Manuals+ — User Manuals Simplified.

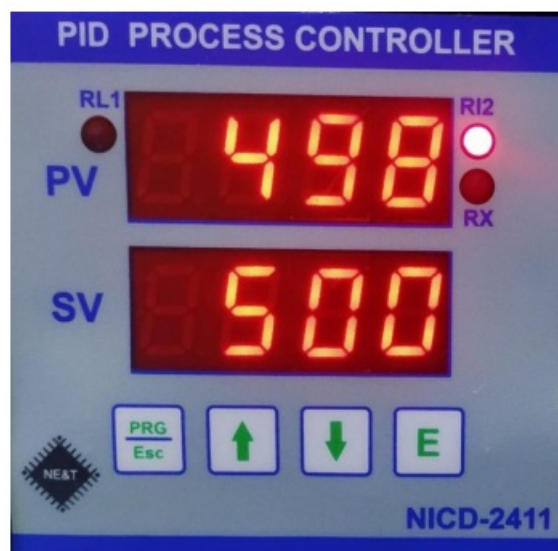# NE T NICD2411 Pid Process Controller Instruction Manual

Contents

NE T

NE T NICD2411 Pid Process Controller

Introduction

This is a micro-controller-based PID Controller Cum Process Controller. The instrument has three modes one is

PID mode 2nd is retransmission mode 3rd is Manual mode. Users can select any one, suppose the user selects the 2nd mode (Retransmission mode) In this mode user can take 4-20mA output according to the input. In the 3rd mode user can take 4-20mA by using the keypad (manually) . The upper display shows the process value and the lower display show the output value/Setpoint. The Instrument has Modbus (RS485) Communication And 2 Relay control. Foreword Thank you for purchasing PID/Process Indicator Controller NICD2411. This manual describes the basic functions and operation methods of NICD2411. Please read through this user's manual carefully before using the product.

Operation

- Before connecting the power supply insure that you are connecting I/P voltage to the right terminals. On application of proper power supply & input sensor. The instrument will display the Control / Set Point value in the lower display and the Process Value in upper display.
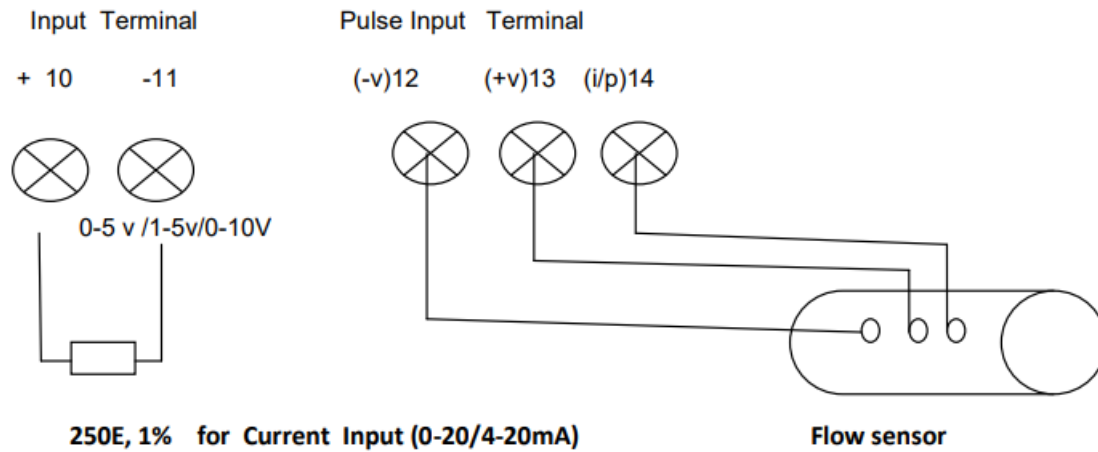
Key Operation

- By pressing the PRG key, For Configuration mode.
- By pressing the UP /DN key value can be changed and press Ent key for the store-modified value.

Relay Operation

- Relay: Relay OFF when Flow is less than Set value & ON when Flow is more than Set value and vice-versa.

Model	Inputs	RS485	RELAY	RETRANSMITION (4-20mA)	
		Yes	YES	YES	
NICD2411	4-20mA				
	0-20mA				
	1-5v DC				
	0-5vDC				
	0-10vDC				
	Pulse Input				

Input Resistance: 250E 1% External for Current Input

Input Terminal	Pulse Input Terminal

+ 10   -11   (-v)12   (+v)13   (i/p)14

0-5 v /1-5v/0-10V

250E, 1%   for Current Input (0-20/4-20mA)   Flow sensor

Terminal details:

- 1 : P (phase) 220VAC @50HZ
- 2: N (Neutral)
- 3: E (Earth)
- 15 : D+ (RS485 COMMUNICATION)
- 16 : D- (Rs485 COMMUNICATION)
- 17 : – mA (o/p Isolated 4-20mA)
- 18 : + mA(o/p Isolated 4-20mA , Positive)
- 13: +24VDC (for Loop power)
- 12: – 24VDC (for Loop Power)
- 14: pulse input (For K factor flow)
- 9 : NC2 (Relay RL2 , NC terminal)
- 7 : C2 (Common Terminal of RL2)
- 8 : NO2(Relay RL2, NO Terminal Of Relay 2)
- 6 : NC1 (Relay RL1 , NC terminal)
- 4 : C1 (Common Terminal of RL1)
- 5 : NO1(Relay RL1, NO Terminal Of Relay 1)
- 10: + input terminal (0-5/1-5/0-10v/0-20mA/4-20mA)
- 11: – input terminal (0-5/1-5/0-10v/0-20mA/4-20mA)

SPECIFICATION

- Main (auxiliary supply) : 220vAC @50Hz / 24 VDC/15V DC
- PV Display value: -199 to 9999
- SV Display Value: -199 to 9999
- Output (Analog): 4-20mA isolated (optical)
- Control Relay: one pair normally open potential free contact: @ 5A at 240v AC
- I/P : 0-20mA/4-20mA/0-5VDC/1-5vDC/0-10VDC/Frequency
- Operating temp. : 0 dec. – 50 dec
- Overall size: 96x96x65 mm (HWD)
- Panel Cutout :92×92 mm(WxH)

Parameters

- Input: in this parameter, user can select the type of input
- Action: In this parameter, user can select action Forward/reveres (For PID/Process Indication)
- Type: In this parameter, user can select instrument Mode(PID/retrains./manual)
- DP: Decimal point in this parameter user can select a decimal point.
- rSid : Modbus Communication ID Address(1-255)
- SPL: Span Low Range.(Value to be displayed on low input signal range Like -199 to 9999)
- Spanish: Span High range of PV. (value to be displayed on high input signal Like -199 to 9999)
- Disp: in this parameter,the user can select whether to show the Setpoint value in the SV
  display or to show the control output value.(SEtP=set point, outP= output value, CmSP= comm. set point etc)
- rL1: Relay 1 Setpoint
- rL2: Relay 2 Setpoint
- His1: Hysteresis 1 for relay 1 set point (If display value low than this then turn off relay1)
- His2: Hysteresis 2 for relay 2 set point (If display value low than this then turn off relay2)
- SP– : in this parameter user can set the value of the PID set point.
- dEtd: In this parameter, the user can set the Derivative value of PID Control(0-3000).
- Intr: in this parameter, user can set the integral value of PID Control (0-3000).
- Pd–: In this parameter user can set the Proportional value of PID Control(0-999.0)
- and : In this parameter user can set dead band % value of Setpoint(dead band= set point x dbnd%)
- Proudly: In this parameter, the user can set the value of PID sample delay time(1= 1MS).
- Fine: In this parameter can be adjusted by fine-tuning of the process value.
- Factor: In this parameter, user can adjust the K factor
- Exit: exit from programming mode.

How Can select Parameters:

1st Press Prgkey for 3 seconds to display inputs parameter in this parameter user can select any one input and press Ekey for next parameters use upkey and pervious parameter use donkey. Users can select any parameter by use upkey/donkey. Exit Parameter, in this parameter, if press E key then exit from programming mode.

PID CONTROL MODE

In this mode use the following parameters:

1. Type = PID
2. ply = Pid delay time (1 value = 1MS)
3. Action parameter use for PID action forward/Revere mode
4. SP– = PID set point.
5. dEtd = Derivative value of PID Control action slow /fast(0-3000).
6. Intr: the integral value of PID Control (0-3000).
7. Pd– : Proportional gain value of PID Setpoint(0-999.0)
8. dbnd : dead band % value of Setpoint(dead band= set point x dbnd%)

For fast action of PID control: then increase integral value & decrease derivative value and adjust the value of

proportional gain. For slow action of PID Control: adjust (increase) derivative value & decrease integral value and adjust proportional gain & derivative value.

band :
In this parameter, the percentage higher and lower side of the set point is defined so that when the PID reaches the process value around the set point, the dead band comes into action at that time and which is the value of the dead band if the process value is within that limit. So there will be no action on the control. And if the process value is more than the dead band value then the PID controls action will take place otherwise no action will be taken due to being in dead band.

SP–: In the running mode, if user presses upkey + Prgkey then display set point press Ekey and set desired value by use up/donkey and press Ekey.

Auto/Manual Mode: First hold down the enter key and then press the prg key after which the instrument will automatically go into manual / auto mode. If earlier it is in AUTO mode then it will go in manual mode and if in the manual mode then it will go in AUTO mode.

Auto/Manual: By pressing and releasing the enter key, the user can check whether the instrument is in auto mode or manual mode.

Display: in the display parameter, the user can define whether he want to show the set point value on the SV display or show the PID control value. If you select our then display pid control output or if you select SEtP then display PID set point value.

Process Indicator cum Controller(Mode2): In this mode user can use the instrument as a process indicator/controller and take 4-20mA retransmission output.
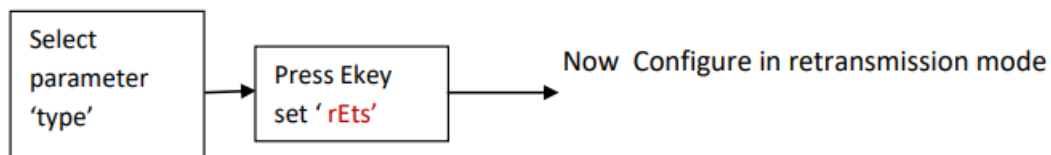
K-factor: This K-factor will be given in terms of the number of pulses produced by the sensor/meter for a given volumetric flow. (e.g) 150 pulses per liter etc. This K-factor is the value that is entered into a batch meter or indicator/totalizer in order to give readout in engineering units.

Example 1 : If the display on a flow rate meter is required in U.S. gallons per second, and the K-factor of the flow meter is 210 pulses per U.S. gallon, then the K-factor entered into the rate meter would be 210. If a totalizer associated with the same flow meter was to be set up so as to flow rate in U.S. gallons the indicator K-factor would be 210. If the indicator was to be set to flow rate in tenths of a gallon the K-factor would be 210 /10 = 21, 21=K-factor
Note: If the user needs to flow value in tenths of a gallon/Liter then the value of the K factor = 21 set in the factor parameter and k_decimal point set zero. If user needs to show flow value in ones then 210 value set in the factor parameter and k_decimal =0 .

Note-For K-factor: Press the Prg key to display the input parameter press the E key and select puls input by up( )/dn( )keys after selection press key now again to display input now use up key for select for the next parameter Fctr(factor) press Ekey now display last loaded value of k_factor,If you want to change value then use up/Donkey according to your k_factor value (Like 225/22.5) now press & hold Prgkey after 1 seconds press
E key now releases both keys and then displays dP(Decimal Point) Press Ekey set the decimal point according to your k_factor value and Press Ekey now again display Fctr (it means the K-factor value has been stored).
Example: If 225 pulse = 1ltr/minutes flow If user needs to show flow value in tenths of a Liter then 225/10 = 22.5 1 st k_factor value(225) set in factor parameter by using up/donkey and press & hold Prgkey after 1second press Ekey and release both key now DP parameter will appear on display Press Ekey and set the position of the decimal point by using up/Donkey and press Ekey.

Communication

- **PROTOCOL:** Modbus RTU serial
- **STANDARD:** RS-485
- **BOUDA RATE :** 9600 BPS
- **DATA BIT:** 8 BITS
- **STOP BIT:** 1
- **PARTY:** NONE
- **MODBUS ID ADDRESS:** 1-255

The unit can be connected in RS-485 communication data link either in multi-drop or repeat mode. Each unit must have unique Serial Number. Entire range of addresses (1 to 255) may be used. Before starting any communication, choose a baud rate compatible to the host computer. The serial protocol used is MODBUS RTU. Read Holding registers FUNCTION = 03

Master Query: [id] [Function Code][High Addr. Byte][Low addr. Byte][No of Points High][No. of point low][CRCL] [CRCH
Slave Response: [id] [Function Code][Byte Count.][Data High][Data Low] [CRCL][CRCH]
Master Query:
[id]]Function Code][High Addr. Byte][Low addr. Byte][No of Points High][No. of point low][CRCL][CRCH]

SN.	ADDRESS	PARAMETER NAME
1.	4000	PROCESS VALUE (R)
2.	4001	SET POINT VALUE (R/W)
3.	4002	OUTPUT VALUE (R)
4.	4003	AUTO/MANUAL STATUS(R/W)
5.	4004	Integral VALE(R/W)
6.	4005	Derivative(R/W)
7.	4006	proportional gain(R/W)

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
CALIBRATION: Press and hold Donkey + Prgkey for 5 seconds then display "Zero" now apply 0mA at the input terminal(+10 &-11) after that press E key now display ADC value counts wait for 3 seconds then press and hold Prgkey after 1 second press Ekey and now release both key , Display CALL (Low calibration) now apply 4mA at input terminal (+10 & -11) after that press Ekey Now display ADC counts wait for 5 seconds then Press and hold Prgkey after 1 second press E key and now release both keys, Display CALH(High Calibration) now apply 20mA at input terminal(+10 & -11) after that press E key now Display ADC counts wait for 5 seconds then press and hold Prgkey after 1-second press E key Now calibration complete. Note after calibration parameter SPANL/SPANH must be redefined.
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Faults/Errors:

1. Err1:
2. -Err:
3. Open:
4. Under

5. over

Err1: If the instrument is showing error1, then the internal data of the instrument has been corrupted in this error, now it has to default. The default value to be loaded in internal memory through for the following process. 1 st switch power of the instrument power after pressing & hold Donkey + Upkey then the power switch on of the instrument after 10 seconds releases both keys, Now instrument must be reconfigured and recalibrated.

-Err: If the instrument is showing -Err, it means the input terminal connection is reversed. So please change the input terminal connection (+10 / -11).
Open: input terminal wire disconnected or input source has been faulted.
Under: input value low then 4mA/1VDC.
Over: input higher than defined range setting.

Documents / Resources

[**NE T NICD2411 Pid Process Controller**](#) [pdf] Instruction Manual
NICD2411, Pid Process Controller, Process Controller, Pid Controller, Controller, NICD2411