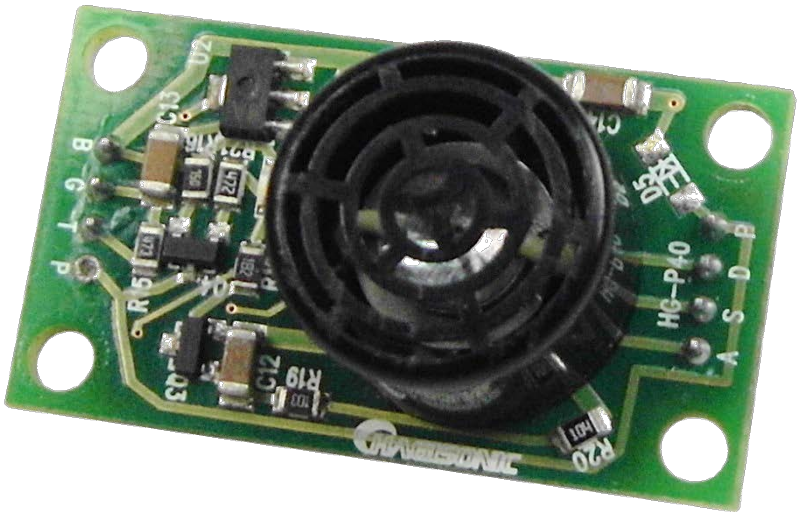
Sensor & Module

(HG-P40 Series)



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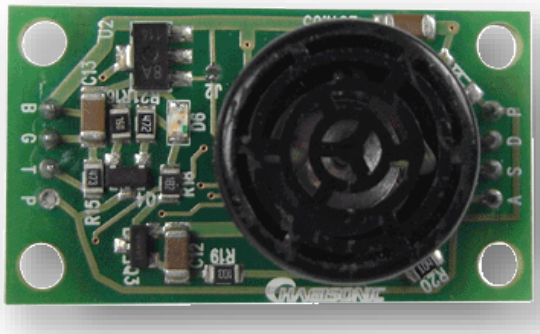
Ultrasonic Proximity Sensor & Module

■ Model : HG-P40 Series

▣ Features

- Multi functional transceiver model
- Two types of transmit modes
  (Free Run / External Trigger)
- Power Supply
  (Low : 5V / High : 6~16V)
- 4 different output signals
  (simultaneously)
  - Real time received and amplified ultrasonic wave
  - Real time TTL square signal
  - Distance pulse width signal
  - Detecting objects within the preset range(proximity)
- High performance ASIC Chip



HG-P40C
(Conventional)
Approx. 65˚ Directivity

▣ Specification

Input DC	Low : 5V / High : 6~16V
Current consumption (when 12V is used)	- **12mA** (Standby Mode) - **18mA** (When an object is detected within the range) - **28mA** (Proximity signal 10mA deducted)
Distance Range (at flat plate)	- **0.4~3m** (when 5V is used) - **0.4~6m** (when 12V±3V is used)
Size	Module : 20x36x20(mm) Sensor : Φ16

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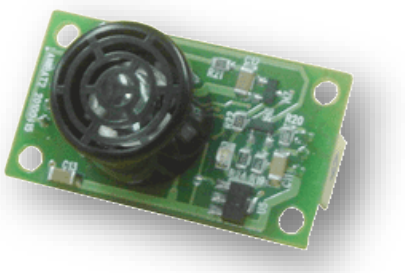
■ Model : HG-P40 Series

▣ Description

- Using only a single transceiver sensor unit for transmit and receive signals.
- Convenient for distance measuring and object detection.
- Two types of transmit mode for convenience.
  - Free Run : With a power supply, sensor transmits trigger and burst signal itself – for basic application
  - External Trigger : External system(controller or processor circuit) controls the trigger signals – for advance application(distance measure)
- Two types of input power – Low(5V) for processor circuit usage and High(12V) for controllers.
- Four different output signal (simultaneously).
  - Real time ultrasonic wave amplified from actually received ultrasonic. (for sound pressure measuring)
  - Real time TTL level square signal(Square Wave) of detection signal. (for robots)
  - Distance pulse width signal which is proportional to the nearest object from the sensor. (for robots and distance measuring)
  - Proximity output signal(10mA current) within the preset range(0.5~4.5m) (for industrial use)
  - Preset range is adjustable from 0.5 to 4.5 m. (factory distance preset available for volume orders)
- High performance ASIC Chip for stable transmission and sensitive reception. (Max. approx. 4,000 times amplification)



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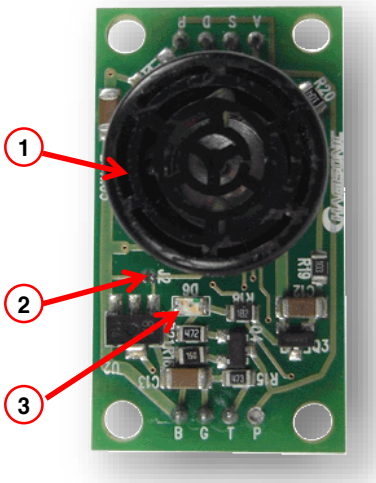
■ Model : HG-P40 Series

▣ Part Name



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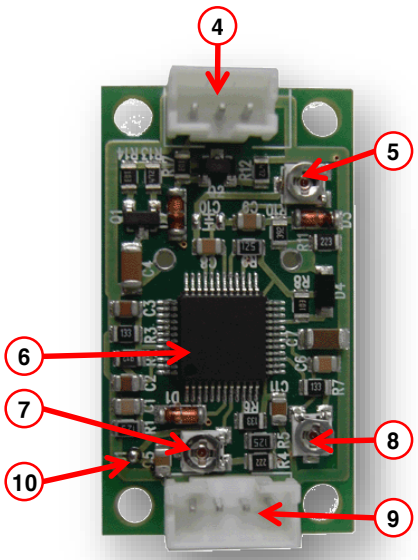

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① **Ultrasonic sensor unit** : Ø16 Open type sensor has conventional directivities(appox. 65~75˚).

② **Power selection PAD(J2)** : Low(5V) – with soldering, High(6~16V) – without soldering(at this condition, more than 6.5V is recommanded).

③ **Proximity detection LED** : When object enters the preset range, red light is on and 10mA output signal is generated

④ **Output Terminal** : three different output is generated simultaneously.(Refer to Page 2 and 6)

⑤ **Receiver sensitivity adjusting VR** : Adjusting gain value of pre-amplifier from range of 0 to 4,000x.(Default factory option: 2,000X)

⑥ **ASIC Chip** : 48pin Chip with many functions. (Hagisonic Product)

⑦ **Distance range adjusting VR** : 0.5 to 4.5m range.

⑧ **Ultrasonic frequency adjusting** : Factory tuned for unit for the best performance(Do not adjust this!)

⑨ **Input Terminal** : Power, External Trigger input and proximity output signal(10mA current) terminal(Refer to Page 2 and 6)

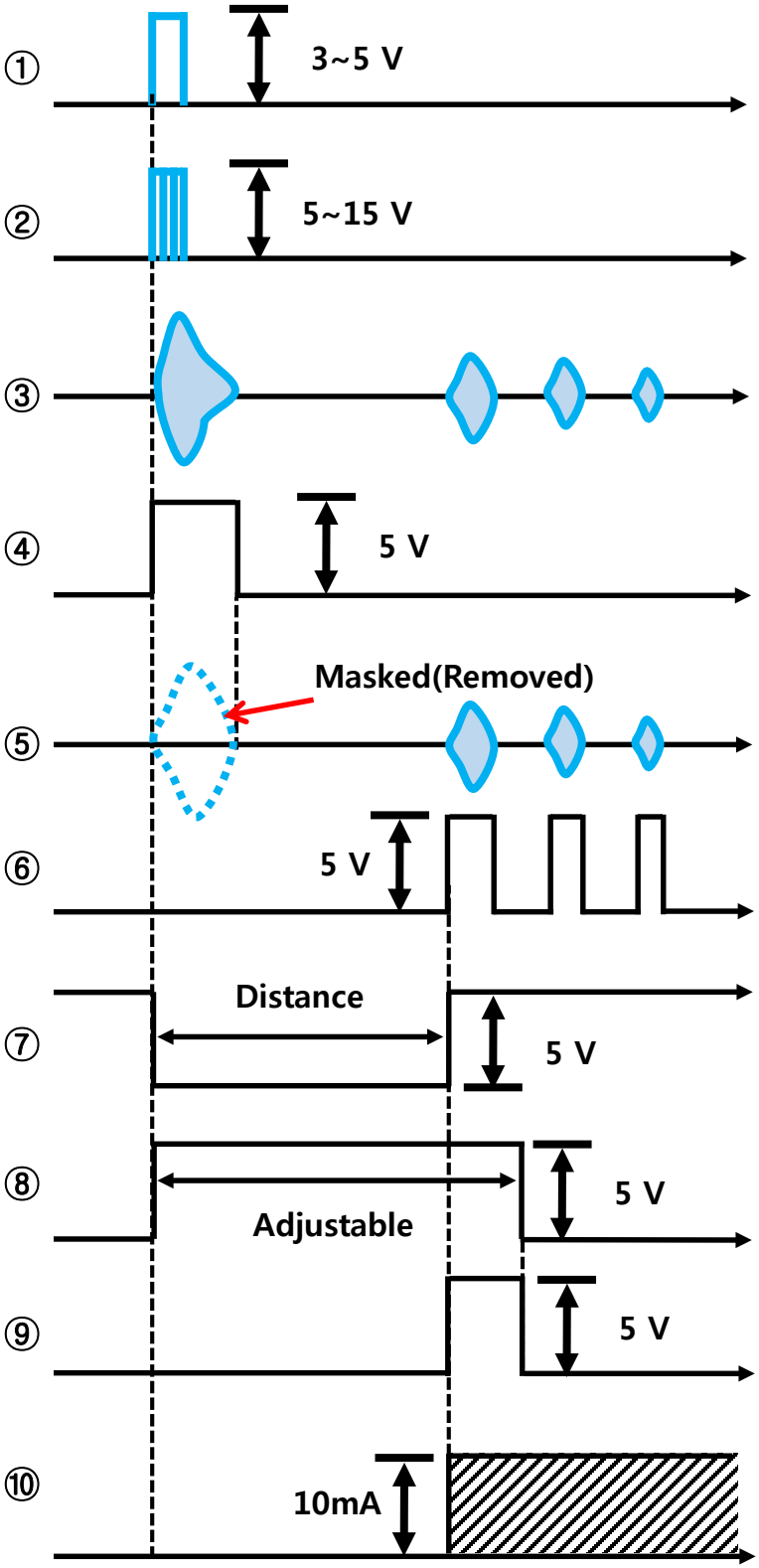
⑩ **Transmit Mode selection PAD(J1)** :

- Free Run Mode : With soldering; approx. 10 to 15 Burst per second is generated. (factory option : Soldered)
- External Trigger Mode : Without soldering; External TTL level Pulse is needed for transmit.(1~100 per second available, but 10~30 per second recommanded) (Pulse width : 0.5~1mS recommended)

Ultrasonic Proximity Sensor & Module

Model : HG-P40 Series

Timing Chart



- Trigger Pulse : generated internally or externally
- Range measuring : 10~30 per second is recommended
- Normal use : 10 per second is recommended

- Ultrasonic burst signal from Trigger Pulse

- The vibration and amplified waveform according to transmitting and receiving of ultrasonic signal.

- Masking signal(Internal) to remove the first received internal crosstalk signal.

- Amplified signals only for the reflected(received) signals

- Converting received signal to digital form (signal)

- Time pulse proportional to the distance of wave that reflected first(proximal object)

- Preset limitation of distance window(Preset range).

- Filtering the signal in which only entered window limit

- Sample / Hold; converting the approach signal to continuous signal.

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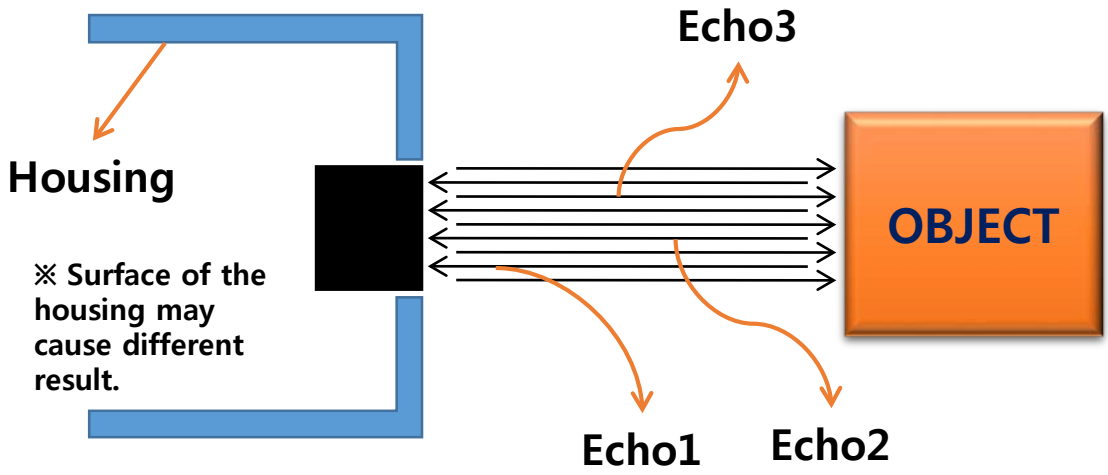
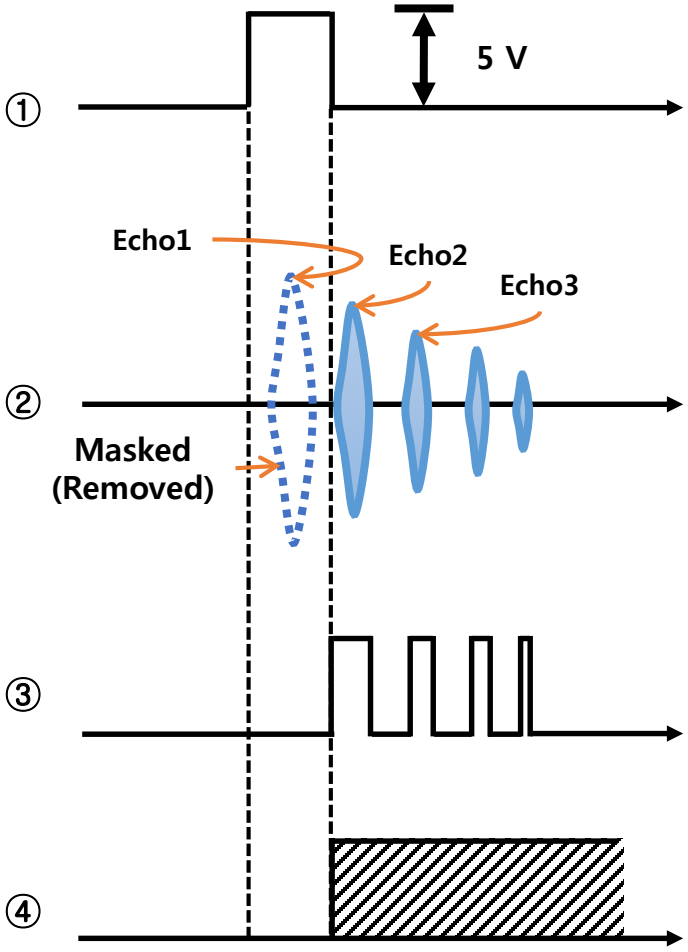
▣ The principle of perceiving proximal object within 40cm range.

※ There will be no quantitative distance value. This is only for determining the object existence and non-existence





- Masking signal(Internal) to remove the first received interrupt signal.
- When the object is close, multi Echo(Flutter Echo) will be generated. Echo1(Sometimes to Echo2) may be masked(removed) since the signal moves so fast.
- The Echo signal perceived after Echo2 (Echo3) will be converted to digital format(signal).
- The Echo signal perceived after Echo2 (Echo3) is in the preset range that it is recognized as an 'Object.'

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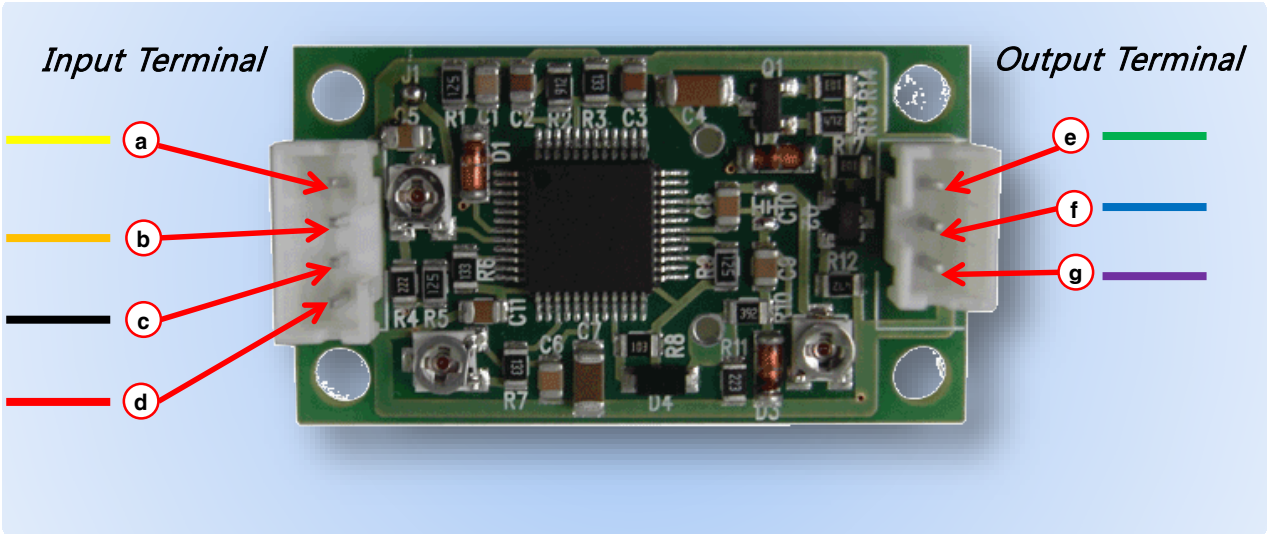
■ Model : HG-P40 Series

▣ Input / Output Terminal Configuration



▣ Terminal Configuration

ⓐ Output signal within the preset(distance) range (#⑩ wave from the Timing Chart(Page 5)) (Yellow)

ⓑ External Trigger / Monitor Terminal (Orange)

- Signal input terminal for External Trigger Mode (0.5~1mS TTL recommended)
- Monitor terminal for Free Run Mode to confirm the Trigger Timing. Internal trigger is generated.

ⓒ GND (Black)

ⓓ +Power : 5V~16V range input (Red)

ⓔ Real time ultrasonic amplified wave output (#⑤ wave from the Timing Chart(Page 5)) (Green)

ⓕ The wave converted similar to digit format. (#⑥ wave from the Timing Chart(Page 5)) (Blue)

ⓖ Pulse wave proportional to distance to the nearest object(The first detected object) (Violet) (#⑦ wave from the Timing Chart(Page 5))