Totally Integrated Automation Portal	
PLC_1 [CPU 312C]	

PLC_1 [CPU 31:	2C]				
PLC_1					
General	Die 4		1		
Name	PLC_1	Author	Enrique	Comment	
Rack	0	Slot	2		
General\Catalog info		<b>I</b> B	lw I		CECT 242 EDEC 4 C 1 = 1
Short designation  Firmware version	V3.3	Description	Work memory 64KB; 0.1ms/1000 instructions; DI10/DO6 integrated; 2 pulse outputs (2.5kHz); 2 channels counting and measuring with 24V (10kHz) incremental encoders; MPI interface; single-tier configuration up to 8 modules	Article number	6ES7 312-5BF04-0AB0
General\Identificatio	1 - 1 -				
Plant designation	ii & Maintenance	Location identifier			
MPI interface\Genera	1	Location identifier			
Name	MPI interface_1	Comment			
	dress\Interface networked with				
Subnet:	MPI_1				
MPI interface\MPI ad	_				
Address:	2	Highest address:	31	Transmission speed:	187.5 kbps
DI 10/DO 6\General					
Name	DI 10/DO 6_1	Comment			
DI 10/DO 6\General\C	_				
Short designation	DI 10/DO 6	Description	Digital input/output DI10 + DO6		
DI 10/DO 6\Inputs\Ch	annel group 0 - 3				
Input delay	3ms				
	annel group 0 - 3\Hardware interrupt o	channel 0\Rising (posit	ive) edge		
Rising (positive) edge					
	annel group 0 - 3\Hardware interrupt o	channel 0\Falling (nega	ative) edge		
Falling (negative)	False				
edge					
•	annel group 0 - 3\Hardware interrupt o	channel 1\Rising (posit	ive) edge		
Rising (positive) edge					
	annel group 0 - 3\Hardware interrupt o	channel 1\Falling (nega	ative) edge		
Falling (negative)	False				
edge					
	annel group 0 - 3\Hardware interrupt o	channel 2\Rising (posit	ive) edge		
Rising (positive) edge					
	annel group 0 - 3\Hardware interrupt o	channel 2\Falling (nega	ative) edge		
Falling (negative)	False				
edge	annel annun O. Billandurana intermunt	ahammal 2) Bising (masis)	iva) adma		
-	annel group 0 - 3\Hardware interrupt o	channel 3\kising (posit	ive) eage		
Rising (positive) edge	e <sub> </sub> raise annel group 0 - 3\Hardware interrupt (	shannal 2\Ealling (nogs	ativa) adaa		
Falling (negative)	False	Chaimer 5\Family (nega	ative) edge		
edge	raise				
DI 10/DO 6\Inputs\Ch	annel group 4 - 7				
Input delay	3ms				
	annel group 4 - 7\Hardware interrupt o	channel 4\Rising (posit	ive) edge		
Rising (positive) edge		The state of the s	, cage		
	annel group 4 - 7\Hardware interrupt o	channel 4\Falling (nega	ative) edge		
Falling (negative)	False	thanner it anning the ge			
edge					
	annel group 4 - 7\Hardware interrupt o	channel 5\Rising (posit	ive) edge		
Rising (positive) edge					
	annel group 4 - 7\Hardware interrupt	channel 5\Falling (nega	ative) edge		
Falling (negative)	False				
edge					
-	annel group 4 - 7\Hardware interrupt	channel 6\Rising (posit	ive) edge		
Rising (positive) edge					
-	annel group 4 - 7\Hardware interrupt	channel 6\Falling (nega	ative) edge		
Falling (negative)	False				
edge					
	annel group 4 - 7\Hardware interrupt o	channel 7\Rising (posit	ive) edge		
Rising (positive) edge					
	annel group 4 - 7\Hardware interrupt o	channel 7\Falling (nega	ative) edge		
Falling (negative)	False				
edge					
DI 10/DO 6\Inputs\Ch					
Input delay	3ms	-1	J		
•	annel group 8 - 9\Hardware interrupt (	cnannel 8\Rising (posit	ive) eage		
Rising (positive) edge		channel OVE-III (	ativa) adaa		
	annel group 8 - 9\Hardware interrupt (	channel &\Falling (nega	ative) eage		
Falling (negative)	False				
edge	annol group 9 Ollanders in terms	channel OlDieiner (m. 1911)	ivo) odgo		
-	annel group 8 - 9\Hardware interrupt o	channel 9\kising (posit	ive) eage		
Rising (positive) edge		channel OVE alling to	ativo) odga		
	annel group 8 - 9\Hardware interrupt	channel 9\Falling (nega	auve) eage		
Falling (negative) edge	False				
DI 10/DO 6\I/O addres	sses\Input addresses				
Start address	124.0	End address	125.7	Process image	OB1-PI
Interrupt OB number		LIIU GUUICSS	123.7	. rocess illiage	00111
c.rupt Ob Hulliber		_			

	es\Output addresses 124.0	End address	124.7	P	rocess image	OB1-PI
Count\General Name	Count_1	Comment				
J	Count	Description	2 channels; counting and freq measurement at 10 kHz, pulse modulation at 2.5 kHz switchinguency	e width		
Count\Interrupt selecti Interrupt selection	ion None					
Count\Channel 0	None					
Operating mode Count\Channel 1	Not configured					
	Not configured					
Count\I/O addresses\In						
Start address nterrupt OB number	768 40	End address	783	P	rocess image	None
Count\I/O addresses\O	utput addresses					
Start address Startup	768	End address	783	P	rocess image	None
Startup if preset con- figuration does not match actual configu- ration	True	Startup after POWER ON	Warm restart			
Startup\Monitoring tin			100 100			
Ready message from modules	SM UU1 XUCO	Parameter transfer to modules	TOUX TOU MS			
Cycle Cycle monitoring	150mc	Cycle lead divises	2004	-	zo of the remain	120
Cycle monitoring time	150ms	Cycle load due to communication	20%		ze of the process nage input:	128
Size of the process	128	OB85 call if I/O access error occurs	No OB85 call			
image output: Clock memory		error occurs				
	False	Memory byte	0			
Interrupts\Time-of-day OB number	rinterrupts\ Priority	Active	Fxe	ecution		Start time
OB 10:	2	True		ery minute		1994-01-01 00:00:00.000
Interrupts\Time-delay	interrupts\					
<b>OB number</b> OB 20:		<b>Priority</b>			<b>ocess image partitio</b> one	on(s)
OB 21:		4			one	
Interrupts\Cyclic interr	-	F	Disc			11
<b>OB number</b> OB 32:	<b>Priority</b> 9	Execution 1000	O Pha	ase offset		Unit ms
OB 33:	10	500	0			ms
OB 34: OB 35:	11 12	200 100	0			ms ms
Interrupts\Hardware in						
<b>OB number</b> OB 40:		<b>Priority</b> 16			ocess image partition	on(s)
ов 40. Interrupts\Asynchrono	us error interrupts\	10		IN	ле	
OB number			Priority			
OB 82: OB 85:			26 26			
OB 87:			26			
Diagnostics system Number of alarms in	10					
the diagnostics buffer						
Diagnostics system\Re Report cause of STOP						
System diagnostics\Ge	neral					
Activate system diag- nostics for this device						
Time of day						
Correction factor	Oms					
Time of day\Synchroni Type of synchroniza-		Time interval	None			
tion						
Time of day\Synchroni Type of synchroniza- tion Retentive memory		Time interval	None			
Number of memory bytes starting at MB 0 Protection		Number of S7 timers starting at T 0	0		umber of S7 coun- ers starting at C 0	8
	No protection	Confirm password				
Protection\ \Can be car Can be canceled with password						
		OP communication:	1	S	7 basic communica-	0
Connection resources PG communication:	1	OP communication:	'	11-		
Connection resources PG communication:	0	Maximum number of S7 connection resources:	6	II .	on:	

Automa	ntegrated tion Portal									
Overview on puts	of addresses\Overvi True	ew of addresse		lresses tputs	True		Addre	s <b>s gaps</b> Fa	lse	
Slot	True									
Туре	Addr. from	Addr. to	Module	PIP	Device name	Device number	Size	Master / IO sys tem	- Rack	Slot
	124	125	DI 10/DO 6_1	OB1-PI	PLC_1 [CPU 312C]	-	2 Bytes	-	0	2 2
)	124	124	DI 10/DO 6_1	OB1-PI	PLC_1 [CPU 312C]	-	1 Bytes	-	0	2 2
	768	783	Count_1	OB1-PI	PLC_1 [CPU 312C]	-	16 Bytes	-	0	2 4
0	768	783	Count_1	OB1-PI	PLC_1 [CPU 312C]	-	16 Bytes	-	0	2 4
l	256	263	AI 4/AO 2x8BIT_1	OB1-PI	PLC_1 [CPU 312C]	-	8 Bytes	-	0	4
0	256	259	AI 4/AO 2x8BIT_1	OB1-PI	PLC_1 [CPU 312C]	-	4 Bytes	-	0	4

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# PLC\_1 [CPU 312C] / Program blocks

### Main [OB1]

<b>Main Properties</b>							
General							
Name	Main	Number	1	Туре	ОВ	Language	LAD
Numbering	Manual						
Information							
Title	"Main Program Sweep (Cy- cle)"	Author		Comment		Family	
Version	0.1	User-defined ID					

Name	Data type	Offset	Default value	Comment
<b>▼</b> Temp				
OB1_EV_CLASS	Byte	0.0		Bits $0-3 = 1$ (Coming event), Bits $4-7 = 1$ (Event class 1)
OB1_SCAN_1	Byte	1.0		1 (Cold restart scan 1 of OB 1), 3 (Scan 2-n of OB 1)
OB1_PRIORITY	Byte	2.0		Priority of OB Execution
OB1_OB_NUMBR	Byte	3.0		1 (Organization block 1, OB1)
OB1_RESERVED_1	Byte	4.0		Reserved for system
OB1_RESERVED_2	Byte	5.0		Reserved for system
OB1_PREV_CYCLE	Int	6.0		Cycle time of previous OB1 scan (milliseconds)
OB1_MIN_CYCLE	Int	8.0		Minimum cycle time of OB1 (milliseconds)
OB1_MAX_CYCLE	Int	10.0		Maximum cycle time of OB1 (milliseconds)
OB1_DATE_TIME	Date_And_Time	12.0		Date and time OB1 started
Constant				

### **Network 1: Available Mix Selection Network**

This network enables the selection of a new mix. It can only be activated while the process isn't working and no liquid from the ingredient A has been poured into the reactor tank.

```
*M6.6 *MW8 *Selection
"Run" "Counter A Value" Available"

Int

O
```

### **Network 2: Funcion FC2 Call Network**

This network calls the function FC2 (Activate Mix). This network indicates that a mix has been selected. It requires the selection available memory to be on.

### **Network 3: Mix Selected Network**

This network indicates that a mix has been selected at least one time, the value for the memories Pulse A and Pulse B are 0 the first time the program is debugging.

### **Network 4: Ready Network**

This Network describes how to set the Ready memory. To do it, first you have to push the Input I124.5 (NewTank). This "empties" the filled QA tank and puts a new one. Then, the either the state 5 must be active or the process must be stopped (Run deactivated). Finally, the value of the Counter Reactor must be equal to 0, meaning that the process has already begun or being restarted. The ready memory keeps on while the value of the Output counter (Counter Out) is equal to zero or while the State 05 is on but liters at the QA tank are less than the liters at the reactor tank.

Totally Integrated **Automation Portal** %MW22 %I124.5 %M7.3 "Counter Reactor' "NewTank" "S5" "Ready" Int %M35.5 %M6.6 "M-NewTank" %MW18 %M6.0 "Counter Out" "Ready Int %MW18 %M7.3 "Counter Out" "S5" Int %MW22 "Counter Reactor

#### **Network 5: Run Network**

This network describes how to activate the Run memory. To activate it, first you have to push the input I124.3 (Start button), while the memories "Selection Avalable" and "Mix Selected" are on. The second branch will always be active once a mix has been selected for the first time. As you can see, you can not activate the Run memory if the input I124.4 is on (Pause). The reset memory under the ready memory closes whenever the Reset signal has been triggered. Finally, the Run memory will keep working until the Reset signal (M7.6) has been activated.

```
%M34.1
%I124.3
                   "Selection
                                       %M34.2
                                                            %M6.0
                                                                               %1124.4
                                                                                                   %M35.4
                                                                                                                        %M6.6
                   Available
                                     "Mix Selected"
                                                            "Ready"
                                                                                                  "M-Pause"
                                                                                                                         "Run"
 "Start"
                                                                                "Pause'
%M35.3
                    %M34.2
                                                            %M7.6
"M-Start'
                 "Mix Selected"
                                                            "Reset"
 %M6.6
                     %M7.6
                    "Reset"
```

### Network 6: Activate state 01 Network

This network describes how to active the state 01. To activate it, the process must be running (run memory on), and all the States must be deactivated.

## Network 7: Reset State 01 and Set State 02 Network

This network describes how to set the state 02 and reset the sate 01. To do it, both the State 01 and the process must be active (Run memory on), and the value of Counter A Value must be equal to the value in the memory Pulse A.

### Network 8: Reset State 02 and Set State 03 Network

This network describes how to set the state 03 and reset the sate 02. To do it, both the State 02 and the process must be active (Run memory on), and the value of Counter B Value must be equal to the value in the memory Pulse B.

### Network 9: Reset State 03 and Set State 04 Network

This network describes how to set the state 04 and reset the sate 03. To do it, both the State 03 and the process must be active (Run memory on), the State 4 must be deactivated, and the value of Timer Count must be greater or equal to 6000. When the conditions are achieved, a 0 passes to the Timer Count memory in order to restart its value (count start from 0 again).

Totally Integrated **Automation Portal** %MW30 %M6.6 %M6.3 %M7.2 "Timer Count" "Run" "S3" "S4" MOVE - EN ENO Int 0 — IN %MW30 "Timer Count %M6.3 "S3" %M7.2 "S4"

#### Network 10: Reset State 04 and Set State 05 Network

This network describes how to set the state 04 and reset the sate 05. To do it, both the State 04 and the process must be active (Run memory on), , and the value of Timer Count must be greater or equal to 24000. When the conditions are achieved, a 0 passes to the Timer Count memory in order to restart its value (count start from 0 again), and a value of 11281 passes to the Fake Input (equivalent to 260 RPM) so it can be converted to RPM and sent to the analog output Q256.

```
%MW30
%M6.6
               %M7.2
                            "Timer Count
                                                           MOVE
                                                           ΕN
                                                                  ENO
                                Int
                                                                         %MW30
                                                                         "Timer Count'
                                                                 OUT1
                                                              %M7.2
                                                              %M7.3
                                                           MOVE
                                                    11281 -
                                                                         %MW24
                                                                         "Fake Input
```

### Network 11: Reset State 05 Network

This network shows how to reset the State 05. In order to reset this network, the state 05 must be active, the liters at the Reactor container must be 0 and the input I124.5 (New Tank) must be pressed.

### Network 12: State 01 Actions: Increase the Counter A Value - Network

This network describes how the pulses from the the A Valve are increasing (the ingredient A is being poured into the reactor container). To do it so, first the process must be running, the State 01 must be active, and the counter "Counter A Value" must be less than the value in form the "Pulse A" memory. Also, to create the pulses effect, the 400 ms Tick is added into this branch.

Note: The value of the counter is reset when the "Reset" memory is active (This occus at the end of the process)

```
%C0
                                                      %MW8
                                                                                           "CA"
%M6.6
                                    %M5.2
                  %M6.1
                                                 "Counter A Value
                   "S1"
                                 "Tick 400 ms"
                                                                                          s_cu
"Run"
                                                                                       CU
                                                      Int
                                                                                                       %MW8
                                                                                                      "Counter A Value
                                                     "Pulse A'
                                                                                       PV
                                                                                                 cv -
                                                                                            CV_BCD
                                                                              "Reset" -
```

### Network 13: State 02 Action: Increase the Counter B Value - Network

This network describes how the pulses from the B Valve are increasing (the ingredient B is being poured into the reactor container). To do it so, first the process must be running, the State 02 must be active, and the counter "Counter B Value" must be less than the value in form the "Pulse B" memory. Also, to create the pulses effect, the 400 ms Tick is added into this branch.

Note: The value of the counter is reset when the "Reset" memory is active (This occus at the end of the process)

```
%C1
"CB"
                                                        %MW10
%M6.6
                                                    "Counter B Value
"Run"
                   "S2"
                                  "Tick 400 ms"
                                                                                              s_cu
                                                                                           CU
                                                         Int
                                                                                                           %MW10
                                                        %MW2
                                                                                                           "Counter B Value
                                                        "Pulse B"
                                                                                                     CV
                                                                                                CV_BCD
                                                                                 %M7.6
                                                                                 "Reset"
```

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### Network 14: State 02 Action: 100 RPM Network

This network accomplishes the requirement for the consrant 100 RPM measured from the motor while the ingredient B is being poured into the reactor container. A fake input was created because the real analog measurement could not be modified as desired. The analog value for the 100 RPM is 7742.

#### Network 15: State 03 Action: 500 RPM Network

This network accomplishes the requirement for the consrant 500 RPM measured from the motor for 10 minutes when the ingredient B has already been poured into the reactor container. A fake input was created because the real analog measurement could not be modified as desired. The analog value for the 500 RPM is 16589.

#### Network 16: State 04 Action: Slowing the RPM from 500 down to 260 - Network

This Network shows how to decreases the RPM value from 500 down to 260. In order to accomplish this goal, the process should be working (Run memory on), while the State 04 is active. The memory "Slowing RPM" increases its value every 100 ms and when it reaches the value of 100 (10 seconds elapsed) it resets its value while decreases the Fake Input's value. This allows to decrease the RPM by 10 every second.

```
%MW32
%M6.6
                 %M7.2
                                "SlowingRPM
                  "S4"
"Run'
                                                                 MOVE
                                                                                 %MW32
                                                                                 "SlowingRPM'
                                                       %MW24
                                                                                 %MW24
                                                     "Fake Input'
                                                                                 "Fake Input
                                                                 IN1
                                                                          OUT
                                                            22 -
                                                                 IN2
```

### Network 17: State 05 Action: Pouring the reactor mix into the QA Tank - Network

This network indicates how the pouring process from the reactor tank into the WA tank is done. First, the process must be active (Run memory on), the State 05 must be on, and the value of the counter "Counter Out" must be less that the value of "Counter Reactor". The value of Counter Out will increases each 400 ms thanks to the programmed Tick. This thick indicates the pulses or the liters that are being poured into the WA tank. To reset its count the liters in the reactor (Counter Reactor) must be 0 and the the input I124.5 must be pressed, indicating that a Nwe QA tank is ready.

```
%C2
                                                        %MW18
                                                                                            "COut"
                                      %M5.2
                                                     "Counter Out"
   "Run"
                     "S5"
                                   "Tick 400 ms"
                                                                                            s_cu
                                                                                         CU
                                                         Int
                                                                                                        %MW18
                                                    "Counter Reactor
                                                                                                  cv — "Counter Out"
                                                                                              CV_BCD
                   %MW22
  %1124.5
                "Counter Reactor
 "NewTank"
  %M35.5
"M-NewTank"
```

### Network 18: State 05 Action: Reset the values - Network

When the liters at the QA tank are already the ones that were at the reactor tank (200 liters), this branch resets the values from several counters by passing the value of 0 or by turning on the Reset memory.

Note: this branch will be activated only once because it requieres to both counters have the same value, and this branch does not turn to 0 the value of the Counter Out (the mix is at the QA tank).

Totally Integrated **Automation Portal** %MW18 MUL %M6.6 %M7.3 "Counter Out" Int "Run" "S5" == Int ENO EN %MW22 %MW22 %MW22 "Counter Reactor "Counter Reactor" IN1 OUT "Counter Reactor" 0 — IN2 - EN ENO - IN %MW24 - "Fake Input' MOVE %MW54 -- "M-Timer-anim" OUT1 -ENO %MD26 %MD26 "RPM Fake" -"RPM Fake" IN1 OUT

0.0 — IN2

%M7.6 "Reset"

### Network 19: Liters at the reactor -Network

This network indicates how many liters of both ingredients have already been poured into the reactor container. This network adds the value from both counters (poured ingredient A and the poured ingredient B).

```
**MW8
"Counter A Value" IN1 OUT

**MW10
"Counter B Value" IN2

**MW22

"Counter Reactor"
```

### **Network 20: AGIT ON Network**

This Network describes when the AGIT ON signal is active. This is while the following conditions and the run memory are active:

State 02: Puring the ingredient B and shaking.

State 03: 10 min shake. State 04: 40 min shake.

State 05 and Counter Out < Counter Reactor: Pouring the mix into the QA tank

### **Network 21: Manual Scaling Network**

```
**ManualScaling** "AutoScaling* "M-AutoScaling* "Manual*

**Mass.2**
"M-ManualScaling*

**Mass.2**
"M-ManualScaling*

**Mass.4**

**Mass.6**

**Mass.6
```

### **Network 22: Manualy Scaling Values**

This Network describes the 3 puttons I125.0, I125.1, and I125.2 corresponding to three different current values: 10mA, 16mA, and 18 mA. These swtiches send the analog input value requires to obtain those current outputs.

Totally Integrated **Automation Portal %M34.0** "Manual" %I125.2 "10mA" MOVE 16128 — IN %MW36 %M34.6 OUT1 — "Switching Input" "M-10mA" %I125.0

23040 -

25344 -- IN

- IN

MOVE - FN

MOVE ENO

ENO

%MW36 OUT1 — "Switching Input"

%MW36 OUT1 — "Switching Input"

# **Network 23: Auto Scaling Network**

This network moves the value from the analog input !W256 to the memory M@36 (Switching Input) as long as the AutoScaling button is on.

"16mA"

%M34.7 "M-16mA"

%I125.1 "18mA"

%M35.0 "M-18mA"

```
%I124.7
"AutoScaling'
                                MOVE
                                - EN
                                       ENO
                                              %MW36
                       %IW256
                   "ACUR_MEAS" — IN OUT1 — "Switching Input"
  %M35.1
"M-AutoScaling"
```

### Network 24: Scale with Real Input (ACUR\_MEAS) -Network

This network scales the input from either the IB125 inputs or the IW256 to obtain range of values that vary from 0.8 mA (the 8u ampers is due to conversion) up to 20 mA.

```
%I124.7
 "AutoScaling"
                                                SCALE
                          %MW36
                                                                      %MW16
                   "Switching Input" — IN
   %M35.1
                                                           RET_VAL
                                                                     "Code Error"
"M-AutoScaling"
                            0.02 — HI_LIM
                                                                      %MD12
                           -0.004 — LO_LIM
                                                                     - "Current Value"
                                                              OUT
   %I124.6
"ManualScaling"
   %M35.2
ManualScaling
    %M6.7
   "Bipolar"
                                    BIPOLAR
```

### **Network 25: Scale with Fake Input - Network**

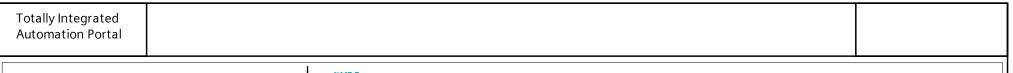
This network describes the parameters required to scale the input to have a RPM value that goes from 0 up to 1000 RPM within a range that goes from 5530 to 27648. The parameters were obtained from the straight line equation. The lowest limit is -250 and the highsest limit is 1000.

This network imitates the analog samplig procedure. The real analog input is used as a alarm detector.

```
%M7.7
             - EN
                                     ENO
   %MW24
                                             %MW16
 "Fake Input" — IN
                                  RET_VAL
    1000.0 — HI_LIM
                                            %MD26
     -250.0 — LO_LIM
                                     OUT — "RPM Fake"
     %M6.7
   "Bipolar" — BIPOLAR
```

### Network 26: Unscale with Fake RPM - Network

This network describes the parameters required to scale the fake RPM input to have an analog value that goes from 0 up to 1000 RPM within a range that goes from 5530 to 27648. The parameters were obtained from the straight line equation. The lowest limit is -250 and the highsest limit is 1000.



```
%M7.7
"AGIT ON"
                          UNSCALE
      %MD26
                                                 %MW16
   "RPM Fake" -
                                                 "Code Error
               - IN
                                      RET_VAL
      1000.0 —
               HI_LIM
                                                 %QW256
       -250.0 — LO_LIM
                                          OUT
 %M6.7
"Bipolar
                BIPOLAR
```

### Network 27: Output Valve A - Network

This network indicates how to activate the Valve A output.

### Network 28: Output Valve B - Network

This network indicates how to activate the Valve B output.

### Network 29: Output Valve Out - Network

This network indicates how to activate the Valve Out output.

### Network 30: 15 mA Warning Network

This Neworks turns on a visual alarm indicating a warning signal. This warning signal is turned on whenever the Current value is grater than 15mA but less than 18mA. This warning signal turns on and off every 400 ms due to the 400 ms Tick.

### Network 31: 18 mA Alarm Network

This Neworks turns on a visual alarm indicating an alarm signal. This alarm signal is turned on whenever the Current value is grater than 18mA. This alarm signal turns on and off every 400 ms due to the 400 ms Tick.

### Network 32: Animation: Pouring Ingredient A - Network

This network describes how to animate the pouring process of the ingredient A into the Reactor Tank.

```
SUB
                                                                         MUL
                 ΕN
        %MW8
                                %MW38
                                                           %MW38
                                                                                     %MW42
                                                     "M-IngredientA" -
                                                                                    "M-A-animation"
"Counter A Value"
                               - "M-IngredientA"
                                                                    - IN1
                 IN1
                         OUT
                                                                             OUT
                                                                 -1 — IN2
        %MW0
```

### Network 33: Animation: Pouring Ingredient B - Network

This network describes how to animate the pouring process of the ingredient B into the Reactor Tank.



### Network 38: Animation: Elapsed Minutes - Network

This netowork show the elapsed time in minutes in the HMI

```
"Timer Count" Int EN ENO "Timer Count" OUT 60 IN2 "MW30" "M-Timer-anim"
```

lezcla A Properties eneral ame Mezcla A	Nui	mber	1	Туре		DB		Language	e DB	
umbering Automatic formation				1,700						
le rsion 0.1		:hor er-defined ID		Comme	ent			Family		
me	Data type	Offset !	Start value		ble from	Writ- able from neering HMI/ OPC UA	Setpoint	Supervi- sion	Comment	
Static Pulso A	Int	0.0	180	True	True	True True	False			
Pulso B	Int		20	True	True	True True	False			

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			1.7.								
_C_1 [C ezcla B [	PU 312C] . [DB2]	/ Program	ı blocks								
zcla B Prope											
neral me	Mezcla B		Number	2	Туре		DB		Language	DB	
mbering ormation le	Automatic		Author		Comm	ant			Family		
rsion	0.1		User-defined	IID	Comm	'			Family		
me		Data type	Offset	Start value	Retain	Accessi- ble from HMI/OPC UA	able HMI er from neerin HMI/ OPC	gi-	Supervi- sion	Comment	
Static							UA				
Pulso A Pulso B		Int Int	0.0 2.0	160 40	True True	True True	True True True True	False False			

Information  Title Author Comment Family  Version 0.1 User-defined ID	Totally Integ Automation	grated Portal										
Mezcla C [DB3]  Mezcla C Properties  Mezcla C Properties  Mame   Mezcla C   Number   3   Type   DB   Language   DB    Mumbering   Automatic   Mezcla C   Number   3   Type   DB   Language   DB    Mezcla C Properties  Mezcla C   Number   3   Type   DB   Language   DB    Mezcla C Properties  Mezcla C   Number   3   Type   DB   Language   DB    Mezcla C Properties  Mexcla C Properties  M	פור 1 [רו	DII 312C1/	Program	blocks								
Separation   Static   Pulso A   Int   O.0   140   True			riogram	DIOCKS								
Mame   Mezcla C   Mumber   3   Type   DB   Language   DB		erties										
Automatic  Information  Itale    Author   User-defined ID      Author   User-defined ID		Mezcla C	N	umber	3	Type		DB		Language	e DB	
Author User-defined ID    Author User-defined ID   Comment   Family   Family	Numbering					.,,,,,,						
Version 0.1 User-defined ID  Name  Data type Offset Start value  Name  Data type Offset Start value  Name  Data type Offset Start value  Name			A	uthor		Comm	ent			Family		
ble from HMI/OPC UA HMI/OPC UA  Static  Pulso A  Int  O.0  140  Pulso A  ble from HMI/OPC UA  From neering HMI engi-from neering  From HMI/OPC UA  True  True  True  True  True  False	Version	0.1			ID							
Value         VA         VA <th< th=""><th>Name</th><th></th><th>Data type</th><th>Offset</th><th>Start value</th><th></th><th>ble from HMI/OPC</th><th>able HMI er from neerin HMI/</th><th>gi-</th><th>Supervi- sion</th><th>Comment</th><th></th></th<>	Name		Data type	Offset	Start value		ble from HMI/OPC	able HMI er from neerin HMI/	gi-	Supervi- sion	Comment	
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			Int	0.0	140	True	True	True True	False			
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neral me	Move Mix Times	Number	1	Туре	FC		Language	LAD	
mbering formation	Automatic			-			W= 11		
le rsion	0.1	Author User-defined ID		Comment			Family		
me		Data type	Offset	Default value		Comment			
Input Output									
InOut									
Temp									
Constant									
Return	:. T:	Void							
Move M	Pulse A Move Network	Void							
			%DBW0	ENO %MWO DUT1 — "Pulse A"					
			%DBW2	ENO  %MW2  UT1 — "Pulse B"					
			EN E	ENO %MW2					
			EN E	ENO %MW2					
			EN E	ENO %MW2					
			EN E	ENO %MW2					

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<b>Automation Porta</b>

# PLC\_1 [CPU 312C] / Program blocks

# CYC\_INT5 [OB35]

CYC_INT5 Prope	CYC_INT5 Properties									
General										
Name	CYC_INT5	Number	35	Type	ОВ	Language	LAD			
Numbering	Manual									
Information										
Title	"Cyclic Interrupt"	Author		Comment		Family				
Version	0.1	User-defined ID								

Name	Data type	Offset	Default value	Comment
<b>▼</b> Temp				
OB35_EV_CLASS	Byte	0.0		Bits $0-3 = 1$ (Coming event), Bits $4-7 = 1$ (Event class 1)
OB35_STRT_INF	Byte	1.0		16#36 (OB 35 has started)
OB35_PRIORITY	Byte	2.0		Priority of OB Execution
OB35_OB_NUMBR	Byte	3.0		35 (Organization block 35, OB35)
OB35_RESERVED_1	Byte	4.0		Reserved for system
OB35_RESERVED_2	Byte	5.0		Reserved for system
OB35_PHASE_OFFSET	Word	6.0		Phase offset (msec)
OB35_RESERVED_3	Int	8.0		Reserved for system
OB35_EXC_FREQ	Int	10.0		Frequency of execution (msec)
OB35_DATE_TIME	Date_And_Time	12.0		Date and time OB35 started
Constant				

#### **Network 1: Tick Network**

This network generates a tick every 100 ms, the value of tick is increased by 1.

```
%M6.6
"Run"
EN ENO
%MW4
"Tick"
1 IN2

WMW4
"Tick"
"Tick"
```

### **Network 2: Reset Tick Network**

This network resets the value of the tick. If Tick has reached 256, its moves a 0 o the memory that stores the Tick.

## **Network 3: Timer Count Network**

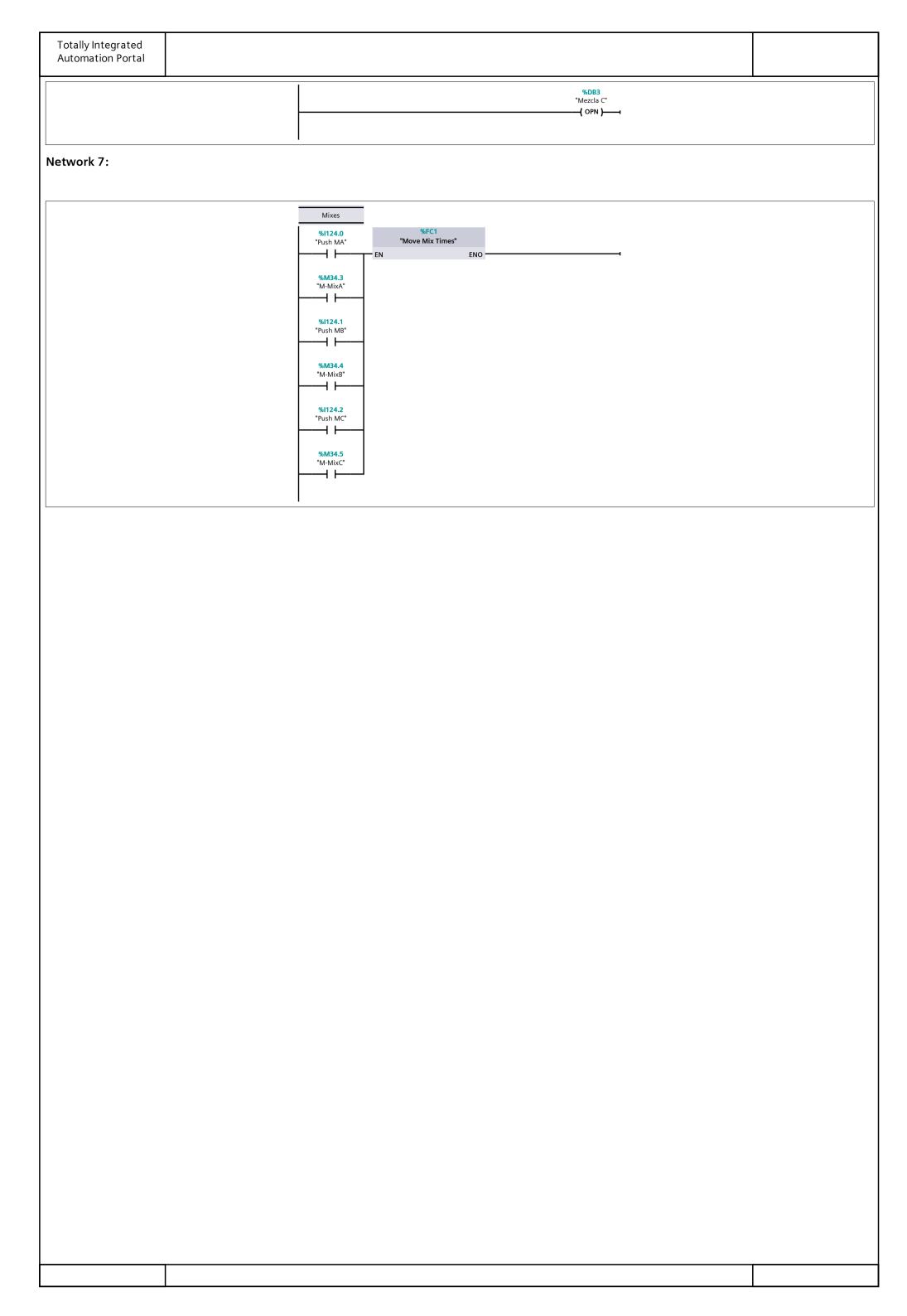
This network work as a timer for the time elapsed within the State 03 and the State 04. It's required that the process is working (Run memory on).

```
%M6.6
"Run"
"S3"
EN ENO
%MW30
"Timer Count"
IN1 OUT
"Timer Count"
IN2
"Timer Count"
```

### **Network 4: Slowing RPM network**

This network increases the value of the memory "SlowingRPM" by 1 each 100 ms. It is required that the process is working (Run memory on)

Totally Integration	n Portal						
PLC_1 [C	PU 312C] / Prog	gram blocks					
	/lixes [FC2]						
ctivate Mixes General	s Properties						
lame lumbering	Activate Mixes Automatic	Number 2		Туре	FC	Language	LAD
nformation	Automatic	A valle vii		C		le	
Title Version	0.1	Author User-defined ID		Comment		Family	
lame		Data type	Offset	Default value	Comment		
Input Output							
InOut Temp							
Constant  Return							
Activate	Mixes	Void					
letwork 1:							
		<b>%I124</b> "Push N	.0 1A"		MixB		
					( JMPN }		
		<b>%M34</b> "M-Mix	A"				
		l					
letwork 2:							
					<b>%DB1</b> "Mezcla A" ————————————————————————————————————		
					(		
letwork 3:		· · · · · · · · · · · · · · · · · · ·					
		MixE					
		<del></del>	.1				
		"Push N	1B"		MixC ——( JMPN )——		
		%M34 "M-Mix	. <b>4</b> B"				
		l					
letwork 4:							
					%DB2 "Mezcla B"		
					—————————————————————————————————————		
Network 5:		·					
ectiviour 3:							
		Mix(					
		"Push M	1C"		Mixes( JMPN }		
		<b>%M34</b> "M-Mix					
Network 6:							



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SCALING VALUES   Author   SEA   Comment   Family   CONVERT	SCALING VALUES   Author   SEA   Comment   Family   CONVERT			Number	103	Туре	I'C	Language	SIL
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me Data type Offset Default value Comment  Input IN Int IN Real LO_LIM Real BIPOLAR OUT OUT Return Return  Data type Offset Default value Oeffault value Oef	e Data type Offset Default value Comment  IN Int Real Int Interpret Industry Interpret Industry Interpret Industry Interpret I	le	SCALING VALUES	Author	SEA	Comment		Family	CONVERT
Input IN Int input value to be scaled HI_LIM Real upper limit in engineering units LO_LIM Real lower limit in engineering units BIPOLAR Bool 1=bipolar; O=unipolar Output COUT Real result of the scale conversion InOut Return COUT Real COUT COUNTY C	IN Int Int Input value to be scaled HI_LIM Real upper limit in engineering units LO_LIM Real lower limit in engineering units BIPOLAR Bool 1=bipolar; 0=unipolar OUT Real result of the scale conversion OUT Real result of the scale conversion	sion	2.1	User-defined I	<b>D</b> SCALE				'
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HI_LIM Real upper limit in engineering units  LO_LIM Real lower limit in engineering units  BIPOLAR Bool 1=bipolar; 0=unipolar  Output Real result of the scale conversion  InOut Return lower limit in engineering units  Inout Ino	HI_LIM Real upper limit in engineering units LO_LIM Real lower limit in engineering units BIPOLAR Bool 1=bipolar; 0=unipolar Output County Real result of the scale conversion County Co			Int			in	nout value to be scaled	
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		Ket_Vai							
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VINSCALING VALUES   Author   SEA   Comment   Family   CONVERT	me		Number	106	Туре	FC	Language	STL
UNSCALING VALUES   Author   User-defined ID   UNSCALE     Comment   Family   CONVERT	mbering	Automatic						
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LO_LIM Real lower limit in engineering units BIPOLAR Bool 1=bipolar; O=unipolar utput OUT Int result of the unscale conversion Out eturn Int Int Int Int Int Int Int Int Int In								
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# PLC\_1 [CPU 312C] / PLC tags / Default tag table [79]

# PLC tags

	lame	Data type	Address	Retain	ble from HMI/OPC	from HMI/OPC	HMI engi-	Supervision	Comment
-	Pulse A	Int	%MW0		<b>UA</b> True	<b>UA</b> True	True		
<b>a</b>	Pulse B	Int	%MW2		True	True	True		
<b>a</b>	Tick	Int	%MW4		True	True	True		
<b>a</b>	Push MA	Bool	%I124.0		True	True	True		
<b>a</b>	Push MB	Bool	%I124.1		True	True	True		
	Push MC	Bool	%I124.2		True	True	True		
<b>6</b>	Start	Bool	%I124.3		True	True	True		
<b>a</b>	Ready	Bool	%M6.0		True	True	True		
<b>a</b>	CA	Counter	%C0		True	True	True		
<b>a</b>	Counter A Value	Int	%MW8		True	True	True		
<b>a</b>	Tick 400 ms	Bool	%M5.2		True	True	True		
•	S1	Bool	%M6.1		True	True	True		
•	Pause	Bool	%I124.4		True	True	True		
<b>4</b>	Counter B Value	Int	%MW10		True	True	True		
•	СВ	Counter	%C1		True	True	True		
<b>a</b>	S2	Bool	%M6.2		True	True	True		
<b>a</b>	S3	Bool	%M6.3		True	True	True		
<b>a</b>	Mem Valv A	Bool	%M6.4		True	True	True		
<b>a</b>	Mem Valv B	Bool	%M6.5		True	True	True		
	Valve A	Bool	%Q124.0		True	True	True		
<b>43</b>	Valve B	Bool	%Q124.1		True	True	True		
<b>41</b>	Valve Out	Bool	%Q124.1		True	True	True		
_	NewTank	Bool	%I124.5		True	True	True		
<b>a</b>	Run	Bool	%M6.6		True	True	True		
<b>a</b>	ACUR_MEAS	Int	%IW256		True	True	True		
<b>a</b>	Current Value	Real	%MD12		True	True	True		
	Code Error	Word	%MW16		True	True	True		
•	Bipolar	Bool	%M6.7		True	True	True		
<b>4</b>	AGIT AO	Int	%QW256		True	True	True		
<b>40</b>	Fake Input	Int	%MW24		True	True	True		
<b>40</b>	Pulse Out	Int	%MW20		True	True	True		
<b>a</b>	COut	Counter	%C2		True	True	True		
	Counter Reactor	Int	%MW22		True	True	True		
<b>a</b>	RPM Fake	Real	%MD26		True	True	True		
<b>a</b>	Tick 100 ms	Bool	%M5.0		True	True	True		
<b>a</b>	Timer Count	Int	%MW30		True	True	True		
<b>a</b>	S4	Bool	%M7.2		True	True	True		
<b>40</b>	S5	Bool	%M7.3		True	True	True		
<b>40</b>	10MinDone	Bool	%M7.4		True	True	True		
<b>a</b>	40MinDone	Bool	%M7.5		True	True	True		
<b>43</b>	SlowingRPM	Int	%MW32		True	True	True		
<b>a</b>	Counter Out	Int	%MW18		True	True	True		
<b>a</b>	Reset	Bool	%M7.6		True	True	True		
<b>a</b>	AGIT ON	Bool	%M7.7		True	True	True		
<b>a</b>	CURR WARN	Bool	%Q124.3		True	True	True		
<b>a</b>	CURR ALARM	Bool	%Q124.3		True	True	True		
	ManualScaling	Bool	%I124.6		True	True	True		
<b>a</b>	Manual	Bool	%M34.0		True	True	True		
<b>60</b>	AutoScaling	Bool	%I124.7		True	True	True		
40 40	Switching Input	Int	%MW36		True	True	True		
<b>43</b>	16mA	Bool	%I125.0		True	True	True		
	18mA	Bool	%I125.1		True	True	True		
<b>a</b>	10mA	Bool	%I125.1		True	True	True		
	Selection Available	Bool	%M34.1		True	True	True		
<b>(01</b> )	Mix Selected	Bool	%M34.1		True	True	True		
(COL)	MIX SEIECTED	1133.6.71	/UIVIJT.Z	1	IIIUC	IIIUC	IIUC		

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ľ	Name	Data type	Address	Retain	Accessi- ble from HMI/OPC UA	from	Visible in Su HMI engi- neering	upervision	Comment	
•	M-MixB	Bool	%M34.4		True	True	True			
<b>(3)</b>	M-MixC	Bool	%M34.5		True	True	True			
93	M-10mA	Bool	%M34.6		True	True	True			
(CII	M-16mA	Bool	%M34.7		True	True	True			
Œ	M-18mA	Bool	%M35.0		True	True	True			
90	M-AutoScaling	Bool	%M35.1		True	True	True			
200	M-ManualScaling	Bool	%M35.2		True	True	True			
200	M-Start	Bool	%M35.3		True	True	True			
_					_					

True

%M35.4

%M35.5

%MW38

%MW40

%MW42

%MW44

%M35.6

%M35.7

%MW46

%MW48

%MW50

%MW52

%MW54

%MW56

%MW58

Bool

Bool

Int

Int

Int

Int

Bool

Bool

Int

Int

Int

Int

Int

Int

Int

M-Pause

M-NewTank

M-IngredientA

M-IngredientB

M-A-animation

M-B-animation

M-Motor-Anim

M-QA-Animation

M-Reactor-Animation

M-FillReactor-Anim

M-QA

M-Reactor

M-Timer-anim
M-FillingReactor

M-ReactorFake-Anim

400

-63

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Totally Integrated Automation Portal					
	C] / PLC tags / Defau	lt tag table [79]			
User constants					
User constants Name		Data type	Value	Comment	

Totally Integrated Automation Portal		
PLC_1 [CPU 312	C]	
PLC data types		
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Totally Integrated Automation Portal					
	C] / Watch and force	tables			
	Address	Display format	Force value	Comment	
Force table Name	Address	Display format	Force value	Comment	

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Totally Integrated Automation Portal		
PI C 1 [CPII 312	C] / PLC supervisions & alarms	
PLC alarms		
PLC alarms		
No entries		

Totally Integrated Automation Portal		
User diagnostics a	C] / PLC supervisions & alarms	
<b>User diagnostics alarms</b> No entries		

<del>-</del>		
Totally Integrated Automation Portal		
DIC 1 [CDII 312	C] / PLC supervisions & alarms	
System alarms	C] / I LC supervisions & diarnis	
System alarms		
No entries		

Totally Integrated Automation Portal		
PLC_1 [CPU 312	C]	
PLC alarm text list		
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	4/AO 2x8BIT_1 neral me	ALA/AO DVODIT 1	Author	Enrique	Comment	
Al 4/AO 2x8BIT  Description  Analog input/output module Al4/AO2 x U/I 8bits of resolution; accuracy appr. 1%; Al grouping 4; AO-grouping 2; 20-pin front connector  ware version  ddresses\Input addresses  address  256  End address  263  Process image  None  ddresses\Output addresses  ddresses\Output addresses	k	0			Comment	
addresses\Input addresses  address 256 End address 263 Process image None  rupt OB number 40  ddresses\Output addresses	t designation		Description	x U/I 8bits of resolution; accuracy appr. 1%; AI grouping 4; AO-grouping	Article number	6ES7 334-0CE01-0AA0
rupt OB number   40 ddresses\Output addresses	ddresses\Input		End address	263	Process image	None
	rupt OB numbe	er 40	End address	203	Process image	None
			End address	259	Process image	None