SYNPLUS Application Example

1、 Automatic Door Control

2、 Parking Machine control

3、 Rolling-up Gate

4、 Elevator door Control

5、 Press feeder control

6、 Mini-boiler temperature control

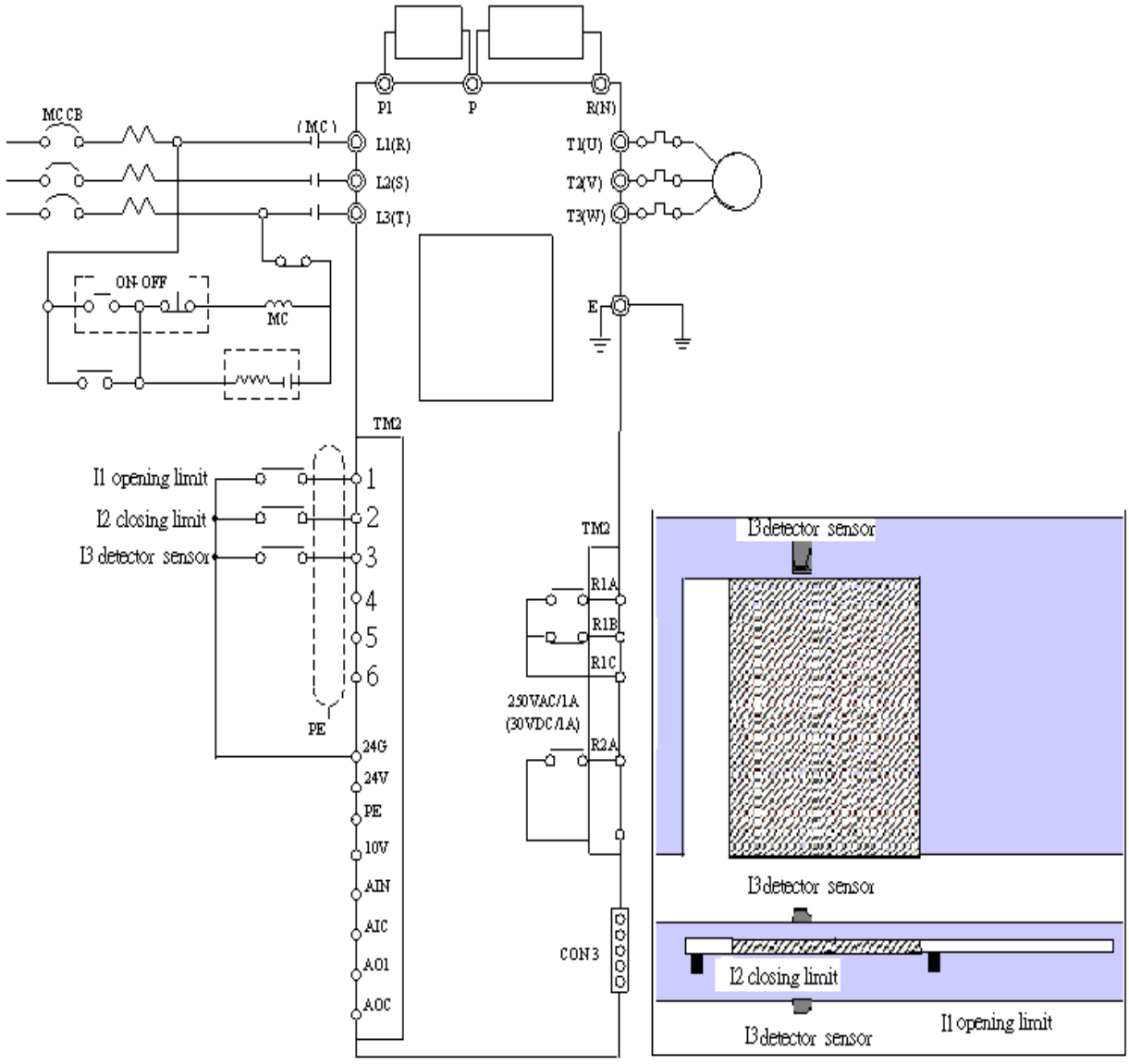
1. Application in Automatic Door Control.

The automatic door is often installed at the entrance of the Supermarket, Building, Bank, Hospital and etc, which facilitates the people.

1.1 System Requirements and Structure of the Automatic Door

SYNPLUS Inverter applied the automatic door can simplify wiring. All that needs to connect the personal detector, limit switch with the SYNPLUS only.

A. External wiring graph for the Automatic Door Control System.



B. System Requirement

1) First time running (Door Open)

It operates in opening mode at normal speed 50Hz (F1 setting symbol 7), then the door will run at low speed 5Hz (F1 setting symbol 8) when it touched the Opening Limit switch (I1) –**Please turned the switch I1 ON by hand,** then the Timer (Timer5 Preset Value 5Sec) begins working. But it didn't touch the Opening Limiter (I1) while exceeded 10 Sec (Timer1 Preset Value), Relay 2 (Digital Output RY2) would be ON. - (only for first time)

2) Closing

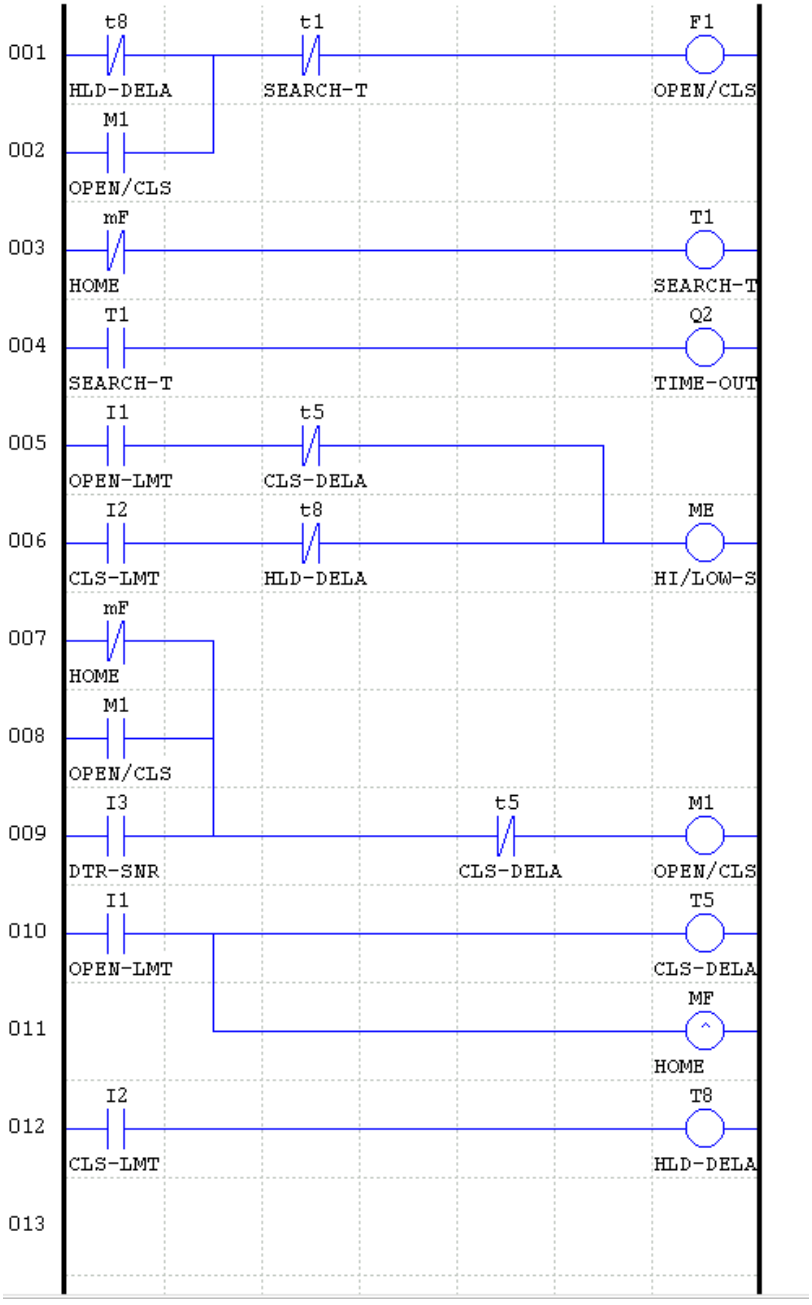
Door will keep open for a period waiting time (Timer5 Preset Value 5Sec) during which there is nobody passing through the door. It operates in closing mode at normal speed 50Hz (F1 setting symbol 7).**Please turned the switch I1 OFF by hand.**

When the door touching the Closing Limit switch **(Please turned the switch I2 ON by hand)**.It operates at 5Hz speed (F1 setting symbol 8) for 1Sec (Timer8 Preset Value) then stop.

3) Recycling

When the door closed, it will open when a person contacted the sensor-**Please turned the switch I3 ON->OFF once by hand.** This motion will be repeated for recycling. **Please turned the switch I2 OFF by hand.**

1.2 The Ladder Diagram and Parameter Setting for the Automatic Door Control



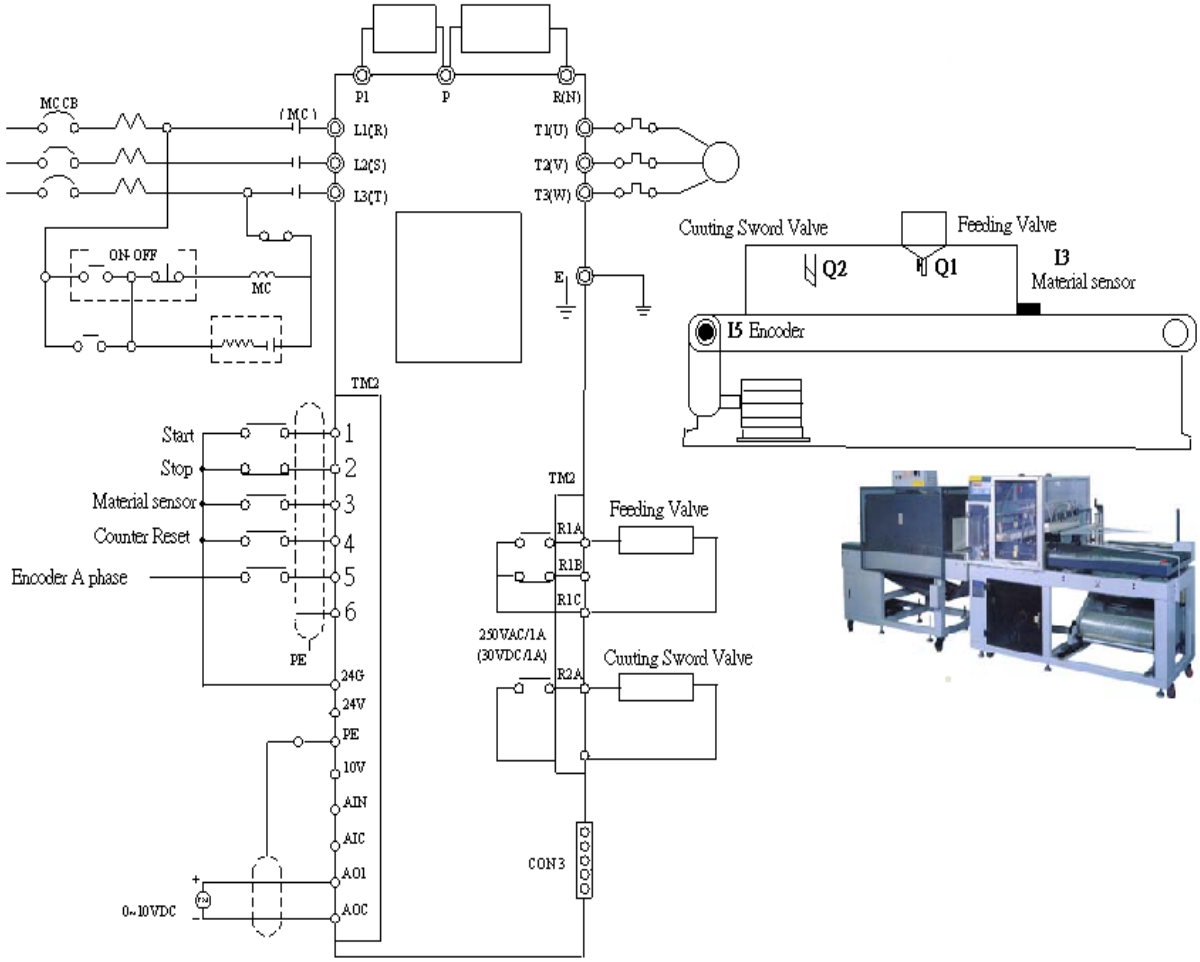
2. Application in Packing Machine Control

Before delivered, the product is measured and packed according to the length or volume of the different products. When the length or the volume reaches the present value, the packing will repeat motion cycle.

2.1 System Requirement and structure of Simple Packing Machine.

The SYNPLUS Inverter applied the Simple Packing Machine can simplify the wiring. It needs to connect the detector Sensor, Start/Stop Switch, Encoder and the cutting tool valve with the SYNPLUS only.

A. External wiring Diagram for Simple Packing Machine



B. System Requirement

1) Position

The inverter will drive auto-feeding by the speed setting (the POT of keypad, F1 setting symbol 7) as the material is on the feeder-table.

The "STOP" Button is Normal Closed Contact in general application, so Please turned the switch I2 ON & turned the switch I1 (START Button) ON->OFF once by hand, then SYNPLUS will be running.

The SYNPLUS will run at low speed 5Hz (F1 setting symbol 8) when the feeding length (H2 Preset Value) reached.

The inverter will stop to feeding when the feeding length (H1 Preset Value) be reached.

2) Putting down the material

The Feeding valve will open (the Q1-Digital Output RY1 would be On) and start the feeding processes.

The valve will stop when the feeding time reached 1Sec (Timer2 Preset Value)

3) Cutting

After the feeding process done, the sealing tool and cutting tool will operate synchronously (the Q2-Digital Output RY2 would be ON)

The Position motion will be restarted as the cutting finished (3Sec of Timer3 Preset Value).

4) Stopping

When 'Stop' button and the no-material sensor (I3) is triggered or reached the counting number 10 times (Counter1 Preset Value), machine will stop immediately.

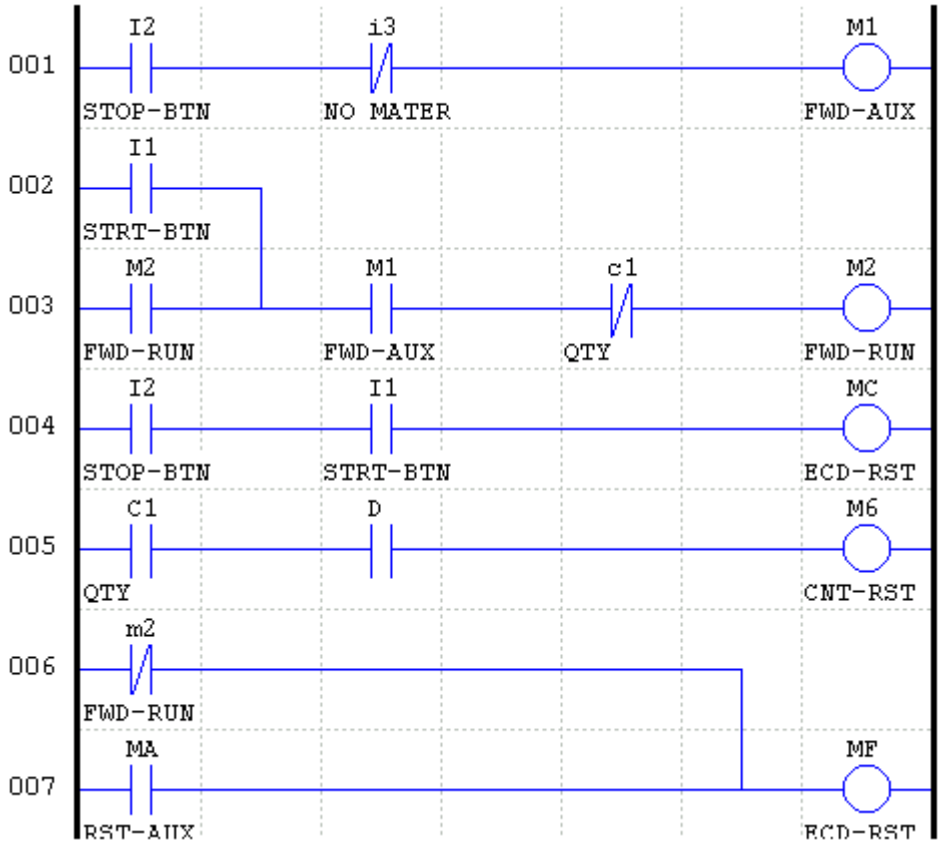
The counting number will be retained when power loss. It will be continued as the power is supplied & press the "START" Button again.

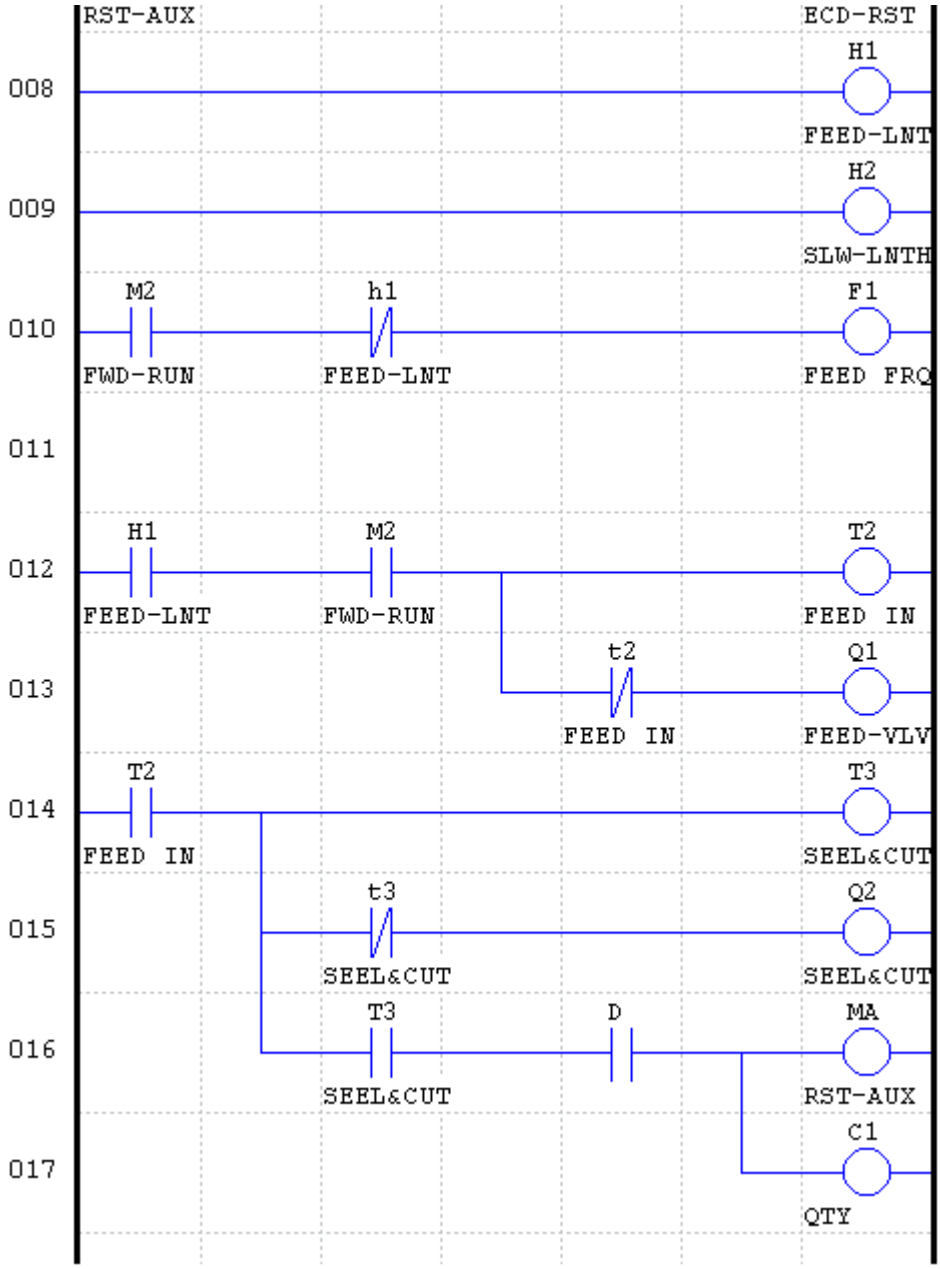
5) Recycling

As the counting number (Counter1 Preset Value) is reached, it will run when the "Counter Reset Button" closed & push the "START" Button again.

Please turned the switch I4 ON->OFF once, then turned the switch I1 ON->OFF once by hand. The motion will be repeated.

2.2 Ladder Diagram and Parameter Setting for Simple Packing Machine




RST-AUX
ECD-RST
008
H1
FEED-LNT
009
H2
SLW-LNTH
010
M2
FWD-RUN
h1
FEED-LNT
F1
FEED FRQ
011
012
H1
FEED-LNT
M2
FWD-RUN
T2
FEED IN
013
t2
FEED IN
Q1
FEED-VLV
014
T2
FEED IN
T3
SEEL&CUT
015
t3
SEEL&CUT
Q2
SEEL&CUT
016
T3
SEEL&CUT
D
MA
RST-AUX
017
C1
QTY

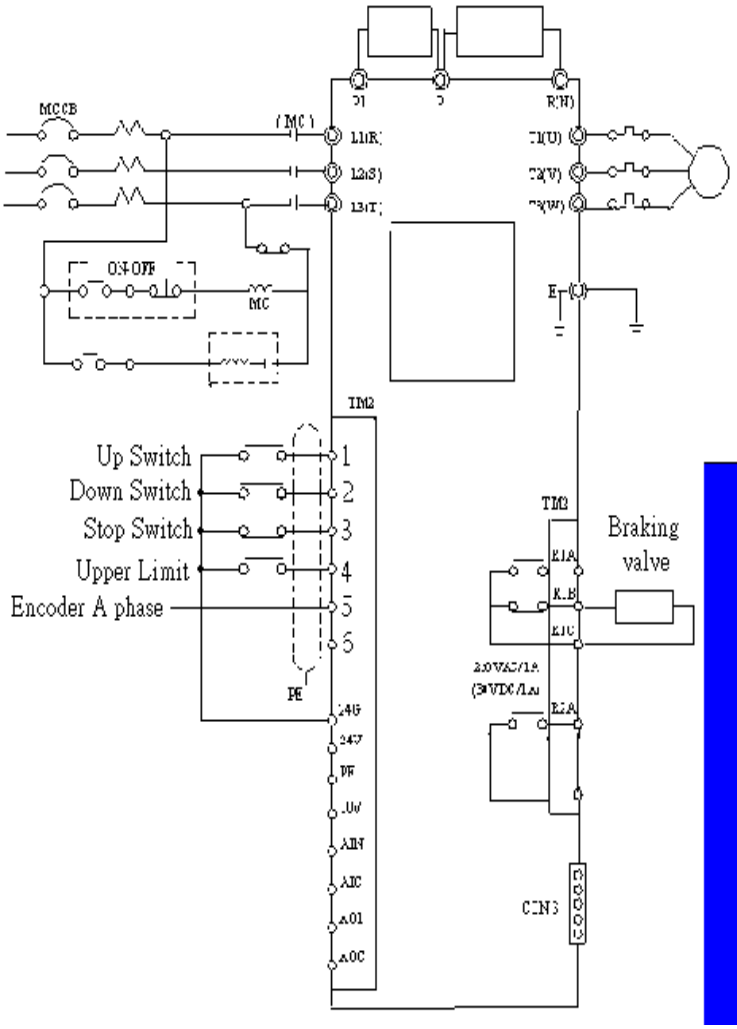
3. Application in Rolling-up Gate

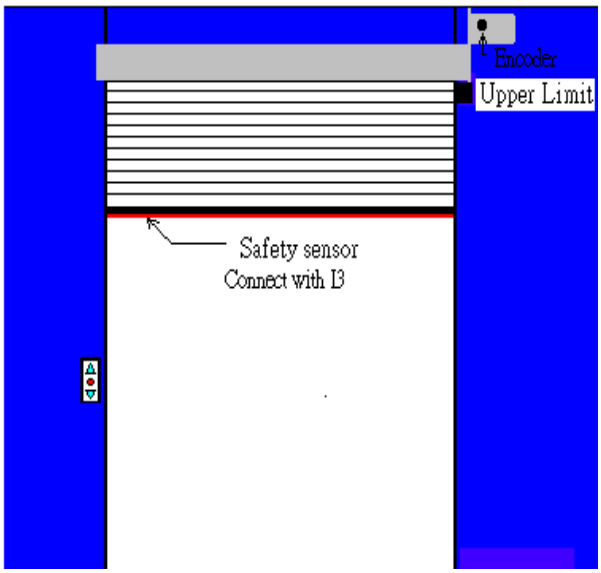
The rolling-up gate is often installed at the entrance of the supermarket, building, bank and warehouse…etc. The system can prevent somebody without permission.

3.1 System Requirement and structure of Rolling-up Gate. (Using the Encoder)

The SYNPLUS Inverter applied the Rolling-up Gate can simplify the wiring. To connect the upper limit switch, UP/DOWN/STOP Switch and the electromagnetic contact for braking with the SYNPLUS is necessary.

A. External wiring Diagram for the Rolling-up Gate





B. System Requirement

1) First time running (Door Open)

The "STOP" Button is Normal Closed Contact in general application, so Please turned the switch I3 ON by hand.

Power ON, and start RUN Command for inverter. In this moment you only can make door up motion even you press DOWN button. (Q1-Digital Output RY1 would be ON). **Please turned the switch I1 or I2 (UP or DOWN Button) ON->OFF once by hand.**

It operates in opening mode at low speed 28Hz (F3 setting symbol 8), then the door will stop when the Upper Limit switch triggered (I4) **Please turned the switch I4 ON by hand.**

2) Closing

The SYNPLUS drivers the gate close at speed 39Hz (F2 setting symbol 7) when the DOWN Button (I2) is pressed **- Please turned the switch I2 (DOWN Button) ON->OFF once by hand.**

The SYNPLUS will run at low speed 7Hz (F8 setting symbol 8) when the feedback length (2300Pulse - H2 Preset Value) be reached, then it will stop to close motion when the feedback length (2600Pulse - H4 Preset Value) is reached..

During closing process, As soon as the safety switch or Stop Button is triggered, the process will stop during closing process - **Please turned the switch I3 OFF by hand**.

3) Opening

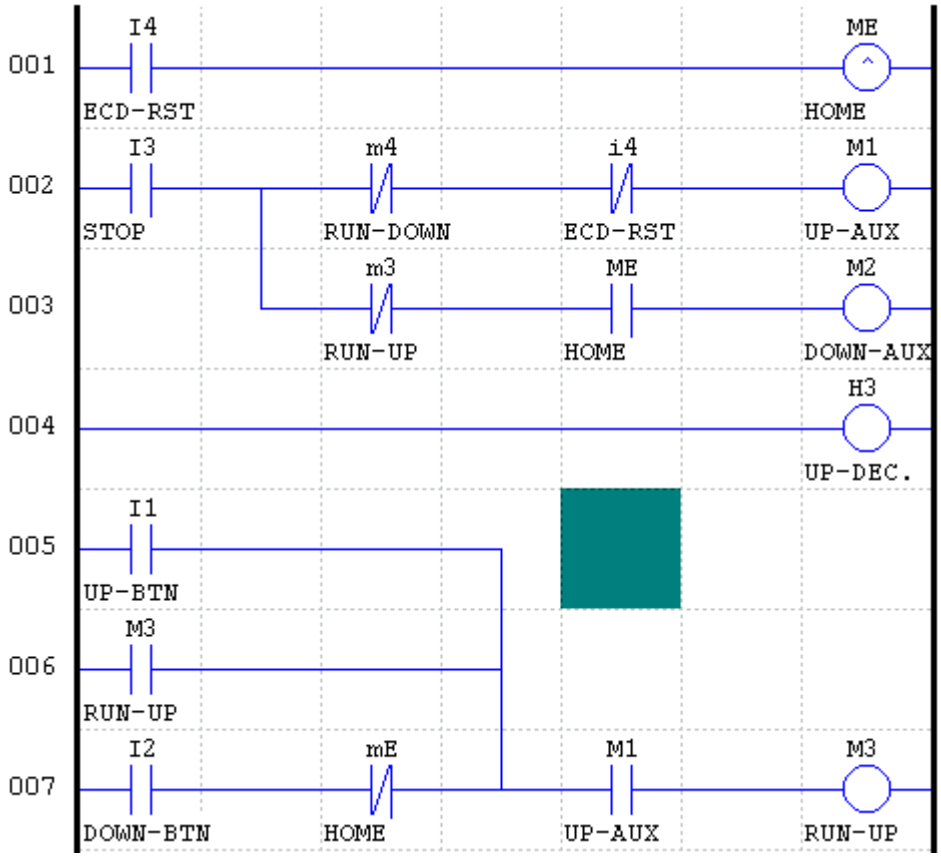
When pressed Up Button, **Please turned the switch I1 (UP Button) ON->OFF once time by hand.** the inverter will drive the gate open with 40Hz (F1 setting symbol 7) until it reach to the present deceleration position (H3 Preset Value) that will decelerate & running at 7Hz (F1 setting symbol 8).

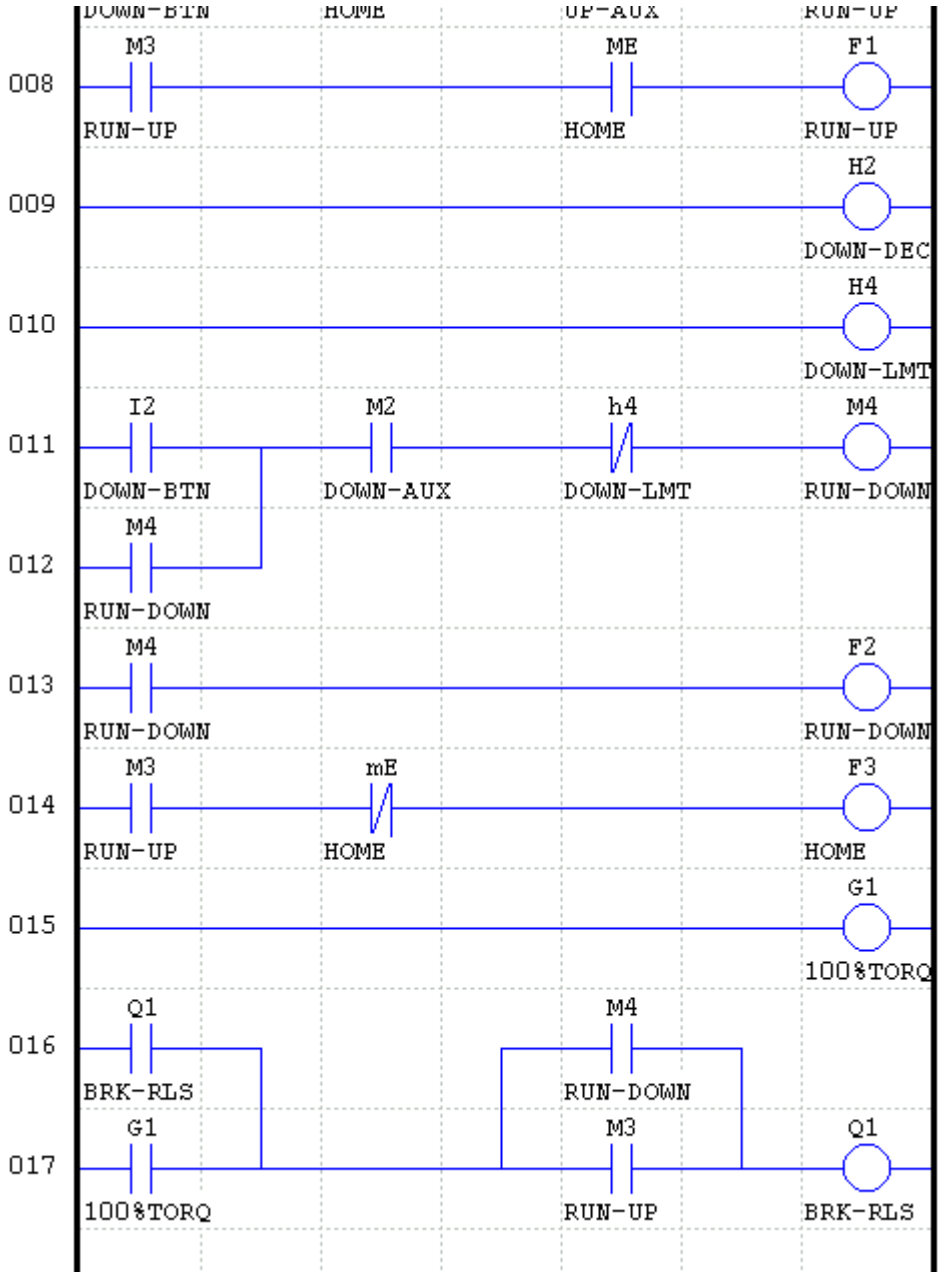
The current value of the Encoder will be reset to 0 at upper limiter and stop. **Please turned the switch I4 ON by hand.**

3) Stopping

The gate will stop when the “Stop Button” or the “Safety Sensor” is pressed. **Please turned the switch I3 OFF by hand.**

3.2 Ladder Diagram and Parameter Setting for Rolling-up Gate.




DOWN-BTN
HOME
UP-AUX
RUN-UP
008
M3
RUN-UP
ME
HOME
F1
RUN-UP
009
H2
DOWN-DEC
010
H4
DOWN-LMT
011
I2
DOWN-BTN
M2
DOWN-AUX
h4
DOWN-LMT
M4
RUN-DOWN
012
M4
RUN-DOWN
013
M4
RUN-DOWN
F2
RUN-DOWN
014
M3
RUN-UP
mE
HOME
F3
HOME
015
G1
100%TORQ
016
Q1
BRK-RLS
M4
RUN-DOWN
017
G1
100%TORQ
M3
RUN-UP
Q1
BRK-RLS

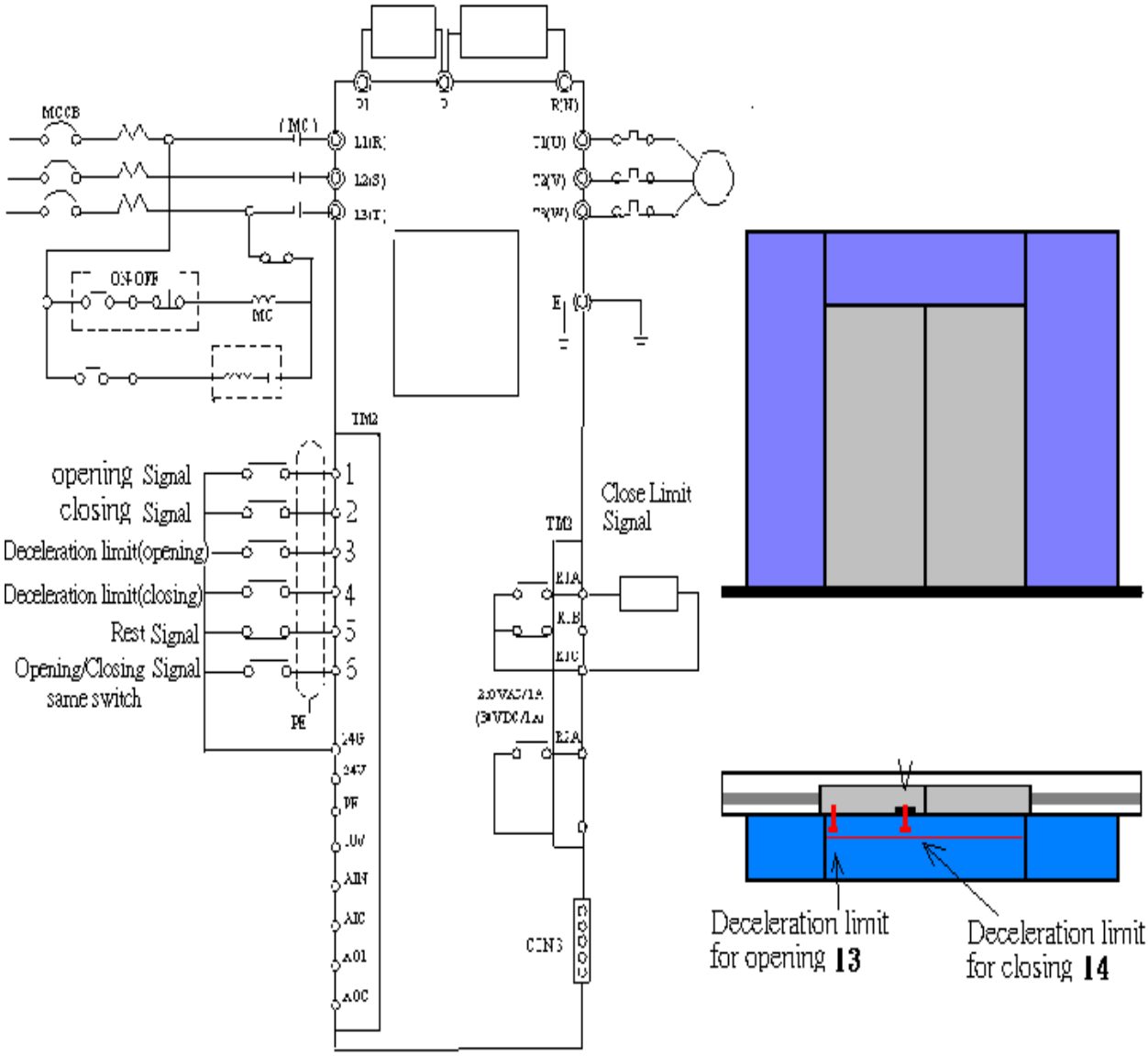
4. Application in Elevator Door Control

The elevator is often installed for the people in the office or apartment. The gate of the elevator-system is an independent device, which is connected with the Main Controller.

4.1 System Requirement and structure of Elevator Gate.(Using the sensor)

The SYNPLUS Inverter applied the Elevator Gate can simplify the wiring. Only connect Open/Close Switch and the limit sensor with SYNPLUS inverter.

A. External wiring Diagram for Elevator Gate



B. System Requirement

1) Opening

The elevator will stop at each floor as someone's call. Then the Main Controller will drive the gate OPEN. **Please turned the switch I1 ON by Hand.**.

The gate will open at a normal speed (20Hz-F1 setting symbol 7) till it touches the decelerate limit sensor - **Please turned the switch I3 ON by hand.** It runs at low speed in the following 1sec (Timer1 Preset Value). Then, the inverter will output retentive frequency 1Hz (F3 Preset Value). There is no open signal in, or there is a close signal input to the Main Controller, the gate will close

automatically - **Please turned the switch I1 OFF by hand.**

2) Closing

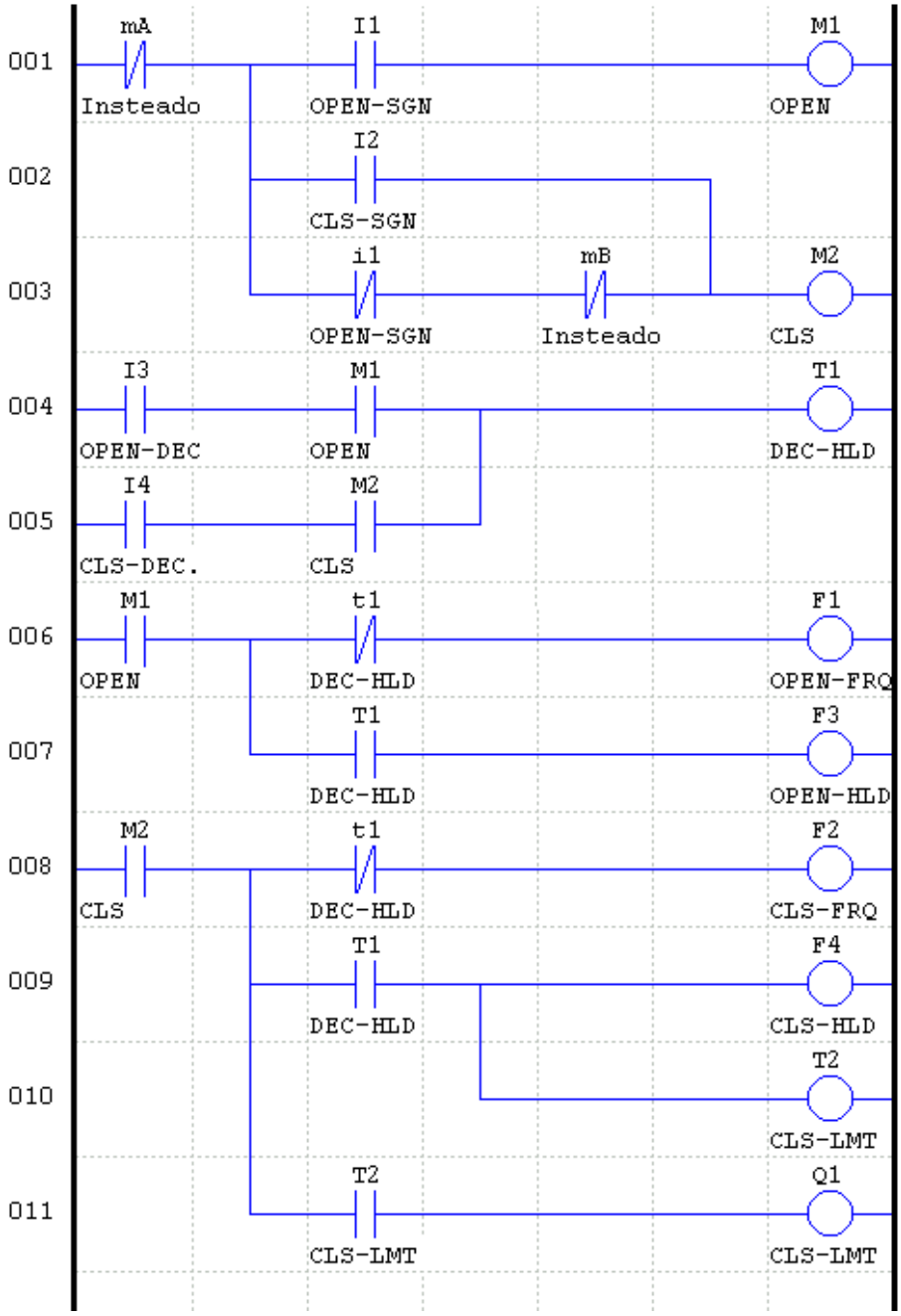
During closing process, the gate will open as long as the opening signal is input to the Main Controller, and it will wait for the next close signal.

The gate will close at an ordinary speed (18Hz- F2setting symbol 7) till it touches the decelerate Switch (I4)- **Please turned the switch I4 ON by hand.** It runs at low speed (7Hz- F2setting symbol 8) in next 1sec(Timer1 Preset Value). The inverter will output retentive frequency 1Hz for 1sec(Timer2 Preset Value), then send closing signal (Q1-Digital Output RY1 ON).

3) Resting

When the rest signal is input from the master, the output will be stopped till the signal is off.

4.2 Ladder Diagram and Parameter Setting for Elevator gate



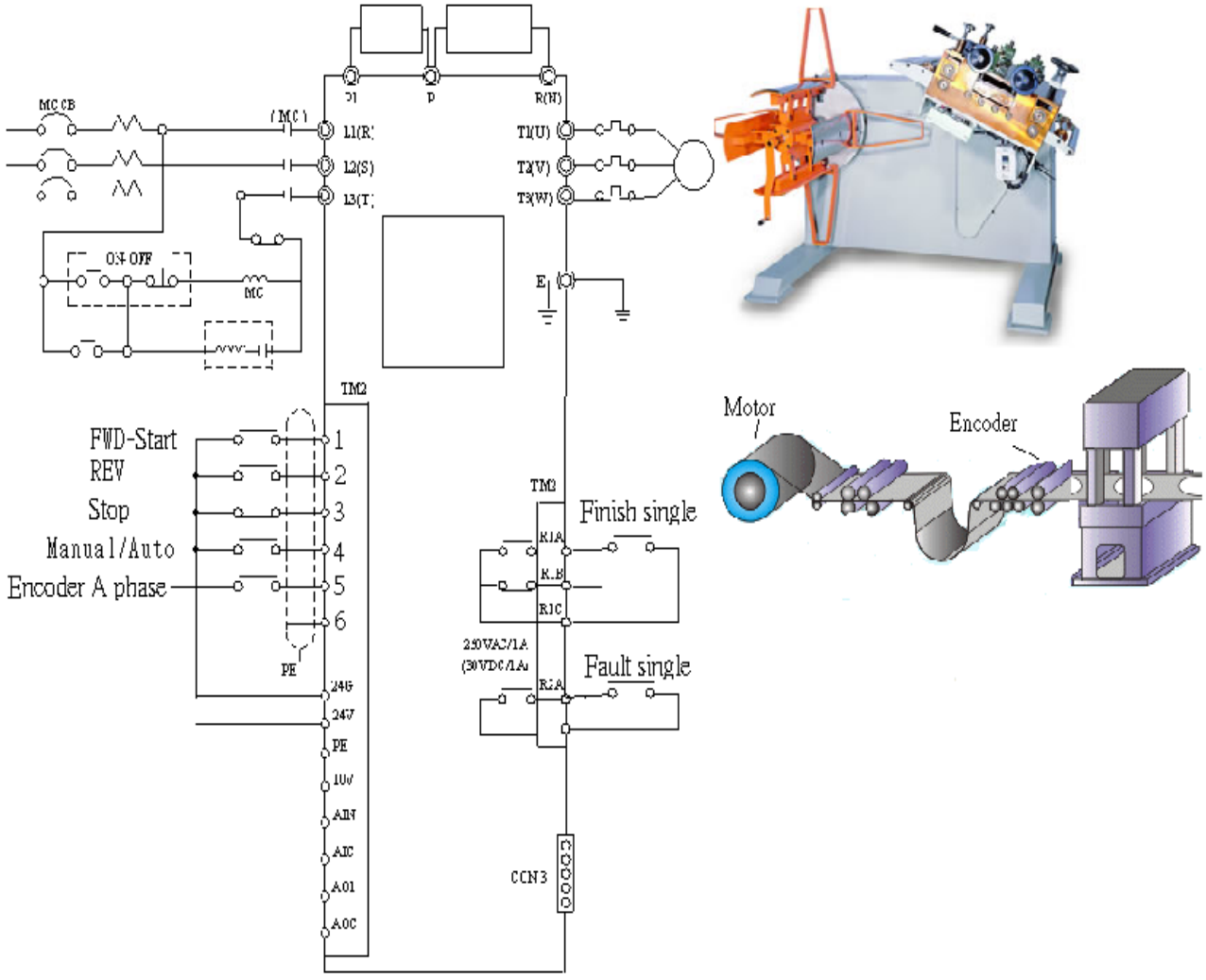
5. Application in Press Feeder Control

The press provides a facility for connecting with automatic feeding device, besides the available manual feeding, on which operator can set the feeding length and time. Of course, the length can be manually controlled.

5.1 System Requirement and structure of Press feeder

The SYNPLUS Inverter applied the Press feeder can simplify the wiring.To connect “Start/Stop” Switch with the SYNPLUS only.

A. External wiring Diagram for Press feeder



B. System Requirement

The “STOP” Button is Normal Closed Contact in general application, so Please turned the switch I3 ON

1) Manual operating

The User can control the feeder forward / backward to adjust the position of material by Manual Mode, then the Inverter will run FOR/REV with 12Hz (F2 Preset Value). **Please turned the switch I4 OFF by hand, then pressed switch I1 for Forward / I2 for Backward running.**

2) Position

Please turn the switch I4 ON for Auto running by hand.

When pressed Up Button, **Please turned the switch I1 (UP Button) ON->OFF once by hand.**

The inverter will run clockwise with 50Hz (F1 setting symbol 7) until it reaches to the present deceleration position (H1 Preset Value) that will decelerate & running at 10Hz (F1 setting symbol 8).

The inverter will Stop when it reach to the present stop position (H2 Preset Value). Then a Signal will be sent to the controller (Q1-Digital Output RY1), and stop to wait for another feeding signal.

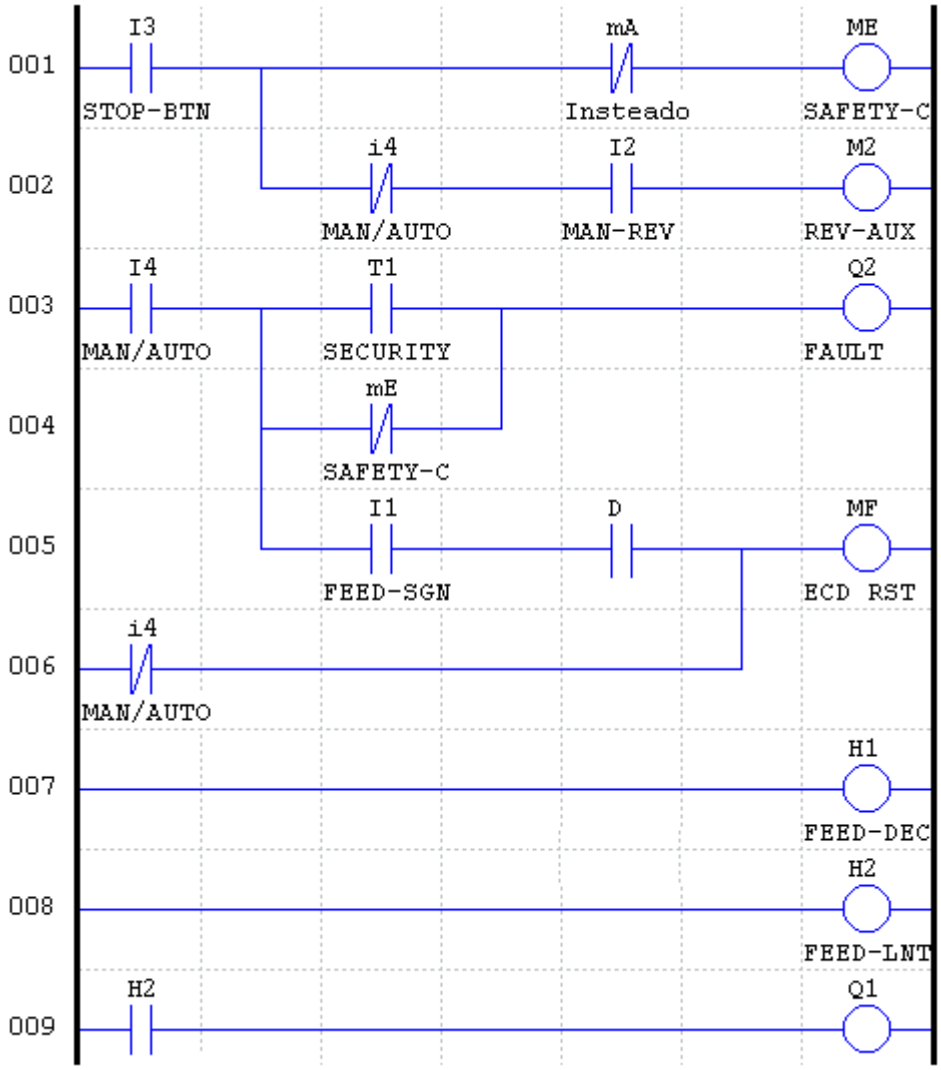
3) Recycling

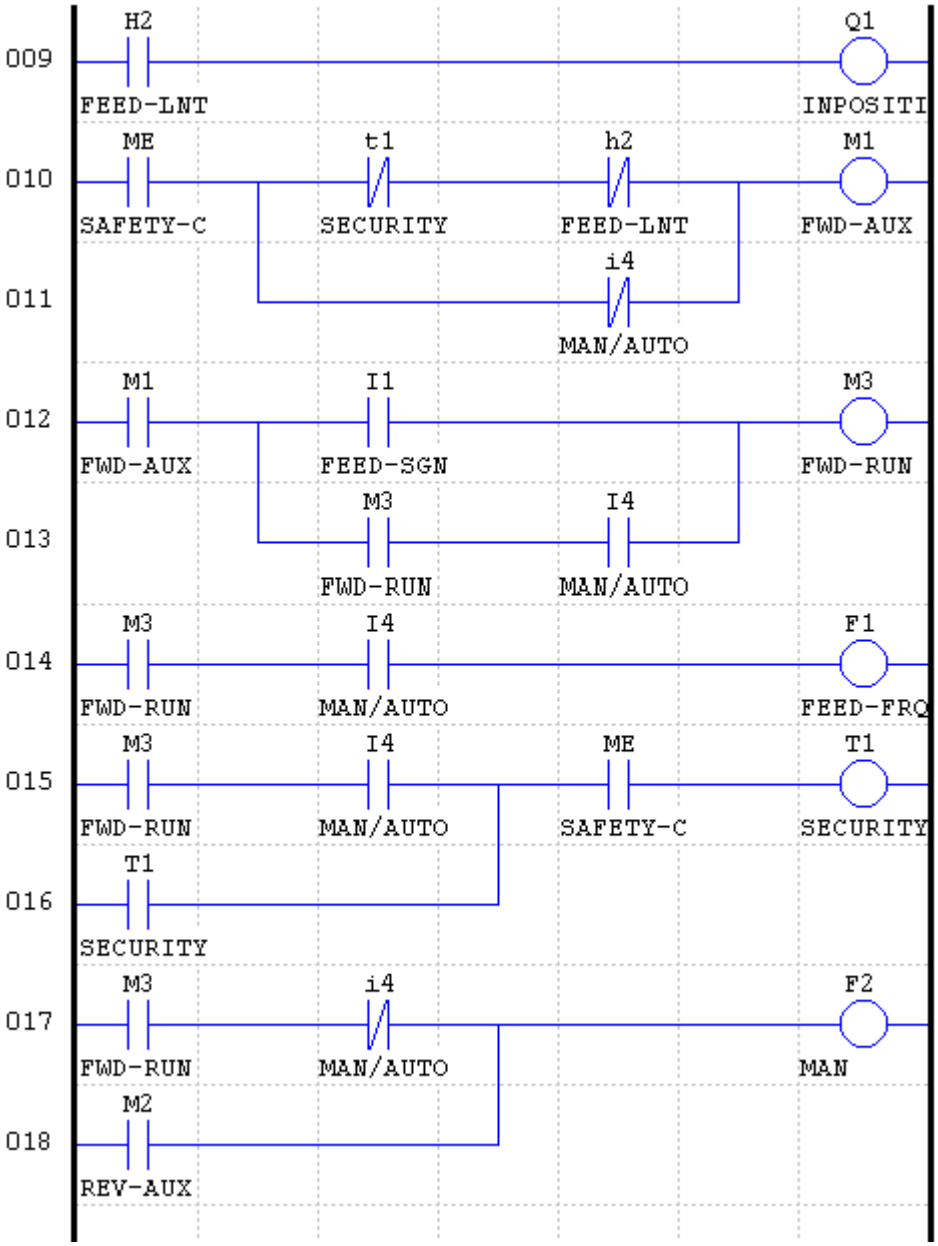
The SYNPLUS will receive the feeding signal **Please turned the switch I1 (UP Button) ON->OFF once by hand**, the motion will be repeated.

2) Stopping

The inverter will stop output as the 'STOP' button is pressed - **Please turned the switch I3 OFF by hand**. An Error Signal (Q2-Digital Output RY2) will be sent to the controller of the press then. The feeding start signal is useless as the no material switch (can use the switch I6) is triggered or the feeding controller is in Stop Mode.

5.2 Ladder Diagram and Parameter Setting for Press Feeding Control




009
H2
FEED-LNT
Q1
INPOSITI
010
ME
SAFETY-C
t1
SECURITY
h2
FEED-LNT
M1
FWD-AUX
011
i4
MAN/AUTO
012
M1
FWD-AUX
I1
FEED-SGN
M3
FWD-RUN
013
M3
FWD-RUN
I4
MAN/AUTO
014
M3
FWD-RUN
I4
MAN/AUTO
F1
FEED-FRQ
015
M3
FWD-RUN
I4
MAN/AUTO
ME
SAFETY-C
T1
SECURITY
016
T1
SECURITY
017
M3
FWD-RUN
i4
MAN/AUTO
F2
MAN
018
M2
REV-AUX

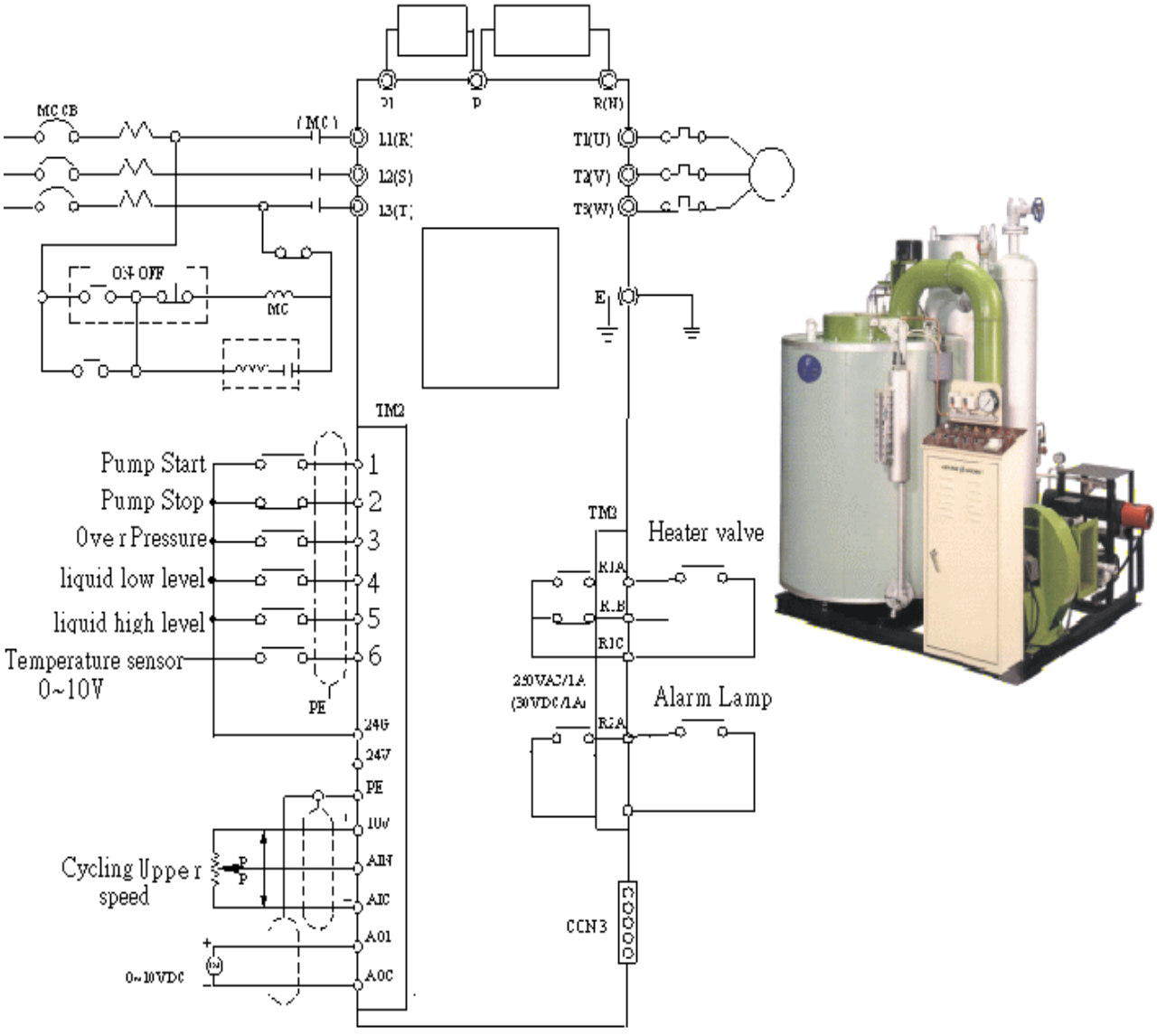
6. Application in Mini boiler Temperature control

The boiler is often installed in the factory or hospital to supply the sufficient heat energy for medical treatment. Water or heated oil is used as medium. Please pay attention to the risk because of the over pressure.

6.1 Motion Requirement and system structure of the Mini boiler

The SYNPLUS Inverter applied the Small boiler can simplify the wiring .To connect Start/Stop Switch, the direct induction sensor with the SYNPLUS is necessary.

A. External wiring Diagram for the control system of Small boiler



B. System Requirement

The "STOP" Button is Normal Closed Contact in general application, so Please turned the switch I3 ON by hand.

1) Starting (in the Monitor Ladder Program by hand)

The boiler can't start if the pressure is too high (over pressure sensor I3 is ON) or water level too

low / high (liquid high/low level sensor I4/I5 is ON).
The cycling pump will operate between the value of AIN input and the value of Keypad's POT to keep the temperature constantly (the value of AV2 Temperature Feedback) between the high temperature 4.0V (the value of G1 setting by the AV2) and low temperature 3.7V (the value of G2 setting by the POT of Keypad) as the 'Start' button is pressed, **stop the Cursor on F1 also turn the POT of AIN/ POT of Keypad to let (F1 setting symbol 7) lower or higher than (F1 setting symbol 8). Then stop Cursor on G1 with monitoring the Current value of G1， turn the POT of AV2, and stop Cursor on G1 with Monitoring the Current value of G1 less than 4.0 by hand.**

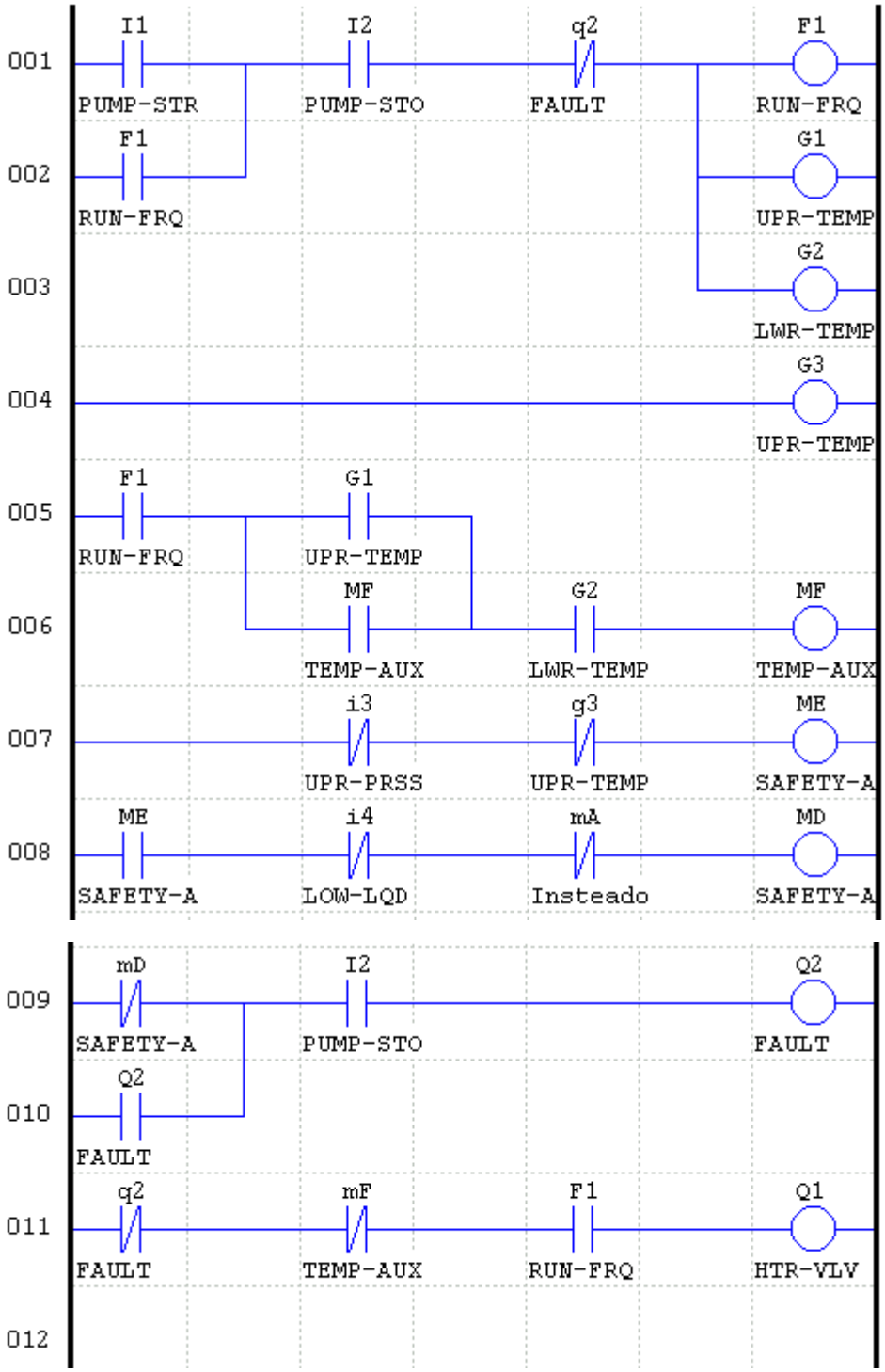
2) Temperature Control

Power ON inverter while done the analog adjustment, inverter will change the speed as the temperature raise/down. - **Please turn the POT of AV2 and stop Cursor on G1 with Monitoring the Current value of G1 higher than 4.0, then adjust the value less than 3.7 by hand.**
The Upper Temperature Limit should be set in order to safety control the boiler.

3) Stopping

The inverter driving the cycling pump will stop & Q2 (the Digital Output RY2) be ON as long as the "Stop" button is pressed, the pressure is too high or water level is too low/high. **Please turned the switch I2 OFF or I3/I4/I5 ON by hand**

6.2 Ladder Diagram and Parameter Setting for the Small Boiler


001
I1
PUMP-STR
I2
PUMP-STO
q2
FAULT
F1
RUN-FRQ
002
F1
RUN-FRQ
G1
UPR-TEMP
003
G2
LWR-TEMP
004
G3
UPR-TEMP
005
F1
RUN-FRQ
G1
UPR-TEMP
006
MF
TEMP-AUX
G2
LWR-TEMP
MF
TEMP-AUX
007
i3
UPR-PRSS
g3
UPR-TEMP
ME
SAFETY-A
008
ME
SAFETY-A
i4
LOW-LQD
mA
Insteado
MD
SAFETY-A
009
mD
SAFETY-A
I2
PUMP-STO
Q2
FAULT
010
Q2
FAULT
011
q2
FAULT
mF
TEMP-AUX
F1
RUN-FRQ
Q1
HTR-VLV
012


Holding
FUN
VOLT
AMP
SEQ
FRQ
FWD
REV
RUN
STOP
FWD
REV
DSP
FUN
RESET
READ
ENTER
SET
BONFIGLIOLI
VECTRON
SYNPLUS