INTRODUCTION

As intelligent transition device, NCS-IF105 converter receives 0 ~ 20mA or 4 ~ 20mA analog signal (4 channels) and converts into fieldbus signal. NCS-FI105 converter uses digital communication technology, and makes the interface between field device and controller easier, and reduces the expense of installation and maintenance.

NCS-IF105 converter fulfils the need of FF fieldbus intelligent instrument and can connect with several FF fieldbus devices. NCS-IF105 converter has abundant function blocks and realizes not only normal measurement function also complex control strategy. In order to realize different function, user can choose different function blocks according to requirements and specific application environment.

INSTALLATION

For installation of NCS-IF105 converter, three types of bracket (pipe mounting flat bracket, plate mounting angle bracket and pipe mounting angle bracket) are provided. Accordingly there are three installation methods as the following.

The installation of pipe mounting flat bracket:
the typical installation as Figure 2.1 shows. Fix NCS-IF105 converter in flat bracket using four bolts provided, and then fix the flat bracket on the vertical pipe in Φ50mm around through the U-shape bolt provided.

The installation of plate mounting angle bracket:
the typical installation as Figure 2.2 shows. Fix NCS-IF105 converter in angle bracket using four bolts provided, and then fix the angle bracket on the plate through the M10 bolt not provided.

The installation of pipe mounting angle bracket:
the typical installation as Figure 2.3, 2.4 shows. Fix NCS-IF105 converter in angle bracket using four bolts provided, and then fix the angle bracket on the horizontal pipe in Φ50mm around through the U-shape bolt provided.
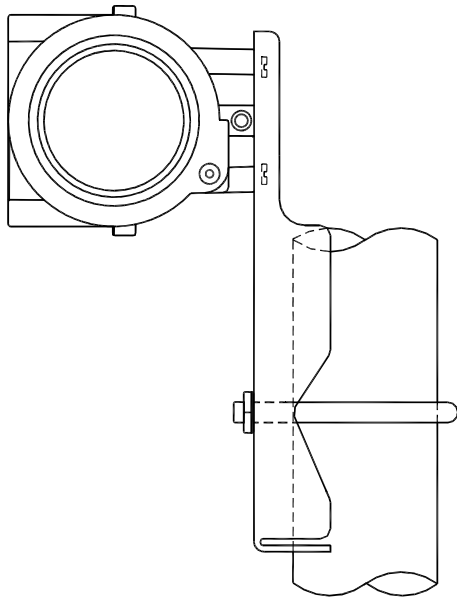
Figure 2.1 The installation of pipe
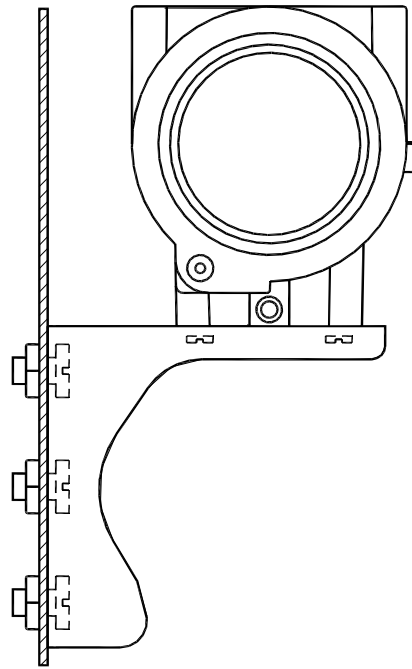
mounting flat bracket

Figure 2.2 The installation of plate
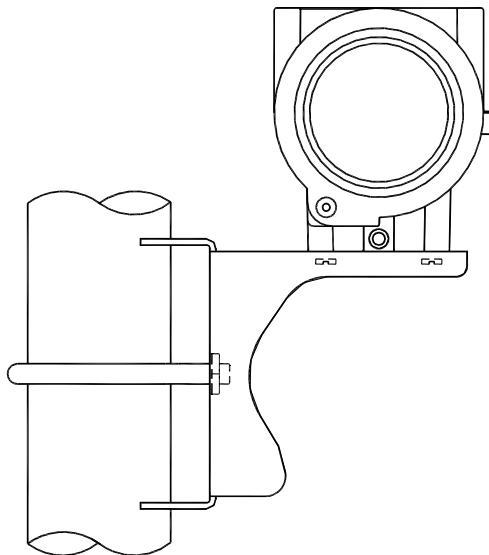
mounting angle bracket

Figure 2.3 The installation of pipe
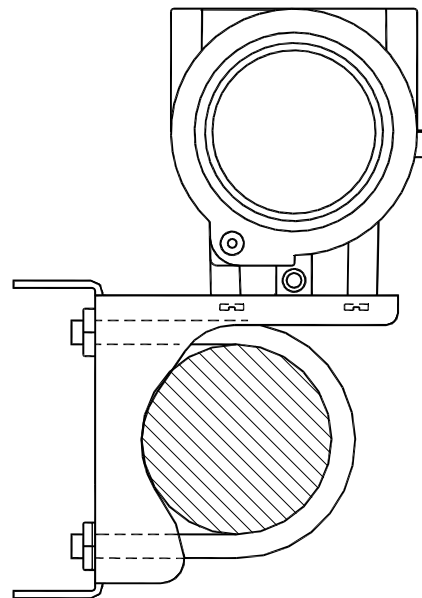
mounting angle bracket-1

Figure 2-4 The installation of pipe

mounting angle bracket-2

WIRING

The power and signal of NCS-IF105 converter Transmitter are sharing one pair of cables (Bus Cable). NCS-IF105 converter is suggested to use specific Fieldbus cables recommended by the IEC61158-2. The wiring terminal is at the rear cover side, the wiring terminal board could be seen when the rear cover is screwed.
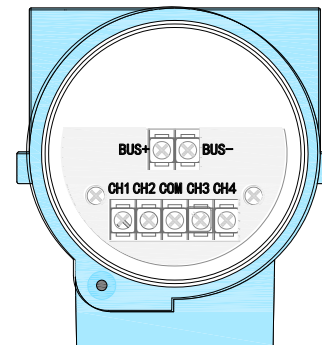

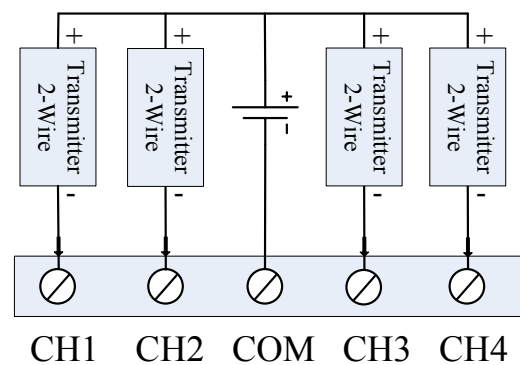Figure 2.5 The wiring terminal board of NCS-IF105 Converter

Figure 2.6 Wiring of NCS-IF105 Converter (2- Wire)

Signal wires should be passed the wire hole. Sensor signal wires are single-point grounding. The Shield of the bus cable should be floating in converter side, and be grounding in bus power side.

The signal and bus cable should not share the line pipe or trunkings with other equipment, and should stay away from high-power equipment.
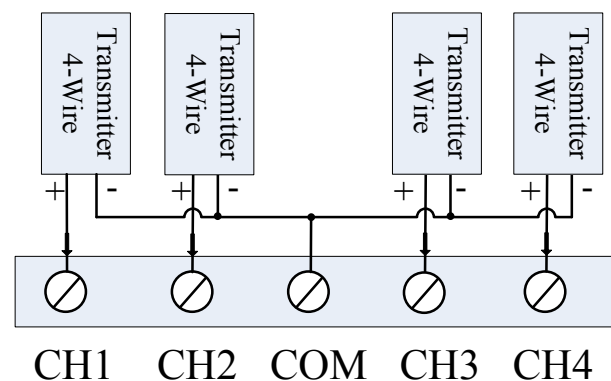

Figure 2.7 Wiring of NCS-IF105 Converter (4- Wire)

PRINCIPLE & STRUCTURE

NCS-IF105 converter convert input current signal that generate by most conventional transmitters to fieldbus signal. NCSIF105 converter is consisted of five components, as shown in Figure 3.1.

1. Terminal board: it is used to connect with fieldbus, current output signal, A/D board and communication board.

2. A/D board: it can convert input current signal to digital signal provided to communication board.

3. Communication card: it is core component of intelligent instrument, which implements the communication, control, diagnosis and maintenance of Foundation Fieldbus.

4. Isolation board: it is used for isolation between communication board and instrument board (power isolation and signal isolation).

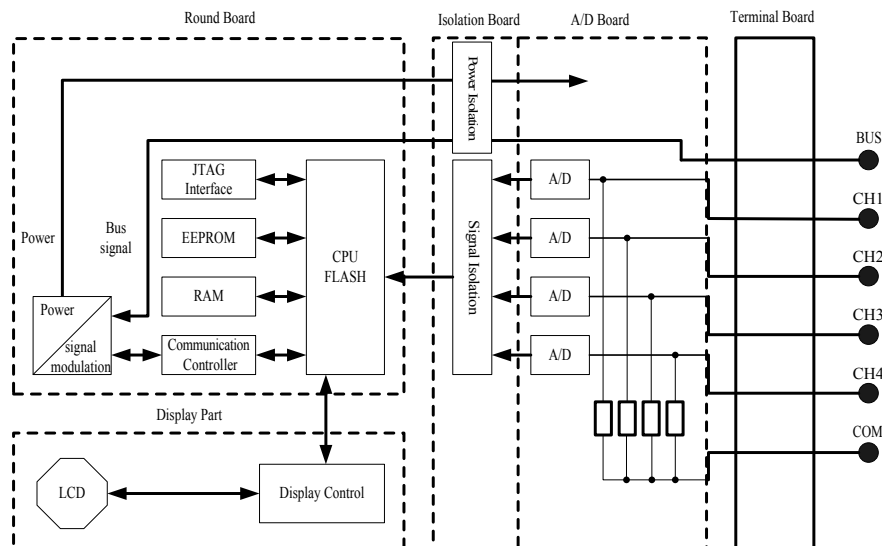5. LCD Card (optional): it is used to display function block parameters.

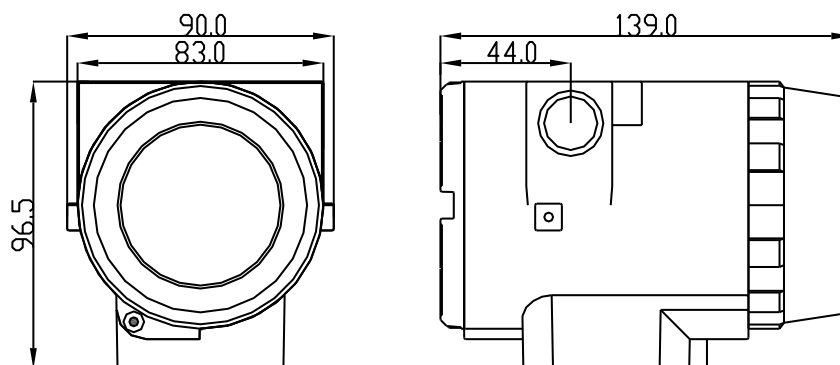Figure 3.1 Schematic diagram of NCS-IF105 converter

● **Size of NCS-IF105 Converter**

Figure 3.2 Size of NCS-IF105 Converter (unit: mm)
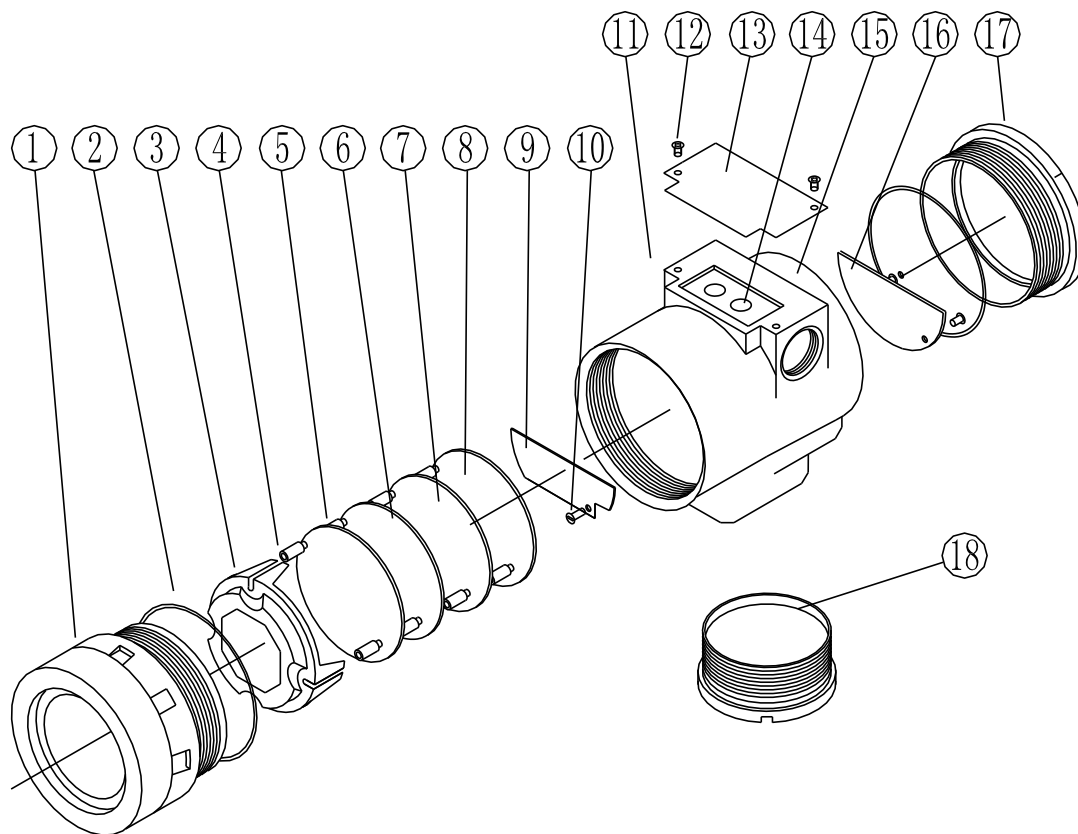
STRUCTURE OF NCS-IF105 CONVERTER

Figure 3.3 Structure of NCS-IF105 Converter

1	Front cover	2	O-ring	3	LCD cover	4	Electronics/LCD
5	Post	6	Communication board	7	Capture board	8	Isolation board
9	Terminal board	10	Screw	11	Wire hole	12	Screw
13	Name plate	14	Z/X button	15	Housing	16	Pin/block
17	Rear cover	18	Button cover				

As the core of NCS-IF105 converter, the Communication Card connects with terminal board, isolation board, instrument board and LCD board. The LCD board rotated in four angles is fixed on the Communication board, as Figure 3.4 shows.
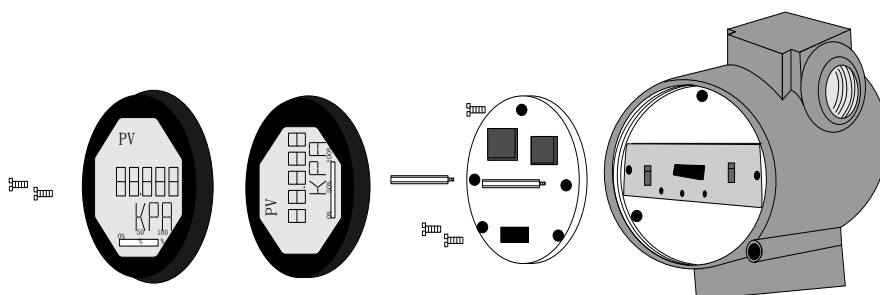
Figure3.4 Assembly structure of the meter

TRANSMITTER CONFIGURATION

Network Topology

FF transmitter supports many kind of connection,As shown in figure 4.1. The classic connection modes for a FF device is bus connection, As shown in figure 4.2.The matching resistance on the both side of terminal ensures a good quality of signal. The maximum length of fieldbus is 1900 meters and can be prolonged to 10 kilometers using repeaters.

Figure 4.1 FF Network Topology

Figure 4.2 FF Bus Connections

FUNCTION BLOCKS

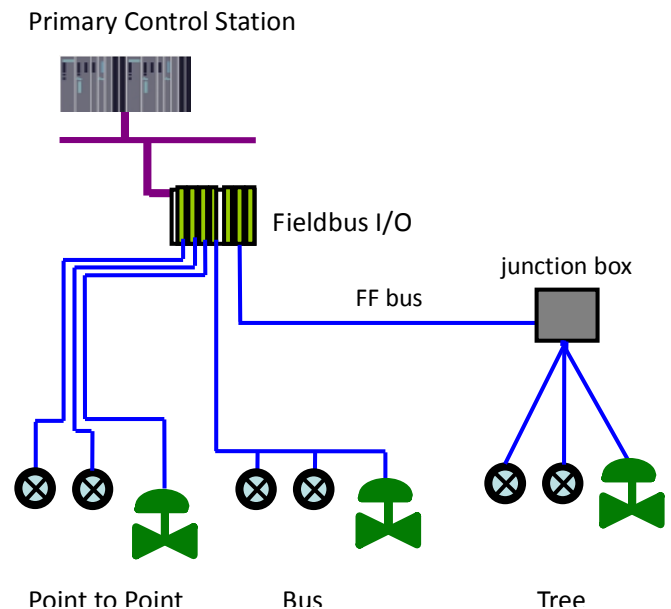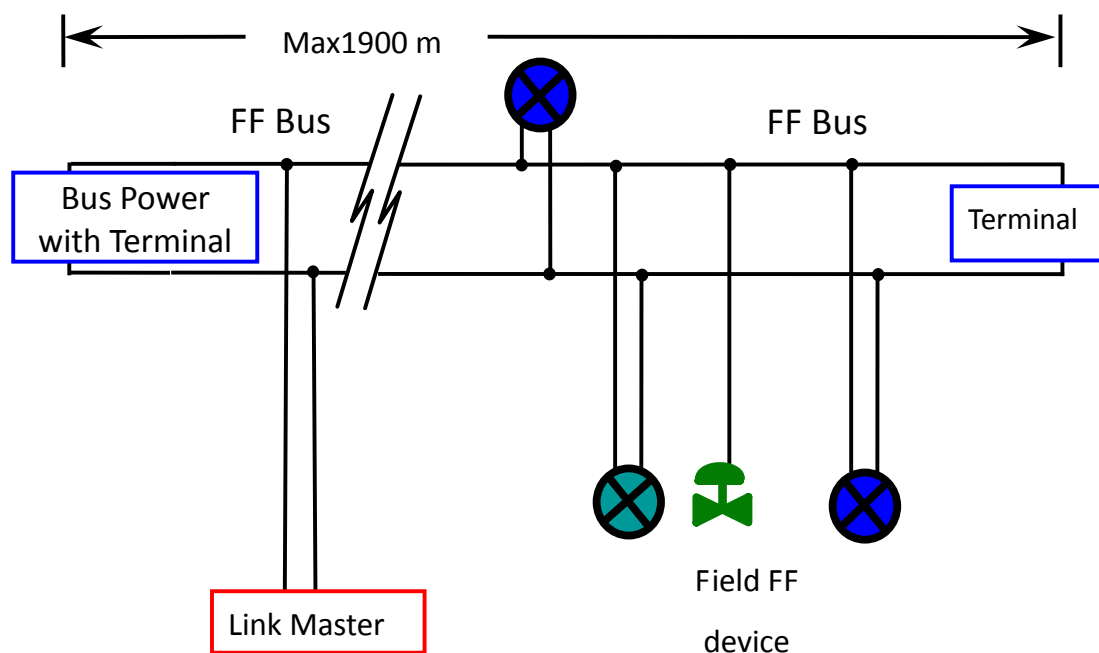| Function Block	Description
Resource	This block contains data from the hardware that is associated with the resource.
Transducer Block	This block converts input/output device variables into relevant engineering data.
Display Transducer	This block configures process variables displayed in LCD.
Analog Input	This block transmits the input data from the transducer block to other function block. It has scaling conversion, filtering, square root and low cut, etc...
PID Control	This block has a lot of features as set point treatment (value and rate limiting), filtering and alarm on PV, feed forward, output tracking and others.
Ratio	This block realizes ratio control between two input data.
Input Selector	This block has four analog inputs that may be selected by an input parameter or according to a criterion as first good, maximum, minimum, middle and average.
Signal Characteristic	This block has capability for two signal characteristics based on the same curve. The second input has an option for swapping "x" to "y", and inverse function may be used in signal characteristic of read back variables.
Lead Lag	This block provides dynamic compensation of a variable. It is used normally in a feed forward control.

CONFIGURATION

NCS-IF105 transmitter can be configured by the Configurator software and NCS4000 DCS software of Microcyber Inc, NI-FBUS Configurator of National Instrument, and DeltaV system of Rosemount.

• Environments

1. Windows 2000 or Windows XP system;

2. NCS-LD105 Linking Device, H1 Bus Power, H1 Terminal Matcher;

3. FF Configurator;

• Two point calibration

The transmitter can be calibrated by the parameter CAL_POINT_HI and CAL_POINT_LO:

1. Input the standard current signal to the channel that will be calibrated. Such as 4 mA.

2. Read the actual current value from the parameter PRIMARY_VALUE of transducer block. For example, it is 3.9 mA.

3. Set the mode of transducer block to O/S, and then change the parameter SENSOR_CAL_METHOD to "User Trim Standard Calibration".

4. Write the value of 4 mA to the parameter CAL_POINT_LO. If the parameter is written with no error, the low calibration would be successful. **Please note that calibration value must be in the range of sensor maximum measurement. The calibration value must not have much difference from actual value, or the calibration will be failed.**

5. Set the mode of transducer block to AUTO.

6. The upper value calibration is the same the lower value calibration. Please write the new upper value to the parameter CAL_POINT_HI while calibrating.

• LCD Configuration

By default, the transmitter LCD displays the parameter PRIMARY_VALUE value of the first channel of transducer block. As is shown in the figure 4.3, if user need displays other parameter of other block, please follow the steps below. (X is equal to 1, 2, 3 or 4, the LCD display transducer block can display four kinds of parameter cicely.) The LCD will show CONFIG_ERR if it receives a wrong configuration parameter. Please set the mode to O/S and correct the configuration parameter then set the mode back to AUTO so that it display normally.

1. BLOCK_TAG_X: This parameter defines the tag name of function blocks. For example, if user wants

to display a parameter of AI1 function block, he should write "AI1" to this parameter. **Please note that the length of written char should be equal to 32 bytes. If the length of char is smaller than 32, please insert blank char to make its length equal to 32.**

2. RELATIVE_INDEX_X: This parameter defines the index of the parameter of function blocks. For example, if user wants to display the OUT parameter of AI1 block, please write 8 to the RELATIVE_INDEX_X.

3. SUB_INDEX: This parameter defines the sub index of the parameter of function blocks. For example, if user wants to display the OUT.VALUE of AI1 block, please write 2 to this parameter.

4. MNEMONIC_X: This parameter defines the text which will be displayed in the LCD. The maximum length of text is 16 bytes.

5. DECI_PNT_NUMB_X: This parameter defines the position of decimal point for displayed value.

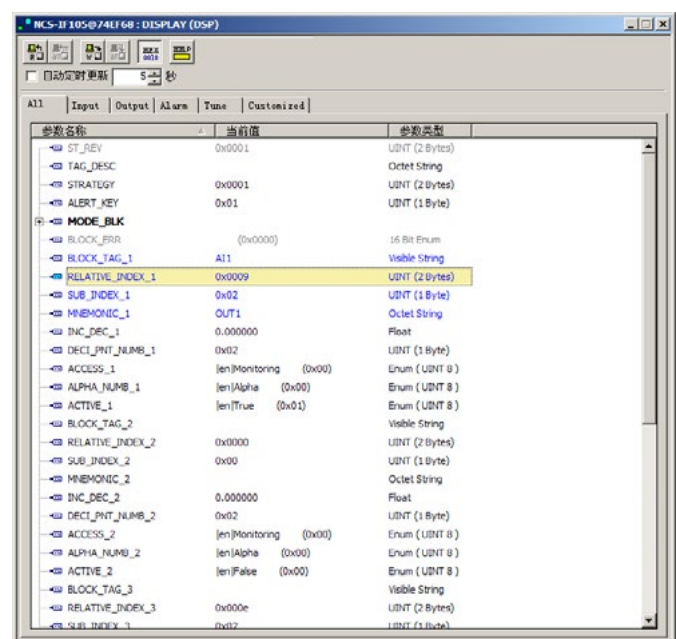6. ACTIVE_X: This parameter wills active the display function of the group.

Figure 4.3 LCD Configuration

JUMPER

NCS-IF105 transmitter has three hardware jumpers:

SIM Jumper: Simulate jumper. It enables the simulation of the transmitter.

WP Jumper: Hardware write lock jumper. It can prevent operator from changing the configuration of the transmitter.

RST Jumper: Factory default reset jumper. It will set the configuration of transmitter to factory default value.
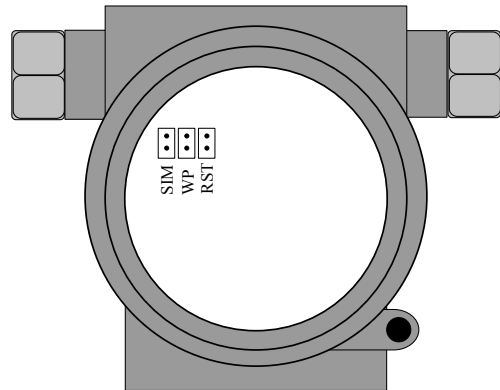

Figure 4.4 NCS-IF105 transmitter hardware jumpers

MAINTENANCE

Phenomenon	Solution
No Communication	**Transmitter connection** - Check the bus connection - Check the polarity of bus power - Check shield of bus cable, if it is single point earthing
	Bus power - Bus power should in the range 9 ~ 32V for the transmitter. - Bus noise and ripple should fulfill: 1. peak to peak value noise is 16mV, 7 ~ 39kHz; 2. peak to peak value noise is 2V, 47 ~ 63HZ, for non EX 3. peak to peak value noise is 0.2V, 47 ~ 63HZ, for EX 4. peak to peak value noise is 1.6V, 3.9M ~ 125MHZ
	Network connection - Check network topology structure - Check terminal matcher and wire connection - Check the length of main trunk and branch
	Address conflict The factory default address if a temporary address from 0xF8 to 0xFB. If there are more devices with temporary address, some device will not communicate online. Please insure that there are not too many devices with temporary address on the bus.
	Transmitter fault - Replace the transmitter with others

MAINTENANCE

Phenomenon	Solution
Fail to read value from transmitter	**Transmitter connection** - Check if it is short circuit or open circuit - Check if it is the fault of transmitter itself
	Noise disturb - Check if the earthing is correct - Check if the terminal is wet - Check if the cable is far from the strong Electromagnetic Interference
	Software configuration - Check the function block configuration
	Transmitter fault - Replace the transmitter with others

TECHNICAL SPECIFICATION

Basic parameters

Input signal	4 ~ 20mA
Channels	4 Channels
Power supply	9 ~ 32 VDC; Current Dissipation (static): ≤ 14mA
Fieldbus Signal	Communication Baudrate 31.25kbit/s, current-mode
Insulation	Between housing and termincal board: 500 Vrms (707 VDC)
Display	6 bits digital number and 5 bits characters LCD display (Optional)
Temperature range	-40 ~ 85 (No display) -30 ~ 70 (Display)
Humidy Range	0% ~ 100% RH
Start Time	≤ 5s
Protection grade	IP65
EMC	Designed to comply IEC 61000

TECHNICAL PERFORMANCE

Accuracy	< 0.05 %
Input impedance	150 Ω
Temperature effect	< ± 50 ppm/°C

PHYSICAL PERFORMANCE

Electrical connection	1/2 - 14 NPT
Material of Construction	Aluminium
Weight	1.1 kg