

**Project Name: AVR\_2\_1**

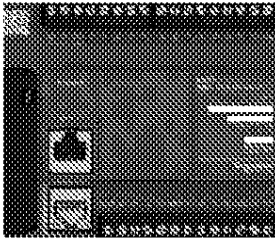
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# BILL OF MATERIAL

## Controller

	<b>Reference</b>	TM221CE24R
<b>Description</b>	TM221CE24R (screw) 14 digital inputs, 10 relay outputs (2 A), 2 analog inputs, 1 serial line port, 1 Ethernet port, 100-240 Vac power supply controller with removable terminal blocks.	
<b>Power supplied to the IO bus</b>	5V: 520 mA / 24V: 160 mA	

# HARDWARE CONFIGURATION

## MyController - TM221CE24R

### Digital Inputs

Used	Address	Filtering	Latch	Run/Stop	Events	Priority	Subroutine
X	%I0.0	3 ms			Not Used		
X	%I0.1	3 ms			Not Used		
X	%I0.2	3 ms			Not Used		
X	%I0.3	3 ms			Not Used		
X	%I0.4	3 ms			Not Used		
X	%I0.5	3 ms			Not Used		
X	%I0.6	3 ms			Not Used		
X	%I0.7	3 ms			Not Used		
X	%I0.8	3 ms			Not Used		
	%I0.9	3 ms			Not Used		
	%I0.10	3 ms			Not Used		
	%I0.11	3 ms			Not Used		
	%I0.12	3 ms			Not Used		
	%I0.13	3 ms			Not Used		

### Digital Outputs

Used	Address	Status Alarm	Fallback value	Used by
X	%Q0.0		0	User logic
X	%Q0.1		0	User logic
X	%Q0.2		0	User logic
X	%Q0.3		0	User logic
X	%Q0.4		0	User logic
X	%Q0.5		0	User logic
	%Q0.6		0	
	%Q0.7		0	
X	%Q0.8		0	User logic
	%Q0.9		0	

### Analog Inputs

Used	Address	Type	Scope	Range	Filter	Sampling
	%IW0.0	0 - 10 V	Normal	0-1000	0	
	%IW0.1	0 - 10 V	Normal	0-1000	0	

## Fast Counters

Used	Address	Input	Configured	Preset	Double Word
	%FC0	%I0.2	NotUsed	0	
	%FC1	%I0.3	NotUsed	0	
	%FC2	%I0.4	NotUsed	0	
	%FC3	%I0.5	NotUsed	0	

## High Speed Counters

Used	Address	Type
	%HSC0	Not Configured
	%HSC1	Not Configured
	%HSC2	Not Configured
	%HSC3	Not Configured

## ETH1

**Device name:** M221

**IP Mode:** Fixed

**IP address:** 0.0.0.0

**Subnet mask:** 0.0.0.0

**Gateway address:** 0.0.0.0

**Transfer Rate:** Auto

**Security Parameters:** Programming protocol enabled  
Auto discovery protocol enabled  
Modbus server enabled  
EtherNet/IP protocol enabled

## **SL1 (Serial line)**

### **Physical Settings**

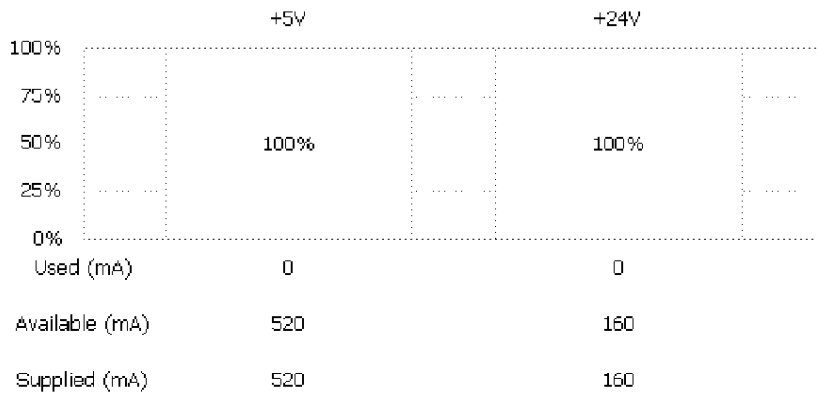
<b>Device:</b>	None
<b>Baud rate:</b>	19200
<b>Parity:</b>	Even
<b>Data bits:</b>	8
<b>Stop bits:</b>	1
<b>Physical medium:</b>	RS-485
<b>Polarization:</b>	No

### **Protocol Settings**

<b>Protocol:</b>	Modbus
<b>Response timeout (× 100 ms):</b>	10
<b>Time between frames (ms):</b>	10
<b>Transmission mode:</b>	RTU
<b>Addressing:</b>	Slave
<b>Address:</b>	1

# IO Bus

Main Controller





# SOFTWARE CONFIGURATION

## Constant Words

### KW

Allocation: Automatic

Allocated: 0

Used	Equ Used	Address	Symbol	Value	Comment
------	----------	---------	--------	-------	---------

### KD

Allocation: Automatic

Allocated: 0

Used	Equ Used	Address	Symbol	Value	Comment
------	----------	---------	--------	-------	---------

### KE

Allocation: Automatic

Allocated: 0

Used	Equ Used	Address	Symbol	Value	Comment
------	----------	---------	--------	-------	---------

## Network Objects

### Input Assembly (Ethernet/Ip)

Used	Address	Symbol	Fallback value	Comment
------	---------	--------	----------------	---------

### Output Assembly (Ethernet/Ip)

Used	Address	Symbol	Comment
------	---------	--------	---------

### Input Registers (Modbus Tcp)

Used	Address	Symbol	Fallback value	Comment
------	---------	--------	----------------	---------

### Output Registers (Modbus Tcp)

Used	Address	Symbol	Comment
------	---------	--------	---------

### Digital inputs (IOScanner)

Used	Address	Channel	Symbol	Comment
------	---------	---------	--------	---------

### Digital outputs (IOScanner)

Used	Address	Channel	Fallback value	Symbol	Comment
------	---------	---------	----------------	--------	---------

### Input registers (IOScanner)

Used	Address	Channel	Symbol	Comment
------	---------	---------	--------	---------

### Output registers (IOScanner)

Used	Address	Channel	Fallback value	Symbol	Comment
------	---------	---------	----------------	--------	---------

# Software Objects

## Timers

Allocation: Automatic

Allocated: 6

Used	Address	Symbol	Type	Retentive	Time Base	Preset	Comment
X	%TM0		TON		1 s	1	Задержка включения
X	%TM1		TON		1 s	1	Задержка на включение
X	%TM2		TON		1 s	1	Задержка на включение, на время пока отключаются вводные АВ
X	%TM3		TON		1 s	3	Задержка на отключение
X	%TM4		TON		1 s	3	Задержка на отключение
X	%TM5		TON		1 s	3	Задержка на отключение

## Counters

Allocation: Automatic

Allocated: 0

## LIFO/FIFO Registers

Allocation: Automatic

Allocated: 0

## Drums

Allocation: Automatic

Allocated: 0

## Shift Bit Registers

Allocation: Automatic

Allocated: 0

## Step Counters

Allocation: Automatic

Allocated: 0

## Schedule Blocks

Allocation: Automatic

Allocated: 0

## RTC

## PID

Used	PID	Symbol	Type	Comment
------	-----	--------	------	---------

## Grafcet Steps

Allocation: Automatic

Allocated: 0

# PROGRAM

## Behavior

**Functional level:** Level 6.2  
**Starting mode:** Start In Previous State  
**Watchdog:** 250 ms  
**Fallback behavior:** Fallback value

## Memory consumption

A successful compilation is required to obtain memory information.

## Application Architecture

### Master Task

**Scan mode:** Normal  
**POU list:** 1 - New POU

### Periodic Task

**Period:** 255 ms

# POU

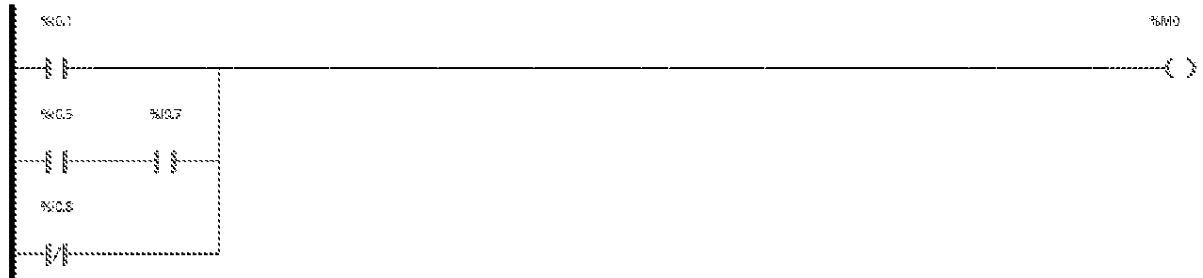
## Master Task

### 1 - New POU

#### Master Task

#### *Rung0*

**Comment:** Блокировка включения ввода 1

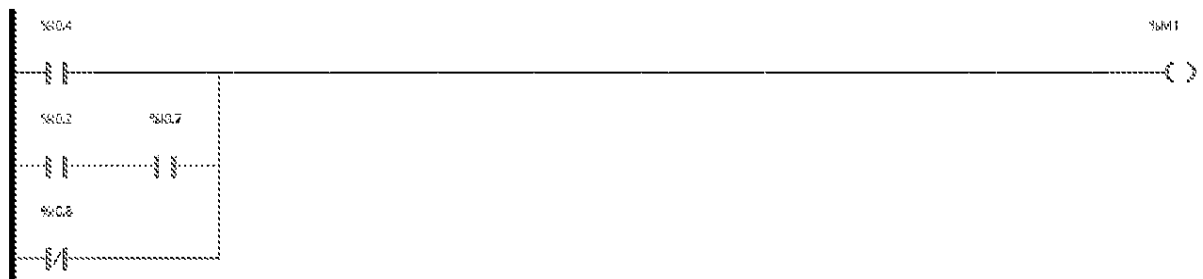


#### Variables used:

%I0.1	АВАРИЯ_1QF
%I0.5	СОСТОЯНИЕ_2QF
%I0.7	СОСТОЯНИЕ_3QF
%I0.8	РЕЖИМ_АВТОМ
%M0	БЛОКИРОВКА_1QF

#### *Rung1*

**Comment:** Блокировка включения ввода 2



#### Variables used:

%I0.2	СОСТОЯНИЕ_1QF
%I0.4	АВАРИЯ_2QF
%I0.7	СОСТОЯНИЕ_3QF
%I0.8	РЕЖИМ_АВТОМ
%M1	БЛОКИРОВКА_2QF

## Rung2

**Comment:** Блокировка включения секционного АВ

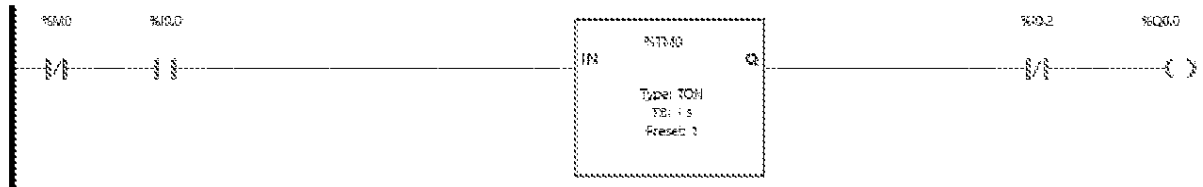


### Variables used:

%I0.1	АВАРИЯ_1QF
%I0.2	СОСТОЯНИЕ_1QF
%I0.4	АВАРИЯ_2QF
%I0.5	СОСТОЯНИЕ_2QF
%I0.6	АВАРИЯ_3QF
%I0.8	РЕЖИМ_АВТОМ
%M2	БЛОКИРОВКА_3QF

## Rung3

**Comment:** Сигнал на включение 1QF

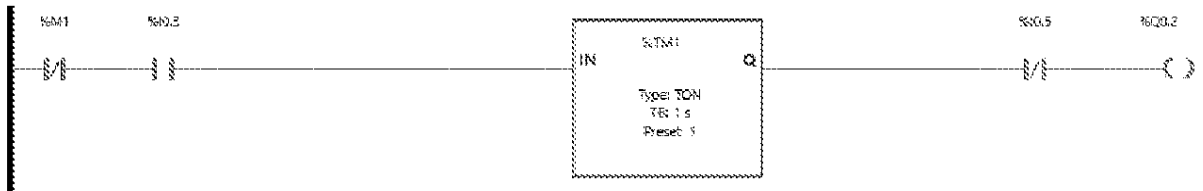


### Variables used:

%I0.0	НАПРЯЖЕНИЕ_ВВОД_1
%I0.2	СОСТОЯНИЕ_1QF
%M0	БЛОКИРОВКА_1QF
%Q0.0	СИГНАЛ_ВКЛЮЧЕНИЯ_1QF
%TMO	Задержка включение

## Rung4

**Comment:** Сигнал на включение 2QF

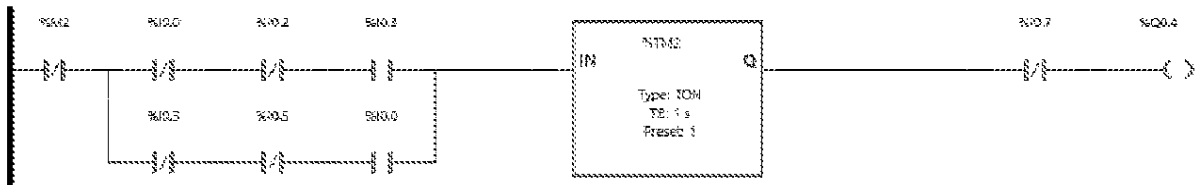


### Variables used:

%I0.3                    НАПРЯЖЕНИЕ\_ВВОД\_2  
%I0.5                    СОСТОЯНИЕ\_2QF  
%M1                      БЛОКИРОВКА\_2QF  
%Q0.2                    СИГНАЛ\_ВКЛЮЧЕНИЯ\_2QF  
%TM1                      Задержка на включение

## Rung5

**Comment:** Сигнал на включение 3QF

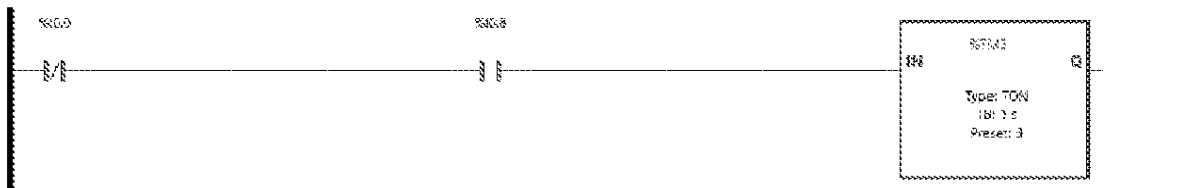


### Variables used:

%I0.0                    НАПРЯЖЕНИЕ\_ВВОД\_1  
%I0.2                    СОСТОЯНИЕ\_1QF  
%I0.3                    НАПРЯЖЕНИЕ\_ВВОД\_2  
%I0.5                    СОСТОЯНИЕ\_2QF  
%I0.7                    СОСТОЯНИЕ\_3QF  
%M2                      БЛОКИРОВКА\_3QF  
%Q0.4                    СИГНАЛ\_ВКЛЮЧЕНИЯ\_3QF  
%TM2                      Задержка на включение, на время пока  
                             отключаются вводные АВ

## Rung6

**Comment:** Формирование сигнала на отключение 1QF



### Variables used:

%I0.0                    НАПРЯЖЕНИЕ\_ВВОД\_1  
%I0.8                    РЕЖИМ\_АВТОМ  
%TM3                      Задержка на отключение



## Rung7

**Comment:** Сигнал на отключение 1QF



### Legend:

1 %TM3.Q

### Variables used:

%I0.1 АВАРИЯ\_1QF

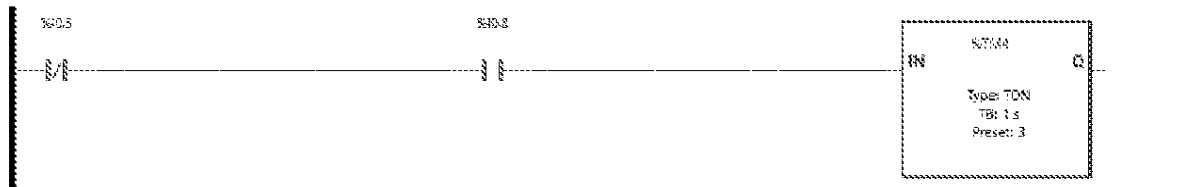
%I0.2 СОСТОЯНИЕ\_1QF

%Q0.1 СИГНАЛ\_ОТКЛЮЧЕНИЯ\_1QF

%TM3.Q Задержка на отключение

## Rung8

**Comment:** Формирование сигнала на отключение 2QF



### Variables used:

%I0.3 НАПРЯЖЕНИЕ\_ВВОД\_2

%I0.8 РЕЖИМ\_АВТОМ

%TM4 Задержка на отключение

## Rung9

**Comment:** Сигнал на отключение 2QF



### Legend:

1 %TM4.Q

### Variables used:

%I0.4 АВАРИЯ\_2QF

%I0.5 СОСТОЯНИЕ\_2QF

%Q0.3 СИГНАЛ\_ОТКЛЮЧЕНИЯ\_2Q

%TM4.Q Задержка на отключение