

# **BP-275S**

## **Marine GPS Receiver**

### **Datasheet**

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Revision: 5.39

Date:2019.1



## GPS Receiver BP-275S Datasheet

### Features:

Item	Description	
Electrical Characteristics	Chipset	G7020-KT
	Frequency	GPS L1, SBAS L1, QZSS L1
	Receiving Format	GPS, SBAS, QZSS
	Channels	56 Searching Channel
Sensitivity	Tracking	-162dBm
	Reacquisition	-160dBm
	Cold start	-148dBm
Accuracy	Position Horizontal	2.0 m (Typical Open Sky)
	Velocity	0.1m/sec 95% (SA off)
	Timing	1us synchronized to GPS time
Acquisition Time	Cold Start	29s
	Warm Start	25s
	Hot Start	1s
Data Output	Support Rate	4800bps to 921600bps, Default 4800bps
	Data Level	Default RS-232 level
	Data Protocol	NMEA-0183 or UBX, Default NMEA-0183
	NMEA Message	RMC, GGA, GSA, GSV
	Update Rate	1Hz-10Hz, Default 1Hz
	FLASH	4M FLASH, Store the configuration permanently
Operational Limits	Altitude	50,000m Max
	Velocity	515m/s Max
	Acceleration	Less than 4g
Power consumption	VCC	DC Voltage 9.0V-34.0V, Typical: 12.0V
	Current	Capture 20mA@12.0V
Mechanical Specifications	Dimension	Φ95*125mm
	Weight	400g
	Connector	No interface, DIY connect cable
	Cable Length	5.0m, with shielding net
	Fixed	Plastic Base
Environment	Operating temp	-40 °C ~ +85°C
	Storage Temp	-40°C ~ +105°C

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### Pin Description:



PIN	PIN Name	I/O	Description
Black	GND	G	Ground.
Yellow	TX	O	RS-232 Serial Data Output.
Green	RX	I	RS-232 Serial Data Input.
Red	VCC	I	DC 9.0V - 34.0V supply input, Typical: 12.0V
Black	Shielding net		Please connect to the GND.

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### NMEA Protocol:

\$GPRMC,002419.000,A,2240.8410,N,11402.7081,E,0.01,0.00,180219,,A\*63

\$GPGGA,002419.000,2240.8410,N,11402.7081,E,1,09,0.8,70.8,M,-2.5,M,,0000\*77

\$GPGSA,A,3,14,25,24,12,15,20,21,32,10,,,,,1.5,0.8,1.3\*3E

\$GPGSV,4,1,13,10,28,323,41,11,,,26,12,21,130,41,14,06,260,36\*43

\$GPGSV,4,2,13,15,29,049,44,20,54,339,46,21,58,235,47,24,59,044,49\*79

\$GPGSV,4,3,13,25,14,165,30,32,17,273,42,40,20,257,38,42,46,123,39\*7B

\$GPGSV,4,4,13,50,46,123,40\*48

\$xxGGA,time,lat,NS,long,EW,quality,numSV,HDOP,alt,M,sep,M,diffAge,diffStation\*cs<CR><LF>

Example:

\$GPGGA,061853.000,2237.5593,N,11401.5946,E,1,11,0.8,106.2,M,-2.5,M,,0000\*47

Field No	Name	Unit	Format	Example	Description
0	xxGGA	-	string	\$GPGGA	GGA Message ID (xx = current Talker ID)
1	time	-	hhmmss.ss	061853.000	UTC time
2	lat	-	ddmm.mmmmm	2237.5593	Latitude (degrees & minutes)
3	NS	-	character	N	North/South indicator
4	long	-	dddmm.mmmmm	11401.5946	Longitude (degrees & minutes)
5	EW	-	character	E	East/West indicator
6	quality	-	digit	1	0:No Fix / Invalid 1:Standard GPS (2D/3D) 2:Differential GPS 6:Estimated (DR) Fix
7	numSV	-	numeric	11	Number of satellites used
8	HDOP	-	numeric	0.8	Horizontal Dilution of Precision
9	alt	m	numeric	106.2	Altitude above mean sea level
10	uAlt	-	character	M	Altitude units: meters (fixed field)
11	sep	m	numeric	-2.5	Geoid separation: difference between geoid and mean sea level
12	uSep	-	character	M	Separation units: meters (fixed field)
13	diffAge	s	numeric	-	Age of differential corrections (blank when DGPS is not used)
14	diffStation	-	numeric	0000	ID of station providing differential corrections (blank when DGPS is not used)
15	cs	-	hexadecimal	*47	Checksum
16	<CR><LF>	-	character	-	Carriage return and line feed

Message Structure:

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\$xxGLL,lat,NS,long,EW,time,status,posMode\*cs<CR><LF>

Example:

\$GPGLL,2237.5593,N,11401.5946,E,061853.000,A,A\*55

Field No	Name	Unit	Format	Example	Description
0	xxGLL	-	string	\$GPGLL	GLL Message ID (xx = current Talker ID)
1	lat	-	ddmm.mmmmm	2237.5593	Latitude (degrees & minutes)
2	NS	-	character	N	North/South indicator
3	long	-	dddmm.mmmmm	11401.5946	Longitude (degrees & minutes)
4	EW	-	character	E	East/West indicator
5	time	-	hhmmss.ss	061853.000	UTC time
6	status	-	character	A	V = Data invalid or receiver warning, A = Data valid
7	posMode	-	character	A	Positioning mode
8	cs	-	hexadecimal	*55	Checksum
9	<CR><LF>	-	character	-	Carriage return and line feed

Message Structure:

\$xxGSA,opMode,navMode{,sv},PDOP,HDOP,VDOP\*cs<CR><LF>

Example:

\$GPGSA,A,3,06,17,23,02,12,05,42,50,09,19,28,,1.5,0.8,1.3\*31

Field No	Name	Unit	Format	Example	Description
0	xxGSA	-	string	\$GPGSA	GSA Message ID (xx = current Talker ID)
1	opMode	-	character	A	Operation mode M:Manually set to operate in 2D or 3D mode A:Automatically switching between 2D or 3D mode
2	navMode	-	digit	3	Navigation mode 1:Fix not available 2:2D Fix 3:3D Fix
Start of repeated block (12 times)					
3 + 1*N	sv	-	numeric	23	Satellite number
End of repeated block					
15	PDOP	-	numeric	1.5	Position dilution of precision
16	HDOP	-	numeric	0.8	Horizontal dilution of precision
17	VDOP	-	numeric	1.3	Vertical dilution of precision
18	cs	-	hexadecimal	*31	Checksum
19	<CR><LF>	-	character	-	Carriage return and line feed

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Message Structure:

`$xxGSV,numMsg,msgNum,numSV,{sv,elv,az,cno}*cs<CR><LF>`

Example:

`$GPGSV,3,1,12,02,38,308,43,05,31,225,38,06,48,003,46,09,29,082,39*7D`

`$GPGSV,3,2,12,12,24,311,40,17,55,095,40,19,66,053,41,23,13,056,40*78`

`$GPGSV,3,3,12,28,16,169,39,40,20,257,34,42,46,123,38,50,46,123,39*70`

Field No	Name	Unit	Format	Example	Description
0	xxGSV	-	string	\$GPGSV	GSV Message ID (xx = GSV Talker ID)
1	numMsg	-	digit	3	Number of messages, total number of GSV messages being output
2	msgNum	-	digit	1	Number of this message
3	numSV	-	numeric	12	Number of satellites in view
Start of repeated block (1..4 times)					
4 + 4*N	SV	-	numeric	02	Satellite ID
5 + 4*N	elv	deg	numeric	38	Elevation (range 0-90)
6 + 4*N	az	deg	numeric	308	Azimuth, (range 0-359)
7 + 4*N	cno	dBH	numeric	43	Signal strength (C/N0, range 0-99), blank when not tracking
End of repeated block					
5.. 16	cs	-	hexadecimal	*7D	Checksum
6.. 16	<CR><LF>	-	character	-	Carriage return and line feed

Message Structure:

`$xxRMC,time,status,lat,NS,long,EW,spd,cog,date,mv,mvEW,navStatus*cs<CR><LF>`

Example:

`$GPRMC,061853.000,A,2237.5593,N,11401.5946,E,2.72,351.13,050916,,A*6B`

Field No	Name	Unit	Format	Example	Description
0	xxRMC	-	string	\$GPRMC	RMC Message ID (xx = current Talker ID)
1	time	-	hhmmss.ss	061853.000	UTC time
2	status	-	character	A	Status V:Navigation receiver warning A :Data valid
3	lat	-	ddmm.mmmmm	2237.5593	Latitude (degrees & minutes)
4	NS	-	character	N	North/South indicator
5	long	-	dddmm.mmmmm	11401.5946	Longitude (degrees & minutes)

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6	EW	-	character	E	East/West indicator
7	spd	Knots	numeric	2.72	Speed over ground
8	cog	degrees	numeric	351.13	Course over ground
9	date	-	ddmmyy	050916	Date in day, month, year format
10	mv	degrees	numeric	-	Magnetic variation value (blank - not supported)
11	mvEW	-	character	-	Magnetic variation E/W indicator (blank - not supported)
12	navStatus	-	character	A	Navigational status indicator (V = Equipment is not providing navigational status information)
14	cs	-	hexadecimal	*6B	Checksum
15	<CR><LF>	-	character	-	Carriage return and line feed

Message Structure:

\$xxVTG,cogt,T,cogm,M,knots,N,kph,K,posMode\*cs<CR><LF>

Example:

\$GPVTG,351.13,T,,M,2.72,N,5.0,K,A\*0A

Field No	Name	Unit	Format	Example	Description
0	xxVTG	-	string	\$GPVTG	VTG Message ID (xx = current Talker ID)
1	cogt	degrees	numeric	351.13	Course over ground (true)
2	T	-	character	T	Fixed field: true
3	cogm	degrees	numeric	-	Course over ground (magnetic), not output
4	M	-	character	M	Fixed field: magnetic
5	knots	knots	numeric	2.72	Speed over ground
6	N	-	character	N	Fixed field: knots
7	kph	km/	numeric	5.0	Speed over ground
8	K	-	character	K	Fixed field: kilometers per hour
9	posMode	-	character	A	Mode Indicator
10	cs	-	hexadecimal	*0A	Checksum
11	<CR><LF>	-	character	-	Carriage return and line feed