

Protocol miniSICS for Cubis MCA balances

Version 1.0 (valid from Cubis MCA Firmware 09-03-04.xx. xx)

Document history

Version	Date	Changed sections	Description of the changes
1.0	2020-09-10		New Document

Author	Rindermann, Rainer	2020-09-10
Audited	Jan Heitmüller	2020-09-14
Release	Jan von Steuben	2020-09-14

Passing on, duplication, distribution and / or editing of this document as well as exploitation of its contents and communication to third parties are not permitted without express permission.

Table of contents

1	Introduction	3
1.1	Purpose and scope	3
2	Protocol miniSICS	3
2.1	Overview of the supported miniSICS commands.....	3
2.2	Syntax and Grammar	3
2.2.1	Command notation	3
2.2.2	Separator	3
2.2.3	News closure.....	4
2.2.4	Maximum length of a command	4
2.2.5	Signal readiness for operation.....	4
2.2.6	Send tare status after start	4
2.3	Command execution	4
2.3.1	No command buffering	4
2.3.2	Command execution when starting the balance	4
2.3.3	Command execution in standby	4
2.4	The commands in detail	4
2.4.1	Command S - Send weight value at stability	4
2.4.2	Command Z - Zero the balance at stability	5
2.4.3	Command T - Tare balance at stability	5
2.4.4	Command WI - Execute draft shield function (optional)	5
2.5	Answers to the commands	7
2.5.1	General answer to errors.....	7
2.5.2	Response format for weight values	7
2.6	Interfaces for the miniSICS protocol	8
2.6.1	Interface COM-RS232.....	8
2.6.2	Interface USB-B	8
2.6.3	Network connection.....	8
2.7	Abbreviations	8

1 Introduction

1.1 Purpose and scope

This document describes how the MCA balance can be operated via the serial interface protocol miniSICS.

2 Protocol miniSICS

The miniSICS protocol is compatible with the original MT-(mini)SICS protocol from Mettler and enables interface commands for basic functions to be sent to the balance. Please note that there are differences due to the different hardware and software platforms.

The command set of miniSICS contains commands for reading weight values and for triggering balance functions. The miniSICS commands implemented in the MCA balance are described in this manual.

2.1 Overview of the supported miniSICS commands

Comm and	Description
S	Send weight value at stability. The balance sends a display value with stability.
Z	Zero balance at stability. The balance performs the zeroing function when stable.
T	Tare balance at stability. The balance performs the tare function when stable.
WI	Execute draft shield function (optional). Query door position of motorized draft shield / Opening or closing doors

2.2 Syntax and Grammar

The transmission of the commands and the answers is done with ASCII characters and can be mapped with any terminal program.

2.2.1 Command notation

The commands are valid in upper and lower case letters, e.g. "S" equals "s".

2.2.2 Separator

Commands and parameters are separated by a single space character (ASCII 0x20).

If more than a single space is detected as a separator, a general syntax error message is returned.

2.2.3 News closure

Each message (command or response) must be terminated by a sequence of the characters 'carriage return' (CR - ASCII 0x0D) and 'line feed' (LF - ASCII 0x0A).

2.2.4 Maximum length of a command

A command may contain a maximum of 64 characters. If a command sequence (excluding spaces and message terminator CR, LF) contains more than 64 characters, a general syntax error message is sent.

2.2.5 Signal readiness for operation

If the balance is ready for operation after switching on or from standby, the interface "STANDARD_ _ _V <Package version>" is sent.

2.2.6 Send tare status after start

If the balance performs an automatic tare after starting, the message "TA" is sent via the interface.

2.3 Command execution

2.3.1 No command buffering

The miniSICS command interpreter does not buffer multiple commands that are sent simultaneously. If a running command is not completed while another command is being sent, this command is ignored without return value.

2.3.2 Command execution when starting the balance

miniSICS commands are only executed when the balance is active and the user interface is displayed or the balance is in Eco mode (energy saving mode). In all other states and their transitions no commands are accepted.

2.3.3 Command execution in standby

No miniSICS command is accepted in standby mode.

2.4 The commands in detail

2.4.1 Command S - Send weight value at stability

The balance sends a weight value with stability. If the balance has no stability, it waits for stability and then sends the stable weight value.

syntax:Command: **S**

Response: Response format for weight values

SI+

The balance has overload

SI-

The balance has underload

EL

1. Function locked, if another command is active.
2. Timeout after 10 seconds, if no stability is achieved.
3. The weight value does not match the formatting.

Example:

Command: S<CR><LF>

Response: S_____99.528_g<CR><LF> The current weight value at stability is 99.528 g

2.4.2 Command Z - Zero the balance at stability

The command waits for a stable weight value and then sets the balance to zero. If the zeroing was successful, no response is sent.

syntax:Command: **Z**Response: **EL**

Upper / lower limit of zeroing range exceeded or timeout after 10 seconds for zeroing occurred.

2.4.3 Command T - Tare balance at stability

The command waits for a stable weight value and then tares the balance. If the taring was successful, no response is sent.

syntax:Command: **T**Response: **EL**

Upper/lower limit of the taring range exceeded or timeout after 10 seconds for taring.

2.4.4 Command WI - Execute draft shield function (optional)

The WI command can be used to query the position of the draft shield doors and to open or close the doors. The WI command is optional and is only executed if a motorized draft shield is also present.

Command	Description	Answer	Description
---------	-------------	--------	-------------

WI_0	LiDS: Opens all doors	<i>none</i>	Command successfully executed
		EL	Command not executable
	RoDS: command not available	ES	Command not implemented
WI_0_R	LiDS: Opens the right door RoDS: Opens to the right to the standard opening position	<i>none</i>	Command successfully executed
		EL	Command not executable
WI_0_L	LiDS: Close all doors RoDS: Closes the door in the direction of the shortest travel distance.	<i>none</i>	Command successfully executed
		EL	Command not executable
WI_1	LiDS: Opens the left door RoDS: Opens to the left to the standard opening position	<i>none</i>	Command successfully executed
		EL	Command not executable
WI	LiDS and RoDS: Open the draft shield up to the learned position of the right draft shield key.	<i>none</i>	Command successfully executed
		EL	Command not executable
WI_?	LiDS: Read door positions	WI_<No>	<0> = All doors closed <1> = Right door open <2> = Left door open <3> = Upper door open <4> = Left and right door open <5> = Left and upper door open <6> = Right and upper door open <7> = All doors open <8> = error <9> = Undefined door position
	RoDS: Read status of door	WI_<No>	<0> = All doors closed <1> = Open to the right side <2> = Open to the left side <8> = error <9> = Undefined door position
		EL	Command not executable

2.5 Answers to the commands

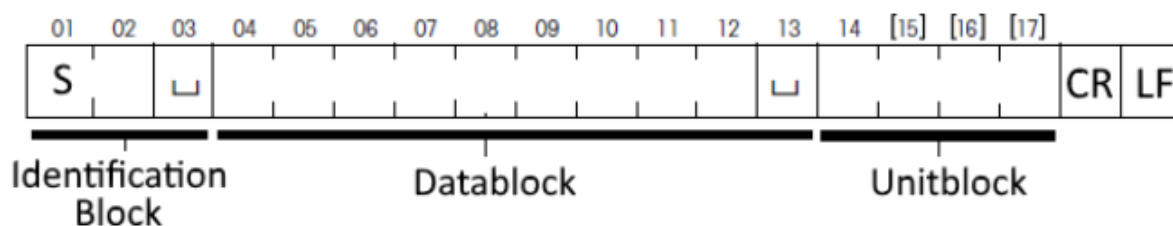
2.5.1 General answer to errors

There are three different general answers in case of error.

Type	Code	Cause
Transmission error	ET	Incomplete or wrong transmission (e.g. parity error or incomplete command)
Syntax Error	ES	Command not recognized or not allowed or wrong number of parameters passed with the command
Logical error	EL	The command cannot be executed because - Function currently locked - command specific behavior

2.5.2 Response format for weight values

Answers that contain a weight value are always formatted in the same way.



Block	Position	Code	Description
Identification	01	S	Code for all messages containing a weight value.
	02		- stable weight value - unstable weight value
	03		Fixed separator, space, ASCII 0x20
Data	04...12		- 9 characters - The weight value is right-aligned - If the value is negative, '-' is placed to the left of the first number of the value - Leading zeros are replaced by spaces - If the value is unstable, the last digit (last decimal place in the actual weight value) is replaced by a space. - If the decimal point becomes the last character, it will be replaced by a space
	13		Fixed separator, space, ASCII 0x20
Units	14...17		- one to four characters (e.g. 'g' or 'kg' ...)

			- CR, LF placed directly after the last character of the unit (e.g. if the unit is "kg", CR is at position 16 and LF at 17).
--	--	--	--

2.6 Interfaces for the miniSICS protocol

The miniSICS protocol can be used via the COM-RS232, USB-B interfaces on the rear panel of the balance and via the Ethernet interface on the display head.

For the respective interface the protocol miniSICS can be set, which can then be operated independently of the task and its application.

2.6.1 Interface COM-RS232

The COM-RS232 interface is intended for serial connection to a PC or PLC control unit. Baud rate, data bits, parity, stop bits and handshake must be set for this interface according to the connected device.

2.6.2 Interface USB-B

The USB-B interface is used to connect a PC via a standard USB cable with USB-A to USB-B plug. On the PC, this connection is set up and displayed as a virtual COM port (VCP). The driver for this interface is automatically installed on the PC by the operating system, provided the user has the appropriate rights.

2.6.3 Network connection

There is also the possibility to use the serial communication protocol miniSICS via the Ethernet network connection. This client/server connection requires the setting of a common TCP port. The default port is 55555.

2.7 Abbreviations

Abbreviation	Description
SICS	Standard Interface Common Set Interface protocol with which the balance can be operated.
miniSICS	Simplified form of SICS
ASCII	American Standard Code for Information Interchange The American standard code for information exchange is a 7-bit character encoding.
SP	Space character, Hexadecimal 0x20, Decimal 32

Abbreviation	Description
CR	Carriage return character, Control character ^M, Hexadecimal 0x0D, Decimal 13
LF	Line feed character, Control character ^J, Hexadecimal 0x0A, Decimal 10
LiDS	Optional: Linear draft shield with three doors (right, top, left)
RoDS	Optional: Rotary draft shield