



# **INDIGO ONE**

**AIRCRAFT TRACKING  
AND  
COMMUNICATION SYSTEM**

**DECLARATION OF DESIGN PERFORMANCE**

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## About this Document

This document is a functional description of the Indigo One GPS Tracking / Satellite Messaging system.

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Revision	Date	Change
01R1	11/02/08	Initial Draft
01R2	20/02/08	Drawing Index added
01R3	04/03/08	Nameplate data added
01R4	04/03/08	Part numbering revised
01R5	05/03/08	Specification table and wiring details added
01R6	07/03/08	Nameplate data amended

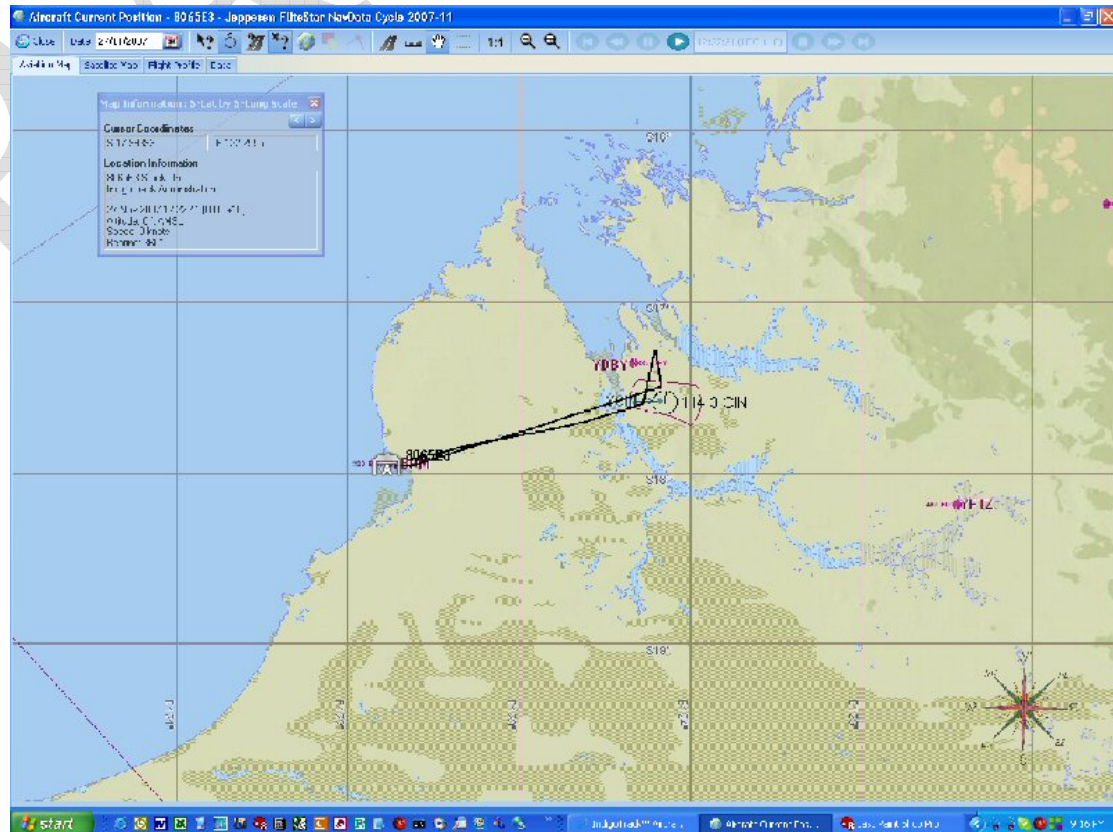
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## 1.0 INTRODUCTION

The Indigo One is a GPS Tracking / Satellite Messaging system, which has been developed by Indigo Track (Pty) Ltd.

Indigo One is designed to operate within Indigo Track's internet based aircraft tracking system. The messaging system has been developed to allow aircraft owners / operator and crew better manage the commercial aspects of their operations.



The Indigo One unit offer GPS position reports and txt messaging. These messages are transmitted via an INMARSAT data modem to IndigoSat.

Indigo One can also receive messages via the modem.

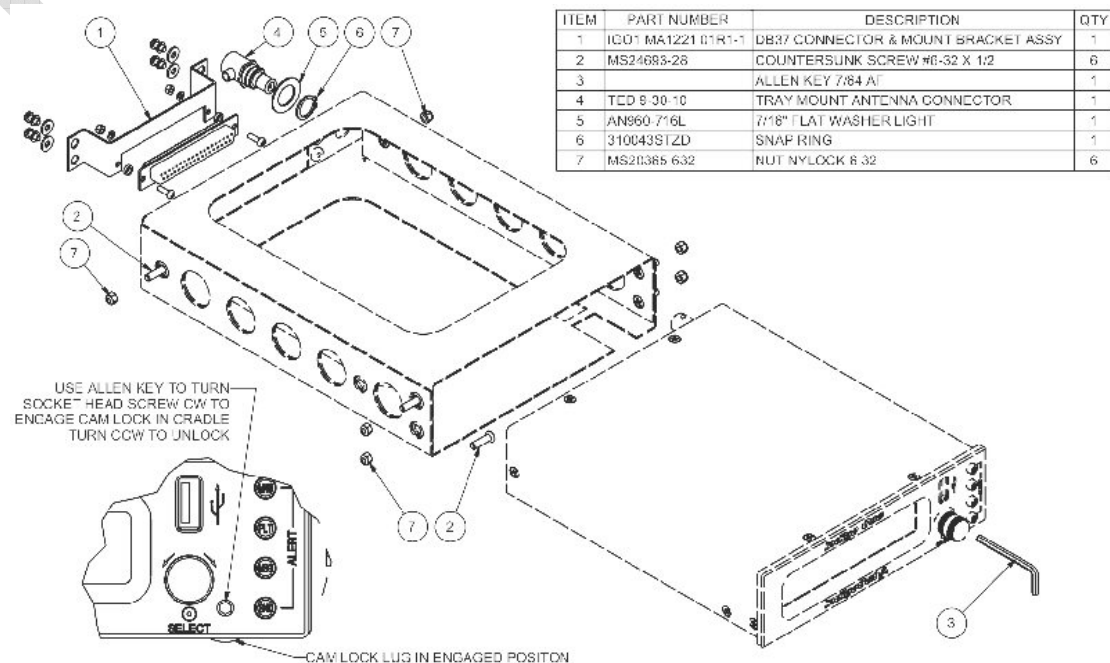
This communication is global in scope, negating the need to integrate with any "local" communications system when the aircraft operate away from its home country.

## 2.0 INSTALLATION

The Indigo One unit is a rectangular case unit with a display and controls on the front face. The Indigo One unit is fitted into a mounting cradle, which has been sized to fit into a 6.25 inch aircraft racking system.

The mounting cradle is fitted with a “floating” bracket for the wiring connector (DB37) to attach to. The RF connector (p/n TED 9-30-10) is fitted to an oversized hole in the rear of the cradle to allow the connector to “float”. The electrical and RF connectors can move approx +/-0.25mm to them self locate when the Indigo One unit slides into the cradle.

Once inserted into the cradle the Indigo One unit has a cam lock fitting located on the under side of the case. The cam lock can be turned using a 7/64” Allen key on the adjusting nut, which can be accessed via a hole in the front face. Starting with the cam in the rear most position, the cam can be rotated into the lock position. Additional turns of the Allen key will pull the Indigo One unit back into the cradle to ensure full connection of the electrical and RF contacts at the rear of the unit, and prevent the unit from moving out of the cradle.

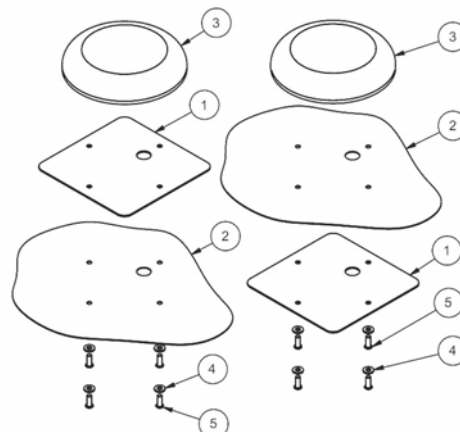


The antenna unit combines the GPS receiver with the Low Noise Amplifier (NLA), and satellite antenna.

The antenna is encased in a moulded hard plastic radome, which is installed on the roof of the aircraft’s fuselage.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	VARIOUS	REINFORCING DOUBLER	1
2		FUSELAGE SKIN	1
3	AS2217D-00-00	INDIGO ONE ANTENNA	1
4	NAS1149F0363	#10 FLAT WASHER	4
5	MS35207-263	SCREW 10-32 X 1/2"PCR	4



## 3.0 FUNCTION

The Indigo One has two primary functions:

- GPS Position Reporting (Tracking)
- Messaging

### 3.1 GPS POSITION REPORTING

The Indigo One antenna is fitted with a GPS receiver which outputs position data to the main unit. The user can select a reporting interval in the unit's configuration setup (eg 5 minutes). The unit will generate a position report at the end of each reporting interval. This report is sent via the satellite modem to the Indigo Track website where the aircraft's activities can be tracked on map base or satellite image.



### 3.2 MESSAGING

The Indigo One has a message set from which the crew can select and send via the satellite modem. The crew can add a small text "payload" to messages, or send a dedicated text message.

The message set is scripted to assist the crew and FBO in the commercial management of the aircraft.

The crew can also receive text messages from the FBO, allowing two way communications. The crew are advised of message activity on a message status screen. An option advisory tone also advises the crew of an incoming message.

The message status screen is present is a similar format to email with IN, OUT, and SENT boxes. The crew can view new or older messages at any time.



## 4.0 MANUFACTURE

The Indigo One is manufactured in Australia by Microair Avionics under an APMA issued by the Australian Civil Aviation Safety Authority (CASA).

The Indigo One GPS/Satellite Messaging System is defined as non-essential equipment for installation on aircraft. The equipment has been assessed under the following terms:

- RTCA/DO-254 Level E (Hardware)
- RTCA/DO-178B Level E (Software)
- RTCA/DO-160E (Environmental)

### 4.1 QUALITY ASSURANCE

The Indigo One is to be manufactured in accordance with the policies and procedures defined in the Microair Avionics Quality Assurance manual (MAQA), and applicable Microair Avionics Procedures (MAP's). The MAQA is approved by the Civil Aviation Safety Authority (CASA) of Australia as compliant to the requirements of CASR Part 21. The Indigo One is manufactured under an Australian Parts Manufacturing Approval (APMA), issued by CASA to Microair Avionics.

#### 4.1.1 CONFIGURATION MANAGEMENT

The configuration or revision control of the Indigo One design data and all related documentation, shall comply with MAP-102.

#### 4.1.2 MATERIAL MANAGEMENT & CONTROL

The identification, inspection, storage, and distribution of all materials used in the production of the Indigo One shall comply with the requirements of MAP-401.

### 4.2 NAMEPLATE

The Indigo One shall be identified by the nameplate decal affixed to the side of the case, and states the following:

<p><b>Indigo One</b></p> <p>This product is manufactured in Australia by Microair Avionics for Indigo track.</p> <p>This product is part of IGO1_MA1236_01R1-1 assembly kit. Refer to Authorised Release Certificate supplied with the kit for aircraft installation eligibility.</p> <p>Input Voltage: 12-33 Volts Negative Ground</p> <p>PART No: IGO1-01</p>	<p>SERIAL NUMBER: 001001</p> <p>CASA APMA: E2000-004</p> <p>RTCA/DO-160E: [(A1)X]CAA[SRU2]XXXXXAAAB[BC][SS]BXXXXX</p>
<p>0 1 2 3 4 5 6 7 8 9</p>	

### 4.3 SPECIFICATIONS

#### *Indigo One*

<b>Physical</b>	Width	158mm	6.22"
	Height	41mm	1.61"
	Length	199mm	7.83"
	Weight	835g	including mountings
<b>Power</b>	Input Voltage	12 – 33Vdc	
	Current (RX)	110 – 140mA	
	Current (TX)	530mA	(2 seconds typically)
	Output Voltage	5Vdc	
<b>Communications</b>	COM1	RS232	9600,8,1,N
	COM2	RS232	9600,8,1,N
	COM3	RS232	9600,8,1,N
	REM DSP	RS232	9600,8,1,N
<b>GPS</b>	16 channels	1575.42MHz	
	CEP	2.5m	
	SEP	5.0m	
<b>Satellite Modem</b>	Inmarsat	+/-75 degrees Latitude	5 Ocean regions
	Receiver	1525.0 to 1559.0MHz	32-FSK
	Transmitter	1626.5 to 1660.5MHz	2-FSK
	EIRP	9 dBW max	
<b>Connection</b>	Electrical	DB-37	
	RF	BNC	
<b>I/O</b>	8 TTL lines	0 / 5Vdc	Max input 33Vdc
	2 Analog lines	0 to 33Vdc	

#### *Antenna*

<b>Physical</b>	Diameter	128mm	5.0"
	Height	24mm	0.94"
	Weight	365g	

#### 4.4 ENVIRONMENTAL TEST COMPLIANCE

The Indigo One has been tested to in accordance with RTCA/DO-160E for equipment to be installed in aircraft.

This schedule is a summary of the required test procedures which are fully defined in the Radio Technical Commission for Aeronautics (RTCA) document order (DO) DO-160E dated December 9, 2004.

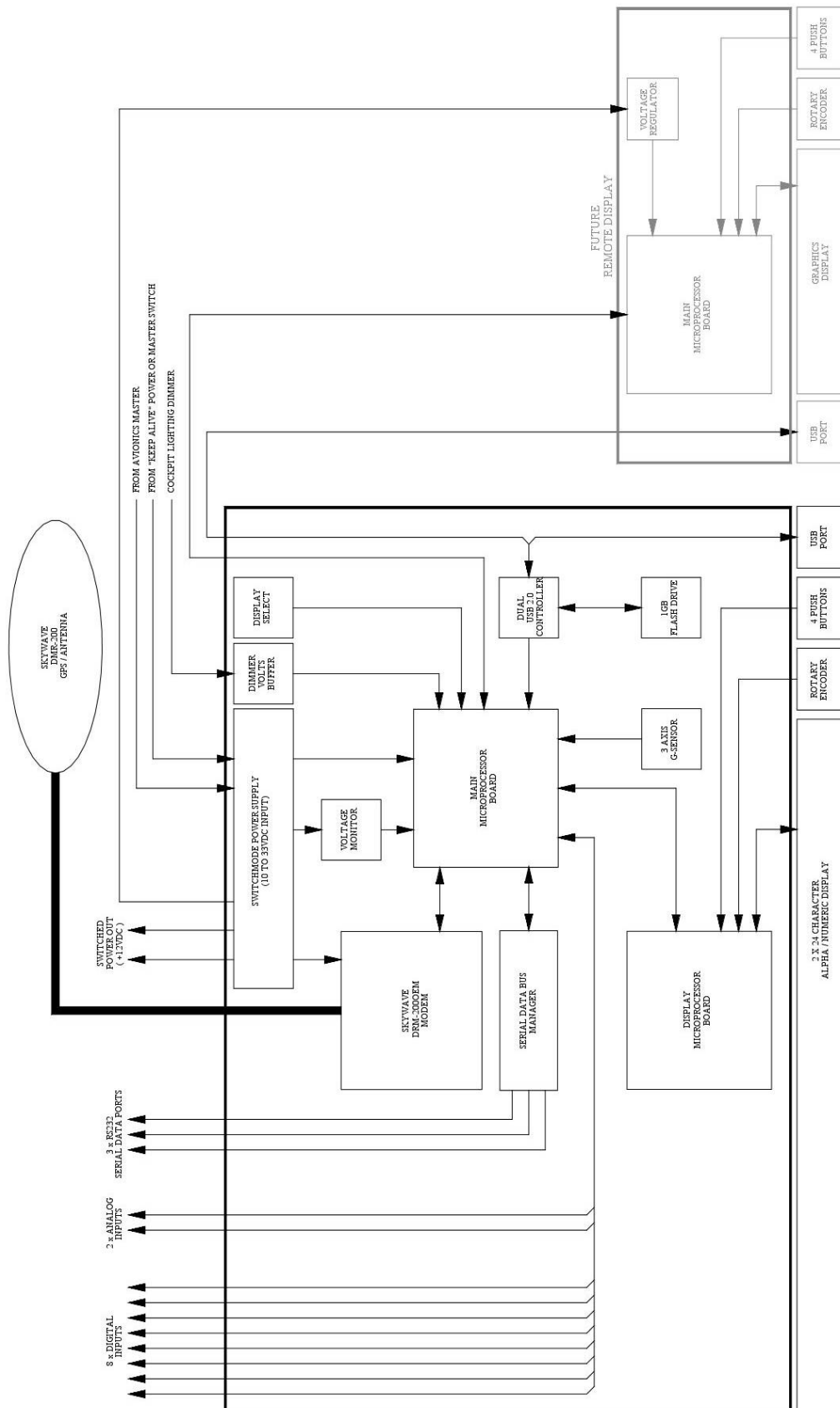
Section	Description	Category
4	Temperature and Altitude	[(A1)X]
5	Temperature Variation	C
6	Humidity	A
7	Operational Shock and Crash Safety	A
8	Vibration	[SRU2]
9	Explosive Atmosphere	X
10	Waterproofness	X
11	Fluids Susceptibility	X
12	Fluids Susceptibility	X
13	Fungus Resistance	X
14	Salt Fog	X
15	Magnetic Effect	A
16	Power Input	A
17	Voltage Spike	A
18	Audio Frequency Conducted Susceptibility – Power Inputs	B
19	Induced Signal Susceptibility	[BC]
20	Radio Frequency Susceptibility (Radiated and Conducted)	[SS]
21	Emission of Radio Frequency Energy	B
22	Lightning Induced Transient Susceptibility	X
23	Lightning Direct Effects	X
24	Icing	X
25	Electrostatic Discharge (ESD)	X
26	Fire, Flammability	X

[(A1)X]CAA[SRU2]XXXXXXAAAB[BC][SS]BXXXXX

Note 1 The altitude testing is in compliance with A1 (15,000ft.) The temperature testing is in compliance with D1 (-20 to +55 degrees C).

Note 2 Section 4.5.5 In-Flight Loss of Cooling test has not been carried out.

# 5.0 BLOCK DIAGRAM



## 6.0 IGO1\_MA1236\_01R1-1

### 6.1 FULL INDIGO ONE KIT (IGO1\_MA1236\_01R1-1)

ITEM	PART NUMBER	DESCRIPTION	QTY
1	AS2217D-00-00	Antenna	1
2	IGO1_MA1217_01R1-0	Cradle Assembly	1
3	IGO1-01 ( 0 )	GPS Tracking Unit Assembly	1
4	IGO1_MAW1014-1_01R1-3	Wiring Harness	1
5	IGO1_MAW1014-2_01R1-3	Coaxial Cable	1
6	IGO1_MA1221_01R1-1	Installation Kit	1

### 6.2 MISC PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
7	49700002	EXP130 210mm x 297mm Label (Top Decal)	1
8	86520680	Avery 936047 63.5mm x 38.1mm Label	1
9	IGO1_MA1229_01R1-0	Packing Base	1
10	IGO1_MA1230_01R1-0	Packing Top	1
11	DP15917	415mm x 260mm x 123mm White Combo Box	1
12	P10A	110mm x 105mm Anti Static Bubble Bag	1
13	AV936020	Avery 936020 199.6mm x 289.1mm Label (Side Decal)	1
14	AV938101	Avery 938101 70mm x 35mm Label (Part / Serial Number Decal)	2
15	30500	254mm x 660mm Anti Static Bag	1

### 6.3 INDIGO ONE ( IGO1-01 (0) )

Part Number	Qty	Description
IGO1_DSK_01R1	1	Display Keypad Board
IGO1_DM_01R2-2	1	Display Main Board
	1	LCD Module - 24x2 Alphanumeric White Backlight on Blue
IGO1_MB_01R2-2	1	Display Main Board
DMR-800S	1	DMR-800S OEM Transceiver SMA with GPS Modem
IGO1_MA1233_01R1-0	1	Base Plate Assembly
IGO1_MA1242_01R1-0	1	Nameplate Decal
IGO1_MA1214_01R1-1	1	Rectangular Top Cover

### 6.4 CRADLE ( IGO1\_MA1217\_01R1-0 )

Part Number	Qty	Description
IGO1_MA1217_01R1-0	1	Cradle Welded Assembly

### 6.5 INSTALLATION KIT ( IGO1\_MA1221\_01R1-3 )

Part Number	Qty	Description
	4	#10 Flat Cadmium Plated Carbon Steel Washer
	4	10-32 x 1/2" Pan Cross Recessed Cadmium Plated Machine Carbon Steel Screw
	1	5 x 4 inch Reseal Bag (Plastic)
	6	6-32 Hex Nylock Zinc Plated Steel Nut
	6	6-32 x 1/2" Flat Countersunk Cross Recessed Machine Stainless Steel Screw
	1	7/16" X 13/16" x 1/32" Flat Copper Shim Washer
	1	7/64" Ball End Screwdriver
	1	Avery 936047 63.5mm x 38.1mm Label
IGO1_MA1222_01R1-1	1	Bracket DB37 Mount Bracket
	2	M3 Hex Nylock Zinc Plated Steel Nut
	4	M3 Spring Grade 304 Stainless Steel Washer
	4	M3 x 6 Pan Phillips Grade 304 Stainless Steel Screw
	4	M3 x 7 x 0.5 Flat Grade 304 Stainless Steel Washer
	2	M3 x 8 Pan Phillips Zinc Plated Steel Screw
IGO1_MA1225_01R1-0	2	Spacer DB37 Mounting
	1	Tray Mount RF Antenna Connector
	1	Tray Mount RF Antenna Connector Snap Ring
	1	250V 10A M205 Black in-line Fuseholder
	1	2A M205 Fast Blow Fuse

**6.6 WIRING HARNESS (IGO1\_MAW1014-1\_01R1-4 )**

Part Number	Qty	Description
M24308/2-284F	1	37 Way D-Sub Straight Female Connector with Crimp Contacts
	1	9 x 13 inch Magic Seal Top Bag (Plastic)
	1	Avery 936047 63.5mm x 38.1mm Label
	24	PS-094-150-W 38.10mm Marker Width White 3:1 One-Sided Printable Permasleeve Wire Marker
W4104	20mm	Heatshrink Tubing 3.2mm Dia 1:2 Black
H1974	10	100 x 2.5mm plastic cable ties
M22759/16-22-0	6.00m	Mil-spec Tefzel wire 22awg – Black
M22759/16-22-2	6.10m	Mil-spec Tefzel wire 22awg – Red
M22759/16-22-4	3.00m	Mil-spec Tefzel wire 22awg – Yellow
M22759/16-22-5	3.00m	Mil-spec Tefzel wire 22awg – Green
M22759/16-22-7	3.00m	Mil-spec Tefzel wire 22awg – Violet
M22759/16-22-8	0.05m	Mil-spec Tefzel wire 22awg – Grey
M27500-22TG1T14	3.00m	Mil-spec Tefzel single core/shielded 22awg

**6.7 COAXIAL LEAD (IGO1\_MAW1014-2\_01R1-3 )**

Part Number	Qty	Description
	1	9 x 13 inch Magic Seal Top Bag (Plastic)
	1	Avery 936047 63.5mm x 38.1mm Label
	27	PS-375-150-W 38.10mm Marker Width White 3:1 One-Sided Printable Permasleeve Wire Marker
RG400	10	50 ohm Coaxial Cable
	1	SMA 50 Ohm Right Angle Plug Crimp Connector

**6.8 ANTENNA (AS2217D-00-00 )**

Part Number	Qty	Description
	1	110mm x 105mm Anti Static Bubble Bag
AS2217D-00-00	1	Antenna

## 7.0 DRAWING INDEX

DWG NO.	REVISION	TITLE
MA1200	01R1-2	INDIGO ONE DMR-200 ANTENNA INSTALLATION
MA1203	01R1-4	INDIGO ONE RECTANGULAR FACE PLATE PAINTED
MA1206	01R1-2	INDIGO ONE CRADLE ASSEMBLY & INSTALLATION
MA1207	01R1-0	INDIGO ONE CRADLE TOP ASSEMBLY
MA1211	01R1-2	INDIGO ONE RECTANGULAR FACE PLATE
MA1212	01R1-0	INDIGO ONE BASE PLATE ASSEMBLY
MA1213	01R1-0	INDIGO ONE BASE PLATE
MA1214	01R1-1	INDIGO ONE CHASSIS COVER
MA1216	01R1-0	INDIGO ONE MAIN PCB FOOT PRINT
MA1217	01R1-0	INDIGO ONE CRADLE WELDED ASSEMBLY
MA1218	01R1-1	INDIGO ONE CRADLE TOP
MA1219	01R1-0	INDIGO ONE CRADLE BASE
MA1220	01R1-1	INDIGO ONE CAM LOCK
MA1221	01R1-3	INDIGO ONE DB37 CONNECTOR MOUNT BRACKET ASSEMBLY
MA1222	01R1-1	INDIGO ONE DB37 MOUNT BRACKET
MA1224	01R1-0	INDIGO ONE SPACER CAM LOCK
MA1225	01R1-0	INDIGO ONE SPACER DB37 MOUNTING
MA1226	01R1-2	INDIGO ONE UNIT ASSEMBLY
MA1226	01R1-2	INDIGO ONE INDIGO ONE UNIT ASSEMBLY
MA1227	01R1-3	INDIGO ONE CAM LOCK LUG
MA1229	01R1-0	INDIGO ONE PACKING BASE
MA1230	01R1-0	INDIGO ONE PACKING TOP
MA1231	01R1-1	INDIGO ONE DISPLAY ASSEMBLY
MA1233	01R1-0	INDIGO ONE CAM & BASE ASSEMBLY
MA1234	01R1-1	INDIGO ONE FOAM PACKING CAM LOCK
MA1235	01R1-2	INDIGO ONE MAIN ASSEMBLY
MA1236	01R1-1	INDIGO ONE COMPLETE GPS TRACKING UNIT KIT ASSEMBLY
MA1242	01R1-8	INDIGO ONE DECAL NAMEPLATE
MA2001	01R1-3	INDIGO ONE GENERIC KEY SET PAINTED

## 8.0 WIRING DIAGRAMS

DWG No.	REVISION	TITLE
MAW1014-1	01R1-4	INDIGO ONE EXTERNAL WIRING DIAGRAM
MAW1014-2	01R1-3	INDIGO ONE COAXIAL CABLE

## 9.0 TECHNICAL DRAWING

