





LDN-x/100D-...-Z-...

industrial, IP-65 digital display



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 MAUAL CAREFULLY BEFORE INSTALLATION AND USE!**

CONTENTS

1. INTRODUCTION

- 1.1 General description
- 1.2 LED digits options
- 1.3 Interfacing
- 1.4 Safety considerations
- 1.5 EMC considerations
- 1.6 Marking

2. INSTALLATION AND WIRING

- 2.1 Unpacking
- 2.2 Installation
- 2.3 Electrical connections

3. OPERATION

- 3.1 Programming
- 3.2 Maintance
- 3.3 Error messages

4. TECHNICAL DATA

5. MODIFICATION HISTORY

6. DISCARDED ELECTRONIC EQUIPMENT COLLECTING INFORMATION

1. INTRODUCTION

1.1. General description

LDN displays in Z type, stainless steel water-proof housings are dedicated for displaying numeric data in wide range of industrial applications. High efficient LED components provide good visibility in all indoor and outdoor locations. LDN can receive data from various sources in simple ASCII format using one of three available serial interfaces. LDN ASCII protocol is very flexible and can be configured to almost all serial communication applications. Special 3-wire SBCD interface, dedicated for PLC systems is also available. Alternatively analogue or counter inputs can be chosen. The display and communication format can be easily programmed by the user.

1.2. LED digits options

Displays are supplied in 4, 5 and digit versions with 100mm high digits. Each digit segment is build of 5mm elliptic diodes. High efficient red is standard color for LED segments. Yellow and green digits can be mounted for special order.

1.3. Interfacing

LDN displays can read data from wide range of electronic systems and devices. Displays can accept analog signals, digital data through standard interfaces or fulfill counter function. Each device has one, fixed type input. Input/interface type must be specified in the order. The internal software provides adjusting data format to achieve compatibility with wide range of automation equipment.

Analog input. Displays with this option work as 4-digit programmable process meter. Both standard voltage and current signals are accepted. The user can set read-out scaling, decimal point position, rounding and filtering.

RS485 interface. The most popular interface in factory automation. Allows long range (up to 1200m) communication with possibility of networking. LDN internal software allows flexible configuration of communication parameters. Two protocols are offered: simple ASCII or standard Modbus RTU. User accesible functions allow formatting displayed data.

RS232 interface. Basic interface for „point to point” local communication with PCs, meters etc. LDN internal software allows flexible configuration of communication parameters. Two protocols are offered: simple ASCII or standard Modbus RTU. User accesible functions allow formatting displayed data.

TTY interface. Old interface standard provided in LDN for compatibility with older equipment. Allows the simplest medium-range communication with galvanic isolation. LDN internal software allows flexible configuration of communication parameters. Two protocols are offered: simple ASCII or standard Modbus RTU. User accesible functions allow formatting displayed data.

SBCD interface. –Special interface with serial transmission for easy connection with PLC controllers. Applied when no serial port is available with the use of typical transistor outputs. Digits and symbols in BCD code are transmitted serially. It is possible to wire a few adressed displays on one line.

Counter input – Typical general-purpose up-counter with reset. Both input and reset input are isolated from display ground. Count value is stored in non-volatile memory.

1.5 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.

1.6. Marking

LDN - 6/100D - MR - 24 - Z - RS485 - A2.04



Rys. 1. LDN-...-Z-... coding system

I Not all options listed are available simultaneously

2. INSTALLATION AND WIRING

2.1 Unpacking

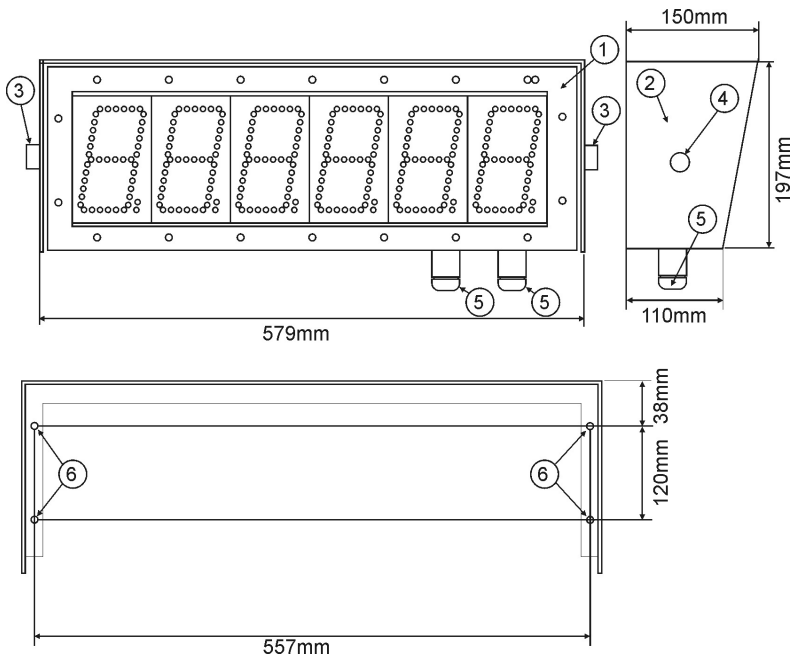
Unpack the instrument and check it for obvious signs of damage. If any damage occur notify the supplier and do not attempt further use. If the unit appears to be in good condition read the Operating Manual before installation and use.

The original box contains:

- LDN display with rain shield 1 pcs
- CA-3 power plug 1 pcs
- CA-6 input plu 1 pcs
- SW-01 programming keyboard 1 pcs
- operation manual 1 pcs

2.2. Mechanical properties and mounting

Display housing is made of stainless, polished steel. It consist of two pieces. The main body with robust, polycarbonate, UV protected front window and sun / rain shield. The shield enables also easy wall-mounting.



- (1) – display body
- (2) – sun/rain shield
- (3),(4) – body fixing screws
- (5) – connectors
- (6) – mounting holes

Fig. 1. Display view and dimensions

The display should be fixed to the wall.

Mounting procedure step by step:

- remove two screws (3) and pull the display body out of the shield,
- fix the shield to the wall using 4 mounting holes inside the shield,
- put the display body into the shield and fix it with screws (3).
- adjust display angle if needed.

I Choose for display mounting the place not exposed to direct sunlight if possible. Bright ambient light decreases display readability. Apply display skew to decrease sun reflection in the front window.

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.

Power connection

LDN display are powered only from 24VDC source.

Table. 1. CA3 (Hirschmann) power connector.

Nr	Nazwa	Opis
1		n.c.
2	0V	Supply ground
3	+24V	Supply positive
⊥	Ground	Connected to housing

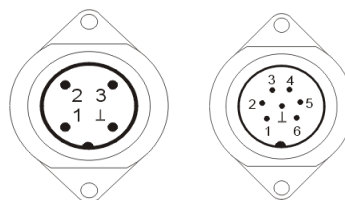


Fig. 2. CA3 and CA6 pin configuration.

Input connection.

Table. 2. CA6 (Hirschmann) input connector.


Nr	RS232	RS485	TTY	SBCD	LI	AN	
1							
2							
3	GND	GND	RX -	GND	GND	GND	
4	RXD	A(+)	RX + / RL-1	CLK	CNT	+20mA	
5	TXD	B(-)	RL-2	DATA	RES	+10V	
6							
⊥	Ground (housing)						

3. DISPLAY OPERATION

3.1. Programming

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

Programming mode is enabled by closing pins 1-2 on supply connector. The additional programming keyboard SW01 must be connected to input connector. Two push-buttons, **S1** and **S2** on programming module are used for menu navigation and settings. Menu messages are displayed on the main display, on four, right-hand display positions. Parameters are grouped in functions named Fc01, Fc02.... Detailed descriptions of the menu functions are published in appendixes related to each interface and protocol type.

 *SW01 programming keyboard is used only during setting procedure.*

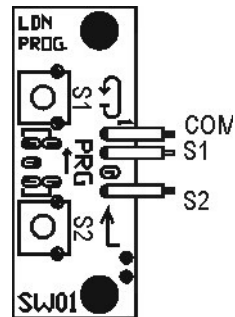
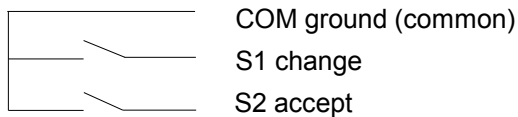


Fig. 3. SW01 internal schematic

Fig. 4. SW01 programming keyboard.

Table. 3. Input CA6 connector pin assignment for SW01 programming keyboard.

Pin No	RS232	RS485	TTY	SBCD	LI	AN	
1	S1	S1	S1	S1	S1	S1	
2	S2	S2	S2	S2	S2	S2	
3							
4							
5							
6	COM	COM	COM	COM	COM	COM	
⊥	Ground (connected to housing)						

Table. 4. Power connector CA3 pin assignment for programming enable.

Pin No	Nazwa	Opis
1	S3	program enable
2	0V	0V supply
3		
⊥		

I To enter programming mode connect pins 1,2 of power CA3 connector and connect SW01 programming keyboard to input CA6 connector.

The function SW01 programming keyboard.

- S1 - CHANGE** – menu function change / value change,
- S2 - ENTER** – menu function entrance / value acceptance,

Programming procedure step-by-step:

1. Close **S3** pin to ground - Edit message appears.
2. Press **S2** key - the first menu function symbol appears (Fc01, Fa01...).
3. Choose function to be edited by pressing **S1** key.
4. Press **S2** key to enter choosen function.
5. Change function value or option with **S1** key.
6. Accept change by pressing **S2** key - function name reappears.
7. Edit other functions by repeating steps 3, 4, 5, 6.
8. Move to the end of function list until Edit message reappears. Settings are stored in this moment.
9. Open **S3** pin. This way, settings memory is hardware protected.

I Programming procedure must end while Edit message is displayed. Otherwise parameter changes will not be stored. Turning off PROGRAM mode in all other possible states closes programming without storing the changes in the memory.

Resetting parameters to default (factory settings).

1. Switch display power off.
2. Close S3 pin to ground.
3. Keep S1 key depressed and turn display supply on - Eini message should appear.
4. Press S2 key to accept the reset.
5. Open S3 pin.

I If S2 key will be depressed erroneously in step 3, Fabr message will appear. Turn display power off and repeat the procedure correctly.

I Each LDN interface version has different menu functions set. Refer to appendix for details of programming. Appropriate appendix is always attached to the manual.

3.2. Maintance

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

3.3 Error messages

Table. 2. Error messages

Message	Description	Reason	Action
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 SPECIFICATION


Table. 3. Technical specification

Function	Parameter	Value	Units	Comments
RS485 interface	isolation	no		Displays have only one interface.
	Overvoltage protection levels	+12 / - 7	V DC	
	pull-up/pull-down resistors	yes		
	Idle state	receive		
RS232 interface	isolation	no		
	Overvoltage protection levels	+ / - 25	V DC	
TTY interface (unidirectional)	Galvanic isolation	1000	VDC	
	Rx input type	passive		
	Built-in limiting resistor RL (terminals RL-1,RL-2)	1200	Ω	
	Loop voltage	24	V DC	
	poziom progowy	10	V DC	
SBCD interface (unidirectional)	Galvanic isolation	1000	VDC	
	Logic high level	10...30	V DC	
	Logic low level	0...5	V DC	
	Receiver input resistance	5	k Ω	
Counter	Galvanic isolation	1000	V	
	Logic high level inputs CNT, RES	10...30	V DC	
	Logic low level inputs CNT i RES	0...5	V DC	
	Output type	PNP		
	Nominal output voltage	24	V DC	
	Load current	0,5	A	
	Overvoltage protection levels input/output	+ 36/ -0,6	V DC	
Analog input (4 digits only)	Current input range	0...20	mA DC	
	Current input resistance	100	Ω	
	Voltage input range	0...10	V DC	
	Voltege input resistance	1,25	M Ω	
	Accuracy	+/- 0,3	% FS	

Function	Parameter	Value	Units	Comments	
	resolution	10	bits		
Supply	Supply voltage	16...30	V DC		
	Power consumption	$N \times 3 + 0,7$	W	monolithic segments	
	N – digit number	$N \times 2,2 + 0,7$	W	discrete segments	
power connector	type	CA3 (Hirschmann)		3+1 pin	
	wire cross-section max	1,5	mm ²		
	cable outer diameter	6-12	mm		
signal connector	type	CA6 (Hirschmann)		6+1 pin	
	wire cross-section max	0,75	mm ²		
	cable outer diameter	6-12	mm		
Display	digit height	100	mm		
	Color and brightness - indoor version	4800	mcd/seg	Super- bright red (SR), super-bright yellow (SY), super-bright green (SG), super-bright orange (SO)	
	Color and brightness - outdoor version	12000	mcd/seg	mega-bright red (MR), mega-bright yellow (MY), mega-bright orange (MO)	
Environmental	Operating temperature range	0...50	°C	from -25°C outdoor version	
	Protection degree	IP-65			
Enclosure / mounting	Enclosure material	stainless steel OH18N9			
	Front filter	Polycarbonate, UV resistant			
	Dimensions	579x197x150	mm		
	Weight		5,82	kg	LDN-4/100D-...-Z-...
			5,87	kg	LDN-5/100D-...-Z-...
		5,91	kg	LDN-6/100D-...-Z-...	
Standards`	Electromagnetic compatibility (EMC)	PN-EN 61326:2002/A3:2004(U)		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. 4. Materials and substances to be removed:

<i>Material</i>	<i>Qty [cm²]</i>	<i>Display type</i>	<i>Comments</i>
Printed circuit boards	611	LDN-4/100D-...-Z-...	
	739	LDN-5/100D-...-Z-...	
	867	LDN-6/100D-...-Z-...	