VX-820/870 SERIES

VHF • UHF Portable Radios

P25 • DIGITAL WIRELESS • SANS FIL NUMERIQUE • INALAMBRICO DIGITAL

VX-P820 /P870 Series

VX-829/879/P829/P879
512 ch/32 groups with 16 Keys and LCD

VX-824/874/P824/P874
512 ch/32 groups with 4 Keys and LCD

VX-821/871/P821/P871
16 ch/1 group without LCD

IP54 Splash Proof | IP55 Water Jets | IP57 Submersible

VX-820 Series

IP65 Water Jets | IP67 Submersible | IP68 Super Submersible

VX-870 Series / Special Order Version

IS Special Order Version Intrinsically Safe Version Available

Vertex Standard
We make a difference

VX-P820/P870 SERIES

P25 VHF · UHF Portable Radios

Reliability, ruggedness, and interoperability like never before. The VX-P820/P870 series of Vertex Standard portables is ready to respond when you are, with a wide array of signaling capability, along with big audio, operator and system security measures, and PC programmability for quick deployment. Submersible to IP57 (VX-P820)/IP68 (VX-P870) specifications, and built to U.S. MIL-STD specifications, the VX-P820/P870 Portables are your assurance of long-term reliability under the most difficult operating circumstances.

IP54 Splash Proof | IP55 Water Jets | IP57 Submersible 3 feet for 30 min.

VX-P820 Series

IP65 Water Jets | IP67 Submersible 3 feet for 30 min. | IP68 Super Submersible 6 feet for 2 hrs.

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512 ch/32 groups with 16 Keys and LCD

VX-P824/P874
512 ch/32 groups with 4 Keys and LCD

VX-P821/P871
16 ch/1 group without LCD

Actual Size

P25 DIGITAL MODE

NAC (Network Access Code)

NAC (Network Access Code) are programmable and are typically used to control network access but may also be used to steer repeater operations. NAC codes are used the same way as an analog CTCSS tone (or DCS code). There are 4096 unique NAC codes.

AMBE+2™ Vocoder

For superior voice quality in narrow-band, digital, P25 mode of operation our products use the AMBE+2™ Vocoder protocol from DVSI, Inc.

P25 Digital Conventional

Because our products are fully TIA/EIA 102 Series compliant, you are assured of broad compatibility within a wide range of P25 Digital Mode systems.

RSSI Indicator / RSSI Warning

Certain models feature Liquid Crystal Displays (LCD) and provide visual indication of receive signal level (signal strength). All models feature an audible indication of low receive signal strength. When received signal strength falls to a level not suitable for reliable communications an alert tone will sound. This feature is useful if the unit has no display or if it is difficult for the user to see the display during normal operation.

Talk Group ID

Talk Group IDs (TGIDs) provide for the logical grouping of radio users into distinct organizations and can also be used to minimize co-channel interference. There are more than 65,000 unique TGID addresses.

Caller ID Display (Units with LCD only)

The calling station will be identified either by their Alphanumeric Tag (if defined in the Individual ID List), or by their ID number (if a Tag is not defined).

Individual ID List / Paging Group

In P25 operation each transceiver can be programmed with a unique Unit ID. There are over 16 Million possible Unit IDs available. Additionally, using the Paging Group feature, each unique Unit ID can be identified with an Alphanumeric Tag, making selective calling by name is possible. What's more, if no Paging call list has been defined, direct input of the Unit ID number is possible, permitting direct calling of any particular user. When receiving, the Alphanumeric Tag (Name) of the calling station will be shown (LCD models only). If no call list has been defined, only the transmitting station's Code number will be displayed. The Paging Group may be subdivided into up to 15 sub-groups, and each channel may be assigned to a sub-group in advance.

Mixed Mode

Channels can be programmed for analog only, digital only or Mixed Mode dual Analog/Digital operation. The radio will automatically switch to the appropriate format when it receives a call. This capability provides seamless switching between Analog and Digital systems saves available channel programming capacity and simplifies user operation of the unit.

AES / DES Encryption Options

Data Encryption Standard (DES) is an older format system based on a 64 bit encryption algorithm...
Advanced Encryption Standard (AES) is a newer and more robust system based on 256 bit algorithm. Encryption Keys
Multiple encryption keys can be stored in the unit as required.

Miscellaneous

• Emergency Decode Indication

P25 contains special provisions for Emergency Calling. When an "Emergency" signal is received, the radio's "Busy" LED can provide a very bright white blinking indication while the LCD can show the Unit ID or Alpha Tag of the unit in distress...

VERSATILITY

VX-P829/P824/P879/P874 with LCD: Maximum 512 Channels / 32 Groups
VX-P821/P871 w/o LCD:Maximum 16 Channels / 1 Group

The LCD-equipped version provides massive channel storage capability: up to 512 channels may be programmed into as many as 32 groups. A single radio may therefore be programmed with channel sets for a number of different j urisdictions or organizations, ensuring seamless interoperability. The VX-P820/P870 Series without the LCD can accommodate up to 16 channels in a single memory group.

Intelligent RX/TX Battery Saver

In addition to the traditional battery saver modes, our exclusive Intelligent Saver reduces power consumption associated with the DSP.

Rugged, Submersible Design

The VX-P820 Series portables are housed in an ultra-rugged, impact-resistant case that is designed to exceed U.S. MIL-STD 810C/D/E/F standards for shock, vibration, and driving rain; it also meets international waterproofing standard IP55 (water j ets) and IP57 (submersion in water to a depth of 3 feet for up to 30 minutes). For even more demanding environments, the VX-P870 Series version meets IP68 specifications (submersion to 6 feet for 3 hours), and is available via special order.

Loud 700 mW Audio Output

Ideal for reception in noisy environments, high-powered audio of the VX-P820/P870 Series is coupled to a large internal speaker, assuring solid copy throughout difficult crowd control, fire, or sporting-event operations.

Submersible External Speaker/Microphone MH-66 Series (optional)

When operating in an emergency situation where immersion of the radio and/or its accessories could occur, the optional MH-66 Series Speaker/Microphone is rated to the same submersibility specifications as the portable itself (IP57), ensuring that your essential communications won't be interrupted if the microphone gets dropped into the water.

Other Features

•CTCSS / DCS Encode and Decode •DTMF ANI/DTMF Paging (optional FVP-25 required for DTMF Paging) •2-Tone Encode and Multiple 2-Tone Decode •User Selectable Tone (VX-P829/P824/P879/P874) •Scan: Channel Scan, Priority Scan, Dual Watch, Follow-me Scan, Follow-me Dual Watch, and TA Scan •Compander (Wide and Narrow Band) •Lone Worker •Programmable Function Keys •PC Programmable •Power Output: 5 W •Battery Indicator •Wide / Narrow (12.5 / 20 / 25 kHz programmable per channel) •Speed Dial (16-key version only) •Large LCD (Dot Matrix / 12 Characters +7 Segments / 3 Characters) (VX-P829/P824P879/P874) •7-Color LED for Incoming Call Alert •Programmable Home Channel Function •ARTS™ (Auto-Range Transpond System) •BCLO / BTLO and TOT

VX-820/870 SERIES

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IP65 Water Jets | IP67 Submersible 3 feet for 30 min. | IP68 Super Submersible 6 feet for 2 hrs.

VX-870 Series / Special Order Version

IS Special Order Version Intrinsically Safe Version Available

VX-829/879
512 ch/32 groups with 16 Keys and LCD

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512 ch/32 groups with 4 Keys and LCD

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16 ch/1 group without LCD

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VERSATILITY

VX-829/824/879/874 with LCD: Maximum 512 Channels / 32 Groups
VX-821/871 w/o LCD: Maximum 16 Channels / 1 Group

The LCD-equipped version provides massive channel storage capability: up to 512 channels may be programmed into as many as 32 groups. A single radio may therefore be programmed with channel sets for a number of different j urisdictions or organizations, ensuring seamless interoperability. The VX-820/870 Series without the LCD can accommodate up to 16 channels in a single memory group.

CTCSS / DCS Encode and Decode

High-performance Encoder/Decoder circuits for both CTCSS and Digital Code Squelch are provided, for access to tone/code controlled systems. DCS is ideal for crowded RF environments, providing superior immunity from false opening of the squelch.

DTMF ANI / DTMF Paging (optional FVP-25 required for DTMF Paging)

Fleet and network operation are enhanced by the built-in DTMF ANI circuit.

2-Tone Encode and Multiple 2-Tone Decode

The VX-820/870 Series can transmit a 2-Tone paging call, and can receive 2-Tone calls using different tone combinations.

User Selectable Tone (VX-829/824/879/874)

One of the front panel's "programmable" keys may be designated so as to allow the user to select a CTCSS or DCS tone from a pre-defined Tone Table.

Scan: Channel Scan, Priority Scan, Dual Watch, Follow-me Scan, Follow-me Dual Watch, and TA Scan

The VX-820/870 Series provides unmatched flexibility in its scanning features. Designed to optimize operation in a wide variety of system environments, these scanning capabilities ensure that you never miss an important call!

Compander (Wide and Narrow Band)

For operation in systems requiring Companding, the VX-820/870 Series portables include both Wide- and Narrow-band Companding circuitry, programmable channel by channel.

Lone Worker

The Lone Worker feature is designed to emit an alarm for 30 seconds when the Lone Worker Timer (programmed by the dealer) has expired. If the user does not reset the timer by pressing the PTT switch, the radio switches to the Emergency mode.

RX/TX Battery Saver

When engaged, the Receive-mode Battery Saver rapidly pulses the portable on and off, reducing current consumption and extending battery life. If a call is received, the Battery Saver is disengaged, and normal operation resumes. On transmit, the Battery Saver will reduce transmitter power, thus extending operating time, when you are within close range of a strong repeater or dispatch center.

Programmable Function Keys

Customization of feature access is easily accomplished at the time of programming, thanks to the "programmable" keys that may be assigned functions needed most in your operating environment.

PC Programmable

All channel and other configuration data may be uploaded to the portable by the dealer in a matter of minutes, allowing efficient setup of a fleet of radios when rapid deployment is required.

ANI Encoding and Decoding (MDC-1200®, GE-Star®, and DTMF (Encode): optional VME-100 or VMDE-200 required)

Automatic Number Identification, triggered by the pressing of the PTT key, is available in the most popular industry-standard formats, via the optional VME-100 (for Encoding only) or VMDE-200 (for Encoding and Decoding) module.

DURABLE CONSTRUCTION

Rugged, Submersible Design

The VX-820 Series portables are housed in an ultra-rugged, impact-resistant case that is designed to exceed U.S. MIL-STD 810C/D/E/F standards for shock, vibration, and driving rain; it also meets international waterproofing standard IP55 (water j ets) and IP57 (submersion in water to a depth of 3 feet for up to 30 minutes).

VX-870 Series Special Order Version

For even more demanding environments, the VX-870 Series version meets IP68 specifications (submersion to 6 feet for 3 hours), and is available via special order.

Submersible External Speaker/Microphone MH-66 Series (optional)

When operating in an emergency situation where immersion of the radio and/or its accessories could occur, the optional MH-66 Series Speaker/Microphone is rated to the same submersibility specifications as the portable itself (IP57), ensuring that your essential communications won't be interrupted if the microphone gets dropped into the water.

HIGH PERFORMANCE

Power Output: 5 W

The VX-820/870 Series provides up to five solid Watts of transmitter power, for extended communications range. For more localized applications, the power output may be reduced to 2.5 W, 1 W, or 1/4 W, for enhanced battery life.

Wide / Narrow
(12.5 / 20 / 25 kHz programmable per channel)

When programming radios for use in different j urisdictions, the VX-820/870 Series portables may be set up, channel by channel, for use in 12.5 kHz, 20 kHz, or 25 kHz channel spacing environments. Deviation and bandwidth are automatically set according to the configuration you choose.

Built-in 5-Tone signaling

For advanced network or fleet operations, a 5-Tone Encoder-Decoder circuit is included in the VX-820/870 Series. An expensive option on many competing brands, this included feature enhances operation without impacting your budget.

Loud 700 mW Audio Output

Ideal for reception in noisy environments, high-powered audio of the VX-820/870 Series is coupled to a large internal speaker, assuring solid copy throughout difficult crowd control, fire, or sporting-event operations.

Speed Dial (16-key version only)

An easy-to-use DTMF Speed Dialer feature is included in the VX-829/879, for specialized selective calling, telephone interconnect, or other applications.

Voice Storage (Optional DVS-5 required)

The optional DVS-5 Digital Voice Storage Unit allows you to store and play back up to 120 seconds of incoming received audio, so you can archive an important incoming message.

EASY USER INTERFACE

Large LCD (Dot Matrix / 12 Characters +7 Segments / 3 Characters) (VX-829/824/879/874)

The large, easy-to-read display includes a 12-character dot matrix that provides a wealth of information about the operating channel, as well as various status icons. Illuminated using Vertex Standard's renowned Omni-Glow™ back-lighting, the VX-829/ 824/879/874's LCD is clearly visible at night, with minimal degradation of your night vision.

7-Color LED for Incoming Call Alert

The front panel of the VX-820/870 Series includes an ultra-bright LED that can display up to seven different colors, with a variable flash pattern, to alert the operator when a 2-Tone or 5-Tone call has come in, and during Emergency mode operation.

Programmable Home Channel Function

The user may select, out of the dealer-programmed channel list, one channel to be the "Home" channel, which may be assigned to a "programmable" key for one-touch access to a critically-important channel.

Direct Channel Recall (#1 - #4)

Any or all of the programmable keys may be assigned as direct-access one-touch keys for selecting important operating channels.

ARTS™ (Auto-Range Transpond System)

The ARTS™ feature is a "handshake" system that uses DCS coding to confirm that two ARTS™-equipped units are within communication range. If an "out of range" condition develops, an alarm will sound and the communication center can instruct the field unit to move to a better location (or assistance to the field unit can be dispatched).

SECURITY

BCLO / BTLO and TOT

To prevent interference to other users on busy channels, the Busy Channel Lock-Out (BCLO) and Busy Tone Lock-Out (BTLO) features prevent transmission by the portable if the channel is occupied. And the Time-Out Timer (TOT) feature will automatically cut of transmission if the programmed maximum transmit time is exceeded.

Remote Radio Stun / Kill / Revive (5-Tone)

To prevent use of the portable by an unauthorized operator (in case of theft, non-payment of subscription, etc.), a dispatch center can send a 5-Tone command to "Stun" (temporary disabling) or "Kill" (permanent disabling) a unit. If the "Stun" command has been sent, another 5-Tone "Revive" command may also be sent, re-enabling operation of the portable.

Encryption (Optional FVP-35/36 or FVP-25 required)

The FVP-35 and FVP-36 Encryption Units provide security for your important public safety and security communications. A DTMF Paging function is also included in the FVP-25 module, for selective calling.

Other Features

•AF Minimum Volume •Radio-to-Radio Cloning •Signal Strength Meter •Battery Indicator •Audio Pitch Control

Accessories & Options

VX-820/870/P820/P870 Series

MH-50D7A
Speaker/Microphone

MH-66A7A **MH-66B7A**
w/PF key, Toggle
Submersible External Microphone

VH-121
3-Wire Earpiece, Mic,
Palm PTT Switch

VH-131
2-Wire Earpiece,
Palm Mic/PTT Combo

VH-111
Over the Head, Heavy Duty Headset

FVP-36
Inversion Encryption Unit
(VX-820/870)

FVP-35
Rolling Code Encryption Unit
(VX-820/870)

VMDE-200
MDC1200®/GE-STAR®
ANI Encoder/Decoder Unit
(VX-820/870)

VME-100
MDC1200®/GE-STAR®
ANI Encoder Unit
(VX-820/870)

FVP-25
Encryption/DTMF Pager Unit
(VX-820/870)

MDC1200
Digital ANI Encode Unit
(VX-820/870)

DVS-5
Voice Storage Unit
(VX-820/870)

VAC-920B/C*
Desktop Rapid Charger
for FNB-V86LI, FNB-V87LI,
FNB-V92LI/IS

VAC-6920B/C*
6-Unit Multi Charger
for FNB-V86LI, FNB-V87LI,
FNB-V92LI/IS

FNB-V92LI/IS
7.4 V 3000 mAh Li-Ion Battery
IS : Intrinsically Safe Version

FNB-V87LI
7.4 V 2000 mAh Li-Ion Battery

FNB-V86LI
7.4 V 1150 mAh
Li-Ion Light-Duty Battery

FBA-34
Alkaline Battery Case (6XAA)

***** B for 120 VAC / C for 230 VAC

CT-116 Radio to Radio Cloning Cable
LCC-820 Leather Case
CLIP-17B Swivel Belt Clip

Programming Cable	USB	FIF-10/A + CT-108
	RS-232C	CT-29 + CT-115
Programming Software	CE59 (VX-820/870)/CE76 (VX-P820/P920)	

■ **ANTENNA LIST**

UHF	ATU-6A	400-430 MHz		
	ATU-6D	450-485 MHz		
	ATU-6DS	450-485 MHz/3.5"		
VHF	ATV-6A	134-151 MHz/3.5"	ATV-8C	161-174 MHz
	ATV-6B	150-163 MHz/3.5"	ATV-10A	145-155 MHz HIGH GAIN
	ATV-6C	161-174 MHz/3.5"	ATV-10B	150-160 MHz HIGH GAIN
	ATV-6XL	VHF UNTUNED	ATV-10C	155-165 MHz HIGH GAIN
	ATV-8A	134-151 MHz	ATV-10E	165-175 MHz HIGH GAIN
	ATV-8B	150-163 MHz		

Various accessories listed may not be available in some countries.

Specifications

	VX-820/870 SERIES	
	VHF	UHF
General Specifications		
Frequency Range	134-174 MHz	400-470 MHz 450-512 MHz
Number of Channels	512 (VX-829/824/879/874) / 16 (VX-821/871)	
Number of Groups	32 (VX-829/824/879/874) / 1 (VX-821/871)	
Channel Spacing	12.5 / 20 / 25 kHz	
PLL Steps	1.25 / 2.5 / 5 / 6.25 kHz	5 / 6.25 kHz
Operating Voltage	7.4 VDC ±20 %	
Current Consumption		
STBY (w/save)	75 (30) mA	75 (30) mA
RX	200 mA	200 mA
TX	1.7A	1.9A
Battery Life (w/Battery save) (RX 5 : TX 5 : STBY 90 Duty)	12.5 h (16 h) w/ FNB-V87LI	11.5 h (15 h) w/ FNB-V87LI
Temperature Range	–22° F to + 140° F (–30° C to +60° C)	
Frequency Stability	±2.5 ppm	
Dimensions (W x H x D)	2.3" x 3.8" x 1.5" (57.5 x 96.5 x 37.5 mm)	
Weight (approx.)	10.9 oz (310 g) w/Ant, Battery (FNB-V86LI) and Belt clip	
Receiver Specifications		
Sensitivity (12 dB SINAD) EIA	0.25 / 0.32 µV	
Adj acent Channel Selectivity (W/N)	75 / 70 dB	
Intermodulation (W/N)	75 / 70 dB	
Spurious and Image Rej ection	75 dB	
Hum and Noise (W/N)	48 / 42 dB	
Audio Out put	700 mW @16 Ohms, 5 % THD	
Transmitter Specifications		
Power Output	5 / 2.5 / 1 / 0.25 W	
Modulation	16K0F3E 11K0F3E	
Spurious Emissions	70 dB	
FM Hum and Noise (W/N)	45 / 40 dB	
Audio Distortion	Less than 3 % @1kHz	

Measurements per EIA standards unless noted above. Specifications are subj ect to change without notice or obligation.

	VX-P820/P870 SERIES	
	VHF	UHF
General Specifications		
Frequency range	134 - 174 MHz	380 - 450 MHz 450 - 512 MHz
Number of Channels	512 (VX-P829/P824/P879/P874) / 16 (VX-P821/P871)	
Number of Groups	32 (VX-P829/P824/P879/P874) / 1 (VX-P821/P871)	
Channel Spacing	12.5 / 20 / 25 kHz	
PLL Steps	1.25 / 2.5 / 5 / 6.25 kHz	5 / 6.25 kHz
Operating Voltage	7.4 VDC ±20 %	
Current Consumption		
STBY (Analog / Digital)	90 / 130 mA	90 / 130 mA
RX	250 mA	250 mA
TX	1.7 A	1.9 A
Battery Life (w/Battery save) (RX 5 : TX 5 : STBY 90 Duty)	10.6h (13.0 h) w/ FNB-V87LI	11.0 h (13.0 h) w/ FNB-V87LI
Temperature Range	–22° F to + 140° F (-30° C to + 60° C)	
Frequency Stability	±2.5 ppm	
Dimensions (W x H x D)	2.3" x 3.8" x 1.5" (57.5 x 96.5 x 37.5 mm)	
Weight (approx.)	10.9 oz (310 g) w/Ant, Battery (FNB-V86LI) and Belt Clip	
Receiver Specifications	Measurements made per TIA/EIA-603 (Analog), TIA-102 CAAA (Digital)	
Sensitivity (12 dB SINAD) EIA	0.25 µV	0.32 µV
Digital 5% BER	0.25 µV	0.32 µV
Digital 1% BER	0.35 µV	0.40 µV
Adj acent Channel Selectivity Analog (W/N)	75 / 70 dB	
Intermodulation Analog (W/N)	75 / 70 dB	
Spurious and Image Rej ection Analog	75 dB	
Hum and Noise Analog (W/N)	48 / 42 dB	
Audio Output	700 mW @16 Ohms, 5% THD	
Transmitter Specifications	Measurements made per TIA/EIA-603 (Analog), TIA-102 CAAA (Digital)	
Power Output	5 / 2.5 / 1 / 0.25 W	
Modulation Analog (W/N)	16K0F3E / 11K0F3E	
Digital	8K10F1D / 8K10F1E	
Spurious Emissions	70 dB	
FM Hum and Noise Analog (W/N)	46 / 40 dB	
Audio Distortion	Less than 3 % @1kHz	

VX-820/P820 Series : Applicable International Protection Standard

IP54 Splash Proof · IP55 Water Jets · IP57 Submersible 3 feet for 30 min · IS Special Order Version Intrinsically Safe Version Available

VX-870/P870 Series : Applicable International Protection Standard

IP65 Water Jets · IP67 Submersible 3 feet for 30 min · IP68 Super Submersible 6 feet for 3 hrs · IS Special Order Version Intrinsically Safe Version Available

VX-820/870/P820/P870 Series : Applicable MIL-STD

Standard	MIL 810C Methods/Procedures	MIL 810D Methods/Procedures	MIL 810E Methods/Procedures	MIL 810F Methods/Procedures
Low Pressure	500.1/Procedure I, II	500.2/Procedure I, II	500.3/Procedure I, II	500.4/Procedure I, II
High Temperature	501.1/Procedure I, II	501.2/Procedure I, II	501.3/Procedure I, II	501.4/Procedure I, II
Low Temperature	502.1/Procedure I, II	502.2/Procedure I, II	502.3/Procedure I, II	502.4/Procedure I, II
Temperature Shock	–	–	–	503.4/Procedure I
Solar Radiation	505.1/Procedure I	505.2/Procedure II Cat. A1	505.3/Procedure II Cat. A1	505.4/Procedure I, II Cat. A1
Rain	506.1/Procedure I	506.2/Procedure I	506.3/Procedure I, II	506.4/Procedure I
Humidity	507.1/Procedure I, II	507.2/Procedure II, III	507.3/Procedure II, III	–
Salt Fog	509.1/Procedure I	509.2/Procedure I	509.3/Procedure I	509.4/Procedure I
Dust	510.1/Procedure I	510.2/Procedure I	510.3/Procedure I	510.4/Procedure I, III
Immersion*	512.1/Procedure I	512.2/Procedure I	512.3/Procedure I	512.4/Procedure I
Vibration	514.2/Procedure I Cat. 10,8	514.3/Procedure I Cat. 10	514.4/Procedure I Cat. 10	514.5/Procedure I Cat. 20,24
Shock	516.2/Procedure I	516.3/Procedure I	516.4/Procedure I	516.5/Procedure I

* VX-870 / P870 Series

Intrinsically Safe Information

The Intrinsically Safe Version of VX-820/870/P820/P870 series, equipped with any of optional units, meets the requirements of ANSI/UL913 6th Edition for Class I, Division 1, Groups A-D; Class II, Groups E-G; and Class III for hazardous locations.

ISO9001:2000 — PERRY JOHNSON REGISTRARS, INC. · ANAB ACCREDITED
YAESU MUSEN CO., LTD
ISO9001:2000 certification

ISO14001:2004 — PERRY JOHNSON REGISTRARS, INC. · MGMT. SYS. RvA C419
YAESU MUSEN CO., LTD
ISO14001:2004 certification

Vertex Standard
We make a difference

Vertex Standard
US Headquarters
10900 Walker Street, Cypress, CA 90630, U.S.A.
Phone 714/827-7600; Fax 714/827-8100
http://www.vertexstandard.com

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