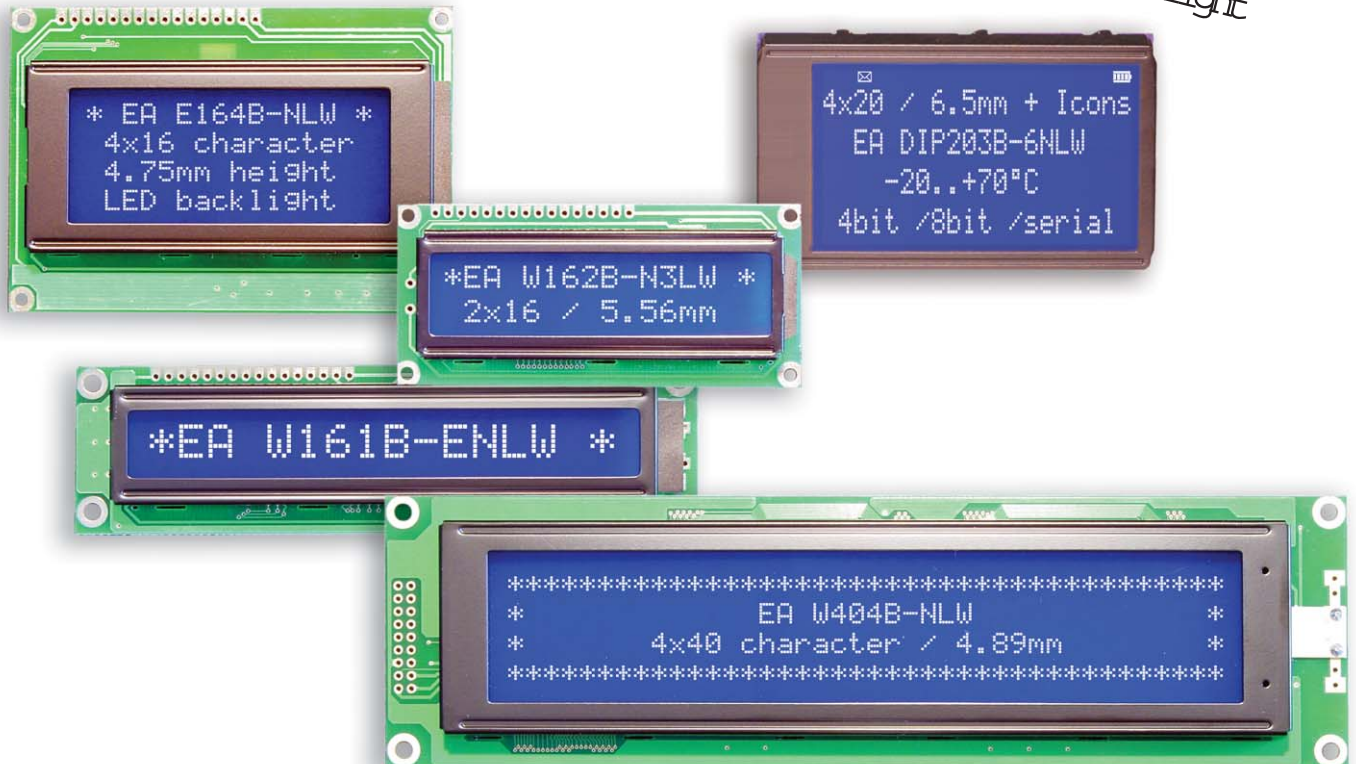


# BLUELINE

Issue 07.2021

## DOTMATRIX DISPLAYS 1x16..4x40

*15..100mA only  
incl. LED backlight*



### FEATURES

- \* SUPERTWIST BLUE NEGATIVE
- \* WITH WHITE LED BACKLIGHT
- \* EXTREME POWER SAVING: LED CURRENT 15mA OFF (max. 75mA)
- \* CHARACTER HEIGHT 4.75..12.7mm
- \* ALL DISPLAYS WITH INTEGRATED CONTROLLER
- \* INTERFACE FOR 8-BIT BUS (ALSO 4 BIT) OR ALTERNATIVELY VIA RS-232 INTERFACE
- \* ALPHANUMERIC: ASCII CHARACTER SET+SPECIAL CHARACTER+8 FREE DEFINABLE
- \* POWER SUPPLY +5V
- \* OPERATING TEMPERATURE RANGE -20°C ... +70°C (SOME 0..+50°C)
- \* STORAGE TEMPERATURE -30..+80°C (SOME -20..+70°C)

### ACCESSORIES

- \* FRONTAL BEZEL WITH ANTIGLARE WINDOW: SERIES **EA 017-xxUKE**
- \* RS-232 OR RS-422 INTERFACE **EA 9707-V24S**



**PINOUT**

Pinbelegung 1x16..4x20/2x40 Zeichen			
Pin	Symbol	Pegel	Beschreibung
1	VSS	L	Versorgung 0V, GND
2	VDD	H	Versorgung +5V
3	VEE	-	Displayspannung 0..0,5V
4	RS	H/L	Register Select
5	R/W	H/L	H: Read / L: Write
6	E	H	Enable
7	D0	H/L	Datenleitung 0 (LSB)
8	D1	H/L	Datenleitung 1
9	D2	H/L	Datenleitung 2
10	D3	H/L	Datenleitung 3
11	D4	H/L	Datenleitung 4
12	D5	H/L	Datenleitung 5
13	D6	H/L	Datenleitung 6
14	D7	H/L	Datenleitung 7 (MSB)
15	LED +	-	LED-Versorgung Plus /Vorwiderstand!
16	LED -	-	LED-Versorgung Minus

*Advice for pins 15/16 (17/18):  
This is power supply for LED backlight. Operation requires a current source or an external series resistor! The value for maximum current is mentioned at the relating counter drawings. In view of life time of backlight please take care of a derating at temperatures permanently above +25°C. The forward voltage of LED backlight is between 3.0V and 3.6V.*

Pinbelegung EA W404B-NLW / 4x40 Zeichen			
Pin	Symbol	Pegel	Beschreibung
1	D7	H/L	Datenleitung 7 (MSB)
2	D6	H/L	Datenleitung 6
3	D5	H/L	Datenleitung 5
4	D4	H/L	Datenleitung 4
5	D3	H/L	Datenleitung 3
6	D2	H/L	Datenleitung 2
7	D1	H/L	Datenleitung 1
8	D0	H/L	Datenleitung 0 (LSB)
9	E1	H	Enable Zeile 1+2
10	R/W	H/L	H: Read / L: Write
11	RS	H/L	Register Select
12	VEE	-	Displayspannung typ. +0,2V
13	VSS	L	Versorgung 0V, GND
14	VDD	H	Versorgung +5V
15	E2	H	Enable Zeile 3+4
16	NC	-	frei
17	LED +	-	LED-Versorgung Plus /Vorwiderstand
18	LED -	-	LED-Versorgung Minus

**CHARACTER SET**

Lower 4 bit	Upper 4 bit	0000 (\$0x)	0010 (\$2x)	0011 (\$3x)	0100 (\$4x)	0101 (\$5x)	0110 (\$6x)	0111 (\$7x)	1010 (\$Ax)	1011 (\$Bx)	1100 (\$Cx)	1101 (\$Dx)	1110 (\$Ex)	1111 (\$Fx)
	CG RAM (0)		0	1	P	~	F		-	9	E	0	p	
xxx0000 (\$x0)	(1)	!	1	A	Q	a	q		u	7	4		ä	q
xxx0010 (\$x2)	(2)	"	2	B	R	b	r		r	i	u		ß	ö
xxx0011 (\$x3)	(3)	#	3	C	S	c	s		j	u	t		e	ö
xxx0100 (\$x4)	(4)	\$	4	D	T	d	t		v	i	t		µ	ö
xxx0101 (\$x5)	(5)	%	5	E	U	e	u		.	o	u		ü	ü
xxx0110 (\$x6)	(6)	&	6	F	V	f	v		7	o	u		ρ	Σ
xxx0111 (\$x7)	(7)	'	7	G	W	g	w		7	o	u		g	π
xxx1000 (\$x8)	CG RAM (0)	(	B	H	X	h	x		i	o	u		7	Σ
xxx1001 (\$x9)	(1)	)	9	I	Y	i	y		o	u	u		'	y
xxx1010 (\$xA)	(2)	*	:	J	Z	j	z		e	o	u		j	7
xxx1011 (\$xB)	(3)	+	:	K	[	k	[		o	u	u		*	7
xxx1100 (\$xC)	(4)	,	<	L	¥	l	l		7	o	u		φ	7
xxx1101 (\$xD)	(5)	-	=	M	]	m	]		u	o	u		o	÷
xxx1110 (\$xE)	(6)	.	>	N	^	n	^		o	o	u		ö	
xxx1111 (\$xF)	(7)	/	?	O	_	o	o		u	o	u		ö	■



**8 FREE DEFINABLE CHARACTER**

All displays in BlueLine series are able to show 8 free definable character additionally to the 192 fixed ROM based character (ASCII codes 0..7).

- 1.) The command "CG RAM Address Set" set the pointer (bit 3,4,5) to the 1st dot line of the new character. The individual dot line will be addressed by bits 0,1 and 2. With this example a character with ASCII code \$00 will be defined.
- 2.) The command "Data Write" defines the upper dot row (here: 0x40). The next „Data Write“ commands are for the other dot rows. Full definition requires 8 write cycles where the last one is the cursor line.
- 3.) This new defined character will be used like a „normal“ ASCII character 0x00 ("DD RAM Address Set", "Data Write").

Adresse im CG RAM setzen			Daten des Zeichens								
Adresse		Hex	Bit								Hex
			7	6	5	4	3	2	1	0	
0 1 0 0 0		0 0 0	\$40								\$04
		0 0 1	\$41								\$04
		0 1 0	\$42								\$04
		0 1 1	\$43								\$04
		1 0 0	\$44								\$04
		1 0 1	\$45								\$0E
		1 1 0	\$46								\$04
		1 1 1	\$47								\$00

COMMAND SET HD44780

Instruction	Code										Description	Execute Time (max.)	
	RS	R/W	DB 7	DB 6	DB 5	DB 4	DB 3	DB 2	DB 1	DB 0			
Clear Display	0	0	0	0	0	0	0	0	0	1	Clears all display and returns the cursor to the home position (Address 0).	1.64ms	
Cursor At Home	0	0	0	0	0	0	0	0	1	*	Returns the Cursor to the home position (Address 0). Also returns the display being shifted to the original position. DD RAM contents remain unchanged.	1.64ms	
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	S	Sets the Cursor move direction and specifies or not to shift the display. These operation are performed during data write and read.	40µs	
Display On/Off Control	0	0	0	0	0	0	1	D	C	B	Sets ON/OFF of all display (D) cursor ON/OFF (C), and blink of cursor position character (B).	40µs	
Cursor / Display Shift	0	0	0	0	0	1	S/C	R/L	*	*	Moves the Cursor and shifts the display without changing DD RAM contents.	40µs	
Function Set	0	0	0	0	1	DL	N	F	*	*	Sets interface data length (DL) number of display lines (N) and character font (F).	40µs	
CG RAM Address Set	0	0	0	1	ACG							Sets the CG RAM address. CG RAM data is sent and received after this setting.	40µs
DD RAM Address Set	0	0	1	ADD							Sets the DD RAM address. DD RAM data is sent and received after this setting.	40µs	
Busy Flag / Address Read	0	1	BF	AC							Reads Busy flag (BF) indicating internal operation is being performed and reads address counter contents.	-	
CG RAM / DD RAM Data write	1	0	Write Data								Writes data into DD RAM or CG RAM	40µs	
CG RAM / DD RAM Data Read	1	1	Read Data								Reads data from DD RAM or CG RAM	40µs	

Hint

The execution time shown in table are valid with active check for „Busy Flag“ only; that means that before reading or writing data from or to the display the „Busy Flag“ BF needs to be checked for „0“. If there's no explicit „Busy Flag“ check but delay then execution time may be definitely longer. The 4 bit mode requires the „Busy Flag“ check every byte only.

Explanation:

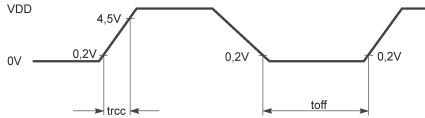
- I/D 1: DD-RAM increment address automatically
- S 1: Shift display content after read/write
- D 1: Display on
- C 1: Cursor visible
- B 1: Character blinks
- S/C 1: Shift display for 1 position (direction depends on R/L)
- R/L 1: Shift to the right
- DL 1: Interface: 8-Bit data bus (DB0..7)
- N 1: 2-line display (also 8+8)
- F 1: 5x10 dot display
- BF 1: Controller st busy
- 0: Decrement DD-RAM address automatically
- 0: Move cursor after read/write
- 0: Display off
- 0: Cursor invisible
- 0: Static character
- 0: Shift cursor for 1 position
- 0: Shift to the left
- 0: Interface: 4-Bit data bus (DB4..7)
- 0: 1-line display
- 0: 5x7 dot display
- 0: Controller is ready to receive new data

RELATIONSHIP DD-RAM ADDRESS AND POSITION ON DISPLAY

Displaytyp	Anfangs - Endadresse (HEX)				Bemerkung
	1.Zeile	2.Zeile	3.Zeile	4.Zeile	
1x8	\$00-\$07				
1x16	\$00-\$0F				MUX 1:8
1x16(8+8)	\$00-\$07				MUX 1:16 (linke Hälfte) (rechte Hälfte)
	\$40-\$47				
1x20	\$00-\$13				
1x40	\$00-\$27				
2x8	\$00-\$07	\$40-\$47			
2x12	\$00-\$0B	\$40-\$4B			
2x16	\$00-\$0F	\$40-\$4F			
2x20	\$00-\$13	\$40-\$53			
2x24	\$00-\$17	\$40-\$57			
2x40	\$00-\$27	\$40-\$67			
4x16	\$00-\$0F	\$40-\$4F	\$10-\$1F	\$50-\$5F	Kontroller HD44780
	\$00-\$13	\$40-\$53	\$14-\$27	\$54-\$67	
4x20	\$00-\$13	\$20-\$33	\$40-\$53	\$60-\$73	Kontroller KS0073
	\$00-\$27	\$40-\$67	-	-	
4x40	-	-	\$00-\$27	\$40-\$67	1. Kontroller (Enable 1)
	-	-	-	-	2. Kontroller (Enable 2)

**POWER-ON-RESET**

The internal Power-On-Reset works only at following conditions:



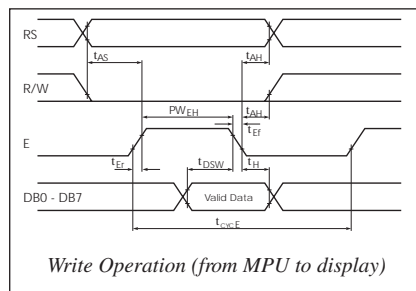
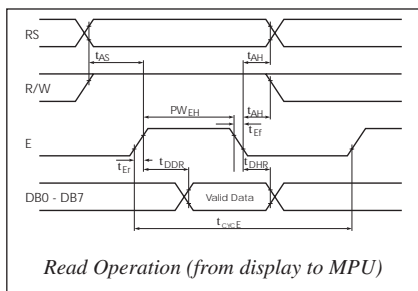
Item	Symbol	Standard Value			Unit
		min	typ	max	
Power Supply Rise Time	trcc	0,1	-	10	ms
Power Supply Off Time	toff	1	-	-	ms

Item	Symbol	Measuring Conditions	Standard Value			Unit
			min.	typ.	max.	
Enable Cycle Time	tCYCE	see Figs.1 and 2	1000	-	-	ns
Enable Pulse Width, High Level	PWEH	see Figs.1 and 2	450	-	-	ns
Enable Rise and Delay Time *)	tER, tEF	see Figs.1 and 2	-	-	25	ns
Address Setup Time, RS, R/W-E	tAS	see Figs.1 and 2	140	-	-	ns
Data Delay Time	tDDR	see Fig.2	-	-	320	ns
Data Setup Time	tDSW	see Fig.1	195	-	-	ns
Data Hold Time	tH	see Fig.1	10	-	-	ns
Data Hold Time	tDHR	see Fig.2	20	-	-	ns
Address Hold Time	tAH	see Figs.1 and 2	10	-	-	ns

\*) Important parameter!  
Use "74LS" or "74HC" gate

VCC=5,0V ±5%, Ta=25°C

Input E (Enable) is the control pin for data lines DB0 to DB7. At E = H and R/W = 1 (µC reads data from display) the LCD controller switches it's data lines to output. Writing data from µC to the display will be done at the falling edge of E (Enable). The fall time of Enable signal (max. 25ns) is essential for an error free communication. IDC cable may deform signals even at a length of 20cm (depends on driver circuit, ambient condition, noise pinout etc.). Improvement can be done with:



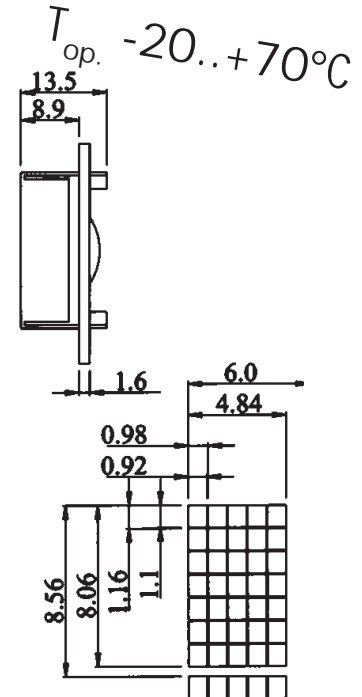
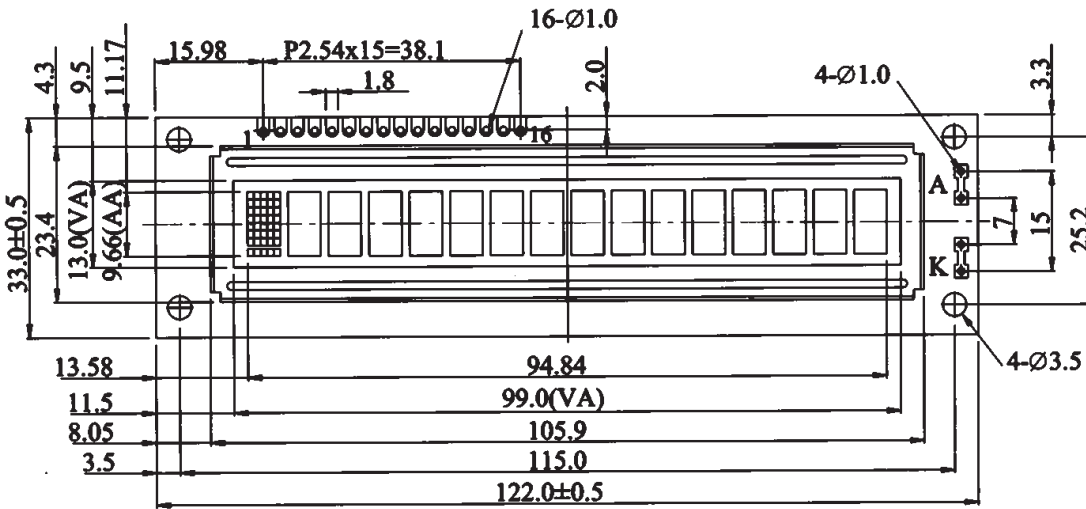
- "slower" data communication via port pins (if data setup or data hold time is too short)
- Pull-Up resistor connected directly to the „E“ pin at display side
- better driver on µC side
- Schmitt trigger on display side for Enable line
- shorten the cable (max. 10cm)

INITIALISIERUNGSBEISPIEL FÜR DEN 4-BIT MODUS							
Befehl	RS	R/W	DB7	DB6	DB5	DB4	Bemerkung
Function Set	0	0	0	0	1	0	4-Bit Datenlänge einschalten (noch im 8-Bit Modus)
Function Set	0	0	0	0	1	0	4-Bit Datenlänge, 1-zeiliges Display, 5x7 Font
Display ON/OFF	0	0	0	0	0	0	Display ein, Cursor ein, Cursor blinken
Clear Display	0	0	0	0	0	0	Display löschen, Cursor auf 1. Spalte von 1. Zeile
Entry Mode Set	0	0	0	0	0	0	Cursor Auto-Increment

INITIALISIERUNGSBEISPIEL FÜR DEN 8-BIT MODUS											
Befehl	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Bemerkung
Function Set	0	0	0	0	1	1	0	0	0	0	8-Bit Datenlänge, 1-zeiliges Display, 5x7 Font
Display ON/OFF	0	0	0	0	0	0	1	1	1	1	Display ein, Cursor ein, Cursor blinken
Clear Display	0	0	0	0	0	0	0	0	0	1	Display löschen, Cursor auf 1. Spalte von 1. Zeile
Entry Mode Set	0	0	0	0	0	0	0	1	1	0	Cursor Auto-Increment

# EA W161B-ENLW

1x16 CHARACTER 9,66mm



Kompatibilität mit EA E161-ENLW		
Tätigkeit	Werte	Anmerkung
Widerstand RA einlöten	RA = 56 Ohm	I <sub>LED</sub> = max. 30mA

LED current max. 30mA@+25°C  
external series resistor at Pin 15 and 16 required  
VEE= typ. 4,5V@20°C

## ORDERING CODE

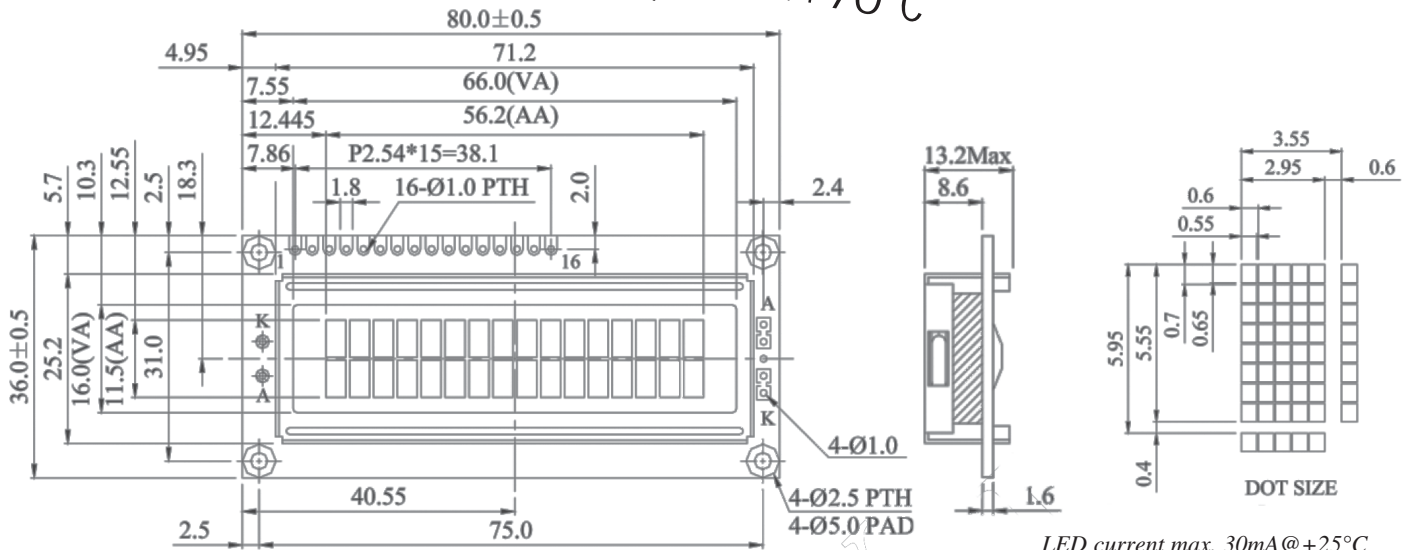
1x16 CHARACTER, 9,66mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 98,5x12,8mm)

EA W161B-ENLW  
EA 017-6UKE

# EA W162B-N3LW

2x16 CHARACTER 5,56mm

$T_{op.} -20..+70^{\circ}C$



LED current max. 30mA@+25°C  
external resistor at Pin 15 and 16  
required  
VEE= typ. 3,4V@+20°C

## ORDERING CODE

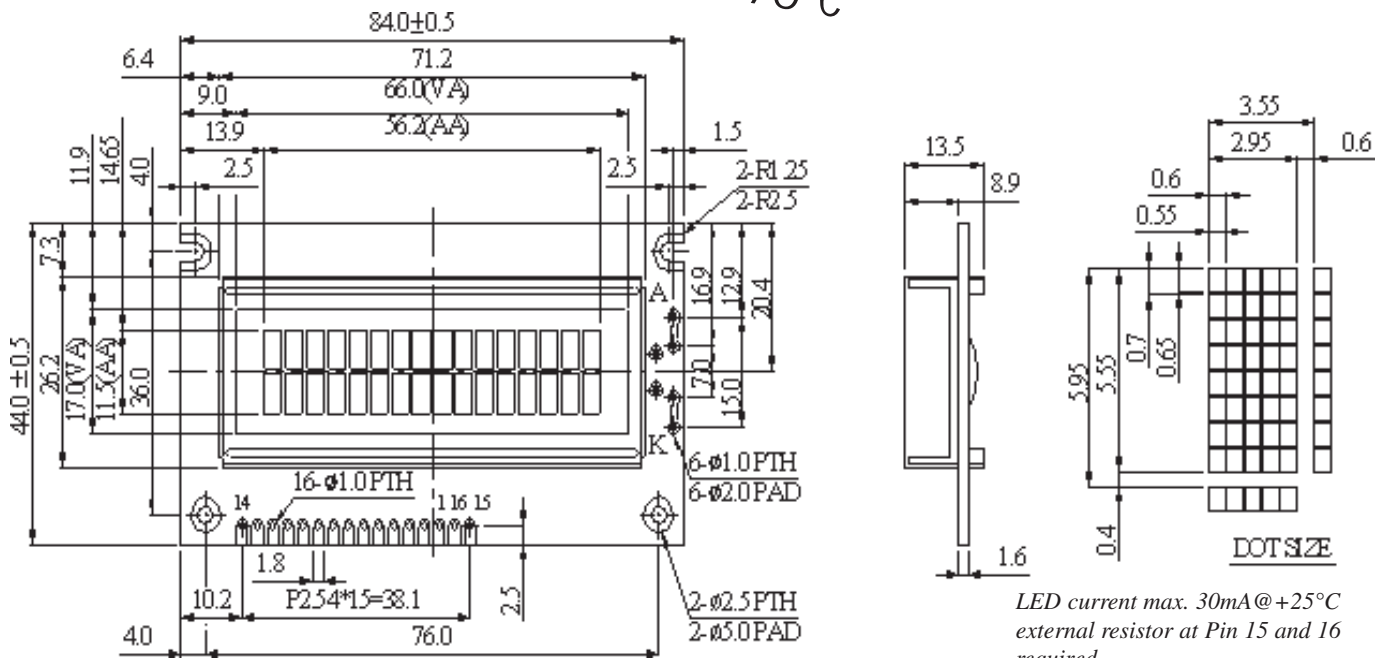
2x16 CHARACTER, 5,56mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 60,0x14,8mm)

**EA W162B-N3LW**  
**EA 017-2UKE**

# EA W162B-NLW

2x16 CHARACTER 5,56mm

$T_{op.} -20..+70^{\circ}C$



LED current max. 30mA@+25°C  
external resistor at Pin 15 and 16  
required  
VEE= typ. 3,7V@+20°C

## ORDERING CODE

2x16 CHARACTER, 5,56mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 60,0x14,8mm)

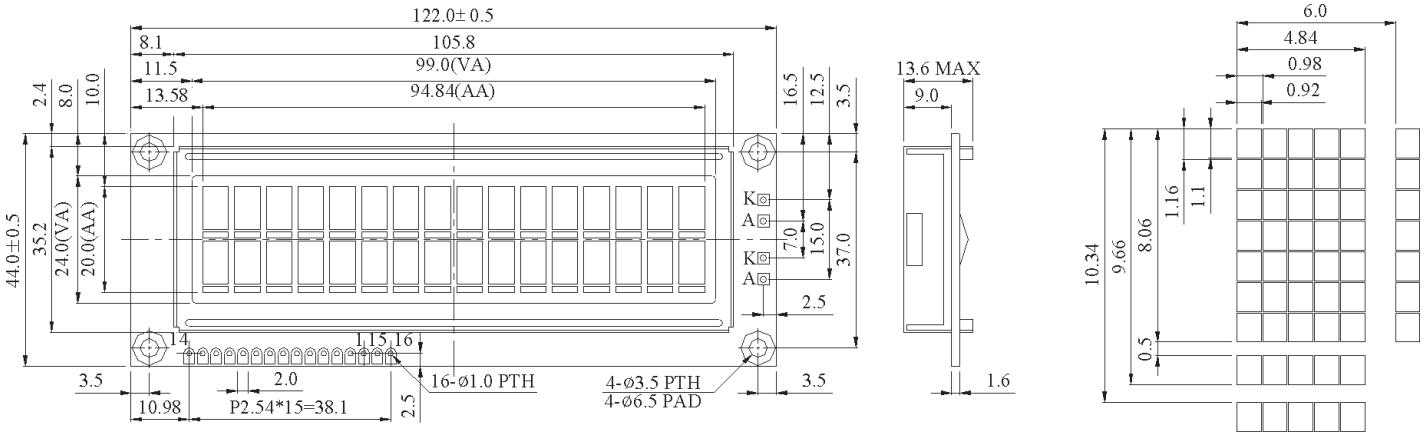
**EA W162B-NLW**  
**EA 017-2UKE**



# EA W162B-BNLW

$T_{op.} -20..+70^{\circ}C$

2x16 CHARACTER 9,66mm



Kompatibilität mit EA E162-BNLW		
Tätigkeit	Werte	Anmerkung
Widerstand J15 nach rechts	J2 = 0 Ohm	Pins 15 und 16 freimachen, int. Versorgung über VDD/VSS; Beleuchtung nicht abschaltbar
Widerstand J16 nach rechts	J1 = 0 Ohm	
Widerstand RA austauschen	RA = 33 Ohm	I <sub>LED</sub> = max. 45mA

LED current max. 45mA@+25°C  
external resistor at Pin 15 and 16  
required  
VEE= typ. 4,4V@20°C

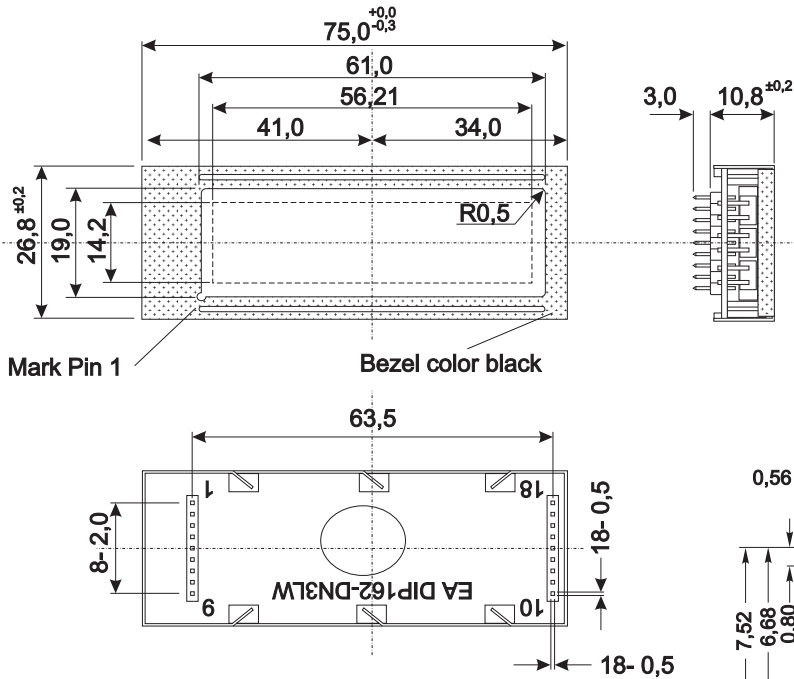
## ORDERING CODE

2x16 CHARACTER, 9,66mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 97,4x22,4mm)

EA W162B-BNLW  
EA 017-12UKE

# EA DIP162-DN3LW

2x16 CHARACTER 6,68mm



$T_{op.} -20..+70^{\circ}C$   
Temp.Comp. built-in

## ORDERING CODE

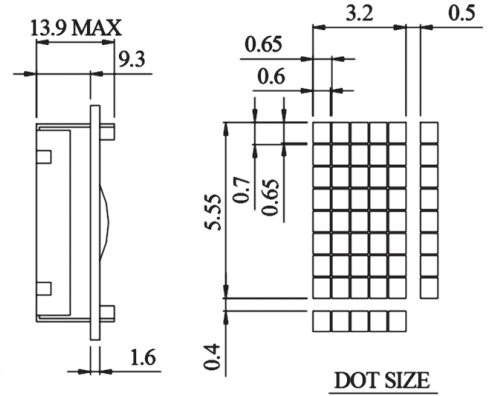
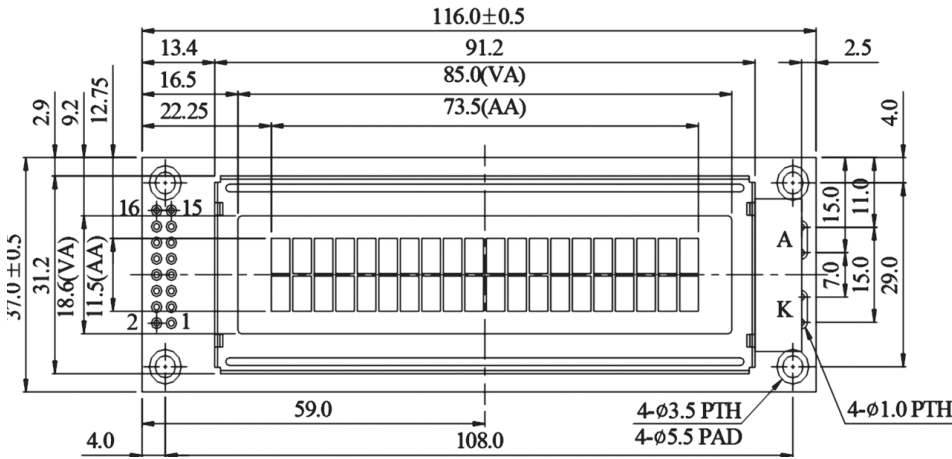
2x16 CHARACTER, 6,68mm, BLUE/WHITE  
BEZEL (WINDOW 60,0x14,8mm)

EA DIP162-DN3LW  
EA 017-2UKE

# EA W202B-NLW

2x20 CHARACTER 5,55mm

$T_{op.} -20..+70^{\circ}C$



LED current max. 30mA@+25°C  
external resistor at Pin 15+ and 16-  
required  
VEE= typ. 4,4V@+20°C

## ORDERING CODE

2x20 CHARACTER, 5,55mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 81,5x17,2mm)

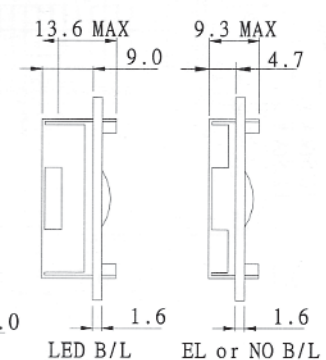
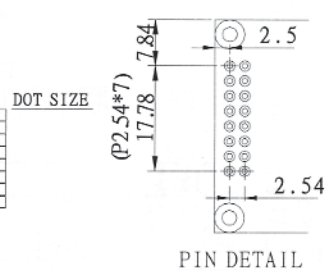
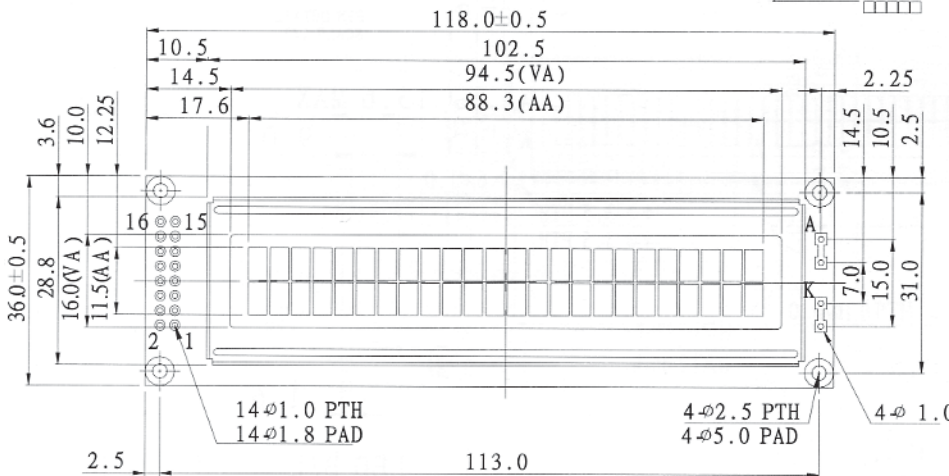
**EA W202B-NLW**  
**EA 017-7UKE**

# EA W242B-NLW

2x24 CHARACTER 5,55mm

$T_{op.} -20..+70^{\circ}C$

Kompatibilität mit EA E242-NLW		
Tätigkeit	Werte	Anmerkung
J15 und J16 öffnen		Pins 15 und 16 freimachen
Widerstände J1 und J2 einlöten	J1 = 0 Ohm J2 = 0 Ohm	Versorgung über VDD/VSS
Widerstand RA einlöten	RA = 33 Ohm	ILED= typ. 40mA



LED current max. 30mA@+25°C  
VEE= typ. 4,8V@+20°C

## ORDERING CODE

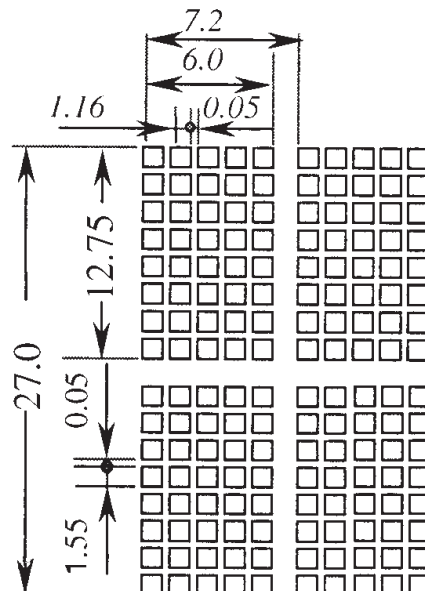
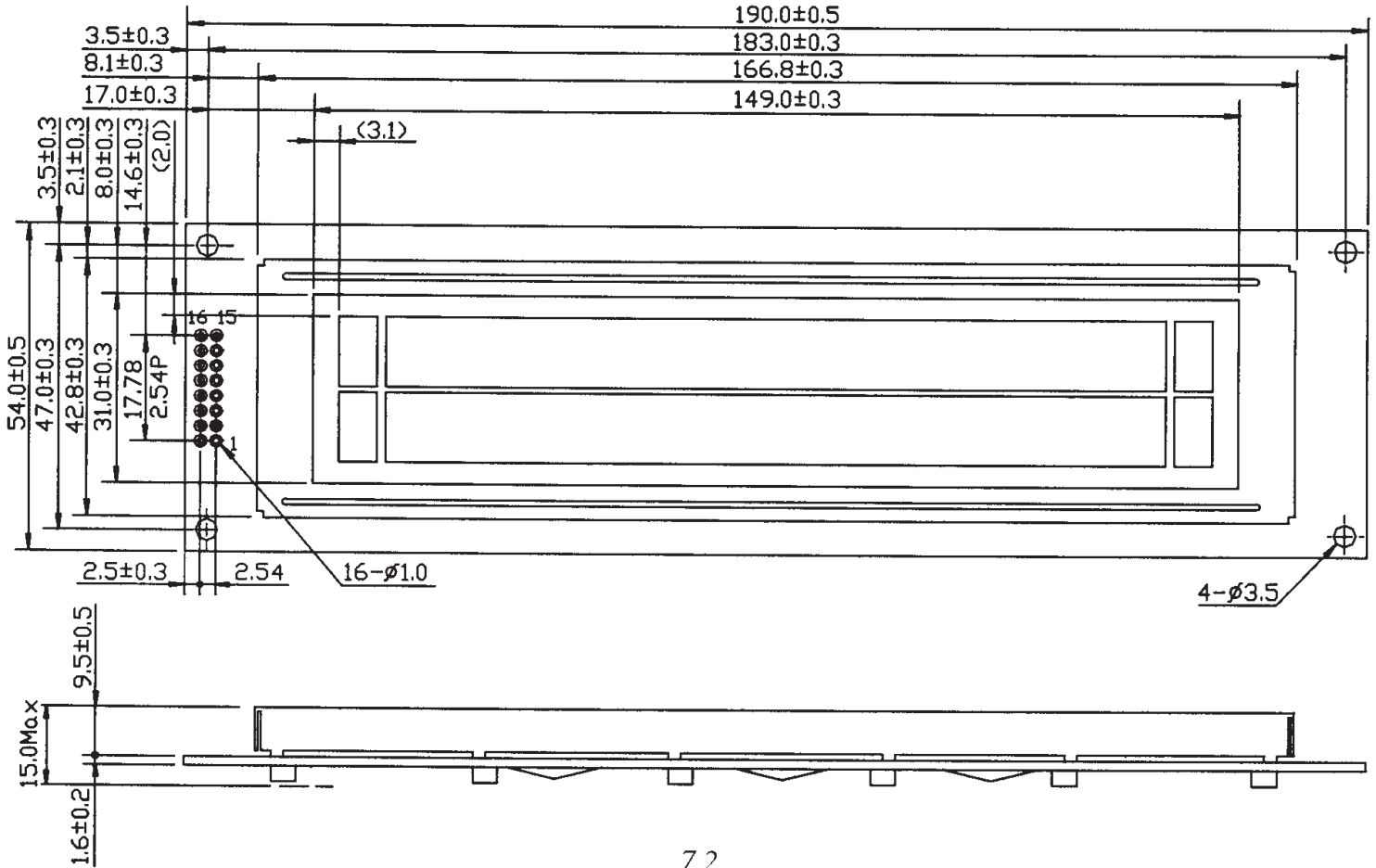
2x24CHARACTER, 5,55mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 92,0x14,8mm)

**EA W242B-NLW**  
**EA 017-14UKE**



# EA E202-CNLW

2x20 CHARACTER 12,7mm  
Operating temperature 0..+50°C



$T_{op.} 0..+50^{\circ}C$

LED current max. 60mA@+25°C  
Pin 15+ and 16- directly at 5V

## ORDERING CODE

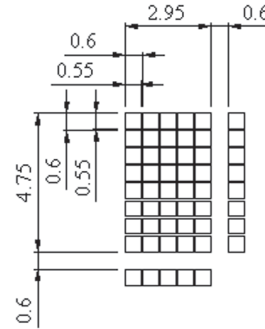
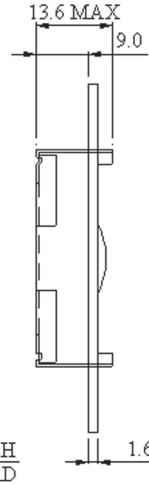
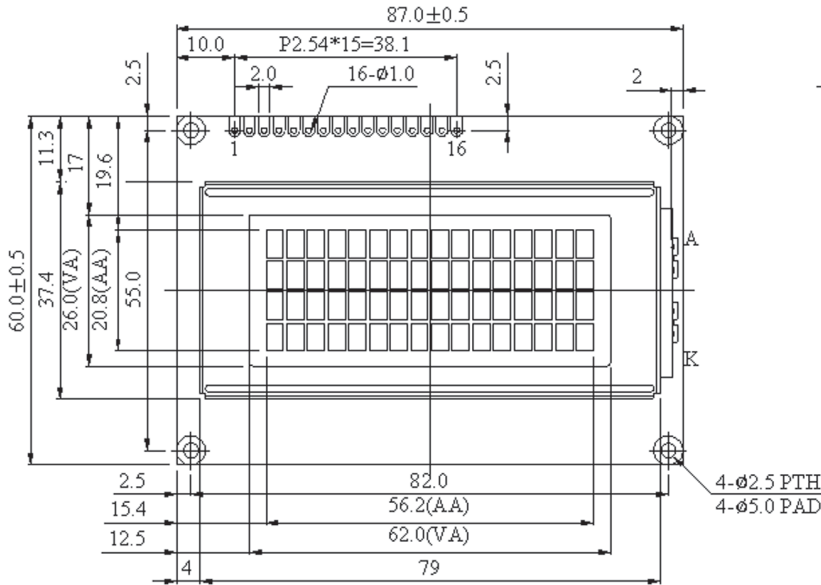
2x20 CHARACTER, 12,7mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 145,0x33,8mm)

**EA E202-CNLW**  
**EA 017-27KE**

# EA W164B-NLW

4x16 CHARACTER 4,75mm

$T_{op.} -20..+70^{\circ}C$   
Temp.Comp. built-in



LED current max. 45mA@+25°C  
external resistor at Pin 15+ and 16-  
required  
VEE= typ. 4,5V@+20°C

## ORDERING CODE

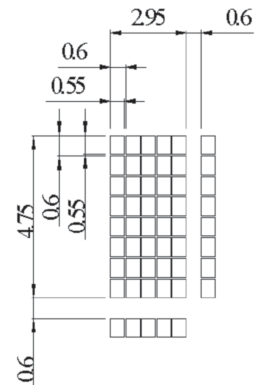
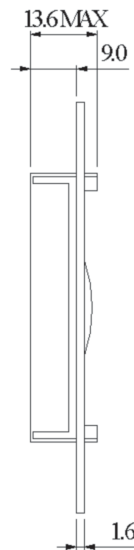
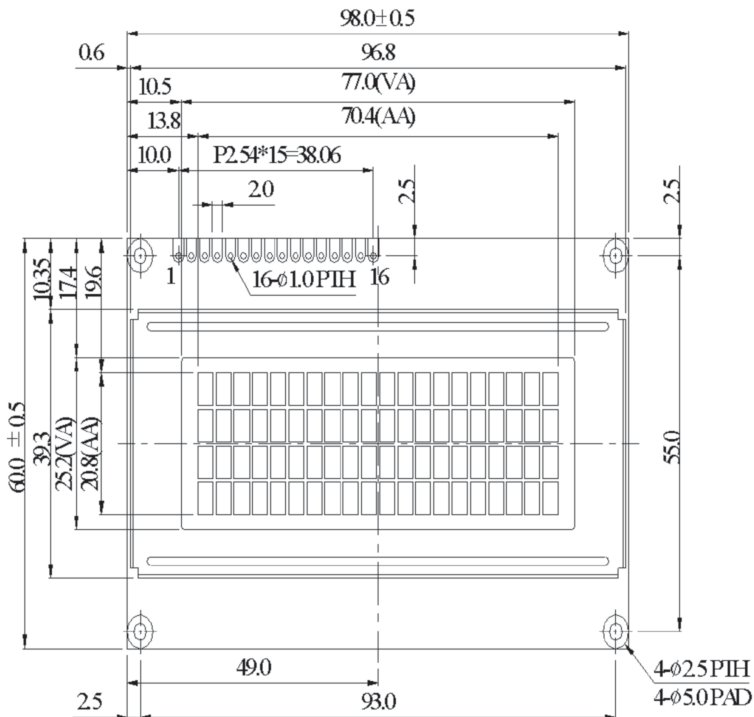
4x16 CHARACTER, 4,75mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 60,8x24,2mm)

**EA W164B-NLW**  
**EA 017-8UKE**

# EA W204B-NLW

4x20 CHARACTER 4,75mm

$T_{op.} -20..+70^{\circ}C$



LED current max. 45mA@+25°C  
external resistor at Pin 15 and 16-  
required  
VEE= typ. 4,7V@+20°C

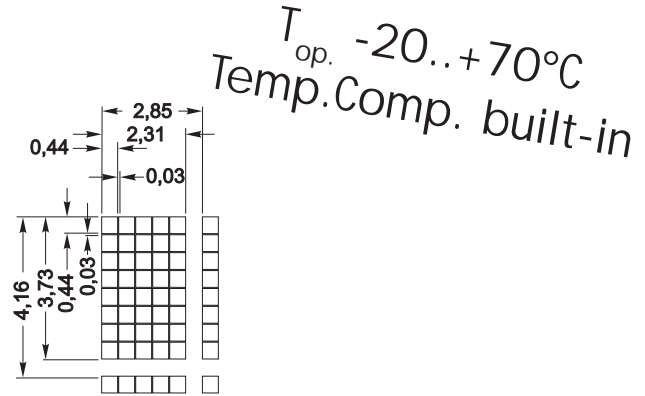
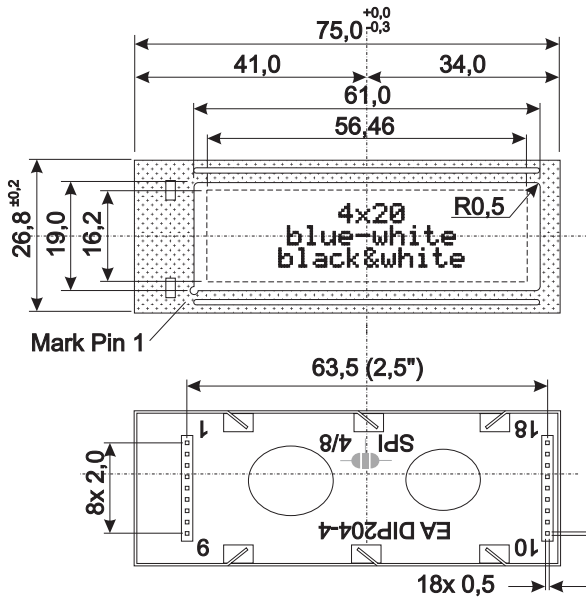
## ORDERING CODE

4x20 CHARACTER, 4,75mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 75,0x24,2mm)

**EA W204B-NLW**  
**EA 017-9UKE**

# EA DIP203B-4NLW

4x20 CHARACTER 3,75mm



$T_{op.} -20..+70^{\circ}C$   
Temp.Comp. built-in

SPI Mode	Parallel Mode (Factory Set)

LED current max. 45mA@+25°C  
external resistor at Pin 17 and 18  
required

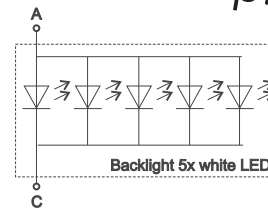
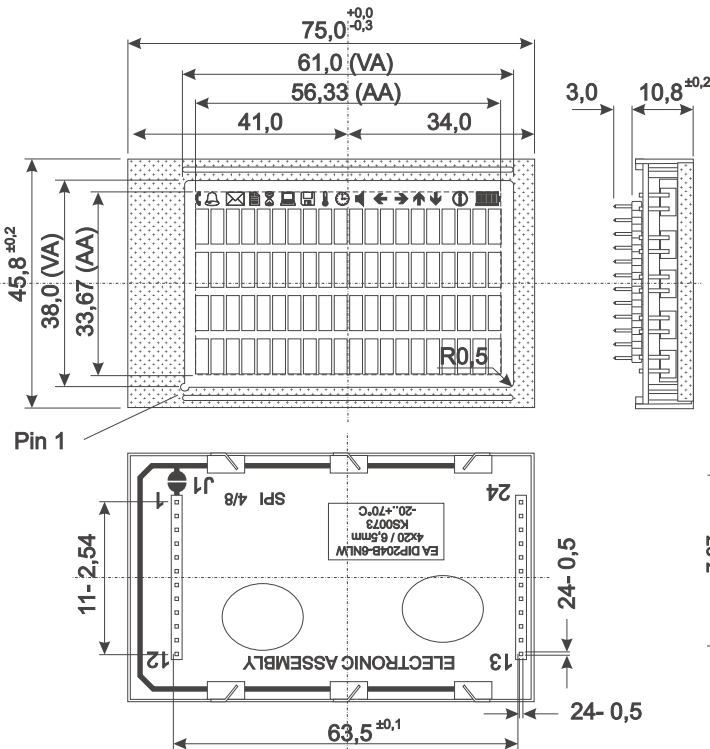
**ORDERING CODE**

4x20 CHARACTER, 3,75mm, BLUE/WHITE

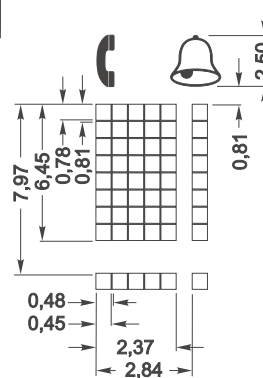
**EA DIP203B-4NLW**

# EA DIP203B-6NLW

4x20 CHARACTER 6,45mm



$T_{op.} -20..+70^{\circ}C$   
Temp.Comp. built-in



LED current max. 75mA@+25°C  
external resistor at Pin 23 and 24  
required

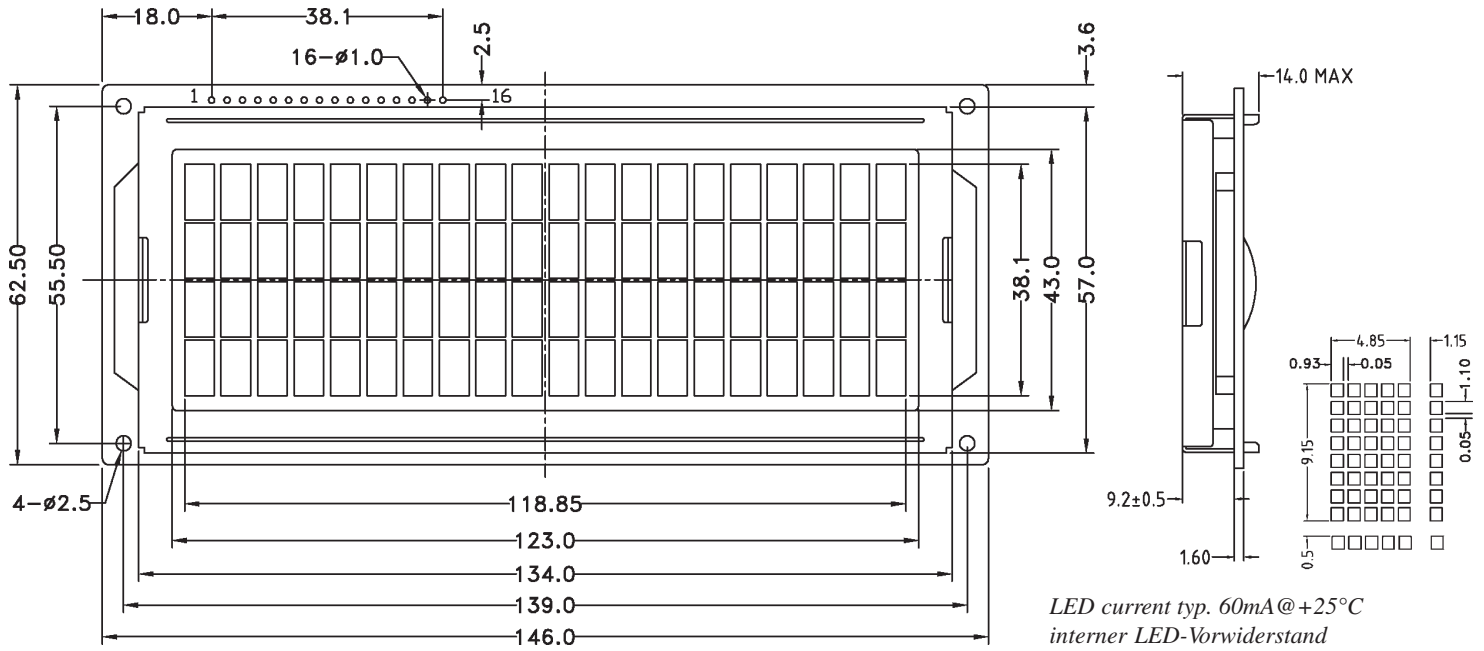
**ORDERING CODE**

4x20 CHARACTER, 6,45mm, BLUE/WHITE

**EA DIP203B-6NLW**

# EA T204B-BNLW

4x20 CHARACTER 9,22mm



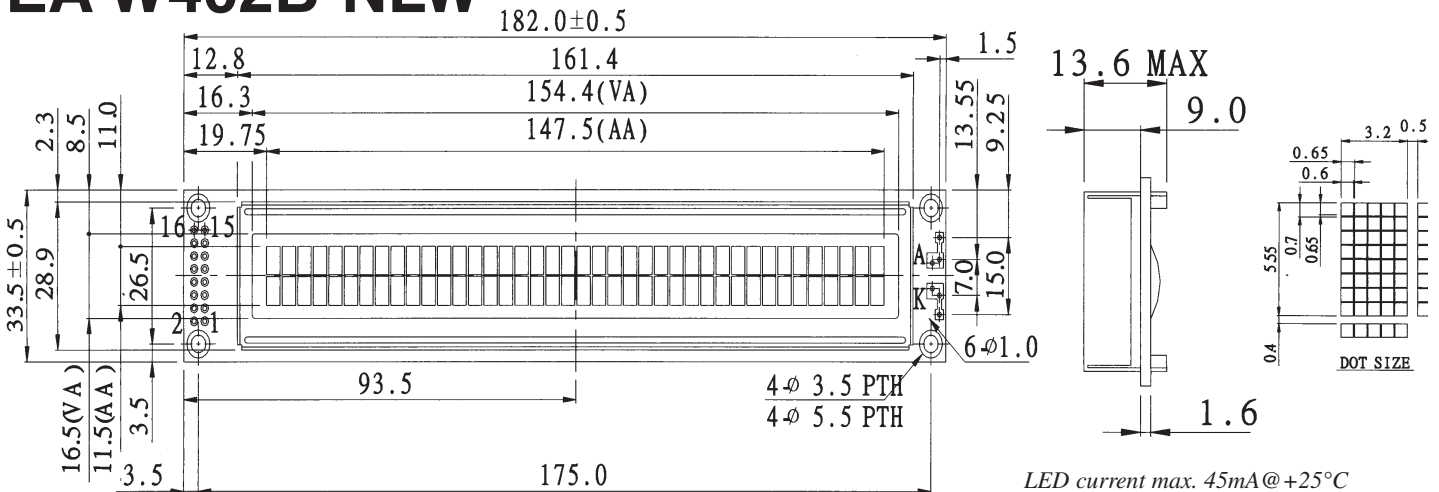
## ORDERING CODE

4x20 CHARACTER, 9,22mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 121,0x41,5mm)

**EA T204B-BNLW**  
**EA 017-25KE**

# EA W402B-NLW

2x40 CHARACTER 5,55mm



LED current max. 45mA@+25°C  
RV<sub>LED</sub> extern required  
VEE= typ. 4,5V@+20°C

$T_{op.} -20..+70^{\circ}C$

Kompatibilität mit EA E402-NLW		
Tätigkeit	Werte	Anmerkung
J15 und J16 öffnen		Pins 15 und 16 freimachen
Widerstände J1 und J2 einlöten	J1 = 0 Ohm J2 = 0 Ohm	Versorgung über VDD/VSS
Widerstand RA einlöten	RA = 38 Ohm	ILED= max. 45mA

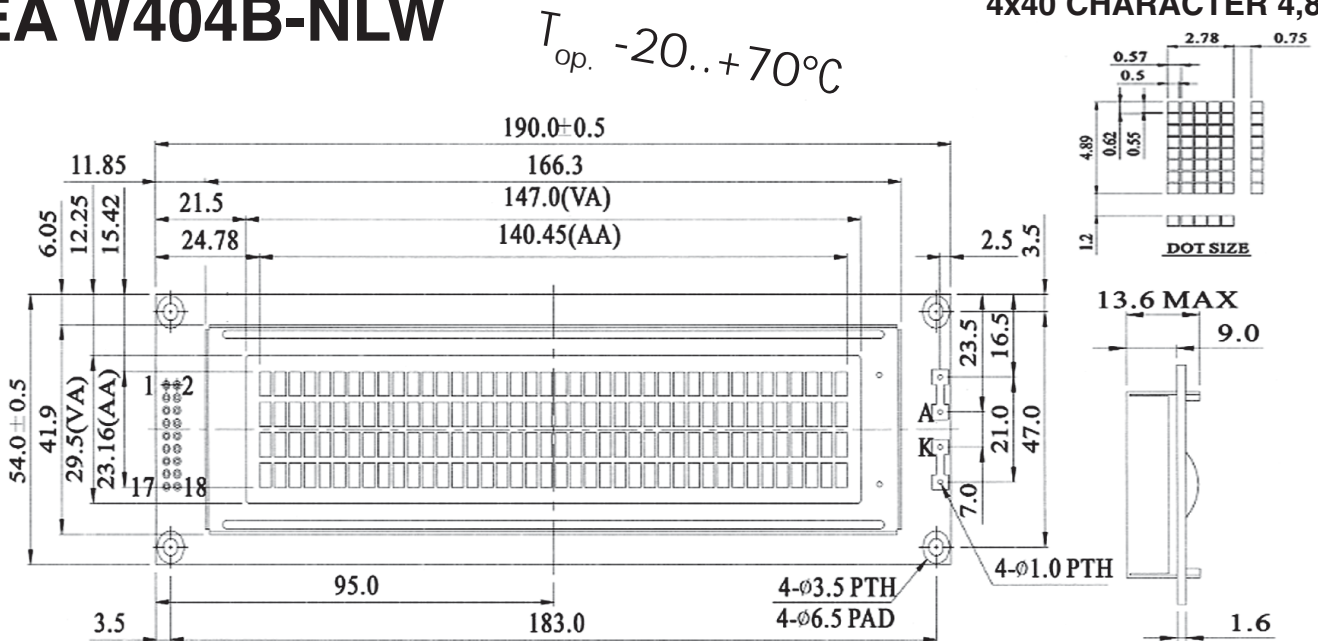
## ORDERING CODE

2x40 CHARACTER, 5,55mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 153,0x14,8mm)

EA W402B-NLW  
EA 017-4UKE

# EA W404B-NLW

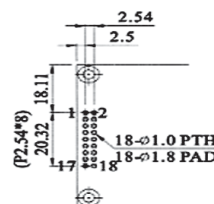
4x40 CHARACTER 4,89mm



LED current max. 75mA@+25°C  
RV<sub>LED</sub> extern required  
VEE= typ. 4,8V@+20°C

$T_{op.} -20..+70^{\circ}C$

Kompatibilität mit EA E404-NLW		
Tätigkeit	Werte	Anmerkung
Widerstand J14 nach links	J14 = 0 Ohm	Pins 17 und 18 freimachen, Versorgung über VDD/VSS
Widerstand J13 nach unten	J13 = 0 Ohm	
Widerstand RA auswechseln	RA = 23 Ohm	ILED= max. 75mA



## ORDERING CODE

4x40 CHARACTER, 4,89mm, BLUE/WHITE, LED BACKLIGHT  
BEZEL (WINDOW 145,0x28,0mm)

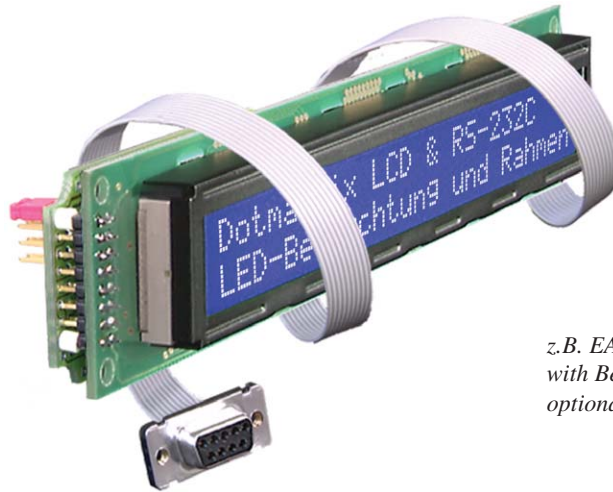
EA W404B-NLW  
EA 017-13UKE

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# BLUELINE DISPLAYS WITH RS-232 / RS-422



*z.B. EA SER402-NLW  
with Bezel and  
optionally cable EA KV24-9B*

## FEATURES

- \* SUPPLY VOLTAGE +5V
- \* SET BAUDRATE BY JUMPER: 300, 1200, 2400 OR 9600 BAUD
- \* AUTOMAT. LINE MANAGEMENT: CR / LF / SCROLL / PLACE CURSOR
- \* MULTIPLE DISPLAYS AT 1 RS-232 LINE, ADDRESSABLE
- \* SHIPMENT INCL. BEZEL WITH ANTIGLARE WINDOW

## OPTIONALLY

- \* DIP SWITCH INSTEAD OF SOLDER LINK TO SET THE ADDRESS: **EA OPT-DIP6**
- \* RS-422 INTERFACE INSTEAD OF RS-232C (STANDARD): **EA OPT-RS422**

## ACCESSORY

- \* EA KV24-9B: CABLE WITH 9-PIN D-SUB CONNECTOR (FEMALE)

## ORDERING CODE

1x16 CHARACTER, 9,66mm, RS-232  
 2x16 CHARACTER, 5,56mm, RS-232  
 2x16 CHARACTER, 5,56mm, RS-232  
 2x16 CHARACTER, 9,66mm, RS-232  
 2x20 CHARACTER, 5,55mm, RS-232  
 2x20 CHARACTER, 12,7mm, RS-232  
 2x24 CHARACTER, 5,55mm, RS-232  
 4x20 CHARACTER, 4,75mm, RS-232  
 2x40 CHARACTER, 5,55mm, RS-232  
 4x40 CHARACTER, 4,89mm, RS-232

**EA SER161-ENLW**  
**EA SER162-N3LW**  
**EA SER162-NLW**  
**EA SER162-BNLW**  
**EA SER202-NLW**  
**EA SER202-CNLW**  
**EA SER242-NLW**  
**EA SER204-NLW**  
**EA SER402-NLW**  
**EA SER404-NLW**

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