

Quick Start Guide

IMC-300 Remote Communication

Introduction

This guide is intended to provide an overview of the Zevision® remote communication protocol. The provided sample commands are intended to be used for remote communications testing only.

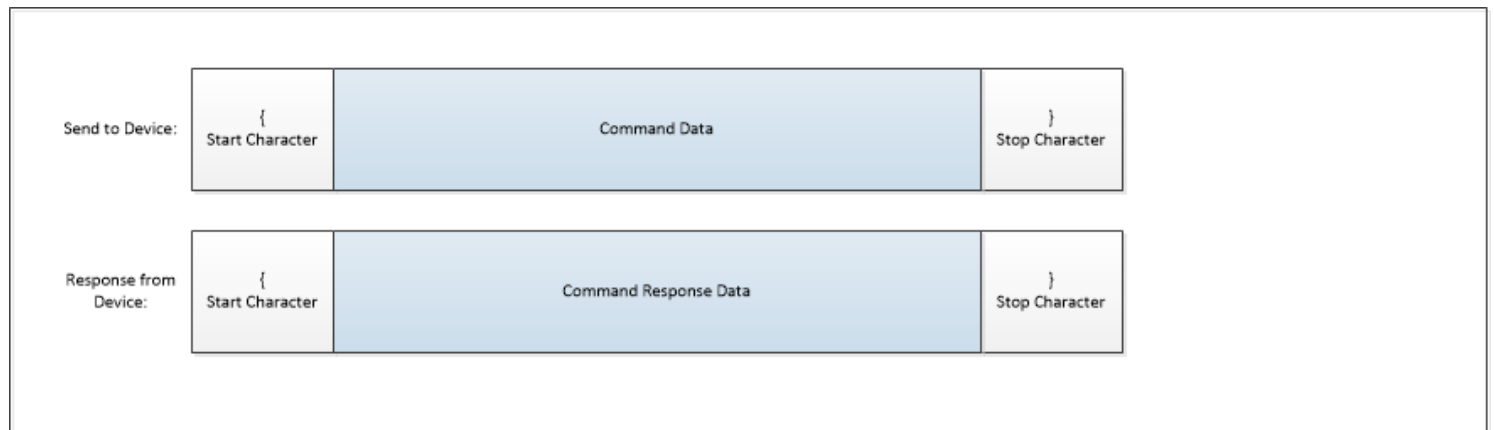
WARNING

IMC300 demo is not to be used in an evaporator tool.

Do not connect the source output cabling to IMC300 demo.

Zevision Protocol

Overview



Sending Data to the Device

Start Character

All transmissions start with a start character. The start character signals to the sender or receiver that a new transmission has started and helps decode the transmission. The start character was chosen to be a printable ASCII character which would not be used in a typical command/response.

Start character: "{"

Command

See Zevision Command for command formatting and specific commands.

Stop Character

All transmissions end with a stop character. The stop character signals to the sender or receiver that the transmission is finished and helps decoding of the transmission. The stop character was chosen to be a printable ASCII character which would not be used in a typical command/response.

Stop character: "}"

Receiving Data from the Device

Start Character

All responses start with a start character. The start character signals to the sender or receiver that a new transmission has started and helps decoding of the transmission. The start character was chosen to be a printable ASCII character which would not be used in a typical command/response.

Start character: "{"

Command

See Zevision Command for command response formatting and specific commands.

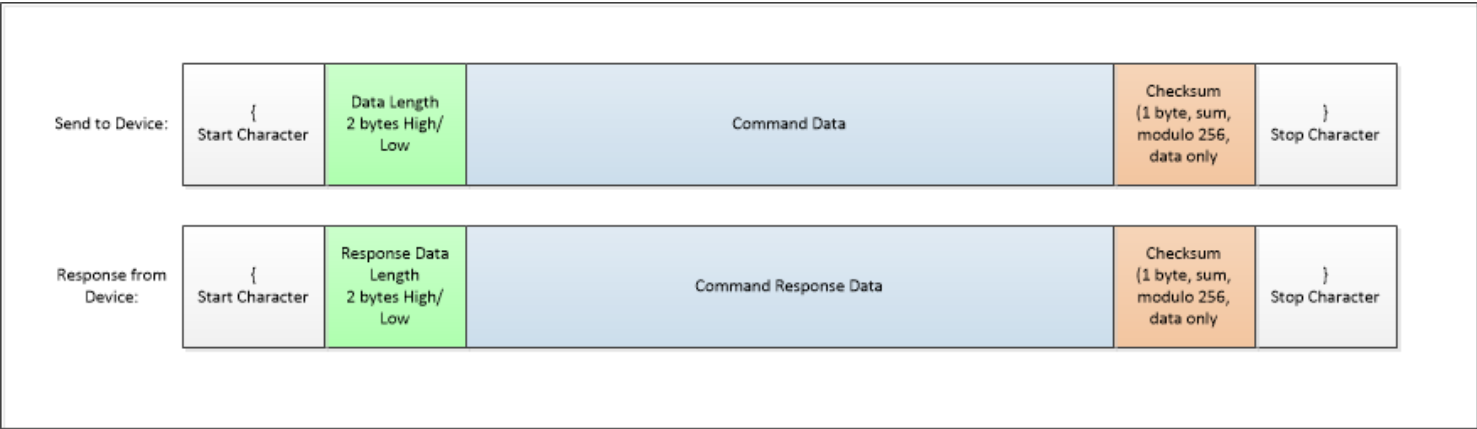
Stop Character

All transmissions end with a stop character. The stop character signals to the sender or receiver that the transmission is finished and helps decoding of the transmission. The stop character was chosen to be a printable ASCII character which would not be used in a typical command/response.

Stop character: "}"

Protocol Options

Options can be enabled to make the protocol more robust and reduce the chance for errors during transmission.



Length

The length of the transmission is defined as two bytes of data (high/low). The length includes all of the command data within the message (blue shaded), excluding the **Start**, **Stop**, **Length** and **Checksum** bits. The length bytes are a numeric value from 1 to 57,000.

For the H1 command, the length would be 2. The command would then be the following in HEX: 7b 0002 4831 7D.

Checksum

The checksum is a single byte. The checksum is calculated by summing of all the command data within the message (blue shaded), excluding the **Start**, **Stop**, **Length** and **Checksum** bits (same as the length). Since its one byte long it uses a modulo 256.

The checksum helps ensure that the message content is valid and a bit did not get lost during transmission.

For example, the checksum for {H1} would be hexadecimal 79, or O. The full checksum command is {H1O}.

Revision Command

Command Formation

Actions U – Update, Q – Query F – Function, S – Status H – Hello	Command Group (L/M/S/...)	Command ID (Level 1)	Command ID (Level 2...)	: Data Separator	Data (Optional from Sets) (2.567, 100)	; (optional) Command Separator
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Action Types

Base commands, also known as actions, define what the command will do. Base commands are a single ASCII character.

- U: Update - Set the value of a configuration setting
- Q: Query - Get the value of a configuration setting
- A: Add - Add an item
- D: Delete - Delete an item
- ?: Help - Get information on the settings
- E: Echo - Echo any data sent

Command Group

Command groups define how the settings are organized. Command groups are a single ASCII character.

Command IDs

Command IDs define a specific setting. Depending on the command, command IDs can have multiple levels. Command IDs are 2 ASCII characters coded in HEX format: **00 - FF**

Command level examples:

Actions	Command Group	Command ID
U - Update, Q - Query F - Function, S - Status	(L/M/S/...)	00-FF (Level 1)

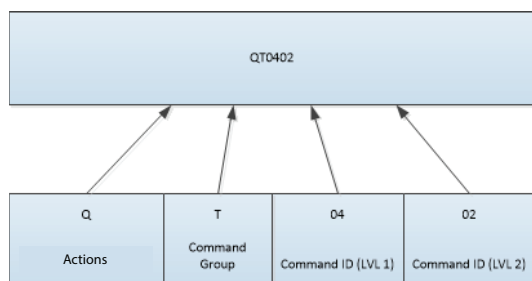
Actions	Command Group	Command ID	Command ID
U - Update, Q - Query F - Function, S - Status	(L/M/S/...)	00-FF (Level 1)	00-FF (Level 2)

Actions	Command Group	Command ID	Command ID	Command ID
U - Update, Q - Query F - Function, S - Status	(L/M/S/...)	00-FF (Level 1)	00-FF (Level 2)	00-FF (Level 3)

Actions	Command Group	Command ID	Command ID	Command ID	Command ID
U - Update, Q - Query F - Function, S - Status	(L/M/S/...)	00-FF (Level 1)	00-FF (Level 2)	00-FF (Level 3)	00-FF (Level 4)

Actions	Command Group	Command ID	Command ID	Command ID	Command ID	Command ID
U - Update, Q - Query F - Function, S - Status	(L/M/S/...)	00-FF (Level 1)	00-FF (Level 2)	00-FF (Level 3)	00-FF (Level 4)	00-FF (Level 5)

Example:



Data

Some commands, such as the **Updates** and **Action** commands require additional data. Data is separated from the command by a colon : ASCII character.

The data in the data field is command specific, but can take the form of:

- Numeric data - ASCII numbers forming a number or a float. For example, numeric 78 or float 68.553.
- String data - an ASCII String. For example, **My Name**. (No quotes are needed)

Multiple Commands

Multiple commands can be sent by separating them with a semicolon (;). There is no limit to the number of commands to be sent as long as the total message length is not more than 57,000 bytes. For example: **H1;H1** would send two hello commands.

Response

Every command sent to the device will get a response.

Command Echoed (Action, Group, ID...)	:	Response Data (Optional from Queries) (2.567, 100)	Response Status (+/-)	Negative Response Error Code (A,B,C)	; (optional) Command Separator
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Command

The full command is echoed in the response. This includes everything before the data separator. This allows individual command responses.

Data Separator

The data separator is used to mark the end of a command and differentiate any data associated with a command. The data separator is useful when identifying commands as the command length can vary in size.

The data separator character was chosen to be a printable ASCII character which would not be used in a typical command/response (although it might be used in logic statements and time input).

Data Separator: ":"

Data

The **Data** field is only transmitted when querying configurations or statuses. The data in the data field is command specific, but can take the form of:

- Numeric data - ASCII numbers forming a number or float. For example, numeric 78 or float 68.553.
- String data - an ASCII string. For example, **My Name**. (No quotes are needed)

Response Status

The response status is an acknowledgement of how the command performed. The response status can be "+" for positive or "-" for negative.

The response status characters were chosen to be a printable ASCII character which would not be used in a typical command/response.

Error Response Code

If the system returned a negative response, an error code is returned to give some insight into why the command failed.

All error codes are ASCII letters:

Error Code	Description
A	Illegal command, the command is not supported
B	Illegal parameter value
C	Checksum error (only when checksum is enabled)
D	Illegal format
F	State error, the system is in the wrong state
L	Length error (only when length is enabled)
T	Time out, only part of a command was received

Multiple Commands

When multiple commands are sent in the same message, the response is separated by a semicolon (;). Each command receives a response.

Command Set

WARNING

Commands are to be used for communication testing only.

The instrument is not to be installed in an evaporator tool.

Commands Supported in the system are as follows:

Help

The help command responds with a human-readable list of commands supported by the system.

Command	Description
?	Display commands supported by the system

Hello Commands

Hello commands allow a simple interaction with the device. They allow the unit to communicate basic configuration data and validate, send, and receive transmissions.

Command	Description
H1	String containing the product name and the software version number
H2	String containing the software version number, with each of the values separated by commas

Echo Command

The **Echo** command is used to test the communication interface. All data passed into the command is sent back as a response.

Command	Description
E	Echo data from the input to the output

General Commands

General commands allow the configuration of the system.

Command	Actions	Description	Type	Range
G01	Q	Communication API Version	Float	1.00
G02	Q	Device Type	String	
G03	Q	Device Name	String	
G04	Q	Vendor	String	

Command	Actions	Description	Type	Range
G05	Q	Model Number	String	
G06	Q	System Serial Number	Integer	
G07	Q	System Hardware Version	Integer	
G08	Q	System Software Version	String	
G1301	Q	RS232 Protocol Type	Integer	0 = Zevision
G1302	Q	RS232 Protocol Version	Float	1.00
G1303	Q	RS232 Baud (bps)	Integer	115200
G1304	Q/U	RS232 Enable Checksum	Integer	0 = length bytes disabled 1 = length bytes enabled
G1305	Q/U	RS232 Enable Length	Integer	0 = length bytes disabled 1 = length bytes enabled
G1501	Q	Thickness and Rate Units	Integer	0 = SI (μm, nm/s)
G1502	Q	Density Units	Integer	0 = SI (g/cm3)

Materials

The user material library is shown. Add and delete materials in the library. Each material contains additional settings for the material. Materials can have IDs 01 to C8 (1 to 200).



The material list is defaulted to zero, users must add materials with the M00 command. Once a material is added, it needs to be updated with specific values.

Command	Actions	Description	Type	Range
M00	A/D	Add or Delete Material from the end of the list	Command	
M**	A	Add Specific Material	Command	01 to 99
M**01	Q/U	Material Name	String	
M**02	Q/U	Density	Float	
M**03	Q/U	Z-Number	Float	



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