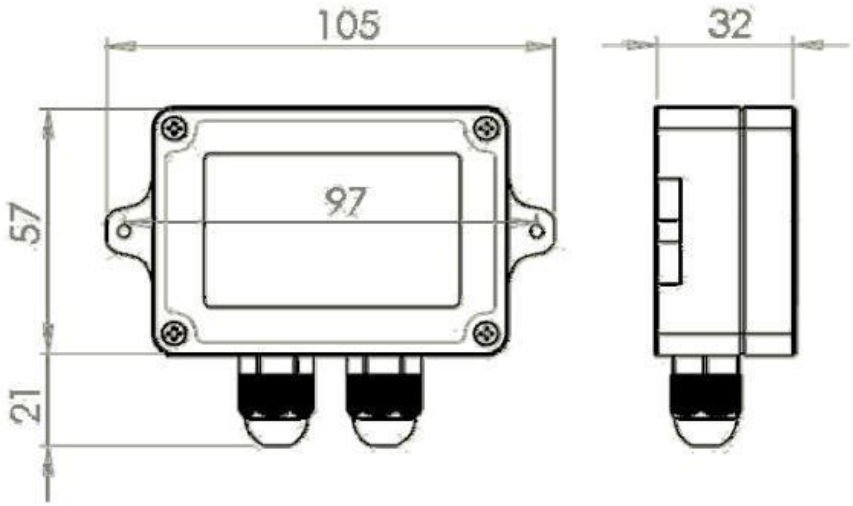
RW-ST01D 2.0 Digital Load Cell Transmitter

- Waterproof design and good sealing
- 24 bit ADC resolution and high-speed microprocessor
- Digital filter inside
- RS232 or RS485 interface, supporting MODBUS RTU protocol
- Simple communication command
- Excellent temperature stability
- Application: All full bridge stain gauge load cells for weighing, tension, compression, torque, etc.

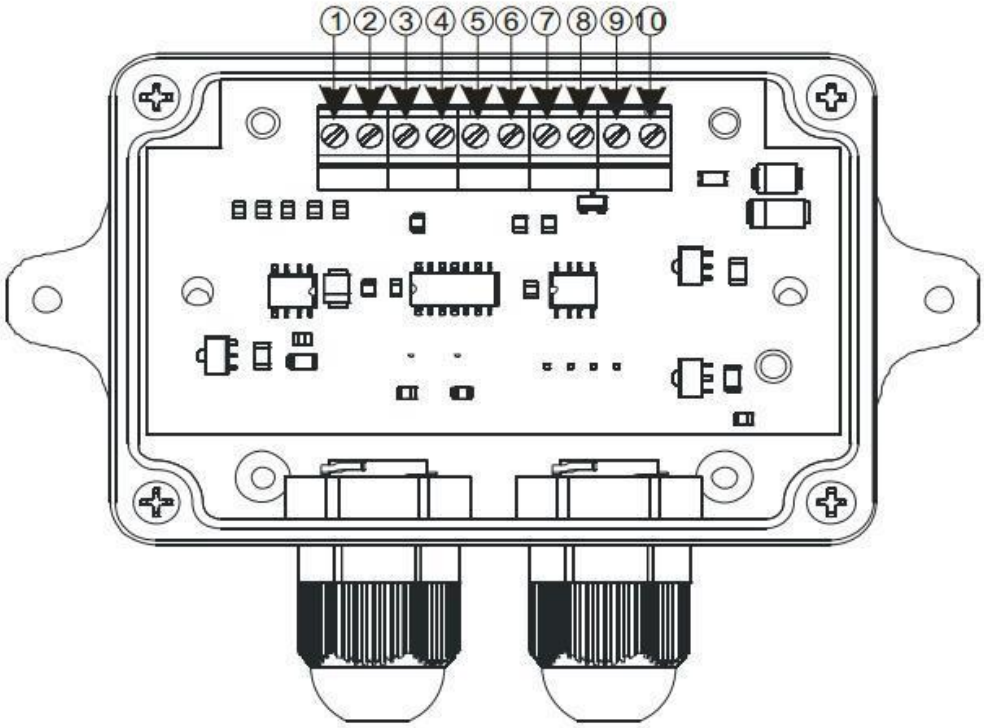
Specification

Overall Precision	0.1%±2digit	%F.S.
Resolution	>50000	Digit
Load cell Sensitivity	0.5-2	mV/V
Interface	RS232/RS485(notice us when order)	
Power Supply	12-24 Vdc	
Power	<1W (single 350Ω load cell)	
Working Environment	-30-85ºC, 85%RH	

Dimension (mm)



Wiring



Connection	No.	Description			
Load Cell	1	Load cell Excitation +			
	2	Load cell Signal Output +			
	3	Load cell Signal Output -			
	4	Load cell Excitation -			
	5	Shield			
Power Supply	6	24VDC+			
	7	24VDC-			
Communication	8	RS232	Data Transmit	RS485	DATA+/A
	9		Data Receive		DATA-/B
	10		Common		Common (Optional)

Note: when wiring, please disconnect all the equipments' power supplies at both sides of communication terminal.

MODBUS RTU protocol

1. Default Format:

   9600bps, 1 start bit, 8 data bits, no parity, 1 stop bit, communication speed and parity bit revisable

2. Default address 01, support address range:1-254. 0 is broadcast address. Please do not use broadcast address, if parallel connection more than (include two) two transmitters on same RS485 bus.

All the operation of host towards transmitter can be done by revising holding register.
See attached table 1.

Table 1: Transmitter parameters and MODBUS holding register

Parameter	Register Address (hex)	Register Address (decimal)	Access Mode	Value Range	Remarks
Measured Value	0000-0001	40001-40002	R/W	32-bit integer	Write this register to clear or preset displayed value
Device Address	0002-0003	40003-40004	R/W	1-254	MODBUS slave address
Zero Value	0004-0005	40005-40006	R/W	32-bit integer	
Calibration point	0006-0007	40007-40008	R/W	2-9	
AVP1	0008-0009	40009-40010	R/W	32-bit integer	1st calibration point AD value
AVP2	000A-000B	40011-40012	R/W	32-bit integer	2nd calibration point AD value
AVP3	000C-000D	40013-40014	R/W	32-bit integer	3rd calibration point AD value
AVP4	000E-000F	40015-40016	R/W	32-bit integer	4th calibration point AD value
AVP5	0010-0011	40017-40018	R/W	32-bit integer	5th calibration point AD value
AVP6	0012-0013	40019-40020	R/W	32-bit integer	6th calibration point AD value
AVP7	0014-0015	40021-40022	R/W	32-bit integer	7th calibration point AD value
AVP8	0016-0017	40023-40024	R/W	32-bit integer	8th calibration point AD value
AVP9	0018-0019	40025-40026	R/W	32-bit integer	9th calibration point AD value
PVP1	001A-001B	40027-40028	R/W	32-bit integer	1st calibration displayed value
PVP2	001C-001D	40029-40030	R/W	32-bit integer	2nd calibration displayed value
PVP3	001E-001F	40031-40032	R/W	32-bit integer	3rd calibration displayed value
PVP4	0020-0021	40033-40034	R/W	32-bit integer	4th calibration displayed value
PVP5	0022-0023	40035-40036	R/W	32-bit integer	5th calibration displayed value
PVP6	0024-0025	40037-40038	R/W	32-bit integer	6th calibration displayed value
PVP7	0026-0027	40039-40040	R/W	32-bit integer	7th calibration displayed value
PVP8	0028-0029	40041-40042	R/W	32-bit integer	8th calibration displayed value
PVP9	002A-002B	40043-40044	R/W	32-bit integer	9th calibration displayed value
ADC speed	0034-0035	40053-40054	R/W	0/1	10 or 40times per second
Filter Class	0056-0057	40087-40088	R/W	0-5	
Filter Band	0058-0059	40089-40090	R/W	0-1000	
Baud Rate	005A-005B	40091-40092	R/W	0-10	300-115200bps, see table 2
Zero tracking delay	005C-005D	40093-40094	R/W	0-50	Time unit:0.1 second
Zero tracking band	005E-005F	40095-40096	R/W	0-10000	
Stability Criterion of time	0060-0061	40097-40098	R/W	1-50	Time unit:01 second
Stability Criterion condition	0062-0063	40099-40100	R/W	1-100	Unit:0.5 display code
Displayed Division	0064-0065	40101-40102	R/W	1-250	
Parity Checking Bit	0066-0067	40103-40104	R/W	0-4	Serial communication parity bit, see table 3
AD Code	1F40-1F41	48001-48002	RO	32-bit integer	AD value without calibration

Table 2: Baud rate setting value

Value	Actual Baud Rate(bps)
0	300
1	600
2	1200
3	2400
4	4800
5	9600
6	19200
7	28800
8	38400
9	57600
10	115200

Table 3: Parity bit setting value

Value	Calibration Mode
0	No parity
1	Odd parity
2	Even parity
3	MARK
4	SPACE

Communication Example:

1. Read measured value: use function code 03 to read holding register. Register No. of measured value is 0000-0001(40001-40002), Length is 4 byte signed long integer. Dimension is related with calibration. For example, if load cell range is 800kg, and calibration is 800000, which means the data read is actual measured value, and unit is g. If calibration is 80000, the value unit read is 0.01kg. This transmitter does not support decimal point.

   Query message from Host:

   01 03 00 00 00 02 C4 0B (slave address: 01, function 03, read 2 consecutive holding register from 0000, the last is CRC calibration code)

   Responsive message from transmitter:

   01 03 04 00 01 05 E2 28 EA (slave address: 01, function: 03, responsive 4 byte data: 00 01 05 E2, which means decimal 67042, that is, measured value is 67042, the last is CRC calibration code)

2. Setting transmitter device address: use function code 10 to write many holding register. For example: the original device address is 01, need to revise to 10.

   Query message from Host:

   01 10 00 02 00 02 04 00 00 00 0A F2 71 (slave address is 01, function:10, write 2 consecutive holing register from 0002, total data bytes:4, new address 10 is changed to 32-byte hex 00 00 00 0A, the last is CRC calibration code)

   Responsive message from transmitter:

   01 10 00 02 00 02 E0 08 (slave address: 01, function: 10, write 2 consecutive holding register from 0002, the last is CRC calibration code)

3. Clear: write measured value register 0 directly. If need to show other value, please write the corresponding value to make display presetting. However, please note that this operation could not save zero value in the inner part of transmitter, when power up next time, it will return to original set value.

   Query Message from Host:

   01 10 00 00 00 02 04 00 00 00 00 F3 AF (slave address:01, function: 10, write 2 consecutive holding register from 0000, total data bytes: 4, set displayed value 0, the last is CRC calibration code)

   Responsive Message from transmitter:

   01 10 00 00 00 02 41 C8 (slave address: 01, function 10, write 2 consecutive holding register from 0000, the last is CRC calibration code).

4. Zero setting:

   First read present displayed value, and then write it into transmitter zero point register. Please note that do not make clear before this operation. Writing zero tracing value 0 is used for factory testing. So we suggest using clear function, so as not to shorten service life of inner part of transmitter,

5. MODBUS Command Calibration

   We suggest using transmitter as AD module, and make calibration calculation on host. Please check below methods to make transmitter calibration through MODBUS command.

   - Weighing nothing, read AD code 32 times (register 1F40-1F41), get average value, write it into AVP1 and write 0 for PVP1
   - For standard loading, read AD code 32 times (register 1F40-1F41), get average value, write it into AVP2, write standard load value for PVP2. Please note that this value decides (affect) resolution of transmitter. For example, if standard load is 10kg and need resolution to show 1g, 10000 must be wrote.
   - If write calibration point 2, calibration is finished.
   - If need to make multi-calibration, make standard load incremented repeatedly, read AD code, write into corresponding register and revise register value of calibration point.