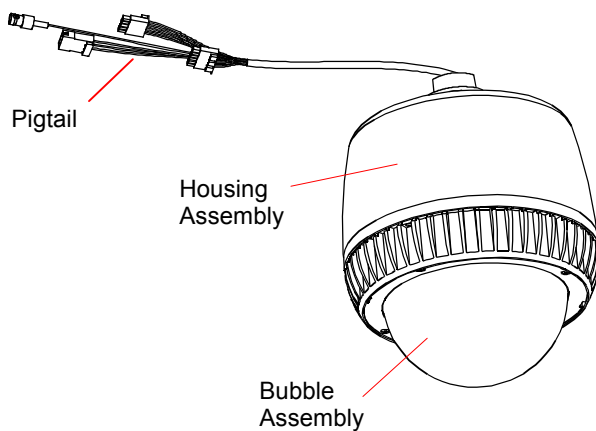

RHODUL Outdoor Housing

RHODUL-03 with Clear Bubble
RHODUL-04 with Smoked Bubble

Installation and Service Guide

Figure 1



Parts Supplied

- Housing assembly 0100-2468-01
- Bubble assembly 0400-1402-01/-02
- Tamperproof drive (supplied with bubble)
- Install kit 0351-2183-01

Purchase or Supply Separately

- Male BNC connector

Tools Required

- 1/4" fixed-handle nut driver for Torx bit
- Wire cutters and strippers

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About this Guide

This guide explains how to install the RHODUL outdoor housing. It does not explain how to install the outdoor mounting structure to which the housing is attached. For this information, see information shipped with the structure.

About the Outdoor Housing

The RHODUL outdoor housing (Figure 1) is used to attach the SpeedDome Ultra camera dome to an outdoor mounting structure.

Note: This guide assumes that a mounting structure is in place and that data and power cables have been pulled to the installation site.

Data Cable Requirements

Table 1 shows data cable requirements for SensorNet, RS422, and Manchester networks. For more information about communication protocols and cable networks, see *Communication Protocols and Cable Networks*, 8000-2573-19.

Table 1. Data cable requirements

	SensorNet	RS422	Manchester
Cable type	1 unshielded, twisted pair*	2 shielded, twisted pair*	1 shielded twisted pair**
Wire gauge	22 AWG	22 AWG	18 AWG
Con- nection	Non-polarized	Polarized	Polarized
Max. devices on line	32	10	3

* Power, data, and video cables can be ordered separately or within a composite cable that can be ordered in various lengths. All cables must be plenum rated for indoor installations where cable is routed above the ceiling. Order parts through your distribution network.

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

** Belden 88760 (plenum), or Belden 8760 cable (non-plenum) cable is recommended. Plenum-rated cable is required for indoor installations where cable is routed above the ceiling. Order cable directly from Belden by calling 1-800-235-3361.

Power Cable Requirements

Length of power cable between a Class 2 LPS (low voltage) ac source, such as a J-box, and the dome depends on the ac line voltage. See Table 2 below for cable lengths based on worst case low line voltages for Japan (100Vac), North America (120vac), and Europe (240vac).

Worst Case

Line Voltages	18AWG	16AWG	14AWG
90 Vac (Japan)	30m (100')	50m (160')	80m (260')
102 Vac (N. Amer.)	60m (200')	100m (320')	160m (520')
180 Vac (Europe)	30m (100')	50m (160')	80m (260')
204 Vac (Europe)	60m (200')	100m (320')	160m (520')

Power-Up Routine

After power is connected to the dome, the dome performs the following homing routine.

1. After a few seconds, the camera lens tilts up into the housing and eyeball assembly.
2. The lens tilts down until it looks at the floor.
3. Eyeball pans slowly.
4. Lens tilts up 90° (home position).

Once the lens is in its home position, you can then use the controller to call up the camera and control it.

Synchronizing Domes

To prevent picture rolling when switching from camera to camera, all domes can be synchronized to a 50Hz or 60Hz ac source. A V-phase adjustment at the control console enables the dome to sync to any line phase.

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!

This dome runs on 24Vac. DO NOT connect line voltage to this dome.

North America power requirements: In North America, this device is intended to be supplied from a Class 2 power supply. For outdoor installations, use Class 3 wiring techniques, liquid-tight conduit, or liquid-tight pipe.

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 if 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.

CAUTIONS

- You should have two boxes: one for the outdoor housing, the other for the bubble assembly. Protect the bubble assembly by leaving it in its box until you are ready to install it.
- Do not run data and power cables adjacent to or in the same conduit as line voltage mains power.
- SensorNet 485 networks require 22 AWG unshielded cable. Do not exceed 32 devices per cable run.
- RS422 networks require 22 AWG shielded cable. Do not exceed 10 devices per cable run.
- Manchester networks require 18 AWG shielded cable. Do not exceed 3 devices per cable run.
- Always terminate the camera dome connected at the end of a cable run.
- The outdoor housing contains an environmental PC board. Touch the metal housing to discharge static electricity before touching this board. Also, use a jeweler's 2.5mm (0.1") slotted screwdriver to tighten PC board connectors. Wider blade widths can damage connectors. Do not over tighten connectors.
- When connecting the housing and eyeball assembly to the outdoor housing:
 - Remove both slot covers to keep the camera from overheating
 - Keep cables entering the housing away from the heater assembly
 - Check heater fan operation. Both fans must be on to prevent overheating.

Procedure

IMPORTANT! To minimize trips up and down ladder, review procedure first before attempting to attach outdoor housing. Lay out and prepare parts accordingly.

Attaching the Housing to the Outdoor Mounting Structure

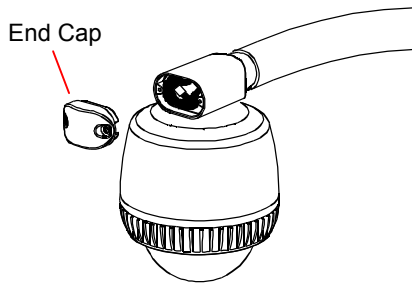


WARNING! Turn power off at the source before beginning this procedure.

1. If a “Street L” pipe or elbow is attached to pipe of mounting structure, replace it with the end cap shown below (Figure 2). Refer to *End Cap Installation Guide*, 8000-2692-04.

Note: A Street L is like an elbow, except that one end is female and the other end is male (which does not mate with the housing).

Figure 2. End cap



2. Connect ac wires to 3-pin plug on pigtail.

Pin	Color	Description
1	N/A	24 Vac
2	N/A	Common
3	N/A	24 Vac

3. Connect BNC connector to pigtail video input.

4. Connect data to 6-pin connector on pigtail.

Note: Wire colors are for composite cable only.

Manchester data connections. Order data cable 88760 (plenum) or 8760 (non-plenum) from Belden by calling 1-800-235-3361.

Pin	Color	Designation
1-4	—	Not used.
5	Black	Manchester (+)
6	White	Manchester (-)

RS422 Data connections

Pin	Color	Designation
1	Orange	RS422 Data In High (+)
2	Green	RS422 Data In Low (-)
3	Yellow	RS422 Data Out High (+)
4	Brown	RS422 Data Out Low (-)
5-6	—	Not used.

SensorNet Data Connections

Pin	Color	Designation
1-4	—	Not used.
5	Brown	SensorNet (unshielded)
6	Yellow	SensorNet (unshielded)

5. Connect alarm input, if used, to 5-pin connector on pigtail.

Pin	Color	Designation
1	N/A	Alarm input (3.5mA sink)
2	N/A	Ground

6. Connect relay output, if used, to 5-pin connector pigtail.

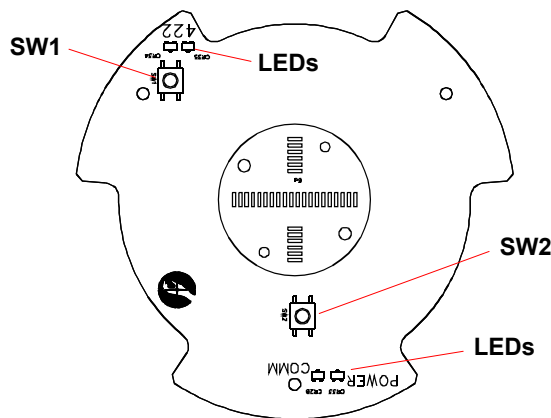
Pin	Color	Description
1	N/A	Normally Open (3.5mA sink)
2	N/A	Common
3	N/A	Normally Closed

7. Apply power to camera dome.

8. Check LEDs on environmental board to verify power and data are reaching outdoor housing (Figure 3).
 - a. Press and hold switch SW2 and observe green (ac power) and yellow (comm.) LEDs. Green LED glows steadily and yellow LED glows steadily (RS422) or blinks (SensorNet).
 - b. For RS422 data, press and hold data test switch SW1 and observe nearby red and green LEDs; they indicate the following:

<i>Constant green, Blinking red</i>	RS422 line is correctly wired.
<i>Constant green, No red</i>	RS422 "Data In -" is shorted to ground.
<i>Constant red, Blinking green</i>	"Data In + /-" wires are reversed.
<i>Blinking red, Green off</i>	"Data In +" is shorted to ground.
<i>Both LEDs off</i>	"Data In +/-" wires are shorted or open.

Figure 3. Test switches



Setting Line Termination

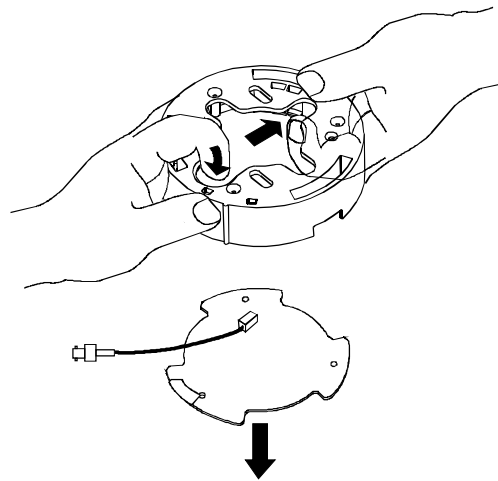
For a SensorNet/Manchester communication line, jumper JW1 on the environmental board is set at the factory to "terminated" (when communication lines do not continue). If the line is to continue to another dome, use this procedure to set the jumper to "unterminate".

CAUTION: This procedure requires that the environmental PC board be detached from the base. This board is static sensitive! Touch metal housing to discharge static electricity.

1. Detach the PC board by pushing the fingers molded into the base away from the board while pushing on the board with your index finger (Figure 4).

CAUTION: A dust cover protects the delicate spring finger connector on the PC board. DO NOT remove this cover until you have installed the dome's base.

Figure 4. Detaching Environmental PC board



2. If comm. lines continue to another dome, remove the jumper JW1 from across pins 2-3 and place it across pins 1-2 for "unterminated".

3. Reattach the PC board to the base.

4. Gently remove the dust cover.

Note: Keep the cover for future use should you need to ship the housing back to the manufacturer.

Attaching the Housing and Eyeball Assembly

Perform the following steps on the ground.

1. Remove SpeedDome Ultra housing and eyeball assembly from box and remove BOTH slot covers from eyeball (Figure 5).



WARNING! Proper ventilation requires that the slot covers be removed. Otherwise, camera dome could overheat.

- a. Gently swivel eyeball so a slot cover is totally exposed.

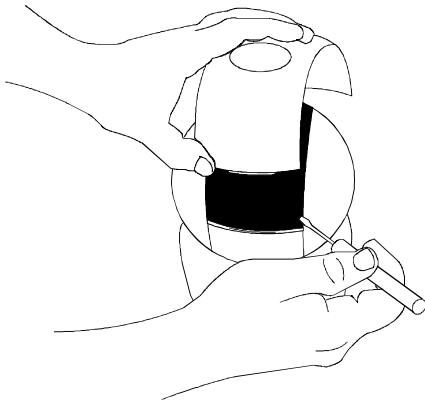
CAUTION: Swiveling fast can damage gears.

- b. Insert small slotted screwdriver into space between cover and eyeball (Figure 5). Gently pry slot cover loose.

CAUTION: Once slot covers are removed, avoid touching lens of camera.

- c. Gently swivel eyeball so remaining slot cover is totally exposed. Lift cover off.

Figure 5. Removing slot covers



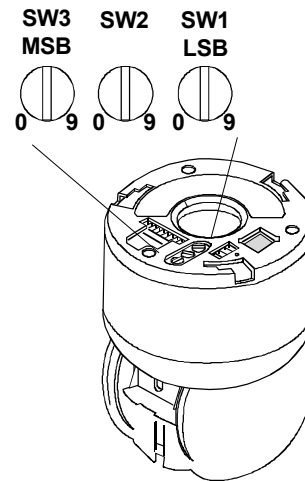
2. Set dome address (Figure 6).

Recessed at top of housing and eyeball assembly are three rotary address switches.

Protocol address ranges are shown below. Set switches from most significant bit (MSB) to least significant bit (LSB). For example: For address 166, set SW3 to 1, SW2 to 6, and SW1 to 6.

Protocol	Address Range
SensorNet	1–255
Manchester	1–64
RS422	1–99

Figure 6. Setting address switches



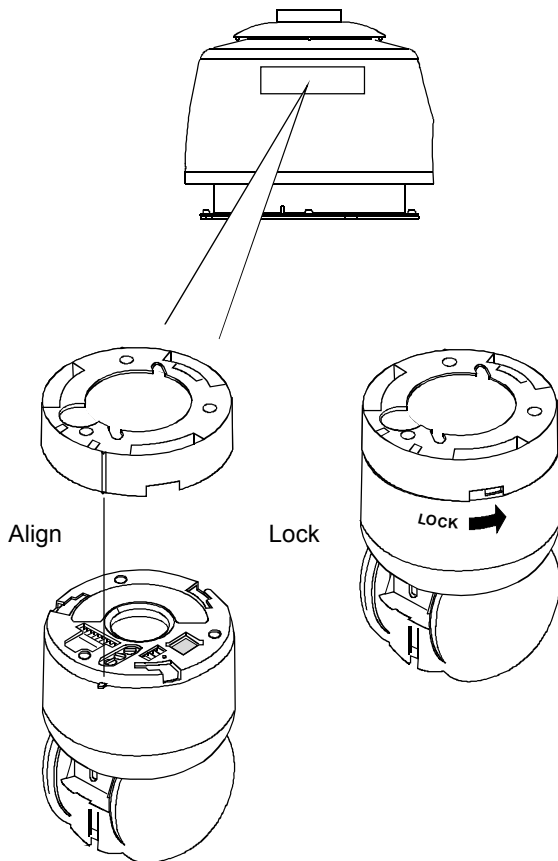
3. Connect housing and eyeball assembly to the base (Figure 7).
 - a. Align recessed dimple on cap of dome with logo visible on environmental PC board.
 - b. Mate housing and eyeball assembly to base and turn it clockwise until you hear a click.

After a few seconds, dome begins its homing routine and heater fans are on. This indicates that address was placed into dome memory.



WARNING! Heater fans must be working! If either or both fans are off, dome could overheat.

Figure 7. Attaching dome to base in outdoor housing (align protusion on cap with protrusion on base, then twist to lock)



Attaching the Trim Ring/ Bubble Assembly

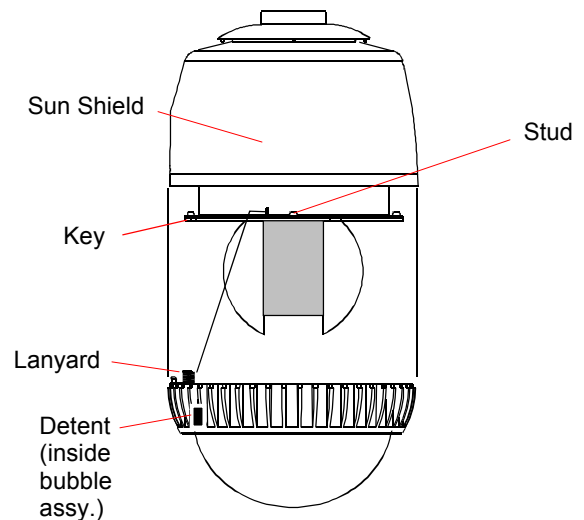
Refer to Figure 8.

1. Remove bubble assembly from package and ensure bubble is clean and free of debris.
2. Attach coiled lanyard from bubble to outdoor housing.

Attach lanyard to threaded stud on housing using thumbnut [d].
3. Attach trim bubble assembly.
 - a. Remove “CAUTION: Remove slot covers” tag. Ensure slot covers are removed.
 - b. Align key on inside of bubble assembly with detent on edge of outdoor housing.
 - c. Secure bubble assembly to housing using four tamperproof screws. Use drive (taped inside bubble) to tighten screws.

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.

Figure 8. Attaching bubble assembly



Troubleshooting Outdoor Domes

Perform the following procedures if one of the following symptoms occur:

- Dome does not respond to commands
- Fans do not turn
- Picture grainy or discolored
- Poor video
- Ice forms on bubble.

Dome Does Not Respond to Commands

Follow steps until the problem is corrected. See page 12 to order parts.

1. Disconnect dome from base and examine address switches.

Are they set correctly?

- YES: Continue.
- NO: Set correct address and reconnect housing and eyeball assembly.

2. Verify power is reaching housing.

Press and hold switch SW2 on environmental PC board and observe the green (ac power) LED. Does green LED glow steadily?

- YES: Reconnect housing and eyeball assembly and continue.
- NO: Check power at J-box and ac cable connections at connector P7 on other side of environmental PC board. If these items are OK, replace environmental PC board.

Connector P7 pin outs

Pin	Color	Description
1	N/A	24 Vac
2	N/A	Common
3	N/A	24 Vac

CAUTION: Screws on ac connector are delicate. DO NOT over tighten them! Use a 2.5mm (0.1") slotted screwdriver. Wider blade widths can damage connectors.

3. Verify data is reaching housing.

SENSORNET or RS422: Press and hold switch SW2 on environmental PC board and observe yellow (comm.) LED. Yellow LED should blink (SensorNet) or glow steadily (RS422). For test switch location, see Figure 3.

To verify RS422 connections at connector P1, press and hold data test switch SW1 on environmental PC board. For test switch location, see Figure 3. Observe nearby red and green LEDs; they indicate the following:

<i>Constant green, Blinking red</i>	RS422 line is correctly wired.
<i>Constant green, No red</i>	RS422 "Data In -" is shorted to ground.
<i>Constant red, Blinking green</i>	"Data In +/-" wires are reversed.
<i>Blinking red, Green off</i>	"Data In +" is shorted to ground.
<i>Both LEDs off</i>	"Data In +/-" wires are shorted or open.

P1 pin outs:

Manchester data connections (Ultra IV only)

Pin	Color	Designation
1-4	—	Not used.
5	Black	Manchester (+)
6	White	Manchester (-)

RS422 Data connections

Pin	Color	Designation
1	Orange	RS422 Data In High (+)
2	Green	RS422 Data In Low (-)
3	Yellow	RS422 Data Out High (+)
4	Brown	RS422 Data Out Low (-)
5-6	—	Not used.

SensorNet Data Connections

Pin	Color	Designation
1-4	—	Not used.
5	Brown	SensorNet (unshielded)
6	Yellow	SensorNet (unshielded)

CAUTION: Screws on connector P1 are delicate. DO NOT over tighten them! Use a 2.5mm (0.1") slotted screwdriver. Wider blade widths can damage connectors.

4. Check fans.

Are fans on?

- YES: Continue.
- NO: Go to “Fans Do Not Turn” procedure on page 10.

5. Check video on monitor.

Does picture roll on monitor?

- YES: Use video controller or switcher to synchronize video vertical sync phases of all domes to ac line. For specific instructions, see installation and service manual for controller or switcher.
- NO: Continue.

Is picture normal?

- YES: See “Detailed Troubleshooting” in installation and service manual supplied with housing and eyeball assembly.
- NO: See “Poor or No Video” on page 11.

Fans Do Not Turn

Follow steps until the problem is corrected. See page 12 to order parts.

1. Determine if housing and eyeball assembly is receiving power.

Look for evidence such as a picture on the video monitor or dome movement.

2. Remove housing and eyeball assembly to access environmental PC board.

Note: Power to fans comes from housing and eyeball assembly. Fans will not function with this assembly removed.

CAUTION: Touch metal housing before handling environmental board.

3. Verify power is reaching housing.

Press and hold switch SW2 and observe the green (ac power) LED. Green LED should glow steadily. If not, check power at J-box and ac cable plugged into connector P7 on other side of environmental PC board.

CAUTION: Connector screws on ac connector are delicate. DO NOT over tighten them! Use a 2.5mm (0.1") slotted screwdriver. Wider blade widths can damage connectors.

4. Check fan connector.

Is fan connector on other side of environmental PC board plugged into connector P5?

- YES: Replace fan/heater assembly 0400-0935-01. Remove two screws to remove assembly. Refer to Figure 9.
- NO: Plug connector in, reinstall environmental board, and reconnect housing and eyeball assembly. If the fans still do not work, replace the fan/heater assembly.

Picture Grainy or Discolored

Check the fans. If they are not turning, the camera dome may be overheating. See “[Dome Does Not Respond to Commands](#)” on page 10.

Poor or No Video

See “Dome Does Not Respond to Commands” on page 9.

Ice Forms On Bubble

Follow steps until the problem is corrected. See page 12 to order parts.

1. Verify that fans in housing are working.

If not, see “[Fans Do Not Turn](#)” on page 10.

2. Determine if housing and eyeball assembly is receiving power.

Look for evidence such as a picture on the video monitor or dome movement.

3. Remove housing and eyeball assembly to access environmental PC board.

Note: Power to heater comes from housing and eyeball assembly. Heater will not function with this assembly removed.

CAUTION: Touch metal housing before handling environmental board.

4. Verify power is reaching housing.

Press and hold switch SW2 and observe the green (ac power) LED. Green LED should glow steadily. If not, check power at J-box and ac cable plugged into connector P7 on other side of environmental PC board.

CAUTION: Connector screws on ac connector are delicate. DO NOT over tighten them! Use a 2.5mm (0.1”) slotted screwdriver. Wider blade widths can damage connectors.

5. Check heater connector.

Is heater connector on other side of environmental PC board plugged into connector P2?

- YES: Unplug heater cable and check heater resistance across pins of plug. Is resistance approximately 16 ohms?
If OK, replace environmental PC board 0301-0949-01. If not, replace fan/heater assembly 0400-0935-01 by removing two screws. Refer to items 20 and 21 in Figure 9.
- NO: Plug connector in, reinstall environmental PC board, and reconnect housing and eyeball assembly. If fans still do not work, replace fan/heater assembly.

Ordering Parts

This section helps you to identify parts that make up the outdoor housing assembly. See table opposite and Figure 9 for parts breakdown.

Note: Although all parts are shown, only parts shown in bold can be ordered.

Order parts through your parts distribution network. If a part to be repaired is other than those listed above, the entire housing must be ordered.

To return parts to the Global Service Center (GSC), call one of the following numbers for a repair authorization.

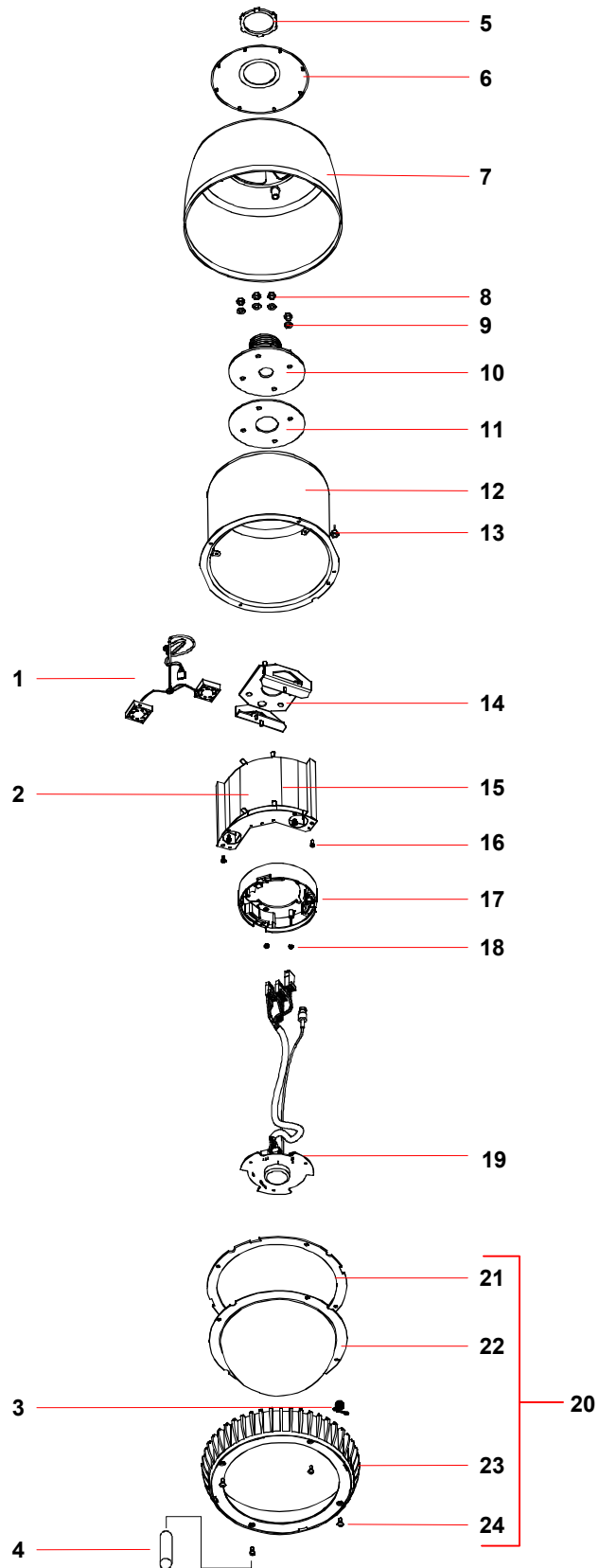
- 1-800-543-9740 (Field Service Technicians)
- 1-800-442-2225 (Dealers)
- 1-800-241-6678 (End Users).

Parts list

1	Cable Assy., Fan*	0650-2000-01
2	Heater*	0500-8023-01
3	Lanyard	0500-8797-01
4	Drive, Tamperproof	1400-0149-01
5	Nut, 1-1/2 NPT	6010-0100-01
6	Cover	0500-8001-01
7	Sun Shield	0500-7954-01
8	Nut, M6 (Qty. 4)	5826-0500-020
9	Washer (Qty. 4)	5840-0500-020
10	Support, Threaded	0500-9288-01
11	Gasket, Round	0500-9375-01
12	Housing	0500-7955-01
13	Thumbnut, M3	5899-0068-02
14	Bracket	0500-8054-01
15	Fan/Heater Assy.	0400-0935-01
16	Screw, M3x8, PH (Qty. 2)	5801-1051-120
17	Base	0500-8049-01
18	Nut, M3 (Qty. 2)	5826-0200-020
19	Environ. PC Board w/Cable	0300-2484-01
20	Bubble Assy.	0400-1402 -01 (Clear) -02 (Smoked)
21	Gasket	0500-9854-01
22	Bubble	0500-9318 -01 (Clear) -02 (Smoked)
23	Trim Ring	0500-7956-02
24	Screw, Tamperproof (Qty. 4)	0500-8034-01

* Part of Fan/Heater Assembly (Item 15).

Figure 9. Outdoor housing assembly (only parts shown in boxes can be ordered)



Specifications

Electrical (combined dome and housing)

Input Voltage	24 to 30 Vac, 50/60 Hz UL Class 2 LPS
Design Tolerance.....	20 to 36 Vac, 50/60 Hz
Power Consumption	80 W max.
Power On In-Rush current	3 A
Line Surge Protection	Gas discharge tube impulse rated at 10kA (8/20µs impulse discharge current)
Alarm Relay:	
Contact Type.....	Form 1-C
Isolation.....	1000 V
Contact Rating	1 A at 30 Vac/dc

Environmental

Operating Temperature	-40°C to 50°C (-40°F to 122°F)
Relative Humidity.....	0 to 95% non-condensing
Storage Temperature.....	-10°C to 50°C (-14°F to 122°F)

Mechanical

Height	32.1 cm (12.6")
Diameter	24.4 cm (9.6")
Weight:	
Without dome.....	2.6 kg (5.7 lbs.)
With dome.....	3.8 kg (8.4 lbs.)

Declarations

Regulatory Compliance

EMC.....	47 CFR, Part 15, Class A ICES-003 EN55022 CL. B EN61000-3-2 EN61000-3-3 AS/NZS 3548, Class A CISPR 22
Immunity	EN50130-4

Safety.....	UL1950 CSA C22.2 No. 950 EN60950 IEC 950
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FCC COMPLIANCE: This equipment complies with Part 15 of the FCC rules for 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

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MDR 08/01