A222 スマートアンテナ

取扱説明書

Rev. A3

株式会社 UniStrong Japan

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Patents			
6111549	6876920	7400956	8000381
6397147	7142956	7429952	8018376
6469663	7162348	7437230	8085196
6501346	7277792	7460942	8102325
6539303	7292185	7689354	8138970
6549091	7292186	7808428	8140223
6711501	7373231	7835832	8174437
6744404	7388539	7885745	8184050
6865465	7400294	7948769	8190337
8214111	8217833	8265826	8271194
8307535	8311696	8334804	RE41358

Australia Patents	
2002244539	2002325645
2004320401	

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1. はじめに

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1.1 製品の概要

A222 は高精度農業、マシンコントロール、建設/土木、海洋などさまざまなアプリケーションに適用可能な GNSS 受信機で、マルチ GNSS による高精度な RTK 測位が可能な Hemisphere GNSS の Eclipse をベースにしています。

A222 はオプション追加により、マルチ GNSS，マルチ周波数の Athena RTK エンジンによる RTK 測位や Atlas L-band サービスによる測位が可能になります。

図 1 A222 スマートアンテナ

Athena RTK エンジンには以下のような特長があります。

・ほとんどの環境で 15 秒以内に初期化が完了

・多様な環境で安定して動作

・すぐれた長基線での測位性能

Atlas L-band には以下のような利点があります。

・4cm RMS の位置精度

・補正情報が途切れた場合でも位置精度を持続

・4cm から 100cm までの用途に応じた精度レベル

・10〜40 分の収束時間

1.2 製品の特長

A222は以下のような特長があります。

・頑丈なエンクロージャを持ち、Atlas L-bandやAthena RTKによりcmレベルの測位が可能

・改善されたGNSSのパフォーマンス

・高速なRTK FIXおよび再捕捉時間

・NMEA0183、NMEA2000に対応

・電源電圧は 8-32VDCに対応

1.3 同梱物

A222のパーツリストを以下に示します（別売りオプション含む）。

	品名	数量	部品番号
1	A222 GNSSスマートアンテナ	1	804-0154-0
2	マウントアダプタ：ポールマウント用	1	710-0130-0
3	パワー/データケーブル（別売りオプション） 3m（Single DB9 ストレート） 3m（Single DB9） 3m（Dual DB9） 4.6m（芯線処理無し） 15m（芯線処理無し）		051-0384-0 051-0129-002 051-0130-003 051-0169-000 051-0168-000

2. 機材の設置

外観
設置
起動
パワー/データコネクタ

2.1 外観

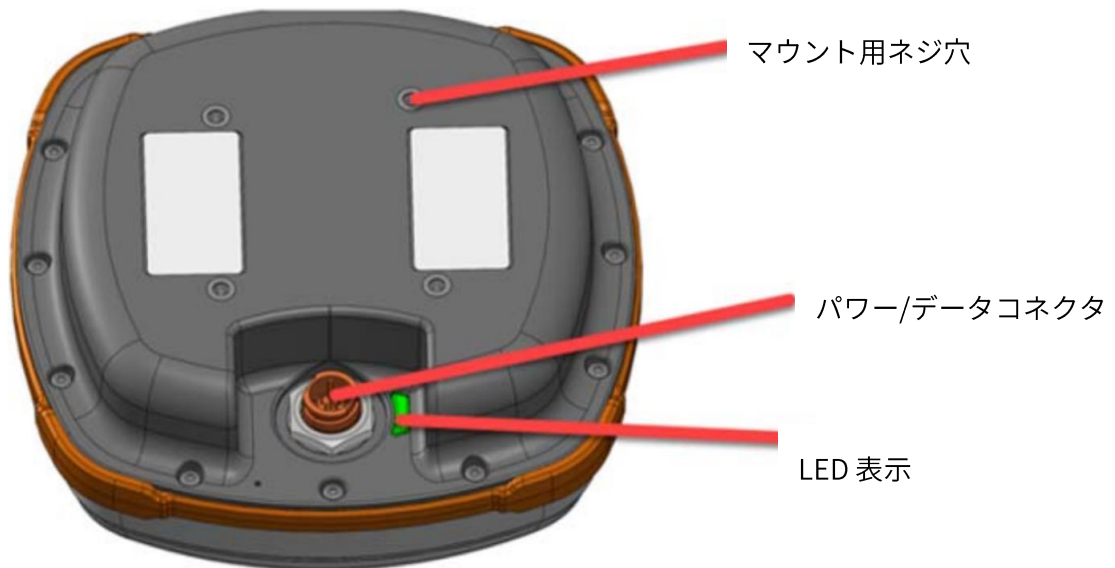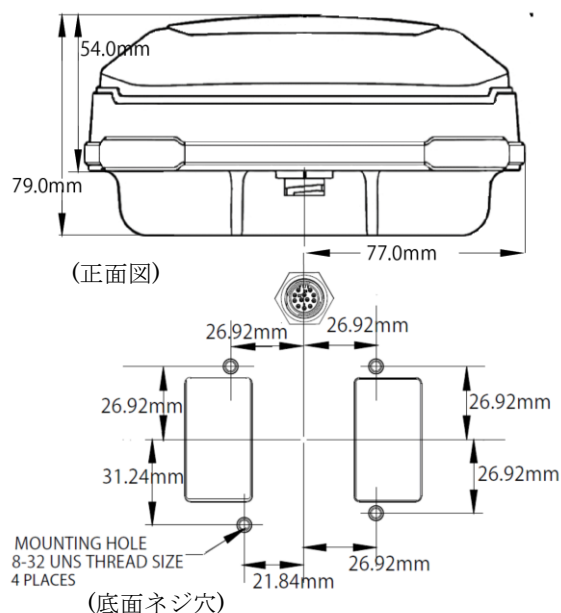A222 の底面のネジ穴、コネクタ、LED を示します。

マウント用ネジ穴

パワー/データコネクタ

LED 表示

図 2 A222 の底面

マウント用ネジ穴を用いて、1 インチ用（アダプタにより 5/8 インチに変換可能）のマウントを取り付けることができます。また、直接、平面に設置することができます。

パワー/データコネクタにパワー/データケーブルを接続することで、受信機への電源供給と NMEA0183 および独自バイナリデータの通信を行います。

以下に A222 の寸法図を示します。

図 3 A222 の寸法図

A222のLEDは動作状態により以下のように変化します。

　・赤の点滅：　　　電源On

　・オレンジの点滅：測位している（RTK FloatおよびAtlasも含む）

　・緑の点滅：　　　RTK FIXまたはAtlas収束

　（注）LEDが点灯を続ける場合、何らかの異常が起きています。

2.2 設置

　設置場所

以下を考慮して A222 の設置場所を決めてください。

　　　・上空に遮蔽物のないできる限り高い位置

　　　・マルチパス／他無線設備の干渉のない場所

　　　注）振動・温度変化の激しい場所あるいは湿度の多い場所への設置は避けてください。

ケーブル

ケーブルについては以下を考慮してください。

- パワー/データケーブルは適切な電源および GNSS データ処理装置（PC 等）に接続してください
- 温度の高い場所、腐食性化学物質を避けてください
- 無理にひねったり折り曲げたりしないでください
- 無理に伸ばさないでください
- 余分なケーブルは巻いておいてください
- 必要に応じて結束バンドを安全に使用してください
- 高電圧や強い RF ノイズ・送信機から遠ざけてください

フラットマウント

フラットマウントキット（別売り）により、平らな面に設置することができます。No. 8-32 のネジ 4 本を使用してください。

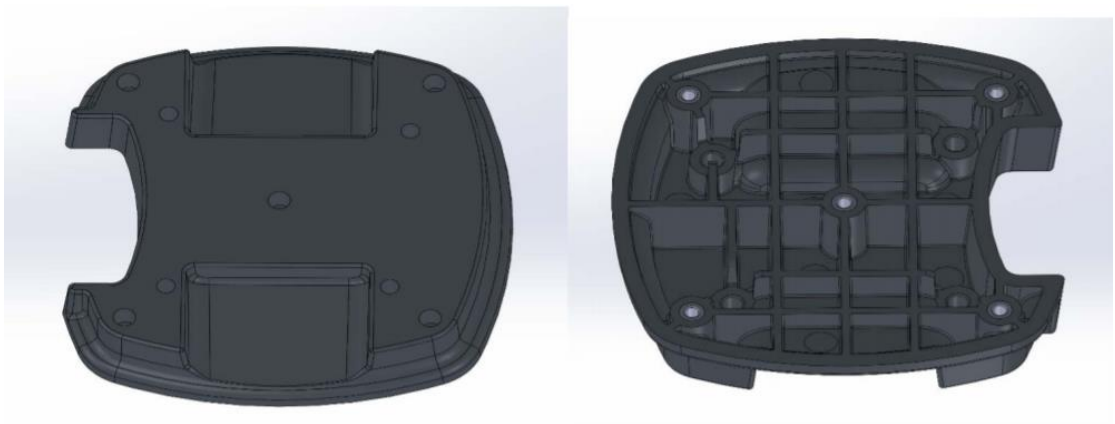図 4 フラットマウントキット

設置の手順は以下の通りです。

（1） A222の設置場所、設置方向を決めます。

（2） 取り付け位置決め用のテンプレートを使って位置決めをします。テンプレートの取り付け用ネジ穴の中心を取り付け面にマークします。外側の4つの穴を使ってください。A222をマークの上に置いて位置を確認してください。必要に応じて微修正します。

（3） 取付面の表面にセンターパンチでネジ穴位置をマークします。

（4） マークした4つの取付位置を5mmのドリルで穴開けします。

（5）　A222を穴位置に合わせ、裏から4つの穴にネジ止めして固定します。

注：A222を取り付ける際は手作業でネジ止めを行ってください。ネジの締めすぎは、故障の原因となり、これに起因する故障は保証対象外となります。

ポールマウント

A222 のポールマウントキットのネジ穴は 1-14 UNS です。また、5/8 インチ変換用のアダプタが付属します。

注：A222を取り付ける際は手作業でネジ止めを行ってください。ネジの締めすぎは、故障の原因となり、これに起因する故障は保証対象外となります。

2.3 起動

　A222 は別売のパワー/データケーブルを使って電源供給および本受信機の制御・測位データの読出し動作を行います。使用可能電源電圧は 8 - 32 VDC です。12VDC を使用した場合 A222 の消費電力は約 3.2W です。
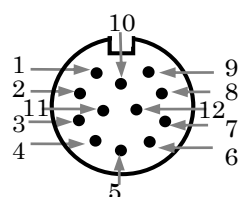
　注）32VDCより高い電圧に接続しないでください。故障の原因となり保証対象外となります。

　電源を投入すると、自動的に測位動作を開始します。

　最初の起動には最大１５分程度時間がかかる場合もありますが、通常は５分程度で測位結果の出力が有効になります。

2.4 パワー/データコネクタ

A222は別売のパワー/データケーブルを使ってPC等に接続します。A222のパワー/データコネクタ上の信号割付けとコネクタのキー（噛合せ用のしるし）位置を示します。

ピン番号	A222信号割付	ケーブル側	
		芯線の色	Dsub 9ピンコネクタ（例）
1		白	7
2		茶	6(PORT B)
3		青	8(PORT B)
4		だいだい	NC
5		黄	5
6	Tx A	むらさき	2(PORT A)
7	1 PPS	ねずみ	9
8	Rx A	ピンク	3(PORT A)
9	CAN Low	うす茶	NC
10	Power in(12V)	赤	NC
11	Power ground	黒	NC
12	Speed out	みどり	NC

3. A222の操作

GNSS

ディファレンシャル補正

パラメータ

設定

A222は電源を入れるだけでGNSSおよびSBAS補正情報の受信を開始します。ほとんどの場合、受信機の設定は必要ありません。

3.1 GNSS

A222 はディファレンシャル補正モードにかかわらず常に GNSS の信号を受信します。自動的に GNSS 衛星を探して信号を受信し、測位や追尾に必要なナビゲーション情報を管理します。

A222 は 4 つ以上の衛星からの信号を受信すると 2.4m 以内の精度で測位します。測位計算には誤差が含まれますが、ディファレンシャル補正情報を用いることで 0.6m 以下の精度で測位可能になります。

A222 は衛星からの信号に基づいて受信機と各衛星との距離を計算して受信機の位置を求めます。

3.2 ディファレンシャル補正

ディファレンシャル補正情報によって、大気圏による誤差、時計誤差、衛星軌道誤差などを除去します。ディファレンシャル補正無しの単独測位の場合、2.4m（95%）の測位精度ですが、SBAS 補正情報や RTCM 補正情報を用いることで 0.6m（95%）以下に測位精度を改善することができます。

A222 は自動的に SBAS 信号を探索/追尾します。複数の SBAS 衛星に対応するため SBAS 用のチャネルは 3 つ用意されています。

3.3 パラメータ

A222の主要パラメータを示します。

項目	内容
DGNSSエンジン	最新のファームウエアを搭載しています。
シリアルポート A, B	RS-232 　　　ボーレート：4800, 9600, 19200, 57600, 115200 　　　8ビット、パリティ無し、ストップビット1
GNSSメッセージ	Hemisphere GNSS独自バイナリ、 NMEA 0183、NMEA2000 更新レート：1Hz − 20Hz（20Hzは要オプション） Ageの最大値：259200秒 仰角マスク：5°

3.4 設定

A222はシリアルポートからコマンドを送信することによって設定します。ポートのボーレートやポートから出力するメッセージの更新レートなどを設定できます。

> Note: 電源を入れ直しても変更した状態を保つために、$JSAVE コマンドを送信して変更した設定を保存してください。

Atlas L-band 補正情報を使用して測位が収束している場合、アンテナの位置を動かさなければ、受信機の電源を落としても再起動後 2 分程度で元の精度を回復します。

4. 付録

付録 A：トラブルシューティング

付録 B：製品仕様

ソフトウェア使用許諾契約書

品質保証について

付録A：トラブルシューティング

表A-1に、本機によく起こるトラブルとその解決方法を示します。

表A-1：トラブルシューティング

事象	対策
電源が入らない	・プラスおよびマイナス電極の取付が正しいことを確認する ・電源コネクタ/ケーブルが正しく接続されていることを確認する ・入力電圧を確認する（8〜32VDC） ・電源電流の制限値を確認する（最大300mA at 12 VDC）
・データ出力がない ・データが正しくない	・電源が入っていることを確認する ・必要なメッセージが出力されるよう設定されているか確認する（PocketMax4やWebUI、もしくは$JSHOWコマンドで確認できます） ・ボーレートが正しいか確認する ・$JIコマンドに応答があるかどうか確認する ・正しいディファレンシャルモードに設定されているか確認する ・４個以上の衛星から信号を受信していることを確認する
解読できない出力	・RTCMまたはバイナリメッセージを出力していないか確認する ・ボーレートが正しいか確認する ・ボーレートと出力データの合計サイズの関係を確認する。
GNSSがロックしない	・パワー/データケーブルの接続を確認する ・上空が開けていることを確認する。 ・GNSS衛星の状態を確認する
測位できない	・上空が開けていることを確認する
A222のLEDが点滅しない	・電源の極性を確認する ・パワー/データケーブルの接続を確認する ・入力電圧が8〜32VDCであることを確認する
A222のLEDが点灯する	・一度電源を切って再度電源を入れ直す

付録B：製品仕様

表B-1：GNSSセンサー仕様

項目	仕様
受信機タイプ	GNSS L1、G1（標準）　GNSS L2、L-band、RTK（オプション）
受信信号	GNSS、Atlas
チャンネル	114
受信感度	-142 dBm
SBAS追尾	3チャンネル、パラレル
更新レート	10Hz（標準）、20Hz（オプション）
タイミング（1PPS）精度	20 ns
コールドスタート	概ね60秒以内（アルマナック、RTC無し）
ウォームスタート	概ね30秒以内（アルマナック、RTC有り）
ホットスタート	概ね10秒以内（アルマナック、RTC、位置情報有り）
最大速度	時速1850 km
最大高度	18288m

表 B-2: 水平精度

項目	仕様	
	RMS（67%）	2DRMS（95%）
RTK	8mm + 1ppm	15mm + 2ppm
L-band	0.04 m	0.08 m
SBAS (MSAS)	0.3 m	0.6 m
単独測位	1.2 m	2.4 m

表 B-3：L-band

項目	仕様
受信タイプ	シングルチャンネル
チャンネル	1530 ～ 1560 MHz
受信感度	-130 dBm
チャンネル間隔	5.0 kHz
衛星選択	自動 または 手動
再捕捉時間	概ね15秒

表 B-4：通信

項目	仕様
シリアル	全二重 RS-232　x 2
ボーレート	4800 ～ 115200
データI/Oプロトコル	NMEA0183、NMEA2000、HemisphereGNSSバイナリ
補正情報プロトコル	HemisphereGNSS独自、RTCM v2.3（DGNSS）、RTCM v3（RTK）、

	CMR（RTK）、CMR+（RTK）（CMR+は受信のみ）
タイミング出力	1PPS CMOS、active low, rising edge sync, 10kΩ, 10pF load
イベントマーカー入力	CMOS, active low, falling edge sync, 10 kΩ, 10pF load

表 B-5：電源仕様

項目	仕様
入力電圧	8〜32VDC
消費電力	3.2W以下（GNSS L1/L2 + L-band）
消費電流	0.26A以下（GNSS L1/L2 + L-band）
パワーアイソレーション	No
逆極性保護	Yes

表 B-6：環境仕様

項目	仕様
動作温度	-40℃ 〜 +70℃
保管温度	-40℃ 〜 +85℃
湿度	95%（結露しないこと）
衝撃/振動	メカニカルショック：EP455 Section 5.14.1 振動：EP455 Section 5.15.1 Random
EMC	CE (ISO 14982 Emissions and Immunity)、FCC Part 15, Subpart B, CISPR 22
筐体	IP67

表 B-7：筐体仕様

項目	仕様
サイズ	15.8 L x 15.8 W x 7.9 H　（cm）
重量	1.05 kg以下
状態表示（LED）	赤点滅：電源On オレンジ点滅：GNSS測位、RTKフロート、Atlas測位 緑点滅：RTK FIX、Atlas収束
パワー/データコネクタ	12ピンオス（メタル）
アンテナ設置	1-14 UNSメス、5/8-11 UNCメスアダプタ、サーフェイスマウント

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