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LARGE SIZE DISPLAY PANELS | 2008

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LARGE SIZE DISPLAY PANELS

CONTENTS

JANUARY 2008

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NUMERICAL DISPLAYS PANEL
DN1, DN2, DN3 TYPES

APPLICATION

Digital displays of DN type can be applied for the visualisation of essential parameters in automation and measurement processes when supervising the quality or working safety.

Information put in a visible place helps in the efficient work in industrial communication, logistics, automation and control technology, and material handling. These displays are destined to be installed in: industrial plants, sports objects, trade buildings and communication areas.

The character height ensures a good visibility and reading from a long distance, up to 120 m.

Digit heights: **DN1** - 100 mm; **DN2** - 200 mm; **DN3** - 300 mm.

Digital displays are offered in four colours: red, green, yellow and blue.

Basic installations are applied for measurements and indications of: temperature, humidity, time, pressure, flow, rotations, pulses, and also the gas content and material quantity. These DN displays together with an external measuring element or transducer can display any physical quantity and co-operate with external devices equipped with an RS-485 digital output with the MODBUS RTU/ASCII protocol.

The configuration of transmission parameters and measuring ranges is made agree with the customer.

Each customer obtains a service manual together with the display unit. The standard version includes the digital diode display field and the unit field. The number of characters and the display colour are expressed by the ordering code or defined by the customer.

The display field brightness is established automatically in accordance with external conditions. The unit can be selected from the list inserted in the ordering code or defined by the user.

TECHNICAL DATA

Power consumption of the single display module:

DN1	2 W
DN2	5 W
DN3	5 W

Read-out field:

DN1	100 mm (digit height)
DN2	200 mm
DN3	300 mm

Communication:

- serial interface	RS-485
- transmission protocol	MODBUS RTU/ASCII

Reaction against supply decay and recovery:

- preservation of configuration data
- continuation of work after supply recovery

Environmental and rated operating conditions:

- ambient temperature	-20...23...55°C
- storage temperature	-20... 80°C
- humidity	20... 80%
- supply	195... 253 V
- external magnetic field	0...40...400 A/m.
- working position	any
- preheating time	1 min

Standards fulfilled by the display:

Electromagnetic compatibility:

- immunity	acc. EN-50082-2
- emission	acc. EN-50081-2

Safety requirements:

acc. IEC 61010-1+A1 standard:

- insulation ensured through the housing	double
- insulation between circuits	basic
- installation category	III
- pollution degree	2
- maximal phase-to-earth working voltage	600 V a.c.

Protection grade ensured by the housing	IP 54
Weight	depending on version

CHOICE OF THE DISPLAY CHARACTER SIZE

In order to ensure the optimal read-out for each application one must choose the appropriate height of the display digit.

Dependence between the read-out distance and the digit size

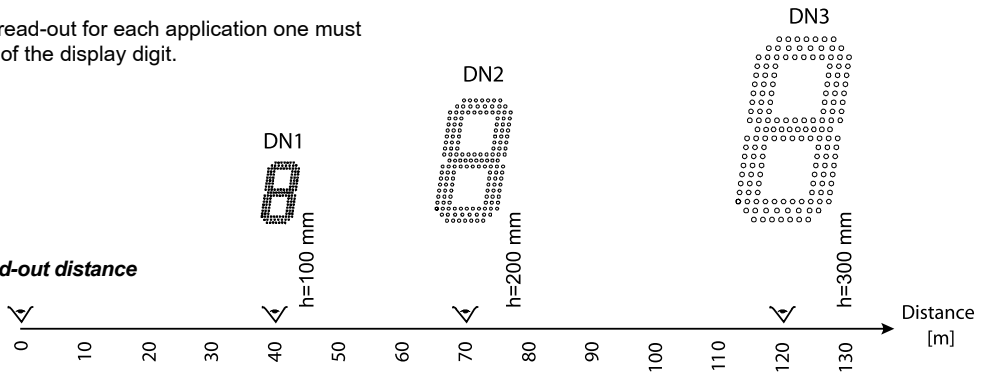

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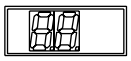
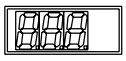
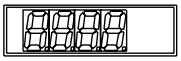
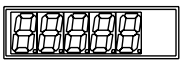
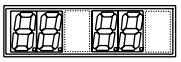
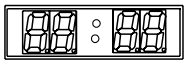
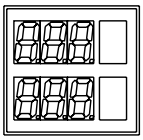
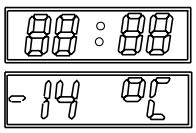
Table 1

Code nr	Kind of display	number of digits	Display overal dimensions [mm]			Assembly dimensions [mm]		
			DN1	DN2	DN3	DN1	DN2	DN3
1		2 digits	a = 415 b = 77 h = 160	a = 560 b = 77 h = 264	a = 820 b = 100 h = 370	c = 220 d = 50 L = 250	c = 320 d = 75 L = 350	c = 450 d = 80 L = 450
2		3 digits	a = 415 b = 77 h = 160	a = 560 b = 77 h = 264	a = 820 b = 100 h = 370	c = 220 d = 50 L = 250	c = 320 d = 75 L = 350	c = 450 d = 80 L = 450
3		4 digits	a = 593 b = 77 h = 160	a = 810 b = 77 h = 264	a = 1200 b = 100 h = 370	c = 320 d = 50 L = 420	c = 430 d = 75 L = 480	c = 850 d = 80 L = 710
4		5 digits	a = 593 b = 77 h = 160	a = 810 b = 77 h = 264	a = 1200 b = 100 h = 370	c = 320 d = 50 L = 420	c = 430 d = 75 L = 480	c = 850 d = 80 L = 710
5		2x 2 digits	a = 593 b = 77 h = 160	a = 810 b = 77 h = 264	a = 1200 b = 100 h = 370	c = 320 d = 50 L = 420	c = 430 d = 75 L = 480	c = 850 d = 80 L = 710
6		clock	a = 593 b = 77 h = 160	a = 810 b = 77 h = 264	a = 1200 b = 100 h = 370	c = 320 d = 50 L = 420	c = 430 d = 75 L = 480	c = 850 d = 80 L = 710
7		2x 3 digits 2 rows	a = 415 b = 77 h = 270	a = 560 b = 77 h = 478	a = 820 b = 100 h = 680	c = 220 d = 50 L = 250	c = 320 d = 75 L = 350	c = 450 d = 80 L = 450
8*	 **Note:** Alternate display every 10 sec. Clock synchronized by DCF signal.	clock + temperature			A = 1200 B = 100 H = 370			C = 850 D = 80 L = 450

* Concerns DN3

Kind of displays and display overall dimensions

Table 2

Unit	Code	Unit	Code	Unit	Code	Unit	Code
lack	**00**	Hz	**17**	s	**34**	CO	**51**
mV	**01**	kHz	**18**	min	**35**	CO_2	**52**
V	**02**	MHz	**19**	h	**36**	I	**53**
kV	**03**	%	**20**	mm	**37**	l/min	**54**
mA	**04**	°C	**21**	cm	**38**	l/h	**55**
A	**05**	°F	**22**	m	**39**	mg	**56**
kA	**06**	K	**23**	m^3	**40**	kg	**57**
kW	**07**	% H_2O	**24**	m/s	**41**	Mg	**58**
MW	**08**	mbar	**25**	m/h	**42**	k/h	**59**
var	**09**	Bar	**26**	km/h	**43**	Mg/h	**60**
kvar	**10**	mmH_2O	**27**	m^3/h	**44**	N	**61**
Mvar	**11**	mmHg	**28**	revolutions	**45**	kN	**62**
kWh	**12**	Pa	**29**	r.p.m.	**46**	mg/l	**63**
Ω	**13**	hPa	**30**	rad	**47**		
kΩ	**14**	kPa	**31**	pieces	**48**		
µS	**15**	MPa	**32**	pcs/h	**49**		
mS	**16**	pH	**33**	O_2	**50**		

Table 3

Displayed quantities	Code number
Without measuring quantity	**0**
Temperature measurement *Measuring range	**1**
Humidity measurement *Measuring range	**2**
Temperature and humidity measurement *Measuring ranges	**3**
Pressure measurement *Measuring range	**4**
Measurement of the real time *Measuring range	**5**
Measurement of pulses, revolutions, working time *Measuring ranges	**6**
Measurement of power network parameters *Measuring ranges	**7**
Measurement of current and voltage standard signals *Measuring ranges	**8**

* **NOTE:** When ordering, one must contact the Export Dept in order to establish the display way, the choice of devices and measuring ranges displayed on the display.

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ORDERING CODES

NUMERICAL DISPLAY DN	X	X	X	X	X	XX	XX	X	XX	X

Digit height:
100 mm **1**
200 mm **2**
300 mm **3**

Kind of display:
code acc. table 1 (exec. 8 concerns DN3) ..... **X**
on order * **9**

Digit colour of the first display field:
red ..... **R**
yellow ..... **Y**
green ..... **G**
blue*** (concerns exec. 1...4 and 6 acc table 1) ..... **B**

Digit colour of the second display field:
lack of second field **0**
red ..... **R**
yellow ..... **Y**
green ..... **G**
blue ..... **B**

Way of fixing:
on the wall **1**
suspended **2**
on order * **9**

Unit of the first display field:
code number of the unit acc. table 2 ..... **XX**
on order * **99**

Unit of the second display field:
code number of the unit acc. table 2 ..... **XX**
on order * **99**

Quantity displayed and measuring device:
acc. table 3 ..... **X**
on order * **9**

Version:
standard **00**
custom-made** ..... **XX**

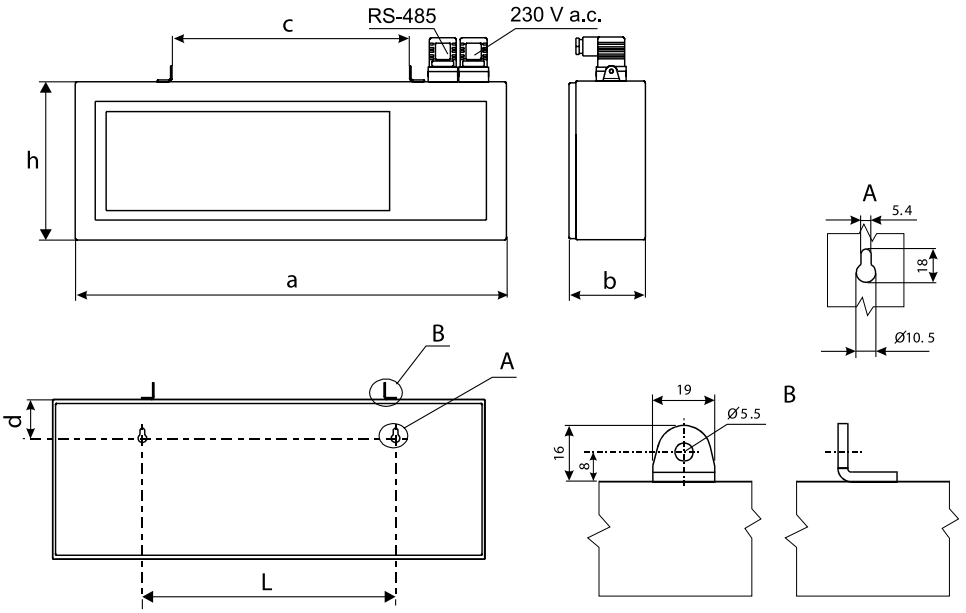
Acceptance tests:
without a quality certificate **8**
with a quality certificate **7**
acc. customer's agreement ** ..... **X**

* After manufacturer's agreement
** The code number will be established by the manufacturer
*** Concerns DN1

EXAMPLE OF ORDER

Code DN 1 7 R Y 1 21 24 3 00 0 means:

DN - Large size numerical display
1 - digit height = 100 mm
7 - quantities are displayed in two rows of 3 digits (table 2)
R - colour of the first display field
Y - colour of the second display field
1 - to be fixed on a wall
21 - °C unit (table 2)
24 - % H2O unit (table 2)
3 - with a temperature and humidity transducer (table 3)
00 - standard version
0 - without an extra quality inspection certificate



Display dimensions and layout of holes and fixing grips.

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NUMERICAL DISPLAY FOR FILLING STATIONS DN4 TYPE

APPLICATION

Displays of DN4 type are destined to display prices in filling stations.

Dimensions and fastening of diodes displays are in accordance with standard electro-mechanic displays of 230 or 300 mm high and can be applied as interchangeable parts.

Together with displays, we can deliver a special software enabling the easy service and price modification. The introduction of displayed values or the controller configuration is carried out from a PC computer through RS-485 digital interface with MODBUS RTU protocol.

These displays match automatically their brightness to the level of external light.

TECHNICAL DATA

Display field:

- digit height	230 or 300 mm
- colour	yellow or red

Communication:

- serial interface	RS-485, galvanically separated
- transmission protocol	MODBUS RTU
- serviced functions	03, 16, 17

Reaction against decays and supply recoveries: preservation of configuration data

Power consumption: ≤ 15 VA

Reference conditions and rated operating conditions:

- working temperature	0...23...60°C
- storage temperature	-40...75°C
- relative humidity	25...95%
- voltage supply	15 ± 0.5 Vd.c.
- external magnetic field	0...40...400 A/m.
- working position	any

Standards fulfilled by panels:

Electromagnetic compatibility:

- immunity	EN 61000-6-2
- emission	EN 61000-6-4
- resistance against supply decays	EN 61000-6-2

Safety requirements:

acc. to EN 61000 -1 standard

- insulation ensured by the housing	basic
- insulation between circuits	basic
- installation category	III
- pollution level	2
- maximal phase-to-earth working voltage:	
- for supply circuits	300 V
- for other circuits	50 V

EXECUTION CODES AND ORDERING

DISPLAY FOR FILLING STATIONS	DN4	X	X	X	XX	X

Digit height:
230 mm **1**
300 mm **2**

display with controller **1**
display without controller **2**

Digit Colour:
yellow **1**
red **2**

Kind of version:
standard version **00**
custom–made version* ..... **XX**

Acceptance tests:
without a quality inspection certificate **8**
with a quality inspection certificate **7**
acc. to customer's agreement* ..... **X**

EXAMPLE OF ORDER

Code DN4 1 1 00 8 means:

DN4 – Large size display for filling stations
1 - digit height: 23
1 - execution with a controller
1 - digit colour: yellow
00 – standard version
8 – without an additional quality inspection

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NUMERICAL DISPLAY PANEL DL1 TYPE

APPLICATION

Large size digital display panel of DL1 type is destined to display the measured value or the set point through the communication interface. It is destined for indoor applications.

Taking in consideration the brightness of panel segments and the housing execution, they are destined to be applied inside buildings.

These panels find application to display digital quantities in office accommodations, production workshops, in production management rooms, as information panels about production parameters, state of machines or devices.

The displayed value on the display can be transmitted from external devices operating in MODBUS standard. It is possible to configure the display to work as “Master” or “Slave”.

Moreover, the display panel enables to connect up to 10 slave devices to it, and can fulfill the role of a local point for data acquisition. All data read out from slave devices can be read out through the RS-485 interface.

DL1 display panels are equipped with two RS-485 communication interfaces operating in the MODBUS RTU standard.

One of the interfaces is destined to connect slave devices, however the second interface is destined to configure the display or to introduce the displayed value (the display fulfils the role of a slave in the MODBUS network).

The basic display option includes four or eight digits laying out suitably in one or two rows.

It is possible to execute a display panel composed of DL1 digits in the defined configuration by the customer.

TECHNICAL DATA

Power consumption:

version 01... 02	< 15 VA
version 03... 06	< 30 VA

Read-out field:

version 01... 02	one row composed of 4 digits of height = 100 mm
version 03... 06	two rows composed of 8 digits of height = 100 mm

Communication:

- interface	2 x RS-485 galvanically separated
- transmission protocol	MODBUS RTU
- serviced functions	03, 16, 17

Reaction against decay and supply recovery:
- preservation of configuration data in the display

Protection degree ensured by:

- the housing	IP 40
- rear side (terminals)	IP 10

Dimensions depending on version code

Auxiliary measuring inputs:

- range	4... 20 mA
- class	0.2%
- input resistance	10 Ω
- error caused by changes of the ambient temperature	0.1%/10°C

Environmental and rated operating conditions:

- working temperature	0...23...50°C
- storage temperature	-20... 75°C
- humidity	25... 95%
- supply	85...230... 253 V a.c.
- frequency	45...50... 60 Hz
- external magnetic field	0...40...400 A/m.
- working position	any

Standards fulfilled by the panel:

Electromagnetic compatibility:

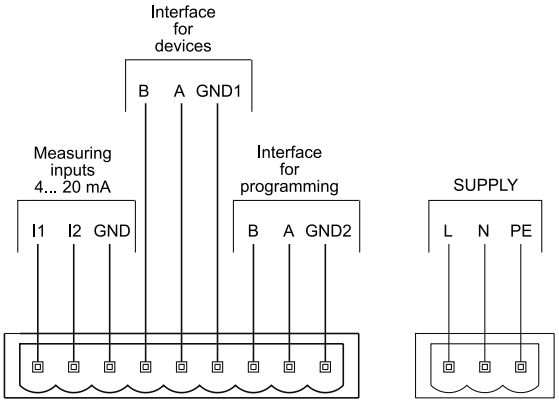
- noise immunity	acc. to EN 61000-6-2
- noise emissions	acc. to EN 61000-6-4
- resistance to supply decay	acc. to EN 61000-6-2

Safety requirements:

acc. IEC 61010-1+A1 standard:

- insulation ensured by the housing	basic
- insulation between circuits	basic
- installation category	III
- pollution grade	2
- maximal phase-to-earth	300 V for supply circuits and operating voltage 50 V for other circuits

ELECTRICAL CONNECTIONS



Caution: measuring inputs I1 and I2 have a common mass potential, which the quantity of measured input signal is reffered to.

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EXTERNAL AND ASSEMBLY DIMENSIONS

The panel housing is made of aluminum. The protection grade ensured by the housing is defined as IP40, and IP10 from the terminal side. The view of the panel and overall dimensions are exposed on the fig. 1 and 2.

The display panel design enables to fix the panel on a wall or by suspension.

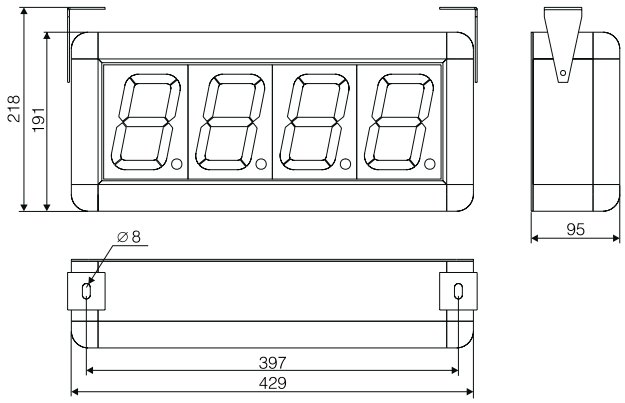

Fig.1. Panel dimensions in one-row version

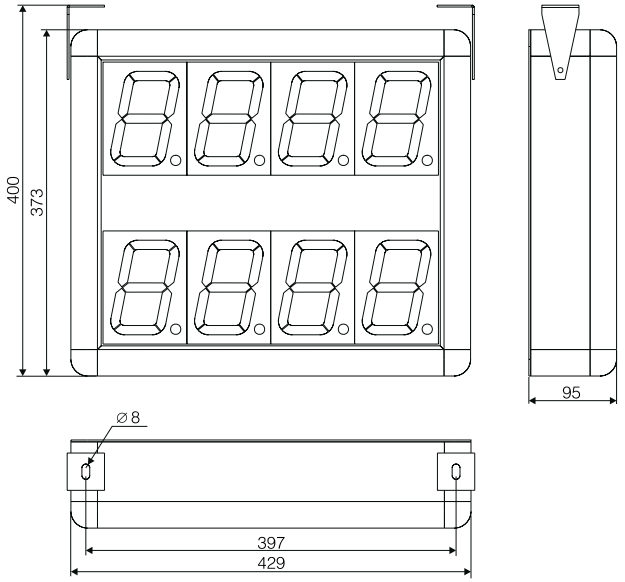

Fig.2. Panel dimensions in two-row version

ORDER CODES

NUMERICAL DISPLAY PANEL	DL1 -	XX

Panel type:	
one row composed of four red digits	01
one row composed of four yellow digits	02
two rows with four digits in the row: upper row in red colour lower row in red colour	03
two rows with four digits in the row: upper row in red colour lower row in yellow colour	04
two rows with four digits in the row: upper row in yellow colour lower row in red colour	05
two rows with four digits in the row: upper row in yellow colour lower row in yellow colour	06
two rows with four digits in the row	XX[1]

1) The numbering will be established by the manufacturer

ORDERING EXAMPLE

The Code: **DL1 - 04** means:

DL1 - digital panel display

04 - with four digit in the row:
upper row: red colour
lower row: yellow colour

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NUMERICAL DISPLAY PANEL
DL11, DL12, DL13 types

APPLICATION

Large-size numerical displays of DL type are destined to display measured values or set values through the communication interface. Taking in consideration the application of 7-segment LED display they are destined to be installed inside buildings.

The 100 mm digit height ensures a good readout from the distance of 40 m.

They find application in office accommodations, production workshops, in production management rooms as information about production parameters, state of machines or devices. The displayed value is transmitted from external devices working in MODBUS standard. The display is working as the network „master". The basic display version includes three digits and the unit, in two rows or three rows. It is possible to make the display in the configuration required by the customer.

DIGITAL DATA

Readout field:

Digit height: 100 mm

DL11 one row of 3 digits + unit field
DL12 two rows of 3 digits + unit field
DL13 three rows of 3 digits + unit field

Colour of the readout field:

red, green and yellow - possibility of colour combination for DL12 and DL13

Power consumption:

DL11	< 12 VA
DL12	< 24 VA
DL13	< 36 VA

Communication:

- interface	RS-485
- transmission protocol	MODBUS

Reaction against decay and supply recovery:
- preservation of configuration data in the display

Protection grade ensured by the housing IP 40

Dimensions:

DL11	482 × 196 × 41 mm
DL12	482 × 368 × 41 mm
DL13	482 × 540 × 41 mm

Environmental and rated operating conditions:

- ambient temperature	0...23...50°C
- storage temperature	-20... 75°C
- humidity	25... 95%
- supply	85...230... 253 V a.c.
- frequency	45...50...60 Hz
- external magnetic field	0...40...400 A/m.
- working position	any

Standards fulfilled by the panel:

Electromagnetic compatibility:

- noise immunity	acc. to EN 61000-6-2
- noise emissions	acc. to EN 61000-6-4
- resistance to supply decay	acc. to EN 61000-6-2

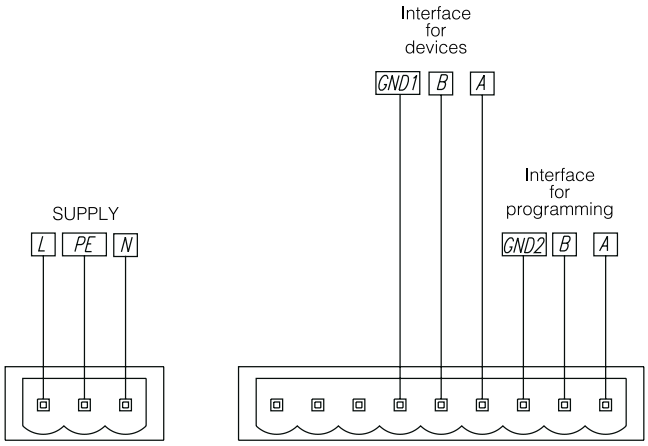
Safety requirements:

acc. IEC 61010-1+A1 standard:

- isolation ensured by the housing	basic
- isolation between circuits	basic
- installation category	III
- pollution degree	2
- maximal working voltage in relation to earth for supply circuits	300 V and 50 V for others circuits

ELECTRICAL CONNECTIONS

Wires of 1 m long for the connection of the supply and display control signals, are led out from the lateral housing side.



Markings of connectors for DL11, DL12, DL13:
- supply 3 × 0.75 mm² [L, N, PE],
- interface 3 × 0.34 mm² [A, B, GND].

Fig. 1

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DESIGN DESCRIPTION AND INSTALLATION

The display housing is made of profiles and aluminium sheets, painted in black colour. The frontal surface is made of polycarbonate as an anti-reflexive glass. The protection degree ensured by the housing is defined as IP40.

The view and overall dimensions of DL11, DL12 and DL13 displays are presented on fig. 1, 2 and 3.

The design enables to fix the display on a wall.

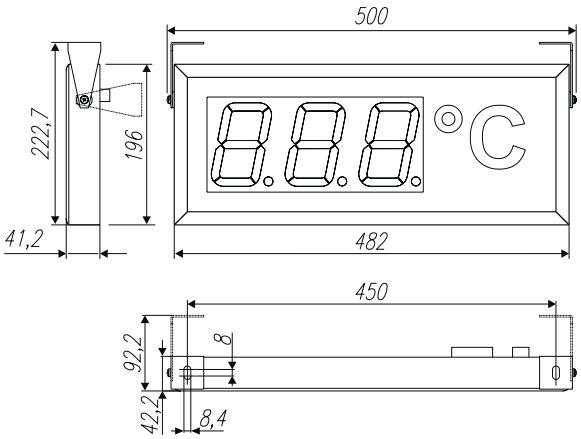

Fig. 2. overall dimensions of the DL11 display.

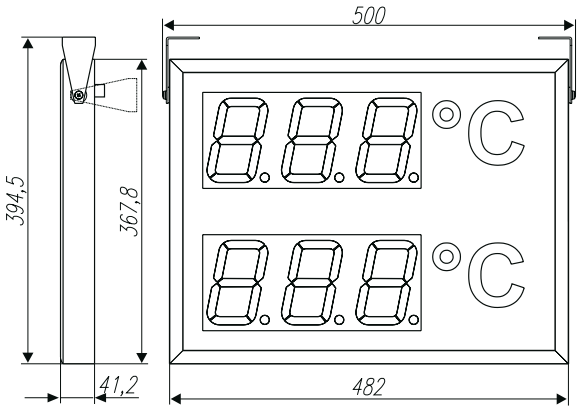

Fig. 3. overall dimensions of the DL12 display.

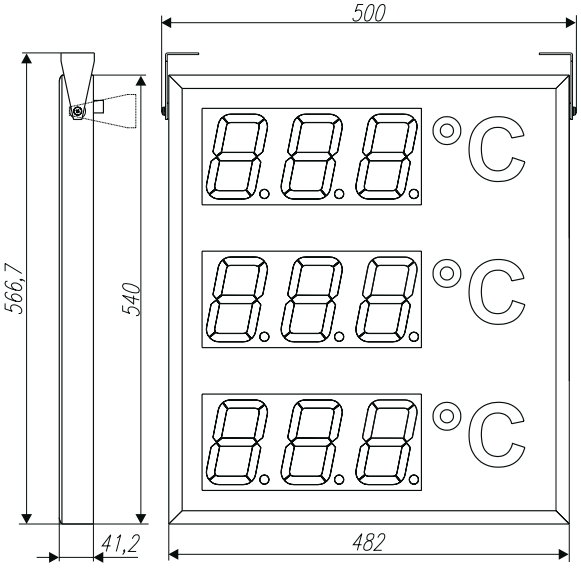

Fig. 4. overall dimensions of the DL13 display.

ORDER CODES

Table 1

NUMERICAL DISPLAY	DL11 -	X	XX

Colour of display field:
Red ..... **R**
Yellow ..... **Y**
Green ..... **G**

Kind of versions:
Standard **00**
custom-made* ..... **XX**

Table 2

NUMERICAL DISPLAY	DL12 -	X	X	XX

Colour of the I display field:
Red ..... **R**
Yellow ..... **Y**
Green ..... **G**

Colour of the II display field:
Red ..... **R**
Yellow ..... **Y**
Green ..... **G**

Kind of versions:
Standard **00**
custom-made* ..... **XX**

Table 3

NUMERICAL DISPLAY	DL13 -	X	X	X	XX

Colour of the I display field:
Red ..... **R**
Yellow ..... **Y**
Green ..... **G**

Colour of the II display field:
Red ..... **R**
Yellow ..... **Y**
Green ..... **G**

Colour of the III display field:
Red ..... **R**
Yellow ..... **Y**
Green ..... **G**

Kind of versions:
Standard **00**
custom-made* ..... **XX**

* The code number is established by the manufacturer

Caution: when ordering, one must give communication parameters of the measuring devices

Coding Example

The Code: **DL13 - R Y G 00** means:

DL13 - Digital display consisting of 3 rows
R - digits in the upper are red
Y - digits in the middle row are yellow
G - digits in the lower row are green
00 - in standard version

Other versions of displays are possible acc. customer's needs after agreeing with the manufacturer.

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DIGITAL CLOCKS
DZ2 and DZ3 TYPES

CE

APPLICATIONS

The DZ digital clock shows the date and time alternately. The quantity switching over is set arbitrarily. The default value is equal 5 seconds.

These digital clocks are intended to be installed outside and inside shops, by production lines, in stores, refrigeration plants, sports and commercial objects.

The DZ2 clock (digits of 200 mm high) ensures a good readout from 80 m distance. The DZ3 clock (digits of 300 mm high) ensures a good readout from 120 m distance. These clocks are offered with digits in 3 versions of colours: red, green and yellow.

DZ clocks co-operate with an external DCF receiver, atomic time standard. These clocks are synchronized every now and again with the time standard. They have additionally the RS-485 interface with MODBUS RTU protocol. This interface enables to set the clock in case when the DCF signal is too weak and there is no possibility to synchronize the clock with the time standard.

The luminosity of digits is programmed by the user taking into consideration the night-time.

TECHNICAL DATA

Power consumption max 45 W

Readout field:

- **DZ2** 10 characters of 200 mm high 8 digits + 2 special characters (colon, hyphen, comma) digit colour: red, yellow, green,
- **DZ3** 10 characters of 300 mm high 8 digits + 2 special characters (colon, hyphen, comma) digit colour: red, yellow, green,

Communication:

- serial interface RS-485
- transmission protocol MODBUS RTU

Reaction to decays and supply recoveries:

- preservation of configuration data,
- continued operation after supply recovery.

Protection degree ensured by the housing IP 54

Dimensions:

	DZ2	DZ3
- width	1510 mm	2020 mm
- height	285 mm	360 mm
- depth	77 mm	77 mm

Reference conditions and rating operating conditions:

- operating temperature -10... 23... 55°C
- storage temperature -20... 80°C
- humidity 25... 95%
- supply 85... 253 V
- external magnetic field 0...40...400 A/m
- operating position any
- heating time 1 minute

Standards fulfilled by the digital clock:

Electromagnetic compatibility:

- noise immunity acc. to EN 61000-6-2
- noise emission acc. to EN 61000-6-4

Safety requirements:

According to EN 61010-1 standard:

- isolation ensured by the housing: basic
- isolation between circuits: basic
- installation category: III
- pollution level: 2
- maximal phase-to-earth voltage:
  - supply 300 V a.c.
  - interface 50 V a. c.

DESIGN AND INSTALLATION

The clock housing is made of steel sheet with the possibility to fix it on a wall or suspend the digital clock. The protection degree is IP54. Housing dimensions:

DZ2: 1510 × 284 × 77 mm, DZ3: 2020 × 360 × 77 mm

The DCF receiver is fixed separately and should be distant from electromagnetic field sources, current-carrying wires, big metallic objects, and electronic devices.

If it is possible, the receiver should be situated outside the building. The DCF signal is broadcasted from Germany in the shape of 0.1 sec. and 0.2 sec. pulses, in one second' intervals. If the DCF receiver is properly situated, the receiver diode lights during 0.1 or 0.2 sec and goes off within 0.9 or 0.8 sec.

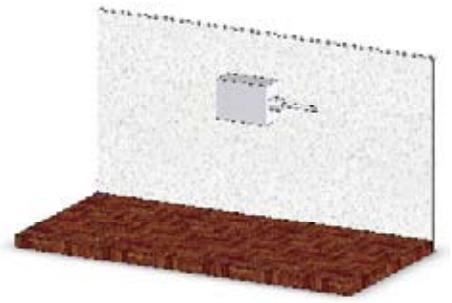

Fig. 1. Fixing way of the DCF receiver

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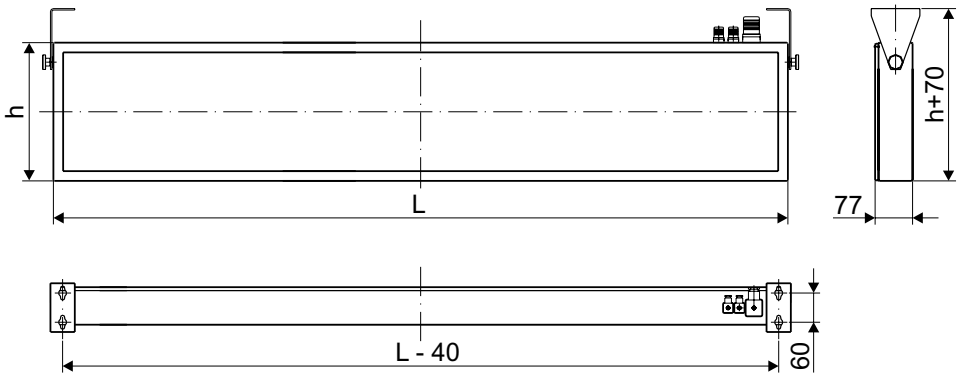

Dimensions	DZ2	DZ3
L	1510	2020
h	284	360

Fig. 2. Overall dimensions of DZ2 and DZ3 digital clocks and layout of holes and suspension clamps

WIRING CONNECTIONS

The clock set includes two female cable connectors: a 3-pole supplying connector and a 4-pole interface connector. The DCF receiver is delivered with a plug. One must perform electrical connectors acc. to the Fig. 3.

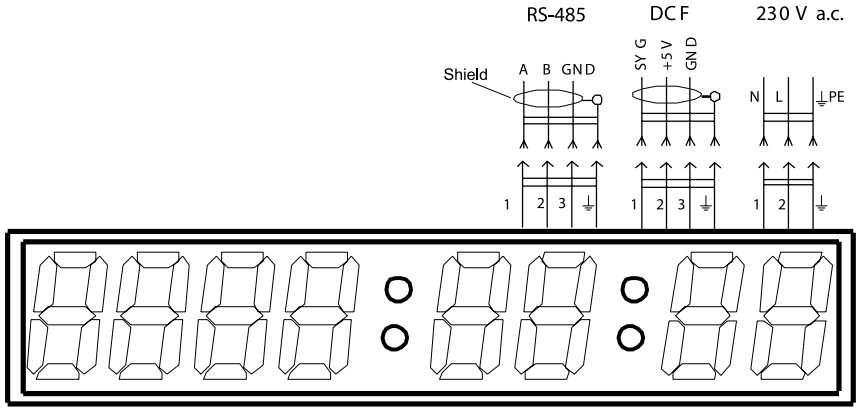

Fig. 3. Electrical connections

ORDERING CODES

Table 2

DIGITAL CLOCK DZ	X-	X	XX
Digit height:			
200 mm.....**2**			
300 mm.....**3**			
Digit colour on the display field:			
red .....**R**			
yellow.....**Y**			
green .....**G**			
Version:			
standard.....**00**			
custom-made* ..... **XX**			

* The code number will be established by the manufacturer

Ordering example:

Code: **DZ 2 - R 00** means:
DZ2 - digital clock with digits of 200 mm high,
R - digit colour on display: red,
00 - standard version

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DIGITAL CLOCK
DLZ TYPE

APPLICATIONS

Large size digital clocks of DLZ type are destined to display the current time inside accomodations. Moreover, they enable the display of the current date, and also the temperature and humidity, in connection with the temperature and humidity P18 transducer. Equipment of the DLZ clock with the communication interface enables its freely configuration, and thanks to a second RS-485 interface built-in, the co-operation with a temperature and humidity transducer is possible. Values resd out from the transducer can be read out by the user through the interface destined for the communication with the user. DLZ digital clocks possess a programmed change of the display brightness, what allows energy saving when the digital clock work is not necessary or a full brightness could dazzle the users. Digital clocks of DLZ series find application everywhere when there is necessary to display the current time, date, temperature and humidity.
It is possible to realize the clock according to customer's requirements.

DESIGN AND INSTALLATION

The DLZ digital clock housing is made of aluminium profiles painted in black colour. The housing ensures the IP40 protection degree, and IP20 from the terminal side. The view and clock dimensions are presented on the fig. 1

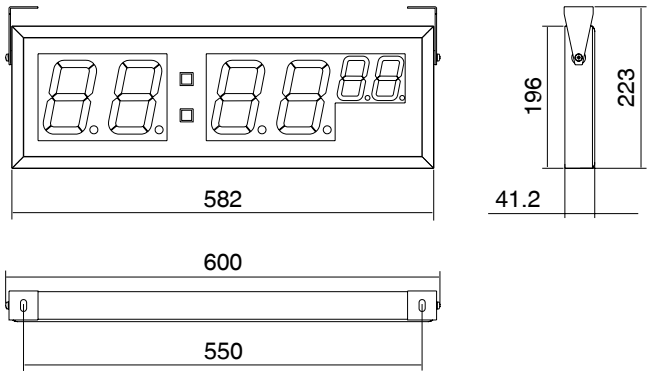

Fig. 1 View of the DLZ clock and overall dimensions

TECHNICAL DATA

Readout field:

The readout field is composed of 7-segment matrix displays

- digit height	100 mm and 57 mm
- display colour	red
- programmable brightness	
Power consumption:	≤ 15 VA
Communication:	
- serial interface	2 × RS-485, galvanically separated
- transmission protocol	MODBUS RTU
- serviced functions:	03, 16, 17
- data format:	8n1, 8n2, 8e1, 8o1
- baud rate [Kb/s]	2.4, 4.8, 9.6, 14.4, 19.2, 28.8, 38.4, 57.6, 76.8, 115.2
- maximal time till the response beginning	<300 ms
Reaction against decays and supply recoveries:	preservation of configured data
Protection degree ensured by the housing:	IP40, and IP20 from the terminal side
Dimensions:	see fig. 1

Reference conditions and rated operating conditions:

- working temperature	0...23...50°C
- storage temperature	-20...75°C
- relative humidity	25...95%
- voltage supply	85...230...253 V a.c.
- frequency	40...50...60 Hz
- external magnetic field	0...40...400 A/m.
- working position	any

Standards fulfilled by panels:
Electromagnetic compatibility:

- immunity	EN 61000-6-2
- emission	EN 61000-6-4
- resistance against supply decays	EN 61000-6-2

Safety requirements:
acc. to EN 61010-1 standard

-insulation ensured by the housing	basic
-insulation between circuits	basic
- installation category	III
- pollution level	2
- maximal phase-to-earth working voltage:	
- for supply	300 V
- for interface circuit	50 V

EXECUTION CODES AND ORDERING

LARGE SIZE DIGITAL CLOCK	DLZ	XX	X

Kind of version:

standard	**00**
custom-made*	**XX**

Acceptance tests:

without a quality inspection certificate	**8**
with a quality inspection certificate	**7**
acc. to customer's agreement*	**X**

* The code number will be established by the manufacturer

EXAMPLE OF ORDER

Code DLZ 1 00 8 means:

DLZ – Large size digital clock
1 – standard type. Digits in red colour
00 – standard version
8 – without an additional quality inspection certificate.

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ALPHANUMERICAL DISPLAYS

DA1 TYPE

APPLICATIONS

Alphanumeric displays are destined to display messages inside buildings and can be applied:

- in selling points to display publicity, price lists, information for customers,
- in banks to display information about: exchange rate, interest rate, publicity, information for customers,
- in concert halls, museums as information about repertoire, informative or welcoming boards for visitors,
- as informative boards in different offices (e.g. Marketing Departments),
- in railway and bus stations or airports as informative boards for travellers,
- in office building halls, as publicity or informative boards destined to display publicity or parameters, e.g. about the weather,
- in office buildings of production plants to display information about the production state (e.g. number of produced pieces, temperature, pressure, etc.),
- in the judiciary as informative boards.

Situated in a visible place, information helps in the efficient work in industrial communication, logistics, automation, selling and control technology.

These alphanumeric displays are offered in three colours of the read-out field: red, green or yellow. They co-operate with external measuring devices equipped with RS-485 interface with MODBUS RTU protocol. It is possible to visualise the technological process and transmit messages from devices.

The basic version of these displays signs includes two lines of 20 characters, or three lines of 24 characters in the text version or a graphical field of 16 × 120 points or 32 × 144 points.

Custom-made display boards can be specially designed for other applications.

In such a case, different number heights and character resolutions in one board can be worked out after agreement with customers.

TECHNICAL DATA

Power consumption:

DA1-01	≤ 60 VA
DA1-02	≤ 90 VA
DA1-03	≤ 60 VA
DA1-04	≤ 125 VA

Read-out field:

DA1-01	Text, 2 lines of 20 characters each
DA1-02	Text, 3 lines of 24 characters each
DA1-03	Graphical, 16 × 120 points
DA1-04	Graphical, 32 × 144 points

Communication:

- serial interface (DA1 → PC)	RS-485 and/or RS232
- serial interface (DA1 → measuring device)	RS-485
- transmission protocol	MODBUS RTU
Reaction against decays and supply recoveries	preservation of configuration data
Protection grade ensured by the housing	IP 40
Dimensions	depending on version (see fig.2)

Reference conditions and rated operating conditions:

- working temperature	0...23...55°C
- storage temperature	- 20... 75°C
- relative humidity	25... 95%
- voltage supply	100...230...240 V a.c.
- frequency	45...50...60 Hz
- external magnetic field	0...40...400 A/m
- working position	any

Standards fulfilled by DA1 display-systems:

Electromagnetic compatibility:

- immunity	EN 61000-6-2
- emission	EN 61000-6-4
- resistance against supply decays	EN 61000-6-2

Safety requirements:

acc. to EN 61000-1:2002(U) standard

- insulation ensured by the housing	basic
- insulation between circuits	basic
- installation category	II
- pollution level	2
- maximal phase-to-earth working voltage:	
- for supply	300 V
- for interface circuit	50 V

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OVERALL AND MOUNTING DIMENSIONS

The housing of the DA1 alphanumeric displays is made of aluminium.
The safety degree ensured by the housing is defined as IP40.
The view of the board is shown on the fig.1.
Housing dimensions, depending on the version are presented on the fig.2.

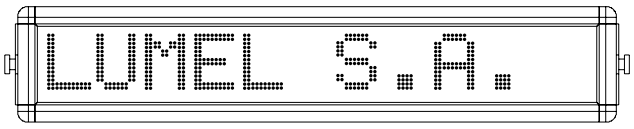
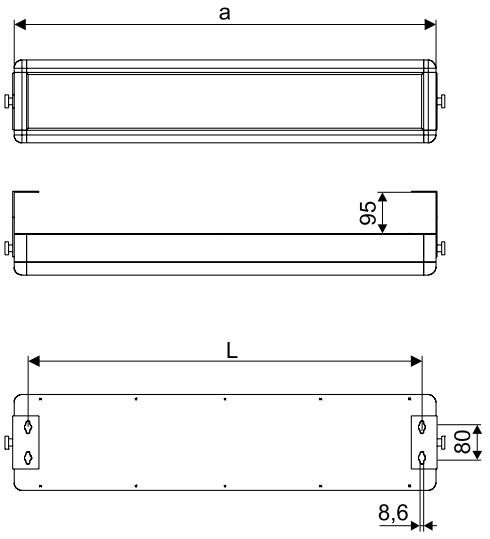
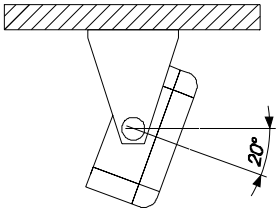


Fig. 1. DA1 board

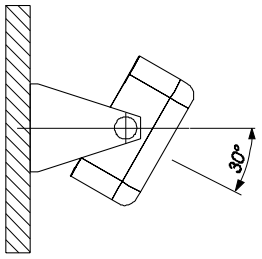


Types of board	Read-out field	Board overall dimensions [mm]			Dimensions of assembly holders [mm]	
		a	b	h	c	L
01	2 lines of 20 characters	971	93.5	218	190.5	907
02	3 lines of 24 characters	1151	93.5	308	190.5	1108
03	graphical 16×120 points	971	93.5	218	190.5	907
04	graphical 32×144 points	1151	93.5	308	190.5	1108

Fig. 2 Board dimensions and spacing of holes and assembly holders.



Suspension of the board



Fixing of the board on the wall

ORDERING CODES

LARGE SIZE ALPHANUMERIC DISPLAY	DA1	XX	X	X

Board type:
with text 2 × 20 characters (character height h = 60 mm) **01**
with text 3 × 24 characters (character height h = 60 mm) **02**
graphical 16 × 120 points **03**
graphical 32 × 144 points **04**
on order ..... **XX**

Colour:
red ..... **R**
green ..... **G**
yellow ..... **Y**

Interface for programming:
RS232 ..... **0**
RS485 ..... **1**
RS232+RS485 ..... **2**
Ethernet **3**
Profibus DP **4**
CAN **5**

EXAMPLE OF ORDER EXAMPLE

The code **DA1 01 R 2** means:
DA1- alphanumeric display of DA1 type,
01 - version with 2 x 20 character text,
R - red colour displays,
2 - with RS232 and RS-485 interfaces.

Note: It is possible to order a board with built-in a light sensor

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ALPHANUMERICAL DISPLAYS (for indoor applications) DA2 TYPE

Reference conditions and rated operating conditions:

- working temperature	0...23...55°C
- storage temperature	- 10... 80°C
- relative humidity	25... 95%
- voltage supply	195... 253 V a.c.
- frequency	45...50...60 Hz
- external magnetic field	0...40...400 A/m
- working position	any
- preheating time	1 min.

Standards fulfilled by DA2 display-systems:

Electromagnetic compatibility:

- immunity	EN 61000-6-2
- emission	EN 61000-6-4
- resistance against supply decays	EN 61000-6-2

Safety requirements:

acc. to EN 61000-1 standard

- insulation ensured by the housing	basic
- insulation between circuits	basic
- installation category	III
- pollution level	2
- maximal phase-to-earth working voltage:	
- for supply	300 V
- for interface circuit	50 V

APPLICATIONS

Alphanumerical displays are destined to display messages inside buildings and can be applied to display information in industrial plants about the production state, technological process parameters, quantity of produced goods, etc.

Information of such a type improves the work of technological, logistics, sales and quality inspection services. Displays have readout fields in red, green and yellow colours.

DA displays co-operate with external measuring devices equipped with the RS-485 interface and MODBUS RTU protocol.

The configuration of transmission and range parameters is agreed with customers. The display with DA2 version has the possibility to change the displayed message through the infrared port (pilot of remote control). Messages are stored in the non-volatile EEPROM memory.

TECHNICAL DATA

Read-out field:	Graphical, 16 × 120 points
Communication:	
- serial interface (DA2 → PC)	RS-485
- serial interface (DA2 → external device)	RS-485
- transmission protocol	MODBUS RTU
- change of programmed pages (remote control)	RC5 (infrared)
Reaction against decays and supply recoveries	preservation of configuration data
Protection grade ensured by the housing	IP 54
Dimensions of the set	960 x 166 x 236 mm

ELECTRICAL DIAGRAMS

Electrical connections must be carried out acc. to the fig. below.

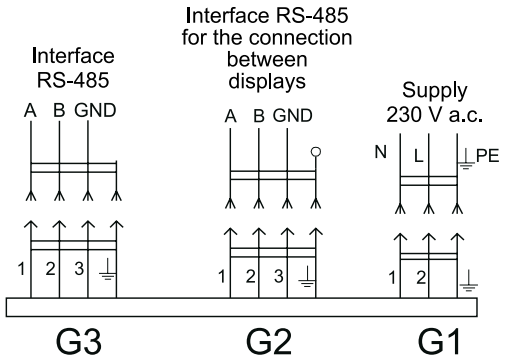

Fig. 1 Electrical connections

Wires:

- maximal wire sections: up to 1,5 mm^2,
- maximal cable diameter: up to 7 mm,

The SM4 module of logical outputs can co-operate with the DA2 display. Module outputs are related to displayed occasionally pages

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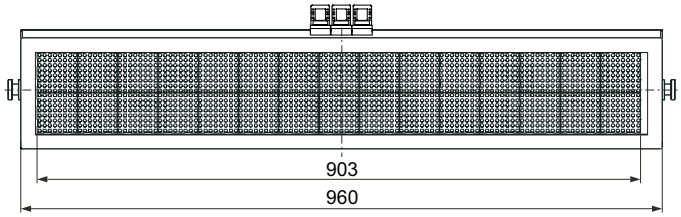
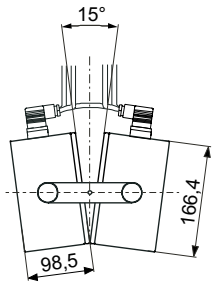
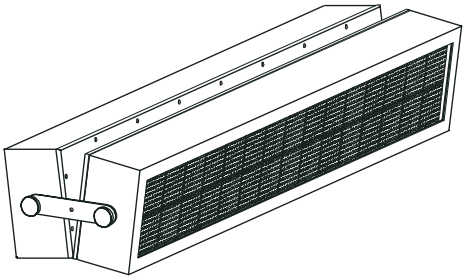
OVERALL AND MOUNTING DIMENSIONS

The housing of the DA2 alphanumerical displays is made of stainless steel. The safety degree ensured by the housing is defined as IP54.
Dimensions of individual housing are: 960 x 166.5 x 98.5 mm
The display is equipped with two assembly holders enabling the suspension.
Displays connected in the way shown on the fig. below, enable the double-sided information readout.







VERSION CODES AND ORDERING

ALPHANUMERICAL DISPLAY DA2	X	X	X

Colour
red ..... **R**
green ..... **G**
yellow..... **Y**

Control:
without remote control **0**
with remote control **1**

Version
catalog version **0**
custom-made version **1**
acc. to customer°s agreement* **2**

* The order code will be established by the manufacturer

EXAMPLE OF ORDER:

The code: **DA2 - R-1-0** means:

DA2 - alphanumerical display of DA2 type
R - red colour display
1 - destined to remote control
0 - in standard, catalog version

Note: It is possible to order a display with a built-in light sensor.

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ALPHANUMERICAL DISPLAY
(for indoor applications)
DA3 TYPE

APPLICATION

The DA3 alphanumerical measuring panel is destined to show value indications of temperature and humidity from external atmospheric condition transducers. Situated in a visible place, information helps in the efficient operation of process engineering, logistic and quality inspection teams. These panels are offered in three colour versions: red, green and yellow.

DA panels of variable information content co-operate with external measuring devices equipped with an RS-485 interface and MODBUS RTU protocol. The visualisation of manufacturing processes and message transmission from devices are possible. The configuration of transmission parameters and indication ranges must be agreed-upon with the customer.

The basic version of the measuring panel includes three lines of 6 characters. After agreeing with the customer, one can realise individual custom-made designs.

TECHNICAL DATA

Power consumption	max 96 VA
Readout field	3 lines, with 6 characters of 120 mm high in each line
Digit colour	red, yellow, green,
Communication:	
- serial interface (DA3 → PC)	RS-485
- serial interface (DA3 → measuring device)	RS-485
- transmission protocol	MODBUS RTU
Reaction to decays and supply recoveries	preservation of configuration data
Protection degree ensured by the housing	IP40
Dimensions	depending on version (see Fig. 1)

Reference conditions and rating operating conditions:

- operating temperature	-10...23...55°C
- storage temperature	-10...80°C
- humidity	25... 95%
- supply	195... 253 V
- external magnetic field	0...40...400 A/m
- operating position	any
- heating time	1 minute

Standards fulfilled by the panel:

Electromagnetic compatibility:

- noise immunity	acc. to EN 61000-6-2
- noise emission	acc. to EN 61000-6-4

Safety requirements:

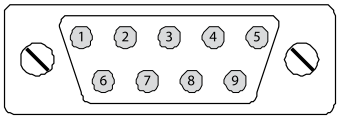
According to EN 61010-1 standard:

- isolation ensured by the housing	basic
- isolation between circuits	basic
- installation category	II
- pollution level	2
- maximal phase-to-earth voltage	600 V

WIRING CONNECTIONS

Two connection cavities are situated on the rear side of the measuring panel. The upper cavity serves to connect the panel supply, the lower one serves to connect control signals and the PC computer in order to configure and monitor the panel. To connect the computer, one should apply a shielded cable ended on both sides by a DB9 plug. This cable should have end plugs connected in a simple way (without crossing the wires). The description of contacts is shown on the RS-485 connector.

One must perform electrical connectors acc. to the Fig. 1.



Signals on the connector
1 - B
2 - A
5 - GND
Housing - wire shield

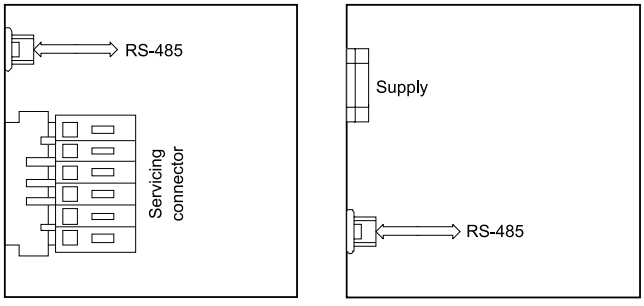


Fig. 1. Electrical connections

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DESIGN AND INSTALLATION

The alphanumerical housing is made of aluminium. The protection degree is IP 40. Housing dimensions: 803 × 522 × 110.5 mm. Housing dimensions with holders: 881 × 588.5 × 110.5 mm.

The panel has two mounting holders enabling the suspension or mounting on a wall with the possibility to regulate the angle.

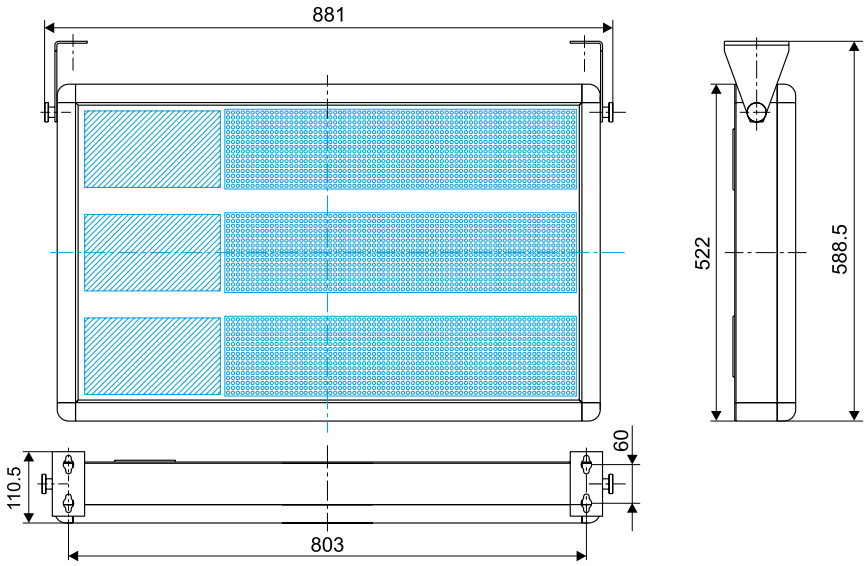

Fig. 1. Overall dimensions of the panel and layout of holes and suspension clamps.

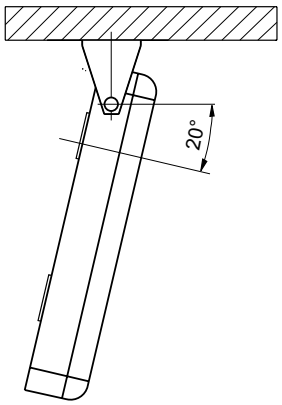

Fig. 2. Panel suspension

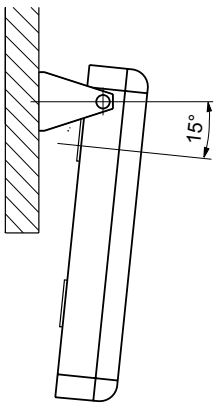

Fig. 3. Mounting on a wall

ORDERING CODES

ALPHANUMERICAL DISPLAY	DA3-	X	XX

Colour:

red ..... **R**
yellow..... **Y**
green ..... **G**
red, yellow, green ..... **A**

Version:

standard..... **00**
custom-made* ..... **XX**

* The code number will be established by the manufacturer

Ordering example:

Code: **DA3 - R 00** means:
DA3 - alphanumerical measuring panel with digits of 120 mm high,
R - display colour on: red,
00 - standard version

For more information, please write to or phone our Export Department

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GRAPHICAL DISPLAY PANEL
(for outdoor applications)
DAZ1 TYPE

APPLICATIONS

Outdoor graphical displays of DAZ1 type are destined to display optional textual or graphic information outside buildings.

The configuration of displayed contents is carried out on the user's computer taking advantages of the dedicated program.

The communication between the user and the display panel is ensured by the communication interface operating in the RS-485 standard with MODBUS RTU transmission protocol. DAZ1 displays modules enable the connection of additional devices equipped with RS-485 interface and the display of measured values by these devices.

The value read out from the device is placed in the display register and this make possible the further readout by master devices, (e.g. computer, PLC controllers, etc.). The panel is equipped with occasional messages (cyclical) what enables the display of textual or graphic messages in definite days and in definite hours, giving the possibility to build a simple information system.

DAZ1 displays give the possibility to display 1024 characters on one textual page. The increase of the number of textual characters is possible thanks to the work in presentation mode, where successive pages are cyclically displayed.

The exposition time is definite for each page and the switching of the scroll on is possible for the given line (row).

The dimensions and configuration of the display field is definite by the user which must only, after the display mounting, define the way to compose the required display. Thanks to the large range of possibilities, DAZ1 displays find application in all industrial branches and everyday life, serving to transmit textual information and to display values originated from external devices.

TECHNICAL DATA

Display dimensions	1280 × 320 × 170 (see fig. 1)
Readout field	128 × 32 pixels
Display digits led diodes:	
- height	80, 160 or 320 mm depending on the number of lines
- colour	amber
Power consumption	< 400 VA.
Resolution	128 × 32 pixels
Brightness	> 4500 cd/m^2
Communication:	
- serial interface	2 × RS-485 galvanically separated
- transmission protocol	MODBUS RTU
- serviced functions	03, 16, 17
- data format	8n1, 8n2, 8e1, 8o1.
- baud rate	2,4; 4,8; 9,6; 14,4; 19,2; 28,8; 38,4; 57,6; 76,8; 115,2 [kb/s]
- maximal time to the answer beginning:	< 100 ms
Reaction against decays and supply recoveries:	preservation of configuration data
Protection class ensured by the housing	IP54 and IP65 from the frontal side
Reference conditions and rated operating conditions:	
- working temperature	- 20...23...40°C
- storage temperature	- 25...75°C
- air relative humidity	25... 95%
- voltage supply	100...230...253 V a.c.
- frequency	45...50...60 Hz
- working position	vertical, small deviations are admissible. At large deviations, one must apply a protective penthouse over the panel (to protect the fan inlet)

Standards fulfilled by DAZ1 displays:

Electromagnetic compatibility:

- immunity	EN 61000-6-2
- emission	EN 61000-6-4
- resistance against supply decays	EN 61000-6-2

Safety requirements (acc. to EN 61000-1 standard)**:**

- insulation ensured by the housing: basic
- insulation between circuits: basic
- installation category III
- pollution level 2
- maximal phase-to-earth working voltage:
  - for supply 300 V
  - for interface circuit 50 V

Design description and installation

The housing of the DAZ1 alphanumerical display is made of steel and ensures the IP54 protection class. All applied connectors ensure the IP65 leakproofness protection. The display module ensures the frontal IP65 protection class.

DAZ1 display are destined to be installed on a supporting structure using the screwed steel pins fixed on the rear part of the housing.

display overall dimensions and mounting pin spacing are shown on the fig. 1.

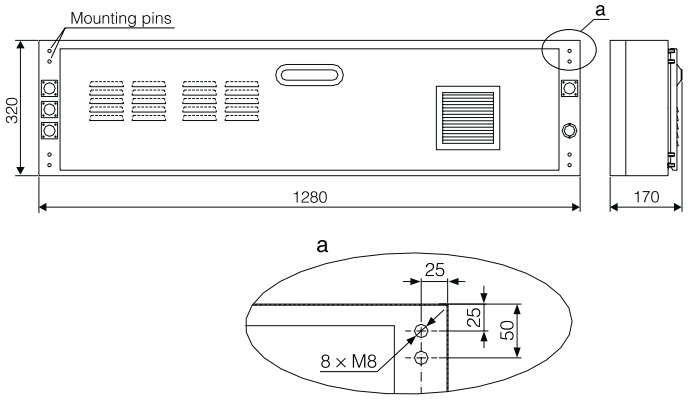

Fig. 1. Display overall dimensions and mounting pin spacing

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On the rear side of the display there is a rear opened shield. When mounting the display module, one must ensure a free air circulation and the space to connect signalling and supplying connectors.

The display module is equipped with an electronically controlled ventilation system, which maintains the optimal working temperature inside the display and ensures the protection against overheating of internal systems.

The applied air filter in the ventilation system must be periodically replaced and the necessity to replace this filter must be taken into consideration when installing the display on the site.

The single display module includes the display field composed of LED diodes with a 128 x 32 pixel configuration. All diodes are controlled from individual current sources and the brightness control is based on the change of the diode lighting time coefficient change preserving the fixed current, what in a significant way influences on the LED diode life.

ELECTRICAL CONNECTIONS

All electrical connections are made using separable sockets. The lay-out of sockets for the version with a controller and without a controller is presented on the fig. 2., however on the fig.3., the description of signals on particular connectors is shown.

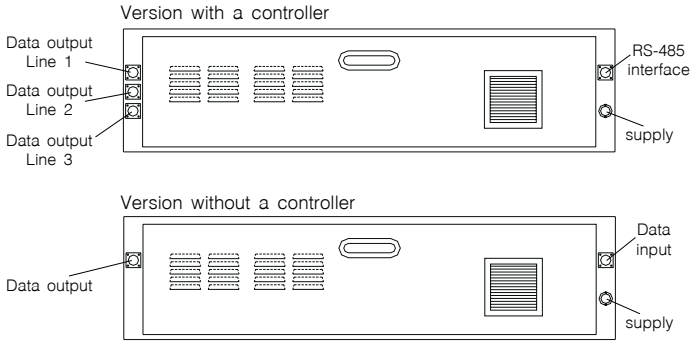

Fig. 2. Lay-out of connection sockets.

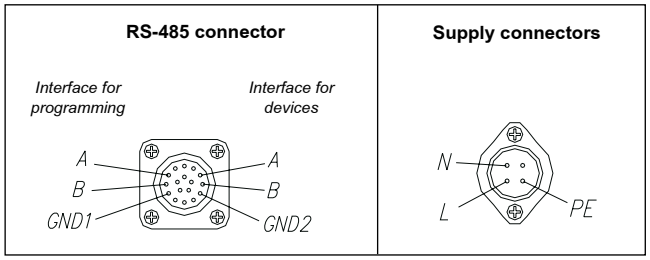

Fig. 3. Leads of signals on connectors.

The display equipped with a controller must be placed in the upper row and on the left side (looking from the panel front). Then, the view of texts on the display in the configuration program will reflect the physical panel view.

Successive display lines are controlled from the display equipped with the controller. In order to ensure the correct transmission, one must connect the beginning of lines with the display equipped with the controller.

The display equipped with the controller can service up to 11 displays without a controller in a configuration composed maximally of 3 lines. An exemplary configuration is presented on the fig. 4.

The connection way of displays between them is presented on the fig.5. Sockets which are not used and data outputs must be protected by means of delivered socket hole plugs.

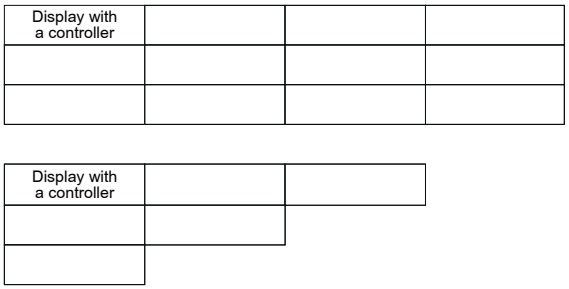

Fig. 4. Exemplary display configuration.

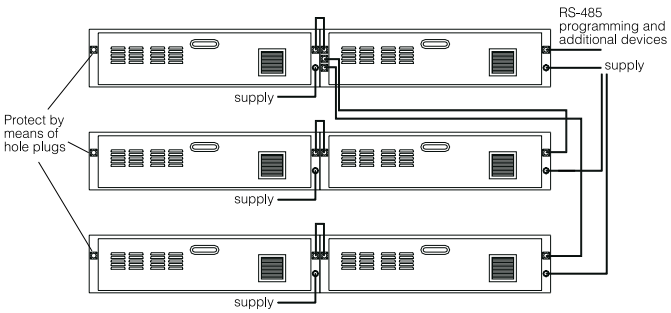

Fig. 5. Example of display connection.

ORDER CODES

GRAPHICAL DISPLAY PANEL	DAZ1 -	X	XX	X

Display type:

type with a controller - maximal service of 11 displays in version without a controller **1**

version without a controller **2**

Kind of version:

standard version acc. to the catalogue **00**

custom-made* ..... **XX**

Acceptance test:

without an extra quality inspection certificate **8**

with an extra quality inspection certificate **7**

acc. to customer's requirement* ..... **X**

* the code number will be established by the manufacturer.

Example of order:

Code: **DAZ1 1 00 8** means:

DAZ1 - graphical display panel of DAZ1 type

1 - type with a controller

00 - standard version

8 - without an extra quality inspection certificate

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GRAPHICAL DISPLAY FOR BUSES (for indoor applications)

TA1 TYPE

APPLICATION

Large size graphical displays with changeable texts of TA1 type are applied in buses for information about the vehicle itinerary, events and can fulfill any other publicity functions. Panels are situated in the front or lateral walls inside the vehicle. These panels, co-operate between them and information on the display can be identical or different in dependence on the choice made by the operator.

The panel operation is carried out from the control panel situated on the rear side of the managing panel. Other panels do not have a controller and are controlled from the managing panel. In the version with an autonomous controller, all panels are managed from the panel which includes the control panel.

LED diodes are applied in these panels, with a high intensity and large angle of light emission, what assures a good visibility also in case of a high insolation. The high resolution (24 x 120 points) allows to write a text with two or three sizes of characters, enables also the display of pictograms or other graphical symbols.

TA1 panels can be freely configured for the customer's needs.

The vehicle itinerary or other information are selected from the managing controller menu. Panel controlled from the managing controller can display the same information or another, e.g. publicity, intermediate stops, pictograms with information. The choose of texts displayed on panel is made in the configuration software prepared for a standard PC computer, with the installed MS Windows TM 98/ME/2000/XP system with USB output. The managing controller

can store 50 itineraries with 120 displayed collections : 80 collections with 32 textual pages and 32 graphical pages, 40 collections with one textual page and one graphical page (digits mainly utilized in the panel).

During the itinerary, one collection is assigned for each panel.

The modification of displayed collection from the managing control panel is made through the change of the itinerary or by the modification currently displayed.

The display of the control panel is highlighted during the programming time.

TECHNICAL DATA

Readout field:	
- resolution	24 × 120 points
- spacing of points	6 × 6 mm
- display colour	yellow or red
- angle of view	120°
- intensity	> 480 mcd/point
Communication:	
- serial interface between panels	RS-485
- transmission protocol	MODBUS RTU
- interface PC – Panel	USB 2.0
Supply:	18…24…30 V d.c.
Power consumption:	< 240 W
Reference conditions and rated operating conditions:	
- working temperature	-20...23...60°C
- storage temperature	-40...80°C
- relative humidity	0...95%
- external magnetic field	0...40...400 A/m.
- working position	any
Protection degree ensured by the housing	IP 40
Dimensions:	
- housing	757 × 182 × 41.2 mm
- dimensions with the frame	803 × 232 × 41.2 mm
Standards fulfilled by panels:	
Electromagnetic compatibility:	
- immunity	EN 61000-6-2
- emission	EN 61000-6-4
Safety requirements:	
acc. to EN 61000 -1 standard	
- insulation ensured by the housing	basic
- insulation between circuits	basic
- installation category	II
- pollution level	IEC60664-12
- maximal working voltage in relation to earth.	50 V a.c.

EXECUTION CODES AND ORDERING

GRAPHICAL DISPLAY FOR BUSES	TA1	X	X	XX

Kind of panel version:
with a controller **1**
without a controller **2**
with an external controller..... **3**
digit panel **4**

Colour of the display field:
yellow..... **Y**
red ..... **R**

Kind of version:
without a quality inspection certificate **08**
standard..... **00**
custom-made* ..... **XX**

* The code number will be established by the manufacturer

EXAMPLE OF ORDER

Code TA1 1 Y 00 means:

TA1 – Large size graphical display for buses
1 – execution with a controller (managing panel)
Y – colour of the display: yellow
00 – standard version, with a mounting frame

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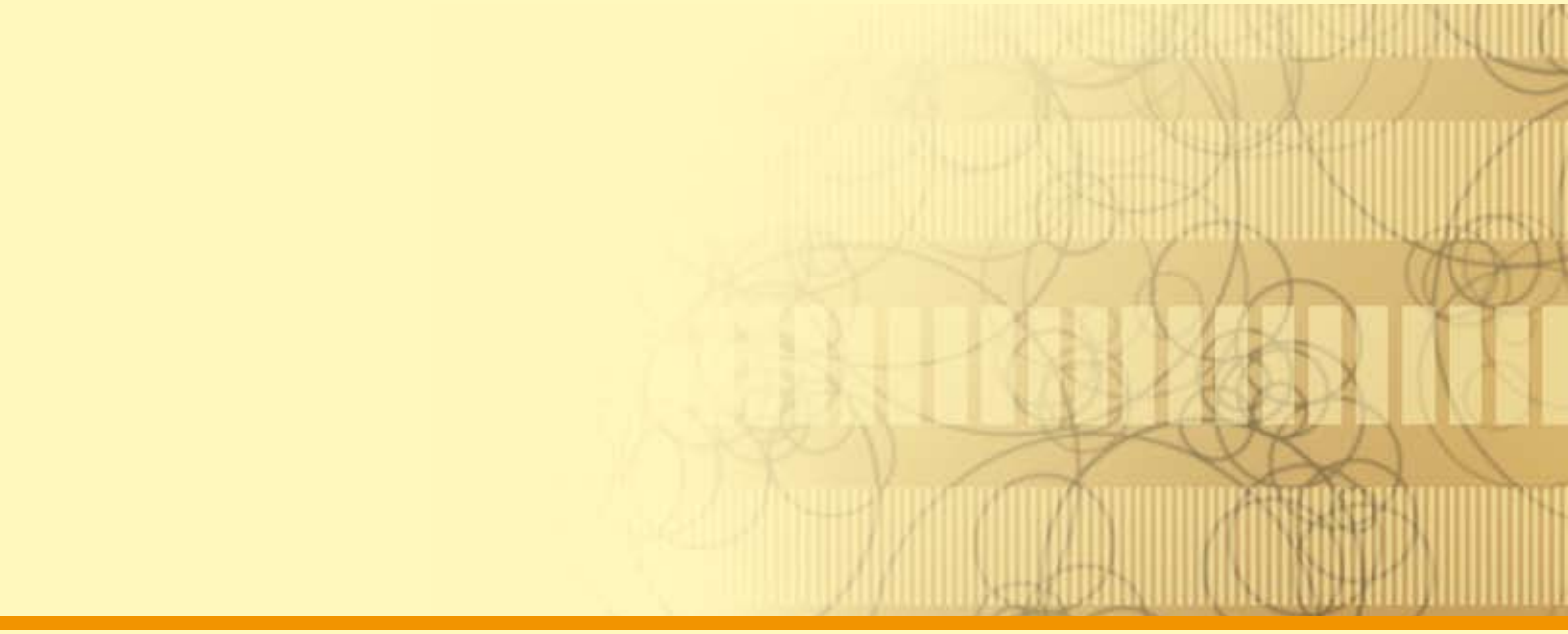

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