MICROCYBER

NCS-HM105

HART Modem

User Manual

Warning

1. It is forbidden for users to disassemble the temperature module by themselves.
2. Please check if the supply voltage meets the power supply voltage requirements in the manual.

Version：V3.0

Disclaimer

The contents of this manual have been checked to confirm the consistency of the hardware and software described. Because errors cannot be completely eliminated, absolute consistency cannot be guaranteed. However, we will regularly review the data in this manual and make necessary corrections in subsequent versions. Any suggestions for improvement are welcome.

Microcyber Corporation 2019

Technical data changes at any time.

Company Introduction

Microcyber Corporation，established as a high-tech enterprise by the Shenyang Institute of Automation Chinese Academy of Sciences, mainly engages in advanced industrial control systems, equipments, instruments and chips for industrial process automation control solutions in the research, development, production and application. Microcyber undertakes a number of national scientific and technical key task and “863” project, and has Liaoning

Province networked control systems engineering research center. The company successfully developed the FF H1 fieldbus protocol stack which is number one to be approved

internationally in China, and the Industrial Ethernet Protocol(HSE) which is number one to be approved in China, and the domestic first fieldbus instrument which has a function of national-level intrinsically safe explosion--proof and safety barrier. Also Microcyber participated in the drafting of the domestic first Ethernet-based industrial automation protocol standards (Ethernet for Plant Automation, EPA). As a result, serial products are composed of configuration, control software, embedded software, control system, instrument chip to the

OEM board, and make Microcyber be an industrial automation products provider in full range, and also further Microcyber‟s leading position in the field of fieldbus technology.

Microcyber is the FF member, the HART member and the Profibus National Organization (PNO) member.

Microcyber passes the Authentication of ISO 9001 Quality System, and has an outstanding innovative R&D team, plentiful practical experiences of design of the Automatic engineering, a leading product series, a huge market network, a strict quality management system and an excellent enterprise culture. All these further a solid foundation of entrepreneurship and sustainable development for Microcyber.

Carrying the ideals of employees, creating customer value and promoting enterprise development.

Microcyber is making progress with China.

Chapter 1 Overview

The numerical transmission and control signals of industrial automation instruments are being upgraded from traditional 4-20mA analog signal to industrial fieldbus with digital communication functions. HART fieldbus has the function of digital communication and it is compatible with 4~20mA analog signal, which is widely used now.

Microcyber HART Modem provides two kinds of PC interface. HM105-RS232 is a converter between HART bus signal and RS-232 serial signal. HM105-USB is a converter between HART bus signal and USB virtual serial signal.

Figure 1 HM105 HART Modem

1.1 Features

- Voltage-mode modem signal
- Compliance with HART (FSK) Physical Layer Specification
- Transformer isolation to avoid grounding effect
- Low power design without external power supply
- Two Choices with USB Port and Serial Port
- USB HART signal modem can supply external power
- The output amplitude of RS232A HART signal modem is adjustable

1.2 Structure

1.2.1 Dimension

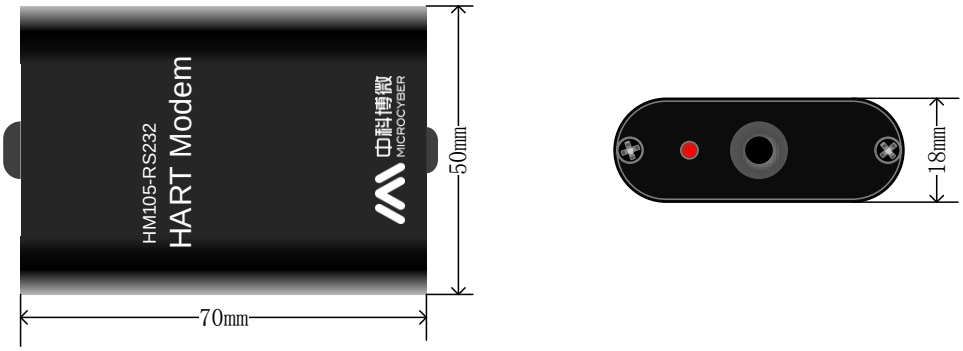


Figure 2 Dimension（70*50*18，unit mm）

1.2.2 Structure

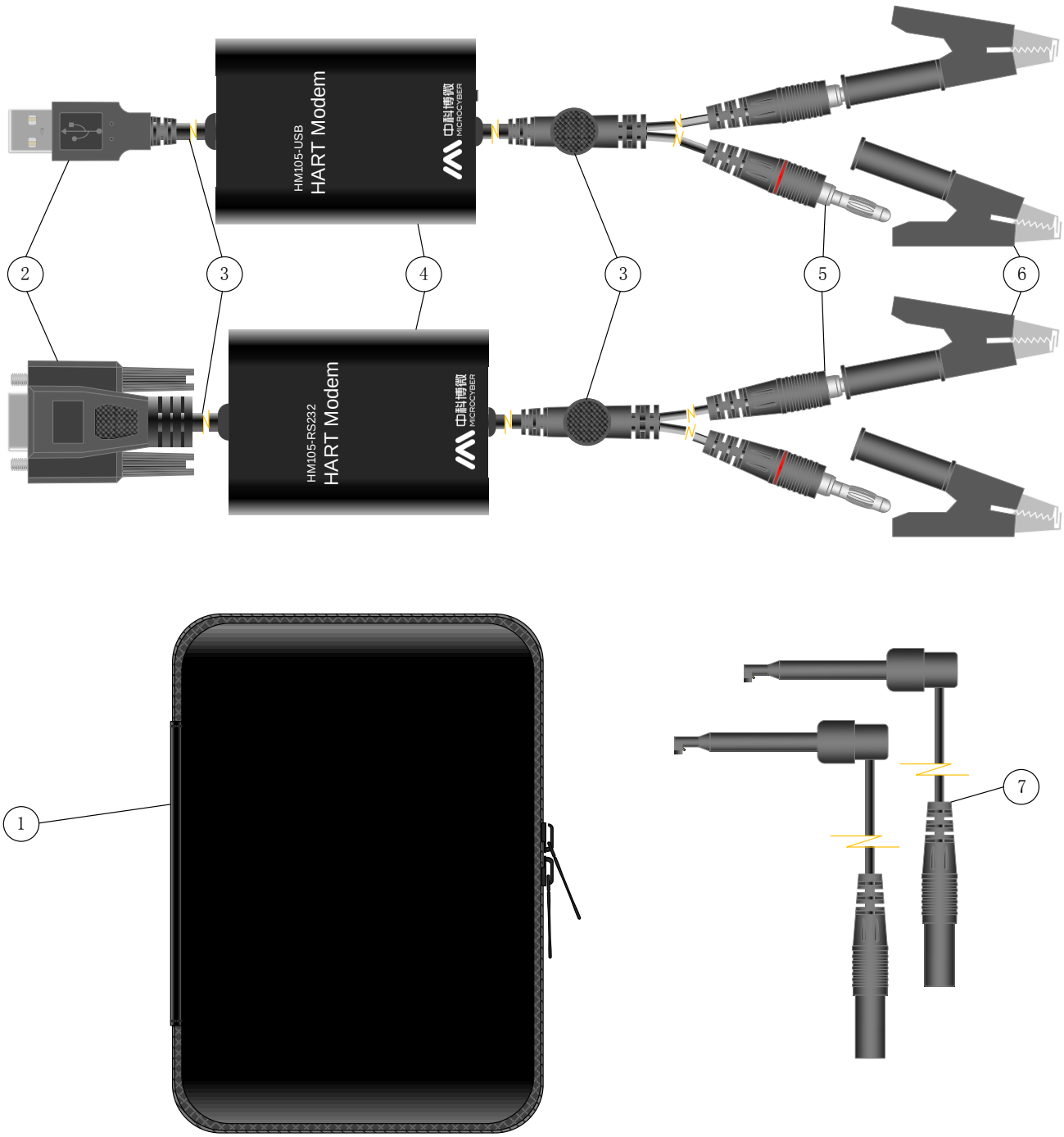


Figure 3 Structure

HM105-USB type

1	Packaging box	2	USB interface	3	lines (total length 2m)	4	HART Modem
5	Banana head	6	crocodile clamp	7	test hook		

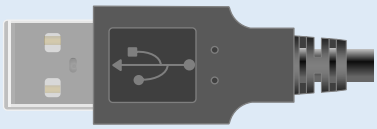
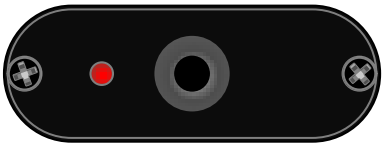
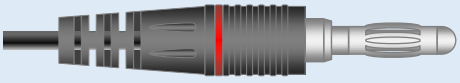
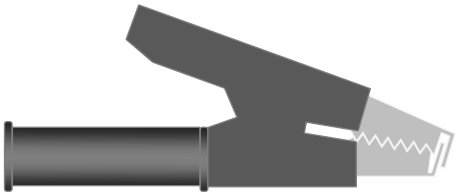
HM105-RS232 type

1	Packaging box	2	RS232 interface	3	lines (total length 2m)	4	HART Modem
5	Banana head	6	crocodile clamp	7	test hook		

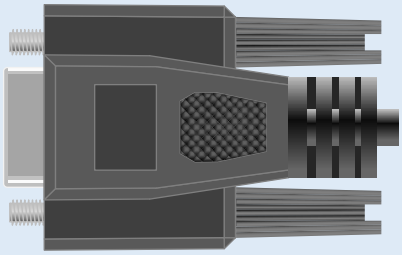
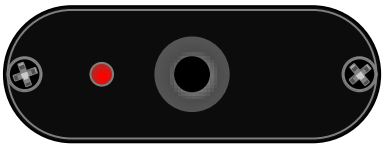
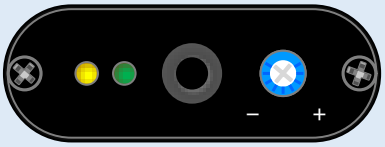
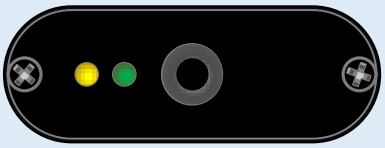
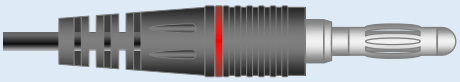
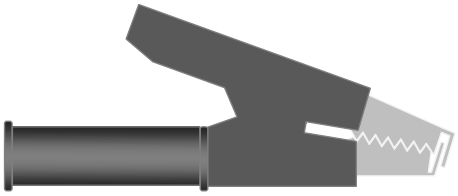
Chapter 2 Installation and Usage

2.1 Interface Description

2.1.1 HM105-USB

Interface	Description
	**USB interface** Used to connect PC, optional to external power supply.
	**Red indicator** The power supply indicator lights up to indicate that the power supply is normal.
	Yellow indicator The data receiving indicator lights up to indicate that the data is being received. **Green indicator** The data sending indicator lights up to indicate that the data is being sent. **Power supply switch** Turn ON, turn on external power supply, supply voltage 24V, and provide 250 ohm resistance. Turn OFF, turn off external power supply, do not provide 250 ohm resistance.
	Banana plug Used to connect alligator clips or hook test clips. When the power supply switch is ON, the banana plug is the negative pole of the power supply.
	**Banana plug** Used to connect alligator clips or hook test clips. When the power supply switch is ON, the banana plug is the positive pole of the power supply.
	**Alligator clips** Used to connect HART bus, can be replaced by a hook test clips.
	Hook test clips Used to connect HART bus, can be replaced with alligator clips.

2.1.2 HM105-RS232 Interface

Interface	Description
	**RS232 interface** Used to connect a PC.
	**Red indicator** Serial port enable indicator, when the serial port is properly connected, it lights up.
 RS232-A  RS232-B	**Yellow indicator** Data receiving indicator, lit to indicate that data is being received **Green indicator** Data transmission indicator, lights up to indicate that data is being sent **Amplitude knob（RS232-A type has，RS232-B type has not）** Turn left to decrease the amplitude Turn right to increase the amplitude
	Banana plug Used to connect alligator clips or hook test clips.
	**Banana plug** Used to connect alligator clips or hook test clips.
	**Alligator clips** Used to connect to the HART bus. Can be replaced with a hook test clips.
	Hook test clips Used to connect to the HART bus. Can be replaced with an alligator clip.

2.2 How to use

The HM105 is a signal converter between the HART-protocol field device and the PC running the configuration software. See below for details.

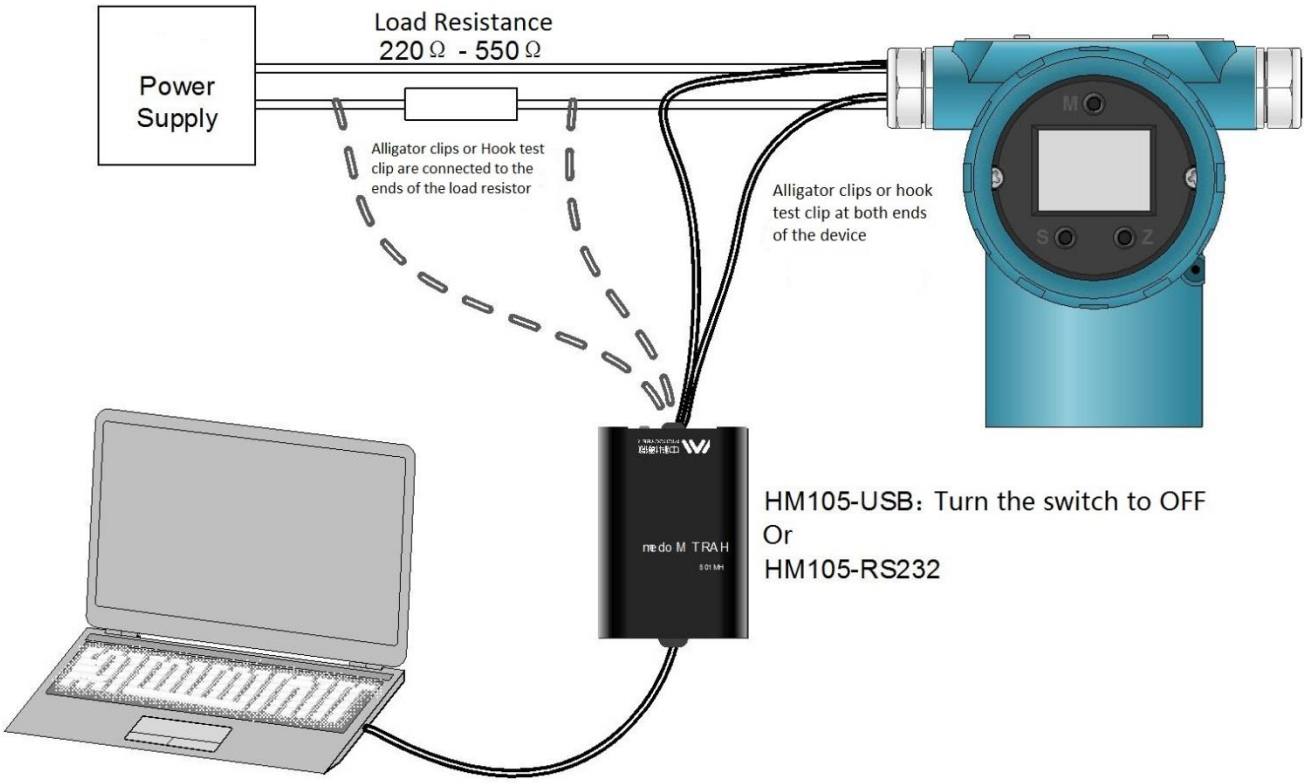


Figure 4 HM105-USB（OFF）or HM105-RS232 Wiring diagram

When connecting multiple HART devices, the above figure is based. Connect the remaining HART devices to the HART devices in the figure. Note that the power supply needs to support multiple devices. The load resistors are connected in series between the power supply and the device.

This product is a voltage-modulated HART signal modem. The two non-polar alligator clips on the HART interface are clamped to the HART load resistors at both ends of the HART load resistor or at both ends of the field device power supply. Connect the other end of the product to the USB port of the PC (when the HM105-RS232 modem is used, the 9-pin serial port) to connect to the PC.

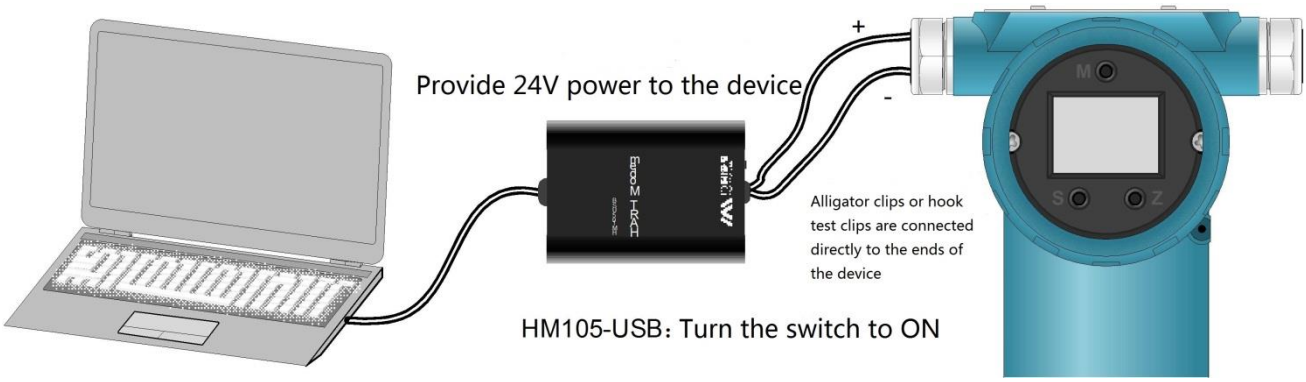


Figure 5 HM105-USB（ON）Wiring diagram

When using HM105-USB modem, the PC needs to install the included USB to serial port driver. The running configuration software uses the virtual serial port provided by the driver. When using HM105-RS232 modem, the configuration software uses the serial port provided by the host. 1200 bps half-duplex asynchronous serial communication via modem and field devices

The HM105-USB uses a FTDI chip to provide a virtual COM port (VCP) that supports Windows, Linux, Mac OS, Windows CE and other operating systems. Driver and system support, please see the following URL: https://www.ftdichip.com/Drivers/VCP.htm

Chapter 3 Technical Specifications

3.1 HM105-USB type performance index

Ambient Temperature	-20℃ ～ 50℃
Isolation Voltage	1000VAC
Receiving Impedance	⩾ 5 KΩ
Receiving Sensitivity	120 mVpp
Output Amplitude	500 mVpp (@ 500 Ω)
24V Output	< 40 mA

3.2 HM105-RS232 type performance index

Ambient Temperature	-20℃ ～ 50℃
Isolation Voltage	1000 VAC
Receiving Impedance	⩾ 5 KΩ
Receiving Sensitivity	120 mVpp
Output Amplitude	60 mVpp ～ 330 mVpp (@ 250 Ω)

Appendix 1 Selection Code Table

NCS-HM105	**HART signal modem**	
	Code	Description
	RS232A	RS232 Interface - adjustable amplitude
	RS232B	RS232 Interface - amplitude is not adjustable
	USB	USB Interface
NCS-HM105 -	RS232A	—— Selection example

Microcyber Corporation
http://www.microcyber.cn/en
Add：17-8 Wensu Street, Hunnan New District, Shenyang, China 110179
Tel：0086-24-31217278/ 31217280
Fax：0086-24-31217293
Email：sales@microcyber.cn