USER MANUAL

T201DCH -MU/-OPEN SERIES

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Introduction

The content of this document refers to the products and technologies described herein.
All technical data contained in the document may be changed without notice.
The content of this document is subject to periodic review.
To use the product effectively and safely, read the following instructions carefully before use.
Use the product exclusively for the use for which it was intended and conceived: any other use is the complete responsibility of the user.
Installation, programming and configuration are permitted only to authorized and physically and intellectually qualified operators.
The configuration must be performed only after a correct installation and the user is required to correctly carry out each single operation described in the installation manual.
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Technical specifications are subject to change without notice.

ORIGINAL INSTRUCTIONS

CONTACT INFORMATION	
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Product information	commerciale@seneca.it

Document revisions

DATE	REVISION	NOTES
26/06/2023	0	First revision

CONTENTS

1. DEVICE DESCRIPTION AND INTENDED USE

ATTENTION!

This user manual extends the information of the installation manual on the device configuration. For further information, use the installation manual.

ATTENTION!

SENECA s.r.l. or its suppliers shall in no event be liable for loss of registration data/income or for indirect or incidental damages due to negligence or incorrect or improper use of the device, even if SENECA is well aware of such possible damages.
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1.1. Description

The meters of the T201DCH MU/OPEN series are isolated AC/DC current transducers, without contact. The appearance and function of the device is very similar to that of a standard active current transformer but with the unique functionality of measuring the DC and AC component. Thanks to its characteristics of electrical sturdiness, ease of use and compact dimensions, the various models adapt to any type of current measurement: up to 50 Adc/Aac, 100 Adc/Aac, 300 Adc/Aac and 600 Adc/Aac depending on the model.
Also supplied with an RS485 port and a USB port with standard Modus RTU slave protocol.
The OPEN versions can be opened and allow the meter to be inserted into a conductor without making any disconnection in the line.

The device can measure a current in 2 different ways (using the dip switches or the Easy Setup software):

- TRUE RMS AC/DC CURRENT MEASUREMENT (TRUE RMS)
- DC BIPOLAR CURRENT MEASUREMENT (also used to obtain the +/- sign of DC current)

2. MODELS

The models of the T201DCH MU/OPEN series are shown in the table:

MODEL	*MEASUREMENT FULL SCALE*	*OPENABLE VERSION*
T201DCH-50-MU	50 A	NO
T201DCH-100-MU	100 A	NO
T201DCH-300-MU	300 A	NO
T201DCH-600-MU	600 A	NO
T201DCH-100-OPEN	100 A	YES
T201DCH-300-OPEN	300 A	YES
T201DCH-600-OPEN	600 A	YES

3. DEVICE CONFIGURATION

The device can be configured in two ways:

- basic configuration from dip switch
- complete configuration from flash (using the Easy Setup software via the USB port)

ATTENTION!

The configuration via dip switch is active only after a restart!

ATTENTION!

The Dip Switch setting overlaps the Flash setting and consequently, in the event that it is necessary to use the flash configuration, ALL the dip switches MUST be positioned in the "OFF" position.

4. CONFIGURATION BY DIP SWITCH

4.1. Loading configuration from flash

If ALL Dip Switches 1…8 are OFF, the device uses the Flash configuration (for the configuration, use the Easy Setup software)

Loading the configuration	*DIP1*	*DIP2*	*DIP3*	*DIP4*	*DIP5*	*DIP6*	*DIP7*	*DIP8*
FROM FLASH	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

4.2. Setting the Modbus RTU RS485 station address

Dip switches 1..4 are used to configure the Modbus RTU station address:

Modbus RTU address	*DIP1*	*DIP2*	*DIP3*	*DIP4*
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

4.3. RS485 Baud rate setting

Dip Switches 5..6 are used to set the Baud Rate

Baud Rate	*DIP5*	*DIP6*
9600	OFF	OFF
19200	ON	OFF
38400	OFF	ON
57600	ON	ON

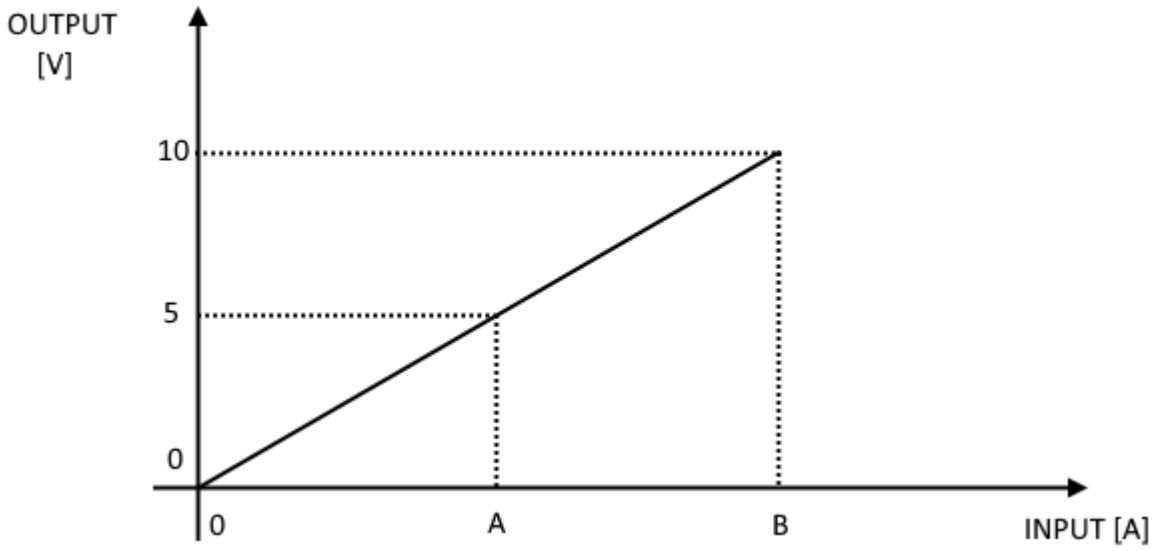
ATTENTION!

The parity bits cannot be configured via dip switches but only via the Easy Setup software. With the setting of the dip switches, the parity is always set to "None" (8,N,1).

4.4. Bipolar/RMS mode setting and 50% - 100% full scale

Dip Switch 7: choose between True RMS Measurement/DC Bipolar Measurement
Dip Switch 8: select 50% of full scale

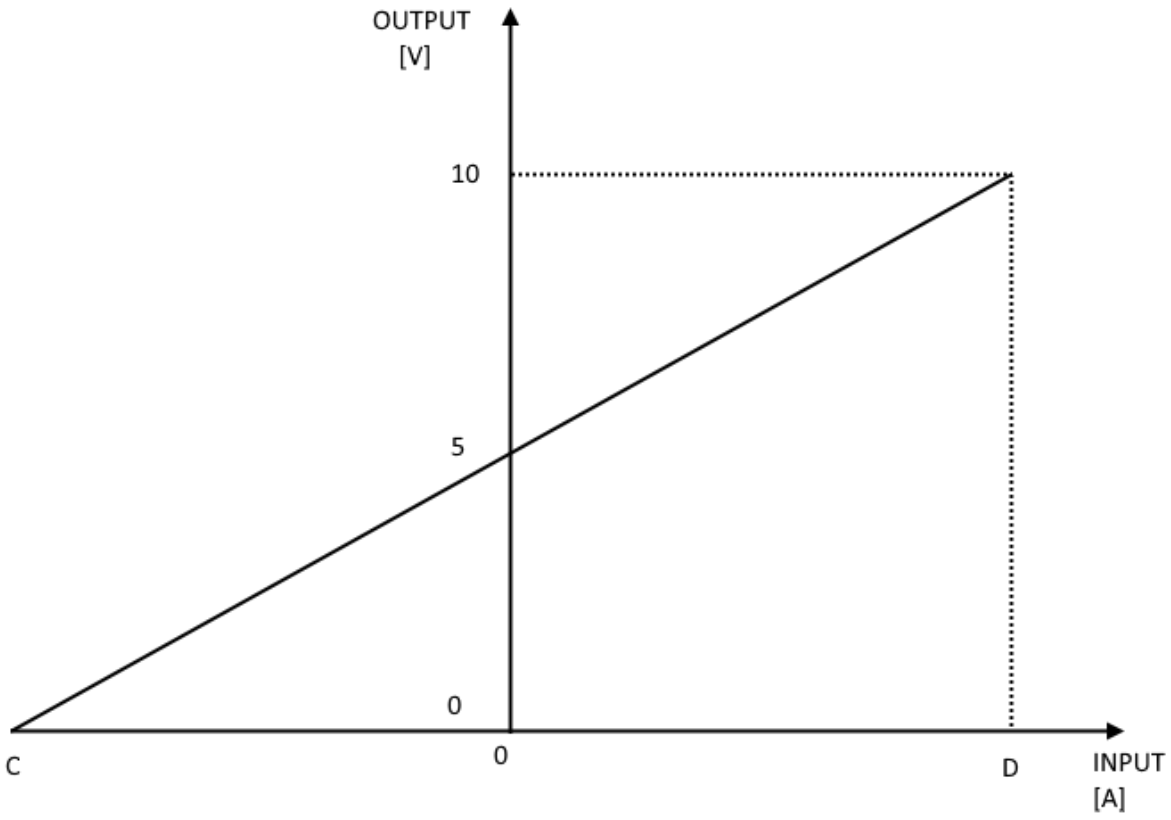
The following figure refers to the RMS measurement (dip switch 7 “Bipol” = OFF):



MODEL	*DIP7*	*DIP8*	*A*	*B*

	BIPOL	***50% FS***		
T201DCH50-MU	OFF	OFF	25 A	50 A
T201DCH50-MU	OFF	ON	12,5 A	25 A
T201DCH100-MU	OFF	OFF	50 A	100 A
T201DCH100-MU	OFF	ON	25 A	50 A
T201DCH300-MU	OFF	OFF	150 A	300 A
T201DCH300-MU	OFF	ON	75 A	150 A
T201DCH600-MU	OFF	OFF	300 A	600 A
T201DCH600-MU	OFF	ON	150 A	300 A
T201DCH100-OPEN	OFF	OFF	50 A	100 A
T201DCH100-OPEN	OFF	ON	25 A	50 A
T201DCH300-OPEN	OFF	OFF	150 A	300 A
T201DCH300-OPEN	OFF	ON	75 A	150 A
T201DCH600-OPEN	OFF	OFF	300 A	600 A
T201DCH600-OPEN	OFF	ON	150 A	300 A

The following figure refers to the Bipolar measurement (dip switch 7 “Bipol” = ON):



MODEL	*BIPOL DIP7 SWITCH*	*50%FS DIP8 SWITCH*	*C*	*D*
T201DCH50-MU	ON	OFF	-50 A	+50 A
T201DCH50-MU	ON	ON	-25 A	+25 A
T201DCH100-MU	ON	OFF	-100 A	+100 A
T201DCH100-MU	ON	ON	-50 A	+50 A
T201DCH300-MU	ON	OFF	-300 A	+300 A
T201DCH300-MU	ON	ON	-150 A	+150 A
T201DCH600-MU	ON	OFF	-600 A	+600 A
T201DCH600-MU	ON	ON	-300 A	+300 A
T201DCH100-OPEN	ON	OFF	-100 A	+100 A
T201DCH100-OPEN	ON	ON	-50 A	+50 A
T201DCH300-OPEN	ON	OFF	-300 A	+300 A
T201DCH300-OPEN	ON	ON	-150 A	+150 A
T201DCH600-OPEN	ON	OFF	-600 A	+600 A
T201DCH600-OPEN	ON	ON	-300 A	+300 A

ATTENTION!

The configuration via dip switch is active only after a restart!

Consequently, for example using the RMS measurement with 0A input, the output voltage is 0V but using Bipolar measurement with 0A input, the output voltage is 5V.

5. MODBUS RTU PROTOCOL

The Modbus protocol supported by the T201DCH -MU/-OPEN devices is:

- Modbus RTU Slave

For more information on these protocols, refer to the Modbus specification website:

http://www.modbus.org/specs.php.

5.1. Modbus RTU function code supported

The following Modbus RTU functions are supported:

- Read Holding Register (function 3) Max 5 registers
- Write Single Register (function 6)
- Write Multiple registers (function 16) Max 2 registers

ATTENTION!

All 32-bit values are stored in 2 consecutive registers

ATTENTION!

With the Read Holding Register function (function 3) a maximum of 5 Modbus registers can be read.

ATTENTION!

With the Write Multiple Register function (function 16), a maximum of 2 Modbus registers can be written

ATTENTION!

Modbus USB configuration is fixed at 38400 baud, 8bit, No parity, 1 stop bit
When the USB cable is inserted, the RS485 will stop communicating until the USB is disconnected.

6. MODBUS REGISTER TABLE

The following abbreviations are used in the register tables:

MS = More significant
LS = Less significant
MSW = 16 most significant bits
LSW = 16 least significant bits
MSW* = the 16 most significant or least significant bits depending on the configuration (most significant by default)
LSW* = the 16 least significant or most significant bits depending on the configuration (least significant by default)
MSW = 8 most significant bits
LSW = 8 least significant bits
MSBIT = Most significant bit
LSBIT = Least significant bit
RO = Register in write-only
RW = Read/write register
RW** = Reading and writing register contained in flash memory, writable for a maximum of 10000 times.
Unsigned 16 bit = the unsigned integer register can take values from 0 to 65535
Signed 16 bit = the signed integer register can take values from -32768 to +32767
Float 32 bit = 32-bit, single-precision floating-point register (IEEE 754) https://en.wikipedia.org/wiki/IEEE_754
BIT = Boolean register, can be 0 (false) or 1 (true)

6.1. "0-BASED" OR "1-BASED" MODBUS ADDRESSES

According to the Modbus standard, Holding Registers are addressable from 0 to 65535 with 2 different address numbering conventions: "0-BASED" and "1-BASED".
For clarity, Seneca shows register tables in both conventions.

ATTENTION!

CAREFULLY READ THE MODBUS MASTER DEVICE DOCUMENTATION TO UNDERSTAND WHICH OF THE TWO CONVENTIONS THE MANUFACTURER HAS DECIDED TO USE

6.1.1. MODBUS ADDRESSES WITH "0-BASED" CONVENTION

The numbering is:

HOLDING REGISTER MODBUS ADDRESS (OFFSET)	*MEANING*
0	FIRST REGISTER
1	SECOND REGISTER
2	THIRD REGISTER
3	FOURTH REGISTER
4	FIFTH REGISTER

Consequently, the first register is at address 0.
In the following tables, this convention is indicated with ***"ADDRESS OFFSET".***

6.1.2. MODBUS ADDRESSES WITH "1-BASED" CONVENTION (STANDARD)

The numbering is that established by the Modbus CONSORTIUM and is of the type:

HOLDING REGISTER MODBUS ADDRESS 4x	*MEANING*
40001	FIRST REGISTER
40002	SECOND REGISTER
40003	THIRD REGISTER
40004	FOURTH REGISTER
40005	FIFTH REGISTER

In the following tables this convention is indicated with ***"ADDRESS 4x"*** since 4 is added to the address so that the first Modbus register is 40001.

A further convention is also possible where the number 4 is omitted in front of the register address:

MODBUS HOLDING ADDRESS WITHOUT 4x	*MEANING*
1	FIRST REGISTER
2	SECOND REGISTER
3	THIRD REGISTER
4	FOURTH REGISTER
5	FIFTH REGISTER

6.2. BIT CONVENTION WITHIN A MODBUS HOLDING REGISTER

A Modbus Holding Register consists of 16 bits with the following convention:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0

If the register value in decimal is for example
12300
the value 12300 in hexadecimal is:
0x300C

the hexadecimal 0x300C in binary value is:
11 0000 0000 1100

So, using the above convention, we get:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0

6.3. BYTE CONVENTION MSB and LSB WITHIN A MODBUS HOLDING REGISTER

A Modbus Holding Register consists of 16 bits with the following convention:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0

The LSB (Least Significant Bit) defines the 8 bits ranging from Bit 0 to Bit 7 included and the MSB (Most Significant Bit) defines the 8 bits ranging from Bit 8 to Bit 15 included:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE MSB								BYTE LSB							

6.4. REPRESENTING A 32-BIT VALUE IN TWO CONSECUTIVE MODBUS HOLDING REGISTERS

The representation of a 32-bit value in the Modbus Holding Registers is done using 2 consecutive Holding Registers (a Holding Register is a 16-bit register). Consequently, to get the 32-bit value, two consecutive registers must be read.
For example, if register 40064 contains the 16 most significant bits (MSW) while register 40065 contains the 16 least significant bits (LSW), the 32 bit value is obtained by composing the 2 registers:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
40064 MOST SIGNIFICANT WORD															

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
40065 LEAST SIGNIFICANT WORD															

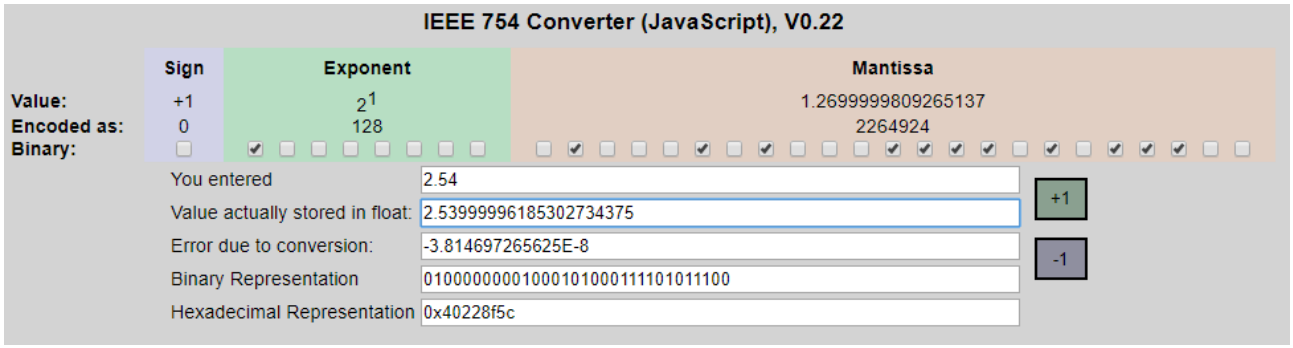
$$Value_{32bit} = Register_{LSW} + (Register_{MSW} * 65536)$$

In the reading registers it is possible to exchange the most significant word with the least significant word and thus obtain 40064 as LSW and 40065 as MSW.

6.5. 32-BIT FLOATING POINT DATA TYPE (IEEE 754)

The IEEE 754 standard (https://en.wikipedia.org/wiki/IEEE_754) defines the format for representing floating point numbers.
As already specified, since it is a 32-bit data type, its representation occupies two 16-bit holding registers.
To get a binary/hexadecimal conversion of a floating point value, you can refer to an online converter at the following address:

http://www.h-schmidt.net/FloatConverter/IEEE754.html



Using the last representation, the value 2.54 is represented in 32 bits as follows:

0x40228F5C

Having 16-bit registers available, the value must be divided into MSW and LSW:

0x4022 (16418 decimal) are the 16 most significant bits (MSW) while 0x8F5C (36700 decimal) are the 16 least significant bits (LSW).

6.6. T201DCH -MU/-OPEN: HOLDING REGISTER MODBUS 4xxxx TABLE (FUNCTION 3 CODE)

REGISTER NAME	COMMENT	REGISTER TYPE	R/W	DEFAULT VALUE OR START VALUE	ADDRESS (4xxxx)	OFFSET ADDRESS
MACHINE ID	Module ID code	Unsigned 16 bits	R	-	40001	0
FIRMWARE REVISION	Firmware Revision Code	Unsigned 16 bits	R	-	40002	1
RESERVED	Reserved	Float32	R	-	40003 (LSW) 40004 (MSW)	2-3
RESERVED	Reserved	Unsigned 16 bits	R	-	40005	4
COMMAND	This register is used for sending commands to the device. The following commands are supported: 49600 Store configuration in Flash 49568 Reset the Module 49920 Reset I max Value 49921 Reset I min Value After the command is executed the register will return to 0 value	Unsigned 16 bits	R/W	0	40006	5
FLOAT CURRENT VALUE [A]	Current Measure Value in floating point LSW-MSW [A]	Float32	R	-	40049 (LSW) 40050 (MSW)	48-49

REGISTER NAME	COMMENT	REGISTER TYPE	R/W	DEFAULT VALUE OR START VALUE	ADDRESS (4xxxx)	OFFSET ADDRESS
INTEGER CURRENT VALUE [A X100] [A X10] (T201DCH600A)	Current Measure Value in signed integer [A x100] For example: 18534 = 185.34 A -2500 = -25.00 A [A x10] for 600A model For example: 60000 = 600.0 A	Signed 16 Bits	R	-	40051	50
CURRENT MIN [A]	Minimum Current Value (use register Command for reset the value) The value is set to 0 at startup	Float32	R	-	40059 (LSW) 40060 (MSW)	58-59
CURRENT MAX [A]	Maximum Current Value (use register Command for reset the value) The value is set to 0 at startup	Float32	R	-	40061 (LSW) 40062 (MSW)	60-61
OUTPUT VOLTAGE [V]	Output Voltage	Float32	R	-	40063 (LSW) 40064 (MSW)	62-63
INVERSE FLOAT CURRENT VALUE [A]	Current Measure Value in floating point MSW-LSW [A] Copy of Float Current Value Registers with Inverse (MSW-LSW) Floating Point	Float32	R	-	40065 (MSW) 40066 (LSW)	64-65

REGISTER NAME	COMMENT	REGISTER TYPE	R/W	DEFAULT VALUE OR START VALUE	ADDRESS (4xxxx)	OFFSET ADDRESS
ALARM STATUS	Alarm status flag: BIT 0 = Max Pre-Alarm BIT 1 = Min Pre-Alarm BIT 2 = Internal Window Pre-Alarm BIT 3 = External Window Pre-Alarm Bit 4..Bit 7 = Not Used BIT 8 = Max Alarm BIT 9 = Min Alarm BIT 10 = Internal Window Alarm BIT 11 = External Window Alarm BIT 12..15 = Not Used	Unsigned 16 bits	R	0	40067	66
MODBUS STATION ADDRESS	Modbus RTU station address	Unsigned 16 bits	RW*	1	40101	100
BAUD RATE	RS485 Port Baud rate 0 = 4800 baud 1 = 9600 baud 2 = 19200 baud 3 = 38400 baud 4 = 57600 baud 5 = 115200 baud 6 = 1200 baud 7 = 2400 baud	Unsigned 16 bits	RW*	3	40102	101
PARITY	Communication Parity Bit 0 = None (8,N,1) 1 = Even (8,E,1) 2 = Odd (8,O,1)	Unsigned 16 bits	RW*	0	40103	102

REGISTER NAME	COMMENT	REGISTER TYPE	R/W	DEFAULT VALUE OR START VALUE	ADDRESS (4xxxx)	OFFSET ADDRESS
OUT MODE TRUE RMS/BIPOLAR	MSB (OUT MODE) Select from Digital or Analog output: 0 = Select Analog Output 1 = Select Digital Output (Alarm) LSB (TRUE RMS/BIPOLAR) Select from True RMS or Bipolar DC measurement mode 0 = True RMS 1 = Bipolar DC	Unsigned 16 bits	RW*	0	40104	103
RESERVED	Reserved	Unsigned 16 bits	R	0	40105	104
FILTER	Select Filter level 0 = LOW RMS =1400 ms response Time BIPOLAR = 78 ms response Time 1 = HIGH RMS = 2900 ms response Time BIPOLAR = 650 ms response Time	Unsigned 16 bits	RW*	0	40106	105

REGISTER NAME	COMMENT	REGISTER TYPE	R/W	DEFAULT VALUE OR START VALUE	ADDRESS (4xxxx)	OFFSET ADDRESS
MODEL	Select the model 0 = T201DCH50-MU 1 = T201DCH100-MU 2 = T201DCH300-MU 3 = T201DCH300-MU HW2 4 = T201DCH600-MU 5 = T201DCH100-OPEN 6 = T201DCH300-OPEN 7 = T201DCH600-OPEN	Unsigned 16 bits	R	According to the model	40107	106
ALARM TYPE	Select the Alarm linked to the Digital Output: 0 = NONE 1 = MAX (Alarm if the Current is above the High Threshold) 2 = MIN (Alarm if the Current is below the Low Threshold) 3 = Window INT (Alarm if the Current > Low Threshold but < High Threshold) 4 = Window EXT (Alarm if the Current is > High Threshold or < Low Threshold)	Unsigned 16 bits	RW*	0	40108	107
DOUT MODE	0 = Digital Output is normally Low 1 = Digital Output is normally High	Unsigned 16 bits	RW*	0	40109	108
ALARM DELAY	Alarm delay in x 10ms (for example write 1000 for obtain 10 seconds of delay)	Unsigned 16 bits	RW*	0	40110	109
START INPUT SCALE	Select the Start Input Scale [A]	Float32	RW*	According to the model	40111 (LSW) 40112 (MSW)	110-111

REGISTER NAME	COMMENT	REGISTER TYPE	R/W	DEFAULT VALUE OR START VALUE	ADDRESS (4xxxx)	OFFSET ADDRESS
STOP INPUT SCALE	Select the Stop Input Scale [A]	Float32	RW*	According to the model	40113 (LSW) 40114 (MSW)	112-113
START OUTPUT SCALE	Select the Start output Scale [V]	Float32	RW*	0.0 V	40115 (LSW) 40116 (MSW)	114-115
STOP OUTPUT SCALE	Select the Stop output Scale [V]	Float32	RW*	10.0 V	40117 (LSW) 40118 (MSW)	116-117
ALARM HYSTERESIS	Select the Hysteresis for the Alarm in [A]	Float32	RW*	10.0 A	40119 (LSW) 40120 (MSW)	118-119
THRESHOLD HIGH	Select the High Threshold for the Alarm in [A]	Float32	RW*	According to the model	40121 (LSW) 40122 (MSW)	120-121
THRESHOLD LOW	Select the Low Threshold for the Alarm in [A]	Float32	RW*	According to the model	40123 (LSW) 40124 (MSW)	122-123

7. COMPLETE CONFIGURATION WITH EASY SETUP

To configure all the device parameters, it is necessary to use the USB or RS485 port and the Easy T201DCH -MU/-OPEN software included in the Easy Setup suite.
The Easy Setup software can be downloaded for free from:

www.seneca.it

7.1. Easy Setup Menu

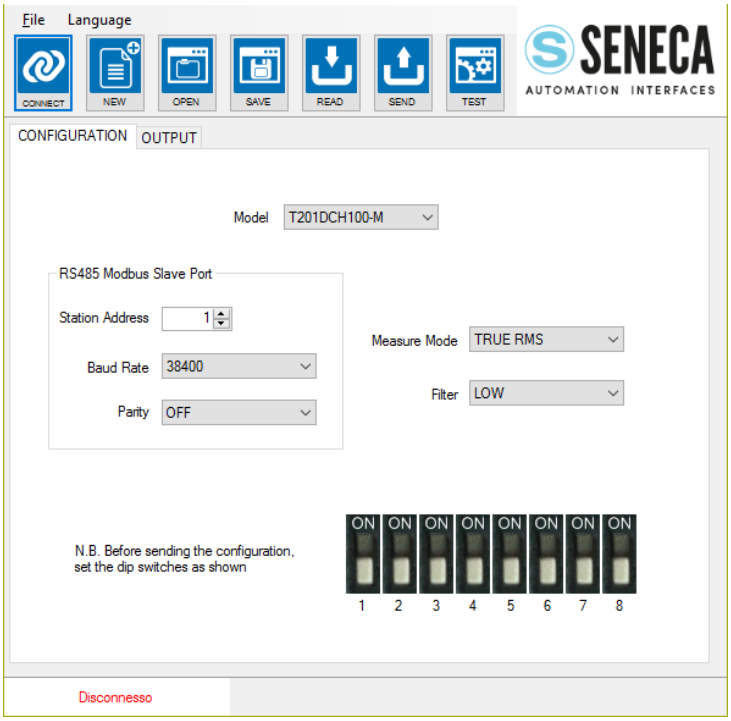
Connect: Use the connect icon to connect your PC to the device. To connect the device to a PC, you need to use an RS485 to USB converter such as the Seneca S117P1 or S107USB.
New: loads the default parameters into the current project
Open: opens a stored project
Save: saves the current project
Read: reads the current configuration from the device (if the dip switches are not ALL OFF, the configuration is read from the dip switches)

ATTENTION!

If a configuration is read from the device with at least one dip switch set to "ON", the software will read the configuration from the dip switch which will override the flash configuration.

Send: to send the project configuration (if the dip switches are not ALL OFF, the device uses the dip switch configuration and NOT the sent configuration)
Test: starts a reading of the Registers. It is also possible to reset the MIN/MAX values and start/stop a Datalogger

7.2. Creating a project configuration



ATTENTION!

You must set all dip switches to OFF before sending the configuration to the device, otherwise the actual configuration will be overwritten by the configuration from dip switches!

The parameters that can be configured in the "Configuration" section are:

Model: to choose between the T201DCH50-MU, T201DCH100-MU/-OPEN, T201DCH300-MU/-OPEN HW2 or T201DCH600-MU/-OPEN models.
Station address: to select the Modbus RTU station address
Baud Rate: to choose the Baud rate from 1200 to 115200 baud
Parity: select NONE, EVEN or ODD
Mode: to select the current measurement mode, True RMS or DC Bipolar
Filter: to choose between LOW or HIGH

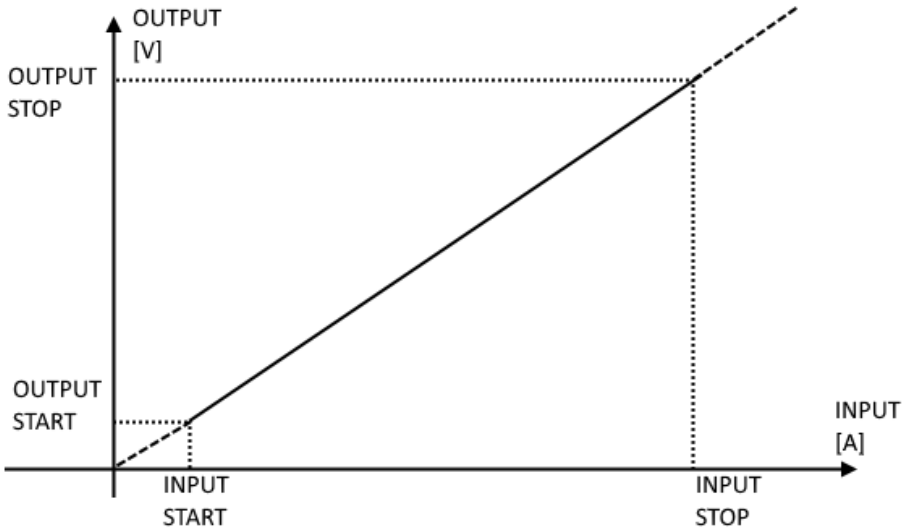
FILTER	*RMS RESPONSE TIME (10%-90% F.S.)*	*DC BIPOLAR RESPONSE TIME (10%-90% F.S.)*
LOW	1400 ms	78 ms
HIGH	2900 ms	650 ms

The parameters that can be configured in the "OUTPUT" section depend on the type of output, whether "Analog" or "Digital" has been selected (only for T201DCH50/100/300-MU models).

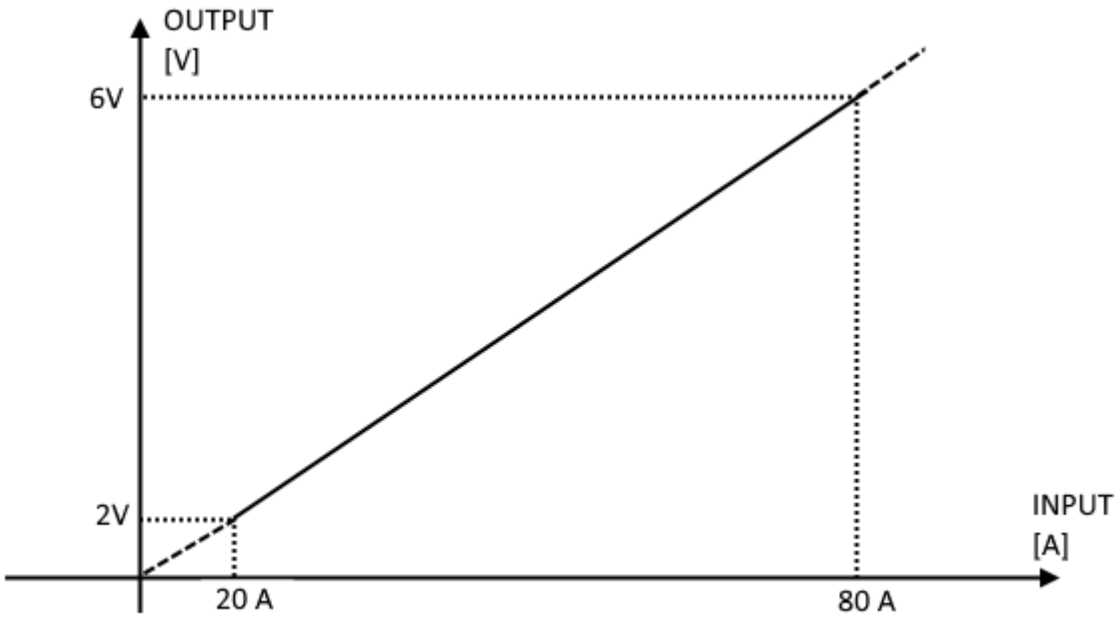
If the Output is configured in "Analog":

N.B.: The T201DCH600-MU instrument and the -OPEN models allow the use of the analog output and the digital output at the same time.

Start/End Scale In and Start/End Scale Out: choose the start and end scale in and out, as shown in the figure.



for example:
INPUT START = 20A
INPUT END = 80A:
OUTPUT START = 2V
OUTPUT END = 6V



Note that with an input of 0A, the output is 0V and with a value greater than 80A, the output is greater than 6V (6V and 2V are not a limit).

ATTENTION!

The output voltage is limited to approximately 10.8V

If the Output is configured in "Digital":

Digital output type: choose from normally high or normally low.

Alarm type: choose between

- ***NONE:*** no active alarms
- ***MAXIMUM***: alarm if the current is above the upper threshold
- ***MINIMUM:*** alarm if the current is below the lower threshold
- ***ACTIVE IF INSIDE THE WINDOW:*** (alarm if current > lower threshold but < upper threshold)
- ***ACTIVE IF OUTSIDE THE WINDOW:*** (alarm if current is > upper threshold or < lower threshold)

Alarm delay: choose the alarm delay in x 10 ms (e.g. write 100 for 1 second delay)

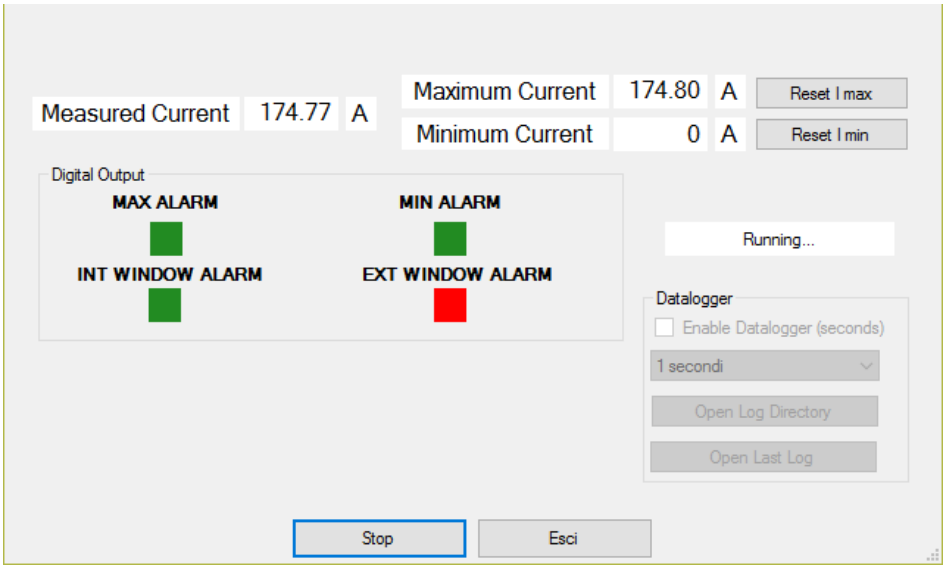
Hysteresis: choose the alarm hysteresis in [A]

Upper alarm: choose the upper threshold for the alarm in [A]

Low alarm: choose the low threshold for the alarm in [A]

7.3. Device test

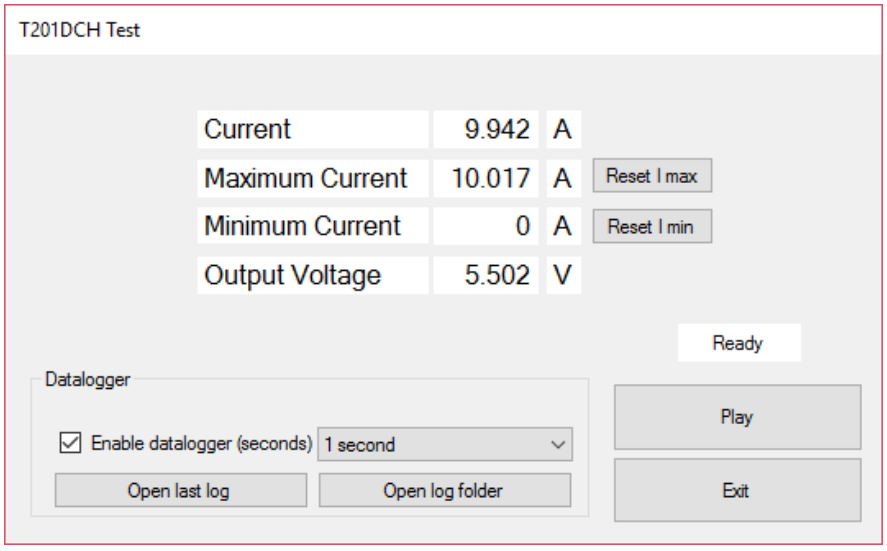
When the configuration is sent to the device, it is possible to test the actual configuration, through the icon  :



The test configuration will acquire the measurement from the Modbus registers and it is also possible to reset the MIN/MAX values.

7.3.1. The Data Logger

The data logger can be used to acquire data that can be used with external software (e.g. Microsoft Excel™). It is possible to set the acquisition time of the samples (a minimum time of 1 second):



The data logger will create a standard .csv format file that you can open with external tools:

	A	B	C	D	E	F	G
1	INDEX	TYPE	TIMESTAMP	I	IMAX	IMIN	VOUT
2	1	LOG	18/07/2017 17:37:16	9,94183	10,01664	0	5,501532
3	2	LOG	18/07/2017 17:37:17	9,984209	10,0598	0	5,502169
4	3	LOG	18/07/2017 17:37:18	10,04912	10,06021	0	5,46909
5	4	LOG	18/07/2017 17:37:19	9,9916	10,06021	0	5,500545
6	5	LOG	18/07/2017 17:37:20	10,0064	10,06021	0	5,49997
7	6	LOG	18/07/2017 17:37:21	10,00188	10,06021	0	5,503278
8	7	LOG	18/07/2017 17:37:22	9,944716	10,07788	0	5,501326
9	8	LOG	18/07/2017 17:37:23	9,977228	10,07788	0	5,502477
10	9	LOG	18/07/2017 17:37:24	10,06232	10,07788	0	5,50186
11	10	LOG	18/07/2017 17:37:25	9,991206	10,07788	0	5,501265
12	11	LOG	18/07/2017 17:37:26	10,03309	10,07788	0	5,500669
13	12	LOG	18/07/2017 17:37:27	10,03637	10,07788	0	5,500587
14	13	LOG	18/07/2017 17:37:29	10,00598	10,07788	0	5,501203
15	14	LOG	18/07/2017 17:37:30	9,976815	10,07788	0	5,50338
16	15	LOG	18/07/2017 17:37:31	10,01295	10,07788	0	5,50225
17	16	LOG	18/07/2017 17:37:32	10,01624	10,07788	0	5,500751
18	17	LOG	18/07/2017 17:37:33	10,0615	10,07788	0	5,502066
19	18	LOG	18/07/2017 17:37:34	10,03803	10,07788	0	5,502476
20	19	LOG	18/07/2017 17:37:35	10,01379	10,07788	0	5,503421
21	20	LOG	18/07/2017 17:37:36	10,0105	10,07788	0	5,502476
22	21	LOG	18/07/2017 17:37:37	10,00846	10,07788	0	5,501059
23	22	LOG	18/07/2017 17:37:38	10,05898	10,08692	0	5,500854
24	23	LOG	18/07/2017 17:37:39	10,03637	10,08692	0	5,501983
25	24	LOG	18/07/2017 17:37:40	10,03022	10,08692	0	5,501552
26	25	LOG	18/07/2017 17:37:41	10,00187	10,08692	0	5,502662
27	26	LOG	18/07/2017 17:37:42	10,00558	10,08692	0	5,502969

The file can also be opened with a text editor:

INDEX;TYPE;TIMESTAMP;I;IMAX;IMIN;VOUT
1;LOG;18/07/2017 17:37:16;9,94182968139648;10,0166397094727;0;5,50153207778931
2;LOG;18/07/2017 17:37:17;9,98420906066895;10,0598001480103;0;5,50216913223267
3;LOG;18/07/2017 17:37:18;10,0491199493408;10,0602102279663;0;5,4690899848938
4;LOG;18/07/2017 17:37:19;9,99160003662109;10,0602102279663;0;5,50054502487183
5;LOG;18/07/2017 17:37:20;10,0064001083374;10,0602102279663;0;5,49996995925903
6;LOG;18/07/2017 17:37:21;10,0018796920776;10,0602102279663;0;5,50327777862549
7;LOG;18/07/2017 17:37:22;9,94471645355225;10,0778799057007;0;5,50132608413696
8;LOG;18/07/2017 17:37:23;9,97722816467285;10,0778799057007;0;5,50247716903687
9;LOG;18/07/2017 17:37:24;10,0623197555542;10,0778799057007;0;5,50186014175415
10;LOG;18/07/2017 17:37:25;9,99120616912842;10,0778799057007;0;5,50126504898071
11;LOG;18/07/2017 17:37:26;10,0330896377563;10,0778799057007;0;5,50066900253296
12;LOG;18/07/2017 17:37:27;10,0363702774048;10,0778799057007;0;5,50058698654175
13;LOG;18/07/2017 17:37:29;10,0059795379639;10,0778799057007;0;5,50120306015015
14;LOG;18/07/2017 17:37:30;9,97681522369385;10,0778799057007;0;5,50337982177734
15;LOG;18/07/2017 17:37:31;10,0129499435425;10,0778799057007;0;5,50225019454956
16;LOG;18/07/2017 17:37:32;10,0162401199341;10,0778799057007;0;5,50075101852417
17;LOG;18/07/2017 17:37:33;10,0614995956421;10,0778799057007;0;5,50206613540649