

MBC25P22

Programmable Pulse Generator/Driver

User's Guide



A N A H E I M A U T O M A T I O N

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Features

- **2.5A Peak Output Current Per Driver**
- **200 to 1600 Steps/Revolution (1, 2, 4 and 8 Selectable Step Operation)**
- **Drives Two Motors**
- **On-Board Programmable Pulse Generator**
- **Pulses From 152Hz to 50,000Hz**
- **Analog Potentiometer Input for Maximum Speed**
- **Clock Output for Daisy Chaining**
- **Busy Output**
- **Motor On/Off Input and Automatic Current Reduction**
- **Short Circuit Protection**

Introduction

Anaheim Automation has developed a step motor driver specifically for the feed-conveyor industry, where high motor speed and precise synchronization is required. Anaheim Automation's engineers have incorporated two driver chips to eliminate the load-sharing issues that typically slowed down motors in earlier designs. This design enables the motors to be run at 50% higher speeds than our earlier designs with no additional cost. The MBC25P22 microstep driver/pulse generator has an output current capability of 0.5A minimum to 2.5A maximum (peak rating). The MBC25P22 driver operates with a DC voltage of 12VDC to 35VDC. The MBC25P22's internal PG (pulse generator) has two different programmable motion profiles and an optional analog input for a potentiometer or equivalent input to control the maximum speed. The MBC25P22 also has a busy output and a clock output that can be used for daisy chaining drivers together. The MBC25P22 driver features direction control and motor current On/Off capabilities. The "Reduce Current Enabled" feature automatically reduces motor current to 70% of the set value. The driver has built in features to indicate power on (green LED), running (yellow LED) and error conditions (red LED). The MBC25P22 has various step resolutions that can be implemented. These divisions range from 200 steps/rev to 1600 steps/rev. The bipolar drive configuration handles 4, 6, and 8 lead step motors and is also equipped with short circuit, over temperature and crossover current protection. The MBC25P22 communicates via RS232 communication. The easy to use Windows software, SMPG20WIN, is used to directly set up the two different motion profiles.

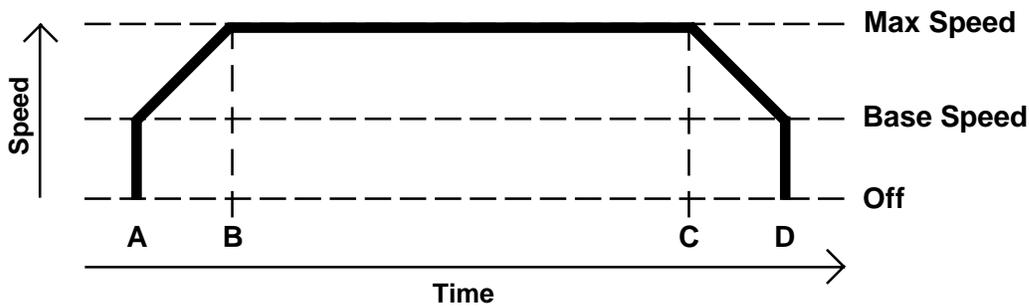
Motion Profiles and Running the Pulse Generator

The programmable pulse generator has the ability to store two different motion profiles. The profiles include a base speed (starting speed), a maximum speed (running speed) and acceleration/deceleration. The base speed has a range of 152-5000 Hz, the maximum speed has a range of 152 Hz-50 kHz, and the acceleration/deceleration has a range of 1-255. A separate command is used to control the ramp down profile. The ramp down profile lets the user have the option to either ramp down to base speed and stop (soft stop), or to hard stop once the Run input is released. The deceleration option is the same for both motion profiles. There are "two ways" to get the pulse generator to run. The first way is to directly control it from the computer with software. Once the motion profiles have been set, the pulse generator is ready to run. From the software, the user can select which profile to run and then hit the "Begin Motion" button. To stop motion within the software, use either the "Soft Limit" or the "Hard Limit" button. The "Soft Limit" button will ramp the pulses down to base speed and stop. The "Hard Limit" button will stop the pulses immediately. The second way to make the pulse generator run is to activate the Run input. When this input is activated, it looks to see what speed profile is set at the Max1/Max2 input. To stop motion, release the Run input. When this input is released, the deceleration option will then either ramp down to base speed and stop or just hard stop depending on the ramp down option setup in the software. Once the pulses stop the reduce current option will take effect if enabled in the software. To use the Analog Potentiometer input to control the maximum speed, the user needs to enable the analog input and set up the upper and lower speed thresholds for the maximum speed in the software. The maximum speed will then be calculated based on the percentage of the potentiometer and lie between these two thresholds at

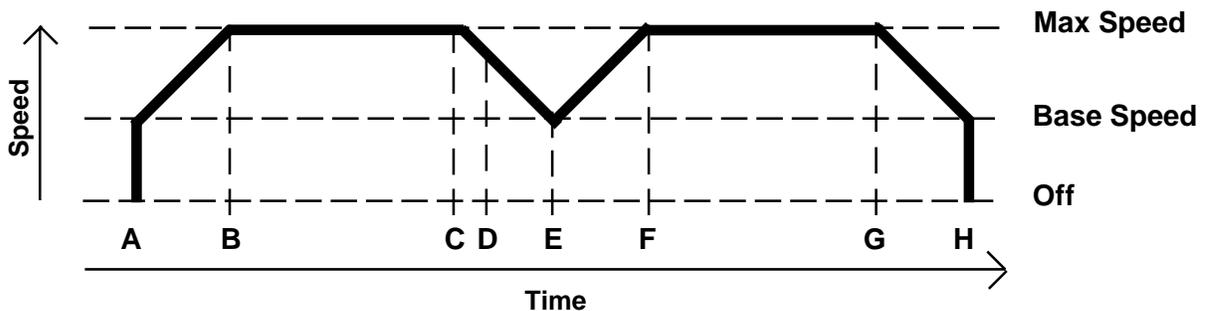
the calculated percentage. A three pin potentiometer will connect between +5V and 0V and the wiper is read to determine the calculated percentage. There are an available 1023 points between the lower and upper thresholds that are set in the software that can be calculated for the maximum speed.

Operation with Ramp Down Option

- A) Run is activated; Starts at base speed and immediately ramps up to max speed.
- B) Run is still active; Max speed is reached (keeps running at max speed).
- C) Run is deactivated; Motor ramps down.
- D) Pulses automatically stop when base speed is reached.

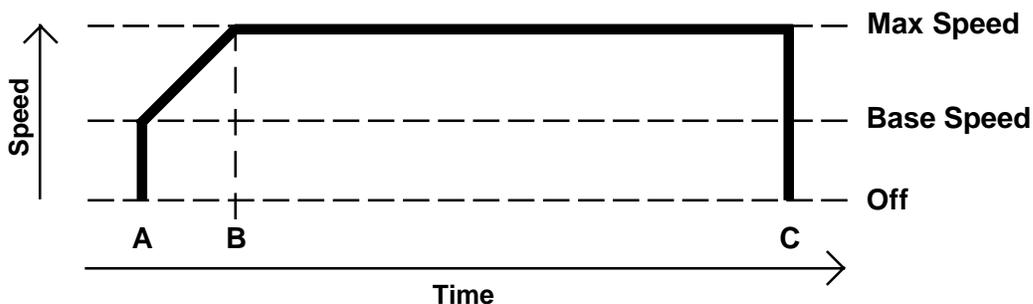


- A) Run is activated; Starts at base speed and immediately ramps up to max speed.
- B) Run is still active; Max speed is reached (keeps running at max speed).
- C) Run is deactivated; Motor ramps down.
- D) Run is activated again before motor stops; The motor will continue to ramp down to base speed
- E) Run is still active; Motor reaches base speed and immediately ramps up to max speed.
- F) Run is still active; Max speed is reached (keeps running at max speed).
- G) Run is deactivated; Motor ramps down.
- H) Pulses automatically stop when base speed is reached.



Operation without Ramp Down Option

- A) Run is activated; Starts at base speed and immediately ramps up to max speed.
- B) Run is still active; Max speed is reached (keeps running at max speed).
- C) Run is deactivated; Motor stops immediately.



LEDs

When powered and operated properly, the status LED will be green. When an error in communication occurs, the LED will change to RED and an error code will be generated in the error code register. To read and clear the error with the software, click on the "Verify Parameters" button. To read and clear the error while in "Direct Mode" use the "!" command. Once the error has been read and cleared, the LED will return to the green color and the error code register will be cleared. Refer to the table in section 5 for a list of the error codes. When the pulse generator is running the yellow LED will be on. Refer to the dimension drawing for location of the LEDs. For more detail on "Direct Mode" refer to the Direct Talk Mode section of user's guide.

Baud Rates

A term used frequently in serial data communications. A "baud" is defined as the reciprocal of the shortest pulse duration in a data word signal, including start, stop, and parity bits. This is often taken to mean the same as "bits per second", a term that expresses only the number of "data" bits per second. Very often, the parity bit is included as an information or data bit. The MBC25P22 only accepts a baud rate of 38400.

Inputs and Outputs

Inputs: All inputs are pulled up to 5VDC. A logic "0" will activate the inputs. An unconnected input will always remain inactive.

Direction: When this input is not active, the motors will be moving in the clockwise or "+" direction. When this input is active, the motors will move in the counterclockwise or "-" direction. When two motors are used, the second motor will move in the opposite direction by default.

On/Off: When this input is not active, the motor will be enabled or energized. When this input is active, the motor will be disabled or de-energized.

Run: When this input is not active, the pulse generator is stopped and will not output any pulses. When this input is active the pulse generator will output pulses starting at the base speed rate and will ramp up and output pulses at the max speed rate. When this input is released, the pulse generator will ramp down to base speed and stop or hard stop depending on the deceleration option set in the software.

Max1/Max2: This input is used to select one of the two profiles when the run input is activated. To use profile 1, then keep this input inactivate. To use profile 2, then activate this input.

External Clock Output: The external clock is the output of the internal pulse generator that can be used to daisy chain other step motor drivers together. This is an open collector output that is capable of sinking 10mA.

Busy Output: This is an open collector output that is capable of sinking 10mA. It is current sinking when the pulse generator is operating (sending pulses), and open when the pulse generator is not sending pulses.

Technical Support

Everyone needs help on occasion. If you have problems using any of the equipment covered by this manual, please read the manual to see if it will answer the questions you have. Be sure to look in the troubleshooting section located near the back of this manual. If you need assistance beyond what this manual can provide, you can call the factory direct for application assistance. If possible, have this manual in hand. It is often helpful to have the unit connected to a computer with the software installed.

Connector Descriptions

Connector P1:	
Pin #	Description
1	Power Supply Ground (0VDC)
2	Power Supply Input (12VDC - 35VDC)
3	Run
4	Busy
5	Max1/Max2
6	Clock Output of Internal Clock
7	Motor On/Off
8	Direction In
9	External Clock Input

Connector P2: (One Motor)	
Pin #	Description
1	Motor 1, Phase 1
2	Motor 1, Phase 3
3	Motor 1, Phase 2
4	Motor 1, Phase 4
5	Motor Ground
6	No Connect
7	No Connect
8	No Connect
9	No Connect
10	No Connect

Connector JP1:	
Pin #	Description
1	5VDC
2	Pot Wiper
3	0VDC

Connector P2: (Two Motors)	
Pin #	Description
1	Motor 1, Phase 1
2	Motor 1, Phase 3
3	Motor 1, Phase 2
4	Motor 1, Phase 4
5	Motor 1 Ground
6	Motor 2, Phase 1
7	Motor 2, Phase 3
8	Motor 2, Phase 2
9	Motor 2, Phase 4
10	Motor 2 Ground

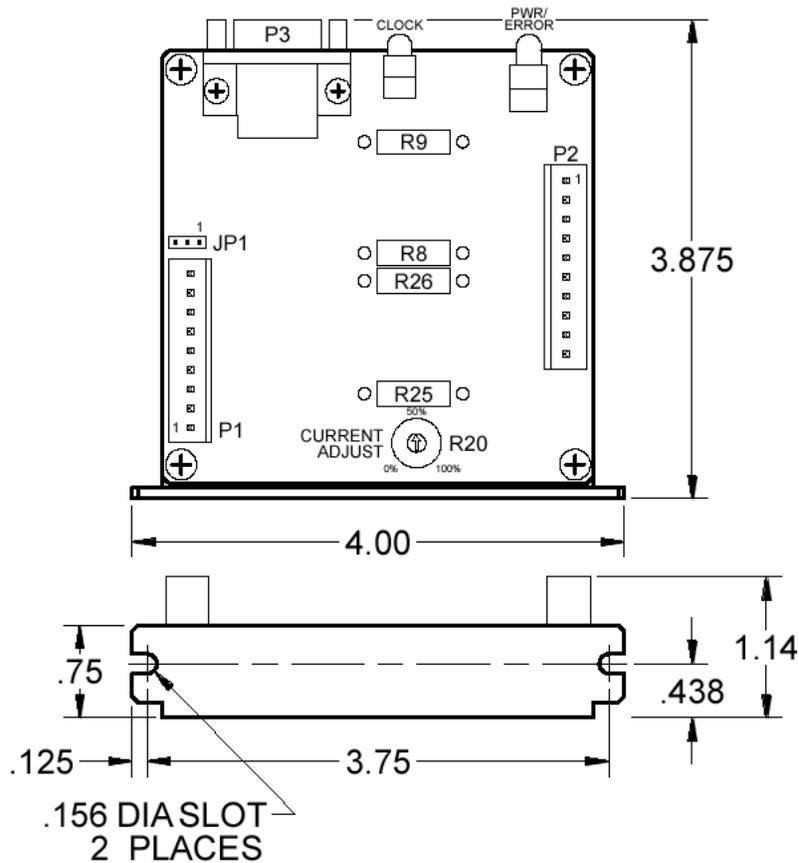
Ordering Information

Part Number	Description
MBC25P22	Dual 2.5A Microstep Driver with integrated Programmable Pulse Generator
PSAM24V2.7A	Power supply for MBC25P22 (24V@2.7A)
CON-6404289	Optional 9 pin connector, 0.156" IDC (AMP part no. 640428-9)
CON-16404280	Optional 10 pin connector, 0.156" IDC (AMP part no. 1-640428-0)
AA9MFC-6	6 foot serial communication cable, Male to Female

Specifications

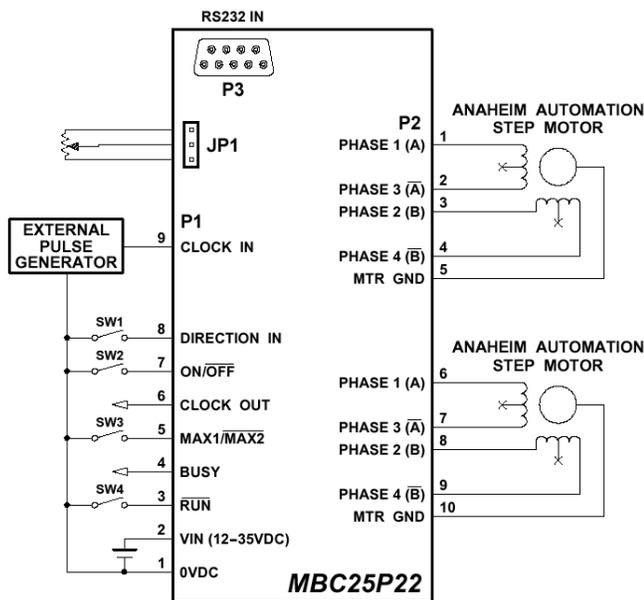
Voltage Requirements	12-35VDC	
Run Input (P1, Pin 3)	Stop	Inactive
	Run	Active
Direction Input (P1, Pin 8)	CW	Inactive
	CWW	Active
On/Off Input (P1, Pin 7)	On	Inactive
	Off	Active
Max1/Max2 Input (P1, Pin 5)	Max 1	Speed Profile 1 is used
	Max 2	Speed Profile 2 is used
Busy Output (P1, Pin4)	Open Drain type Output, 75mA Sink, 40VDC Stand Off	
Clock Output (P1, Pin6)	Open Drain type Output, 75mA Sink, 40VDC Stand Off	
Clock Out Frequency (P1, Pin 6)	Min	152Hz
	Max	50kHz
Output Current: $T_A = 25^\circ\text{C}$	Min	0.5A peak
	Max	2.5A peak
Driver Chopping Frequency	25kHz - 30kHz	
Operating Temperature	0 - 70°C	
LEDs	Green	Power On
	Red	Programming Error
	Yellow	Clocks being received above 10Hz
Com Port Settings	38400,N,8,1	

Dimensions and Jumper/Potentiometer Locations

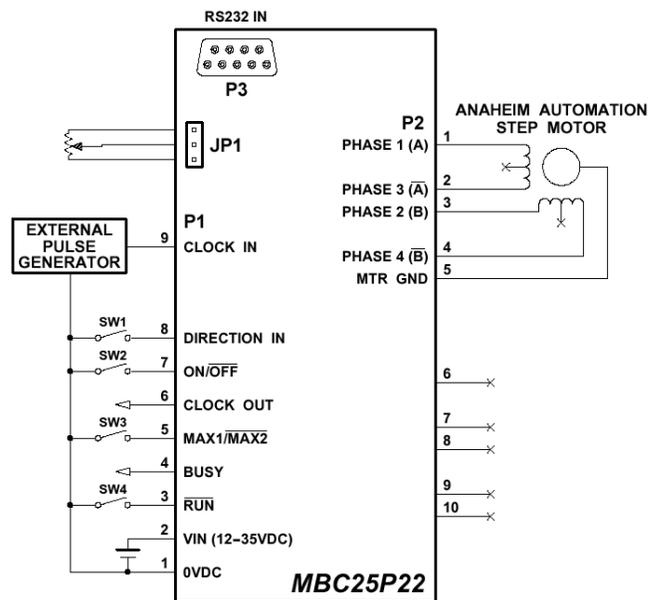


Wiring Diagrams

Two Motors



One Motor



Microstep Modes

The microstepping modes are set by using the software when the profiles are being setup. The ranges of microstepping are 200, 400, 800, and 1600 steps per revolution in a 200 step/revolution step motor. To set the divisor just select the divisor wanted (1,2,4, or 8).

Setting the Output Current

The output current on the MBC25P22 is set by the on-board potentiometer R20 (Refer to Dimension Drawings and Potentiometer Locations). This current adjust potentiometer determines the per phase peak output current of both drivers. Both drivers are controlled by the same potentiometer. The relationship between the output current and the potentiometer setting is as follows:

Peak Current	Potentiometer Setting
0.5A	0%
0.7A	10%
0.9A	20%
1.1A	30%
1.3A	40%
1.5A	50%
1.7A	60%
1.9A	70%
2.1A	80%
2.3A	90%
2.5A	100%

Reducing Output Current

Reducing the output current is accomplished automatically depending on the current reduction setting in the software. The amount of current per phase in the reduction mode is approximately 70% of the set current. When the current reduction circuit is activated, the current reduction resistor is paralleled with the current adjustment potentiometer. This lowers the total resistance value, and thus lowers the per phase output current. This is done when the pulse generator is not running.

Determining Output Current

The output current used for the motor when microstepping is determined differently from that of a full/half step unipolar driver. In the MBC25P22, a sine/cosine output function is used in rotating the motor. The output current for a given motor is determined by the motors current rating and the wiring configuration of the motor. There is a current adjustment potentiometer used to set the output current of the MBC25P22. This sets the peak output current of the sine/cosine waves. The specified motor current (which is the unipolar value) is multiplied by a factor of 1.0, 1.4, or 2.0 depending on the motor configuration (series, half-coil, or parallel).

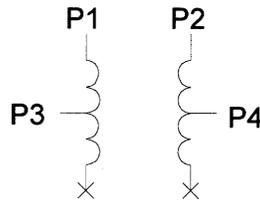
Step Motor Configurations

Step motors can be configured as 4, 6, or 8 leads. Each configuration requires different currents. Refer to the lead configurations and the procedures to determine their output current.

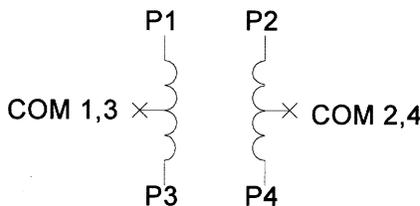
WARNING! Step motors will run hot even when configured correctly. Damage may occur to the motor if a higher than specified current is used. Most specified motor currents are maximum values. Care should be taken to not exceed these ratings.

6 Lead Motors

When configuring a 6 lead motor in a **half-coil configuration** (connected from one end of the coil to the center tap), multiply the specified per phase (or unipolar) current rating by 1.4 to determine the current setting potentiometer value. This configuration will provide more torque at higher speeds when compared to the series configuration.

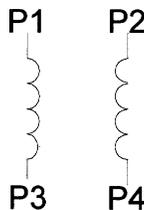


When configuring the motor in a **series configuration** (connected from end to end with the center tap floating) use the specified per phase (or unipolar) current rating to determine the current setting potentiometer value.



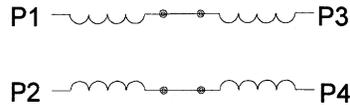
4 Lead Motors

Multiply the specified **series** motor current by 1.4 to determine the current adjustment potentiometer value. 4 lead motors are usually rated with their appropriate series current, as opposed to the *Phase Current*, which is the rating for 6 and 8 lead motors.

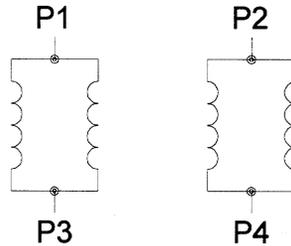


8 Lead Motors

Series Connection: When configuring the motor windings in series, use the per phase (or unipolar) current rating to determine the current setting potentiometer value.



Parallel Connection: When configuring the motor windings in parallel, multiply the per phase (or unipolar) current rating by 2.0 to determine the current setting potentiometer value.



Note: After the current has been determined, according to the motor connections above, use the potentiometer setting table to choose the proper setting for the current setting potentiometer.

Connecting the Step Motor

The MBC25P22 is designed to accept either one or two motors. For wiring of the motor refer to the pages containing the connector descriptions and hookup diagrams.

Note: The physical direction of the motor with respect to the direction input will depend on the connection of the motor windings. To reverse the direction of the motor with respect to the direction input, switch the wires on phase 1 and phase 3. With the operation of 2 motors, they will run in the opposite direction when wired the same.

WARNING: Do not connect or disconnect motor wires while power is applied!

Circuit Protection

This driver is equipped with short circuit, over temperature and cross over current protection.

Note: When drive experiences a fault condition, it will cease to function. Power down, inspect wiring, motors, etc. and allow for a 30 second pause to resume functioning. If driver is too hot, additional ventilation and airflow should be added to prevent temperature to exceed recommended temperature limit.

Functions

Max1/Max2 Input: This inputs is used to select the specified speed profile. These inputs are used in conjunction with the Run input. Max1 selects profile 1 and Max2 selects profile 2.

Run: Triggering this input will cause the pulse generator to start. The pulse generator will use the selected speed profile and start at base speed and ramp up to max speed. The motor will run at max speed until the stop/run is released. If the pulse generator is running at max speed when the stop/run input is released then it will either stop hard or ramp down to base and stop depending on the setting of the ramp down profile.

Ramp Down Option: When this option is off the pulse generator will stop hard when the Run input is released. If this option is on, then the pulse generator will ramp down to base speed and stop when the Run input is released.

Reduce Current Option: When this option is on the motor will receive 70% of its set current when the pulses stop. When this option is off the motor will receive 100% of its set current when the pulses stop.

Microstep Resolution: These options will set the divisor for both drivers. The options are 1 (200 steps/rev), 2 (400 steps/rev), 4 (800 steps/rev) or 8 (1600 steps/rev)

Analog Speed Option: When this option is on the pulse generator will calculate the max speed to use when motion is started. The maximum speed will be calculated based upon the percentage of the potentiometer input and the percentage between the upper and lower inputs

Acceleration/Deceleration: The acceleration and deceleration are by default the same value. This function controls the time that the motor will take to move from base speed to max speed. The higher the value, the slower the motor will accelerate. The same principal applies for the deceleration which is controlling the time it takes to go from maximum speed to base speed. The higher the value, the slower the pulses will decelerate. (Range: 1 to 255)

Base Speed: The base speed is the speed at which motion starts and stops. It is entered directly as the number of steps per second. This speed must always be less than the max speed. The different base profiles are stored in EEprom for standalone use. (Range: 152 to 5000)

Max Speed: The max speed is the top speed the user wants the pulses to run at. This speed must always be equal or greater than the base speed. It is entered directly as the number of steps/second. The different max profiles are stored in EEprom for standalone use. (Range: 152 to 50000)

Lower Analog Limit: The lower analog limit is the speed at which the max speed will calculate when the potentiometer is at its lower position (0VDC).

Upper Analog Limit: The upper analog limit is the speed at which the max speed will calculate when the potentiometer is at its upper position (5VDC).

Direction Input: If this input is open then the unit will be running in the clockwise direction. If this input is active then the unit will be running in the counterclockwise direction.

Busy Output: This output will be pulled low when the pulse generator is operating. It is an open drain output so when the pulse generator is not running the pin is open.

SMPG20WIN Software

The SMPG20WIN software is a handy utility that supports Anaheim Automation's programmable pulse generator. Connecting your PC to the MBC25P22, via a serial cable, the SMPG20WIN software can easily perform the following tasks:

- Exercise and monitor the MBC25P22
- Directly communicate with the MBC25P22

Installation

Software

- The SMPG20WIN is supplied on a CD, containing the setup program for the SMPG20WIN software and this user's guide.
- SMPG20WIN is compatible with all versions of Windows including Windows 2000 and Windows XP

Windows 95/98/NT/ME/2000/XP Installation

Option 1

- 1) Insert the CD into the drive
- 2) On the Windows Taskbar select **Start | Run**
- 3) Enter **D:\setup** and click **OK** - use the appropriate drive letter (i.e. **D** or **E**)

Option 2

- 1) Open Windows Explorer
- 2) Open CD Drive Folder (D: or E:)
- 3) Double click the Setup Icon

Getting Started

- 1) Apply power to the pulse generator unit.
- 2) Double click on the SMPG20WIN icon to run the SMPG20WIN software.
- 3) Set the appropriate communication setting by selecting Setup | Communication Setting from the menu bar.
- 4) Establish communications with the pulse generator by clicking on the Connect Icon, or select Setup | Connect. If the unit is connected properly, the program will notify you when communications have been established.

“The Unit is Connected” / “The Unit is NOT Connected”

On the right of the Toolbar, the user will find the communication status of the pulse generator. If communications are not established, please refer to the troubleshooting section.



File Menu



Setup Menu



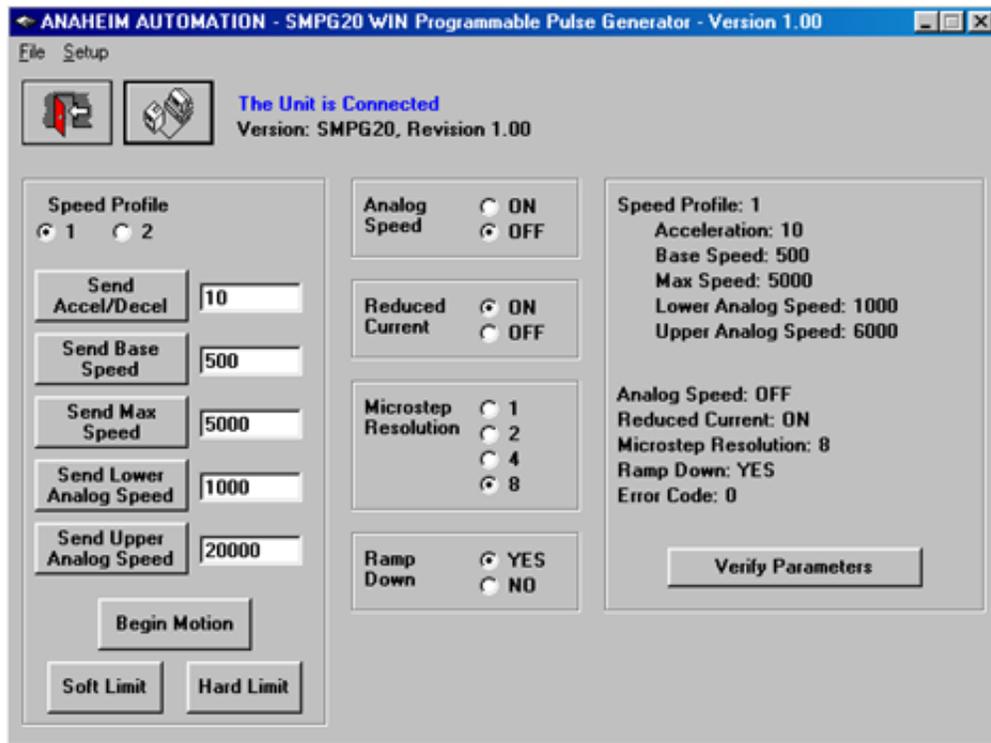
Exit	Exit the SMPG20WIN software
Connect	Establish communications with the controller.
Communication Settings...	COM port Selection (Ports 1, 2, 3 or 4)

Toolbar



Exit	Exit the SMPG20WIN software.
Connect	Establish communication with the controller.

Program Window



Speed Profile	Select speed profiles 1 or 2 to be used in conjunction with the Max1/Max2 Input
Send Accel/Decel	Send acceleration & deceleration parameter to the pulse generator. (1=fastest, 255=slowest)
Send Base Speed	Send base speed parameter to the pulse generator. (steps/sec)
Send Max Speed	Send maximum speed parameter to the pulse generator. (steps/sec)
Send Lower Analog Speed	Send upper analog speed limit to the pulse generator. (steps/sec)
Send Upper Analog Speed	Send lower analog speed limit to the pulse generator. (steps/sec)
Begin Motion	Motor will ramp up to maximum speed and keep moving until a limit switch is triggered.
Soft Limit	Motor will ramp down to base speed and stop.
Hard Limit	Stop any motor motion.
Analog Speed	Set analog speed to on or off.
Reduced Current	Set reduced current on or off.
Microstep Resolution	Set microstep resolution to divide by 1, 2, 4, or 8.
Ramp Down	Set ramp down option to yes or no.
Verify Parameters	Updates and displays controllers parameters and resets the error codes.

Direct Talk Mode

Direct mode is used to directly control the motion for real time movements through serial communication. The pulse generator has 14 commands which are easy to remember for direct movement of a step motor.

COM Port Settings

Baud Rate: 38400
Parity: None
Data Bits: 8
Stop Bits: 1
Flow Control: Xon/Xoff

Unit Selection

In order to select a unit the @ command followed by 0 (address of the unit) must be sent.
NOTE: There should be no spaces between the @ and the 0.

How to select the unit:

@0 (Unit is selected)

How to get a response from the unit:

@0\$ (Carriage Return)

After the \$ command, the pulse generator will return a SMPG20 and the current revision number.
Note: In direct talk mode each command is followed by a carriage return (enter command).

The unit communicates in half duplex mode, therefore proper setup of hyper terminal is necessary to view characters, if characters are to be echoed back to the screen.

Instructions

All instructions require that no spaces be sent between the command and the parameter followed by a carriage return. The commands are also case sensitive and are all sent as capitals.

Command Summary:

A - Acceleration/Deceleration	M - Max Speed
B - Base Speed	R - Microstep Resolution
C - Current Reduction	S - Soft Limit
D - Ramp Down	U - Upper Speed Limit
E - Analog Speed	V - Verify
G - Go (Run)	\$ - Version Number Register
H - Hard Limit	! - Error Codes Register
L - Lower Speed Limit	

\$ - Version Number Register

Format: \$

Description: This command requests the pulse generator to return the version number.

! - Error Codes Register

Format: !

Description: This command requests the pulse generator to get the current error code and print it to the screen.

A - Acceleration/Deceleration

Format: A#[value] - where # is the speed profile number 1 or 2

Sample: @0A1_255 Accel of profile 1 equals 255

Description: This command sets the acceleration profile which can be an integer value between 1 and 255. The lower the value the faster the pulse acceleration, so a 1 is the fastest profile and 255 is the slowest. These values are saved in the EEPROM for standalone use.

Range: 1 - 255

B - Base Speed

Format: B#[value] - where # is the speed profile number 1 or 2

Sample: @0B2_200 Base Speed of profile 2 equals 200

Description: This command sets the base (start) speed for motion. This value must be set before motion begins and be less than the maximum speed. The pulses will ramp down to this speed after a soft limit is triggered and run at this speed until a hard limit is triggered. These values are saved in the EEPROM for standalone use.

Range: 152 - 5,000

C - Current Reduce Option

Format: C# - where # is 0 or 1

Description: This command enables the driver to reduce current after pulses are done being sent. A 1 will enable current reduction, and a 0 will disable current reduction. This value is saved in the EEPROM for standalone use.

D - Deceleration Option

Format: D# - where # is 0 or 1

Description: This command enables the pulse generator to ramp down to base speed before stopping when using the external Run/Stop input. A 1 will enable the pulses to ramp down to base speed and stop, and a 0 will disable ramp down causing the pulse generator to hard stop at maximum speed. This value is saved in the EEPROM for standalone use.

E - Analog Input Option

Format: E# - where # is 0 or 1

Description: This command enables the pulse generator to calculate the maximum speed based upon the potentiometer settings. A 1 will enable the analog speed and a 0 will disable the analog speed and use the entered maximum speed. This value is saved in the EEPROM for standalone use.

G - Go Slew (Run)

Format: G# - where # is the speed profile number 1 or 2

Description: This command will send clocks out to the pulse generator. The only commands that can stop the clocks are H (stop motion) and the S(soft limit) command.

H - Hard Limit or Stop Motion

Format: H

Description: This command will stop all motion. It can only be used when pulses are running.

L - Lower Analog Speed Limit

Format: L#[value] - where # is the speed profile number 1 or 2

Sample: @0L2_25000 Lower Analog Speed of profile 2 equals 25000

Description: This command sets the lower analog speed limit speed for motion. This value must be set before motion begins and be equal or greater than the base speed and less than or equal to the upper analog speed limit. This value is used as the lower threshold when calculating the analog maximum speed. These values are saved in the EEPROM for standalone use.

Range: 152 - 50,000

M - Max Speed

Format: M#[value] - where # is the speed profile number 1 or 2

Sample: @0M2_10000 Max Speed of profile 2 equals 10000

Description: This command sets the maximum (running) speed for motion. This value must be set before motion begins and be equal or greater than the base speed. The motor will run at this speed until a soft limit or a hard limit is triggered. This speed is used when the analog inputs is disabled. These values are saved in the EEPROM for standalone use.

Range: 152 - 50,000

R - Microstepping Resolution

Format: R# - where # is 1, 2, 4, or 8

Description: This command enables the user to select the desired resolution for the microstepping driver. Divisions for the driver are Full step (1), Half step (2), Quarter step (4), and Eighth step (8). This value is saved in the EEPROM for standalone use.

S - Soft Limit

Format: S

Description: This command will cause the pulse generator to ramp down to base speed and stop. It can only be used when pulses are running.

U -Upper Analog Speed Limit

Format: U#[value] - where # is the speed profile number 1 or 2

Sample: @0U1_5000 Upper Analog Speed of profile 1 equals 5000

Description: This command sets the upper analog speed limit speed for motion. This value must be set before motion begins and be equal or greater than the base speed and the lower analog speed input. This value is used as the upper threshold when calculating the analog maximum speed. These values are saved in the EEPROM for standalone use.

Range: 152 - 50,000

V - Verify

Description: This command can be used with the listed commands to verify the register contents. Valid Commands are: A, B, C, D, E, L, M, R, and U.

Format: V[command]

This format is used for C, D, E, and R.

- C - If a 1 is sent back then the driver is in reduced current mode. If a 0 is sent back then the driver is not in reduced current mode.
- D - If a 1 is sent back then the pulse generator will ramp down to stop when the Run/Stop input is released. If a 0 is sent back then the pulse generator will stop hard when the Run/Stop input is released.
- E - If a 1 is sent back then the analog voltage input is active. If a 0 is sent back then the analog voltage is off and the entered max speed will be used.
- R - If a 1 is sent back then the driver is in Full step mode. If a 2 is sent back then the driver is in Half step mode. If a 4 is sent back then the driver is in Quarter step mode. If an 8 is sent back then the driver is in Eighth step mode.

Sample: @0VR Verification of Microstep Resolution is prompted.

Format: V[command]# - where # is the speed profile number 1 or 2

This format is used for A, B, L, M and U.

- A# - Verify Acceleration/Deceleration for given speed profile.
- B# - Verify Base speed for given speed profile.
- L# - Verify Lower Analog speed limit for given speed profile.
- M# - Verify Max speed for given speed profile. If the analog speed option is enabled then the calculated value will be sent back. If the analog speed is disabled then the entered max speed will be sent back.
- U# - Verify Upper Analog speed limit for given speed profile.

Sample: @0VB1 Verification of Base Speed in Profile 1 is prompted.

Troubleshooting

Problem:

Can not establish communications with the pulse generator.

Possible Solutions:

- 1) Make sure the pulse generator has power. Is the Green LED on.
- 2) Check RS232 connections.
- 3) Check for loose cable connection either on the pulse generator or COM Port.
- 4) Was the software installed successfully?
- 5) Go to **Setup | Communication Settings** and verify COM port settings.
- 6) Click on **Connect** icon to communicate with the pulse generator.
- 7) If problems still exist, contact Anaheim Automation Tech Support.

Problem:

There is no power to the pulse generator.

Possible Solutions:

- 1) Is the pulse generator connected to the appropriate power supply?
- 2) Check for any blown fuses in line with the pulse generator.
- 3) If problems still exist, contact Anaheim Automation at 714-992-6990.

Problem:

The pulse generator has a fault condition.

Possible Solutions:

- 1) To clear an error use either the SMPG20WIN software or the direct mode command.
- 2) The SMPG20WIN can clear an error by clicking on the Verify Parameters button.
- 3) The direct mode command “!” can clear an error by prompting pulse generator to serially send the error code back to the user.

Example: @0! (carriage return)

Description: Address the unit by typing @ followed by a 0 (address number) an ! (Error Codes Register) and a carriage return.

Note: The error code is returned in binary coded decimal format. If two errors were received their binary values would be added together.

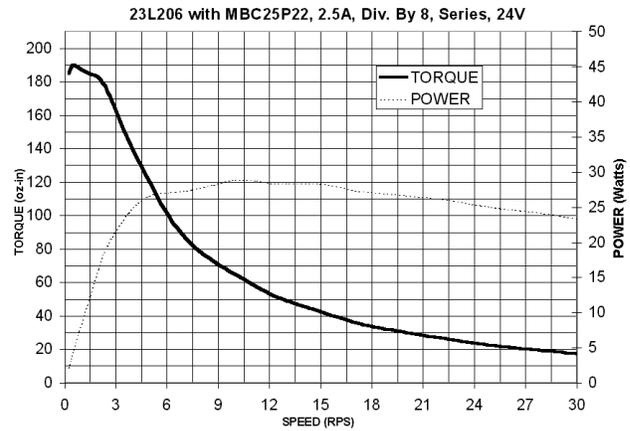
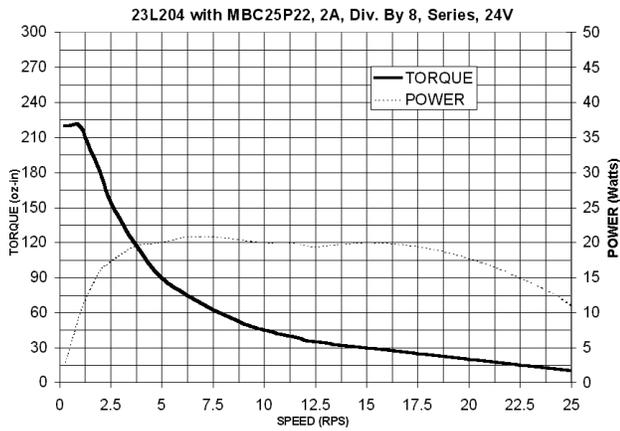
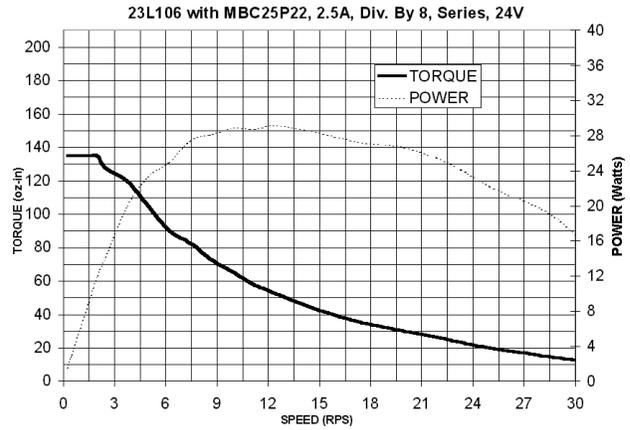
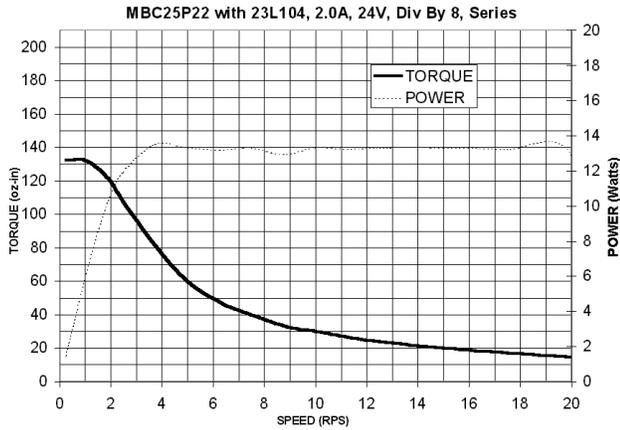
Error Codes

Error Code	Type	Description
1	Recieve Overflow Error	The serial communications had a recieving error. This is an internal error caused by the computer.
2	Range Error	There was an invalid number of characters sent to the pulse generator. Check to see if the parameters are invalid for the command that was sent.
4	Command Error	A bad command was sent to the pulse generator. Please check to see that the command being sent is valid, or that the pulse generator is not running.
8	Transmitt Error	To many parameters sent back to the PC. This is an internal error caused by the eeprom.
16	Motor Error	Motor speed profiles are set incorrectly. Please make sure that the base speed is less than the max speed and that the speeds are within their valid ranges.
32	Zero Parameters Error	There were no parameters sent to the pulse generator. A command was sent to the pulse generator that expected to see parameters after the command.

ASCII Table for Direct Mode

ASCII Symbol	Hex Value	ASCII Symbol	Hex Value	ASCII Symbol	Hex Value
Carriage Return	0D	8	38	L	4C
0	30	9	39	M	4D
1	31	A	41	R	52
2	32	B	42	S	53
3	33	C	43	U	55
4	34	D	44	V	56
5	35	E	45	!	21
6	36	G	47	\$	24
7	37	H	48	_	5F

Torque Speed Curves



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