

Bosch IDS 2.0 Split System Heat Pump

Condensing Units Up to 20.5 SEER

2-3-4-5 Ton Capacity

R410A



BOSCH

Service Manual



Table of Contents

1 Key to Symbols and Safety Instructions	4	12 Diagnosis and Troubleshooting	37
1.1 Key to Symbols	4	12.1 Control Board Component Layout	37
1.2 Safety	4	12.1.1 BOVA36 Outdoor Unit Control Board	37
2 Nomenclature	6	12.1.2 BOVA60 Outdoor Unit Control Board	38
2.1 Bosch IDS BVA2.0	6	12.1.3 BVA2.0 Indoor Unit Control Board	39
2.2 Bosch IDS BOVA2.0	7	12.2 Fault Code and Limited Condition Descriptions	40
3 Models & Part Numbers	8	12.3 Fault Codes and Limited Conditions Troubleshooting	42
4 Dimensions	9	12.3.1 C3 Troubleshooting	42
4.1 Bosch IDS BVA2.0	9	12.3.2 E4 Troubleshooting	43
4.2 Bosch IDS BOVA2.0	10	12.3.3 E5 Troubleshooting	44
5 AHRI 210/240 Performance Data	11	12.3.4 E6 Troubleshooting	45
5.1 Bosch IDS BOVA2.0	11	12.3.5 E7 Troubleshooting	46
6 Product Specifications	12	12.3.6 E9 Troubleshooting	47
6.1 Bosch IDS BVA2.0	12	12.3.7 H0 Troubleshooting	48
6.2 Bosch IDS BOVA2.0	13	12.3.8 H8 Troubleshooting	49
7 Extended Performance Data	14	12.3.9 P0 Troubleshooting	50
7.1 Outdoor Unit (BOVA) + Indoor Unit (BVA) – Cooling Mode	14	12.3.10 P1/F1 Troubleshooting	51
7.2 Outdoor Unit (BOVA) + Indoor Unit (BVA) – Heating Mode	22	12.3.11 P2/H5 Troubleshooting	52
8 Layout of Functional Components	26	12.3.12 P3 Troubleshooting	53
8.1 3 Ton	26	12.3.13 P4 Troubleshooting	54
8.2 5 Ton	27	12.3.14 P5 Troubleshooting	55
9 Refrigerant Flow Diagrams	28	12.3.15 P8 Troubleshooting	56
9.1 Cooling Operation	28	12.3.16 PH Troubleshooting	57
9.2 Heating Operation	29	12.3.17 LO-L9 Troubleshooting	58
10 Control	31	12.3.18 AtL Troubleshooting	59
10.1 Crankcase Heater Control	31	12.4 Situational Troubleshooting	60
10.2 Other Operations	31	12.4.1 LED Display is Blank	60
10.2.1 Defrost Operation	31	12.4.2 System Does Not Start	61
10.2.2 Oil Return Operation	31	12.4.3 Poor Capacity	62
10.2.2 Force Mode Operation	32	12.4.4 Poor Dehumidification	63
10.2.3 Indoor Fan Motor Function	32	13 Advanced System Check	64
11 Field Settings	33	13.1 Abnormal Pressure	64
11.1 Initial Unit Preparation and Installation Checklist	33	13.2 Pressure Transducer (PT)	65
11.2 Initial Start-up Checklist	33	13.3 Electronic Expansion Valve (EEV)	66
11.3 Dip Switch Settings	33	13.4 Temperature Sensor (T3,T4,T5,Th,T3L,Tf)	67
11.3.1 Outdoor Unit Dip Switch Settings	33	13.5 High Pressure Switch (HPS)	68
11.3.2 When to Change Outdoor Unit Dip Switch Settings	34	13.6 Outdoor Fan Motor	69
11.3.3 Indoor Unit Dip Switch Settings	35	13.7 Indoor Blower Motor	70
11.3.4 When to Change Indoor Unit Dipswitch Settings	35	13.8 Compressor	71
11.4 Check Point Values	36	13.9 System Charge	72
		13.10 Outdoor Board Fuse	73
		13.11 Indoor Board Fuse	74
		Appendix	75
		Appendix 1 Outdoor Unit Control Board	75
		Appendix 2 Indoor Unit Control Board	77

1 Key to Symbols and Safety Instructions

1.1 Key to Symbols

Warnings



Warnings in this document are identified by a warning triangle printed against a grey background. Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

The following keywords are defined and can be used in this document:

- ▶ **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- ▶ **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- ▶ **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.
- ▶ **NOTICE** is used to address practices not related to personal injury.

Important information



This symbol indicates important information where there is no risk to people or property.

1.2 Safety

Please read before proceeding

NOTICE: MAINTENANCE

- ▶ Please refer to your Installation, Operation and Maintenance Manual for details on maintenance requirements.



WARNING: ELECTRICAL HAZARD 380 VOLTS DC

- ▶ Failure to follow this warning could result in property damage, severe personal injury, or death.
- ▶ WAIT THREE (3) MINUTES after disconnecting power prior to touching electrical components as they may hold a dangerous charge of 380 VDC, then verify DC Voltage is less than 42VDC at inverter TEST POINTS P-N.

NOTICE:

- ▶ This document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.
- ▶ These instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation.
- ▶ 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 your installing dealer or local distributor.



The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the manufacturer's split systems are AHRI rated only with TXV indoor systems. Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.



This document contains a wiring diagram and service information. This is customer property and is to remain with this unit. Please return to service information pack upon completion of work.



WARNING:

- ▶ This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair a central air conditioning product may result in personal injury and/or property damage.

**WARNING: HAZARDOUS VOLTAGE**

- ▶ Failure to follow this warning could result in property damage, severe personal injury, or death.
- ▶ Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

**CAUTION: GROUNDING REQUIRED**

- ▶ Failure to inspect or use proper service tools may result in equipment damage or personal injury. Reconnect all grounding devices. All parts of this product that are capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

**WARNING: REFRIGERANT OIL**

- ▶ Any attempt to repair a central air conditioning product may result in property damage, severe personal injury, or death. These units use R-410A refrigerant which operates at 50 to 70% higher pressures than R-22. Use only R-410A approved service equipment. Refrigerant cylinders are painted a "Rose" color to indicate the type of refrigerant and may contain a "dip" tube to allow for charging of liquid refrigerant into the system. All R-410A systems with variable speed compressors use a POE oil (VG74 or equivalent) that readily absorbs moisture from the atmosphere. To limit this "hygroscopic" action, the system should remain sealed whenever possible. If a system has been open to the atmosphere for more than 4 hours, the compressor oil must be replaced. Never break a vacuum with air and always change the driers when opening the system for component replacement.

**WARNING: SERVICE VALVES**

- ▶ Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and/or property damage. Extreme caution should be exercised when opening the service valves. Turn valve stem counterclockwise only until the stem contacts the rolled edge.

**WARNING: BRAZING REQUIRED**

- ▶ Failure to inspect lines or use proper service tools may result in equipment damage or personal injury. If using existing refrigerant lines make certain that all joints are brazed, not soldered.

**WARNING: HOT SURFACE**

- ▶ May cause minor to severe burning. Failure to follow this Caution could result in property damage or personal injury. Do not touch top of compressor.

**WARNING: HIGH CURRENT LEAKAGE**

- ▶ Failure to follow this warning could result in property damage, severe personal injury, or death. Grounding is essential before connecting electrical supply.

**CAUTION: CONTAINS REFRIGERANT**

- ▶ Failure to follow proper procedures can result in personal illness or injury or severe equipment damage. System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening system.

**WARNING:**

- ▶ This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

NOTICE: INDOOR UNIT REQUIRED

- ▶ The indoor units must be matched with TXV. The model of TXV can be changed according to the system capacity.

2 Nomenclature

2.1 Bosch IDS BVA2.0

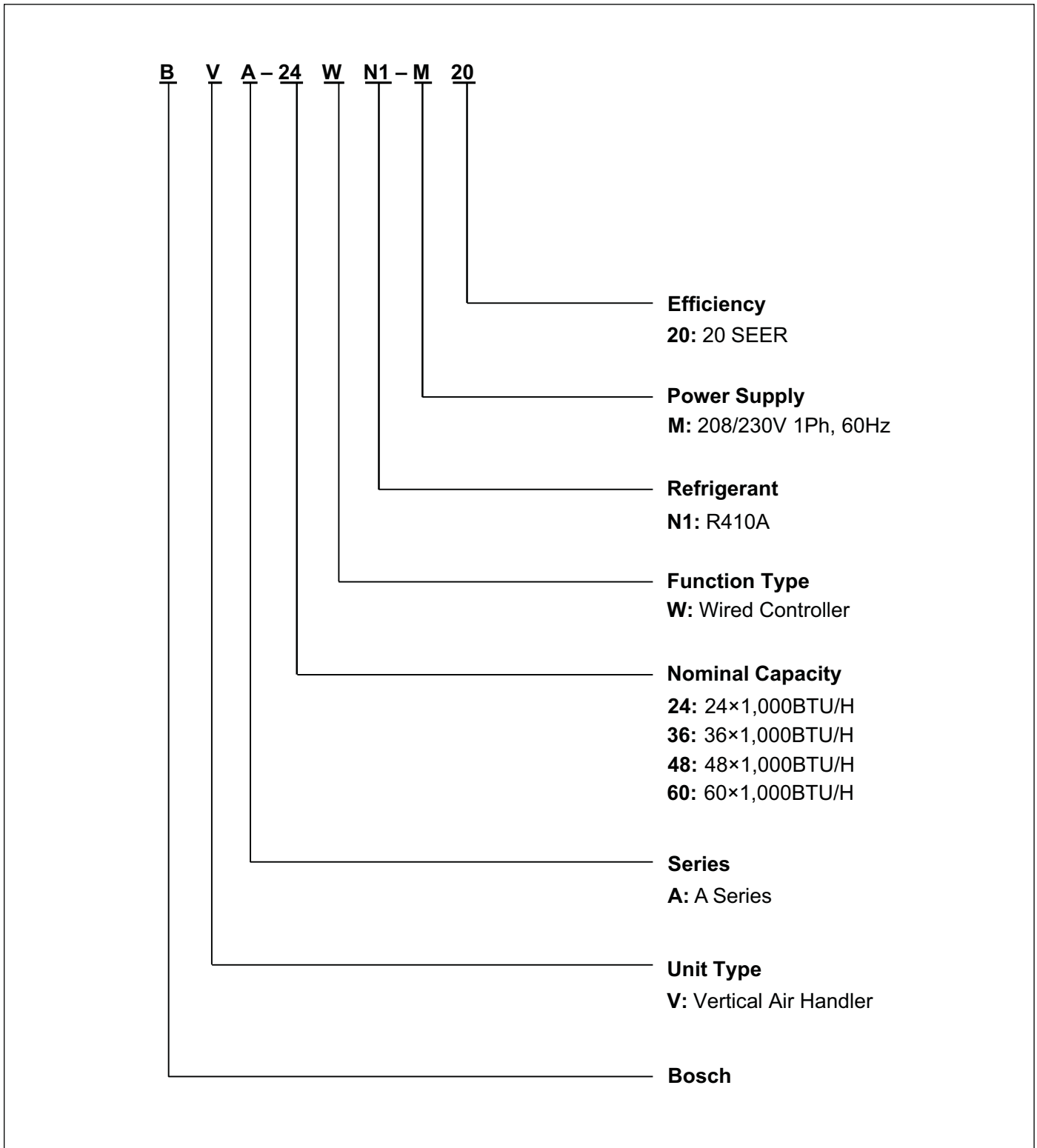


Figure 1

2.2 Bosch IDS BOVA2.0

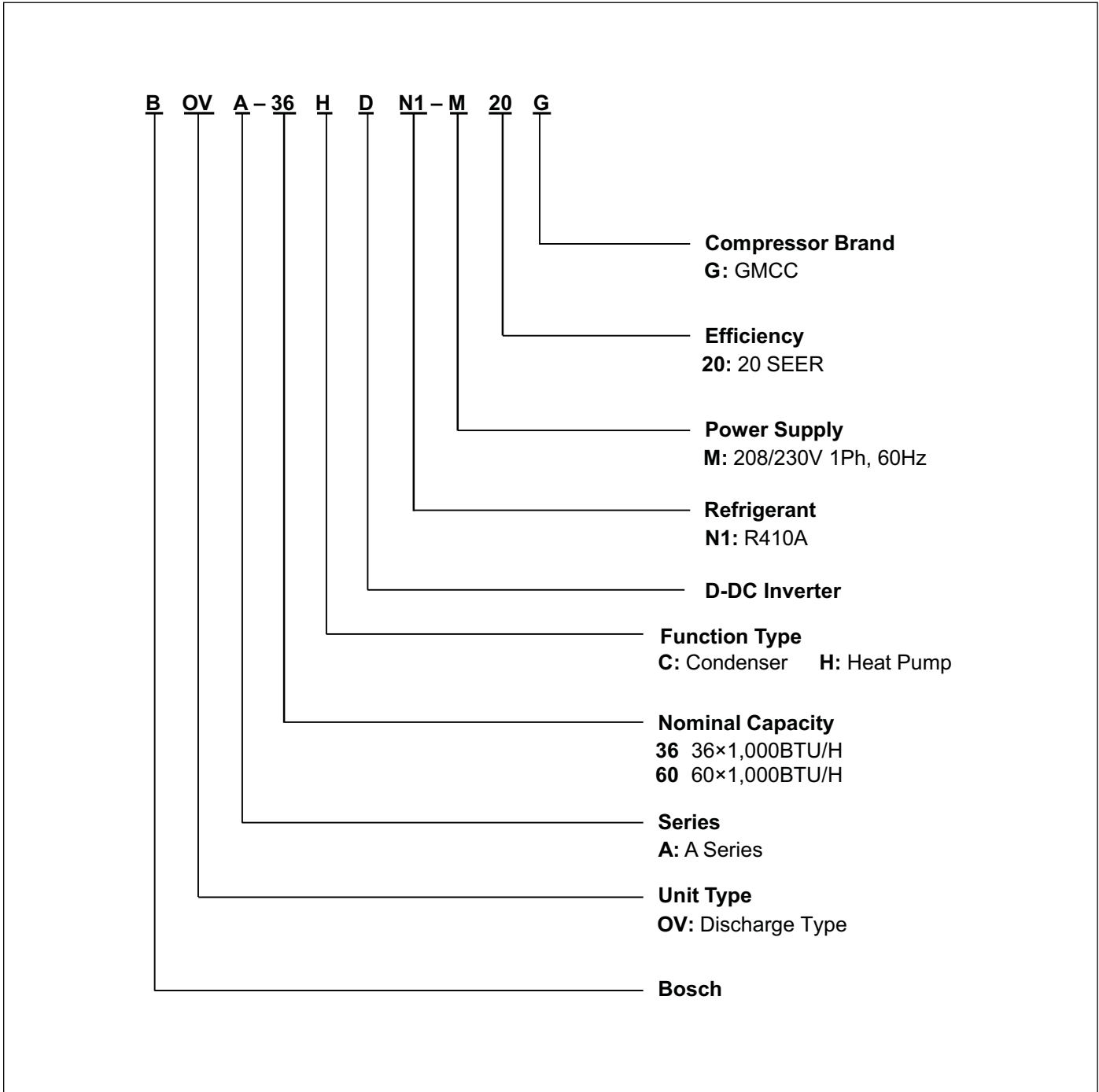


Figure 2

3 Models & Part Numbers

Bosch Part Number	Bosch Model Number
8733952437	BOVA-36HDN1-M20G
8733952438	BOVA-60HDN1-M20G
8733952439	BVA-24WN1-M20
8733952440	BVA-36WN1-M20
8733952441	BVA-48WN1-M20
8733952442	BVA-60WN1-M20

Table 1

4 Dimensions

4.1 Bosch IDS BVA2.0

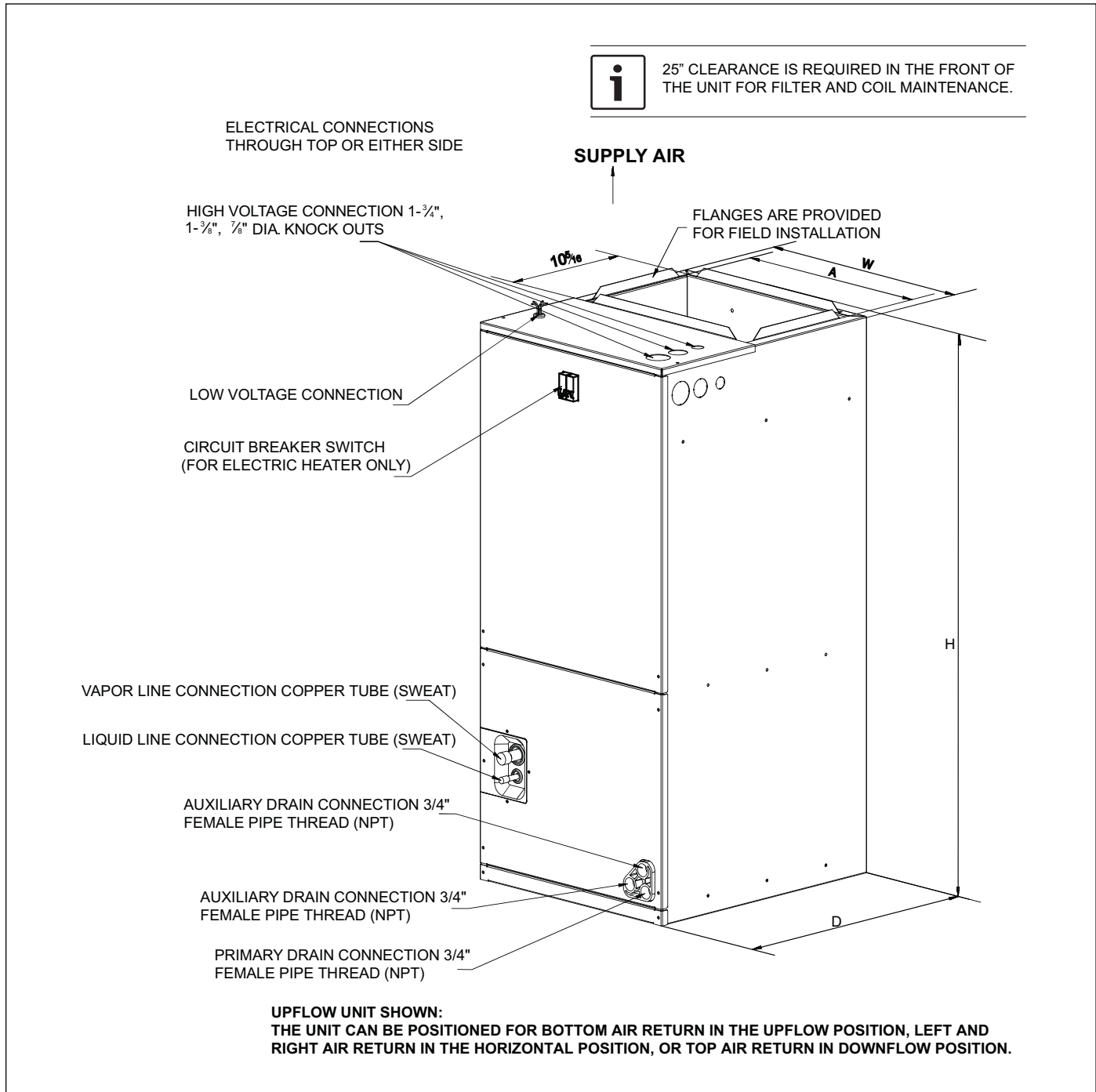


Figure 3

Model Size	Dimensions Inch [mm]				
	Unit Height "H"	Unit Width "W"	Unit Length "D"	Supply Duct "A"	Liquid Line / Vapor Line
24	46-1/2 [1180]	19-5/8 [500]	21-5/8 [550]	18 [456]	3/8 / 3/4 [9.5]/[19]
36	46-1/2 [1180]	19-5/8 [500]	21-5/8 [550]	18 [456]	3/8 / 3/4 [9.5]/[19]
48	54-1/2 [1385]	22 [560]	24 [610]	19-1/2 [496]	3/8 / 7/8 [9.5]/[22]
60	54-1/2 [1385]	22 [560]	24 [610]	19-1/2 [496]	3/8 / 7/8 [9.5]/[22]

Table 2

4.2 Bosch IDS BOVA2.0

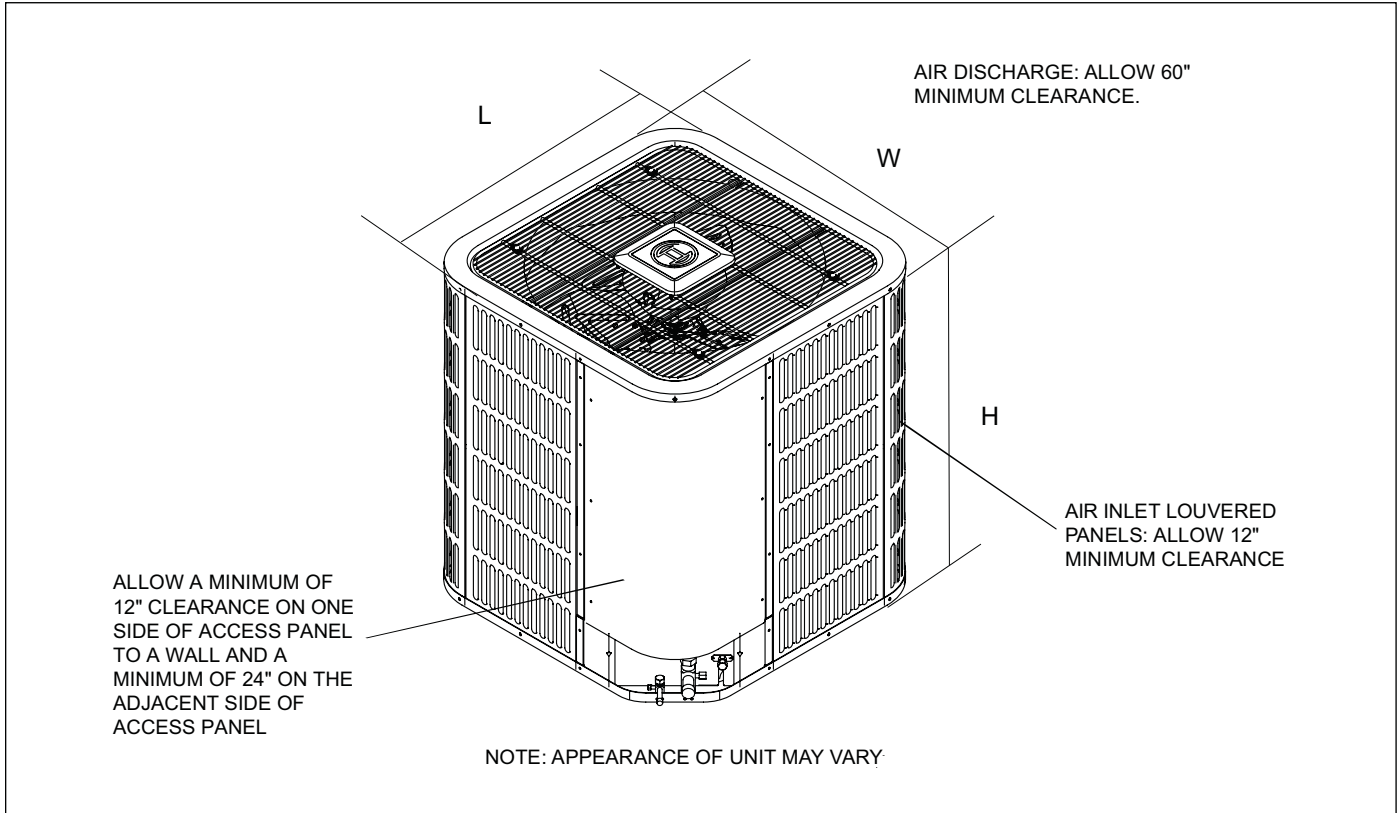


Figure 4

Model Size	Dimensions (Inches)		
	"H" in. [mm]	"W" in. [mm]	"L" in. [mm]
Heat Pump			
BOVA 36	24-15/16 [633]	29-1/8 [740]	29-1/8 [740]
BOVA 60	33-3/16 [843]	29-1/8 [740]	29-1/8 [740]

Table 3

5 AHRI 210/240 Performance Data

5.1 Bosch IDS BOVA2.0

Outdoor Unit Model	Indoor Unit Model		Cooling Capacity (BTU/h)			Heating Capacity			CFM
	Coils/Air Handlers	Furnace Model	Total	EER ²	SEER ¹	Hi	HSPF ³	Low ⁴	
BOVA-36HDN1-M20G	BVA-24WN1-M20	/	24000	14	20.5	24000	10.5	23000	860/680
BOVA-36HDN1-M20G	BVA-36WN1-M20	/	34600	12.5	20	34200	10.5	28000	1150/820
BOVA-60HDN1-M20G	BVA-48WN1-M20	/	47500	13.5	20	48000	10.5	40000	1530/1150
BOVA-60HDN1-M20G	BVA-60WN1-M20	/	54500	12.5	19	56000	10.5	44000	1750/1350
BOVA-36HDN1-M20G	BMAC2430ANTD	/	23400	11.8	16	23400	9.5	18000	750
BOVA-36HDN1-M20G	BMAC2430BNTD	/	23600	11.8	16	23800	9.5	18000	800
BOVA-36HDN1-M20G	BMAC3036ANTD	/	32000	10.8	16	33600	9.5	22000	900
BOVA-36HDN1-M20G	BMAC3036BNTD	/	32400	11.2	16	33800	9.5	23000	1000
BOVA-36HDN1-M20G	BMAC3036CNTD	/	32600	11.4	16	34000	9.5	23000	1050
BOVA-36HDN1-M20G	BMAC4248BNTF	/	33000	11.2	16	33800	9.5	24000	1000
BOVA-36HDN1-M20G	BMAC4248CNTF	/	33200	11.2	16	34200	9.5	24000	1050
BOVA-36HDN1-M20G	BMAC4248DNTF	/	33400	11.2	16	34200	9.5	24000	1100
BOVA-60HDN1-M20G	BMAC4248BNTF	/	43000	11.2	16	45500	9.5	31400	1200
BOVA-60HDN1-M20G	BMAC4248CNTF	/	44000	11.8	16	46500	9.5	32000	1350
BOVA-60HDN1-M20G	BMAC4248DNTF	/	45000	11.8	16	47500	9.5	32000	1450
BOVA-60HDN1-M20G	BMAC4860CNTF	/	55000	10.5	16	55500	9.5	38000	1350
BOVA-60HDN1-M20G	BMAC4860DNTF	/	56000	10.5	16	56000	9.5	39000	1500
BOVA-36HDN1-M20G	BMAC2430ANTD	BGH96M060B3A	24000	13	18.5	24000	10	18000	820/630
BOVA-36HDN1-M20G	BMAC2430ANTD	BGH96M080B3A	24000	13	18.5	24000	10	18000	800/580
BOVA-36HDN1-M20G	BMAC2430BNTD	BGH96M060B3A	24000	13.5	19	24000	10	19000	860/680
BOVA-36HDN1-M20G	BMAC2430BNTD	BGH96M080B3A	24000	13.5	19	24000	10	19000	840/630
BOVA-36HDN1-M20G	BMAC3036ANTD	BGH96M060B3A	32200	11.2	17	34000	10	25000	1050/800
BOVA-36HDN1-M20G	BMAC3036ANTD	BGH96M080B3A	32200	11.2	17	34000	10	25000	1020/800
BOVA-36HDN1-M20G	BMAC3036BNTD	BGH96M060B3A	33000	11.6	17.5	34200	10	25000	1100/850
BOVA-36HDN1-M20G	BMAC3036BNTD	BGH96M080B3A	33000	11.6	17.5	34200	10	25000	1070/850
BOVA-36HDN1-M20G	BMAC3036CNTD	BGH96M080C4A	33600	12	18	34200	10	25000	1050/820
BOVA-36HDN1-M20G	BMAC3036CNTD	BGH96M100C5A	33600	12	18	34200	10	25000	1150/750
BOVA-36HDN1-M20G	BMAC4248BNTF	BGH96M080B3A	33000	12.5	18.5	34200	10	26000	1000/850
BOVA-36HDN1-M20G	BMAC4248CNTF	BGH96M100C5A	33000	12.5	18.5	34200	10	26000	1100/800
BOVA-60HDN1-M20G	BMAC4248BNTF	BGH96M080B3A	43000	11.2	18	45000	9.5	34000	1250/1050
BOVA-60HDN1-M20G	BMAC4248CNTF	BGH96M080C4A	44000	12	18.5	46000	10	35000	1250/1050
BOVA-60HDN1-M20G	BMAC4248CNTF	BGH96M100C5A	45000	12.5	18.5	46500	10	35000	1450/1150
BOVA-60HDN1-M20G	BMAC4248DNTF	BGH96M100D5A	45500	12.5	18.5	47000	10	35000	1500/1200
BOVA-60HDN1-M20G	BMAC4248DNTF	BGH96M120D5A	45500	12.5	18.5	47000	10	35000	1500/1200
BOVA-60HDN1-M20G	BMAC4860CNTF	BGH96M100C5A	52000	12	18	53500	10	37000	1450/1150
BOVA-60HDN1-M20G	BMAC4860DNTF	BGH96M100D5A	52000	12.5	18.5	54000	10	38000	1500/1200
BOVA-60HDN1-M20G	BMAC4860DNTF	BGH96M120D5A	52000	12.5	18.5	54000	10	38000	1500/1200

Table 4

¹ Seasonal Energy Efficiency Ratio; Certified per AHRI 210/240

² Energy Efficiency Ratio; Certified per AHRI 210/240

³ HSPF = Heating Seasonal Performance Factor; Certified per AHRI 210/240

⁴ Jumper cut or dip switch off

 Items in **bold** boxes meet the requirements for ENERGY STAR



Always check the rating plate for electrical data on the unit being installed. The above data are for reference only.

6 Product Specifications

6.1 Bosch IDS BVA2.0

	BVA024	BVA036	BVA048	BVA060
Cooling Capacity				
Nominal Cooling (BTU/h)	24000	34600	47500	54500
Nominal Heating (BTU/h)	24000	34200	48000	56000
Blower				
Diameter (mm)	10-5/8" (270)	10-63/64" (279)	10-63/64" (279)	10-63/64" (279)
Width (mm)	8-5/32" (207)	10-43/64" (271)	10-43/64" (271)	10-43/64" (271)
Fan Motor				
Horsepower (HP)	1/3	1/2	3/4	3/4
Full Load Amps	2.6	3	4.5	4.5
Refrigeration System				
Refrigerant Line Size ¹				
Liquid Line Size (O.D.)	3/8"	3/8"	3/8"	3/8"
Suction Line Size (O.D.)	3/4"	3/4"	7/8"	7/8"
Refrigerant Connection Size				
Liquid Line Size (O.D.)	3/8"	3/8"	3/8"	3/8"
Suction Line Size (O.D.)	3/4"	3/4"	7/8"	7/8"
Expansion Device [TXV=Thermal Expansion Valve]	TXV			
Decibels dB(A)				
High Speed	63	65	67	68
Medium Speed	59	62	63	64
Low Speed	55	58	59	60
Electrical Data				
Voltage-Phase-Hz	208/230-1-60	208/230-1-60	208/230-1-60	208/230-1-60
Minimum Circuit Ampacity ²	3.3	3.8	5.7	5.7
Max. Overcurrent Protection ³	15	15	15	15
Min / Max Volts	172V/270V			
Air Filter				
Air Filter Sizes	18" x 20"	18" x 20"	20" x 22"	20" x 22"
Weight				
Net Weight (without packaging) (lbs)	119	126	162	170
Gross Weight (including packaging) (lbs) ⁴	132	139	180	188
Dimensions				
Unit D x W x H (in.)	21-5/8 x 19-5/8 x 46-1/2	21-5/8 x 19-5/8 x 46-1/2	24 x 22 x 54-1/2	24 x 22 x 54-1/2
Unit D x W x H (in.) (with pallet and packaging)	25-3/8 x 22-5/16 x 52-9/16	25-3/8 x 22-5/16 x 52-9/16	27-11/16 x 24-11/16 x 60-5/8	27-11/16 x 24-11/16 x 60-5/8
Indoor Coil				
Net face area-sq.ft.	4.02	4.02	5.99	5.99
Tube diameter	9/32" (7 mm)	9/32" (7 mm)	9/32" (7mm)	9/32" (7mm)
No. of rows	4	4	4	5
Fins per inch	17	17	17	17

Table 5

¹ Tested and rated in accordance with AHRI Standard 210/240.

² Wire size should be determined in accordance with National Electrical Codes; extensive wire runs will require larger wire sizes.

³ Must use time-delay fuses or HACR-type circuit breakers of the same size as noted.

⁴ Weight shown includes packaging

6.2 Bosch IDS BOVA2.0

	BOVA 36	BOVA 60
Cooling Capacity		
Nominal Cooling (BTU/h)	34,600	54,500
Nominal Heating (BTU/h)	34,200	56,000
Decibels([dB(A))		
Max @ 100% load	77	79
Min @ min load	56	60
Compressor		
RLA	19	29
LRA	44	52
Condenser Fan Motor		
Horsepower (HP)	1/3	1/3
FLA	2.5	2.5
Refrigeration System		
Refrigerant Line Size ¹		
Liquid Line Size (OD)	3/8"	3/8"
Suction Line Size (OD)	3/4"	7/8"
Refrigerant Connection Size		
Liquid Valve Size (OD)	3/8"	3/8"
Suction Valve Size (OD)	3/4"	7/8"
Refrigerant Charge (R410-A, oz)	7 lbs. 9 oz.	11 lbs. 5 oz.
Expansion Device	EEV	EEV
Maximum Line Length	150 FT	150 FT
Maximum Elevation Difference	50 FT	50 FT
Operating Range		
Cooling	15-125°F	
Heating	-4~86°F	
Electrical Data		
Voltage-Phase-Hz	208/230-1-60	208/230-1-60
Minimum Circuit Ampacity ²	26.3	38.8
Max. Overcurrent Protection ³	45	60
Max Fuse Size	45	60
Min/Max Volts	172V/270V	
Weight		
Net Weight (without packaging)	150	220
Gross Weight (including packaging) ⁴	180	253
Dimensions		
Unit L x W x H (in.)	29-1/8 x 29-1/8 x 24-15/16	29-1/8 x 29-1/8 x 33-3/16
Outdoor Coil		
Net face area - sq.ft. Outer Coil	13.6	18.4
Tube diameter-in.	9/32" (7mm)	9/32" (7mm)
No.of rows	2	2.8
Fins per inch	17	19

Table 6

¹ Tested and rated in accordance with AHRI Standard 210/240.

² Wire size should be determined in accordance with National Electrical Codes; extensive wire runs will require larger wire sizes.

³ Must use time-delay fuses or HACR-type circuit breakers of the same size as noted.

⁴ Weight values are estimated.



- Always check the rating plate for electrical data on the unit being installed.
- Unit is factory charged with refrigerant for 15' of 3/8" liquid line. System charge must be adjusted per Installation Instructions Final Charge Procedure.
- TXV is required at indoor unit to match our outdoor unit.

7 Extended Performance Data

7.1 Outdoor Unit (BOVA) + Indoor Unit (BVA) – Cooling Mode

		BOVA 36 + BVA 24 For Cooling																
Indoor Airflow (CFM)	Outdoor DB (°F)	IWB (°F) IDB (°F)	59				63				67				71			
			70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
620	15	TC	17.8	18.0	18.4	18.6	18.4	18.6	18.8	19.0	19.6	19.8	20.0	20.2	/	25.6	25.8	26.1
		S/T	0.88	0.93	1.00	1.00	0.63	0.79	0.93	0.96	0.39	0.57	0.74	0.91	/	0.38	0.52	0.65
		KW	0.77	0.78	0.78	0.78	0.78	0.79	0.80	0.81	0.81	0.82	0.83	0.84	/	1.05	1.06	1.08
	65	TC	17.9	18.1	18.6	18.8	18.6	18.8	19.0	19.2	19.8	20.0	20.2	20.4	/	25.8	26.0	26.3
		S/T	0.88	0.93	1.00	1.00	0.63	0.79	0.93	0.96	0.39	0.57	0.74	0.91	/	0.38	0.52	0.65
		KW	0.78	0.79	0.80	0.80	0.80	0.81	0.82	0.83	0.82	0.83	0.84	0.85	/	1.06	1.07	1.09
	75	TC	18.1	18.3	18.7	18.9	18.7	18.9	19.1	19.4	20.0	20.2	20.4	20.6	/	25.4	25.7	25.9
		S/T	0.89	0.94	1.00	1.00	0.63	0.80	0.93	0.96	0.39	0.57	0.74	0.91	/	0.38	0.52	0.65
		KW	0.95	0.96	0.97	0.97	0.97	0.98	0.99	1.00	1.00	1.01	1.02	1.03	/	1.32	1.34	1.35
	85	TC	18.1	18.3	18.7	18.9	18.7	18.9	19.1	19.3	19.9	20.1	20.3	20.5	/	25.4	25.7	25.9
		S/T	0.89	0.94	1.00	1.00	0.63	0.80	0.93	0.96	0.39	0.57	0.74	0.91	/	0.38	0.52	0.66
		KW	1.12	1.13	1.14	1.14	1.14	1.16	1.17	1.18	1.18	1.19	1.20	1.21	/	1.46	1.48	1.49
	95	TC	18.0	18.2	18.7	18.9	18.7	18.9	19.1	19.3	19.9	20.1	20.3	20.5	/	25.3	25.5	25.7
		S/T	0.89	0.94	1.00	1.00	0.63	0.80	0.93	0.96	0.39	0.57	0.74	0.91	/	0.38	0.52	0.66
		KW	1.35	1.36	1.38	1.38	1.38	1.39	1.41	1.42	1.43	1.44	1.45	1.46	/	1.76	1.78	1.80
	105	TC	18.0	18.2	18.6	18.8	18.6	18.8	19.0	19.2	19.8	20.0	20.2	20.4	/	25.1	25.3	25.5
		S/T	0.88	0.93	1.00	1.00	0.63	0.80	0.93	0.96	0.39	0.57	0.74	0.91	/	0.38	0.52	0.66
		KW	1.61	1.63	1.65	1.65	1.65	1.66	1.68	1.70	1.70	1.72	1.73	1.75	/	2.11	2.13	2.15
	115	TC	17.7	17.9	18.3	18.5	18.3	18.5	18.7	18.9	19.5	19.7	19.9	20.1	/	24.9	25.1	25.3
		S/T	0.89	0.94	1.00	1.00	0.64	0.80	0.93	0.96	0.39	0.57	0.75	0.92	/	0.38	0.52	0.66
		KW	1.89	1.91	1.93	1.93	1.93	1.95	1.97	1.99	1.99	2.01	2.03	2.05	/	2.51	2.53	2.55
	125	TC	16.2	16.4	16.8	17.0	16.8	17.0	17.2	17.3	18.2	18.3	18.3	18.3	/	19.4	19.4	19.4
		S/T	0.89	0.94	1.00	1.00	0.59	0.79	0.93	0.96	0.40	0.58	0.76	0.95	/	0.39	0.57	0.74
		KW	1.89	1.91	1.93	1.93	1.93	1.95	1.97	1.99	2.03	2.03	2.03	2.03	/	2.04	2.04	2.04
660 (Low Stage)	15	TC	18.2	18.4	18.8	19.0	18.8	19.0	19.2	19.4	20.1	20.3	20.5	19.2	/	26.1	26.4	26.7
		S/T	0.95	1.00	1.00	1.00	0.65	0.89	0.96	1.00	0.40	0.57	0.75	0.99	/	0.39	0.52	0.66
		KW	0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.40	0.39	0.40	0.41	0.35	/	0.70	0.72	0.74
	65	TC	18.2	18.4	18.8	19.0	18.8	19.0	19.2	19.4	20.0	20.2	20.4	20.6	/	26.2	26.4	26.7
		S/T	0.95	1.00	1.00	1.00	0.65	0.89	0.96	1.00	0.40	0.57	0.75	0.92	/	0.39	0.52	0.66
		KW	0.77	0.77	0.78	0.78	0.78	0.79	0.80	0.81	0.80	0.81	0.82	0.83	/	1.05	1.06	1.08
	75	TC	18.4	18.6	19.0	19.2	19.0	19.2	19.4	19.6	20.2	20.4	20.6	20.8	/	25.8	26.1	26.3
		S/T	0.95	1.00	1.00	1.00	0.64	0.89	0.96	1.00	0.40	0.57	0.75	0.92	/	0.39	0.53	0.66
		KW	0.93	0.94	0.95	0.95	0.95	0.96	0.97	0.98	0.98	0.99	1.00	1.01	/	1.31	1.33	1.35
	85	TC	18.4	18.6	19.0	19.2	19.0	19.2	19.4	19.6	20.2	20.4	20.6	20.8	/	25.8	26.0	26.3
		S/T	0.95	1.00	1.00	1.00	0.64	0.89	0.96	1.00	0.40	0.57	0.75	0.92	/	0.39	0.53	0.66
		KW	1.10	1.11	1.13	1.13	1.13	1.14	1.15	1.16	1.16	1.17	1.18	1.19	/	1.45	1.46	1.48
	95	TC	18.3	18.5	18.9	19.1	18.9	19.1	19.3	19.5	20.1	20.4	20.5	20.8	/	25.7	25.9	26.1
		S/T	0.95	1.00	1.00	1.00	0.64	0.89	0.96	1.00	0.40	0.57	0.75	0.92	/	0.39	0.53	0.66
		KW	1.33	1.35	1.36	1.36	1.36	1.38	1.39	1.40	1.41	1.42	1.43	1.45	/	1.76	1.77	1.79
	105	TC	18.2	18.4	18.8	19.0	18.8	19.0	19.2	19.4	20.1	20.3	20.5	20.7	/	25.4	25.7	25.9
		S/T	0.94	1.00	1.00	1.00	0.64	0.89	0.96	1.00	0.40	0.57	0.75	0.92	/	0.39	0.53	0.67
		KW	1.60	1.61	1.63	1.63	1.63	1.65	1.67	1.68	1.69	1.72	1.73	1.73	/	2.11	2.13	2.15
	115	TC	17.9	18.1	18.5	18.7	18.5	18.7	18.9	19.1	19.8	20.0	20.1	20.3	/	25.2	25.4	25.7
		S/T	0.95	1.00	1.00	1.00	0.64	0.89	0.96	1.00	0.40	0.58	0.76	0.93	/	0.39	0.53	0.67
		KW	1.87	1.89	1.91	1.91	1.91	1.94	1.96	1.98	1.98	2.00	2.02	2.04	/	2.52	2.54	2.56
	125	TC	16.4	16.6	16.9	17.1	16.9	17.1	17.3	17.5	18.4	18.4	18.4	18.5	/	19.5	19.6	19.6
		S/T	0.95	1.00	1.00	1.00	0.64	0.89	0.96	1.00	0.40	0.59	0.79	1.00	/	0.39	0.58	0.76
		KW	1.90	1.92	1.94	1.94	1.94	1.96	1.98	2.00	2.04	2.04	2.04	2.04	/	2.05	2.05	2.05
760	15	TC	20.2	20.5	20.9	21.2	20.9	21.2	21.4	21.6	22.3	22.6	22.8	21.3	/	28.9	29.3	29.5
		S/T	0.96	1.00	1.00	1.00	0.65	0.90	0.97	1.00	0.39	0.58	0.76	1.00	/	0.39	0.53	0.67
		KW	0.51	0.51	0.52	0.52	0.52	0.52	0.53	0.53	0.53	0.54	0.55	0.48	/	0.91	0.94	0.95
	65	TC	20.1	20.3	20.8	21.0	20.8	21.0	21.2	21.5	22.2	22.4	22.6	22.9	/	28.6	28.9	29.1
		S/T	0.96	1.00	1.00	1.00	0.66	0.90	0.97	1.00	0.39	0.58	0.76	0.94	/	0.39	0.53	0.67
		KW	0.91	0.92	0.93	0.93	0.93	0.94	0.95	0.96	0.95	0.96	0.97	0.99	/	1.22	1.23	1.24
	75	TC	20.3	20.5	21.0	21.2	21.0	21.2	21.4	21.7	22.4	22.6	22.8	23.0	/	28.7	29.0	29.2
		S/T	0.96	1.00	1.00	1.00	0.65	0.90	0.97	1.00	0.39	0.58	0.76	0.94	/	0.39	0.53	0.67
		KW	1.08	1.09	1.10	1.10	1.10	1.12	1.13	1.14	1.14	1.15	1.16	1.18	/	1.45	1.47	1.49
	85	TC	20.3	20.5	21.0	21.2	21.0	21.2	21.4	21.7	22.3	22.6	22.8	23.0	/	28.4	28.6	28.9
		S/T	0.95	1.00	1.00	1.00	0.65	0.90	0.97	1.00	0.39	0.58	0.76	0.94	/	0.39	0.53	0.68
		KW	1.24	1.25	1.26	1.26	1.26	1.28	1.29	1.30	1.31	1.32	1.33	1.34	/	1.63	1.64	1.66
	95	TC	20.2	20.4	20.9	21.1	20.9	21.1	21.3	21.6	22.2	22.5	22.7	22.8	/	28.1	28.4	28.6
		S/T	0.95	1.00	1.00	1.00	0.65	0.90	0.97	1.00	0.39	0.58	0.75	0.95	/	0.39	0.53	0.68
		KW	1.49	1.51	1.52	1.52	1.52	1.54	1.55	1.57	1.58	1.59	1.60	1.61	/	1.96	1.99	2.00
	105	TC	19.8	20.1	20.5	20.7	20.5	20.7	20.9	21.2	21.9	22.1	22.3	22.5	/	27.8	28.1	28.3
		S/T	0.95	1.00	1.00	1.00	0.65	0.90	0.97	1.00	0.39	0.58	0.77	0.95	/	0.39	0.53	0.68
		KW	1.76	1.78	1.80	1.80	1.80	1.82	1.83	1.85	1.86	1.88	1.89	1.91	/	2.35	2.37	2.40
	115	TC	19.7	19.9	20.4	20.6	20.4	20.6	20.8	21.0	21.7	21.9	22.1	22.4	/	27.5	27.7	28.0
		S/T	0.96	1.00	1.00	1.00	0.65	0.90	0.97	1.00	0.39	0.58	0.77	0.96	/	0.39	0.54	0.69
		KW																

BOVA 36 + BVA 24 For Cooling																		
Indoor Airflow (CFM)	Outdoor DB (°F)	IWB (°F)	59				63				67				71			
		IDB (°F)	70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
860 (High Stage)	15	TC	22.2	22.5	23.0	23.2	23.0	23.2	23.5	23.7	24.5	24.7	25.0	23.3	/	31.6	31.9	32.2
		S/T	0.96	1.00	0.99	1.00	0.66	0.90	0.97	1.00	0.39	0.58	0.77	1.00	/	0.38	0.53	0.68
		KW	0.66	0.67	0.68	0.68	0.68	0.69	0.69	0.70	0.69	0.70	0.72	0.62	/	1.14	1.16	1.18
	65	TC	22.3	22.5	23.0	23.3	23.0	23.3	23.5	23.8	24.6	24.8	25.0	25.3	/	31.1	31.4	31.7
		S/T	0.96	1.00	1.00	1.00	0.66	0.90	0.97	1.00	0.39	0.58	0.77	0.95	/	0.39	0.54	0.68
		KW	0.99	1.00	1.01	1.01	1.01	1.02	1.04	1.05	1.04	1.06	1.07	1.08	/	1.41	1.43	1.45
	75	TC	22.0	22.3	22.8	23.0	22.8	23.0	23.3	23.5	24.4	24.7	24.8	24.8	/	31.2	31.4	31.7
		S/T	0.96	1.00	1.00	1.00	0.66	0.90	0.97	1.00	0.39	0.58	0.77	1.00	/	0.39	0.54	0.68
		KW	1.23	1.25	1.26	1.26	1.26	1.27	1.29	1.30	1.31	1.32	1.33	1.33	/	1.66	1.68	1.70
	85	TC	21.9	22.1	22.6	22.9	22.6	22.9	23.1	23.4	24.4	24.5	24.6	24.8	/	30.8	31.1	31.3
		S/T	0.96	1.00	1.00	1.00	0.66	0.90	0.97	1.00	0.39	0.59	0.78	1.00	/	0.39	0.54	0.69
		KW	1.36	1.38	1.39	1.39	1.39	1.41	1.42	1.44	1.46	1.46	1.46	1.48	/	1.81	1.83	1.85
	95	TC	21.7	22.0	22.5	22.7	22.5	22.7	22.9	23.2	24.0	24.2	24.4	24.6	/	30.5	30.7	30.9
		S/T	0.96	1.00	0.99	1.00	0.66	0.90	0.97	1.00	0.39	0.59	0.78	1.00	/	0.39	0.54	0.69
		KW	1.62	1.64	1.66	1.66	1.66	1.68	1.69	1.71	1.73	1.74	1.75	1.77	/	2.19	2.21	2.22
	105	TC	21.5	21.8	22.3	22.5	22.3	22.5	22.8	23.0	23.8	24.0	24.2	24.5	/	30.0	30.2	30.5
		S/T	0.95	1.00	1.00	1.00	0.66	0.90	0.97	1.00	0.39	0.59	0.78	1.00	/	0.39	0.54	0.70
		KW	1.95	1.97	1.99	1.99	1.99	2.01	2.03	2.05	2.06	2.08	2.09	2.11	/	2.63	2.65	2.68
	115	TC	21.4	21.6	22.1	22.3	22.1	22.3	22.6	22.8	23.6	23.8	24.0	24.2	/	28.8	28.8	28.7
		S/T	0.95	1.00	1.00	1.00	0.66	0.90	0.97	1.00	0.39	0.59	0.79	0.99	/	0.39	0.55	0.72
		KW	2.31	2.33	2.36	2.36	2.36	2.38	2.41	2.43	2.44	2.46	2.48	2.50	/	3.00	3.00	3.00
	125	TC	16.8	17.0	17.4	17.6	17.4	17.6	17.7	17.9	18.8	18.9	18.9	18.9	/	20.1	20.1	20.1
		S/T	1.00	1.00	1.00	1.00	0.66	0.92	1.00	1.00	0.40	0.65	0.90	1.00	/	0.40	0.64	0.87
		KW	1.97	1.99	2.01	2.01	2.01	2.03	2.05	2.07	2.11	2.11	2.11	2.11	/	2.12	2.12	2.12
1080	15	TC	25.8	26.1	26.7	27.0	26.7	27.0	27.3	27.6	28.6	28.8	29.1	29.4	/	36.1	36.4	36.6
		S/T	0.98	1.00	1.00	1.00	0.67	0.90	0.97	1.00	0.39	0.60	0.80	0.99	/	0.38	0.55	0.71
		KW	1.04	1.05	1.06	1.06	1.06	1.07	1.08	1.09	1.09	1.10	1.12	1.13	/	1.59	1.62	1.64
	65	TC	25.9	26.2	26.8	27.1	26.8	27.1	27.4	27.7	28.6	28.8	29.1	29.4	/	36.1	36.4	36.6
		S/T	0.98	1.00	1.00	1.00	0.67	0.90	0.97	1.00	0.39	0.60	0.80	0.99	/	0.38	0.55	0.71
		KW	1.33	1.34	1.36	1.36	1.36	1.37	1.39	1.40	1.40	1.41	1.43	1.44	/	1.90	1.93	1.95
	75	TC	26.0	26.3	26.9	27.2	26.9	27.2	27.5	27.8	28.7	29.0	29.2	29.5	/	36.1	36.4	36.7
		S/T	0.97	1.00	1.00	0.99	0.67	0.90	0.97	1.00	0.39	0.59	0.80	1.00	/	0.38	0.55	0.71
		KW	1.56	1.57	1.59	1.59	1.59	1.61	1.62	1.64	1.64	1.66	1.68	1.69	/	2.07	2.10	2.12
	85	TC	25.6	25.9	26.5	26.8	26.5	26.8	27.1	27.4	28.3	28.6	28.8	29.0	/	35.5	35.8	36.1
		S/T	0.98	1.00	1.00	1.00	0.67	0.90	0.97	1.00	0.39	0.60	0.80	1.00	/	0.38	0.55	0.71
		KW	1.71	1.73	1.75	1.75	1.75	1.76	1.78	1.80	1.81	1.83	1.84	1.85	/	2.29	2.31	2.34
	95	TC	25.3	25.6	26.2	26.5	26.2	26.5	26.8	27.0	28.0	28.2	28.5	28.7	/	34.2	34.4	34.4
		S/T	0.97	1.00	0.99	0.99	0.67	0.90	0.97	1.00	0.39	0.60	0.81	0.99	/	0.38	0.56	0.73
		KW	2.03	2.05	2.07	2.07	2.07	2.09	2.12	2.14	2.14	2.16	2.18	2.20	/	2.65	2.65	2.65
	105	TC	24.9	25.2	25.8	26.1	25.8	26.1	26.3	26.6	27.6	27.8	28.0	28.3	/	32.2	32.4	32.5
		S/T	0.98	1.00	1.00	1.00	0.67	0.90	0.97	1.00	0.39	0.60	0.82	0.99	/	0.39	0.57	0.75
		KW	2.39	2.42	2.44	2.44	2.44	2.47	2.50	2.52	2.53	2.55	2.57	2.59	/	2.93	2.93	2.93
	115	TC	24.5	24.8	25.4	25.6	25.4	25.6	25.9	26.2	27.1	27.3	27.6	27.8	/	29.6	29.7	29.9
		S/T	0.97	1.00	1.00	0.99	0.68	0.90	0.97	1.00	0.39	0.61	0.82	1.00	/	0.39	0.59	0.79
		KW	2.83	2.86	2.89	2.89	2.89	2.92	2.95	2.98	2.99	3.01	3.05	3.07	/	3.11	3.12	3.12
	125	TC	16.9	17.1	17.5	17.7	17.5	17.7	17.9	18.1	19.0	19.0	19.0	19.1	/	20.3	20.3	20.3
		S/T	0.98	1.00	1.00	1.00	0.71	0.90	0.97	1.00	0.40	0.71	1.00	1.00	/	0.41	0.71	0.99
		KW	2.08	2.11	2.13	2.13	2.13	2.15	2.17	2.20	2.24	2.24	2.24	2.24	/	2.25	2.25	2.25

Table 8

TC refer to total capacity S/T: refer to the ratio of sensible heat and total capacity kW: refer to total input power

BOVA 36 + BVA 36 For Cooling																		
Indoor Airflow (CFM)	Outdoor DB (°F)	IWB (°F) IDB (°F)	59				63				67				71			
			70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
650	15	TC	22.1	22.3	22.8	23.1	22.8	23.1	23.3	23.6	24.4	24.6	24.8	25.1	/	30.1	30.4	30.7
		S/T	0.78	0.84	0.92	1.00	0.59	0.77	0.86	0.89	0.40	0.54	0.68	0.82	/	0.39	0.50	0.62
		kW	0.84	0.85	0.87	0.87	0.87	0.88	0.89	0.90	0.89	0.90	0.92	0.93	/	1.22	1.24	1.25
	65	TC	22.4	22.6	23.1	23.4	23.1	23.4	23.6	23.9	24.7	24.9	25.1	25.4	/	30.4	30.7	31.0
		S/T	0.78	0.84	0.92	1.00	0.59	0.77	0.86	0.89	0.40	0.54	0.68	0.82	/	0.39	0.50	0.62
		kW	0.94	0.95	0.97	0.97	0.97	0.98	0.99	1.00	0.99	1.00	1.02	1.03	/	1.32	1.34	1.35
	75	TC	22.1	22.3	22.8	23.1	22.8	23.1	23.3	23.6	24.3	24.6	24.8	25.0	/	30.4	30.7	31.0
		S/T	0.78	0.84	0.92	1.00	0.59	0.76	0.83	0.86	0.40	0.54	0.69	0.83	/	0.39	0.50	0.62
		kW	1.18	1.19	1.21	1.21	1.21	1.22	1.23	1.25	1.24	1.26	1.27	1.29	/	1.57	1.58	1.60
	85	TC	22.0	22.3	22.8	23.0	22.8	23.0	23.3	23.5	24.3	24.5	24.8	25.0	/	30.2	30.4	30.7
		S/T	0.78	0.84	0.92	1.00	0.59	0.76	0.86	0.89	0.40	0.54	0.69	0.83	/	0.39	0.50	0.62
		kW	1.32	1.34	1.35	1.35	1.35	1.36	1.38	1.39	1.39	1.41	1.42	1.43	/	1.73	1.75	1.76
	95	TC	21.9	22.2	22.6	22.9	22.6	22.9	23.1	23.4	24.2	24.4	24.6	24.8	/	29.8	30.1	30.4
		S/T	0.78	0.84	0.92	1.00	0.59	0.77	0.86	0.89	0.40	0.54	0.69	0.83	/	0.39	0.51	0.62
		kW	1.60	1.62	1.63	1.63	1.63	1.65	1.67	1.68	1.69	1.70	1.72	1.73	/	2.10	2.12	2.15
	105	TC	21.7	22.0	22.5	22.7	22.5	22.7	23.0	23.2	24.0	24.2	24.4	24.7	/	29.5	29.7	30.0
		S/T	0.78	0.84	0.92	1.00	0.59	0.77	0.86	0.89	0.40	0.55	0.69	0.83	/	0.39	0.51	0.63
		kW	1.92	1.94	1.96	1.96	1.96	1.98	2.00	2.02	2.03	2.04	2.06	2.08	/	2.55	2.57	2.60
	115	TC	21.5	21.8	22.3	22.5	22.3	22.5	22.8	23.0	23.8	24.0	24.2	24.4	/	28.1	28.3	28.2
		S/T	0.78	0.84	0.92	1.00	0.59	0.77	0.86	0.89	0.40	0.55	0.69	0.84	/	0.39	0.51	0.64
		kW	2.28	2.31	2.33	2.33	2.33	2.36	2.38	2.41	2.41	2.44	2.46	2.48	/	2.87	2.87	2.87
	125	TC	16.6	16.8	17.2	17.4	17.2	17.4	17.6	17.8	18.6	18.7	18.7	18.7	/	19.8	19.9	19.9
		S/T	0.77	0.83	0.91	1.00	0.60	0.77	0.86	0.89	0.40	0.59	0.78	1.00	/	0.40	0.58	0.75
		kW	1.87	1.90	1.92	1.92	1.92	1.94	1.96	1.98	2.02	2.02	2.02	2.02	/	2.02	2.02	2.02
820 (Low Stage)	15	TC	24.4	24.7	25.2	25.5	25.2	25.5	25.8	26.1	27.0	27.2	27.5	27.7	/	33.4	33.7	34.0
		S/T	0.81	0.87	0.95	1.00	0.61	0.79	0.89	0.92	0.40	0.56	0.71	0.87	/	0.39	0.52	0.64
		kW	1.02	1.03	1.05	1.05	1.05	1.06	1.07	1.08	1.08	1.09	1.11	1.12	/	1.48	1.50	1.53
	65	TC	24.7	25.0	25.5	25.8	25.5	25.8	26.1	26.4	27.3	27.5	27.8	28.0	/	33.7	34.0	34.3
		S/T	0.81	0.87	0.95	1.00	0.61	0.79	0.89	0.92	0.40	0.56	0.71	0.87	/	0.39	0.52	0.64
		kW	1.12	1.13	1.15	1.15	1.15	1.16	1.17	1.18	1.18	1.19	1.21	1.22	/	1.58	1.60	1.63
	75	TC	24.5	24.8	25.4	25.6	25.4	25.6	25.9	26.2	27.1	27.3	27.6	27.8	/	33.7	34.0	34.3
		S/T	0.81	0.87	0.95	1.00	0.61	0.78	0.89	0.92	0.40	0.56	0.71	0.87	/	0.39	0.52	0.64
		kW	1.41	1.42	1.44	1.44	1.44	1.45	1.47	1.48	1.48	1.49	1.51	1.53	/	1.76	1.78	1.81
	85	TC	24.5	24.8	25.3	25.6	25.3	25.6	25.9	26.1	27.1	27.3	27.5	27.8	/	33.3	33.6	33.8
		S/T	0.81	0.87	0.95	1.00	0.61	0.78	0.89	0.92	0.40	0.56	0.72	0.87	/	0.39	0.52	0.65
		kW	1.51	1.53	1.54	1.54	1.54	1.56	1.58	1.59	1.60	1.61	1.62	1.64	/	2.00	2.02	2.04
	95	TC	24.3	24.6	25.1	25.4	25.1	25.4	25.7	25.9	26.8	27.1	27.3	27.5	/	32.8	33.1	33.3
		S/T	0.81	0.87	0.95	1.00	0.61	0.78	0.89	0.92	0.40	0.56	0.71	0.88	/	0.39	0.52	0.65
		kW	1.82	1.84	1.86	1.86	1.86	1.88	1.90	1.92	1.92	1.94	1.96	1.97	/	2.43	2.45	2.47
	105	TC	24.0	24.3	24.8	25.1	24.8	25.1	25.4	25.7	26.6	26.8	27.0	27.2	/	32.3	32.5	32.7
		S/T	0.81	0.87	0.95	1.00	0.61	0.79	0.89	0.92	0.40	0.56	0.72	0.88	/	0.39	0.52	0.66
		kW	2.17	2.20	2.22	2.22	2.22	2.24	2.27	2.29	2.30	2.32	2.34	2.36	/	2.91	2.93	2.96
	115	TC	23.7	24.0	24.5	24.8	24.5	24.8	25.0	25.3	26.2	26.4	26.6	26.8	/	29.3	28.8	29.0
		S/T	0.81	0.87	0.95	1.00	0.61	0.79	0.89	0.92	0.40	0.56	0.73	0.89	/	0.39	0.54	0.69
		kW	2.60	2.63	2.66	2.66	2.66	2.69	2.71	2.74	2.75	2.77	2.80	2.82	/	2.93	2.92	2.92
	125	TC	16.9	17.1	17.5	17.7	17.5	17.7	17.9	18.1	19.0	19.0	19.0	19.0	/	20.2	20.2	20.3
		S/T	0.81	0.87	0.95	1.00	0.61	0.79	0.89	0.92	0.40	0.64	0.88	1.00	/	0.41	0.63	0.85
		kW	1.92	1.94	1.96	1.96	1.96	1.98	2.00	2.02	2.06	2.06	2.06	2.06	/	2.07	2.07	2.07
1020	15	TC	29.0	29.3	29.9	30.3	29.9	30.3	30.6	30.9	31.9	32.3	32.6	32.9	/	39.4	39.8	40.1
		S/T	0.88	0.92	1.00	1.00	0.63	0.83	0.95	1.00	0.39	0.57	0.74	0.91	/	0.39	0.53	0.66
		kW	1.01	1.02	1.03	1.03	1.03	1.04	1.05	1.07	1.06	1.08	1.09	1.10	/	1.39	1.41	1.43
	65	TC	29.4	29.7	30.3	30.7	30.3	30.7	31.0	31.3	32.4	32.7	33.0	33.2	/	39.5	39.8	40.1
		S/T	0.88	0.92	1.00	1.00	0.61	0.83	0.95	1.00	0.39	0.57	0.73	0.90	/	0.39	0.53	0.67
		kW	1.54	1.56	1.57	1.57	1.57	1.59	1.60	1.62	1.62	1.63	1.65	1.67	/	2.04	2.06	2.09
	75	TC	29.4	29.8	30.4	30.7	30.4	30.7	31.1	31.4	32.5	32.8	33.1	33.3	/	39.1	39.4	39.7
		S/T	0.89	0.93	0.99	1.00	0.62	0.83	0.95	1.00	0.39	0.56	0.73	0.90	/	0.39	0.53	0.67
		kW	1.71	1.73	1.75	1.75	1.75	1.77	1.79	1.80	1.79	1.82	1.84	1.86	/	2.25	2.27	2.29
	85	TC	29.0	29.3	29.9	30.3	29.9	30.3	30.6	30.9	32.0	32.3	32.6	32.8	/	38.4	38.7	38.9
		S/T	0.89	0.93	1.00	1.00	0.62	0.84	0.95	1.00	0.39	0.57	0.74	0.91	/	0.39	0.53	0.67
		kW	1.93	1.95	1.97	1.97	1.97	1.99	2.01	2.03	2.03	2.05	2.07	2.09	/	2.55	2.58	2.60
	95	TC	28.5	28.8	29.4	29.8	29.4	29.8	30.1	30.4	31.5	31.8	32.0	32.3	/	37.5	37.8	38.0
		S/T	0.89	0.93	1.00	1.00	0.62	0.84	0.95	1.00	0.39	0.57	0.74	0.92	/	0.39	0.53	0.68
		kW	2.32	2.34	2.37	2.37	2.37	2.39	2.42	2.44	2.45	2.47	2.49	2.52	/	3.04	3.06	3.09
	105	TC	27.9	28.3	28.9	29.2	28.9	29.2	29.5	29.8	30.9	31.2	31.4	31.6	/	36.2	36.3	36.5
		S/T	0.88	0.92	1.00	1.00	0.62	0.84	0.95	1.00	0.39	0.57	0.75	0.93	/	0.39	0.54	0.69
		kW	2.76	2.79	2.82	2.82	2.82	2.85	2.88	2.91	2.91	2.94	2.96	2.99	/	3.52	3.53	3.54
	115	TC	25.0	25.3	25.9	26.1	25.9	26.1	26.4	26.7	27.8	28.0	28.1	28.3	/	30.1	30.3	30.4
		S/T	0.89	0.93	1.00	1.00	0.62	0.85	0.95	1.00	0.40	0.60	0.79	0.99	/	0.39	0.58	0.76
		kW	2.81	2.84	2.87	2.87	2.87	2.91	2.94	2.97	2.99	3.01	3.03					

BOVA 36 + BVA 36 For Cooling																			
Indoor Airflow (CFM)	Outdoor DB (°F)	IWB (°F)	59				63				67				71				
			IDB (°F)	70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
1150 (High Stage)	15	TC	31.3	31.6	32.3	32.7	32.3	32.7	33.0	33.4	34.5	34.8	35.2	35.5	/	42.8	43.1	43.5	
		S/T	0.89	0.94	1.00	1.00	0.64	0.86	0.96	1.00	0.39	0.58	0.76	0.94	/	0.38	0.54	0.68	
		KW	1.16	1.18	1.19	1.19	1.19	1.20	1.21	1.23	1.22	1.24	1.25	1.27	/	1.64	1.66	1.68	
	65	TC	31.6	31.9	32.7	33.0	32.7	33.0	33.4	33.7	35.0	35.2	35.5	35.8	/	42.2	42.5	42.8	
		S/T	0.89	0.94	1.00	1.00	0.63	0.86	0.96	1.00	0.39	0.58	0.76	0.94	/	0.39	0.54	0.69	
		KW	1.80	1.82	1.84	1.84	1.84	1.86	1.88	1.90	1.89	1.92	1.94	1.96	/	2.34	2.37	2.39	
	75	TC	31.6	32.0	32.7	33.0	32.7	33.0	33.4	33.8	35.0	35.3	35.5	35.8	/	41.9	42.2	42.5	
		S/T	0.90	0.94	1.00	1.00	0.62	0.85	0.96	1.00	0.39	0.58	0.76	0.94	/	0.39	0.54	0.69	
		KW	1.97	1.99	2.01	2.01	2.01	2.03	2.05	2.07	2.07	2.09	2.12	2.14	/	2.46	2.49	2.51	
	85	TC	31.1	31.4	32.1	32.5	32.1	32.5	32.8	33.2	34.4	34.7	34.9	35.2	/	40.8	41.1	41.4	
		S/T	0.90	0.94	1.00	1.00	0.63	0.86	0.96	1.00	0.39	0.58	0.76	0.95	/	0.39	0.54	0.70	
		KW	2.17	2.19	2.22	2.22	2.22	2.24	2.26	2.29	2.29	2.31	2.33	2.36	/	2.84	2.86	2.89	
	95	TC	30.7	31.1	31.8	32.1	31.8	32.1	32.4	32.8	33.7	34.2	34.5	34.7	/	39.8	40.0	40.2	
		S/T	0.90	0.94	0.99	1.00	0.63	0.87	0.96	1.00	0.39	0.58	0.76	1.00	/	0.39	0.55	0.71	
		KW	2.58	2.61	2.64	2.64	2.64	2.66	2.69	2.72	2.73	2.75	2.78	2.80	/	3.34	3.37	3.39	
	105	TC	29.9	30.3	31.0	31.3	31.0	31.3	31.6	32.0	33.0	33.4	33.6	33.9	/	36.9	36.9	37.1	
		S/T	0.89	0.94	0.99	1.00	0.63	0.87	0.96	1.00	0.39	0.59	0.78	1.00	/	0.39	0.57	0.74	
		KW	3.05	3.08	3.11	3.11	3.11	3.15	3.18	3.21	3.22	3.25	3.28	3.30	/	3.61	3.59	3.61	
	115	TC	24.8	25.1	25.6	25.9	25.6	25.9	26.2	26.5	28.2	28.3	27.9	28.0	/	29.1	29.2	29.3	
		S/T	0.90	0.94	1.00	1.00	0.64	0.88	0.96	1.00	0.40	0.62	0.86	1.00	/	0.40	0.62	0.84	
		KW	2.86	2.89	2.92	2.92	2.92	2.95	2.98	3.01	3.06	3.08	3.07	3.09	/	3.12	3.13	3.14	
	125	TC	17.2	17.4	17.8	18.0	17.8	18.0	18.2	18.4	19.3	19.3	19.3	19.4	/	20.6	20.6	20.6	
		S/T	0.89	0.94	0.99	1.00	0.75	1.00	0.96	0.99	0.41	0.75	1.00	1.00	/	0.43	0.74	1.00	
		KW	2.03	2.05	2.07	2.07	2.07	2.09	2.11	2.14	2.18	2.18	2.18	2.18	/	2.18	2.18	2.18	
1350	15	TC	34.2	34.6	35.4	35.8	35.4	35.8	36.2	36.5	37.8	38.1	38.5	38.8	/	45.0	45.3	45.7	
		S/T	0.89	0.93	1.00	1.00	0.64	0.89	1.00	1.00	0.39	0.58	0.78	1.00	/	0.38	0.54	0.70	
		KW	1.41	1.43	1.45	1.45	1.45	1.46	1.48	1.49	1.49	1.50	1.52	1.54	/	2.01	2.03	2.06	
	65	TC	33.6	34.0	34.7	35.1	34.7	35.1	35.5	35.9	37.2	37.5	37.7	38.0	/	44.5	44.8	45.5	
		S/T	0.89	0.93	1.00	1.00	0.64	0.88	0.96	1.00	0.39	0.59	0.78	0.99	/	0.38	0.55	0.71	
		KW	2.11	2.13	2.15	2.15	2.15	2.18	2.20	2.22	2.22	2.24	2.27	2.29	/	2.68	2.70	2.56	
	75	TC	33.7	34.1	34.9	35.2	34.9	35.2	35.6	36.0	37.4	37.6	37.9	38.2	/	45.6	45.8	45.9	
		S/T	0.89	0.94	1.00	1.00	0.63	0.88	0.96	1.00	0.39	0.59	0.78	1.00	/	0.38	0.55	0.71	
		KW	2.17	2.19	2.22	2.22	2.22	2.24	2.26	2.29	2.29	2.31	2.33	2.36	/	2.95	2.96	2.96	
	85	TC	33.0	33.4	34.1	34.5	34.1	34.5	34.8	35.2	36.6	36.8	37.1	37.3	/	43.0	43.2	43.5	
		S/T	0.89	0.94	1.00	1.00	0.64	0.89	0.96	1.00	0.39	0.59	0.79	1.00	/	0.39	0.56	0.73	
		KW	2.45	2.47	2.50	2.50	2.50	2.53	2.55	2.58	2.59	2.61	2.63	2.65	/	3.15	3.18	3.20	
	95	TC	32.2	32.5	33.2	33.6	33.2	33.6	34.0	34.3	35.7	35.9	36.1	36.4	/	40.9	41.1	41.1	
		S/T	0.90	0.94	1.00	1.00	0.64	0.90	0.96	1.00	0.39	0.60	0.80	1.00	/	0.39	0.57	0.75	
		KW	2.88	2.91	2.94	2.94	2.94	2.97	3.00	3.03	3.05	3.07	3.09	3.11	/	3.56	3.57	3.57	
	105	TC	31.3	31.6	32.3	32.7	32.3	32.7	33.0	33.4	34.7	34.9	35.1	35.4	/	37.4	37.6	37.4	
		S/T	0.90	0.94	1.00	1.00	0.65	0.90	0.96	1.00	0.39	0.60	0.81	1.00	/	0.39	0.59	0.79	
		KW	3.36	3.39	3.43	3.43	3.43	3.47	3.50	3.54	3.56	3.59	3.61	3.64	/	3.74	3.76	3.70	
	115	TC	25.0	25.2	25.8	26.1	25.8	26.1	26.4	26.6	27.8	27.9	28.0	28.2	/	29.8	29.9	30.0	
		S/T	0.90	0.94	1.00	1.00	0.66	1.00	0.96	1.00	0.40	0.66	0.93	1.00	/	0.40	0.65	0.90	
		KW	2.97	3.00	3.04	3.04	3.04	3.07	3.10	3.13	3.17	3.18	3.20	3.21	/	3.31	3.32	3.33	
	125	TC	17.2	17.4	17.8	18.0	17.8	18.0	18.2	18.4	19.3	19.3	19.4	19.4	/	20.6	20.6	20.6	
		S/T	0.89	0.94	1.00	1.00	0.79	1.00	0.96	1.00	0.41	0.80	1.00	1.00	/	0.43	0.80	0.99	
		KW	2.11	2.14	2.16	2.16	2.16	2.18	2.20	2.23	2.27	2.27	2.27	2.27	/	2.28	2.28	2.28	

Table 10

TC refer to total capacity S/T: refer to the ratio of sensible heat and total capacity kW: refer to total input power

		BOVA 60 +BVA 48 For Cooling																
Indoor Airflow (CFM)	Outdoor DB (°F)	IWB (°F)	59				63			67			71					
		IDB (°F)	70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
1180 (Low Stage)	15	TC	39.0	39.4	40.3	40.7	40.3	40.7	41.2	41.6	43.0	43.4	43.8	44.1	/	52.2	52.6	53.6
		S/T	0.84	0.89	0.96	1.00	0.59	0.79	0.91	0.95	0.40	0.55	0.69	0.84	/	0.39	0.51	0.63
		KW	1.25	1.27	1.29	1.29	1.29	1.31	1.33	1.35	1.34	1.36	1.39	1.40	/	1.97	2.00	1.79
	65	TC	38.9	39.3	40.2	40.6	40.2	40.6	41.1	41.5	42.9	43.3	43.7	44.0	/	52.1	52.5	53.5
		S/T	0.84	0.89	0.96	1.00	0.59	0.79	0.91	0.95	0.40	0.55	0.69	0.84	/	0.39	0.51	0.63
		KW	1.85	1.87	1.89	1.89	1.89	1.91	1.93	1.95	1.94	1.96	1.99	2.00	/	2.57	2.60	2.39
	75	TC	38.6	39.1	39.9	40.4	39.9	40.4	40.8	41.2	42.6	43.0	43.4	43.8	/	51.6	52.2	52.6
		S/T	0.84	0.89	0.96	1.00	0.59	0.79	0.91	0.95	0.40	0.55	0.69	0.84	/	0.39	0.51	0.63
		KW	2.09	2.11	2.13	2.13	2.13	2.16	2.18	2.20	2.20	2.22	2.25	2.27	/	2.69	2.60	2.62
	85	TC	38.2	38.6	39.5	39.9	39.5	39.9	40.3	40.7	42.6	42.8	42.9	43.3	/	51.0	51.4	51.8
		S/T	0.84	0.89	0.96	1.00	0.59	0.79	0.91	0.95	0.40	0.55	0.70	0.85	/	0.39	0.51	0.63
		KW	2.22	2.25	2.27	2.27	2.27	2.29	2.32	2.34	2.38	2.39	2.39	2.41	/	2.94	2.96	2.99
	95	TC	37.8	38.2	39.1	39.5	39.1	39.5	39.9	40.4	41.7	42.2	42.5	42.8	/	50.2	50.6	50.9
		S/T	0.84	0.89	0.96	1.00	0.60	0.79	0.91	0.95	0.40	0.55	0.70	0.85	/	0.39	0.51	0.64
		KW	2.69	2.72	2.75	2.75	2.75	2.78	2.81	2.84	2.84	2.87	2.89	2.92	/	3.52	3.55	3.58
	105	TC	37.4	37.8	38.6	39.0	38.6	39.0	39.5	39.9	41.3	41.6	42.0	42.3	/	49.3	49.6	49.9
		S/T	0.84	0.89	0.96	1.00	0.60	0.79	0.91	0.95	0.39	0.55	0.70	0.86	/	0.39	0.51	0.64
		KW	3.22	3.26	3.29	3.29	3.29	3.32	3.36	3.39	3.41	3.44	3.46	3.49	/	4.19	4.23	4.26
	115	TC	36.8	37.2	38.1	38.5	38.1	38.5	38.9	39.3	40.7	41.0	41.4	41.7	/	44.9	45.1	45.4
		S/T	0.84	0.89	0.96	1.00	0.60	0.80	0.91	0.95	0.40	0.55	0.71	0.86	/	0.39	0.53	0.67
		KW	3.84	3.88	3.92	3.92	3.92	3.96	4.00	4.04	4.05	4.08	4.13	4.16	/	4.34	4.35	4.35
	125	TC	29.5	29.9	30.5	30.8	30.5	30.8	31.2	31.5	33.0	33.1	33.2	33.2	/	35.1	35.2	35.3
		S/T	0.86	0.91	0.98	1.00	0.60	0.81	0.92	0.96	0.40	0.59	0.79	1.00	/	0.39	0.58	0.76
		KW	3.13	3.16	3.19	3.19	3.19	3.23	3.26	3.29	3.36	3.36	3.36	3.36	/	3.38	3.38	3.39
1330	15	TC	40.9	41.4	42.3	42.8	42.3	42.8	43.2	43.7	45.1	45.6	46.0	46.4	/	55.3	55.7	56.2
		S/T	0.89	0.93	1.00	1.00	0.61	0.82	0.95	1.00	0.39	0.55	0.71	0.87	/	0.38	0.52	0.64
		KW	1.33	1.35	1.36	1.36	1.36	1.38	1.39	1.41	1.38	1.40	1.43	1.46	/	1.74	1.75	1.77
	65	TC	40.6	41.0	41.9	42.4	41.9	42.4	42.9	43.3	45.3	45.4	45.6	46.0	/	55.3	55.7	56.2
		S/T	0.89	0.93	1.00	1.00	0.60	0.81	0.95	1.00	0.39	0.55	0.71	0.87	/	0.38	0.52	0.64
		KW	2.01	2.03	2.05	2.05	2.05	2.07	2.09	2.11	2.14	2.15	2.16	2.19	/	2.58	2.61	2.64
	75	TC	40.8	41.2	42.1	42.6	42.1	42.6	43.1	43.5	45.0	45.4	45.8	46.2	/	55.0	55.4	55.8
		S/T	0.89	0.93	1.00	1.00	0.60	0.81	0.95	1.00	0.39	0.55	0.71	0.87	/	0.38	0.52	0.65
		KW	2.17	2.19	2.22	2.22	2.22	2.24	2.26	2.29	2.28	2.31	2.33	2.36	/	2.80	2.83	2.86
	85	TC	40.2	40.7	41.6	42.0	41.6	42.0	42.5	42.9	44.4	44.8	45.2	45.6	/	54.1	54.5	54.9
		S/T	0.89	0.93	1.00	1.00	0.60	0.81	0.95	1.00	0.39	0.56	0.72	0.88	/	0.38	0.52	0.65
		KW	2.41	2.44	2.46	2.46	2.46	2.49	2.52	2.54	2.55	2.57	2.59	2.62	/	3.16	3.19	3.22
	95	TC	39.7	40.2	41.1	41.5	41.1	41.5	42.0	42.4	43.9	44.3	44.6	45.0	/	53.0	53.4	53.8
		S/T	0.89	0.93	1.00	1.00	0.61	0.81	0.95	1.00	0.39	0.56	0.72	0.88	/	0.38	0.52	0.66
		KW	2.90	2.93	2.96	2.96	2.96	2.99	3.02	3.05	3.06	3.09	3.12	3.14	/	3.77	3.80	3.83
	105	TC	39.1	39.6	40.5	40.9	40.5	40.9	41.3	41.8	43.3	43.6	44.0	44.3	/	51.9	52.3	52.6
		S/T	0.89	0.93	1.00	1.00	0.61	0.82	0.95	1.00	0.39	0.56	0.73	0.89	/	0.38	0.52	0.66
		KW	3.45	3.49	3.53	3.53	3.53	3.57	3.60	3.64	3.65	3.68	3.71	3.74	/	4.48	4.52	4.55
	115	TC	38.3	38.8	39.6	40.0	39.6	40.0	40.5	40.9	42.6	42.9	43.1	43.4	/	45.3	45.5	45.7
		S/T	0.89	0.93	1.00	1.00	0.61	0.83	0.95	1.00	0.39	0.56	0.73	0.90	/	0.39	0.55	0.71
		KW	4.07	4.11	4.15	4.15	4.15	4.20	4.24	4.28	4.33	4.36	4.37	4.36	/	4.39	4.41	4.43
	125	TC	29.7	30.0	30.7	31.1	30.7	31.1	31.4	31.7	33.3	33.3	33.4	33.5	/	35.4	35.5	35.5
		S/T	0.90	0.94	1.00	1.00	0.63	0.86	0.96	1.00	0.40	0.62	0.83	1.00	/	0.40	0.60	0.81
		KW	3.18	3.21	3.25	3.25	3.25	3.28	3.31	3.35	3.42	3.42	3.42	3.42	/	3.44	3.44	3.44
1530 (High Stage)	15	TC	43.8	44.3	45.3	45.8	45.3	45.8	46.3	46.8	48.3	48.8	49.2	49.7	/	58.7	59.2	59.6
		S/T	0.90	0.94	1.00	1.00	0.62	0.84	0.96	1.00	0.39	0.56	0.73	0.90	/	0.38	0.53	0.67
		KW	1.65	1.67	1.68	1.68	1.68	1.70	1.72	1.74	1.70	1.74	1.77	1.80	/	2.14	2.16	2.18
	65	TC	43.2	43.7	44.6	45.1	44.6	45.1	45.6	46.1	47.7	48.1	48.5	48.9	/	58.5	58.9	59.4
		S/T	0.90	0.94	1.00	1.00	0.61	0.84	0.96	1.00	0.39	0.57	0.74	0.91	/	0.38	0.53	0.67
		KW	2.30	2.33	2.35	2.35	2.35	2.37	2.40	2.42	2.41	2.44	2.47	2.50	/	2.92	2.95	2.98
	75	TC	43.4	43.9	44.8	45.3	44.8	45.3	45.8	46.3	47.9	48.3	48.7	49.1	/	58.1	58.5	58.9
		S/T	0.90	0.94	1.00	1.00	0.62	0.84	0.96	1.00	0.39	0.57	0.74	0.91	/	0.38	0.53	0.67
		KW	2.44	2.47	2.50	2.50	2.50	2.52	2.55	2.58	2.57	2.60	2.63	2.65	/	3.11	3.13	3.16
	85	TC	42.7	43.2	44.2	44.7	44.2	44.7	45.1	45.6	47.2	47.7	48.0	48.4	/	57.0	57.5	57.9
		S/T	0.90	0.94	1.00	1.00	0.62	0.84	0.96	1.00	0.39	0.57	0.74	0.91	/	0.38	0.53	0.67
		KW	2.67	2.70	2.73	2.73	2.73	2.76	2.78	2.81	2.82	2.85	2.87	2.90	/	3.47	3.50	3.52
	95	TC	42.2	42.7	43.7	44.1	43.7	44.1	44.6	45.1	46.6	47.0	47.5	47.8	/	55.8	56.2	56.6
		S/T	0.90	0.94	1.00	1.00	0.62	0.84	0.96	1.00	0.39	0.57	0.75	0.92	/	0.38	0.53	0.68
		KW	3.18	3.21	3.25	3.25	3.25	3.28	3.32	3.35	3.37	3.39	3.42	3.45	/	4.12	4.16	4.19
	105	TC	41.4	41.9	42.8	43.3	42.8	43.3	43.7	44.2	45.7	46.2	46.5	46.9	/	54.5	54.8	55.1
		S/T	0.90	0.94	1.00	1.00	0.62	0.85	0.96	1.00	0.39	0.57	0.75	0.93	/	0.38	0.54	0.69
		KW	3.77	3.81	3.85	3.85	3.85	3.89	3.93	3.97	3.98	4.02	4.05	4.08	/	4.87	4.90	4.93
	115	TC	38.9	39.3	40.2	40.6	40.2	40.6	41.1	41.5	43.3	43.4	43.7	43.4	/	46.7	46.9	47.1
		S/T	0.90	0.94	1.00	1.00	0.62	0.86	0.96	1.00	0.39	0.59	0.78	1.00	/	0.39	0.57	0.75
		KW	4.19	4.23	4.28	4.28	4.28	4.32	4.37	4.41	4.49	4.48</						

BOVA 60 +BVA 48 For Cooling																		
Indoor Airflow (CFM)	Outdoor DB (°F)	IWB (°F)	59				63				67				71			
			IDB (°F)	70	75	80	85	70	75	80	85	70	75	80	85	70	75	80
1760	15	TC	46.4	47.0	48.0	48.5	48.0	48.5	49.0	49.6	51.3	51.7	52.2	52.6	/	61.7	62.2	62.6
		S/T	0.90	0.94	1.00	1.00	0.63	0.87	0.96	1.00	0.39	0.57	0.75	0.93	/	0.38	0.53	0.69
		kW	2.01	2.03	2.05	2.05	2.05	2.07	2.09	2.11	2.08	2.12	2.16	2.20	/	2.61	2.63	2.66
	65	TC	45.5	46.0	47.0	47.5	47.0	47.5	48.0	48.5	50.4	50.7	51.1	52.3	/	61.3	61.7	62.7
		S/T	0.90	0.94	1.00	1.00	0.62	0.86	0.96	1.00	0.39	0.58	0.76	0.94	/	0.38	0.54	0.69
		kW	2.62	2.65	2.68	2.68	2.68	2.70	2.73	2.76	2.76	2.79	2.82	2.62	/	3.27	3.30	3.08
	75	TC	45.9	46.4	47.4	47.9	47.4	47.9	48.4	49.0	50.5	50.9	51.5	51.9	/	61.2	61.6	62.0
		S/T	0.90	0.94	1.00	1.00	0.63	0.86	0.96	1.00	0.39	0.58	0.76	0.94	/	0.38	0.54	0.69
		kW	2.62	2.65	2.68	2.68	2.68	2.71	2.74	2.76	2.89	2.92	2.82	2.85	/	3.32	3.34	3.37
	85	TC	45.0	45.5	46.5	47.0	46.5	47.0	47.5	48.0	49.8	50.2	50.5	50.9	/	59.7	60.1	60.5
		S/T	0.90	0.94	1.00	1.00	0.63	0.86	0.96	1.00	0.39	0.58	0.77	0.95	/	0.38	0.54	0.70
		kW	2.95	2.98	3.01	3.01	3.01	3.04	3.07	3.11	3.12	3.15	3.17	3.20	/	3.80	3.84	3.87
	95	TC	44.1	44.6	45.6	46.1	45.6	46.1	46.6	47.1	48.9	49.2	49.6	50.0	/	58.2	58.6	59.0
		S/T	0.90	0.94	1.00	1.00	0.63	0.87	0.96	1.00	0.39	0.58	0.77	1.00	/	0.38	0.55	0.71
		kW	3.48	3.52	3.56	3.56	3.56	3.59	3.63	3.67	3.69	3.72	3.74	3.78	/	4.49	4.53	4.56
	105	TC	43.2	43.7	44.7	45.1	44.7	45.1	45.6	46.1	47.9	48.2	48.5	48.9	/	56.5	56.5	56.7
		S/T	0.90	0.94	1.00	1.00	0.63	0.88	0.96	1.00	0.39	0.59	0.78	1.00	/	0.38	0.55	0.72
		kW	4.09	4.14	4.18	4.18	4.18	4.22	4.27	4.31	4.33	4.37	4.40	4.43	/	5.24	5.24	5.25
	115	TC	38.9	39.3	40.2	40.6	40.2	40.6	41.1	41.5	43.3	43.5	43.7	43.9	/	47.8	44.3	44.5
		S/T	0.90	0.94	1.00	1.00	0.64	0.89	0.96	1.00	0.39	0.61	0.83	1.00	/	0.39	0.61	0.82
		kW	4.26	4.31	4.35	4.35	4.35	4.40	4.45	4.49	4.61	4.63	4.58	4.60	/	3.61	3.61	3.62
	125	TC	29.9	30.2	30.9	31.3	30.9	31.3	31.6	31.9	33.5	33.6	33.6	33.7	/	35.7	35.8	35.8
		S/T	0.92	0.97	1.00	1.00	0.68	1.00	0.96	1.00	0.40	0.68	1.00	1.00	/	0.41	0.67	1.00
		kW	3.37	3.41	3.44	3.44	3.44	3.48	3.51	3.55	3.62	3.62	3.62	3.62	/	3.64	3.65	3.65
1900	15	TC	47.9	48.5	49.5	50.1	49.5	50.1	50.6	51.2	53.1	53.5	53.8	54.3	/	64.0	64.4	64.8
		S/T	0.91	0.96	1.00	1.00	0.64	0.88	0.96	1.00	0.39	0.58	0.78	0.99	/	0.38	0.54	0.71
		kW	2.59	2.62	2.65	2.65	2.65	2.68	2.70	2.73	2.74	2.77	2.79	2.82	/	3.23	3.26	3.29
	65	TC	47.9	48.5	49.5	50.1	49.5	50.1	50.6	51.2	53.1	53.5	53.8	54.3	/	64.0	64.4	64.8
		S/T	0.91	0.96	1.00	1.00	0.64	0.88	0.96	1.00	0.39	0.58	0.78	0.99	/	0.38	0.54	0.71
		kW	2.59	2.62	2.65	2.65	2.65	2.68	2.70	2.73	2.74	2.77	2.79	2.82	/	3.23	3.26	3.29
	75	TC	47.5	48.1	49.1	49.7	49.1	49.7	50.2	50.7	52.6	53.0	53.4	53.8	/	63.2	63.6	64.0
		S/T	0.92	0.97	0.99	1.00	0.64	0.89	0.96	1.00	0.39	0.59	0.78	0.99	/	0.38	0.55	0.71
		kW	2.79	2.82	2.85	2.85	2.85	2.88	2.91	2.94	2.95	2.98	3.00	3.03	/	3.52	3.55	3.58
	85	TC	46.7	47.2	48.2	48.8	48.2	48.8	49.3	49.8	51.6	52.0	52.4	52.8	/	61.6	62.0	62.4
		S/T	0.92	0.97	1.00	1.00	0.64	0.89	0.96	1.00	0.39	0.59	0.79	1.00	/	0.38	0.55	0.72
		kW	3.13	3.16	3.20	3.20	3.20	3.23	3.26	3.30	3.31	3.33	3.36	3.39	/	4.02	4.05	4.08
	95	TC	45.6	46.1	47.2	47.7	47.2	47.7	48.2	48.7	50.6	50.9	51.3	51.7	/	60.0	60.3	60.7
		S/T	0.91	0.97	1.00	1.00	0.64	0.90	0.96	1.00	0.39	0.59	0.80	1.00	/	0.38	0.56	0.73
		kW	3.67	3.71	3.75	3.75	3.75	3.79	3.83	3.87	3.89	3.92	3.95	3.98	/	4.72	4.76	4.79
	105	TC	44.6	45.1	46.1	46.6	46.1	46.6	47.1	47.6	49.4	49.7	50.1	50.4	/	57.2	57.5	57.3
		S/T	0.92	0.97	1.00	1.00	0.65	0.91	0.96	1.00	0.39	0.60	0.81	1.00	/	0.39	0.57	0.75
		kW	4.30	4.35	4.39	4.39	4.39	4.44	4.49	4.53	4.55	4.58	4.62	4.66	/	5.32	5.32	5.32
	115	TC	39.7	40.1	41.0	41.5	41.0	41.5	41.9	42.4	44.2	44.4	44.6	44.8	/	45.1	45.3	45.4
		S/T	0.91	0.97	1.00	1.00	0.65	0.92	0.96	1.00	0.39	0.63	0.86	1.00	/	0.39	0.61	0.82
		kW	4.33	4.38	4.43	4.43	4.43	4.47	4.52	4.57	4.65	4.66	4.66	4.66	/	4.70	4.70	4.71
	125	TC	30.0	30.3	31.0	31.3	31.0	31.3	31.7	32.0	33.6	33.7	33.7	33.8	/	35.9	35.9	36.0
		S/T	0.93	0.98	0.99	1.00	0.71	1.00	0.96	1.00	0.40	0.71	1.00	1.00	/	0.41	0.70	0.99
		kW	3.43	3.47	3.51	3.51	3.51	3.54	3.58	3.62	3.69	3.69	3.69	3.69	/	3.71	3.71	3.71

Table 12

TC refer to total capacity S/T: refer to the ratio of sensible heat and total capacity kW: refer to total input power

BOVA 60 +EVA 60 For Cooling																		
Indoor Airflow (CFM)	Outdoor DB (°F)	IWB (°F)	59				63				67				71			
			IDB (°F)	70	75	80	85	70	75	80	85	70	75	80	85	70	75	80
1160	15	TC	39.1	39.6	40.4	40.9	40.4	40.9	41.3	41.8	43.2	43.6	44.0	44.4	/	51.9	52.3	53.3
		S/T	0.65	0.70	0.78	1.00	0.59	0.77	0.81	0.86	0.40	0.54	0.68	0.83	/	0.38	0.51	0.62
		kW	1.54	1.56	1.57	1.57	1.57	1.59	1.61	1.62	1.61	1.64	1.66	1.68	/	2.24	2.27	2.06
	65	TC	39.2	39.6	40.5	41.0	40.5	41.0	41.4	41.8	43.3	43.7	44.1	44.5	/	52.0	52.4	53.4
		S/T	0.77	0.82	0.90	1.00	0.59	0.77	0.88	0.93	0.40	0.54	0.68	0.83	/	0.38	0.51	0.62
		kW	1.91	1.94	1.96	1.96	1.96	1.98	2.00	2.02	2.01	2.04	2.06	2.08	/	2.64	2.67	2.46
	75	TC	39.0	39.4	40.3	40.7	40.3	40.7	41.2	41.6	43.0	43.4	43.8	44.2	/	52.3	52.7	53.2
		S/T	0.77	0.82	0.90	1.00	0.59	0.77	0.89	0.94	0.40	0.54	0.69	0.83	/	0.38	0.51	0.62
		kW	2.18	2.20	2.22	2.22	2.22	2.25	2.27	2.29	2.29	2.31	2.34	2.37	/	2.64	2.67	2.69
	85	TC	38.6	39.0	39.9	40.3	39.9	40.3	40.7	41.2	42.6	43.0	43.3	43.8	/	51.5	51.9	52.3
		S/T	0.77	0.82	0.90	1.00	0.59	0.77	0.89	0.94	0.40	0.54	0.69	0.83	/	0.38	0.51	0.63
		kW	2.31	2.33	2.36	2.36	2.36	2.38	2.41	2.43	2.44	2.46	2.48	2.51	/	3.01	3.04	3.06
	95	TC	38.2	38.6	39.5	39.9	39.5	39.9	40.4	40.8	42.2	42.6	42.9	43.3	/	50.7	51.1	51.5
		S/T	0.78	0.83	0.91	1.00	0.59	0.77	0.89	0.94	0.39	0.54	0.69	0.84	/	0.38	0.51	0.63
		kW	2.79	2.82	2.85	2.85	2.85	2.88	2.91	2.94	2.94	2.97	3.00	3.02	/	3.61	3.64	3.67
	105	TC	37.7	38.1	39.0	39.4	39.0	39.4	39.8	40.2	41.7	42.0	42.3	42.7	/	49.8	50.2	50.5
		S/T	0.78	0.83	0.91	1.00	0.59	0.78	0.89	0.94	0.39	0.55	0.70	0.84	/	0.38	0.51	0.64
		kW	3.33	3.36	3.40	3.40	3.40	3.43	3.47	3.50	3.52	3.55	3.58	3.61	/	4.29	4.32	4.36
	115	TC	37.2	37.6	38.4	38.8	38.4	38.8	39.3	39.7	41.1	41.4	41.8	42.1	/	45.5	45.7	46.0
		S/T	0.78	0.83	0.91	1.00	0.59	0.78	0.93	0.98	0.39	0.55	0.70	0.85	/	0.39	0.52	0.66
		kW	3.96	4.00	4.04	4.04	4.04	4.09	4.13	4.17	4.18	4.22	4.26	4.29	/	4.35	4.36	4.36
	125	TC	29.2	29.5	30.2	30.5	30.2	30.5	30.8	31.2	32.7	32.8	32.8	32.9	/	34.8	34.8	34.9
		S/T	0.79	0.84	0.92	1.00	0.60	0.81	0.93	0.98	0.40	0.59	0.78	1.00	/	0.39	0.58	0.76
		kW	3.13	3.16	3.19	3.19	3.19	3.23	3.26	3.30	3.36	3.36	3.36	3.36	/	3.39	3.39	3.39
1320 (Low Stage)	15	TC	41.6	42.1	43.0	43.5	43.0	43.5	43.9	44.4	46.0	46.4	46.8	47.2	/	56.0	56.5	56.9
		S/T	0.69	0.74	0.82	1.00	0.59	0.79	0.81	0.86	0.39	0.55	0.70	0.85	/	0.38	0.51	0.64
		kW	1.68	1.70	1.71	1.71	1.71	1.73	1.75	1.77	1.76	1.78	1.81	1.84	/	2.22	2.25	2.28
	65	TC	41.8	42.3	43.2	43.7	43.2	43.7	44.2	44.7	46.2	46.6	47.0	47.4	/	56.2	56.7	57.1
		S/T	0.81	0.86	0.94	1.00	0.59	0.79	0.90	0.95	0.39	0.55	0.70	0.85	/	0.38	0.51	0.64
		kW	2.15	2.18	2.20	2.20	2.20	2.22	2.24	2.27	2.26	2.28	2.31	2.34	/	2.72	2.75	2.78
	75	TC	41.9	42.4	43.4	43.8	43.4	43.8	44.3	44.8	46.3	46.7	47.1	47.5	/	55.8	56.3	56.7
		S/T	0.80	0.85	0.93	1.00	0.59	0.79	0.90	0.95	0.39	0.55	0.70	0.85	/	0.38	0.51	0.64
		kW	2.31	2.33	2.36	2.36	2.36	2.38	2.41	2.43	2.43	2.45	2.48	2.51	/	2.93	2.96	2.99
	85	TC	41.4	41.9	42.8	43.3	42.8	43.3	43.8	44.2	45.8	46.2	46.6	46.9	/	55.0	55.4	55.8
		S/T	0.80	0.85	0.93	1.00	0.59	0.79	0.90	0.95	0.39	0.55	0.71	0.86	/	0.38	0.51	0.64
		kW	2.55	2.58	2.61	2.61	2.61	2.63	2.66	2.69	2.70	2.72	2.74	2.77	/	3.30	3.33	3.36
	95	TC	40.9	41.4	42.3	42.7	42.3	42.7	43.2	43.7	45.2	45.5	46.0	46.3	/	53.9	54.3	54.7
		S/T	0.80	0.85	0.93	1.00	0.59	0.79	0.90	0.95	0.39	0.55	0.70	0.86	/	0.38	0.52	0.65
		kW	3.06	3.09	3.13	3.13	3.13	3.16	3.23	3.23	3.26	3.29	3.32	3.32	/	3.93	3.97	4.00
	105	TC	40.2	40.7	41.6	42.0	41.6	42.0	42.5	42.9	44.5	44.9	45.2	45.5	/	52.8	53.1	53.4
		S/T	0.80	0.85	0.93	1.00	0.60	0.80	0.90	0.95	0.39	0.56	0.71	0.87	/	0.38	0.52	0.66
		kW	3.63	3.67	3.71	3.71	3.71	3.75	3.79	3.83	3.84	3.88	3.91	3.94	/	4.67	4.71	4.74
	115	TC	38.3	38.7	39.6	40.0	39.6	40.0	40.5	40.9	42.6	42.9	43.0	42.8	/	45.8	46.0	46.2
		S/T	0.81	0.86	0.94	1.00	0.60	0.80	0.90	0.95	0.39	0.56	0.73	0.90	/	0.39	0.54	0.70
		kW	4.06	4.10	4.15	4.15	4.15	4.19	4.24	4.28	4.36	4.37	4.37	4.36	/	4.41	4.41	4.41
	125	TC	29.5	29.9	30.5	30.9	30.5	30.9	31.2	31.5	33.1	33.1	33.2	33.3	/	35.2	35.3	35.3
		S/T	0.83	0.88	0.96	1.00	0.62	0.86	0.91	0.96	0.40	0.61	0.83	1.00	/	0.40	0.60	0.81
		kW	3.18	3.21	3.25	3.25	3.25	3.28	3.32	3.35	3.42	3.42	3.42	3.42	/	3.44	3.44	3.44
1520	15	TC	45.9	46.4	47.4	47.9	47.4	47.9	48.5	49.0	50.7	51.2	51.6	52.0	/	60.6	61.1	61.5
		S/T	0.72	0.77	0.85	1.00	0.60	0.81	0.86	0.91	0.39	0.55	0.72	0.87	/	0.38	0.52	0.65
		kW	1.87	1.89	1.91	1.91	1.91	1.93	1.95	1.97	1.94	1.98	2.02	2.06	/	2.44	2.47	2.49
	65	TC	48.0	48.5	49.6	50.1	49.6	50.1	50.7	51.2	53.1	53.5	53.9	54.3	/	62.9	63.4	63.8
		S/T	0.85	0.90	0.98	1.00	0.60	0.80	0.93	0.98	0.39	0.55	0.70	0.85	/	0.38	0.51	0.64
		kW	2.55	2.57	2.60	2.60	2.60	2.63	2.66	2.68	2.68	2.71	2.74	2.77	/	3.13	3.17	3.20
	75	TC	47.6	48.2	49.2	49.8	49.2	49.8	50.3	50.8	52.7	53.2	53.5	53.9	/	62.3	62.7	63.1
		S/T	0.85	0.90	0.98	1.00	0.60	0.80	0.93	0.98	0.39	0.55	0.70	0.86	/	0.38	0.52	0.65
		kW	2.75	2.78	2.81	2.81	2.81	2.84	2.87	2.90	2.91	2.93	2.96	2.98	/	3.43	3.46	3.50
	85	TC	46.8	47.3	48.4	48.9	48.4	48.9	49.4	49.9	51.8	52.2	52.6	53.0	/	60.8	61.3	61.7
		S/T	0.85	0.90	0.98	1.00	0.60	0.80	0.93	0.98	0.39	0.55	0.71	0.87	/	0.38	0.52	0.65
		kW	3.09	3.12	3.15	3.15	3.15	3.19	3.22	3.25	3.27	3.30	3.32	3.35	/	3.94	3.98	4.01
	95	TC	45.9	46.4	47.4	48.0	47.4	48.0	48.5	49.0	50.8	51.2	51.6	51.9	/	59.3	59.7	60.1
		S/T	0.85	0.90	0.98	1.00	0.60	0.81	0.93	0.98	0.39	0.55	0.72	0.87	/	0.38	0.52	0.66
		kW	3.66	3.70	3.74	3.74	3.74	3.78	3.82	3.86	3.87	3.90	3.93	3.96	/	4.66	4.69	4.72
	105	TC	44.8	45.3	46.3	46.8	46.3	46.8	47.4	47.9	49.7	50.0	50.4	50.7	/	57.7	57.9	57.9
		S/T	0.85	0.90	0.98	1.00	0.60	0.81	0.93	0.98	0.39	0.56	0.72	0.89	/	0.38	0.53	0.67
		kW	4.31	4.36	4.40	4.40	4.40	4.45	4.50	4.54	4.56	4.60	4.64	4.67	/	5.46	5.48	5.48
	115	TC	38.4	38.9	39.7	40.2	39.7	40.2	40.6	41.0	42.8	43.0	43.2	43.3	/	44.7	44.8	45.0
		S/T	0.85	0.90	0.98	1.00	0.61	0.82	0.93	0.98	0.39	0.59	0.78	1.00	/	0.39	0.58	0.76
		kW	4.25	4.30	4.34	4.34	4.34	4.39	4.43	4.48	4.53	4.55	4.57					

BOVA 60 +BVA 60 For Cooling																			
Indoor Airflow (CFM)	Outdoor DB (°F)	IWB (°F)	59				63				67				71				
		IDB (°F)	70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85	
1750 (High Stage)	15	TC	48.7	49.3	50.4	50.9	50.4	50.9	51.5	52.0	53.9	54.3	54.8	55.2	/	64.2	64.6	65.0	
		S/T	0.73	0.78	1.00	1.00	0.61	0.83	0.88	0.93	0.39	0.56	0.73	0.90	/	0.38	0.53	0.67	
		KW	2.30	2.33	2.35	2.35	2.35	2.38	2.40	2.43	2.38	2.43	2.48	2.53	/	3.00	3.03	3.05	
	65	TC	51.0	51.6	52.7	53.3	52.7	53.3	53.9	54.4	56.5	56.9	57.3	57.7	/	66.5	66.9	67.3	
		S/T	0.86	0.91	1.00	1.00	0.60	0.82	0.94	0.99	0.39	0.55	0.72	0.88	/	0.38	0.52	0.66	
		KW	2.91	2.94	2.97	2.97	2.97	3.01	3.04	3.07	3.07	3.10	3.13	3.16	/	3.55	3.58	3.62	
	75	TC	50.6	51.1	52.3	52.8	52.3	52.8	53.4	54.0	56.0	56.4	56.8	57.2	/	65.7	66.1	66.9	
		S/T	0.85	0.90	1.00	1.00	0.60	0.82	0.94	0.99	0.39	0.56	0.72	0.89	/	0.38	0.52	0.66	
		KW	3.09	3.12	3.16	3.16	3.16	3.19	3.22	3.26	3.27	3.30	3.32	3.35	/	3.83	3.87	3.78	
	85	TC	49.6	50.2	51.3	51.8	51.3	51.8	52.4	53.0	54.9	55.3	55.7	56.1	/	64.1	64.5	64.8	
		S/T	0.86	0.91	1.00	1.00	0.61	0.82	0.94	0.99	0.39	0.56	0.73	0.90	/	0.38	0.53	0.67	
		KW	3.43	3.47	3.50	3.50	3.50	3.54	3.58	3.61	3.63	3.65	3.69	3.72	/	4.35	4.39	4.42	
	95	TC	48.5	49.0	50.1	50.7	50.1	50.7	51.2	51.7	53.7	54.0	54.5	54.7	/	62.2	62.6	62.9	
		S/T	0.86	0.91	1.00	1.00	0.61	0.83	0.94	0.99	0.39	0.56	0.73	0.91	/	0.38	0.53	0.68	
		KW	4.03	4.08	4.12	4.12	4.12	4.17	4.21	4.25	4.27	4.31	4.34	4.37	/	5.09	5.13	5.16	
	105	TC	47.2	47.7	48.8	49.3	48.8	49.3	49.8	50.4	52.3	52.7	53.0	53.3	/	58.5	58.8	58.7	
		S/T	0.85	0.90	1.00	1.00	0.61	0.83	0.94	0.99	0.39	0.57	0.75	0.92	/	0.38	0.54	0.71	
		KW	4.72	4.77	4.83	4.83	4.83	4.88	4.93	4.98	5.01	5.05	5.08	5.11	/	5.62	5.66	5.62	
	115	TC	39.6	40.0	40.9	41.3	40.9	41.3	41.8	42.2	44.1	44.3	44.5	44.6	/	45.7	45.8	46.0	
		S/T	0.86	0.91	1.00	1.00	0.62	0.85	0.94	0.99	0.39	0.60	0.81	1.00	/	0.39	0.60	0.80	
		KW	4.38	4.42	4.47	4.47	4.47	4.52	4.56	4.61	4.67	4.69	4.71	4.72	/	4.84	4.85	4.86	
	125	TC	29.9	30.2	30.9	31.2	30.9	31.2	31.6	31.9	33.5	33.5	33.6	33.7	/	35.7	35.8	35.8	
		S/T	0.87	0.92	1.00	1.00	0.68	1.00	0.95	1.00	0.40	0.68	1.00	1.00	/	0.40	0.67	0.99	
		KW	3.38	3.41	3.45	3.45	3.45	3.49	3.52	3.56	3.63	3.63	3.63	3.63	/	3.65	3.65	3.65	
1880	15	TC	51.0	51.6	52.8	53.3	52.8	53.3	53.9	54.5	56.6	57.0	57.4	57.9	/	66.6	67.0	67.4	
		S/T	0.75	0.80	1.00	1.00	0.61	0.84	0.90	0.95	0.39	0.57	0.75	0.92	/	0.38	0.53	0.69	
		KW	2.69	2.72	2.75	2.75	2.75	2.78	2.81	2.84	2.79	2.85	2.90	2.95	/	3.51	3.54	3.57	
	65	TC	53.2	53.8	55.0	55.5	55.0	55.5	56.1	56.7	59.0	59.3	59.7	60.1	/	69.1	69.5	69.9	
		S/T	0.87	0.92	1.00	1.00	0.61	0.83	0.95	1.00	0.39	0.56	0.73	0.90	/	0.38	0.53	0.68	
		KW	3.18	3.21	3.24	3.24	3.24	3.28	3.31	3.35	3.35	3.38	3.41	3.45	/	3.86	3.89	3.92	
	75	TC	53.0	53.5	54.7	55.3	54.7	55.3	55.9	56.5	58.7	59.1	59.5	59.9	/	68.6	69.0	69.4	
		S/T	0.87	0.92	1.00	1.00	0.61	0.83	0.95	1.00	0.39	0.56	0.73	0.91	/	0.38	0.53	0.68	
		KW	3.22	3.26	3.29	3.29	3.29	3.33	3.36	3.40	3.42	3.44	3.47	3.50	/	4.00	4.03	4.06	
	85	TC	51.6	52.2	53.4	54.0	53.4	54.0	54.5	55.1	57.3	57.6	58.0	58.4	/	66.4	66.8	67.1	
		S/T	0.87	0.92	1.00	1.00	0.61	0.84	0.95	1.00	0.39	0.57	0.74	0.92	/	0.38	0.54	0.69	
		KW	3.68	3.72	3.76	3.76	3.76	3.80	3.84	3.88	3.90	3.93	3.96	3.99	/	4.65	4.68	4.71	
	95	TC	50.3	50.8	52.0	52.5	52.0	52.5	53.1	53.7	55.8	56.2	56.5	56.8	/	64.2	64.6	64.9	
		S/T	0.87	0.92	1.00	1.00	0.62	0.84	0.95	1.00	0.39	0.57	0.75	0.93	/	0.38	0.54	0.70	
		KW	4.31	4.36	4.40	4.40	4.40	4.45	4.50	4.54	4.57	4.60	4.64	4.67	/	5.40	5.43	5.47	
	105	TC	48.8	49.4	50.5	51.0	50.5	51.0	51.6	52.1	54.2	54.5	54.8	55.2	/	59.6	58.6	58.9	
		S/T	0.87	0.92	1.00	1.00	0.62	0.85	0.95	1.00	0.39	0.58	0.76	0.95	/	0.38	0.56	0.73	
		KW	5.02	5.07	5.13	5.13	5.13	5.18	5.24	5.29	5.33	5.36	5.40	5.43	/	5.78	5.69	5.72	
	115	TC	40.5	40.9	41.8	42.3	41.8	42.3	42.7	43.2	45.1	45.3	45.5	45.7	/	46.4	46.6	46.7	
		S/T	0.87	0.92	1.00	1.00	0.63	0.88	0.95	1.00	0.39	0.62	0.84	1.00	/	0.39	0.61	0.84	
		KW	4.54	4.59	4.64	4.64	4.64	4.69	4.74	4.79	4.86	4.87	4.89	4.90	/	5.00	4.70	4.71	
	125	TC	30.0	30.3	31.0	31.3	31.0	31.3	31.7	32.0	33.6	33.7	33.7	33.7	/	35.8	35.9	36.0	
		S/T	0.88	0.93	0.99	1.00	0.71	1.00	0.96	1.00	0.40	0.70	0.99	1.00	/	0.41	0.70	0.99	
		KW	3.45	3.49	3.52	3.52	3.52	3.56	3.60	3.64	3.71	3.71	3.71	3.71	/	3.73	3.73	3.73	

Table 14

TC refer to total capacity S/T: refer to the ratio of sensible heat and total capacity kW: refer to total input power

7.2 Outdoor Unit (BOVA) + Indoor Unit (BVA) – Heating Mode

BOVA 36 + BVA 24 For Heating																				
Airflow (CFM)	ID (°F)	OD (°F)	86	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4	
620	60	TC	26.8	26.8	26.8	26.8	26.8	26.7	26.7	26.5	26.5	25.8	25.3	24.3	24.2	22.4	21.4	20.4	18.6	
		kW	0.90	1.20	1.31	1.44	1.59	1.71	1.86	2.00	2.21	2.26	2.57	2.48	2.41	2.33	2.25	2.19	2.13	
	70	TC	19.9	19.9	19.9	19.9	19.8	19.8	19.8	19.8	19.8	19.7	19.7	19.7	19.7	18.8	17.7	16.9	16.6	15.8
		kW	0.63	0.88	0.97	1.06	1.17	1.26	1.37	1.54	1.65	1.76	1.90	2.02	2.12	2.36	2.43	2.35	2.29	
	75	TC	16.4	16.4	16.3	16.3	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.1	16.1	16.1	15.7
		kW	0.61	0.73	0.81	0.88	0.96	1.06	1.16	1.25	1.37	1.48	1.57	1.70	1.81	1.92	2.09	2.28	2.38	
	80	TC	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.7	12.7
		kW	0.50	0.59	0.66	0.72	0.80	0.86	0.94	1.00	1.14	1.20	1.29	1.37	1.46	1.59	1.70	1.80	1.95	
660 (Low Stage)	60	TC	27.3	27.3	27.2	27.2	27.2	27.2	27.2	27.0	27.0	25.7	26.2	24.5	24.4	23.2	22.1	21.1	19.5	
		kW	0.90	1.21	1.31	1.44	1.60	1.71	1.86	2.02	2.23	2.22	2.52	2.44	2.36	2.29	2.22	2.15	2.10	
	70	TC	20.2	20.2	20.2	20.2	20.2	20.1	20.1	20.1	20.1	20.0	20.1	20.0	19.1	18.0	17.2	16.8	16.0	
		kW	0.64	0.89	0.96	1.05	1.16	1.25	1.37	1.53	1.65	1.76	1.88	2.03	2.20	2.38	2.39	2.31	2.25	
	75	TC	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.4	16.4	16.4	16.4	16.5	16.3	16.3	16.3	15.6
		kW	0.51	0.73	0.79	0.87	0.97	1.05	1.15	1.24	1.36	1.48	1.56	1.70	1.81	1.93	2.10	2.30	2.34	
	80	TC	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	12.9	12.9
		kW	0.40	0.58	0.64	0.70	0.78	0.84	0.93	1.02	1.13	1.19	1.28	1.36	1.45	1.58	1.70	1.82	1.96	
760	60	TC	29.9	29.9	29.9	29.9	29.9	29.8	29.7	29.7	27.8	26.0	26.6	24.8	24.7	23.4	22.3	21.3	19.7	
		kW	1.04	1.37	1.49	1.61	1.77	1.88	2.06	2.28	2.25	2.18	2.48	2.41	2.34	2.27	2.21	2.14	2.10	
	70	TC	22.2	22.2	22.2	22.2	22.2	22.1	22.1	22.1	22.0	22.0	22.0	22.0	21.0	19.8	18.9	18.5	17.6	
		kW	0.74	1.00	1.08	1.18	1.29	1.41	1.57	1.69	1.83	1.93	2.11	2.27	2.46	2.45	2.38	2.30	2.24	
	75	TC	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.1	18.1	18.1	18.1	18.1	18.0	18.0	18.0	17.1	15.8	
		kW	0.60	0.82	0.89	0.97	1.08	1.17	1.27	1.37	1.54	1.63	1.75	1.87	1.99	2.15	2.34	2.40	2.33	
	80	TC	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.3	14.2	14.2	
		kW	0.47	0.66	0.72	0.79	0.87	0.94	1.05	1.13	1.24	1.31	1.41	1.50	1.63	1.74	1.82	2.01	2.17	
860 (High Stage)	60	TC	32.7	32.7	32.7	32.7	32.7	32.4	32.4	30.4	28.2	26.1	26.9	25.0	24.8	23.5	22.5	21.4	19.9	
		kW	1.19	1.54	1.66	1.80	1.96	2.11	2.30	2.29	2.23	2.17	2.46	2.40	2.34	2.27	2.21	2.15	2.10	
	70	TC	24.3	24.3	24.3	24.3	24.3	24.2	24.2	24.1	24.1	24.0	24.0	24.0	22.9	21.6	20.6	19.7	18.2	
		kW	0.84	1.13	1.22	1.32	1.48	1.58	1.73	1.86	2.01	2.14	2.35	2.53	2.52	2.45	2.38	2.31	2.26	
	75	TC	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.8	19.8	19.8	19.8	19.7	19.7	19.7	19.0	17.4	16.1	
		kW	0.69	0.93	1.00	1.09	1.20	1.29	1.41	1.57	1.69	1.79	1.93	2.05	2.20	2.39	2.48	2.40	2.34	
	80	TC	15.8	15.8	15.8	15.8	15.8	15.8	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.6	15.6	15.6	
		kW	0.55	0.75	0.82	0.89	0.97	1.06	1.16	1.24	1.36	1.44	1.55	1.68	1.79	1.89	2.04	2.23	2.40	
1080	60	TC	39.0	39.0	38.9	38.8	38.0	35.8	34.0	31.3	28.7	27.8	27.3	25.8	26.4	25.0	23.9	22.8	21.1	
		kW	1.66	1.96	2.11	2.30	2.41	2.36	2.36	2.30	2.24	2.21	2.49	2.44	2.38	2.33	2.27	2.23	2.19	
	70	TC	29.1	29.1	29.1	29.1	29.1	29.0	29.0	28.7	28.2	27.4	27.0	25.2	26.2	24.7	23.6	22.5	20.8	
		kW	1.35	1.45	1.58	1.70	1.85	1.98	2.14	2.31	2.45	2.40	2.69	2.63	2.56	2.50	2.44	2.38	2.33	
	75	TC	24.0	24.0	24.0	24.0	23.9	23.9	23.9	23.8	23.8	23.7	23.7	23.7	23.1	21.4	19.6	17.9	16.6	
		kW	0.98	1.20	1.30	1.41	1.52	1.67	1.81	1.94	2.08	2.20	2.39	2.57	2.67	2.60	2.53	2.47	2.42	
	80	TC	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.1	19.0	19.0	18.8	18.8	18.8	17.7	16.4	
		kW	0.79	0.99	1.07	1.15	1.26	1.35	1.45	1.55	1.72	1.81	1.95	2.06	2.18	2.35	2.54	2.56	2.50	

Table 15

TC refer to total capacity S/T: refer to the ratio of sensible heat and total capacity kW: refer to total input power

BOVA 36+BVA 36 For Heating																				
Airflow (CFM)	ID (°F)	OD (°F)	86	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4	
650	60	TC	30.1	30.1	30.1	30.1	30.1	29.8	29.7	29.7	29.7	29.7	29.7	28.1	26.1	24.2	22.3	20.5	18.9	
		kW	1.08	1.43	1.58	1.71	1.86	1.98	2.16	2.39	2.62	2.82	3.10	3.04	2.92	2.82	2.72	2.62	2.54	
	70	TC	23.2	23.2	23.0	23.0	23.0	23.0	23.0	23.0	22.9	22.8	22.7	22.7	22.7	22.7	22.7	21.7	19.9	18.3
		kW	0.82	1.06	1.18	1.28	1.40	1.51	1.64	1.82	1.97	2.07	2.28	2.46	2.66	2.89	2.94	2.83	2.74	
	75	TC	19.4	19.4	19.3	19.3	19.3	19.3	19.3	19.3	19.2	19.2	19.2	19.2	19.0	19.0	19.0	19.0	19.0	18.1
		kW	0.73	0.90	0.98	1.07	1.18	1.28	1.39	1.50	1.64	1.78	1.93	2.03	2.19	2.38	2.59	2.84	2.86	
	80	TC	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.7	15.7	15.7	15.7	15.7	15.5	15.5	15.5	14.5	
		kW	0.68	0.73	0.81	0.88	0.97	1.05	1.14	1.25	1.38	1.46	1.57	1.68	1.80	1.92	2.09	2.30	2.30	
	820 (Low Stage)	60	TC	34.6	34.6	34.6	34.3	34.3	34.2	34.2	34.1	32.6	30.6	30.5	28.6	26.4	24.5	22.7	20.8	19.3
			kW	1.42	1.71	1.86	1.99	2.18	2.36	2.57	2.85	2.87	2.78	3.05	2.95	2.85	2.76	2.67	2.59	2.52
		70	TC	26.5	26.5	26.5	26.5	26.5	26.5	26.4	26.2	26.2	26.2	26.2	26.2	25.9	24.0	22.0	20.3	18.8
			kW	1.02	1.28	1.40	1.53	1.65	1.80	1.95	2.09	2.30	2.46	2.69	2.91	3.09	2.99	2.88	2.79	2.71
75		TC	22.3	22.3	22.3	22.3	22.3	22.2	22.2	22.0	22.1	21.9	21.9	21.9	21.9	21.9	21.8	19.9	18.4	
		kW	0.96	1.08	1.17	1.27	1.39	1.49	1.62	1.73	1.94	2.03	2.22	2.39	2.58	2.80	3.01	2.91	2.82	
80		TC	18.3	18.3	18.3	18.3	18.3	18.2	18.2	18.2	18.1	18.1	18.1	18.1	17.9	17.9	17.9	18.0	18.0	
		kW	0.82	0.88	0.96	1.05	1.14	1.24	1.35	1.46	1.59	1.69	1.83	1.96	2.08	2.26	2.45	2.69	2.91	
1020		60	TC	41.3	41.0	41.0	40.9	40.9	40.8	39.3	36.1	33.4	31.0	31.1	29.2	27.9	26.1	24.2	22.6	21.1
			kW	1.69	2.18	2.33	2.53	2.74	2.96	2.98	2.87	2.77	2.69	2.96	2.88	2.80	2.72	2.65	2.57	2.52
		70	TC	31.7	31.7	31.7	31.7	31.6	31.3	31.2	31.2	31.2	30.5	30.5	28.4	27.5	25.6	23.8	22.3	20.7
			kW	1.27	1.63	1.72	1.89	2.02	2.17	2.36	2.60	2.83	2.94	3.22	3.12	3.03	2.93	2.85	2.76	2.69
	75	TC	26.7	26.7	26.6	26.6	26.6	26.6	26.6	26.2	26.2	26.2	26.2	26.2	26.1	24.2	22.3	20.4	18.9	
		kW	1.06	1.36	1.46	1.58	1.70	1.86	2.01	2.14	2.34	2.50	2.74	2.95	3.16	3.06	2.97	2.88	2.80	
	80	TC	21.9	21.9	21.9	21.9	21.9	21.8	21.8	21.7	21.7	21.7	21.5	21.5	21.5	21.5	21.5	20.1	18.6	
		kW	0.86	1.13	1.20	1.30	1.41	1.51	1.64	1.76	1.95	2.07	2.20	2.37	2.56	2.76	3.01	3.00	2.92	
	1150 (High Stage)	60	TC	45.9	45.8	45.8	45.7	44.5	42.0	39.8	36.7	33.9	31.7	31.6	29.3	28.5	26.6	24.7	23.1	21.5
			kW	1.97	2.58	2.73	2.95	3.03	2.95	2.92	2.83	2.74	2.68	2.94	2.86	2.79	2.72	2.65	2.58	2.53
		70	TC	35.6	35.5	35.3	35.0	35.0	35.0	34.8	34.7	33.1	31.0	30.9	28.9	28.2	26.0	24.1	22.6	21.0
			kW	1.50	1.88	2.01	2.13	2.31	2.51	2.66	3.00	2.99	2.91	3.18	3.10	3.01	2.93	2.85	2.77	2.71
75		TC	29.9	29.9	29.8	29.6	29.8	29.7	29.3	29.3	29.4	29.4	29.4	28.5	26.5	24.6	22.6	20.6	19.2	
		kW	1.23	1.58	1.68	1.79	1.97	2.08	2.24	2.46	2.68	2.87	3.15	3.23	3.14	3.05	2.96	2.88	2.81	
80		TC	24.5	24.5	24.5	24.5	24.5	24.5	24.4	24.4	24.1	24.1	24.0	24.1	24.1	24.1	22.3	20.3	18.9	
		kW	1.01	1.30	1.38	1.50	1.61	1.73	1.86	2.05	2.17	2.32	2.52	2.72	2.92	3.16	3.09	2.99	2.92	
1350		60	TC	51.1	51.0	50.2	47.4	45.3	42.7	40.5	37.2	34.4	32.2	32.1	30.0	28.9	27.0	25.1	23.5	21.9
			kW	2.38	3.03	3.10	3.03	3.01	2.94	2.92	2.83	2.76	2.70	2.96	2.89	2.83	2.77	2.70	2.64	2.59
		70	TC	39.2	39.2	39.1	39.1	39.1	39.0	39.0	36.4	33.6	31.5	31.4	29.4	28.4	26.5	24.6	23.0	21.4
			kW	1.74	2.16	2.30	2.50	2.70	2.91	3.14	3.09	3.00	2.93	3.20	3.12	3.04	2.97	2.90	2.82	2.77
	75	TC	33.4	33.4	33.3	33.3	32.9	32.9	32.8	32.9	32.8	31.1	31.0	29.0	27.0	25.0	23.0	21.2	19.7	
		kW	1.47	1.84	1.95	2.12	2.22	2.40	2.60	2.85	3.09	3.06	3.34	3.25	3.17	3.09	3.01	2.93	2.87	
	80	TC	27.5	27.5	27.4	27.4	27.4	27.4	27.4	27.3	26.9	26.9	27.0	26.9	26.9	26.6	24.7	22.7	20.8	19.3
		kW	1.22	1.53	1.62	1.75	1.86	2.02	2.17	2.31	2.51	2.67	2.91	3.12	3.30	3.21	3.13	3.04	2.97	

Table 16

TC refer to total capacity S/T: refer to the ratio of sensible heat and total capacity kW: refer to total input power

BOVA 60+BVA 48 For Heating																				
Airflow (CFM)	ID (°F)	OD (°F)	86	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4	
1180 (Low Stage)	60	TC	53.4	53.4	53.4	53.3	53.3	53.2	52.9	52.7	48.7	45.7	42.9	41.5	39.7	38.3	36.5	34.7	32.9	
		kW	2.11	2.57	2.81	3.05	3.31	3.57	3.86	4.21	4.04	3.91	4.11	4.50	4.50	4.38	4.31	4.23	4.07	
	70	TC	41.1	41.1	41.0	41.1	41.0	41.0	40.9	40.8	41.0	40.8	38.7	37.5	35.9	34.6	33.0	31.4	29.7	
		kW	1.68	2.01	2.15	2.31	2.53	2.70	2.94	3.20	3.49	3.71	3.90	4.27	4.27	4.16	4.08	4.01	3.86	
	75	TC	34.7	34.7	34.6	34.6	34.6	34.6	34.5	34.4	34.6	34.6	34.6	34.6	34.4	34.3	34.2	32.5	30.6	28.4
		kW	1.46	1.75	1.85	1.99	2.15	2.29	2.45	2.70	2.93	3.13	3.40	3.62	3.90	4.22	4.47	4.30	4.16	
80	TC	28.6	28.6	28.5	28.5	28.5	28.5	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.2	28.2	28.2	27.9	
	kW	1.25	1.50	1.60	1.70	1.84	1.95	2.09	2.23	2.42	2.59	2.77	2.99	3.21	3.42	3.71	4.05	4.34		
1330	60	TC	57.3	57.3	57.2	57.1	57.1	56.8	56.9	53.3	49.2	46.1	43.8	42.4	40.6	39.2	37.4	35.5	33.7	
		kW	2.23	2.86	3.06	3.32	3.59	3.87	4.21	4.14	3.99	3.83	4.03	4.41	4.41	4.29	4.22	4.14	3.99	
	70	TC	44.1	44.0	44.0	44.0	43.9	43.8	43.8	43.7	43.7	43.7	41.6	40.2	38.5	37.2	35.4	33.7	31.9	
		kW	1.75	2.19	2.32	2.52	2.71	2.92	3.17	3.46	3.75	4.04	4.24	4.65	4.65	4.53	4.45	4.36	4.20	
	75	TC	37.1	37.1	37.0	37.0	37.0	37.0	36.9	36.8	36.9	36.9	36.8	36.8	36.8	36.8	35.0	33.5	31.7	29.8
		kW	1.54	1.90	1.99	2.13	2.30	2.45	2.69	2.90	3.16	3.37	3.65	3.92	4.23	4.27	4.15	4.06	3.89	
80	TC	30.6	30.6	30.5	30.5	30.5	30.5	30.5	30.5	30.4	30.4	30.4	30.4	30.4	30.4	30.2	30.3	30.2	28.2	
	kW	1.36	1.63	1.72	1.82	1.97	2.08	2.23	2.39	2.62	2.77	3.00	3.21	3.43	3.69	4.01	4.40	4.33		
1530 (High Stage)	60	TC	63.0	63.0	63.0	62.8	62.7	62.0	58.8	53.7	49.9	46.6	44.3	42.9	41.0	39.6	37.8	35.9	34.0	
		kW	2.49	3.27	3.49	3.76	4.07	4.31	4.25	4.08	3.96	3.85	4.04	4.43	4.43	4.31	4.24	4.16	4.00	
	70	TC	48.6	48.6	48.5	48.4	48.4	48.3	48.2	48.2	48.2	45.6	43.3	42.0	40.1	38.8	36.9	35.1	33.3	
		kW	1.98	2.46	2.63	2.83	3.07	3.30	3.61	3.91	4.25	4.19	4.40	4.82	4.82	4.70	4.61	4.53	4.36	
	75	TC	40.9	40.9	40.8	40.8	40.6	40.7	40.7	40.6	40.7	40.6	40.6	40.6	40.6	40.1	38.1	36.5	34.5	32.5
		kW	1.72	2.13	2.24	2.39	2.56	2.78	3.01	3.27	3.54	3.77	4.12	4.43	4.76	4.81	4.66	4.57	4.38	
80	TC	33.7	33.7	33.6	33.6	33.6	33.6	33.5	33.5	33.5	33.5	33.5	33.5	33.4	33.4	33.4	31.0	28.7		
	kW	1.52	1.83	1.92	2.04	2.19	2.33	2.49	2.72	2.93	3.12	3.38	3.60	3.85	4.16	4.53	4.63	4.67		
1760	60	TC	68.9	68.7	68.7	68.7	66.8	63.0	59.7	54.8	50.6	46.8	44.4	43.0	41.2	39.8	37.9	36.0	34.1	
		kW	2.89	3.70	3.95	4.28	4.40	4.29	4.24	4.10	3.97	3.87	4.06	4.45	4.45	4.33	4.25	4.18	4.02	
	70	TC	53.2	53.2	53.2	53.0	53.0	52.9	52.7	52.8	49.4	46.3	44.0	42.6	40.7	39.3	37.5	35.6	33.8	
		kW	2.24	2.77	2.98	3.21	3.47	3.72	4.00	4.39	4.33	4.22	4.43	4.85	4.85	4.72	4.64	4.55	4.39	
	75	TC	44.9	44.9	44.9	44.8	44.8	44.7	44.6	44.6	44.6	44.5	44.5	42.0	40.6	38.6	36.9	34.9	32.9	
		kW	1.95	2.39	2.53	2.72	2.92	3.13	3.38	3.67	3.97	4.25	4.65	4.93	4.78	4.83	4.69	4.59	4.40	
80	TC	37.1	37.0	36.9	36.9	36.9	36.9	36.8	36.7	36.8	36.8	36.7	36.7	36.7	36.7	34.5	31.6	29.3		
	kW	1.72	2.07	2.16	2.29	2.46	2.61	2.84	3.05	3.29	3.50	3.76	4.03	4.32	4.69	4.68	4.77	4.82		
1900	60	TC	74.0	74.0	74.0	70.9	67.5	63.6	59.9	54.7	50.5	47.7	45.3	43.9	42.0	40.6	38.6	36.7	34.8	
		kW	3.63	4.07	4.39	4.40	4.35	4.25	4.20	4.06	3.95	3.88	4.07	4.46	4.46	4.34	4.26	4.19	4.03	
	70	TC	57.5	57.5	57.5	57.4	57.4	56.9	56.9	54.0	49.9	46.7	44.3	42.9	41.1	39.7	37.8	35.9	34.1	
		kW	2.83	3.05	3.31	3.56	3.83	4.08	4.41	4.45	4.42	4.41	4.63	5.08	5.08	4.94	4.85	4.77	4.59	
	75	TC	48.7	48.7	48.7	48.6	48.6	48.5	48.3	48.2	48.2	47.1	46.0	43.0	40.9	38.8	37.2	35.1	33.1	
		kW	2.41	2.60	2.80	2.99	3.24	3.46	3.72	4.04	4.38	4.40	5.06	4.92	4.78	4.83	4.69	4.59	4.40	
80	TC	40.2	40.2	40.2	40.2	40.2	40.1	40.0	39.9	40.1	40.0	39.8	39.8	39.8	37.8	34.9	31.9	29.6		
	kW	1.96	2.24	2.37	2.52	2.69	2.90	3.11	3.36	3.63	3.82	4.15	4.45	4.79	4.83	4.68	4.78	4.82		

Table 17

TC refer to total capacity S/T: refer to the ratio of sensible heat and total capacity kW: refer to total input power

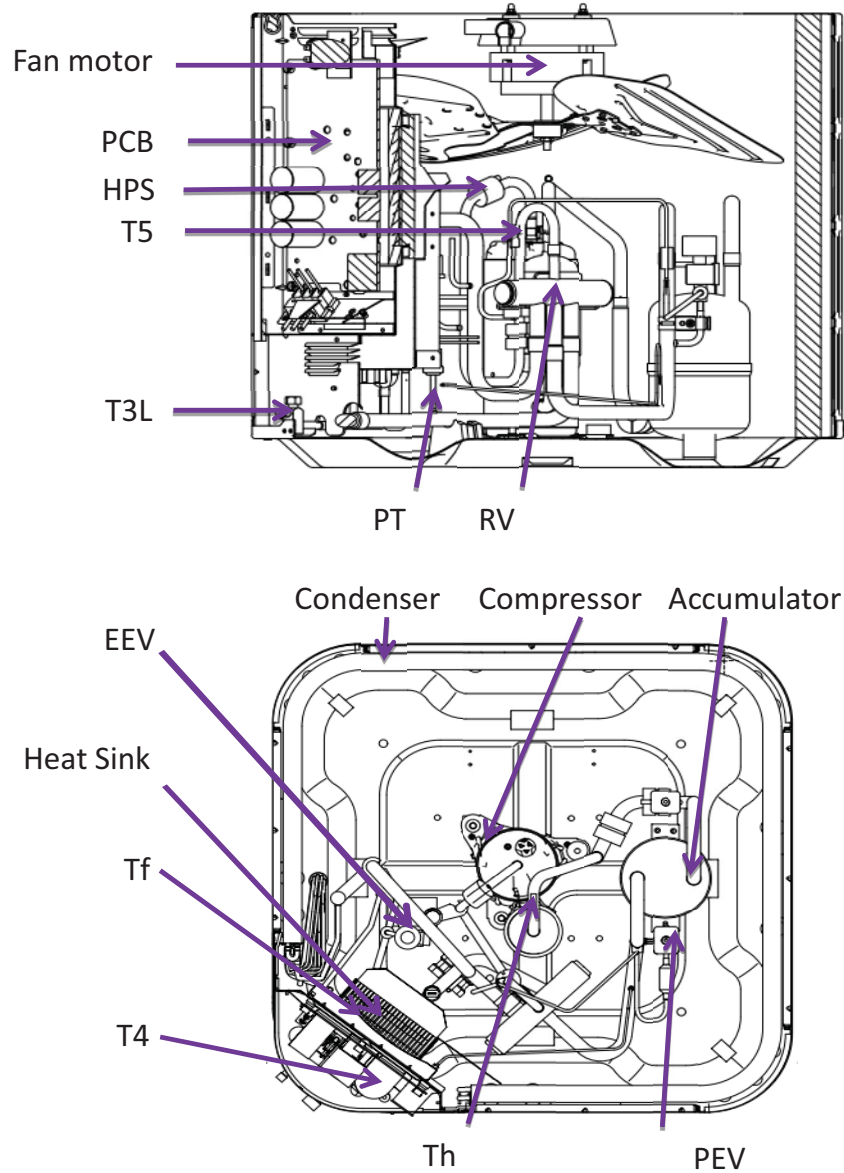
BOVA 60+BVA 60 For Heating																				
Airflow (CFM)	ID (°F)	OD (°F)	86	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4	
1160	60	TC	56.7	56.7	56.7	56.6	56.6	56.3	56.1	56.1	55.5	51.9	49.3	45.1	42.3	40.2	40.3	36.3	33.2	
		kW	2.20	2.58	2.83	3.09	3.36	3.59	3.92	4.34	4.71	4.56	5.30	5.49	5.30	5.11	4.93	4.74	4.60	
	70	TC	42.7	42.7	42.6	42.6	42.5	42.5	42.4	42.3	42.3	42.1	40.0	37.5	35.0	34.1	33.3	32.6	30.2	
		kW	1.81	1.95	2.10	2.26	2.44	2.64	2.90	3.17	3.42	3.68	3.79	3.90	3.94	3.87	3.80	3.72	3.68	
	75	TC	35.4	35.4	35.4	35.3	35.3	35.3	35.2	35.1	35.1	35.1	35.0	34.8	34.8	33.1	31.7	29.9	28.2	
		kW	1.60	1.66	1.78	1.91	2.07	2.21	2.38	2.57	2.85	3.05	3.33	3.52	3.79	3.79	3.64	3.53	3.45	
	80	TC	28.4	28.4	28.4	28.4	28.4	28.3	28.3	28.2	28.1	28.1	28.1	28.1	28.1	28.0	27.9	27.9	27.9	
		kW	1.34	1.42	1.51	1.61	1.72	1.83	1.99	2.12	2.30	2.44	2.64	2.82	3.03	3.24	3.51	3.83	4.16	
	1320 (Low Stage)	60	TC	62.2	62.2	62.2	61.8	61.6	61.5	61.4	60.8	56.1	52.5	49.8	45.5	43.2	42.5	39.9	36.7	34.1
			kW	2.34	2.93	3.20	3.44	3.74	4.04	4.40	4.80	4.62	4.48	5.58	5.40	5.22	5.05	4.88	4.71	4.56
		70	TC	46.8	46.8	46.8	46.8	46.7	46.7	46.6	46.4	46.2	46.2	43.9	41.1	38.4	37.4	36.5	34.2	31.9
			kW	1.74	2.16	2.33	2.52	2.74	2.98	3.24	3.54	3.83	4.13	4.57	4.94	5.39	5.47	5.28	5.09	4.94
75		TC	38.8	38.8	38.8	38.8	38.7	38.7	38.6	38.6	38.6	38.6	38.2	38.3	38.3	37.2	35.9	33.6	31.2	
		kW	1.61	1.84	1.97	2.12	2.28	2.44	2.62	2.92	3.17	3.39	3.66	3.94	4.25	5.47	5.28	5.09	4.94	
80		TC	31.2	31.2	31.2	31.2	31.2	31.1	31.2	31.2	31.1	31.1	31.1	31.1	30.8	30.7	30.7	30.7	30.7	
		kW	1.42	1.55	1.66	1.77	1.90	2.04	2.18	2.34	2.54	2.70	2.94	3.14	3.33	3.60	3.91	4.30	4.65	
1520		60	TC	69.0	69.0	68.5	68.5	68.4	68.3	67.4	61.6	56.6	53.0	52.2	52.7	49.1	45.6	42.1	38.7	36.0
			kW	2.64	3.45	3.65	3.98	4.30	4.67	4.92	4.73	4.56	4.44	5.30	5.34	5.18	5.02	4.86	4.70	4.57
		70	TC	52.0	52.0	52.0	52.0	52.0	51.9	51.5	51.5	51.4	51.4	48.9	45.8	42.7	41.6	40.6	38.0	36.0
			kW	1.99	2.50	2.68	2.91	3.16	3.40	3.63	4.03	4.39	4.76	4.90	5.04	5.09	4.99	4.91	4.80	4.76
	75	TC	43.2	43.2	43.2	43.1	43.1	43.1	43.0	42.9	42.8	42.6	42.6	42.6	42.6	40.5	38.8	36.7	34.5	
		kW	1.71	2.12	2.24	2.40	2.58	2.78	3.04	3.32	3.56	3.82	4.19	4.51	4.90	4.90	4.71	4.56	4.46	
	80	TC	34.8	34.8	34.8	34.8	34.7	34.7	34.4	34.7	34.7	34.7	34.7	34.2	34.2	34.2	34.2	34.2	33.9	
		kW	1.48	1.78	1.88	2.00	2.16	2.29	2.46	2.64	2.88	3.10	3.36	3.53	3.80	4.10	4.47	4.92	5.36	
	1750 (High Stage)	60	TC	76.1	75.6	75.5	75.5	75.5	72.1	68.2	62.4	57.5	53.8	51.1	47.9	44.6	43.6	42.5	39.8	37.1
			kW	3.09	3.97	4.22	4.58	4.96	4.95	4.88	4.71	4.56	4.45	2.10	5.12	5.12	4.98	4.90	4.81	4.63
		70	TC	57.4	57.3	57.5	57.4	57.2	56.4	56.2	56.1	55.3	53.6	51.0	47.7	44.5	43.4	42.4	39.7	37.0
			kW	2.28	2.87	3.08	3.33	3.60	3.82	4.13	4.56	4.77	4.84	4.99	5.13	5.18	5.08	5.00	4.89	4.84
75		TC	47.8	47.8	47.8	47.7	47.6	47.6	47.5	47.1	47.0	47.0	47.0	47.0	44.0	41.8	40.1	37.9	35.7	
		kW	1.95	2.40	2.55	2.74	2.96	3.20	3.45	3.73	4.04	4.34	4.78	5.17	5.42	5.42	5.20	5.04	4.93	
80		TC	38.6	38.6	38.5	38.5	38.4	38.4	38.2	38.2	38.2	38.2	37.9	37.9	37.8	37.9	37.8	37.2	34.5	
		kW	1.68	2.02	2.13	2.27	2.43	2.58	2.76	3.01	3.29	3.51	3.74	4.01	4.30	4.68	5.09	5.54	5.39	
1880		60	TC	81.2	81.0	81.0	81.0	77.1	72.6	68.6	62.6	58.0	54.2	54.4	53.8	50.0	46.5	43.1	40.2	37.4
			kW	3.46	4.40	4.66	5.08	5.02	4.90	4.84	4.69	4.56	4.45	5.27	5.33	5.19	5.05	4.91	4.77	4.65
		70	TC	61.6	61.6	61.7	61.6	61.0	60.8	60.9	61.0	56.8	54.2	51.5	48.2	45.0	43.9	42.8	40.0	36.8
			kW	2.51	3.18	3.39	3.66	3.90	4.20	4.54	5.03	4.97	4.84	4.99	5.13	5.18	5.08	5.00	4.89	4.84
	75	TC	51.3	51.3	51.3	51.1	51.1	51.1	51.0	50.5	50.4	50.4	50.4	50.4	44.6	42.4	40.6	38.4	36.1	
		kW	2.13	2.62	2.79	2.98	3.26	3.50	3.76	4.08	4.43	4.77	5.27	5.70	5.85	5.85	5.62	5.44	5.32	
	80	TC	41.4	41.4	41.4	41.4	41.3	41.2	41.2	41.2	41.2	40.9	40.7	40.7	40.7	40.7	40.7	37.7	34.9	
		kW	1.83	2.21	2.32	2.47	2.64	2.80	3.02	3.32	3.59	3.77	4.09	4.39	4.73	5.13	5.65	5.56	5.41	

Table 18

TC refer to total capacity S/T: refer to the ratio of sensible heat and total capacity kW: refer to total input power

8 Layout of Functional Components

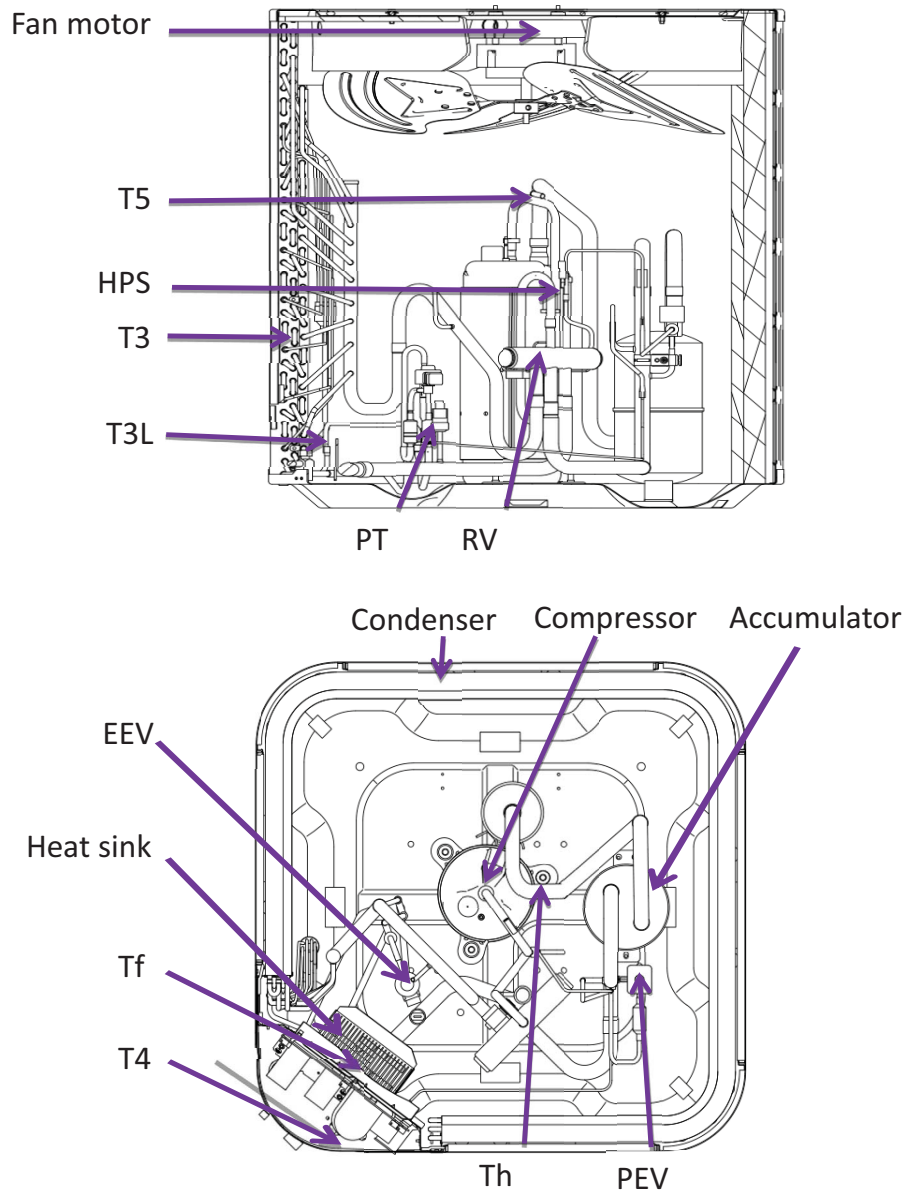
8.1 3 Ton



Note: T3 not shown in figure, but is located on the condenser coil.
Please reference Table 18 for abbreviation and parts description.

Figure 5

8.2 5 Ton



Note: Please reference Table 18 for abbreviation and parts description.

Figure 6

9 Refrigerant Flow Diagrams

9.1 Cooling Operation

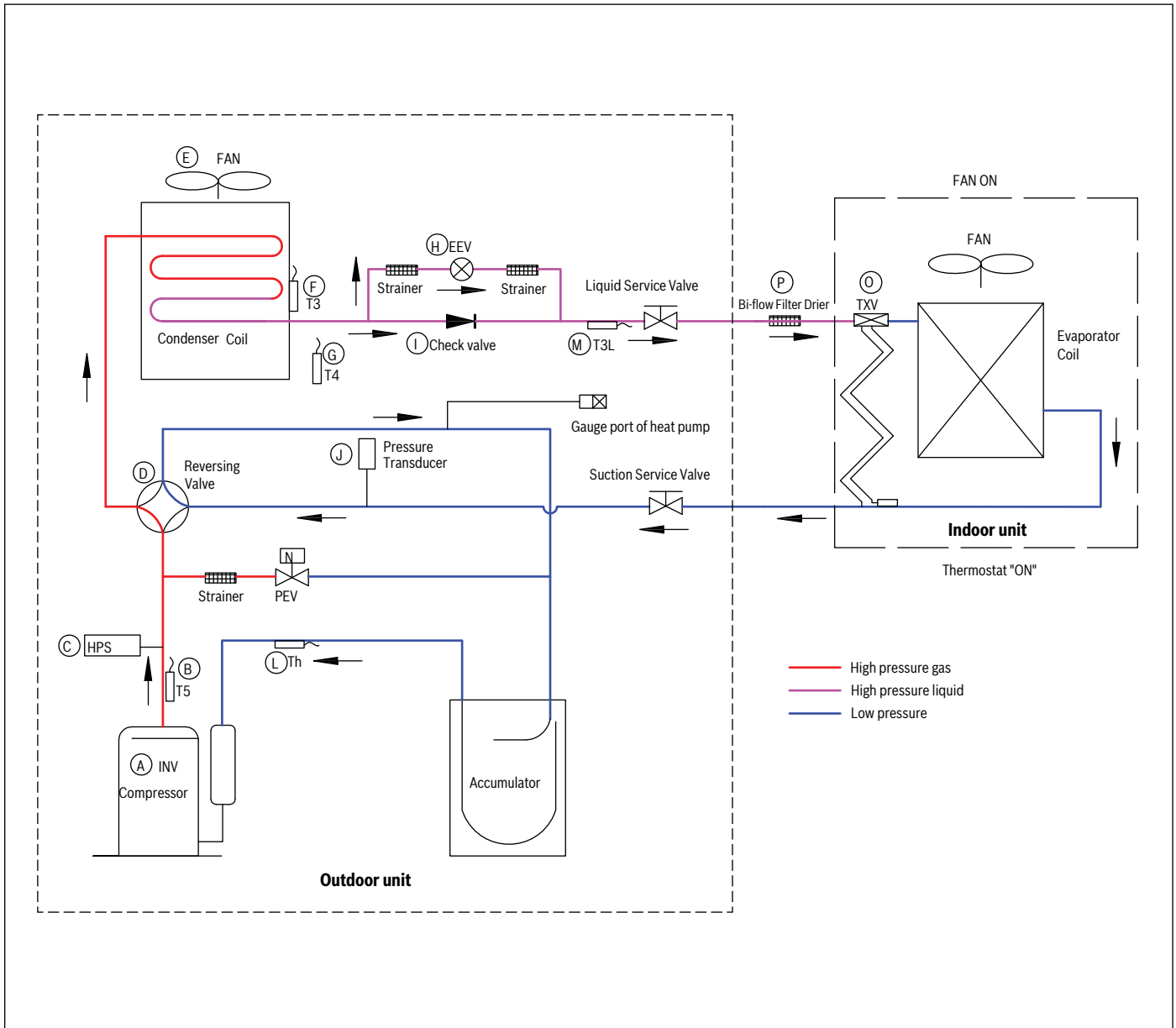


Figure 7 Refrigerant flow during cooling operation/cooling oil return operation/defrost operation

9.2 Heating Operation

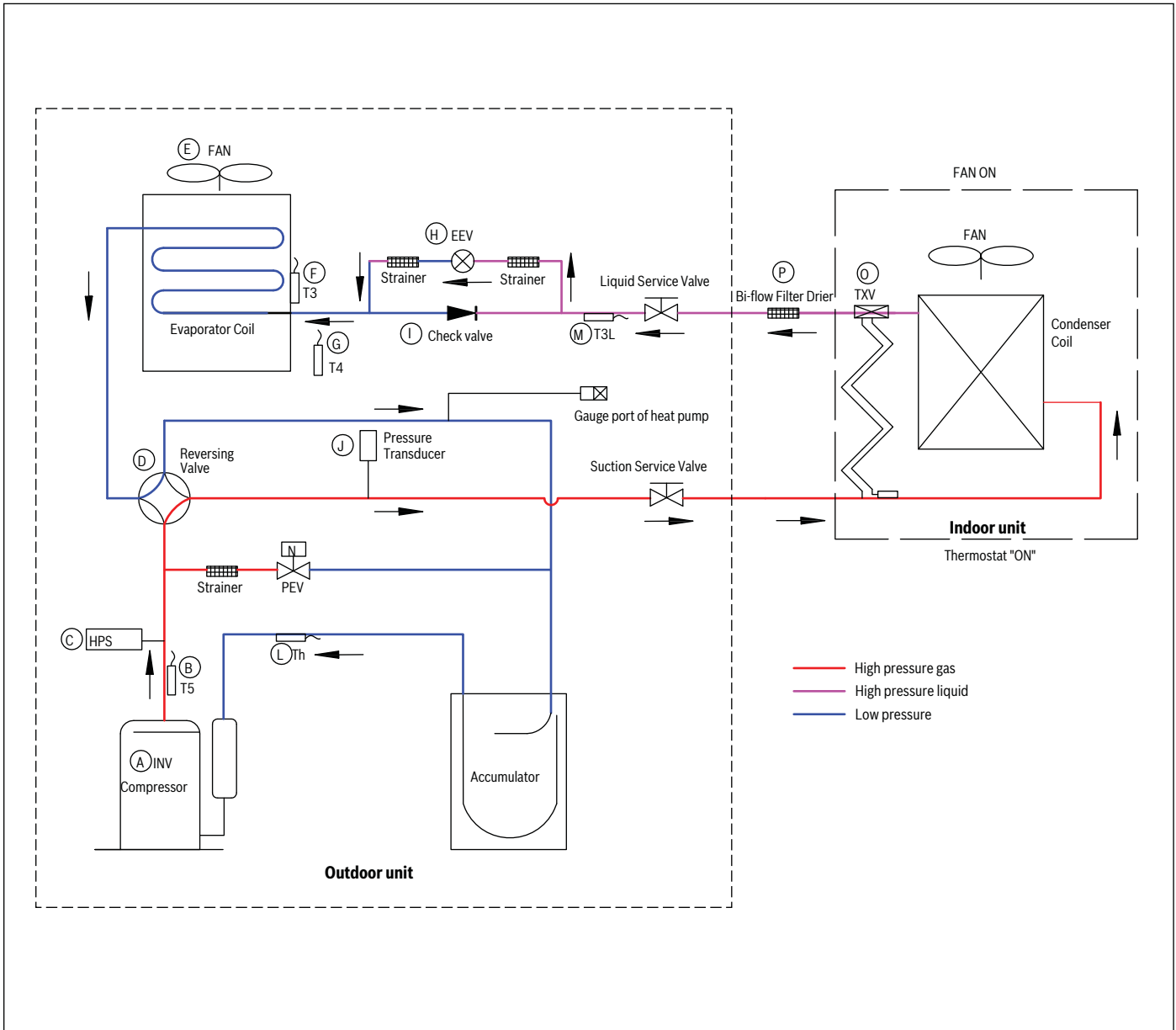


Figure 8 Refrigerant flow during heating operation/heating oil return operation

No. in diagram	Abbreviation	Part Description	Major functions
A	INV Comp.	Inverter Compressor	The inverter compressor's speed is controlled based on coil pressures monitored by the unit's pressure transducer (PT)
B	T5	Compressor discharge temperature sensor	Used for compressor discharge temperature protection and EEV control in heating mode.
C	HPS	High Pressure Switch	<ul style="list-style-type: none"> — High Pressure Switch opens at P > 580 PSIG, the compressor and outdoor fan stop. — High Pressure Switch closes at P < 435 PSIG, the compressor and outdoor fan restart.
D	RV	Reversing Valve	Used to switch mode between cooling and heating.
E	Fan	Outdoor Fan	Used for heat exchange
F	T3	Outdoor Coil temperature sensor	<ul style="list-style-type: none"> — Used for discharge temperature protection — Fan control (cooling mode) — Defrost control (heating mode)
G	T4	Outdoor Ambient Temperature sensor	Used for ambient protection and fan control in heating mode, and defrost control.
H	EEV	Electronic Expansion Valve	Fully open during cooling mode and adjusted during heating mode. Controlled in heating mode via compressor discharge superheat.
I	CV	Check Valve	Open during cooling and closed during heating.
J	PT	Pressure Transducer	<ul style="list-style-type: none"> — Compressor frequency control — Electronic Expansion Valve (EEV) control (heating mode only) — High pressure protection (heating mode) — Low pressure protection (cooling mode)
K	Tf	Control board heat dissipation temperature sensor	Used for control board heat dissipation temperature protection.
L	Th	Compressor Suction temperature sensor	Used to monitor suction temperature
M	T3L	Liquid Line temperature sensor	Used to monitor condenser outlet temperature
N	PEV	Pressure Equalizer Valve	Used to balance pressure before compressor starts
O	TXV	Thermal Expansion Valve	Used only in cooling mode to control superheat and protect compressor
P	Bi-Flow Filter Drier	Bi-Flow Filter Drier	Used to remove refrigerant impurities in order to protect compressor

Table 19

10 Control

10.1 Crankcase Heater Control

The crankcase heater only operates when the compressor is OFF (i.e. during standby). Refrigerant migration during the OFF cycle can result in noisy start-ups, therefore a Crankcase Heater (CCH) is used to minimize refrigerant migration thereby minimizing start-up noise and/or compressor damage. Its purpose is to warm the compressor during the OFF cycle, driving refrigerant from compressor. After extended shutdown periods (high voltage power off) in cold weather, it is recommended to allow CCH to be energized for at least 12 hours prior to compressor operation by applying line voltage to heat pump with thermostat OFF.

10.2 Other Operations

The operations shown in this section are unit operations which occur only under specific conditions.

10.2.1 Defrost Operation

If there is no fault code and the unit is in defrost mode, the LED display will show "dF**" (** shows the frequency of compressor in Hz). The unit can enter defrost mode via logic or manually.

The Demand Defrost Control (DDC) monitors the outdoor unit coil temperature using thermistor (T3). A second thermistor (T4) monitors outdoor ambient temperature. Based on these parameters, as well as accumulative run time and high pressure, the DDC calculates proper initiation of defrost.

Any one of the below three conditions is required to enter defrost:

1. The calculated temperature difference between the outdoor temperature (T4) and the coil temperature (T3) is called Delta T. After Delta T is achieved and continues for 3 minutes.
 - T4 ≥ 39°F, Delta T = 18°F
 - T4 ≥ 30°F, Delta T = 16°F
 - T4 ≥ 19°F, Delta T = 14°F
 - When T4 < 19°F, T3 < 9°F, accumulative compressor run time ≥ 80 minutes.
2. After "Minimum Run Time" (MRT) is achieved. MRT is based on outdoor ambient temperature (T4), for example:
 - MRT is 4 hours when: T4 < 23°F
 - MRT is 2 hours when: 23°F ≤ T4 < 42°F
3. After the high pressure saturation temperature drops below 82°F for 20 minutes.

Defrost will terminate once outdoor coil temperature (T3) reaches 64° F for a period of 1 minute or defrost time has exceeded 8 minutes.

Defrost Termination Settings (SW5) offers different defrost termination options for enhanced defrost for different geographical and outdoor conditions.

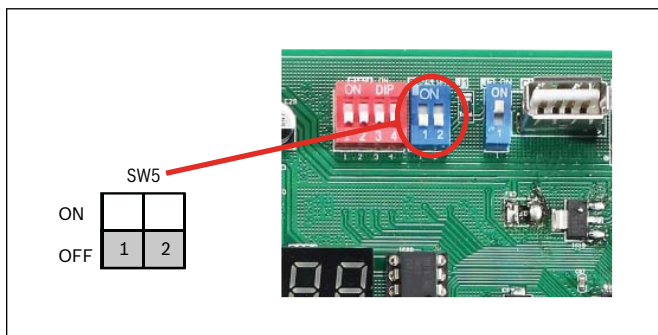


Figure 9

Defrosting Choice	SW5-1	SW5-2	Remarks
ON	Operating time is reduced by 10%	Defrosting extended for 60 seconds	
OFF	Normal	Normal	Default
Remarks	Enter defrost	Quit defrost	

Table 20

Manual Defrost:

1. System must have a call for heat and have been operating for a minimum of 8 minutes.
2. Press "Force" button on inverter board for 6 seconds to begin manual defrost.
3. Wait approximately 40 seconds for defrost to initiate.
4. Once defrost initiates, the display will indicate "dF".
5. Defrost test will terminate automatically, after which the display will indicate running speed.
6. If a second defrost test is required, repeat steps 2-5 after 5 minutes.

10.2.2 Oil Return Operation

In order to prevent the compressor from operating in a low oil condition, the oil return operation is conducted to recover oil to the compressor. The LED display will show "A**" during oil return operation (** shows the frequency of compressor).

10.2.2 Force Mode Operation

Force mode is also referred to as charge mode in cooling. The LED display will show "—**" during force mode (** shows the frequency of compressor). The unit will only go into force mode if manually placed in this mode by the user.

Function: Used in cooling mode to verify superheat/subcooling and charge system. Force Mode forces the unit to run at 100% capacity.

To Enter Force Mode: Press FORCE button for 1 second (should press it after the "start up phase" finished. If unit fails to enter Force Mode, wait a few minutes and try again.

To Exit Force Mode: Press FORCE button again to quit immediately or it will automatically quit after 2 hours.

You can verify that the system is at 100% capacity using the table below. It should not take more than a few minutes to reach 100% capacity.

Force mode frequency	2T*	3T	4T*	5T	Remark
Cooling	48	72	54	62	Charge mode
Heating	52	74	58	66	Cannot verify superheat/subcooling in heating mode

Table 21 Compressor frequency during force mode

* assumes the J2 dip switch on the outdoor control board is flipped to OFF (forcing unit to 2 or 4 ton).

10.2.3 Indoor Fan Motor Function

System operation and function

Two Stage Fan Control

The IDS 2.0 IDU supports two stage fan control which requires a two stage thermostat (Y1&Y2). When there is a call for Y2, the blower motor will turn to high speed setting. When there is a call for Y1, the blower motor will turn to low speed setting. Unit will run at low speed setting when there is only G call. It will run in high speed setting when there is W/W1/W2 signal (when the electric heat kit is on).

The X13 ECM motor supports 5 speeds. Customer can select the suitable speed by adjusting the SW6-1 and SW6-2 dip switches. Refer to Airflow Performance Table in the relevant IDU IOM for reference airflow. Refer to figure 12 for dip switches settings.

If 2 stage thermostat is not available, single stage thermostat may be used, please refer to Wiring Diagram section for wiring instructions. If Y1 and Y2 are jumped, the unit will only run in high stage fan speed.

Anti-Cold Air Fan Delay

The Anti-Cold Air Fan Delay function utilizes a sensor (T2) located on the indoor coil, which prevents the blower from turning on until the coil has reached a certain temperature. This feature prevents cold air blow during heating operation.

- When SW6-3 dip switch is set to the "ON" position and the unit is in heating mode, the Anti-Cold Air Fan Delay function will activate based on the following entry conditions (all 3 conditions must be met):
 - Indoor Coil Temperature (T2) < 82.4°F
 - Electric heat kit is turned off
 - There is a call for Y1 from thermostat to indoor unit
- This function will deactivate if ONE OF the following exit conditions are met OR the system has been operating in heating mode for 15 minutes.
 - T2 ≥ 89.6°F
 - Heater kit is turned on
 - The system is NOT running Heat mode
- During the heating mode, if one of the exit conditions of Anti-Cold Air is satisfied, the blower motor will turn on in first stage fan speed.
- During the heating mode, if all of the entry conditions of Anti-Cold Air are met and maintained for 120s, the blower motor will change to first stage speed.

Heating Fan Delay

If SW6-3 dip switch is set to the "OFF" position and the unit is in heating mode, the blower will operate with a 90 second delay with the fan speed dictated by Y1 or Y2 signal.

Passive Dehumidification (Optional)

IDS 2.0 IDU has a Passive Dehumidification function which lowers the fan speed (first stage) with a DH call from the thermostat. This function requires proper DH wiring from the indoor unit to the thermostat (with a humidistat).



If DH wire is not connected, the unit will still function normally.

11 Field Settings

11.1 Initial Unit Preparation and Installation Checklist



WARNING:

- ▶ This checklist is NOT to be used in place of the Installation, Operation, and Maintenance Manual. Please refer to Installation, Operation, and Maintenance Manual for specifications and detailed installation requirements.

✓	No.	Setting Up the Unit
	1	Be sure to consider maximum lineset lengths
	2	Ensure proper clearances and location restrictions for outdoor and indoor unit
	3	Ensure outdoor unit is installed on a pad
✓	No.	Check Refrigerant Lines
	1	Ensure proper lineset diameters
	2	Ensure proper insulation and routing
	3	Braze refrigerant lines using proper techniques
	4	Perform leak check
	5	Properly evacuate lines
	6	Open service valves, ensure they are fully open
✓	No.	Low Voltage Wiring
	1	Ensure low voltage wiring does not exceed maximum length
	2	Ensure proper gage wire is used
	3	Connect thermostat wiring as shown in wiring diagrams in IOM
✓	No.	High Voltage Wiring
	1	Connect high voltage power supply ensuring proper safety precautions are followed
	2	Install high voltage disconnect switch
	3	Ensure proper grounding on indoor and outdoor units

Table 22

11.2 Initial Start-up Checklist



WARNING:

- ▶ This checklist is NOT to be used in place of the Installation, Operation, and Maintenance Manual. Please refer to Installation, Operation, and Maintenance Manual for specifications and detailed installation requirements.

✓	No.	System Start-up
	1	Consider non-default dipswitch positions as needed, refer to section 11.3.2 and 11.3.4
	2	Set thermostat to OFF prior to unit charging
✓	No.	Unit Charging
	1	Determine proper charging method: weigh in method or charge by subcooling. If design superheat and subcooling cannot be achieved, refer to section 13.9 for troubleshooting.
	2	After 20 minutes of unit operation, ensure proper drainage of condensate on indoor and outdoor units
	3	Force unit into Manual Defrost to verify functionality.

Table 23

11.3 Dip Switch Settings

11.3.1 Outdoor Unit Dip Switch Settings

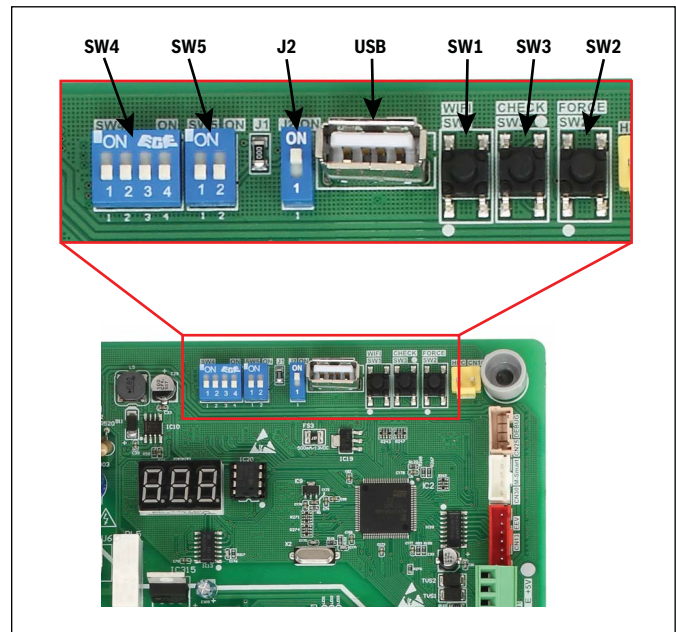


Figure 10 3 Ton

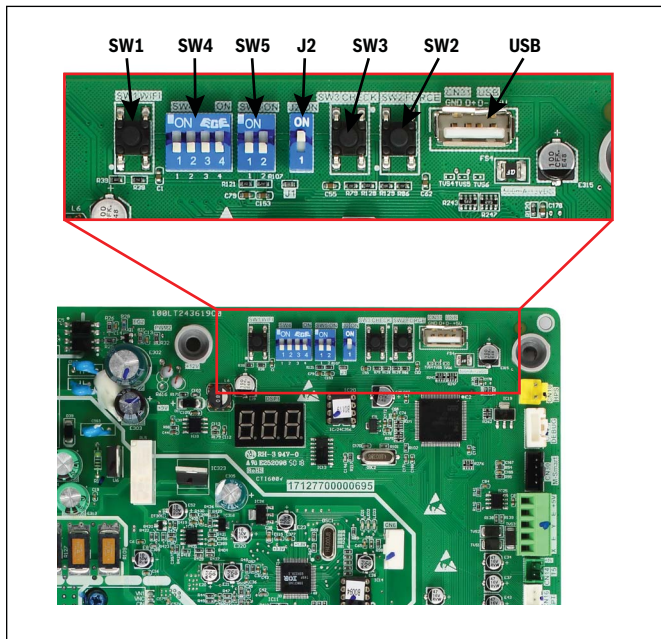


Figure 11 5 Ton

Switch	Position	Function
SW1	Push Button	Reserved
SW2	Push Button	For check point data
SW3	Push Button	Force mode/Manual defrost
SW4-1	ON	Program For IDP
	OFF*	Program For IDS 2.0
SW4-2	Reserved	Reserved
SW4-3	ON	Adaptive capacity output disabled
	OFF*	Adaptive capacity output enabled
SW4-4	ON	Accelerated cooling/heating
	OFF*	Normal cooling/heating
SW5-1	ON	Operating time is reduced by 10%
	OFF*	Normal operation
SW5-2	ON	Defrosting extended for 60 seconds
	OFF*	Normal operation
J2	ON*	For 3/5 ton Capacity
	OFF	For 2/4 ton Capacity

Table 24 Outdoor unit dip switch settings

* Default setting



Prior to leaving installation site, ensure the SW4-1 dip switch is in the proper position for the unit.

11.3.2 When to Change Outdoor Unit Dip Switch Settings

NOTICE:

- ▶ Power should be turned off when adjusting dip switches.

In most scenarios, it is recommended to keep all outdoor unit board dip switch positions in their manufacturer default positions. There are some specific scenarios when it makes sense to change dip switch settings:

- ▶ **SW4-3:** Default is OFF position (enabled), allows for coil/condenser target temperature to drift +/- 4°F based on previous hour of operation in an attempt to optimize run time. If dip switch is changed to ON, software requires a “hard” target for coil temperature and does not drift to optimize runtime.
Reason to change from default: In zoning applications but only as needed as a result of customer expectations and/or performance.
- ▶ **SW4-4:** Default is OFF position, system uses the default target coil temperatures. If dip switch is changed to ON, this reduces the target coil temperature by 4°F in cooling and increases target coil temperature by 4°F in heating. **Reason to change from default:** Recommended to be used only as-needed as a result of customer expectations and/or performance (i.e. not getting enough capacity, or not dehumidifying well enough).
- ▶ **SW5-1:** Default is OFF position, uses default defrost operating time (maximum of 8 minutes). If dip switch is changed to ON, default defrost time is reduced by 10%.
Reason to change from default: Can be used in mild/warm climates, where it may take less time than usual to defrost the outdoor coil.
- ▶ **SW5-2:** Default is OFF position, uses default defrost operating time (maximum of 8 minutes). If dip switch is changed to ON, default defrost time is increased by 1 minute.
Reason to change from default: Can be used in colder climates, where it may take more time than usual to defrost the outdoor coil.
- ▶ **J2:** Default is ON, which leaves the compressor capacity at default (3 or 5 ton depending on the model). Regardless of if the matching air handler is 2 ton or 3 ton (when paired with the 3 ton condenser), or matching air handler is 4 ton or 5 ton (when paired with 5 ton condenser), the J2 jumper can be left at default position. The compressor will ramp to required coil temperature regardless of paired air handler size.
Reason to change from default: If you want (or need) to minimize maximum condenser capacity from 3 to 2 tons (3 ton condenser model) OR 5 to 4 tons (5 ton condenser model).

11.3.3 Indoor Unit Dip Switch Settings

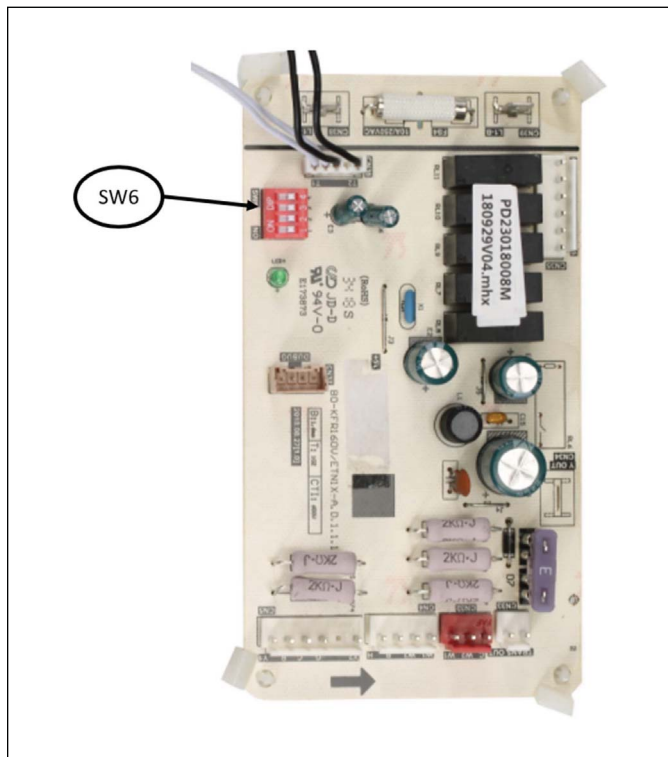


Figure 12 Indoor board dip switches

11.3.4 When to Change Indoor Unit Dipswitch Settings

NOTICE:

- ▶ Power should be turned off when adjusting dip switches.

In most scenarios, it is recommended to keep all indoor unit board dip switch positions in their manufacturer default positions. There are some specific scenarios when it makes sense to change dip switch settings:

- ▶ **SW6-1/2:** Default positions vary by air handler size, see Table 25. Changing the position of these dip switches changes the fan motor speed settings for high and low speed.
 - Reason to change from default:** The manufacturer recommends 350-450 CFM/ton, the static pressure and speed tap settings influence the CFM. Refer to the air flow performance chart in the IOM to select fan speed settings depending on your application.

Dip Switch Position	Low Fan Speed	High Fan Speed	Default
SW6-1 OFF	1	2	
SW6-2 OFF			
SW6-1 OFF	1	3	Default on 48 air handler model
SW6-2 ON			
SW6-1 ON	2	4	Default on 24/36/60 air handler model
SW6-2 OFF			
SW6-1 ON	3	5	
SW6-2 ON			

Table 25

- ▶ **SW6-3:** Default is ON position, which turns on the Anti-Cold Air Fan Delay function. This function utilizes a sensor (T2) located on the indoor coil, which prevents the blower from turning on until the coil has reached a temperature of 89.6 deg F, at which point it will run in low speed. The blower will exit the Anti-Cold Air Fan Delay function when the coil temperature is above 100.4 deg F. This feature prevents cold air blowing into the space during heating operation. If dip switch changes to ON, the fan will operate in heating mode with a 90 second fan delay.
 - Reason to change from default:** Recommended to be used only as-needed as a result of customer expectations and/or performance
- ▶ **SW6-4:** Default is OFF position, but the function of this dip switch is simply reserved for future use (no functionality at this time).
 - Reason to change from default:** Never recommend to change from default.

11.4 Check Point Values

To display system parameters, press the "check" button on the outdoor board to index through the series of parameters available. The first time you press the "check" button, it will display the sequence, and after 1 second it will display the value of the parameter. If you press the "check" button again, it will display the next sequence.

After 20 seconds on the same parameter, display will revert back to normal status.

No.	Point check content	Example	Remark
0	Outdoor unit capacity	H3	H3 = Heat pump 3 ton
1	Outdoor unit mode	2	0 standby 2 cooling 3 heating
2	Outdoor unit set compressor speed(Hz)	66	
3	T3 (outdoor coil temp.) (°F)		
4	T4 (outdoor ambient temp.) (°F)		
5	T5 (compressor discharge temp.) (°F)		
6	T6 (compressor suction temp.) (°F)		
7	T7 (liquid line temp.) (°F)		
8	Tf (module temp.) (°F)		
9	Pe (evaporating pressure) (PSI)		Low (suction) Pressure
10	Pc (condensing pressure) (PSI)		High (head) Pressure
11	Tes (target of the evaporating temp.) (only use for cooling mode) (°F)		
12	Te (evaporating temp.) (°F)		
13	Tcs (target of the condensing temp.) (only use for heating mode) (°F)		
14	Tc (condensing temp.) (°F)		
15	Target of the compressor discharge superheat (only use for heating mode) (°F)		
16	Compressor discharge superheat (°F)		
17	Openings of EEV		
18	Fan speed		
19	Compressor current (A)		
20	Alternating voltage (V)		
21	Compressor input dc voltage (V)		
22	Continuous running time of the compressor (min)		
23	Last Fault Code	00	
24	Software version	01	
25	Remark"--"	--	--

Table 26 Check Point Values

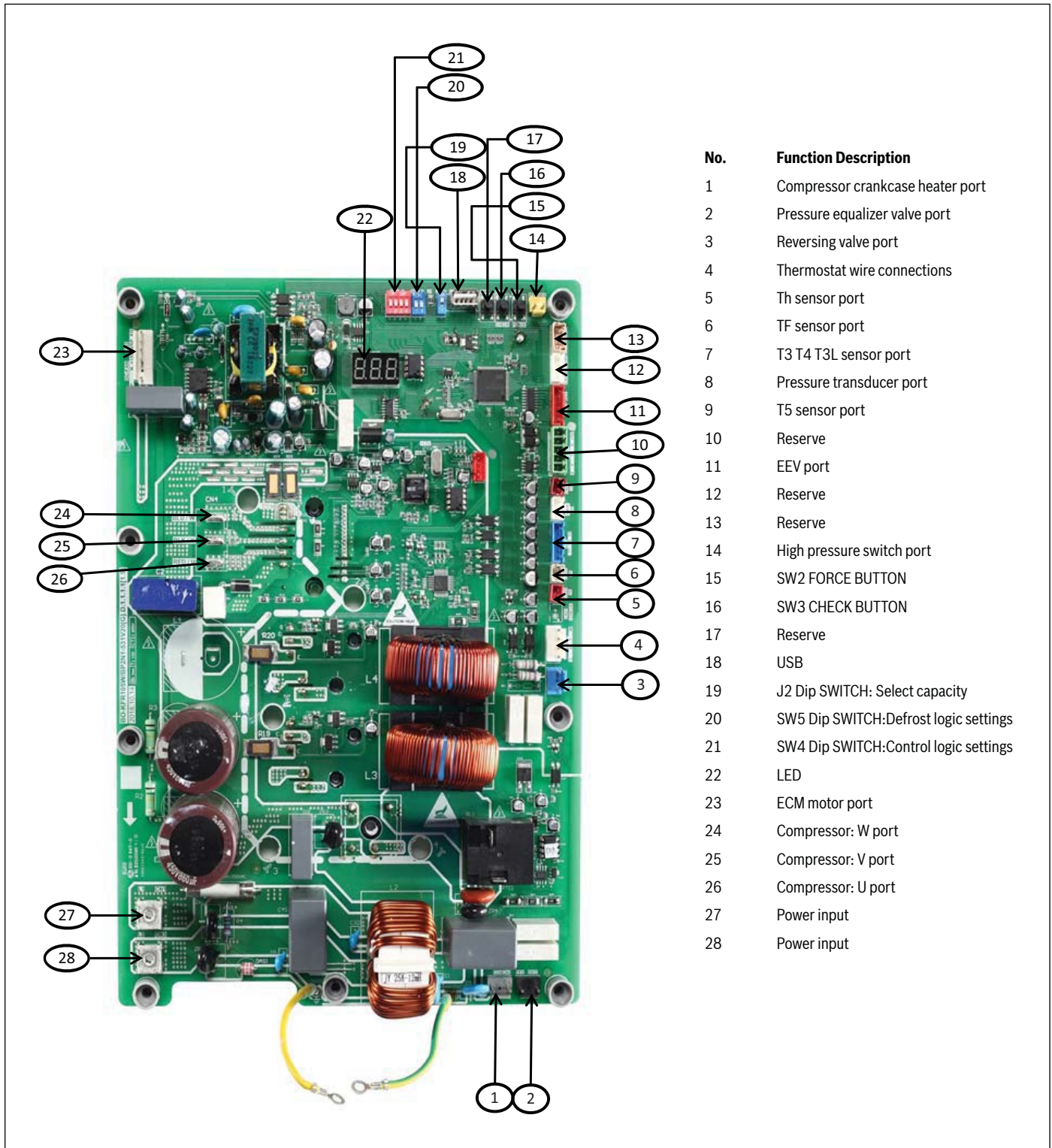


It is recommended to use the "check" button to verify outdoor unit capacity (No. 0), operation mode (No. 1), and subcooling (No. 7 minus No. 3 (will be within 2 degrees of measured gauge values)) prior to leaving the installation site. See IOM for required subcool values.

12 Diagnosis and Troubleshooting

12.1 Control Board Component Layout

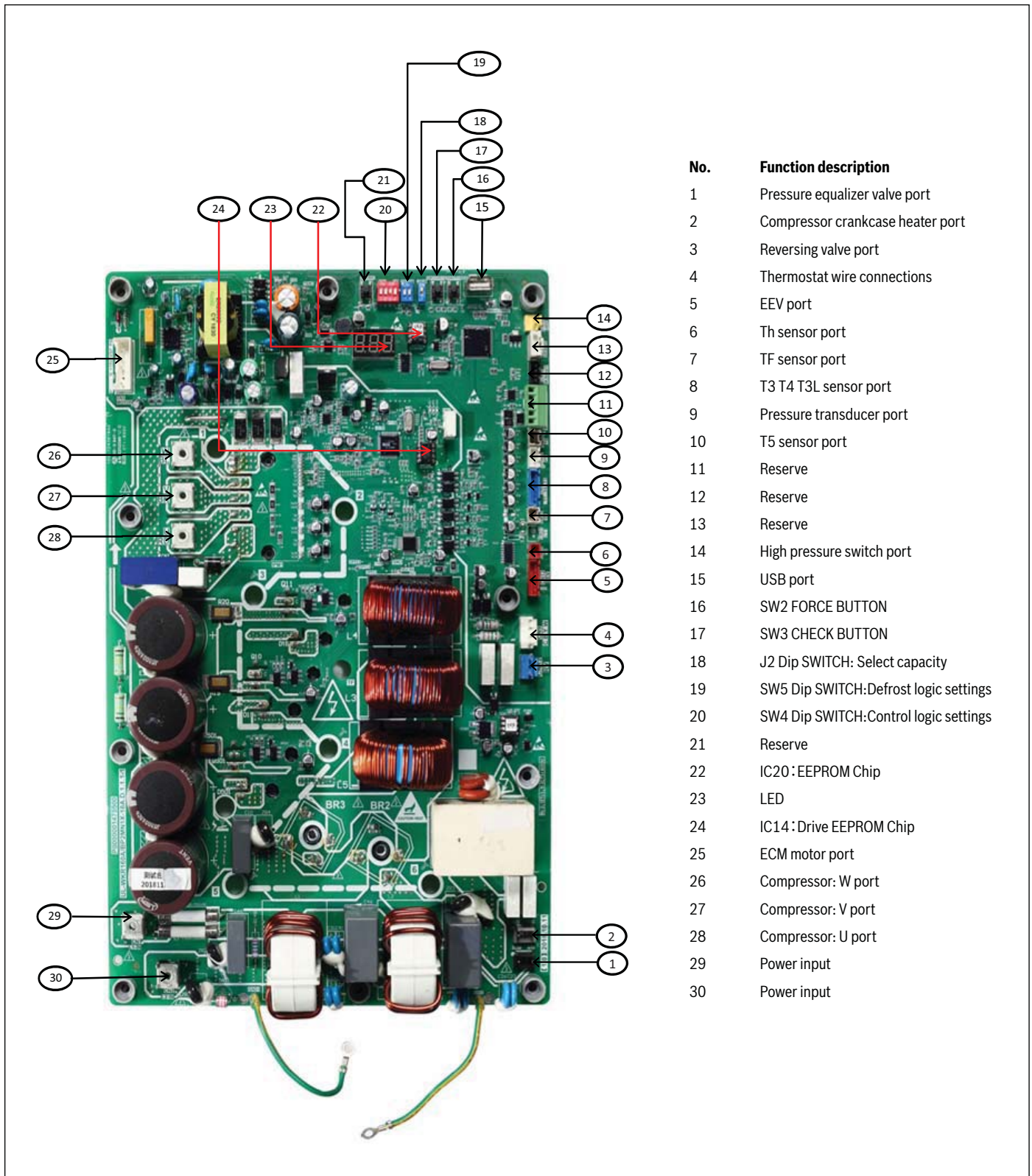
12.1.1 BOVA36 Outdoor Unit Control Board



No.	Function Description
1	Compressor crankcase heater port
2	Pressure equalizer valve port
3	Reversing valve port
4	Thermostat wire connections
5	Th sensor port
6	TF sensor port
7	T3 T4 T3L sensor port
8	Pressure transducer port
9	T5 sensor port
10	Reserve
11	EEV port
12	Reserve
13	Reserve
14	High pressure switch port
15	SW2 FORCE BUTTON
16	SW3 CHECK BUTTON
17	Reserve
18	USB
19	J2 Dip SWITCH: Select capacity
20	SW5 Dip SWITCH: Defrost logic settings
21	SW4 Dip SWITCH: Control logic settings
22	LED
23	ECM motor port
24	Compressor: W port
25	Compressor: V port
26	Compressor: U port
27	Power input
28	Power input

Figure 13 Outdoor unit main PCB ports for 3 ton

12.1.2 BOVA60 Outdoor Unit Control Board



No.	Function description
1	Pressure equalizer valve port
2	Compressor crankcase heater port
3	Reversing valve port
4	Thermostat wire connections
5	EEV port
6	Th sensor port
7	TF sensor port
8	T3 T4 T3L sensor port
9	Pressure transducer port
10	T5 sensor port
11	Reserve
12	Reserve
13	Reserve
14	High pressure switch port
15	USB port
16	SW2 FORCE BUTTON
17	SW3 CHECK BUTTON
18	J2 Dip SWITCH: Select capacity
19	SW5 Dip SWITCH:Defrost logic settings
20	SW4 Dip SWITCH:Control logic settings
21	Reserve
22	IC20 : EEPROM Chip
23	LED
24	IC14 : Drive EEPROM Chip
25	ECM motor port
26	Compressor: W port
27	Compressor: V port
28	Compressor: U port
29	Power input
30	Power input

Figure 14 Outdoor unit main PCB ports for 5 ton

12.2 Fault Code and Limited Condition Descriptions

Limited Condition Status codes are displayed when a condition exists that could harm the unit. To protect itself, the unit continues to run, but with limited compressor frequency. When these protection codes are visible, the unit is still functioning, just not according to its normal logic. If condition worsens/persists, a fault code will be displayed and the compressor will shut off. For Limited Condition Status codes, no service is required. Service may be recommended for active fault codes, see fault code troubleshooting section for more detail.

Fault codes are displayed when an abnormal condition exists that could harm the unit. Fault codes cause the compressor to shut off and force the unit into standby mode until the abnormal condition goes away. When the abnormal condition ceases, the unit will restart and operate as normal. The only exception is H5 which requires a hard restart. Service may be recommended for active fault codes, see fault code troubleshooting section for more detail.

Limited Condition Status code	Fault Code	Fault Code Description	Potential Cause
	C3	T3 sensor is not reading correctly in cooling.	<ul style="list-style-type: none"> ▶ Wrong location of T3 sensor ▶ Failed T3 sensor ▶ Failed T4 sensor
	E4	Temperature sensor fault	<ul style="list-style-type: none"> ▶ Temperature sensors failed ▶ Wrong wire connections of sensor ▶ Ambient temperature beyond system operation range
U**	E5	High/low voltage protection.	<ul style="list-style-type: none"> ▶ Power supply $\geq 270V$ ▶ Power supply $< 172V$ ▶ Control board issue
	E6	Outdoor DC fan motor fault.	<ul style="list-style-type: none"> ▶ Motor failed ▶ Fan blade damaged or blocked ▶ Extreme weather conditions ▶ Electrical issue
	E7	T5 sensor not reading correctly.	<ul style="list-style-type: none"> ▶ Wrong location of T5 sensor ▶ Wrong connection on control board of T5&Tf ▶ T5 sensor failed
	E9	EEPROM IC20 fault.	<ul style="list-style-type: none"> ▶ EEPROM IC20 poor contact ▶ EEPROM IC20 improperly installed
	H0	Communication fault in EEPROM IC14 chip.	<ul style="list-style-type: none"> ▶ Control board failed
	H8	Pressure transducer (PT) fault.	<ul style="list-style-type: none"> ▶ Pressure transducer wiring not secure ▶ Pressure transducer failed
F**	P0	Control board is over-heated.	<ul style="list-style-type: none"> ▶ Poor heat dissipation ▶ Tf sensor failed ▶ Wrong connection on control board of T5&Tf ▶ Outdoor motor failed, causing control board to overheat
	P1/F1	High pressure protection.	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil ▶ Fan motor failure ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Over charged

Table 27 Fault code and limited condition status table

** If the first digit shown on the control board LED is one of the following protection codes (followed by two numerical digits which show the current compressor frequency in Hz), the unit will continue to run but in a limited condition. The only exception is when the system is in defrost mode, which only displays "dF" (without any numerical digits following).

Limited Condition Status code	Fault Code	Fault Code Description	Potential Cause
	P2/H5	Low pressure protection.	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil ▶ Fan motor failure ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Under charged
C**	P3	Compressor over current protection.	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil ▶ Fan motor failure ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Over charged. ▶ Control board or compressor issue
d**	P4	High compressor discharge temperature (T5) protection.	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil ▶ Fan motor failure ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Over charged
L**	P5	Condenser coil temperature (T3) protection in cooling.	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil ▶ Fan motor failure ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Over charged
	P8	DC outdoor fan motor protection.	<ul style="list-style-type: none"> ▶ Severe weather (fan running in standby mode due to high wind)
	PH	Low discharge superheat protection.	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil ▶ Fan motor failure ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Under charged
	L0-L9	The IPM module protection.	<ul style="list-style-type: none"> ▶ Control board failed ▶ Compressor failed ▶ Abnormal pressure
	AtL	Ambient Temperature Limited Condition.	<ul style="list-style-type: none"> ▶ Ambient temperature beyond operating range ▶ Incorrect O/B thermostat setting ▶ T4 sensor fault
P**		Running indication under compressor ratio limited condition	<ul style="list-style-type: none"> ▶ Low temperature and low load
-		Force Mode	<ul style="list-style-type: none"> ▶ Force button was pressed on outdoor unit, forcing 100% compressor capacity
A		Oil return mode	<ul style="list-style-type: none"> ▶ Long compressor operation time
dF		Defrost mode	<ul style="list-style-type: none"> ▶ Outdoor coil freezes

Table 28 Fault code and system protection status table

** If the first digit shown on the control board LED is one of the following Limited Condition Status codes (followed by two numerical digits which show the current compressor frequency in Hz), the unit will continue to run but in a limited condition. The only exception is when the system is in defrost mode, which only displays "dF" (without any numerical digits following).

12.3 Fault Codes and Limited Conditions Troubleshooting



WARNING:

- ▶ All electrical work must be carried out by competent and suitably qualified, certified and accredited professionals and in accordance with all applicable legislation (all national, local and other laws, standards, codes, rules, regulations and other legislation that apply in a given situation).



WARNING: ELECTRICAL HAZARD

- ▶ Power-off the outdoor units before connecting or disconnecting any connections or wiring, otherwise electric shock (which can cause physical injury or death) may occur or damage to components may occur.

12.3.1 C3 Troubleshooting

LED display output:	C3
Description:	T3 sensor is not reading correctly in cooling
Possible causes:	<ul style="list-style-type: none"> ▶ Wrong location of T3 sensor (common cause) ▶ Failed T3 sensor – sensor reading incorrect value (common cause) ▶ Failed T4 sensor

Table 29

Procedure:

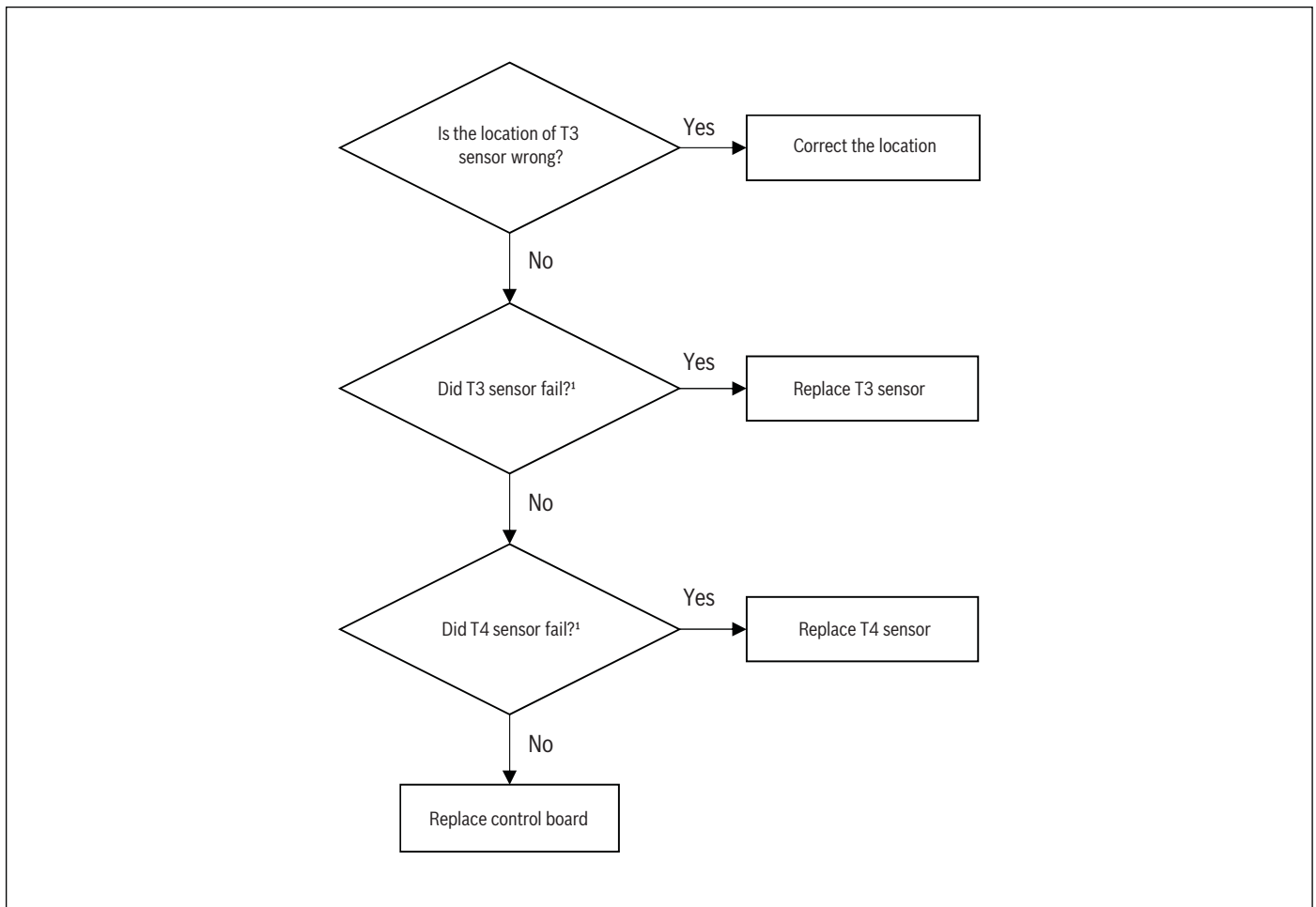


Figure 16

1) See Section 13.4

12.3.2 E4 Troubleshooting

LED display output:	E4
Description:	Temperature sensor fault (T3, T4, T5, Th, T3L, Tf)
Possible causes:	<ul style="list-style-type: none"> ▶ Temperature sensors failed – shorted or open (common cause) ▶ Wrong wire connections of sensor ▶ Ambient temperature beyond our operation range

Table 30

Procedure:

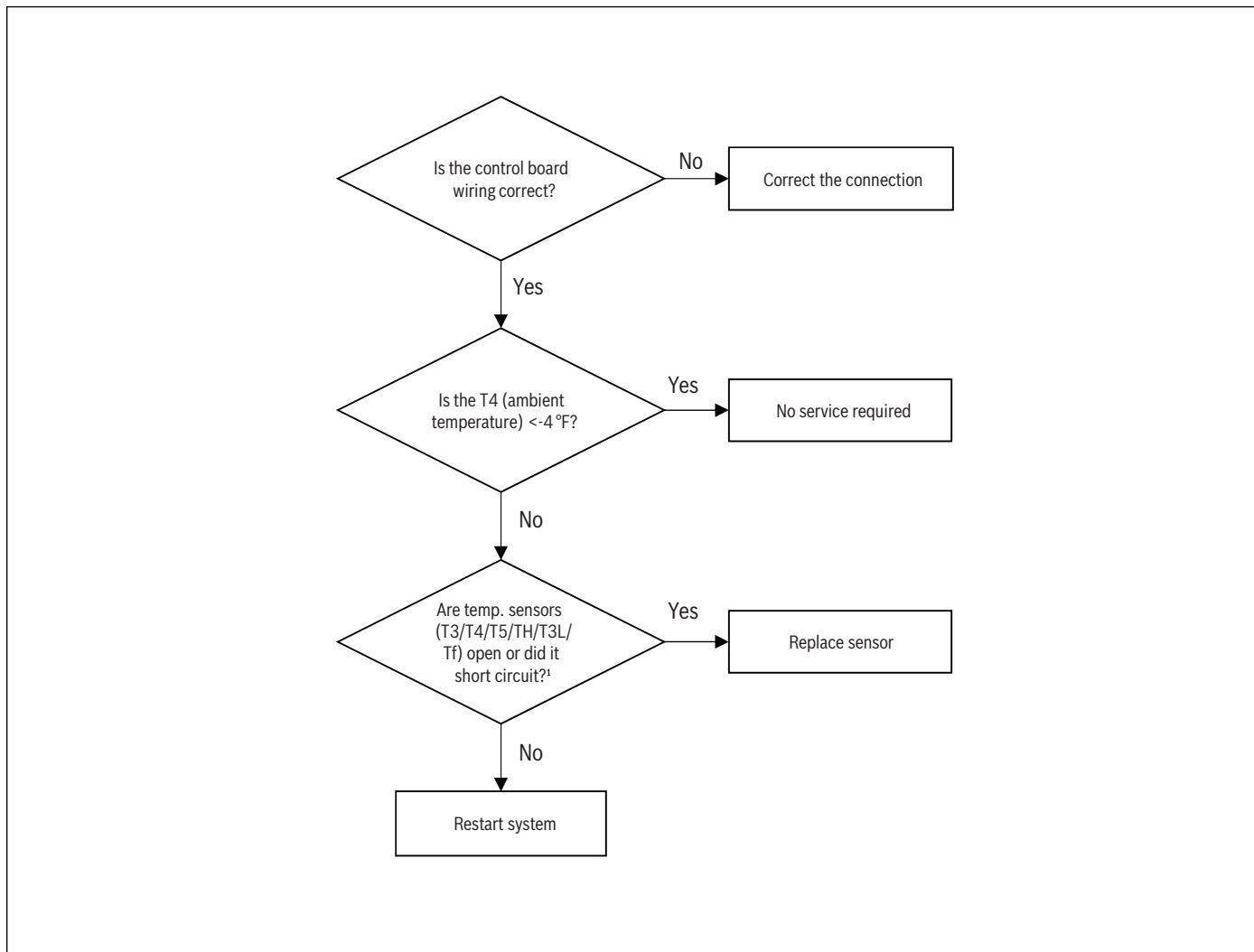


Figure 17

1) See Section 13.4

12.3.3 E5 Troubleshooting

LED display output:	E5
Description:	High/low voltage protection
Possible causes:	<ul style="list-style-type: none"> ▶ Power supply $\geq 270V$ ▶ Power supply $< 172V$ ▶ Control board issue

Table 31

Procedure:

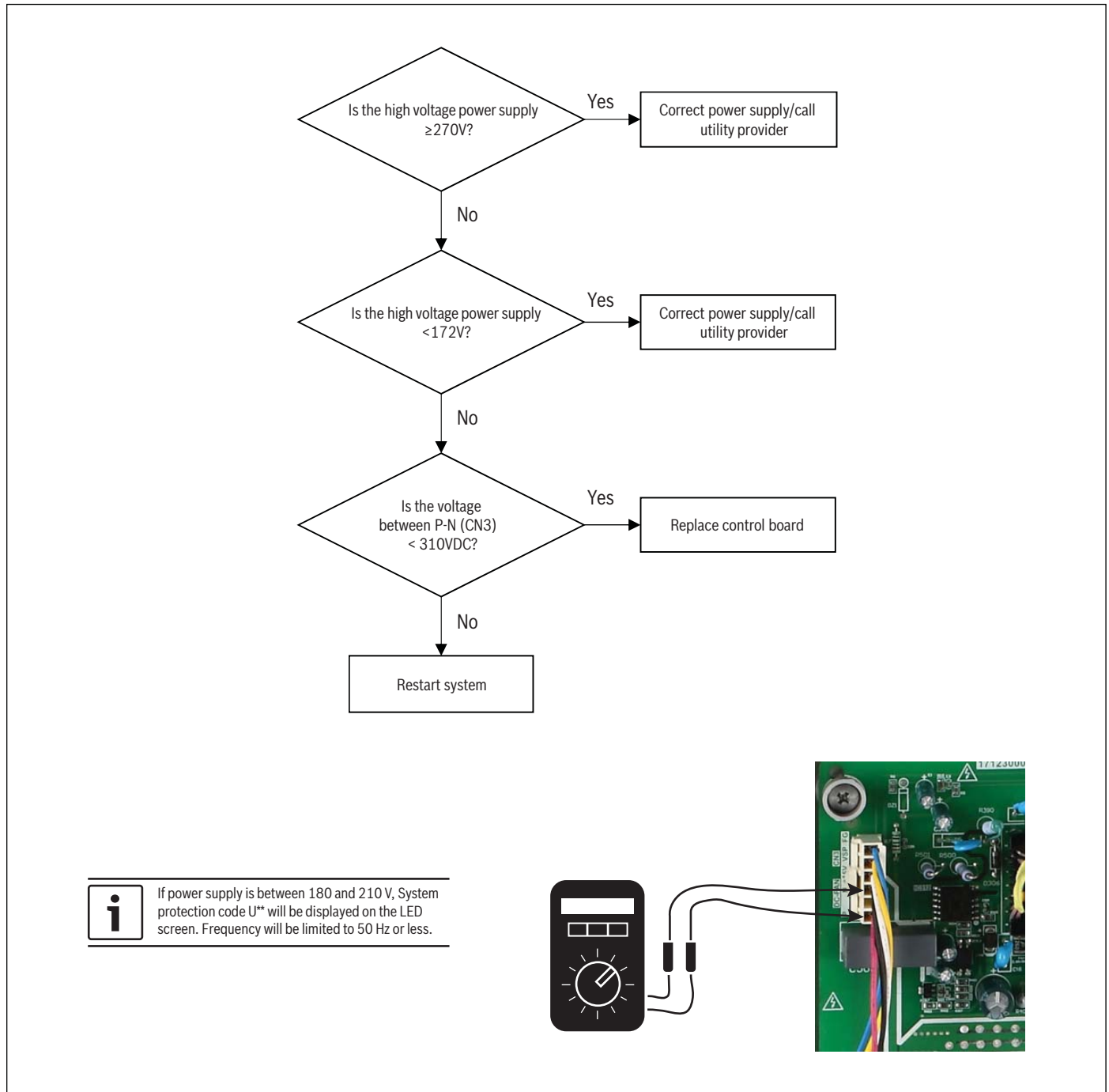


Figure 18

12.3.4 E6 Troubleshooting

LED display output:	E6
Description:	Outdoor DC fan motor fault
Possible causes:	<ul style="list-style-type: none"> ▶ Motor failed ▶ Fan blade damaged or blocked ▶ Extreme weather conditions ▶ Electrical issue

Table 32

Procedure:

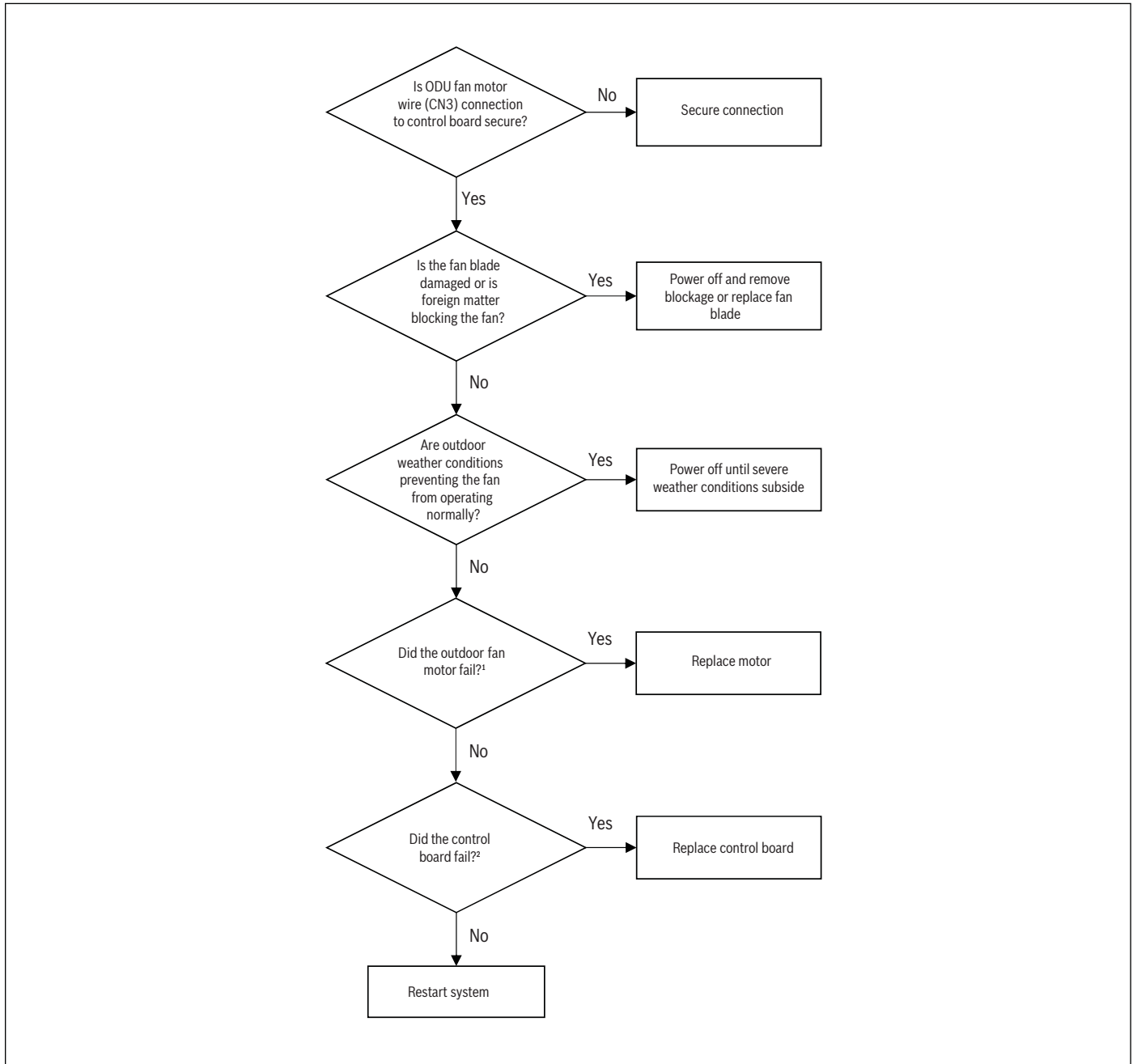


Figure 19

1) See Section 13.6

2) See Appendix 1

12.3.5 E7 Troubleshooting

LED display output:	E7
Description:	T5 sensor not reading correctly
Possible causes:	<ul style="list-style-type: none"> ▶ Wrong location of T5 sensor (compressor discharge temp. sensor) ▶ Wrong connection on control board of T5 & Tf (common cause) ▶ T5 sensor failed – reading incorrectly

Table 33

Procedure:

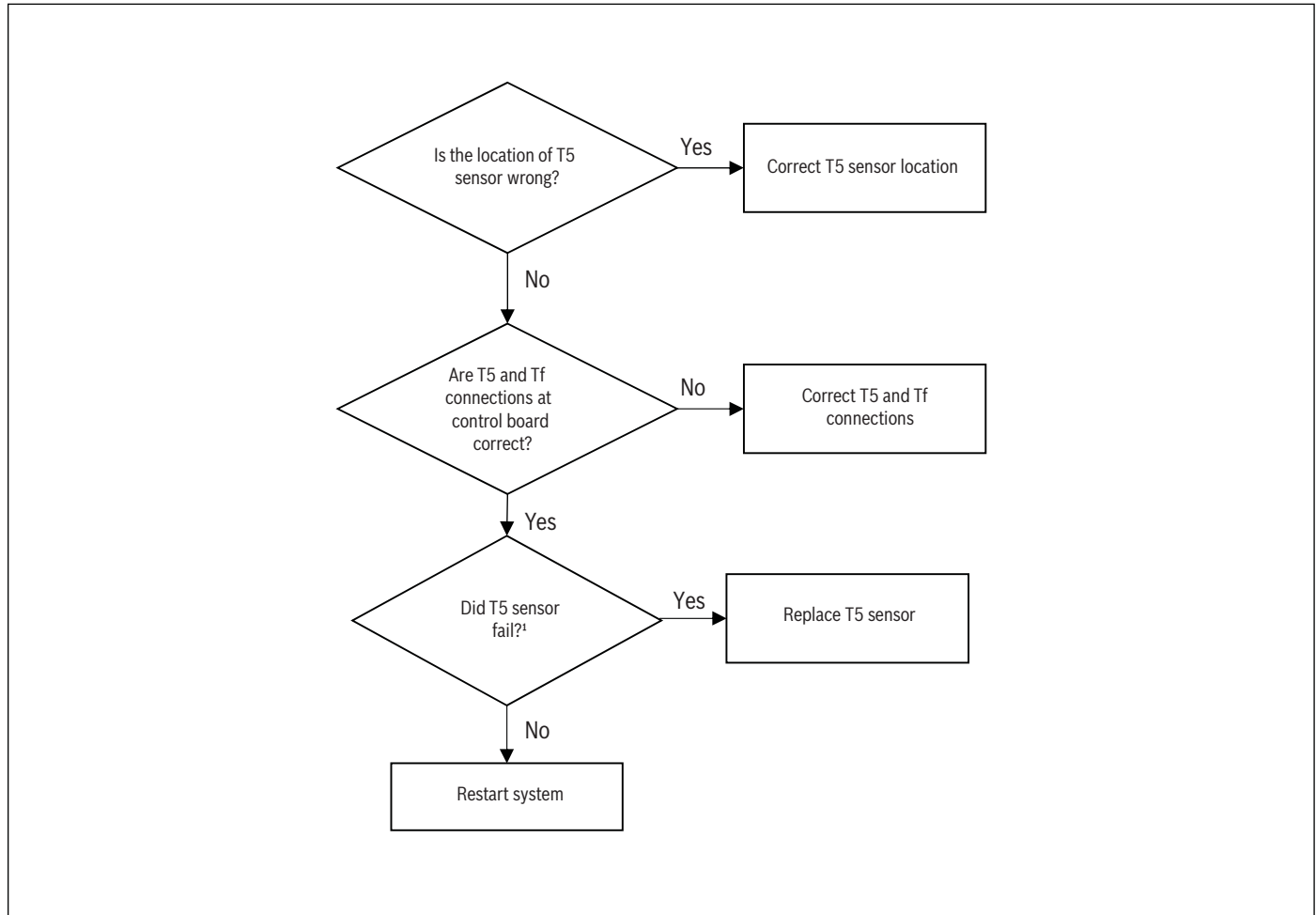


Figure 20

1) See Section 13.4

12.3.6 E9 Troubleshooting

LED display output:	E9
Description:	EEPROM IC20 fault
Possible causes:	<ul style="list-style-type: none"> ▶ EEPROM IC20 poor contact ▶ EEPROM IC20 improperly installed

Table 34

Procedure:

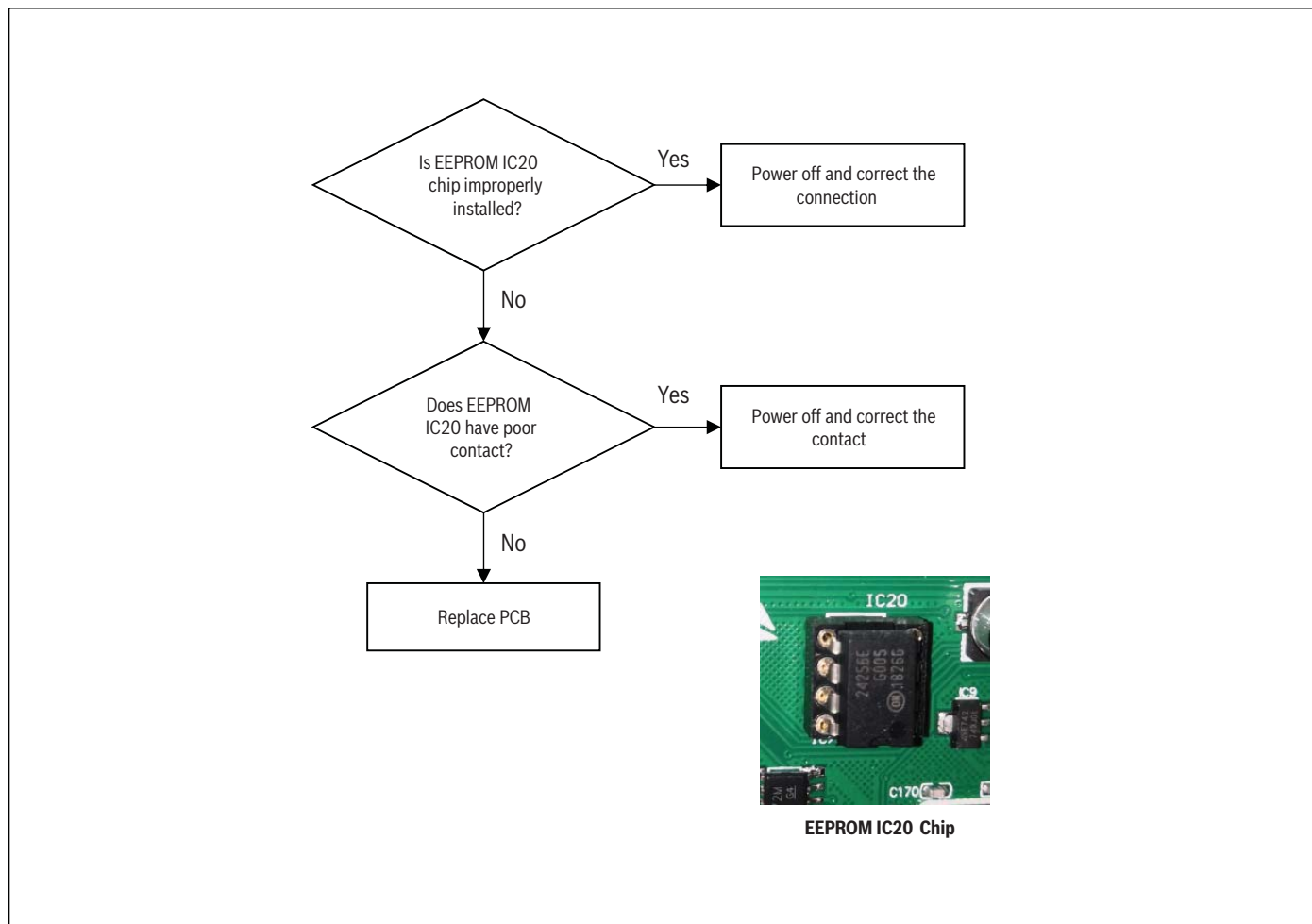


Figure 21

12.3.7 H0 Troubleshooting

LED display output:	H0
Description:	Communication fault in EEPROM IC14 chip
Possible causes:	► Control board failed

Table 35

Procedure:

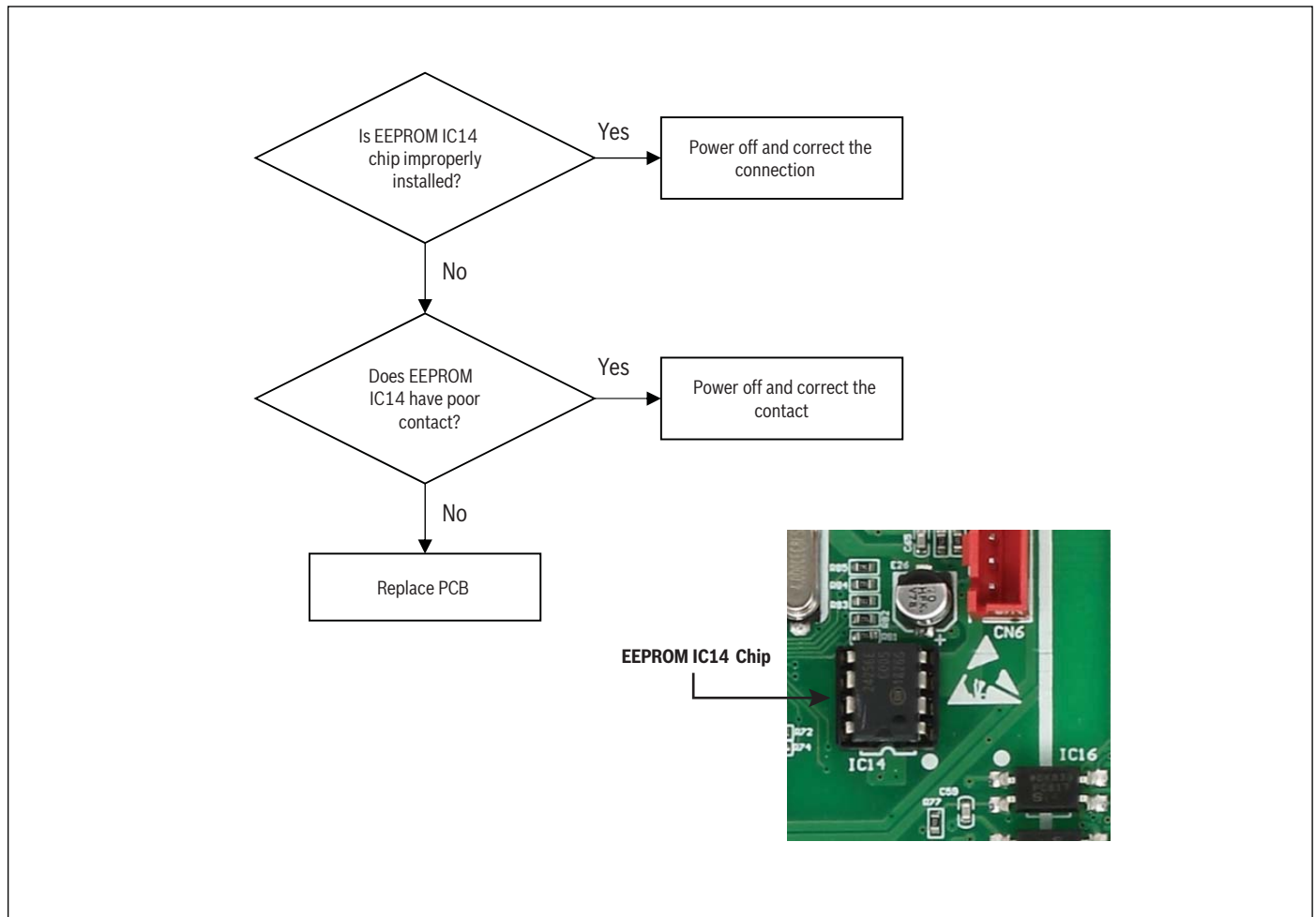


Figure 22

12.3.8 H8 Troubleshooting

LED display output:	H8
Description:	Pressure transducer (PT) fault
Possible causes:	<ul style="list-style-type: none"> ▶ Pressure transducer wiring not secure ▶ Pressure transducer failed

Table 36

Procedure:

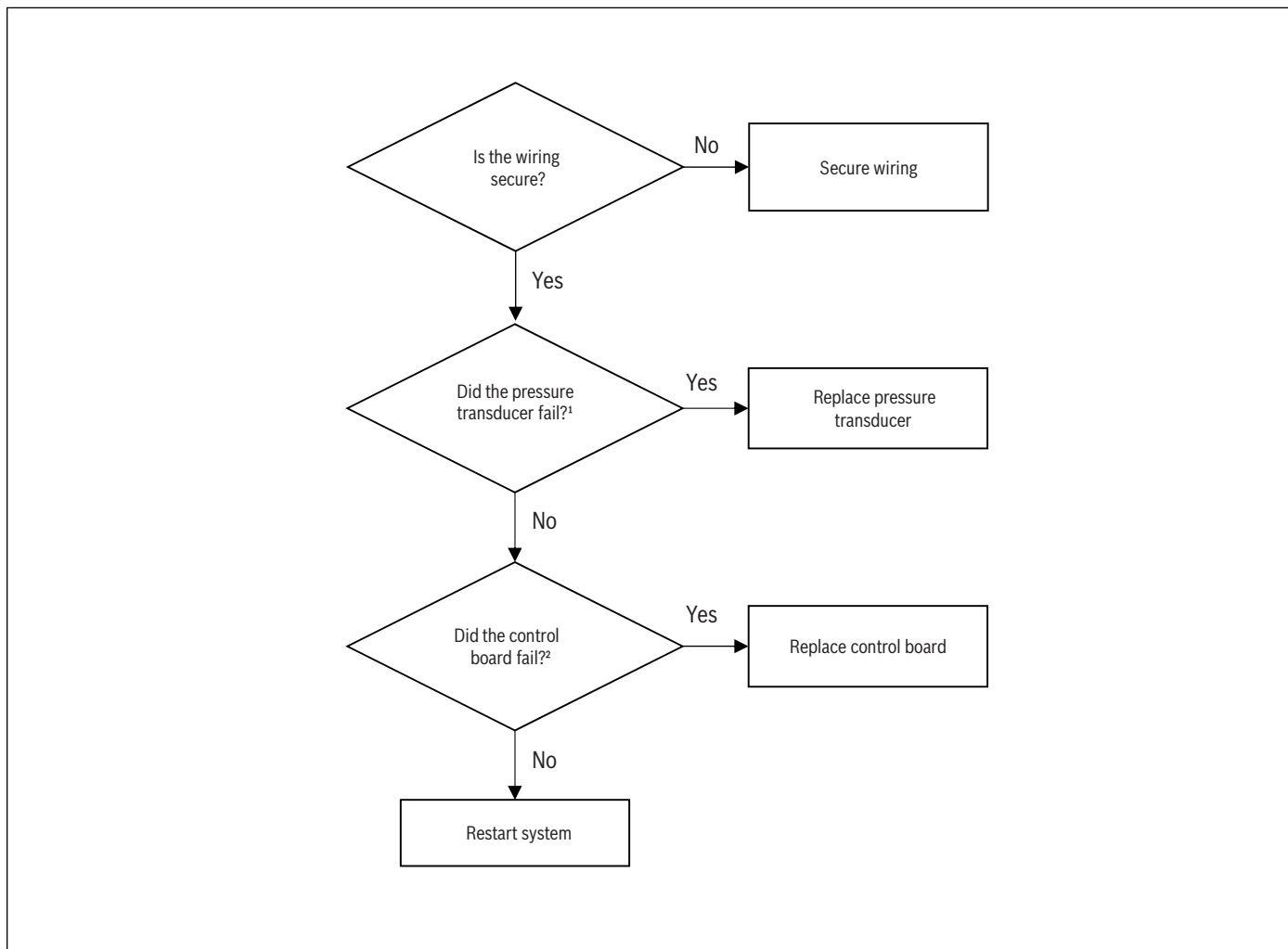


Figure 23

1) See Section 13.2

2) See Appendix 1

12.3.9 P0 Troubleshooting

LED display output:	P0
Description:	Control board is over-heated
Possible causes:	<ul style="list-style-type: none"> ▶ Poor heat dissipation, causing control board to overheat ▶ Tf sensor failed ▶ Wrong connection on control board of T5&Tf (common cause) ▶ Outdoor motor failed, causing control board to overheat

Table 37

Procedure:

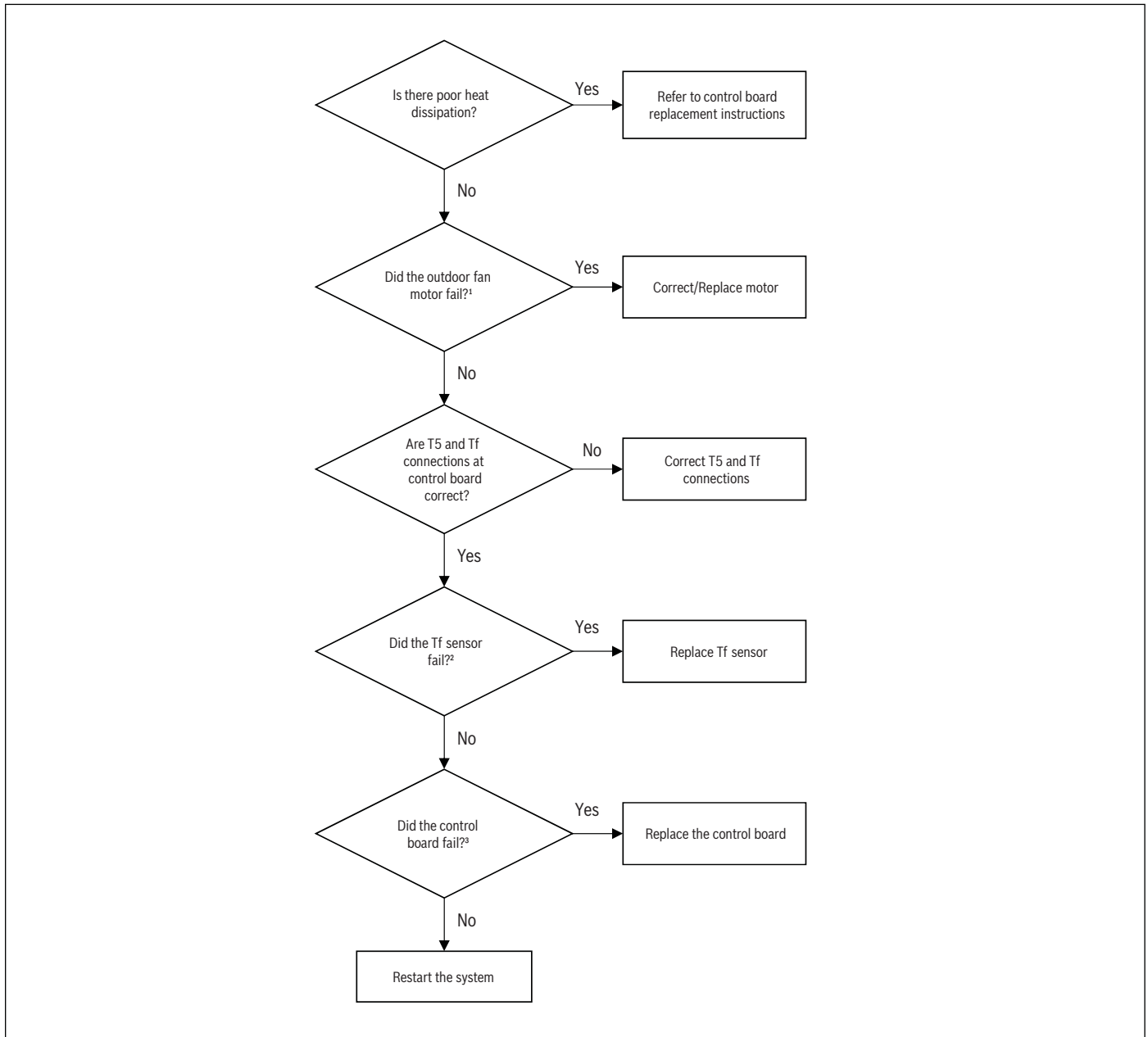


Figure 24

1) See Section 13.6
 2) SeeSection 13.4
 3) See Appendix 1

12.3.10 P1/F1 Troubleshooting

LED display output:	P1/F1
Description:	High pressure protection
Possible causes:	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil (cooling mode – outdoor coil, heating mode – indoor coil) ▶ Fan motor failure (cooling mode – outdoor fan, heating mode – indoor fan) ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Over charged

Table 38

Procedure:

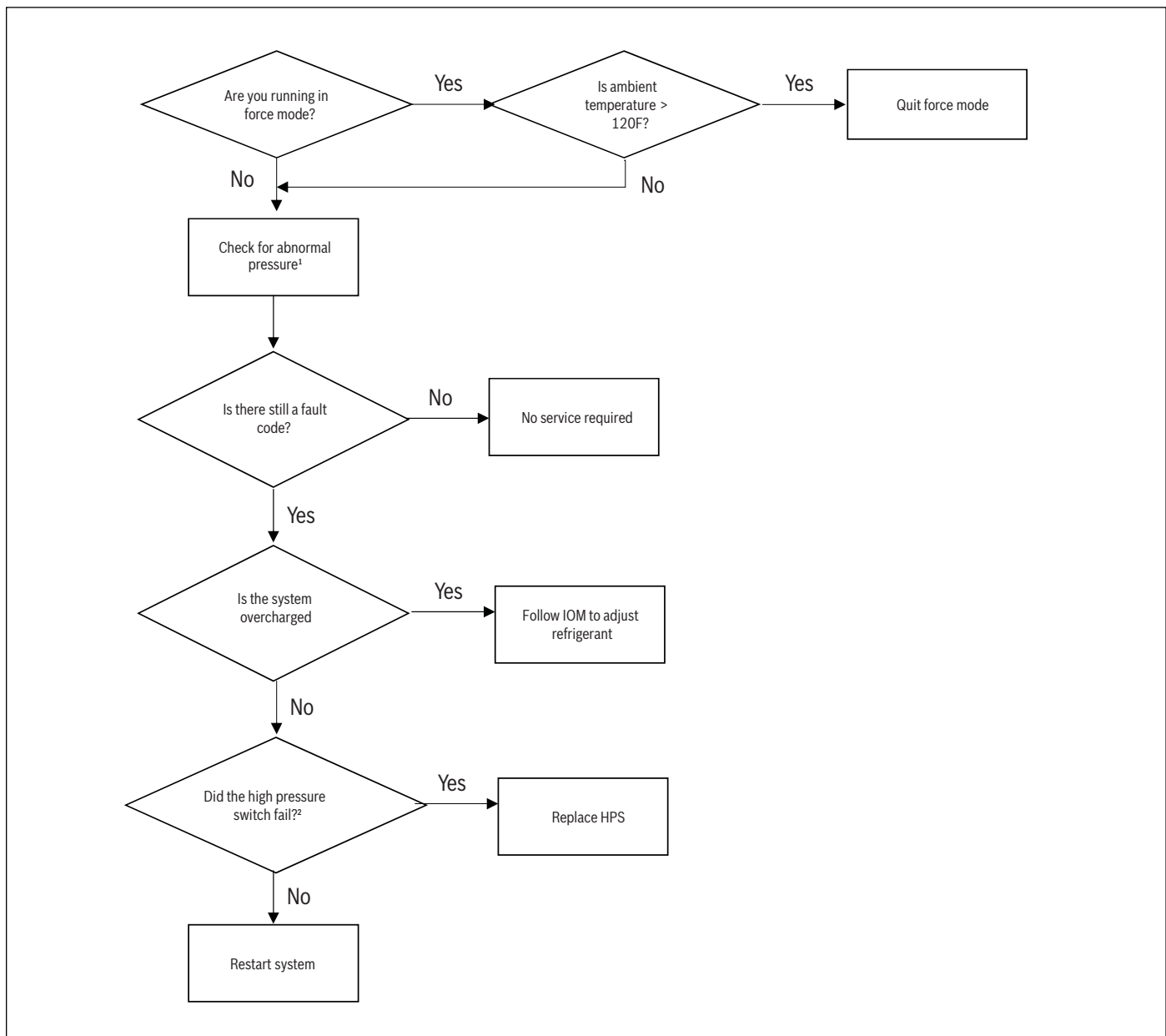


Figure 25

1) See Section 13.1

2) See Section 13.5

12.3.11 P2/H5 Troubleshooting

LED display output:	P2/H5
Description:	Low pressure protection
Possible causes:	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil (cooling mode – indoor coil, heating mode – outdoor coil) ▶ Fan motor failure (cooling mode – indoor fan, heating mode – outdoor fan) ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Under charged

Table 39

Procedure:

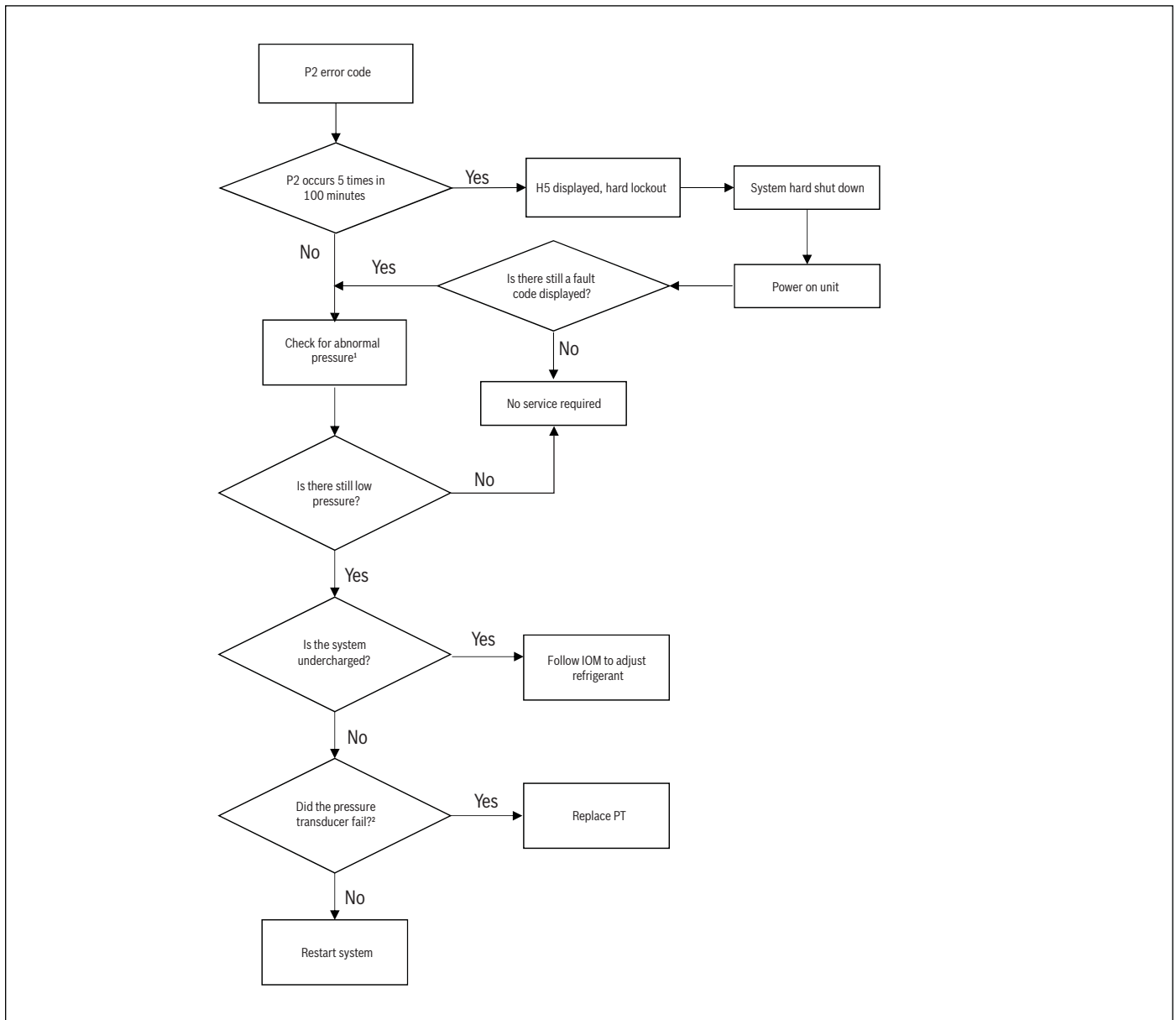


Figure 26

1) See Section 13.1

2) See Section 13.2

12.3.12 P3 Troubleshooting

LED display output:	P3
Description:	Compressor over current protection
Possible causes:	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil (cooling mode – outdoor coil, heating mode – indoor coil) ▶ Fan motor failure (cooling mode – outdoor fan, heating mode – indoor fan) ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Over charged ▶ Control board or compressor issue

Table 40

Procedure:

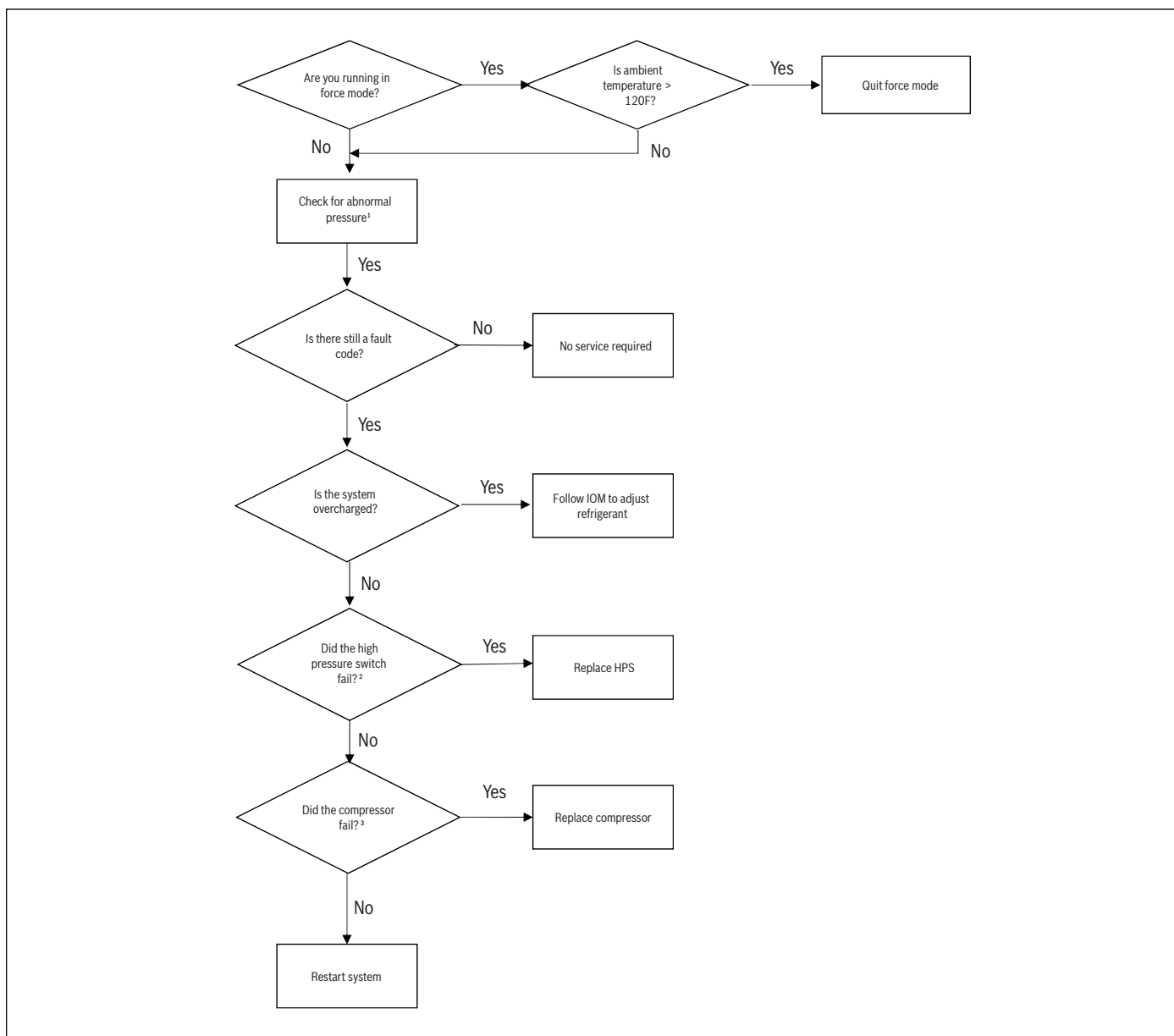


Figure 27

1) See Section 13.1
 2) See Section 13.5
 3) See Section 13.8

12.3.13 P4 Troubleshooting

LED display output:	P4
Description:	High compressor discharge temperature (T5) protection
Possible causes:	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil (cooling mode – outdoor coil, heating mode – indoor coil) ▶ Fan motor failure (cooling mode – outdoor fan, heating mode – indoor fan) ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Over charged

Table 41

Procedure:

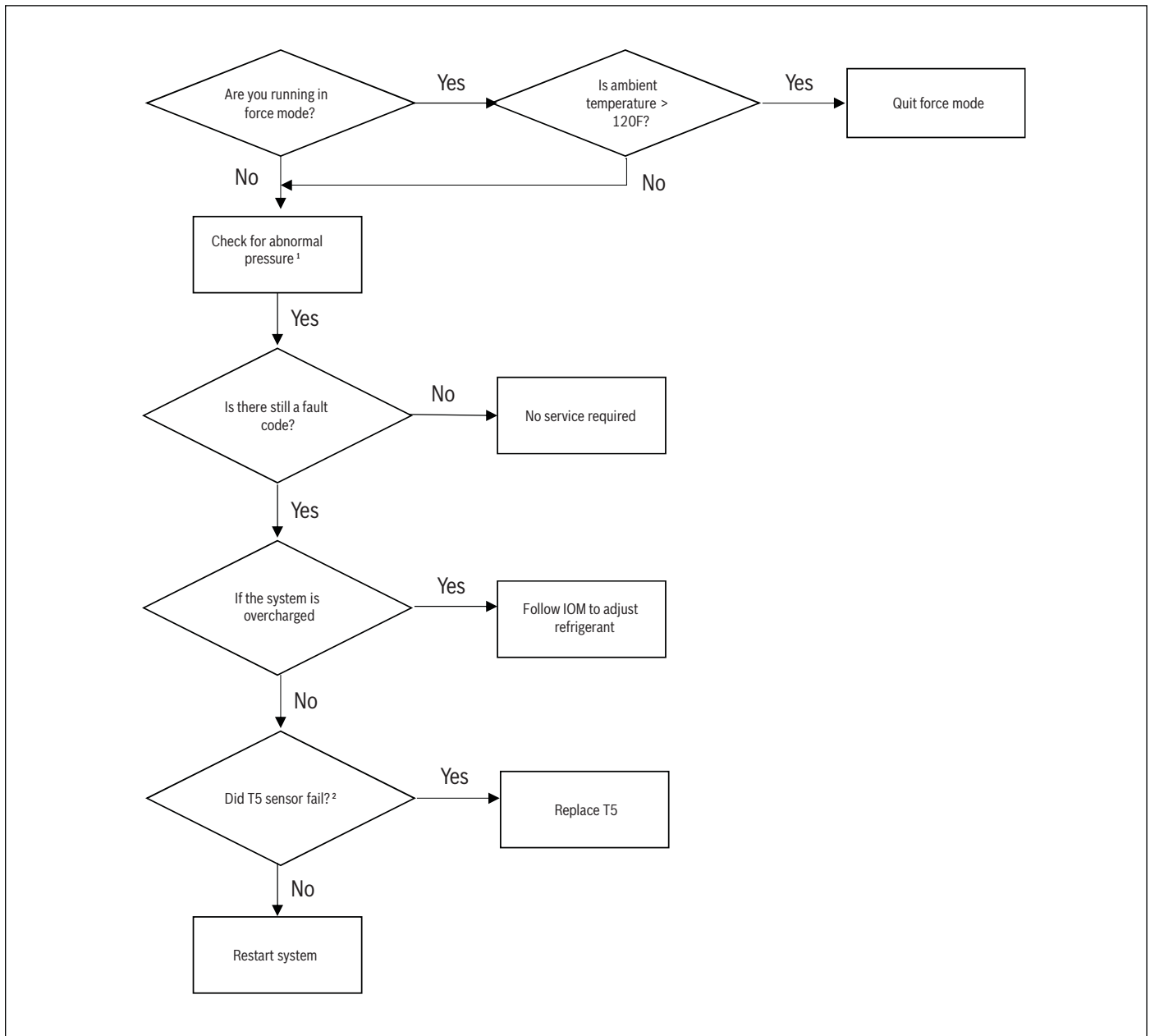


Figure 28

1) See Section 13.1

2) See Section 13.4

12.3.14 P5 Troubleshooting

LED display output:	P5
Description:	Condenser coil temperature (T3) protection in cooling
Possible causes:	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil (cooling mode – outdoor coil) ▶ Fan motor failure (cooling mode – outdoor fan) ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Over charged

Table 42

Procedure:

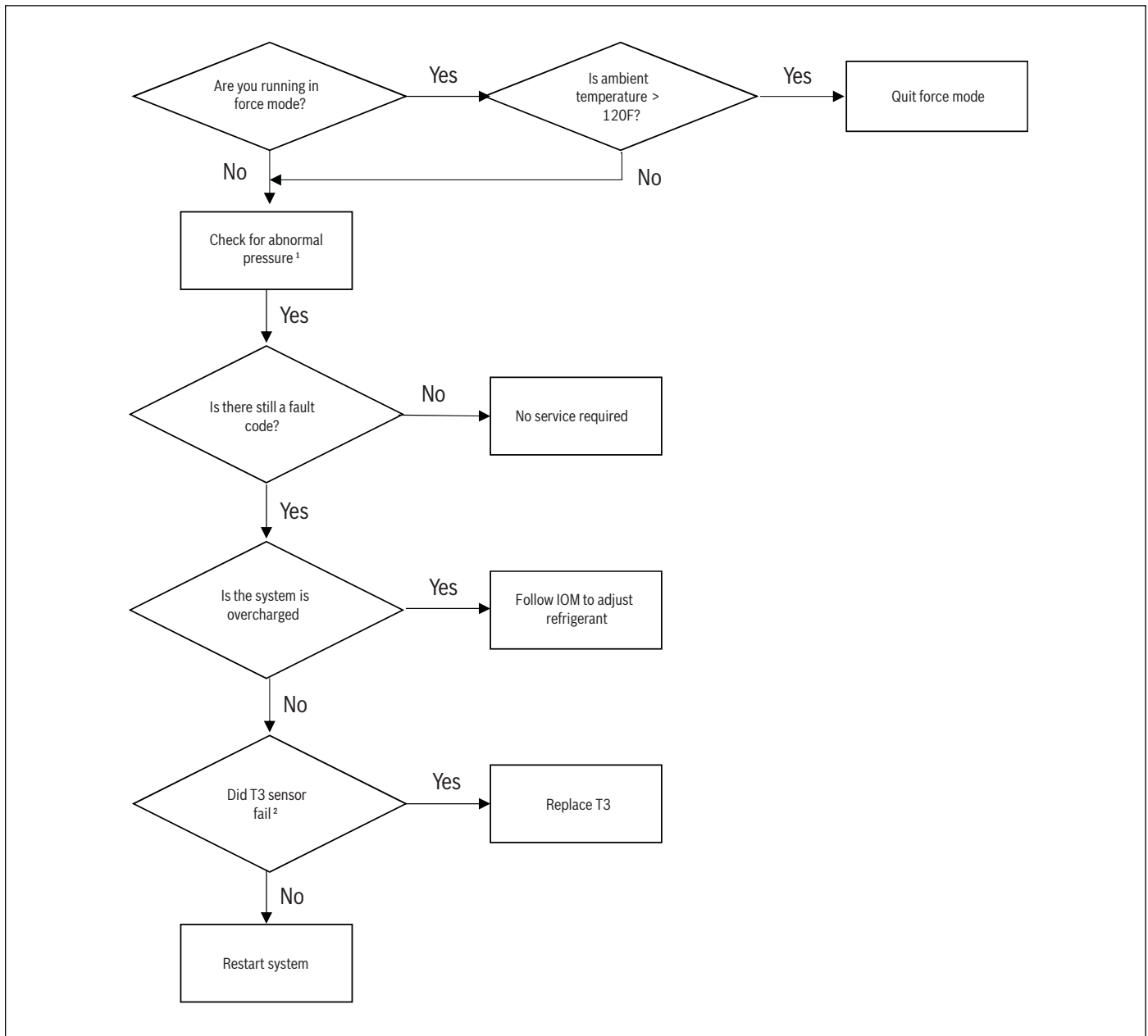


Figure 29

1) See Section 13.1

2) See Section 13.4

12.3.15 P8 Troubleshooting

LED display output:	P8
Description:	DC outdoor fan motor protection
Possible causes:	► Severe weather (fan running in standby mode due to high wind)

Table 43

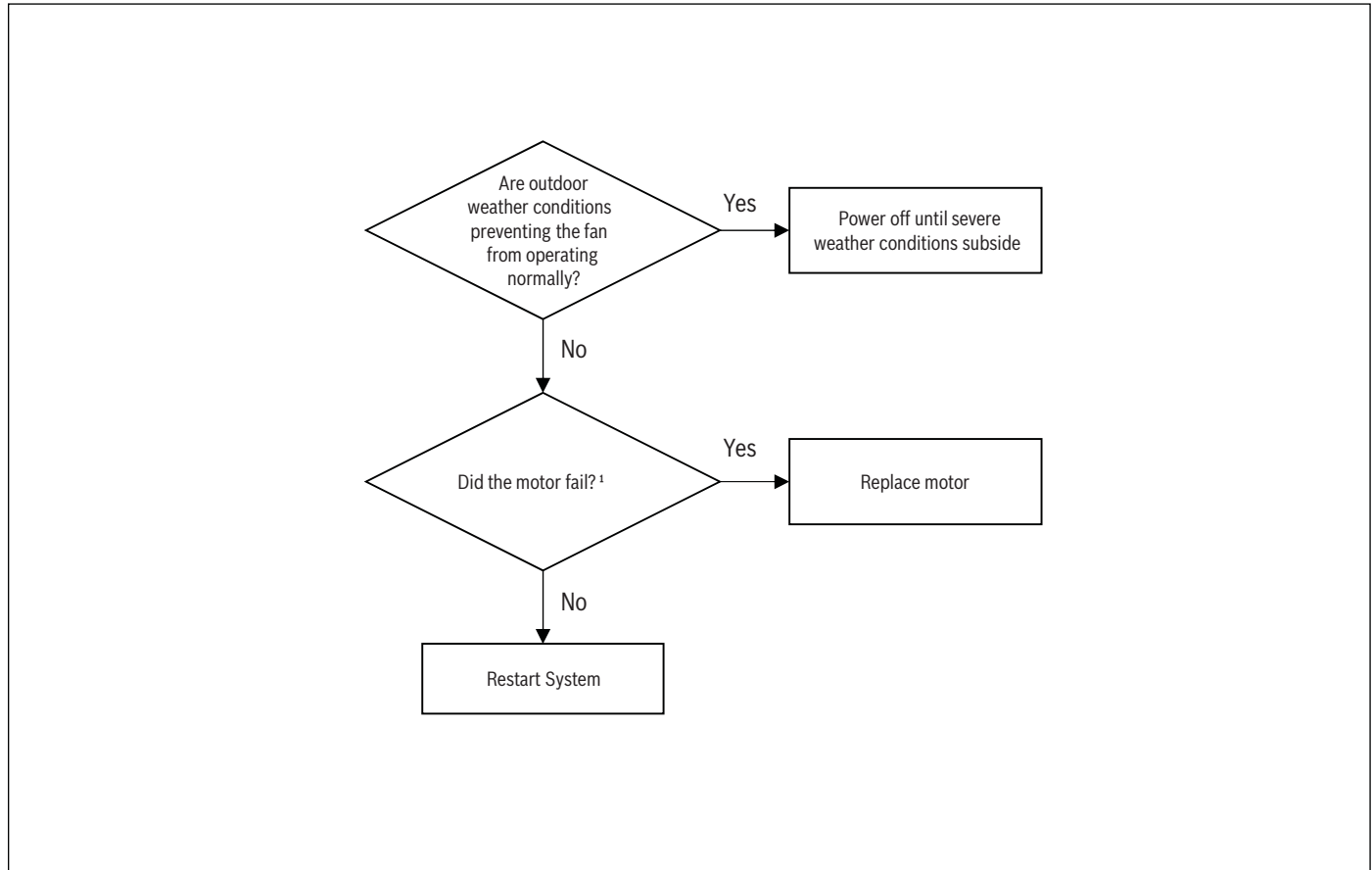
Procedure:

Figure 30

1) See Section 13.6

12.3.16 PH Troubleshooting

LED display output:	PH
Description:	Low discharge superheat protection.
Possible causes:	<ul style="list-style-type: none"> ▶ Poor heat exchange on coil (cooling mode – indoor coil, heating mode – outdoor coil) ▶ Fan motor failure (cooling mode – indoor fan, heating mode – outdoor fan) ▶ Service valves not open ▶ TXV/EEV/filter drier blocked ▶ Under charged

Table 44

Procedure:

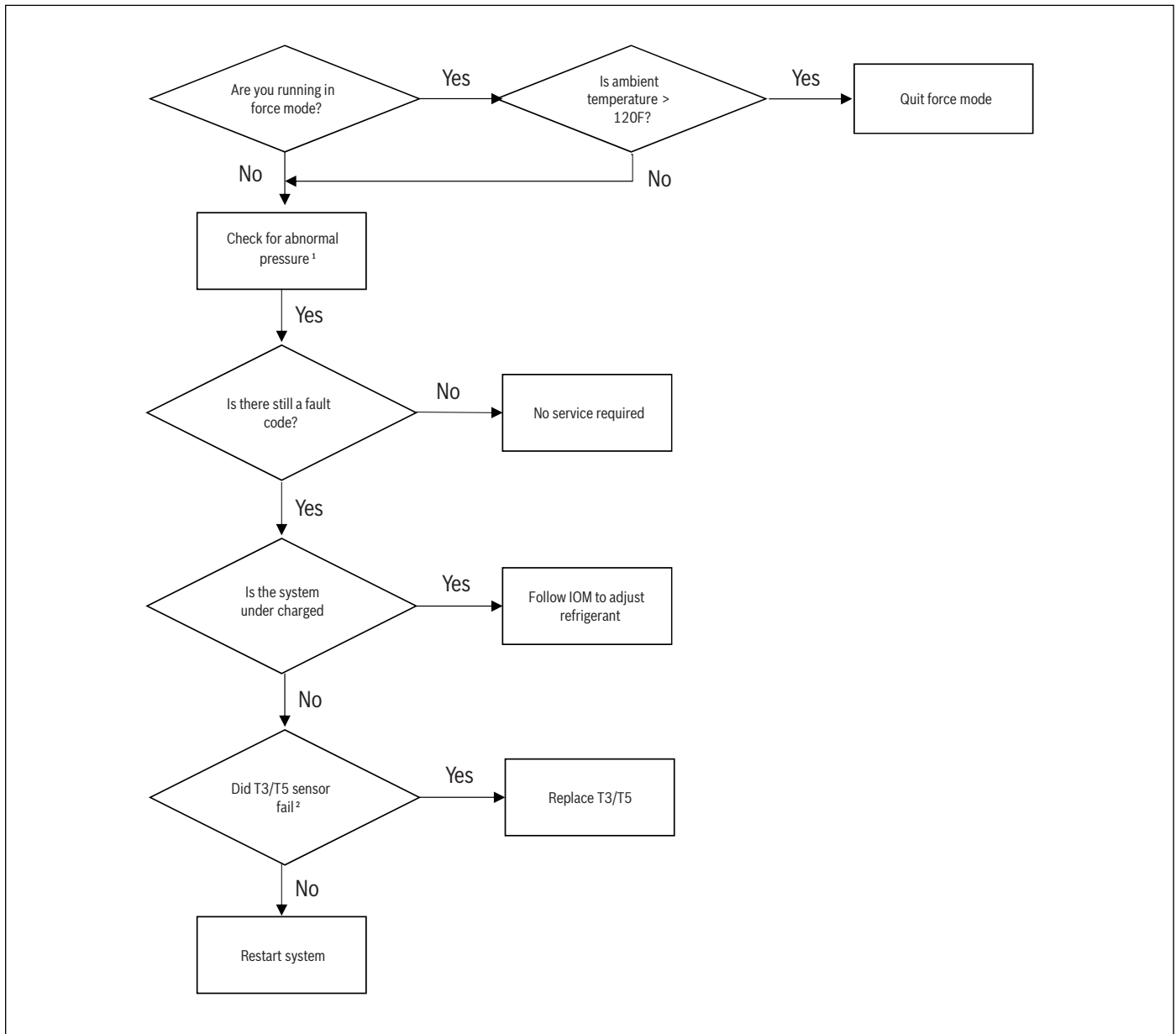


Figure 31

1) See Section 13.1

2) See Section 13.4

12.3.17 LO-L9 Troubleshooting

LED display output:	LO-L9
Description:	The IPM module protection
Possible causes:	<ul style="list-style-type: none"> ▶ Control board failed ▶ Compressor failed ▶ Abnormal pressure

Table 45

Procedure:

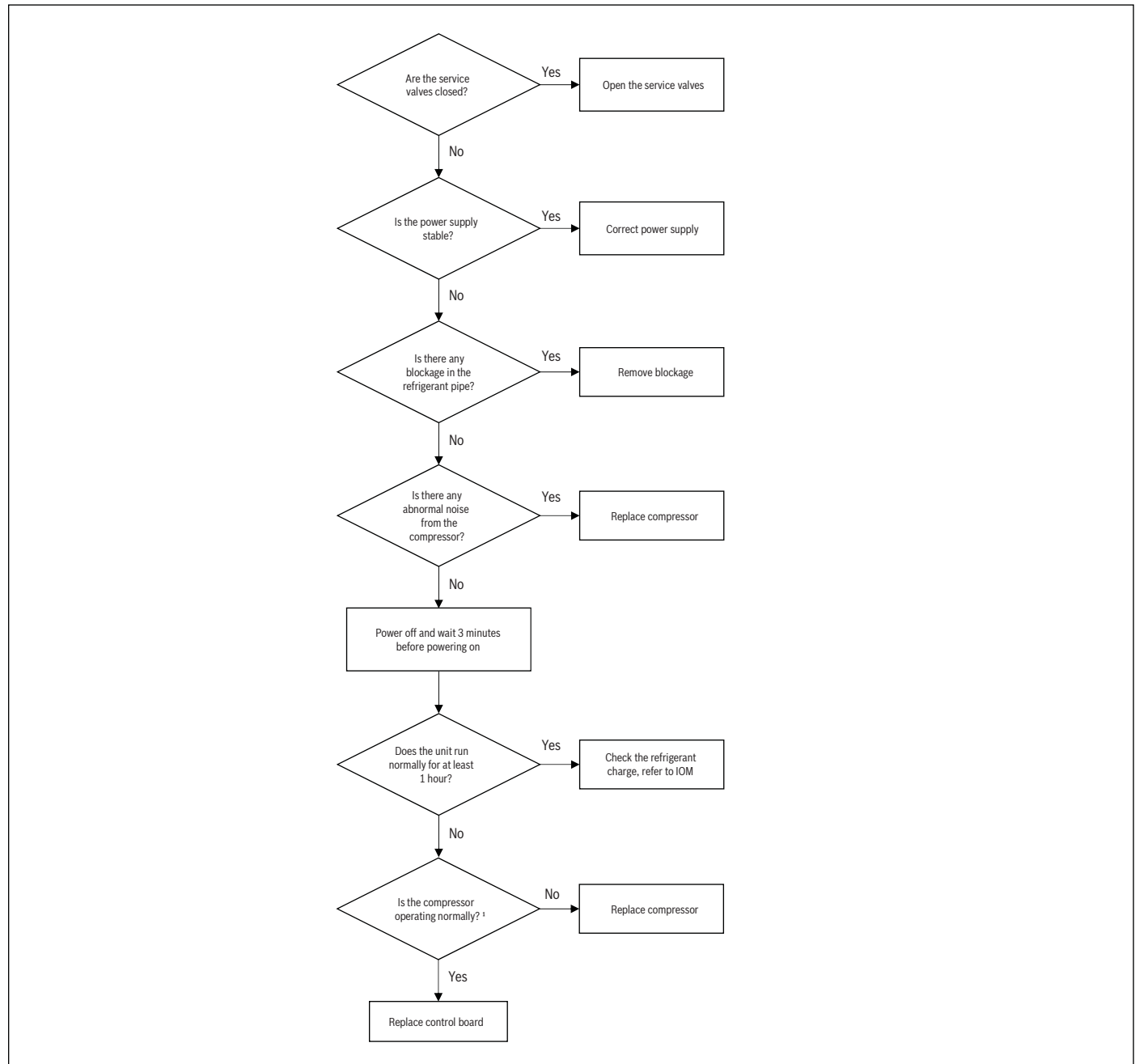


Figure 32

1) See Section 13.8

12.3.18 AtL Troubleshooting

LED display output:	AtL
Description:	Ambient Temperature Limited Condition
Possible causes:	<ul style="list-style-type: none"> ▶ Ambient temperature beyond operating range ▶ Incorrect O/B thermostat setting ▶ T4 sensor fault

Table 46

Procedure:

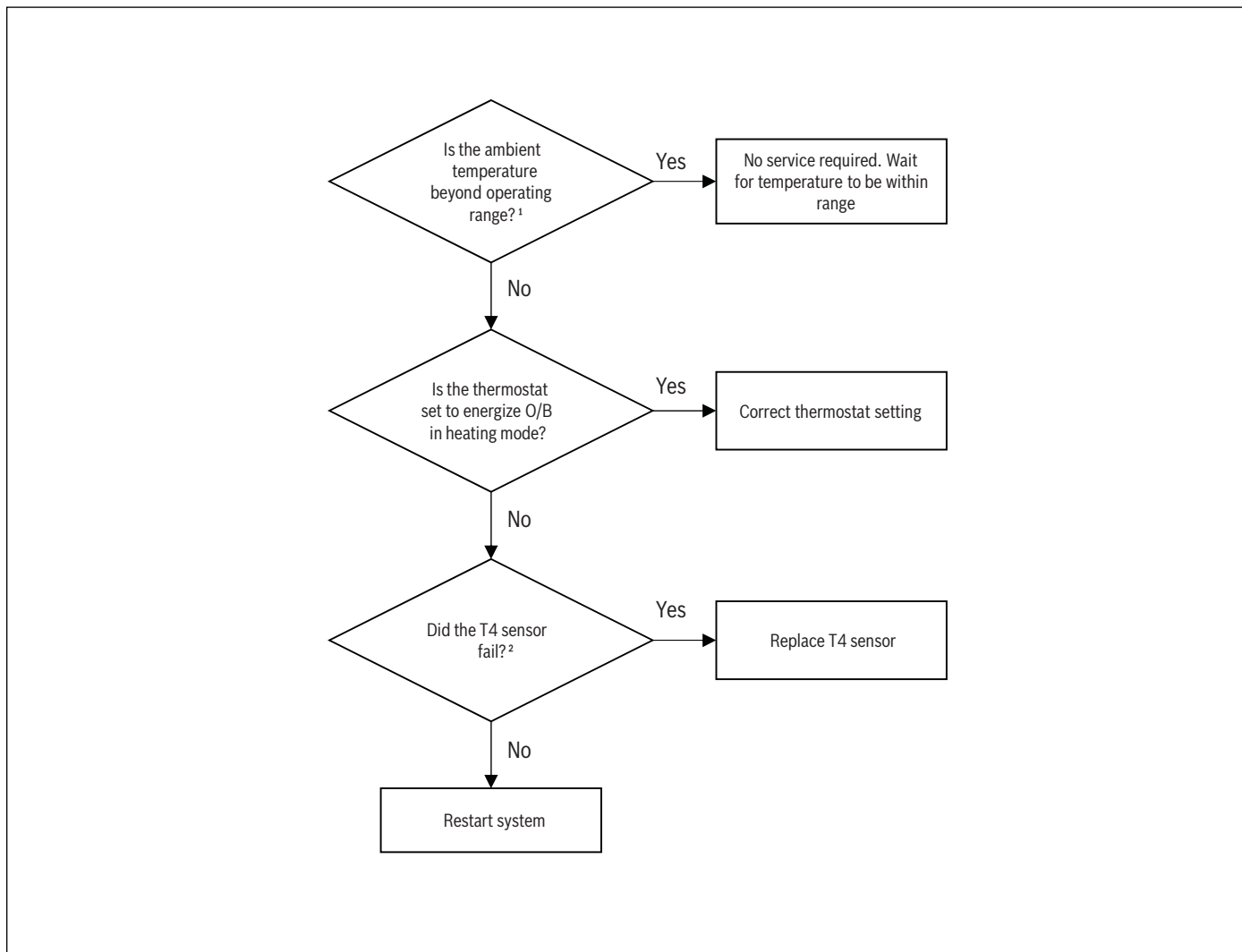


Figure 33

1) Cooling: 15~125°F, Heating: -4~86°F

2) See Section 13.4

12.4 Situational Troubleshooting

12.4.1 LED Display is Blank

LED display output:	No fault code displayed
Description:	Nothing is displayed on the LED display, but there is high voltage power to the board
Possible causes:	<ul style="list-style-type: none"> ▶ Input voltage is supplied and removed frequently (within 3 min) ▶ Abnormal power input ▶ Abnormal wire connections ▶ Compressor/outdoor motor/control board failure

Table 47

Procedure:

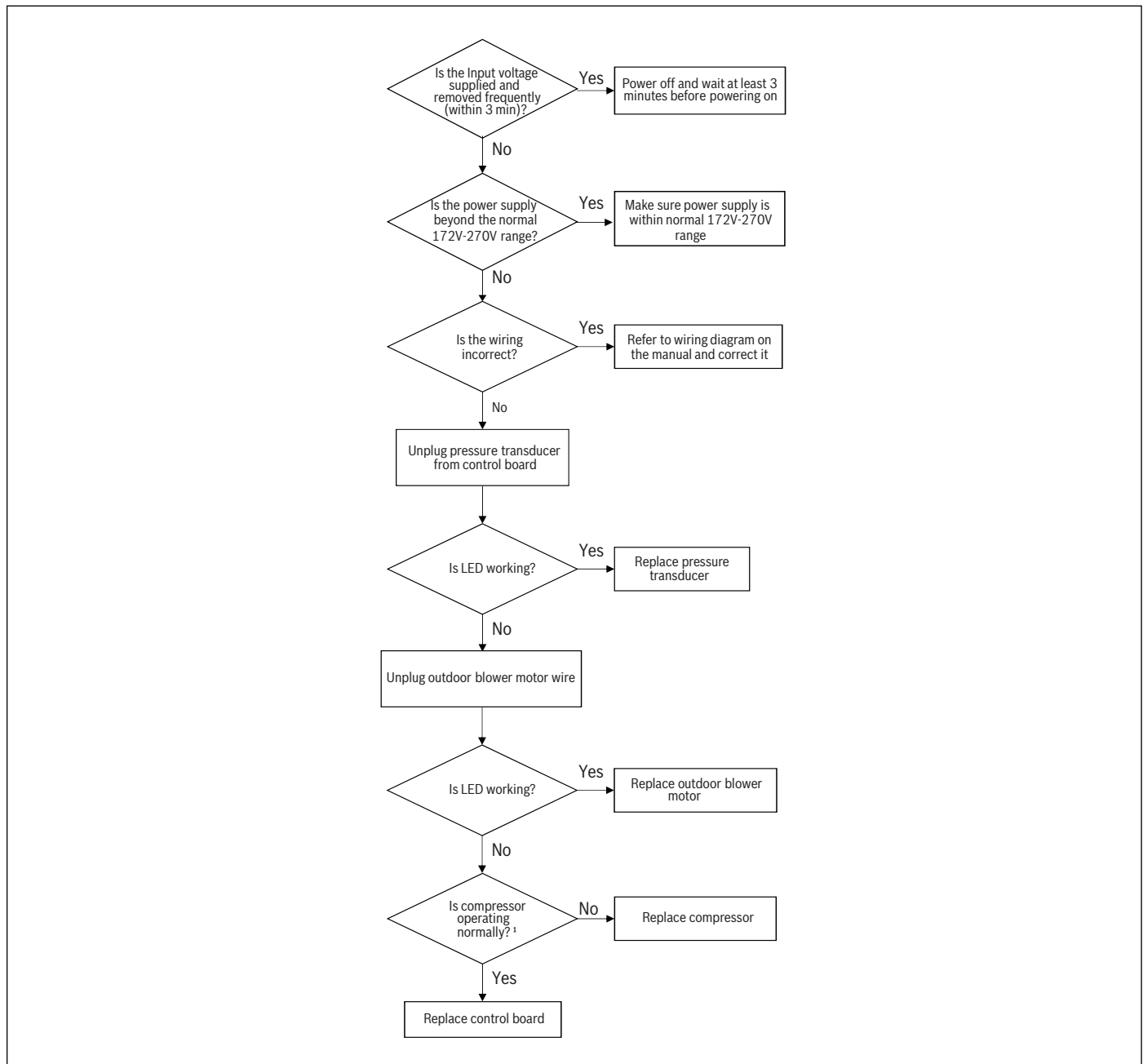


Figure 34

1) See Section 13.8

12.4.2 System Does Not Start

LED display output:	No fault code displayed
Description:	High voltage power is available to the unit, unit is given call for heating/cooling, system does not start
Possible causes:	<ul style="list-style-type: none"> ▶ The thermostat is improperly wired ▶ Thermostat not giving call for heating/cooling ▶ Damaged thermostat ▶ Disconnected compressor wiring harness

Table 48

Procedure:

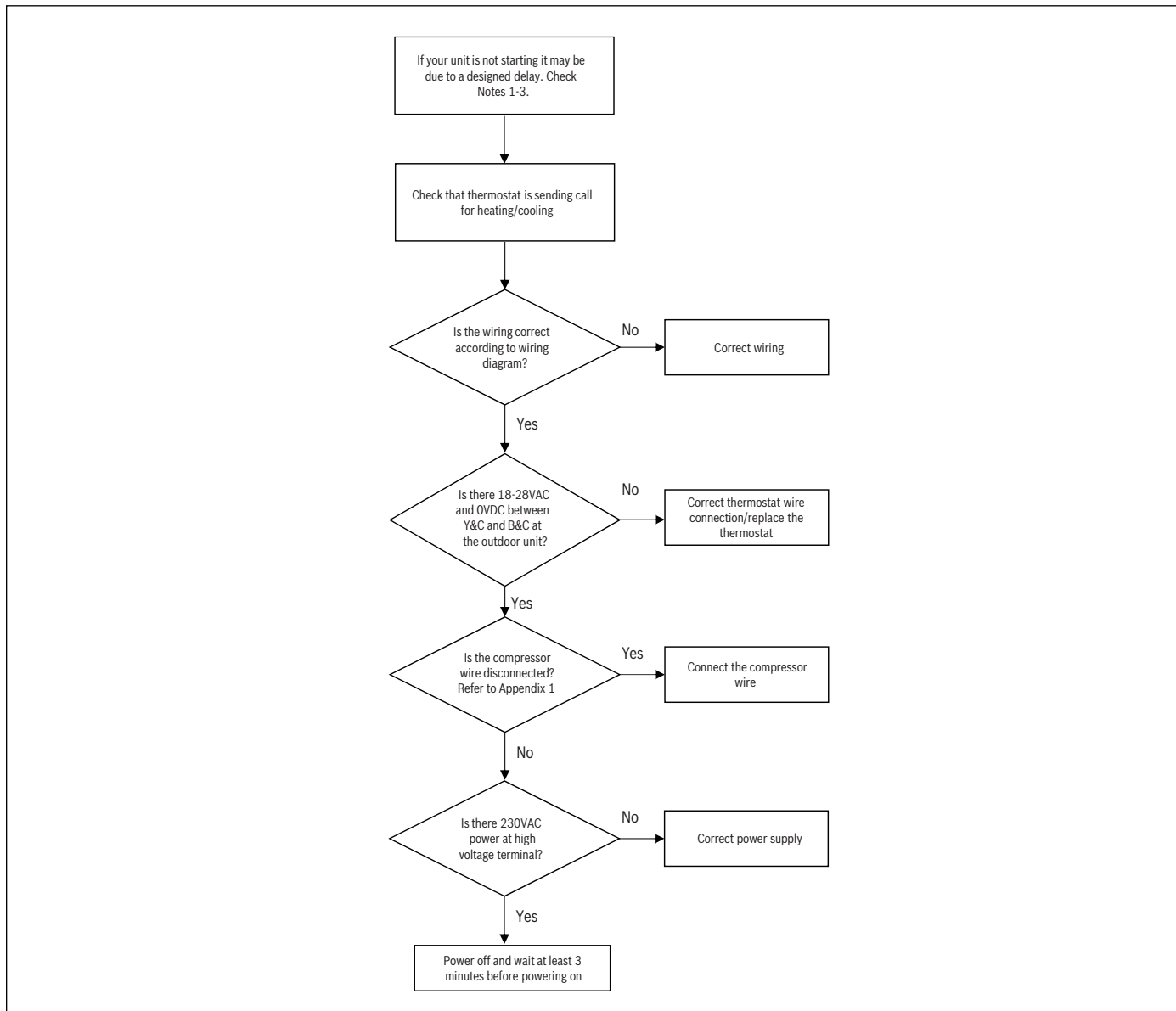


Figure 35

- 1) If high voltage power to the unit is interrupted and then restored, the compressor ALWAYS waits at least 3 mins before it starts via a thermostat Y call, the outdoor fan motor will always start immediately upon thermostat Y call.
- 2) In cooling mode: There is at least a 6 minute delay between when the thermostat is satisfied and compressor can turn back on with a Y call.
- 3) In heating mode: There is at least a 3 minute delay between when the thermostat is satisfied and compressor can turn back on with a Y call.

12.4.3 Poor Capacity

LED display output:	No fault code displayed
Description:	No fault code displayed but poor capacity (the heating or cooling capacity is insufficient, but the unit is running)
Possible causes:	<ul style="list-style-type: none"> ▶ Unit improperly sized ▶ System running in limited condition ▶ Abnormal pressure (under charged, failed TXV/EEV, poor heat exchange)

Table 49

Procedure:

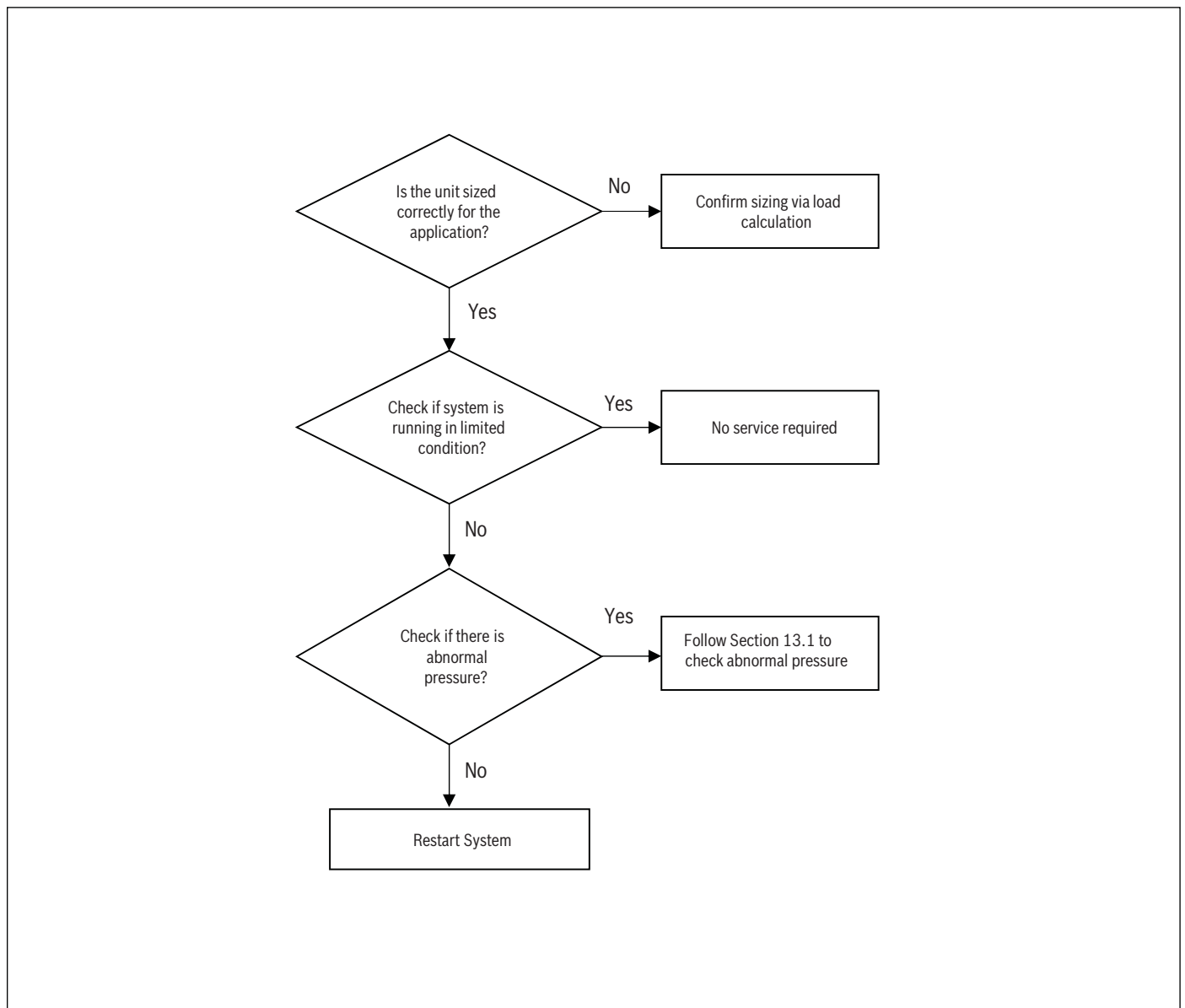


Figure 36

12.4.4 Poor Dehumidification

LED display output:	No fault code displayed
Description:	System is running, but not dehumidifying the space to customer's expectation
Possible causes:	<ul style="list-style-type: none"> ▶ Unit improperly sized ▶ Duct work design error ▶ Unit improperly charged ▶ Improper indoor fan speed

Table 50

Procedure:

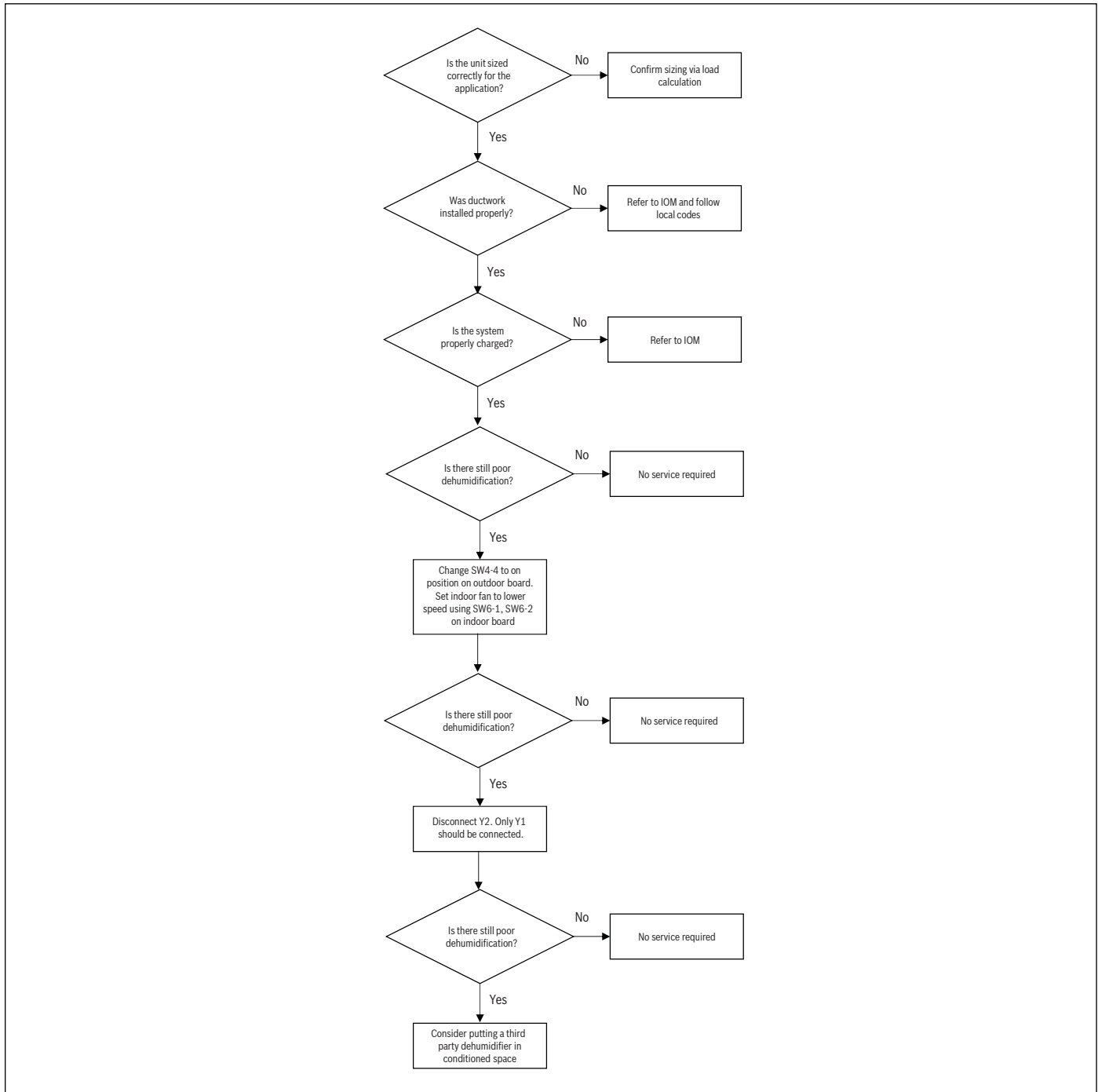
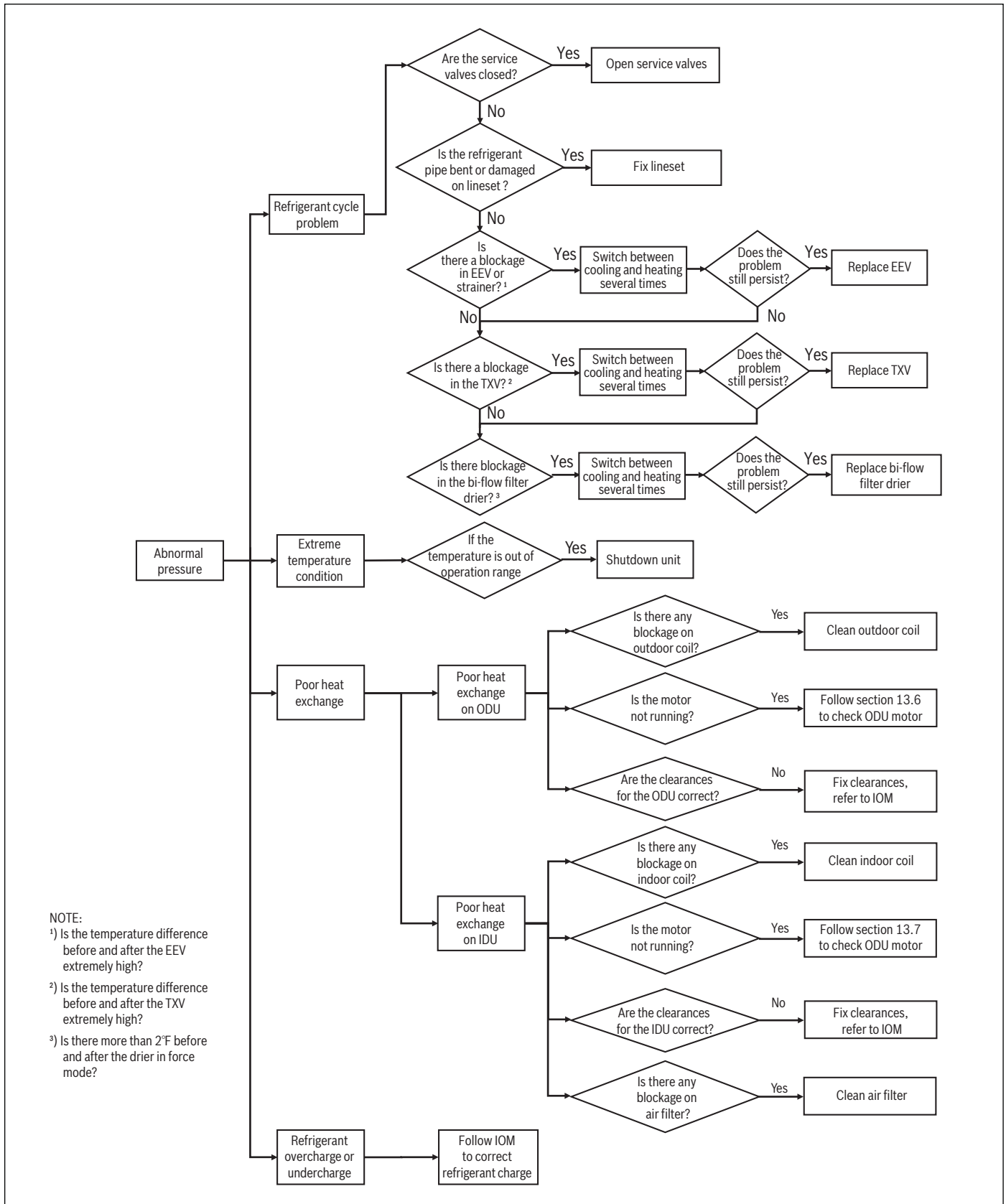


Figure 37

13 Advanced System Check

13.1 Abnormal Pressure



NOTE:
 1) Is the temperature difference before and after the EEV extremely high?
 2) Is the temperature difference before and after the TXV extremely high?
 3) Is there more than 2°F before and after the drier in force mode?

Figure 38

13.2 Pressure Transducer (PT)

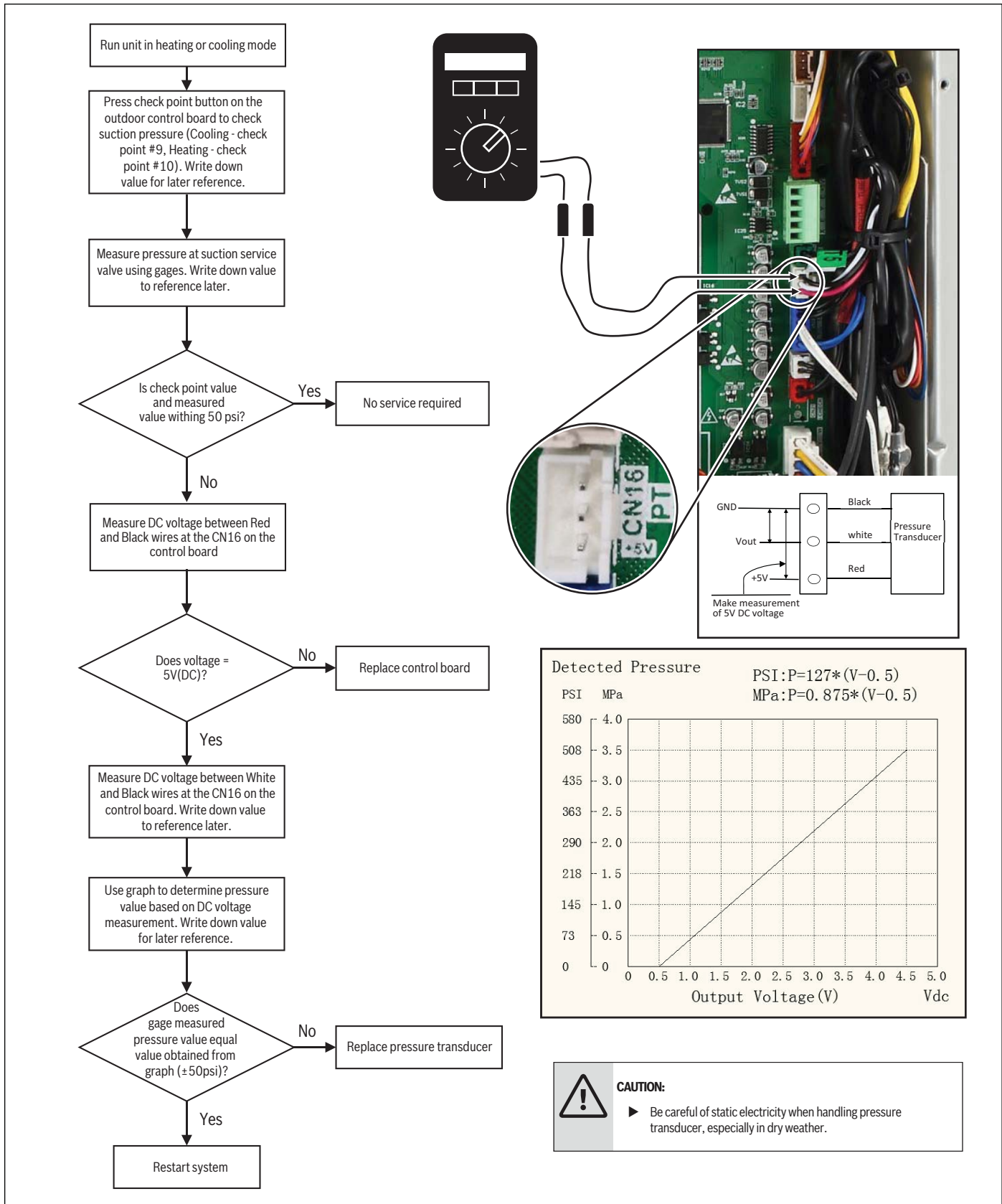


Figure 39

13.3 Electronic Expansion Valve (EEV)

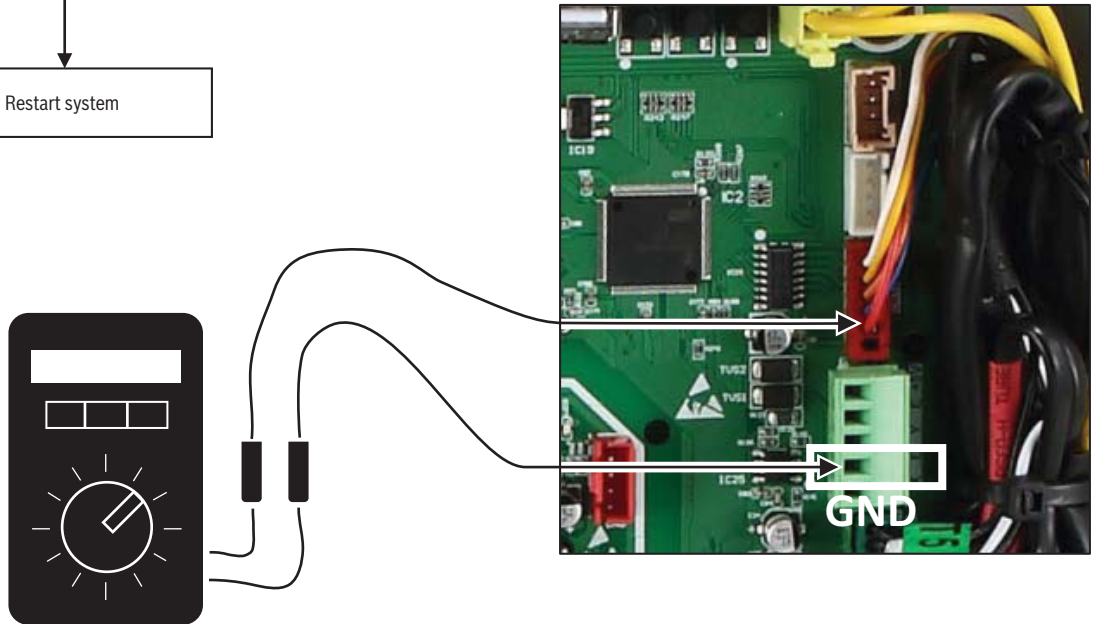
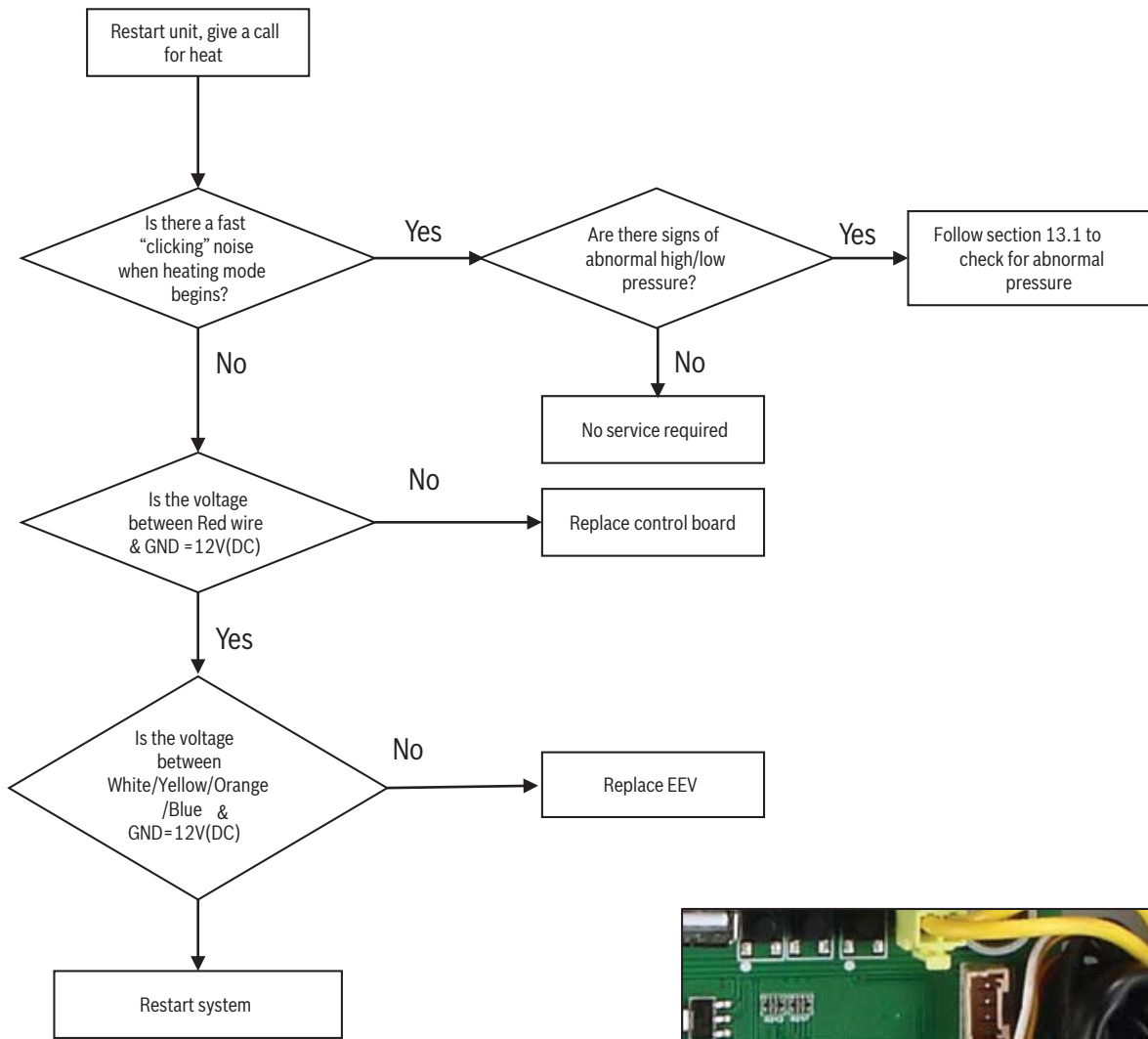


Figure 40

13.4 Temperature Sensor (T3,T4,T5,Th,T3L,Tf)

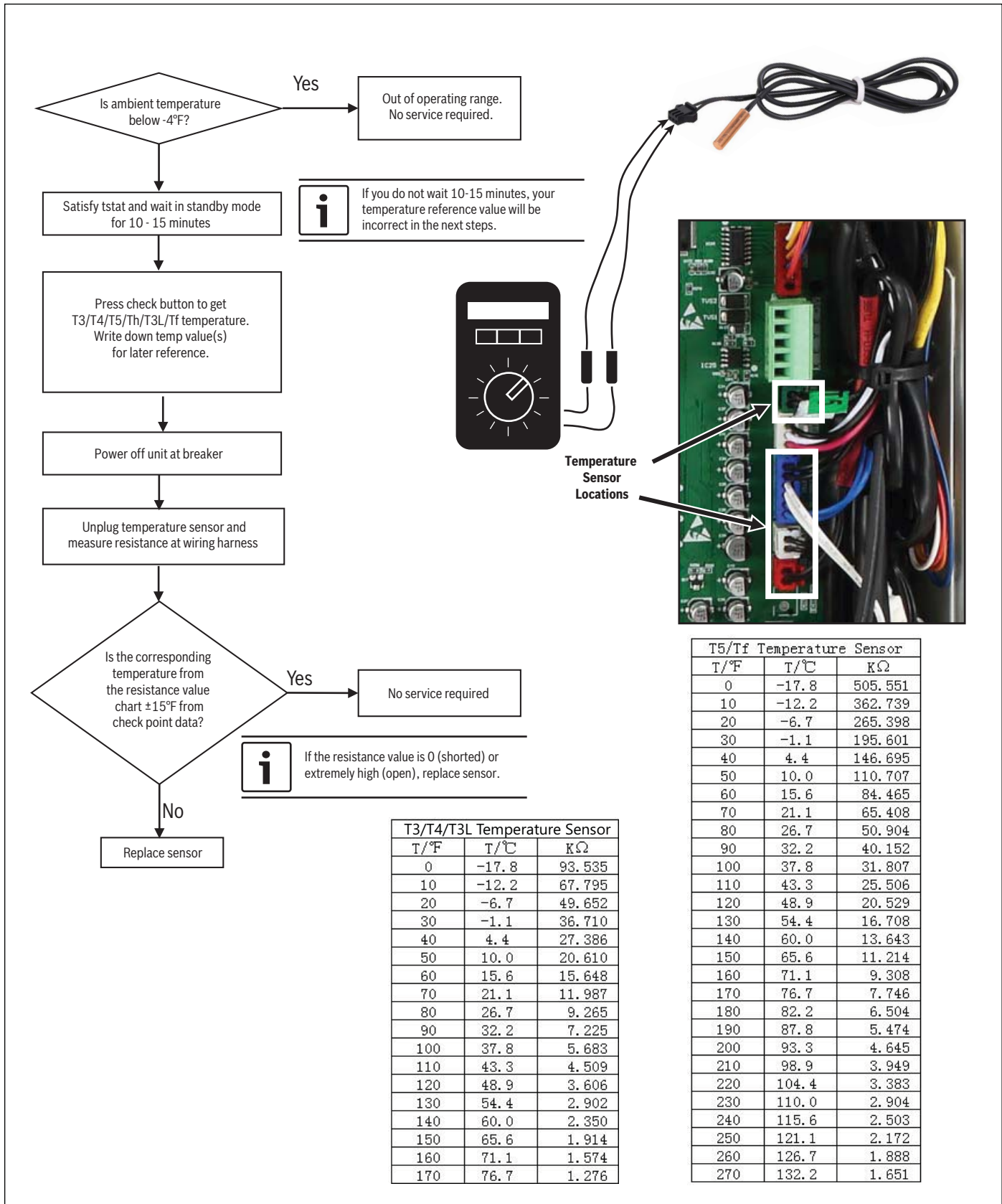


Figure 41

13.5 High Pressure Switch (HPS)

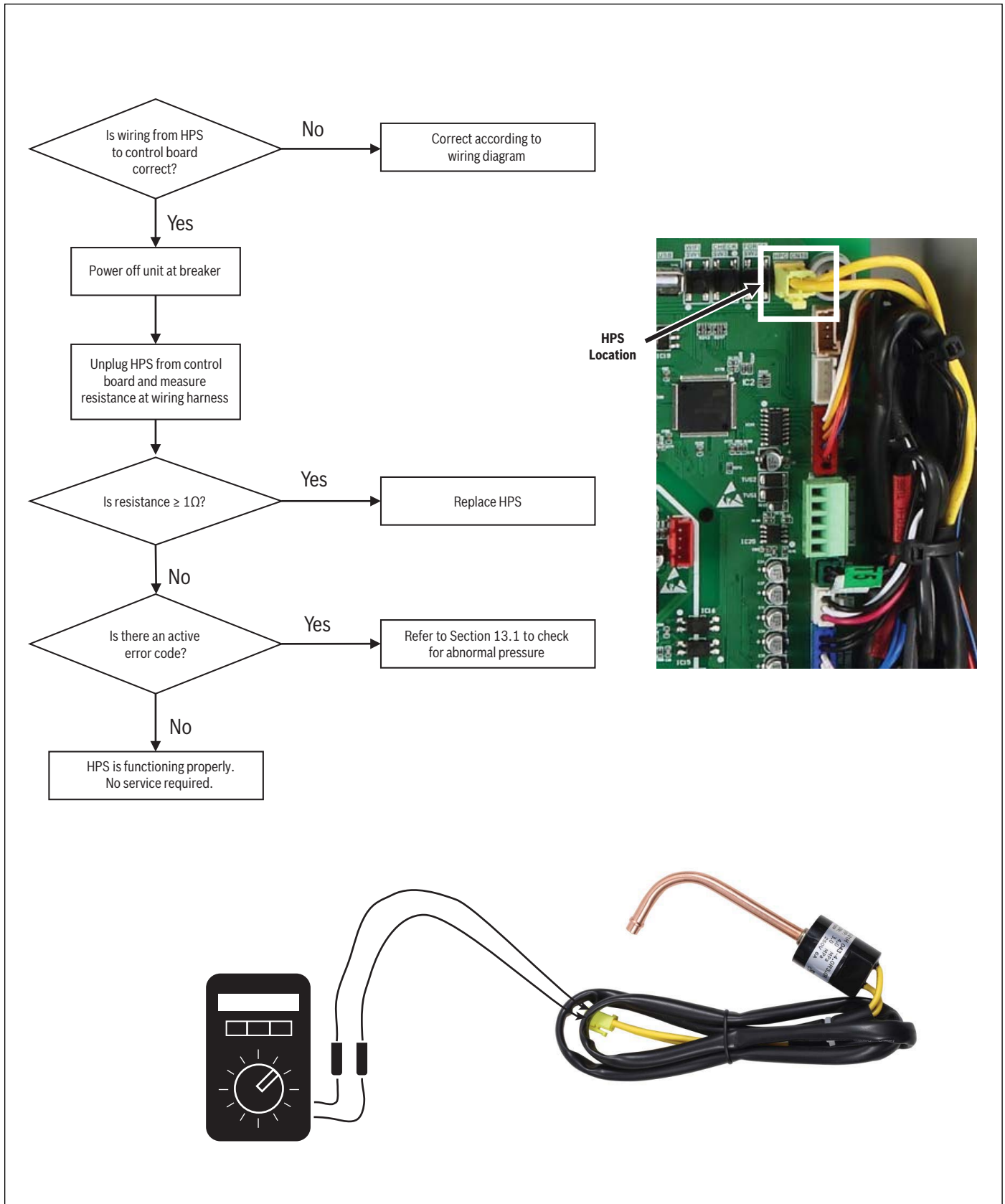


Figure 42

13.6 Outdoor Fan Motor

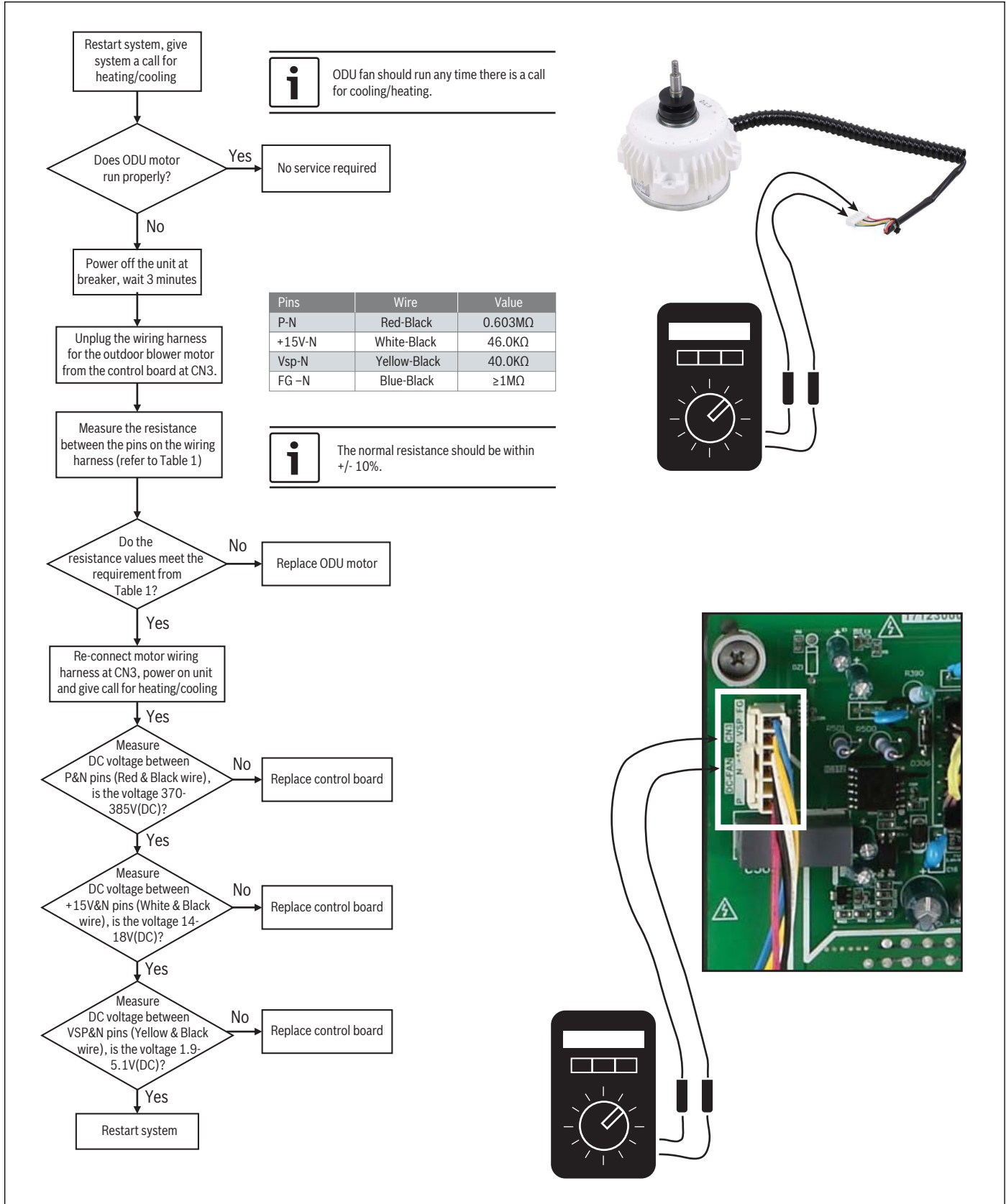


Figure 43

13.7 Indoor Blower Motor

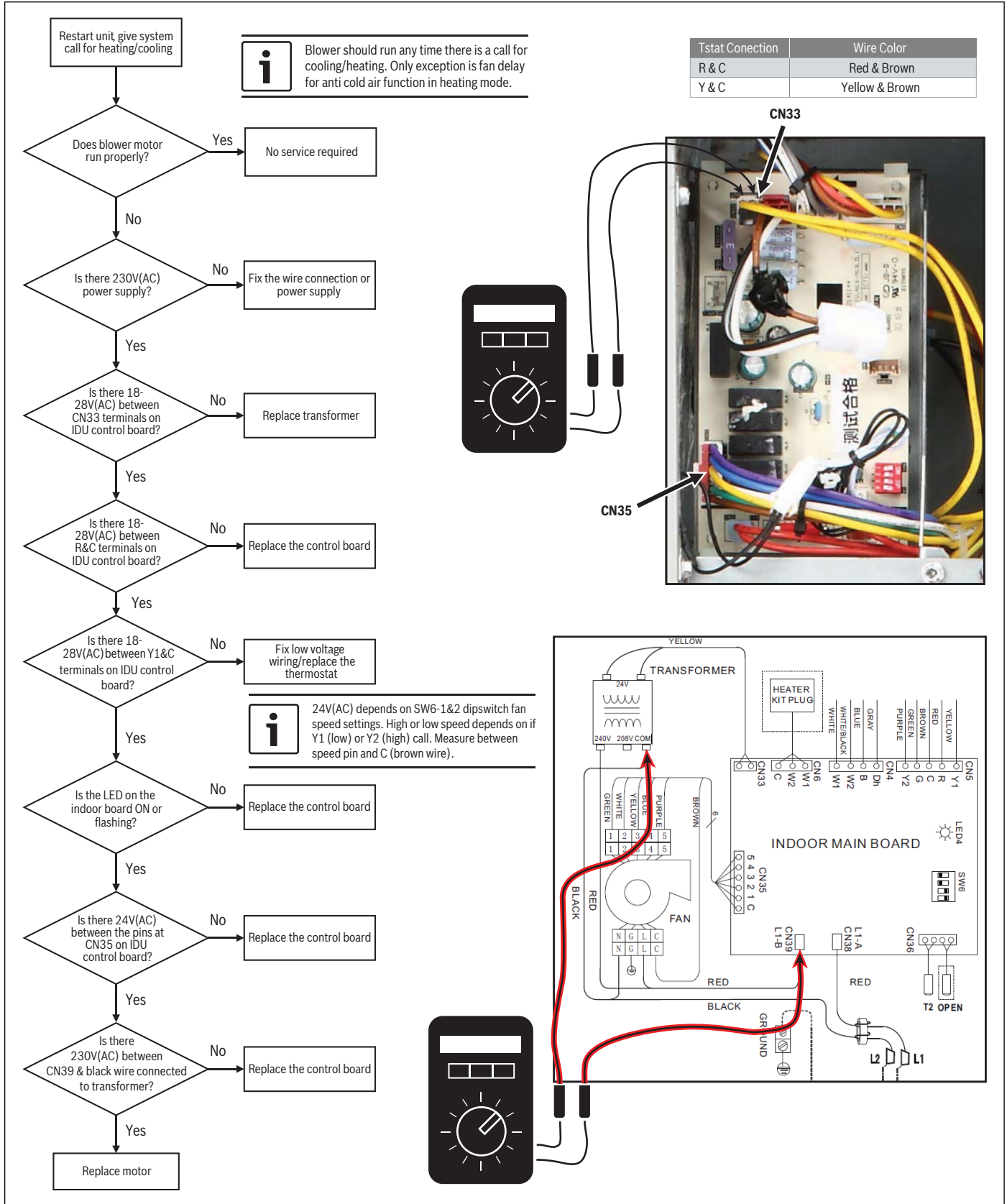


Figure 44

13.8 Compressor

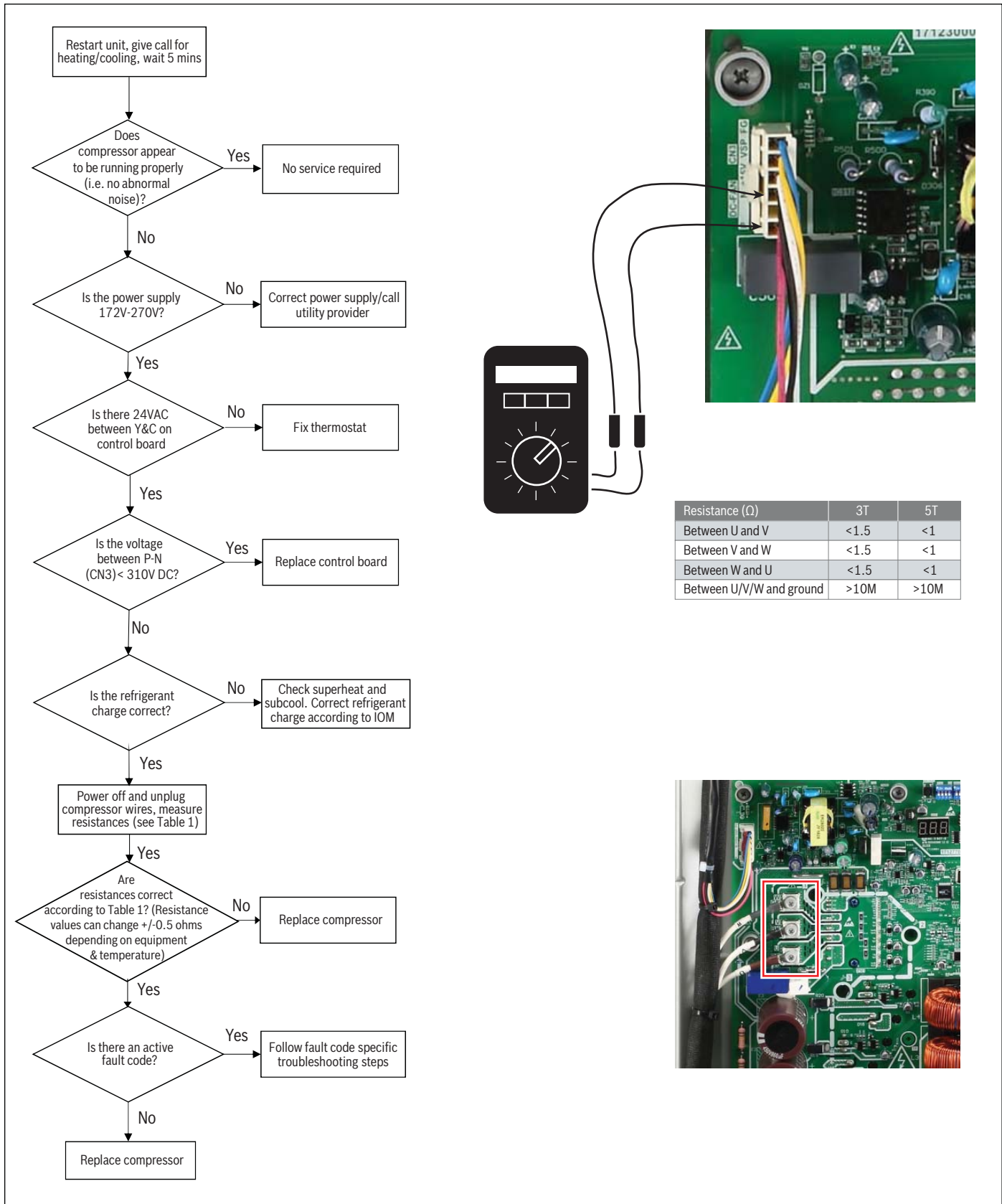
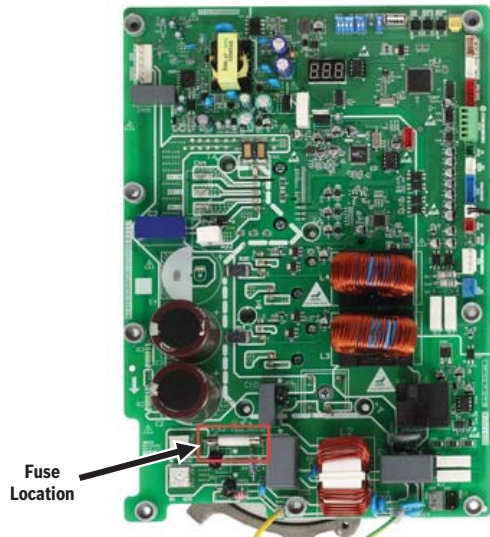
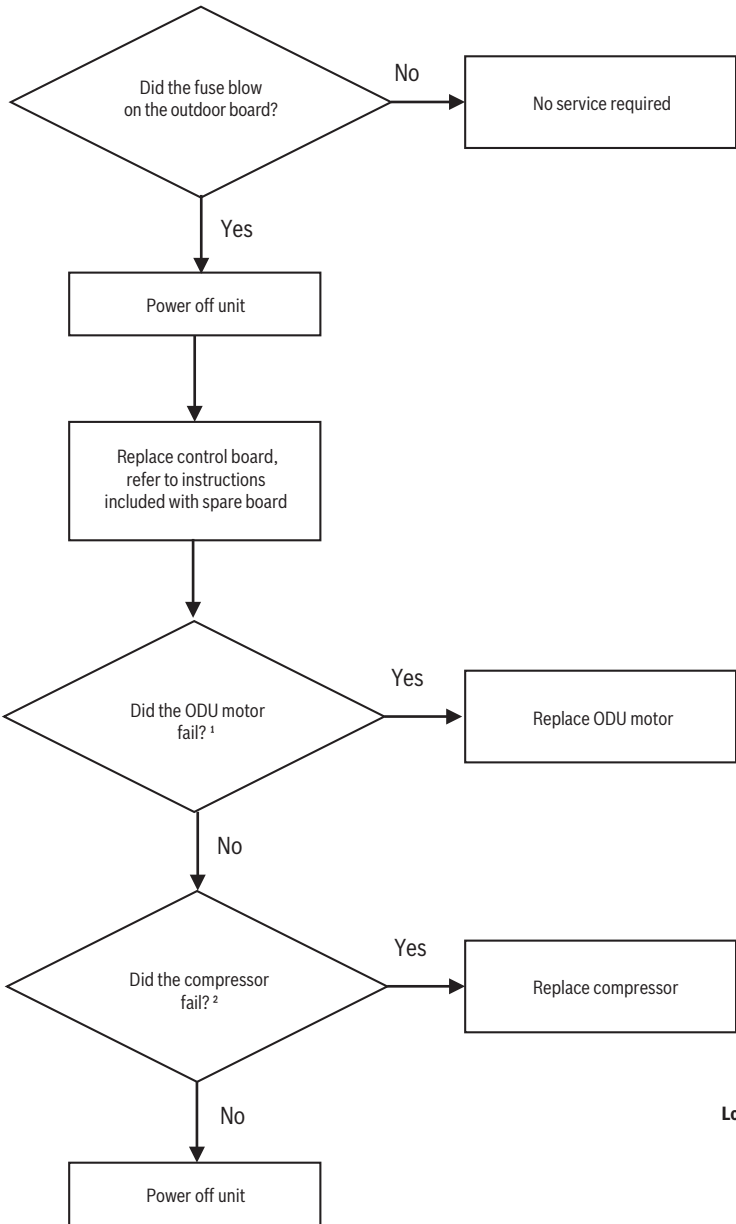


Figure 45

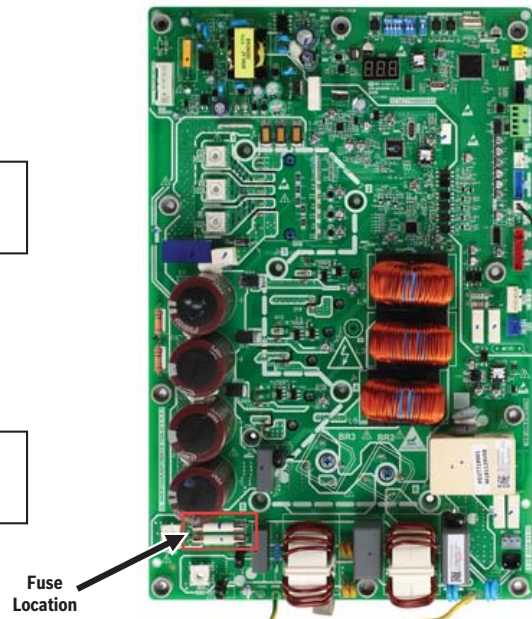
13.10 Outdoor Board Fuse

Outdoor Board Fuse	
Fuse Type	250V/30A
Function	Protect control board

i The System will not work if this fuse is blown.



IDS 2.0 3T ODU board



IDS 2.0 5T ODU board

Figure 47

1) See Section 13.6

2) See Section 13.8

13.11 Indoor Board Fuse

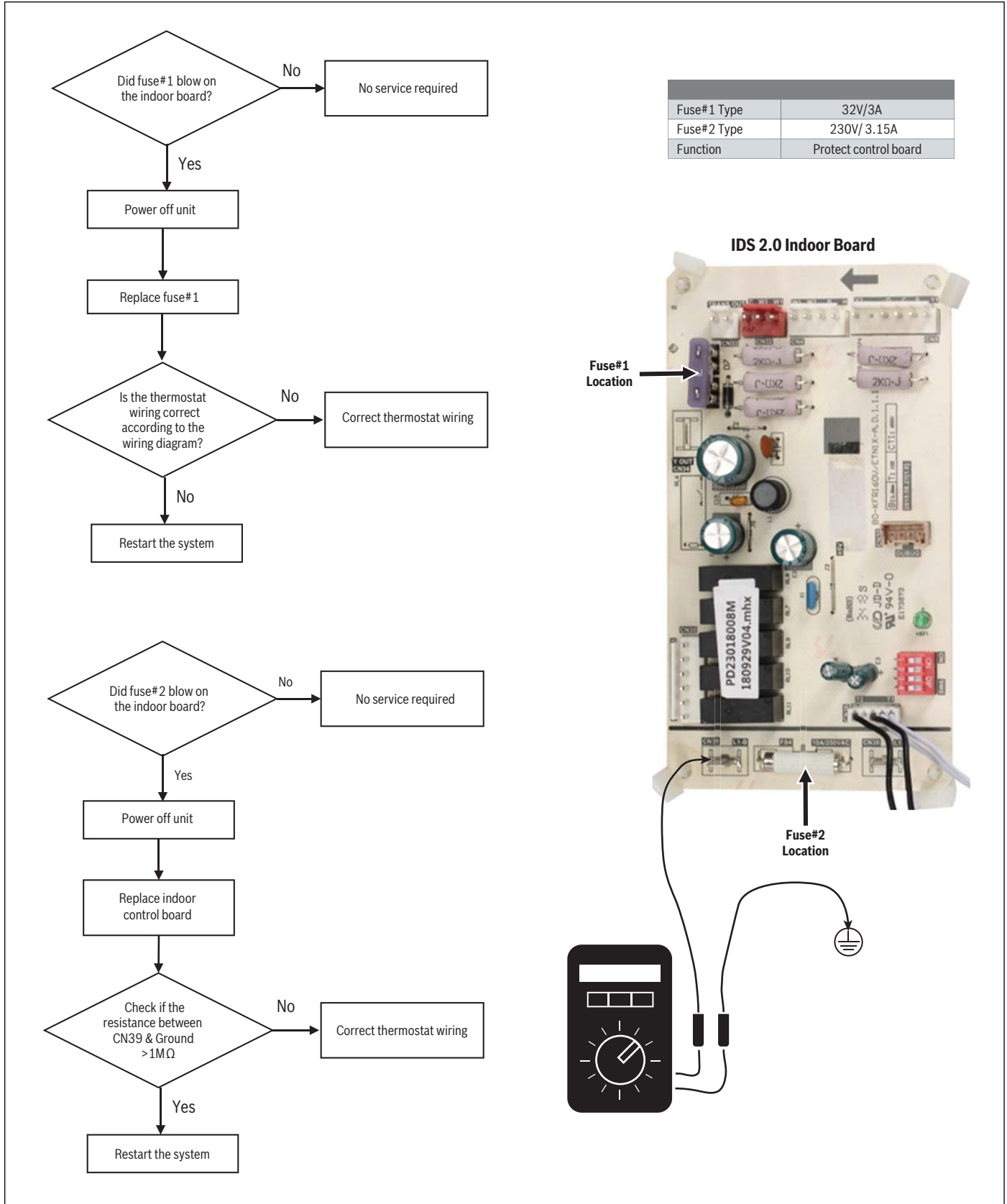


Figure 48

Appendix

Appendix 1 Outdoor Unit Control Board

WARNING: ELECTRICAL HAZARD 380 VOLTS DC

- ▶ Failure to follow this warning could result in property damage, severe personal injury, or death.
- ▶ WAIT THREE (3) MINUTES after disconnecting power prior to touching electrical components as they may hold a dangerous charge of 380 VDC, then verify DC Voltage is less than 42VDC at inverter TEST POINTS P-N.

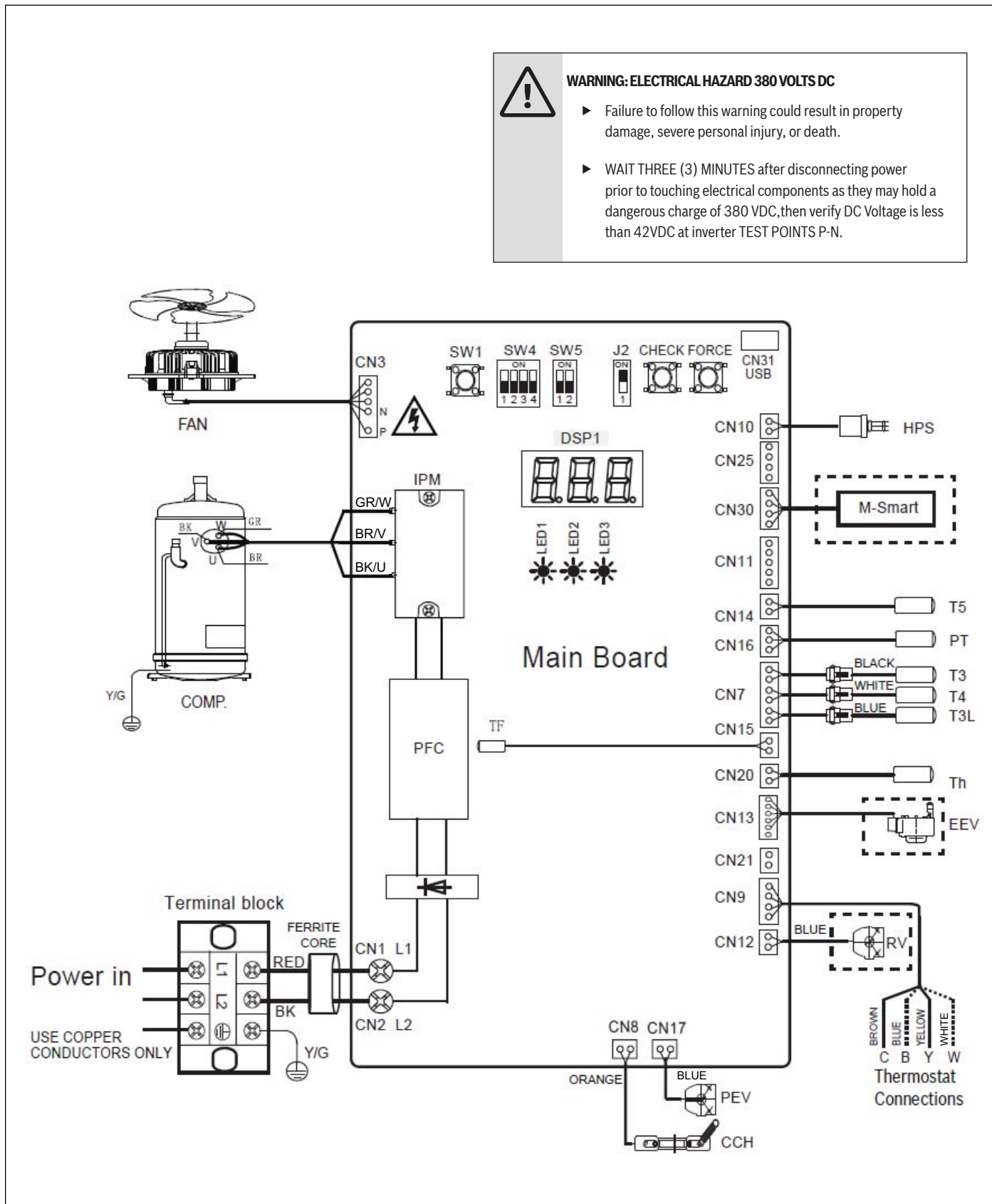


Figure 49

Component Check	Measure location	Parameter	When to check
High voltage power supply	Terminal Block (L1-L)	172-270V(AC)	When there is high voltage power to unit
Low voltage power supply	CN9 Thermostat connection (Y-C, B-C, W-C)	18-30V(AC)	When there is call from thermostat
LED Display	DSP1	CODE or numbers	When there is high voltage power to unit
DC motor control power	CN3 (+15V-N)	14-18V(DC)	When there is call from thermostat
DC voltage	CN3 (P-N)	370-385V(DC)	When compressor starts
LED light	LED 1/2/3	Light or flash	When there is call from thermostat
Reversing valve (RV)	CN12	Light or flash	When there is B call from thermostat
CCH - Crank Case Heater	CN8	24-36V(AC)	At initial power on/long period in standby mode, see IOM
PEV - Pressure Equalization Valve	CN17	172-270V(AC)	At initial power on/start up sequence
EEV – Electronic Expansion Valve	CN13 (All pins-GND)	12V(DC)	When there is B call from thermostat
PT - Pressure transducer	CN16 (+5V-GND)	5V (DC)	When there is high voltage power to unit
HPS - High pressure switch	CN10	1Ω	When power OFF at breaker
Compressor	U-V, V-W, W-U	<1.5Ω (3T), <1Ω (5T)	When power OFF at breaker

Table 51 Outdoor Board Component Check

Appendix 2 Indoor Unit Control Board

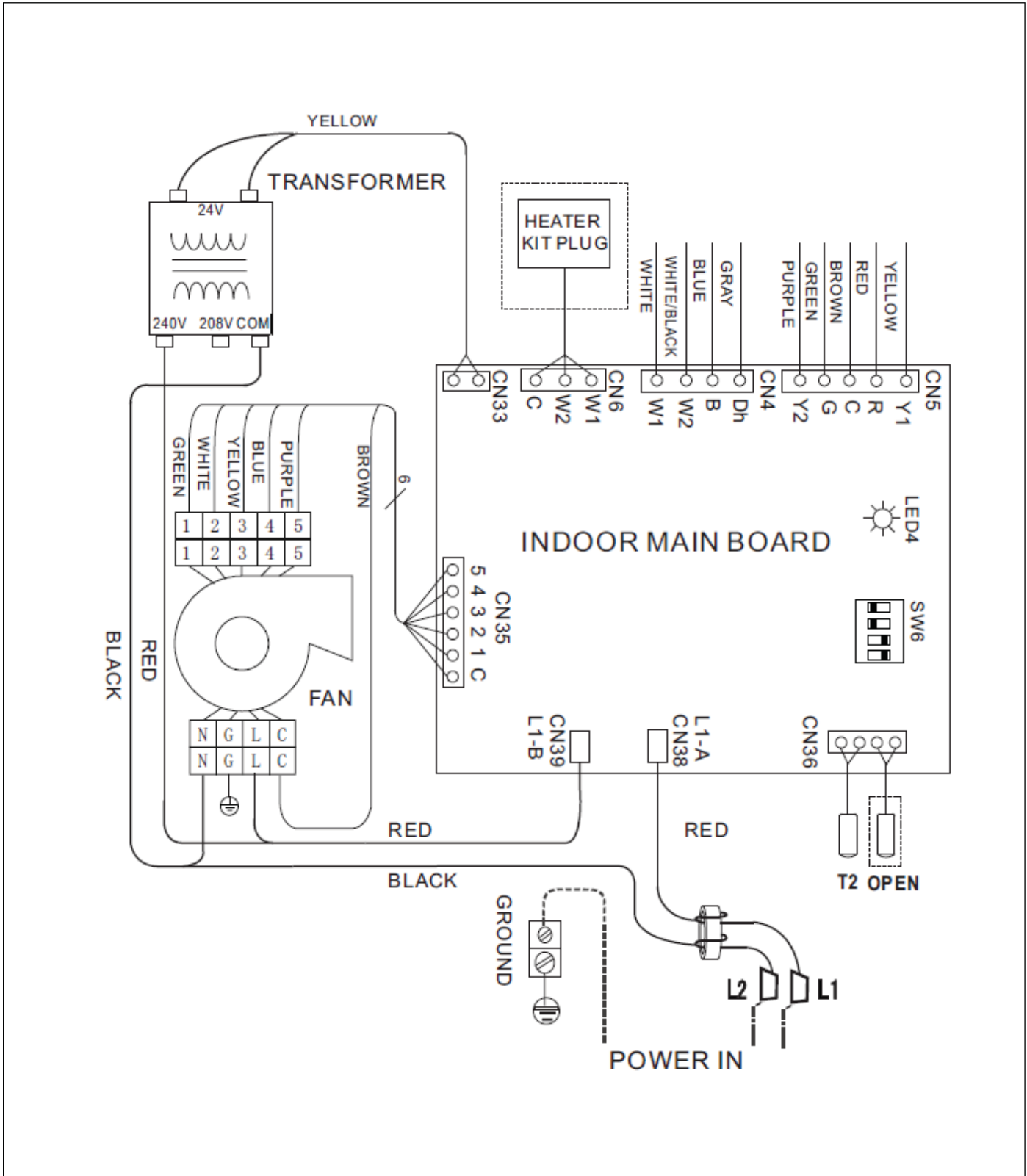


Figure 50

Component Check	Measure location	Parameter	When to check
High voltage power supply to board	Terminal Block (L1-L)	172-270V(AC)	When there is high voltage power to unit
Thermostat connection	CN5 (Y1-C, Y2-C, R-C, G-C) CN4 (Dh-C, B-C, W1-C, W2-C)	18-30V(AC)	When there is call from thermostat
LED light	LED 4	Light or flash	When there is high voltage power to unit
Electric heat	CN6 (W1-C, W2-C)	172-270V(AC)	When there is a call for electric heat
Low voltage power supply to board	CN33	18V-30V(AC)	When there is high voltage power to unit
Indoor blower motor	CN39-COM CN35 (1,2,3,4,5-C) ¹	230V(AC) 18-30V(AC)	When there is high voltage power to unit When the compressor is running

Table 52 Indoor Board Component Check

1) Depends on SW6-1&2 dipswitch fan speed settings. High or low speed depends on if Y1 (low) or Y2 (high) call. Measure between speed pin and C (brown wire).

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