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### MGL-bath01.\*

The Knudsen 3260 depth is output to files *MGL-bath01.yYYYYdjjj* using the following format:

\$SDDPT,x.xx,x.xx,x.xx*hh		
Item	Definition	Units / Options
x.xx	Water depth relative to transducer	m
x.xx	Offset from transducer	m; positive means from transducer to water line
x.xx	Range in use	m
*hh	Checksum	n/a (hexadecimal)

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### MGL-bath02.\*

The EM122 center beam depth is output to files *MGL-bath02.yYYYYdjjj* using the following format:

\$KIDPT,x.xx,x.xx,x.x*hh		
Item	Definition	Units / Options
x.xx	Water depth	m
x.xx	Offset from transducer	m; positive means from transducer to water line
x.x	Maximum range scale in use	n/a
*hh	Checksum	n/a (hexadecimal)

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### MGL-cnavtower.\* / MGL-cnavstern.\*

The two C-Nav DGPS systems, located respectively on the PSO tower and at the stern, output data to files *MGL-cnavtower.yYYYYdjjj* and *MGL-cnavstern.yYYYYdjjj*. The PSO tower unit is used as the primary reference for the vessel. The following sentence types are recorded in both files:

- \$GNDTM: Datum reference information
- \$GNGGA: Global Positioning System Time, position and fix related data
- \$GNGLL: Position data: position fix, time of position fix, and status
- \$GNGSA: GPS Dilution of Precision (DOP) and active satellites
- \$GNRMC: Recommended Minimum Navigation Information
- \$GNVTG: Track made good and Ground speed data
- \$GNZDA: UTC day, month, and year, and local time zone offset

In addition, the unit located at the stern includes the following sentences:

- \$PNCTDTM: C-Nav proprietary Datum reference information
- \$PNCTGGA: C-Nav proprietary GPS Time, position and fix related data
- \$PNCTGST: C-Nav proprietary GPS position error statistics

#### \$GNDTM sentence

\$GNDTM,aaa,a,mm.mmmmm,a,mm.mmmmm,a,0,aaa*hh		
Item	Definition	Units / Options
aaa	Local datum code	n/a
a	Local datum subcode	n/a
mm.mmmmm	Latitude offset	minutes
a	Direction of Latitude	N: North; S: South
mm.mmmmm	Longitude offset	minutes
a	Direction of Longitude	E: East; W: West
0	Altitude offset	m (always 0)
aaa	Datum code	n/a
*hh	Checksum	n/a (hexadecimal)

### \$GNGGA sentence

\$GNGGA, hhmmss.ss, ddmm.mmmmm, a, dddmm.mmmmm, a, x, n, x.x, x.x, M, x.x, M, x.x, a*hh		
Item	Definition	Units / Options
hhmmss.ss	UTC time of position	Hours/Minutes/Seconds.decimal.
ddmm.mmmmm	Latitude	Degrees/Minutes.decimal.
a	Direction of Latitude	N: North; S: South
dddmm.mmmmm	Longitude	Degrees/Minutes.decimal
a	Direction of Longitude	E: East; W: West
n	GPS Quality indicator	0: not valid; 1: Auto fix; 2: Corrected fix
n	Number of GPS satellites used in solution fix	n/a
x.x	Horizontal Dilution of Precision	n/a
x.x	Antenna altitude from Mean Sea Level (MSL)	m
M	Altitude units--M indicates meters	n/a
x.x	Geoidal separation distance from MSL	m
M	Geoidal separation units	n/a (M indicates meters)
x.x	Age of corrections used in solution fix	s
nnnn	Differential GPS reference station ID	n/a
*hh	Checksum	n/a (hexadecimal)

### \$GNGLL sentence

\$GNGLL, ddmm.mmmmmmm, a, dddmm.mmmmmmm, a, hhmmss.ss, a, a*hh		
Item	Definition	Units / options
ddmm.mmmmmmm	Latitude	Degree, decimal minute
a	Latitude direction	N: North; S: South
dddmm.mmmmmmm	Longitude	Degree, decimal minute
a	Longitude direction	E: East; W: West
hhmmss.ss	UTC time	Hour/minute/Sec.dec
a	Status indicator	A: valid; V: not valid
a	Mode Indicator	n/a
*hh	Mode*Checksum data	n/a (hexadecimal)

### \$GNGSA sentence

\$GNGSA, A, 3, nn, nn, nn, nn, nn, nn, nn, nn, nn, nn, nn, nn, x.x, x.x, x.x, 1*3D		
Item	Definition	Units / options
a	Mode	M: Manual; A: Automatic
n	Solution	1: N/A; 2: 2D; 3: 3D
nn	ID (PRN) of satellites used	Up to 12 values
x.x	Position (3D) of Dilution of Precision (PDOP)	N/A
x.x	Horizontal Dilution of Precision (HDOP)	N/A
x.x	Vertical Dilution of Precision (VDOP)	N/A
n	System ID	1 = GPS
*hh	Checksum	n/a (hexadecimal)

## \$GNRMC sentence

\$GNRMC, hhmmss.ss, a, dddmm.mmmmmm, a, dddmm.mmmmmm, a, x.xx, x.x, ddmmyy, , , a, a*hh		
Item	Definition	Units / options
hhmmss.ss	UTC time	Hour/minute/sec.dec
a	Status indicator	A: valid; V: not valid
dddmm.mmmmmm	Latitude	Degree, decimal minute
a	Latitude direction	N: North; S: South
dddmm.mmmmmm	Longitude	Degree, decimal minute
a	Longitude direction	E: East; W: West
x.xx	Speed over ground (SOG)	Nautical miles per hour (knots)
x.x	Course Made Good (CMG)	Degrees from True North
ddmmyy	Date	DayMonthYear
a	Mode Indicator	D, A, N or E
a	Nav Status	S=safe; C=caution; U=unsafe; V=not valid
*hh	*Checksum data	n/a (hexadecimal)

## \$GNVTG sentence

\$GNVTG, xxx.x, T, xxx.x, M, x.xx, N, x.xx, K, a*hh		
Item	Definition	Units / Options
ttt.t	Course over ground (COG)	Degrees from True North
T	Indicates course relative to True North	n/a
mmm.m	COG relative to magnetic north	Degrees from Magnetic North
M	Indicates course relative to magnetic north	n/a
x.xx	Speed over ground (SOG)	Nautical miles per hour (knots)
N	Indicates that SOG is in knots	n/a
x.xx	SOG	km/h
K	Indicates that the SOG is in km/h	n/a
a	Mode Indicator	n/a
*hh	Checksum	n/a (hexadecimal)

## \$GNZDA sentence

\$GNZDA, hhmmss.sss, dd, mm, yyyy, hh, mm*hh		
Item	Definition	Units / options
hhmmss.sss	UTC time	Hour/minute/Sec.dec
dd	Day	01-31
mm	Month	01-12
yyyy	Year	
hh	Local time zone offset from GMT, hours	00-13
mm	Local time zone offset from GMT, minutes	00-59
*hh	Checksum	n/a (hexadecimal)

### \$PNCTDTM sentence

\$PNCTDTM,aaa,,,,,,,,,aaa*hh		
Item	Definition	Units / Options
aaa	Local datum code	n/a
a	Local datum subcode	n/a
mm.mmmmm	Latitude offset	minutes
a	Latitude direction	N: North; S: South
mm.mmmmm	Longitude offset	minutes
a	Direction of Longitude	E: East; W: West
0	Altitude offset from reference	m
aaa	Reference Datum code	n/a
*hh	Checksum	n/a (hexadecimal)

### \$PNCTGGA sentence

\$PNCTGGA,hhmmss.ss,ddmm.mmmmmm,a,dddmm.mmmmmm,a,n,n,x.x,x.x,M,x.x,M,x.x,ii,jj*hh		
Item	Definition	Units / Options
hhmmss.ss	UTC time of position	Hours/Minutes/Seconds.decimal.
ddmm.mmmmmm	Latitude	Degrees/Minutes.decimal.
a	Direction of Latitude	N: North; S: South
dddmm.mmmmmm	Longitude	Degrees/Minutes.decimal
a	Direction of Longitude	E: East; W: West
n	GPS Quality indicator	0: not valid; 1: GPS SPS fix; 2: DGPS SPS fix
n	Number of GPS satellites used in solution fix	n/a
x.x	Horizontal Dilution of Precision	n/a
x.x	Antenna altitude from Mean Sea Level (MSL)	m
M	Antenna Altitude units	n/a (M indicates meters)
x.x	Geoidal separation distance from MSL	m
M	Geoidal separation units	n/a (M indicates meters)
x.x	Age of corrections used in solution fix	s
ii,jj	Differential GPS reference ID	ii:satellite beam; jj: correction type
*hh	Checksum	n/a (hexadecimal)

### \$PNCTGST sentence

\$PNCTGST,hhmmss.ss,x.xxxx,x.xxxx,x.xxxx,x.xxxx,x.xxxx,x.xxxx,x.xxxx,fisher*hh		
Item	Definition	Units / Options
hhmmss.ss	UTC time of position	Hours/Minutes/Seconds.decimal.
x.xxxx	RMS std deviation of ranges in navigation solution	
x.xxxx	Std deviation of semi-major axis of error ellipse	m
x.xxxx	Std deviation of semi-minor axis of error ellipse	m
x.xxxx	Orientation of semi-major axis of error ellipse	True North Degrees
x.xxxx	Std deviation of latitude error	m
x.xxxx	Std deviation of longitude error	m
x.xxxx	Std deviation of altitude error	m
fisher	Fisher test result	n/a
*hh	Checksum	n/a (hexadecimal)