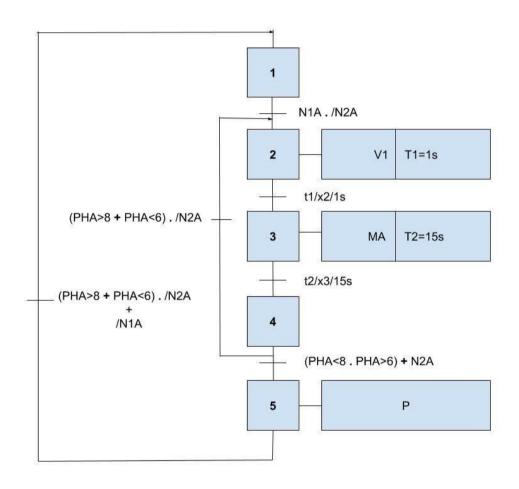
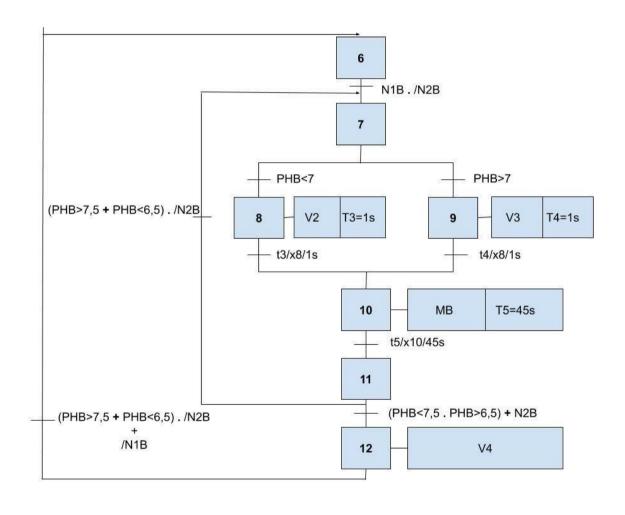
Projet: Automatisation d'une station d'eaux usées sur TIA PORTAL

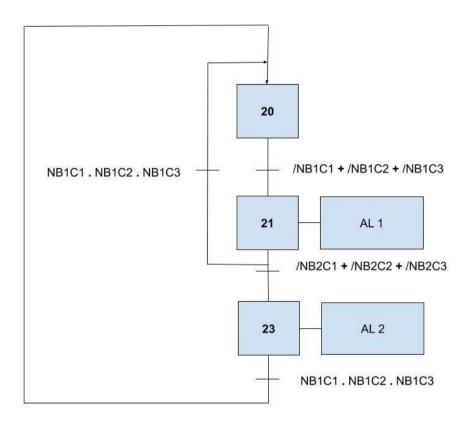
1- Grafcet 1 :



2- Grafcet 2 :



3- Grafcet 3:



4- Programmation sur TIA PORTAL:

Totally Integrated
Automation Portal

Eau usée / PLC_1 [CPU 1214C DC/DC/DC] / PLC tags

Default tag table [98]

ı	Name	Data type	Address	Retain	HMI/OPC	from	Visible in Supervision HMI engi- neering	Comment
_	N1A	Bool	%10.0	False	True	True	True	
-	N2A	Bool	%I0.1	False	True	True	True	
=	РНА	Int	%IW64	False	True	True	True	
-	PHB	Int	%IW66	False	True	True	True	
_	N1B	Bool	%10.2	False	True	True	True	
_ _	N2B	Bool	%10.3	False	True	True	True	
	NB1C1	Bool	%10.4	False	True	True	True	
<u>-</u>	NB1C2	Bool	%10.5	False	True	True	True	
-	NB1C3	Bool	%10.6	False	True	True	True	
	NB2C1	Bool	%10.7	False	True	True	True	
	NB2C2	Bool	%I1.0	False	True	True	True	
	NB2C3	Bool	%I1.1	False	True	True	True	
-	V1	Bool	%Q0.0	False	True	True	True	
]]	V2	Bool	%Q0.1	False	True	True	True	
_	V3	Bool	%Q0.1 %Q0.2	False	True	True	True	
_	V4	Bool	%Q0.2 %Q0.3	False	True	True	True	
_	MA	Bool	%Q0.3 %Q0.4	False	True	True	True	
-	MB	Bool	%Q0.4 %Q0.5	False	True	True	True	
_	Р	Bool	%Q0.5 %Q0.6	False	True	True	True	
_		Bool	%Q0.6 %Q0.7	False	True	True	True	
_	AL1 AL2	Bool	%Q0.7 %Q1.0	False	True	True	True	
_								
<u> </u>	TR12	Bool	%M0.0	False	True	True	True	
	TR23	Bool	%M0.1	False	True	True	True	
_	TR34	Bool	%M0.2	False	True	True	True	
┚	TR42	Bool	%M0.3	False	True	True	True	
_	TR45	Bool	%M0.4	False	True	True	True	
┚	TR52	Bool	%M0.5	False	True	True	True	
	TR67	Bool	%M0.6	False	True	True	True	
	TR78	Bool	%M0.7	False	True	True	True	
	TR79	Bool	%M1.0	False	True	True	True	
_	TR810	Bool	%M1.1	False	True	True	True	
	TR910	Bool	%M1.2	False	True	True	True	
	TR1011	Bool	%M1.3	False	True	True	True	
	TR117	Bool	%M1.4	False	True	True	True	
	TR1112	Bool	%M1.5	False	True	True	True	
_	TR127	Bool	%M1.6	False	True	True	True	
	TR2021	Bool	%M1.7	False	True	True	True	
	TR2120	Bool	%M2.0	False	True	True	True	
	TR2123	Bool	%M2.1	False	True	True	True	
	TR2320	Bool	%M2.2	False	True	True	True	
-	X1	Bool	%M2.3	False	True	True	True	
-	X2	Bool	%M2.4	False	True	True	True	
	Х3	Bool	%M2.5	False	True	True	True	
	X4	Bool	%M2.6	False	True	True	True	
	X5	Bool	%M2.7	False	True	True	True	
-	Х6	Bool	%M3.0	False	True	True	True	
3	Х7	Bool	%M3.1	False	True	True	True	
-	X8	Bool	%M3.2	False	True	True	True	
3	Х9	Bool	%M3.3	False	True	True	True	
-	X10	Bool	%M3.4	False	True	True	True	
_ _	X11	Bool	%M3.5	False	True	True	True	
	X12	Bool	%M3.6	False	True	True	True	
3	X20	Bool	%M3.7	False	True	True	True	
3	X21	Bool	%M4.0	False	True	True	True	
-	X23	Bool	%M4.1	False	True	True	True	

N	lame	Data type	Address	Retain	Accessi- ble from	Writable	Visible in Supervision HMI engi-	Comment	
					HMI/OPC UA/Web	HMI/OPC UA/Web	neering		
3	Tag_1	DWord	%MD14	False	API True	API True	True		
]	Tag_2	Word	%MW14	False	True	True	True		
3	Tag_3	Real	%MD100	False	True		True		
1	Tag_4	Real	%MD50	False	True		True		
1	Tag_5	Real	%MD54	False	True		True		
1	Tag_6	Real	%MD56	False	True		True		
1	Tag_7 Tag_8	Real Real	%MD58 %MD62	False False	True True	True True	True True		
1 1	TR51	Bool	%M4.2	False	True	True	True		
	TR126	Bool	%M4.3	False	True		True		
1	Tag_13	Bool	%M4.4	False	True		True		
]	Tag_15	Bool	%M4.5	False	True	True	True		
]	Tag_9	Int	%MW0	False	True	True	True		

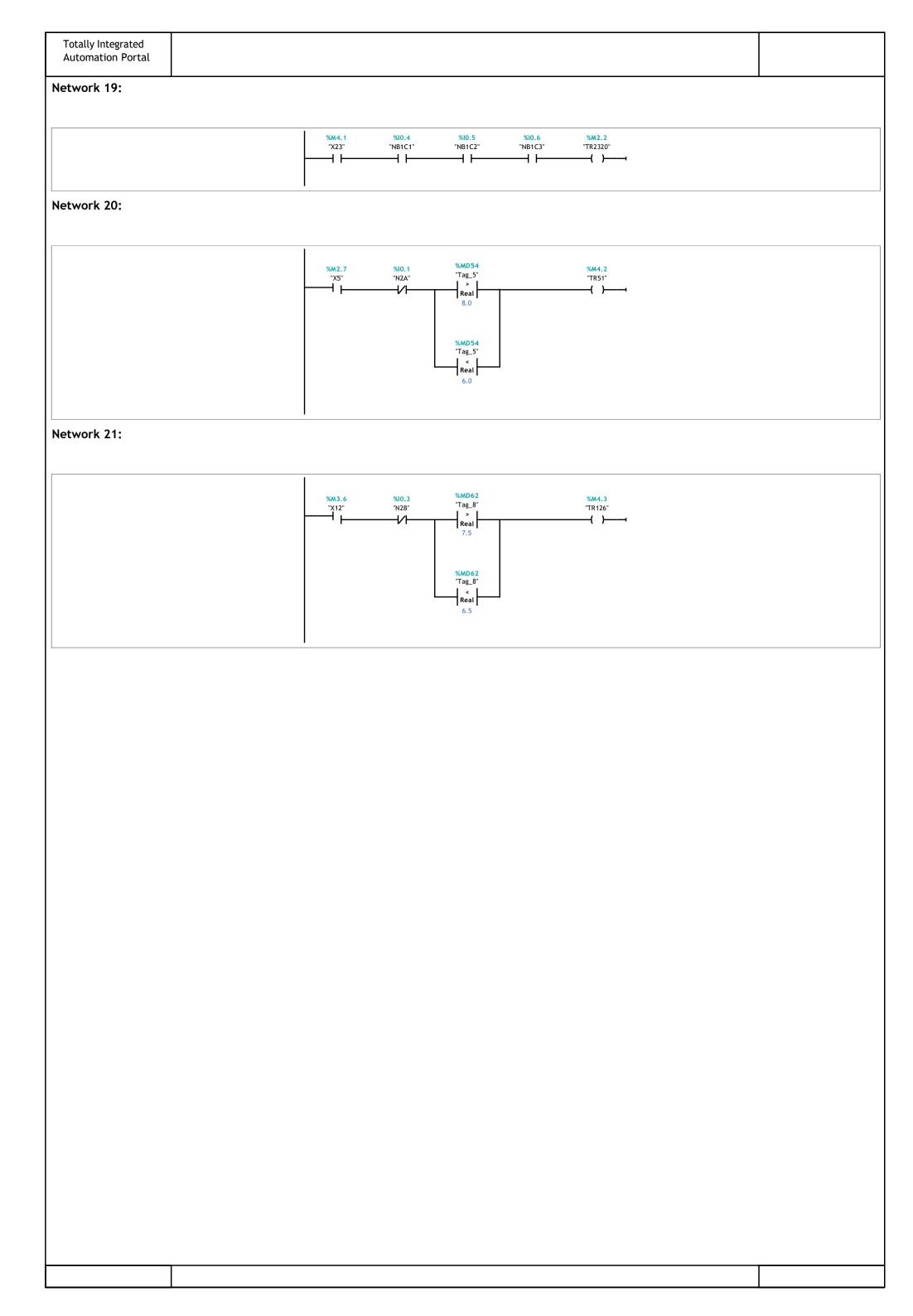
memering Number of Transitions Number of Transitions Number of Numbers of Num	mbering A ormation e		Number 1		Туре	-C	Language	LAD
and the second of the second o		acomacie .						
Data type	0.01.),1			Comment		Family	
population			Data type	Default value		Comment		
### Property Propert								
	nOut							
Transitions Void								
work 1:	Return							
work 2: 1			Void					
work 2: MAS. 4 THE	work 1:							

**************************************			%M2.3 "X1"	%I0.0 "N1A"				
twork 2: MAD 1				%M4.4		()		
\$002.4 \$22 \$171 TON TON TON TON TON TON TON TO				"Tag_13"				
\$302.4 \$322 \$111 \$100 \$111 \$100 \$111 \$100 \$111 \$100 \$111 \$100			I					
twork 3: MAZ.5 TON	twork 2:							
twork 3: MAZ.5 TON								
twork 3: MAZ.5 TON			<u> </u>			%DB1		
**************************************			"X2"			"T1"		
MA2.5 7.7 Ton Time T#155 MA2.6 MA2.6 MAD54 Tag.5 Real 8.0 MAD54 Tag.5 Real 6.0			''			Time T#1S		
XM2.5 XM2.5 TON Time TW155 XMD84 T845 XMD84 T845 Real 8.0 XMD84 T845 Real 6.0								
XM2.5 XM2.5 TON Time TW155 XMD84 T845 XMD84 T845 Real 8.0 XMD84 T845 Real 6.0	twork 3:		•					
TYT' TON Time T#155 **MA2.6	LWOIK J.							
**************************************			1					
Ton Ton Time T#155 **M2.6						%DB2		
TW155 twork 4: MAZ.6 MID.1 MAD54 MAD.3 TR42 Mac.4 MAD54 MAD			^{"X3"}			(TON		
%M0.54 "X4" "N2A" "Real 8.0 %M0.3 "TR42" Real 8.0 %M0.54 Ta_5.5 Real 6.0						T#15S		
%M2.6 %I0.1 %MD54								
"Tag_5" "TR42" Real 8.0	twork 4:							
"Tag_5" "TR42" Real 8.0								
"Tag_5" "TR42" Real 8.0 8.0								
					ag_5"	%M0.3 "TR42"		
%MD54 "Tag_5" <			<u> </u>	ν	Real	()——		
"Tag_5" <					0.0			
Real 6.0				%	MD54			
					ag_5" <			
twork 5:				ı	6.0			
twork 5:								
	twork 5:							

```
Totally Integrated
   Automation Portal
                                                                                       %M2.6
"X4"
                                                                                                                                           %M0.4
"TR45"
                                                                                        %I0.1
"N2A"
Network 6:
                                                                                                                                           %MO.5
"TR52"
                                                                                        %I0.0
"N1A"
                                                                                                         %I0.1
"N2A"
                                                                                       Network 7:
                                                                       %M3.0
"X6"
                                                                                        %I0.2
"N1B"

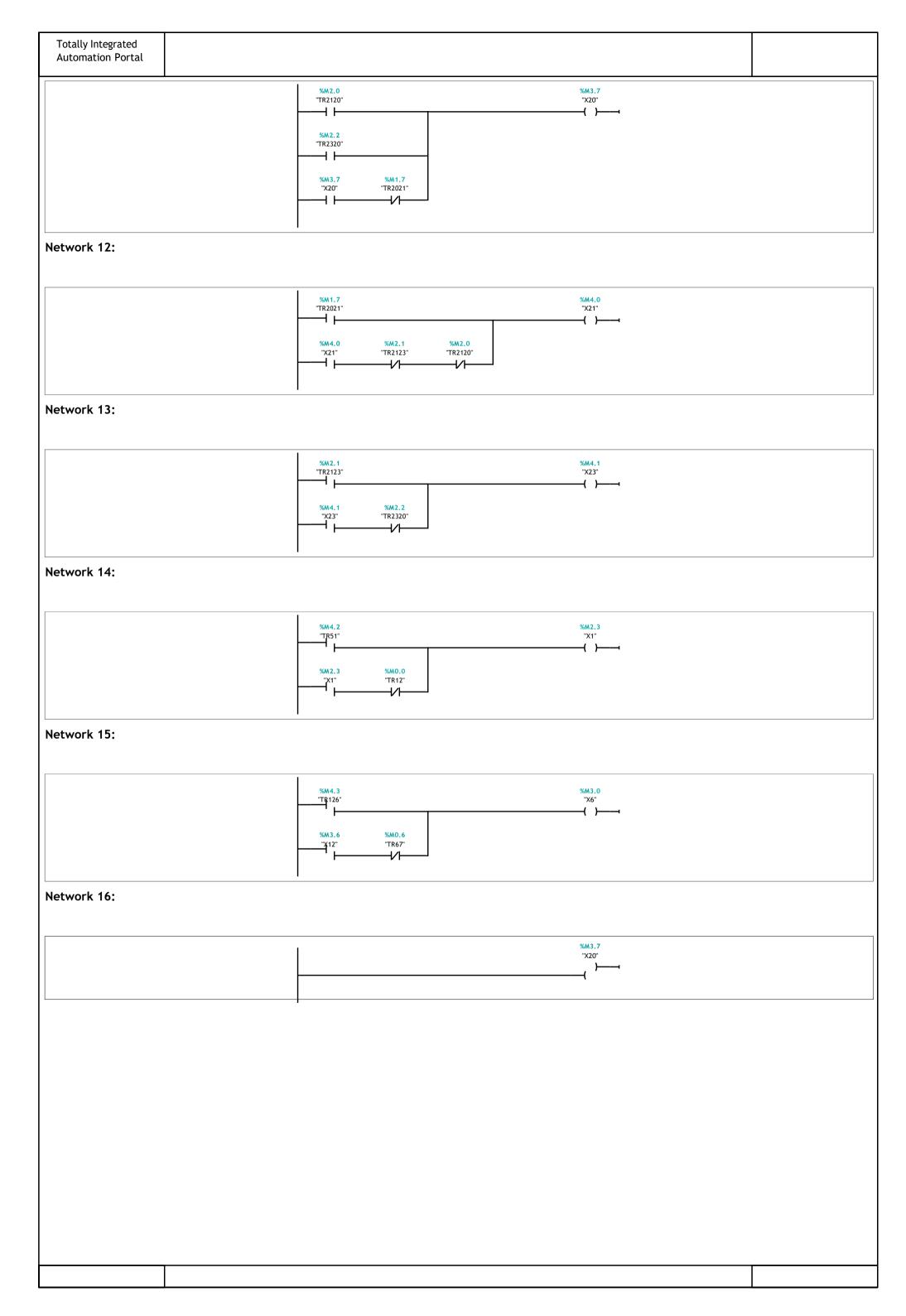
→ P —
                                                                                                                                           %M0.6
"TR67"
                                                                                       %M4.5
"Tag_15"
Network 8:
                                                                                                                                           %M0.7
"TR78"
Network 9:
Network 10:
                                                                                                                                     *DB3
"T3"
TON
Time
T#15
Network 11:
                                                                                                                                           %DB4
"T4"
TON
Time
T#1S
                                                                       %M3.3
Network 12:
```

```
Totally Integrated
   Automation Portal
                                                                                                                                                    %DB5
"T5"
TON
Time
T#10S
                                                                            %M3.4
"X10"
Network 13:
                                                                                                                %MD62
                                                                                              %I0.3
"N2B"
                                                                                                                                                   %M1.4
"TR117"
                                                                            %M3.5
"X11"
                                                                                                                "Tag_8"
                                                                                                                >
Real
                                                                                                               %MD62
"Tag_8"
                                                                                                                Real
Network 14:
                                                                                             %MD62
                                                                                                                %MD62
                                                                                                                                                   %M1.5
"TR1112"
                                                                            %M3.5
                                                                                             "Tag_8"
                                                                                                                "Tag_8"
                                                                            "X11"
                                                                                                                Real
                                                                                              %10.3
"N2B"
Network 15:
                                                                                              %I0.2
"N1B"
                                                                                                                %I0.3
"N2B"
                                                                                                                                                    %M1.6
"TR127"
                                                                            %M3.6
"X12"
Network 16:
                                                                            %M3.7
"X20"
                                                                                             %I0.4
"NB1C1"
                                                                                                                                                   %M1.7
"TR2021"
                                                                                             %I0.5
"NB1C2"
                                                                                               %10.6
                                                                                             "NB1C3"
                                                                                               <del>-</del>1/1-
Network 17:
                                                                        %M4.0
"X21"
                                                                                          %I0.4
"NB1C1"
                                                                                                           %I0.5
"NB1C2"
                                                                                                                             %I0.6
"NB1C3"
                                                                                                                                                 %M2.0
"TR2120"
                                                                                                              — | | — — ( ) — ·
Network 18:
                                                                           %M4.0
"¥21"
                                                                                             %I0.7
"NB2C1"
                                                                                                                                                   %M2.1
"TR2123"
                                                                                                                                                     → )—
                                                                                             %I1.0
"NB2C2"
                                                                                               ---
                                                                                             %I1.1
"NB2C3"
                                                                                              -//⊢
```



me	Actions	Number	2	Туре	FC	Language	LAD
umbering formation tle	Automatic	Author		Commer	nt	Family	
ersion	0.1	User-defined ID				"	
ame		Data type	Defau	lt value	Comment		
Input Output							
InOut Temp							
Constant							
Return Actions		Void					
etwork 1:		Volu					
etwork i.							
			M0.0		%M2.4		
			-R12"		"X2"		
		%	M2.4				
			"X2" "T1".	.Q.			
		%	M0.5				
			rR52" •				
			MO.3				
			M0.3 rR42"				
etwork 2:							
etwork 2:							
etwork 2:			rR42"		%M2.5		
etwork 2:					%M2.5 "X3"		
etwork 2:		"7	F1".Q		"X3"		
etwork 2:		"7	FR42" -		"X3"		
etwork 2:		"7	F1".Q M2.5 "X3" "T2".		"X3"		
		"7	F1".Q M2.5 "X3" "T2".		"X3"		
		"7	F1".Q M2.5 "X3" "T2".		"X3"		
etwork 2:		"7 %	F1".Q		"X3" ()		
		"7 %	F1".Q		"X3" ()		
		**************************************	T1".Q	.3 %M0.4	"X3" ()		
		**************************************	F1".Q	.3 %M0.4	"X3" ()		
		**************************************	T1".Q	.3 %M0.4	"X3" ()		
etwork 3:		**************************************	T1".Q	.3 %M0.4	"X3" ()		
etwork 3:		**************************************	T1".Q	.3 %M0.4	"X3" ()		
etwork 3:		"T	T1".Q	.3 %M0.4	"X3" ()		
etwork 3:		"T	M2.5	.3 %M0.4	%M2.6 "X4"		
etwork 3:		%	T1".Q	.3 %M0.4 2" "TR45"	%M2.6 "X4" (***) %M2.7 "X5"		
		%	M2.5 M2.5 X3" M2.6 X4" TR4 TR4 TR4 TR4 TR4 TR4 TR4 T	.3 %M0.4 2" "TR45"	%M2.6 "X4" () ———————————————————————————————————		

```
Totally Integrated
   Automation Portal
                                                                                                                                                             %M3.1
"X7"
                                                                                %M0.6
"TR67"
                                                                                %M1.6
"TF 127"
                                                                                %M1.4
"TF 117"
                                                                                                   %M0.7
"TR78"
                                                                                                                      %M1.0
"TR79"
                                                                                 %M3.1
                                                                                  "X7"
Network 6:
                                                                                %M0.7
"TR78"
                                                                                                                                                             %M3.2
"X8"
                                                                                %M3.2
"X8"
                                                                                                    "T3".Q
Network 7:
                                                                                %M1.0
"TR79"
                                                                                                                                                             %M3.3
"X9"
                                                                                 %M3.3
                                                                                                    "T4".Q
Network 8:
                                                                                                                       %M3.6
"X12"
                                                                                                                                                             %M3.4
"X10"
                                                                                %M3.4
"X10"
                                                                                                    "T5".Q
Network 9:
                                                                                 %M3.5
                                                                                 %M3.4
Network 10:
                                                                                %M1.5
"TR1112"
                                                                                                                                                             %M3.6
"X12"
                                                                                                                                                              ~ }
                                                                                                   %M4.3
"TR126"
                                                                                %M3.6
                                                                                 <u>"</u>¥12"
⊢
Network 11:
```



Mise à l'échelle Number 5 Type FC Language LAD Authoratic Mathematic Muthoratic Muthor	umbering information fittle Author Comment Family ersion 0.1 User-defined ID The put Output InDut In	
pering Authors Author Comment Family	mbering ormation le Author Comment Family rsion 0.1 User-defined ID me Data type Default value Comment Input Output Input Output Input Output Inout Output Input Output Input Output Inout Output Input Output Output Output Input Output Output Output Input Output Output Input Output Output Input Output Output Input Output	
Author User-defined ID Data type Default value Comment Put July July July July July July July July	twork 2: Author Data type Default value Comment	
Put put put put put put put put	Data type Default value Comment Input Output InDut Output InDut Temp Constant Return Mise à l'échelle Void NORM_X Int to Real NORM_X Int to Rea	
put utput Out lemp Instant eturn Mise à l'échelle Void Instant Ins	Input Output InfoUt Temp Constant Return Mise à l'échelle Void NORM_X Int to Real Int to Real NORM_X Int to Real	
Dut Out Instant Sturn Mise à l'échelle Void NORM, X Inst to Real O Min OUT Tag. 1 YAMDSO OUT Tag. 2 YAMDSO OUT Tag. 5 NORM, X Inst to Real O Min OUT Tag. 5 YAMDSO OUT Tag. 5 YAMDSO OUT Tag. 5 YAMDSO OUT Tag. 7 YA	Output InOut Temp Constant Return Mise à l'échelle Void NORM_X Int to Real PINAT VALUE 27648 MAX NORM_X Int to Real O MIN SAMDSO OUT Tag_4" NAMDSO OUT Tag_4" NAMDSO OUT Tag_5" Real to Real OUT Tag_5" NAMDSO OUT Tag_7" NAMDSO	
NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM_X NORM	Temp Constant Return Mise à l'échelle Void Work 1: NORM_X Int to Real NORM_X NORM_X	
Anstant Mise à l'échelle Void NORM_X Int to Real O MIN XINY64 PHA VALUE Tag_4 NORM_X Int to Real O MIN NORM_X Int to Real O MIN XMD50 Tag_4 VALUE Tag_5 NORM_X Int to Real OUT Tag_7 NORM_X Int to Real O MIN NORM_X INT	Constant Return Mise à l'échelle Void NORM_X Int to Real O MIN SINGA PPIA' VALUE 27648 MAX NORM_X Int to Real O MIN SINGA PPIA' VALUE 14.0 MAX SCALE_X Real to Real OUT Tag_4' NAD50 Tag_4' VALUE 14.0 MAX SCALE_X Real to Real OUT Tag_5' NAD54 OUT Tag_5' NORM_X Int to Real OUT Tag_7' NAD58 OUT Tag_7' NAD58 OUT Tag_7' VALUE OUT Tag_5' NAD64 OUT Tag_7' VALUE OUT Tag_7' VALUE OUT Tag_7' VALUE OUT Tag_8' Tag_7' VALUE OUT Tag_8' Tag_7' VALUE OUT Tag_8' NAD64 OUT Tag_7' VALUE OUT Tag_8' NAD658 OUT Tag_7' VALUE	
Mise à l'échelle Void NORM_X Int to Real NORM_X SCALE_X Real to Real NORM_X SIMM64 PHA VALUE 70-K 2: NORM_X Int to Real	Mise à l'échelle Work 1: NORM_X Int to Real ENO MIN MMD50 OUT Tag_4" MMD50 OUT Tag_5"	
NORM_X Int to Real O_MIN SYMD50 O_MIN SWMD50 O_MIN SWMD50 O_MIN SWMD50 OUT Tag_4' WMD50 Tag_4' VALUE 27648 MAX NORM_X Int to Real O_MIN SYMD50 OUT Tag_5' VALUE OUT Tag_7' WMD58 OUT Tag_7' WMD58 OUT Tag_7' VALUE OUT Tag_8' OUT Tag_8' OUT Tag_8' VALUE OUT Tag_8' VALUE OUT Tag_8' Tag_7' VALUE OUT Tag_8' Tag_7' VALUE	Work 1: NORM_X Int to Real ENO SCALE_X Real to Real ENO SMD54	
NORM_X int to Real O MIN SCALE_X Real to Real O MIN WMD50 OUT Tag_4" WMD50 Tag_4" VALUE 27648 MAX NORM_X int to Real Tag_5" NORM_X int to Real O MIN SCALE_X Real to Real ENO WMD54 Tag_5" Tag_7" VALUE Int to Real O MIN SCALE_X Real to Real EN SCALE_X Real to Real EN WMD54 Tag_7" WMD58 OUT Tag_8" Tag_7" VALUE Tag_7" VALUE Tag_7" VALUE Tag_7" VALUE Tag_7" VALUE	NORM_X Int to Real O MIN WIND50 OUT Tag_4" WAD50 OUT Tag_4" WAD50 Tag_4" VALUE 11.0 MAX NORM_X Int to Real NORM_X Int to Real O MIN WAD54 OUT Tag_5" WAD54 OUT Tag_5" WAD55 OUT Tag_6" WAD56 OUT Tag_7" WAD58 OUT Tag_7" WAD58 OUT Tag_7" WAD58 OUT Tag_8" Tag_7" VALUE OUT Tag_8"	
## Find to Real Find SCALE X X X X X X X X X	Work 2: NORM_X SCALE_X Real to Real	
## Find to Real Find SCALE X X X X X X X X X	Work 2: NORM_X SCALE_X Real to Real	
O MIN	### NORM_X Int to Real NORM_X Int to Real EN	
Tag_4" VALUE	Tag_4" VALUE 27648 — MAX NORM_X Int to Real EN O — MIN WMD58 OUT — Tag_7" WMD58 OUT — Tag_7" WMD58 OUT — Tag_7" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE Tag_4" VALUE VALUE	
Vork 2: NORM_X	NORM_X Int to Real PHB" VALUE NORM_X Int to Real PHB" SCALE_X Real to Real Real to Real WMD62 WMD62 WMD68 Tag_7" WMD58 Tag_7" VALUE	
NORM_X Int to Real EN O MIN %MD58 OUT "Tag_7" %MD58 OUT "Tag_7" WMD58 OUT "Tag_8"	NORM_X Int to Real EN O MIN %MD58 OUT "Tag_7" %MD58 OUT "Tag_7" WMD58 OUT "Tag_8"	
NORM_X Int to Real EN O MIN %MD58 OUT "Tag_7" %MD58 OUT "Tag_7" VALUE SCALE_X Real to Real EN WMD62 "Tag_8"	NORM_X Int to Real EN O MIN %MD58 OUT "Tag_7" %MD58 OUT "Tag_7" WMD58 OUT "Tag_8"	
Int to Real	Int to Real	
Int to Real	Int to Real	
0 — MIN	0 — MIN	
"PHB" — VALUE "Tag_7" — VALUE	"PHB" — VALUE "Tag_7" — VALUE	
27648 — MAX 14.0 — MAX	27648—MAX 14.0—MAX	

pertie	Sortie	Number 3		Туре	FC	Language	LAD
ng on	Automatic	Author		Comment		Family	
	0.1	User-defined ID		Comment		Family	
		Data type	Default value		Comment		
:		Data type	Default value		Comment		
out							
t							
ip stant							
urn							
ortie		Void					
ork 1:		%M2.4 "X2"			%Q0.0 "V1" ()		
ork 2:		·					
		%M2.5			¥00.4		
		"X3"			%Q0.4 "MA"		
		├ ─ ├			()—		
ork 3:		%M2.7 "X5"			%Q0.6 "P"		
ork 4:							
		%M3.2 "X8"			%Q0.1 "V2"		
					()——		
ork 5:							
		%M3.3			%Q0.2		
		"X9"			"V3"		
		'⊢			()—¬		
ork 6:		l					
		%M3.4			%O0 5		
		%M3.4 "X10"			%Q0.5 "MB"		
		 			()		
ork 7:							
		%M3,6			%Q0.3 "V4"		
		"X12"					
		' <u> </u>			() 		

Totally Integrated Automation Portal		
Network 8:		•
	%M4.0 "X21"	%Q0.7 "AL1" —()——
Network 9:		
	%M4.1	%Q1.0 "AL2"
	"X23" 	"AL2" —()——-

Totally Integr Automation I	ated Portal								
		1 [CPU 121	4C DC/	DC/DC] /	Program blo	ocks			
Main [OB1]									
Main Properties General Name	Main		Number	1		T	OB	language	LAD
Numbering Information	Automati	2	Number	1		Туре	OB	Language	LAD
Title	"Main Pro	gram Sweep (Cy-	Author			Comment		Family	
Version	0.1		User-defi	ned ID					
Main Name			Data t	vpe	Default value		Comment		
Temp Constant			Juliu	.,,,,,	Default value				
Network 1:									
iteework i.									
				%FC2					
				"Actions" — EN ENO					
Network 2:									
			-	%FC	°5				
				"Mise à l'é					
Network 3:									
				%FC3 "Sortie"					
				EN ENO					
Network 4:									
neework i.									
				%FC1					
				"Transitions" EN ENO					
	1								

Automatic mation "Complete Restart" Author Comment Family on 0.1 User-defined ID "Data type Default value Comment LostRetentive Bool True if retentive data are lost Emp	artup Proper eneral								
"Complete Restart" Author Comment Family on 0.1 User-defined ID Comment Comment True if retentive data are lost True if date and time are lost emp onstant vork 1:	ne mbering		Number	100		Туре	ОВ	Language	LAD
on 0.1 User-defined ID Up Default value Comment Dut LostRetentive Bool True if retentive data are lost True if date and time are lost emp onstant vork 1:	rmation								
Data type Default value Comment Dut LostRetentive Bool True if retentive data are lost True if date and time are lost Emp Instant Vork 1:	e -i			ID		Comment		Family	
Data type Default value Comment LostRetentive LostRTC Bool True if retentive data are lost True if date and time are lost emp onstant vork 1: Move 257 Move NAMYO MANUE		0.1	oser-derined	וטו					
LostRetentive Bool True if retentive data are lost LostRTC Bool True if date and time are lost emp onstant vork 1: MOVE 257 N	ie		Data type	<u> </u>	Default value		Comment		
LostRTC Bool True if date and time are lost emp constant vork 1:	nput		2.00. 3,72						
emp onstant vork 1: MOVE EN EN EN MOVE 357 IN MOVE 36MWO									
vork 1: MOVE EN END %MWO			Bool				True if date and tin	ne are lost	
MOVE EN — ENO N	onstant								
MOVE EN — ENO 257 — IN									
EN — ENO — KNO — K	WOIK I.								
EN — ENO — MWO ***********************************									
257 — IN %MWO									
■ 30/11—11%** 10/11 11/1				257 _	-IN %MW0				
					POUT1 — "Tag_9"	,			