





LDN-...-N2(Z)-IAN-N2.01.001

large LED displays
with analogue input



Operation manual

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

 **READ THE MANUAL CAREFULLY BEFORE INSTALLATION AND USE!**

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1. INTRODUCTION

1.1 General description

LDN-...-N2-IAN displays in N2 type, flat, aluminium housings are dedicated for displaying numeric data in wide range of industrial and public information applications. Isolated, precision analogue input allows processing data from any analogue signal sources. High efficient LED components provide good visibility in all indoor locations.

LED digits options

Displays are typically supplied in 4, 5 and 6 digit versions with 100, 150, 227 or 450mm high digits. Up to 8 digits versions are available on request. High efficient red is standard color for LED segments. Optionally, yellow and green digits can be mounted for special order with automatic dimming module. 100mm high version can be alternatively supplied with super-bright discrete LEDs, sufficient for outdoor use.

Analogue input and signal sources

Isolated analogue input is designed for standardised: voltage (0-10V), or current (0(4)-20mA), signal sources. Process value can be displayed in required format, according to user settings like 2-point, or multipoint scaling. Also, decimal point position, rounding and filtering can be programmed by the user.

1.2 Safety considerations



Indicator is dedicated for SELV installations only!

Safety recommendations:

- read operating manual carefully before use
- follow the manual safety recommendations
- disconnect power during display mounting and wiring
- do not use the display in corrosive and explosive atmosphere
- keep environmental conditions within specification
- provide proper ventilation by keeping appropriate spacing
- do not use even partially damaged display.

1.3 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 display 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.

1.4. Marking

LDN - 4/227D - SR - 24 - N2 - IAN - N2.01.001

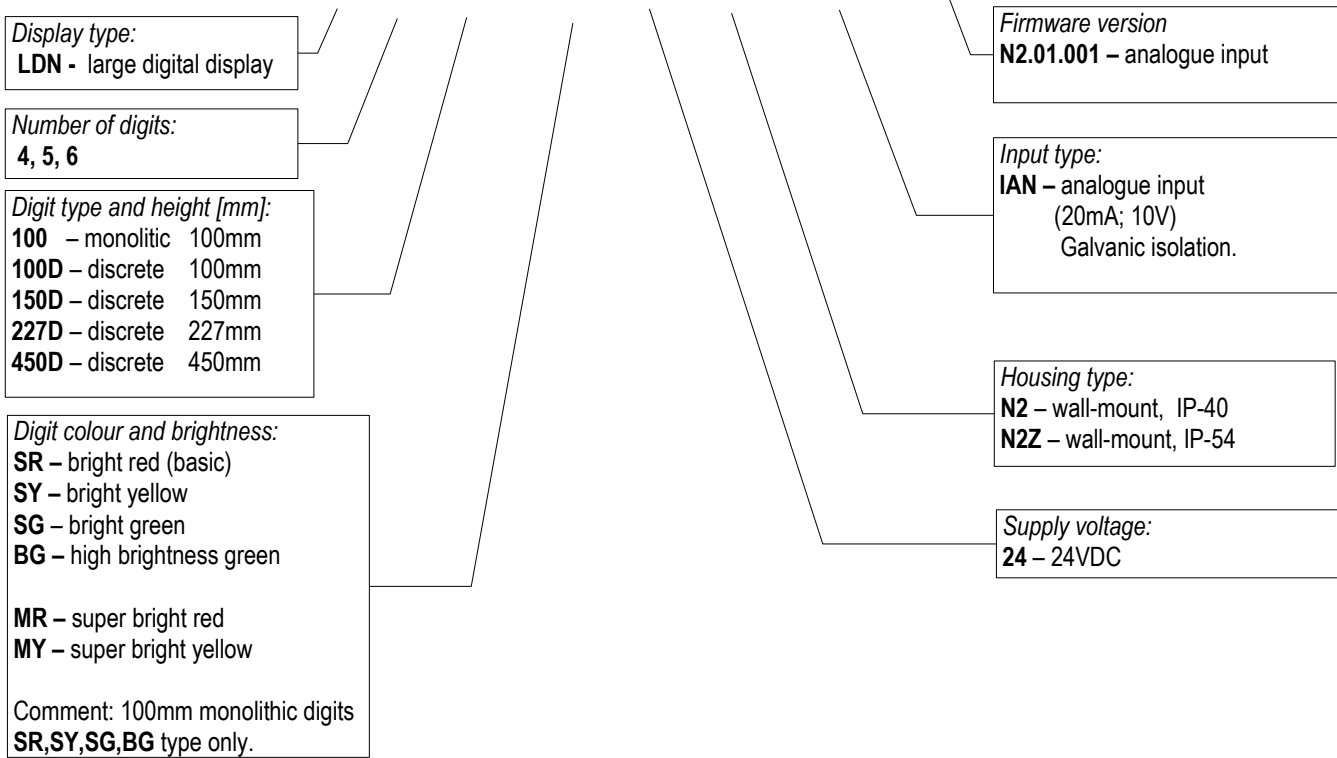


Fig. 1. LDN-...-N2(Z)-IAN displays marking.

2. INSTALLATION AND WIRING

2.1 Unpacking

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.

The original box contains:

- display 1 pcs
- connectors 2 pcs
- operation manual 1 pcs

2.2. Instalation

Display housing is made from extruded aluminium frame with composite rear-wall and transparent PMMA filter at front. Four, wall mounting brackets are fixed on the back side of the frame. The brackets can be moved around the frame and fixed in required position on top/down or side elements of the frame. It is also possible to reverse the brackets and hide them behind.

Please refer to Fig. 2, 3 and Table 1, for detailed type-specific dimesions.

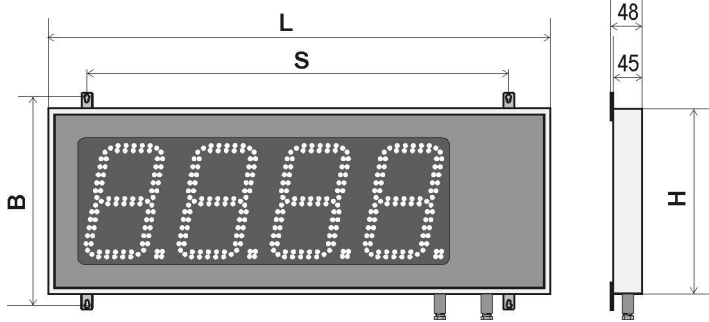


Fig. 2. Display dimensions.

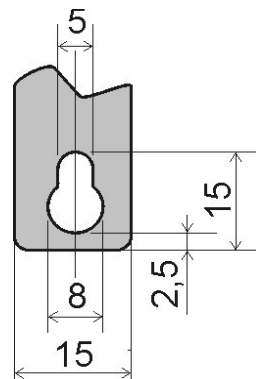




Fig. 3. Fixing bracket dimensions.

Tab. 1. Display dimensions.

Display type	H [mm]	B [mm]	L (x-number of digits) [mm]	S (maximum) [mm]
LDN-x/100D-...-N2-...	182	H + 44	$156 + x * 80$	L - 100
LDN-x/150D-...-N2-...	238		$165 + x * 120$	
LDN-x/227D-...-N2-...	332		$161 + x * 180$	
LDN-x/450D-...-N2-...	650		$200 + x * 450$	

2.3. Electrical connections

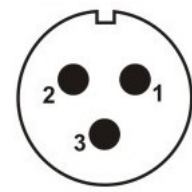
 *Disconnect power before installation procedure!*

 *Incorrect connections or reversed supply polarity may damage the instrument!*

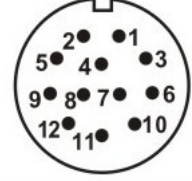
Before electrical connections the display should be fixed in it's working position. Make connections strictly according the following instructions.

Display has two separate connectors for power and signal connections.

Tab. 2. Power connector wiring.

Pin no	Marking	Description	Pin layout
1	⊥	Frame ground	
2	0V	0V power	
3	+24V	+24V power	

Tab. 3. Signal connector wiring.




Pin No	Marking	Description	Pin layout
1	⊥	Frame ground	
2			
3			
4			
5			
6			
7	GND	Signal ground	
8	+20mA	Current input	
9	+10V	Voltage input	
10			
11			
12			

3. Operation

3.1 Programming

I LDN display are supplied with default settings. Each unit should be programmed according to application requirements.










Programming is performed with three push-buttons on the front side of the display:











-  – S1, escape;
-  – S2, change;
-  – S3, enter/accept.



I Settings are available in Programming Mode, which should be activated at first.

(Underline indicates blinking of digits)












Display	Key	Action	Alternative action	Comments
0.00		Press and hold for >=3s		Programming mode activation. (0.00 is for example)
Edt?		Enter the Programming Mode	 Back to Operation Mode	
Fn00		Choose function to be set	  Back to Operation Mode without storing the changes	Function Fn00 restes all options to default. Details in separate table.
FA01				Choose FA02, for instance.
FA02		Enter Fa02 function.		
2		Value change		Changing the value to 4.

<u>3</u>		Value change		
<u>4</u>		Acceptance and back to function list.		
FA02		Choose another function.		The change will not be stored until using Sav? function.
		...		
Fd88				
Sav?		Storing the changes in memory	  Back to Operation Mode without saving or  Back to Edt? (menu beginning), editing can be continued.	Funkcja Sav? służy do zapisu wszystkich zmian w pamięci.
Wait		Wait. Writing to memory in progress		
Edt?			 Back to menu	
0.00		The display is back in Operation Mode		(0.00 is for example)

FA03 - readout scaling.













(The number of scaling points must be first set with FA02 function)


(Underline indicates blinking of digits)


Display	Key	Action	Alternative action	Comments
		...		
FA03		Enter FA03 function		
<u>P01</u>		Enter editing the point 01	 Change scaling point to be set	P01 to P16 - scaling point numbers
<u>00.00</u>		Setting the first digit of input signal value	 To next digit without changing	Input signal value is displayed with decimal point (readout values, without)
	...			Setting
<u>00.00</u>		Acceptance of the last digit and beginning readout value editing		00.00 (mA/V) input signal value of P01 scaling point was set
<u>0000</u>		Setting of the first digit of readout		
	...			Setting the values for other digits
<u>0100</u>		Acceptance of the last digit		100 value was set as readout for P01 point
<u>P01</u>		Choosing other point for editing	 Back to menu	
	...	Setting the values for other points		
<u>P02</u>		Back to menu		This example shows 2-point (P01, P02) scaling

Scaling points are automatically sorted in ascending order, while leaving Fa03 function.


Fn00 function - resetting the memory
(Underline indicates blinking of digits)


Na wyświetlaczu	Przycisk	Czynność	Czynność alternatywna	Uwagi
0.00		Press and hold for >=3s		(0.00 is for example)
<u>Edt?</u>		Enter the menu	 Back to Operation Mode without saving	
<u>Fn00</u>		Activate reset function	  Back to operation mode	
<u>Ecod</u>	   	User settings are deleted and factory settings reestablished.		
<u>IniU</u>		Resetting in progress		
<u>Fn00</u>		Back in menu function list	  Back to operation mode	

 Underline indicates blinking of digits.

 Some values are edited digit-by-digit. If the edited value exceeds its allowable range, (e.g. 300 if the range is up to 255) exceeding value will be rejected and previous value displayed.

Tab. 4. Menu function table.

Func.	Description	Display	Value/option range	Factory setting
Fn00	Reset (back to defaults)		Ecod = press  4 times	
FA01	Analog input type		I - current 0-20mA; U - voltage 0-10V	I
FA02	Number of scaling points		2 (linear scaling) – 16	2
FA03	Readout scaling		P01 to Pnn - input value (displayed with the dot) and required readout (displayed without the dot) for each scaling point must be set. Scaling range: see the next table	P01: 00.00:0000 P02: 20.00:2000
FA04	The number of digits after decimal point		0 – without d.p., 0.0 – 1 digit, 0.00 – 2 digits, 0.000 – 3 digits, 0.0000 – 4 digits	Refer to scaling table
FA05	Rounding		1 (without rounding), 2, 5, 10 (rounding to 2, 5, 10)	1
FA06	Filtering time constant	Fil	0 – 60ms; 1 – 120ms; 2 – 240ms; 3 – 480ms; 4 – 960ms; 5 – 1.92s; 6 – 3.84s; 7 – 7.68s; 8 – 15.36s; 9 - 30.72s	2
Fn10	Unit	u	000 – without units; 001 – automatic (see Fn07); 002 - „g”; 003 - „kg”; 004 - „t”	000
Fd01	Leading zeros formatting	0	Of – leading zeros hidden, On – leading zeros displayed	Of
Fd02	INACTIVE: shift	A	rO – right-hand with overrange indication;	rO

Func.	Description	Display	Value/option range	Factory setting
Fd03	Brightness	L	00 – AUTOMATIC, 01(min brightness) – 15(max brightness)	00
Fd88	Display test		Repeat  to display: hole segments, A, B, C, D, E, F, G, H segments separately.	

Tab. 5. Scaling ranges

Display type (number of digits)	Input signal range [mA] or [V]	Readout range (decimal point position depends of FA04 function set)	Factory setting (2-point, linear scale)	Decimal point position
6 digit (LDN-6...)	<-99.999;99.999>	<-99999;99999>	P01: 00.000 : 00000; P02: 20.000 : 20000	0.000
5 digit (LDN-5...)	<-9.999;99.999>	<-9999;99999>	P01: 00.000 : 00000; P02: 20.000 : 20000	0.000
4 digit (LDN-4...)	<-9.99;99.99>	<-999;9999>	P01: 00.00 : 0000; P02: 20.00 : 2000	0.00

Example of 4 digit, (LDN-4...) display scaling.

Tab. 6.

Parameter	Required value	Function No	Setting introduced
Input type	current	FA01	1
Scaling point number	2	FA02	2
Input signal range	4-20mA	FA03	P01 : 04.00 : 0000 P02 : 20.00 : 3000
Readout	0-3000		
Number of digits after decimal point	1	FA04	0.0
Readout rounding	Without rounding	Fn05	1
Filtering time constant	480ms	Fn05	3

Readouts achieved according to settings listed above:

Tab. 7.

Input signal	Readout
0.00mA	-75.0
4.00mA	0.0
12.00mA	150.0
16.00mA	225.0
20.00mA	300.0

3.2. Maintenance

LDN displays need no specific maintenance. If display front screen has to be cleaned, use soft, moist cloth and detergent. Computer screen cleaners can also be used. Do not use aggressive solvents.

3.3 Error messages

Table. 8. Error messages

Message	Description	Reason	Action
9999 ... (blinking)	Readout overrange	-incorrect user-settings -incorrect input wiring -internal failure	-check user setting, the scaling, at first -check the signal source and input connection
-999 ... (blinking)	Readout underrange	-incorrect user-settings -incorrect input wiring -internal failure	-check user setting, the scaling, at first -check the signal source and input connection
Readout blinking	Input signal overrange		-check the signal source and input connection
ErrF	Factory settings memory error. (calibration, digit configuration...)	-strong electric disturbance -memory failure	Turn the unit off. Apply power after 5s. If message reappears, contact the service.
IniF	Factory settings initialisation.		Turn the unit off. Apply power after 5s. If message reappears, contact the service.
ErrU	User settings memory error.	-strong electric disturbance -memory failure	Turn the unit off. Apply power after 5s. If message reappears, press S2 key. IniU message should be momentary displayed, what informs about successful default settings reestablishment.
IniU	User settings memory initialisation.		If permanently displayed, contact the service.

4. TECHNICAL DATA


Tab. 9. Technical data

Category	Parameter	Value	Units	Comments
Current input	accuracy	+/-0.1	%	FS
	Thermal drift	+/- 100	ppm / °C	
	Internal resolution	15	bit	
	Sampling rate	16,6	Hz	
	Filter time constant	0-30,72	s	
	50Hz noise rejection	>=65	dB	
	Input range	0..20	mA	-0.1 .. +21mA
	Input resistance	<56	om	
	Input current max	Internally limited		
	Voltage transient suppressor	-0.6...+36	V=	transil
Voltage input	Input range	0...10	V	-0.05 .. +10.5V
	Input resistance	>=50	kom	
	Voltage transient suppressor	-0.6...+36	V=	transil
Input isolation	Isolation voltage	1000	VAC	To power and other circuits
Power	Supply voltage	24 +/-10%	V DC	
	Power consumption max N – number of digits	1 + N * 3	W	LDN-x/100-...-N2(Z)-...
		1 + N * 2,2	W	LDN-x/100D-...-N2(Z)-...
		1 + N * 4,3	W	LDN-x/150D-...-N2(Z)-...
		1 + N * 6,4	W	LDN-x/227D-...-N2(Z)-...
1 + N * 24	W	LDN-x/450D-...-N2(Z)-...		

Category	Parameter	Value	Units	Comments
Power connector	Pin number	3		
	Power cable wire crosssection max	4,17	mm ²	AWG11
	Power cable outer diameter	7-12	mm	
Signal connector	Pin number	0,785	mm ²	
	Signal wire cross section max	0,5	mm ²	AWG18
	Signal cable outer diameter	7-12	mm	
Readout	Digit height	100, 150, 227, 450	mm	Discrete segments
	brightness – 100mm (digit height)	4800	mcd/seg	Colour code: SR,SY,SG
	brightness – 100mm	12000	mcd/seg	Colour code: MR,MY
	brightness – 150mm	9600	mcd/seg	Colour code: SR,SY,SG
	brightness – 150mm	24000	mcd/seg	Colour code: MR,MY
	brightness – 227mm	14400	mcd/seg	Colour code: SR,SY,SG
	brightness – 227mm	36000	mcd/seg	Colour code: MR,MY
	brightness – 450mm	51000	mcd/seg	Colour code: SR,SY,SG
	brightness – 450mm	127000	mcd/seg	Colour code: MR,MY
Environmental	Working temperature range	5...50 (N2Z: -25...50)	°C	
	Relative humidity	10...95	%	No condensation
	Case protection degree	IP-40 (N2Z: IP54)		
Mechanical	dimensions	refer Tab. 1.		
	weight	2,3	kg	LDN-4/100D-...-N2(Z)-...
		2,6	kg	LDN-5/100D-...-N2(Z)-...
		3,0	kg	LDN-6/100D-...-N2(Z)-...
		3,2	kg	LDN-4/150D-...-N2(Z)-...
		3,7	kg	LDN-5/150D-...-N2(Z)-...
		4,3	kg	LDN-6/150D-...-N2(Z)-...
		4,0	kg	LDN-4/227D-...-N2(Z)-...
		4,8	kg	LDN-5/227D-...-N2(Z)-...
		5,5	kg	LDN-6/227D-...-N2(Z)-...
		17,3	kg	LDN-4/450D-...-N2(Z)-...
		21,7	kg	LDN-5/450D-...-N2(Z)-...
		26,1	kg	LDN-6/450D-...-N2(Z)-...
Standards	Electromagnetic compatibility (EMC)	PN-EN 61326-1:2009		Industrial environment, class A

5. MODIFICATION HISTORY

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).

Tab. 10. Materials to be removed:

Material	Qty [cm²]	Comments
Printed boards	611	LDN-4/100D-...-N2(Z)-...
	739	LDN-5/100D-...-N2(Z)-...
	867	LDN-6/100D-...-N2(Z)-...
	931	LDN-4/150D-...-N2(Z)-...
	1147	LDN-5/150D-...-N2(Z)-...
	1363	LDN-6/150D-...-N2(Z)-...
	2011	LDN-4/227D-...-N2(Z)-...
	2497	LDN-5/227D-...-N2(Z)-...
	2983	LDN-6/227D-...-N2(Z)-...
	9960	LDN-4/450D-...-N2(Z)-...
	12435	LDN-5/450D-...-N2(Z)-...
	14910	LDN-6/450D-...-N2(Z)-...

ldn_n2_ian_n201001_dtr03 ENG r.odt