

# INSTALLATION & OPERATING INSTRUCTIONS

## \_HLH - SERIES



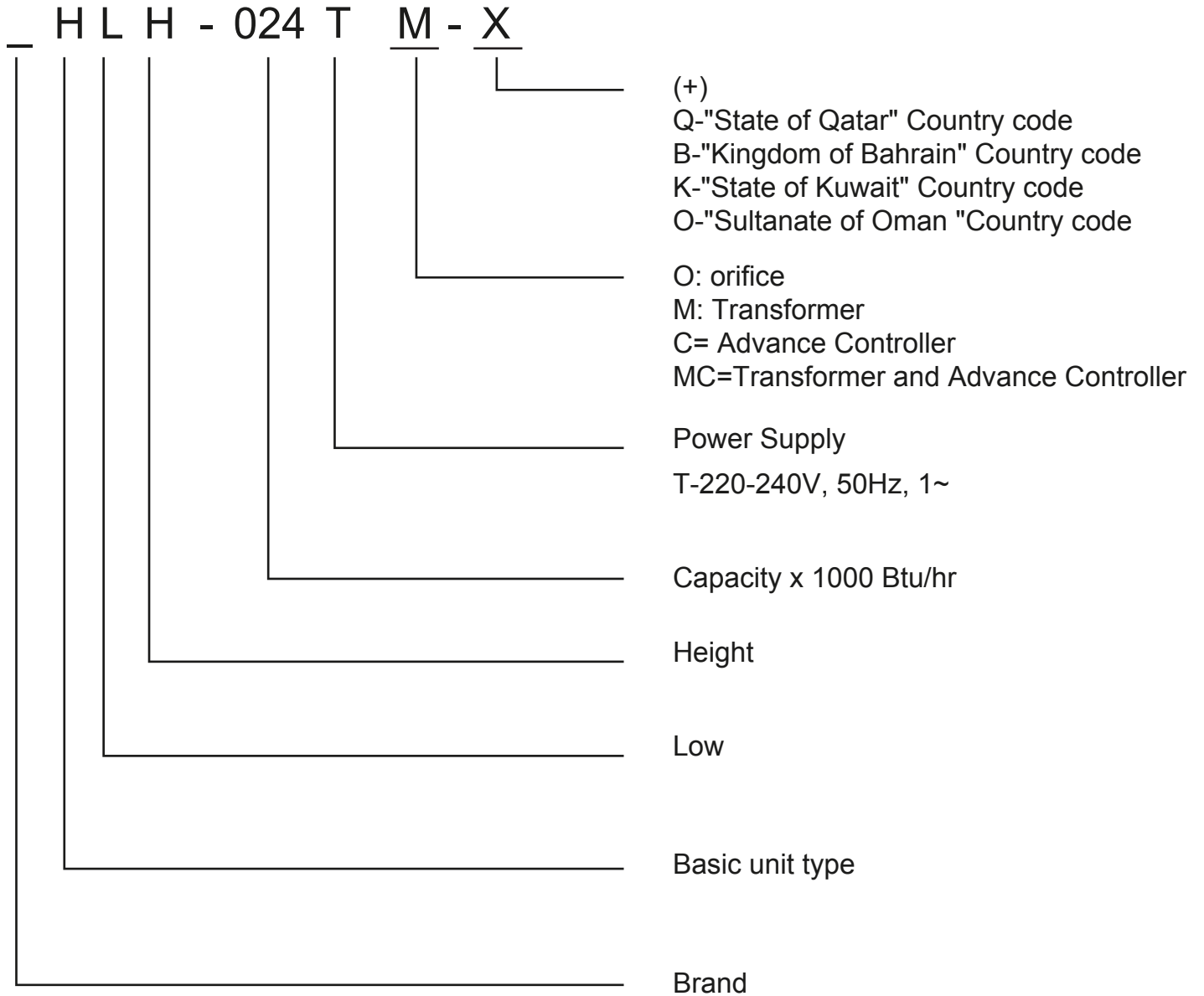


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# 1. MODEL NOMENCLATURE



# 3.0: GENERAL INFORMATION

The Indoor unit to which these instructions apply in versatile, and your installing contractor may have applied it with an outdoor cooling unit.

Please become familiar with the provisions of the limited warranty applicable to this unit. We suggest you record on your limited warranty the complete model and serial number and date of installation of this new indoor unit. The model number and serial number are listed on the rating plate, located either on the inner control box panel or on the outer coil door panel. This information may be helpful if a replacement part is required at a later date.

Expect for the need to clean or change the air filter your unit will require little service. Therefore these instructions include only a few suggestions relating to the use and care of this unit, but you should become familiar with these pointers

**WARNING : DO NOT REMOVE SERVICE ACCESS PANELS AND ATTEMPT UNIT SERVICE WITHOUT DISCONNECTING ALL POWER CABLES**

## **BLOWER MOTOR**

The blower motor bearings are pre lubricated by motor manufacturer and may not require attention for an indefinite period of time. However, our Recommendations are as follows

Motors without oiling ports

Re lubricated and sealed. No further lubrication should be required, but in case of bearing problems, The blower and the motor end bells can be disassemble And the bearings re lubricated by a qualified service person.

In any event, clean motor periodically to prevent the possibility of overheating due to an accumulation of dust and dirt on windings or on the motor exterior. And as suggested elsewhere in these Instructions, the air filter should be kept airflow and the motor depends upon sufficient air flowing across and through it to keep from overheating.

## **FUSE LINKS**

These are provided as backup protection for the primary automatic reset high temperature limits. If a fuse link should Open without an obvious reason, such as , insufficient air flow, the primary limit should be checked for proper calibration or replaced

**Indoor units are IP-X0 protected**

**WARNING: THE FUSE LINK MUST BE REPLACED, NOT JUMPED, JUMPING FUSE LINK MAY HELP TO CREATE AN UNSAFE CONDITION**

**NOTE:** Fuse links are not applicable to units without electrical heating elements

## **FILTER MAINTENANCE:**

Check filter every sixty (60) days of operation under normal use and, if required clean or replace. Replacement filters should be the same size, or larger, and the same type as originally supplied. If these filters are a permanent type they may cleaned in warm soapy water and replaced. The unit must not run without filter, not with a dirty filter for a long period of time. If system is equipped with electric air cleaner Instead of conventional type air filters, consult the air cleaner Maintenance instruction.

## **INDOOR COIL**

Check periodically and clean if necessary with warm water and mild detergent.

# 2.1: GENERAL

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The information contained in this manual has been prepared to assist in the proper installation, operation and maintenance of the air conditioning system. Improper installation, or installation not made in accordance with these instructions, can result in unsatisfactory operation and/or dangerous conditions, and can cause the related warranty not to apply.

Read this manual and any instructions packaged with separate equipment required to make up the system prior to installation. Retain this manual for future reference.

To achieve optimum efficiency and capacity, the indoor cooling coils listed in the condensing unit specification sheet should be used.

**IMPORTANT:** We recommend replacement of any HVAC equipment that has been subjected to flooding in order to avoid any risk of injury or harm.

**IMPORTANT:** Use all available safety precautions during the installation and servicing of any HVAC equipment.

Reference the model nameplate and brand label on the unit for the following product information:

- Model Number
- Serial Number
- Country of Origin
- Rated Voltage and Frequency
- Rated T1 and T3 conditions for:
- Rated Current
- Rated Power (kW)
- Rated Capacity
- Rated EER

The Estimated Annual Energy Consumption of this product is calculated using the following formula:

Estimated Annual Energy Consumption = Rated Power (kW) at T1 conditions multiplied by 2700 working hours.

## 2.1 Checking Product Received

Upon receiving unit, inspect it for any shipping damage. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company. Check condensing unit model number, electrical characteristics and accessories to determine if they are correct and match the original order from the local distributor. Check system components (evaporator coil, condensing unit, evaporator blower, etc.) to make sure they are properly matched.

## 2.2 Application

Before installing any air conditioning equipment, a duct analysis of the structure and a heat gain calculation must be made. A heat gain calculation begins by measuring all external surfaces and openings that gain heat from the surrounding air and quantifying that heat gain. A heat gain calculation also calculates the extra heat load caused by sunlight and by humidity removal.

There are several factors that the installers must consider:

- Outdoor unit location
- System refrigerant charge
- Indoor unit blower speed
- System air balancing
- Proper equipment evacuation
- Indoor unit airflow
- Supply and return air duct design and sizing
- Diffuser and return air grille location and sizing

## 2.3. Information on R410a & Tools

Manifold Sets:  
-Up to 800 PSIG High Side  
-Up to 250 PSIG Low Side

Manifold Hoses:  
-Service Pressure Rating of 800 PSIG

Recovery Cylinders:  
-400 PSIG Pressure Rating

### CAUTION

*R-410A systems operate at higher pressures than R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.*

### 2.3.1 SPECIFICATION OF R-410A:

**Application:** R-410A is not a drop-in replacement for R-22; equipment designs must accommodate its higher pressures. It cannot be retrofitted into R-22 condensing units.

**Physical Properties:** R-410A has an atmospheric boiling point of -62.9°F and its saturation pressure at 77°F is 224.5 psig.

**Composition:** R-410A is an azeotropic mixture of 50% by weight difluoromethane (HFC-32) and 50% by weight pentafluoroethane (HFC-125).

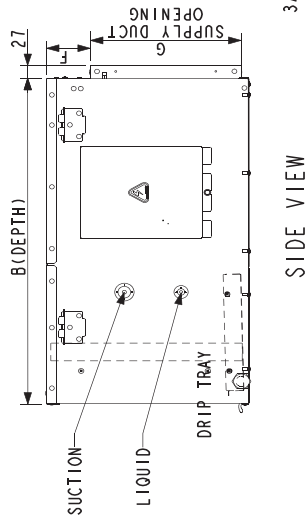
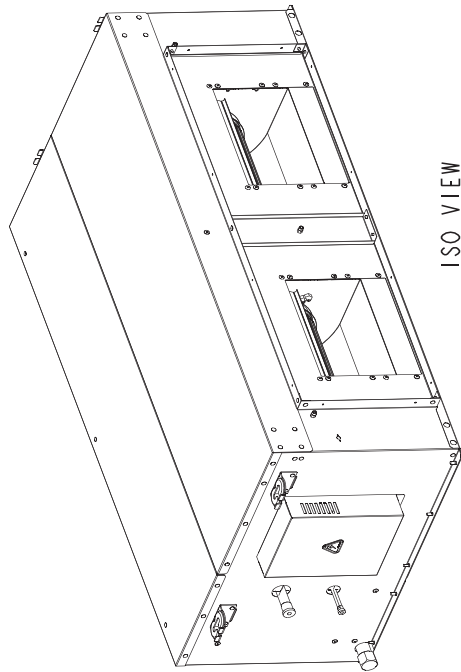
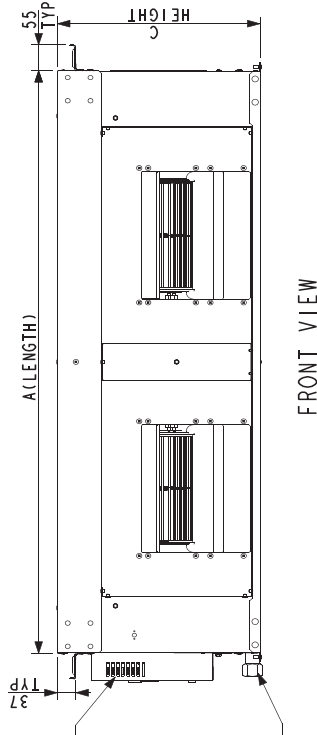
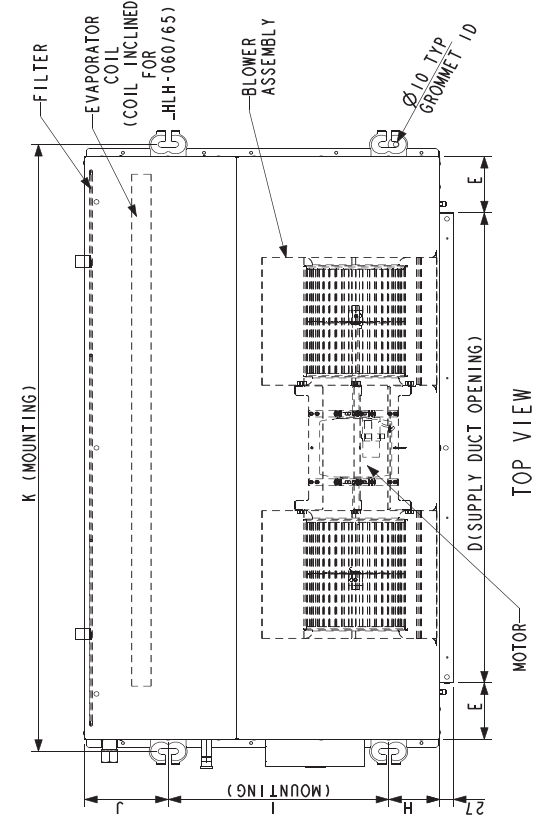
**Pressure:** The pressure of R-410A is approximately 60% (1.6 times) greater than R-22. Recovery and recycle equipment, pumps, hoses and the like need to have design pressure ratings appropriate for R-410A. *Manifold sets need to range up to 800 psig high-side and 250 psig low-side with a 550 psig low-side retard. Hoses need to have a service pressure rating of 800 psig. Recovery cylinders need to have a 400 psig service pressure rating.* DOT 4BA400 or DOT BW400.

**Combustibility:** At pressures above 1 atmosphere, mixture of R-410A and air can become combustible. R-410A and air should never be mixed in tanks or supply lines, or be allowed to accumulate in storage tanks. Leak checking should never be done with a mixture of R-410A and air. Leak checking can be performed safely with nitrogen or a mixture of R-410A and nitrogen.

### 2.3.2 QUICK REFERENCE GUIDE FOR R-410A

- R-410A refrigerant operates at approximately 60% higher pressure (1.6 times) than R-22. Ensure that servicing equipment is designed to operate with R-410A.
- R-410A refrigerant cylinders are pink in color.
- R-410A, as with other HFC's is only compatible with POE oils.
- Vacuum pumps will not remove moisture from oil.
- R-410A systems are to be charged with liquid refrigerants. Prior to March 1999, R-410A refrigerant cylinders had a dip tube. These cylinders should be kept upright for equipment charging. Post March 1999 cylinders do not have a dip tube and should be inverted to ensure liquid charging of the equipment.
- Do not install a suction line filter drier in the liquid line.
- A liquid line filter drier is standard on every unit. Only manufacturer approved liquid line filter driers can be used. These are Sporlan (CW083S) and Alco (80K083S) driers. These filter driers are rated for minimum working pressure of 600 psig.
- Desiccant (drying agent) must be compatible for POE oils and R-410A.

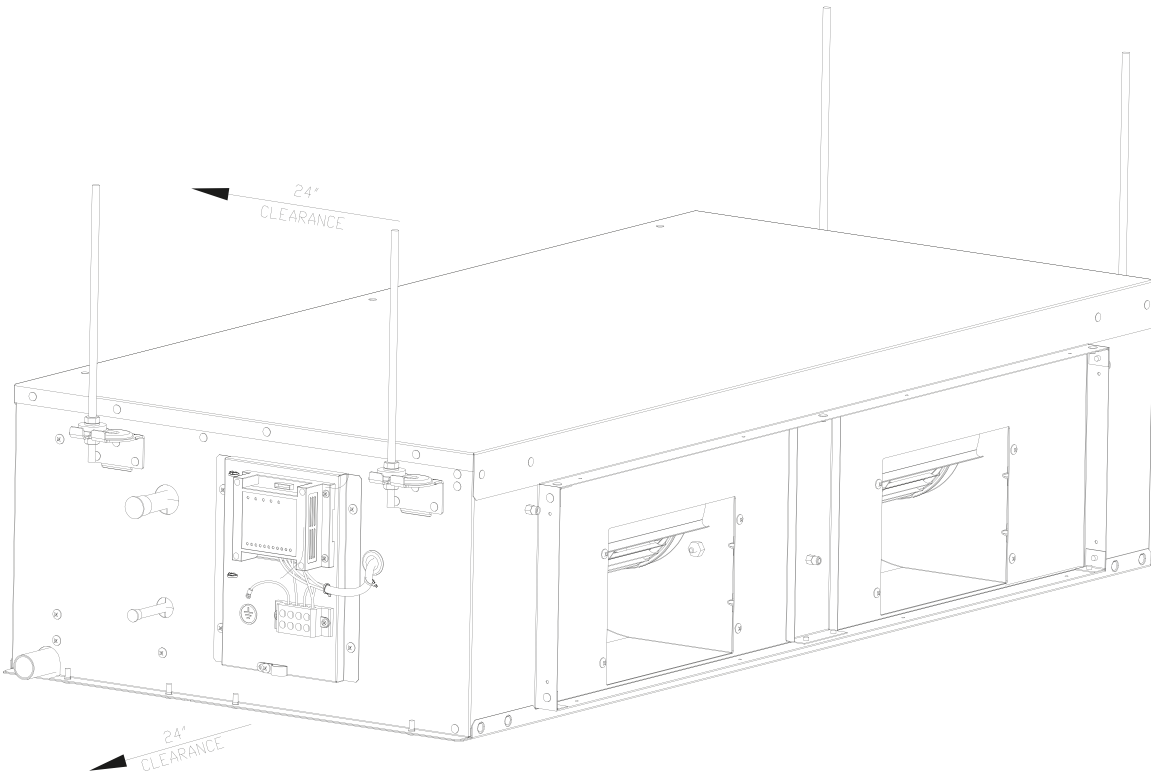
# 3. UNIT DIMENSION



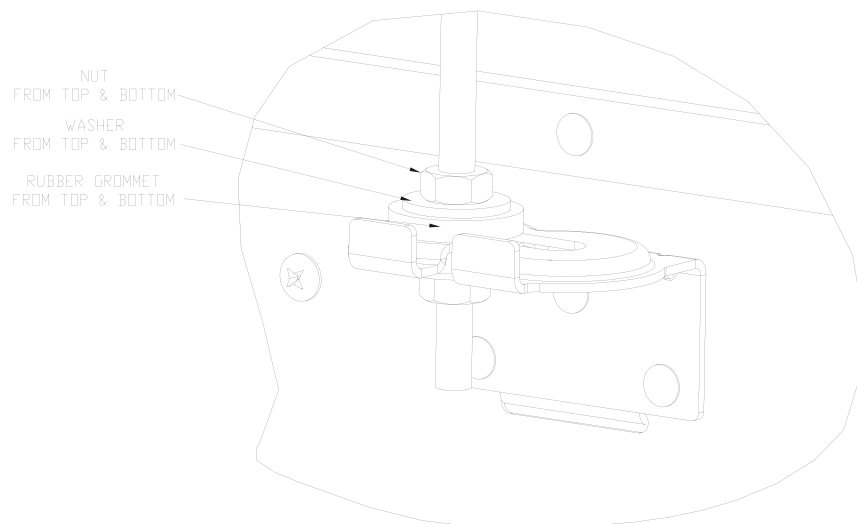
MODEL-T SERIES	MODEL-TM SERIES	A	B	C	D	E	F	G	H	I	J	K	SUC. SIZE	LIO. SIZE
_HLH-12	-	977	600	310	815	81	52	242	75	390	135	1304	5/8"	3/8"
_HLH-018	-	977	600	310	815	81	52	242	75	390	135	1304	3/4"	3/8"
_HLH-024/30	_HLH-018/24/30	1252	600	310	1010	121	52	242	75	390	135	1304	3/4"	3/8"
_HLH-036/42	_HLH-036/42	1252	700	400	1010	121	87	297	100	435	165	1304	3/4"	3/8"
_HLH-048/54	_HLH-054	1652	700	400	1200	226	87	297	100	435	165	1704	7/8"	3/8"
_HLH-065	_HLH-065	1652	900	400	1200	226	87	297	126	557	217	1704	7/8"	3/8"



## 4. INSTRUCTIONS FOR INSTALLATION



- Locate the unit as shown in the below figure
- Hang it on the threaded bolts of size 8mm dia
- Lock the unit on the hangers as shown in the below figure



**Note:** Please follow the local safety guidelines building codes and instructions.

## 5. SERVICE INSTRUCTIONS

### **⚠ WARNING**

THESE INSTRUCTION ARE INTENDED AS AN AID TO QUALIFIED.LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION,ADJUSTMENT AND OPERATION OF THIS UNIT READ THESE INSTRUCTIONS TROROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION.FALUIRE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION.ADJUSTMENT SERVIC OR MAINTENENCE POSSIBLY RESULTING IN FIRE ELECTRICAL SHOCK,PROPERTY DAMAGE,PERSONAL INJURYOR DEATH.

### MAINTENANCE

For continuing high performance, and to minimize possible equipment failure,it is essential that periodic maintenance be Performed on this equipment.Consult your local dealer as to the proper frequency of Maintenance and the availability of a maintenance contract.

### **⚠ WARNING**

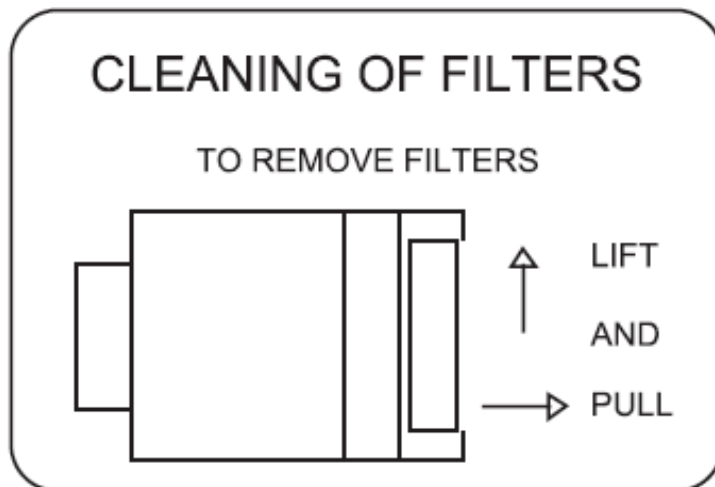
UNITS WITH CIRCUIT BREAKER(S) MEET REQUIREMENTS AS A SERVICEISCONNET SWITCH,HOWEVER,IF ACCESS IS QUIRED TO THE LINE SIDE(COVERED) OF THE CIRCUIT BREAKER WITH THE BREAKER (S) DEENERGIZED CONTACT WITH THE LINE SIDE CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

### BLOWER MOTOR AND WHEEL

Inspect the blower motor and wheel for cleanliness.with the system air filter in place,it should be several years before it would become necessary to clean the blower motor and wheel. If it becomes necessary to remove the blower assembly from the unit, see instruction on removal and disassembly of motor,blower and heater parts. The blower motor and wheel may be cleaned by using a vacuum with a soft brush attachment. Remove grease with a mild solvent such as Hot water and detergent.Be careful not to distrub the balance weight (clips) on the blower wheel blades.Do not drop or bend wheel as balance will be affected.

### Instruction for air Filter removal

**CAUTION** : Do not operate the system without a filter in place.



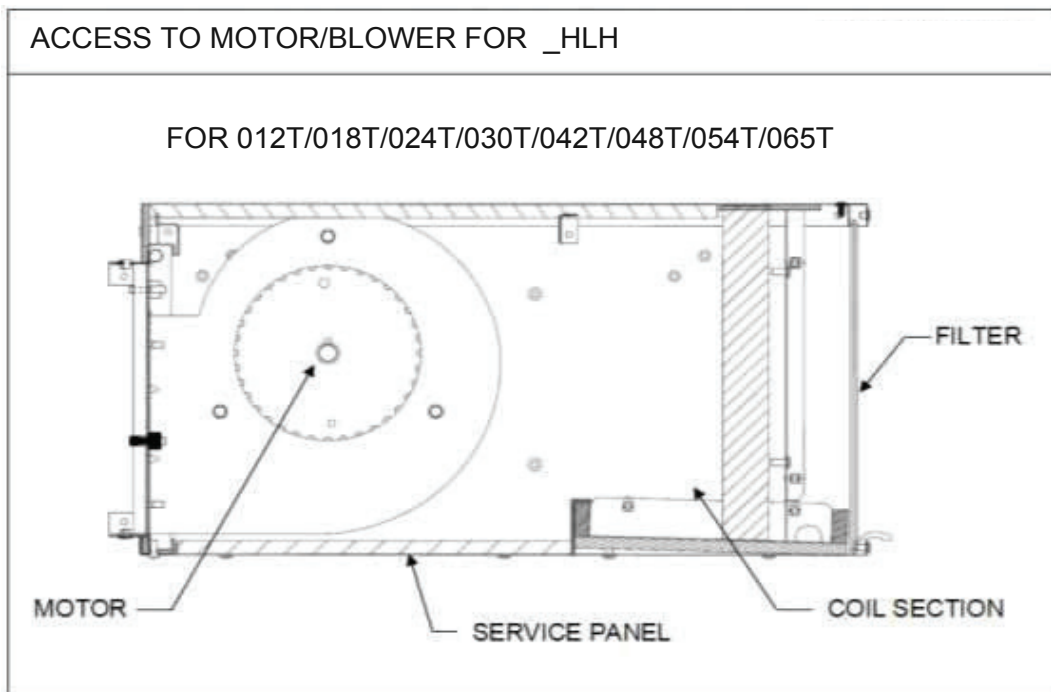
**Note:** The supply cord instruction " If cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard".

## INDOOR COIL - DRAIN PAN-DRAIN LINE

Inspect the indoor coil once each year for cleanliness and clean as necessary. In some cases, it may be necessary to remove the filter and check the return side of the coil with a mirror and flashlight.

- Generally, the coil can be easily cleaned when it is dry. If the coil is coated with dirt or limit, blow compressed air nitrogen through the supply air side of the coil fins. Blowing dirt or lint from the return air side of the coil into filter or cardboard placed between filter and coil. Be sure lint and dirt is removed from the filter and return air system.
- If the coil is coated with oil or grease, clean it with a mild detergent and water solution. Rinse the coil thoroughly with clear water. Be careful not to splash water excessively into unit and system.
- Inspect the drain pan and condensate drain at the same time the cooling coil is checked. Clean the drain pan and condensate drain by removing any foreign matter from the pan. Flush the pan and drain tube with clear water.
- If the drain tube is restricted, it can generally be cleaned with high pressure water. Remove the drain line from the unit. Away from the pan and coil to clear the drain.

**IMPORTANT:** Do not use caustic household drain Cleaners in the condensate pan or near the indoor coil. Drain cleaners will quickly damage the indoor coil.



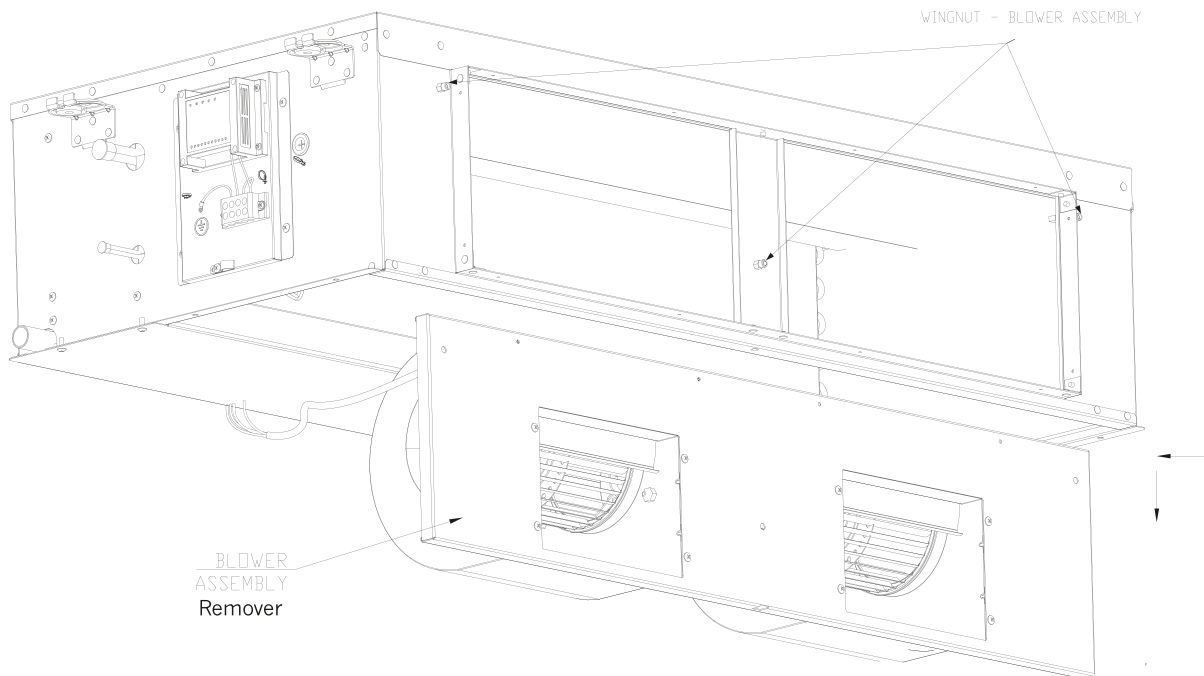
## 5. BLOWER ASSEMBLY REMOVAL AND REPLACEMENT (BOTTOM ACCESS PANEL)

Removing the blower assembly is not required for normal service and Maintenance. Removal is necessary for replacement of defective parts such as motor, blower wheel and electric heaters(s) after extended use. Removal of the blower assembly may become necessary for thorough cleaning of the blower motor and wheel.

### **⚠ WARNING**

**IF REMOVAL OF THE BLOWER ASSEMBLY IS REQUIRED, ALL DISCONNECT SWITCHES SUPPLYING POWER TO THE EQUIPMENT MUST BE DE-ENERGIZED AND LOCKED ( IF NOT IN SIGHT OF UNIT ) SO THE FIELD POWER WIRES CAN BE SAFETY REMOVED FROM THE BLOWER ASSEMBLY. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.**

Sr.No	Model No	Part Name	Weight (Kg)
1	_HLH-012/018	Fan panel assembly	14.0
2	_HLH-024/030	Fan panel assembly	16.0
3	_HLH-036/042	Fan panel assembly	19.0
4	_HLH-048/054	Fan panel assembly	20.0
5	_HLH-065	Fan panel assembly	23.0



## 6. ELECTRICAL DATA

### 6.1 POWER WIRING

It is important that proper electrical power is available for connection to the unit model being installed. See the unit nameplate, wiring diagram and electrical data in the installation instructions.

If required, install a branch circuit disconnect of adequate size located within sight of and readily accessible to the unit.

Supply circuit power wiring must be 75°C minimum Copper conductors only. See electrical data for ampacity, wire size and circuit protector requirement. Supply circuit protective devices may be either Fuses or HACR type circuit breakers.

Power wiring is connected to the power terminal block.

see wiring diagrams attached to indoor and outdoor sections to be connected and control wiring diagram booklet supplied with Outdoor heat pump section.

Do not leave excess field control wiring label inside unit, pull excess control wire to outside of unit and provide strain relief for field control wiring on inside of cabinet at point wiring penetrates cabinet.


Make sure, after installation, separation of control wiring and power wiring has been maintained.

### 6.2 CONTROL WIRING

**IMPORTANT:** class 2 low voltage control wire should not be run in conduit with power wiring and must be separated from power wiring, unless class 1 wire of proper voltage rating is used.

Low voltage control wiring should be 18Awg Color-coded (105°C minimum) for lengths longer than 100ft 16Awg wire should be used.

### 6.3. GROUNDING

 <b>WARNING</b>
<b>THE UNIT MUST BE PERMANENTLY GROUNDED. FAILURE TO DO SO CAN RESULT IN ELECTRICAL SHOCK CAUSING PERSONAL INJURY OR DEATH.</b>

Grounding may be accomplished Metal conduit when installed in accordance with electrical codes to the unit cabinet.

### 6.4 Electrical Ratings

#### Indoor Unit ( \_HLH Series - 50Hz)

MODEL	POWER SUPPLY	MAX CURRENT (A)	Cable size (core X sq.mm) Copper	MCB RATING
_HLH-012TO	220-240V/50Hz/1~	2	3 X 1.5	4
_HLH-018TO	220-240V/50Hz/1~	2	3 X 1.5	4
_HLH-024TM/TO	220-240V/50Hz/1~	2	3 X 1.5	4
_HLH-030TM/TO	220-240V/50Hz/1~	2	3 X 1.5	4
_HLH-036TM	220-240V/50Hz/1~	3	3 X 1.5	6
_HLH-042TM/TO	220-240V/50Hz/1~	3	3 X 1.5	6
_HLH-048TM	220-240V/50Hz/1~	3	3 X 1.5	6
_HLH-054TM	220-240V/50Hz/1~	4	3 X 1.5	6
_HLH-065TM	220-240V/50Hz/1~	4	3 X 1.5	6

# 7. PHYSICAL AND ELECTRICAL DATA (Scroll Compressor)

TABLE FOR TECHNICAL DATA													
AIR HANDLING UNIT MODEL				_HLH-018TM	_HLH-024TM	_HLH-030TM	_HLH-036TM	_HLH-042TM	_HLH-042TM	_HLH-048TM	_HLH-054TM	_HLH-065TM	_HLH-065TM
CONDENSING UNIT MODEL				_AGL-018TA	_AHM-024TS	_AHM-030TS	_AHM-036TS	_AHM-042TS	_AHM-042MS	_AHM-048MS	_AHM-054MS	_AHM-054MS	_AHM-065MS
AMBIENT TEMP 35 °C	EVAP ENTERING AIR TEMP.	27 DB / 19 WB °C	TMBH	15.4	21.9	25.2	29.5	37.4	38.1	39.1	45.4	48.9	58.7
			SMBH	13.0	17.7	20.9	25.2	29.5	30.0	31.5	36.5	42.7	47.7
		24.4 DB / 17.2 WB °C	TMBH	14.4	20.7	23.7	27.7	35.5	36.0	36.9	42.7	46.3	55.5
			SMBH	12.2	17.1	19.5	23.7	28.2	28.3	29.8	34.5	40.7	45.3
AMBIENT TEMP 46 °C	EVAP ENTERING AIR TEMP.	29 DB / 19 WB °C	TMBH	13.8	19.8	22.9	27.1	33.8	34.1	34.5	40.3	44.0	51.0
			SMBH	13.1	18.9	21.3	25.5	31.7	31.7	32.3	38.1	43.1	50.6
		24.4 DB / 17.2 WB °C	TMBH	12.4	18.2	21.0	24.0	31.3	31.3	32.2	37.3	40.9	48.4
			SMBH	11.0	15.9	18.0	21.4	26.1	26.0	27.3	31.8	37.6	42.0
AIR FLOW PERFORMANCE (DRY COIL)	LOW	CFM		440	745	840	1170	1250	1250	1195	1315	1740	1740
			MED	515	770	890	1225	1290	1290	1355	1450	1865	1865
			HIGH	610	790	945	1275	1355	1355	1495	1645	1990	1990
NOISE LEVEL	LOW	dBA		37.8	40.8	46.3	45.8	45.9	45.9	46.9	48.1	51.3	51.3
			MED	38.8	41.3	46.5	46.3	46.7	46.7	48.1	49.1	52.0	52.0
			HIGH	40.6	41.7	47.5	47.1	47.4	47.4	49.1	50.7	52.6	52.6
EXTERNAL STATIC PRESSURE (ESP)			IN (Pa)	0.1 (25)	0.1 (25)	0.1 (25)	0.15 (37)	0.15 (37)	0.15 (37)	0.15 (37)	0.2 (50)	0.2 (50)	0.2 (50)
NUMBER OF COMPRESSORS				1	1	1	1	1	1	1	1	1	1
NUMBER OF REFRIGERANT CIRCUIT FOR AHU				1	1	1	1	1	1	1	1	1	1
EXPANSION DEVICE/REFRIGERANT - R410A				Thermostatic Expansion Valve									
ELECTRICAL DATA	POWER SUPPLY	AIR HANDLING UNIT	PH-HZ-VOLT	1-50-230	1-50-230	1-50-230	1-50-230	1-50-230	1-50-230	1-50-230	1-50-230	1-50-230	1-50-230
		CONDENSING UNIT		1-50-230	1-50-230	1-50-230	1-50-230	1-50-230	3-50-400	3-50-400	3-50-400	3-50-400	3-50-400
	POWER INPUT	AIR HANDLING UNIT	KW	0.07	0.10	0.15	0.17	0.23	0.23	0.27	0.29	0.40	0.40
		CONDENSING UNIT		1.18	1.68	1.99	2.26	2.88	2.94	2.98	3.54	3.54	4.61
	CIRCUIT BREAKER SIZE	AIR HANDLING UNIT	AMPS	15	15	15	15	15	15	15	15	15	15
		CONDENSING UNIT		25	25	25	32	32	20	20	25	25	25
	FULL LOAD CURRENT	AIR HANDLING UNIT	AMPS	0.3	0.4	0.6	0.9	1.4	1.3	1.3	1.4	1.7	1.8
		CONDENSING UNIT		5.1	7.5	9.0	9.8	12.5	6.1	6.2	7.1	7.1	8.9
COIL FACE AREA		AIR HANDLING UNIT	SQ. FT	3.6	3.56	3.56	4.47	4.47	4.47	6.10	6.10	8.20	8.20
		CONDENSING UNIT		11.1	6.71	6.71	9.18	9.18	9.18	9.18	10.34	10.34	11.92
NO OF FANS		AIR HANDLING UNIT	NOS.	2	2	2	2	2	2	2	2	2	2
		CONDENSING UNIT		1	1	1	1	1	1	1	1	1	1
NET WEIGHT		INDOOR UNIT	KG	37	37	42	52	52	52	68	68	76	76
		OUTDOOR UNIT		57	54	58	72	82	82	92	89	89	95

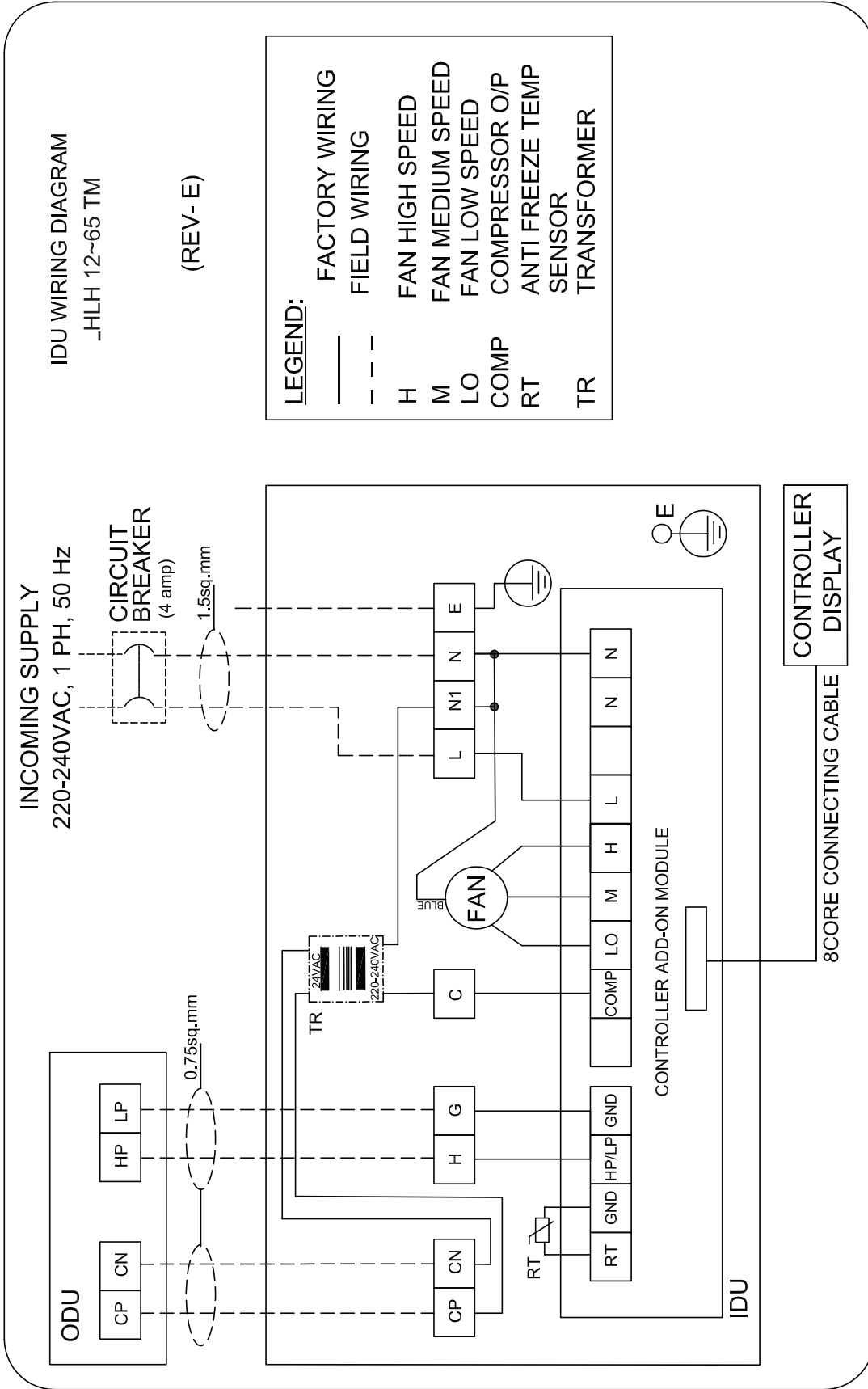
# 8.0 PHYSICAL AND ELECTRICAL DATA (Rotary Compressor)

TABLE FOR TECHNICAL DATA									
AIR HANDLING UNIT MODEL				_HLH-012TO	_HLH-018TO	_HLH-024TO	_HLH-030TO	_HLH-042TO	
CONDENSING UNIT MODEL				_AHM-012TR	_AHM-018TR	_AHM-024TR	_AHM-030TR	_AHM-036TR	
AMBIENT TEMP 35 °C	EVAP ENTERING AIR TEMP.	27°DB/ 19 WB °C	TMBH	11.6	17.9	21.1	24.5	30.2	
			SMBH	10.1	14.4	17.4	19.8	25.4	
		24.4°DB/ 17.2°WB °C	TMBH	10.6	16.7	19.9	22.7	28.8	
			SMBH	9.6	13.4	16.3	18.6	24.2	
AMBIENT TEMP 46 °C	EVAP ENTERING AIR TEMP.	29°DB/ 19°WB °C	TMBH	10.4	15.7	19.2	21.5	27.6	
			SMBH	9.9	15.0	18.1	20.6	26.4	
		24.4°DB/ 17.2°WB °C	TMBH	9.0	13.9	17.4	19.6	24.9	
			SMBH	8.5	12.2	15.0	17.0	22.1	
AIR FLOW PERFORMANCE (DRY COIL)	LOW	CFM		360	485	745	795	1145	
			MED	435	570	770	840	1200	
			HIGH	500	650	790	890	1250	
SOUND LEVEL	LOW	dBA		38.6	38.4	40.8	46.3	44.8	
			MED	39.3	39.1	41.3	46.5	45.4	
			HIGH	39.7	40.5	41.7	47.5	45.9	
EXTERNAL STATIC PRESSURE (ESP)			IN (Pa)	0.1 (25)	0.1 (25)	0.1 (25)	0.1 (25)	0.15 (37)	
NUMBER OF COMPRESSORS				1	1	1	1	1	
NUMBER OF REFRIGERANT CIRCUIT FOR AHU				1	1	1	1	1	
EXPANSION DEVICE/REFRIGERANT - R410A				Orifice					
ELECTRICAL DATA	POWER SUPPLY	AIR HANDLING UNIT	PH-HZ-VOLT	1-50-230	1-50-230	1-50-230	1-50-230	1-50-230	
		CONDENSING UNIT		1-50-230	1-50-230	1-50-230	1-50-230	1-50-230	
	POWER INPUT	AIR HANDLING UNIT	KW	0.06	0.08	0.10	0.15	0.17	
		CONDENSING UNIT		0.92	1.41	1.59	1.92	2.30	
	CIRCUIT BREAKER SIZE	AIR HANDLING UNIT	AMPS	15	15	15	15	15	
		CONDENSING UNIT		25	25	25	25	32	
	FULL LOAD CURRENT	AIR HANDLING UNIT	AMPS	0.3	0.4	0.4	0.7	0.8	
		CONDENSING UNIT		4.1	6.2	7.1	8.6	11.0	
COIL FACE AREA		AIR HANDLING UNIT	SQ. FT	2.7	2.7	3.6	3.6	4.5	
		CONDENSING UNIT		6.7	6.7	6.7	6.7	9.2	
NO OF FANS		AIR HANDLING UNIT	NOS.	2	2	2	2	2	
		CONDENSING UNIT		1	1	1	1	1	
NET WEIGHT		INDOOR UNIT	KG	34	36	37	42	52	
		OUTDOOR UNIT		49	58	60	60	83	
MAXIMUM AVAILABLE VERTICAL SEPARATION (ODU ABOVE)			Meter	10	21	21	21	21	
TOTAL AVAILABLE EQUIVALENT PIPING			Meter	20	30	30	30	30	

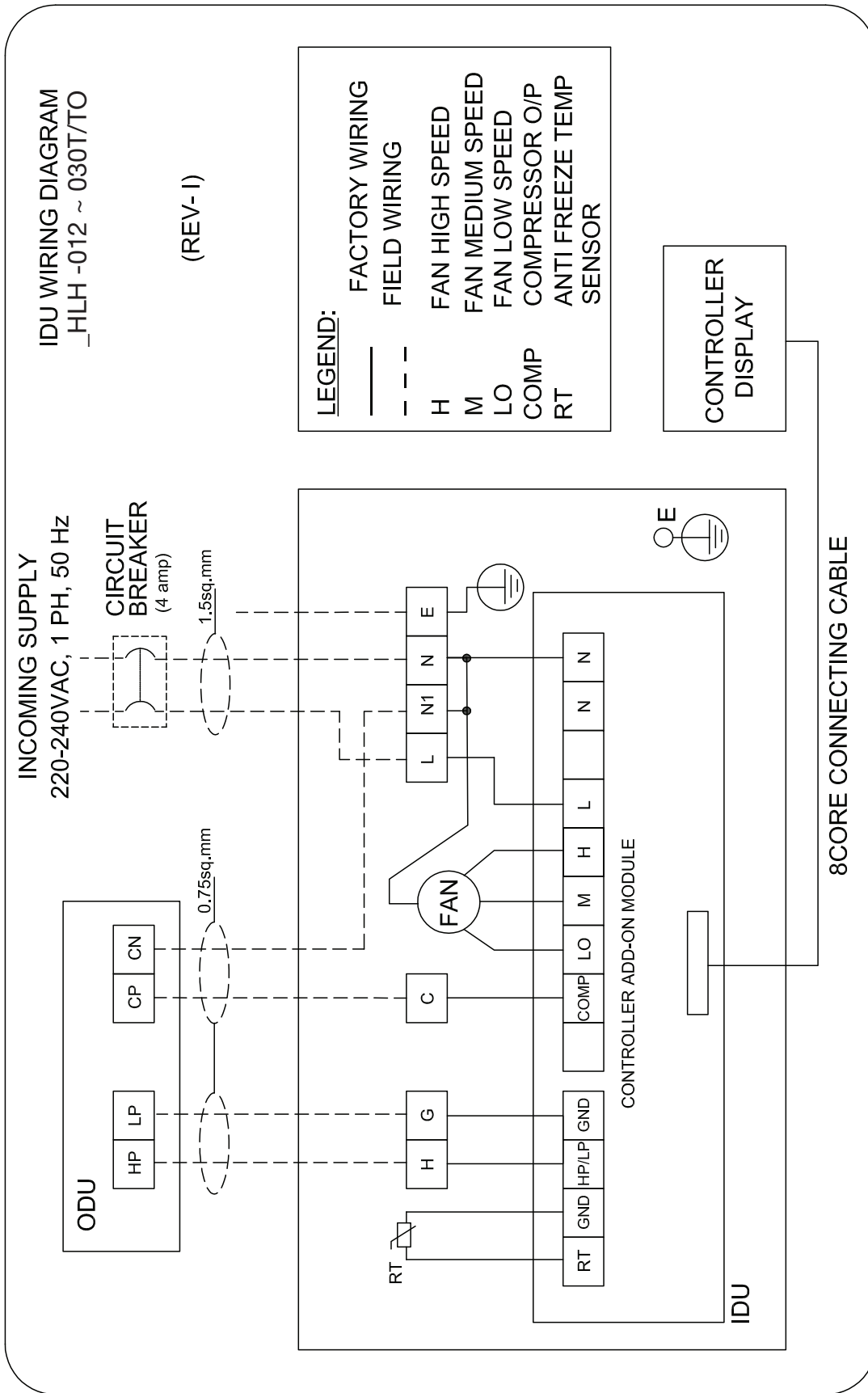
\* Electrical data is mentioned at T1 condition.

\* In Case of ODU Below IDU maximum allowed vertical separation is six Meter.

# 9. WIRING DIAGRAM

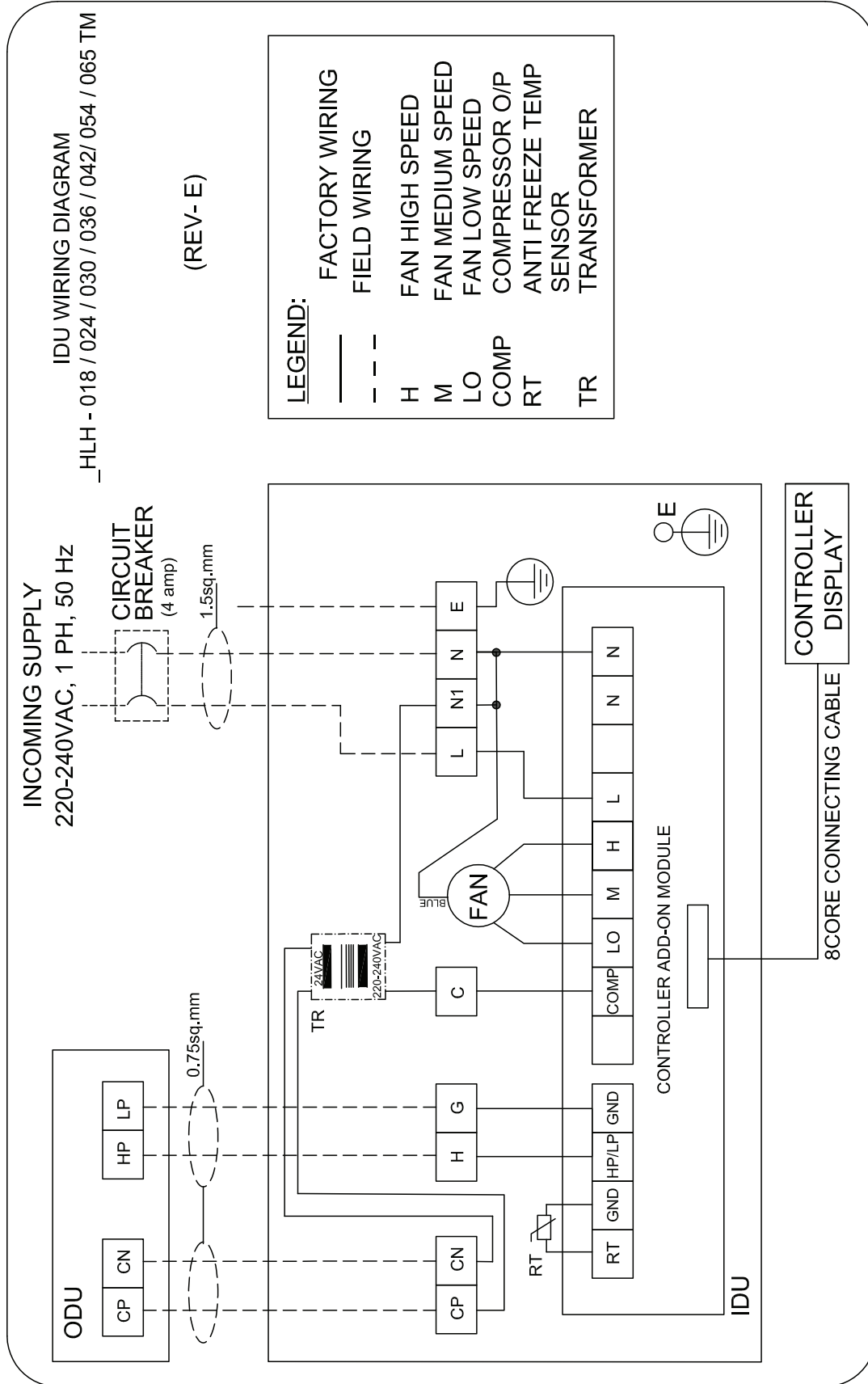


# 9.1 WIRING DIAGRAM





# 9.2 WIRING DIAGRAM



# 10.0 AIRFLOW PERFORMANCE DATA

## \_HLH TM -50Hz

MODEL	BLOWER MOTOR SPEED	PERFORMANCE	CFM @ EXTERNAL STATIC PRESSURE (Inches of Water)					
			0	0.1	0.15	0.2	0.3	0.4
_HLH-018TM	LOW	CFM	515	440	345	200	-	-
	MED	CFM	585	515	400	250	-	-
	HIGH	CFM	690	610	540	365	-	-
_HLH-024TM	LOW	CFM	890	745	645	425	-	-
	MED	CFM	925	770	665	450	-	-
	HIGH	CFM	955	790	685	470	-	-
_HLH-030TM	LOW	CFM	930	840	795	740	585	-
	MED	CFM	980	890	845	790	640	-
	HIGH	CFM	1030	945	900	845	690	-
_HLH-036TM	LOW	CFM	1360	1240	1170	1075	655	-
	MED	CFM	1440	1300	1225	1125	720	-
	HIGH	CFM	1540	1360	1275	1170	750	-
_HLH-042TM	LOW	CFM	1485	1330	1250	1145	705	-
	MED	CFM	1560	1385	1290	1185	720	-
	HIGH	CFM	1635	1455	1355	1235	785	-
_HLH-048TM	LOW	CFM	1250	1220	1195	1150	930	490
	MED	CFM	1400	1380	1355	1315	1055	565
	HIGH	CFM	1550	1525	1495	1450	1190	645
_HLH-054TM	LOW	CFM	1400	1380	1355	1315	1055	565
	MED	CFM	1550	1525	1495	1450	1190	645
	HIGH	CFM	1900	1795	1720	1645	1350	755
_HLH-065TM	LOW	CFM	1930	1865	1815	1740	1430	870
	MED	CFM	2140	2025	1955	1865	1570	950
	HIGH	CFM	2350	2185	2095	1990	1705	1030

# 10.1 AIRFLOW PERFORMANCE DATA

## \_HLH TO -50Hz

MODEL	BLOWER MOTOR SPEED	CFM @ EXTERNAL STATIC PRESSURE (Inches of Water)					
		0	0.1	0.15	0.2	0.3	0.4
_HLH-012TO	LOW	455	360	290	-	-	-
	MED	510	435	340	-	-	-
	HIGH	575	500	400	-	-	-
_HLH-018TO	LOW	580	485	360	-	-	-
	MED	675	570	435	280	-	-
	HIGH	785	650	560	290	-	-
_HLH-024 TO	LOW	890	745	645	425	-	-
	MED	925	770	665	450	-	-
	HIGH	955	790	685	470	-	-
_HLH-030 TO	LOW	890	795	745	695	520	-
	MED	930	840	795	740	585	-
	HIGH	980	890	845	790	640	-
_HLH-042 TO	LOW	1485	1330	1250	1145	705	-
	MED	1560	1385	1290	1185	720	-
	HIGH	1635	1455	1355	1235	785	-

# 11.0: OPERATION

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## Ductable Split unit controller

### A) Specifications:

- |                                   |   |
|-----------------------------------|---|
| 1. Powers supply to controller    | 230VAC +/-10% , 50/60Hz, +/-1Hz, 1Ph  |
| 2. Operating temperature limit    | 18~45°C   |
| 3. Storage temperature limit      | 0 - 60°C  |
| 4. Display                        | LCD graphics display with Backlight   |
| 5. Temperature control accuracy   | ± 1°C   |
| 6. Temperature display resolution | 1°C   |
| 7. Temperature display range      | 0°C to 50°C   |
| 8. Set temperature range          | 20°C- 30°C  |
| 9. Temperature sensors            | a. Inbuilt room temperature sensor  |
| 10. Inputs                        | a. Inbuilt room temperature sensor<br>b. Digital input for HP/ LP   |
| 11. Outputs                       | Three fan speeds & one compressor   |
| 12. Add on Module                 | Add on module acts as interface between controller display and input/outputs and consists of<br>a. One relay (10 Amps) for compressor<br>b. Three relays (10 Amps each) for fan Speeds<br>c. Potential free input for HP/LP interlocking. |
| 13. Connecting Cable              | 8 core cable connect with 12 volt supply ,connecting cable between display and module .<br>Direct plug and Pull type connection required .<br>Length : 10 meter as standard.  |

## **C) Modes of operation:**

Press MODE key to switch between Fan, Cool and Auto modes.

### **1. Cool mode:**

- a. In cool mode logic, IDU will control the temperature as per the set temperature.
- b. Compressor ON OFF will as per the logic for achieving desired temperature.
- c. Temperature setting range in cool mode is from 20°C to 30°C
- d. Fan speed will be as per user selection

### **2. Auto mode :**

Auto mode is similar to cool mode with fan ON/OFF logic as given below :

- a. IDU fan and compressor will switch OFF in this mode on achieving the set temperature. Compressor will switch off immediately and indoor fan will switch OFF after 1 minute of compressor.
- b. IDU fan will switch ON after thermostat signal.
- c. Compressor will switch on 10 sec after thermostat signal provided the anti-cycle time of 3 minutes is completed.
- d. IDU fan continue to run and compressor will trip in case of HP/LP and temperature sensor fault.

### **3. Fan mode :**

- a. In fan mode, only IDU fan operates at High, Med or Low speed as per setting. Compressor will remain OFF in this mode.
- b. Temperature will not be settable in this mode of operation

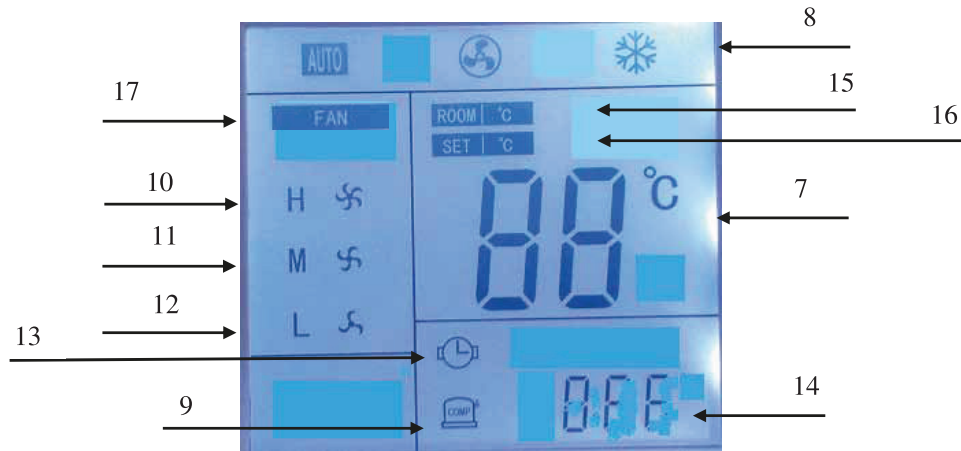
## **D) Operation after power failure :**

Functioning of Cool, Fan and Auto modes during the following conditions

- a. Unintentional power cycle - Controller should remember previous settings and should continue in same mode, fan speed & previous temperature setting of operation after power is restored.
- b. IDU Off/On by user - Mode of operation, fan speed and previous temperature setting should be restored.

## **E) Fan speed display & logic :**

Fan motor will operate on selected speed from the Fan key and symbol for high, medium or low speed will be displayed on the display.



### 1. LCD Segment description

Sr No.	Segment	Description
7	Seven segment digits (temp segment)	<ul style="list-style-type: none"> <li>a. Indicates room temperature / Set temperature value , fault or alarm condition.</li> <li>b. Room temperature will be displayed by default. Set temperature should appear on temp segments on pressing of Up/down key . Along with display of “SET TEMP” .This should remain for 10 seconds and revert back to room temperature. “SET TEMP” text will not be displayed when room temp is displayed.</li> <li>c. Error code will be displayed in case of fault or alarms</li> </ul>
8	Cool, Fan, Auto mode	<ul style="list-style-type: none"> <li>a. Indicates the operation mode.</li> <li>b. Cool Mode : Cool symbol will be displayed</li> <li>c. Auto Mode : Cool &amp; Auto Fan symbol will be displayed</li> <li>d. Fan Mode : Selected fan speed symbol will be displayed</li> </ul>
9	Compressor ON status	<ul style="list-style-type: none"> <li>a. Indicates ON status.</li> </ul>
10	Fan high speed	<ul style="list-style-type: none"> <li>a. Indicate fan high speed condition</li> </ul>
11	Fan medium speed	<ul style="list-style-type: none"> <li>a. Indicate fan medium speed condition</li> </ul>
12	Fan low speed	<ul style="list-style-type: none"> <li>a. Indicate fan low speed condition</li> </ul>
13	Timer	<ul style="list-style-type: none"> <li>a. Indicate timer mode.</li> </ul>
14	Unit OFF status	<ul style="list-style-type: none"> <li>a. Indicate OFF mode.</li> </ul>
15	Room temp display	<ul style="list-style-type: none"> <li>a. Indicate Room temp</li> </ul>
16	Set temp display	<ul style="list-style-type: none"> <li>a. Indicate set temp</li> </ul>
17	Fan indication	<ul style="list-style-type: none"> <li>a.. Indicate fan</li> </ul>

## F) OFF Timer function:

It will OFF the system after specified time which will be settable.

**Setting Procedure :** In the working state, press the mode button for 5sec, displays the clock mark, enter the timing off set, blinking display clock marker ☉, then, by reducing the key change delay shutdown time, set after the end, 5 sec automatically returns to the state, display of set temperature and the LCD screen display clock marker ☉.will automatically lapse time temperature controller,automatic shutdown time is zero. Timing shutdown setting range: 0.0—23.50 hours (shown in the set column). Time is set to 0.0, cancel the shutdown function.

**Note :** This function will get canceled in case of power loss or timer function is completed.

## G) Temperature control logic

### 1. Fan logic :

- a. Fan will switch ON immediately on switching the unit ON.
- b. Fan will be ON when unit is switched ON from controller except Auto mode.

### 2. Compressor Control :

Temperature condition	Compressor status
Actual temp > = Set value + 1	Compressor ON
Actual temp < = Set value - 1	Compressor OFF

### 3. Compressor Logic

- a. Anti-cycle time of 180 sec is delay between compressor OFF to ON.
- b. Minimum compressor ON time - 120sec once the compressor starts. Minimum run time is to be ignored when there is any one of the following faults: Low /High pressure ,Temp sensor fault .
- c. HP/LP fault should be ignored for initial 45 sec.
- d. Once the compressor starts, it should run minimum 2 minutes irrespective of the demand from room temperature sensor. After 2 min controller will decide the compressor relay status based on demand.
- e. In case HP/LP fault arises after 45 secs , compressor will trip immediately.
- f. In case coil temperature fall below antifreeze alarm, compressor will trip immediately with error display.

## B) Description of LCD icons and Keys on handset



### Key operation

Sr. No.	Key	Description
1	FAN SPEED	Press to change the fan speed (High → Med → Low )
2	DOWN	Press to decrease temperature by 1 °C
3	MODE	Press to change the mode of the unit (Fan → Cool → Auto )
4	UP	Press to increase temperature by 1 °C
5	POWER	Press to switch unit ON and OFF
5a	RESET(UP+DOWN)	Press any key to make backlight ON , & then press UP & DOWN key together for 5 secs to reset the alarms
5b	LOCK OUT REST (MODE+FAN SPEED)	Press any key to make backlight ON , & then press MODE & FAN SPEED key together for 10 secs to reset the lock out alarms



# 12.0: TROUBLESHOOTING

## 12.1: Error Code

LCD indicators displays the various faults occurring in the unit are as following.

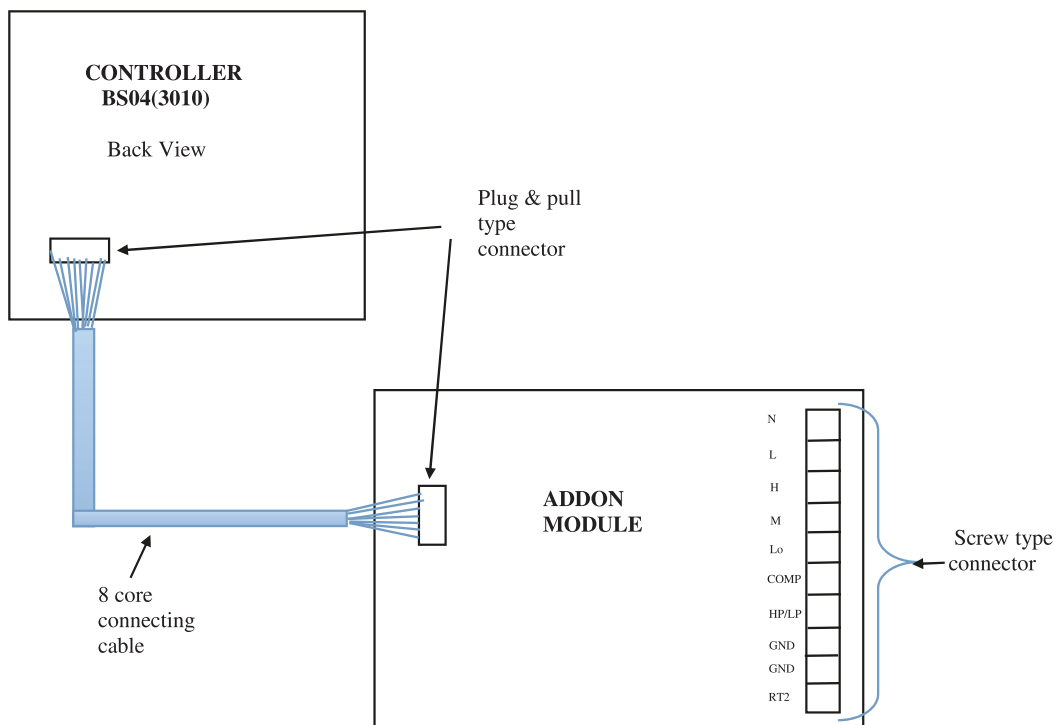
Alarm symbol:

Nature of Fault	LCD Display	Correction of Fault.
Room Temp sensor is open	E1	If Temp sensor is open or damaged, E1 will be displayed and only blower fan will operate. This fault is Auto reset.
Room Temp sensor is short	E2	If Temp sensor is short, E2 will be displayed and only blower fan will operate. This fault is Auto reset.
High Pressure /Low Pressure /SPPR Lock out fault	E7	E7 will be displayed on the unit when HP / LP/SPPR trips three times in last one hour. Total system will enter in to lock out condition.

Note : High Pressure /Low Pressure /SPPR fault

When HP/LP/SPPR error happens first and second time : Unit gets Autoreset. No Error Code display. When HP/LP/SPPR error happens third time with in 1hour : Unit required manual reset.

### I) Controller & add-on module connection .





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Before proceeding with installation, refer to installation instructions packaged with each model, as well as complying with all Federal, Stat, Provincial, and Local codes, regulations, and practies.

In keeping with its policy of continuous progress and product improvement,  
Manufacturer reserves the right to make changes without notice

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