AC890 Engineering Reference

Addendum for v4.1 Software for Product Manuals

Frames:

    B C & D

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    PX

HA501281U001 Issue 1

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Appendix D **Programming**

The following pages are for the v4.1 software only and replace any current information in the master manuals.

MOVE TO MASTER

SETUP::PHASE CONTROL::MOVE TO MASTER

Performance Level = ADVANCED : CLOSED-LOOP VEC Motor Control Mode only.

This block provides a command which when executed will start a trapezoidal move that aligns the load position with the Master Position + Total Offset. The Dist To Master is loaded such that there is a zero position error at the moment the position loop is enabled. This prevents the shaft moving when the position loop is enabled.

Parameter Descriptions

ENABLE
PREF: 124.01   *Default: FALSE*   *Range: FALSE / TRUE*

This parameter commands the Move To Master function to start on positive edge.

MOVE METHOD
PREF: 124.02   *Default: 0*   *Range: See below*

This parameter defines how the move will be performed, either Forwards, Backwards, or taking the Shortest distance.

Enumerated Value : Move Method

0 : SHORTEST
1 : FORWARD
2 : BACKWARD

DIRECTION BAND
PREF: 124.03   *Default: 0.05*   *Range: 0.00 to 200.00*

This parameter defines the move distance for which the Shortest move will always be taken, overriding the Forward and Backward options of Move Method. This parameter is scaled such that 1.0 = 1 load mechanical revolution.

VELOCITY
PREF: 124.04   *Default: 1.00 %*   *Range: 0.10 to 300.00 %*

This parameter defines the maximum velocity of the move, set in percent of maximum load speed.

ACCELERATION
PREF: 124.05   *Default: 1.00 %*   *Range: 0.01 to 3000.00 %*

This parameter defines the maximum acceleration of the move, set in percent of maximum load speed per second.

DIST TO MASTER
PREF: 124.06   *Default: —.xxxx*   *Range: —.xxxx*

This diagnostic displays the distance (1.0 = 1 load mechanical revolution) between the load shaft position and the Master Position + Total Offset position.

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Parameter Descriptions

ACTIVE
PREF: 124.08 *Default: FALSE* *Range: FALSE / TRUE*

This diagnostic is TRUE to indicate Move to Master is active.

STATE
PREF: 124.09 *Default: 1* *Range: See below*

This diagnostic indicates the state of the Move to Master move.

Enumerated Value : *State*

0 : RESET	the move to master is in a reset state and cannot be used.
1 : READY	the move to master is ready to be enabled
2 : POS AQUIRE	the target position for the move is being acquired
3 : ALIGN	the move is active
4 : DONE	the move to master is complete

PHASE CAM

SETUP::PHASE CONTROL::PHASE CAM

Performance Level = HIGH : CLOSED-LOOP VEC Motor Control Mode only.

Used to provided basic camming functionality in position mode.

Parameter Descriptions

ENABLE *PREF: 181.01* *Default: FALSE* *Range: FALSE / TRUE*

When TRUE, Phase CAM function block is enabled as long as the Position Loop is also enabled.

LOAD CAM *PREF: 181.02* *Default: FALSE* *Range: FALSE / TRUE*

On a transition from FALSE to TRUE and if there is a valid inactive CAM table, swaps the inactive and active CAM tables and flags the previously active CAM table as invalid.

TRIGGER *PREF: 181.10* *Default: FALSE* *Range: FALSE / TRUE*

When TRUE, causes the output position demand to be set from the output of the active CAM table. At the beginning of each cam cycle (either when **TRIGGER** is first transitions from FALSE to TRUE or at the end of the delay from the previous cycle), the current position loop demand is used as an input offset for the active CAM table (i.e. CAM cycle always starts at the beginning of the CAM table). At the end of one input cycle (input moving 360 degrees), there is a delay (no change in output position) of **DELAY MUL / DELAY DIV** input cycles. When **TRIGGER** transitions from TRUE to FALSE, the CAM remains active until the end of the current CAM cycle (i.e. active CAM table input goes through 360 degrees).

OUTPUT TRIM *PREF: 181.03* *Default: 0.000* *Range: -180.000 to 180.000*

This parameter is used to add an offset to the output of the CAM table. This offset is added to the output (load position) incrementally when the **SYNCHRONIZE** input is active. The output trim is not scaled by **OUTPUT MUL** and **OUTPUT DIV**. The **DISTANCE LEFT** output displays the remaining output trim while the move is active.

OUTPUT MUL *PREF: 181.13* *Default: 10000* *Range: 0 to 2147483647*

Used to scale the output from the active CAM table. New position demand = previous position demand + ((new CAM output – previous CAM output) * **OUTPUT MUL / OUTPUT DIV**).

OUTPUT DIV *PREF: 181.14* *Default: 10000* *Range: 1 to 2147483647*

Used to scale the output from the active CAM table, see **OUTPUT MUL** above.

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Parameter Descriptions

DELAY MUL *PREF: 181.11* *Default: 0* *Range: 0 to 2147483647*

Used to scale the delay at the end of each cam cycle. Delay = **DELAY MUL / DELAY DIV** input cycles.

DELAY DIV *PREF: 181.12* *Default: 10000* *Range: 1 to 2147483647*

Used to scale the delay at the end of each cam cycle. Delay = **DELAY MUL / DELAY DIV** input cycles.

SYNCHRONIZE *PREF: 181.15* *Default: FALSE* *Range: FALSE / TRUE*

On transition from FALSE to TRUE, enables synchronizing output position with current encoder position and starts relative move specified by **OUTPUT TRIM**.

HOLD SPEED *PREF: 181.16* *Default: FALSE* *Range: FALSE / TRUE*

When enabled, filtered speed is used to generate the input position for active CAM table. See functional description for details.

ACTIVE *PREF: 181.04* *Default:* *Range: FALSE / TRUE*

This diagnostic display TRUE while CAM is active (i.e. output of active CAM table is not being held).

CAM ID *PREF: 181.05* *Default: 0* *Range: ±2147483647*

This displays the CAM identifier for the active CAM table or 0 if there is no valid active CAM table.

POSITION *PREF: 181.06* *Default:* *Range: $0.00 - 359.99\,^{o}$*

This diagnostic shows the output position.

SPEED *PREF: 181.07* *Default:* *Range:0.00 to 10000.00Hz*

This diagnostic shows the output.

DISTANCE LEFT *PREF: 181.08* *Default:* *Range: —.xxx*

This diagnostic shows the distance left of a **SYNCHRONIZE** move.

Functional Description

This function block, when enabled, modifies the position loop such that the total position demand (the sum of any other active Phase function blocks and the position demand) is used as an input to the active CAM table. The output of the active CAM table provides a new position demand and speed scaler for the drive. If the active CAM table is not valid or is not triggered, the new position demand will remain equal to the input position demand at the time the function block was enabled plus any offset changes (i.e. the load position will not change). In addition, there is the option to provide a delay (no change in position) at the end of each input revolution to the active CAM table.

CAM tables are created by other application function block(s). A CAM table can also specify two digital outputs (labelled DIGITAL 0 and DIGITAL 1) and one analog output value for ranges of the CAM table. The input to the active CAM table determines the value of these outputs. When they change as the CAM input changes, application events are generated. These events can be used in the application to synchronize with the camming. **HOLD SPEED** is only enabled when DIGITAL 0 is TRUE for the current input to the active CAM table.

NOTE: This function blocks expects only increasing input position from the Position Loop. It may not function properly for decreasing input position.

PHASE INCH

SETUP::PHASE CONTROL::PHASE INCH

> *CLOSED-LOOP VEC Motor Control Mode only.*

Used with the external registration controller to advance/retard the Load reference position with respect to the Master position.

Parameter Descriptions

ADVANCE *PREF: 108.01* *Default: FALSE* *Range: FALSE / TRUE*

Command to Inch the load forwards. While TRUE, counts are added to the error calculator at a rate given by RATE. Note: if both ADVANCE and RETARD are TRUE then no action is taken.

RETARD *PREF: 108.02* *Default: FALSE* *Range: FALSE / TRUE*

Command to Inch the load backwards. While TRUE, counts are subtracted from the error calculator at a rate given by RATE.

RESET *PREF: 108.09* *Default: FALSE* *Range: FALSE / TRUE*

This parameter, when TRUE, resets the Inch Offset to zero. The block may only be reset while the position loop is not operating.

RATE *PREF: 108.03* *Default: 0.1000* *Range: 0.0001 to 30.0000*

Speed of the Inch in load rev/s and the rate at which counts are added to the error calculator. A rate of 0.05 with a system scaled in revolutions would cause the drive to advance at a rate of 0.05 revolutions a second with respect to the master.

RATE SCALE *PREF: 108.08* *Default: 1.000* *Range: 0.001 to 30.000*

Gain applied to Rate to allow fine control of Inch Rate. This allows fine control over the inch rate by scaling the value of RATE. Actual Rate = RATE x RATE SCALE

OFFSET *PREF: 108.10* *Default: —.xxxx* *Range: —.xxxx*

This diagnostic shows the position offset generated by the block (1.0 = 1 load mechanical revolution). This output is persistent.

ACTIVE *PREF: 108.04* *Default: FALSE* *Range: FALSE / TRUE*

This diagnostic display True while Advance or Retard actions are active.

Functional Description

When in Phase control, the Phase Inch function block may be used to advance or retard the relative position on the slave axis with respect to the master axis. This is achieved by feeding extra counts into the position calculator at a rate given by RATE in units per second.

ADVANCE and RETARD are usually linked to operator controlled, momentary-action push buttons

PHASE MOVE

SETUP::PHASE CONTROL::PHASE MOVE

Performance Level = ADVANCED : CLOSED-LOOP VEC Motor Control Mode only.

This function block moves the drive a set distance. The distance is in revolutions of the load and is added to movement of other phase blocks and the position demand.

Parameter Descriptions

ENABLE   *PREF: 109.01*   *Default: FALSE*   *Range: FALSE / TRUE*

If the function block is not already Active, ENABLE starts the Move operation when going from FALSE to TRUE. Setting ENABLE to FALSE while a move is active will **NOT** abort the operation.

HOLD   *PREF: 109.08*   *Default: FALSE*   *Range: FALSE / TRUE*

Command to hold the current move. (In this state a new move may be triggered, replacing the held move)

RESET   *PREF: 109.11*   *Default: FALSE*   *Range: FALSE / TRUE*

When True, this input aborts the current Move, and if the position loop is not operating, resets the Offset to zero.

DISTANCE   *PREF: 109.02*   *Default: 1.0*   *Range: -3000.0 to 3000.0*

Sets the move distance in revolutions. The actual move distance is the sum of **DISTANCE** and **DISTANCE FINE**.

DISTANCE FINE   *PREF: 109.03*   *Default: 0.0000*   *Range: -1.0000 to 1.0000*

Fine adjustment of move distance. The actual move distance is the sum of **DISTANCE** and **DISTANCE FINE**.

VELOCITY   *PREF: 109.04*   *Default: 1.00 %*   *Range: 0.10 to 300.00 %*

The maximum velocity at which the distance is added to the phase loop, set in units per second.

ACCELERATION   *PREF: 109.07*   *Default: 1.00 %*   *Range: 0.01 to 300.00 %*

The acceleration at which the distance is added to the phase loop, set in units per second^2.

ACTIVE   *PREF: 109.05*   *Default: FALSE*   *Range: FALSE / TRUE*

Active is set TRUE whenever the block is enable, i.e. the move distance is none zero..

Parameter Descriptions

DISTANCE LEFT   *PREF: 109.06*   *Default: —.xx*   *Range: —.xx*

A diagnostic showing the distance remaining before the move is complete.

OFFSET   *PREF: 109.10*   *Default: —.xxxx*   *Range: —.xxxx*

This diagnostic shows the total position offset generated by the move block. (1.0 = 1 load mechanical revolution)

Functional Description

This is a simple trapezoidal relative move function, which acts on each rising edge of the Enable input. The slave shaft is moved a fixed distance at a rate given by the VELOCITY parameter. A move must be complete before a new move will be registered.
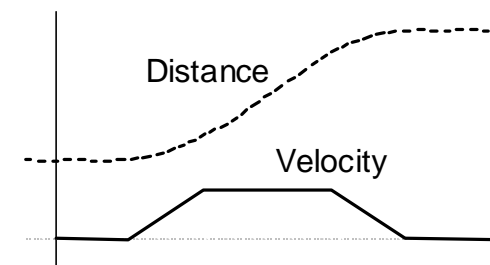
PHASE MOVE ABS

SETUP::PHASE CONTROL::PHASE MOVE ABS

> *Performance Level = ADVANCED : CLOSED-LOOP VEC Motor Control Mode only.*

This block provides a method to move to an absolute position. Once enabled this block provides the reference, disconnecting the remote/firewire reference, until either the drive is stopped or this block is reset. If the remote/firewire reference is non-zero on reset, the drive will accelerate to this reference on the system ramp.

Parameter Descriptions

ENABLE   *PREF: 120.01*   *Default: FALSE*   *Range: FALSE / TRUE*

On a positive edge, this parameter commands the Move Abs function to start.

RESET   *PREF: 120.02*   *Default: FALSE*   *Range: FALSE / TRUE*

With Enable false, a positive edge resets the Move Abs function releasing the position demand back to the Unsynchronised Position Demand.

MOVE METHOD   *PREF: 120.03*   *Default: 0*   *Range: See below*

This parameter defines how the move will be performed, either Forwards, Backwards, or taking the Shortest distance.

Enumerated Value : *Move Method*

0 : SHORTEST
1 : FORWARD
2 : BACKWARD

DIRECTION BAND   *PREF: 120.04*   *Default: 0.05*   *Range: 0.00 to 1.00*

This parameter defines the move distance for which the Shortest move will always be taken, overriding the Forward and Backward options of Move Method. This parameter is scaled such that 1.0 = 1 load mechanical revolution.

POSITION   *PREF: 120.05*   *Default: 0.0000*   *Range: 0.0000 to 1.0000*

The absolute position demand (1.0 = 1 load mechanical revolution).

VELOCITY   *PREF: 120.06*   *Default: 1.00 %*   *Range: 0.10 to 300.00 %*

This parameter defines the maximum velocity of the move, set in percent of maximum load speed.

Parameter Descriptions

ACCELERATION
PREF: 120.07   *Default: 1.00 %*   *Range: 0.01 to 3000.00 %*

This parameter defines the maximum acceleration of the move, set in percent of maximum load speed per second.

ABS POSITION
PREF: 120.08   *Default: —.xxxx*   *Range: —.xxxx*

This diagnostic displays the absolute position feedback (1.0 = 1 load mechanical revolution).

ACTIVE
PREF: 120.10   *Default: FALSE*   *Range: FALSE / TRUE*

This diagnostic is TRUE to indicate Move Abs is active (i.e. the position demand is being provided by this block)

DONE
PREF: 120.11   *Default: FALSE*   *Range: FALSE / TRUE*

This diagnostic is TRUE to indicate the last Move Abs enabled has completed.

STATE
PREF: 120.12   *Default: 1*   *Range: See below*

This diagnostic indicates the state of the Move Abs move.

Enumerated Value : *State*

0 : RESET   in a reset state and cannot be used.
1 : READY   a move is ready to be enabled
2 : POS AQUIRE   the target position for the move is being acquired
3 : ALIGN   the move is active
4 : DONE   the move is complete and **ENABLE** is still TRUE

PHASE MOVE HIRES

SETUP::PHASE CONTROL::PHASE MOVE HIRES

Performance Level = HIGH : CLOSED-LOOP VEC Motor Control Mode only.

This function block moves the drive a set distance. The distance is in revolutions of the load and is added to movement of other phase blocks and the position demand.

Parameter Descriptions

ENABLE   *PREF: 172.01*   *Default: FALSE*   *Range: FALSE / TRUE*

If the function block is not already Active, ENABLE starts the Move operation when going from FALSE to TRUE. Setting ENABLE to FALSE while a move is active will **NOT** abort the operation.

HOLD   *PREF: 172.08*   *Default: FALSE*   *Range: FALSE / TRUE*

Command to hold the current move. (In this state a new move may be triggered, replacing the held move)

RESET   *PREF: 172.11*   *Default: FALSE*   *Range: FALSE / TRUE*

When True, this input aborts the current Move, and if the position loop is not operating, resets the Offset to zero.

DISTANCE   *PREF: 172.02*   *Default: 1.0*   *Range: -3000.0 to 3000.0*

Sets the move distance in (revolutions * 16). The actual move distance is (**DISTANCE** + **DISTANCE FINE**) / 16 revolutions. So if (**DISTANCE** + DISTANCE FINE) = 16, the move will be 1 revolution.

DISTANCE FINE   *PREF: 172.03*   *Default: 0.0000*   *Range: -1.0000 to 1.0000*

Fine adjustment of move distance in (revolutions * 16). The actual move distance is (**DISTANCE** + **DISTANCE FINE**) / 16 revolutions. So if (**DISTANCE** + **DISTANCE FINE**) = 16, the move will be 1 revolution.

VELOCITY   *PREF: 172.04*   *Default: 1.00 %*   *Range: 0.10 to 300.00 %*

The maximum velocity at which the distance is added to the phase loop, set in units per second.

ACCELERATION   *PREF: 172.07*   *Default: 1.00 %*   *Range: 0.01 to 300.00 %*

The acceleration at which the distance is added to the phase loop, set in units per second^2.

Parameter Descriptions

ACTIVE   *PREF: 172.05*   *Default: FALSE*   *Range: FALSE / TRUE*

Active is set TRUE whenever the block is enable, i.e. the move distance is none zero..

DISTANCE LEFT   *PREF: 172.06*   *Default: —.xx*   *Range:0.00 – 359.99 ^{o}*

A diagnostic showing the distance remaining before the move is complete.

OFFSET   *PREF: 172.10*   *Default: —.xxxx*   *Range: —.xxxx*

This diagnostic shows the total position offset generated by the move block. (1.0 = 1 load mechanical revolution)

Functional Description

This is a simple trapezoidal relative move function, which acts on each rising edge of the Enable input. The slave shaft is moved a fixed distance at a rate given by the VELOCITY parameter. A move must be complete before a new move will be registered.
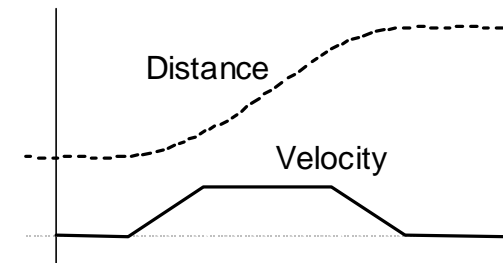
PHASE OFFSET

SETUP::PHASE CONTROL::PHASE OFFSET

CLOSED-LOOP VEC Motor Control Mode only.

Provides an unramped position Offset of the Master reference position with respect to the Load position, or an unramped speed Offset to the Master reference speed.

> *Phase Output = Error + Offset + Offset Fine*

Parameter Descriptions

OFFSET   *PREF: 110.01*   *Default: 0.0*   *Range: -3000.0 to 3000.0*

A course offset added to the phase error allowing an absolute phase correction to be applied.

OFFSET FINE   *PREF: 110.02*   *Default: 0.0000*   *Range: -1.0000 to 1.0000*

Additional correction added to OFFSET to allow fine control of position.

SPEED OFFSET   *PREF: 110.04*   *Default: 0.00 %*   *Range: -300.00 to 300.00 %*

A speed offset added to the speed demand.

ACTIVE   *PREF: 110.03*   *Default: FALSE*   *Range: FALSE / TRUE*

True while the offset count is being added.

PHASE TUNING

SETUP::PHASE CONTROL::PHASE TUNING

The Tuning function block provides a means of injecting a speed offset or a phase offset in a selected wave form to assist the tuning of the speed and phase loops. It would be unusual for both tests to be active together.

Parameter Descriptions

ENABLE PHASE   *PREF: 111.04*   *Default: FALSE*   *Range: FALSE / TRUE*

Activates a test function to add a test signal to the position demand (phase offset).

ENABLE SPEED   *PREF: 111.02*   *Default: FALSE*   *Range: FALSE / TRUE*

Activates a test function to add a test signal to the speed demand (speed offset).

REFERENCE TYPE   *PREF: 111.08*   *Default: 0*   *Range: See below*

Type of tuning reference, either square, sine, or triangular wave.

Enumerated Value : *Type*

0 : SQUARE
1 : SINUSOIDAL
2 : TRIANGULAR

SPEED AMPLITUDE   *PREF: 111.09*   *Default: 0.1000 rev/s*   *Range: 0.0000 to 100.0000 rev/s*

This parameter sets the amplitude of the test signal. The signal is symmetric. (i.e. for an amplitude of 1 % the test signal varies by +/- 1.0 %). In speed test mode, the unit of this parameter are load speed, in position test mode, the unit is percent of 1 load revolution.

POS'N AMPLITUDE   *PREF: 111.16*   *Default: 1.0000 deg*   *Range: 0.0000 to 100.0000 deg*

This parameter sets the amplitude of the test signal. The signal is symmetric. (i.e. for an amplitude of 1 % the test signal varies by +/- 1.0 %). In speed test mode, the unit of this parameter are load speed, in position test mode, the unit is percent of 1 load revolution.

PERIOD   *PREF: 111.01*   *Default: 10.000 s*   *Range: 0.001 to 30.000 s*

The wave form period in seconds.

ACTIVE   *PREF: 111.06*   *Default: FALSE*   *Range: FALSE / TRUE*

Diagnostic. TRUE when either ENABLE SPEED or ENABLE PHASE are active.

Parameter Descriptions

RUN TR FUNC TEST
PREF: 111.12   *Default: FALSE*   *Range: FALSE / TRUE*

Use this parameter to start the test. Wait until the motor is turning at steady speed, then set it to TRUE. When the test is finished it will be automatically returned to FALSE.

NO OF MEASRMENTS
PREF: 111.13   *Default: 100*   *Range: 1 to 1000*

This parameter sets the number of times the pseudorandom torque sequence is applied to the motor. The sequence duration is typically around 2 seconds, the test will last for 2 seconds times the number of measurements set here. The results will normally be contaminated with noise. The more measurements are taken, the better the signal to noise ratio. Typically 100 to 1000 measurements will be required, depending on the complexity of the system.

TORQUE AMPLITUDE
PREF: 111.14   *Default: 10.00 %*   *Range: 0.00 to 100.00 %*

Sets the amplitude of the pseudorandom torque pulses applied for the test. The larger the amplitude, the better the signal to noise ratio. However, the current loop must be operating in linear mode for the test to be valid, so do not choose an amplitude that would drive the current loop into saturation.

TRANS FUNC TYPE
PREF: 111.15   *Default: 1*   *Range: See below*

(i.e. Transfer Function Type)

The normal mode of operation is OPEN LOOP TRANS FN. This adds a pseudorandom binary sequence of torque onto the torque demand signal. The resultant change in speed is measured, stored, and read out to a pc where it may be analysed, and the system transfer function determined.

Using this mode it is also possible to determine the closed loop speed loop transfer function, the open loop position loop transfer function, and the closed loop position loop transfer function.

However, it is also possible to measure the closed loop speed loop transfer function directly, by setting this parameter equal to SPEED TRANSFR FN.

Enumerated Value : *Type*

0 : SPEED TRANSFR FN
1 : OPEN LP TRANS FN

POSITION LOOP

SETUP::MOTOR CONTROL::POSITION LOOP

This block controls the position of the motor. It compares a position demand, with position feedback, and generates a speed demand dependent on the difference. Note that the function blocks Move to Master, Phase CAM, Phase Inch, Phase Move, Phase Move Abs, etc. will not work if this block is not enabled (PREF 121.07).

Parameter Descriptions

ENABLE	*PREF: 121.07*	*Default: FALSE*	*Range: FALSE / TRUE*

Set True to enable the position loop to operate.

PROP GAIN	*PREF: 121.01*	*Default: 10.0*	*Range:*

The position loop proportional gain.

INTEGRAL TIME	*PREF: 121.02*	*Default: 500.0 ms*	*Range:*

The position loop integral time constant.

INTEGRAL DEFEAT	*PREF: 121.03*	*Default: FALSE*	*Range:*

When TRUE, this parameter sets the position loop integral to 0.0 and prevents it from operating.

LIMIT	*PREF: 121.11*	*Default: 10.00 %*	*Range: 0.00 to 300.00 %*

This parameter sets a symmetric clamp as a percentage of maximum speed, to limit the maximum position loop output of the block (PID Output).

POSITION DEMAND	*PREF: 121.15*	*Default: —.xx deg*	*Range: —.xx deg*

This diagnostic shows the input position demand.

TOTAL OFFSET	*PREF: 121.14*	*Default: —.xxxx*	*Range: —.xxxx*

This diagnostic shows the total position offset from the phase control blocks, Phase Inch, Phase Move, Phase Offset & Phase Tuning.

OUTPUT	*PREF: 121.10*	*Default: —.xxxx Hz*	*Range: —.xxxx Hz*

This diagnostic shows the total output (PID Output + Spd Feedforward).

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Parameter Descriptions

FOLLOWING ERROR   *PREF: 121.13*   *Default: —.xxxx deg*   *Range: —.xxxx deg*

This diagnostic shows the absolute maximum position loop error over a 1 second period.

LIMITING   *PREF: 121.12*   *Default: FALSE*   *Range: FALSE / TRUE*

This diagnostic is TRUE if the PID output has reached the Limit value.

PID OUTPUT   *PREF: 121.09*   *Default: —.xxxx Hz*   *Range: —.xxxx Hz*

This diagnostic shows the output of the position loop PI loop only.

SPD FEEDFORWARD   *PREF: 121.08*   *Default: —.xxxx Hz*   *Range: —.xxxx Hz*

This diagnostic shows the Speed Feedforward from other blocks, e.g. inertia compensation.

POSITN INTEGRAL   *PREF: 121.06*   *Default: —.xxxx deg*   *Range: —.xxxx deg*

This diagnostic shows the value of the position loop integral.

POSITION ERROR   *PREF: 121.05*   *Default: —.xxxx deg*   *Range: —.xxxx deg*

This diagnostic shows the instantaneous position error.

POSN LOOP RSPONS   *PREF: 121.04*   *Default: —.x ms*   *Range: —.x ms*

This diagnostic shows the nominal response time of the position loop.

Parameter Descriptions

MODE   *PREF: 121.16*   *Default: 0*   *Range: See below*

This diagnostic shows the operating mode of the position loop. (Range: Enumerated – 0: DISABLED, 1: ENABLED, , 2: UNSYNCHRONISED, 3: SYNCHRONISED , 4: ABSOLUTE,.)

Enumerated Value :	*Mode*	
	0 : DISABLED	The position loop is disabled.
	1 : ENABLED	The position loop is enabled, but not operating
	2 : UNSYNCHRONISED	The position loop is operating, but this drive has not been synchronized to the master by a Move To Master operation
	3 : SYNCHRONISED	The position loop is operating, and the drive has been synchronized to the master, by a Move To Master operation
	4 : ABSOLUTE	The position loop is operating with demands from the Phase Move Abs block

Functional Description

The position error (position demand – position feedback) is calculated and processed by a proportional + integral (PI) controller. The output of the PI controller is a speed demand, which is passed directly to the speed loop block. (speed loop Speed Demand = position loop Output. Note that speed loop Phase Input = 0).
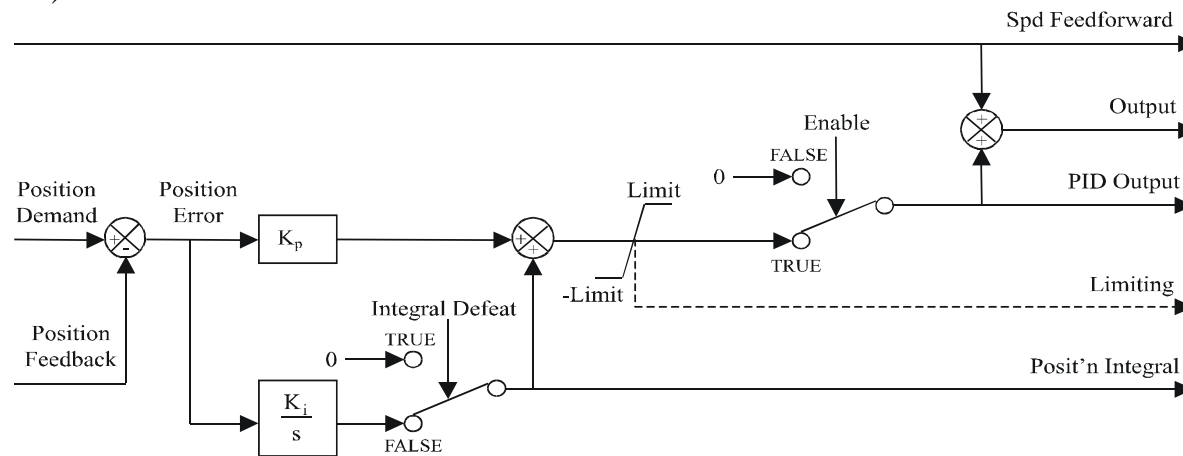
Parameter Table: PREF Number Order

PREF	Name	Block	Type	Range	Default	ro\rw	Notes
172.01	ENABLE	PHASE MOVE HIRES		FALSE / TRUE	TRUE		
172.02	RESET	PHASE MOVE HIRES		-3000.0 to 300.0	1.0		
172.03	DISTANCE FINE	PHASE MOVE HIRES		-1.0000 to 1.0000	0.0000		
172.04	VELOCITY	PHASE MOVE HIRES		0.10 to 300.00 %	1.00 %		
172.05	ACTIVE	PHASE MOVE HIRES		FALSE / TRUE	FALSE		
172.06	DISTANCE LEFT	PHASE MOVE HIRES		0.00 to 359.99^o	--.xx		
172.07	ACCELERATION	PHASE MOVE HIRES		0.01 to 300.00 %			
172.08	HOLD	PHASE MOVE HIRES		FALSE / TRUE	FALSE		
172.10	OFFSET	PHASE MOVE HIRES		--.xxxx	--.xxxx		
172.11	RESET	PHASE MOVE HIRES		FALSE / TRUE	FALSE		
181.01	ENABLE	PHASE CAM		FALSE / TRUE	FALSE		
181.02	LOAD CAM	PHASE CAM		FALSE / TRUE	FALSE		
181.03	OUTPUT TRIM	PHASE CAM		-180.000 TO 180.000	0.000		
181.04	ACTIVE	PHASE CAM		FALSE / TRUE			
181.05	CAM ID	PHASE CAM		$\pm$2147483647			
181.06	POSITION	PHASE CAM		0.00 to 359.99 ^{o}	--.xxx		
181.07	SPEED	PHASE CAM		0.00 to 10000.00Hz	--.xx		
181.08	DISTANCE LEFT	PHASE CAM			--.xxx		
181.10	TRIGGER	PHASE CAM		FALSE / TRUE	FALSE		
181.11	DELAY MUL	PHASE CAM		0 to 2147483647	0		
181.12	DELAY DIV	PHASE CAM		1 to 2147483647	10000		
181.13	OUTPUT MUL	PHASE CAM		0 to 2147483647	10000		

181.14	OUTPUT DIV	PHASE CAM		1 to 2147483647	10000		
181.15	SYNCHRONISE	PHASE CAM		FALSE / TRUE	FALSE		
181.16	HOLD SPEED	PHASE CAM		FALSE / TRUE	FALSE		

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