

" - "

CDL

:

187 -

"

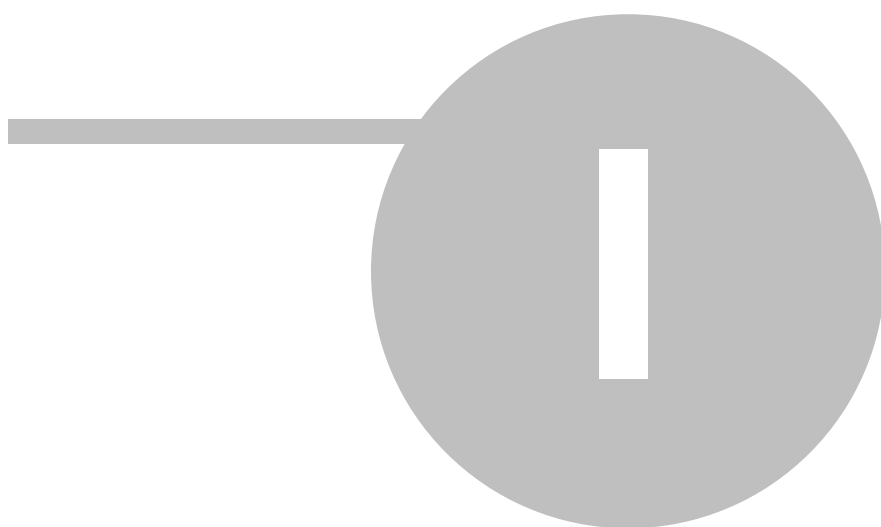
",

.

8.

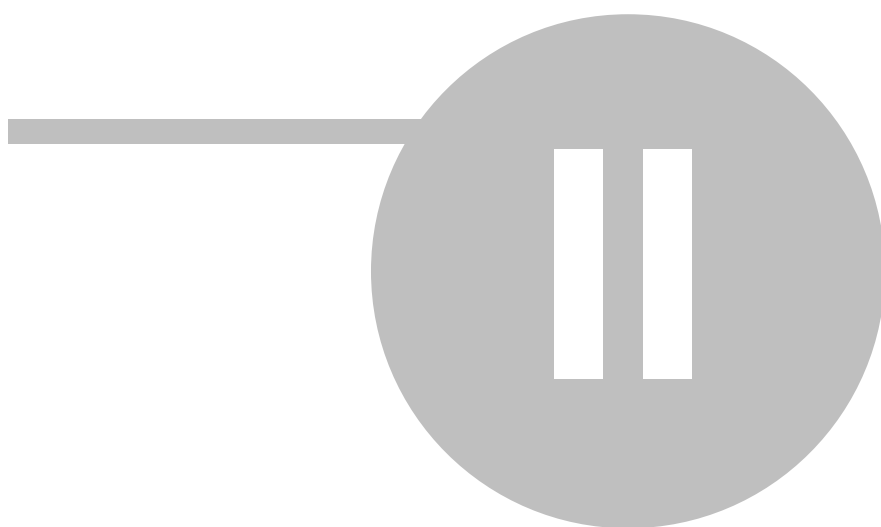
I	3
II	7
III	11
IV	15
1	15
2	16
3	18
4	19
5	20
6	21
7	23
V	29
1	29
2	30
3	32
4	33
5	33
6	33
VI	39
1	39
2	40
	40
	40
	40
	41
	42
	42
	46
	49
	51
3	52
VII	57
1	57
2	58
VIII	63

II	CDL	
1	.....	63
IX	CADET	
logic		67
1	.....	67
X		71
1	.....	71
2	.....	72
3	.....	73
		0



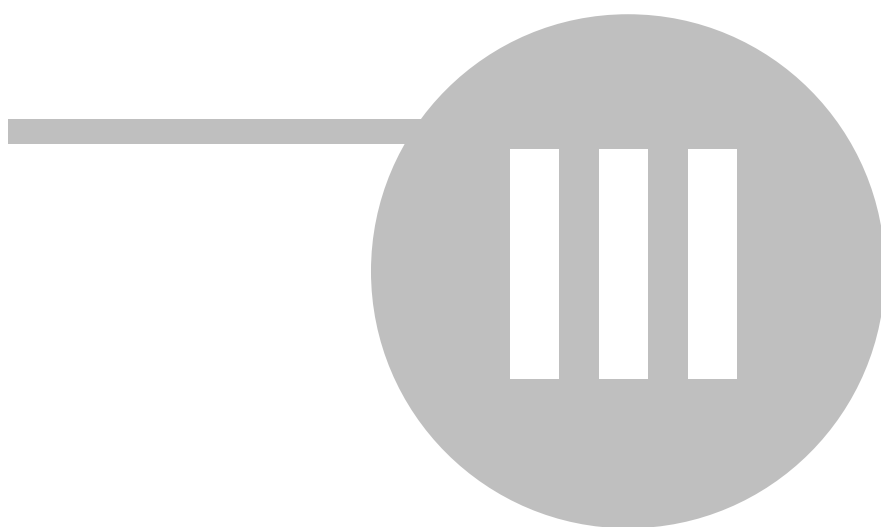
1

" CDL" / CADET
logic " - " (www.raut-automatic.kiev.ua).
" (Ladder Diagram), IEC 61131-3,
" .
" " CDL"
-
.



2

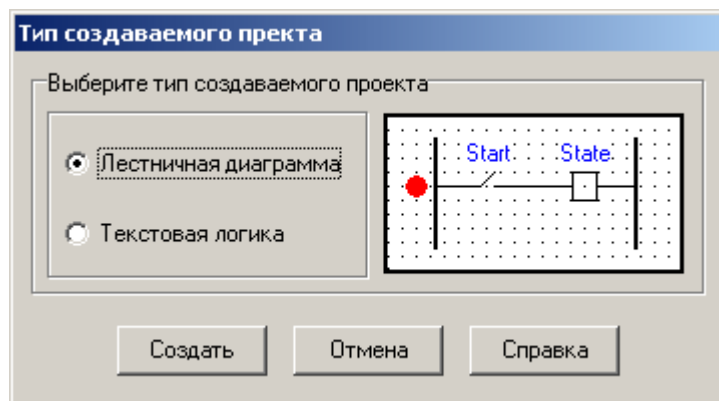
```
CDL "
    "CfgLogic-install.exe" (
        .
        "
    )
    ,
    :
    •
    •
    •
    ,
    "
    /
    CDL "
    "
    ".
    "
    CDL "
    "CfgLogic.exe"
    /
    .
    -
    ,
    "
    CDL "
```

3

•
•

:



IEC 61131-3.

С.

" "

" "

(" ").

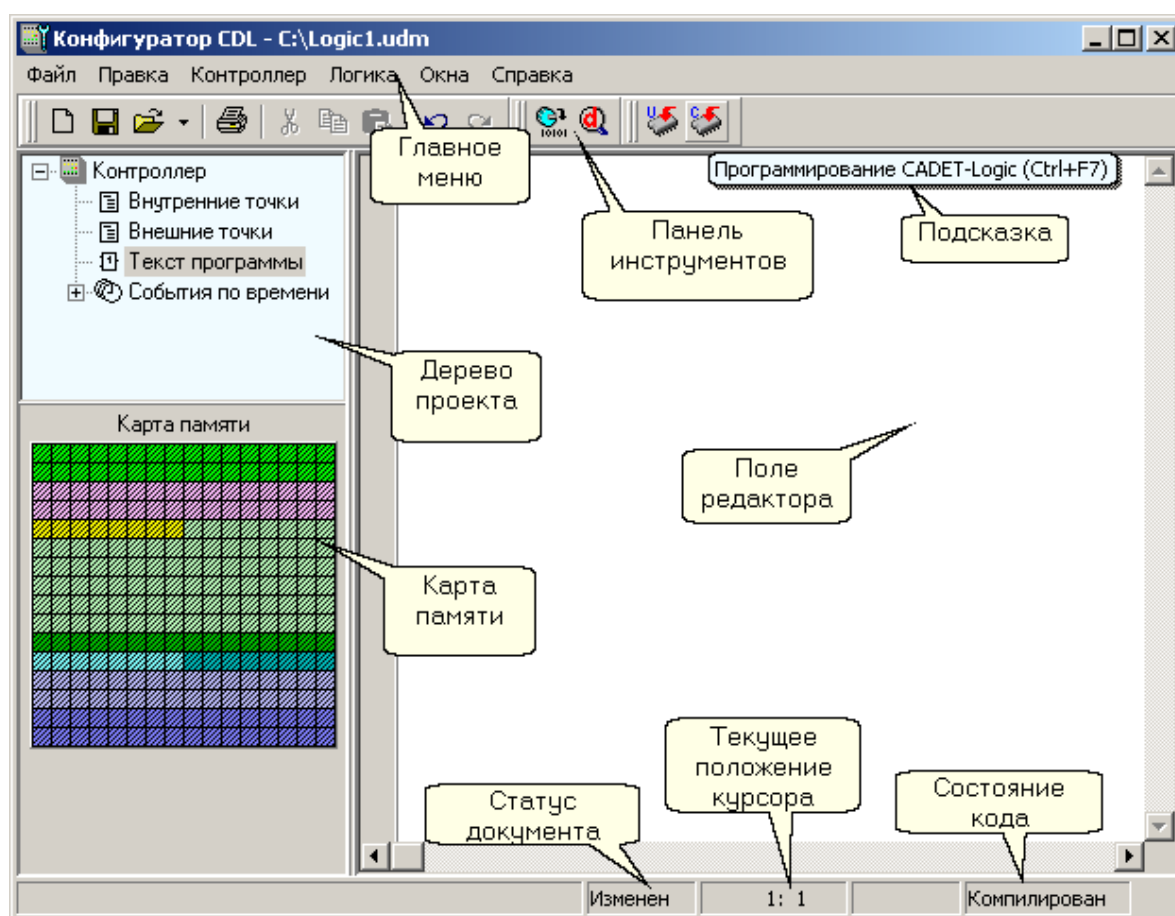
CDL".



4

4.1

- " CDL"
- _____
 - _____
 - _____
 - _____ CADET logic
- :"
- _____
 - _____
 - _____
 - _____ CADET logic

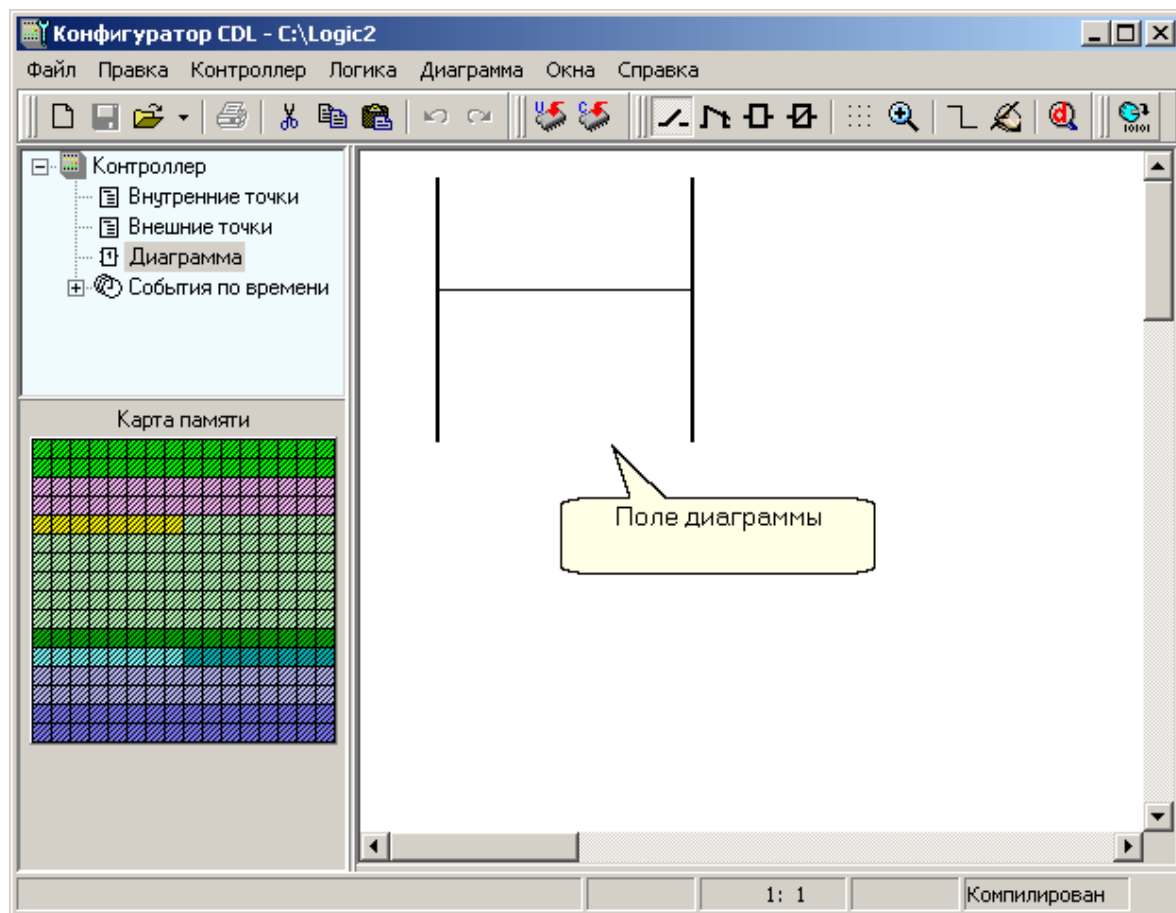


" "

(,) " : (" ") 1:1).

" "

,



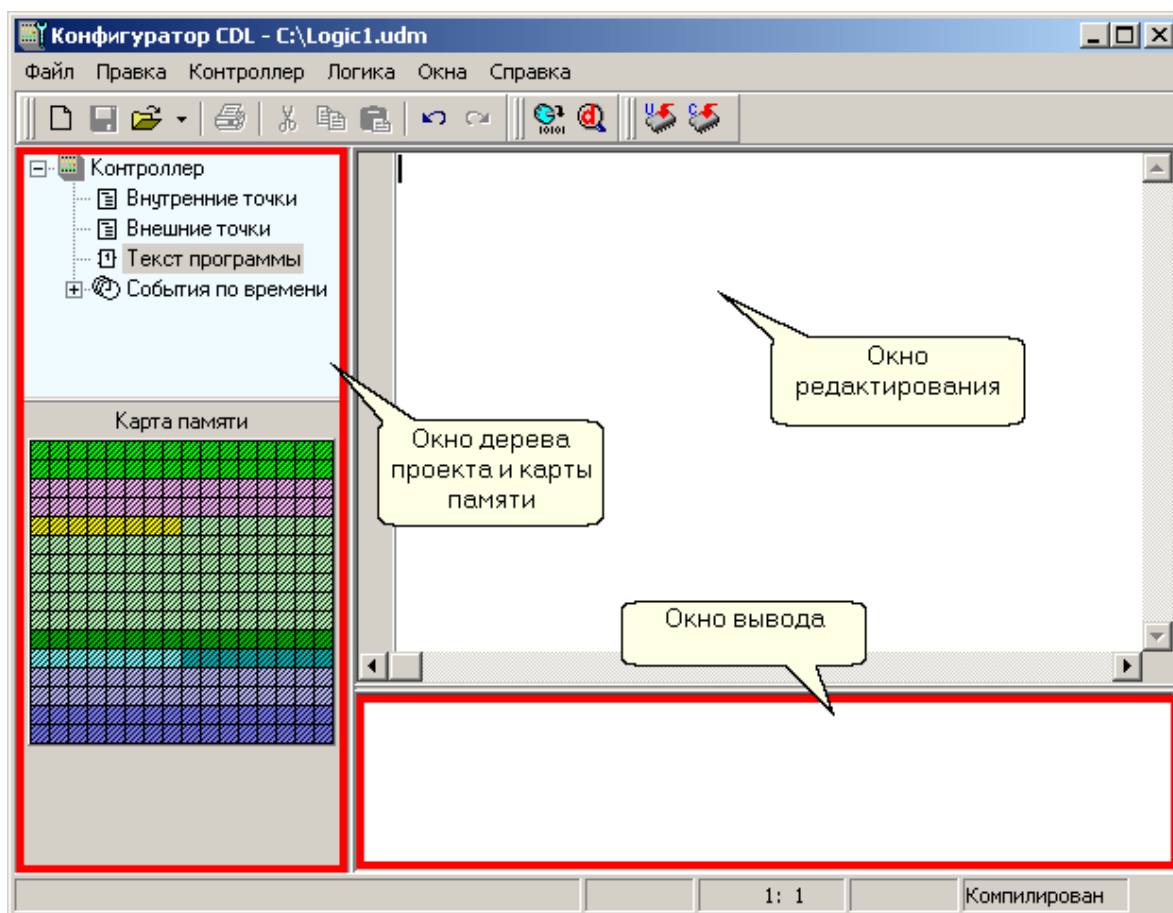
4.2

" CDL"

;

; 2) (; 3) (: 1)

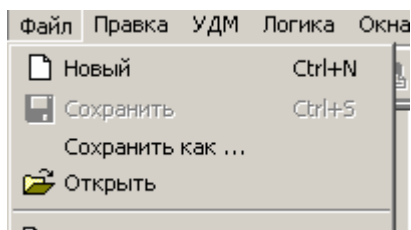
) ();



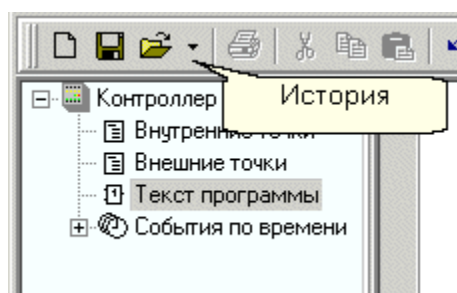
- .
- , (
- , , . " " >>
- - , " " >> "

4.3

:



:



" " ,
CDL" " " " >>
CTRL+N

:

" " "

:

,

,

,

,

,

CTRL+O

-

.

,

,

:

- UDM -
- UDD -

/

/

- " " >> "

" " " >> "

.

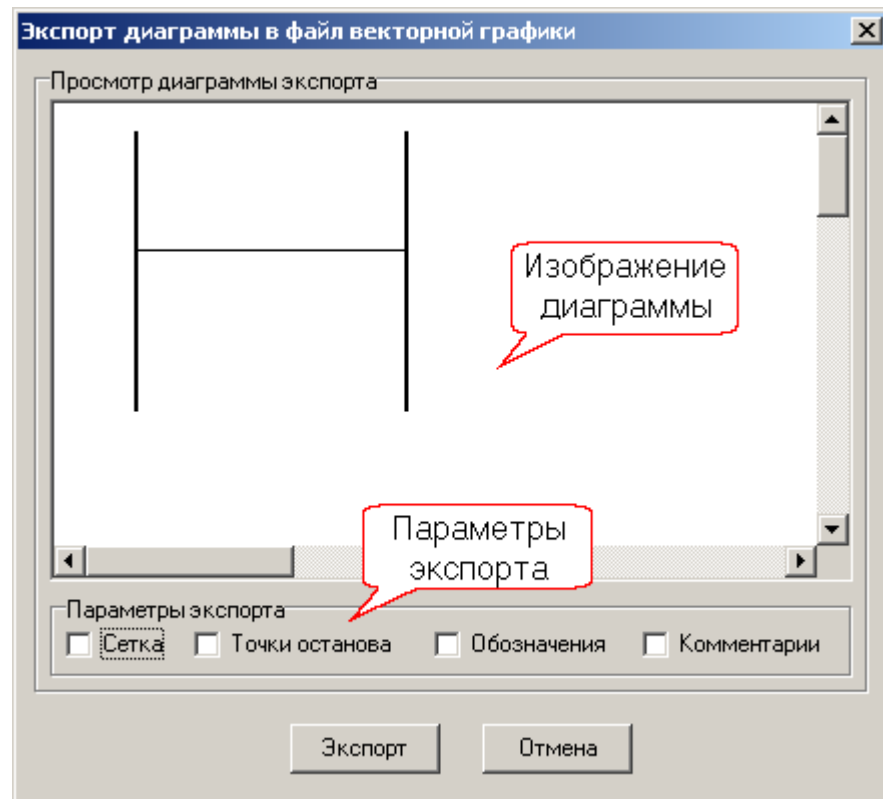
,

.

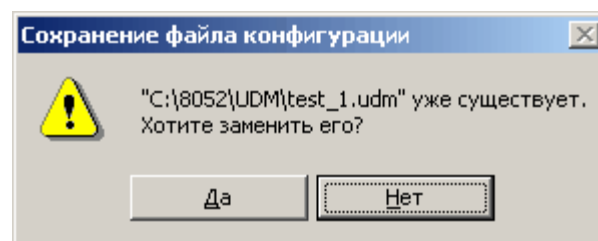
- " " >> "

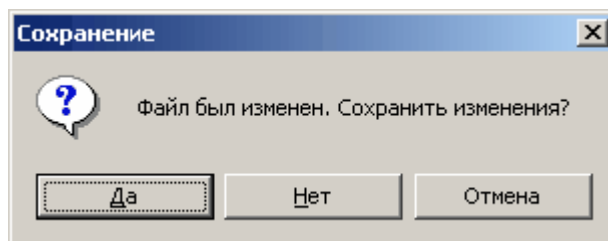
.

,

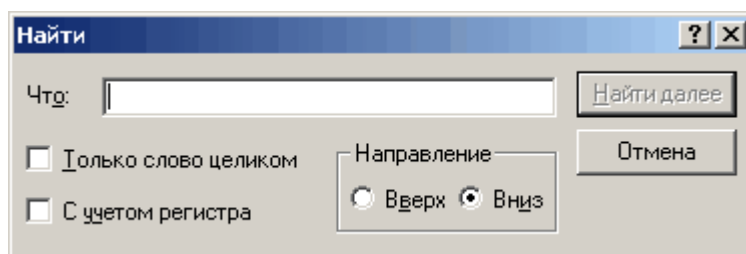
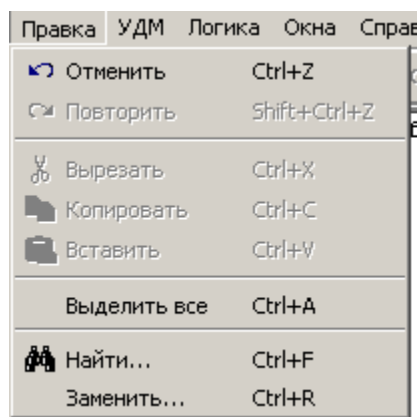


4.4

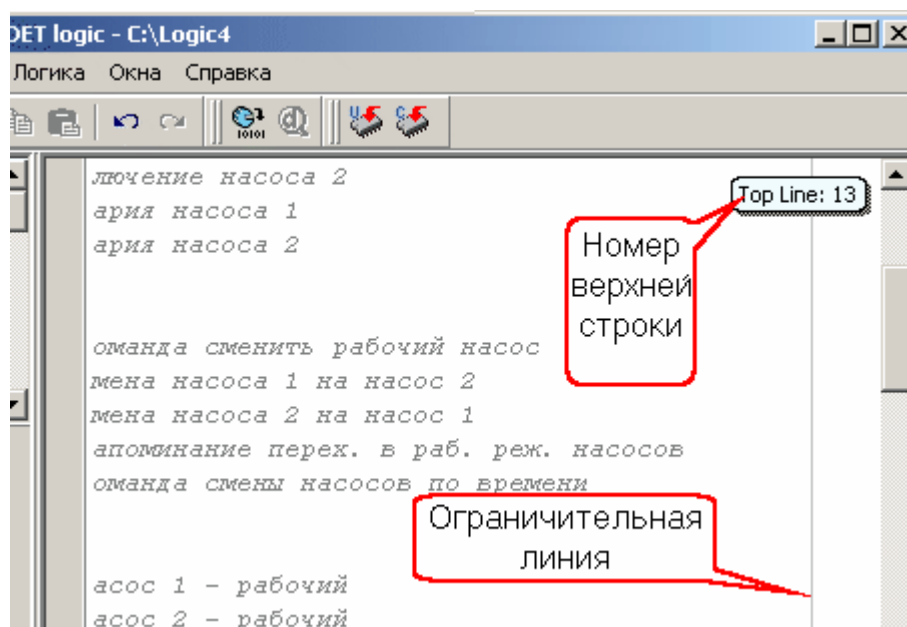
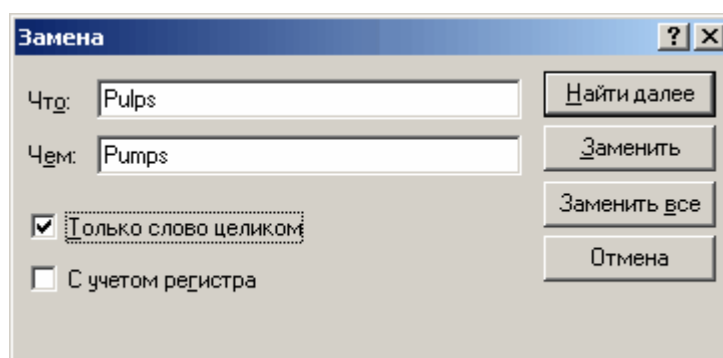




4.5



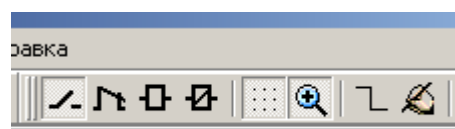
(" "); (" ").
 ().



4.6

" CDL"

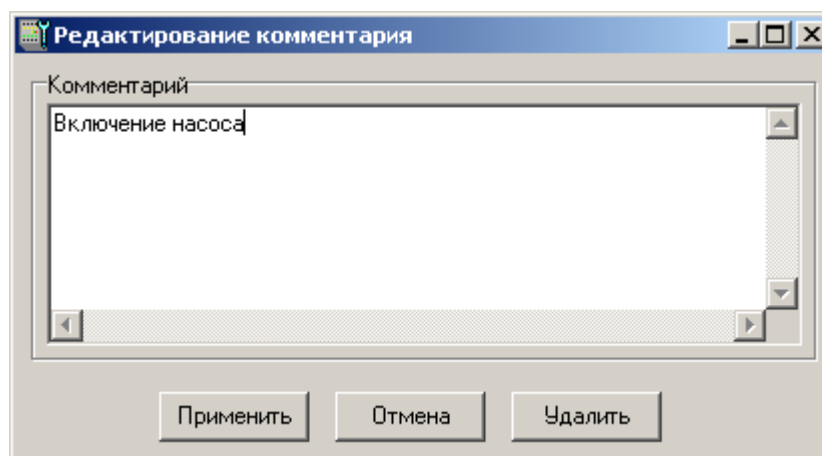
" "



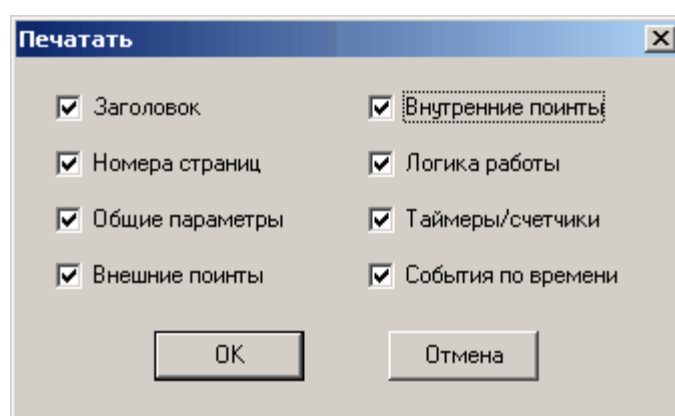
" "

•

- ,



4.7



BoilersPumps_udm

Страница 1

Заголовок

Общие параметры

Интервал автопосылки аварийных поинтов = 5 сек

Скорость обмена по сети = 38400

Количество устройств в сети = 32

Собственный номер в сети = 4

Внутренние поинты

Количество = 1

PointID	Address To	Interval Send	TimeOut	WorkFlags	Begin	End	Default Value	State Flags	Independent Mask
000Ah	02h	20	0	00h	M9	M14	0000h	0000h	0000h

Внешние поинты

Количество = 0

Логика работы

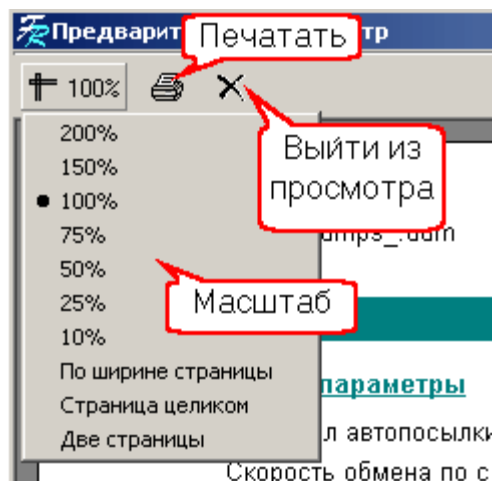
//КОТЕЛЬНАЯ. НАСОСЫ КОТЛОВОЙ ВОДЫ

//КОНТРОЛЛЕР "УДМ"

//Входы

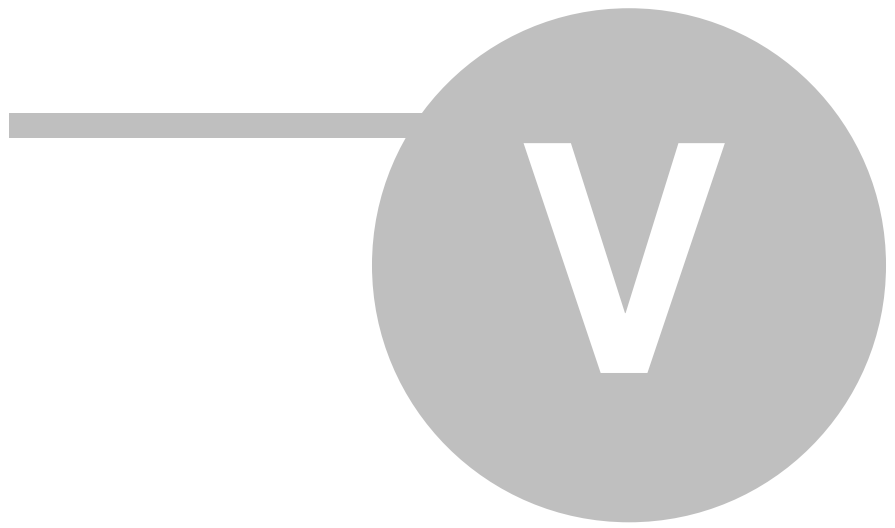
define PumpsPD = X1; //перепад давления на насосах

CDL".

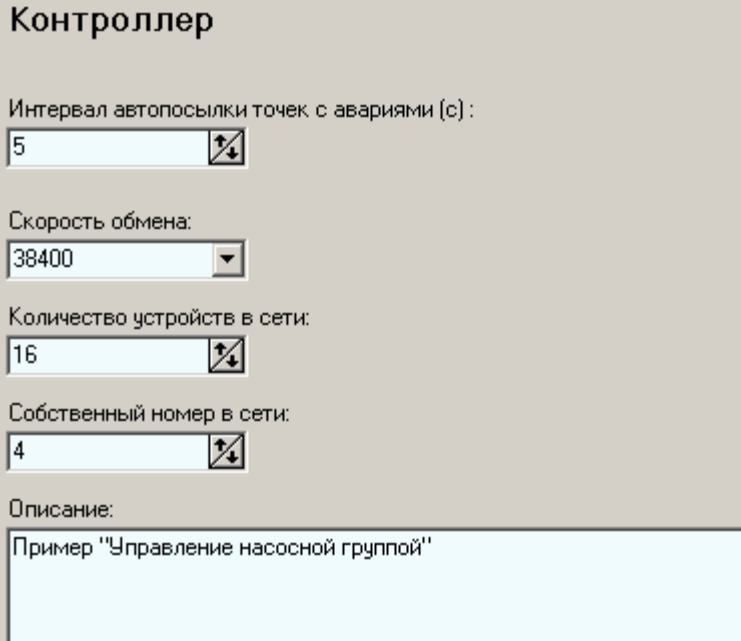


,

.



5.1



Контроллер

Интервал автопосылки точек с авариями (с) :

5

Скорость обмена:

38400

Количество устройств в сети:

16

Собственный номер в сети:

4

Описание:

Пример "Управление насосной группой"

© 2007,

(1200 / 115200 /).

, 9600 / ,

- 38400 / .

" (UNIVERS) /

. - 10 ,

: 10+"

" * 2 (3 ,

10+3*2= 16).

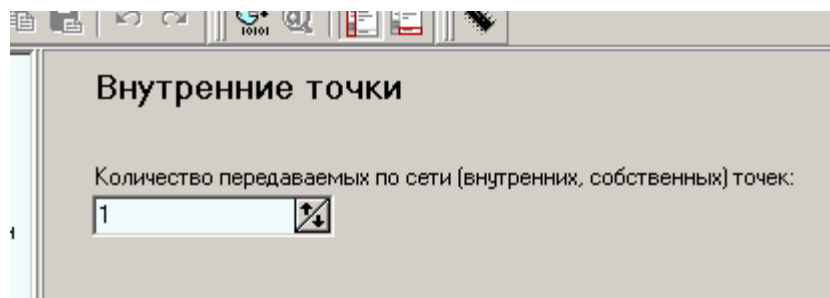
" "

"0" . 2, 4, 6

5.2

" , " - 1, .

(ID).



(_____ -).

Внутренние точки - ID=10 (000Ah)

PointID:
 000Ah = 10

To:
 2

Send interval:
 20

TimeOut:
 0

Begin: 80 Count: 2

AlarmMaskFlags

15	14	13	12	11	10	9	8
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	6	5	4	3	2	1	0
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

PointID

), (- ()
).

To

,

Send interval

(" ").

,

- 255

TimeOut

Begin

0 255
 " "

Count

Begin.

- 80 81.

80,

2,

" "

- 16.

AlarmMaskFlags

80-) 1- ("1", 81-).

80- 81-

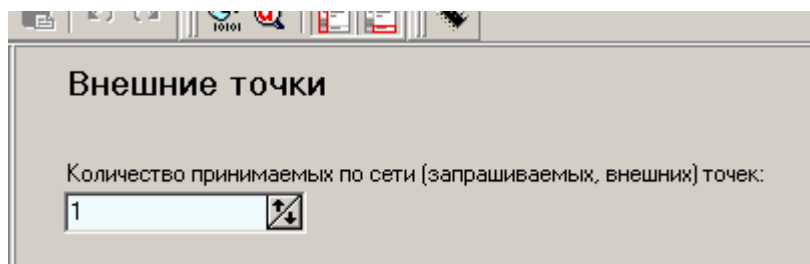
0- (

()".

5.3

1,

(ID).

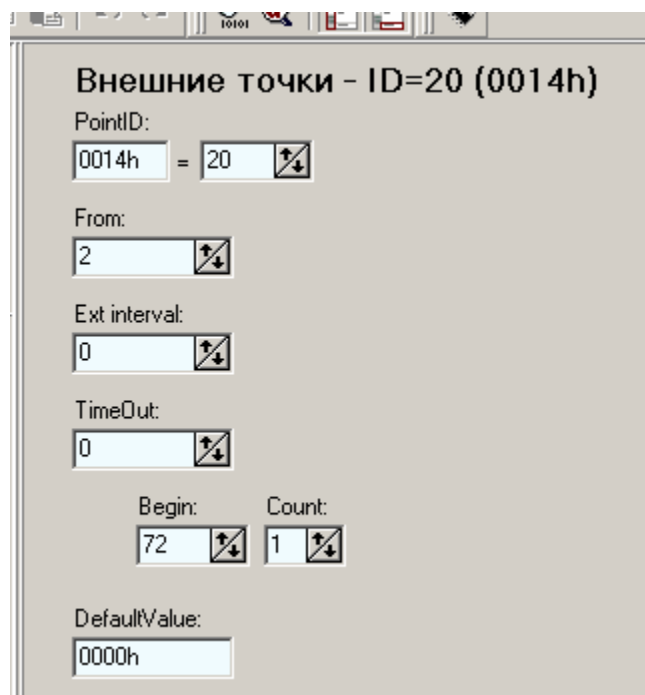


Внешние точки

Количество принимаемых по сети (запрашиваемых, внешних) точек:

1

(



Внешние точки - ID=20 (0014h)

PointID:
0014h = 20

From:
2

Ext interval:
0

TimeOut:
0

Begin: 72 Count: 1

DefaultValue:
0000h

PointID

),

).

From

Ext interval

0.

TimeOut

From. ,
DefaultValue.

Begin

0 255
" "

Count

Begin. , 80, 2, " ,
- 80 81. ,
- 16.

DefaultValue

5.4

CDL"
-
.

5.5

" ,
" CDL".
.

5.6

CDL"
-
"0"("OFF") "1"("ON").
32

Смена насосов

☒ Разрешено

Тип

☒ =

☐ >=

Минуты:

0

Маска часа

0	1	2	3	4	5	6	7	8	9	10	11
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12	13	14	15	16	17	18	19	20	21	22	23
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Маска месяца

1	2	3	4	5	6	7	8	9	10	11	12
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

День

☒ Маска дня недели

Пн	Вт	Ср	Чт	Пт	Сб	Вс
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Маска числа месяца

" 1" ().

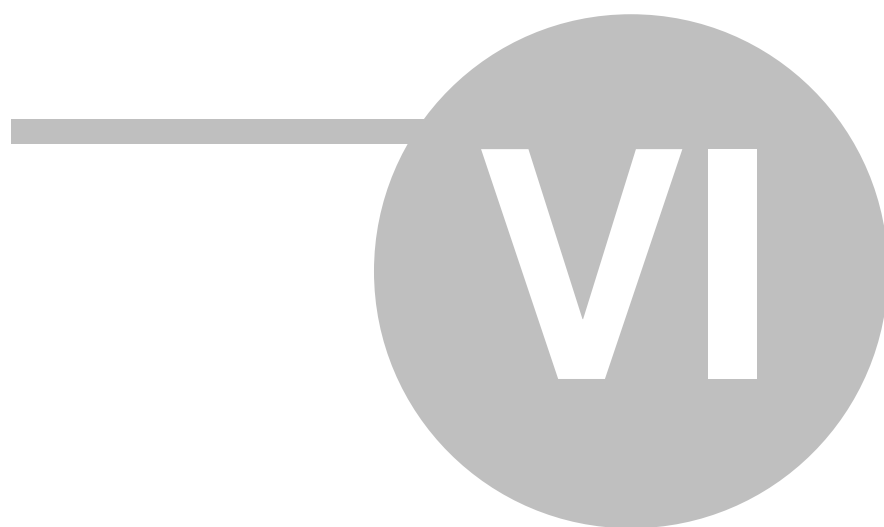
" "

("1")

"=" , ">=" ,

"1" ; ">=" -

·
,
10'
·



6

6.1



256

- 1 32 (0 31),
 - 1 32 (32 63),
 - Y1 Y8 (64 71),
 - 1 88 (71 159),
 - 89 104 (160 175),
 - CI1 CI8 (176 183),
 - C 1 C 8 (184 191),
 - 1 32 (192 223),
 - S1 S32 (224 255),
- (0:0)
- (0:0)
- (0,1,2 . .).

6.2

6.2.1

6.2.1.1

[illegible]

6.2.1.2

```
define.
define PumpChange = M1;
1.
```

1	2	1 & M2	1 | M2	M1 ^ M2
0	0	0	0	0
1	0	0	1	1
0	1	0	1	1
1	1	1	1	0

:

1 = 1, ! 1 = 0.

:

M1 = !M2 | M3 & M4 ^ (M5 & M6);

M5 & M6 (M5 & M6= 1),
 ! 2 (! 2= 2).
 M3 & M4 (M3 & M4= 3),
 ()
 2 | 3 (2 | 3= 4),
 4 ^ 3 (4 ^ 3= 5).
 1 = 5.

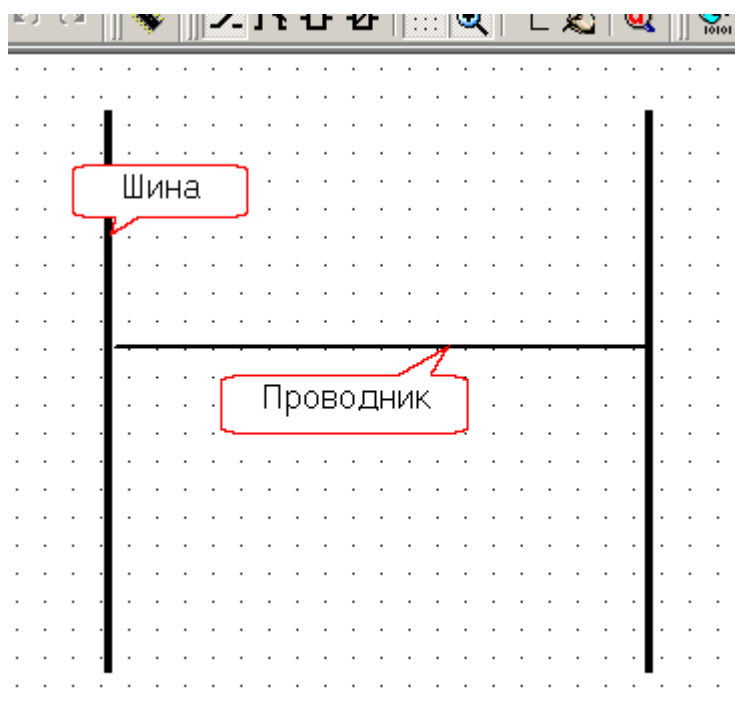
6.2.2

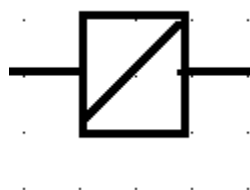
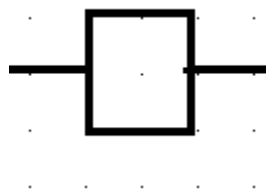
6.2.2.1

"
 LD (Ladder Diagram) CDL"

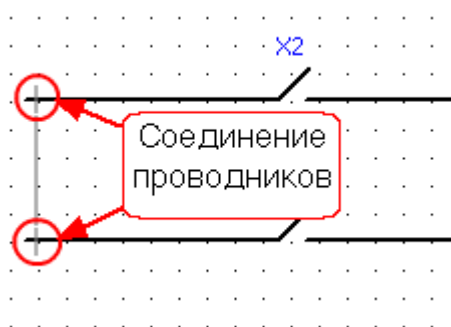
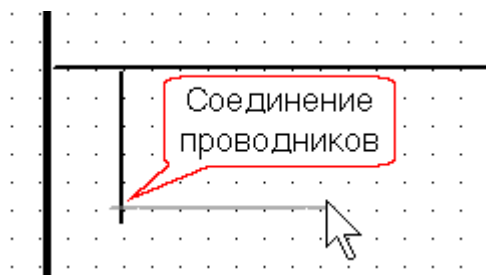
IEC-61131-3 (61131-3).

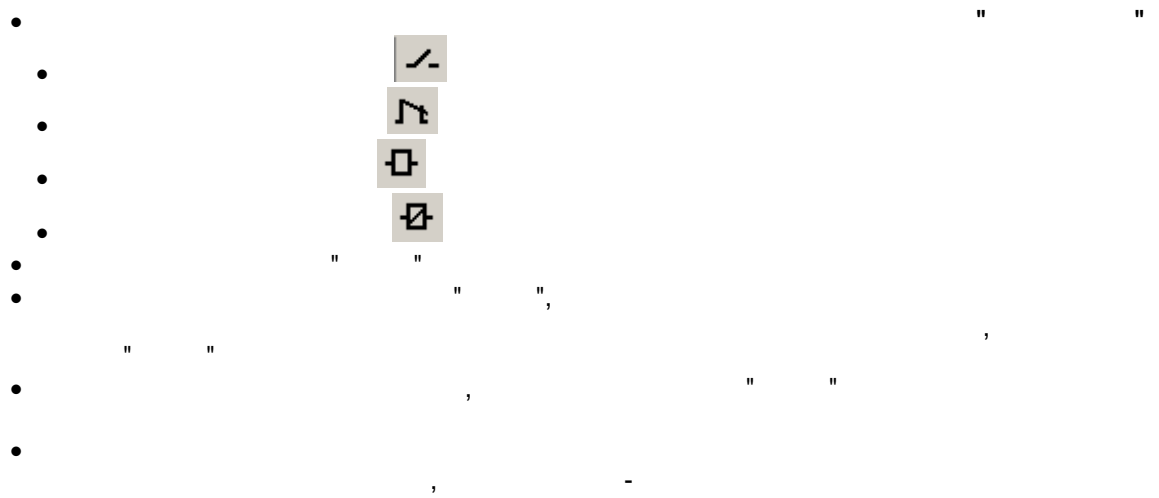
- - ,
- - , ()



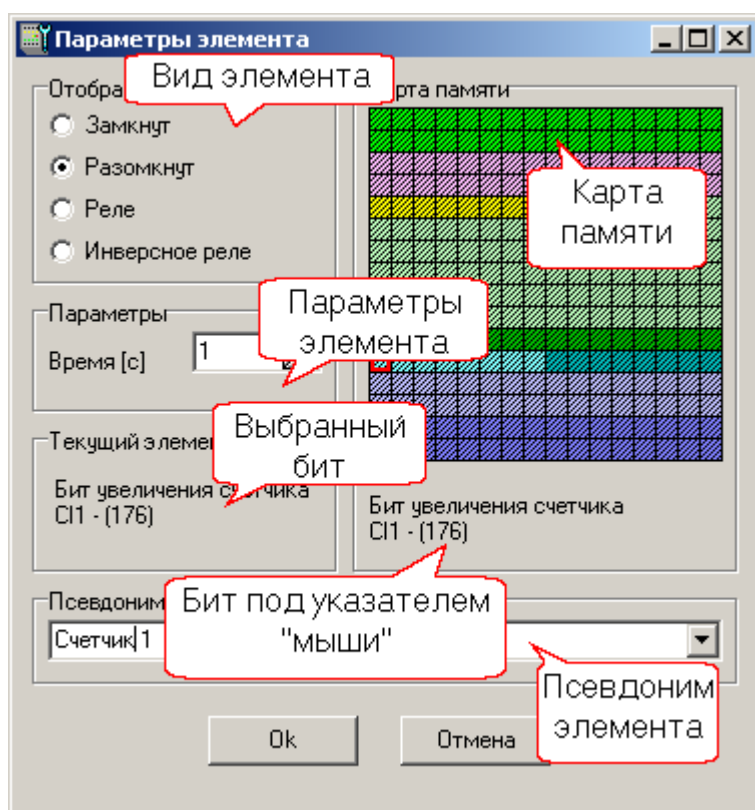
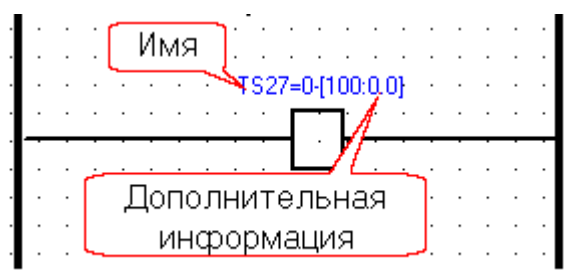


" "

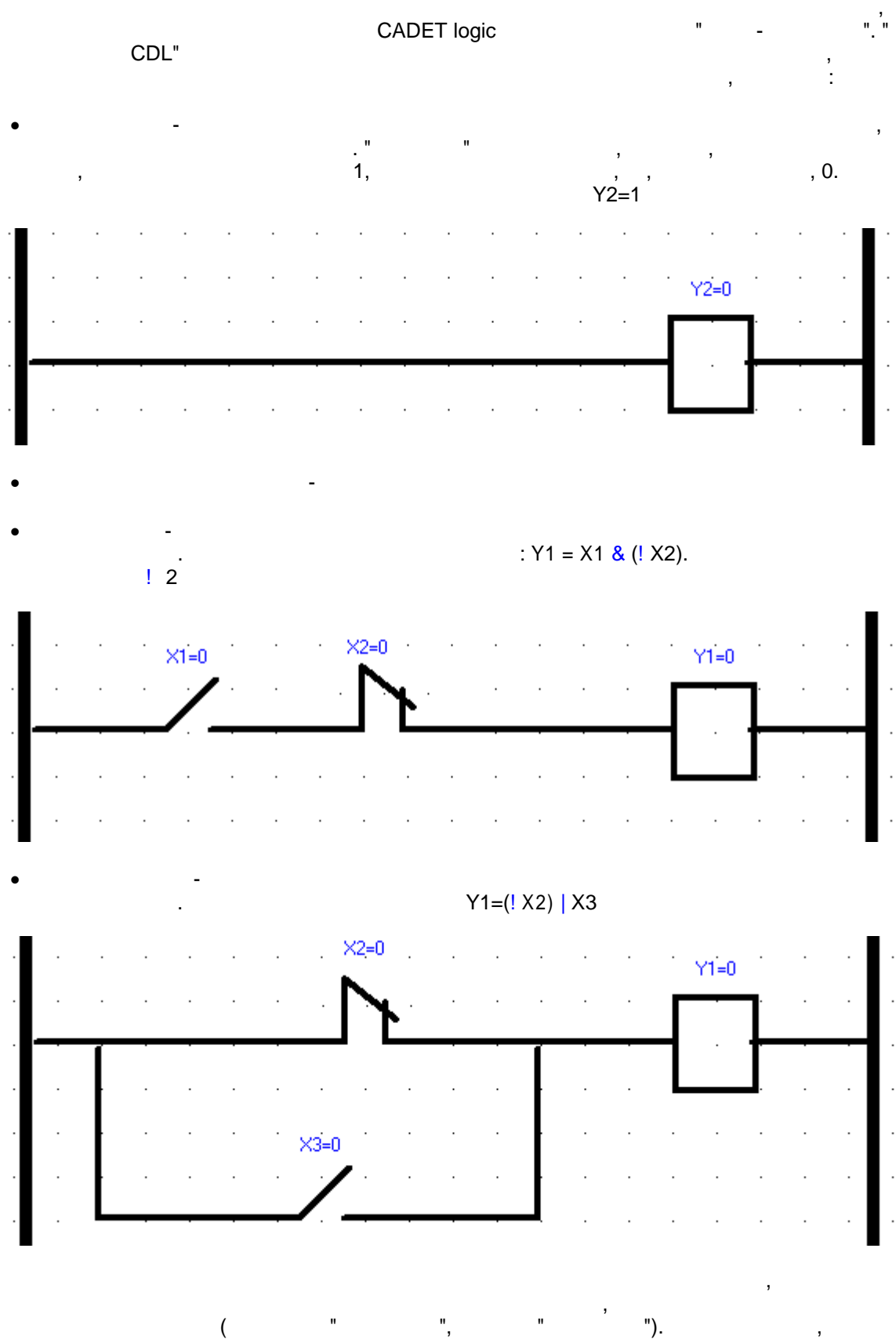




6.2.2.2



6.2.2.3



1

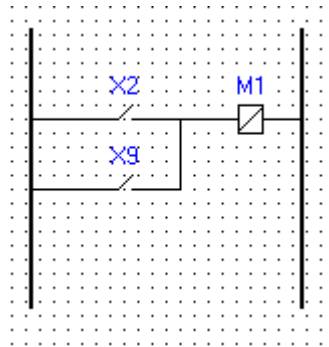
(1=1), Y1 " "

:

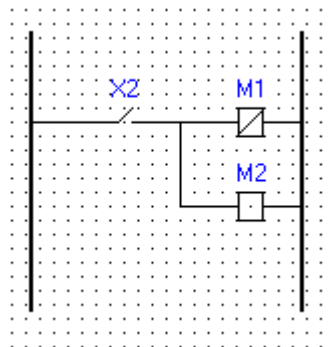
,

:

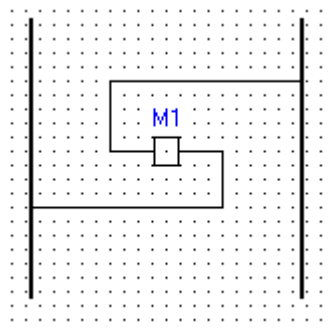
•



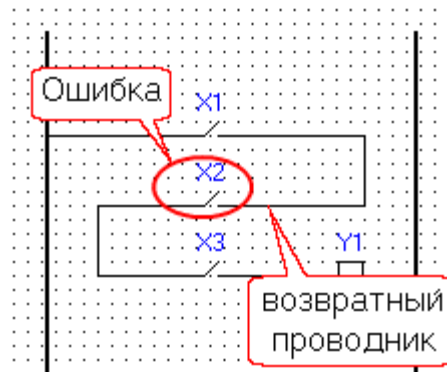
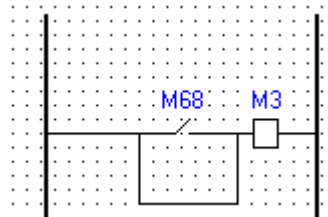
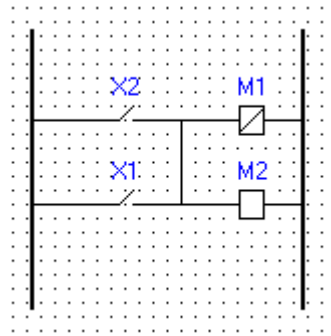
•



•



•



6.2.3

CDL" 32 _____, 8 ' 32 " .

_____ 32 63, 1 32.

define.

:

define ChangeTime = B1;

1

"1", 1 "0" - ChangeTime,

```

"          CDL"
•          192 - 207 ( 1 - 16) 224 - 239 (TS1 - TS16)
          ,
          - 25,5
•          208 - 223 ( 17 - 32) 240 - 255 (TS17 - TS32)
          ,
          - 255
          (
          ):
timer T17 = 30;
T17 - 30 - 17 , TS17 17 TS17.
          "1", 30 ,
          17 "1" ( ). - TS17
TS17 "0", "1". : ( : , TS17
          ).
          8
          176 - 183 (CI1 - CI8) 184 - 191 ( 1 - 8).
255. ( ):
counter C1 = 10;
1 - 10 - , CI1 CI1 1.
          "1", , CI1 "0", 1.
( ). : ( 1 - "1"
          ).

```

6.3

```

/
" "
" " -> " " (Ctrl + F9)
          (
          ):
•          < > -
( ).
•          - /
•          , ,
•          (timer, define, counter)
•          -
          , (
          ,
          1).
•          < > -

```

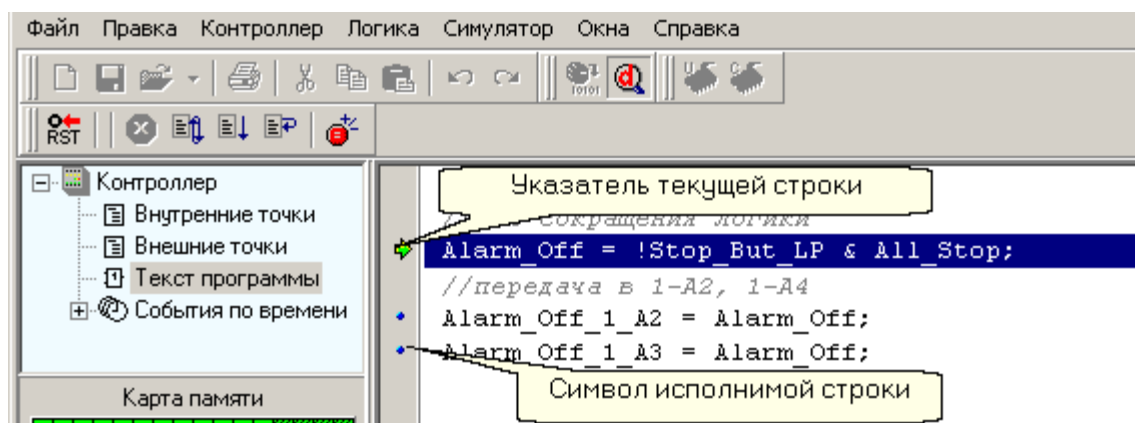



7

7.1

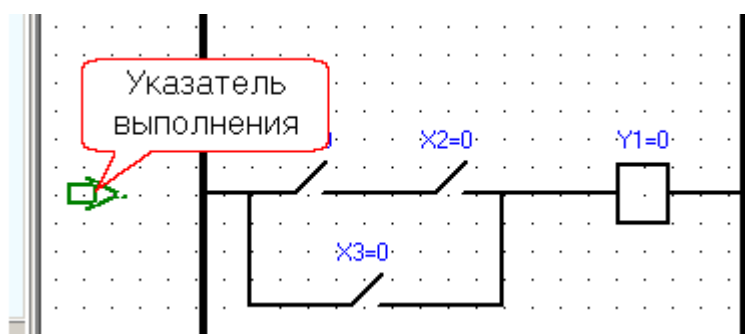
-> " (F6),

):

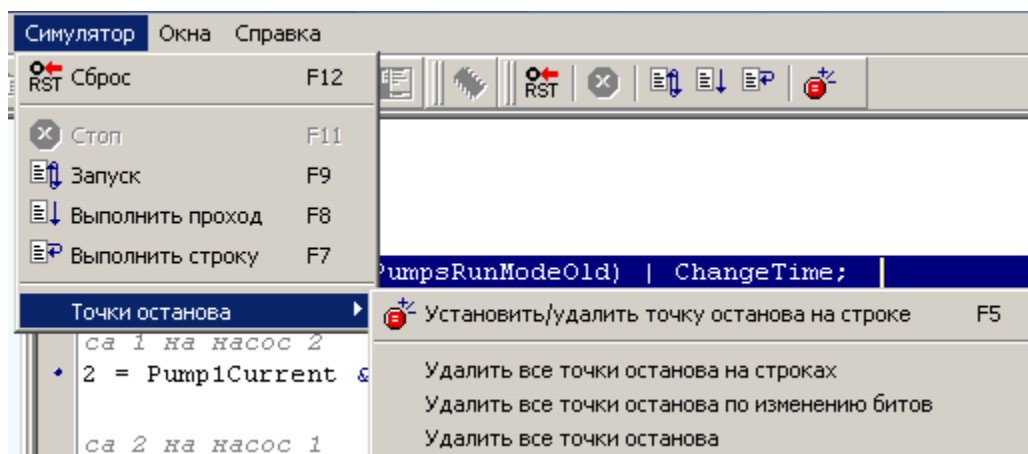


).

).



" ,



((-), , /)

7.2

, .

"0" ("OFF").

"1", :



, .

3

"1".

"0".

1

TS1, 1.


```

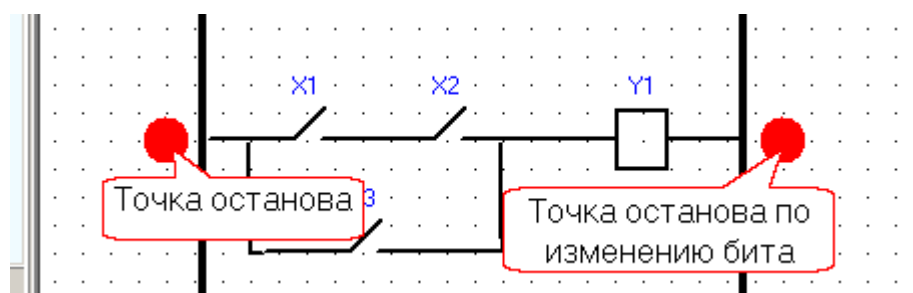
• Pump1Current = !Pump2Current & !PumpsChange12;
//насос 2 - рабочий
• Pump2Current = !Pump1Current & !PumpsChange21;
//запрещение перехода в рабочий режим насосов

```

```

• Pump1Current = !Pump2Current & !PumpsChange12;
//насос 2 - рабочий
• Pump2Current = !Pump1Current & !PumpsChange21;
  Pump1Current (M89) = 1
//запрещение перехода в рабочий режим насосов

```



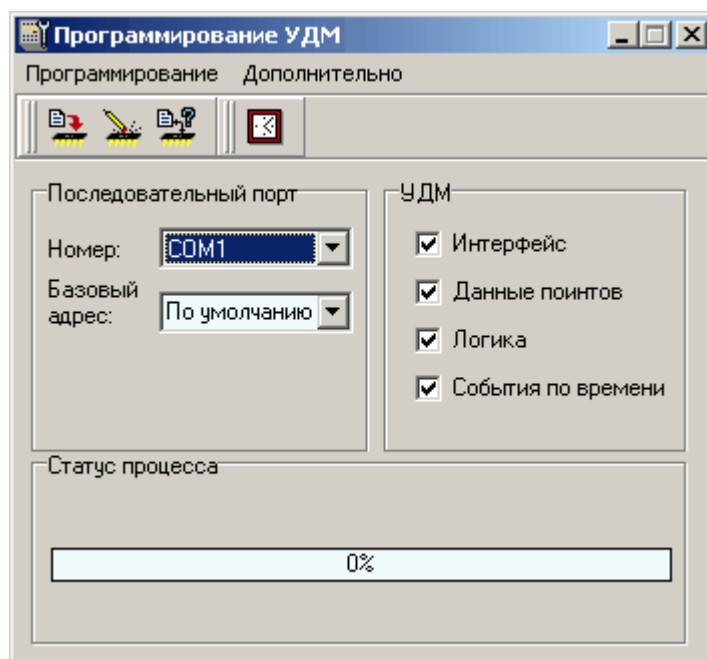


8

8.1

" CDL"

" ">>"



- - (1,
- 2...).

- , :
- , (
- . .).

- -
- -
- -

" ">>"

" "

" -> "

" CDL"

" " > "

" ,

" "

" .



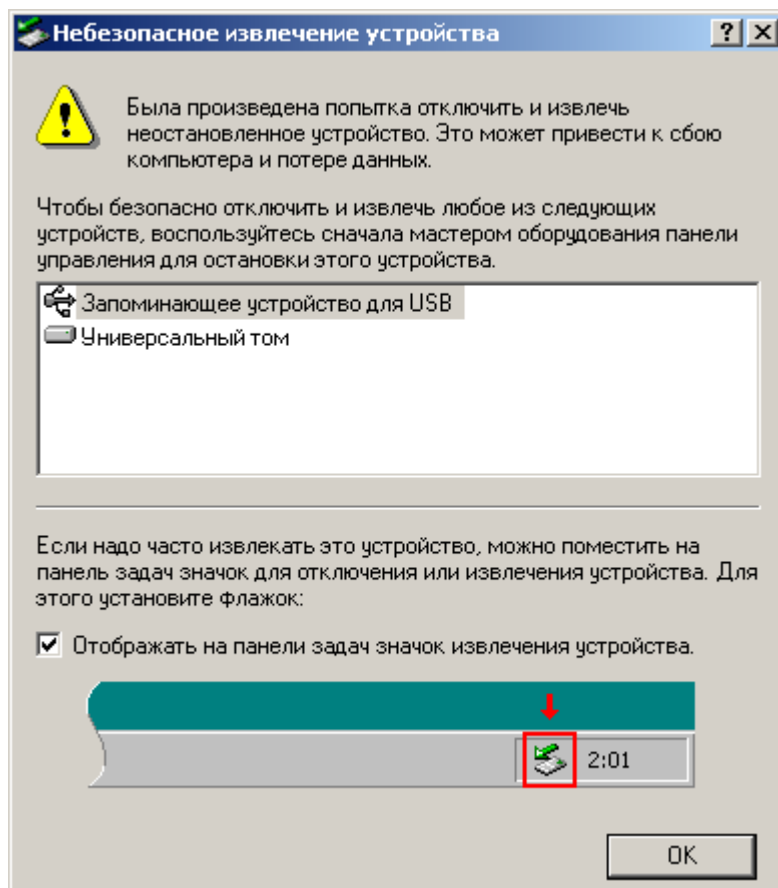
CADET logic

9

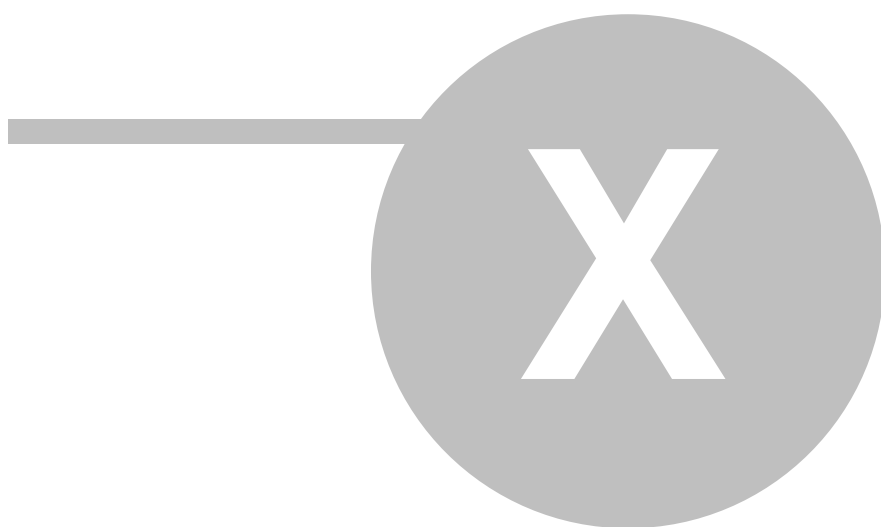
CADET logic

9.1

The screenshot displays the 'Программирование CADET logic' (Programming CADET logic) window. The window has a blue title bar and a toolbar with icons for file operations and a refresh button. The main text area shows 'Контроллер CADET logic найден' (CADET logic controller found) and 'Статус процесса: Ожидая команды' (Process status: Waiting for commands). A small icon of a controller is visible in the bottom right corner of the window.



Windows,

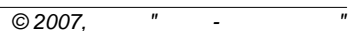


10

10.1

- .
- :
- -
- .
- /
- (
-).
- (10)
- .
- .

" "



10.3

```

" "
,
:
•
; 2) 4 , : 1) ; 3)
; 4)
4 :
define PumpsPD = X1; //
define PumpsStart = X2; //
define PumpsNotStop = X3; //
define PumpsRunMode = X4; //
1 - 1 = 0
"1" 4 2 3 -
•
: 4
define Pump1On = Y1; // 1
define Pump2On = Y2; // 2
define Pump1AlarmLight = Y3; // 1
define Pump2AlarmLight = Y4; // 2
•
• ,
• , 1- 2-
• , 2- 1-
• , ( / )
• ( )
• , ( / ).
• ,
define PumpChange = M1; //
define PumpsChange12 = M2; // 1 2
define PumpsChange21 = M3; // 2 1
define PumpsRunModeOld = M4; //
define ChangeTime = M5; //
define Pump1Current = M89; // 1 -
define Pump2Current = M90; // 2 -
•
"1" ( ), 3 : TS
timer T17 = 30; // 1
timer T18 = 30; // 2
timer T28 = 70; //
1.

```

$$PumpChange = (!PumpsRunMode \& PumpsRunModeOld) \mid ChangeTime;$$

• $\neg (P_{12} \wedge P_{21})$: $\neg (P_{12} \wedge P_{21})$

$PumpsChange_{12} = Pump1Current \wedge PumpChange \wedge \neg PumpsChange_{21};$
 $PumpsChange_{21} = Pump2Current \wedge PumpChange \wedge \neg PumpsChange_{12};$

• : 28 ,

ChangeTime = *B1* & !*TS28*;

• $TS28$: 28 bits
 • $TO28$: 28 bits
 • $TS28 = (ChangeTime \mid TS28) \& !TO28$;

• (2- 2-): 1 2- , 1- -

Pump1Current = !Pump2Current & !PumpsChange12;
Pump2Current = !Pump1Current & !PumpsChange21;

- $PumpsRunModeOld = PumpsRunMode;$

```

1- " " : 1- " " , 1- ( " " , 1- " " , 2- Pump1On
    " " , " " Pump2Alarm ).
    .

```

```
Pump1On = PumpsRunMode & !Pump1Alarm & PumpsNotStop &  
((Pump1Current & PumpsStart) | Pump2Alarm | Pump1On);
```

```
Pump2On = PumpsRunMode & !Pump2Alarm & PumpsNotStop &
((Pump2Current & PumpsStart) | Pump1Alarm | Pump2On);
```

• 1- 30 , (17):

$TS17 = Pump1On \ \& \ PumpsPD;$

$TS18 = Pump2On \ \& \ PumpsPD;$

• $\frac{17}{2} : \frac{30}{1} = \frac{17}{2} \cdot \frac{1}{30} = \frac{17}{60}$

Pump1Alarm = (TO17 | Pump1Alarm) & PumpsRunMode;

Pump2Alarm = (TO18 | Pump2Alarm) & PumpsRunMode;

• :

```
Pump1AlarmLight = Pump1Alarm;  
Pump2AlarmLight = Pump2Alarm;
```


" - "

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