

# PG20 PULSE GENERATOR

- Linear Ramping
- Adjustable Base and Max Speeds
- Remote Max Speed Pot
- Low and High Speed Ranges
- Independent Acceleration and Deceleration Adjustments
- Open Collector Pulse Output
- VCO Input



PG20	STANDALONE PULSE
DPS32PG1	3.5A OPEN FRAME DRIVER W/ PULSE GENERATOR
DPD72PG1	7A DRIVER PACK WITH PULSE GENERATOR

## **GENERAL DESCRIPTION**

The PG20 is a linear ramping pulse generator (PG) designed to be used with Anaheim Automation's Step Motor Drivers. It has adjustable BASE and MAX speeds and independent adjustments for acceleration (ramping up) and deceleration (ramping down).

## **SPEED RANGES**

The PG20 has an adjustable BASE speed (starting speed) and an adjustable MAX speed (running speed). There are two speed ranges that are jumper selectable, on JP1. For the low speed range, the BASE speed can be adjusted from 50 pulses/sec to 500 pulses/sec and the MAX speed can be adjusted from 50 pulses/sec to 5,000 pulses/sec. For the high speed range, the BASE speed can be adjusted from 200 pulses/sec to 2,000 pulses/sec and the MAX speed can be adjusted from 200 pulses/sec to 20,000 pulses/sec. Note: it is possible to have a MAX speed that is lower than the BASE speed. The BASE speed potentiometer is on-board; the MAX speed potentiometer is external (mounted on bracket).

## **LIMITING THE MAX SPEED**

In some applications, it may be necessary to limit the MAX speed so that the operator does not run the "machine" or system too fast. Potentiometer R31 can be adjusted to limit the top speed. Please note that this only affects the MAX speed; the BASE speed is unaffected.

## **RAMPING**

There are separate adjustments for acceleration and deceleration. The ramp times are adjustable from 50 milliseconds to 1.0 seconds. This is the time it takes to ramp from the lowest BASE speed to the highest MAX speed. In terms of acceleration units, the accel/decel rates are adjustable from 5,000 to 100,000 steps/sec<sup>2</sup> on the low speed range and 20,000 to 400,000 steps/sec<sup>2</sup> on the high speed range.

## **PULSE OUTPUT**

The clock pulse output is an open collector type output that can sink up to 100mA. When the PG20 is used with Anaheim Automation drivers, the drivers must be configured for negative going (pulled up) clock inputs.

## **POWER REQUIREMENTS**

There are three ways to power the PG20 pulse generator. It may be powered by an AC voltage (9-12VAC), an unregulated DC voltage (8-15VDC), or by a regulated +5VDC (see specifications). When the PG20 is used with Anaheim Automation Driver Packs or transformers, the easiest way to supply power to the PG20 is by connecting the orange logic windings of the transformer to the AC inputs of the PG20. This voltage is typically around 10 VAC.



**ANAHEIM AUTOMATION, INC.**

4985 East Landon Drive, Anaheim, CA 92807  
sales@anaheimautomation.com

P: (714) 992-6990 F: (714) 992-0471  
www.anaheimautomation.com

#L010746

### +5VDC OUTPUT

Pin 3 of TB2 can be used as a power input; but when the PG20 is powered by an AC voltage or unregulated DC voltage, this terminal can be used as a regulated +5VDC output capable of supplying other devices or circuits with a maximum of 1.0 Amps. *The actual amount of current that may be drawn from this output depends on the magnitude and stiffness of the AC voltage or unregulated DC voltage. When loading this output, the unregulated DC voltage (pin 1, TB2) must NOT drop below 8VDC. Up to 1.0 amps may be drawn from this output as long as the unregulated DC voltage does not drop below 8VDC.*

### INPUTS

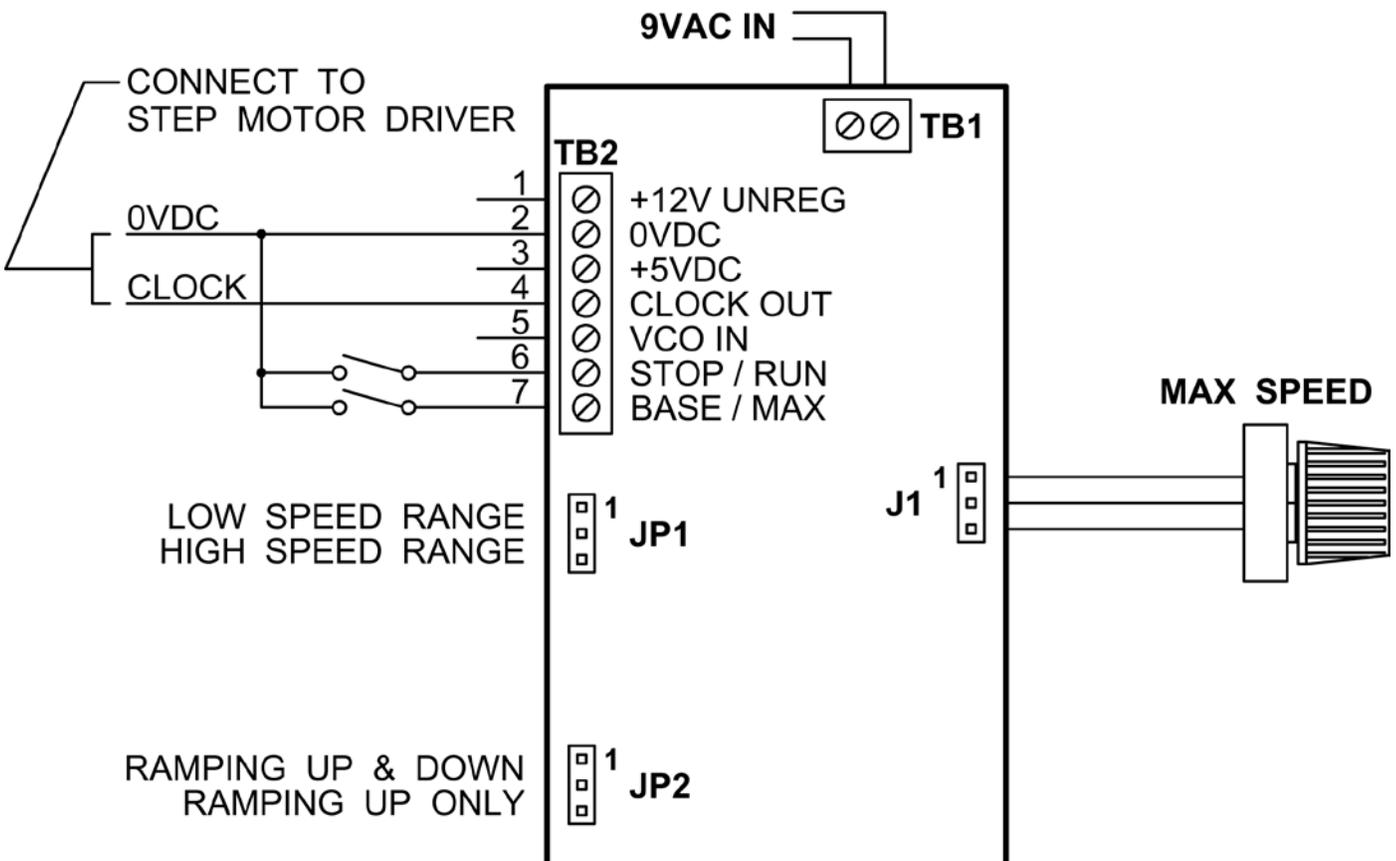
(See operating modes)

**STOP/RUN** - When this input is open or logic "1", the PG is stopped and will not output any pulses. When this input is pulled low to a logic "0", the PG will output pulses at the BASE speed rate if the BASE/MAX input is left open, or logic "1". If both the STOP/RUN and the BASE/MAX inputs are at a logic "0", the PG will ramp up and output pulses at the MAX speed rate. This input is only used in the "Two-input" operation.

**BASE/MAX** - This input has two functions. In the Two-input operation, this input selects either BASE speed (logic "1") or MAX speed (logic "0"). When this input changes, the PG will ramp from one speed to the other.

In the Single-input operation, this input is used to start and stop the PG (logic "1"=stop, logic "0"=run). Upon starting, the PG will start running at BASE speed but immediately ramp up to the MAX speed and keep running at the Max speed while this input is logic "0". When this input goes back to logic "1", the p.g. will either stop immediately, or it will ramp down and stop when it reaches BASE speed (depending on JP2 setting). With Single-input operation, the PG only uses BASE speed as a starting speed; it cannot run at BASE speed "for a while". The STOP/RUN input is NOT used with Single-input operation.

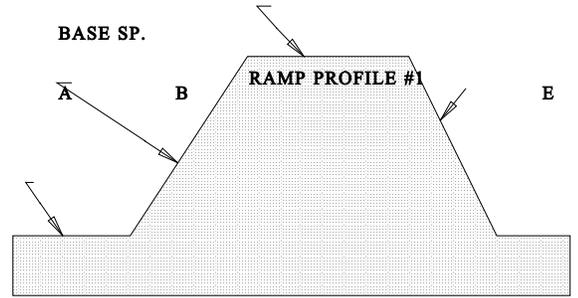
**VCO IN** - A voltage (0 to 5Vdc) can be fed into this input instead of using the MAX speed remote POT. The PG20 will produce a frequency that is proportional to the voltage on this input. To use this input, the BASE/MAX input must be pulled to a logic "0" and the MAX Speed POT disconnected. Please note that the PG will start at BASE speed (set by the BASE speed POT) and ramp to the frequency determined by the voltage fed into the VCO Input. In most cases, it is best to set the BASE speed POT to the lowest setting when using the VCO Input.



## OPERATING MODES

### 1. TWO INPUT OPERATION - see Ramp Profile 1.

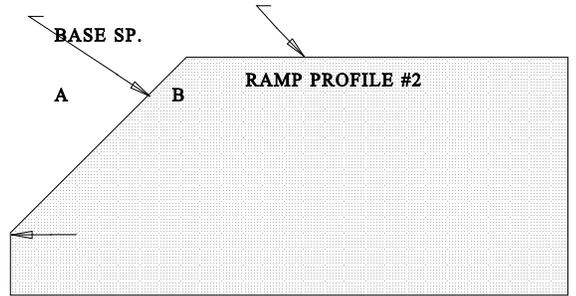
- STOP/RUN is pulled low; Start at BASE speed and run for a while at BASE speed
- BASE/MAX is pulled low; Ramp up to MAX speed
- Both inputs are still low; MAX speed is reached (keep running at MAX speed)
- BASE/MAX input is let go, or pulled high and STOP/RUN is still low; Ramp down to BASE speed
- STOP/RUN is still low; BASE speed is reached
- STOP/RUN input is let go, or pulled high; STOP



### 2. SINGLE INPUT OPERATION W/ NO RAMPING DOWN\* see Ramp Profile 2.

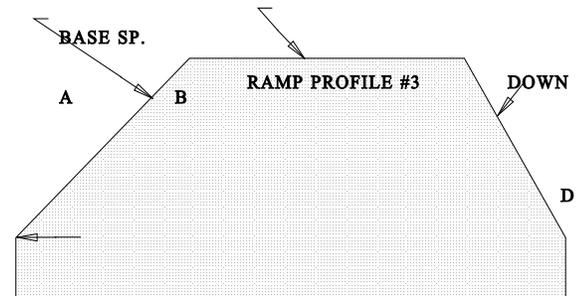
- BASE/MAX input is pulled low; Start at BASE speed and immediately ramp up to MAX speed
- BASE/MAX input is still low; MAX speed is reached
- BASE/MAX input is let go, or pulled high; STOP immediately

Note: In this mode, the PG still ramps down internally even though pulses stop; so, before starting again, the operator must allow sufficient time for the PG to ramp back down to BASE speed. Also, the decel adjustment should be set for the fastest ramp down.



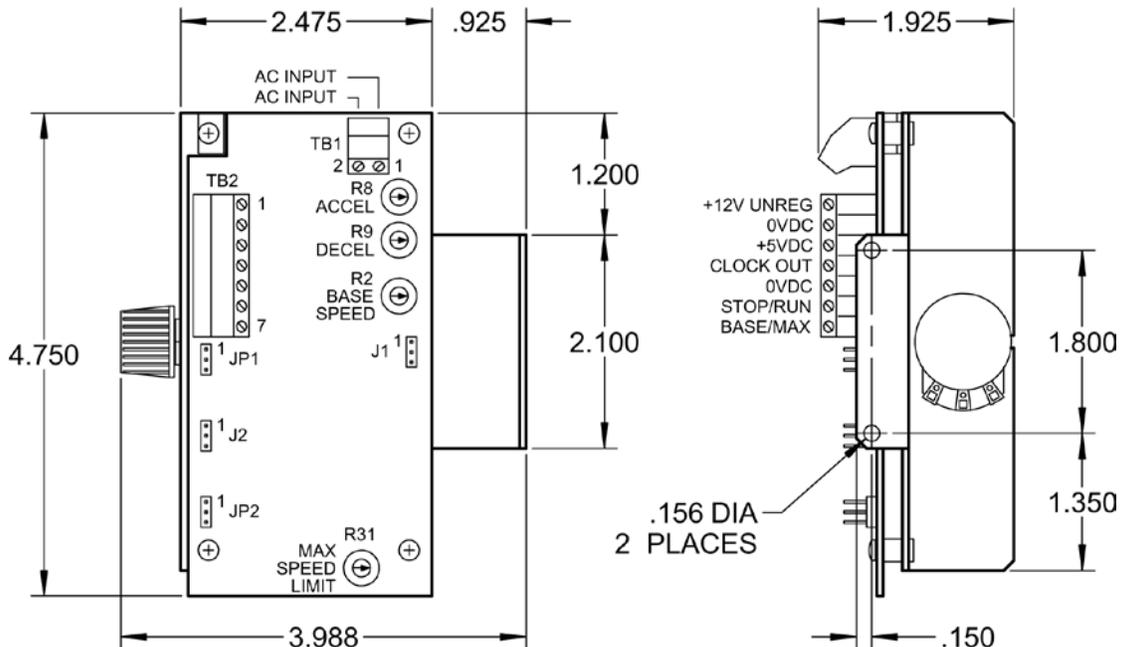
### 3. SINGLE INPUT OPERATION W/ RAMPING DOWN\* see Ramp Profile 3.

- BASE/MAX input is pulled low; Start at BASE speed and immediately ramp up to MAX speed
- MAX speed is reached
- BASE/MAX input is let go or pulled high; Ramp down
- Automatically stop when BASE speed is reached.



\* NOTE: With single input operation, jumper JP2 is used to select RAMPING DOWN, or NO RAMPING DOWN.

## DIMENSIONS



**SPECIFICATIONS**

**POWER REQUIREMENTS**

The PG20 has provisions for the following power supply inputs:

- 9-12VAC @ 30mA - pins 1 & 2, TB1
- 8-15VDC unregulated @ 30mA - pin 1, TB2
- +5VDC regulated @ 30mA - pin 3, TB2
- 0VDC reference - pin 2, TB2

BASE/MAX Input: pin 7, TB2

- (10k ohm pullup)
- Base speed - Logic "1" or open
- Max speed (single input running) - Logic "0"

STOP/RUN Input: pin 6, TB2

- (10k ohm pullup)
- Stop - Logic "1" or open
- Run - Logic "0"

VCO Input: pin 5, TB2

- 0 to 5Vdc
- Input Impedance: 1Meg Ohm

PULSE OUTPUT: pin 4, TB2

- Open collector, sink 100 mA
- Standoff 50 Vdc

SPEED RANGES, approximate:

- Low: BASE SPEED 50 - 500 pulses/sec
- MAX SPEED 50 - 5,000 pulses/sec
  
- High: BASE SPEED 200 - 2,000 pulses/sec
- MAX SPEED 200 - 20,000 pulses/sec

RAMP TIMES: time to ramp from lowest BASE to highest MAX  
50 milliseconds to 1.0 seconds

ACCELERATION/DECELERATION RATES:

- 5,000 - 100,000 pulses/s<sup>2</sup> for the Low speed range
- 20,000 - 400,000 pulses/s<sup>2</sup> for the High speed range

POWER SUPPLY OUTPUTS

- +5VDC output: 1.0 Amps absolute maximum \*  
(see paragraph on +5VDC OUTPUT)
  
- +12VDC unregulated output: 1.5 Amps maximum \*

\* No more than 1.5A total can be drawn from both of these outputs simultaneously.

**Speed and Ramp Options**

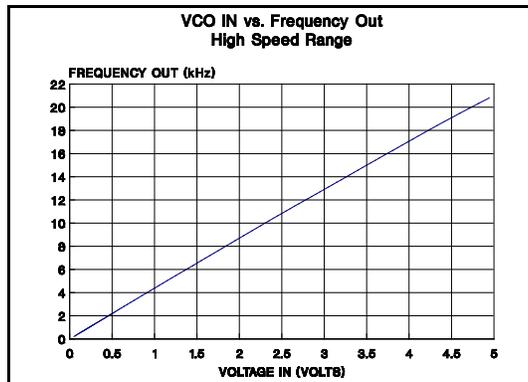
Function	JP1	JP2
Low Speed Range	1-2	-----
High Speed Range	2-3	-----
Ramp Up Only	-----	2-3
Ramp Up and Down	-----	1-2

**TB1 Terminals**

Terminal	Function
1	9-12 VAC INPUT
2	9-12 VAC INPUT

**TB2 Terminals**

Terminal	Function
1	+12V UNREG INPUT
2	0VDC
3	+5VDC
4	CLOCK OUT
5	VCO IN
6	STOP/RUN
7	BASE/MAX



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