ALAN
Manufacturing Inc.

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"Gladiola Damper Control System"

"Gladiola" system allows assembly of an independent HVAC damper unit or several dampers, controlled by two choices;
1) An R/C (remote control) wireless thermostat used as a room/zone control.
2) Wall mounted Thermostat control with low voltage wiring as a room/zone control

System's Task

A. Automatic control of room temperature modulating the optimal air quantity with 5 damper shutter positions:
   0% (closed), 25%, 50%, 75%, and 100% (opened) entering to the room from the HVAC unit.
B. Manual control on air quantity entering the room from the HVAC unit.
C. To adapt to any existing HVAC system.

System Includes

| 1 | 2 | 3 | 4 |

| 5 | 6 |
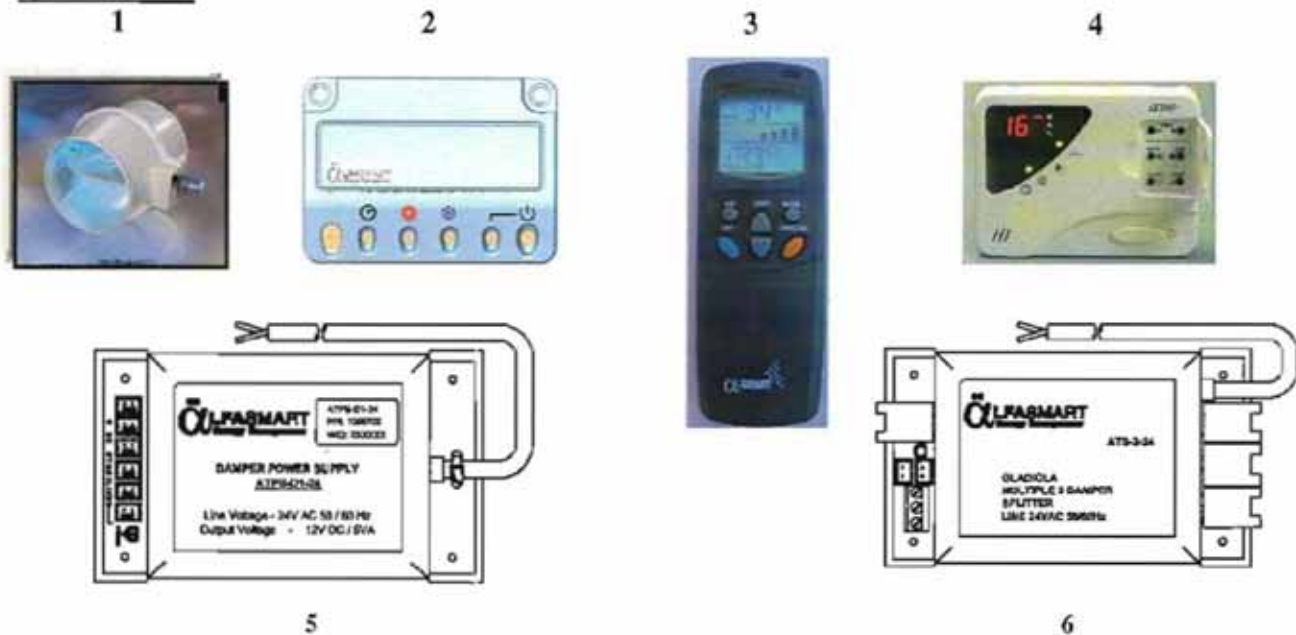
1. 6" or 8" diameter plastic Damper frame unit, with air shutter and motor unit with power supply cable 12 VDC 6m. long
2. Electronic IR Receiver unit model ATDC-1 with Communication cable 6 m. long, to connect between IR Receiver and damper frame. Screws to attach to wall or ceiling supplied.
3. R/C (remote control) wireless thermostat with mode "I FEEL" + wall bracket with 2 batteries AAA for R/C thermostat to communicate with Electronic IR Receiver.
4. Attractive modern styling, microprocessor based room thermostat, model ATRTD-1C, with digital display and varied Control options.
5. Stabilized power unit 24V/12 VDC used to power up 1 to 6 damper units each independently controlled.
6. Stabilized, splitter power unit 24V/12 VDC used to power up 1 to 3 damper units – Up to 5 splitters interconnected to control maximum 15 dampers by one thermostat controller.

System's Features
1. Power Supply: 24VAC ± 10%, 50/60 Hz.
2. Operation modes: Cool, Ventilation, Heat.
3. Optimal control on air quantity entering the room by 5 damper positions.
5. Storage temp (-) 30° to 90° C.
6. Friendly & easy installation with plug and play wiring.
7. "Self Test mode" technician's assurance test for proper operation and installation.

1

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Dimensions of components of Gladiola system

Unit	6"		8"	
Damper frame	9.05"x6.89"x6.70	230X175X170mm.	9.45"X10.25"X12.6"	240 X 260 X 320mm
Power unit&splitter	1.66"X2.76"X4.73"	42x70x120 mm.		
R/ C thermostat	1.26"X2.05"X5.32"	32 X 52 X 135 mm		
- IR Receiver unit	0.83"X2.13"X2.92"	(21 X 54 X 74 mm		
Thermostat Control	4.25"x3.15"x1"	108x80x25 mm.		

System's basic Operating Principals:

Ventilation Mode: The damper unit operates regardless of real & desired temperatures.

Automatic and Manual operating modes: COOL & HEAT
Manual mode: Upon system at OFF. the damper is fully closed. Upon system at ON the damper will open to selected position when actual room temperature is greater then ≥ ° C (°F) desired temperature setting.

Automatic mode: Upon system OFF. the damper is fully closed. Upon turning on, Room Thermostat always resets to mode setting of when it was shut off. Damper will open to one of 5 desired positions in compliance with difference between the desired temperature and the real room temperature (see table below).
Very important! The user must switch the Room Control to operate the damper in the same mode. Cool or Heat, as the HVAC unit. Ventilation mode is allowed at all HVAC unit operation modes.

Automatic Mode of Operation with
Thermostat ATRTD-1C & R/C Thermostat ATDC-1

Heat Mode Diff. in deg. Between Real / desired temp T(SP)-T(ROOM)	Cool Mode Diff. in deg. Between Real / desired temp T(ROOM)_T(SP)	Damper Opening Angle In percentage open
+.5 °C	-.5 °C	(close) 0%
0 °C	0 °C	25 %
-.5 °C	+.5 °C	50 %
-1.0 °C	+1.0 °C	75 %
-1.5 °C	+1.5 °C	(open)100 %

T (Room) - real temp. T (SP) - desired temp.

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DESIGN AND INSTALLATION PROCEDURES

To establish which components needed of a Gladiola damper system one must simply choose between wireless R/C thermostat and wall mounted wired thermostat control. To assist in choosing your component requirements the following schematics have been supplied.

### Draft Drawing of one zone "Gladiola damper with wireless R/C thermostat"

DAMPER FRAME

IR RECEIVER UNIT

24V, POWER SUPPLY
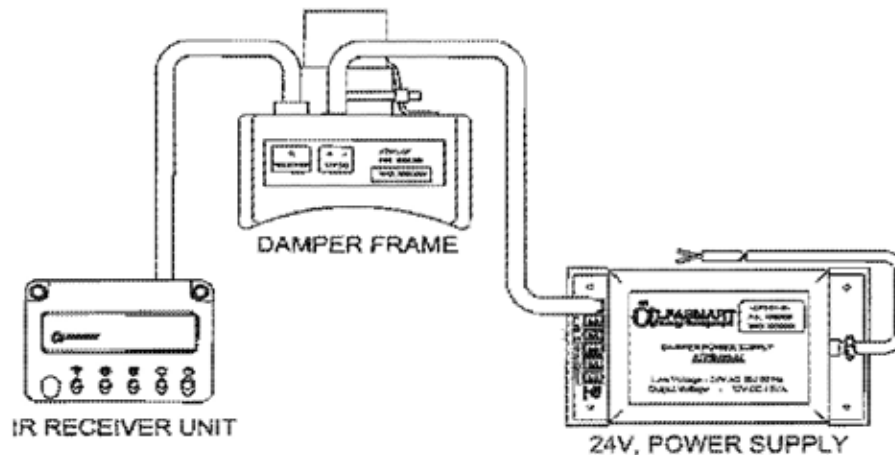
One Zone kit with Wireless R/C control

Cat. No	Set Model	Content Of Kit includes		
		Damper unit	R/C Thermostat	IR Receiver
1098714??	DG1PO??	1-6" ???	1 ATRC-D	1 ATDC-1
1098273??	DG1P0??	1-8" ATMB-D1	1 ATRC-D	1 ATDC-1

NOTE: One power box Item #1098700 is required for 1 to 6 damper kits.

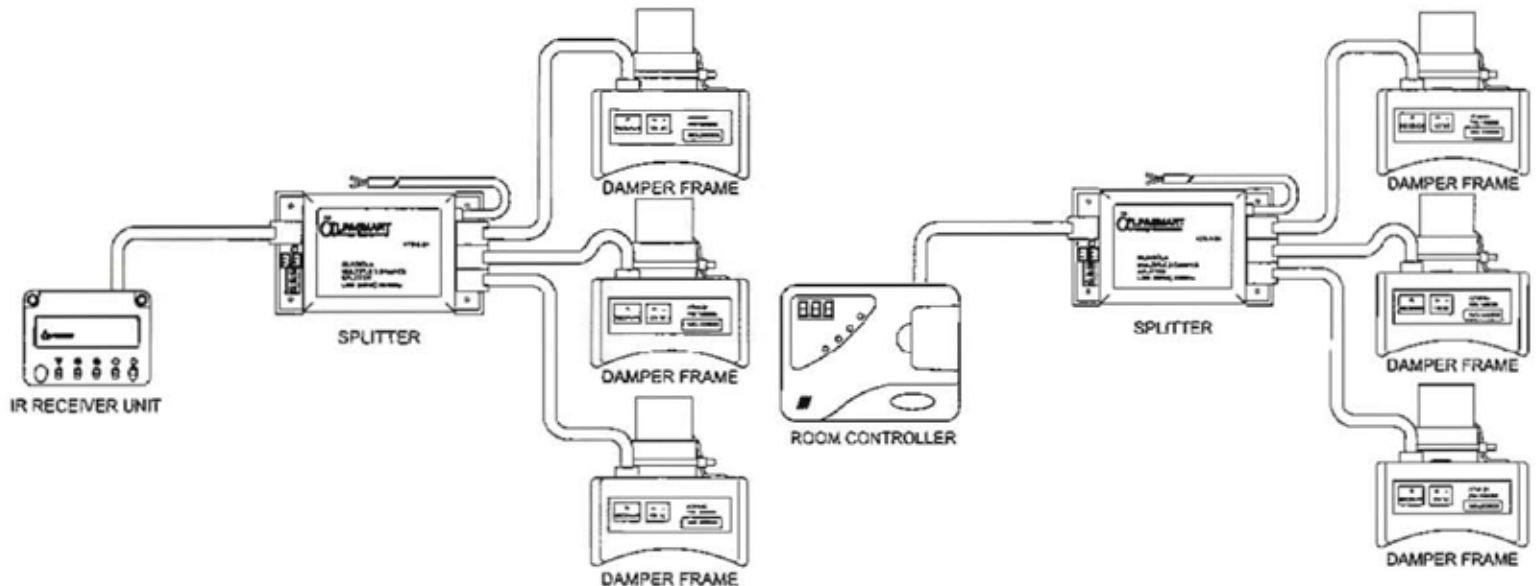### Draft Drawing of one zone "Gladiola damper with 24V wired Thermostat control"

DAMPER FRAME

ROOM CONTROLLER

24V, POWER SUPPLY
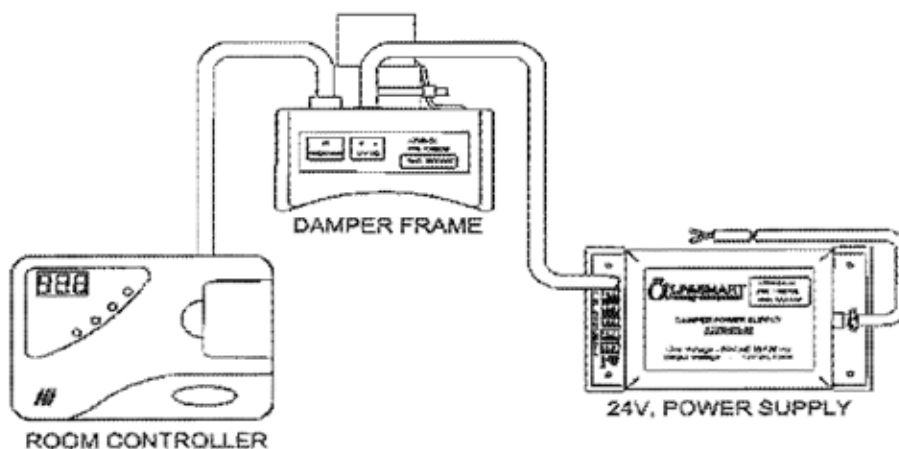
One Zone Kit with 24V Thermostat control

Kit Cat. No	Set Model	Content Of Kit includes	
		Damper unit	Thermostat Control
1098714	DG1PO	1-6" ???	1 ATRTD-1C
1098273	DG1P0	1-8" ATMB-D1	1 ATRTD-1C

NOTE: One power box Item #1098700 is required for 1 to 6 damper kits.

3

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MULTIPLE DAMPERS CONTROLED BY EITHER THERMOSTAT USING SPLITTER POWER SUPPLY

Components requirements;

Use one splitter for every 3 damper units and a connecting wire catalogue part _____ to interconnect the second splitter and another connecting wire for the third and so-on.

The splitter power unit offers dry contact relay to use jointly with BMS (building management system) or directly to a HVAC unit as a main or central control.

Note:

* Make sure that all set components are disconnected from power source 24VAC, before any connections performed.

* Electric cables lengths provided have length and size limits. Do not extend length of electric or electronic cables, with out consulting distributor.

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The Gladiola 6" Damper unit is a complete unit preassembled assembled.

The Gladiola 8" Damper unit is a modular unit assembled from the following components:
- Motor unit, including plastic base, motor, electronic circuit with motor-stop device.
- 2 symmetric plastic parts, cut-off conic shaped with motor brackets.
- Round shutter with holding hinges and grove to connect the motor.
- 6 plastic clips to quick-connect of 2 damper frame halves.

Assemble the Damper As Follows:
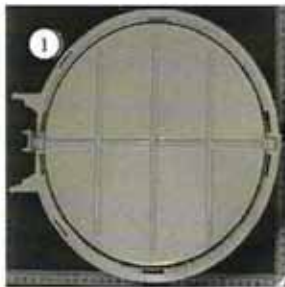
1. Place shutter in location at one of the damper's conduits. (Illustration 1).
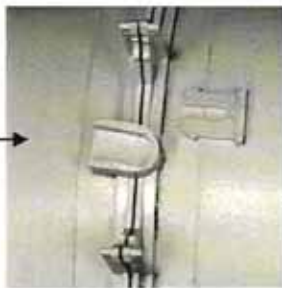
2. Align the two damper halves together and fasten using the 6 clips provided. (Ill. 2)

3. Make sure that motor's "leg" and the grove in shutter are aligned in same direction. Attach the motor unit between the 2 brackets and press inward until "click" heard. (Ill. 3)

4. Make sure the shutter is at "closed" position. (Ill. 4). Assembly of damper set is completed.

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· **Important:**

- The damper set has to be connected to the spiral conduits supplying ventilation towards the room/s to be controlled as close as possible to the center.
  - Install the damper's frame to the ceiling or building by tightening band via the groves located at the damper's frame.
  - Upon installing the damper, avoid locating the motor below the unit (to prevent possible condensation from dripping onto the motor during "COOL" mode.)
  - Advisable to avoid full control on all air outlets of the HVAC system. Some Gladiola damper installations may require mechanical contractor to install freeze protection for condenser coil of air-conditioning systems, or install a relief bypass damper.
  - Refrain from installing the dampers sets in damp locations.

Power Supply Unit ATPB-D1:
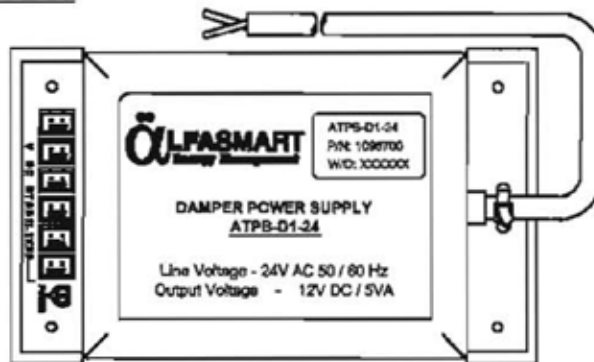
This power supply unit is designed to provide 12VDC stabilized power for 1 up-to 6 independent Gladiola damper units, by cables with quick-connections supplied each damper unit.

Splitter power supply unit ATS-3-24:

Splitter unit is designed to provide 12VDC stabilized power for 1 up-to 3 independent Gladiola damper units, by cables with quick-connections supplied with each damper unit. One can interconnect several splitters using connector wire_____ to a maximum of 15, all controlled by one IR Receiver with R/C control or Thermostat control.
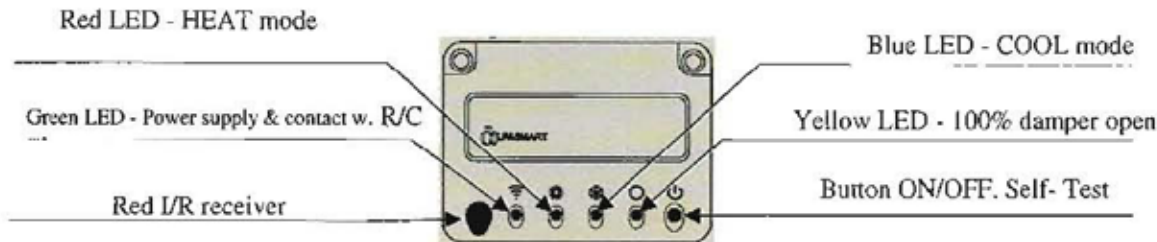"BMS" dry contact outlet to signal external units. Relay rating: 1A@120 VAC/30 VDC.   24V????????

General Specifications of power units:
- Operation voltage range: 24 VAC ± 10%, 50/60 Hz
- Output for each damper frames: 12 VDC, 100mA Max.
- Red LED light to indicate power supply activated.
- Operation relative humidity: 10% to 90% (None condensing).
- Operating temperature: (-) 15°C to (+) 65°C.
- Storage environment: (-) 30°C to (+) 85°C, with 5% to 95% RH, non-condensing.
- ABS plastic self extinguish.

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IR Receiver Unit ATDC-1:

Red LED - HEAT mode

Green LED - Power supply & contact w. R/C

Red I/R receiver

Blue LED - COOL mode

Yellow LED - 100% damper open

Button ON/OFF. Self- Test

Task

1. Displays operation modes by LED light at the IR Receiver.
2. Indication of R/C thermostat signals reception by buzzer at IR Receiver.
3. Push-button for manual start at IR Receiver, for full opening & shutting of damper without R/C thermostat. R/C operation eliminates this button's function.
4. Pace of updating data from R/C thermostat to IR Receiver - every 3 minutes.

This unit is designed to receive commands from R/C Thermostat to control the motorized damper. It will display operation modes of the air damper assembly and perform a self- test of the system. The IR Receiver is connected to the damper's frame by 6 wires telephone cable (quick-connect).
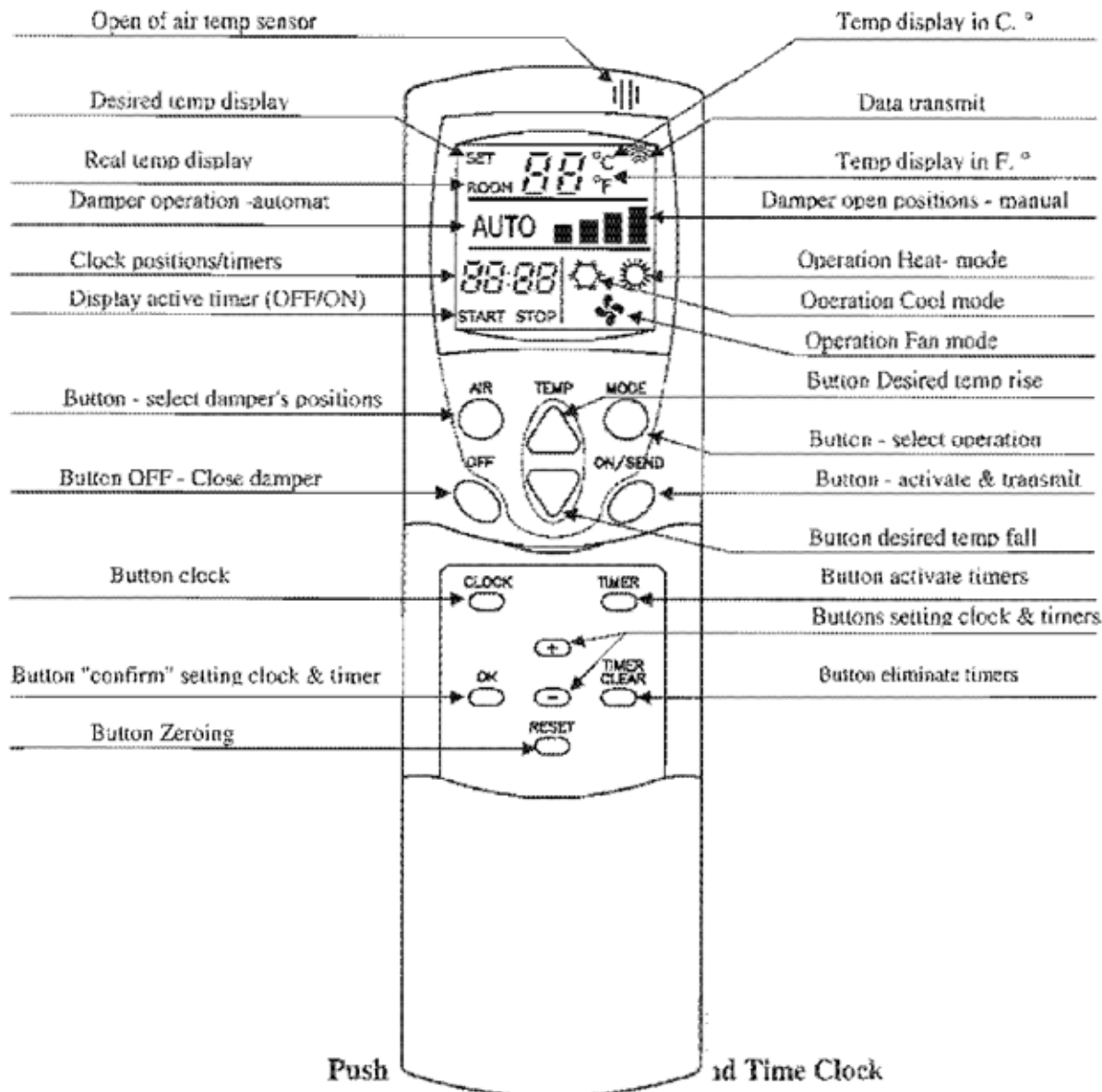
Operation Modes:

1. Cool - blue LED ON.
2. Heat - red LED ON.
3. Damper fully open - yellow LED ON.
4. Feed power proper - green LED ON continuously.
5. After 23 continuous minutes without contact to R/C - green LED flashing and damper fully opens (communication failure). Upon receiving command from R/C green LED ON continuously and the system will operate as per last R/C thermostat command.
6. Push-button ON/OFF, Self-Test:
   a. Short push on button will shut-off system (damper closed) or activate system (damper fully opened).
   Note: Once a command is received from R/C thermostat at this status, the system will operate as per R/C command.
   b. Continuous push 3 seconds will start SELF-TEST procedure. At beginning of the SELF-TEST a long "beep" is heard and damper will fully open (100%). All LED lights turn ON. SELF-TEST procedure will proceed while closing of damper in 4 stages accompanied by short "beep" (75%, 50%, and 25%) every 10 seconds. At end of each stage one LED light will shut-off up to full closing (0%), all LED lights OFF upon end of SELF-TEST. A long "beep" is heard and the damper will return to the last position of the R/C thermostat before SELF-TEST began. The R/C has no effect on the system during SELF-TEST.
   c. **Note:** Refrain from hiding the IR Receiver in a conduit, to avoid it being heated by the hot air (at HEAT). The IR Receiver must be exposed on the wall for "eye-contact" with R/C thermostat.
   d. For installment of IR Receiver use the screws and anchors provided.

R/C (Remote Control) Thermostat ATRC-D:

R/C thermostat with temp sensor built-in transmits in two ways; one is manual by the operator, or automatically every 3 minutes to the IR Receiver located in the room itself.
The R/C includes a real-time clock and 2 timers (START, STOP) allowing pre-programming ON and OFF.

Important: For proper communication, it is necessary to locate R/C thermostat at eye-sight with IR Receiver. Normal range is approximately 23 ft (7 meters).

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Open of air temp sensor	Temp display in C. °
Desired temp display	Data transmit
Real temp display	Temp display in F. °
Damper operation -automat	Damper open positions - manual
Clock positions/timers	Operation Heat- mode
Display active timer (OFF/ON)	Operation Cool mode
	Operation Fan mode
Button - select damper's positions	Button Desired temp rise
	Button - select operation
Button OFF - Close damper	Button - activate & transmit
	Button desired temp fall
Button clock	Button activate timers
	Buttons setting clock & timers
Button "confirm" setting clock & timer	Button eliminate timers
Button Zeroing	

Push .... nd Time Clock

- Pushing red button **ON / SEND** activates the system. As well transmits all data displayed in the screen to the IR Receiver. Upon pushing the one of the desired temp buttons desired temp is automatically displayed, real room-temp returns 4 seconds after release of button.
- Pushing blue "**OFF**" button transmits shut off command to the system. At this stage the screen will show room temp and Clock only.
- Pushing "**MODE**" button selects work mode by flashing at the various icons on the screen. For selection and activation of Selected Work Mode you must push red "**ON/SEND**" button within 5 seconds from MODE selection to send signal to IR Receiver.
- Upon selecting of "**COOL**" mode desired temp will automatically show 21° C. (failure choice).
- Upon selecting of "**HEAT**" mode desired temp will automatically show 25° C. (failure choice).
- Upon selecting of "**VENTILATION**" mode the real temp will show. Desired temp unavailable.
- Upon setting desired temp – push "**ON/SEND**" within 5 seconds from release of temp buttons, to send signal to IR receiver.
- Change temperature display between °C. & °F by simultaneously pushing the 2 temp buttons for 4 seconds.
- Pushing button "**AIR**" is to select damper's operation modes: one of 5 settings. Pushing **ON/SEND** button within 5 seconds after "AIR" mode selection to send signal to IR Receiver to confirm selection.

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- **Setting of real-time clock:** Push on button "CLOCK" will cause clock display to flash.
  Push on button "+" will advance clock time by 1 minute each push. Upon continuous push on buttons "+" or "-" the clock's Advance will be forward or backward at 1 hour per 1 second. The clock is of "24 Hours". Setting of time - by push on orange Button "OK". If button "OK" is not pushed within 5 seconds from release of buttons "+" or "-", the clock will not be set and Time display will return to its last setting before beginning of setting.

- <u>**Time Adjustment:**</u>
  Timing cycle of opening or closing of damper is available by R/C thermostat time clock. The operation depends on setting of clock to real time and setting "ON" and "OFF". The pre-set time cycle will transmit command ON and OFF to IR Receiver automatically. These transmitted commands are special that they do not activate the IR Receiver buzzer. Upon timers activation - display "START" and / or "STOP" show on screen.
  NOTE: These displays will vanish at end of the pre-set timer's cycle, erasing the ON and OFF settings.
  Push on button "TIMER" starts time clock for activating. "START" will flash. Setting of start time by pushing buttons "+" or "-" as in clock setting. Time setting must be confirmed by pushing button "OK". If button "OK" is not pushed within 5 seconds from release of "+" or "-" buttons, timing will not register in memory and timer's display will return to its former position. Before beginning of setting. Upon request for setting timer to shut-off, same order of steps should be done as in start setting, but timer's screen should show "STOP" by double push on button "TIMER".
  Timers erasing is performed by approach to proper timer by pushing button "TIMER" and erasing of the pre-programmed time by continuous push on "TIMER CLEAR".
  The button "RESET" eliminates all data on screen, displays for 1 second all the icons of the screen and ends by leaving room temp display and 4 flashing lines at the clock display.

- **"Weak" Batteries:** Attention: Long operation time of R/C thermostat will cause low quality display at the LCD screen of the R/C. At this stage the batteries should be replaced. At the R/C back - a sliding cover. Remove it and change batteries.
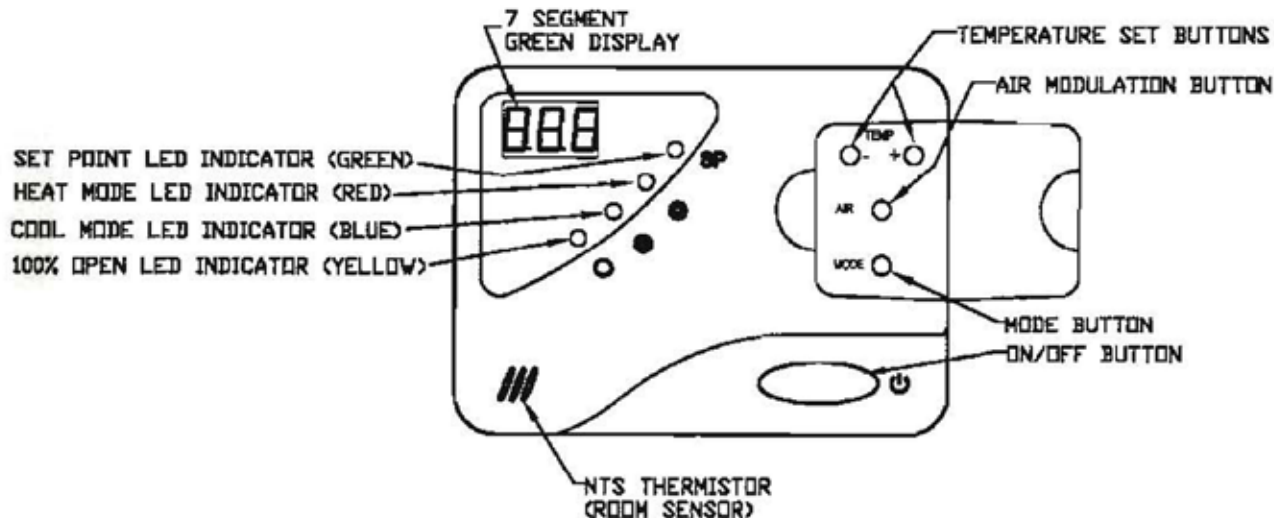
  Alkaline AAA. Install batteries at proper polarity. After change - re set clock to real time.

Specification: ????
1. Measuring room temp by R/C thermostat at 0.5° C. resolution (1° F.). Temp display in full figures.
2. Operation temp <u>25° to 70° C</u>   ???????.

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Thermostat Control Unit ATRTD-1C

Room Thermostat control with built-in temperature sensor, continuously measuring ambient zone/room temperature. It will display operation modes, air damper position and can perform a self-test of the system. The room thermostat control is connected to the damper unit by a 6 wires telephone cable (quick-connect).

Operation Modes:
1. Cool - blue LED light.
2. Heat - red LED light.
3. Damper fully open - yellow LED light.
4. Display ambient temperature shown by default. Setting demand temperature will be shown by green LED light on.
5. Push-button ON/OFF, Self-Test:
   a. Continuous push 3 seconds will start SELF-TEST procedure:
      At beginning of SELF-TEST the damper will fully open 100%. All LED lights turn ON. SELF-TEST procedure will proceed while closing the damper in 4 stages 75%, 50%, and 25%, every 10 seconds.
      At end of each stage one LED light will shut-off up to full closing (0%), all LED lights OFF upon end of SELF-TEST. The damper will return to the last position of the room thermostat before SELF-TEST began.
      The room thermostat has no effect on the system during SELF-TEST.
   b. Short push on button will shut-off system (damper closed) or activate system (damper fully opened).
   Note: Once a command is received from room thermostat at this status, the system will operate as per Room thermostat command.
6. Screws provided for installation of room Thermostat Control.

Thermostat Control, Push-Buttons Characteristics:

- Pushing "ON/OFF" button turn on or shut off the system. When the system is shut off, the word "OFF" will be display.
- Pushing "MODE" button selects work mode. With each selection the appropriate LED light turns on.
- Upon selecting of "COOL" mode desired temp will automatically show 22° C. (failure choice).
- Upon selecting of "HEAT" mode desired temp will automatically show 25° C. (failure choice).
- Upon selecting "VENTILATION" mode the real temp will show. Upon demand set point temp unavailable.
- Push "TEMP" buttons – or + only when room controller is turn on. Every push will show desired temp while green LED light is on.
- To change temp display between °C. & °F by simultaneously pushing the 2 temp buttons – and + for 4 seconds.
- Pushing "AIR" button is to select damper's operation modes, one of 5 settings, automatic or Manuel. In **Automatic** mode the display will show ambient temp and the capital letter "A" right after it. In both, Manual & automatic modes horizontal lines will be shown in the display in accordance to damper frame position: Lower line – 25%, middle line – 50%, upper line – 75%, all the three lines together – 100%.