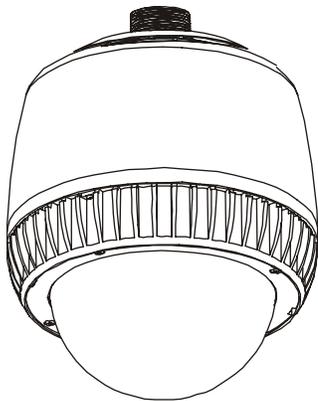


SpeedDome® Optima LT Camera Dome Indoor Pendant Mounting Structure

Installation Guide

FOR INDOOR USE ONLY!

Figure 1. Optima LT camera dome (in housing)



About this Guide

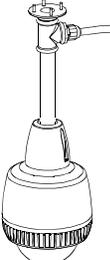
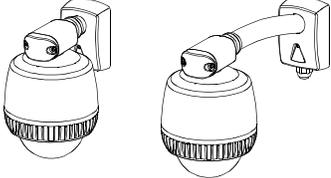
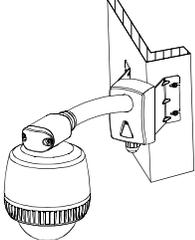
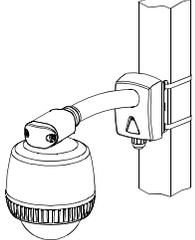
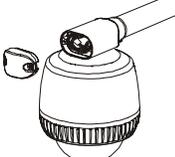
This guide explains how to prepare the camera dome for installation to an indoor mounting structure and assumes that the mounting structure is in place and that data and power cables have been pulled to the installation site.

This guide does not explain how to install the mounting structure. For this information, see information shipped with the mounting structure.

About the Indoor Housing

The indoor housing (Figure 1) is used to attach the SpeedDome Optima LT camera dome to an indoor mounting structure. This housing can attach to mounting structures shown in Table 1.

Table 1. Indoor mounting structures

RHOPN Pendant Mount	
RHIUBM I-Beam Mount	
RHOSW/RHOLW Short/Long Wall Mount	
RHOWCA Corner Mount	
RHOWPA Pole Mount	
ROENDC End Cap	

Warnings and Cautions

Please review the following warnings and cautions before you begin installation or service.

WARNINGS



WARNING!

ALWAYS USE:

- Proper safety equipment for the location and type of installation.
- Proper lift equipment to reach the installation.
- Safety features of the lift equipment.

BE SURE:

- Electrical power is not connected to the dome when connecting wires. Dome will move when power is applied.
- Electrical power is not connected to nearby fixtures that you might touch during installation.



WARNING!

The camera dome used in this housing runs on 24Vac. DO NOT connect line voltage to this dome.

Worldwide power requirements: A certified limited power source is required.

North America power requirements: This device is intended to be supplied from a Class 2 power supply.

This installation should be made by a qualified service person and should conform to all local codes.



WARNING!

DO NOT install this housing in hazardous areas where highly combustible or explosive products are stored or used.

WARNING!



EU power requirements: This product runs on 24Vac. In the EU, it is intended to be powered from a Limited Power Source. A limited power source is a certified source of SELV, and is inherently limited, with 8 amps maximum output current, and a maximum of 100VA available; or if not inherently limited, fused with a maximum value of 3.3 Amps, meeting section 2.11 of IEC950, and a maximum of 250VA available. The power supply can be obtained through Sensormatic or through another source where the provider can furnish the verification. This is required to assure electrical safety in the product.

Stromanforderungen in der EU:

Dieses Produkt wird mit 24 V Wechselstrom betrieben. In der EU ist es für den Betrieb durch eine begrenzte Stromquelle vorgesehen. Eine begrenzte Stromquelle ist eine zertifizierte SELV-Quelle (Schutzkleinspannung), bei inhärenter Begrenzung mit einem maximalen Ausgangsstrom von 8 A und 100 VA maximaler Verfügbarkeit, bei nicht inhärenter Begrenzung mit einer maximalen Sicherung von 3,3 A gemäß Abschnitt 2.11 der IEC950 und 250 VA maximaler Verfügbarkeit. Das Netzteil kann über Sensormatic oder eine andere Quelle bezogen werden, wobei der Anbieter den Nachweis der Konformität bereitstellen sollte. Dies ist zur Gewährleistung der elektrischen Sicherheit des Produktes erforderlich.

Before You Begin

To ensure a smooth and successful installation, observe the following requirements.

General Requirements

- Have electrical work comply with latest national electrical code, national fire code, and all applicable local codes and ordinances.
- Coordinate work with other trades to avoid interference.
- Verify existing site conditions and coordinate with the owner's representative and appropriate utilities as required.
- Obtain copies of all related plans, specifications, shop drawings and addenda to schedule and coordinate related work.
- Thoroughly review the project to ensure that all work meets or exceeds the above requirements. Bring alleged discrepancies to the attention of the CCTV Project Coordinator.

Mounting Requirements

Structural members: Verify that ceiling members can support the camera dome and mounting structure, if used.

Weight: 2.5kg (5.5 lbs)

Cable Requirements

Data cables: Table 2 shows cable requirements for SensorNet and Manchester networks. For more information about communication protocols and cable networks, see *Communication Protocols and Cable Networks*, 8000-2573-19.

Table 2. Data cable requirements

	SensorNet	RS-422 Simplex	Manchester
Cable type	1 unshielded, twisted pair*	1 shielded, twisted pair** **	1 shielded twisted pair***
Wire gauge	22 AWG	22AWG	18 AWG
Connection	Non-polarized	Polarized	Polarized
Max. devices per cable run	32	10	3

* Power, data, and video cables can be ordered separately or within a composite cable that can be ordered in various lengths. Plenum-rated cables must be used in indoor ceilings used for environmental air return (called "other air space" in the National Electrical Code). Order parts through your distribution network.

Note: If you order cable from an outside source, wire colors may be different.

** The RS-422 Simplex connection only uses a single twisted pair allowing the dome to receive only. RS-422 transmit from the dome is not supported.

*** Belden 88760 (plenum), or Belden 8760 cable (non-plenum) cable is recommended. Plenum-rated cables must be used in indoor ceilings used for environmental air return (called "other air space" in the National Electrical Code). Order cable directly from Belden by calling 1-800-235-3361.



WARNING! Do not run cables adjacent to or in the same conduit as line voltage mains power.

Power cables. Make power cable lengths as short as possible to minimize the affects of low line voltages and outdoor cold temperature performance. Maximum cable length between a Class 2 LPS (low voltage) ac source, such as a J-box, and the dome depends on the ac line voltage. See the tables below for maximum cable lengths based on the worst-case low line voltages.

The line voltage must not go below the voltage shown for the dome to be able to power up and operate at the corresponding distances shown. Typically cable distances are used that provide a 15% margin between nominal and low line conditions. For example, if the nominal voltage measures 120Vac, restrict the cable length to the distance for 0.85 x 120 or approximately 100Vac.

Power cable requirements

Table 3 shows the maximum cable distance for several worst-case low line voltages between various indoor power sources and the indoor SpeedDome Optima LT camera dome. These distances are for Sensormatic composite cables, which use 18 AWG ac power wires.

Table 3. Power cable requirements

Indoor Dome AC Power Source	Worst-Case Low Line V	Meters (Feet)
28 VA Transformer 5604-0006-01	117	130 (425)
	100	80 (250)
	90	60 (200)
50 VA Transformer 5604-0044-01	117	160 (525)
	100	100 (325)
	90	60 (200)
1-position SensorNet RJ1SNUD	117	160 (525)
	100	100 (325)
	90	80 (250)
1-position SensorNet RJ1SNUD-1	240	160 (525)
	200	100 (325)
	180	80 (250)
6-position SensorNet Indoor J-Box RJ6SN	117	210 (675)
	100	130 (425)
	90	80 (250)
	240	210 (675)
	200	130 (425)
Universal Transformer 0300-0914-01	117	130 (425)
	100	100 (325)
	90	60 (200)
Universal Transformer 0300-0914-03	240	160 (525)
	200	100 (325)
	180	80 (250)

SensorNet Line Termination

SensorNet communication protocols require line termination. Accessing slide switch S1 through the hole in the top of the dome, terminate the dome furthest from the video controller or junction box by moving the switch to the “terminated” position. All other domes along the line must be unterminated.

Manchester and RS-422 protocols do not require line termination.

Setting the Camera Address

At the top of the dome are rotary switches SW1, SW2, and SW3 used to set the dome address.

Protocol address ranges are as follows:

SensorNet	1-255
Manchester	1-64
RS-422	1-99

For example, for address 107, set SW3 to 1, SW2 to 0 (black dot), and SW1 to 7.

Compatibility with the VM96 Controller

If using a VM96 controller, the controller must be Version 5.2 or higher.

Power-Up Routine

After power is connected to the dome, the dome performs a homing routine. During the homing process, the camera will pan and then either:

- Go to the start point of the “apple peel” pattern, or
- If powered up once before, to the last position in memory.

Once the camera stops, the camera is online and is ready to be controlled.

Synchronizing Domes

To prevent picture rolling when switching from camera to camera, all domes can be synchronized to the ac source. A V-phase adjustment at the control console enables the dome to sync to any line phase.

Save Packaging Material

Should the camera dome need to be sent to a repair center, use the packaging that the dome was shipped in.

Procedure

Parts Supplied

Housing Assy.	1	0404-0103-01
Bubble Assembly, Clear/Smoked	1	0400-1402-01/-02
Chassis Assy., NTSC/PAL	1	0101-0075-01/-02
Install Kit	1	0352-0126-01
Connector, 3-Pos., Power	1	2109-0254-02
Connector, 2-Pos., Data	1	2109-0756-01

Purchase or Supply Separately

- Male BNC connector
- RULOB Indoor I/O Board

Tools Required

- 6mm (.25in) fixed-handle nut driver for Torx bit
- Small screwdriver for tightening connectors
- Wire cutters and strippers



WARNING! Turn power off at the source before beginning this procedure.

The following steps refer to Figure 2 and Figure 3.

1. To expose connectors and settings at the top of the dome assembly, loosen three captive screws securing the dome to the housing, press in the three latches, and remove the dome from the housing.
2. Run cables exiting the mounting structure down through the hole in the housing.

Figure 2. Screws and latches securing dome assembly to housing

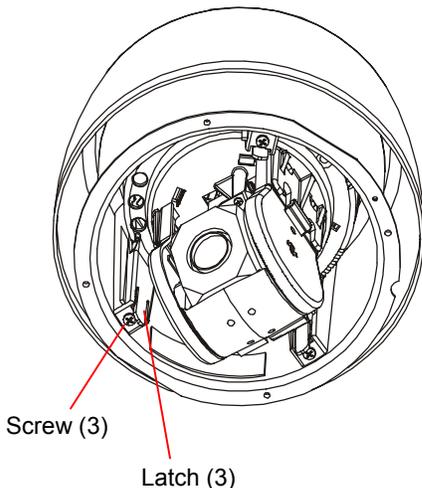
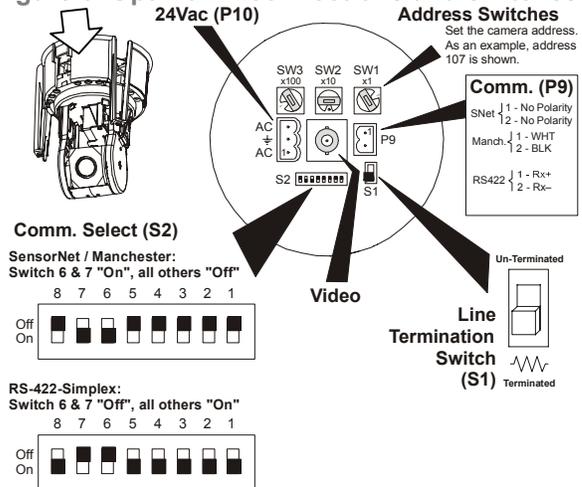


Figure 3. Optima LT connections and switches



3. On the PC board, set switches SW1, SW2, and SW3 for the camera address (example: 001–016 for VM16, 001–096 for VM96).
4. If daisy-chaining domes, the dome furthest from the video controller requires that switch S1 remain in the “terminated” position (resistor symbol). Set all other domes along the chain to “un-terminated”.
5. Check DIP switch S2 for correct communications settings.
 - For SensorNet and Manchester, ensure switches 6 and 7 are “On”. Other switches should be “Off”.
 - For RS-422, ensure that switches 6 and 7 are “Off”. Other switches should be “On”.
6. Connect power and communications cables.



WARNING! Ensure power is off at the source when connecting cables. Otherwise, the dome will operate during installation.

- a. Remove 2.5-3.8cm (1–1.5in.) of jacket from the ends of power and data cables.
- b. Attach the orange 3-pin plug to the power cable and the gray 2-pin plug to the communications cable. Use a small screwdriver to tighten the connector screws. **DO NOT** over tighten connectors!
- c. On the PC board, plug the orange 3-pin plug into receptacle P10 and the gray 2-pin plug into receptacle P9.
7. Attach a BNC connector to the video cable and plug it into the video receptacle.

8. Push cables back into the mounting structure. Then reinsert the dome assembly into the housing unit it clicks in place and tighten the three captive screws (Figure 2).
9. Apply power to the camera dome.



CAUTION: Dome moves when power is applied.

Note: When power is applied, the dome checks its function by performing a homing routine during which the camera pans and then either goes to the start point of the “apple peel” pattern or if powered up once before, to the last position in memory. Once the camera stops, the camera is online and is ready to be controlled.

Also, green, red, and yellow LEDs will light in various patterns to indicate status. Typically, you do not need to view these LEDs unless a failure occurs during or after the routine. See “Troubleshooting” for an explanation of the LED patterns.

Referring to Figure 4.

10. Remove the bubble assembly from the package and ensure the bubble is clean and free of debris.
11. Attach the coiled lanyard from the bubble to the threaded stud on the housing using the thumbnut supplied.
12. Attach trim bubble assembly.
 - a. Discard the red “CAUTION: Remove slot covers” tag. There is no need to remove the slot covers for indoor applications.
 - b. Align the key on the inside of the bubble assembly with the detent on the edge of the housing.

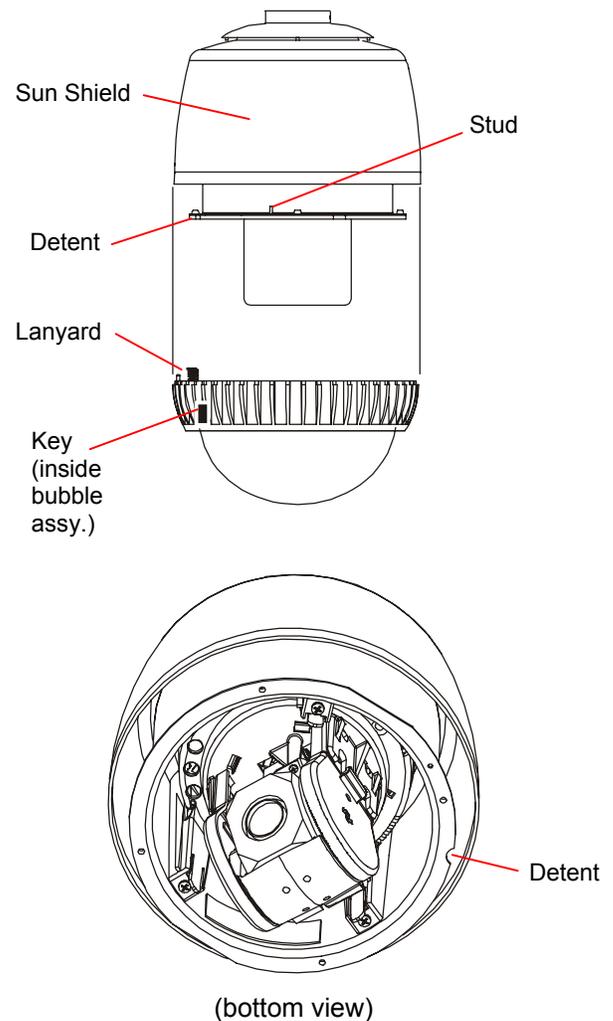


CAUTION: To maintain the integrity of the gasket seal between the housing flange and the trim ring, do not let the lanyard get caught between these two pieces as you secure the bubble assembly to the housing.

- c. Use the drive (taped inside bubble) to tighten the four tamper-proof screws on the bubble assembly. To compress the gasket evenly, tighten each screw in clockwise formation until slight resistance is felt, then retighten each screw again in clockwise formation until all screws are evenly tight.

13. See instructions for the mounting structure for how to attach the housing assembly.

Figure 4. Attaching bubble assembly



Troubleshooting

If a failure cannot be easily fixed, send the dome to a repair center.

No power (no LEDs light).

Check for power coming in from J-box or controller.

Homing routine does not complete.

Green, red, and yellow LEDs are visible through small holes in the dome housing that surround the camera yoke. After power up, LEDs light as shown in Table 4:

Table 4. Dome status/LED response

	GREEN (DS1)	RED (DS2)	YELLOW (DS3)
PLD Loading (approx. 20 sec)	On	Off	Off
Homing Process	Off	Blink	On
Looking for Network*	On	Off	On
Online Waiting for 1st Command**	Blink	Blink	On

* If the dome remains in this state, it cannot locate the SensorNet, RS-422, or Manchester network.

** The yellow LED remains on until it receives a PTZ movement command, then goes off. Further PTZ commands will cause the LED to blink; otherwise, the LED is off.

Connected to RS-422 but no communication.

Check RS-422 wiring by doing the following.

1. Set the dome address to 901; observe the green, red, and yellow LEDs through the housing.

LED Indication	Cause
Yellow blinks	Wiring OK.
Red flickers, Green blinks*	RS-422 wired backwards.
Red blinks. Green flickers*	A wire is not connected.

*Fix wiring.

2. Reset the dome to the desired address.

No video.

1. Check the video cable and its connection to the dome. If not OK, fix or replace the cable.
2. Check the iris setting. Open iris or set to auto iris.
3. If the problem cannot be corrected, send the dome to a repair center.

Video rolls when switching cameras.

Perform V-phase adjustment at the controller.

Contrast or color off.

1. Check the iris setting. Open iris or set to auto iris.
2. If the problem cannot be corrected, send the dome to a repair center.

Pan control absent or improper, but other control OK.

Send the dome to a repair center.

Tilt control absent or improper, but other control OK.

1. Check tilt belt operation. Fix the belt if necessary.
2. If the problem cannot be corrected, send the dome to a repair center.

Zoom, focus, and iris control is absent.

Check the flex cable connecting the camera the housing. If you see damage, send the dome to a repair center.

Only some camera control (for example, zoom and focus works, iris doesn't).

Send the dome to a repair center.

Parts List for Authorized Users

Only parts below can be ordered, and only by authorized users. To become authorized, contact your sales representative.

Table 5. Parts list

1	Bubble Assy. Clear	0400-1402-01
2	Bubble Assy. Smoked	0400-1402-02
3	Housing Assembly SpeedDome Optima Pendant	0404-0103-01
4	Chassis Assy. NTSC	0101-0075-01
5	Chassis Assy. PAL	0101-0075-02
6	T20 Tamperproof Torx Bit	1400-0149-01

Specifications

Operation

Manual pan speed	1–50° per second
Target pan speed.....	100° per second max.
Pan travel	360° continuous, no end stop
Manual tilt speed.....	1–50° per second.
Target tilt speed.....	50° per second max.
Tilt travel	>90°
Optical zoom.....	22X
Digital zoom.....	11X
Bubble density	Clear, f0
Tilt/Pan accuracy	±0.5°
Zoom/Focus accuracy	±0.5%
Quick View™ access	< 2 seconds to pan and tilt position < 3 seconds to full zoom position < 1 second focus on VM16 and VideoManager controllers < 7 seconds focus on VM96 and RV2715 controllers.
Synchronization	Automatically selected
Line locked	Remote V-phase adjustment
Internal.....	Built-in sync generator
Program storage	256K bytes of electrically programmable Flash Memory
Data storage	128kB of SRAM
Video output connector.....	Female BNC
Product life.....	5 years operation 500,000 position changes

Color Camera Specifications

Type.....	Interline Transfer ¼" CCD array
Scanning system	2:1 interlace
Horizontal resolution	470 lines at center
Video out	1.0 Vp-p / 75 ohms composite
Signal/Noise	48dB (typical)
Minimum illumination	1.5 lux (20 IRE)
Gain control	Automatic (AGC)

White balance Through the Lens (TTL)
Automatic Tracing White Balance (ATW)

NTSC version:

Pickup device.....	768 (H) x 494 (V) pixels
Scanning	525 lines, 60 fields, 30 frames
Horizontal.....	15.734 kHz
Vertical.....	59.9Hz

PAL version:

Pickup device.....	752 (H) x 582 (V) pixels
Scanning	625 lines, 50 fields, 25 frames
Horizontal.....	15.625 kHz
Vertical.....	50Hz

Lens

Design.....	Aspherical
Focal length	4 to 64 mm
Aperture	f1.4 (wide), f2.2 (tele)
Scanning area	3.2mm (H) x 2.4mm(V)
Viewing angle:	
4 mm.....	47.0°H x 35.2°V
48 mm.....	4.0°H x 2.25°V

Field-of-View Formulas:

$$\frac{3.2 \text{ mm}^* \times \text{distance from camera (m)}}{\text{Focal length (mm)}} = \text{Horizontal view (m)}$$

$$\frac{2.4 \text{ mm}^{**} \times \text{distance from camera (m)}}{\text{Focal length (mm)}} = \text{Vertical view (m)}$$

* Horizontal scanning area of pickup device (mm) in camera.
** Vertical scanning area of pickup device (mm) in camera.

Example: Wide angle view with lens at 6mm and viewed object at 10m.

$$\frac{3.2\text{mm} \times 10\text{m}}{6\text{mm}} = 5.33\text{m Horizontal view (m)}$$

$$\frac{2.4\text{mm} \times 10\text{m}}{6\text{mm}} = 4.0\text{m Vertical view (m)}$$

Electrical Specifications

Power Line

Input voltage	18–30Vac, Class 2 Certified Limited Power Source
Design tolerance	16–36Vac
Line frequency	50/60Hz
Power consumption	21W max.
Power on inrush current.....	3A
Allowable drop out:	33ms
Connector:	Plug-in Euro-style terminal block 5.08mm
Max. cable distance	See chart on page 4.

Surge Protection

Video output	Gas discharge tube rated at: <ul style="list-style-type: none">• 8/20μs impulse discharge current: 10kA• Ten 8/20μs impulses discharge current: 5kA• 3.9 ohm series resistors• Low capacitance Zener suppressor 6.5V 1500W
Power line	Gas discharge tube rated at: <ul style="list-style-type: none">• 8/20μs impulse discharge current: 10kA• Ten 8/20μs impulses discharge current: 5kA• TVS rated at 60V, 250A, 1.5 Joules, 8/20μs impulse
SensorNet/Manchester	Gas discharge tube rated at: <ul style="list-style-type: none">• 8/20μs impulse discharge current: 10kA• Ten 8/20μs impulses discharge current: 5kA• Isolation transformer coupled, 2000Vrms• PTC resettable fuse protects transformer• TVS rated at 5.6V, 40A, 0.1 Joules, 8/20μs impulse

EIA-422 comm	Gas discharge tube impulse rated at: <ul style="list-style-type: none">• 8/20μs Impulse discharge current: 10kA• Ten 8/20 μs Impulses Discharge Current: 5kA• 33 ohm series resistors• TVS rated at 5.6V, 40A, 0.1 Joules, 8/20μs impulse
--------------------	---

SensorNet Communications

Address range	0 to 255
Network distance	1 km
Maximum loads	32 per node
Node repeaters	SensorNet junction boxes
Cable topologies	Daisy chain Backbone Star
Transmission medium	Single non-polarized unshielded twisted pair UTP 22AWG
Wire configuration	Single unshielded twisted pair UTP 22AWG non-polarized
Connector:	Plug-in Euro-style terminal block 5.08mm
Terminating resistor	120 ohms, switch selectable

EIA-422 Communications

Address range	1 to 99
Network Distance	1km
Maximum Loads	10/node
Cable topologies	Daisy chain Star
Wire configuration	One twisted pair 22AWG, polarized, shielded
Connector	Plug-in Euro-style terminal block 3.81mm

Manchester Communications

Address range	1 to 64
Network distance	1.5 km
Maximum loads	32 per node
Node repeaters	SensorNet junction boxes
Cable topology	Daisy chain
Transmission medium	Single polarized twisted pair 18AWG (Beldon 8760)
Connector	Plug-in Euro-style terminal block 5.08mm
Terminating resistor	120 ohms, switch selectable

Mechanical Specifications

Camera Dome

Housing diameter.....	190mm (7.5in)
Housing height (above ceiling)	210mm (8.26in)
Bubble diameter.....	178mm (7.0in)
Bubble depth (below ceiling).....	94mm (3.7in)
Weight	2.7kg (5.9 lbs)

Environmental Specifications

Operating temperature:

Indoor	-10°C to 50°C (14°F to 122°F)
Humidity.....	0-95% non-condensing
Storage temperature.....	-20°C to 65°C (-4°F to 149°F)

Declarations

Regulatory Compliance

REG ID: SV SDUW

Emissions	47 CFR, Part 15 EN 50130-4 ICES-003 EN 55022
Safety	UL1950 CSA C22.2 No 950 EN 60 950

FCC COMPLIANCE: This equipment complies with Part 15 of the FCC rules for intentional radiators and Class A digital devices when installed and used in accordance with the instruction manual. Following these rules provides reasonable protection against harmful interference from equipment operated in a commercial area. This equipment should not be installed in a residential area as it can radiate radio frequency energy that could interfere with radio communications, a situation the user would have to fix at their own expense.

EQUIPMENT MODIFICATION CAUTION: Equipment changes or modifications not expressly approved by Sensormatic Electronics Corporation, the party responsible for FCC compliance, could void the user's authority to operate the equipment and could create a hazardous condition.

Other Declarations

Thank you for using American Dynamics products. We support our products through an extensive and worldwide network of dealers. The dealer, through whom you originally purchased this product, is your point of contact if you have a need for service or support. Our dealers are fully empowered to provide the very best in customer service and support. Dealers should contact American Dynamics at (800) 507-6268 or (561) 912-6259 or on the web at www.americandynamics.net.

WARRANTY DISCLAIMER: Sensormatic Electronics Corporation makes no representation or warranty with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose.

NOTICE: The information in this manual was current when published. The manufacturer reserves the right to revise and improve its products. All specifications are therefore subject to change without notice.

LIMITED RIGHTS NOTICE: For units of the Department of Defense, all documentation and manuals were developed at private expense and no part of it was developed using Government Funds. The restrictions governing the use and disclosure of technical data marked with this legend are set forth in the definition of "limited rights" in paragraph (a) (15) of the clause of DFARS 252.227.7013. Unpublished - rights reserved under the Copyright Laws of the United States.

TRADEMARK NOTICE: *American Dynamics* and *Sensormatic* are trademarks or registered trademarks of Sensormatic Electronics Corporation. Other product names mentioned herein may be trademarks or registered trademarks of Sensormatic or other companies.

COPYRIGHT: Under copyright laws, the contents of this manual may not be copied, photocopied, reproduced, translated or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of Sensormatic Electronics.

MDR (bsl) 5/04