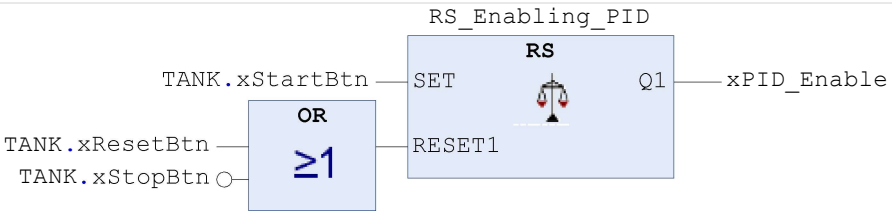
```
1   PROGRAM PLC_PRG
2   VAR
3       // ============================================================
4       // 1. PROCESS CONTROL
5       // ============================================================
6       xPID_Enable        : BOOL ;   // Main enable signal for PID operation
7       RS_Enabling_PID    : RS ;     // Flip-flop (Start/Stop) for button
    handling
8
9       // ============================================================
10      // 2. INPUTS & SCALING
11      // ============================================================
12      rPV                : REAL ;       // Process Variable (Water Level) -
    real value (0-300)
13      Lin_Out            : LIN_TRAFO ;  // Function block for input scaling
    (0-1000 -> 0-300)
14      xTrafo_Error       : BOOL ;       // Scaling block error flag (optional)
15
16      // ============================================================
17      // 3. SET POINTS
18      // ============================================================
19      rSP                : REAL ;   // Set Point for controllers (REAL)
20
21      // ============================================================
22      // 4. FILLING CONTROL LOOP
23      // ============================================================
24      PID_Controller     : Util . PID_FIXCYCLE ;  // Main PID controller for
    filling
25      rMV_PID            : REAL ;               // Controller output (REAL 0.0
    - 100.0)
26      iMV_PID_raw        : INT ;                // Temporary output converted
    to INT (before selection logic)
27
28      // ============================================================
29      // 5. DISCHARGE CONTROL LOOP
30      // ============================================================
31      PID_Discharge      : PID_FIXCYCLE ;  // Second PID controller for
    discharge (overflow/high level)
32      rMV_Discharge      : REAL ;          // Controller output (REAL 0.0 -
    100.0)
33      iMV_Discharge_Raw  : INT ;           // Temporary output converted to INT
    (before selection logic)
34
35      // ============================================================
36      // 6. FINAL VALVE OUTPUTS
37      // ============================================================
38      // These variables are the result of the SEL blocks (logic selection)
39      iFinal_Fill        : INT ;    // Final control signal for the Fill Valve
40      iFinal_Discharge   : INT ;    // Final control signal for the Discharge
    Valve
41
42      // ============================================================
43      // 7. HMI / VISUALIZATION
44      // ============================================================
45      iSP                : INT ;    // Set Point value for HMI display
46      iPV                : INT ;    // Current Process Variable for HMI display
47      iMV_PID            : INT ;    // Fill Valve opening value (for HMI
```

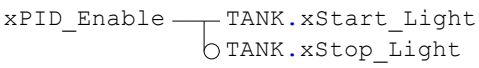
```
    animation/display)
48      iMV_Discharge      : INT ;    // Discharge Valve opening value (for HMI
    animation/display)
49
50      // ============================================================
51      // 8. ALARMS
52      // ============================================================
53      xAlarm_Limits      : BOOL ;   // Control loop limits reached alarm
54      xAlarm_Overflow    : BOOL ;   // Tank overflow alarm (e.g., High-High
    limit)
55  END_VAR
56
```

1 *Tank controle -> Filling the tank:*

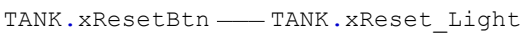
2



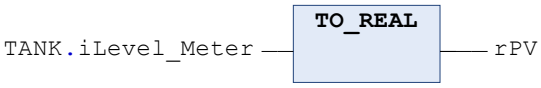

3



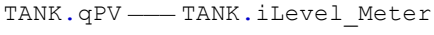

4



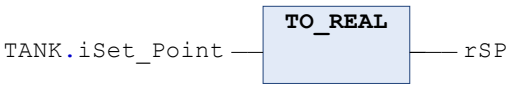

5



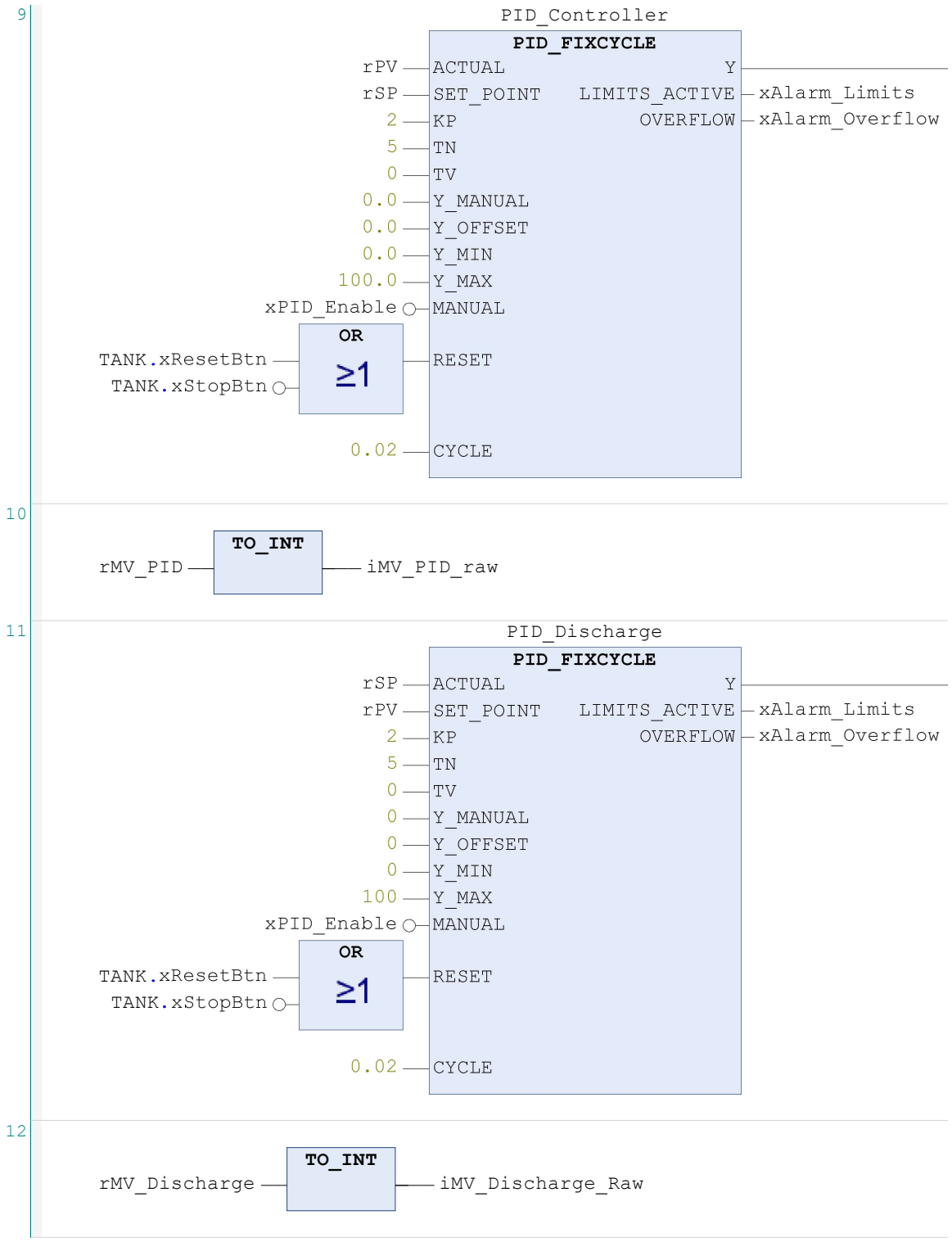

6




7



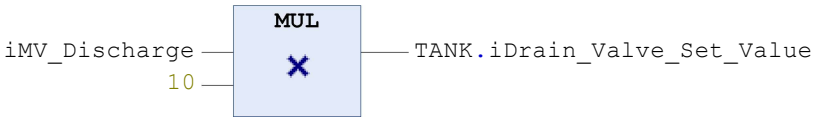

8


9
PID_Controller
PID_FIXCYCLE
rPV
ACTUAL
Y
rSP
SET_POINT
LIMITS_ACTIVE
xAlarm_Limits
2
KP
OVERFLOW
xAlarm_Overflow
5
TN
0
TV
0.0
Y_MANUAL
0.0
Y_OFFSET
0.0
Y_MIN
100.0
Y_MAX
xPID_Enable
MANUAL
OR
TANK.xResetBtn
≥1
RESET
TANK.xStopBtn
0.02
CYCLE
10
TO_INT
rMV_PID
iMV_PID_raw
11
PID_Discharge
PID_FIXCYCLE
rSP
ACTUAL
Y
rPV
SET_POINT
LIMITS_ACTIVE
xAlarm_Limits
2
KP
OVERFLOW
xAlarm_Overflow
5
TN
0
TV
0
Y_MANUAL
0
Y_OFFSET
0
Y_MIN
100
Y_MAX
xPID_Enable
MANUAL
OR
TANK.xResetBtn
≥1
RESET
TANK.xStopBtn
0.02
CYCLE
12
TO_INT
rMV_Discharge
iMV_Discharge_Raw

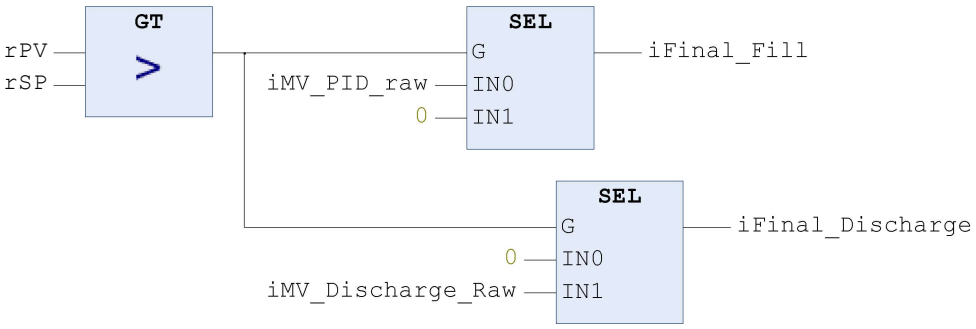
—— rMV_PID

—— rMV_Discharge

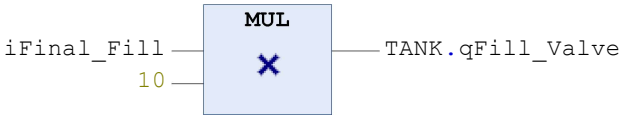
13



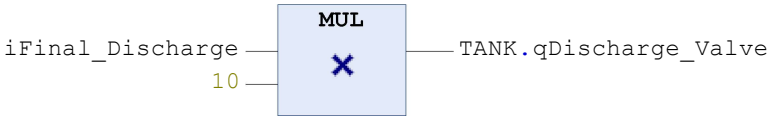

14



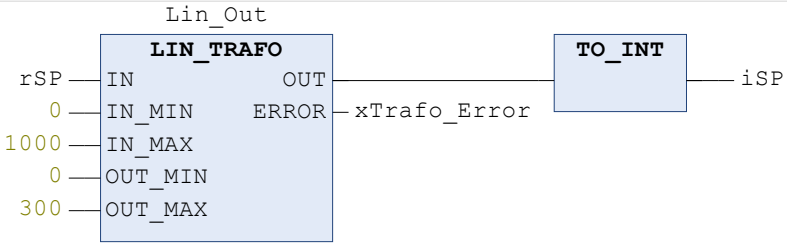

15



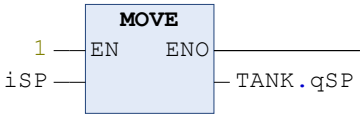

16

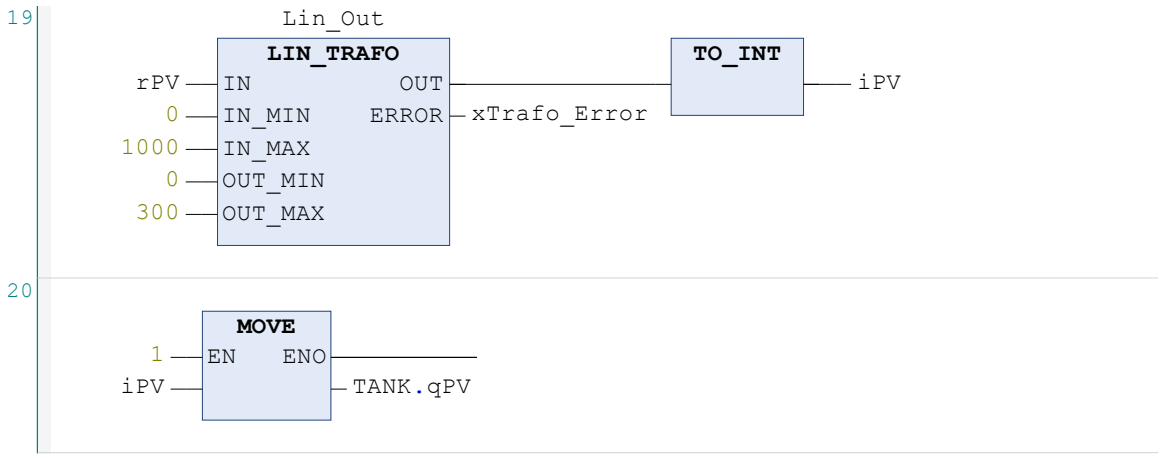



17




18




19
Lin_Out
LIN_TRAFO
rPV
IN
OUT
0
IN_MIN
ERROR
xTrafo_Error
1000
IN_MAX
0
OUT_MIN
300
OUT_MAX
TO_INT
iPV
20
MOVE
1
EN
ENO
iPV
TANK.qPV