WW-11N

4-20mA loop-powered programmable meter

Operation manual

CONTENTS

SYMBOL	*DESCRIPTION*
	CAUTION or WARNING: Tells you about the risk of electrical shock.
	CAUTION, WARNING or IMPORTANT: Tells you of circumstances or practices than can effect the instrument's functionality and must refer to technical documentation.
	INFORMATION: Helpful information.

1. INTRODUCTION

1.1 General information.

WW-11N is designed for industrial measurement and control systems. It is dedicated for a wide range of industrial transducers with current output.

1.2 Functional description.

It is designed for 4-20mA loop measurements without additional power supply. WW-11N draws the energy needed for operation from input line. High efficient 4-digit LED display is used to provide good visibility in all ambient light conditions. WW-11N is user programmable with internal push-buttons. Display scaling, signal filtering and linear or root square conversion can be set.
Robust, fully sealed housing ensures reliable operation in harsh conditions and wide temperature range.

1.3 Safety.

- Read the manual carefully before installation,
- disconnect power supply before installation and wiring,
- do not attempt to operate the instrument if any damage is found,
- do not operate the unit in aggressive or explosive environment,
- check if connected wiring and devices fullfil safety regulations required in certain application.

1.4 EMC considerations.

Instrument meets EN-61326 EMC requirements for industrial environment.

Follow listed below instructions to provide proper operation in real conditions:

- Do not install the product near devices generating strong electromagnetic fields,
- wire the lines connected to the meter separately from power lines carrying high voltages or currents,
- use twisted or shielded signal lines in noisy environment,
- always apply functional grounding,
- apply external surge protectors close to the unit if long lines are connected,
- apply additional filtering in noisy environment.

2. INSTALLATION

2.1 Unpacking.

The original manufacturers carriage should contain:

WW-11N meter	1 pcs.
Operation manual	1 pcs.

Check the contents for possible damages and report to the supplier if only founded.

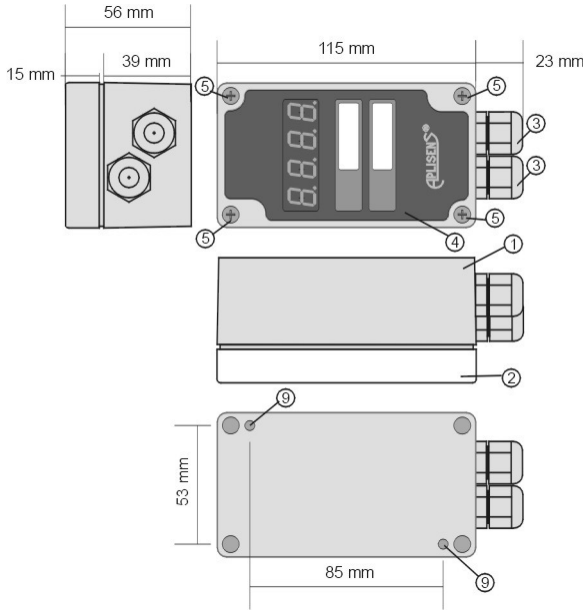

Fig.1 WW-11N dimensions.

2.2 Mechanical assembly.

The meters housing is dedicated for wall mounting. Mounting holes should be prepared according to Fig.1. Before mounting the clear cover and front plate should be removed. Two mounting holes are placed in bottom part of the housing. After fixing the bottom part on the wall electrical connections and programming can be done. It is very important to apply the wires of proper diameter and to tighten the cable glands carefully. In other case specified moisture protection will not be fulfilled. The units and other user data can be placed in white fields on the the front plate. For final, the front plate and clear cover are to be fixed again.

However the housing provides high environmental protection, choosing the place not exposed to direct sun-shine and moisture will always extend the meter's life.

2.3 Electrical connection.

Disconnect power supply before installation and wiring!

Prior to wiring the meter should be fixed according to 2.2. The cables are introduced into the housing though PG9 cable-glands. This allows installing the meter on the line without separate connection boxes. Transducer cable comes thru one cable-gland in and the cable to supply goes out through another.
Meters with one cable gland are supplied for special order.

Keep cable diameters within specification!

Tight the cable glands carefully to keep housing sealed!

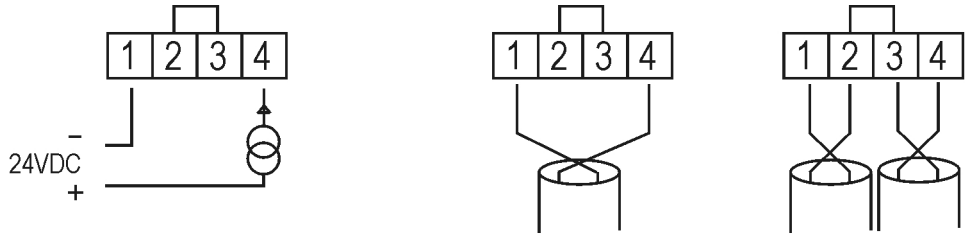

Fig.2 WW-11N input wiring diagram

WW-11N terminal block specification.

Connector	*Position*	*Marking*	*Description*	*Value*
INPUT / POWER	1	I-	negative input / power terminal	4-20mA (30VDCmax)
	2		auxiliary bridge terminal	
	3		auxiliary bridge terminal	
	4	I+	positive input / power terminal	

Terminals 2 and 3 are internally connected.

3. OPERATION

3.1 Programming.

WW-11N has a set of parameters which should be programmed for certain application. All settings are stored in non-volatile memory and hardware protected against accident erase.

Programming mode is activated by closing pins 2,3 on J5 connector with a jumper. This connection releases also write-protect function of internal memory. While entering programming mode, **„Edit"** message is displayed. Further programming operations are performed with four push-button switches marked: ▼, ▲ , **ESC**, **ENT.**

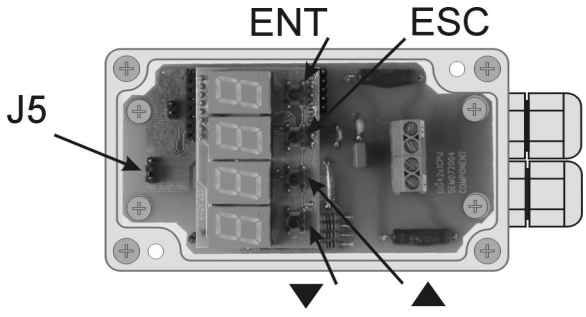

Fig.3 Programming switches inside WW-11N housing.

Programming dialog is initiated by pressing **ENT** key, once. **"Fn01"** message should appear. ▼, ▲ Keys scroll though all menu functions set. To enter the function selected, **ENT** key should be pressed. Value eidting is performed with ▼, ▲ keys. **ENT** key accepts selection. **ESC** key in „**Fnxx**" display state closes editing and writes the setting to the memory. After memory writing „**Edit**" message reappears. Now the jumper can be moved back to 1-2 position. In this position the memory is write protected and meter runs in normal operation mode.

Programming keys function table.

Key	*Function*	*Comments*
▲	- scrolling menu up - increasing numerical value	
▼	- scrolling menu down - decreasing numerical value	
ESC	- ESCAPE, - canceal, back to higher menu level	
ENT	- ENTER - selection, value acceptance	

Restoring factory settings.

Factory settings can be restored by switching the meter on with **ENT** key depressed (the jumper should be set in 2-3 position). After **„Eini"** message appearance, **ENT** key should be pressed once again.

If ▲ key will be in this procedure accidentally used, „**Fabr**" can be seen. In this situation the meter should be reset by switching the input signal off for a moment.

Programming menu functions table

Function No	**Name**	**Range of setting**	**Default value**	**Comments**
Fn00*	transfer function	**Lin**-linear, **Pier**- square-root	**Lin**	
Fn01**	low scale input current	**-9.99 do 99.99**	**4.00**	
Fn02**	low scale read-out	**-9.99 do 99.99**	**400**	
Fn03**	high scale input current	**-9.99 do 99.99**	**20.00**	
Fn04**	high scale read-out	**-9.99 do 99.99**	**2000**	
Fn05	decimal point position	**0.000**; **0.00**; **0.0**, **0**	**00.00**	leading zeros are suppresed
Fn06	digital filter time constant	**0** - 20ms **1** - 160ms, **2** - 320ms, **3** - 640ms, **4** - 1,28s, **5** -2,56s, **6** - 5,12s, **7** - 10,24s, **8** - 20,48s, **9** - 40,96s	**0**	0 – analog filter only
Fn07	read-out rounding	**1**, **2**, **5**, **10**	**1**	1 – without rounding

(*) Transfer function may be:

1. linear:

$$Readout = a * I + b$$

2. square-root:

$$Readout = c * \sqrt{I - 4{,}00} + d$$

where: I -input current [mA],
a, b, c, d -constants internally calculated from user's scaling data

(**) Numerical values are edited digit by digit, with ▼, ▲ keys. Each digit setting should be accepted with ENT key. After last digit acceptance the whole number (setting) is stored.

Linear scaling example. Input: 4-20mA – readout 0,0-100,0

Parametr	*Required value*	*Function number*	*Programmed parameter*
transfer function	linear	Fn00	Lin
low scale input current	4.00mA	Fn01	*„04.00”*
low scale read-out	0.0	Fn02	„0000”
high scale input current	20.00mA	Fn03	„20.00”
high scale read-out	100.0	Fn04	„1000”
decimal point position	0.0	Fn05	„ 0.0”
filter time-constant	640ms	Fn06	3
read-out rounding	no	Fn07	1

3.3 Error messages.

There is a set of error massages which inform the user about device condition. One of them concern internal error states, the other inform about out of range conditions.

Error code	*Description*	*Possible reason*	*Action*
ErrF	Factory setting memory error, also calibration error	-abnormal EMC condition -memory failure	Disconnect the meter for 5s and turn-on again. If error remains contact the supplier (service).
InIF	Memory initialisation with default data. The meter requires calibration.		Disconnect the meter for 5s and turn-on again. If error remains contact the supplier (service).
ErrU	User setting memory error. All user data may be lost.	-abnormal EMC condition -memory failure	Disconnect the meter for 5s and turn-on again. If error remains press ENT key. The meter will set default values with momentary IniU message.
InIU	Memory initialisation with default data.		If message repeats contact the service.
display flashing	Input signal overrange.	- I<3.8mA or I>20.2mA	Check input circuitry and signal source if the actual current value is correct in certain condition.
9999 (flashing)	Display overrange.	-input current out of range -wrong scaling parameters -internal failure	Check input circuitry and signal source. Check scaling parameters.
-999 (flashing)	Display underrange	-input current out of range -wrong scaling parameters -internal failure	Check input circuitry and signal source. Check scaling parameters.
0.00 (flashing)	Negative value for square-root operation.	- Fc01 or Fc03 is set to less than 4.00mA - input current below 4.00mA	Check Fc01and Fc03 values. Check if I<4.00mA is correct for certain working conditions.

4. TECHNICAL SPECIFICATION

CATEGORY	PARAMETER	VALUE	COMMENTS
MEASUREMENT	accuracy	+/-0.2% FS	FS=20.00mA
	thermal drift	+/- 100ppm / °C	
	internal resolution	12 bit	
	sampling rate	100Hz	
	digital filter time-constant	0-40,96s	
INPUT	input range	3,8..20,2mA	
	maximum input current	50mA	internally limited, Uwe<=30VDC
	minimum input current	3,0mA	
	voltage drop	6,5V max	3,8mA<I<20.2mA
	input voltage limit	-0.6...+36VDC	transil protection
DISPLAY	digit number	4	
	digit height	13mm	
	digit colour	high efficient red	
ENVIRONMENTAL	operating temperature range	-30..50°C	
	storage temperature range	-40 .. +60°C	
	protection degree	IP-65	
WIRING	wire cross section	<= 2,5mm^2	
	outer wire diameter	4 - 8mm	
	cable-gland type	PG-9	
MECHANICAL	dimensions	65 x 115 x 55 mm	W x H x D
	weight	260g	
	mounting hole distance	53 x 85 mm	
	mounting hole diameter	4,5 mm	
	mounting screw head diameter	<= 8,0 mm	
	horizontal device spacing	>5mm	
	vertical device spacing	>55mm	
COMPLIANCE	EMC	EN 61326:1997/A3:2003	industrial environment

6. DISCARDED ELECTRONIC EQUIPMENT COLLECTING INFORMATION.

This equipment should be collected and treated according to 2002/96/EC European Directive on waste electric and electronic equipment (WEEE).

Material and substances to be removed:

Material, substance	*Quantity*	*Comments*
Printed circuit boards	76 cm^2	