

LIN260, DIG260

programmable panel meters



Operating manual

TABLE OF CONTENTS

1. INTRODUCTION

- 1.1 General information
- 1.2 Features
- 1.3 Safety
- 1.4 EMC considerations
- 1.5 Marking

2. INSTALLATION

- 2.1 Unpacking
- 2.2 Mechanical assembly
- 2.3 Electrical connections





3. OPERATION

- 3.1 Programming
- 3.2 Set-point adjustment
- 3.3 Alternate output control
- 3.4 Error codes
- 3.5 Serial communication
- 3.6 Display test

4. TECHNICAL SPECIFICATIONS

5. REVISION HISTORY

6. DISCARDED ELECTRONIC EQUIPMENT COLLECTING INFORMATION.

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.
	INFORMATION: Discarded electronic equipment collecting

1. INTRODUCTION

1.1 General information

LIN260 and DIG260 are precision panel meters for a wide range of industrial applications. Provides measurement of voltage and current process signals, analog signal retransmission, ON/OFF relay control and serial interface communication. Two versions are available: LIN260 with dual digital/analog display and DIG260 with single, big digit display.

1.2 Features

Measurement

User programmable 4-digit read-out of voltage or current signals is provided. Filtering time-constant, read-out rounding and decimal point position may be also programmed. The unit features also a 16 point linearisation routine.

Bargraph indication

26 point, tricolour LED bargraph (LIN260 version) allows easy judgement of levels and threshold values.

Control outputs

Depending on version, 2 or 4 relay outputs are available. Threshold levels with individual hysteresis and ON/OFF function are user programmed. The special function called „alternate output control” allows optimal control of cascaded pumps.


Analog output

The instrument has optional 4-20mA fully isolated output for analog retransmission.

Serial interface


The isolated RS-485 optional interface allows system connection.

1.3 Safety

 *Hazardous voltage exist within enclosure. Only trained personnel should perform installation and service. Electrical wiring should be performed in accordance with all applicable national standards and regulations. Instrument is protected in accordance with Class II of EN 61010-1.*

- read the manual carefully before installation,
- disconnect power supply before installation and wiring,
- do not touch the terminals while power is being supplied,
- do not attempt to operate the instrument if any damage is found,
- do not operate the unit in aggressive or explosive environment,
- do not expose the instrument to condensing moisture,
- provide sufficient air circulation to keep the temperature in specified range.

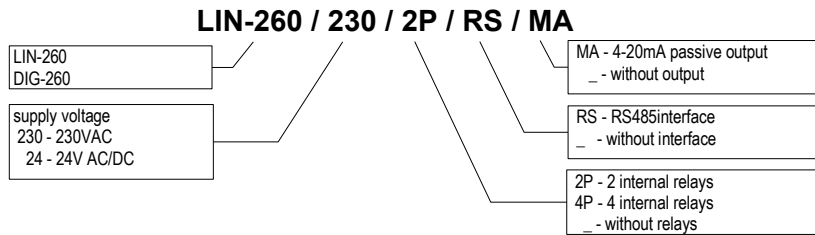
1.4 EMC consideration

 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.

1.5 Product marking



2. INSTALLATION

2.1 Unpacking

The shipping carton should contain:

LIN260 or DIG260 meter	1 pcs,
fixing clip	2 pcs,
operating manual	1 pcs.

Unpack the instrument and check it for obvious signs of damage. If any damage occur notify the supplier and do not attempt further use. If the unit appears to be in good condition read the Operating Manual before installation and use.

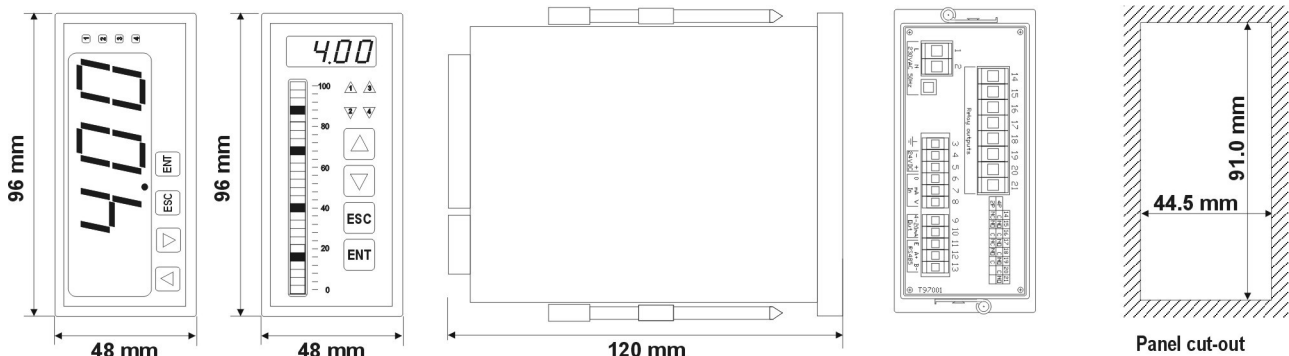


Fig.1 LIN(DIG)-260 basic dimensions.


2.2 Mechanical assembly


The unit is designed for front panel mounting. It requires panel cut-out according to the specification with proper distance to other devices.

Mounting procedure:

- put the meter from the front side into the panel cut-out,
- attach 2 fixing clips on brass rivets,
- tighten the screws just enough to hold the housing firmly in place.

2.3 Electrical connections

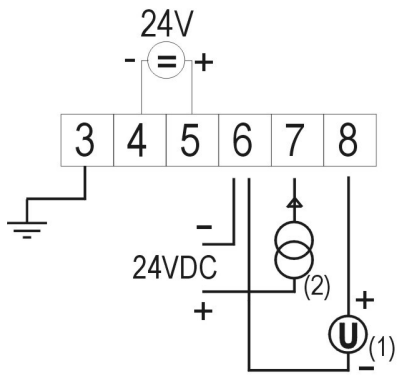
 *Disconnect power supply before installation and wiring. Check power supply voltage on instrument's label.*

 *Terminal 3 is functional ground terminal. It should be grounded as short as possible to provide proper noise rejection. Signal line shields should be also connected here.*

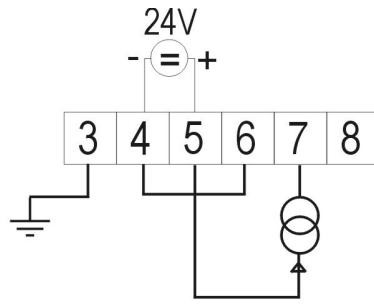
Electrical connection procedure:

- check proper mechanical installation of the unit,
- unplug terminal blocks on the rear wall,
- make required connections according to wiring table and diagrams,
- replug terminal blocks,
- check the connections before applying power **INCORRECT CONNECTIONS CAN DAMAGE YOUR METER!**

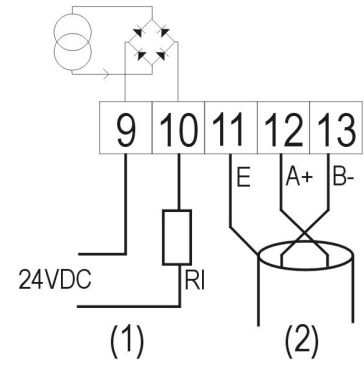
Connector	Pin number	Symbol	Terminal description	Rating	
POWER SUPPLY 230VAC verion	1	L	supply	AC 230V 50Hz	
	2	N	supply		
POWER SUPPLY 24VAC/DC verion	1		supply	24V AC/DC	
	2		supply		
SIGNAL INPUT, EXCITATION OUTPUT	3		functional ground	DC 24V	
	4	-	excitation output		
	5	+	excitation output		
	6	0	signal ground		
	7	mA	current input		20mA
	8	V	voltage input		10V
ANALOG OUTPUT, SERIAL INTERFACE	9	4-20mA	analog output	4-20mA	
	10	4-20mA	analog output		
	11	E	RS485 ground		
	12	A+	RS485 line		
	13	B-	RS485 line		
RELAY OUTPUT 2P version	14	C	AL1 relay common	1A / 250VAC	
	15	NO	AL1 relay NO		
	16	C	AL2 relay common		
	17	NO	AL2 relay NO		
	18	C	AL3 relay common		
	19	NO	AL3 relay NO		
	20	C	AL4 relay common		
	21	NO	AL4 relay NO		
RELAY OUTPUT 4P version	14	NC	AL1 relay NC	1A / 250VAC	
	15	NO	AL1 relay NO		
	16	C	AL1 relay common		
	17	NC	AL2 relay NC		
	18	NO	AL2 relay NO		
	19	C	AL2 relay common		
	20		not connected		
	21		not connected		



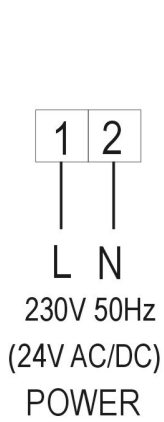
ANALOG INPUT
 (1) voltage source
 (2) current source
 (external supply) .



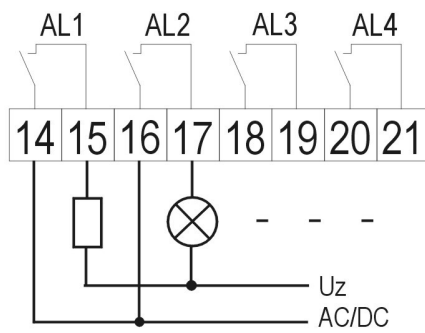
ANALOG INPUT
 current source
 local supply



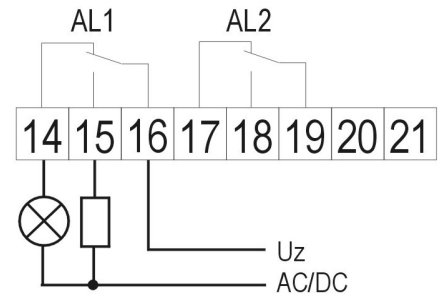
(1) ANALOG OUTPUT
 (2) RS485 INTERFACE



230V 50Hz
 (24V AC/DC)
 POWER



RELAY OUTPUTS
 4 x NO relay




RELAY OUTPUTS
 2 x NO/NC relay

Fig. 2 Wiring diagrams.

3. Meter operation.

3.1 Programming

 *Incorrect programming may cause incorrect read-out and uncontrolled output relay operation!*

The meter has many user-selected programme settings. All settings may be done with front panel push-buttons. Set-points levels are programmed directly in normal mode. Other settings require entering programme mode. Programming menu is code protected.

Button function in programming mode.

Button	Description	Comments
▲	- scrolling up through menu functions and options - increasing numerical values	
▼	- scrolling down through menu functions and options - decreasing numerical values	
ESC	- ESCAPE - go to previous menu level	
ENT	- ENTER, access to function - selected value/option confirmation	

I *To enter programming mode press ESC key for 2 seconds until „P.cod” message appear. Then press **ESC, ▲, ▲, ENT** combination. „Fn00” message should appear.*

In programming menu several functions are available. Detailed function description is given in the table.

Use cursor buttons to navigate through the functions and ENT button to enter selected function. Numerical values should be set digit by digit. Flashing digit should be adjusted using cursor buttons and stored with ENT button.

All the settings are stored in non-volatile memory while leaving the programming menu.

Programming menu.

Menu function	Description	Available options	Factory setting	Comments
Fn00	input selection	I-0-20mA current input active, U-0-10V voltage input active	I	
Fn01	linearization points	2 – 16	2	2 - linear scale
Fn02	display scaling	P01 - Pnn scaling points	P01 : 00.00 : 0000 P02 : 20.00 : 2000	Define input value and display value for each scaling point-(1)
		-9.99 - 99.99 input value (with DP)		
		-999 - 9999 display value		
Fn03	decimal point	0000; 0.000; 00.00; 000.0	00.00	Leading zeros are suppressed
Fn04	display rounding	1, 2, 5, 10	1	1 - without rounding
Fn05	filter time-constant	0 – 20ms, 1 - 60ms, 2 - 120ms, 3 - 240ms, 4 - 480ms, 5 - 960ms, 6 - 1.92s, 7 - 3.84s, 8 - 7.68s, 9 - 15.36s	2	
Fn06	bargraph mode	3C – three colour (green, yellow, red) 1C - single colour (green)	3C	(2)
Fn07	set-point	AL1, AL2, AL3, AL4	AL1 : H : 1	

Menu function	Description	Available options	Factory setting	Comments
	mode	H - high L - low A - alternate 1 – 9999 hysteresis [display divisions]	AL2 : L : 1 AL3 : H : 1 AL4 : L : 1	(3)
Fn08	output scaling	P01 - zero (low) P02 - full scale -999 - 9999 meter's display 03.00 - 21.00 [mA] output current	P01 : 0000 : 4.00 P02 : 2000 : 20.00	Define meter's display and output current for both scaling points.
Fn09	all reset	Ecod (4)		Reset to factory setting
Fc01	serial comm. address	01h -F7h - address (001-247)	01	
Fc02	serial comm. speed	2.4, 4.8, 9.6, 19.2 kbps	9.6	
Fc03	serial comm. parity	no-no parity even-even parity odd-odd parity	even	

Remarks:

(1) - The meter is factory set to linear scale with two scaling points. If non-linear scale is needed the required number of scale points should be set in Fn01 function at first. Then, the input and display values for each point should be set. Doubled input values are automatically rejected. Scaling point values are automatically sorted by input values in ascending order, after each Fn02 function access.

(2) - In 1 colour mode the bargraph is green with red set-points.

In 3 colour mode the central zone between AL3 and AL4 is green. Zones AL1 - AL3 and AL2 - AL4 are yellow. Zones above AL1 and below AL2 are red. Relation $AL2 \leq AL4 \leq AL3 \leq AL1$ should be true for proper colour zone display.

Bargraph 0% indication corresponds to the lowest scaling point, while 100% corresponds to the highest scaling point of the digital display analog.

(3) - The set-point number is equal to relay number, excluding alternate mode. Overall hysteresis is equal to twice the value set in Fn07 function.

(4) - While „Ecod” message appears, press ENT button four times.

Parameter	Zadana wartość	Function number	Nastawy
input type	current	Fn00	1
scaling points number	2	Fn01	2
input range	4-20mA	Fn02	P01 : 04.00 : 0000
display range	0-3000		P02 : 20.00 : 3000
decimal point position	000.0	Fn03	000.0
rounding	none	Fn04	1
filter time constant	240ms	Fn05	3
AL1 „ON” level	>2500	(1)	AL1 : 2500
AL2 „ON” level	<1000	(1)	AL2 : 1000
AL1 hysteresis	10	Fn07	AL1 : H : 0005
AL2 hysteresis	20		AL2 : L : 0010
output current at zero display	5mA	Fn08	P01 : 0000 : 05.00
output current at full scale (3000) display	19mA		P02 : 3000 : 19.00

(1) - settings available in normal mode

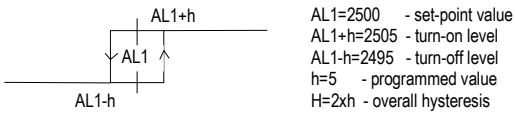


Fig.3 Hysteresis definition.

3.2 Set-point programming

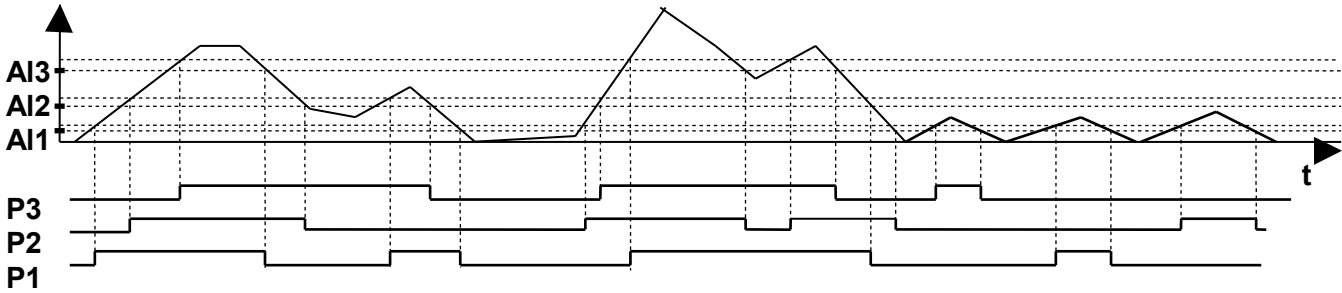
Set-points are programmed in normal mode of the meter using front panel buttons. Press ▲ button for 3 seconds to enter AL1 or AL3 programming. Choose AL1 or AL3 with cursors and press ENT button. Adjust each flashing digit using ▲ ▼ buttons and store the value with ENT button. Similarly AL2 and AL4 are programmed while activated with ▼ button.

I The relation $AL2 \leq AL4 \leq AL3 \leq AL1$ should be true in 3 colour bargraph mode for proper colour zone display.

3.3 Alternate output control

LIN(DIG)-260 has built-in “alternate output control” function, called also “alternate lead/lag control”. While “A” option in Fn07 menu function is set, corresponding set-point belongs to “alternate output group”. The group may consist of 2, 3 or 4 set-points and relays but the relays are not dedicated to certain set-points. Relays in the group are activated with special queue algorithm. After each ON/OFF sequence the relay is assigned to be the last in the queue. In this way the ON time of the grouped relays is equally shared. In the case of the failure of one of the controlled devices, remaining devices still work on all grouped set-points. The diagram below illustrates the principle of 3 level group operation.

Alternate output control is typically used for level control applications with cascaded pumps.



3.4 Error codes

Error code	Description	Possible reasons	Operation
ErrF	calibration memory error	-abnormal EMC condition -internal fault	Turn off the meter for 5 s. If message reappears after power-up contact the service.
InIF	calibration memory initialization		Turn off the meter for 5 s. If message reappears after power-up contact the service.
ErrU	user memory error	-abnormal EMC condition -internal fault	Turn off the meter for 5 s. If message reappears after power-up press ENT button. Meter reads factory settings with momentarily displayed InIU message.
InIU	user memory initialization		If the message appears after each power-up contact the service.
display flashing	input under/overrange		-check signal source -check input circuitry
9999 (flashing)	overrange	-incorrect meter settings -incorrect input connection -internal fault	-check signal source -check meter's scaling -check signal wiring
-999 (flashing)	underrange	-incorrect meter settings -incorrect input connection -internal fault	-check signal source -check meter's scaling -check signal wiring

3.5 Serial communication

LIN(DIG)-260 has serial communication option with RS-485 internal module installed. The meter works with Modbus RTU protocol as slave device. Function 3 (register read) and function 16 (multiple registers write).

The data exchanged with the meter are variable type "V" or parameters "P". Parameters are also accessible from programming menu.

Variables are read-only (R). Parameters are read-only type (R) or read/write type (R/W).

Variables and parameters are grouped for simplicity and functionality:

Group	Register range	Description
1	400002-400003	digital read-out, decimal point position, general status, set-point status
2	400004-400008	set-point values, output current
3	400009-400015	bargraph read-out
4	400033-400084	programming menu settings without serial port settings
5	400097-400099	serial port settings
6	418435	Modbus firmware identification

Data blocks exchanged with LIN(DIG)-260 should contain only registers specified in tables below. In other case 0x02 exception code (ILLEGA_DATA_ADDRESS) is returned.

Modbus Function 16 limitations:

1. In response to (R) specified register write attempt, 0x02 exception code (ILLEGA_DATA_ADDRESS) is returned.
2. Registers from the range 400048-400080 must be sent in one frame. Register 400048 must contain the number of scaling points used. Following registers contain scaling points data. Each point definition requires two registers with input and read-out values. For two-point scaling next to 400048 register four registers and no more must be sent. Excessive data in the range of 400048-400080 causes 0x02 exception return. Unused set-point data fields in the meter are automatically cleared (filled with 25000 (0x61A8) control value). Signal values in scaling data must be unique. In other case exception code 0x03 (ILLEGA_DATA_VALUE) is returned. Scaling data transmitted to the meter must be sorted by input value in ascending order. In other case exception code 0x03 is returned.

Example - 2-point scaling - 4-20mA input with 0-1000 read-out.

Data to be sent in one frame:

400048 :	2
400049 :	400
400050 :	0
400051 :	2000
400052 :	1000

During manual programming with front keys the meter returns exception code 0x06 (SLAVE_DEVICE_BUSY) and no other data. The same exception is returned during internal EEPROM write process.

LIN(DIG)-260 Modbus register assignment:

Register number/ address	Variable/parameter	Type	Value range	Default value	Comments
400002/ 0x0001	<i>digital read-out</i>	V (R)	-999 - 9999 (0xFC19-0x270F)	-	
400003/ 0x0002	<i>Status</i>	V (R)	0-65535 (0x0000-0xFFFF)	-	bit0 (LSB): PP=1 - manual programming in progress bit1: EAL=1 - set-point programming in progress bit2: WEE=1 - memory write in progress bit3: MIG=1 - display flashing bit4: UND=1 - input underrange bit5: OVR=1 - input overrange bit6: MBAR1=1 - bargraph LED01 flashing bit7: MBAR2=1 - bargraph LED01 flashing bit8: ALR1=1 - AL1 relay ON bit9: ALR2=1 - AL2 relay ON bit10: ALR3=1 - AL3 relay ON bit11: ALR4=1 - AL4 relay ON bit13,bit12:DPH,DPL - DP position (Fn03): 00 - „0000” 01 - „0.000” 10 - „00.00” 11 - „000.0” bit14: Input type : 0 - current 1 - voltage bit15: - not used
400004/ 0x0003	<i>Set-point 1 level</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	1800 (0x0708)	AL1
400005/ 0x0004	<i>Set-point 2 level</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	200 (0x00C8)	AL2
400006/ 0x0005	<i>Set-point 3 level</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	1500 (0x05DC)	AL3
400007/ 0x0006	<i>Set-point 4 level</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	500 (0x01F4)	AL4
400008/ 0x0007	<i>Output current</i>	V (R)	-32768 - 32767 (0x8000-0x7FFF)	-	*10 ⁻³ mA
400009/ 0x0008	<i>Mnimum read-out</i>	P (R)	-999 - 9999 (0xFC19-0x270F)	0 (0x0000)	
400010/ 0x0009	<i>Maximum read-out</i>	P (R)	-999 - 9999 (0xFC19-0x270F)	2000 (0x07D0)	
400011/ 0x000A	<i>Bargraph height</i>	V (R)	0-27 (0x0000-0x001B)	-	0 - Display underrange (LED01 flashing) 27 - Display overrange (LED26 flashing)
400012/ 0x000B	<i>Bargraph colour 0108</i>	V (R)	0-65535 (0x0000-0xFFFF)	-	Colour codes: 00 - off

Register number/ address	Variable/parameter	Type	Value range	Default value	Comments
					01 - green 10 - red 11 - orange bit1,bit0: LED01(lowest) bit3,bit2: LED02 bit5,bit4: LED03 bit7,bit6: LED04 bit9,bit8: LED05 bit11,bit10: LED06 bit13,bit12: LED07 bit15,bit14: LED08
400013/ 0x000C	<i>Bargraph colour 0916</i>	V (R)	0-65535 (0x0000-0xFFFF)	-	Colour codes: see above bit1,bit0: LED09 bit3,bit2: LED10 bit5,bit4: LED11 bit7,bit6: LED12 bit9,bit8: LED13 bit11,bit10: LED14 bit13,bit12: LED15 bit15,bit14: LED16
400014/ 0x000D	<i>Bargraph colour 1724</i>	V (R)	0-65535 (0x0000-0xFFFF)	-	Colour codes: see above bit1,bit0: LED17 bit3,bit2: LED18 bit5,bit4: LED19 bit7,bit6: LED20 bit9,bit8: LED21 bit11,bit10: LED22 bit13,bit12: LED23 bit15,bit14: LED24
400015/ 0x000E	<i>Bargraph colour 2532</i>	V (R)	0-65535 (0x0000-0xFFFF)	-	Colour codes: see above bit1,bit0: LED25 bit3,bit2: LED26 bit15-bit4: -
...				-	
400033/ 0x0020	<i>Identification number</i>	P (R)	0-65535 (0x0000-0xFFFF)	-	0 - no number available
400034/ 0x0021	<i>Actual scaling points number</i>	P (R)	From 2 (0x0002) to Fn01 setting	2 (0x0002)	Actually defined in Fn02 number of scaling points.
400035/ 0x0022	<i>Input type</i>	P (R/W)	0 (0x0000) - current [mA] 1 (0x0001) - voltage [V]	0 (0x0000)	Fn00
400036/ 0x0023	<i>Decimal point position</i>	P (R/W)	0x0000 - 0000 0x0001 - 0.000 0x0002 - 00.00	2 (0x0002)	Fn03

Register number/ address	Variable/parameter	Type	Value range	Default value	Comments
			0x0003 - 000.0		
400037/ 0x0024	<i>Read-out rounding</i>	P (R/W)	1 (0x0001) - do 1 2 (0x0002) - do 2 5 (0x0005) - do 5 10 (0x000A) - do 10	1 (0x0001)	Fn04
400038/ 0x0025	<i>Filetring level</i>	P (R/W)	0 - 9 (0x0000 - 0x0009)	2 (0x0002)	Fn05
400039/ 0x0026	<i>Brgraph colour mode</i>	P (R/W)	1 (0x0001) - single colour 3 (0x0003) - tricolour	3 (0x0003)	Fn06
400040/ 0x0027	<i>AI 1 mode</i>	P (R/W)	0x0000 - H (high) 0x0001 - L (low) 0x0002 - A (alternating)	0 (0x0000)	Fn07 - AL1 set-point mode setting
400041/ 0x0028	<i>AI 2 mode</i>	P (R/W)	- " -	1 (0x0001)	Fn07 - AL2 set-point mode setting
400042/ 0x0029	<i>AI 3 mode</i>	P (R/W)	- " -	0 (0x0000)	Fn07 - AL3 set-point mode setting
400043/ 0x002A	<i>AI 4 mode</i>	P (R/W)	- " -	1 (0x0001)	Fn07 - AL4 set-point mode setting
400044/ 0x002B	<i>AI1 hysteresis</i>	P (R/W)	1 - 9999 (0x0001 - 0x270F)	1 (0x0001)	Fn07 - AL1 set-point hysteresis
400045/ 0x002C	<i>AI1 hysteresis</i>	P (R/W)	- " -	1 (0x0001)	Fn07 - AL2 set-point hysteresis
400046/ 0x002D	<i>AI1 hysteresis</i>	P (R/W)	- " -	1 (0x0001)	Fn07 - AL3 set-point hysteresis
400047/ 0x002E	<i>AI1 hysteresis</i>	P (R/W)	- " -	1 (0x0001)	Fn07 - AL4 set-point hysteresis
400048/ 0x002F	<i>Scaling points number</i>	P (R/W)	2-16 (0x0002 - 0x0010)	2 (0x0002)	Fn01
400049/ 0x0030	<i>P01 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	0 (0x0000)	Fn02:P01
400050/ 0x0031	<i>P01 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	0 (0x0000)	Fn02:P01
400051/ 0x0032	<i>P02 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	2000 (0x07D0)	Fn02:P02
400052/ 0x0033	<i>P02 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	2000 (0x07D0)	Fn02:P02
400053/ 0x0034	<i>P03 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P03 Initial value for unused point
400054/ 0x0035	<i>P03 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P03
400055/ 0x0036	<i>P04 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P04
400056/ 0x0037	<i>P04 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P04
400057/ 0x0038	<i>P05 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P05
400058/ 0x0039	<i>P05 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P05

Register number/ address	Variable/parameter	Type	Value range	Default value	Comments
400059/ 0x003A	<i>P06 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P06
400060/ 0x003B	<i>P06 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P06
400061/ 0x003C	<i>P07 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P07
400062/ 0x003D	<i>P07 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P07
400063/ 0x003E	<i>P08 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P08
400064/ 0x003F	<i>P08 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P08
400065/ 0x0040	<i>P09 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P09
400066/ 0x0041	<i>P09 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P09
400067/ 0x0042	<i>P10 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P10
400068/ 0x0043	<i>P10 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P10
400069/ 0x0044	<i>P11 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P11
400070/ 0x0045	<i>P11 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P11
400071/ 0x0046	<i>P12 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P12
400072/ 0x0047	<i>P12 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P12
400073/ 0x0048	<i>P13 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P13
400074/ 0x0049	<i>P13 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P13
400075/ 0x004A	<i>P14 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P14
400076/ 0x004B	<i>P14 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P14
400077/ 0x004C	<i>P15 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P15
400078/ 0x004D	<i>P15 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P15
400079/ 0x004E	<i>P16 input value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P16
400080/ 0x004F	<i>P16 read-out value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	25000 (0x61A8)	Fn02:P16
400081/ 0x0050	<i>Read-out for low linear output</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	0 (0x0000)	Fn08:P01
400082/ 0x0051	<i>Read-out for linear output</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	2000 (0x07D0)	Fn08:P02
400083/ 0x0052	<i>Low linear output value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	400 (0x0190)	Fn08:P01 (default 4.00mA)
400084/ 0x0053	<i>High linear output value</i>	P (R/W)	-999 - 9999 (0xFC19-0x270F)	2000 (0x07D0)	Fn08:P02 (default 20.00mA)

Register number/ address	Variable/parameter	Type	Value range	Default value	Comments
0x0053					
...					
400097/ 0x0060	<i>Serial communication slave address</i>	P (R)	1 - 247 (0x0001-0x00F7)		Fc01
400098/ 0x0061	<i>Communication speed</i>	P (R)	3 (0x0003) - 2400bps 4 (0x0004) - 4800bps 5 (0x0005) - 9600bps 6 (0x0006) - 19200bps	5 (0x0005)	
400099/ 0x0062	<i>Parity</i>	P (R)	0 (0x0000) - no parity 1 (0x0001) - even parity 2 (0x0002) - odd parity	1 (0x0001)	
...				-	
418435/ 0x4802	<i>Modbus Firmware ID</i>	P(R)	10000 (0x2710)	-	

3.6 Display test.

LIN(DIG)-260 has special test procedure for LED display, relays and version check. The test is initiated when the meter is powered-up with ▲ key pressed. LED segments are lighted-up in following cycle:

- four digit meter version code,
- digital display (all segments simultaneously),
- alarm leds with output relays activation,
- bargraph green (all segments simultaneously),
- bargraph red (all segments simultaneously).

The ENT key toggles between simultaneous and single segment activation during test. ESC key closes the test.

4. TECHNICAL SPECIFICATION


CATEGORY	PARAMETER	VALUE	COMMENTS
INPUT	Accuracy	+/-0.1% FS	
	Temperature coefficient	+/- 100ppm / °C	
	Internal resolution	15 bit	
	Sampling rate	16,6Hz	
	Filter time constant	0-15,36s	
	Noise rejection	>=65dB	f=50Hz
CURRENT INPUT	Range	0..20mA	-0.1 .. +21mA
	Input resistance	<56om	
	Max. input current	internally limited	
	Overvoltage protection level	-0.6...+36V=	transil
VOLTAGE INPUT	Range	0...10V	-0.05 .. +10.5V
	Input resistance	>=50kom	
	Overvoltage protection level	-0.6...+36V=	transil
CONTROL RELAY OUTPUT	Rating	1A / 250VAC	
	Contact configuration (2P version)	2 x NO/NC	
	Contact configuration (4P version)	4 x NO	
	Open contact withstand voltage	1000VAC	
	Contact life mechanical / electrical	15x10 ⁶ / 10 ⁶	
	Load capacity	250VA	resistive load
ANALOG OUTPUT	Range	3..21mA	
	Output voltage range	10-30VDC	
	Accuracy	+/- 0.1%	
	Resolution	12 bit	
	Temperature coefficient	+/- 100ppm / °C	
	Output voltage effect	+/-20ppm / V	
	Overvoltage protection level	36V	transil
	Refresh rate	30Hz	
SERIAL INTERFACE	Type	RS485	
	Protocol	Modbus RTU	
	Transmission speed	2.4, 4.8, 9.6, 19.2kbps	
	Data bits	8	
	Overvoltage protection level	+7 / -12V	transil
SENSOR EXCITATION	Voltage	24VDC, +/-10%	
	Current max	25mA	
	Current limit	continuous	
	Overvoltage protection level	36V	
POWER SUPPLY	Voltage - AC 230V version	230VAC +10/-20%	
	- AC/DC 24V version	20-35VDC 18-26VAC	
	Power consumption	<6W	

CATEGORY	PARAMETER	VALUE	COMMENTS
DISPLAY	Digits	4	Green LED
	Digit height	7mm	(LIN260)
		20mm	(DIG260)
	Bargraph resolution	26	(LIN260)
ENVIRONMENTAL	Operating temperature	5..40°C	
	Storage temperature	-10 .. +70°C	
	Humidity (relative)	10-95%	without condensing
	Enclosure protection (front)	IP-65	
	Enclosure protection (rear)	IP-20	
	Pollution degree	2	
	Overvoltage category	II	
ELECTRIC ISOLATION	Power supply - other circuits	2300VAC	
	Relay outputs - other circuits	2300VAC	
	Signal input - functional ground	1000VDC	
	Excitation output - other circuits	1000VDC	
	Analog output - signal input	1000VAC	
	RS485 - signal input	1000VAC	
MECHANICAL	Dimensions	48x96x120mm	
	Weight	280g	
	Panel cut-out	44.5x91mm	
	Panel thickness	0..15mm	
	Horizontal spacing	>30mm	
	Vertical spacing	>40mm	
COMPLIANCE	Electrical safety	EN 61010-1:2001+AC:2002	
	EMC	EN 61326-1:2006	

5. REVISION HISTORY

VERSION	MODBUS FIRMWARE ID	DATE	CHANGES INFO
2.01		05.2004	
3.00		12.2004	serial communication added
3.05		04.2005	3.00 fixed, display test added
3.06	10000	05.2005	Modbus Firmware ID register added

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	164 cm ²	