File No: SH-YF-02-00

Protocol

Protocol name: Height and weight scale serial port (Bluetooth) communication protocol (JSON version)

Version	Date	Modify information
V1.0.0	2020.1.2	Initial release, for SH-E10 and E50 devices
V1.0.1	2020.8.5	Added the function of receiving age and gender via serial port or Bluetooth
V1.0.2	2020.11.19	Add startup command with parameters
V1.0.3	2021.7.16	1. Added commands to start height, weight, blood pressure, and body composition separately 2. Added commands to obtain device unique ID
V1.0.4	2022.8.5	1. Sort and merge the received and sent fields 2. Add uid, name, remark and other fields 3. Adapt to the full range of height and weight scales, but please note that some fields may not be available due to different configurations.
V1.0.5	2024.1.12	Add temperature measurement start command (15$)

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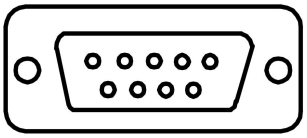
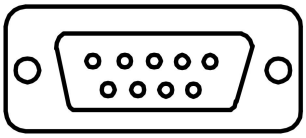
1. Interface definition

The serial data interface of the Shanghe series intelligent interconnected height and weight scale is a DB9 socket (9-pin hole).

The connection method between the DB9 interface and the host computer serial port is a direct connection.



2.TXD —— 2.RXD
3.RXD —— 3.TXD
5.GND —— 5.GND



Electronic scale serial port (DB9 hole) Host computer serial port (DB9 pin)

If the host computer does not have a serial port, you can use a USB to serial port cable to connect directly to the electronic scale.

2. Serial port settings

Baud rate	4800 (default) Can be set to 600, 1200, 2400, 4800, 9600, 14400, 19200, 115200
Check Digit	Nothing
Stop bits	1 digit
Data bits	8 digit

Note: If you need to transmit data via Bluetooth, please set the baud rate to 9600.

3.Data Format

Unless otherwise specified, the data involved in this Agreement are all strings in JSON format.

3.1 The command format sent by the host computer to the electronic scale

```
{
    “stCode” : “xxx”,          //Command field, required, detailed command explanation see Table 1
    “uid” : “12345678”,        //Identity or card number information, optional
    “name” : “Zhang San”,      //User name, optional
    “gender” : “0”,            //User gender, optional, 1-male, 0-female
```

```
        “age” : “25”,                   //User age, optional, range 6-99
        “remark” : “Remarks”            //Remarks, optional
}
```

Table 1 Command field meaning description

Object	Value	Illustrate
stCode	00$	Get the unique ID number of the device, The device returns { "rtCode" : "xxxxxxxxxxx"}
	10$	Online command, The device returns {"rtCode":"60$"}, indicating that the electronic scale is online or connected normally.
	11$	Start all measurements. The device returns {"rtCode":"11$"} and starts all measurement items in sequence.
	12$	Start height and weight measurement. The device returns {"rtCode":"12$"} and starts height and weight measurement.
	13$	Start body composition measurement. The device returns {"rtCode":"13$"} and starts body composition measurement.
	14$	Start blood pressure measurement. The device returns {"rtCode":"14$"} and starts blood pressure measurement.
	15$	Start temperature measurement. The device returns {"rtCode":"15$"} and starts temperature measurement.

3.2 Data sent by the electronic scale to the host computer

Unless otherwise specified, this data is sent in real time and is not saved or cached.

3.2.1 The data format returned by the electronic scale after receiving the command

```
{
    “rtCode” : “xxx”,                    //Command Response Field
}
```

When the device receives the command and data sent by the host computer correctly, the value of rtCode is shown in Table 1.

When the command or data sent by the host computer is incorrect, the value of rtCode is fixed to "-1". For example, when the age sent by the host computer is out of range, the device replies {"rtCode": "-1"}.

3.2.2 Identity information (need to activate identity recognition)

```
{
    “uid” : “12345678”,          //ID number or card number information, optional
    “name” : “Zhang San”,        //User name, optional
    “gender” : “0”,              //User gender, optional, 1-male, 0-female
    “age” : ”25”,                //User age, optional
    “remark” : “Remarks”         //Remarks, optional
}
```

3.2.3 Height and weight data (sent once after measurement)

```
{
    “height”: “176.8”,           //Height, unit cm
    “weight”: “79.23”,           //Weight, unit kg
    “bmi”: “25.35”               //bmi
}
```

3.2.4 Blood pressure data (sent once after measurement)

```
{
    “HBP”: “132”,                //High blood pressure (systolic blood pressure), unit mmHg
    “LBP”: “93”,                 //Low pressure (diastolic pressure), unit mmHg
```

```
        “HB”: “80”                    //Heart rate (pulse), unit beats/min
    }
```

3.2.5 Body temperature data (sent once after measurement)

```
    {
        "type": "0",                  //Type: 0 = body temperature (default) 1 = object temperature: water temperature/milk temperature, etc.
        “temp”: “36.5”                //Temperature value, unit ℃
    }
```

3.2.6 Blood oxygen saturation (sent once after measurement)

```
    {
        “spo2”: “96”,          //Blood oxygen saturation, unit %
        "hr": "78"             //Pulse  rate unit  beats/min
    }
```

3.2.7 Blood sugar (optional: uric acid, total cholesterol, hemoglobin, results will be given one by one)

```
    {
        "glu": "5.0",          //Blood sugar unit mmol/L (Note: Blood sugar is the only parameter)
        "ua": "0.52",          //Uric acid unit mmol/L
        "chol": "5.53",        //Total cholesterol unit mmol/L
        "hgb": "43.3",         //Hemoglobin unit g/dL
    }
```

3.2.8 Body composition (sent once after measurement)

```
    {
        "impedance":   "581",       //Human body impedance value, unit - ohm (Ω)
        "fatKg": "18.9",            //Fat mass,unit kg
        "fatPercent":    "23.9",    //Fat percentage, unit %
        "fatAssess": "0",           //Fat percentage assessment (0-high, 1-low, 2-normal)
        "fatRange": "11.0-16.9" ,   //Fat percentage standard range
```

```
        "waterPercent": "52.2",        //Body water content (%)
        "waterKg":   "41.4",           //Body water content (kg)
        "waterAssess":   "1",          //Moisture content assessment (0-high, 1-low,
2-normal)
        "waterRange":   "53.0-67.0", //Normal range of moisture content (%)
        "muscleKg": "57.4",            //Muscle mass (kg)
        "muscleAssess": "2",           //Muscle mass assessment (0-high, 1-low,
2-normal)
        "muscleRange": "49.5-59.3", //Muscle mass standard range (kg)
        "boneKg":   "3.1",             //Bone mass (kg)
        "boneAssess":   "2",           //Bone mass assessment (0-high, 1-low,
2-normal)
        "boneRange":   "3.1-3.3",    //Bone mass standard range
        "bmr":  "1714",                //Basal metabolism (kcal)
        "bmrAssess":    "2",          //Basic metabolic assessment (0-high, 1-low,
2-normal)
        "bmrRange":"1691",             //Minimum basal metabolic rate, the standard
should be ≥ this value
        "vfal":   "10",                //Visceral fat level
        "vfalAssess":"2",              //Visceral fat level assessment (0-dangerous,
1-normal, 2-caution)
        "vfalRange": "0-9",            //Normal range of visceral fat
        "proteinPercent":    "16.0",  //Protein rate (%)
        "proteinAssess": "2",          //Protein rate assessment (0-high, 1-low,
2-normal)
        "proteinRange": "16.0-17.9", //Protein rate standard range
        "fatSubcutKg":   "17.0",       //Subcutaneous fat mass (kg)
        "mineral": "3.3" ,             //Inorganic salt content (mineral content),
unit kg
        "waterECW": "13.4",            //Extracellular fluid, unit kg
        "waterICW": "13.4",            //Intracellular fluid, unit kg
        "bodyAge": "28",               //Physical age
        "bodyScore": "44"              //Physical score
    }
```

Appendix 1

Bluetooth property description

① **Bluetooth 2.0**

Device name	SPP-CA
Match password	1234

② **Bluetooth 4.0**

Device name	SH-eScale
Service UUID	53480001-534d-4152-542d-455343414c45
Characteristics write	53480002-534d-4152-542d-455343414c45
Characteristics notify	53480003-534d-4152-542d-455343414c45