



General information

The controllers have an integrated PLC, field bus systems and multi-axis control with a maximum of 11 controlled axes (max 3 with ± 10 V and max. 8 with CAN bus). 64 axes altogether can be controlled via the CAN bus (without feedback). Additional inputs and outputs permit several CAN REMOTE I/Os with up to 64 inputs or outputs per node and up to 64 node addresses.

The standard CoDeSys programming environment runs in parallel with the multi-axis control and offers full transparency for all parameters. Parametrization of all 7 axes is effected by a PC tool and offers menu-guidance for comfortable setting of the usual parameters.

The standard programming environment in acc. with IEC 61131-3 includes a library of ready-made and powerful technology functions for terminal programming and automatic motion control.

Up to four different communication channels are available with one interface enabling all conventional field bus systems (PROFIBUS-DP, DeviceNet,...) to be used.

The field bus modules can be retrofitted or replaced at any time without the need to modify the PLC program.

Characteristics of MotionPLCs

- ▶ Hardware
 - RAM: 1 MByte in total
 - NVRAM: 8 kBytes in total
 - Flash: 1 MByte in total
 - free memory space for PLC applications: 256 kBytes
- ▶ 2 CAN bus-interfaces (servoconverter, CAN REMOTE I/O module)
- ▶ 2 asynchronous interfaces (one optionally RS 232 or RS 485, one RS 422)
- ▶ High noise immunity due to electrically isolated digital and analogue inputs and outputs
- ▶ 3 encoder inputs (SSI, incremental, 5 V / 24 V)
- ▶ Short projecting times due to ready-made functional blocks and pre-configured inputs and outputs

MotionPLC – Description

In- and outputs

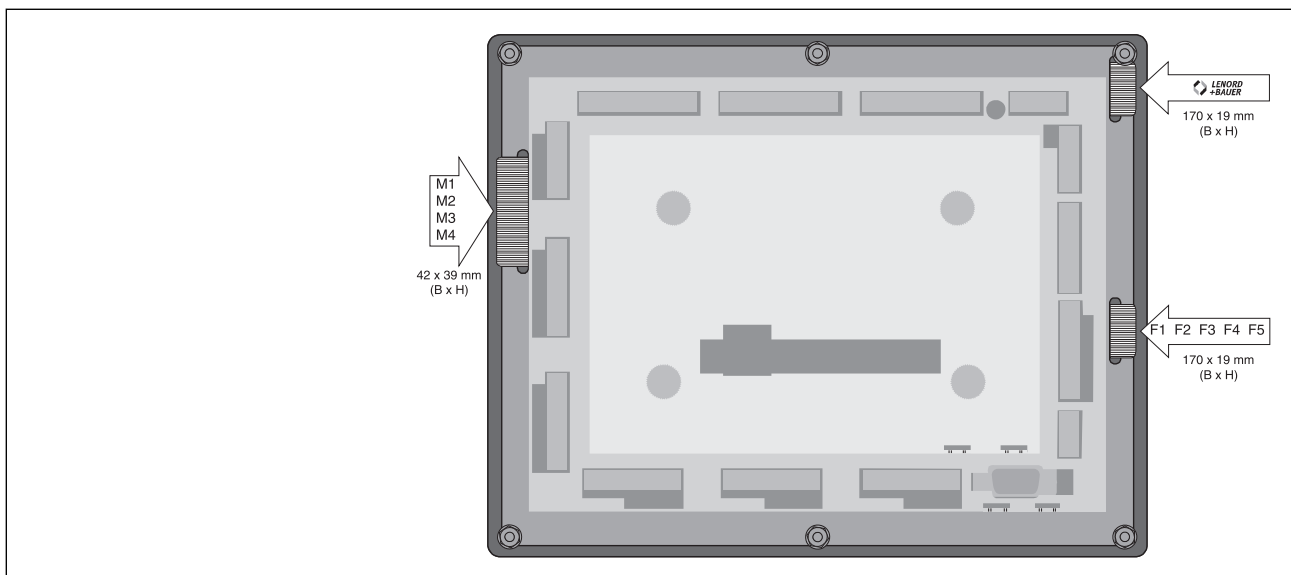
	GEL 8240	GEL 8241
Digital inputs	22	30
Digital outputs	15	15
Analogue inputs	1	3
PT100 inputs	0	4
Analogue outputs	3	3

Key panel

- ① Function keys (key assignment depends on active window)
- ② Numerical keys
- ③ Menu keys
- ④ Delete key (delete entered value)
- ⑤ Escape key (cancel entry/function and return to higher menu level)
- ⑥ Confirm entry
- ⑦ Navigation and selection keys
- ⑧ Scroll keys

Using your own labelling strips, the inscription of the keys in groups ① and ③ and the company logo can be adapted to individual needs.

Rear view



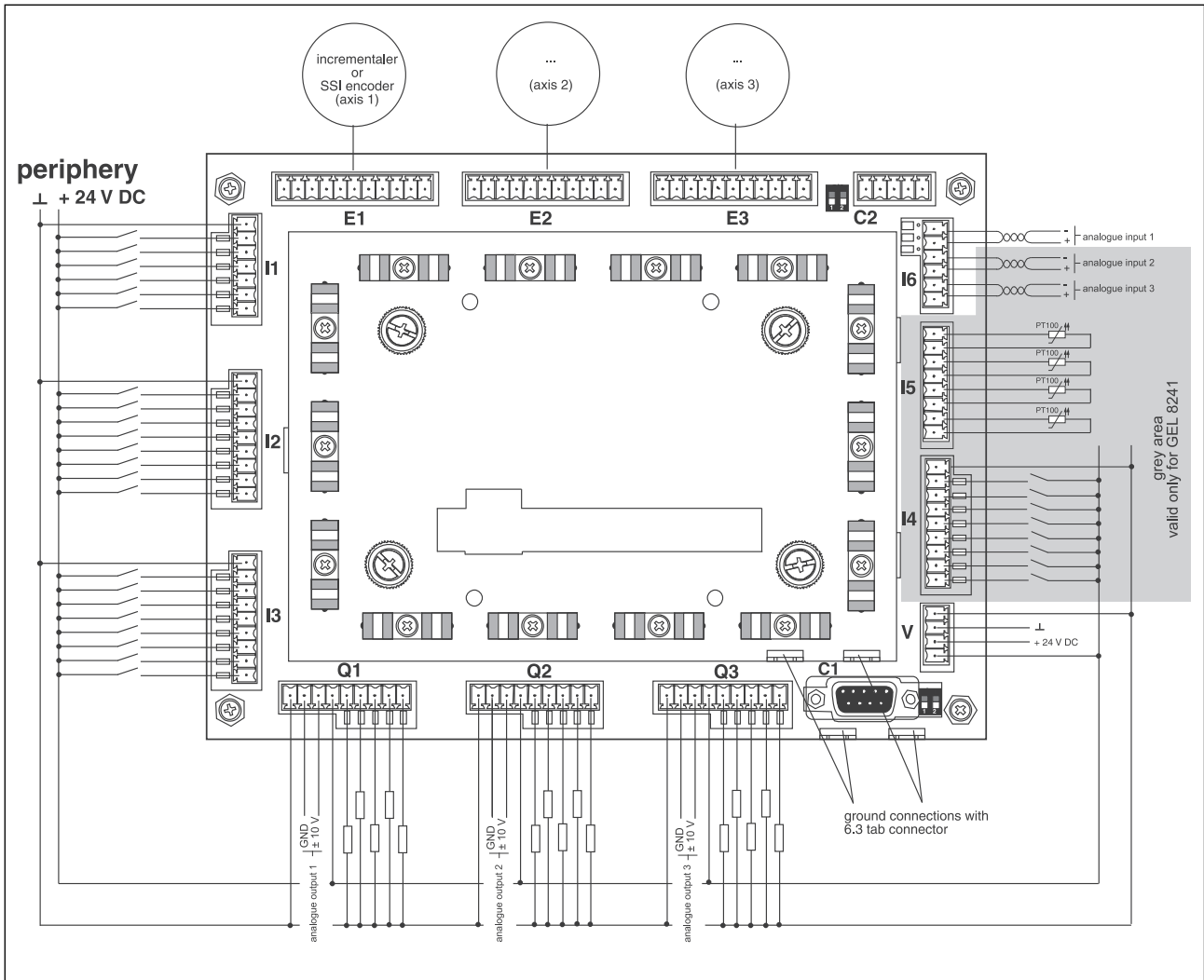
Technical data

	GEL 8240	GEL 8241
Electrical Data		
Supply voltage	19 to 30 V DC	
Current consumption	1 A max. (depending on interface)	
Interfaces		
Serial interfaces (communication or programming)	2 with adjustable baud rate COM1: RS232C or RS422/485 COM2: RS232C	
CAN bus interfaces	2 (CANopen, CANlink)	
Field bus interface	1 extension slot for PROFIBUS-DP, InterBus-S or DeviceNet (other ones upon request)	
Encoder inputs (actual value inputs, galvanically separated)		
Encoder inputs	3 incremental or absolute (5 V or 24 V, SSI) freely combinable	
Max. input frequency	200 kHz	
Encoder supply loading	24 V, 900 mA / 5 V, 600 mA in total	
Outputs (galvanically separated)		
Digital outputs	Red LED status indicator 9 x 24 V, 30 mA, 6 x 24 V, 500 mA;	
Analogue outputs	3 x ± 10 V, max. 10 mA, resolution 2 mV	
Inputs (galvanically separated)		
Digital Inputs	Green LED status indicator 22 x 24 V 30 x 24 V	
Analogue inputs (max. 10 bit resolution)	1, switchable (0 to 10 V or 0 to 20 mA)	3, switchable (0 ... 10 V or 0 ... 20 mA)
PT100 inputs	–	4 (-40 °C to +350 °C)
Ambient data		
Working temperature	0 °C to +50 °C	
Operating temperature	-20 °C to +50 °C	
Storage temperature	-20 °C to +70 °C	
Rel. atmospheric humidity	$\leq 95\%$, no condensation	
Protection class	frontside IP 65 backside IP 20	
EMC	EN 61000-6-2 and 4 ⁽¹⁾	
Mechanical Data		
Housing material	Stahlblech, verzinkt front panel: aluminium with edge protection	
Anzeige	LC display, 240 x 64 pixels with LED background lighting (visible area: 133 mm x 39 mm)	
Weight	Approx. 1.7 kg	

⁽¹⁾ When using the devices in residential areas or in commercial or industrial environments the requirements as to electromagnetic emission defined in EN 61000-6-3 can be complied with by applying additional shieldings and filters.

Connection assignment

Overview



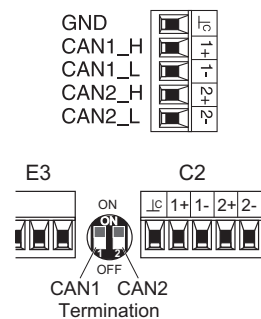
Terminal strips E1, E2, E3 (digital inputs) (actual-value for axis 1, 2 or 3)

	E1	5 V	24 V	SSI	Function
GND (E)			GND encoder		terminal strip V
+5 V DC Out		supply *			
+24 V DC Out			supply**	**	terminal strip V
CLK_SSI+				clock SSI	
CLK_SSI-				clock SSI	
INCR_1+/Data_SSI+		A	track 1	data	0°, counter, data
INCR_1-/Data_SSI-		B	track 1	data	
INCR_2+		B	track 2		90°, direction, data
INCR_2-		B	track 2		
INCR_N+		N	N		reference fine
INCR_N-		N	N		

* terminal strip V (U_E) intern ally regulated to 5 V

** direct from terminal strip V (U_E)

Terminal strip C2 (CAN bus)



Connection assignment

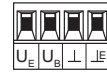
Terminal strips I1, I2, I3 und I4 (digital inputs)

I1	I2	I3	I4	I1/I2 I3/I4	signal	function
⊥I1	⊥I2	⊥I3	⊥I4		GND	optocoupler supply ← not interconnected
I1.0 / I2.0 / I3.0 / I4.0					input	*
I1.1 / I2.1 / I3.1 / I4.1					input	*
I1.2 / I2.2 / I3.2 / I4.2					input	*
I1.3 / I2.3 / I3.3 / I4.3					input	*
I1.4 / I2.4 / I3.4 / I4.4					input	*
I1.5 / I2.5 / I3.5 / I4.5					input	*
I2.6 / I3.6 / I4.6					input	*
I2.7 / I3.7 / I4.7					input	*, SPS RUN for I3.7

↑ additional valid only GEL 8241

* assignment (start, stop) defined by technology function selected; can be adapted at any time

Terminal strip V (power supply 24 V)



U_E Encoder supply 24 V DC
 U_B Logical supply 24 V DC
 ⊥ GND
 ⊥^E GND encoder

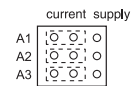
Terminal strip I5 PT100 inputs analogue (-40 ... +350 °C)

I5	signal	function
	AE 1.4	GND
	AE 1.4	analogue
	AE 1.5	GND
	AE 1.5	analogue
	AE 1.6	GND
	AE 1.6	analogue
	AE 1.7	GND

Terminal strip I6 (analogue inputs) (0 to 20 mA or 0 to 10 V)

I6	signal	function
	AE1.1	analogue -
	AE1.1	analogue +
	AE1.2	analogue -
	AE1.2	analogue +
	AE1.3	analogue -
	AE1.3	analogue +

jumper position for



position as delivered: current

grey area valid only for GEL 8241

Terminal strips Q1, Q2, Q3 (outputs for axis 1, 2, 3)

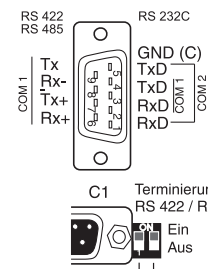
Q1	Q2	Q3	Q1/Q2 Q3/Q4	signal	function
⊥ Q1	⊥ Q2	⊥ Q3		GND	driver **
Q10- / Q20- / Q30-					analogue output 1, 2, 3 0 V ***
Q10+ / Q20+ / Q30+					analogue output 1, 2, 3 ± 10 V ***
24 V DC In / 24 V DC In / 24 V DC In					supply driver **
Q1.0 / Q2.0 / Q3.0					output 30 mA *
Q1.1 / Q2.1 / Q3.1					output 30 mA *
Q1.2 / Q2.2 / Q3.2					output 30 mA *
Q1.3 / Q2.3 / Q3.3					output 500 mA
Q1.4 / Q2.4 / Q3.4					output 500 mA

* assignment (start, stop) defined by technology function selected; can be adapted at any time

** terminal strip Q1/Q2/Q3 not interconnected

*** terminal strip Q1/Q2/Q3 interconnected

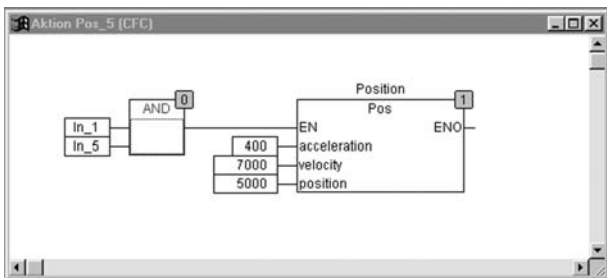
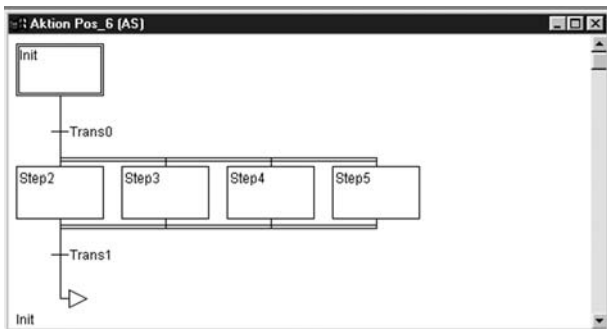
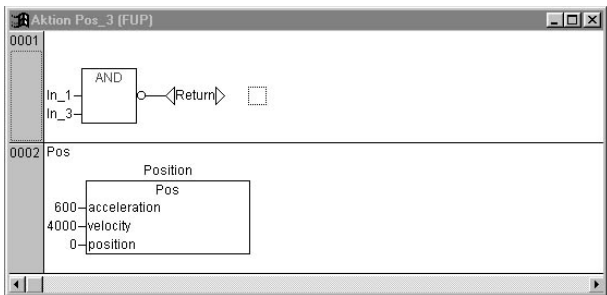
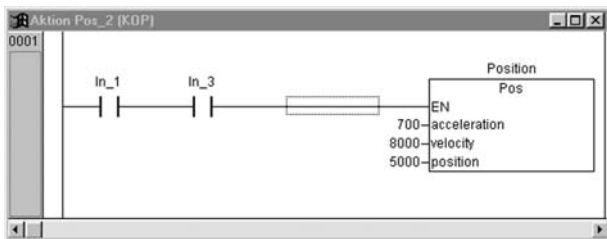
Connector C1 (9-pole sub-D miniature connector)



C1 Terminierung COM1/
RS 422 / RS 485

PLC programming environment

IEC 1131-3 is an international standard for programming languages adapted to stored-program control units. The programming languages realized in **CoDeSys** are in conformity with the requirements of the standard. They can be mixed whenever needed and are partially convertible.



Instruction list (IL)

An instruction list (German: Anweisungsliste AWL) is composed of a sequence of instructions. Each instruction begins in a new line and consists of an operator and - depending on the type of operation - of one or several operands separated by

Ladder diagram (LD)

The ladder diagram (German: Kontaktplan KOP), too, is a graphics-oriented programming language which is basically similar to an electrical circuit. It consists of a series of networks. A network is limited on the right and left side of the plan by a vertical current path. In between, there is a circuit comprising contacts, inductances and connecting lines.

Function block diagram (FBD)

The function block diagram (German Funktionsplan FUP) is another graphics-oriented programming language. It is organized by lines and uses a list of networks, each containing a structure representing respectively a logical or an arithmetical expression, the recall of a function block, a jump or a return instruction.

Structured text (ST)

The structured text is a series of instructions which can be executed - as in the higher programming languages - depending on a condition („IF..THEN..ELSE“) or iteratively (WHILE..DO).

Sequential function chart (SFC)

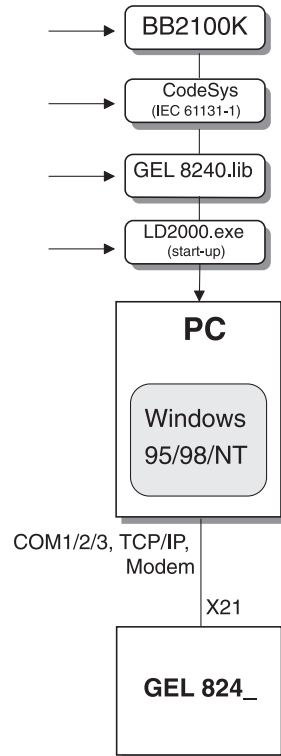
The sequential function chart (German: Ablaufsprache AS) is a graphics-oriented language to describe the sequential execution of different actions in a program.

Continuous Function Chart Editor (CFC)

The essential difference with regard to the FBD is the free arrangement of function blocks. CFC is a useful enlargement of the IEC 1131-3 standard.

Technological cam-plate function

- ▶ Curve modification without set-up times
- ▶ Reduced jerking during movements due to harmonic and cycloid curve shapes
- ▶ Engagement and disengagement of the slave axis
- ▶ Virtual master function: permits displacement of the curve drive
- ▶ Dynamic adaptation of curve shapes: lengthening, shortening, etc.



Within the scope of supply

Available on our homepage www.lenord.de:

bb2100k.exe

Curve editor BB2100K for operation and monitoring of servo-converter LD 2000 with cam-plate module.

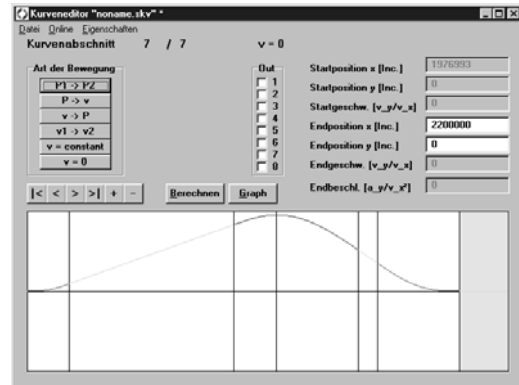
ld2000.exe

Start-up software for servo-converter LogiDrive LD 2000

BB2100K operating software curve editor

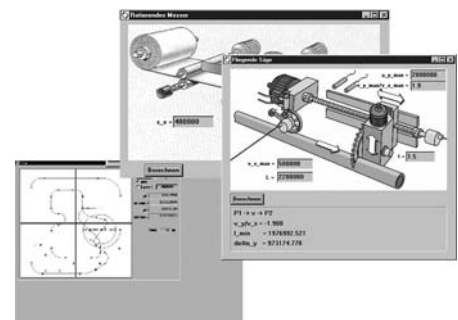
The BB2100K operating software can be used to define the desired curve characteristics on a PC. The PC is connected to the MotionCard via the serial interface. The parameter editor for the servo-converter LD 2000 can also be started out of this program. Other program characteristics:

- ▶ System parameter editor
- ▶ Oscilloscope function
- ▶ Setting of range signals via mouse-click



Curve editor example

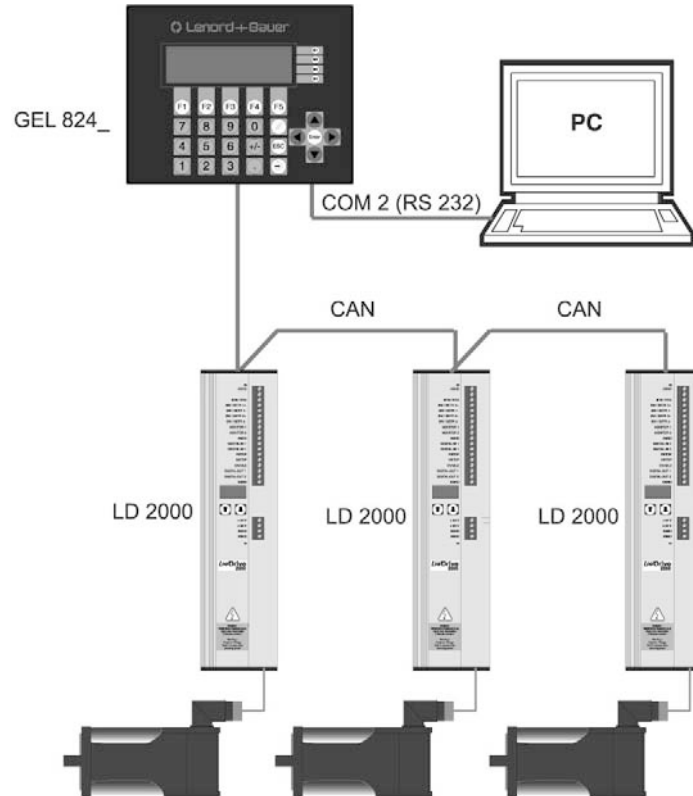
- ▶ Individual programming due to free editing of program texts
- ▶ Assistance with the analysis of curves (position, speed, acceleration and torque)
- ▶ Graphics-aided editing of parameters for special applications (e.g. rotating cutter and flying saw)



Application example

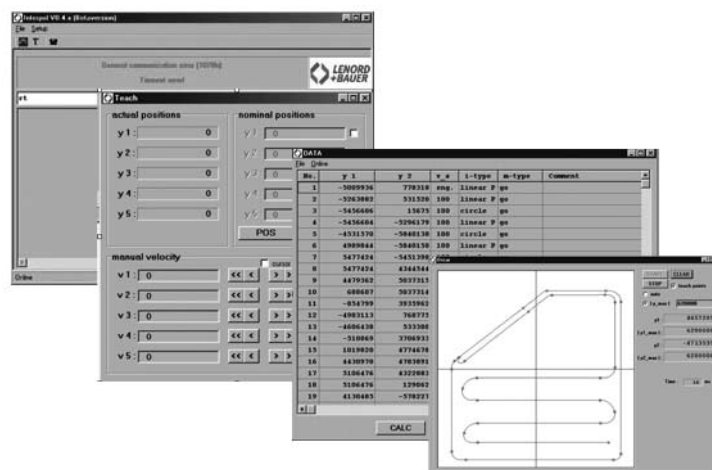
Application of adhesive on a car door

An glue dispenser with a three-axis portal equipped with servo drives and amplifiers is controlled by the MotionPLC in such a way that the tool follows a trajectory in three dimensions which has been fixed beforehand by a small number of essential tool center points in the teach-in mode.



Control components communication interlink

The PC tool for contour tracking



Teach-in example

Order details

Type code

824	0 LC display
	1 LC display and additional inputs

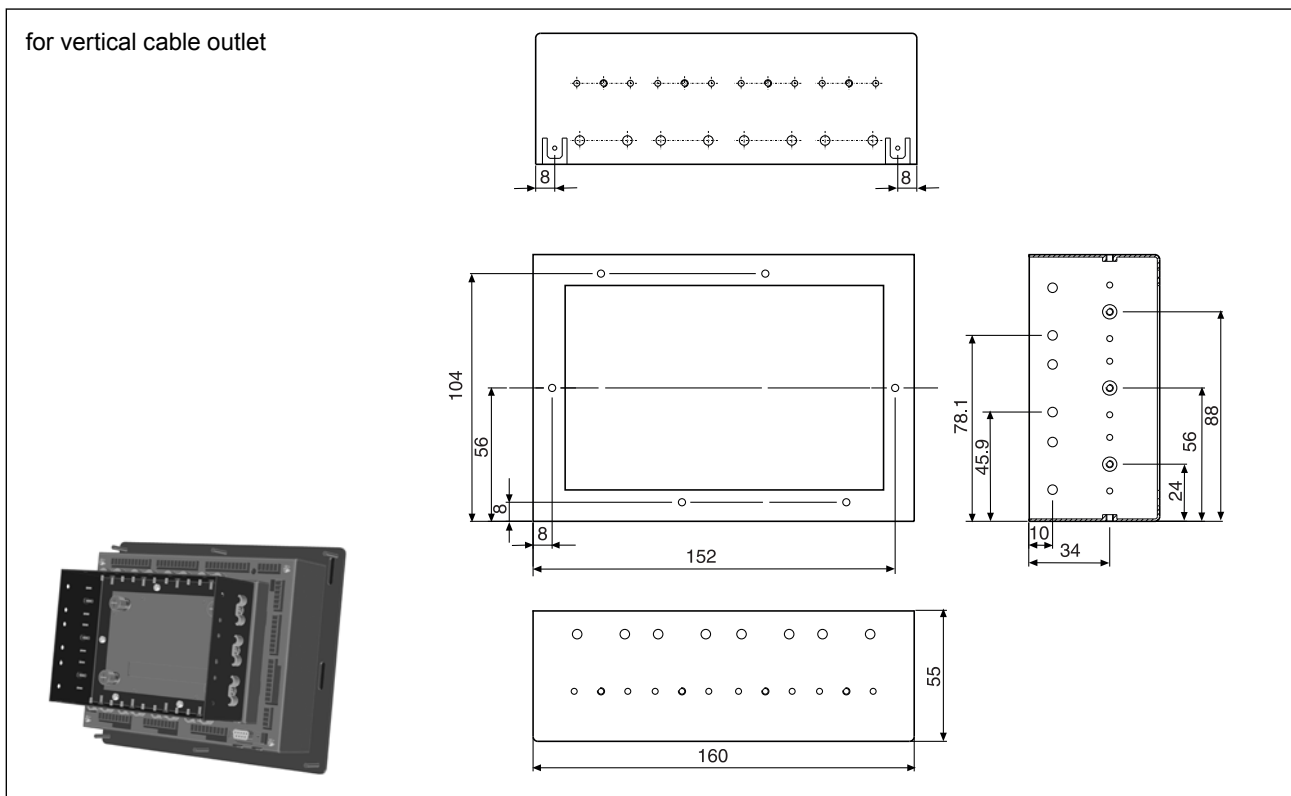
Accessories (included in scope of supply)

Item-no.	Description
GEL 89042	Counterplug set (only for GEL 8240)
GEL 89043	Counterplug set (only for GEL 8241)
BG 4622	14 hex screws M3 x 10, 14 cable bride, 2 earthing terminals, 14 toothed lock washers
BG 4623	6 hex screws M4, 6 washers, 6 spring washers, 2 earthing terminals
CD GEL 824	CD-ROM GEL GEL 824 (inklusive Handbuch als pdf-Datei)

Accessories (optional)

GEL 89022	Connection cable RS 232 C between PC and MotionController
GEL 89130	Fieldbus module (PROFIBUS-DP)
GEL 89131	Fieldbus module (InterBus-S)
GEL 89132	Fieldbus module (DeviceNet)
GEL 89133	Fieldbus module (Ethernet)
GK 2063	Mounting frame: 6 hex screws M3 x 10 and 6 toothed lock washers
DS-12-824x	Manual GEL 824x (printed)

Mounting frame GK 2063



Your notes:

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Subject to technical modifications and typographical errors.
The latest version can be downloaded at www.lenord.de.



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