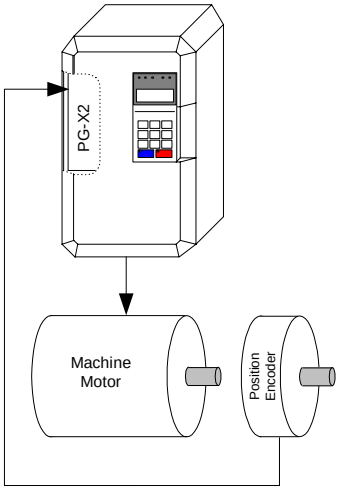
Document Name	Document Revised	Software number	Part Number
TM.G5SW.021	07/01/2004	VSG114743	CIMR-G5MXXXXXF-021

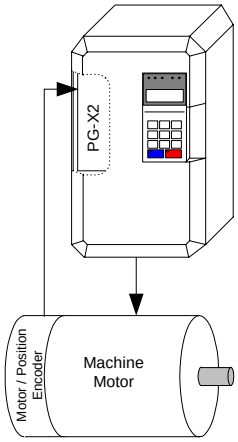
A Yaskawa GPD515/G5 AC drive flashed with this software has the ability to control the stopped orientation of the driven machine. Orientation is achieved by means of feedback from a position encoder directly coupled to the device to be positioned. The targeted applications are for equipment that must stop in specific positions during the processing cycle of an operation. Drive enhancements include a definable home position and 15 additional positions relative to home that can be sequenced automatically or selected through multi-function inputs. A special serial register that does not require accept or enter commands is provided to enable dynamic control of the stopped position via serial communications. Drive sequence (start/stop) can come from the terminals (2 or 3 wire control), MODBUS serial communications, or option board based serial communications (DeviceNet, Profibus, Modbus Plus, etc.). The spindle orient function will *not* work in local mode or if the run command source is operator (B1-02 = 0).

Supported Configurations

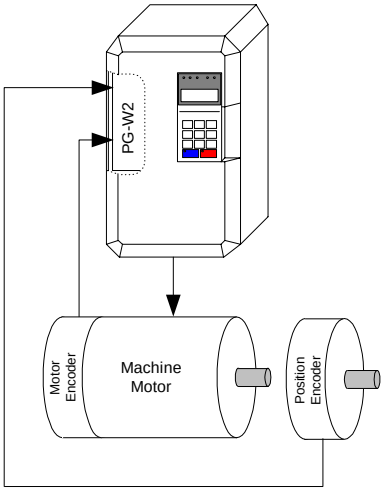
Open Loop Control
With Position Encoder



Closed Loop Control



Closed Loop Control
With Position Encoder

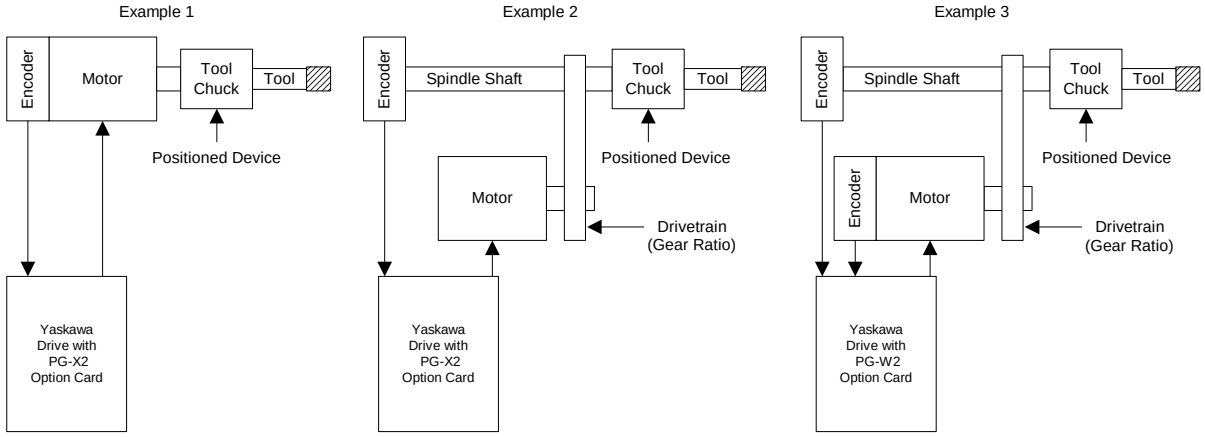


Open Loop Control with Position Encoder
The open loop control method may be used when the motor and the device to be positioned are connected through a drivetrain with a constant ratio. Feedback into a PG option card from the position encoder attached to the device being positioned is required.

Closed Loop Control
The closed loop control method may be used for better speed control and positioning characteristics when the drive motor directly drives the device being positioned.
When using this method the motor encoder is used for positioning.

Closed Loop Control with Position Encoder
Closed loop control may be used when the motor and the device to be positioned are connected through a drivetrain with a constant ratio. Feedback from an encoder attached to the device being positioned is required. This method will provide better performance than the open loop method.

Example Applications



These examples show typical applications. In these examples the encoder Z or marker pulse is used to indicate the zero or marker position. An external switch may be used as the marker pulse to indicate this position.

Example 1
This is a direct drive system where the encoder, motor and spindle shafts are directly coupled. This system can use the motor's encoder for positioning and closed loop vector control of the motor to provide the best performance.

Example 2
This is an indirect drive system where the motor and the spindle shaft are connected through a drive train. The motor and spindle speeds must have a constant ratio between them. The ratio must be entered into the drive using the provided ratio parameters. The position encoder is coupled to the spindle shaft. Since there is no motor encoder the drive must be set to open loop vector control. This configuration will not provide the performance of a closed loop system.

Example 3
This is an indirect drive system where the motor and the spindle shaft are connected through a drive train. The motor and spindle speeds must have a constant ratio between them. The ratio must be entered into the drive using the provided ratio parameters. The position encoder is coupled to the spindle shaft. The motor encoder allows for closed loop vector control. This method will provide the best indirect positioning performance.

Required Components

The application will dictate the required configuration. The configuration will dictate the components needed. The following table can be used to determine the components needed based on the configurations from the example.

Example	Yaskawa Drive	Software	PG option card	Position Encoder	Motor Encoder
1	G5 / GPD515	VSG11474X	PG-X2	512 to 2048 PPR	Not Required
2	G5 / GPD515	VSG11474X	PG-X2	512 to 2048 PPR	Not Required
3	G5 / GPD515	VSG11474X	PG-W2	512 to 2048 PPR	512 to 2048 PPR

All encoders must be quadrature encoders. The position encoder must have a Z pulse or an external switch must be used to locate the marker position. **DO NOT USE PARAMETER F1-05 TO CHANGE ENCODER PHASING WITH THIS SOFTWARE. PLEASE SWAP ENCODER SIGNALS A+ AND A- INSTEAD.**

How it Works

The function of this software is to provide the ability to orient the position encoder and any device connected to it to any position within the PPR (pulses per revolution) resolution. This requires the position encoder to be directly coupled to the device to be positioned, which is driven by the drive flashed with VSG11474X software. The position encoder must also be connected to the drive via a PG option card.

This software has no effect on the normal drive functions and a drive flashed with it can be configured to operate as a standard drive with a standard software flash. The software is only active when the orient input has been energized. When that occurs the offset value is read and the drive will accelerate or decelerate to the threshold frequency. The threshold frequency is determined by 4096 x P1-07: Stop Frequency Gain. If the output frequency of the drive is below the threshold frequency the drive will accelerate at the rate controlled by C1-01: Accel Time 1. If the output frequency is above the threshold frequency the drive will begin to decelerate at the rate controlled by C1-02: Decel Time 1. The drive's output frequency is monitored. When the output frequency is equal to the threshold frequency the PG card's Z pulse is monitored. When a Z pulse is detected the marker position is set and this software begins to orient the position encoder. The output frequency is dynamically reduced as the position encoder nears the orient position. The orient position is equal to the marker position plus any additional offset. When the position encoder is within the number of counts set in P1-05: Position Count of the orient position the output frequency will be set to P1-04: Position Speed. The drive will maintain this output frequency until the position encoder is within the number of counts set in P1-06: Stop Count of the orient position where it will stop and zero servo until the orient input or the run input is de-energized. The orient position maintained will be +/- the counts set in P1-06: Stop Count of the set orient position. This provides a method to prevent oscillation while the position is being maintained. When this position has been acquired the orient complete output will activate. If the run input is de-energized while the orient input remains energized the drive will resume operation where it stopped when the run input is re-energized. The orient complete output will de-activate when the orient input is de-energized.

The drive will orient the position encoder within two revolutions after the marker position has been set. Revolutions may be added when needed by incrementing the marker offset value by the quadrature pulse count of the position encoder. The maximum offset count value is 32767. If you are using a 1024 PPR position encoder the quadrature count will be 1024 PPR x 4 or 4096 counts per revolution. Using this position encoder, for each 4096 counts added to the offset the drive will require an additional revolution to orient.

All orientation is done relative to the marker position. The Z pulse from the position encoder or an external-switch device is required to identify the marker position. P1- 03: Marker Offset parameter is provided to adjust the marker position to the required or home position. All subsequent offset positions are relative to the home position. The stop position or orient position is equal to the marker-offset or home position plus the current offset.

To set P1- 03: Marker Offset and identify the home position it is necessary to run the drive and perform an orient by energizing the orient input. After the drive has stopped and holding position de-energize the run and orient inputs. The device connected to the position encoder may be rotated into the required or the desired home position. This operation may be done by hand or by reducing the frequency reference to the drive and using the run inputs to jog the device into position. When the device is in position the value shown at monitor U1-50: Marker Offset must be entered into P1- 03: Marker Offset. Monitor U1-50: Marker Offset contains the number of counts past the marker position that the position encoder has rotated. It is a rolling counter and will restart at zero after the count has exceeded P1-02: Spindle PPR x 4. (Rolling counter range = 0 to quadrature count –1)

There are four orient control selections. Parameter P1-10: Control Select can be used to select from the following.

0 – **Marker Offset** – The drive will only use P1- 03: Marker Offset as the orient position when the orient input is energized. This is the home position.

1 – **Sequenced Offset** – The drive will automatically increment to the next sequence offset when the orient input is energized. Parameters P2-01: Offset 1 to P3-05: Offset 15 are used to set the sequence offset values. These parameters provide 15-sequenced steps. Each step can contain an offset value. When the offset value read is 0 the sequence step will reset to 0, which is the home position. A sequence-reset input is provided and will reset the step to 0 or the home position when energized. A home position multifunction output will activate when the sequence is

at the home position. After the sequence-reset has reset the sequence step to 0 the next orient input will increment it to 1 pointing to offset value stored at P2-01 as the first step.

2 – **Selected Offset** – The offset value to be used can be selected via multifunction inputs. The following selection table will illustrate how steps can be selected.

Selection Table

Parameter Number	Step	Multifunction Inputs			
		84: Select MSB 4	85: Select Bit 3	86: Select Bit 2	87: Select LSB 1
P1-03: Marker Offset	0	Off	Off	Off	Off
P2-01: Offset 1	1	Off	Off	Off	**On**
P2-02: Offset 2	2	Off	Off	**On**	Off
P2-03: Offset 3	3	Off	Off	**On**	**On**
P2-04: Offset 4	4	Off	**On**	Off	Off
P2-05: Offset 5	5	Off	**On**	Off	**On**
P2-06: Offset 6	6	Off	**On**	**On**	Off
P2-07: Offset 7	7	Off	**On**	**On**	**On**
P2-08: Offset 8	8	**On**	Off	Off	Off
P2-09: Offset 9	9	**On**	Off	Off	**On**
P2-10: Offset 10	10	**On**	Off	**On**	Off
P3-01: Offset 11	11	**On**	Off	**On**	**On**
P3-02: Offset 12	12	**On**	**On**	Off	Off
P3-03: Offset 13	13	**On**	**On**	Off	**On**
P3-04: Offset 14	14	**On**	**On**	**On**	Off
P3-05: Offset 15	15	**On**	**On**	**On**	**On**

To select step 6 requires multifunction inputs 85: Select 3 and 86: Select 2 to be energized. Multifunction inputs 84:Select MSB 4 and 87: Select LSB 1 must be off or de-energized. The sequence steps are bit mapped to the multifunction inputs. If the 4 inputs are read as a 4 bit binary number its decimal equivalent is the sequence step.

The selection can be made anytime prior to energizing the orient input. Changing the selection while the orient input is energized will have no affect until the next orient input.

3 – **Serial Offset** – The offset value will be read from U1-59: Serial Offset. U1-59: Serial Offset can be written to via serial communications. The serial offset can be written to anytime prior to energizing the orient input. Changing the serial offset while the orient input is energized will have no affect until the next orient input. U1-58: Sequence Step will be set to 99 when this method is used and the serial offset is greater than 0.

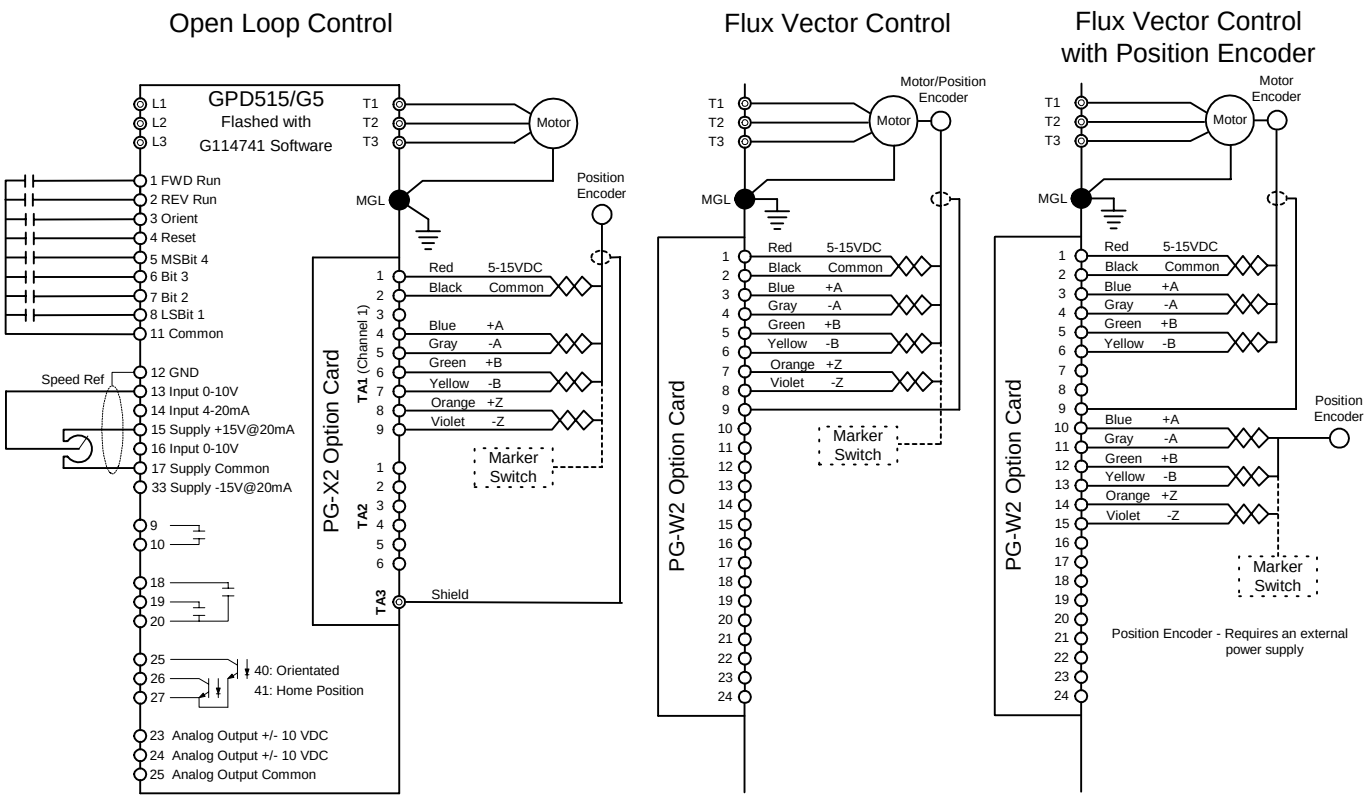
The value of the offset entered into an offset parameter is controlled by P3-06: Count or Degree. P1- 03: Marker Offset is not affected by this parameter and always remains as a count value. P3-06: Count or Degree has the following selections.

0 – **Count –** The value entered into the offset parameters are in quadrature encoder counts. (PPR x 4) The number of counts entered will be used as the offset. This can result in more than one revolution during an orient since 32767 counts can be entered.

1 – **Degree –** The value entered into the offset parameters are in degrees ranging from 0 to 360 degrees. If the value entered is greater than 360 it will be reduced to then equivalent position within one revolution. (380 = 20)

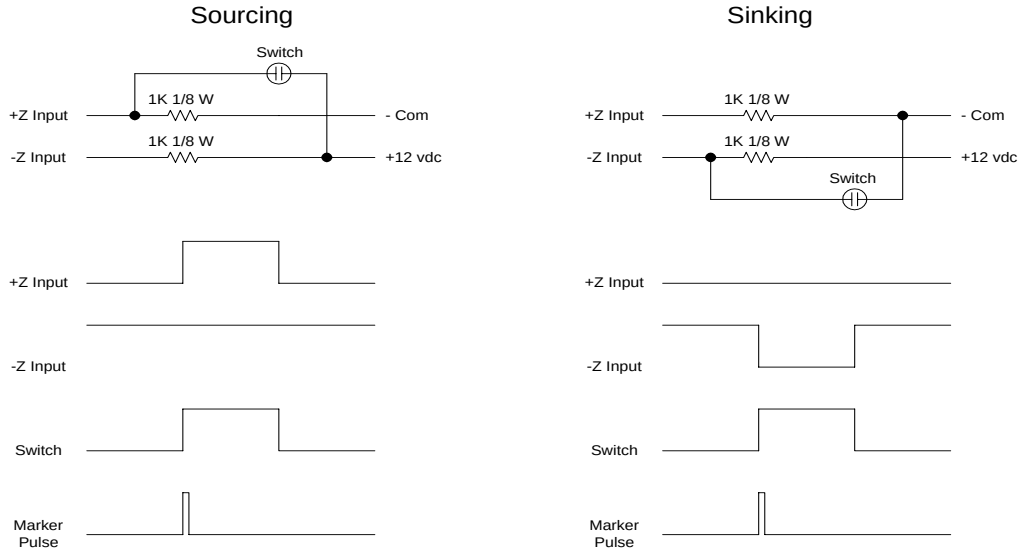
All offset counts are measured in the counter-clockwise direction facing the position encoder shaft. All offset degrees are measured in the clock-wise direction. Because of this increasing the offset count will result in the orient position moving counter-clockwise and increasing offset degrees will result in the orient position moving clockwise. Either selection provides for absolute orientation regardless of running direction. If the position encoder's PPR is 1024, the marker offset places the home position at 12 o'clock and the offset value is 1024 counts the position encoder will orient at 1024 counts counter-clockwise past the home position. This is the 9 o'clock position. If the home position is set to 12 o'clock and the offset value is 270 degrees the orient position will be at the 9 o'clock position. Both these statements are true regardless of running direction.

Wiring



Using a Switch for the Marker

The PG option card's Z pulse inputs require a line driver type output. A line driver output will toggle the +Z and –Z inputs from +5-12 VDC on the +Z input and –5 to 12 VDC on the –Z input to –5-12 VDC on the +Z input and +5-12 VDC on the –Z input. This transition constitutes a pulse. The following diagram shows how conventional sourcing or sinking switches can be used to trigger the marker pulse. The switch should be powered by an external power supply.



Special Programming Notes

This software document is only a supplement to the Magnetek GPD515 instruction manual. All parameters and features not mentioned in this document are not changed.

New Constant Default Settings

***Group C Tuning* – Function C2 S-Curve Acc/Dec**

C2-01	=	0	
C2-02	=	0	
C2-03	=	0	

***Group H Terminal* – Function H1 Digital Inputs**

H1-01	=	80: Orient	
H1-02	=	81: Reset to Home	
H1-03	=	84: Select MSB 4	
H1-04	=	85: Select Bit 3	
H1-05	=	86: Select Bit 2	
H1-06	=	87: Select LSB 1	

***Group H Terminal* – Function H2 Digital Outputs**

H2-02	=	40: Orient Complete	
H2-03	=	41: Home Position	

New Multi-Function Digital Input Settings

For Constants H-01 through H-06

Setting	Display	Description
80	Orient	Causes the drive to orient the position encoder to the current offset
81	Reset to Home	Resets the current offset to the home position (P1-03: Marker Offset)
84	Select MSB 4	Most Significant Bit 4 of the Select bit map (decimal value = 8)
85	Select Bit 3	Bit 3 of the Select bit map (decimal value = 4)
86	Select Bit 2	Bit 2 of the Select bit map (decimal value = 2)
87	Select LSB 1	Least Significant Bit 1 of the Select bit map (decimal value = 1)

New Multi-Function Digital Output Settings

For Constants F5-01 & 02 and H2-01 through H2-03

Setting	Display	Description
40	Orient Complete	Activates when the orientation command is complete
41	Home Position	Activates when the sequence step is 0 or the home position

New Parameters

New Program Group

Group P Orient Constants

New Program Group Functions

Function P1 Orient Settings

Function P2 Seq Offset 1-10

Function P3 Seq Offset 11-15

New Program Group Function P1

PG Channel Channel 1

Setting Range: 0 or 1
Factory Default: 0
MODBUS Address: 0x580

P1-01	PG Channel	Q	Q	Q	Q

Either channel 1 or 2 may be used for positioning. Set this to the channel that is connected to the positioning encoder. When a PG-X2 option card is used this setting must be 1. Channel 2 is only available with a PG-W2 option card. **DO NOT USE PARAMETER F1-05 TO CHANGE ENCODER PHASING IN THIS SOFTWARE. PLEASE SWAP ENCODER SIGNALS A+ AND A- INSTEAD.**

Pos. Encoder PPR P1-02= 1024 PPR

Setting Range: 1 to 32767 PPR
Factory Default: 1024 PPR
MODBUS Address: 0x581

P1-02	Position Encoder Pulses Per Revolution	Q	Q	Q	Q

The position encoder PPR is the actual pulse resolution or single output PPR of the position encoder used. The quadrature pulse rate will be 4x this rate. 1024 PPR = 1024 x 4 or 4096 quadrature pulses per revolution.

Marker Offset
P1-03= 0

Setting Range: 0 to 32767
Factory Default: 0
MODBUS Address: 0x582

P1-03	Orient offset distance	Q	Q	Q	Q

The marker offset contains the number of quadrature pulses or counts offset past the marker position that the shaft will travel before stopping at the orient position. When this value is 0 the shaft will stop at the marker position. The desired value may be found by running the drive and energizing the orient input. When the drive stops de-energize the run and orient inputs. Rotate the shaft to the desired position by hand or by jogging the drive using the run inputs. Read the value of U1-50: Marker Offset and enter it here.

The value of U1-50 is a rolling counter ranging from 0 to the number of quadrature counts per revolution. The direction of rotation is irrelevant. The value indicates an absolute position to the marker position and is the same in either direction.

This value may also be used to add counts to the positioning algorithm. Adding the number of positioning encoder quadrature counts per revolution increases the stopping distance by one revolution.

Position Speed
P1-04= 0.10 HZ

Setting Range: 0.00 to 10.00 HZ
Factory Default: 0.10 HZ
MODBUS Address: 0x583

P1-04	Position Speed	Q	Q	Q	Q

The position speed is the minimum speed that may be used during positioning. This speed is also used when the shaft is within the number of quadrature counts set in P1-05: Position Count of the orient position. If this speed is set to high the drive will oscillate when trying to hold the orient position. The positioning algorithm will decrease the speed until zero speed is reached at the orient position or this speed is reached and maintained until the orient position.

Position Count
P1-05= 0

Setting Range: 0 to 4096
Factory Default: 0
MODBUS Address: 0x584

P1-05	Position Count	Q	Q	Q	Q

The position count is the number of quadrature counts before the orient position that the drive will hold the speed set in P1-04: Position Speed. This may be used to prevent overshooting the orient position. If this count is set to high the drive will slow down to soon and cause extended positioning times.

Stop Count
P1-06= 0

Setting Range: 0 to 100
Factory Default: 0
MODBUS Address: 0x585

P1-06	Stop Count	Q	Q	Q	Q

The stop count is the number of quadrature counts before and after the actual orient position that will not result in a correction. This creates a stop range that prevents oscillation while the drive is in zero servo. The effect of this is dependent on the position encoder's resolution.

Stop Spd Gain P1-07= 1

Setting Range: 0 to 10
Factory Default: 1
MODBUS Address: 0x586

P1-07	Stop Speed Gain	Q	Q	Q	Q

The stop speed gain controls the threshold frequency where the positioning algorithm takes control of stopping the drive. It is based on a minimum threshold of 4.096 Hz with a 1 setting. The minimum threshold is multiplied by this value to achieve a maximum threshold of 40.96 Hz. This value also controls the rate of deceleration. The positioning algorithm will bring the drive to a stop in the orient position within 2 revolutions after initiated. The number of revolutions required to stop may be extended by the marker offset used.

Motor Ratio Num P1-08= 1

Setting Range: 0 to 10
Factory Default: 1
MODBUS Address: 0x587

P1-08	Spindle Ratio Numerator	Q	Q	Q	Q

The motor ratio numerator is the numerator for the motor ratio equation P1-08: Spindle Ratio Numerator / P1-09: Spindle Ratio Div. The proper drivetrain ratio between the driven device connect to the position encoder and the motor must be set for positioning to function properly.

Motor Ratio Div P1-09= 1

Setting Range: 0 to 10
Factory Default: 1
MODBUS Address: 0x588

P1-09	Spindle Ratio Divisor	Q	Q	Q	Q

The motor ratio divisor is the denominator for the motor ratio equation P1-08: Spindle Ratio Numerator / P1-09: Spindle Ratio Div. The proper drivetrain ratio between the driven device connect to the position encoder and the motor must be set for positioning to function properly.

Control Select Marker Offset

Setting Range: 0 to 3
Factory Default: 0
MODBUS Address: 0x589

P1-10	Control Select	Q	Q	Q	Q

The control select constant sets how the orient control of the drive. The selections are:
0 – Marker Offset – The orient position is maintained as the marker offset or home position.
1 – Sequence Offset – The orient position is incremented to the next sequence step (0 to 15) and new orient position.
2 – Selected Offset – The orient position is selected from the 16 available positions via multifunction inputs.
3 – Serial Offset – The orient position is read from U1-59: Serial Offset.

When using a 1 or 2 selection parameters P2-01 to P3-05 are used to set the orient positions.

New Program Group Functions P2 - P3

Offset xx PX-XX = 0

Setting Range: 0 to 32767
Factory Default: 0
MODBUS Address: see chart

P2-01 to P3-05	Offset 1 to 15	Q	Q	Q	Q

Offset 1 to 15 are provided for use when P1-10 is set to 1: Sequence or 2: Select. When P1-10 is set to 1: Sequence, energizing the orient input will increment to the next parameter and read the offset value. If the offset value is 0 the sequence step is reset to 0 or P1-03: Marker Offset or the home position. When P1-10 is set to 2: Select, energizing the orient input will read the bit mapped multifunction inputs to see if they are energized and use the parameter offset indicated by the table below. If none of the inputs are energized the drive will orient at the home position. P1-03: Marker Offset controls this position.

			Multifunction Inputs				
Constant	Description	MODBUS Address	Seq. Step	84: Select MSB 4	85: Select Bit 3	86: Select Bit 2	87: Select LSB 1
P2-01	Offset 1	0x0590	1	Off	Off	Off	**On**
P2-02	Offset 2	0x0591	2	Off	Off	**On**	Off
P2-03	Offset 3	0x0592	3	Off	Off	**On**	**On**
P2-04	Offset 4	0x0593	4	Off	**On**	Off	Off
P2-05	Offset 5	0x0594	5	Off	**On**	Off	**On**
P2-06	Offset 6	0x0595	6	Off	**On**	**On**	Off
P2-07	Offset 7	0x0596	7	Off	**On**	**On**	**On**
P2-08	Offset 8	0x0597	8	**On**	Off	Off	Off
P2-09	Offset 9	0x0598	9	**On**	Off	Off	**On**
P2-10	Offset 10	0x0599	10	**On**	Off	**On**	Off
P3-01	Offset 11	0x05a0	11	**On**	Off	**On**	**On**
P3-02	Offset 12	0x05a1	12	**On**	**On**	Off	Off
P3-03	Offset 13	0x05a2	13	**On**	**On**	Off	**On**
P3-04	Offset 14	0x05a3	14	**On**	**On**	**On**	Off
P3-05	Offset 15	0x05a4	15	**On**	**On**	**On**	**On**

Count or Degree Offset Degrees

Setting Range: 0 to 1
Factory Default: 1
MODBUS Address: 0x05a5

P3-06	Count or Degree	Q	Q	Q	Q

The count or degree parameter is used to determine the value of parameters P2-01 to P3-05.
0 – Offset Counts – Parameters P2-01 to P3-05 are interpreted as counts.
1 – Offset Degrees – Parameters P2-01 to P3-05 are interpreted as degrees. Entering a number greater than 360 results in only the integer remainder from the equation number entered / 360 being used. If the number entered is 32767 the remainder from the equation is 7. The offset is 7 degrees. (360 * 91 = 32760, 32767 – 32760 = 7)

Mtr 2 ASR Param Normal (Fixed)

Setting Range: 0 to 1
Factory Default: 0
MODBUS Address: 0x05a6

P3-07	Motor 2 ASR Parameter Mode Selection	A	A	A	A

This parameter changes the source of the ASR Proportional and Integral adjustments when Motor 2 is selected via multi-function input.

0 – Normal (Fixed) – The factory default values (based on control mode) of C5-01 ~ C5-04 are used to set the proportional gain and integral time when Motor 2 is selected. The values are fixed and cannot be changed. This is identical to the function of standard software.

1 – Use P3-08/P3-09 – Parameters P3-08 and P3-09 are used to set the proportional gain and integral time when Motor 2 is selected.

Mtr 2 ASR P Gain P3-08 = 20.00

Setting Range: 0 to 300.00
Factory Default: 20.00
MODBUS Address: 0x05a7

P3-08	Motor 2 ASR Proportional Gain	A	A	A	A

P3-08 adjusts the proportional gain of the ASR when Motor 2 is selected.

NOTE: The default P3-08 setting of 20.00 is optimized for Flux Vector control mode. Unstable operation may occur with this setting in other control modes.

Mtr 2 ASR I Time P3-09 = 0.500 Sec

Setting Range: 0 to 10.000sec
Factory Default: 0.500sec
MODBUS Address: 0x05a8

P3-09	Motor 2 ASR Integral Time	A	A	A	A

P3-09 adjusts the integral time of the ASR when Motor 2 is selected.

NOTE: The default P3-09 setting of 0.500sec is optimized for Flux Vector control mode. Unstable operation may occur with this setting in other control modes.

New Monitors

Marker Offset U1-50 = 2303 cts

Display Range: 0 to 32767 cts
MODBUS Address: 0x00d0

U1-50	Marker Offset	Q	Q	Q	Q

Displays the number of quadrature encoder counts the shaft is past the marker pulse. This is a rolling pulse counter with a range from 0 to the quadrature PPR rating of the position encoder. (Quad PPR = P1-02: Pos. Encoder PPR x 4) The drive must be orientated after energizing to identify the marker pulse position. This monitor will display the offset count from the last marker pulse. A 1024 PPR encoder has a quadrature count of 1024 X 4 or 4096. Using this encoder this value will increment from 0 to 4095 in the forward direction. It will decrement from 4095 to 0 in the reverse direction. The 0 indicates the marker position.

Shaft Angle U1-51 = 0.0

Display Range: -180.0 to 179.9
MODBUS Address: 0x00d1

U1-51	Shaft Angle	Q	Q	Q	Q

Displays the angle between the position encoder and the home position. The display will indicate 0 to 179.9 degrees then change to –180.0 to 0 degrees when rotated in the clockwise direction. Counter clockwise rotation will result in 0 to –180.0 then it will change to 179.9 and count down to 0.

Shaft Angle Deg U1-52 = 0.0

Display Range: 0.0 to 359.9
MODBUS Address: 0x00d2

U1-52	Shaft Angle Degrees	Q	Q	Q	Q

Displays the angle between the position encoder and the home position. The display will indicate 0 to 359.9 degrees when the position encoder is rotated clockwise.

Seq Offset U1-57 = 0

Display Range: 0 to 32767
MODBUS Address: 0x00d7

U1-57	Sequence Offset	Q	Q	Q	Q

Displays the last read offset value pointed to by the sequence step. The value is read when the orient input is energized. The sequence offset is used as the offset to the home position. The readable values are set in the P2-01 to P3-05 parameters. When the sequence step is 0 the P1-03: Marker Offset will be read. The actual value of the sequence offset is controlled by P3-06: Count or Degree. (Quadrature PPR counts or 360 degrees = 1 revolution)

Sequence Step U1-58 = 0

Display Range: 0 to 15
MODBUS Address: 0x00d8

U1-58	**Sequence Offset**	Q	Q	Q	Q

Displays the last sequence step used. The sequence step will increment upon energizing the orient input when P1-10: Control Select is set to 1: Sequenced Offset or 2: Selected Offset. The drive is in the home position when the sequence step is 0. When P1-10 is set for serial offset and its value is greater than 0 the sequence step is set to 99. When the value of the serial offset is 0 the sequence step will be at the home position or 0.

Serial Offset U1-59 = 0

Display Range: 0 to 32767
MODBUS Address: 0x00d9
Modified: Write to

U1-59	**Sequence Offset**	Q	Q	Q	Q

Displays the last serial offset written to this register. This monitor has been modified to allow writes. It is a volatile register that will be lost upon shutdown. This register does not require enter or accept commands. P1-10: Control Select must be set to 3: Serial Offset to use this register as the offset value. The value must be written to this register prior to energizing the orient input.