Cyclical Maintenance Plan for:
Frank Lloyd Wright's Pope-Leighey House



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Table of Contents

Section 1: Introduction 1
- Executive Summary
- Purpose
- Significance of the Pope-Leighey House
- Available References

Section 2: Existing Conditions Report 11
- Introduction
- Scope of Work
- Materials and Construction
    - Exterior
    - Interior
    - Furnishings
    - Appliances
- Frank Lloyd Wright Specifications
- Maintenance Issues
- Existing Conditions Evaluation Drawings

Section 3: Annual Building Inspection 32
- Introduction
- Instructions
- Survey Checklists
- Building Inspection Report Image Survey
- Drawings

Section 4: Cyclical Maintenance Reports 71
- Documentation Methods
- 2009 Essential Projects Lists
- Housekeeping Tasks
    - Daily
    - Weekly
    - Monthly
    - Spring
    - Summer
    - Fall
    - Winter
    - Long-Term
- Approved Cleaning Methods

Section 5 In-Depth Information 83
- Definitions and Detailed Instructions
    - Concrete Slab
    - Brick

    - Exterior Cypress
    - Roof
    - Interior Cypress
    - Glass
    - Metals
    - Porcelain Fixtures
    - Screens
    - Furniture and Rugs
    - Mechanical Systems

Section 6: Supporting Information 95

- Supplies
- Equipment Replacement Map
- Stockpiled Materials
- Documentation of Stockpiled Materials
- References for Professional Conservation

Section 7: Disaster Plan 100

- Important Contact Information
- Emergency Phone Numbers
- Inclement Weather Policy
- Bomb Threats and Suspicious Objects
- Chemical Spills and Fires
- Disturbed Visitor
- Electrical Power Loss
- Employee Evacuation Procedure
- Explosions
- Fire
    - Fire Extinguishers
    - False Fire Alarm and Panel Reset
- Injuries and Illnesses
- Power Shut-Off
- Propane Shut-Off
- Salvage
- Services and Supplies
- Smoke/Heat Detectors and Horns
- Weather Emergencies
- Map of Evacuation Assembly Areas
- Map of Fire Extinguishers & Smoke/Heat Detectors
- Map of Grounds Electrical Outlets
- Map of Water Lines
- Accident/Illness Report

Appendices: Mechanical Systems and Technical Information 138

- Mechanical Systems
    - Appendix A: Class of Service to be Supplied by Potomic Power Company
    - Appendix B: Honeywell Ademco Vista Series Security Systems User's Guide
    - Appendix C: Honeywell T7200, T7300, and Q7300 Programmable Commercial Thermostats and Sub-bases
    - Appendix D: Model Lx 600 Controller
    - Appendix E: Point-of-Use Electronic Water Heater Use and Care Manual
    - Appendix F: Slant/Fin Users Information Manual, Victory VSPH Series Gas Boilers
- Frank Lloyd Wright Specifications
    - Appendix G: Building Instructions for The Usonian Type House
    - Appendix H: Building Instructions, Dwelling for Mr. and Mrs. Loren Pope: East Falls Church, Virginia

Section 1: Introduction

Preservation – "the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property...Protection, maintenance and repair are emphasized while replacement is minimized."[1]

Maintenance – Cyclical and intermittent work required to prevent deterioration in a building.

The goal of this cyclical maintenance manual is to provide a guide to preservation for the Pope-Leighey house. The manual contains information for all staff associated with the maintenance of the house. It includes checklists, inspection reports, material information and standard methods for preservation. Selected research, drawings, and a list of additional references are included for additional use. If used properly, this manual will ensure effective communication between all parties involved in the building and will bring new employees up to speed quickly and effectively.

The manual is not foolproof, and common sense and personal discretion must be used. Some sections of the manual are minutely detailed while others leave room for the readers' own judgement. If a user is unsure about any task or method, they should always ask their supervisor or contact the Graham Gund Architect of the National Trust for Historic Preservation (NTHP). This maintenance manual should be of long-term use to the site. Feedback from users is always important, and regular revisions are imperative to its continued functionality. The Graham Gund Architect maintains this document and will work with site staff to make revisions as necessary.

Executive Summary

This maintenance manual is based on research of materials, systems and processes associated with the house including personal interviews, past reports and a conditions survey. The research concludes that the house is in good repair, but in need of organized maintenance. The manual consists of seven sections which are then broken down into specific sub-sections:

Section 1: Introduction

Provides a general introduction to the practice of maintenance and the contents of this manual.

Section 2: Existing Conditions Report

Documents the condition of the house in Summer 2008. The report suggests repairs and describes ongoing problems.

Section 3: Annual Building Inspection

[1] The Secretary of the Interior's Standards for Preservation and Guidelines for Preserving Historic Buildings, available at The Secretary of the Interior's Standards for Preservation and Guidelines for Preserving Historic Buildings National Park Service, http://www.nps.gov/history/hps/tps/standguide/preserve/preserve_index.htm, accessed 5 November 2009.

Includes plans, checklists and instructions for the annual building conditions inspection. This report will be used to track changes and prioritize maintenance.

Section 4: Cyclical Maintenance Reports

Contains instruction and checklists for daily, weekly, monthly and seasonal housekeeping and building maintenance.

Section 5: Detailed Materials Information and Instruction

Provides detailed information about the elements of the building.

Section 6: Supporting Information

A collection of references, contacts, supply information, and supporting forms.

Section 7: Woodlawn and Pope-Leighey Emergency Procedures

Provides standard procedures for disaster situations on the site, contact information for emergency personnel and vital information on the site's emergency systems.

Appendices

Equipment manuals, service information, and original construction specifications.

Purpose

The manual was created with the intent to preserve the Pope-Leighey house in accordance the standards of the NTHP. The last recorded conservation philosophy was included in the section 3a of the 1992 Conservation Plan by Quinn-Evans Architects:

1. Conservation/restoration planning for the house should strive to conserve and restore the house and reconstruct its site as accurately as possible to reflect the design and construction as directed by Frank Lloyd Wright, and subsequently, as modified by the Popes, in consultation with Wright.
2. The conservation and interpretation should further strive to reflect the influence of Mr. Pope and his family as the client who was inspired by Mr. Wright's genius and who employed him, and embraced his philosophy of "Usonian" living. Mr. Pope and Mr. Wright collaborated on a number of design issues in the initial design as well as subsequent modifications.
3. Interpretation efforts should strive to present the occupancy of both the Popes and the Leighey family as the two primary owners who aspired to Mr. Wright's philosophy and ensured the long-term preservation of this National Historic Landmark. Therefore, QE/A recommends that we guide physical conservation and activities around a plan to restore the house, and reconstruct the site to approximate its condition when Mr. Wright had his last influence, around 1945 or 1946. Therefore, the focus of physical restoration activities will be the design of the house and site as executed and adapted to the Falls Church site by Frank Lloyd Wright, including modifications completed by Mr. Chadwick (Wright's site representative) and Loren Pope (with Wright's consultation).

Significance of the Pope-Leighey House

"We can rejoice, that a wonderfully simple work of an American artist is to be preserved in such a setting."[2]

The Pope Leighey House is one of the houses Frank Lloyd Wright designed in his Usonian period. In the 1930's, Wright experienced a career renaissance, more than two decades after his initial rise to architectural prominence with his nativistic Prairie Style. Rather than creating individual buildings uniquely suited to their landscape, this second act of his career was focused on defining distinctively American patterns of development. Described and illustrated in his book *Broadacre City* (1932), Wright's renderings dissolved the dense, vertical city in favor of dispersed, single-use zones, with low buildings spreading across the vast expanse of the American continent, marked by occasional, isolated, skyscrapers. After offering this larger vision, Wright turned to designing and building the individual parts of his new civilization, and gave particular attention to the problem of the affordable middle-class home. Between 1936 and his death in 1959, Wright built approximately fifty modest homes he called "Usonian," based on an alternative term for American (U.S.-onian). In 1939, journalist Loren Pope, inspired by Wright's ideas, commissioned him to build a home for his family, and worked with him to shape the building to his family's needs and budget.

The materials and assemblage of the building reflect the spirit of simplicity inherent in the Usonian vision. Wright's use of only four visible building materials (concrete, brick, cypress, glass) creates a visual harmony. The modular nature of the structure minimizes detailing while still providing infinite design flexibility. Custom-cut transoms are simple but unique. This system was then carefully set into its particular site.

After residing in their home for five years, the Popes sold it to Robert and Marjorie Leighey, who also cherished the home. Robert died in 1963, and in 1964 the house was in the way of a major highway expansion project. Mrs. Leighey led a broad campaign to save her home. In 1965 she donated the house and its furnishings to the NTHP, and the house was moved to nearby Woodlawn, one of the Trust's historic sites. Marjorie Leighey returned to live in the house from 1969 until her death in 1983, at which time it became a permanent museum. In 1995 unstable soils forced a second move to a slightly different location within the estate. By preserving and interpreting the house, the NTHP opens this building to the broader public for its education and inspiration.

[2] "Remarks of Secretary of the Interior Stewart L. Udall at the dedication of the Pope-Leighey House, June 16, 1965, Woodlawn, Virginia." Press Release available as #8 in Pope-Leighey Articles binder, Stewardship of Historic Sites Department, National Trust for Historic Preservation, 1785 Massachusetts Ave NW, Washington DC.

Available References

Drawings at the Stewardship of Historic Sites Division, NTHP
1785 Massachusetts Ave. NW, Washington DC 20036

Title	Drawn-By	Date	Location
Original Drawings			
Hemicycle Lawn	Frank Lloyd Wright Studios	June 1940	Flat Files
Standard Detail Sheet for Usonian Houses	Frank Lloyd Wright Studios	28 May 1940	Flat Files
Usonian House for Loren Pope, East Falls Church, VA	Frank Lloyd Wright Studios	May 1940	Roll Box
Lounging Chair	Frank Lloyd Wright Studios	Unknown	Flat Files
Study for Revision to Kitchen	Frank Lloyd Wright Studios	Unknown	Flat Files
Later Drawings			
The Pope-Leighey House Exhibit	Quinn-Evens	5 May 1995	Flat Files
Pope Leighey Conservation and Existing Conditions	Quinn-Evens	30 October 1991	Flat Files
Pope Leighey Field Survey Notes	Quinn-Evens	22 April 1991	Flat Files
Pope Leighey House Existing Conditions	Quinn-Evens	1 April 1991	Flat Files
Pope Leighey Typical Sections	Law Engineering	15 March 1990	Flat Files
Pope-Leighey Survey	Donald F. Mori P.C.	1 January 1987	Flat Files
Loren Pope as-Built Drawings (1 of 6)	National Park Service	20 July 1964	Flat Files
Loren Pope as-Built Drawings (6 of 6)	National Park Service	20 July 1964	Flat Files
Loren Pope as-Built Drawings (full set)	National Park Service	20 July 1964	Flat Files
Usonian House	National Park Service Student Summer Team	1964	Flat Files
Pope-Leighey House Exhibit at Woodlawn	Dewberry/Davis	12 April 1995	Flat Files
Pope-Leighey House Exhibit at Woodlawn - Planting Plan	Quinn-Evens	15 March 1995	Flat Files

Landscape Drawings			
Proposed Driveway Grading Plans	Dewberry/Davis	1 March 1995	Flat Files
Proposed Sewer to Serve Woodlawn Plantation	Donald F. Mori P.C.	August 1987	Flat Files
The Gifts of Fredrick Froebel	M.J. Mosca	October 1974	Flat Files
"The Gifts" Sketches	M.J. Mosca	not known	Flat Files
Planting Plan and Revision to steps	Kane Carruth and O'Brian P.C.	1 May 1972	Flat Files
Planting Plan	Kane Carruth and O'Brian P.C.	2 June 1971	Flat Files
Site Work and Grading Plan	Kane Carruth and O'Brian P.C.	26 May 1971	Flat Files
Study For Driveway	Kane Carruth and O'Brian P.C.	30 April 1971	Flat Files
Woodlawn Sign E.	Design and Production Inc.	29 July 1965	Flat Files
Topographic Survey	R.W. Berry Civil Engineering	26 August 1947	Flat Files
General Design Plan For Mr. and Mrs. Robert Leighey	Rose Greeley	1 December 1941	Flat Files
Woodlawn Plantation Topography	U.S. Dept. of the Interior	unknown	Flat Files
As-Built Plot Plan	Greg Morrison	unknown	Flat Files

Reports and Studies at the Stewardship of Historic Sites Division, NTHP
1785 Massachusetts Ave. NW, Washington DC 20036 (06/06/09)

Title	Author	Location	Date
"Back Page," *Where Washington*, 88	Cohen, Jean Lawlor	Pamphlet	1 March 1999
Building with Frank Lloyd Wright	Jacobs, Herbert	Reference	31 May 2005
Conservation Plan for Frank Lloyd Wright's Pope-Leighey House, Programming and Schematic Design Report	Quinn Evans/Architects	Reference	8 January 1992
Core Staff Emergency Procedures Woodlawn Plantation and Pope-Leighey House	unspecified	Pamphlet	unknown
Finding Guide to the Archival Holdings of Pope-Leighey House	Obien, Rodney	Reference	1 January 1996
"A Frank Lloyd Wright House for the People," *House Beautiful*	Pope, Lauren	Pamphlet	1 February 1992
Frank Lloyd Wright Pope-Leighey House Programming and Schematic Design	Quinn/Evans Architects	Reference	14 June 2005
Frank Lloyd Wright's Hanna House: The Client's Report	Hanna, Paul R., Jean S Hanna	Reference	1981
Frank Lloyd Wright's Pope-Leighey House, Promotional Brochure	NTHP	Pamphlet	1 February 1988
Frank Lloyd Wright's Pope Leighey House, Reprint of "Re-Creating Wright" *Architecture* 88:8, 126-133	Sullivan, Ann C.	Pamphlet	1 August 1997
Frank Lloyd Wright's Pope-Leighey House: An Historic Structure Report, Part I: Historical Analysis and Existing Conditions	Lipman Davis Architects	Reference	9 June 2005
Frank Lloyd Wright's Pope-Leighey House Programming and Schematic Design Draft	Quinn/Evans Architects	Reference	8 January 1992
Frank Lloyd Wright's Pope-Leighey House: Site Investigation	Lipman Davis Architects	Pamphlet	22 August 1988
Interpretive Outline for the Frank Lloyd Wright Usonian House (Pope-Leighey House)	unspecified	Reference	unknown
Looking For Mr. Wright	Cohen, Jean	Reference	21 June 2005
"The Odd Couple," *Historic Preservation* 46:2, 56-65	Pretzer, Michael	Pamphlet	March/April 1994

Pope-Leighey Articles	Various	Reference	Various
Pope-Leighey Correspondence and Articles	unspecified	Reference	unknown
Pope-Leighey Historic Structure Report	Lipman Davis Architects	Reference	9 June 2005
"The Pope Leighey House," *Historic Preservation* Special Issue on Pope-Leighey House 21:2-3	NTHP	Reference	April-September 1969
Pope Leighey House - Promotional Pamphlet	NTHP	Pamphlet	18 June 2005
"The Pope Leighey House," Reprint of *Historic Preservation* Special Issue	NTHP	Reference	5 June 2005
"The Pope-Leighey House: An Interview with Lauren Pope," *National Building Museum Blueprints* 24:3, 3-7.	Reiss, Steven M. A.I.A.	Pamphlet	Summer 2006
Pope-Leighey House Annotated Photographic Record of Existing Conditions	Quinn/Evans Architects	Reference	27 June 1991
Pope-Leighey House Historic American Building Survey Photographs, Written Historical and Descriptive Data	Historic American Building Survey	Reference	17 May 2005
Pope-Leighey House Oral History	Beasley, Ellen, Oobie Gleysteen, Majorie Leighey, Celeste Moore, Terry B. Morton, Pearl Thompson	Reference	21 May - 10 July 1969
Pope-Leighey House Reconstruction and Restoration, Construction Budget/Schedule/Minutes	Quinn/ Evans Architects	Reference	17 June 2005
Pope-Leighey House Heritage Conservation and Recreation Service Development Project Completion Reports	The National Trust	Reference	1971, 1975-78
Pope-Leighey House Valuation	Maryland Casualty Company	Pamphlet	1 January 1974
Pope-Leighey Insurance Assessment	Albers, Rick of Chubb Group of Insurance Companies	Reference	20 November 1998
Pope-Leighey Relocation Drawings	Quinn/ Evans Architects	Pamphlet	17 June 2005

"Re-Creating Wright" *Architecture* 88:8, 126-133	Sullivan, Ann C.	Pamphlet	1 August 1997
School Programs at Woodlawn & Pope-Leighey House, Promotional Brochure	NTHP	Pamphlet	23 June 2005
Specifications for the Pope-Leighey House, Final Submission	Quinn/Evans Architects	Reference	5 May 1995
Taliesin Documents Lauren Pope House	Wright, Frank	Reference	unknown
Woodlawn & Pope-Leighey House Special Events and Workshops, Promotional Brochure	NTHP	Pamphlet	unknown
Wright-Sized Houses: Frank Lloyd Wright's Solutions for Making Small Houses Feel Big (signed)	Maddex, Diane	Reference	25 June 2005
"Wright's Pope-Leighey House," *The Prairie School Review* 4:4, 20-26	Morton, Terry Brust	Pamphlet	Fourth Quarter, 1967

Drawings at Woodlawn Plantation
Location - Flat Files, Woodlawn (05/15/08)

Title	Author	Location	Date
Original Drawings			
Sheet 1 General Plan	Frank Lloyd Wright Studios	Flat Files	May 1940
Sheet 2 Elevations	Frank Lloyd Wright Studios	Framed	May 1940
Sheet 3 Roof Plans	Frank Lloyd Wright Studios	Flat Files	May 1940
Sheet 4 Sections	Frank Lloyd Wright Studios	Flat Files	May 1940
Sheet 5 Millwork Details	Frank Lloyd Wright Studios	Flat Files	May 1940
Plot Plan	Frank Lloyd Wright Studios	Flat Files	Jun 1940
Mill Schedule	Frank Lloyd Wright Studios	Flat Files	Unknown
Later Drawings			
Pope-Leighey House Modification to Brick Steps and Walls	Kane, Carruth and O'Brian. P.C.	Flat Files	Aug 1971
Planting Plan	Kane, Carruth and O'Brian. P.C.	Flat Files	2 June 1971
Site Work and Grading Plan	Kane, Carruth and O'Brian. P.C.	Flat Files	May 1971
Sketches of Planting Plans	Kane, Carruth and O'Brian. P.C.	Flat Files	Unknown
Landscape Drawings			
Home of Mr. and Mrs. Robert Leighey Topographic Plans	R.W. Berry Civil Engineers	Flat Files	26 August 1947
General Design Plan For Mr. and Mrs. Robert Leighey	Rose Greely L.A.	Flat Files	23 June 1947
General Landscape and Grading Plan	U.S. Department of the Interior	Flat Files	1 July 1964
Site Plan Pope-Leighey House	U.S. Department of the Interior	Flat Files	14 July 1964
Access Road Plan/Section	U.S. Department of the Interior	Flat Files	14 July 1964
Structural Repairs typ. Details (sheet 3)	James Madison Cuts, Structural Eng.	Flat Files	20 Sept. 1978
Structural Repairs General Plan (sheet 1)	James Madison Cuts, Structural Eng.	Flat Files	20 Sept. 1978

House for Mr. and Mrs. Robert Warren, Design for Table Lamp	Taliesin Associates	Flat Files	Unknown
Relocation of Loren Pope House to Woodlawn (sheet 1 plot plan)	William Wesley Peters	Flat Files	Unknown
Relocation (Sheet 2 Mat Plan)	William Wesley Peters	Flat Files	Unknown
Relocation (Sheet 3 General Plan)	William Wesley Peters	Flat Files	Unknown
Relocation (Sheet 4 Elevations)	William Wesley Peters	Flat Files	Unknown
Relocation (Sheet 5 Sections)	William Wesley Peters	Flat Files	Unknown
Relocation (Sheet 6 Roof Frame)	William Wesley Peters	Flat Files	Unknown
Relocation (Sheet 7 Millwork)	William Wesley Peters	Flat Files	Unknown
Relocation (Sheet 8 Cabinet Work)	William Wesley Peters	Flat Files	Unknown
Relocation (Sheet 9-10 Specs)	William Wesley Peters	Flat Files	Unknown
Sketches for Restoration and Relocation	Unknown	Flat Files	Unknown

Section 2: Existing Conditions Report

Introduction

This report documents the existing conditions of Frank Lloyd Wright's Pope-Leighey House. Although appearing quite similar to the original structure, much of the building is not historic. The masonry, foundation, and concrete floors were replaced in the 1965 and 1995 moves, so only the cypress, fenestration, and hardware are original to the structure. Additional structure was also added to walls and shelves in the last move.

Scope of Work

This section presents the existing condition of the Pope-Leighey House as of summer 2008. It includes both exterior and interior conditions, but does not address landscape or collections items which are not integral to the house. Repairs and maintenance strategies suggested by staff are recorded with their respective issues.

Materials and Construction

This information is compiled from the Lipman Davis Architects 1981 Historic Structure Report and the 1995 construction drawings by Quinn-Evans Architects. For more information refer to the 1995 specifications by Quinn-Evans Architects.

Exterior

Foundation (1995)

- Footings – 1'8" x 1', bottom of footing set 3' below grade, reinforced with (2) continuous 4/8" reinforcing bars.
- Foundation Wall – 1'2" thick concrete with 2" rigid insulation, inset with single-wythe brick veneer and 2" rigid insulation from approximately 4" below grade to rowlock course meeting top of slab.
- Slab on Grade – 5" thick concrete with 3/8" reinforcing bars at 3" on center, topped by a 2" colored concrete slab. Heating coils (some original, some replacement to match), set into slab for radiant heating system.
- Insulation- 2" rigid
- Vapor Barrier- 6 millimeter polyethylene
- Base- 6" gravel on 2'-0" of fill
- Brick Planters – Brick, set into foundation walls, lined with copper

Brick Walls (1995)

- Brick- red 2 ¼" x 7 7/8"x 3 5/8" face brick, double wythe, grouted in center. Vertical joints raked concave and flush with matching red mortar. Horizontal grout recessed ½" with grey mortar.

Wood Walls (1939)

- Core-3/4" marine grade plywood with building paper on either side.
- Siding- tidewater red cypress board and batten with 2" joints, attached to core at both interior and exterior.

- Base - tidewater red cypress at exterior
- Hardware- all exposed hardware is cadmium plated brass (original or matched) or steel
- Reinforcement- walls reinforced with 4"x 4" steel angles attached below topping slab.
- Exterior Finish- Originally waxed, later stained and rewaxed, currently raw

Casement Windows (1939)

- Frame- perforated tidewater red cypress, 9/16" thickness
- Bracing- tidewater red cypress fins
- Hardware- Cadmium plated brass or steel
- Blocking- tidewater red cypress where exposed, otherwise, southern yellow pine
- Glass- 1/8" or 1/4" plate glass

Wood Framed Glass Doors (1939)

- Door Panel- refurbished tidewater red cypress (all doors 1'-10 ½"x 6'-7 ¼"x 1 ¼")
- Hardware- brass or steel piano hinges
- Threshold- copper "Z" threshold anchored in concrete
- Seal- neoprene gasket
- Glass- 1/8" or 1/4" clear plate glass

Roof (1939, 1995)

- Fascia- tidewater red cypress
- Membrane- 3-ply built-up roofing
- Sheathing- ¾" marine-grade plywood
- Blocking-southern yellow pine
- Structural Members- LVL engineered wood
- Vapor Barrier- unspecified
- Flashing- steel
- Cover- white pea gravel
- Entry Porch Ceiling- tidewater red cypress
- Insulation- R-21 batt insulation
- Drain- original copper rain scuppers on exterior, new cast iron rain leaders on inside of cast iron. PVC is used where the leader goes through steel beams to avoid galvanic action.

Fascia/Trellises/Trim (1939, 1995)

- Wood- tidewater red cypress
- Hardware- small galvanized nails and screws
- Finish- residual finish left from 1995 restoration

Brick Paved Entry (1995)

- Brick-red 2 ¼" x 7 7/8"x 3 5/8" face brick, running bond, grouted flush with typical grey mortar
- Base- Concrete

Brick Paved Patio (1995)

- Brick-red 2 ¼" x 7 7/8"x 3 5/8" face brick, running bond, no grout
- Base- sand

Screened Porch (1939, 1995)

- Slab – waxed, tinted concrete
- Framing – 2" x 4" cypress at wall and ceiling
- Copper screening and screws on porch
- Copper tubing, painted Cherokee red

Retaining Wall (1995)

- Exterior Face- red brick with matching mortar (see drawings for coursing patterns and mortar details)
- Insulation- 2" rigid
- Waterproofing- not specified
- Footing- typ. concrete w/ #4 rebar
- Drain- 4" perforated pipe w/gravel

Interior

Floor (1995)

- Waxed, scored tinted concrete in living spaces
- Brick grouted flush with gray mortar to match entry in vestibule
- Untreated concrete in mechanical room
- Slab not scored in bathroom

Brick Walls (1995)

- See exterior

Wood Walls (1939)

- Waxed tidewater red cypress board and batten

Ceiling (1939)

- Waxed tidewater red cypress panels

Bookshelves

- Shelf- tidewater red cypress
- Bracing – steel angle and welded plates, galvanized screws
- Hardware- brass

Fireplace

- Hearth- red brick
- Base- rowlock red brick with recess for grate
- Back Wall- fire brick painted red

- Other Walls- red brick
- Flue/ Chimney- double wythe brick (fire brick inside, red brick outside)
- Damper- metal, unspecified
- Flashing- copper
- Grate- iron

Floor Grilles
- Frame- Steel concrete-embedded angle w/cross-bars at 4" on center
- Grille -¼" close-mesh steel grille with kynar finish to match stained concrete

Lighting
- Blocking/Casing- tidewater red cypress
- Receptors- stainless steel for Lumiline fixtures, porcelain for others

Stove
- Finish- white enamel
- Knobs/Handles- chrome finish
- Eyes-wide coils (one non-matching replacement)

Sinks
- Bowl-cast iron with ceramic coat
- Faucets- Chrome finished steel
- Drain- Steel Pipe

Bathtub
- Bowl- cast iron with ceramic coat
- Faucets- Steel with chrome finish
- Soap dish- Steel with chrome finish
- Drain- steel intake and pipe

Toilet
- Bowl- cast iron with ceramic coat
- Handle- chrome finish

Notes
- All exposed metal other than copper flashing and brass/steel hardware is painted (kynar) to match its surrounding material.
- Sprinkler heads are recessed and covered (factory finished Kynar).

Furnishings

Frank Lloyd Wright Designed Furniture
- Living Room
    - Bookshelves

    - 2 Small End Tables - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
    - 1 Chair - 9/16” 3-ply plywood and cypress veneer, solid cypress trim, original cushions.
    - 1 Ottoman - 9/16” 3-ply plywood and cypress veneer, solid cypress trim, original cushions.
    - 2 Large Tables - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
- Kitchen
    - 2 Kitchen Cabinets- 9/16” 3-ply plywood and cypress veneer.
- Dining Room
    - Bookshelves
    - 3 Large Tables - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
    - 4 Chairs - 9/16” 3-ply plywood and cypress veneer, solid cypress trim, original cushions.
- Sanctum
    - Bookshelves
    - 1 Large Desk - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
    - 1 Chair - 9/16” 3-ply plywood and cypress veneer, solid cypress trim, original cushions.
- Children’s Bedroom
    - Bookshelves
    - 1 Large Table - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
    - 1 Bed Frame- 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
- Master Bedroom
    - Bookshelves
    - Closets- solid cypress with steel reinforcement.
    - 1 Large Desk - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
    - 2 Bed Frames - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.

Replica Furniture

- Living Room
    - 8 Chairs - 9/16” 5-ply plywood and cypress veneer, solid cypress trim, cushions.
- Entry Porch
    - 1 Table - 9/16” 5-ply plywood, solid wood trim.

Appliances

- Alarms System- Honeywell Ademco Vista Series
- Boiler- Slant/Fin Victory VSPH Series Gas Boiler
- HVAC
    - Thermostat- Honeywell
- Radiant Heating
    - Pipes – cast iron and plastic(in-floor)
    - Pump-Lexington model LX-600
- Sprinkler System- Virginia Sprinkler
- Smoke Alarm- Watchguard/ADT
- Water Heater

Frank Lloyd Wright Specifications

From the letter "Dwelling for Mr. and Mrs. Loren Pope: East Falls Church, Va: Frank Lloyd Wright, Architect" and drawings by Frank Lloyd Wright Studios. Also from specifications written by Frank Lloyd Wright for typical Usonian houses and for the Pope-Leighey house.

Concrete

- Grid system (scoring)
- Red dye on top layer, red wax

Brick

- Red, paving or sand-molded approved
- Matching color for mortar
- Horizontal joints ½" wide and raked ¾" deep

Wood

- 7/8" sheathing or plywood core
- boards of fir or sugar pine (also cabinets and doors)
- Battens of redwood or walnut
- Framing of common stock, #2 or #3 2"x4" 's
- Shiplap roof sheathing

Glass

- Polished plate set in vulcatex mastic (asbestos caulk)

Metal

- Exposed brass in walls
- Copper flashing
- Zinc lining in flower boxes

Construction notes

- Zero-Board used for wall core
- Leftover cypress used for closet doors, doors are not intended to close fully
- Electrical plates of brass
- All hardware in brass, cadmium finish for exteriors
- 6-page construction set, including standard details
- 1-3/4" wrought iron coils
- 2-3" slab on grade
- entry hall floor of brick pavers
- drywall footing

Maintenance Issues

Exterior

Condition- The flat built-up tar roof on the house was installed in 1995. Quinn-Evans Architects specified the current 3-ply tar roof rather than a membrane roof because membranes were not walkable at the time. The trade-off for the walkability of the built-up tar roof is the fact that it must be inspected and repaired at regular intervals. The roof has not been professionally inspected since its initial installation. It has several leaks, including one over the desk which damaged some books.



Figure 1: Ponding water on roof (NTHP).

Recommendation – Staff must clean out the roof drains and use butyl caulk to seal flashing cracks on a regular basis. Roof technology now offers several walkable roof membrane options. These should be researched when the roof is scheduled to be replaced in 2015.



Figure 2: Water on roof (NTHP).

Drains
Condition- Drains work effectively, but become clogged with organic material frequently, leading to standing water and interior leaks.

Recommendation- Staff must clear the drains after every rain. A professional inspection is needed to assure the roof's soundness.



Figure 3: Drains clogged with debris (NTHP).

Flashing
Condition- The flashing on the exterior of the roof was installed with steel rather than the specified copper. Cracks between the eave flashing sections have caused water infiltration in several places, including the north wall of the Child's Bedroom. There is noticeable ponding on the roof over the bedroom area.

Recommendation- Staff must inspect the eave and roof flashing frequently and use butyl caulk to seal any cracks that develop.



Figure 4: Steel flashing (NTHP).

Exterior Cypress

Condition- In his Usonian houses, Frank Lloyd Wright typically specified that the figure and grain of wood be visible to create a continuity between interior and exterior. The house was initially covered with a paste wax. In 1986 “cabots clear penta, with raw sienna and burnt umber added for silver color” was applied after the replacement of some panels *(Historic Structure Report, 86*). During the 1995 move, the cypress was treated with a gentle wax treatment. This finish has been largely worn away and the wood is wearing irregularly, raw and spots which are exposed to heavy wind and rain.



Figure 5: Uneven wood exposure (NTHP).

Recommendation- In 2009, the NTHP was developing a plan for a more durable protective treatment.

Chimney

Condition- There is no chimney cap, leaving allowing rain and debris into the house through the shaft. As a result, the chimney brick has some efflorescence on the interior. It can be cleaned, but returns again.

Recommendation- Add a copper cap.



Figure 6: Open chimney (NTHP).

Patio

Condition- Water collects in a low spot near the living room wall, and moss is currently growing in the damp section. Moss or algae also appears more prevalent on the walls near this ponding water.

Recommendation- The pavers are not mortared in this area, so they could be lifted, sloped and re-set to improve drainage.



Figure 8: Water and moss on patio (NTHP).

Landscape

Condition- The landscape directly around the house is well maintained, though some plants have died due to lack of water. The surrounding landscape of Woodlawn, however, needs attention, and some of the paths to the Pope-Leighey house are grown over.

Recommendation- The landscape is being evaluated as a portion of a larger Woodlawn Save America's Treasures grant.



Figure 9: Patio in landscape (NTHP).

Moisture from Plants

Condition- The plants in the planters can grow up to the cypress siding, trapping moisture against the wood and speeding the development of mold and rot.

Recommendation- Keep plants trimmed so that they do not contact the wood siding.



Figure 10: Damp siding adjacent to plants (NTHP).

Insects

Condition- Carpenter bees are actively boring into the eaves; the staff has not been able to find a spray which will deter the bees so they have been regularly filling the holes with expandable foam and patching the exterior with hand-cut mahogany plugs. Evidence of other non-damaging, though unsightly, insects is present.

Recommendation- Records indicate that Perma-Treat of Woodbridge, Virginia, treated the house until 2007 when their services were terminated. There is no record of any other pest service since then, so it can be assumed that the house has been untreated for at least two years. A pest service should be hired as soon as possible. An alternative method for killing bee larvae (other than expandable foam) should be considered.



Figure 11: Boring insects at roof level (NTHP).

Floors

Condition- Cracks have shown up in the floor but they appear to only be surface cracks and are not actively expanding. They are clustered around the under-slab heating coils, so it is likely that they developed because the contractor set them too high, rather than because of ground heave. There is currently no wax on the floor, so the finish is somewhat dull.

Recommendation- Monitor the cracks for expansion and evaluate yearly for filling. Re-wax floor.



Figure 12: Floor cracks (NTHP).

Doors

Condition- All exterior doors are lightly built, with thin, untreated cypress stiles and rails enclosing large panes of glass. They are worn and in constant need of re-gluing, nailing and shimming. The hardware is also in need of constant maintenance. The glass doors forming a corner at the northeast corner of the dining area are the most badly warped, bowed almost ½", causing the latches to require shims to operate.

Recommendation- At some point, however, some will need to be removed and pressed or steamed straight. The Virginia Tech School of Architecture in Alexandria has expressed an interest having their students to do minor repair work in their shop. For more info call Jonathan Foote at the WAAC center in Alexandria, (703-706-3003). Notify the Graham Gund Architect before undertaking repair work.When wood treatment plan is developed, consider removing, treating and re-framing original wood members.



Figure 13: Wear and warping at corner doors (NTHP).

Windows

Condition- Similar to the lightly-built doors, the windows are warping and splitting.

Recommendation- See Door recommendations.



Figure 14: Warping windows (NTHP).

Kitchen Door
Conditions- The folding kitchen door attachment has pulled loose from the wall.

Recommendations- Door is currently wired partly shut to prevent pulling on the attachment. The door needs to be removed and re-mounted to the wall before it can be opened and closed.



Figure 15: Kitchen door attachment to wall (NTHP).

Thresholds
Condition- The current door thresholds are of felt and copper. Many have become dislodged from their channel.

Recommendation- Although this threshold type is historically accurate, they are not visible unless they become detached and could be replaced by a more modern assembly. Quinn-Evans provided a more durable threshold assembly detail for the 1995 restoration.



Figure 16: Deteriorating threshold (NTHP).

Front Door Lock
Condition- The hardware of the front door is deteriorating due to its frequent use. This damage, taken with wear at the upper latch pocket makes it possible to pull open the front doors when they are locked.

Recommendation- Improved security method must be developed.



Figure 17: Front door latch (NTHP).

Light Fixtures

Condition- The light fixtures are constantly in need of adjustment, and the light boxes must be removed to check the insulation. The cypress ceiling panels are tongue-and-groove and are difficult to remove. There are 4 tubular incandescent bulbs in the kitchen and other utility spaces. The 6 incandescent bulbs in the cove lighting in the living room currently get warm enough to char the adjacent wood.

Recommendation- The tubular incandescent bulbs and caps can be purchased from several specialty light bulb companies. It might be prudent, however, to stockpile extra bulbs in case they cease to become available. Where bulbs are not visible, replace incandescents with CFL's which will be more efficient and cooler.



Figure 17: The plank ceiling with removable light box (NTHP).



Figure 18: Tubular incandescent bulb (NTHP).

Bathroom Fixtures

Condition- The fixtures in the bathroom are in general need of upkeep. The bathtub is discolored due to constant dripping. The bathtub appears to only have surface stains, and the stainless steel hardware is minimally corroded. There is a significant loss of enamel in the sink, with rust stains and raw ceramic in some locations.

Recommendation- Enamel fixtures should never be re-finished. Rather, precautions should be taken to avoid further rust or loss. Fix all drips or leaks immediately, and follow the gentle cleaning methods outlined in Section 4 of this manual.



Figure 19: Rusting sink (NTHP).

Appliances
Conditions- One of the stove burners has been replaced with a modern coil, which stands out from the 40's era stove. The refrigerator does not work, although its repair has been evaluated.

Recommendations- It is advisable to leave all appliances in the house non-operable. Find a historic, matching coil to replace the newer one.



Figure 20: Stove with mismatched coil (NTHP).

Furniture
Condition- There are a handful of replica pieces, but most of the furniture in the house is original and in good repair. There is, however some concern about the fading of the furniture due to exposure to sunlight (particularly the three tables in the dining area).

Recommendation- Undertake a study analyzing the impact of UV film.



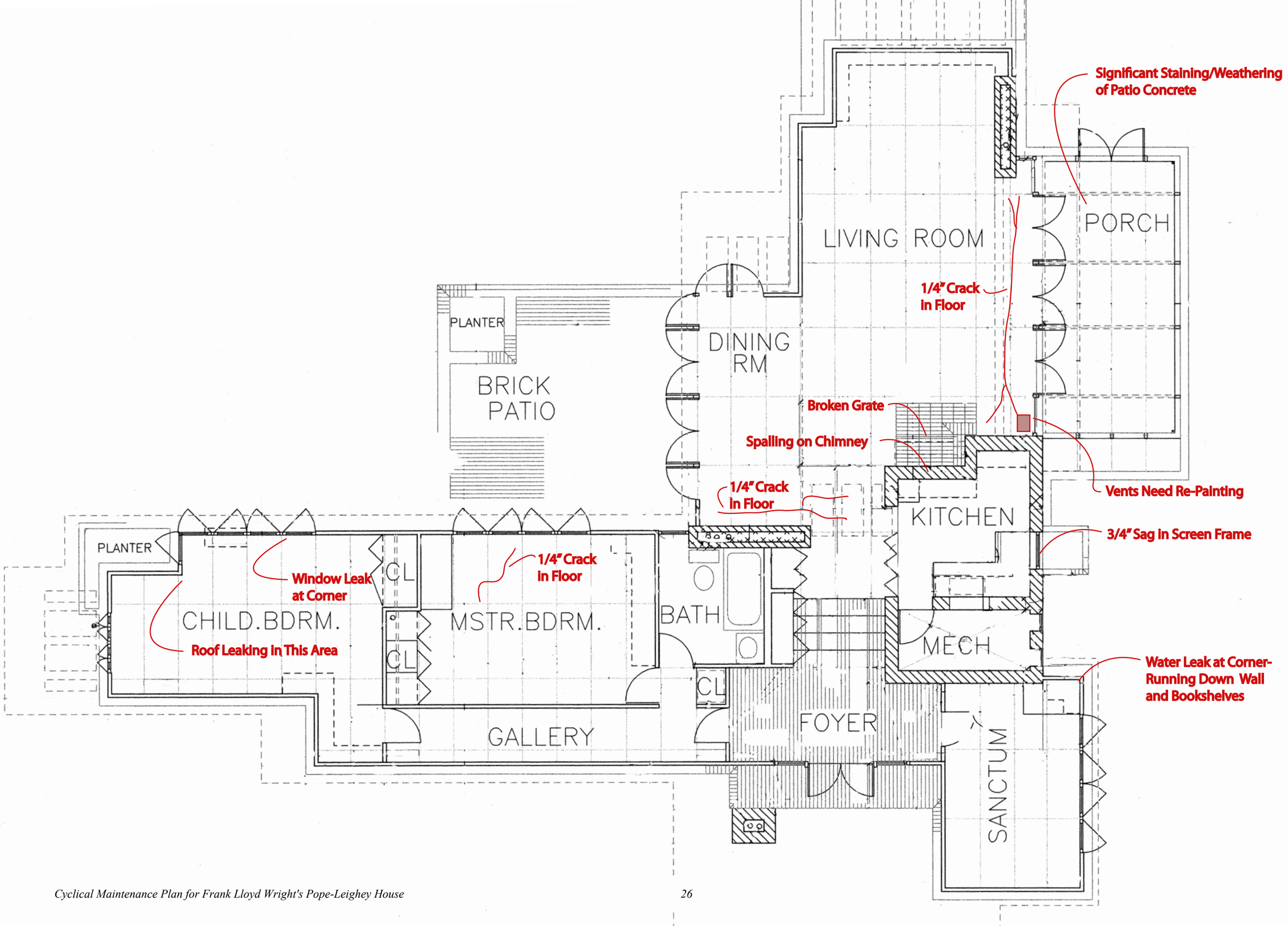
Figure 21: Furniture exposed to sunlight

Drawings
Condition- The original Wright drawings for Pope-Leighey house, especially the details, are still used to make decisions about repair.

Recommendation- Since the copies are of unreadable quality, legible copies of the drawings should be made for regular use. If the copies can be used, originals would not be damaged by handling.



Figure 22: Original blueprints (NTHP).



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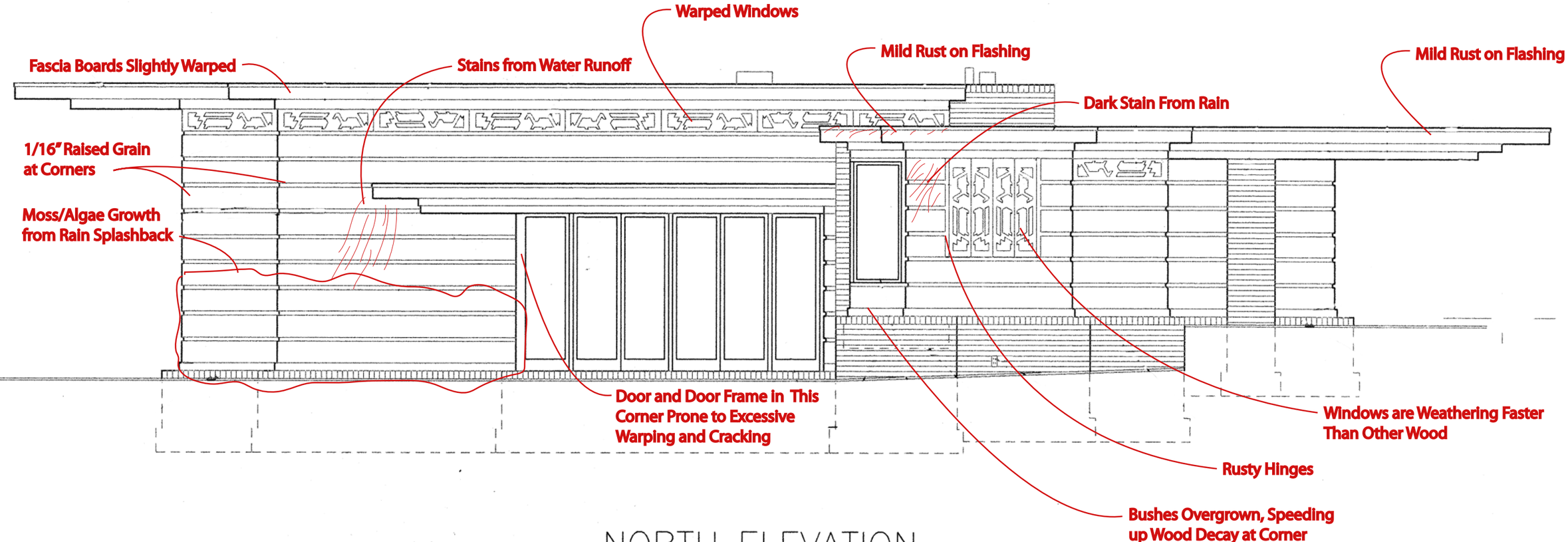
Floor Plan
Not to Scale

Frank Lloyd Wright's Pope-Leighey House
Existing Conditions Evaluation, 08/05/08

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Roof Plan
Not to Scale

Frank Lloyd Wright's
Pope-Leighey House
Existing Conditions Evaluation, 08/05/08

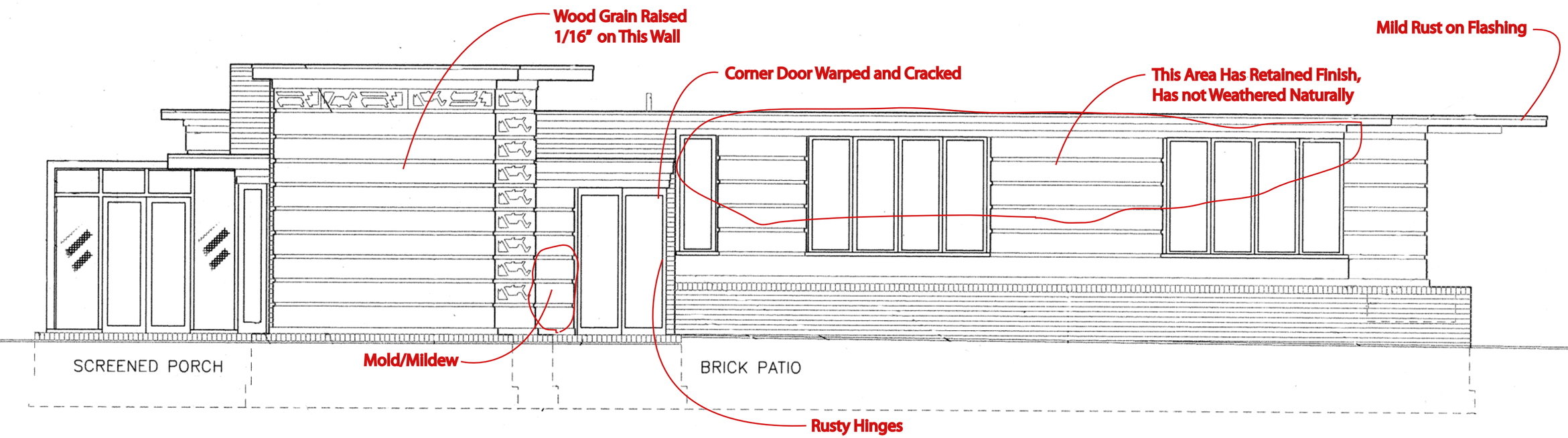


NORTH ELEVATION

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North Elevation
Not to Scale

Frank Lloyd Wright's
Pope-Leighey House
Existing Conditions Evaluation, 08/05/08

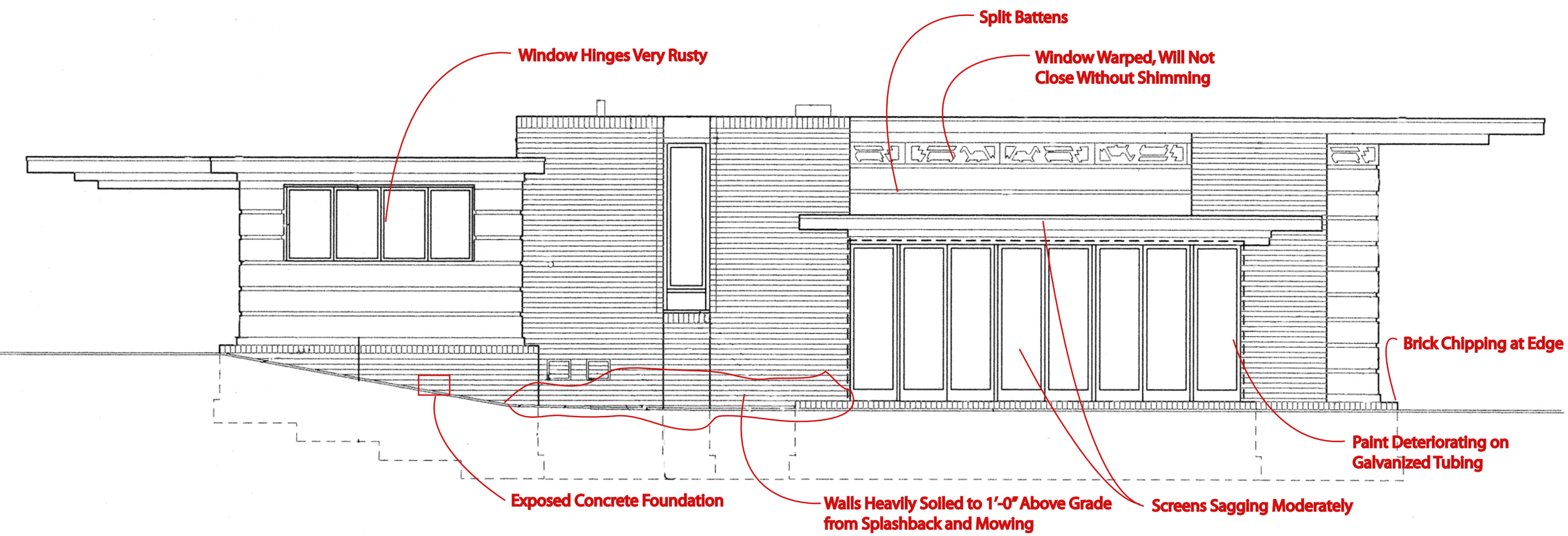


EAST ELEVATION

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East Elevation
08/05/08

Frank Lloyd Wright's
Pope-Leighey House
Existing Conditions Evaluation, 08/05/08

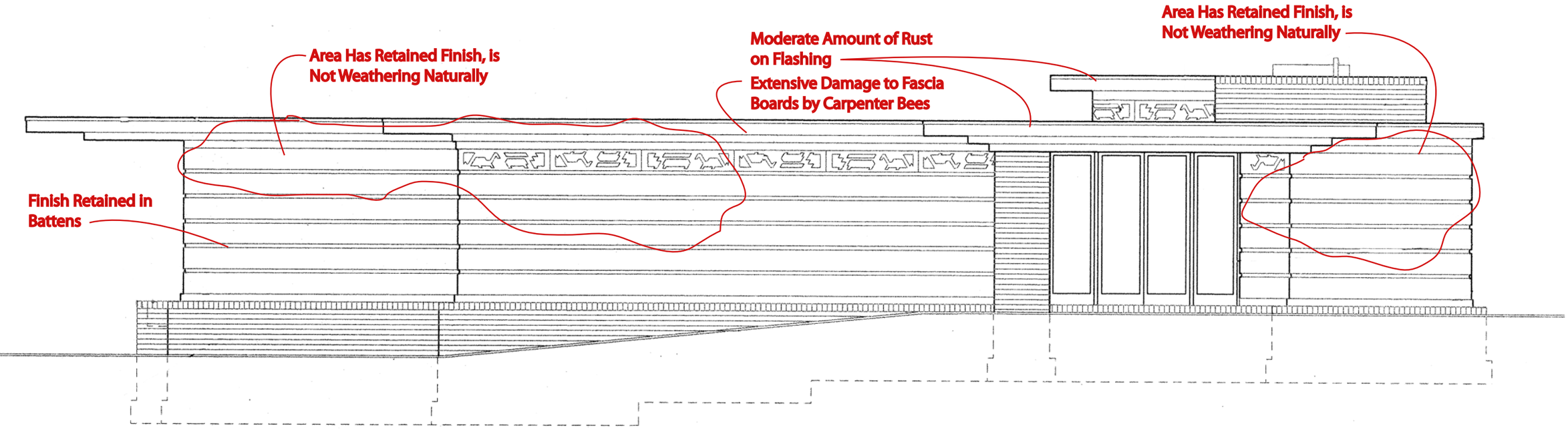


SOUTH ELEVATION

NATIONAL TRUST FOR HISTORIC PRESERVATION®

South Elevation
Not to Scale

Frank Lloyd Wright's Pope-Leighey House
Existing Conditions Evaluation, 08/05/08



WEST ELEVATION

NATIONAL TRUST FOR HISTORIC PRESERVATION

West Elevation
Not to Scale

Frank Lloyd Wright's
Pope-Leighey House
Existing Conditions Evaluation, 08/05/08

Section 3: Annual Building Inspection

The annual building inspection is a thorough inspection of the Pope-Leighey House and its immediate grounds. A completed report should provide a complete understanding of the house's current condition. This thorough inspection should be conducted each year to assist with the capital project and maintenance decisions for the upcoming year. The inspection should be completed by the buildings and grounds superintendent and given to the executive director for critique and distribution.

Items needed for building inspection:

- Last year's inspection report
- Plans, elevations
- Pens and pencils
- Flashlight
- Digital camera
- Small mirror
- Ladder
- Small knife or flat-head screwdriver

Instructions

Complete the checklist, indicating condition and any relevant comments. Indicate particular problem areas on floor plans and elevations. This annual survey also involves taking photos at indicated locations in order to track deterioration and general conditions over time. Take digital photos at the locations indicated on the plan, matching them to the numbered shots on the survey. These photos should be downloaded in .jpeg format, each renamed thusly; "#(Year)". Each year, these photos should be burned onto a CD. Once the checklists, drawings, and images have been completed, submit them to the director, who will distribute them appropriately. These forms and processes (particularly the image survey) should be frequently revised to better suit the Pope-Leighey House's unique conditions.

Suggested Subjects for Inclusion in the Annual Maintenance Report:

- Were all instructions for maintenance carried out?
- Were all "essential projects" for this year carried out as planned?
- What additional maintenance was required this year?
- What changes/problems have arisen?
- How effective was the "cyclical maintenance plan". What needs to be changed?
- Has there been any change of staff?
- Have any emergencies occurred?
- Is there any reason maintenance inspections or checklist should be used more or less often?

Building Inspection Report - Grounds

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Trees: Check trees for broken or weak branches, note any trees which appear to be dying.				
Path: Check paths for debris and proper ground cover.				
Planters: Check for plants in contact with house.				
Hazardous Conditions: Note any conditions, such as bee nests or poison ivy, which might be hazardous to guests.				
General: Evaluate overall condition of landscape.				

Building Inspection Report - Entry Porch

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Grout: Document cracked or missing grout at edges. Evaluate for re-pointing.				
Brick: Inspect for new cracks, stains, and wear. Look for loose sand or tilting. Look for missing corners, edges, and spalling. Document new findings.				
Salt Damage: Have bricks been damaged by salt use? Flaking or other surface damage may indicate salt use.				

Building Inspection Report - Patio

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Grout: Document cracked or missing grout. Evaluate for re-pointing.				
Brick: Inspect for new cracks, stains, and wear. Look for loose sand or tilting. Look for missing corners, edges, and spalling. Document new findings.				
Salt Damage: Have bricks been damaged by salt use? Flaking or other surface damage may indicate salt use.				
Planter: Check mortar, conditon				

Building Inspection Report - Foundation

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Runoff: Check that ground water is properly diverted away from the building.				
Foundation: Note any areas which are visible. Check foundation for cracks, shifting or other signs of instability.				
Exposed Brick: Examine for cracks. Look for biological growth.				

Building Inspection Report - Brick Exterior Walls

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Grout: Document cracked or missing mortar (flush red verticals, recessed grey horizontals). Evaluate for re-pointing.				
Brick: Inspect for new cracks, stains, and wear. Look for missing corners, edges, and spalling.				
Brick: Are walls in plumb?				
Brick: Indicate areas of water infiltration.				
Brick: Note heavily soiled areas. Note lawnmower damage.				

Building Inspection Report - Exterior Siding

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Weathering: Is the wood weathering equally? Check for areas where the wood is worn heavily (raised grain), note on elevations.				
Deterioration: Are certain areas rotted or damaged (note on elevations), have repaired areas maintained their integrity?				
Finish: On elevations, note wax buildup or yellowing, deterioration, discoloration.				
Nails and screws: Are all nails and screws in place and sunk? Are all screw slots oriented horizontally?				
Alignment: Is board-and-batten siding still joined tightly?				
Attachment: inspect all joints between different materials, roof, and door frame. Note all gaps or cracks.				

Building Inspection Report - Screened Porch

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Concrete: Document new cracks or expanding old ones, general conditions				
Walls				
Framing: Document condition of wood framing, note water damage				
Screens: Note rips, places where screening has become detached.				
Ceiling				
Framing: Document condition of wood framing, note water damage				
Screens: Note, rips, places where screening has become detached.				

Building Inspection Report - Exterior Doors

Door	Aspect for Examination								Comments
Ratings: S= Stable F= Fair									
	General: Check alignment in frame. Examine for proper fit and operation. Look for condensation on door. Look for signs of dampness and leakage.	**Screen:** Check for corrosion, sag or damage.	**Flashing:** Inspect for rust, cracks, pits, loose or missing flashing.	**Frame:** Document wear from moving parts and human contact. Assure frame is square or aligned with door. Check for condensation on interior.	**Glass:** Inspect glass for bowing, warping, cracks, and chips.	**Hardware:** Inspect for signs of holes, pitting, cracking and rust. Look for areas of bare or rusting metal, for open joints. Inspect paint condition.	**Weather-stripping:** Document cracked or missing weather-stripping. Assess general condition.	**Threshold**: Note condition, look for rust, wear, rotted felt, detachment from door or other deterioration.	**Comments**
NORTH ELEVATION									
D1		N/A							
D2 (A)		N/A							
D2 (B)		N/A							
D3 (A)		N/A							
D3(B)		N/A							
WEST ELEVATION									
D4(A)		N/A							
D4(B)		N/A							
SOUTH ELEVATION									
D5(A)		N/A							
D5(B)		N/A							
D6(A)		N/A							
D6(B)		N/A							
D7(A)		N/A							

Building Inspection Report - Exterior Doors

Door	Aspect for Examination								Comments
Ratings: S= Stable F= Fair									
	General: Check alignment in frame. Examine for proper fit and operation. Look for condensation on door. Look for signs of dampness and leakage.	**Screen:** Check for corrosion, sag or damage.	**Flashing:** Inspect for rust, cracks, pits, loose or missing flashing.	**Frame:** Document wear from moving parts and human contact. Assure frame is square or aligned with door. Check for condensation on interior.	**Glass:** Inspect glass for bowing, warping, cracks, and chips.	**Hardware:** Inspect for signs of holes, pitting, cracking and rust. Look for areas of bare or rusting metal, for open joints. Inspect paint condition.	**Weather-stripping:** Document cracked or missing weather-stripping. Assess general condition.	**Threshold**: Note condition, look for rust, wear, rotted felt, detachment from door or other deterioration.	**Comments**
D7(B)		N/A							
EAST ELEVATION									
D8(A)					N/A				
D8(B)					N/A				
D9		N/A							

Building Inspection Report - Windows

Window	Aspect for Examination						Comments
S= Stable F= Fair P= Poor							
	General: Check window alignment in frame. Examine windows for proper fit and operation. Check that all glass and screen is intact. Look for condensation on windows. Look for signs of dampness and leakage.	**Frame:** Check for cracks and splitting. Ensure that frame is not bowed or in need of shims. Check for condensation on interior.	**Glass:** Inspect glass for bowing, warping, cracks, and chips.	**Hardware:** Inspect all hardware for signs of holes, pitting, cracking, rust, and oxide jacking. Look for areas of bare or rusting metal. Look for open joints. Inspect paint condition.	**Weather-stripping:** Document cracked or missing weather-stripping. Assess general condition.	**Stains**: Note stains on window frame or adjacent wood.	**Comments**
NORTH ELEVATION							
W1				N/A			
W2							
W3 (A)							
W3 (B)							
W4 (A)							
W4 (B)							
WEST ELEVATION							
W5				N/A			
W6				N/A			
SOUTH ELEVATION							
W7							
W8 (A)							
W8(B)							
W9							
W10							

Building Inspection Report - Windows

Window	Aspect for Examination						Comments
S= Stable F= Fair P= Poor							
	General: Check window alignment in frame. Examine windows for proper fit and operation. Check that all glass and screen is intact. Look for condensation on windows. Look for signs of dampness and leakage.	**Frame:** Check for cracks and splitting. Ensure that frame is not bowed or in need of shims. Check for condensation on interior.	**Glass:** Inspect glass for bowing, warping, cracks, and chips.	**Hardware:** Inspect all hardware for signs of holes, pitting, cracking, rust, and oxide jacking. Look for areas of bare or rusting metal. Look for open joints. Inspect paint condition.	**Weather-stripping:** Document cracked or missing weather-stripping. Assess general condition.	**Stains**: Note stains on window frame or adjacent wood.	**Comments**
W11				N/A			
W12				N/A			
EAST ELEVATION							
W13				N/A			
W14				N/A			
W15							
W16							
W17 (A)							
W17(B)							
W18							
W19							
W20(A)							
W20(B)							
W21							

Building Inspection Report - Transoms

Window	Aspect for Examination						Comments
S= Stable F= Fair P= Poor							
	Operable Y/N	**General:** Check sash alignment in frame. Examine windows for proper fit and operation. Look for condensation on windows. Look for signs of dampness and leakage.	**Frame:** Check for cracks and splitting. Ensure that frame is not bowed or in need of shims. Check for condensation on interior.	**Glass:** Inspect glass for bowing, warping, cracks, and chips.	**Hardware:** Inspect all hardware for signs of holes, pitting, cracking, rust, or rot. Look for open joints.	**Stains**: Note stains on window frame or adjacent wood.	**Comments**
NORTH ELEVATION							
T1	N				N/A		
T2	N				N/A		
T3	Y						
T4	Y						
T5	Y						
T6	Y						
T7	N				N/A		
T8	N				N/A		
T9	N				N/A		
WEST ELEVATION							
T10	Y						
T11	Y						
T12	Y						
T13	Y						

Building Inspection Report - Transoms

Window	Aspect for Examination						Comments
S= Stable F= Fair P= Poor							
	Operable Y/N	**General:** Check sash alignment in frame. Examine windows for proper fit and operation. Look for condensation on windows. Look for signs of dampness and leakage.	**Frame:** Check for cracks and splitting. Ensure that frame is not bowed or in need of shims. Check for condensation on interior.	**Glass:** Inspect glass for bowing, warping, cracks, and chips.	**Hardware:** Inspect all hardware for signs of holes, pitting, cracking, rust, or rot. Look for open joints.	**Stains**: Note stains on window frame or adjacent wood.	**Comments**
T14	Y						
T15	Y						
T16	N				N/A		
T17	N				N/A		
T18	N				N/A		
T19	N				N/A		
SOUTH ELEVATION							
T20	N				N/A		
T21	Y						
T22	Y						
T23	Y						
T24	N				N/A		
EAST ELEVATION							
T25	N				N/A		
T26	Y						

Building Inspection Report - Transoms

Window	Aspect for Examination						Comments
S= Stable F= Fair P= Poor							
	Operable Y/N	**General:** Check sash alignment in frame. Examine windows for proper fit and operation. Look for condensation on windows. Look for signs of dampness and leakage.	**Frame:** Check for cracks and splitting. Ensure that frame is not bowed or in need of shims. Check for condensation on interior.	**Glass:** Inspect glass for bowing, warping, cracks, and chips.	**Hardware:** Inspect all hardware for signs of holes, pitting, cracking, rust, or rot. Look for open joints.	**Stains**: Note stains on window frame or adjacent wood.	**Comments**
T27	N				N/A		
T28a	N				N/A		
T28b	N				N/A		
T28c	N				N/A		
T28d	N				N/A		
T28e	N				N/A		
T28f	N				N/A		
T28g	N				N/A		
T28h	N				N/A		
T28j	N				N/A		

Building Inspection Report - Roof

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Caulking: Inspect parapet, flashing, soffits, vents, chimney, & other roof penetrations.				
Flashing/edge drains: Inspect for rust, cracks, pits, loose or missing flashing.				
Drains: Are the drains above the level of the built-up roof?				
Drains: Clear of debris and determine if functional.				
Drains: Inspect drains for holes, pitting, cracking, rust, or oxide jacking. Look for areas of bare or rusting metal. Look for open joints and leaks. Inspect paint condition.				
Mechanical: Examine mechanical vent, check for blockage, ensure that roof penetrations are watertight.				
Metal: Inspect fasteners, steel angles, and fascia for signs of holes, pitting, cracking, rust, and oxide jacking. Look for areas of bare or rusting metal. Look for open joints.				
Roofing: Look at expansion joints for signs of separation or water penetration. Look for open joints.				
Roofing: Look for vegetation growing on or through roof.				
Roof Membrane: Look for bubbles, blistering, separation, or cracking in the asphalt or roofing felt. Roof should not feel spongy underfoot. Roofing felt should not be visible.				
Structure: Inspect roof for sagging.				
Structure: Inspect roof for signs of ponding/ standing water (water or water marks). If so, there may be structural deflection.				
Fascia: Check fascia for rot or insect damage.				
Overall: Based on its age and condition, evaluate the overall roof life expectancy.				

Building Inspection Report - Foyer

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Bricks: Inspect for new cracks, stains, and wear. Look for uplift at joints. Look for missing corners, edges, and spalling. Document new findings.				
Rugs: Examine carpeting for tears, lumps, wrinkles and wear.				
Walls				
Grout: Document cracked or missing mortar (flush red verticals, recessed grey horizontals). Evaluate for re-pointing.				
Brick: Inspect for new cracks, stains, and wear. Look for missing corners, edges, and spalling.				
Wood: Inspect for cracks, warping, mold or signs of moisture. Is sandwich wall still bound together and in alignment?				
Finish (wax) is the wax coat in place? Note buildup and yellowing. Indicate note areas needing wax in drawings.				
Nails and Screws: are all nails and screws in place and sunk?				
Switchplates: Condition of faceplates for lightswitches and receptacles.				
Ceiling				
Wood condition: Check for cracking, splitting, rot or insects. Check for water damage indicating roof leaks.				
Insulation: remove a light box to check the condition of the insulation.				
Structure: Inspect ceiling for sagging and separation. Check site lines.				
Lighting: Ensure light fixtures are secure and operate correctly.				
Nails and Screws: check for loose or missing nails or screws.				

Building Inspection Report - Foyer

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Interior Fenestration				
D10: Condition of door, alignment with frame, hardware condition and operability.				
D12: Condition of folding door, alignment with frame, hardware condition and operability.				
D13: Condition of folding door, alignment with frame, hardware condition and operability.				
D14: Condition of folding door, alignment with frame, hardware condition and operability.				
D15: Condition of door, alignment with frame, hardware condition and operability.				
Stairs				
Structure: Inspect for signs of movement including new cracks or expanding old cracks. Inspect joint between stair and slab.				
Wear: Inspect nosing and tread for wear or discoloration.				
Bricks: Check for chipped corners or loose bricks.				
Mortar: Check for cracks or wear, estimate time before next re-pointing.				
Finishes				
Closets: Check joints and wood condition, inspect hardware.				

Building Inspection Report - Sanctum

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Concrete: Document new cracks or expanding old ones. Report fading and wax condition- note on plan.				
Rugs: Examine carpeting for tears, lumps, wrinkles and wear.				
Walls				
Grout: Document cracked or missing mortar (flush red verticals, recessed grey horizontals). Evaluate for re-pointing.				
Brick: Inspect for new cracks, stains, and wear. Look for missing corners, edges, and spalling.				
Wood: Inspect for cracks, warping, mold or signs of moisture. Is sandwich wall still bound together and in alignment?				
Finish: Is the wax coat in place? Note buildup and yellowing. Indicate note areas needing wax in drawings.				
Nails and Screws: Are all nails and screws in place and sunk?				
Switchplates: Condition of faceplates for lightswitches and receptacles.				
Ceiling				
Wood condition: Check for cracking, splitting, rot or insects. Check for water damage indicating roof leaks.				
Insulation: remove a light box to check the condition of the insulation.				
Structure: Inspect ceiling for sagging and separation. Check site lines.				
Lighting: Ensure light fixtures are secure and operate correctly.				
Nails and Screws: check for loose or missing nails or screws.				
Finishes				
Desk: Condition of writing surface, smooth operation of drawers.				
Bookshelf: Check joints, stability, and wood condition, inspect hardware.				
Desk Light: Condition of wood, pivoting elements.				

Building Inspection Report - Kitchen

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Concrete: Document new cracks or expanding old ones, general conditions				
Walls				
Grout: Document cracked or missing mortar (flush red verticals, recessed grey horizontals). Evaluate for re-pointing.				
Brick: Inspect for new cracks, stains, and wear. Look for missing corners, edges, and spalling.				
Switchplates: Condition of faceplates for lightswitches and receptacles.				
Ceiling				
Wood condition: Check for cracking, splitting, rot or insects. Check for water damage indicating roof leaks.				
Structure: Inspect ceiling for sagging and separation. Check site lines.				
Lighting: Ensure light fixtures are secure and operate correctly.				
Fenestration				
D11: Condition of door, smooth operation, alignment with cabinet frame. Hardware condition and operability.				
Finishes				
Sink: Check for loss of enamel, rust, scratches and stains in both basins. Ensure that all hot and cold water works.				
Oven: Check for operability, note stains, rust, etc.				
Refrigerator: Inspect seals and hinges. Note any stains, rust, etc.				
Cabinetry: Condition of cabinet around sink, doors, hardware, shelves within				
Cabinetry: Condition of countertop and drawers adjacent to stove, doors, hardware, shelves within				
Cabinetry: Condition of wood drainboard at sink				
Cabinetry: Condition of countertop and cabinet below window, doors, hardware, shelves within.				
Cabinetry: Condition of cabinet and open shelves over sink. Check attachment to wall, condition of doors, hardware, shelves within.				
Cabinetry: Condition of cabinet over stove. Check attachment to wall, condition of doors, hardware, shelves within.				

Building Inspection Report - Mechanical Room

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Concrete: Document new cracks or expanding old ones, general conditions				
Walls				
Grout: Document cracked or missing mortar (flush red verticals, recessed grey horizontals). Evaluate for re-pointing.				
Brick: Inspect for new cracks, stains, and wear. Look for missing corners, edges, and spalling.				
Ceiling				
Wood condition: Check for cracking, splitting, rot or insects. Check for water damage indicating roof leaks.				
Structure: Inspect ceiling for sagging and separation. Check site lines.				
Lighting: Ensure light fixtures are secure and operate correctly.				
Finishes				
Equipment: Check for operability, note new problems				

Building Inspection Report - Living/Dining Room

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Concrete: Document new cracks or expanding old ones, general conditions				
Walls				
Grout: Document cracked or missing mortar (flush red verticals, recessed grey horizontals). Evaluate for re-pointing.				
Brick: Inspect for new cracks, stains, and wear. Look for missing corners, edges, and spalling.				
Wood: Inspect for cracks, warping, mold or signs of moisture. Is sandwich wall still bound together and in alignment?				
Finish: Is the wax coat in place? Note buildup and yellowing. Note areas needing wax in drawings.				
Nails and Screws: are all nails and screws in place and sunk?				
Switchplates: Condition of faceplates for lightswitches and receptacles.				
Ceiling				
Wood condition: Check for cracking, splitting, rot or insects. Check for water damage indicating roof leaks.				
Structure: Inspect ceiling for sagging and separation. Check site lines.				
Insulation: remove a light box to check the condition of the insulation.				
Wall-Mounted Fixtures: Check condition of wood overhang. Ensure light fixtures are secure and operate correctly.				
Recessed Lighting: Check condition of inset wood light boxes, chain-pulls. Ensure inset light fixtures are secure and operate correctly.				
Cove Lighting: Check condition of wood cove. Ensure inset light fixtures are secure and operate correctly.				
Fireplace				
Damper: Check damper operation.				
Firebox: Inspect bricks for cracks, stains, and wear. Look for uplift at joints. Look for missing corners, edges, and spalling.				
Hearth Bricks: Inspect for cracks, stains, and wear. Look for uplift at joints. Look for missing corners, edges, and spalling.				

Building Inspection Report - Living/Dining Room

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Grate: Inspect grate for rust and cracks, note condition of paint.				
Vents: Check for damage, paint fading.				
Finishes				
Bookshelves: Check joints, stability, and wood condition, inspect hardware.				
Dining Room Shelves: Check joints, stability, and wood condition, inspect hardware.				

Building Inspection Report - Gallery

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Concrete: Document new cracks or expanding old ones. Report fading and wax condition- note on plan.				
Rugs: Examine carpeting for tears, lumps, wrinkles and wear.				
Walls				
Wood: Inspect for cracks, warping, mold or signs of moisture. Is sandwich wall still bound together and in alignment?				
Finish (wax) is the wax coat in place? Note buildup and yellowing. Note areas needing wax in drawings.				
Nails and Screws: are all nails and screws in place and sunk?				
Switchplates: Condition of faceplates for lightswitches and receptacles.				
Ceiling				
Wood condition: Check for cracking, splitting, rot or insects. Check for water damage indicating roof leaks.				
Insulation: remove a light box to check the condition of the insulation.				
Structure: Inspect ceiling for sagging and separation. Check site lines.				
Lighting: Ensure light fixtures are secure and operate correctly.				
Nails and Screws: check for loose or missing nails or screws.				
Doors				
D16: Condition of door, alignment with frame, hardware condition and operability.				
D17: Condition of door, alignment with frame, hardware condition and operability.				
D20: Condition of door, alignment with frame, hardware condition and operability.				

Building Inspection Report - Gallery

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Transoms				
T1: Condition of sash, alignment with frame, hardware condition and operability.				
T2: Condition of sash, alignment with frame, hardware condition and operability.				
T3: Condition of sash, alignment with frame, hardware condition and operability.				
T4: Condition of sash, alignment with frame, hardware condition and operability.				
Finishes				
Linen Closet: Condition of floor, walls, shelving, smooth operation of cabinetry, hardware, pulls.				

Building Inspection Report - Bath

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Floor: Document new cracks or expanding old ones, general conditions				
Walls				
Grout: Document cracked or missing mortar (flush red verticals, recessed grey horizontals). Evaluate for re-pointing.				
Brick: Inspect for new cracks, stains, and wear. Look for missing corners, edges, and spalling.				
Wood: Inspect for cracks, warping, mold or signs of moisture. Is sandwich wall still bound together and in alignment?				
Finish: Is the wax coat in place? Note buildup and yellowing. Note areas needing wax in drawings.				
Nails and Screws: Are all nails and screws in place and sunk?				
Switchplates: Condition of faceplates for lightswitches and receptacles.				
Ceiling				
Wood condition: Check for cracking, splitting, rot or insects. Check for water damage indicating roof leaks.				
Structure: Inspect ceiling for sagging and separation. Check site lines.				
Lighting: Ensure wall-mounted light fixtures are secure and operate correctly.				
Nails and Screws: check for loose or missing nails or screws.				
Finishes				
Sink: Check for loss of enamel, rust, scratches and stains. Ensure that all hot and cold water works.				
Bathtub: Check for loss of enamel, rust, scratches and stains. Ensure that all hot and cold water works.				
Toilet: Check for loss of enamel, rust, scratches and stains. Ensure that toilet flushes.				
Mirror: Condition of wall-mounted mirror over sink.				

Building Inspection Report - Master Bedroom

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Concrete: Document new cracks or expanding old ones. Report fading and wax condition- note on plan.				
Rugs: Examine carpeting for tears, lumps, wrinkles and wear.				
Walls				
Wood: Inspect for cracks, warping, mold or signs of moisture. Is sandwich wall still bound together and in alignment?				
Finish (wax) is the wax coat in place? Note buildup and yellowing. Note areas needing wax in drawings.				
Nails and Screws: are all nails and screws in place and sunk?				
Switchplates: Condition of faceplates for lightswitches and receptacles.				
Ceiling				
Wood condition: Check for cracking, splitting, rot or insects. Check for water damage indicating roof leaks.				
Insulation: remove a light box to check the condition of the insulation.				
Structure: Inspect ceiling for sagging and separation. Check site lines.				
Lighting: Ensure light fixtures are secure and operate correctly.				
Nails and Screws: check for loose or missing nails or screws.				
Fenestration				
D18: Condition of folding door, alignment with frame, hardware condition and operability.				
D19: Condition of folding door, alignment with frame, hardware condition and operability.				
Finishes				
Desk: Condition of desktop, smooth operation of drawers, hardware, pulls, condition of mirror.				
Closet: Condition of floor, walls, shelving, rods, smooth operation of cabinetry, hardware, pulls.				
Wall-Mounted Shelving: Check joints, stability, and wood condition, inspect hardware.				

Building Inspection Report - Children's Bedroom

Item	Condition			Location/Comments
	Stable	Fair	Poor	
Floor				
Structure: Look for separation between floor and walls. Inspect joint where floor meets walls.				
Concrete: Document new cracks or expanding old ones. Report fading and wax condition- note on plan.				
Rugs: Examine carpeting for tears, lumps, wrinkles and wear.				
Walls				
Wood: Inspect for cracks, warping, mold or signs of moisture. Is sandwich wall still bound together and in alignment?				
Finish (wax) is the wax coat in place? Note buildup and yellowing. Note areas needing wax in drawings.				
Nails and Screws: are all nails and screws in place and sunk?				
Switchplates: Condition of faceplates for lightswitches and receptacles.				
Ceiling				
Wood condition: Check for cracking, splitting, rot or insects. Check for water damage indicating roof leaks.				
Insulation: remove a light box to check the condition of the insulation.				
Structure: Inspect ceiling for sagging and separation. Check site lines.				
Lighting: Ensure light fixtures are secure and operate correctly.				
Nails and Screws: check for loose or missing nails or screws.				
Fenestration				
D21: Condition of folding door and hardware				
Finishes				
Closet: Condition of floor, walls, shelving, rod, smooth operation of cabinetry, hardware, pulls.				
Wall-Mounted Shelving: Check joints, stability, and wood condition, inspect hardware.				

Building Inspection Report Image Survey

Each year, please re-photograph these images with a digital camera in the daylight, replicating the shots as closely as possible. Photos should be taken at 96 pixels/inch. See the numbers indicated on the floor plans for assistance in identifying locations. Once the digital images have been taken, save them in .jpeg format, renaming each file for their image number indicated here, along with the year they were taken. Create a folder on the server called "Annual Photo Survey," create a sub-folder for each year and place the photo files in their relevant folder. For example, image 5, taken in 2009 should be titled "5(2009)," saved in the 2009 folder, within the "Annual Photo Survey" folder. This process will allow the tracking of current and future maintenance issue, and the documentation of general conditions over time.

Image #1



Image #2



Image #3



Image #4



Image #5



Image #6



Image #7



Image #8



Image #9



Image #10



Image #11



Image #12



Image #13



Image #14



Image #15



Image #16



Image #17



Image #18



Image #19



Image #20



Image #21



Image #22



Image #23



Image #24



Image #25



Image #26



Image #27



Image #28



Image #29



Image #30



Image #31



Image #32



Image #33



Image #34



Image #35



Image #36



Image #37



Image #38



Image #39



Image #40



Image #41



Image #42



Image #43



Image #44



Image #45



Image #46



Image #47



Image #48



Image #49



Image #50



Image #51



Image #52



Image #53



Image #54

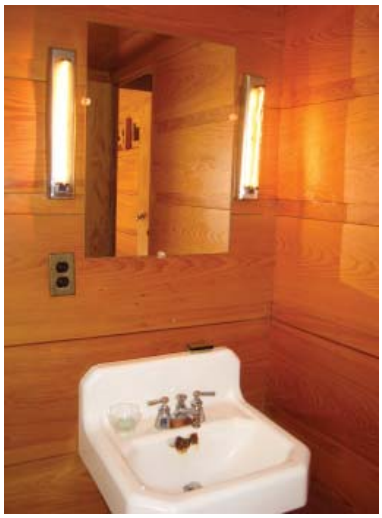


Image #55



Image #56



Image #57

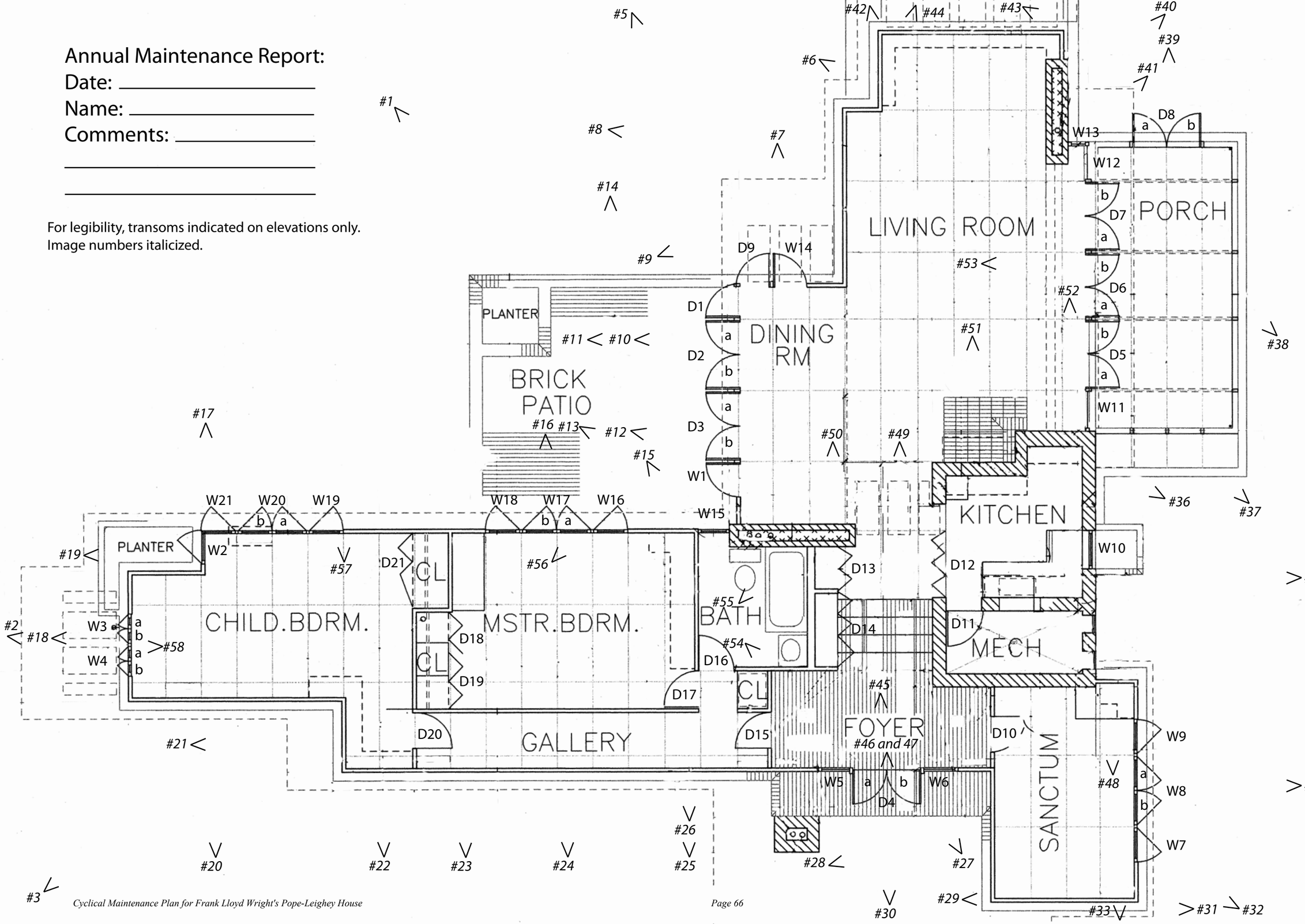


Image #58



Annual Maintenance Report:
Date: _____
Name: _____
Comments: _____
_____
_____

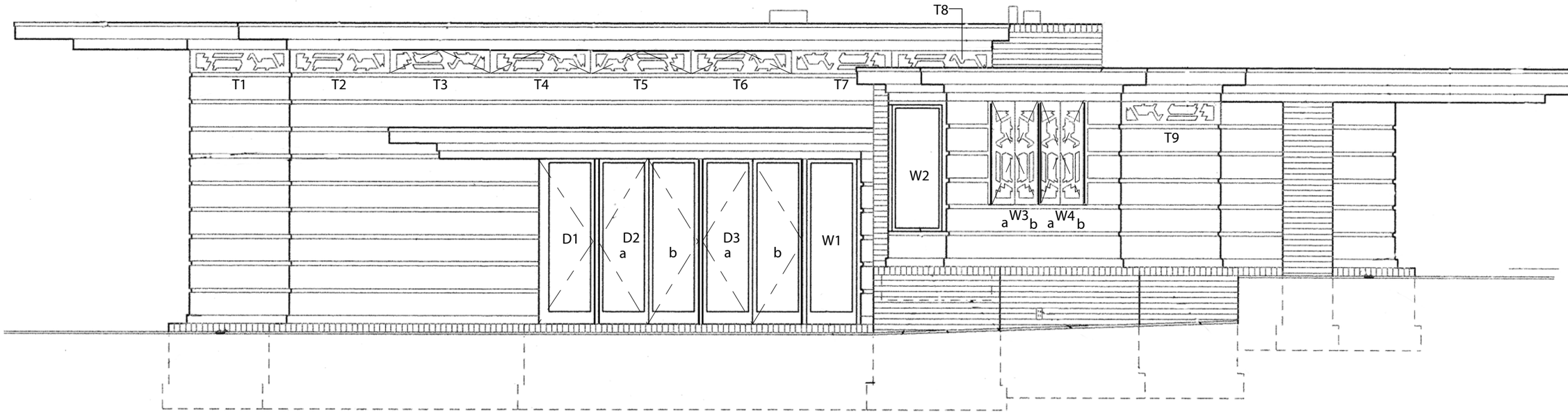
For legibility, transoms indicated on elevations only.
Image numbers italicized.



NATIONAL TRUST FOR HISTORIC PRESERVATION

Floor Plan
Not to Scale

Frank Lloyd Wright's
Pope-Leighey House
Existing Conditions Evaluation



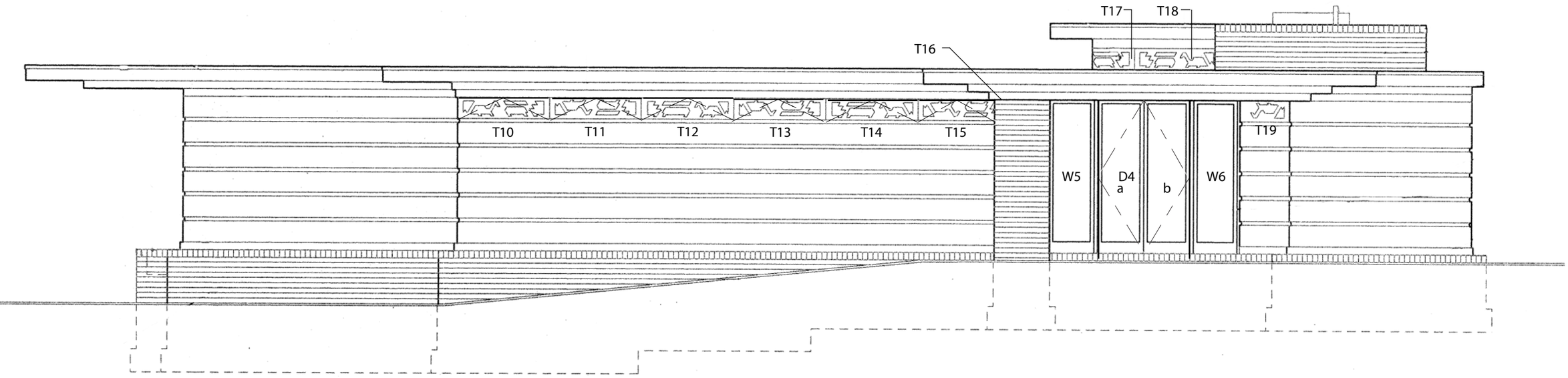
NORTH ELEVATION

Annual Maintenance Report:
Date: _____
Name: _____
Comments: _____
_____
_____

NATIONAL TRUST FOR HISTORIC PRESERVATION®

North Elevation
Not to Scale

Frank Lloyd Wright's Pope-Leighey House
Existing Conditions Evaluation



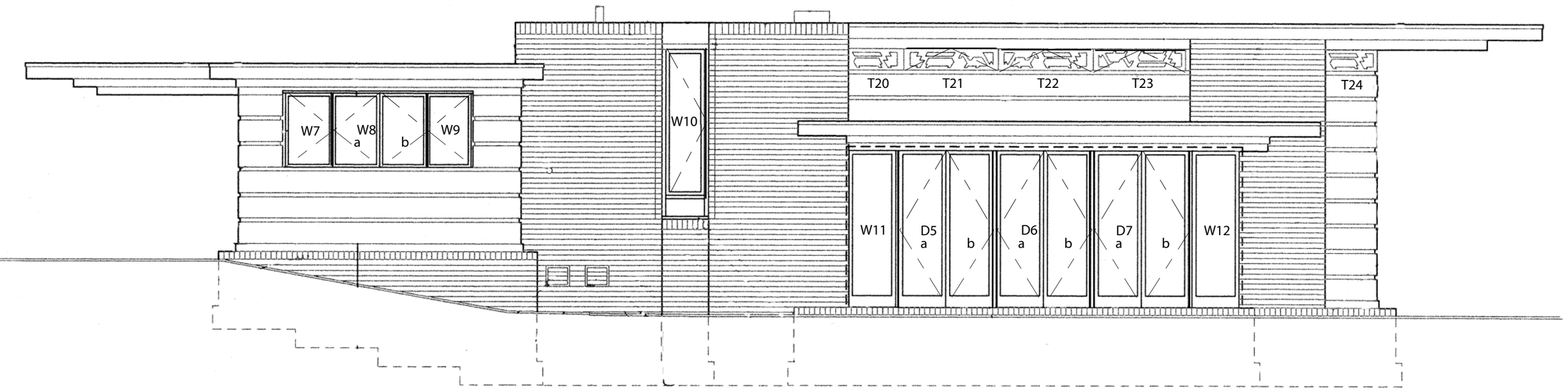
WEST ELEVATION

Annual Maintenance Report:
Date: _____
Name: _____
Comments: _____
_____
_____

NATIONAL TRUST FOR HISTORIC PRESERVATION®

West Elevation
Not to Scale

Frank Lloyd Wright's Pope-Leighey House
Existing Conditions Evaluation



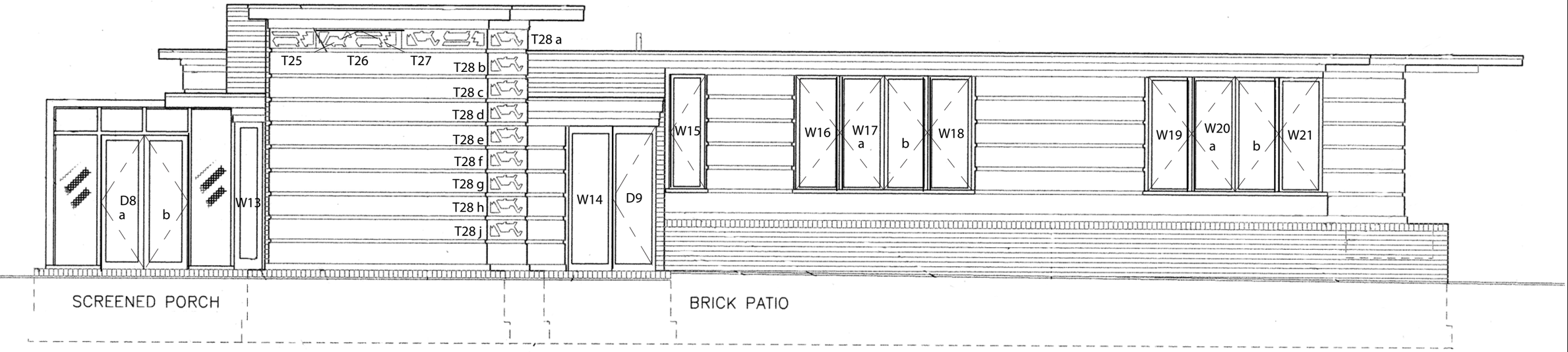
SOUTH ELEVATION

Annual Maintenance Report:
Date: _____
Name: _____
Comments: _____
_____
_____

NATIONAL TRUST FOR HISTORIC PRESERVATION®

South Elevation
Not to Scale

Frank Lloyd Wright's Pope-Leighey House
Existing Conditions Evaluation



EAST ELEVATION

Annual Maintenance Report:
Date: _____
Name: _____
Comments: _____
_____
_____

NATIONAL TRUST FOR HISTORIC PRESERVATION®

East Elevation
08/05/08

Frank Lloyd Wright's Pope-Leighey House
Existing Conditions Evaluation

Section 4: Cyclical Maintenance Reports

Documentation Methods

The maintenance of the Pope-Leighey House must be continuously documented for planning, budgetary and accountability reasons. In addition to the annual checklist presented in Section 3, this section includes daily, weekly, monthly and seasonal checklists that should be manually completed and filed for reference.

Annually, the maintenance director will create a maintenance report based on the data from the annual inspection and the regular, cyclical checklists. The essential projects list, held by the Graham Gund Architect, will be updated at this time. All digital data will be saved into the main folder and dated with the site name and date.

The cyclical checklists in this section should be changed to make them as useful and relevant as possible. Changes to these checklists should be done in the master folder, rather than the folder for the current year. Former report folders may be saved, but they must be dated and labeled "OLD" so that they will not be confused with the current manual.

Site directors are also encouraged to set up a calendar in Microsoft Outlook, or a similar program to remind directors and staff to undertake checklists.

ESSENTIAL PROJECTS: Pope-Leighey House

	PROJECT TYPE	BUILDING / FEATURE	COST	CRITICAL PRIORITY
Level A				
Exterior Siding Weathering and Stain Repair *Repair/Replace rotted wood. Identify preservative that will protect without altering appearance.*	Maintenance/Improvement	House	$45,000	☐
Total for A (1 project)			$45,000	
Level B				
Landscape Plan	Planning/Research	Landscape	$75,000	☐
Roof Replacement *March, 2009. Roof in good condition, but will require replacement within ten years.*	Maintenance/Improvement	House	$40,000	☐
Total for B (2 projects)			$115,000	
Level C				
Evaluate cracking/radiant heat *Concrete floor cracking*	Maintenance/Improvement	House	$15,000	☐
Total for C (1 project)			$15,000	
Grand Total			$175,000	

** Critical Priority: Regularly accessible to public, tenants or staff, AND code violation, life safety threat, critical structural concern, or high risk of continued deterioration.*
** Level A: Projects to be completed within the next year; Level B: Projects to be completed within 3 years; Level C: Projects to be completed within 10 years.*

DAILY CHECKLIST

Date:

Task	Instructions	Initials
Opening		
Clear entryway, porches and walkways	Clear entry of debris. If ice or snow is present, hand-clean or use approved ice melt (see section 5).	
Doors locked upon entry	If door is unlocked, check for stolen articles, call police if there has been burglary.	
Turn on lights	Replace light bulbs if needed (see replacement schedule, section 6).	
Check alarms	Deactivate, then report any malfunction in the alarm system (see manual).	
Check smoke detectors	Report any smoke alarm not flashing.	
Clean smudged glass surfaces	With a damp cloth, clean glazing in front door and any other locations frequently touched by visitors. For subborn smudges, use a small amount of ethanol, protect adjacent wood.	
Clean knobs	With a damp cloth, clean knobs and other metals frequently touched by visitors	
Vacuum high traffic areas	Vacuum high-traffic areas as necessary.	
Empty trash cans	Dispose of trash and recycling as necessary.	
Closing		
Return objects to location	Return all freestanding objects to their spot. Report any missing/ or damaged items.	
Check faucets	Ensure that no dripping faucets, etc. are left on in kitchen, bathroom or garden.	
Set thermostat	Check thermostat to ensure it is at the appropriate temperature. Make sure heating and cooling are not on at the same time.	
Turn off lights	Turn off all lights not needed for security.	
Set alarm	Set alarms for night (see manual, section 5).	
Secure doors and windows	Close and lock all windows.	

WEEKLY CHECKLIST		Date:
Task	Instructions	Initials
Sweep exterior	Sweep entry, patio, screened porch and other hard surfaces around house.	
Clean screened porch roof	Brush away leaves or other matter collecting on the screened roof of the porch.	
Dust furniture, shelves and windowsills	Clean wood furniture, shelves, sills with a damp cloth. Use a dry cloth or hand vacuum on all furniture. Clean stains on replica furniture with approved cleaner. Consult maintenance director about new stains on original furniture.	
Sweep interior	Avoid contact with baseboards, etc..	
Clean rugs	Vaccum all rugs (none are historic).	
Reposition collections objects	Return objects to their typical locations. Report any missing objects to museum director.	
Clean chrome pieces in kitchen	Dust with a soft cloth.	
Clean kitchen sink	Wipe with a damp, soft cloth.	
Clean bathroom sink	Wipe with a damp, soft cloth.	
Clean bathroom mirror	Use an approved cleaner and soft cloth, do not use spray bottles	
Check light bulbs	Replace standard bulbs as needed, if tubular incandescent bulbs are replaced, retain old bulb and notify maintenance director for re-stocking.	
Test security system	See ADEMCO manual in Appendix for procedure	
Test thermostat	See manual in Appendix for procedure	

MONTHLY CHECKLIST		Date:
Task	Instructions	Initials
Clean screens	Use a low suction vacuum for window screens, vacuum or blow debris off outside screens	
Clean concrete floors	Use a mild soap/water solution, do not remove wax from floor, hand-clean at edges to avoid wetting wood walls.	
Clean all baseboards, doors, doorframes, and other interior woodwork	Clean with a damp soft cloth.	
Dust books and light fixtures	Use a dry soft cloth or feather duster.	
Vacuum textiles on furniture, etc.	Use lightest vacuum pressure possible, cover nozzle with screen	
Vacuum fireplace interior	Hold vacuum away from the back of the fireplace to avoid contamination from soot	
Check for evidence of insects on textiles, windowsills, and furniture	Report any evidence of damaging insects to maintenance director immediately	
Clean steel lights	Use an approved cleaner and soft cloth, report any tough stains, scratches or rust	
Clean toilet	Wipe outside with damp cloth. See Section 5 for approved bowl cleaning solution.	
Clean bathtub	Wipe with a damp cloth, clean mineral stains with ethanol-treated cloth. Report any new, resistant stains, scratches or rust.	
Clean shower curtain	Soak in spot cleaning solution outlined in Section 5. Rinse well.	
Sweep mechanical room floor.	Sweep floor, organize room.	
Drain 1 gallon of water from the water heater	Decreases the build-up of hard water deposits.	
Stock supplies	Refill all supply stockpiles	

SPRING CHECKLIST

Date:

In preparation for annual opening, the spring checklist is the lengthiest seasonal checklist, incorporating quarterly, bi-annual and annual tasks.

Task	Instructions	Initials
Exterior		
Inspect roof membrane, drains and fascia vents	Do not prop ladder on roof, use freestanding stepladder. Always use a spotter. Examine membrane for ponding, deflection, alligatoring or other failure. Ensure that all roof drains are in place and free from obstruction.	
Survey exterior walls	Examine condition of brick and wood. Note new signs of water infiltration, condition of mortar.	
Inspect fascia for insect damage	Inspect fascia for damage by boring bees, treat any existing nest with an approved insect dust and filling method (see section 5).	
Brush off dirt and moss from exterior siding.	Use special care around corners and damaged areas, brush only areas which need to be cleaned.	
Preventative insect maintenance	Insect prevention/treatment to be done by service professional.	
Treat exterior for mold	Treat wood with Mold-Ram or other mold preventative where necessary.	
Treat exterior for pests	Treat wood with bora-care or other approved insecticide. See Section 5 for boring bee treatment.	
Wash exterior of windows	Use an approved cleaner and distilled water on a soft cloth or cotton wool, avoid contact with wood, DO NOT SPRAY SOLUTION ONTO GLASS.	
Wash porch screens	Brush away dirt and debris, rinse with low pressure hose.	
Clear plants from perimeter of building	Make sure that plants are not touching the building and that organic material has not clogged weeps.	
Interior		
Remove all objects from interior.	Move rugs, furniture and objects to a prearranged location. Do not drag furniture. Document location of objects prior to move.	
Inspect each room envelope	Check for evidence of insects, water, mold, floor cracks, etc. Report new damage to maintenance director.	
Clean and wax wood walls and ceiling	Avoid disturbing splintered wood, place unintentional splinters in a sealable bag along with a photograph of the location. Use soft cloth or brush for surfaces and a vacuum with a screened nozzle to clean gaps in joints. Remove wax buildup with mineral spirits-infused cloth. Coat all wood with paste wax, buff with soft brush. Buff with the grain.	
Dust and clean any areas or ledges requiring a ladder	DO NOT prop ladder on bookshelves, use freestanding stepladder placed on a rug, use a soft cloth on a pole or vacuum extension if necessary.	
Clean and wax floors	Clean with mild soap/water solution, hand-clean at edges to avoid wetting wood walls. Wax all concrete floors.	
Wash interior of windows	Use an approved cleaner and distilled water on a soft cloth or cotton wool, avoid contact with wood, DO NOT SPRAY SOLUTION ONTO GLASS.	
Vacuum drapes	Use the lightest suction possible, cover nozzle with a screen and avoid abrasion to any damaged areas.	
Rug cleaning	Examine carpets, assess necessity for professional cleaning. If required, do not clean in place.	
Wax furniture	Remove wax buildup with mineral spirits-infused cloth. Coat all wood with paste wax, buff with soft brush. Buff in the direction of the grain.	
Clean and wax floor grates	Remove dust and dirt with a soft brush. Apply a thin coat of wax, let set overnight and buff.	

Task	Instructions	Initials
Inventory collections	Use inventory checklist, report any missing, damaged or deteriorating items to site director.	
Inspect books	Handle carefully with gloves, report any damage to maintenance director.	

Systems

Hot water heater	Flush and monitor condition of anode rod. Replace when more than 6" of core wire is exposed. Lift and release lever handle on the temperature release valve.	
Boiler	Follow instructions in user manual, perform tasks and have professionally inspected yearly.	
Inspect heat pump indoor cooling coil	Check for leaks.	
Check heat pump outdoor equipment	Clean ice and/or debris from the updraft fans, check for level, check insulation.	
Check fire extinguishers, smoke alarms, security system	Ensure that batteries are effective and gauges read well, report anything that needs replacing to maintenance director.	
Check gauges	Check to ensure proper pressure in all gauges.	

SUMMER CHECKLIST

Date:

Performed during the mid-season, the summer checklist is the shortest seasonal checklist, incorporating quarterly tasks only.

Task	Instructions	Initials
Exterior		
Inspect roof drains and fascia vents	Do not prop ladder on roof, use freestanding stepladder placed on a solid surface. Always use a spotter. Ensure that all roof drains are in place and free from obstruction.	
Inspect and repair insect damage	Inspect fascia for damage by boring bees, treat any existing nest with an approved insect dust and filling method (see section 5).	
Preventative insect maintenance	Insect prevention/treatment to be done by service professional.	
Clear plants from perimeter of building	Make sure that plants are not touching the building and that organic material has not clogged weeps.	
Interior		
Clean ceiling for dust and cobwebs	Use soft cloth or brush, use a vacuum with a screened nozzle to clean gaps in joints.	
Dust and clean any areas or ledges requiring a ladder	DO NOT prop ladder on bookshelves, use freestanding stepladder placed on a rug, use a soft cloth on a pole or vacuum extension if necessary.	
Wax floors	Buff wax as needed, particularly at screened porch.	
Vacuum under furniture	Pick furniture up to move, DO NOT DRAG FURNITURE ACROSS FLOOR. Cover vacuum nozzle with screen.	
Inspect books	Handle carefully with gloves, report any damage to maintenance director.	
Systems		
Check fire extinguishers, smoke alarms, security system	Ensure that batteries are effective and gauges read well, report anything that needs replacing to maintenance director.	
Check gauges	Check to ensure proper pressure in all gauges.	
Inspect heat pump indoor cooling coil	Check for leaks.	
Check heat pump outdoor equipment	Clean ice and/or debris from the updraft fans, check for level, check insulation.	

FALL CHECKLIST

Date:

In preparation for the end of the season, the fall checklist is a lengthier seasonal checklist, incorporating quarterly and bi-annual tasks.

Task	Instructions	Initials
Exterior		
Inspect roof drains and fascia vents	Do not prop ladder on roof, use freestanding stepladder placed on a solid surface. Always use a spotter. Ensure that all roof drains are in place and free from obstruction.	
Inspect and repair insect damage	Inspect fascia for damage by boring bees, treat any existing nest with an approved insect dust and filling method (see section 5).	
Wash exterior of windows	Use an approved cleaner and distilled water on a soft cloth or cotton wool, avoid contact with wood, DO NOT SPRAY SOLUTION ONTO GLASS.	
Wash porch screens	Brush away dirt and debris, rinse with low pressure hose.	
Preventative insect maintenance	Insect prevention/treatment to be done by service professional.	
Clear plants from perimeter of building	Make sure that plants are not touching the building and that organic material has not clogged weeps.	
Interior		
Clean ceiling for dust and cobwebs	Use soft cloth or brush, use a vacuum with a screened nozzle to clean gaps in joints.	
Dust and clean any areas or ledges requiring a ladder	DO NOT prop ladder on bookshelves, use freestanding stepladder placed on a rug, use a soft cloth on a pole or vacuum extension if necessary.	
Wash interior of windows	Use an approved cleaner and distilled water on a soft cloth or cotton wool, avoid contact with wood, DO NOT SPRAY SOLUTION ONTO GLASS.	
Clean and wax floors	Clean with mild soap/water solution, hand-clean at edges to avoid wetting wood walls. Wax all concrete floors, particularly those at the screened-in	
Vacuum under furniture	Pick furniture up to move, DO NOT DRAG FURNITURE ACROSS FLOOR. Cover vacuum nozzle with screen.	
Inspect books	Handle carefully with gloves, report any damage to maintenance director.	
Systems		
Check fire extinguishers, smoke alarms, security system	Ensure that batteries are effective and gauges read well, report anything that needs replacing to maintenance director.	
Check gauges	Check to ensure proper pressure in all gauges.	
Inspect heat pump indoor cooling coil	Check for leaks.	
Check heat pump outdoor equipment	Clean ice and/or debris from the updraft fans , check for level, check insulation.	

WINTER CHECKLIST

Date:

Performed during the closed season, the winter checklist is the shortest seasonal checklist, incorporating quarterly tasks only.

Task	Instructions	Initials
Exterior		
Inspect roof drains and fascia vents	Do not prop ladder on roof, use freestanding stepladder placed on a solid surface. Always use a spotter. Ensure that all roof drains are in place and free from obstruction.	
Inspect and repair insect damage	Inspect fascia for damage by boring bees, treat any existing nest with an approved insect dust and filling method (see section 5).	
Preventative insect maintenance	Insect prevention/treatment to be done by service professional.	
Clear plants from perimeter of building	Make sure that plants, ice and snow are not touching the building and that organic material has not clogged weeps.	
Interior		
Clean ceiling for dust and cobwebs	Use soft cloth or brush, use a vacuum with a screened nozzle to clean gaps in joints.	
Dust and clean any areas or ledges requiring a ladder	DO NOT prop ladder on bookshelves, use freestanding stepladder placed on a rug, use a soft cloth on a pole or vacuum extension if necessary.	
Wax floors	Buff wax as needed, particularly at screened porch.	
Vacuum under furniture	Pick furniture up to move, DO NOT DRAG FURNITURE ACROSS FLOOR. Cover vacuum nozzle with screen.	
Inspect books	Handle carefully with gloves, report any damage to maintenance director.	
Systems		
Check fire extinguishers, smoke alarms, security system	Ensure that batteries are effective and gauges read well, report anything that needs replacing to maintenance director.	
Check gauges	Check to ensure proper pressure in all gauges.	
Inspect heat pump indoor cooling coil	Check for leaks.	
Check heat pump outdoor equipment	Clean ice and/or debris from the updraft fans, check for level, check insulation.	

LONG-TERM CHECKLIST

Date:

	Item	Date Installed	Anticipated Lifespan	Professional Inspection	Planned Replacement Date	Notes	Initials/ Date
Roof							
	Membrane	1995	20 years	5 years	2015	10 year warranty expired 2005	
	Flashing	1995	20 years	5 years	2015		
	Rainwater leaders	1995	Unlimited	5 years		Evaluate for patching 2025	
Exterior							
	Mortar (Brick walls)	1995	50 years	10 years		Repointing every 10 years, beginning in 2015	
	Cypress	1939	Preservation Priority	15 years		Evaluate for refinishing every 15 years, beginning 2010	
	Brass or Steel Hardware		50 years	15 years			
	Kynar-finished Steel	1995	50 years			Evaluate in 2045	
	Glass	1939	Preservation Priority			Replace when cracked/broken	
	Weatherstripping	1995	10 years		2005		
	Porch screening	1995	20 years	10 years		Repainting and stretching every 10 years	
Mechanical							
	Heat pump indoor unit	1995	20 years	5 years	2015		
	Heat pump outdoor unit	1995	15 years		2010		
	Water heater	1995	20 years	5 years	2010		
	Inline Centrifugal Pump	1995	50 years		2045		
	Boiler	1995	20 years		2015		

APPROVED CLEANING METHODS

Material/Element	**Recommended Cleaning Method** (use for all routine cleaning)	**Alternative Cleaning Method** (use only if recommended cleaning method does not work, see definitions/detailed instructions before use. Method is only safe for material listed, avoid contact with other materials)	**Soiling Cleaning Method** (only for emergency situations, requires supervisor's permission and supervision)
Bricks and Mortar	Low-pressure water and brush	None	None, consult conservator
Concrete Slab	Sweep, mop with water, wax	Mop with water and mild detergent	None, consult conservator
Exterior Cypress	To be determined in consulation with a conservator	Remove buildup with soft cloth lightly damp with mineral spirits, never spray or pour mineral spirits directly on wood, spot clean only.	Scrub with water, mild detergent and brush
Furniture Fabric	vacuum with light-suction vacuum w/screen over nozzle	None	None, consult conservator
Glass	Clean with water and soft cloth	Clean smudges with soft cloth and ethanol	None, consult conservator
Interior Cypress	Paste wax	Remove buildup with soft cloth lightly damp with mineral spirits, never spray or pour mineral spirits directly on wood, spot clean only.	None, consult conservator
Mechanical Systems	Consult manual (Alarm System-pg 41,45. Boiler-pg 3-5. Thermostat-pg 13. Water Heater-pg 4.). Consult "definitions and detailed instructions for HVAC systems	Have professional inspect systems	Have professional inspect systems
Metals	Leave natural finish	Clean with water and soft cloth	None, consult conservator
Plywood Furniture	Remove dust with dry, soft cloth or light-suction vacuum	Light coatings of paste wax	Remove buildup with soft cloth lightly damp with mineral spirits, never spray or pour mineral spirits directly on wood, spot clean only.
Porcelain Fixtures	Clean with water and soft cloth	Clean mineral deposits with soft cloth and ethanol	None, consult conservator
Roof	Remove debris by hand or with leaf blower		Clean with mild detergent and moderate-pressure water
Rugs	Vacuum with normal vacuum cleaner, spot clean with mild agent.	Professionally clean	Replace
Screen Porch	Remove debris by hand or with leaf blower	Clean with low pressure water	None, consult conservator

Section 5: Detailed Materials Information and Instruction

Definitions and Detailed Instructions

1. Concrete Slab

a. Definition and function: The concrete foundation slab comprises the floor of the house and the screened-in porch. Lying on a bed of gravel, the simple slab is topped by 2 inches of red, scored concrete, highlighting the modular system of the house. The radiant heating system's 5/8" polymer heating tubes are set into the slab. Poured in place during the 1995 move, the slab is not original to the house.

b. Problems and symptoms: Ground shifts cause cracking and crazing. Most cracks currently cluster around the radiant heating, likely due to improperly-set pipes.

c. Typical Maintenance Requirements and Methods:
   i. Clean floor monthly.
   ii. Wax floors in the spring and fall.
   iii. Wax porch and high traffic areas seasonally as needed.
   iv. Inspect cracks as a part of the annual conditions survey. If cracks widen and pose a tripping hazard, they may be filled with mortar dyed to match the slab.



Figure 27: Small crack in the floor slab (NTHP).

d. Maintenance Materials:
   i. Wax floors with a paste wax.
   ii. Consult conservator regarding built-up wax removal.

2. Brick

a. Definition and function: The red brick walls are the major structural component of the house, the stairs, and the patios. All the brick was replaced when the building was moved in 1995.

b. Problems and symptoms:
   i. Spalling: If leaks introduce water into the brick wall cavity, the moisture will often move through the brick, leaving behind salt

residue. The migrating salts will build up behind the surface layer of the brick, causing it to flake off. More than simply losing the face of the brick, spalling is a sign of water infiltration and should be investigated and resolved.

ii. Efflorescence: Migrating salts also may sit on the surface of the brick, causing an unsightly white residue.

iii. Shifting Walls: Soil or foundation shifts may cause a brick wall to deflect and crack, usually at mortar joints.

iv. Mineral stains: Runoff from copper and other materials may stain the face of the brick. They do not harm the brick and may be either removed or retained.

c. Typical Maintenance Requirements, Materials and Methods:

i. Normally, brick is a durable material Clean as needed with a stiff brush and water.

ii. Mortar may require repointing and should be evaluated every 50 years. Replacement brick and re-pointing mortar must conform to the 1995 Quinn-Evans specifications.

iii. Inspect brick as a part of the annual conditions survey

iv. The site has a stockpile of replacement brick for the patio. These should be stored open to the weather and should be used when replacement becomes necessary.

d. Precautions

i. Avoid pressure washing or sandblasting as it can strip the hardest portion of the brick away.

ii. Cleaning methods safe for brick may not be safe for adjacent materials, use caution when selecting cleaning methods and protecting the site.

iii. Any repair must be approved by the Graham Gund Architect.

3. Exterior Cypress

a. Definition and Function:

i. Board-and-batten: The boards are 11 ¾”x ¾” cypress planks, notched into 2” battens.

ii. Windows and doors: All windows and doors are made of cypress and plate glass.

iii. Roof trim and fascia: The roof fascia and trim protects the overhanging roof structure from water runoff. The trim is not original to the house, dating to the 1995 move and rehabilitation.

b. Problems and Symptoms:

i. Cypress is rot-resistant but is a softwood that erodes quickly when exposed to wind and rain.

ii. As an untreated wood, cypress warps and cracks as it weathers.

iii. Mold can damage the wood in areas that are frequently damp.

iv. Insect can bore into the wood.



Figure 26: New Wood.



Figure 27: Weathered Wood.



Figure 28: Raised/Open Grain.

c. Typical Maintenance Requirements and Methods:
   i. Clean stains with warm water as necessary.
   ii. Treat the wood with bora-care or another approved pest preventive. If boring bee holes develop, use an approved method to kill the larvae and fill the holes with a matching wood plug.
   iii. Monitor siding near the patio where water splashes back against the building for mold, treat with a preventative if necessary.
   iv. Inspect wood as a part of the annual conditions survey.

d. Maintenance Materials:
   i. Boracare or similar insecticide (active ingredient: Disodium Octaborate Tetrahydrate)
   ii. Mold-Ram or similar mold preventive (active ingredient: chlorothalonil)

e. Precautions
   i. Cypress has a life expectancy of 75 years but can last much longer if properly maintained. The cypress wood comprises the majority of the original material found on the house and should be the top preservation priority.
   ii. Avoid treatments that contain mineral spirits, as they reduce the natural cypressine in the wood.
   iii. Seek approval from Graham Gund Architect for any treatments beyond those specified.

4. Roof

a. Definition and Function:
   i. The roof membrane, structure, and insulation were replaced during the 1995 move and restoration.
   ii. The new roof drain channels water to the center of the roof and down internal rainwater leaders rather than sheeting off the sides as originally designed.

b. Potential Problems:
    i. The roof drains frequently become clogged and need to be cleared as standing water causes leaks and roof deflection.
    ii. Flashing and patches may leak water into the wall cavity or other interstitial space.
    iii. The roof membrane may be damaged by natural conditions, penetration, or deterioration. Watch for cracking or "alligatoring" during dry seasons.



Figure 25: Roof drain clogged by leaves. (http://www.blocksom.com/roofdrain.htm).

c. Typical Maintenance Requirements:
    i. Monitor roof for deflection, rot, warping or failure.
    ii. Flashing: Steel flashing must be monitored for rust and adherence to the roof membrane.
    iii. Drains: Must be cleared seasonally of debris.



Figure 26: A filter keeps the roof drain from becoming clogged by leaves. (http://www.blocksom.com/roofdrain.htm).

d. Precautions:
    i. Use care when walking on the roof. Avoid smoking or other potentially harmful activities.
    ii. A roof drain filter may be installed to reduce clogging, but drains will require unclogging with the same frequency.

e. Maintenance Methods and Materials:
    i. Hand clean debris or snow away from drains as needed.
    ii. Low-pressure wash to remove dirt and mold.
    iii. Inspect roof as a part of the annual conditions survey.
    iv. Professionally inspect roof membrane every 5 years.
    v. The built-up roof membrane is expected to last 20 years. It may be replaced with another longer-lasting membrane system at that time.
    vi. Flashing sealants are expected to need maintenance every 20 years.
    vii. Rainwater leaders are expected to last the lifetime of the house but should be evaluated every 30 years.

f. Unacceptable Methods and Materials:
    i. Harsh roof cleaners containing sodium hydroxide, chlorine, or any other oxidizing agents.
    ii. Aggressive debris removal such as raking or pressure washing.

5. Interior Cypress

a. Definition and Function:
   i. Interior cypress wall paneling and trim
   ii. Doors, window sash and frames.

b. Problems and Symptoms:
   i. Wood will split, crack, or rot if exposed to moisture.
   ii. Horizontal surfaces may discolor from sun, frequent touching or other abuse.
   iii. Wood is vulnerable to insect attack.

c. Maintenance Methods and Materials:
   i. Any water intrusion must be investigated and halted.
   ii. Clean dust and dirt with a damp cloth weekly.
   iii. Apply paste wax annually to protect wood and enhance natural grain.
   iv. Wax buildup may be cleaned with a cloth lightly damp with mineral spirits.
   v. Clean dust and dirt off wood with soft cloth, duster, or light-suction vacuum.
   vi. Interior insect protection by professional service as necessary. Methods must not damage wood or wax.
   vii. Inspect wood as a part of the annual conditions survey.

d. Unacceptable Methods and Materials:
   i. Care must be taken so that mineral spirits do not penetrate through the wax into the wood.
   ii. Never clean with an abrasive.

6. Glass

a. Definition and Function:
   i. Windows and exterior doors include either 1/8” or 1/4” clear plate glass.
   ii. Mirrors in bedrooms and bathroom.

b. Problem: Glass is easily chipped or broken.

c. Maintenance Materials and Methods:
   i. Encourage visitors not to touch glass.
   ii. Weekly (more often in high-traffic areas), clean reachable glass with damp soft cloth to remove dirt and smudges.
   iii. Clean all glass, inside and out, biannually.
   iv. Clean stubborn smudges with a soft cloth lightly damp with ethanol; do not touch surrounding wood with cloth. If ethanol contacts surrounding wood, blot with a dry soft cloth and re-wax if necessary.

v. Inspect as a part of the annual conditions survey.

d. Unacceptable Maintenance Methods and Materials:
   i. Do not use cleaners with dyes.
   ii. Clean with solution-damp cloth only. Never spray liquid onto surface.

7. Metals

a. Definition and Function:
   i. Chrome surfaces include: light fixtures, handles, toaster, etc..
   ii. Enameled surfaces such as the refrigerator, stove, etc.
   iii. Brass and copper hardware and screws
   iv. Steel hardware and flashing

b. Problems and Symptoms:
   i. Chrome veneer may crack or split from steel base.
   ii. Stainless steel is subject to rust if moisture is trapped on the surface or if the thin oxidizing layer is worn through.
   iii. Raw metal can be worn away by excessive cleaning or harsh cleaning products.

c. Typical Maintenance Requirements:
   i. Allow metals to weather and corrode naturally.
   ii. The bathtub, refrigerator, and stove are not operable and therefore only need corrosion preventive maintenance.

d. Maintenance Methods and Materials:
   i. Clean doorknobs and other frequently used metal objects with a damp cloth daily.
   ii. Clean other interior metals weekly with a damp cloth.
   iii. Keep metals as dry and clean as possible.
   iv. Use a light-suction vacuum to remove dust from hard-to reach areas.
   v. Inspect as a part of the annual conditions survey.

e. Unacceptable Methods and Materials: Any cleaners or abrasive brushes that will remove the natural patina.

8. Porcelain Fixtures

a. Definition and Function:
   i. Bathroom sink, toilet and bathtub
   ii. Double-basin kitchen sink.

b. Problems and Symptoms:
   i. Porcelain fixtures are steel, coated with a layer of baked-on porcelain. They are prone to rust above or below the ceramic

coating, as well as chipping and cracking. The porcelain layer may also wear through.

c. Maintenance Methods and Materials:
   i. Porcelain fixtures must be kept free of dust and mineral deposits to avoid moisture retention, which will encourage rust.
   ii. Wipe dirt from toilet and sinks with water and a soft cloth weekly.
   iii. Dust unused bathtub with water and a soft cloth monthly.
   iv. Mineral deposits may be cleaned with a soft cloth moistened with ethanol.
   v. To remove stains from toilet bowl, pour: ¼ c. baking soda into bowl and drizzle with vinegar. Let sit for ½ hour, scrub and flush.[1]

d. Unacceptable Maintenance Methods and Materials:
   i. Do not use aggressive acidic or abrasive cleaners.
   ii. Avoid scratching ceramic, stainless steel, or glass fixtures. Remove watches, rings, etc before cleaning. Protect from damage from shoes, etc. with rubber mats.
   iii. Use damp cloth only, no spray bottles.
   iv. Never "re-finish" a porcelain fixture, the "finish" is just an impermanent acrylic layer that damages the original surfaces.

9. Screens

a. Definition and Function:
   i. Copper screens cover the porch and operable windows. The screening is held with wood framing, attached with metal screws.

b. Problems and Symptoms:
   i. Screens are susceptible to tearing and corrosion.
   ii. On the porch, the screen roof collects debris.
   iii. Wood frames may deteriorate, warp, or crack.
   iv. Metal hardware may loosen, break, or corrode.

c. Typical Maintenance Requirements:
   i. Copper screens must be brushed monthly to avoid dirt buildup which is unsightly and damaging.
   ii. The screen "roof" must be kept free of debris daily so that it will not sag or tear.
   iii. Wash screens with a mild detergent in spring and fall.
   iv. Non-historic galvanized steel tubing at corner framing must be kept painted.
   v. Treat wood framing as all exterior wood.
   vi. Brass, copper and steel hardware should weather naturally. If replaced, match as closely as possible, and retain fragments of

[1] Cleaning process found in http://www.ecocycle.org/hazwaste/recipes.cfm, accessed August 2008.

original material. If tightened, ensure that screw slots are oriented horizontally.

vii. Inspect screens as a part of the annual conditions survey.

viii. Evaluate screens for re-painting and re-stretching every 10 years

ix. Screen is estimated to need replacement every 20 years.

d. Precautions: The screens are not original to the house, but patina with age, so cannot be replaced without care. The same rule applies to any wood or hardware.

e. Maintenance Materials

i. Cleaning agents must be safe for copper, wood, brass, and concrete. Runoff must not damage the surrounding landscape.

ii. Mild detergent (to be approved by a conservator- must not contain sodium chloride or dyes) and water solution for general cleaning.

10. Furniture and Rugs

a. Definition and Function:

i. Frank Lloyd Wright Designed Furniture

- Living Room
  - Bookshelves
  - 2 Small End Tables - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
  - 1 Chair - 9/16” 3-ply plywood and cypress veneer, solid cypress trim, original cushions.
  - 1 Ottoman - 9/16” 3-ply plywood and cypress veneer, solid cypress trim, original cushions.
  - 2 Large Tables - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
- Kitchen
  - 2 Kitchen Cabinets- 9/16” 3-ply plywood and cypress veneer.
- Dining Room
  - Bookshelves
  - 3 Large Tables - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
  - 4 Chairs - 9/16” 3-ply plywood and cypress veneer, solid cypress trim, original cushions.
- Sanctum
  - Bookshelves
  - 1 Large Desk - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
  - 1 Chair - 9/16” 3-ply plywood and cypress veneer, solid cypress trim, original cushions.
- Children’s Bedroom
  - Bookshelves

- 1 Large Table - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
- 1 Bed Frame- 9/16” 3-ply plywood and cypress veneer, solid cypress trim.

- Master Bedroom
  - Bookshelves
  - Closets- solid cypress with steel reinforcement.
  - 1 Large Desk - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.
  - 2 Bed Frames - 9/16” 3-ply plywood and cypress veneer, solid cypress trim.

ii. Replica Furniture

- Living Room
  - 8 Chairs - 9/16” 5-ply plywood and cypress veneer, solid cypress trim, cushions.
- Patio
  - 1 Table - 9/16” 5-ply plywood, solid wood trim.
- Rugs throughout the house resemble originals, but are new

b. Problems and Symptoms:
   i. Composed primarily of cypress veneer plywood, the furniture is susceptible to de-lamination (evidenced by ripples, bubbles or split ends).
   ii. Fabric upholstery and wood may fade if exposed to direct sunlight.
   iii. Rugs may trap moisture or harbor dirt and insects.
   iv. Rugs might become unsightly from wear or staining.

c. Typical Maintenance Requirements:
   i. Avoid exposure to sunlight and moisture.
   ii. Keep fabric clean and dry. Original cloth must be kept away from visitor activity and sunlight.

d. Maintenance Materials and Methods:
   i. Clean with damp cloth weekly.
   ii. Buff historic wood pieces with paste wax annually.
   iii. Clean historic cloth with a low-suction vacuum.
   iv. Non-historic furniture and rugs do not require particularly gentle methods, but should be cleaned in a manner which does not harm surrounding materials.



Figure 29: A low suction, screened vacuum (CCI Newsletter 32 (November 2003); x).

v. Inspect furniture as a part of the annual conditions survey.
vi. Vacuum rugs weekly, spot-clean with specified solution: Mix together**:** ¼ c. vegetable oil-based liquid soap, 3 tbsp. (or more) water.Whip ingredients in bowl with egg beater. Rub foam into problem areas of the rug. Rinse well with water.[2]
vii. Annually, evaluate rugs for professionally cleaning, not in place
viii. If a rug gets wet, pull it up from the ground while it dries.

e. Precautions:
i. Avoid using solvents which may dissolve the plywood glue.
ii. Avoid spot remover or fabric cleaner.
iii. Do not remove tarnish from metal hinges or screws.
iv. Avoid allowing modern cleaning agents acceptable for rugs touch other elements in the house.
v. Do not re-arrange rugs without approval from site director.

11. Mechanical Systems

a. Definitions and Functions:
i. The radiant heating system distributes hot water through the floor. Designed by Wright and re-interpreted by Quinn-Evens in 1995, the new system includes a boiler (see Appendix for boiler manual), centrifugal pump, and plastic piping cast into the concrete slab.
ii. The HVAC system heats and cools through the central air system. It consists of an indoor unit, an outdoor unit, a compressor, and distribution ducts.
iii. The thermostat controls the HVAC system.
iv. The point-of-use electric water heater supplies hot water for all applications in the house other than the radiant floor heating.
v. The water filter removes minerals and deposits from water.
vi. The dry-pipe sprinkler system extinguishes fires by releasing pressurized water.
vii. Security alarms alert occupants and authorities of emergencies such as fire or forced entry.

b. Typical Maintenance Requirements:
i. Drain water heater completely annually.
ii. Drain 1 gallon of water from the water heater monthly to decrease build-up of hard water deposits.
iii. Lift and release water heater lever handle on the temperature relief valve annually.
iv. Test security alarm weekly. See ADEMCO manual in Appendix for procedure.
v. Test thermostat weekly. See manual in Appendix for procedure.
vi. Virginia Sprinkler tests fire sprinkler system and extinguishers annually.

[2] Cleaning process found in http://www.ecocycle.org/hazwaste/recipes.cfm, accessed August 2008.

c. Problems and Symptoms:
    i. Water heater:
        1. May retain bacteria or sediment causing noise or smell.
        2. May leak due to a faulty pressure-release valve.
    ii. HVAC:
        1. May fail because the heating or cooling load has exceeded the ability of the system due to extreme weather.
        2. If the HVAC seems to be less effective try the following:
            a. open vents which might be closed.
            b. check for open windows or doors.
            c. remove ice or debris from the outdoor unit.
            d. check for blown fuses or circuit breakers.
            e. reset outdoor unit on/off switch.
            f. if none of the above works, have the HVAC checked by a professional.
    iii. Alarm keypad will beep when 9 volt or 3 volt batteries in sensors get low. Read messages and consult manual for replacement.
    iv. Thermostat system will not function when electricity is out.
    v. HVACs will not function when electricity is out.
    vi. Sprinkler system may rust, and penetration of a pipe wall can result in the activation of the system. Examine any signs of corrosion.

d. Precautions
    i. Only certified professionals may inspect and service systems.
    ii. Read and understand all manuals to ensure correct maintenance and use of the various mechanical systems.
    iii. Inspect, clean and flush the water heater.
    iv. The gas-fired boiler is not user-serviceable. If occupants smell gas, immediately call gas supplier from outside the house. If not reachable, call the fire department.
    v. Alarm system: if burglar alarm is beeping rapidly when you open the door, someone has tripped the system. Do not enter, retreat to a safe location and call the police.
    vi. Place a laminated copy of “50 Quick Guides to Basic System Functions” and “Summary of Audible/Visible Notifications” next to alarm systems (see Appendix 51-52)

e. Frequency of Maintenance:
    i. Inspect boiler prior to seasonal activation, and monthly when in use, follow inspection list provided in manual.
    ii. Flush water heater yearly, follow inspection list provided in manual.
    iii. Lift and release water heater lever handle on the temperature relief valve annually.
    iv. Test security alarm after any alarm event.

v. Professionally inspect all mechanical systems every 5 years.
vi. Water heater must be replaced every 20 years to avoid leaks. (See Appendix for water heater manual).
vii. Inspect each system as a part of the annual conditions survey.

Section 6: Supporting Information

Supplies

Supply Schedule/Information

Light Bulbs: (see supply replacement map for locations)

Type (A): Regular Incandescent, 100w/120a or similar compact florescent
Widely available

Type (B): Compact Fluorescent, Type E26, 11w SPARSAM
Available at IKEA

Type (C): Tubular Incandescent, 40w 120a GE Lumaline Lamp.
Available at http://www.buylightfixtures.com

Water Filters

Use 10”x4.5” water filters (American Plumber Model W10-PR**)**
Available at any hardware or plumbing store
Available at
http://www.waterfilters.net/culligan/wholehouse/replacement_filters/Wholehouse-10-Inch-Big-Blue.htm

Air Filters

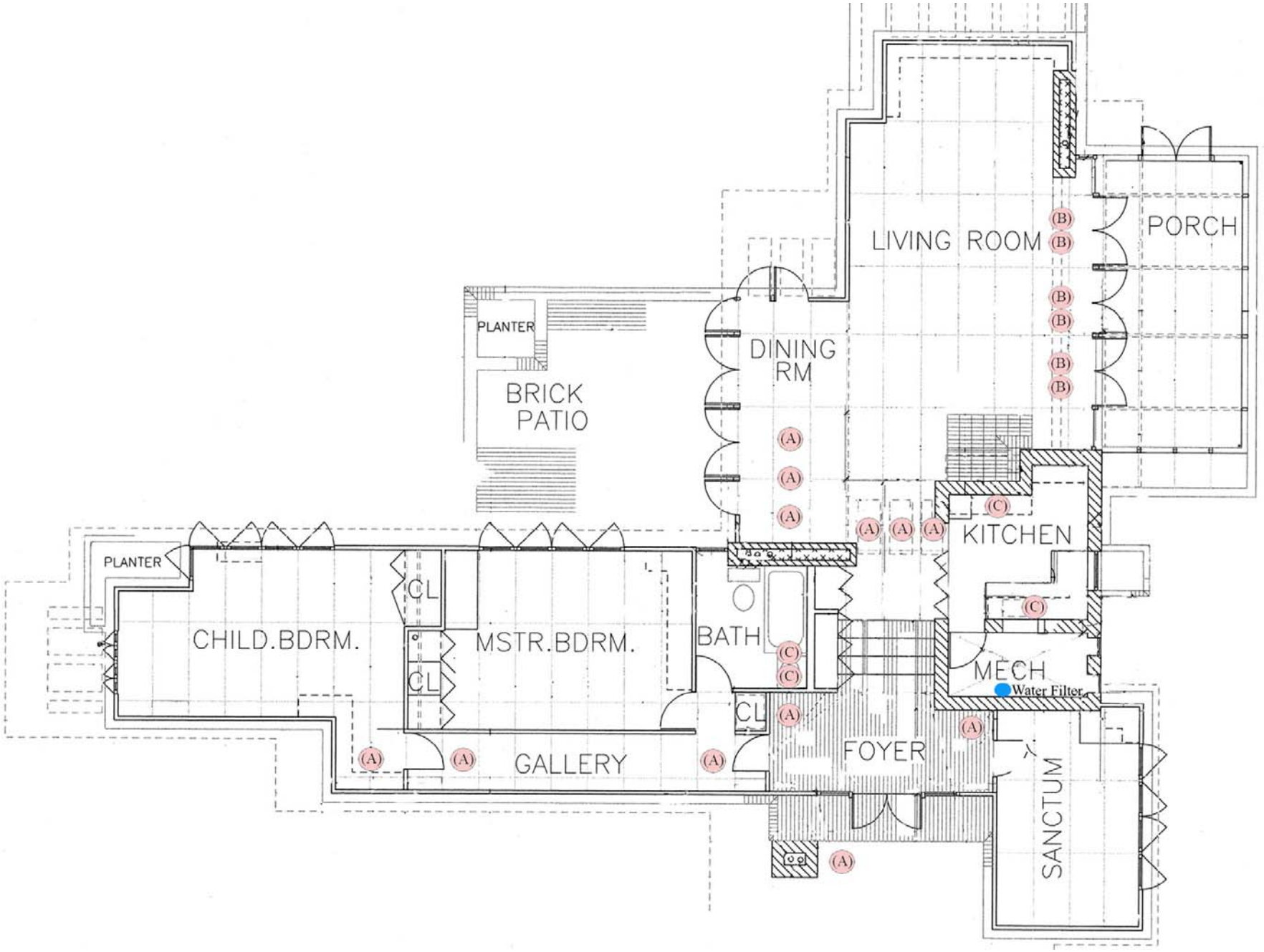
Electronic Filter

Smoke Detectors

Hardwired, no maintenance needed. See Quinn-Evans 1995 specifications section 16721 part 2.4.

Disposal:

Compact florescent bulbs contain mercury and must be recycled separately from other glass products. The easiest way is to store used bulbs and take them to an approved recycler (Home Depot offers free CFL recycling, and local recycling centers may also have a specified disposal). Alternatively, one can order a mail-in recycling kit from https://www.thinkgreenfromhome.com/SafeConvenient.cfm



Frank Lloyd Wright's Pope-Leighey House
Lightbulb Replacement Key

Floor Plan
Not to Scale

NATIONAL TRUST FOR HISTORIC PRESERVATION

Stockpiled Materials

Stockpiled materials are extra items either ordered in advance or leftover from the 1995 move of the house. Materials salvaged from the house may also be considered stockpiled, but should be documented carefully and given extra protection. Any materials added to or taken away from the stockpiles should be documented on the following form.

Brick

There is a stockpile of patio brick, which may be left outdoors so that it weathers naturally at the same rate as the house. It must be kept off the ground and stacked to drain water (to avoid damage by the freeze-thaw cycle).

Wood

If wood is original to the house, it must be documented and stored in a safe, dry location. A small amount of extra cypress is located in the storage shed mixed with several other boards. It is recommended that cypress be stored separately from other woods, since it is much more valuable. The cypress may be stored outside, but it is not recommended to be pre-weathered, since it wears quickly. Spare cypress must be kept free from insects and water, and labeled so that it is not used carelessly.

Glass

Glass should be stored inside, either in the maintenance shed or the Woodlawn mansion. All glass should be padded, stored well above floor level and away from trafficked areas. The plate glass used in the house should be wrapped with a protective material and labeled with a warning since it may have sharp edges.

Hardware

All hardware should be kept away from water or any other corroding substance. Small pieces should be bagged and labeled to avoid loss or separation. There is no need to age metal pieces, since they can be chemically aged if necessary to match, but neither is there any need to wax or polish them to avoid a natural patina.

Light Bulbs

It is recommended that type (B) and type (C) bulbs be stockpiled in case they are discontinued (especially the tubular incandescent, since a ban on incandescent bulbs is probable in the near future). Supplies of this type are usually stored in the cabinet opposite the kitchen.

Other

Any other materials should be stored in the maintenance shed and documented on the form on the next page. If in doubt, always ask the maintenance director for assistance.

Documentation of Stockpiled Materials

Material Type	**Date**	**Description of Use**	**Amount Used**	**Initials**

References for Professional Conservation

Conservators should be only contacted in conjunction with the Graham Gund Architect.

Andrew Fearon
Architectural Conservator
MILNER + CARR CONSERVATION, LLC
1431 Cadwallader Street, Philadelphia, PA 19122
Tel: (215) 763-8090 Fax: (215) 763-8098
afearon@milnercarrconservation.com

Terry L. Amburgey, Ph D
Giles Distinguished Professor
Department of Forest Products
Box 9820
Mississippi State University 39762-9820
Tel (662) 325-3057 Fax (662) 325-8126
tamburgey@CFR.MsState.Edu

Jason Church
Materials Conservator
National Center for Preservation Technology and Training
645 University Parkway, Natchitoches LA 71457
Tel. (318) 356-7444 Fax (318) 356-9119
jason_church@contractor.nps.gov

Pam Kirsch
Wooden Artifacts Conservator
Tel. (518) 428-1424
PGKIRSCH@aol.com

Section 7: Woodlawn and Pope-Leighey Emergency Procedures

- Important Contact Information
- Emergency Phone Numbers
- Inclement Weather Policy
- Introduction
- Employee Evacuation Procedure
- Bomb Threats and Suspicious Objects
- Chemical Spills and Fires
- Disturbed Visitor
- Electrical Power Loss
- Explosions
- Fire
    - Fire Extinguishers
    - False Fire Alarm and Panel Reset
- Injuries and Illnesses
- Power Shut-Off
- Propane Gas Tank Shut-Off
- Salvage
- Services and Supplies
- Locations of Smoke/Heat Detectors and Alarms
- Weather Emergencies
- Accident/Illness Report
- Map of Evacuation Assembly Areas
- Map of Fire Extinguishers & Smoke/Heat Detectors
- Map of Grounds Electrical Outlets
- Map of Water Lines

Woodlawn and Pope Leighey

Emergency Procedures

Updated 07-24-08

Have Doubts?

Call:

911

Important Contact Information

Woodlawn **Pope-Leighey**	**703-780-4000** **703-780-3264**
Duane Hill **Buildings and Grounds Superintendent**	**Cell: (703)517-7745**
Laurie Ossman, ext. 26334 **Executive Director**	**Cell: (703)780-8509**
Stacy Hawkins, ext 33 **Site Administrator**	**Home: 301-464-0720**
Joan Mitchell **Woodlawn Stables and Mason House**	**Home:** **Cell:**
Dottie Palmer **Merchandising**	**Cell: 703-851-4856**

Emergency Phone Numbers

Fire/Rescue	911
Police	911 703-360-8400 (non-emergency)
State Police	703-323-4500
Poison	800-552-6337 (statewide) 703-379-3070
FBI	202-324-3000
US Marshals Service	703-235-2713
US Secret Service	202-435-5100
Mt. Vernon Hospital	703-664-7000
Chemical Spill	800-424-8802
NTHP Headquarters	202-588-6000

Remember to tell them:

1. Nature of emergency
2. State, city, or town
3. Street and number
4. Exact location
5. Telephone number

Inclement Weather Policy

Office Staff: Closed when Federal Government closes
Museum – Weekday: Closed when Fairfax County Schools are closed
Museum – Weekend: Executive Director makes the call by 8:00 am, then informs the weekend supervisor, who then calls the guides.

Introduction

Many emergencies can be prevented by daily inspection of your site, reporting possible problems to the proper staff person.

In the event you see or are informed of an emergency, please stay calm and follow the instructions on the following pages.

Reading, studying and reviewing this plan will aid you in keeping calm and taking correct action in an emergency.

After reporting an emergency, DO NOT use the telephones, we have only four main lines at Woodlawn which must be used for outside emergency calls. In the event of a power outage, the telephone system will not function – see electrical power loss for more information.

In any case, notify the Executive Director (x25) of problem first, if the director is not available, please notify an administrative staff person.

Employee Evacuation Procedure

In advance, each guide, volunteer, and staff person should:

1. Understand the evacuation plan.
2. Recognize the sound of the fire alarm.
3. Know at least two ways out of the building from his/her normal work station.

When you hear the alarm or the staff tells you to leave the building;

1. Remain calm.
2. Stop what you are doing and leave. Instruct visitors to leave the building in an orderly fashion and show them the exit to use.
3. Guides and volunteers are responsible for ensuring that all visitors evacuate.
4. The highest ranking staff member in each department is responsible for ensuring the evacuation of all members of his/her department. In addition, every employee should check that all others in the workspace are leaving as told.
5. As you are leaving, quickly check nearby restrooms and other spaces for staff or visitors.
6. Take with you: your car keys, purse and/or briefcase. DO NOT try to take large or heavy objects.
7. Accompany and assist handicapped personnel, visitors, and any others who might need assistance.
8. Shut all doors behind you as you go. Closed doors can slow the spread of fire, smoke and water.
9. Proceed as quickly as possible, in an orderly fashion. Do not push or shove, hold handrails when on stairs.
10. Once outside, move away from the building. Assemble in the areas designated in the evacuation plan at the end of this document. STAY OUT of the Woodlawn carriage circle and the Pope-Leighey driveway as these are staging areas for the fire department vehicles. Make sure no visitor enters or re-enters for any reason. Do not let anyone go down the drive as fire department vehicles may be coming up at a high rate of speed.
11. If the problem is at Woodlawn, a staff member should direct the fire department to the fire alarm panel located in the southwest room to determine which zone the alarm came from. If the problem is in Pope-Leighey, a staff member should direct the fire department to the alarm panel located in the utility room. Refer to the fire section for more information.
12. Other situations which might call for evacuations of a building or part of a building: personal and visitor safety, orders of the police or fire department or when a seriously injured or ill person is in a building.

Bomb Threats and Suspicious Objects

It is possible, although highly unlikely, that an administrative staff person, guide or volunteer might receive a threatening telephone call, letter, or suspicious parcel or discover a suspicious object somewhere on the premises.

Telephone Threat

1. Remain calm.
2. Listen carefully. Be polite and show interest. Try to keep the caller talking, so that you can gather more information.
3. If possible, write a note of information during the call or as soon as the caller hangs up.
4. Call the Executive Director (x25) or Shop (x27) and have an administrative person come to you.
5. The administrative person will call the police. When they arrive, direct them to the person who took the call.
6. Call the other staff to aid in an evacuation, if needed.
7. Promptly jot down as many details as you can remember. This information will be needed for police interviews.
8. Do not discuss the threat with other staff or visitors.
9. Be guided by the staff and police department. If evacuation is ordered, proceed to one of the areas designated in the evacuation plan at the end of this document.

Letter/Parcel/Object

1. Be calm.
2. Keep everyone from handling it or going near it.
3. When notified, find out location, number of people involved, and if outside emergency services have been called.
4. Call Executive Director (x25) or Shop (x27) to have an administrative person come to you.
5. Administrative staff will call police and give the location.
6. Promptly write down everything you can remember about receiving the letter or parcel or finding the object. The information will be needed for the police interviews.
7. Be guided by the police department. If evacuation is ordered, proceed to one of the areas designated in the evacuation plan at the end of this document.

Chemical Spills & Fires

All chemical spills and fires, no matter how small, must be reported to the fire department.

Spill

1. If toxic chemicals come in contact with your skin immediately flush the affected area with clear water.
2. When you notify the administrative staff, pass along the location and number of people involved.
3. A staff person will determine what additional outside assistance or other services are needed. Call if necessary and render the minimum first aid.
4. If there is danger present, evacuate to the areas designated in the evacuation plan at the end of this document.

Fire

1. Remain calm.
2. Evacuate to the areas designated in the evacuation plan at the end of this document.
    a. Never allow the fire to come between you and the exit.
3. See fire section.

Disturbed Visitor

1. Remain calm.
2. **Remember: Self preservation before historic preservation!**
3. Call Executive Director (x25) or Shop (x27) if possible and pass along the location and number of people involved.
4. Staff will go to the location of the emergency.
5. Do not argue with the person. Evacuate visitors and staff from troubled person and area.
6. A staff person will determine what outside assistance or other services needed. Call if directed by administrative staff.

Electrical Power Loss

1. Remain calm.
2. If you are in an unlighted area, proceed cautiously to an area with window light. Emergency flashlights are located in the cabinets next to the phone at the Pope-Leighey House.
3. Be mindful of public safety and the security of the collection. You can give tours however you should not allow visitors to go into darkened areas. Staff should assist guides and visitors if needed.
4. Call Maintenance at 703-780-4000 (x30) from the Pope-Leighey phone. Staff will then call Dominion Power at 703-455-4408
5. If the power is to be off for half a day or more, the museum must close.
6. Stand by for instructions from staff and if instructed, go to the areas designated in the evacuation plan at the end of this document.

Woodlawn and Pope-Leighey are on different electrical grids. Therefore, a power outage at Woodlawn does not mean power is out at Pope-Leighey.

Explosions

Chemical accidents, leaking gas, faulty boilers or even bombs or falling aircraft could be the cause of life threatening explosions.

1. Remain calm.
2. Be prepared for possible further explosions.
3. Crawl under a table or desk.
4. Stay away from windows, mirrors, overhead fixtures, filing cabinets, bookcases and electrical equipment.
5. Staff will go to problem area to determine what outside services are needed. Call if necessary.
6. If evacuation is ordered, proceed to the areas designated in the evacuation plan at the end of this document.
7. If fire is involved, see fire procedures.
8. Staff will direct emergency services to the incident location.
9. Be prepared to shut off building power (see power shut-off list).
10. Do not move seriously injured persons unless they are in obvious immediate danger.
11. Open doors carefully. Watch for falling objects.
12. Do not use matches or lighters.
13. Avoid using telephones except for emergency calls.

Fire

Woodlawn and Pope-Leighey have never had a fire which caused monetary loss. There is no reason for us to ever have such a fire if we continue to promote fire prevention, report all hazards to the staff, and continue to educate ourselves on all aspects of fire prevention. A fire hydrant location map is included at the end of this document. If a fire occurs:

1. Remain calm.
2. **Remember: Self preservation before historic preservation!**
3. If the fire is small, attempt to put it out with a fire extinguisher (see Fire Extinguisher location list). If you can not contain it, evacuate.
4. Notify Executive Director (x25) or Shop (x27) giving your location and problem.
    a. All fires, no matter how small, must be reported to the fire department.
5. Staff will call the fire department.
6. If there is a fire, the staff will call on line 3 or 4 as Line 1 and 2 should be kept clear for emergency calls. In case of a power failure at Woodlawn, call from Pope-Leighey or the Woodlawn emergency phone located in the mailbox shelving.
7. If electrical equipment is on fire, disconnect the item if it is safe to do so. Pull the plug or throw the circuit breaker.
8. Do not break windows. Oxygen feeds fire.
9. Do not open hot doors. Before opening any door touch it near the top. If the door is hot or smoke is visible, do not open the door.
10. Do not put yourself at risk by trying to save personal items or museum collections objects.
11. Evacuate your building and get all visitors outside (see employee evacuation procedure). Close the windows and doors if time allows.
12. Never allow the fire to come between you and the exit.
13. Watch all doors after people are out of the building. Allow only fire department personnel and staff to enter.
14. DO NOT RESET the fire alarm panel or silence alarms until the fire department has arrived and checked out the building. This includes a false alarm.
15. If there is a fire at Woodlawn, keep carriage circle drive clear as it is the designated staging area for the fire department vehicles. If there is a fire at Pope-Leighey, please keep driveway and area immediately surrounding the house clear.
16. Set up area security. Do not let anyone go down the drive as fire department vehicles may be coming up at a high rate of speed.
17. Do not return to emergency areas until directed to do so by the staff or fire department.
18. For more information on the collection and fire, see section “Salvage.”

Fire Extinguishers

1. ABC – ordinary combustibles, flammable liquids, electrical equipment
2. BC – flammable liquids, electrical equipment
3. D – metals, we do not have this type on the site

To use the fire extinguisher

1. Pull ring out of handle.
2. Squeeze handle
3. Direct nozzle to base of fire

Fire Extinguisher Locations

see map of locations for Woodlawn and Pope-Leighey at the end of this document.

Location		Type
Woodlawn		
Basement	Room 8B (on stairs, in server room)	ABC - 5 lb.
	Room 7 (wall in well room)	Water
	Room 5 (in center hall room)	ABC - 5 lb.
	Room 3 (furnace room)	BC - 30 lb.
1st Floor	Room 107 (museum shop)	ABC - 5 lb.
	Room 102 (between reception room and parlor	ABC - 5 lb.
	Room 110 (southwest room)	Water
	Room 106 (kitchen)	BC - 10 lb
	room 103 (next to carriage entrance, behind door in the basement stairwell)	ABC - 5 lb.
2nd Floor	Room 220 (north wing, at top of stairs)	ABC - 5 lb.
	Room 212 (in hallway before rooms 203 & 213) - Northwest and East chambers	ABC - 5 lb.
	Room 219 (in hallway before Rooms 205&214) - Southwest and East chambers	ABC - 5 lb.
Pope-Leighey		
	Kitchen	ABC, BC - 5lb
	Office	ABC, BC - 5lb
Maintenance Office		
	North Wall	ABC,BC - 5 lb
	Vehicle Bay	ABC,BC - 5 lb
Truck		
	Cab	ABC - 5 lb.

False Alarm and Panel Reset

If false fire alarm is sounded, you should follow the fire procedures. DO NOT RESET or silence the alarm until the fire department has arrived and checked out the building. Look for continuous fire/smoke or red indicator lights in ceiling smoke detectors. Once the building has been checked out and the source of alarm found, the staff will reset the system.

To silence the alarm

1. Press the digit “1” (reset alarm) on the “Silent Knight” touchpad, then press “Enter”
2. Press “1,2,3,4,5”
3. Proceed to the ADT touchpad and enter “ 1,2,3,4,5”
4. Press “Reset”
5. Press “Alarms”

To clear the memory

1. Press “1,2,3,4,5”
2. Press “Clear Memory”
3. Press “Enter”
4. Press “1,2,3,4,5”
5. Memory is now clear, “Normal” should show on the display screen.

Injuries and Illness

Staff, Guides, or Volunteers

1. Notify the Executive Director (x25) or Shop (x27) immediately. Give the location and the number of people involved.
2. Staff will be dispatched to your area to determine what additional treatment or outside emergency services might be needed, and will call if necessary.
3. Unless it is a life threatening situation, do not attempt to render any first aid yourself before staff or additional personnel arrive. Render minimum first aid if necessary.
4. Do not attempt to move a person who has fallen and appears to be in pain.
5. Avoid unnecessary conversation with, or about, the injured person. You might increase the person's distress or fears and contribute to their medical shock. Just reassure the person.
6. Direct emergency services to location if required.
7. After the person's needs have been taken care of and the incident is concluded, fill out an Accident/Illness Report.
8. Assist the staff in filling out worker's compensation or medical insurance forms if necessary.
9. Leave the report in the Building Superintendents' mailbox.

Visitors

1. Notify the Executive Director (x25) or Shop (x27) immediately. Give the location and the number of people involved.
2. Staff will be dispatched to your area to determine what additional treatment or outside emergency services might be needed, and will call if necessary.
3. Unless it is a life threatening situation, do not attempt to render any first aid yourself before staff or additional personnel arrive. Render minimum first aid if necessary.
4. Secure the area for the privacy of the ill or injured person. Evacuate an area of the building if necessary.
5. For minor injuries, a first aid kit is located in room 110 (southwest room) closet at Woodlawn and in the closet at Pope-Leighey. The first aid material should be applied by the injured person, parent, teacher, or guardian.
6. Do not attempt to move a visitor who has fallen and appears to be in pain.
7. Avoid unnecessary conversation with, or about, the injured person. You might increase the person's distress or fears and contribute to their medical shock. Just re-assure the person.
8. Do not discuss the possible cause of an accident or any conditions which may have contributed to the cause.
9. Staff will direct the emergency services to the location.
10. After the visitor's needs have been taken care of and the incident is concluded, have them fill out the Accident/Illness Report and leave a copy in the Building Superintendent's mailbox.

Power Shut-Off

During a fire or water damage situation, you might have to shut off power to part of, or all of the buildings.

At Woodlawn, go to the kitchen panel located in the basement of the house – Room 8A (the room before the kitchen) closet, look at the electrical inventory and locate the area to be shut off. Push the appropriate circuit breaker switch to off position. Put a piece of tape and note over breaker switch so no one will put it back on until ready to do so. The other electrical panel boxes in the mansion are located in:

- Room 3 (furnace room)
- Room 9 (basement collections storage)
- Room 10 (paper storage)
- Room 4B (school program storage – north wall behind closet)
- Room 211 (northwest room closet)

The panel box in the maintenance office is located to the left of the tool chest.

The panel box at Pope-Leighey is located in the furnace room to the right.

Propane Gas Tank Shut-Off

The only two buildings on the property that are heated by propane are the Pope-Leighey House and maintenance shop. The propane tank at Pope-Leighey is located in the wooded area directly in front of the entrance. The tank to the maintenance shop is located directly behind the garage.

If there is a leak in the tank or valves:

1. Evacuate the area
2. Call the fire department
3. Do not use open flame or electricity in the area.

To shut off the gas:

1. Lift cover on top of tank
2. Turn valve clockwise until tight.

Salvage

Emergency service personnel may remove objects from a building that is threatened. The museum staff will have to decide where to direct or bring objects once outside. A staff person, in cooperation with the fire chief, could direct fire personnel in a “salvage” operation. When the fire chief approves, staff members can continue inside salvage operation.

In general, if Woodlawn is burning, clean objects can be brought to the Pope-Leighey House for safe keeping. Dirty materials or smoked objects should be brought to the maintenance shop. However, the salvage locations will depend upon the number and kind of objects. It is possible to salvage a small number of objects by removing them to another part of the building. If the number and kind of objects are large and damaged, it is preferable that they be brought to a part of the same building that is equipped with heat and security.

Services and Supplies

Police	Fairfax County - 911
	Fairfax County Sheriffs Department – (703) 246-3227
	State Police – (800) 572-4510, (703) 323-4500
Power	Dominion Power – (703) 455-4408
Water	Fort Belvoir – (703) 806-3109
Telephone	Verizon – (703) 954-6222
Alarms	Watch Guard of the Potomac, (703) 938-2400
Architect	Barbara Campagna, NTHP (202) 588-6261
Electricians	Truland (703) 524-4900, Emergency # (703) 516-2600
Plumbers	Griffin Plumbing (703) 780-5400
Heating Fuel/ Services (Woodlawn)	Griffith (703) 823-1400
Heating Fuel/ Services (Pope-Leighey, Grandview)	Cambell's (703) 780-6400
Heat pump/Furnace Service (Pope-Leighey, Grandview)	Cropp-Metcalfe (703) 941-8800
Appliance Repair	R.A. Dobson Emergency # (703) 241-0888
Fridge/Freezer	Nationwide Refrigeration (703) 534-6100
Locksmith	Cintron Safe and Lock Co. Emergency # (703) 768-2060
Rental and Tents	Rent-All Center (703) 780-8282 Emergency # (703) 360-2976
Tree Removal	Woodlawn Tree Service (703) 780-8040

Locations of Smoke/Heat Detectors and Alarms

Smoke/Heat Detectors

Woodlawn

Basement	Room 2 (men and woman's public restrooms
	Room 3 (furnace room)
	Room 10 (paper storage - 3)
	Room 9 (basement collections storage -2)
	Room 4B (School Program Storage)
	Room 4A (Kitchen)
	Room 5 (center hall)
	Room 5 (center hall closet)
	Room 6 (pub)
	Room 11 (program storage)
	Room 7 (well room - 4)
	Room 8A (beer/wine storage)
	Room 8 B (server room)
1st Floor	Room 101&107 (museum shop- 2)
	Room 101 (reception room - 2)
	Room 102 (living room)
	Room 108 (bedchamber)
	Room 103 (center hall - 2)
	Room 104 (parlor)
	Room 109 (dining room)
	Room 105 (underwood room - 2)
	Room 106 (kitchen)
	Room 110 (southwest room)
2nd Floor	Room 220 (hallway, north wing - 4)
	Room 209 (office - 1st alert, battery powered)
	Room 200 (office- 1st alert, battery powered)
	Room 210 (office supply room office - 1st alert, battery powered)
	Room 211 (office - 1st alert, battery powered)
	Room 202 (north wing bathroom - 1st alert, battery powered)
	Room 203 (northeast chamber)
	Room 212 (northwest chamber)
	Room 213 (center hall)
	Room 204 (linen room)
	Room 214 (southwest chamber)
	Room 205 (southeast chamber)
	Room 219 (south wing hallway - 3)
	Room 206 (curatorial staging room - 1st alert, battery powered)
	Room 207 (southeast curatorial storage - 1st alert, battery powered)
	Room 208 (Lounge - 1st alert, battery powered)
	Room 216 (Archives - 1st alert, battery powered)
	Room 217 (office - 1st alert, battery powered)
	Room 218 (bathroom - 1st alert, battery powered)
Attic	South center an north ceiling

Pope-Leighey

	Living Room
	Dining Room
	Sanctum
	Hallway
	Master Bedroom
	Children's Room

Alarms

Woodlawn

Basement	Room 3, south wall (furnace room)
	Room 5 south wall (center hall)
	Room 8A, north wall (beer/wine storage)
1st floor	Room 101 & 107 (museum shop)
	Room 110 above double doors (southwest room)
	Room 220 beam in middle (north wing)
	Room 219 beam in middle (south wing)
Attic	Center section, on overhead beam

Pope-Leighey

	Entrance hallway
	Living room
	Master bedroom
	Children’s bedroom

Weather Emergencies

Violent storms of thunder and lightning, heavy rain, hurricanes, snow, or tornados may occur.

During Museum Hours – Weekday

1. Remain calm.
2. Close any open doors and windows.
3. Stay away from glass doors and windows.
4. Watch visitors for security problems.
5. Do not give tours, only answer questions from visitors. Continue watching the visitors.
5. If fire alarm goes off, evacuate to the areas designated in the evacuation plan at the end of this document.
6. If power goes off at Woodlawn, use the emergency phone located in the mailbox shelving.
7. The Executive Director will make the final decision to close early.

During Museum Hours – Weekend

The Executive Director will decide if the museum is closed or open by 8:00 am, at which time the weekend supervisor will be notified. The weekend supervisor will then call the guides on the schedule for that day.

Hurricanes

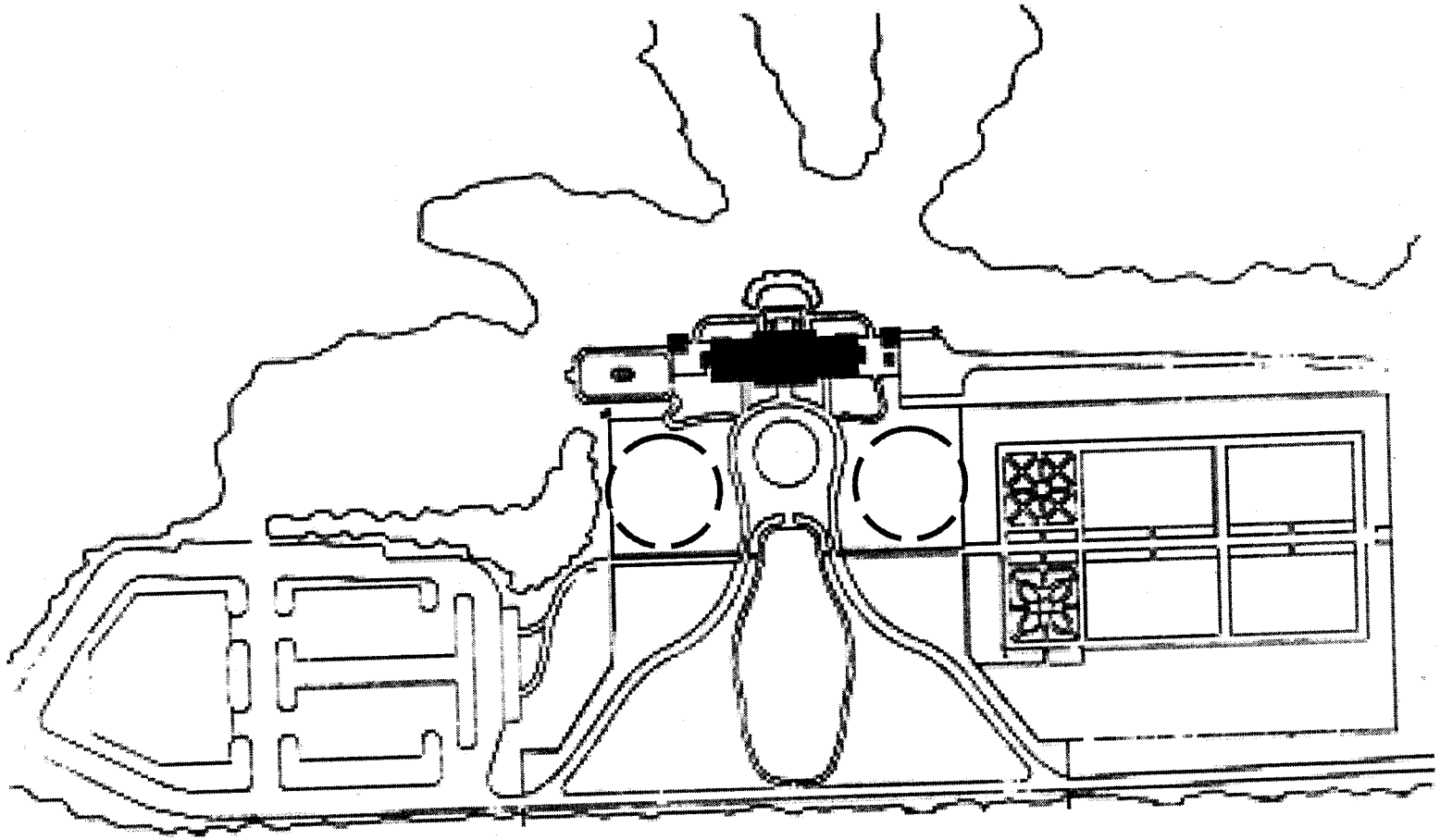
- Clean gutters and drains, if time allows.
- Close exterior and interior shutters at Woodlawn.
- Place all outside objects indoors.
- Secure computer and telephone systems and terminals.
- Remove all fragile, breakable, and small objects and return to collections storage.
- Assign a communications captain.

Snow

- Plow drive and parking lots.
- Shovel and sand pathways to and around Woodlawn and Pope-Leighey. NEVER use salt on or near brick.

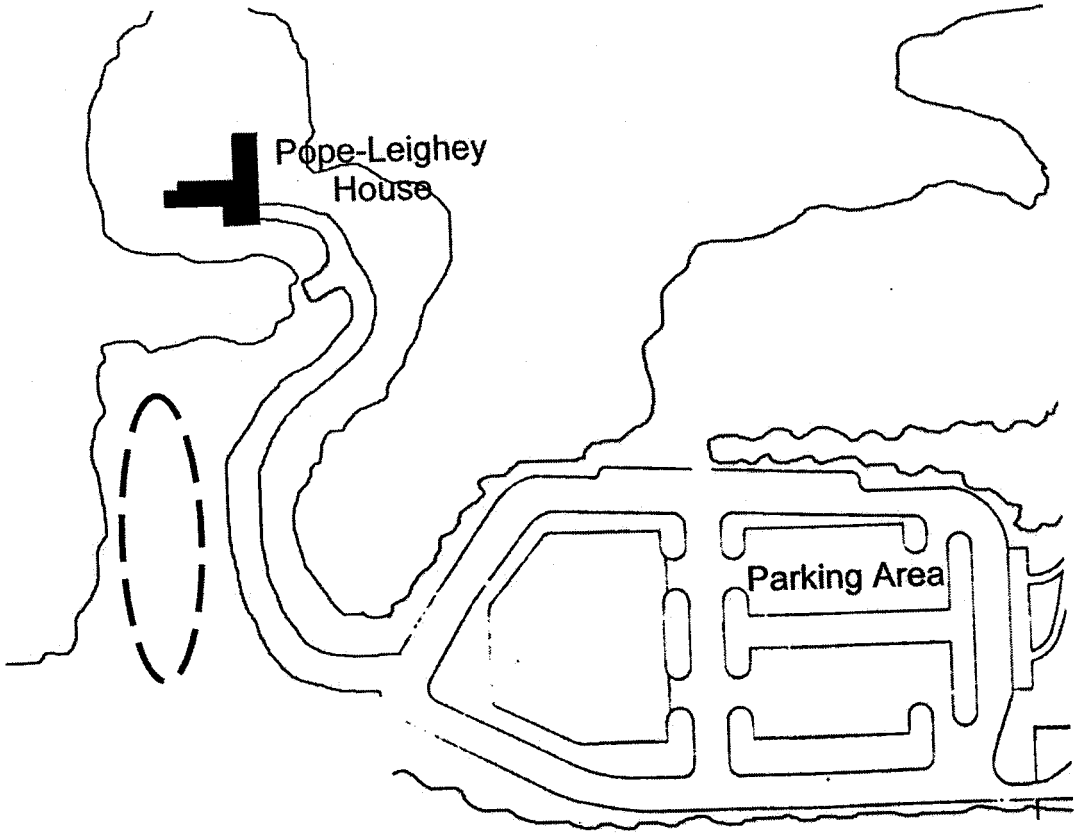
Tornados

- Close exterior and interior shutters at Woodlawn, if time allows.
- Place all outside objects indoors, if time allows.
- At Woodlawn, move to basement for protection. At Pope-Leighey, lay on the floor away from windows.
- Put all fragile, breakable, and small objects and in to collections storage.
- Secure computer and telephone systems and terminals.
- Assign a communications captain.



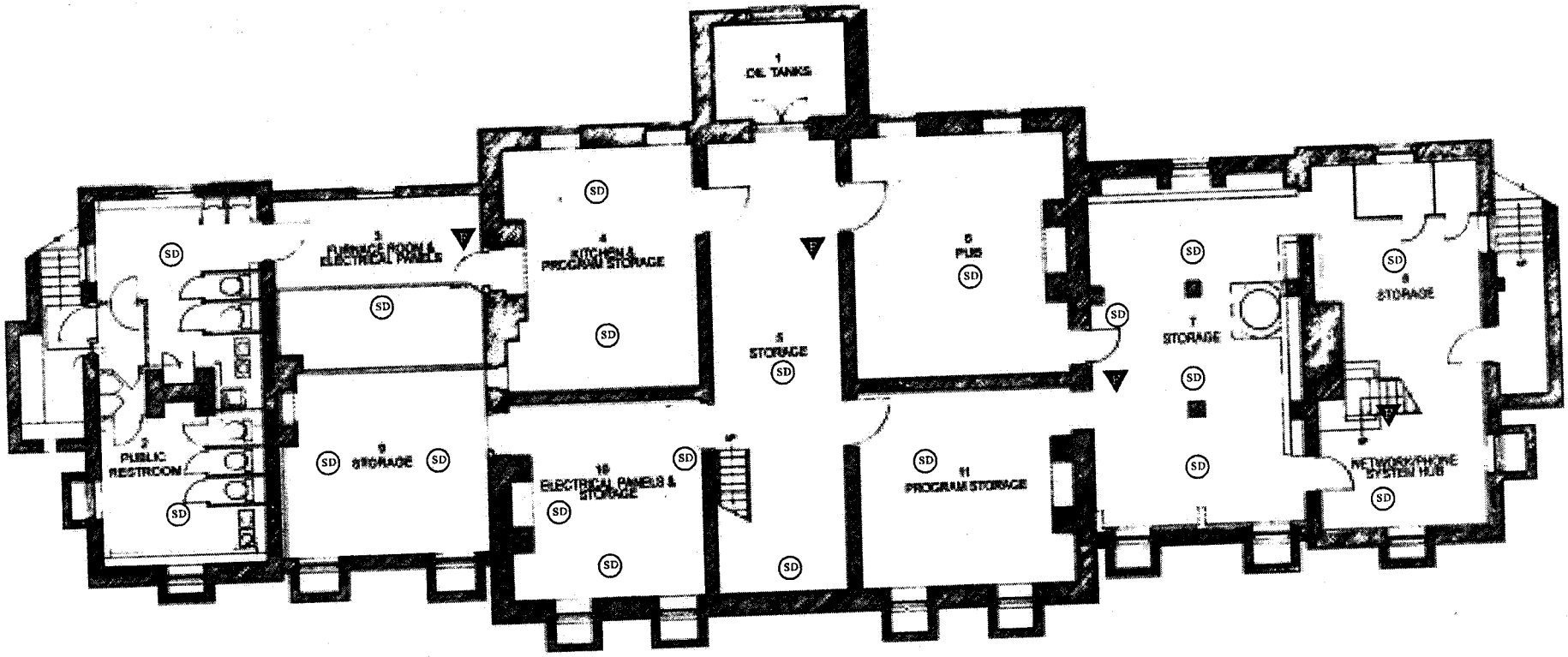
WOODLAWN

Assembly Areas
No Scale



FRANK LLOYD WRIGHT'S POPE-LEIGHEY HOUSE

Assembly Areas
No Scale

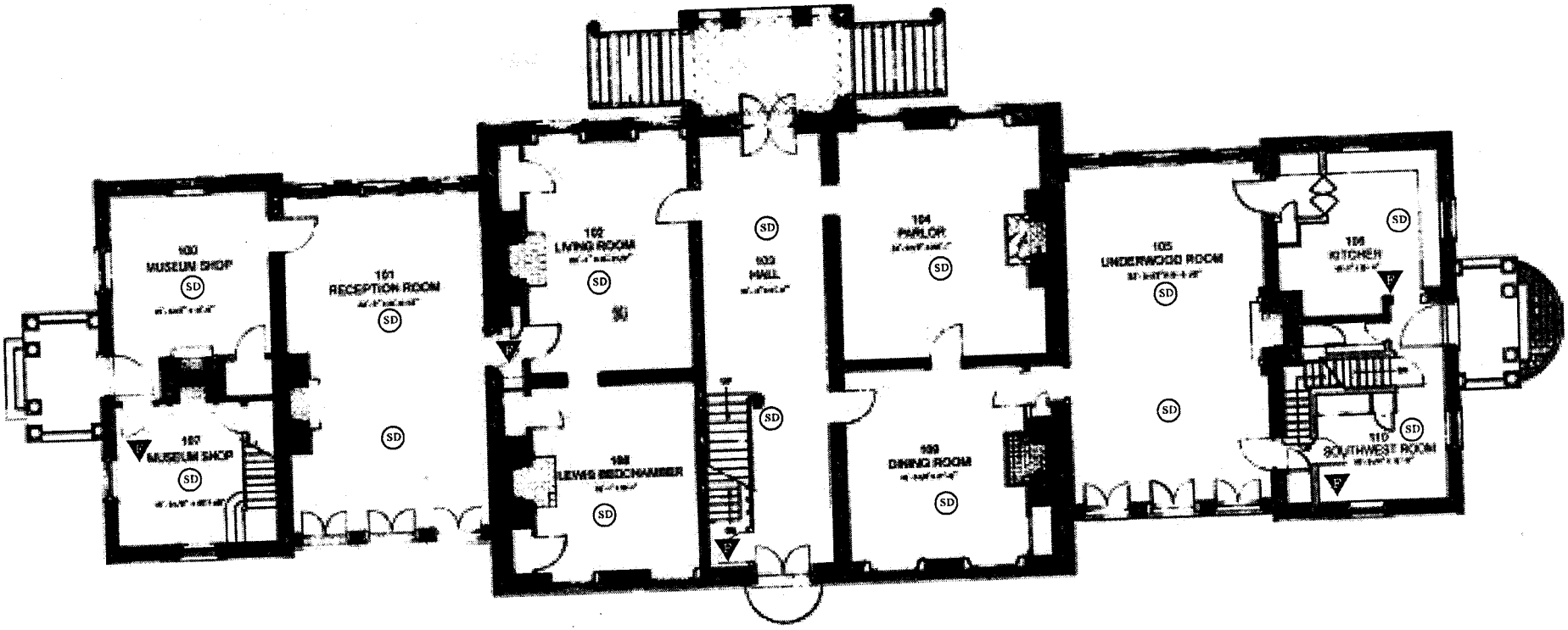


WOODLAWN

Basement Floor Plan

No Scale

Notes:
SD = Smoke Detector
▼ = Fire Extinguisher

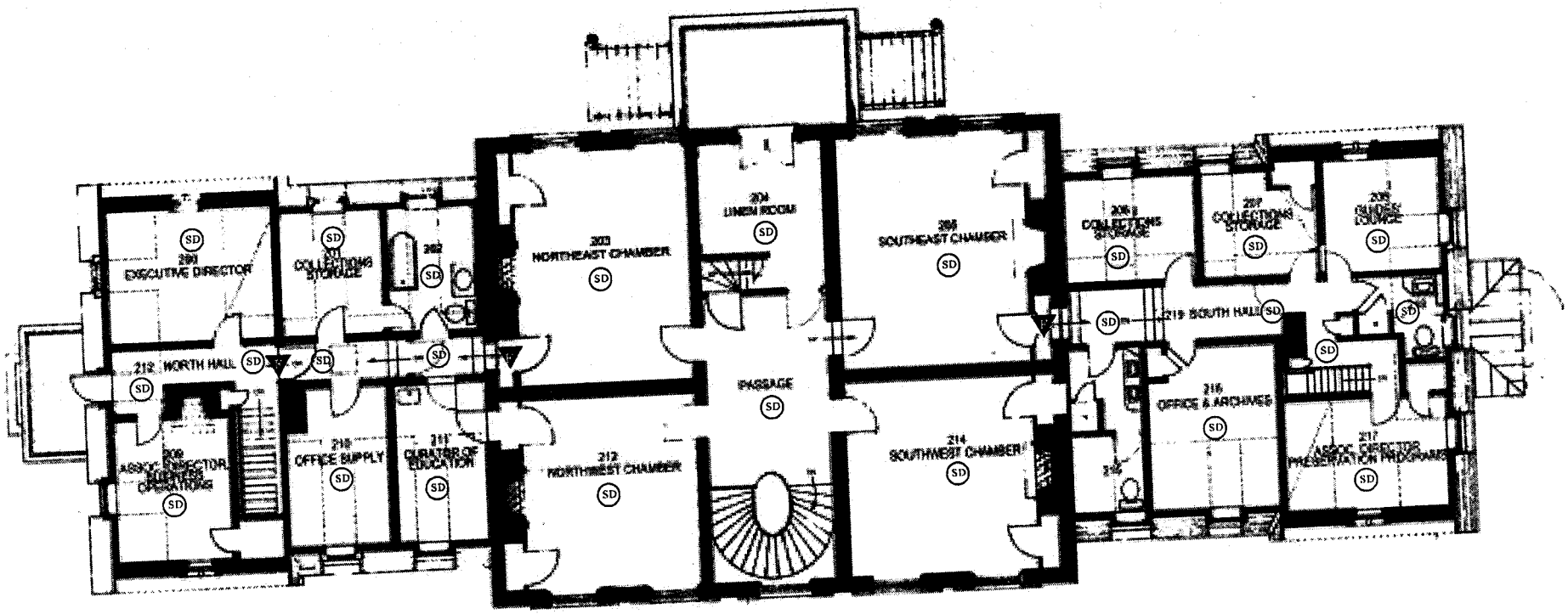


WOODLAWN

First Floor Plan

No Scale

Notes:
(SD) = Smoke Detector
F = Fire Extinguisher

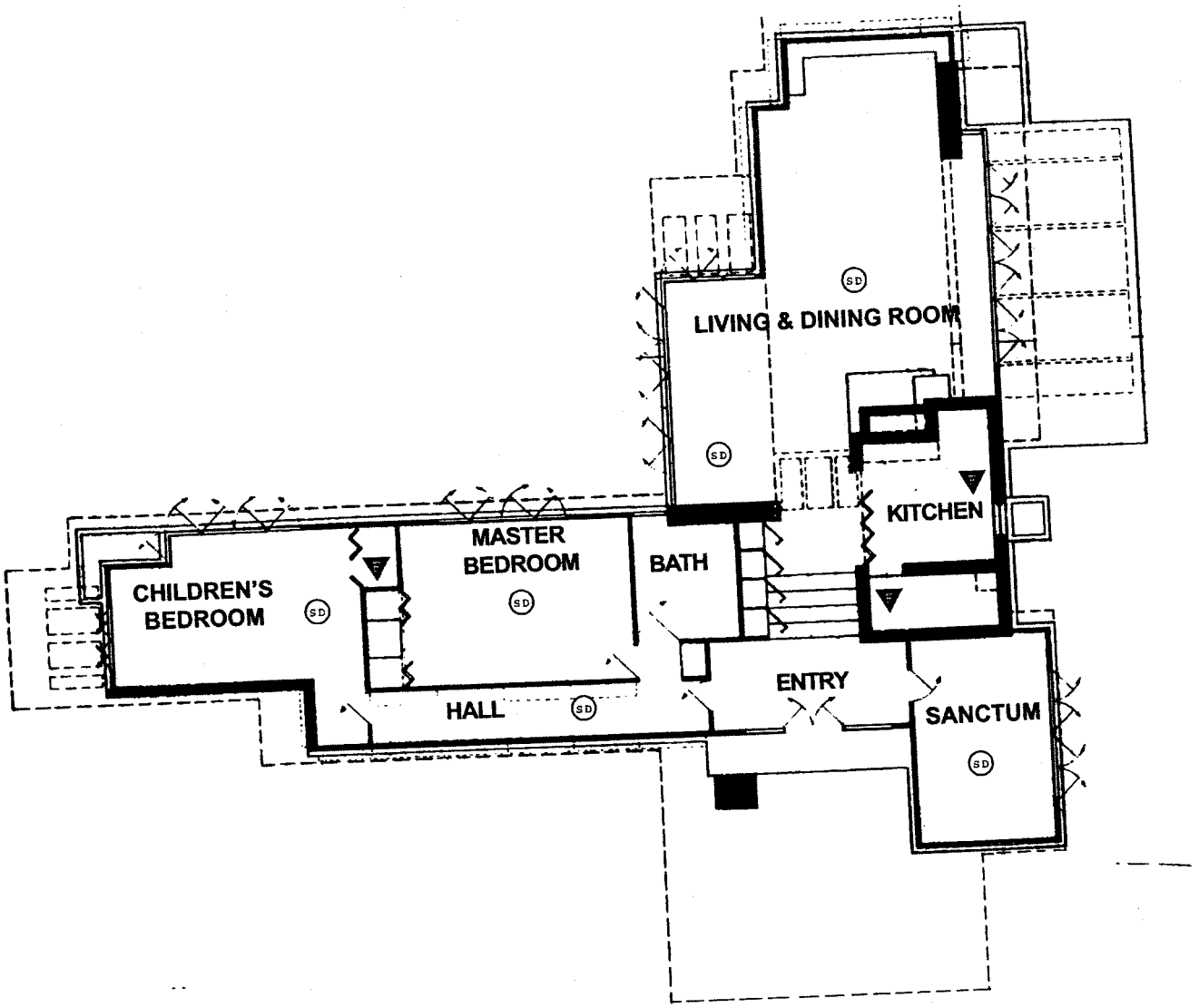


WOODLAWN

Second Floor Plan

No Scale

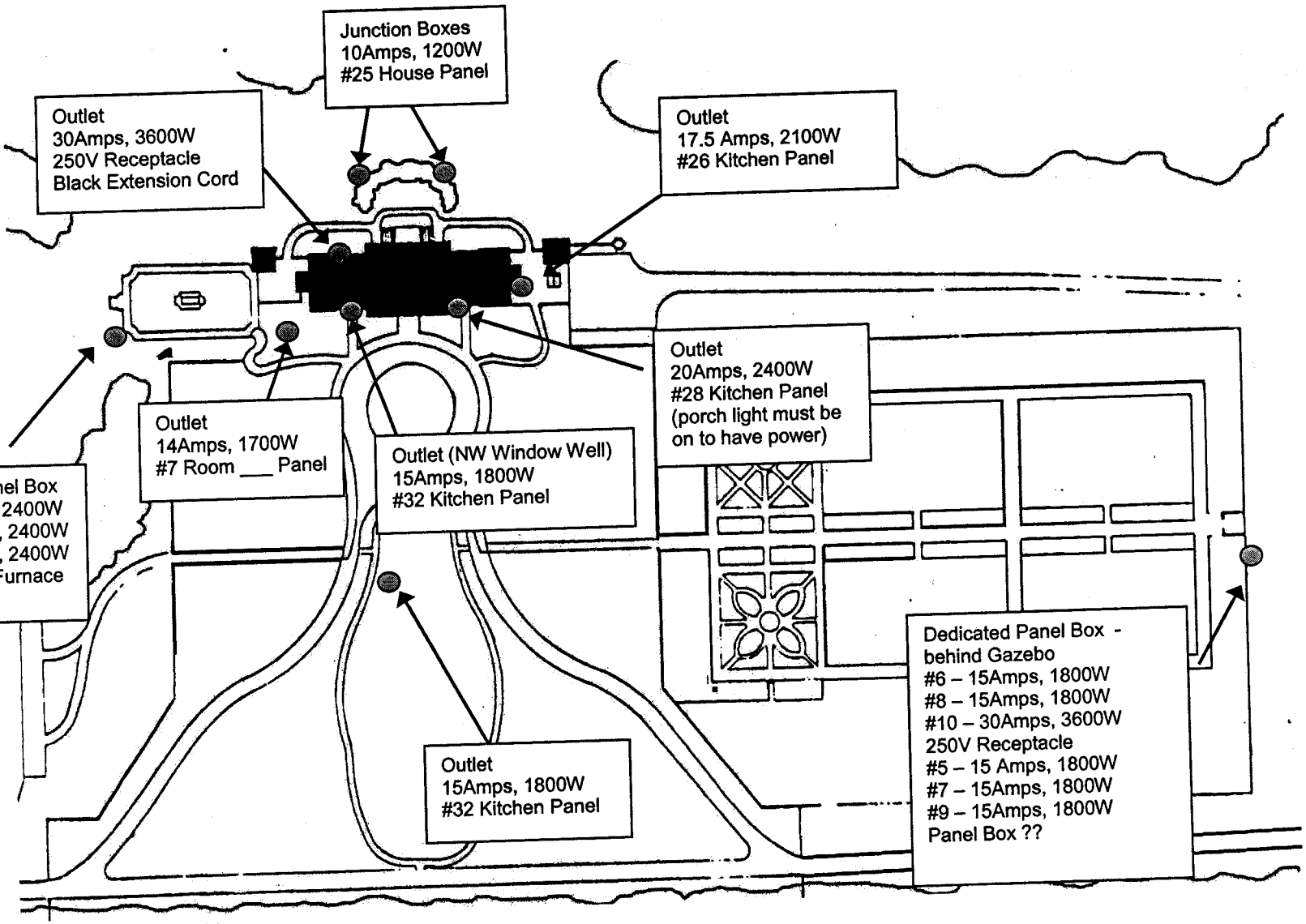
Notes:
(SD) = Smoke Detector
▼ = Fire Extinguisher



FRANK LLOYD WRIGHT'S POPE-LEIGHEY HOUSE

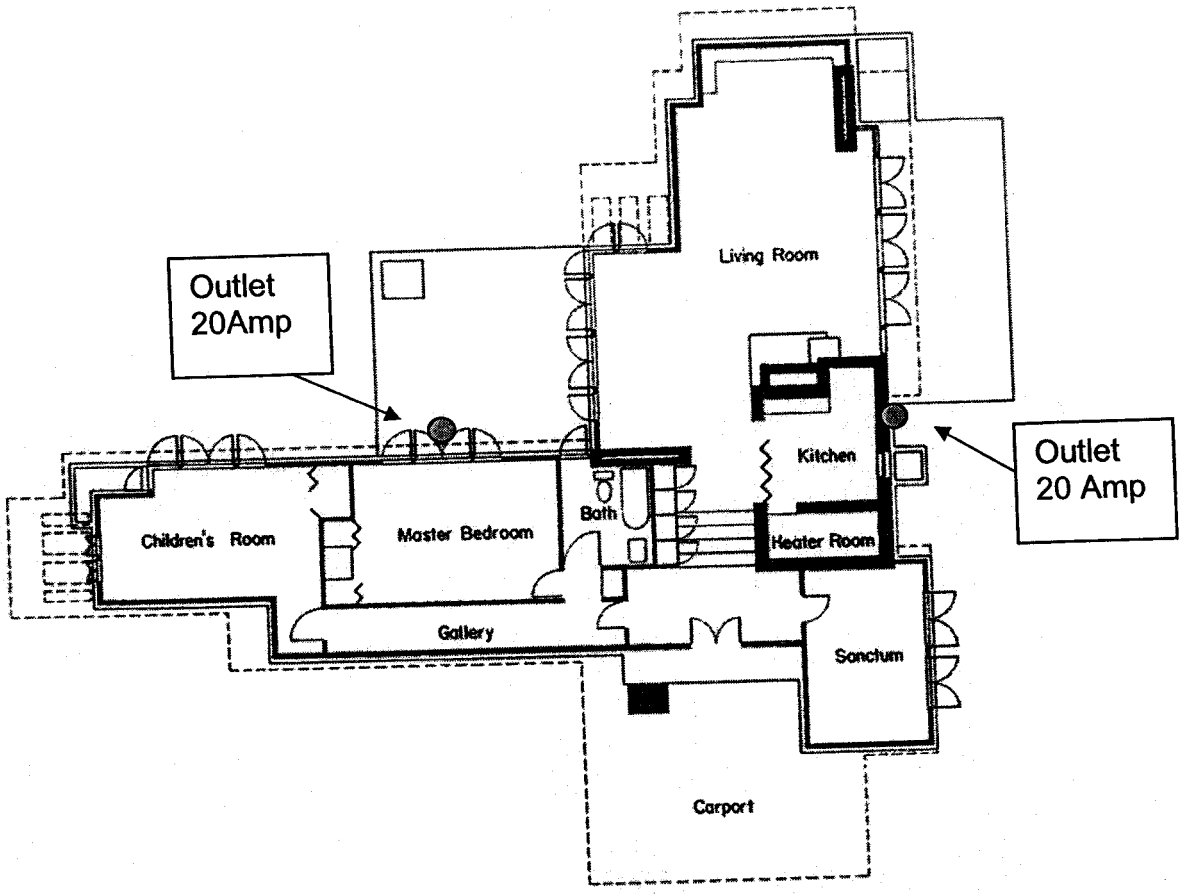
First Floor PLan
No Scale

Notes:
SD = Smoke Detector
▼ = Fire Extinguisher



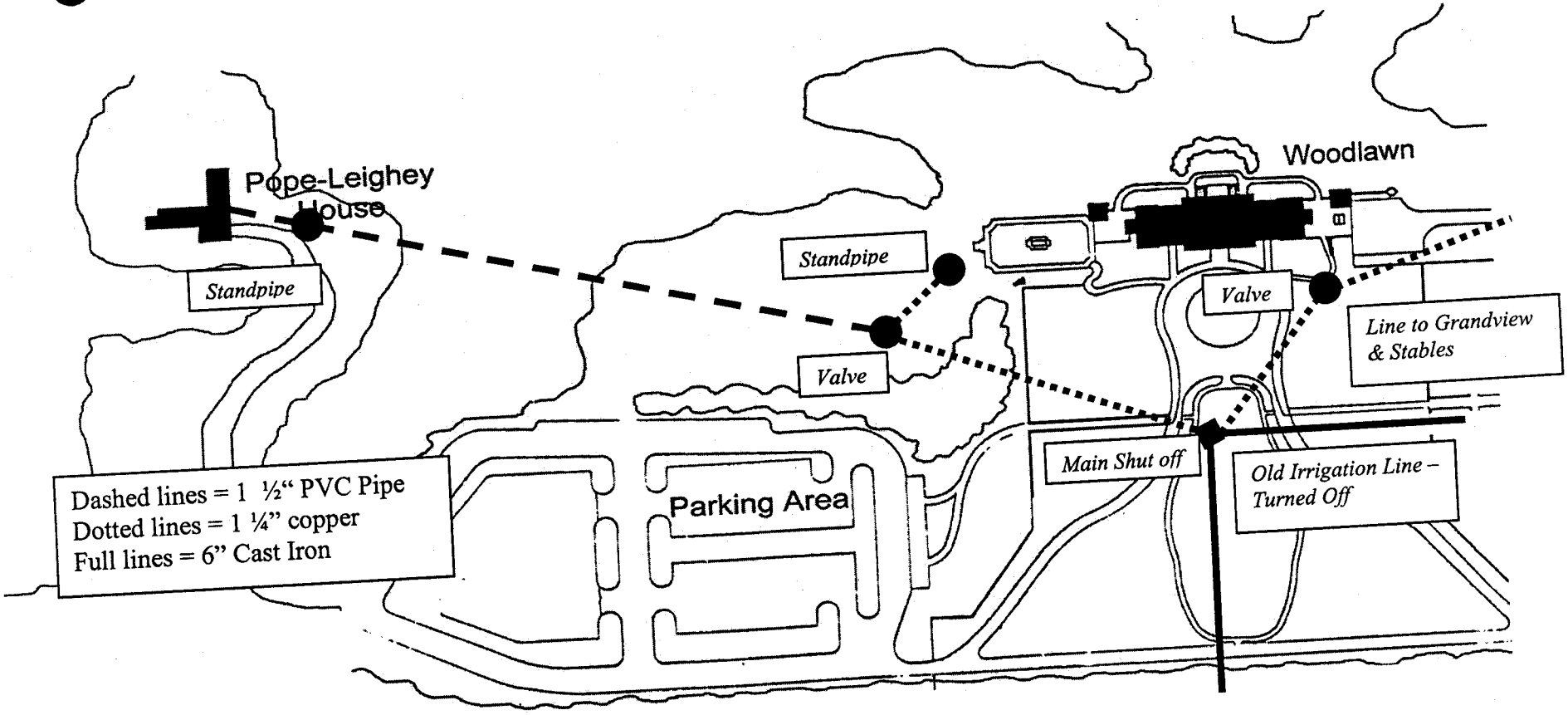
WOODLAWN

Electrical Outlets
No Scale



FRANK LLOYD WRIGHT'S POPE-LEIGHEY HOUSE

Electrical Outlets
No Scale



WOODLAWN
FRANK LLOYD WRIGHT'S POPE-LEIGHEY HOUSE

Water Lines
No Scale

National Trust for Historic Preservation
Incident/Accident/Illness Report

Property: _____
☐Tour ☐Special Property Use ☐Special Event

Name of Injured Party: _____
☐ Visitor ☐ Volunteer ☐ Employee

Address of Injured Party: _____

_____

Phone (h)_____ Phone (w) _____

Date of Incident: _____ Time of Incident: _____

Injury/Illness? Describe:_____
_____
_____

Where did Incident Occur? _____

What Happened?_____
_____
_____

Witnesses: ☐ No ☐ Yes _____

Was First Aid Given? ☐ No ☐ Yes By Whom? _____

Did You Offer to Send for Ambulance? ☐ No ☐ Yes

Was Medical Help Accepted? ☐ No ☐ Yes
If Yes: Hospital _____
Doctor _____
If No, did you suggest that Injured see own doctor? _____

Reported by_____ Title_____ Phone_____

Additional Comments _____
_____
_____

Injured Party Signature _____ Date_____

Please leave report in Associate Director, Business Operations box for review and follow-up.

National Trust for Historic Preservation
Incident/Accident/Illness Report

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☐Tour ☐Special Property Use ☐Special Event

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_____
_____

Where did Incident Occur? _____

What Happened?_____
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☐Tour ☐Special Property Use ☐Special Event

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Date of Incident: _____ Time of Incident: _____

Injury/Illness? Describe:_____
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Witnesses: ☐ No ☐ Yes _____

Was First Aid Given? ☐ No ☐ Yes By Whom? _____

Did You Offer to Send for Ambulance? ☐ No ☐ Yes

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Additional Comments _____
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_____

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What Happened?_____
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Did You Offer to Send for Ambulance? ☐ No ☐ Yes

Was Medical Help Accepted? ☐ No ☐ Yes
If Yes: Hospital _____
Doctor _____
If No, did you suggest that Injured see own doctor? _____

Reported by_____ Title_____ Phone_____

Additional Comments _____
_____
_____

Injured Party Signature _____ Date_____

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Where did Incident Occur? _____

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Reported by_____ Title_____ Phone_____

Additional Comments _____
_____
_____

Injured Party Signature _____ Date_____

Please leave report in Associate Director, Business Operations box for review and follow-up.

CLASS OF SERVICE TO BE SUPPLIED BY
Potomac Electric Power Company

09-17-1996 P12:43

Location 701-A Russell Ave. Plat #740-480, 738-480
Corner of Rt #355 and Rt #124
Occupant Lake Forest Assoc.
Business Conducted Sign Service
Inquirer Lake Forest Shopping Center Attn: Mark Hewitt
Address 701 Russell Ave., Gaithersburg, Maryland 20877 Telephone: 301-670-0599

Present Load

Lights _____KW
Air Conditioning _____KW
Other Power _____KW
Maximum Summer Demand _____KW
Existing Voltage 120/240, 1 phase, 3 wires

Largest Motor _____HP
Largest Motor _____HP

Cooking _____KW
Heating _____KW
_____ _____KW
Maximum Winter Demand _____KW

New Load

Lights 10 KW
Air Conditioning _____KW
Other Power _____KW
Estimated New Summer Demand 3 KW
Estimated New Winter Demand 3 KW
Providing Capacity for _____, _____HP Air Conditioning Units
Proposed Voltage 120/240V, 1 phase, 3 wires

Largest Motor _____HP
Largest Motor _____HP
(___)Add'l Cir. only
(___)Add'l Cir. only

Cooking _____KW
Heating _____KW
Receptacles _____KW
Water Heat _____KW
_____ _____KW

Service Entrance

Existing - No. of service terminations: 1 SERVING 1-HDMS for 1-100 amp disc.

Revised or New - No. of service terminations: 1 SERVING 1-HDMS for 1-100 amp disc. - NOTE - Cust. Erecting new sign along conduit run to old sign - relocating service.

Received by: P. Wilson

Class of Service will be 120/240 volts, single phase, three wire, approximately sixty cycles, alternating current, based on above load if installed within one year from date. Any changes in proposed connected load, largest motor size or switchgear cancels this class of service. It will be necessary for the customer, at his expense, to adapt any existing wiring and equipment for operation on this class of service which will be supplied for the entire load of the building.

Starting Current:

This Company will permit a maximum locked rotor starting current of --- amperes at this location for the load described above. " See Motor Starting Currents", in **Potomac Electric Power Company Rules and Regulations** for details.

Rules and Regulations:

All consumer installations and equipment must meet the requirements of local authorities having jurisdiction and all Rules and Regulations of the Potomac Electric Power Company.

Important Notice:

This is not a proposal for the installation or change in the electric service supply, but is only a statement of the class of service. Separate arrangements must be made for original installation or changes in the electric service supply.

(X) Existing Class of Service 120/240 V 1Φ 3W
(___) O. H. Connection _____" Raceway
(X) U. G. Connection
Meter Location (___) Inside, (X) Outside
(___) Switchgear Drawings Required
(___) Refer to attached service sketch
(___) Extension Necessary
(___) Heavy Up
(X) Other Work Re-connect service lateral to "New Sign" service location.
(X) Estimate Required $800.00

Additional Information Required: Existing #2/0 (AL) T/C service cables are direct buried. Customer must call Mill Utility to avoid damaging existing service cables. PEPCO to locate and connect to existing service cables to provide service to the "New" sign. Customer to re-use existing meter socket.

Refer to PEPCO standard drawing CE.01.06 for meter socket data including maximum conductor sizes. All connections in meter sockets in which PEPCO terminates will be made by PEPCO. Customer will be responsible to provide pressed hylugs for load conductors other than 2/0, 4/0, 250, 350 or 500KCMIL.

PEPCO to provide and install at cost to customer 1 set of #2/0 (AL) T/C service cable to new service location.

Bottom of meter glass and C.T.'s must be mounted between 30 inches and 66 inches high.

The maximum size of a service conductor 600 volts or less shall not exceed 500KCM for Copper or Aluminum conductor.

PEPCO will provide metering equipment and meter location(s) must be approved by Meter Department, (301) 670-8817.

Burley

Signed _____
POTOMAC ELECTRIC POWER COMPANY

Paul H. Wilson
Representative
Customer Engineering
Montgomery County Region
Telephone: (301) 670-8737
September 12, 1996

JEH\djf

wp\COS\VIII\f:\701-ARUS.COS

Honeywell

ADEMCO VISTA SERIES

VISTA-20P / VISTA-20PSIA
VISTA-15P / VISTA-15PSIA

Security Systems

User Guide

K5309-1V4 10/04 Rev. A

IMPORTANT!

PROPER INTRUSION PROTECTION

For proper intrusion coverage, sensors should be located at *every possible point of entry* to a home or commercial premises. This would include any skylights that may be present, and the upper windows in a multi-level building.

In addition, we recommend that radio backup be used in a security system so that alarm signals can still be sent to the Central Monitoring Station in the event that the telephone lines are out of order (alarm signals are normally sent over the phone lines).

EARLY WARNING FIRE DETECTION

Early warning fire detection is important in a home. Smoke and heat detectors have played a key role in reducing fire deaths in the United States. With regard to the number and placement of smoke/heat detectors, we subscribe to the recommendations contained in the National Fire Protection Association's National Fire Alarm Code (NFPA 72). These recommendations can be found on page 47 of this manual.

SYSTEM COMPATIBILITY NOTICE

Your Honeywell security system is designed for use with devices manufactured or approved by Honeywell for use with your security system. Your Honeywell security system is not designed for use with any device that may be attached to your security system's keypad or other communicating bus if Honeywell has not approved such device for use with your security system. Use of any such unauthorized device may cause damage or compromise the performance of your security system and affect the validity of your Honeywell limited warranty. When you purchase devices that have been manufactured or approved by Honeywell, you acquire the assurance that these devices have been thoroughly tested to ensure optimum performance when used with your Honeywell security system.

About This Manual

This manual is a step-by-step guide that will acquaint you with the system's features and benefits. It defines the components and their functions, describes their operation, and provides clear step-by-step instructions for normal and emergency procedures. Keep this manual in a convenient place so that you can refer to it as necessary.

Table of Contents

System Overview 5
Introduction 5
System Basics 5
Using the Voice Message Center 7
About The Keypads 8
General Information 8
Fixed-Word Display Keypad 10
Functions of the Keypads 11
Entry/Exit Delays 14
Entry Delay 14
Exit Delay 14
Exit Alarms 15
Checking For Open Zones 16
Using the [*] Key to Display and Announce System Status 16
Arming the System 17
STAY Mode: Arms Perimeter Only, Entry Delay On 17
NIGHT-STAY Mode: Arms Perimeter Only, Plus Selected Zones 17
INSTANT Mode: Arms Perimeter Only, Entry Delay Off 17
AWAY Mode: Arms Entire System, Entry Delay On 17
MAXIMUM Mode: Arms Entire System, Entry Delay Off 17
Arming Commands 18
Single Button Arming 19
Single Button “Step” Arming 19
Keyswitch 20
Using the Keyswitch 20
Disarming and Silencing Alarms 21
Using the [OFF] key 21
Bypassing Protection Zones 22
Using the BYPASS Key 22
Quick Bypass 23
Chime Mode 24
Using the Chime Mode 24
Using the Voice Chime 24
Date and Time 25
Viewing the Current Date and Time 25
Setting the Date and Time 25
Panic Keys 26
Using Panic Keys 26

Table of Contents (continued)

Macro Key Programming & Usage 27
About Macro Keys 27
Example of Macro Programming 28
Using a Programmed Macro Key 28
Using Device Commands 29
Paging Feature 30
About Automatic Paging 30
About Manual Paging 31
Latch Key Paging 31
Security Codes & Authority Levels 32
About Security Codes 32
Authority Level Definitions 32
How to Assign User Codes and Attributes 33
Accessing Other Partitions (VISTA-20P Series) 34
About Accessing Partitions 34
Using the GoTo Command 35
Multi-Partition Arming 35
Common Zone Operation (VISTA-20P Series) 36
Scheduling 37
About Scheduling 37
Creating Schedules 37
Event Logging Procedures 39
About Event Logging 39
Viewing the Event Log 39
Testing the System 41
Trouble Conditions 42
Maintaining Your System 45
Fire Alarm System 46
Quick Guide to Basic System Functions 50
Summary of Audible/Visual Notifications 51
Regulatory Statements and Warnings 53
System Features 55
User Setup 56
Paging Setup 57
List of Output Devices 58
Owner's Insurance Premium Credit Request 59
Limitations Of This System 63
Warranty 63

System Overview

Introduction

Congratulations on your ownership of a Honeywell Security System. You've made a wise decision in choosing it, for it represents the latest in security protection technology today. This system provides:

- Three forms of protection: burglary, fire* and emergency
- At least one keypad which provides control of system and displays system status
- Various sensors for perimeter and interior burglary protection
- Smoke or combustion detectors* designed to provide early warning in case of fire.

Your system may also have been programmed to automatically send alarm or status messages over the phone lines to a Central Monitoring Station.

** Commercial installations and some residential systems may not include fire protection – check with your installer.*

NOTE: Features and procedures described in this manual apply to the VISTA-20P/VISTA-20PSIA (VISTA-20P series) and VISTA-15P/VISTA-15PSIA (VISTA-15P series) security systems. Differences are noted where applicable.

System Basics

Burglary Protection

- Several modes of burglary protection: Stay, Night-Stay, Away, Instant, Maximum.
  STAY: arms perimeter zones only and entry delay is on
  INSTANT: same as STAY, except entry delay is off
  NIGHT-STAY: arms perimeter zones and selected interior zones; entry delay on
  AWAY: arms perimeter and all interior zones, entry delay is on
  MAXIMUM: same as AWAY, except entry delay is off
- You can BYPASS selected zones while leaving the rest of the system armed.
- CHIME mode alerts you to the opening of protected doors and windows while the system is disarmed.

Fire Protection

- Fire protection is always active (if installed) and an alarm sounds if a fire condition is detected
- If necessary, you can manually initiate a fire alarm using the keypad (if programmed).
- Refer to the Fire Alarm System section for information regarding fire protection, smoke detectors and planning emergency exit routes.

Security Codes

- You were assigned a 4-digit security code during system installation.
- Use your security code when arming and disarming the system, and when performing other system functions.
- Other users can be assigned different security codes, each with different authority levels, which define the system functions a particular user can perform.

System Overview (cont'd)

Zones and Partitions

- The system sensing devices have been assigned to various "zones," which are specific areas of protection (e.g., front door, kitchen window, etc.).
- Zone numbers are displayed at the keypad when an alarm or trouble condition occurs on a sensor.
- Partitions (VISTA-20P Series) provide two independent areas of protection, with each partition containing a group of zones that can be armed and disarmed without affecting other zones or users.
- Partitioned systems (VISTA-20P Series) can include a common zone area, which is an area shared by users of both partitions (such as a lobby in a building).

Arming, Step-Arming and Disarming Burglary Protection

- The system must be armed before the burglary protection can sense intrusions.
- To arm your system, enter your user code followed by the desired arming key.
- If programmed, you can press the [#] key in place of your user code when arming the system (e.g., instead of entering your 4-digit user code + [3-STAY] to arm the system in STAY mode, you can press [#] + [3-STAY]).
- You can also use the step-arming feature if programmed, to arm the system. This is a function key that allows you to arm the system in one of three modes by simply pressing the key repeatedly.
- To disarm the system, enter your user code then press the [OFF] key.

Alarms

- When an alarm occurs, both the keypad and external sounders sound, and the keypad displays the zone(s) causing the alarm.
- If your system is connected to a Central Monitoring Station, an alarm message is also sent. (**Delayed Reporting Note:** Message reporting is delayed 30 seconds by default to reduce false alarms. If desired, this delay can be removed or can be increased to 45 seconds. See your installer if you want the delay time changed.)
- To stop the alarm sounding, simply disarm the system.

Memory of Alarm

- When an alarm condition occurs, the keypad displays the number(s) of the zone(s) that caused the problem, and displays the type of alarm.
- The message remains displayed even after disarming the system, but can be cleared with another "off" sequence.

Phone Access

- If included, a phone module permits you to access the system via a touch-tone phone, either on-premises or by call-in when away.
- When you call in, the phone module announces system status over the telephone, and you can arm/disarm the system and perform most function commands remotely using the telephone keys.
- Complete information for using these features is provided with the voice module.

System Overview (cont'd)

Function Keys

- The "A," "B," "C," and "D" keys can be programmed to perform various functions.
- Functions include: activate a panic alarm, arm the system, provide step arming, switch lights on/off, send a message to a pager, display Time/Date, and start a programmed Macro sequence.

Paging Feature

- If programmed, the system can automatically send certain system condition messages to up to four (VISTA-20P Series) or two (VISTA-15P Series) pagers.
- The pager displays code numbers identifying the type of condition that has occurred.

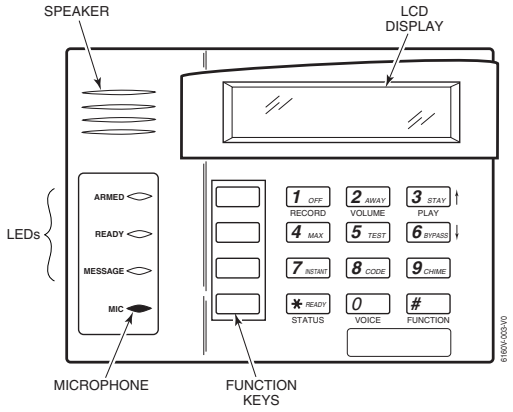
Scheduling

- Your system can be programmed to automatically perform certain functions (e.g., arm the system) at a predetermined time each day.

Using the Voice Message Center (if Voice Keypad is installed)

Voice keypads feature a voice message center that lets you record and playback one message.

- The message can be up to 2.5-minutes long
- The message remains in memory until a new message is recorded.
- The volume control is adjustable.
- Refer to the procedures below when using the Message Center functions.



Message Center Functions

To...	Press these keys...	Notes...
record a message	# FUNCTION + 0 VOICE + 1 OFF RECORD	The red MESSAGE LED lights. Message remains in memory until a new message is recorded.
end recording	1 OFF RECORD	The red MESSAGE LED flashes, indicating message waiting.
play a message	# FUNCTION + 0 VOICE + 3 STAY PLAY	The recorded message plays and the red MESSAGE LED turns off.
adjust the volume	# FUNCTION + 0 VOICE + 2 AWAY VOLUME, then press volume key [3] ↑ (up) or [6] ↓ (down)	Adjusting message volume also adjusts status volume. Volume cannot be adjusted while playing.

About The Keypads

General Information

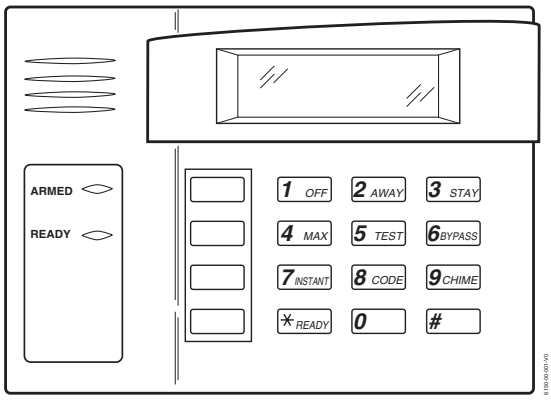
Your keypads allow you to control all system functions and feature the following:

- A telephone style (digital) keypad
- Liquid Crystal Displays (LCD) that show the nature and location of all occurrences
- Built-in sounder that sounds during alarms and troubles. The sounder also "beeps" during certain system functions and also when depressing any of the keys (to acknowledge the key press).
- Backlighting of the LCD display windows. Backlighting turns on when any key is pressed or when entering the premises through any assigned entry/exit door. This feature is helpful when a keypad is located in a dimly lit area.
- Some keypads have a voice feature that announces the nature and location of all system occurrences. Voice keypads also announce any faulted entry/exit or perimeter zone when Chime mode is on. Ask your installer if this option has been programmed for your system.

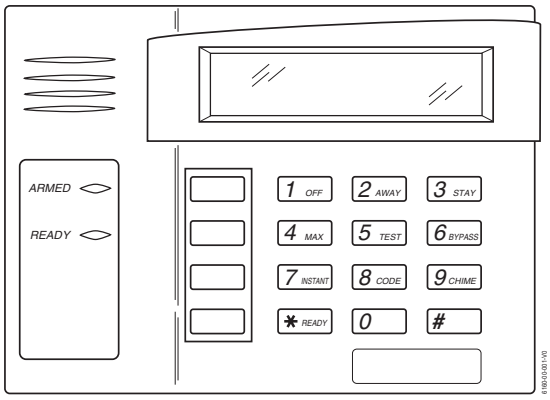
IMPORTANT: If the keypad beeps rapidly upon entering the premises, it indicates that an alarm has occurred during your absence and an intruder may still be on the premises. LEAVE IMMEDIATELY and CONTACT THE POLICE from a nearby safe location.

Alpha Display	2-line alpha display keypads feature a 2-line, 32-character alphanumeric LCD that displays system messages in friendly English. These keypads can also be programmed with custom zone descriptors.
Fixed-Word Display	Fixed-Word display keypads are functionally identical to Alpha display keypads, but the LCD display uses pre-designated words to identify the nature and location of occurrences.

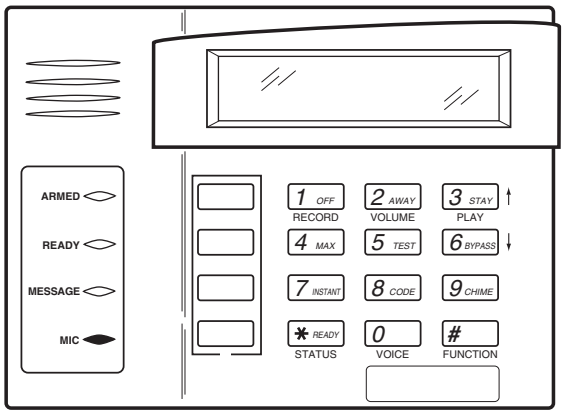
About The Keypads (cont'd)



Standard Fixed-Word Display Keypad



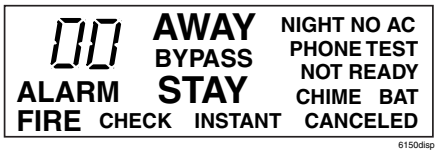
Standard Alpha Display Keypad



Voice-Capable Alpha Display Keypad

About The Keypads (Cont'd)

FIXED-WORD DISPLAY KEYPAD



FIXED-WORD DISPLAY

AWAY: All burglary zones, interior and perimeter, are armed.

STAY: Perimeter burglary zones, such as protected windows and doors, are armed.

NIGHT-STAY: When specific interior zones are armed and all others bypassed, the NIGHT and STAY indicators are both on.

INSTANT: Entry delay is turned off:
Lit with STAY = Instant mode
Lit with AWAY = Maximum mode

BYPASS: This appears when one or more burglary protection zones have been bypassed.

NOT READY: Appears when burglary portion of the system is not ready for arming (due to open protection zones). The system is ready to arm when this message disappears and the READY indicator light comes on.

NO AC: Appears when AC power has been cut off. System is operating on backup battery power.

AC: Appears when AC power is present.

CHIME: Appears when the chime feature is activated.

BAT: Low battery condition in a wireless sensor (if zone number displayed) or low system battery (if no zone number displayed).

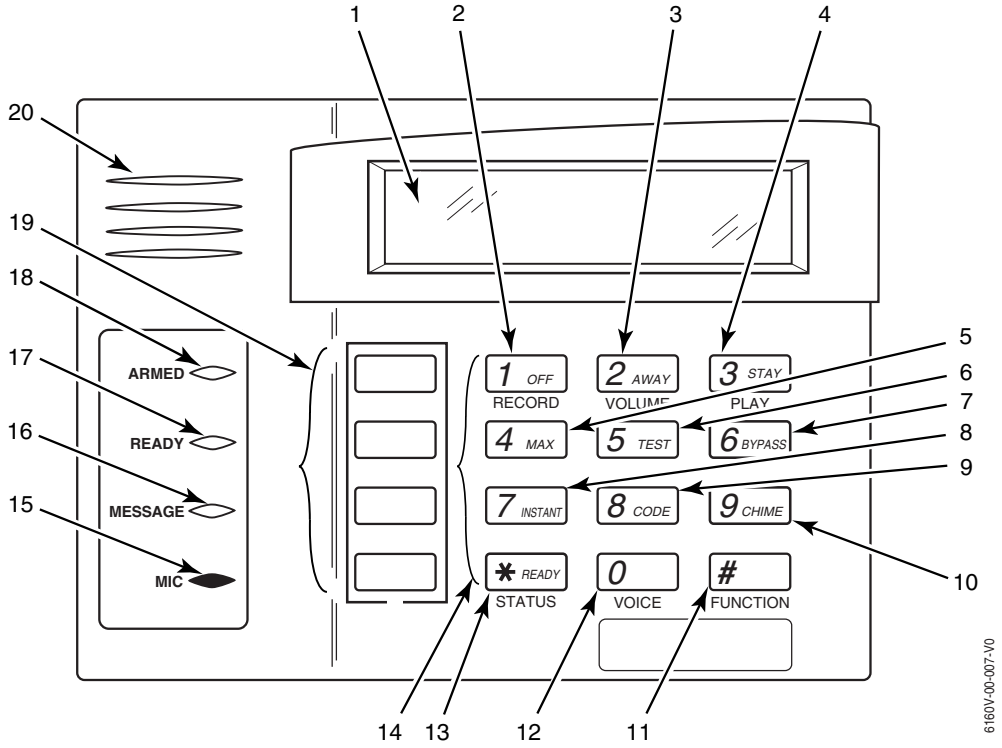
ALARM: Appears when an intrusion has been detected and the system is armed (also appears during a fire alarm or audible emergency alarm). Accompanied by the protection zone in alarm.

CHECK: Appears when a malfunction is discovered in the system at any time, or if an open is detected in a fire zone at any time, or a fault in a DAY/NIGHT burglary zone during a disarmed period. Accompanied by a display of zone number in trouble.

FIRE: Appears when a fire alarm is generated. Accompanied by a display of the zone in alarm.
A FIRE display also appears when a fire alarm is manually activated, accompanied by a display of the fire emergency key zone number.

CANCELED: Appears when an alarm has been silenced by the Code + OFF sequence and will remain on until another Code + OFF sequence is keyed.

Functions of the Keypads



Voice-capable 2-line Alpha keypad
(shown with flip-down front door removed)

IMPORTANT!

- Match the numerical callouts in the above graphic with the corresponding number on the following pages for a description of usage.
- When entering codes and commands, sequential key depressions must be made within 4-5 seconds of one another. If 4-5 seconds elapse without a key depression, the entry will be aborted and must be repeated from its beginning. Be sure to observe this precaution when performing any of the procedures in this manual.
- If you make a mistake while entering a **security** code, stop, press the [✱] key, and then start over. If you stop in the middle while entering a code, and then immediately start the entry over, an erroneous code might be entered.

Functions of the Keypads (cont'd)

NOTE: The functions printed directly on the keys indicate their primary purpose; the functions printed under some of the keys (shown in brackets under the respective key), indicate their alternate or secondary purpose.

1. **DISPLAY WINDOW**

   Alpha Display Keypads: 2-line, 32-character Liquid Crystal Display (LCD) keypads that display protection point identification, system status, and messages.

   Fixed-Word Display Keypads: Display protection zone ID and system status messages using pre-designated words in the LCD display area.

2. **1** *OFF* Disarms burglary portion of the system, silences alarms and audible trouble indicators, and clears visual display after problem's correction.

   [RECORD] On Voice keypads, used in conjunction with the FUNCTION and VOICE keys to record up to a 2.5-minute message.

3. **2** *AWAY* Arms the entire burglary system, perimeter and interior.

   [VOLUME] On Voice keypads, used in conjunction with the FUNCTION and desired volume control keys ↑ [3] or ↓ [6] to adjust the volume of a recorded message or voice system status.

4. **3** *STAY* Arms perimeter portion of burglary system only. Interior protection is not armed, allowing movement within premises without causing an alarm. If pressed twice in succession, arms system in Night-Stay mode.

   [PLAY] On Voice keypads, used in conjunction with the FUNCTION and VOICE keys to play the recorded message.

   [↑] On Voice keypads, used in conjunction with the FUNCTION and VOLUME keys to raise the message and voice system status volume.

5. **4** *MAX* Arms the entire burglary system, perimeter and interior, but without entry delay feature. Entering via an entry/exit door will cause an alarm.

6. **5** *TEST* Tests the system and alarm sounder if disarmed. Refer to *Testing The System* section for test procedures.

7. **6** *BYPASS* Removes individual protection zones from being monitored by the system.

   [↓] On Voice keypads, used in conjunction with the FUNCTION and VOLUME keys to lower the message and voice system status volume.

8. **7** *INSTANT* Arms in manner similar to the STAY mode, but without the entry delay feature.

   Entering via an entry/exit door will cause an alarm.

9. **8** *CODE* Used to assign additional user codes and attributes for other users of the system.

10. **9** *CHIME* Turns CHIME mode on and off. When on, the opening of windows or doors while the system is disarmed will sound 3 beeps at the keypad(s).

Functions of the Keypads (cont'd)

11. [#] This key can be used for "Quick Arming" of the system without use of a security code (if programmed).

[FUNCTION] On Voice keypads, enables the desired voice or volume function.

12. [0]

[VOICE] On Voice keypads, enables the RECORD, VOLUME and PLAY functions.

13. [* *READY*] Used to display all open protection zones.

[STATUS] On Voice keypads, a momentary press of the STATUS key annunciates the current system status. Pressing the STATUS key a second time annunciates and displays system and/or zone faults (if they exist).

14. KEYS 0–9: Used to enter your security code(s) and to perform their associated system functions after the security code has been entered.

15. MIC
On voice keypads, microphone for Message Center recordings.

16. MESSAGE LED INDICATOR: (RED) On Voice keypads, flashes red when message waiting or lights red (steady) when in record mode.

17. READY LED INDICATOR: (GREEN) Lit when the system is ready to be armed (no faults present). While the system is disarmed, this indicator will go on and off as protection zones are closed and opened.

18. ARMED LED INDICATOR: (RED) Lit when the system has been armed.

19. FUNCTION KEYS: Keys A, B, C, D may have been programmed for a variety of functions, including panic (emergency) functions. For details, see the *Function Keys* section.

20. INTERNAL SPEAKER: The built-in speaker mimics the alarm sounder during alarms, and will also "beep" during certain system functions. The speaker also provides voice playback for any recorded messages.

Entry/Exit Delays

Entry Delay

Entry Delays give you time to disarm the system when you re-enter through the designated entrance door. There are two entry delays (if programmed). The first is for your primary entrance and the second can be used for a secondary entrance, where a longer delay is required to walk to the keypad to disarm the system.

You must disarm the system before the entry delay period ends, or an alarm will occur. The keypad beeps during the entry delay period, reminding you to disarm the system. The beeps stop when a code is entered, but will restart after about 15 seconds if an invalid code is entered.

You can also arm the system with no entry delay at all by using the INSTANT or MAXIMUM arming modes. These modes provide greater security while on the premises or while away for extended periods of time.

See your installer for your delay times.

Partition 1_____

Exit Delay: ☐☐☐ seconds Entry Delay 1: ☐☐☐ seconds

Entry Delay 2: ☐☐☐ seconds

NOTE: Entry/Exit times set for partition 1 also apply to the Common Zone of the VISTA-20P Series.

Partition 2 (on VISTA-20P Series only)_____

Exit Delay: ☐☐☐ seconds Entry Delay 1: ☐☐☐ seconds

Entry Delay 2: ☐☐☐ seconds

Exit Delay

Exit delay gives you time to leave through the designated exit door(s) without setting off an alarm. Exit delay begins immediately after arming your system in any arming mode and Alpha Display keypads display the message "You May Exit Now." When "You may exit now" disappears, the system is fully armed. If programmed, a slow beeping will sound during the exit delay period until the last 10 seconds, which then changes to fast beeping (alerting you to the end of exit delay). If you cannot leave within this delay time period, you should stop, disarm the system, and start over to avoid a false alarm.

Exit Delay Restart (if programmed):If you wish to open the entry/exit door to let someone in after arming STAY, you can restart the *exit* time delay at any time – **simply press the** [**✱**] **key**, then let that person in. The system automatically rearms when the exit delay expires, thereby avoiding having to disarm the system and then rearm it again.

Additionally, when the system is armed AWAY, reopening and closing the entry/exit door **before** exit delay time expires (e.g., re-entering to get a forgotten item), will reset the exit delay time once.

Entry/Exit Delays (cont'd)

Exit Alarms

Exit Error Conditions
Whenever you arm the system, the exit delay begins. If an entry/exit door or interior zone is faulted before exit delay expires and remains faulted (e.g., exit door left open), the system sounds an alarm and starts the **entry** delay timer. If you disarm the system before the entry delay ends, the alarm sound stops and the message "ALARM CANCELED " or "CA" is displayed on the keypad, along with a zone number indicating the faulted zone. No message is sent to the Central Monitoring Station.

To clear the exit error condition, the open zone must be made intact; to clear the display, enter your code plus OFF.

If you do not disarm the system before the entry delay ends and the faulted zone remains open, the alarm sound continues and an "exit alarm" message is sent to the Central Monitoring Station (after the installer-programmed dial delay expires). The message "EXIT ALARM" or "EA" is displayed on the keypad, along with a zone number indicating the faulted zone. To stop the alarm, the system must be disarmed (your code plus OFF); to clear the display, enter your code plus OFF a second time.

An "exit alarm" also results if an entry/exit door or interior zone is faulted within two minutes after the end of the exit delay.

Your system may have been programmed for this feature to minimize false alarms sent to the Central Monitoring Station. Ask your installer if "Exit Alarm" is active in your system. If so, check this box. ☐

VISTA-20PSIA/VISTA-15PSIA: The Exit Error condition works the same as described above, except that in addition to the "EXIT ALARM" message, a "zone alarm" message is also sent to the Central Monitoring Station. In addition, if an entry/exit door or interior zone is faulted within two minutes after the end of the exit delay, a "Recent Closing" condition occurs instead of the "exit alarm." Refer to the next paragraph for details.

"Recent Closing" Condition (VISTA-20PSIA/VISTA-15PSIA only)
A Recent Closing condition is similar to the Exit Error condition described above, but occurs if an entry/exit door or interior zone is faulted within two minutes **after** the initial exit delay expires. If you disarm the system within the two minutes, the alarm sound stops and the message "ALARM CANCELED " or "CA" is displayed on the keypad, along with a zone number indicating the faulted zone. No message is sent to the Central Monitoring Station.

If you do not disarm the system within two minutes and the faulted zone remains open, the alarm sound continues and a "recent closing" and a "zone alarm" message is sent to the Central Monitoring Station (after the installer-programmed dial delay expires). The alarm message along with a faulted zone number is displayed on the keypad. To stop the alarm, the system must be disarmed (your code plus OFF); to clear the display, enter your code plus OFF a second time.

Checking For Open Zones

Using the [∗] Key to Display and Announce System Status

Before arming your system, all protected doors, windows and other protection zones must be closed or bypassed; otherwise the keypad will display a "Not Ready" message.

Use the READY key to display all faulted zones, making it easier for you to identify and secure any open zone.

1. Press [∗] (do not enter code first) to display faulted zones.
2. Secure or bypass the zones displayed.
   The keypad's READY indicator lights when all protection zones have been either closed or bypassed.
3. Arm the system as desired.

Alpha Display:

```
DISARMED
HIT * FOR FAULTS
```

Fixed-Word Display:
Zone no. and "NOT READY"

Voice Status: Voice keypads (if installed), can announce system status and faulted zones (up to 3 zone descriptors) if the Voice Status feature is turned on.

To turn the Voice Status feature on/off: [#] + [0] + [2] + [4]
(also turns on Voice Chime mode; see *Chime mode* section)

To announce Status: Press [#] FUNCTION + [0] VOICE + [∗] STATUS key. (Announces current system status; e.g., "Disarmed Ready to Arm.")

To announce faults: Press [#] FUNCTION + [0] VOICE + [∗] STATUS + [∗] again within 5 seconds of the first press. (Announces up to three faulted zones with their zone descriptors, if programmed.)

Arming the System

STAY Mode: Arms Perimeter Only, Entry Delay On

- Used when you want to arm the system with persons staying inside (or if you have pets that are moving throughout the premises).
- The perimeter sensors are armed, but interior sensors are left disarmed.
- Exit delay begins (you can leave through the entry/exit door, if desired).
- An alarm sounds if any protected window or non-entry/exit door is opened.
- You may otherwise move freely within the premises.
- Persons entering later can enter through an entry/exit door, but they must disarm the system within the *entry* delay period to avoid sounding an alarm.

NIGHT-STAY Mode: Arms Perimeter Only, Plus Selected Zones

- Use NIGHT-STAY mode to provide increased security while staying inside.
- Arms same as STAY mode, but also arms preselected interior sensors (programmed by your installer), while other interior sensors are left disarmed.
- Persons entering later can enter through an entry/exit door but they must disarm the system **and** must not violate any of the programmed interior zones to avoid sounding an alarm.
- **IMPORTANT:** When NIGHT-STAY mode is on, the selected interior zones are armed and cause an alarm if anyone enters those areas (e.g., waking in the middle of the night). To avoid sounding an alarm, you must disarm the system before any activity takes place in those interior zones.

INSTANT Mode: Arms Perimeter Only, Entry Delay Off

- Used when staying inside and do not expect anyone to use an entry/exit door.
- Arms same as STAY mode.
- An alarm sounds immediately if any protected perimeter window or any door is opened, including entry/exit doors.
- **IMPORTANT:** Arming the system in this mode greatly increases the chance of false alarms. Use extreme care in selecting this mode of arming.

AWAY Mode: Arms Entire System, Entry Delay On

- Used when nobody will be staying inside (including pets).
- The entire system (interior and perimeter) is armed.
- Exit delay begins letting you leave through the entry/exit door.
- An alarm sounds if a protected window or any door is opened, or if any movement is detected inside your premises.
- You can re-enter through an entry/exit door, but you must disarm the system within the *entry* delay period to avoid sounding an alarm.

MAXIMUM Mode: Arms Entire System, Entry Delay Off

- Used when leaving the premises for extended periods (e.g., vacation).
- Arms same as Away mode, but entry delay is off.
- An alarm sounds same as Away mode, and sounds upon opening entry/exit doors.

Arming the System (cont'd)

Arming Commands

Before arming, close all perimeter doors and windows and make sure the Ready to Arm message is displayed.

Mode	Press these keys...	Keypad Confirms By...
STAY	security code + [3 STAY]	• three beeps† • armed STAY message displayed • red ARMED indicator lights
NIGHT-STAY	security code + [3 STAY] + [3 STAY]	• three beeps† • NIGHT-STAY message displayed • red ARMED indicator lights
INSTANT	security code + [7 INSTANT]	• three beeps† • armed STAY message displayed • red ARMED indicator lights Note that entry delay is turned off.
AWAY	security code + [2 AWAY]	two beeps†, or, if programmed, beeping for duration of exit delay • armed AWAY message displayed • red ARMED indicator lights Leave the premises through an entry/exit door during the exit delay period to avoid causing an alarm. The keypad beeps rapidly during the last 10 seconds of the exit delay to warn you that it is ending.
MAXIMUM	security code + [4 MAX]	• same as AWAY (described above) Note that entry delay is turned off.

† **Arming Ding:** In addition to the keypad beeps, the external sounder emits a short "ding" sound after arming, if programmed to do so. The ding confirms that the system is armed, and may occur immediately after the command or be delayed (until arm/disarm report is sent or exit delay expires). Ask your installer about how this feature is set for your system.

Quick Arming

If "Quick Arming" was programmed by the installer, the [#] key can be pressed in place of the security code when arming the system in any of the arming modes (except Night-Stay). **However, the security code must always be used when manually disarming the system.**

Function Key Arming

For any arming command, a function key may have also been programmed for your system. If so, you can press and hold the appropriate function key for 2 seconds to arm the system. See your installer for the designated functions (see ***Single Button Arming*** section).

Refer to the ***Accessing Other Partitions*** section for information on multi-partition arming (VISTA-20P Series only).

Arming the System (cont'd)

Single Button Arming

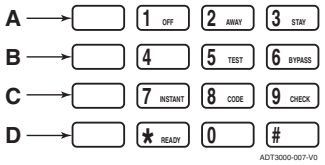
The "A", "B", "C", and/or "D" keys on your keypad may have been programmed for single-button arming. Note that while it is not necessary to use a security code for arming (by using the Quick Arm method described previously), a security code must always be used when manually disarming the system.

If Single-Button Arming is programmed:

- A function key has been assigned to a specific type of arming: STAY mode, NIGHT-STAY mode, AWAY mode, or STEP-ARMING (see Step-Arming paragraph).
- You DO NOT need to enter your user code before pressing the function key but you always need your user security code to DISARM the system.

Before arming, close all perimeter doors and windows.

1. Press and hold the assigned function key for 2 seconds (no code is required). Function keys are shown below.



Alpha Display:

```
DISARMED
READY TO ARM
```

Fixed-Word Display: Green LED lit

2. The keypad begins beeping and displays the armed message. The red ARMED indicator also lights.

Alpha Display:

```
ARMED***AWAY***
YOU MAY EXIT NOW
```

Fixed-Word Display: AWAY

Single Button "Step" Arming

Single-Button "Step" arming may be programmed into one of the lettered keys (A, B, C, or D). Check with your installer to see if this has been done in your system.

If Step-Arming is programmed:

- The assigned key provides a choice of three levels of security.
- The selected key can be pressed once, twice, or three times, increasing the level of security with each press, as follows

Key ⇩	**First Press** ⇩	**Second Press** ⇩	**Third Press** ⇩
A, B, C, D	Armed-STAY	Armed NIGHT-STAY (if programmed)	Armed-AWAY

Keyswitch

Using the Keyswitch

Your system may be equipped with a keyswitch for use when arming and disarming. Red and green lights on the keyswitch plate indicate the status of your system as follows:

Green Light: Lights when the system is **disarmed and ready** to be armed (no open zones). If the system is disarmed and the green light is off, it indicates the system is not ready (one or more zones are open).

Red Light: Lights or flashes when system is armed in AWAY or STAY mode. See your installer for the meanings of the lit red light:

Lit Steady = system armed AWAY or
system armed STAY and exit delay has expired

Flashing = system armed STAY and exit delay timer active

Rapid flashing = an alarm has occurred (memory of alarm).

Before arming, close all perimeter doors and windows.

To arm in the AWAY mode:

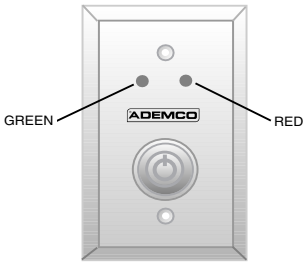
Turn the key to the right for 1/2 second and release. Keypads beep twice and the red indicator lights or flashes.

To arm in the STAY mode:

Turn the key to the right and hold for longer than 1 second, then release. Keypads beep three times and the red indicator lights or flashes.

To disarm the system:

Turn the key to the right and release. The red light turns off



Disarming and Silencing Alarms

Using the [OFF] key

The **OFF** key is used to disarm the system, silence alarm and trouble sounds, and clear alarm memories.

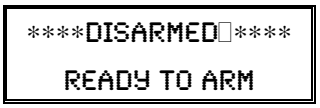
IMPORTANT: **If you return and the main burglary sounder is on,** DO NOT ENTER, but CONTACT THE POLICE from a nearby safe location.
If you return after an alarm has occurred and the main sounder has shut itself off, **the keypad will beep rapidly upon your entering, indicating that an alarm has occurred during your absence.**
LEAVE AT ONCE, and CONTACT THE POLICE from a nearby safe location.

1. ☐ ☐ ☐ ☐ + **1** *OFF*

   (Security Code)
   The "READY" indicator light will be lit if all zones are secure, and the keypad will emit a single tone to confirm that the system is disarmed.

   NOTE: If entry delay has started (you've opened the entry door), you do **not** need to press the OFF key – simply enter your security code. The system will disarm in about 15 seconds after the last digit of the code is entered.

Alpha Display:



Fixed-Word Display: READY

2. **To Silence a Burglary Alarm and Clear a Memory of Alarm**

   Enter your **security code** and press the **OFF** key to silence the alarm (or warning tones of a Memory of Alarm).

   Note the zone in alarm on the keypad display, and correct the problem (close door, window, etc.). After correcting the problem, enter the security code plus OFF sequence *again* to clear the keypad's Memory of Alarm display.

3. **To Silence a Fire Alarm and Clear a Memory of Alarm**

   Simply press the **OFF** key to silence the alarm. Then enter the **security code** plus **OFF** sequence *twice* to clear the keypad's Memory of Alarm display. See the *Fire Alarm System* section.

Bypassing Protection Zones

Using the BYPASS Key

Use this key when you want to arm your system with one or more zones intentionally unprotected. The system must be disarmed first.

Vent Zones: Your system may have certain windows set as "vent" zones, which are automatically bypassed if left open when arming the system (you do not need to manually bypass them). However, if a vent zone window is closed **after** arming, it becomes protected and will cause an alarm if opened again while the system is armed.

When bypassing zones:

- The system must be disarmed before you can bypass zones.
- Bypassed zones are unprotected and will not cause an alarm if violated.
- The system will not allow fire zones to be bypassed.
- Zones are automatically unbypassed when the system is disarmed.

1. ☐ ☐ ☐ ☐ + [**6** *BYPASS*] + zone numbers (see below)
   (Security Code)
   Enter the 2-digit zone number(s) for the zone(s) to be bypassed (e.g., 06, 10, 13, etc.). Single digit zone numbers must be preceded by a zero (e.g. 05, 06).

2. When finished, the keypad will momentarily display a "Bypass" message for each bypassed zone number. Wait for all bypassed zones to be displayed.
   Arm the system as usual. When armed, the arming message is displayed with "ZONE BYPASSED."
   To display bypassed zones **prior** to arming, enter your security code and press the [6] BYPASS key.

Alpha Display:

```
DISARMED
HIT * FOR FAULTS
```

Fixed-Word Display:
NOT READY

Alpha Display:

```
DISARMED BYPASS
READY TO ARM
```

Fixed-Word Display: BYPASS

Alpha Display:

```
ARMED: STAY
ZONE BYPASSED
```

Typical armed display after bypassing zones.

Bypassing Protection Zones (cont'd)

Quick Bypass

If programmed, "Quick Bypass" allows you to easily bypass all open (faulted) zones without having to enter zone numbers individually. This feature is useful if, for example, you routinely leave certain windows open when arming at night.

1. ☐☐☐☐ + **6** *BYPASS* + [#]

   (Security Code)

   In a few moments, all open zones will be displayed and automatically bypassed. Make sure that only those zones that you wish to leave **unprotected** are bypassed, and that there are no other zones unintentionally left open.

Alpha Display:

```
DISARMED - PRESS
HIT * FOR FAULTS
```

Fixed-Word Display: NOT READY

2. Wait for all bypassed zones to be displayed, then arm the system as desired.

   Ask your installer if "Quick Bypass" is active for your system, and if so, check here: ☐

Alpha Display:

```
DISARMED BYPASS
READY TO ARM
```

Fixed-Word Display: BYPASS

Chime Mode

Using the Chime Mode

CHIME mode alerts you to the opening of a perimeter door or window while the system is disarmed.

When Chime mode is activated:

- Three tones sound at the keypad whenever a perimeter door or window is opened.
- Interior zones do not produce a tone when they are faulted.
- Pressing the **READY** key will display the open protection points.
- Chime mode can be used only while the system is disarmed.

To turn Chime Mode on:

☐ ☐ ☐ ☐ + [**9** *CHIME*]

(Security Code)

The CHIME message will appear. Perimeter zones will cause a tone when faulted.

Alpha Display:

```
DISARMED CHIME
READY TO ARM
```

Fixed-Word Display: CHIME

To turn Chime Mode off:

☐ ☐ ☐ ☐ + [**9** *CHIME*]

(Security Code)

The CHIME message will disappear.

Alpha Display:

```
****DISARMED****
READY TO ARM
```

Fixed-Word Display: READY

Using the Voice Chime

Voice keypads have a feature that works in concert with the Chime Mode called Voice Chime. Voice chime provides a voice status annunciation, chime, and display when any faulted entry/exit or perimeter zone exists. Ask your installer if this option has been enabled for your system.

To turn Voice Chime Mode on or off: [#] + [0] + [2] + [4]

(normal Chime mode must be on first)

When Voice Chime is on, faulted zones cause a voice status announcement, chime and display. When off, the sounder still provides chime if normal Chime mode is on.

Date and Time

Viewing the Current Date and Time

The system lets you view its time and date setting on an alpha keypad.

☐☐☐☐ + [#] + [6] [3]

(Security Code)

OR,

Press the function key (A, B, C, or D) for viewing current date and time, if programmed.

Alpha Display:

```
****DISARMED****
  READY TO ARM
```

A typical time/date display is shown.

The display will remain on for about 30 seconds or until a key is pressed.

```
TIME/DATE    SAT
12:05AM_05/09/00
```

"A" "B" "C" "D"

☐ ☐ ☐ ☐

If one of the above keys has been programmed for the date/time display feature, place a check mark in the box beneath that key.

Setting the Date and Time

You can set the time and date by doing the following:

1. ☐☐☐☐ +[#] + [6] [3]
   (Security Code)

Alpha Display:

```
****DISARMED****
  READY TO ARM
```

2. Press [∗] when the time/date is displayed.
   A cursor appears under the first digit of the hour.
   To move cursor ahead, press [∗]. To go back, press [#].
   - Enter the 2-digit hour setting.
   - Enter the 2-digit minute setting.
   - Press [1] for PM or [0] for AM.
   - Enter the last two digits of the current year.
   - Enter the 2-digit month setting.
   - Enter the 2-digit day setting.
3. To exit, press [∗] when cursor is at the last digit, or wait 30 seconds.

```
TIME/DATE    SAT
04:04PM 10/17/00
```

Current time display

```
TIME/DATE    SAT
04:04P2000/10/17
```

Time/date editing display

Panic Keys

Using Panic Keys

Your system may have been programmed to use special keys to manually activate emergency (panic) functions as follows:

This Function	Sends This Signal*	With This Sounding…
Silent Alarm	silent alarm	no audible alarm; displays, "Press [*] to show faults," indicating that a silent alarm has been initiated.
Audible Alarm	audible alarm	a loud, steady alarm at keypad(s) and at any external sounders that may be connected.
Personal Alarm	auxiliary alarm	steady alarm sound at keypad(s), but not at external bells or sirens.
Fire Alarm	fire alarm	temporal (pulsing) sound at external bells and sirens.

*All panic functions send signals to the Central Monitoring Station, if connected.

To activate a Panic Function:

Press and hold down for at least 2 seconds whichever lettered key on the keypad has been programmed for the desired emergency function.

OR

Press both keys of the assigned key pair at the same time.

Normal Alpha Display:

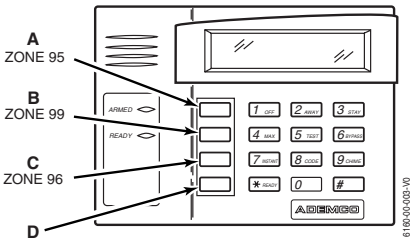
```
****DISARMED****
READY TO ARM
```

Fixed-Word Display: READY

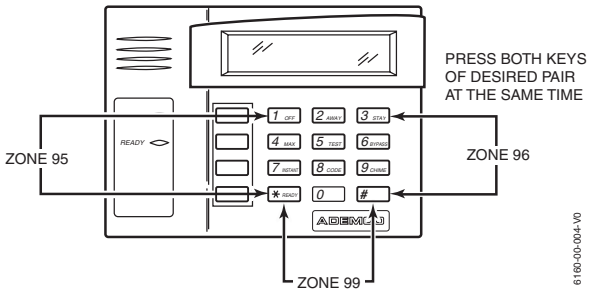
Typical Panic Alpha Display:

```
ALARM 96  ZONE 96
```

Fixed-Word Display: 96 and ALARM



Lettered Panic Keys



Panic Key Pairs

See your installer and use the chart provided in the ***Features Programmed in Your System*** section to note the functions that have been programmed for your system.

Macro Key Programming & Usage

About Macro Keys

The “A”, “B”, “C” or “D” keys can be used to automatically activate a series of commands of up to 16 keystrokes, if programmed for this function. These keystrokes, as a group, are called “macros” and are stored in the system's memory.

- Typical macro functions can include:
  - Arming sequences: STAY, NIGHT-STAY, INSTANT, or AWAY
  - Bypassing particular zone(s)
  - Activating relay(s) for turning on (or off) lights, fans, etc.
- Up to four (VISTA-20P Series) or two (VISTA-15P Series) macros can be assigned – but no more than one macro to a key.
- Macros can be activated only by users with authority levels authorized to perform the macro’s function.

NOTE: The installer must activate the desired function key (using *57 Function key Menu Mode) before macros can be assigned.

See the chart at the back of this manual for the key(s) assigned for macros.

1. ☐ ☐ ☐ ☐ + [#] + [6] + [6]

   (Security Code)

Alpha Display:

```
****DISARMED****
  READY TO ARM
```

2. Enter the macro number (1-4 for VISTA-20P Series; 1-2 for VISTA-15P Series) to be programmed at the “Select Macro?” prompt. Remember, only one macro can be assigned to each key.

```
SELECT MACRO
1-4            0
```

3. If a macro has been previously defined, the keystrokes are shown on the bottom line of the display; otherwise the display is blank.
   To exit this mode (and keep the existing macro definition), press any key except the [∗] key. The system returns to normal mode.
   To define a macro for the selected key, press [∗] and continue with the next prompt.

```
MACRO DISPLAY
```

   Enter the first of the series of desired commands, (do not include your user code), then press/hold the “D” key for at least two seconds to complete the first command. This key terminates each command, and appears as an “F” in the keypad display.

```
MACRO PGM
```

Macro Key Programming & Usage (cont'd)

The keypad beeps to acknowledge your input and displays the command you entered (followed by "F").

4. Enter the next command, followed by press/holding the "D" key for at least two seconds. The keypad beeps and displays the keystrokes entered so far.
5. Repeat until the all the desired commands (up to 16 characters including the "F"s) have been entered**.**

   Be sure to check your keystrokes before continuing. If you made a mistake, you must start over.

6. To exit, press/hold the "D" key for at least two seconds. The display returns to system status and indicates system is ready.

Example of Macro Programming

Suppose you want to (1) bypass the two upstairs window zones, then (2) turn on an exterior light, and then (3) arm the security system in the AWAY mode. The procedures in the table that follows show you how you would program this macro:

Typical Macro Alpha Display:

```
MACRO PGM
60203F6701F2F
```

Function	Keystrokes Required	Keypad Display
1. Bypass zones 02 & 03	Press BYPASS [6] key, then 2-digit zone numbers 02 & 03.	60203
2. Insert terminator	Press the "D" key for at least 2 seconds.	60203F
3. Turn light on (device 01)	Press [#] and 7 key for "device ON", and [01] key for selecting device 1.	60203F#701
4. Insert terminator	Press the "D" key for at least 2 seconds.	60203F#701F
5. Arm system AWAY	Press AWAY [2] key.	60203F#701F2
6. Insert terminator	Press the "D" key for at least 2 seconds.	60203F#701F2F

Using a Programmed Macro Key

```
****DISARMED****
READY TO ARM
```

1. Press the Macro key programmed for the desired series of commands for at least 2 seconds. The "Enter User Code" prompt appears. The prompt remains displayed for up to 30 seconds.

```
ENTER USER CODE
* * * *
```

2. Enter your 4-digit user code.

   The programmed macro sequence begins automatically after the user code is entered.

Using Device Commands

About Device Commands

Your system may be set up so that it can control certain lights or other devices.

- Some devices may be automatically turned on or off by the system.
- You may be able to override automatically controlled devices using the commands described below.
- Some devices can be manually turned on or off using the commands described below.
- See your installer for a list of devices that may be set up for your system. A list of these devices is provided at the back of this manual for you to fill out.

To Activate Devices:

☐ ☐ ☐ ☐ + [#] + [7] + 2-digit device number

(Security Code)

Devices associated with that device number activate.

To Deactivate Devices:

☐ ☐ ☐ ☐ + [#] + [8] + 2-digit device number

(Security Code)

Devices associated with that device number deactivate.

Alpha Display:

```
****DISARMED****
READY TO ARM
```

Fixed-Word Display: READY

Paging Feature

About Automatic Paging

Your system may be set up to automatically send messages to several pagers (4 pagers for VISTA-20P Series, 2 pagers for VISTA-15P Series) as certain conditions occur in your system.

- The following events can be programmed by your installer to be sent to the pagers: arming and disarming†, alarms, and trouble conditions. († reports when arming/disarming from a keypad using a security code; auto-arming/disarming, arming with assigned button, and keyswitch arming do not send pager messages.)
- You can also program the system to send an automatic pager message to alert you in the event that someone has not arrived home (disarmed the system) within a defined period of time (see the ***Scheduling*** section for details on programming a "latch key report").
- Your installer programs the pager phone numbers and reporting events.
- The pager message consists of a 7-digit system status code that indicates the type of condition that has occurred.
- An optional, predefined 16-digit character string can precede the 7-digit system status code; these characters can consist of a PIN no., subscriber account no., or any additional data that you may wish to have sent to the pager.
- The pager display format is as follows:

Optional 16 digits ↓ *3-digit Event Code* ↓

AAAAAAAAAAAAAAAA – BBB – CCCC ← *1-digit Partition No. + 3-digit Zone No.* ***or*** *User No.*

A =	B =	C =
Optional 16-digits for Account numbers, PIN numbers, or any other data; programmed by the installer, if required.	A 3-digit code that describes the event that has occurred in your system (see for event codes table below)	A 1-digit Partition number plus a 3-digit Zone or User number, depending on the type of event that has occurred, where: • alarms and troubles display zone number • arming/disarming (opens/closes) display user number

The 3-digit Event Codes (BBB) that can be displayed are:

911 =	811 =	101 =	102 =
Alarms. The 4-digit number (CCCC) following this code is the partition no. and *zone no.* that caused the alarm.	**Troubles.** The 4-digit number (CCCC) following this code is the partition no. and *zone no.* that caused the trouble.	**Open (system disarmed).** The 4-digit number (CCCC) that follows this code is the partition no. and *user no.* that disarmed the system.	**Close (system armed).** The 4-digit number (CCCC) that follows this code is the partition no. and *user no.* that armed the system.

Examples of typical 7-digit pager displays follow.

Ex. 1. 911-1004 = Reporting of an alarm (911) caused by a fault on zone 4 on Partition 1 (1004).

Ex. 2. 102-2005 = Reporting of a closing–system arming (102)– by user 5 in Partition 2 (2005).

Paging Feature (cont'd)

About Manual Paging

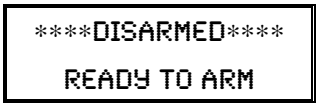
Your system may be set up so you can manually send a message to up to four (VISTA-20P Series) or two (VISTA-15P Series) pagers.

- Your installer programs the paging function key and the pager phone numbers.
- Pressing the paging keys sends the message [999–9999] to the selected pager.
- This message could mean "call home", "call your office", or any other prearranged meaning.
- See the Paging chart at the back of this manual for details of the paging setup for your system.

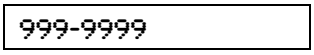
1. Press and hold the programmed Paging Key for at least 2 seconds (wait for beep), then press the pager number* (1-4) representing the pager intended to receive the message.
2. The recipient, on seeing the 999–9999 message, will understand the prearranged meaning of this signal.

* *If no number is pressed, the message is sent to pager 1.*

Alpha Display:



Fixed-Word Display: READY



Pager Display

Latch Key Paging

You can program a schedule that causes a pager report to be sent if the system is not DISARMED by the scheduled time (see ***Scheduling*** section, event "03"). For example, a working parent might want a message to be sent to a pager if their child did not arrive home from school and disarm the system by a certain time.

If programmed, the message that is sent is: [777–7777].

Security Codes & Authority Levels

About Security Codes

Your installer assigned a master code that is used to perform all system functions. In addition, you can assign different security codes for use by other users (VISTA-20P Series provides 47 additional codes; VISTA-15P Series provides 31 additional codes).

- Only the System Master and Partition Master can assign user codes to users.
- Users are identified by 2-digit user numbers and are pre-assigned to either partition 1 or partition 2 (VISTA-20P Series).
- Only the Installer or System Master can change user partitions.
- In addition to a security code, each user is assigned various system attributes.
- User codes can be used interchangeably within a partition when performing system functions (a system armed with one user's code can be disarmed by another user's code), with the exception of the Guest code Arm Only code described below.
- User code programming involves these steps:
  1. Choose a user number from the set of users assigned to the partition in which the user will be operating, and assign a 4-digit security code.
  2. Assign an authority level to that user.
  3. Assign other attributes as necessary (see attributes on the next page).

NOTE: The factory settings are designed to meet most normal user situations. Therefore, the only step you usually need to do when adding users is assign a user number (from the partition's pre-assigned user numbers) and a security code.

Authority Level Definitions

Authority levels define the system functions a particular user can/cannot perform.

Level	Title	Explanation
N/A	System Master (default = 1234)	Reserved for user 02; Can perform all system functions and assign codes in both partitions; can change its own code as follows: Master code + [8] + 02 + new master code + new master code again
0	Standard User:	Can only perform security functions in assigned partition. Cannot perform system functions reserved for the master user.
1	Arm Only:	Can only arm the system. Cannot disarm or do other functions.
2	Guest:	Can arm the system in assigned partitions, but cannot disarm the system **unless** the system was armed with this code. This code is typically assigned to someone (e.g., babysitter or cleaner) who has a need to arm/disarm the system only at certain times. The user of this code should **not** use the "Quick Arming" feature.
3	Duress Code:	Intended for use when you are forced to disarm or arm the system under threat. When used, the system will act normally, but can silently notify the Central Monitoring Station of your situation, if that service has been provided.
4	Partition Master	(VISTA-20P Series) Can do everything a standard user can do, and can assign user codes to users in their partition.

Security Codes & Authority Levels (cont'd)

How to Assign User Codes and Attributes

The following lists the various command strings for adding user codes and attributes.

Refer to the User Setup chart at the back of this manual for factory defaults of user attributes and to keep a record of user programming.

NOTE: Partition Master codes (VISTA-20P Series only) apply only to those user numbers previously assigned (by the system master/installer) to the partition master's partition.

Add User Code:
System/Partition Master code + [8] + user no. + new user's code

(*Users 03/33 are preset to partition programmers, but can be changed.)*

User 01 = installer
User 02 = master
User 03 = partition 1 master
User 33 = partition 2 master
The Keypad beeps once to confirm that new user was added.

Delete User Code:
System/Partition Master code + [8] + [user no.] + [#] [0]

The user code and all attributes* programmed for this user number, including any associated RF keys, are erased from the system. (*except assigned partition)

Authority Level:
System/Partition Master code + [8] + [user no.] + [#] [1]+ auth. level

Factory Defaults:
users 04-32/34-49 = 0
users 03/33 = 4

Authority Levels (see definitions on previous page):
0 = standard user
1 = arm only
2 = guest
3 = duress
4 = partition master (VISTA-20P Series only)

Access Group:
System/Partition Master Code + [8] + [user no.] + [#] [2]+ group (1-8)

Factory Defaults:: none

You can assign users to a group, then set an access schedule that defines the times this group of users can operate the system. The system ignores these users outside the scheduled times.

User's Partition:
System Master Code + [8] + [user no.] + [#] [3] + [0] + partition(s) + [#]

(VISTA-20P only)
Factory Defaults:
Part. 1 = users 03-32
Part. 2 = users 33-49

This command assigns the partitions the user can access. If more than one, enter partition numbers sequentially, then press [#] to end. E.g., master code + [8] + [user no.] + [#] [3] + [0] + [1] [2] + [#] gives the user access to partitions 1 and 2 and the common partition.
Partition Entries: 1 = partition 1 and common
2 = partition 2 and common
3 = common partition only

RF User Number:
Master/Part. Prog. Code + [8] + [user no.] + [#] [4]+ zone no.

Factory Defaults:: none

Use this command to assign a wireless button device (keyfob) to this user (keyfob must be enrolled in system first; see installer).
Zone number: enter the zone number assigned to a button on the keyfob that will be used for arming/disarming by this user.

Pager On/Off:
Master/Part. Prog. Code + [8] + [user no.] + [#] [5] + 0 or 1

Factory Defaults:
users 01-49 = 1 (on)

You can program a user so that a message is sent to a pager whenever this code is used to arm or disarm the system.
Paging On/Off: 1 = allow paging; 0 = no paging for this user

Accessing Other Partitions (VISTA-20P)

About Accessing Partitions

(GOTO Command and Multi-Partition Arming)

Each keypad is assigned a default partition for display purposes, and will show only that partition's information.

- If the user is authorized, a keypad in one partition can be used to perform system functions in the other partition by using the **GOTO** command. Refer to the GOTO section.
- If the user is authorized, that user can arm other partitions. Refer to the Multi-Partition Arming section.

The following table shows the relationship of the keypads in each partition when system is armed and disarmed.

	PARTITION 1		**PARTITION 2**		**COMMON ZONE (LOBBY, etc.)**	
	Arming State	**Keypad Status**	**Arming State**	**Keypad Status**	**Arming State**	**Keypad Status**
Condition 1 ⇨	Disarmed	Partition 1 **Only**	Disarmed	Partition 2 **Only**	Disarmed	Common Zone **Only**
Condition 2 ⇨	Disarmed	Partition 1 and Common Zone	Armed	Partition 2 **Only**	Disarmed	Common Zone **Only**
Condition 3 ⇨	Armed	Partition 1 **Only**	Disarmed	Partition 2 and Common Zone	Disarmed	Common Zone **Only**
Condition 4 ⇨	Armed	Partition 1 **Only**	Armed	Partition 2 **Only**	Armed	Common Zone **Only**

When both partitions are disarmed, the keypad in each partition displays zone status for its partition only. The common zone keypad shows the status in that zone only. See Condition 1 above.

When partition 1 is disarmed and partition 2 is armed, the keypad in partition 1 shows the status of partition 1 **and** the common zone. Partition 2 will display the status of partition 2 **only.** See Condition 2 above.

When partition 1 is armed and partition 2 is disarmed, the keypad in partition 1 shows the status of partition 1 **only**. Partition 2 will display the status of partition 2 **and** the common zone**.** See Condition 3 above.

As long as any one of the two partitions is disarmed, the common zone will always be disarmed. The common zone will be armed only when both partition 1 and 2 are armed. See Condition 4 above.

Accessing Other Partitions (cont'd)

Using the GoTo Command (VISTA-20P)

If the user is authorized, a keypad in one partition can be used to perform system functions in the other partition by using the **GOTO** command.

- You must use an Alpha keypad to access another partition.
- Keypads automatically return to their original partition after 2 minutes with no keypad activity.

1. ☐ ☐ ☐ ☐ + [*] + partition number (0,1,2,3)
   (Security Code)
   0 = return to keypad's original partition.
   1 = partition 1; 2 = partition 2; 3 = common zone
   The keypad beeps to confirm the partition change.

Alpha Display:

```
1 DISARMED
READY TO ARM
```

Fixed-Word Display: Green LED lit

2. The keypad remains in the new partition until directed to go to another partition, or until it automatically returns to the original partition.
   The active partition number is displayed in the upper left portion of screen, if the option is selected.

Alpha Display:

```
2 DISARMED
READY TO ARM
```

Fixed-Word Display: Green LED lit

Multi-Partition Arming (VISTA-20P)

Some users can be given Multi-Partition arming ability by being assigned to both partitions when programming user attributes.
When attempting to arm multi-partitions:

- You must use an Alpha keypad.
- The system arms only if all partitions are "ready to arm."
- If any partition is "not ready," the system does not arm at all.
- You can use the GOTO command to bypass open zones before arming.
- If any partition is already armed when global arming is attempted, that partition remains in its existing armed state.

☐ ☐ ☐ ☐ + [0] + arm command (see list below)
(Security Code)

Alpha Display:

```
1 DISARMED
READY TO ARM
```

Fixed-Word Display: Green LED lit

Multi-Partition Arming Commands

2 = arms all partitions AWAY
3 = arms all partitions STAY
33 = arms all partitions NIGHT-STAY
4 = arms all partitions MAXIMUM
7 = arms all partitions INSTANT
1 = disarms all partitions

Accessing Other Partitions (cont'd)

Common Zone Operation (VISTA-20P)

Ask your installer if a "common zone" was assigned. If so, check this box ☐

Your system may have been set up to use a common zone, which is an area shared by users of both partitions, such as a foyer or lobby. If so, please note the following:

- The common zone will sound and report alarms only when **both** partitions are armed. If only one partition is armed, the system ignores faults on the common zone.
- Either partition may arm its system if the common zone is faulted, but once armed, the other partition **will not** be able to arm unless the common zone is first bypassed or the fault is corrected.
- Faults on the common zone are displayed on common partition keypads, and will also appear on another partition's keypad when the alternate partition is armed.
- Either partition can clear and restore the common zone after an alarm.
- Entry/exit time for the common zone is the same as for partition 1.

Scheduling

About Scheduling

The system provides end-user schedules (programmable by master/installer only), which can control various types of events.

- Each schedule causes a defined event to start and stop (when appropriate) at a specified time.
- Schedules can be set to automatically repeat at various intervals.
- Schedules can be set for random starting, if desired.
- VISTA-20P Series provides up to 16 user schedules.
- VISTA-15P Series provides up to 4 user schedules.

Creating Schedules

Alpha Displays:

1. ☐ ☐ ☐ ☐ + [#] + [6] [4]
   (Master Code)

```
1 DISARMED
READY TO ARM
```

2. Enter a 2-digit schedule number from:
   01-16 (VISTA-20P Series) or 01-04 (VISTA-15P Series)
   Press [∗] to continue.

```
ENTER SCHED NO.
00/QUIT      00
```

3. Enter the desired 2-digit event number from the list:
   00 = clear the scheduled event
   01 = turn a programmed output on or off
   (see ***Using Device Commands*** section for a list of output device numbers used in your system)
   02 = set a user access schedule for one or more users
   (see ***Security Codes*** section for an explanation of access groups)
   03 = send a "latch-key" report to a pager if the system is not disarmed by a specified time; message sent is "777-7777."
   04 = automatically arm the system in STAY mode at a specified time
   05 = automatically arm the system in AWAY mode at a specified time
   06 = automatically disarm the system at a specified time
   07 = Display the word "REMINDER" at a specified time (if selected, the keypad beeps every 30 seconds beginning when the word "REMINDER" is first displayed, and the display alternates with the normal keypad display about every 4-5 seconds. To stop the beeps and cancel the display once it starts, press any key).
   Press [∗] to continue.

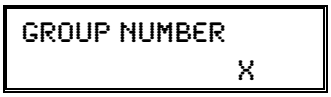
```
ENTER EVENT
CLEAR EVENT  00
```

4. For event number "01," enter the output number associated with this schedule.
   Otherwise, this prompt is skipped.
   Press [∗] to continue to the "Start" prompt shown on the next page.

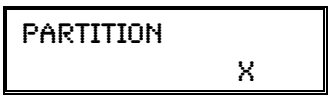
```
RELAY NUMBER
             00
```

Scheduling (cont'd)

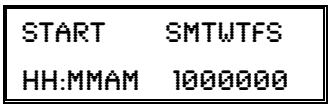
5. For event number "02," enter the access group number. Otherwise, this prompt is skipped.
   Press [∗] to continue to the "Start" prompt below.



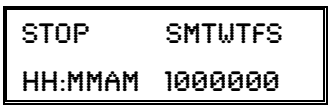
6. For event numbers "03-07," enter the partition number to be armed or disarmed.
   0 = arm all; 1 = partition 1; 2 = partition 2;
   3 = arm common
   Otherwise, this prompt is skipped.
   Press [∗] to continue to the "Start" prompt.



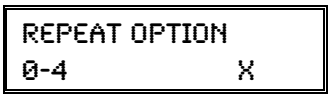
7. Enter the event's start time and days of week.
   Hour = 00-12; minute = 00-59
   AM = 0; PM = 1
   Days = Position the cursor under the desired days using the [∗] key to move forward, then press "1" to select the day.
   Press [∗] to continue.



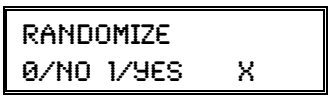
8. If applicable, enter the event's stop time and days of week (applies only to event numbers 01, 02, and 03). Refer to step 7 for available entries.
   Press [∗] to continue.



9. Enter the desired repeat option.
   0 = no repeat
   1 = repeat schedule weekly
   2 = repeat schedule biweekly (every other week)
   3 = repeat schedule every third week
   4 = repeat schedule every fourth week
   e.g., To make a schedule that happens everyday you would select all days with a repeat count of 1. To make a schedule that runs for one week then stops, select everyday with a repeat count of 0.



10. For event number 01 (output on/off), select the randomize option, if desired.
    0 = no; 1 = yes
    If selected, the schedule times will vary within 60 minutes of the "hour" time. For example, if a schedule is set to start at 6:15pm, it will do so the first time 6:15pm arrives, but on subsequent days it will start anytime between 6:00 and 6:59 p.m.
    Press [∗] to continue.



Event Logging Procedures

About Event Logging

The system records various events in a history log, which can be viewed by the master user on an Alpha Display keypad.

- The Event Log holds up to 100 (VISTA-20P Series) or 50 (VISTA-15P Series) events.
- Events are displayed in chronological order, from most recent to oldest.
- When the log is full, the oldest event is replaced by the logging of any new event.

Viewing the Event Log

1. ☐ ☐ ☐ ☐ + [#] + [6] + [0]
   (Master Code)

Alpha Displays:

```
****DISARMED****
READY TO ARM
```

2. The system displays the most recent event as follows:
   - event number
   - type of event, identified by its corresponding code (refer to the code table that follows)
   - zone or user number (depending on type of event)
   - partition in which event occurred
   - time and date of the event's occurrence.

```
001 E441 U001 P1
12:34AM 01/02/00
```

3. Pressing [∗] displays previous events (back in time). Pressing [#] displays events forward in time.
4. Exit the event log by pressing any key other than [∗] or [#].

Understanding the Type of Event Displayed

If the event code is preceded by an E (as in the above display), it means that the event is new and ongoing; if preceded by an R, it means the event has been restored.

Code	Definition
110	Fire Alarm
121	Duress
122	Alarm, 24-hour Silent
123	Alarm, 24-hour Audible

Code	Definition
131	Alarm, Perimeter
132	Alarm, Interior
134	Alarm, Entry/Exit
135	Alarm, Day/Night

Event Logging Procedures (cont'd)

Code	Definition
143	Alarm, Expansion Module
145	ECP Module cover tamper
146	Silent Burglary
150	Alarm, 24-Hour Auxiliary/Monitor zone
162	Carbon Monoxide
301	AC Power
302	Low System Battery/Battery Test Fail
305	System Reset (Log only)
309	Battery Test Failure
321	Bell/Siren Trouble
333	Trouble, Expansion Mod. Supervision
341	Trouble, ECP Cover Tamper
344	RF Receiver Jam
351	Telco Line Fault
353	Long Range Radio Trouble
373	Fire Loop Trouble
374	Exit Error Alarm
380	Global Trouble, Trouble Day/Night
381	RF Supervision Trouble
382	Supervision Auxiliary Wire Zone
383	RF Sensor Tamper
384	RF Sensor Low-battery
393	Clean Me

Code	Definition
401	Disarmed, Armed AWAY, Armed STAY
403	Schedule Arm/Disarm AWAY
406	Cancel by User
407	Remote Arm/Disarm (Downloading)
408	Quick Arm AWAY
409	Keyswitch Arm/Disarm AWAY
441	Disarmed/Armed STAY/INSTANT, Quick-Arm STAY/INSTANT
442	Keyswitch Arm/Disarm STAY
459	Recent Closing
570	Bypass
601	Manually Triggered Dialer Test
602	Periodic Test
606	AAV to Follow
607	Walk Test Entered/Exited
623	Event Log 80% Full
625	Real-Time Clock was Changed (log only)
627	Program Mode Entry (log only)
628	Program Mode Exit (log only)
642	Latch Key (log only)
750 -789	Reserved for Configurable Zone Type report codes (check with central station when using these codes)

NOTE: Ask your installer to explain the meaning of any code you do not understand.

Testing the System

About Testing the System

Using the Test mode allows each protection point to be checked for proper operation. ***Testing should be conducted weekly to ensure proper operation***.

- The keypad sounds a single beep about every 30 seconds as a reminder that the system is in the Test mode.
- Alarm messages are not sent to your Central Station while Test mode is on.

Alpha Displays:

1. Disarm the system and close all protected windows, doors, etc. The READY indicator light should come on if all zones are intact (i.e., all protected windows, doors, etc. are closed.

```
****DISARMED****
READY TO ARM
```

2. ☐☐☐☐ + **5** *TEST* then [0] (walk)
   (Security Code)
   The Dial test (option "1") is intended for the installer and should not be used unless directed to do so by your Security System Representative.

```
1 = DIAL, 0 = WALK
```

3. Listen. The external sounder should sound for about 1 second then turn off. If the sounder does not sound, CALL FOR SERVICE. The "Test in Progress" display appears only on the keypad that started the test.

```
TEST IN PROGRESS
```

4. Fault zones. Open each protected door and window in turn and listen for three beeps from the keypad. Identification (zone number or zone description) of each faulted protection point should appear on the display. The display clears when the door or window is closed.
5. Walk in front of any interior motion detectors (if used) and listen for three beeps. The identification of the detector should appear on the display when it is activated. The display clears when no motion is detected. *Note that if wireless motion detectors are used, there is a 3-minute delay between activations. This conserves battery life.*
6. Test all smoke detectors, following the manufacturer's instructions. The identification of each detector should appear on the display when each is activated.

   If a problem is experienced with any protection point (no confirming sounds, no display), call for service immediately.

   When all protection points have been checked and are intact (closed), there should be no zone identification numbers displayed on the keypad.
7. Exit test mode: ☐☐☐☐ + **1** *OFF*
   (Security Code)

If the test mode is inadvertently left active, it automatically turns off after 4 hours. During the final five minutes, the keypad will emit a double beep every 30 seconds.

Trouble Conditions

"Check" and "Battery" Displays

The word **CHECK** on the keypad's display, accompanied by a "beeping" at the keypad, indicates a trouble condition in the system.

To silence the beeping for these conditions, press any key.

1. **A display of "CHECK" and one or more zone numbers** indicates that a problem exists with the displayed zone(s) and requires your attention. Determine if the zone(s) displayed are intact and make them so if they are not. If the problem has been corrected, the display can be cleared if you enter the OFF sequence (security code plus OFF key) **twice**. If the display persists, CALL FOR SERVICE.

   Note: A display of **CHECK 70** on Alpha Display keypads indicates that the wiring connection to the external sounder is at fault (opened or shorted), and you should CALL FOR SERVICE. See "BELL FAILURE" on next page. A display of **CHECK 90** indicates that RF interference may be impeding the operation of wireless sensors* in the system. See "**Rcvr Jam**" on next page.

2. **If there are wireless sensors* in your system,** the **CHECK** condition may also be caused by some change in the environment that prevents the wireless receiver from receiving messages from a particular sensor. CALL FOR SERVICE if this occurs.

   * Not all systems use wireless sensors.

IF YOU CANNOT CORRECT A "CHECK" DISPLAY, CALL FOR SERVICE.

TYPICAL "CHECK" DISPLAYS



FIXED-WORD DISPLAY KEYPAD



ALPHA DISPLAY KEYPAD

Trouble Conditions (cont'd)

Words or letters in parentheses ( ) are those that are displayed on Fixed-Word Display keypads.

Other Trouble Displays

COMM. FAILURE (or **FC**)	Indicates that a failure has occurred in the telephone communication portion of your system. CALL FOR SERVICE.
SYSTEM LO BAT (or **BAT** with no zone No.)	Indicates that a low system battery condition exists. Display is accompanied by "beeping"* at the keypad. If this condition persists for more than one day (with AC present), CALL FOR SERVICE.
LO BAT **+** zone descriptor (or **BAT** with zone No.)	Indicates that there is a low battery condition in the wireless transmitter** number displayed (00 is RF keypad). Accompanied by a single "beep"* (about once every 30 seconds) at the keypad. Either replace the battery yourself, or CALL FOR SERVICE. If the battery is not replaced within 30 days, a **CHECK** display may occur.
Rcvr Jam (or **CHECK 90**)	Wireless part of the system is experiencing RF interference which may impede reception from wireless sensors.**
ALARM 1xx **FAULT 1xx** **CHECK 1xx** (or **91**)	Indicates a communication problem between the control and a connected device (e.g., RF receiver, zone expander) where the "xx" indicates the device address. CALL FOR SERVICE.
MODEM COMM (or **CC**)	Indicates that the control is on-line with the Central Monitoring Station's remote computer. The control will not report system activity while on-line. Wait a few minutes — the display should disappear.
BELL FAILURE (or **CHECK 70**)	Indicates that the wiring connection to the external sounder is at fault (open or shorted). Accompanied by "beeping" at the keypad. CALL FOR SERVICE.

* Any "beeping" that accompanies a trouble display can be stopped by depressing any key on the keypad or by entering an OFF sequence (code + OFF)

** Not all systems use wireless sensors.

Trouble Conditions (cont'd)

Other Trouble Displays (Continued)

AC LOSS (or **NO AC**)	The system is operating on battery power only due to an AC power failure. If only some lights are out on the premises, check circuit breakers and fuses and reset or replace as necessary. If AC power cannot be restored and a "low system battery" message appears (see previous page), **CALL FOR SERVICE**.
Busy-Standby (or **dI**)	If this message remains displayed for more than 1 minute, system is disabled. **CALL FOR SERVICE**.
OPEN CIRCUIT (or **OC**)	The keypad is not receiving signals from the control. CALL FOR SERVICE.
Long Rng Trbl (or **bF**)	If part of your system, back-up Long Range Radio communication has failed. CALL FOR SERVICE.
TELCO FAULT (or **CHECK 94**)	The telephone line has a problem. CALL FOR SERVICE.

Total Power Failure

If there is no keypad display at all, and the READY indicator is not lit, operating power (from AC and back-up battery) for the system has been interrupted and the system is inoperative. **CALL FOR SERVICE.**

In The Event Of Telephone Operational Problems

In the event of telephone operational problems, disconnect the control from the phone line by removing the plug from the phone wall jack. We recommend that your installer demonstrate this disconnection on installation of the system. Do not attempt to disconnect the phone connection inside the control. Doing so will result in the loss of your phone lines. If the regular phones work correctly after the control has been disconnected from the phone wall jack, the control has a problem and you should immediately call for service. If upon disconnection of the control, there is still a problem on the phone line, notify the Telephone Company that they have a problem and request prompt phone repair service. The user may not under any circumstances attempt any service or repairs to the security system. Repairs must be made only by authorized service (see the LIMITED WARRANTY statement for information on how to obtain service).

Maintaining Your System

Taking Care of Your System

The components of your security system are designed to be as maintenance-free as possible. However, to make sure that your system is in reliable working condition, do the following:

1. Test your system weekly.
2. Test your system after any alarm occurs.

Silencing Low Battery Warning Tones at the Keypad

You can silence the keypad's warning tones by pressing the OFF key**,** but the keypad's low battery message display will remain on as a reminder that you have a low battery condition in one or more of your wireless sensors. When you replace the weak battery with a fresh one, the sensor sends a "good battery" signal to the control as soon as the sensor is activated (opening/closing of door, window, etc.), causing the low battery display to turn off. If the sensor is not activated, the display will automatically clear within approximately 1 hour.

Replacing Batteries in Wireless Sensors

Wireless sensors may not have been used in your security system

IMPORTANT: Use only batteries recommended by your installer as replacement.

Each wireless sensor in your system has a 9-volt or 3-volt battery. The system detects a low battery in wireless sensors, including smoke detectors, the personal emergency transmitter, and the portable wireless keypad and displays a low battery message*. (A low battery in a portable wireless keypad is detected as soon as one of its keys is pressed, and displayed as **00**.). Battery-operated smoke detectors with a low battery also emit a single "chirp" sound approximately once every 20–30 seconds.

Alkaline batteries provide a minimum of 1 year of operation, and in most units and applications, provide 2–4 years of service. 3-volt lithium batteries provide up to 4 or more years of operation. Actual battery life will depend on the environment in which the sensor is used, the number of signals that the transmitter in the sensor has had to send, and the specific type of sensor. Factors such as humidity, high or low temperatures or large swings in temperature, may all lead to the reduction of actual battery life in an installation.

* The low battery message comes on as a warning that battery replacement in indicated sensor(s) is due within 30 days. In the meantime, a sensor causing a low battery indication is still fully operational.

Routine Care

- Treat the components of your security system as you would any other electrical equipment. Do not slam sensor-protected doors or windows.
- Keep dust from accumulating on the keypad and all protective sensors, particularly on motion sensors and smoke detectors.
- The keypad and sensors should be cleaned carefully with a dry soft cloth. **Do not spray water or any other fluid on the units.**

Fire Alarm System

THIS SECTION APPLIES ONLY TO RESIDENTIAL SYSTEMS

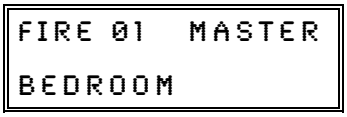
General

Your fire alarm system (if installed) is on 24 hours a day, for continuous protection. In the event of an emergency, the strategically located smoke and heat detectors will sound their alarms and automatically send signals to your system, triggering a loud, interrupted pulsed sound* from the Keypad(s) and any external sounders. A FIRE message will appear at your Keypad and remain on until you silence the alarm (see below for silencing fire alarms).

* Temporal pulse sounding is produced for Fire alarms, as follows:

3 pulses–pause–3 pulses–pause–3 pulses–pause. . . , repeated.

TYPICAL FIRE EMERGENCY DISPLAYS



ALPHA DISPLAY KEYPAD



FIXED-WORD DISPLAY KEYPAD

Silencing Fire Alarms and Clearing Memory of Alarm

1. You can silence the alarm at any time by pressing the **OFF** key (the security code is not needed to silence fire alarms). To clear the display, enter your code and press the **OFF** key again (to clear Memory of Alarm).
2. If the Keypad's FIRE display does not clear after the second OFF sequence, smoke detectors may still be responding to smoke or heat producing objects in their vicinity. Investigate, and should this be the case, eliminate the source of heat or smoke.
3. If this does not remedy the problem, there may still be smoke in the detector. Clear it by fanning the detector for about 30 seconds.

   When the problem has been corrected, clear the display by entering your code and pressing the **OFF** key.

Smoke Detector Reset

Depending on the type of smoke detectors in your system, it may be necessary to "reset" the smoke detectors after a fire alarm has been turned off. Check with your installer. This "reset" is accomplished at a keypad, as follows:

Enter User Code (except “arm only” user), then press the [**1**] key.

NOTE: During smoke detector reset, “FAULT xx” appears (about six seconds) and should disappear if the detector is clear.

Fire Alarm System (cont'd)

THIS SECTION APPLIES ONLY TO RESIDENTIAL SYSTEMS

Manually Initiating a Fire Alarm

1. Should you become aware of a fire emergency before your smoke or heat detectors sense the problem, go to your nearest keypad and manually initiate an alarm by pressing the panic key assigned for FIRE emergency for 2 seconds (see below). If a key pair has been assigned for fire, press both keys at the same time. See the *Using the Panic Keys* section below for further details.
2. Evacuate all occupants from the premises.
3. If flames and/or smoke are present, leave the premises and notify your local Fire Department immediately.
4. If no flames or smoke are apparent, investigate the cause of the alarm. The zone number(s) of the zone(s) in an alarm condition will be displayed at the keypad.

Using the Panic Key(s) Assigned for FIRE Emergency

A key or key pair may have been assigned for manually initiating a FIRE alarm. See the *Panic Keys* section for key assignments.
For convenience, indicate the key or key pair assigned for fire below.

Individual Keys

A B C

☐ ☐ ☐ Press the individual key assigned for fire for 2 seconds.

OR

Key Pairs

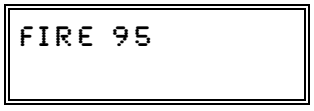
☐ [1 OFF] and [* READY] (zone 95)

☐ [* READY] and [#] (zone 99)

☐ [3 STAY] and [#] (zone 96)

Press both keys of the key pair assigned for fire at the same time.

DISPLAYS FOLLOWING MANUAL INITIATION OF A FIRE ALARM



ALPHA DISPLAY KEYPAD



FIXED-WORD KEYPAD

Fire Alarm System (cont'd)

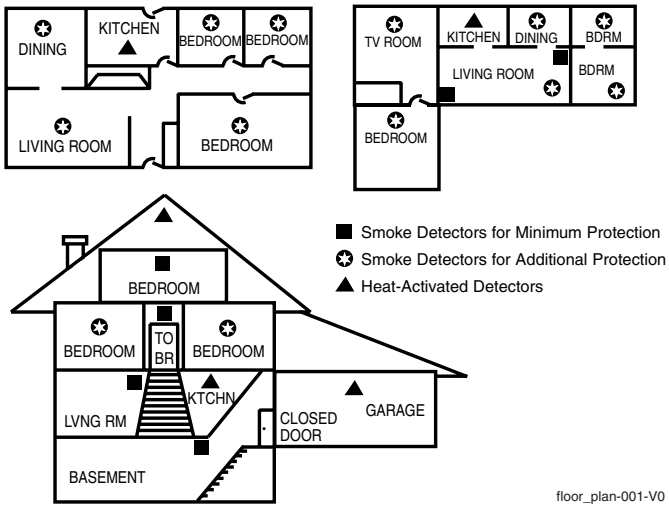
THIS SECTION APPLIES ONLY TO RESIDENTIAL SYSTEMS

National Fire Protection Association Recommendations on Smoke Detectors

With regard to the number and placement of smoke/heat detectors, we subscribe to the recommendations contained in the National Fire Protection Association's National Fire Alarm Code (NFPA 72) noted below.

Early warning fire detection is best achieved by the installation of fire detection equipment in all rooms and areas of the household as follows: A smoke detector installed outside of each separate sleeping area, in the immediate vicinity of the bedrooms and on each additional story of the family living unit, including basements and excluding crawl spaces and unfinished attics.

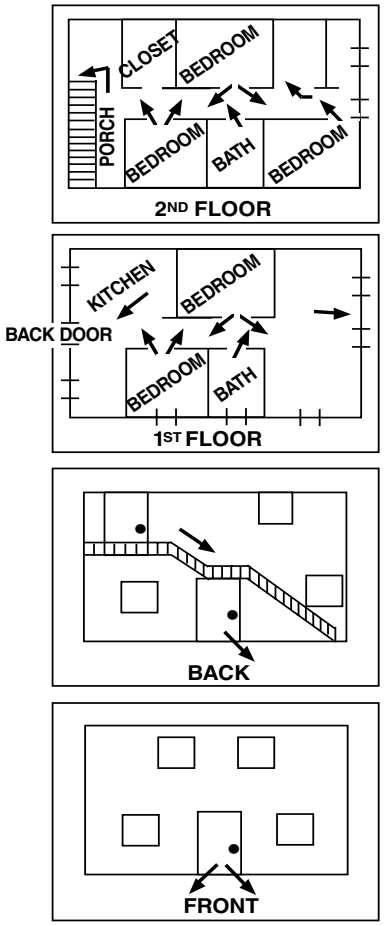
In addition, the NFPA recommends that you install heat or smoke detectors in the living room, dining room, bedroom(s), kitchen, hallway(s), attic, furnace room, utility and storage rooms, basements and attached garages.



Fire Alarm System *(cont'd)*

THIS SECTION APPLIES ONLY TO RESIDENTIAL SYSTEMS

Emergency Evacuation



Establish and regularly practice a plan of escape in the event of fire. The following steps are recommended by the National Fire Protection Association:

1. Position your detector or your interior and/or exterior sounders so that they can be heard by all occupants.
2. Determine two means of escape from each room. One path of escape should lead to the door that permits normal exit from the building. The other may be a window, should your path be impassable. Station an escape ladder at such windows if there is a long drop to the ground.
3. Sketch a floor plan of the building. Show windows, doors, stairs and rooftops that can be used to escape. Indicate escape routes for each room. Keep these routes free from obstruction and post copies of the escape routes in every room.
4. Assure that all bedroom doors are shut while you are asleep. This will prevent deadly smoke from entering while you escape.
5. Try the door. If the door is hot, check your alternate escape route. If the door is cool, open it cautiously. Be prepared to slam the door if smoke or heat rushes in.
6. When smoke is present, crawl on the ground. Do not walk upright, since smoke rises and may overcome you. Clearer air is near the floor.
7. Escape quickly; don't panic.
8. Establish a common meeting place outdoors, away from your house, where everyone can meet and then take steps to contact the authorities and account for those missing. Choose someone to assure that nobody returns to the house — many die going back.

Quick Guide to Basic System Functions

FUNCTION	PROCEDURE	COMMENTS
Check Zones	Press READY key.	View faulted zones when system not ready.
Arm System	Enter code. Press arming key desired: (AWAY, STAY, NIGHT-STAY, MAXIMUM, INSTANT)	Arms system in mode selected.
Quick Arm (if programmed)	Press #. Press arming key desired: (AWAY, STAY, MAXIMUM, INSTANT)	Arms system in mode selected, quickly and without use of a code.
Bypass Zone(s)	Enter code. Press BYPASS [6] key. Enter zone number(s) to be bypassed (use 2-digit entries).	Bypassed zones are unprotected and will not cause an alarm if violated.
Quick Bypass (if programmed)	Enter code. Press BYPASS [6] key + [#].	Bypasses all faulted zones automatically.
Silence Sounders		
Burglary:	Enter code. Press OFF [1] key.	Also disarms system. Memory of alarm remains until cleared.
Fire:	Press OFF [1] key.	Memory of Alarm remains until cleared.
"Check":	Press any key.	Determine cause.
Disarm System	Enter code. Press OFF [1] key.	Also silences sounders. Memory of alarm remains until cleared.
Clear Alarm Memory	After disarming, enter code again. Press OFF [1] key again.	Keypad beeps rapidly on entry if alarm has occurred while absent. Alarm display will remain upon disarming until cleared.
Duress (if active and connected to Central Station)	Arm or disarm "normally," but use your 4-digit Duress code to do so.	Performs desired action and sends silent alarm to Central Station.
Panic Alarms (as programmed)	Press key [A], [B], or [C] for at least 2 seconds, or key pairs 1 + ✱; ✱ + #, or 3 + # respectively.	See the *Panic Keys* section for emergency functions programmed for your system. Note: Keys “A”, “B”, and “C” may have been programmed for other functions.
Chime Mode	*To turn ON or OFF:* Enter code. Press CHIME key.	The keypad will sound if doors or windows are violated while system is disarmed and chime mode is ON.
Test Mode	*To turn ON:* Enter code. Press TEST key. *To turn OFF:* Enter code. Press OFF key.	Tests alarm sounder and allows sensors to be tested.
Phone Access if applicable	Consult *Phone Access User's Guide* that accompanies the Phone Module.	Permits system access remotely, via Touch-tone phone.

Summary of Audible/Visual Notifications

Fixed-Word Display Keypads

SOUND	CAUSE	DISPLAY
LOUD, INTERRUPTED* Keypad & Ext.	FIRE ALARM	**FIRE** is displayed; zone number of zone in alarm is displayed. If a fire alarm is manually activated, zone number 95 will be displayed.
LOUD, CONTINUOUS* Keypad & Ext.	BURGLARY/AUDIBLE EMERGENCY ALARM	**ALARM** is displayed. Zone number of zone in alarm is also displayed.
ONE SHORT BEEP (not repeated) Keypad only	a. SYSTEM DISARM b. SYSTEM ARMING ATTEMPT WITH AN OPEN ZONE. c. BYPASS VERIFY	a. READY indicator light comes on. b. Number of the open protection zone displayed. c. Zone numbers of the bypassed protection zones are displayed (one beep is heard for each zone displayed). Subsequently, **BYPASS** is displayed.
ONE SHORT BEEP (once every 40 secs) Keypad only	a. SYSTEM IS IN TEST MODE b. LOW BATTERY AT A TRANSMITTER c. SYSTEM WILL AUTOARM WITHIN 10 MINUTES	a. Opened zone numbers will appear. b. **BAT** displayed with zone number of transmitter. c. No special display.
TWO SHORT BEEPS Keypad only	ARM AWAY or MAXIMUM	**AWAY** is displayed. Red ARMED indicator is lit.
THREE SHORT BEEPS Keypad only	a. ARM STAY, NIGHT-STAY, INSTANT b. ZONE OPENED WITH SYSTEM IN CHIME MODE.	a. **STAY** or **INSTANT** is displayed. Red ARMED indicator is lit. b. **CHIME** displayed; zone number of open protection zone will be displayed if the [✱] key is pressed.
RAPID BEEPING Keypad only	a. TROUBLE b. MEMORY OF ALARM c. SYSTEM LOW BATTERY d. EXT. SOUNDER WIRING FAIL	a. **CHECK** displayed. Zone number of troubled protection zone is displayed. b. **FIRE** or ALARM is displayed; zone number of zone in alarm is displayed c. **BAT** displayed with no zone ID number. d. **CHECK 70** is displayed.
SLOW BEEPING Keypad only	a. EXIT DELAY WARNING b. ENTRY DELAY WARNING	a. **AWAY** is displayed. b. Exceeding the entry delay time without disarming causes alarm.

* If a bell is used as external sounder, fire alarm is *pulsed ring;* burglary/audible emergency is *steady ring*.

Summary of A/V Notifications (cont'd)

Alpha Display Keypads

SOUND	CAUSE	DISPLAY
LOUD, INTERRUPTED* Keypad & Ext.	FIRE ALARM.	**FIRE** is displayed; descriptor of zone in alarm is displayed. If a fire alarm is manually activated, zone number 95 will be displayed.
LOUD, CONTINUOUS* Keypad & Ext.	BURGLARY/AUDIBLE EMERGENCY ALARM.	**ALARM** is displayed. If programmed, descriptor of zone in alarm is also displayed
ONE SHORT BEEP (not repeated) Keypad only	a. SYSTEM DISARM. b. SYSTEM ARMING ATTEMPT WITH AN OPEN ZONE. c. BYPASS VERIFY.	a. **DISARMED/READY TO ARM** is displayed. b. Number and descriptor of open protection zone is displayed. c. Numbers and descriptors of the bypassed zones are displayed (One beep is heard for each zone displayed). Subsequently, the following is displayed: **DISARMED BYPASS /Ready to Arm.**
ONE SHORT BEEP (once every 40 seconds) Keypad only	a. SYSTEM IS IN TEST MODE. b, LOW BATTERY AT A TRANSMITTER. c. SYSTEM WILL AUTOARM WITHIN 10 MINUTES	a. Opened Zone identifications will appear. b. **LO BAT** displayed with description of transmitter. c. No special display.
TWO SHORT BEEPS Keypad only	ARM AWAY or MAXIMUM.	**ARMED AWAY or MAXIMUM** displayed. Red ARMED indicator lit.
THREE SHORT BEEPS Keypad only	a. ARM STAY, NIGHT-STAY, OR INSTANT. b. ZONE OPENED WHILE SYSTEM IS DISARMED.	a. **ARMED STAY** or **ARMED INSTANT** displayed. Red ARMED indicator lit. b. **CHIME** displayed, descriptor of open protection zone will be displayed if the [✱] key is pressed.
RAPID BEEPING Keypad only	a. TROUBLE. b. MEMORY OF ALARM. c. SYSTEM LOW BATTERY. d. EXT. SOUNDER WIRE FAIL.	a. **CHECK** displayed. Descriptor of troubled protection zone is displayed. b. **FIRE** or **ALARM** is displayed; descriptor of zone in alarm is displayed. c. **SYSTEM LO BAT** displayed. d. **BELL FAILURE** is displayed.
SLOW BEEPING Keypad only	a. EXIT DELAY WARNING (if programmed). b. ENTRY DELAY WARNING.	a. **ARMED AWAY or MAXIMUM** is displayed along with **You May Exit Now.** b. **DISARM SYSTEM OR ALARM WILL OCCUR** is displayed. **Exceeding the delay time without disarming causes an alarm.**

* If a bell is used as external sounder, fire alarm is *pulsed ring;* burglary/audible emergency is *steady ring*.

Regulatory Statements and Warnings

WARNING: This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

RADIO FREQUENCY EMISSIONS

Federal Communications Commission (FCC) Part 15

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada

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

TELEPHONE/MODEM INTERFACE

FCC Part 68

This equipment complies with Part 68 of the FCC rules. On the front cover of this equipment is a label that contains the FCC registration number and Ringer Equivalence Number (REN). You must provide this information to the telephone company when requested.

This equipment uses the following USOC jack: RJ31X

This equipment may not be used on telephone-company-provided coin service. Connection to party lines is subject to state tariffs. This equipment is hearing-aid compatible.

Industry Canada

NOTICE: The Industry Canada Label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together, This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves but should contact appropriate electric inspection authority, or electrician, as appropriate.

Ringer Equivalence Number Notice:

The **Ringer Equivalence Number** (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

Regulatory Statements (cont'd)

Industrie Canada
AVIS: l'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme aux normes de protection, d'exploitation et de sécurité des réseaux de télécommunications, comme le prescrivent les documents concernant les exigences techniques relatives au matériel terminal. Le Ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'enterprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée da raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêche pas la dégradation du service dans certaines situations.

Les réparations de matériel nomologué doivent être coordonnées par un représentant désigné par le fournisseur. L'entreprise de télécommunications peut demander à l'utilisateur da débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'energie électrique, de lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

Avertissement : L'utilisateur ne doit pas tenter de faire ces raccordements lui-même; il doit avoir racours à un service d'inspection des installations électriques, ou à un électricien, selon le cas.

AVIS : L'indice d'équivalence de la sonnerie (IES) assigné à chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent être raccordés à une interface. La terminaison d'une interface téléphonique peut consister en une combinaison de quelques dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas 5.

System Features Log

Features	Comments
Exit Delay	Part. 1: Part. 2*:
Entry Delay 1	Part. 1: Part. 2*:
Entry Delay 2	Part. 1: Part. 2*:
NIGHT-STAY Zones	Zones:
Quick Arm	yes no
Quick Bypass	yes no
Automatic Paging	yes no users:
Keyswitch Arming (circle type of LED lighting)	Arm AWAY: steady flash Arm STAY: steady flash

Function Keys	A	B	C	D	Comments
• Single-Button Arming					
• Step Arming					
• Paging (see Paging chart)					
• Time/Date Display					
• Macro Key 1					
• Macro Key 2					
• Macro Key 3*					
• Macro Key 4*					
• Emergency Key**: Personal					
• Emergency Key**: Silent Alarm					
• Emergency Key**: Audible Alarm					
• Emergency Key**: Fire					
• Device Activation					Device:

* Features marked with this single asterisk apply to the VISTA-20P Series only.

** Emergency Keys: A = [1] / [∗] B = [∗] / [#] C = [3] / [#]

System Features Log (cont'd)

User Setup

The following chart will help keep track of system users. Copies should be distributed to the partition† 1 and partition† 2 (if applicable) masters for their records.

To program a user attribute:
Enter system/partition* master code + [8] + user no. + "#" command listed in column heading.

User No.	User Name	User's Part(s).† (system master only) [#] [3] + part(s) + [#]	Security Code enter new code	Auth. Level [#] [1] + level	Access Group [#] [2] + group	RF Zone Number [#] [4] + zone no.	Pager on/off [#] [5] + 0/1
01	installer	(all)		installer			(1)
02	system master	(all)		master			(1)
03	partition 1 master	(1)		(4)			(1)
04		(1)		(0)			(1)
05		(1)		(0)			(1)
06		(1)		(0)			(1)
07		(1)		(0)			(1)
08		(1)		(0)			(1)
09		(1)		(0)			(1)
10		(1)		(0)			(1)
11		(1)		(0)			(1)
12		(1)		(0)			(1)
13		(1)		(0)			(1)
14		(1)		(0)			(1)
15		(1)		(0)			(1)
16		(1)		(0)			(1)
17		(1)		(0)			(1)
18		(1)		(0)			(1)
19		(1)		(0)			(1)
20		(1)		(0)			(1)
21		(1)		(0)			(1)
22		(1)		(0)			(1)
23		(1)		(0)			(1)
24		(1)		(0)			(1)
25		(1)		(0)			(1)
26		(1)		(0)			(1)
27		(1)		(0)			(1)
28		(1)		(0)			(1)
29		(1)		(0)			(1)
30		(1)		(0)			(1)
31		(1)		(0)			(1)
32		(1)		(0)			(1)

* Partitions apply to the VISTA-20P Series only.

System Features Log (cont'd)

User Setup (cont'd)

Enter system/partition master code + [8] + user no. + "#" command listed in column heading.

User No.*	User Name	User's Part(s). (system master only) [#] [3] + part(s) + [#]	Security Code enter new code	Auth. Level [#] [1] + level	Access Group [#] [2] + group	RF Zone Number [#] [4] + zone no.	Pager on/off [#] [5] + 0/1
33	partition 2 master	(2)		(4)			(1)
34		(2)		(0)			(1)
35		(2)		(0)			(1)
36		(2)		(0)			(1)
37		(2)		(0)			(1)
38		(2)		(0)			(1)
39		(2)		(0)			(1)
40		(2)		(0)			(1)
41		(2)		(0)			(1)
42		(2)		(0)			(1)
43		(2)		(0)			(1)
44		(2)		(0)			(1)
45		(2)		(0)			(1)
46		(2)		(0)			(1)
47		(2)		(0)			(1)
48		(2)		(0)			(1)
49		(2)		(0)			(1)

Authority Levels: 0 = standard user
1 = arm only
2 = guest
3 = duress
4 = partition master

Partitions: 0 = clears partition 1 and partition 2 defaults
1 = partition 1 and common
2 = partition 2 and common
3 = common partition only

Paging: 0 = no paging; 1 = allow paging

* Users 34-49 apply to VISTA-20P Series only; user 33 is partition 2 master for VISTA-20P Series, and the last user for VISTA-15P Series.

Paging Setup

Pager	Pager Phone Number\ Prefix Characters	Automatically Reports Upon…						Sched.	Func. Key
		open/close		alarm/trouble		zone list			
		p1	p2	p1	p2	p1	p2		
1									
2									
3**									
4**									

** Pagers 3 and 4 and partitions apply to VISTA-20P Series only.

System Features Log (cont'd)

Schedules*: master code + [#] + [6] [4]

No.	Event (see list below)	Device No. for "01" events: (see device list below)	Group No. for "02" events: enter 1-8	Partition** for "04-06" events: enter 1, 2, or 3	Start Time/ Day	Stop Time/ Day	Repeat (1-4)	Random (yes/no)
01								
02								
03								
04								
05*								
06*								
07*								
08*								
09*								
10*								
11*								
12*								
13*								
14*								
15*								
16*								

Events: 00 = clear event; 01 = device on/off; 02 = user access; 03 = latch key report; 04 = forced STAY arm; 05 = forced AWAY arm; 06 = auto disarm; 07 = display "reminder"

Repeat Options: 0 = none; 1 = repeat weekly; 2 = repeat every other week; 3 = repeat every third week; 4 = repeat every fourth week

* VISTA-20P Series can use schedules 01-16; VISTA-15P Series can only use schedules 01-04.)

** Partitions apply to the VISTA-20P Series only.

List of Output Devices

Device**	Description	Schedule No.	Function Key
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			
13			
14			
15			
16			
17			
18			

(** VISTA-20P Series can use devices 01-16; VISTA-15P Series can only use devices 01-08; both can use trigger devices 17/18.)

OWNER'S INSURANCE PREMIUM CREDIT REQUEST

This form should be completed and forwarded to your homeowner's insurance carrier for possible premium credit.

A. GENERAL INFORMATION:

Insured's Name and Address: _____

_____

Insurance Company: _____ Policy No.: _____

VISTA-20P / VISTA-15P Other _____

(circle the appropriate model number)

Type of Alarm: ☐ Burglary ☐ Fire ☐ Both

Installed by: _____ Serviced by: _____

Name Name

_____ _____

Address Address

B. NOTIFIES (Insert B = Burglary, F = Fire)

Local Sounding Device _____ Police Dept. _____ Fire Dept. _____

Central Station ☐ Name: _____

Address: _____

Phone: _____

C. POWERED BY: A.C. With Rechargeable Power Supply

D. TESTING: ☐ Quarterly ☐ Monthly ☐ Weekly ☐ Other _____

continued on other side

OWNER'S INSURANCE PREMIUM CREDIT REQUEST (cont.)

E. SMOKE DETECTOR LOCATIONS

☐ Furnace Room ☐ Kitchen ☐ Bedrooms ☐ Attic

☐ Basement ☐ Living Room ☐ Dining Room ☐ Hall

F. BURGLARY DETECTING DEVICE LOCATIONS:

☐ Front Door ☐ Basement Door ☐ Rear Door ☐ All Exterior Doors

☐ 1st Floor Windows ☐ All windows ☐ Interior locations

☐ All Accessible Openings, Including Skylights, Air Conditioners and Vents

G. ADDITIONAL PERTINENT INFORMATION:

_____

_____

_____

_____

_____

Signature: _____ Date: _____

LIMITATIONS OF THIS SYSTEM

WARNING! THE LIMITATIONS OF THIS ALARM SYSTEM

While this system is an advanced design security system, it does not offer guaranteed protection against burglary or other emergency. Any alarm system, whether commercial or residential, is subject to compromise or failure to warn for a variety of reasons. For example:

- Intruders may gain access through unprotected openings or have the technical sophistication to bypass an alarm sensor or disconnect an alarm warning device.
- Intrusion detectors (e.g. passive infrared detectors), smoke detectors, and many other sensing devices will not work without power. Battery operated devices will not work without batteries, with dead batteries, or if the batteries are not put in properly. Devices powered solely by AC will not work if their AC power supply is cut off for any reason, however briefly.
- Signals sent by wireless transmitters may be blocked or reflected by metal before they reach the alarm receiver. Even if the signal path has been recently checked during a weekly test, blockage can occur if a metal object is moved into the path.
- A user may not be able to reach a panic or emergency button quickly enough.
- While smoke detectors have played a key role in reducing residential fire deaths in the United States, they may not activate or provide early warning for a variety of reasons in as many as 35% of all fires, according to data published by the Federal Emergency Management Agency. Some of the reasons smoke detectors used in conjunction with this System may not work are as follows. Smoke detectors may have been improperly installed and positioned. Smoke detectors may not sense fires that start where smoke cannot reach the detectors, such as in chimneys, in walls, or roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level of a residence or building. A second floor detector, for example, may not sense a first floor or basement fire. Moreover, smoke detectors have sensing limitations. No smoke detector can sense every kind of fire every time. In general, detectors may not always warn about fires caused by carelessness and safety hazards like smoking in bed, violent explosions, escaping gas, improper storage of flammable materials, overloaded electrical circuits, children playing with matches, or arson. Depending upon the nature of the fire and/or the locations of the smoke detectors, the detector, even if it operates as anticipated, may not provide sufficient warning to allow all occupants to escape in time to prevent injury or death.
- Passive Infrared Motion Detectors can only detect intrusion within the designed ranges as diagrammed in their installation manual. Passive Infrared Detectors do not provide volumetric area protection. They do create multiple beams of protection, and intrusion can only be detected in unobstructed areas covered by those beams. They cannot detect motion or intrusion that takes place behind walls, ceilings, floors, closed doors, glass partitions, glass doors, or windows.

  Mechanical tampering, masking, painting or spraying of any material on the mirrors, windows or any part of the optical system can reduce their detection ability. Passive Infrared Detectors sense changes in temperature; however, as the ambient temperature of protected area approaches the temperature range of 90° to 105°F, the detection performance can decrease.
- Alarm warning devices such as sirens, bells or horns may not alert people or wake up sleepers if they are located on the other side of closed or partly open doors. If warning devices sound on a different level of the residence from the bedrooms, then they are less likely to waken or alert people inside the bedrooms. Even persons who are awake may not hear the warning if the alarm is muffled from a stereo, radio, air conditioner or other appliance, or by passing traffic. Finally, alarm warning devices, however loud, may not warn hearing-impaired people or waken deep sleepers.
- Telephone lines needed to transmit alarm signals from a premises to a central monitoring station may be out of service or temporarily out of service. Telephone lines are also subject to compromise by sophisticated intruders.
- Even if the system responds to the emergency as intended, however, occupants may have insufficient time to protect themselves from the emergency situation. In the case of a monitored alarm system, authorities may not respond appropriately.
- This equipment, like other electrical devices, is subject to component failure. Even though this equipment is designed to last as long as 10 years, the electronic components could fail at any time.

The most common cause of an alarm system not functioning when an intrusion or fire occurs is inadequate maintenance. This alarm system should be tested weekly to make sure all sensors and transmitters are working properly.

Installing an alarm system may make one eligible for lower insurance rates, but an alarm system is not a substitute for insurance. Homeowners, property owners and renters should continue to act prudently in protecting themselves and continue to insure their lives and property.

We continue to develop new and improved protection devices. Users of alarm systems owe it to themselves and their loved ones to learn about these developments.

ONE YEAR LIMITED WARRANTY

Honeywell International Inc., acting through its Security & Custom Electronics business ("Seller"), 165 Eileen Way, Syosset, New York 11791, warrants its security equipment (the "product") to be free from defects in materials and workmanship for one year from date of original purchase, under normal use and service. Seller's obligation is limited to repairing or replacing, at its option, free of charge for parts, labor, or transportation, any product proven to be defective in materials or workmanship under normal use and service. Seller shall have no obligation under this warranty or otherwise if the product is altered or improperly repaired or serviced by anyone other than the Seller. In case of defect, contact the security professional who installed and maintains your security equipment or the Seller for product repair.

This one year Limited Warranty is in lieu of all other express warranties, obligations or liabilities. THERE ARE NO EXPRESS WARRANTIES, WHICH EXTEND BEYOND THE FACE HEREOF. ANY IMPLIED WARRANTIES, OBLIGATIONS OR LIABILITIES MADE BY SELLER IN CONNECTION WITH THIS PRODUCT, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, ARE LIMITED IN DURATION TO A PERIOD OF ONE YEAR FROM THE DATE OF ORIGINAL PURCHASE. ANY ACTION FOR BREACH OF ANY WARRANTY, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, MUST BE BROUGHT WITHIN 12 MONTHS FROM DATE OF ORIGINAL PURCHASE. IN NO CASE SHALL SELLER BE LIABLE TO ANYONE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF THIS OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, OR UPON ANY OTHER BASIS OF LIABILITY WHATSOEVER, EVEN IF THE LOSS OR DAMAGE IS CAUSED BY THE SELLER'S OWN NEGLIGENCE OR FAULT. Some states do not allow limitation on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Seller does not represent that the product may not be compromised or circumvented; that the product will prevent any personal injury or property loss by burglary, robbery, fire or otherwise; or that the product will in all cases provide adequate warning or protection. Buyer understands that a properly installed and maintained alarm may only reduce the risk of a burglary, robbery, fire or other events occurring without providing an alarm, but it is not insurance or a guarantee that such will not occur or that there will be no personal injury or property loss as a result. CONSEQUENTLY, SELLER SHALL HAVE NO LIABILITY FOR ANY PERSONAL INJURY, PROPERTY DAMAGE OR OTHER LOSS BASED ON A CLAIM THE PRODUCT FAILED TO GIVE WARNING. HOWEVER, IF SELLER IS HELD LIABLE, WHETHER DIRECTLY OR INDIRECTLY, FOR ANY LOSS OR DAMAGE ARISING UNDER THIS LIMITED WARRANTY OR OTHERWISE, REGARDLESS OF CAUSE OR ORIGIN, SELLER'S MAXIMUM LIABILITY SHALL NOT IN ANY CASE EXCEED THE PURCHASE PRICE OF THE PRODUCT, WHICH SHALL BE THE COMPLETE AND EXCLUSIVE REMEDY AGAINST SELLER. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. No increase or alteration, written or verbal, to this warranty is authorized.

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K5309-1V4 10/04 Rev. A

DO NOT REMOVE

Honeywell

T7200, T7300 and Q7300 Programmable Commercial Thermostats and Subbases

The T7200, T7300 Thermostats and Q7300 Subbases control commerical single zone heating, ventilating and air conditioning (HVAC) equipment.



- One model can be used for single-stage and multi-stage applications.
- 7-day programming—two occupied/unoccupied periods per day.
- Individual temperature setpoints for:
  —Occupied heat and cool.
  —Unoccupied heat and cool.
- Proportional plus integral control—eliminates temperature fluctuations and thermostat tampering.
- Intelligent Recovery™—automatically optimizes start time depending on building load.
- Intelligent Fan™—energizes fan on call for heating or cooling only. Fan can be configured to run continuously in occupied mode.
- Automatic heat/cool changeover.
- Universal Versaguard™ Thermostat Guard available for T7200 and T7300/Q7300.
- Locking setpoints and schedules eliminate tampering (use keyboard security).
- One thermostat can be used for heat pump or conventional control.
- Optional remote sensors.
- Configurable to vary fan and reversing valve operation.
- Use with Q7300 to interface with C7400/W7459 Economizer System for total integration of rooftop control.
- Convenient overrides allow temporary changes.
- Battery backup saves program and maintains clock time during power failure.
- Auxiliary contacts available for use with economizer.

CONTENTS

Specifications 2
Ordering Information 2
Recycling Notice 4
Installation 4
Temperature Averaging Networks (See Fig. 5-9) 5
Set Q7300 Subbase DIP Switches 6
Set Thermostat DIP Switches 9
Set Thermostat Mini-Jumper 11
Program the Thermostat 12
Checkout 13
Test Mode 13
Operation 15
Cross Reference 18
Wiring Diagrams 22
Troubleshooting 45

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63-4036-7

Specifications

IMPORTANT: *The specifications given in this publication do not include normal manufacturing tolerances. Therefore, this unit may not exactly match the listed specifications. This product is tested and calibrated under closely controlled conditions, and some minor differences in performance can be expected if those conditions are changed.*

T7200 AND T7300 THERMOSTATS

- T7200A is an autochangeover programmable commercial thermostat to be used with a single stage conventional heat/cool system.
- T7200B is an autochangeover programmable commercial thermostat to be used with a single stage heat pump system.
- T7300A is a fully configurable programmable commercial thermostat to be used with a Q7300 Subbase.
- T7300B is a fully configurable programmable commercial thermostat with the 3-HOUR OVERRIDE key in the cover, to be used with a Q7300 Subbase. (See Fig. 2).
- T7300C is a fully configurable programmable commercial thermostat with limited access cover for easy programming. Cover includes Set Heat, Set Cool, Warmer, Cooler and Occupied/Unoccupied keys. Use with Q7300 Subbase. (See Fig. 3).

Q7300 SUBBASE

Q7300 Subbases provide features listed in Table 1.

TABLE 1—Q7300 SUBBASE FEATURES.

Model	System Switch	Fan Switch	LEDs	Application	Selectable Output
Q7300A[a,b]	None	None	None	Conventional	1 heat-1 cool; 1 heat-2 cool 2 heat-1 cool; 2 heat-2 cool
Q7300B	Heat-Off-Cool-Auto	Auto-On			
Q7300C	Em. Ht.-Heat-Off-Cool-Auto		Em. Ht., Aux. Ht.	1 stage heat pump compressor with auxiliary heat	1 heat-1 cool; 2 heat-1 cool
				2 stage heat pump compressor with auxiliary heat	1 heat-1 cool; 2 heat-1 cool; 3 heat-1 cool
Q7300D			None	1 stage heat pump compressor with auxiliary heat	1 heat-1 cool; 2 heat-1 cool
				2 stage heat pump compressor with auxiliary heat[c]	1 heat-1 cool; 2 heat-1 cool; 3 heat-1 cool
Q7300E	None			Conventional	1 heat-1 cool; 2 heat-2 cool
Q7300F		None	Aux. Ht.	1 stage heat pump compressor with auxiliary heat	1 heat-1 cool; 2 heat-1 cool
				2 stage heat pump compressor with auxiliary heat	1 heat-1 cool; 2 heat-1 cool; 3 heat-1 cool
Q7300G	Heat-Off-Cool-Auto		None	Conventional 1 stage heat with 3-stage cool	1 heat-3 cool (fixed)
Q7300L	None	Auto-On	Heat Cool	2 stage heat (ML984 actuator/ V5013 Valve) 1 stage cool	1 heat-1 cool; 2 heat-1 cool

[a] Select models do not have auxiliary relay output. The auxiliary relay output is used with an ecomonomizer for minimum position control based on programmed time schedule. Can also be used for switching other external equipment.
[b] Q7300A1000 model configures for 1 heat-1 cool only (fixed).
[c] Uses conventional terminal designations. Compressor changeover is controlled by the heat pump equipment.

Ordering Information

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the Tradeline Catalog or price sheets for complete ordering number, or specify—

1. Order number.
2. Accessories, if desired.
3. Order additional system components and system accessories separately.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Home and Building Control Sales Office (please check the white pages of your phone directory).
2. Home and Building Control Customer Logistics
   Honeywell Inc., 1885 Douglas Drive North
   Minneapolis, Minnesota 55422-4386 (612) 951-1000

   In Canada—Honeywell Limited/Honeywell Limitée, 155 Gordon Baker Road, North York, Ontario M2H 2C9. International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

THERMOSTAT

ELECTRICAL RATING: 24 to 30 Vac, 50/60 Hz.

SYSTEM CURRENT DRAW: 6 VA maximum at 30 Vac, 50 or 60 Hz.

OUTPUT RELAY DRAW: See Table 2.

TABLE 2—MAXIMUM AMPS AT 30 VAC.

Relay	Running (A)	Inrush (A)
Fan	1.6	3.5
Heat	1.6	3.5
Cool	1.6	7.5
Auxillary (Economizer)	1.6	3.5

TEMPERATURE:

Ratings:

Ambient: 40°F to 110°F (4°C to 43°C).

Shipping: -30°F to +150°F (-34°C to +65°C).

Display Accuracy: ±1°F (±1°C).

Setpoint:

Range: 45°F to 95°F (7°C to 35°C).

Differential: 2°F (1°C).

Default Settings: See Table 3.

TABLE 3—DEFAULT SETPOINTS.

Control	Occupied	Unoccupied
Heating	68°F (20°C)	55°F (13°C)
Cooling	78°F (26°C)	90°F (32°C)

REMOTE SENSOR WIRING TEMPERATURE OFFSET: Temperature offset occurs with 500 ft (157m) to 1000 ft (305m) of 2-wire cable. See Table 4.

TABLE 4—TEMPERATURE OFFSET.

Temperature Range	18 AWG	20 AWG	22 AWG
50-90°F	-0.4°F	-0.7°F	-1.0°F
10-32°C	-0.3°C	-0.4°C	-0.6°C

MINIMUM STAGE OPERATION TIME:

Conventional Heat: Two minutes On or Off.

Compressor: Two minutes On and four minutes Off.

HUMIDITY RATINGS: 5% to 90% RH, noncondensing.

CLOCK ACCURACY: ±1 minute per month.

BATTERY BACKUP: Up to 60 hours with fresh 9-volt alkaline battery. Mallory MN11604™ or equivalent.

FINISH: Beige thermostats with brown subbases or Premier White™ thermostats with light gray subbases.

DIMENSIONS: See Fig. 1.

T7300 Doors: See Fig. 2.

MOUNTING MEANS: T7200 Thermostat mounts on a wallplate. The T7300 mounts on the Q7300 Subbase. The Q7300 and wallplate mount horizontally on a wall or outlet box with two no. 6 x 32 screws (included).

Fig. 1—Thermostat and subbase dimensions in in. (mm).

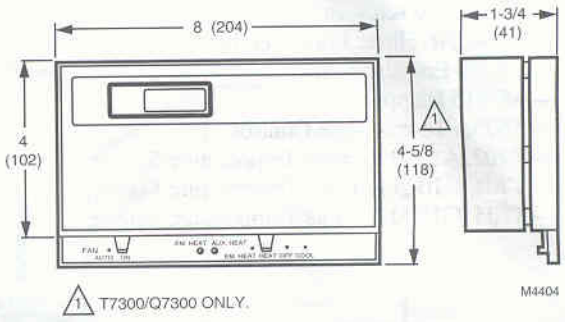


Fig. 2—T7300B door.

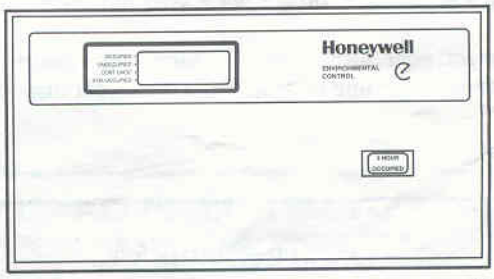
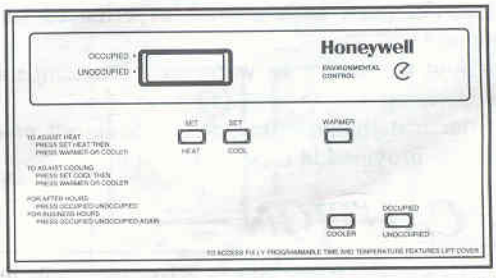


Fig. 3—T7300C door.



ACCESSORIES:

— 229997BU T7300B Conversion Kit. (See Fig. 2).

— 229997BY T7300A Conversion Kit. (See cover photo).

— 229997CE T7300C Conversion Kit. (See Fig. 3).

— 231054AA White Door Assembly for T7300C. (See Fig. 3.

— 231055AA White Door Assembly for T7300B. (See Fig. 2).

— 231056AA White Door Assembly for T7300A. (See cover photo).

— 4074EEP Hardware for door and hinge pin assembly.

— 4074EFS Bag Assembly (two sheet metal screws and two machine screws).
— 4074EKA Bag Assembly (Allen wrench and four Allen head screws).
— 4074ENE Hinge Pin Assembly.
— C7400 Enthalpy Sensor.
— M7415 Damper Actuator.
— T675A Temperature Control.
— T7022A1010 Remote Temperature Sensor.
— T7047C1025 Remote Temperature Sensor.
— T7047G1000 Remote Temperature Sensor.
— T7147A1002 Remote Temperature Sensor and Override Module.
— T7147A1010 Remote Temperature Sensor and Override Module.
— T7147A1028 Remote Temperature Sensor and Override Module.
— R8222 Switching Relay.
— W950A System Supervisor.
— W859D Packaged Economizer.
— W7459 Economizer Logic Module.

Recycling Notice

If this control is replacing a control that contains mercury in a sealed tube, do *not* place your old control in the trash.

Contact your local waste management authority for instructions regarding recycling and the proper disposal of this control, or of an old control containing mercury in a sealed tube.

If you have questions, call Honeywell Inc. at 1-800-468-1502.

Installation

WHEN INSTALLING THIS PRODUCT...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service tech-nician.
4. Allow thermostat to warm to room temperature before operating.
5. After installation is complete, check out product operation as provided in these instructions.

! CAUTION

Disconnect power supply before beginning installation to prevent electrical shock or equipment damage.

LOCATION

Thermostat Without Remote-Mounted Temperature Sensor

Install the thermostat about 5 ft (1.5m) above the floor in an area with good air circulation at average temperature. See Fig. 4.

Do not mount the thermostat where it can be affected by:
— drafts or dead spots behind doors, in corners or under cabinets.
— hot or cold air from ducts.
— radiant heat from the sun, fireplace, or appliances.
— concealed pipes and chimneys.
— unheated (uncooled) areas such as an outside wall behind the thermostat.

Thermostat With Remote-Mounted Temperature Sensor(s)

Install the thermostat in an area that is accessible for setting and adjusting the temperature and settings.

Install the remote-mounted sensor(s) about 5 ft (1.5m) above the floor in an area with good air circulation at average temperature. See Fig. 4.

Do not mount the sensor(s) where it can be affected by:
— drafts or dead spots behind doors, in corners or under cabinets.
— hot or cold air from ducts.
— radiant heat from the sun, fireplace, or appliances.
— concealed pipes and chimneys.
— unheated (uncooled) areas such as an outside wall behind the thermostat.

If more than one remote sensor is required, they must be arranged in a temperature averaging network consisting of two, three, four, five, or nine sensors. Instal as shown in Fig. 5-9.

REPLACE AN EXISTING THERMOSTAT OR NEW INSTALLATION

Replace An Existing Thermostat

Turn off all sources of power for the thermostat. Remove any existing wallplate or subbase from the wall. To avoid miswiring later, label or write down each wire color with the letter or number on the wiring terminal as the wire is removed.

Fig. 4—Location for installing thermostat or remote-mounted sensor.

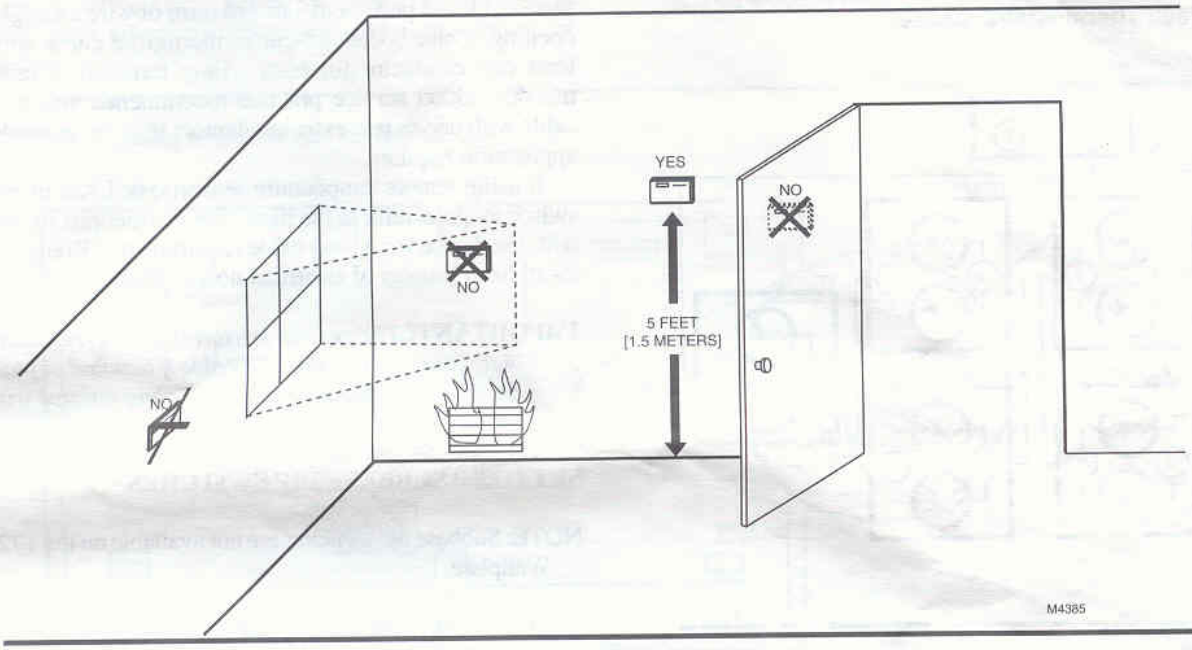


Fig. 5—Two T7047G1000 Sensors providing a temperature averaging network for a T7300/ Q7300 Thermostat/Subbase.

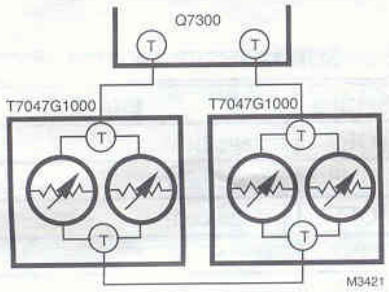


Fig. 6—Two T7047C1025 and one T7047G1000 Sensors providing a temperature averaging network for a T7300/Q7300 Thermostat/ Subbase.

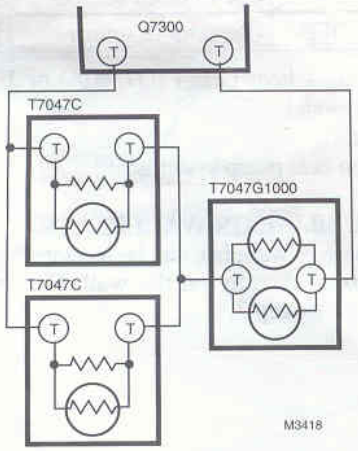


Fig. 7—Four T7047C1025 Sensors providing a temperature averaging network for a T7300/ Q7300 Thermostat /Subbase.

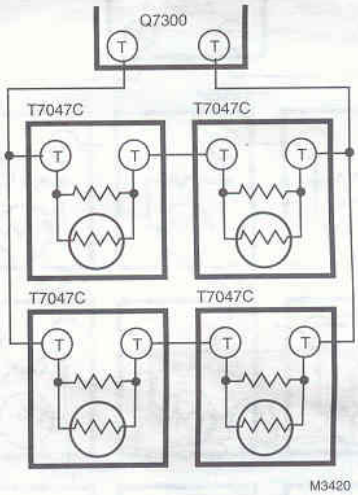


Fig. 8—Five T7047G1000 Sensors providing a temperature averaging network for a T7300/ Q7300 Thermostat/Subbase.

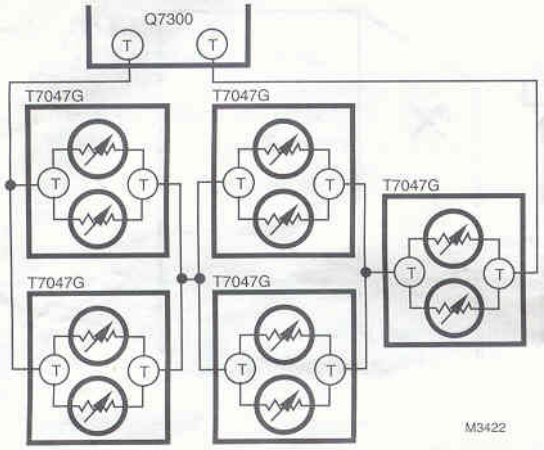
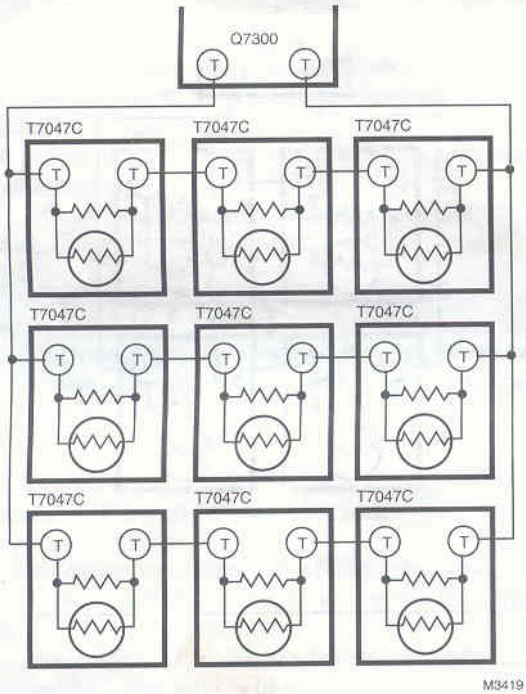


Fig. 9—Nine T7047C1025 Sensors providing a temperature averaging network for a T7300/ Q7300 Thermostat/Subbase.



New Installation

Run cable to a hole at the selected wall location for the thermostat and pull about 3 in. (76 mm) of wire through the opening. Color-coded, 18-gauge thermostat cable with at least one conductor for each wiring terminal is recommended. Good service practice recommends selecting a cable with one or two extra conductors than the immediate application requires.

If using remote temperature sensor(s) or LAN override switch module, refer to the mounting instructions included with the device for wiring cable requirements. Route cable away from sources of electrical noise.

IMPORTANT: *The remote sensor(s) or override switch wires must be in a shielded cable if bundled or placed in the same conduit with the cooling control wires. Earth ground the shield at the thermostat.*

SET Q7300 SUBBASE DIP SWITCHES

NOTE: Subbase dip switches are not available on the T7200 Wallplate.

The Q7300 Subbase provides the T7300 Thermostat with an interface to the single zone HVAC system. See Table 5 for DIP switch settings. The subbase DIP switches are located on the front and to the right of the wiring terminals. See Fig. 10. Set the DIP switches for the system being controlled.

TABLE 5—SUBBASE DIP SWITCH SETTINGS.

Switch	Setting	Function
1[a]	OFF	1 stage heat
	ON[b]	2 stage heat
2[a]	OFF	1 stage cool
	ON[b]	2 stage cool
3	OFF	Proportional control (allows droop)
	ON[b]	Proportional plus integral (P+I) control (droopless)
4[c]	ON[b]	Energizes fan on cool only
	OFF	Energizes fan on heat and cool
5	ON[b]	Use internal sensor
	OFF	Use remote sensor

[a] No effect on 1 heat/1 cool (Q7300A) or 1 heat/3 cool (Q7300G) models.
[b] Factory setting.
[c] No effect on heat pump systems.

MOUNT SUBBASE OR WALLPLATE

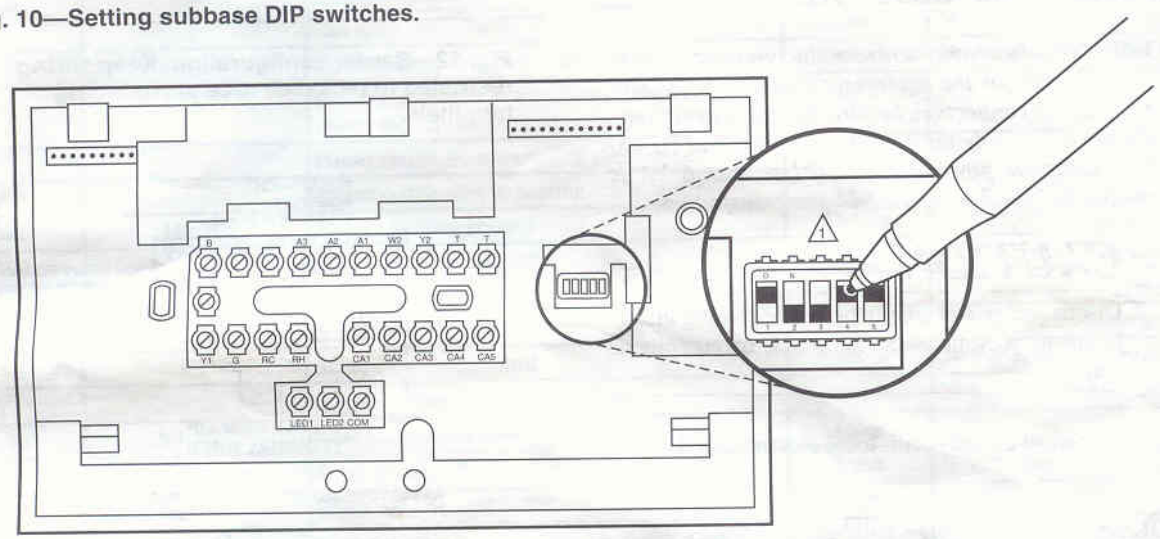
The subbase or wallplate can be mounted on a horizontal outlet box or directly on the wall. For an outlet box installation, go to step 3.

1. For a wall installation, hold subbase or wallplate in position and mark holes for the anchors. See Fig. 4. Wall anchors must be obtained locally. Be careful that the wires do not fall back into the wall opening. Set aside subbase or wallplate.

2. Drill four 3/16 in. (4.8 mm) holes and gently tap anchors into the holes until flush with the wall.

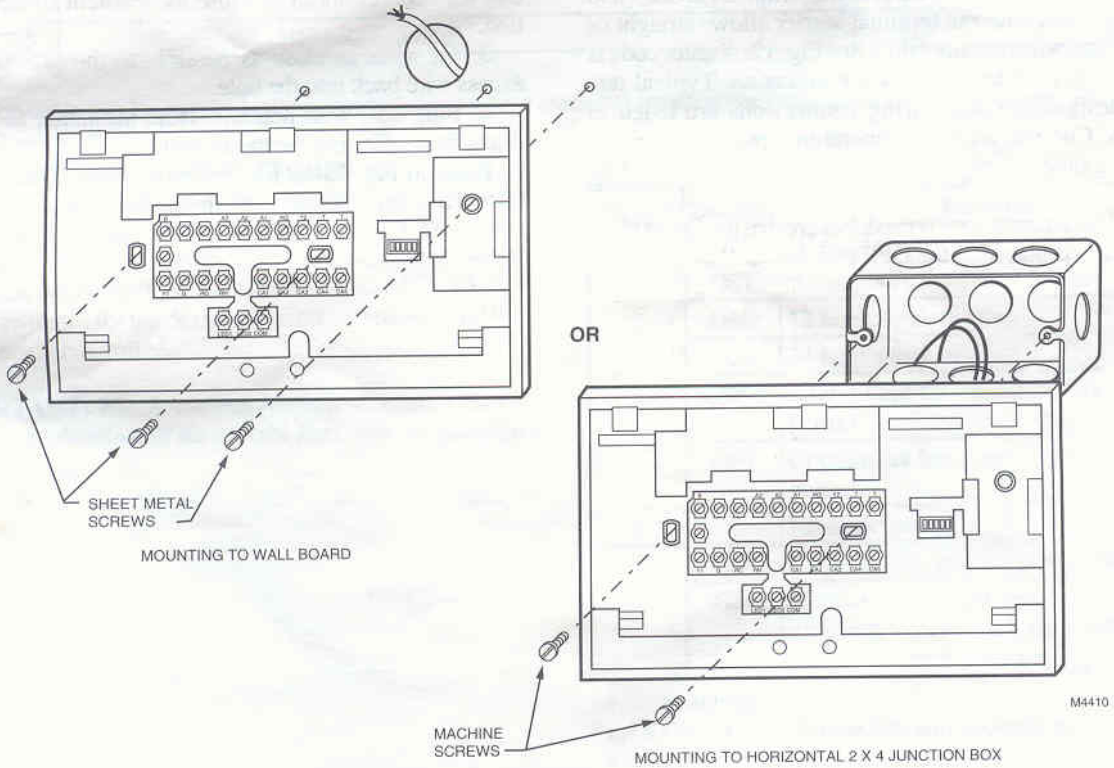
3. Pull wires through the cable opening. See Fig. 11.

Fig. 10—Setting subbase DIP switches.



1 CONFIGURATION OF ILLUSTRATED SWITCH IS:
1 – ON
2 – OFF
3 – OFF
4 – ON
5 – ON

Fig. 11—Installing subbase on outlet box or on wall.



4. Secure the subbase or wallplate with the screws provided. Do not fully tighten the screws.

5. Level the subbase or wallplate for appearance only. Leveling is not required for operation. Securely tighten the screws.

WIRE SUBBASE OR WALLPLATE

IMPORTANT: *Most equipment manufacturers size system transformers for the equipment installed at the factory. Before connection, be sure that the system transformer can supply the T7200 OR T7300 and Q7300 with adequate power (6 VA). If less than 6 VA is available, install a separate 24 Vac transformer.*

⚠ CAUTION

Disconnect power supply before beginning installation to prevent electrical shock or equipment damage.

All wiring must comply with local electrical codes and ordinances.

IMPORTANT: *Use 18 gauge, solid-conductor wire whenever possible. If using 18 gauge stranded wire, no more than 10 wires can be used. Do* ***not*** *use larger than 18 gauge wire.*

Follow equipment manufacturer's wiring instructions when available. See Fig. 23-46 for wiring diagrams. To wire subbase, proceed as follows:

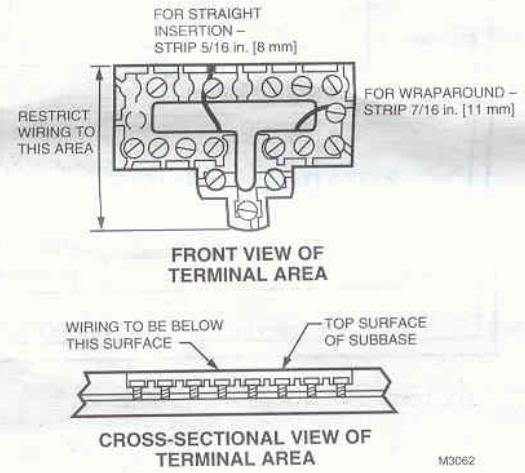
1. Connect the correct wires to the terminals as shown in applicable diagram; the terminal barrier allows straight or wraparound wiring connection. See Fig. 12. A letter code is located near each terminal for identification. Typical terminal designation and wiring connections are listed in Table 6. Connect remote temperature sensor or override switch module.

NOTE: If a remote sensor is used, be sure that the Q7300 DIP switch 5 is placed in the OFF position.

⚠ CAUTION

Never install more than one wire per terminal unless using factory-supplied jumper with spade terminal.

Fig. 12—Barrier configuration. Keep wiring restricted to recessed area surrounding terminals.



2. Firmly tighten each terminal screw. Loose or intermittent wire connections can cause inconsistent system operation.

3. Fit wires as close as possible to the subbase. Push excess wire back into the hole.

4. Plug hole with nonflammable insulation to prevent drafts from affecting the thermostat.

Refer to Fig. 23-46 for typical hookups. When system installation is complete, perform the initial power up procedure in the Checkout section.

TABLE 6—TERMINAL DESIGNATIONS.

Standard Terminal Designation	Alternate Designations Or Customer Specials	Typical Connection	Function	Terminal Type
B		Heating damper motor; changeover valve/relay	Output	24 Vac powered contact
E	K	Emergency heat relay	Output	24 Vac powered contact
G	F	Fan relay coil	Output	24 Vac powered contact
O	R	Cooling damper motor; changeover valve/relay	Output	24 Vac powered contact
R	V	Power connection to transformer (internally connected for heating and cooling)	Input	
RC		Power connection to cooling transformer	Input	
RH		Power connection to heating transformer	Input	
W1	H1, R3	Stage 1 heating control	Output	24 Vac powered contact
W2	H2, Y, R4	Stage 2 heating control	Output	24 Vac powered contact
W3		Stage 3 heating control	Output	24 Vac powered contact
Y1	C1, M	Stage 1 cooling control	Output	24 Vac powered contact
Y2	C2	Stage 2 cooling control	Output	24 Vac powered contact
Y3[a]		Stage 3 cooling control[a]	Output	24 Vac powered contact
X	X1,X2,C	Common connection	Input	
T		Remote sensor[b]	Input	
	L, C, H	HSII control panel		
	O	Momentary circuit, changeover		
LED1, LED2, COM	A,A1,A2,Z,C,L	LEDs	Annunciation	
	T	External temperature readout, T relay		
	R1, R2	LO and HI speed fan relays		
	RS	Cooling contactor		
Y	M	Compressor contactor		
A1, A2, A3		Auxiliary relay	Output	Dry contact
CA1-CA5		Remote override[b]	Input	Low power

[a] Q7300G only.
[b] Shielded cable can be required in some installations where electrical interference (noise) can cause control problems.

SET THERMOSTAT DIP SWITCHES

The thermostat DIP switches provide the thermostat with an interface to the single zone HVAC system. See Table 7 for DIP switch settings. The thermostat DIP switches are located on the back of the thermostat. See Fig. 13. Set the DIP switches for the desired thermostat features and the system being controlled.

IMPORTANT: *The thermostat configuration must match the application, or the control logic will not function properly.*

TABLE 7—THERMOSTAT DIP SWITCH SETTINGS

Switch	Setting	Function
1	ON[a]	°F display
	OFF	°C display
2	ON[a]	12 hour clock display
	OFF	24 hour clock display
3	ON[a,b]	Intermittent fan operation in occupied period
	OFF	Continuous fan operation in occupied period
4		Nonfunctional switch
5	ON[a]	Keyboard is used for programming
	OFF	Keyboard disabled, but can be used to review program, perform overrides and make clock changes.

[a] Factory setting.
[b] Q7300B,C,D,E,L: fan switch will override this switch setting.
Q7300A,F,G: no override is available.

Fig. 13—Setting thermostat DIP switches.

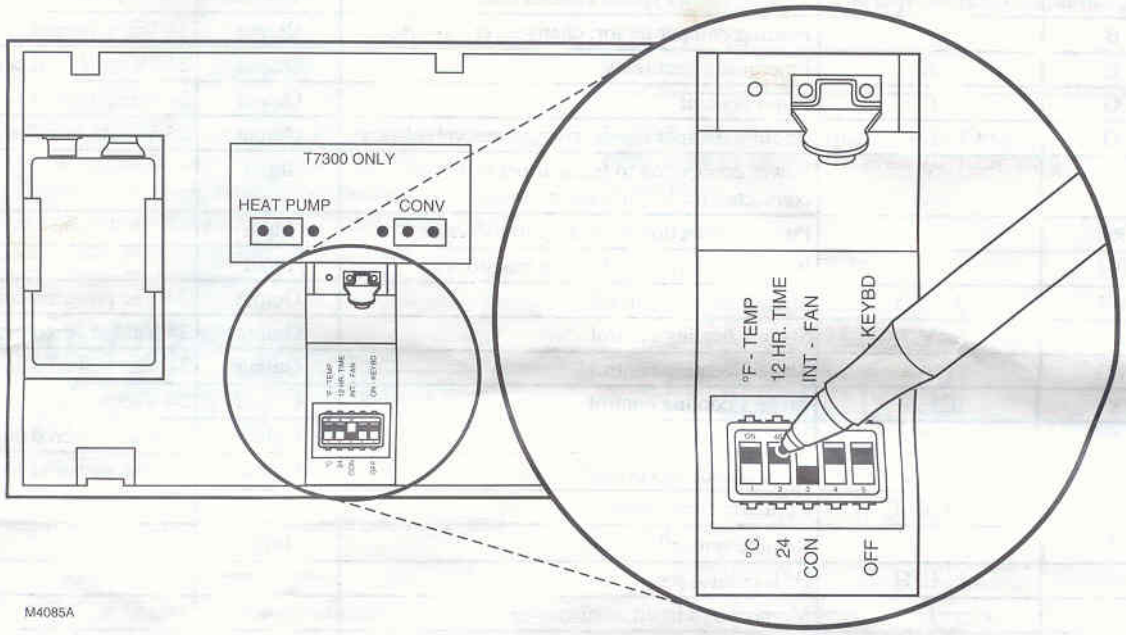
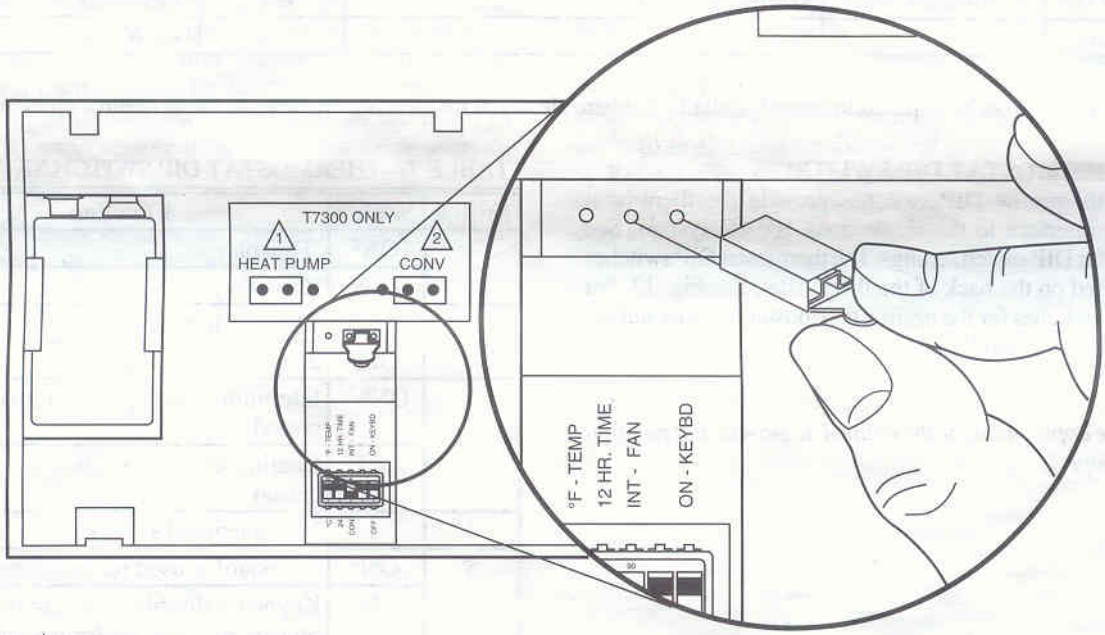


Fig. 14—Setting thermostat mini-jumper for conventional or heat pump system.



1 ONLY PUT MINI-JUMPER IN THIS POSITION WHEN USING Q7300C,D, OR F SUBBASES.

2 ONLY PUT MINI-JUMPER IN THIS POSITION WHEN USING Q7300A,B,E, OR G SUBBASES.

M4086A

SET THERMOSTAT MINI-JUMPER

NOTE: This operation must be done prior to installing the batteries. If batteries are installed prior to this operation, remove battery for 15 minutes and begin.

The T7300 is factory-set for conventional system control using the Q7300A,B,E,G. If using with a heat pump and Q7300C,D,F, locate the mini-jumper on the back of the T7300. See Fig. 14. Pull the mini-jumper off the two CONV pins and move to the two HEAT PUMP pins. This changes the thermostat to the heat pump algorithm.

If you wish to change the control of the thermostat because a new subbase has been purchased, remove battery for 15 minutes, change mini-jumper position, and re-install battery.

MOUNT THERMOSTAT

! CAUTION

Always disconnect power supply and remove battery from the T7300 before connecting the ribbon cables to prevent electrical shock and equipment damage.

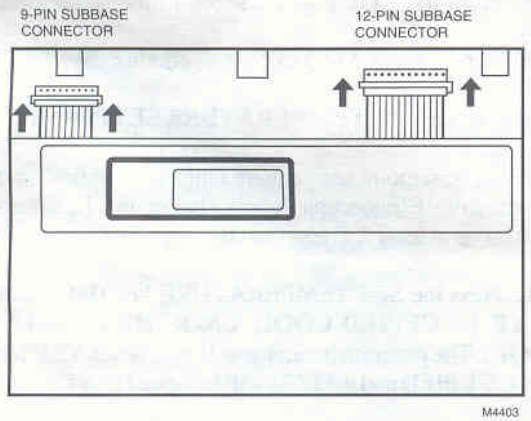
Use the following procedure to connect the T7300 ribbon cables to the Q7300.

1. Check that the 24 Vac power supply is disconnected from the Q7300.
2. Check that the 9 Vdc battery is *not* installed in the T7300.

IMPORTANT: *First be sure to connect the 12 pin ribbon cable to the Q7300.*

3. Connect the 12 pin (larger) ribbon cable to the Q7300. See Fig. 15.
4. Connect the 9 pin (smaller) ribbon cable to the Q7300.
5. If using a 9 Vdc battery, go to the Install Battery Backup section for installation instructions.

Fig. 15—Connecting the pin ribbon cables to the subbase connectors.



INSTALL BATTERY (OPTIONAL)

The 9 volt battery is not necessary for the operation of the thermostat, but holds the program during power outages. When the power is restored, the system will resume normal operation. Without the battery, the system will follow the default setpoints. See Table 3. Use the following steps to install a battery:

1. Locate the battery holder on the back of the thermostat.
2. Slide the battery up to the connector until it is firmly seated. See Fig. 16.

NOTE: Observe the polarity when snapping a 9 volt alkaline battery into the holder.

NOTE: The plugs must be firmly seated on the connectors for the thermostat to work properly.

6. Hang the top edge of the thermostat on the subbase hooks. See Fig. 17.
7. Swing down and press on the lower edge until the thermostat snaps in place.
8. Insert and tighten three Allen head screws on the bottom of the thermostat. See Fig. 17.

Fig. 16—Installing optional 9 volt battery.

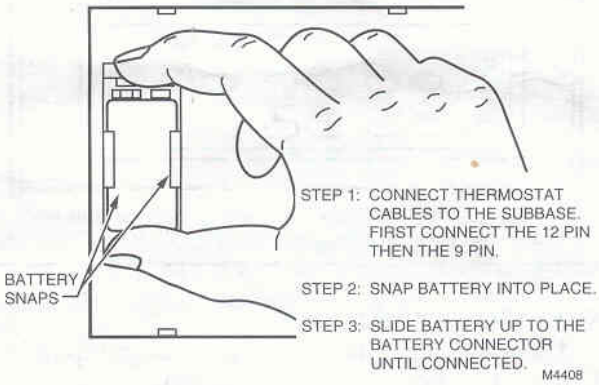
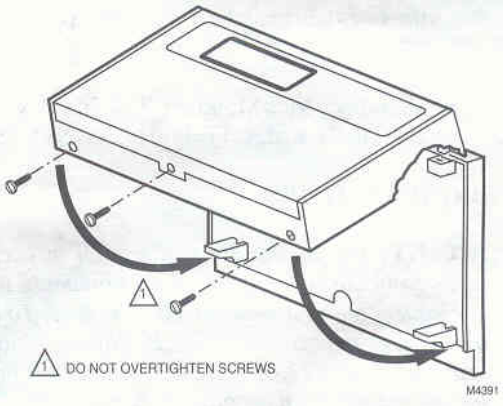


Fig. 17—Mounting thermostat on subbase.



Program the Thermostat

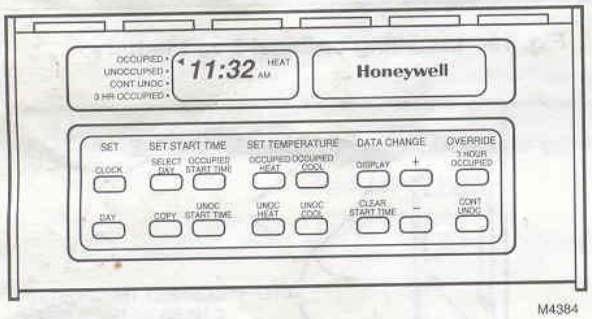
OVERVIEW

The keyboard is located behind the thermostat flip-up cover. See Fig. 18. There are 16 keys to set, review and modify programmed times and temperatures. The liquid crystal display (LCD) shows day, time or temperature and which programming period is operating.

The thermostat can be set for two occupied and two unoccupied time and temperatures for each day of the week (28 independent settings). The two override keys provide quick temporary programming changes for increased occupant comfort.

IMPORTANT: *To program the thermostat, 24 Vac is required (turn on system power) and the keyboard lockout switch (see Fig. 27) must be in the ON-KEYBD position.*

Fig. 18—Thermostat programming keys and LCD display.



SET CURRENT TIME/DAY

1. Set the current time by pressing and releasing the **CLOCK** key once.
2. Press the + or - key until the current time appears on the LCD.
3. Set the current day by pressing and releasing the **DAY** key once.
4. Press the + or - key until the current day appears on the LCD.

NOTE: Su=Sunday; Mo=Monday; Tu=Tuesday; We=Wednesday; Th=Thursday; Fr=Friday; Sa=Saturday.

SET PROGRAM TIMES

IMPORTANT: *The thermostat will remain in occupied mode from the point of initial programming until it encounters the first unoccupied start time. To avoid the unnecessary occupied period following initial programming, set a 12:00 AM unoccupied start time on the thermostat when programmed.*

NOTE: The programming times are in intervals of ten minutes; i.e., 8:00, 8:10, 8:20.

1. Press the **SELECT DAY** key. The display shows the abbreviation for a day.
2. Press and hold the + or - key until the desired day appears.
3. Press the **OCCUPIED START TIME** key. The program indicator will point to OCCUPIED.
4. Press and hold the + or - key until the desired start time appears.

NOTE: Anytime a start time is not required, press the **CLEAR START TIME** key.

5. Press the **UNOC START TIME** key. The program indicator will point to UNOCCUPIED.
6. Press and hold the + or - key until the desired start time appears.
7. To program a second occupied start time for the selected day, repeat Step 3 until four dashes (----) are displayed or the second start time (if previously programmed) is displayed. Then repeat Step 4.
8. To program a second unoccupied start time for the selected day, repeat Step 5 until four dashes (----) are displayed or the second start time (if previously programmed) is displayed. Then repeat Step 6.
9. Repeat Steps 1 through 8 for each remaining day of the week or refer to the following section, COPY A DAY.

COPY A DAY

1. Press the **SELECT DAY** key. The display shows the abbreviation for a day.
2. Press and hold the + or - key until the day to be copied *from* appears.
3. Press the **COPY** key.
4. Press and hold the + or - key until the day to be copied *to* appears.

NOTE: The day to be copied *from* will remain on the display.

5. Press the **COPY** key a second time to perform the copy.
6. Repeat Steps 3 to 5 to copy to another day.

SET PROGRAM TEMPERATURE SETPOINTS

NOTE: The setpoint temperature range is 45°F (unoccupied heat) to 95°F (unoccupied cool). The occupied heat setpoint must be at least 2°F less than the occupied cool setpoint.

1. Press the SET TEMPERATURE key (**OCCUPIED HEAT, OCCUPIED COOL, UNOC HEAT,** or **UNOC COOL**). The program indicator will point to OCCUPIED or UNOCCUPIED and the LCD will indicate HEAT or COOL.

2. Press and hold the + or - key until the desired temperature appears.
3. Repeat Steps 1 and 2 until all four temperatures are set.

SET OPERATING DISPLAY

The LCD can show time or temperature. To change the current display, press the **DISPLAY** key until the desired operating display appears.

CLEAR START TIME

1. Press the **SELECT DAY** key.
2. Press and hold the + or - key until the desired day appears.
3. Press and hold the **OCCUPIED START TIME** or the **UNOC START TIME** key until the time to clear appears.
4. Press and hold the **CLEAR START TIME** key until the display shows four dashes (----).

NOTE: If there is a second OCCUPIED setting, the start for time this setting will appear instead of four dashes (----).

TEMPORARILY OVERRIDE PROGRAM

There are three overrides available. The 3 hour occupied overrides can be initiated from a remote location or the thermostat. The 3 hour occupied override *without* + or - keys can also be initiated from the T7300B cover.

NOTE: Pressing the **DISPLAY** key at anytime will return the thermostat to the program.

3 Hour Occupied

The **3 HOUR OCCUPIED** key is used to override the unoccupied program when people need to use the area temporarily (working late, weekends or holidays).

1. Press the **3 HOUR OCCUPIED** key to change the unoccupied temperature setting to the occupied setpoint for three hours.

NOTE: The program indicator will point to 3 HR OCCUPIED while the override is in effect.

3 Hour Occupied with + or - Key

SET + OR - KEY VALUE

When using the + or - key with the **3 HOUR OCCUPIED** key, the + or - key has a preassigned value of 0 to 5°F (default is 0). Use the following steps to check or change the value:

1. Press the **3 HOUR OCCUPIED** key. The program indicator will point to 3 HR OCCUPIED.
2. Press the **DISPLAY** key. The LCD will show a number from 0 to 5.
3. Press the + or - key to change the value.
4. Press the **DISPLAY** key to return to the program.

Set 3 Hour Occupied Override With + or - Key

The **3 HOUR OCCUPIED** key with the + or - key will override the unoccupied program for three hours with the occupied temperature setpoint ± the preassigned key value (see Set + or - Key Value section).

1. Press the **3 HOUR OCCUPIED** key to change the unoccupied temperature setting to the occupied setpoint for three hours.
2. Press the + key to increase or press the - key to decrease the occupied setpoint by the key value.

EXAMPLE: Unoccupied setpoint is 62°F, occupied setpoint is 70°F and key value is 3°F. Pressing the 3 HOUR OCCUPIED key and the + key will change the setpoint from 62°F to 70°F plus 3°F or 73°F. Pressing the - key would change the setpoint to 70°F minus 3°F or 67°F.

NOTE: The program indicator will point to 3 HR OCCUPIED while the override is in effect. The LCD will not reflect the key value.

Cont Unoc

The continuous unoccupied override feature holds the setpoint at the unoccupied temperature setpoint until the DISPLAY or CONT UNOC key is pressed. This override is used when the area will be closed for a temporary closing such as a long holiday.

1. Press the **CONT UNOC** key to hold the temperature at the unoccupied setpoint.
2. Press the **CONT UNOC** key again to return to the program.

Checkout

OVERVIEW

Check that all wiring is correctly completed and all sensors are installed. The thermostat should be mounted on the wallplate or subbase. If the thermostat has not been programmed, when the power is first turned on, the LCD will show four dashes (----). Without programming, the thermostat will operate from default temperature setpoints (see OPERATION section).

NOTE: It is helpful to program the thermostat before using the Checkout procedure. Refer to the Programming section to set a program.

If the display has two dashes and a degree sign (--°), wait sixty seconds and press the DISPLAY key twice. If the display does not change or is blank, refer to the Troubleshooting section.

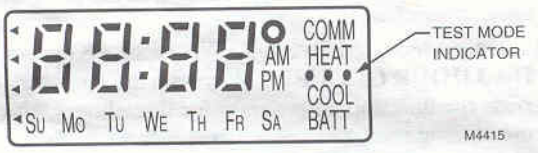
TEST MODE

The thermostat has a test mode that aids the installer in performing the checkout. The test mode overrides the minimum on and off times so the checkout can be quickly performed. Press the **CLOCK** and **DAY** keys at the same time to start the test mode. All the display segments will appear. See Fig. 19

CAUTION

Do not use the test mode for longer than 10 minutes. The test mode overrides the minimum on and off times that protect the system. Equipment damage can result if the thermostat remains in the test mode.

Fig. 19—All segments on display.



To discontinue the test mode at any time, press the **CLOCK** and **DAY** keys at the same time. The Test Mode Indicators will no longer show on the screen.

HEAT

NOTE: When the thermostat is used with a subbase with subbase and fan switches, set the switches to AUTO.

1. Press the **CLOCK** and **DAY** keys at the same time. This starts the test mode.
2. Press the **DISPLAY** key. See Fig. 20.

Fig. 20—Display when starting test sequence.



3. Press the **OCCUPIED HEAT** key.
4. Press the + key to raise the setpoint 5°F (3°C) above the room temperature. The heating should start (both stages if multistage), and the fan should run (may be a short delay on forced air systems).

NOTE: It can be necessary to change the OCCUPIED COOL setpoint. However, be aware that OCCUPIED HEAT and OCCUPIED COOL setpoints must have a 2°F difference.

5. Press the **OCCUPIED HEAT** key.
6. Press the - key to lower the setpoint 5°F (3°C) below the room temperature. The heating should shut off, followed by the fan shutoff.

When the thermostat has a system switch, move the switch to the HEAT position and repeat steps 3 through 6.

COOL

Move switch to auto.

CAUTION

Do not operate cooling if outdoor temperature is below 50°F (10°C). Refer to the manufacturer recommendations.

NOTE: When cooling setting changes, thermostat will wait up to five minutes before turning on the cooling equipment. This delay is to protect the compressor.

1. Press the **OCCUPIED COOL** key.
2. Press the - key to lower the setpoint 5°F (3°C) below the room temperature. The cooling should start (both stages if multistage), and the fan should run.

NOTE: It can be necessary to change the OCCUPIED HEAT setpoint. However, be aware that the OCCUPIED HEAT and OCCUPIED COOL setpoints must have a 2°F difference.

3. Press the **OCCUPIED COOL** key.
4. Press the + key to raise the setpoint 5°F (3°C) above the room temperature. The cooling and fan should shut off.

When the thermostat has a system switch, move the switch to the COOL position and repeat Steps 1 through 4.

Move the system switch to the OFF position. All heating or cooling should stop.

FAN

Thermostat

Fan Switch (located on the back of the thermostat):

- — CON: Fan operates continuously in the occupied mode.
- — INT-FAN: Fan operates directly with the thermostat call for heating or cooling in the occupied mode.

Subbase

NOTE: Subbase fan switch overrides the thermostat fan switch.

Subbase Dip Switch No. 4:

- — ON: Fan operates only with cool.
- — OFF: Fan operates with heat and cool.

Q7300E Fan Switch:

- — ON: Fan operates continuously.
- — AUTO: Fan operates directly with the thermostat call for heating or cooling.

IMPORTANT: *Press the **CLOCK** and **DAY** keys at the same time to discontinue the test mode. The Test Mode Indicators will no longer show on the screen. See Fig. 19.*

Operation

T7200/T7300 RELAY LOGIC

The T7300 contains three switching relays. When the mini-jumper is set for conventional applications, the relays control first stage cooling, first stage heating, and fan. When the mini-jumper is set for heat pump applications, the relays control the heat pump compressor, auxiliary heat, and fan. Because of this change in switching logic, it is important to use Q7300C,D, or F subbases when the T7300 is set for heat pump applications and use Q7300A,B,E,G subbases when the T7300 is set for conventional applications.

The T7200A Relay Logic is for conventional applications. The T7300B Relay Logic is for heat pump applications.

T7200/T7300 AND CONVENTIONAL THERMOSTATS

P+I Control

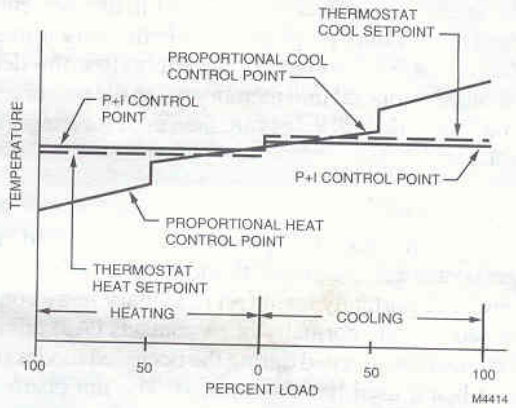
The T7200/T7300 microprocessor based control requires that the user understands temperature control and thermostat performance. A conventional electromechanical or electronic thermostat does not control temperature precisely at setpoint. Typically, there is an offset (droop) in the control point as the system load changes. This is a phenomenon that most people in the industry know and accept. Many factors contribute to offset including switch differential, thermal lag, overshoot, cycle rates and system load.

The thermostat microprocessor simultaneously gathers, compares and computes data. Using this data, it controls a wide variety of functions. The special proprietary algorithm (program) in the thermostat eliminates the factors causing offset. This makes temperature control more accurate than the conventional electromechanical or electronic thermostats. The temperature control algorithm is called proportional plus integral (P+I) control.

The thermostat sensor, located on the thermostat or remote, senses the current space temperature. The proportional error is calculated by comparing the sensed temperature to the programmed setpoint. The deviation from the setpoint is the proportional error.

The thermostat also determines integral error, which is a deviation based on the length of error time. The sum of the two errors is the (P+I) error. The cycle rate used to reach and maintain the setpoint temperature is computed using the P+I. The addition of the integral error is what differentiates the thermostat from many other electronic and electromechanical thermostats. See Fig. 21.

Fig. 21—Proportional temperature control versus P+I temperature control.



While the thermostat is designed to eliminate droop, allowing droop can be desirable in applications where building visitors are dressed for the weather and their stays are brief. Examples of these applications include fast food restaurants and convenience stores. The droopless feature of the thermostat can be overridden by placing the droop/droopless select switch located on the subbase in the OFF position. This removes the integral calculation from the thermostat control scheme, allowing only the proportional control to occur.

EQUIPMENT PROTECTION

As part of the operational sequence, the T7200/T7300 microprocessor also incorporates minimum On and Off times for all heating and cooling stages. Minimum On and Off times assure that rapid cycling of equipment will not occur, extending equipment life. Minimum On/Off times for compressor stages are two minutes On and four minutes Off. Minimum On/Off times for heat (electric resistive or gas) are two minutes.

T7200/T7300 THERMOSTAT OPERATION

Startup

When power to the thermostat is turned on, a startup and initialization program begins. The startup takes place after total loss of power (24 Vac and battery backup). At this time, the system default values are put into memory (replacing the user program that was lost). Default values are heating 68°F (20°C) and cooling 78°F (26°C) for the occupied modes. Unoccupied default values are heating 55°F (13°C) and cooling 90°F (32°C).

NOTE: These unoccupied defaults are only used if an unoccupied start time is entered or the CONT UNOC key is pressed. Immediately following initialization, the user can enter new setpoints to be used in place of the default values.

If the battery backup was operating during a power failure, and 24 Vac power comes back on, the user-entered time and temperature program saved in memory is used. If 24 Vac is lost, and no battery backup exists, the default temperatures is placed into memory when the power comes back on. These default values are then used for temperature control.

Occupied

When the thermostat is operating in the occupied mode, the temperature is controlled to the occupied heat or cool setpoint. The normally open (A1) auxiliary relay contacts are closed and the normally open contacts (A3) auxiliary relay contacts are opened during the occupied modes (if the subbase being used has this option). The fan operates as follows:

- No switching subbase used: Operation of the fan is continuous (fan always energized) unless the fan option switch on the back of the T7300 (#3) is set to intermittent (cycles with Y1 or W1).
- Switching subbase used: Q7300 fan switch can be set to ON (always energized) or AUTO (cycles with Y1 or W1).

NOTE: If subbase configuration switch no. 4 (on any Q7300 conventional subbase) is set to the ON position, the fan cycles on a call for cooling only; switch no. 4 has no effect on heat pump subbases (Q7300C, D, F).

Unoccupied

When the thermostat is operating in the unoccupied mode, the temperature is controlled to the unoccupied heat or cool setpoint. The auxiliary relay contacts is open and the fan operates as follows:

- Switching or non-switching subbase used: Fan is always be intermittent (cycles with Y1 or W1). See NOTE for OCCUPIED.

Conventional System

RECOVERY FROM UNOCCUPIED

Intelligent Recovery™ is a Honeywell trademark for the way the thermostat controls the heating and cooling equipment during recovery from unoccupied to occupied setting. During recovery, the control point ramps up at the rate of 5°F (3°C) per hour rather than jumping from the energy savings setting to the comfort setting all at once. This provides additional energy savings.

When the Intelligent Recovery™ is used in the heating mode, the control point raises 5°F (3°C) per hour, maximizing the use of the more economical first stage heat to bring the sensed temperature to the desired comfort setpoint. This minimizes using the typically more expensive second stage heat.

The advantages are:

- Comfort setting is achieved at the programmed time and maintained regardless of weather conditions; occupants are comfortable.
- Drafts from low temperature discharge air are minimized during occupied periods.
- The thermostat automatically uses the more economical first stage of heat as the primary heat source during heat mode recovery, avoiding the use of the expensive second stage heating.
- Comfort and energy savings can be achieved in both heating and cooling.
- The thermostat reduces heat cycling, extending equipment life.

Heat Pump Operation

The T7200 is fixed for either heat pump or conventional control applications. The T7300 is configurable for either heat pump or conventional applications, depending on the subbase used. Additional information is required when configured for heat pump.

The heat pump mini-jumper (located on the back of the thermostat) places the thermostat into the heat pump mode. Refer to the Installation section.

O AND B TERMINALS FOR HEATING OR COOLING CHANGEOVER

The Q7300C and F controls heat pump changeover. The Q7300D is only used in a heat pump application when the heat pump controls the reversing valve changeover. See Table 8 for the operation of the O and B terminals on the Q7300C and F.

TABLE 8—OPERATION OF THE Q7300 O AND B TERMINALS.

System Switch	O	B
Heat	Open	Closed
Cool	Closed	Open
Auto (Heat)[a]	Open	Closed
Auto (Cool)[b]	Closed	Open
Emergency Heat	Open	Closed
Off	[c]	[c]

[a] When the system is calling for heat or is de-energized, but the last function was heat.

[b] When the system is calling for cool or is de-energized, but the last function was cool.

[c] When the last function was heating, the operation is the same as Auto (Heat). If the last function was cooling, the operation is the same as Auto (Cool).

RECOVERY FROM UNOCCUPIED

The heating recovery ramp is 3°F per hour, which differs from the 5°F per hour for conventional systems. The 3°F degree difference helps the system use the economical heat pump more and the expensive auxiliary heat less. The cooling ramp is 5°F, the same as conventional systems.

FAN OPERATION

When the subbase fan switch is in the ON position, the fan is energized continuously in the occupied mode. The AUTO position energizes the fan with the heating or cooling system. If the subbase is Q7300D, during unoccupied mode, the fan cycles with Y1 and W1.

NOTE: The Q7300 switch no. 4 has no effect when the thermostat is configured for heat pump.

EMERGENCY HEAT

When the system switch is in the EM. HEAT position (on select Q7300 subbases), the auxiliary heat is stage 1 and the compressor stages are locked off. The fan cycles with the auxiliary heat.

GENERAL OPERATION INFORMATION

Cycle Rates

The thermostat control algorithm maintains the temperature by cycling stages of heating or cooling to meet setpoint. See Table 9 for the nominal cycle rates provided.

TABLE 9—NOMINAL CYCLE RATES FOR HEATING AND COOLING.

System Type	H1	H2	C1	C2	C3
Conventional	8	8	4	4	4
Heat Pump	4	8	4	4	—

Subbase Auxiliary Relay

The Q7300 auxiliary relay output acts as a time-of-day switch to be used with an economizer minimum position control. The normally open (A1) auxiliary relay contacts are closed during the occupied period and open during the unoccupied period. The normally closed (A3) auxiliary relay contacts are open during the occupied period and closed during the unoccupied period. The contacts are in the normal state during recovery.

Interfacing with Electromechanical Economizers (Subbases with Auxiliary Relay)

Mechanical cooling is often used when outside temperatures are in the 50° to 60°F range and humidity is below 50 percent. In central and northern climates, hundreds of hours fall into this temperature category. By permitting 80 to 100 percent outside air into the system, mechanical cooling may not be needed at all, particularly during spring and fall.

An economizer is used to take advantage of the outside air. The typical economizer consists of an outside air damper, motor, outdoor air changeover control and a minimum position potentiometer. The motor controls the dampers. Suitability of the outside air for cooling is determined by the outdoor air changeover control. The potentiometer is used for adjusting the minimum position of the economizer dampers, which provide a minimum amount of fresh air for ventilation.

The economizer reduces compressor run time, thereby saving energy and extending the compressor life. The drawback to the economizer is that during the unoccupied period, if there is no call for cooling or outdoor air is not suitable for free cooling, the economizer is controlled to minimum position. This position allows some percentage of outdoor air to enter the building, regardless of air suitability. The situation can cause the heating or cooling to run more often than if suitable outdoor air is permitted to enter the building.

The thermostat can take advantage of an economizer by connecting the auxiliary relay contacts (A1 and A2) of the subbase to control the economizer minimum position potentiometer. The contacts close during the occupied period, allowing the economizer to operate normally. The contacts are open duirng the unoccupied period, disabling the minimum position feature of the economizer. The open contacts cause the economizer to drive dampers fully closed instead of staying at minimum open position. This reduces the possibility of unsuitable outdoor air from entering the building, which lowers the internal load on the HVAC system are saves additional energy.

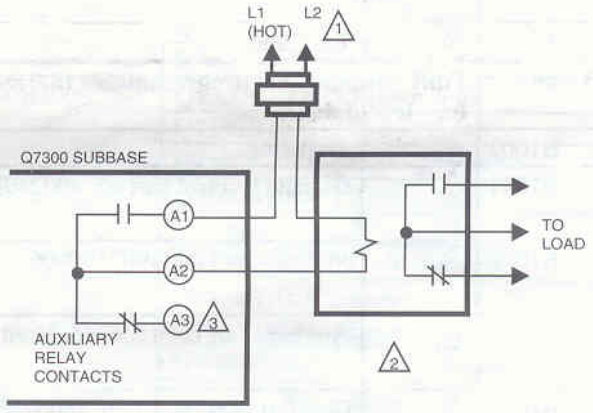
Other Uses for the Auxiliary Relay

Examples of other uses of the auxiliary relay are hot water heaters, lighting or baseboard heat. The additional loads are connected to the auxiliary relay contacts on the subbase. The contacts are rated for 1.6A at 30 Vac, but can be adapted to higher current applications with the use of an external relay and transformer. See Fig. 22.

Duty Cycle Interface

Duty cycling HVAC equipment controlled with a T7200 or T7300 is recommended because the thermostat is already maintaining an optimum control cycle rate. Adding another external duty cyle increases the P+I error being sensed and results in degradation of temperature control and equipment efficiency.

Fig. 22—Use of external relay and transformer for auxiliary loads greater than 1.6A.



1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

2 RELAY REQUIRED (R8222 OR SIMILAR).

3 TERMINAL A3 AVAILABLE ON Q7300A,B,D,E AND G MODELS ONLY

M4383

Cross Reference

Refer to Table 10 for thermostat and subbase cross referencing information.

TABLE 10—THERMOSTAT AND SUBBASE CROSS REFERENCE.

Model Number	Fig. No.	Description	Trade Replacement	Remarks
T7200A	**7-day programmable thermostat for commercial conventional systems.**			
A1006	23,24,25	Tradeline®.	T7200A1006	Beige color
A1022	23,24,25	International faceplate.	T7200A1006	Beige color
T7200B	**7-day programmable thermostat for commercial water source heat pump systems.**			
B1004	9,26	Tradeline.	T7200B1004	Beige color
B1012	9,26	Mammoth part number 71116701.	T7200B1004	Beige color
B1020	9,26	Carrier part number HH07AX010A.	T7200B1004	Beige color
T7300A	**7-day programmable thermostat for commercial conventional systems.**			
A1005	⚠1	Tradeline®.	T7300A1005	Beige color
A1013	⚠1	York part no. 025-27506. Used in Y7300B1008, Y7300C1006 and Y7300D1004.	T7300A1005	Beige color
			T7300A1104	Premier White™ color
A1021	⚠1	Lennox part no. 81G5901.	T7300A1005	Beige color
			T7300A1104	Premier White™ color
A1039	⚠1	Trane part no. THT-0608.	T7300A1005	Beige color
			T7300A1104	Premier White™ color
A1047	⚠1	Micrometl part no. 901-114. Used in Y7300A1000 and Y7300C11014.	T7300A1005	Beige color
			T7300A1104	Premier White™ color
A1054	⚠1	International face plate.	T7300A1005	Beige color
			T7300A1104	Premier White™ color
A1062	⚠1	Carrier part no. HH07AX005. Used in Y7300A1018.	T7300A1005	Beige color
			T7300A1104	Premier White™ color
A1070	⚠1	International face plate.	T7300A1005	Beige color
			T7300A1104	Premier White™ color
A1088	⚠1	Spanish face plate.	T7300A1005	Beige color
			T7300A1104	Premier White™ color
A1104	⚠1	Tradeline.	T7300A1104	Premier White™ color
T7300B	**Fully configurable programmable thermostat with 3-HOUR OVERRIDE key on cover. See figure 2 for view of door.**			
B1003	⚠1	Tradeline.	T7300B1003	Beige color
B1011	⚠1	Climate Control part no. 490249B-05.	T7300B1003	Beige color
			T7300B1052	Premier White™ color
B1029	⚠1	McQuay part no. 490249B-06.	T7300B1003	Beige color
			T7300B1052	Premier White™ color
B1037	⚠1	Arcoaire part no. 1506746. Used in Y7300B1024.	T7300B1003	Beige color
			T7300B1052	Premier White™ color
B1045	⚠1	Comfort Maker part no. 1505746. Used in Y7300B1016.	T7300B1003	Beige color
			T7300B1052	Premier White™ color
B1052	⚠1	Tradeline.	T7300B1052	Premier White™ color

⚠1 See subbase for figure number.

(Continued)

TABLE 10—THERMOSTAT AND SUBBASE CROSS REFERENCE (Continued).

Model Number	Fig. No.	Description	Trade Replacement	Remarks
T7300C	**Fully configurable programmable thermostat with limited access cover. See Figure 3 for view of door.**			
C1001	⚠1	Tradeline.	T7300C1001	Beige color
C1019	⚠1	Tradeline. Premier White™ T7300.	T7300C1019	Premier White™ color
Subbase				
Q7300A	**Conventional equipment. System: none. Fan: none.**			
A1000	27	Tradeline. 1 heat and 2 cool.	Q7300A1000	Brown color
A1018	28,29, 30,32, 35,36	Tradeline. 2 heat and 2 cool.	Q7300A1018	Brown color
A1034	27,32	Trane part no. BAS-0444.	Q7300A1000	Brown color
			Q7300A1075	Light gray color
A1042	28,29, 30,32, 35,36	Trane part no. BAS-0445.	Q7300A1018	Brown color
			Q7300A1083	Light gray color
A1059	28,29 30,32, 35,36	Micrometl part no. 901-3. Used in Y7300A1000.	Q7300A1018	Brown color
			Q7300A1083	Light gray color
A1067	28,29, 30,32, 35,36	Carrier part no. HH93AX005.	Q7300A1018	Brown color
			Q7300A1083	Light gray color
A1075	27,32	Tradeline. Used with Premier White™ T7300. 1 heat and 1 cool.	Q7300A1075	Light gray color
A1083	28,29, 30,32, 35,36	Tradeline. Used with Premier White™ T7300. 2 heat and 2 cool.	Q7300A1083	Light gray color
Q7300B	**Conventional equipment. System: Heat-Off-Cool-Auto. Fan: Auto-On.**			
B1008	28,29, 30,32, 35,36	Tradeline. 2 heat and 2 cool.	Q7300B1008	Brown color
B1016	28,29, 30,32, 35,36	Lennox part no. 81G6001.	Q7300B1008	Brown color
			Q7300B1073	Brown color
			Q7300B1081	Light gray color
B1024	28,29, 30,32, 35,36	York part no. 025-227507. Used in Y7300B1008.	Q7300B1008	Brown color
			Q7300B1073	Brown color
			Q7300B1081	Light gray color
B1032	28,29, 30,32, 35,36	Trane part no. BAS-0446.	Q7300B1008	Brown color
			Q7300B1073	Brown color
			Q7300B1081	Light gray color
B1040	28,29, 30,32, 35,36	Carrier part no. HH93AAX004.	Q7300B1008	Brown color
			Q7300B1073	Brown color
			Q7300B1081	Light gray color
B1057	28,29, 30,32, 35,36	Snyder General part no. 1520510. Used in Y7300B1016 and Y7300B10224.	Q7300B1008	Brown color
			Q7300B1073	Brown color
			Q7300B1081	Light gray color
B1065	28,29 30,32, 35,36	Snyder General part no. 490249B-04.	Q7300B1008	Brown color
			Q7300B1073	Brown color
			Q7300B1081	Light gray color

⚠1 See subbase for figure number.

(Continued)

TABLE 10—THERMOSTAT AND SUBBASE CROSS REFERENCE (Continued).

Model Number	Fig. No.	Description	Trade Replacement	Remarks
B1073	28,29, 30,32, 35,36	Tradeline. 2 heat and 2 cool.	Q7300B1073	Brown color
B1081	28,29, 30,32, 35,36	Tradeline. Used with Premier White T7300. 2 heat and 2 cool.	Q7300B1081	Light gray color
Q7300C	**Heat pump systems. System: Em. Ht.-Heat-Off-Cool-Auto. Fan: Auto-On.**			
C1006	38,42	Tradeline. 1 stage heat pump.	Q7300C1006	Brown color
C1014	40	Tradeline. 2 stage heat pump.	Q7300C1014	Brown color
C1022	40	Lennox part no.81G6901.	Q7300C1014	Brown color
			Q7300C1089	Brown color
			Q7300C1105	Light gray color
C1030	40	York part no. 025-27508. Used in Y7300C1006.	Q7300C1014	Brown color
			Q7300C1089	Brown color
			Q7300C1105	Light gray color
C1048	38,42	Trane part no.BAS-0447.	Q7300C1014	Brown color
			Q7300C1089	Brown color
			Q7300C1105	Light gray color
C1055	40	Trane part no.BAS-0448.	Q7300C1014	Brown color
			Q7300C1089	Brown color
			Q7300C1105	Light gray color
C1063	38,42	Micrometl part no. 901-24. Used in Y7300C1014.	Q7300C1006	Brown color
			Q7300C1097	Light gray color
C1071	40	Obsolete		Brown color
C1089	40	Tradeline. 2 stage heat pump.	Q7300C1089	Brown color
C1097	38,42	Tradeline. Used with Premier White T7300. 1 stage heat pump.	Q7300C1097	Light gray color
C1105	40	Tradeline. Used with Premier White T7300. 2 stage heat pump.	Q7300C1105	Light gray color
Q7300D	**Heat pump system. System: Em.Ht.-Heat-Off-Cool-Auto. Fan: Auto-On.**			
D1004	41	Carrier part no. HH93AX002.	Q7300D1038	Brown color
			Q7300D1061	Brown color
			Q7300D1079	Light gray color
D1012	39,42	Carrier part no. HH93AX003.	Q7300D1053	Brown color
			Q7300D1087	Light gray color
D1020	41	York part no. 025-27724-000. Used in Y7300D1004.	Q7300D1038	Brown color
			Q7300D1061	Brown color
			Q7300D1079	Light gray color
D1038	41	Tradeline. 2 stage heat pump.	Q7300D1038	Brown color
D1046	41	Lennox part no. 13H7601.	Q7300D1038	Brown color
			Q7300D1061	Brown color
			Q7300D1079	Light gray color

(Continued)

TABLE 10—THERMOSTAT AND SUBBASE CROSS REFERENCE (Continued).

Model Number	Fig. No.	Description	Trade Replacement	Remarks
D1053		Tradeline. 1 stage heat pump.	Q7300D1053	Brown color
D1061	41	Tradeline. 2 stage heat pump.	Q7300D1061	Brown color
D1079	41	Tradeline. Used with Premier White T7300. 2 stage heat pump.	Q7300D1079	Light gray color
D1087	39,42	Tradeline. Used with Premier White T7300. 1 stage heat pump.	Q7300D1087	Light gray color
Q7300E	**Conventional equipment. System: none. Fan: none.**			
E1001	28,29, 30	Tradeline. 2 heat and 2 cool.	Q7300E1001	Brown color
E1019	28,29, 30	Tradeline. Used with Premier White T7300. 2 heat and 2 cool.	Q7300E1019	Light gray color
Q7300F	**Heat pump systems. System: none. Fan: none.**			
F1009	44	Tradeline. 1 stage heat pump.	Q7300F1009	Brown color
F1017	44	Tradeline. 2 stage heat pump.	Q7300F1017	Brown color
F1025	44	Tradeline. Used with Premier White T7300. 1 stage heat pump.	Q7300F1025	Light gray color
F1033	44	Tradeline. Used with Premier White T7300. 2 stage heat pump.	Q7300F1033	Light gray color
F1041	43	Carrier part no. HH93AX006. Used in Y7300A1018.	Q7300F1009	Brown color
			Q7300F1025	Light gray color
Q7300G	**Conventional equipment. System: Heat-Off-Cool-Auto. Fan: none.**			
G1007	31,32, 33,34	Tradeline. 1 heat and 3 cool.	Q7300G1007	Brown color
G1015	31,32, 33,34	Tradeline. Used with Premier White T7300. 1 heat and 3 cool.	Q7300G1015	Light gray color
Q7300L	**Conventional equipment. System: none. Fan: Auto-On.**			
L1006	45	LDS Church.	Q7300L1014	Brown color
L1014	46	Tradeline. 2 heat and 1 cool.	Q7300L1014	Brown color

Wiring Diagrams

Fig. 23—T7200A with wallplate.

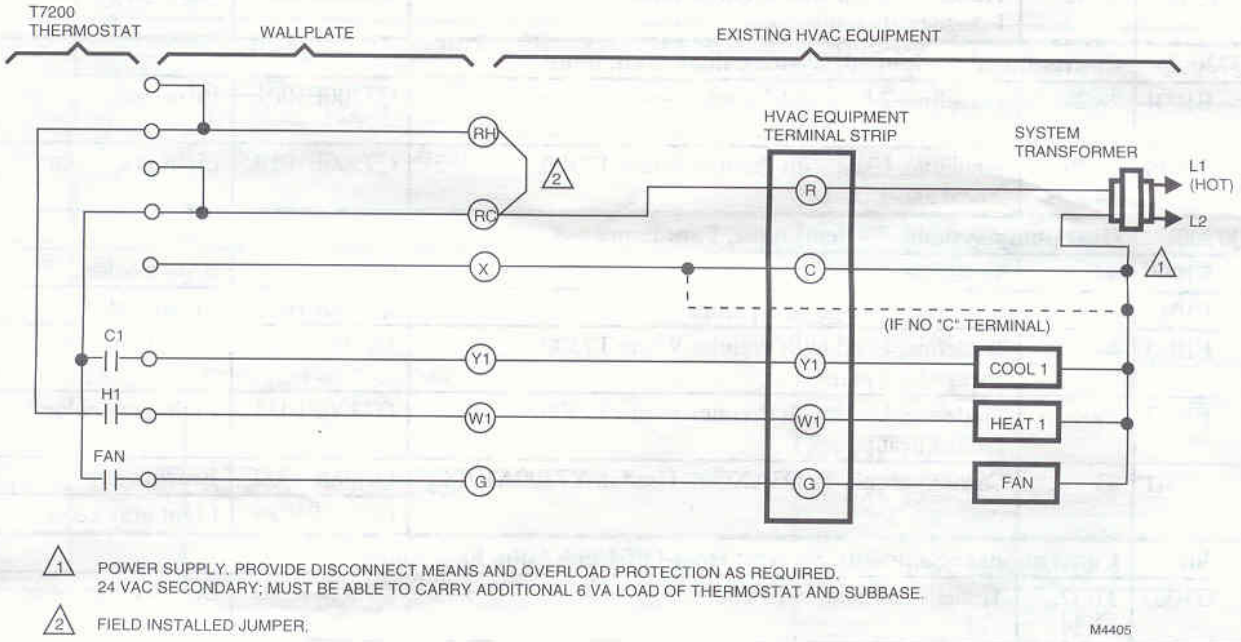
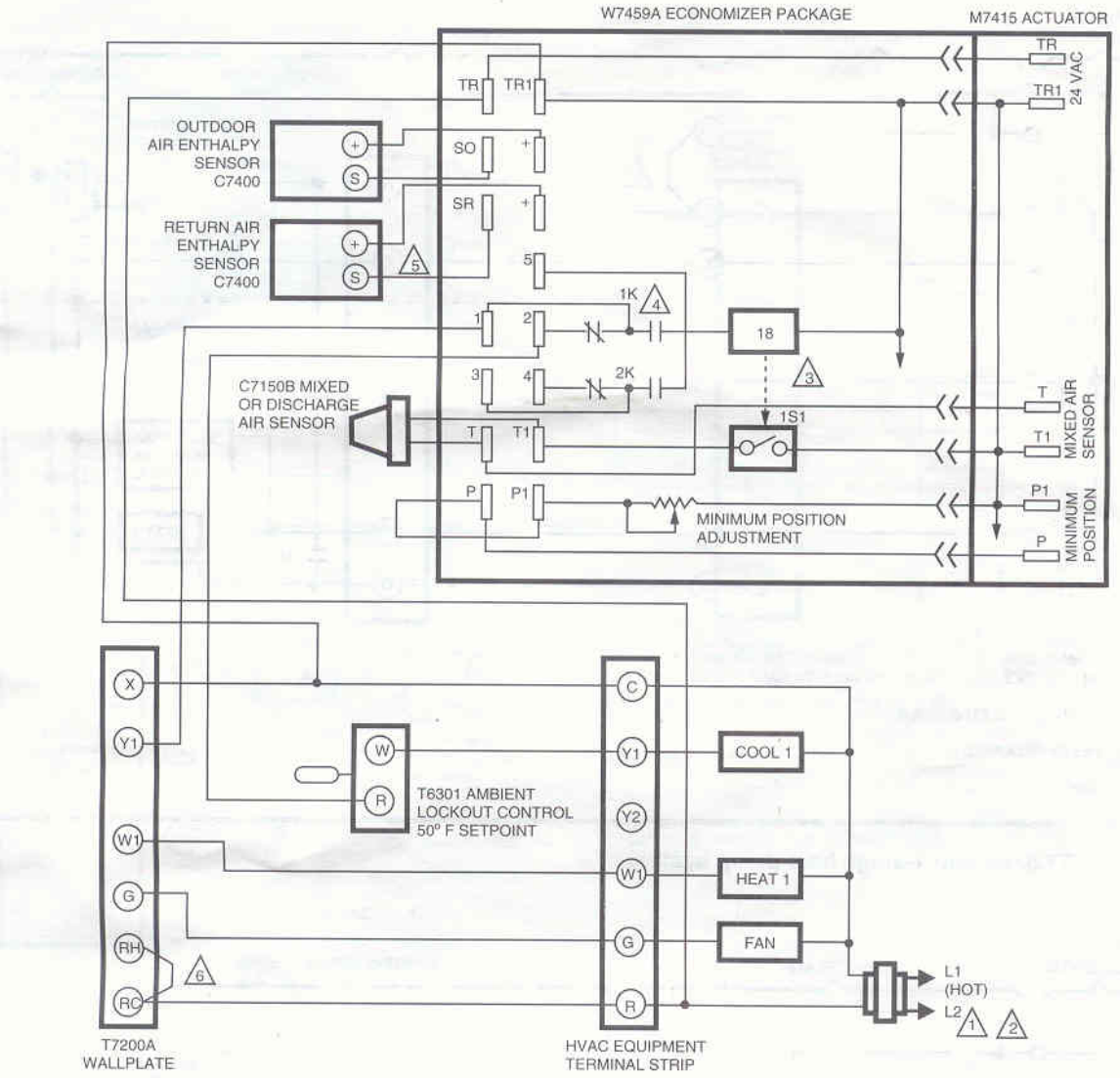


Fig. 24—T7200A with 1-stage cooling system with differential enthalpy changeover using W7459A/C7400 with M7415 Actuator.



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED. 24 VAC SECONDARY.
2. ASSURE THAT EQUIPMENT TRANSFORMER IS SIZED TO HANDLE THE EXTRA LOAD OF THE ECONOMIZER, ACTUATOR, T7200 AND WALLPLATE
3. AN ELECTRONIC SWITCH THAT CLOSES WHEN POWERED BY A 24 VAC INPUT.
4. RELAYS 1K AND 2K ACTUATE WHEN THE ENTHALPY SENSED BY THE C7400 IS HIGHER THAN THE ENTHALPY SETPOINT A-D.
5. FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR SHOULD BE REMOVED ONLY IF A C7400 ENTHALPY SENSOR IS ADDED TO SR AND + FOR DIFFERENTIAL ENTHALPY.
6. FIELD INSTALLED JUMPER.

M4407

Fig. 25—T7200A with electric heat system.

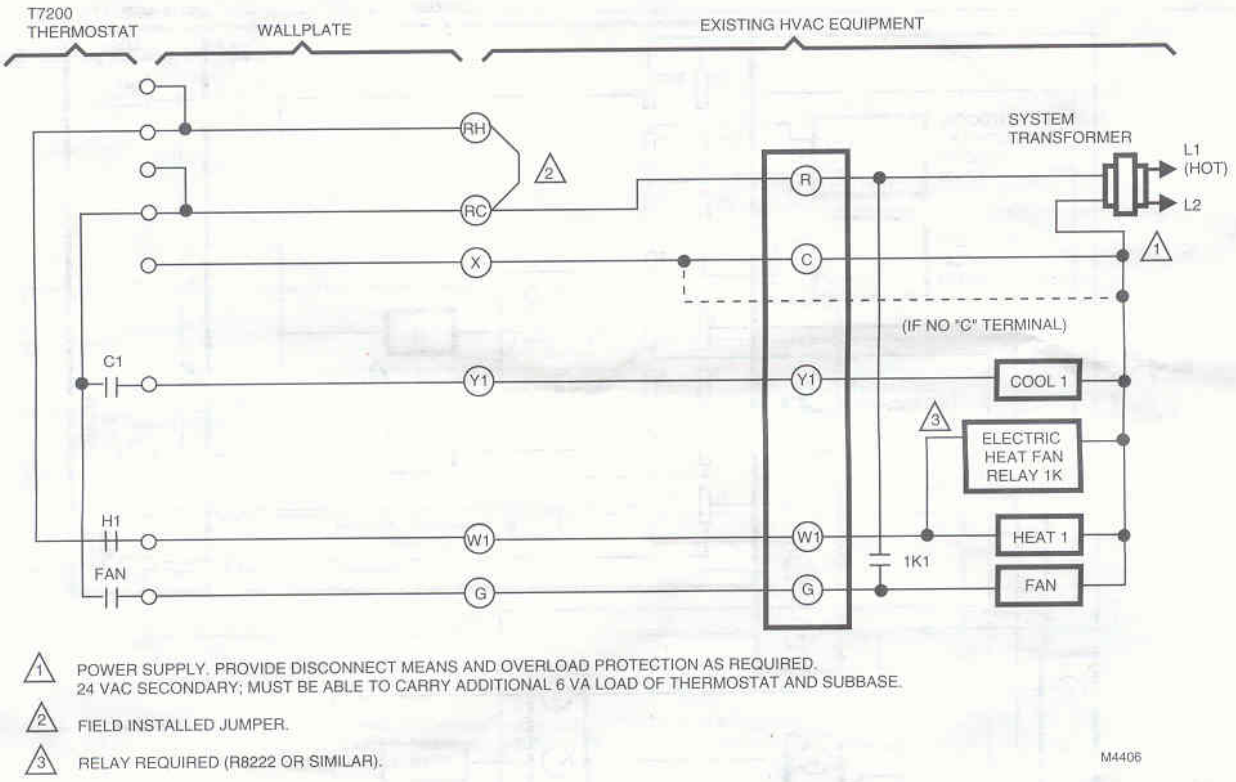


Fig. 26—T7200B with 1-stage heat pump system.

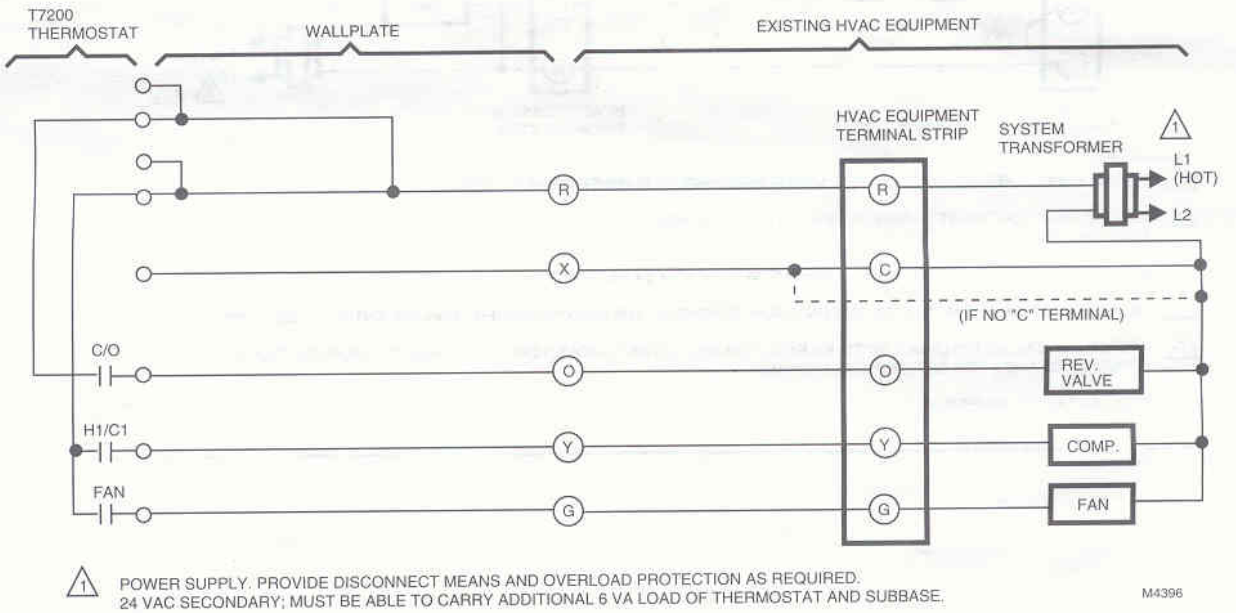


Fig. 27—T7300/Q7300A with single transformer 1-stage heat/1-stage cool system.

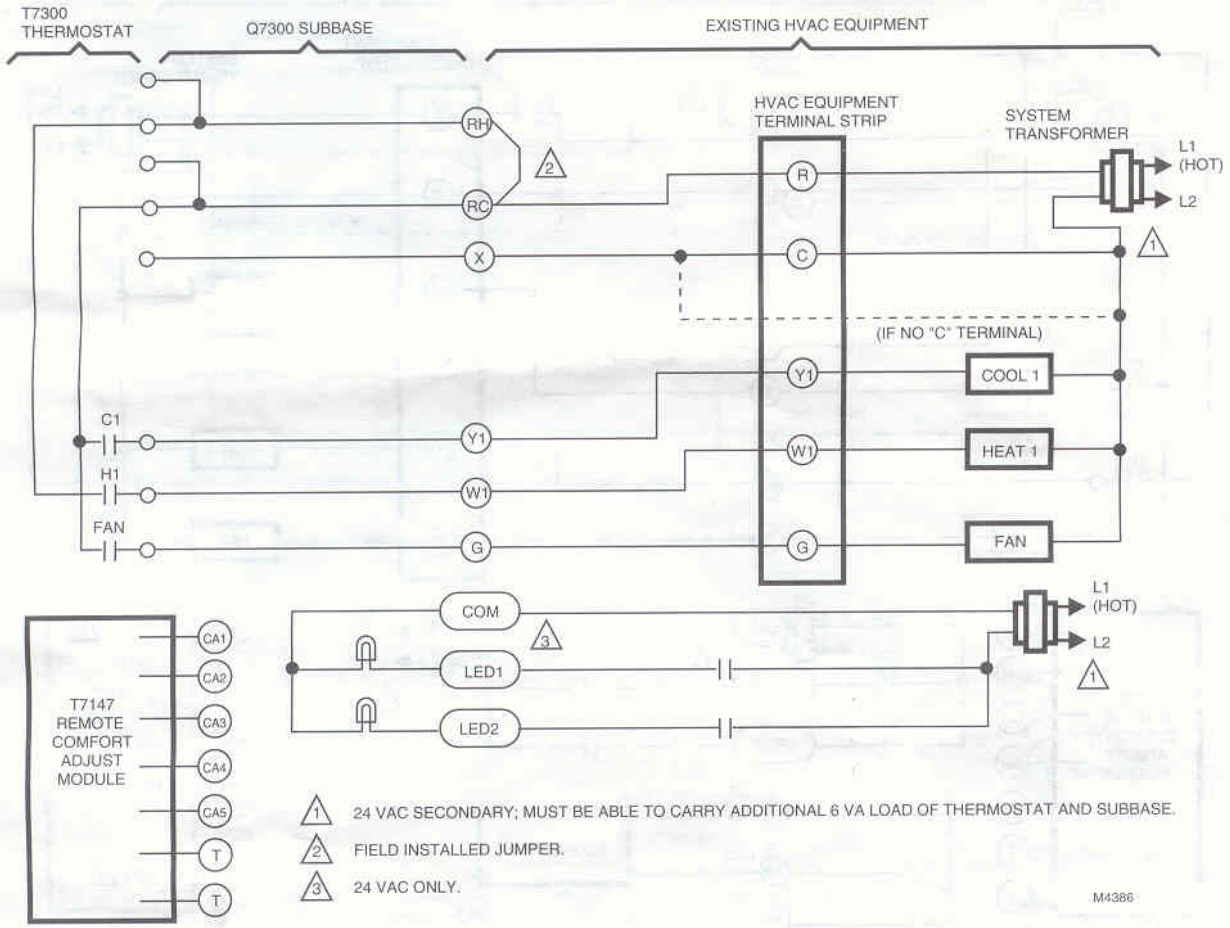
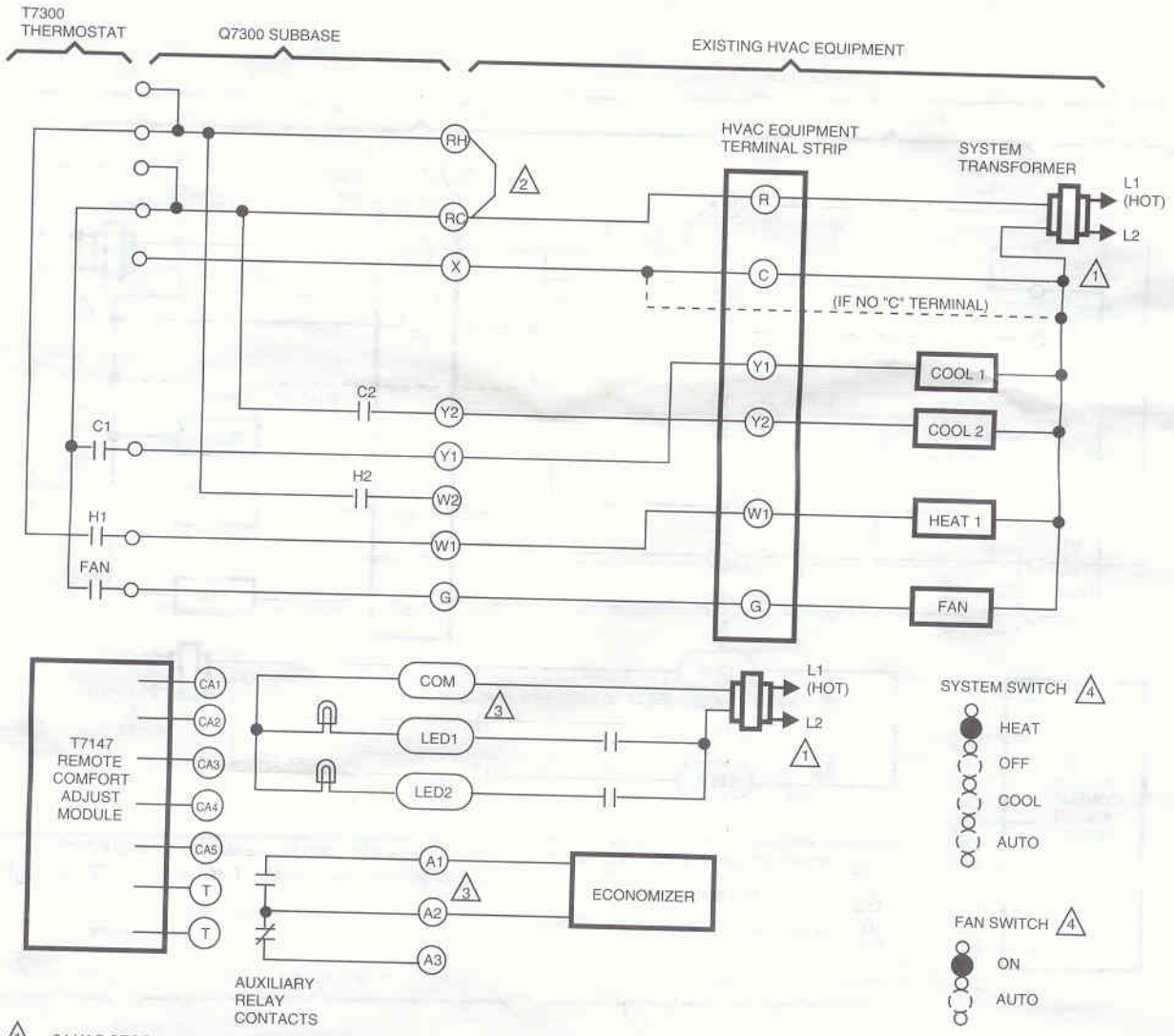


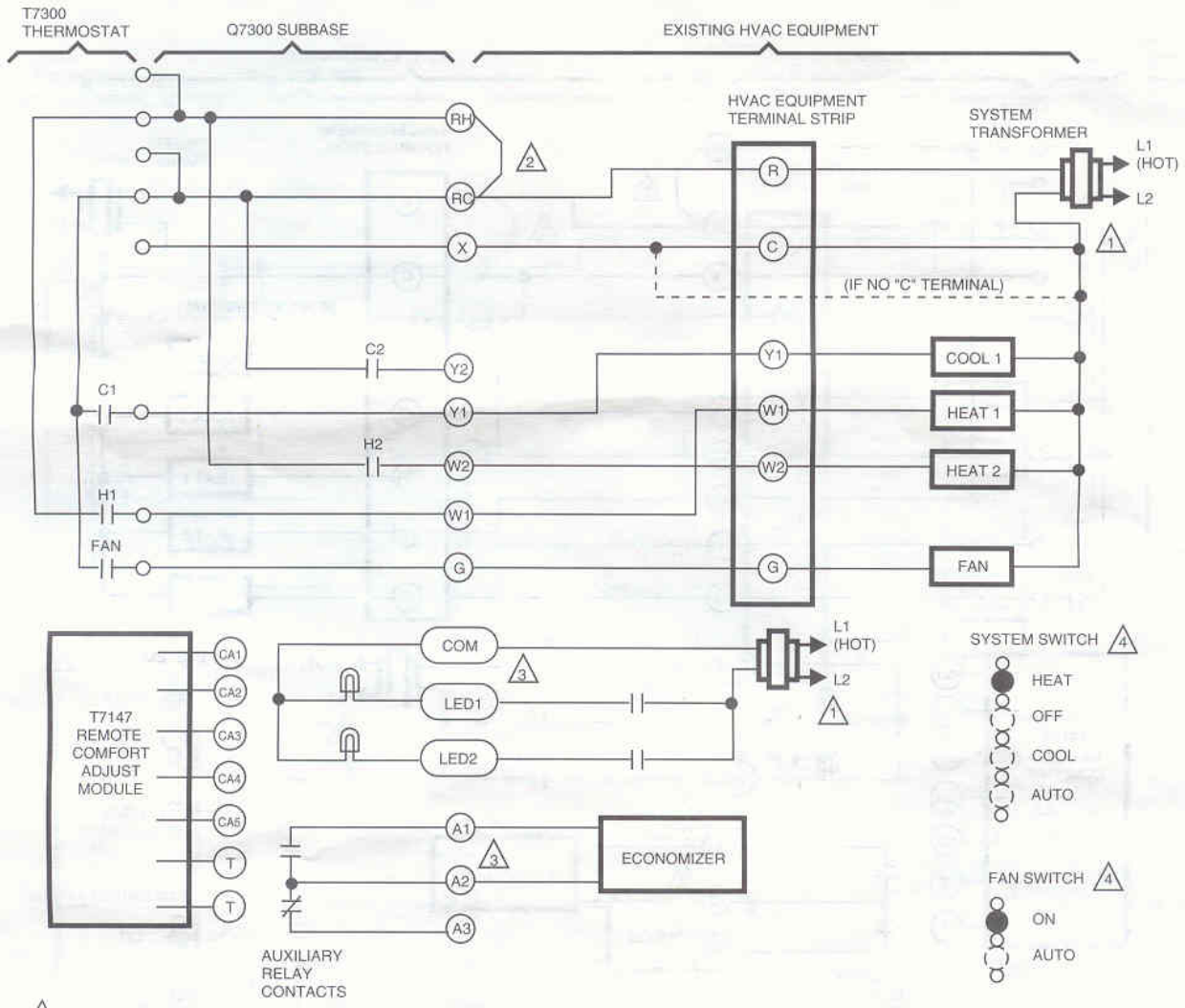
Fig. 28—T7300/Q7300A,B,E used with single transformer 1-stage heat/2-stage cool system.



1. 24 VAC SECONDARY; MUST BE ABLE TO CARRY ADDITIONAL 6 VA LOAD OF THERMOSTAT AND SUBBASE.
2. FIELD INSTALLED JUMPER.
3. 24 VAC ONLY.
4.

MODEL NUMBER	FAN SWITCH	SYSTEM SWITCH
Q7300A	NO	NO
Q7300B	YES	YES
Q7300E	YES	NO

Fig. 29—T7300/Q7300A,B used with single transformer 2-stage heat/1-stage cool system.

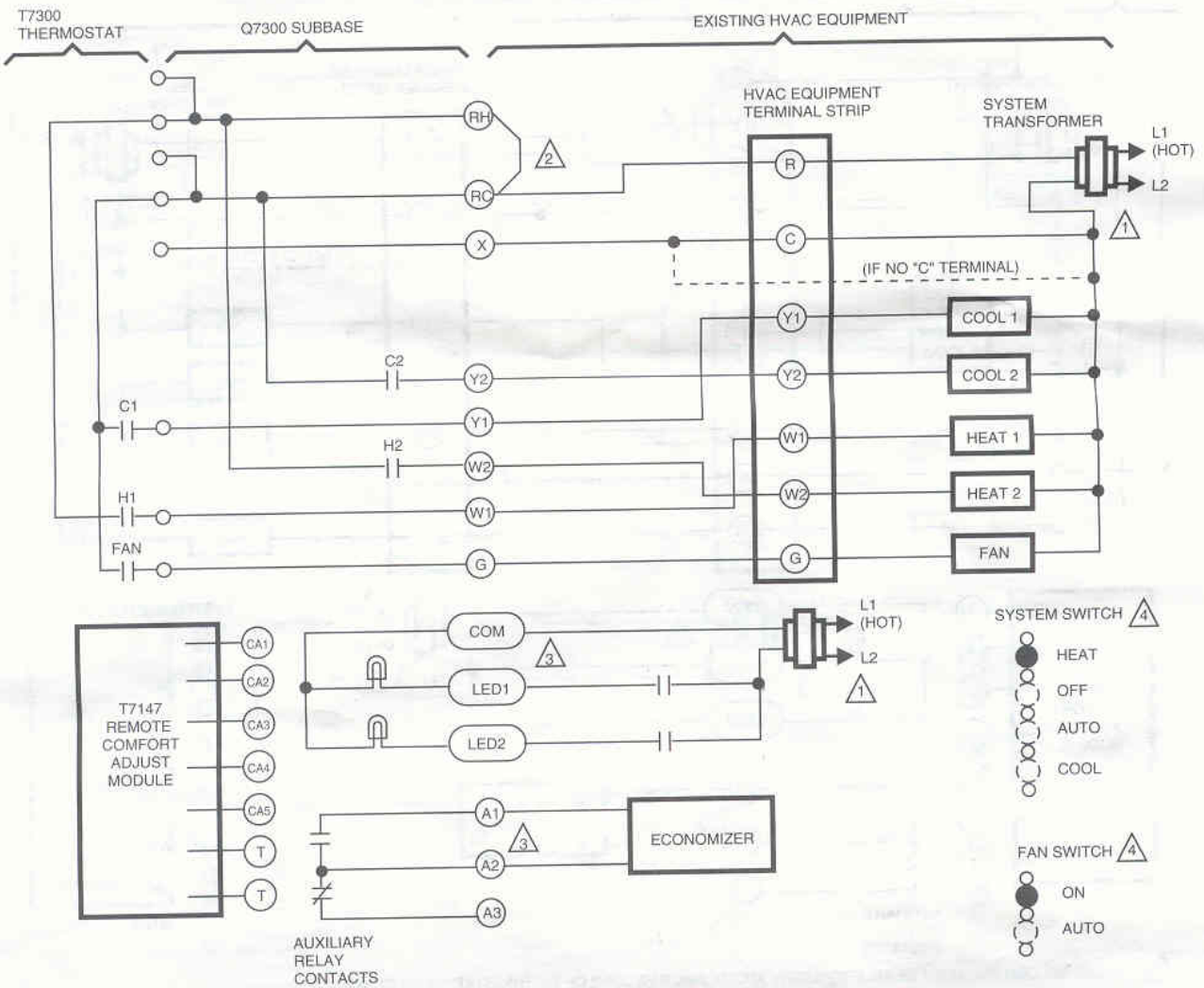


1. 24 VAC SECONDARY; MUST BE ABLE TO CARRY ADDITIONAL 6 VA LOAD OF THERMOSTAT AND SUBBASE.
2. FIELD INSTALLED JUMPER.
3. 24 VAC ONLY.
4.

MODEL NUMBER	FAN SWITCH	SYSTEM SWITCH
Q7300A	NO	NO
Q7300B	YES	YES
Q7300E	YES	NO

M4388

Fig. 30—T7300/Q7300A,B,E used with single transformer 2-stage heat/2-stage cool system without economizer.



1. 24 VAC SECONDARY; MUST BE ABLE TO CARRY ADDITIONAL 6 VA LOAD OF THERMOSTAT AND SUBBASE.
2. FIELD INSTALLED JUMPER.
3. 24 VAC ONLY.
4.

MODEL NUMBER	FAN SWITCH	SYSTEM SWITCH
Q7300A	NO	NO
Q7300B	YES	YES
Q7300E	YES	NO

Fig. 31—T7300/Q7300G with single transformer 1-stage heat/3-stage cool system.

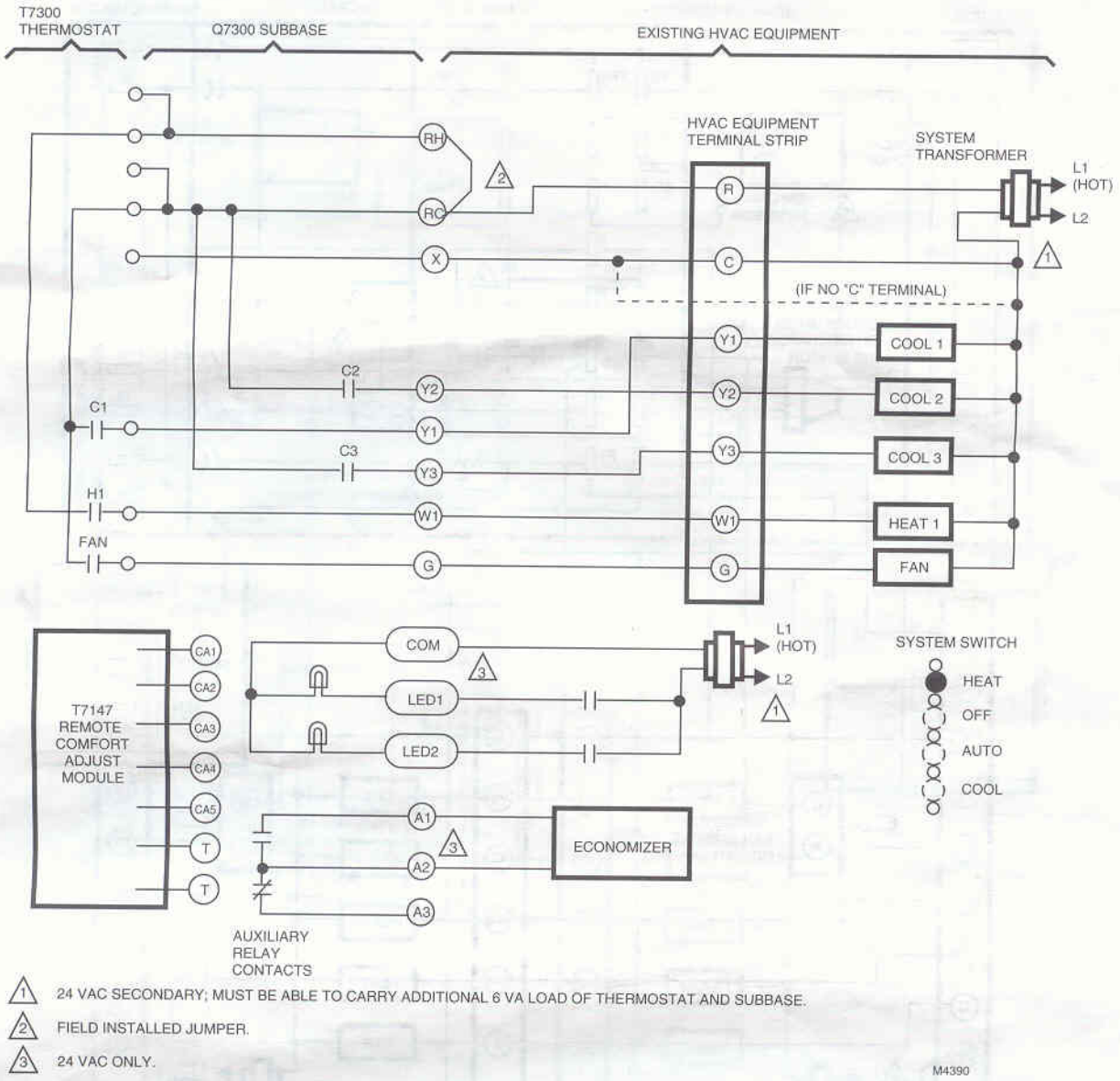
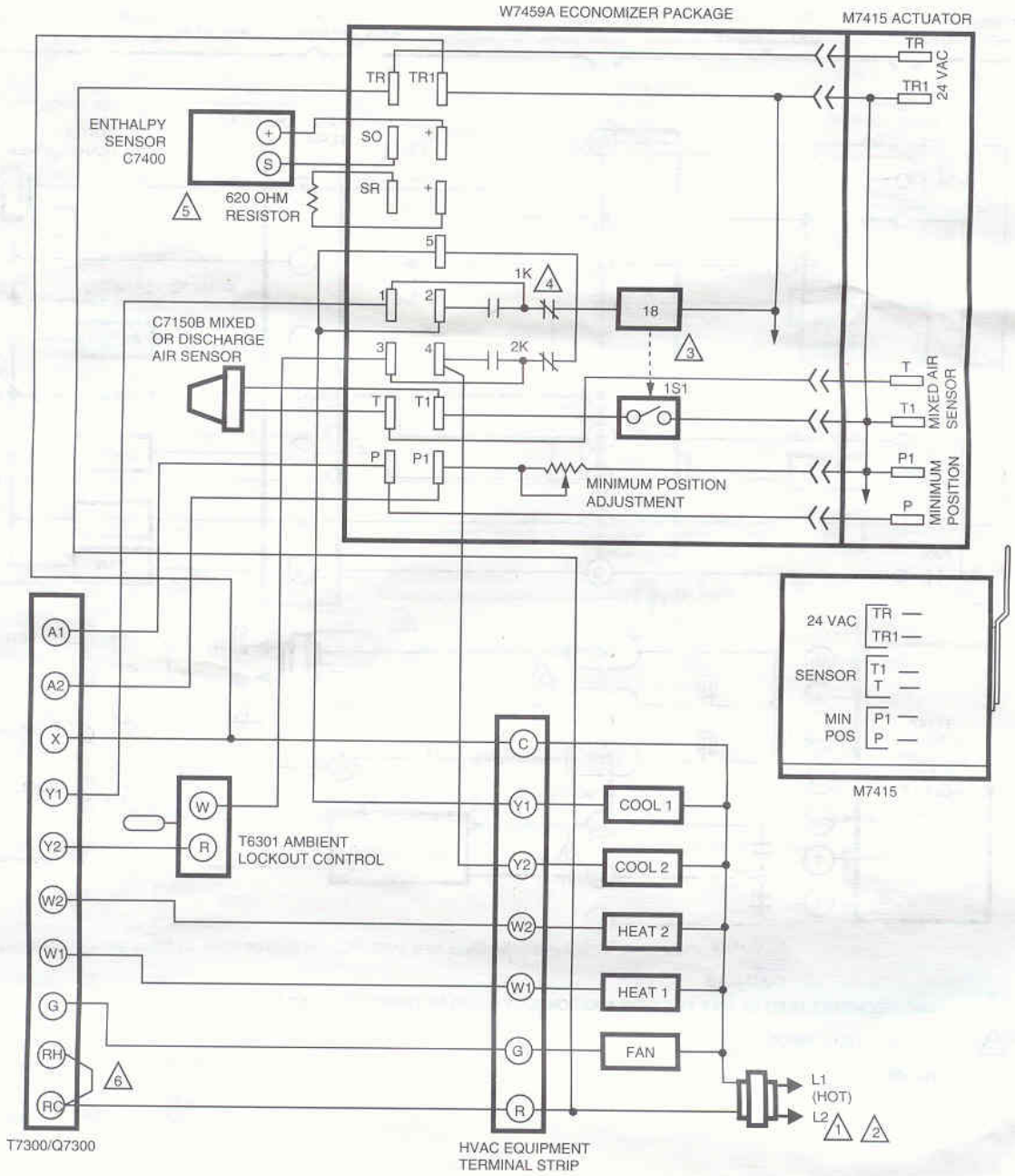


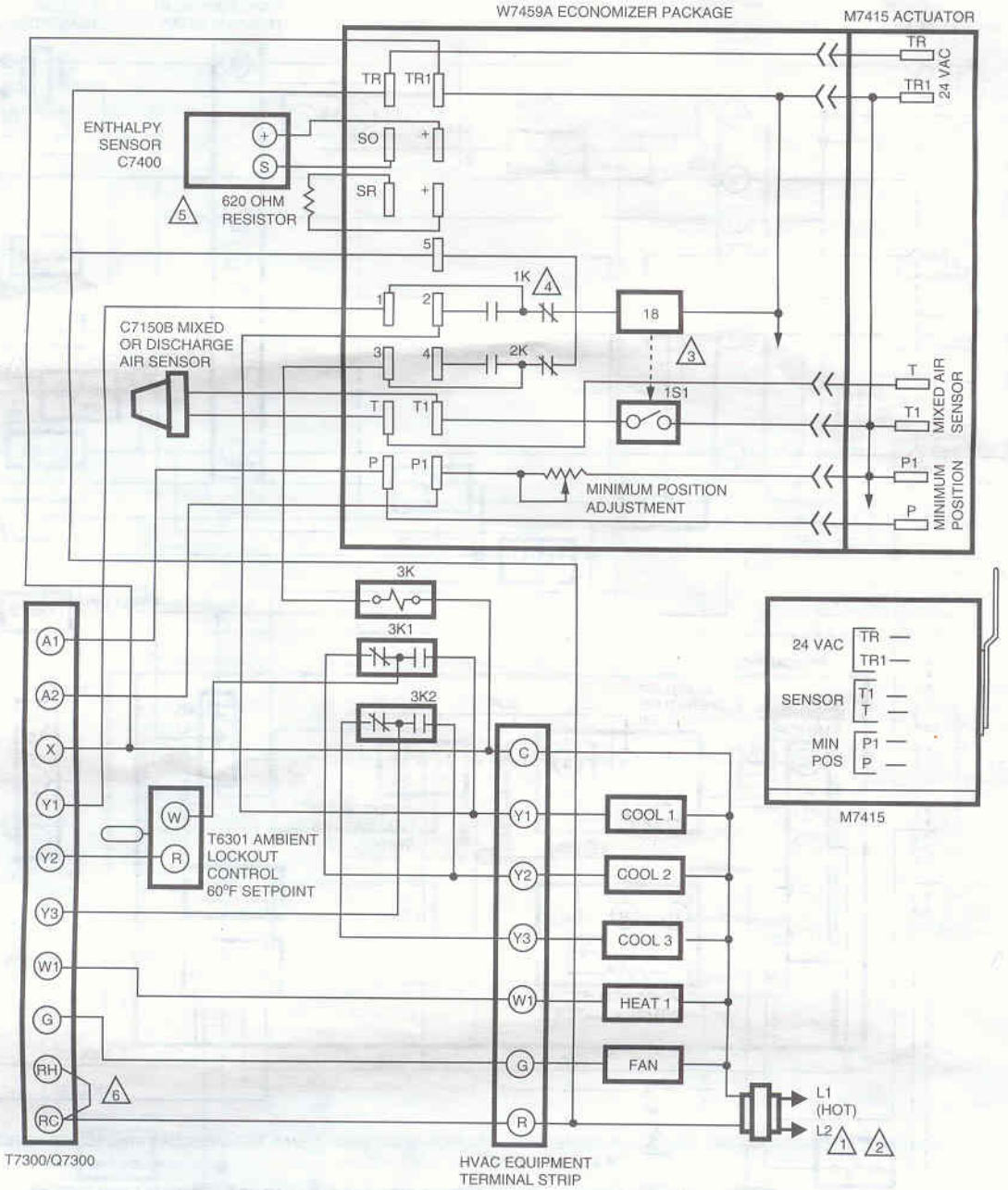
Fig. 32—T7300/Q7300A,B,G defeating economizer minimum position during unoccupied period in a 2-stage cool system with single enthalpy changeover using W7459A/C7400 with an M7415 actuator.



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTIONS AS REQUIRED. 24 VAC SECONDARY.
2. ASSURE THAT EQUIPMENT TRANSFORMER IS SIZED TO HANDLE THE EXTRA LOAD OF THE ECONOMIZER, ACTUATOR AND T7300/Q7300.
3. 1S, AN ELECTRONIC SWITCH THAT CLOSES WHEN POWERED BY A 24 VAC INPUT.
4. RELAYS 1K AND 2K ACTUATE WHEN THE ENTHALPY SENSED BY THE C7400 IS HIGHER THAN THE ENTHALPY SETPOINT A-D.
5. FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR SHOULD BE REMOVED ONLY IF C7400 ENTHALPY SENSOR IS ADDED TO SR AND + FOR DIFFERENTIAL ENTHALPY.
6. FIELD INSTALLED JUMPER.

M4392

Fig. 33—T7300/Q7300G defeating economizer minimum position during unoccupied period in 3-stage cool system with single enthalpy changeover using W7459A/C7400 with M7415 Actuator.



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTIONS AS REQUIRED. 24 VAC SECONDARY.
2. ASSURE THAT EQUIPMENT TRANSFORMER IS SIZED TO HANDLE THE EXTRA LOAD OF THE ECONOMIZER, ACTUATOR AND T7300/Q7300.
3. 1S, AN ELECTRONIC SWITCH THAT CLOSES WHEN POWERED BY A 24 VAC INPUT.
4. RELAYS 1K AND 3K ACTUATE WHEN THE ENTHALPY SENSED BY THE C7400 IS HIGHER THAN THE ENTHALPY SETPOINT A-D.
5. FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR SHOULD BE REMOVED ONLY IF C7400 ENTHALPY SENSOR IS ADDED TO SR AND + FOR DIFFERENTIAL ENTHALPY.
6. FIELD INSTALLED JUMPER.

M4395

Fig. 34—T7300/Q7300G with W859A Economizer package in 1-stage heat/3-stage cool system defeating economizer minimum position during unoccupied period.

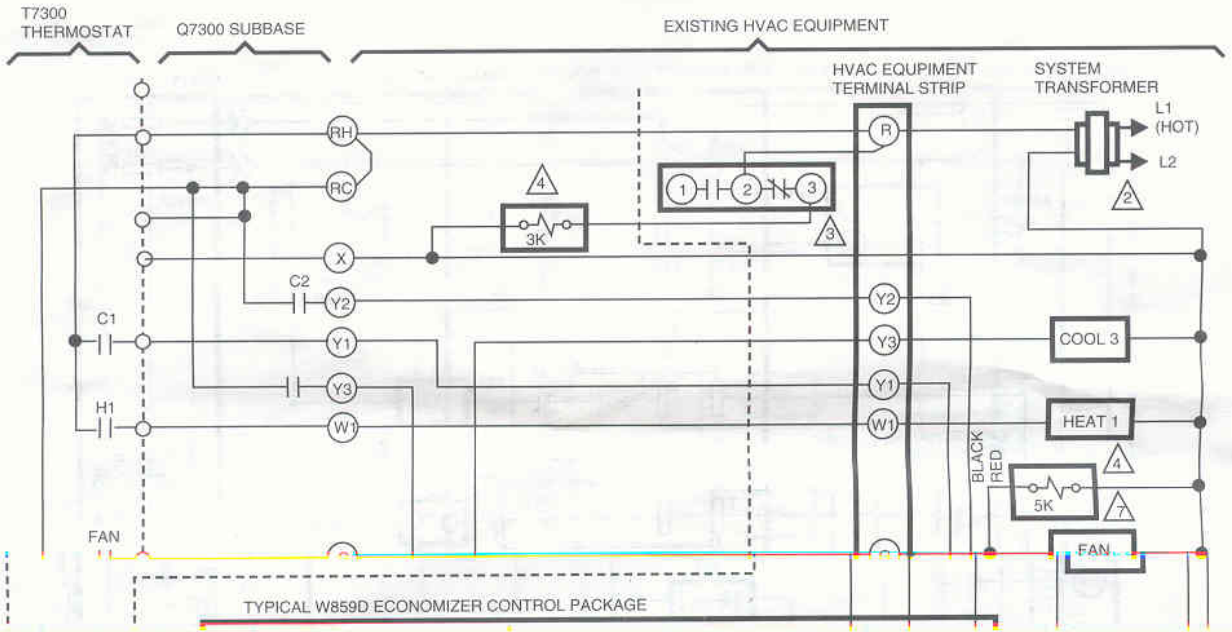
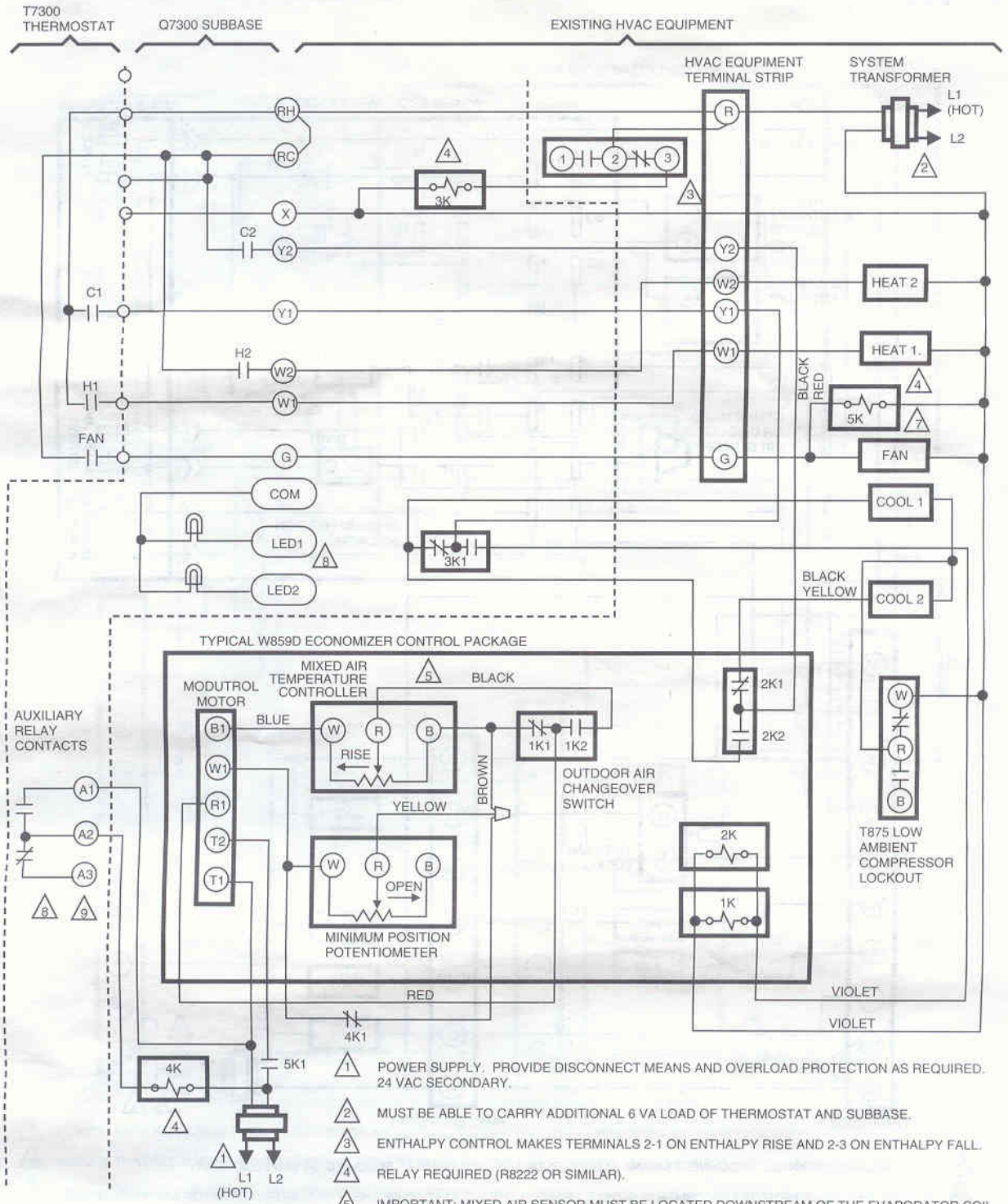


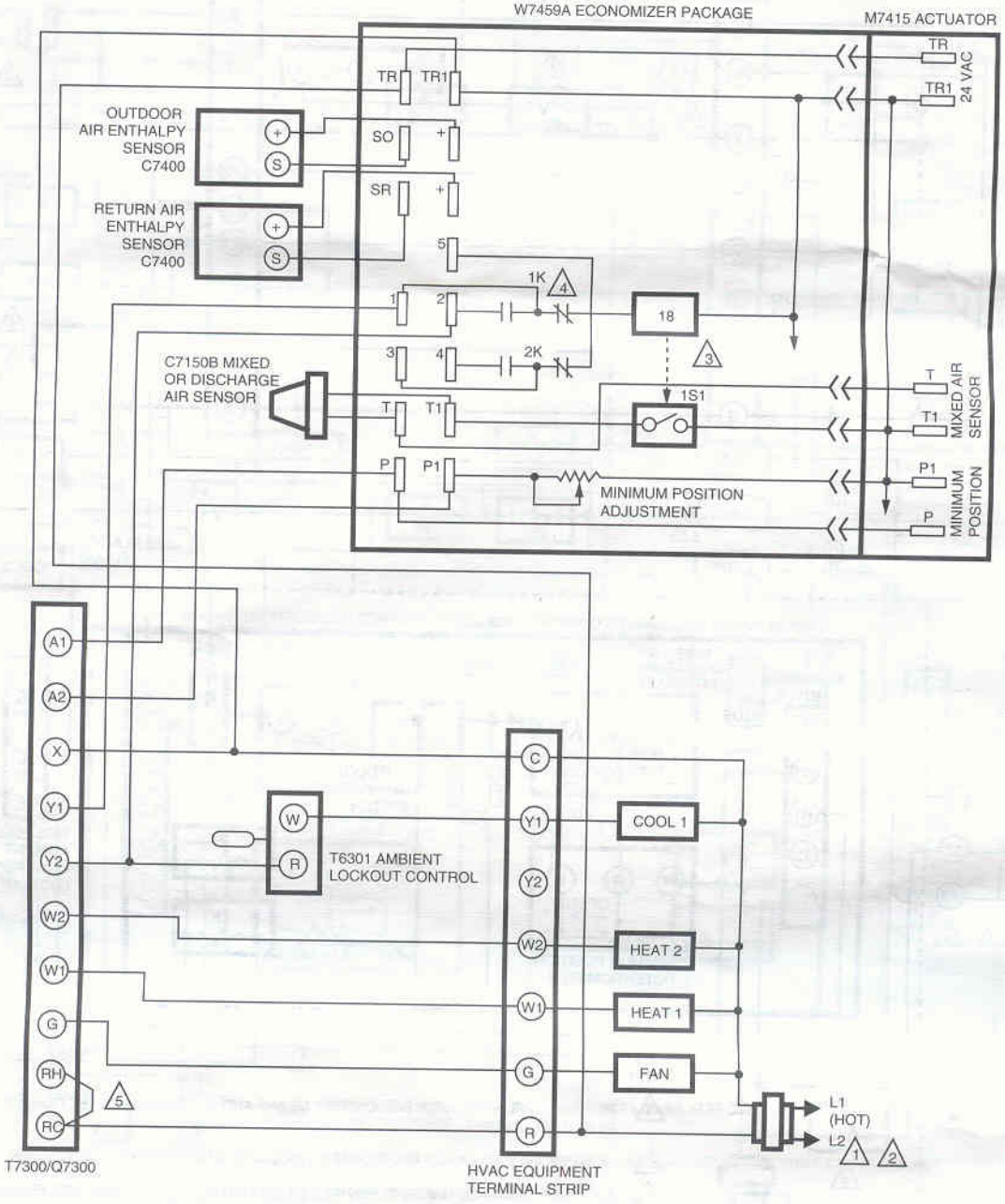
Fig. 35—T7300/Q7300A,B with W859D economizer package in 2-stage heat/2-stage cool system defeating economizer minimum position during unoccupied period.



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED. 24 VAC SECONDARY.
2. MUST BE ABLE TO CARRY ADDITIONAL 6 VA LOAD OF THERMOSTAT AND SUBBASE.
3. ENTHALPY CONTROL MAKES TERMINALS 2-1 ON ENTHALPY RISE AND 2-3 ON ENTHALPY FALL.
4. RELAY REQUIRED (R8222 OR SIMILAR).
5. IMPORTANT: MIXED AIR SENSOR MUST BE LOCATED DOWNSTREAM OF THE EVAPORATOR COIL IN THE DISCHARGE AIR DUCT TO PROVIDE ECONOMIZER LOW LIMIT FUNCTION.
6. FIELD INSTALLED JUMPER.
7. ECONOMIZER MOTOR SPRING RETURNS CLOSED ANYTIME FAN IS NOT RUNNING.
8. 24 VAC ONLY.
9. A3 TERMINAL AVAILABLE ON Q7300A,B,D,E, AND G MODELS ONLY.

M4411

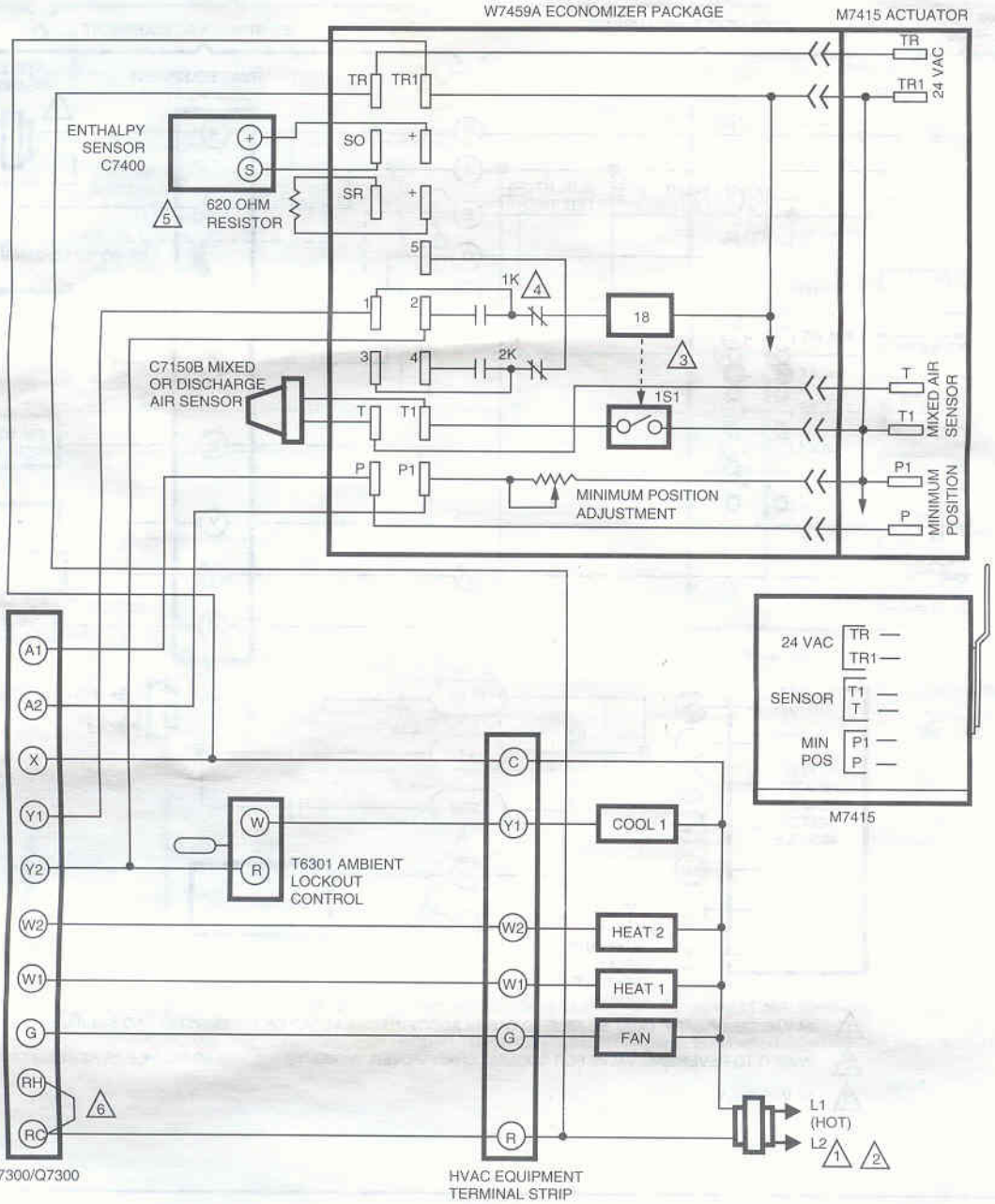
Fig. 36—T7300/Q7300A,B with economizer package in 1-stage cool system defeating economizer minimum position during unoccupied period with differential enthalpy changeover using W7459A/C7400 with M7415 Actuator.



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTIONS AS REQUIRED. 24 VAC SECONDARY.
2. ASSURE THAT EQUIPMENT TRANSFORMER IS SIZED TO HANDLE THE EXTRA LOAD OF THE ECONOMIZER, ACTUATOR AND T7300/Q7300.
3. AN ELECTRONIC SWITCH THAT CLOSES WHEN POWERED BY A 24 VAC INPUT.
4. RELAYS 1K AND 2K ACTUATE WHEN THE ENTHALPY SENSED BY THE C7400 IS HIGHER THAN THE ENTHALPY SETPOINT A-D.
5. FIELD INSTALLED JUMPER.

M4393

Fig. 37—T7300/Q7300 with economizer package in 1-stage cool system defeating economizer minimum position during unoccupied period with single enthalpy changeover using W7459A/C7400 with M7415 Actuator.



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTIONS AS REQUIRED. 24 VAC SECONDARY.
2. ASSURE THAT EQUIPMENT TRANSFORMER IS SIZED TO HANDLE THE EXTRA LOAD OF THE ECONOMIZER, ACTUATOR AND T7300/Q7300.
3. 1S, AN ELECTRONIC SWITCH THAT CLOSES WHEN POWERED BY A 24 VAC INPUT.
4. RELAYS 1K AND 2K ACTUATE WHEN THE ENTHALPY SENSED BY THE C7400 IS HIGHER THAN THE ENTHALPY SETPOINT A-D.
5. FACTORY INSTALLED 620 OHM, 1 WATT, 5% RESISTOR SHOULD BE REMOVED ONLY IF C7400 ENTHALPY SENSOR IS ADDED TO SR AND + FOR DIFFERENTIAL ENTHALPY.
6. FIELD INSTALLED JUMPER.

M4394

Fig. 38—T7300/Q7300C with 2-stage heat/1-stage cool heat pump system using O or B terminal for reversing valve.

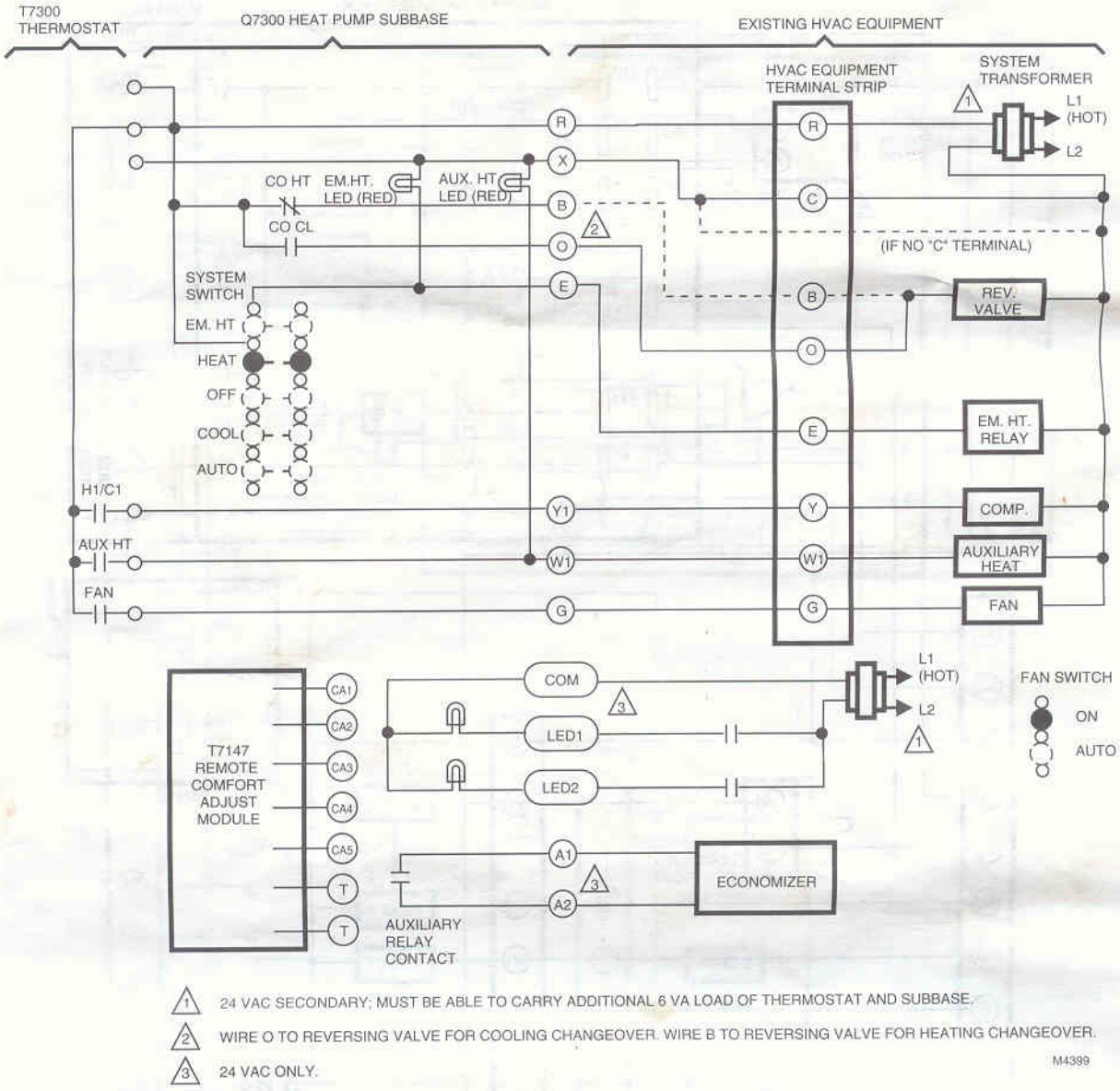


Fig. 39—T7300/Q7300D with 2-stage heat/1-stage cool heat pump system.

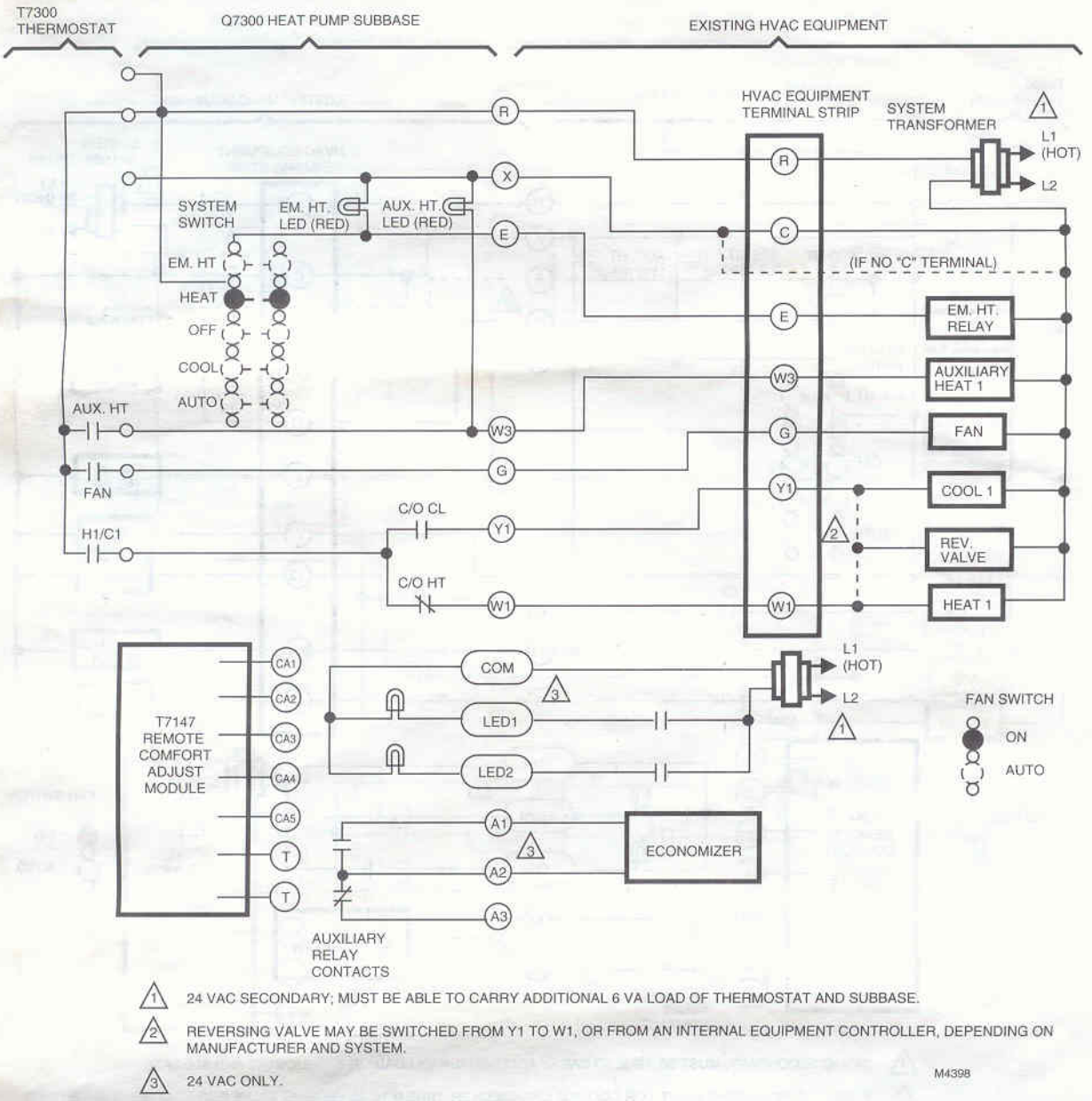
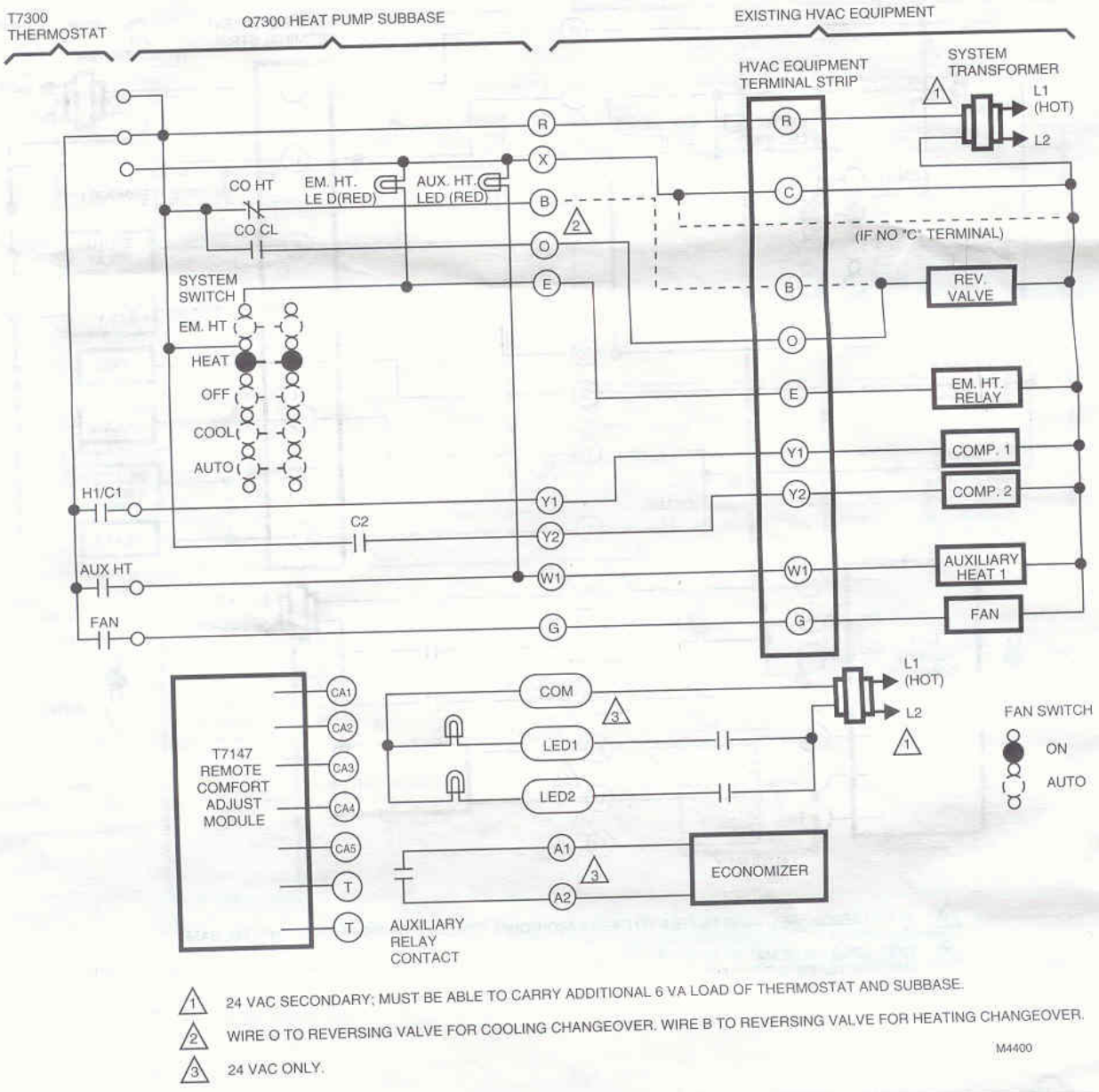


Fig. 40—T7300/Q7300C with 2-stage heat/2-stage cool heat pump system using O or B terminal for reversing valve.



1 24 VAC SECONDARY; MUST BE ABLE TO CARRY ADDITIONAL 6 VA LOAD OF THERMOSTAT AND SUBBASE.

2 WIRE O TO REVERSING VALVE FOR COOLING CHANGEOVER. WIRE B TO REVERSING VALVE FOR HEATING CHANGEOVER.

3 24 VAC ONLY.

M4400

Fig. 41—T7300/Q7300D with 3-stage heat/2-stage cool heat pump system.

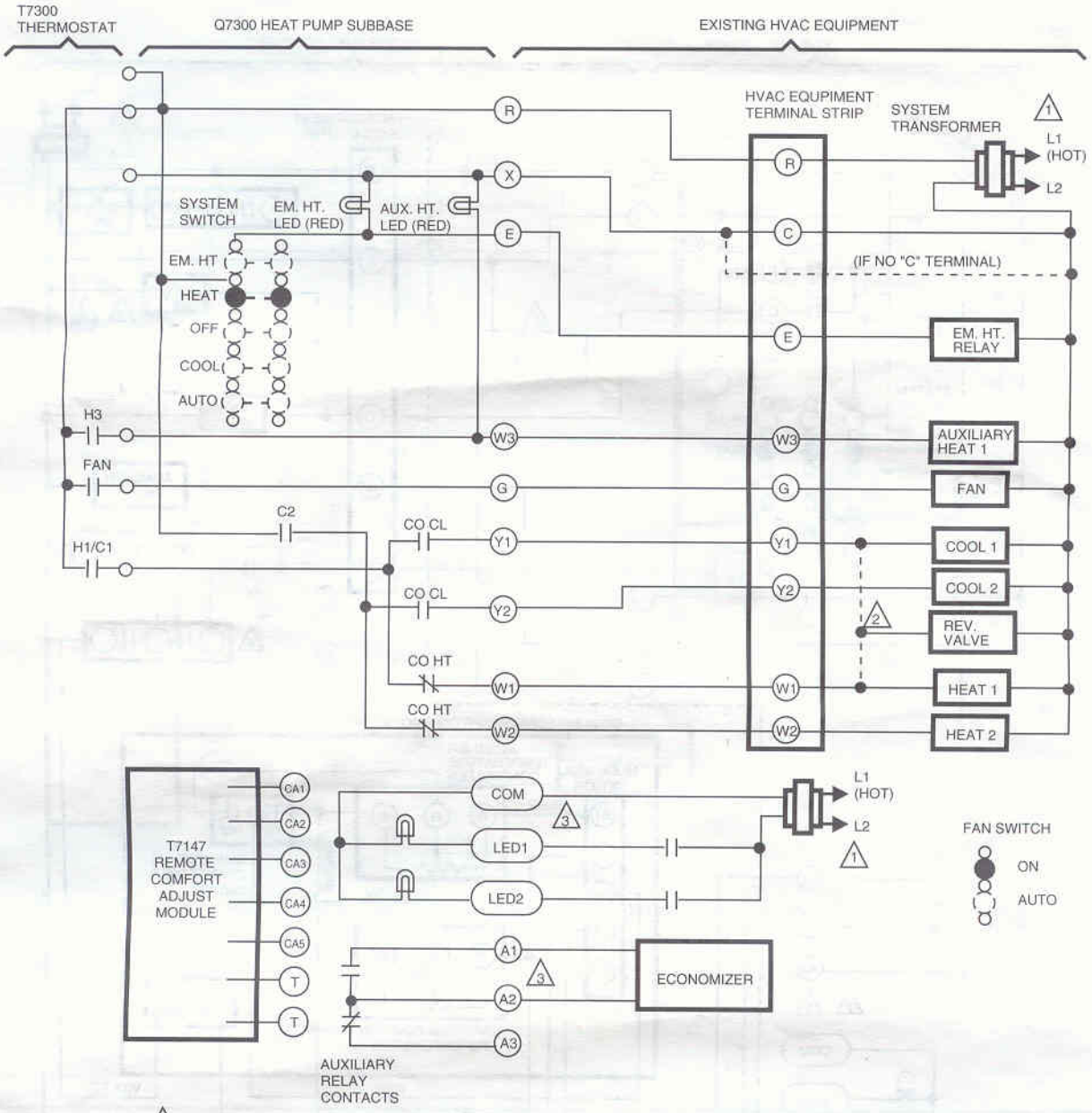


Fig. 42—T7300/Q7300C,D with economizer package in 2-stage heat/1 stage cool heat pump system defeating economizer minimum position during unoccupied period.

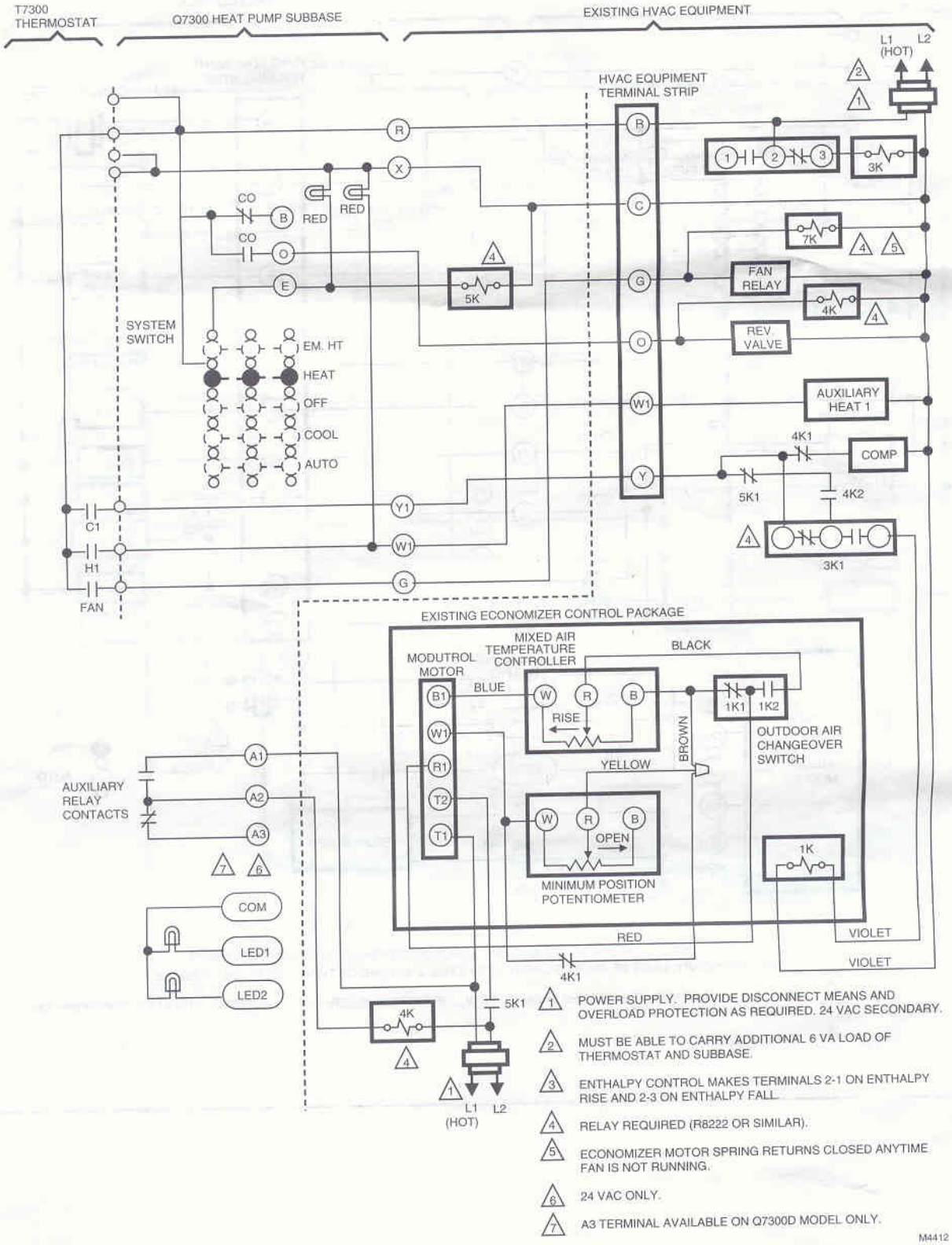
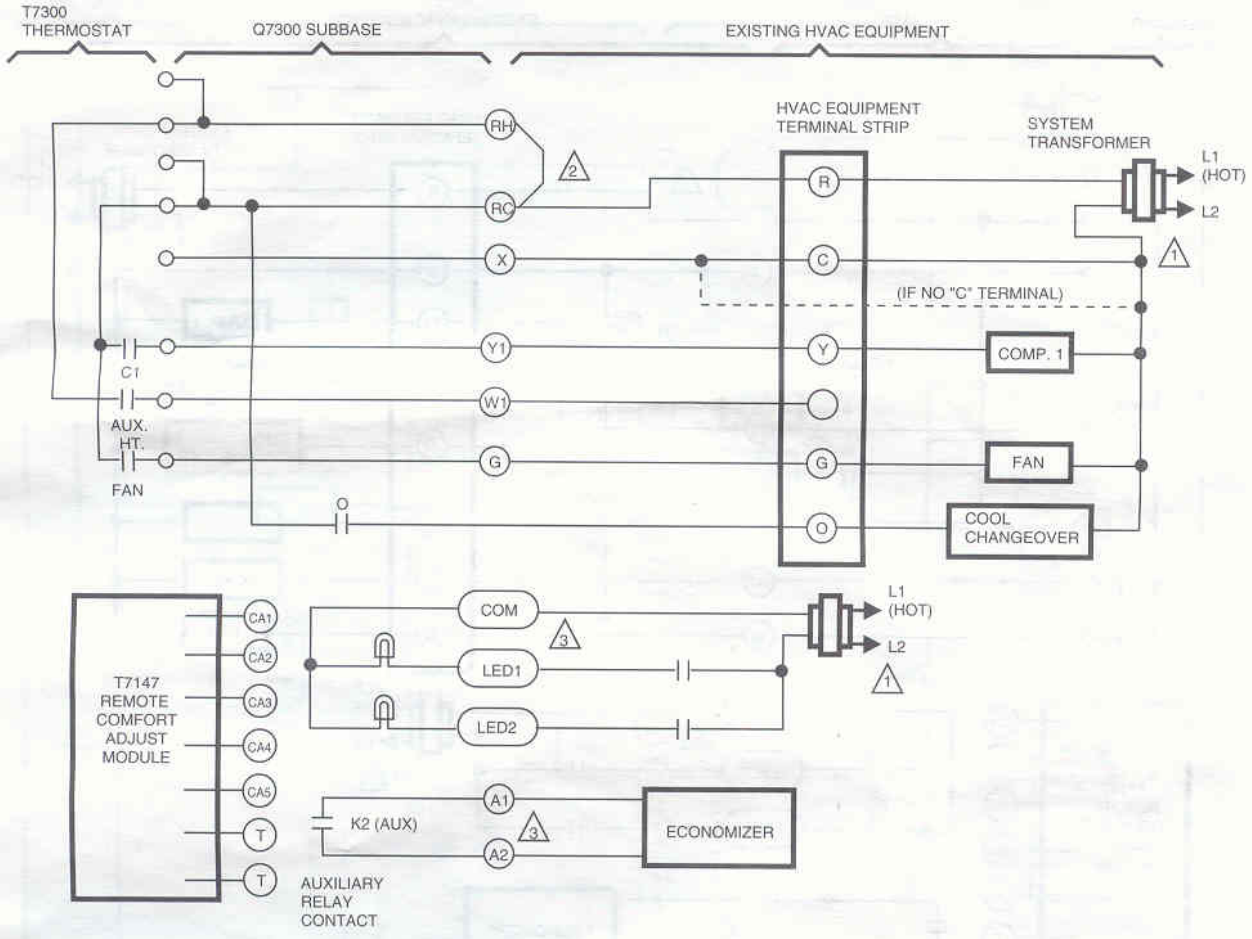


Fig. 43—T7300/Q7300F for 1-stage heat pump.



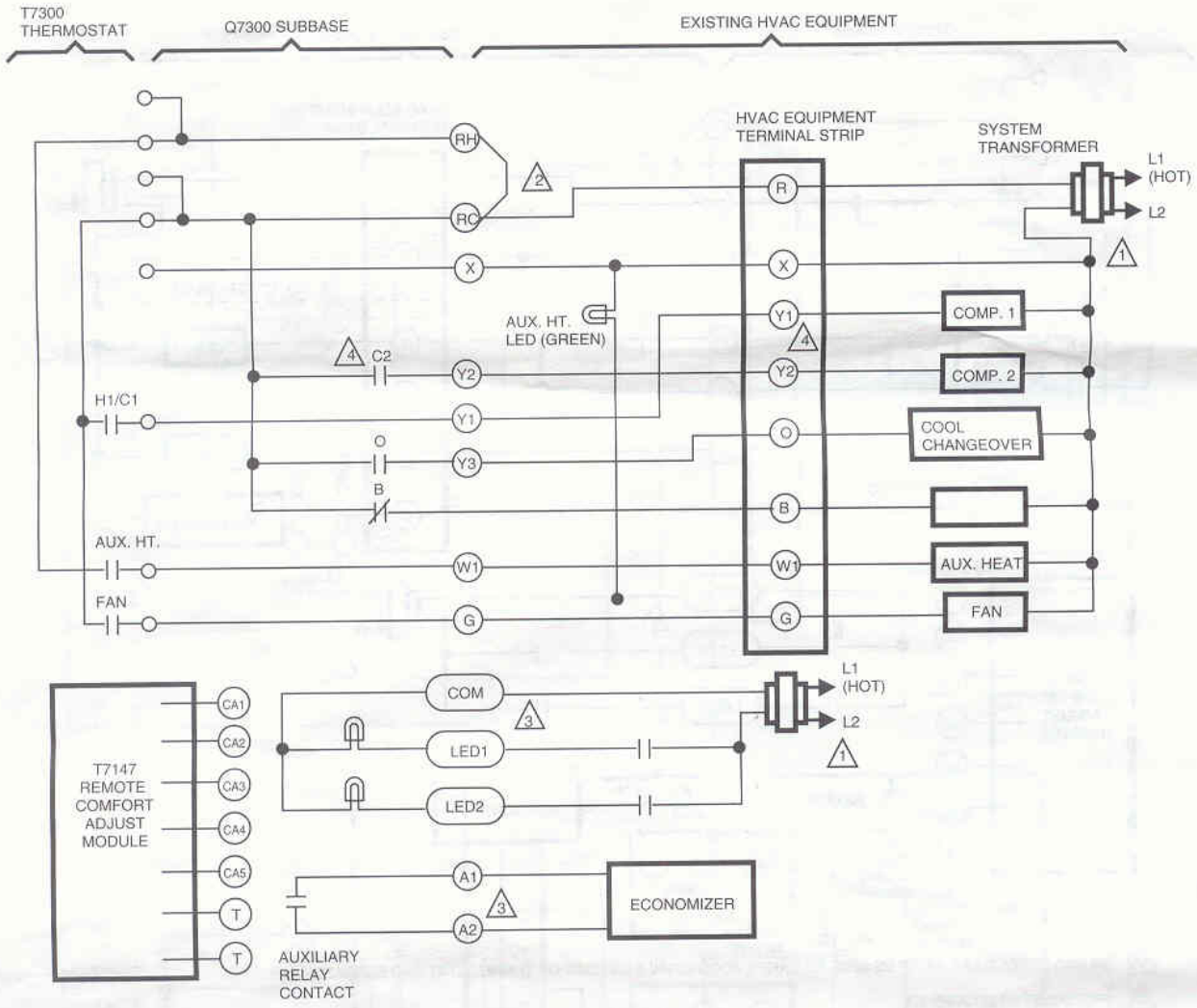
1 24 VAC SECONDARY; MUST BE ABLE TO CARRY ADDITIONAL 6 VA LOAD OF THERMOSTAT AND SUBBASE.

2 FIELD INSTALLED JUMPER.

3 24 VAC ONLY.

M4419

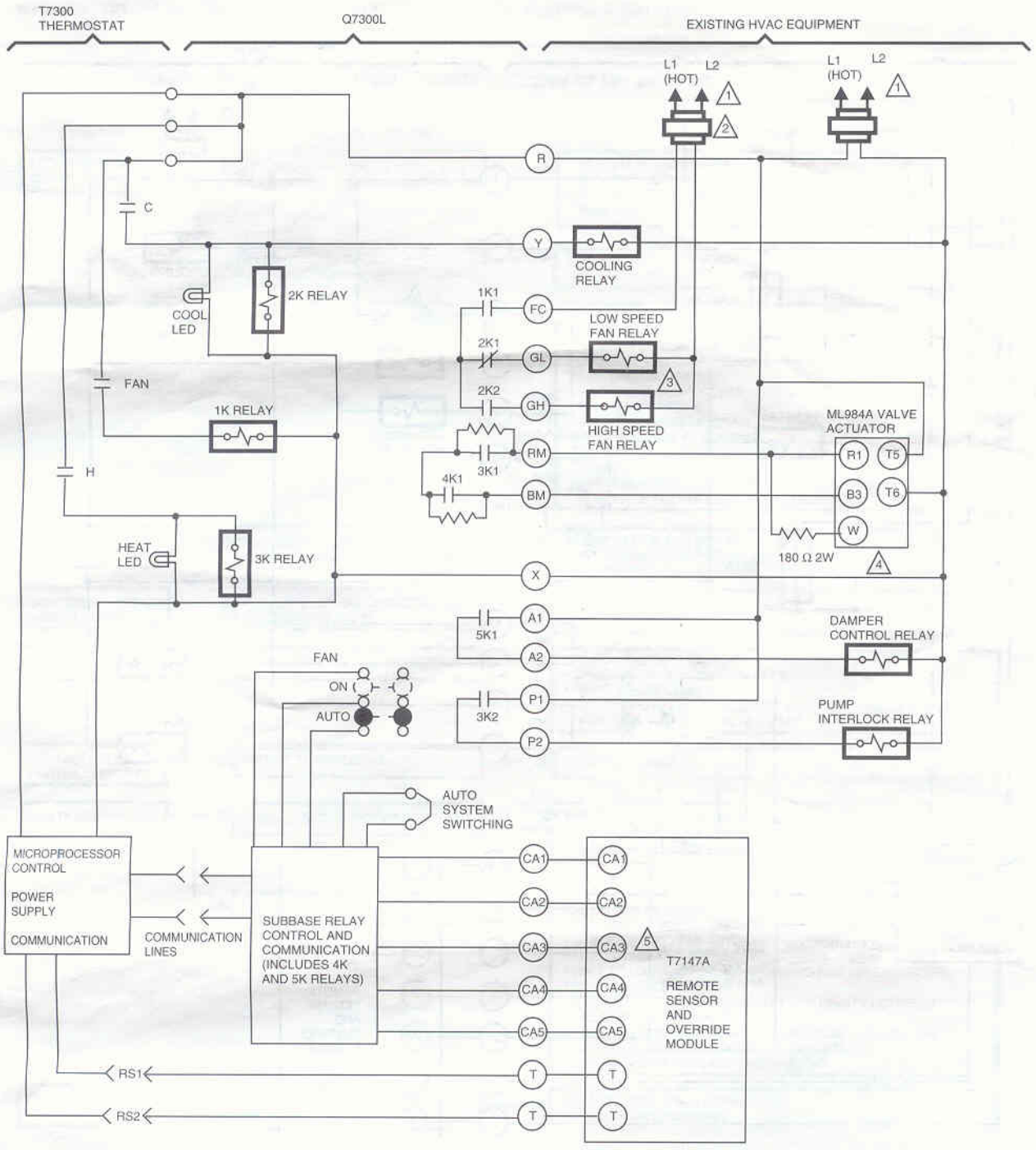
Fig. 44—T7300/Q7300F for 1-stage heat/1-stage cool and 2-stage heat/1-stage cool heat pumps.



1. 24 VAC SECONDARY; MUST BE ABLE TO CARRY ADDITIONAL 6 VA LOAD OF THERMOSTAT AND SUBBASE.
2. FIELD INSTALLED JUMPER.
3. 24 VAC ONLY.
4. AVAILABLE ON Q7300F1017 AND Q7300F1033 ONLY.

M4420

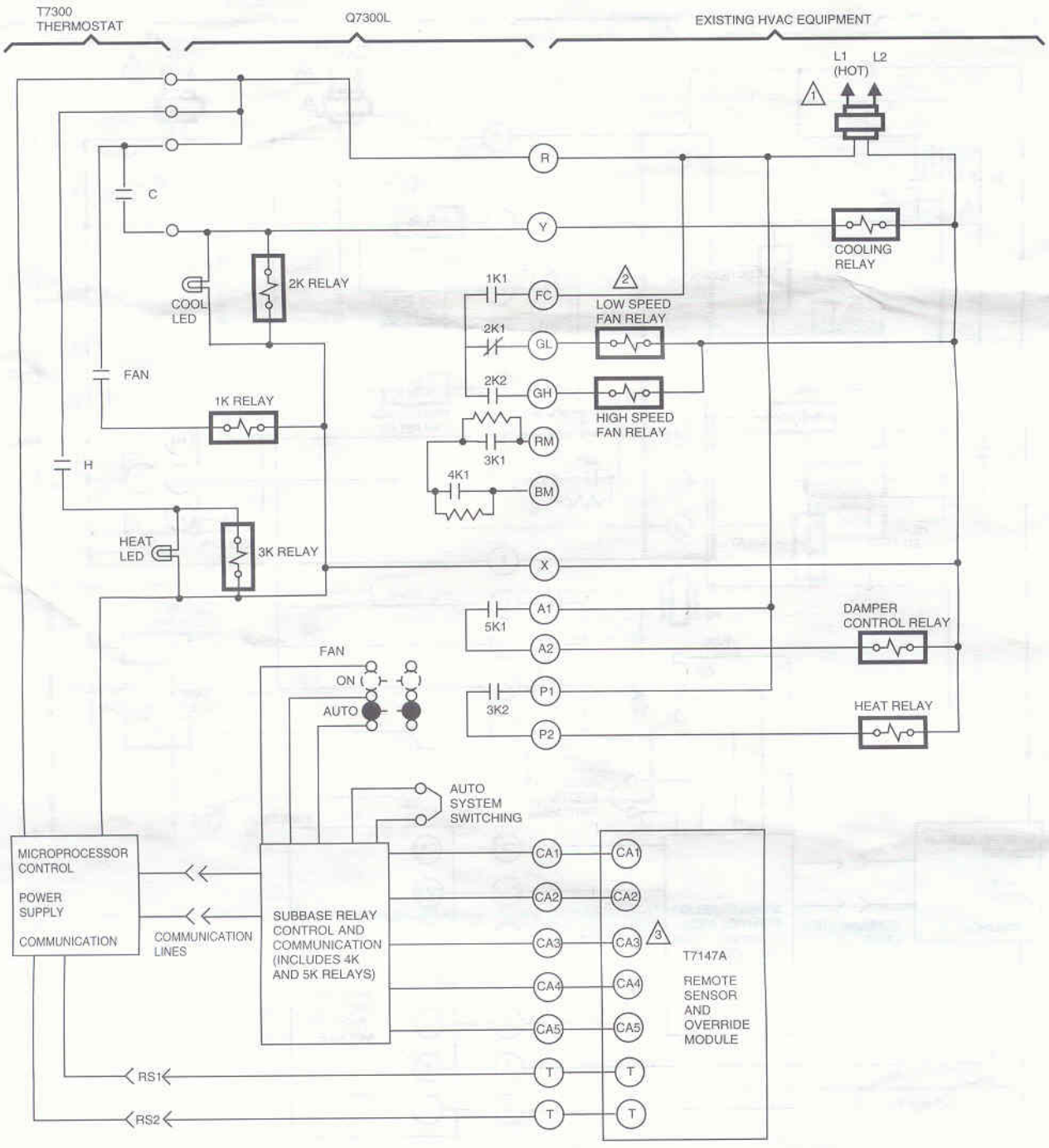
Fig. 45—Q7300L for 2-stage heating with three-position ML984A actuator/V50B valve and 1-stage cooling.



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
2. INDEPENDENT FAN TRANSFORMER OPTIONAL. IF SINGLE TRANSFORMER IS USED, JUMPER FC TO R.
3. FOR SINGLE SPEED FAN, JUMPER GL AND GH.
4. 180 Ω 2W RESISTOR MUST BE INSTALLED AS SHOWN.
5. REFER TO T7147 INSTRUCTIONS FOR APPROPRIATE CA TERMINAL CONNECTIONS. T7047 HAS T-T TERMINALS ONLY.

M4377

Fig. 46—Q7300L for single-stage conventional heating systems with single-stage cooling.



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
2. FOR SINGLE SPEED FAN JUMPER GL AND GH.
3. REFER TO T7147 INSTRUCTIONS FOR APPROPRIATE CA TERMINAL CONNECTIONS. T7407 HAS T-T TERMINALS ONLY.

M4378

Troubleshooting

Refer to Figs. 47 and 48 to troubleshoot problems with the thermostat and system.

Fig. 47—Troubleshooting chart to quickly isolate a display or fan problem.

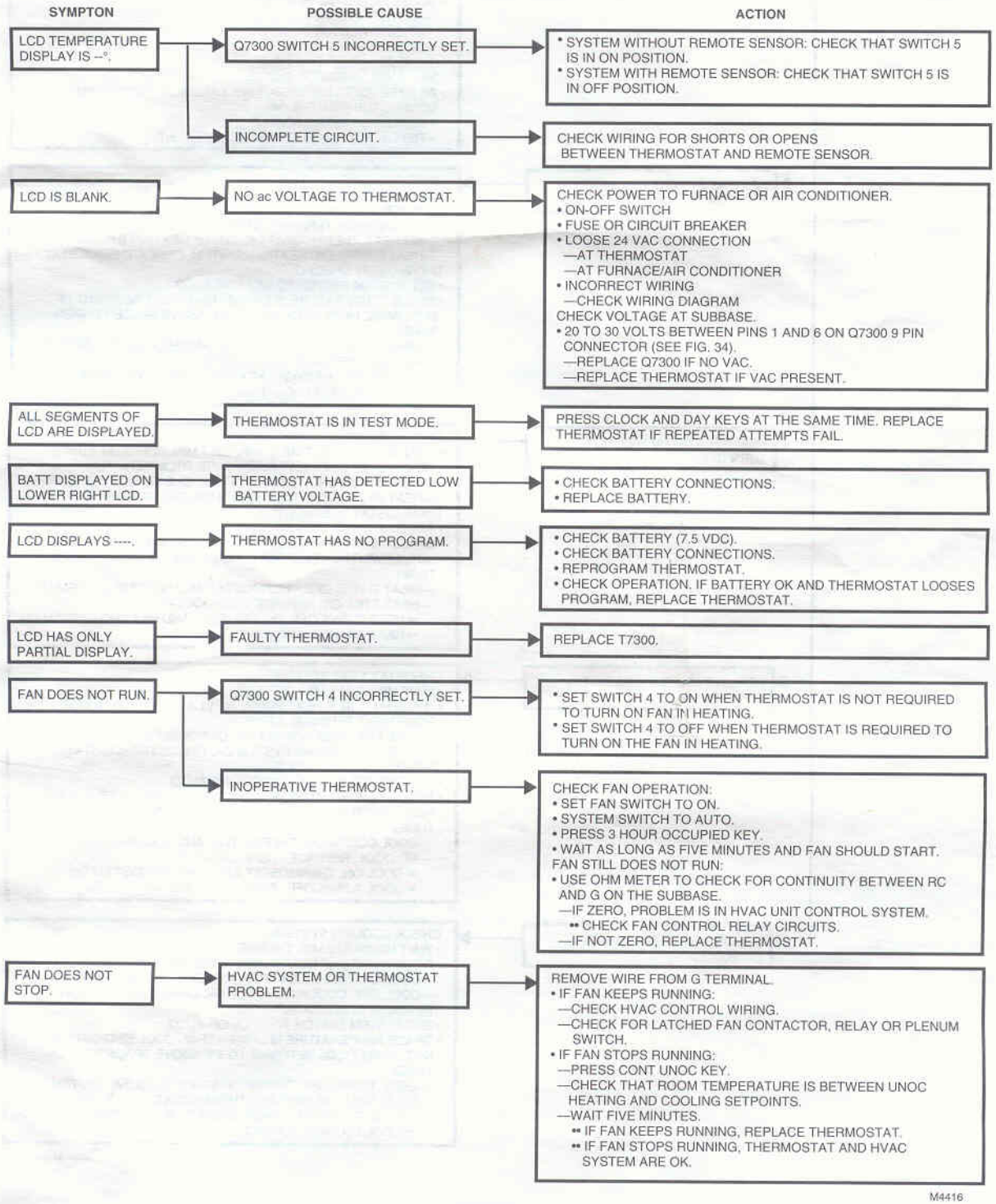
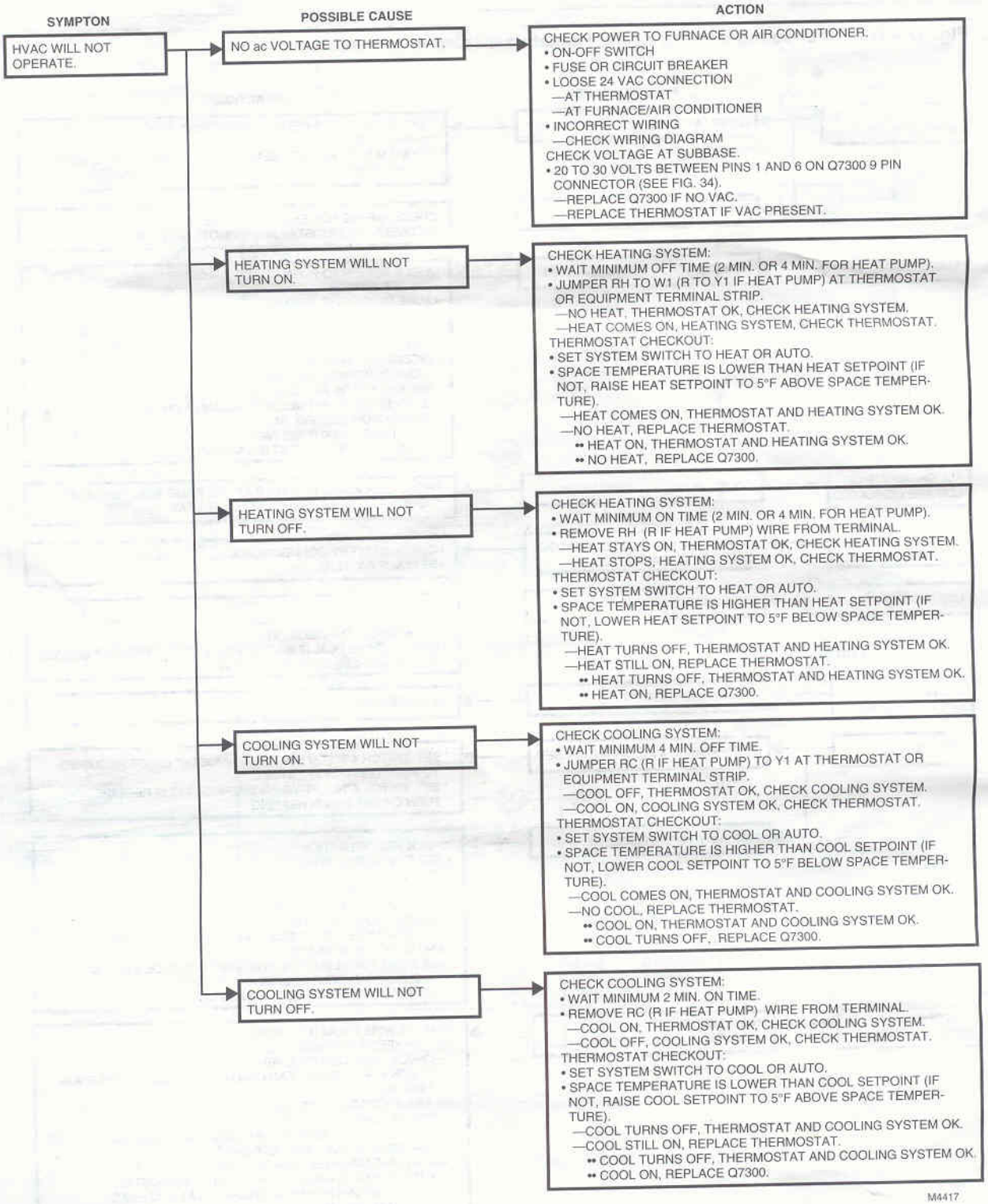


Fig. 48—Troubleshooting chart to quickly isolate a HVAC problem.



INSTRUCTION MANUAL

MODEL LX-600 CONTROLLER

For Pressure Maintenance Pumps
(jockey or make-up)

LEXINGTON SWITCH & CONTROLS

LEXINGTON CONTROLS
HUBBELL / INDUSTRIAL CONTROLS, INC.
50 Edwards Street
Madison, Ohio 44057
Phone: (216) 428-1161 Fax: (216) 428-7635

400823020

Appendix D

A. RECEIVING, HANDLING & STORAGE

1. Immediately upon receipt, the controller should be carefully unpacked and inspected for damage that might have been sustained in shipment. If damage or rough handling is in evidence, a damage claim should be filed with the transportation company.

2. If the controller must be stored, it should be covered and kept in a clean, dry location. Avoid unheated locations where condensation can result in damage to the insulation and corrosion of metal parts.

B. INSTALLATION & INSPECTION INSTRUCTIONS

1. Consult motor nameplate to determine voltage, current and horsepower rating and check the jockey pump controller nameplate for matching voltage and horsepower rating.

2. Set the controller securely in position on a substantial non-combustible base.

3. Exercise all relays, control switches, safety switches or circuit breakers to determine that all components operate freely.

4. Check all internal wiring connections and component mountings for looseness resulting from excessive vibration during shipment.

5. Check that the control power transformer connections confrom to the voltage of the power supply.

6. The three phase incoming power supply may now be connected to the top (line side) of the safety switch at terminals marked L1, L2, and L3. Motor cables are to be connected to terminals marked T1, T2, and T3 on the load side of the motor contactor.

7. Jockey Pump controllers require piping for the pressure switch. Connect the water pressure sensing line from the downstream side of the system check valve to the Mercoid pressure switch in the controller.

C. PRELIMINARY TESTS & ADJUSTMENTS

1. Check incoming power supply for correct voltage in all phases before attempting to close the safety switch.

2. Check the minimum run timer (TR) for correct setting. This should be one minute for each ten horsepower.

3. Jockey Pump controllers require that fuses be installed. (These are not supplied).

4. Adjust Mercoid pressure switch to meet water system requirements. This adjustment is not usually made at the factory. Consult descriptive bulletin supplied with the switch for adjustment procedures to provide contacts open with normal pressure and contacts closed with loss of pressure.

5. Finally, check the motor and pump for proper rotation. This may be done as follows:

   STEP 1 - Close door of control panel
   STEP 2 - Place HOA switch in the Automatic position.
   STEP 3 - Close safety switch.

   The motor should start after STEP 3 if proper system pressure has not yet been attained. If the motor does not start, the system has either full water pressure or the pressure switch is incorrectly set.

   If the motor does not automatically start, placing the HOA switch in the Hand position should energize the motor. After observing the rotation, stop the motor by opening the safety switch or by placing the HOA switch in the Off position.

   If the motor rotation is incorrect, open the safety switch and recheck all electrical connections.

6. The controller may now be placed in the stand-by automatic condition by following the three steps noted above.

LEXINGTON
SWITCH & CONTROLS

INTENANCE & SERVICING

Periodically, depending on the environment and duty, the controller should be inspected and cleaned.

Observe due safety precautions when inspecting or trouble- shooting the controller. For scheduled inspections, open the safety switch to restrict all live circuits to the L1, L2, and L3 terminals at the top of the safety switch.

Visually, inspect all devices for loose bolts and nuts. (Refer to the respective device bulletins if adjustments or replacements are indicated).

. Inspect all electrical connections for evidence of heating and check for tightness.

. If operating problems occur, review the operation description for the particular controller involved and then observe at which stage of operation the controller fails to function. The faulty component can then be identified.

. The HOA switch in the Hand position can be used to determine that the power supply, safety switch, motor contactor, and motor are serviceable.

. If the motor does not operate in the Hand position, the above items can be checked in sequence with a voltage tester to determine which is at fault. Use extreme care in testing these energized circuits.

SEQUENCE OF OPERATIONS

1. Closing the safety switch will energize the control circuit transformer (XMFER).

2. The controller is now ready for either an automatic or a manual start operation.

AUTOMATIC OPERATION

A drop in the water system pressure will activate the contact of the pressure switch (PS) to a closed position and the circuit will be completed to energize starter coil and time run relay (TR). The starter contacts close to place the motor across the line.

When normal water pressure is restored, the pressure switch contact will open to de-energize the starter. However, if the minimum run time (max. 3 minutes) has not elapsed, the time run relay contact (T1 and 2) in series with a seal-in contact (M1) will keep the starter coil and timing relay energized and the pump will run until the minimum run time has elapsed.

If an optional pilot light is present, it will be illuminated and will show the pump is running.

If for some reason it is required to stop the pump before the minimum time has elapsed and all automatic starting devices have returned to normal, placing the HOA switch in the Off position will stop the motor.

MANUAL START

By placing the HOA switch in the Hand position, the starter coil will become energized and its contacts will close to seal itself in and to complete the circuit to the main line thus starting the pump.

To stop the pump after it has been manually started, it will be necessary to place the HOA switch in the Off position.

NOTE: Controllers without a run period timer will start and stop upon the operation of the pressure switch alone.

Mounting Fuse-Clip Kits and Operating Shafts On 30-ampere, Style HCI Disconnect Switches Catalog Numbers THC31, THC31S

INTRODUCTION

Your General Electric Disconnect Switch can be ily assembled as a no-fuse or a fused device with installation of the proper accessory kit. The e clip kits available for the 30-ampere HCI dis- nect switch are listed in this instruction sheet. ese kits give your disconnects added flexibility a variety of applications.

SCRIPTION NO-FUSE KITS

If your disconnect is to be used without fuses, a -fuse kit (Cat. No. THC3100) must be installed. is kit consists of straps and mounting Sems its. You mount these straps to join line and load es of each pole unit. Then attach line shield. See g. 1.

SE-CLIP KITS

These kits include fuse clips, mounting straps d/or sub-assemblies and mounting Sems Units. ey are available for NEC fuses and General lectric type CLF fuses.

OLS

A screwdriver and wrench for socket head set rews are the only tools needed to install or change se-clip kits, no-fuse straps and operating shaft.

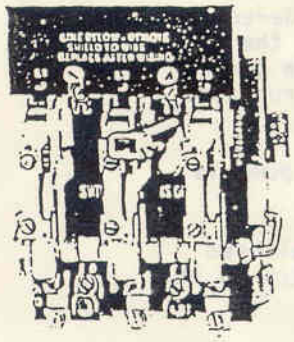


Fig. 1

CAUTION — *Be sure line conductors are de-energized before installing kit.*

INSTALLATION ON THC31 SWITCHES

Read instructions carefully before mounting fuse clips. Fuse clips must be installed per instructions.

30-AMPERE, 250-VOLT KITS

Catalog Numbers: THC3121, -31L21

Mount fuse clips with Sems Units. See Fig. 2 The open ends of the fuse clips must face center of switch. On line side, mount fuse clip in hole nearest load side. Attach line shield to plastic nubs.

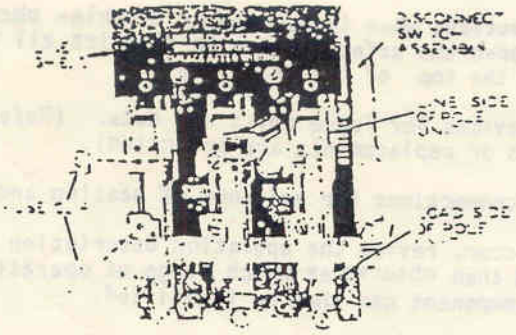


Fig. 2

60-AMPERE, 250-VOLT KITS

Catalog Numbers: THC3122, -31L22

On the line side of the disconnect switch, place small square spacers so that their nubs catch on each side of the pole units. See Fig. 3. With the open end of the fuse clip facing the load-side, fasten the clip on the spacer with ¾" Sems Units

Attach fuse-clip and connection-strap assemblies to load side of disconnect switch with ¾" Sems Units. When the slot in the connection strap is in the correct positioning notch, the screw holes will align. Mount connection strap and fuse clip on right pole line side so that fuse clip is away from operating shaft. Load side, mount "L" shaped connection strap and fuse clip, offsetting fuse clip to right of pole unit. Attach line shield to plastic nubs.

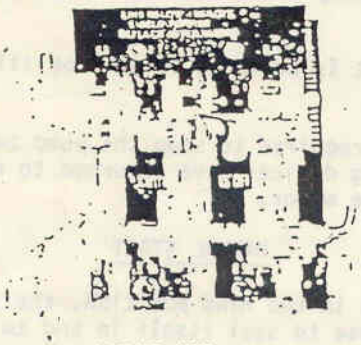


Fig. 3

100 AMPERE, 250-VOLT KIT

Catalog Number: THC3123, -31L23

Mount line-side fuse clip assembly on line-side plastic nubs, assuring that the projections on the line-shield mounting brackets slip easily into the positioning notches in the plastic nubs. Do not secure these screws yet. Align connection straps and set Sems Units in place. Secure Sems Units and

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

DISTRIBUTION EQUIPMENT DIVISION PLAINVILLE, CONN 06062

GENERAL ELECTRIC

CN J-656

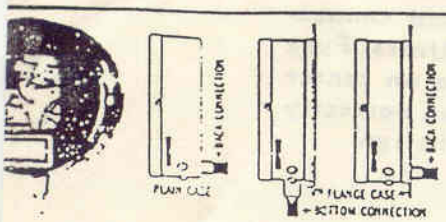
12-72

MERCOID SERIES "D" PRESSURE CONTROLS

WITH HERMETICALLY SEALED MERCURY SWITCHES & BOURDON TUBE POWER ELEMENTS

IN-U 1 E
Supersedes 0-01 E
Revised 3-4

(The following instructions apply to Mercoid Pressure Controls prefixed by the letter "D" except Series "DP" Differential Pressure Controls)



GENERAL PURPOSE Prefixed by
DA, DAF, DL, DR, DS, DRF, DSF



WATERTIGHT OR
WEATHER-RESISTANT
Prefixed by DAW, DRW, DSW,
N3-DAW, N3-DRW, N3-DSW



EXPLOSION PROOF
Prefixed by
DAH, DAHF, DLH, DRH, DSH



EXPLOSION PR[illegible]
Prefixed by
DAE, DLE, DRE, [illegible]

CONTROL NUMBERS

rt of the control number identifies the type of control case. The git 1 of 21, 31, 41, 81, 221, 231, 241, 251, 261, 281, 421, 431, 1, 521, 531, 541, 581, denotes a plain case with bottom connect-n.

he digit 2 of 22, 32, 222, 232, 242, 422, 432, 522, 532, denotes a ain case with back connection

he digit 3 of 23, 33, 43, 83, 223, 233, 243, 283, 423, 433, 443, 23, 533, 543, 583, denotes a flanged case with bottom connection.

he digit 4 of 24, 34, 54, 224, 234, 524, denotes a flanged case with ack connection.

CIRCUIT SUFFIX NUMBERS (SWITCH OPERATION)

uffix number after control number denotes whether circuit is to pen or close on increase or decrease of pressure, etc. Examples: YPE DA-21-2 suffix -2 indicates circuit is to open on pressure ncrease. Type DSW-221-3 suffix -3 indicates circuit is to close on ressure increase. FOR EXPLANATION OF CIRCUIT NUMBERS AND VARIATIONS SEE PAGE 4.

LOCATION AND MOUNTING

Select a location recommended by equipment manufacturer. Note: Vibration causes erratic operation of any instrument and shortens its life. It is important that a location be selected that is reasonably free from vibration caused by reciprocating or rotating machinery. Where excessive vibration occurs, use a remote connection and mount by means of a mounting bracket or separable flange (available on order). Where pulsations, pressure surges or water hammer are present, protect the control with a surge tank or snubber.

MOUNT ALL CONTROLS VERTICALLY AND LEVEL

GENERAL PURPOSE CONTROLS: Prefixed by letters DA, DAF, DRF, DL, DS, DSF. Install control firmly in a LEVEL POSITION. Do not mount control by twisting the case, use wrench on the square part of the ¼" bottom pipe connection. To level, sight across the two cover screws or check the lower end of the glass opening in cover to see that the control is lined up horizontally. (On controls with an operating range of 500-8,000 psi, be sure that the special sealing nut (with Teflon insert) is turned to the uppermost threaded section of the ¼" pressure connection. Apply a flat open-end wrench to the flat side of the bottom pressure connection when piping the control. After it has been properly connected, be sure to tighten the sealing nut in order to assure a leak-proof connection).

On general purpose controls provided with a flange, mount by means of the three holes in flange - see drawing No. 1000B page 4.

WATERTIGHT OR WEATHER RESISTANT TYPES: Prefixed by letters DAW, DRW, DSW, DLW, N3-DAW, N3-DRW, N3-DSW, N3-DLW: Supplied with flanged case, bottom connection only, for surface mounting. (see drawing No. 1062, page 4) Install firmly in a LEVEL POSITION. Do not mount control by twisting the case, use wrench on the square part of the ¼" bottom pipe connection. Be sure pipe connection is in a vertical position. After cover is properly attached with name plate on bottom of cover, sight across the lower end of the glass opening in cover to see that control is lined up vertically.

EXPLOSION PROOF TYPES: Prefixed by letters DAH, DAHF, DRH, DSH, DAE, DRE, DSE: (see drawings No. 1350 and 1062, page 4) Mount control level by means of mounting lugs attached to control housing. Line up horizontally by sighting across the left and right conduit hubs.

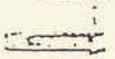
WHEN IN DOUBT AS TO EXCESSIVE VIBRATION USE A REMOTE CONNECTION.

NOTE:
SERIES D-30, D-230, D-430, D-530 (i.e., DA-31-3, etc.) when used for steam with operating ranges 35 psi or higher, must be siphoned to prevent live steam entering the Bourdon tube. On high pressure steam in excess of 100 psi, use a remote connection (see illustration page 1).
SERIES D-20, D-220, D-420, D-520 (i.e., DA-21-2, etc.) incorporate an orifice as standard in the bottom stem to dampen out surges or pulsations.

ACCESSOIRES



Remote Connection
No 49-62 (300 psi.
No 49-62HP (to 2500) psi.)



MOUNTING
BRACKET
No. 33-25



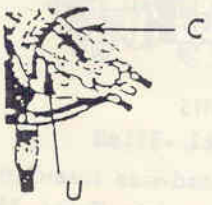
P[illegible] Siphon
No. 42-61 (300 p
No. 42-[illegible]-[illegible] (2[illegible]

WIRING

Wire in accordance with local electrical codes or equipment manufacturer's instructions.
For general purpose controls use a short piece of BX between the rigid conduit and the control so that it will not be subjected to conduit expansion and contraction. Where control is directly connected into load circuit it should be connected into hot side of line. For electrical rating see nameplate attached to control [illegible]

ADJUSTMENTS HOW TO SET OPERATING POINT

DOUBLE ADJUSTMENT TYPES-FULLY AUTOMATIC:



Prefixed by DA, DAF, DAE, DAW, DAH, DAHF - provided with double adjustments. Adjust the upper pointer "C" to set the HIGH PRESSURE POINT for switch operation. Adjust the lower pointer "U" to set the LOW PRESSURE OPERATING POINT. The difference between the HIGH and LOW pointers is the operating differential between "on-off" switch operation. Minimum differential for each respective range is shown on page 3.

SINGLE ADJUSTMENT TYPES-FULLY AUTOMATIC:

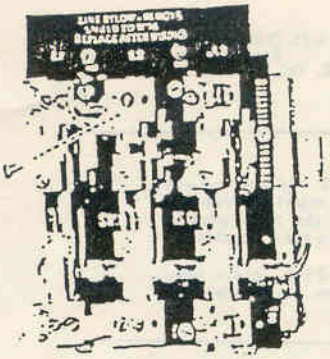


Single Adjustment

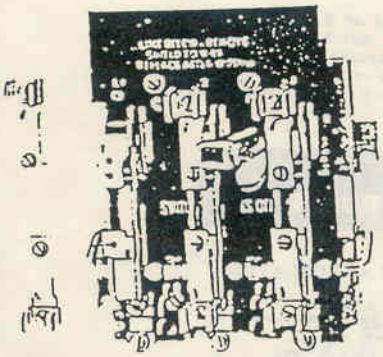
Prefixed by DS, DSE, DSF, DSH - equipped with a single adjustment. The single pointer on the scale sets the pressure where switch operation occurs. Differential is fixed (not adjustable). Example setting: Type DS-21-2 range 0-60 psi. circuit opens on pressure rise. If pointer is set at 40 psi., the control will operate to OPEN circuit at 40 psi and RE-CLOSE CIRCUIT AT THE FIXED DIFFERENTIAL OF 4 PSI.
For fixed differential of each range see page 3.

(Continued on page two)

ing screws. Loosen the screw on the center lip just enough to rotate the fuse clip into position. Caution: Do not disengage screw fastening strap. Drop long screw and lock- r in place and secure both screws. Place line- in position and secure.
int load-side assembly in similar manner.

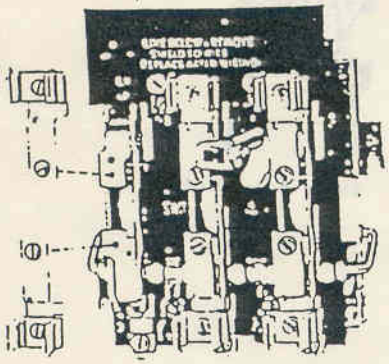


MPERE, 600-VOLT KITS
og Numbers: THC3161, -31L61
ount line and load-side fuse clips and connec- strap assemblies with short Sems Units. See 5. When straps are seated correctly in posi- ng notches, screw holes will align. Attach line d to plastic nubs.



5

AMPERE, 600-VOLT KITS
alog Numbers: THC3162, -31L62
Mount line-side and load-size fuse-clip and con- tion-strap assemblies with Sems Units. See . 6. When straps are seated correctly in position- notches, screw holes will align. Attach line eld to plastic nubs.



. 6

INSTALLATION ON THC31S SWITCHES

30-AMPERE, 600-VOLT KITS

Catalog Numbers: THC31S61 and THC31SL61

Mount line and load side fuse clip and connection strap assemblies with short Sems Units. Fuse clip assemblies with plastic barriers go on center pole. See Fig. 7. When straps are seated correctly in positioning notches, screw holes will align.

Attach line shield to plastic nubs.

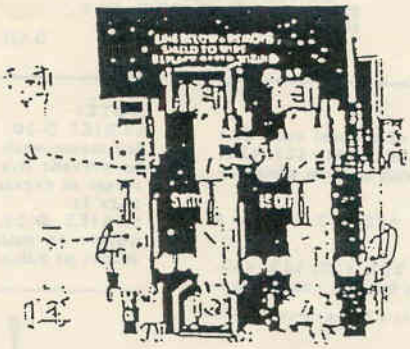


Fig. 7

INSTALLATION OF OPERATING SHAFT

Catalog Numbers: THC1, THC1L, THC1P, and THC1PL

With switch in OFF position, insert catalog numbers THC1 and THC1L in square tube as shown in Fig. 8. Insert catalog numbers THC1P and THC1PL in square tube as shown in Fig. 9.

When operating shaft is in position, tighten set screw and locknut to lock shaft in place.

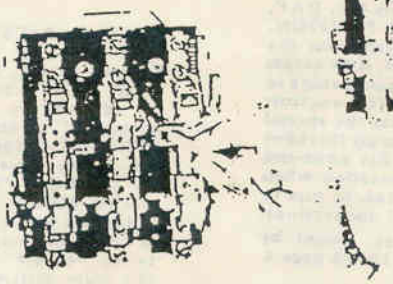


Fig. 8

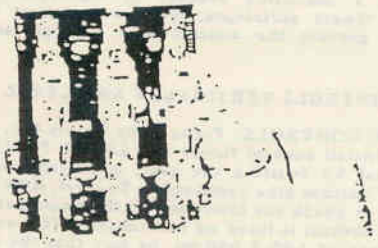


Fig. 9

RENEWAL PARTS

Order by Part Number from General Electric Company, Plainville, Conn.

For line shield replacements in kits listed for THC31 and THC31S Switches, order Part No. TP254V395P1. To order replacement fuse clips only, use the following numbers:

RATING	FUSE CLIP PART NUMBER	
	NEC	CLF
30 amp, 250 v	TC3A	TK219-1A
30 amp, 600 v	TC1692	TK219-2A
60 amp, 250 v	TC4A	TK219-3A
60 amp, 600 v	TC104A	TK219-4A

d from normally open to normally closed no additional parts Perform steps 1 ugh 4 shown under "Easy Coil oval". Lift coil and magnet from able arm. Remove return spring from er of movable arm. Remove molded er from movable arm. Depress movable tact spring and spring seat against able contact and rotate these parts ½ without removing them from window. nove the stationary contacts. Install movable arm in the device. Install the ionary contacts so that their silver s face the movable contact silver pads.

Reassemble the device To change con- ts from normally-closed to normally- en position, reverse the above procedure

IECK FOR WELDED CONTACTS OVERLOAD RELAY

his feature permits the maintenance son to check for welded contacts. With wer disconnected, disconnect the con- l wiring from the relay terminals. Place ell set or resistance measuring instru- nt across relay terminals. Depress and ease reset arm to insure relay is reset this condition there should be continui- between the terminals Depress white anual check operator to trip the relay In e tripped condition the circuit between e terminals should be open indicating e contacts are operating normally Re- re the terminals and reset the relay for rmal operation.

The exclusive manual contact-operation check gives positive assurance that contacts have not welded due to short circuits in the control wiring.

SIMPLE MAINTENANCE

300-Line starters and contactors require virtually no corrective maintenance. Preventive maintenance will assure many years of dependable on-line service

1. Always remove power from device before performing any maintenance.
2. Keep magnet mating surfaces free of accumulated dirt or dust.
3. DO NOT OIL OR GREASE the magnet mating surfaces
4. Contacts are carefully designed for maximum life They need only be replaced when nearly all the silver tip is gone and the contact tip support is exposed DO NOT FILE the contacts Filing or otherwise dressing the contacts only results in lost tip material and reduces contactor or starter life
5. The ultimate tripping current of the installed relay heater can be adjusted ±10% by using adjustment dial shown in Fig 1

Coil Data (Order Cat No 55-153472G [illegible] number per table below)

Frequency	115V	200 208	230V	460V	575	600
60 Hertz	002	023	003	004	005	006

Frequency	110V	220	380V	440	550	500
50 Hertz	007	008	054	009	010	[illegible]

Use 022 for 220V 60 Hertz/110V 50 Hertz coil

Accessory Kits

Pushbutton	CR30[illegible]
Selector switch, H-O-A	CR30[illegible]
Selector switch, OFF-ON	CR30[illegible]
Indicating light	CR30[illegible]
Fifth pole	CR30[illegible]
Control circuit fuse	CR30[illegible]
	CR305X141A [illegible]

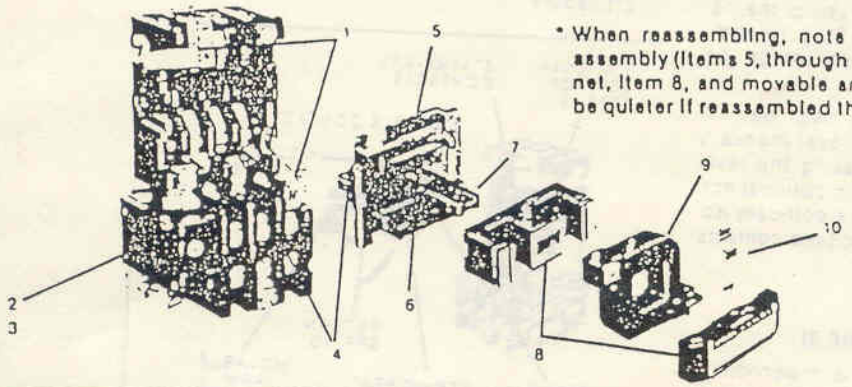


FIGURE 3

* When reassembling, note that the magnet and movable arm assembly (Items 5, through 10) will fit ONLY ONE WAY. The magnet, Item 8, and movable arm, Item 7, will fit either way but will be quieter if reassembled the same way they were taken apart.

PRINCIPAL RENEWAL PARTS

Ref No	Description	Catalog Number	Quantity Required CR305	Quantity Required CR30[illegible]
1	Coil retainer assembly	546A301G050	2	2
2	Overload relay (3 heater, non-compensated form, 1 NC contact)	CR324C310F	-	-
3	Overload relay (3 heater, non-compensated form, 1 NO - 1 NC contacts)	CR324C360F	-	-
4	Set of stationary and movable contacts with springs and screws for 4 poles	55-152313G208	1	1
5	Molded cover for stationary and movable contacts	[illegible]P001	1	1
6	Return spring for movable contact support	54[illegible]278	1	1
7	Molded movable contact support 2, 3, 4 pole	[illegible]350P001	1	1
8	Armature and frame (magnet)	546A301G054	1	1
9	Operating coil	55-153472G***	1	1
10	Spring retainer for armature	546A588P001	1	1

*** Add numbers for particular coil rating required See COIL TABLE above

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation operation or maintenance Should further information be desired or should particular problems arise which are not covered sufficiently for the Purchaser's purposes, the matter should be referred to the nearest GE Sales Office

GENERAL ELECTRIC COMPANY
GENERAL PURPOSE CONTROL DEPARTMENT
BLOOMINGTON, ILLINOIS 61701

GENERAL ELECTRIC

GEH-4782 8/83 (1500)

300-Line

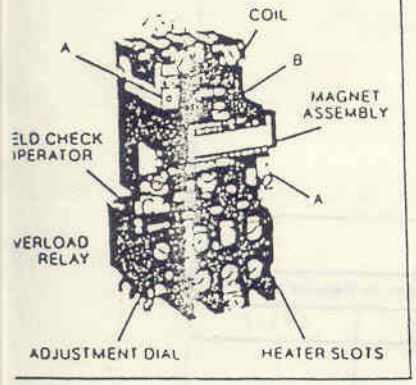
CR305/CR306 Magnetic Contactors and Starters

ION: Before installing in a nuclear ation, determine that the product is led for such use

dING: Disconnect power before in- ig or servicing

CRIPTION

eneral Electric 300 Line full voltage ietic motor starters include a magnetic actor and a three leg block overload providing motor protection against ng and stalled motor overloads. The oad relay is provided with a yellow ndicator which is located to the right e reset arm, and is visible when the load relay is tripped. (Series A forms not have this trip indicator feature.) nsure against welded overload relay acts in the tripped condition, perform "Check For Welded Contacts" as cribed on the reverse side. Separate or branch circuit overcurrent protec- against electrical faults should be plied in accordance with the National trical Code.



IGURE 1. Typical 300-Line magnetic starter

ATINGS

as. ont- ge	Contactor Max. Current Rating	AC Volts	Max. Hp for AC Motors	
			Single-phase	Poly-phase
500	20 amp (open) 18 amp (enclosed)	115	1	—
		200	—	3
		230	2	3
		460-575	—	5

EASE OF INSTALLATION

Three-point mounting, straight-through wiring saves time, makes installation easy. Before connecting starter to power supply:

1. Remove all packing.
2. Clean magnet mating surfaces of anti-rust coating or foreign matter.
3. Install overload relay heaters. To prevent overloading the starter, do not select heaters for a motor of a larger rating than given on the starter name plate. Select heaters only in accordance with heater table which accompanies each starter unit.
4. Operate movable magnet and operating arm by pressing on the armature to assure free movement.
6. Quick and convenient electrical connections can be made using the 7/8 knockouts provided in NEMA 1 enclosures and by taking advantage of straight-through wiring.
7. The three-leg block overload relay, included on the starter, is reset manually by depressing and releasing the reset arm. Overload relays with optional normally-open contacts are electrically isolated from the normally-closed contacts.

EASY COIL REMOVAL
(* ALSO REFER TO FIGURE 3)

The encapsulated coil is impervious to moisture, contaminants and oil. It resists mechanical damage and pressures due to high humidity. No tools are required to remove coil.

1. Remove power from device.
2. Press against coil while pulling up slightly on coil retainers (A–Figure 1) and move retainers away from coil.
3. Withdraw magnet assembly, coil, molded cover and movable arm from device.
4. Withdraw spring clip (B–Figure 1) and remove armature from movable arm.
5. Remove coil from magnet.
6. Reassemble device by reversing procedure.

QUICK CONTACT REMOVAL

Movable contacts can be inspected and replaced in seconds—without tools.

1. Remove power from device.
2. Perform steps 1 through 5 under "Easy Coil Removal".
3. Remove magnet from molded cover and movable arm.
4. Remove return spring from center of movable arm.
5. Remove molded cover from movable arm.
6. Depress and slide movable contact spring and spring seat from movable arm.
7. Remove screws holding stationary contacts in place and remove stationary contacts.
8. Reassemble device by reversing procedure.

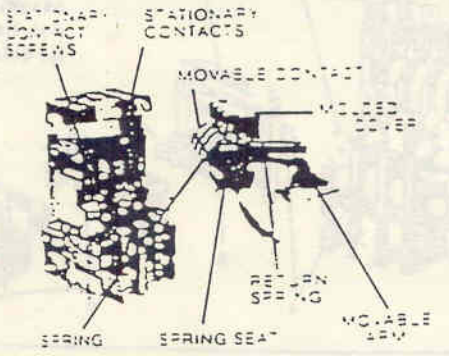


FIGURE 2

NOTE: For starters with one or more normally closed contacts, perform steps 1 and 2 shown under "Easy Coil Removal". Withdraw spring clip (B–Figure 1) and remove armature, coil and magnet from device. Remove return spring from center of movable arm. Remove molded cover and stationary contacts before lifting movable arm from device.

NORMALLY CLOSED CONTACTS

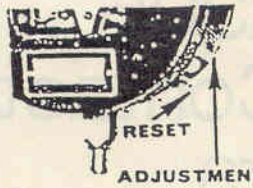
The contact on this device may be con-

GENERAL ELECTRIC

ADJUSTMENTS (CONTINUED)

MATIC CONTROL WITH MANUAL RESET

DR, DRF, DRH, DRE, ffix -L or -U. Example: single adjustment sets g point for automatic push button reset must manually to restore the e original position after eration. Example: Type circuit will open auto- a pressure rise to the cated by the pointer on o matter how much the pressure drops, the circuit will ntil the reset button is operated.

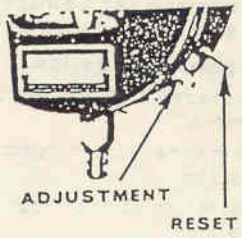


notes control will operate automatically on an increase.
notes control will operate automatically on a decrease.

OCK TYPE RESET CONTROL

tomatically on a decrease with provision for manual pressure is below set

DL, DLW, DLE, DLH: ustment sets the low pres- ing point of control at n scale range. l will operate automatic- set point only on a drop . The lock type feature t circuit to be reset and position when pressures ontrol setting.



remains in effect until the pressure has risen to a value control setting. Lock then releases and the circuit is held t position due to the pressure rise. It will remain in the on until it is called on to again operate automatically on drop to the selected setting.

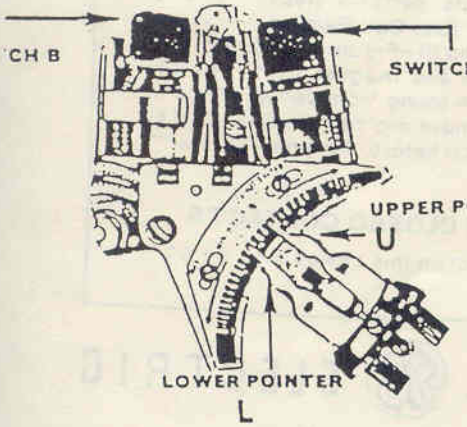
TWO-STAGE PRESSURE CONTROLS
SERIES D-400

DAW, DAH, DAE - with suffixes 421, 423, 431, 433, ed by specification numbers 4122, 4123, 4129, 4132.

incorporates two single pole, single throw, magnetic itches, actuated by the same Bourdon tube. The operat- if each switch is adjustable thru an outside adjustment.

e in pressure which opens and closes each switch at its setting is the fixed differential of the switch. The pressure l by the difference between the two adjustment pointers sure "spread" between operation of the two switches ation).

nter "U" indicates the operating point of the HIGH pres- t. Lower pointer "L" indicates the operating point of the sure circuit. See switch operating specification chart on



TWO STAGE OPERATION (CONTINUED)

EXAMPLE SETTING: - Type DA-421, Specification No. 4122, range 0-60 psi. With lower pointer "L" set at 25 psi. and upper pointer "U" at 50 psi., both circuits will be closed when the pressure is 25 psi and lower. When pressure rises to 26 psi, mercury switch "A" will open its circuit. When pressure rises to 50 psi, mercury switch "B" will open its circuit; both switches remain open above this setting. The fixed differential (sensitivity) of each switch for this particular range is 1 psi and upon a drop in pressure, mercury switch "B" will close its circuit at 49 psi and mercury switch "A" will close its circuit at 25 psi.

TWO-STAGE PRESSURE CONTROLS
SERIES D-400
RANGES AND DIFFERENTIALS

Range No.	Adj. Working Range	Bourdon Tube Material	Minimum Pressure Spread Between Switch Operation	Fixed Differential Each Switch (Sensitivity)
For Steam and Other Applications: DA-431, DAW-433, DAH-431				
1	1/8-15 psig	Brass	2½ psig	1 psig
2	0-30 psig	Brass	4" Hg.	1" Hg. Vac.
3	10" Vac 12 psig	Brass	2½ psig	½ psig
3A	1/8-20 psig	Brass	2½ psig	½ psig
4	1-35 psig	Brass	3½ psig	1 psig
5	2-60 psig	Brass	5 psig	1½ psig
6	5-100 psig	Brass	7 psig	1 psig
7	5-150 psig	Brass	10 5/8 psig	1 7/8 psig
8	5-200 psig	Brass	15 psig	1½ psig
9	10-300 psig	Brass	25 psig	2 psig
27	25" Vac 50 psig	Brass	7 psig	1 psig
For General Pressure Applications: DA-421, DAW-423, DAH-421				
5S	2-50 psig	Steel	5 psig	1½ psig
6S	5-100 psig	Steel	8 psig	2 psig
8S	10-200 psig	Steel	10 psig	2 psig
9S	10-300 psig	Steel	20 psig	4 psig
9AS	40-350 psig	Steel	20 psig	4 psig
10S	25-600 psig	Steel	40 psig	7 psig
11S	50-1000 psig	Steel	100 psig	10 psig
12S	100-1500 psig	Steel	150 psig	12 psig
13S	300-2500 psig	Steel	250 psig	20 psig
15S	500-5000 psig	Steel	600 psig	150 psig
25S	0-30" Vac 60 psig	Steel	5 psig	1 psig
26S	30" Vac 75 psig	Steel	10 psig	2 psig
316 S. S. Bourdon Tubes: DA-441, DAW-443, DAH-441				
26E	30" Hg. Vac 75	316 S.S.	12 psig	2 psig
23E	5-75 psig	316 S.S.	12 psig	2 psig
6E	10-100 psig	316 S.S.	12 psig	2 psig
24E	10-150 psig	316 S.S.	13 psig	3 psig
9E	10-300 psig	316 S.S.	35 psig	6 psig
21E	30-400 psig	316 S.S.	40 psig	8 psig
22E	75-800 psig	316 S.S.	85 psig	15 psig
11E	100-1000 psig	316 S.S.	125 psig	22 psig
13E	200-2500 psig	316 S.S.	275 psig	75 psig

ELECTRICAL RATINGS D-400

AC 120V 0.3A, 240V, 0.15A; (24V 0.9A) DC 120V 0.15A, 240V 0.07A For higher electrical capacities use compatible relay. (Not available for 440V service.)

SWITCH OPERATING SPECIFICATIONS

In ordering, select operation desired, add suffix number of specification to the type number of control. EXAMPLE Type DA-431-4122.

SPECIFICATION NO. 4122. One circuit opens on increase of pressure—second circuit opens on further increase of pressure

SPECIFICATION NO. 4129. One circuit closes on increase of pressure—second circuit closes on further increase of pressure.

SPECIFICATION NO. 4132. Both circuits open at intermediate pressure. One circuit closes on increase of pressure above neutral zone—second circuit closes on decrease in pressure below neutral zone.

Specification No.	Switch Mk.	CONTACT POSITION: Low Pressure Hi-Vac.	Intermediate Pressure	High Pressure Lo Vac.
—4122	"A"	ON	OFF	OFF
	"B"	ON	ON	OFF
—4129	"A"	OFF	ON	ON
	"B"	OFF	OFF	ON
—4132	"A"	ON	OFF	OFF
	"B"	OFF	OFF	ON
—4123	"A"	OFF	ON	ON
	"B"	ON	ON	OFF

SPECIFICATION NO. 4123. Both circuits close at intermediate pressure. One circuit opens on increase of pressure above neutral zone—second circuit opens on decrease in pressure below neutral zone.

300-Line

CR305/CR306 Magnetic Contactors and Starters

CAUTION: Before installing in a nuclear application, determine that the product is intended for such use.

WARNING: Disconnect power before installing or servicing.

DESCRIPTION

General Electric 300-Line full voltage magnetic motor starters include a magnetic contactor and a three-leg block overload relay, providing motor protection against running and stalled motor overloads. The overload relay is provided with a yellow trip indicator which is located to the right of the reset arm, and is visible when the overload relay is tripped. (Series A forms will not have this trip indicator feature.) To insure against welded overload relay contacts in the tripped condition, perform the "Check For Welded Contacts" as described on the reverse side. Separate motor branch circuit overcurrent protection against electrical faults should be supplied in accordance with the National Electrical Code.

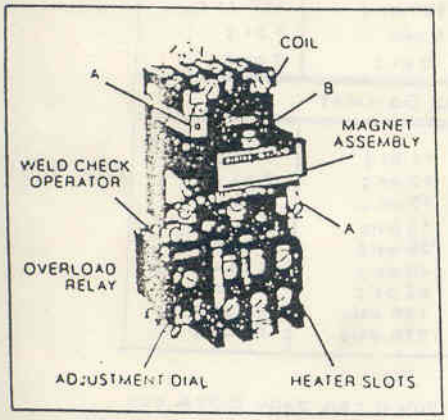


FIGURE 1. Typical 300-Line magnetic starter

RATINGS

Max. Voltage	Contactor Max. Current Rating	AC Volts	Max. Hp for AC Motors	
			Single-phase	Poly-phase
600	10 amp (open)	115	½	—
		200	—	1½
	9 amp (enclosed)	230	1	1½
		460-575	—	2

EASE OF INSTALLATION

Three-point mounting, straight-through wiring saves time, makes installation easy. Before connecting starter to power supply:

1. Remove all packing.
2. Clean magnet mating surfaces of rust, dirt or foreign matter.
3. Install overload relay heaters suited to prevent overloading the starter do not select heaters for a motor of a larger rating than given on the starter name plate. Select heaters in accordance with heater table, which accompanies each starter unit.
4. Operate movable magnet and operating arm by pressing on the nameplate to assure free movement.
6. Quick and convenient electrical connections can be made using the 12 knockouts provided in NEMA 1 enclosures and by taking advantage of straight through wiring.
7. The three-leg block overload relay included on the starter, is reset manually by depressing and releasing the reset arm. Overload relays with optional normally-open contacts are electrically isolated from the normally-closed contacts.

EASY COIL REMOVAL
(* ALSO REFER TO FIGURE 3)

The encapsulated coil is impervious to moisture, contaminants and oil. It resists mechanical damage and failures due to high humidity. No tools are required to remove coil.

1. Remove power from device.
2. Press against coil while curling up slightly on coil retainers (A – Figure 1) and move retainers away from coil.
3. Withdraw magnet assembly, coil, molded cover and movable arm from device.
4. Withdraw spring clip (B – Figure 1) and remove armature from movable arm.
5. Remove coil from magnet.
6. Reassemble device by reversing procedure.

QUICK CONTACT REMOVAL

Movable contacts can be inspected and replaced in seconds – without tools:

1. Remove power from device.
2. Perform steps 1 through 5 under "Easy Coil Removal".
3. Remove magnet from molded cover and movable arm.
4. Remove return spring from center of movable arm.
5. Remove movable contact arm.
6. Depress and slide movable contact spring and spring seat from movable arm.
7. Remove screws holding stationary contacts in place and remove stationary contacts.
8. Reassemble device by reversing procedure.

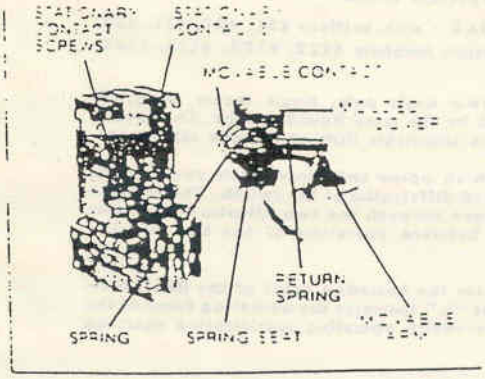


FIGURE 2

NOTE. For starters with one or more normally closed contacts, perform steps 1 and 2 shown under "Easy Coil Removal". Unscrew spring clip (B – Figure 1) and remove armature, coil and magnet from device. Remove return spring from center of movable arm. Remove molded cover and stationary contacts before lifting movable arm from device.

NORMALLY CLOSED CONTACTS

The contact on this device may be [illegible]

GENERAL ELECTRIC

MODEL LX-600
JOCKEY PUMP CONTROL
REPLACEMENT PARTS LIST

ESCRIPTION	VOLTAGE	HORESPOWER	PART NUMBER
verload Heater (Sets Only)	200/208	1/3	402117320
		1/2	402117520
		3/4	402117720
		1	402117920
		1-1/2	402118220
		2	402118420
		3	402118620
		5	402119020
		7-1/2	402119320
		10	402119420
)verload Heater (Sets Only)	220/240	1/3	402117220
		1/2	402117520
		3/4	402117720
		1	402117920
		1-1/2	402118120
		2	402118320
		3	402118520
		5	402118920
[illegible]	[illegible]	[illegible]	[illegible]
		1/2	402117120
		3/4	402117220
		1	402117420
		1-1/2	402117620
		2	402117820

JOCKEY PUMP CONTROL

REPLACEMENT PARTS LIST

DESCRIPTION	VOLTAGE	HORSEPOWER	PART NUMBER
Disconnect Switch	208/230	1/3 thru 7-1/2	402044820
	208/230	10 and 15	402044920
Fuse Clips (Sets Only)	208/230	1/3 thru 5	402012920
	208/230	7-1/2	402013120
	208/230	10 and 15	402018420
Disconnect Switch	440/480	1/3 thru 15	402044820
	440/480	20 and 25	402044920
Fuse Clips (Sets Only)	440/480	1/3 thru 15	402013020
	440/480	20 and 25	402018620
Starter	208/230	1/3 thru 1-1/2	402116620
	208/230	2 and 3	402116720
	208/230	5 and 7-1/2	402116820
	208/230	10 and 15	402116920
Starter	440/480	1/3 thru 2	402116620
	440/480	3 and 5	402116720
	440/480	7-1/2 and 10	402116820
	440/480	15 thru 25	402116920
Control Power Transformer (50 VA)	208/230/460	1/3 thru 25	402093320
Control Power Transformer (100 VA) (Used with Size 2 Contractor)	208/230/460	1/3 thru 25	402121920
Selector Switch H.O.A.			402014420
Pressure Switch 10-300 PSI			402108020
Run Period Timer 0-10 Minutes			402093120
Pump Running Light			402093620
Lamp NE51H			402098420

LEXINGTON SWITCH & CONTROLS

the relay for normal operation.

INTENANCE

O-Line starters and contactors require ally no corrective maintenance. Pre- ive maintenance will assure many s of dependable on-line service.

.lways remove power from device efore performing any maintenance.

:eep magnet mating surfaces free of ccumulated dirt or dust.

)O NOT OIL OR GREASE the magnet nating surfaces.

Contacts are carefully designed for naximum life. They need only be re-)laced when nearly all the silver tip is)one and the contact tip support is ex-)osed. DO NOT FILE the contacts. Fil- ng or otherwise dressing the contacts only results in lost tip material and reduces contactor or starter life.

installed relay heater can be adjusted in Figure 1.

COILS

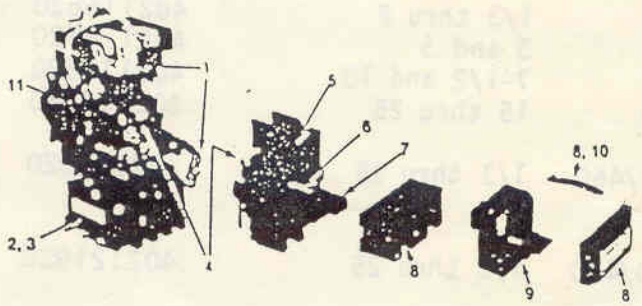
For two- and three-pole devices, order coil Cat. No. 15D22G plus number in table.
For four- and five-pole devices, order coil Cat. No. 15D23G plus number in table.

Frequency	115V	200/ 208V	230V	460V	575V	600V
60 Hz	002	023	003	004	005	006
Frequency	**110V**	**220V**	**380V**	**440V**	**550V**	**600V**
50 Hz	007	008	004	009	010	011

Use 022 for 120V, 60 Hz/110V, 50 Hz coil.

Accessory Kits

1 st NO auxiliary contact for CR305, CR306 (right side mounting)	CR305X200A
1 st NC auxiliary contact for CR305, CR306 (right side mounting)	CR305X200B
1 st NO–NC auxiliary contact for CR305, CR306 (right side mounting)	CR305X200C
Additional NO auxiliary contact for all forms	CR305X100D
Additional NC auxiliary contact for all forms	CR305X100E
Pushbutton	CR305X220N
Selector switch, H–O–A	CR305X230N
Selector switch, OFF–ON	CR305X230D
Indicating light	CR305X250N
Fifth pole (for adding to 4-pole form only)	CR305X211B
Control circuit fuse	CR305X241A, B, C, D



PRINCIPAL RENEWAL PARTS

Ref. No.	Description	Catalog Number	Quantity Required	
			CR305	CR306
1	Coil retainer assembly	548A780G052	2	2
2	Overload relay (3-heater, non-compensated form, 1NC contact)	CR324D310F	—	1
3	Overload relay (3-heater, non-compensated, 1NO-1NC contacts)	CR324D360F	—	1
4	Set of stationary and movable contacts with springs and screws for 3 poles	548A780G051	1	1
5	Molded cover for stationary and movable contacts	548A780G054	1	1
6	Return spring for movable contact support	547A524G001	1	1
7	Molded movable contact support for 2, 3 poles	188D700P001	1	1
8	Armature and frame (magnet) with retainer	548A780G053	1	1
9	Operating coil for 2 and 3 pole forms	15D22G***	1	1
10	Spring retainer for armature	548A627P001	1	1
11	Cross electrical interlock	CR305X200C	1	1

*** Add suffix numbers for particular coil rating required. See COIL TABLE above.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the Purchaser's purposes, the matter should be referred to the nearest GE Sales Office.

GENERAL ELECTRIC COMPANY
GENERAL PURPOSE CONTROL DEPARTMENT
BLOOMINGTON, ILLINOIS 61701

GEH-4774A 3/83 (1M)

GENERAL ELECTRIC

PRINTED IN U. S. A.

300-Line

CR305/CR306 Magnetic Contactors and Starters

TION: Before installing in a nuclear cation, determine that the product is ided for such use

tNING: Disconnect power before in- ing or servicing.

SCRIPTION

eneral Electric 300-Line full voltage netic motor starters include a mag- c contactor and a three-leg block over- l relay, providing motor protection a- ist running and stalled motor over- :s. The overload relay is provided with ellow trip indicator which is located to right of the reset arm, and is visible en the overload relay is tripped. (Series orms will not have this trip indicator ture.) To insure against welded over- d relay contacts in the tripped con- on, perform the "Check For Welded ntacts In Overload Relay" as described ow. Separate motor branch circuit over- rent protection against electrical faults ould be supplied in accordance with the tional Electrical Code.

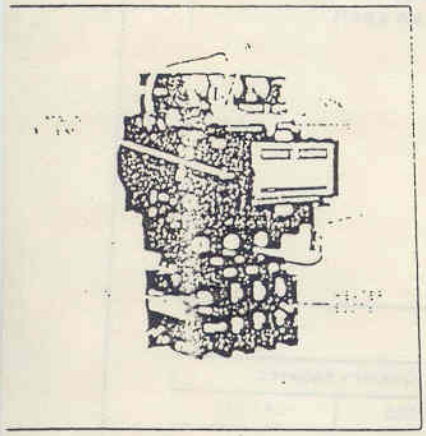


FIGURE 1. Typical 300-Line magnetic starter

RATINGS

Max. Volt- age	Contactor Max. Current Rating	AC Volts	Max Hp for AC Motors	
			Single-phase	Poly-phase
600	50 amp (open)	115	3	—
		200	—	10
	45 amp (enclosed)	230	7½	15
		460-575	—	25

INSTALLATION

Before connecting the starter:

1. Remove all packing
2. Clean magnet mating surfaces of any dirt or foreign matter.
3. Select and install heaters in accordance with heater table, which accompanies each starter unit
4. Operate movable magnet and operating arm by pressing on the armature to assure free movement
5. Mount starter on a sturdy, vertical support
6. Make the electrical connections
7. The overload relay can be reset manually by depressing and releasing the reset arm. The optional normally open contact on overload relays is electrically isolated from the normally closed contact.

COIL REMOVAL

The encapsulated coil is impervious to moisture, contaminants and it withstands mechanical damage and failures due to high humidity. No tools are required to remove coil

1. Remove all power from device
2. Press against coil while pulling up slightly on coil retainers (A-Figure 1) and move retainers away from coil
3. Withdraw magnet assembly, coil, molded cover and movable arm from device.
4. Withdraw spring clip (B-Figure 1) and remove armature from movable arm.
5. Remove coil from magnet
6. Replace coil
7. Reassemble device by reversing procedure

CONTACT REMOVAL

Movable contacts can be inspected and replaced in seconds—without tools

1. Perform steps 1 through 5 under "COIL REMOVAL".
2. Remove magnet from molded cover and movable arm.
3. Remove return spring from center of movable arm.

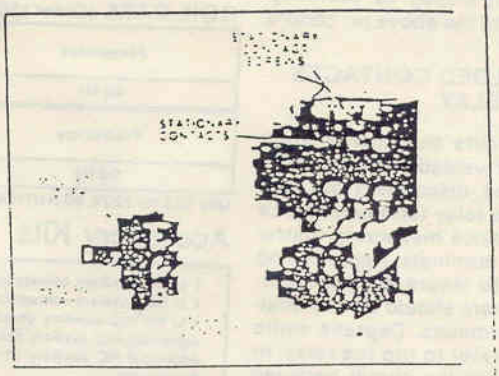


Figure 2

4. Remove molded cover from movable arm.
5. Depress and slide movable contact and spring from movable arm.
6. Remove screws holding stationary contacts in place and remove stationary contacts.
7. Reassemble device by reversing procedure.

Note: Do not attempt to remove molded Arc Traps in Arc Chute Cover.

When reassembling, note that the Arc Chute Cover will only fit one way and is marked "TOP" in upper right-hand corner. Magnet and movable arm will fit either way but will be quieter if reassembled the same way they were taken apart

CHECK FOR WELDED CONTACTS IN OVERLOAD RELAY

This feature permits the maintenance person to check for welded contacts with power disconnected from the device. Disconnect the control wiring from the terminals of the relay and place a bell set or resistance measuring instrument across the relay terminals. Depress and release the reset arm to insure the relay is reset. In this condition there should be continuity between the terminals. Depress the white manual check operator to trip the relay. In the tripped condition the circuit between the terminals should be open indicating the contacts are operating normally. Remove the bell set or resistance measuring

GENERAL ELECTRIC

ned from normally open to normally closed th no additional parts. Perform steps 1 rough 4 shown under "Easy Coil emoval" Lift coil and magnet from ovable arm. Remove return spring from enter of movable arm. Remove molded over from movable arm. Depress movable ontact spring and spring seat against ovable contact and rotate these parts ½ rn without removing them from window. emove the stationary contacts. Install ne movable arm in the device. Install the tationary contacts so that their silver ads face the movable contact silver pads.

Reassemble the device. To change contacts from normally-closed to normally-pen position, reverse the above procedure.

CHECK FOR WELDED CONTACTS N OVERLOAD RELAY

This feature permits the maintenance person to check for welded contacts. With power disconnected, disconnect the control wiring from the relay terminals. Place a bell set or resistance measuring instrument across relay terminals. Depress and release reset arm to insure relay is reset. In this condition there should be continuity between the terminals. Depress white manual check operator to trip the relay. In the tripped condition the circuit between the terminals should be open indicating the contacts are operating normally. Rewire the terminals and reset the relay for normal operation.

The exclusive manual contact-operation check gives positive assurance that contacts have not welded due to short circuits in the control wiring.

SIMPLE MAINTENANCE

300-Line starters and contactors require virtually no corrective maintenance. Preventive maintenance will assure many years of dependable on-line service.

1. **Always remove power from device before performing any maintenance.**
2. Keep magnet mating surfaces free of accumulated dirt or dust.
3. DO NOT OIL OR GREASE the magnet mating surfaces.
4. Contacts are carefully designed for maximum life. They need only be replaced when nearly all the silver tip is gone and the contact tip support is exposed. DO NOT FILE the contacts. Filing or otherwise dressing the contacts only results in lost tip material and reduces contactor or starter life.
5. The ultimate tripping current of the installed relay heater can be adjusted ±10% by using adjustment dial shown in Fig. 1.

COIL DATA (Order 15D21G plus number in table)

Frequency	115V	200/208V	230V	460V	575V	600V
60 Hz	002	023	003	004	005	006
Frequency	**110V**	**220V**	**380V**	**440V**	**550V**	**600V**
50 Hz	007	008	004	009	010	011

Use 022 for 120V, 60 Hz/110V, 50 Hz coil.

Accessory Kits

1 st NO auxiliary contact for CR305, CR306	CR305X100A
1 st NC auxiliary contact for CR305, CR306	CR305X100B
1 st NO-NC auxiliary contact for CR305, CR306	CR305X100C
Additional NO auxiliary contact for all forms	CR305X100D
Additional NC auxiliary contact for all forms	CR305X100E
Pushbutton	CR305X100N
Selector switch, H-O-A	CR305X100S
Selector switch, OFF-ON	CR305X100P
Indicating light	CR305X100Q
Fifth pole	CR305X100R
Control circuit fuse	CR305X141A, B, C, D

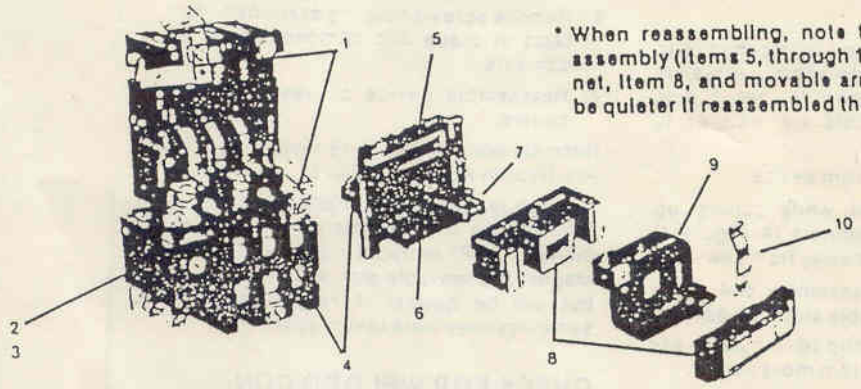


FIGURE 3

* When reassembling, note that the magnet and movable arm assembly (items 5, through 10) will fit ONLY ONE WAY. The magnet, item 8, and movable arm, item 7, will fit either way but will be quieter if reassembled the same way they were taken apart.

PRINCIPAL RENEWAL PARTS

Ref No	Description	Catalog Number	Quantity Required CR305	Quantity Required CR306
1	Coil retainer assembly	546A301G050	2	2
2	Overload relay (3-heater, non-compensated form, 1NC contact)	CR324C310F	–	1
3	Overload relay (3-heater, non-compensated form, 1 NO–1 NC contacts)	CR324C360F	1	–
4	Set of stationary and movable contacts with springs and screws for 4 poles	546A301G063	1	1
5	Molded cover for stationary and movable contacts	188D711P001	1	1
6	Return spring for movable contact support	541A278	1	1
7	Molded movable contact support 2, 3, 4 pole	187D350P001	1	1
8	Armature and frame (magnet)	546A301G054	1	1
9	Operating coil	15D21G***	1	1
10	Spring retainer for armature	546A588P001	1	1

*** Add numbers for particular coil rating required. See COIL TABLE above

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GENERAL ELECTRIC COMPANY
GENERAL PURPOSE CONTROL DEPARTMENT
BLOOMINGTON, ILLINOIS 61701

GENERAL ELECTRIC

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GEH-4756C 3/83

Point-of-Use Electric Water Heater

Use & Care Manual

WITH INSTALLATION INSTRUCTIONS FOR THE CONTRACTOR

Introduction

LOCAL INSTALLATION REGULATIONS — Many localities and utilities have ordinances, regulations or codes governing the installation of electrical appliances. These must be followed in addition to the instructions in this manual.

If additional wiring information is desired, the latest edition of the National Electrical Code is recommended. It is available from some local libraries or the National Fire Prevention Association, Batterymarch Park, Quincy, MA 02269 as booklet ANSI/NFPA 70.

LOCATION — Locate the water heater in a clean dry area as near as possible to hot water fixtures, or close to the hot water faucet most frequently used. This water heater is designed to meet a wide range of applications. It fulfills a demand for a small water heater that can be installed in a limited space such as under counter tops, cabinets or in a closet. Place the water heater in such a manner that the thermostat and element access panel can be removed for servicing. The water heater and water lines should be protected from freezing temperatures. Do not install the water heater in outdoor, unprotected areas.

CAUTION!! This water heater should not be located in an area where leakage of the tank or connections will result in damage to the area adjacent to it or to lower floors of the structure. Where such areas cannot be avoided, it is recommended that a suitable catch pan, adequately drained, be installed under the water heater.

NOTE: Auxiliary catch pan installation **MUST** conform to local codes.

WARNING!! This water heater SHOULD NOT be installed in an area where flammable liquids are stored, or where vapors from combustible liquids might be ignited by the arc drawn within the water heater's contols.

Installation

1. ***INSPECT SHIPMENT*** — *Inspect* water heater for possible damage. Check the markings on the rating plate of the water heater to be certain the power supply corresponds to that for which the water heater is equipped.

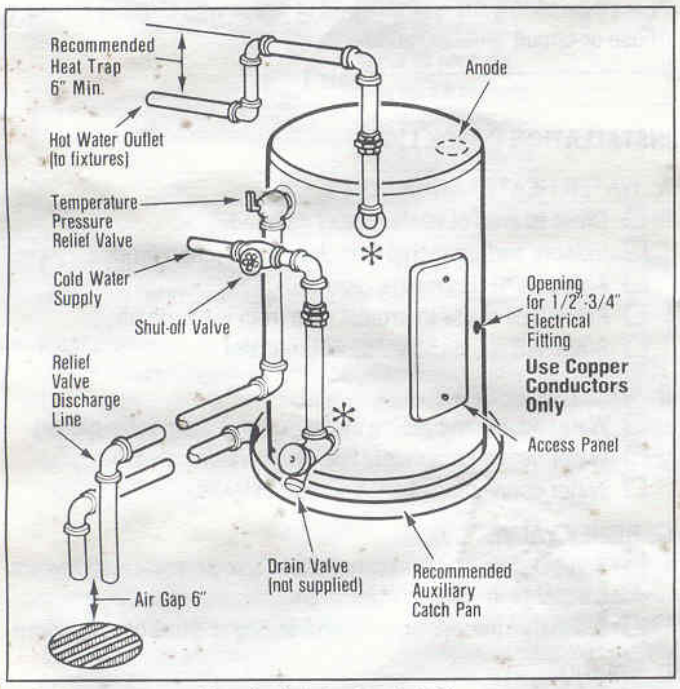


Fig. 1 — Typical Installation

***DO NOT apply heat to this fitting when making sweat connections. Sweat tubing to adapter before fitting adapter to the HOT outlet nipple.**

2. **WATER SUPPLY CONNECTIONS** — Refer to Fig. 1 for suggested typical installation. Provide unions or flexible copper connectors on the water connections, so that the water heater may be easily disconnected for servicing if necessary. Connect cold water supply line to 3/4" pipe connection near bottom of water heater. Install a shut-off valve and a drain valve (not supplied) in cold water line near water heater. Connect hot water line to 3/4" pipe connection marked "HOT" on side near top of water heater. Local codes may require an Anti-Syphon device on the water inlet of a side connect water heater.

3. **RELIEF VALVE** — A marked opening on the water heater is provided for the installation of a relief valve. Refer to Fig. 1

   CAUTION!! For protection against excessive pressure and temperature in this water heater, install "Temperature and Pressure" protective equipment required by local codes, but not less than a combination "Temperature and Pressure" relief valve certified as meeting the requirements of ANSI Z21.22, by a nationally recognized testing laboratory.

   The pressure rating of the relief valve must not exceed the working pressure of the water heater tank as marked on the rating plate. If other components in the system have a lower working pressure, the relief pressure rating should be selected accordingly.

   The BTUH Rating of the relief valve must not be less than the input rating of the water heater (1 watt = 3.412 BTUH).

   Refer to Fig. 1. Install the relief valve in the 3/4" NPT fitting provided and marked for the purpose on the water heater. Connect the outlet of the relief valve to a suitable open drain, so that the discharge

AP-16227 Rev. 1
(8/91)

water cannot contact live electrical parts and to eliminate potential water damage. The discharge line must be no smaller than outlet of the relief valve. Material for the discharge line shall be of the type used for hot water distribution. The valve and line must drain fully by gravity. The end of the discharge line should terminate within 6 inches of an open drain, should not be threaded nor concealed and should be protected from freezing. No valve, restriction or reducer coupling of any type shall be installed between the relief valve and the tank or in the discharge line.

4. **TO FILL WATER HEATER** — Make certain drain valve is completely closed. Open shut-off valve in cold water supply line. Open each hot water faucet slowly to allow air to vent from the water heater and piping. Allow sufficient time for water heater to completely fill with water, as indicated by a steady flow of water from the hot water faucet(s).

   CAUTION!! Tank MUST BE full of water BEFORE power is turned on. Heating element(s) WILL BE DAMAGED if energized for even a short time while tank is dry, thus voiding the element limited warranty (reference is made to the limited warranty for complete terms and conditions.

5. **ELECTRICAL CONNECTIONS** — A separate branch circuit with copper conductors, overcurrent protective device and suitable disconnecting means must be provided by a qualified electrician. All wiring must conform to local codes or latest edition of National Electrical Code ANSI/NFPA 70.

   The water heater is completely wired to the junction bracket inside jacket at front of water heater. An opening for 1/2" or 3/4" electrical fitting is provided for field wiring connections.

   The voltage requirements and wattage load for the water heater is specified on the rating plate. Table 1 recommends minimum branch circuit sizing based on National Electric Code. Refer to wiring diagrams, page 8 for field wiring connections.

   CAUTION!! The presence of water in the piping and water heater does not provide sufficient conduction for a ground. Non-metallic piping, dielectric unions, flexible connectors, etc., can cause the water heater to be electrically isolated.

   The branch circuit wiring should include either:

   A. Metallic conduit or metallic sheathed cable approved for use as a grounding conductor and installed with fittings approved for the purpose.

   B. Non-metallic sheathed cable, or metallic conduit or metallic sheathed cable not approved for use as a ground conductor, shall include a separate conductor for grounding. It should be attached to the ground terminals of the water heater and the electrical distribution box.

6. **WARNING!! The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving devices may shorten the life of the water heater and may endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices.**

   If local codes require external application of insulation blanket kits, the manufacturer's instructions included with the kit must be carefully followed.

   CAUTION!! Application of any external insulation to this water heater will require careful attention to the following:

   Do not cover the temperature and pressure relief valve.

   Do not cover jacket access panels to thermostats and heating elements.

   Do not cover electrical junction box of water heater.

   Do not cover operating or warning labels attached to the water heater nor attempt to relocate them on exterior of insulation blanket.

Branch Circuit Sizing Guide Based on N.E.C. NFPA 70

Watt Load	Recommended Over Current Protection Rating†			Copper Wire Size - AWG Based on N.E.C. Table 310-16 (60°C.)			Approx. Recovery Gal Per Hour @ 100° F. Rise
	120 V	208 V	240 V	120 V	208 V	240 V	
1500*	20	15	15	12	14	14	6.1
1700	20	—	—	12	—	—	7.0
2000	25	15	15	10	14	14	8.2
2500	30	15	15	10	14	14	10.2
3000	35	20	20	8	12	12	12.3
3500	—	25	20	—	10	12	14.3
4000	—	25	25	—	10	10	16.4
4500	—	30	25	—	10	10	18.4
5000	—	30	30	—	10	10	20.5
5500	—	35	30	—	8	10	22.5
6000	—	40	35	—	8	8	24.6

*Less than 1500 watts may be wired 14 gauge with 15 amp protection
†Fuse or circuit breaker rating

Table 1

INSTALLATION CHECK LIST

A. WATER HEATER LOCATION
- ☐ Close to area of heated water demand.
- ☐ Indoors and protected from freezing temperatures.
- ☐ Area free of flammable vapors.
- ☐ Provisions made to protect area from water damage.
- ☐ Sufficient room to service water heater.

B. WATER SUPPLY
- ☐ Water heater and piping air vented and drain valve closed.
- ☐ Water heater completely filled with water.
- ☐ Water connections tight and free of leaks.

C. RELIEF VALVE
- ☐ Temperature and Pressure Relief Valve properly installed and discharge line run to open drain.
- ☐ Discharge line protected from freezing and free of restrictions.

D. WIRING
- ☐ Power supply voltage agrees with water heater rating plate.
- ☐ Branch circuit wire and fusing or circuit breaker of proper size.
- ☐ Electrical connections tight and unit properly grounded.

Operation

SAFETY PRECAUTIONS

A. ***Do*** turn off water heater if it has been subjected to physical damage, flooding, or fire.

B. ***Do not*** turn on water heater unless it is filled with water.

C. ***Do not*** turn on water heater if cold water supply shut-off valve is closed.

D. If there is any difficulty in understanding or following the OPERATION or MAINTENANCE instructions, it is recommended that a qualified person or serviceman perform the work.

E. **CAUTION!!** Hydrogen gas can be produced in a hot water system served by this water heater that has not been used for a long period of time (generally two weeks or more). **HYDROGEN GAS IS EXTREMELY FLAMMABLE.** To dissipate such gas and to reduce the risk of injury, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. ***Do not*** smoke or use an open flame near the faucet at the time it is open.

1. **WATER TEMPERATURE REGULATION** — The temperature of the water in the water heater is regulated by the adjustable surface mounted thermostat(s) located behind the jacket access panel(s). Dual element heaters have two thermostats. The thermostat(s) are factory set at 140° F. or less where local codes require.

   Energy conservation if a factor to be considered when selecting the water temperature setting of the water heater's thermostat(s). The lower the temperature setting the greater the savings in energy and operating costs. A temperature setting of 140° F. or less is recommended as a usable water temperature.

   DANGER!! HOTTER water increases the risk of SCALD injury.

   NOTE: Households with small children or invalids may require a 120° F. or lower thermostat setting to prevent accidental contact with "HOT" water.

TIME/TEMPERATURE RELATIONSHIPS IN SCALDS

Temperature	Time to Produce Serious Burn
120° F.	More than 5 minutes
125° F.	1-1/2 to 2 minutes
130° F.	About 30 seconds
135° F.	About 10 seconds
140° F.	Less than 5 seconds
145° F.	Less than 3 seconds
150° F.	About 1-1/2 seconds
155° F.	About 1 second

Table courtesy of Shriners Burn Institute

DANGER!! Make certain power to water heater is OFF before removing jacket panel(s) FOR ANY REASON.

If adjustment is necessary, ***turn off power*** to water heater, remove jacket access panel(s) and insulation exposing thermostat(s). Thermostat protective cover(s) ***should not be removed.*** Set thermostat(s) dial pointer(s), with a small screwdriver, to desired temperature. Refer to Fig. 2. Replace insulation and jacket access panel(s). Turn on power to water heater.

2. **SAFETY CONTROLS** — The water heater is equipped with a combination Thermostat and Temperature Limiting Control (ECO) that is located above the heating element in contact with the tank surface. If for any reason the water temperature becomes excessively high, the Temperature Limiting Control breaks the power circuit to the heating element. Once the control opens, it must be reset manually. However, the cause of the high temperature condition must be investigated by qualified service personnel.

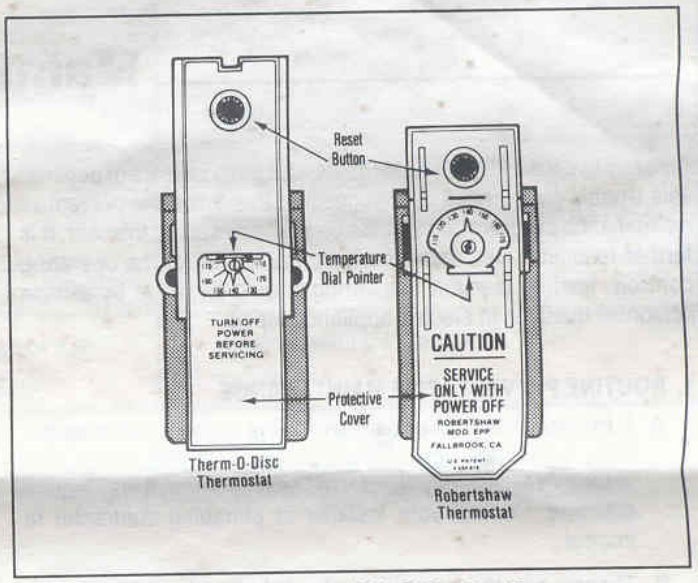


Fig. 2 — Thermostat With Protective Cover

To reset Temperature Limiting Control, ***turn off power to water heater,*** remove jacket access cover panel(s) and insulation. ***The thermostat protective cover SHOULD NOT be removed.*** Refer to Fig. 2. Press red "RESET" button. Replace insulation and jacket access panel before turning on power to water heater.

3. **EMERGENCY INSTRUCTIONS** — Should the water heater be subjected to flood, fire, or other unusual condition, turn off power and water to water heater. ***Do not*** place water heater in operation again until it has been thoroughly checked by qualified service personnel.

4. **VACATION AND LONG TIME SHUT-DOWN** — If the water heater is to remain idle for an extended period of time, the power and water to the water heater should be turned off to conserve energy. The water heater and piping should be drained if they might be subjected to freezing temperatures.

   See item "E" in Safety Precautions.

   After a very long shut-down period, the water heater's operation and controls should be checked by qualified service personnel. Make certain the water heater is filled ***before*** again placing it in operation.

Operation

5. **DRAINING HEATER**

CAUTION!! Shut off power to water heater before draining water.

In order to drain water heater, it is necessary to open a hot water faucet or lift the handle on the relief valve to admit air to the tank. Attach a garden hose to the drain valve on the water heater and direct the stream of water to a drain where it will do no damage.

CAUTION!! The water may be hot enough to create a SCALD hazard.

6. **ANODE** — This water heater is equipped with an anode rod designed to prolong the life of the glasslined tank. The anode is slowly consumed protecting the glasslined tank (cathode), thereby minimizing corrosion.

Water sometimes contains a high sulfate and/or mineral content and together with the cathodic protection process can produce a hydrogen sulfide or rotten egg odor in the heated water. Chlorination of the water supply should minimize the problem.

NOTE: Do not remove the anode rod from the water heater's tank, except for inspection and/or replacement, as permanent removal will shorten the life of the glasslined tank.

Maintenance

Properly maintained, your water heater will provide years of dependable trouble-free service. It is suggested that a routine preventive maintenance program be established and followed by the user. It is further recommended that a periodic inspection of the operating controls, heating element and wiring should be made by service personnel qualified in electric appliance repair.

1. **ROUTINE PREVENTATIVE MAINTENANCE**

A. Most electrical appliances make some sound when in operation, even when new. If the hissing or singing sound level increases excessively, the electric heating element may require cleaning. Contact your installer or plumbing contractor to inspect.

B. The area near the water heater should be kept free of flammable liquids.

C. Lift and release the lever handle (at least annually) on the temperature pressure relief valve, located near the top of the water heater, to make certain the valve operates freely. Make certain the discharged water is directed so as to do no damage.

DANGER!! Before manually operating the relief valve, make certain no one will be exposed to the danger of coming in contact with the hot water released by this valve. The water may be hot enough to create a SCALD hazard. The water released should be directed to a suitable drain to prevent injury or damage.

NOTE: If the temperature and pressure relief valve on the water heater discharges periodically, this may be due to thermal expansion in a "Closed" water system. Contact the water supplier or local plumbing inspector on how to correct this. *DO NOT* plug the relief valve outlet.

D. A water heater's tank can act as a settling basin for solids suspended in the water. It is, therefore, not uncommon for hard water deposits to accumulate in the bottom of the tank. It is suggested that a few quarts of water be drained from the water heater's tank every month.

E. Rapid closing of faucets or solenoid valves in automatic water using appliances can cause a pounding "Water Hammer" sound. "Water Hammer" can be described as a banging noise heard in the water pipe following an abrupt alteration of the flow with resulting pressure surges. Strategically located risers in the water pipe system can be used to minimize the problem. Also water hammer arresting devices are usually available from your plumber or local plumbing supply store.

2. **ANODE ROD INSPECTION** — The anode rod should be inspected and replaced when more than 6" of core wire is exposed at either end of the rod. Refer to Fig. 1 for anode rod location.

Trouble Shooting Electric Water Heaters

CAUTION!! Maker certain power to water heater is OFF before removing jacket access panel(s) for any reason.

NATURE OF TROUBLE	POSSIBLE CAUSE	SERVICE
No Hot Water	1. Manual Disconnect Switch turned off	Turn to ON
	2. Improper Wiring	*Rewire per wiring diagram
	3. No power - overcurrent protective device open	
	a. Shorted wiring	*Replace or repair
	b. Circuit overload	*Provide adequate circuit or reduce load
	c. Improper wiring	*Rewire per wiring diagram
	d. Grounded Element or Thermostat	*Replace
	4. Manual reset limit open	Refer to "OPERATIONS" Section 2
	a. Thermostat(s) breakdown	*Replace Thermostat
	b. Thermostat out of calibration	*Lower setting or replace
	c. Heat build-up due to loose wires	*Tighten connections
	d. Limit breakdown	*Replace
Not enough Hot Water	1. Water heater undersized	Reduce rate of hot water use
	2. Element(s) breakdown	*Check amperage, replace element if low
	[illegible]hermostat breakdown	*Check wiring — replace
	[illegible] only one element to operate	
Water too hot or not enough	1. Thermostat setting too high or low	Change setting as required
	2. Thermostat out of calibration	*Replace
Noisy Heating Element(s)	1. Scale build-up on element	*Remove and clean

***CAUTION: For your safety, DO NOT attempt repair of electrical wiring, thermostat(s), heating elements or other operating controls. Refer repairs to qualified service personnel.**

How to Obtain Service Assistance

1. Should you have any questions about your new water heater, or if it requires adjustment, repair or routine maintenance, it is suggested that you first contact your installer, plumbing contractor or previously agreed upon service agency. In the event that the firm has moved, or is unavailable, refer to the telephone directory commercial listings or local utility for qualified service assistance.

2. Should your problem not be solved to your complete satisfaction, you should then contact the Manufacturer's Regional Service Manager.

When contacting the manufacturer, the following information should be made available.

1. Model and serial numbers of the water heater as shown on the rating plate attached to the jacket of the heater.

2. Address where water heater is located and can be seen.

3. Name and address of installer and any service agency who performed service on the water heater.

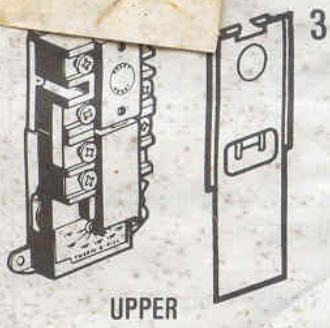
4. Date of original installation and dates any service work was performed.

5. Details of the problem as you can best describe them.

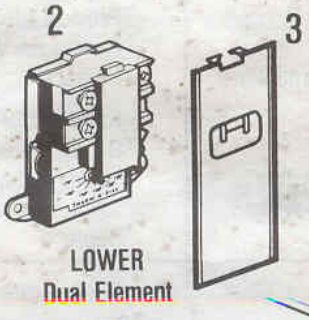
6. List of people, with dates, who have been contacted regarding your problem.

Thermostat and Element Parts

rm-O-Disc Thermostats

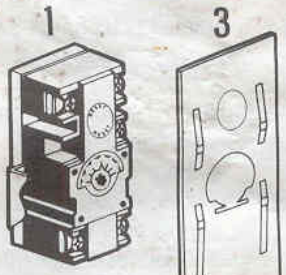


UPPER
Dual Element
Models or
Lower on
Single Element
Models

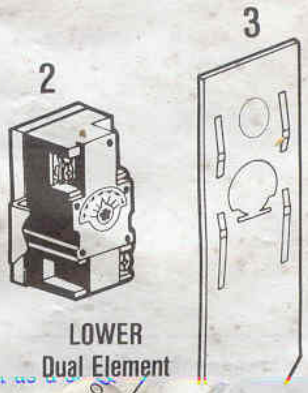


LOWER
Dual Element

Robertshaw Thermostats



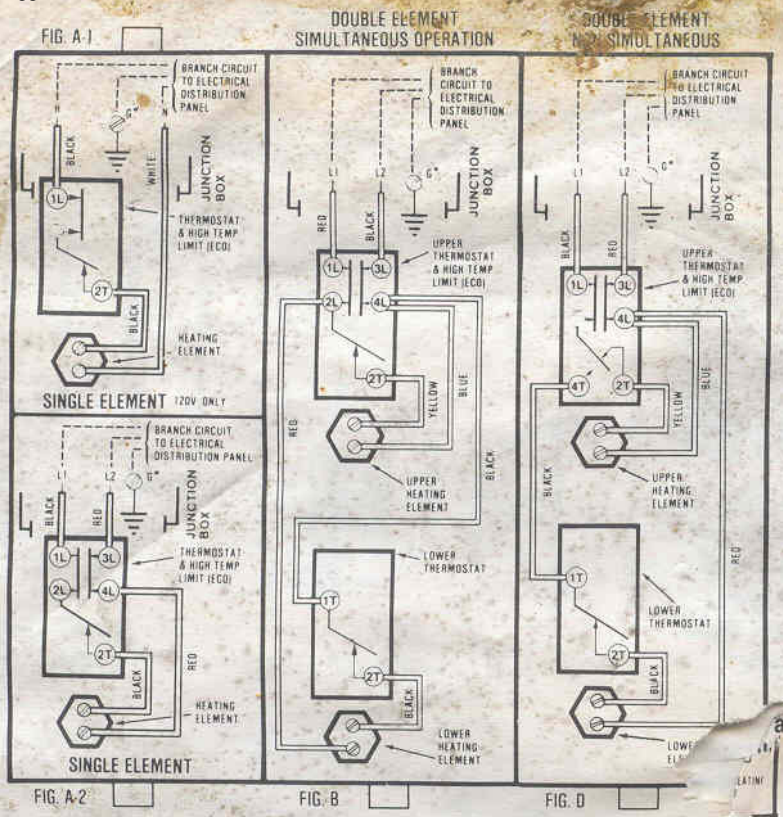
UPPER
Dual Element
Models or
Lower on
Single Element
Models



LOWER
Dual Element

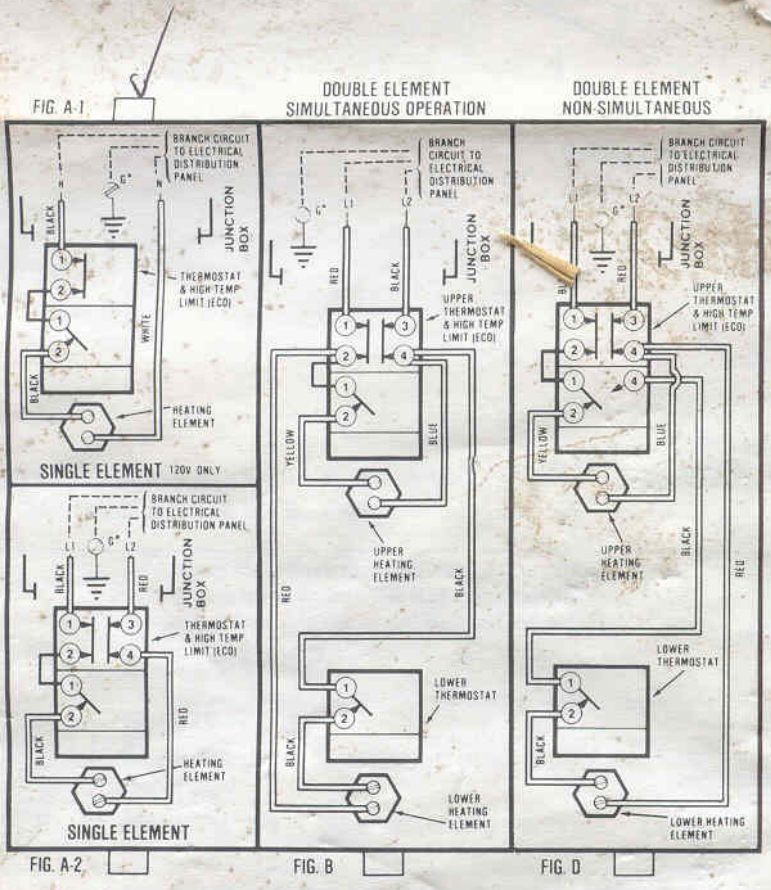


Heating Element



Wiring Diagrams
Robertshaw Thermostats

*Grounding conductor may be required.
Refer to wiring section of manual.



Wiring Diagrams
Therm-O-Disc Thermostats

WATER HEATER PARTS
2600 Gunter Park Dr., Montgomery, Alabama 36193

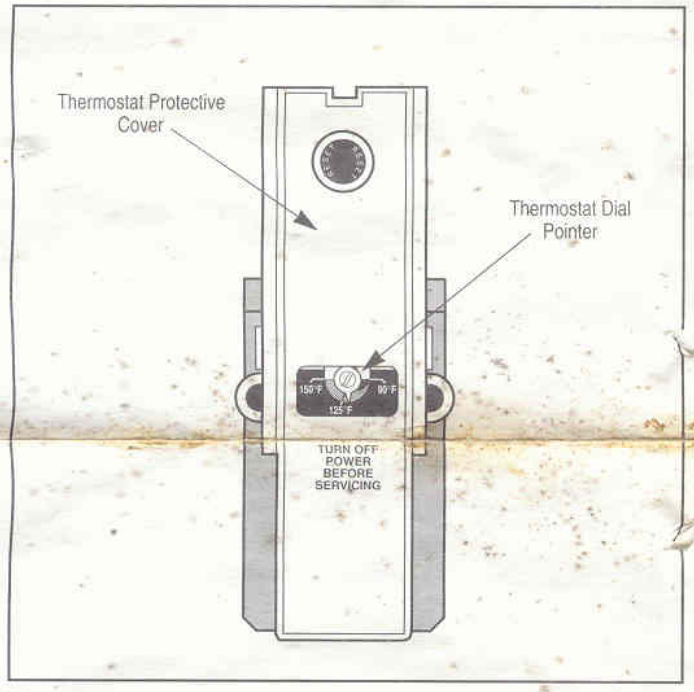
Supplement Sheet

Residential Electric Water Heaters
Supplements the following Use & Care Manuals:

AP8913	AP8320	AP8450	AP8638	AP8711
AP9006	AP9007	AP9029	AP9043	AP10024
AP10025	AP10026	AP10141	AP10227	AP10241
AP10242	AP10269	AP10414	AP10486	

The instructions in the Use & Care Manual supplied with the water heater should be followed in addition to the following Operating Instructions.

WATER TEMPERATURE SETTING — The temperature of the water in the water heater can be regulated by setting the temperature dial of the adjustable surface mounted thermostat(s) located behind the jacket access panel (s) . Dual element heaters have two thermostats. To comply with safety regulations the thermostat(s) are factory set at 120° F. or less where local codes require.



Thermostat and Protective Cover.

Safety and energy conservation are factors to be considered when selecting the water temperature setting of the water heater's thermostat(s) . The lower the temperature setting the greater the savings in energy and operating costs.

⚠ DANGER

There is a Hot Water SCALD Potential if the thermostat is set too high.

NOTE: Households with small children or invalids may require a 120° F. or lower thermostat setting to prevent contact with "HOT" water.

⚠ DANGER

Make certain power to water heater is OFF before removing jacket access panel(s) FOR ANY REASON.

If adjustment is necessary, ***turn off*** power to water heater, remove jacket access panel(s) and insulation exposing thermostat(s). The thermostat protective cover(s) ***should not be removed***. Set thermostat(s) dial pointer(s), with a small screwdriver, to desired temperature. Replace insulation and jacket access panel(s). Turn on power to water heater.

TIME / TEMPERATURE RELATIONSHIPS IN SCALDS

Temperature	Time to Produce Serious Burn
120° F.	More than 5 minutes
125° F.	1½ to 2 minutes
130° F.	About 30 seconds
135° F.	About 10 Seconds
140° F.	Less than 5 seconds
145° F.	Less than 3 seconds
150° F.	About 1½ seconds
155° F.	About 1 second

Table courtesy of Shriners Burn Institute

SAFETY CONTROLS — The water heater is equipped with a combination Thermostat and Temperature Limiting Control (ECO) that is located above the heating element in contact with the tank surface. If for any reason the water temperature becomes excessively high, the Temperature Limiting Control (ECO) breaks the power circuit to the heating element. Once the control opens, it must be reset manually.

⚠ CAUTION

The cause of the High Temperature Condition must be investigated by qualified service personnel and corrective action taken before placing the water heater in service again.

To reset Temperature Limiting Control, ***turn off*** power to water heater, remove jacket access panel(s) and insulation. ***The thermostat protective cover SHOULD NOT be removed***. Press red "RESET" button. Replace insulation and jacket access panel(s) before turning on power to water heater.

EMERGENCY INSTRUCTIONS —

⚠ WARNING

If water heater has been subjected to flood,fire,or physical damage, turn off power and water to water heater. Do not operate the water heater again until it has been thoroughly checked by qualified service personnel.

⚠ CAUTION

Hydrogen gas can be produced in a hot water system served by this water heater that has not been used for a long period of time (generally two weeks or more). HYDROGEN GAS IS EXTREMELY FLAMMABLE!! To dissipate such gas and to reduce risk of injury, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. *Do not* smoke or use an open flame near the faucet at the time it is open.

AP10677-2 (9/95)

Slant/Fin®

Residential • Gas fired • Hot Water Boilers

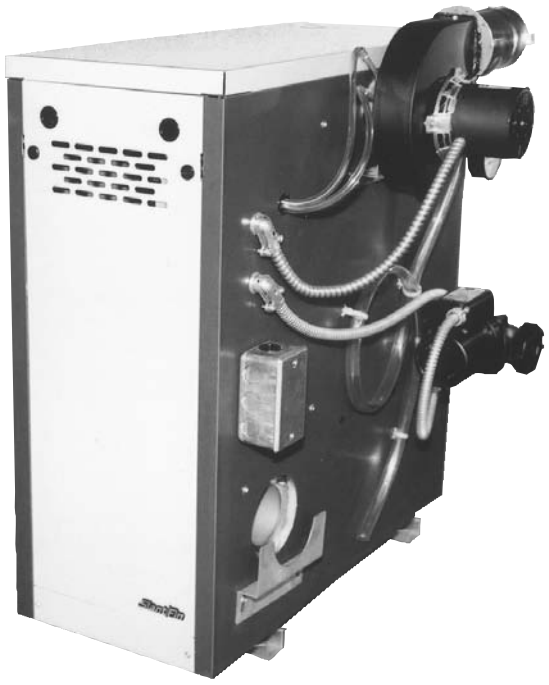
User's Information Manual

VICTORY VSPH SERIES GAS BOILERS

Sealed Combustion - Direct Vent Models

FOR YOUR SAFETY:

- Before operating this boiler, READ this manual.
- DO NOT attempt to install, service or repair this boiler yourself. There are no user serviceable parts. Contact a qualified service agency if your boiler needs repair or maintenance. Ask your gas supplier for a list of qualified service agencies.
- A qualified service agency should inspect the venting system of this boiler on an annual basis.



WARNING: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

__ **DO NOT** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

__ **WHAT TO DO IF YOU SMELL GAS**
- **DO NOT** try to light any appliance.
- **DO NOT** touch any electrical switch
- **DO NOT** use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

__ Installation and service must be performed by a qualified installer, service agency or the gas supplier.

Your gas boiler must be installed and serviced by a qualified service agency or gas supplier. The lack of proper service can result in a dangerous condition.

This manual must be left with owner, hung on or adjacent to the boiler. Owner should retain manual for future reference.

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Part No. 455036

Publication No. VSPH-UIM
271 Rev. A

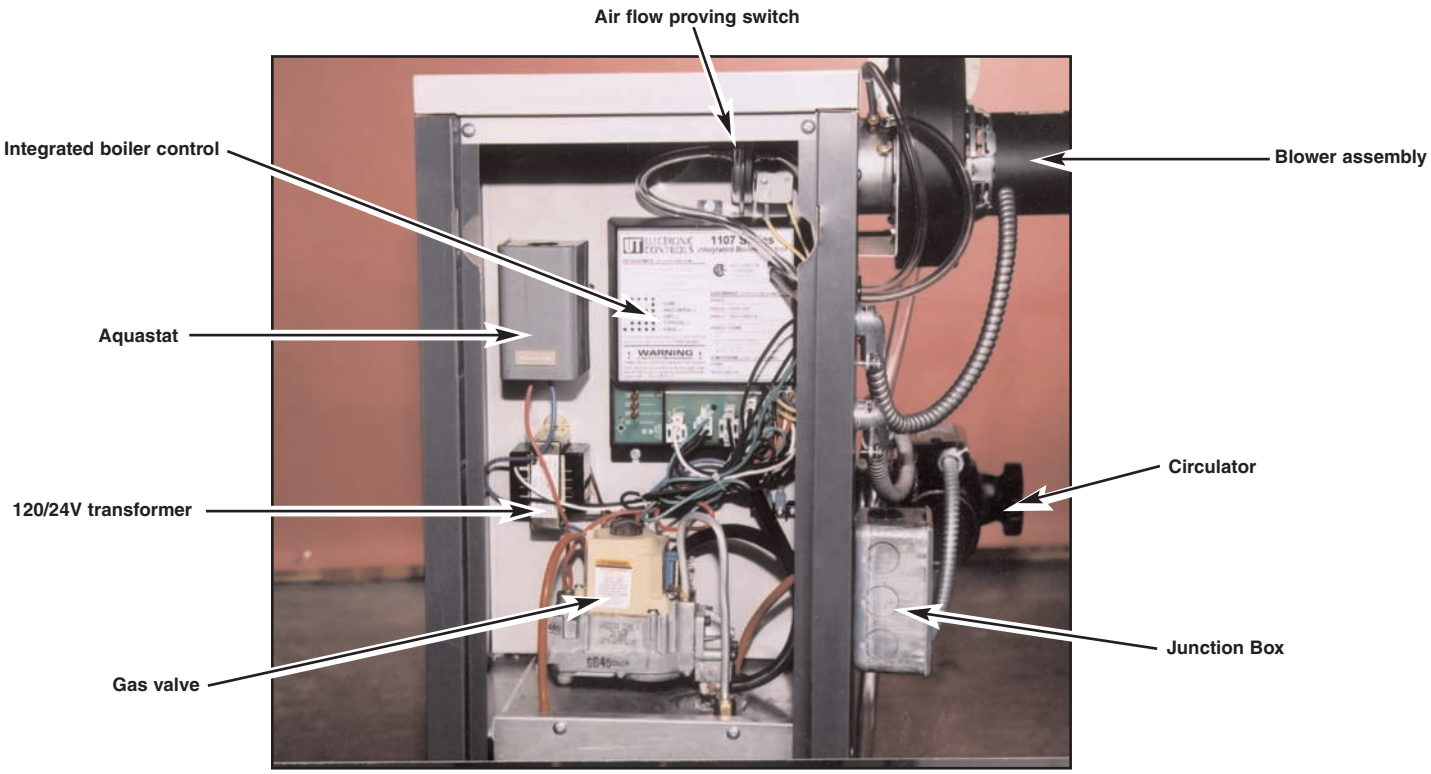


Figure 1. Location and Identification of parts.

WELCOME TO OUR VALUED CUSTOMER

You are now the owner of a Slant/Fin Victory VSPH gas-fired boiler, another quality heating product designed and manufactured by an industry leader, to provide your family with many years of reliable comfort and trouble-free performance.

The care and maintenance of your new boiler is important to prevent a hazardous condition which might result form lack of proper servicing. Therefore, you should perform regular "owner" inspections as described in this manual (and report any concerns to a qualified service technician) as well as have your boiler serviced by a qualified service technician at least once a year, preferably before the beginning of each heating season.

LIGHTING INSTRUCTIONS

Locate, read and then follow the procedures on the lighting instructions label attached to the boiler. For reference, we have reproduced those instructions in this manual.

DO NOT use this boiler if any part has been underwater. Immediately call a qualified service technician to inspect the boiler and to replace any part of the control system and any gas control which has been underwater.

WARNING

Should overheating occur or the gas supply fail to shut off, DO NOT turn off or disconnect the electric supply to the circulator pump. Instead, shut off the gas supply at a location EXTERNAL to the appliance.

WARNING

SLANT/FIN DOES NOT PERMIT THE USE OF VENT DAMPERS ON VICTORY SERIES BOILERS. OTHER DAMPERS OR DEVICES WITH SIMILAR PURPOSE ARE NOT PERMITTED.

Keep the boiler area clean and free of all materials that can burn.
***NEVER close or reduce openings that supply air** for the boiler fire and for ventilation.*

INSPECTION

Your boiler and heating system will last an indefinitely long time at full efficiency, if it is inspected regularly and is kept in good repair and adjustment. You, the user, should make regular inspections, and report any problems to your service agency. At regular intervals, you should have that agency inspect the system, clean the boiler and make repair adjustments as necessary. what you and the service agency should do is listed below. Contact your gas supplier for a list of qualified service and repair agencies.

USER INSPECTION

The user should make the following inspections at least once each month during the heating season and once just before cold weather starts. VSPH boilers maybe installed and vented either as direct-vent boiler, which all air for combustion is obtained directly from outside through the air intake piping or as non-direct-vent boiler, which all air for combustion is taken from inside the boiler room. Typical direct-vent installations are shown on FIgures 2 and 3. Non-direct-vent installation is shown on Figures 4, 5 and 6.

1. VENTING AND AIR INTAKE SYSTEM REGULAR INSPECTION

Inspect the system regularly for condensation, corrosion and/or physical damage. A qualified professional should service the boiler annually and include such an inspection at that time. The homeowner should look over the system monthly for damage, water stains, any signs of rust, other corrosions or separation of the vent and air intake piping (if direct-vent).

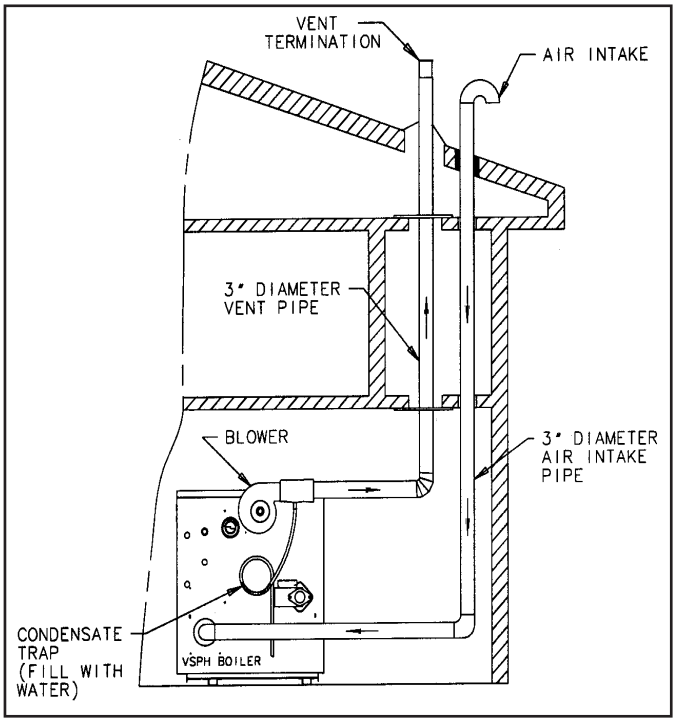


Figure 3.

Should an inspection turn up signs of condensation, corrosion or damage, the boiler should be shut down immediately and the condition should be corrected by a qualified professional.

If the boiler is vented horizontally through the wall, the outside termination, louvers and screen should be checked for any debris blocking the opening and cleaned as required.

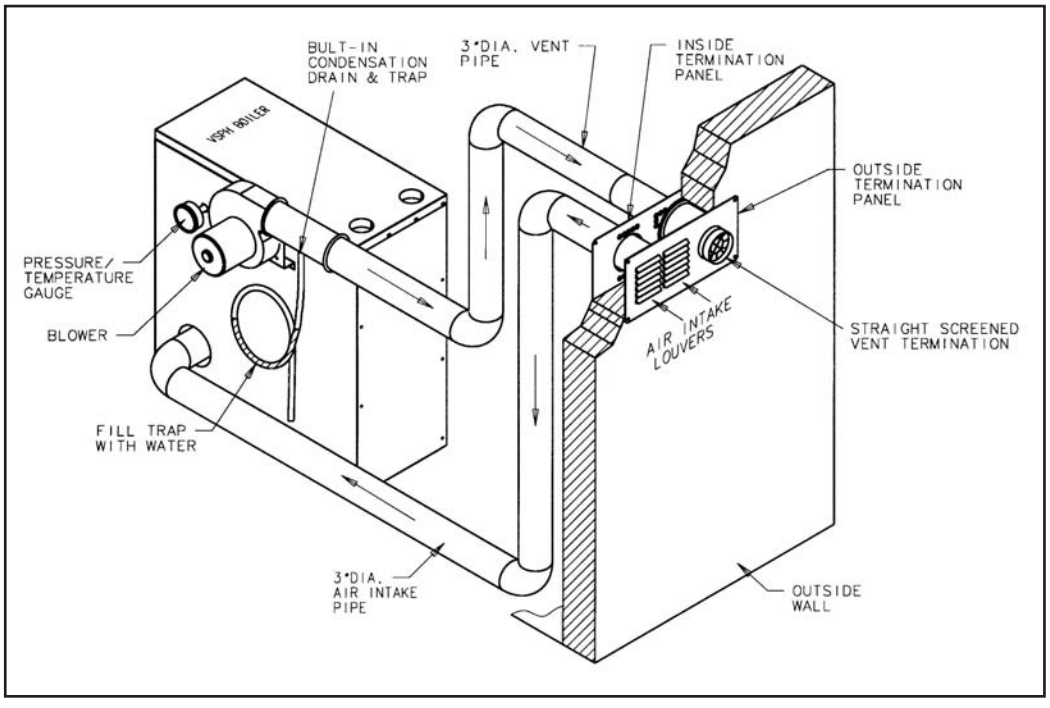


Figure 2.

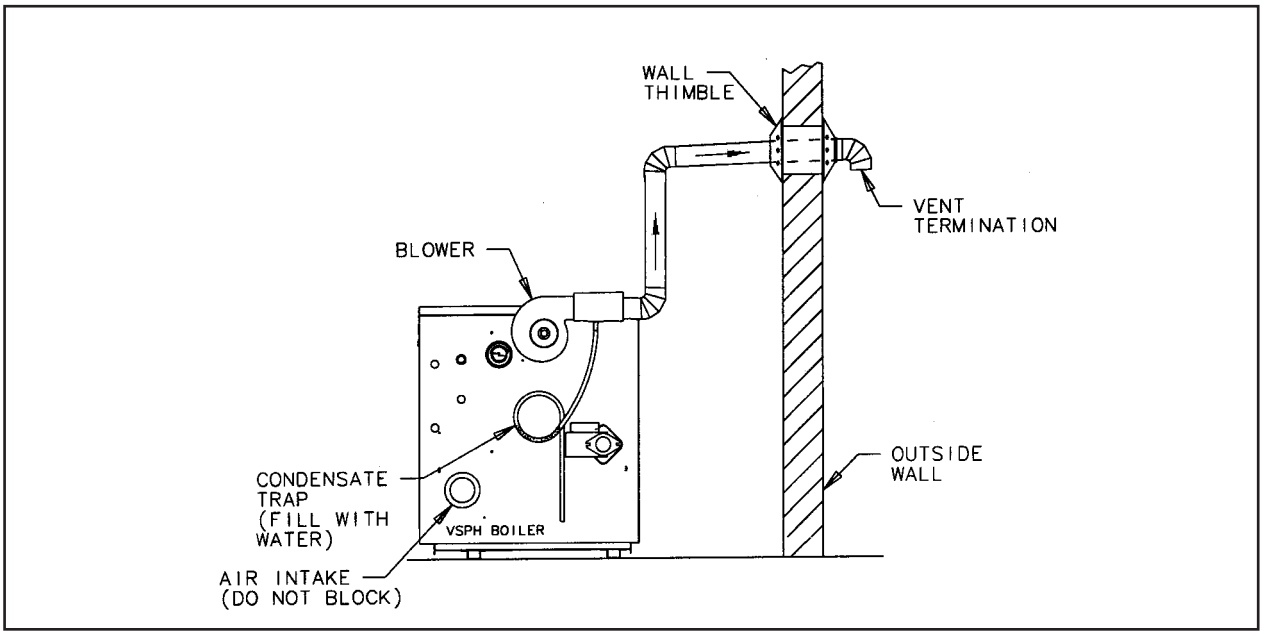


Figure 4.

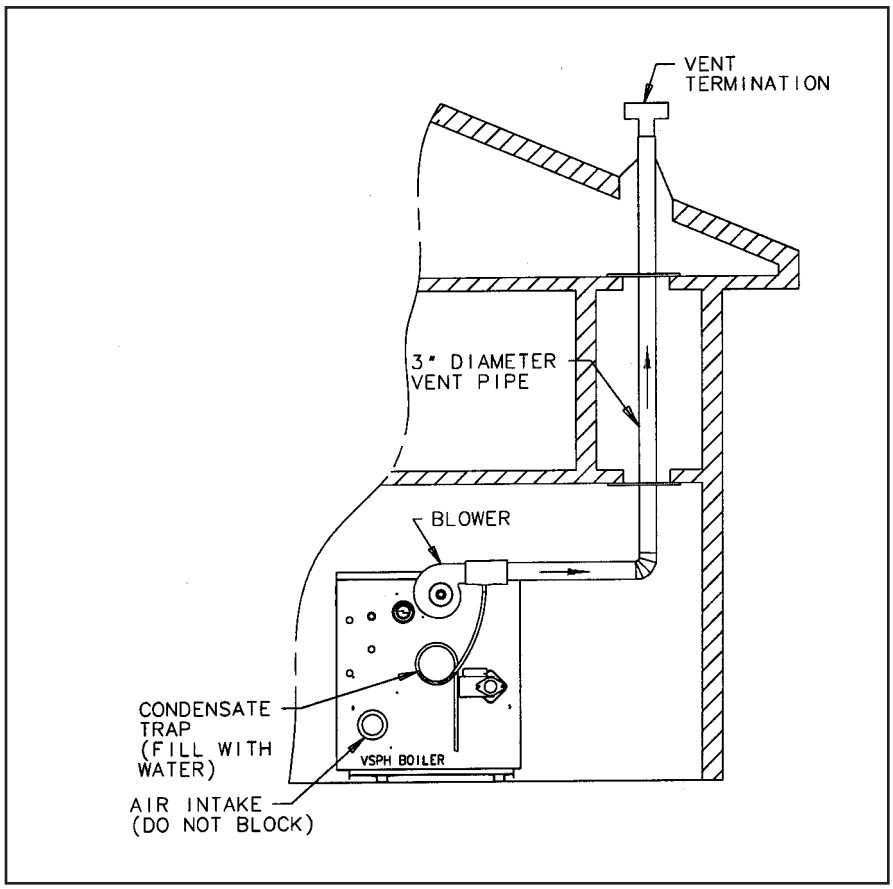


Figure 5.

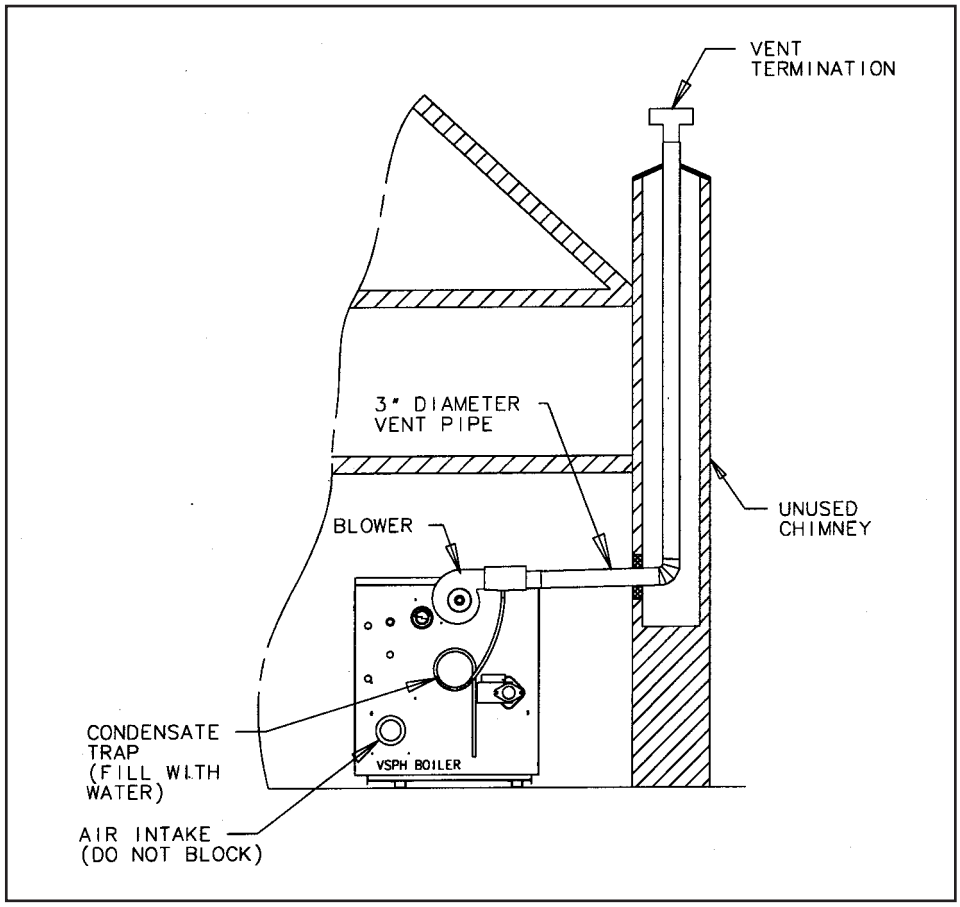


Figure 6.

2. CONDENSATION DRAIN

All Victory VSPH boilers are equipped with a built-in condensation drain and trap. The trap loop must be filled with water. DO NOT operate the boiler without filling the trap with water to prevent flue gas discharge into space. Periodic inspection should be made of this assembly for deterioration of the tubing and to insure that the trap is not plugged. If it is plugged or appears to have excessive sediment in it, it should be removed from the drain assembly, straightened out to clear the obstruction, reformed, filled with water and reinstalled as before.

3. PIPING INSPECTION

Look at all water piping. There should be no leaks or signs of leaks at any pipe joints or around the boiler.

4. SYSTEM WATER PRESSURE INSPECTION

The temperature and pressure gauge indicates the pressure in the boiler at each water temperature. For most installations, it should indicate about 12 to 15 psi pressure when temperature is about 70 to 100F and from 15 psi to 25 psi when temperature is up to 240F. FOR YOUR SYSTEM, there is one correct pressure for each temperature. ASK YOUR INSTALLER OR SERVICEPERSON TO EXPLAIN AND SHOW YOU. Learn what normal pressure to look for. If pressure decreases from normal, the relief valve will open to relieve the pressure. Call your service organization if pressures are higher or lower than normal, and if the relief valve spills water. Repair or adjustment is needed.

5. UNUSUAL NOISE

Stand near the boiler and look and listen. As the burners start and shut off, there should be no unusual noise.

6. BOILER ROOM AIR SUPPLY

Ample boiler room fresh air is required for combustion (non-direct vent installation) and ventilation (direct-vent installation).
Check air vents for continues positive supply of air as required. Air needs are greatest in cold weather if boiler installation is non-direct vent method. Air vents must be open and free of obstruction.

Warning: The flow of combustion and ventilating air to the boiler should not be obstructed.

Warning: If you find any problem during your inspection, call for service immediately.

ANNUAL SERVICE AND GENERAL MAINTENANCE

A trained and qualified service technician should perform inspection and general maintenance listed in Installation and Operating Instructions (Publication No. VSPH-40) before each heating season and at regular intervals.

SAFETY AND OPERATING INSTRUCTIONS

Follow the lighting instructions in this manual. These instructions are also attached to the boiler.

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

SAFETY INFORMATION

For Your Safety Read Before Operating

A. This appliance is equipped with an ignition device which automatically lights the pilot. DO NOT try to light the pilot by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS:
- **DO NOT** try to light any appliance.
- **DO NOT** touch any electric switch: **DO NOT** use any phone in your building.
- Immediately call you gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. **DO NOT** use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. **DO NOT** try to light the pilot by hand.
5. Remove jacket front panel
6. Turn gas control knob clockwise ↷ to "OFF". **DO NOT** force.
7. Wait five (5) minutes (longer for propane) to clear out any gas, then smell for gas, including near the floor. If you then smell gas, STOP! Follow "B" in the safety information above on this page. If you don't smell gas, go to next step.
8. Turn as control knob counterclockwise ↶ to "ON".
9. Replace jacket front panel.
10. Turn on all electric power to the appliance.
11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas to Appliance" and call your service technician or gas supplier.

To Turn Off Gas to Appliance

1. Set thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove jacket front panel.
4. Turn gas control knob clockwise ↷ till knob stops, then continue to "OFF". Do not force.
5. Replace jacket front panel.

Gas Valve VR8204 or VR8304

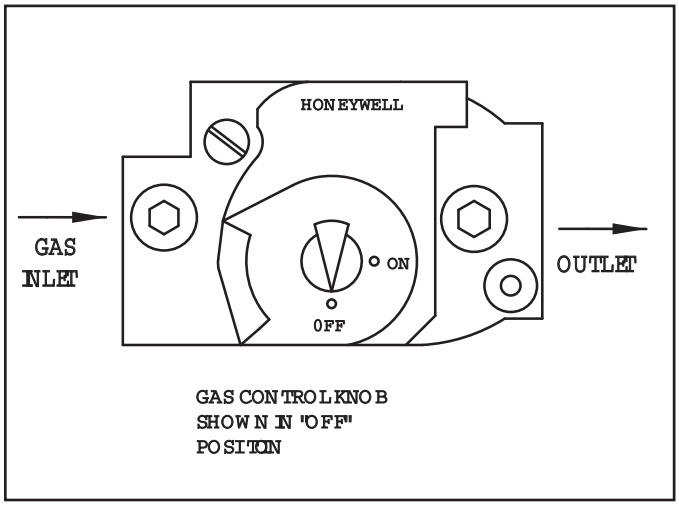


Figure 7.

Removing Jacket Front Panel

1. Turn black screws ¼ turn to open position.
2. Remove front panel.
   To replace the panel, reverse procedure.

INTEGRATED BOILER CONTROL

The integrated boiler control monitors the status of the room thermostat, high limit control (Aquastat), pressure switch (air flow proving switch) and the flame sensor. It controls the operation of the circulator, inducer motor (blower), gas valve and spark for pilot ignition. The boiler control also determines the sequence of operation and timing for pre and post purge periods, trial for ignition adn lockout. The control indicator lights (LED's) provide information of boiler operation when lights are steady on or diagnostic information when they are flashing in order to help to determine the cause of boiler failure.

INTEGRATED BOILER CONTROL

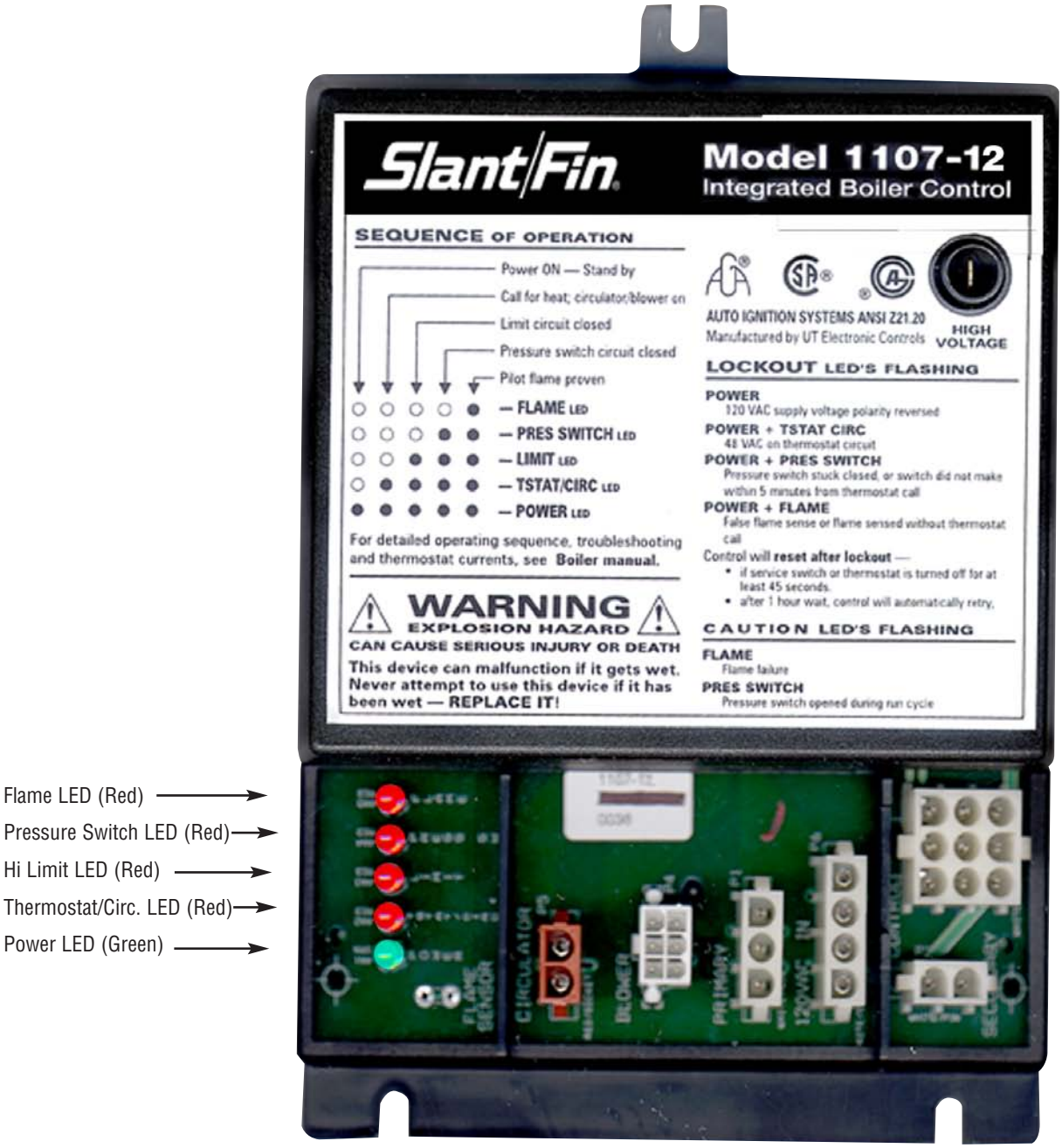


Figure 8.

A. NORMAL OPERATION - STATUS OF INDICATOR LIGHTS (LED'S)

O = LED off ☼ = LED steady on

DESCRIPTION OF OPERATION	POWER LED	TSTAT/CIRC LED	LIMIT LED	PRESS SWITCH LED	FLAME LED
Standby-Boiler waits for call for heat	☼	O	O	O	O
Thermostat calls for heat Circulator on	☼	☼	O	O	O
Boiler water temperature below high limit setting Inducer on	☼	☼	☼	O	O
Pressure switch contacts closed 30 seconds pre-purge period Trial for ignition	☼	☼	☼	☼	O
Gas valve open Pilot flame and main burners on Boiler heating period	☼	☼	☼	☼	☼
Thermostat call for heat ends Circulator off 15 seconds post purge period. Burners off.	☼	O	☼	☼	O

B. DIAGNOSTIC FLASH CODES

Flashing LED's provide diagnostic information

WARNING: Only a trained, experienced service technician should perform troubleshooting. Turn off all electric power to the boiler before service

LED's FLASHING	INDICATION	REMEDY
POWER LED *	120 V power supply. Polarity is reversed	Reverse Hot and NEUTRAL wires in the junction box.
POWER + TSTAT/CIRC LED'S *	48 VAC on thermostat circuit.	Check and correct the thermostat or zone valves wirings.
POWER + PRES SWITCH LED'S *	Pressure switch contacts are closed prior to energizing the blower motor or does not close within 5 minutes of the blower being turned on.	Check air pressure switch. Check hose connections to pressure switch. Check for obstruction/restriction in venting, air intake piping and termination.
POWER + FLAME LED'S *	Flame sensed without call for heat.	Remove air box front panel. Turn off power for at least 45 seconds. Check if pilot flame exists during pre-purge period (first 30 seconds). If pilot flame exists, replace gas valve
FLAME LED *	Pilot flame was not established during trial for ignition.	Check gas valve knob to be in "ON" position. Check inlet gas pressure. Check pilot gas line. Check ignition cable and the connections. Check pilot flame to be "to 1/2" long"
PRES SWITCH LED	Pressure switch opened during boiler run period. Wind gusts over 40 mph.	Check pressure switch and its hoses. Check for obstruction in venting, air intake piping and termination.

* Control Lockout

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F.C. 1608

SPECIFICATIONS

FOR THE USONIAN TYPE HOUSE

FRANK LLOYD WRIGHT, ARCHITECT



PART ONE
SECTION ONE: EXCAVATION, GRADING, FILLING
SECTION TWO: CONCRETE WORK
SECTION THREE: MASONRY

PART TWO — CARPENTRY

PART THREE — MILLWORK

PART FOUR — SHEET METAL AND ROOFING

PART FIVE — HARDWARE

PART SIX — HEATING

PART SEVEN — ELECTRIC WIRING

PART EIGHT — PLUMBING

PART NINE — PAINTING AND FINISHING

PART TEN — GLAZING AND CAULKING

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART ONE : EXCAVATION . GRADING . FILLING

The contractor shall take out all permits required by the authorities to allow him to proceed with his work including legal employer's liability insurance. With the assistance of the architect's superintendent, he shall carefully lay out the building according to the plans and to the grade established by the architect. Before proceeding both grade and layout should be approved by the architect.

Carefully remove all sod and top soil to a depth of 6" throughout the area of the building and mark sod and pile dirt on the premises where directed. Remove trees that interfere with construction, as approved by the Architect. All trenches for foundation walls or piers must have solid level and undisturbed bottoms. The areas below floor slab and bottom of all trenches must be graded so as to form uniform pitch approximately ½" to a foot towards outside of building and so then discharge upon lower ground or into drain. Where the grade is approximately level 3" agricultural drain tile is to be laid at outside corner of bottom of trenches to discharge at lower level. Fill under the floor slab and in footing trenches up to a level indicated on drawings with 3" of coarse clean broken stone or clean large gravel as approved. Whenever filling is required it must be done with sand and broken stone to the correct height and grade. Earth removed from excavations shall be used to form an even and gentle slope away from the building and as directed by the Architect. The grades shall then be covered with top soil and sodded for 2 feet around building. All earth not used for filling or grading is to be removed by this contractor unless otherwise directed.

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART ONE : SECTION TWO : CONCRETE WORK

This branch of the work includes floors, wall beds on broken stone in trenches, and floor mats. All are indicated on drawings as being of concrete. Cement shall be an approved brand of Portland Cement. Sand must be clean, coarse, sharp and free from foreign matter. Aggregate shall be either good hard large broken stone or clean gravel of sizes from ¼" to 1½". All work shall be protected from elements while in progress and when finished and any work injured by weather must be removed and satisfactorily rebuilt by this contractor.

This Contractor shall construct all such chases and openings for pipes or raggles for flashings as indicated or required. He shall set and build in all anchors, bolts, flash wall plugs, blocks and grooves, etc., as may be required: all these materials to be placed and approved by the Building Superintendent.

This Contractor shall accurately set in during laying of the floor-mat all tongued metal strips at base of all partitions — outside or inside — and where they form thresholds at outside low windows. They are to be included in this contract. They shall secure accurately in the unit lines of the construction.

All concrete in footings, walls and floors shall be mixed in proportions of one part cement, 2 parts sand, and 4 parts broken stone or gravel. This Contractor shall provide and set all material for the forming of the concrete walls including scaffolding necessary. All the forms must be true to line and surface and be thoroughly braced where needed. All blocks for grooves, rabbets, reglets, etc., are to be carefully set as directed. All floor mats shall be finished — integral — and steel troweled smooth, jointed 2/3rds through, unit lines showing as shown in drawings. He shall provide and set fire brick backs and hearths in the fireplace and provide and/set fire-clay flue linings of proper size where indicated in chimney.

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART ONE: SECTION THREE : MASONRY

The mortar throughout this work shall be composed of one part approved cement and lime mortarmix to 3 parts clean sharp sand. Natural color for horizontal joints. Horizontal joints struck. The flush vertical joints shall be left unfilled to depth of ½".

The several brick walls where so directed indicated by line in center, shall have placed in the center a continuous vertical 2'0" high band of ½" celotex or equal insulation as approved, coated both sides with a good quality asphaltum. The two sides of the wall shall be anchored together by horizontal bands of 5" x 6" #10 mesh laid flat at 2'0" intervals, vertically and horizontally.

All brick throughout the work shall be local brick or nearest available as approved by Architect costing not more than $15.00 per M. f.o.b. factory.

Wherever wood walls join brick walls a vertical ground 1½" x 4" is to be correctly set up and projecting 1½" built edgewise into brick work as directed by Carpenter.

All brick must be laid with solid joints. No empty spaces shall be left in walls unless so shown or directed. Tile flue linings are to be provided as shown on drawings, rising 6'0" ABOVE in each fireplace OR BOILER FLUE. All bricks shall be laid as stretchers with a row of headers UP EDGEWISE every fifth course or if so directed, bonding shall be accomplished by cross strips of 5" x 10" #10 galv. mesh laid 2'0" on centers vertically and horizontally. Provide and set all angle irons and throat dampers of approved pattern in fireplace hoods or chimney throats and any metal beams shown as included in this contract are to be built in AND anchored as indicated.

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART TWO : CARPENTRY

This Contractor shall assist the mason in laying out the entire building, set baffle boards, stakes, etc, where and as may be required. He shall provide all necessary scaffolding for his work, furnish protection from weather during construction, and set all nails, screws, steel, and other rough hardware in connection with his work. He will furnish and superintend the proper setting of all vertical grounds in brickwork properly placed to receive wooden partitions where they come in contact with the brick.

This Contractor will take the Millwork from the car to the building and install same accord ingto drawings in workmanlike manner, free from blemishes. All finishing nails where used shall be counter sunk. Screw heads exposed in construction shall be neatly spaced on unit lines where directed by the Superintendent. This contract shall include rough lumber and rough framing and the labor of setting all cabinets, shelves, seats, stairs, hanging of all doors and sash with piano hinges, and assembling large frames or other work necessarily delivered in the "knock-down", all as indicated in the drawings and shown as of wood in the contract for Millwork. Where screws are necessary all outside boarding is to be put together with cadmium plated screws of proper size all set in on unit lines in regular order. All framing lumber shall be No.Two common fir -- pine or whatever lumber is available in the locality and suitable for the purpose as approved by the architect.

This Contractor shall check up and make smooth and easy the operation of all outside doors and windows and interior doors and same work after installation. He shall return three months after building has otherwise been completed and properly/adjust same.

All joints at floor slabs, ceiling, or joinings with brick work or concrete with woodwork shall be sealed neatly with "Vulcaton" by use of mastic gun.

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART THREE : MILLWORK

This Contractor shall furnish all wood material exposed to sight in the completed building. All exterior and interior woodwork shall be No.2 grade Common Red Tidewater Cypress of thickness indicated -- sap streaks and small knots not objectionable. All plywood (unless otherwise shown as less) to be 15/16" thick cypress door stock. No beaded edges are needed on interior doors or furniture which will be plain millwork. The ornamental boards and battens of the walls inside and outside are included in this contract and may be either solid 7/8" stock or plywood. If used outside plywood must be fabricated with casein glue.

This contract shall also include the 3/8" plywood cores for all walls. Where used on ceilings the plywood may be put on with open V cut joints in since indicated on details. The slabs shall be fastened with finishing nails counter sunk. If boards instead of plywood are used on ceilings they shall be same as walls -- put up in the same way as the walls.

This Contractor shall also provide all shelving, seats, doors, windows, screens, counter tops, etc., and such furniture as is indicated on the drawings and according to details. This furniture is intended to be plain millwork, not cabinet work. All sash are to be prepared with loose wood stops for setting glass at building. Window screens are to be provided for all openings unless otherwise specified: coarse light copper mesh -- details.

The hardware will be furnished by the Owner and will consist of piano hinges on doors and sash throughout the building -- requiring no letting in. All may be applied to the surface as they are to extend full length of sash door or sash. Thrust bolts on low windows at top -- kick bolts at bottom surface applied. Mortise locks only on outside front and rear doors. Catches where required are friction catches. Screens same, except hinges will be plain offset not piano hinges -- and applied to face of casing.

Such work as MIGHT be damaged in shipment is to be suitably crated or SAFELY tied up for shipment and all millwork loaded on car at factory.

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART FOUR : SHEET METAL AND ROOFING

Provide and apply all asphaltum flashings TO BE applied to raggle strips in brickwork as shown in drawings or as may be required to make roofs thoroughly water-tight. All junctions of decks and wood walls shall be counter-flashed likewise. All flashing to brickwork to be no more than 4" high painted to match brickwork. Counter strips are to be nailed to strips set into brickwork or woodwalls, joints well coated. Provide and set 2" diameter lead drips where indicated, IN OVERHANGS OF BALCONY FLOORS cut off ½" below soffits and flared outward.

All roofing shall be as follows:

One layer 30# Barrett (or equal) rag felt nailed to roof decking. ONE layers OF 15# Barrett (or equal) rag felt lapped and well mopped with genuine asphalt.

Insulation on roof:

WEARCOTE TOPPING MIXED AS FOLLOWS:

1 part Portland Cement
4 parts sand
½ bundle short plaster fibre per cu.ft.sand
½ gal. emulsified asphalt per gal. water

This mixture shall be smoothly rolled down over paper roofing on coating of hot asphalt, 1/2" THICK.
Care must be taken to pitch slightly to water outlets and all made smooth.

This Contractor shall guarantee the roofs and decks free from leaks for a period of three years following construction.

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART FIVE : HARDWARE

All doors, exterior and interior, including closets, cabinets, and all windows to be hung with brass piano hinges full length, since varying with thickness of sash, but usual hinge — 1½" wide when open with screw holes ½" c.c. All interior doors including low windows and excluding closets and cabinets to be equipped with thrust bolts top and bottom and kick bolts at bottom and suitable pulls. Cabinets and closet doors to have be fastened shut with friction catches and knobs to or pulls to meet architect's approval. Outside entrance doors to be equipped with Schlage type door public locks submitted for Architect's approval. All short sash are to be equipped with Reffnan (or other approved) casement openers of a size to fit available space between or beneath screen and sash. Clerestory windows or perforated boards are to be equipped with piano hinges — and thrust bolts at bottom.

All hardware to be brass or heavily brass plated. Allowance $110.00.

Screens are to be hung with offset brass hinges let into screen but fastened to face of trim.

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART SIX: HEATING

This specification and these drawings are intended to provide for a complete and perfectly working heating system.

This Contractor shall test all of his work at various times if directed as the construct progresses. The tests shall be conducted in the presence of the Architect or his representative and this contractor shall provide all fuell, etc., necessary for the test.

This Contractor shall guarantee in writing a complete and noiseless operation throughout the entire heating system. The system of heating to be employed will be a hot water system with circulating pump or steam circulated in similar manner. It shall include the following equipment as manufactured and sold by the York Ice Machinery Company.

One YORK Y 8 ~~NEW~~ 336 (360 feet radiation) BOILER (or equivalent). Complete with the following auxiliaries: Boiler castings, drain cock, thermometer, altitude gauge, oil burner, and jacket with decorative trim and insulation. One 1½" hot water circulating pump together with flow control valve and relay.

One domestic hot water heater (40-60 gallons) (100° rise 5 hours) draft regulator, refractory segments, thermostat, protector clay, aquastat, protector clay, aquastat for oil burner control during heating cycle and aquastat for control of domestic hot water temperature. The Plumbing Contractor will make all the connections to this boiler, etc. to the hot water tank and system throughout the building.

In addition this Contractor must supply and install ~~NEW~~ black wrought iron pipe coils with welded connections laid as shown in the drawings cut for shipment where indicated and threaded for connecting at the building. The whole connected to the pump and boiler to properly form a complete working system. This Contractor is to make own test on pipe before they are covered in, maintaining 100 lbs water pressure for 12 hours, free of leaks.

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART SEVEN : ELECTRIC WIRING

These specifications are intended to provide for a complete system of electric wiring, INCLUDING LAMPS.
The Contractor is to pay for all permits, service connections and inspectors fees. He shall be responsible for any injury to his work from any cause until work is finally accepted by the Architect. He shall comply with all requirements of local authorities and the Board of Fire Underwriters. Service is to be brought underground to the building in No.8 lead covered wire buried 9" deep.

All wires, switches, fittings, cut-out box, etc., shall be such as are found in the list of approved fittings on the National Board of Fire Underwriters. Samples of all materials are to be submitted to the Architect for his approval together with a complete layout for the Architect's approval before proceeding with the work. However, no such approval is to be construed as annulling in any way the perfect operation of the system.

The locations of the cut-out box and various outlets are shown by the Architect's drawing but must be verified by the Architect or his representative at the Building before any of the outlets are placed.

Not only the service connections but the telephone connections shall be run underground in parkway or other approved cable in a ditch dug by this Contractor, not less that 9" deep. Wiring is mainly confined to concrete or brick walls or to ceiling over head.

This Contractor shall see that the service is brought in where and in manner approved by the Architect. He shall provide and install a meat meter board and switch and fuse-box at the point indicated. All switches, clips, etc. shall b e of approved pattern and of ample capacity, with balck iron covers. Run inside conduit, approved by Telephone Company from company extension at exterior wall to outlet as indicated by Architect for use in telephone installation.

Note: In submitting his estimate the Electric Contractor should submit a unit price which would apply in case of addition of more outlets after construction of building

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BUILDING INSTRUCTIONS: USONIAN TYPE HOUSE

PART EIGHT : PLUMBING

These specifications are intended to provide for a complete and perfect system of hot and cold water supply, vent piping, etc., and it is laid out and standardized to permit shop prefabrication. This Contractor will be held strictly responsible for the quality of the materials and for the proper installation of the system. All work shall conform to the rules and regulations of the Plumbing Code.

This Contractor shall file all drawings, pay all fees, and obtain and pay for all permits in connection with his work. He shall see that an adequate supply of water for b building purposes is provided at commencement of the building operation.

Before the building is commenced this Contractor shall submit for approval a layout of the proposed system of piping, indicating clearly the exact position of all pipes, chases, etc., he proposes.

The Contractor shall make all tests of his work in the presence of the Architect or his representative and repair all leaks until the system is shown to be perfectly tight.

This Contractor shall do all excavation for his ground work. All sewer piping within the building shall be of cast iron properly caulked and leaded. All exterior sewer piping shall be in glazed tiling properly laid to a uniform pitch, caulked and cemented at the joints.

All water piping shall be ~~copper~~ GALV. IRON. Circulating hot water system. All exposed piping shall be chromium plated. All exposed pipes shall have chromium plated escutcheons and sleeves where passing through walls and floors.

This Contractor shall provide and set plumbing fixtures as shown in the drawings and approved by the Architect. Enumerated as follows:

BUILDING INSTRUCTIONS : USONIAN TYPE HOUSE

PART EIGHT : PLUMBING CONTINUED:

ENUMERATION OF FIXTURES:

The Heating Contractor will furnish as part of his Contract a domestic hot-water heater with controls. The Plumbing Contractor will connect this heater to the water syste and complete the installation to insure its correct operation. This Contractor will provide and install a 40-60 gallon insulated galvanized hot-water storage tank in connection with the hot-water system.

BUILDING SPECIFICATIONS : USONIAN TYPE HOUSE

PART NINE : PAINTING AND FINISHING

There is no painting in this building except one coat of Minwax applied with brush to all wood throughout interior and exterior and rubbed smooth. The sink drainboard shall receive two coats genuine liquid bakelite.

All nail holes, etc., shall be filled with Beeswax colored to approximate the natural color of the wood previous to the application of the Minwax.

PART TEN: GLAZING AND CAULKING

All glass in building shall be ¼" Polished Plate or mill plate. All glass and loose wood stops shall be set in Valentex Glazing Compound as manufactured by A.C. Horn Company. All glazing surfaces coming in contact with mastic on frames to have one coat of paint.

Caulk around frames and doors where they join brick walls, at point of juncture or with mullions at all sills and along heads as indicated in drawings. All caulking shall be executed with "Valentex" (gun grade) compound as manufactured by the A.C. Horn Company.

B U I L D I N G I N S T R U C T I O N S

DWELLING FOR MR.AND MRS.LORE POPE: EAST FALLS CHURCH:VIRGINIA

FRANK LLOYD WRIGHT: ARCHITECT

This building is to be laid out on a 2'0" x 4'0" unit system wherein the unit lines become the joint lines of the concrete and this mat must be completed before the superstructure is commenced. In the preparation of this mat the accuracy of the unit layout is most important and the joint lines must be made to extend two thirds of the way through the thickness of the mat. To prepare for the mat remove the top soil beneath it to one side of the lot for use later in regrading. Make all necessary excavation to the plans and sections and do with it whatever filling is required to bring the undergrade to within 9½" of the level of the finished floor. This undergrade should slope slightly to avoid any possibility of moisture accumulating beneath the floors. At this time such drains as are indicated should be laid in and such retaining walls as are occasioned by excavations or filling of the ground slopes should be built up to the level of the mat to make whatever connections with the edges of the mat may be shown on the elevations and sections herewith. A filling of coarse gravel, broken stone, or equivalent, should now be spread over the leveled and graded surface of the ground, the gravel bed to be 6" thick, to be raised to within 3½" of the finished floor and in this gravel bed should be laid such heating and plumbing pipes as are indicated on the plans or for which instructions will be given at the proper time. When this preparation is complete the concrete mat, top dressing colored as directed, may be laid down in the usual manner, all surfaces finished flat (no pitch) jointing the whole on the unit lines as ordinary sidewalk work is jointed, edges of sections slightly rounded. The tonoan metal strips, at all outside sash and partition lines (see details) are to be laid in the fresh concrete at this time (see detail of wood wall). When this mat is complete the roof may be completely built upon temporary supports and the walls prefabricated and afterward

set beneath it. Or when the concrete mat is completed all the wood partitions inside and outside may be set upon the metal strips on these unit lines according to plan. Where the wood partitions or outside walls occur, they begin upon his weatherstrip of brass or toncan metal strips which has already been inserted into the joint lines of the fresh concrete when the mat is made. The mat when completed is the basis upon which any or all of the prefabricated walls, partitions, and the fenestration as well may be erected.

NOTE: Where concentrations of load occur - a concrete footing of specified area and depth should be cast beneath the mat upon a bed of broken stone as indicated.

The inside partitions of this building as well as the outside walls are to be set up on a vertical unit system (see elevations) and they are all to be made up of a core of vertical common boards or 7/8" plywood (rough) covered each side with approved insulating felt or building paper. Over this paper covering the horizontal board and inserted batten system is to be put upon each side as indicated. The wall and partition sections may be th s prefabricated or made on the concrete mat floor at the building and raised up. In either case they are to be set up over the metal strips in the mat and locked at the corners ~~et th~~ as shown. All walls and partitions will be three boards and two layers of paper in thickness. The paper is to be carried over and around all corners outside a d inside.

The fenestration, or window construction, is fabricated upon the same unit system as the board walls. All windows may also be prefabricated at the shop, glass inserted and hardware put on complete before setting up at the building. Where this fenestration is intended to support the roof, temporary props may be used until expedient to set up the prefabricated sections. In the roof and ceiling construction, the unit system of the layout becomes identical in floor and ceiling. All the framing of the roof (piece sizes as indicated) will be done on these lines (see plan) so that ceilings of plywood or other synthetic material may be securely fastened to the framework with little or no cutting.

There will be no plastering in this building. There will be no painting or staining of any kind. Wax will be used for the interiors. It is therefore important that all joints be clean and workmanship good.

The framing of the roof is to be made of these 2x4s, one upon the other. Braced up to the required pitch of 1/8" to the foot - the 2x4s are to be toe-nailed together to hold this pitch. While thus propped up they are to be covered with matched and dressed common sheathing or ship-lap. All roofs are to be covered with one layer of insulating paper all carefully wrapped around corners of the ceiling joists or rafters and secured under the facia of the eaves. All exposed roof surfaces are to be covered with a 4 ply tar and felt guaranteed roofing and over this ½ to 5/8" thick of Nearcote roofing. There are to be no gutters, no downspouts, and the roof is not pitched to drain except as indicated in the preceeding paragraph referring to the crowning of the laminated roof beams.

Where brickwork is shown the construction may be brick throughout the wall - if outside walls, a plywood core may be used or a brick facing laid up each side and the hollow spaces filled with approved insulating ~~fold~~ material. The brick courses are laid out on the same vertical unit system as the board walls. Vertical joints are to be kept close, pointed flush, with mortar the color of the brick. The horizontal joints are to be ½" to 5/8" high raked out ½" deep. Fireplace brick are to be laid same way and of same bricks. Hearths likewise: bricks on edge as shown in details. Where board walls join brick walls a 7/8" vertical ground strip is to be built into the brickwork to receive the wall covering papering and battens.

MATERIALS

CONCRETE: Clean coarse sharp sand and gravel and Portland Cement for walls and mat base. Mixtures always used fresh. For pre-cast slabs or finish surfaces: 1-3 otherwise same (no gravel).

BRICKS: Red, paving or sand mold - approved. Laid in cement mortar, part lime to 1-3 of cement mortar. Vertical joints are to be laid close and pointed flush - mortar

Page 4: Loren Pope

same color as brick. Horizontal joints ½" - raked 3/4" deep. All fireplaces are to include dampers of proper size in chimney throats.

WOOD: Core of walls and partitions, common sheathing 7/8" thick - set up vertically or coarse plywood 13/16" thick. Boards to be of sound fir or sugar pine. Battens of redwood or walnut. Sound notes are allowable but stock must be thoroughly seasoned and approved by architect. Roof framing to be No.2 or 3 common piece stock - roof sheathing of No.2 common ship-lap. Sash, doors, and cabinets to be of same boards (sound knots allowable) as walls.

PAPER: Heavy insulating felt or F and B building paper or as approved by the architect

GLASS: Polished plate. Or polished plate culls may be used instead, all to be carefull set in Vulcatex Mastic.

SHEET METAL: Roofs are to be well flashed to brickwork or upper woodwork and counter flashed with copper strips in workmanlike manner. Flashing neatly painted and sanded to match the brickwork if so directed. Flower boxes to be lined 9" deep with 12 oz zinc lining, pipe drains inserted through ~~in~~ brick in walls. Pipe seams and all connections must be tested water tight.

HEATING: Horizontal welded pipe system of 2" diameter wrought iron or Byers pipe laid in gravel bed or broken stones under concrete floor mat and connected to oil burning boiler in the basement according to architect's diagram. Heater proportioned to carry required feet of radiation. Oil supply to hold 250 gallons. Layout of this system will be furnished by the architect. For purposes of estimate: allowance $475.00.

PLUMBING: Durham one-pipe system, non-siphonable traps, or according to the ordinance of the city having jurisdiction.

Fixtures: simple porcelain enameled pressed or cast iron: as few fittings are to be finally showing as showing: exposed fittings/fixtures to be white metal: selected by owner or architect

Sewers: vitrified drain tile carefully cemented joints to standard cement or tile septic tank of proper capacity or to city sewage system if available. Piping is indicated on floor plans.

ELECTRIC WIRING: All according to Fire Underwriters rules. All outlets are to be in ceilings where and as indicated on plans. Wiring diagram is to be prepared and submitted to architect with estimate for approval. A price per outlet is to be given in case additional outlets are put in. The service is to be carried underground to the building by utility company, ready to be connected to cut-out box where specified to be located.

HARDWARE: To be carefully set by the builder but to be selected by owner or architect; black iron: invisible type. Allowance $85.00.

Necessary permits are to be taken out in owner's name and paid for by the builder. The builder will assume all responsibility for any violation of city ordinances in the course of the construction of the building including all necessary employee's liability insurance.

The builder shall keep the work adequately insured against fire and other damage and at all times facilitate inspection by the architect or owner. Additional information or drawings, as they may be requested by the builder, will be furnished by the architect as work proceeds. Good workmanship throughout the structure will be insisted upon. The architect's opinion on this point is to be final and binding upon the builder. Any instructions to the builder concerning construction or any changes whatsoever in plans or details for this building must have the sanction and written authority of the architect before being executed by the builder. All payments to the builder shall issue only upon architect's certificate - and he will allow 85% of the estimated value of work and materials in place from time to time as work proceeds when in the judgement of the architect such payments are due and proper. All plans, specifications and details concerning this work are the property of the architect. They are not to be duplicated without permission of the architect and are to be returned to him upon completion of the building or upon his request at any time.

Frank Lloyd Wright; Taliesin; December 1939