





# LDN-...-T-...

## T-series panel LED displays



## Operation manual

<b>SYMBOL</b>	<b>DESCRIPTION</b>
	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!**

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#### 1. INTRODUCTION

##### 1.1. General description

LDN panel displays are dedicated for displaying numeric data in wide range of industrial measurement and control applications. It 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 accept almost all data formats. Special 3-wire SBCD interface, dedicated for PLC systems is also available. Alternatively analogue or counter inputs can be choosed. The display and communication format can be easily programmed using push-buttons and on-screen menu. Displays are supplied in various DIN, panel cases with different digit heights and digit number. High efficient red LED digits is standard, but yellow and green digits can be mounted for special order.

## 1.2 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 accessible 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 accessible 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 accessible 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 addressed 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.

## 1.3 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.

## 1.4 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 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.

## 1.5 Marking

### LDN - 4/20 - SR - 24 - T - RS485 - A2.04

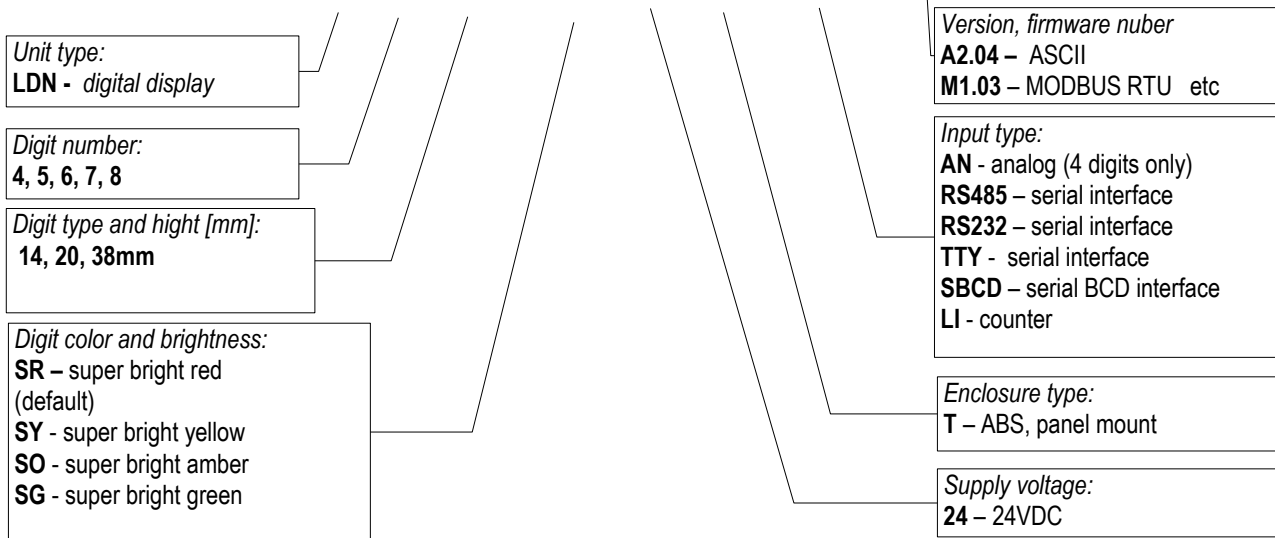


Fig. 1. LDN-...-T-... coding system

**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:

- display 1 pcs
- plug-in terminal block 1 pcs
- fixing clamps 2 pcs
- operation manual 1 pcs

### 2.2 Installation

Display housing is made of black ABS and should be mounted in panel cut-out. LDN...T cases are dimensioned according to DIN standard. Panel cut-out should be done within specified tolerance for easy placement and tight fixing. The instrument introduced into the cut-out from the front side must be fixed with two clamps. Clamps are attached on the rivets on both side walls of the case and tightened by screw-driver.

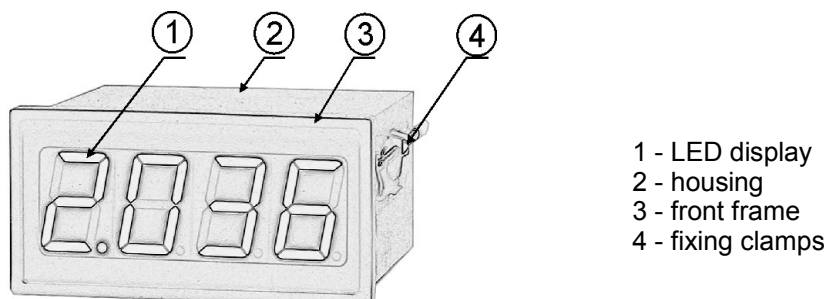


Fig. 2. General view

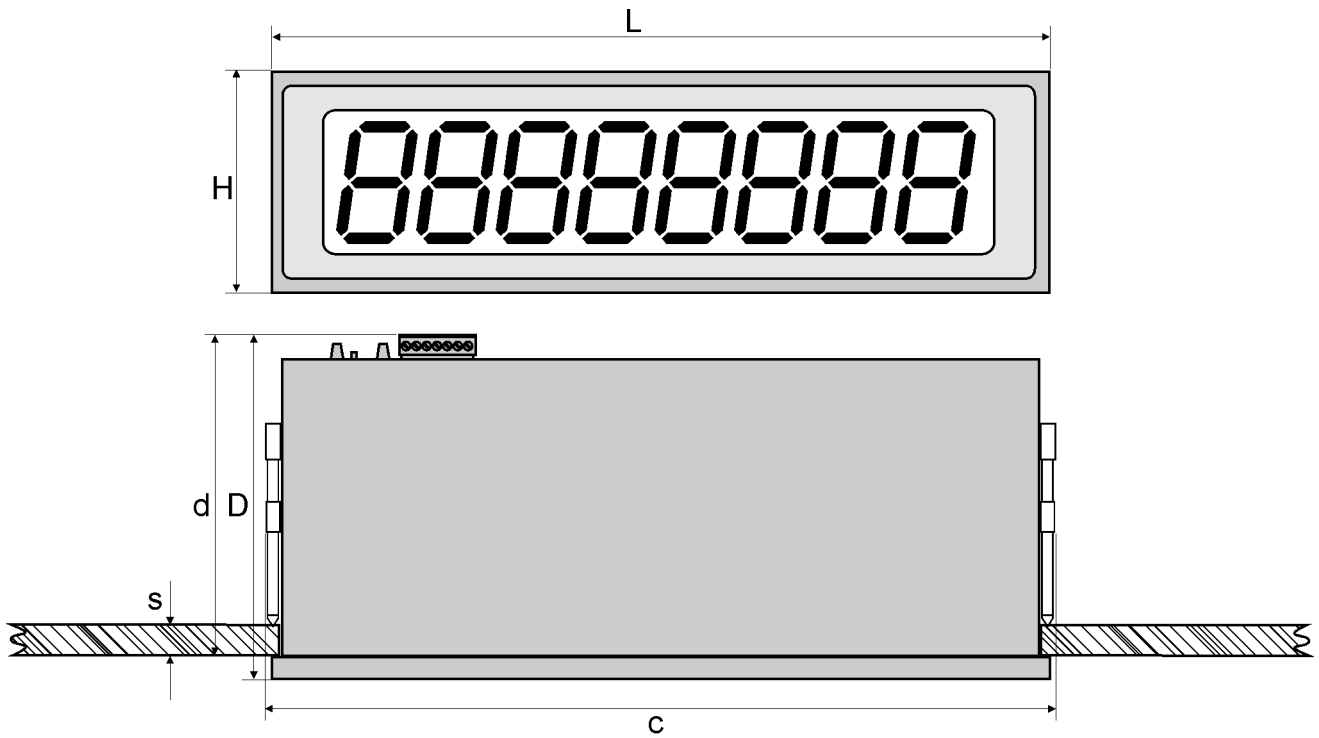


Fig. 3. Housing dimensions

Several housing sizes are applied for LDN-...-T-... display family. All version-specific dimensions are listed in the table below.

Table. 1. Dimensions

Front plate	Depth	Mounting cut-out	Overall Width	Maximum panel thickness	Digit number					
					L x H	D x d	c	s	4	5
[mm]	[mm]	[mm]	[mm]	[mm]						
96 x 24	130	92 x 22	107	6	LDN-4/14	LDN-5/14	LDN-6/14			
96 x 48	130	92 x 45	107	47	LDN-4/20					
144 x 48	130	138 x 45	155	47		LDN-5/20	LDN-6/20			
144 x 72	130	138 x 68	155	47	LDN-4/38					
192 x 72	130	186 x 68	203	47		LDN-5/38				
288 x 72	130	282 x 68	299	47			LDN-6/38	LDN-7/38	LDN-8/38	

### 2.3. Electrical connections



*Disconnect power before installation procedure!*



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

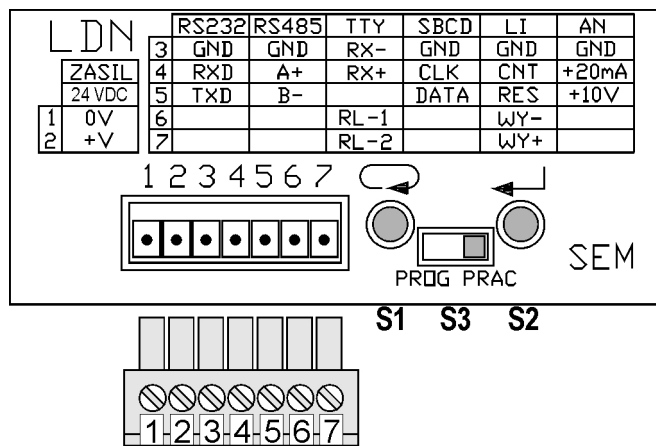


Fig.4 Rear-wall view with plug-in terminal block shown separately.

Before electrical connections the display should be fixed the panel.

All power and signal connections are placed in single plug-in terminal block on the rear wall of the instrument. Pin assignemet for all interface and input options are shown in the table below.

Table. 2. Electrical connections

No	RS232	RS485	TTY	SBCD	LI	AN
1	0V supply					
2	+24V= supply					
3	GND	GND	RX-	GND	GND	GND
4	RXD	A(+)	RX+	CLK	CNT	+20mA
5	TXD	B(-)		DATA	RES	+10V
6			RL-1		OUT -	
7			RL-2		OUT+	

### 3. DISPLAY OPERATION

#### 3.1. Programming

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

Programming switches and push-buttons are placed on the rear wall of the instrument.

Programming mode is enabled by switching **S3** switch into PROGRAM position. Two push-buttons, **S1** and **S2** 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.

The function of programming switches.

- S1 - CHANGE** – menu function change / value change,
- S2 - ENTER** – menu function entrance / value acceptance,
- S3** - (bi-stable switch) enables programming mode. In left,PROGRAM position programming mode is activated. In right position, PRACA (Operation) the display is in operating mode.

Programming procedure step-by-step:

1. Set **S3** switch into left, **PROGRAM** position - 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 chosen 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. Switch **S3** into right, **PRACA** position. This way, settings memory is hardware protected.

**I** *S3 switch must be switched to operation position PRACA in Edit state. 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. Set S3 switch to PROGRAM position.
3. Keep S1 key depressed and turn display supply on - Eini message should appear.
4. Press S2 key to accept the reset.

**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. Maintenance

LDN displays needs no specific maintenance. 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. These displays do not have parts which can be replaced by the user.

### 3.3 Error messages

Table. 3. Error messages

<b>Message</b>	<b>Description</b>	<b>Reason</b>	<b>Action</b>
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. 4. Technical specification

<i>Function</i>	<i>Parameter</i>	<i>Value</i>	<i>Units</i>	<i>Comments</i>
RS485 interface	isolation	no		Certain unit can have only one interface (input)
	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	$\Omega$	
	Loop voltage	24	V DC	
	Threshold level	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 $\Omega$	
Counter	Galvanic isolation	1000	V DC	
	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	$\Omega$	
	Voltage input range	0...10	V DC	
	Voltege input resistance	1,25	M $\Omega$	
	Accuracy	+/- 0,3	% FS	
	resolution	10	bits	
Supply	Supply voltage	11...30	V DC	
	Power consumption	0,75+k x 0,75	W	
Wiring	Wire cross-section max	1,5	mm <sup>2</sup>	
	Terminal pitch	3,81	mm	
LED display	Digit height	14, 20, 38	mm	
	14mm digit colour and brightness	8	mcd/seg	Super- bright red (SR) - (standard)
		3	mcd/seg	green (G)
		2	mcd/seg	yellow (Y)
	20mm digit colour and brightness	8	mcd/seg	Super- bright red (SR) - (standard), super-bright yellow (SY), super-bright green (SG)



<b>Function</b>	<b>Parameter</b>	<b>Value</b>	<b>Units</b>	<b>Comments</b>
		3	mcd/seg	green (G)
		2	mcd/seg	yellow (Y)
	38mm digit colour and brightness	18	mcd/seg	Super- bright red (SR) - (standard), super-bright yellow (SY), super-bright green (SG)
Environmental	Operating temperature range	0...50	°C	
	Related humidity	10...95	%	No condensation
	Protection degree - front panel	IP-52		
	Protection degree - rear panel	IP-20		
Enclosure / mounting	Enclosure material	ABS, glass reinforced		
	Display filter material	PMMA		
	Dimensions	See Table 1		
	Weight	150	g	LDN-4/14...T...
		160	g	LDN-5/14...T...
		170	g	LDN-6/14...T...
		230	g	LDN-4/20...T...
		300	g	LDN-5/20...T...
		340	g	LDN-6/20...T...
		380	g	LDN-4/38...T...
		390	g	LDN-5/38...T...
		400	g	LDN-6/38...T...
		410	g	LDN-7/38...T...
	420	g	LDN-8/38...T...	
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).

Table. 5. Materials and substances to be removed:

<b>Material</b>	<b>Qty [cm<sup>2</sup>]</b>	<b>Display Type</b>	<b>Comments</b>
Printed circuit boards (PCB)	82.6	LDN-4/14...T...	
	82.6	LDN-5/14...T...	
	82.6	LDN-6/14...T...	
	99.8	LDN-4/20...T...	
	117.7	LDN-5/20...T...	
	117.7	LDN-6/20...T...	
	141.9	LDN-4/38...T...	
	170.6	LDN-5/38...T...	
	290.7	LDN-6/38...T...	
	290.7	LDN-7/38...T...	
	290.7	LDN-8/38...T...	