



# A2X\_21P1H58

A2X021P1H58	= 115 Vac
A2X121P1H58	= 230 Vac
A2X221P1H58	= 24 Vac
A2X321P1H58	= 24 Vdc



## DIFFERENTIAL REGULATOR (DOUBLE 4...20 mA INPUT) WITH TWO THRESHOLD ALARMS AND ANALOG OUTPUT

### PACKING LIST

- user's manual
- warnings
- apparatus
- two fixing clamps
- two extractable 12 + 12 pole terminal blocks (into the unit)

### FUNCTIONAL USE OF THE APPARATUS

Regulator with two 4...20 mA input (IN1; IN2) and differential measuring (IN1 - IN2) with maximum range  $\pm 99999$ ;  
two alarm threshold and regulation analog output (selectable through terminal block connection 4..20mA / 0..10V).

### GENERAL SPECIFICATIONS

#### PACKAGE

Suitable for panel mounting - frontal dimensions 48x96 mm  
Cutout dimensions 45x92 mm  
Weight 450 grams max (300 grams 24Vdc power supply models).  
Depth 100 mm over connecting terminal  
Protection level IP54  
Connection by two removable screw terminal blocks 12+12 pole

#### DIGITAL INPUT

Autocalibration; hold; peak hold; analog output forcing  
IN1 (zero); IN2 (span) - unpowered or static NPN contact  
Voltage at terminal 18 max.  
Making current 4 mA max

#### ANALOG INPUT

Two 4...20 mA (default) or 0...20 mA analog input.  
Common negative.  
Input terminal configuration:  
Impedance: 100 ohm  
Maximum overload: 100 % constant  
Output 24 Vdc for transmitter power supply

#### A/D CONVERTER

Resolution:  $\pm 20.000$  points  
Average conversion time 250ms

#### INDICATOR

5-digit indicator plus sign  
Maximum range:  $\pm 99999$   
Reading scale programmable by keyboard  
Decimal point programmable

#### THRESHOLDS ALARMS AND OUTPUT RELAYS

Two keyboard programmable alarms  
Alarm configuration: relative, window, absolute  
Two relays: R1, R2 - with SPST 5A - 250V

#### ANALOG OUTPUT

Selectable through terminal block connection 4..20mA and 0..10V  
Resolution: 2000 points  
Precision 0,01 %  
Linearity 0,0025 %  $\pm 1$  point

#### POWER SUPPLY

Voltage defined in order: 24Vac; 115 Vac; 230Vac; 24Vdc  
Main frequency (AC models): 50/60 Hz  
Data storage during power outage on EEPROM

#### COMPLIANCE WITH EEC DIRECTIVES

93/68 EEC  
89/336 Electromagnetic compatibility EEC  
73/23 low voltage EEC

#### WORKING TEMPERATURE

Working temperature range: -10...50°C



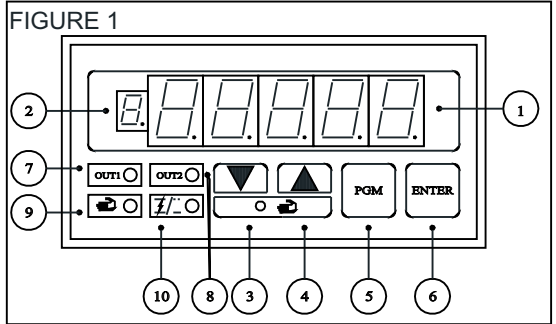
**GESINT.**

# ASSEMBLY AND INSTALLATION

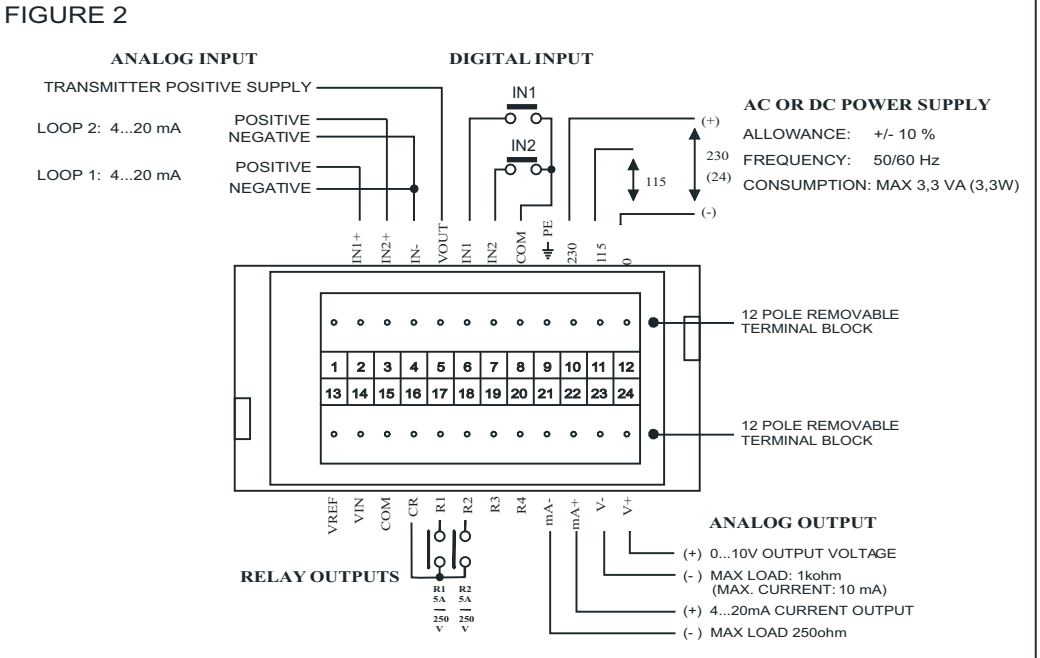
The instrument is set up for panel mounting.  
 It is fixed in place with the two clamps provided.  
 The maximum permitted panel thickness is 4mm.  
 Make all electrical connections with power supply off.  
 Take care to ensure electrical connections are correct.

## FRONT VIEW

- 1 = 5-digit measured variable display, character height 12.5 mm
- 2 = polarity display
- 3 = DOWN key: used to decrease variable setting.
- 4 = UP key: used to increase variable setting.
- 5 = PGM key: accesses programming levels
- 6 = ENTER key: confirms programmed data
- 7 = OUT 1 led: indicates output 1 energization status for setpoint 1
- 8 = OUT 2 led: indicates output 2 energization status for setpoint 2
- 9 = MANUAL led: indicates that indicator is on manual programming mode
- 10 = CABLE INTERRUPTED LED: indicates that display show the analog output value.



## REAR VIEW AND CONNECTIONS



# CONNECTION OF ANALOG INPUT

FIGURE 3

**4...20 mA - 2 WIRE TRANSMITTER  
POWERED FROM DEVICE**

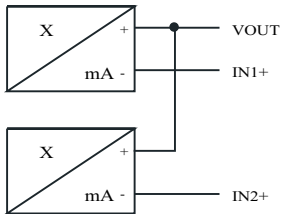


FIGURE 4

**4...20 mA - 2 WIRE TRANSMITTER  
POWERED EXTERNALLY ( $V_{ext}$ )**

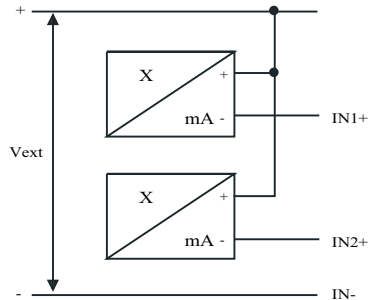


FIGURE 5

**4...20 mA - 3 WIRE TRANSMITTER  
POWERED EXTERNALLY ( $V_{ext}$ )**

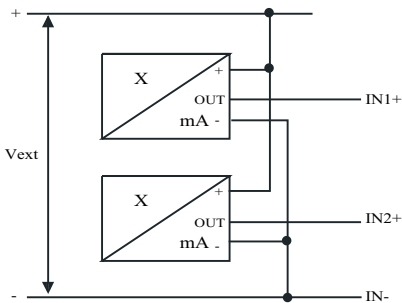
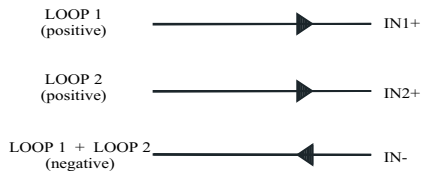


FIGURE 6

**4...20 mA LOOP (powered)**



Two removable 12+12 pole terminal blocks are provided at the rear of the instrument for electrical connections (see Figure 2).

## POWER SUPPLY

24 Vdc to terminals 0(12) (negative) e 24Vdc(10) (positive)

24 Vac to terminals 0(12) e 24(10)

115 Vac to terminals 0(12) e 115(11)

230 Vac to terminals 0(12) e 230(10)

Connect ground to associated terminal 1/9

## DIGITAL INPUTS

IN1 input: zero calibration short circuit between IN1(6) and COM(8)

Analog output forcing (to program U In1 value)

IN2 input: span calibration short circuit between IN2(7) and COM(8)

hold; peak-hold

Analog output forcing (to program U In2 value)

Decrease SET1 value

## ANALOG INPUT

Look FIGURE 3...FIGURE 6

## OUTPUT RELAYS

Relay 1: normally open contact available to:

CR<sub>(16)</sub>= common

R1<sub>(17)</sub>= normally open

Relay 2: normally open contact available to:

CR<sub>(16)</sub>= common

R2<sub>(18)</sub>= normally open

## ANALOG OUTPUT

V+ (24) = voltage output - positive

V- (23) = voltage output - negative

mA+ (22) = current output - positive

mA- (21) = current output - negative

## SAFETY PRECAUTIONS

Before setting the instrument at work, read carefully the instructions available with the product (see packing list).

This is an electronic instrument, thus it must not be considered a machine; consequently, it is not subjected to the requirements fixed by CEE 89/392 Directive (Directive relating to Machinery).

If the instrument is used as part of a machine, it cannot be supplied if the machine does not meet the Directive requirements.

The instrument marking does not release the customer from fulfilling the obligations provided by the law concerning his end-item.

## PROGRAMMING

Five programming levels are available:

OPERATION

PARAMETRIZATION

CONFIGURATION

MANUAL

CALIBRATION

## OPERATION - SET-POINT VALUE

The setpoint (S.P.) and two alarms (SET1 and SET2) are programmed in this stage.

The range of S.P. parameter is defined between two parameter: start of set-point scale (SEtIS) and end of set-point scale (SEtFS)

Programming access may be immediate upon pressing the **PGM** key or protected by a password, depending on the configuration **PASS** and **L.PASS** programs.

After each programming step, press **PGM** to go on to the next step or **ENTER** to return to the input variable display.

After the **PGM** key is depressed, the display will indicate "S.P." for one second, followed by the value. The latter can be changed using the **UP** and **DOWN** keys.

Press **PGM** again to program the other threshold, proceeding in the same way.

## PARAMETRIZATION PROGRAMMING

The following items are programmed in this level:

MESSAGE INDICATES	ITEM	DEFAULT
H-P	proportional band	[15]
trS	regulation time (ramp of climb/increase)	[5.0]
trd	regulation time (ramp of reduction /decrease)	[5.0]
r	master reset	only with P regulation [0]
tn	integrating time	only with PI e PID regulation [500]
tu	derivating time	only with PID regulation [1000]

After alarm SET2 has been programmed, the parametrization level can be accessed by holding down the **PGM** key for three consecutive seconds before pressing **ENTER**. Programming may be immediate upon pressing the **PGM** key or protected by a password, depending on the configuration **PASS** and **L.PASS** programs. After each programming step, press **PGM** to go on to the next step or **ENTER** to return to the input variable display.

### PROPORTIONAL BAND

Program proportional band in the range 1...30 % of set-point span. The display indicates "H-P". After approximately one second, display shows the previously programmed value. Value can be changed using the **UP** and **DOWN** keys.

### REGULATION TIME - RAMP OF CLIMB / INCREASE

Program regulation time; range is 0,1...199,9 seconds. The display indicates "trS". After approximately one second, display shows the previously programmed value. Value can be changed using the **UP** and **DOWN** keys.

### REGULATION TIME - RAMP OF REDUCTION / DECREASE

Program regulation time; range is 0,1...199,9 seconds. The display indicates "trd". After approximately one second, display shows the previously programmed value. Value can be changed using the **UP** and **DOWN** keys.

### MASTER RESET

Program master reset in the range -30...30 % of set-point span. The display indicates "r". After approximately one second, display shows the previously programmed value. Value can be changed using the **UP** and **DOWN** keys. "r" program is available only with with P regulation

### INTEGRATING TIME

Program integrating time. Range is 1...1000 seconds. The display indicates "tn". After approximately one second, display shows the previously programmed value. Value can be changed using the **UP** and **DOWN** keys. "tn" program is available only with with PI and PID regulation.

### DERIVATING TIME

Program derivating time. Range is 1...1000 seconds. The display indicates "tu". After approximately one second, display shows the previously programmed value. Value can be changed using the **UP** and **DOWN** keys. "tu" program is available only with with PID regulation.

## CONFIGURATION PROGRAMMING

The following parameters can be programmed in this level:

MESSAGE INDICATES	ITEM	DEFAULT
rEg	regulation type	[0]
FrS	analog output level	[0]
LIS	analog output minimum level	[0]
LFS	analog output maximum level	[100]
U In1	analog output IN1 forcing value	[0]
U In2	analog output IN2 forcing value	[100]
99999.	decimal- point	[none]
Zeri	fixed zeroes	[0]
IS-FS (IS flashing)	start of scale reading	[0]
IS-FS (FSflashing)	end of scale reading	[1000]
Int	reading integration	[1.0]
SEtIS	start of set-point scale	[0]
SEtFS	end of set-point scale	[1000]
OUt 1	alarm type, set1	[0]
OUt 2	alarm type, set 2	[0]
rA1	relay 1 function	[0]
rA2	relay 2 function	[0]
rA	power-on delay	[0]
PASS	password	[0]
LPASS	password level	[0]
InP	digital input function	[3]

After "tu" has been programmed, the parametrization level can be accessed by holding down the **PGM** key for three consecutive seconds before pressing **ENTER**. Programming may be immediate upon pressing the **PGM** key or protected by a password, depending on the configuration **PASS** and **L.PASS** programs.

After each programming step, press **PGM** to go on to the next step or **ENTER** to return to the input variable display. After access, the display will show "S.L. 0.2", which identifies the device's software level.

### REGULATION TYPE

The display will show "rEg" for one second. Use the **UP** and **DOWN** keys to set one of the following numbers:

- 0 = P regulation
- 1 = PI regulation
- 2 = PID regulation

### ANALOG OUTPUT LEVEL

The display will show "FrS" for one second. Use the **UP** and **DOWN** keys to set one of the following numbers:

- 0 = output is 0% (0V - 4mA) when input > S.P
- 1 = output is 0% (0V - 4mA) whwn input < S.P.

### ANALOG OUTPUT MINIMUM REGULATION LEVEL

Program in the range 0...99%. The display indicates "LIS".

After approximately one second, display shows the previously programmed value. Value can be changed using the **UP** and **DOWN** keys.

### ANALOG OUTPUT MAXIMUM REGULATION LEVEL

Program in the range LIS...100%. The display indicates "LFS".

After approximately one second, display shows the previously programmed value. Value can be changed using the **UP** and **DOWN** keys.

### **ANALOG OUTPUT IN1 FORCING VALUE**

Program in the range 0...100 %. The display indicates "UIN1".

After approximately one second, display shows the previously programmed value.

Value can be changed using the **UP** and **DOWN** keys.

### **ANALOG OUTPUT IN2 FORCING VALUE**

Program in the range 0...100 %. The display indicates "UIN2".

After approximately one second, display shows the previously programmed value.

Value can be changed using the **UP** and **DOWN** keys.

### **DECIMAL POINT**

Select decimal point position. The display shows "99999" (no decimal point).

Use the **UP** key to enter the decimal point. The decimal point will move one place to the left each time the key is depressed: "9999.9" "999.99" "99.999" "9.9999".

### **FIXED ZEROES**

Select fixed zeroes whereby units and tens columns on display can be stabilized at zero if readings are highly irregular. The display will show "Zeroes" for one second. Use the **UP** and **DOWN** keys to set one of the following numbers:

0 = No fixed zero.

1 = Units on display locked on zero.

2 = Units and tens on display locked on zero.

### **START OF SCALE READING**

Program display reading to be associated with analog input start of scale. Display indicates "IS-FS" with the IS flashing. After approximately one second, display shows the programmed value. Value can be changed using the **UP** and **DOWN** keys.

### **END OF SCALE READING**

Program display reading to be associated with analog input end of scale. Display indicates "IS-FS" with the FS flashing. After approximately one second, display shows the programmed value. Value can be changed using the **UP** and **DOWN** keys.

### **INTEGRATION**

Display indicates "Int" for one second.

Value can be changed from 0.0 to 25.0 seconds using the **UP** and **DOWN** keys.

Integration introduces a filter on input variable acquisition.

### **START OF SET-POINT**

Program set-point start scale. Display indicates "SEtIS". Range is -99999...99999

After approximately one second, display shows the programmed value.

Value can be changed using the **UP** and **DOWN** keys.

### **END OF SET-POINT**

Program set-point end scale. Display indicates "SEtFS". Range is SEtIS...99999

After approximately one second, display shows the programmed value.

Value can be changed using the **UP** and **DOWN** keys.

### **ALARM TYPE FOR SET 1**

The display will show "OUT 1" for one second. Use the **UP** and **DOWN** keys to set one of the following numbers:

0 = -30...30 % (of S.P. span) relative alarm

1 = 1...30 % (of S.P. span) windows alarm

2 = absolute (between S.P. span) alarm

## **ALARM TYPE FOR SET 2**

The display will show "OUT 2" for one second. Use the **UP** and **DOWN** keys to set one of the following numbers:

0 = -30...30 % (of S.P. span) relative alarm

1 = 1...30 % (of S.P. span) windows alarm

2 = absolute (between S.P. span) alarm

## **RELAY 1 FUNCTION**

The display will show "rA1" for one second. Use the **UP** and **DOWN** keys to set one of the following numbers:

0 = relay is energized in alarm condition

1 = relay is de-energized in alarm condition

## **RELAY 2 FUNCTION**

The display will show "rA2" for one second. Use the **UP** and **DOWN** keys to set one of the following numbers:

0 = relay is energized in alarm condition

1 = relay is de-energized in alarm condition

## **POWER-ON DELAY**

Program relay energization delay. Range is 0...9 seconds. The display indicates "rA".

After approximately one second, display shows the previously programmed value.

Value can be changed using the **UP** and **DOWN** keys.

## **PASSWORD**

Set desired password. Password must be a number between 1 and 99999.

Password is disabled if zero is selected.

If password is lost, programs can be accessed through value 21204.

## **PASSWORD LEVEL**

This program is presented in the configuration menu only if a password other than zero has been programmed.

The display will indicate "L.PASS" for one second.

Select the parts of the program which must be accessed using the password by choosing one of the following numbers:

0 = Configuration.

1 = Parametrization + configuration.

2 = Operation + parametrization + configuration.

## **DIGITAL INPUT FUNCTION**

Display will show "Inp" for approximately one second.

Values from 0 to 3 can be selected using the **UP** and **DOWN** keys.

0 = IN1 performs zero calibration.

IN2 performs end of scale calibration

1 = IN1 has no function.

IN2 hold (holds the reading present at the time command is given).

2 = IN1 has no function.

IN2 peak-hold (records and displays peak value reached by analog input).

3 = IN1 set analog output to "analog output IN1 forcing value"

IN2 set analog output to "analog output IN2 forcing value"

## MANUAL PROGRAMMING

To access "Manual" level, hold down **UP** and **DOWN** keys simultaneously for three seconds, starting from the operation level (do not attempt to access "Manual" from other programming levels); the MAN LED will go on.

The display shows analog output value in 0...100 % range.

Value can be changed using the **UP** and **DOWN** keys.

Press the **UP** and **DOWN** keys simultaneously to exit manual mode.

MAN LED will go off.

## CALIBRATION PROGRAMMING

The calibration operation makes it possible to associate two values for the input variable (start and end of scale) with the two reading values programmed for the parameters "start of scale reading" and "end of scale reading" in the configuration programs.

### KEYPAD PROCEDURE

To access keypad calibration, hold down the **PGM** key for three consecutive seconds after the last configuration programming step.

To perform this operation, indicator must be connected with the input variable (real or calibrator).

To apply IN1+ and IN2+ at the value of start of scale reading

To enter to the calibration program

The display shows the label "tar. IS" if you press ENTER KEY the display shows "attend" and the device execute the calibration (the time is proportional to integration parameter value)

At the end of calibration the display indicates "tar FS"

Don't change IN2+ input but to apply IN1+ input at the value of end-scale reading, and press ENTER KEY

The display shows "attend" and the device execute the calibration (the time is proportional to integration parameter value)

If you don't want to calibrate the device press PGM KEY.

### DIGITAL INPUT PROCEDURE

To perform this operation, indicator must be connected with the input variable (real or calibrator).

The "inp" calibration program must be set to zero.

To apply IN1+ and IN2+ at the value of start of scale reading

To apply the signal at IN1 input (to see figure 2)

The device saves the calibration of start-scale reading

Don't change IN2+ input but to apply IN1+ input at the value of end-scale reading, and press ENTER KEY

To apply the signal at IN2 input (to see figure 2)

The device saves the calibration of end-scale reading

## **CALIBRATION**

The device is calibrated for to measure 1000 when the difference between IN1 and IN2 is 16 mA (for example IN1=20 mA e IN2=4 mA). You can choose to change this calibration

For calibration operation see "calibration programming".

We advise to repeat the annual calibration.

## **MAINTENANCE**

The device does not have any parts that require maintenance.

## **ASSISTANCE**

All assistance operations must be carried out by the manufacturer or by an authorised representative. Pack the instrument carefully, enclose both a brief description and a full description of the nature of the malfunction with the package, and send to the manufacture.

## **STORAGE**

Storage temperature -20...50°C; Relative humidity up to 95 hot condensing.

A dry, dust-free environment is recommended

Avoid exposure to corrosive acid vapours

Do not wash the products with water

Prevent liquids from entering into the internal circuits

## **GUARANTEE**

The device is covered by a guarantee for production defects, valid for 12 months from the date of consignment.

The guarantee does not cover devices that have been tampered with, improperly repaired or used in a manner that does not conform to the instructions for use

For assistance regulations, see the "General Assistance Conditions"



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