MICROCYBER

NCS-FI105

Fieldbus to Current Converter

Contents

Brief Introduction

NCS-FI105 fieldbus to current Converter is used to convert fieldbus signals to conventional analog signals. It can receive fieldbus signals, and convert them to 4-channel 4~20mA analog signals. NCS-FI105 is the converter between fieldbus system and control valve/other actuator.

NCS-FI105 is an intelligent instrument and complies with FF Fieldbus Specification. It can be interlinked with several FF equipment. Abundant function blocks are integrated into NCS-FI105, and so it can complete not only the general measuring but also the complex controlling strategy. According to the requirement and actual application environment, the users can choose different function blocks to implement different function.

NCS-FI105 utilizes digital technology, which simplifies the interface between the control center and the field equipment. And so the expense of installing, running and maintenance can be reduced.

Installation

Installation

For installation of NCS-FI105 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-FI105 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-FI105 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-FI105 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.

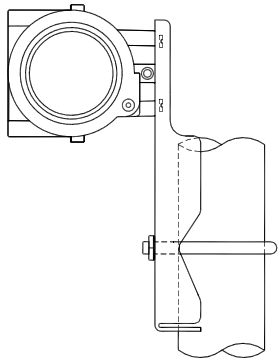

Figure 2.1 The installation of pipe mounting flat bracket

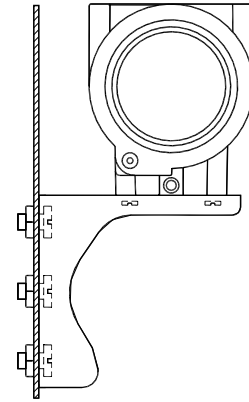

Figure 2.2 The installation of plate mounting angle bracket

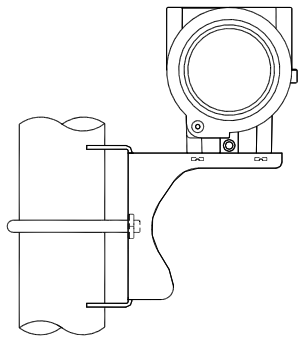

Figure 2.3 The installation of pipe mounting angle bracket-1

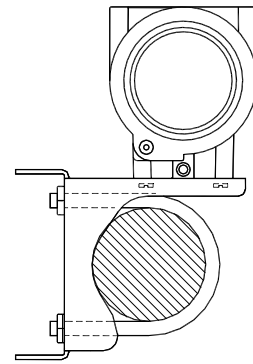

Figure 2-4 The installation of pipe mounting angle bracket-2

Wiring

The power and signal of NCS-FI105 converter Transmitter are sharing one pair of cables (Bus Cable). NCS- FI105 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.

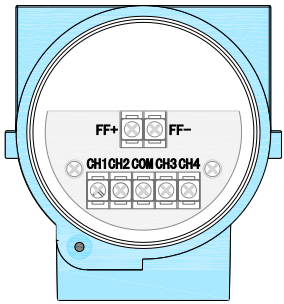

Figure 2.5 The wiring terminal board of NCS-FI105 Converter

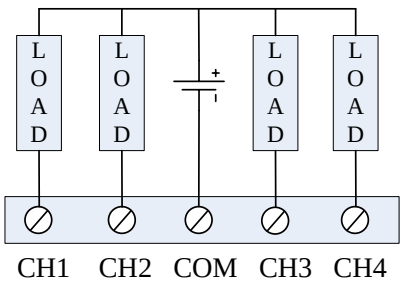

Figure 2.6 Wiring of NCS-FI105 Converter

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.

Principle and Structure

NCS-FI105 converter convert fieldbus signal signal to input current(4-20mA).

NCS-FI105 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, D/A board and communication board.
2) D/A board: it can convert digital signal provided to communication board to input current signal.
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.

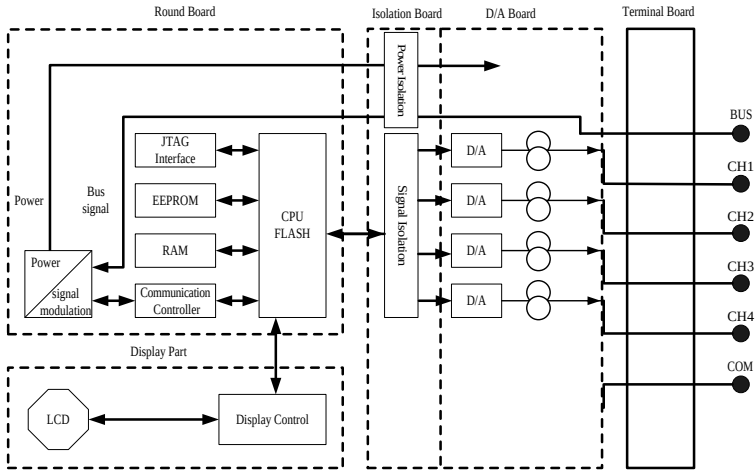

Figure 3.1 Schematic diagram of NCS-FI105 converter

- **Size of NCS-FI105 Converter**

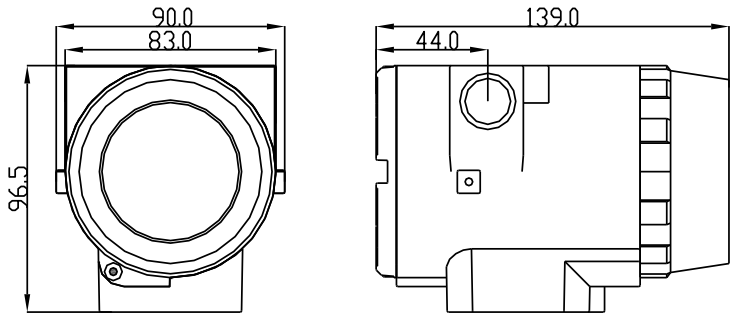

Figure 3.2 Size of NCS-FI105 Converter (unit: mm)

- **Structure of NCS-FI105 Converter**

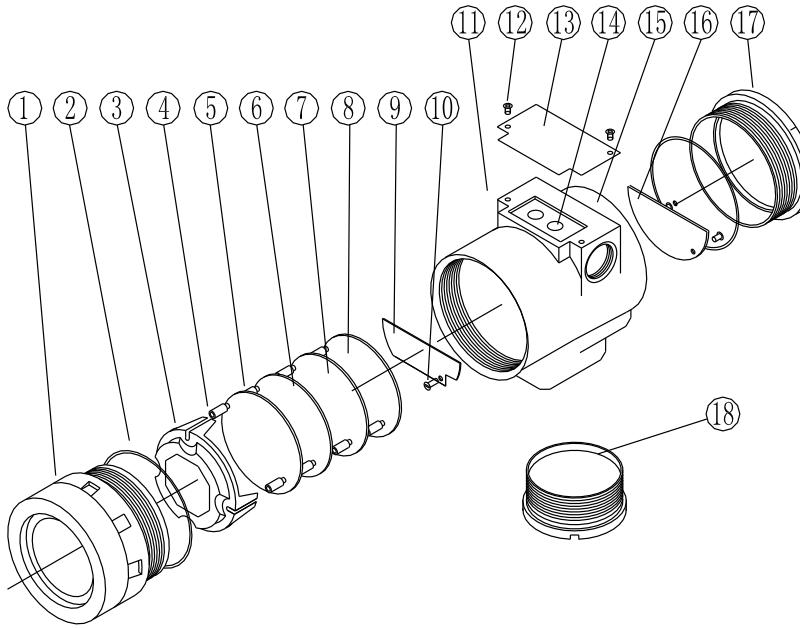

Figure 3.3 Structure of NCS-FI105 Converter

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	Bottom cover				

As the core of NCS-FI105 converter, the Communication Card

connects with terminal board, isolation board, D/A board and LCD board. The LCD board rotated in four angles is fixed on the Communication board, as Figure 3.4 shows.

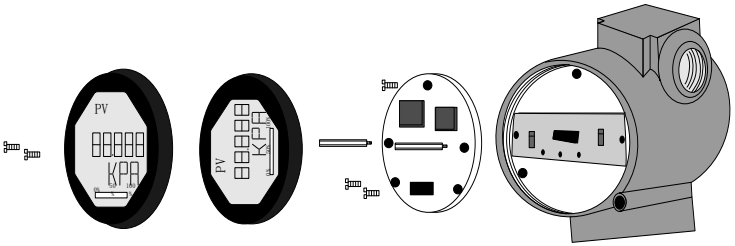

Figure3.4 Assembly structure of the meter

NCS-FI105F 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.

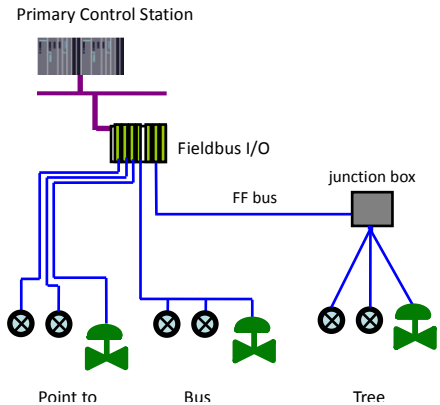

Figure 4.1 FF Network Topology

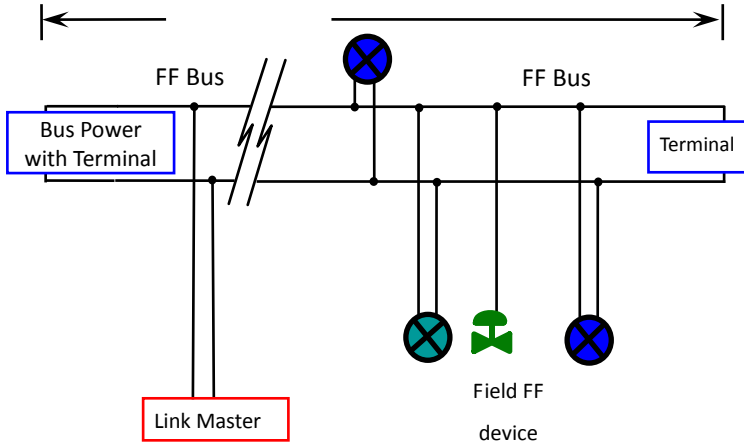

Figure 4.2 FF Bus Connections

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 Output	This block transmits the output data to the transducer block and applies on physical devices.
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.
Lead Lag	This block provides dynamic compensation of a variable. It is used normally in a feed-forward control.

Configuration

NCS-FI105 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 Terminator;
  3) FF Configurator.

- **Two point calibration**

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

1） Manually input current for the channel of sensor, such as lower limit is 4mA.

2） Read the actual current value from the parameter

PRIMARY_VALUE of transducer block. For example, it is 3.9 mA.

1） Measure the actual output current value using standard current meter and write it on the SENSOR_VALUE parameter of transducer block.

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.

- **Multi-point calibration**

The transmitter can be calibrated by the multi-point parameters CAL_CURVE_X and CAL_CURVE_Y：

1) The intelligent transmitter support 8 inputting adjusting points—the parameter CAL_CURVE_Y array of the Transform Block. User can set the current value which to be adjusted to the array. For example, when

adjusting the 3 points interpolating, 5mA，15mA，20mA can be selected as the adjusting points by user, these value are filled to the CAL_CURVE_Y array, as shown in figure 4.3:

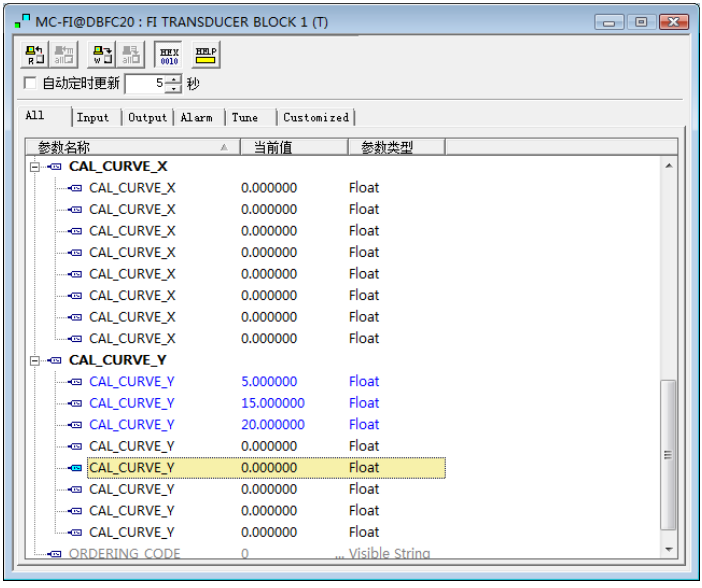

Figure 4.3 CAL_CURVE_Y configuration

2) Measure the actual output current value using standard current meter and write them to the CAL_CURVE_X array. For example, write read values 4.94，14.96，19.9 to the CAL_CURVE_X array, as shown figure 4.4:

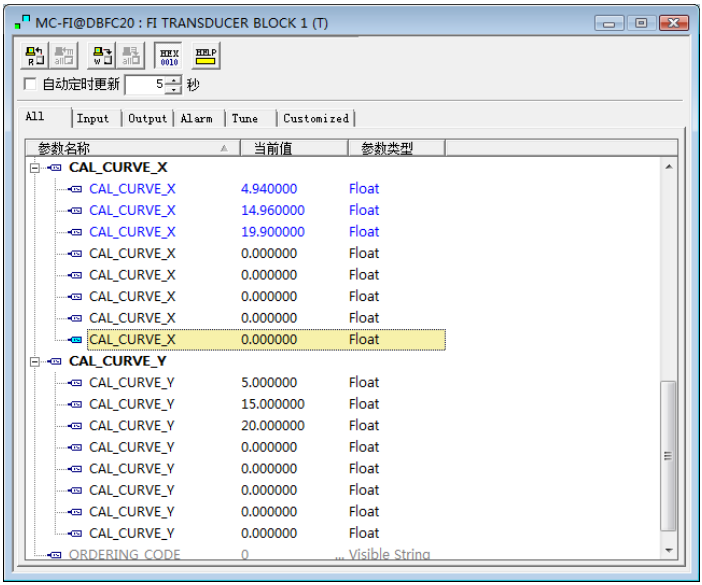

Figure 4.4 CAL_CURVE_X configuration

3) Change the SENSOR_CAL_METHOD to “user trim special calibration” to make sure the intelligent transmitter working after adjusting.

- **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 4.5, 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 AO1 function block, he should write “AO1 ” 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 AO1 block, please write 9 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 AO1 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.

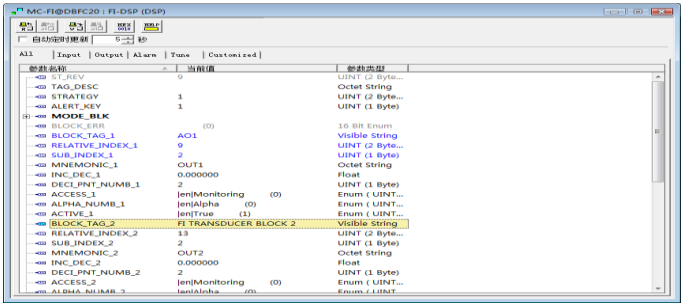

Figure 4.5 LCD Configuration

Jumper

NCS-FI105 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.

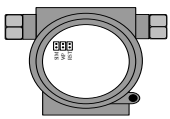

Figure 4.6 NCS-FI105 transmitter hardware jumpers

NCS-FI105P Transmitter Configuration

Network Topology

One Profibus PA network topology supports various kinds of structures, as shown in figure 5.1. The classic connection mode for a PA device is bus connection, as shown in figure 5.2. 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.

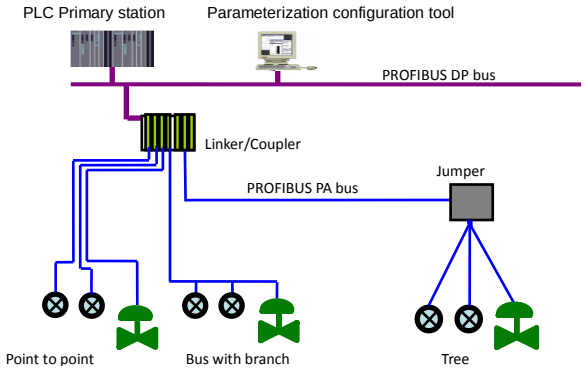

Figure 5.1 PROFIBUS PA Network Topology

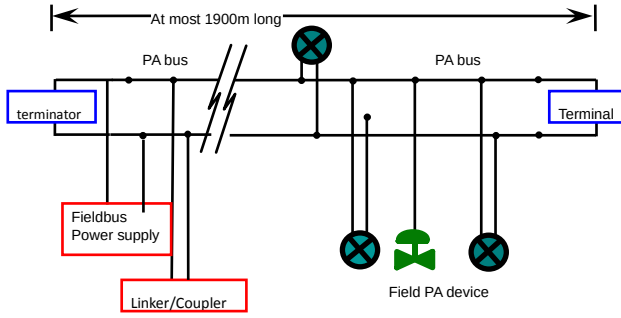

Figure 5.2 PROFIBUS PA Bus Connection

Function Blocks

PA Protocol FI transmitter realizes function blocks under PA standard, as shown in table below. Please check PROFIBUS PA guide regulations for its configuration.

Function block name	Description
Physical Block	Physical Block（PB） describes device's specific hardware information and recognition、diagnose information, including device item number, software version, hardware version and installation date etc.
Transducer Block	This block isolates function block from instrument's input and output characteristics, fulfilling the function of input and output data's calibration and linearization.
Analog Output Block	This block transmits the output data to the transducer block and applies on physical devices.

Functional Configuration

PA Protocol FI transmitter's parameter configuration abides by PROFIUBS PA guide regulation 3.01 version. User can use Siemens device management software Simatic PDM to read-write transmitter's function block or Siemens Step7 configuration software to configure it.

- **Environments**
  1) PC，Windows 2000 or Windows XP system；
  2) Siemens Step7 configuration software，Siemens PDM device management software；
  3) DP/PA coupler or linker；
  4) Class 1 primary station, e.g. PLC, Class 2 primary station, e.g. CP5611；
  5) PA terminal matcher；
  6) Standard temperature source.
- **FI Transducer Block parameter configuration**

This block isolates function block from physical proprietary I/O devices, such as sensor、actuator, and it depends on realization of device manufactures to visit or control I/O device. By visiting I/O device, transducer block can get input data or set output data. Generally, transducer block has functions as linearization, characterization, temperature compensation, control and exchange data.

Transducer block parameter is as below:

Parameter	Function description
FINAL_VALUE	From AO function block's set value
FINAL_VALUE_RANGE	Including FINAL_VALUE range, unit

Parameter	Function description
	and other information
CAL_POINT_HI	calibration high point
CAL_POINT_LO	calibration low point
CAL_MIN_SPAN	calibration smallest span
CAL_UNIT	calibration unit
ACT_SN	actuator serial number
CAL_LOC	device maintenance site
CAL_DATE	device maintenance date
SENSOR_CAL_WHO	device maintenance person
RETURN_VALUE	return to set value, possible to be calibrated value
SENSOR_VALUE	sensor original value
LIN_TYPE	linearization type

- **PROFIBUS cyclical data communication configuration**

PROFIBUS DP cyclical data communication means class one primary station and slave station exchange input output data by master-slave polling, and its communication method is connectionless. In every cycle, primary station initiatively send data exchange request, and slave station passively response to the request. Cyclical data communication is mainly used for configuration of slave station and PLC primary station device, by which PLC get real-time input data from slave station or output data to slave station.

PA Protocol FI transmitter's cyclical data communication configuration is generally the same as PROFIBUS DP slave station, expect that coupler or linker should be used between PA bus and DP bus.

PA Protocol FI transmitter's cyclical data comes from

Device AO function block's input parameter or master station device's set value etc. For cyclical communication, transmitter supports various identifier, please refer to GSD file description. User can use Siemens Step7 for PROFIBUS PA cyclical data communication configuration, shown as following example.

Open SIMATIC Manager, according to reminders, choose PLC master station and create new project, as shown in figure 5.3.

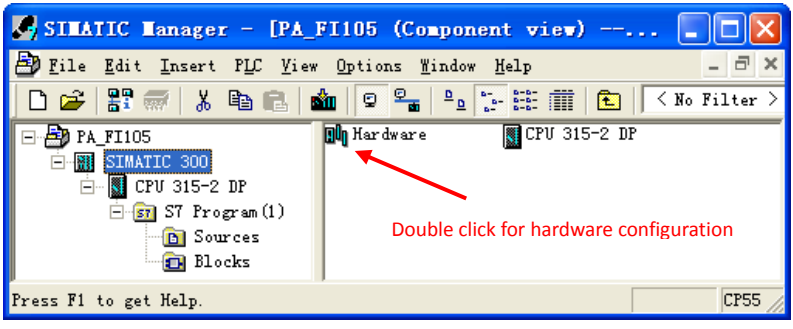

Figure 5.3 choose PLC master station and create new project

Double-click Hardware to open HW Config software and hardware configuration. Choose Install GSD in Option menu to install PA transmitter GSD file, as shown in figure 5.4.

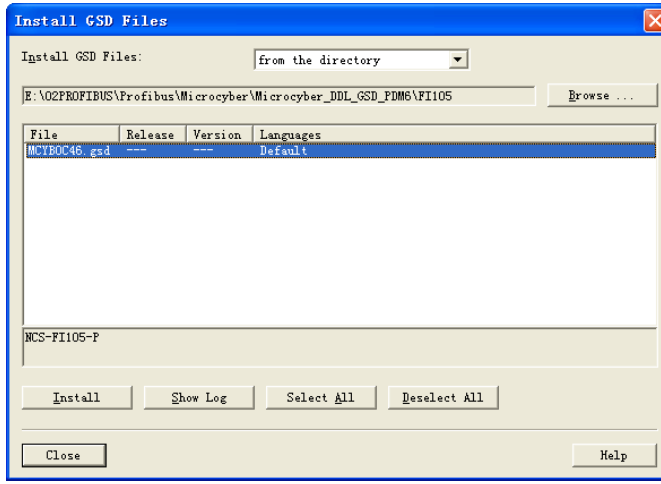

Figure 5.4 Install GSD file

When GSD is installed successfully, on HW Config device list on the right will appear the PA device just installed. Click it and drag it to PROFIBS DP bus, as shown in figure 5.5.

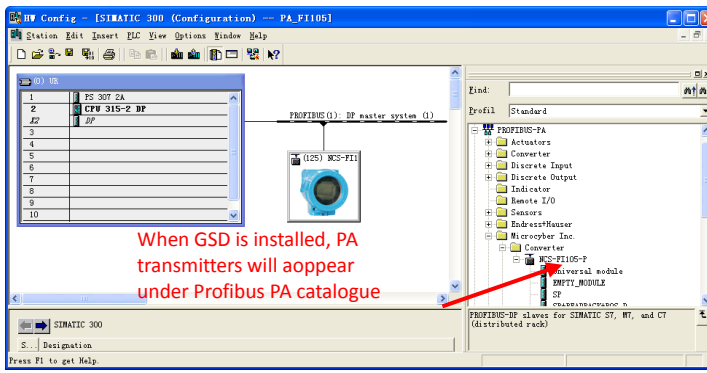

Figure 5.5 drag PA device to PROFIBS DP bus

In PLC menu, choose Download to download configuration

information to PLC master station. Then cyclical data communication configuration between PA transmitter and master station is finished, as shown figure 5.6.

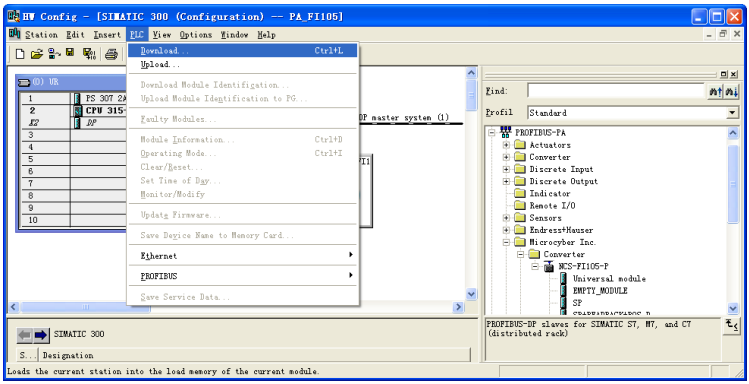

Figure 5.6 download configuration information to PLC

- **PROFIBUS non-cyclical data communication configuration**

PROFIBUS DP non-cyclical data communication refers to connection-oriented data communication between class two master station and slave station. This data communication is conducted in bus non-cyclical cycle, under the circumstance of not affecting cyclical data communication. Non-cyclical data are mainly PA function block's parameter and device's recognition and diagnosis information. Non-cyclical data communication is mainly applied for PA device's management, diagnosis, recognition, calibration and maintenance etc.

User can use Siemen device management software SIMATIC PDM to conduct non-cyclical data communication

configuration to PA transmitter, as shown in example below.

Open LifeList attached in SIMATIC PDM, then under the scan menu, choose Start to scan DP bus, as shown in figure 5.7.

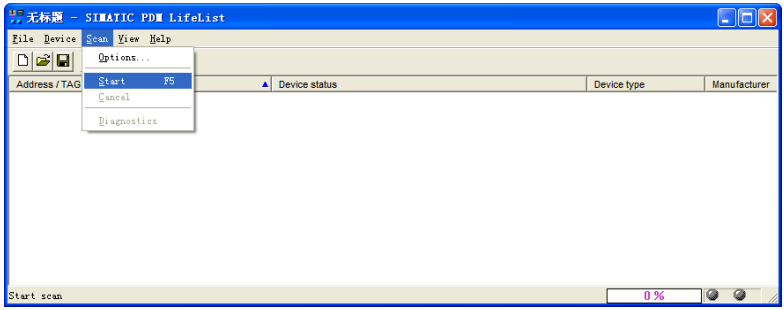

Figure 5.1 start LifeList

After scanning bus, slave station devices under DP bus will be listed, and at the same time device's manufacturer ID and some diagnosis information will appear, as shown in figure 5.8.

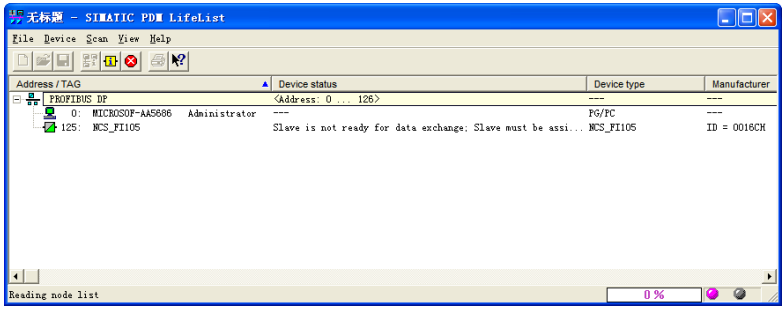

Figure 5.1 Scan DP bus & list PA device

Double-clicking PA device will start SIMATIC PDM software, through which user can read-write and diagnose PA device.

When choosing PA instrument types in pop-up dialog box, user need choose Device catalogue… and lead-in GSD file. For NCS-FI105 series PA transmitter, user can choose to lead-in Microcyber Inc\NCS-FI105 type, as shown in figure 5.9.

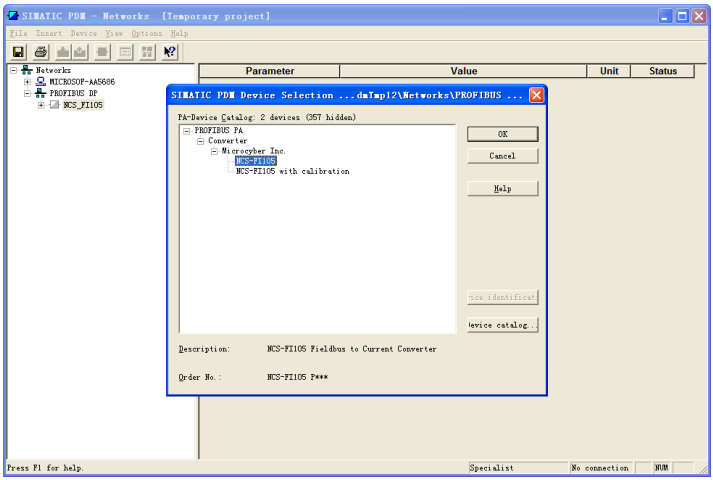

Figure 5.9 choose device type

After choosing device type, click OK to finish non-cyclical data communication configuration. User can complete PA instruments' parameter read-write by PDM software's upload and download function, as shown in figure 5.10.

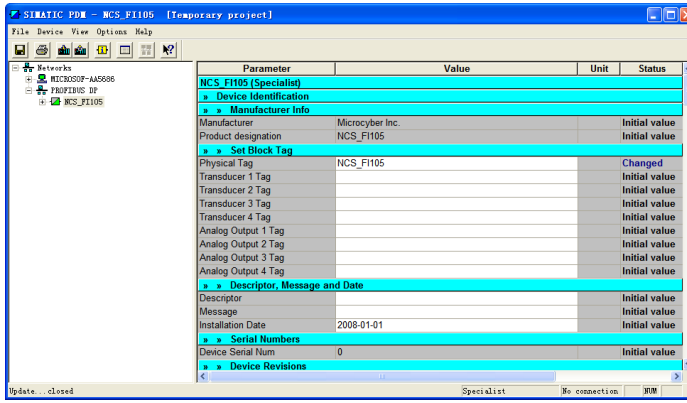

图5.1 Figure 5.10 use PDM software for device management

- **On-line, off-line configuration function**

PA protocol FI transmitter realizes PA standard function block, and on-line off-line configuration function realizes the function of single configuration for function block parameter. By PDM, after configuration, choosing Device -> Online Configuration or Device -> Offline Configuration can conduct read-write for function block parameter.

- **Two points linearization calibration**

PA protocol FI transmitter has been strictly calibrated before leaving factory, thus user doesn't need calibration again. User can also Calibration menu to realize two points linearization calibration.

Steps are as below：

1） Provide 24VDC stabilized voltage supply to the channel which need calibration, and then connect high precision multimeter.

2） Open PDM, choose Device -> Calibration ->Transducer->TRD-X Lower / Upper, export FI low point calibration page.（X：choose 1-4 based on the actual channel that need calibration）

3） Change AO function block mode to MAN, execute Lower Calibration Point function, and input low point calibration value, e.g. 4mA. Read high precision multimeter's value, input it and finally assure it to complete low point calibration.

4） Modify AO function block mode to MAN, execute Upper Calibration Point function, and input high point calibration value, e.g. 4mA. Read high precision multimeter's value, input it and finally assure it to complete high point calibration.

5） After calibration, change AO function block mode to AUTO.

Note：Using Device -> Master Reset, will unset transmitter CPU, and this will stop communication temporarily. However it is normal symbol, just re-connect it.

Jumper

PA protocol FI transmitter has three hardware jumpers, so far two of them can be used, as shown in figure 5.11, SIM is not used.

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

Note: when using RST jumper factory default value, please cut off transmitter power supply, pull out RST jumper and then use the transmitter as normal, otherwise if RST jumper is always there, restart of transmitter, will cause all data back to factory default value and configuration information before power down lost.

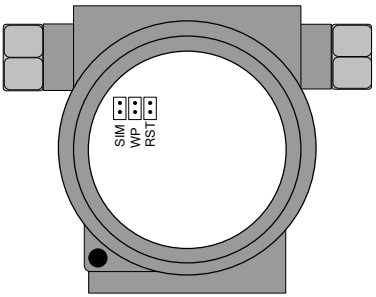

Figure 5.2 PA Protocol FI transmitter hardware jumper

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

Adjusting in Workplace

Operation Instruction for Magnetic Sticks

The adjusting in workplace can be realized by inserting magnetic sticks into the holes named as “SPAN” or “ZERO”, which are on the top of the transmitter housing, shown as figure 6.1.

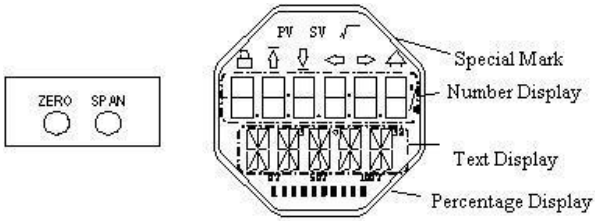

Figure 6.1 Location of magnetic sticks inserted holes and full.scale LCD

The following will show how to utilize different combinations of magnetic sticks inserting to simulate four virtual key buttons, which is for description of adjusting in workplace.

According to different functions, the four virtual key buttons are defined as Mode (M), Input adjusting ([↑], [↓]) and Confirmation ([Enter]).

Mode (M): It can be switched in all operational modes.

Input adjusting [↑]: Increment operation.

Input adjusting [↓]: Degression operation

Confirmation [Enter]: Confirmation operation.

The detailed info for operations of (M), [↑], [↓] and [Enter] are shown as following:

Mode(1)	Input adjusting(1)	Confirmation

[M]	[↓]	[↑]	[Enter]
) Insert the magnetic sticks into “Zero” and “Span” at the same time(1)	Zero	Span	Insert “Zero” and “Span” for 2s, get them out(2)

Notes:

1) Insert / Get out the magnetic sticks in Mode (M) and Input adjusting is considered as ([↑], [↓]) button operation once, also, inserting the magnetic sticks for long can be considered as long operation. In a button operation, it is suggested that user should insert the magnetic sticks for 1s, and then get it out. Otherwise, the operation can’t be tested. The long operation is carried out automatically every two seconds.

2) In order to avoid the collision between Confirmation and Mode, when user is carrying out the confirmation operation, when the process is 100%, it means that the magnetic sticks are inserted for 2s, and then get the two magnetic sticks out to make sure the confirmation operation. When the process is 100%, the magnetic sticks are not gotten within 3s, which means to carry out switch operation. When the process is not 100%, user shall get the magnetic sticks out without operation.

General Adjusting Method

Following is the general adjusting method. Please refer to specific description for info in detail.

In the measurement value display mode, press Mode [M] to do

mode switch.

When it is displayed in mode needs to be adjusted, get out the two magnetic sticks, the present value to be adjusted will be displayed in the LCD.

Press [↑] or [↓] to adjust, after that, press [Enter] to confirm.

Press [M], switch to measurement value display mode.

Notes:

1. It is not necessary to confirm for some functions. After adjustment, it is saved at the same time.
2. If there is no button operation within 1 min (There is no magnetic sticks inserted in the two holes), it will return to normal display mode.
3. Carrying out the calibration function, after the successful calibration, it will be back immediately to LCD display mode.

Adjusting for NCS-FI105F Smart Transmitter

In this section, we describe the adjusting steps of NCS-FI105 smart transmitter. By adjusting in the workplace, you can carry out upper limit calibration, lower limit calibration, setting sensor type, wiring and so on for transmitters.

The functions and operation are shown as following in detail.

Function	Mode	Button Function			Function Display	Display, description
	[M]	[↑]	[↓]	[Enter]		[M]
Measurement value						Display the configuration info displayed by

Function	Mode	Button Function			Function Display	Display, description
	[M]	[↑]	[↓]	[Enter]		[M]
display						DSP display block
Failure display						Failure! When the transmitter is in failure, it will display the reason.
No. Channel	02	Decreasing	Ascending		Fun02 CH_x	Pre-calibration No.Channel x:1 ~4
Lower limit	16	Pre-setting decreasing	Pre-setting ascending	Implementation	Fun16 LOWER	Set the lower limit of characteristic curve
Upper limit	17	Pre-setting decreasing	Pre-setting ascending	Implementation	Fun17 UPPER	Set the upper limit of characteristic curve

Press [M], it can be switched among the functions above.

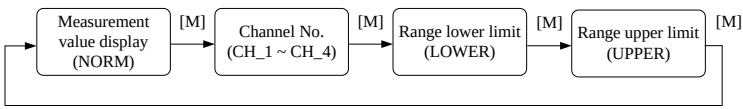

Figure 6.2 Adjusting function and LCD display

In mode switch, the Number Display will display function code,

e.g. “Fun02” and the Text Display will display function description shown as above, e.g. “CH_1”.
In addition, there is no need to confirm Mode 02, it will be saved after the adjusting.

Measurement value display

It will display configuration info of DSP display block, and the local operation can’t modify the unit. When the value exceeds the LCD range, it will display in scientific notation.
The method to return measurement value:
(1) Switch mode to “NORM”.
(2) There is no operation within 1 min. (There are no magnetic sticks for the 2 holes)

Error Display

In the course of local operation, the following error info may occur:

Display	Explanation
NumEr	Number Error
FNErr	Mode Number Error
Lock	The jump-pin is set as configuration protection.

Pre-setting No. Channel—Mode 02

It is used to set No. Channel, the default is CH_1. The range of

No. Channel: CH_1- CH_4.

You may set No. Channel according to following steps:

--Select mode 02, the present No. Channel will be displayed in text display.

--Use [M] to do mode switch.

The No. Channel affects functions such as sensor type, sensor wiring, etc. Please set the No. Channel before doing pre-adjusting.

Operation steps for lower limit of range—Mode 16

In this mode, you shall modify the slope of characteristic curve. The characteristic curve is rolling around the high setting point. You shall implement the calibration of lower limit according to the following steps:

--Select mode 16, LCD will display the calibrated process value last time and related unit,

--Input the reference temperature value starting from this point via [↑] or [↓],

--Press [Enter] to set. If the setting is successful, it will show “OK”, otherwise, it will show “Err”,

--Use [M] to do mode switch.

Please refer to 5.1 for detailed info about processing bar.

Operation steps for upper limit of range—Mode 17

In this mode, you shall modify the slope of characteristic curve. The characteristic curve is rolling around the low setting point. You shall implement the calibration of upper limit according to the following steps:

--Select mode 17, LCD will display the calibrated process value last time and related unit,

--Input the reference temperature value starting from this point via [↑] or [↓],

--Press [Enter] to set. If the setting is successful, it will show “OK”, otherwise, it will show “Err”,

--Use [M] to do mode switch.

Please refer to 5.1 for detailed info about processing bar.

Adjusting for NCS-FI105P Smart Transmitter

In this section, we describe the adjusting steps of NCS-FI105P smart transmitter. By adjusting in the workplace, user can carry out bus address, measurement channel display functions & etc for transmitters.

The functions and operation are shown as following in detail.

Function	Mode	Button Function			Function Display	Description
	[M]	[↓]	[↑]	[Enter]		
Measurement Value Display						Display of corresponding channel measurement value

Function	Mode	Button Function			Function Display	Description
	[M]	[↓]	[↑]	[Enter]		
Failure display						Failure! When the transmitter is in failure, it will display the reason.
No. Channel	02	Decreasing	Ascending		Fun02 CH_x	Display No. Channel x:1、2、3、4 or LOOP
Measurement Value Display Type	11	Select from 3 possibilities			Fun11 DISP	Final_Value, Return_Value, AO_Set Point
Bus Address	13	Pre-setting decreasing	Pre-setting ascending	Implementation	Fun13 ADDR	User address in PROFIBUS(0…126)
Decimal Point	14	decrease	increase		Fun14 DECPT	
linearization Type	22	Pre-setting decreasing	Pre-setting ascending	Implementation	Fun22 S_TYP	Choose calibration curve type 0: factory calibration 1: user calibration

Press [M], it can be switched among the functions above, shown as Figure 6.3.

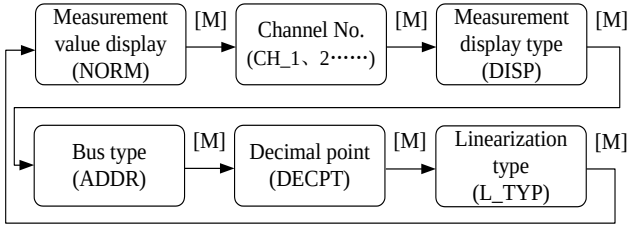

Figure 6.3 Adjusting Function and Display

In mode switch, function code is displayed in digital display, e.g.”Fun 02”. Function description is displayed in text display, e.g.”LOOP”.

There is no need to confirm Mode 02, they will be saved after adjustment.

Measurement value display

It will display configuration info of DSP display block, and the local operation can’t modify the unit. When the value exceeds the LCD range, it will display in scientific notation.

The method to return measurement value:

(1) Switch mode to “NORM”.

(2) There is no operation within 1 min. (There are no magnetic sticks for the 2 holes)

Error Display

In the course of local operation, the following error info may occur:

Display	Explanation
NumEr	Number Error
FNErr	Mode Number Error
Lock	The software is set as write-protection.

Setting No. Channel—Mode 02

It is used to set Display No. Channel, the default is LOOP. The range of No. Channel: CH_1- CH_4 & LOOP..
You may set No. Channel according to following steps:
--Select mode 02, the present No. Channel will be displayed in text display.
--Select channel via [↑] or [↓].
--Use [M] to do mode switch.
It can only show certain channel measurement value (CH_1 — CH_4), it can also be set to circularly show four channels value (LOOP).

Operation steps for setting measurement value display type-- Mode 11

In this mode, you shall select the value to be displayed.

You shall select the source of measurement value according to the following steps:

--Select mode 11.

--Select the display source of measurement value via [↑] or [↓],

--Use [M] to do mode switch.

Following is display source of supported measurement value.

Measurement Value Display Type	LCD Display Description
[0] Final Value	FINAL
[1] Return Value	RET_V
[2] AO set point	AO_SP

Operation steps for setting bus address-- Mode 13

In this mode, you shall set the user address of PROFIBUS, the allowable range is 0~126.

You shall set the user address of PROFIBUS according to the following steps:

--Select mode 13, the user address of PROFIBUS will be displayed in measurement value display,

--Select the address via [↑] or [↓] in the allowable range,

--Press [Enter] to set. If the setting is successful, it will show “OK”, otherwise, it will show “Err”,

Please refer to 5.1 for detailed info about processing bar.

Operation steps for setting scaling position-- Mode 14

The measurement value can display as much as 5 decimals.
You shall move the position of scaling according to the following steps:
--Select mode 14, the scaling position will be displayed in digital display.
--Select expected digital format via [↑] or [↓],
8.88888 88.8888 888.888 8888.88 88888.8 888888
--Use [M] to do mode switch, and the setting will be saved.

Operation steps for setting sensor type—Mode 22

This operation can modify and choose different calibration Coefficient.
You shall set linearization type according to the following steps:
--Select mode 22.
--Select linearization type via [↑] or [↓],
--Press [Enter] to set. If the setting is successful, it will show “OK”, otherwise, it will show “Err”,

Linearization type	Type Description
0	Factory calibration, which has been calibrated by high precision calibration source when leaving factory
1	User calibration, user can use PDM software to realize two points calibration

Return instrument data to factory data

Returning instrument data to factory data is a special operation, there is no function code. After the operation, all the configured data will disappear and will return to factory data. Please pay more attention when you do like this.

You may return instrument data to factory data according to the following steps:

--Turn off the power supply with instrument,

--Insert two magnetic bars into “Zero” and “Span” holes at the same time,

--Turn on the power supply for instrument, the LCD will display “RST?”,

--If you would like to return instrument data to factory data, get the two magnetic bars out, and then insert two magnetic bars, when the process is 100%, get the two magnetic bars out again, the LCD will display “R_OK”, which means the return is successful.

-- If you wouldn’t like to return instrument data to factory data, get the two magnetic bars out, and wait for 5 seconds, it will back to normal.

Notes:

If there is RAT jump-pin, it will return to factory data without “RST”.

When the process is not 100%, if you get the two magnetic bars out, it may cancel the operation of returning instrument data to factory data.

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: 6） peak-to-peak value noise is 16mV, 7~39kHz; 7） peak-to-peak value noise is 2V, 47~63HZ, for non-EX 8） peak-to-peak value noise is 0.2V, 47~63HZ, for EX 9） 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.
Output error	**Transmitter connection** Check if it is short circuit or open circuit.
	Load power Check load voltage which should be between 9 ～ 32VDC; supply voltage ≥ (output current * load resistance + 5VCD)
	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
Current output	NPN collector output
Power supply	9 ～ 32 VDC ;Current Dissipation (static): ≤ 14mA
Fieldbus Signal	Communication Baudrate 31.25kbit/s, current-mode
Insulation	Between housing and terminal 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）
Humidity Range	0% ～ 100% RH
Start Time	≤ 5s
Protection grade	IP 65
EMC	Designed to comply IEC 61000

Technical performance

Accuracy	< 0.05 %
Maximum load	1350Ω
Load power	9 ～ 32VDC Note：supply voltage ≥ (output current * load resistance + 5VDC)

Temperature effect	< ± 50 ppm/℃

Physical performance

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