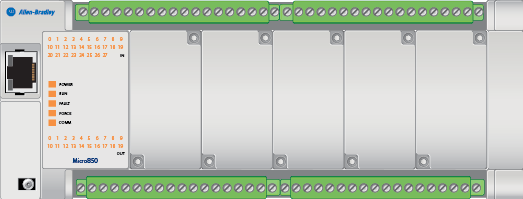
# Micro850

## Device Configuration

### Controller

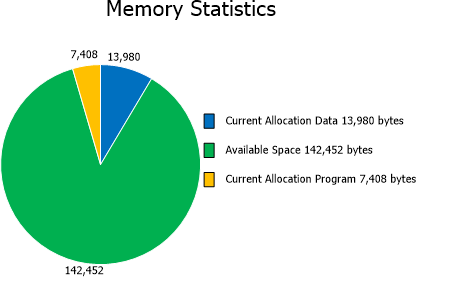
#### Overview



#### General

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Description | Vendor Name | Catalog ID | Controller Project Version | Download Source Code |
| Micro850 |  | Allen-Bradley | 2080-LC50-48QWB-SIM | 12 | Yes |

#### Memory



|  |  |  |  |
| --- | --- | --- | --- |
| Name | Allocated | Used | Free |
| Embedded Project | 348,160 bytes | 51,145 bytes | 297,015 bytes |
| Temporary Variables | 8,452 bytes | 260 bytes | 8,192 bytes |

#### Startup/Faults

|  |  |
| --- | --- |
| Mode Behavior | Fault Override |
| Retain previous power-down mode | Do not clear fault |

#### Embedded I/O

**Input Filter**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Inputs** | 0-1 | 2-3 | 4-5 | 6-7 | 8-9 | 10-11 | 12-13 | 14-15 | 16-23 | 24-27 |
| **Input Filter** | Default | Default | Default | Default | Default | Default | Default | Default | Default | Default |

**Input Latch and EII Edge**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Input** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **Enable Latch** | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled |
| **Latch Edge** | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling |
| **EII Edge** | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling | Falling |

## Global Variables

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| \_IO\_EM\_DO\_00 | DO\_Butter\_Dispenser | BOOL |  |  |  | Dispenses on high pulses | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_01 | DO\_Sugar\_Dispenser | BOOL |  |  |  | Dispenses while high | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_02 | DO\_Mixer | BOOL |  |  |  | Dispenses drops while high | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_03 | DO\_Egg\_Dispenser | BOOL |  |  |  | Dispenses on high pulses | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_04 | DO\_Vanilla\_Dispenser | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_05 | DO\_Flour\_Dispenser | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_06 | DO\_Salt\_Dispenser | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_07 | DO\_Soda\_Dispenser | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_08 | DO\_Ball\_Roller | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_09 | DO\_Bowl\_Cleaner | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_10 | DO\_Conveyor\_Fwd | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_11 | DO\_Conveyor\_Rev | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_12 | DO\_Oven | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_13 | DO\_Door | BOOL |  |  |  | Door opens when true, closes when false | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_14 | DO\_Piston | BOOL |  |  |  | Pushes cookies out the door to user on high pulse | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_15 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_16 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_17 | DO\_Ready | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_18 | DO\_Warning | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DO\_19 | DO\_Error | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_00 | DI\_Start\_PB | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_01 | DI\_Stop\_PB | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_02 | DI\_Restocked | BOOL |  |  |  | Pressed by user when restocked ingredients to clear errors | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_03 | DI\_Butter\_PE | BOOL |  |  |  | Photoelectric sensor at bottom of butter stack, true when stack is empty | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_04 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_05 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_06 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_07 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_08 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_09 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_10 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_11 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_12 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_13 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_14 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_15 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_16 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_17 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_18 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_19 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_20 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_21 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_22 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_23 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_24 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_25 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_26 |  | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| \_IO\_EM\_DI\_27 | DI\_Reset\_PB | BOOL |  |  |  |  | VarDirectlyRepresented |  |
| Flour\_Tank\_Capacity |  | REAL |  | 0.0 |  |  | Var |  |
| Flour\_Tank\_Full |  | BOOL |  |  |  |  | Var |  |
| Flour\_Tank\_Minimum |  | REAL |  |  |  |  | Var |  |
| Flour\_Tank\_Low |  | BOOL |  |  |  |  | Var |  |
| Running |  | BOOL |  |  |  |  | Var |  |
| Flour\_Needed |  | REAL |  |  |  |  | Var |  |
| Flour\_Weight |  | REAL |  |  |  |  | Var |  |
| Process\_Index |  | INT |  | 0 |  |  | Var |  |
| Next\_Step |  | BOOL |  |  |  |  | Var |  |
| Initialize |  | BOOL |  |  |  |  | Var |  |
| DI\_Bowl\_Weight |  | REAL |  |  |  | Simulated weight [g] measurement | Var |  |
| Recipe\_Flour |  | REAL |  | 180.0 |  | Weight [g] | Var |  |
| Recipe\_Eggs |  | INT |  | 2 |  | Number of eggs | Var |  |
| Tare\_Weight |  | REAL |  |  |  | Weight [g] | Var |  |
| Relative\_Weight |  | REAL |  |  |  | (DI\_Bowl\_Weight) - (Tare\_Weight) [g] | Var |  |
| Tare |  | BOOL |  |  |  |  | Var |  |
| Recipe\_Sugar |  | REAL |  | 100.0 |  | Weight [g] | Var |  |
| Butter\_Weight |  | REAL |  |  |  |  | Var |  |
| Sugar\_Dispensed |  | BOOL |  |  |  |  | Var |  |
| Butter\_Dispensed |  | BOOL |  |  |  |  | Var |  |
| Vanilla\_Dispensed |  | BOOL |  |  |  |  | Var |  |
| Recipe\_Vanilla |  | INT |  | 70 |  | Number of drops | Var |  |
| Dispense\_Butter |  | BOOL |  |  |  |  | Var |  |
| Dispense\_Sugar |  | BOOL |  |  |  |  | Var |  |
| DI\_Vanilla\_Drop |  | BOOL |  |  |  | Simulated output from vanilla dispenser - high pulse for every drop dispensed | Var |  |
| Clean\_Bowl |  | BOOL |  |  |  |  | Var |  |
| Cleaning\_Complete |  | BOOL |  |  |  |  | Var |  |
| C\_Bowl\_Weight |  | REAL |  |  |  |  | Var |  |
| C\_Butter\_Weight |  | REAL |  |  |  |  | Var |  |
| IDX\_Butter |  | INT |  |  |  |  | Var |  |
| IDX\_Sugar |  | INT |  |  |  |  | Var |  |
| IDX\_Clean |  | INT |  |  |  |  | Var |  |
| IDX\_End |  | INT |  |  |  |  | Var |  |
| IDX\_Mix\_1 |  | INT |  |  |  |  | Var |  |
| Mix\_Complete |  | BOOL |  |  |  |  | Var |  |
| \_\_SYSVA\_CYCLECNT |  | DINT |  |  |  | Cycle counter | VarGlobal |  |
| \_\_SYSVA\_CYCLEDATE |  | TIME |  |  |  | Timestamp of the beginning of the cycle in milliseconds (ms) | VarGlobal |  |
| \_\_SYSVA\_KVBPERR |  | BOOL |  |  |  | Kernel variable binding producing error (production error) | VarGlobal |  |
| \_\_SYSVA\_KVBCERR |  | BOOL |  |  |  | Kernel variable binding consuming error (consumption error) | VarGlobal |  |
| \_\_SYSVA\_RESNAME |  | STRING |  |  |  | Resource name (max length=255) | VarGlobal |  |
| \_\_SYSVA\_SCANCNT |  | DINT |  |  |  | Input scan counter | VarGlobal |  |
| \_\_SYSVA\_TCYCYCTIME |  | TIME |  |  |  | Programmed cycle time | VarGlobal |  |
| \_\_SYSVA\_TCYCURRENT |  | TIME |  |  |  | Current cycle time | VarGlobal |  |
| \_\_SYSVA\_TCYMAXIMUM |  | TIME |  |  |  | Maximum cycle time since last start | VarGlobal |  |
| \_\_SYSVA\_TCYOVERFLOW |  | DINT |  |  |  | Number of cycle overflows | VarGlobal |  |
| \_\_SYSVA\_RESMODE |  | SINT |  |  |  | Resource execution mode | VarGlobal |  |
| \_\_SYSVA\_CCEXEC |  | BOOL |  |  |  | Execute one cycle when application is in cycle to cycle mode | VarGlobal |  |
| \_\_SYSVA\_REMOTE |  | BOOL |  | FALSE |  | Remote status | VarGlobal |  |
| \_\_SYSVA\_SUSPEND\_ID |  | UINT |  | 0 |  | Last Suspend ID | VarGlobal |  |
| \_\_SYSVA\_TCYWDG |  | UDINT |  | 2000 |  | Software Watchdog | VarGlobal |  |
| \_\_SYSVA\_MAJ\_ERR\_HALT |  | BOOL |  | FALSE |  | Major Error Halted status | VarGlobal |  |
| \_\_SYSVA\_ABORT\_CYCLE |  | BOOL |  | FALSE |  | Aborting Cycle | VarGlobal |  |
| \_\_SYSVA\_FIRST\_SCAN |  | BOOL |  | TRUE |  | First scan bit | VarGlobal |  |
| \_\_SYSVA\_USER\_DATA\_LOST |  | BOOL |  | FALSE |  | User data lost | VarGlobal |  |
| \_\_SYSVA\_POWERUP\_BIT |  | BOOL |  | TRUE |  | Power-up bit | VarGlobal |  |
| \_\_SYSVA\_PROJ\_INCOMPLETE |  | UDINT |  | 0 |  | Project Incomplete | VarGlobal |  |
| C\_Butter\_Max |  | INT |  |  |  |  | Var |  |
| C\_Eggs\_Max |  | INT |  |  |  |  | Var |  |
| Warn\_Butter\_Low |  | BOOL |  |  |  |  | Var |  |
| Error\_Butter\_Empty |  | BOOL |  |  |  |  | Var |  |
| Error |  | BOOL |  |  |  |  | Var |  |
| Warn |  | BOOL |  |  |  |  | Var |  |
| Warn\_Sugar\_Low |  | BOOL |  |  |  |  | Var |  |
| Error\_Sugar\_Empty |  | BOOL |  |  |  |  | Var |  |
| Ready |  | BOOL |  |  |  |  | Var |  |
| C\_Sugar\_Max |  | REAL |  |  |  |  | Var |  |
| C\_Flour\_Max |  | REAL |  |  |  |  | Var |  |
| C\_Sugar\_Low |  | REAL |  |  |  |  | Var |  |
| C\_Sugar\_Empty |  | REAL |  |  |  |  | Var |  |
| DI\_Sugar\_Low\_PE |  | BOOL |  |  |  |  | Var |  |
| DI\_Sugar\_Empty\_PE |  | BOOL |  |  |  |  | Var |  |
| Dispense\_Vanilla |  | BOOL |  |  |  |  | Var |  |
| IDX\_Eggs\_Vanilla |  | INT |  |  |  |  | Var |  |
| IDX\_Mix\_2 |  | INT |  |  |  |  | Var |  |
| IDX\_Flour |  | INT |  |  |  |  | Var |  |
| Warn\_Eggs\_Low |  | BOOL |  |  |  |  | Var |  |
| Error\_Eggs\_Empty |  | BOOL |  |  |  |  | Var |  |
| Dispense\_Eggs |  | BOOL |  |  |  |  | Var |  |
| Eggs\_Dispensed |  | BOOL |  |  |  |  | Var |  |
| C\_Egg\_Weight |  | REAL |  |  |  |  | Var |  |
| C\_Egg\_Dispense\_Time |  | TIME |  |  |  |  | Var |  |
| Egg\_Dispense\_Delay |  | TIME |  |  |  | Time [s] to wait for eggs to dispense | Var |  |
| Mix |  | BOOL |  |  |  |  | Var |  |
| Recipe\_Mix\_1 |  | TIME |  | T#3s |  |  | Var |  |
| Recipe\_Mix\_2 |  | TIME |  | T#3s |  |  | Var |  |
| Mix\_Time |  | TIME |  |  |  |  | Var |  |
| C\_Clean\_Bowl\_Time |  | TIME |  |  |  |  | Var |  |
| Dispense\_Flour |  | BOOL |  |  |  |  | Var |  |
| Flour\_Dispensed |  | BOOL |  |  |  |  | Var |  |
| DI\_Flour\_Low\_PE |  | BOOL |  |  |  |  | Var |  |
| DI\_Flour\_Empty\_PE |  | BOOL |  |  |  |  | Var |  |
| C\_Flour\_Low |  | REAL |  |  |  |  | Var |  |
| C\_Flour\_Empty |  | REAL |  |  |  |  | Var |  |
| Error\_Flour\_Empty |  | BOOL |  |  |  |  | Var |  |
| Warn\_Flour\_Low |  | BOOL |  |  |  |  | Var |  |
| Dispense\_Salt |  | BOOL |  |  |  |  | Var |  |
| Salt\_Dispensed |  | BOOL |  |  |  |  | Var |  |
| Dispense\_Soda |  | BOOL |  |  |  |  | Var |  |
| Soda\_Dispensed |  | BOOL |  |  |  |  | Var |  |
| IDX\_Salt\_Soda |  | INT |  |  |  |  | Var |  |
| IDX\_Mix\_3 |  | INT |  |  |  |  | Var |  |
| Recipe\_Mix\_3 |  | TIME |  | T#5s |  |  | Var |  |
| Recipe\_Cook\_Time |  | TIME |  | T#10s |  |  | Var |  |
| Recipe\_Cool\_Time |  | TIME |  | T#10s |  |  | Var |  |
| IDX\_Roll |  | INT |  |  |  |  | Var |  |
| IDX\_Bake |  | INT |  |  |  |  | Var |  |
| IDX\_Present |  | INT |  |  |  |  | Var |  |
| Roll |  | BOOL |  |  |  |  | Var |  |
| Rolling\_Complete |  | BOOL |  |  |  |  | Var |  |
| Bake |  | BOOL |  |  |  |  | Var |  |
| Baking\_Complete |  | BOOL |  |  |  |  | Var |  |
| DI\_Conveyor\_Oven\_PE |  | BOOL |  |  |  |  | Var |  |
| DI\_Conveyor\_Start\_PE |  | BOOL |  |  |  |  | Var |  |
| Present |  | BOOL |  |  |  |  | Var |  |
| Presenting\_Complete |  | BOOL |  |  |  |  | Var |  |
| DI\_Piston\_Extended |  | BOOL |  |  |  |  | Var |  |

## Programs

### Constants

**Programs**

### Equations

**Programs**

### Process

**Rung1 Diagram**

**Start new process**



**Rung2 Diagram**

**Increment process index**



**Rung3 Diagram**

**Dispense butter**



**Rung4 Diagram**

**Dispense sugar**



**Rung5 Diagram**

**Mix\_1**



**Rung6 Diagram**

**Dispense eggs, vanilla**



**Rung7 Diagram**

**Dispense flour**



**Rung8 Diagram**

**Disepnse salt, baking soda**



**Rung9 Diagram**

**Roll into balls on tray**



**Rung10 Diagram**

**Clean**



**Rung11 Diagram**

**Bake**



**Rung12 Diagram**

**Present**



**Rung13 Diagram**

**End process once cleaning is finished**



**Rung14 Diagram**

**Reset**



### Mixing\_Bowl

**Local Variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| TON\_1 |  | TON |  | ... | ... |  | Var |  |
| TON\_2 |  | TON |  | ... | ... |  | Var |  |
| TON\_4 |  | TON |  | ... | ... |  | Var |  |
| TON\_3 |  | TON |  | ... | ... |  | Var |  |

**Rung1 Diagram**

**Initialize bowl weight**



**Rung2 Diagram**

**Tare - store bowl weight measurement**



**Rung3 Diagram**

**Mix output**



**Rung4 Diagram**

**Mix timer**



**Rung5 Diagram**

**Roll dough balls**



**Rung6 Diagram**

**Send signal to ball roller**



**Rung7 Diagram**

**Clean bowl**



**Rung8 Diagram**

**Clean bowl for 5s**



**Rung9 Diagram**

**Simulate emptying bowl - set weight to bowl weight after 1s**



### Butter\_Dispenser

**Local Variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| Stock\_Butter |  | INT |  |  |  |  | Var |  |
| TON\_7 |  | TON |  | ... | ... |  | Var |  |
| Dispensing\_Butter |  | BOOL |  |  |  |  | Var |  |

**Rung1 Diagram**

**Initialize to full stack**



**Rung2 Diagram**



**Rung3 Diagram**

**Wait for taring to dispense butter**



**Rung4 Diagram**

**Begin dispensing butter when signal received**



**Rung5 Diagram**

**Simulate butter dispensing - increase bowl weight after 2 seconds**



**Rung6 Diagram**

**Detect butter dispensed by weight - at least 10g increase**



**Rung7 Diagram**

**Decrease stock when dispensed**



**Rung8 Diagram**

**Low count warning**



**Rung9 Diagram**

**Out of stock error**



**Rung10 Diagram**

**Restock to max**



### Sugar\_Dispenser

**Local Variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| TON\_2 |  | TON |  | ... | ... |  | Var |  |
| TON\_3 |  | TON |  | ... | ... |  | Var |  |
| Sugar\_Pulse\_State |  | BOOL |  |  |  |  | Var |  |
| Stock\_Sugar |  | REAL |  |  |  | Simulated amount of sugar in tank [g] | Var |  |

**Rung1 Diagram**



**Rung2 Diagram**

**Initialize dispense sugar**



**Rung3 Diagram**

**Wait for taring to dispense sugar**



**Rung4 Diagram**

**Simulate dispensing sugar at 100g/s = 25g/250ms, pulse high to low**





**Rung5 Diagram**

**Sugar pulse low to high**



**Rung6 Diagram**

**Detect sugar dispensed by weight**



**Rung7 Diagram**

**Simulate low level photoelectric sensor**



**Rung8 Diagram**

**Simulate empty level photoelectric sensor**



**Rung9 Diagram**

**Low level warning**



**Rung10 Diagram**

**Empty error**



**Rung11 Diagram**

**Restock to max**



### Egg\_Dispenser

**Local Variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| Stock\_Eggs |  | INT |  |  |  |  | Var |  |
| TON\_1 |  | TON |  | ... | ... |  | Var |  |
| Egg\_Pulse\_State |  | BOOL |  |  |  |  | Var |  |
| TON\_2 |  | TON |  | ... | ... |  | Var |  |
| Pulse\_In\_Count |  | INT |  |  |  | Counter for egg dispenser input signal | Var |  |
| Dispensing\_Egg |  | BOOL |  |  |  |  | Var |  |
| TON\_3 |  | TON |  | ... | ... |  | Var |  |
| Pulse\_Out\_Count |  | INT |  |  |  | Counter for generating the output pulse to egg dispenser | Var |  |
| TON\_4 |  | TON |  | ... | ... |  | Var |  |

**Rung1 Diagram**

**Initialize full egg carton**



**Rung2 Diagram**

**Initialize dispense eggs**



**Rung3 Diagram**

**Delay timer waiting for eggs to dispense**



**Rung4 Diagram**

**Generate a pulse with a high per number of eggs needed, low to high**





**Rung5 Diagram**

**Pulse high to low**



**Rung6 Diagram**

**Reduce egg stock for every pulse sent**



**Rung7 Diagram**

**Send pulse to dispenser**



**Rung8 Diagram**

**Count number of pulses received**



**Rung9 Diagram**

**Dispense egg if pulse count >0**



**Rung10 Diagram**

**Simulate dispensing egg over 2s**



**Rung11 Diagram**

**Low eggs warning**



**Rung12 Diagram**

**Empty eggs error**



**Rung13 Diagram**

**Restock eggs to full**



### Vanilla\_Dispenser

**Local Variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| TON\_4 |  | TON |  | ... | ... |  | Var |  |
| Vanilla\_Pulse\_State |  | BOOL |  |  |  |  | Var |  |
| TON\_1 |  | TON |  | ... | ... |  | Var |  |
| Vanilla\_Drops\_Count |  | INT |  |  |  |  | Var |  |

**Rung1 Diagram**

**Initialize dispense - set drop count to 0**



**Rung2 Diagram**

**Send signal to dropper**



**Rung3 Diagram**

**Generate pulse with 3ms period**



**Rung4 Diagram**

**Pulse high to low**



**Rung5 Diagram**

**Simulate dispensing drop on pulse high - increase bowl weight by 0.05g**



**Rung6 Diagram**

**Simulate dropper output signal with a high pulse for every drop dispensed**



**Rung7 Diagram**

**Count number of vanilla drops dispensed based on dropper output signal**



**Rung8 Diagram**

**Stop dispensing vanilla when recipe drop count reached**



**Rung9 Diagram**



### Flour\_Dispenser

**Local Variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| Stock\_Flour |  | REAL |  |  |  |  | Var |  |
| TON\_2 |  | TON |  | ... | ... |  | Var |  |
| Flour\_Pulse\_State |  | BOOL |  |  |  |  | Var |  |
| TON\_3 |  | TON |  | ... | ... |  | Var |  |

**Rung1 Diagram**



**Rung2 Diagram**

**Initialize dispense sugar**



**Rung3 Diagram**

**Wait for taring to dispense**



**Rung4 Diagram**

**Simulate dispensing flour at 200g/s = 50g/250ms, pulse high to low**





**Rung5 Diagram**

**Flour pulse low to high**



**Rung6 Diagram**

**Detect flour dispensed by weight**



**Rung7 Diagram**

**Simulate low level photoelectric sensor**



**Rung8 Diagram**

**Simulate empty level photoelectric sensor**



**Rung9 Diagram**

**Low level warning**



**Rung10 Diagram**

**Empty error**



**Rung11 Diagram**

**Restock to max**



### Salt\_Dispenser

**Local Variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| TON\_1 |  | TON |  | ... | ... |  | Var |  |
| TON\_2 |  | TON |  | ... | ... |  | Var |  |

**Rung1 Diagram**

**Salt timer**



**Rung2 Diagram**

**Salt output**



**Rung3 Diagram**

**Soda timer**



**Rung4 Diagram**

**Soda output**



### Oven

**Local Variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| Cooking |  | BOOL |  |  |  |  | Var |  |
| Cooling |  | BOOL |  |  |  |  | Var |  |
| TON\_4 |  | TON |  | ... | ... |  | Var |  |
| TON\_5 |  | TON |  | ... | ... |  | Var |  |
| TON\_2 |  | TON |  | ... | ... |  | Var |  |
| TON\_1 |  | TON |  | ... | ... |  | Var |  |

**Rung1 Diagram**

**Move tray into oven on conveyor**



**Rung2 Diagram**

**Cook**



**Rung3 Diagram**

**Cool**



**Rung4 Diagram**

**End of cooling**



**Rung5 Diagram**

**Move tray out of oven on conveyor**



**Rung6 Diagram**

**Simulate oven PE on**



**Rung7 Diagram**

**Simulate oven PE off**



**Rung8 Diagram**

**Simulate start PE on**



**Rung9 Diagram**

**Simulate start PE off**



### Presenting\_Window

**Local Variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Alias | Data Type | Dimension | Initial Value | Project Value | Comment | Direction | String Size |
| TON\_1 |  | TON |  | ... | ... |  | Var |  |
| DI\_Door\_Open |  | BOOL |  |  |  |  | Var |  |
| TON\_2 |  | TON |  | ... | ... |  | Var |  |
| TON\_3 |  | TON |  | ... | ... |  | Var |  |
| Opening\_Door |  | BOOL |  |  |  |  | Var |  |
| Pushing |  | BOOL |  |  |  |  | Var |  |
| Closing\_Door |  | BOOL |  |  |  |  | Var |  |
| TOF\_1 |  | TOF |  | ... | ... |  | Var |  |

**Rung1 Diagram**

**Open door**



**Rung2 Diagram**

**Push cookies out**



**Rung3 Diagram**

**Close door**



**Rung4 Diagram**

**Complete presentation**



**Rung5 Diagram**

**Open door output**



**Rung6 Diagram**

**Piston output**



**Rung7 Diagram**

**Close door output**



**Rung8 Diagram**

**Simulate door opening**



**Rung9 Diagram**

**Simulate door closing**



**Rung10 Diagram**

**Simulate piston extending**



**Rung11 Diagram**

**Simulate piston retracting**



### Indicators

**Programs**

