SARTORIUS

Entris® II

Description of the Interface

Technical Note

Your balance is equipped with an serielle RS232 interface port for connection to a computer or other peripheral device.
You can connect a computer to change, start and/or monitor the functions of the balance and the application programs.

Features

- Type of interface: Serial interface
- Operating mode: Full duplex
- Standard: RS-232
- Transmission rates: 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 baud
- Parity: odd, even, none
- Number of data bits: 7 or 8 bits
- Character format:
  1 start bit, 7-bit ASCII, parity, 1 Stop bit
- Handshake:
  For 2-wire interface: Software
  For 4-wire interface: Hardware (CTS/RTS)
- Data output format of the balance/scale:
  16 or 22 characters

Factory Settings

- Transmission rate: **9600** baud (Code 2.1.2.7.)
- Parity: **ODD** (Code 2.1.3.3.)
- Stop bits: **1 STOP BIT** (Code 2.1.4.1.)
- Handshake:
  HRDWARE. Hardware (Code 2.1.5.2.)
- Operating mode: **SBI** (Code 2.1.1.1.)
- Printing: **IND.NO.** Manual without stability (Code 3.1.1.1.)

Preparation

See “Pin Assignments” and “Pin Assignment Chart”

Configuring the Interface

Parameter Settings (Menu):
Please refer to the installation and operating instructions supplied with your balance/scale.

Data Output Format with 16 Characters
Display segments that are not activated are output as spaces.

The type of character that can be output depends on the character's position:

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	D	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	–			.	.	.	.	.	.	.		*	*	*		
or	*	*	*	*	*	*	*	*	*							

*: Space
D: Digit or letter
U: Unit symbol
CR: Carriage return
LF: Line Feed
. : Decimal point

Special Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	*	*	*	*	*	*	*	*	*	*	*	CR	LF
or							H	i	g	h						
or							L	o	w							
or				C	a	l	.	E	x	t	.					

*: Space
Cal. Ext.: Calibration, external
High: Overload
Low: Underload

Error Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				E	r	r	*	#	#	#	*	*	*	*	CR	LF
				A	P	P	.	E	R	R[1)]	*	*	*	*	CR	LF
				D	I	S	.	E	R	R[1)]	*	*	*	*	CR	LF
				P	R	T	.	E	R	R[1)]	*	*	*	*	CR	LF

*: Space
#: Error number

[1)] See "Troubleshooting Guide" in the installation and operating instructions supplied with your balance/scale

Example: Output of the weight value + 123.56 g

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	*	*	1	2	3	.	5	6	*	g	*	*	CR	LF
	+	*	*	1	2	3	.	5	[	6	][1)]	g	*	*	CR	LF

Position 1: Plus or minus sign or space
Position 2: Space
Positions 3 - 10: Weight with a decimal point; leading zeros = space
Position 11: Space
Position 12 - 14: Unit symbol or space
Position 15: Carriage Return
Position 16: Line Feed

Data Output Format with 22 Characters

When data is output with an ID code, the 6-character code precedes the 16-character string described above. The code identifies the subsequent value.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
I	I	I	I	I	I	+	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
	*	*	*	*	*	–		.	.	.	.	.	.	.	.		*	*	*		
						*		*	*	*	*	*	*	*	*						

I: ID code character
*: Space
D: Digit or letter
U: Unit symbol [1)]
CR: Carriage Return
LF: Line Feed

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
N						+				1	2	3	.	5	6	*	g	*	*	CR	LF
N						+			1	2	3	.	5	[	6	]1)	g	*	*	CR	LF

1) **Identification of Non-Verified Digits:**
To have non-verified digits (when "e # d") automatically identified on the printout, set the following parameters: Communication: **PRINTER** (YDP20-0CE, YDP30) (Code 2.1.1.x). Non-verified digits are marked by square brackets [ ].

SBI mode:
When the »**SBI**« (Code 2.1.1.1.) mode is active, non-verified digits are not marked. To mark non-verified digits, configure the auxiliary device as needed.

Special Codes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
S	t	a	t	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	CR	LF
												H	i	g	h						
												L	o	w							
									C	a	l	.	E	x	t	.					

*: Space
Cal. Ext.: Calibration, external
High: Overload
Low: Underload

Error Codes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
S	t	a	t	*	*	*	*	*	E	R	R	*	#	#	#	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	A	P	P	.	E	R	R1)	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	D	I	S	.	E	R	R1)	*	*	*	*	CR	LF
S	t	a	t	*	*	*	*	*	P	R	T	.	E	R	R1)	*	*	*	*	CR	LF

*: Space
#: Error code number

1) See "Troubleshooting Guide" in the installation and operating instructions supplied with your balance/scale

Commands (Data Input Format)

You can connect a computer to your balance/scale to send commands via the balance/scale interface port for controlling balance/scale functions and applications. The commands sent are control commands and may have different formats. Control commands consist of up to 13 characters. Each character must be transmitted according to the settings configured in the operating menu for data transmission.

Format for Control Commands

Format 1:	Esc	!	CR	LF		
Format 2:	Esc	!	#	_	CR	LF

Esc: Escape (optional)
!#: Command character
_: Underline
CR: Carriage Return
LF: Line Feed (optional)

Command character	Format 1
!	Meaning
?	Placing the internal adjustment weight [1, 2)]
@	Lifting the internal adjustment weight [1, 2)]
kP	Key PRINT output to all interfaces
K	Ambient conditions: very stable
L	Ambient conditions: stable
M	Ambient conditions: unstable
N	Ambient conditions: very unstable
O	Block keys
P	Print, auto print; activate or block
Q	Beep
R	Unblock keys
S	Restart/self-test
T	Zero/Tara command
U	Key **TARE**
V	Key **ZERO**
W	Adjustment (depending on the menu setting) [2)]
Z	Perform internal adjustment [1)]

Command character	Format 2
!#	Meaning
f0_	Function key **V** [3)]
f1_	Function key **CAL** [3)]
f2_	Function key **ENTER** [3)]
f3_	Key **ZERO**
f4_	Key **TARE**
s3_	Key **CANCEL FUNCTION**
s9_	Create a screenshot on USB stick [4)]
x0_	Internal calibration [1)]
x1_	Print model number
x2_	Print serial number
x3_	Print BAC software version (old notation)
x4_	Print APC software version (old notation)
x5_	Print balance ID
x20_	Print BAC software version (new notation)
x21_	Print APC software version (new notation)

[1)] = only for balances with internal weight
[2)] = may be inaccessible on verified balances
[3)] = only for Essential Line
[4)] = only for Advanced Line

Synchronization
During data communication between the balance/scale and a connected device (computer), messages consisting of ASCII characters are transmitted via the interface. For error-free data communication, the parameters for baud rate, parity, handshake mode and character format must be the same for both units.

You can set these parameters in the Setup menu so that hey match those of the connected device. You can also define parameters in the balance/scale to make data output dependent on various conditions. The conditions that can be configured are listed in the descriptions of the application programs.

If you do not connect a peripheral device to the interface port, this will not generate an error message.

Handshake
The balance/scale interface (Sartorius Balance Interface = SBI) has transmit and receive buffers. You can define the handshake parameter in the Setup menu:
- Hardware Handshake (CTS/RTS)
- Software Handshake (XON, XOFF)

Hardware Handshake
With a 4-wire interface, 1 more character can be transmitted after CTS (Clear to Send).

Software Handshake
The software handshake is controlled via XON and XOFF. When a device is switched on, XON must be transmitted to enable any connected device to communicate.

Data Output by Print Command
The print command can be transmitted by **PRINT** or by a software command (Esc P or Esc kP).

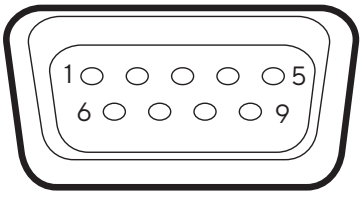
Automatic Data Output
Activate the "auto print" (Code 3.1.1.4., 3.1.1.5.) operating code to have data output to the interface port without a print command. You can have data output automatically at defined display update intervals, with or without the stability parameter. The length of a print interval depends on the operating menu settings for **AMBIENT** (ambient conditions) (menu code 1. 1. 1. x) and **AUT.CYCL.** (time-dependent autom. printing; menu code 1. 6. 3. x). If you activate the auto print setting, data will be transmitted immediately the moment you turn on the balance/scale. In the operating menu, you can define whether automatic printing can be stopped by pressing.

Pin Assignment Chart

Female Interface Connector:
Sub-D male connector 9-pin with screw lock hardware

Warning when using Pre-wired RS232 connecting cable:
The pin assignments in RS-232 cables purchased from other manufacturers may be incompatible with Sartorius weighing instruments. Be sure to check the pin assignments against the chart below before connecting the cable, and disconnect any lines identified differently from those specified by Sartorius. Failure to do so may damage or even completely ruin your balance | scale and/or peripheral device(s).

Pin assignments:

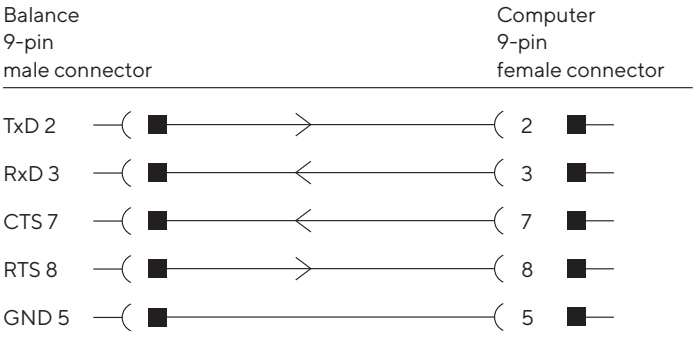


Pin 1: Not assigned
Pin 2: Data output (TxD)
Pin 3: Data input (RxD)
Pin 4: Not assigned
Pin 5: Internal ground
Pin 6: Not assigned
Pin 7: Clear to Send (CTS)
Pin 8: Request to Send (RTS)
Pin 9: Universal key

Cabling Diagram

For connecting a computer or other peripheral device to the balance using the standard DCE protocol and cable lengths of up to 15 m (approx. 50 ft).

Important: do not connect any other pins to the cable connector of the balance.



Cable type: AWG 24 specification

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