

MCR-SL-D-FIT

Programmable Digital Display for Frequencies, Pulses and Times



INTERFACE

Data Sheet
102526_01_en

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1 Description

The Standard Line digital display **MCR-SL-D-FIT** with six displaying positions is used to display frequencies, pulses and times. The required function can be configured quickly and easily via the two front buttons.

Measured values can be easily read on the high-resolution 8 mm high LED display. The self-explanatory programmability of the digital display offers the user enormous time-savings.

The 24 V DC-supplied display in a 48 mm x 24 mm DIN format saves the data if the supply voltage fails. The position of the decimal point is freely selectable. The digital display also has a NPN transistor output that can be used, among other things, for counting applications and is activated in the "zero" position.

Features

- For frequencies, pulses and times
- Programmable
- Data saving with Power Off
- 6 positions displayed
- Display 48 x 24 mm



Make sure you always use the latest documentation.
It can be downloaded at www.download.phoenixcontact.com.
A conversion table is available on the Internet at
www.download.phoenixcontact.com/general/7000_en_00.pdf.

2 Ordering Data

Description	Type	Order No.	Pcs./Pkt
Programmable digital display for frequencies, pulses and times Scope of delivery: Digital display, clamp, front panel for clamp mounting (panel cut-out 50 x 25 mm), front panel for screw mounting (panel cut-out 50 x 25 mm), seal	MCR-SL-D-FIT	2864024	1

3 Technical Data

Input Data	
Signal input	60 kHz, max. (CntDir) 25 kHz, max. (UpDown / Up.Up/Quad 1/ Quad 2) 15 kHz, max. (Quad 4)
Reset input	Setting function at setting value or zero
Pulse time	5 µs, min.
Input sources	NPN/PNP transistor outputs, floating relay contacts
Polarity	Can be programmed jointly for all inputs
Standard switching level	
1 signal („H“)	0.6 x U _B ... 30 V DC
0 signal „L“)	0 V DC ... 0.2 x U _B
Switching level (5 V)	
1 signal („H“)	4 V DC ... 30 V DC
0 signal „L“)	0 V DC ... 2 V DC
Input resistance	10 kΩ
Impulse form	Any (Schmitt trigger input), rectangular pulse 1:1 at maximum frequency
Count frequency	20 kHz can be damped to 30 Hz (max. 11 kHz when using quadrature mode)
Min. pulse length of the reset input	5 ms
Output Data	
Display	7-segment LED; 8 mm; red
Number of the positions displayed	6
Accuracy of tachometer / frequency counter	< 0.1%
Timer accuracy	< 0.005%
Switching Output	
Max. switching voltage	30 V DC
Max. switching current	10 mA
Pulse counter function	Active, at counter reading ≤ 0
Tacho-generator / frequency counter function	Active, at f = 0
Timer function	1 Hz frequency, with active time measurement
Max. switching performance of the optocoupler	30 V / 10 mA
General Data	
Supply voltage U _B	10 V DC ... 30 V DC
Current consumption	40 mA, max.
Data memory	EEPROM 1 mil. memory cycles or 10 years
Degree of protection	IP65 from the front
Ambient temperature (operation)	
at 10 V DC ... 26 V DC	-20°C ... +65°C
at 26 V DC ... 30 V DC	-20°C ... +55°C
Ambient temperature (storage)	-25°C ... +70°C
Control panel cutout	22(+0.6)×45(+0.8) mm

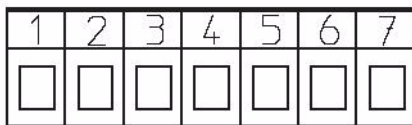
General Data (Continued)

Conductor cross section solid	Pluggable screw connection 0.14 mm ² ... 1 mm ² (AWG 26-16)
stranded	0.14 mm ² ... 1.5 mm ² (AWG 26-16)
Housing material	Macrolon 2405
Noise immunity	EN 61000-6-4; EN 55011 Class B; EN 50082-2
Weight	50 g, approx.
Cleaning	The front of the unit is only to be cleaned with a soft wet (water) cloth.

Conformity / Approvals

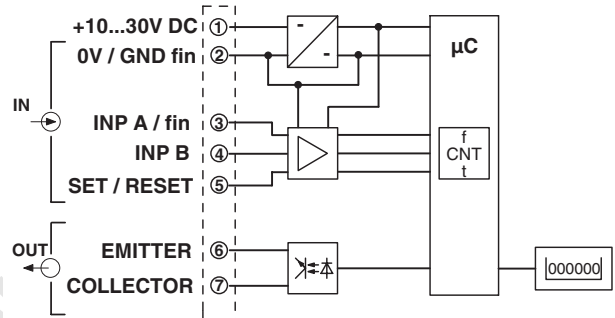
Conformance	CE compliance
UL, USA / Canada	UL applied for

3.1 Terminal Assignment



- 1 10...30 V DC
- 2 0 V/GND f_{in}
- 3 INP A/ f_{in}
- 4 INP B
- 5 SET/RESET
- 6 Emitter
- 7 Collector

3.2 Block Diagram



4 Dimensions

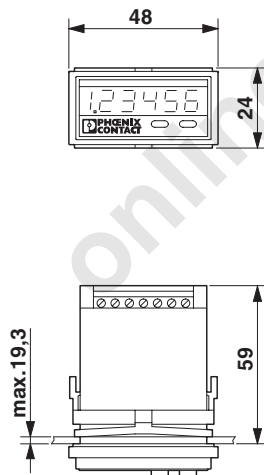


Figure 1 Digital display dimensions (in mm)

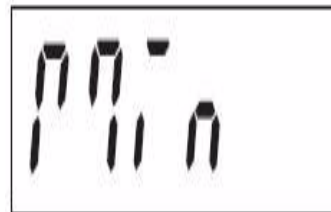


Figure 2 Panel cut-out (in mm)

5 Mounting



Before carrying out any installation or maintenance work, make sure that the power supply of the digital display is switched off.



The digital display is not intended for use in areas with risks of explosion and in the branches excluded by the standard EN 61010-1.

- Insert the digital display into the panel cut-out.
- Connect the inputs to the digital display (see "Terminal Assignment" on page 3).
- Connect the power supply.



We recommend the use of wire end ferrules in order to avoid short-circuits between adjacent terminals.



The digital display shall not be installed near to contactors or motor starters.



In order to keep the interferences at the measuring input as low as possible, the signal and power supply wires must be routed separately.



Use shielded cables for all signal/probe wirings and avoid routing the signal/probe wirings parallel to each other. The shield shall only be grounded at one point in order to avoid ground loops.

5.1 Mounting Frame

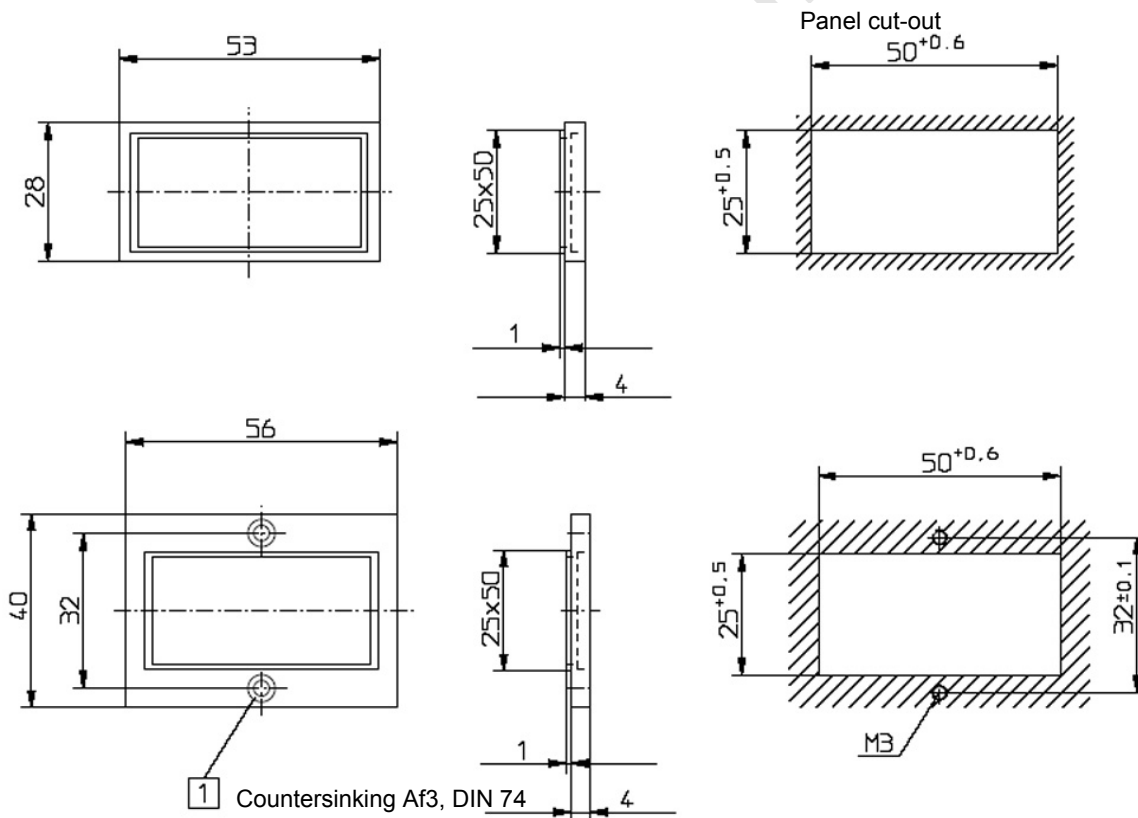


Figure 3 Mounting frame

6 Setting of the Operating Parameters

- Hold down keys on front panel and switch on supply voltage.

The display shows:

After releasing the keys the display alternates between menu title and corresponding menu item with a frequency of 0.5 Hz. After any key is pressed, only the menu item is displayed.

- Pressing the right key, the menu item will be **switched to next value**. To input **numerical values** (e. g. for scaling factor), select first the decade with the left key. The decade blinks. Set now the numerical value using the right key
- Hold down the left key and press the right key to **switch to the next menu title**.
- After programming the last menu item, the **programming routine will be left** (menu "EndPro") and the new values will be stored by switching the menu item to "YES". If you chose "NO", the programming routine will be passed through once again.

7 Programming Routine

The first menu item is the basic function.

7.1 Operating Mode

Operating mode

Pulse counter (see page 5)

Frequency counter (see page 7)

Time meter (see page 9)

8 MCR-SL-D-FIT as Pulse Counter (Adding Counter and Position Indicator)

8.1 Description

- 6-digit adding counter, resettable
- LED display with 8 mm high characters and very high luminosity
- Display range -199999...999999 (overflow condition will be indicated by flashing of the display)
- Programming of count functions and operating parameters via the setting keys. During programming the display guides the user with text prompts.
- Optocoupler output (as option). Active at count values ≤ 0 .
- Programmable features:
 - Input polarity (npn or pnp)
 - Max. count frequency (30 Hz or 20 kHz)
 - Input mode
 - Scaling factor
 - Decimal point
 - Reset mode
 - manual and electrical
 - no reset
 - electrical
 - manual
- Set point

8.2 Inputs

INP A

Dynamic count input. Max. count frequency 30 Hz or 20 kHz programmable via set up

INP B

Dynamic count input. Max. count frequency 30 Hz or 20 kHz programmable via set up

SET/RESET

Dynamic set input. Linked to the red set key.

8.3 Optocoupler Output

Active if count value ≤ 0 . Simple preset counter can be realized, when using subtract mode.

8.4 Programming Routine

Programmable parameters are shown in succession. After one pass, the device is fully programmed.



In each case the first shown item is the factory preset.

8.4.1 Input Polarity

InPol

nPn

Npn: switching to 0 V

PnP

Pnp: switching to +24 V

8.4.2 Activating the 30 Hz Filter

Filter

off

Max. count frequency
20 kHz

on

Max. count frequency
30 Hz

8.4.3 Input Mode

InPut

Cnt.dir

Count input and count direction input
INP A: count input
INP B: count direction input

uP.dn

Differential input
INP A: count input adding
INP B: count input subtracting

QuAd

Quadrature input
INP A: count input 0°
INP B: count input 90°

QuAd 2

Quadrature input with pulse doubling
INP A: count input 0°
INP B: count input 90°
Each pulse edge of INP A will be counted

8.4.4 Scaling Factor

Factor

00.0001

It can be set from 00.0001 up to 99.9999. The decimal point is set to 4 decimal places. "0" won't be accepted!

99.9999

8.4.5 Decimal Point

The decimal point defines the way of displaying the count values. It does not affect counting.

dP

0

0 no decimal place
0.0 one decimal place
0.00 two decimal places
0.000 three decimal places

0.000

8.4.6 Set Mode

rESnrd

MANEL

Manual set (left key) and electrical set

no rES

No set (left key and set input locked)

EL rES

Electrical set only

MANrE

Manual set only

8.4.7 Set Value

The device will be set to the set point by pressing set key or activating set input.

SEtPt

199999

999999

Set value
-199999...999999 (number of decimal places depends on the decimal point option)

8.4.8 End of Programming

EndPro

no

Programming routine will be passed through once again. All parameters can be checked.

YES

Programming routine will be left and the new parameters will be stored.

Afterwards the device is ready to use.

9 MCR-SL-D-FIT as Frequency Meter (and Tachometer)

9.1 Description

- 6-digit tachometer/frequency meter
- LED display with 8 mm high characters and very high luminosity
- Display range -199999...999999 (overflow condition will be indicated by flashing of the display)
- Programming of count functions and operating parameters via the setting keys. During programming the display guides the user with text prompts.
- Optocoupler output (as option). Active at $f = 0$ Hz.
- Programmable features:
 - Input polarity (nnp or pnp)
 - Max. count frequency (30 Hz or 20 kHz)
 - Scaling factor
 - Decimal point
 - Display mode
 - 1/min (rpm)
 - 1/sec (Hz)
 - Time to wait until "0" is displayed

9.2 Inputs

INP

Dynamic count input. Max. count frequency 30 Hz or 20 kHz programmable via set up

9.3 Optocoupler Output

Active at $f = 0$ Hz. Can be used e.g. to activate a "No operation" lamp.

9.4 Programming Routine

Programmable parameters are shown in succession. After one pass, the device is fully programmed.



In each case the first shown item is the factory preset.

9.4.1 Input Polarity

InPOL

nPn

Npn: switching to 0 V

PnP

Pnp: switching to +24 V

9.4.2 Activating the 30 Hz Filter

FILTER

off

Max. count frequency
20 kHz

on

Max. count frequency
30 Hz

9.4.3 Scaling Factor

FACTOR

00.0001

99.9999

It can be set from
00.0001 up to 99.9999.
The decimal point is set
to 4 decimal places. "0"
won't be accepted!

9.4.4 Decimal Point

The decimal point defines the way of displaying the count values. It does not affect counting.

dPtArch

0

0 no decimal place
0.0 one decimal place
0.00 two decimal places
0.000 three decimal
places

0.000

9.4.5 Display Mode Frequency Meter

diSPn7

5Ec - 1

Calculating and display-
ing the value to 1/
sec (Hz)

P7:n - 1

Calculating and display-
ing the value to 1/min

9.4.6 Max. Time to Wait Until "0" is Displayed

This parameter indicates, how long it takes at active mea-
suring, until "0" is displayed

011

Max. time to wait 01.1 s
(min. value)

99.9

Max. time to wait 99.9 s

9.4.7 End of Programming

EndPro

no

Programming routine
will be passed through
once again. All param-
eters can be checked.

YES

Programming routine
will be left and the new
parameters will be
stored.

Afterwards the device is
ready to use.

10 MCR-SL-D-FIT as Time Meter

10.1 Description

- 6-digit time meter, resettable
- LED display with 8 mm high characters and very high luminosity
- Display range 0...999999 with leading zero blanking.
- Programming of count functions and operating parameters via the setting keys. During programming the display guides the user with text prompts.
- Optocoupler output (as option). At active counting the output alternates at 1 Hz between active and inactive.
- Programmable features:
 - Input polarity (npn or pnp)
 - Max. count frequency (30 Hz or 20 kHz)
 - Input mode
 - Operating mode
 - Decimal point
 - Reset mode
 - manual and electrical
 - no reset
 - electrical
 - manual

10.2 Inputs

INP A

Stop input (depending on chosen input mode)

INP B

Start/Stop or gate input (depending on chosen input mode)

RESET

Dynamic reset input. Linked to the left reset key.

10.3 Optocoupler Output

On active counting the output alternates at a frequency of 1 Hz between active and inactive.

10.4 Programming Routine

Programmable parameters are shown in succession. After one pass, the device is fully programmed.



In each case the first shown item is the factory preset.

10.4.1 Input Polarity

InPol

nPn

Npn: switching to 0 V

PnP

Pnp: switching to +24 V

10.4.2 Activating the 30 Hz filter

FILTEr

oFF

Start/Stop inputs: normal operation

oN

Start/Stop inputs: damped, e.g. when using mechanical switches

10.4.3 Input Mode Time Meter

StArT

GAtE.Lo

Start/Stop via INP B. Counting while NP B (gate) inactive or open

GAtE.Hi

Start/Stop via INP B. Counting while INP B (gate) active (High level at pnp; Low level at npn)

Inb.Inb

Counting will be started and stopped via INP B (LOW-HIGH edge at pnp; HIGH-LOW edge at npn). Every active edge changes the counter status.

InA.Inb

Counting will be started via INP A, stopped via INP B (LOW-HIGH edge at pnp; HIGH-LOW edge at npn).

10.4.4 Operating Mode

Mode

SEC

Timing in s (accuracy depending on position of the decimal point*)

min

Timing in min. (accuracy depending on position of the decimal point*)

hour

Timing in h (accuracy depending on position of the decimal point*)

h.min.s

Timing in h:min:s (decimal point will be ignored)

*0; 0.1; 0.01; 0.001 0.001 means: Counting in 0; 0,1; 0,01; 0,001 units of time

10.4.5 Decimal Point

The decimal point defines the resolution of the displayed value.

dpt

0

0 1
0.0 1/10 (0,1)

0.000

0.00 1/100 (0,01)
0.000 1/1000 (0,001)

10.4.6 Reset Mode

reset

MANUEL

Manual reset (left key) and electrical reset

no reset

No reset (left key and reset input locked)

EL reset

Electrical reset only

MANUEL

Manual reset only

10.4.7 End of Programming

EndPro

no

Programming routine will be passed through once again. All parameters can be checked.

YES

Programming routine will be left and the new parameters will be stored.

Afterwards the device is ready to use.