7. Electrical Data

Model	Power Supply	Applicable Voltage		Cooling Operation		Heating Operation		Maximum Current
		Maximum	Minimum	IPT	RNC	IPT	RNC	
		(V)	(V)	(kW)	(A)	(kW)	(A)	(A)
RAS-H06RNCCLW	3N~380-415V 50Hz	457	342	76.94	142.5	102.14	187.1	234.3
RAS-H08RNCCLW	3N~380-415V 50Hz	457	342	78.96	146.2	107.36	196.6	235.4
RAS-H10RNCCLW	3N~380-415V 50Hz	457	342	80.98	149.9	112.58	206.1	236.5
RAS-H12RNCCLW	3N~380-415V 50Hz	457	342	83.00	153.6	117.80	215.6	237.6

7.3 IN/SA

Heat Pump (Standard Type)

Model	Power Supply	Applicable Voltage		Cooling Operation		Heating Operation		Maximum Current
		Maximum	Minimum	IPT	RNC	IPT	RNC	
		(V)	(V)	(kW)	(A)	(kW)	(A)	(A)
RAS-080HNCCLI	3N~380-415V 50Hz	457	342	4.07	6.9	4.80	8.1	16.1
RAS-100HNCCLI	3N~380-415V 50Hz	457	342	5.73	10.2	6.18	10.9	20.0
RAS-120HNCCLI	3N~380-415V 50Hz	457	342	7.21	14.0	7.81	14.8	23.3
RAS-140HNCCLI	3N~380-415V 50Hz	457	342	8.55	16.9	9.91	19.1	27.7
RAS-160HNCCLI	3N~380-415V 50Hz	457	342	9.91	19.1	12.12	22.7	32.7
RAS-180HNCCLI	3N~380-415V 50Hz	457	342	11.71	22.2	13.04	24.5	39.7
RAS-200HNCCLI	3N~380-415V 50Hz	457	342	12.44	23.0	12.91	23.6	40.0
RAS-220HNCCLI	3N~380-415V 50Hz	457	342	13.84	25.6	15.64	28.6	42.7
RAS-240HNCCLI	3N~380-415V 50Hz	457	342	16.17	30.0	19.93	36.5	53.0
RAS-260HNCCLI	3N~380-415V 50Hz	457	342	18.73	34.7	24.23	44.4	58.3
RAS-280HNCCLI	3N~380-415V 50Hz	457	342	20.75	38.4	29.45	53.9	59.4
RAS-300HNCCLI	3N~380-415V 50Hz	457	342	18.92	36.2	20.85	39.3	63.0
RAS-320HNCCLI	3N~380-415V 50Hz	457	342	20.26	39.1	22.95	43.6	67.4
RAS-340HNCCLI	3N~380-415V 50Hz	457	342	21.62	41.3	25.16	47.2	72.4
RAS-360HNCCLI	3N~380-415V 50Hz	457	342	23.42	44.4	26.08	49.0	79.4
RAS-380HNCCLI	3N~380-415V 50Hz	457	342	23.75	44.7	27.76	51.3	75.4
RAS-400HNCCLI	3N~380-415V 50Hz	457	342	25.55	47.8	28.68	53.1	82.4
RAS-420HNCCLI	3N~380-415V 50Hz	457	342	27.88	52.2	32.97	61.0	92.7
RAS-440HNCCLI	3N~380-415V 50Hz	457	342	27.68	51.2	31.28	57.2	85.4
RAS-460HNCCLI	3N~380-415V 50Hz	457	342	30.01	55.6	35.57	65.1	95.7
RAS-480HNCCLI	3N~380-415V 50Hz	457	342	32.34	60.0	39.86	73.0	106.0
RAS-500HNCCLI	3N~380-415V 50Hz	457	342	34.90	64.7	44.16	80.9	111.3
RAS-520HNCCLI	3N~380-415V 50Hz	457	342	37.46	69.4	48.46	88.8	116.6
RAS-540HNCCLI	3N~380-415V 50Hz	457	342	39.48	73.1	53.68	98.3	117.7
RAS-560HNCCLI	3N~380-415V 50Hz	457	342	41.50	76.8	58.90	107.8	118.8
RAS-580HNCCLI	3N~380-415V 50Hz	457	342	37.26	70.0	41.72	77.6	122.1
RAS-600HNCCLI	3N~380-415V 50Hz	457	342	39.59	74.4	46.01	85.5	132.4
RAS-620HNCCLI	3N~380-415V 50Hz	457	342	39.39	73.4	44.32	81.7	125.1
RAS-640HNCCLI	3N~380-415V 50Hz	457	342	41.72	77.8	48.61	89.6	135.4
RAS-660HNCCLI	3N~380-415V 50Hz	457	342	44.05	82.2	52.90	97.5	145.7
RAS-680HNCCLI	3N~380-415V 50Hz	457	342	43.85	81.2	51.21	93.7	138.4
RAS-700HNCCLI	3N~380-415V 50Hz	457	342	46.18	85.6	55.50	101.6	148.7
RAS-720HNCCLI	3N~380-415V 50Hz	457	342	48.51	90.0	59.79	109.5	159.0
RAS-740HNCCLI	3N~380-415V 50Hz	457	342	51.07	94.7	64.09	117.4	164.3
RAS-760HNCCLI	3N~380-415V 50Hz	457	342	53.63	99.4	68.39	125.3	169.6
RAS-780HNCCLI	3N~380-415V 50Hz	457	342	56.19	104.1	72.69	133.2	174.9
RAS-800HNCCLI	3N~380-415V 50Hz	457	342	58.21	107.8	77.91	142.7	176.0
RAS-820HNCCLI	3N~380-415V 50Hz	457	342	60.23	111.5	83.13	152.2	177.1
RAS-840HNCCLI	3N~380-415V 50Hz	457	342	62.25	115.2	88.35	161.7	178.2
RAS-860HNCCLI	3N~380-415V 50Hz	457	342	55.56	103.4	64.25	118.2	178.1
RAS-880HNCCLI	3N~380-415V 50Hz	457	342	57.89	107.8	68.54	126.1	188.4
RAS-900HNCCLI	3N~380-415V 50Hz	457	342	60.22	112.2	72.83	134.0	198.7
RAS-920HNCCLI	3N~380-415V 50Hz	457	342	60.02	111.2	71.14	130.2	191.4
RAS-940HNCCLI	3N~380-415V 50Hz	457	342	62.35	115.6	75.43	138.1	201.7
RAS-960HNCCLI	3N~380-415V 50Hz	457	342	64.68	120.0	79.72	146.0	212.0
RAS-980HNCCLI	3N~380-415V 50Hz	457	342	67.24	124.7	84.02	153.9	217.3
RAS-H00HNCCLI	3N~380-415V 50Hz	457	342	69.80	129.4	88.32	161.8	222.6
RAS-H02HNCCLI	3N~380-415V 50Hz	457	342	72.36	134.1	92.62	169.7	227.9

7. Electrical Data

Model	Power Supply	Applicable Voltage		Cooling Operation		Heating Operation		Maximum Current
		Maximum	Minimum	IPT	RNC	IPT	RNC	
		(V)	(V)	(kW)	(A)	(kW)	(A)	(A)
RAS-H04HNCCLI	3N~380-415V 50Hz	457	342	74.92	138.8	96.92	177.6	233.2
RAS-H06HNCCLI	3N~380-415V 50Hz	457	342	76.94	142.5	102.14	187.1	234.3
RAS-H08HNCCLI	3N~380-415V 50Hz	457	342	78.96	146.2	107.36	196.6	235.4
RAS-H10HNCCLI	3N~380-415V 50Hz	457	342	80.98	149.9	112.58	206.1	236.5
RAS-H12HNCCLI	3N~380-415V 50Hz	457	342	83.00	153.6	117.80	215.6	237.6

7.4 ANZ

Universal (Standard Type)

Model	Power Supply	Applicable Voltage		Cooling Operation		Heating Operation		Maximum Current
		Maximum	Minimum	IPT	RNC	IPT	RNC	
		(V)	(V)	(kW)	(A)	(kW)	(A)	(A)
RAS-080RNCCLW	3N~380-415V 50Hz	457	342	4.36	7.4	5.15	8.7	16.1
RAS-100RNCCLW	3N~380-415V 50Hz	457	342	6.37	11.4	6.70	11.8	20.0
RAS-120RNCCLW	3N~380-415V 50Hz	457	342	8.14	15.9	8.56	16.3	23.3
RAS-140RNCCLW	3N~380-415V 50Hz	457	342	9.68	19.1	10.18	19.6	27.7
RAS-160RNCCLW	3N~380-415V 50Hz	457	342	11.79	22.7	12.94	24.3	32.7
RAS-180RNCCLW	3N~380-415V 50Hz	457	342	12.73	24.2	14.57	27.3	39.7
RAS-200RNCCLW	3N~380-415V 50Hz	457	342	12.92	23.9	13.84	25.3	40.0
RAS-220RNCCLW	3N~380-415V 50Hz	457	342	15.22	28.2	18.60	34.0	42.7
RAS-240RNCCLW	3N~380-415V 50Hz	457	342	18.13	33.6	22.82	41.8	53.0
RAS-260RNCCLW	3N~380-415V 50Hz	457	342	17.82	35.0	18.74	35.9	51.0
RAS-280RNCCLW	3N~380-415V 50Hz	457	342	19.93	38.6	21.50	40.6	56.0
RAS-300RNCCLW	3N~380-415V 50Hz	457	342	20.87	40.1	23.13	43.6	63.0
RAS-320RNCCLW	3N~380-415V 50Hz	457	342	22.41	43.3	24.75	46.9	67.4
RAS-340RNCCLW	3N~380-415V 50Hz	457	342	24.52	46.9	27.51	51.6	72.4
RAS-360RNCCLW	3N~380-415V 50Hz	457	342	25.46	48.4	29.14	54.6	79.4
RAS-380RNCCLW	3N~380-415V 50Hz	457	342	27.01	50.9	31.54	58.3	75.4
RAS-400RNCCLW	3N~380-415V 50Hz	457	342	27.95	52.4	33.17	61.3	82.4
RAS-420RNCCLW	3N~380-415V 50Hz	457	342	30.86	57.8	37.39	69.1	92.7
RAS-440RNCCLW	3N~380-415V 50Hz	457	342	30.44	56.4	37.20	68.0	85.4
RAS-460RNCCLW	3N~380-415V 50Hz	457	342	33.35	61.8	41.42	75.8	95.7
RAS-480RNCCLW	3N~380-415V 50Hz	457	342	36.26	67.2	45.64	83.6	106.0
RAS-500RNCCLW	3N~380-415V 50Hz	457	342	35.14	67.5	39.32	74.2	107.1
RAS-520RNCCLW	3N~380-415V 50Hz	457	342	37.25	71.1	42.08	78.9	112.1
RAS-540RNCCLW	3N~380-415V 50Hz	457	342	38.19	72.6	43.71	81.9	119.1
RAS-560RNCCLW	3N~380-415V 50Hz	457	342	39.74	75.1	46.11	85.6	115.1
RAS-580RNCCLW	3N~380-415V 50Hz	457	342	40.68	76.6	47.74	88.6	122.1
RAS-600RNCCLW	3N~380-415V 50Hz	457	342	43.59	82.0	51.96	96.4	132.4
RAS-620RNCCLW	3N~380-415V 50Hz	457	342	43.17	80.6	51.77	95.3	125.1
RAS-640RNCCLW	3N~380-415V 50Hz	457	342	46.08	86.0	55.99	103.1	135.4

7. Electrical Data

Universal (High Effiency Type)

Model	Power Supply	Applicable Voltage		Cooling Operation		Heating Operation		Maximum Current
		Maximum	Minimum	IPT	RNC	IPT	RNC	
		(V)	(V)	(kW)	(A)	(kW)	(A)	(A)
RAS-080RNCBLW	3N~380-415V 50Hz	457	342	4.33	8.5	5.09	10.0	16.1
RAS-100RNCBLW	3N~380-415V 50Hz	457	342	5.90	10.5	6.63	11.7	19.5
RAS-120RNCBLW	3N~380-415V 50Hz	457	342	7.20	14.0	7.94	15.1	22.4
RAS-140RNCBLW	3N~380-415V 50Hz	457	342	8.84	17.4	10.06	19.3	28.0
RAS-160RNCBLW	3N~380-415V 50Hz	457	342	10.22	19.7	12.06	22.6	30.6
RAS-180RNCBLW	3N~380-415V 50Hz	457	342	11.22	21.3	12.02	22.5	35.0
RAS-200RNCBLW	3N~380-415V 50Hz	457	342	12.78	23.7	13.65	25.0	37.4
RAS-220RNCBLW	3N~380-415V 50Hz	457	342	13.10	24.5	14.57	26.8	41.9
RAS-240RNCBLW	3N~380-415V 50Hz	457	342	14.40	28.0	15.88	30.2	44.8
RAS-260RNCBLW	3N~380-415V 50Hz	457	342	16.04	31.4	18.00	34.4	50.4
RAS-280RNCBLW	3N~380-415V 50Hz	457	342	17.68	34.8	20.12	38.6	56.0
RAS-300RNCBLW	3N~380-415V 50Hz	457	342	19.06	37.1	22.12	41.9	58.6
RAS-320RNCBLW	3N~380-415V 50Hz	457	342	20.44	39.4	24.12	45.2	61.2
RAS-340RNCBLW	3N~380-415V 50Hz	457	342	21.44	41.0	24.08	45.1	65.6
RAS-360RNCBLW	3N~380-415V 50Hz	457	342	22.44	42.6	24.04	45.0	70.0
RAS-380RNCBLW	3N~380-415V 50Hz	457	342	24.00	45.0	25.67	47.5	72.4
RAS-400RNCBLW	3N~380-415V 50Hz	457	342	25.56	47.4	27.30	50.0	74.8
RAS-420RNCBLW	3N~380-415V 50Hz	457	342	26.52	52.2	30.18	57.9	84.0
RAS-440RNCBLW	3N~380-415V 50Hz	457	342	27.90	54.5	32.18	61.2	86.6
RAS-460RNCBLW	3N~380-415V 50Hz	457	342	29.28	56.8	34.18	64.5	89.2
RAS-480RNCBLW	3N~380-415V 50Hz	457	342	30.66	59.1	36.18	67.8	91.8

7.5 LA

Universal (Standard Type)
Power Supply: 380-415V

Model	Power Supply	Applicable Voltage		Cooling Operation		Heating Operation		Maximum Current
		Maximum	Minimum	IPT	RNC	IPT	RNC	
		(V)	(V)	(kW)	(A)	(kW)	(A)	(A)
RAS-080RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	4.00	6.8/6.8	4.27	7.2/7.2	16.1
RAS-100RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	5.73	10.2/10.0	6.18	10.9/10.7	20.0
RAS-120RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	7.21	14.0/13.5	7.81	14.8/14.3	23.3
RAS-140RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	8.55	16.9/16.4	9.91	19.1/18.6	27.7
RAS-160RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	9.91	19.1/18.6	11.49	21.6/21.0	32.7
RAS-180RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	11.71	22.2/21.4	12.36	23.2/22.4	39.7
RAS-200RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	12.44	23.0/22.2	12.91	23.6/22.8	40.0
RAS-220RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	13.84	25.6/24.7	15.64	28.6/27.6	42.7
RAS-240RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	16.17	30.0/28.9	19.87	36.4/35.1	53.0
RAS-260RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	18.73	34.7/33.5	24.23	44.4/42.8	58.3
RAS-280RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	20.75	38.4/37.1	29.45	53.9/52.0	59.4
RAS-300RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	18.92	36.2/34.9	20.17	38.0/36.7	63.0
RAS-320RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	20.26	39.1/37.8	22.27	42.3/41.0	67.4
RAS-340RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	21.62	41.3/40.0	23.85	44.8/43.4	72.4
RAS-360RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	23.42	44.4/42.8	24.72	46.4/44.8	79.4
RAS-380RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	23.75	44.7/43.3	27.13	50.2/48.6	75.4
RAS-400RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	25.55	47.8/46.1	28.00	51.8/50.0	82.4
RAS-420RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	27.88	52.2/50.3	32.23	59.6/57.5	92.7
RAS-440RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	27.68	51.2/49.4	31.28	57.2/55.2	85.4
RAS-460RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	30.01	55.6/53.6	35.51	65.0/62.7	95.7
RAS-480RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	32.34	60.0/57.8	39.74	72.8/70.2	106.0
RAS-500RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	34.90	64.7/62.4	44.10	80.8/77.9	111.3
RAS-520RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	37.46	69.4/67.0	48.46	88.8/85.6	116.6
RAS-540RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	39.48	73.1/70.6	53.68	98.3/94.8	117.7
RAS-560RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	41.50	76.8/74.2	58.90	107.8/104.0	118.8
RAS-580RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	37.26	70.0/67.5	40.36	75.0/72.4	122.1
RAS-600RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	39.59	74.4/71.7	44.59	82.8/79.9	132.4
RAS-620RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	39.39	73.4/70.8	43.64	80.4/77.6	125.1
RAS-640RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	41.72	77.8/75.0	47.87	88.2/85.1	135.4
RAS-660RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	44.05	82.2/79.2	52.10	96.0/92.6	145.7
RAS-680RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	43.85	81.2/78.3	51.15	93.6/90.3	138.4
RAS-700RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	46.18	85.6/82.5	55.38	101.4/97.8	148.7
RAS-720RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	48.51	90.0/86.7	59.61	109.2/105.3	159.0
RAS-740RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	51.07	94.7/91.3	63.97	117.2/113.0	164.3
RAS-760RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	53.63	99.4/95.9	68.33	125.2/120.7	169.6

7. Electrical Data

Model	Power Supply	Applicable Voltage		Cooling Operation		Heating Operation		Maximum Current
		Maximum	Minimum	IPT	RNC	IPT	RNC	
		(V)	(V)	(kW)	(A)	(kW)	(A)	(A)
RAS-780RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	56.19	104.1/100.5	72.69	133.2/128.4	174.9
RAS-800RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	58.21	107.8/104.1	77.91	142.7/137.6	176.0
RAS-820RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	60.23	111.5/107.7	83.13	152.2/146.8	177.1
RAS-840RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	62.25	115.2/111.3	88.35	161.7/156.0	178.2
RAS-860RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	55.56	103.4/99.7	63.51	116.8/112.7	178.1
RAS-880RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	57.89	107.8/103.9	67.74	124.6/120.2	188.4
RAS-900RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	60.22	112.2/108.1	71.97	132.4/127.7	198.7
RAS-920RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	60.02	111.2/107.2	71.02	130.0/125.4	191.4
RAS-940RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	62.35	115.6/111.4	75.25	137.8/132.9	201.7
RAS-960RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	64.68	120.0/115.6	79.48	145.6/140.4	212.0
RAS-980RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	67.24	124.7/120.2	83.84	153.6/148.1	217.3
RAS-H00RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	69.80	129.4/124.8	88.20	161.6/155.8	222.6
RAS-H02RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	72.36	134.1/129.4	92.56	169.6/163.5	227.9
RAS-H04RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	74.92	138.8/134.0	96.92	177.6/171.2	233.2
RAS-H06RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	76.94	142.5/137.6	102.14	187.1/180.4	234.3
RAS-H08RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	78.96	146.2/141.2	107.36	196.6/189.6	235.4
RAS-H10RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	80.98	149.9/144.8	112.58	206.1/198.8	236.5
RAS-H12RNCCLW	3N~380-415V 50Hz /3N~380V 60Hz	457	342	83.00	153.6/148.4	117.80	215.6/208.0	237.6

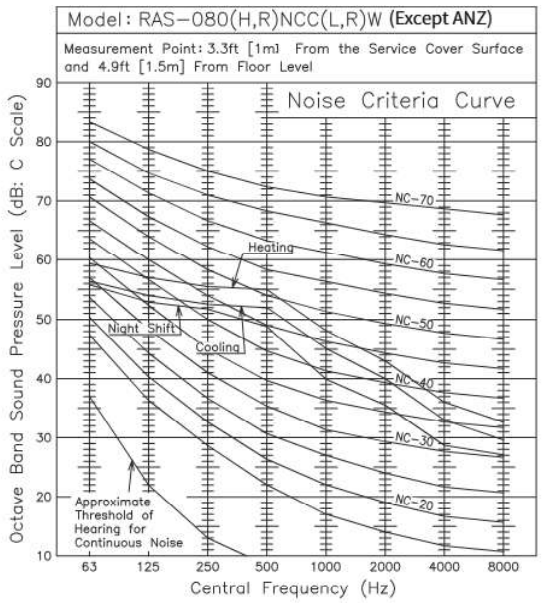
Universal (Standard Type)
Power Supply: 220V

Model	Power Supply	Applicable Voltage		Cooling Operation		Heating Operation		Maximum Current
		Maximum	Minimum	IPT	RNC	IPT	RNC	
		(V)	(V)	(kW)	(A)	(kW)	(A)	(A)
RAS-080RNCCRW	3~220V 60Hz	242	198	4.00	11.4	4.27	12.2	23.7
RAS-100RNCCRW	3~220V 60Hz	242	198	5.73	16.5	6.18	17.8	32.9
RAS-120RNCCRW	3~220V 60Hz	242	198	7.21	20.6	7.81	22.3	38.2
RAS-140RNCCRW	3~220V 60Hz	242	198	8.55	24.4	9.91	28.3	45.5
RAS-160RNCCRW	3~220V 60Hz	242	198	9.91	28.3	11.49	32.8	53.7
RAS-180RNCCRW	3~220V 60Hz	242	198	11.71	33.4	12.36	35.3	65.3
RAS-200RNCCRW	3~220V 60Hz	242	198	12.44	35.5	12.91	36.8	65.7
RAS-220RNCCRW	3~220V 60Hz	242	198	13.84	39.5	15.64	44.6	70.1
RAS-240RNCCRW	3~220V 60Hz	242	198	16.17	46.1	19.87	56.7	87.0
RAS-260RNCCRW	3~220V 60Hz	242	198	18.73	53.4	24.23	69.1	95.7
RAS-280RNCCRW	3~220V 60Hz	242	198	20.75	59.2	29.45	84.0	97.6
RAS-300RNCCRW	3~220V 60Hz	242	198	18.92	54.0	20.17	57.6	103.5
RAS-320RNCCRW	3~220V 60Hz	242	198	20.26	57.8	22.27	63.6	110.8
RAS-340RNCCRW	3~220V 60Hz	242	198	21.62	61.7	23.85	68.1	119.0
RAS-360RNCCRW	3~220V 60Hz	242	198	23.42	66.8	24.72	70.6	130.6
RAS-380RNCCRW	3~220V 60Hz	242	198	23.75	67.8	27.13	77.4	123.8
RAS-400RNCCRW	3~220V 60Hz	242	198	25.55	72.9	28.00	79.9	135.4
RAS-420RNCCRW	3~220V 60Hz	242	198	27.88	79.5	32.23	92.0	152.3
RAS-440RNCCRW	3~220V 60Hz	242	198	27.68	79.0	31.28	89.2	140.2
RAS-460RNCCRW	3~220V 60Hz	242	198	30.01	85.6	35.51	101.3	157.1
RAS-480RNCCRW	3~220V 60Hz	242	198	32.34	92.2	39.74	113.4	174.0
RAS-500RNCCRW	3~220V 60Hz	242	198	34.90	99.5	44.10	125.8	182.7
RAS-520RNCCRW	3~220V 60Hz	242	198	37.46	106.8	48.46	138.2	191.4
RAS-540RNCCRW	3~220V 60Hz	242	198	39.48	112.6	53.68	153.1	193.3
RAS-560RNCCRW	3~220V 60Hz	242	198	41.50	118.4	58.90	168.0	195.2
RAS-580RNCCRW	3~220V 60Hz	242	198	37.26	106.3	40.36	115.2	200.7
RAS-600RNCCRW	3~220V 60Hz	242	198	39.59	112.9	44.59	127.3	217.6
RAS-620RNCCRW	3~220V 60Hz	242	198	39.39	112.4	43.64	124.5	205.5
RAS-640RNCCRW	3~220V 60Hz	242	198	41.72	119.0	47.87	136.6	222.4
RAS-660RNCCRW	3~220V 60Hz	242	198	44.05	125.6	52.10	148.7	239.3
RAS-680RNCCRW	3~220V 60Hz	242	198	43.85	125.1	51.15	145.9	227.2
RAS-700RNCCRW	3~220V 60Hz	242	198	46.18	131.7	55.38	158.0	244.1
RAS-720RNCCRW	3~220V 60Hz	242	198	48.51	138.3	59.61	170.1	261.0
RAS-740RNCCRW	3~220V 60Hz	242	198	51.07	145.6	63.97	182.5	269.7
RAS-760RNCCRW	3~220V 60Hz	242	198	53.63	152.9	68.33	194.9	278.4
RAS-780RNCCRW	3~220V 60Hz	242	198	56.19	160.2	72.69	207.3	287.1
RAS-800RNCCRW	3~220V 60Hz	242	198	58.21	166.0	77.91	222.2	289.0
RAS-820RNCCRW	3~220V 60Hz	242	198	60.23	171.8	83.13	237.1	290.9
RAS-840RNCCRW	3~220V 60Hz	242	198	62.25	177.6	88.35	252.0	292.8
RAS-860RNCCRW	3~220V 60Hz	242	198	55.56	158.5	63.51	181.2	292.5
RAS-880RNCCRW	3~220V 60Hz	242	198	57.89	165.1	67.74	193.3	309.4
RAS-900RNCCRW	3~220V 60Hz	242	198	60.22	171.7	71.97	205.4	326.3
RAS-920RNCCRW	3~220V 60Hz	242	198	60.02	171.2	71.02	202.6	314.2
RAS-940RNCCRW	3~220V 60Hz	242	198	62.35	177.8	75.25	214.7	331.1
RAS-960RNCCRW	3~220V 60Hz	242	198	64.68	184.4	79.48	226.8	348.0
RAS-980RNCCRW	3~220V 60Hz	242	198	67.24	191.7	83.84	239.2	356.7
RAS-H00RNCCRW	3~220V 60Hz	242	198	69.80	199.0	88.20	251.6	365.4
RAS-H02RNCCRW	3~220V 60Hz	242	198	72.36	206.3	92.56	264.0	374.1

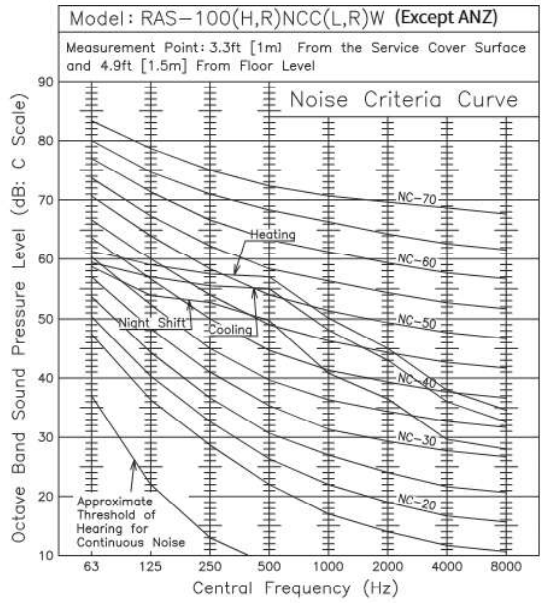
7. Electrical Data

Model	Power Supply	Applicable Voltage		Cooling Operation		Heating Operation		Maximum Current
		Maximum	Minimum	IPT	RNC	IPT	RNC	
		(V)	(V)	(kW)	(A)	(kW)	(A)	(A)
RAS-H04RNCCRW	3~220V 60Hz	242	198	74.92	213.6	96.92	276.4	382.8
RAS-H06RNCCRW	3~220V 60Hz	242	198	76.94	219.4	102.14	291.3	384.7
RAS-H08RNCCRW	3~220V 60Hz	242	198	78.96	225.2	107.36	306.2	386.6
RAS-H10RNCCRW	3~220V 60Hz	242	198	80.98	231.0	112.58	321.1	388.5
RAS-H12RNCCRW	3~220V 60Hz	242	198	83.00	236.8	117.80	336.0	390.4

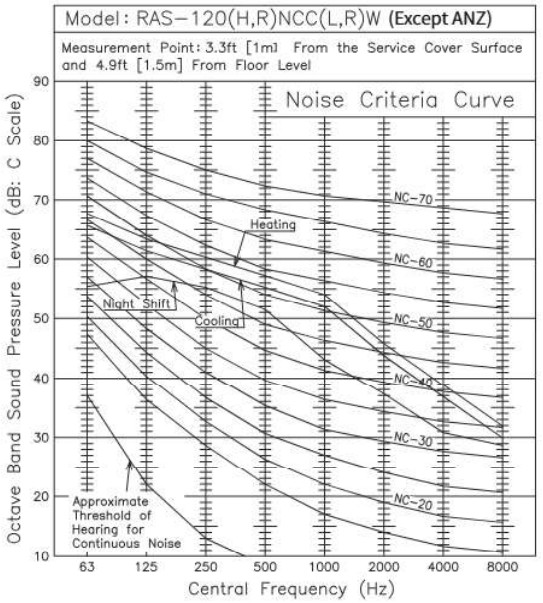
8. Sound Data (Single Unit Only)



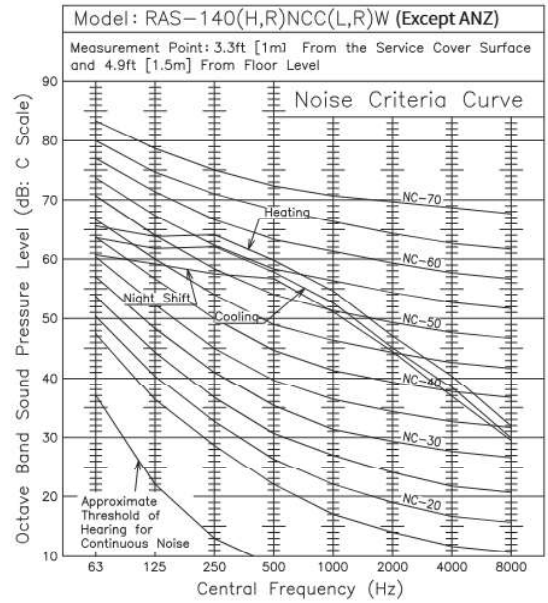
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	56.4	54.0	52.5	52.0	48.1	40.0	33.0	29.6	52.0
	Heating	59.4	57.0	55.5	55.0	48.1	43.0	36.0	32.6	55.0
	Night Shift	55.8	52.9	51.7	48.8	39.9	35.5	28.7	27.1	49.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	59.4	57.0	55.5	55.0	48.1	43.0	36.0	32.6	55.0
	Heating	61.4	59.0	57.5	57.0	50.1	45.0	38.0	34.6	57.0
	Night Shift	58.7	53.9	52.7	49.7	40.8	36.5	29.6	28.0	50.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	65.7	61.4	58.3	55.2	52.0	43.8	36.8	29.9	57.0
	Heating	67.7	63.4	60.3	57.2	54.0	45.8	38.8	31.9	59.0
	Night Shift	55.4	57.1	55.2	51.5	43.1	37.3	30.8	28.7	52.0

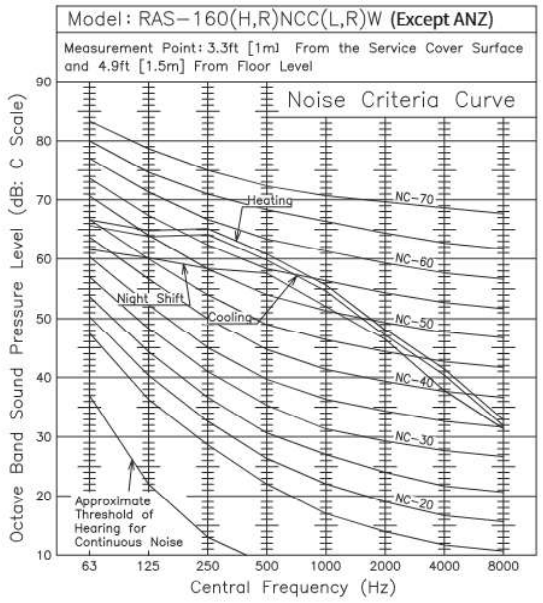


Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	63.6	61.8	62.1	57.8	52.6	45.1	38.4	29.9	59.0
	Heating	65.6	63.8	64.1	59.8	54.6	47.1	40.4	31.9	61.0
	Night Shift	60.7	59.2	57.5	56.7	51.1	44.5	36.9	29.5	57.0

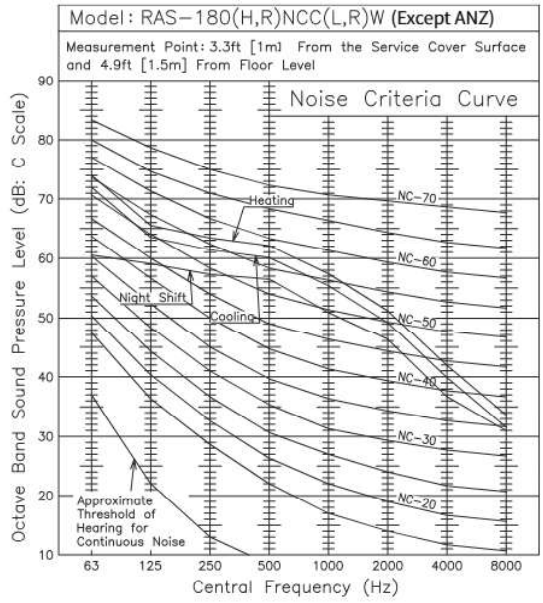
NOTES:

- The sound data is measured in an anechoic chamber.
  However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise.
  Be sure to check environmental conditions before installation.
- The sound of the air inlet side may be 8dB higher than that of the front side.

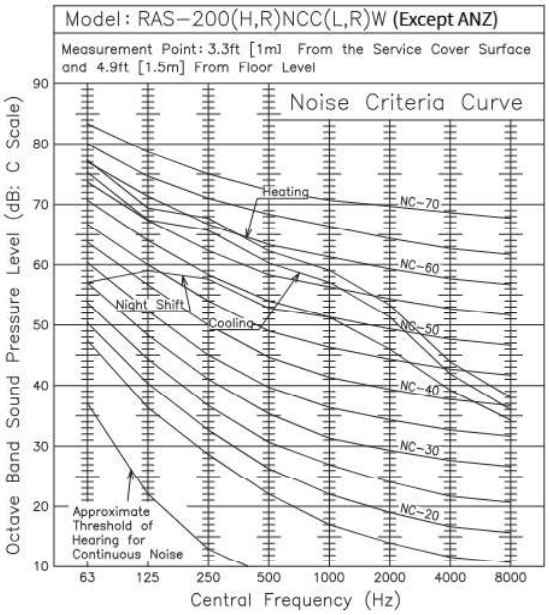
8. Sound Data (Single Unit Only)



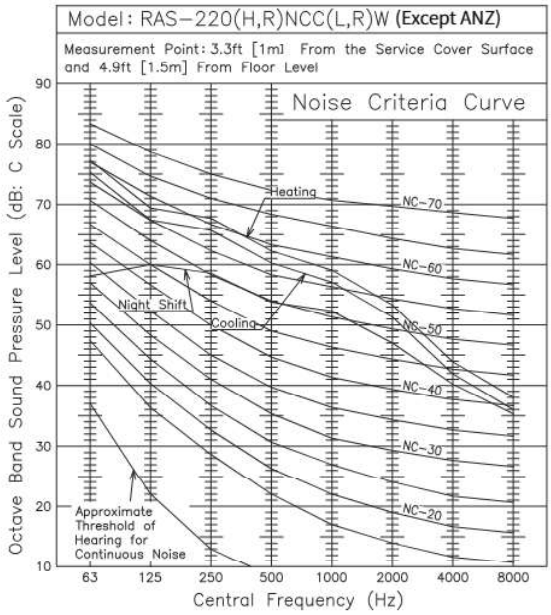
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	65.6	63.8	64.1	59.8	54.6	47.1	40.4	31.9	61.0
	Heating	66.6	64.8	65.1	60.8	55.6	48.1	41.4	32.9	62.0
	Night Shift	61.6	60.2	58.4	57.6	52.0	46.4	37.8	31.4	58.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	72.0	63.5	61.4	60.1	55.4	49.2	39.9	31.6	61.0
	Heating	74.0	65.5	63.4	62.1	57.4	51.2	41.9	33.6	63.0
	Night Shift	60.5	59.1	57.3	56.5	50.9	46.3	36.7	31.0	57.0



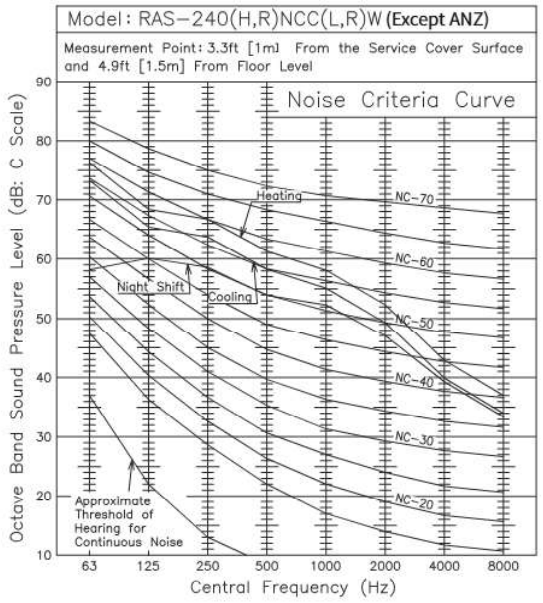
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	67.4	65.7	60.3	57.1	51.3	41.9	36.0	63.0
	Heating	77.3	69.4	67.7	62.3	59.1	53.3	43.9	38.0	65.0
	Night Shift	57.1	59.0	57.6	52.8	51.3	46.0	39.2	34.3	56.0



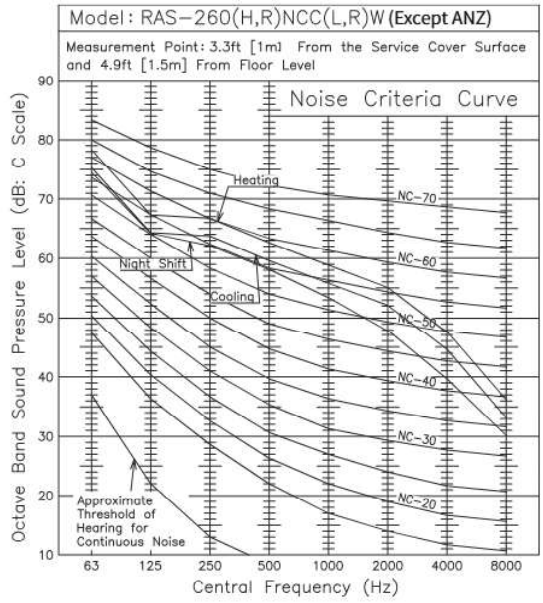
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	67.4	65.7	60.3	57.1	51.3	41.9	36.0	63.0
	Heating	77.3	69.4	67.7	62.3	59.1	53.3	43.9	38.0	65.0
	Night Shift	58.1	60.0	58.6	53.8	52.3	47.0	40.2	35.3	57.0

NOTES:

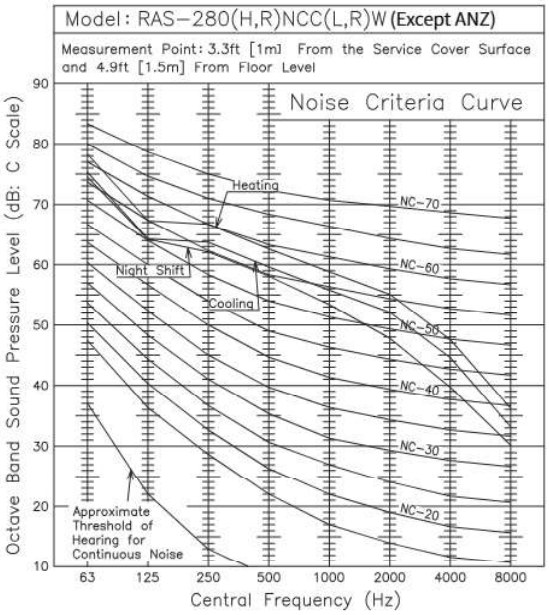
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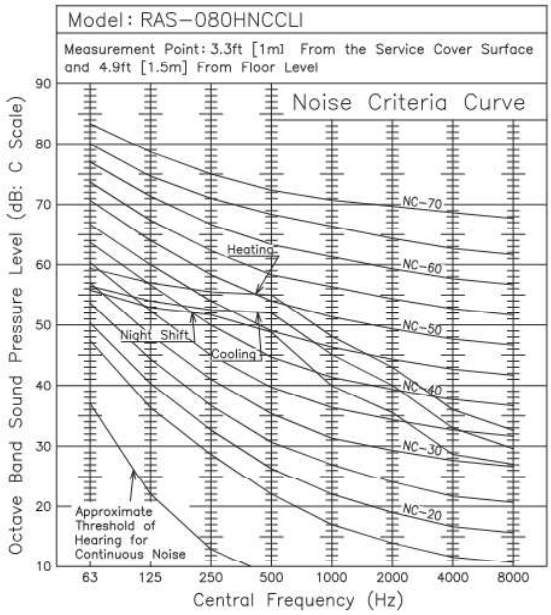
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	73.3	65.4	63.7	58.3	55.1	49.3	39.9	34.0	61.0
	Heating	76.3	68.4	66.7	61.3	58.1	52.3	42.9	37.0	64.0
	Night Shift	58.2	60.1	58.6	53.9	52.3	47.0	39.3	33.4	57.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	62.0
	Heating	78.3	67.3	66.7	62.6	58.8	55.1	47.6	36.2	65.0
	Night Shift	74.5	64.2	62.1	58.1	53.4	47.8	39.7	30.2	60.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	62.0
	Heating	78.3	67.3	66.7	62.6	58.8	55.1	47.6	36.2	65.0
	Night Shift	74.5	64.2	62.1	58.1	53.4	47.8	39.7	30.2	60.0

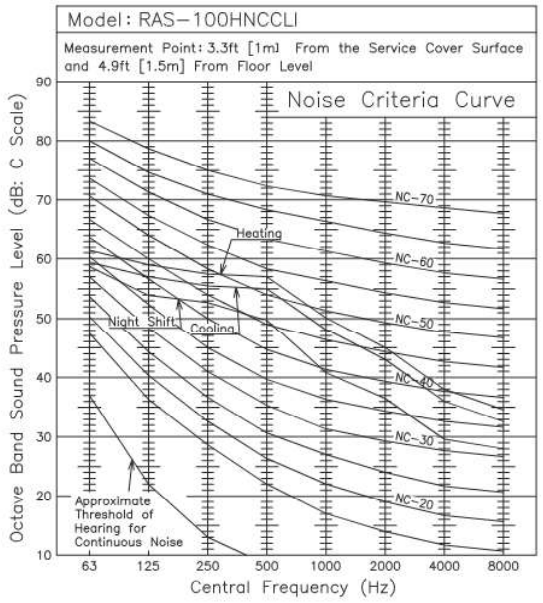


Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	56.4	54.0	52.5	52.0	45.1	40.0	33.0	29.6	52.0
	Heating	59.4	57.0	55.5	55.0	48.1	43.0	36.0	32.6	55.0
	Night Shift	55.8	52.9	51.7	48.8	39.9	35.5	28.7	27.1	49.0

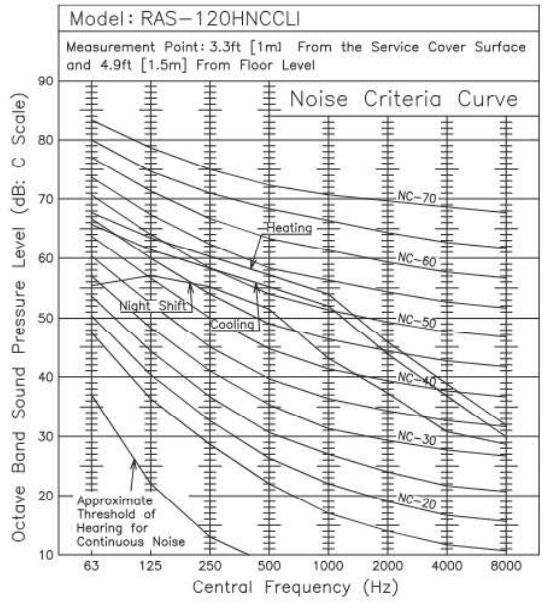
NOTES:

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  However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise.
  Be sure to check environmental conditions before installation.
- The sound of the air inlet side may be 8dB higher than that of the front side.

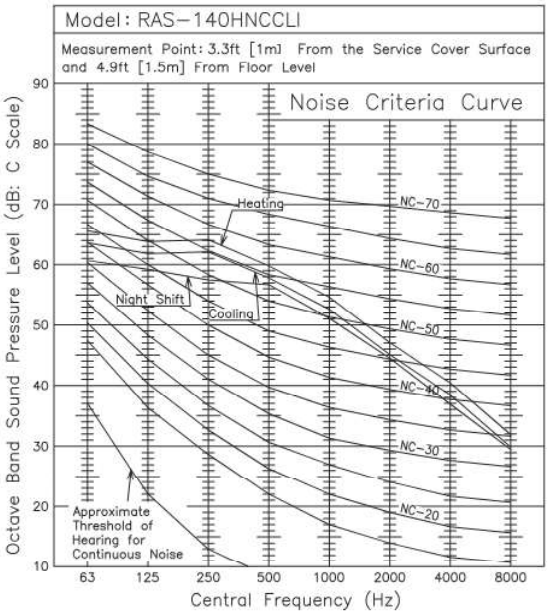
8. Sound Data (Single Unit Only)



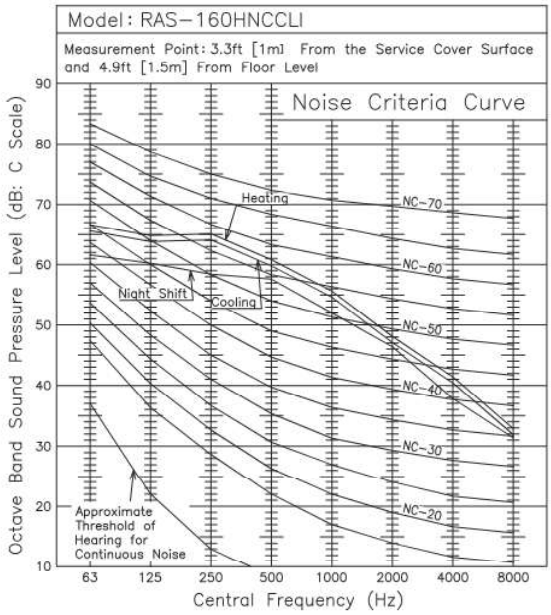
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	59.4	57.0	55.5	55.0	48.1	43.0	36.0	32.6	55.0
	Heating	61.4	59.0	57.5	57.0	50.1	45.0	38.0	34.6	57.0
	Night Shift	58.7	53.9	52.7	49.7	40.8	36.5	29.6	28.0	50.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	65.7	61.4	58.3	55.2	52.0	43.8	36.8	29.9	57.0
	Heating	67.7	63.4	60.3	57.2	54.0	45.8	38.8	31.9	59.0
	Night Shift	55.4	57.1	55.2	51.5	43.1	37.3	30.8	28.7	52.0



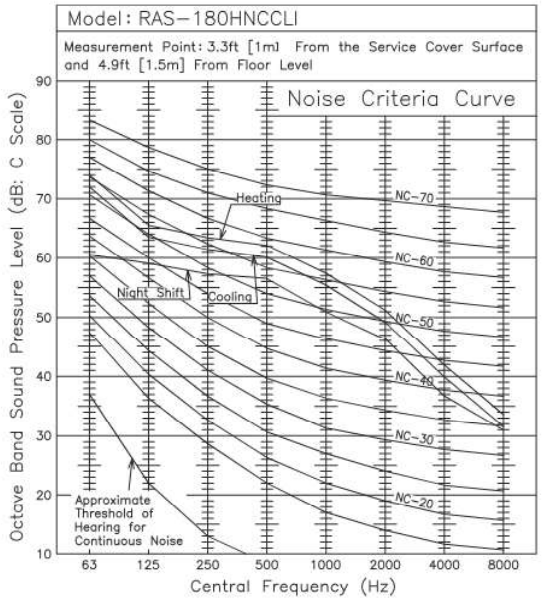
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	63.6	61.8	62.1	57.8	52.6	45.1	38.4	29.9	59.0
	Heating	65.6	63.8	64.1	59.8	54.6	47.1	40.4	31.9	61.0
	Night Shift	60.7	59.2	57.5	56.7	51.1	44.5	36.9	29.5	57.0



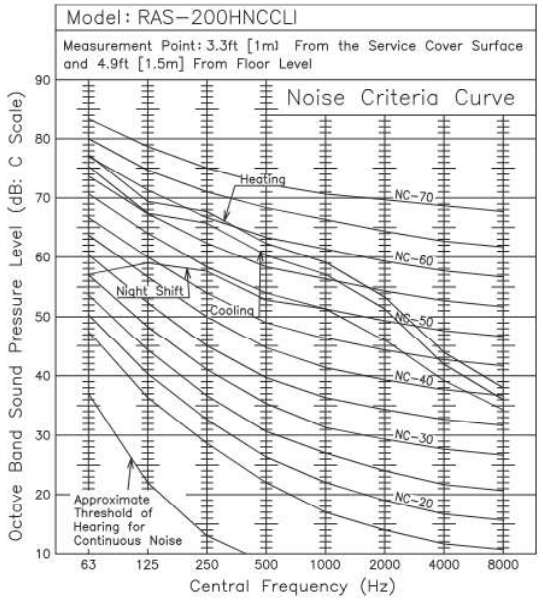
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	65.6	63.8	64.1	59.8	54.6	47.1	40.4	31.9	61.0
	Heating	66.6	64.8	65.1	60.8	55.6	48.1	41.4	32.9	62.0
	Night Shift	61.6	60.2	58.4	57.6	52.0	46.4	37.8	31.4	58.0

NOTES:

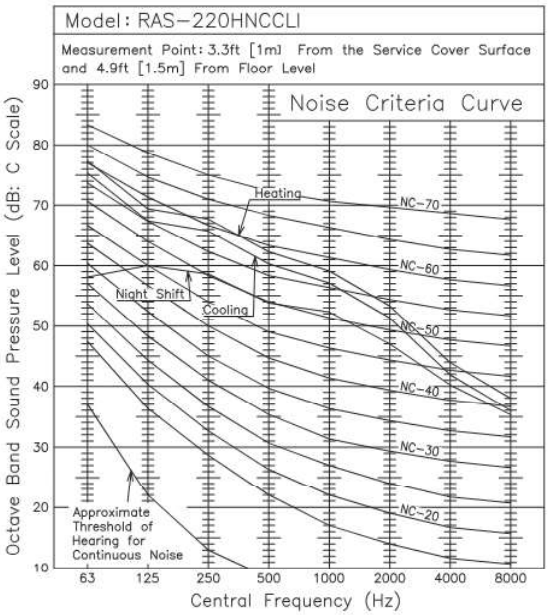
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- The sound of the air inlet side may be 8dB higher than that of the front side.



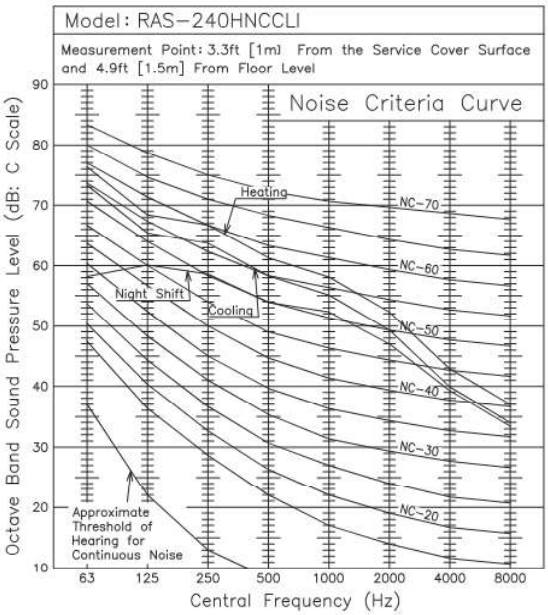
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	72.0	63.5	61.4	60.1	55.4	49.2	39.9	31.6	61.0
	Heating	74.0	65.5	63.4	62.1	57.4	51.2	41.9	33.6	63.0
	Night Shift	60.5	59.1	57.3	56.5	50.9	46.3	36.7	31.0	57.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	67.4	65.7	60.3	57.1	51.3	41.9	36.0	63.0
	Heating	77.3	69.4	67.7	62.3	59.1	53.3	43.9	38.0	65.0
	Night Shift	57.1	59.0	57.6	52.8	51.3	46.0	39.2	34.3	56.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	67.4	65.7	60.3	57.1	51.3	41.9	36.0	63.0
	Heating	77.3	69.4	67.7	62.3	59.1	53.3	43.9	38.0	65.0
	Night Shift	58.1	60.0	58.6	53.8	52.3	47.0	40.2	35.3	57.0

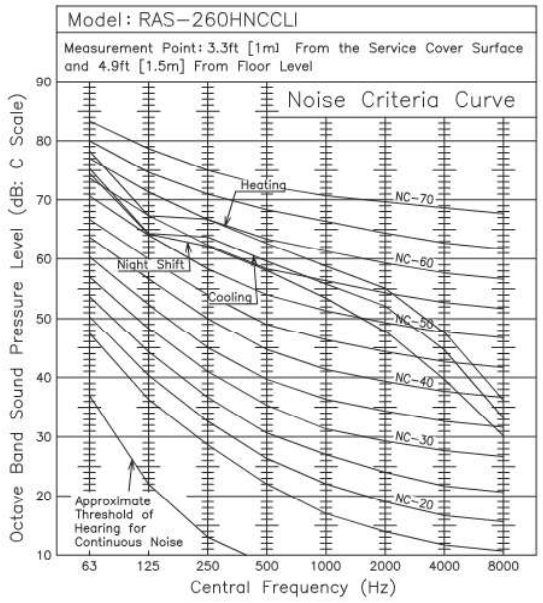


Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	73.3	65.4	63.7	58.3	55.1	49.3	39.9	34.0	61.0
	Heating	76.3	68.4	66.7	61.3	58.1	52.3	42.9	37.0	64.0
	Night Shift	58.2	60.1	58.6	53.9	52.3	47.0	39.3	33.4	57.0

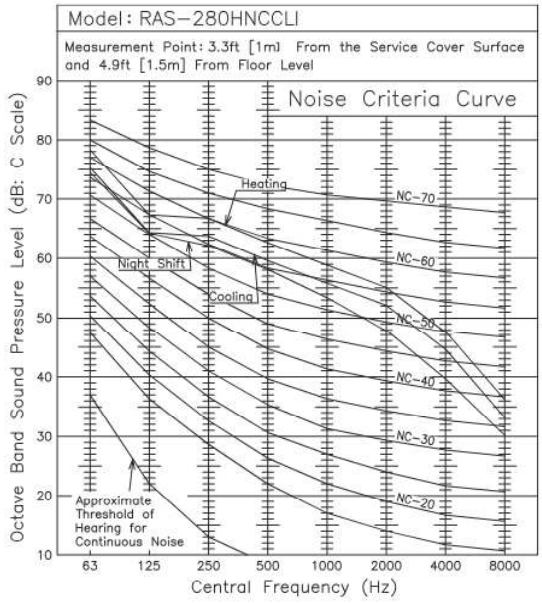
NOTES:

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  However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise.
  Be sure to check environmental conditions before installation.
- The sound of the air inlet side may be 8dB higher than that of the front side.

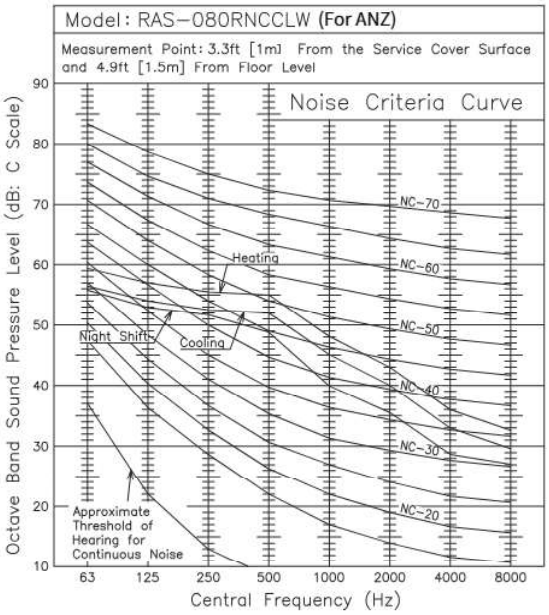
8. Sound Data (Single Unit Only)



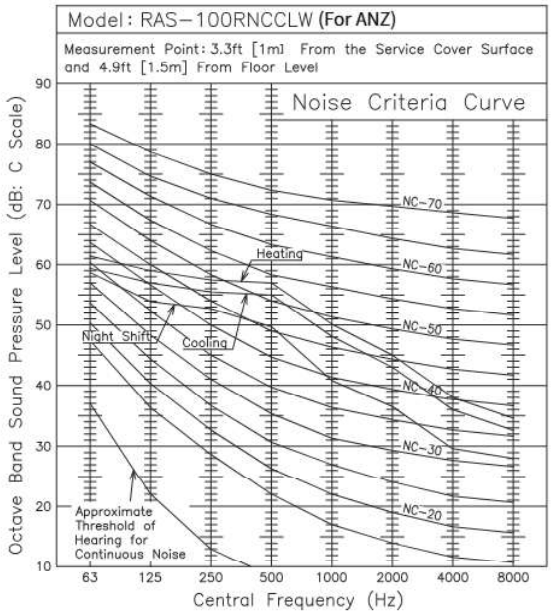
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	62.0
	Heating	78.3	67.3	66.7	62.6	58.8	55.1	47.6	36.2	65.0
	Night Shift	74.5	64.2	62.1	58.1	53.4	47.8	39.7	30.2	60.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	62.0
	Heating	78.3	67.3	66.7	62.6	58.8	55.1	47.6	36.2	65.0
	Night Shift	74.5	64.2	62.1	58.1	53.4	47.8	39.7	30.2	60.0



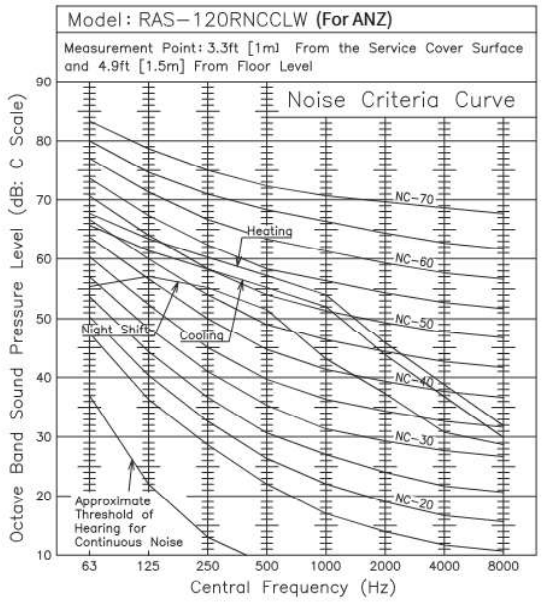
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	56.4	54.0	52.5	52.0	45.1	40.0	33.0	29.6	52.0
	Heating	59.4	57.0	55.5	55.0	48.1	43.0	36.0	32.6	55.0
	Night Shift	55.8	52.9	51.7	48.8	39.9	35.5	28.7	27.1	49.0



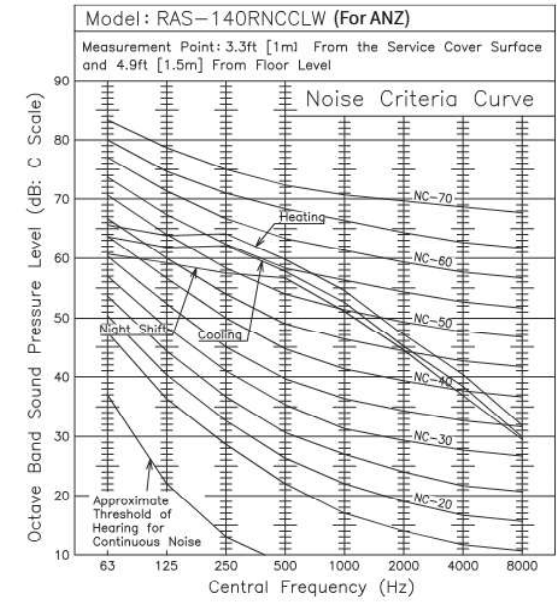
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	59.4	57.0	55.5	55.0	48.1	43.0	36.0	32.6	55.0
	Heating	61.4	59.0	57.5	57.0	50.1	45.0	38.0	34.6	57.0
	Night Shift	58.7	53.9	52.7	49.7	40.8	36.5	29.6	28.0	50.0

NOTES:

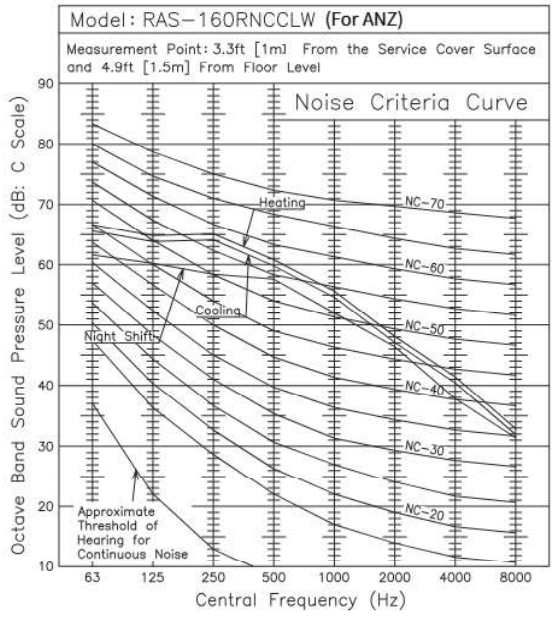
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  Be sure to check environmental conditions before installation.
- The sound of the air inlet side may be 8dB higher than that of the front side.



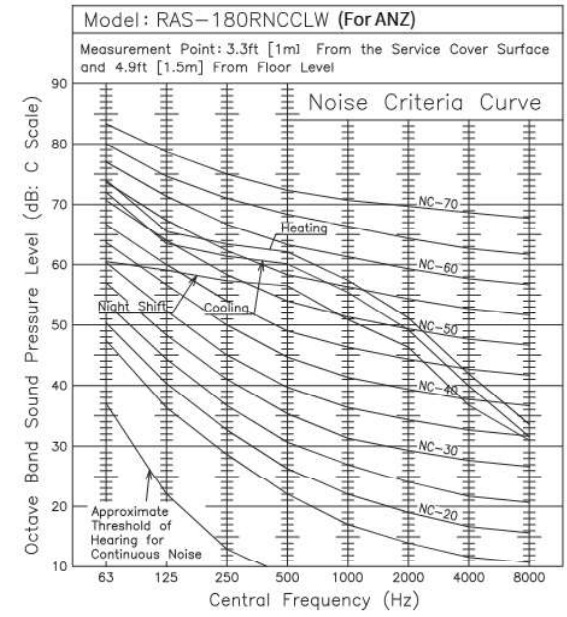
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	65.7	61.4	58.3	55.2	52.0	43.8	36.8	29.9	57.0
	Heating	67.7	63.4	60.3	57.2	54.0	45.8	38.8	31.9	59.0
	Night Shift	55.4	57.1	55.2	51.5	43.1	37.3	30.8	28.7	52.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	63.6	61.8	62.1	57.8	52.6	45.1	38.4	29.9	59.0
	Heating	65.6	63.8	64.1	59.8	54.6	47.1	40.4	31.9	61.0
	Night Shift	60.7	59.2	57.5	56.7	51.1	44.5	36.9	29.5	57.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	65.6	63.8	64.1	59.8	54.6	47.1	40.4	31.9	61.0
	Heating	66.6	64.8	65.1	60.8	55.6	48.1	41.4	32.9	62.0
	Night Shift	61.6	60.2	58.4	57.6	52.0	46.4	37.8	31.4	58.0

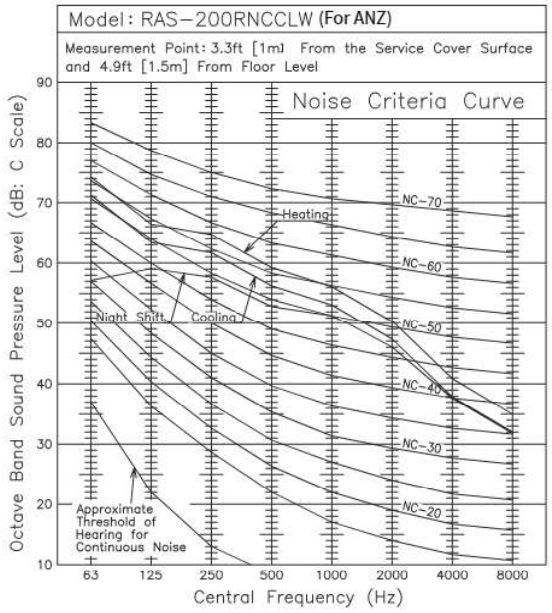


Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	72.0	63.5	61.4	60.1	55.4	49.2	39.9	31.6	61.0
	Heating	74.0	65.5	63.4	62.1	57.4	51.2	41.9	33.6	63.0
	Night Shift	60.5	59.1	57.3	56.5	50.9	46.3	36.7	31.0	57.0

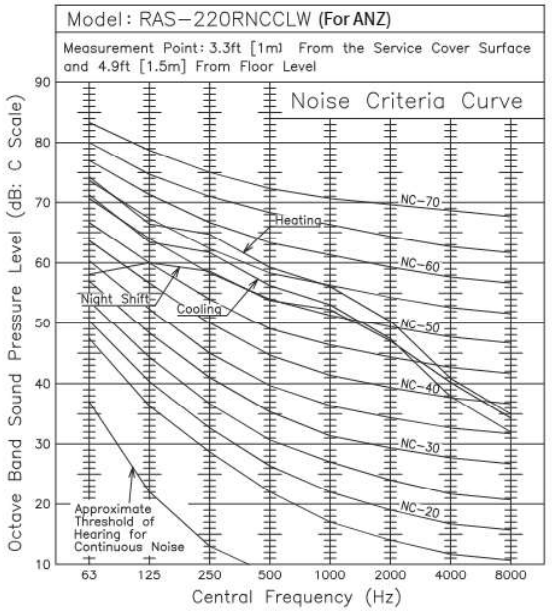
NOTES:

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- The sound of the air inlet side may be 8dB higher than that of the front side.

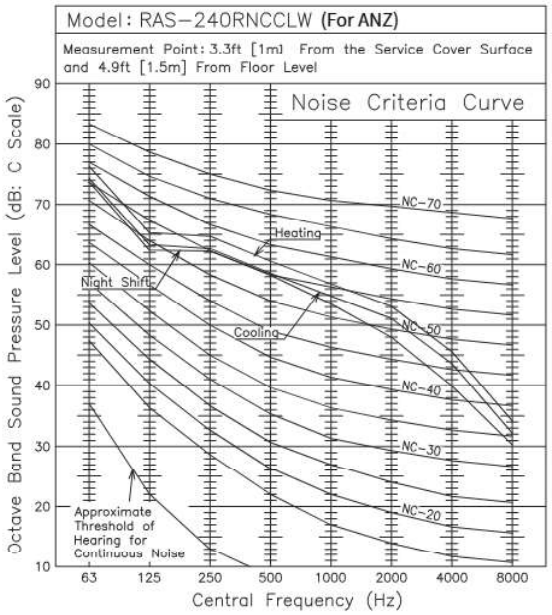
8. Sound Data (Single Unit Only)



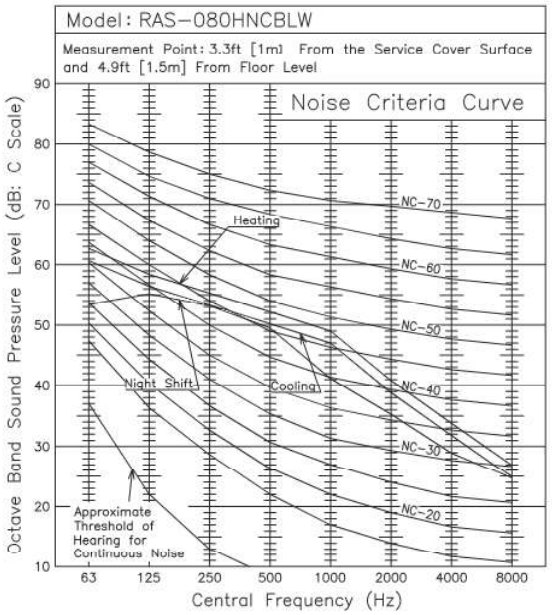
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB)	Cooling	71.3	63.4	61.7	56.3	53.1	47.3	37.9	32.0	59.0
	Heating	74.3	66.4	64.7	59.3	56.1	50.3	40.9	35.0	62.0
	Night Shift	57.2	59.1	57.7	52.9	51.3	46.0	37.6	31.8	56.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB)	Cooling	71.3	63.4	61.7	56.3	53.1	47.3	37.9	32.0	59.0
	Heating	74.3	66.4	64.7	59.3	56.1	50.3	40.9	35.0	62.0
	Night Shift	58.1	60.0	58.6	53.8	52.3	47.0	40.2	34.3	57.0



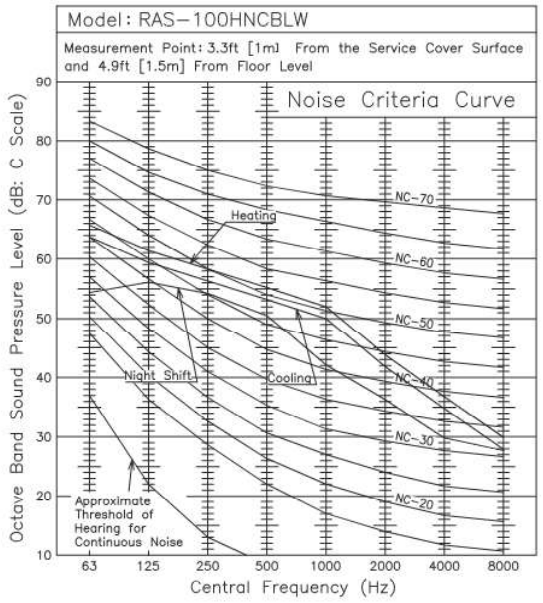
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	74.3	63.3	62.7	58.6	54.8	51.1	43.6	32.2	61.0
	Heating	76.3	65.3	64.7	60.6	56.8	53.1	45.6	34.2	63.0
	Night Shift	73.7	62.4	62.3	58.3	53.5	48.0	39.9	30.3	60.0



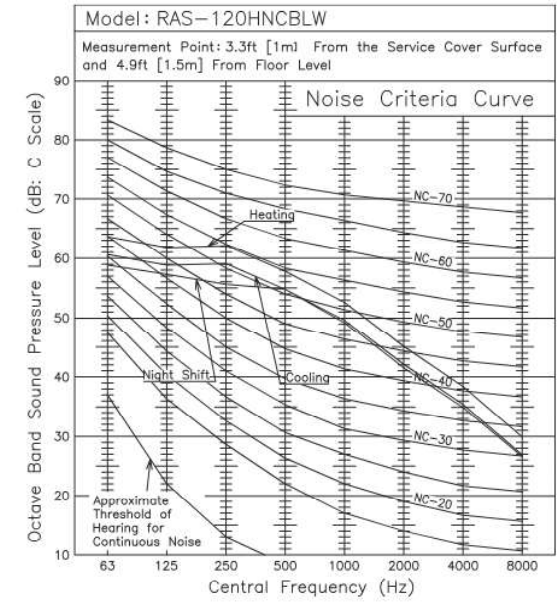
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	60.7	56.4	53.3	50.2	47.0	38.8	31.8	24.9	52.0
	Heating	62.7	58.4	55.3	52.2	49.0	40.8	33.8	26.9	54.0
	Night Shift	53.4	55.2	53.2	49.5	41.1	35.3	28.9	24.7	50.0

NOTES:

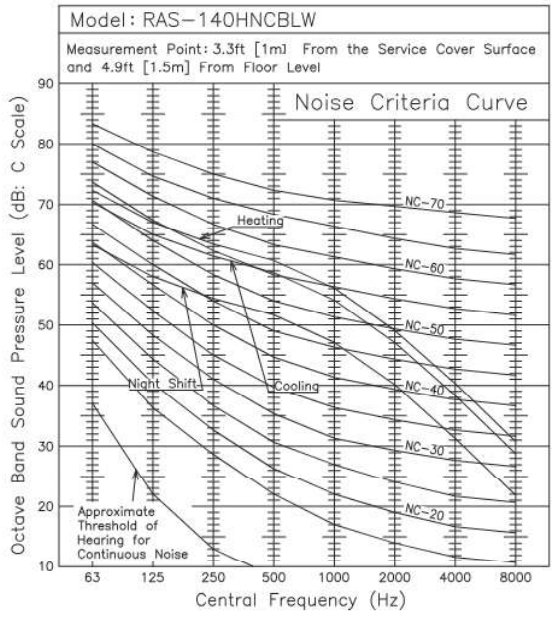
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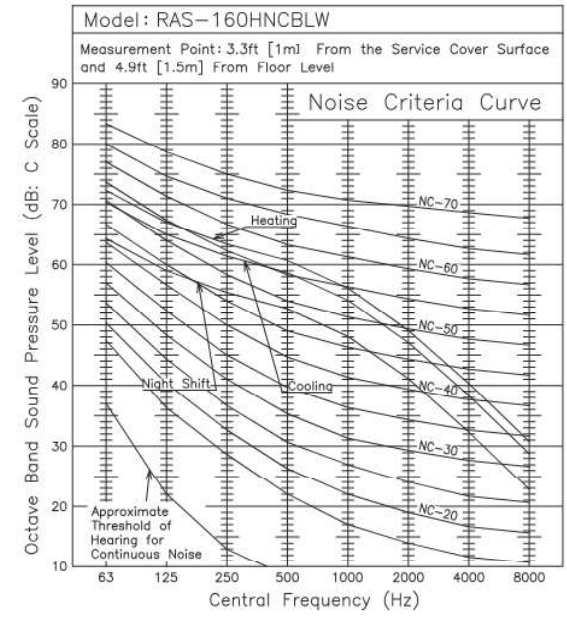
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	63.7	59.4	56.3	53.2	50.0	41.8	34.8	27.9	55.0
	Heating	65.7	61.4	58.3	55.2	52.0	43.8	36.8	29.9	57.0
	Night Shift	54.4	56.1	54.2	50.5	42.1	36.3	29.8	27.7	51.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	60.6	58.8	59.1	54.8	49.6	42.1	35.4	26.9	56.0
	Heating	63.6	61.8	62.1	57.8	52.6	45.1	38.4	29.9	59.0
	Night Shift	58.8	57.3	55.6	54.8	49.2	41.5	34.9	26.6	55.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	70.3	65.0	61.4	58.7	54.1	47.1	38.3	28.8	60.0
	Heating	72.3	67.0	63.4	60.7	56.1	49.1	40.3	30.8	62.0
	Night Shift	63.3	58.0	54.4	51.7	47.1	40.1	31.3	21.8	53.0

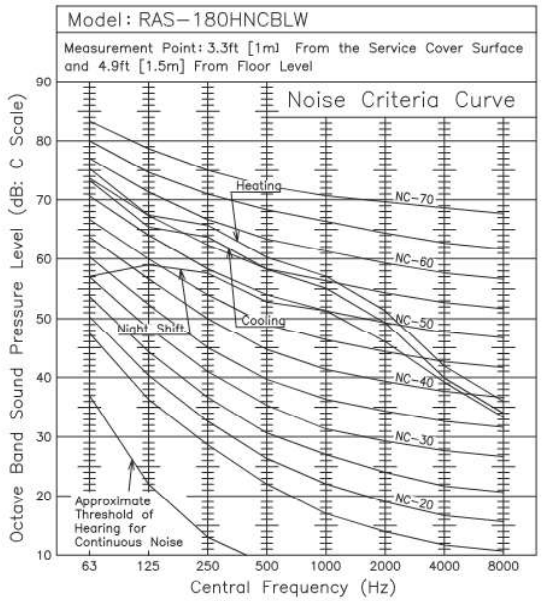


Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	70.3	65.0	61.4	58.7	54.1	47.1	38.3	28.8	60.0
	Heating	72.3	67.0	63.4	60.7	56.1	49.1	40.3	30.8	62.0
	Night Shift	64.3	59.0	55.4	52.7	48.1	41.1	32.3	22.8	54.0

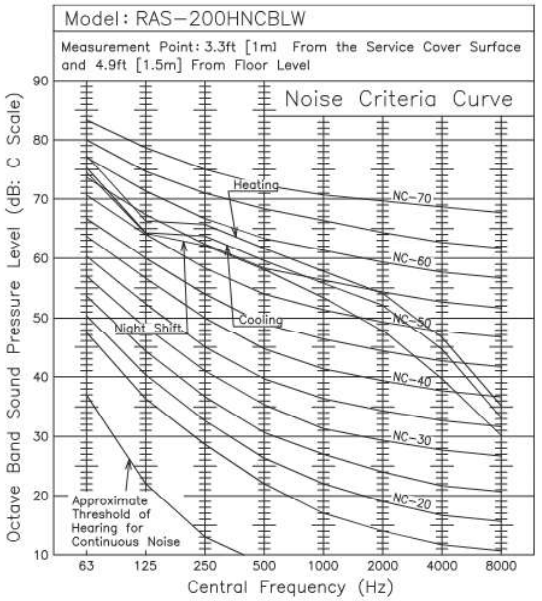
NOTES:

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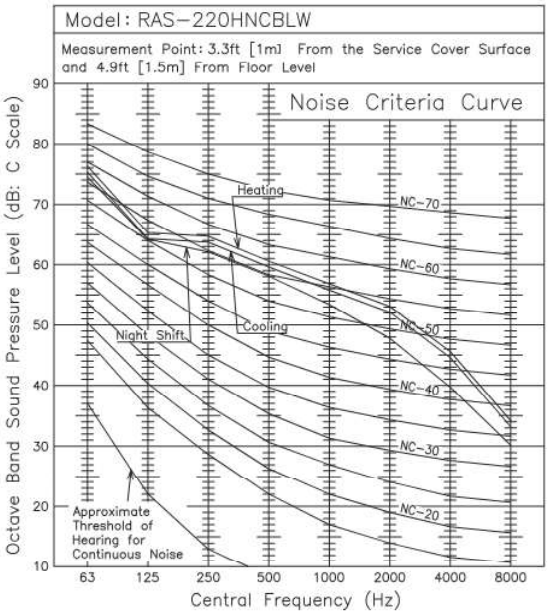
8. Sound Data (Single Unit Only)



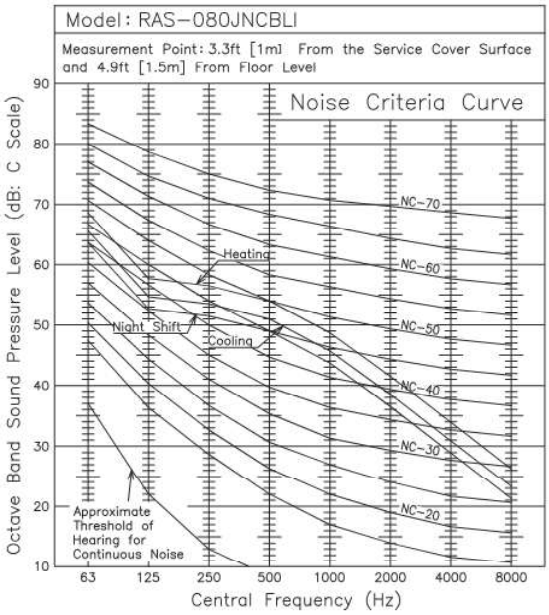
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	73.3	65.4	63.7	58.3	55.1	49.3	39.9	34.0	61.0
	Heating	75.3	67.4	65.7	60.3	57.1	51.3	41.9	36.0	63.0
	Night Shift	57.1	59.0	57.6	52.8	51.3	46.0	39.2	33.3	56.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	62.0
	Heating	77.3	66.3	65.7	61.6	57.8	54.1	46.6	35.2	64.0
	Night Shift	74.5	64.2	62.1	58.1	53.4	47.8	39.7	30.2	60.0



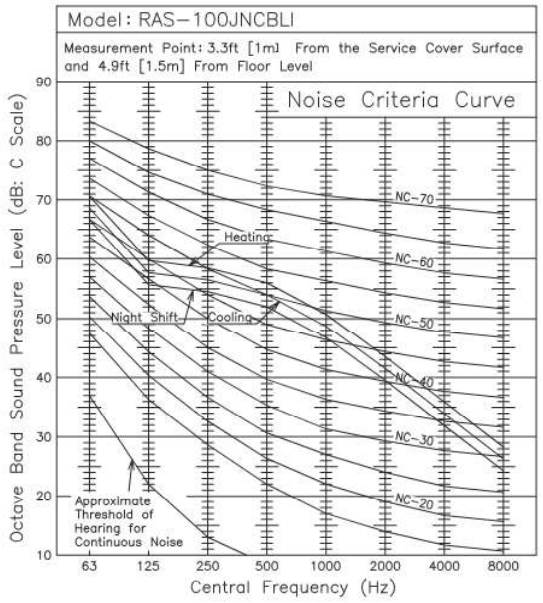
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	62.0
	Heating	76.3	65.3	64.7	60.6	56.8	53.1	45.6	34.2	63.0
	Night Shift	74.5	64.2	62.1	58.1	53.4	47.8	39.7	30.2	60.0



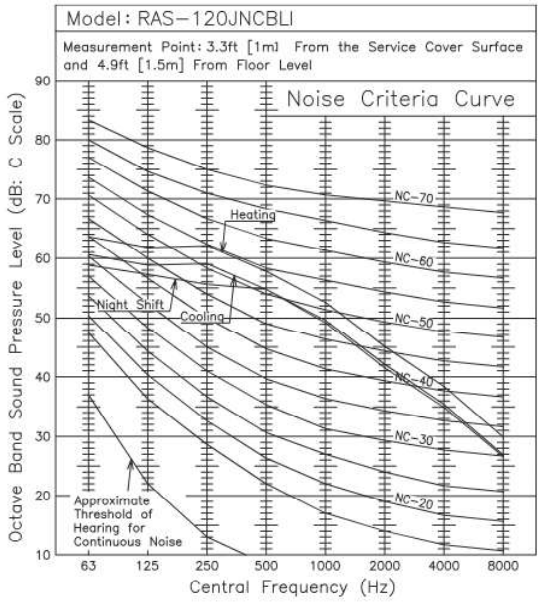
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	65.6	54.7	53.5	51.0	45.7	38.5	30.9	23.3	52.0
	Heating	68.6	57.7	56.5	54.0	48.7	41.5	33.9	26.3	54.0
	Night Shift	63.6	52.7	51.5	49.0	43.7	36.5	28.9	21.3	50.0

NOTES:

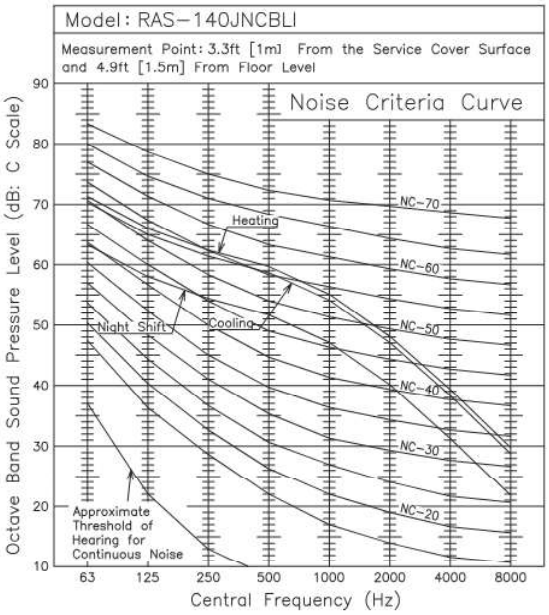
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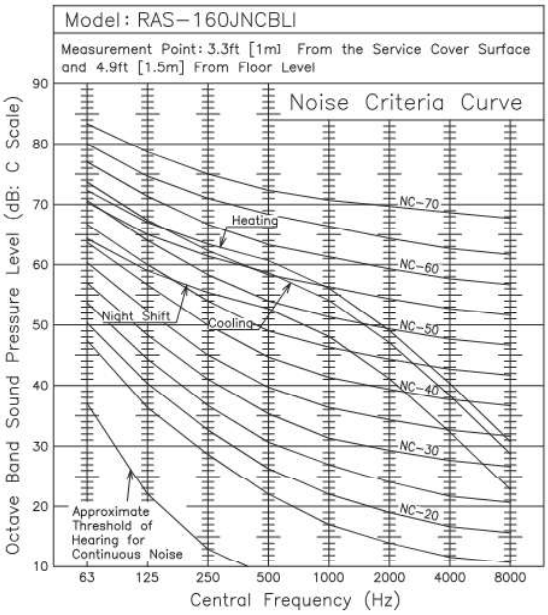
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	68.6	57.7	56.5	54.0	48.7	41.5	33.9	26.3	55.0
	Heating	70.6	59.7	58.5	56.0	50.7	43.5	35.9	28.3	57.0
	Night Shift	66.6	55.7	54.5	52.0	46.7	39.5	31.9	24.3	51.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	60.6	58.8	59.1	54.8	49.6	42.1	35.4	26.9	56.0
	Heating	63.6	61.8	62.1	57.8	52.6	45.1	38.4	29.9	59.0
	Night Shift	58.8	57.3	55.6	54.8	49.2	41.5	34.9	26.6	55.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	70.3	65.0	61.4	58.7	54.1	47.1	38.3	28.8	60.0
	Heating	71.3	66.0	62.4	59.7	55.1	48.1	39.3	29.8	62.0
	Night Shift	63.3	58.0	54.4	51.7	47.1	40.1	31.3	21.8	53.0

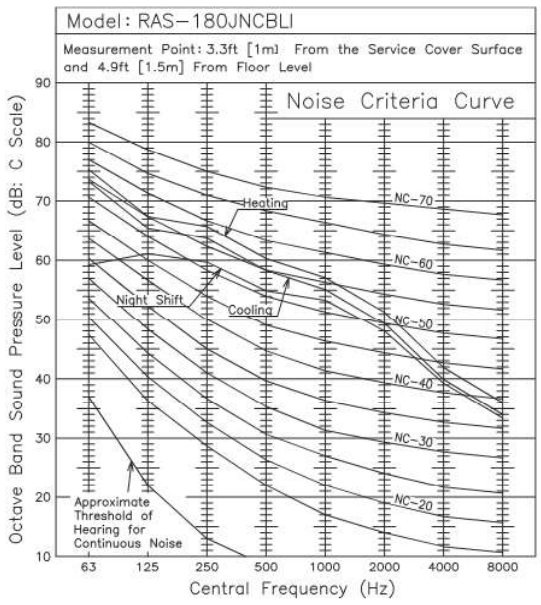


Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	70.3	65.0	61.4	58.7	54.1	47.1	38.3	28.8	60.0
	Heating	72.3	67.0	63.4	60.7	56.1	49.1	40.3	30.8	62.0
	Night Shift	64.3	59.0	55.4	52.7	48.1	41.1	32.3	22.8	54.0

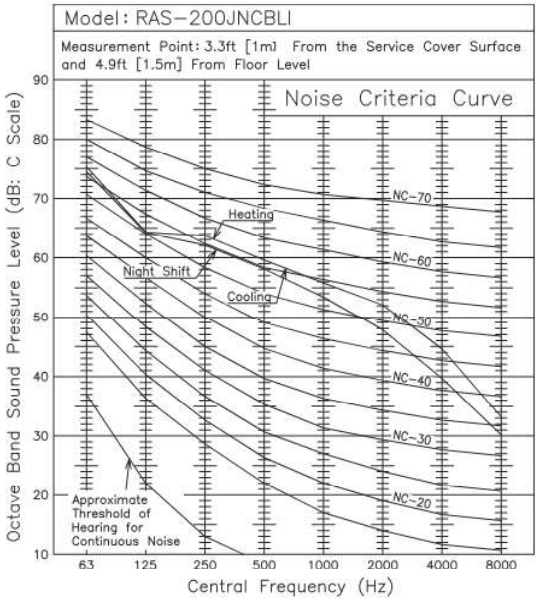
NOTES:

- The sound data is measured in an anechoic chamber.
  However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise.
  Be sure to check environmental conditions before installation.
- The sound of the air inlet side may be 8dB higher than that of the front side.

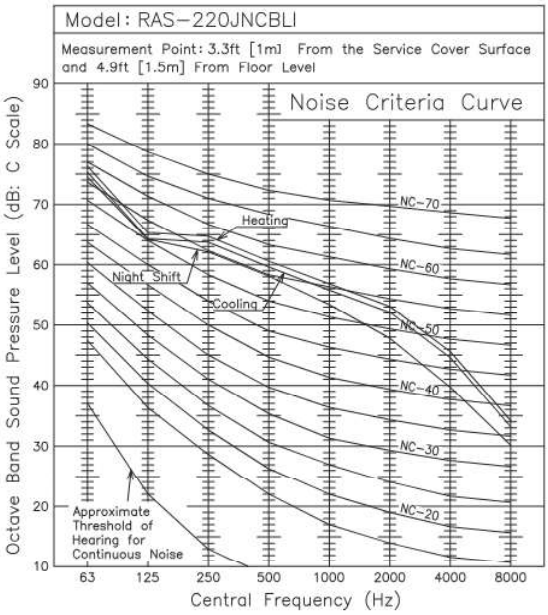
8. Sound Data (Single Unit Only)



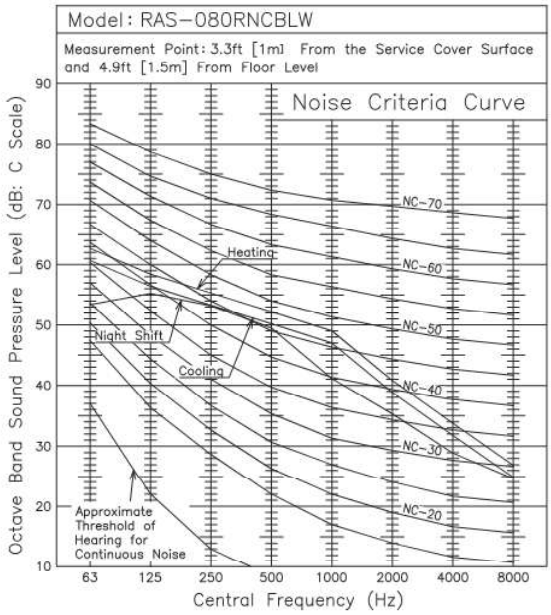
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	73.3	65.4	63.7	58.3	55.1	49.3	39.9	34.0	61.0
	Heating	75.3	67.4	65.7	60.3	57.1	51.3	41.9	36.0	63.0
	Night Shift	59.2	61.1	59.7	54.9	53.3	48.0	39.3	33.4	56.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	62.0
	Heating	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	64.0
	Night Shift	74.5	64.2	62.1	58.1	53.4	47.8	39.7	30.2	60.0



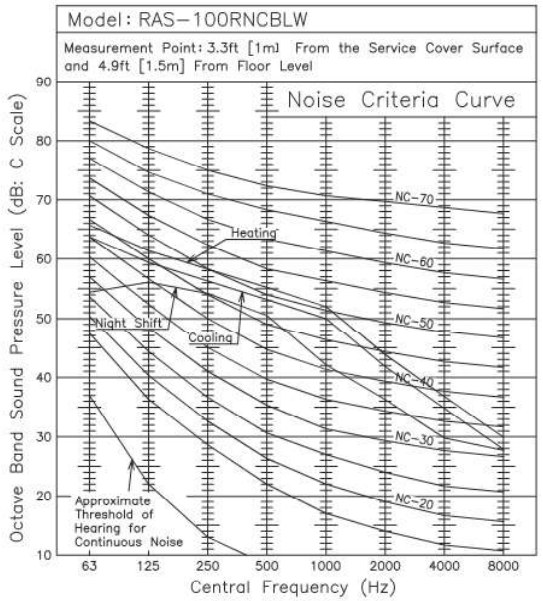
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	62.0
	Heating	76.3	65.3	64.7	60.6	56.8	53.1	45.6	34.2	63.0
	Night Shift	74.5	64.2	62.1	58.1	53.4	47.8	39.7	30.2	60.0



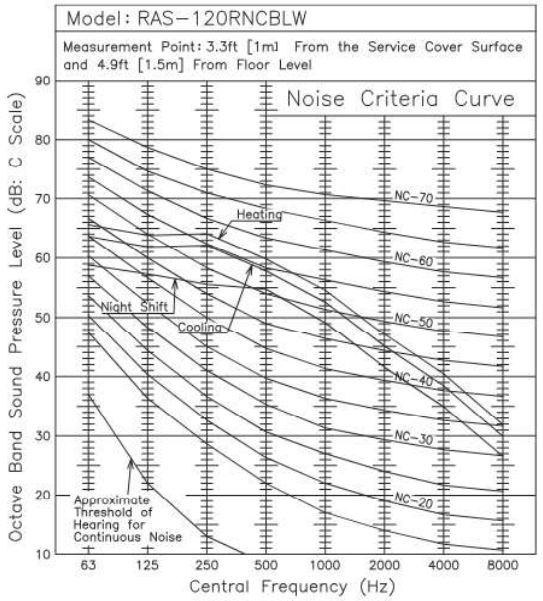
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	60.7	56.4	53.3	50.2	47.0	38.8	31.8	24.9	52.0
	Heating	62.7	58.4	55.3	52.2	49.0	40.8	33.8	26.9	54.0
	Night Shift	53.4	55.2	53.2	49.5	41.1	35.3	28.9	24.7	50.0

NOTES:

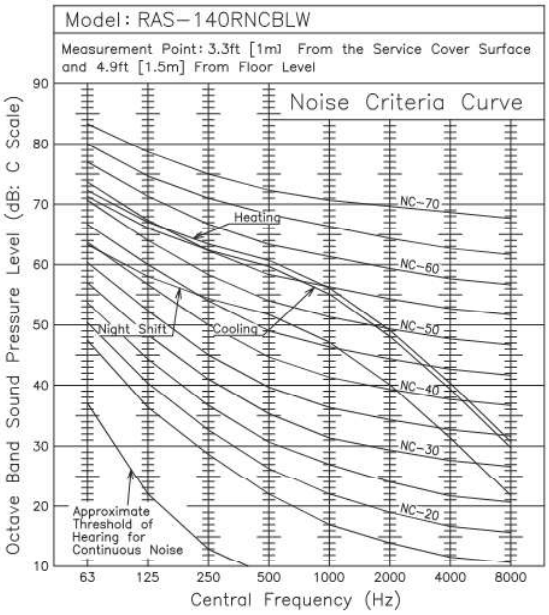
- The sound data is measured in an anechoic chamber.
  However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise.
  Be sure to check environmental conditions before installation.
- The sound of the air inlet side may be 8dB higher than that of the front side.



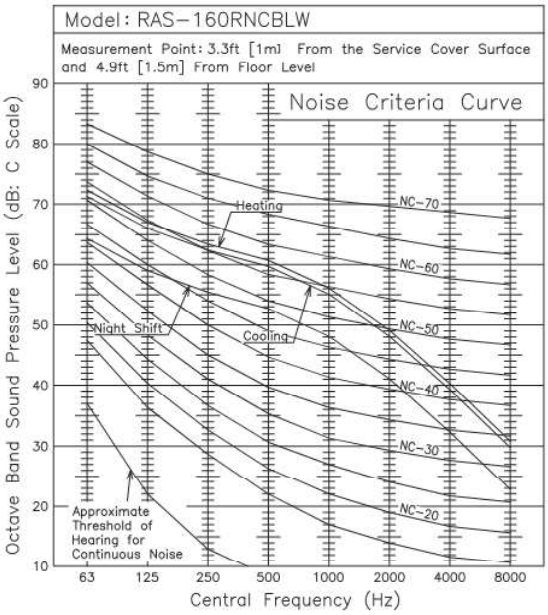
Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	63.7	59.4	56.3	53.2	50.0	41.8	34.8	27.9	55.0
	Heating	65.7	61.4	58.3	55.2	52.0	43.8	36.8	29.9	57.0
	Night Shift	54.4	56.1	54.2	50.5	42.1	36.3	29.8	27.7	51.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB)	Cooling	63.6	61.8	62.1	57.8	52.6	45.1	38.4	29.9	59.0
	Heating	65.6	63.8	64.1	59.8	54.6	47.1	40.4	31.9	61.0
	Night Shift	58.8	57.3	55.6	54.8	49.2	41.5	34.9	26.6	55.0



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB)	Cooling	71.3	66.0	62.4	59.7	55.1	48.1	39.3	29.8	61.0
	Heating	72.3	67.0	63.4	60.7	56.1	49.1	40.3	30.8	62.0
	Night Shift	63.3	58.0	54.4	51.7	47.1	40.1	31.3	21.8	53.0

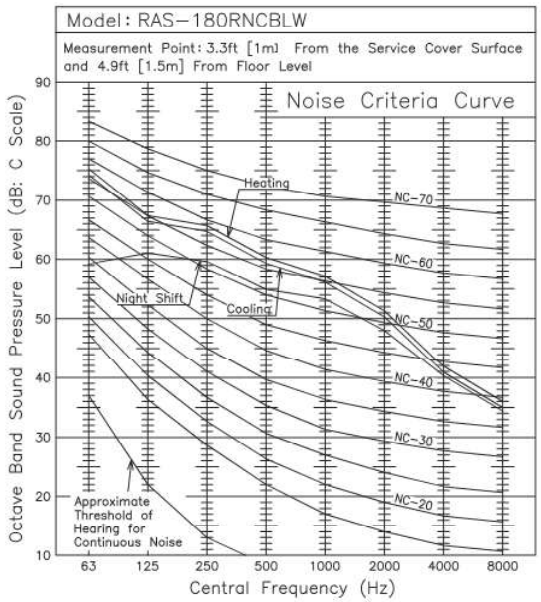


Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	71.3	66.0	62.4	59.7	55.1	48.1	39.3	29.8	61.0
	Heating	72.3	67.0	63.4	60.7	56.1	49.1	40.3	30.8	62.0
	Night Shift	64.3	59.0	55.4	52.7	48.1	41.1	32.3	22.8	54.0

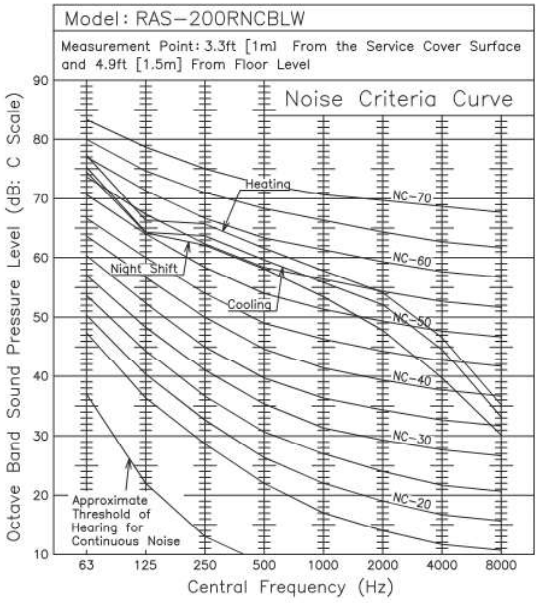
NOTES:

- The sound data is measured in an anechoic chamber.
  However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise.
  Be sure to check environmental conditions before installation.
- The sound of the air inlet side may be 8dB higher than that of the front side.

8. Sound Data (Single Unit Only)



Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	74.3	66.4	64.7	59.3	56.1	50.3	40.9	35.0	62.0
	Heating	75.3	67.4	65.7	60.3	57.1	51.3	41.9	36.0	63.0
	Night Shift	59.2	61.1	59.6	54.9	53.3	48.0	40.3	34.4	58.0

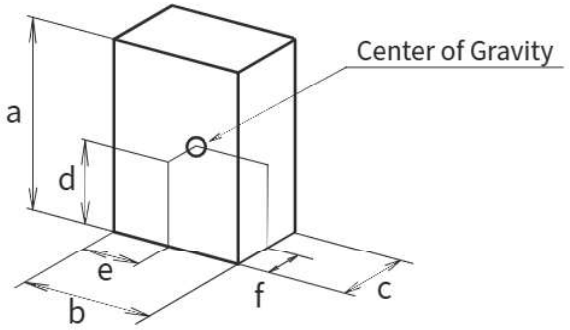


Central Frequency (Hz)		63	125	250	500	1000	2000	4000	8000	Overall (A Scale)
Sound Data (dB) (C Scale)	Cooling	75.3	64.3	63.7	59.6	55.8	52.1	44.6	33.2	62.0
	Heating	77.3	66.3	65.7	61.6	57.8	54.1	46.6	35.2	64.0
	Night Shift	74.5	64.2	62.1	58.1	53.4	47.8	39.7	30.2	60.0

NOTES:

- The sound data is measured in an anechoic chamber.
  However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise.
  Be sure to check environmental conditions before installation.
- The sound of the air inlet side may be 8dB higher than that of the front side.

9. Center of Gravity



Front Side of Unit

9.1 Heat Pump

(Standard Type)
MEA, IN/SA and NEU

Model	3N~380-415V 50Hz 3N~380V 60Hz (mm)						Weight (kg)	
	a	b	c	d	e	f	Net	Gross
RAS-080HNCCL(I/W)	1805	975	775	725	510	335	207	226
RAS-100HNCCL(I/W)	1805	975	775	725	510	335	212	231
RAS-120HNCCL(I/W)	1805	975	775	725	510	335	226	245
RAS-140HNCCL(I/W)	1805	1235	775	760	630	350	281	302
RAS-160HNCCL(I/W)	1805	1235	775	760	630	350	282	303
RAS-180HNCCL(I/W)	1805	1235	775	760	630	350	282	303
RAS-200HNCCL(I/W)	1805	1625	775	690	820	340	364	388
RAS-220HNCCL(I/W)	1805	1625	775	690	820	340	364	388
RAS-240HNCCL(I/W)	1805	1625	775	690	820	340	364	388
RAS-260HNCCL(I/W)	1805	1625	775	690	820	340	390	414
RAS-280HNCCL(I/W)	1805	1625	775	690	820	340	390	414

SEA

Model	3N~380-415V 50Hz 3N~380V 60Hz (mm)						Weight (kg)	
	a	b	c	d	e	f	Net	Gross
RAS-080HNCCLW	1795	950	765	660	515	330	191	210
RAS-100HNCCLW	1795	950	765	660	515	330	197	216
RAS-120HNCCLW	1795	950	765	660	515	330	211	230
RAS-140HNCCLW	1795	1210	765	705	635	350	264	285
RAS-160HNCCLW	1795	1210	765	705	635	350	265	286
RAS-180HNCCLW	1795	1210	765	705	635	350	265	286
RAS-200HNCCLW	1795	1600	765	635	820	335	341	365
RAS-220HNCCLW	1795	1600	765	635	820	335	341	365
RAS-240HNCCLW	1795	1600	765	635	820	335	341	365
RAS-260HNCCLW	1795	1600	765	635	820	335	367	392
RAS-280HNCCLW	1795	1600	765	635	820	335	367	392

9. Center of Gravity

(High Efficiency Type)
SEA

Model	3N~380-415V 50Hz 3N~380V 60Hz (mm)						Weight (kg)	
	a	b	c	d	e	f	Net	Gross
RAS-080HNCBLW	1795	950	765	660	515	330	211	230
RAS-100HNCBLW	1795	950	765	660	515	330	211	230
RAS-120HNCBLW	1795	1210	765	705	635	350	264	300
RAS-140HNCBLW	1795	1210	765	695	690	330	300	321
RAS-160HNCBLW	1795	1210	765	695	690	330	300	321
RAS-180HNCBLW	1795	1600	765	635	820	335	341	365
RAS-200HNCBLW	1795	1600	765	635	820	335	367	391
RAS-220HNCBLW	1795	1600	765	635	820	335	367	391

(High Ambient Type)
MEA

Model	3N~380-415V 50Hz 3N~380V 60Hz (mm)						Weight (kg)	
	a	b	c	d	e	f	Net	Gross
RAS-080JNCBLI	1805	975	775	725	510	335	229	248
RAS-100JNCBLI	1805	975	775	725	510	335	229	248
RAS-120JNCBLI	1805	1235	775	760	630	350	281	302
RAS-140JNCBLI	1805	1235	775	735	685	335	317	338
RAS-160JNCBLI	1805	1235	775	735	685	335	317	338
RAS-180JNCBLI	1805	1625	775	690	820	340	363	388
RAS-200JNCBLI	1805	1625	775	690	820	340	390	414
RAS-220JNCBLI	1805	1625	775	690	820	340	390	414

9.2 Heat Recovery and Universal

(Standard Type)

MEA

Model	3N~380-415V 50Hz 3N~380V 60Hz (mm)						Weight (kg)	
	a	b	c	d	e	f	Net	Gross
RAS-080RNCCLW	1805	975	775	725	510	335	210	229
RAS-100RNCCLW	1805	975	775	725	510	335	215	234
RAS-120RNCCLW	1805	975	775	725	510	335	230	249
RAS-140RNCCLW	1805	1235	775	760	630	350	285	306
RAS-160RNCCLW	1805	1235	775	760	630	350	286	307
RAS-180RNCCLW	1805	1235	775	760	630	350	286	307
RAS-200RNCCLW	1805	1625	775	690	820	340	368	392
RAS-220RNCCLW	1805	1625	775	690	820	340	368	392
RAS-240RNCCLW	1805	1625	775	690	820	340	368	392
RAS-260RNCCLW	1805	1625	775	690	820	340	393	417
RAS-280RNCCLW	1805	1625	775	690	820	340	393	417

ANZ

Model	3N~380-415V 50Hz 3N~380V 60Hz (mm)						Weight (kg)	
	a	b	c	d	e	f	Net	Gross
RAS-080RNCCLW	1795	975	765	660	515	330	197	216
RAS-100RNCCLW	1795	975	765	660	515	330	203	221
RAS-120RNCCLW	1795	975	765	660	515	330	217	236
RAS-140RNCCLW	1795	1235	765	705	635	350	271	292
RAS-160RNCCLW	1795	1235	765	705	635	350	272	293
RAS-180RNCCLW	1795	1235	765	705	635	350	272	293
RAS-200RNCCLW	1795	1625	765	635	820	335	350	374
RAS-220RNCCLW	1795	1625	765	635	820	335	350	374
RAS-240RNCCLW	1795	1625	765	635	820	335	375	399

LA(380-415V)

Model	3N~380-415V 50Hz 3N~380V 60Hz (mm)						Weight (kg)	
	a	b	c	d	e	f	Net	Gross
RAS-080RNCCLW	1795	975	765	660	515	330	197	216
RAS-100RNCCLW	1795	975	765	660	515	330	203	221
RAS-120RNCCLW	1795	975	765	660	515	330	217	236
RAS-140RNCCLW	1795	1235	765	705	635	350	271	292
RAS-160RNCCLW	1795	1235	765	705	635	350	272	293
RAS-180RNCCLW	1795	1235	765	705	635	350	272	293
RAS-200RNCCLW	1795	1625	765	635	820	335	350	374
RAS-220RNCCLW	1795	1625	765	635	820	335	350	374
RAS-240RNCCLW	1795	1625	765	635	820	335	350	374
RAS-260RNCCLW	1795	1625	765	635	820	335	375	399
RAS-280RNCCLW	1795	1625	765	635	820	335	375	399

9. Center of Gravity

LA(220V)

Model	3~220V 60Hz					(mm)	Weight (kg)	
	a	b	c	d	e	f	Net	Gross
RAS-080RNCCRW	1795	975	765	660	515	330	222	241
RAS-100RNCCRW	1795	975	765	660	515	330	227	246
RAS-120RNCCRW	1795	975	765	660	515	330	245	263
RAS-140RNCCRW	1795	1235	765	705	635	350	302	323
RAS-160RNCCRW	1795	1235	765	705	635	350	303	324
RAS-180RNCCRW	1795	1235	765	705	635	350	304	325
RAS-200RNCCRW	1795	1625	765	635	820	335	386	410
RAS-220RNCCRW	1795	1625	765	635	820	335	386	410
RAS-240RNCCRW	1795	1625	765	635	820	335	386	411
RAS-260RNCCRW	1795	1625	765	635	820	335	392	416
RAS-280RNCCRW	1795	1625	765	635	820	335	392	416

(High Effiency Type)
ANZ

Model	3N~380-415V 50Hz 3N~380V 60Hz					(mm)	Weight (kg)	
	a	b	c	d	e	f	Net	Gross
RAS-080RNCBLW	1795	975	765	660	515	330	217	236
RAS-100RNCBLW	1795	975	765	660	515	330	217	236
RAS-120RNCBLW	1795	1235	765	705	635	350	272	293
RAS-140RNCBLW	1795	1235	765	695	690	330	307	328
RAS-160RNCBLW	1795	1235	765	695	690	330	307	328
RAS-180RNCBLW	1795	1625	765	635	820	335	350	374
RAS-200RNCBLW	1795	1625	765	635	820	335	374	398

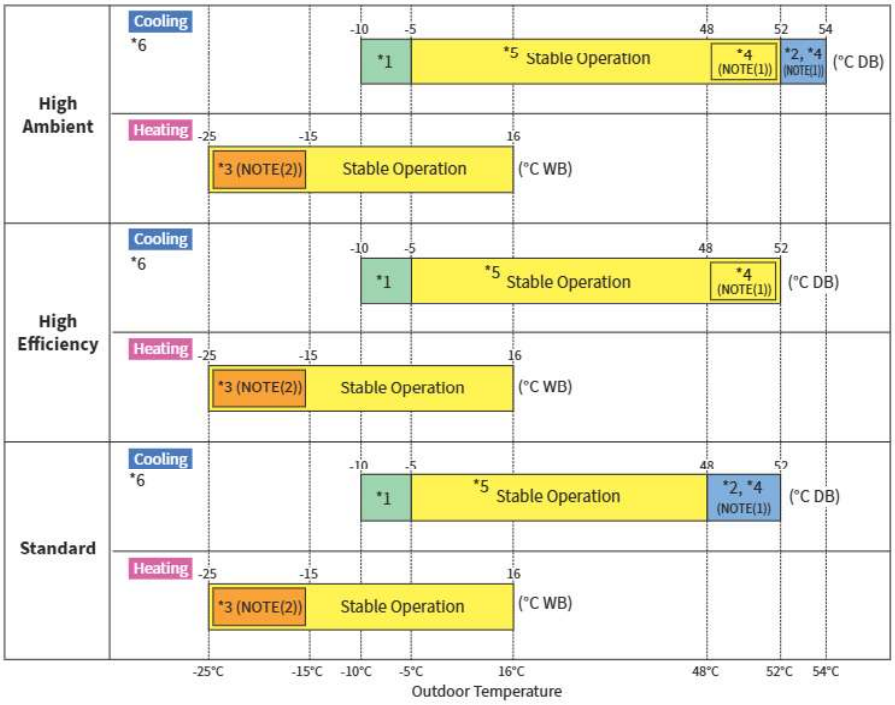
10. Working Range

10.1 Power Supply

Working Voltage: 90% to 110% of the Rated Voltage
Voltage Imbalance: Within a 3% Deviation from Each Voltage at the Main Terminal of Outdoor Unit
Starting Voltage: Higher than 85% of the Rated Voltage

10.2 Temperature Range

The temperature ranges are given in the following table.



(NOTE(1)):
For cooling operation at 48 °C~ 52 °C or 52 °C~ 54 °C, there are limitaiton *2 described below.

(NOTE(2)):
For heating operation at -25 °C~ -15 °C, there are limitaiton *3 described below.

*1. When setting cooling operation at a low outdoor temperature (On-site setting)
There are connection requirements when setting air cooling operation at a low outdoor temperature, so please keep them in mind when designing.
- Attach a snow protection hood (optional part).
- The minimum indoor unit connection capacity is 2.8HP.
- Setting on site is required. See the Installation and Maintenance Manual for setting instructions.

*2. Cooling Operation Range
Only in the case where the outside temperature (outdoor unit air inlet temperature) rises temporarily due to, for example, the installation condition, the system can be used at a temperature up to 54°C (or 52 °C). It is not recommended to install outdoor units to a place where the outdoor temperature (outdoor unit air inlet temperature) always exceeds 52°C (or 48°C). If the outdoor unit is installed at an outside temperature of 52°C (or 48°C) or more, the performance based on the connected capacity may not be achieved. See the technical documents for details.

*3. Heating Operation Range
- The range is intended for only a limited amount of time, for example, starting up the system early in the morning and is not for continuous stable operation for a long period of time.
- For use in cold regions (where the outdoor temperature is -10°C or less) or a place that can cause a heavy heating load, make sure that the total indoor unit connection ratio is 100% or less, and the total piping extension length is 300m or less.

*4. When installing outdoor units in a place where the ambient temperature exceeds 48°C, follow the restrictions below.
- The total indoor unit connection capacity ratio is 130% or less.
- Do not attach an air outlet duct kit (with high static pressure mode setting).
- Do not attach a snow protection hood (optional part).
- When the outdoor air inlet temperature is more than 48°C during cooling operation, "intermittent operation" may be activated to prevent the unit from overloading. If the outdoor unit operates for a long time at a tempearture higher than 48°C, protection control may be activated.

*5. If the outdoor air inlet air temperature exceeds 40°C during cooling operation, the following will result.
- The rotation speed of the outdoor fan will increase and the noise level will increase by 5 to 7dB(A).

*6. In the Heat Pump system, it may take some time for the indoor fan to start up to protect the unit when starting the cooling operation after the heating operation or after the FrostWash.

10. Working Range

NOTE:

- The following table shows the temperature ranges for cooling and heating operation for the Heat Recovery system.
  Simultaneous cooling and heating operation is not possible outside the temperature ranges.

Temperature DB: Dry Bulb, WB: Wet Bulb

	Cooling and Heating Operation	
	Cooling	Heating
Indoor Air Inlet Temperature	15 to 23°C WB	15 to 27°C DB
Outdoor Air Inlet Temperature	-5(-10[*1]) to 25°C DB -6(-11[*1]) to 16°C WB	

*1. When setting cooling operation at a low outdoor temperature (On-site setting)
There are connection requirements when setting air cooling operation at a low outdoor temperature, so please keep them in mind when designing.

- Attach a snow protection hood (optional part).
- The minimum indoor unit connection capacity is 2.8HP.
- Setting on site is required. See the Installation and Maintenance Manual for setting instructions.

11. Optional Accessories

11.1 Multi-Kit

- For Heat Pump (2 pipes)

< Line Branch >

First Branch

Outdoor Unit HP	Model
8, 10	MW-NP282A3
12 - 16	MW-NP452A3
18 - 24	MW-NP692A3
26 - 54	MW-NP902A3
56 - 112	MW-NP2682A3

After First Branch

Total Indoor Unit HP	Model
<12	MW-NP282A3
12 - 17.99	MW-NP452A3
18 - 25.99	MW-NP692A3
26 - 55.99	MW-NP902A3
≥56	MW-NP2682A3

< Header Branch >

Total Indoor Unit HP	No. of Header Branches	Model
~ 8	4	MH-NP224A
~ 10	8	MH-NP288A

- For Heat Recovery (3 pipes)

First Branch

Outdoor Unit HP	Model
8, 10	MW-NP282X3
12 - 16	MW-NP452X3
18, 20	MW-NP562X3
22, 24	MW-NP692X3
26 to 54	MW-NP902X3
56 - 112	MW-NP2682X3

After First Branch

Total Indoor Unit HP	Model
< 5.99	MW-NP142X3
6 to 11.99	MW-NP282X3
12 - 17.99	MW-NP452X3
18 - 21.99	MW-NP562X3
22 to 25.99	MW-NP692X3
26 - 55.99	MW-NP902X3
≥ 56	MW-NP2682X3

< Header Branch >

Total Indoor Unit HP	No. of Header Branches	Model
~ 10	8	MH-NP288X

11.2 Drain Boss

The drain boss is for the drain pipe connection in order to use outdoor unit bottom base as a drain pan.

- Model Name

Name	Model
Drain Boss	DBS-TP10A

- Quantity

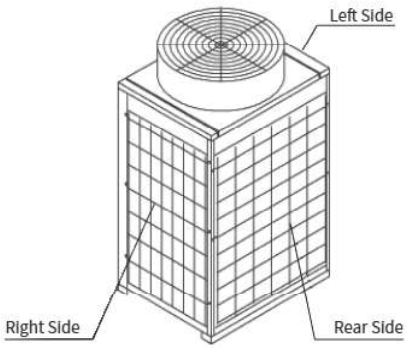
  One single unit requires one set of Drain Boss.

< Drain Water Treatment >

Drain water is discharged during heating and defrosting operation. (Rain water is also discharged.)
Pay attention to the followings.

- Choose a place where well drainage is available or provide a drain ditch.
- Do not install the unit over the walkways. Condensation water may fall on people.
  In case of installing the unit in such a place, provide the additional drain pan.
- Do not use drain boss in the cold area. The drain water in the drain pipe may be frozen and then the drain pipe may crack.

11.3 Air Inlet Grille

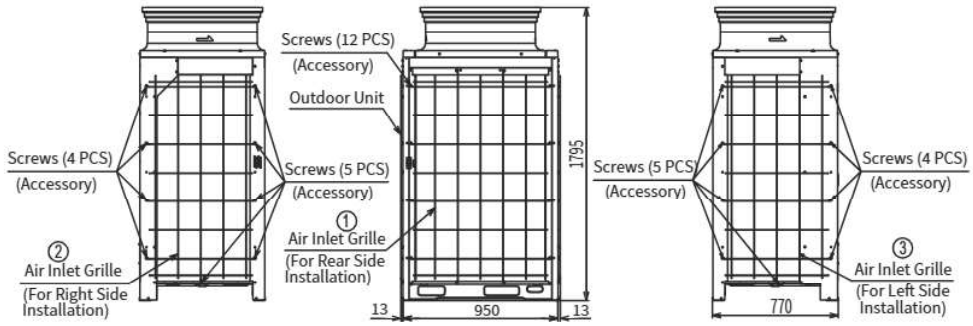


< Installation Appearance >

Cabinet Size	Air Inlet Grille		
	Rear Side	Right Side	Left Side
S	PSN-TP30BA	PSN-TP30LR x 2	
M	PSN-TP30BB	PSN-TP30LR x 2	
L	PSN-TP30BC	PSN-TP30LR x 2	

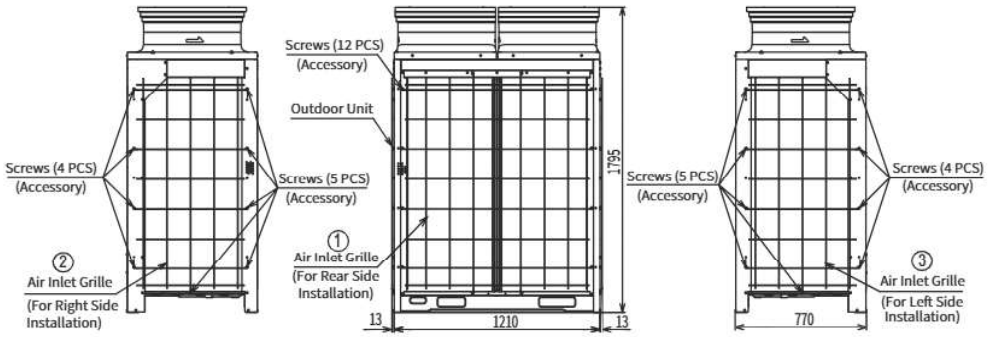
- S Cabinet Size

Unit: mm



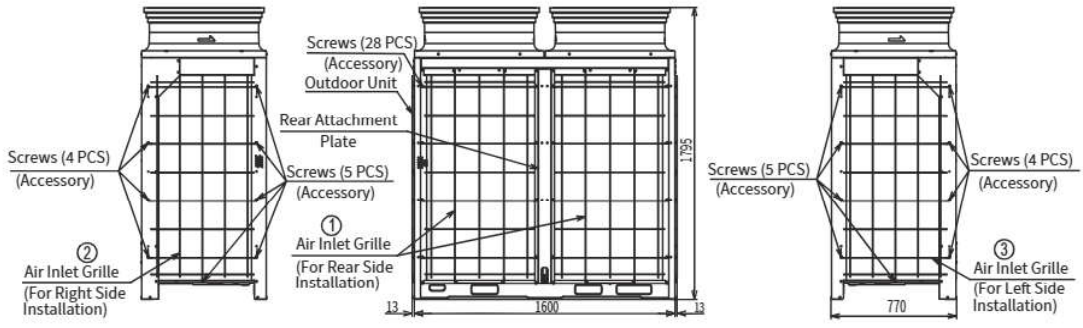
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- M Cabinet Size



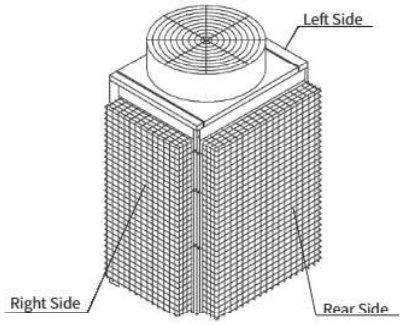
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- L Cabinet Size



< Right Side > < Rear Side > < Left Side >

11.4 Protection Net

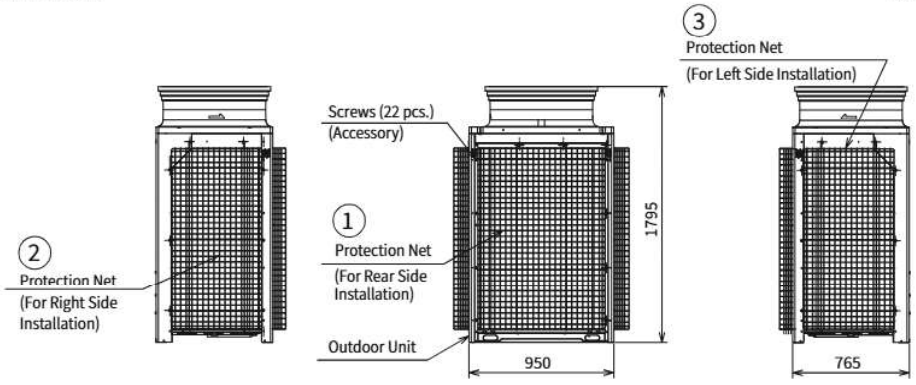


Cabinet Size	Protection Net		
	Rear Side	Right Side	Left Side
S	PN-TP30BA	PN-TP30LR x 2	
M	PN-TP30BB	PN-TP30LR x 2	
L	PN-TP30BC	PN-TP30LR x 2	

< Installation Appearance >

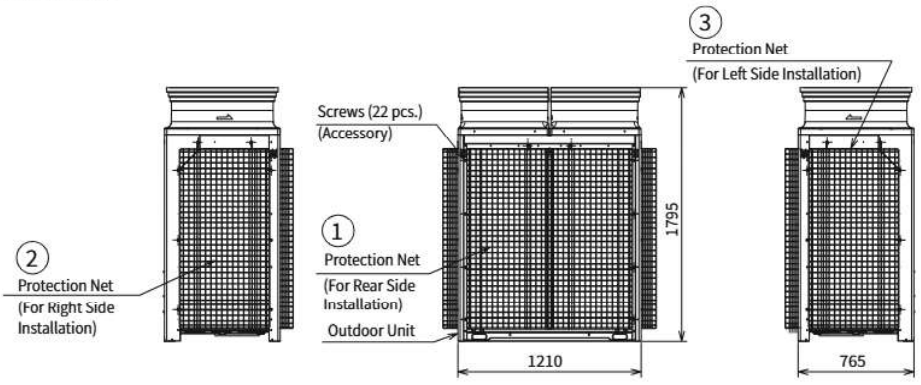
- S Cabinet Size

Unit: mm



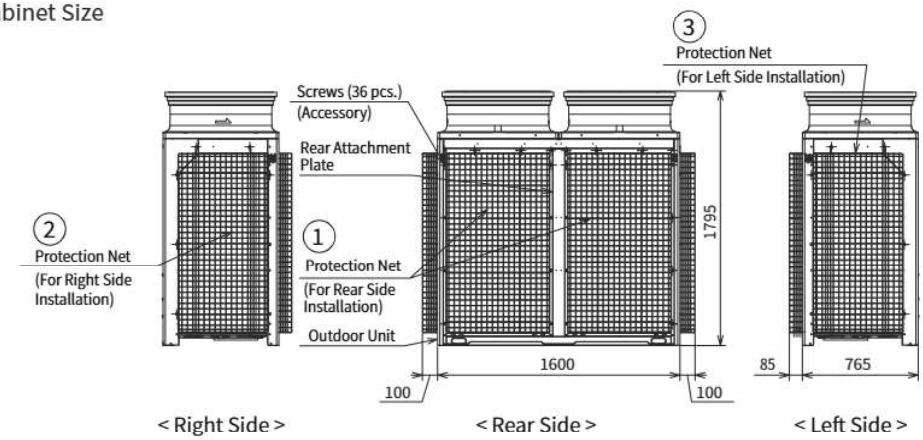
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- M Cabinet Size



< Right Side > < Rear Side > < Left Side >

- L Cabinet Size



< Right Side > < Rear Side > < Left Side >

11.5 Air Outlet Duct Kit

- Air Outlet Duct Kit



< Installation Appearance >

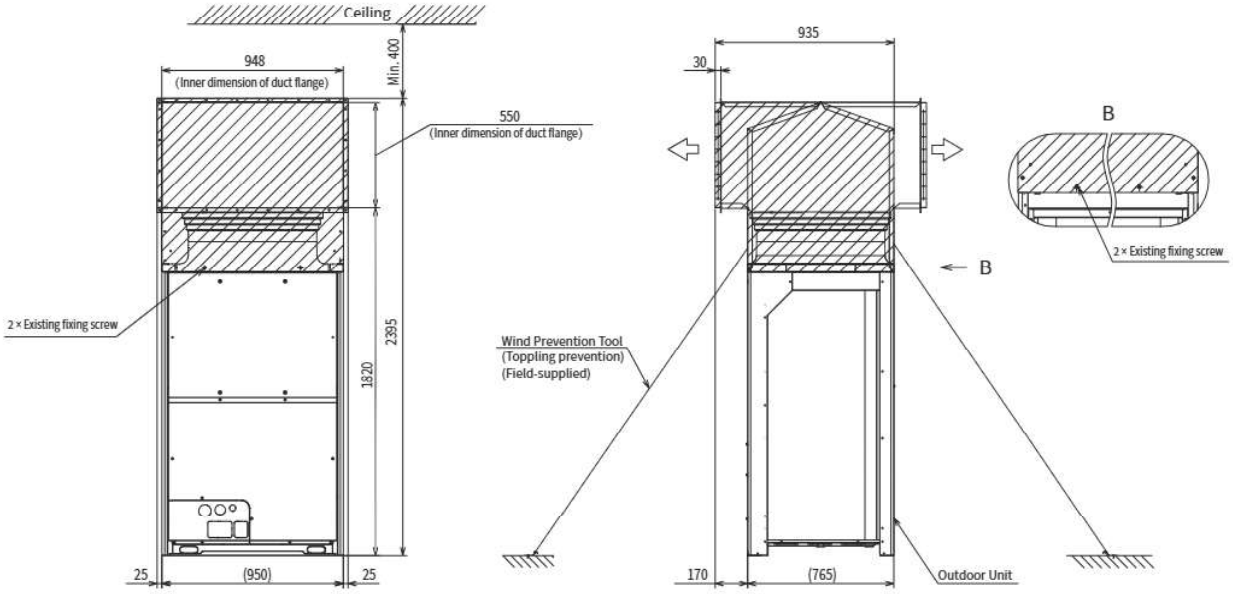
Cabinet Size	Air Outlet Duct Kit (Available upon order)
S	FDK-TP20A
M	FDK-TP20B
L	FDK-TP20C

NOTES:

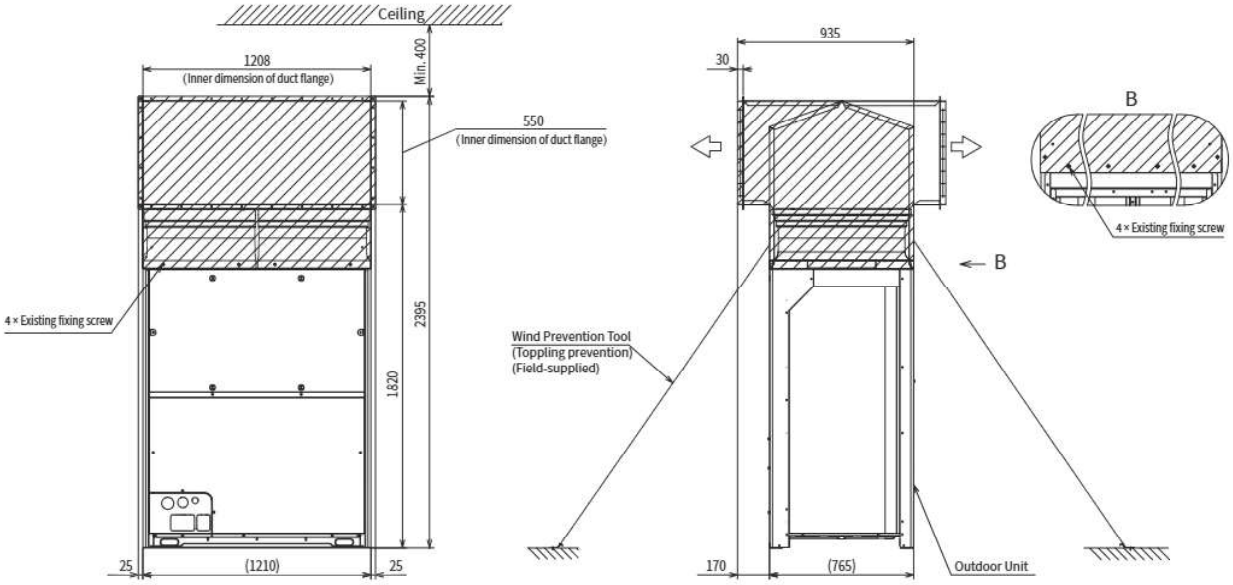
- A protection net and an air outlet duct kit cannot be installed together.
- Air outlet duct kits are available on order.
- When attaching air inlet grilles (for right side and for left side) to outdoor units to be installed side by side, a service space of 50mm or more is required between outdoor units. For an air out duct kit, a service space of 60mm is required.

- S Cabinet Size

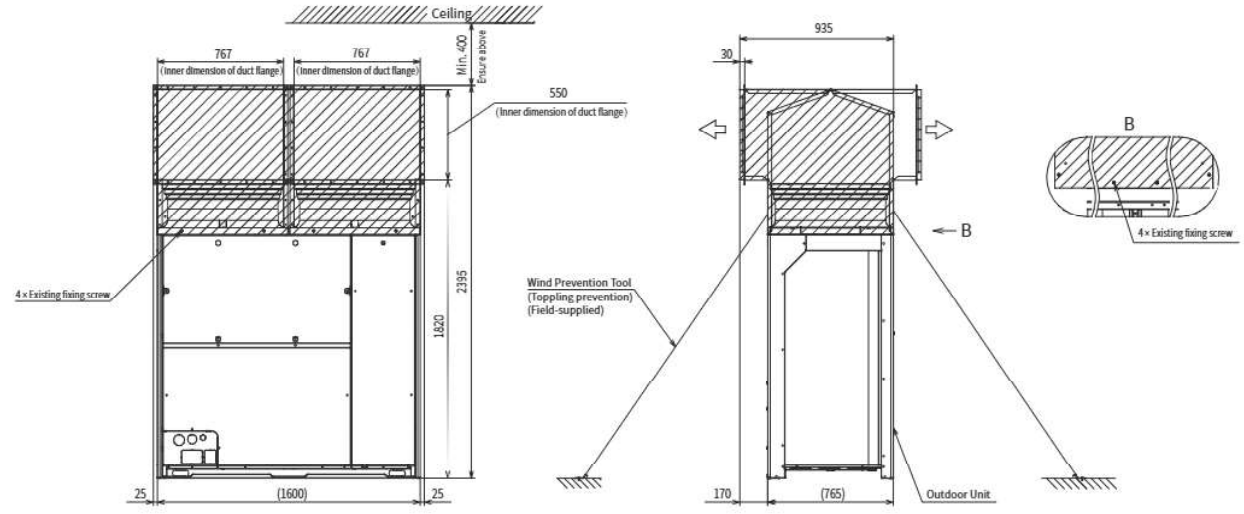
Unit: mm



- M Cabinet Size



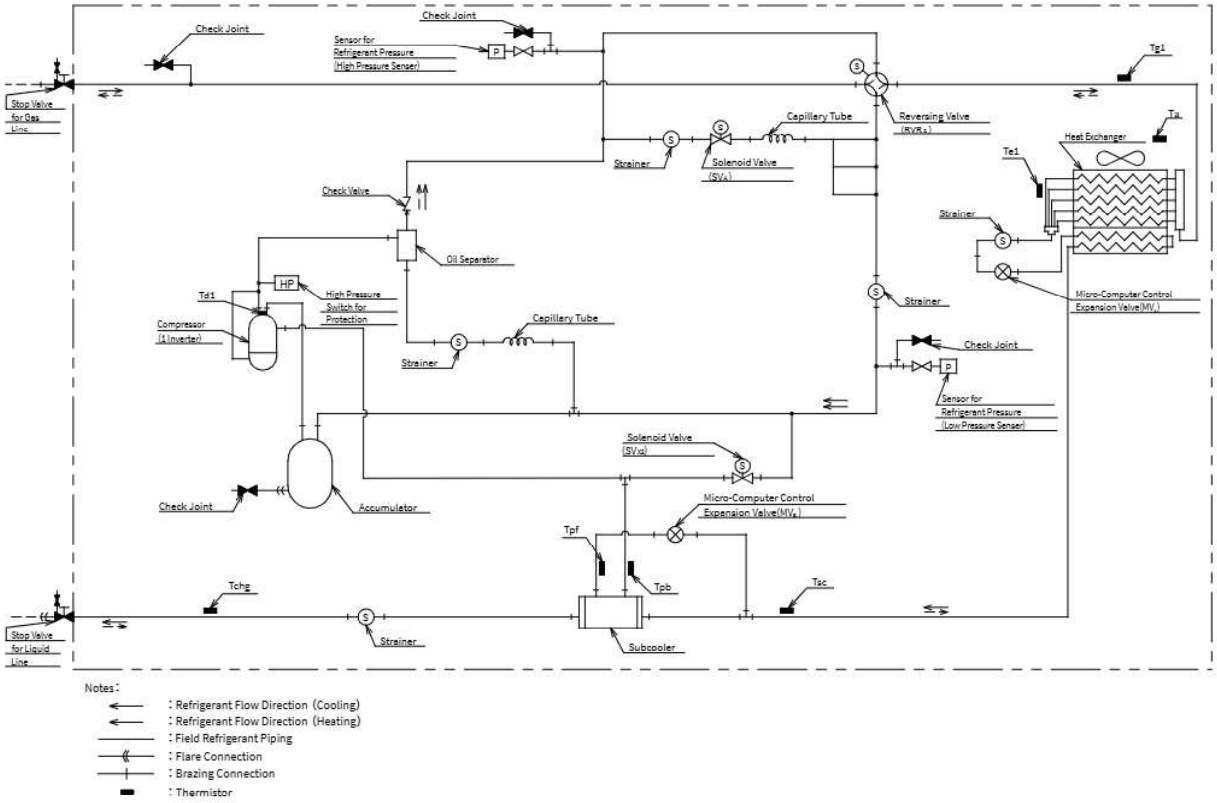
- L Cabinet Size



12. Control System

12.1 Refrigeration Cycle

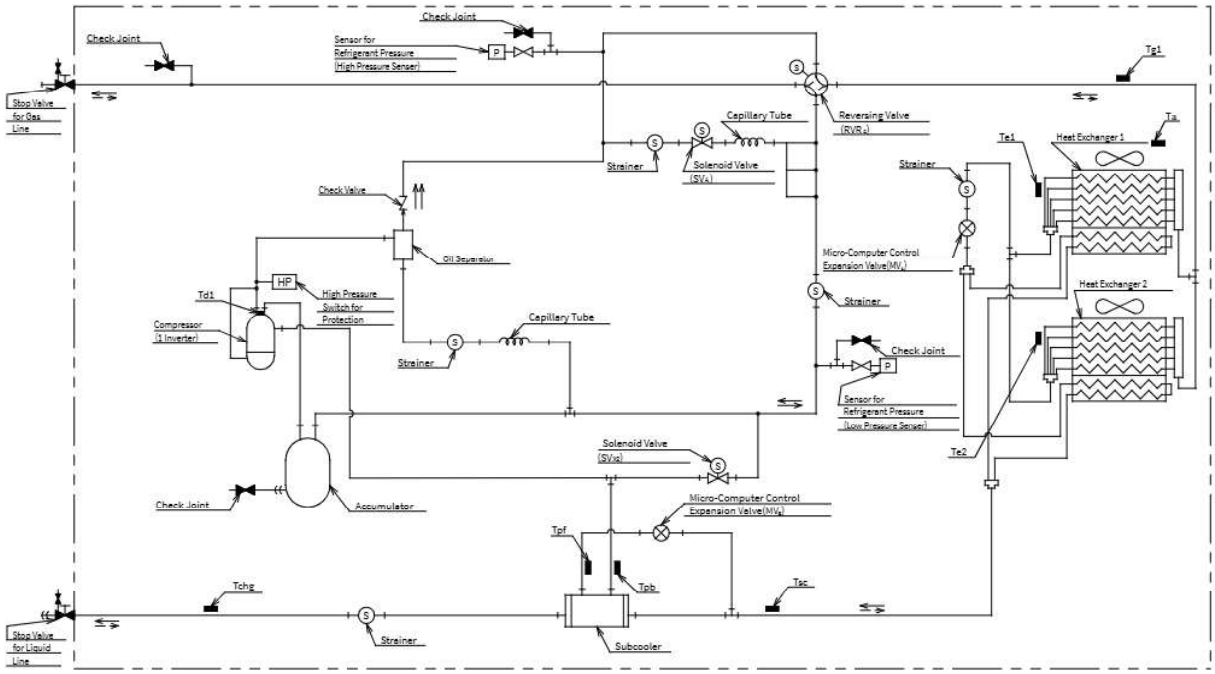
<Heat Pump>
Model: RAS-080 to 100(H/J)NCBL(I/W)
RAS-080 to 120HNCCL(I/W)



Notes:
: Refrigerant Flow Direction (Cooling)
: Refrigerant Flow Direction (Heating)
: Field Refrigerant Piping
: Flare Connection
: Brazing Connection
: Thermistor

Mark	Name
Td	Thermistor for Upper Side of Compressor
Tg	Thermistor for Heat Exchanger Gas Side
Ta	Thermistor for Entering Water
Te	Thermistor for Heat Exchanger Liquid Side
Tsc	Thermistor for Subcooler Inlet
Tchg	Thermistor for Liquid Stop Valve

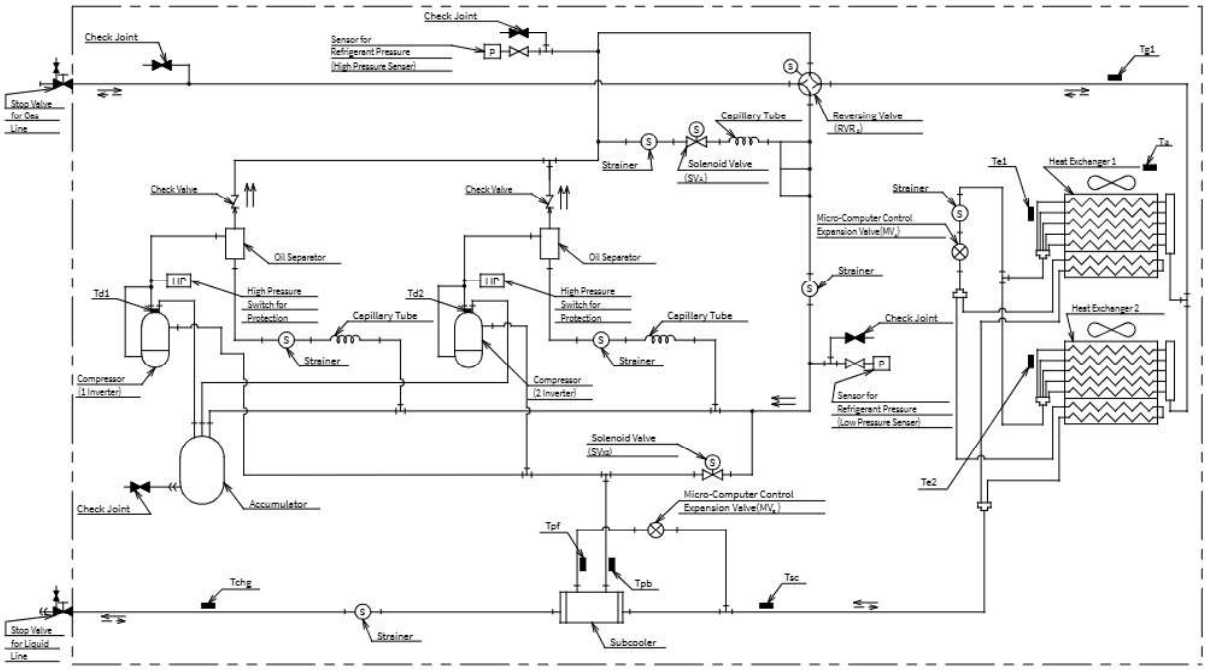
<Heat Pump>
Model: RAS-120(H/J)NCBL(I/W)
RAS-140 to 180HNCCL(I/W)



Notes:
: Refrigerant Flow Direction (Cooling)
: Refrigerant Flow Direction (Heating)
: Field Refrigerant Piping
: Flare Connection
: Brazing Connection
: Thermistor

Mark	Name
Td	Thermistor for Upper Side of Compressor
Tg	Thermistor for Heat Exchanger Gas Side
Ta	Thermistor for Entering Water
Te	Thermistor for Heat Exchanger Liquid Side
Tsc	Thermistor for Subcooler Inlet
Tchg	Thermistor for Liquid Stop Valve

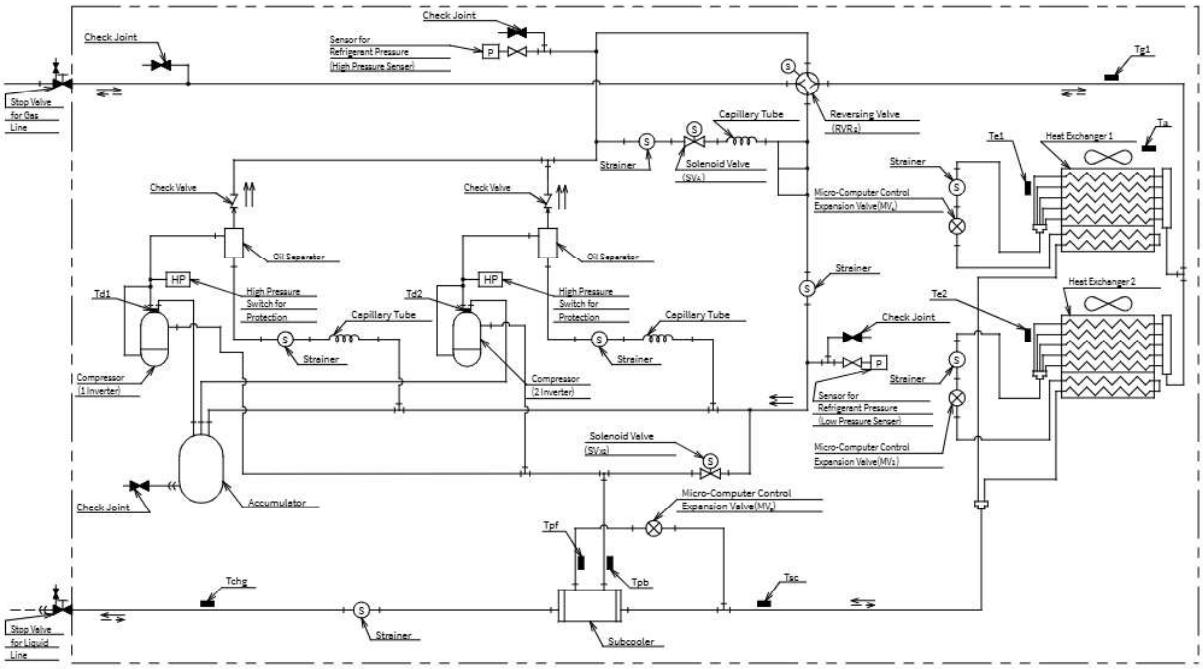
<Heat Pump>
Model: RAS-140 to 160(H/J)NCBL(I/W)



Notes:
- : Refrigerant Flow Direction (Cooling)
- : Refrigerant Flow Direction (Heating)
- : Field Refrigerant Piping
- : Flare Connection
- : Brazing Connection
- : Thermistor

Mark	Name
Td	Thermistor for Upper Side of Compressor
Tg	Thermistor for Heat Exchanger Gas Side
Ta	Thermistor for Entering Water
Te	Thermistor for Heat Exchanger Liquid Side
Tsc	Thermistor for Subcooler Inlet
Tchg	Thermistor for Liquid Stop Valve

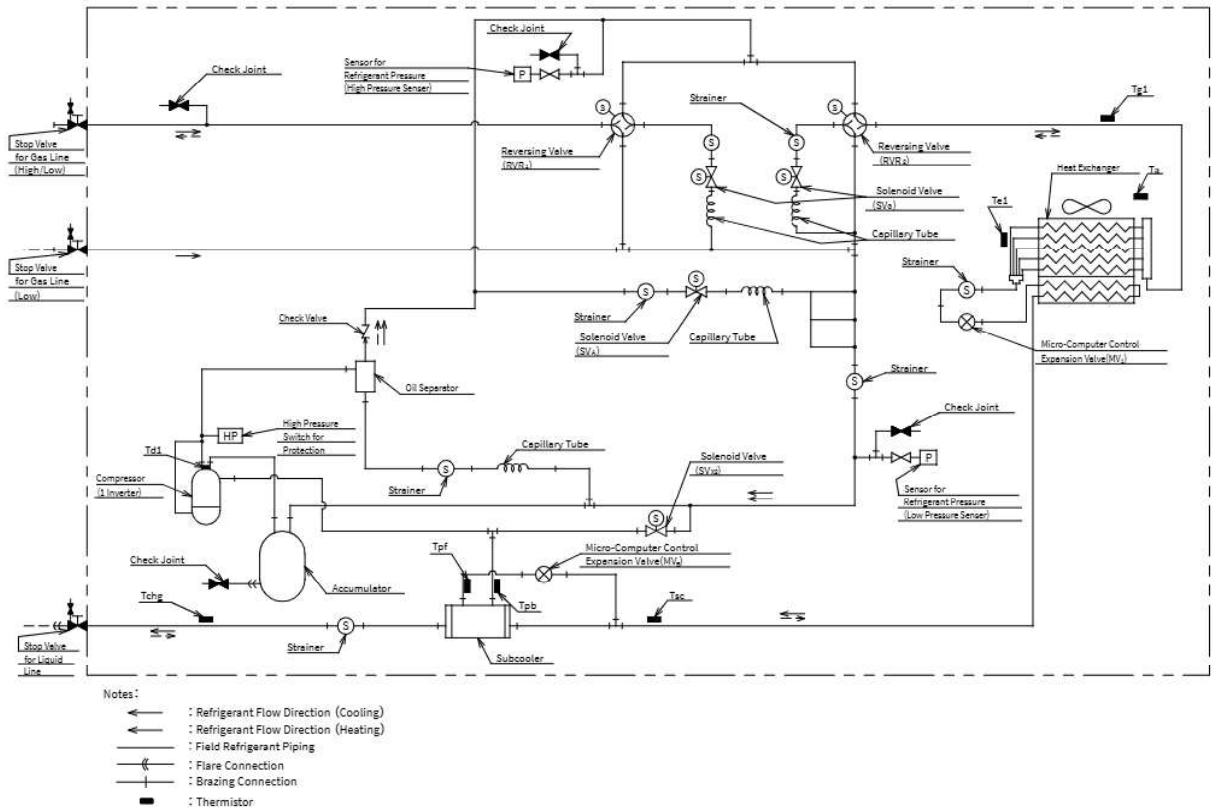
<Heat Pump>
Model: RAS-180 to 220(H/J)NCBL(I/W)
RAS-200 to 280HNCCL(I/W)



Notes:
: Refrigerant Flow Direction (Cooling)
: Refrigerant Flow Direction (Heating)
: Field Refrigerant Piping
: Flare Connection
: Brazing Connection
: Thermistor

Mark	Name
Td	Thermistor for Upper Side of Compressor
Tg	Thermistor for Heat Exchanger Gas Side
Ta	Thermistor for Entering Water
Te	Thermistor for Heat Exchanger Liquid Side
Tsc	Thermistor for Subcooler Inlet
Tchg	Thermistor for Liquid Stop Valve

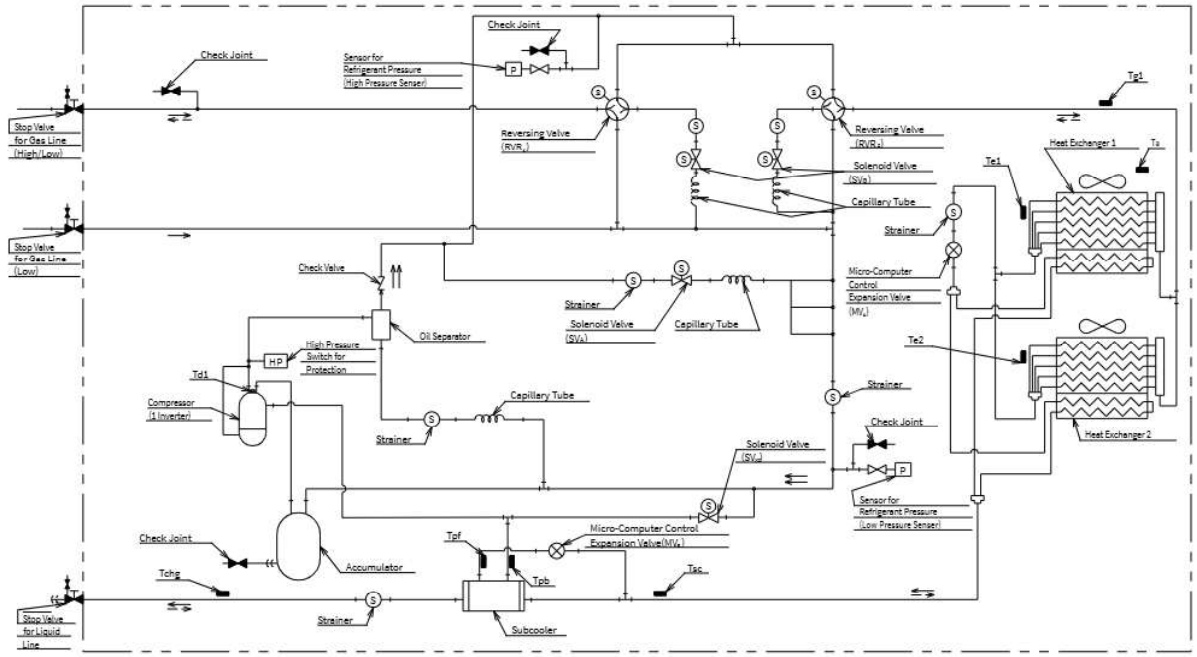
<Heat Recovery>
Model: RAS-080 to 100RNCBLW
RAS-080 to 120RNCCLW



Notes:
: Refrigerant Flow Direction (Cooling)
: Refrigerant Flow Direction (Heating)
: Field Refrigerant Piping
: Flare Connection
: Brazing Connection
: Thermistor

Mark	Name
Td	Thermistor for Upper Side of Compressor
Tg	Thermistor for Heat Exchanger Gas Side
Ta	Thermistor for Entering Water
Te	Thermistor for Heat Exchanger Liquid Side
Tsc	Thermistor for Subcooler Inlet
Tchg	Thermistor for Liquid Stop Valve

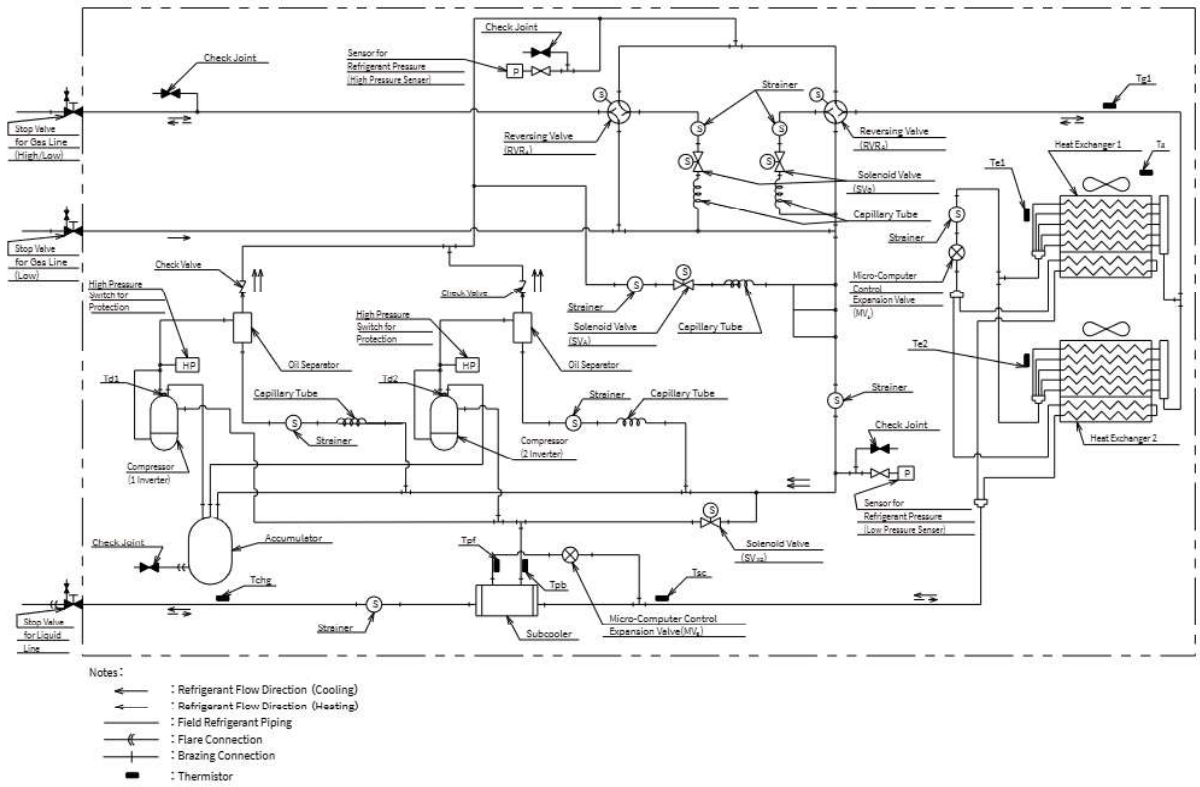
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Model: RAS-120RNCBLW
RAS-140 to 180RNCCLW



Notes:
: Refrigerant Flow Direction (Cooling)
: Refrigerant Flow Direction (Heating)
: Field Refrigerant Piping
: Flare Connection
: Brazing Connection
: Thermistor

Mark	Name
Td	Thermistor for Upper Side of Compressor
Tg	Thermistor for Heat Exchanger Gas Side
Ta	Thermistor for Entering Water
Te	Thermistor for Heat Exchanger Liquid Side
Tsc	Thermistor for Subcooler Inlet
Tchg	Thermistor for Liquid Stop Valve

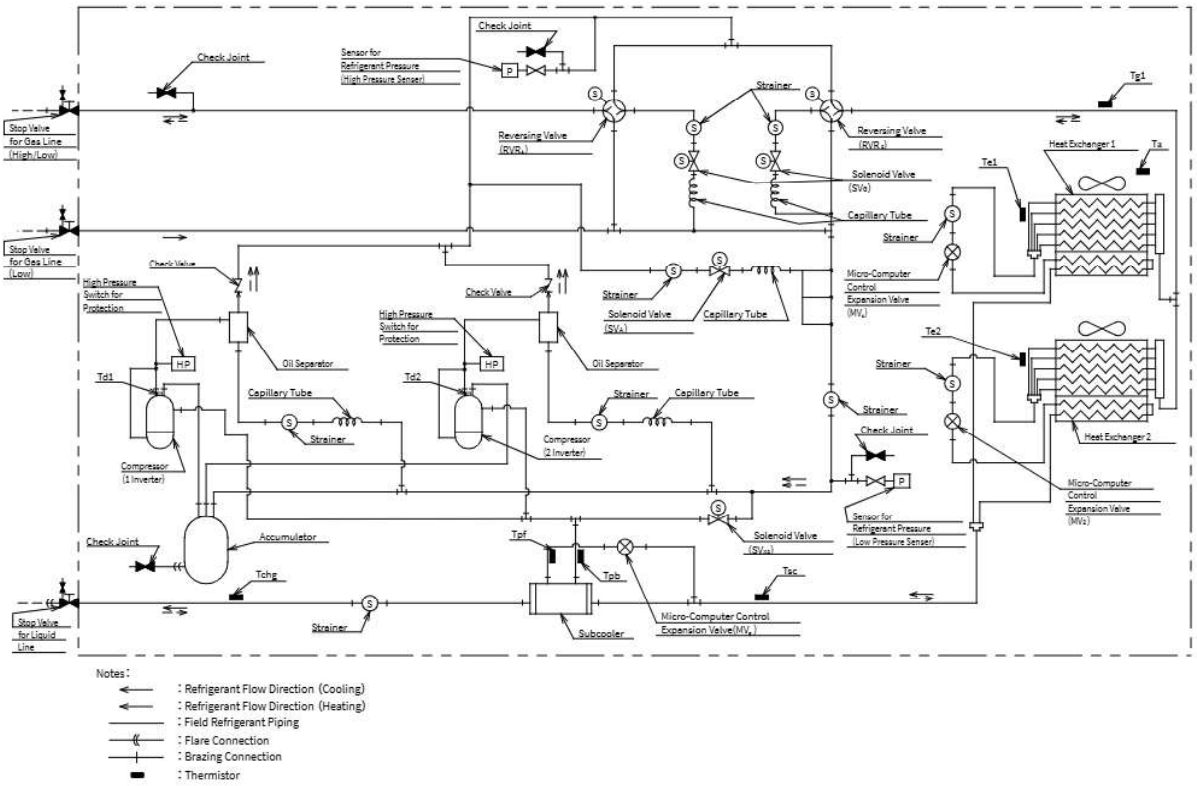
<Heat Recovery>
Model: RAS-140 to 160RNCBLW



Notes :
- : Refrigerant Flow Direction (Cooling)
- : Refrigerant Flow Direction (Heating)
- : Field Refrigerant Piping
- : Flare Connection
- : Brazing Connection
- : Thermistor

Mark	Name
Td	Thermistor for Upper Side of Compressor
Tg	Thermistor for Heat Exchanger Gas Side
Ta	Thermistor for Entering Water
Te	Thermistor for Heat Exchanger Liquid Side
Tsc	Thermistor for Subcooler Inlet
Tchg	Thermistor for Liquid Stop Valve

<Heat Recovery>
Model: RAS-180 to 200RNCBLW
RAS-200 to 280RNCCLW



Notes:
: Refrigerant Flow Direction (Cooling)
: Refrigerant Flow Direction (Heating)
: Field Refrigerant Piping
: Flare Connection
: Brazing Connection
: Thermistor

Mark	Name
Td	Thermistor for Upper Side of Compressor
Tg	Thermistor for Heat Exchanger Gas Side
Ta	Thermistor for Entering Water
Te	Thermistor for Heat Exchanger Liquid Side
Tsc	Thermistor for Subcooler Inlet
Tchg	Thermistor for Liquid Stop Valve

12.2 Control System

Cycle Control
<Heat Pump>

Control Device	Control				
	Cooling Operation *1		Heating Operation		Defrosting
	Purpose of Control	Contents	Purpose of Control	Contents	Contents
Inverter Frequency of Compressor	Total I.U. Operating Capacity	Inverter Frequency Control is carried out to make I.U. air inlet temperature to temperature setpoint.	Total I.U. Operating Capacity	Inverter Frequency Control is carried out to make I.U. air inlet temperature to temperature setpoint.	All of the compressors: ON
Electronic Expansion Valve for O.U. Heat Exchange	When the O.U. is a base unit: -	Fully open	O.U. Heat Exchanger SH	PI control is carried out to achieve the targeted value of O.U. heat exchanger SH.	Fully open
	When the outdoor unit is a combination of base units: Liquid Pressure Control	PI control is carried out to achieve the targeted value of the liquid pressure.			
Electronic Expansion Valve for Supercooling Heat Exchanger	Tsc - Tchg	PI control is carried out to achieve the targeted value of Tsc - Tchg.	Tchg - Tsc	PI control is carried out to achieve the targeted value of Tchg - Tsc.	Tsc - Tchg
Electronic Expansion Valve for I.U. Heat Exchanger	I.U. Heat Exchanger SH	PI control is carried out to achieve the targeted value of I.U. heat exchanger SH.	I.U. Heat Exchanger SC	Controls supercooling of I.U. liquid thermistor to achieve the targeted value.	I.U. Heat Exchanger SH Control
Outdoor Fan	Pd Control	PI control is carried out to achieve the targeted value of Pd.	Ps Control	PI control is carried out to achieve the targeted value of Ps.	Stop
Gas Bypass Valve (SVA)	1. Pd Increase Protection 2. Ps Decrease Protection	1. Pd > 3.6 MPa: Open 2. Ps < 0.20 MPa: Open	1. Pd Increase Protection 2. Ps Decrease Protection	1. Pd > 3.5 MPa: Open 2. Ps < 0.2 MPa: Open	Closed
Gas Injection Switch Valve/ Supercooling Bypass Circuit (SVX2)	Switch Gas Injection/ Supercooling Bypass Circuit	Gas Injection is controlled: Closed	Switch between Gas Injection/Supercooling Bypass Circuit	Gas Injection is controlled: Closed	Open
		Supercooling Bypass Circuit is controlled: Open		Supercooling Bypass Circuit is controlled: Open	

*1. Dry operation is included in the cooling operation.

Pd: Discharge Pressure
Ps: Suction Pressure
SH: Superheat
SC: Subcool
Tsc: Subcooler Temperature
Tchg: Liquid Stop Valve Temperature
I.U.: Indoor Unit
O.U.: Outdoor Unit

<Heat Recovery>

Control Device	Control						
	Cooling Operation		Heating Operation		Cooling and Heating Operation		Defrosting
	Purpose of Control	Contents	Purpose of Control	Contents	Purpose of Control	Contents	Contents
Inverter Frequency of Compressor	Total I.U. Operating Capacity	Inverter Frequency Control is carried out to make I.U. air inlet temperature to temperature setpoint.	Total I.U. Operating Capacity	Inverter Frequency Control is carried out to make I.U. air inlet temperature to temperature setpoint.	Cooling mainly: I.U. Cooling Operating Capacity	Inverter Frequency Control is carried out to make I.U. air inlet temperature for the cooling setting to temperature setpoint.	All of the compressors: ON
					Heating mainly: I.U. Heating Operating Capacity	Inverter Frequency Control is carried out to make I.U. air inlet temperature for the heating setting to temperature setpoint.	
Electronic Expansion Valve for O.U. Heat Exchanger	When the O.U. is a base unit: -	Fully Open	O.U. Heat Exchanger SH	PI control is carried out to achieve the targeted value of O.U. heat exchanger SH.	Cooling mainly: Liquid Pressure Control	PI control is carried out to achieve the targeted value of the liquid pressure.	Fully Open
	When the outdoor unit is a combination of base units: Liquid Pressure Control	PI control is carried out to achieve the targeted value of the liquid pressure.			Heating mainly: O.U. Heat Exchanger SH	PI control is carried out to achieve the targeted value of O.U. heat exchanger SH.	
Electronic Expansion Valve for Supercooling Heat Exchanger	Tsc - Tchg	PI Control is carried out to achieve the target value of Tsc - Tchg.	Tchg - Tsc	PI Control is carried out to achieve the target value of Tsc - Tchg.	-	Fully Open	PI Control is carried out to achieve the target value of Tsc - Tchg.
Electronic Expansion Valve for I.U. Heat Exchanger	I.U. Heat Exchanger SH	PI control is carried out to achieve the targeted value of I.U. heat exchanger SH.	I.U. Heat Exchanger SC	Controls supercooling of I.U. liquid thermistor to achieve the targeted value.	Cooling Setting: *1 I.U. Heat Exchanger SH	PI control is carried out to achieve the targeted value of I.U. heat exchanger SH.	I.U. Heat Exchanger SH
					Heating Setting: I.U. Heat Exchanger SC	Controls supercooling of I.U. liquid thermistor to achieve the targeted value.	
Outdoor Fan	Pd Control	PI control is carried out to achieve the targeted value of Pd.	Ps Control	PI control is carried out to achieve the targeted value of Ps.	Cooling mainly: Pd Control	PI control is carried out to achieve the targeted value of Pd.	For a base unit: Pd control For a combination of units: Stop
					Heating mainly: Ps Control	PI control is carried out to achieve the targeted value of Ps.	
Gas Bypass Valve (SVA)	1. Pd Increase Protection 2. Ps Decrease Protection	1. Pd≥3.2MPa: Open 2. Ps≤0.2MPa: Open	1. Pd Increase Protection 2. Ps Decrease Protection	1. Pd≥3.2MPa: Open 2. Ps≤0.2MPa: Open	1. Pd Increase Protection 2. Ps Decrease Protection	1. Pd≥3.2MPa: Open 2. Ps≤0.2MPa: Open	Closed
High and Low Pressure Shut-off Valve (SVG)	Shut-off High and Low Pressure inside Cycle during Stoppage	Compressor Run: Open Compressor Stop: Closed	Shut-off High and Low Pressure inside Cycle during Stoppage	Compressor Run: Open Compressor Stop: Closed	Shut-off High and Low Pressure inside Cycle during Stoppage	Compressor Run: Open Compressor Stop: Closed	Open
Gas Injection Switch Valve/ Supercooling Bypass Circuit (SVX2)	Switch Gas Injection/ Supercooling Bypass Circuit	Gas Injection is controlled: Closed	Switch Gas Injection/ Supercooling Bypass Circuit	Gas Injection is controlled: Closed	-	Open	Open
		Supercooling Bypass Circuit is controlled: Open		Supercooling Bypass Circuit is controlled: Open			

*1. Dry operation is included in the cooling operation.

Pd: Discharge Pressure
Ps: Suction Pressure
SH: Superheat
SC: Subcool
Tsc: Subcooler Temperature
Tchg: Liquid Stop Valve Temperature
I.U.: Indoor Unit
O.U.: Outdoor Unit

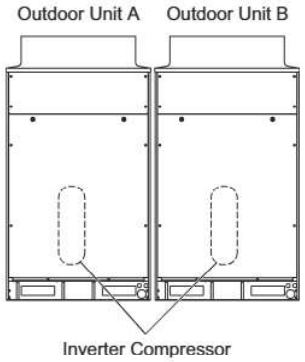
Compressor Operation Control

1. Compressor Rotation Control

This compressor rotation control is performed in order to make the compressor operating time equal for each outdoor unit.
This control is performed during the outdoor unit thermo-OFF or switch OFF.
When turning ON the outdoor unit, the inverter compressor with the shortest operating time (average operating time for the outdoor unit installed two inverter compressors) will operate preferentially.
At least 2 outdoor units are required for this function.

The operating sequence of compressor rotation control is as follows.

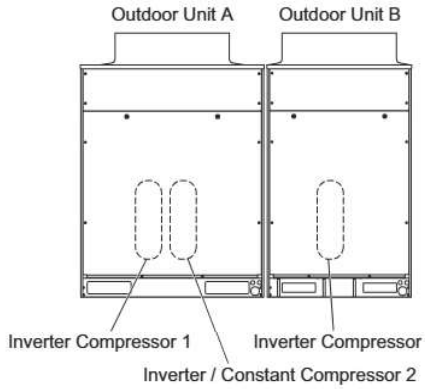
RAS-240(H/J)NCBL(I/W), RAS-300 to 360(H/R)NCC(L/R)(I/W)
RAS-260 to 360RNCCLW(For ANZ), RAS-220 to 240RNCBLW(For ANZ)



< Compressor Operating Sequence >

	Outdoor Unit A	Outdoor Unit B
	Inverter Compressor	
Last Time	1	2
This Time	2	1
Next Time	1	2

RAS-260(H/J)NCBL(I/W), RAS-380 to 420(H/R)NCC(L/R)(I/W)
RAS-380 to 420RNCCLW(For ANZ), RAS-260RNCBLW(For ANZ)

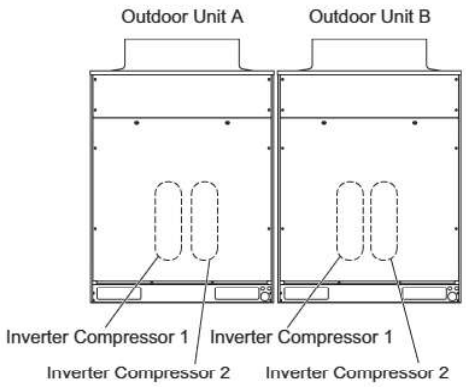


< Compressor Operating Sequence >

	Outdoor Unit A		Outdoor Unit B
	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor
Last Time	1	3	2
This Time	2	3	1
Next Time	1	3	2

NOTE:
When turning ON the outdoor unit A, the inverter compressor 1 or 2 with the shortest operating time will operate preferentially.

RAS-280 to 440(H/J)NCBL(I/W), RAS-440 to 560(H/R)NCC(L/R)(I/W)
RAS-440 to 480RNCCLW(For ANZ), RAS-280 to 400RNCBLW(For ANZ)

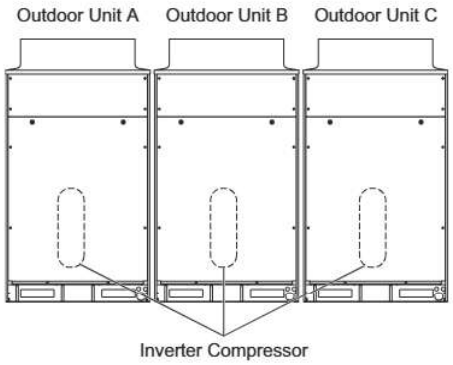


< Compressor Operating Sequence >

	Outdoor Unit A		Outdoor Unit B	
	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2
Last Time	1	3	2	3
This Time	2	3	1	3
Next Time	1	3	2	3

NOTE:
When turning ON the outdoor units, the inverter compressor of each outdoor unit with the shortest operating time will operate preferentially.

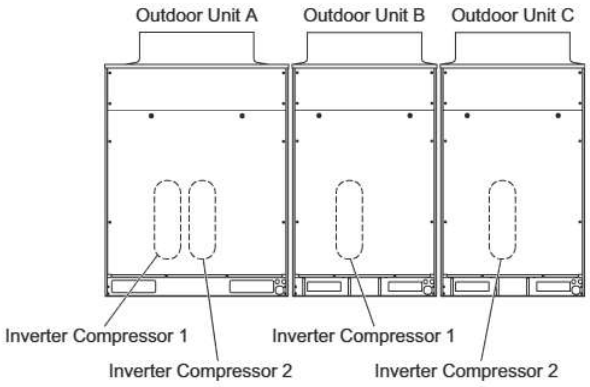
RAS-580 to 600(H/R)NCC(L/R)(I/W)
RAS-500 to 540RNCCLW(For ANZ)



< Compressor Operating Sequence >

	Outdoor Unit A	Outdoor Unit B	Outdoor Unit C
	Inverter Compressor	Inverter Compressor	Inverter Compressor
Last Time	1	2	3
This Time	3	1	2
Next Time	2	3	1

RAS-560 to 600RNCCLW(For ANZ)

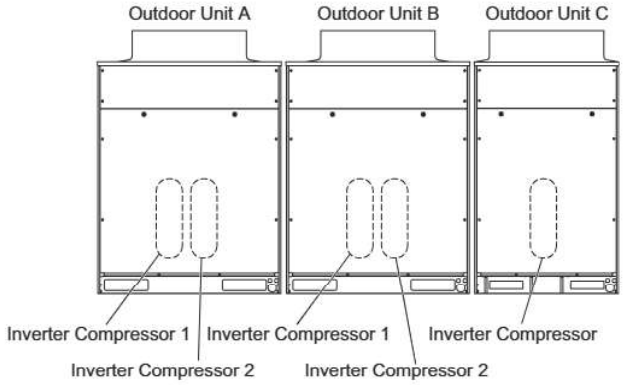


< Compressor Operating Sequence >

	Outdoor Unit A		Outdoor Unit B	Outdoor Unit C
	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2
Last Time	1	4	2	3
This Time	2	4	1	2
Next Time	2	4	3	1

NOTE:
When turning ON the outdoor unit A, the inverter compressor 1 or 2 with the shortest operating time will operate preferentially.

RAS-620 to 660(H/R)NCC(L/R)(I/W)
RAS-620 to 640RNCCLW(For ANZ)

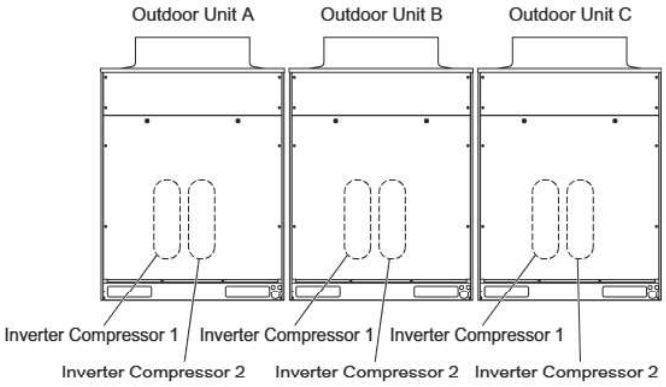


< Compressor Operating Sequence >

	Outdoor Unit A		Outdoor Unit B		Outdoor Unit C
	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor
Last Time	1	4	2	4	3
This Time	2	4	1	4	2
Next Time	2	4	3	4	1

NOTE:
When turning ON the outdoor units, the inverter compressor of the outdoor unit A and B with the shortest operating time will operate preferentially.

RAS-460 to 660(H/J)NCBL(I/W), RAS-680 to 840(H/R)NCC(L/R)(I/W)
RAS-420 to 480RNCBLW(For ANZ)

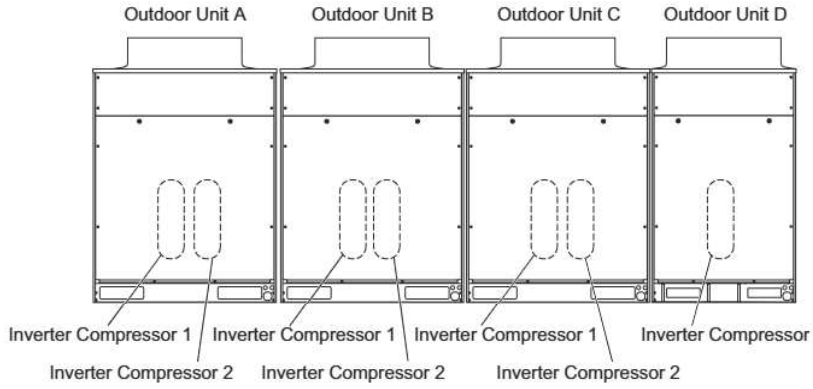


< Compressor Operating Sequence >

	Outdoor Unit A		Outdoor Unit B		Outdoor Unit C	
	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2
Last Time	1	4	2	4	3	4
This Time	3	4	1	4	2	4
Next Time	2	4	3	4	1	4

NOTE:
When turning ON the outdoor units, the inverter compressor of each outdoor unit with the shortest operating time will operate preferentially.

RAS-860 to 900(H/R)NCC(L/R)(I/W)

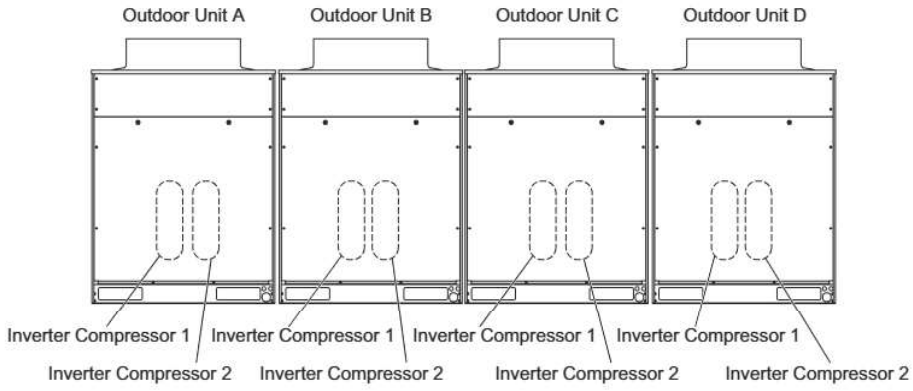


< Compressor Operating Sequence >

	Outdoor Unit A		Outdoor Unit B		Outdoor Unit C		Outdoor Unit D
	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor
Last Time	1	5	2	5	3	5	4
This Time	4	5	1	5	2	5	3
Next Time	3	5	4	5	1	5	2

NOTE:
When turning ON the outdoor units, the inverter compressor of each outdoor unit with the shortest operating time will operate preferentially.

RAS-680 to 880(H/J)NCBL(I/W)
RAS-920 to H12(H/R)NCC(L/R)(I/W)



< Compressor Operating Sequence >

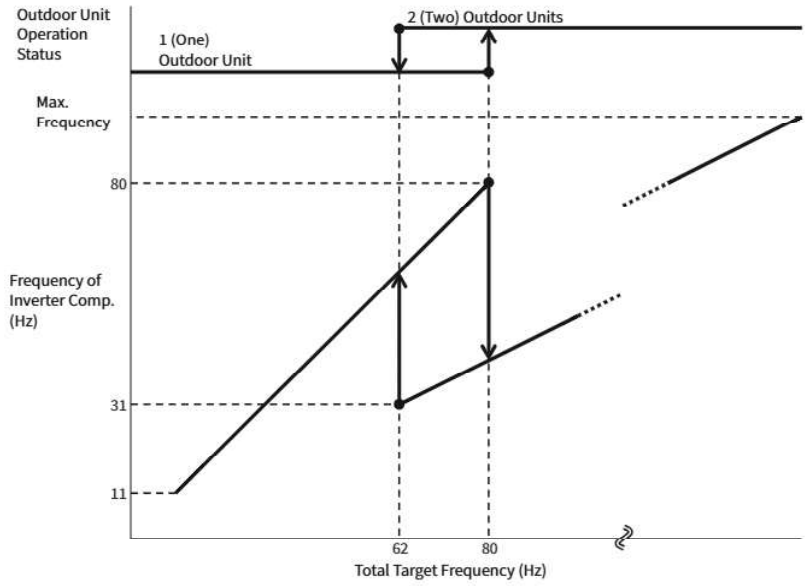
	Outdoor Unit A		Outdoor Unit B		Outdoor Unit C		Outdoor Unit D	
	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2	Inverter Compressor 1	Inverter Compressor 2
Last Time	1	5	2	5	3	5	4	5
This Time	4	5	1	5	2	5	3	5
Next Time	3	5	4	5	1	5	2	5

NOTE:
When turning ON the outdoor units, the inverter compressor of each outdoor unit with the shortest operating time will operate preferentially.

2. Compressor Frequency Control

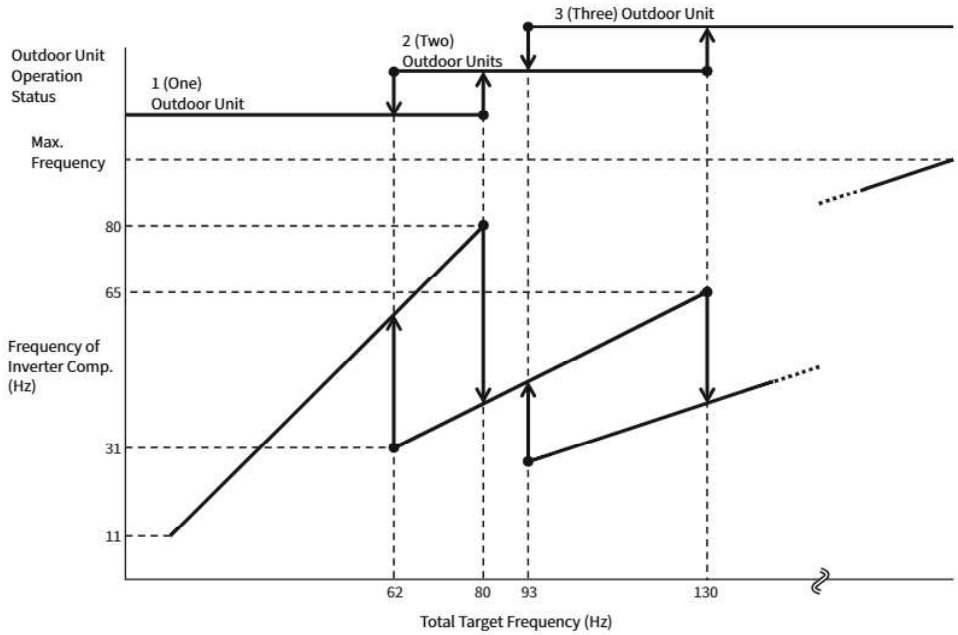
Compressor Operation Control is to adjust the output frequency of an Inverter Compressor according to Target Frequency.
(Target Frequency is determined by capacity control according to cooling and heating loads.)
Therefore, when the load is smaller, all compressors may not operate.

In case of multiple outdoor units (Two outdoor units)



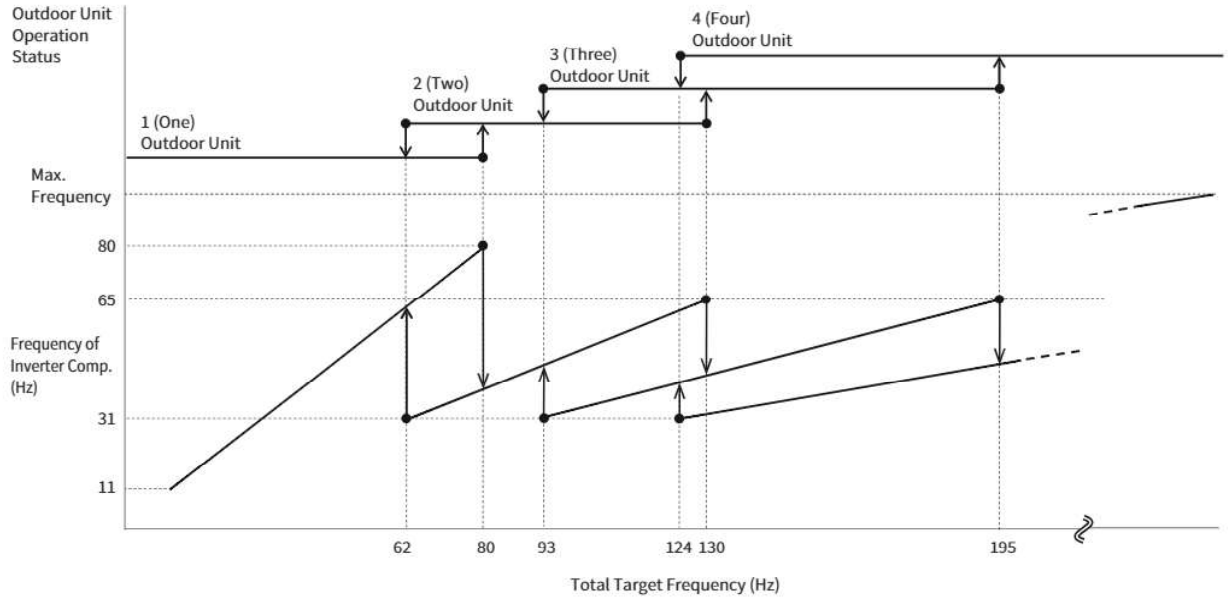
Target Frequency [Hz]	Each Compressor Frequency [Hz]					
	Increase Direction			Decrease Direction		
	Comp. Operation Status	Outdoor Unit (A)	Outdoor Unit (B)	Comp. Operation Status	Outdoor Unit (A)	Outdoor Unit (B)
11.0	1	11.0	—	1	11.0	—
61.0	1	61.0	—	1	61.0	—
62.0	1	62.0	—	2	31.0	31.0
80.0	1	80.0	—	2	40.0	40.0
81.0	2	40.5	40.5	2	40.5	40.5
・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・

In case of multiple outdoor units (Three outdoor units)



Target Frequency [Hz]	Each Compressor Frequency [Hz]							
	Increase Direction				Decrease Direction			
	Comp. Operation Status	Outdoor Unit (A)	Outdoor Unit (B)	Outdoor Unit (C)	Comp. Operation Status	Outdoor Unit (A)	Outdoor Unit (B)	Outdoor Unit (C)
11.0	1	11.0	—	—	1	11.0	—	—
61.0	1	61.0	—	—	1	61.0	—	—
62.0	1	62.0	—	—	2	31.0	31.0	—
80.0	1	80.0	—	—	2	40.0	40.0	—
81.0	2	40.5	40.5	—	2	40.5	40.5	—
92.0	2	46.0	46.0	—	2	46.0	46.0	—
93.0	2	46.5	46.5	—	3	31.0	31.0	31.0
130.0	2	65.0	65.0	—	3	43.3	43.3	43.3
131.0	3	43.6	43.6	43.6	3	43.6	43.6	43.6
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

In case of multiple outdoor units (Four outdoor units)



Target Frequency [Hz]	Each Compressor Frequency [Hz]									
	Increase Direction					Decrease Direction				
	Comp. Operation Status	Outdoor Unit (A)	Outdoor Unit (B)	Outdoor Unit (C)	Outdoor Unit (D)	Comp. Operation Status	Outdoor Unit (A)	Outdoor Unit (B)	Outdoor Unit (C)	Outdoor Unit (D)
11	1	11.0	-	-	-	1	11.0	-	-	-
61	1	61.0	-	-	-	1	61.0	-	-	-
62	1	62.0	-	-	-	2	31.0	31.0	-	-
80	1	80.0	-	-	-	2	40.0	40.0	-	-
81	2	40.5	40.5	-	-	2	40.5	40.5	-	-
92	2	46.0	46.0	-	-	2	46.0	46.0	-	-
93	2	46.5	46.5	-	-	3	31.0	31.0	31.0	-
123	2	61.5	61.5	-	-	3	41.0	41.0	41.0	-
124	2	62.0	62.0	-	-	4	31.0	31.0	31.0	31.0
130	2	65.0	65.0	-	-	4	32.5	32.5	32.5	32.5
131	3	43.6	43.6	43.6	-	4	32.7	32.7	32.7	32.7
195	3	65.0	65.0	65.0	-	4	48.7	48.7	48.7	48.7
196	4	49.0	49.0	49.0	49.0	4	49.0	49.0	49.0	49.0
・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・

Compressor Capacity Control

The operating speed of the compressor is determined according to the temperature difference (ΔT) between setting temperature and indoor unit air inlet temperature detected by each indoor unit under cooling/heating thermo-ON operation and the variation of ΔT to control compressor frequency.

The frequency is calculated as follows:
Current Frequency × Coefficient Based on the Temperature

1. Cooling Operation
   The coefficient becomes larger when the value of ΔT (the temperature difference between setting temperature and air inlet temperature is large) or variation of ΔT is larger.
   The coefficient becomes smaller when the value of ΔT (the temperature difference between setting temperature and air inlet temperature is small) or variation of ΔT is smaller.

2. Heating Operation
   The coefficient becomes larger when the value of ΔT (the temperature difference between setting temperature and air inlet temperature is large) or variation of ΔT is larger.
   The coefficient becomes smaller when the value of ΔT (the temperature difference between setting temperature and air inlet temperature is small) or variation of ΔT is smaller.
   NOTE:
   - The temperature of the thermistor in the wired controller is utilized instead of indoor unit air inlet temperature when the thermistor in the wired controller is set by functional setting mode.

Heat Exchanger Mode Control

In accordance with the connectable indoor unit operation mode, the outdoor unit heat exchanger will be switched as shown in the table below.

O.U. Heat Exchanger Mode at Cooling: Condenser [COND]
O.U. Heat Exchanger Mode at Heating: Evaporator [EVAP]

1. The Number of Outdoor Unit: 1 (one)

Heat Exchanger Mode		Cooling Mode	Heating Mode	Defrosting Mode
Heat Exchanger Condition		COND	EVAP	COND
Reversing Valve	RVR	OFF	ON	OFF
Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
	MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg

2. The Number of Outdoor Unit: 2 (two)

Heat Exchanger Mode			Cooling Mode	Heating Mode	Defrosting Mode
Main Outdoor Unit	Heat Exchanger Condition		COND	EVAP	COND
	Reversing Valve	RVR	OFF	ON	OFF
	Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg
Sub Outdoor Unit	Heat Exchanger Condition		COND	EVAP	COND
	Reversing Valve	RVR	OFF	ON	OFF
	Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg

3. The Number of Outdoor Unit: 3 (three)

Heat Exchanger Mode			Cooling Mode	Heating Mode	Defrosting Mode
Main Outdoor Unit	Heat Exchanger Condition		COND	EVAP	COND
	Reversing Valve	RVR	OFF	ON	OFF
	Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg
Sub Outdoor Unit 1	Heat Exchanger Condition		COND	EVAP	COND
	Reversing Valve	RVR	OFF	ON	OFF
	Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg
Sub Outdoor Unit 2	Heat Exchanger Condition		COND	EVAP	COND
	Reversing Valve	RVR	OFF	ON	OFF
	Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg

4. The Number of Outdoor Unit: 4 (four)

Heat Exchanger Mode			Cooling Mode	Heating Mode	Defrosting Mode
Main Outdoor Unit	Heat Exchanger Condition		COND	EVAP	COND
	Reversing Valve	RVR	OFF	ON	OFF
	Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg
Sub Outdoor Unit 1	Heat Exchanger Condition		COND	EVAP	COND
	Reversing Valve	RVR	OFF	ON	OFF
	Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg
Sub Outdoor Unit 2	Heat Exchanger Condition		COND	EVAP	COND
	Reversing Valve	RVR	OFF	ON	OFF
	Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg
Sub Outdoor Unit 3	Heat Exchanger Condition		COND	EVAP	COND
	Reversing Valve	RVR	OFF	ON	OFF
	Expansion Valve	MV1	Fully Open	Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg	Tchg - Tsc	Tsc - Tchg

Condition of Heat Exchanger

COND : Use as Condenser

EVAP : Use as Evaporator

Control Method of Expansion Valve

Tsc - Tchg and Tchg - Tsc:
PI control is carried out to achieve the target value of temperature difference between Tsc and Tchg.

Heat Exchanger SH: PI control is carried out to achieve the targeted value of outdoor heat exchanger SH.

■ Heat Exchanger Mode Control

In accordance with the connectable indoor unit operation mode, the outdoor unit heat exchanger will be switched as shown in the table below.

O.U. Heat Exchanger Mode at Cooling: Condenser COND
O.U. Heat Exchanger Mode at Heating: Evaporator EVAP

(1) The Number of Outdoor Unit: 1 (one)

Heat Exchanger Mode		Cooling Mode	Mainly Cooling Mode		Mainly Heating Mode	Heating Mode	Defrosting Mode
		COND	D1	D1-1	D4	EVAP	DEF1
Heat Exchanger Condition		COND	COND	cond	EVAP	EVAP	COND
Reversing Valve	RVR2	OFF	OFF	OFF	ON	ON	OFF
	RVR1	ON	OFF	OFF	OFF	OFF	ON
Expansion Valve	MV1	Fully Open	Pd	Pd	Heat Exchanger SH	Heat Exchanger SH	Fully Open
	MVB	Tsc - Tchg	Tsc - Tchg	Closed	Tchg - Tsc	Tchg - Tsc	Tsc - Tchg

(2) The Number of Outdoor Unit: 2 (two)

Heat Exchanger Mode			Cooling Mode	Mainly Cooling Mode		Mainly Heating Mode		Heating Mode
			COND	D1	D2	D3	D4	EVAP
Main Outdoor Unit	Heat Exchanger Condition		COND	COND	COND	cond	EVAP	EVAP
	Reversing Valve	RVR2	OFF	OFF	OFF	OFF	ON	ON
		RVR1	ON	OFF	OFF	OFF	OFF	OFF
	Expansion Valve	MV1	Pd	Pd	Pd	Pd	Heat Exchanger SH	Heat Exchanger SH
		MVB	Tsc - Tchg	Tsc - Tchg	Tsc - Tchg	Closed	Tchg - Tsc	Tchg - Tsc
Sub Outdoor Unit	Heat Exchanger Condition		COND	COND	evap	EVAP	EVAP	EVAP
	Reversing Valve	RVR2	OFF	OFF	ON	ON	ON	ON
		RVR1	ON	OFF	OFF	OFF	OFF	OFF
	Expansion Valve	MV1	Pd	Pd	Closed	Heat Exchanger SH	Heat Exchanger SH	Heat Exchanger SH
		MVB	Tsc - Tchg	Tsc - Tchg	Closed	Tchg - Tsc	Tchg - Tsc	Tchg - Tsc

Heat Exchanger Mode			Defrosting Mode	
			DEF2	DEF1
			with CH-Box	without CH-Box
Main Outdoor Unit	Heat Exchanger Condition		COND / EVAP	COND
	Reversing Valve	RVR2	ON / OFF	OFF
		RVR1	OFF	ON
	Expansion Valve	MV1	Fully Open / Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg / Tchg - Tsc	Tsc - Tchg
Sub Outdoor Unit	Heat Exchanger Condition		COND / EVAP	COND
	Reversing Valve	RVR2	ON / OFF	OFF
		RVR1	OFF	ON
	Expansion Valve	MV1	Fully Open / Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg / Tchg - Tsc	Tsc - Tchg

(3) The Number of Outdoor Unit: 3 (three)

Heat Exchanger Mode			Cooling Mode	Mainly Cooling Mode		
			COND	D1	D2-1	D2-2
Main Outdoor Unit	Heat Exchanger Condition		COND	COND	COND	COND
	Reversing Valve	RVR2	OFF	OFF	OFF	OFF
		RVR1	ON	OFF	OFF	OFF
	Expansion Valve	MV1	Pd	Pd	Pd	Pd
		MVB	Tsc - Tchg	Tsc - Tchg	Tsc - Tchg	Tsc - Tchg
Sub Outdoor Unit 1	Heat Exchanger Condition		COND	COND	evap	evap
	Reversing Valve	RVR2	OFF	OFF	ON	ON
		RVR1	ON	OFF	OFF	OFF
	Expansion Valve	MV1	Pd	Pd	Closed	Closed
		MVB	Tsc - Tchg	Tsc - Tchg	Closed	Closed
Sub Outdoor Unit 2	Heat Exchanger Condition		COND	COND	COND	evap
	Reversing Valve	RVR2	OFF	OFF	OFF	OFF
		RVR1	ON	OFF	OFF	OFF
	Expansion Valve	MV1	Pd	Pd	Pd	Closed
		MVB	Tsc - Tchg	Tsc - Tchg	Tsc - Tchg	Closed

Heat Exchanger Mode			Mainly Heating Mode				Heating Mode
			D2-3	D3-1	D3-2	D4	EVAP
Main Outdoor Unit	Heat Exchanger Condition		cond	cond	cond	EVAP	EVAP
	Reversing Valve	RVR2	OFF	OFF	OFF	ON	ON
		RVR1	OFF	OFF	OFF	OFF	OFF
	Expansion Valve	MV1	Pd	Pd	Pd	Heat Exchanger SH	Heat Exchanger SH
		MVB	Tchg - Tsc	Tchg - Tsc	Tchg - Tsc	Tchg - Tsc	Tchg - Tsc
Sub Outdoor Unit 1	Heat Exchanger Condition		EVAP	EVAP	EVAP	EVAP	EVAP
	Reversing Valve	RVR2	ON	ON	ON	ON	ON
		RVR1	OFF	OFF	OFF	OFF	OFF
	Expansion Valve	MV1	Heat Exchanger SH	Heat Exchanger SH	Heat Exchanger SH	Heat Exchanger SH	Heat Exchanger SH
		MVB	Tchg - Tsc	Tchg - Tsc	Tchg - Tsc	Tchg - Tsc	Tchg - Tsc
Sub Outdoor Unit 2	Heat Exchanger Condition		evap	EVAP	EVAP	EVAP	EVAP
	Reversing Valve	RVR2	ON	ON	ON	ON	ON
		RVR1	OFF	OFF	OFF	OFF	OFF
	Expansion Valve	MV1	Closed	Heat Exchanger SH	Heat Exchanger SH	Heat Exchanger SH	Heat Exchanger SH
		MVB	Closed	Tchg - Tsc	Tchg - Tsc	Tchg - Tsc	Tchg - Tsc

Heat Exchanger Mode			Defrosting Mode	
			DEF2	DEF1
			with CH-Box	without CH-Box
Main Outdoor Unit	Heat Exchanger Condition		COND / EVAP	COND
	Reversing Valve	RVR2	OFF / ON	OFF
		RVR1	OFF	ON
	Expansion Valve	MV1	Fully Open / Heat Exchanger SH	Fully Open
		MVB	Isc - Ichg / Ichg - Isc	Isc - Ichg
Sub Outdoor Unit 1	Heat Exchanger Condition		COND / EVAP	COND
	Reversing Valve	RVR2	OFF / ON	OFF
		RVR1	OFF	ON
	Expansion Valve	MV1	Fully Open / Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg / Tchg - Tsc	Tsc - Tchg
Sub Outdoor Unit 2	Heat Exchanger Condition		COND / EVAP	COND
	Reversing Valve	RVR2	OFF / ON	OFF
		RVR1	OFF	ON
	Expansion Valve	MV1	Fully Open / Heat Exchanger SH	Fully Open
		MVB	Tsc - Tchg / Tchg - Tsc	Tsc - Tchg

NOTES:

1. Condition of Heat Exchanger
   - COND : Use as Condenser
   - EVAP : Use as Evaporator
   - cond : Avoid the use of Heat Exchanger (under the high pressure condition)
   - evap : Avoid the use of Heat Exchanger (under the low pressure condition)

2. Control Method of Expansion Valve
   Pd - Normally fully open. (The opening is depending on the refrigerant cycle condition.)
   PI control is performed to achieve the targeted value of discharge pressure when discharge pressure decreases.

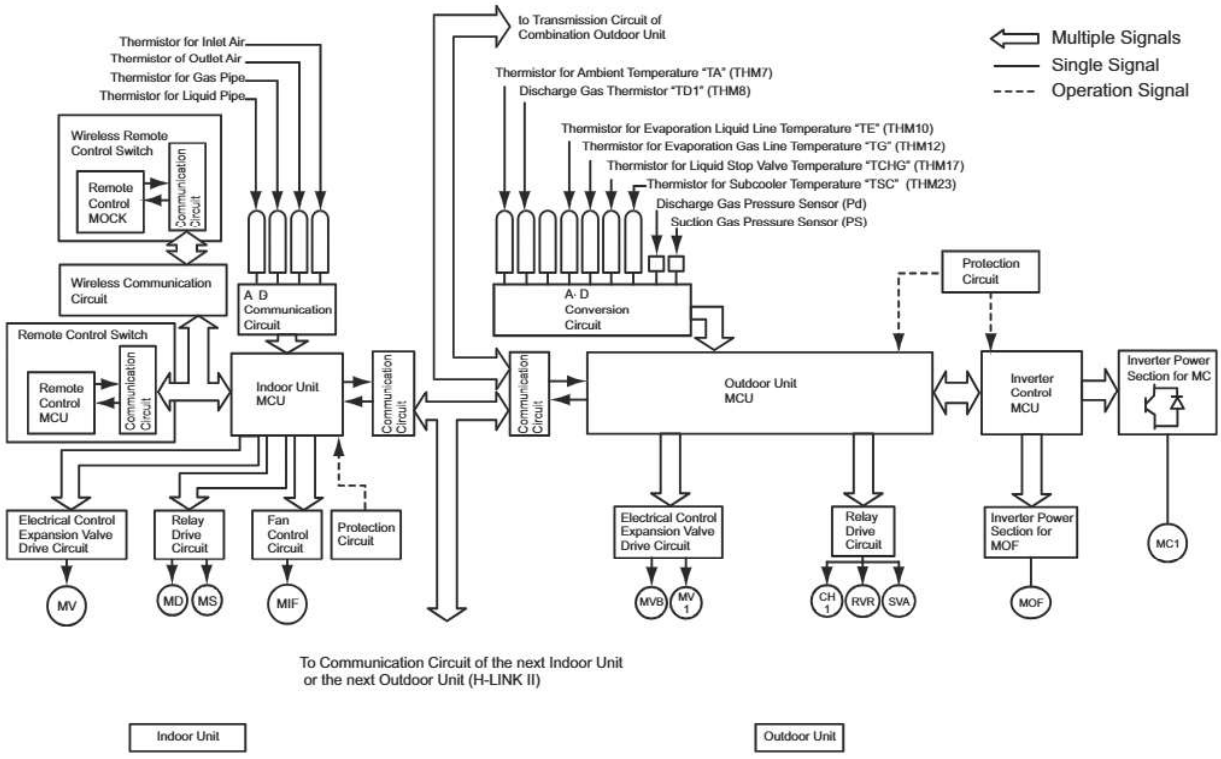
   Tsc - Tchg and Tchg - Tsc: PI control is carried out to achieve the target value of temperature difference between Tsc and Tchg.

   Heat Exchanger SH: PI control is carried out to achieve the targeted value of outdoor heat exchanger SH.

12. Control System

The figure below is a representation of the control system.

Example:

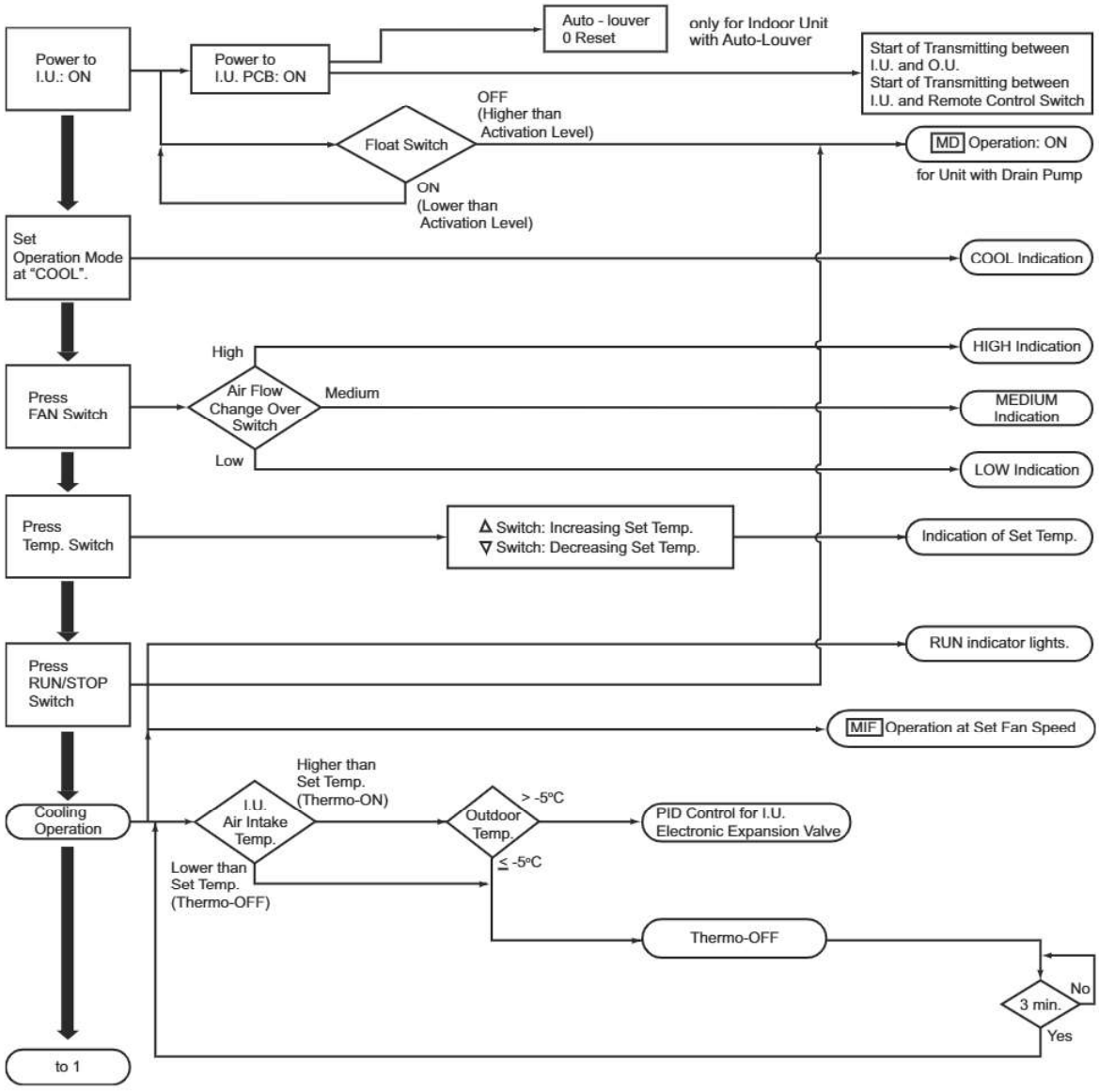


Symbol	Name
THM	Thermistor
MCU	Microcontroller
MC_1	DC Motor (for Inverter Compressor)
MOF	DC Motor (for Outdoor Fan)
MIF	Motor (for Indoor Fan)
MS	Motor (for Auto-Louver)
MD	Motor (for Drain Pump)
MV	Electronic Expansion Valve (for Indoor Unit)
MV_1	Electronic Expansion Valve (for Outdoor Unit)
MVB	Electronic Expansion Valve for Supercooling Heat Exchanger
SVA	Solenoid Valve
RVR	Reversing Valve
CH_1	Crankcase Heater

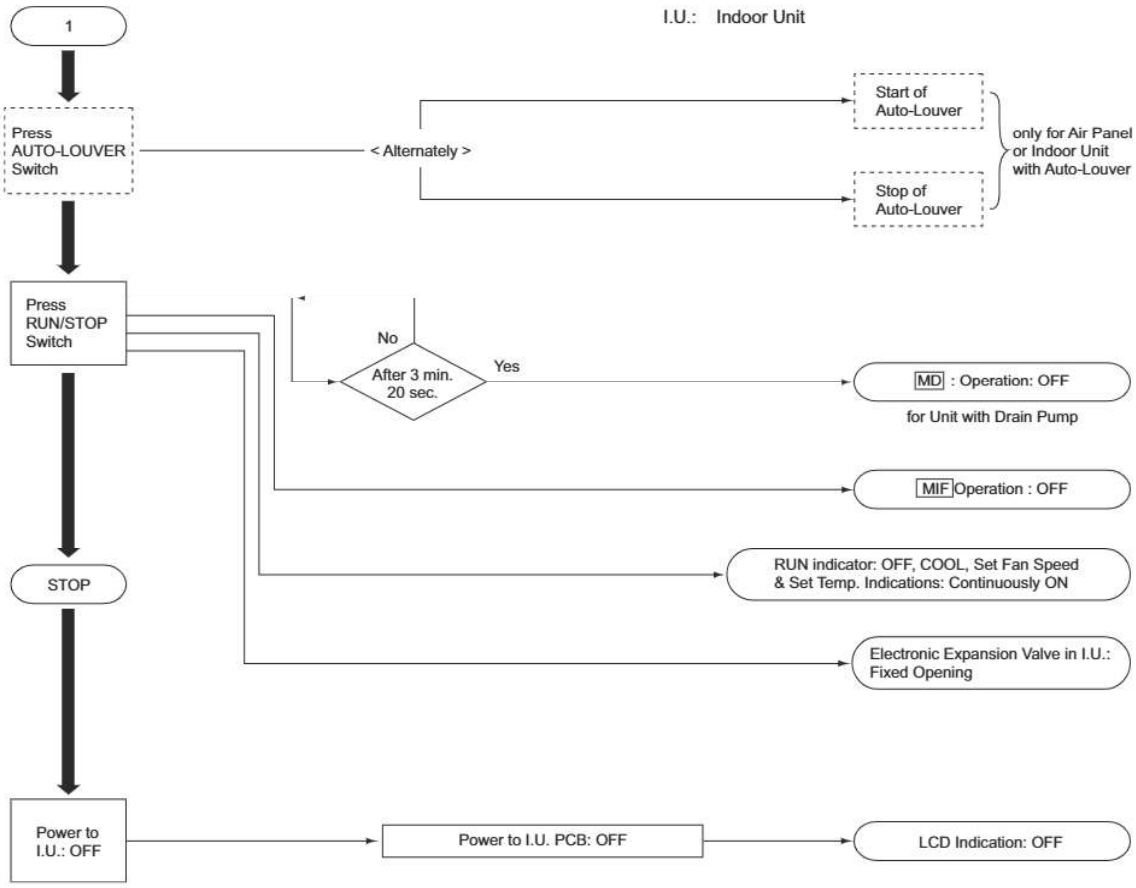
12.3 Standard Operation Sequence

Cooling Operation

I.U.: Indoor Unit
O.U.: Outdoor Unit

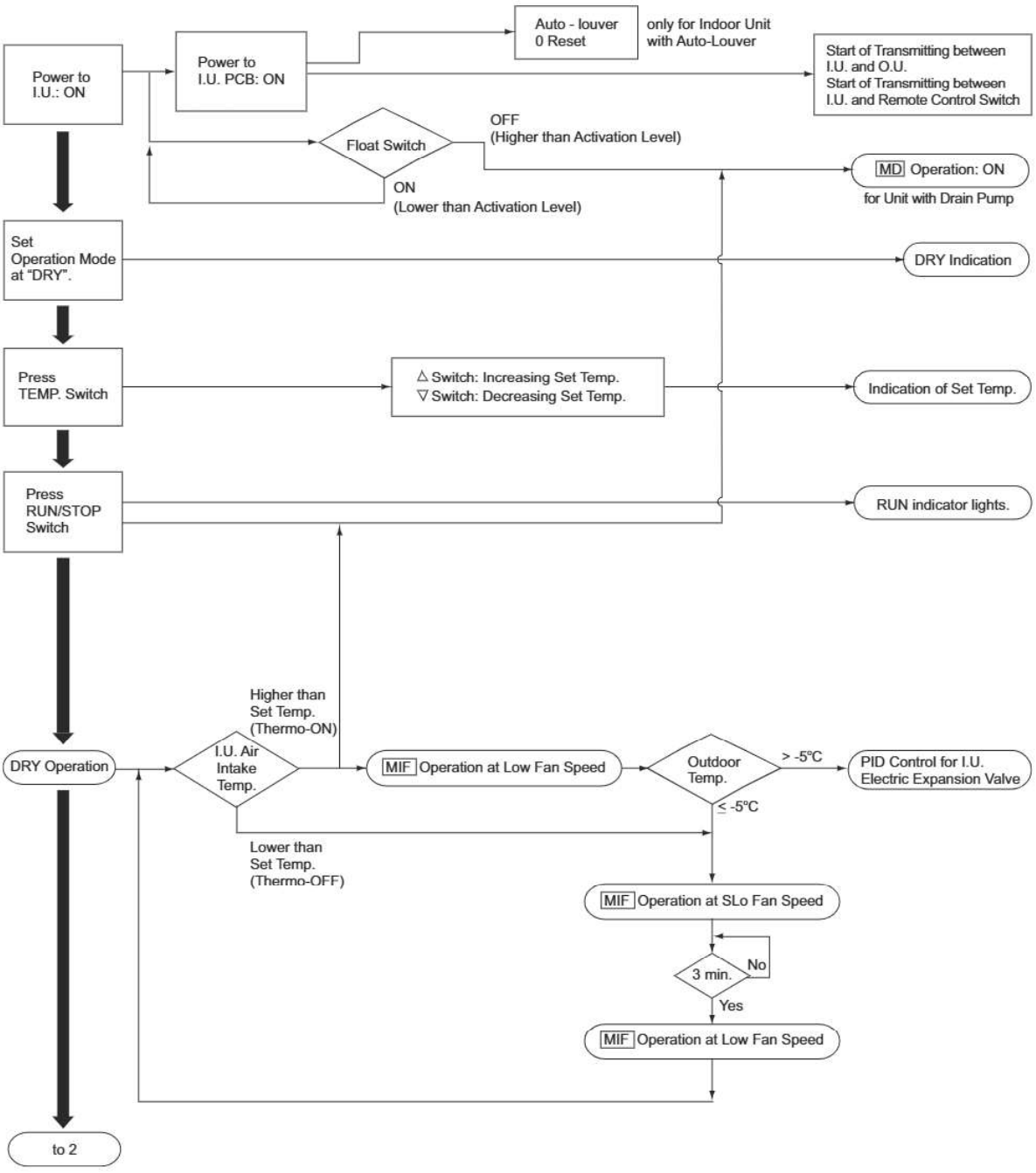


Cooling Operation

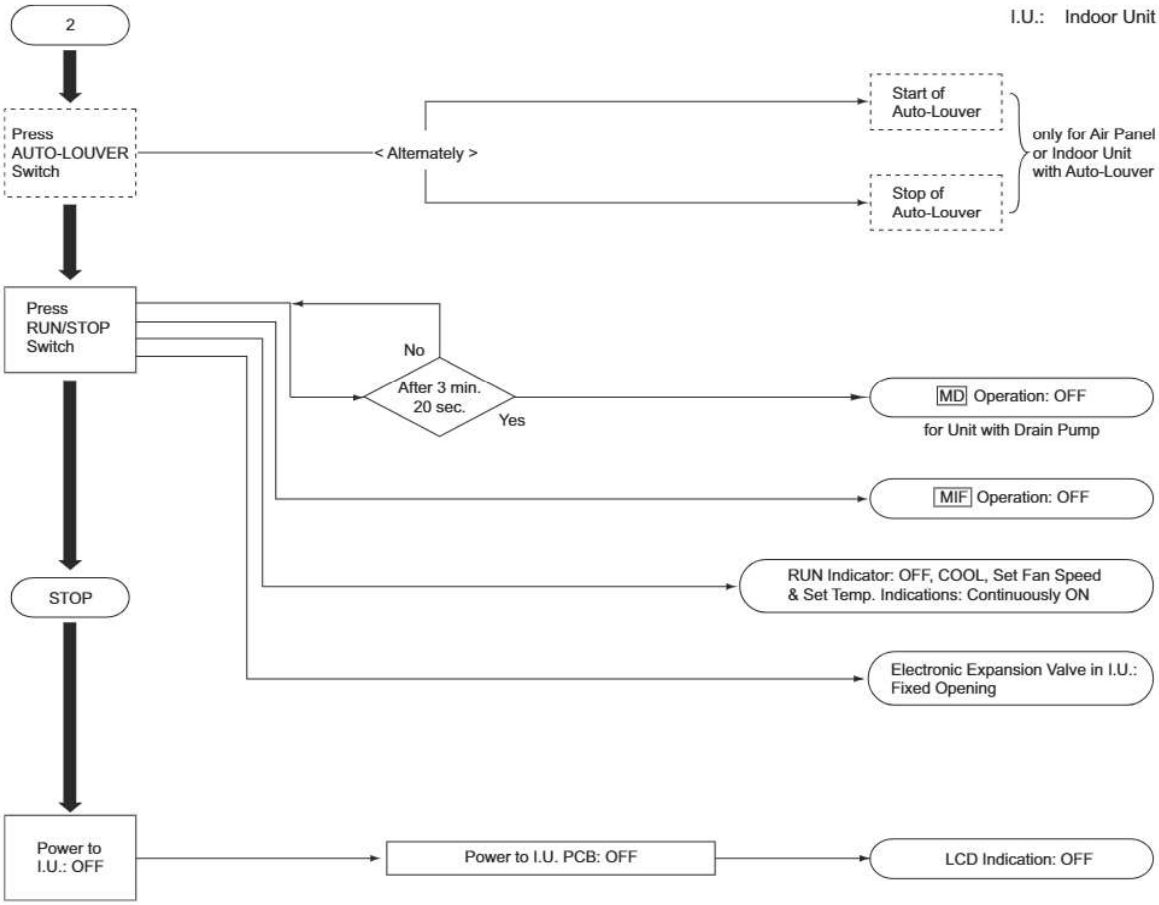


Dry Operation

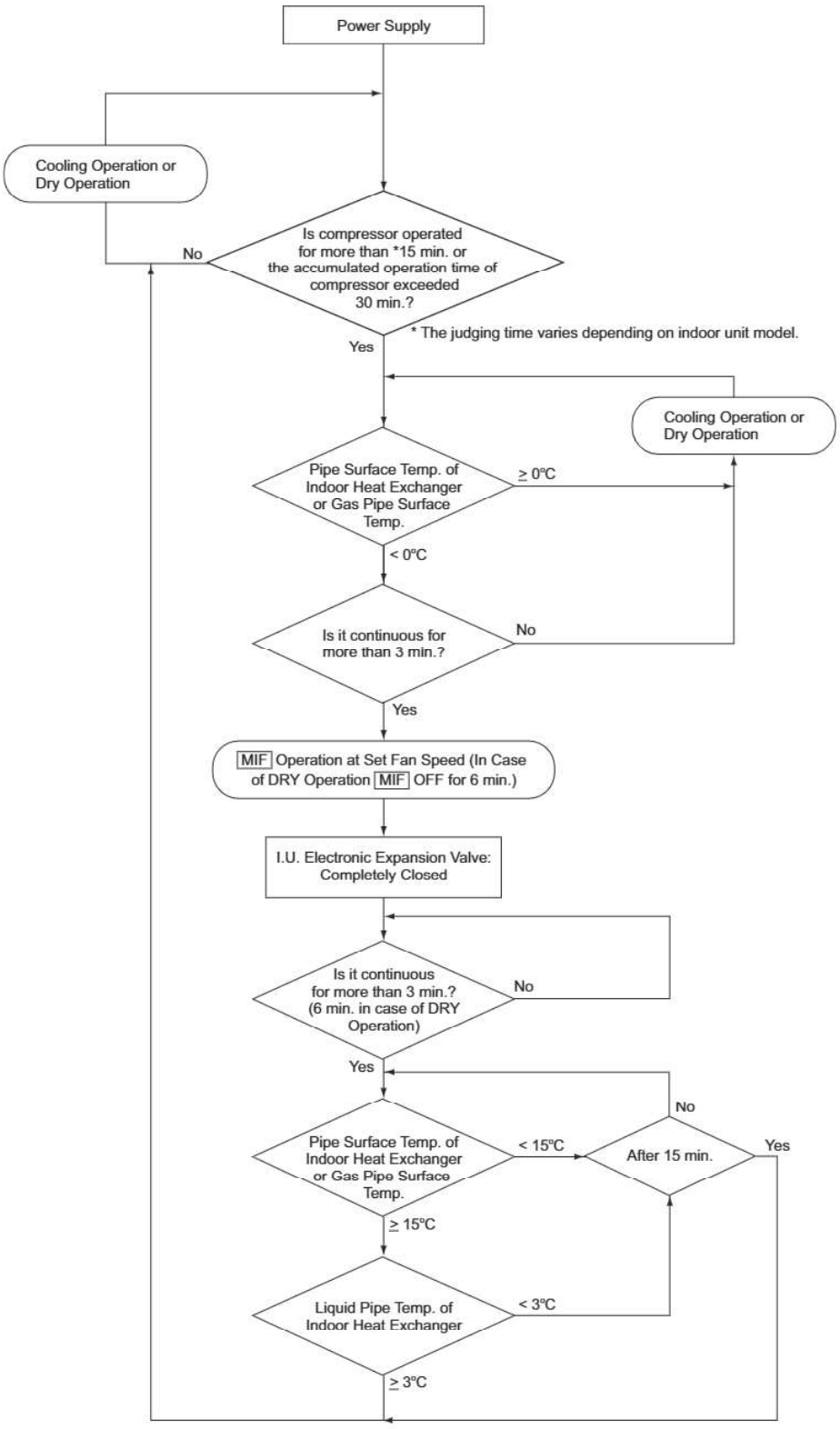
I.U.: Indoor Unit
O.U.: Outdoor Unit



Dry Operation

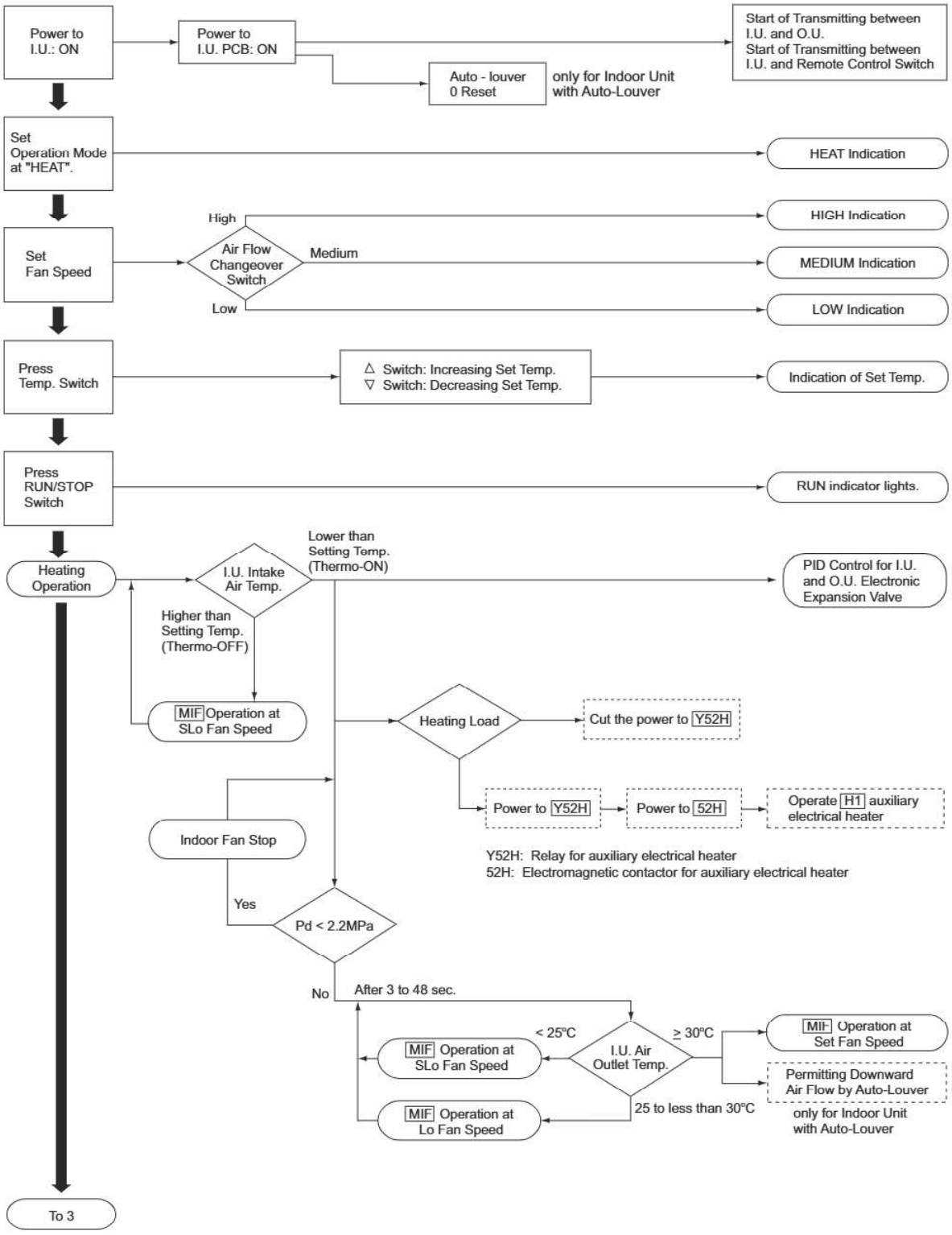


Freezing Protection Control during Cooling or Dry Operation

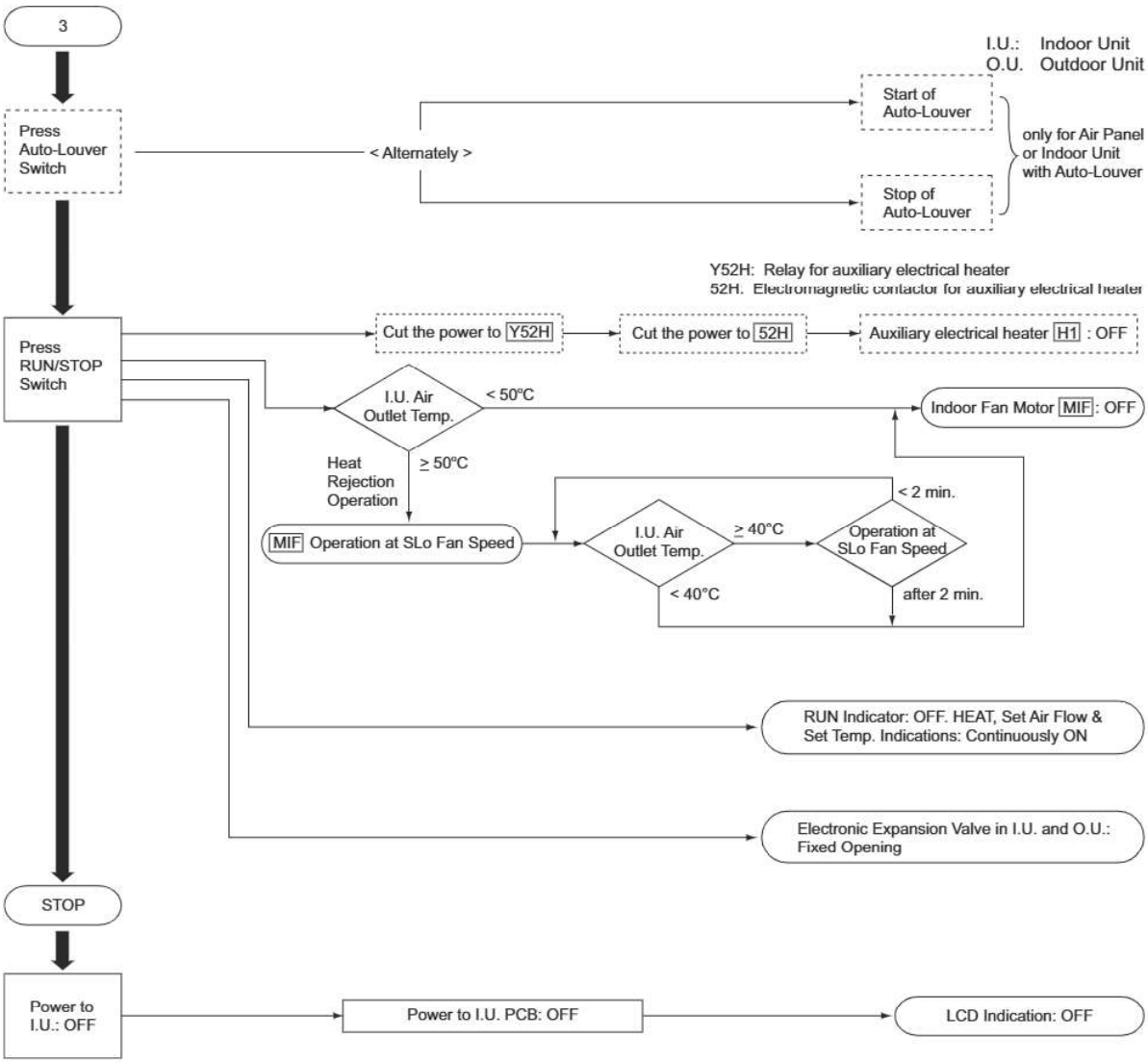


Heating Operation

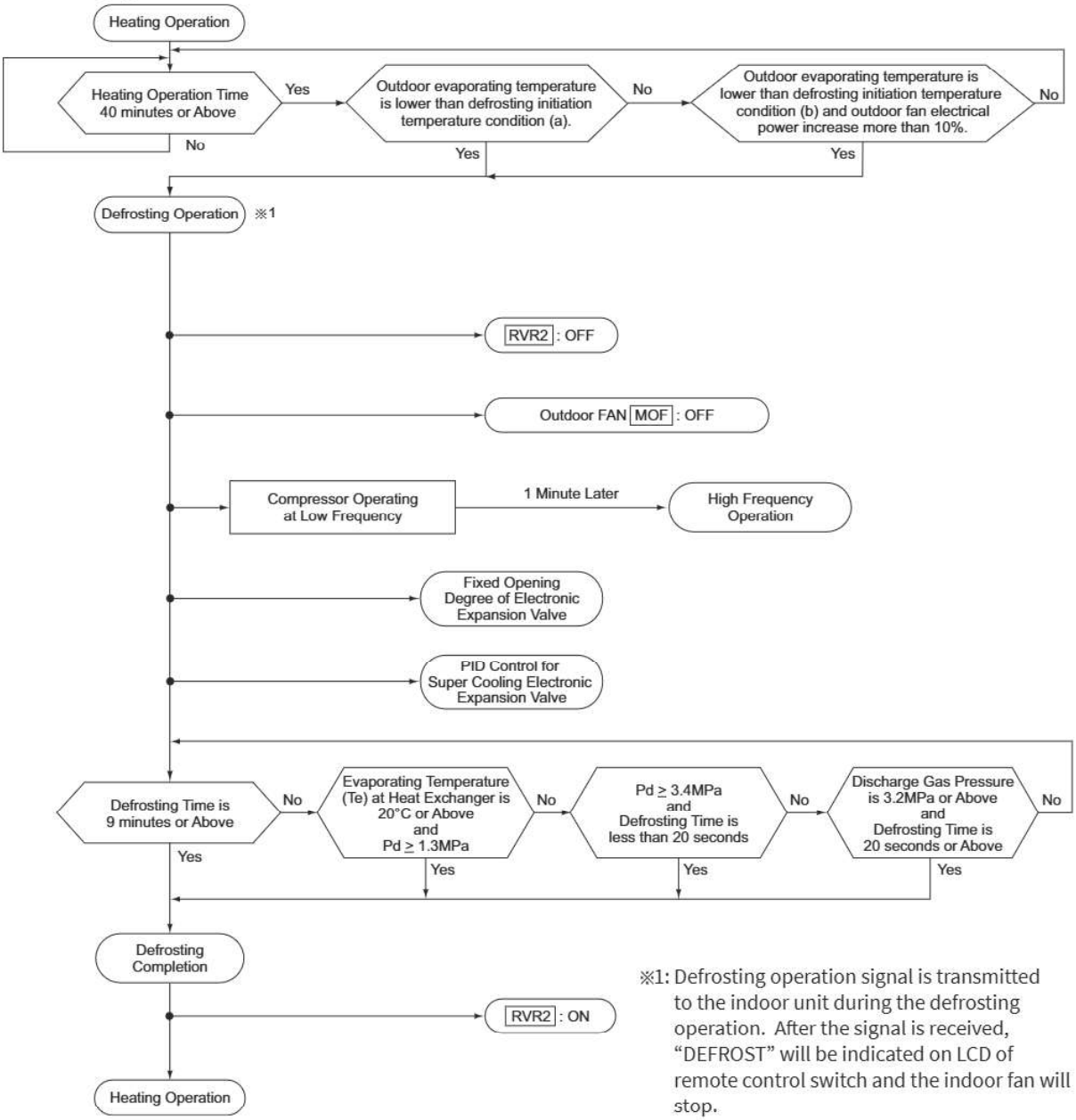
I.U.: Indoor Unit
O.U.: Outdoor Unit



Heating Operation

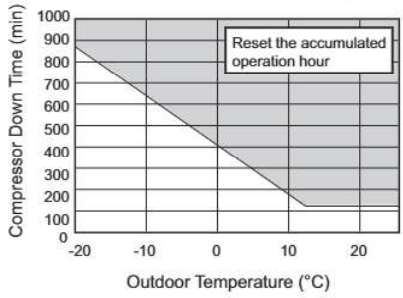


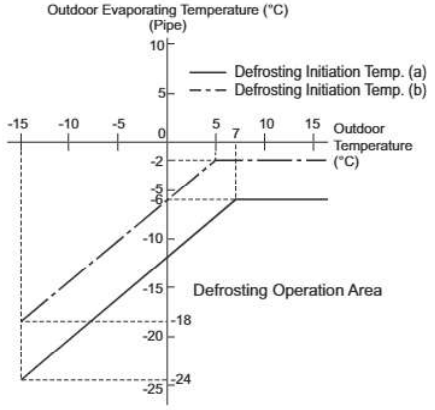
Defrosting Operation



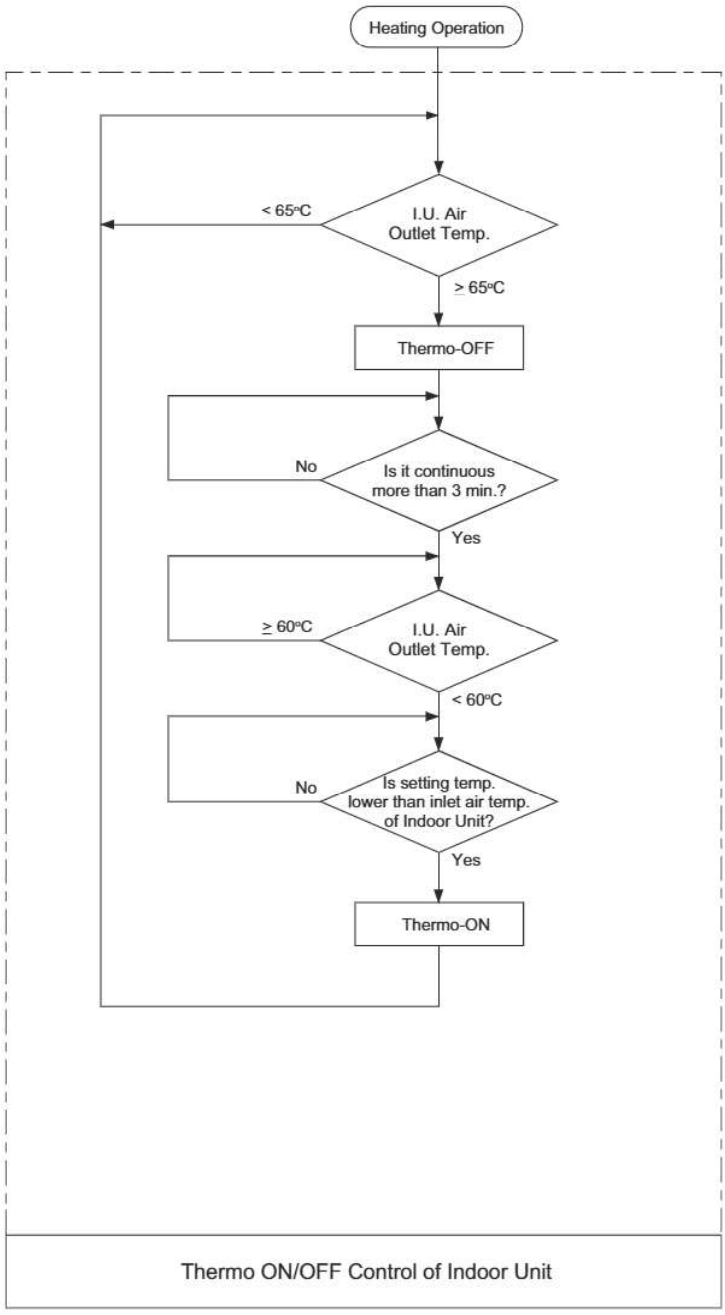
※1: Defrosting operation signal is transmitted to the indoor unit during the defrosting operation. After the signal is received, "DEFROST" will be indicated on LCD of remote control switch and the indoor fan will stop.

Accumulated Heating Operation Hour Resetting Condition	Temperature Condition under Defrosting Operation
To prevent initiation of defrosting operation within minimum time when start operation after long time stoppage, reset the accumulated heating operation hour according to outdoor temperature (Ta) and compressor down time when turning ON the power.	





Prevention Control for Excessively High Discharge Air Temperature



Protection Control

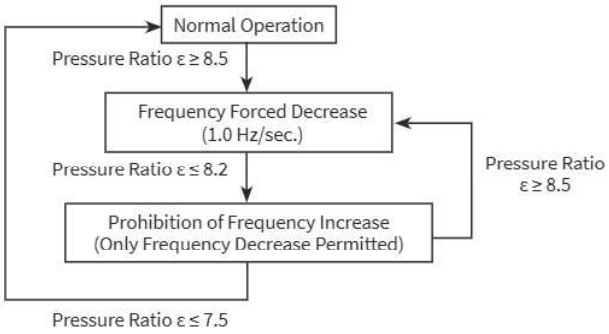
Whenever protection control sequences are activated, the corresponding code is displayed on the 7-segment LED array of the main control board.
Protection control code is displayed when a unit protection mode has been initiated. The code will disappear once the cause of protection has been addressed.

Indicated Contents

Indication	Protection Control Contents	Code During Degeneration Control
P01	Pressure Ratio Protection Control	Pc1
P02	High Pressure Increase Protection Control	Pc2
P03	Inverter Current Protection Control	Pc3
P04	Inverter Fin Temperature Increase Protection Control	Pc4
P05	Discharge Temperature Increase Protection Control	Pc5
P06	Low Pressure Decrease Protection Control	—
P09	High Pressure Decrease Protection Control	
P0A	Demand Current Control	
P0d	Low Pressure Increase Protection Control	

1. P01: Pressure Ratio Protection Control
   a. Pressure Ratio Increase Protection Control
      Pressure Ratio Increase Protection Control is performed in order to protect the compressor from an increase of pressure ratio.

Details of Control

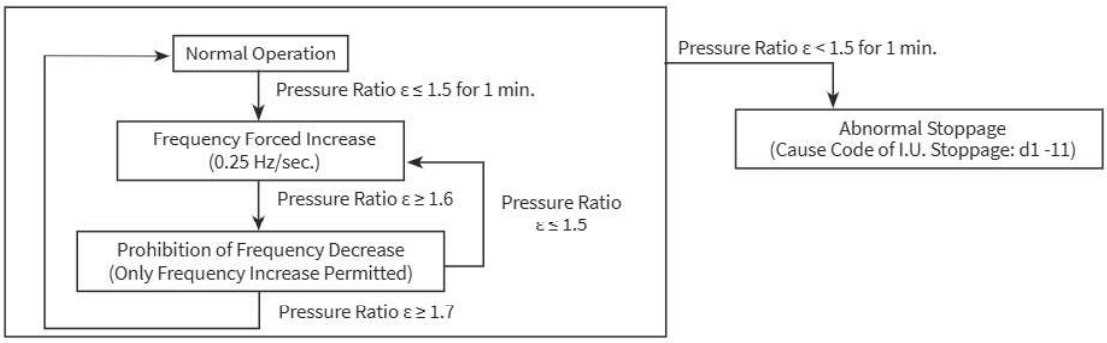


NOTE:

- With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
- The pressure ratio is calculated in each outdoor unit, and this control uses the maximum value.
  e = (Pd [MPa] + 0.1)/(Ps [MPa] + 0.06)
  e = (Pd [psi] + 15)/(Ps [psi] + 9)
  Pd: Detected Value of High Pressure Sensor [MPa (psi)]
  Ps: Detected Value of Low Pressure Sensor [MPa (psi)]

b. Low Pressure Ratio Protection Function
This function is activated to protect the compressor during occurrences of low pressure ratio.

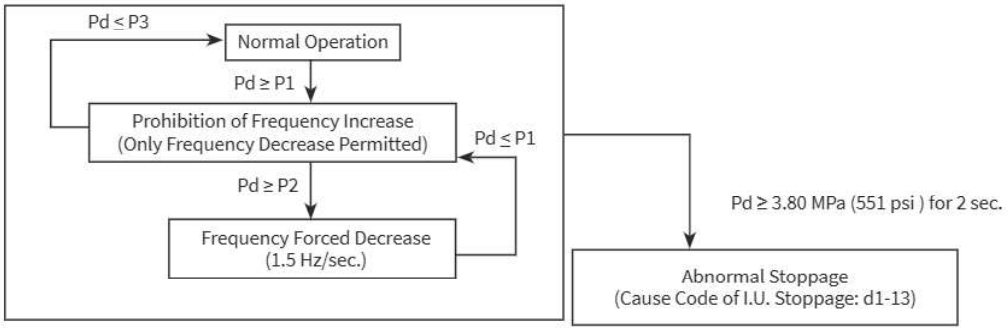
Details of Control



NOTE:
- With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
- The pressure ratio is calculated in each outdoor unit, and this control uses the minimum value.

2. P02: High Pressure Increase Protection Control
High Pressure Protection Control is performed in order to prevent activation of a protection device caused by a high pressure increase during an abnormality and to protect the compressor from an excessive increase of discharge pressure.

Details of Control



Control Value [MPa(psi)]

Operation Mode	P1	P2	P3
Cooling	3.50 (508)	3.55 (515)	3.30 (479)
Heating	3.50 (508)	3.55 (515)	3.30 (479)

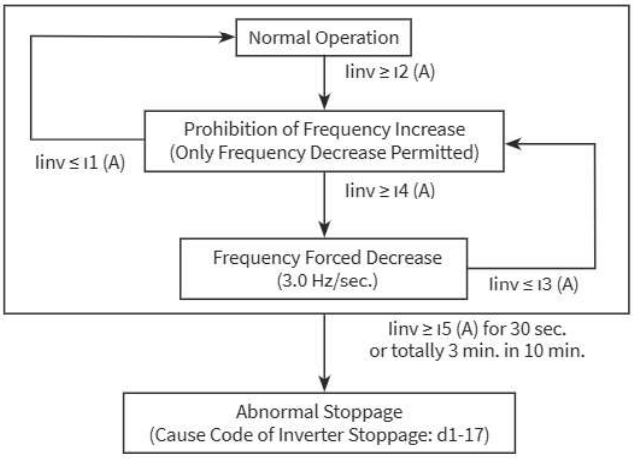
NOTE:
- With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
- High pressure is detected in each outdoor unit, and this control uses the maximum value.
  Pd: Detected Value of High Pressure Sensor [MPa(pis)]

3. P03: Inverter Current Protection Control

Inverter Current Protection Control is performed in order to prevent an inverter trip caused by an increase of inverter secondary current value.

a. Inverter Secondary Current Protection

Details of Control



Iinv: Detected Value of Inverter Secondary Current Sensor [A]

Control Value

< 380-415V >

RAS-080 to 220 JNCBLI

models	I1	I2	I3	I4	I5
8	37.5	38.0	38.5	39.0	41.0
10	37.5	38.0	38.5	39.0	41.0
12	37.5	38.0	38.5	39.0	41.0
14	24.5	25.0	25.5	26.0	27.3
16	24.5	25.0	25.5	26.0	27.3
18	37.5	38.0	38.5	39.0	41.0
20	37.5	38.0	38.5	39.0	41.0
22	37.5	38.0	38.5	39.0	41.0

RAS-080 to 280 (H/R)NCCL(I/W)

models	I1	I2	I3	I4	I5
8	24.5	25.0	25.5	26.0	27.3
10	24.5	25.0	25.5	26.0	27.3
12	24.5	25.0	25.5	26.0	27.3
14	37.5	38.0	38.5	39.0	41.0
16	37.5	38.0	38.5	39.0	41.0
18	37.5	38.0	38.5	39.0	41.0
20	24.5	25.0	25.5	26.0	27.3
22	24.5	25.0	25.5	26.0	27.3
24	24.5	25.0	25.5	26.0	27.3
26	37.5	38.0	38.5	39.0	41.0
28	37.5	38.0	38.5	39.0	41.0

RAS-080 to 220 (H/R)NCBLW

RAS-080 to 200 RNCBLW(For ANZ)

models	I1	I2	I3	I4	I5
8	24.5	25.0	25.5	26.0	27.3
10	24.5	25.0	25.5	26.0	27.3
12	37.5	38.0	38.5	39.0	41.0
14	24.5	25.0	25.5	26.0	27.3
16	24.5	25.0	25.5	26.0	27.3
18	37.5	38.0	38.5	39.0	41.0
20	37.5	38.0	38.5	39.0	41.0
22	37.5	38.0	38.5	39.0	41.0

RAS-080 to 240 RNCCLW(For ANZ)

models	I1	I2	I3	I4	I5
8	24.5	25.0	25.5	26.0	27.3
10	24.5	25.0	25.5	26.0	27.3
12	24.5	25.0	25.5	26.0	27.3
14	37.5	38.0	38.5	39.0	41.0
16	37.5	38.0	38.5	39.0	41.0
18	37.5	38.0	38.5	39.0	41.0
20	24.5	25.0	25.5	26.0	27.3
22	24.5	25.0	25.5	26.0	27.3
24	37.5	38.0	38.5	39.0	41.0

< 220V >

RAS-080 to 280 RNCCRW

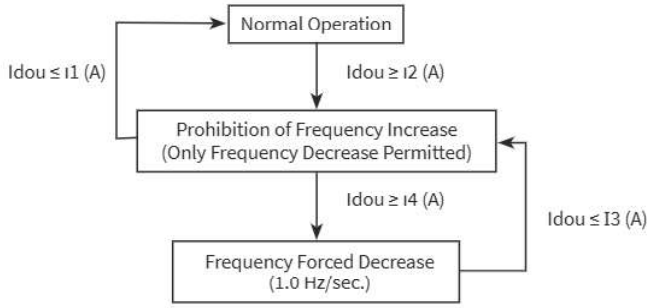
models	I1	I2	I3	I4	I5
8	45.5	46.5	47.0	48.0	50.4
10	45.5	46.5	47.0	48.0	50.4
12	45.5	46.5	47.0	48.0	50.4
14	55.5	56.5	57.0	58.0	60.9
16	55.5	56.5	57.0	58.0	60.9
18	76.5	77.5	78.0	79.0	83.0
20	45.5	46.5	47.0	48.0	50.4
22	45.5	46.5	47.0	48.0	50.4
24	45.5	46.5	47.0	48.0	50.4
26	55.5	56.5	57.0	58.0	60.9
28	55.5	56.5	57.0	58.0	60.9

NOTE:

- With a combination of base units, the control in the figure is performed for each outdoor unit connected. When there is outdoor unit in Prohibition of Frequency Increase, all the outdoor units in operation are prohibited to increase frequency. When there is outdoor unit in Frequency Forced Decrease, all the outdoor units in operation are forced to decrease frequency.

b. Primary Current Protection for each Outdoor Unit

Details of Control



Idou: Total Value of Primary Current of all the Inverter PCB in an Outdoor Unit [A]

Control Value

< 380-415V >

RAS-080 to 220 JNCBLI
RAS-080 to 220 (H/R)NCBLW
RAS-080 to 200 RNCBLW(For ANZ)

models	I1	I2	I3	I4
8	12.2	12.7	13.2	13.7
10	17.0	17.5	18.0	18.5
12	19.8	20.3	20.8	21.3
14	25.1	25.6	26.1	26.6
16	27.6	28.1	28.6	29.1
18	31.8	32.3	32.8	33.3
20	34.1	34.6	35.1	35.6
22	37.7	38.2	38.7	39.2

RAS-080 to 280 (H/R)NCCL(I/W)
RAS-080 to 240 RNCCLW

models	I1	I2	I3	I4
8	12.2	12.7	13.2	13.7
10	17.5	18.0	18.5	19.0
12	20.6	21.1	21.6	22.1
14	24.8	25.3	25.8	26.3
16	29.6	30.1	30.6	31.1
18	36.3	36.8	37.3	37.8
20	36.6	37.1	37.6	38.1
22	39.1	39.6	40.1	40.6
24	48.9	49.4	49.9	50.4
26	53.9	54.4	54.9	55.4
28	55.1	55.6	56.1	56.6

< 220V >

RAS-080 to 280 RNCCRW

models	I1	I2	I3	I4
8	20.5	22.0	22.0	22.5
10	29.3	30.8	30.8	31.3
12	34.3	35.8	35.8	36.3
14	41.2	42.7	42.7	43.2
16	49.1	50.6	50.6	51.1
18	60.1	61.6	61.6	62.1
20	60.6	62.1	62.1	62.6
22	64.7	66.2	66.2	66.7
24	80.8	82.3	82.3	82.8
26	89.1	90.6	90.6	91.1
28	90.9	92.4	92.4	92.9

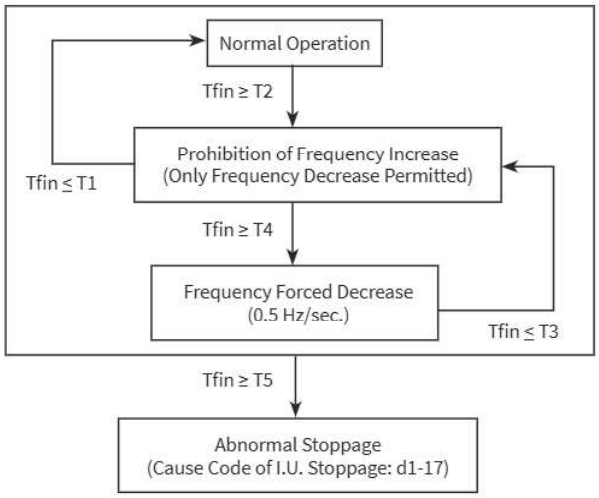
NOTE:

- With a combination of base units, the control in the figure is performed for each outdoor unit connected. When there is outdoor unit in Prohibition of Frequency Increase, all the outdoor units in operation are prohibited to increase frequency. When there is outdoor unit in Frequency Forced Decrease, all the outdoor units in operation are forced to decrease frequency.

4. P04: Inverter Fin Temperature Increase Protection Control

Inverter Fin Temperature Increase Protection Control is performed in order to prevent an inverter trip caused by a temperature increase of the inverter fin.

Detail of Control



Tfin: Inverter Fin Temperature Sensor Detected Value [°C]

Control Value

models	T1	T2	T3	T4	T5
RAS-140 to 180 JNCBLI RAS-080 · 100 (H/R)NCBLW, RAS-140 to 180 (H/R)NCBLW RAS-080 to 120 (H/R)NCCL(I/W), RAS-200 to 240 (H/R)NCCL(I/W) RAS-080 to 120 RNCCLW, RAS-200 · 220 RNCCLW(For ANZ)	99	101	101	103	106
RAS-080 to 120 JNCBLI , RAS-200 · 220 JNCBLI RAS-120 (H/R)NCBLW, RAS-200 · 220 (H/R)NCBLW RAS-120 RNCBLW, RAS-200 RNCBLW (For ANZ) RAS-140 to 180 (H/R)NCCL(I/W), RAS-260 · 280 (H/R)NCCL(I/W) RAS-140 to 180 RNCCLW, RAS-240 RNCCLW(For ANZ)	97	99	99	101	104
RAS-080 to 120 RNCCRW, RAS-200 to 240 RNCCRW	93	95	95	97	100
RAS-140 · 160 RNCCRW, RAS-260 · 280 RNCCRW	88	90	90	92	95
RAS-180 RNCCRW	92	94	94	96	99

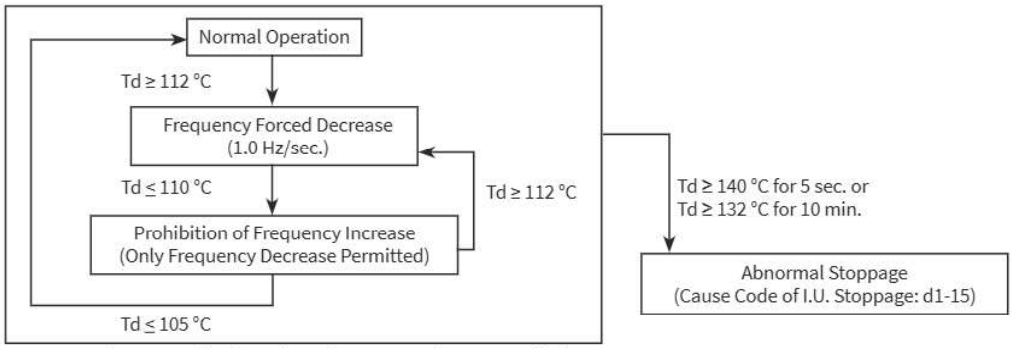
NOTE:

- In case of combination of base units, the control in the figure is performed for each outdoor unit connected. When there is outdoor unit in Prohibition of Frequency Increase, all the outdoor units in operation are prohibited to increase frequency. When there is outdoor unit in Frequency Forced Decrease, all the outdoor units in operation are forced to decrease frequency.

5. P05: Discharge Temperature Increase Protection Control

Discharge Temperature Increase Protection Control is performed in order to protect the compressor motor coil from an increase of discharge temperature during an abnormality.

Details of Control



Td: Detected Value of Discharge Gas Thermistor [°C]

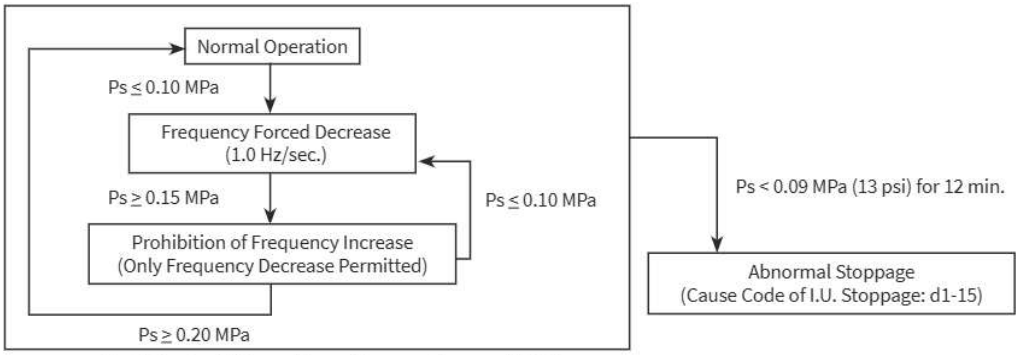
NOTE:

- With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
- Discharge temperature is detected in each outdoor unit, and this control uses the maximum value.

6. P06: Low Pressure Decrease Protection Control

Low Pressure Decrease Protection Control is performed in order to protect the compressor from a transitional decrease of suction pressure.

Details of Control



Ps: Detected Value of Low Pressure Sensor [MPa]

NOTE:

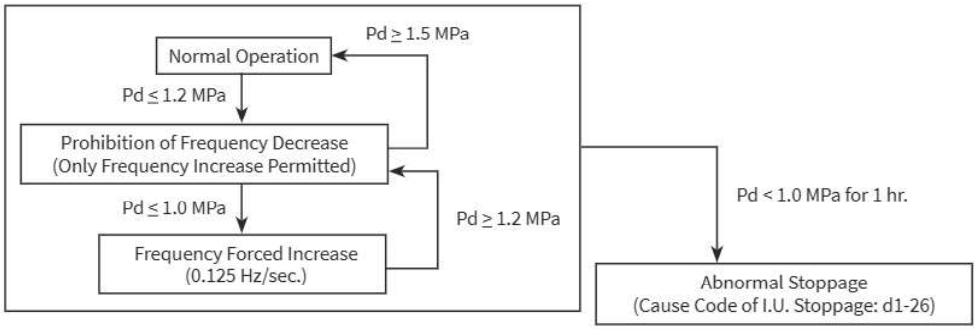
- With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
- Low pressure is detected in each outdoor unit, and this control uses the minimum value.

7. P09: High Pressure Decrease Protection Control

When decreasing high pressure, the compressor operation frequency is controlled by this protection control for the following purposes.

a. To prevent insufficient refrigerant supply to indoor units installed at different height locations.
b. To keep the refrigerant oil supply in the compressor.

Details of Control



Pd: Detected Value of High Pressure Sensor [MPa(psi)]

NOTE:

- With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
- High pressure is detected in each outdoor unit, and this control uses the minimum value.

8. P0A: Demand Current Control

The compressor operation frequency is controlled to set at the setting value of the outdoor unit inverter primary current (40 % to 100 % of rated current of cooling operation). This function is detailed in the "External Input and Output Setting". Refer to the Service Manual for details.

Operating Conditions

The demand current control can be performed under the following conditions.

a. The demand signal is input from the centralized operation controller.
b. The demand signal is input at the external input terminals of the outdoor unit from external equipment such as a building management system or a utility with a smart meter.
c. The demand function settings are set from the outdoor unit PCB.
d. The wave function is set from the outdoor unit PCB.
e. The demand signal is input from the indoor unit (wired controller).

NOTE:

- If the operation current exceeds each setting function value, the compressor operation frequency is controlled.

Cancellation Condition

The input signal is stopped at each condition (a) to (e).

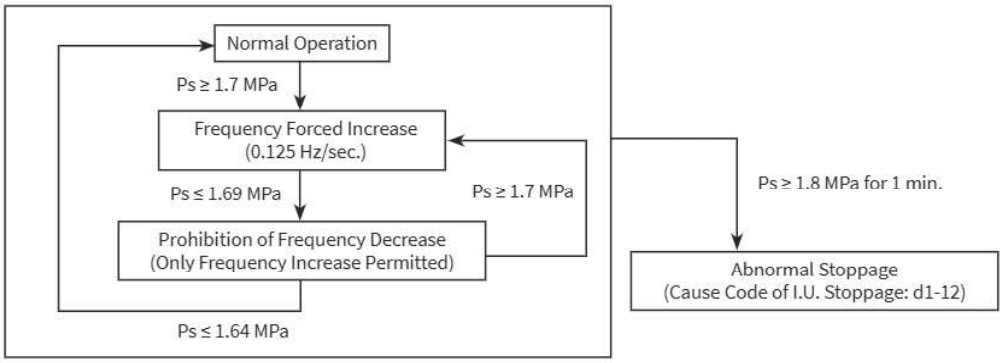
NOTE:

- This function is not available when the compressor starts or during a defrosting operation.

9. P0d: Low Pressure Increase Protection Control

The compressor operation frequency is controlled to protect the compressor from suction pressure transitional increasing.

Details of Control



Ps: Detected Value of Low Pressure Sensor [MPa(psi)]

NOTE:

- With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
- Low pressure is detected in each outdoor unit, and this control uses the maximum value.

10. Priority of Protection Control

If two or more protection controls meet a condition, the protection controls perform according to the following.

Priority Order	Indication Code	Protection Control Performed
1	P01	Pressure Ratio Protection Control
2	P02	High Pressure Increase Protection Control
3	P03	Inverter Current Protection Control
4	P04	Inverter Fin Temperature Increase Protection Control
5	P05	Discharge Temperature Increase Protection Control
6	P06	Low Pressure Decrease Protection Control
7	P0A	Demand Current Control
8	P0d	Low Pressure Increase Protection Control
9	P09	High Pressure Decrease Protection Control

NOTE:

- While a higher-priority protection control is activated, lower-priority ones are not available.
- However, if a higher-priority protection control is the increase/decrease prohibition protection of compressor frequency while a lower-priority protection control is the forced increase/decrease protection of compressor frequency, the forced increase/decrease protection will be prioritized.
  The relative of priority is shown in the below table for details.

①	②	Protection Control Priority
Higher Priority Order of Protection Control Function	Lower Priority Order of Protection Control Function	
Forced Decrease	Forced Decrease	①
	Forced Increase	①
	Prohibition of Increase	①
	Prohibition of Decrease	①
Forced Increase	Forced Decrease	①
	Forced Increase	①
	Prohibition of Increase	①
	Prohibition of Decrease	①
Prohibited Increase	Forced Decrease	②
	Forced Increase	①
	Prohibition of Increase	② *1
	Prohibition of Decrease	①
Prohibited Decrease	Forced Decrease	②
	Forced Increase	②
	Prohibition of Increase	②
	Prohibition of Decrease	②

*1: Discharge Temperature Increase Protection Control (P05) is higher than the following protection controls.

a. Low Pressure Decrease Protection Control (P06)
b. Demand Current Control (P0A)

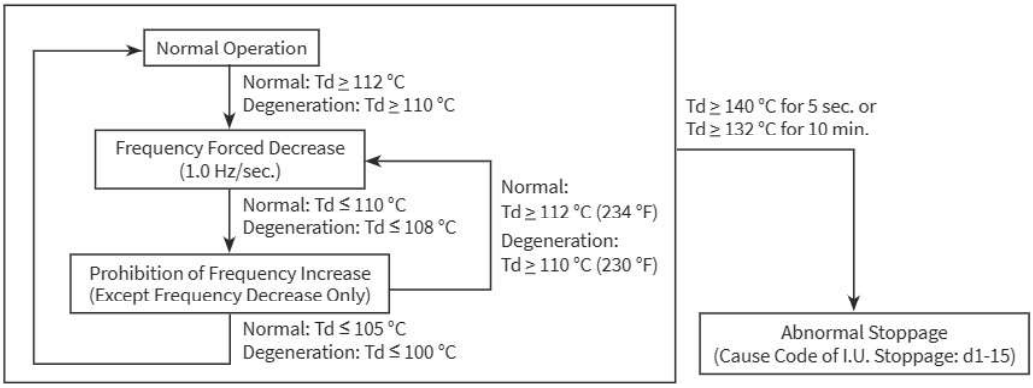
11. Degeneration Control

Degeneration Control is performed to change the protection control range.
This control sequence will suppress re-occurring alarms in response to repeated equipment restarts during protection control conditions listed below.

Related Protection Control

- Pressure Ratio Decrease Protection Control (P01)
- High Pressure Increase Protection Control (P02)
- Inverter Current Protection Control (P03)
- Inverter Fin Temperature Increase Protection Control (P04)
- Discharge Temperature Increase Protection Control (P05)

Example of Discharge Temperature Increase Protection Control



Td: Detected Value of Discharge Gas Thermistor [°C]

12. Oil Return Control

Oil return control is performed in order to avoid insufficient oil supply to the compressor caused by long time low frequency operation. This control is utilized to return the oil flow out to the indoor unit side from the compressor.

Activating Condition

This control function is started the compressor runs below the specified speed for 1 hour continuously (refer to the table below).

Compressor Speed for Oil Return Control

Heat Pump

Outdoor Unit (HP)	Cooling Operation			Heating Operation		
	Psmin<Ps1	Ps1≤Psmin<Ps2	Ps2≤Psmin	Psmin<Ps1	Ps1≤Psmin<Ps2	Ps2≤Psmin
8	16.5	13.5	11.5	28	22	15.5
10	24	19	16.5	40	32	22.5
12 , 14	33	26	22.5	55	44	31
16 to 24	43	35	29	72	57	40
26 to 34	68	55	47	112	90	64
36 to 54	132	105	90	165	132	93
56 to 72	146	117	99	238	190	134
74 to 96	162	130	110	264	212	150
98 to 112	162	130	110	264	212	150

Heat Recovery

Outdoor Unit (HP)	Cooling Operation			Heating Operation or Cooling and heating simultaneous operation		
	Psmin<Ps1	Ps1≤Psmin<Ps2	Ps2≤Psmin	Psmin<Ps1	Ps1≤Psmin<Ps2	Ps2≤Psmin
6,8	18.5	14.5	12.5	11	11	11
10	29	23	19.5	18	14.5	11
12 , 14	53	42.5	36	27.5	22	15.5
16 to 20	53	42.5	36	27.5	22	15.5
22 to 24	59.5	47.5	40	40	32	22.5
26	93.5	75	63.5	55	44	31
28 to 34	93.5	75	63.5	55	44	31
36	126.5	101	85.5	55	44	31
38 to 54	178	134	114	92.5	74	52
56 to 72	192	152	130	112.5	90	63.5
74 to 96	258	205	175	166	133	94
98 to 112	310	246.5	210	238	191	134.5

P1...Cooling: 1.0 MPa, Heating: 0.9 MPa
P2...Cooling: 1.4 MPa, Heating: 1.3 MPa

Detail of Control

Compressor:
Increases the compressor speed above the required value to return the oil to the compressor

Expansion Valve:
(In the Case of Cooling Operation) Open the expansion valve of the indoor unit under thermo-ON.
(In the Case of Heating Operation) Open the expansion valve of the outdoor unit.

Deactivating Condition

This control function is canceled when the oil return control continues for more than 60 sec. (for cooling operation) /120 sec. (for heating operation).

12.4 Safety and Control Device Setting

Compressor Protection

The compressor is protected by the following devices and their combinations.

1. High Pressure Switch: This switch cuts out the operation of the compressor when the discharge pressure exceeds the setting.
2. Oil Heater: This band type heater protects against oil foaming during cold starting, as it is energized while the compressor is stopped.

< 380-415V 50Hz > < 380V 60Hz >
(Standard Type) (Except ANZ)

Model			RAS-080 (H/R)NCCL(I/W)	RAS-100 (H/R)NCCL(I/W)	RAS-120 (H/R)NCCL(I/W)	RAS-140 (H/R)NCCL(I/W)	RAS-160 (H/R)NCCL(I/W)	RAS-180 (H/R)NCCL(I/W)
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)					
High	Cut-Out	MPa	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	50	50	50	63	63	63
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer			Non-Adjustable					
Setting Time		min.	3	3	3	3	3	3
For DC Fan Module Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	5	5	5	10	10	10

Model			RAS-200 (H/R)NCCL(I/W)	RAS-220 (H/R)NCCL(I/W)	RAS-240 (H/R)NCCL(I/W)	RAS-260 (H/R)NCCL(I/W)	RAS-280 (H/R)NCCL(I/W)
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)				
High	Cut-Out	MPa	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	50	50	50	63	63
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer			Non-Adjustable				
Setting Time		min.	3	3	3	3	3
For DC Fan Module Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	5	5	5	5	5

(Standard Type) (For ANZ)

Model			RAS-080RNCCLW	RAS-100RNCCLW	RAS-120RNCCLW	RAS-140RNCCLW	RAS-160RNCCLW	RAS-180RNCCLW
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)					
High	Cut-Out	MPa	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	50	50	50	63	63	63
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer			Non-Adjustable					
Setting Time		min.	3	3	3	3	3	3
For DC Fan Module Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	5	5	5	10	10	10

Model			RAS-200RNCCLW	RAS-220RNCCLW	RAS-240RNCCLW
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)		
High	Cut-Out	MPa	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	50	50	50
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer			Non-Adjustable		
Setting Time		min.	3	3	3
For DC Fan Module Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	5	5	5

12. Control System

(High Efficiency Type)

Model			RAS-080(H/R)NCBLW	RAS-100(H/R)NCBLW	RAS-120(H/R)NCBLW	RAS-140(H/R)NCBLW
For Compressor			Automatic Reset, Non-Adjustable			
Pressure Switches			(each one for each compressor)			
High	Cut-Out	MPa	4.15 $^{-0.05}_{-0.15}$	4.15 $^{-0.05}_{-0.15}$	4.15 $^{-0.05}_{-0.15}$	4.15 $^{-0.05}_{-0.15}$
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	50	50	63	50
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer			Non-Adjustable			
Setting Time		min.	3	3	3	3
For DC Fan Module Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	5	5	10	5

Model			RAS-160(H/R)NCBLW	RAS-180(H/R)NCBLW	RAS-200(H/R)NCBLW	RAS-220HNCBLW
For Compressor			Automatic Reset, Non-Adjustable			
Pressure Switches			(each one for each compressor)			
High	Cut-Out	MPa	4.15 $^{-0.05}_{-0.15}$	4.15 $^{-0.05}_{-0.15}$	4.15 $^{-0.05}_{-0.15}$	4.15 $^{-0.05}_{-0.15}$
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	50	50	63	63
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer			Non-Adjustable			
Setting Time		min.	3	3	3	3
For DC Fan Module Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	5	5	5	5

(High Ambient Type)

Model			RAS-080JNCBLI	RAS-100JNCBLI	RAS-120JNCBLI	RAS-140JNCBLI
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)			
High	Cut-Out	MPa	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	50	50	63	50
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer			Non-Adjustable			
Setting Time		min.	3	3	3	3
For DC Fan Module Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	5	5	10	5

Model			RAS-160JNCBLI	RAS-180JNCBLI	RAS-200JNCBLI	RAS-220JNCBLI
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)			
High	Cut-Out	MPa	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	50	50	63	63
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer			Non-Adjustable			
Setting Time		min.	3	3	3	3
For DC Fan Module Fuse Capacity 3N~, 400V, 50Hz 3N~, 380-415V, 50Hz 3N~, 380V, 60Hz		A	5	5	5	5

12. Control System

< 220V 60Hz >
(Standard Type)

Model			RAS-080RNCCRW	RAS-100RNCCRW	RAS-120RNCCRW	RAS-140RNCCRW	RAS-160RNCCRW	RAS-180RNCCRW
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)					
High	Cut-Out	MPa	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3~, 220V, 60Hz		A	80	80	80	80	80	80
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer Setting Time		min.	Non-Adjustable 3	3	3	3	3	3
For DC Fan Module Fuse Capacity 3~, 220V, 60Hz		A	10	10	10	10	10	10

Model			RAS-200RNCCRW	RAS-220RNCCRW	RAS-240RNCCRW	RAS-260RNCCRW	RAS-280RNCCRW
For Compressor Pressure Switches			Automatic Reset, Non-Adjustable (each one for each compressor)				
High	Cut-Out	MPa	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15
	Cut-In	MPa	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15	3.20 ±0.15
Fuse Capacity 3~, 220V, 60Hz		A	80	80	80	80	80
Oil Heater Capacity		W	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3	37.3 x 3
CCP Timer Setting Time		min.	Non-adjustable 3	3	3	3	3
For DC Fan Module Fuse Capacity 3~, 220V, 60Hz		A	10	10	10	10	10

12.5 Electrical Wiring Diagram

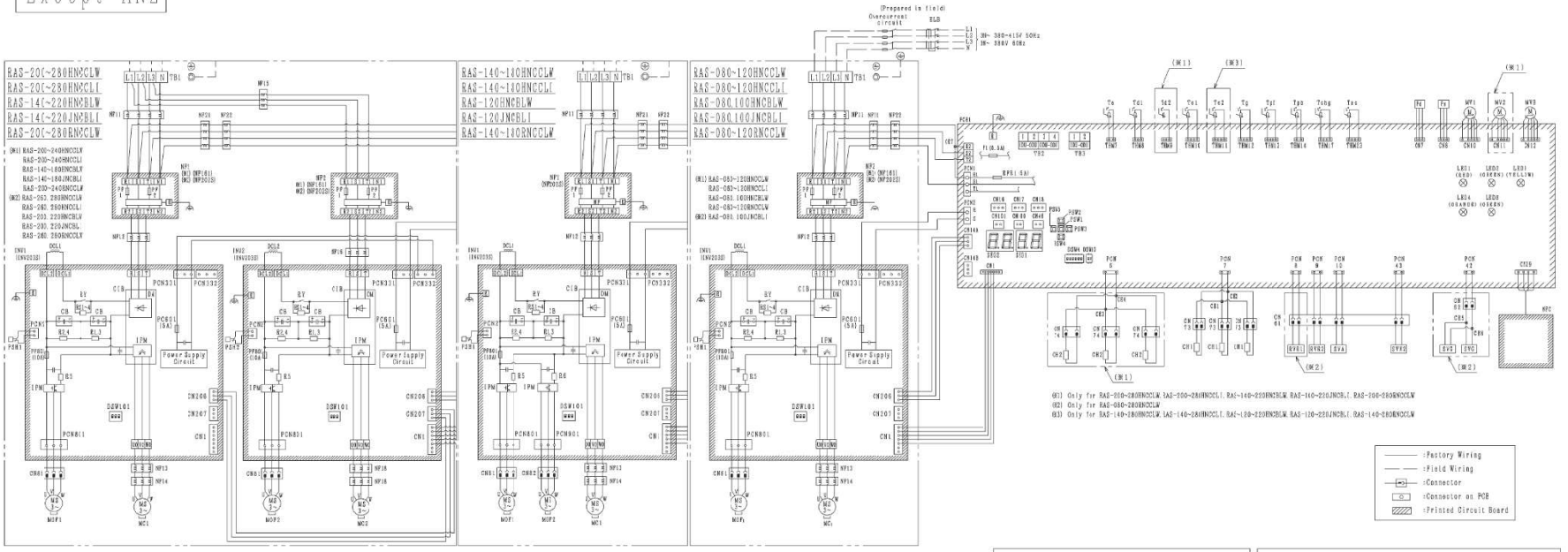
12.5.1 Outdoor Units

380-415V

Except ANZ

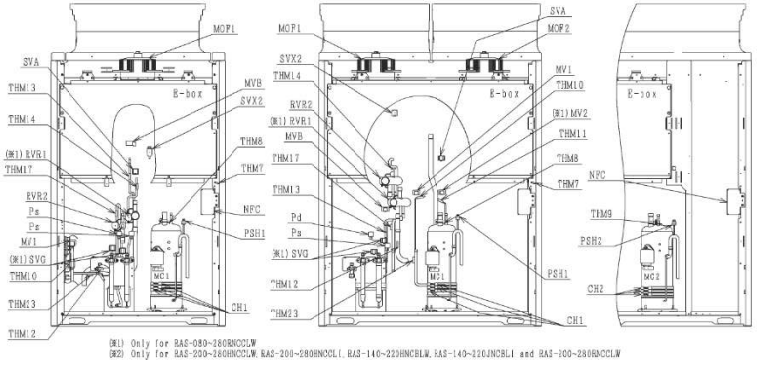
Electrical Wiring Diagram of Hitachi Air Conditioner Outdoor Unit

Models: RAS-080HNCCLW, RAS-100HNCCLW, RAS-120HNCCLW, RAS-140HNCCLW, RAS-160HCCLW, RAS-180HNCCLW, RAC-200HNCCLW, RAS-220HNCCLW, RAS-240HNCCLW, RAS-260HNCCLW, RAS-280HNCCLW
RAS-080HNCCLI, RAS-100HNCCLI, RAS-120HNCCLI, RAS-140HNCCLI, RAS-160HCCLI, RAS-180HNCCLI, RAS-200HNCCLI, RAS-220HNCCLI, RAS-240HNCCLI, RAS-260HNCCLI, RAS-280HNCCLI
RAS-080HNCBLW, RAS-100HNCBLW, RAS-120HNCBLW, RAS-140HCBLW, RAS-160HCBLW, RAS-180HNCBLW, RAC-200HNCBLW, RAS-220HNCBLW
RAS-080RNCCLW, RAS-100RNCCLW, RAS-120RNCCLW, RAS-140RNCCLW, RAS-160RCCLW, RAS-180RNCCLW, RAC-200RNCCLW, RAS-220RNCCLW, RAS-240RNCCLW, RAS-260RNCCLW, RAS-280RNCCLW
RAS-080JNCBLI, RAS-100JNCBLI, RAS-120JNCBLI, RAS-140JNCBLI, RAS-160JCBLI, RAS-180JNCBLI, RAC-200JNCBLI, RAS-220JNCBLI



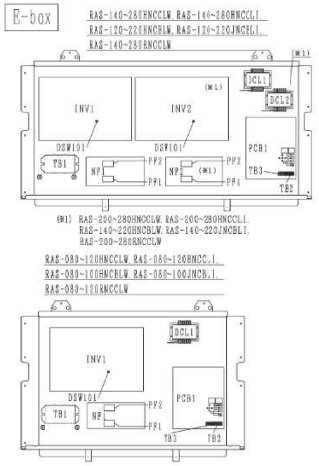
(W1) Only for RAS-200~280HNCCLW, RAS-200~280HNCCLI, RAS-140~220HNCBLW, RAS-140~220JNCBLI, RAS-200~280RNCCLW
(W2) Only for RAS-080~280HNCCLW
(W3) Only for RAS-140~280HNCCLW, RAS-140~280HNCCLI, RAS-120~220HNCBLW, RAS-120~220JNCBLI, RAS-140~280RNCCLW

Outdoor Unit layout drawing



(W1) Only for RAS-080~280HNCCLW
(W2) Only for RAS-200~280HNCCLW, RAS-200~280HNCCLI, RAS-140~220HNCBLW, RAS-140~220JNCBLI and RAS-100~280RNCCLW

E-box



(W1) RAS-200~280HNCCLW, RAS-200~280HNCCLI, RAS-140~220HNCBLW, RAS-140~220JNCBLI, RAS-200~280RNCCLW

Mark Table		
Mark	Name	Note
MC1, 2	Motor for Compressor	
MOP1, 2	Motor for Outdoor Fan	
CH1, 2	Crankcase Heater	
RVR2	Reversing Valve	
RVR1	Reversing Valve	
SVA	Solenoid Valve	
SVX2	Solenoid Valve	
SVG	Solenoid Valve	
Pd	Sensor for Refrigerant Pressure	
Ps	Sensor for Refrigerant Pressure	
THM7~13	Thermistor	
PSH1, 2	Pressure Switch for Protection	
NF1, 2	Noise Filter	
NF3~21	Noise Filter (Ring Core)	
PCB1	Printed Circuit Board	
NFC	Printed Circuit Board	
INV1, 2	Printed Circuit Board	
FUSE1	Fuse on PCB1	In PCB1
F1	Fuse on PCB1	In PCB1
FF1, 2	Fuse on Noise Filter	In NF1
FC501	Fuse on INV1, 2	In INV1, 2
FC801	Fuse on INV1, 2	In INV1, 2
R1, 2	Resistors	In INV1, 2
CIB	Converter-Inverter-Break	In INV1, 2
IPM	Transistor Module	In INV1, 2

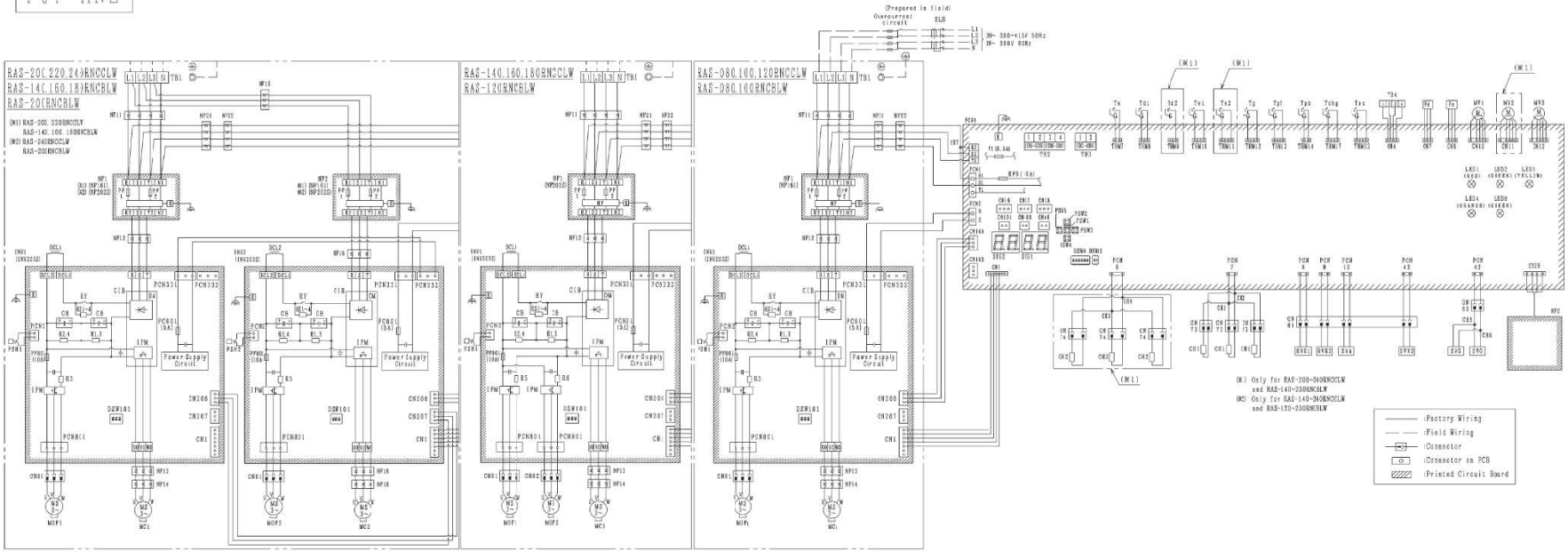
Mark Table		
Mark	Name	Note
DM	Diode Module	In INV1, 2
DCL1, 2	Reactor	
CB	Capacitor	In INV1, 2
RS	Resistor for Starting	In INV1, 2
RY	Relay	In INV1, 2
CB1~7	Closed End Connector	
TB1	Terminal Board	
TB2	Terminal Board	In PCB1
TB3	Terminal Board	In PCB1
⏚, ⏚	Earth	
CN16	Connector for External Output(Option Function)	In PCB1
CN17, 18	Connector for External Input(Option Function)	In PCB1
CN100	Connector for EXPROM Access (Data Logging)	In PCB1
CN101	Connector for H-Link	In PCB1
CN46	Connector for Control Software Installation	In PCB1
DSW4, 10	Dip Switch on PCB1	In PCB1
DSW101	Dip Switch on INV1, 2	In INV1, 2
PSW1~5	Push Switch on PCB1	In PCB1
LED1	Signal Light (Red) for Power Status	In PCB1
LED2	Signal Light (Green) for INV Communication	In PCB1
LED3	Signal Light (Yellow) for H-Link Communication	In PCB1
LED4	Signal Light (Orange) for ODU-ODU Communication	In PCB1
LED5	Signal Light (Green) for Communication	In PCB1
SEG1, 2	7-Segment on PCB1	In PCB1
E	Earth	

380-415V

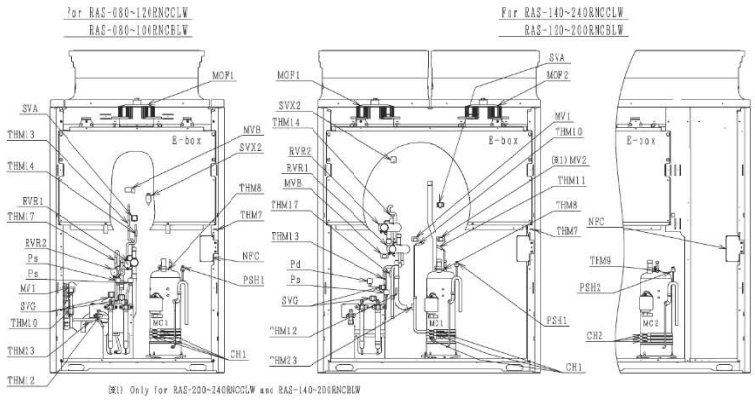
For ANZ

Electrical Wiring Diagram of Hitachi Air Conditioner Outdoor Unit

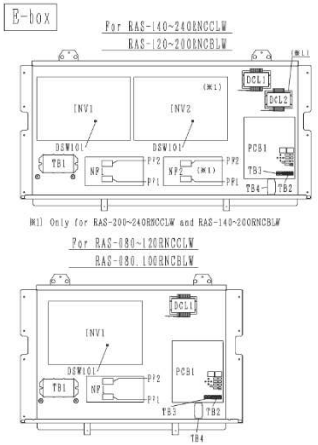
Models: RAS-080RNCCLW, RAS-100RNCCLW, RAS-120RNCCLW, RAS-140RNCCLW, RAS-160NCCLW, RAS-180RNCCLW, RAS-200RNCCLW, RAS-220RNCCLW, RAS-240RNCCLW
RAS-080RNCBLW, RAS-100RNCBLW, RAS-120RNCBLW, RAS-140RNCBLW, RAS-160NCBLW, RAS-180RNCBLW, RAS-200RNCBLW



Outdoor Unit layout drawing



E-box



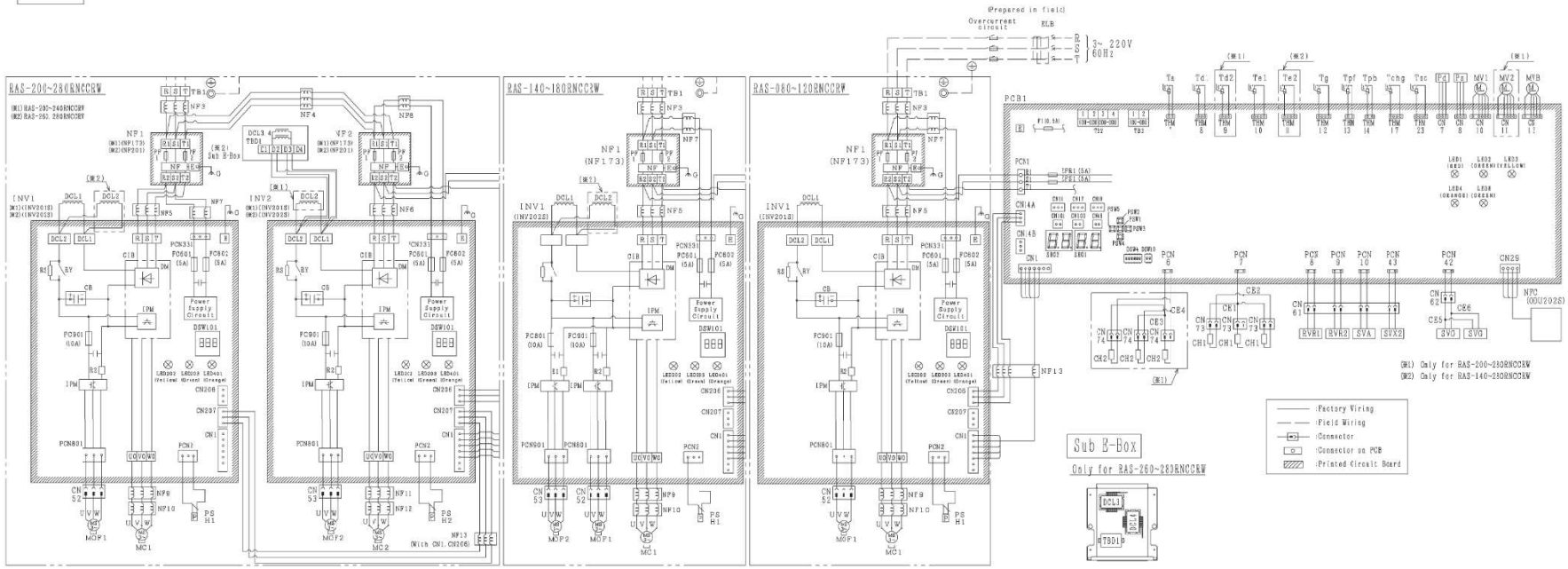
Mark Table		
Mark	Name	Note
MC1, 2	Motor for Compressor	
MOF1, 2	Motor for Outdoor Fan	
CH1, 2	Crankcase Heater	
RVR2	Reversing Valve	
RVR1	Reversing Valve	
SVA	Solenoid Valve	
SVX2	Solenoid Valve	
SVG	Solenoid Valve	
Pd	Sensor for Refrigerant Pressure	
Ps	Sensor for Refrigerant Pressure	
THM7~13	Thermistor	
PSH1, 2	Pressure Switch for Protection	
NF1, 2	Noise Filter	
NF3~21	Noise Filter (Ring Core)	
PCB1	Printed Circuit Board	
NFC	Printed Circuit Board	
INV1, 2	Printed Circuit Board	
EFR1	Fuse on PCB1	In PCB1
F1	Fuse on PCB1	In PCB1
FF1, 2	Fuse on Noise Filter	In NF1
FC501	Fuse on INV1, 2	In INV1, 2
FC601	Fuse on INV1, 2	In INV1, 2
R1, 2	Resistors	In INV1, 2
CIB	Converter-Inverter-Break	In INV1, 2
IPM	Transistor Module	In INV1, 2
DM	Diode Module	In INV1, 2

Mark Table		
Mark	Name	Note
DCL1, 2	Reactor	
CB	Capacitor	In INV1, 2
RS	Resistor for Starting	In INV1, 2
RY	Relay	In INV1, 2
CB1~7	Closed End Connector	
TB1	Terminal Board	
TB2	Terminal Board	In PCB1
TB3	Terminal Board	In PCB1
TB4	Terminal Board for Demand Stoppage (DRED)	
⏚	Earth	
CN16	Connector for External Output (Option Function)	In PCB1
CN17, 18	Connector for External Input (Option Function)	In PCB1
CN100	Connector for EEPROM Access (Data Logging)	In PCB1
CN101	Connector for H-Link	In PCB1
CN46	Connector for Controk Software Installation	In PCB1
DSW4, 10	Dip Switch on PCB1	In PCB1
DSW101	Dip Switch on INV1, 2	In INV1, 2
PSW1~5	Push Switch on PCB1	In PCB1
LED1	Signal Light (Red) for Power Status	In PCB1
LED2	Signal Light (Green) for INV Communication	In PCB1
LED3	Signal Light (Yellow) for H-Link Communication	In PCB1
LED4	Signal Light (Orange) for ODU-ODU Communication	In PCB1
LED8	Signal Light (Green) for Communication	In PCB1
SEG1, 2	7-Segment on PCB1	In PCB1
E	Earth	

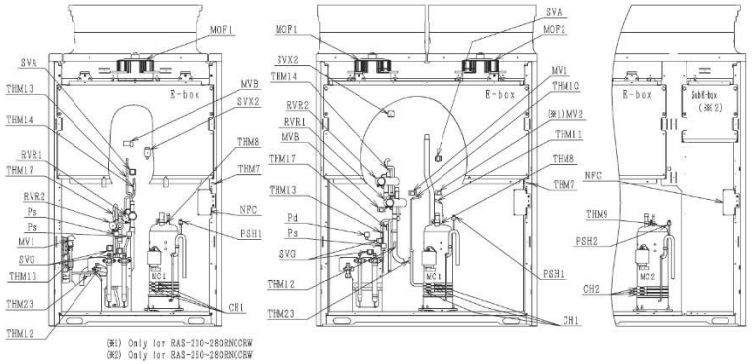
220V

Electrical Wiring Diagram of Hitachi Air Conditicner Outdoor Unit

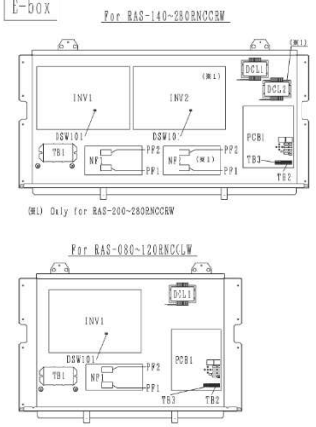
Models: RAS-080RNCCRW, RAS-100RNCCRW, RAS-120RNCCRW, RAS-140RNCCRW, RAS-160RNCCRW, RAS-180RNCCRW, RAS-200RNCCRW, RAS-220RNCCRW, RAS-240RNCCRW, RAS-260RNCCRW, RAS-280RNCCRW



Outdoor Unit layout drawing



B-box



Mark Table		
Mark	Name	Note
MC1, 2	Motor for Compressor	
MOF1, 2	Motor for Outdoor Fan	
CH1, 2	Crankcase Heater	
4VR2	Reversing Valve	
4VR1	Reversing Valve	
SVA	Solenoid Valve	
SVX2	Solenoid Valve	
SVG	Solenoid Valve	
Pd	Sensor for Refrigerant Pressure	
Ps	Sensor for Refrigerant Pressure	
THM7~23	Thermistor	
PSH1, 2	Pressure Switch for Protection	
NF1, 2	Noise Filter	
NF3~23	Noise Filter (Ring Core)	
PCB1	Printed Circuit Board	
NPC	Printed Circuit Board	
INV1, 2	Printed Circuit Board	
FPB1	Fuse on PCB1	In PCB1
F1	Fuse on PCB1	In PCB1
FF1, 2	Fuse on Noise Filter	In NF1
FC601	Fuse on INV1, 2	In INV1, 2
FC801	Fuse on INV1, 2	In INV1, 2
RS1, 2	Resistors	In INV1, 2
CIB	Converter-Inverter-Break	In INV1, 2
IPM	Transistor Module	In INV1, 2
DM	Diode Module	In INV1, 2

Mark Table		
Mark	Name	Note
DCL1~4	Reactor	
CB	Capacitor	In INV1, 2
RS	Resistor for Starting	In INV1, 2
RY	Relay	In INV1, 2
CE1~6	Closed End Connector	
TB1	Terminal Board	
TB2	Terminal Board	In PCB1
TB3	Terminal Board	In PCB1
TBD1	Terminal Board	
⏚, ⏚	Earth	
CN16	Connector for External Output (Option Function)	In PCB1
CN17, 18	Connector for External Input (Option Function)	In PCB1
CN100	Connector for EEPROM Access (Data Logging)	In PCB1
CN101	Connector for M-Link	In PCB1
CN46	Connector for Control Software Installation	In PCB1
DSW4, 10	Dip Switch on PCB1	In PCB1
DSW101	Dip Switch on INV1, 2	In INV1, 2
PSW1~5	Push Switch on PCB1	In PCB1
LED1	Signal Light (Red) for Power Status	In PCB1
LED2	Signal Light (Green) for INV Communication	In PCB1
LED3	Signal Light (Yellow) for M-Link Communication	In PCB1
LED4	Signal Light (Orange) for OCU-ODU Communication	In PCB1
LED8	Signal Light (Green) for Communication	In PCB1
SEG1, 2	7-Segment on PCB1	In PCB1
E	Earth	

13. Miscellaneous Notes

Special Notes

1. Provide a service access door near the unit piping connection part on the false ceiling for the cassette type units.
2. Consider the air distribution from the unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained.
   Cassette and Ceiling Types - Avoid unit installation in a room where the ceiling height (distance between the floor to the false ceiling) exceeds three meters. If the indoor unit is installed in a room with a ceiling more than three meters in height, it is recommended that an air circulation fan be installed separately to obtain uniform air temperature in the room, especially during the heating operation.
3. Check to ensure that the ceiling slab is strong enough and that the false ceiling is flat and level.
4. Avoid obstacles which may restrict the air intake or the discharge flow.
5. Do not install the unit in a machinery shop or kitchen where vapor from oil or its mist can enter the unit. The oil will deposit on the heat exchanger, which may reduce the unit performance, cause deformation, and in the worst case, break the plastic parts of the unit.
6. Pay attention to the following points when the unit is installed in a hospital or other facilities where electromagnetic wave is radiated from medical equipment.
   a. Do not install the unit where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
   b. Install the unit and components as far from an electromagnetic wave radiator (at least three meters) as possible.
   c. Prepare a steel box and install the remote control switch in it. Prepare a steel conduit pipe and wire the remote control cable in it. And then, connect earth wire with the box and the pipe.
   d. Install a noise filter when the power supply emits harmful noise.
7. Do not install the units in an acid or alkaline environment, as the heat exchanger will be damaged by corrosive action. In the case that outdoor units are installed near the sea, it is recommended that optional corrosion-resistant-type outdoor unit be used.
8. Do not install the units in a flammable environment, as there is a danger of an explosion.
9. Regarding cassette type indoor units, consider the direct and reflected sound level, when selecting the unit for spaces where extremely low sound is required.
10. During heating operation, the outdoor heat exchanger produces dew condensation or melted frost water. Install the outdoor unit where such water can be drained, or provide a drain passage.
11. Heating Performance: The heating capacity normally decreases when outdoor temperatures decrease. Therefore, provide an auxiliary heating unit if outdoor temperatures are very low.
12. In the case that an outdoor temperature is low and humidity is high, the outdoor heat exchanger will be covered with frost, resulting in lower heating capacity. In order to remove the frost, the unit operation mode automatically changes to the defrosting mode. During this defrosting operation, the unit stops for approximately 3 to 10 minutes.
13. As this unit is heat pump type by circulating hot air in the whole room space, it takes some time to raise the room temperature.
14. The operating sound data is based on an anechoic chamber. Therefore, the actual operating sound will be higher due to reflected sound from the floor and wall.
15. In the case that the unit is operated for a long time at an indoor temperature of over 27 °C DB, or at an indoor humidity of over 80 %, dew condensation may occur on the cabinets, resulting in dew drops. If dew condensation occurs, it is required to add thermal insulator on the cabinets.
16. Provide snow-protection hoods to prevent snow from clogging the outdoor heat exchanger.
    If the unit is operated in an area where it snows heavily, provide a base under the outdoor unit, which should be 50 cm higher than the presumable maximum snow height.
17. It is recommended that periodical service and maintenance be performed by authorized service engineers before air conditioning seasons, in order to avoid performance decrease due to dust or dirt.
18. This heat pump air conditioner has been designed for normal air conditioning for men. Do not use the product for other purposes such as for food, animals, plants, high precision machines or work of art. Also do not use the product for vehicles or vessels. It will results in water leakage or electrical leakage.
19. It is recommended that the system be installed by authorized engineers. If not, it may cause water leakage, electric shock or fire.
20. In a place where fibers or dusts are floating, the air filter or heat exchangers or the drain pipe may be clogged, resulting in water leakage from the drain pan.

14. Standard Specifications

UNIT

The unit shall be a multi-split system inverter-driven heat pump air conditioner for application with R410A refrigerants, and shall be composed of 4-way cassette type indoor units, or in-the-ceiling type indoor units, 2-way cassette type indoor units, ceiling type indoor units, wall type indoor units, floor type indoor units and an outdoor unit, with a distributed refrigeration cycle, electrical components and enclosing cabinets. Optional accessories shall also be provided upon customer request. The indoor unit shall be constructed for installation, and the outdoor unit shall be completely weather-proofed for outdoor installation. Both indoor unit and the outdoor unit shall be properly assembled, internally piped and wired, throughly tested, and charged with R410A refrigerant at the factory and shall comply with Japanese Industrial Standards and other Japanese standardization statues.

CAPACITY

The total capacity of the multi-split system inverter-driven heat pump air conditioner shall be ____kW or greater with ____°C air inlet dry bulb, ____°C air inlet wet bulb, ____°C outdoor air inlet temperature and ____m^3/min. indoor air flow. The total compressor power inputs shall not exceed ____kW. The total heating capacity of the split-type air conditioners shall be____kW or greater, with ____°C indoor heat exchanger air inlet dry bulb, ____°C outdoor heat exchanger air inlet dry bulb, ____°C outdoor heat exchanger air inlet wet bulb, and ____m^3/min. indoor air flow.
The total compressor power input shall not exceed____kW.

OUTDOOR UNIT

CABINET

The cabinet shall be constructed of galvanized steel sheet, baked with synthetic resin paint. The service panel shall be easily removable for service access to the electrical components and the compressor section.

REFRIGERATION CYCLE

Each refrigeration cycle shall be equipped with (a) scroll compressor(s), a solenoid valve, a heat exchanger, an accumulator, a 4-Way valve and flare connection parts.

COMPRESSOR PROTECTION

The compressor shall be protected against breakdown by a quick response overcurrent relay, a high pressure switch, a wrap-around type oil heater and a discharge gas thermistor.

OUTDOOR FAN AND FAN MOTOR

The outdoor fan(s) shall be the plastic propeller type, dynamically balanced, and the fan shall be directly driven by a ____W motor for vertical-flow air discharge. The fan motor shall be permanently lubricated and be protected from ingress of water.

OUTDOOR HEAT EXCHANGER

The heat exchanger shall be the multi-pass, cross-finned tube type, equipped with highly-efficient aluminum fins, mechanically bonded to oxygen-free copper tubes. The coil shall be cleaned, dehydrated and tested for leakage at the factory.

CONTROL

All electrical control devices, shall be enclosed in the indoor and outdoor units.
In addition to the compressor protection devices, the indoor fan motor shall be equipped with an internal thermostat. The outdoor fan motor shall be protected by an internal thermostat. The indoor fan motor shall be directly supplied with the power source from the control circuit. The functions of these control devices shall compose an electrical sequence of manual starting and stopping, automatic continuous operation whenever the room thermostat requires, and the protection devices allow the operation.

CABINET

The cabinet shall be constructed of galvanized steel sheet.

REFRIGERATION CYCLE

The refrigeration cycle shall be equipped with solenoid valves and flare connections to changeover the cycle in mediating between outdoor unit and indoor unit.

15. Caution on Refrigerant Leakage

The refrigerant gas should be controlled not to exceed the limit concentration in case of the refrigerant leakage in the room where the packaged air conditioner is installed.

15.1 Maximum Permissible Concentration of HFC Gas

Non-flammable and non-toxic is used with this unit. If by any chance the refrigerant gas is leaked and fills the room, the possibility of suffocation may occur.
As air365 Max series multi-type systems involve multiple indoor units connected by long-distance piping, they use a larger amount of refrigerant compared to general individual air conditioners. Before the indoor unit installation, confirm that the room can keep the gas concentration below the limit value that will allow emergency measures to be taken without hindrance in the event of a gas leak.

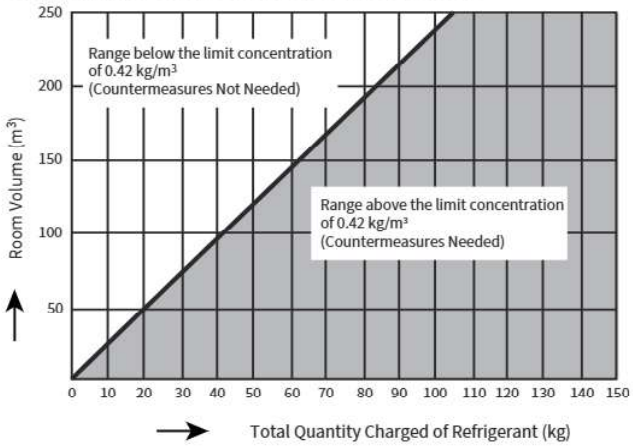
15.2 Calculation of Refrigerant Concentration

1. Calculate the total quantity of refrigerant R (kg) charged in the system connecting all the indoor units of rooms to be air-conditioned.
2. Calculate the Room Volume V (m^3) of each room.
3. Calculate the refrigerant concentration C (kg/m^3) of the room according to the following equation.

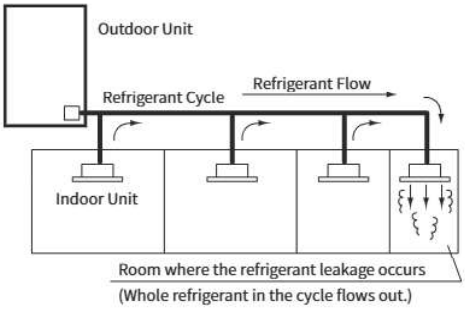
$$\frac{\text{R: Total Quantity of Charged Refrigerant (kg)}}{\text{V: Room Volume } (m^3)} = \text{C: Refrigerant Concentration} < 0.42\ (kg/m^3) \text{ for R410A}$$

⚠WARNING

- **The refrigerant R410A is non-toxic and non-flammable in its original state. However, in consideration of a state where the refrigerant leaks into the room, measures against refrigerant leaks must be taken in small rooms where the tolerable level could be exceeded. Take countermeasures by installing ventilation devices, etc.**



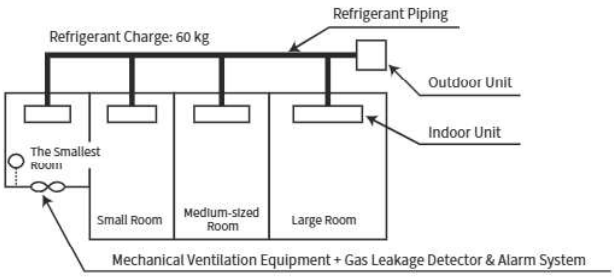
Calculations should prove that the room in which the indoor unit is to be installed is able to keep the gas concentration lower than the limit value. If it cannot be proved but the air conditioner must be installed in this room due to unavoidable circumstances, each of the following countermeasures must be taken.



1. Provide an opening*1 for ventilation between adjacent rooms to avoid exceeding the permissible concentration.

   *1: An opening in a wall of a room without a door, or an opening at the upper or lower side of a door, which is more than 0.15 % of the floor area.

<Example>



NOTES:

- The quantity of refrigerant gas leakage for each room should be calculated as 60 kg each.
- The refrigerant concentration must be below 0.42 kg/m^3 for each room.

The installer and system specialist must secure for leakage according to local regulations or standards.
The following standards may be applicable, if local regulations are not available.
International Organization for Standardization, ISO5149 or European Standard, EN378 or Japan Standard, KHKS0010.

ANEXO TECNICO

NP 29: IZAJE Y POSICIONAMIENTO DE UNIDAD CONDENSADORA, INCLUYE EQUIPO DE LEVANTE, APAREJOS, PERSONAL CERTIFICADO, SEÑALIZACIÓN Y MANIOBRA SEGURA

FUERZAS MILITARES DE COLOMBIA

FUERZA AEROESPACIAL COLOMBIANA

VOLAMOS, ENTRENAMOS Y COMBATIMOS PARA VENCER

JEFATURA LOGÍSTICA

DIRECCIÓN DE INFRAESTRUCTURA

MUSEO AÉROESPACIAL COLOMBIANO

TOCANCIPÁ / CUNDINAMARCA

PLANOS MECÁNICOS

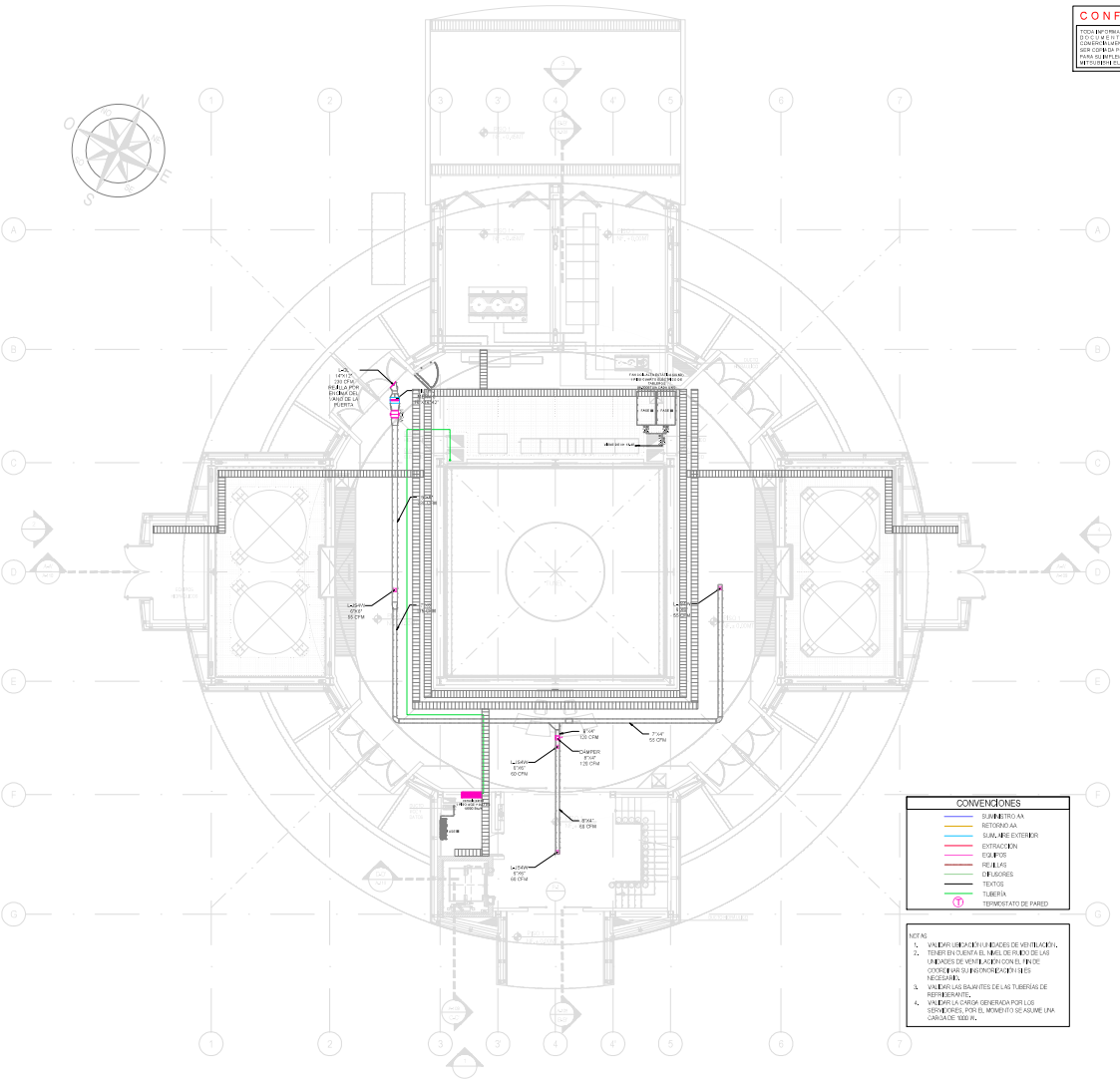
CENTRO DE INSTRUCCIÓN EN CAÍDA LIBRE E INVESTIGACIÓN AERONÁUTICA PARA LA FAC

FASE IV

FAC2025-16

FEBRERO- 2026

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NOTAS

1. VALIDAR UBICACIÓN UNIDADES DE VENTILACIÓN, TENER EN CUENTA EL NMS DE FLUJO DE LAS UNIDADES DE VENTILACIÓN CON EL FIN DE COORDINAR SU INSONORIZACIÓN SI ES NECESARIO.
2. VALIDAR LAS BAJANTES DE LAS TUBERÍAS DE REFRIGERANTE.
3. VALIDAR LA CARGA GENERADA POR LOS SERVIDORES, POR EL MOMENTO SE ASUME UNA CARGA DE 1000 W.

PROYECTO

TÚNEL DE VIENTO FAC

CIUDAD / UBICACIÓN

ZIPAQUIRA

CONVENCIONES

- DUCTO DE SUMINISTRO AIRE ACONDICIONADO
- DUCTO DE SUMINISTRO AIRE FRESCO
- DUCTO DE EXTRACCIÓN
- DUCTO DE RETORNO
- TUBERÍA DE REFRIGERANTE/GAS
- TUBERÍA DE CONTROL
- DIFUSOR 4 VÍAS
- DIFUSOR 3 VÍAS
- DIFUSOR 2 VÍAS
- REJILLA
- REJILLA VISTA EN PERFIL
- TERMOSTATO
- EVAPORADORA TIPO CASSETTE
- EVAPORADORA TIPO FAN COIL DESNUDO / DDAS
- EVAPORADORA TIPO PARED
- EVAPORADORA DE TECHO SUSPENDIDO
- EVAPORADOR A MULTIPOSICIÓN
- CONDENSADORA SERIES M&P, CITY MULTI SERIES S
- CONDENSADORA SERIE CITY MULTI
- CAJA DE DISTRIBUCIÓN
- CAJA DE VENTILACIÓN
- VENTILADOR CENTRÍFUGO
- UNIDAD RECUPERADORA DE ENERGÍA

CONTROL DE MODIFICACIONES

No.	FECHA	DESCRIPCIÓN
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MITSUBISHI ELECTRIC
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CONTENIDO

SISTEMA DE AIRE ACONDICIONADO Y VENTILACIÓN MECÁNICA PISO 1

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ELABORÓ:

ANTONIO ZÚÑIGA

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FIRMA: _____

APROBÓ:

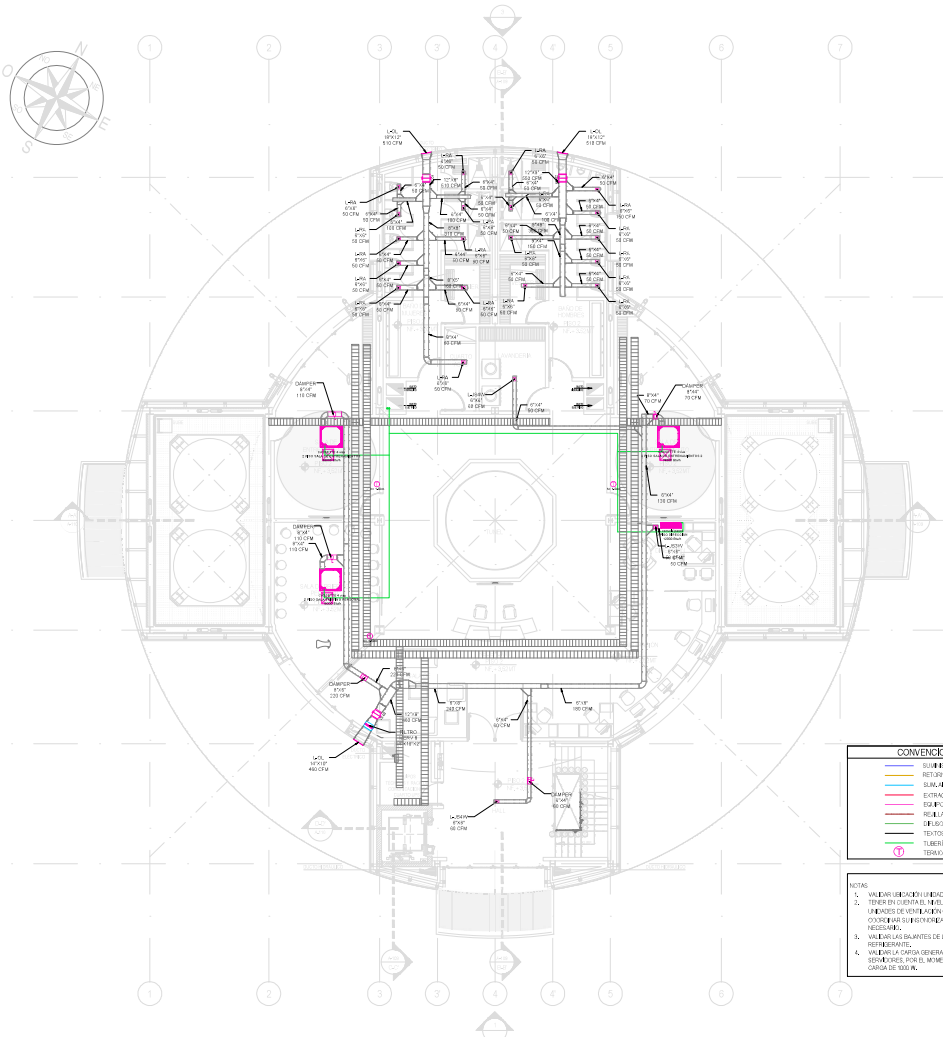
JUAN PABLO BERMUDEZ

FIRMA: _____

ESCALA:	ARCHIVO:
SCL : N/A	16-700 MECANICOS TUNEL 12-2

PLANO:	VERSIÓN:
DA-2023-035	V1
	NÚMERO DEL PLANO: 01

DA-2023-035



NOTAS

1. VALIDAR UBICACIÓN LUMINARIAS DE VENTILACIÓN.
2. TENER EN CUENTA EL NIVEL DE PISO DE LAS UNIDADES DE VENTILACIÓN CON EL FIN DE COORDINAR SU RECOMENDACIÓN (SI ES NECESARIO).
3. VALIDAR LAS BAJANTES DE LAS TUBERÍAS DE REFRIGERANTE.
4. VALIDAR LA CARGA GENERADA POR LOS SENSORES, POR EL MOMENTO SE ASUME UNA CARGA DE 1000 W.

CONFIDENCIAL

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PROYECTO

TÚNEL DE VIENTO FAC

CIUDAD / UBICACIÓN

ZIPAQUIRA

CONVENCIONES

- DUCTO DE SUMINISTRO AIRE ACONDICIONADO
- DUCTO DE SUMINISTRO AIRE FRESCO
- DUCTO DE EXTRACCIÓN
- DUCTO DE RETORNO
- TUBERÍA DE REFRIGERANTE/GAS
- TUBERÍA DE CONTROL
- DIFUSOR 4 VÍAS
- DIFUSOR 3 VÍAS
- DIFUSOR 2 VÍAS
- REJILLA
- REJILLA TIPO PERFIL
- TERMOSTATO
- EVAPORADORA TIPO CASSETTE
- EVAPORADORA TIPO FAN COIL DESNUDO / DDAS
- EVAPORADORA TIPO PARED
- EVAPORADORA DE TECHO SUSPENDIDO
- EVAPORADORA MULTIPOSICIÓN
- CONDENSADORA SERIES M&P, CITY MULTI, SERIE S
- CONDENSADORA SERIE CITY MULTI
- CAJA DE DISTRIBUCIÓN
- CAJA DE VENTILACIÓN
- VENTILADOR CENTRÍFUGO
- UNIDAD RECUPERADORA DE ENERGÍA

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Changes for the Better

CONTENIDO

SISTEMA DE AIRE ACONDICIONADO Y VENTILACIÓN MECÁNICA PISO 2

PLANO APROBADO POR INTELCOL

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FECHA DE ELABORACIÓN:

12/04/2023

ELABORÓ:

ANTONIO ZAPATA

FIRMA: _____

REVISÓ:

JHEFERSON OCAMPO

FIRMA: _____

APROBÓ:

JUAN PABLO BERMUDEZ

FIRMA: _____

ESCALA: SCL : N/A

ARCHIVO: M-700 MECANICOS TUNEL 13-2

PLANO: DA-2023-035

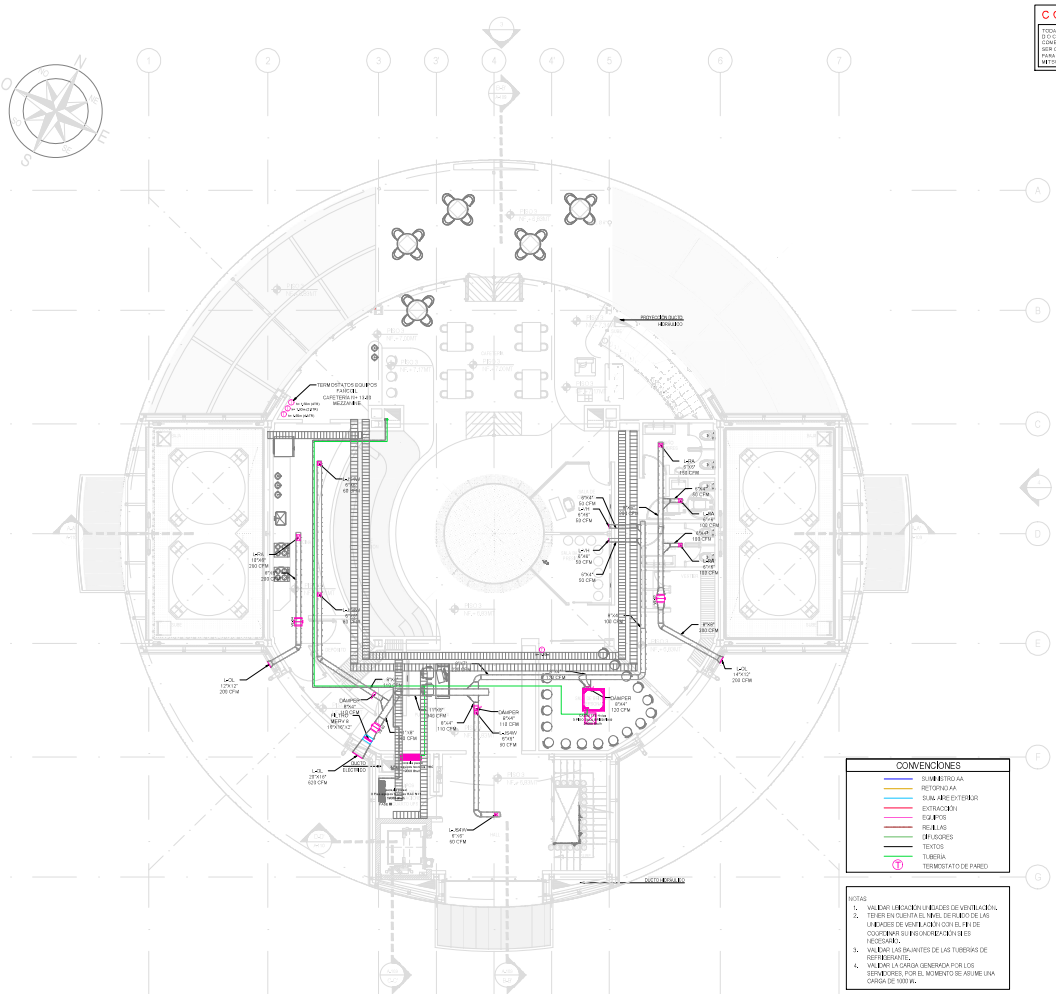
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NÚMERO DEL PLANO: 02

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NOTAS

1. VALIDAR UBICACION UNIDADES DE VENTILACION.
2. TENER EN CUENTA EL NIVEL DE RUIDO DE LAS UNIDADES DE VENTILACION CON EL FIN DE COORDINAR SUS SONORIZACIONES NECESARIAS.
3. VALIDAR LAS BAJANTES DE LAS TUBERIAS DE REFRIGERANTE.
4. VALIDAR LA CARGA GENERADA POR LOS SERVIDORES, POR EL MOMENTO SE ASUME UNA CARGA DE 1000 W.

PROYECTO

TÚNEL DE VIENTO FAC

CIUDAD / UBICACIÓN

ZIPAQUIRA

CONVENCIONES

- DUCTO DE SUMINISTRO AIRE ACONDICIONADO
- DUCTO DE SUMINISTRO AIRE FRESCO
- DUCTO DE EXTRACCIÓN
- DUCTO DE RETORNO
- TUBERIA DE REFRIGERANTE/GAS
- TUBERIA DE CONTROL
- DIFUSOR 4 VÍAS
- DIFUSOR 3 VÍAS
- DIFUSOR 2 VÍAS
- REJILLA
- REJILLA TIPO EGGCRATE
- TERMOSTATO
- EVAPORADORA TIPO CASSETTE
- EVAPORADORA TIPO FAN COIL DESNUDO / DUCTS
- EVAPORADORA TIPO PARED
- EVAPORADORA DE TECHO SUSPENDIDO
- EVAPORADORA MULTIPOSICIÓN
- CONDENSADORA SERIES M/P CITY MULTI SERIES
- CONDENSADORA SERIES CITY MULTI
- CAJA DE DISTRIBUCIÓN
- CAJA DE VENTILACIÓN
- VENTILADOR CENTRIFUGO
- UNIDAD RECUPERADORA DE ENERGIA

CONTROL DE MODIFICACIONES

No.	FECHA	DESCRIPCIÓN
V1	30/08/XX	DESARROLLO / REVISIÓN

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PLANO APROBADO POR ARQ. Y/O INGS.

FIRMA: _____ FECHA: _____

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CONTENIDO

SISTEMA DE AIRE ACONDICIONADO Y VENTILACIÓN MECÁNICA PISO 3

PLANO APROBADO POR INELCOL

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FECHA DE ELABORACIÓN:

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ELABORO:

ANTONIO ZORRO

FIRMA: _____

REVISO:

JHEFERSON OCAMPO

FIRMA: _____

APROBO:

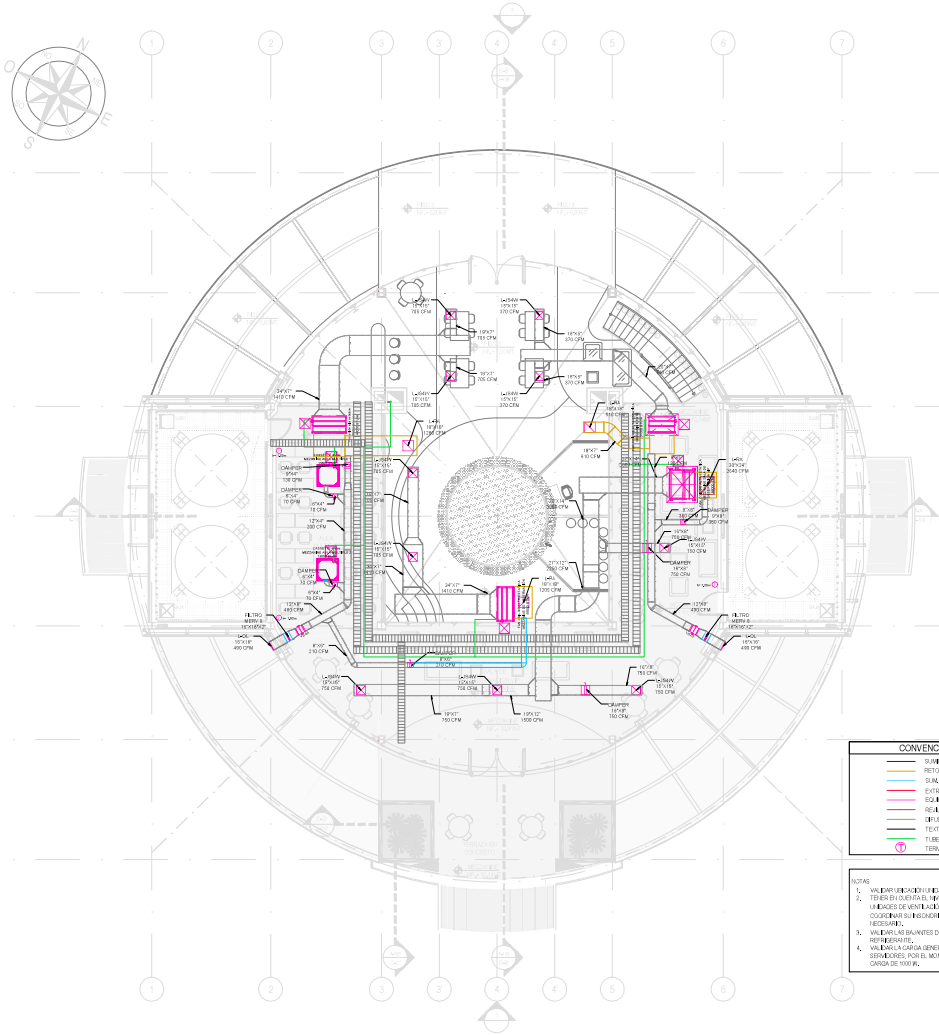
JUAN PABLO BERMUDEZ

FIRMA: _____

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SCL : N/A	M-700 MECANICOS TUNEL 12-2

PLANO:	VERSIÓN:
DA-2023-035	V1
	NÚMERO DEL PLANO: 03

DA-2023-035



CONVENCIONES

- SUMINISTRO AA
- RETORNO AA
- SUM. AIRE EXTERIOR
- EXTRACCIÓN
- EQUIPOS
- REJILLAS
- DIFUSORES
- TEXTOS
- TUBERÍA
- TERMOSTATO DE PARED

NOTAS

1. VALIDAR BALANCEO UNIDADES DE VENTILACIÓN.
2. TENER EN CUENTA EL NIVEL DE RUIDO DE LAS UNIDADES DE VENTILACIÓN CON RELEVO DE COORDINAR SU ENCAMBUCACIÓN SI ES NECESARIO.
3. VALIDAR LAS BAJANTES DE LAS TUBERÍAS DE REFRIGERANTE.
4. VALIDAR LA CARGA GENERADA POR LOS SERVIDORES, POR EL MOMENTO SE ASUME UNA CARGA DE 1000 W.

CONFIDENCIAL

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PROYECTO

TÚNEL DE VIENTO FAC

CIUDAD / UBICACIÓN

ZIPAQUIRA

CONVENCIONES

- DUCTO DE SUMINISTRO AIRE ACONDICIONADO
- DUCTO DE SUMINISTRO AIRE FRESCO
- DUCTO DE EXTRACCIÓN
- DUCTO DE RETORNO
- TUBERÍA DE REFRIGERANTE/GAS
- TUBERÍA DE CONTROL
- DIFUSOR 4 VÍAS
- DIFUSOR 3 VÍAS
- DIFUSOR 2 VÍAS
- REJILLA
- REJILLA TIPO PERFIL
- TERMOSTATO
- EVAPORADORA TIPO CASSETTE
- EVAPORADORA TIPO FAN COIL DESNUDO / DUCT
- EVAPORADORA TIPO PARED
- EVAPORADORA DE TECHO SUSPENDIDO
- EVAPORADOR A MULTIPOSICIÓN
- CONDENSADORA SERIES M&P, CITY MULTI, SERIE S
- CONDENSADORA SERIE CITY MULTI
- CAJA DE DISTRIBUCIÓN
- CAJA DE VENTILACIÓN
- VENTILADOR CENTRÍFUGO
- UNIDAD RECUPERADORA DE ENERGÍA

CONTROL DE MODIFICACIONES

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MITSUBISHI ELECTRIC
Changes for the Better

CONTENIDO

SISTEMA DE AIRE ACONDICIONADO Y VENTILACIÓN MECÁNICA MEZZANINE

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12/04/2023

ELABORÓ:

ANTONIO ZORRO

FIRMA: _____

REVISÓ:

JHEFERSON OCAMPO

FIRMA: _____

APROBÓ:

JUAN PABLO BERMUDEZ

FIRMA: _____

ESCALA: SCL : N/A

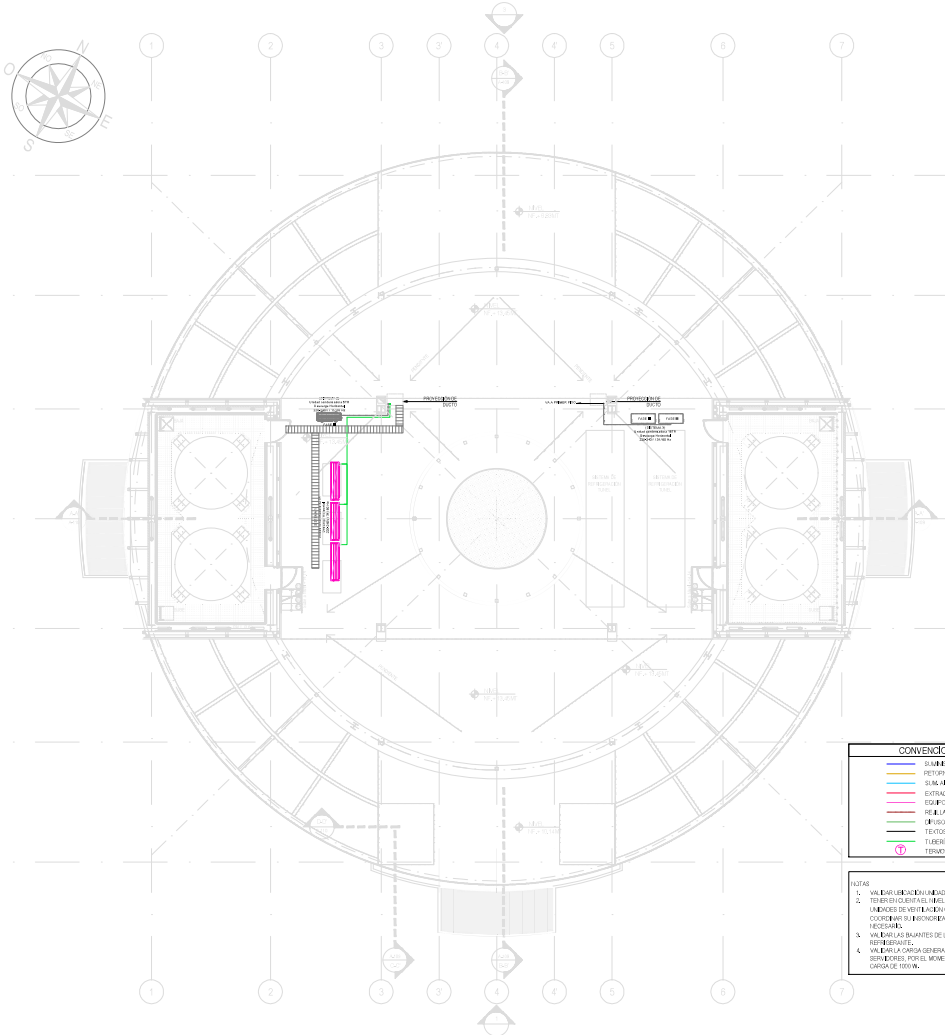
ARCHIVO: M-700 MECANICOS TUNEL 12-2

PLANO: DA-2023-035

VERSIÓN: V1

NÚMERO DEL PLANO: 04

DA-2023-035



CONVENCIONES

- SUMINISTRO AA
- RETORNO AA
- SUMINISTRO EXTERIOR
- EXTRACCIÓN
- EQUIPOS
- REJILLAS
- DIFUSORES
- TEXTOS
- TUBERÍA
- TERMOSTATO DE PARED

NOTAS

1. VALIDAR UBICACIÓN UNIDADES DE VENTILACIÓN.
2. TENER EN CUENTA EL NIVEL DE RUIDO DE LAS UNIDADES DE VENTILACIÓN CON EL FIN DE COORDINAR SU UBICACIÓN SI ES NECESARIO.
3. VALIDAR LAS BAJANTES DE LAS TUBERÍAS DE REFRIGERANTE.
4. VALIDAR LA CARGA GENERADA POR LOS SERVIDORES, POR EL MOMENTO SE ASUME UNA CARGA DE 1000 W.

CONFIDENCIAL

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PROYECTO

TÚNEL DE VIENTO FAC

CIUDAD / UBICACIÓN

ZIPAQUIRA

CONVENCIONES

- DUCTO DE SUMINISTRO AIRE ACONDICIONADO
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- EVAPORADORA DE TECHO SUSPENDIDO
- EVAPORADORA MULTIPOSICIÓN
- CONDENSADORA SERIES M&P, CITY MULTI SERIES S
- CONDENSADORA SERIE CITY MULTI
- CAJA DE DISTRIBUCIÓN
- CAJA DE VENTILACIÓN
- VENTILADOR CENTRÍFUGO
- UNIDAD RECUPERADORA DE ENERGÍA

CONTROL DE MODIFICACIONES

No.	FECHA	DESCRIPCIÓN
V1	30/08/XX	DESCRIPCIÓN VERSIÓN

PLANO APROBADO POR EL PROPIETARIO

FIRMA: _____ FECHA: _____

PLANO APROBADO POR ARQ. Y/O INGS.

FIRMA: _____ FECHA: _____

MITSUBISHI ELECTRIC
Changes for the Better

CONTENIDO

UBICACIÓN UNIDADES EXTERIORES

PLANO APROBADO POR MELCOL

FIRMA: _____ FECHA: _____

FECHA DE ELABORACIÓN:

12/04/2023

ELABORÓ:

ANTONIO ZAPATA

FIRMA: _____

REVISÓ:

JHEFERSON OCAMPO

FIRMA: _____

APROBÓ:

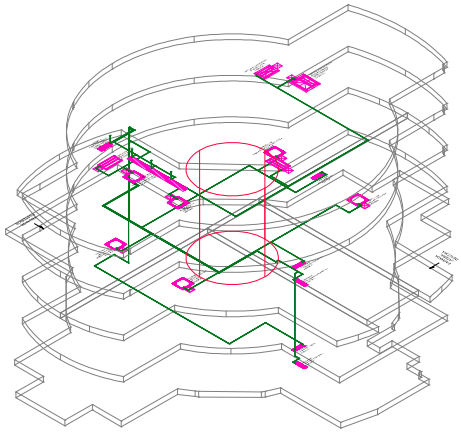
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FIRMA: _____

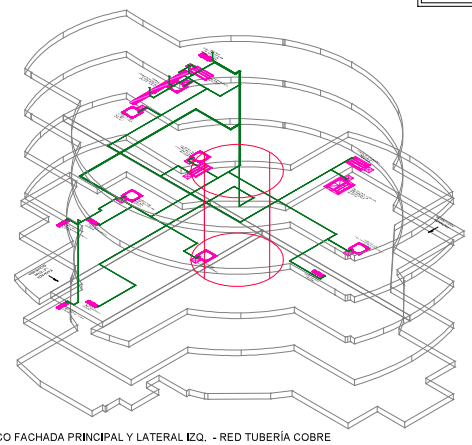
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PLANO:	VERSIÓN:
DA-2023-035	V1
	NÚMERO DEL PLANO: 05

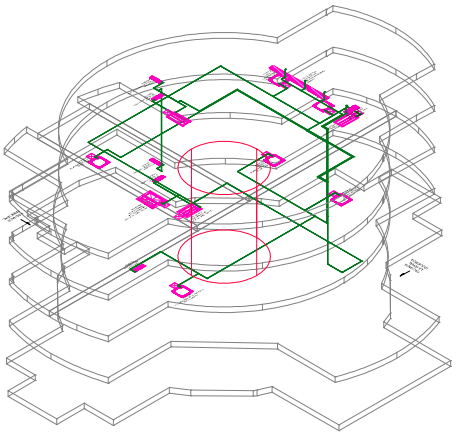
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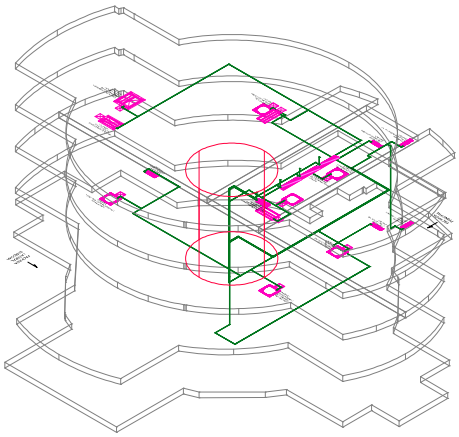
1 ISOMÉTRICO FACHADA PPAL Y LATERAL IZQ. -RED TUBERÍA COBRE
ESCALA 1:150



3 ISOMÉTRICO FACHADA PRINCIPAL Y LATERAL IZQ. - RED TUBERÍA COBRE
ESCALA 1:150



2 ISOMÉTRICO FACHADA POSTERIOR Y LATERAL DER. -RED TUBERÍA COBRE
ESCALA 1:150



4 ALZADO FACHADA POSTERIOR Y LAT. IZQ. - RED TUBERÍA COBRE
ESCALA 1:150

CONFIDENCIAL
TODA INFORMACIÓN CONTEMPLADA EN ESTE DOCUMENTO ES CLASIFICADA Y CONFIDENCIALMENTE CONFIDENCIAL. NO PUEDE SER COPIADA POR NINGUN MÉTODO UTILIZADA PARA SU IMPLEMENTACIÓN SIN EL PERMISO DE MITSUBISHI ELECTRIC DE COLOMBIA LTDA.

PROYECTO
TÚNEL DE VIENTO FAC

CIUDAD / UBICACIÓN
ZIPAQUIRA

CONVENCIONES

	DUCTO DE SUMINISTRO AIRE ACONDICIONADO
	DUCTO DE SUMINISTRO AIRE FRESCO
	DUCTO DE EXTRACCIÓN
	DUCTO DE RETORNO
	TUBERIA DE REFRIGERANTE/GAS
	TUBERIA DE CONTROL
	DIFUSOR 4 VÍAS
	DIFUSOR 3 VÍAS
	DIFUSOR 2 VÍAS
	REJILLA
	REJILLA TIPO RANURA
	TERMOSTATO
	EVAPORADORA TIPO CASSETTE
	EVAPORADORA TIPO FAN COIL DESNUDO / DUCTS
	EVAPORADORA TIPO PARED
	EVAPORADORA DE TECHO SUSPENDIDO
	EVAPORADORA MULTIPOSICIÓN
	CONDENSADORA SERIES M/P, CITY MULTI SERIES
	CONDENSADORA SERIE CITY MULTI
	CAJA DE DISTRIBUCIÓN
	CAJA DE VENTILACIÓN
	VENTILADOR CENTRÍFUGO
	UNIDAD RECUPERADORA DE ENERGÍA

CONTROL DE MODIFICACIONES

No.	FECHA	DESCRIPCIÓN
01	30/08/XX	DESCRIPCIÓN MODIFICACIÓN

PLANO APROBADO POR EL PROPIETARIO
FIRMA: _____ FECHA: _____

PLANO APROBADO POR ARQ. Y/O INGS.
FIRMA: _____ FECHA: _____

MITSUBISHI ELECTRIC
Changes for the Better

CONTENIDO
UBICACIÓN UNIDADES EXTERIORES

PLANO APROBADO POR MELCOL
FIRMA: _____ FECHA: _____

FECHA DE ELABORACIÓN:
12/04/2023

ELABORO:
ANTONIO ZORRO
FIRMA: _____

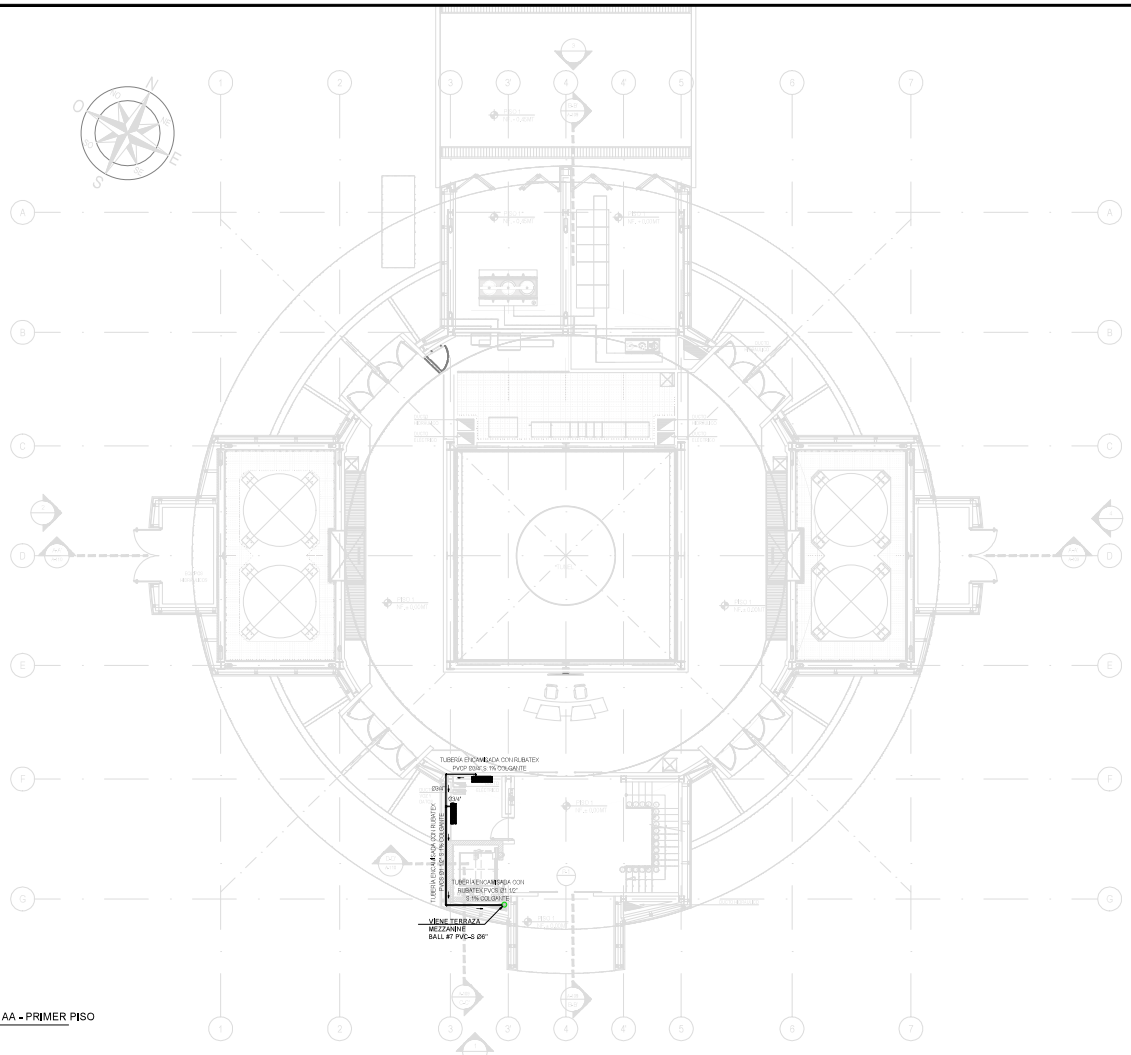
REVISO:
JHEFERSON OCAMPO
FIRMA: _____

APROBO:
JUAN PABLO BERMUDEZ
FIRMA: _____

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ARCHIVO: 16-700 MECANICOS TUNEL 12-2

PLANO: DA-2023-035
VERSIÓN: V1
NÚMERO DEL PLANO: 05

VERSION FORMATO: 18 MAYO 2021



1 RED DE DESAGUES AA - PRIMER PISO
ESCALA 1:100

FUERZAS MILITARES DE COLOMBIA

FUERZA AÉREA COLOMBIANA

JEFATURA LOGÍSTICA
DIRECCIÓN DE INFRAESTRUCTURA

UNIDAD O GUARNICION
MUSEO AEROESPACIAL COLOMBIANO

TOCANCIPA - CUNDINAMARCA

PROYECTO:
CENTRO DE INSTRUCCIÓN EN CAÍDA LIBRE E INVESTIGACIÓN AERONÁUTICA PARA LA FAC

OBSERVACIONES:

DISEÑO:
TE. DANIELA AYALA GAMBOA
ING. AMBIENTAL Y SANITARIA SUTEP
MP 15231-415868 BYS

REVISO:
MY. GENNY RODRÍGUEZ MARTINEZ
ING. AMBIENTAL Y SANITARIA SUTEP
MP- 252015270 CND

DIBUJO:
TZ LUIS MIGUEL JIMENEZ A.
DELINEANTE DE ARQUITECTURA E INGENIERÍA
MP T129302014-1013639688

CÓDIGO DIBUJO:
FAC2023-06

CONTIENE:
H440 PL
RED DE DESAGUES AA PRIMER PISO

FECHA:
13 DE FEBRERO DE 2026

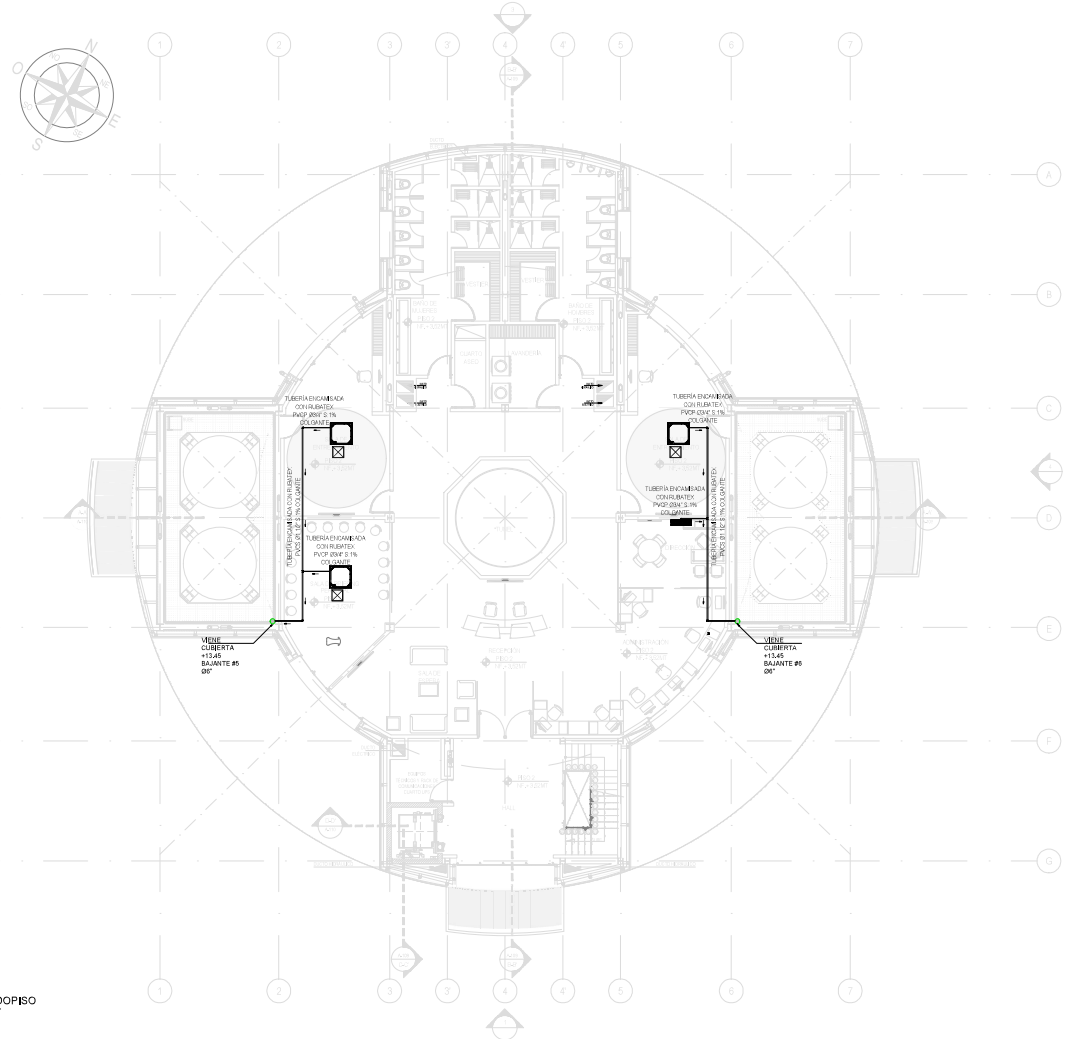
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Impreso por: TZ LUIS MIGUEL JIMENEZ AGUDELO
Impreso el: 18 febrero 2026

VERSION FORMATO: 18 MAYO 2021



1 RED DE DESAGUES AA - SEGUNDOPISO
ESCALA 1:100

FUERZAS MILITARES DE COLOMBIA

FUERZA AÉREA COLOMBIANA

JEFATURA LOGÍSTICA
DIRECCIÓN DE INFRAESTRUCTURA

UNIDAD O GUARNICION
MUSEO AEROESPACIAL COLOMBIANO

TOCANCIPA - CUNDINAMARCA

PROYECTO:
CENTRO DE INSTRUCCIÓN EN CAÍDA LIBRE E INVESTIGACIÓN AERONÁUTICA PARA LA FAC

OBSERVACIONES:

DISEÑO:
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MP. 252015701 CND

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MP T129302014-1013639688

CÓDIGO DIBUJO:
FAC2023-06

CONTIENE:
H441 PL

RED DE DESAGUES
AA
SEGUNDOPISO

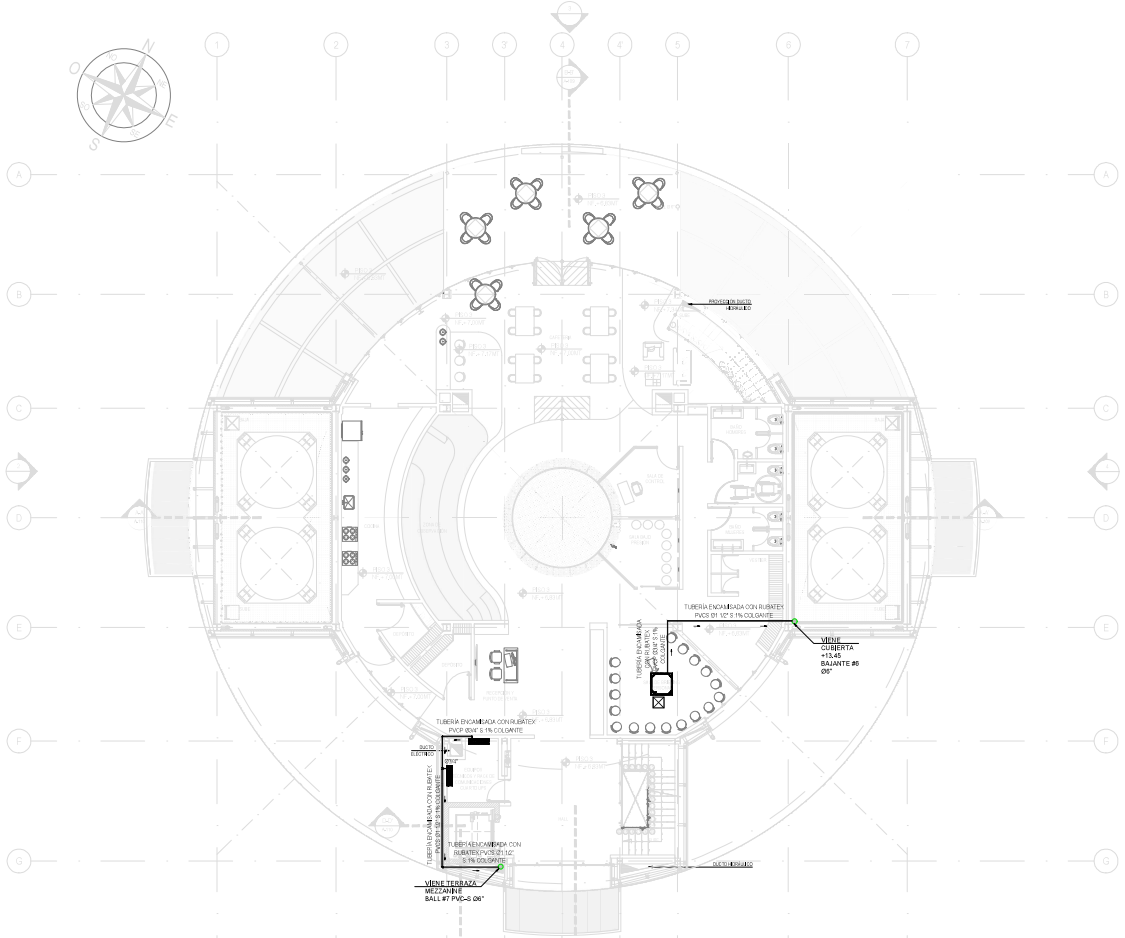
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Impreso por: TZ LUIS MIGUEL JIMENEZ AGUDELO
Impreso el 18 febrero 2026



1 RED DE DESAGUES AA - TERCER PISO
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FUERZAS MILITARES DE COLOMBIA
FUERZA AÉREA COLOMBIANA
JEFATURA LOGÍSTICA
DIRECCIÓN DE INFRAESTRUCTURA

UNIDAD O GUARNICION
MUSEO AEROESPACIAL COLOMBIANO

TOCANCIPA - CUNDINAMARCA

PROYECTO:
CENTRO DE INSTRUCCIÓN EN CAÍDA LIBRE E INVESTIGACIÓN AERONÁUTICA PARA LA FAC

OBSERVACIONES:

DISEÑO:
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MP. 1523141566B SYS

REVISO:
MY. GENNY RODRÍGUEZ MARTINEZ
ING. AMBIENTAL Y SANITARIA SUTEP
MP. 252015570 CND

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MP T129302014-1013639688

CÓDIGO DIBUJO:
FAC2023-06

CONTIENE:
H442 PL

RED DE DESAGUES
AA
TERCER PISO

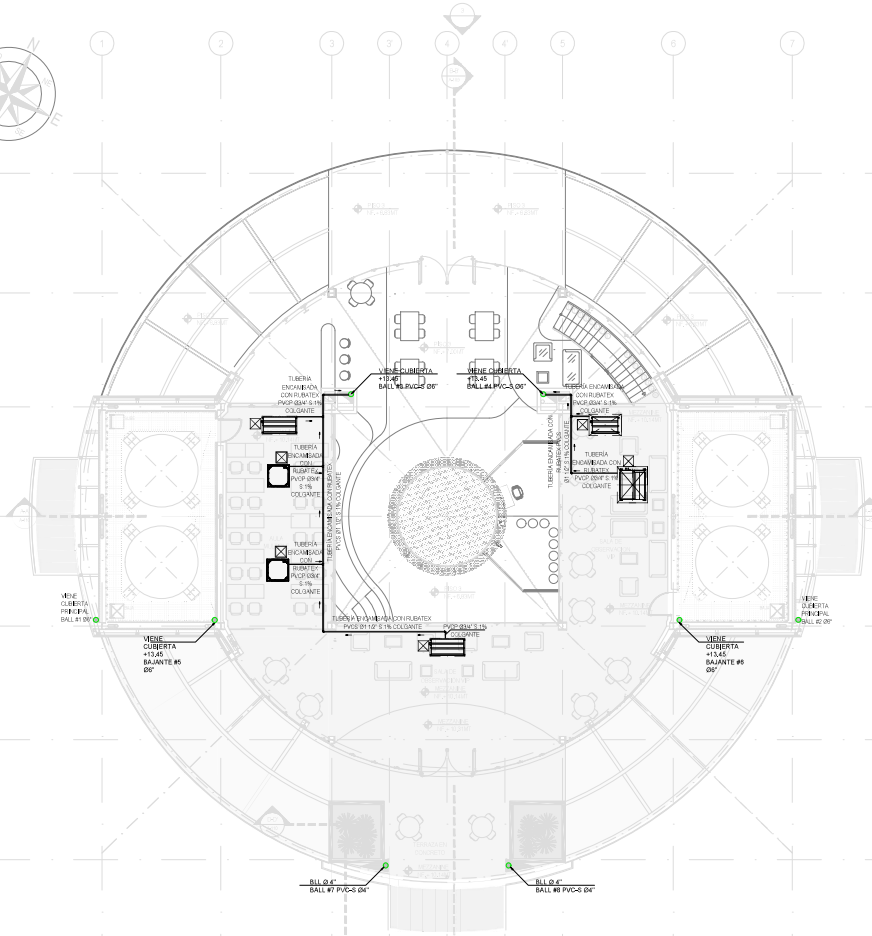
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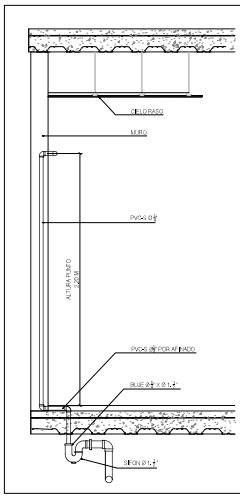
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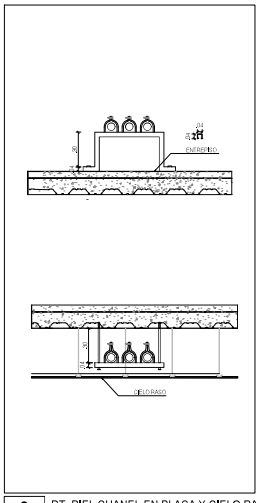
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Impreso por: TZ LUIS MIGUEL JIMENEZ AGUDELO
Impreso el: 18 febrero 2026



1 RED DE DESAGUES AA - MEZZANINE
ESCALA 1:100



2 DETALLE PUNTO MINI SPLIT
ESCALA 1:20



3 DT. RIEL CHANEL EN PLACA Y CIELO RASO
ESCALA 1:20

FUERZAS MILITARES DE COLOMBIA
FUERZA AÉREA COLOMBIANA
JEFATURA LOGÍSTICA
DIRECCIÓN DE INFRAESTRUCTURA

UNIDAD O GUARNICION
MUSEO AEROESPACIAL COLOMBIANO

TOCANCIPA - CUNDINAMARCA

PROYECTO:
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OBSERVACIONES:

DISEÑO:
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MP. 1523141566B-BYS

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DIBUJO:
TZ LUIS MIGUEL JIMENEZ A.
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MP T129302014-1013639688

CÓDIGO DIBUJO:
FAC2023-06

CONTIENE:
H443 PL
RED DE DESAGUES AA MEZZANINE

FECHA:
13 DE FEBRERO DE 2026

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VERSION: .1.

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