

UO‘T 681.51

**Artezian tik quduqlarida nasoslarini boshqarish va avtomatlashtirishni
PLC dasturiy ta‘minot tizimini ishlab chiqish**

Stajyor o‘qituvchi: Boboyorov Azizjon Eshmuminovich

TJ va ICha va B yo‘nalishi talabasi: To‘xtayev Habibjon Nabijon o‘g‘li

TJ va ICha va B yo‘nalishi talabasi: Olimov Doniyor Himmat o‘g‘li

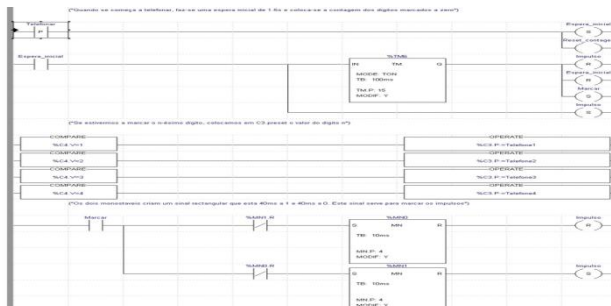
“TIQXMMI” MTU Buxoro tabiiy resurslarni boshqarish instituti.

Email: azizbekboboyorov@gmail.com

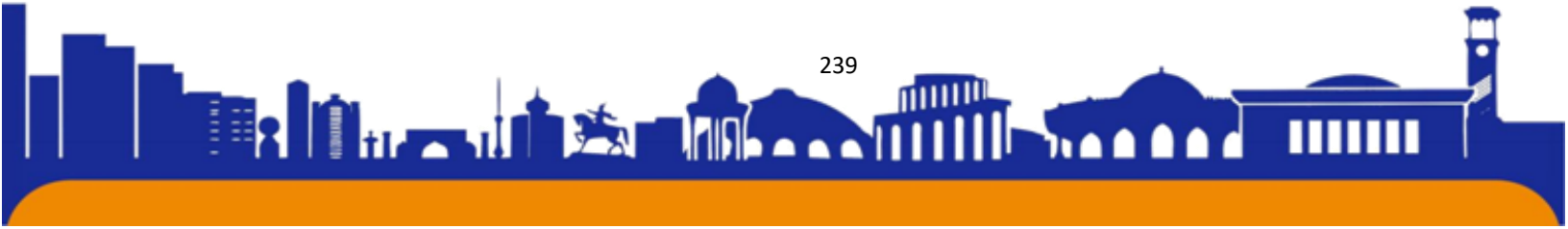
Annotatsiya. Ushbu maqolada meliorativ yerlarda sug‘orish uchun artezian skvajinalardan nasos yordamida suvni ko‘tarish va ushbu nasoslar ish rejimini nazorat qilish hamda avtomatlashtirilgan boshqaruv tizimini ishlab chiqish ko‘zda tutilgan. PLC dasturiy ta‘minot tizimini uch fazali nasoslar uchun qo‘llash hamda Ladder dasturiy tili o‘rnatish qo‘llangan.

Kalit so‘zlar: PLC dasturiy ta‘minot tizimi, Ladder dasturiy tili, Meliorativ yerlar, Narvon mantig‘i,

Kirish. Ladder dasturiy tili(narvon mantig‘i) PLC(Program logic controller)-larni dasturlash uchun keng qo‘llaniladi, bu erda jarayon yoki ishlab chiqarish jarayonini ketma-ket nazorat qilish talab qilinadi. Narvon mantig‘i oddiy, ammo muhim boshqaruv tizimlari uchun yoki eski simli o‘rni zanjirlarini qayta ishlash uchun foydalidir[1]. Dasturlashtiriladigan mantiqiy kontrollerlar yanada murakkablashgani sayin, u juda murakkab avtomatlashtirish tizimlarida ham qo‘llanila boshlandi. Ko‘pincha narvon mantiqiy dasturi kompyuter ish stantsiyasida ishlaydigan HMI dasturi bilan birgalikda ishlatiladi(1-rasm).



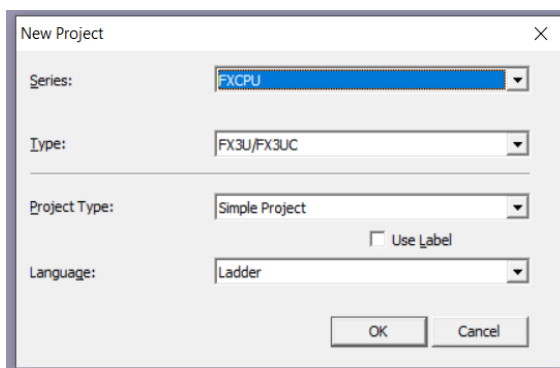
1-rasm. Kontaktlar va bobinlar, taqqoslashlar, taymerlar va monostabil multivibratorlarni o‘z ichiga olgan narvon diagrammasining bir qismi



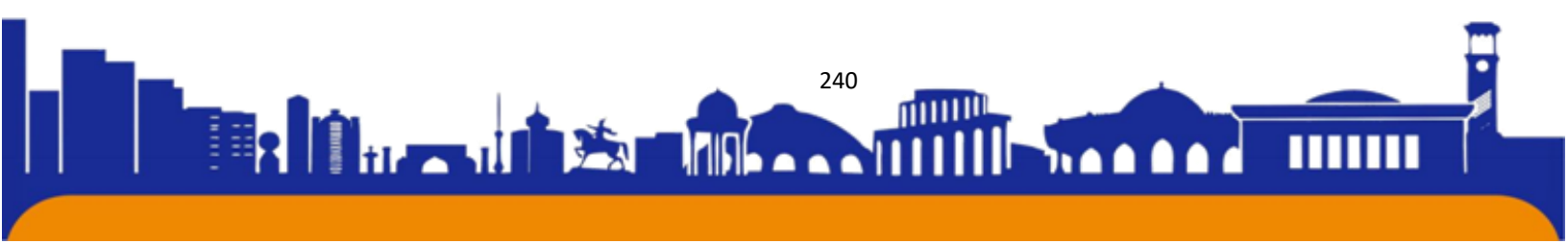
Narvon diagrammasida ketma-ket boshqaruv mantig'ini ifodalash zavod muhandislari va texniklariga maqsadli kompyuter tilni o'rganish uchun qo'shimcha tayyorgarliksiz dasturiy ta'minotni ishlab chiqishga imkon berish edi. Tanish o'rni apparat tizimlariga o'xshashligi sababli ishlab chiqish va texnik xizmat ko'rsatish soddalashtirildi[2, 3, 4]. Narvon mantig'ini protsessual til emas, balki qoidalarga asoslangan til sifatida ko'rish mumkin. Narvondagi "zinapoya" qoidani ifodalaydi. O'rni va boshqa elektromexanik qurilmalar bilan amalga oshirilganda, turli qoidalar bir vaqtning o'zida va darhol amalga oshiriladi[9]. Dasturlashtiriladigan mantiqiy kontrollerda amalga oshirilganda, qoidalar odatda dasturiy ta'minot tomonidan uzluksiz tsikl yoki "skanerlash" orqali ketma-ket bajariladi. Loopni etarlicha tez, odatda soniyada ko'p marta bajarish orqali bir vaqtning o'zida va darhol bajarish effektiga erishiladi. Dasturlashtiriladigan kontrollerlardan to'g'ri foydalanish pog'onalarini bajarish tartibining cheklovlarini tushunishni talab qiladi[6, 7, 8].

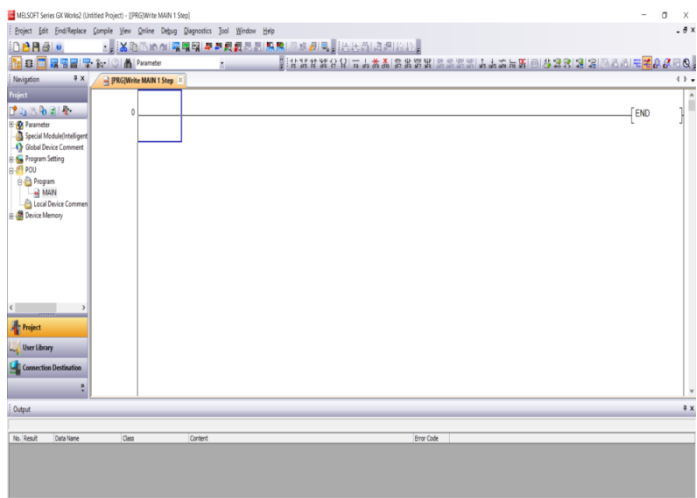
Material va usullar

Bu usulni o'rganishga tayyorgarlik jarayonida bir qancha adabiyotlar, manbalar [6] o'rganildi va tahlil qilindi, shunga o'xshash turli xil materiallarning mosligi tekshirildi. Biroq, nashrlar va tadqiqot natijalari qidiruv manbalarida ladder tilining qulay usuli kamligini ko'rsatdi. Bir tomondan, bu usulning to'liq dasturiy ta'minoti nazariy asosining yo'qligi bizni tadqiqot olib borishimizni qiyinlashtiradi. Dasturni ishga tushirish quyidagicha:



Ladder tilining yangi loyiha ochish bo'limi





Ladder tilida yangi loyiha tuzish bo'limi Bosqichli kiritish

Dama (kontaktlar)

- —[]— Odatda ochiq kontakt, unga mos keladigan lasan yoki uni boshqaradigan kirish quvvatlanganda yopiladi
- —[\]— Odatda yopiq ("emas") kontakt, unga mos keladigan lasan yoki uni boshqaradigan kirish quvvatlanmagan bo'lsa, yopiladi

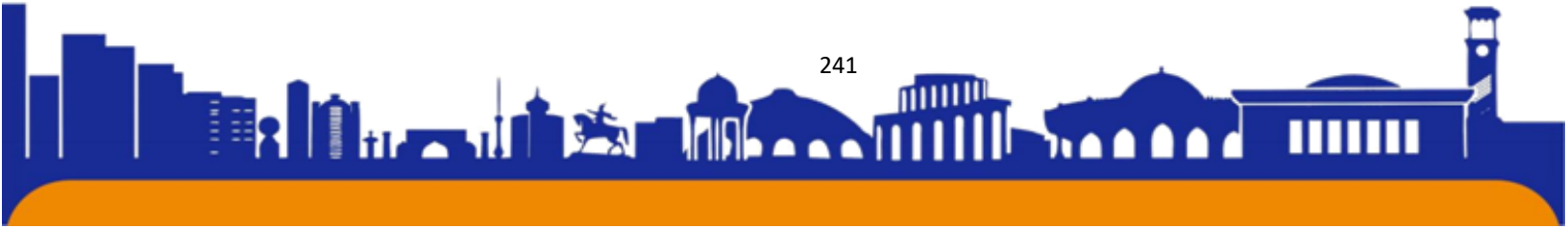
• **Bosqich chiqishi**

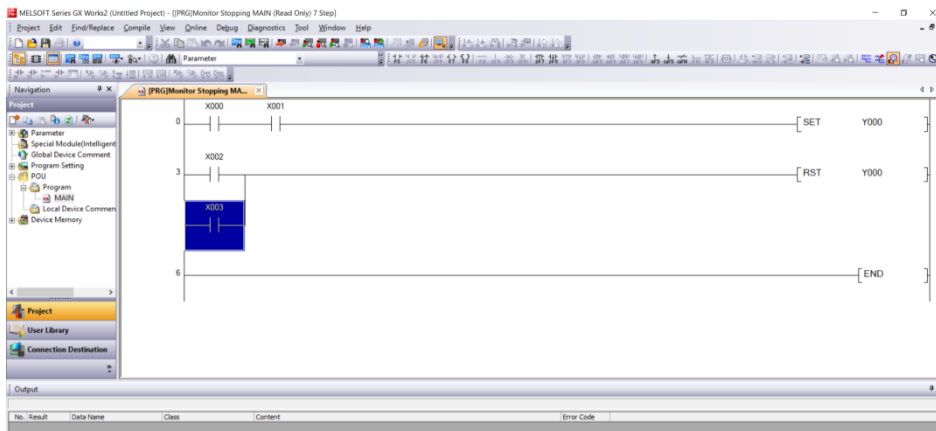
Aktuatorlar (bobinlar)

- —()— Odatda faol bo'lmagan lasan, uning pog'onasi yopilganda quvvatlanadi.
- —(\)— Odatda faol ("emas") lasan, uning pog'onasi ochiq bo'lganda quvvatlanadi.

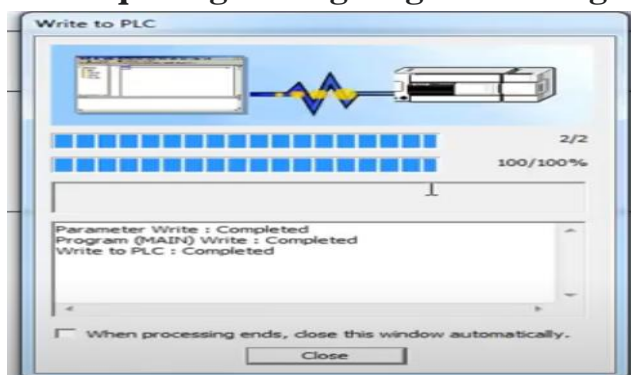
"Bobin" (pog'onaning chiqishi) dasturlashtiriladigan kontrollerga ulangan ba'zi qurilmalarni boshqaradigan jismoniy chiqishni yoki dasturning boshqa joylarida foydalanish uchun ichki xotira bitini ko'rsatishi mumkin.

PLC dasturiy ta'minot tizimini ladder tili bilan yozish quyidagicha:





Kirish va chiqish signallning belgilanish diogrammasi



Dasturni kontrollerga yuklash

Online Data Operation

Connection Channel List: Simulation

Read
 Write
 Verify
 Delete

PLC Module Execution Target Data(No / Yes)

Title: [Empty]

Edit Data
 Parameter+Program
 Select All
 Cancel All Selections

Module Name/Data Name	Title	Target	Detail	Last Change	Target Memory Setting	Size
(Untitled Project)						
PLC Data						Program Memory/De...
Program(Program File)		<input type="checkbox"/>		2023/12/11 22:41:19		
MAIN		<input type="checkbox"/>		2023/12/11 22:41:19		
Parameter		<input type="checkbox"/>		2023/12/11 22:41:17		
PLC Parameter/Network Parameter		<input type="checkbox"/>		2023/12/11 22:41:17		
Global Device Comment		<input type="checkbox"/>	<input type="checkbox"/> Detail	2023/12/11 22:41:19		
COMMENT		<input type="checkbox"/>	<input type="checkbox"/> Detail	2023/12/11 22:41:19		
Device Memory		<input type="checkbox"/>		2023/12/11 22:41:19		
MAIN		<input type="checkbox"/>		2023/12/11 22:41:19		

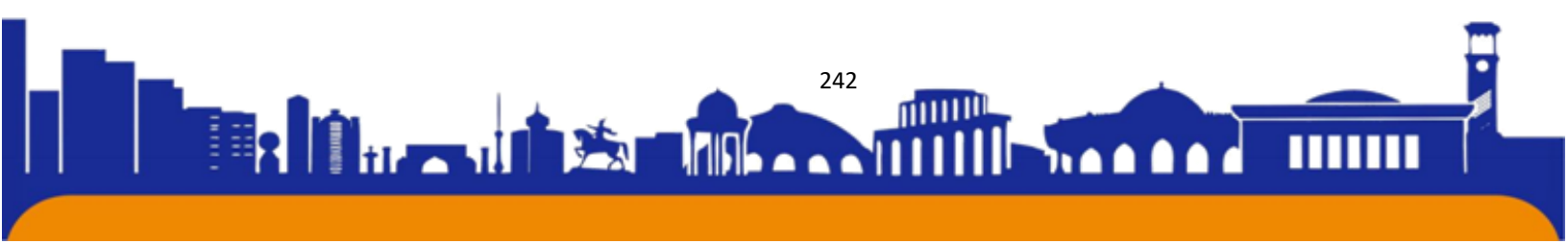
Necessary Setting(No Setting / Already Set) Set if it is needed(No Setting / Already Set)

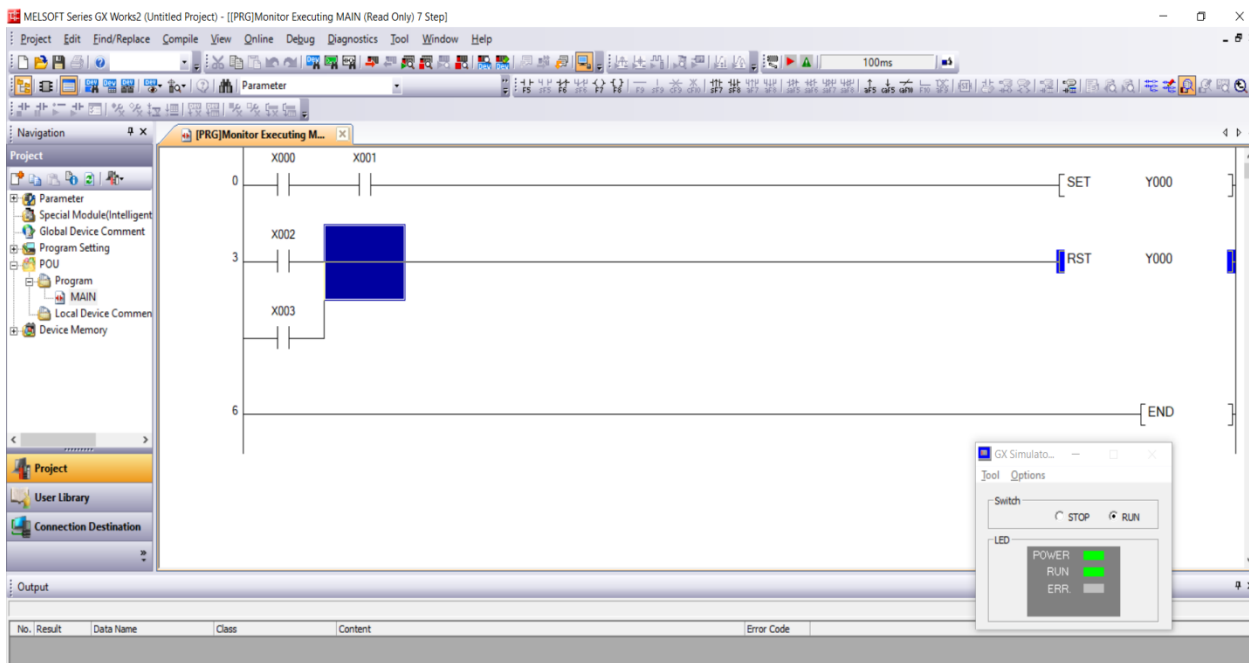
Refresh

Related Functions << Execute Close

Remote Operation: Clear PLC Memory

Online ma'lumotlarni kiritish





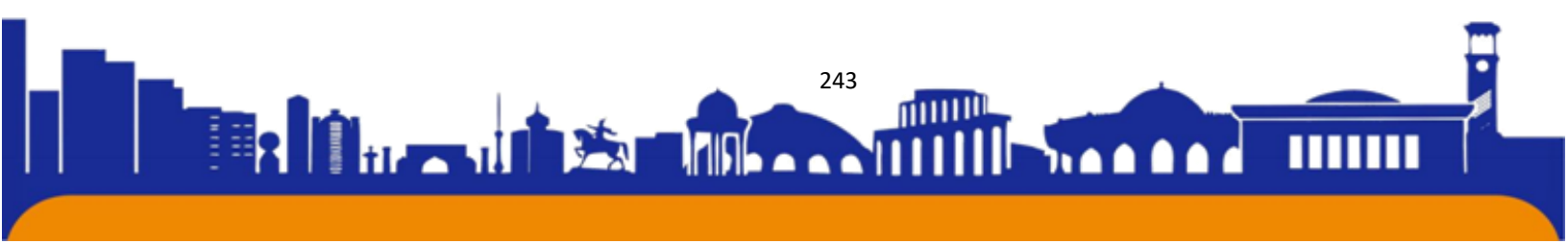
Dastuni simulatsiya qilish Natijalar va muhokamalar

Tadqiqoddan olingan natija shuni ko'rsatadiki: nasoslarini boshqarish va avtomatlashtirishni PLC dasturiy ta'minot tizimi ichki logotip konfiguratsiyasi orqali aniqlaymiz. Ko'pincha, elektr motorini boshqarish uchun dastur ishlatiladi. Ushbu sxema "To'xtatish" oraliq tugmasidan foydalanmasdan elektr motorining aylanish yo'nalishini o'zgartirishga imkon beradi. Ushbu tugma faqat vosita to'liq to'xtatilganda ishlatiladi.

Xulosa

Tadqiqot natijasida artezian tik quduqlarida nasoslarini samaradorligini oshirish uchun bu tizimga inson-mashina interfeysini o'rnatish talabi qoyilgani bois kerakli parametrlar o'rganilib chiqildi. Tadqiqot ishida jaroyonga bog'liq bo'lgan barcha texnik uskunalarning xususiyatlari va parametrlari to'liq shaklda keltirilib o'tildi.

Avtomatlashtirish tufayli xodimlarning suv ta'minotini boshqarish va tartibga solishda ishtirok etish ehtiyoji minimallashtiriladi. Bu ishlarni avtomatlashtirish sifatiga talablarning o'sishi bir qator: muhandislik kibernetikasi, hisoblash texnikasi va tizimlarning umumiy nazariyasi fanlarining yutuqlari bazasida tizimli yondoshish



pozitsiyasi bilan yechiladigan masalalarni yechish zaruriyatini oldingi o'ringa chiqardi.

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