

Allflex Model RS601-3 ISO Compatible RF/ID Portable Reader

User Manual

(Rev B1 - August 2006 / Software V3.00+)

These instructions are intended to guide the user through the basic setup and operation of the Allflex Portable Reader, and apply to its use either with or without the Accessory Kit.

Preparing For Use

Unpacking

The Portable Reader and its optional Accessory Kit are packaged together in one shipping box. The box label identifies the box contents: either the Portable Reader, or the Portable Reader w/Accessory Kit. The Accessory Kit can be ordered separately as an upgrade to the Portable Reader (P/N AK101 (U.S.) or AK102 (Intn'l.)). Remove all items from the shipping box, and compare the contents with the appropriate equipment list provided below in Table 1.

Contents

The Allflex Portable Reader and the optional Accessory Kit are provided with the following components. Please contact Allflex Product Support in the event that the shipping box contents are damaged, deficient, or defective.

Table 1 - Contents of Portable Reader and Optional Accessory Kit

Component/Item	Reader Only	w/U.S. Accessory Kit	w/Int'l Accessory Kit
Portable Reader Unit w/wrist strap	X	X	X
Quick Start Instruction Brochure	X	X	X
Alkaline Batteries - Pkg. of 4	X	X	X
Rechargeable NiMH Batteries - Pkg. Of 4		X	X
120 VAC/60 Hz Battery Trickle Charger		X	
230 VAC/50 Hz Battery Trickle Charger			X
End-cap with Data/Power Cable		X	X
CD-ROM - User Manual and Configuration Utility Program	X	X	X

Portable Reader User Interface

The diagram on the next page illustrates the Portable Reader's features that are instructive to its operation and use. Each feature and its corresponding function are described in the accompanying Table 2.

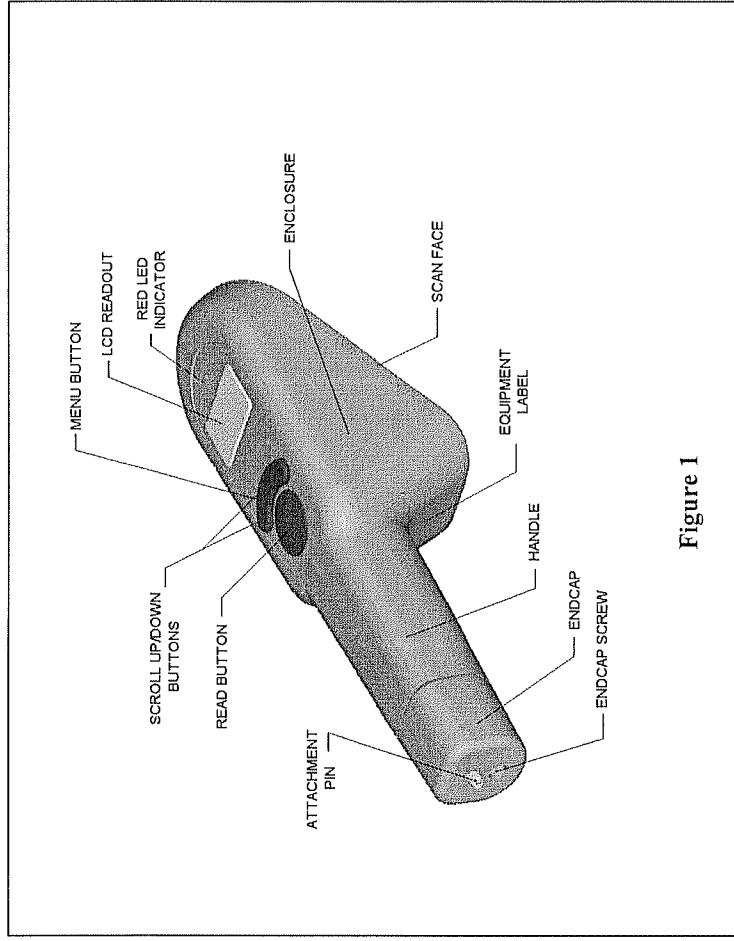


Figure 1

Table 2 - Features and Description of Use

Feature/Item	Description of Use
READ Button	Turns Reader ON from OFF state Activates transponder reading from ON state Selects certain option alternatives in Options Menu
MENU Button	Activates Options Menu / Selects Options Menu Category
SCROLL UP/DOWN Buttons	Navigates Options Menu (Press both buttons simultaneously to turn off unit)
2x8 Character LCD	Displays transponder ID Code information, Reader status, and Options Menu selections
Red LED Indicator	Lights when valid transponder ID Codes are detected (optionally lights with Options Menu selections)
Scan Face	Reader surface planar with scanning coil. Transponder coil axis should be perpendicular to Reader scan face for maximum reading distance
Handle	Ambidextrous gripping surface
End Cap	User removable component for accessing battery compartment
End Cap Screw	Retains End-cap in place
Attachment Pin and Ring	Used to attach wrist strap, belt hook, etc.
Data/Power Cable	Connects Reader to PC and battery charger (not shown)
Battery Compartment	Accepts 4 AA alkaline or 4 AA rechargeable batteries (not shown)
Data/Power Connectors	Data/Power Cable End-cap connectors interface (not shown)
Equipment Label	Provides model, serial number, and agency certification notices
Enclosure	Rugged, shock-resistant, and hermetic case

Setup

The Portable Reader is shipped with the wrist strap end-cap installed. In order to prepare the Reader for use, 4 AA batteries (either alkaline or rechargeable) must be installed. The rechargeable batteries are shipped in a discharged state, and must be fully charged prior to installation.

Caution: *Do not attempt charging alkaline batteries, and do not combine alkaline and rechargeable batteries, or combine different rechargeable battery types.*

Battery Installation Instructions

- Unscrew the end-cap fastener by turning it counter-clockwise approximately 5 complete turns.
- Remove the end-cap by pulling it away from the Reader's handle.
- Install the alkaline batteries or rechargeable batteries, observing the polarity orientation icons located beneath the battery channel.

Note: Incorrect installation of the batteries will not damage the reader. However, the Reader will fail to operate unless the batteries are correctly oriented. Small icons engraved near the battery compartment indicate Battery orientation. With the Reader positioned such that the battery compartment is above and the connectors are below, insert the two battery cells on the right side with positive terminals inward (in the direction of the engraved arrow); insert the two battery cells on the left with negative terminals inward (in the direction of the engraved arrow).

- Reposition the end-cap on the handle end, guiding the connector plugs into their respective receptacles (if the end-cap is so equipped), and tighten the end-cap fastener by turning it clockwise about 5 complete turns until fully seated.

Note: The U.S. Accessory Kit is provided with a wall mount style battery trickle charger. The International Accessory Kit is provided with an inline style battery trickle charger equipped with an IEC 60320 C14 type power mains receptacle. The power mains cable for the International Charging Unit is not provided with the Accessory Kit, and must be furnished by the user.

Connections

If rechargeable batteries have been installed in the Portable Reader, and the data/power cable end-cap has been installed, the battery charger must be plugged into an AC power mains outlet, and its DC output plug must be connected to the mating receptacle on the data/power cable. The batteries must be charged for 12 to 16 hours from a completely discharged state, prior to use using the trickle charging method when the batteries are installed. Alternately, the batteries can be fast charged externally using a commercially available battery charger.

Caution: *Use only an external charger that is compatible with the rechargeable batteries. Consult the battery manufacturer for further information.*

Note: The trickle charger may be left connected to the Reader continuously when the Reader is being used with the data/power cable end-cap. Overcharging of the battery pack will not occur.

Serial Communications Interface

The power/data cable end-cap also provides a standard DB-9(F) connector for interfacing to a serial communications port such as that commonly available on personal computers. The Portable Reader, when equipped with the data/power cable endcap, is capable of sending ID Code information to such terminal devices. A PC can be equipped with communications terminal software (Such as Microsoft Windows® "Hyperterminal"®) to receive and display the Reader's ID Code information. The Portable Reader's default communications parameters are 9600 bits/second, no parity, 8 bits/word, 1 stop bit, and no flow control (9600N81). The Allflex Portable Reader Configurator® program is designed especially for the Portable Reader, and conveniently sets configuration options and displays ID Code output format.

Each time a new transponder is read, the ID Code is transmitted via the serial port in the format as specified in the Options Menu. The default configuration for this serial data transmission is specified in Table 6, and the corresponding data format is shown on page 6 of this user manual.

Operating and Using the Portable Reader

Activating the Portable Reader

After installing the batteries (and charging if rechargeable batteries are being used), and making the necessary data/power cable connections, the Portable Reader is ready for operation.

The Portable Reader is activated from its normally OFF state by momentarily pressing the READ button for at least ½ second. Upon depression of this button, the Reader is turned ON, and an indication of this state is enunciated by momentary flashing of the Red LED visual indicator, beeping of the audible indicator. The LCD will immediately display either the last tag read (if this has been selected in the option menu) or will display "Reader Ready", indicating that the Reader is powered and ready to scan for tags.

If the batteries exhibit a low charge level at power up or when the Read button is subsequently pressed for scanning a tag, the LCD will exhibit "Low Battery"; and the Reader may automatically power off.

Reading Transponders

Prior to reading transponders installed in their respective identified items, it is recommended that the Reader be checked with a spare test transponder to ensure satisfactory performance, if the user has available transponders of the types that the Allflex Portable Reader is capable of reading. Table 3 below provides nominal read distance performance that can be expected when the transponder is optimally oriented to the Reader.

Table 3 - Nominal Read Range Performances

Manufacturer	Transponder Description	Read Range
Allflex	FDX-B (ISO) 12 mm Glass Implantable	8 cm
Allflex	HDX 30mm Plastic Eartag	2.5 cm
Allflex	HDX 32mm Glass Implantable	2.5 cm
Allflex	FDX-B 30mm Plastic Eartag	20 cm
Allflex	FDX-A 12mm Glass Implantable	2 - 5 cm

Note: In order to read a transponder, hold it in front of the Reader's scan face, and press the READ button. The Reader will search for a transponder for 3 seconds (the factory set default value), and if a transponder is detected during this interval, the Red LED will flash, the audible beeper will sound, and the ID Code will be displayed on the LCD readout. If no transponder is detected during this search interval, there will be no audible/visual indication, and the LCD will display NO TAG FOUND. When any tag number is read more than once, the LED and beeper indication will be a double flash/beep indication.

Note: When reading transponders whose orientation cannot be ascertained, the reading distance may be less than those listed in Table 3. The Reader may need to be moved and its orientation may need to be changed in order to obtain a reading. Generally, reading such non-visible (implanted) transponders will require such Reader movement.

Interpreting the Visual ID Code Information

The Portable Reader is capable of reading 3 different transponder technologies, and can be configured via the Options Menu to display the corresponding ID Code information in various formats (see Table 5). Independently, the serial data can be configured to transmit ID Code information in a variety of formats, which can include or exclude the Date/Time and Manufacturer/Country Code (see Table 6).

Using the Options Menu, the Reader can be configured to display a transponder's Manufacturer/Country Code (ISO tags) and the Identification Code, or only its Identification Code. Furthermore, the transponder's information can be displayed in either decimal (0 > 9) or hexadecimal (0 > F) representation. Furthermore, the transponder type - H, F, or A (HDX, FDX-B, or FDX-A) can be displayed.

Note: The Manufacturer's Code is displayed only for ISO compliant HDX and FDX-B transponders that contain a decimal value in the range of 900 to 999, per ISO 11784 requirements, and per ICAR assignment. A value less than 900 is also displayed, but represents a Country Code per ISO 11784 and ISO 3166.

Note: The Manufacturer Code information appears on the LCD as the left-most 3 characters on the top line. When the LCD format has been set for hexadecimal representation, a subscript "H" follows the Manufacturer/Country code and the ID code.

Note: FDX-A type tags do not contain any manufacturer or country code data. FDX-A tags are designated on the LCD with the leading characters "FDXA" (see Table 5).

Table 4 - Manufacturer and Country Code Designations

Manufacturer/ Country Code	Interpretation
900 > 999 (384 > 3E7 Hex)	ISO Compatible HDX or FDX-B type transponder Manufacturer Code per ISO 11784 and ICAR assignment (Note: 999 is reserved for universal use to designate a prototype transponder).
001 > 899 (001 > 383 Hex)	ISO Compatible HDX or FDX-B type transponder Country Code per ISO 11784 and ISO 3166

Table 5 - Display Setup Options (default settings shown in bold-face)

Option	Setting	Display Format (ISO)	Format FDX-A
# Format	Hex	Dec	
	Yes	No	
Lead 0's	Yes	No	
Cty Code	Alpha	Numeric	
F / H / A	Yes	No	

3D6 _H 000	982 0000	0A1	0432
0C45AE9 _H	12868329	2201134 _H	53764404
982 0000	982	0432	432
12868329	12868329	53764404	53764404
USA 0001	840 0001	(no effect)	
23456800	23456800		
982F0000	982 0000	FDXA 432	432
12868329	12868329	53764404	53764404

Interpreting the Visual ID Code Information

The Portable Reader provides extensive formatting capability for the content and arrangement of ID code information transmitted from its RS232 serial port. The default serial port data format for an ISO tag is:

LA_982_000000277213

Options allow for this data to be changed in various ways to meet the specific requirements of the user's application. The Configurator® software utility provided with the Portable Reader provides an easy means of changing all option settings and for observing the resulting format of the data that the Portable Reader outputs on its serial port.

Default Option Settings

The Options Menu (see Figure 4) provides the user with the means to configure the Reader in a manner that best suites the user and the Reader's intended application. These options can be set using the Menu, Read, and Scroll keys on the Portable Reader, and can be set alternately using the Portable Reader Configurator® PC software utility. Table 7 below lists the option categories and the factory default settings for each option. Further information is available in the Configurator® utility Help menu.

Table 6 - Option Menu List and Default Settings

Option Category	Option (* = Default)	Function
Display Setup	# Format Hex *Dec Lead 0's *Yes No Last Tag *On Off Cty Code *Alp Num F / H / A Yes *No	Sets LCD numerical format Suppresses ID code leading 0's Last tag displayed upon power on Country code display format Tag type indication
Reader Settings	Menu Beep *On Off Wrls Sync On *Off Time On 0:30 Min Read Time 3 sec	Keys beep in Options Menu Wireless Synchronization Sets time for reader auto power off Sets reader scanning interval
Stored ID Tags	xxxx IDs stored Send All <Read> Select Tags	xxxx = number of tags read and stored Read key sends stored IDs on RS232 Selects stored ID numbers to send
RS232 Settings	Bit Rate 9600 Data Bits 7 Parity None Flow Cntl On *Off	Sets serial port bit rate Sets data bits per character Sets parity mode Sets software Xon/Xoff control mode
ID code Format	Rsrv Fld On *Off DB Flag On *Off Delimiter Space 1st Char L Tag Type TI-RFID TimeDate On *Off	Suppresses ISO Reserved Field Suppresses ISO Data Bit Flag Sets character between data fields Sets first character transmitted Sets character fields Suppresses time and date information
Time & Date	Date DDDMMYY Time AM HH:MM:SS Format *12 24	Sets date in 01JAN06 format Sets time in 10:51:32 format Sets 12 hour (AM/PM) or 24 hour
Reader Info	Info SW V3.00 Info HW V3.00 Info xxxx Sto Info xxxx Avl	Indicates software version number Indicates hardware version number Number of ID tags stored in memory Number of memory spaces remaining

Reading Performance

RFID Readers are most frequently assessed with respect to performance by reading distance. The reading distance performance of a Reader is principally affected by the following effects:

Transponder Orientation - For maximum reading distance, the axes of the transponder and reader antenna coils must be oriented coaxially.

Transponder Quality - Each manufacturer's transponder differs in (a) the amount of exciter signal energy necessary to sufficiently operate the transponder's internal circuitry, and (b) the signal level of the ID Code information that is returned to the reader. Consequently, it is normal for transponders of a common type (FDX-B, for

example) made by different manufacturers to exhibit different read range performance characteristics.

Electrical Noise Interference - RFID transponders and readers use electromagnetic signals as a premise of operation. Other electromagnetic phenomena – radiated electrical noise from computer displays, for example – can interfere with the transmission and reception of RFID signals, and consequently reduce reading distance.

Transponder Motion - Most portable readers have small antenna geometries, and consequently small effective “reading zones”. Portable readers are generally designed for reading transponders under quasi-static conditions. Transponders that are moving quickly past the reader may not be present within the reader's read zone sufficiently long for all the ID Code information to be obtained.

Transponder Size - Physically larger transponders generally contain larger receiving coils which produce longer reading distances than smaller transponders.

Transponder Type - HDX transponders generally exhibit greater reading distances than FDX-B transponders of comparable size.

Proximal Metallic Objects - Metal objects located near the transponder or Reader can attenuate and distort the electromagnetic fields generated in RFID systems, and thus diminish read distance performance.

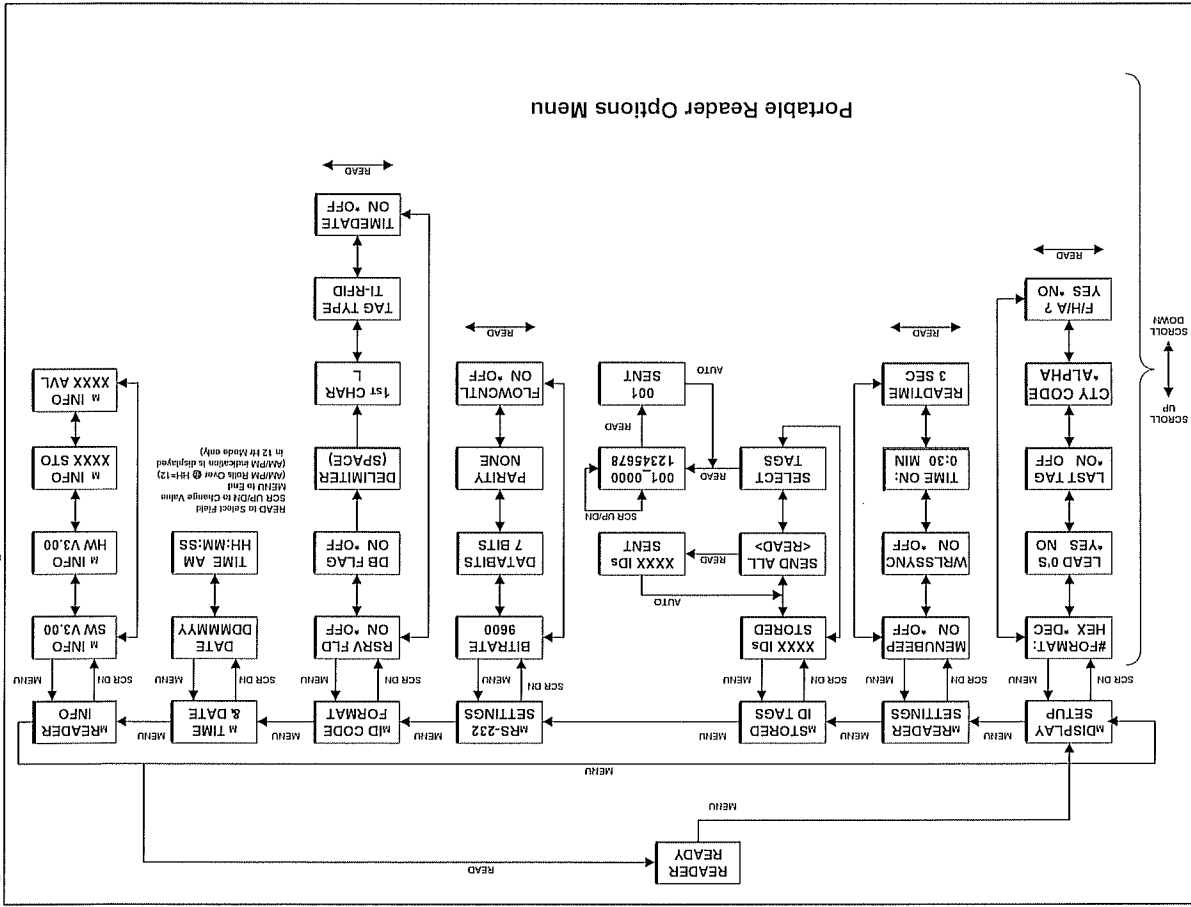
Installing the Allflex Configurator®

The CD-ROM included with the Portable Reader Accessory Kit provides a copy of the Allflex Configurator®, a Microsoft Windows® based software program that can be used to set the Portable Reader's options variables, and that provides verification of serial port operation and data format. Configurator® is installed in a conventional manner by placing the CD-ROM in the PC's CD_ROM drive, and running “setup.exe” and following the instructions that appear on the PC screen. A shortcut icon is automatically entered onto the PC's desktop, and double-clicking this icon will launch the program. Minimum recommended PC specifications are:

IBM compatible PC - /Pentium
Windows 2000/XP
SVGA monitor
At least 2 MB HDD space available
128 MB RAM

Configurator® comprises a single window with four tabbed sub-sections for setting Operational, ID-Code Format, LCD & Communications, and Real Time Clock options. The Help tab on the main tool bar provides detailed information about Configurator®.

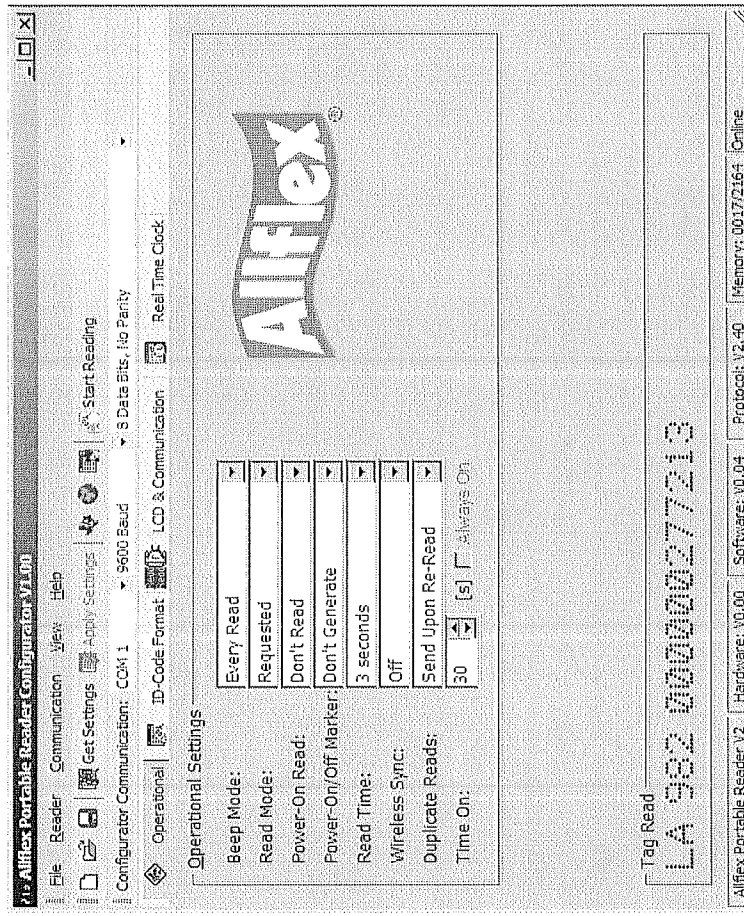
Figure 4 - Portable Reader Options Menu Structure



The opening window for Configurator is reproduced below, and illustrates the Operational parameters. When the Portable Reader is connected to the PC's serial port, and communications have been established, the Reader's current settings are automatically transferred to Configurator®, and appear in each drop-down box associated with each option parameter.

At the bottom of the Configurator® window is a display of the data format transmitted from the Portable Reader's serial data port. This display can be used in conjunction with the Communications sub-section tab to tailor the data format to the user's requirements.

Note: While the Portable Reader is connected to the PC running Configurator, the automatic power off function of the Portable Reader is disabled. If the Reader is left connected in this state, the Reader's batteries will eventually discharge.



**RS601-3 Portable Reader
TECHNICAL SPECIFICATIONS**

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Fax 64 (06) 358-5982

<http://www.allflexusa.com>

GENERAL	
RFID Compatibility:	ISO 11784 & 11785 HDX and FDX-B and Fecava FDX-A
Form Factor:	Portable Handheld Santoprene Enclosure
User Interface:	Single "On/Press to Read" Activation Button Menu & Scroll Up/Down Option Select Buttons 16 character (2x8) LCD display Audible Beeper and Red LED "Read" Indicators
ID Code Display Format	Decimal or Hexadecimal
Clock/Calendar	ddmmmyy and hh:mm:ss (12 or 24 hour format)
Memory:	1600 ID codes (including Mfr Code and date/time)
Battery Power:	4 AA Alkaline battery cells, or 4 AA NiCad or NiMH rechargeable battery cells
Electromagnetic Compatibility (EMC) Certifications	FCC Part 15 Class A CISPR 22 (EN55022), and EN50082-1 ETSI 300 330-1 Industry Canada RSS-210

PHYSICAL/ENVIRONMENTAL	
Dimensions:	275 mm L x 68 mm W x 83 mm H
Weight:	Approx 0.35 kg. with alkaline battery installed
Enclosure Material:	Monsanto Santoprene®
Color:	Medium Gray (Pantone 423C)
Operate Temperature	+5°C to +40°C (IEC68.2.1/2)
Storage Temperature	-10°C to +55°C (IEC68.2.1/2)
Humidity:	0 to 95% (IEC68.2.56)
Altitude:	-100 to +3,000 meters
Mechanical Shock:	Per IEC 68-2-27
Vibration:	Per IEC 68-2-6
Hermeticity:	IP-68 to 1 meter immersion per IEC 529
Buoyancy:	Approximately 1/2 the weight of water it displaces
Chemical Resistance:	Resistant to petroleum based solvents & fluids, biological and organic fluids, aqueous solutions, and mild acid/alkaline solutions

RELIABILITY	
MTBF:	50,000 hours
MTTR:	0.5 hours
Expected Life:	5 years, minimum

PERFORMANCE	
Read Distances:	8 cm -- Allflex 12mm FDX-B implantable tag 5 cm -- Allflex 12mm FDX-A implantable tag 2.5 cm -- Allflex HDX eartag 20 cm -- Allflex FDX-B eartag
Reading Orientation:	0° to 30° with less than 10% range decrease
Read Error Rate:	Less than 1 in 10 ⁶
Read Cycles/Battery:	5,000 - Alkaline (disposable) (based on 2 second read intervals) 2,500 - NiCad (rechargeable) 5,000 - NiMH (rechargeable)

Regulatory Notices

FCC ID: NQY-930043

Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

This device has been tested and meets the Electromagnetic Compatibility (EMC) requirements of EMC Directive 2004/108/EC and R&TTE Directive 99/5/EC.

Industry Canada No. 4246A-930043

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada

RBRC™ Battery Recycling Program

This product uses nickel-cadmium (ni-cad) rechargeable and recyclable batteries. When the batteries no longer hold a charge, they should be removed and recycled. They must NOT be incinerated or composted. In some venues, it is illegal to place depleted batteries in municipal solid waste. Many battery retailers participate in the RBRC™ (Rechargeable Battery Recycling Corporation) program. For further information consult www.rbrc.org.

Note: The 230 VAC/50 Hz Battery Charging unit is equipped with electrical fuses for safety. If it becomes necessary to replace these fuses, use identical type T500 / 230 VAC / 5 x 20 mm compliant fuses only.