User Manual

ITKU-106-02-06-26-EN

AP2

Analog output module 4 - 20 mA

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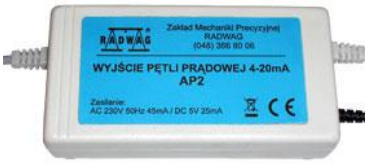
1. GENERAL INFORMATION

AP2 Current Loop unit 4–20 mA has been designed to convert digital value of mass to analog value. The unit cooperates with weighing instruments manufactured by **Radwag** and must not be used for cooperation with balances and scales of other brands. Current Loop unit is a unit of passive type, i.e. it requires to be supplied with power from an external source, of 24 VDC voltage value. Current Loop unit indicates mass as:

- absolute value (no sign),
- positive values exclusively,
- mass value with sign.

There are two mechanical designs of AP2 Current Loop unit:

- **AP2-1** housed in a plastic casing, intended for cooperation with **PUE C315**, **PUE C32**, **PUE 7.1** indicators, and powered by an external power supply **230V/5VDC**. **AP2-1** and the power supply are sold as a set. The current circuit is led through 1.7-meter-long cable. **RS232** interface is led through 1.7-meter-long cable terminated with **DB9/F** connector.



- **AP2-4** housed in a stainless steel casing, intended for cooperation with **PUE H315, PUE HX7 and PUE HY10** indicators, and powered by the indicator. The current circuit is led through 1.7-meter-long cable. **RS232** interface is led through 2-meter-long cable terminated with **M12** connector.





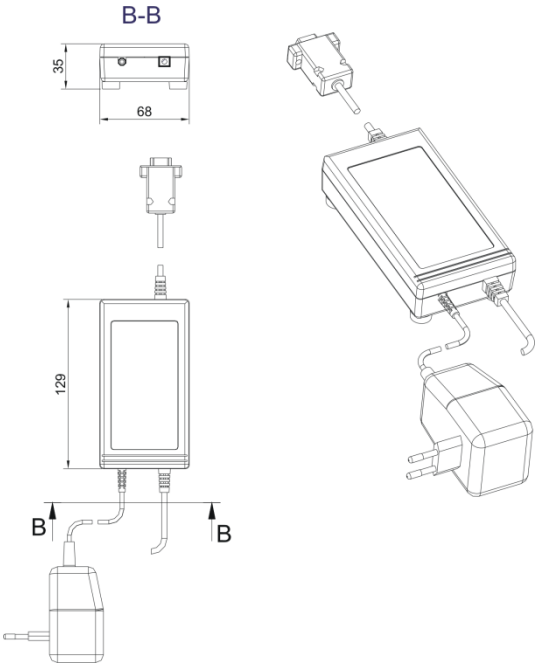
AP2-4 Current Loop unit is available exclusively as a set with a weighing device.

2. TECHNICAL SPECIFICATIONS

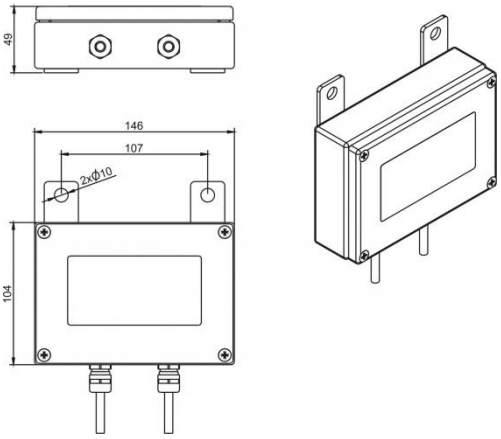
	AP2-1	**AP2-4**
Housing	plastic	stainless steel
Power supply for a device	Power supply 230 VAC / 5 VDC 500 mA	PUE H315 indicator
Power supply for a Current Loop unit	Stabilized external power supply 24 VDC (min 50 mA)	
Power loss	450 mW	
Maximum loop resistance	500 Ω	
Output resolution	16 Bits	
Linearity error	+/- 0.01 %	
Indication error 4 mA (+ 25 C)	+/- 0.1 %	
Indication error 20 mA (+ 25 C)	+/- 0.2 %	
Temperature error for 4 mA	+/- 25 ppm/°C	
Temperature error for 20 mA	+/- 50 ppm/°C	
Operating temperature range	- 10 °C ÷ + 40 °C	
Output cable	1.7m	
RS232 cable	1.7 m with DB9/F connector	2 m with M12 female connector
Dimensions (mm)	68 x 35 x 129	146 x 49 x 104
Net weight (complete set)	~475 g	~1.15 kg

3. DIMENSIONS

- **AP2-1 Current Loop unit:**



- **AP2-4 Current Loop unit:**

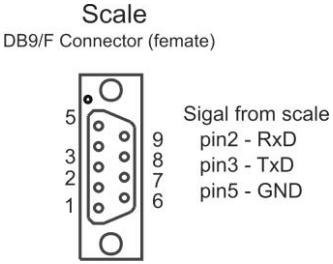


4. RS 232 INTERFACE

RS232 interface of **AP2** Current Loop unit is equipped with:

- **DB9/F** connector - **AP2-1** model.
- **M12** female connector - **AP2-4** model.

DB9/F connector is intended to connect the **AP2-1** Current Loop unit to computer and **PUE C315, PUE C32, PUE 7.1** indicators.



DB9/F connector signals

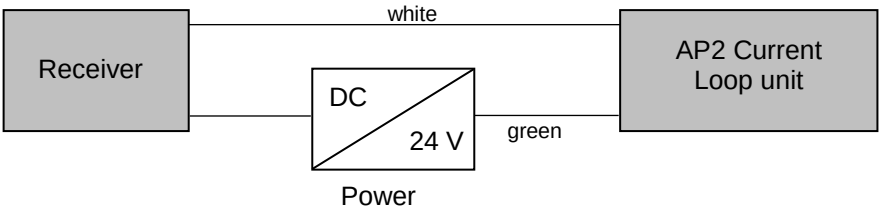
M12 female connector is intended to connect the **AP2-4** Current Loop unit to **PUE H315, PUE HX7, PUE HY10** indicators exclusively.

RS 232 interface parameters:

Baud rate	9600
Data bits	8
Parity	none
Stop bits	1
Transmission control	none

	***It is not possible to change transmission parameters in a Current Loop unit. In order to synchronize the interface, it is necessary to use indicator.***

5. CONNECTING A RECEIVER



6. SETTING 'INDICATOR - CURRENT LOOP UNIT' COOPERATION

In order to provide correct **Indicator – Current Loop unit** cooperation, run the indicator and:

- set transmission parameters for **RS 232**, do it in accordance with table that is to be found in section 4 of this user manual,
- enable continuous transmission and/or, depending on indicator type, select respective printout template.

	***APPENDIX section provides settings for cooperation between the most popular indicators (PUE C315, PUE 7.1, PUE 5) and Current Loop unit.***

7. PROGRAMMING CURRENT LOOP UNIT

In order to provide correct operation of Current Loop unit, set the following parameters:

- indicator type,
- maximum capacity of the weighing device,
- operation mode.

If the Current Loop unit is ordered along with a weighing device then **its default parameters correspond with the purchased scale type**. If you purchase Current Loop unit only, or Current Loop unit along with an indicator (no metrological data), then you have to calibrate the Current Loop unit.

In order to introduce any modifications, use a computer and **'4-20mA Current Loop'** PC software delivered with the unit (for detailed information read section 8 of this user manual).

7.1. Indicators List

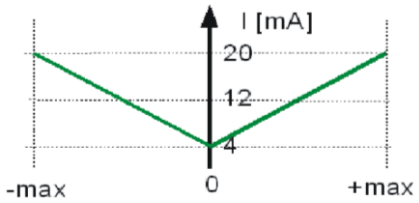
Current Loop unit can cooperate with the following Radwag-manufactured indicators:

- PUE C315,
- PUE C32,
- PUE 7.1,
- PUE H315,
- PUE HX7,
- PUE HY10,
- WLY,
- WLC,
- WPY.

7.2. Working Modes

There are three working modes determining method of Current Loop unit control:

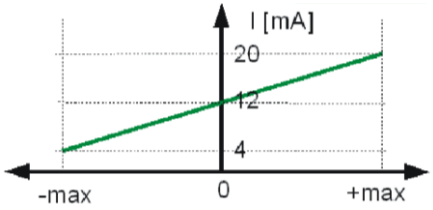
I. Current Loop unit transmits information regarding absolute value of mass in accordance with below characteristic curve:



	Mode I is set by default.

Indication 4 mA corresponds to mass value equal [0], whereas indication 20 mA corresponds both to mass values equal [- max] and [+ max].

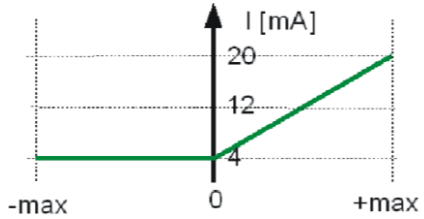
II. Current Loop unit transmits information in accordance with below characteristic curve:



Indication 4 mA corresponds to mass value equal [- max].
Indication 12 mA corresponds to mass value equal [0].
Indication 20 mA corresponds to mass value equal [+ max].

	***In case of mode II, Current Loop unit resolution is divided into two intervals – one for positive mass values and one for negative mass values.***

III. Current Loop unit transmits information regarding exclusively positive values of mass in accordance with below characteristic curve:



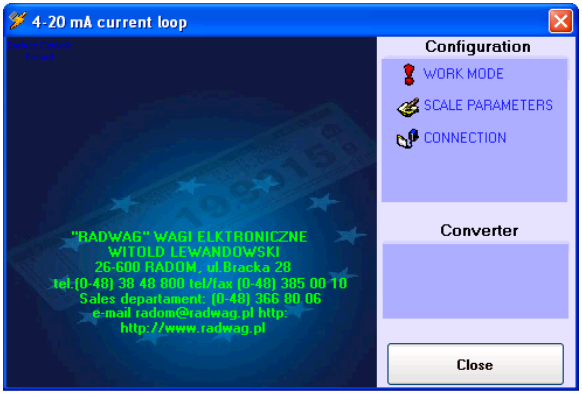
Indication 4 mA corresponds to [- max] ÷ [0] mass value range.
Indication 20 mA corresponds to mass value equal [+ max].

8. '4-20 mA Current Loop' PC SOFTWARE

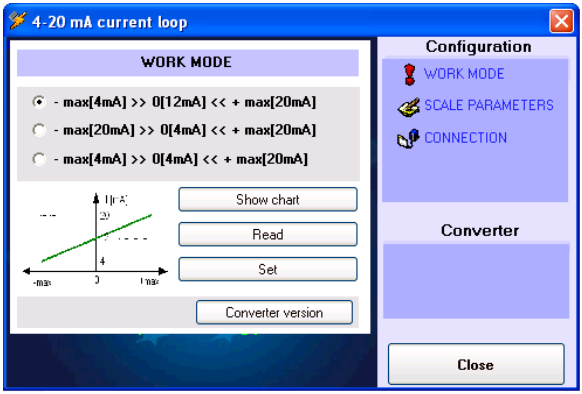
'4-20 mA Current Loop' is designed to configure and test operation of **AP2** Current Loop unit.

	***Connect the Current Loop unit and a computer, next run '4-20mA Current Loop' PC software.***

Home screen:

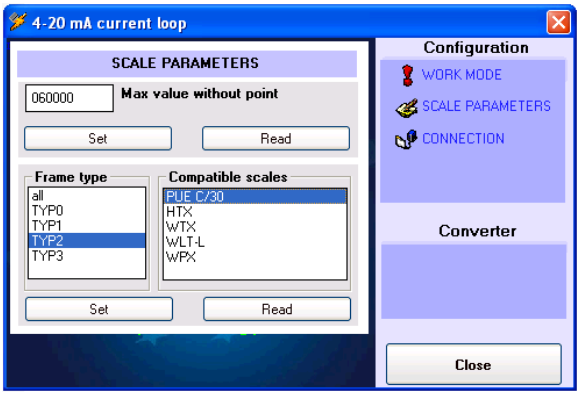


To define all parameters of Current Loop unit go to **<Configuration>** tab:



Tick the selected working mode, next press **<Set>** button, the settings are sent to the Current Loop unit.

	***It is possible to check settings of Current Loop unit, to do it press <Read> button, working mode set on a Current Loop unit is ticked automatically.***



<SCALE PARAMETERS> tab allows you to enter scale's maximum capacity and indicator type with which the Current Loop unit is to cooperate.

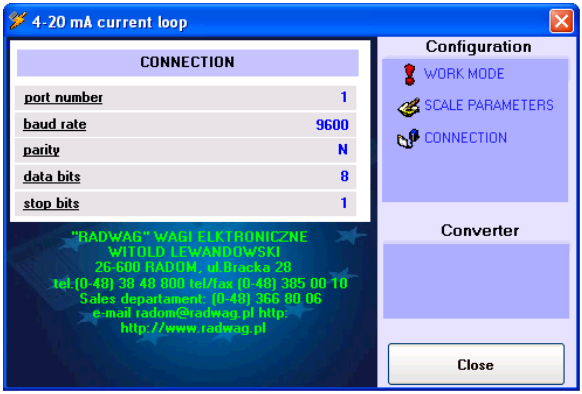
Go to **<Max value without point>** box, enter maximum capacity value, and press **<Set>** button to send it to Current Loop unit. Max value is to be entered without decimal point, see the below table:

Maximum capacity value	**Value to be entered**
10.00kg	1000
3.000kg	3000
6000g	6000

Now, go to **<Compatible scales>** box, select type of **indicator – scale** cooperating with the Current Loop unit. **Indicator - scale** types use different communication protocols; due to this the Current Loop unit must be set to particular type of frame sent from scale.

<Frame type> box provides information on type of **RS232** protocol used by given **indicator - scale**.

To select communication port for a computer to which Current Loop unit is connected, go to **<CONNECTION>** box and set transmission parameters in accordance with table that is to be found in section 4 of this user manual.



9. DEFECTS

No signal from Current Loop unit.	Check polarization. Check if 24 VDC voltage is applied. Check power supply 230 VAC.
4 mA on the output unchangeably.	Wrong configuration of Current Loop unit. Wrong baud rate value on the scale. Continuous transmission disabled on the scale. No connection between the scale and the Current Loop unit.
Current gain does not correspond to mass value gain.	Wrong configuration of Current Loop unit. Wrong maximum capacity value entered.
Communication with the PC software not established.	Check power supply 230 VAC. Check RS 232 connection.
PC software displays message „Port in use”.	The selected COM port is used by another application.

10. APPENDIX

10.1. Setting 'PUE C315 - Current Loop Unit' Cooperation

Printout settings:

Access path	**Parameter value**
Setup / P2.Prnt / 2.1.Pr_n	CntA

Serial communication settings:

Access path	Parameter value
Setup / P2.Prnt / 2.3.bAud	9600
Setup / P2.Prnt / 2.4.S_rS	8d1SnP

10.2. Setting 'PUE 7.1/HY 10 - Current Loop Unit' Cooperation

Communication port settings:

Access path	Parameter value
Setup / Parameters / Devices / Additional display/ Port	COM 1

Printout template settings:

Access path	Parameter value
Setup / Parameters / Devices / Additional display/ Template	**Sl {0}** – code entered using an on-screen keyboard

Serial communication settings:

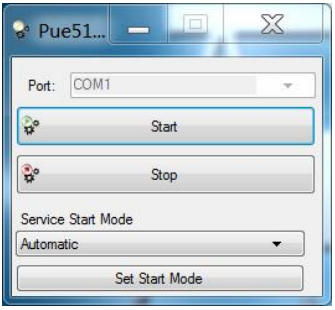
Access path	Parameter value
Setup / Parameters / Communication / COM 1 / Baud rate	9600
Setup / Parameters / Communication / COM 1 / Data bits	8
Setup / Parameters / Communication / COM 1 / Stop bits	1
Setup / Parameters / Communication / COM 1 / Parity	None

10.3. Setting 'PUE 5 - Current Loop Unit' cooperation

- **Run <Pue515 Service Manager> – support for communication with MW04 weighing module:**

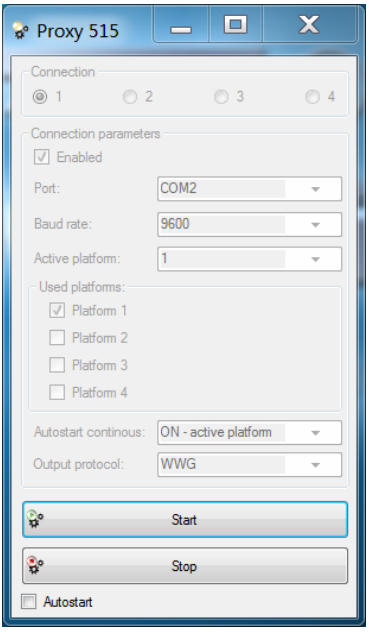
Access path	Parameter value
Start / Pue515 Service Manager	COM 1 – default port for MW04* internal module.

(*) – In case of previous PUE 5 models, COM 6 port was used for communication with MW04 weighing module.



- **Run <Proxy Manager> – support for communication with peripheral devices, e.g.: WWG and WD additional displays.**

Access path
Start / Proxy Manager



Parameter	Default parameter value
Connection	1
Port	COM 2 or COM 3 *
Baud rate	9600
Active platform	1
Used platforms	Platform 1
Autostart continuous	ON - active platform
Output protocol	WWG

(*) – COM port for connecting current loop, in case of previous PUE 5 models it is necessary to set COM 3 or COM 5.