

Data Sheets

Codicount 7-Segment-LED-Displays

Series 100

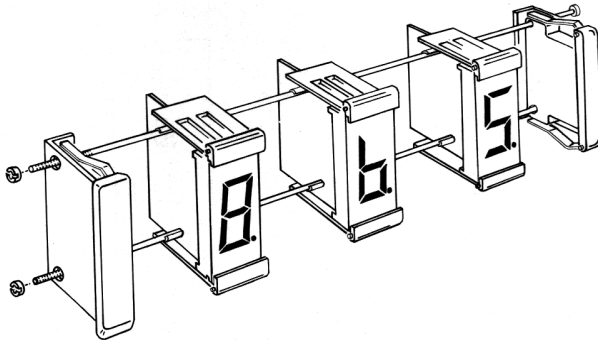
Mounting instructions

Assembly

The individual display modules are lined up in blocks. Each block is completed with end brackets. The block is secured with threaded rods.

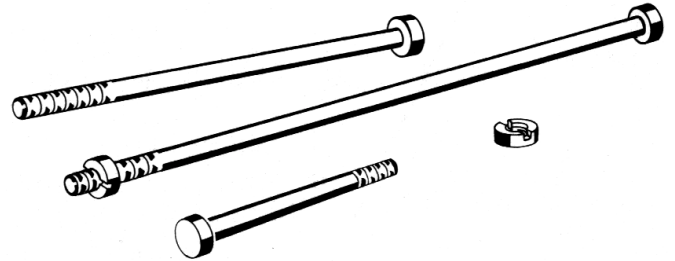
The assembly procedure is completed after the block is inserted through the cut-out in the front panel.

The snap springs provide reliable fastening power. In series 100 and 300, the individual modules are assembled into blocks simply by pressing them together (push-fit principle). Threaded rods can be used in both these series to fulfil extreme requirements.



Mounting material

In series 500 and 800, modules are assembled with two M2 threaded rods and two M2 slotted nuts. For increased strength, series 100 / 300 can also be assembled with threaded rods and slotted nuts of size M2.

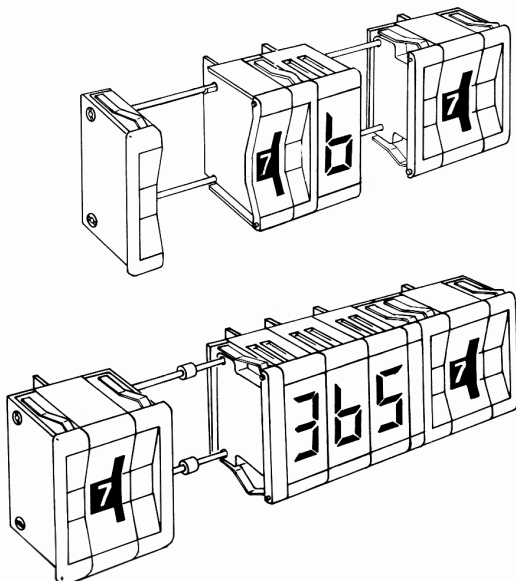


Connections

All plug connectors are hard gold-plated. A matching connector program is available.

Additional assembly of division plates or dummy housings

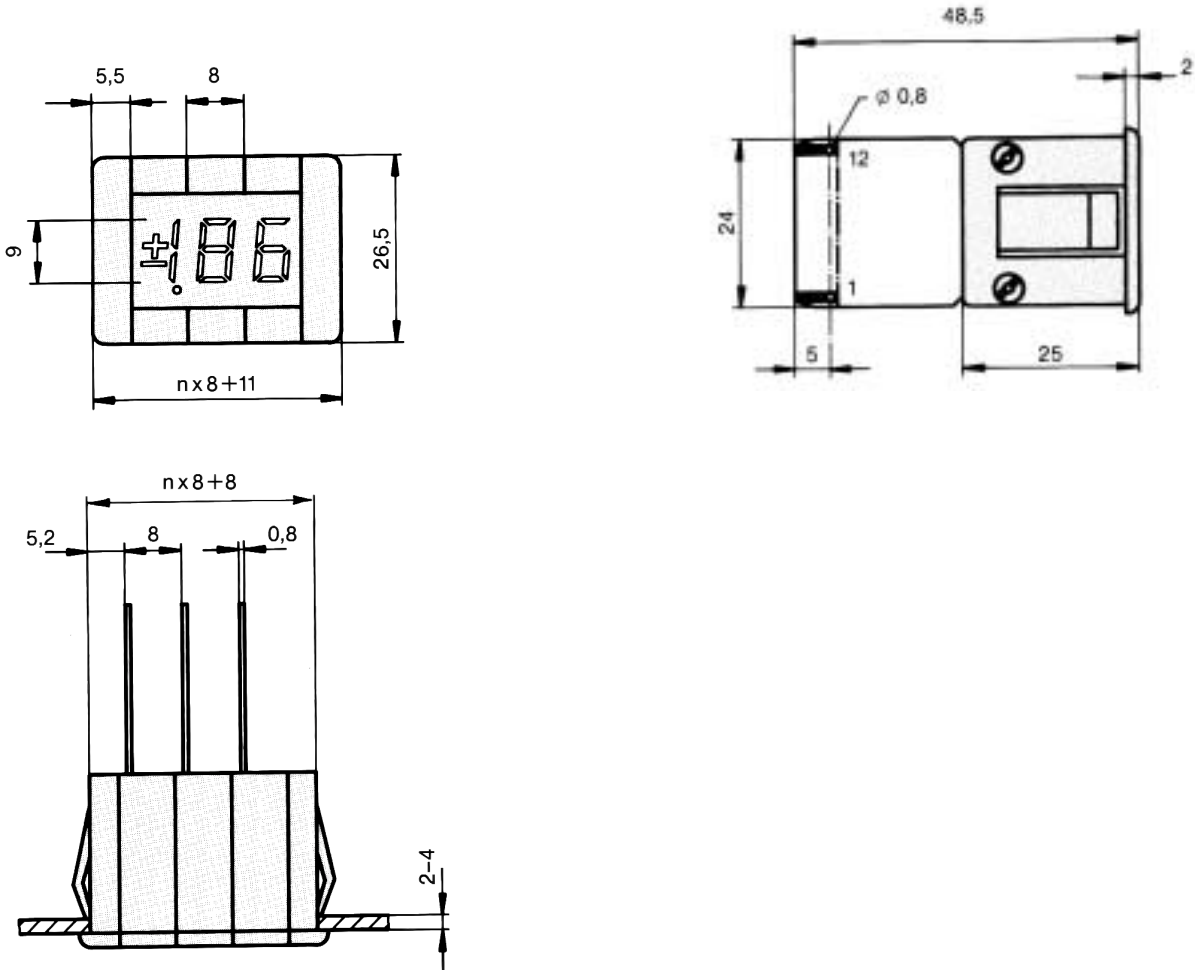
A display block can be subdivided into groups with dummy housings. If selector switches are to be integrated in a display block, the division plates will provide a neat transition between display and switch modules. Switches can be mounted on either side of the display modules. In series 100 and 300, the division plates are one-piece elements. In the other series, they are composed of a division plate of the display series and of a division plate of the corresponding **Multiswitch** series. Centering sleeves simplify assembly procedures.



Data Sheet

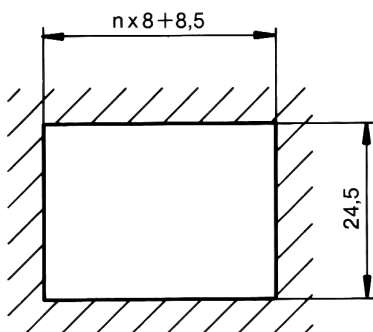
Displays *Codicount* Series 100

- Display red
- Module width 8 mm
- Contrast filters for up to 4 modules
- Small, compact display module
- Compatible in size with **Multiswitch** Type V
- Block length unlimited
- Simple (push-fit) assembly

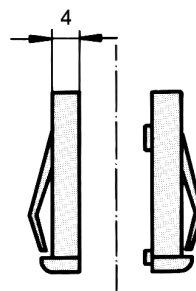


n = number of modules

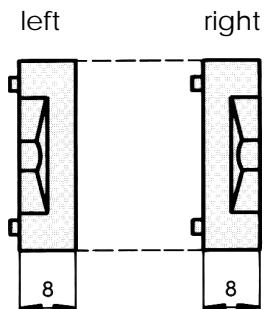
Panel cut-out



End bracket pair



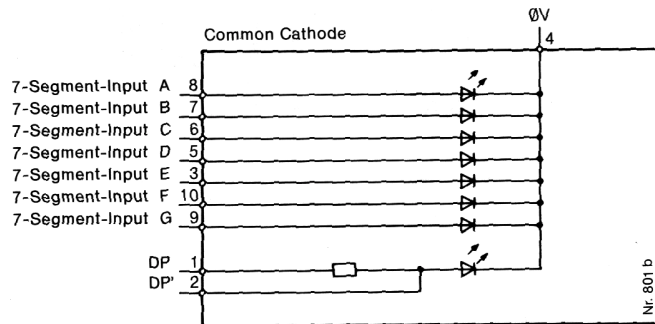
Thumbwheel switch adapters



Type 101

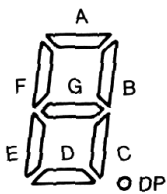
- ♦ 7-segment display
- ♦ Height of character 9 mm
- ♦ Direct input
- ♦ 5 or 12 V supply voltage
- ♦ Depth when mounted 46.5 mm

Circuit diagram



In this display module, all segments are wired directly to the pcb terminations. It is operated with the 7-segment code. For a fixed decimal point, input DP is connected to +V_{CC} via the built-in current limiting resistor. For the floating decimal point mode and particularly in multiplex operation, input DP' must be wired to an external driver.

Segment configuration



Technical data

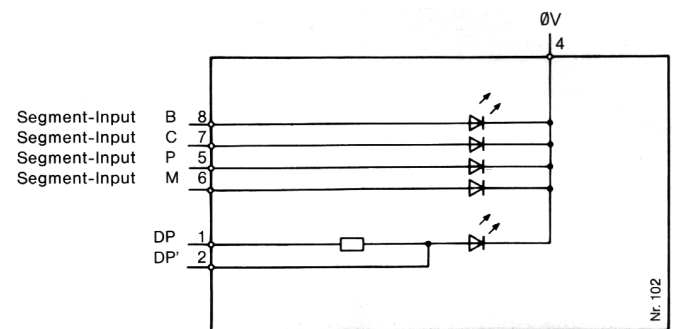
Forward voltage of LEDs with $I_{nom} = 6 \text{ mA}$	typ. 1.7 V
Recommended operating current per LED	5-7 mA DC
Inverse voltage	max. 3 V
Colour of LED display	red
Character height	9 mm

Type	VDC	Ordering code
101,	5 V	101-040-21
101,	12 V	101-045-21

Type 102

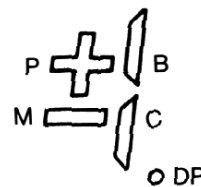
- ♦ Sign and overflow display
- ♦ Height of character 9 mm
- ♦ Direct input
- ♦ 5 or 12 V supply voltage
- ♦ Depth when mounted 46.5 mm

Circuit diagram



This display is used to indicate sign and overflow (± 1). For a fixed decimal point, input DP is connected to +V_{CC} via the built-in current limiting resistor. For the floating decimal point mode and particularly in multiplex operation, input DP' must be wired to an external driver.

Segment configuration



Technical data

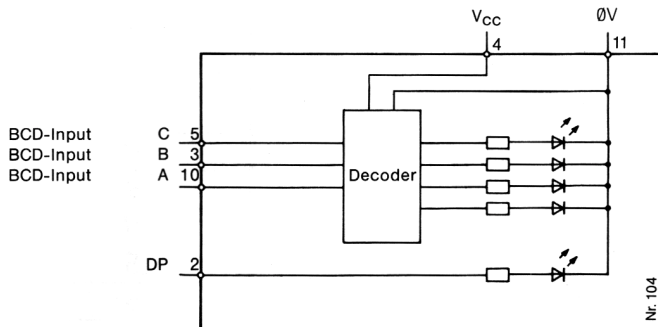
Forward voltage of LEDs with $I_{nom} = 6 \text{ mA}$	typ. 1.7 V
Recommended operating current per LED	5-7 mA DC
Inverse voltage	max. 3 V
Colour of LED display	red
Character height	9 mm

Type	VDC	Ordering code
102,	5 V	102-040-21
102,	12 V	102-045-21

Type 104

- Sign and overflow display
- Height of character 9 mm
- BCD-Input
- 5 or 12 V supply voltage
- Depth when mounted 46.5 mm

Circuit diagram



This module is used to display sign and overflow (± 1). It is operated with the BCD code in positive logic. All inputs are TTL- or CMOS compatible.

Technical data

Colour of display	red
Character height	9 mm
Supply current I_{CC}	typ. 24 mA

Input data

Input voltage (all inputs)

U_{in} «0» applies to all supply voltages	max.	1 V
U_{in} «1» with $V_{CC} = 5 V$	min.	4 V
U_{in} «1» with $V_{CC} = 12 V$	min.	9.8 V

Input current

I_{in} «0» with $U_{in} = 1 V$	max.	0.1 μA
I_{in} «1» with $U_{in} = 4 V$	max.	16 μA
I_{in} «1» with $U_{in} = 8 V$	max.	17 μA
I_{in} «1» with $U_{in} = 9.8 V$	max.	17 μA
I_{in} «1» with $U_{in} = 12 V$	max.	18 μA

Truth table

Inputs			Outputs
C 2^2	B 2^1	A 2^0	Display
0	0	0	none
0	0	1	-
0	1	0	1
0	1	1	- 1
1	0	0	+
1	0	1	\pm
1	1	0	+ 1
1	1	1	± 1 (Test)

Type VDC

104,	5 V
104,	12 V

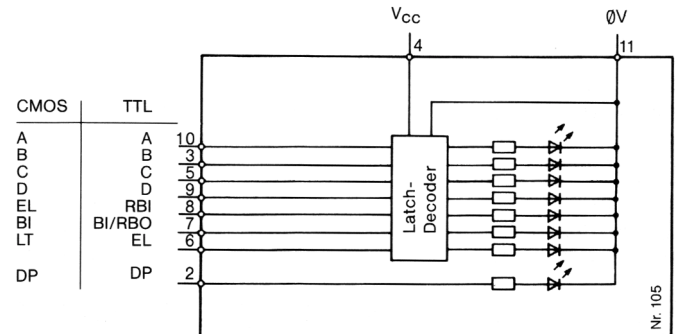
Ordering code

104-050-21
104-055-21

Type 105

- 7-segment display
- Height of character 9 mm
- BCD-Input
- Memory
- 5 or 12 V supply voltage
- Depth when mounted 46.5 mm

Circuit diagram



In this module, the display is operated by the BCD code in positive logic. A control signal (Input EL) makes it possible to freeze the display and suppress response to changing BCD input signals.

Caution: These terminals for TTL and CMOS are not identical. Observe the General handling directions for CMOS logic elements (s. page 2).

Technical data

Colour of display	red
Character height	9 mm
Supply current I_{CC} for TTL	typ. 93 mA
for CMOS	typ. 48 mA

Input data

Input voltage (all inputs)

	TTL	CMOS
U_{in} «0» with $V_{CC} = 5 V$	max. 0.8 V	1.5 V
U_{in} «0» with $V_{CC} = 12 V$	max.	3.6 V
U_{in} «1» with $V_{CC} = 5 V$	min. 2 V	3.5 V
U_{in} «1» with $V_{CC} = 12 V$	min.	8.4 V

Input currents

TTL logic:

BCD-Input currents with EL = «0»

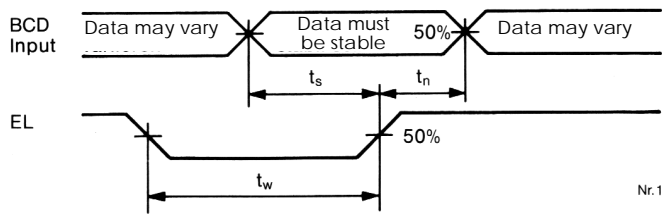
I_{in} «0» with $U_{in} = 0.4 V$	max. -1.6 mA
I_{in} «1» with $U_{in} = 2.4 V$	max. 80 μA
With EL = «1» I_{in} «0» and «1»	max. -0.1 mA

Inputs EL and RBI

I_{in} «0» with $U_{in} = 0.4 V$	max. -1.6 mA
I_{in} «1» with $U_{in} = 2.4 V$	max. 40 μA

Input BI

I_{in} «0» with $U_{in} = 0.4 V$	max. -3.2 mA
I_{in} «1» with $U_{in} = 2.4 V$	max. 80 μA

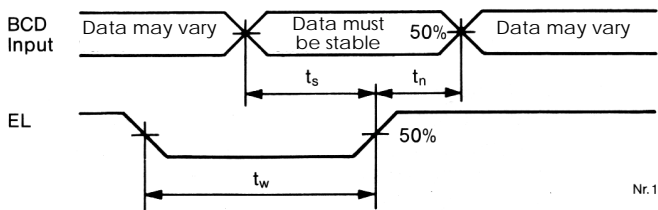


Length of storage instruction t_w min. 45 ns
 Length of setting time t_s min. 30 ns
 Length of holding time t_n min. 0 ns

CMOS logic:

all inputs

I_{in} «0» and I_{in} «1» typ. 10 pA
 Input capacitance C_{in} typ. 5 pF



	V_{CC}		
Length of storage instruction	t_w 5	min.	400 ns
	10	min.	160 ns
	15	min.	100 ns
Length of setting time	t_s 5	min.	150 ns
	10	min.	70 ns
	15	min.	40 ns
Length of holding time	t_n 5	min.	75 ns
	10	min.	35 ns
	15	min.	20 ns

Output data (RBO only)

Output voltage

U_{out} «0» with $I_{out} = -3.2$ mA max. 0.4 V
 U_{out} «1» with $I_{out} = -80$ μ A min. 2.4 V

Output current

I_{out} «0» max. -3.2 mA
 I_{out} «1» max. -80 μ A

Description of Enable Latch (EL)

and Decimal Point (DP):

EL (Enable Latch): This instruction will freeze the display and suppress further response to changes of the BCD input.

«EL» on «0» The display responds to the BCD input value.

«EL» on «1» The display freezes on the last value.

DP (Decimal Point): The decimal point must be controlled externally. The module features an integral current limiting resistor.

«DP» on «0» Decimal point off
 «DP» on «1» Decimal point on

Truth table

CMOS logic

Inputs							Outputs	
EL	LT	D _{2³}	C _{2²}	B _{2¹}	A _{2⁰}	BI	Display	
x	0	x	x	x	x	x	8 (Test)	
x	1	x	x	x	x	0	none	
0	1	0	0	0	0	1	0	
0	1	0	0	0	1	1	1	
0	1	0	0	1	0	1	2	
0	1	0	0	1	1	1	3	
0	1	0	1	0	0	1	4	
0	1	0	1	0	1	1	5	
0	1	0	1	1	0	1	6	
0	1	0	1	1	1	1	7	
0	1	1	0	0	0	1	8	
0	1	1	0	0	1	1	9	
1	1	x	x	x	x	1	stored*	

x = «0» or «1»

* Controlled by applied BCD code during the leading edge of the «EL» instruction signal.

TTL logic

Inputs							Outputs		
EL	RBI	D _{2³}	C _{2²}	B _{2¹}	A _{2⁰}	BI**	RBO	Display	
x	x	x	x	x	x	0	0	none	
0	0	0	0	0	0	x	0	none	
0	1	0	0	0	0	1	1	0	
0	x	0	0	0	1	1	1	1	
0	x	0	0	1	0	1	1	2	
0	x	0	0	1	1	1	1	3	
0	x	0	1	0	0	1	1	4	
0	x	0	1	0	1	1	1	5	
0	x	0	1	1	0	1	1	6	
0	x	0	1	1	1	1	1	7	
0	x	1	0	0	0	1	1	8	
0	x	1	0	0	1	1	1	9	
0	x	1	0	1	0	1	1	A	
0	x	1	0	1	1	1	1	b	
0	x	1	1	0	0	1	1	C	
0	x	1	1	0	1	1	1	d	
0	x	1	1	1	0	1	1	E	
0	x	1	1	1	1	1	1	F	
1	x	x	x	x	x	1	1	stored*	

x = «0» or «1»

* Controlled by the applied BCD code during the leading edge of the «EL» instruction signal.

** Input BI should only be shifted to «0» to obtain blanking of the display irrespective of the BCD input. Further information on this input is provided in the general section.

Type

VDC

Ordering code

105,	5 V,	TTL	105-010-21
105,	5 V,	CMOS	105-020-21
105,	12 V,	CMOS	105-025-21

Type 115

- ♦ 7-segment display
- ♦ Height of character 9 mm
- ♦ BCD-input
- ♦ Memory
- ♦ Signal level adaptation
- ♦ 24 V supply voltage
- ♦ Depth when mounted 77 mm

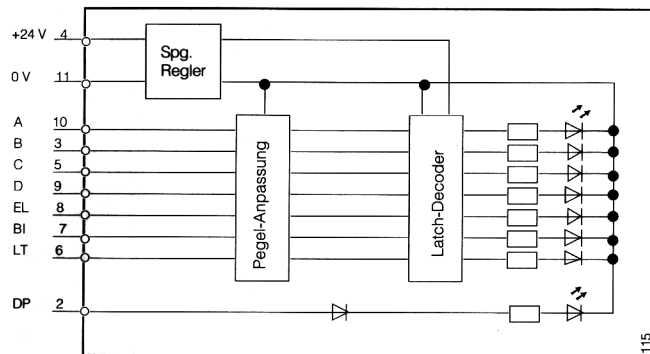
Input supply (DP)

U_{in} «0»	min.	-2 V
	max.	+2.2 V
U_{in} «1»	min.	+6.5 V
	max.	+30 V

Input currents (DP)

i_{in} «0» with $U_{in} = -2 V$	max.	0 mA
$U_{in} = +2.2 V$	max.	+30 μ A
i_{in} «1» with $U_{in} = +6.5 V$	max.	+2 mA
$U_{in} = +30 V$	max.	+14 mA

Circuit diagram



In this module, the display is controlled by the BCE code in positive logic. The signal voltage is + 24 V. A control signal (input EL) will freeze the display without affecting incoming BCD signals.

Technical data

Character height	8 mm
Supply voltage V_{CC}	12...30 V
Supply current I_{CC} with $V_{CC} = 12 V$	typ. 36 mA
$= 24 V$	typ. 22 mA
$= 30 V$	typ. 20 mA
Limit frequency with $V_{CC} = 12 V$	20 kHz
$= 24 V...30 V$	50 kHz
Depth behind panel	77 mm

Input data without DP

All inputs are connected to ground $\emptyset V$.

Input voltage (all inputs)

U_{in} «0»	min.	-3.5 V
or open to	max.	+6 V
U_{in} «1»	min.	+7.5 V
	max.	+30 V

Input currents (all inputs)

i_{in} «0» with $U_{in} = -3.5 V$	max.	-0.17 mA
$U_{in} = +6.0 V$	max.	+0.74 mA
i_{in} «1» with $U_{in} = +7.5 V$	max.	+0.93 mA
$U_{in} = +30 V$	max.	+5 mA

Input resistance (all inputs) $\approx 20 K\Omega$

Decimal point (DP): The decimal point must be controlled externally. There is an integral limiting resistor.

- «DP» on «0» Decimal point off
- «DP» on «1» Decimal point on

Truth table

Inputs							Outputs
LT	BI	EL	D 2 ³	C 2 ²	B 2 ¹	A 2 ⁰	display
1	1	0	0	0	0	0	0
1	1	0	0	0	0	1	1
1	1	0	0	0	1	0	2
1	1	0	0	0	1	1	3
1	1	0	0	1	0	0	4
1	1	0	0	1	0	1	5
1	1	0	0	1	1	0	6
1	1	0	0	1	1	1	7
1	1	0	1	0	0	0	8
1	1	0	1	0	0	1	9
1	1	0	1	0	1	0	none
1	1	0	1	0	1	1	none
1	1	0	1	1	0	0	none
1	1	0	1	1	0	1	none
1	1	0	1	1	1	0	none
1	1	0	1	1	1	1	none
0	x	x	x	x	x	x	8 (Test)
1	0	x	x	x	x	x	none
1	1	1	x	x	x	x	stored*

x = «0» or «1»

* Controlled by applied BCD code during the leading edge of the «EL» instruction signal

Type VDC

115, 24 V

Ordering code

115-057-21

Type 116

- ♦ Sign and overflow display
- ♦ Height of character 9 mm
- ♦ BCD-input
- ♦ Memory
- ♦ Signal level adaptation
- ♦ 24 V supply voltage
- ♦ Depth when mounted 77 mm

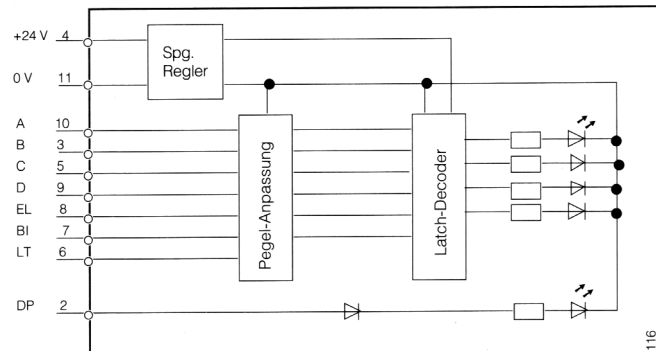
Input supply (DP)

U_{in} «0»	min.	-2 V
	max.	+2.2 V
U_{in} «1»	min.	+6.5 V
	max.	+30 V

Input currents (DP)

I_{in} «0» with	$U_{in} = -2 V$	max.	0 mA
	$U_{in} = +2.2 V$	max.	+30 μA
I_{in} «1» with	$U_{in} = +6.5 V$	max.	+2 mA
	$U_{in} = +30 V$	max.	+14 mA

Circuit diagram



This module is used to display sign and overflow (± 1). It is controlled with the BCD code in positive logic. The signal and display voltage is +24 V. A control signal (input EL) will freeze the display without affecting incoming BCD signals.

Truth table

Inputs							Outputs
LT	BI	EL	D 2^3	C 2^2	B 2^1	A 2^0	Display
0	1	0	0	0	0	0	+1
0	1	0	0	0	0	1	1
0	1	0	0	0	1	0	\pm
0	1	0	0	0	1	1	± 1
0	1	0	0	1	0	0	-1
0	1	0	0	1	0	1	\pm
0	1	0	0	1	1	0	± 1
0	1	0	0	1	1	1	1
0	1	0	1	0	0	0	± 1
0	1	0	1	0	0	1	-1
0	1	0	1	0	1	0	-1
0	1	0	1	0	1	1	± 1
0	1	0	1	1	0	0	+
0	1	0	1	1	0	1	± 1
0	1	0	1	1	1	0	\pm
0	1	0	1	1	1	1	-
1	1	0	0	0	0	0	± 1 (Test)
x	0	x	x	x	x	x	none
-0	1	1	x	x	x	x	stored*

x = «0» or «1»

* Controlled by applied BCD code during the leading edge of the «EL» instruction signal

Technical data

Character height	9 mm
Supply voltage V_{CC}	12...30 V
Supply current I_{CC} with V_{CC}	= 12 V typ. 60 mA
	= 24 V typ. 35 mA
	= 30 V typ. 32 mA
Limit frequency with $V_{CC} = 12 V$	20 kHz
	= 24 V...30V 50 kHz
Depth behind panel	77 mm

Input data without DP

All inputs are connected to ground $\emptyset V$.

Input voltage (all inputs)

U_{in} «0»	min.	-3.5 V
or open to	max.	+6 V
U_{in} «1»	min.	+7.5 V
	max.	+30 V

Input currents (all inputs)

I_{in} «0» with	$U_{in} = -3.5 V$	max.	-0.17 mA
	$U_{in} = +6 V$	max.	+0.74 mA
I_{in} «1» with	$U_{in} = +7.5 V$	max.	+0.93 mA
	$U_{in} = +30 V$	max.	+5 mA

Input resistance (all inputs) = 20 K Ω

DP (decimal point): The decimal point must be controlled externally. There is an integral limiting resistor.

«DP» on «0» Decimal point off

«DP» on «1» Decimal point on

Type VDC

116, 24 V

Ordering code

116-057-21

Accessories

Series 100

Ordering code

End bracket pair, black	100-03-302
Thumbwheel switch adapter left, black	100-04-321
Thumbwheel switch adapter right, black	100-04-322
Contrast filter, length 8 mm	100-06-008
Contrast filter, length 16 mm	100-06-016
Contrast filter, length 24 mm	100-06-024
Contrast filter, length 32 mm	100-06-032
Slotted nut M2 A100	M2A100
Threaded rod M2	G2x...mm
Block assembly	BLOCK100

The Codicount 7 Segment LED Displays are combinable with the following **MULTISWITCH** series:

Codicount series	100
in combination with	
MULTISWITCH series	V

Serie 100 with V switches

