

Warranty

Each unit is carefully tested and adjusted at the factory before shipping and is warranted for one full year against original defects in materials or workmanship. This warranty does not include damage to the product resulting from accident or misuse.

If the product should become defective within the warranty period, we will repair or replace it free of charge, including free return transportation, provided it is delivered prepaid to the dealer from whom it is originally purchased.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state, or country to country.

CruzPro®



RP-60



NMEA 0183 Remote Data Repeater

Notes

Introduction

The RP60 remote data repeater is capable of displaying many standard NMEA 0183 and proprietary sentences. The RP60 can monitor up to 4 separate data channels and can be trained to learn new sentences. New sentence formats can be downloaded into nonvolatile memory using the RS-232 serial data port of a PC compatible running Windows 95, 98, NT, SE, ME or 2000.

Five levels of backlighting can be selected and all setup information is automatically saved to nonvolatile memory. The RP60 works on both 12 and 24 VDC systems.

189 \$YXDBS DEPTH BELOW SURFACE FEET
 190 \$YXDBS DEPTH BELOW SURFACE METERS
 191 \$YXDBS DEPTH BELOW SURFACE FATHOMS
 192 \$YXDPT WATER DEPTH BELOW TRANSDUCER FT.
 193 \$YXDPT WATER DEPTH BELOW TRANSDUCER MTRS
 194 \$YXDPT WATER DEPTH BELOW TRANSDUCER FATH
 195 \$YXDPT DEPTH RELATIVE TO TRANSDUCER MTRS
 196 \$YXXDR,A ANGULAR DISPLACEMENT DEGREES
 197 \$YXXDR,C TEMPERATURE DEGREES CELCIUS
 198 \$YXXDR,D LINEAR DISPLACEMENT METERS
 199 \$YXXDR,F FREQUENCY HERTZ
 200 \$YXXDR,G GENERIC
 201 \$YXXDR,H HUMIDITY PERCENT
 202 \$YXXDR,I CURRENT AMPERES
 203 \$YXXDR,N FORCE NEWTONS
 204 \$YXXDR,P PRESSURE PASCAL OR BAR
 205 \$YXXDR,R FLOW RATE LITRES/SECOND
 206 \$YXXDR,S SWITCH OR VALVE
 207 \$YXXDR,T TACHOMETER RPM
 208 \$YXXDR,U VOLTAGE VOLTS
 209 \$YXXDR,V CUBIC METERS
 210 TO BE DEFINED

Installation

*Before starting the installation, please read this entire section first. Be sure to install the bulkhead gasket before you install the instrument. **Finger tighten the screws that mount the instrument bracket - do not use tools.***

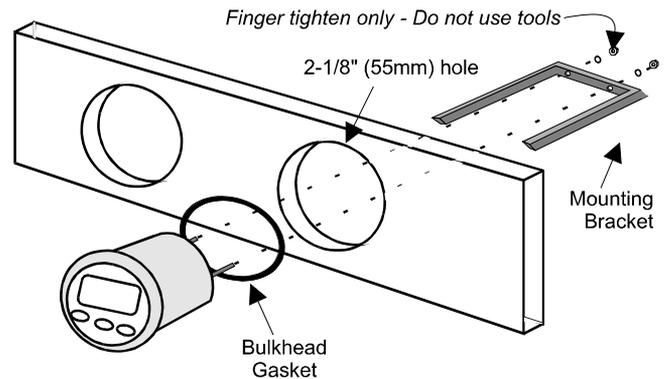


Figure 1

146 \$VDMTW WATER TEMPERATURE DEGREES CELCIUS
 147 \$VDVHW HEADING DEGREES TRUE
 148 \$VDVHW HEADING DEGREES MAGNETIC
 149 \$VDVHW SPEED KNOTS
 150 \$VDVHW SPEED KM/HOUR
 151 \$VDVLW TOTAL DISTANCE N.MILES
 152 \$VDVLW DISTANCE SINCE RESET N.MILES
 153 \$VMMTW WATER TEMPERATURE DEGREES CELCIUS
 154 \$VMVHW HEADING DEGREES TRUE
 155 \$VMVHW HEADING DEGREES MAGNETIC
 156 \$VMVHW SPEED KNOTS
 157 \$VMVHW SPEED KM/HOUR
 158 \$VMVLW TOTAL DISTANCE N.MILES
 159 \$VMVLW DISTANCE SINCE RESET N.MILES
 160 \$VWMTW WATER TEMPERATURE DEGREES CELCIUS
 161 \$VWVHW HEADING DEGREES TRUE
 162 \$VWVHW HEADING DEGREES MAGNETIC
 163 \$VWVHW SPEED KNOTS
 164 \$VWVHW SPEED KM/HOUR
 165 \$VWVLW TOTAL DISTANCE N.MILES
 166 \$VWVLW DISTANCE SINCE RESET N.MILES

- Carefully check all your wiring and mount the RP60 in the instrument hole. Be sure the bulkhead gasket is in place and use only finger tension to tighten the bracket hold-down nuts. *Do not overtighten the bracket or you may damage the case - do not use tools to tighten the nuts.*

● Drill **no smaller than** a 2-1/8" (55mm) mounting hole where you desire to mount the instrument.

● Bring the data cables, ground and power lines out of the mounting hole and use a small flat screwdriver to make the connections to the screw terminals on the instrument case back as shown.

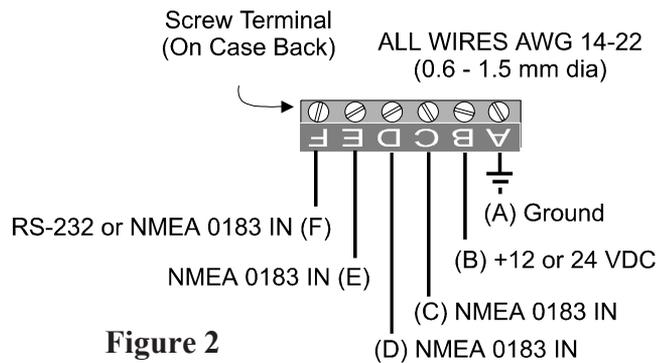


Figure 2

167 \$WIMDA	BAROMETRIC PRESS. INCH. OF MERCURY
168 \$WIMDA	BAROMETRIC PRESSURE BARS
169 \$WIMDA	AIR TEMPERATURE DEGREES CELCIUS
170 \$WIMDA	RELATIVE HUMIDITY %
171 \$WIMDA	ABSOLUTE HUMIDITY %
172 \$WIMDA	DEWPOINT DEGREES CELCIUS
173 \$WIMDA	WIND DIRECTION DEGREES TRUE
174 \$WIMDA	WIND DIRECTION DEGREES MAGNETIC
175 \$WIMDA	WIND SPEED KNOTS
176 \$WIMDA	WIND SPEED METERS/SECOND
177 \$WIMWD	WIND DIRECTION DEGREES TRUE
178 \$WIMWD	WIND DIRECTION DEGREES MAGNETIC
179 \$WIMWD	WIND SPEED KNOTS
180 \$WIMWD	WIND SPEED METERS/SECOND
181 \$WIMWV	WIND ANGLE DEGREES
182 \$WIVWR	RELATIVE WIND DIRECTION DEGREES
183 \$WIVWR	SPEED KNOTS
184 \$WIVWR	SPEED METERS/SECOND
185 \$WIVWR	SPEED KM/HOUR
186 \$YXDBK	DEPTH BELOW KEEL FEET
187 \$YXDBK	DEPTH BELOW KEEL METERS
188 \$YXDBK	DEPTH BELOW KEEL FATHOMS

Operation

Key Functions

The ▼, + and ▲ keys are used to select which NMEA sentence to display, set backlight levels, select a data channel, save and delete NMEA sentences from the favorites list and prepare the instrument to receive new sentences from a PC. All setup information, backlight levels, etc. are automatically saved to memory.

Backlight Intensity

Press the + key for 1/2 second to adjust the backlight level for nighttime viewing. Each time you press the + key for 1/2 second, the level will get brighter 1, 2, 3, 4, OFF, 1, 2, ... etc.

125 \$PBVE	T-30 TEMPERATURE DEG. FAHRENHEIT
126 \$PBVE	CH-30 WINDLASS BATTERY VOLTAGE
127 \$PBVE	CH-30 RHODE OUT
128 \$PBVE	CT-30 TIME 24 HOURS
129 \$PBVE	OP-30 PRESSURE P.S.I.
130 \$PBVE	FU-30 FUEL REMAINING LTRS OR GALS
131 \$PBVE	FU-30 FUEL USED LITRES OR GALLONS
132 \$PBVE	FU-30 CONSUMPTION LTRS OR GAL./HR
133 \$SDBBK	DEPTH BELOW KEEL FEET
134 \$SDBBK	DEPTH BELOW KEEL METERS
135 \$SDBBK	DEPTH BELOW KEEL FATHOMS
136 \$SDBBS	DEPTH BELOW SURFACE FEET
137 \$SDBBS	DEPTH BELOW SURFACE METERS
138 \$SDBBS	DEPTH BELOW SURFACE FATHOMS
139 \$SDBBT	DEPTH BELOW TRANSDUCER FEET
140 \$SDBBT	DEPTH BELOW TRANSDUCER METERS
141 \$SDBBT	DEPTH BELOW TRANSDUCER FATHOMS
142 \$SDDPT	DEPTH RELATIVE TO TRANSDUCER MTRS
143 \$STIROT	RATE OF TURN DEGREES/MINUTE
144 \$STIRPM	SPEED RPM
145 \$STIRPM	PROPELLER PITCH % OF MAX

104 \$HNBOD BEARING MAGNETIC
 105 \$IIXDR,A ANGULAR DISPLACEMENT DEGREES
 106 \$IIXDR,C TEMPERATURE DEGREES CELCIUS
 107 \$IIXDR,D LINEAR DISPLACEMENT METERS
 108 \$IIXDR,F FREQUENCY HERTZ
 109 \$IIXDR,G GENERIC
 110 \$IIXDR,H HUMIDITY PERCENT
 111 \$IIXDR,I CURRENT AMPERES
 112 \$IIXDR,N FORCE NEWTONS
 113 \$IIXDR,P PRESSURE PASCAL OR BAR
 114 \$IIXDR,R FLOW RATE LITERS/SECOND
 115 \$IIXDR,S SWITCH OR VALVE
 116 \$IIXDR,T TACHOMETER RPM
 117 \$IIXDR,U VOLTAGE VOLTS
 118 \$IIXDR,V VOLUME CUBIC METERS
 119 \$INBOD BEARING TRUE
 120 \$INBOD BEARING MAGNETIC
 121 \$PBVE RH-30 ELAPSED TIME HOURS
 122 \$PBVE RH-30 ELAPSED TIME MIN. AND SEC.
 123 \$PBVE RH-30 ENGINE HOURS AND MINUTES
 124 \$PBVE RH-30 ENGINE RPM

is only available on the one channel, it will return back to the original.

Selecting Different Sentences With Identical ID's

Some CruzPro instruments (such as the V60 triple volts gauge and the TL60 triple tank level gauge) transmit more than one sentence with the same identifier but different data. The TL60 Digital Tank Level Gauge for three tanks transmits one sentence per tank but each have the same NMEA identifier "\$IIXDR". When viewing data from one of these CruzPro instruments you can step through the different values with a quick press the **+** key.

Selecting a NMEA Sentence to Display

Up to 12 sentences can be stored in a list of often viewed sentences. You can select a sentence from the list using the **▼** and **▲** keys. The RP60 comes pre-programmed with the following list.

142 \$SDDPT DEPTH RELATIVE TO TRANSDUCER MTRS
 163 \$VWVHW SPEED KNOTS
 160 \$VWMTW WATER TEMPERATURE DEGREES
 98 \$GPRMC COURSE OVER GROUND DEGREES TRUE
 36 \$AGWNC DISTANCE WAYPT TO WAYPT N.MILES
 125 \$PBVE T-30 TEMPERATURE DEG. FAHRENHEIT
 129 \$PBVE OP-30 PRESSURE P.S.I.
 124 \$PBVE RH-30 ENGINE RPM

You can add and delete sentences to/from this list as often as desired. Pressing the **▼** or **▲** key will step

41 \$APAPB BEARING PRESENT TO DESTINATION
 42 \$APAPB HEADING TO STEER TO DESTINATION
 43 \$APBEC BEARING DEGREES TRUE
 44 \$APBEC BEARING DEGREES MAGNETIC
 45 \$APBEC DISTANCE NAUTICAL MILES
 46 \$APBOD BEARING TRUE
 47 \$APBOD BEARING MAGNETIC
 48 \$APBWC BEARING TO WAYPOINT DEGREES TRUE
 49 \$APBWC BEARING TO WAYPOINT DEGREES MAG.
 50 \$APBWC DISTANCE NAUTICAL MILES
 51 \$APBWR BEARING TO WAYPOINT DEGREES TRUE
 52 \$APBWR BEARING TO WAYPOINT DEGREES MAG.
 53 \$APBWR DISTANCE NAUTICAL MILES
 54 \$APBWW BEARING WAYPOINT TO WAYPOINT TRUE
 55 \$APBWW BEARING WAYPOINT TO WAYPOINT MAG.
 56 \$APHSC COMMANDED HEADING DEGREES TRUE
 57 \$APHSC COMMANDED HEADING DEGREES MAG.
 58 \$APVBW LONGITUDNAL WATER SPEED KNOTS
 59 \$APVBW TRANSVERSE WATER SPEED KNOTS
 60 \$APVBW LONGITUDNAL GROUND SPEED KNOTS
 61 \$APVBW TRANSVERSE GROUND SPEED KNOTS

you through the list. " - - - " will be displayed until the selected sentence is found on one of the channels.

Adding A Sentence To the List

Press and hold the **+** and **▲** keys for 10 seconds until a long beep is heard. "c011" is displayed. Use the **▼** and **▲** keys to select a sentence from Table 1. Once the desired table entry is displayed, hold down the **+** key for 1/2 second to save the sentence to the list. The RP60 will immediately start searching for the new sentence on all four channels.

If "FULL" is displayed in place of "c011", a sentence will first have to be deleted from the list (see "Deleting A Sentence From the List").

62	\$APWCV	WAYPOINT CLOSURE VELOCITY KNOTS
63	\$APWNC	DISTANCE WAYPT TO WAYPT N.MILES
64	\$APWNC	DISTANCE WAYPOINT TO WAYPOINT KM
65	\$DEDCN	POSITION UNCERTAINTY N.MILES
66	\$DFAPB	BEARING ORIGIN TO DISTANCE
67	\$DFAPB	BEARING PRESENT TO DESTINATION
68	\$DFAPB	HEADING TO STEER TO DESTINATION
69	\$DFABE	BEARING DEGREES TRUE
70	\$DFBEC	BEARING DEGREES MAGNETIC
71	\$DFBEC	DISTANCE NAUTICAL MILES
72	\$DFBOD	BEARING TRUE
73	\$DFBOD	BEARING MAGNETIC
74	\$DFBWC	BEARING TO WAYPOINT DEGREES TRUE
75	\$DFBWC	BEARING TO WAYPOINT DEGREES MAG.
76	\$DFBWC	DISTANCE NAUTICAL MILES
77	\$DFBWR	BEARING TO WAYPOINT DEGREES TRUE
78	\$DFBWR	BEARING TO WAYPOINT DEGREES MAG.
79	\$DFBWR	DISTANCE NAUTICAL MILES
80	\$DFBWW	BEARING WAYPOINT TO WAYPOINT TRUE
81	\$DFBWW	BEARING WAYPOINT TO WAYPOINT MAG.
82	\$DFHDG	MAGNETIC SENSOR HEADING DEGREES

83	\$DFHDT	HEADING DEGREES TRUE
84	\$DFWCV	WAYPOINT CLOSURE VELOCITY KNOTS
85	\$DFWNC	DISTANCE WAYPT TO WAYPT N.MILES
86	\$DFWNC	DISTANCE WAYPOINT TO WAYPOINT KM
87	\$GPBWC	BEARING WAYPT TO WAYPT DEG. TRUE
88	\$GPBWC	BEARING WAYPT TO WAYPT DEG. MAG.
89	\$GPBWC	DISTANCE NAUTICAL MILES
90	\$GPBWR	BEARING WAYPT TO WAYPT DEG. TRUE
91	\$GPBWR	BEARING WAYPT TO WAYPT DEG. MAG.
92	\$GPBWR	DISTANCE NAUTICAL MILES
93	\$GPRMB	CROSS TRACK ERROR NAUTICAL MILES
94	\$GPRMB	RANGE TO DESTINATION NAUT. MILES
95	\$GPRMB	BEARING TO DESTINATION DEG. TRUE
96	\$GPRMB	DESTINATION CLOSING VELOCITY KTS
97	\$GPRMC	SPEED OVER GROUND KNOTS
98	\$GPRMC	COURSE OVER GROUND DEGREES TRUE
99	\$HCBOD	BEARING TRUE
100	\$HCBOD	BEARING MAGNETIC
101	\$HEBOD	BEARING TRUE
102	\$HEBOD	BEARING MAGNETIC
103	\$HNBOD	BEARING TRUE

Deleting A Sentence From the List

If all 12 list positions are full, one sentence will have to be deleted. Press and hold the **▼** and **+** keys for 10 seconds. Use the **▼** and **▲** keys to scroll through the list. When the sentence to be deleted is displayed, press the **+** key for 1/2 second.

Manually Selecting A Data Channel

The RP60 searches each of the four data channels for the desired sentence. When a matching sentence is found the RP60 stops at that channel and displays the data. To select between two or more data channels containing the same sentence, press and hold the **+** key for 3 seconds. The RP60 will search the other channels for the sentence. If the sentence

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20 $AGBOD BEARING MAGNETIC
21 $AGBWC BEARING TO WAYPOINT DEGREES TRUE
22 $AGBWC BEARING TO WAYPOINT DEGREES MAG.
23 $AGBWC DISTANCE NAUTICAL MILES
24 $AGBWC BEARING TO WAYPOINT DEGREES TRUE
25 $AGBWR BEARING TO WAYPOINT DEGREES MAG.
26 $AGBWR DISTANCE NAUTICAL MILES
27 $AGBWW BEARING WAYPOINT TO WAYPOINT TRUE
28 $AGBWW BEARING WAYPOINT TO WAYPOINT MAG.
29 $AGHSC COMMANDED HEADING DEGREES TRUE
30 $AGHSC COMMANDED HEADING DEGREES MAG.
31 $AGVBW LONGITUDNAL WATER SPEED KNOTS
32 $AGVBW TRANSVERSE WATER SPEED KNOTS
33 $AGVBW LONGITUDNAL GROUND SPEED KNOTS
34 $AGVBW TRANSVERSE GROUND SPEED KNOTS
35 $AGWCV WAYPOINT CLOSURE VELOCITY KNOTS
36 $AGWNC DISTANCE WAYPT TO WAYPT N.MILES
37 $AGWNC DISTANCE WAYPOINT TO WAYPOINT KM.
38 $APAAM WAYPOINT ARRIVAL ALARM RADIUS
39 $APAPB MAGNITUDE OF CROSSTRACK ERROR
40 $APAPB BEARING ORIGIN TO DESTINATION

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Downloading New NMEA Sentences

You can add up to 10 new sentences to Table 1 using a PC and a serial data cable connected to Terminal F on the back of the RP60 as shown in Figure 3. To upload a new sentence to the RP60, press and hold the ▼ and ▲ keys for 10 seconds. The instrument is ready for data transfer when "rdY" is displayed. Execute the program called RP60NMEA.EXE on the supplied floppy diskette.

When a beep is heard check the display for the status of the transfer, if "good" is displayed, the process was successful. If "bAd" is displayed, the process was unsuccessful, try the download process again.

Note: Check for possible newer versions of this software on our website www.cruzpro.com

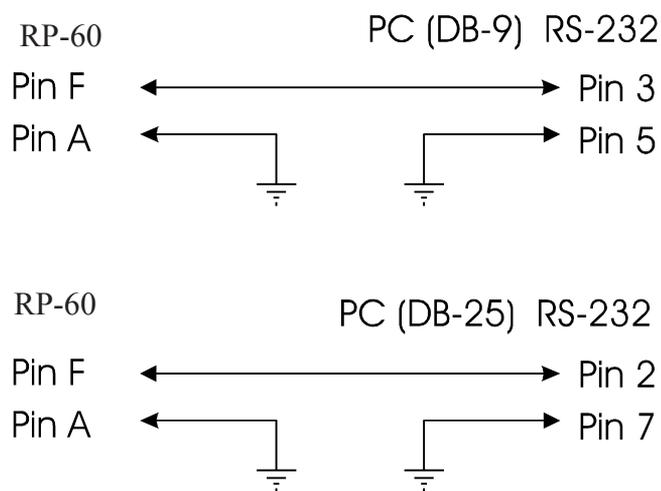


Figure 3 - PC to RP60 Connections

NMEA 0183 Sentences - TABLE 1

1	USER PROGRAMMED
2	USER PROGRAMMED
3	USER PROGRAMMED
4	USER PROGRAMMED
5	USER PROGRAMMED
6	USER PROGRAMMED
7	USER PROGRAMMED
8	USER PROGRAMMED
9	USER PROGRAMMED
10	USER PROGRAMMED
11	\$AGAAM WAYPOINT ARRIVAL ALARM RADIUS
12	\$AGAPB MAGNITUDE OF CROSSTRACK ERROR
13	\$AGAPB BEARING ORIGIN TO DESTINATION
14	\$AGAPB BEARING PRESENT TO DESTINATION
15	\$AGAPB HEADING TO STEER TO DESTINATION
16	\$AGBEC BEARING DEGREES TRUE
17	\$AGBEC BEARING DEGREES MAGNETIC
18	\$AGBEC DISTANCE NAUTICAL MILES
19	\$AGBOD BEARING TRUE

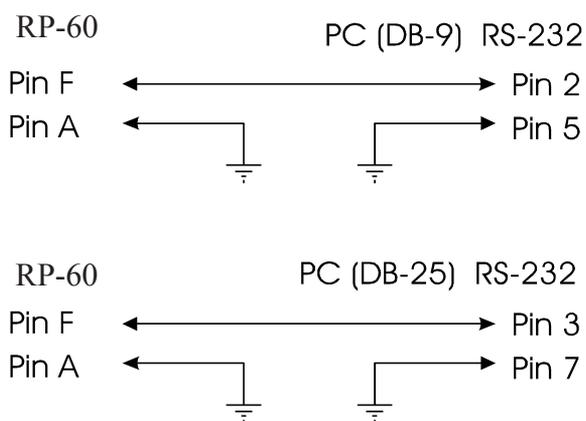


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2	USER PROGRAMMED
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5	USER PROGRAMMED
6	USER PROGRAMMED
7	USER PROGRAMMED
8	USER PROGRAMMED
9	USER PROGRAMMED
10	USER PROGRAMMED
11	\$AGAAM WAYPOINT ARRIVAL ALARM RADIUS
12	\$AGAPB MAGNITUDE OF CROSSTRACK ERROR
13	\$AGAPB BEARING ORIGIN TO DESTINATION
14	\$AGAPB BEARING PRESENT TO DESTINATION
15	\$AGAPB HEADING TO STEER TO DESTINATION
16	\$AGBEC BEARING DEGREES TRUE
17	\$AGBEC BEARING DEGREES MAGNETIC
18	\$AGBEC DISTANCE NAUTICAL MILES
19	\$AGBOD BEARING TRUE

20	\$AGBOD BEARING MAGNETIC
21	\$AGBWC BEARING TO WAYPOINT DEGREES TRUE
22	\$AGBWC BEARING TO WAYPOINT DEGREES MAG.
23	\$AGBWC DISTANCE NAUTICAL MILES
24	\$AGBWC BEARING TO WAYPOINT DEGREES TRUE
25	\$AGBWR BEARING TO WAYPOINT DEGREES MAG.
26	\$AGBWR DISTANCE NAUTICAL MILES
27	\$AGBWW BEARING WAYPOINT TO WAYPOINT TRUE
28	\$AGBWW BEARING WAYPOINT TO WAYPOINT MAG.
29	\$AGHSC COMMANDED HEADING DEGREES TRUE
30	\$AGHSC COMMANDED HEADING DEGREES MAG.
31	\$AGVBW LONGITUDNAL WATER SPEED KNOTS
32	\$AGVBW TRANSVERSE WATER SPEED KNOTS
33	\$AGVBW LONGITUDNAL GROUND SPEED KNOTS
34	\$AGVBW TRANSVERSE GROUND SPEED KNOTS
35	\$AGWCV WAYPOINT CLOSURE VELOCITY KNOTS
36	\$AGWNC DISTANCE WAYPT TO WAYPT N.MILES
37	\$AGWNC DISTANCE WAYPOINT TO WAYPOINT KM.
38	\$APAAM WAYPOINT ARRIVAL ALARM RADIUS
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