM||2^153314^401^1^20120131|||||||C^P|
OBR||2|||8685|
OBX|2|||8685||0^-362&-361&24786&-362&24149&|||16|||F||||bmserv||75|c701
^1^MU1#c701#1^6^Current|20101019091421|
SID||
```

Measurement of ISE Calibration Results

For an ISE Calibration Result, measurement result field (OBX-5) contains three components.

CalType^DataAlarm^Data

Subcomponent	Description
<i>CalType</i>	<i>String</i> This states what kind of test has been done. Possible values are: <ul style="list-style-type: none">• Type-A• Type-B
<i>DataAlarm</i>	<i>Complex</i> Data alarm. ☞ For details, see <i>ISE data alarms</i> on page D-32.
<i>Data</i>	<i>Complex</i> Test calibration analytical data. ☞ For details, see <i>ISE calibration analytical data</i> on page D-32.

ISE data alarms

The data alarms from the ISE calibration contain the following subcomponents, separated with an ampersand (&). Each component is a Number type.

- Internal standard solution electromotive force data alarm
- Low solution electromotive force data alarm
- High solution electromotive force data alarm
- Calibrator solution electromotive force data alarm
- Slope for display data alarm
- Internal standard solution concentration data alarm
- Calibrator solution concentration data alarm
- Carryover rate alarm
- Calculation slope value alarm
- Compensation value data alarm

ISE calibration analytical data

The analytical data from the ISE calibration data contain the following subcomponents, separated with an ampersand (&). Each component is a Number type, with Maximum length 6.

- Internal standard solution electromotive force data
- Low solution electromotive force data
- High solution electromotive force data
- Calibrator solution electromotive force data
- Slope for display data
- Internal standard solution concentration data
- Calibrator solution concentration data
- Carryover rate
- Calculation slope value
- Compensation value data alarm

Complete example ISE calibration result message

The following is a complete example of a calibration from an ISE module.

```
MSH|^~\&|cobas 8000||host||20100316105742||OUI^R22^ICUPL|270||2.5|||||  
ER||UNICODE UTF-8|  
SPM|||||||C^I|  
OBR|1|||989|  
OBX|1|||989|||Type-A^0&0&0&0&0&0&0&0^32.7&-34.7&-28.4&-30.2&50.4&  
131.5&147.7&0.0&49.9&-4.7|||Valid|||F||||bmserv||37|MU1#ISE#1#1|  
20100316105741|  
SID||  
SPM|||||||C^I|  
OBR|2|||990|
```

```

OBX|2||990||Type-A^0&0&0&0&0&0&0&0^34.2&-45.5&-24.8&-34.5&56.3&
4.76&4.70&0.0&56.2&-0.17|||Valid|||F||||bmserv||38|MU1#ISE#1#1|
20100316105742|
SID|||
SPM|||||||C^I|
OBR|3|||991|
OBX|3||991||Type-A^0&0&0&0&0&0&0^136.4&138.5&130.6&134.1&-44.9&
89.0&100.3&0.0&-45.1&0.7|||Valid|||F||||bmserv||39|MU1#ISE#1#1|
20100316105742|
SID|||

```

Measurement of E-module immunological Calibration Results

For an Immunological Calibration Result from an E-module, the measurement result field (OBX-5) field contains the following components.

*CalResultStatus^MissingValue^MinSignal^MaxSignal^CalibratorFactor^
 Deviation^Slope^MinAcceptDiff^SystemError^SignalVal1&SignalVal2^
 TargetValue^Unit^CUTOff^BorderLineAreaUpperLimit^
 BorderLineAreaLowerLimit*

Subcomponent	Description
<i>CalResultStatus</i>	Result Status: <ul style="list-style-type: none"> • Valid • Invalid
<i>MissingValue</i>	<i>String</i> <ul style="list-style-type: none"> • true if violation • false if no violation
<i>MinSignal</i>	<i>String</i> <ul style="list-style-type: none"> • true if violation • false if no violation
<i>MaxSignal</i>	<i>String</i> <ul style="list-style-type: none"> • true if violation • false if no violation
<i>CalibratorFactor</i>	<i>Number</i> Decimal value
<i>Deviation</i>	<i>String</i> <ul style="list-style-type: none"> • true if violation • false if no violation
<i>Slope</i>	<i>String</i> Decimal value (used for qualitative tests)
<i>MinAcceptDiff</i>	<i>String</i> <ul style="list-style-type: none"> • true if violation • false if no violation
<i>SystemError</i>	<i>String</i> <ul style="list-style-type: none"> • true if violation • false if no violation
<i>SignalVal1&SignalVal2</i>	<i>Complex</i> Signal value, in two decimal subcomponents: <i>SignalVal1&SignalVal2</i>
<i>TargetValue</i>	<i>Complex</i> Target Value (for quantitative tests). This can be empty <i>Level1&Level2&Level3&Level4&Level5</i> Note that version 1.02 of the <i>data manager</i> does not send data for this component.
<i>Unit</i>	<i>String</i> Unit

Subcomponent	Description
<i>CUTOFF</i>	String CUT off (for qualitative tests). Note that the <i>data manager</i> does not send data for this component.
<i>BorderLineAreaUpperLimit</i>	Number (Used for qualitative tests). Note that the <i>data manager</i> does not send data for this component.
<i>BorderLineAreaLowerLimit</i>	Number (Used for qualitative tests). Note that the <i>data manager</i> does not send data for this component.

Complete example E-module calibration result message

The following is a complete example of a calibration from a E-module (immunology).

```
MSH|^~\&|cobas 8000||host||20111118175844||OUL^R22^ECUPL|14268||2.5|||  
|ER||UNICODE UTF-8|  
SPM||2^158941^1^None^20111119|||||||C^E|  
OBR|1|||1|  
OBX|1||1||Valid^false^false^false^1.064^false^^false^false^38293.490&3  
8596.120^^^^|||LotCalibration|||F||||bmserv||26|e602^2^MU1#e602#2#2^1  
0^Current|20111118175844|  
SID|1^^^ASY^18^0|157328|5|  
SPM||1^158941^1^None^20111119000000|||||||C^E|  
OBR|2|||1|  
OBX|2||1||Valid^false^false^false^1.064^false^^false^false^839.413&797  
.173^^^^|||LotCalibration|||F||||bmserv||26|e602^2^MU1#e602#2#2^10^Cu  
rrent|20111118175844|  
SID|1^^^ASY^18^0|157328|5|
```

Calibration alarm flags

This section describes the calibration alarms send in field OBX-8.

ISE calibration alarm

For ISE calibration results, the OBX-8 field contains the calibration status sent by the instrument. Possible values are:

- `Valid` meaning the calibration was successful.
- `Invalid` meaning calibration failed.

C-module (photometric) calibration alarm

For photometric calibration results, this field contains the calibration alarm. Zero (0) indicates that there is no alarm.

E-module (immunological) calibration alarm

For Elecsys calibration results, this field contains the CalibrationMethod. This is a string with one of the following eight values.

NoCalibration
LotCalibration
ContainerCalibration
InheritedLotCalibration
InheritedItemCalibration
UserModifiedCalibration
UnmaskedCalibration
FailedCalibration

Test Code Detail Segment - TCD

The *data manager* uses the test code detail segment in result report message to give dilution factors.

```
TCD|1|1
TCD|1|Inc|
TCD|1|50|
```

Field	Value	Host	DM	Description
TCD-1	Number	-	R	Universal Service Identifier. (Testcode or Application Code, which identifies the test or analyte tested for.)
TCD-2	String	-	R	Auto-dilution factor. Permitted values are: <ul style="list-style-type: none"> • For an ISE module, the dilution factor is always: 1 • For C-modules (photometry): Dec, Inc, 1 • For E-module (immunoassay): 1, 2, 5, 10, 20, 50, 100, 400

Substance Identifier Segment - SID

The *data manager* uses the substance identifier segment to identify the reagents used in a test, when sending the host a result report message.

Patient upload from a C-module (photometric):

```
SID|8706^^784648^R1^2^0|231478|5|
```

Calibration result from an E-module (Immunology):

```
SID|1^^^ASY^14^0|156369|
```

For messages containing patient results from the ISE module, no SID segment is sent.

Field	Value	Host	DM	Description
SID-1	Complex	-	O/R	Test code / Method Identifier. Takes the format: <i>Test^Type^Code^ReagentType^Position^Expiry</i> This field is empty for ISE calibration results.
SID-1.1	Number		O/R	Testcode (or Application Code). This is the code number the host uses for identifying the test or analyte to test for.
SID-1.2	String		O/R	Type of the test, if available.
SID-1.3	Number		O/R	Reagent code. For calibration results from a C or E module, this is empty.

Field	Value	Host	DM	Description
SID-1.4	String	O/R	Reagent	Reagent type. Empty for C module calibration results.
			Type	R1 Reagent 1 used for a patient or QC test on a C module.
			R2	Reagent 2 used for a patient or QC test on a C module.
			R3	Reagent 3 used for a patient or QC test on a C module.
			SPR	Special reagent
			ASY	Assay, used on immunology (E) modules. An E-module test will have exactly one ASY segment.
			IS	Inner standard (ISE - QC results)
			DIL	Diluent (ISE - QC results)
			REF	Reference (ISE - QC results)
			Position	Reagent Position on Disk
SID-1.5	Number	O/R	Position	Reagent Position on Disk
SID-1.6	Number	O/R	Expiry	Expiration flag:
				<ul style="list-style-type: none"> • 0 = expired • 1 = not expired
SID-2	String	-	O	Lot number of the reagent used. Not used for ISE-module calibration results.
SID-3	String	-	O	Serial number of the reagent used. Not used for ISE-module calibration results.



Reagents on a C module

Note that R1-R3 might not all be present on a C module (photometric).

Comment Segment - NTE

The *data manager* uses the comment segment in a result report message.

```
NTE|1|I|23^Sample Short|I|
NTE|2|L|This sample is haemolytic^DMROUTINE^20090402172605|G|
```

There will always be an instrument flag sent with the result report message. In the case of a result with no alarm flag (zero), the segment will be as follows:

```
NTE|1|I|0|I|
```

This is “NTE-one-i-zero-i”.

Field	Value	Host	DM	Description
NTE-1	Number	R	Set ID	
NTE-2	Character	R	Source of comment text. Fixed string value.	<ul style="list-style-type: none"> • I Result flag, from the instrument or the <i>data manager</i>. • L The comment was added on the <i>data manager</i>.

Field	Value	Host	DM	Description
NTE-3	Complex		O/R	Comment. Value depends on value of NTE-4. This is optional if NTE-4 is G. (Result comment) ☞ For details of this field, see <i>Types of comment segment</i> on page D-37.
NTE-4	String		R	Code for qualifying the comment segment type. Comments sent by <i>data manager</i> can have the following types. <ul style="list-style-type: none"> • I Result flag. This is an extension to the HL7 specification. • G Result comment.

Types of comment segment

The content of the comment segment depends on the type of comment and where it comes from.

User comments If the user enters a comment, the field NTE-4 has the value G.

Field NTE-3 has details of the comment.

Text^User^Date

Text	String	Comment text
User	String	User who entered the comment
Date	String	Creation date and time in datetime format

Instrument comments If the instrument sends the *data manager* an data flag (alarm or “error flag”), the *data manager* passes this to the host in a comment segment. NTE-4 has the value I.

Field NTE-3 has details of the data flag.

flag^desc

flag	Number	Number showing the data alarm code of the data flag. If there is no error, this value is zero: 0.
desc	String	Description of data flag. Blank if the flag is zero.

☞ For details of possible error flags, see Chapter 11 *Data Alarms*

Query Parameter Segment - QPD (for a test selection inquiry)

The *data manager* uses the query parameter segment in an inquiry for a test selection, to give details of the sample.

QPD|TSREQ|12896|000137||50042|2||||S1|SC|R1|R|

If the system is not using barcodes (with aliquots from a **MODULAR PRE-ANALYTICS**), and is requesting a sample ID from the host:

QPD|TSREQ|12897|*****|50045|1||||S1|SC|R1|R|

If sample are identified by sequence number:

QPD|TSREQ|563067|^1031||50203|3||||S1|SC|R1|R|

Field	Comp.	Value	Host	DM	Description
QPD-1		TSREQ		R	Message name, fixed string TSREQ.
QPD-2		String		O	Query tag to identify the query.
QPD-3		String / Complex		R	If using barcodes (default), this is a string field containing the Sample ID. If samples are identified by sequence number, this is a complex field:
QPD-3.1		String		R/O	Must be empty if samples are identified by sequence number, and a sequence number is sent in QPD-3.2.
QPD-3.2		String		O/R	Sequence number. (Max. value = 60,000.) Only used if samples are identified by sequence number, and the sample has no barcode. ☞ For details of sequence numbers, see Chapter 14 <i>Identifying patient samples by sequence number</i> .
QPD-4		<i>Field contains no data.</i>			
QPD-5		String		R	Rack ID, as visible on Control Unit
QPD-6		String		R	Position on rack
QPD-7		<i>Field contains no data.</i>			
QPD-8		<i>Field contains no data.</i>			
QPD-9		<i>Field contains no data.</i>			
QPD-10		String		R	Rack type as assigned to a specific sample type on the cobas® 8000 modular analyzer series. Depending on the version and modules installed, not all of these types may be available on any particular system. S1 Serum / Plasma S2 Urine S3 Cerebrospinal Fluid S4 Supernatant S5 Other fluids S6 Whole blood S7 Oral fluids (Saliva) S8 Reserved for future use S9 Reserved for future use SA Reserved for future use S0 No specimen assigned (only used for messages from <i>data manager</i>).
QPD-11		String		R	Sample container type. A two-character code. <ul style="list-style-type: none">• MC Micro cup• SC (or empty) Standard cup
QPD-12		String		R	Kind. A two-character code. <ul style="list-style-type: none">• R1 Query for 1st measurement (Initial run)• R2 Rerun query
QPD-13		String		R	Code indicating the sample priority. <ul style="list-style-type: none">• S STAT sample• R Routine sample

Query Parameter Segment - QPD (for a Result Query)

The host uses the query parameter segment (QPD) in a result query to inquire for the measurement results for a given sample.

```
QPD|RSREQ||12896
QPD|RSREQ||12896|
QPD|RSREQ||12896|F
QPD|RSREQ||12896|||||S1
```

If identifying samples by sequence number:

```
QPD|RSREQ||^1031||
```

Field	Comp.	Value	Host	DM	Description
QPD-1		RSREQ	R		Message name, fixed string RSREQ.
QPD-2					<i>Field contains no data.</i>
QPD-3		String / Complex	R		In the default mode using barcodes, this is a string field containing the Sample ID. If samples are identified by sequence number, this is a complex field:
QPD-3.1	String		R/O		Must be empty if samples are identified by sequence number and a sequence number is sent in QPD-3.2.
QPD-3.2	String		O/R		Sequence number. (Max. value = 60,000.) Only used if samples are identified by sequence number, and the sample has no barcode. ☞ For details of sequence numbers, see Chapter 14 <i>Identifying patient samples by sequence number.</i>
QPD-4	String	O			Selection mode <ul style="list-style-type: none"> • (empty) All results • F Final results
QPD-5					<i>Field contains no data.</i>
QPD-6					<i>Field contains no data.</i>
QPD-7					<i>Field contains no data.</i>
QPD-8					<i>Field contains no data.</i>
QPD-9					<i>Field contains no data.</i>

Field	Comp.	Value	Host	DM	Description
QPD-10		String	O		Rack type as assigned to a specific sample type on the cobas® 8000 modular analyzer series. Depending on the version and modules installed, not all of these types may be available on any particular system.
		S1			Serum / Plasma
		S2			Urine
		S3			Cerebrospinal Fluid
		S4			Supernatant
		S5			Other fluids
		S6			Whole blood
		S7			Oral fluids (Saliva)
		S8			Reserved for future use
		S9			Reserved for future use
		SA			Reserved for future use
		S0			No specimen assigned (only used for messages from <i>data manager</i>).

Subsequent fields contain no data.

Query Parameter Segment - QPD (for an Order Query)

The host uses the query parameter segment (QPD) in an order query to inquire for all test selections with and without results for a given sample.

```
QPD|TSREQ||12896|O
QPD|TSREQ||12896|||||S1
```

If identifying samples by sequence number:

```
QPD|TSREQ||^1031|||||S1|
```

Field	Value	Host	DM	Description
QPD-1	TSREQ	R		Message name, fixed string TSREQ.
QPD-2	<i>Field contains no data.</i>			
QPD-3	String / Complex	R		In the default mode using barcodes, this is a string field containing the Sample ID. If samples are identified by sequence number, this is a complex field:
QPD-3.1	String	R/O		Empty if samples are identified by sequence number and a sequence number is sent in QPD-3.2.
QPD-3.2	String	O/R		Sequence number. (Max. value = 60,000.) Only used if samples are identified by sequence number, and the sample has no barcode. ☞ For details of sequence numbers, see Chapter 14 <i>Identifying patient samples by sequence number</i> .
QPD-4	String	O		Selection mode <ul style="list-style-type: none"> • (empty) All requested tests • O (Capital O) Open. (Only test selections with no results yet)
QPD-5	<i>Field contains no data.</i>			

Field	Value	Host	DM	Description
QPD-6				<i>Field contains no data.</i>
QPD-7				<i>Field contains no data.</i>
QPD-8				<i>Field contains no data.</i>
QPD-9				<i>Field contains no data.</i>
QPD-10	String	O		Rack type as assigned to a specific sample type on the cobas® 8000 modular analyzer series. Depending on the version and modules installed, not all of these types may be available on any particular system. S1 Serum / Plasma S2 Urine S3 Cerebrospinal Fluid S4 Supernatant S5 Other fluids S6 Whole blood S7 Oral fluids (Saliva) S8 Reserved for future use S9 Reserved for future use SA Reserved for future use S0 No specimen assigned (only used for messages from <i>data manager</i>).

Subsequent fields contain no data.

Response Control Parameter Segment - RCP

The *data manager* and the host use the response control parameter segment (RCP) with a query message (test selection inquiry, result query, order query) to specify the priority of the message.

RCP | I | 1 | R |

Field	Value	Host	DM	Description
RCP-1	I	R	R	Query priority (immediate), fixed string I.
RCP-2	1	O	R	Query limited request, fixed value 1.
RCP-3	R	O	R	Response modality, fixed character value R.

Equipment Detail Segment - EQU

The host used the Equipment Detail Segment to instruct the *data manager* to apply the instructions in the following ECD segments, in a masking message.

EQU | 1 | 20090402173655 |

Field	Value	Host	DM	Description
EQU-1	1	R		Identifier for the equipment. This is the identifier from an institution's master list of equipment. Fixed value "1".
EQU-2	Datetime	R		The date and time that the masking or unmasking request is sent.

Equipment Command Segment - ECD

The host uses the Equipment Command Segment to instruct the *data manager* what masking to perform.

```
ECD||UC|||989^MU1#c701#1#1^ALL|
ECD||LK|||989^P^MU1#e602#1#1^ALL|
ECD||LK|||989^T^MU1#ISE#1#1^ALL|
```

Field	Value	Host	DM	Description
ECD-1	<i>This field contains no data.</i>			
ECD-2	String	R		<p>The instruction specifying masking or unmasking.</p> <ul style="list-style-type: none"> • LK (for “lock”) to implement masking. • UC (for “unlock”), to unmask.
ECD-3	<i>This field contains no data.</i>			
ECD-4	<i>This field contains no data.</i>			
ECD-5	Complex	R		<p>This field specifies the parameters of the command.</p> <p><i>TestCode^MaskType^Unit_ID^ALL</i></p>
ECD-5.1	Number	R	-	<p><i>TestCode</i> The code identifying the analyte or test. Required field: masking only possible by test.</p>
ECD-5.2	Character	O	-	<p><i>MaskType</i> A character flag instructing <i>data manager</i> which kind of masking to perform:</p> <ul style="list-style-type: none"> • P Mask only patient results. The <i>data manager</i> uploads quality control and calibration results to the host. • T Mask all results, including patient, quality control and calibration results. • This field is empty if ECD-2 is UC (unmask).
ECD-5.3	String	R	-	<p><i>Unit_ID</i> This is the user-editable identifier for the instrument and module.</p> <p> For details, see <i>Identifier of the analytical unit sent to host</i> on page B-30.</p>
ECD-5.4	ALL	R	-	Hard-coded to ALL.

HL7 Acknowledgement handling

This chapter explains how cobas® 8000 data manager implements HL-7 acknowledgement messages.

In this chapter

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HL7 acknowledgement messages

This chapter explains how to handle HL7 acknowledgement messages when sending and receiving messages to cobas® 8000 data manager.

Messages from the *data manager*

HL7 messages send a flag instructing the receiver under what conditions to send an acknowledgement. You can define which flag the *data manager* sends. This setting applies to the flag sent in the following messages:

- Result upload messages (patient, QC, or calibration) and
- Test selection uploads.

This is configured in **c8000 DM Service > Service-related configuration > Interface options**.

 For details of how to configure the application acknowledge level of the *data manager*, see *Configuring HL7 Acknowledgement handling* on page B-28.

The code in MSH-16 instructs the receiver whether to send an application acknowledgement reply. Four levels of acknowledgement are supported, as described below.

MSH-16 Code	Meaning	Required host response	Timeout (for patient and QC results)
AL	Always	Send an acknowledgement to every message.	Defaults to 60 seconds. The <i>data manager</i> expects Accept (AA) or Error (AE). Data is marked in Upload Status as "Pending" in <i>data manager</i> until acknowledgement received or timeout.
SU	Success	If message processed, send Accept (AA). If message cannot be processed, send no acknowledgement.	Defaults to 60 seconds. The <i>data manager</i> expects Accept (AA). Data is marked in Upload Status as "Pending" in <i>data manager</i> until acknowledgement received or timeout.
ER	Error	If message processed, send no acknowledgement. If message cannot be processed, send Error (AE).	The <i>data manager</i> assumes success, unless it receives an Error (AE) or Reject (AR) at any time before the uploaded message is deleted.
NE	Never	Never send an acknowledgement.	The <i>data manager</i> expects no response.

For acknowledgement message, the level of application acknowledgement is set to Never (NE).

For other messages from the *data manager* (inquiry for test selections or test selection upload), the level of application acknowledgement is set to Error (ER).

If the *data manager* cannot send a result report message because of a low-level error, such as a disconnected cable, the results are marked in the column **Host Upload Status** as "Failed".

The *data manager* only displays the outcome of the most recent attempt to send results.

Inquiry for test selections

The *data manager* always sends an Error (ER) code with an inquiry for a test selections.

The data manager sends in MSH-16:	The host returns in MSA-1			
	AA (Accept)	AE (Error)	AR (Reject)	no response
Always (AL)			<i>Not sent</i>	
Success (SU)			<i>Not sent</i>	
Error (ER)		ER always sent. The <i>data manager</i> currently does not respond to any value returned.		
Never (NE)			<i>Not sent</i>	

If the host cannot find a test selection

If the host cannot find a test selection or if the sample ID is unknown, it should send a test selection download message with no tests ordered.

Result report patient

The *data manager* can send AL/SU/ER/NE in a result report.

The data manager sends in MSH-16:	The host returns in MSA-1			
	AA (Accept)	AE (Error)	AR (Reject)	no response
Always (AL)	The <i>data manager</i> marks the results in Upload Status as “Sent”.	The <i>data manager</i> marks the results in Upload Status as “Failed”.	The <i>data manager</i> marks the results in Upload Status as “Failed”.	After timeout, the <i>data manager</i> marks the results in Upload Status as “Failed”.
Success (SU)	The <i>data manager</i> marks the results in Upload Status as “Sent”.	No allowed	No allowed	After timeout, the <i>data manager</i> marks the results in Upload Status as “Failed”.
Error (ER)	No allowed	The <i>data manager</i> marks the results in Upload Status as “Failed”.	The <i>data manager</i> marks the results in Upload Status as “Failed”.	The <i>data manager</i> marks the results in Upload Status as “Sent”.
Never (NE)	No allowed	No allowed	No allowed	The <i>data manager</i> marks the results in Upload Status as “Sent”.

If the host sends an Error (AE) or Reject (AR) response, or the message times out:

- the *data manager* reports an error in **Service > Communication messages**.
- the *data manager* writes an error to logs in **System Configuration > Log files**.
- the *data manager* writes an error to logs in **Routine > System alarms**.
- the *data manager* marks the results in “Upload status” as “Failed”.

Result report quality control

The *data manager* can send AL/SU/ER/NE in a Quality Control result report.

The <i>data manager</i> sends in MSH-16:		The host returns in MSA-1			
		AA (Accept)	AE (Error)	AR (Reject)	no response
Always (AL)		The <i>data manager</i> marks the results in Upload Status as “Sent”.	The <i>data manager</i> marks the results in Upload Status as “Failed”.	The <i>data manager</i> marks the results in Upload Status as “Failed”.	After timeout, the <i>data manager</i> marks the results in Upload Status as “Failed”.
Success (SU)		The <i>data manager</i> marks the results in Upload Status as “Sent”.	No allowed	No allowed	After timeout, the <i>data manager</i> marks the results in Upload Status as “Failed”.
Error (ER)		No allowed	The <i>data manager</i> marks the results in Upload Status as “Failed”.	The <i>data manager</i> marks the results in Upload Status as “Failed”.	The <i>data manager</i> marks the results in Upload Status as “Sent”.
Never (NE)		No allowed	No allowed	No allowed	The <i>data manager</i> marks the results in Upload Status as “Sent”.

If the host sends an Error (AE) or Reject (AR) response, or the message times out:

- the *data manager* reports an error in **Service > Communication messages**.
- the *data manager* writes an error to logs in **System Configuration > Log files**.
- the *data manager* writes an error to logs in **Routine > System alarms**.
- the *data manager* marks the results in “Upload status” as “Failed”.

Result report calibration data

The *data manager* can send AL/SU/ER/NE in a result report.

The <i>data manager</i> sends in MSH-16:		The host returns in MSA-1			
		AA (Accept)	AE (Error)	AR (Reject)	no response
Always (AL)		Message considered sent successfully.	Error logged in <i>data manager</i> .	Error logged in <i>data manager</i> .	After timeout, error logged in <i>data manager</i> .
Success (SU)		Message considered sent successfully.	No allowed	No allowed	After timeout, error logged in <i>data manager</i> .
Error (ER)		No allowed	Error logged in <i>data manager</i> .	Error logged in <i>data manager</i> .	Message considered sent successfully.
Never (NE)		No allowed	No allowed	No allowed	Message considered sent successfully.

If the host sends an Error (AE) or Reject (AR) response, or the message times out:

- the *data manager* reports an error in **Service > Communication messages**.
- the *data manager* writes an error to logs in **System Configuration > Log files**.
- the *data manager* writes an error to logs in **Routine > System alarms**.

Test selection upload from *data manager* to host

The *data manager* can send AL/SU/ER/NE in a test selection upload.

The <i>data manager</i> sends in MSH-16:		The host returns in MSA-1			
		AA (Accept)	AE (Error)	AR (Reject)	no response
Always (AL)	Message considered sent successfully.		Error logged in <i>data manager</i> .	Error logged in <i>data manager</i> .	After timeout, error logged in <i>data manager</i> .
Success (SU)	Message considered sent successfully.	No allowed		No allowed	After timeout, error logged in <i>data manager</i> .
Error (ER)	No allowed		Error logged in <i>data manager</i> .	Error logged in <i>data manager</i> .	Message considered sent successfully.
Never (NE)	No allowed		No allowed	No allowed	Message considered sent successfully.

If the host sends an Error (AE) or Reject (AR) response, or the message times out:

- the *data manager* reports an error in **cobas® 8000 data manager Service > Communication messages**.
- the *data manager* writes an error to logs in **System Configuration > Log Files**.
- the *data manager* writes an error to logs in **Routine > System alarms**.

If the *data manager* cannot find a test selection

If the *data manager* cannot find the requested test selection, it returns a test selection upload message with a sample ID and sample type, but no orders, containing only the MSH and SPM segments.

Acknowledgement

The *data manager* always sends an NE code in an acknowledgement message.

Sending messages from host to the *data manager*

The *data manager* responds, as detailed in this section, according to the setting of MSH-16 in the host messages. The *data manager* sends either an Accept (AA) or an Error (AE) response, but does not currently the Reject (AR) response.

Result query

The *data manager* sends no acknowledgment message or segment in response to a result query. If the query is successful, the *data manager* responds with a result upload. (OUL^R22^BATCH).

For result queries, the *data manager* only supports the acknowledgement code NE.

If the *data manager* cannot find a test selection with that sample ID

If the *data manager* cannot find a test selection that has the sample ID given in the host's query, it makes no reply.

Order query

The *data manager* sends no acknowledgment message or segment in response to an order query. If the message is successful, the *data manager* sends a test selection upload (OML^O33).

For an order query, the *data manager* only supports the acknowledgement code NE.

If the *data manager* cannot find a test selection

If the *data manager* cannot find a test selection with the requested sample ID, it returns a test selection upload message containing the sample ID and sample type as requested, but containing no orders, using only the MSH and SPM segments.

☞ For an example, see *No tests found* on page E-87.

Masking

In reply to a masking or unmasking request, the *data manager* sends an acknowledgement message if requested.

The host sends in MSH-16:		The <i>data manager</i> returns in MSA-1 in an ACK message		
		AA (Accept)	AE (Error)	AR (Reject)
Always (AL)	Indicates success.	Indicates an error, specified in the MSA segment.	<i>Not sent</i>	<i>Not sent</i>
Success (SU)	Indicates success.	<i>Not sent</i>	<i>Not sent</i>	Indicates unspecified error.
Error (ER)	<i>Not sent</i>	Indicates an error, specified in the MSA segment.	<i>Not sent</i>	Indicates success.
Never (NE)	<i>Not sent</i>	<i>Not sent</i>	<i>Not sent</i>	Supported.

Test Selection download

In reply to a test selection download, the *data manager* sends an acknowledgement message if requested.

The host sends in MSH-16:		The <i>data manager</i> returns in MSA-1		
		AA (Accept)	AE (Error)	AR (Reject)
Always (AL)	Indicates success.	Indicates an error, specified in the MSA segment.	<i>Not sent</i>	<i>Not sent</i>
Success (SU)	Indicates success.	<i>Not sent</i>	<i>Not sent</i>	Indicates unspecified error.
Error (ER)	<i>Not sent</i>	Indicates an error, specified in the MSA segment.	<i>Not sent</i>	Indicates success.
Never (NE)	<i>Not sent</i>	<i>Not sent</i>	<i>Not sent</i>	Supported.

Acknowledgement

The *data manager* never replies to an acknowledgement message.

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E

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Data Alarms

Data alarms and error codes

This chapter gives a reference to the data alarms that cobas® 8000 data manager and the Control Unit can generate.

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The meaning of the data alarms

This table presents a brief description, the priority and output character of each data alarm.

No.	Name	Meaning	Priority	Output character		
				HOST	UI	
					PRN	SCR
0	(No Alarm)					
1	ADC abnormal	<ul style="list-style-type: none"> <i>Photometry</i>: The ADC value of the primary or secondary wavelength is zero (in monochromatic measurement, the primary wavelength only). <i>ISE</i>: The system cannot read the ADC data properly. <i>Immunoassay</i>: The ADC data is abnormal. 	1	1	ADC.E	✓
2	ABS Cell blank abnormal	The cell blank value used for measurement exceeds or less than the reference value by more than 0.1Abs.	1	2	>Cuvet	✓
3	Sample short	<p>Before sample aspiration, the liquid level cannot be detected in the sample container.</p> <p><i>Immunoassay</i>:</p> <ul style="list-style-type: none"> Sample short was detected. No sample was placed. 	2	3	Samp.S	✓
4	Reagent short	<p>The liquid level cannot be detected in the reagent container.</p> <ul style="list-style-type: none"> c701/e601: Alarm is generated when reagent pipetted by LLD check c501: Alarm is NOT generated because reagent probe does not have LLD. 	2	4	Reag.S	✓
5	ABS over	The absorbance value to be used for calculation after cell blank correction exceeded 3.3. (Check is done for each wavelength)	3	5	>Abs	✓
6	Prozone Error	The prozone check value exceeds the specified limit value. (Antigen readdition method)	3	6	>Proz	✓
7	Reaction limit over	<p>In a rate assay, the main wavelength absorbance in measure points exceeds the specified reaction limit value (the value after the automatic correction). Depending on the number of measure points within the limit, there are three types:</p> <ol style="list-style-type: none"> All measure points exceed the reaction limit. 	3	7	>React	✓
8	Reaction limit over (2nd ..)	<ol style="list-style-type: none"> The second and subsequent points exceed the reaction limit. 	3	8	>React	✓
9	Reaction limit over (3rd ..)	<ol style="list-style-type: none"> The third and subsequent points exceed the reaction limit. 	3	9	>React	✓
10	Linearity abnormal 1	<p>In rate assay, the reaction linearity exceeds the specified limit value. There are two types of checks depending on the number of measure points:</p> <ol style="list-style-type: none"> When there are 9 or more measure points for c701, 17 or more for c502. 	3	10	>Lin	✓
11	Linearity abnormal 2	<ol style="list-style-type: none"> When there are 4-8 measure points for c701, 6 to 16 for c502. 	3	11	>Lin	✓
12	S1ABS abnormal	During calibration, expected absorbance is outside the S1 Abs Limit.	4	12	S1A.E	✓

No.	Name	Meaning	Priority	Output character		
				HOST	UI	
					PRN	SCR
13	DUPLICATE error	<ul style="list-style-type: none"> Photometry: The difference between the first and second measurement (absorbance) of a calibrator is outside the specified range. Immunoassay: The difference between the first and second measured signals of the calibrator is out of the range specified in the assay. 	4	13	Dup.E	✓
14	STANDARD error	<p>During photometric calibration, any one of the following alarms was encountered:</p> <ul style="list-style-type: none"> ADC abnormal cell blank abnormal sample short reagent short absorbance over reaction limit over linearity abnormal prozone error duplicate error calculation not possible standard 1 absorbance abnormal. <p>Otherwise one of the following errors occurred:</p> <ul style="list-style-type: none"> During calibration, calculation was disabled. During nonlinear calibration, an extreme value appeared. 	4	14	Std.E	✓
15	SENSITIVITY error	<p>Sensitivity is checked for linear (2 to 6 points) or nonlinear calibration. The alarm is issued if the following is smaller than the sensitivity limit:</p> <p>Mean Abs of Std (N)* - Mean Abs of Std (1)</p> <p>Mean Conc of Std (N) - Mean Conc of Std (1)</p> <p>*N: = Std 2 for 2 Point = span calibrator for multipoint calibration</p>	4	15	Sens.E	✓
16	CALIB error	<p>The current calibrator concentration value or slope value differs from the previous one by more than the specified Compensated Limit.</p> $ (previous\ value - current\ value)/((previous\ value + current\ value)/2) * 100 < Compensated\ limit$	5	16	Cal.E	✓
17	SD limit error	During nonlinear or multipoint linear calibration, the SD value was larger than the specified SD limit.	5	17	SD.E	✓
18	ISE Noise error	<p>The fluctuation in electromotive force exceeds the following value:</p> <ul style="list-style-type: none"> Na+: 0.7 mV K+: 1.0 mV Cl-: 0.8 mV 	4	18	ISE.N	✓
19	ISE Voltage Level error	<p>During measurement of internal reference, the mean of the EMF values was not within the following ranges (Internal standard solution):</p> <ul style="list-style-type: none"> Na+: -90.0 to -10 mV K+: -90.0 to -10 mV Cl-: 80.0 to 160 mV 	4	19	ISE.E	✓

No.	Name	Meaning	Priority	Output character		
				HOST	UI	
					PRN	SCR
20	Slope abnormal	The slope value is less than 45.0 mV for Na+ or K+ electrodes, or greater than -35 mV for the Cl- electrode.	3	20	Slop.E	✓
21	Preparation abnormal	The slope value is within the following range: <ul style="list-style-type: none">• Na+ or K+ electrodes: 45.0 to 49.9 mV• Cl- electrodes: -39.9 to -35.0 mV	3	21	Prep.E	✓
22	IS concentration abnormal	The concentration of the Internal Standard solution (ISE IS) was not within the following ranges* <ul style="list-style-type: none">• Na+: 120.0-160.0 mmol/L,• K+: 3.0-7.0 mmol/L• Cl-: 80.0-120.0 mmol/L	3	22	IStd.E	✓
23	ISE Sample range over	The sample concentration was outside the following range: <ul style="list-style-type: none">• Na+: 10-250 mmol/L,• K+: 1-100 mmol/L,• Cl-: 10-250 mmol/L	5	23	< >Test	✓
24	Data error in comp. Test	<ul style="list-style-type: none">• In test-to-test compensation calculation, a data alarm for the compensation test data is indicated.• Calculation not possible, test-to-test compensation disabled, overflow, random error, systematic error, QC error and outside of expected value.	5	24	CmpT.E	✓
25	Unable to calculate comp. Test	<ul style="list-style-type: none">• During test-to-test compensation calculation, the denominator became zero.• The test used for test-to-test compensation has not been measured yet.• Any test used for test-to-test compensation has data alarm not possible (Calc.?) or test-to-test compensation error (CmpT.E).• Any test used in the compensation formula has a data alarm that leaves the result blank.	5	25	CmpT.?	✓
26	Technical Limit over (upper)	The concentration exceeds the specified technical limit range. <i>Immunoassay:</i> The concentration exceeds the measuring range. Measurement data is displayed as Upper Limit Value.	"4	26	>Test	✓
27	Technical Limit over (lower)	<i>Photometry/ISE:</i> The concentration is below the specified technical limit range. <i>Immunoassay:</i> The concentration is below the measuring range. Measurement data is displayed as Lower Limit Value.	"4	27	<Test	✓
28		Reserved for former alarm (Random error in real-time QC)	-			
29		Reserved for former alarm (Systematic error 1 in real-time QC)	-			
30		Reserved for former alarm (Systematic error 2 in real-time QC)	-			
31		Reserved for former alarm (Systematic error 3 in real-time QC)	-			
32		Reserved for former alarm (Systematic error 4 in real-time QC)	-			
33		Reserved for former alarm (Systematic error 5 in real-time QC)	-			
34		Reserved for former alarm (Systematic error 6 in real-time QC)	-			
35		Reserved for former alarm (QC error 1)	-			
36		Reserved for former alarm (QC error 2)	-			
37	Calculation test error	A data alarm has occurred for the test needed in the calculation.	6	37	CICt.E	✓

No.	Name	Meaning	Priority	Output character		
				HOST	UI	
					PRN	SCR
38	Overflow	Display is not possible because the output figure exceeds the defined number of digits.	6	38	Over.E	✓
39	Calculation not possible	<ul style="list-style-type: none"> The denominator becomes zero in calculation. An overflow occurred in logarithmic or exponential calculation. Result was left blank. 	2	39	Calc.?	✓
40		Reserved for former alarm (Outside of expected value (upper))	-			
41		Reserved for former alarm (Outside of expected value (lower))	-			
42	Edited test	<p>The data has been edited.</p> <p>Effective when "Edited Data Check" is ON.</p>	0	42	Edited	✓
43	Calibration result abnormal (Sample Flag)	No calibration data or previous calibration data used (The last calibration failed due to an Std, or Sens alarm). This alarm is attached to routine/rerun/STAT/control samples.	7	43	Cal.E	✓
44	Repeat limit over (upper)	<p>The quantitative result exceeds the upper limit of the specified repeat limit range.</p> <ul style="list-style-type: none"> Effective when "Repeat Limit Check" is ON. Auto rerun ON/OFF is depending on the setting. 	7	44	>Rept	✓
45	Repeat limit over (lower)	<p>The quantitative result falls below the lower limit of the specified repeat limit range.</p> <ul style="list-style-type: none"> Effective when "Repeat Limit Check" is ON. Auto rerun ON/OFF is depending on the setting. 	7	45	<Rept	✓
46	ABS maximum over (nonLin curve)	The absorbance of a sample is found equal or greater than the theoretical maximum absorbance (for infinite analyte concentration).	3	46	Samp.?	✓
47			-			
48			-			
49			-			
50			-			
51	Response(ISE) abnormal 1	<p>"The A Factor is outside the following limits:</p> <ul style="list-style-type: none"> Na+: A > 0.154 K+: A > 0.107 Cl-: A > 0.330 	3	51	Rsp1.E	✓
52	Response(ISE) abnormal 2	<p>The A Factor is outside the following limits:</p> <ul style="list-style-type: none"> Na+: A > 0.232 K+: A > 0.160 Cl-: A > 0.490 	3	52	Rsp2.E	✓
53	Conditioning(ISE) abnormal	The slope value is 68.1 mV or greater for Na+ or K+ electrodes, or it is -68.1 mV or less for the Cl- electrode.	3	53	Cond.E	✓
54			-			
55	ISE range over		6	55	>ISE	✓
56	Kinetic unstable (Prozone error 2)	The prozone check value exceeds the specified limit value. (reaction rate method)	3	56	>Kin	✓
57		Reserved for former alarm (Serum index 1 interference)	-			
58		Reserved for former alarm (Serum index multiple interference)	-			
59	Stop mixing		2	59	MIXSTP	✓
60	Mixing current low		2	60	MIXLOW	✓

No.	Name	Meaning	Priority	Output character		
				HOST	UI	
					PRN	SCR
61			-			
62	System reagent short	Shortage in ProCell/CleanCell is detected.	2	62	Sys.R.S	✓
63	AB level range over (Assay Buffer) run start	No data alarm could be attached because the detection channel is masked.	-	63	>AB	✓
64	AB level check error	No data alarm could be attached because the detection channel is masked.	-	64	AB.E	✓
65	Current range over (run start)	No data alarm could be attached because the detection channel is masked.	-	65	>Curr	✓
66	Current range check error	No data alarm could be attached because the detection channel is masked.	-	66	Curr.E	✓
67	Sample hovering	The sample probe hovers over the sample.	2	67	Samp.H	✓
68	Sample air bubble	Air bubble is detected in the sample syringe flow path when the sample is aspirated.	2	68	Samp.B	✓
69	Reagent hovering	The reagent probe hovers over the reaction disk (over reagent / dilution / pretreatment).	2	69	Reag.H	✓
70	Reagent film detection	The reagent probe detects a film on the reagent (reagent / dilution / pretreatment / ProCell / CleanCell).	2	70	Reag.F	✓
71	Potential carry over	The signal level of this sample is low (a carryover may have occurred).	3	71	CarOvr	✓
72	Sample clot	The specified volume of sample is not aspirated: Clogging was detected in the sample probe.	2	72	Samp.C	✓
73	Carry over detergent short	Shortage of detergent for reagent carryover evasion is detected.	2	73	Det.S	✓
74	Reagent disk temperature	Reagent disk temperature is out of range	8	74	Reag.T	✓
75	Incubator temperature	Incubator temperature is out of range.	8	75	Inc.T	✓
76	System reagent temperature	ProCell/CleanCell temperature is out of range.	8	76	Sys.R.T	✓
77	Cell temperature	Measuring cell temperature is out of range.	8	77	Cell.T	✓
78	Missing value	One or more of the calibration results is invalid.	4	-----		
79	System errors	An error occurs on the system during measurement.	4	(79)	Sys.E	✓
80	Monotony of curve	The working curve is not monotonically increasing or monotonically decreasing.	4	(80)	Mono.E	✓
81	Minimum signal	One or two of the calibrator signal values is lower than the specified lower limit value.	4	(81)	<Sig	✓
82	Maximum signal	One or two of the calibrator signal values is higher than the specified lower limit value.	4	(82)	>Sig	✓
83	Sample carry over for modules	After pipetting at C module, appended test (Reflex) is required sample carry over wash.	5	(83)	Samp.O	✓
84	Minimum/Maximum signal	If one or more effective signal values falls out of the allowable minimum/maximum signal range	4	(84)	Sig.E	✓
85	Minimum acceptable difference	The difference of the signals between each level of calibrators is below the permissible value.	4	(85)	Diff.E	✓

No.	Name	Meaning	Priority	Output character		
				HOST	UI	
					PRN	SCR
86	Sample LLD abnormal	The sample probe does not start LLD or LLD is not completed (because of dirt on the tip etc.)	2	86	SLLD.E	✓
87	Sample LLD noise	The sample probe did not detect the liquid surface properly because of air bubbles on the sample or static electricity.	2	87	SLLD.N	✓
88			-			
89			-			
90			-			
91			-			
92			-			
93	Washing buffer temperature	PreClean temperature is out of range.	8	93	WB.T	✓
94	Washing buffer short	The remaining volume for PreClean is 0, or liquid short signal is detected.	2	94	WB.S	✓
95	Clot pressure sensor ADC (underflow)	In checking the pressure sensor, underflow data is detected.	2	95	Clot.E	✓
96	Clot pressure sensor ADC (overflow)	In checking the pressure sensor, overflow data is detected.	2	96	Clot.E	✓
97	Clot pressure abnormal	The clot pressure value is abnormal.	2	97	Clot.E	✓
98	Sample pipettor air bubble	Air bubble is detected in the sample syringe flowpath when the sample is aspirated.	2	98	Samp.B	✓
99	Current range over (operation)	The measuring cell current is out of range in the determination cycle during operation.	2	99	>Curr	✓
100	Low level signal	The effective signal of test is lower than the specified lower limit value.	2	100	<SigL	✓
101	Reagent Expired Date	The alarm indicates that an expired reagent was used; the test result is not guaranteed.	9	101	ReagEx	✓
102	QC error	There is an error related to QC.	7	102	QCerr	✓
103	Serum index interference lipaemia	The lipaemia value exceeds the specified limit value. <ul style="list-style-type: none">• Flag is attached to the data which is assigned Serum Index check in the Utility -Application -Range" screen.	5	103	>I.L	✓
104	Serum index interference hemolysis	The hemolysis value exceeds the specified limit value. <ul style="list-style-type: none">• Flag is attached to the data which is assigned Serum Index check in the Utility -Application -Range" screen.	5	104	>I.H	✓
105	Serum index interference icteric	The icteric value exceeds the specified limit value. <ul style="list-style-type: none">• Flag is attached to the data which is assigned Serum Index check in the Utility -Application -Range" screen.	5	105	>I.I	✓
106	Serum index interference lipaemia / hemolysis	Both of the lipaemia value and hemolysis value exceed the specified limit value. <ul style="list-style-type: none">• Flag is attached to the data which is assigned Serum Index check in the Utility -Application -Range" screen.	5	106	>I.LH	✓
107	Serum index specific interference lipaemia / icteric	Both of the lipaemia value and icteric value exceed the specified limit value. <ul style="list-style-type: none">• Flag is attached to the data which is assigned Serum Index check in the Utility -Application -Range" screen.	5	107	>I.LI	✓

No.	Name	Meaning	Priority	Output character		
				HOST	UI	
					PRN	SCR
108	Serum index interference hemolysis / icteric	Both of the hemolysis value and icteric value exceed the specified limit value. <ul style="list-style-type: none">Flag is attached to the data which is assigned Serum Index check in the Utility -Application -Range" screen.	5	108	>I.HI	✓
109	Serum index interference lipaemia / hemolysis / icteric	All of lipaemia, hemolysis and icteric values exceed the specified limit value. <ul style="list-style-type: none">Flag is attached to the data which is assigned Serum Index check in the Utility -Application -Range" screen.	5	109	>I.LHI	✓
110	On board stability limit over on Reagent Manager	On-board stability limit was exceeded on Reagent Manager <ul style="list-style-type: none">This data alarm is attached to results with the reagents which exceed on board stability limit 30 minutes or more.	8	111	OBS.RM	✓
111	On board stability limit over on Reagent Rotor	On board stability limit was exceeded on Reagent Rotor	8	112	OBS.RR	✓

Alarms for Routine or STAT samples

This section tells you how to interpret data alarms when generated with regard to routine or STAT samples.

The following symbols are used in the chart.

D Data	A Alarm	R Rerun TS	A Auto Rerun
			R
✓ With result	● AU	= Same volume	Auto rerun
✗ Without result	○ Core/PC, AU	▼ Decrease	No auto rerun
☒ Without result in specified conditions	◎ Core/PC	▲ Increase	Either
≥ Upper limit	D data manager	- No order	
≤ Lower limit			

No.	Name	Routine / STAT ^(a)											
		Clinical Chemistry					Immuno-assay						
		Photometry		LHI		ISE	Calc. Test		Photometry		LHI		
		D	A	R	A		D	A	R	A			
		R	R	R	R		R	R	R	R			
0	(No Alarm)												
1	ADC abnormal	✓	●	=	A	✓	●	=	A	✓	●	=	A
2	ABS Cell blank abnormal	✓	●	=	A	✓	●	=	A				
3	Sample short	☒	●	=	N	☒	●	=	N	☒	●	=	N
4	Reagent short	☒	●	=	N	☒	●	=	N	☒	●	=	N
5	ABS over	✓	●	▼	A	✓	●	=	A				
6	Prozone Error	✓	●	▼	A								
7	Reaction limit over	✓	●	▼	A								
8	Reaction limit over (2nd ..)	✓	●	▼	A								
9	Reaction limit over (3rd ..)	✓	●	▼	A								
10	Linearity abnormal 1	✓	●	=	A								
11	Linearity abnormal 2	✓	●	=	A								
12	S1ABS abnormal												
13	DUPLICATE error												
14	STANDARD error												
15	SENSITIVITY error												
16	CALIB error												
17	SD limit error												
18	ISE Noise error							✓	●	=	A		
19	ISE Voltage Level error							✓	●	=	A		
20	Slope abnormal												
21	Preparation abnormal												
22	IS concentration abnormal												
23	ISE Sample range over							✓	●	=	A		
24	Data error in comp. Test	✓	○	=	A	✓	○		✓	○	=	A	
25	Unable to calculate comp. Test	✓	○	=	A	✗	○		✗	○	=	A	

No.	Name	Routine / STAT ^(a)											
		Clinical Chemistry					Immuno-assay						
		Photometry	LHI	ISE	Calc. Test		D	A	R	A	D	A	R
D	A	R	A	R	A	D	A	R	A	D	A	R	A
26	Technical Limit over (upper)	✓	● ↓ A			✓	○ ↓ A					≥ ● ↓ A	
27	Technical Limit over (lower)	✓	● ↑ A			✓	○ = A					≤ ● - N	
28													
29													
30													
31													
32													
33													
34													
35													
36													
37	Calculation test error									✓ ○ = A			
38	Overflow	✗	○ N	✗ ○		✗	○ N	✗ ○ N	✗ ○ N	✗ ○ N			
39	Calculation not possible	✗	○ = A	✗ ○		✗	○ = A	✗ ○ = A	✗ ○ = A	✗ ○ = A			
40													
41													
42	Edited test	✓	○ N	✓ ○		✓	○ N	✓ ○ N	✓ ○ N	✓ ○ N			
43	Calibration result abnormal (Sample Flag)	✓	● = N	✓		✓	● = N				✗ ● = N		
44	Repeat limit over (upper)	✓	○ = +			✓	○ = +	✓ ○ = +	✓ ○ = +	✓ ○ = +			
45	Repeat limit over (lower)	✓	○ = +			✓	○ = +	✓ ○ = +	✓ ○ = +	✓ ○ = +			
46	ABS maximum over (nonLin curve)	✗	● ↓ A										
47													
48													
49													
50													
51	Response(ISE) abnormal 1												
52	Response(ISE) abnormal 2												
53	Conditioning(ISE) abnormal												
54													
55	ISE range over						✓ ○ ↓ A						
56	Kinetic unstable (Prozone error 2)	✓	● ↓ A										
57													
58													
59	Stop mixing	✓	● = A	✓ ● = A	✓ ● = A	✓ ● = A							
60	Mixing current low	✓	● = A	✓ ● = A	✓ ● = A	✓ ● = A							
61													
62	System reagent short									✗ ● = A			
63	AB level range over (Assay Buffer) run start									✓ ● = A			
64	AB level check error									✓ ● = A			
65	Current range over (run start)									✓ ● = A			

No.	Name	Routine / STAT ^(a)							
		Clinical Chemistry				Immuno-assay			
		Photometry	LHI	ISE	Calc. Test	D A R A	D A R A	D A R A	D A R A
		R	R	R		R	R	R	R
66	Current range check error								✓ ● = A
67	Sample hovering								✗ ● = A
68	Sample air bubble								✗ ● = N
69	Reagent hovering								✗ ● = A
70	Reagent film detection								✗ ● = A
71	Potential carry over								✓ ● = A
72	Sample clot	☒ ● = N	☒ ● = N	☒ ● = N					✗ ● = N
	• If Clot Check count is 99 (in other words, no check), data will not be <Space>								
73	Carry over detergent short	✓ ● = N	✓ ● = N						✓ ● = A
74	Reagent disk temperature								✓ ● = A
75	Incubator temperature								✓ ● = A
76	System reagent temperature								✓ ● = A
77	Cell temperature								✓ ● = A
78	Missing value								
79	System errors								
80	Monotony of curve								
81	Minimum signal								
82	Maximum signal								
83	Sample carry over for modules	✓ ○ - N			✓ ○ - N				✓ ○ - N
84	Minimum/Maximum signal								
85	Minimum acceptable difference								
86	Sample LLD abnormal								✗ ● = A
87	Sample LLD noise								✗ ● = A
88									
89									
90									
91									
92									
93	Washing buffer temperature								✗ ● = A
94	Washing buffer short								✗ ● = A
95	Clot pressure sensor ADC (underflow)								✗ ● = A
96	Clot pressure sensor ADC (overflow)								✗ ● = A
97	Clot pressure abnormal								✗ ● = A
98	Sample pipettor air bubble								✗ ● = A
99	Current range over (operation)								✓ ● = A
100	Low level signal								✗ ● = A
101	Reagent Expired Date	✓ ○ N							✓ ○ N
102	QC error								
103	Serum index interference lipaemia	✓ ○ - N		✓ ○ - N	✓ ○ - N	✓ ○ - N	✓ ○ - N		

No.	Name	Routine / STAT ^(a)												
		Clinical Chemistry								Immuno-assay				
		Photometry		LHI		ISE		Calc. Test						
		D	A	R	A	D	A	R	A	D	A			
		R	R	R	R	R	R	R	R	R	R			
104	Serum index interference hemolysis	✓	●	-	N		✓	●	-	N	✓	●	-	N
105	Serum index interference icteric	✓	●	-	N		✓	●	-	N	✓	●	-	N
106	Serum index interference lipaemia / hemolysis	✓	●	-	N		✓	●	-	N	✓	●	-	N
107	Serum index specific interference lipaemia / icteric	✓	●	-	N		✓	●	-	N	✓	●	-	N
108	Serum index interference hemolysis / icteric	✓	●	-	N		✓	●	-	N	✓	●	-	N
109	Serum index interference lipaemia / hemolysis / icteric	✓	●	-	N		✓	●	-	N	✓	●	-	N
110														
111	On board stability limit over on Reagent Manager	✓	●	-	N	✓	●	-	N		✓	●	-	N
112	On board stability limit over on Reagent Rotor	✓	●	-	N	✓	●	-	N		✓	●	-	N

(a) Legend:

D Data: ✓ With result / ✗ Without result / ☐ Without result in specified conditions / ≥ Upper limit / ≤ Lower limit

A Alarm: ● AU / ○ Core/PC, AU / ☉ Core/PC / D data manager

R Rerun test selection: = Same volume / ↓ Decrease / ↑ Increase / - No order

AR Auto rerun: A Auto rerun / N No auto rerun / + Either

Alarms for Control and Calibration samples

This section tells you how to interpret data alarms when generated by quality control or calibration samples.

The following symbols are used in the chart.

D	Data	A	Alarm
✓	With result	●	AU
*	Without result	○	Core/PC, AU
☒	Without result in specified conditions	◎	Core/PC
≥	Upper limit	D	data manager
≤	Lower limit		

No.	Name	Control ^(a)						Calibration ^(a)						
		Clin Chem				Imm		Clin Chem				Imm		
		Photo		ISE				Photo		ISE				
		D	A	D	A	D	A	D	A	D	A	D	A	
0	(No Alarm)													
1	ADC abnormal	✓	●	✓	●			☒	●	✓	●	✓	●	
2	ABS Cell blank abnormal	✓	●							✓	●			
3	Sample short	☒	●	☒	●			☒	●	☒	●	☒	●	
4	Reagent short	☒	●	☒	●			☒	●	☒	●	☒	●	
5	ABS over	✓	●							✓	●			
6	Prozone Error													
7	Reaction limit over	✓	●							✓	●			
8	Reaction limit over (2nd ..)	✓	●							✓	●			
9	Reaction limit over (3rd ..)	✓	●							✓	●			
10	Linearity abnormal 1	✓	●							✓	●			
11	Linearity abnormal 2	✓	●							✓	●			
12	S1ABS abnormal									✓	●			
13	DUPLICATE error									✓	●	✓	●	
14	STANDARD error									✓	●	✓	●	
15	SENSITIVITY error									✓	●			
16	CALIB error									✓	●	✓	●	
17	SD limit error									✓	●			
18	ISE Noise error			✓	●						✓	●		
19	ISE Voltage Level error			✓	●						✓	●		
20	Slope abnormal										✓	●	✓	●
21	Preparation abnormal										✓	●		
22	IS concentration abnormal										✓	●		
23	ISE Sample range over			✓	●									
24	Data error in comp. Test	✓	○	✓	○									
25	Unable to calculate comp. Test	☒	○	☒	○									
26	Technical Limit over (upper)							≥	●					

No.	Name	Control ^(a)						Calibration ^(a)					
		Clin Chem				Imm	Clin Chem		Imm	Clin Chem		Imm	
		Photo		ISE			Calc			Photo			
		D	A	D	A	D	A	D	A	D	A	D	A
27	Technical Limit over (lower)					≤	●						
28													
29													
30													
31													
32													
33													
34													
35													
36													
37	Calculation test error					✓							
38	Overflow	✗	○	✗	○	✗	○	✗	○	✗	○	✗	○
39	Calculation not possible	✗	○	✗	○	✗		✗	●	✗	●	✗	●
40													
41													
42	Edited test												
43	Calibration result abnormal (Sample Flag)	✓	●	✓	●			✗	●				
44	Repeat limit over (upper)												
45	Repeat limit over (lower)												
46	ABS maximum over (nonLin curve)	✗	●										
47													
48													
49													
50													
51	Response(ISE) abnormal 1										✓	●	
52	Response(ISE) abnormal 2										✓	●	
53	Conditioning(ISE) abnormal										✓	●	
54													
55	ISE range over												
56	Kinetic unstable (Prozone error 2)												
57													
58													
59	Stop mixing	✓	●	✓	●					✓	●	✓	●
60	Mixing current low	✓	●	✓	●					✓	●	✓	●
61													
62	System reagent short							✗	●				
63	AB level range over (Assay Buffer) run start							✓	●				
64	AB level check error							✓	●				
65	Current range over (run start)							✓	●				
66	Current range check error							✓	●				

No.	Name	Control ^(a)						Calibration ^(a)					
		Clin Chem				Imm		Clin Chem				Imm	
		Photo		ISE				Photo		ISE			
		D	A	D	A	D	A	D	A	D	A	D	A
67	Sample hovering					x	●						
68	Sample air bubble					x	●						
69	Reagent hovering					x	●						
70	Reagent film detection					x	●						
71	Potential carry over					✓	●						
72	Sample clot	☒	●	☒	●	x	●	☒	●	☒	●		
	• If Clot Check count is 99 (in other words, no check), data will not be <Space>												
73	Carry over detergent short	✓	●					✓	●				
74	Reagent disk temperature							✓	●				
75	Incubator temperature							✓	●				
76	System reagent temperature							✓	●				
77	Cell temperature							✓	●				
78	Missing value											●	
79	System errors											●	
80	Monotony of curve									●			●
81	Minimum signal											●	
82	Maximum signal											●	
83	Sample carry over for modules	✓	○	✓	○			✓	○				
84	Minimum/Maximum signal											●	
85	Minimum acceptable difference											●	
86	Sample LLD abnormal					x	●						
87	Sample LLD noise					x	●						
88													
89													
90													
91													
92													
93	Washing buffer temperature							x	●				
94	Washing buffer short							x	●				
95	Clot pressure sensor ADC (underflow)							x	●				
96	Clot pressure sensor ADC (overflow)							x	●				
97	Clot pressure abnormal							x	●				
98	Sample pipettor air bubble							x	●				
99	Current range over (operation)							✓	●				
100	Low level signal							x	●				
101	Reagent Expired Date	✓	○					✓	○				
102	QC error	✓	D	✓	D	✓	D	✓	D				
103	Serum index interference lipaemia												
104	Serum index interference hemolysis												
105	Serum index interference icteric												

No.	Name	Control ^(a)						Calibration ^(a)					
		Clin Chem			Imm	Clin Chem			Imm				
		Photo	ISE	Calc		Photo	ISE	Calc		Photo	ISE	Calc	
		D	A	D	A	D	A	D	A	D	A	D	A
106	Serum index interference lipaemia / hemolysis												
107	Serum index specific interference lipaemia / icteric												
108	Serum index interference hemolysis / icteric												
109	Serum index interference lipaemia / hemolysis / icteric												
110													
111	On board stability limit over on Reagent Manager	✓	●			✓	●						
112	On board stability limit over on Reagent Rotor	✓	●			✓	●	✓	●				

(a) Legend:

D Data: ✓ With result / ✗ Without result / ☐ Without result in specified conditions / ≥ Upper limit / ≤ Lower limit

A Alarm: ● AU / ○ Core/PC, AU / ◉ Core/PC / D data manager

Instrument alarms

This chapter describes the alarms generated on the cobas® 8000 instrument by errors in communication with the *data manager* or the host.

In this chapter

Chapter **12**

Instrument alarms	E-23
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Instrument alarms

This section has a table of the instrument alarms involving communication between the Control Unit or the instrument on one side, and the *data manager* or host on the other.

If an instrument alarm occurs that is not in this list, consult your RAuthorized Roche Diagnostics service personnel for more information.

Code	Sub-	Alarm Message	Content	Troubleshooting
110	1	Abnormal Text from Data Manager	Contents of the text received from the Data Manager are invalid.	<ol style="list-style-type: none"> 1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.
111	2	Abnormal Test Selection from Data Manager	System did not receive a response against its inquiry within a timeout period.	<ol style="list-style-type: none"> 1. Check the Data Manager's operation or connection status. 2. Check if the connector got unplugged during the data communication. 3. Check the inquiry timeout on Utility > System > Data Manager Settings. 4. Contact service representative, if alarm recurs.
111	51	Abnormal Test Selection from Data Manager	Reading error occurred in the sample management database.	<ol style="list-style-type: none"> 1. Restart the system. 2. Contact service representative, if alarm recurs.
111	52	Abnormal Test Selection from Data Manager	Dilution ratio value is outside the range.	<ol style="list-style-type: none"> 1. Check the Data Manager settings. 2. Check the dilution ratio. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
111	53	Abnormal Test Selection from Data Manager	The received sample information is not requested one. Either of the following items is wrong: <ul style="list-style-type: none"> • Sample Type • Sample ID • Sequence No. • Rack ID • Position No. 	<ol style="list-style-type: none"> 1. Check the Data Manager settings. 2. Check the sample information. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
111	54	Abnormal Test Selection from Data Manager	Writing error occurred in the sample management database.	<ol style="list-style-type: none"> 1. Restart the system. 2. Contact service representative, if alarm recurs.
111	55	Abnormal Test Selection from Data Manager	Sample data file on the sample management database is full.	<ol style="list-style-type: none"> 1. Perform Delete All on Workplace > Data Review. 2. Perform Sample Data Clear on System Overview.
111	56	Abnormal Test Selection from Data Manager	Result data file on the sample management database is full.	<ol style="list-style-type: none"> 1. Perform Delete All on Workplace > Data Review. 2. Perform Sample Data Clear on System Overview.
111	57	Abnormal Test Selection from Data Manager	The Stat rack ID is out of the range.	Check the orders on System > Rack Assignment.

Code	Sub-	Alarm Message	Content	Troubleshooting
111	58	Abnormal Test Selection from Data Manager	The sample position on the Stat rack is out of the range.	1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Test Selection Download Text - Batch) 3. Contact service representative, if alarm recurs.
111	59	Abnormal Test Selection from Data Manager	The combination of a Stat rack ID and a sample position has been already assigned.	1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Test Selection Download Text)
111	60	Abnormal Test Selection from Data Manager	The sample ID contains the abnormal code.	1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Test Selection Download Text)
126	200	Data Manager Communication Error	Communication error occurred. Communication line was turned to offline status.	1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.
126	201	Data Manager Communication Error	Automatic recovery measures for connection between the Data Manager and the system were performed 15 times in a row. By this alarm, the communication will be disconnected.	1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.
126	202	Data Manager Communication Error	Communication error occurred during connection. (Control socket communication line)	1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.
126	203	Data Manager Communication Error	Communication error occurred. When receiving it, abnormality was detected. (Control socket communication line)	1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.
126	204	Data Manager Communication Error	Internal process error occurred.	1. Restart the system. 2. Contact service representative, if alarm recurs.
126	205	Data Manager Communication Error	Communication error occurred. When receiving it, abnormality was detected. (Control socket communication line)	1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.
126	206	Data Manager Communication Error	Communication error occurred, due to either of the following causes: <ul style="list-style-type: none">• Wire break.• Momentary power failure.	1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
126	207	Data Manager Communication Error	Internal process error occurred.	1. Restart the system. 2. Contact service representative, if alarm recurs.
126	208	Data Manager Communication Error	Internal process error occurred.	1. Restart the system. 2. Contact service representative, if alarm recurs.
126	301	Data Manager Communication Error	No response from Data Manager within a timeout. (Control socket communication line)	1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.
126	302	Data Manager Communication Error	Message error occurred. (Control socket communication line)	1. Restart the system. 2. Contact service representative, if alarm recurs.
126	303	Data Manager Communication Error	FTP transmission error occurred. (Control socket communication line)	1. Restart the system. 2. Contact service representative, if alarm recurs.
126	304	Data Manager Communication Error	Internal process error occurred. (Control socket communication line)	1. Restart the system. 2. Contact service representative, if alarm recurs.
126	305	Data Manager Communication Error	Database access error occurred. (Control socket communication line)	1. Restart the system. 2. Contact service representative, if alarm recurs.
126	306	Data Manager Communication Error	Communication was turned to offline status. (Control socket communication line)	1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.
126	401	Data Manager Communication Error	Abnormality connection with Data Manager. (FTP line)	1. Restart the system. 2. Contact service representative, if alarm recurs.
126	402	Data Manager Communication Error	A file cannot be copied.	1. Restart the system. 2. Contact service representative, if alarm recurs.
126	403	Data Manager Communication Error	There is no response from Data Manager.	1. Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. 2. Check if the connector was not plugged in during the data communication. 3. Restart the system. 4. Contact service representative, if alarm recurs.
126	501	Data Manager Communication Error	The response from the Data manager is wrong.	1. Restart the system. 2. Contact service representative, if alarm recurs.
127	1	Abnormal Text from Data Manager	Communication ID error was detected in the CI11.	1. Perform System Communication Trace on Print. 2. Check the CI11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
127	2	Abnormal Text from Data Manager	Communication ID error was detected in the UR11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the UR11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	3	Abnormal Text from Data Manager	Communication ID error was detected in the PL11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the PL11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	4	Abnormal Text from Data Manager	Communication ID error was detected in the PD11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the PD11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	5	Abnormal Text from Data Manager	Communication ID error was detected in the CL11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the CL11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	6	Abnormal Text from Data Manager	Communication ID error was detected in the CD11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the CD11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	7	Abnormal Text from Data Manager	Communication ID error was detected in the QL11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the QL11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	8	Abnormal Text from Data Manager	Communication ID error was detected in the QD11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the QD11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	9	Abnormal Text from Data Manager	Communication ID error was detected in the RD11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the RD11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	10	Abnormal Text from Data Manager	Communication ID error was detected in the TQ11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the TQ11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	11	Abnormal Text from Data Manager	Communication ID error was detected in the CV11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the CV11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
127	12	Abnormal Text from Data Manager	Communication ID error was detected in the CQ11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the CQ11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	13	Abnormal Text from Data Manager	Communication ID error was detected in the MR11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the MR11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	14	Abnormal Text from Data Manager	Communication ID error was detected in the MK11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the MK11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	15	Abnormal Text from Data Manager	Communication ID error was detected in the RM11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the RM11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	16	Abnormal Text from Data Manager	Communication ID error was detected in the EI12.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the EI11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	17	Abnormal Text from Data Manager	Communication ID error was detected in the EI13.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the EI13 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	18	Abnormal Text from Data Manager	Communication ID error was detected in the PU11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the PU11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	19	Abnormal Text from Data Manager	Communication ID error was detected in the PU12.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the PU12 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	20	Abnormal Text from Data Manager	Abnormal communication ID was detected.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the undefined communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	21	Abnormal Text from Data Manager	Communication ID error was detected in the EU11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the EU11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
127	22	Abnormal Text from Data Manager	Communication ID error was detected in the WL11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the WL11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	23	Abnormal Text from Data Manager	Communication ID error was detected in the WD11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the WD11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	24	Abnormal Text from Data Manager	Communication ID error was detected in the ER11.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the ER11 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	25	Abnormal Text from Data Manager	Communication ID error was detected in the ER12.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the ER12 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
127	26	Abnormal Text from Data Manager	Communication ID error was detected in the ER13.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the ER13 communication ID. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
300	1	Sample Management Database Error	Sample data file on the sample management database is full.	<ol style="list-style-type: none"> 1. Perform Delete All on Workplace > Data Review. 2. Perform Sample Data Clear on System Overview.
300	2	Sample Management Database Error	Result data file on the sample management database is full.	<ol style="list-style-type: none"> 1. Perform Delete All on Workplace > Data Review. 2. Perform Sample Data Clear on System Overview.
300	3	Sample Management Database Error	Link data file on the sample management database is full.	Check the test selection on Workplace > Test Selection.
300	4	Sample Management Database Error	The sample data file on the sample management database is full.	<ol style="list-style-type: none"> 1. Perform Delete All on Workplace > Data Review. 2. Perform Sample Data Clear on System Overview.
300	5	Warning of Database Registration	The sample data file on the sample management database becomes full.	<ol style="list-style-type: none"> 1. Perform Delete All on Workplace > Data Review. 2. Perform Sample Data Clear on System Overview.
301	-3	TS Register Error	The test selections are not registered because the sample test DB is full. The subcategory code indicates the rack No. and the cup position. For example, Subcategory code No. (XXXXXX) XXXXXX: rack No. Y: cup	Check the test selections on Workplace > Test Selection or QC > Status.

Code	Sub-	Alarm Message	Content	Troubleshooting
302	-3	Rerun TS Register Error	The rerun test selections are not registered because the sample test DB is full. The subcategory code indicates the rack No. and the cup position. For example, Subcategory code No. (XXXXXY) XXXXX: rack No. Y: cup	Check the test selections on Workplace > Test Selection.
321	1	Sample Duplication Error	The system cannot analyze a sample, because duplicated date is included in the barcode label on the sample. The duplicated data is followings: <ul style="list-style-type: none"> • In case of routine sample in barcode mode: Sample Type, Sample ID • In case of Stat sample in barcode mode: Sample Type, Sample ID • In case of routine sample in non-barcode mode: Sample Type 	<ol style="list-style-type: none"> 1. When the system completes the analysis of loaded samples, retry the sample. 2. Check the followings. * Sample Type * Sample ID * Sequence No. * Rack ID * Rack Position No.
322	-3	Control Sample Duplication Error	In the following cases, there exists same control sample numbers registered in database: <ul style="list-style-type: none"> • The same number is applied to a control sample because applied number returned to the first. • There are same control samples in a same rack group in case of rack assign mode. The subcategory code indicates the rack 	<ol style="list-style-type: none"> 1. Perform Delete All on Workplace > Data Review. 2. Perform Sample Data Clear on System Overview. 3. Don't set the same control samples in a same rack groups.
323	-3	Control Sequence No. Register Error	Control samples are not registered because the control sequence No. cannot be corresponding to the one which will be registered in the Sample DB. The subcategory code indicates the rack No. and the cup position. For example, Subcategory code No. (XXXXXY) XXXXX: rack No. Y: cup	<ol style="list-style-type: none"> 1. Perform Delete All on Workplace > Data Review. 2. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
341	-1	Application Code / testcode Conversion Error (Transmission)	When result is uploading, Host code is not registered. The subcategory code indicates the application code.	Contact service representative.
342	1	Application Code / testcode Conversion Error	When request is downloading, Host code is not registered.	Contact service representative.
891	-2	Data Manager Communication Error	Communication error was occurred during connection. (HL7 communication line) The subcategory code indicates communication line number.	<ol style="list-style-type: none"> Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. Check if the connector was not plugged in during the data communication. Restart the system. Contact service representative, if alarm recurs.
892	-2	Data Manager Communication Error	Communication error occurred during connection. Detected disconnection. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. Check if the connector was not plugged in during the data communication. Restart the system. Contact service representative, if alarm recurs.
893	-2	Data Manager Communication Error	Communication error occurred. When receiving it, abnormality was detected. (HL7 communication line) The subcategory code indicates communication line number.	<ol style="list-style-type: none"> Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. Check if the connector was not plugged in during the data communication. Restart the system. Contact service representative, if alarm recurs.
894	-2	Data Manager Communication Error	Communication error occurred. When receiving it, abnormality was detected. (HL7 communication line) The subcategory code indicates communication line number.	<ol style="list-style-type: none"> Check the connection status of Data Manager on System Overview > Data Manager. If it is wait status, connect it from Data Manager. Check if the connector was not plugged in during the data communication. Restart the system. Contact service representative, if alarm recurs.
895	-2	Data Manager Communication Error	Internal process error occurred. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> Restart the system. Contact service representative, if alarm recurs.
901	-2	Abnormal Text from Data Manager	First segment is not a header segment (MSH). The subcategory code indicates communication line number.	<ol style="list-style-type: none"> Perform System Communication Trace on Print. Check the MSH segment. Refer to the specifications of system interface communication. Contact service representative, if alarm recurs.
902	-2	Abnormal Text from Data Manager	Undefined segment was found. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> Perform System Communication Trace on Print. Check the undefined segment. Refer to the specifications of system interface communication. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
903	-2	Abnormal Text from Data Manager	There is no end code in the message. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR><FS><CR>' (0x0d1c0d) is at the end of the message. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
904	-2	Abnormal Text from Data Manager	There is no end code in the EQU segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the EQU segment. 3. Contact service representative, if alarm recurs.
905	-2	Abnormal Text from Data Manager	There is no end code in the INV segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the INV segment. 3. Contact service representative, if alarm recurs.
906	-2	Abnormal Text from Data Manager	There is no end code in the MSA segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the MSA segment. 3. Contact service representative, if alarm recurs.
907	-2	Abnormal Text from Data Manager	There is no end code in the MSH segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the MSH segment. 3. Contact service representative, if alarm recurs.
908	-2	Abnormal Text from Data Manager	There is no end code in the NDS segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the NDS segment. 3. Contact service representative, if alarm recurs.
909	-2	Abnormal Text from Data Manager	There is no end code in the OBR segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the OBR segment. 3. Contact service representative, if alarm recurs.
910	-2	Abnormal Text from Data Manager	There is no end code in the OBX segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the OBX segment. 3. Contact service representative, if alarm recurs.
911	-2	Abnormal Text from Data Manager	There is no end code in the ORC segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the ORC segment. 3. Contact service representative, if alarm recurs.
912	-2	Abnormal Text from Data Manager	There is no end code in the PID segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the PID segment. 3. Contact service representative, if alarm recurs.
913	-2	Abnormal Text from Data Manager	There is no end code in the QAK segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the QAK segment. 3. Contact service representative, if alarm recurs.
914	-2	Abnormal Text from Data Manager	There is no end code in the QID segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the QID segment. 3. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
915	-2	Abnormal Text from Data Manager	There is no end code in the QPD segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the QPD segment. 3. Contact service representative, if alarm recurs.
916	-2	Abnormal Text from Data Manager	There is no end code in the RCP segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the RCP segment. 3. Contact service representative, if alarm recurs.
917	-2	Abnormal Text from Data Manager	There is no end code in the SAC segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the SAC segment. 3. Contact service representative, if alarm recurs.
918	-2	Abnormal Text from Data Manager	There is no end code in the SID segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the SID segment. 3. Contact service representative, if alarm recurs.
919	-2	Abnormal Text from Data Manager	There is no end code in the SPM segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the SPM segment. 3. Contact service representative, if alarm recurs.
920	-2	Abnormal Text from Data Manager	There is no end code in the TQ1 segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the TQ1 segment. 3. Contact service representative, if alarm recurs.
921	-2	Abnormal Text from Data Manager	There is no end code in the TCD segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Check whether '<CR>' (0x0d) is at the end of the TCD segment. 3. Contact service representative, if alarm recurs.
922	-2	Abnormal Text from Data Manager	An error was detected in the EQU segment. The subcategory code indicates field number and communication line number.	1. Perform System Communication Trace on Print. 2. Check the EQU segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
923	-2	Abnormal Text from Data Manager	An error was detected in the INV segment. The subcategory code indicates field number and communication line number.	1. Perform System Communication Trace on Print. 2. Check the INV segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
924	-2	Abnormal Text from Data Manager	An error was detected in the MSA segment. The subcategory code indicates field number and communication line number.	1. Perform System Communication Trace on Print. 2. Check the MSA segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
925	-2	Abnormal Text from Data Manager	An error was detected in the MSH segment. The subcategory code indicates field number and communication line number.	1. Perform System Communication Trace on Print. 2. Check the MSH segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
926	-2	Abnormal Text from Data Manager	An error was detected in the NDS segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the NDS segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
927	-2	Abnormal Text from Data Manager	An error was detected in the OBR segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the OBR segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
928	-2	Abnormal Text from Data Manager	An error was detected in the OBX segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the OBX segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
929	-2	Abnormal Text from Data Manager	An error was detected in the ORC segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the ORC segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
930	-2	Abnormal Text from Data Manager	An error was detected in the PID segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the PID segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
931	-2	Abnormal Text from Data Manager	An error was detected in the QAK segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the QAK segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
932	-2	Abnormal Text from Data Manager	An error was detected in the QID segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the QID segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
933	-2	Abnormal Text from Data Manager	An error was detected in the QPD segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the QPD segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
934	-2	Abnormal Text from Data Manager	An error was detected in the RCP segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the RCP segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
935	-2	Abnormal Text from Data Manager	An error was detected in the SAC segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the SAC segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
936	-2	Abnormal Text from Data Manager	An error was detected in the SID segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the SID segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
937	-2	Abnormal Text from Data Manager	An error was detected in the SPM segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the SPM segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
938	-2	Abnormal Text from Data Manager	An error was detected in the TQ1 segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the TQ1 segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
939	-2	Abnormal Text from Data Manager	An error was detected in the TCD segment. The subcategory code indicates field number and communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the TCD segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
940	-2	Abnormal Text from Data Manager	An error was detected in the MSG segment. The message type of the HL7 text was abnormal. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the message type [MSH-9] field of the MSH segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
941	-2	Abnormal Text from Data Manager	There is no EQU segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the EQU segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
942	-2	Abnormal Text from Data Manager	There is no MSA segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the MSA segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
943	-2	Abnormal Text from Data Manager	There is no MSH segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the MSH segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
944	-2	Abnormal Text from Data Manager	There is no OBR segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the OBR segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
945	-2	Abnormal Text from Data Manager	There is no OBX segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the OBX segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
946	-2	Abnormal Text from Data Manager	There is no ORC segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the ORC segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
947	-2	Abnormal Text from Data Manager	There is no PID segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the PID segment exists. 3. Refer to the specifications of system interface communication. 3. Contact service representative, if alarm recurs.
948	-2	Abnormal Text from Data Manager	There is no QAK segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the QAK segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
949	-2	Abnormal Text from Data Manager	There is no QID segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the QID segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
950	-2	Abnormal Text from Data Manager	There is no QPD segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the QPD segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
951	-2	Abnormal Text from Data Manager	There is no RCP segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the RCP segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
952	-2	Abnormal Text from Data Manager	There is no SPM segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the SPM segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
940	-2	Abnormal Text from Data Manager	An error was detected in the MSG segment. The message type of the HL7 text was abnormal. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the message type [MSH-9] field of the MSH segment. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
941	-2	Abnormal Text from Data Manager	There is no EQU segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the EQU segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
942	-2	Abnormal Text from Data Manager	There is no MSA segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the MSA segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
943	-2	Abnormal Text from Data Manager	There is no MSH segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the MSH segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
944	-2	Abnormal Text from Data Manager	There is no OBR segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the OBR segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
945	-2	Abnormal Text from Data Manager	There is no OBX segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the OBX segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
946	-2	Abnormal Text from Data Manager	There is no ORC segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the ORC segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
947	-2	Abnormal Text from Data Manager	There is no PID segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the PID segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
948	-2	Abnormal Text from Data Manager	There is no QAK segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the QAK segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
949	-2	Abnormal Text from Data Manager	There is no QID segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the QID segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
950	-2	Abnormal Text from Data Manager	There is no QPD segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the QPD segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
951	-2	Abnormal Text from Data Manager	There is no RCP segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the RCP segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
952	-2	Abnormal Text from Data Manager	There is no SPM segment. The subcategory code indicates communication line number.	1. Perform System Communication Trace on Print. 2. Confirm that the SPM segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
953	-2	Abnormal Text from Data Manager	There is no TQ1 segment. The subcategory code indicates communication line number.	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Confirm that the TQ1 segment exists. 3. Refer to the specifications of system interface communication. 4. Contact service representative, if alarm recurs.
992	-1	Abnormal Test Selection from Data Manager	One or more tests requested by Data Manager are in progress.	<ol style="list-style-type: none"> 1. Check if the Item Codes requested by the Host are appropriate. 2. Contact service representative, if alarm recurs.
994	1	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Test Selection Response Text)	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Test Selection Response Text) 3. Contact service representative, if alarm recurs.
994	2	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Patient/QC Result Response Text - Real)	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Patient/QC Result Response Text - Real) 3. Contact service representative, if alarm recurs.
994	3	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Chemistry Calibration Result Response)	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Chemistry Calibration Result Response Text) 3. Contact service representative, if alarm recurs.
994	4	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (ISE Calibration Result Response Text)	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the HL7 text. (ISE Calibration Result Response Text) 3. Contact service representative, if alarm recurs.
994	5	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Immune Calibration Result Response Text)	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Immune Calibration Result Response Text) 3. Contact service representative, if alarm recurs.
994	6	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Patient/QC Result Response Text - Batch)	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Patient/QC Result Response Text - Batch) 3. Contact service representative, if alarm recurs.
994	7	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Reaction Monitor Result Response Text)	<ol style="list-style-type: none"> 1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Reaction Monitor Result Response Text) 3. Contact service representative, if alarm recurs.

Code	Sub-	Alarm Message	Content	Troubleshooting
994	8	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Reaction Monitor Calibration Result Response Text)	1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Reaction Monitor Calibration Result Response Text) 3. Contact service representative, if alarm recurs.
994	9	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Raw Data Result Response Text)	1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Raw Data Result Response Text) 3. Contact service representative, if alarm recurs.
994	10	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Raw Data Calibration Result Response)	1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Raw Data Calibration Result Response Text) 3. Contact service representative, if alarm recurs.
994	11	Data Manager Communication Error	Message Control ID of the HL7 text received from Data Manager is not the corresponding one. (Alarm Response Text)	1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Alarm Response Text) 3. Contact service representative, if alarm recurs.
994	12	Data Manager Communication Error	The sample No. value is invalid.	1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Test Selection Download Text - Batch) 3. Contact service representative, if alarm recurs.
994	13	Data Manager Communication Error	The orders of the serum index tests (L/H/I) are illegal.	1. Perform System Communication Trace on Print. 2. Check the HL7 text. (Test Selection Download Text - Batch) 3. Contact service representative, if alarm recurs.
995	-1	Abnormal Text from Data Manager	The sample type value is invalid. The subcategory code indicates the application code.	Check the sample type.
997	-2	Data Manager Communication Error	Though the system transmitted a text, the Data Manager did not receive a response within 15 seconds. (Reception timeout) The subcategory code indicates communication line number.	1. Check the Data Manager settings. 2. Refer to the system interface communication specifications.
999	-1	Data Manager Communication Error	Host code is duplication defined. The subcategory code indicates the application code.	Contact service representative.

Using MODULAR PRE-ANALYTICS

How to use a MODULAR PRE-ANALYTICS and aliquoted samples without barcodes with data manager

This chapter describes how to use a MODULAR PRE-ANALYTICS with cobas® 8000 data manager. When using an MODULAR PRE-ANALYTICS, aliquoted samples do not have barcodes. This chapter describes how samples are identified in this case.

In this chapter

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Using a MODULAR PRE-ANALYTICS

This chapter describes how to handle test selection requests, when using a **MODULAR PRE-ANALYTICS** with **cobas® 8000 data manager**. When using an **MODULAR PRE-ANALYTICS**, aliquoted samples do not have barcodes. This chapter describes how such samples are identified, and in which fields data is passed from *data manager* to the host and back.

Sample IDs and barcodes

For maximum throughput on the **cobas® 8000 instrument**, it is necessary to identify the samples from a barcode. For this reason, and other reasons of efficiency, the instrument generates the sample identifiers by reading the barcodes on the tubes. This is the default configuration for the **cobas® 8000 instrument**.

However, if a **MODULAR PRE-ANALYTICS** is used in conjunction with the **cobas® 8000 instrument**, aliquoted sample tubes will not have barcodes. Therefore, it is not possible to generate the sample identifiers from the barcodes. In this situation, it is necessary to configure the **cobas® 8000 instrument**'s Control Unit so that it sends a query to the *data manager* if a sample lacks a barcode. It is also necessary to configure *data manager* to send the query to the host.

Handling query messages without barcodes

In normal operation, by default, a sample without a barcode generates an error on **cobas® 8000 instrument**, and is handled by the instrument operator.



The host should be able to handle a missing sample ID

Because a user with configuration privileges can (intentionally or otherwise) configure the **cobas® 8000 instrument** and *data manager* to send test selection inquiries without barcode information, the host should be able to handle such a message, either with a test selection reply or at least with a meaningful error message.

Configuring the Control Unit

To configure the **cobas® 8000 instrument** to process samples without barcodes with a **MODULAR PRE-ANALYTICS**, enable the option on the Control Unit *Test Selection Ask in Barcode Read Error* in: **Utility > System > Data Manager Settings > Test Selection Inquiry Settings > Test Selection Ask in Barcode Read Error**.

☞ For details of the GUI settings, see *Test Selection Ask in Barcode Read Error* on page B-38.

Rerun without barcodes

When working without barcodes, rerun by gray racks (racks for 1st run) is not permitted, because the analyzer cannot determine whether this is the first or second presentation of the rack.

If you want to rerun the same routine rack, ensure that the LIS can handle a second R1 Query correctly. This means that the LIS has to know which tests have already been downloaded, because the tests should not be downloaded again. If this can not be guaranteed, use rerun racks.

Order of messages

If a **MODULAR PRE-ANALYTICS** is connected, and a sample tube lacks a barcode, and the messages are sent in realtime mode, order of messages is then as follows:

1. The **cobas® 8000 instrument** recognizes that a sample exists without a barcode. It sends *data manager* a query for test selections, identifying the sample by:
 - the rack ID
 - the sample's position on the rack (1 to 5)
 - the sample type (which is the same as the rack type, as each type of sample uses a different type of rack)
2. The *data manager* sends a query to the host asking for test selections for the sample. The sample is identified to the host through the following information:
 - the sample ID is given as a string of 22 asterisk (*) characters. This shows that the sample tube lacks a barcode. This is passed in:
 - ASTM Query Record (Q) field 3, component 3, or
 - HL7 Query Parameter Definition Segment QPD-3.
 - the rack ID, passed in:
 - ASTM Query Record (Q) field 3, component 5, or
 - HL7 Query Parameter Definition Segment QPD-5
 - the sample's position on the rack (1 to 5). This is passed in:
 - ASTM Query Record (Q) field 3, component 6, or
 - HL7 Query Parameter Definition Segment QPD-6
 - the sample type (or rack type), in:
 - in ASTM in the Query Record (Q) field 3, component 8, or
 - in HL7 Query Parameter Definition Segment QPD-10.
3. The host must be programmed so that it looks up the sample's identifier. It sends the sample identifier in the order (or test selection) to *data manager*, as well as the other identifying information:
 - the sample ID is passed in:
 - ASTM Order Record (O) field 3, or
 - HL7 Specimen Segment (SPM) field SPM-2.
 - the rack number, passed in:
 - ASTM Order Record (O) field 4, component 2, or
 - HL7 Container Information Segment (SAC) fields SAC-10
 - the sample's position on the rack (1 to 5). This is passed in:
 - ASTM Order Record (O) field 4, component 3, or
 - HL7 Container Information Segment (SAC) field SAC-11
 - the sample type (or rack type)
 - ASTM the Order Record (O) field 4, component 4, or
 - HL7 Specimen Segment (SPM) field SPM-4.
4. The *data manager* passes this information on to the Control Unit.
5. The Control Unit, *data manager* and the host then use the sample identifier to identify the sample in subsequent messages.
☞ For full information on the content of the supported ASTM and HL7 fields, see the definitions in *ASTM text content (LIS2 - A2)* on page C-13, and *HL7 text content* on page D-7.

Handling batch test selections with strict rack and position

If you are using a MODULAR PRE-ANALYTICS and working without barcodes, the recommended procedure is to configure the Control Unit and *data manager* to send test selection queries, and to obtain a sample ID. However, if for some reason this cannot be done, it is possible to configure the *data manager* to identify a sample tube by the rack and position given in a batch test selection download. The *data manager* then sets up a one-to-one relationship between the sample ID and the rack and position of the sample tube.

Configuring *data manager*

To configure *data manager* to process batch test selection downloads for samples without barcodes with an MODULAR PRE-ANALYTICS, enable the option **Strict rack and position mode** in **c8000 DM System Configuration > Service-related configuration > Interface options**.

- ☞ To use the **Strict rack and position mode**, select the *data manager* option **Strict rack and position mode**. See *Rack and position mode* on page B-30.

By default, the *data manager* ignores any information about rack and position in a batch test selection message. The option **Strict rack and position mode** configures the *data manager* so that it uses the information on rack and position.

Identifying the sample

In this situation, the host must be programmed so that it looks up the rack and position of the sample. It sends the sample identifier in the order (or test selection) to *data manager*, as well as the other identifying information:

- the sample ID, passed in:
 - ASTM Order Record (O) field 3, or
 - HL7 Specimen Segment (SPM) field SPM-2.
- the rack number, passed in:
 - ASTM Order Record (O) field 4, component 2, or
 - HL7 Container Information Segment (SAC) fields SAC-10
- the sample's position on the rack (1 to 5). This is passed in:
 - ASTM Order Record (O) field 4, component 3, or
 - HL7 Container Information Segment (SAC) field SAC-11
- the sample type (or rack type), passed in:
 - ASTM the Order Record (O) field 4, component 4, or
 - HL7 Specimen Segment (SPM) field SPM-4.

The *data manager* uses all the same fields to identify the sample in result message.



Clearing the sample list

In this situation, the *data manager* keeps an internal list of the rack and position of each sample. When the samples are off-loaded from the racks, and new samples

Do not move the sample to another rack

If you are using the MODULAR PRE-ANALYTICS with **Strict rack and position mode**, do not move the sample to another rack until it is deleted. The tube's rack and position must stay the same, for the host, cobas® 8000 modular analyzer series and *data manager* to identify it.

loaded, it is necessary to clear this list of samples. The host must implement functionality to do this, and simultaneously, the list of samples must be cleared manually from the *data manager* by the laboratory technicians. To clear the list of samples, navigate to **cobas® 8000 data manager Routine Workplace > Sample Overview**, and select **Reset Rack**. For details see the *cobas® 8000 modular analyzer series Operator's Manual*.

Identifying patient samples by sequence number

Numbering samples in sequence instead of using a barcode

This chapter describes how the **cobas® 8000** modular analyzer series can number patient samples in sequence, instead of using barcodes and sample IDs.

In this chapter

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Identifying samples

This section describes how the **cobas® 8000** modular analyzer series instrument, Control Unit, and *data manager* identify samples. It gives an outline of the options available.

Sample IDs and barcodes

For maximum throughput on the **cobas® 8000** instrument, it is necessary to identify the samples from a barcode. For this reason, and other reasons of efficiency, the instrument generates the sample identifiers by reading the barcodes on the tubes. This is the default configuration for the **cobas® 8000** instrument.

Patient samples without barcodes

However, in some situations, the patient sample tubes will not have barcodes. Therefore, it is not possible to generate the sample identifiers from the barcodes.

In version 1.02.03 and higher, one way of handling this situation, is to configure the **cobas® 8000** instrument to give each sample a sequence number. This is described below.

Identifying patient samples by sequence number

This section tells you how to identify patient samples by sequence number.

This setting on the instrument is called “*sequence mode*”. This works as follows:

- By default the sequence numbers start with 1, and then increase by 1 for each sample. (1, 2, 3, etc.) The starting number is configurable, but the highest possible number for a sample is 60,000.
- To implement this on the *data manager*, the Control Unit and the **cobas® 8000** modular analyzer series instrument, ask for assistance from your authorized Roche Diagnostics service personnel. Implementation requires a dedicated installation tool. For details of installation, see the relevant service bulletins from August 2011, and the **cobas® 8000** modular analyzer series *Service Manual* from version 1.02.04 (available 2012).

NOTICE

Sequence numbers can only be used with patient samples

Sequence numbers can only be used with patient samples. Control samples cannot use sequence numbers, even if patient samples are configured to do so.

NOTICE

This configuration does not support a MODULAR PRE-ANALYTICS

Note that sequence numbers cannot be used with samples from a **MODULAR PRE-ANALYTICS**.

Sequence numbers and sample IDs

The *data manager* database is independent of the setting of the cobas® 8000 modular analyzer series instrument and the Control Unit. Even if the instrument, the Control Unit, and the *data manager* are configured for sequence mode, the host can still send the *data manager*:

- order queries for earlier samples which are identified by barcode / sample ID. Any response is sent at once.
- result queries for earlier samples which are identified by barcode / sample ID. Any response is sent at once.
- test selection inquiries for samples with barcodes. These test selections will not be downloaded to the instrument until the instrument is reconfigured to read barcodes.



Identify a sample by either sample ID or sequence number, but not both.

If you want to identify the sample by sequence number, make sure that the sample ID (O-3, SPM-2.3) is empty. If you send both a sample ID and a sequence number, the *data manager* will use only the sample ID to identify the sample.

What the *data manager* understands

The *data manager* interprets each message as a barcode message or a sequence number message according to how the sample is identified.

Sample ID	Sequence number	Sample identified by:
Sent in ASTM O-3, Q-3.3, or HL7 SPM-2, QPD-3	Sent in ASTM O-4.1, Q-3.4, or HL7 QPD-3.2, SPM-2.2	
empty	empty	Not permissible. Sample not identified. <ul style="list-style-type: none"> • ASTM: sample created with no ID. • HL7: ORA-2001 validation error
String	empty	Sample ID
empty	Integer up to 60,000	Sequence number
String	Integer up to 60,000	Sample ID, but this message is not recommended nor supported.

Table E-1 Identifying the sample in messages

Important information for using sequence numbers

When setting up or using sequence numbers, please consider the following.



CAUTION

Only service personnel can enable or disable sequence mode

Only authorized Roche Diagnostics service personnel can enable or disable sequence mode on the *data manager*, the cobas® 8000 modular analyzer series instrument and Control Unit.

When using sequence numbers, pay attention to the following

Carefully observe the following warnings.



WARNING

Regular database clean-up required

The *data manager* and cobas® 8000 modular analyzer series instrument can only handle sequence numbers up to 60,000. **You must clean up and delete the data** in the *data manager*'s internal database before the sequence number reaches **60,000**. Otherwise samples will be confused with earlier ones. Consult your Roche Diagnostics service personnel and the relevant service bulletins starting August 2011 or the cobas® 8000 modular analyzer series *Service Manual* from version 1.02.04 (available 2012), for more information.



WARNING

Do not start sample IDs with the same internal prefix that is used in the *data manager*

The *data manager* uses an internal prefix to identify sequence numbers, and to differentiate them from sample IDs. By default, this prefix is set to "seq#". However, it can be configured to any other value by the authorized Roche Diagnostics service personnel, using the relevant installation tool. Find out from them the exact prefix which is used in your installation of the *data manager*. **Choose a prefix that is different from the starting characters of any possible sample ID used on your site.** These sample IDs are read from the barcodes affixed to tubes. Ask the administrators of the laboratory organization for details on how they define the format of barcodes and sample IDs.

Make sure that sample IDs and sequence numbers do not start with the same characters. Otherwise the *data manager* could confuse samples with each other.



CAUTION

The sample ID sent by the host takes precedence over the sequence number

If the host sends a sample ID to the *data manager*, the *data manager* uses the sample ID in preference to any sequence number in the message. If you are using a sequence number in the message, make sure that the sample ID is not sent.

Using sample sequence numbers in ASTM

This section compares messages in ASTM using barcode sample IDs and sequence numbers.

Test selection inquiry

In a test selection inquiry message from the *data manager* to the host:

- When using the default barcode sample IDs, the *data manager* sends sample ID from the barcode in Q-3.3.
- When identifying samples by sequence number, the *data manager* sends the sequence number in Q-3.4.

Sample ID inquiry Q|1|^2110903^0^50094^3^^S1^SC^R1| |ALL|||||||R|O|

Sequence number inquiry Q|1|^3^50094^3^^S1^SC^R1| |ALL|||||||R|O|

These fields are used the same way in an order query from the host to the *data manager*.

Test selection download

In a test selection download message from the host to the *data manager*:

- When using the default barcode sample IDs, the host sends sample ID from the barcode in O-3.
- When identifying samples by sequence number, the host sends the sequence number in O-4.1.

Sample ID order record O|1|2110903|^50094^3^^S1^SC^|^^^205^|R|201108...

Sequence number order record Either

O|1| |3^^^^S1^SC^|^^^205^|R|201...

or

O|1| |3^50094^3^^S1^SC^|^^^205^|R|201...

Note that in a test selection upload from the *data manager* to the host, the Order record, field 4 (O-4) is a simple number field, containing the sequence number.

O|1| |3|^^^205^|R|201...

Test result message

In a test result message from the *data manager* to the host:

- When using the default barcode sample IDs, the *data manager* sends sample ID from the barcode in O-3.
- When identifying samples by sequence number, the *data manager* sends the sequence number in O-4.1.

Sample ID order record O|1|2110903|0^50094^3^^S1^SC^not|^^^112^1|R|201108...

Sequence number order record 0|1||3^50094^3^^S1^SC^not|^^^991^1|R|201...

Using sample sequence numbers in HL7

This section compares messages in HL7 using barcode sample IDs and sequence numbers.

Test selection inquiry

In a test selection inquiry message from the *data manager* to the host:

- When using the default barcode sample IDs, the *data manager* sends sample ID from the barcode in QPD-3-1.
- When identifying samples by sequence number, the *data manager* sends the sequence number in QPD-3.2.

Sample ID inquiry QPD|TSREQ|4362|2110903||50094|3||||S1|SC|R1|R|

Sequence number inquiry QPD|TSREQ|4565|^3||50094|3||||S1|SC|R1|R|

These fields are used the same way in an order query from the host to the *data manager*.

Test selection download

In a test selection download message from the host to the *data manager*:

- When using the default barcode sample IDs, the host sends sample ID from the barcode in SPM-2.1.
- When identifying samples by sequence number, the host sends the sequence number in SPM-2.2, and must send the rack ID in SAC-10, and tube's position in SAC-11.

Sample ID specimen segment SPM||2110903||S1||not||||P|||^^^|||20110615215424|||||||SC

Sequence number specimen and container detail segments SPM||^3||S1||not||||P|||^^^|||20110615215424|||||||SC
SAC|||||||50094|3

These fields are used in the same way in a test selection upload from the *data manager* to the host.

Test result message

In a test selection download message from the *data manager* to the host:

- When using the default barcode sample IDs, the *data manager* sends sample ID from the barcode in SPM-2.1, and the rack ID in SAC-10, and tube's position in SAC-11.
- When identifying samples by sequence number, the *data manager* sends the sequence number in SPM-2.2, and the rack ID in SAC-10, and tube's position in SAC-11.

Sample ID specimen and container detail segments

```
SPM||2110903||S1||not|||||P|||^~^|||20110615215424|||||||SC|
SAC|||||||50094|3|
```

Sequence number specimen and container detail segments

```
SPM||^3||S1||not|||||P|||^~^|||20110617105639|||||||SC|
SAC|||||||50094|3|
```

Communication examples

This chapter presents some examples of messages generated by cobas® 8000 data manager, and a connected host system (LIS / WAM).

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Example communication trace files

This section gives example trace files of messages between *data manager* and the host. This shows the precise content of the messages sent, including the control characters.

ASTM trace files

This section gives examples of ASTM messages between *data manager* and the host.

Low level trace file

This section shows a low-level ASTM trace file, showing the control characters, the acknowledgement handling, and the frames.

```
c8kDM 18:46:29,145 [ENQ]
HOST 18:46:29,176 [ACK]
c8kDM 18:46:29,317 [STX]1H|^\&|116486||cobas 8000^1.02||||host|RS
UPL|P|1|20101020184623|[CR]P|1||||^|||||[CR]O|1|
10002|0^10002^2^^S4^SC^not|^____870^1\____880^1\____
^890^1|R|20101016120539|20101016120539||||N|||||
4|||||||||F|[CR]C|1|I|^____|G|[CR]R|1|^____870/1|
not|17.30|g/dL|^TECH\^N[ETB]E9[CR][LF]
HOST 18:46:29,333 [ACK]
c8kDM 18:46:29,411 [STX]2ORM\^CRIT\^USER|||F||bmserv^SYSTEM|200912
18164600|20101016120550|c502^1^MU1#c502#2#1^9^0
| [CR]C|1|I|0|I|[CR]R|2|^____880/1/not|1.50|g/dL|^
TECH\^NORM\^CRIT\^USER|||F||bmserv^SYSTEM|20091
218164600|20101016120552|c502^1^MU1#c502#2#1^9^
0|[CR]C|1|I|0|I|[CR]R|3[ETB]BA[CR][LF]
HOST 18:46:29,411 [ACK]
c8kDM 18:46:29,426 [STX]3|____890/1/not|8.67|%|^TECH\^NORM\^CRIT\^U
SER|||F||bmserv^SYSTEM||20101016120552|c502^1^M
U1#c502#2#1^9^0|[CR]C|1|I|0|I|[CR]L|1|N|[CR][ET
X]F1[CR][LF]
HOST 18:46:29,426 [ACK]
c8kDM 18:46:29,442 [EOT]
```

Figure E-1 Low-level trace: the message is sent in as few 240-byte frames as possible.

Each frame has a maximum of 240 bytes for text, plus 7 bytes for frame control characters. The message is sent in as few frames as possible, so the last may be less than 240 bytes.

The message is sent as unicode UTF-8, so unicode characters may occupy more than one byte. Also, one unicode character might be split between two frames.

For readability the rest of the examples are displayed on a record level, and not on the frame level.

Test selection inquiry from *data manager*

This section shows examples of ASTM test selection enquiries sent from the data manager, and the host's test selection downloads in reply.

Routine test selection inquiry and download

This section shows an example of an ASTM test selection inquiry for a routine sample sent from the *data manager*, and the host's test selection download in reply.

```
DM:
H|^&|15220||cobas 8000^1.02||||host|TSREQ|P|1|20101020091706|
Q|1|^321070^0^50094^2^^S1^SC^R1||ALL|||||R|O|
L|1|N|


Host:
H|^&|||ASTM-Host^V 6.8g||||cobas 8000^1.02|TSDWN|P|1|20101020100000
P|1||PatID3||Parker^Bill||19881231|M
O|1|321070|0^50094^2^^S1^SC^not|^^^989^1\^^^990^1\^^^991^1|R|||||A||||1|||||||O
C|1|L|Comm1^Comm2^Comm3^Comm4^Comm5|G
L|1|N|
```

Figure E-2 Routine test selection inquiry and download

STAT sample test selection inquiry and download

This section shows an example of an ASTM test selection inquiry for a STAT sample, and the host's test selection download.

```
DM:
H|^&|15223||cobas 8000^1.02||||host|TSREQ|P|1|20101020091724|
Q|1|^321040^0^40002^3^^S1^SC^R1||ALL|||||S|O|
L|1|N|


Host:
H|^&|||ASTM-Host^V 6.8g||||cobas 8000^1.02|TSDWN|P|1|20101020100000
P|1||PatID3||Parker^Bill||19881231|M
O|1|321040|0^40002^3^^S1^SC^not|^^^989^1\^^^990^1\^^^991^1|S|||||A||||1|||||||O
C|1|L|Comm1^Comm2^Comm3^Comm4^Comm5|G
L|1|N|
```

Figure E-3 STAT sample test selection inquiry and download

Test selection inquiry and download if no sample found

This section shows an example of an ASTM test selection inquiry for a sample, and the host's test selection download, saying that it could not find the sample.

```
DM:
H|^&|15220||cobas 8000^1.02||||host|TSREQ|P|1|20101020091706|
Q|1|^321071^0^50094^1^^S1^SC^R1||ALL|||||R|O|
L|1|N|


Host:
H|^&|||ASTM-Host^V 6.8g||||cobas 8000^1.02|TSDWN|P|1|20101020100000
P|1|
O|1|321071|0^50094^1^^S1^SC||R|||||A||||1|||||||O
L|1|N|
```

Figure E-4 Test selection inquiry and download if no sample found



Send patient demographic data if sample found with no tests ordered

Take care in the situation where the *data manager* sends a test selection query, but the host has no patient demographic information nor tests for the sample, although it recognizes the sample ID. When the host sends its test selection download, the *data manager* updates the patient demographic information along with the tests. Therefore, if the host sends no patient demographic information, the *data manager* might lose its current patient demographic data.

In this case, the host should send a normal test selection download, with full patient information, and comments etc., but no testcodes.

For examples of normal test selections, see *Routine test selection inquiry and download* on page E-58 and *STAT sample test selection inquiry and download* on page E-58.

Test selection inquiry with sequence number

This section shows an example of an ASTM test selection inquiry for a sample, identified by sequence number.

```
DM:
H|^&|563017||cobas 8000^1.02||||host|TSREQ|P|1|20110720151610|
Q|1|^1013^50101^3^^S1^SC^R1||ALL|||||R|O|
L|1|N|


Host:
H|^&|||ASTM-Host^V 6.8g||||cobas 8000^1.02|TSDWN|P|1|20110715093311
P|1||M820101K||Froihofe^Kahila||19831213|F
O|1||1013^50101^3^^S1^SC^not|^^^8571^1\^^^8413^1\^^^8706^1\|R|20110715093311|20110715093311||||A|||
|1|||||||O
C|1|L|Comm1^Comm2^Comm3^Comm4^Comm5|G
L|1|N|
```

Figure E-5 Test selection inquiry for a sample identified by sequence number

Patient result upload messages

This section shows examples of ASTM patient result upload messages.

Realtime ISE result upload

This section shows an example of an ASTM realtime result upload from an ISE module.

```
H|^\&|12927||cobas 8000^1.02||||host|RSUPL|P|1|20101018185138|
P|1||||^|||
O|1|321088|0^50022^5^^S1^SC^not|^^^990^1|R|20101016183237|20101016183237||||N||||1|||||||||F|
C|1|I|^____|G|
R|1|^__990/1/not|0.68|mmol/L|^TECH|^NORM|^CRIT|^USER|||C||bmserv^SYSTEM|20101018185121|201010181851
36|ISE^2^MU1#ISE#1#2^4^128|
C|1|I|23^ISE Sample range over|I|
L|1|N|
```

Figure E-6 Realtime ISE result upload

ISE result upload - sample short

This section shows an example of an ASTM result upload, stating that the result value is missing because the sample is short.

```
H|^\&|12835||cobas 8000^1.02||||host|RSUPL|P|1|20101018183109|
P|1||||^|||
O|1|321042|0^50011^4^^S1^SC^not|^^^991^1|R|20101014115322|20101006162241||||N||||1|||||||||F|
C|1|I|^____|G|
R|1|^__991/1/not| mmol/L|^TECH|^NORM|^CRIT|^USER|||C||bmserv^SYSTEM|20101018183051|20101018
83106|ISE^1^MU1#ISE#1#1^3^126|
C|1|I|3^Sample short|I|
L|1|N|
```

Figure E-7 ISE result upload, result missing as sample is short

C-module result upload with no flag

This section shows an example of an ASTM result upload from a C-module with no alarm flag.

```
H|^\&|13815||cobas 8000^1.02||||host|RSUPL|P|1|20101019100042|
P|1||||^|||
O|1|321042|0^50011^4^^S1^SC^not|^^^8717^1|R|20101019094904|20101019094904||||N||||1|||||||||F|
C|1|I|^____|G|
R|1|^__8717/1/not|4.28|mmol/L|^TECH|^NORM|^CRIT|^USER|||F||bmserv^SYSTEM|20101019095027|20101019100
040|c701^1^MU1#c701#1#1^6^77|
C|1|I|0|I|
L|1|N|
```

Figure E-8 C-module result upload with no flag

Glucose result with alarm flag

This section shows an example of an ASTM result upload from a C-module with an alarm flag.

```
H|^&|13667||cobas 8000^1.02||||host|RSUPL|P|1|20101019092637|
P|1|||||^|||||
O|1|321057|0^50007^1^^S1^SC^not|^^^8717^1|R|20101019085027|20101019085027||||N||||1|||||||F|
C|1|I|^^^^|G|
R|1|^^^8717/1/not|-0.01|mmol/L|^TECH|^NORM|^CRIT|^USER|||F||bmserv^SYSTEM|20101019091622|20101019092635|c701^1^MU1#c701#1#1^6^77|
C|1|I|27^PANIC value over (lower) Technical Limit|I|
L|1|N|
```

Figure E-9 Glucose result with alarm flag

Batch upload of current results

This section shows an example of an ASTM batch result upload showing current results only.

```
H|^&|15326||cobas 8000^1.02||||host|RSUPL|P|1|20101020095834|
P|1||PatID1||Smith^Alan||19451231|M|
O|1|321015|0^50071^1^^S1^SC^not|^^^990^1\^^^991^1\^^^8717^1|R|20101019174209|20101019174209||||N|||
|1|||||||F|
C|1|I|C1^C2^C3^C4^C5|G|
R|1|^^^990/1/not|0.75|mmol/L|^TECH|^NORM|^CRIT\< 0^USER|||F||bmserv^SYSTEM|20101020095735|20101020095751|ISE^1^MU1#ISE#1#1^3^125|
C|1|I|23^ISE Sample range over|I|
R|2|^^^991/1/not|297.28|mmol/L|^TECH|^NORM|^CRIT\<
0^USER|||F||bmserv^SYSTEM|20101020095735|20101020095751|ISE^1^MU1#ISE#1#1^3^126|
C|1|I|23^ISE Sample range over|I|
R|3|^^^8717/Inc/not|-0.02|mmol/L|^TECH|^NORM|^CRIT|^USER|||C||bmserv^SYSTEM|20101019175614|20101019180627|c701^1^MU1#c701#1#1^6^77|
C|1|I|27^PANIC value over (lower) Technical Limit|I|
L|1|N|
```

Figure E-10 Batch upload of current results

Batch upload of current results -sample short

This section shows an example of an ASTM batch result upload stating that the result value is missing because the sample is short.

```
H|^&|12811||cobas 8000^1.02||||host|RSUPL|P|1|20101018182329|
P|1|||||^|||||
O|1|321042|0^50011^4^^S1^SC^not|^^^989^1\^^^990^1\^^^991^1|R|20101014115322|20101006162241||||N|||
|1|||||||F|
C|1|I|^^^^|G|
R|1|^^^989/1/not| mmol/L|^TECH|^NORM|^CRIT|^USER|||C||bmserv^SYSTEM|20101018173814|20101018173829|ISE^1^MU1#ISE#1#1^3^124|
C|1|I|3^Sample short|I|
R|2|^^^990/1/not| mmol/L|^TECH|^NORM|^CRIT|^USER|||C||bmserv^SYSTEM|20101018173814|20101018173829|ISE^1^MU1#ISE#1#1^3^125|
C|1|I|3^Sample short|I|
R|3|^^^991/1/not| mmol/L|^TECH|^NORM|^CRIT|^USER|||C||bmserv^SYSTEM|20101018173814|20101018173829|ISE^1^MU1#ISE#1#1^3^126|
C|1|I|3^Sample short|I|
L|1|N|
```

Figure E-11 Batch upload of current results

Batch upload all previous results

This section shows an example of an ASTM batch upload of all previous results.

```
H|^&|15325||cobas 8000^1.02||||host|RSUPL|P|1|20101020095830|
P|1||PatID1||Smith^Alan||19451231|M|
O|1|321015|0^50071^1^^S1^SC^not|^^^990^1|^^^991^1|^^^8717^1|R|20101019174209|20101019174209||||N|||
|1|||||||||F|
C|1|I|C1^C2^C3^C4^C5|G|
R|1|^990/1/not|0.91|mmol/L|^TECH|^NORM|^CRIT\< 0^USER|||F||bmserv^SYSTEM|20101019174423|20101019174439|ISE^2^MU1#ISE#1#2^4^128|
C|1|I|23^ISE Sample range over|I|
R|2|^990/1/not|0.70|mmol/L|^TECH|^NORM|^CRIT\< 0^USER|||C||bmserv^SYSTEM|20101019174459|20101019174515|ISE^1^MU1#ISE#1#1^3^125|
C|1|I|23^ISE Sample range over|I|
R|3|^990/1/not|0.75|mmol/L|^TECH|^NORM|^CRIT\< 0^USER|||F||bmserv^SYSTEM|20101020095735|20101020095751|ISE^1^MU1#ISE#1#1^3^125|
C|1|I|23^ISE Sample range over|I|
R|4|^991/1/not|252.89|mmol/L|^TECH|^NORM|^CRIT\< 0^USER|||F||bmserv^SYSTEM|20101019174347|20101019174403|ISE^1^MU1#ISE#1#1^3^126|
C|1|I|23^ISE Sample range over|I|
R|5|^991/1/not|256.84|mmol/L|^TECH|^NORM|^CRIT\< 0^USER|||C||bmserv^SYSTEM|20101019174423|20101019174439|ISE^2^MU1#ISE#1#2^4^129|
C|1|I|23^ISE Sample range over|I|
R|6|^991/1/not|297.28|mmol/L|^TECH|^NORM|^CRIT\< 0^USER|||F||bmserv^SYSTEM|20101020095735|20101020095751|ISE^1^MU1#ISE#1#1^3^126|
C|1|I|23^ISE Sample range over|I|
R|7|^8717/1/not|-0.04|mmol/L|^TECH|^NORM|^CRIT|^USER|||F||bmserv^SYSTEM|20101019174533|20101019175547|c701^1^MU1#c701#1#1^6^77|
C|1|I|27^PANIC value over (lower) Technical Limit|I|
R|8|^8717/Inc/not|-0.02|mmol/L|^TECH|^NORM|^CRIT|^USER|||C||bmserv^SYSTEM|20101019175614|20101019180627|c701^1^MU1#c701#1#1^6^77|
C|1|I|27^PANIC value over (lower) Technical Limit|I|
L|1|N|
```

Figure E-12 Batch upload all previous results

Result below normal range

This section shows an example of an ASTM result upload below the normal reference range.

```
H|^&|10252||cobas|^8000^1.02||||host|RSUPL|P|1|20100610200938|
P|1||ES06516622121998||Rister^Wolfgang||19330813|M|
O|1|123|0^50063^2^^S1^SC^not|^^^989^1|^^^991^1|^^^8717^1|R|20100604235148|20100604235148||||N|||
|||||||F|
C|1|I|^G|
R|1|^989/1/not|2.1|mmol/L|^TECH\9 - 144^NORM|^CRIT|^USER|L||F||bmserv^SYSTEM|20100621084348|20100621084404|ISE^1^MU1#ISE#1#1^3^28|
C|1|I|0|I|
R|2|^991/1/not|1.1|mmol/L|^TECH|^NORM|^CRIT|^USER|||F||bmserv^SYSTEM|20100621084348|20100621084404|ISE^1^MU1#ISE#1#1^3^28|
C|1|I|0|I|
R|3|^8717/1/not|14.57|mmol/L|^TECH|^NORM|^CRIT|^USER|||F||bmserv^SYSTEM|20100621085921|20100621090935|c701^2^MU1#c701#1#2^7^168|
C|1|I|0|I|
L|1|N|
```

Figure E-13 Result below normal reference range

Result below level of detection

This section shows an example of an ASTM result upload below the EP-17A level of detection.

```
H|^&|10256||cobas|^|8000^1.02||||host|RSUPL|P|1|20100610201014|
P|1||ES06516622121998||Rister^Wolfgang||19330813|M|
O|1|123|0^50063^2^^S1^SC^not|^^^989^1|^991^1|^8717^1|R|20100604235148|20100604235148||||N||||1|
|||||||F|
C|1|I|^|||G|
R|1|^989/1/not|0.1|mmol/L|^TECH\9 - 144^NORM|^CRIT|^USER|LoD||F||bmserv^SYSTEM|20100621084348|201
00621084404|ISE^1^MU1#ISE#1#1^3^28|
C|1|I|0|I|
R|2|^991/1/not|1.1|mmol/L|^TECH|^NORM|^CRIT|^USER||F||bmserv^SYSTEM|20100621084348|2010062108440
4|ISE^1^MU1#ISE#1#1^3^28|
C|1|I|0|I|
R|3|^8717/1/not|14.57|mmol/L|^TECH|^NORM|^CRIT|^USER||F||bmserv^SYSTEM|20100621085921|2010062109
0935|c701^2^MU1#c701#1#2^7^168|
C|1|I|0|I|
L|1|N|
```

Figure E-14 Results upload below level of detection

Result with sample identified by sequence number

This section shows an example of an ASTM result upload with the sample identified by sequence number.

```
H|^&|563030||cobas 8000^1.02||||host|RSUPL|P|1|20110720152309|
P|1||M820101K||Froihofe^Kahila||19831213|F|
O|1||1013^50101^3^^S1^SC^not|^^8413^1|^8571^1|^8706^1|R|20110715093311|20110715093311||||N||||1
|||||||F|
C|1|I|^|||G|
R|1|^8413/1/not|15|g/dL|^TECH|^NORM|^CRIT|^USER||F||bmserv^SYSTEM|20110715084600|20110715084600|
c702^2^MU1#c702#1#2^7^193|
C|1|I|0|I|
R|2|^8571/1/not|16|U/L|^TECH|^NORM|^CRIT|^USER||F||bmserv^SYSTEM|20110715084600|20110715084600|c
702^2^MU1#c702#1#2^7^193|
C|1|I|0|I|
R|3|^8706/1/not|17|mmol/L|^TECH|^NORM|^CRIT|^USER||F||bmserv^SYSTEM|20110715084600|2011071508460
0|c702^2^MU1#c702#1#2^7^193|
C|1|I|0|I|
L|1|N|
```

Figure E-15 Results upload with sample identified by sequence number

Quality control uploads

This section shows examples of ASTM quality control result uploads.

Realtime quality control upload

This section shows an example of an ASTM realtime quality control upload.

```
H|^\&|13772||cobas 8000^1.02||||host|RSUPL^REAL|P|1|20101019094737|
P|1|
O|1|PNU^150403^2|0^30005^1^^QC^SC^not|^^^8685^1|R|||||Q||||1|||||||F|
C|1|I|^^^|G|
R|1|^^^8685/1/not|48|U/L||||F||bmserv^SYSTEM|20101019093722|20101019094737|c701^1^MU1#c701#1#1^6^75
^Current|
C|1|I|0|I|
L|1|N|
```

Figure E-16 Realtime quality control upload

Realtime quality control upload with a standby bottle

This section shows an example of an ASTM realtime quality control upload measured from the standby bottle.

```
H|^\&|13791||cobas 8000^1.02||||host|RSUPL^REAL|P|1|20101019094918|
P|1|
O|1|PNU^150403^2|0^30005^1^^QC^SC^not|^^^8685^1|R|||||Q||||1|||||||F|
C|1|I|^^^|G|
R|1|^^^8685/1/not|44|U/L||||F||bmserv^SYSTEM|20101019093903|20101019094918|c701^1^MU1#c701#1#1^6^76
^Standby^1|
C|1|I|0|I|
L|1|N|
```

Figure E-17 Realtime quality control upload from the standby bottle

Batch quality control upload

This section shows an example of an ASTM batch quality control upload.

```
H|^\&|14262||cobas 8000^1.02||||host|RSUPL^BATCH|P|1|20101019124105|
P|1|
O|1|PNU^150403^2|0^30005^1^^QC^SC^not|^^^8685^1|R|||||Q||||1|||||||F|
C|1|I|^^^|G|
R|1|^^^8685/1/not|47|U/L||||F||bmserv^SYSTEM|20101019111853|20101019112908|c701^1^MU1#c701#1#1^6^75
^Current|
C|1|I|0|I|
L|1|N|
```

Figure E-18 Batch quality control upload

Batch quality control upload with a standby bottle

This section shows an example of an ASTM batch quality control upload measured from the standby bottle.

H|^&|14261||cobas 8000^1.02||||host|RSUPL^BATCH|P|1|20101019124103|
P|1|
O|1|PNU^150403^2|0^30005^1^^QC^SC^not|^^^8685^1|R|||||Q||||1|||||||F|
C|1|I|^***|G|
R|1|^**8685/1/not|48|U/L|||F||bmserv^SYSTEM|20101019111857|20101019112911|c701^1^MU1#c701#1#1^6^76
^Standby^1|
C|1|I|0|I|
L|1|N|

Figure E-19 Batch quality control upload from the standby bottle

Calibration result uploads

This section shows examples of ASTM calibration result uploads.

C-module calibration result upload

This section shows example of ASTM C-module calibration result uploads.

H|^&|14273||cobas 8000^1.02||||host|PCUPL^REAL|P|1|20101019091421|
M|1|PCR|bmbserv|^^^8685|MU1#c701#1#1|16|0|22851^4^22866^2^0^\\24786^-361^24149^-362^0^\\^^^^^\\^^
^^^\\^^^^^|
L|1|N|

Figure E-20 C-module calibration result upload

H|^&|14274||cobas 8000^1.02||||host|PCUPL^REAL|P|1|20101019091425|
M|1|PCR|bmserv|^^^8685|MU1#c701#1#1|16|0|22045^4^22237^6^0^\\24134^-372^23966^-361^0^\\^^^^^\\^^^^^\\^
^^^^\\^^^^^|
L|1|N|

Figure E-21 C-module calibration result upload

H|^&|14275||cobas 8000^1.02||||host|PCUPL^REAL|P|1|20101019091432|
M|1|PCR|bmserv|^^^8717|MUL#C701#1#1|16|0|956^31^962^40^0^\\8100^6814^8147^6849^0^\\^^^^^\\^^^^^\\^^^^^\\
^^^^^|
L|1|N|

Figure E-22 C-module calibration result upload

ISE-module calibration result upload

This section shows examples of ASTM ISE-module calibration result uploads.

Figure E-23 ISE-module calibration result upload

Figure E-24 ISE-module calibration result upload

E-module calibration result upload

This section shows examples of ASTM E-module calibration result uploads.

```
H|^\&|14276||cobas 8000^1.02||||host|ECUPL^REAL|P|1|20101018175819|
M|1|ECR|bmserv|^\&1|LotCalibration|MU1#e602#2#1|157328||0|158941|O|I^O^M^O^S^O^R^1.074^D^O^L^
\f^O^Y^O^B^O^936.337^888.767\39609.680^39716.950||||20101018175819|
L|1|N|
```

Figure E-25 E-module calibration result upload

```
H|^\&|14277||cobas 8000^1.02||||host|ECUPL^REAL|P|1|20101018175844|
M|1|ECR|bmserv|^\&1|LotCalibration|MU1#e602#2#2|157328||0|158941|O|I^O^M^O^S^O^R^1.064^D^O^L^
|F^O^Y^O^B^O^839.413^797.173\38293.490^38596.120||||20101018175844|
L|1|N|
```

Figure E-26 E-module calibration result upload

Result request from host and the *data manager* result upload

This section shows examples of ASTM result requests from the host and the *data manager's* result upload in reply.

Request for currently active results

This section shows an example ASTM result request from the host for currently results for a sample, and the *data manager*'s result upload.

```
Host:  
H|^&|12345||cobas 8000^1.02||||host|RSREQ|P|1|20101020075900|  
Q|1|^S1^321015|||||||||F|  
L|1|N|  
  
DM:  
H|^&|15126||cobas 8000^1.02||||host|RSUPL^BATCH|P|1|20101020090056|  
P|1||PatID1||Smith^Alan||19451231|M|  
O|1|321015|0^50071^1^^S1^SC^not|^^8717^1|R|20101019174209|20101019174209||||N||||1|||||||F|  
C|1|I|C1^C2^C3^C4^C5|G|  
R|1|^^^8717|Inc/not|-0.02|mmol/L|^TECH|^NORM|^CRIT|^USER|||C||bmserv^SYSTEM|20101019175614|20101019  
180627|c701^1^MU1#c701#1#1^6^77|  
C|1|I|27^PANIC value over (lower) Technical Limit|I|  
L|1|N|
```

Figure E-27 Result request from the host for currently results, and the *data manager's* result upload

Request for all results

This section shows an example of an ASTM result request from the host for all results for a sample, and the *data manager's* result upload

```

Host:
H|^&|12345||cobas 8000^1.02||||host|RSREQ|P|1|20101020075900|
Q|1|^S1^321015|||||||||
L|1|N|


DM:
H|^&|15123||cobas 8000^1.02||||host|RSUPL^BATCH|P|1|20101020090031|
P|1||PatID1||Smith^Alan||19451231|M|
O|1|321015|0^50071^1^^S1^SC^not|^^^990^1\^^^991^1\^^^8717^1|R|20101019174209|20101019174209||||N|||
|1|||||||||F|
C|1|I|C1^C2^C3^C4^C5|G|
R|1|^^^990/1/not|0.91|mmol/L|^TECH\^NORM\^CRIT\< 0^USER|||F||bmserv^SYSTEM|20101019174423|20101019
174439|ISE^2^MU1#ISE#1#2^4^128|
C|1|I|23^ISE Sample range over|I|
R|2|^^^990/1/not|0.70|mmol/L|^TECH\^NORM\^CRIT\< 0^USER|||C||bmserv^SYSTEM|20101019174459|20101019
174515|ISE^1^MU1#ISE#1#1^3^125|
C|1|I|23^ISE Sample range over|I|
R|3|^^^991/1/not|252.89|mmol/L|^TECH\^NORM\^CRIT\< 0^USER|||F||bmserv^SYSTEM|20101019174347|2010101
9174403|ISE^1^MU1#ISE#1#1^3^126|
C|1|I|23^ISE Sample range over|I|
R|4|^^^991/1/not|256.84|mmol/L|^TECH\^NORM\^CRIT\< 0^USER|||C||bmserv^SYSTEM|20101019174423|2010101
9174439|ISE^2^MU1#ISE#1#2^4^129|
C|1|I|23^ISE Sample range over|I|
R|5|^^^8717/1/not|-0.04|mmol/L|^TECH\^NORM\^CRIT\^USER|||F||bmserv^SYSTEM|20101019174533|2010101917
5547|c701^1^MU1#c701#1#1^6^77|
C|1|I|27^PANIC value over (lower) Technical Limit|I|
R|6|^^^8717/Inc/not|-0.02|mmol/L|^TECH\^NORM\^CRIT\^USER|||C||bmserv^SYSTEM|20101019175614|20101019
180627|c701^1^MU1#c701#1#1^6^77|
C|1|I|27^PANIC value over (lower) Technical Limit|I|
L|1|N|

```

Figure E-28 Result request from the host for all results for a sample

Result request but no results

This section shows an example of an ASTM result request from the host, where the *data manager* does not have any results for the sample.

```

Host:
H|^&|12345||cobas 8000^1.02||||host|RSREQ|P|1|20101020075900|
Q|1|^S1^321016|||||||||
L|1|N|


DM:
<No Reply>

```

Figure E-29 Result request but no reply as no results found

Result request but sample not found

This section shows an example of an ASTM result request from the host, where the *data manager* does not have record of the sample.

```
Host:
H|^&|12345||cobas 8000^1.02||||host|RSREQ|P|1|20101020075900|
Q|1|^S1^NOT_A_SAMPLE|||||||||
L|1|N|


DM:
<No Reply>
```

Figure E-30 Result request but no reply as no sample found

Result request in with a sequence number

This section shows an example of an ASTM result request from the host, for the sample with sequence number 1031.

```
Host:
H|^&|12345||cobas 8000^1.02||||host|RSREQ|P|1|20110711093355|
Q|1|^S1^^1031|||||||F|
L|1|N|


DM:
H|^&|564735||cobas 8000^1.02||||host|RSUPL^BATCH|P|1|20110712112553|
P|1||M820101K||Froihofe^Kahila||19831213|F|
O|1||1013^50101^3^^S1^SC^not|^^^8413^1\^^^8571^1\^^^8706^1|R|20110711093311|20110711093311||||N|||
1|||||||F|
C|1|I|^^^|G|
R|1|^^^8413/1/not|15|g/dL|^TECH\^NORM\^CRIT\^USER|||F||bmserv^SYSTEM|20111212104600|20111212104600|
c702^2^MU1#c702#1#2^7^193|
C|1|I|0|I|
R|2|^^^8571/1/not|16|U/L|^TECH\^NORM\^CRIT\^USER|||F||bmserv^SYSTEM|20111212104600|20111212104600|c
702^2^MU1#c702#1#2^7^193|
C|1|I|0|I|
R|3|^^^8706/1/not|17|mmol/L|^TECH\^NORM\^CRIT\^USER|||F||bmserv^SYSTEM|20111212104600|20111212104600|
0|c702^2^MU1#c702#1#2^7^193|
C|1|I|0|I|
L|1|N|
```

Figure E-31 Result request with a sequence number

Order query from the host

This section shows examples of ASTM test selection queries (or order queries) from the host to the *data manager*.

Order query for all tests

This section shows an example of an ASTM order query for all tests on a sample.

```
Host:
H|^&|||cobas 8000^1.02||||host|TSREQ|P|1|
Q|1|^S1^321015|||||||||
L|1|N|


DM:
H|^&|14997||cobas 8000^1.02||||host|TSUPL|P|1|20101020081756|
P|1||PatID1||Smith^Alan||19451231|M|
O|1|321015||^^^990^1|^^^991^1|^^^8717^1||||||O||||1|||||||F|
C|1|I|C1^C2^C3^C4^C5|G|
L|1|N|
```

Figure E-32 Order query for all open tests

Order query for all open tests

This section shows an example of an ASTM order query for open tests on a sample.

```
Host:
H|^&|||cobas 8000^1.02||||host|TSREQ|P|1|
Q|1|^S1^321015|||||||||O|
L|1|N|


DM:
H|^&|15002||cobas 8000^1.02||||host|TSUPL|P|1|20101020082031|
P|1||PatID1||Smith^Alan||19451231|M|
O|1|321015||^^^990^1|^^^991^1||||||O||||1|||||||F|
C|1|I|C1^C2^C3^C4^C5|G|
L|1|N|
```

Figure E-33 Order query for all open tests

Order query but no open tests

This section shows an example of an ASTM order query for all open tests on a sample, but the *data manager* does not have any open orders on the sample.

```
Host:
H|^&|||cobas 8000^1.02||||host|TSREQ|P|1|
Q|1|^S1^321016|||||||||O|
L|1|N|


DM:
H|^&|15005||cobas 8000^1.02||||host|TSUPL|P|1|20101020082222|
P|1||PatID1||Smith^Alan||19451231|M|
O|1|321016|||||||O||||1|||||||F|
C|1|I|^^^^|G|
L|1|N|
```

Figure E-34 Order query but no open tests

Order query but sample not found

This section shows an example of an ASTM order query for all open tests on a sample, but the *data manager* does not have any record of the sample

```
Host:
H|^&|||cobas 8000^1.02||||host|TSREQ|P|1|
Q|1|^S1^NOT_EXISTING|||||||||
L|1|N|


DM:
H|^&|14980||cobas 8000^1.02||||host|TSUPL|P|1|20101020081236|
P|1||||^|||||
O|1|NOT_EXISTING|||||||O||||1|||||||F|
C|1|I|^^^|G|
L|1|N|
```

Figure E-35 Order query but sample not found

Order query with sample identified by sequence number

This section shows an example of an ASTM order query for all open tests on a sample identified by sequence number. Note that the order record, field 4 (O-4) is a simple number field, containing the sequence number (1013).

```
Host:
H|^&|||cobas 8000^1.02||||host|TSREQ|P|1|
Q|1|^S1^1013|||||||O|
L|1|N|


DM:
H|^&|563024||cobas 8000^1.02||||host|TSUPL|P|1|20110720151956|
P|1||M820101K||Froihofe^Kahila||19831213|F|
O|1||1013||8413^1||8571^1||8706^1||||||O||||1|||||||F|
C|1|I|Comm1^Comm2^Comm3^Comm4^Comm5|G|
L|1|N|
```

Figure E-36 Order query for a sample identified by sequence number

HL7 trace files

This section gives examples of HL7 messages between *data manager* and the host.

Test selection inquiry and download

In the examples in this section shows the *data manager* sends HL7 test selection requests, and the host replies with test selection downloads.

Test selection inquiry for routine rack

This section shows an example of an HL7 test selection inquiry for a routine rack.

```
DM:
MSH|^~\&|cobas 8000||host||20101020091052||TSREQ|15161|2.5||||ER||UNICODE UTF-8|
QPD|TSREQ|15161|321070||50094|2||||S1|SC|R1|R|
RCP|I|1|R|


Host:
MSH|^~\&|host||cobas 8000||20090508135730||OML^O33|38749|2.5||||ER||UNICODE UTF-8
PID|1|PatID3|||Wood^Sara||19881231|F
SPM||321070||S1||not||||||Comm1^Comm2^Comm3^Comm4^Comm5|||20101020122000|||||||SC
SAC|||||||||50094|2
TQ1|1|||||||R
OBR|1|||990^||||||A
TQ1|1|||||||R
OBR|2|||991^||||||A
TQ1|1|||||||R
OBR|3|||8781^||||||A
TQ1|1|||||||R
OBR|4|||8717^Inc||||||A
```

Figure E-37 Test selection inquiry for routine rack

Test selection inquiry for STAT rack

This section shows an example of an HL7 test selection inquiry for a STAT rack.

```
DM:
MSH|^~\&|cobas 8000||host||20101020091110||TSREQ|15164|2.5||||ER||UNICODE UTF-8|
QPD|TSREQ|15164|321040||40002|3||||S1|SC|R1|S|
RCP|I|1|R|


Host:
MSH|^~\&|host||cobas 8000||20101020123900||OML^O33|38749|2.5||||ER||UNICODE UTF-8
PID|1|PatID3|||Wood^Sara||19881231|F
SPM||321040||S1||not||||||Comm1^Comm2^Comm3^Comm4^Comm5|||20101020122000|||||||SC
SAC|||||||||4000232
TQ1|1|||||||S
OBR|1|||990^||||||A
TQ1|1|||||||S
OBR|2|||991^||||||A
TQ1|1|||||||S
OBR|3|||8781^||||||A
```

Figure E-38 Test selection inquiry for STAT rack

```
TQ1|1|||||||S
OBR|4|||8717^Inc||||||A
```

Figure E-38 Test selection inquiry for STAT rack**Routine rack (AL) with acknowledgement**

This section shows an example of an HL7 test selection inquiry for a routine sample, with the test selection download. The host requests an acknowledgement (level AL) and the *data manager* replies.

```
DM:
MSH|^~\&|cobas 8000||host||20101020091052||TSREQ|15161||2.5||||ER||UNICODE UTF-8|
QPD|TSREQ|15161|321070||50094|2||||S1|SC|R1|R|
RCP|I|1|R

Host:
MSH|^~\&|host||cobas 8000||20090508135730||OML^O33|38777||2.5||||AL||UNICODE UTF-8
PID|1|PatID3||Wood^Sara||19881231|F
SPM||321070||S1||not||||||Comm1^Comm2^Comm3^Comm4^Comm5|||20101020122000|||||||SC
SAC|||||||50094|2
TQ1|1|||||||R
OBR|1|||990^||||||A
TQ1|1|||||||R
OBR|2|||991^||||||A
TQ1|1|||||||R
OBR|3|||8781^||||||A
TQ1|1|||||||R
OBR|4|||8717^Inc||||||A

DM:
MSH|^~\&|cobas 8000||host||20101020132118||ACK|15831||2.5||||NE||UNICODE UTF-8|
MSA|AA|38777||
```

Figure E-39 Routine rack (AL) with acknowledgement**Routine rack invalid test (ER)**

This section shows an example of an HL7 test selection inquiry, and the host's test selection download. In this test selection download there is an invalid sample ID, and the *data manager* replies with an acknowledgement that informs the host of the error.

```
DM:
MSH|^~\&|cobas 8000||host||20101020091052||TSREQ|15161||2.5||||ER||UNICODE UTF-8|
QPD|TSREQ|15161|321070||50094|2||||S1|SC|R1|R|
RCP|I|1|R

Host:
MSH|^~\&|host||cobas 8000||20090508135730||OML^O33|38777||2.5||||ER||UNICODE UTF-8
PID|1|PatID3||Wood^Sara||19881231|F
SPM||321070||S1||not||||||Comm1^Comm2^Comm3^Comm4^Comm5|||20101020122000|||||||SC
SAC|||||||50094|2
TQ1|1|||||||R
OBR|1|||990^||||||A
TQ1|1|||||||R
OBR|2|||991^||||||A
TQ1|1|||||||R
OBR|3|||8781^||||||A
```

Figure E-40 Routine rack invalid test (ER)

```
TQ1|1||||||R
OBR|4|||INVALID^Inc||||||A

DM:
MSH|^~\&|cobas 8000||host||20101020132233||ACK|15834||2.5||||NE||UNICODE UTF-8|
MSA|AE|38777|ORA-20001: Validation error|
```

Figure E-40 Routine rack invalid test (ER)**Test selection inquiry no sample found**

This section shows an example of an HL7 test selection inquiry, but the host cannot find the sample.

```
DM:
MSH|^~\&|cobas 8000||host||20101020091052||TSREQ|15167||2.5||||ER||UNICODE UTF-8|
QPD|TSREQ|15167|321071||50094|3||||S1|SC|R1|R
RCP|I|1|R

Host:
MSH|^~\&|host||cobas 8000||20090508135730||OML^O33|38749||2.5||||ER||UNICODE UTF-8
PID|1|
SPM||321071||S1|
SAC||||||50094|3
```

Figure E-41 Test selection inquiry no sample found**Send patient demographic data if sample found with no tests ordered**

Take care in the situation where the *data manager* sends a test selection query, but the host has no patient demographic information nor tests for the sample, although it recognizes the sample ID. When the host sends its test selection download, the *data manager* updates the patient demographic information along with the tests. Therefore, if the host sends no patient demographic information, the *data manager* might lose its current patient demographic data.

In this case, the host should send a normal test selection download, with full patient information, and comments etc., but no testcodes.

For examples of normal test selections, see *Routine test selection inquiry and download* on page E-58 and *STAT sample test selection inquiry and download* on page E-58.

Test selection inquiry with a sequence number

This section shows an example of an HL7 test selection inquiry, when the sample is identified by sequence number.

```
DM:
MSH|^~\&|cobas 8000||host||20110720154106||TSREQ|563067||2.5||||ER||UNICODE UTF-8|
QPD|TSREQ|563067|^1031||50203|3||||S1|SC|R1|R
RCP|I|1|R

Host:
MSH|^~\&|host||c8000DM||20110715081133||OML^O33|227442||2.5||||ER||UNICODE UTF-8
PID|1|M820092K||Muller^Urs||19730416|F
SPM||^1031||S1||not||||P|||^^^|||20110715085411|||||||SC
SAC||||||50203|3
```

Figure E-42 Test selection inquiry with sample identified by sequence number

```
TQ1|1|||||||R
OBR|1|||8571^||||||A
TQ1|1|||||||R
OBR|2|||8413^||||||A
TQ1|1|||||||R
OBR|3|||8706^||||||A
```

Figure E-42 Test selection inquiry with sample identified by sequence number

Patient result upload messages

In the examples in this section the *data manager* uploads HL7 patient results.

Single patient result upload

This section shows an example of a single HL7 patient result upload.

Note that the result abnormal flag is blank as there is no reference range defined.

```
MSH|^~\&|cobas 8000||host||20101019101825||OUL^R22|13890||2.5||||ER||UNICODE UTF-8|
PID|1||||^|||
SPM||321042||S1||not||||P|||^^^|||20101019094904|||||||SC|
SAC|||||||50011|4|
OBR|1|||8685|
TQ1|1|||||||RI|
OBX|1||8685||47|U/L|^TECH~^NORM~^CRIT~^USER||||F|||20101019100810|bmserv^SYSTEM||75|c701^1^MU1#c701
#1#1^6|20101019101824|
TCD|8685|1|
SID|8685^^564957^R1^9^0|616478|924|
SID|8685^^564957^R3^9^0|616478|924|
NTE|1|I|0|I|
```

Figure E-43 Single patient result upload

Batch upload all previous results

This section show a batch upload of all previous results for a sample.

Note that the result abnormal flag is blank as there is no reference range defined.

```
MSH|^~\&|cobas 8000^1.02||host||20101020111635||OUL^R22|15593||2.5||||ER||UNICODE UTF-8|
PID|1|PatID1|||Smith^Alan||19451231|M|
SPM||321015||S1||not||||P|||C1^C2^C3^C4^C5|||20101019174209|||||||SC|
SAC|||||||50071|1|
OBR|1|||990|
TQ1|1|||||||RI|
OBX|1||990||0.91|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||F|||20101019174423|bmserv^SYSTEM||128|ISE^2^M
U1#ISE#1#2^4|20101019174439|
TCD|990|1|
NTE|1|I|23^ISE Sample range over|I|
OBR|2|||990|
TQ1|1|||||||RI|
OBX|2||990||0.70|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||C|||20101019174459|bmserv^SYSTEM||125|ISE^1^M
U1#ISE#1#1^3|20101019174515|
TCD|990|1|
NTE|1|I|23^ISE Sample range over|I|
```

Figure E-44 Batch upload all previous results

```

OBR|3|||990|
TQ1|1|||||||RI|
OBX|3||990||0.75|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||F|||20101020095735|bmserv^SYSTEM||125|ISE^1^M
U1#ISE#1#1^3|20101020095751|
TCD|990|1|
NTE|1|I|23^ISE Sample range over|I|
OBR|4|||990|
TQ1|1|||||||RI|
OBX|4||990||0.99|mmol/L|^TECH~^NORM~^CRIT~< 0^USER|||C|||20101020095905|bmserv^SYSTEM||128|ISE^2^M
U1#ISE#1#2^4|20101020095921|
TCD|990|1|
NTE|1|I|23^ISE Sample range over|I|
OBR|5|||991|
TQ1|1|||||||RI|
OBX|5||991||252.89|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||F|||20101019174347|bmserv^SYSTEM||126|ISE^1
^MU1#ISE#1#1^3|20101019174403|
TCD|991|1|
NTE|1|I|23^ISE Sample range over|I|
OBR|6|||991|
TQ1|1|||||||RI|
OBX|6||991||256.84|mmol/L|^TECH~^NORM~^CRIT~< 0^USER|||C|||20101019174423|bmserv^SYSTEM||129|ISE^2
^MU1#ISE#1#2^4|20101019174439|
TCD|991|1|
NTE|1|I|23^ISE Sample range over|I|
OBR|7|||991|
TQ1|1|||||||RI|
OBX|7||991||297.28|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||F|||20101020095735|bmserv^SYSTEM||126|ISE^1
^MU1#ISE#1#1^3|20101020095751|
TCD|991|1|
NTE|1|I|23^ISE Sample range over|I|
OBR|8|||991|
TQ1|1|||||||RI|
OBX|8||991||304.89|mmol/L|^TECH~^NORM~^CRIT~< 0^USER|||C|||20101020095905|bmserv^SYSTEM||129|ISE^2
^MU1#ISE#1#2^4|20101020095921|
TCD|991|1|
NTE|1|I|23^ISE Sample range over|I|
OBR|9|||8717|
TQ1|1|||||||RI|
OBX|9||8717||-0.04|mmol/L|^TECH~^NORM~^CRIT~^USER||||F|||20101019174533|bmserv^SYSTEM||77|c701^1^M
1#c701#1#1^6|20101019175547|
TCD|8717|1|
SID|8717^^568316^R1^30^0|616731|674|
SID|8717^^568316^R3^30^0|616731|674|
NTE|1|I|27^PANIC value over (lower) Technical Limit|I|
OBR|10|||8717|
TQ1|1|||||||RI|
OBX|10||8717||-0.02|mmol/L|^TECH~^NORM~^CRIT~^USER||||C|||20101019175614|bmserv^SYSTEM||77|c701^1^M
U1#c701#1#1^6|20101019180627|
TCD|8717|Inc|
SID|8717^^568316^R1^30^0|616731|674|
SID|8717^^568316^R3^30^0|616731|674|
NTE|1|I|27^PANIC value over (lower) Technical Limit|I|

```

Figure E-44 Batch upload all previous results

Batch upload all current results

This section shows a batch upload of all current results.

Note that the result abnormal flag is blank as there is no reference range defined.

```
MSH|^~\&|cobas 8000^1.02||host||20101020111632||OUL^R22|15591||2.5||||ER||UNICODE UTF-8|
PID|1||PatID1|||Smith^Alan||19451231|M|
SPM||321015||S1||not||||P|||C1^C2^C3^C4^C5|||20101019174209|||||||SC|
SAC|||||||50071|1|
OBR|1|||990|
TQ1|1|||||||RI|
OBX|1||990||0.99|mmol/L|^TECH~^NORM~^CRIT~< 0^USER|||C|||20101020095905|bmserv^SYSTEM||128|ISE^2^M
U1#ISE#1#2^4|20101020095921|
TCD|990|1|
NTE|1||I|23^ISE Sample range over|I|
OBR|2|||991|
TQ1|1|||||||RI|
OBX|2||991||304.89|mmol/L|^TECH~^NORM~^CRIT~< 0^USER|||C|||20101020095905|bmserv^SYSTEM||129|ISE^2
^MU1#ISE#1#2^4|20101020095921|
TCD|991|1|
NTE|1||I|23^ISE Sample range over|I|
OBR|3|||8717|
TQ1|1|||||||RI|
OBX|3||8717||-0.02|mmol/L|^TECH~^NORM~^CRIT~^USER|||C|||20101019175614|bmserv^SYSTEM||77|c701^1^MU
1#c701#1#1^6|20101019180627|
TCD|8717|Inc|
SID|8717^^568316^R1^30^0|616731|674|
SID|8717^^568316^R3^30^0|616731|674|
NTE|1||I|27^PANIC value over (lower) Technical Limit|I|
```

Figure E-45 Batch upload all current results.

Batch upload of current results sample short

This section shows an example of an HL7 batch upload of current results, saying that the measurement could not be done as the sample was short.

```
MSH|^~\&|cobas 8000||host||20101018174529||OUL^R22|12636||2.5||||ER||UNICODE UTF-8|
PID|1||||^|||||
SPM||321042||S1||not||||P|||^~^~|||20101006162241|||||||SC|
SAC|||||||50011|4|
OBR|1|||989|
TQ1|1|||||||RI|
OBX|1||989|||mmol/L|^TECH~^NORM~^CRIT~^USER|||C|||20101018173814|bmserv^SYSTEM||124|ISE^1^M
U1#ISE#1#1^3|20101018173829|
TCD|989|1|
NTE|1||I|3^Sample short|I|
OBR|2|||990|
TQ1|1|||||||RI|
OBX|2||990|||mmol/L|^TECH~^NORM~^CRIT~^USER|||C|||20101018173814|bmserv^SYSTEM||125|ISE^1^M
U1#ISE#1#1^3|20101018173829|
TCD|990|1|
NTE|1||I|3^Sample short|I|
```

Figure E-46 Batch upload of current results

```
OBR|3|||991|
TQ1|1|||||||RI|
OBX|3||991||      |mmol/L|^TECH~^NORM~^CRIT~^USER||||C|||20101018173814|bmserv^SYSTEM||126|ISE^1^M
U1#ISE#1#1^3|20101018173829|
TCD|991|1|
NTE|1|I|3^Sample short|I|
```

Figure E-46 Batch upload of current results

No result as sample short

This section shows an example of an HL7 result message, where the measurement could not be done as the sample was short.

```
MSH|^~\&|cobas 8000||host||20101018173833||OUL^R22|12624||2.5||||ER||UNICODE UTF-8|
PID|1|||||RI|
SPM||321042||S1||not||||P|||^^^|||20101006162241|||||||SC|
SAC|||||||50011|4|
OBR|1|||991|
TQ1|1|||||||RI|
OBX|1||991||      |mmol/L|^TECH~^NORM~^CRIT~^USER||||C|||20101018173814|bmserv^SYSTEM||126|ISE^1^M
U1#ISE#1#1^3|20101018173829|
TCD|991|1|
NTE|1|I|3^Sample short|I|
```

Figure E-47 No result as sample short

Result outside user range

This section shows an example of an HL7 patient result outside the user-defined reference range.

```
MSH|^~\&|cobas 8000||host||20101018192600||OUL^R22|13338||2.5||||ER||UNICODE UTF-8|
PID|1|||||RI|
SPM||321671||S1||not||||P|||^^^|||20101018191906|||||||SC|
SAC|||||||50054|5|
OBR|1|||991|
TQ1|1|||||||RI|
OBX|1||991||202.52|mmol/L|^TECH~^NORM~^CRIT~< 1^USER||||F|||20101018192542|bmserv^SYSTEM||126|ISE^1
^MU1#ISE#1#1^3|20101018192558|
TCD|991|1|
NTE|1|I|0|I|
```

Figure E-48 Result outside user range

Result outside normal range

This section shows an example of an HL7 result upload below the normal reference range.

```
MSH|^~\&|cobas 8000||host||20100609022505||OUL^R22|8277||2.5||||AL||UNICODE UTF-8|
PID|1|ES06516622121998|||Rister^Wolfgang||19330813|M|
SPM||123||S1||not||||P|||^^^|||20100604235148|||||||SC|
SAC|||||||50063|2|
```

Figure E-49 Result below normal reference range

```

OBR|1|||989|
TQ1|1|||||||RI|
OBX|1||989||2.1|mmol/L|^TECH~9 - 144^NORM~^CRIT~^USER|L|||F|||20100621084348|bmserv^SYSTEM| |28|ISE^
1^MU1#ISE#1#1^3|20100621084404|
TCD|989|1|
NTE|1|I|0|I|
TQ1|1|||||||RI|
OBX|2||991||1.1|mmol/L|^TECH~^NORM~^CRIT~^USER| |||F|||20100621084348|bmserv^SYSTEM| |28|ISE^1^MU1#IS
E#1#1^3|20100621084404|
TCD|991|1|
NTE|1|I|0|I|
OBR|3|||8717|
TQ1|1|||||||RI|
OBX|3||8717||14.57|mmol/L|^TECH~^NORM~^CRIT~^USER| |||F|||20100621085921|bmserv^SYSTEM| |168|c701^2^M
U1#c701#1#2^7|20100621090935|
TCD|8717|1|
NTE|1|I|0|I|

```

Figure E-49 Result below normal reference range

Result below level of detection

This section shows an example of an HL7 result upload below the EP-17A limit of detection. (LoD)

```

MSH|^~\&|cobas 8000||host||20100609022105||OUL^R22|8267||2.5||||AL||UNICODE UTF-8|
PID|1|ES06516622121998|||Rister^Wolfgang||19330813|M|
SPM||123||S1||not||||P|||^~^|||20100604235148|||||||SC|
SAC|||||||50063|2|
OBR|1|||989|
TQ1|1|||||||RI|
OBX|1||989||0.1|mmol/L|^TECH~12 - 144^NORM~^CRIT~^USER|LoD|||F|||20100621084348|bmserv^SYSTEM| |28|I
SE^1^MU1#ISE#1#1^3|20100621084404|
TCD|989|1|
NTE|1|I|0|I|
OBR|2|||991|
TQ1|1|||||||RI|
OBX|2||991||1.1|mmol/L|^TECH~^NORM~^CRIT~^USER| |||F|||20100621084348|bmserv^SYSTEM| |28|ISE^1^MU1#IS
E#1#1^3|20100621084404|
TCD|991|1|
NTE|1|I|0|I|
OBR|3|||8717|
TQ1|1|||||||RI|
OBX|3||8717||14.57|mmol/L|^TECH~^NORM~^CRIT~^USER| |||F|||20100621085921|bmserv^SYSTEM| |168|c701^2^M
U1#c701#1#2^7|20100621090935|
TCD|8717|1|
NTE|1|I|0|I|

```

Figure E-50 HL7 results upload below level of detection

Quality control result upload messages

In the examples in this section shows the *data manager* uploads HL7 quality control results.

Batch QC from C-module

This section shows an example of a batch HL7 quality control result from a C-module.

```
MSH|^~\&|cobas 8000||host||20111119123938||OUL^R22^BATCH|14250||2.5||||ER||UNICODE UTF-8|
PID|1|
SPM||PNU^150403^2^20111121||S1||not||||Q|||^~^|||||||||||SC|
SAC|||||||30005|1|
OBR||||8717^|
TQ1|||||||RI|
OBX||1||8717||4.30|mmol/L|4.5^TARGET~0.5^SD||||F|||20111119111900|bmserv^SYSTEM| |77|c701^1^MU1#c701#
1#1^6^Current|20111119112915|
TCD|8717|1|
SID|8717^^568316^R1^30^0|616731|674|
SID|8717^^568316^R3^30^0|616731|674|
NTE|1|I|0|I|
```

Figure E-51 Batch QC from C-module

Batch QC from C-module standby bottle

This section shows an example of a batch HL7 quality control result from a C-module from a standby bottle.

```
MSH|^~\&|cobas 8000||host||20111119123853||OUL^R22^BATCH|14249||2.5||||ER||UNICODE UTF-8|
PID|1|
SPM||PNU^150403^2^20111121||S1||not||||Q|||^~^|||||||||||SC|
SAC|||||||30005|1|
OBR||||8685^|
TQ1|||||||RI|
OBX||1||8685||48|U/L|50^TARGET~3^SD||||F|||20111119111857|bmserv^SYSTEM| |76|c701^1^MU1#c701#1#1^6^St
andby^1|20111119112911|
TCD|8685|1|
SID|8685^^564957^R1^31^0|616478|923|
SID|8685^^564957^R3^31^0|616478|923|
NTE|1|I|0|I|
```

Figure E-52 Batch QC from C-module standby bottle

Realtime QC from C-module

This section shows an example of a realtime HL7 quality control result from a C-module.

```
MSH|^~\&|cobas 8000||host||20111119112926||OUL^R22^REAL|14109||2.5||||ER||UNICODE UTF-8|
PID|1|
SPM||PPU^150415^3^20111121||S1||not||||Q|||^~~~|||||||||||SC|
SAC|||||||30005|2|
OBR|1|||8717^|
TQ1|1|||||||RI|
OBX|1||8717||12.44|mmol/L|12^TARGET~1^SD||||F|||20111119111911|bmserv^SYSTEM||77|c701^1^MU1#c701#1#
1^6^Current|20111119112926|
TCD|8717|1|
SID|8717^^568316^R1^30^0|616731|674|
SID|8717^^568316^R3^30^0|616731|674|
NTE|1|I|0|I|
```

Figure E-53 Realtime QC from C-module

Realtime QC from C-module standby bottle

This section shows an example of a realtime HL7 quality control result from a C-module from a standby bottle.

```
MSH|^~\&|cobas 8000||host||20111119112922||OUL^R22^REAL|14105||2.5||||ER||UNICODE UTF-8|
PID|1|
SPM||PPU^150415^3^20111121||S1||not||||Q|||^~~~|||||||||||SC|
SAC|||||||30005|2|
OBR|1|||8685^|
TQ1|1|||||||RI|
OBX|1||8685||121|U/L|127^TARGET~3^SD||||F|||20111119111907|bmserv^SYSTEM||76|c701^1^MU1#c701#1#1^6^
Standby^1|20111119112922|
TCD|8685|1|
SID|8685^^564957^R1^31^0|616478|923|
SID|8685^^564957^R3^31^0|616478|923|
NTE|1|I|0|I|
```

Figure E-54 Realtime QC from C-module standby bottle

QC results from E-module

This section shows examples of HL7 quality control results from an E-module.

```
MSH|^~\&|cobas 8000||host||20111119123353||OUL^R22^REAL|14226||2.5||||ER||UNICODE UTF-8|
PID|1|
SPM||PC_U1 ^156227^156227^4^20111121||S1||not||||Q|||^~~~|||||||||||SC|
SAC|||||||30001|1|
OBR|1|||1^|
TQ1|1|||||||RI|
OBX|1||1||1.45|mIU/L|1.5^TARGET^0.15^SD||||F|||20111119121523|bmserv^SYSTEM||0|e602^1^MU1#e602#2#1^
9^Current|20111119123353|
TCD|1|1|
SID|1^^1^ASY^18^0|157328|62769|
NTE|1|I|0|I|
```

Figure E-55 QC result from an E-module

```

MSH|^~\&|cobas 8000||host||20111119123413||OUL^R22^REAL|14231||2.5||||ER||UNICODE UTF-8|
PID|1|
SPM||PC_U1 ^156227^4^20111121||S1||not||||Q|||^~^~||||||||||SC|
SAC||||||30001|1|
OBR||||1^|
TQ1|1||||||R1|
OBX||1||1||1.45|mIU/L|1.5^TARGET^0.15^SD||||F|||20111119121544|bmserv^SYSTEM||0|e602^2^MU1#e602#2#2^
10^Current|20111119123413|
TCD|1|1|
SID|1^^1^ASY^18^0|157328|62769|
NTE|1|I|0|I|

```

Figure E-56 QC result from an E-module

Calibration result upload messages

In the examples in this section the *data manager* uploads HL7 calibration results.

C-module calibration results

This section shows examples of an HL7 calibration results from a C-module.

```

MSH|^~\&|cobas 8000||host||20111119091421||OUL^R22^PCUPL|14262||2.5||||ER||UNICODE UTF-8|
SPM||1^999999^901^1^20111121|||||||C^P|
OBR||||8685|
OBX||1||8685||0^3&4&22851&2&22866&|||0|||F|||bmserv||75|c701^1^MU1#c701#1#1^6^Current|2011111909142
1|
SID|8685^^^^2^1|231478|5|
SPM||2^153314^401^1^20111201|||||||C^P|
OBR|2|||8685|
OBX|2||8685||0^-362&-361&24786&-362&24149&|||0|||F|||bmserv||75|c701^1^MU1#c701#1#1^6^Current|2011
1119091421|
SID|8685^^^^3^1|231480|9|

```

Figure E-57 C-module calibration result

```

MSH|^~\&|cobas 8000||host||20111119091432||OUL^R22^PCUPL|14264||2.5||||ER||UNICODE UTF-8|
SPM||1^999999^901^1^20111121|||||||C^P|
OBR||||8717|
OBX||1||8717||0^36&31&956&40&962&|||0|||F|||bmserv||77|c701^1^MU1#c701#1#1^6^Current|20111119091432
|
SID|8717^^^^2^1|231478|5|
SPM||2^153314^401^1^20111121|||||||C^P|
OBR|2|||8717|
OBX|2||8717||0^6832&6814&8100&6849&8147&|||0|||F|||bmserv||77|c701^1^MU1#c701#1#1^6^Current|201111
19091432|
SID|8717^^^^3^1|231480|9|

```

Figure E-58 C-module calibration result

ISE-module calibration results

This section shows examples of an HL7 calibration results from an ISE-module.

```
MSH|^~\&|cobas 8000||host||20101020110002||OUL^R22^ICUPL|14265||2.5||||ER||UNICODE UTF-8|
SPM|||||||C^I|
OBR|1|||989|
OBX|1||989||Type-A^0&0&0&0&0&0&0^--33.0&-37.9&-30.4&-33.2&60.0&144.59&143.56&0.0&60.2&-
0.56|||Valid|||F||||bmserv||130|ISE^1^MU1#ISE#1#1^3|20101020110002|
SID||
SPM|||||||C^I|
OBR|2|||990|
OBX|2||990||Type-A^0&0&0&0&0&0&0^--34.9&-48.9&-27.3&-37.8&58.7&5.19&4.64&0.0&59.1&-0.05|||Vali-
d|||F||||bmserv||131|ISE^1^MU1#ISE#1#1^3|20101020110002|
SID||
SPM|||||||C^I|
OBR|3|||991|
OBX|3||991||Type-A^0&0&0&0&0&0&0^137.3&141.6&132.8&136.8&-50.0&97.42&99.75&0.0&-
50.3&1.25|||Valid|||F||||bmserv||132|ISE^1^MU1#ISE#1#1^3|20101020110002|
SID||
```

Figure E-59 ISE-module calibration result

```
MSH|^~\&|cobas 8000||host||20101020110008||OUL^R22^ICUPL|14266||2.5||||ER||UNICODE UTF-8|
SPM|||||||C^I|
OBR|1|||989|
OBX|1||989||Type-A^0&0&0&0&0&0&0^--37.9&-42.6&-35.3&-38.0&58.4&144.15&143.45&0.0&59.4&-
0.45|||Valid|||F||||bmserv||133|ISE^2^MU1#ISE#1#2^4|20101020110008|
SID||
SPM|||||||C^I|
OBR|2|||990|
OBX|2||990||Type-A^0&0&0&0&0&0&0^--38.7&-51.9&-31.2&-41.3&56.3&5.15&4.63&0.0&57.3&-
0.04|||Valid|||F||||bmserv||134|ISE^2^MU1#ISE#1#2^4|20101020110008|
SID||
SPM|||||||C^I|
OBR|3|||991|
OBX|3||991||Type-A^0&0&0&0&0&0&0^131.3&134.6&126.2&130.1&-47.7&93.93&99.57&0.0&-
48.3&1.43|||Valid|||F||||bmserv||135|ISE^2^MU1#ISE#1#2^4|20101020110008|
SID||
```

Figure E-60 ISE-module calibration result

E-module calibration results

This section shows examples of an HL7 calibration results from an E-module.

```
MSH|^~\&|cobas 8000||host||20111118175819||OUL^R22^ECUPL|14267||2.5||||ER||UNICODE UTF-8|
SPM||2^158941^1^None^20111119||||||C^E|
OBR|1|||1|
OBX|1||1||Valid^false^false^false^1.074^false^^false^false^39609.680&39716.950^^^^^|||LotCalibration||F||||bmsserv||25|e602^1^MU1#e602#2#1^9^Current|20111118175819|
SID|1^^^ASY^18^0|157328|5|
SPM||1^158941^1^None^20111119||||||C^E|
OBR|2|||1|
OBX|2||1||Valid^false^false^false^1.074^false^^false^false^936.337&888.767^^^^^|||LotCalibration||F||||bmsserv||25|e602^1^MU1#e602#2#1^9^Current|20111118175819|
SID|1^^^ASY^18^0|157328|5|
```

Figure E-61 E-module calibration result

```
MSH|^~\&|cobas 8000||host||20111118175844||OUL^R22^ECUPL|14268||2.5||||ER||UNICODE UTF-8|
SPM||2^158941^1^None^20111119||||||C^E|
OBR|1|||1|
OBX|1||1||Valid^false^false^false^1.064^false^^false^false^38293.490&38596.120^^^^^|||LotCalibration||F||||bmsserv||26|e602^2^MU1#e602#2#2^10^Current|20111118175844|
SID|1^^^ASY^18^0|157328|5|
SPM||1^158941^1^None^20111119||||||C^E|
OBR|2|||1|
OBX|2||1||Valid^false^false^false^1.064^false^^false^false^839.413&797.173^^^^^|||LotCalibration||F||||bmsserv||26|e602^2^MU1#e602#2#2^10^Current|20111118175844|
SID|1^^^ASY^18^0|157328|5|
```

Figure E-62 E-module calibration result

Masking messages

In the examples in this section the host sends masking messages.

Successful masking message

In this section the host sends a masking command, and the *data manager* replies with an Accept acknowledgement message.

```
Host:
MSH|^~\&|host||cobas 8000||20101007113655||EAC^U07|13010||2.5||||AL||UNICODE UTF-8|
EQU|1|20101007113600|
ECD|1234|LK||989^P^MU1#ISE#1#1^ALL|


DM:
MSH|^~\&|cobas 8000||host||20101007113946||ACK|19922||2.5||||NE||UNICODE UTF-8|
MSA|AA|13010||
```

Figure E-63 Successful masking message

Unsuccessful masking message

In this section the host sends a masking command, but the module does not exist.

```
Host:
MSH|^~\&|host||cobas 8000||20101007113655||EAC^U07|13011||2.5||||AL||UNICODE UTF-8|
EQU|1||20101007113600|
ECD|1234|LK|||989^P^module_X^ALL|


DM:
MSH|^~\&|cobas 8000||host||20101007125554||ACK|19987||2.5||||NE||UNICODE UTF-8|
MSA|AE|13011|Submodule (module_X) not found|
```

Figure E-64 A masking message that failed as module_X did not exist

Result requests from the host

In the examples in this section the host sends result requests.

Request for all results

In this section the host sends a request for all results for a sample.

```
Host:
MSH|^~\&|host||cobas 8000||20100430105126||RSREQ|13007||2.5||||NE||UNICODE UTF-8|
QPD|RSREQ||321015||


DM:
MSH|^~\&|cobas 8000||host||20101020084603||OUL^R22^BATCH|15042||2.5||||ER||UNICODE UTF-8|
PID|1|PatID1|||Smith^Alan||19451231|M|
SPM||321015||S1||not||||P|||C1^C2^C3^C4^C5|||20101019174209|||||||||SC|
SAC|||||||50071|1|
OBR|||||990|
TQ1|||||||RI|
OBX|1||990||0.91|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||F|||20101019174423|bmserv^SYSTEM||128|ISE^2^M
U1#ISE#1#2^4|20101019174439|
TCD|990|1|
NTE|1||I|23^ISE Sample range over|I|
OBR|2|||990|
TQ1|||||||RI|
OBX|2||990||0.70|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||C|||20101019174459|bmserv^SYSTEM||125|ISE^1^M
U1#ISE#1#1^3|20101019174515|
TCD|990|1|
NTE|1||I|23^ISE Sample range over|I|
OBR|3|||991|
TQ1|||||||RI|
OBX|3||991||252.89|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||F|||20101019174347|bmserv^SYSTEM||126|ISE^1
^MU1#ISE#1#1^3|20101019174403|
TCD|991|1|
NTE|1||I|23^ISE Sample range over|I|
OBR|4|||991|
TQ1|||||||RI|
OBX|4||991||256.84|mmol/L|^TECH~^NORM~^CRIT~< 0^USER||||C|||20101019174423|bmserv^SYSTEM||129|ISE^2
^MU1#ISE#1#2^4|20101019174439|
TCD|991|1|
NTE|1||I|23^ISE Sample range over|I|
```

Figure E-65 Result query for all results for a sample and the result upload

```
OBR|5|||8717|
TQ1|1|||||||RI|
OBX|5||8717||-0.04|mmol/L|^TECH~^NORM~^CRIT~^USER||||F|||20101019174533|bmserv^SYSTEM||77|c701^1^MU
1#c701#1#1^6|20101019175547|
TCD|8717|1|
SID|8717^^568316^R1^30^0|616731|674|
SID|8717^^568316^R3^30^0|616731|674|
NTE|1|I|27^PANIC value over (lower) Technical Limit|I|
OBR|6|||8717|
TQ1|1|||||||RI|
OBX|6||8717||-0.02|mmol/L|^TECH~^NORM~^CRIT~^USER||||C|||20101019175614|bmserv^SYSTEM||77|c701^1^MU
1#c701#1#1^6|20101019180627|
TCD|8717|Inc|
SID|8717^^568316^R1^30^0|616731|674|
SID|8717^^568316^R3^30^0|616731|674|
NTE|1|I|27^PANIC value over (lower) Technical Limit|I|
```

Figure E-65 Result query for all results for a sample and the result upload

Request for active results

In this section the host sends a request for active results for a sample.

```
Host:
MSH|^~\&|host||cobas 8000||20100430105126||RSREQ|13007||2.5||||NE||UNICODE UTF-8|
QPD|RSREQ||321015|F|
```

DM:

```
MSH|^~\&|cobas 8000||host||20101020084713||OUL^R22^BATCH|15045||2.5||||ER||UNICODE UTF-8|
PID|1|PatID1|||Smith^Alan||19451231|M|
SPM||321015||S1||not||||P|||C1^C2^C3^C4^C5|||20101019174209||||||||SC|
SAC||||||||50071|1|
OBR|1|||8717|
TQ1|1|||||||RI|
OBX|1||8717||-
0.02|mmol/L|^TECH~^NORM~^CRIT~^USER||||C|||20101019175614|bmserv^SYSTEM||77|c701^1^MU1#c701#1#1^6|2
0101019180627|
TCD|8717|Inc|
SID|8717^^568316^R1^30^0|616731|674|
SID|8717^^568316^R3^30^0|616731|674|
NTE|1|I|27^PANIC value over (lower) Technical Limit|I|
```

Figure E-66 Request for active results for a sample

No results found

In this section the host sends a request for active results for a sample, but the *data manager* cannot find any results.

```
Host:
MSH|^~\&|host||cobas 8000||20100430105126||RSREQ|13007||2.5||||NE||UNICODE UTF-8|
QPD|RSREQ||321016|F|
```

DM:

```
<No Reply>
```

Figure E-67 Result request, but no results found

Sample not found

In this section the host sends a request for active results for a sample, but the *data manager* cannot find any record of the sample.

```
Host:
MSH|^~\&|host||cobas 8000||20100430105126||RSREQ|13007||2.5||||NE||UNICODE UTF-8|
QPD|RSREQ||NOT_FOUND|F|


DM:
<No reply>
```

Figure E-68 Result request, but sample not found

Result request with a sequence number

In this section the host sends a request for results for a sample with sequence number 1031.

```
Host:
MSH|^~\&|host||cobas 8000||20100430105126||RSREQ|13007||2.5||||NE||UNICODE UTF-8|
QPD|RSREQ||^1031||


DM:
MSH|^~\&|cobas 8000||host||20110712133259||OUL^R22^BATCH|564847||2.5||||NE||UNICODE UTF-8|
PID|1|M820092K|||Muller^Urs||19730416|F|
SPM||^1031||S1||not||||P|||^~^~|||20110711085411|||||||SC|
SAC|||||||50203|3|
OBR|1|||8413|
TQ1|1|||||||R|
OBX|1||8413||19|g/dL|^TECH~^NORM~^CRIT~^USER||||F|||20111212104600|bmserv^SYSTEM||193|c702^2^MU1#c7
02#1#2^7|20111212104600|
TCD|8413|1|
SID|8413^^784648^R1^2^0|231478|5|
SID|8413^^784648^R3^2^0|231478|5|
NTE|1|I|0|I|
OBR|2|||8571|
TQ1|1|||||||R|
OBX|2||8571||21|U/L|^TECH~^NORM~^CRIT~^USER||||F|||20111212104600|bmserv^SYSTEM||193|c702^2^MU1#c70
2#1#2^7|20111212104600|
TCD|8571|1|
SID|8571^^784648^R1^2^0|231478|5|
SID|8571^^784648^R3^2^0|231478|5|
NTE|1|I|0|I|
OBR|3|||8706|
TQ1|1|||||||R|
OBX|3||8706||23|mmol/L|^TECH~^NORM~^CRIT~^USER||||F|||20111212104600|bmserv^SYSTEM||193|c702^2^MU1#
c702#1#2^7|20111212104600|
TCD|8706|1|
SID|8706^^784648^R1^2^0|231478|5|
SID|8706^^784648^R3^2^0|231478|5|
NTE|1|I|0|I|
```

Figure E-69 Result request with a sequence number

Order requests from the host

In the examples in this section the host sends order requests.

Request for all tests

In this section the host sends a request for all tests for a sample.

```
Host:
MSH|^~\&|host||cobas 8000||20100825132805||TSREQ|10001||2.5||||NE||UNICODE UTF-8|
QPD|TSREQ||321015||||||S1|
RCP|I|1|R|


DM:
MSH|^~\&|cobas 8000||host|||OML^O33|15023||2.5|||ER||UNICODE UTF-8|
SPM||321015||S1||||||C1^C2^C3^C4^C5|
OBR||||990|
OBR||||991|
OBR||||8717|
```

Figure E-70 Request for all tests

Request for open tests

In this section the host sends a request for open tests for a sample.

```
Host:
MSH|^~\&|host||cobas 8000||20100825132805||TSREQ|10001||2.5||||NE||UNICODE UTF-8|
QPD|TSREQ||321015|O|||||S1|
RCP|I|1|R|


DM:
MSH|^~\&|cobas 8000||host|||OML^O33|15021||2.5|||ER||UNICODE UTF-8|
SPM||321015||S1||||||C1^C2^C3^C4^C5|
OBR||||990|
OBR||||991|
```

Figure E-71 Request for open tests

No tests found

In this section the host sends a request for open tests for a sample, but the *data manager* does not find any tests.

```
Host:
MSH|^~\&|host||cobas 8000||20100825132805||TSREQ|10001||2.5||||NE||UNICODE UTF-8|
QPD|TSREQ||321016|O|||||S1|
RCP|I|1|R|


DM:
MSH|^~\&|cobas 8000||host|||OML^O33|15025||2.5|||ER||UNICODE UTF-8|
SPM||321016||S1|||||||^^^^|
```

Figure E-72 Request for open tests, but no tests found

Sample not found

In this section the host sends a request for open tests for a sample, but the *data manager* does not find the sample.

```
Host:  
MSH|^~\&|host||cobas 8000^1.02||20100825132805||TSREQ|10001||2.5||||NE||UNICODE UTF-8|  
QPD|TSREQ||NOT_EXISTING||||||S1|  
RCP|I|1|R|  
  
DM:  
MSH|^~\&|cobas 8000^1.02||host|||OML^O33|15028||2.5||||ER||UNICODE UTF-8|  
SPM||NOT_EXISTING||S1|||||||||^_____|
```

Figure E-73 Request for open tests, but sample not found

Order request with a sequence number

In this section the host sends an order request for a sample with sequence number 1031.

```
Host:  
MSH|^~\&|host||cobas 8000||20110711122805||TSREQ|10001||2.5||||NE||UNICODE UTF-8|  
QPD|TSREQ||^1031||||||S1|  
RCP|I|1|R|  
  
DM:  
MSH|^~\&|cobas 8000||host|||OML^O33|564825||2.5||||NE||UNICODE UTF-8|  
SPM||^1031||S1|||||||||^_____|  
OBR||||8413^1|  
OBR||||8571^1|  
OBR||||8706^1|
```

Figure E-74 Order request with a sequence number

Preparing the host communication

Important preliminary information for the preparation of the host communication

This chapter explains the differences in functionality as regards the host communication protocol between Modular / cobas® 6000 and cobas® 8000 data manager.

In this chapter

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Differences to the MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series

This section describes the main differences in the ASTM protocols used with cobas® 8000 data manager and MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series.

General differences in the ASTM protocol

This section describes the general differences in functionality between the MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series and the cobas® 8000 data manager.

Message encoding and transport



Extended ASCII is converted to UTF-8

Extended ASCII values 128 to 255 were supported in MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series. However cobas® 8000 data manager uses UTF-8. You need to use a conversion mechanism to convert extended ASCII value to UTF-8.

Item	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
Character encoding	Not specified / Only ASCII can be truly supported due to possible 7-bit data transfer option	UTF-8. That means characters up to 127 are compatible with ASCII 8- bit data transfer used.	
ASTM Message Type(s)	ASTM E1381 (low level), ASTM E1394 (message)	ASTM E1381 (low level), ASTM E1394 (message)	
HL7 Messaging	Not supported	Minimal Layer Protocol HL7 2.5	Extended
RS232	Variable settings, editable from graphical user interface	Fixed to 19200, 8 N 1 (could be changed by configuration file)	
Network	Not supported	TCP/IP socket client (could be changed by configuration files)	Extended

Sample identification

Item	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
Sample number mode^(a)	Yes (Only for Batch Download with Sample Barcode Reader = OFF)	Sequential sample numbering available from 1.02.03 for patient samples.	Similar functionality. See Chapter 14 <i>Identifying patient samples by sequence number</i>
Barcode label	Yes	Yes	
Rack & Sample Position	Yes	Yes	

(a) No real sample identification

Sample types

The sample types (or Rack Types) are used in Query Record and Order Record (Specimen Types). While all these types are supported by the cobas® 8000 data manager, their availability on any particular system also depends on the configuration and modules installed on the cobas® 8000 instrument.

Item	Rack Type	Specimen Type	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
No specimen assigned	S0		Yes	Yes	
Serum/Plasma	S1	1	Yes	Yes	
Urine	S2	2	Yes	Yes	
Cerebrospinal Fluid	S3	3	Yes	Yes	
Supernatant	S4	4	Yes	Yes	
Other	S5	5	Yes	Yes	
Whole Blood	S6	6	No	Yes	Extended
Oral Fluids (Saliva)	S7	7	No	Yes	Extended
Other 2	S8	8	No	Yes	Extended
Other 3	S9	9	No	Yes	Extended
Other 4	SA	A	No	Yes	Extended

Patient demographics

Item	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
First Name	Comment Record after Order Record	Patient Record	See, more Details below
Last Name	Comment Record after Order Record	Patient Record	See, more Details below
Date of Birth	Comment Record after Order Record	Patient Record	See, more Details below
Patient's age	Patient Record	No (coded in Date of Birth)	See, more Details below
Patient's age unit	Patient Record	No (coded in Date of Birth)	See, more Details below

ASTM message types

Item	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Direction	Comment
Inquiry for the Requested Tests	TSREQ^REAL	TSREQ	<i>data manager</i> to host	Reduced
Result Report (realtime)	RSUPL^REAL	RSUPL	<i>data manager</i> to host	Reduced
Result Report (batch)	RSUPL^BATCH	RSUPL	<i>data manager</i> to host	Reduced
Result Report (quality control: for first upload of results)	RSUPL^REAL	RSUPL^REAL	<i>data manager</i> to host	(Unchanged for QC results)
Result Report (quality control: when repeating uploads of results previously sent)	RSUPL^BATCH	RSUPL^BATCH	<i>data manager</i> to host	(Unchanged for QC results)
Result Report (query)	RSUPL^REPLY	RSUPL	analyzer to host	Reduced
Photometry Calibration Result Report	PCUPL^REAL	PCUPL^REAL	to host	Reduced
ISE Calibration Result Report	ICPUL^REAL	ICPUL^REAL	to host	Reduced
Calibration Result Report from Immunology Modules	ECUPL^REAL	ECUPL^REAL	to host	Reduced
Photometric Raw Data Report	ABUPL^BATCH	n/a	to host	Reduced
Raw Data Report from Immunology Modules	EBUPL^BATCH	n/a	to host	Reduced
Test Selection Download (answer to inquiry)	TSDWN^REPLY	TSDWN	host to <i>data manager</i>	Reduced
Test Selection Download (unsolicited)	TSDWN^BATCH	TSDWN	host to <i>data manager</i>	Reduced
Inquiry of Result	RSREQ^BATCH	RSREQ	host to instrument	Reduced
Inquiry for Requested Test	n/a	TSREQ	host to <i>data manager</i>	Enhanced

HL7 message types

Item	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
Inquiry for the Requested Tests	NO	TSREQ	Extended
Result Report (realtime)	NO	OUL^R22	Extended
Result Report (batch)	NO	OUL^R22	Extended
Quality Control Result Report (realtime)	NO	OUL^R22^REAL	Extended
Quality Control Result Report (batch)	NO	OUL^R22^BATCH	Extended
Test Selection Download (inquiry)	NO	OML^O33	Extended
Test Selection Download (inquiry)	NO	OML^O33	Extended
Photometric Calibration Result	NO	OUL^R22^PCUPL	Extended
ISE Calibration Result	NO	OUL^R22^ICUPL	Extended
Immunology Calibration Result	NO	OUL^R22^ECUPL	Extended
Masking command	NO	EAC^U07	Extended

Differences in ASTM message definitions

This section describes the differences in the ASTM messages used by the **MODULAR ANALYTICS EVO** analyzer / **cobas® 6000** analyzer series and the **cobas® 8000** data manager.

General differences in the ASTM messages

ASTM message records in **cobas® 8000** are terminated by a vertical bar, but in **MODULAR ANALYTICS EVO** analyzer / **cobas® 6000** analyzer series the vertical bar is omitted.

Message Header Record

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
3	Control ID	NO	YES	Extended
5	<i>data manager</i> to host: Sender ID	As specified at host setting screen	Editable in Interface options , default cobas® 8000 ^1	
10	<i>data manager</i> to host: Receiver ID	As specified at host setting screen	Fixed to host	
11	Comment or special instruction	See ASTM Msg. Types	See ASTM Msg. Types	See above
14	Date/Time of message	No	Yes, YYYYMMDDhhmmss	Extended

Message Termination Record

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
3	Termination Code	N, T, R, E, Q, I, T	N	Reduced

Patient Record

The cobas® 8000 data manager supports no patient age information, but uses the patient's day of birth instead.

 For more information, see *Patient demographics* on page E-93.

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
6, C1,C2	Patientname	NO	Name^firstname	Other location
8	Date of Birth	NO	YYYYMMDD	Other data and location
15 C1,C2	Special Field 1	Age^Age Unit	NO	Other data and location



The data manager supports only M, F, or U for patient sex.

For male patients, the host must send M, for females, F. Otherwise the wrong reference range might be applied. The *data manager* reads any other value as U, and applies the reference ranges for a patient of unknown sex.

Make sure the host sends only M, F, or U, as required. Each new configuration must be tested to ensure the correct data transfer between the *data manager* and the host.

Order Record

The cobas® 8000 data manager supports:

- application codes (or testcodes) 1 to 5 characters long, as opposed to MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series which only supported up to 3 characters.
- rack types S1 to S9 + SA, but MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series only supports S1 to S5
- dilution factors changed, and no dilution shown by 1, not by an empty component.
- Action code "R" for reruns: "A" however can also be used for ordering reruns.
- The host may download testcodes for calculated tests, so long as the calculated tests are programmed on the *data manager*. For details, see the cobas® 8000 modular analyzer series *Operator's Manual*.

Also, cobas® 8000 data manager requires no padding with spaces for the sample ID.

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
3	Sample ID for controls	Control-SID: Name or Lotnumber (Selectable at Host Information Screen)	Name^LotNr^Control-ID (if no sample ID)	Extended, Upload
4,C2	Rack ID	4 digits	5 digits	Extended
4,C5	Rack Type	S1-S5,QC	S1-SA,QC	Extended
4,C7	Diluted	Not used	not, pre-diluted, no value	Extended

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
5,C5	Universal Test ID, Dilution	Photometry: Inc,Dec,3,5,10,20,50, 100,empty	ISE module: • 1 Clinical chemistry module: • 1, Inc, Dec Immunology module: • 1, 2, 5, 10, 20, 50, 100, 400	Reduced. Also, the value 1 is now sent for "No dilution". When sent from the host (TS download), in case of no pending test on the host side this field has to be empty
7	Requested/ Ordered Date and Time	Not used	Yes, YYYYMMDDhhmmss	Extended
12	Action Code	By host: • A=Add, • C=Cancel	By host: • A=Add or rerun. • C=Cancel, • R=Add or rerun	Extended
16	Specimen Descriptor	1,2,3,4,5	1,2,3,4,5,6,7,8,9, A (According to Racktype)	Extended
23	Date/Time Results reported	Yes	No	Reduced for Result upload

Result Record

The cobas® 8000 data manager identifier is different to the **MODULAR ANALYTICS EVO** analyzer / **cobas® 6000** analyzer series identifier. The **cobas® 8000** data manager consists of a configurable analytical unit ID, the module name and the internal number as registered in *data manager*. (Field R-14)

The **cobas® 8000** data manager writes the instrument operator username and (when pass-through mode is off) the *data manager* operator username into two components of field 11.

The **cobas® 8000** data manager can also indicate a manually edited result in field 9.

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
3,C5	Universal Test ID	Dilution Factor for Photometry: Inc,Dec,3,5,10,20,50, 100	For an ISE module, : • 1 For a clinical chemistry module: • 1, Inc, Dec For an immunology module, 1, 2, 5, 10, 20, 50, 100, 400	The value 1 is now sent for "No dilution".
4,C1	Measurement value	Qualitative Value	ReportableResult	Change
			For quantitative results, this is a number, up to 6 digits. In case of a missing result this field contains six spaces (ASCII 32 / 0x20).	
			For qualitative results, this contains an integer code from -2 to 3 inclusive.	
4,C2	Measurement value	Quantitative Value	AdditionalResultValues	Change
			For quantitative results, this is empty or contains a qualitative flag.	
			For qualitative results, this contains the quantitative result	
6	Reference ranges	No	Reference ranges	Extended
7	Result abnormal flags	A=Abnormal	A=Alphanumeric out of normal range AA=Alphanumeric out of critical range EP-17 flags also supported	Extended
9	Result status	F=First Run, C=Corrective	F =First Run, C =Corrected, M =Manually edited X = Calculated test, but test could not be calculated (for example, divided by zero)	Extended
11	Operator Identification	Operator at Analyzer	Operator at Analyzer^ Operator at <i>data manager</i>	Extended

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
13	Date/Time Test completed	No	Yes	Extended
14	Measurement unit ID (Module or Instrument ID)	P1,P2,P3,P4,ISE1,ISE 2,Exy	<i>ModuleType^SubModule^AnalyticalUnitID^InstrumentID^CalID^Bottle^SBNo</i> <i>Bottle^SBNo</i> used only for QC. ModuleTypes: c502, c701, e602, c702, ISE, DM, c8000	Extended

Comment Record (following an Order Record)

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
3	Comment Source	“I” by Analyzer, “L” by Host	“I” by Analyzer, “L” by Host or <i>data manager</i>	

Comment Record (following a Result Record)

A *data manager* user can enter multiple comments for each result. This was not possible for the MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series.

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
3	Comment source	"I" by Analyzer	"I" by Analyzer, "L" by <i>data manager</i>	Extended
4	Comment Text, if type I	Flagnumber	Flagnumber^Description	Extended
5	Comment Type, if type G	No	Text^User^Date	Extended

Query Record

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
3, C5	Rack ID	4 Digits	5 Digits	Extended
3, C8	Rack Type	S0, S1, ... S5	S0, S1, ... S5, S6, ... S9, SA	Extended
12	User Field 2	No	Priority: <ul style="list-style-type: none">• R = Routine• S = STAT	Extended
13	Request Information Status Code	<ul style="list-style-type: none"> • A=Rejects previous req. • O=Request for Test Request • F=Final Result 	<ul style="list-style-type: none"> • O=Request for Test Request • F=Final Result 	Reduced

Photometric Calibration Result Record

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
6	Analytical Unit ID	P1,P2,P3,P4,ISE1,ISE2,Exy	AnalyticalUnitID, Instrument# ModuleType# Position# SubModule For example;; MU1#e602#1#1	Extended default: Fully safely editable.
9, C6	Prozone value	Sent	Not sent	Reduced
10	Reagent lot number	1 to 99999999	Not sent	Reduced

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
11	Reagent bottle number	1 to 19999	Not sent	Reduced
12	Expired flag	0 or 1	Not sent	Reduced
13	Calibrator lot number	1 to 99999999	Not sent	Reduced
14	Pipetting date and time	YYYYMMDDHHM MSS	Not sent	Reduced

ISE Calibration Result Record

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
5	Analytical Unit ID	P1,P2,P3,P4,ISE1,ISE 2,Exy	AnalyticalUnitID, default: <i>Instrument#</i> <i>ModuleType#</i> <i>Position#</i> <i>SubModule</i> For example; MU1#e602#1#1 Fully editable.	Extended
9,C7	Na Data alarms	Component 7 contains: Numbers for compensation alarm	Component 7 contains: Carryover rate alarm (Numbers for compensation alarm passed in Component 10.)	Extended
9,C8	Calculation slope value alarm	Not supported	Supported	Extended
9,C10	Numbers for compensation alarm	Passed in Component 7	Passed in Component 10	
10,C7	K Data alarms	Component 7 contains: Numbers for compensation alarm	Component 7 contains: Carryover rate alarm (Numbers for compensation alarm passed in Component 10.)	Extended
10,C8	Calculation slope value alarm	Not supported	Supported	Extended
10,C10	Numbers for compensation alarm	Passed in Component 7	Passed in Component 10	

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
11,C7	Cl Data alarms	Component 7 contains: Numbers for compensation alarm	Component 7 contains: Carryover rate alarm (Numbers for compensation alarm passed in Component 10.)	Extended
11,C8	Calculation slope value alarm	Not supported	Supported	Extended
11,C10	Numbers for compensation alarm	Passed in Component 7	Passed in Component 10	
12,C7	Na Calibration analytical data	Component 7 contains: Numbers for compensation data	Component 7 contains: Carryover rate (Numbers for compensation data passed in Component 10.)	Extended
12,C8	Calculation slope value alarm	Not supported	Supported	Extended
12,C10	Numbers for compensation data	Passed in Component 7	Passed in Component 10	
13,C7	K Calibration analytical data	Component 7 contains: Numbers for compensation data	Component 7 contains: Carryover rate (Numbers for compensation data passed in Component 10.)	Extended
13,C8	Calculation slope value alarm	Not supported	Supported	Extended
13,C10	Numbers for compensation data	Passed in Component 7	Passed in Component 10	
14,C7	Cl Calibration analytical data	Component 7 contains: Numbers for compensation data	Component 7 contains: Carryover rate (Numbers for compensation data passed in Component 10.)	Extended
14,C8	Calculation slope value	Not supported	Supported	Extended
14,C10	Numbers for compensation data	Passed in Component 7	Passed in Component 10	

E-module (Immunology) Calibration Result Record

Field	Description	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
6	Calibration method	LOT, RackPack	Permitted values: <ul style="list-style-type: none">• NoCalibration• LotCalibration• ContainerCalibration• InheritedLotCalibration• InheritedItemCalibration• UserModifiedCalibration• UnmaskedCalibration• FailedCalibration	Extended
7	Analytical Unit ID	P1,P2,P3,P4,ISE1,ISE2,Exy	AnalyticalUnitID, default: <i>Instrument#</i> <i>ModuleType#</i> <i>Position#</i> <i>SubModule</i> For example; MU1#e602#1#1 Fully editable.	Extended
12	Result Status	<ul style="list-style-type: none">• O• Q• F	<ul style="list-style-type: none">• O• F	Reduced
13.3	Result Characteristics, detail	Many values, up to a 20 digit code	Not supported	Reduced
15	Target value	Complex field, five numbers	Not supported	Reduced
16	Unit	String	Not supported	Reduced
17	Cut off	Number	Not supported	Reduced
18	Border line area	Complex field	Not supported	Reduced

Other differences

Encoding

Extended ASCII values 128 to 255 were supported in MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series. However, cobas® 8000 data manager uses UTF-8. This represents greatly extended functionality, but may require a conversion mechanism from extended ASCII to UTF-8.

Rerun results

Item	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
Stored rerun results	Can store and send: • first result • most recent result	Can store and send all for a test.	Extended results for a test.

LIS communications

Item	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
Communication protocols	ASTM over serial.	• HL7 over TCP/IP • ASTM over TCP/IP • ASTM over serial	Extended

Details

- ☞ For details of how to select a connection, see *Starting and stopping the host connection* on page B-21.
- ☞ For details of the physical connections, see *Host communication settings and cables* on page B-47.

Identifying samples by sequence number

Since version 1.02.03, it is possible to identify samples by a sequential number.

Item	MODULAR ANALYTICS EVO analyzer / cobas® 6000 analyzer series	cobas® 8000 data manager	Comment
Identification of samples	Barcode and sample ID.	<ul style="list-style-type: none"> • Barcode and sample ID • Sequential numbering • Rack and position 	Extended

Details

- ☞ For details of how to identify samples by a sequential number, see *Identifying patient samples by sequence number* on page E-47.
- ☞ For details of how to identify samples by a strict rack and position, see *Using a MODULAR PRE-ANALYTICS* on page E-41, and *Rack and position mode* on page B-30.

Traceability information for quality control and calibration results

Since version 1.02.05, there is additional data sent with quality control and calibration results, that improves traceability. This is only supported in HL7.

Details

- ☞ For details see *Upgrading to version 1.02.05 with HL7* on page E-106.

Upgrading to version 1.02.05 with ASTM

There is no change to the ASTM interface when upgrading to 1.02.05.

The previous mandatory upgrade of the cobas® 8000 data manager software was version 1.02.02, and the previous recommended upgrade was 1.02.03. The new functionality in version 1.02.05 is only supported in HL7. Therefore, there is no change to the ASTM interface.

Upgrading to version 1.02.05 with HL7

This section lists the differences to a host interface using the HL7 protocol between the version 1.02.03 and version 1.02.05 of the *data manager*.

Version 1.02.02 was the previous mandatory upgrade of the cobas® 8000 data manager software. Version 1.02.03 was the previous recommended upgrade.

The specimen segment SPM

This section lists the changes to the specimen segment SPM.

 For calibration results, the SPM segment looks quite different, see *Specimen Segment - SPM for calibration results* on page D-18.

Field	Description	1.02.03	1.02.05
SPM-2	Expiry date of control or calibration lot added.	<ul style="list-style-type: none"> For patient results: sample ID For QC: <i>Name^Lot^ID</i> For C-module and E-module calibration materials, <i>Level^Lot^Code^Count</i> For ISE module calibration results: empty. 	<ul style="list-style-type: none"> For patient results: sample ID For QC: <i>Name^Lot^ID^ExpiryDate</i> For C-module and E-module calibration materials, <i>Level^Lot^Code^Count^Expirydate</i> For ISE module calibration results: empty.
SPM-2.4	Expiry date of control lot: used only in Quality Control results	Empty for quality control results	For quality control results: expiry date of control lot.
SPM-2.5	Expiry date of control lot: used only for C-module and E-module calibration results	Empty for calibration results	For C-module and E-module calibration results: expiry date of calibration lot.

The observation result segment OBX

This section lists the changes to the observation result segment OBX.

Field	Description	1.02.03	1.02.05
OBX-7	Reference ranges	Not supported for quality control results.	Target value and standard deviation supplied. ☛ <i>Observation Result Segment - OBX (for QC results)</i> on page D-26.
OBX-18	Measurement Unit ID	$ModuleType^$ $SubModule^$ $AnalyticalUnitID^$ $InstrumentID^$ $Bottle^SBNo$ $Bottle^SBNo$ used only for QC. Note: ISE module only supports AnalyticalUnitID here.	$ModuleType^$ $SubModule^$ $AnalyticalUnitID^$ $InstrumentID^$ $Bottle^SBNo$ $Bottle^SBNo$ used only for QC and for C-module (photometry) and for E-module (immunology) results. Note: ISE module only supports AnalyticalUnitID here.

The substance identifier segment SID

This section lists the changes to the substance identifier segment SID.

Field	Description	1.02.03	1.02.05
SID-1	Substance identifier (for calibration results)	<ul style="list-style-type: none"> Not supported by C-module (photometry) or ISE calibration results. 	<ul style="list-style-type: none"> Supported by C-module calibration results. Not supported by ISE calibration results.
SID-2	Reagent lot	<ul style="list-style-type: none"> Not supported by C-module (photometry) or ISE calibration results. Supported by E-module (immunology) calibration results. 	<ul style="list-style-type: none"> Supported by C-module and E-module calibration results. Not supported by ISE calibration results.
SID-3	Reagent serial number	Not supported by calibration results.	<ul style="list-style-type: none"> Supported by C-module and E-module calibration results. Not supported by ISE calibration results.

Text encoding tables

This chapter shows a table with ASCII codes and another with UTF-8 codes for common Western European characters, for the convenience of developers.

In this chapter

Chapter **17**

ASCII table	E-111
Western European characters in UTF-8	E-112

ASCII table

The ASCII 127 character codes are shown below, with each printed character and its hexadecimal and decimal value

NUL 000	DLE 10 16	Space 20 32	0 30 48	@ 40 64	P 50 80	 60 96	 70 112
SOH 011	DC1 11 17	! 21 33	1 31 49	A 41 65	Q 51 81	a 61 97	q 71 113
STX 022	DC2 12 18	" 22 34	2 32 50	B 42 66	R 52 82	b 62 98	r 72 114
ETX 033	DC3 13 19	# 23 35	3 33 51	C 43 67	S 53 83	c 63 99	s 73 115
EOT 044	DC4 14 20	\$ 24 36	4 34 52	D 44 68	T 54 84	d 64 100	t 74 116
ENQ 055	NAK 15 21	% 25 37	5 35 53	E 45 69	U 55 85	e 65 101	u 75 117
ACK 066	SYN 16 22	& 26 38	6 36 54	F 46 70	V 56 86	f 66 102	v 76 118
BEL 077	ETB 17 23	' 27 39	7 37 55	G 47 71	W 57 87	g 67 103	w 77 119
BS 088	CAN 18 24	(28 40	8 38 56	H 48 72	X 58 88	h 68 104	x 78 120
HT 099	EM 19 25) 29 41	9 39 57	I 49 73	Y 59 89	i 69 105	y 79 121
LF 0A 10	SUB 1A 26	* 2A 42	: 3A 58	J 4A 74	Z 5A 90	j 6A 106	z 7A 122
VT 0B 11	ESC 1B 27	+" 2B 43	; 3B 59	K 4B 75	[5B 91	k 6B 107	{ 7B 123
FF 0C 12	FS 1C 28	, 2C 44	< 3C 60	L 4C 76	\ 5C 92	l 6C 108	 7C 124
CR 0D 13	GS 1D 29	- 2D 45	= 3D 61	M 4D 77	 5D 93	m 6D 109	{ 7D 125
SO 0E 14	RS 1E 30	. 2E 46	> 3E 62	N 4E 78	^ 5E 94	n 6E 110	~ 7E 126
SI 0F 15	US 1F 31	/ 2F 47	? 3F 63	O 4F 79	- 5F 95	o 6F 111	DEL 7F 127

Western European characters in UTF-8

This section shows the Unicode code point and the hexadecimal value of common Western European characters in UTF-8 format. By default, the cobas® 8000 data manager uses UTF-8.

Unicode code point	Character	UTF-8 (hex.)	Name	Unicode code point	Character	UTF-8 (hex.)	Name
U+0000		00	<control>	U+0001		01	<control>
U+0002		02	<control>	U+0003		03	<control>
U+0004		04	<control>	U+0005		05	<control>
U+0006		06	<control>	U+0007		07	<control>
U+0008		08	<control>	U+0009		09	<control>
U+000A		0a	<control>	U+000B		0b	<control>
U+000C		0c	<control>	U+000D		0d	<control>
U+000E		0e	<control>	U+000F		0f	<control>
U+0010		10	<control>	U+0011		11	<control>
U+0012		12	<control>	U+0013		13	<control>
U+0014		14	<control>	U+0015		15	<control>
U+0016		16	<control>	U+0017		17	<control>
U+0018		18	<control>	U+0019		19	<control>
U+001A		1a	<control>	U+001B		1b	<control>
U+001C		1c	<control>	U+001D		1d	<control>
U+001E		1e	<control>	U+001F		1f	<control>
U+0020		20	SPACE	U+0021	!	21	EXCLAMATION MARK
U+0022	"	22	QUOTATION MARK	U+0023	#	23	NUMBER SIGN
U+0024	\$	24	DOLLAR SIGN	U+0025	%	25	PERCENT SIGN
U+0026	&	26	AMPERSAND	U+0027	'	27	APOSTROPHE
U+0028	(28	LEFT PARENTHESIS	U+0029)	29	RIGHT PARENTHESIS
U+002A	*	2a	ASTERISK	U+002B	+	2b	PLUS SIGN
U+002C	,	2c	COMMA	U+002D	-	2d	HYPHEN-MINUS
U+002E	.	2e	FULL STOP	U+002F	/	2f	SOLIDUS
U+0030	0	30	DIGIT ZERO	U+0031	1	31	DIGIT ONE
U+0032	2	32	DIGIT TWO	U+0033	3	33	DIGIT THREE
U+0034	4	34	DIGIT FOUR	U+0035	5	35	DIGIT FIVE
U+0036	6	36	DIGIT SIX	U+0037	7	37	DIGIT SEVEN
U+0038	8	38	DIGIT EIGHT	U+0039	9	39	DIGIT NINE
U+003A	:	3a	COLON	U+003B	;	3b	SEMICOLON
U+003C	<	3c	LESS-THAN SIGN	U+003D	=	3d	EQUALS SIGN
U+003E	>	3e	GREATER-THAN SIGN	U+003F	?	3f	QUESTION MARK
U+0040	@	40	COMMERCIAL AT	U+0041	A	41	LATIN CAPITAL LETTER A
U+0042	B	42	LATIN CAPITAL LETTER B	U+0043	C	43	LATIN CAPITAL LETTER C
U+0044	D	44	LATIN CAPITAL LETTER D	U+0045	E	45	LATIN CAPITAL LETTER E
U+0046	F	46	LATIN CAPITAL LETTER F	U+0047	G	47	LATIN CAPITAL LETTER G

Unicode code point	Character	UTF-8 (hex.)	Name
U+0048	H	48	LATIN CAPITAL LETTER H
U+004A	J	4a	LATIN CAPITAL LETTER J
U+004C	L	4c	LATIN CAPITAL LETTER L
U+004E	N	4e	LATIN CAPITAL LETTER N
U+0050	P	50	LATIN CAPITAL LETTER P
U+0052	R	52	LATIN CAPITAL LETTER R
U+0054	T	54	LATIN CAPITAL LETTER T
U+0056	V	56	LATIN CAPITAL LETTER V
U+0058	X	58	LATIN CAPITAL LETTER X
U+005A	Z	5a	LATIN CAPITAL LETTER Z
U+005C	\	5c	REVERSE SOLIDUS
U+005E	^	5e	CIRCUMFLEX ACCENT
U+0060	`	60	GRAVE ACCENT
U+0062	b	62	LATIN SMALL LETTER B
U+0064	d	64	LATIN SMALL LETTER D
U+0066	f	66	LATIN SMALL LETTER F
U+0068	h	68	LATIN SMALL LETTER H
U+006A	j	6a	LATIN SMALL LETTER J
U+006C	l	6c	LATIN SMALL LETTER L
U+006E	n	6e	LATIN SMALL LETTER N
U+0070	p	70	LATIN SMALL LETTER P
U+0072	r	72	LATIN SMALL LETTER R
U+0074	t	74	LATIN SMALL LETTER T
U+0076	v	76	LATIN SMALL LETTER V
U+0078	x	78	LATIN SMALL LETTER X
U+007A	z	7a	LATIN SMALL LETTER Z
U+007C		7c	VERTICAL LINE
U+007E	~	7e	TILDE
U+0080	c2 80	<control>	
U+0082	c2 82	<control>	
U+0084	c2 84	<control>	
U+0086	c2 86	<control>	
U+0088	c2 88	<control>	
U+008A	c2 8a	<control>	
U+008C	c2 8c	<control>	
U+008E	c2 8e	<control>	
U+0090	c2 90	<control>	

Unicode code point	Character	UTF-8 (hex.)	Name
U+0049	I	49	LATIN CAPITAL LETTER I
U+004B	K	4b	LATIN CAPITAL LETTER K
U+004D	M	4d	LATIN CAPITAL LETTER M
U+004F	O	4f	LATIN CAPITAL LETTER O
U+0051	Q	51	LATIN CAPITAL LETTER Q
U+0053	S	53	LATIN CAPITAL LETTER S
U+0055	U	55	LATIN CAPITAL LETTER U
U+0057	W	57	LATIN CAPITAL LETTER W
U+0059	Y	59	LATIN CAPITAL LETTER Y
U+005B	[5b	LEFT SQUARE BRACKET
U+005D]	5d	RIGHT SQUARE BRACKET
U+005F	_	5f	LOW LINE
U+0061	a	61	LATIN SMALL LETTER A
U+0063	c	63	LATIN SMALL LETTER C
U+0065	e	65	LATIN SMALL LETTER E
U+0067	g	67	LATIN SMALL LETTER G
U+0069	i	69	LATIN SMALL LETTER I
U+006B	k	6b	LATIN SMALL LETTER K
U+006D	m	6d	LATIN SMALL LETTER M
U+006F	o	6f	LATIN SMALL LETTER O
U+0071	q	71	LATIN SMALL LETTER Q
U+0073	s	73	LATIN SMALL LETTER S
U+0075	u	75	LATIN SMALL LETTER U
U+0077	w	77	LATIN SMALL LETTER W
U+0079	y	79	LATIN SMALL LETTER Y
U+007B	{	7b	LEFT CURLY BRACKET
U+007D	}	7d	RIGHT CURLY BRACKET
U+007F		7f	<control>
U+0081	c2 81	<control>	
U+0083	c2 83	<control>	
U+0085	c2 85	<control>	
U+0087	c2 87	<control>	
U+0089	c2 89	<control>	
U+008B	c2 8b	<control>	
U+008D	c2 8d	<control>	
U+008F	c2 8f	<control>	
U+0091	c2 91	<control>	

Unicode code point	Character	UTF-8 (hex.)	Name
U+0092		c2 92	<control>
U+0094		c2 94	<control>
U+0096		c2 96	<control>
U+0098		c2 98	<control>
U+009A		c2 9a	<control>
U+009C		c2 9c	<control>
U+009E		c2 9e	<control>
U+00A0		c2 a0	NO-BREAK SPACE
U+00A2	¢	c2 a2	CENT SIGN
U+00A4	¤	c2 a4	CURRENCY SIGN
U+00A6	¦	c2 a6	BROKEN BAR
U+00A8	„	c2 a8	DIAERESIS
U+00AA	ª	c2 aa	FEMININE ORDINAL INDICATOR
U+00AC	¬	c2 ac	NOT SIGN
U+00AE	®	c2 ae	REGISTERED SIGN
U+00B0	°	c2 b0	DEGREE SIGN
U+00B2	²	c2 b2	SUPERSCRIPT TWO
U+00B4	‘	c2 b4	ACUTE ACCENT
U+00B6	¶	c2 b6	PILCROW SIGN
U+00B8	,	c2 b8	CEDILLA
U+00BA	º	c2 ba	MASCULINE ORDINAL INDICATOR
U+00BC	¼	c2 bc	VULGAR FRACTION ONE QUARTER
U+00BE	¾	c2 be	VULGAR FRACTION THREE QUARTERS
U+00C0	À	c3 80	LATIN CAPITAL LETTER A WITH GRAVE
U+00C2	Â	c3 82	LATIN CAPITAL LETTER A WITH CIRCUMFLEX
U+00C4	Ä	c3 84	LATIN CAPITAL LETTER A WITH DIAERESIS
U+00C6	Æ	c3 86	LATIN CAPITAL LETTER AE
U+00C8	È	c3 88	LATIN CAPITAL LETTER E WITH GRAVE
U+00CA	Ê	c3 8a	LATIN CAPITAL LETTER E WITH CIRCUMFLEX
U+00CC	Ì	c3 8c	LATIN CAPITAL LETTER I WITH GRAVE

Unicode code point	Character	UTF-8 (hex.)	Name
U+0093		c2 93	<control>
U+0095		c2 95	<control>
U+0097		c2 97	<control>
U+0099		c2 99	<control>
U+009B		c2 9b	<control>
U+009D		c2 9d	<control>
U+009F		c2 9f	<control>
U+00A1	¡	c2 a1	INVERTED EXCLAMATION MARK
U+00A3	£	c2 a3	POUND SIGN
U+00A5	¥	c2 a5	YEN SIGN
U+00A7	§	c2 a7	SECTION SIGN
U+00A9	©	c2 a9	COPYRIGHT SIGN
U+00AB	«	c2 ab	LEFT-POINTING DOUBLE ANGLE QUOTATION MARK
U+00AD	‐	c2 ad	SOFT HYPHEN
U+00AF	‐	c2 af	MACRON
U+00B1	±	c2 b1	PLUS-MINUS SIGN
U+00B3	³	c2 b3	SUPERSCRIPT THREE
U+00B5	µ	c2 b5	MICRO SIGN
U+00B7	·	c2 b7	MIDDLE DOT
U+00B9	¹	c2 b9	SUPERSCRIPT ONE
U+00BB	»	c2 bb	RIGHT-POINTING DOUBLE ANGLE QUOTATION MARK
U+00BD	½	c2 bd	VULGAR FRACTION ONE HALF
U+00BF	¿	c2 bf	INVERTED QUESTION MARK
U+00C1	Á	c3 81	LATIN CAPITAL LETTER A WITH ACUTE
U+00C3	Ã	c3 83	LATIN CAPITAL LETTER A WITH TILDE
U+00C5	Å	c3 85	LATIN CAPITAL LETTER A WITH RING ABOVE
U+00C7	Ҫ	c3 87	LATIN CAPITAL LETTER C WITH CEDILLA
U+00C9	É	c3 89	LATIN CAPITAL LETTER E WITH ACUTE
U+00CB	Ê	c3 8b	LATIN CAPITAL LETTER E WITH DIAERESIS
U+00CD	Í	c3 8d	LATIN CAPITAL LETTER I WITH ACUTE

Unicode code point	Character	UTF-8 (hex.)	Name
U+00CE	İ	c3 8e	LATIN CAPITAL LETTER I WITH CIRCUMFLEX
U+00D0	Đ	c3 90	LATIN CAPITAL LETTER ETH
U+00D2	Ӯ	c3 92	LATIN CAPITAL LETTER O WITH GRAVE
U+00D4	Ӱ	c3 94	LATIN CAPITAL LETTER O WITH CIRCUMFLEX
U+00D6	ӷ	c3 96	LATIN CAPITAL LETTER O WITH DIAERESIS
U+00D8	Ӹ	c3 98	LATIN CAPITAL LETTER O WITH STROKE
U+00DA	ӹ	c3 9a	LATIN CAPITAL LETTER U WITH ACUTE
U+00DC	ӻ	c3 9c	LATIN CAPITAL LETTER U WITH DIAERESIS
U+00DE	Ӻ	c3 9e	LATIN CAPITAL LETTER THORN
U+00E0	à	c3 a0	LATIN SMALL LETTER A WITH GRAVE
U+00E2	â	c3 a2	LATIN SMALL LETTER A WITH CIRCUMFLEX
U+00E4	ä	c3 a4	LATIN SMALL LETTER A WITH DIAERESIS
U+00E6	æ	c3 a6	LATIN SMALL LETTER AE
U+00E8	è	c3 a8	LATIN SMALL LETTER E WITH GRAVE
U+00EA	ê	c3 aa	LATIN SMALL LETTER E WITH CIRCUMFLEX
U+00EC	ì	c3 ac	LATIN SMALL LETTER I WITH GRAVE
U+00EE	î	c3 ae	LATIN SMALL LETTER I WITH CIRCUMFLEX
U+00F0	ð	c3 b0	LATIN SMALL LETTER ETH
U+00F2	ò	c3 b2	LATIN SMALL LETTER O WITH GRAVE
U+00F4	ô	c3 b4	LATIN SMALL LETTER O WITH CIRCUMFLEX
U+00F6	ö	c3 b6	LATIN SMALL LETTER O WITH DIAERESIS
U+00F8	ø	c3 b8	LATIN SMALL LETTER O WITH STROKE
U+00FA	ú	c3 ba	LATIN SMALL LETTER U WITH ACUTE

Unicode code point	Character	UTF-8 (hex.)	Name
U+00CF	İ	c3 8f	LATIN CAPITAL LETTER I WITH DIAERESIS
U+00D1	ጀ	c3 91	LATIN CAPITAL LETTER N WITH TILDE
U+00D3	Ӯ	c3 93	LATIN CAPITAL LETTER O WITH ACUTE
U+00D5	Ӱ	c3 95	LATIN CAPITAL LETTER O WITH TILDE
U+00D7	×	c3 97	MULTIPLICATION SIGN
U+00D9	ӻ	c3 99	LATIN CAPITAL LETTER U WITH GRAVE
U+00DB	ӻ	c3 9b	LATIN CAPITAL LETTER U WITH CIRCUMFLEX
U+00DD	Ӵ	c3 9d	LATIN CAPITAL LETTER Y WITH ACUTE
U+00DF	Ӹ	c3 9f	LATIN SMALL LETTER SHARP S
U+00E1	á	c3 a1	LATIN SMALL LETTER A WITH ACUTE
U+00E3	â	c3 a3	LATIN SMALL LETTER A WITH TILDE
U+00E5	ã	c3 a5	LATIN SMALL LETTER A WITH RING ABOVE
U+00E7	ç	c3 a7	LATIN SMALL LETTER C WITH CEDILLA
U+00E9	é	c3 a9	LATIN SMALL LETTER E WITH ACUTE
U+00EB	ë	c3 ab	LATIN SMALL LETTER E WITH DIAERESIS
U+00ED	í	c3 ad	LATIN SMALL LETTER I WITH ACUTE
U+00EF	î	c3 af	LATIN SMALL LETTER I WITH DIAERESIS
U+00F1	ñ	c3 b1	LATIN SMALL LETTER N WITH TILDE
U+00F3	ó	c3 b3	LATIN SMALL LETTER O WITH ACUTE
U+00F5	õ	c3 b5	LATIN SMALL LETTER O WITH TILDE
U+00F7	÷	c3 b7	DIVISION SIGN
U+00F9	ù	c3 b9	LATIN SMALL LETTER U WITH GRAVE
U+00FB	û	c3 bb	LATIN SMALL LETTER U WITH CIRCUMFLEX

17 Text encoding tables

Western European characters in UTF-8

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Unicode code point	Character	UTF-8 (hex.)	Name
U+00FC	ü	c3 bc	LATIN SMALL LETTER U WITH DIAERESIS
U+00FE	þ	c3 be	LATIN SMALL LETTER THORN

Unicode code point	Character	UTF-8 (hex.)	Name
U+00FD	ý	c3 bd	LATIN SMALL LETTER Y WITH ACUTE
U+00FF	ÿ	c3 bf	LATIN SMALL LETTER Y WITH DIAERESIS