GPD515/G5 Software Option (VSG114724)
Part Number: CIMR-G5MXXXXXF-020

1.0 Overview:

The purpose of this software is to give the GPD515/G5 inverter motion control capabilities. This software is designed to cover basic linear motion, rotary motion, and cut to length indexing applications. This software has the following features:

Three choices of move lengths:
- Binary selected 31 distances.
- 32 bit serial command.
- Analog distance command

Multiple position feedback options:
- Motor mounted incremental encoder.
- Motor mounted incremental encoder and machine mounted incremental encoder.
- Motor mounted incremental encoder and machine mounted absolute encoder.
- Note: use of an absolute encoder eliminates the need for homing after a power loss.

Multiple homing options:
- Home to limit switch.
- Home to limit switch and marker pulse.
- Home to value of absolute encoder.

Other features:
- Jogging commands for machine set up and manual control.
- Over-travel limit inputs for machine protection.

1.1 Typical applications:

Linear Absolute Applications with incremental or absolute encoder feedback
- Pick and place robots.
- Linear slides.
- Ball screws.

Linear Relative Applications with incremental encoder feedback
- Cut to length
- Extruders pump feed.

Rotary Applications with incremental or absolute encoder feedback
- Index Turntables.
- Turret winders
- Dial tables

1.2 Different Types of Motion

This software, through parameter P1-01, differentiates between linear or rotary motion and absolute or relative position coordinates. These four choices will setup the commands needed for various functions outlined below. These choices will also change the definition of the length of move for any of the 31 move profiles.

Rotary motion, such as winder turrets and dial tables, is defined as motion where the commanded move destination can be reached in both the positive and negative direction. Linear motion, such as a ball screw or transfer station, is defined as motion where there is only one direction to reach the commanded move destination.

Absolute positioning is the determination of a position independent of the current position (i.e. positioning related back to home). An example would be a transfer station or dial table. Relative positioning will use the current position information and make the next move as an offset from the current position, without relation to home. An example would be a cut to length application.

This software supports three motion positioning combinations: absolute linear, absolute rotary, and relative. In absolute linear, each move destination setting in the A2 parameter group is defined as a distance from home (home switch + home offset).

In absolute rotary, each move destination setting in the A2 parameter group is defined as the move destination from home (home switch + home offset) in the positive direction within one revolution of the machine. This can be thought of establishing positions for the hour marks on a clock. The maximum value for a move destination must not exceed one complete revolution. The move positive and move negative commands are both active since the commanded position can be reached in either direction.

In relative motion, each move destination setting in the A2 parameter group is defined as a length of move from the current position. There is no direction implied so both the move positive and move negative commands are needed to give a move direction. The motion can be rotary or absolute. In relative motion, the drive simply rotates the motor the commanded number of revolutions in the commanded direction. However, the drive will keep track of the number of pulses and direction from home and can be commanded to return to the home pulse count even though multiple moves away from home had been made. Additionally, the drive can be selected to have “relative memory”. This selects if the drive should begin its move using its actual current position or the position commaned from the previous move.

1.3.1 Command I/O Table for multi profile

Command table with P1-03 = 0 (multi profile)

Move Pos. Term #1	Move Neg. Term #2	Enable Servo	Home Cmd	Multi Step Profile	Destination source	Accel/ decel	Max Speed used	Action of motor
-	-	0	-	-	-	-	-	Not running
0	0	1	0	-	-	-	zero	running
0	0	1	1	-	-	C1-01,02	P2-02,03	Homing
1	0	1	0	0 0 0 0 0	-	C1-01,02	D1-09	Jog Positive
0	1	1	0	0 0 0 0 0	-	C1-01,02	D1-09	Jog Negative
1	0	1	0	0 0 0 0 1	A2-01	C1-01,02	D1-01	Move to pos A2-01
0	1	1	0	0 0 0 0 1	A2-01	C1-01,02	D1-01	Move to neg A2-01
1	0	1	0	0 0 0 1 0	A2-02	C1-03,04	D1-02	Move to pos A2-02
0	1	1	0	0 0 0 1 0	A2-02	C1-03,04	D1-02	Move to neg A2-02
1	0	1	0	0 0 0 1 1	A2-03	C1-05,06	D1-03	Move to pos A2-03
0	1	1	0	0 0 0 1 1	A2-03	C1-05,06	D1-03	Move to neg A2-03
1	0	1	0	0 0 1 0 0	A2-04	C1-07,08	D1-04	Move to pos A2-04
0	1	1	0	0 0 1 0 0	A2-04	C1-07,08	D1-04	Move to neg A2-04
1	0	1	0	0 0 1 0 1	A2-05	C1-01,02	D1-05	Move to pos A2-05
0	1	1	0	0 0 1 0 1	A2-05	C1-01,02	D1-05	Move to neg A2-05
1	0	1	0	0 0 1 1 0	A2-06	C1-03,04	D1-06	Move to pos A2-06
0	1	1	0	0 0 1 1 0	A2-06	C1-03,04	D1-06	Move to neg A2-06
1	0	1	0	0 0 1 1 1	A2-07	C1-05,06	D1-07	Move to pos A2-07
0	1	1	0	0 0 1 1 1	A2-07	C1-05,06	D1-07	Move to neg A2-07
1	0	1	0	0 1 0 0 0	A2-08	C1-07,08	D1-08	Move to pos A2-08
0	1	1	0	0 1 0 0 0	A2-08	C1-07,08	D1-08	Move to neg A2-08
1	0	1	0	0 1 0 0 1	A2-09	C1-01,02	D1-01	Move to pos A2-09
0	1	1	0	0 1 0 0 1	A2-09	C1-01,02	D1-01	Move to neg A2-09
1	0	1	0	0 1 0 1 0	A2-10	C1-02,03	D1-02	Move to pos A2-10
0	1	1	0	0 1 0 1 0	A2-10	C1-02,03	D1-02	Move to neg A2-10
~	~	~	~	~	~	~	~	~
~	~	~	Continued pattern				~	~
~	~	~	~	~	~	~	~	~
~	~	~	~	~	~	~	~	~
1	0	1	0	1 1 1 1 0	A2-30	C1-03,04	D1-06	Move to pos A2-30
0	1	1	0	1 1 1 1 0	A2-30	C1-03,04	D1-06	Move to neg A2-30
1	0	1	0	1 1 1 1 1	A2-31	C1-05,06	D1-07	Move to pos A2-31
0	1	1	0	1 1 1 1 1	A2-31	C1-05,06	D1-07	Move to neg A2-31

1.3.2 Command I/O Table for 32 bit distance

Command table with P1-03 = 1 (32 bit distance)

Move Pos. Term #1	Move Neg. Term #2	Enable Servo	Home Cmd	Multi Step Profile	Destination source	Accel/ decel	Max Speed used	Action of motor
-	-	0	-	-	-	-	-	Not running
0	0	1	0	-	-	-	zero	running
0	0	1	1	-	-	C1-01,02	P2-02,03	Homing
1	0	1	0	0 0 0 0 0	-	C1-01,02	D1-09	Jog Positive
0	1	1	0	0 0 0 0 0	-	C1-01,02	D1-09	Jog Negative
1	0	1	0	0 0 0 0 1	Modbus 05A8 & 05A9	C1-01,02	D1-01	Move to pos Value of modbus 05A8 &05A9
0	1	1	0	0 0 0 0 1	Modbus 05A8 & 05A9	C1-01,02	D1-01	Move to neg Value of modbus 05A8 &05A9

1.3.3 Command I/O Table for analog distance

Command table with P1-03 = 2 (Analog distance)

Move Pos. Term #1	Move Neg. Term #2	Enable Servo	Home Cmd	Multi Step Profile	Destination source	Accel/ decel	Max Speed used	Action of motor
-	-	0	-	-	-	-	-	Not running
0	0	1	0	-	-	-	zero	running
0	0	1	1	-	-	C1-01,02	P2-02,03	Homing
1	0	1	0	0 0 0 0 0	-	C1-01,02	D1-09	Jog Positive
0	1	1	0	0 0 0 0 0	-	C1-01,02	D1-09	Jog Negative
1	0	1	0	0 0 0 0 1	MF Analog Input =21	C1-01,02	D1-01	Move to pos value of Analog input
0	1	1	0	0 0 0 0 1	MF Analog Input =21	C1-01,02	D1-01	Move to neg value of Analog input

1.4 Requirements

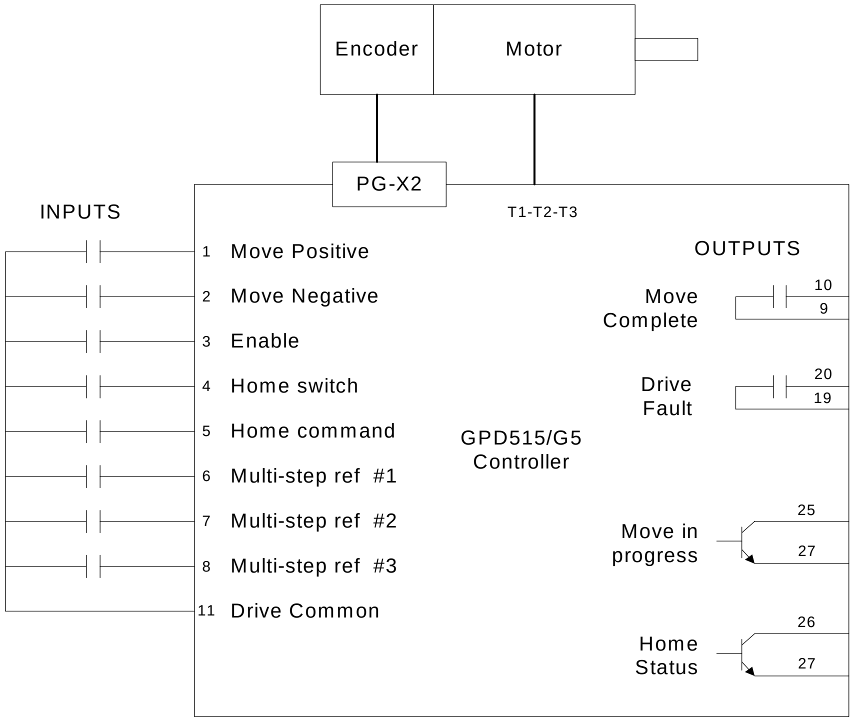
- The inverter must be run in closed loop flux vector mode.
- The inverter requires a **PG-X2** or **PG-W2** encoder feedback board depending on application.
- A **DI-08** or **DI-16G** may be required by the application.
- **Do not use parameter F1-05 to change incremental encoder phasing in this software. Please swap encoder signals A+ and A- instead.**

1.5 Wiring

Wire the incoming power, motor, accessories and control wiring as specified in the GPD515/G5 Technical Manual TM4515. If a second position feedback encoder is used it should be wired to terminals 10 through 16 according to the PG-W2 instruction sheet. Absolute encoder is wired to the DI-16G card (Details below).

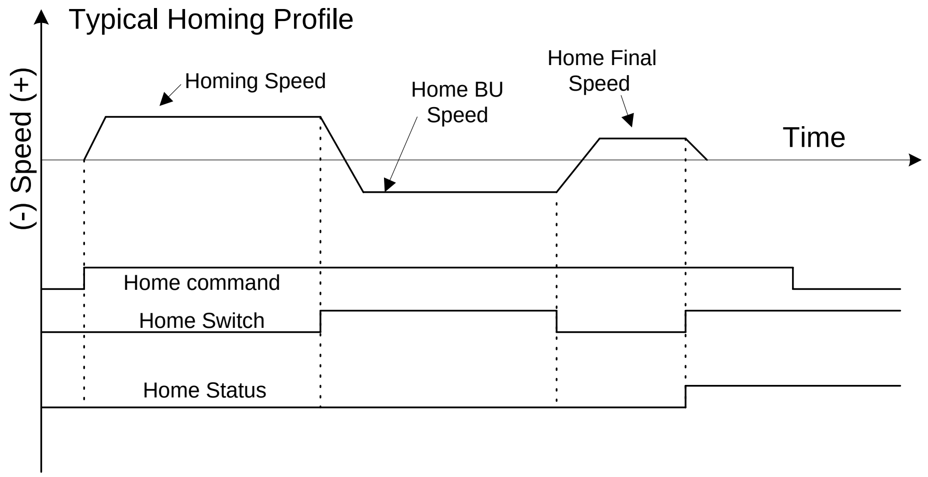
Note: The +12V supply on the PG-W2 card is capable of only 200mA, be sure not to overload it.

1.6 Typical Control Wiring Diagram


Encoder
Motor
PG-X2
T1-T2-T3
INPUTS
1 Move Positive
2 Move Negative
3 Enable
4 Home switch
5 Home command
6 Multi-step ref #1
7 Multi-step ref #2
8 Multi-step ref #3
11 Drive Common
GPD515/G5 Controller
OUTPUTS
Move Complete
10
9
Drive Fault
20
19
Move in progress
25
27
Home Status
26
27

2.0 Timing Charts
2.1 Typical Homing Profile Timing Chart

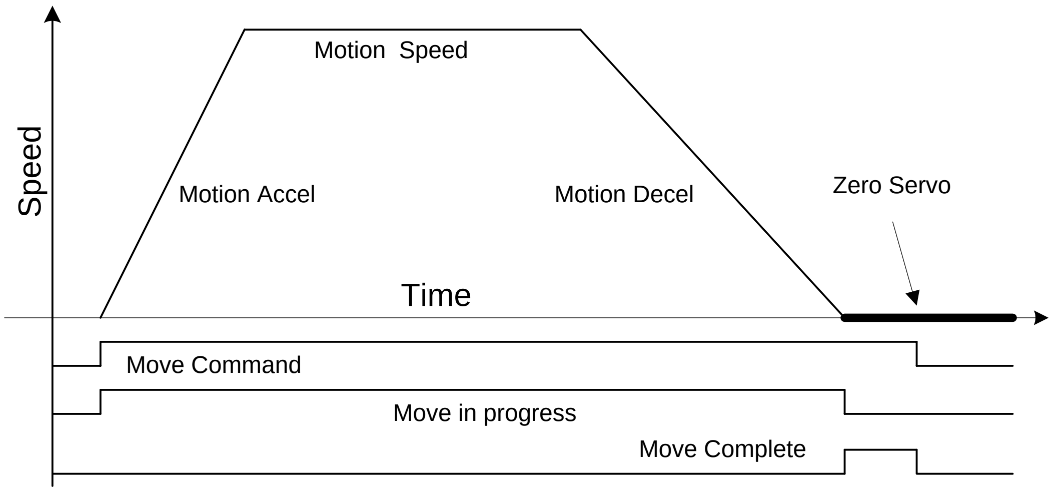
Homing begins with movement in the direction (home accelerations and velocities) specified while looking for the home limit switch. Once the home limit is found the specified edge of the limit is then sought out. (The home limit switch polarity is also settable). Once the proper edge is found the home backup function can be used to reverse the motor and re-approach the limit edge at the home final velocity (a separate value from the home velocity) until the edge is found again.



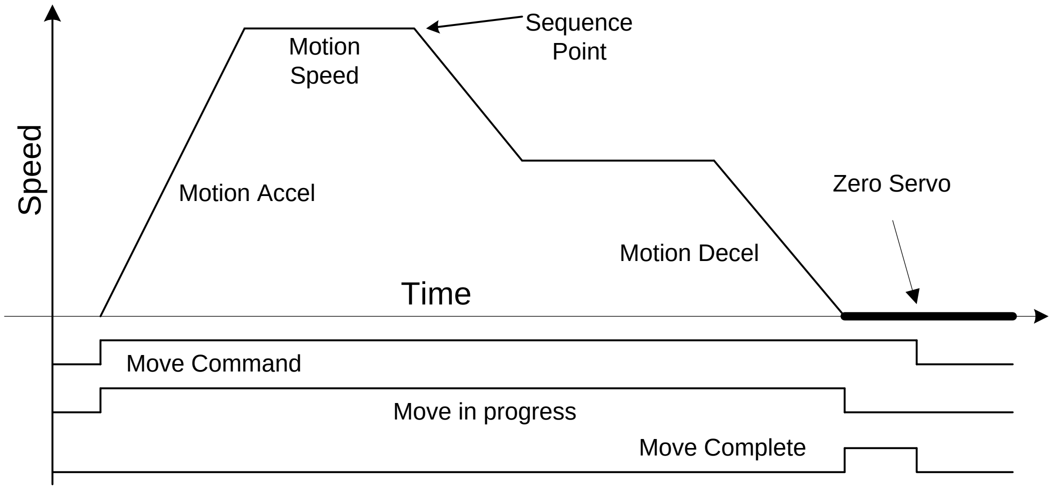
2.2 Typical Move Profile Timing Chart

When the drive receives a “Move Command”, it will complete the move profiles selected using the multi-function to that destination specified at the set motion speed. It will decel to a stop and turns on the move complete output when the move is within the position window.

Typical Move Profile


Motion Speed
Speed
Motion Accel
Motion Decel
Zero Servo
Time
Move Command
Move in progress
Move Complete

Typical Sequence Move Profile


Sequence Point
Motion Speed
Speed
Motion Accel
Zero Servo
Motion Decel
Time
Move Command
Move in progress
Move Complete

3.0 I/O Definitions of Terminals 1 and 2

Terminal 1 Move Positive	Ths terminal is used run a motion command or jog function in the positive direction. See command chart above.
Terminal 2 Move Negative	Ths terminal is used run a motion command or jog function in the negative direction. Motion destination are inverted when this command is given. See command chart above.

3.1 I/O Definitions of multi-function inputs

For constants H1-01 through H1-06.

Setting	Display	Description
3	Multi-Step Ref 1	The binary combination of multi-step inputs 1-5 will select move profiles 1-31. Each profile consists of a speed reference from D1-01~08, a length from A2-01~31, and accel / decel times from C1-01~08. See command chart above.
4	Multi-Step Ref 2	See setting 3 above
5	Multi-Step Ref 3	See setting 3 above
86	Multi-Step Ref 4	See setting 3 above
87	Multi-Step Ref 5	See setting 3 above
80	Enable	Enable inverter: Open = stop, Closed = run. Enables the drive to output power to the motor. No move, home, or jog commands will be accepted without this input.
81	Home Switch	Home limit switch input: The home limit polarity (NO or NC) is set in parameter P1-04.
82	Home Command	Home command: Open = no action, Closed = Run homing. This input will initiate the homing routine set up in the P1 and P2 parameters. Note: Drive must also be enabled.
84	Positive OT Limit Switch	Positive over travel limit switch: The OT limit polarity (NO or NC) is set in parameter P1-04. Jogging in the negative direction can move the machine off this limit switch.
85	Negative OT Limit Switch	Positive over travel limit switch: The OT limit polarity (NO or NC) is set in parameter P1-04. Jogging in the positive direction can move the machine off this limit switch.

3.3 Multi-Step Digital Input when DI-08 option card is used

Because there is a limited number on inputs on the controller, it is possible to run out if attempting to use all 31 multi-step profiles. If the DI-08 option card is installed in the controller, the five multi-step input will come from the first five inputs on the DI-08 card.

3.4 New Multi-Function Digital Output Settings

For constants F5-01 & 02 and H2-01 through H2-03:

Setting	Display	Description
40	Move in Progress	Closed: Drive is completing the specified move profile.
41	Move Complete	Closed: Move routine has been completed and is within the specified stop motion window (P1-05).
42	Home Status	With P2-07 =0 (Homing complete) Closed = Drive has successfully completed the homing routine and knows its position relative to the home switch. With P2-07 =1 (Homing needed) Closed = Drive has not successfully completed the homing routine .

3.5 New Multi-Function Analog Input Settings

For constants H3-05 and H3-09:

Setting	Display	Description
21	Motion Dist	Sets the length of move for the selected move profile. When P1-01 is set for an analog length of move, this input will control the destination of the move. See parameter P1-06.

3.6 Using a Absolute encoder as Position Feedback

For Applications that must **retain the position data during a power loss**, the use of an **absolute encoder is required**. The drive uses a DI-16H2 option card to acquire position date from an absolute encoder. The DI-16H2 card has the capability of decoding 18 Bits of GRAY code information giving the system a resolution of 1 part in 262144. If an encoder with more than 18 bits is used, select the group of 18 bits that is appropriate for the application.

Terminal Strip	Terminal Number	Encoder GRAY Bit
TC1	1	Bit 0 Gray
TC1	2	Bit 1 Gray
TC1	3	Bit 2 Gray
TC1	4	Bit 3 Gray
TC1	5	Bit 4 Gray
TC1	6	Bit 5 Gray
TC1	7	Bit 6 Gray
TC1	8	Bit 7 Gray
TC1	9	Bit 8 Gray

Terminal Strip	Terminal Number	Encoder GRAY Bit
TC1	10	Bit 9 Gray
TC2	1	Bit 10 Gray
TC2	2	Bit 11 Gray
TC2	3	Bit 12 Gray
TC2	4	Bit 13 Gray
TC2	5	Bit 14 Gray
TC2	6	Bit 15 Gray
TC2	7	Bit 16 Gray
TC2	8	Bit 17 Gray

4.0 New Program Group

Group P
Motion Control

4.1 New Program Functions

Function P1
System Settings

Function P2
Homing Settings

Function P3
Misc. Functions

4.2 P1 Group Parameters

Motion Type
Linear Absolute

Setting Range:	0 to 4
Factory Default:	1
Modbus Address:	0580 Hex

P1-01 Motion Type

Setting	Function	Description
0	Analog Absolute	Controller uses an analog command to determine move destination. IE. A 5-volt command moves the machine 10 inches from home, a 10-volt command move the machine 20 inches from home. The analog input can continually update the destination and act as motion amplifier. See parameter P1-03 and P1-06
1	Linear Absolute	Controller moves to a specified distance from home.
2	Linear Relative	Controller moves to a specified distance from its starting position.
3	Rotary Absolute	Controller rotates machine a specified distance from home
4	Rotary Relative	Controller rotates machine a specified distance from its starting position

Stopping Method
Zero Servo

Setting Range:	0 to 1
Factory Default:	1
Modbus Address:	0581 Hex

P1-02 Stopping Method

Setting	Function	Description
0	Zero Speed	Controller speed reference goes to zero at end of the move.
1	Zero Servo	Controller maintains position at the end of the move.

Distance Select
Multi-Profile

Setting Range: 0 to 2
Factory Default: 0
Modbus Address: 0582 Hex

P1-03 Distance Selection

Controls where the distance command come from

Setting	Function	Description
0	Multi-Profile	Distance comes from the A2 parameters. See the command chart.
1	32 Bit Distance	Distance comes from Modbus addresses 5a8 and 5a9. This is used when an external computer is used to set the destination. See P3-09 and P3-10.
2	Analog Distance	Distance in controlled by an analog input to the controller.

Switch Type
Both NO

Setting Range: 0 to 3
Factory Default: 0
Modbus Address: 0583 Hex

P1-04 Switch Type

Tells the controller the normal state of the home and over-travel limit switches.

Setting	Function	Description
0	Both NO	Both home and over-travel limit switches are open when the machine is in the middle of the travel zone.
1	OT NO, Home NC	Over-travel limit switches are open when the machine is in the middle of the travel zone. Home limit switch is closed when the machine is in the middle of the travel zone.
2	OT NC, Home NO	Over-travel limit switches are closed when the machine is in the middle of the travel zone. Home limit switch is open when the machine is in the middle of the travel zone
3	Both NC	Both home and over-travel limit switches are closed when the machine is in the middle of the travel zone.

In Posit. Window
P1-05 = 0.05 Unt

Setting Range:	0.00 to 100.00 Units
Factory Default:	0.05 Units
Modbus Address:	0584 Hex

P1-05 In-Position Window

Controls when the **move complete** digital output turns on. Also determines when the drive switches to zero servo control.

Analog Distance
P1-06 = 10.00 Unt

Setting Range:	0.00 to 655.35 Units
Factory Default:	10.00 Units
Modbus Address:	0585 Hex

P1-06 Analog Distance

When analog distance control is used, this value will be the distanced traveled when a 10 volt input command is received.

Length of Rotate
P1-07 = 10.00 Unt

Setting Range:	0.00 to 655.35 Units
Factory Default:	10.00 Units
Modbus Address:	0586 Hex

P1-07 Length of One Rotation

Sets the distance in units of one complete revolution of the the rotary machine. The value of P1-07 x P1-10 must exactly equal the number of encoder counts for one machine revolution to prevent an accumulative error.

Positioning Dist
P1-08 = 0.05 Unt

Setting Range:	0.00 to 655.35 Units
Factory Default:	0.05 Units
Modbus Address:	0587 Hex

P1-08 Positioning Distance

During a motion control move, this is the creep distance traveled before the final stopping point. If overshooting occurs, increase this distance.

Positioning Spd
P1-09 = 0.50 Hz

Setting Range:	0.00 to 100.00 Hz
Factory Default:	0.50 Hz
Modbus Address:	0588 Hex

P1-09 Positioning Speed

During a motion control move, this is the final speed used during positioning. If over shooting occurs, decrease this speed.

Counts Per Unit
P1-10 = 4096

Setting Range:	0 to 65535 Counts
Factory Default:	4096 Counts
Modbus Address:	0589 Hex

P1-10 Counts Per Unit

This parameter is a scaling factor for all the parameters using units to measure distance.. The counts per unit, P1-10, are multiplied by unit value to determine move length in counts.

Setting example: The customer wants to move a machine slide 40.25”. The motor is coupled to a ball screw by a 20:1 reduction gearbox. The screw pitch is 0.5” per revolution. The encoder is rated at 1024 ppr.

- For every 20 motor revolutions, the ball travels 0.5”.
- For 1.0” of ball travel, the motor must rotate 40 times.
- There are 4096 encoder counts per motor revolution. The encoder feedback is in quadrature. This means that the number of pulses counted by the drive is 4 times the encoder ppr.
- Therefore the encoder will generate 163,840 counts per 1.0” of travel (4096 x 40).
- To set the move resolution (units) at 1.00”, set P1-10 at 163,840 counts
- To travel 40.25”, set A2-xx to 40.25 units.

4.2 P2 Group Parameters

Homing Type
Home Neg w/BU

Setting Range: 0 to 5
Factory Default: 1
Modbus Address: 0590 Hex

P2-01 Homing Type

Tells the controller the action o take when a home command is issued.

Setting	Function	Description
0	Home Negative	Homing direction is negative and occurs on the leading edge of the homing switch.
1	Home Negative w/ Backup	Homing direction is negative, when machine get to leading edge of the homing switch it will travel positive to get off the switch and then approach the switch at a very slow speed to find the leading edge.
2	Home Positive	Homing direction is positive and occurs on the leading edge of the homing switch.
3	Home Positive w/ Backup	Homing direction is positive, when machine get to leading edge of the homing switch it will travel negative to get off the switch and then approach the switch at a very slow speed to find the leading edge.
4	Home Negative w/ marker	Homing direction is negative and occurs at the first marker pulse after the leading edge of the homing switch.
5	Home Positive w/ marker	Homing direction is positive and occurs at the first marker pulse after the leading edge of the homing switch.

Homing Speed
P2-02 = 10.00 Hz

Setting Range: 0.00 to 400.00 Hz
Factory Default: 10.00 Hz
Modbus Address: 0591 Hex

P2-02 Homing Speed

This parameter is the speed reference used for course homing.

Homing BU Speed
P2-03 = 2.00 Hz

Setting Range: 0.00 to 400.00 Hz
Factory Default: 2.00 Hz
Modbus Address: 0592 Hex

P2-03 Homing Back Up Speed

This parameter is the speed reference used for the back up portion of the homing routine.

Homing Final Spd
P2-04 = 1.00 Hz

Setting Range: 0.00 to 400.00 Hz
Factory Default: 1.00 Hz
Modbus Address: 0593 Hex

P2-04 Homing Final Speed

This parameter is the speed reference used for the final portion of the homing routine.

Home Offset
P2-05 = 0.00 Unt

Setting Range: -99.99 to 99.99 Units
Factory Default: 0.00 Units
Modbus Address: 0594 Hex

P2-05 Home Offset

This is the distance from the home limit switch to the point that is defined as 0.00 units.

Position Memory
Memory Off

Setting Range: 0 to 1
Factory Default: 0
Modbus Address: 0595 Hex

P2-06 Position Memory

Setting	Function	Description
0	Memory Off	On Relative moves. The machine will move the specified distance from the starting position. Use this on cut to length applications.
1	Memory On	On Relative moves. The machine will move the specified distance from the previous memorized destination. Use this on applications such as rotating tables that continue to rotate in the same direction.

Homing Output
Homing Complete

Setting Range: 0 to 1
Factory Default: 0
Modbus Address: 0596 Hex

P2-07 Homing Output

Setting	Function	Description
0	Homing Complete	Multi-function output programmed to Home status (42) turns on when homing is complete.
1	Homing Needed	Multi-function output programmed to Home status (42) turns on when homing is needed.

4.4 P3 Group Parameters

Position Encdr
PGX-W Port #1

Setting Range:	0 to 2
Factory Default:	0
Modbus Address:	05a0 Hex

P3-01 Position Encoder

Setting	Function	Description
0	Pg-X2 or PG-W2 Port 1	Machine position feedback uses the motor feedback coming in on Channel 1 of the PG-X2 or a PG-W2 encoder feedback card.
1	PG-W2 Port 2	Machine position feedback uses a machine mounted feedback encoder coming in on Channel 2 of the PG-W2 encoder feedback card.
2	DI-16 Absolute Encoder	Machine position feedback uses a machine mounted absolute feedback encoder coming in on 18 bits of the DI-16H2 card.

Pos.encdr. NUM
P3-02 = 1

Setting Range:	0-65535
Factory Default:	1
Modbus Address:	05a1 Hex

P3-02 Position Encoder Numerator

This is used to set the ratio between the machine-mounted encoder and the motor mounted encoder.

Example: Motor encoder is 1024 ppr
Position encoder 256 PPR is mounted to output of 20:1 gearbox
So (1024 * 20) / 256 = 80
For every encoder count on the machine, you get 80 counts on the motor.
Program P3-02 to 80 and P3-03 to 1.

Pos.encdr. Den
P3-03 = 1

Setting Range:	0-65535
Factory Default:	1
Modbus Address:	05a2 Hex

P3-03 Position Encoder Denominator

This is used to set the ratio between the machine-mounted encoder and the motor mounted encoder. See example above.

Profile Point P3-04 = 0.00 Unt	Setting Range: Factory Default: Modbus Address:	0-655.35 0.00 05a3 Hex

P3-04 Profile Point

This is used to set the point during a profile move that the speed will change to the value of P3-05. It is not used if set to zero. When the current position is greater than P3-04 and the direction is positive, speed P3-05 is used.

Profile Speed P3-05 = 5.00 Hz	Setting Range: Factory Default: Modbus Address:	0-400.00 Hz 5.00 05a4 Hex

P3-05 Profile Speed

This is used to set the speed during a profile move. When the position is greater than P4-04 and the direction is positive, this speed is used. It is not used if P3-04 is set to zero.

32-bit Dist MSB P3-09 = 1	Setting Range: Factory Default: Modbus Address:	-32767 to 32767 1 05a8 Hex

P3-09 32-bit Dist MSB

A computer can be used to send distance information to the controller. 32-bit accuracy is possible (31 plus sign) Write the first MSB 16 bits to Modbus address 05a8 and LSB 16bits to 05a9. No enter command is necessary.

32-bit Dist LSB P3-10 = 0	Setting Range: Factory Default: Modbus Address:	0 to 65535 0 05a9 Hex

P3-10 32-bit Dist MSB

See above.

5.0 New Monitors

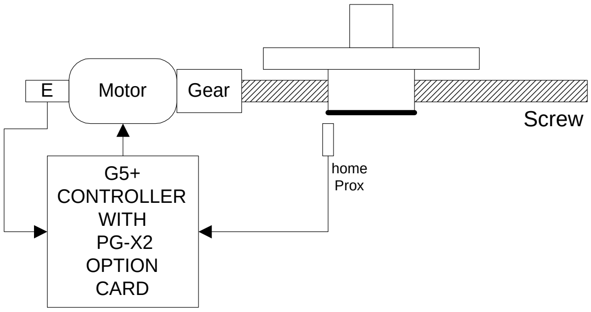
Parameter	Modbus	Display	Digits	Description
U1-50	00d0	Destination	xxx.xx Unt	Displays the commanded destination in units.
U1-51	00d1	Speed Ref input	xxx.xx Hz	Displays the commanded speed reference.
U1-52	00d2	case_flag3	xxxxxH	Displays the hex value of an internal temporary flag register for diagnostics and monitoring by external computers. home_sw_on bit 0 pos_ot_limit_tripped bit 1 neg_ot_limit_tripped bit 2 servo mode bit 3 home_sw_on2off bit 4 home_sw_off2on bit 5 case_pos direction bit 6 case_neg direction bit 7 home_command bit 8 position_command bit 9 jog_command bit 10
U1-53	00d3	case_flag4	xxxxxH	Displays the hex value of an internal retentive flag register for diagnostics and monitoring by external computers. home_completed bit 0 home_sw_last_scan bit 1 prev_complete bit 2
U1-54	00d4	Active Block	xxxxx	Displays the active block of code or sub-routine in the program. Used for diagnostics and monitoring by external computers. 0 = no command 1 = no command 2 = zero servo 11= home positive 12= home back up 13= Home Final 14= Home stop 15= Home complete 21= position move distance. to go calculation 22= position move travel in progress 23= position move decel in progress 24= position move creep in progress 25= position move stop in progress 31= Jog in progress
U1-55	00d5	Speed Ref output	xxx.xxHz	Displays the speed reference coming out of the motion software.
U1-56	00d6	Dist From Home	xxx.xx Units	Displays the distance from home in units.
U1-57	00d7	Dist to Go	xxx.xx Units	Displays the distance between where the machine is at and where it is going.
U1-58	00d8	Counts to Go	xxxxx Counts	Displays the distance between where the machine is at and where it is going in motor counts.
U1-59		ABS Encoder		Monitors machine position feedback from absolute feedback encoder coming in on 18 bits of a DI-16H2 card.

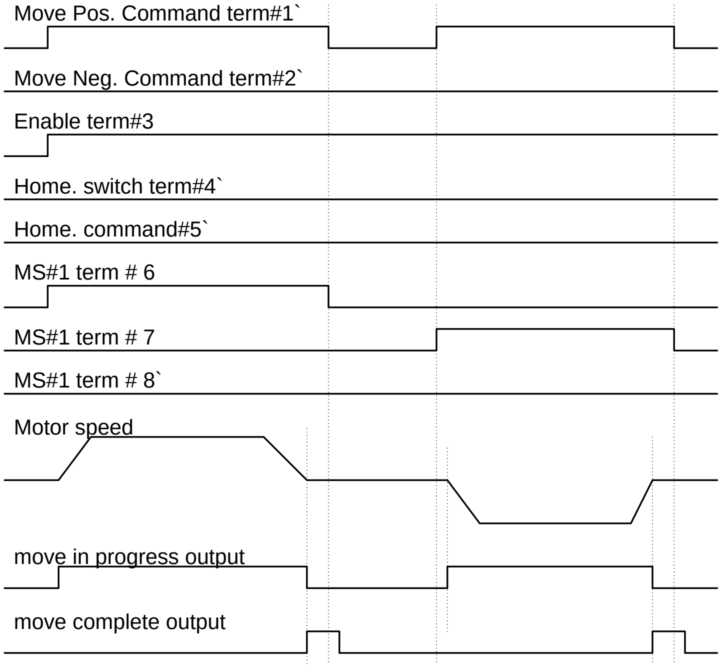
6.0 New Alarm and Fault Codes

Fault Display	Name	Description	Corrective Action
F1-05 Encdr Dir	Encoder Direction Fault	F1-05 must be set to 0 (CCW direction) for the software to work correctly.	Set F1-05 to 0 (CCW) and switch encoder wires to insure correct phasing.

7.0 Sample Applications

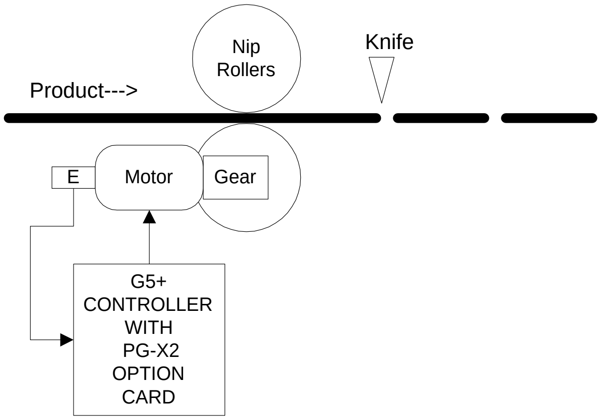
7.1 Two position Ballscrew Slide

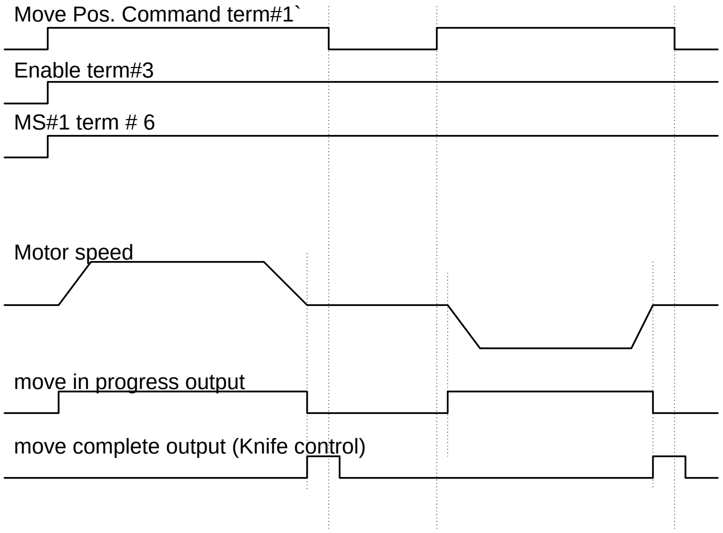

E
Motor
Gear
Screw
home
Prox
G5+
CONTROLLER
WITH
PG-X2
OPTION
CARD


Move Pos. Command term#1`
Move Neg. Command term#2`
Enable term#3
Home. switch term#4`
Home. command#5`
MS#1 term # 6
MS#1 term # 7
MS#1 term # 8`
Motor speed
move in progress output
move complete output

Modified constants	Function
A2-01	Distance from home multistep 1 is selected.
A2-02	Distance from home multistep 2 is selected.
C1-01	Accel when multistep 1 is selected.
C1-02	Decel when multistep 1 is selected.
C1-03	Accel when multistep 2 is selected.
C1-04	Decel when multistep 2 is selected.
D1-01	Speed when multistep 1 is selected.
D1-02	Speed when multistep 2 is selected.

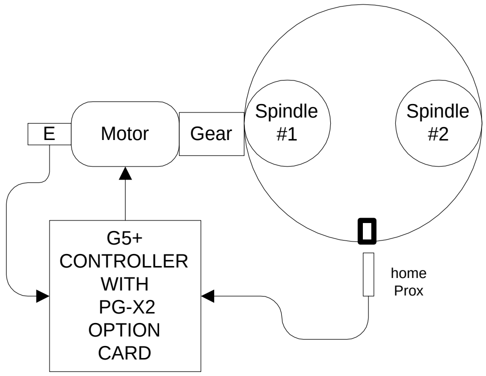
7.2 Cut To Length

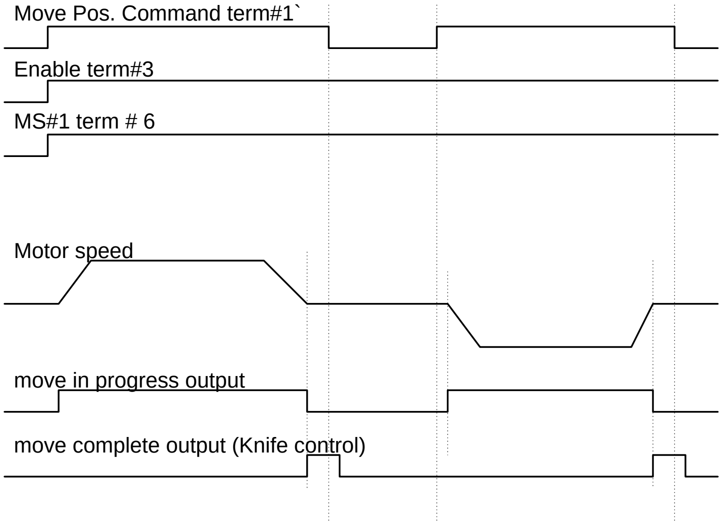

Nip
Rollers
Knife
Product--->
E
Motor
Gear
G5+
CONTROLLER
WITH
PG-X2
OPTION
CARD


Move Pos. Command term#1`
Enable term#3
MS#1 term # 6
Motor speed
move in progress output
move complete output (Knife control)

Modified constants	Function
A2-01	Distance (length of cut).
C1-01	Accel when multistep 1 is selected.
C1-02	Decel when multistep 1 is selected.
D1-01	Speed when multistep 1 is selected.
P1-01	Motion Type set to #2 Linear Realitive

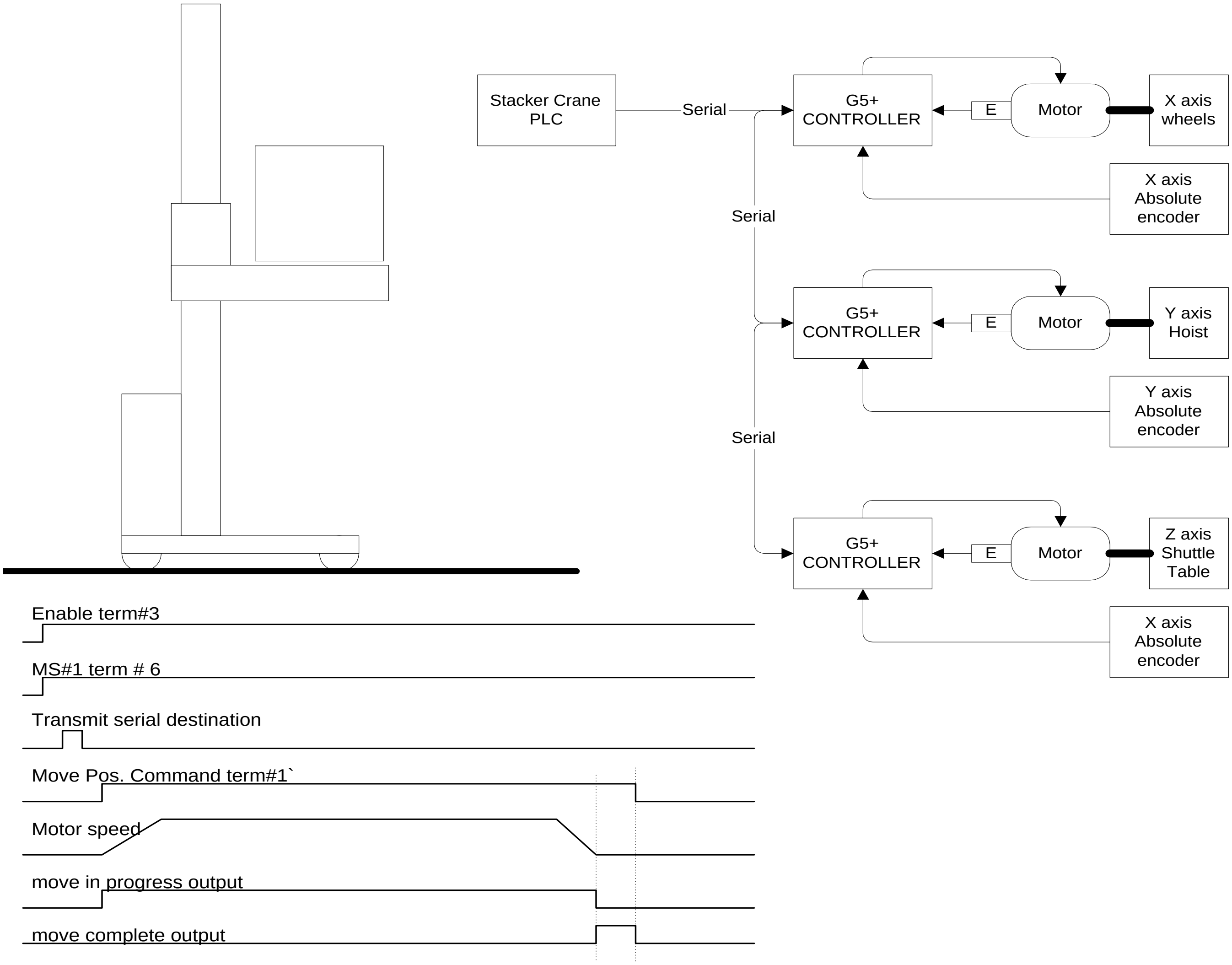
7.3 Rotary Turret


E
Motor
Gear
Spindle #1
Spindle #2
G5+ CONTROLLER WITH PG-X2 OPTION CARD
home Prox


Move Pos. Command term#1`
Enable term#3
MS#1 term # 6
Motor speed
move in progress output
move complete output (Knife control)

Modified constants	Function
A2-01	Distance of rotation
C1-01	Accel when multistep 1 is selected.
C1-02	Decel when multistep 1 is selected.
D1-01	Speed when multistep 1 is selected.
P1-01	Motion Type set to #4 Rotary Relative
P1-07	Length of Rotate
P1-06	Memory On

7.4 Stacker Crane using absolute encoder feedback


Stacker Crane PLC
Serial
G5+ CONTROLLER
E
Motor
X axis wheels
X axis Absolute encoder
Serial
G5+ CONTROLLER
E
Motor
Y axis Hoist
Y axis Absolute encoder
Serial
G5+ CONTROLLER
E
Motor
Z axis Shuttle Table
X axis Absolute encoder
Enable term#3
MS#1 term # 6
Transmit serial destination
Move Pos. Command term#1`
Motor speed
move in progress output
move complete output

Modified constants	Function
C1-01	Accel when multistep 1 is selected.
C1-02	Decel when multistep 1 is selected.
D1-01	Speed when multistep 1 is selected.
P1-03	32 bit serial distance
P3-01	Absolute encoder feedback
P3-02	Encoder ratio
P3-03	Encoder ratio