

PositionServo Sample Program: Homing Example (Home Functions)

Concept:

This sample program demonstrates the use of the PositionServo predefined homing functionality. The code executes one of the pre-defined homing routines on start up, and then whenever it is requested by the 'Request homing' Input. Following a successful home sequence the program carries out a pre-defined sequence of Motion Commands, until either the enable is removed or homing is requested again. Pre-defined homing functionality is described in detail in the PositionServo Programmers Guide.

The program uses the Enable Input on A3 as a safety enable for safety devices on the system. Input A4 is used to request the drive re-home the system again using the pre-defined home routine. Input B1 is the input from the Homing Sensor. Output 1 is used to signal to the outside world that homing was completed successfully. The PositionServo is placed in Position Mode with internal reference selected through the relevant variable at the start of the program.



Digital Inputs A1, A2, and A3 have additional pre-defined functionality that can effect the operation of the homing function. Generally they should not be used as the connection for the homing sensor.

At initialisation (following power up or reset) the drive will first run the homing routine. The homing routine functionality is defined by the following parameters within the indexer program.

```

;Variables Used for Homing Functionality:
*****
;
;* Set Fast homing speed           :           Variable #242      *
;* Set Slow homing speed          :           Variable #243      *
;* Set Homing accel/decel        :           Variable #239      *
;* Set home offset in User Units  :           variable #240      *
;* Set home offset in encoder pulses :           Variable #241      *
;* Set Home Switch input         :           Variable #246      *
;* Set Home Method               :           Variable #244      *
*****
;

```

The variables are set within the program as follows;

```

;Homing specific set up..
VAR_HOME_FAST_VEL = 10      ; Units = rps
VAR_HOME_SLOW_VEL = 1       ; Units = rps
VAR_HOME_ACCEL = 100       ; Units = rps/sec^2
VAR_HOME_OFFSET= 1         ; 1 Rev (User Unit) offset from sensor
VAR_HOME_SWITCH_INPUT = 4   ; input B1 (0-A1, 1-A2...3-A4, 4-B1,...11-C4)
VAR_HOME_METHOD = 19       ; Set required homing function

```

The programmer can alter these values to obtain the homing functionality required.

An event is used to detect the input request to carry out the homing procedure again. This event is turned off while homing is actually taking place.

No subroutines are used in this example.

Motor mechanics:

For the purpose of the demonstration a motor should be used with a disc fitted to the motor shaft so that the user can see the Positioning / Velocity output executed by the PositionServo.

Fault Handling:

In the event of a fault, the code will be restarted. The operator must switch the drive enable input off and on again for the program loop to restart. Homing will be performing again immediately following reset from a fault condition.

I/O:

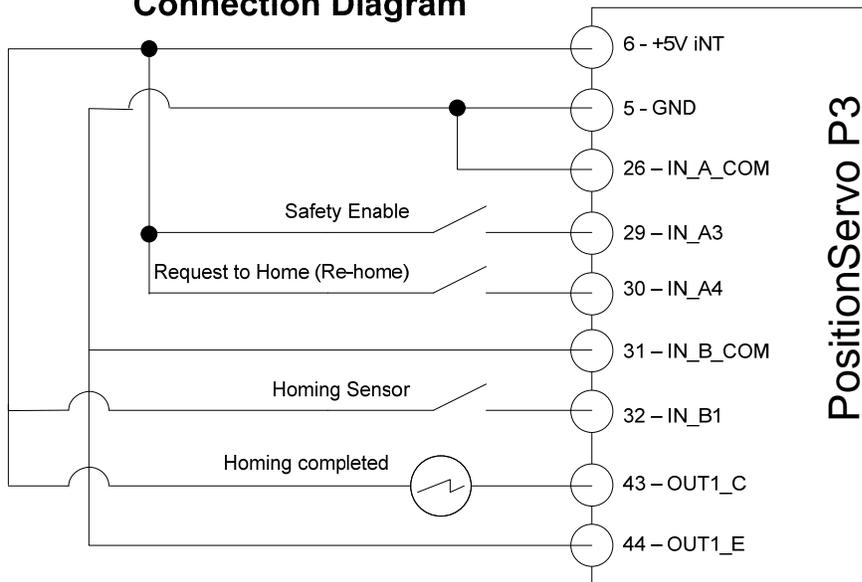
IN_A3: Safety Enable / stop - Connected to machine safety Guards / Devices

IN_A4: Request Homing Input

IN_B1: Homing Sensor

OUT1: Homing Completed Indicator

**Homing Example (Home Functions)
Connection Diagram**



; Indexing Code:

```
***** PositionServo User Indexing Program *****
;***** Header *****
;Title      :      Sample Homing Program From Training Exercises
;Author     :      AC Technology International Ltd
;Description :      Program Performs Simple Homing Routine using the pre-defined homing
;           :      functionality provided in the PositionServo drive.
;           :      Input A4 used to Re-Initialise Homing Routine during Main Program Execution
;           :      Homing Sensor on Input B1
;           :      Homing Complete Output on Out 1
;Version Number :      V1.0.2
;Date       :      24/01/08
;
;***** I/O List *****
;      Input A1-      not used
;      Input A2-      not used
;      Input A3-      Enable Input / Safety stop
;      Input A4-      Request Homing Input
;      Input B1-      Homing Sensor
;      Input B2-      not used
;      Input B3-      not used
;      Input B4-      not used
;      Input C1-      not used
;      Input C2-      not used
;      Input C3-      not used
;      Input C4-      not used
;
;      Output 1-      Homing Complete
;      Output 2-      not used
;      Output 3-      not used
;      Output 4-      not used
;
;      Analog In 1    -      not used
;      Analog In 2    -      not used
;      Analog Out     -      not used
;
;      Encoder Out    -      not used
;
;*****
```

```

;***** Initialize and Set Variables *****
; Define Constants and Variables. Assign I/O and Initialize Variable Values

;Variables Used for Homing Functionality:
;*****
;* Set Fast homing speed           : Variable #242 *
;* Set Slow homing speed          : Variable #243 *
;* Set Homing accel/decel        : Variable #239 *
;* Set home offset in User Units  : variable #240 *
;* Set home offset in encoder pulses : Variable #241 *
;* Set Home Switch input         : Variable #246 *
;* Set Home Method                : Variable #244 *
;*****

;Homing specific set up..
VAR_HOME_FAST_VEL = 10           ; rps
VAR_HOME_SLOW_VEL = 1           ; rps
VAR_HOME_ACCEL = 100            ; rps/sec^2
VAR_HOME_OFFSET= 1              ; 1 Rev (User Unit) offset from sensor
VAR_HOME_SWITCH_INPUT = 4       ; Set input A1 (0-A1, 1-A2...3-A4, 4-B1,...11-C4)
VAR_HOME_METHOD = 19           ; Set required homing function, see table in Programming manual
                                ; NOTE: Switches A1 & A2 are reserved for Hard limit Switches
                                ; and shouldn't be set as homing switch
VAR_REFERENCE = 1               ; set Reference to Internal
VAR_DRIVEMODE = 2               ; Set Operating mode to Position mode
VAR_ENABLE_SWITCH_TYPE = 0      ; enable switch function set to "Inhibit"

UNITS = 1                       ; Units in RPS
Accel = 1000                    ; Accelerate 1000 RPS/S
Decel = 1000                    ; Decelerate 1000 RPS/s
MaxV = 20                       ; Set Normal Operating Speed 20 RPS

Define System_Enable In_A3       ; Define Variable for Enable Input / Safety stop
Define Homing_Request In_A4      ; Define Variable for Homing Request Input
Define Homing_Complete Out1     ; Define Variable for Homing Completed Output

;***** Events *****
Event Homing_Call input Homing_Request rise ; Events looks for Homing Request Input and Jumps to Homing Code
      jump Homing
Endevent

```

```

;***** Main Program *****
PROGRAM_START:
Event Homing_Call off      ; Turn off Event to check for homing Reuest Input
Wait While System_Enable == 0 ; Wait for drive safety enable to be active - Safe Condition
Enable                     ; enable drive

Homing:                    ; Homing Routine, Performed at Start Up and after Homing Routine Request inout goes high
Event Homing_Call off      ; Turn off Event to check for homing Reuest Input
Homing_Complete = 0        ; Turn off Homing Completed Variable
VAR_START_HOMING = 1       ; starts homing sequence
Homing_Complete = 1        ; Turn on Homing Completed Variable
Event Homing_Call on       ; Turn on Event to check for homing Reuest Input
;Drive homed

Move_Profile:              ; Basic position loop
Moved 5                    ; move distance 5
wait time 200              ; wait 200 ms
Moved 10                   ; move distance 10
wait time 500              ; wait 500 ms
Moved -15                  ; move back distance 15
wait time 1500             ; wait 1500 ms
Goto move_profile          ; restart positioning loop

End

Fault_Section:
    wait while System_Enable == 1 ; wait until enable input is removed
    goto program_start           ; restart program

;***** Sub-Routines *****
;
;    Enter Sub-Routine code here

;***** Fault Handler Routine *****
;
;    Enter Fault Handler code here
ON FAULT
    resume fault_section
ENDFAULT

```