Tanta University , faculty of engineering
Computer & Automatic Control Department
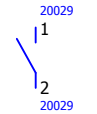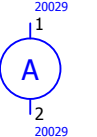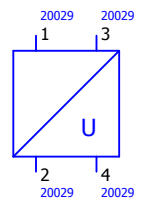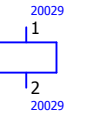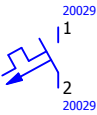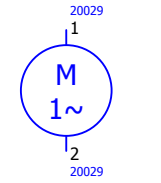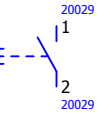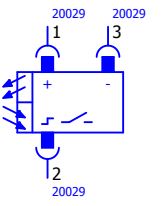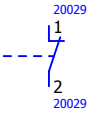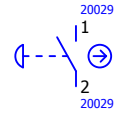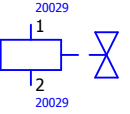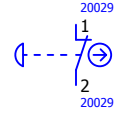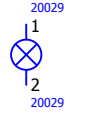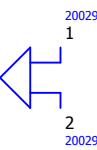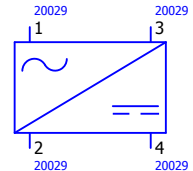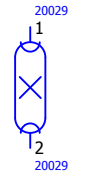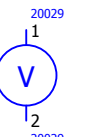
DATAM

Supervision of	Assoc. Prof. Dr\ Mohammad Arafa Al-Badry
Project name	Water treatment plant automation using PLC and SCADA

Place of installation / Tanta University, Computers & Automatic Control Department

Implemenation of /
Mohamed Adel Darwish
Abanoub Ashraf Labib
Abdallah Mohamed Abd El-Razik
Tasbih Ahmed Attia
Mostafa Esmail Arafat

Power source / 220VAC , 50HZ L,N

Control voltage / 220VAC , 50HZ / 24Vdc , 12Vdc , 5Vdc / 2 power supplies

Last EPLAN version used / 2.9.4

Potential color definition legend

L	
N	
+24V	
+12V	
0-5V	
0V	

Created on	23/06/2023
Edit date	12/07/2023

Number of pages 10

Project Name / Location	Project description	Supervision of /	Mohamed Adel Darwish / Abanoub Ashraf Labib / Abdallah Mohamed Abd El-Razik / Tasbih Ahmed Attia / Mostafa Esmail Arafat	Page number	1 /10
Graduation project / Tanta university	Water treatment plant automation using PLC and SCADA	Assoc. Prof. Dr\ Mohammad Arafa Al-Badry		Scale	1 : 1
				Page Name	cover sheet

Symbol overview

IEC_symbol

1 **S** NO contact NO auxiliary contact	**93** **PA** Measuring instrument, with current display, ampmeter Measuring instrument, 2 connection points	**1151** **TISPQ** Measuring transducer, ideal voltage source Measuring transducer, variable
20 **K** Electromechanical operating device, general / relay coil, general Coil for power contactor	**98** **FA1** Circuit breaker, single-pole Circuit breaker	**1204** **M2AIR** AC motor, ventilator / fan Single-coil motor without PE
35 **SSD** Pressure switch, NO contact Pushbutton, NO contact	**138** **SSLRX** Photoelectric switch, NO contact, with plug-in connection Light barrier, NO contact with power supply	**1352** **X2_2** Terminal with 2 connection points (1 x graphical line) Terminal, general, with saddle jumper, 2 connection points
36 **SOD** Pressure switch, NC contact Pushbutton, NC contact	**169** **SSNOT1** Emergency stop switch / Emergency stop pushbutton, NO contact Pushbutton, NO contact	**1411** **X1_B** Terminal with one connection point and 2 saddle jumper connections Terminal, general, with saddle jumper, 1 connection point
45 **Y1** Solenoid valve, general Valve, single	**170** **SONOT1** Emergency stop switch / Emergency stop pushbutton, NC contact Pushbutton, NC contact	**1413** **X2_NB** Terminal with 2 connection points without saddle jumper connections Terminal, general, 2 connection points
46 **H** Lamp / indicator light, general Lamp, single	**283** **HSI** Siren Signal device, acoustic, single	
56 **G22** Rectifier, single-phase Rectifier, variable	**313** **EH2** Fluorescent lamp without PE Light, 2 connection points	
92 **PV** Measuring instrument, with voltage display / voltmeter Measuring instrument, 2 connection points	**1150** **TISTQ** Measuring transducer, ideal current source Measuring transducer, variable	

Legend

EMG : emergency switch	Ph.cell : photoelectric cell	DPDT : double path, double through
S1 : start system	RQ0.0/Q1.7 : plc output card relays	1PDT: one path, double through
S2 : led start	RTD : resistance temperature detector	LEV : level sensor
P.S : power supply	TPDT : tripple path, double through	

-PS-1
220Vac, 50/60HZ
24Vdv, 5A

0V   +24V

-PS-2
220Vac, 50/60HZ
12Vdv, 10A

0V   +5V   +12V

+24V / 7.0:A

+12V / 6.0:A

+5V / 4.2:J

0V / 4.2:J

Main DC system

R   N0

-RMava
main available
A1
A2

13 — 14 /11.1:C

-RGava
generator available
A1
A2

13 — 14 /11.2:C

-RM
/11.8:I

1 3 5
2 4 6

-RG
/11.9:I

1 3 5
2 4 6

N
4.0:J

L
4.0:J

L1   N1

Main power source1 ,220V/50HZ

L2   N2

Gen power source2, 220V/50HZ

Project Name / Location	Project description	Supervision of /	Mohamed Adel Darwish	Page number	3 /10
Graduation project / Tanta university	Water treatment plant automation using PLC and SCADA	Assoc. Prof. Dr\ Mohammad Arafa Al-Badry	Abanoub Ashraf Labib	Scale	1 : 1
			Abdallah Mohamed Abd El-Razik	Page Name	ATS
			Tasbih Ahmed Attia		
			Mostafa Esmail Arafat		

-Current sensor
0-20A,ac/dc
0-5Vdc analoge output
I
0-5Vdc

L1 / 5.0:A

4-4
4-4

4-5
I.ang / 7.0:E

-EMG
/9.4:E
11
12

4-1
4-1

-Ph.cell
220Vac,50/60HZ
3-wire interface
1 2
+ -
3

4-7
4-7
4-7

4-3

-S1
Selector
1 way through
1 position
13
14

-S2
Selector
1 way through
1 position
13
14

4-1

4-9

4-8
4-9

4-8
4-8
4-9

-Voltage sensor
0-240Vac,50/60HZ
0-5Vdc analoge output
U
0-5V

4-6
V.ang / 7.0:F

A1
A2
-K1
220Vac,50/60HZ
TPDT, 11 legs
system run
4-1

x1
x2
-H1
220Vac,50/60HZ
phi-22mm2
system run indicator
green
4-1

A1
A2
-K2
220Vac,50/60HZ
TPDT, 11 legs
photocell relay
4-1

N / 5.0:J

13 — 14 /9.1:E

13 — 14 /9.7:E

ATS output

1
-CB
MCB,1P,C10,6KA
400/220VAC, 50/60HZ
main
2

3.4:I / 0V
0V / 6.0:J

3.9:I / L
3.9:I / N

3.4:H / +5V
+5V / 11.0:B

Power circuit 220Vac for o/p byte 0

Column headers: 0 1 2 3 4 5 6 7 8 9

Row A: 4.9:A / L1 → ... → L1 / 6.0:B

Branches (labeled 4-4 at row C):
- -RQ0.0 /10.1:I 13 14
- -RQ0.1 /10.1:I 13 14
- -RQ0.2 /10.2:I 13 14
- -RQ0.3 /10.2:I 13 14
- -RQ0.4 /10.3:I 13 14
- -RQ0.5 /10.3:I 13 14
- -RQ0.6 /10.4:I 13 14
- -RQ0.7 /10.4:I 13 14

byte 0 relays for output

Cross references (row F): 5-1 5-2 5-3 5-4 5-5 5-6 5-7

Loads (row H):
- M 1~ -Raw Pump 220Vac, 50/60HZ main
- x1 x2 -AL2SO4 valve 220Vac, 50/60HZ single-acting
- M 1~ -flash mixer 220Vac, 50/60HZ
- M 1~ -slow mixer 220Vac, 50/60HZ main
- M 1~ -sludge clarifier 220Vac, 50/60HZ main
- x1 x2 -enter valve filter1 220Vac, 50/60HZ single-acting
- x1 x2 -Treat-1 valve 220Vac, 50/60HZ

Row I labels: 4-1 (repeated for each branch)

Row N: 4.9:I / N → ... → N / 6.0:J

Project Name / Location	Project description	Supervision of /	Mohamed Adel Darwish	Page number	5 /10
Graduation project / Tanta university	Water treatment plant automation using PLC and SCADA	Assoc. Prof. Dr\ Mohammad Arafa Al-Badry	Abanoub Ashraf Labib / Abdallah Mohamed Abd El-Razik / Tasbih Ahmed Attia / Mostafa Esmail Arafat	Scale / Page Name	1 : 1 / Power ciruit 220Vac for o/p byte 0

	0	1	2	3	4	5	6	7	8	9

3.4:H / +12V

3-5

5.9:A / L1   L1 /

L1 /

3-5

4-4   4-4   4-4   4-4   4-4   3-5   4-4   4-4   4-4

4-4   4-4

byte 0 relays for output

13 -RQ1.0 /10.5:I 14
13 -RQ1.1 /10.5:I .... -RQ1.1 /10.5:I 14
13 -RQ1.2 /10.6:I .... -RQ1.2 /10.6:I 9/11
13 -RQ1.3 /10.6:I 14
13 -RQ1.4 /10.7:I 14
13 -RQ1.5 /10.7:I 14
13 -RQ1.6 /10.8:I 14
13 -RQ1.7 /10.8:I 14

6-1   6-2   6-3   6-4   6-5   6-6   6-7   6-8   6-9

x1   M 1~   x1   M 1~   x1   M 1~   x1   x1   x1
x2   1/2   x2   1/2   x2   1/2   x2   x2   x2

-Treat-2 valve 220Vac, 50/60HZ single-acting

-Air blower 220Vac, 50/60HZ main

-Air valve-1 220Vac, 50/60HZ single-acting

-Washing pump1 220Vac, 50/60HZ main

-Washing valve1 220Vac, 50/60HZ single-acting

-Sludge pump1 220Vac, 50/60HZ main

-Siren 12Vdc alarms indicator

-Plant lighting 220Vac, 50/60HZ

-Sludge valve filter1 220Vac, 50/60HZ single-acting

4-1   4-1   4-1   4-1   4-1   4-1   4-1

5.9:J / N

4.9:J / 0V   0V /   0V / 7.0:B

Mohamed Adel Darwish
Abanoub Ashraf Labib
Abdallah Mohamed Abd El-Razik
Tasbih Ahmed Attia
Mostafa Esmail Arafat

Project Name / Location	Project description	Supervision of /	
Graduation project / Tanta university	Water treatment plant automation using PLC and SCADA	Assoc. Prof. Dr\ Mohammad Arafa Al-Badry	

Page number	6 /10
Scale	1 : 1
Page Name	Power ciruit 220Vac for o/p byte 1

3.2:H / +24V   +24V / 9.0:A

6.9:J / 0V   9.0:B
0V

4.2:C / I.ang   4-5

4.2:H / V.ang   4-6

3-4   3-4   3-4   3-4   3-4

-RQ0.2   -RQ0.3   -RQ0.4   -RQ1.1   -RQ1.2
13   13   13   13   13
/10.2:I   /10.2:I   /10.3:I   /10.5:I   /10.6:I
14   14   14   14   14

Flash mixer over flow   3-4

4-5

4-6

7-1   7-2   7-3   7-4   7-5

i/p analoge PLC card-1

+ 1   _ 1   + 2   _ 2   0V 1

4-6 3-3   4-5 3-3
A   A
4-6 3-3   4-5 3-3
V   V

I2.0 1   I2.1 2   I2.2 3   I2.3 4   I2.4 5   I2.5 6   I2.6 7   I2.7 8

7.9:A / +24V → +24V → +24V / 10.0:A

7.9:B / 0V → 0V → 0V / 10.0:B

3-4   3-4   3-4   3-4

-K1 13   -RQ0.0 13   -EMG 13   -K2 13
/4.4:H 14   /10.1:I 14   /4.4:C 14   /4.7:H 14

3-4   3-4   LEVsensor Raw tank 3-4   low filter tank1 3-4   high filter tank1 3-4   low filter tank2 3-4   sludge H-sensor tank 3-4   LEVsensor flash mixer 3-4   LEVsensor slow mixer 3-4   LEVsenclarifier buttom 3-4   sludge L-sensor tank 3-4   service intake 3-4

9-1   9-2   9-3   9-4

i/p PLC card-2

+24V 0 | -I0.0 1 | -I0.1 1 | -I0.2 1 | -I0.3 1 | -I0.4 1 | -I0.5 1 | -I0.6 1 | -I0.7 1 | -I1.0 1 | -I1.1 1 | -I1.2 1 | -I1.3 1 | -I1.4 1 | -I1.5 1 | -I1.6 1 | -I1.7 1 | 0v 1

Project Name / Location	Project description	Supervision of /	Mohamed Adel Darwish	Page number	9 /10
			Abanoub Ashraf Labib	Scale	1 : 1
Graduation project / Tanta university	Water treatment plant automation using PLC and SCADA	Assoc. Prof. Dr\ Mohammad Arafa Al-Badry	Abdallah Mohamed Abd El-Razik Tasbih Ahmed Attia Mostafa Esmail Arafat	Page Name	PLC digital inputs card-1

10.9:A / +24V

10.9:B / 0V

4.9:J / +5V

3-4

3-4   3-4

-RMava /3.6:H   13 14

-RGava /3.7:H   13 14

-R2 /11.5:I   13 14

-R8 /11.8:I   13 14

11-1   11-2

i/p arduino card

+5V 0   0V 0   A0/S1 1   A1/S2 2   A2/S3 3   A3/S4 4   D2/S5 5   D3/S6 6

o/p arduino card

D13/R1 9   D12/R2 10   D11/R3 11   D6/R4 12   D7/R5 13   D8/R6 14   D9/R7 15   D10/R8 16

11-6   11-7

11-3   11-4   11-5

relay module card

-R2 5Vdc 1PDP   A1 A2   3-3

-R3 5Vdc 1PDP remote start signal dry contact   A1 A2

-R8 5Vdc 1PDP   A1 A2   3-3

-RM 24Vdc TPDP   A1 A2   3-3

-RG 24Vdc TPDP   A1 A2   3-3

3-3

13 — 14 /11.8:C

13 — 14 /11.9:C

1 — 2 /3.8:G

1 — 2 /3.9:G