

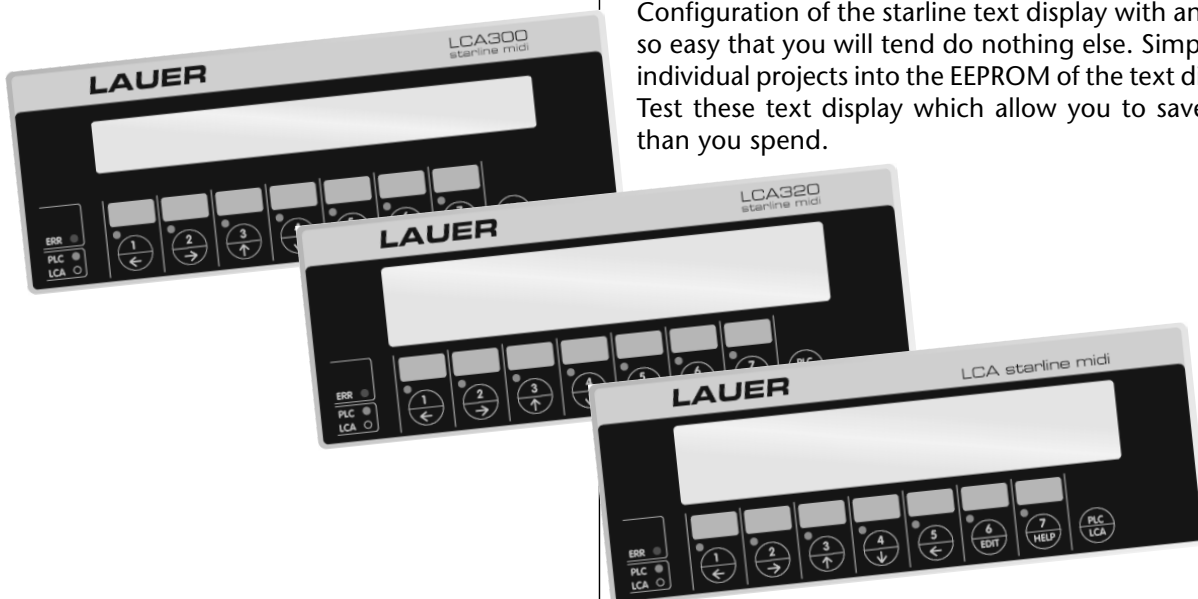
LCA 301 Manual & Practice

Knowing what's happening nearly free of charge

The starline-text displays visualize your machine's and controller's capabilities. If you want, 1024 times, even in different languages.

Small and compact but equipped with powerful functions, the LCA 300 and LCA 320 text displays fit decently into your machines design, the number of times you desire or the information you want to display.

Configuration of the starline text display with any PC is so easy that you will tend do nothing else. Simply load individual projects into the EEPROM of the text displays. Test these text display which allow you to save more than you spend.



Reg 10060/0998

Edition 5/10.98

© Systeme Lauer GmbH & Co KG

Systeme Lauer GmbH & Co KG
Post office box 1465
D-72604 Nürtingen

Manual: LCA 301 Manual & Practice
Edition: 23. Oktober 1998
Editor: Scheid

Operating instructions, manuals and software are protected by copyright. All rights reserved. Copies, translating, duplicate, convert the whole thing or in pieces is not allowed. With the exception of a backup copy for own use.

- Subject to alterations without notice in advance.
- The faultless and accuracy of the programs and datas on the disk we can't guarantee.
- Disks can be manipulate, so we can only guarantee the physical condition. The extent of the liability is limited on substitute.
- Ideas for improvements as well as refers to mistakes are welcome.
- The agreements are similar for the special parts of these manual.

Microsoft, MS, MS-DOS, Windows, Windows '95, Windows NT and the Windows Logo are registered trade marks or trade marks of the Microsoft Corporation in USA and/or other countries.
SIMATIC and STEP5 registered trade marks of the Siemens AG.

The remain descriptions in these written work can be marks which breach the third party rights by using.

User Notes

Please read the manual carefully before using the LCA and file it for reference.

Target Group

The manual is written for user with PC technology and process automation skills.

Portrayal conventions

[BUTTON] User entries are printed in brackets, i.e. [STRG] or [ENTER].

DISPLAY Display messages are printed in Courier

Courier bold Parameter entries are printed in Courier bold, i.e. **TO PLC**.

Italic Names of selected functions, menus and parameters as well as product names are printed *italic*.

Pictogram

The following pictograms and symbols are used within the manual.



Danger
Potentially dangerous situation.
Disregard may end in personal injury.



Attention
Potentially dangerous situation.
Disregard may end in serious damage of the product or its environment.



Tips and completing hints

Table of Contents

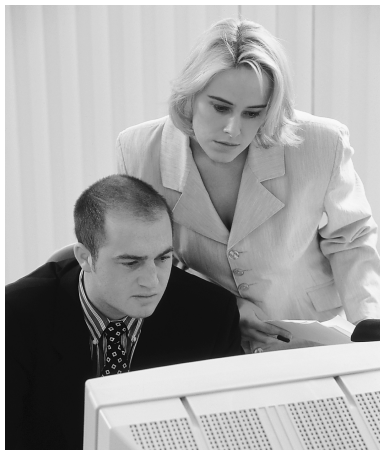
User Notes	0-3
Quality and Support	0-5
Safety Regulations	0-6
Norms and Approvals	0-7
Product Family LCA starline	0-8
1 Commissioning and installation	1- 1
1.1 Configuration with the LCAPRO software	1- 2
1.2 Interfacing of the text display	1- 4
1.3 General measures for interference suppression	1- 6
1.4 Installation notes	1- 7
1.5 Power Supply Voltage	1- 8
1.6 Control elements	1- 9
1.7 Character table	1- 12
2 Communication between the LCA and the PLC	2- 1
2.1 Communication principle	2- 1
2.2 System area	2- 3
2.3 Variable formats	2- 8
2.4 Example for variable	2- 9
2.5 The Printer	2- 20
2.6 The editor (operating)	2- 22
3 Technical data	3- 1
3.1 Maintenance	3- 4
3.2 Using the LCA in an Ex area	3- 5
Index	I- 1

Quality and Support



At Lauer, quality is the most important factor. From the single electronic component, to the assembled device, Lauer Quality Management tests everything under national and international test standards (ISO, TÜV, VDE, CE, Germanischer Lloyd, UL).

Each device is thoroughly tested for 48 hours under power and at varying temperatures (0 ... 50 °C) to insure superior quality.



Lauer products offer extraordinary efficiency and reliability, and include a comprehensive service package.

Ask for demo units and your personal online support during your first application.

Our qualified sales engineers offer excellent application support.



Product training is offered as another valuable part of the Lauer service package. Extensive training is available either at our modern training facility, or at the customer's location. Please ask for the actual training schedule.

Systeme Lauer also provides individual services including consulting, application support, hotline, manuals and training in regards to the complete Lauer product line.



Whenever you need us, Lauer is at your service. We are dynamic, creative and extremely efficient, with all the experience of a successful worldwide company.

Technical Support: 7022/9660-222, -223, -230, -231, -132
 Mailbox: 7022/9660-225
 eMail: support@systeme-lauer.de
 Website: www.systeme-lauer.de

Safety Regulations

This manual includes important information for safe operation of the device.

- This manual, particularly the safety related information, must be observed by all persons operating or handling the device.
- National and international safety regulations must also be observed.
- Operation of remote devices is permitted only when supervised by a qualified person at the remote site. This person must be able to terminate the operation immediately. Remote access is not allowed without visible communication or control.
- Installation and operation requires specially trained and qualified personnel who are familiar with the device.
- The responsibility of persons operating the device must be clearly determined in order to avoid undefined competencies and resulting hazardous situations.
- The device was developed for applications in an industrial area. It must not be used in applications other than those described in this manual.
- The device meets the current technical state of the art and complies with the applicable safety regulations. However, its operation may cause danger or impairment to the machine or other material assets.
- The device complies with the requirements of the EMC regulations and the harmonized European norms. Each hardware change may effect the EMC characteristics.
- The device must not be operated in intrinsically safe areas, or areas which require special observation, unless special precautions have been taken.
- Danger of explosion. Do not heat up batteries. Disregarding may cause major injuries.
- The supply voltage of the device must not exceed specified range. See according information on label.

Norms and Approvals

The LCA meets the current technical state of the art and complies with the following guidelines and norms:

- EMC Guideline 89/336/EWG
- EMC Basic Norm EN50081, Part 2
- EMC Basic Norm EN55082, Part 2

Mounting and connection notes must be observed as described in the manual.

The conformity is declared by the CE mark on the device. A declaration of conformity can be requested by:

Systeme Lauer GmbH & Co KG
Post office box 1465
D - 72604 Nürtingen
Germany

Product Family LCA starline

The text display LCA 300/320/325 show all relevant data concerning your PLC and machine. Text displays are not exotic accessories but tools which decisively increase the availability of machines and equipment. Text displays present clear information and offer a user-friendly simple operation.

Text displays LCA starlinen

- signalize faults and display current operating data
- inform you about trouble shooting procedures
- display configuration and adjustment instructions
- show what the machine is currently performing
- display a large number of actual values (variables) combined with different texts
- support maintenance and service
- offer different variable formats which can even be edited

Operating

All text displays are characterized by an individual, decent appearance. LCA text displays are functional units and at the same time creative elements fitting harmonically into your machine environment. A clearly arranged information medium is indispensable to a modern machine conception and a sophisticated controller. Therefore, text displays are part of the standard equipment of any machine.

Product Family LCA starline

Important features

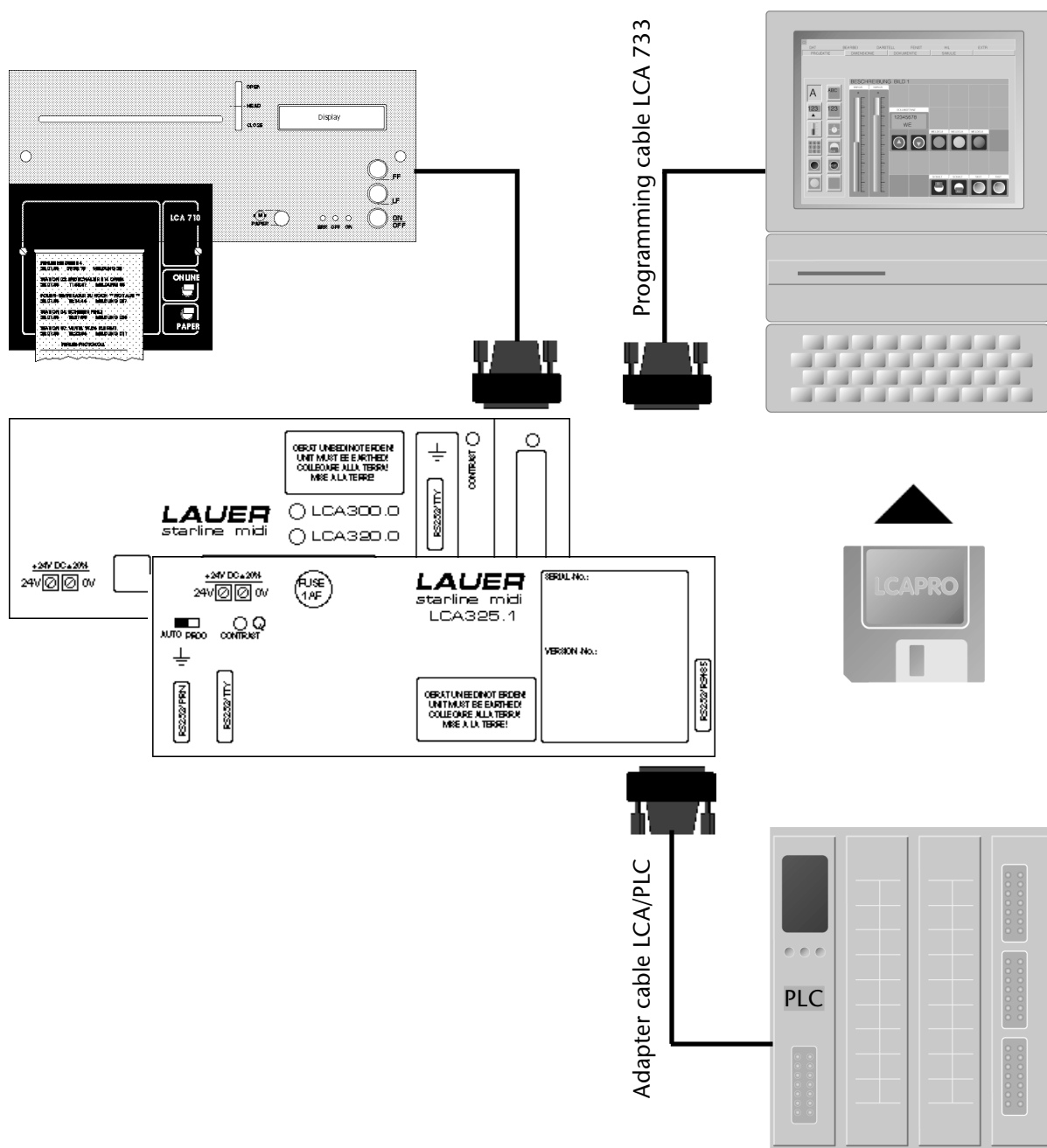
- LCD-Display 2 x 40 characters (LCA 320) with LED background illumination.
- LCD Display 4 x 40 characters (LCA 320/325) with LED-background illumination, from Version 201.4 with international character set
- 8 function keys for PLC actions and LCA operation, from version 201.4 whit international character set.
- Serial interface RS 232 and TTY (.0)
- Serial interface RS 422/RS 485 (.1)
- Serial Printer interface (LCA 325)
- interface for Profibus L2-DP, Interbus and ArcNET (LCA 300/320)
- Integrated EEPROM for firmware, texts and variables definitions
- Up to 1024 message texts with a maximum of 32 lines, each message text can be combined with variables and can be used for information display or as fault indication
- Help texts with up to 32 lines can be assigned to idle, operating and message text
- Up to 256 idle texts, up to 256 operating pages
- 3 message formats, last message, first message, cyclic display
- 8 variable formats (PRESET/ACTUAL), BIT, STRING, BCD, BIN, VBIN, WORD, TIMER and ASCII variables

Product Family LCA starline

The individual project data and the firmware are downloaded into the EEPROM of the LCA 300/320/325.

To connect the PC (COM1 or COM2) to the LCA 300/320/325 the programming cable LCA 733 must be used.

A corresponding adapter cable is used for communication with a PLC of any type.



For each PLC a specific driver is required, a detailed manual we deliver.

1 Commissioning and installation

You must be familiar with the commissioning procedures and the functions of the programmable controller system being used. For detailed information, please refer to the manuals of the PLC system.

Commissioning of the LCA 300/320/325

1. Switch off the equipment or machine
2. Connect the operating voltage to the LCA 300/320/325. The operating voltage connections 1 (0V) and 2 (+24V) are 2-pole terminals accepting wires up to 2 mm². The current consumption and the operating voltage limits are indicated in the section „Specifications“.
3. Load the project created by means of the configuration software LCAPRO (supplied by Systeme Lauer) into the LCA 300/320/325
4. Switch on the equipment or machine



Attention!

The protective conductor and 0V of the operating voltage are separated in the device. The protective conductor is connected to the enclosure of the interface connectors. The enclosure must be grounded to avoid noise in the best way. The grounding wire (4 mm²) must be as short as possible. Additionally, 0V must be neutralized near the power supply (according to VDE regulations).



Tip!

Creation of a project requires use of the LCAPRO software. Other software packages are not admissible and may cause malfunctions in the LCA and the PLC.

Use only the drivers specified for the PLC. Other drivers may cause malfunctions in the LCA and the PLC.

Malfunctioning of the LCA and the PLC may occur, if the LCA and the PLC are not configured correctly. Check the correct function/reaction of the LCA.

1 Commissioning and installation

1.1 Configuration with the LCAPRO software

Using the configuration software LCAPRO, you configure LCA 300/320/325 text displays within a small amount of time in an easy to understand and clearly structured manner.

LCAPRO offers

- Simple selection of the preferred PLC linking
- Fast interactive generation of all texts and variables
- Access to all data areas of your PLC system and therefore for example a direct message call without using the PLC program. (This function is executed according to the specific driver and requires parameterization of address references.)
- An overview of the current transfer area assignment, available at any time
- Loading of data records from the LCA 300/320/325 and therefore a direct data record access during service in the field



- Data record documentation generation
- A context-sensitive help system that contains all necessary information about admissible parameter settings, text groups, variable types etc.
- Optional selection of the desired language (Dutch, English, French, German or Italian)

1 Commissioning and installation

LCAPRO requires a PC equipped with

- the operating system MS-DOS or DR-DOS
- at least one serial interface
- 3 MByte of free hard disk memory



Tip!

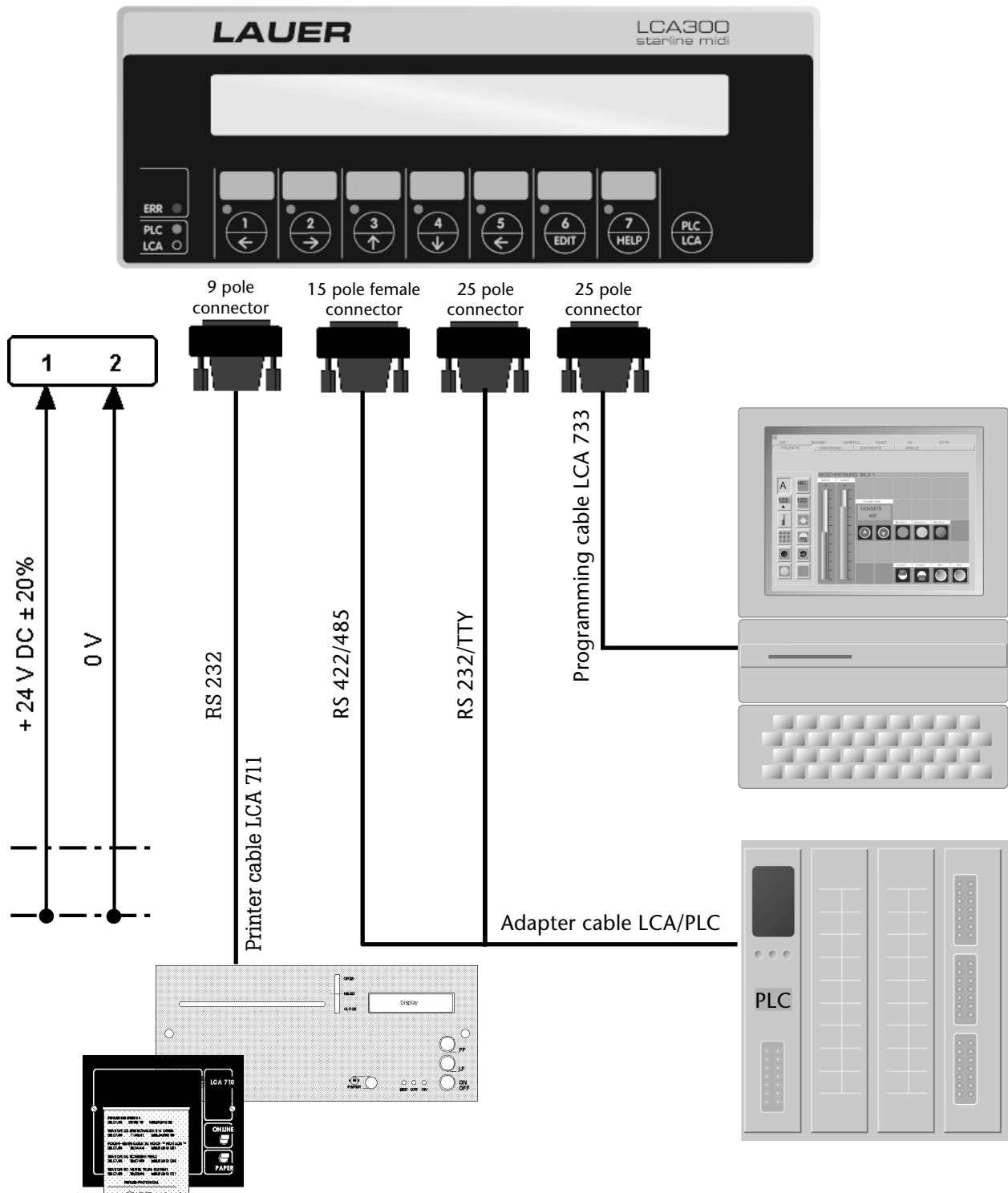
Select only international character set when BIOS-version > 201.4

1 Commissioning and installation

1.2 Interfacing of the text display

Programmable controller	<p>According to the specific type, the PLC is connected to the LCA 300/320/325 via an</p> <ul style="list-style-type: none">• adapter cable, 25-pole, Sub-D connector, RS 232/TTY interface (LCA 300/320/325.0)• adapter cable, 15-pole, Sub-D female connector, RS 422/485 interface (LCA 300.1/320.1/325.1) <p>All LCA 300/320/325 functions are performed via this serial interface:</p> <ul style="list-style-type: none">• Display of help texts• Display of message texts• Transfer of variables• Editing variables• Operation of the text displays
Printer connection	<p>The LCA 325 is connected to the Printer LCA 710/750 via the Printer cable LCA 711.</p>
PC connection	<p>The LCA 300/320/325 is connected to the PC via the programming cable LCA 733.</p> <p>The projects created with LCAPRO are downloaded from the PC into the EEPROM of the LCA 300/320/325 text display.</p>
Power supply	<p>The operating voltage (24VDC) is connected to the LCA 300/320/325 text display via a 2-pole terminal.</p>

1 Commissioning and installation

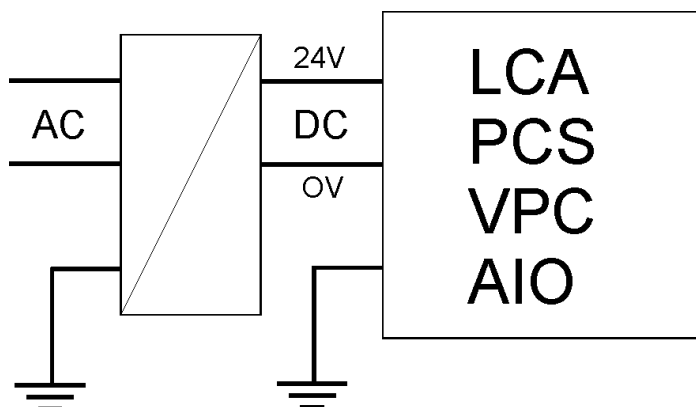


1 Commissioning and installation

1.3 General measures for interference suppression

Secure functioning can only be guaranteed up to a certain noise level, even if the best electronic design and components are used. To avoid unnecessary failure of devices, the following notes should already be observed when planning the application:

1. If possible, run power supply and signal lines of LCA devices in separate cable conduits
2. Allow a safety clearance to interference sources of 250 mm or more
3. Inductors installed in the same control cabinet (contactor and relay coils) must be wired to corresponding recovery diodes or RC surge absorbing components
4. Do not use fluorescent lamps to illuminate the control cabinet
5. Determine a central grounding point with a large cross section to connect the protective earth conductor (PE)
6. If high magnetic field intensities are present (generated for example by large transformers), we recommend installation of a separating sheet metal
7. Suppress interference in frequency converters and other devices by shielded filter circuits
8. Shielded signal lines provide the best means to eliminate high-frequency noise. The shield should be grounded at both ends. However, an equipotential bonding conductor 10 mm² must be installed (see VDE 0100, Teil 547).
9. If high noise levels are present, install factory-assembled filter circuits in front of the power supply to suppress noise in an efficient way.



DC galvanisch getrennt

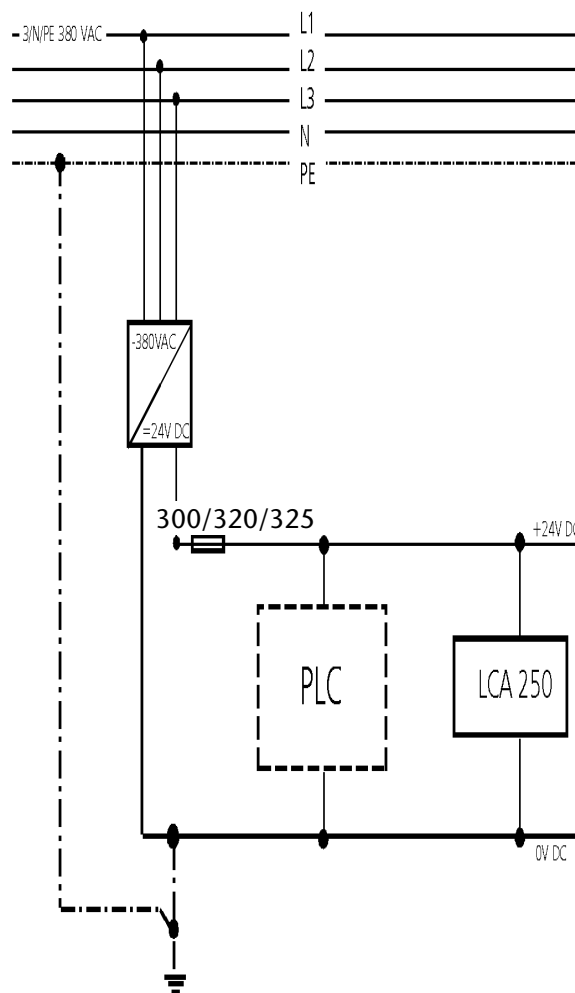
1 Commissioning and installation

1.4 Installation notes

A fault-free operation of the text display requires a distance of 250 mm or more between all sources generating radiated noise and the LCA 300/320/325. This applies also to the data lines and power supply lines of the LCA 300/320/325.

If the cable length exceeds 5 m, we recommend shielded cables (grounded at both ends). Please note that this may require an equipotential bonding conductor with a cross section of at least 10 times that of the cable shield (due to equalizing currents).

Cables to the LCA 300/320/325 should be separated from high voltage cables and high-frequency cables.



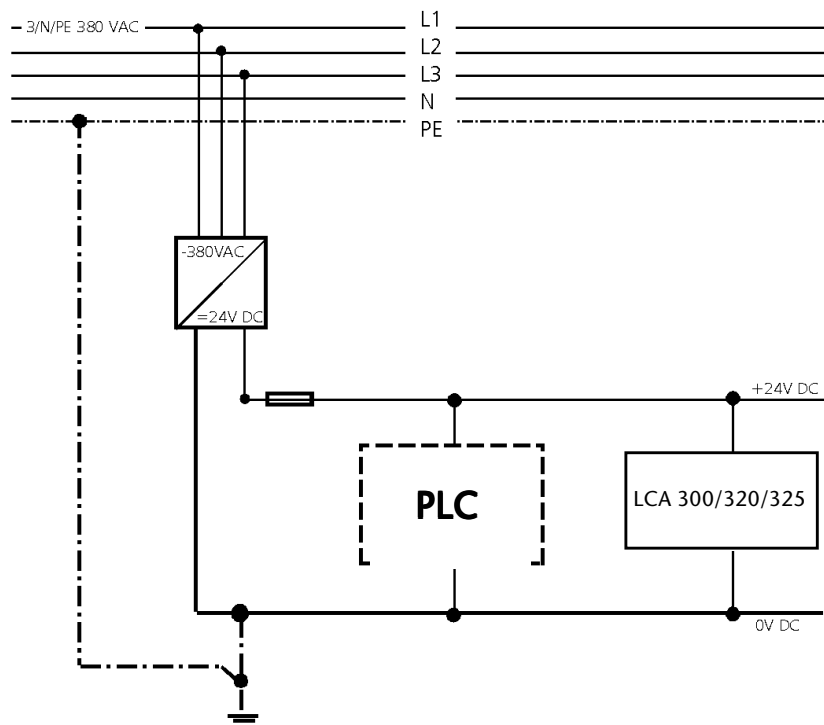
1 Commissioning and installation

1.5 Power Supply Voltage



A fault-free operation of the text display LCA 300/320/325 requires observance of the following notes:

- Operate the LCA 300/320/325 only within the indicated operating voltage range
- Short-term supply voltage dropouts of up to 20 ms are admissible
- LCA devices may only be operated with the „safety extra-low voltage“ according to VDE 100 (functional extra-low voltage with protective separation). The control-power transformer must meet VDE 0551 regulations. In this case, a single-pole grounding of the operating voltage according to VDE is admissible. This grounding method is recommended for the operation of our devices.
- Without single-pole grounding of the operating voltage, you have to install your own control-power transformer in order to operate the LCA 300/320/325
- If contactors or relays are actuated by the operating/signal voltage, these devices must be connected to recovery diodes and/or protective suppression



Operating voltage according to DIN 19240	U_B	: 24 V DC m (5% residual ripple)
	U_{Bmax}	: 28,8 V DC
	U_{Bmin}	: 19,2 V DC
Current consumption		: ~300 mA (at +24 V DC)

1 Commissioning and installation

1.6 Control elements

LED displays

All LED displays of the LCA 300/320/325 are assigned 4 states: OFF, ON, FLASHING (75% light phase/25% dark phase), INVERSE FLASHING (25% light phase /75% dark phase).

The functions of the 10 LED displays of an LCA 300/320/325 are described below:

ERR

This LED lights, if a failure occurs in the LCA 300/320/325:

- No or wrong data record loaded
- No or wrong firmware loaded
- System error in the LCA 300/320/325
- Communication between the LCA and the PLC not yet established
- During data record transmission

This LED is flashing, if a failure occurs in the LCA 300/320/325:

- Communication between the LCA and the PLC is interrupted



The SHIFT key (PLC/LCA) is used to switch between the functions of the combined keys 1...7.

PLC

If the PLC-LED is lit, the key codes of the keys pressed are transferred into the PLC.

LCA

If the LCA-LED is lit, internal functions are assigned to the keys enabling messages to be displayed and variables to be edited.

1 Commissioning and installation

7 key LEDs 1...7

One LED is integrated in each of the combined function and control keys 1...7. The status of each LED (OFF, ON, FLASHING, INVERSE FLASHING) is controlled by two bytes in the data area of the PLC.

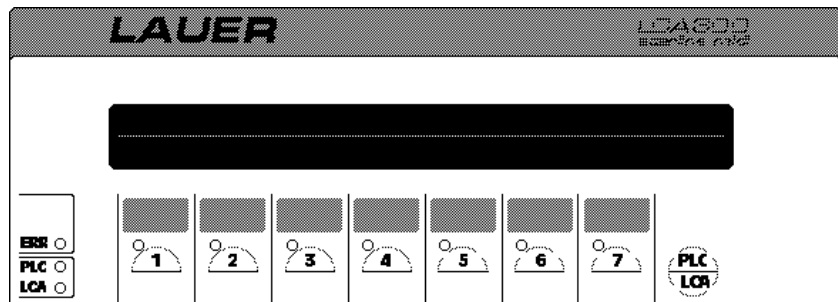
Keys

The text display LCA 300/320/325 is equipped with 7 combined function and control keys and a shift key.

The SHIFT key (PLC/LCA) is used to switch between external and internal functions

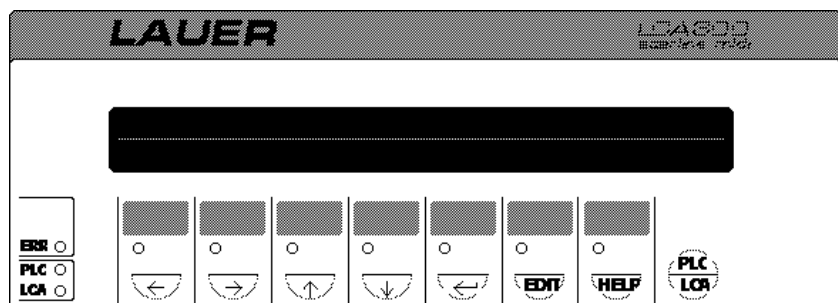
External functions

After activation of the external functions (the „PLC“ LED is lit) the key codes of the combined function and control keys 1...7 are transferred into the PLC. As long as a key is pressed, a corresponding bit is set in the data area of the PLC. These functions allow you to directly enable PLC functions and actions.



Internal functions

After activation of the internal functions (the „LCA“ LED is lit) the combined function/control keys 1...7 enable messages to be displayed and variables to be edited. Although the key bit is set, no key code is transferred into the PLC.



1 Commissioning and installation

The following internal functions are available.

← Cursor Left

- Selection of operating pages. Pressing the key enables selection of the previous operating page
- Selection of the digit to be edited in an operating page variable. Pressing and holding the key activates a repeat function.

→ Cursor Right

- Selection of operating pages. Pressing the key enables selection of the next operating page.
- Selection of the digit to be edited in an operating page variable. Pressing and holding the key activates a repeat function.

↑ Cursor up

- Paging through messages and help texts. Pressing the key enables the preceding part of the text to be displayed.
- Incrementing variables in operating pages. Pressing and holding the key activates a repeat function.

↓ Cursor Down

- Paging through messages and help texts. Pressing the key enables the next part of the text to be displayed.
- Decrementing variables in operating pages. Pressing and holding the key activates a repeat function.

ENTER

- Switching to the edit mode
- When editing a variable on operating pages, pressing this key causes the value of the variable to be transferred into the PLC.

EDIT

- Display of the operating page overview
- Exit the operation mode

HELP

A help text is assigned to each message page, idle page and operating page. Pressing this key enables the help text to be displayed. Use the CURSOR UP/DOWN keys for paging through the help text.

PLC/LCA

- Switching back to external functions also exits the edit mode

1 Commissioning and installation

1.7 Character table

To BIOS version 101.3

The character table contains all ASCII and special characters (with the corresponding decimal code) that can be represented on the LCA 300/320/325 display.

The 8 definable characters enable customized special characters to be generated.

192 fixed characters

8 definable characters

08
09
10
11
12
13
14
15

32	0	@	P	`	p	160	一	夕	≡	α	p	
33	1	A	Q	a	q	161	ア	千	ㄥ	ä	q	
34	2	B	R	b	r	162	イ	ツ	メ	β	e	
35	3	C	S	c	s	163	ウ	テ	ㄱ	ε	∞	
36	4	D	T	d	t	164	エ	ト	ㄗ	μ	Ω	
37	5	E	U	e	u	165	オ	ナ	工	σ	ü	
38	6	F	V	f	v	166	ヲ	カ	ニ	ヨ	p	Σ
39	7	G	W	g	w	167	ア	キ	又	ラ	g	π
40	8	H	X	h	x	168	イ	ク	ネ	リ	√	̄
41	9	I	Y	i	y	169	ウ	ケ	ノ	ル	-	y
42	:	J	Z	j	z	170	エ	コ	ハ	レ	j	千
43	;	K	[	k	{	171	オ	サ	ヒ	口	×	斤
44	<	L	¥	l	|	172	ヲ	シ	フ	フ	¢	円
45	=	M	]	m	}	173	ユ	ズ	ハ	リ	£	÷
46	>	N	^	n	→	174	ヨ	セ	キ	・	ñ	
47	/	?	O	-	o	175	ツ	リ	マ	°	ö	■

1 Commissioning and installation

From BIOS version 201.4

The character table contains all ASCII and special characters (with the corresponding decimal code) that can be represented on the LCA 300/320/325 display.

The 8 definable characters enable customized special characters to be generated.

These characters can be represented on the LCD display. 8 characters are individual definable.

	▶	ø	@	P	`	ƒ	Б	α	||	o	À	θ	à	ø	
	◀	!	1	Â	Q	ä	¶	Ɔ	♪	i	±	Á	Ñ	á	ñ
	“	"	2	B	R	b	r	Ж	Г	¢	â	ò	â	ò	
	”	#	3	C	S	c	s	Э	π	£	ÿ	ó	ÿ	ó	
	£	\$	4	D	T	d	t	И	Σ	×	Ê	ô	ä	ô	
	¥	%	5	E	U	e	u	Й	σ	¥	Ë	ö	ë	ö	
	•	&	6	F	V	f	v	Ј	Ј	ı	Œ	ö	œ	ö	
	€	'	7	G	W	g	w	П	τ	§	•	Ÿ	×	÷	
(1)	↑	(	8	H	X	h	x	У	•	ƒ	ø	è	ƒ	è
(2)	↓	)	9	I	Y	i	y	Ц	Ө	¹	é	ù	é	ù
(3)	→	*	:	J	Z	j	z	Ч	Ω	≡	ê	ú	ê	ú	
(4)	←	+	;	K	[	k	[	Ш	δ	«	»	ë	û	ë
(5)	≤	,	<	L	\	l	|	Щ	∞	№	¼	ì	ü	ì	
(6)	≥	-	=	M	]	m	]	Ъ	•	Я	½	í	ý	í
(7)	▲	.	>	N	^	n	~	Ы	ε	⊞	¾	î	ÿ	î	
(8)	▼	/	?	O	_	o	ˆ	Э	Π	•	¿	ï	ÿ	ï	



Attention!

Configuration software LCAPRO for LCA 300/320/325 must be version 5.0 or higher.

1 Commissioning and installation

2 Communication between the LCA and the PLC

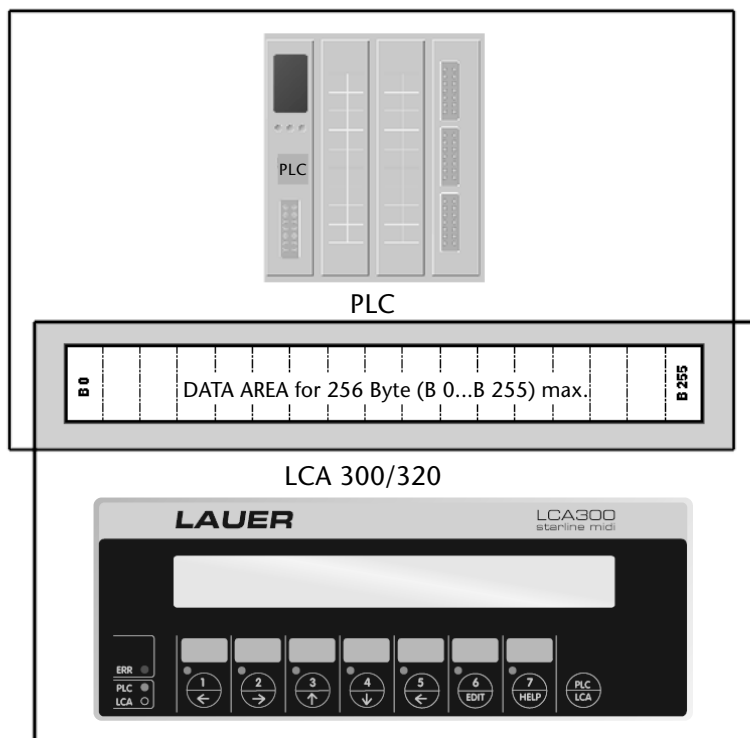
2.1 Communication principle

The electrical connection between a PLC of any type and the LCA 300/320/325 is effected by a special adapter cable (order number LCA 7xx). Communication is based on a principle which can easily be understood.

The transmission scheme is described below:

- If a new call on operation text, byte 0 is written into the PLC
- Byte 1 is written into the PLC
- If any key has been pressed, byte 3 is written into the PLC
- If any preset value has been edited, the corresponding byte(s) is (are) written into the PLC
- The next coherent block is read from the PLC
- Repetition, beginning with step 1

Bytes B 00...B 09 are permanently assigned in the LCA 300/320/325 (see the section „Data area structure“). Bytes B 10...B 255 are available for any operating projects.



2 Communication between the LCA and the PLC



Tip!

Creation of a data record requires use of the LCAPRO configuration software. Other software packages are not admissible and may cause malfunctions in the LCA and the PLC.

The functionality of the LCA 300/320/325 depends on the configuration software LCAPRO. This software enables creation of a data record which contains texts, variable definitions and other elements. This data record is transferred via a serial interface (RS 232) into the LCA 300/320/325 using the specific firmware for the PLC interfacing. The data are then stored in a non-volatile memory of the LCA 300/320/325.

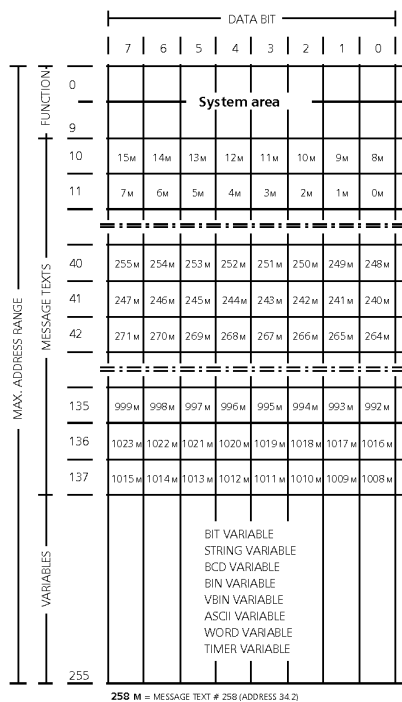
Use only the firmware specified for the PLC. Another firmware may cause malfunctions in the LCA and the PLC.

2 Communication between the LCA and the PLC

2.2 System area

Due to its functionality, the LCA 300/320/325 enables a maximum of:

- 1024 message texts (information and failure messages)
- 256 idle texts
- 256 operating texts
- Help text for each message text, idle text and operating text



Each idle text, message text and help text may contain up to 32 lines, with 40 characters each. Operating texts are assigned a length of 2 lines x 40 characters. Each text group is assigned a certain priority. Operation texts have the highest and the idle text has the lowest priority.

Each message text is assigned a message bit in the PLC. The 1024 messages (message 0...1023) are stored in the area from byte B 10.0 to byte B 137.7.

If the message bit is set to logical 1, the message text is displayed. If it is set to logical 0, the message text is cleared. If several message bits are simultaneously set to logical 1, this status is registered in the message buffer of the LCA 300/320/325. A maximum of 128 information and 128 failure messages can be stored in the message buffer which is, however, volatile. If the message buffer is full and if messages are selectively deleted or new messages activated, a correct timing cannot be guaranteed. According to the selected message format, messages are displayed as first or last message or cyclically.

An idle text is only displayed on the LCA 300/320/325, if no message or operating text is activated.

Conversion formula:

Even byte address a

Address a.b -> Message text

Example: Address 34.2 -> Message 202

Odd byte address a

Address a.b -> Message text

Example: Address 35.2 -> Message 194

2 Communication between the LCA and the PLC

Key status

- **Byte 0**
Reported the operation text number 0...255 if tropical select back (from LCAPRO version 3.3)
- **Byte 1, Bit 0 - Alive signal**
The LCA 300/320/325 cyclically sets this bit to logical 1. This enables the PLC to verify, if communication with the LCA is enabled or if the LCA 300/320/325 is switched on.
- **Bit1..7 - Key status**
The status of the keys (1...7), if pressed, is transferred into the PLC. The key bits are set to logical 1 as long as the corresponding key is pressed and communication is performed without errors.

	DATA BIT								LCA	PLC		
	7	6	5	4	3	2	1	0				
0	Operating text number state									→		
1	1	2	3	Key status			4	5	6	7	Alive signal	→
2	RESERVED									→		
3	Key status	LCA/PLC Key	X	X	X	Key code (1...7)				→		
4	LED driving									←		
5	LED driving flashing									←		
6	X	X	X	X	X	X	X	X	Data record selection	←		
7	Disable fault priority	Disable info priority	Message mode		Disable operating priority	Lock keyboard externally	Lock keyboard internally	Preset value class		←		
8	RESERVED									←		
9	Idle text number (0...255)									←		

Printer-status

- **Byte 2, Printer-status, only LCA 325**
- **Bit 0**
A log.1 announce, that the Hard copy is concluded. When Byte 8 is reseted, these Bit is 0
- **Bit 1**
If a message is printed, these Bit is log.1.
- **Bit 2**
This Bit announce that the Printer is reay. A updating happens on each Message- and Hardcopy printout.

2 Communication between the LCA and the PLC

Key code

- **Byte 3, Bit 0..2 - Key code**
If the external function has been selected for the LCA 300/320/325 keys, the key state of a pressed key (1...7) is transferred into the PLC. After evaluation, bits 0..2 should be set to zero by the PLC.
- **Bit 6**
This Bit is set to 1, when the shift key (PLC-LCA) is pressed
- **Byte 3, Bit 7**
This bit is set to 1, if the internal functions have been selected

LED control

- **Byte 4, Bit 1..7**
The states of the LEDs of the LCA 300/320/325 keys
- **Byte 5, Bit 1..7**
Are determined by the two related bits of byte 4 and 5

Byte 4, Bit X	Byte 5, Bit X	Status
0	0	OFF
0	1	INVERSE FLASHING
1	0	ON
1	1	FLASHING

Data record/language selection

- **Byte 6, Bit 0**
The LCA 300/320/325 can optionally be operated with two data records. This allows selection of another language for example.
Bit 0 = 0 => Data record 1 active
Bit 0 = 1 => Data record 2 active
(if two data records are stored in the device)



Attention!

If two data records are used, all settings concerning the communication with the PLC (for example address re-assignment for AS511 Multi DB coupling) are always read out from the first data record. Verify the action/reaction of the LCA and the PLC after data record switching.

2 Communication between the LCA and the PLC

Message mode, disable priorities,
preset value groups

- Byte 7, Bit 0..1 - Preset value edit
0 = Preset value edited
1 = Preset value not edited
- Bit 1
Switch keyboard to internal functions and lock keyboard. The internal locking has a higher Priority then external locking.
- Bit 2
Switch keyboard to external functions and lock keyboard.
- Bit 3 - Operating priority
0 = Priority enabled
0 = Priority disabled
- Bit 4..5 - Message mode
These two bits determine the format of the 128 specified messages (maximum number) in the message memory.

Bit 5	Bit 4	Message mode
0	0	Last value message
0	1	First value message
1	0	Cyclic display
1	1	n.c. (reserved)

- Bit 6 - Information priority
0 = Priority enabled
1 = Priority disabled
- Bit 7 - failure priority
0 = Priority enabled
1 = Priority disabled

Idle text number

- Byte 9, Bit 0..7
Number of the idle text to be displayed (0..255)

2 Communication between the LCA and the PLC

Priorities

The LCA 300/320/325 features 5 priority levels

- Idle priority (priority 0 = lowest priority)
- Information priority (priority 1)
- Failure priority (priority 2)
- Operating priority (priority 3)
- Editing priority (priority 4 = highest priority)

The LCA 300/320/325 displays the highest (enabled) priority. The help priority for each base priority can be activated by the internal function of the 7th key (HELP), as long as this key is pressed.

The failure priority can be displayed, if a message bit is set to which a message text of the „failure“ priority has been assigned. Failures are only displayed after reset of bit 7.7. To suppress failure displays, bit 7.7 must be set to logical 1.

The information priority can be displayed, if a message bit is set to which a message text of the „information“ priority has been assigned. Information are only displayed after reset of bit 7.6. To suppress information displays, bit 7.6 must be set to logical 1.

The operating priority can be selected, if bit 7.3 is set to logical 0. To suppress operating priority selections, bit 7.3 must be set to logical 1.

The idle priority is displayed, if no information texts, failures texts, operating texts or help texts are active.

2 Communication between the LCA and the PLC

2.3 Variable formats

Character and numeric variables with different formats are used in the LCA 300/320/325.

When using character variables, a string is assigned to the logical states of individual (BIT variable) or several (STRING variable) bits.

When using numeric variables, the system differentiates between BINARY and BCD coded values transferred by the PLC. The LCA 300/320/325 converts the numeric variable and displays it in a decimal format.

Variables can be allocated to all addresses (0...255). The user has to take care that variable and function/message bit areas do not overlap.

All variables can be used as actual and preset variables. If the operating priority is enabled, the editor function enables a preset variable to be changed and to be transferred into the PLC.

The message bit area is automatically limited to the range from byte 10 to the most significant byte used by an allocated message text.



Tip!

If for example M186 (byte 32.2) is used as maximum message text, the addresses beginning with byte 34 can be used for variables.

2 Communication between the LCA and the PLC

2.4 Example for variable

BIT variable

Two expressions (strings) are assigned to the two logical states of a bit. Message text 245 (example) combines texts with three BIT variables:

- Variable VAR1 (address 160.1)
- Variable VAR2 (address 160.2)
- Variable VAR3 (address 160.3)

BIT variable definition (2 texts per variable)

Name ① : VAR 1
 Format : BIT
 Text, if Bit is log. 0 ② : WITHOUT
 Text, if Bit is log. 1 ② : WITH
 Address ③ : 160.1

BIT variable definition (2 texts per variable)

Name ① : VAR 2
 Format : BIT
 Text, if Bit is log. 0 ② : OFF
 Text, if Bit is log. 1 ② : ON
 Address ③ : 160.2

BIT variable definition (2 texts per variable)

Name ① : VAR 3
 Format : BIT
 Text, if Bit is log. 0 ② : OFF
 Text, if Bit is log. 1 ② : ON
 Address ③ : 160.3

Definition of message text 253

TRANSPORT □□□□ 4
 VENTILATION □□□ COOLING WATER □□□

The state of message bit 245 (address 41.5) is logical 1 and the assigned message text is displayed. Depending on the logical states of the data bits for the variables VAR1, VAR2 and VAR3 (addresses 160.1, 160.2, 160.3), the texts „ON, WITH“ (logical 1) or „OFF, WITHOUT“ (logical 0) are displayed.

Legend

- ① Variable name (a maximum of 16 characters)
- ② 2 texts (a maximum of 40 characters) assigned to logical 0 and logical 1 of the BIT variable
- ③ 8 BIT variables can be assigned per address
- ④ Place holder for the variables in the idle text, message text or help text. The field length depends on the longest variable text.

2 Communication between the LCA and the PLC

Message bit 41.5 = log 1
 Bit-Variable 1 160.1 = log 1
 Bit-Variable 2 160.2 = log 0
 Bit-Variable 3 160.3 = log 0

TRANSPORT	<u>ON</u>		
VENTILATION	<u>OFF</u>	COOLING WATER	<u>OFF</u>

Message bit 41.5 = log 1
 Bit-Variable 1 160.1 = log 0
 Bit-Variable 2 160.2 = log 1
 Bit-Variable 3 160.3 = log 0

TRANSPORT	<u>ON</u>		
VENTILATION	<u>OFF</u>	COOLING WATER	<u>OFF</u>

Message bit 41.5 = log 1
 Bit-Variable 1 160.1 = log 0
 Bit-Variable 2 160.2 = log 1
 Bit-Variable 3 160.3 = log 1

TRANSPORT	<u>ON</u>		
VENTILATION	<u>OFF</u>	COOLING WATER	<u>OFF</u>

Message bit 41.5 = log 1
 Bit-Variable 1 160.1 = log 1
 Bit-Variable 2 160.2 = log 1
 Bit-Variable 3 160.3 = log 1

TRANSPORT	<u>ON</u>		
VENTILATION	<u>OFF</u>	COOLING WATER	<u>OFF</u>

	7	6	5	4	3	2	1	0
41	247 _M	246 _M	245_M	244 _M	243 _M	242 _M	241 _M	240 _M
42	271 _M	270 _M	269 _M	268 _M	267 _M	266 _M	265 _M	264 _M
160					BIT VAR3	BIT VAR2	BIT VAR1	
161								

2 Communication between the LCA and the PLC

STRING variable

Up to 256 expressions (strings) are assigned to the 256 states of a data area byte. 6 expressions are shown in the example below.

Message text 242 (example) combines comment texts with a STRING variable:

Variable STATUS (address 163)

STRING variable definition (a maximum of 256 texts per variable)

Name ①	: STATUS
Format	: STRING
Text, if STRING is 0000 0000 ②	: SETTING UP
Text, if STRING is 0000 0001 ②	: SINGLE STEP
Text, if STRING is 0000 0010 ②	: SEMI-AUTOMATIC
Text, if STRING is 0000 0011 ②	: AUTOMATIC
Text, if STRING is 0000 0100 ②	: AUTOMATIC WITH PRE-HEATING
Text, if STRING is 0000 0101 ②	: AUTOMATIC WITH HEATING REGULATION
Address	: 163

Definition of message text 250

PACKING MACHINE

STATUS: □□□□□□□□□□□□□□□□

③

The state of message bit 242 (address 41.2) is logical 1 and the assigned message text is displayed. Depending on the logical states of the data bits for the STATUS variable (address 163), the following texts are displayed, SETTING UP, SINGLE STEP, SEMI-AUTOMATIC, AUTOMATIC, AUTOMATIC WITH PRE-HEATING, AUTOMATIC WITH HEATING REGULATION.

Legend

- ① Variable name (a maximum of 16 characters)
- ② 256 texts (a maximum of 40 characters) assigned to the STRING variables: from logical 0000 0000 to logical 1111 1111
- ③ Place holder for the variables in the idle text, message text or help text. The field length depends on the longest variable text.

2 Communication between the LCA and the PLC

Message bit 41.2 = log 1
String-Variable 163 = log 0000 0000

PACKING MACHINE
STATUS: *SETTING UP*

Message bit 41.2 = log 1
String-Variable 163 = log 0000 0001

PACKING MACHINE
STATUS: *SINGLE STEP*

Message bit 41.2 = log 1
String-Variable 163 = log 0000 0010

PACKING MACHINE
STATUS: *SEMI-AUTOMATIC*

Message bit 41.2 = log 1
String-Variable 163 = log 0000 0011

PACKING MACHINE
STATUS: *AUTOMATIC*

Message bitt 41.2 = log 1
String-Variable 163 = log 0000 0100

PACKING MACHINE
STATUS: *AUTOMATIC WITH PRE-HEATING*

Message bit 41.2 = log 1
String-Variable 163 = log 0000 0101

PACKING MACHINE
STATUS: *AUTOMATIC WITH HEATING RAGULATION*

	7	6	5	4	3	2	1	0
41	247 _M	246 _M	245 _M	244 _M	243 _M	242_M	241 _M	240 _M
42	271 _M	270 _M	269 _M	268 _M	267 _M	266 _M	265 _M	264 _M
160								
161								
162								
163	STRING-VARIABLE							

2 Communication between the LCA and the PLC

BINARY variable

Any data area byte or word can be represented as decimal number without sign (BIN-BYTE, BIN-WORD), with sign (VBIN-BYTE, VBIN-WORD), with or without pre-decimal/decimal point places, with or without leading zeros and with MIN and MAX value limits. Message texts 240 and 264 (example) combine comment texts with BIN and VBIN variables:

BIN-WORD variable NUMBER OF PIECES (address 160 + 161)

BIN-BYTE variable CYLINDER NUMBER (address 163)

VBIN-WORD variable TEMPERATURE (address 200 + 201)

VBIN-BYTE variable POSITION (address 255)

BIN-BYTE variable definition

Name ① : CYLINDER NUMBER
 Format : BIN-1
 Address ② : 163
 Pre-decimal point places : 2
 Decimal places : 0
 Minimum : 0
 Maximum : 99
 Leading zeros : no

BIN-WORD variable definition

Name ① : NUMBER OF PIECES
 Format : BIN-2
 Address ② : 160
 Pre-decimal point places : 4
 Decimal places : 0
 Minimum : 0
 Maximum : 9999
 Leading zeros : no

VBIN-BYTE variable definition

Name ① : TEMPERATURE
 Format : VBIN-BYTE
 Address ② : 255
 Pre-decimal point places : 2
 Decimal places : 1
 Minimum : -128
 Maximum : +127
 Leading zeros : yes

2 Communication between the LCA and the PLC

VBIN-WORD variable definition

Name ①	: POSITION
Format	: VBIN-WORD
Address ②	: 200
Pre-decimal point places	: 1
Decimal places	: 2
Minimum	: -458
Maximum	: +299
Leading zeros	: no

Definition of message text 264

PACKING MACHINE
FINISHED: □□□□ PIECES

Definition of message text 240

PACKING MACHINE
CYLINDER: □□
TEMPERATURE: □□,□ °C
POSITION: □□,□□

③

The state of message bit 264 (address 42.0) is logical 1 and the assigned message text is displayed. Depending on the BINARY value of the variable NUMBER OF PIECES (addresses 160 + 161), the current number of pieces is displayed.

The state of message bit 240 (address 41.0) is logical 1 and the assigned message text is displayed. Depending on the BINARY value of the variable CYLINDER NUMBER (address 163), the current cylinder number is displayed.

Depending on the BINARY value of the TEMPERATURE variable (address 255), the current temperature is displayed.

Depending on the BINARY value of the POSITION variable (addresses 200 and 201), the current position is displayed.

Legend

- ① Variable name (a maximum of 16 characters)
- ② WORD variables always allocate two addresses.
- ③ Place holder for the variables in the idle text, message text or help text

2 Communication between the LCA and the PLC

Message bit 42.0 = log 1
 Bin-Word-Variable 160 (HGHI) = 0000 1000
 Bin-Word-Variable 161 (LOW) = 0010 0001

PACKING MACHINE
 FINISHED: 2081 PIECES

Message bit 42.0 = log 1
 Bin-Word-Variable 160 (HGHI) = 0000 1000
 Bin-Word-Variable 161 (LOW) = 0010 0010

PACKING MACHINE
 FINISHED: 2082 PIECES

Message bit 42.0 = log 1
 Bin-Word-Variable 160 (HGHI) = 0000 1000
 Bin-Word-Variable 161 (LOW) = 0010 0011

PACKING MACHINE
 FINISHED: 2083 PIECES

Message bit 41.0 = log 1
 Bin-Byte-Variable 163 = 0010 0100
 VBin-Word-Variable 200 (HGHI) = 1111 1111
 VBin-Word-Variable 201 (LOW) = 1010 1111
 VBin-Word-Variable 255 = 1110 0100

PACKING MACHINE
 TEMP: -02,8 POS: -0,81 CYLINDER 36

Message bit 42.0 = log 1
 Bin-Byte-Variable 163 = 0000 0100
 VBin-Word-Variable 200 (HGHI) = 0000 0001
 VBin-Word-Variable 201 (LOW) = 0100 0001
 VBin-Word-Variable 255 = 0111 1100

PACKING MACHINE
 TEMP: +12,4 POS: +3,21 CYLINDER 4

	7	6	5	4	3	2	1	0
41	247 _M	246 _M	245 _M	244 _M	243 _M	242 _M	241 _M	240_M
42	271 _M	270 _M	269 _M	268 _M	267 _M	266 _M	265 _M	264_M

160	BIN-WORD-VARIABLE BIT 8...15
161	BIN-WORD-VARIABLE BIT 0...7
162	
163	BIN-BYTE-VARIABLE BIT 0...7
200	VBIN-WORD-VARIABLE BIT 8...15
201	VBIN-WORD-VARIABLE BIT 0...7
255	VBIN-BYTE-VARIABLE BIT 0...7

2 Communication between the LCA and the PLC

BCD variable

The content of any data area byte can be represented as one or two BCD numbers. Message text 251 (example) combines comment texts with BCD variables (length of 5 digits):

```
BCD/DIGIT 0_1 (Address 159)
BCD/DIGIT 2_3 (Address 160)
BCD/DIGIT 4   (Address 161)
```

BCD variable definition

```
Name ① : DIGIT 0_1
Format : BCD
Address : 159
Length for representation : 2 digits
Name ① : DIGIT 2_3
Format : BCD
Address : 160
Length for representation : 2 digits
Name ① : DIGIT 4
Format : BCD
Address : 161
Length for representation : 1 digit
```

Definition of message text 243

```
HEATER 1
BOILER PRESSURE: □□□.□□ bar
                ②
```

The state of message bit 243 (address 41.3) is logical 1 and the assigned message text is displayed. Depending on the value of the BCD variable DIGIT 0...4 (addresses 159...161), the current pressure (measured in bar) is displayed.

If the BCD variable length is only one digit, only the least significant nibble of the byte is evaluated. The most significant nibble can be used for another variable for example.

Legend

- ① Variable name (a maximum of 16 characters)
- ② Place holder for the variables in the idle text, message text or help text

2 Communication between the LCA and the PLC

Message bit 41.3 = log 1
 BCD-Variable 159 (Digit 0_1) = 0001 0010
 BCD-Variable 160 (Digit 2_3) = 0000 0000
 BCD-Variable 161 (Digit 4) = 0000 0000

HEATER 1
 BOILER PRESSURE: 120.00 bar

Message bit 41.3 = log 1
 BCD-Variable 159 (Digit 0_1) = 0010 0011
 BCD-Variable 160 (Digit 2_3) = 1001 0001
 BCD-Variable 161 (Digit 4) = 0000 0100

HEATER 1
 BOILER PRESSURE: 239.14 bar

Message bit 41.3 = log 1
 BCD-Variable 159 (Digit 0_1) = 0001 0101
 BCD-Variable 160 (Digit 2_3) = 1000 0000
 BCD-Variable 161 (Digit 4) = 0000 1000

HEATER 1
 BOILER PRESSURE: 158.08 bar

	7	6	5	4	3	2	1	0
41	247 _M	246 _M	245 _M	244 _M	243_M	242 _M	241 _M	240 _M
42	271 _M	270 _M	269 _M	268 _M	267 _M	266 _M	265 _M	264 _M

159	BCD-VARIABLE DIGIT 0_1
160	BCD-VARIABLE DIGIT 2_3
161	BCD-VARIABLE DIGIT 4

2 Communication between the LCA and the PLC

ASCII variable

Any data area byte can be represented as ASCII character (see character table). Message text 242 (example) combines comment texts with several ASCII variables:

Variable STATUS (address 163)

ASCII variable definition

Name ①	:	NAME 1
Format	:	ASCII
Address:		163
Name ①	:	NAME 2
Format	:	ASCII
Address	:	164
Name ①	:	NAME 3
Format	:	ASCII
Address	:	165
Name ①	:	NAME 4
Format	:	ASCII
Address	:	166

Definition of message text 242

PACKING MACHINE

OPERATOR: □□□□

②

The state of message bit 242 (address 41.2) is logical 1 and the assigned message text is displayed. Depending on the contents of the ASCII variables NAME 1 - NAME 4 (addresses 163...166), the corresponding ASCII characters are displayed (see character table).



Attention!

ASCII variables must be presetted with a meaningful value (see ASCII table). By no means it is not allowed to set the values on 00_{hex}.

Legend

① Variable name (a maximum of 16 characters)

② Place holder for the variables in the idle text, message text or help text. The field length depends on the longest variable text.

2 Communication between the LCA and the PLC

Message bit 41.2 = log 1
 ASCII-Variable 163 = 0100 1011 „K“
 ASCII-Variable 164 = 0100 1110 „N“
 ASCII-Variable 165 = 0101 0101 „U“
 ASCII-Variable 166 = 0101 0100 „T“

```
PACKING MACHINE
-----
OPERATOR:  KNUT
```

Message bit 41.2 = log 1
 ASCII-Variable 163 = 0100 1011 „S“
 ASCII-Variable 164 = 0100 1110 „W“
 ASCII-Variable 165 = 0101 0101 „E“
 ASCII-Variable 166 = 0101 0100 „N“

```
PACKING MACHINE
-----
OPERATOR:  SWEN
```

Message bit 41.2 = log 1
 ASCII-Variable 163 = 0100 1011 „O“
 ASCII-Variable 164 = 0100 1110 „T“
 ASCII-Variable 165 = 0101 0101 „T“
 ASCII-Variable 166 = 0101 0100 „O“

```
PACKING MACHINE
-----
OPERATOR:  OTTO
```

Message bit 41.2 = log 1
 ASCII-Variable 163 = 0100 1011 „K“
 ASCII-Variable 164 = 0100 1110 „A“
 ASCII-Variable 165 = 0101 0101 „R“
 ASCII-Variable 166 = 0101 0100 „L“

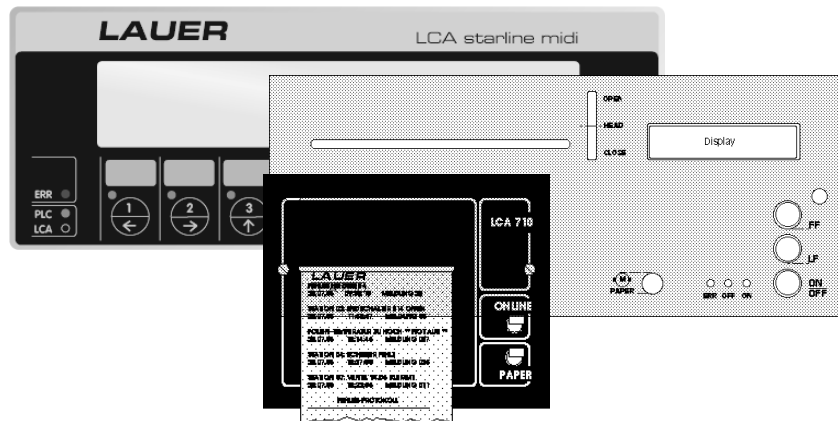
```
PACKING MACHINE
-----
OPERATOR:  KARL
```

	7	6	5	4	3	2	1	0
41	247 _M	246 _M	245 _M	244 _M	243 _M	242_M	241 _M	240 _M
42	271 _M	270 _M	269 _M	268 _M	267 _M	266 _M	265 _M	264 _M

160	
161	
162	
163	NAME 1
164	NAME 2
165	NAME 3
166	NAME 4

2 Communication between the LCA and the PLC

2.5 The Printer



The LCA 325 features a printer interface and supports one printer protocol. Printer parameters are selected via the LCAPRO configuration software (version 4.0 and higher).

Printer parameters

In the LCAPRO configuration software, define printer parameters under the PROJECT PRINTER PARAMETER menu item.

The following parameters can be set:

- Handshake selection: NONE, XON/XOFF, RTS-CTS. With NONE handshake, printer characters are send without any verification. The printer always signals operational readiness. With XON/XOFF handshake, printing is interrupted only if XOFF is received. With RTS-CTS, data is send only if RTS is set to logical 1.
- Printer output direction UP or DOWN. Corresponding to the physical design of the printer it is possible to select whether the first or last line is transmitted first to the printer. For the LCA printer it is favorable to transmit the last line first. Therefore, select UP.
- The printer baud rate is selectable between 1200 and 9600 baud
- The number of printer data bits is selectable between 7 or 8 data bits
- The number of printer stop bits is selectable between 1 or 2 data bits
- For printer parity, NONE, EVEN or ODD parity can be selected

In addition, the following function can be set via the LCAPRO configuration software:

- Printer initialization. After powering-up, 0 up to 8 characters are send to the printer. The default setting is "OD 0A" - carriage return linefeed.
- Replacement characters for freely definable display characters. For LCA display up to eight characters can be defined. These characters can not be printed. Thus eight replacement characters have to be defined.

2 Communication between the LCA and the PLC

Printer status

In the PLC, the status of the printer is reported in byte 2, bit 2. The operational readiness is only. The operational readiness is only unambiguous with RTS-CTS handshaking. The printer always signals its readiness if NONE handshake has been selected.

The communication loss to the PLC aborts the printing process.

Hard copy

A hard copy of the current display contents can be initiated from the PLC. For this, a 0 -> 1 transition of bit 0 of byte 8 is evaluated. The contents of the display is output for printing line-by-line if this transition is detected. Bit 0 of byte 2 is set if printing has ended. This bit remains set until the request bit 0 of byte 2 is reset to 0. The hard copy print-out is aborted if a time-out condition is detected.

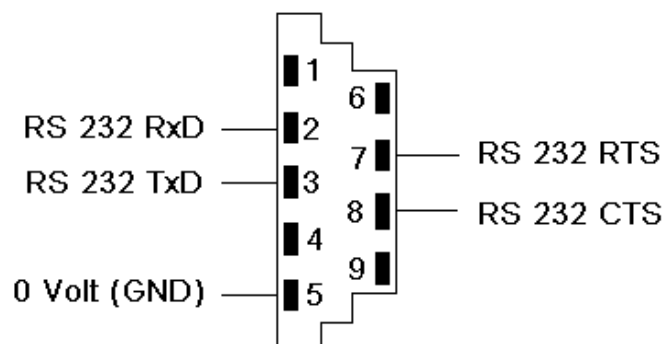
If a hardcopy request is received during message printing then this request is only processed after finishing the message printout.

Message printout

A printout of all defined message can be initiated by the PLC. If bit 1 of byte 8 is set to 1 then the message area is checked for 0 -> 1 transitions. The respective message is inserted into a print queue if one or several transitions are detected. Active printing is signaled via a set bit 1 of byte 2. All queued messages are cleared from the queue if bit 1 of byte 8 is set 0. All message lines are printed. Printing and retrieving the variables from the PLC is performed line-orientated, i. e. variables are entered into the line if the corresponding line is printed.

Printer interface

Pin assignment of the printer interface: (view from the top onto the female connector)



2 Communication between the LCA and the PLC

2.6 The editor (operating)

For the LCA 300/320/325 operating priority, 256 operating texts are available for text display or variable changes. Preset variables can be modified and transferred into the PLC. The different editing steps are described below:

- Activate the internal key functions by pressing the PLC/LCA key (the „LCA“ LED lights)
- Switch to the operating priority by pressing the EDIT key
- Select the desired operating page using the following keys

"CURSOR ←"	Selection of the first created operating text
"CURSOR →"	Selection of the last created operating text
"CURSOR ↑"	Selection of the next operating text
"CURSOR ↓"	Selection of the previous operating text
"EDIT"	Exit the operating text selection
- Select the desired operating text by pressing the ENTER key. The flashing display cursor is now positioned on the left digit of the first variable which can be edited (preset variable).
- Select the variable to be edited by pressing one of the following keys "CURSOR ← →"
- Increment or decrement the variable by pressing one of the following keys "CURSOR ↑ ↓"
- Transmit the modified variable into the PLC by pressing the ENTER key. After the transfer has been successfully completed, the cursor is positioned on the next variable which can be edited (preset variable).
- Press ENTER on the last variable to exit the editing mode
- If you do not want to change a variable nor transfer the modified value into the PLC, select another variable using "CURSOR ← →" or exit the menu by pressing the EDIT key.
- Return to the operating text selection by pressing the EDIT key
- Select another operating page or exit the operating priority using the EDIT key

Tip!

LCAPRO enables specification of a period after which the operating priority is automatically deactivated, if no key has been pressed.

3 Technical data

Operating voltage	+24V DC, ± 20%
Power	8 W
Enclosure type (according to IEC 529)	front: IP 65 rear: IP 20
Connections	2-pol. plug connector 25-pol. Sub-D female connector 9-pol. Sub-D female connector (LCA 325)
LCA 300.1/320.1/325.1 add. LCA 320.i/p	15-pol. Sub-D connector 9-pol. Sub-D female connector
Humidity	no condensation at the rear max. 95%
Noise immunity	see manufacturer information
Temperature	storage -25...+70° C operation 0...+50° C
Display	LCD (LED-background illumination)
Reading angle	(60° upwards and 60° downwards) 120°
Number of lines	2 LCA 300 bzw. 4 LCA 320/325
Number of characters per line	40
Character height, pixel matrix	5 mm, 5 x 7 Dots
Character set	ASCII, International character set (8 characters freely definable)
Keys	7 combined function/control keys, 1 shift key
LED displays	3 system LEDs, 7 green LEDs in function/control keys
Message call	Multiplex
Message pages	max.1024
Operating pages	max.256
Idle, message, help pages	32 lines
Memory (for firmware and texts)	Flash PROM 64 kB
Variable formats (ACTUAL/PRESET)	BIT, STRING, BCD, BIN, VBIN, WORD, TIMER, ASCII
Dimensions (without connectors)	216 x 84 x 57 mm
Weight	LCA 300 ca. 450g / LCA 320 ca. 600g / LCA 325 ca. 950g

3 Technical data

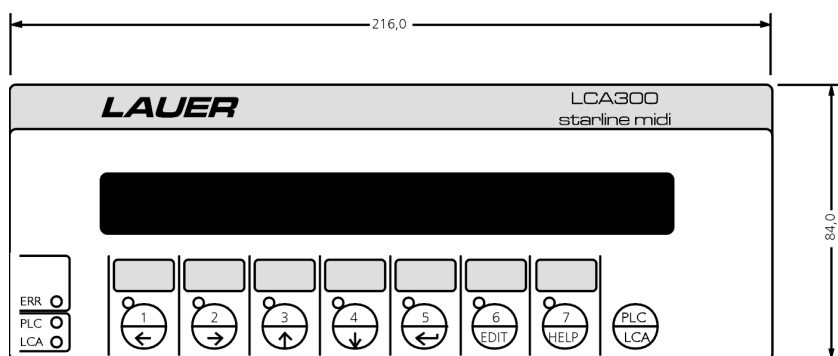
Elements on the rear

- Cutout for glass fuse 1 A mT (Fuse)
- 2-pole RIA terminal for power supply (24V, 0V)
- Jumper for normal position „AUTO“, aux. operation „PROG“ *)
- 25-pole Sub-D female connector for serial PLC interfacing and programming (RS 232/TTY)
- 9-pol. Sub-D female connector for Printer (only LCA 325)
- 6.3 mm flat connector for ground connection
- Potentiometer for contrast setting (CONT)

*) The PROG position enables the LCA 300/320/325 version number to be displayed after cycling power. This information should be available in any case for support inquiries.

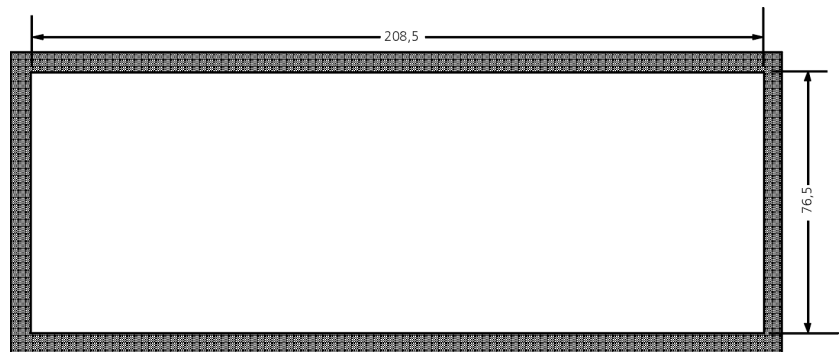


Dimensions



3 Technical data

Panel cut-out



3 Technical data

3.1 Maintenance

The LCA 300/320/325 text display is maintenance-free



Attention!

Static charge of the front panel is possible. Clean only with a moist cloth.

This is especially important when using the LCA 300/320/325 in an Ex area.



Attention!

The LCD display contains poisonous substances. Do not touch the display, if it is damaged.



Attention!

The designated product is only intended for being installed in other machines. Commissioning is prohibited, until conformity of the final product with the regulation 89/392/EWG has been ascertained.

3 Technical data

3.2 Using the LCA in an Ex area



Attention!

Static charge of the front panel is possible. Clean only with a moist cloth.


The LCA 300/320/325 can be pre-setup for use in an Ex area. This must be known when ordering the device. A subsequent release or certified declaration by the manufacturer is not possible. The devices can be pre-setup for use in Ex area 1 or 2.

An overpressure encapsulation with a low-pressure system is available. This means that a difference in atmospheric pressure of 2-4mbar exists between the interior space and the outside of the front. With higher pressures, unwanted cambers may occur above the keys.

The devices are only pre-setup for use in Ex area 1 or 2. This means that the devices must be installed according to VDE 0165 or VDE 170/171, depending on the application. For installation of the devices in encapsulated enclosures with pressure protection - including test certifications which may be required - Systeme Lauer informs the user about the cooperating companies on request.

For use of the devices in Ex area 2, please refer to the specifications of the manufacturer and an explanatory memorandum published by Systeme Lauer. The specifications of the manufacturer may be used as basic documentation for the certification of the device in Ex area 2.

3 Technical data



Example

Specifications of the manufacturer concerning Ex area 2

Safety class of the text displays, operator consoles
and visual display devices

We design, develop, manufacture and test our devices according to the following VDE-EN regulations:

- a) DIN VDE 0160/12.90 considering the following sections:
- b) EN 60204 T.1/DIN VDE 0113 T.1/02.86
- c) DIN VDE 0110 Part 1/2/01.89
- d) EN 60950/DIN VDE 0805/05-90
- e) DIN IEC 68 Part 2-3/Part 2-6

According to our knowledge, based on the information given by the German physical technical federal institution and the German VDE test agency, the majority of our devices can be used in the Ex area 2. According to circumstances, the specific characteristics of each individual device must, however, be looked up in the declaration given by the manufacturer. The Ex area 2 mentioned above refers to areas in which one has to expect that a dangerous, explosive atmosphere occurs only rarely and, if it occurs, only for a short time.

An explosive atmosphere is defined as a mixture of flammable gases, vapour, mist or dust in which a reaction propagates itself after ignition. Equipment which does not generate sparks, arcs, or inadmissible temperatures during normal operation, is admissible in these areas. Normal operation is defined as the undisturbed operation of equipment within the specified limits, for example the temperature limits. Each equipment must feature a good technical industrial quality which we can guarantee.

According to the requirements specified by the German physical technical federal institution and the German VDE test agency, prototype test certifications for an equipment to be used in area 2 are not required. For installation, the VDE 0165 regulations must be observed.

Apart from the manufacturer's specifications referring to a specific device, special requirements exist which must be observed for all devices manufactured by our company:

1. The supply cables for the operating voltage may only be connected or disconnected to the PCS operator console after switching off the power.
2. Interface connectors may only be connected or disconnected after switching off the power.
3. EPROM cassettes may only be installed or removed after switching off power to the devices.

Before using devices in Ex area 1, an inspection and acceptance of the system by the physical technical federal institution in Brunswick or Berlin is required in any case, according to the German regulation.

Index

A

ASCII variable 2- 18

B

BCD variable 2- 16

BIN-BYTE 2- 13

BIN-WORD 2- 13

BINARY variable 2- 13

BIT variable 2- 9

C

Character table 1- 12

Commissioning and installation 1- 1

Communication between the

LCA and the PLC 2- 1

Communication principle 2- 1

Configuration with the LCAPRO software 1- 2

Control elements 1- 9

D

Data record/language selection 2- 5

E

Elements on the rear 3- 2

EMC Guideline 0-7

Ex area 2 3- 6

Example for variable 2- 9

External functions 1- 10

F

From BIOS version 201.4 1- 13

G

General measures for interference suppression 1- 6

H

Hard copy 2- 21

I

Idle text number 2- 6

Important features 0-9

Installation notes 1- 7

Interfacing of the text display 1- 4

Internal functions 1- 10

K

Key code 2- 5

Key status 2- 4

Keys 1- 10

L

LED control 2- 5

LED displays 1- 9

Legend 2- 9

M

Mailbox 0-5

Maintenance 3- 4

Message mode, disable priorities

reset value grou 2- 6

Message printout 2- 21

N

Norms 0-7

O

Operating 0-8

Outer dimensions 3- 2

Index

P

Panel cut-out	3- 3
PC connection	1- 4
Pictogram	0-3
Portrayal conventions	0-3
Power supply	1- 4
Power Supply Voltage	1- 8
Printer interface	2- 21
Printer parameters	2- 20
Printer status	2- 4, 2- 21
Priorities	2- 7
Product Family LCA starline	0-8
Programmable controller	1- 4

S

STRING variable	2- 11
System area	2- 3

T

Technical data	3- 1
Text displays LCA starlinen	0-8
The editor (operating)	2- 22
The Printer	2- 20
To BIOS version 101.3	1- 12
trade marks	0-2

U

Using the LCA in an Ex area	3- 5
-----------------------------------	------

V

Variable formats	2- 8
VBIN-BYTE	2- 13
VBIN-WORD	2- 14