LED DayLite® HDi™

DENTAL

USER GUIDE

Model: DVI-LEDDC

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DESIGNS FOR VISION, INC. LED DAYLITE® HDI™

The Designs for Vision LED DayLite® HDi™ provides bright, portable light to the laboratory environment. It is designed to be comfortable yet functional. The headlight is made to clip onto a wide variety of frames and/or headsets.

INDICATIONS FOR USE

The Designs for Vision LED DayLite® HDi™ is an illumination device used to aid in visualization for dental professionals. It is intended to illuminate various tissues and/or body parts. This device is intended to be used by dental professionals, requiring no specific training other than what is contained in this manual.

CONTRAINDICATIONS

None known

WARNINGS

Save these instructions. This manual contains important safety and operating instructions

Always examine the unit and accessories for damage before commencing use. Damaged accessories must not be used and must be replaced. Use original Designs for Vision, Inc. parts and accessories only. The use of unapproved parts may void the warranty.

To reduce the risk of battery explosion, follow these instructions and those marked on the battery

Do not Autoclave

For indoor use only

If the equipment is used in a manner not specified by Designs for Vision, Inc., the protection provided by the equipment may be impaired

A spent battery should not be used. Contact Designs for Vision Inc. for ordering a replacement

Replace with Designs for Vision, Inc. battery only. Using unapproved batteries may not work and will void the warranty

This equipment and accessories do not contain serviceable parts. All repairs need to be conducted by Designs for Vision, Inc. service personnel

Do not let liquids enter openings or ports. Do not immerse parts in solutions. Allowing liquids to enter openings or ports may void warranty

Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or in an oxygen rich environment

Care must be taken when operating this equipment around other equipment to avoid reciprocal interference. Potential electromagnetic or other interference could occur to this or to the other equipment. Try to minimize this interference by not using other equipment in conjunction with this device

No modification of this equipment is allowed. Performing unauthorized modification on the equipment, accessories or the product labelling may void the warranty

Remove battery from power pack if this device is not in use and will be stored for some time. Maintain storage at environmental conditions listed below

Improper use of battery may cause them to get hot, ignite or explode. Always follow all safety precautions listed in this manual

Never make changes or modifications to the battery pack

Do not short circuit

Do not expose to fire

When replacing battery, be careful to not crimp or crush wires inside of power pack

Protect battery from fluids and damp environments

Charge batteries with supplied charger only

Waste of electrical and electronic equipment must not be disposed as unsorted municipal waste. It must be collected separately, and must be disposed as per local regulations

Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

Do not plug or unplug the headlight to/from the power pack while the power pack is on.

SPECIFICATIONS

LED DayLite® HDi™		Model Number: DVI-LEDDC
POWER REQUIREMENTS		
Battery Power : 7.4VDC, 3.5Ah 18650 Li-Ion *For Charging :* [A] Cell-Con Charger Model 2240 Input : 100-240VAC, 50/60 Hz, .35A Output : 8.4 VDC, 1.3A max		
ILLUMINATION		*Measured with a cosine corrected light meter*
At 12" UltraMini®/UltraMini® HDi™	High	55,000 lux ± 10%
	Low	30,000 lux ± 10%
UltraMini IR/UltraMini IR HDi	High	55,000 lux ± 10%
	Low	30,000 lux ± 10%
RUNTIME		*Measured with a fully charged battery*
UltraMini®/UltraMini® HDi™	High	10 hours +/-10%
	Low	19 hours +/-10%
UltraMini IR/UltraMini IR HDi	High	10 hours +/-10%

	Low	19 hours +/-10%
DIMENSIONS		
POWER PACK	3.60” X 1.95” X .95”	
WEIGHT:	4.9 oz	
UltraMini® HEADLIGHT:	.76” Dia. x 1.27”	
WEIGHT:	.49 oz	
UltraMini® HDi™ HEADLIGHT:	.76” Dia. x 1.27”	
WEIGHT	.50 oz.	
UltraMini® *IR* HEADLIGHT	1.5” x 1.1” x .81”	
WEIGHT	.58 oz	
UltraMini® *IR* HDi™ HEADLIGHT	1.5” x 1.1” x .81”	
WEIGHT:	.61 oz.	
ENVIRONMENTAL OPERATING CONDITIONS		
TEMPERATURE: RELATIVE HUMIDITY: ATMOSPHERIC PRESSURE:	10^{O}C to 40^{O}C 30% to 75% 700 to 1060 hPa	
TRANSPORT & STORAGE		
TEMPERATURE: RELATIVE HUMIDITY: ATMOSPHERIC PRESSURE:	-40^{O}C to 70^{O}C 10% to 100% including condensation 500 to 1060 hPa	

APPROVALS	
UL 61010-1: 2012, CAN/CSA C22.2#61010-1: 2012, IEC 61010-1:2010, IEC 60601-1-2:4th Class B, IEC 62133	
EQUIPMENT CLASS:	 Class II
INGRESS OF WATER:	IPX0 (ordinary equipment)
MODE OF OPERATION	Continuous
PROTECTION FROM SHOCK:	NO APPLIED PARTS
OVERCURRENT PROTECTION	Firmware Controlled Protection
METHODS OF STERILIZATION	Not Intended to be Sterilized
OXYGEN RICH ENVIRONMENT	Not Intended for Oxygen Rich Environments
PATENTS:	8,851,709; 8,215,791; 7,690,806; RE46,463; D600,728; D589,545 HDi™ Technology Patent Pending

A) External charger provided with an approved detachable power supply cord which can be easily and safely remove from supply mains

CONTENTS

DEVICE DESCRIPTION

The UltraMini® / UltraMini® HDi™ /UltraMini® *IR/* UltraMini® *IR* HDi™ headlights generate a 3" spot of light at a 12-inch working distance with an intensity of 55,000 lux and up to 19-hour battery runtime. All four lights have a correlated color temperature of 5800K.

The LED DayLite® HDi™ includes these main components:

Power Pack(s)
Desktop Charger
Power Cord
UltraMini® Headlight, or
UltraMini® HDi™ Headlight, or
UltraMini® *IR* Headlight, or
UltraMini® *IR* HDi™ Headlight
UV/Blue Light Filter (installed)
Headlight Cable

Accessories include:

Two Holsters
Belt Clips
Hex Drivers
Cable Wrap Kit
Operation Manual
Registration Card
T-Mount Bracket *(sold separately)*

DIRECTIONS FOR USE

LED DAYLITE® HDI™ INITIAL SETUP AND CHARGING

Remove the components from the shipping container, checking that all parts on the packing list have been received. Carefully remove the headlight, power pack(s), desktop charger and charger cord from the packaging carton.

NOTE: The batteries need to receive a full charge before initial operation

The desktop charger is designed to meet multi-national regulatory requirements and has multi-input voltage capability to accommodate various line voltages from 100-240 VAC. The unit is to be charged with the supplied charger only. Plug the cord into the jack connector on the

FIG. 1

front of the power pack *(Fig. 1)*.

Plug the power cord into the charger and connect the desktop charger to the AC outlet. *NOTE: International cords are available through Designs for Vision; refer to the list on page 24 of this manual.*

The power button light will start pulsing to indicate the unit is in "Smart Charge" mode. The status indicator *(Fig. 2)* will display the current state of charge. The LED will change colors as the battery charges; going from **RED** to **ORANGE** to **GREEN**. When the power button light remains steady, the unit is fully charged.

You can now disconnect the cord from the power pack to run on battery. The belt clip on the rear of the holster will allow you to carry it around with you.

FIG. 2

HOLSTER OPERATION

In addition to the holsters, Ratcheting Belt Clips have been included to allow for a full 360° rotation of the unit, even while it is attached to you. To place the belt clip on to the holster, simply slide it up over the raised circular ratchet disk until an audible 'click' is heard *(Fig. 3)*. The clip on the back of the leather case is designed to clip onto a belt.

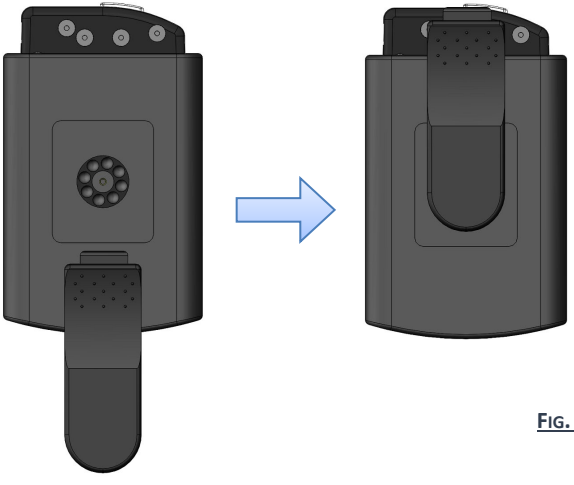


FIG. 3

Squeeze the clip together to open. Arrow A *(Fig. 4)* shows where to press. The power pack can rotate to your desired position.

Each increment is followed by an audible click. To remove the power pack from the clip, depress the button on the top of the belt clip while pulling up on the power pack, which is shown by arrow B *(Fig. 4)*.

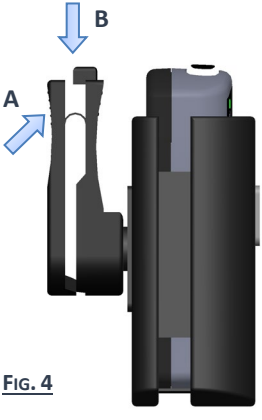


FIG. 4

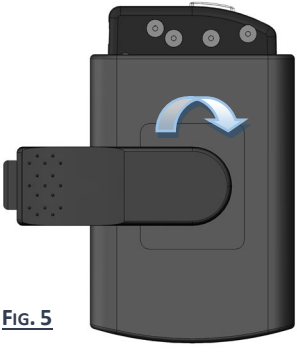
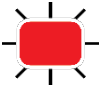


FIG. 5

NOTE: Make sure power pack is properly seated before commencing use.

UNDERSTANDING THE STATUS INDICATOR

The LED DayLite® HDi™ incorporates an advanced status monitoring system. The following table describes what each indication signifies:

	**SOLID GREEN**: FULLY CHARGED BATTERY
	**SOLID/PULSING RED**: LOW BATTERY
	**FAST BLINK RED**: GENERAL ERROR. PLEASE CONTACT DESIGNS FOR VISION, INC. FOR FURTHER ASSISTANCE
	**SLOW BLINK RED**: BATTERY SPENT. PLEASE CONTACT DESIGNS FOR VISION, INC. FOR FURTHER ASSISTANCE

NOTE: A spent battery should not be used. Contact Designs for Vision Inc. for ordering a replacement.

The LED DayLite® HDi™ also incorporates a Low Battery Warning system. With approximately ten (10) minutes of battery power remaining, the headlight will flash three times. At five (5) minutes remaining, the headlight will flash another three times. At 30 (thirty) seconds remaining, the headlight will flash continually until the battery is completely depleted.

REPLACING THE BATTERY

At the end of its useful life, the battery will need to be discarded and replaced with a new one. To accomplish this, you will need the hex driver supplied with the unit. Loosen the screw at the bottom of the power pack until it is removed from the battery door. Slide the door down and out to expose the battery *(Fig. 6)*.

FIG. 6

Unplug the black connector on the battery on the inside of the unit. *Note: Replace with Designs for Vision, Inc. battery only. Using unapproved batteries may not work and will void the warranty.* Insert the new battery being very careful to install in the proper orientation.

Plug the battery into the connector then place the battery in the pack. Make sure all wires are tucked into the compartment. Replace door and tighten screw. *NOTE: You will need to fully charge the battery before the fuel gauge will read properly.*

USING THE ULTRAMINI® / HDI™ HEADLIGHTS

NOTE: If the battery is installed improperly, the unit will not function

Place the headlight onto the t-mount bracket for your frame. The headlight can be adjusted up and down to align with your point of view. The headlight can then be locked into that position using the provided driver *(if equipped)*. Locate the hex in the locking shaft of the headlight *(Fig. 7)*. Place the driver into this

opening and turn clockwise to tighten the shaft. To unlock the position, loosen the shaft by turning counter-clockwise. *NOTE: The shaft will only turn a limited distance. Do not force in either direction*.

FIG. 7

NOTE: Before inserting or removing any headlight cable from the power pack make sure the power pack is OFF

FIG. 8

The power pack ***MUST BE OFF*** before plugging or unplugging the headlight Plug the headlight cable into the headlight *(Fig. 8)*. The micro USB connector can only be plugged in one way. The indicator on the connector

must be facing in the direction shown. Connect the large end of the headlight cable to the headlight port on the top of the power pack.

Clips and a cable wrap are also supplied to be used in conjunction with your frame to direct the cable away from your face.

Press the power button on the front of your battery pack. The headlight will turn on at high intensity. The power button will illuminate and the status indicator will display the current state of charge. A second press of the power button will lower the light intensity of the headlight. A third press turns the power pack off.

A UV/blue light filter is provided to prevent premature curing of dental composites (comes pre-installed). To use, slide the filter over the front of the headlight until completely

FIG. 9

seated (Fig. 9). Using the supplied tool, tighten the set screw on the bottom of the filter to properly secure to the headlight. You can now rotate the UV/blue light filter into and out of the path of light, as required. *NOTE: Be careful to not overtighten set screw when installing.*

USING THE ULTRAMINI® IR/ IR HDI™ HEADLIGHT

The UltraMini® IR HDi™ incorporates an infrared (IR) sensor to allow for activation/deactivation of the headlight using only simple hand gestures. Located on the top of the headlight is the built-in sensor *(Fig. 10)*. Once power is applied from the power pack, move your hand over the sensor about four to six inches above. Wave your hand once to shut the light off, a second time to turn the light back on.

FIG. 10

The UltraMini® IR HDi™ is designed to look for an *intentional* wave of your hand. To accomplish this, the headlight utilizes advanced circuitry that constantly monitors the headlight's position. It only allows operation if the headlight is relatively still and in an upright position. Simply put, if the headlight is hanging downwards or if it is moving, then the motion sensor will be deactivated.

USING THE INTUITIVE RESPONSE ULTRAMINI HDI ™

Your new Designs for Vision LED DayLite® UltraMini IR™ headlight employs Infrared sensing technology along with on-board biometrics to provide a reliable user interface. When your LED headlight is first turned on, it will remain on for a period of approximately five (5) seconds. During this time you may freely adjust the position of the headlight as shown in Figure 11. After this time is up, the light will blink

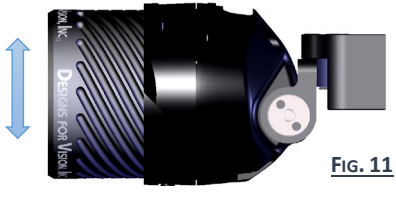


FIG. 11

twice to indicate that it is entering biometric mode. Once in biometric mode, your LED headlight constantly monitors body position to determine if you are in your working position. When in your working position, the LED headlight will be on. If you look up from your working position the LED headlight should turn off automatically.

Changing your working position: The working position of the headlight can be changed at any time. To do this, rotate your headlight or change your body position that best fits your working style.

FIG. 12

Once this position is found, place your finger directly onto the IR sensor(blue arrow) and hold it there as shown in Figure 12 The light will blink faster and faster until eventually it turns on and stays on

(approximately two (2) seconds). Remove your finger from the sensor, and the current position of the LED headlight will be saved as your new working position.

NOTE: The sensor does not turn off the power pack. In order to shut down power to the headlight, you need to press the button on the power pack.

INSPECTION AND PREVENTATIVE MAINTENANCE

- Clean lenses with a standard glass cleaner and a soft, lint-free cloth, making sure not to scratch the surface.
- Not intended to be sterilized. It is recommended for disinfection that all the exposed plastic sections of the headlight, power pack and accessories be wiped with Lysol IC surface disinfectant/cleaner or an equivalent plastic-safe cleaner. *Note: Do not use alcohol, phenol, ammonia, or iodine complex solutions*
- Wipe the sections rather than spraying onto plastic parts. *Note: Do not let liquids enter openings or ports.*

Do not immerse parts in solutions. Using solutions other than recommended may void warranty. Allowing liquids to enter openings or ports may void warranty.

- Wipe cables with plastic-safe cleaners, if necessary. Do not allow cleaners to get onto the cable connectors as it may cause the electrical terminals to corrode
- Internal batteries must be replaced every 24 months to ensure proper operation
- Always examine all components for damage before each use. Examine all cables for broken or frayed wires before each use

DESCRIPTION OF VARIOUS SYMBOLS

	*ATTENTION / CAUTION*
	*CAUTION: HOT SURFACE*

	INDICATES CONFORMITY WITH MDD 93/42/EEC ANNEX VII/MDR2017
	INDICATES WHERE THE UNIT CAN BE TURNED ON AND OFF
	INDICATES BATTERY STATE OF CHARGE
	INDICATES WHERE THE UNIT CAN BE CHARGED
	*READ ACCOMPANYING DOCUMENTS*
	*WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) DIRECTIVE SYMBOL*
	*ELECTRICAL SHOCK HAZARD*
	EQUIPMENT CLASS

Replacement Parts

Description	Part Number
UltraMini®	4929-3000-0002
UltraMini® HDi™	4902-3000-0001
UltraMini® *IR*	4933-3000-0001
UltraMini® *IR* HDi™	4932-3000-0001
Li-Ion Battery Charger	4912-0000-2019
Li-Ion Battery	4912-0000-1018
United States Plug & Cord Set	4706-0000-0038
European Plug & Cord Set	4706-0000-0030
Australian Plug & Cord Set	4706-0000-0032
South African Plug & Cord Set	4706-0000-0039
Indian Plug & Cord Set	4706-0000-0033
English Fused Plug & Cord Set	4706-0000-0034
Japanese Plug & Cord Set	4706-0000-0037
Headlight Cable	4911-0001-0022
Holster	0030-4912-0001
Belt Clip	4911-0002-0029

Electromagnetic Information

This equipment is designed to comply with IEC 60601-1-2. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. Harmful interference to other devices can be determined by turning this equipment ON and OFF. Try to correct the interference using one or more of the following:

- Reorient or relocate the receiving device
- Increase the separation between the equipment
- Consult Designs for Vision, Inc. for help

Table 201 – Guidance and Manufacturer's Declaration – Emissions
All Equipment and Systems

Guidance and Manufacturer's Declaration – Emissions
The LED DayLite® HDi™ is intended for use in the electromagnetic environment specified below. The customer or user of the LED DayLite HDi™ should insure that it is used in such an environment.

Emissions Test	**Compliance**	**Electromagnetic Environment-Guidance**
RF Emissions CISPR 11	Group 1, Class B	The LED DayLite® HDi™ uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Harmonics IEC 61000-3-2	Class B	The LED DayLite® HDi™ is suitable for use in all establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Flicker IEC 61000-3-3	Complies	

Table 202 – Guidance and Manufacturer's Declaration – Immunity
All Equipment and Systems

Guidance and Manufacturer's Declaration – Immunity
The LED DayLite® HDi™ is intended for use in the electromagnetic environment specified below. The customer or user of the LED DayLite® HDi™ should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
ESD IEC 61000-4-2	±8kV Contact ±2kV, ±4kV, ±8kV, ±15kV Air	±8kV Contact ±15kV Air	Floor should be wood, concrete or ceramic tile. If floors are synthetic, the r/h should be at least 30%.
EFT IEC 61000-4-4	±2kV 100kHz Repetition frequency	±2kV 100kHz Repetition frequency	Mains power quality should be that of a typical residential environment.
Surge IEC 61000-4-5	±0.5kV, ±1kV Line-to-line ±0.5kV, ±1kV, ±2kV Line-to-ground	±1kV Line-to-line ±2kV Line-to-ground With client modifications	Mains power quality should be that of a typical residential environment.

Voltage Dips/Dropout IEC 61000-4-11	0% U_T: for 0.5 Cycle At 0˚, 45˚, 90˚, 135˚, 180˚, 225˚, 270˚, 315˚ 0% U_T: for 1 Cycle and 70% U_T: for 25/30 Cycles Single Phase: at 0˚	0% U_T: for 0.5 Cycle At 0˚, 45˚, 90˚, 135˚, 180˚, 225˚, 270˚, 315˚ 0% U_T: for 1 Cycle and 70% U_T: for 25/30 Cycles Single Phase: at 0˚	Mains power quality should be that of a typical residential environment. If the user of the LED DayLite® HDi™ requires continued operation during power mains interruptions, it is recommended that the LED DayLite® HDi™ be powered from an uninterruptible power supply or battery.
Power Frequency 50Hz or 60 Hz Magnetic Field IEC 61000-4-8	30 A/m 50Hz or 60Hz	30 A/m 50Hz or 60Hz	Power frequency magnetic fields should be that of a typical residential environment.

Table 204 – Guidance and Manufacturer's Declaration – Emissions
Equipment and Systems that are NOT Life-Supporting

Guidance and Manufacturer's Declaration – Emissions
The LED DayLite® HDi™ is intended for use in the electromagnetic environment specified below. The customer or user of the LED DayLite® HDi™ should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Conducted Disturbances induced by RF Fields IEC 61000-4-6	3 V 0.15 MHz-80 MHz 6 V in ISM bands between 0.15MHz and 80MHz 80% AM at 1 kHz	3 V 0.15 MHz to 80 MHz 6 V in ISM bands between 0.15MHz and 80MHz 80% AM at 1 kHz	Interference may occur in the vicinity of equipment containing a transmitter.
Radiated RF EM Fields IEC 61000-4-3	3 V/m 80MHz-2.7GHz 80AM at 1KHz	3 V/m 80MHz-2.7GHz 80AM at 1KHz	

Table 206 – Recommended Separation Distances between portable and mobile RF Communications equipment and the LED DayLite® HDi™ *Equipment and Systems that are NOT Life-Supporting*

Recommended Separations Distances for the LED DayLite® HDi™
The LED DayLite® HDi™ is intended for use in the electromagnetic environment in which radiated disturbances are controlled. The customer or user of the LED DayLite® HDi™ can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and the LED DayLite® HDi™ as recommended below, according to the maximum output power of the communications equipment.

Test Frequency (MHz)	Band[a] (MHz)	Service [a]	Modulation [b]	Max Power (W)	Distance (m)	Immunity Test Level (V/m)
385	380 - 390	TETRA 400	Pulse Modulation [b] 18 Hz	1,8	0,3	27
450	430 - 470	GMRS 460, FRS 460	FM [c] ±5 kHz deviation 1 kHz sine	2	0,3	28
710	704 - 787	LTE Band 13, 17	Pulse Modulation [b] 217 Hz	0,2	0,3	9
745						
780						
810	800 - 960	GSM 800-900 TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse Modulation [b] 18 Hz	2	0,3	28
870						
930						

1720 1845 1970	1700 - 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse Modulation [b] 217 Hz	2	0,3	28
2450	2400 - 2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse Modulation [b] 217 Hz	2	0,3	28
5240 5500 5785	5100 - 5800	WLAN 802.11 a/n	Pulse Modulation [b] 217 Hz	2	0,3	9
NOTE If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the LED DayLite® HDi™ may be reduced to 1 m. The 1 m test distance is permitted by IEC 61000-4-3.						
[a] For some services, only the uplink frequencies are included. [b] The carrier shall be modulated using a 50 % duty cycle square wave signal. [c] As an alternative to FM modulation, 50 % pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.						

WARNING: Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

WARNING: Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this

equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the LED DayLite® HDi™, including cables specified by Designs for Vision, Inc. Otherwise, degradation of the performance of this equipment could result.

NOTE: The EMISSIONS characteristics of this equipment make it suitable for use in a residential environment (CISPR 11 class B).

NOTE: The LED DayLite® HDi™ may be adversely affected by EM DISTURBANCES possibly resulting in a loss of light output.

WARRANTY

The UltraMini®, UltraMini® HDi™, UltraMini® *IR* and UltraMini® *IR* HDi™ headlights are warranted against imperfections and defects in materials and workmanship for four years. The power pack is warranted for two years. The internal batteries, charger, and cables are warranted for one year. Any damage caused by improper maintenance as described in the manual may not be covered by the warranty.

SEE WHAT'S RIGHT ABOUT
MADE IN AMERICA®

TECHNICAL SUPPORT/CUSTOMER SERVICE

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