MESTEK, INC.

MODEL HW-ECM INSTALLATION, OPERATION & MAINTENANCE MANUAL

**Low Temperature
High Wall Heating/Cooling Fan Coil
Units up to 2 Ton Capacity**

ETL LISTED
c ETL us
Intertek

INVESTING IN QUALITY, RELIABILITY & PERFORMANCE.

ISO 9001 QUALITY

Every product is manufactured to meet the stringent requirements of the internationally recognized ISO 9001 standard for quality assurance in design, development and production.

World Leading Design and Technology
Equipped with the latest air-conditioning test rooms and manufacturing technology, we produce over 50,000 fan coil units each year, all conforming to the highest international standards of quality and safety.

ETL SAFETY STANDARDS

All products conform to UL standard for Safety for Heating and Cooling Equipment UL1995 4th Edition, October 14, 2011;

All products conform to CSA standard for Safety for Heating and Cooling Equipment CSA C22.2 No.236-11, 4th Edition, October 14 2011.

The Highest Standards of Manufacturing
In order to guarantee the very highest standards and performance, we manage every stage in the manufacturing of our products. Throughout the production process we maintain strict control, starting with our extensive resources in research and development through to the design and manufacture of almost every individual component, from molded plastics to the assembly of units and controllers.

WEEE MARK

All products conform to the **"WEEE"** directive to guarantee correct standards of environmental solutions.

Quality Controlled from Start to Finish
Our highly-trained staff and strict quality control methods enable us to produce products with an exceptional reputation for reliability and efficiency, maintained over many years. As well as full CE certification and ISO 9001, several products ranges have UL / ETL safety approval in the USA and Canada, Eurovent performance and sound certification as well as ROHS compliance for Europe, giving you the confidence of knowing our company is the right choice when selecting fan coil units.

ALWAYS MAKE SURE THIS MANUAL REMAINS WITH THE UNIT. READ THIS MANUAL BEFORE PERFORMING ANY OPERATION ON THE UNIT.

A. General Description

This HighWall Unit is designed to meet and exceed demanding requirements for efficiency, quiet operation and appearance. The sleek profile and elegantly styled cabinet complements any interior design theme, while the microprocessor assures accurate environmental control.

Cabinet - the stylish cabinet is constructed of durable flame resistant acrylonitrile-butadiene-styrene (ABS) plastic. The silver white color and rounded corners provide its modern look.

Water Coil - the water coil has a large heat transfer surface and utilizes the latest fin profile technology. It combines an advanced technology approach with the security of a traditional design regarding tube thickness. The water coil is also equipped with an air vent valve and a water purge valve.

Integral Hoses - an integral hose is a synthetic elastomer tube, with stainless steel outer braiding and brass connectors, which enables quick, low cost connections with no brazing.

Blower and Motor - the unit incorporates only specially designed and tested EC motors, allowing the blower wheel to provide optimum performance in airflow-efficiency and quiet operation.

Filters - washable, easy-to-remove, fine mesh air filters are standard to all HighWall models. Tabs located on the front of the unit can be unsnapped, allowing the filter to be easily slid downward and removed. No tools are required, nor any dismantling of the equipment.

Air Grille Distribution - all units are equipped with both deflector blades and independent directional vanes, enabling supply air to be automatically distributed, and air flow and direction to be customized.

Microprocessor controls (S3 type)
The PCB (printed circuit board) Modbus microprocessor controls functionality of the indoor-fan motor, water valves (ON/OFF or modulating) and electric heater (optional), to maintain room conditions at a user-defined set point. Temperature settings, fan speeds and other control functions can be changed by either infrared handset or wired wall pad.

Electro-mechanical controls (W3 type)
A 24VAC power strip is provided. Louver stepping motor controlled from PCB. Normally open or normally closed contacts are standard, allowing connection and control of field devices.

- High efficiency EC motor.
- Cool, Heat, Auto, Dehumidifier and Fan modes.
- Sleep, Auto-Fan, Daily Timer, Auto-Restart with memory functions.
- User friendly remote control.
- Heat and cool temperature protections and safety cut out.
- Manual control panel in cabinet.
- Auxiliary switch for cooling and heating signal.

B. Technical Data
General Specification – HW-ECM Series

Product range: HW-ECM Hydronic High Wall 2 Pipe with EC Motor

		HW-[Size]-ECM				6	15	18
Unit Configuration		Configuration				2-Pipe		
		Number Of Fan Blowers				Single		
		Power Supply		(V/Ph/Hz)		115/1/60		
Performance Data	Air	Air Flow	H	CFM		294	379	464
			M			218	294	435
			L			171	218	335
	Cooling	Cooling Capacity	H	BTU/Hr		6967	10207	12602
			M			5534	8394	11069
			L			4620	6339	9040
		Sensible Cooling Capacity	H			4889	7126	8808
			M			3856	5822	7702
			L			3202	4357	6247
	Heating	Heating Capacity	H	BTU/Hr		11147	16331	20163
			M			8854	13430	17710
			L			7392	10142	14464
	Electrical	Fan motor power	H	W		18	26	30
			M			13	20	20
			L			10	13	13
		Fan Motor Running Current @ H 115V		A		0.284	0.364	0.544
	Sound	Sound Pressure Level H/M/L		dB(A)		39/31/26	45/34/31	49/44/37
	Hydronic Weight	Cooling Water Flow Rate	H	GPM		1.39	2.03	2.52
			M			1.1	1.68	2.2
			L			0.92	1.26	1.81
		Cooling Pressure Drop	H	Ft.wg		7.53	8.92	6.12
			M			5.09	6.37	4.91
			L			3.75	3.95	3.48
		Heating Water Flow Rate @H/M/L		GPM		Same as "Cooling Water Flow Rate"		
		Heating Pressure Drop	H	Ft.wg		6.03	7.13	4.89
			M			4.07	5.09	3.93
			L			3	3.16	2.79
		Water Content		gal		0.02	0.03	0.05
		Water Connections	Type			Socket (NPT Threaded Female)		
			In	in		1/2		
			Out					
		Condensate Drainage Connection				0.63		
		Net Weight		lbs		26.5	28.7	30.9

a. Cooling Mode (2-Pipe):
Return air temperature: 80°F DB/67°F WB.
Inlet/Outlet water temperature: 45°F/55°F

b. Heating Mode (2-Pipe):
Return air temperature: 70°F
Inlet water temperature: 140°F

Coil Data – 2-Pipe Systems

Model	Fin Height (inch)	Fin Length (inch)	Fins per Inch	No. of Rows	No. of Copper	No. of Circuits	Tube Diameter (inch)
HW-06-ECM	14.1	26.8		2	20	4	0.3
HW-15-ECM	14.1	26.8	19.5	2	26	5	0.3
HW-18-ECM	14.1	26.8		2	34	5	0.3

Sound Power and Pressure Data

Sound Pressure

Model		HW-06-ECM			HW-15-ECM			HW-18-ECM		
A-weighted Sound Pressure dB(A)		33.8	24.6	20.7	40.9	27.9	24.3	44.4	39.4	32
Sound Pressure in 1/3 Octave-bands (unit: dB)	31.5Hz	11.5	-8.4	-5.1	1.1	-4.6	-3.8	-5.7	-5.3	2.2
	63Hz	10	-3.8	-5.9	3.8	-6.2	-5.4	13.1	5.3	1.9
	125Hz	17	-0.8	-3.8	12.9	1.7	2.5	17.9	11.2	5.8
	250Hz	30.3	13.2	8.6	29	15.3	16.1	33.1	26.9	20.3
	500Hz	35.1	17.3	11.9	32.4	20.5	21.3	36.6	31.1	25.9
	1000Hz	32.3	11.9	7.1	31	16.4	17.2	34.7	29.3	22.2
	2000Hz	26.1	7.7	5.9	26.6	10.3	11.1	31.5	24.6	15.2
	4000Hz	18.3	6.6	6.1	16.9	6.3	7.1	22.5	15.3	8.7
	8000Hz	14.8	5.7	5.1	7.8	4.9	5.7	11.2	6.9	5.7
	16000Hz	8	-1.4	-1.3	-1.3	-2.2	-1.4	-1.1	1.5	-1.4
	Speed	H	M	L	H	M	L	H	M	L

Dimensional Drawings – HW-06/15/18-ECM
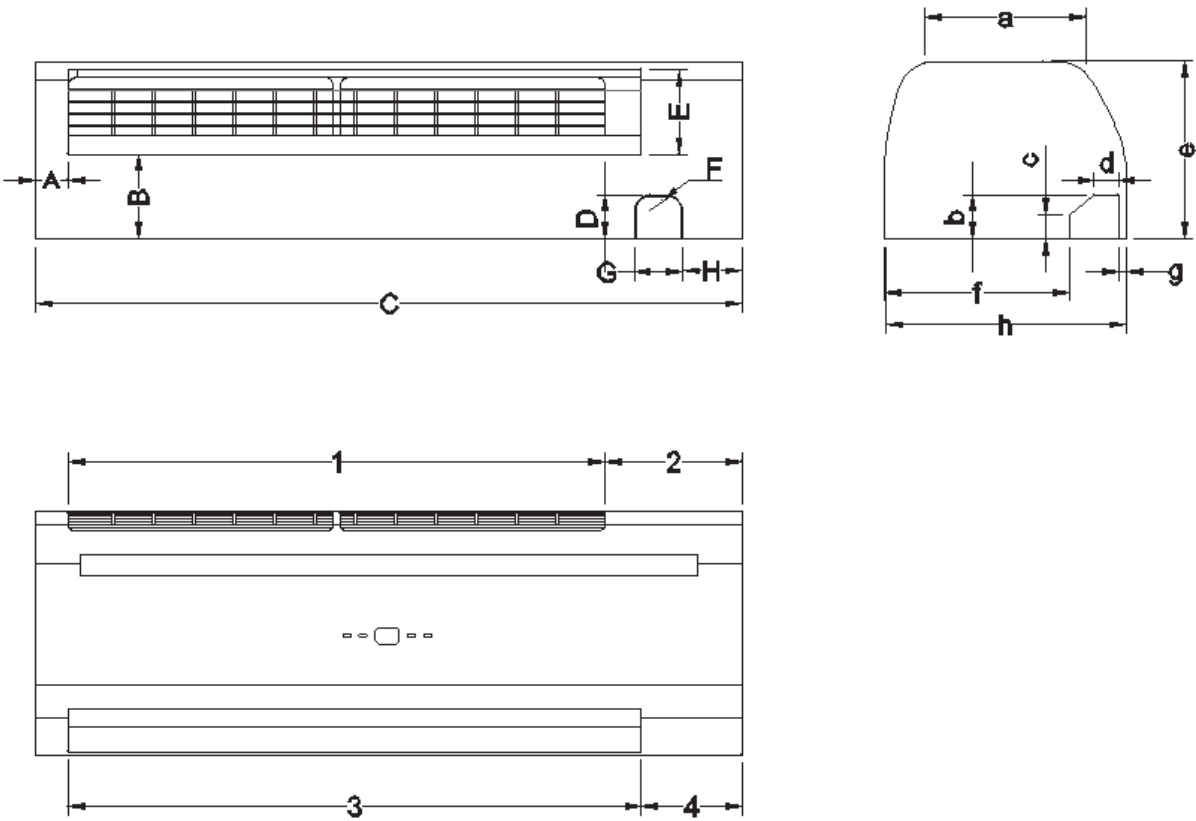
HW-06/15/18-ECM

Unit Dimensions							
A	B	C	D	E	F	G	H
1.57	4.13	34.45	2.17	4.13	R0.78	2.36	2.91

Unit Dimensions							
a	b	c	d	e	f	g	h
7.87	2.17	1.18	1.18	8.66	9.02	0.39	11.81

Unit Dimensions			
1	2	3	4
26.18	6.69	27.95	4.92

(All dimensions are shown in inches)

C. Service and Installation

Operating Limits

Power Supplies

Volt	Phase	Hz
110-120	1	60

Water Circuit

Minimum entering water temperature	35.6°F (+2°C)
Maximum entering water temperature	176°F (+80°C)
Water side recommended maximum pressure	232 PSI (1600 kPa)

Installation of HighWall Unit

Selecting a Location

Select the location for the HighWall unit with the following considerations:
1. The air inlet and outlet area should be clear without obstructions. The air should flow freely.
2. The HighWall unit should be mounted on solid wall.
3. The location should allow easy access to connect water pipes easily achieve drainage.
4. Ensure the clearance around the fan coil unit conforms to the following drawing.
5. The unit should be installed higher than eye level.
6. Avoid installing the unit with direct sunlight.
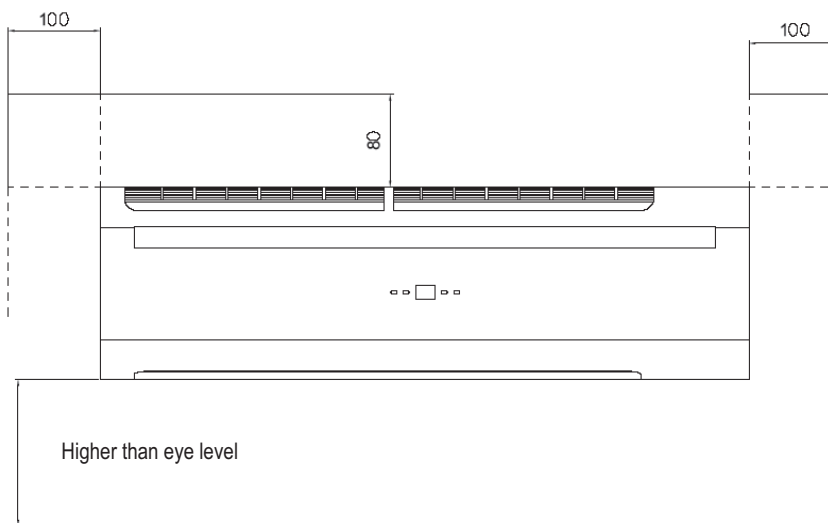
Notes:
Required clearance for maintenance and servicing is as shown above.
All dimensions shown in inches.

7. The signal receiver on the unit must be kept away from any high frequency emission source.
8. Keep the unit away from fluorescent lamps, which may affect the control system.
9. Avoid electromagnetic control system interference, ensure control wires are installed separately from 110 VAC power supply wires.
10. Use shielded sensor cables where electromagnetic waves present.
11. Install a noise filter if the power supply creates any disruptive noises.

Mounting Plate Dimensions
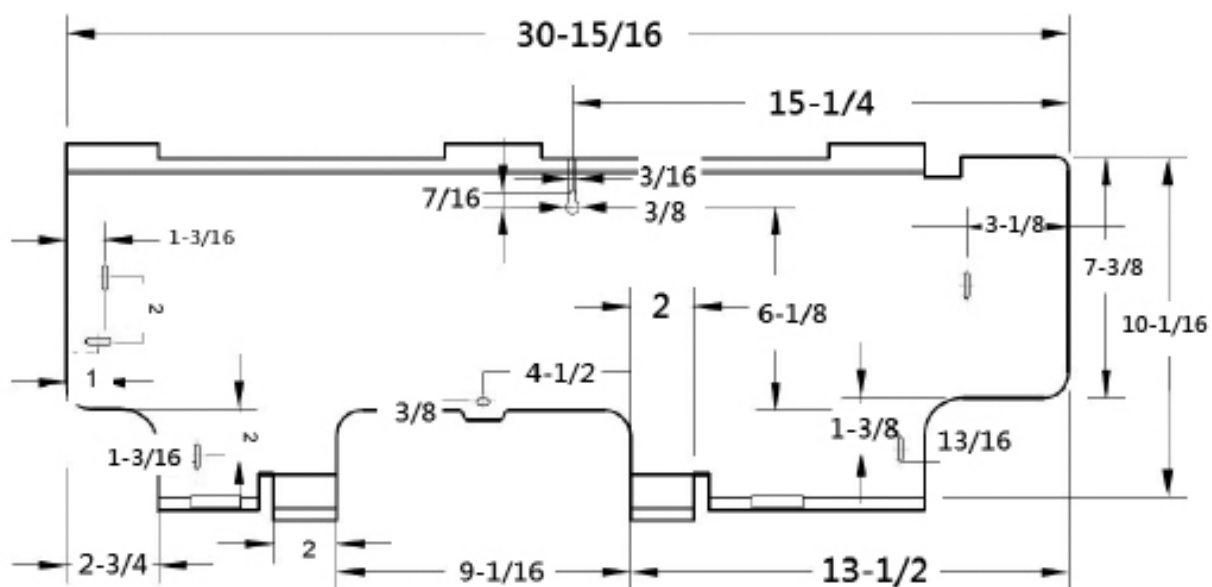
(All dimensions are in inches)

Installing the Mounting Plate

1. Select the structural position (e.g. a pillar or lintel) on the wall.
2. Then temporarily fasten the mounting plate on the wall with a steel nail.
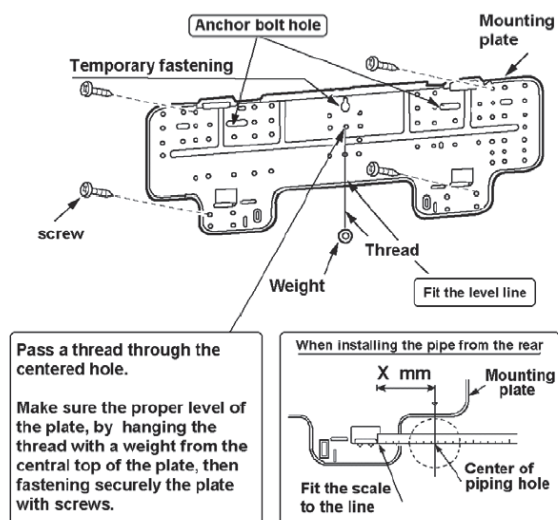
3. Mount the mounting plate horizontally as shown in the above figure or by means of gradiometer. Failure to follow this may cause water to drip indoors and create atypical noise.
4. Fix the mounting plate by means of expansion screws or tapping screws.

Drill a hole on the wall

Anchor plastic clip

Expansion screw

Drilling the Condensate Drain Hole

1. Ensure that the hole for condensate drain is correctly positioned. The height should be lower than the bottom edge of the indoor unit.
2. Drill a 2.5" diameter hole with a descending slope.
3. Seal it off with putty after installation.
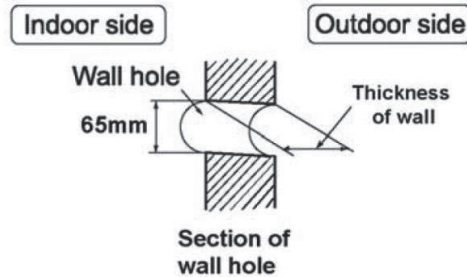
Installing the Hydronic Unit

1. Pass the piping through the hole in the wall and hook the indoor unit on the mounting plate by the upper hooks.
2. Move the body of the unit from side to side to verify if it is securely fixed.
3. While pushing the unit toward the wall, lift it slightly from beneath to hook it up on the mounting plate by the lower hooks.
4. Make sure the unit firmly rests on the hooks of the mounting plate.
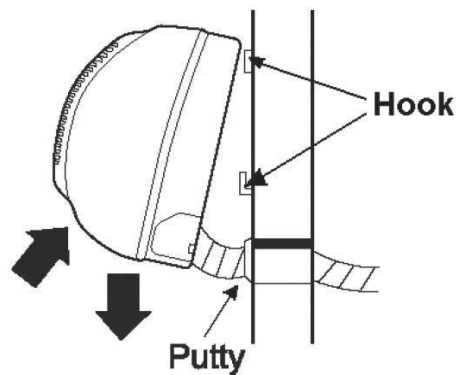
Drain Piping Works

1. Install the drain hose so that it slopes downward slightly for free drainage. Avoid installing it as shown in the below illustrations marked with an "X".
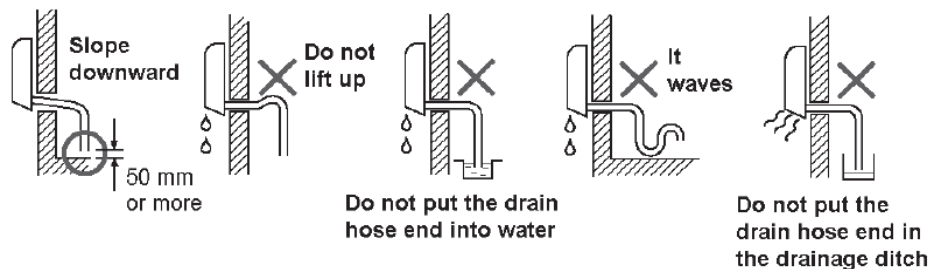
2. Put water in the drain pan and make sure that the water drains outdoors.
3. If the flexible drain hose provided with the indoor unit is not long enough, please extend it by joining it to a field supplied extension. Be sure to insulate the connecting part of the extension with a shield pipe as shown.
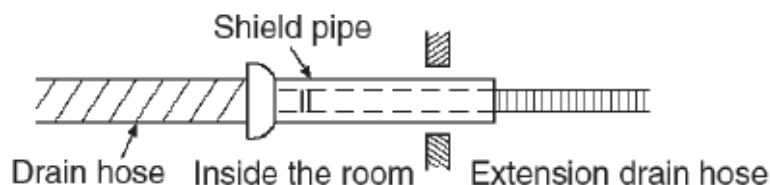
4. If the attached drain hose passes through an indoor area, insulate it with insulation material.

Unit Maintenance and Preparation

Opening and Closing Of Lift-Up Grille Cover
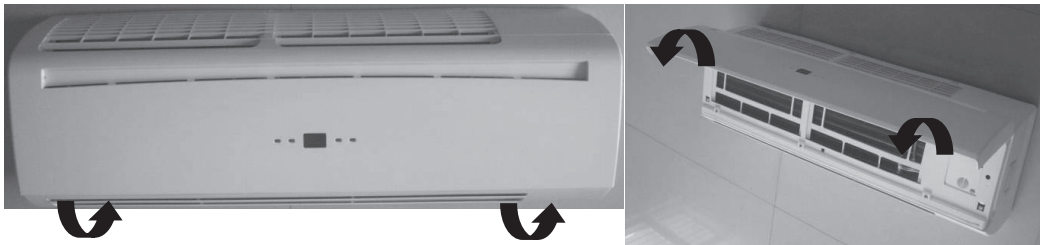
Open the grille cover by lifting from the bottom position indicated by the arrows.

Close the grille cover by pressing down at the positions indicated by the arrows..

Removing Front Cover Assembly

1. Set the horizontal louver to the horizontal position.
2. Remove the screw caps below the louver, and then remove the mounting screws.
3. Open the lift-up grille cover by grasping the panel at both sides as shown above.
4. Remove the remaining screws located in the center of the front cover.
5. Grasp the lower part of the front cover and pull the entire assembly out and up towards you.
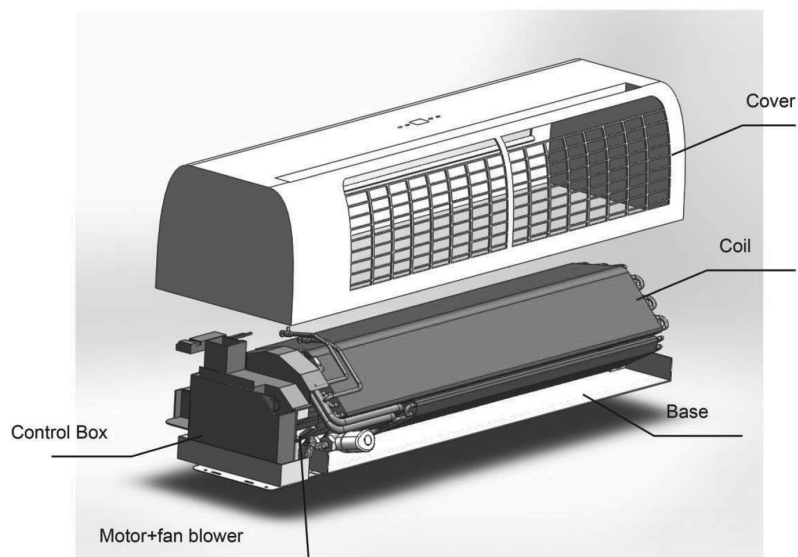
Air Purging

1. After connecting the water inlet and outlet pipes to the main supply lines turn on the main breaker and operate the unit in COOLING mode.
2. Open the water inlet valve and flood the coil.
3. Check all connections for water leakage. If no leak is found, open the purging valve with an open end wrench while supporting the unit with your other hand. Then purge the air trapped inside the coil. When performing this activity, take care not to touch the electrical parts.
4. Close the purging valve when no bubbles appear.
5. Open the water outlet valve.

Wiring Connections

Unit components are wired to the terminal block of the indoor unit. Wiring can be accessed from the terminal block inside the control box.

D. Control Specifications: Complete Control PCB - S Type Control

Abbreviations

Ts = Setting temperature   AUX1 = Hot water free contact
Tr = Room air temperature   AUX2 = Chilled water free contact
Ti1 = Chilled water coil temperature   MTV1 = Chilled Motorized valve
Ti2 = Hot water coil temperature   MTV2 = Hot Motorized valve

Definition of Input/Output

	I/O	Code	2-Pipe
Analogue Input	Return air sensor	AI1	Return air temperature (Tr)
	Coil sensor	AI2	Chilled / hot water coil circuit (Ti1)
Input	LED display / IR reciever	X-DIS1	Digital communication port to LED display / IR receiver board.
Digital input	Occupancy contact	On/Off	Window contacts: for remote ON/OFF (when DIPB SW1 = 1). Economy contacts: for remote activation of economy mode (when DIPB SW1 = 0).
Power input	Phase	L1	Power supply: 115V/1Ph/60Hz
	Neutral	N1	
	Earth	PE1	
Voltage output	Fan	CN4	Fan driver
	Valve 1	MTV1	2-pipe coil circuit valve output - chilled / hot water valve. Voltage output (L)
	Valve 2	MTV2	Reserved
Output	Stepping motor	CN1 / CN2	Louver stepping motor relay
	Auxiliary contact 2	AUX2	Cooling mode signal relay (NO). Voltage free contact. To ensure the sensitivity of the connection, please make sure max wiring length < 100ft.
	Auxiliary contact 1	AUX1	Heating mode signal switch (NO). Voltage free contact. To ensure the sensitivity of the connection, please make sure max wiring length <200" 100ft.

Wiring Schematic

ABG-S1.1

SWITCH

L1 L2

TERMINAL

| L1 | L2/N | ⏚ | V1 | V2 | EH |

FUSE

Electrical heater

TEMP. SWITCH

TR2

TR1

W1 C

Y1 C

YL/GR

BK
WH
RD
RD

BK
BL

L
N

VALVE1
VALVE2
HEAT
AUX1
AUX2

CN1

Reset switch
Reset switch

KEY

EH ON/OFF

PRO

S1
S2

Dip switch A
Dip switch B

S4 S3

CPU

CN4

CN1
CN2

FUSE

Renturn sensor (Tr)   AI1
2 pipe sensor (Ti1)   AI2
chilled /hot water
4-pipe coil circut sensor   AI3
(Ti2):hot water

AI1
AI2
AI3

CN3

A B A B

prog
DIS
TTL1

TTL1

EC MOTOR

A B

Legend:
DIPA-S1
SW1-5: set the unit address
SW6 :set unit type :master or slave
Mode Configuration
SW7=0;SW8=0; unit operates in cooling/heating
SW7=0;SW8=1; unit operates in cooling/heating
w/booster EH
SW7=1;SW8=0 ; unit operates in cooling
SW7=1;SW8=1; unit operates in cooling with primary
EH
DIPB-S2
SW1:Occupancy connect setting
SW2: Unit configuration setting: 0=2pipe
system;1=4-pipe system)
SW3:on/off valve configuration:0= no valve 1=with
valve (applicable to 2 pipe system only)
SW4:preheat setting:0=36C;1=28C
SW5,SW6,S3(jump)——RPM selection.
L ,N——Power supply
Y1:24V on/off valve output; (2pipe:cooling/heating);
4pipe:cooling)
V1 220V (or 110v)on. off valve output
W1:24V on/off valve output.   (4-pipe only:heating)
V2: 220V(or 110V)on off valve output

HEAT——Electrical heater
AI1:Return air temperature sensor(Tr)
AI2:Indoor coil temperature sensor1 (Ti1)
AI3:Indoor coil temoeraturesensor 2 (Ti2)
AUX1:Voltage free contact;ON:unit in heating mode.
AUX2:Voltage free contact;ON:unit in cooling mode.
ON/OFF:Occupancy contact
CN1. 2——Stepping motor
CN3——Serial BUS contacts.
CN4——Ec motor
DIS—Led receiver display
TTL—wired wall pad

Motorized Fan Speed Settings for Different Models on DIPB:

Unit Model	Speed (RPM)		
	Low	Medium	High
HW-06-ECM	600	700	900
HW-15-ECM	700	800	1100
HW-18-ECM	900	1100	1300
Default RPM	900	1200	1350

Mode configuration:

DIPA-S1		Model
SW7	SW8	Model setting
0	0	Cool-Heat
0	1	Cool-Heat + booster heater
1	0	Cooling only
1	1	Cool + primary heater

HighWall Unit ON/OFF

There are 3 ways to turn the system on or off:

a)   By the ON/OFF button on the handset or wired wall pad.
b)   By the programmable timer on the handset or wired wall pad.
c)   By the manual control button on the HighWall unit.

Power On Setting

There are 3 ways to turn the system on or off:

a)   Handset only user interface: When the power ON signal is received by the unit, the Mode, Fan Speed, Set temperature and Louver setting will be the same as the handset setting before the last power OFF.
b)   When the power ON signal is received by the HighWall unit, the Mode, Fan Speed, Set temperature, Louver setting and Timer ON/OFF weekly program will be the same as the handset setting before the last power OFF.

Control Logics For 2-Pipe System (Standard Unit)

With Thermoelectric Valve Configuration

COOL MODE
a) MTV2, AUX1 and heater are always off.
b) If $Tr \geq Ts + 1.8°F$ (or $+ 7.2°F$ if economy contact is activated), then cool operation is activated and MTV1 and AUX2 are turned on. Indoor fan runs at set speed.
c) If $Tr < Ts$, then cool operation is terminated and MTV1 and AUX2 are turned off. Indoor fan runs at set speed.
d) The range of Ts is 60.8 - 86°F
e) Indoor fan speed can be adjusted to low, medium, high and auto.
f) When turned on, MTV1 requires 30 seconds before it is fully open.
g) When turned off, MTV1 requires 120 seconds before it is fully closed.
h) When the unit is turned off, the indoor fan will shut down after 5 seconds.

LOW TEMPERATURE PROTECTION OF INDOOR COIL
a) If $Ti1 \leq 35.6°F$ for 2 minutes, then MTV1 and AUX2 are turned off. If indoor fan is set for low speed, it will run at medium speed. If it is set at medium or high speed, it will keep running at the same speed.
b) If $Ti1 \geq 41°F$ for 2 minutes, then MTV1 and AUX2 are turned on. Indoor fan runs at set speed.

FAN MODE
a) Indoor fan runs at the set speed while heater, MTV1, MTV2, AUX1 and AUX2 are turned off.
b) Indoor fan speed can be adjusted to low, medium and high.

PRE-HEAT
a) If $Ti1 < 96.8°F$ (or $82.4°F$ depending on DIP setting), then MTV1 and AUX1 are turned on, indoor fan runs at 200RPM.
b) If $Ti1 \geq 100.4°F$ (or $86°F$ depending on DIP setting), then MTV1 and AUX1 are turned on, indoor fan runs at set speed.
c) If the indoor coil temperature sensor is damaged, then the pre-heat time is set for 2 minutes. Indoor fan runs at set speed.

POST-HEAT
a) If $Ti1 \geq 100.4°F$, then MTV1 and AUX1 are turned off. Indoor fan continues to run at set speed.
b) If $96.8°F \leq Ti1 \leq 100.4°F$, then MTV1 and AUX1 are turned off. Indoor fan maintains its original state.
c) If $Ti1 < 96.8°F$, then MTV1 and AUX1 are turned off. Indoor fan runs at 200RPM.
d) If the indoor coil temperature coil is damaged, then the post-heat time is set for 3 minutes with the indoor fan running at set speed.

OVER-HEAT PROTECTION OF INDOOR COIL
a) If $Ti1 \geq 167°F$, then MTV1 and AUX1 are turned off. Indoor fan remains on and runs at high speed.
b) If $Ti1 < 158°F$, then MTV1 and AUX1 are turned on. Indoor fan remains on and runs at set speed.
c) If the indoor coil temperature sensor is damaged, then the protection mode will be overridden and the unit will work according to the pre-heat and post-heat program.

DEHUMIDIFICATION MODE
a) MTV2, AUX1 and heater are always off.
b) If $Tr \geq 77°F$, then MTV1 and AUX2 will be turned on for 3 minutes, and then off for 4 minutes.
c) If $60.8°F \leq Tr < 77°F$, then MTV1 and AUX2 will be turned on for 3 minutes, and then off for 6 minutes.
d) If $Tr < 60.8°F$, MTV1 and AUX2 will be turned off for 4 minutes.
e) At the end of the above dehumidification cycle, the system will decide the next dehumidification control option. Indoor fan will run at low speed throughout the dehumidification process.

AUTOMODE
a) Every time the unit is turned on, MTV1 is on while AUX1, AUX2 and fan are off. MTV2 and the heater are always off. After 120 seconds, the subsequent operation mode is decided according to the following:
    i.   If the coil temperature sensor (Ti1) $\geq 96.8°F$, then MTV1, AUX1 and fan turn on or off according to HEAT mode.
    ii. If $Ti1 < 96.8°F$, then MTV1, AUX2 and fan turn on or off according to COOL mode.
b) Unit remains in AUTO COOL or AUTO HEAT mode throughout the operating cycle until the user changes the mode manually or restarts the unit.
c) Should the Ti1 sensor fail or be damaged, auto mode will not function.

Note: AUTO COOL or AUTO HEAT operations are the same as COOL or HEAT mode respectively.

Sleep Mode

a) The sleep mode can only be set when the unit is in cool mode or heat mode.
b) If the sleep mode is activated when the unit is in cool mode, then the indoor fan will run at low speed and Ts will increase by 3.6ºF over 2 hours.
c) If the sleep mode is activated when the unit is in heat mode, then the indoor fan will run at set speed and Ts will decrease by 3.6ºF over 2 hours.
d) Changing the mode of operation will cancel the sleep mode.

The cool mode sleep profile is:
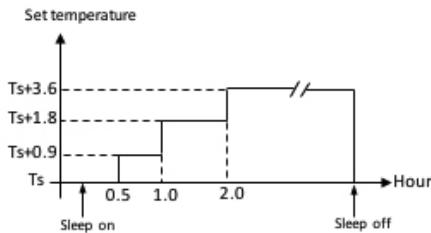
The heat mode sleep profile is:
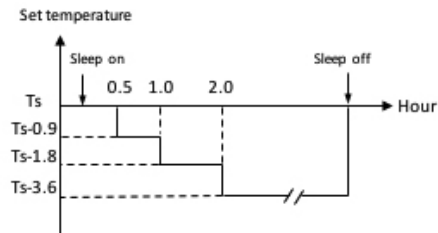
Auto Fan Speed

In COOL mode, the fan speed cannot change until it has run for more than 30 seconds. Fan speed is regulated according to the profile below.
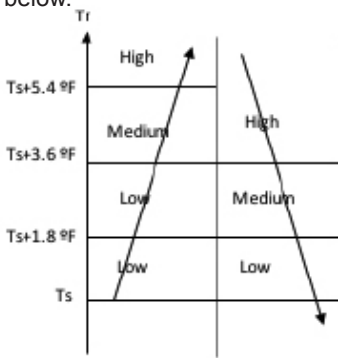
In HEAT mode, the fan speed cannot change until it has run for more than 30 seconds.
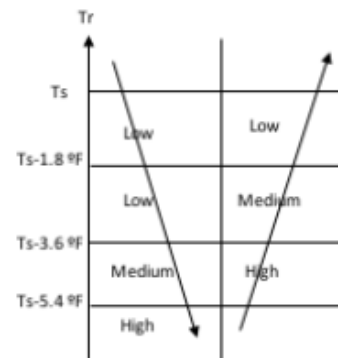
LED Lights

For all units Power / Operation LED light (both green)	
Unit on	Power LED Off, Operation LED On
Unit in standby	Power LED On, Operation LED Off

LED Display and Error Description

For all units - Operation LED light (Green)			
Error Description	Blink	Reason	Remedy
Electrical heater failure	Green LED blinks 1 times, stops for 3s	Only for unit with EH. EH safety switch is open.	1. Change fan speed to high. 2. Replace the damaged EH safety switch.
Indoor coil sensor 2 failure	Green LED blinks 2 times, stops for 3s	Ti2 sensor unplugged or damaged.	1. Check if Ti2 plug is connected or not. 2. Check if sensor's resistance is correct or not.
Return air sensor failure	Green LED blinks 3 times, stops for 3s	Room sensor unplugged or damaged.	1. Check if Tr plug is connected or not. 2. Check if sensor's resistance is correct or not.
Indoor coil sensor 1 failure	Green LED blinks 4 times, stops for 3s	Ti1 sensor unplugged or damaged.	1. Check if Ti1 plug is connected or not. 2. Check if sensor's resistance is correct or not.
Indoor coil low temperature protection	Green LED blinks 5 times, stops for 3s	Water temperature is lower than 37.4ºF.	Check the water temperature.
Indoor coil over heat protection	Green LED blinks 6 times, stops for 3s	Water temperature is higher than 158ºF.	Check the water temperature
EC motor failure	Green LED blinks 9 times, stops for 3s	No EC motor feedback	1. Check DIPB-SW5 and SW6 setting. 2. Check the EC motor.

E. Control Specifications: Flexible Control PCB - W Type Control

Abbreviation
Ti1 = Chilled water coil temperature

Definition of Input/Output

I/O		Code	2-Pipe
Analogue Input	Chilled water Sensor	AI1	Coil sensor (Ti1)
Power input	High Speed	Lo	24 Voltage input (NO). If any speed is powered, the unit is turned on. If no speed receives power, the unit is turned off.
	Medium Speed	Med	
	Low Speed	Hi	
Power input	Phase	L	Power supply: 115V/1Ph/60Hz
	Neutral	N	
	Earth	GND	
Output	EC motor	CN3	EC motor output
	Stepping motor	CN1, CN2	Stepping motor output
	Electric Heater Signal	CN4, CN5	Electric Heater control signal
	LED Display	X-DIS	LED Display signal

ABG-W1.1

Wiring Schematic

SWITCH

L1 L2

Connect to thermostat

24V control signal

Legend:

CN1,CN2:Stepping motor
CN3:EC motor output
CN4,CN5:Electrical heat on/off
contact, it is optional.
X-DIS:Led display
TTL:Wired wallpad,change
the motor rpm.
0~10VDC: EC motor control
signal.
S2~S4: Speed selection

TERMINAL

L1 L2/N ⊕ G0 G1 G2

Y1 W1

R L

TR2

Electrical heater

FUSE

Electrical heater control signal From thermostat

TEMP. SWITCH

CN4

FUSE

CN5 RY-10A

L BK
N BL
Lo OR
Me BR
Hi YL
   WH
24V-N GY
   RD 0-10VDC
   GR INPUT

X-DIS   TTL   AI1

CN2
CN1

DIP s1~s4
ON
1 2 3 4

CPU

CN3
BLDC

T

A B A B CN6

CN3 MOTOR

X-DIS

TTL1

CN1 2

16

F. Users Interface

Remote Control Handset

Adjust Set Temperature
Press down or up button to decrease or increase the desired room temperature.
Note: Temperature can not be set in Fan mode.

Mode
Press this button to advance the mode in the following sequence:
Cool→Dry→Fan→Heat→Auto Cool-Heat
[Both Cool and Heat symbol light up]

Fan
Press this button to advance the fan speed as follows:
Auto→Low→Medium→High

Under Fan mode, only low, medium and high are available.
Under Dry mode, fan speed will be inhibited and will not be displayed.

On Timer
First press shows the last timer setting. Subsequent pressing will change the timer setting in 1 minute intervals. Hold down the On button continuously to increase the updating speed.

Cancel Timer
Press this button to cancel all timer settings.

Sleep
Press to activate the energy saving Sleep function which automatically adjusts the temperature to provide a more comfortable sleep, ie for use in bedrooms.

On/Off
Press to switch on or off the air conditioner.

Louver
Press this button to change louver angle to a fixed position 1,2,3,4, auto sweep or stop.

Swing
It is not available

Clock
Press down or up button for 2 seconds to activate. The current clock setting will decrease or increase at 1 minute intervals on each press.
The speed of interval updating increases after 4 seconds of continuous key press. It will update at high speed after 6 seconds of continuous key press.

Off Timer
First press shows the last timer setting. Subsequent pressing will change the timer setting in 1 minute intervals. Hold down the Off button continuously to increase the updating speed.

FAN   MODE
SLEEP LOUVER
TIMER FUNCTION
ON CANCEL OFF
SWING

Cool Dry Fan Heat Signal

Fan Speed

Set Temperature

Sleep

Louver

Clock

Timer On/Off

17

G. Sensor Resistance R-T Conversion Table

Resistance :   R (77°F) = 10KΩ ± 1%
Beta Constant :   B (25/85) = 3977 ± 1%

T (°F)	Rmin (KΩ)	Rnom (KΩ)	Rmax (KΩ)	T (°F)	Rmin (KΩ)	Rnom (KΩ)	Rmax (KΩ)
-22	174	182.7	191.8	39.2	26.11	26.9	27.71
-20.2	163.4	171.5	179.9	41	24.85	25.59	26.34
-18.4	153.6	161.1	168.9	42.8	23.65	24.35	25.05
-16.6	144.4	151.3	158.5	44.6	22.52	23.17	23.83
-14.8	135.8	142.2	148.9	46.4	21.45	22.06	22.68
-13	127.8	133.8	140	48.2	20.44	21.01	21.59
-11.2	120.3	125.8	131.6	50	19.48	20.02	20.55
-9.4	113.3	118.4	123.8	51.8	18.58	19.7	19.58
-7.6	106.7	111.5	116.5	53.6	17.71	18.18	18.65
-5.8	100.6	105.1	109.7	55.4	16.9	17.33	17.77
-4	94.9	99.03	103.3	57.2	16.12	16.53	16.94
-2.2	89.51	93.39	97.41	59	15.39	15.77	16.16
-0.4	84.5	88.11	91.85	60.8	14.69	15.05	15.41
1.4	79.8	83.17	86.64	62.6	14.03	14.37	14.7
3.2	75.39	78.53	81.76	64.4	13.41	13.72	14.03
5	71.26	74.18	77.19	66.2	12.81	13.1	13.4
6.8	67.37	70.1	72.9	68	12.24	12.52	12.79
8.6	63.73	66.26	68.88	69.8	11.7	11.96	12.22
10.4	60.3	62.67	65.1	71.6	11.19	11.43	11.67
12.2	57.08	59.28	61.55	73.4	10.71	10.93	11.15
14	54.05	56.1	58.22	75.2	10.24	10.45	10.66
15.8	51.19	53.12	55.08	77	9.8	10	10.2
17.6	48.51	50.3	52.14	78.8	9.374	9.57	9.765
19.4	45.98	47.66	49.37	80.6	8.969	9.16	9.351
21.2	43.61	45.17	46.77	82.4	8.584	8.77	8.957
23	41.36	42.82	44.31	84.2	8.218	8.4	8.582
24.8	39.25	40.61	42	86	7.869	8.047	8.225
26.6	37.26	38.53	39.83	87.8	7.537	7.71	7.885
28.4	35.38	36.56	37.78	89.6	7.221	7.39	7.56
30.2	33.6	34.71	35.85	91.4	6.92	7.085	7.251
32	31.93	32.97	3402	93.2	6.633	6.794	6.956
33.8	30.35	31.32	32.3	95	6.36	6.517	6.675
35.6	28.85	29.76	30.68	96.8	6.099	6.252	6.407
37.4	27.44	28.29	29.15	98.6	5.85	6	6.151

Resistance :   R (77°F) = 10KΩ ± 1%
Beta Constant : B (25/85) = 3977 ± 1%

T (°F)	Rmin (KΩ)	Rnom (KΩ)	Rmax (KΩ)	T (°F)	Rmin (KΩ)	Rnom (KΩ)	Rmax (KΩ)
100.4	5.614	5.759	5.907	167	1.417	1.474	1.532
102.2	5.387	5.53	5.673	168.8	1.37	1.426	1.482
104	5.172	5.31	5.451	170.6	1.326	1.379	1.434
105.8	4.966	5.101	5.238	172.4	1.282	1.335	1.389
107.6	4.769	4.901	5.034	174.2	1.241	1.292	1.344
109.4	4.582	4.71	4.84	176	1.201	1.25	1.302
111.2	4.402	4.527	4.654	177.8	1.162	1.211	1.261
113	4.231	4.353	4.477	179.6	1.125	1.172	1.221
114.8	4.067	4.186	4.307	181.4	1.089	1.135	1.183
116.6	3.911	4.027	4.144	183.2	1.055	1.1	1.146
118.4	3.761	3.874	3.989	185	1.021	1.065	1.111
120.2	3.618	3.728	3.84	186.8	0.9891	1.032	1.077
122	3.481	3.588	3.697	188.6	0.9582	1	1.044
123.8	3.35	3.454	3.561	190.4	0.9284	0.9697	1.012
125.6	3.225	3.326	3.43	192.2	0.8998	0.9401	0.9818
127.4	3.105	3.204	3.305	194	0.8721	0.9115	0.9522
129.2	2.99	3.086	3.185	195.8	0.8455	0.8839	0.9237
131	2.88	2.974	3.07	197.6	0.8198	0.8573	0.8961
132.8	2.774	2.866	2.959	199.4	0.795	0.8316	0.8696
134.6	2.673	2.762	2.854	201.2	0.7711	0.8069	0.8439
136.4	2.576	2.663	2.752	203	0.748	0.783	0.8192
138.2	2.483	2.568	2.655	204.8	0.7258	0.7599	0.7953
140	2.394	2.477	2.562	206.6	0.7043	0.7376	0.7722
141.8	2.309	2.39	2.472	208.4	0.6836	0.7161	0.7499
143.6	2.227	2.306	2.386	210.2	0.6635	0.6953	0.7283
145.4	2.149	2.225	2.304	212	0.6442	0.6752	0.7075
147.2	2.073	2.148	2.224	213.8	0.6255	0.6558	0.6874
149	2.001	2.074	2.148	215.6	0.6075	0.6371	0.6679
150.8	1.931	2.002	2.075	217.4	0.59	0.619	0.6491
152.6	1.865	1.934	2.005	219.2	0.5732	0.6015	0.631
154.4	1.801	1.868	1.937	221	0.5569	0.5846	0.6134
156.2	1.739	1.805	1.872				
158	1.68	1.744	1.81				
159.8	1.623	1.686	1.75				
161.6	1.569	1.63	1.692				
163.4	1.516	1.576	1.637				
165.2	1.466	1.524	1.583				

H. Troubleshooting Guide

The fan coil does not start up		
	No voltage	- Check for presence of voltage - Check fuse on board
	Mains switch in the "OFF position	- Place in the "ON" position
	Faulty room control	- Check the room control
	Faulty fan	- Check fan motor

Insufficient output		
	Filter clogged	- Clean the filter
	Air flow obstructed	- Remove obstacles
	Room control regulation	- Check the room air sensor
	Incorrect water temperature	- Check the water source

Noise and vibrations		
	Contact between metal parts	- Check for loosening parts
	Loose screws	- Tighten screws

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