

ISO-9001:2015 certified by **TUV NORD**

Refrigerant Type Heat Recovery Unit (HRU) For Precision Temperature & Humidity Controls



HRU Series

Cooling Capacity Range 12 - 110 kW
R22 & R407C

Total solution to create the perfect climate controls for HVAC application

COMPANY PROFILE

With extensive experience in the air-conditioning industry, ENERCOV has become one of the most reliable supplier who specializes in design and manufacture precision temperature and humidity systems for commercial and industrial uses. We are total system solution provider for precision are properties control. Customized solutions are provided so as to bring energy efficient-based systems and generate cost savings for our customers. We created the optimum air conditioning solution for each individual project; with products which are easy to maintain, extremely durable and designed with and eye to low energy consumption.

QUALITY

We believe in quality. Quality people, quality system and good technology will lead to highest quality products.

QUALITY CONTROL

It is all in the total system of quality control, people, process and product. Our quality management system is integrated with international quality management system. To meet customer's satisfaction and to maintain highest product quality at all time, the product performance, functions and safety must go through our most stringent tests. Quality management system and advance technology are continually developed.

COST

In ENERCOV, cost has always been retrieved from all integrated functions. From engineering design and production, where hi-tech machinery is employed to ensure high yield, low defect and energy consumption. As by logistic, whose work is to see that all systems even quantitive shipment analysis is working well. And from quality management system, where only almost no defect yield can be accepted. All of that has set our cost so competitive

COMPETENCY

Is the ability in delivery a diverse range of exclusive products and services to our customers by taking into account of customer's needs and benefits. Being a leader in the market enables us to be at the advantage of better, quicker response to our customers.

CREDIBILITY

To earn the customers' trust is a must. Not only quality products we provide, but quality services too and we do not take services any less seriously. Our highly trained service personnel are on 24 standbby and they will be on site within 3 hours upon activation. Spare parts are readily housed and can be retrieved at all time. The satisfaction of our customers is always at the forefront of our consideration.

COMPLIANCE TO ASHRAE 90.1 CODE

The ASHRAE Building Code 90.1 establishes a standard for energy conservation of commercial HVAC equipment. It states that some systems cannot use new energy to reheat the air, rather ,75% of their energy must be site-recovered. Enercov units comply with this code by using hot gas reheat coils.

General Specification (R22/R407C)

Heat Recovery Unit Model	Unit	HRU040	HRU048	HRU060	HRU080	HRU100	HRU120	HRU150	HRU200	HRU250	HRU280	HRU380
Cooling capacity*	kW	11.75	14.50	18.23	23.74	30.50	37.50	46.00	63.40	72.70	82.70	109.10
	Btu/hr	40,102	49,488	62,218	81,024	104,096	127,986	156,997	216,382	248,123	282,255	372,355
Power source	V/Ph/Hz	380-420/3/50										
Required condensing capacity	kW	15.86	19.58	24.61	32.05	41.18	50.63	62.10	83.30	96.50	125.00	144.80
Max reheat capacity	T0	kW	-	-	-	-	-	-	-	-	-	-
	T1	kW	9.40	11.60	14.58	18.99	24.40	30.00	36.80	50.72	58.16	66.16
	T2	kW	14.10	17.40	21.88	28.49	36.60	45.00	55.20	76.08	87.24	99.24
Hot gas reheat valve	T0	-	Without reheat valve									
	T1	-	Electric on/off hot gas solenoid valve									
	T2	-	Electronic 3 way modulating hot gas valve									
Capacity control range	MHGBP	-	40-100%			50-100%			60-100%			
	EHGBP	-	5-100%			10-100%			20-100%			
	VSD/DC Inverter	-	n/a, (10-100% option with inverter scroll compressor)								60-100%	
	VSD + EHGBP	-	n/a*						0-100%			
Current @400 V	Amps	6.6	8.3	9.2	12.5	16.5	19.1	23.6	19.14	39.80	42.50	61.00
Compressor max. running amps	Amps	7.9	10.0	11.4	15.1	20.7	25.6	27.8	43.00	56.00	68.00	95.00
Locked Rotor Amps	LRA	51.5	65.5	74.0	99.0	127.0	167.0	198.0	173.0	223.0	253.0	345.0
Compressor power input	kW	3.60	4.43	5.25	6.60	9.10	11.20	13.60	19.87	23.80	25.70	35.80
Refrigerant	-	R-22/R407C										
No. of compressor	-	1										
Compressor type	-	Hermetic Scroll (Option : Inverter Hermetic Scroll)							Semi-Hermetic Reciprocating			
Compressor VSD kW	kW	-							22	30	30	37
Suction accumulator type	-	Suction & discharge heat exchanger										
No. of refrigerant circuit	-	1										
Matching to air cooled heat rejection	kW	16.1	19.9	24.7	31.9	41.6	51.1	62.6	87.4	101.3	113.8	152.1
Dimension in mm.	Height	1450						1450			1650	
	Width	1,300						1,500			1,700	
	Dept	750						900			900	
Approx. net weight	kg	170	170	180	280	300	300	325	412	412	476	476
Pipe conn.	LIQ-IN/LIQ-OUT	inch	3/8	3/8	1/2	1/2	1/2	5/8	5/8	5/8	3/4	7/8
	DISC	inch	1/2	5/8	5/8	5/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1-5/8
	HGS/HGR	inch	1/2	5/8	5/8	5/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1-5/8
	HGBP	inch	3/8	1/2	1/2	1/2	5/8	7/8	7/8	7/8	1-1/8	1-3/8
	SUCT	inch	5/8	7/8	7/8	7/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	2-1/8

Note : Cooling capacity based on saturated condensing temperature (SCT) 54.4°C and saturated suction temperature (SST) 7.2°C.

Refrigerant Piping Sizing Installation

Heat Recovery Unit Model	Unit	HRU040	HRU048	HRU060	HRU080	HRU100	HRU120	HRU150	HRU200	HRU250	HRU280	HRU380
Nominal cooling capacity	kW	11.75	14.50	18.23	23.74	30.50	37.50	46.00	63.40	72.70	82.70	109.10
	Btu/hr	40,102	49,488	62,218	81,024	104,096	127,986	156,997	216,382	248,123	282,255	372,355
Equivalent length	Refrig Line	-	Pipe sizing upon equivalent length									
<10 m.	LIQ	Inches	3/8	3/8	1/2	1/2	1/2	5/8	5/8	3/4	3/4	3/4
	HGBP	Inches	5/8	5/8	5/8	5/8	5/8	7/8	7/8	1-1/8	1-1/8	1-1/8
	SUCT	Inches	5/8	5/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8
	HGS/HGR/DISC	Inches	5/8	1/2	7/8	7/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8
10-20 m.	LIQ	Inches	3/8	3/8	1/2	5/8	5/8	5/8	3/4	3/4	3/4	7/8
	HGBP	Inches	3/8	3/8	1/2	5/8	7/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8
	SUCT	Inches	5/8	5/8	7/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	2-1/8	2-1/8
	HGS/HGR/DISC	Inches	1/2	1/2	5/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1-5/8	1-5/8
20-30 m.	LIQ	Inches	1/2	1/2	5/8	5/8	5/8	3/4	3/4	7/8	7/8	1-1/8
	HGBP	Inches	1/2	1/2	5/8	7/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8
	SUCT	Inches	7/8	7/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	2-1/8	2-1/8	2-1/8
	HGS/HGR/DISC	Inches	5/8	5/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8
30-40 m.	LIQ	Inches	1/2	1/2	5/8	5/8	5/8	3/4	3/4	7/8	1-1/8	1-1/8
	HGBP	Inches	1/2	1/2	5/8	7/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8
	SUCT	Inches	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	2-1/8	2-1/8	2-1/8
	HGS/HGR/DISC	Inches	7/8	7/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8
40-50 m.	LIQ	Inches	1/2	1/2	5/8	5/8	3/4	3/4	7/8	1-1/8	1-1/8	1-1/8
	HGBP	Inches	5/8	5/8	5/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1-5/8	1-5/8
	SUCT	Inches	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	2-1/8	2-1/8	2-5/8
	HGS/HGR/DISC	Inches	7/8	7/8	7/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	2-1/8	2-1/8
50-70 m.	LIQ	Inches	5/8	5/8	3/4	3/4	3/4	7/8	7/8	1-1/8	1-1/8	1-1/8
	HGBP	Inches	5/8	5/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1-5/8	1-5/8	1-5/8
	SUCT	Inches	1-1/8	1-1/8	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8
	HGS/HGR/DISC	Inches	7/8	7/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	2-1/8	2-1/8	2-1/8

Performance Data

Cooling Capacity in kW

Heat Recovery Unit Model	Evap Temp (°C)	HRU040			HRU048			HRU060		
		SDT 49 C	SDT 54 C	SDT 59 C	SDT 49 C	SDT 54 C	SDT 59 C	SDT 49 C	SDT 54 C	SDT 59 C
Nom cooling capacity*	-	11.60			14.15			19.40		
Compressor Model	-	48K3			61KC			81KC		
Capacity @ Evap. Temp	0.0	9.43	8.85	8.26	11.40	10.70	10.00	15.85	14.85	13.75
	2.5	10.35	9.74	9.10	12.60	11.85	11.10	17.40	16.35	15.20
	5.0	11.35	10.70	10.00	13.85	13.05	12.25	19.05	17.95	16.75
	7.5	12.40	11.70	10.95	15.15	14.30	13.45	20.80	19.65	18.35
	10.0	13.55	12.80	12.00	16.50	15.60	14.70	22.60	21.40	20.10

Heat Recovery Unit Model	Evap Temp (°C)	HRU080			HRU100			HRU120		
		SDT 49 C	SDT 54 C	SDT 59 C	SDT 49 C	SDT 54 C	SDT 59 C	SDT 49 C	SDT 54 C	SDT 59 C
Nom cooling capacity*	-	22.80			29.70			36.50		
Compressor Model	-	94KC			12M3			16M3		
Capacity @ Evap. Temp	0.0	18.40	17.15	15.70	24.30	22.90	21.40	29.90	28.10	26.10
	2.5	20.30	19.00	17.50	26.60	25.10	23.50	32.70	30.80	28.80
	5.0	22.30	21.00	19.45	29.10	27.50	25.80	35.80	33.80	31.60
	7.5	24.50	23.00	21.40	31.80	30.00	28.20	39.10	36.90	34.60
	10.0	26.70	25.20	23.60	34.60	32.70	30.80	42.50	40.20	37.80

Heat Recovery Unit Model	Evap Temp (°C)	HRU150			HRU200			HRU250		
		SDT 49 C	SDT 54 C	SDT 59 C	SDT 49 C	SDT 54 C	SDT 59 C	SDT 49 C	SDT 54 C	SDT 59 C
Nom cooling capacity*	-	44.80			57.70			75.91		
Compressor Model	-	19M3			C550			C565		
Capacity @ Evap. Temp	0.0	36.60	34.60	32.50	45.22	41.68	38.09	58.43	53.72	49.15
	2.5	40.10	38.00	35.70	50.62	46.77	42.87	65.90	60.73	55.70
	5.0	43.80	41.50	39.10	56.53	52.35	48.12	74.11	68.46	62.95
	7.5	47.70	45.30	42.60	62.99	58.45	53.88	83.15	76.97	70.96
	10.0	51.90	49.20	46.40	70.04	65.13	60.20	93.06	86.35	79.80

Heat Recovery Unit Model	Evap Temp (°C)	HRU280			HRU380		
		SDT 49 C	SDT 54 C	SDT 59 C	SDT 49 C	SDT 54 C	SDT 59 C
Nom cooling capacity*	-	83.70			110.34		
Compressor Model	-	C575			C599		
Capacity @ Evap. Temp	0.0	64.80	59.78	54.75	85.96	80.01	74.15
	2.5	72.79	67.42	62.03	96.13	89.64	83.24
	5.0	81.48	75.74	69.97	107.27	100.20	93.24
	7.5	90.92	84.80	78.64	119.45	111.79	104.22
	10.0	101.18	94.66	88.29	132.77	124.47	116.28

Note : Nom. cooling capacity based on saturated condensing temperature (SDT) 54.4°C, saturated suction temperature (SST) 7.2°C and subcooling 5.0°C.

SDT (SCT) - Saturated Condensing Temperature.

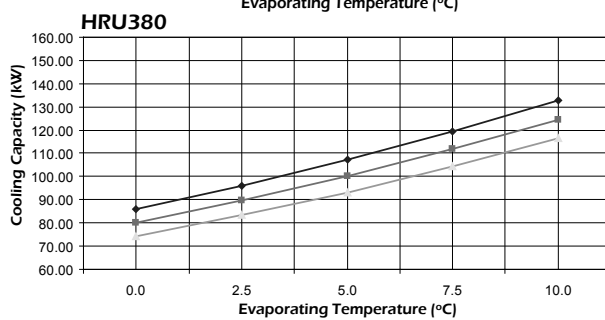
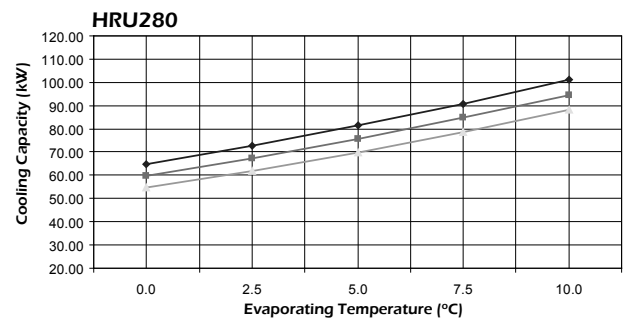
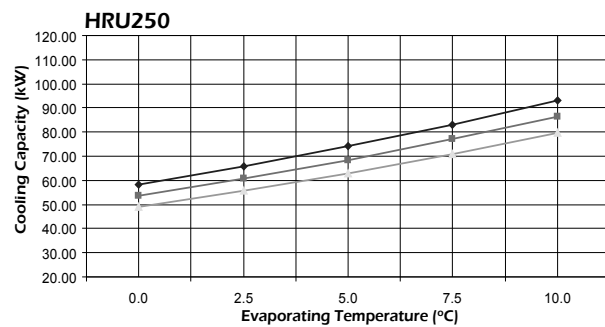
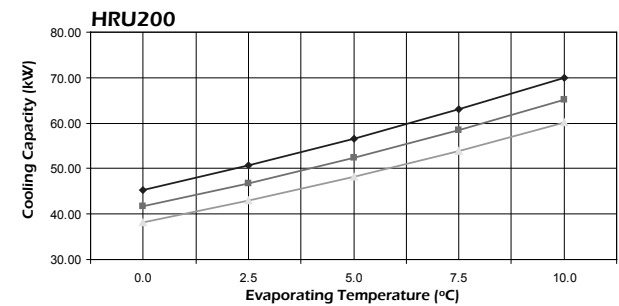
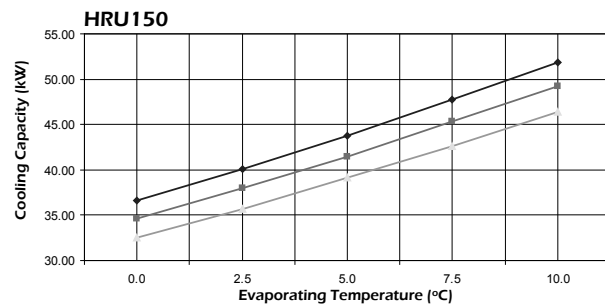
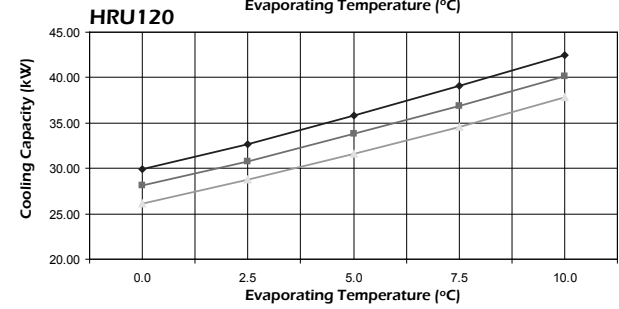
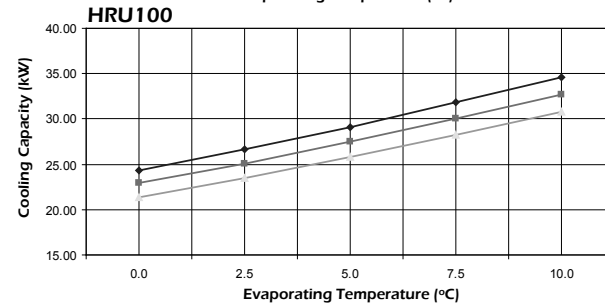
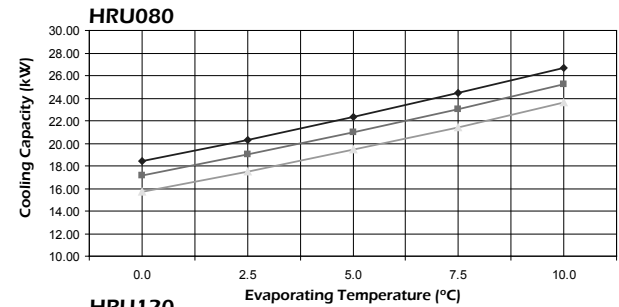
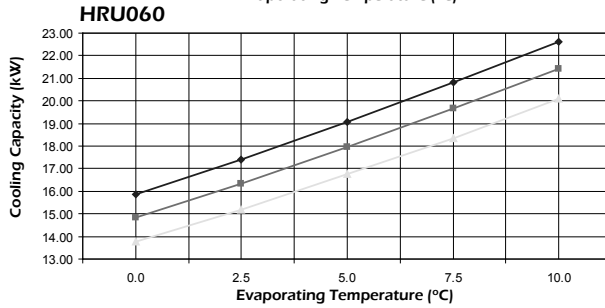
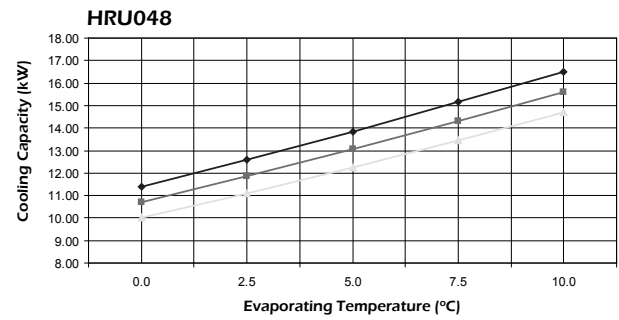
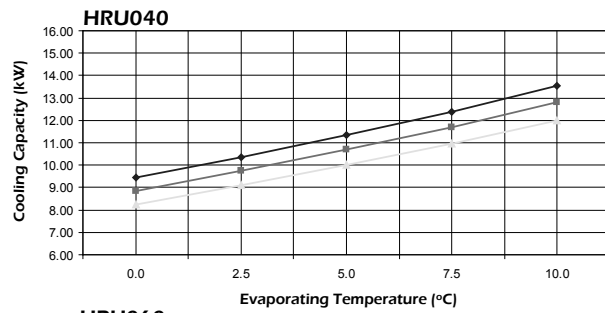
VSD - Variable Speed Drive

HGBP - Hot Gas Bypass

EHGBP - Electronic HGBP

MHGBP - Mechanical HGBP

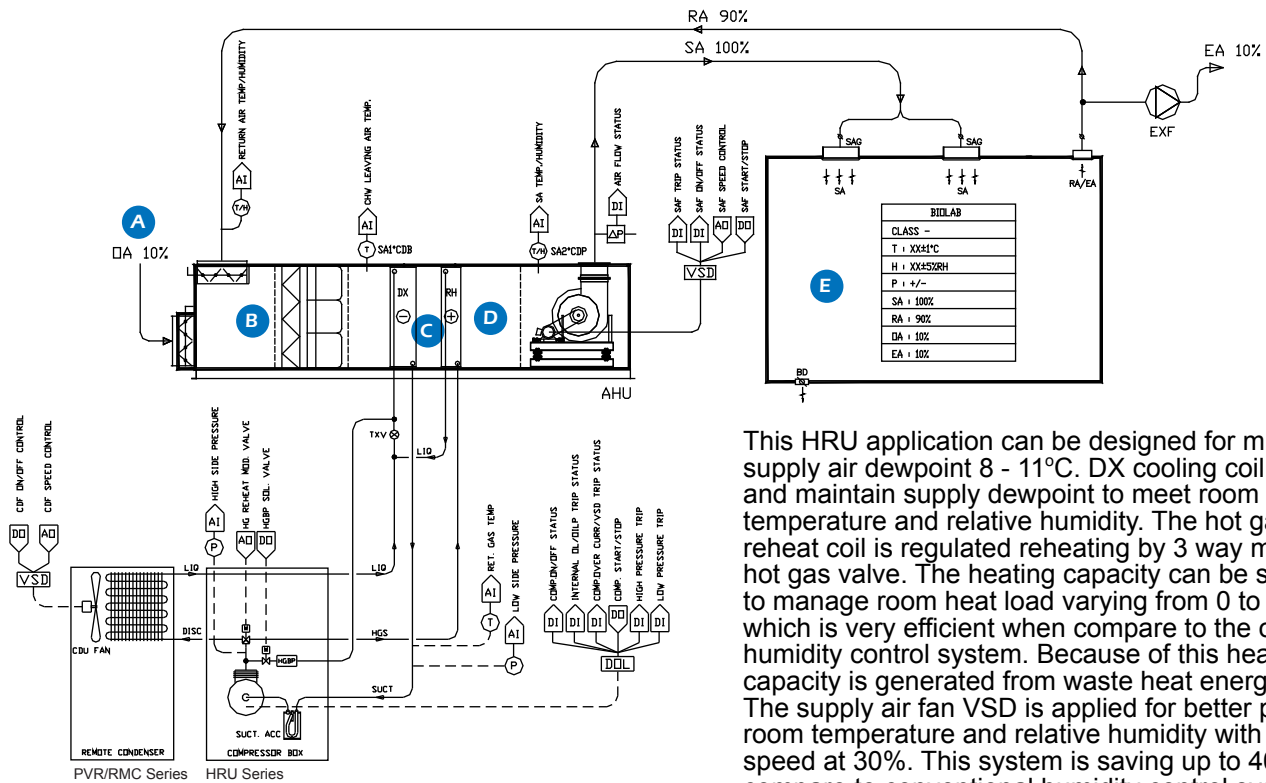
Performance curve



◆ SDT 49°C
 ■ SDT 54°C
 ▲ SDT 59°C

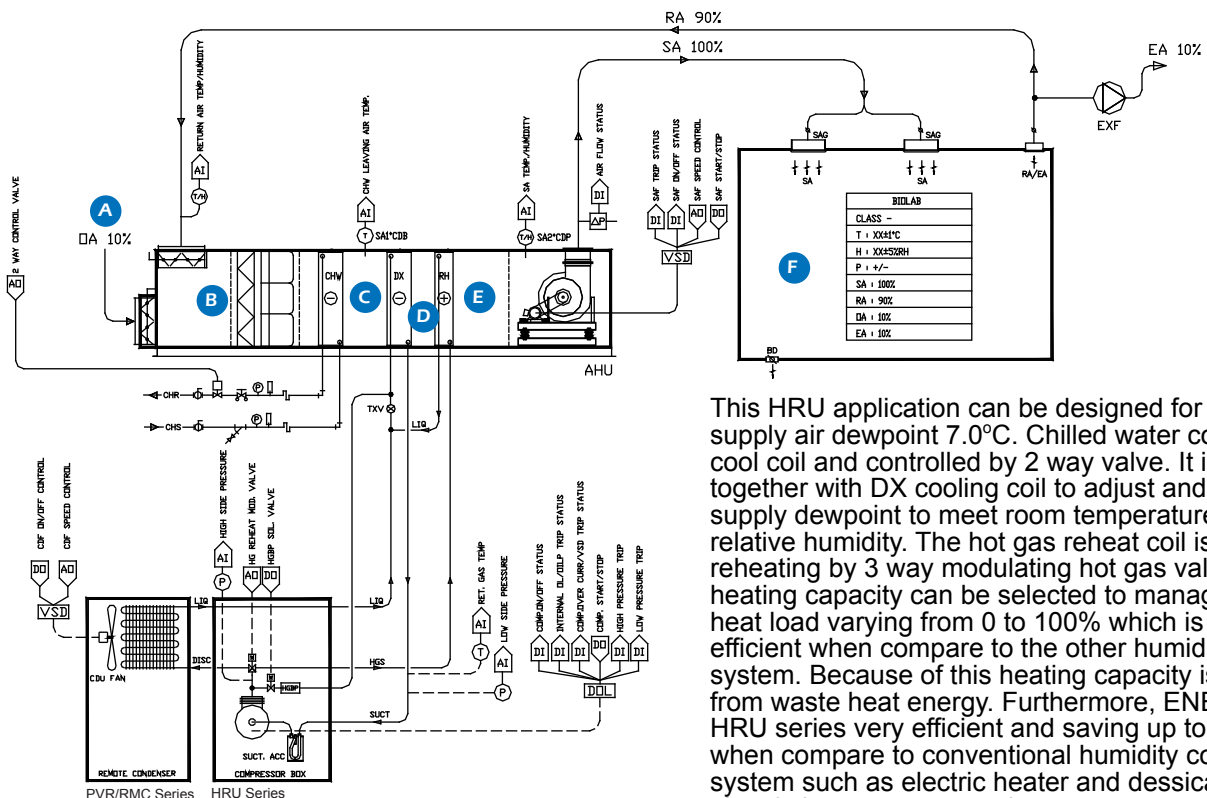
HRU application

Single DX cooling coil HRU system

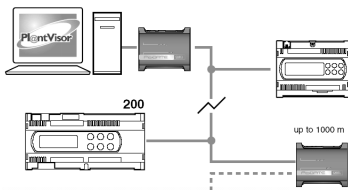
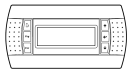


This HRU application can be designed for minimum supply air dewpoint 8 - 11°C. DX cooling coil is adjust and maintain supply dewpoint to meet room temperature and relative humidity. The hot gas reheat coil is regulated reheating by 3 way modulating hot gas valve. The heating capacity can be selected to manage room heat load varying from 0 to 100% which is very efficient when compare to the other humidity control system. Because of this heating capacity is generated from waste heat energy. The supply air fan VSD is applied for better precise room temperature and relative humidity with minimum speed at 30%. This system is saving up to 40% when compare to conventional humidity control system such as electric heater.

DX cooling coil HRU with chilled water coil



This HRU application can be designed for minimum supply air dewpoint 7.0°C. Chilled water coil is a pre-cool coil and controlled by 2 way valve. It is operate together with DX cooling coil to adjust and maintain supply dewpoint to meet room temperature and relative humidity. The hot gas reheat coil is regulated reheating by 3 way modulating hot gas valve. The heating capacity can be selected to manage room heat load varying from 0 to 100% which is very efficient when compare to the other humidity control system. Because of this heating capacity is generated from waste heat energy. Furthermore, ENERCOV's HRU series very efficient and saving up to 40-70% when compare to conventional humidity control system such as electric heater and dessicant with electric heater re-generating system.



Hardware Feature

Direct Digital Controls

HRU system controller is the result of ENERCOV's years of experience in the design and develop of programmable controllers for heat recovery system for temperature and humidity control units. HRU system controller consists of programmable controllers, LCD user interfaces, completed algorithm software, all necessarily sensors, and a series of optional boards to interface to the more commonly-used Building Management Systems and a proprietary supervisory system.

LCD Display

HRU system controller's display provide 4 lines x 20 characters with 6 key pads, animation feature .It is human interface device to access to all of HRU system parameters. Furthermore, it also display alarms, configuration, setpoint, and other menus.

Sensors

HRU system controller's sensor consist of room (or duct) temperature/humidity sensor, low/high refrigerant pressure transducer, supply air temperature, air on coil temperature, refrigerant suction temperature.

Network Capability

HRU system controller's optional interface board to BMS consists of LonWorks, Modbus, BACnet, SNMP. The controller offers solution for interfacing to each other by RS485 via PLAN or tLAN network. This communication is also capable to connect to supervisory system on personel computer for more management features as per customer require.

Control Functions

Temperature & Humidity Controls

The most important HRU system controller's algorithm is temperature and humidity controls function. It regulates compressor capacity control devices, hot gas reheat valve, and cooling coil control valve to maintain supply air dewpoint, room temperature and humidity at setting point. The FUZZY control routine adapt with PID control algorithm within HRU system controller is very powerful and accurately.

Compressor Capacity Controls

HRU system controller energizes hot gas bypass (HGBP) solenoid valve to reduce compressor capacity. HGBP is a mechanical device to release discharge gas back to suction section in propoirtinal. So, compressor will running continuously without cycling on/off to prevent temperature and humidity fluctuation.

Compressor Safety Protection

Compressor safety protection devices consist of high/low pressure switch, oil diff pressure cutout switch, internal protection switch, air flow switch, return gas temperature sensor to monitor too high and too low suction temperature. Compressor will be stopped when one of protection switch energized.

Refrigerant Pressure Balancing Function

According to heat rejection of ENERCOV's HRU series are always vary depending on outdoor air temperature and percentage opening of hot gas reheat valve. It effects to high and low side refrigerant pressure which may cuases to compressor tripping. So, HRU system controller consists of low and high refrigerant pressure transducers to detect the actual operating value and maintain high/low pressure within compressor operating range by regulate condensing fan speed and also controls hot gas bypass valve.

Alarms Function

HRU system controller's will energize alarm light keypad when alarms had been occured. We can display alarm message and reset alarms by pressing alarm keypad.

Setpoint Adjustment

HRU system controller's can adjust all necessarily setpoints such as temperature, humidity, room pressure, and much more.

Service Configuration

Use for service person to access all setting and configured parameters with password to access.

Sensor Calibration

HRU system controller provides sensor calibration routine to compensate all sensors error.

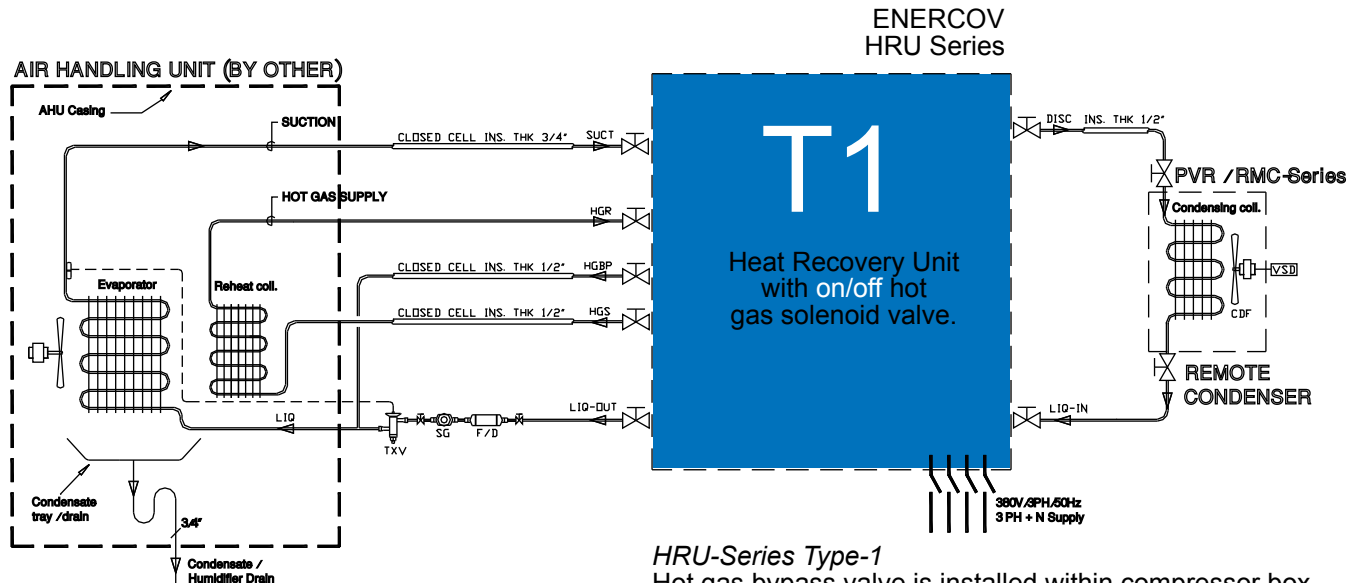
System Diagnostic

HRU system controller's will recheck all its safety function before start running unit.



Refrigerant diagram

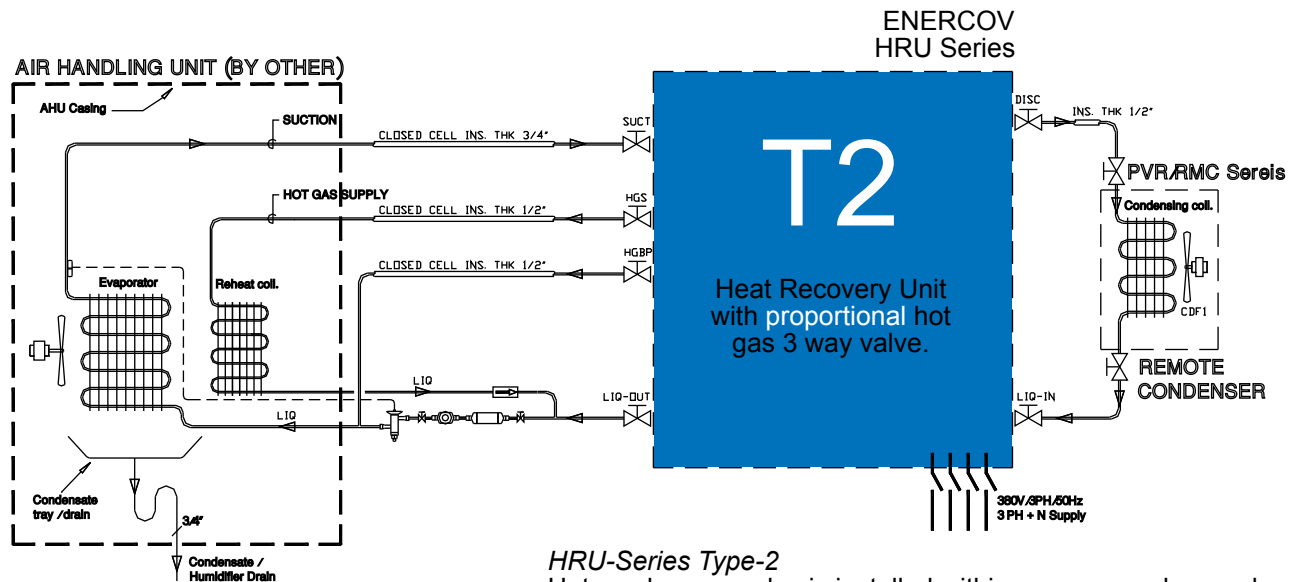
Refrigerant Diagram Type-1



HRU-Series Type-1

Hot gas bypass valve is installed within compressor box and bypass discharge gas to inlet evaporator (after TXV). The two sets of solenoid valves are operated as heating and dehumidifying function. The heating coil of this type is on/off or PWM selectable.

Refrigerant Diagram Type-2



HRU-Series Type-2

Hot gas bypass valve is installed within compressor box and bypass discharge gas to inlet evaporator (after TXV). This type is not necessary to install de-superheat TXV. The hot gas reheat coil is controlled by 3 way modulating valve and can be designed as auxiliary condenser in parallel. The maximum heating capacity of hot gas reheat coil is approximate cooling coil capacity plus compressor power input kilowatts which is about 135% of cooling capacity. Heating capacity is regulated in proportional from 0 to 100% adjustable. Temperature and relative humidity are controlled by this heat recovery system can be maintained very precisely.

The condenser fan speed is varied to control high side pressure of discharge refrigerant. This type can apply for low ambient temperature at minimum -10°C.

Unit dimension (mm.)

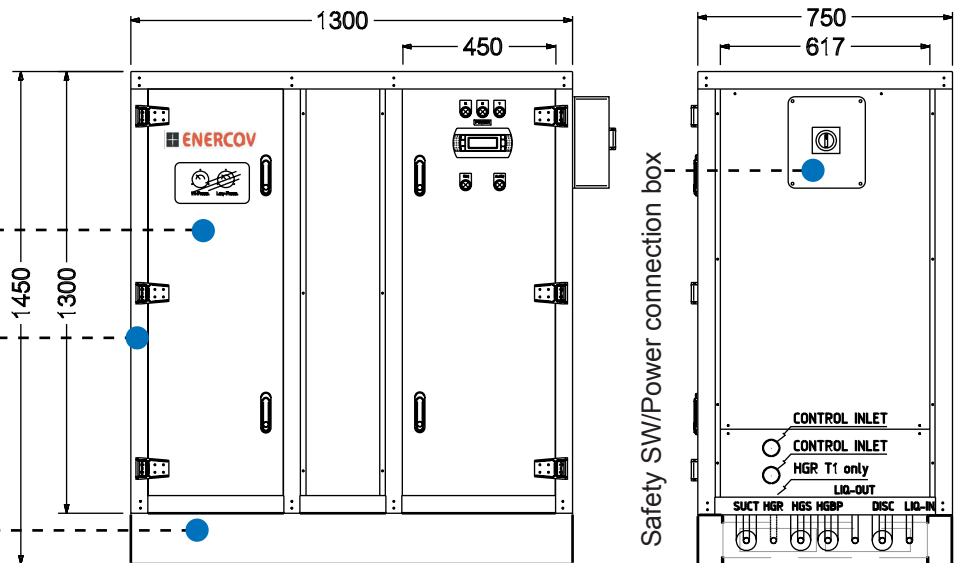
HRU040 - 120

Casing materials ;

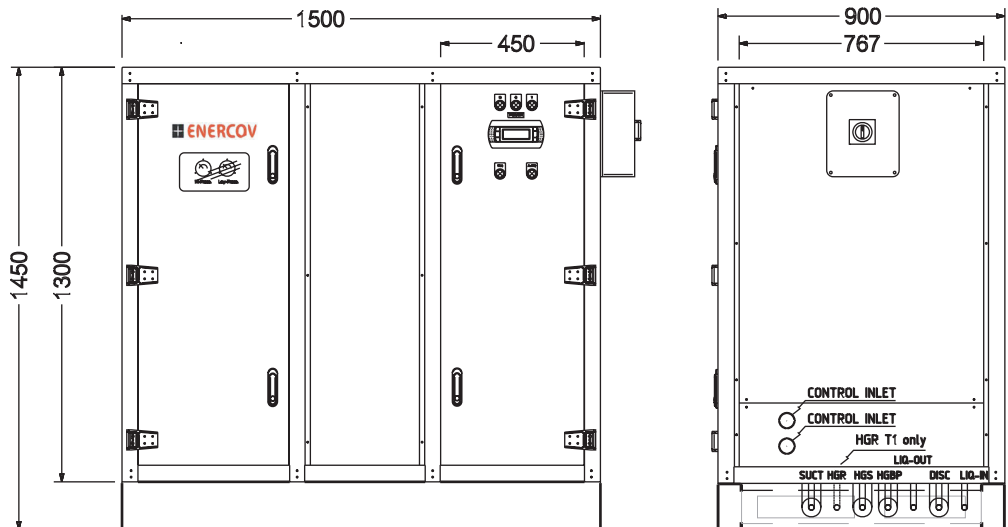
Casing and cabinets are constructed of galvanized steel w/epoxy powder coated thickness 1.2 mm

Beam column thickness - 1.5 mm

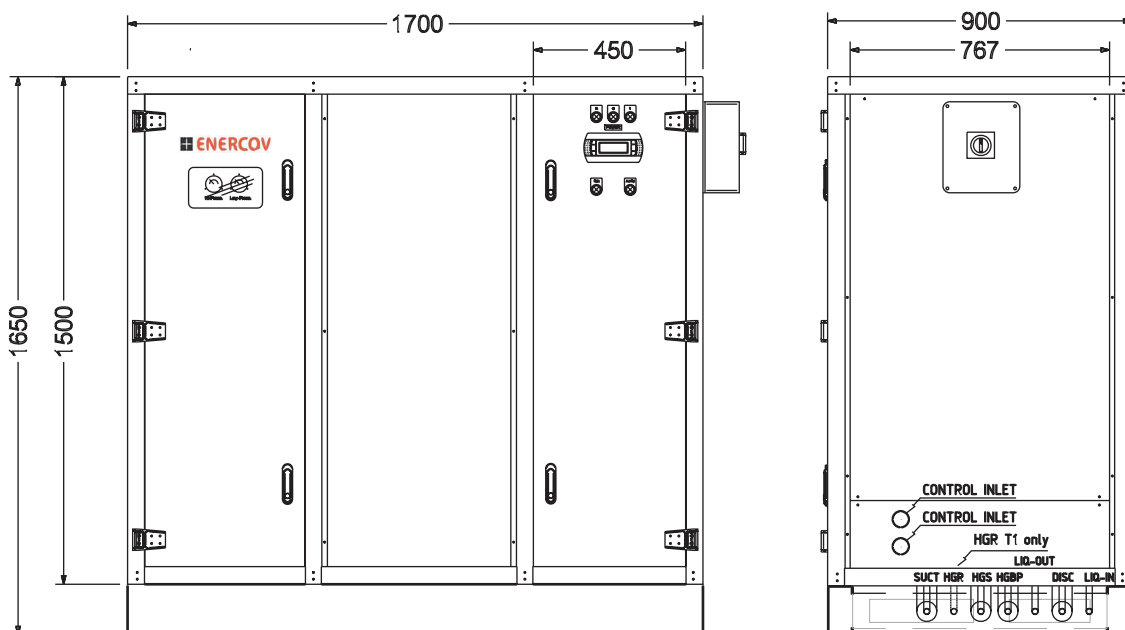
Base supporting thickness - 2.0 mm



HRU150 - 250



HRU280 - 380



A

B

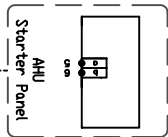
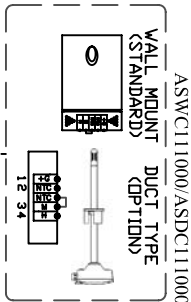
C

D

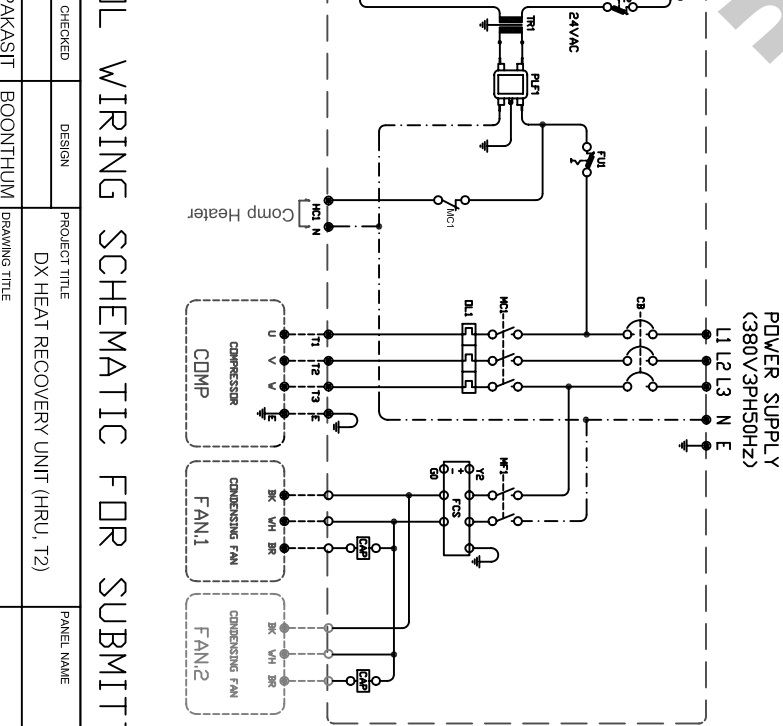
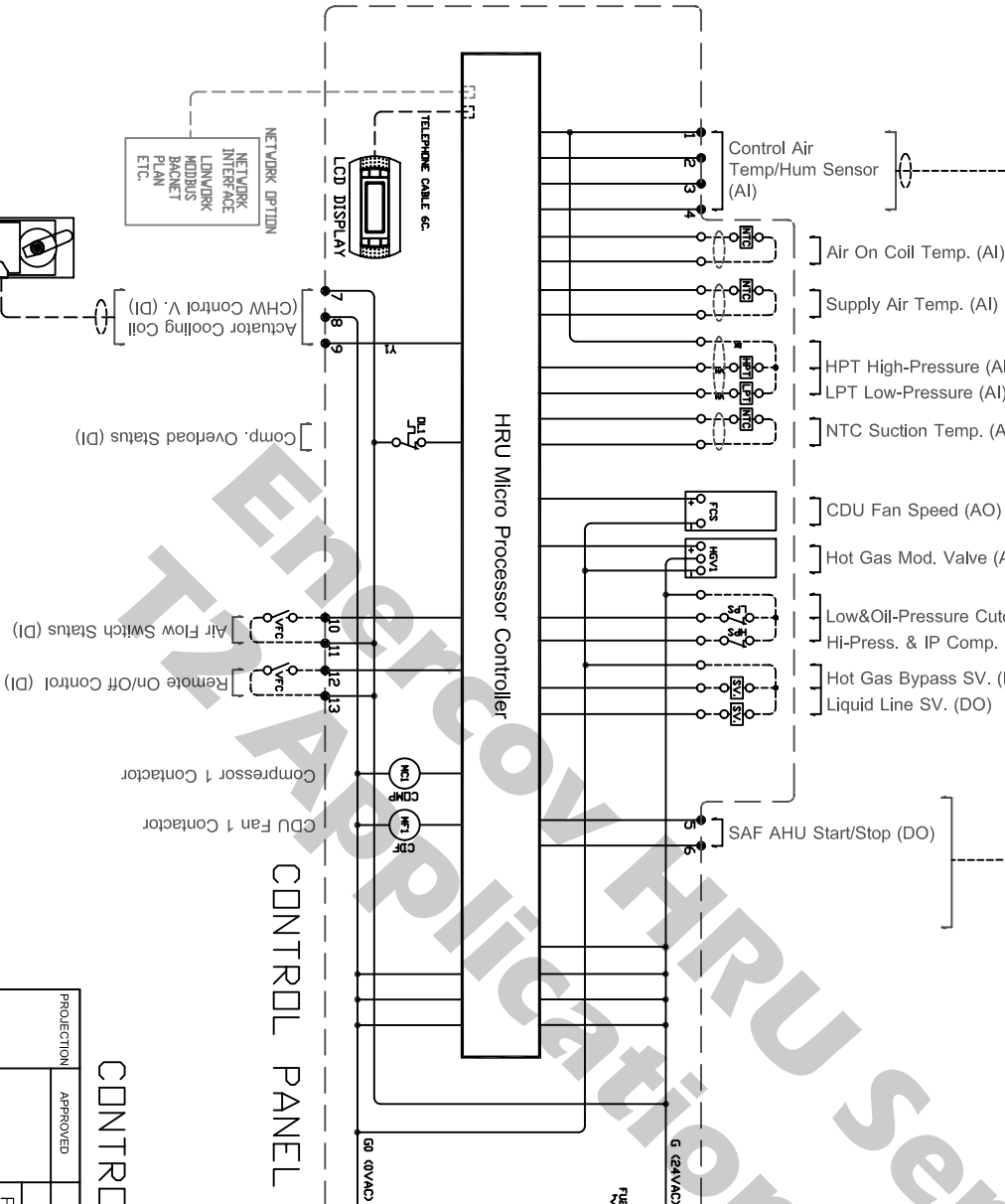
E

F

G



ABBR.	DESCRIPTION	PART NO.	REF.
ASVC/ASDC	ROOM/DUCT AIR TEMP & HUMID SENSOR	ASVC011000/ASDC111000	CAREL
ASDT	DUCT AIR TEMP. SENSOR	ASDT011000	CAREL
NTC	TEMP. SENSOR NTC TYPE	NTC015WP	CAREL
HPT	HI-PRESSURE TRANSDUCER 4-20mA	SPK1023	CAREL
LPT	LDW-PRESSURE TRANSDUCER 4-20mA	SPK1032	CAREL
HPS	HI-PRESSURE SWITCH	-	-
LPS	LDW-PRESSURE SWITCH	-	-
SV	SOLENOID VALVE 24 VAC.	-	-
LCD	LCD DISPLAY & KEYPAD	PGD10007-00	CAREL
PCD3M	MICROPROCESSOR CONTROLLER	PCD3000A40	CAREL
DL	DIVER LOAD RELAY CDMEC	-	-
PHPS	PHASE PROTECTION SWITCH	-	-
VFC	VOLTAGE FREE CONTACT	-	-
FCS	FAN CONTROL SPEED 12A, 1P 220VAC	FCS1122300	CAREL
CCV	ACTUATOR FOR COOLING COIL VALVE	-	-
○	POWER 24 VAC. INPUT 0-10VDC	-	-
⊗	INTERNAL TERMINAL	-	-
⊗	EXTERNAL TERMINAL	-	-

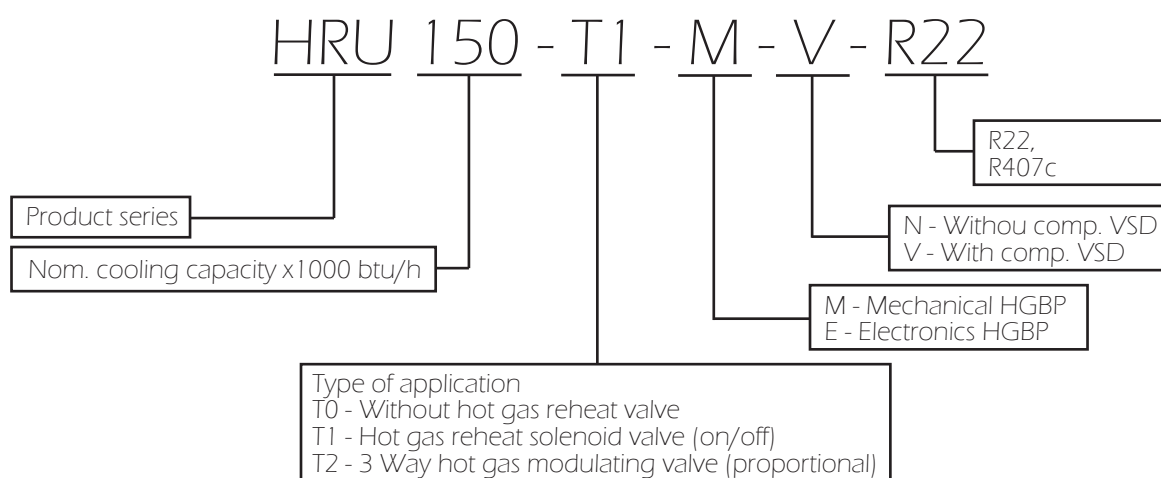


CONTROL WIRING SCHEMATIC FOR SUBMITTAL

PROJECTION	APPROVED	CHECKED	DESIGN	PROJECT TITLE	PANEL NAME
				DX HEAT RECOVERY UNIT (HRU, T2)	
SCALE	-	-	PAKASIT	DRAWING TITLE	
			BOONTHUM	EL. CONTROL WIRING SCHEMATIC	
				DRAWING NO.	REV.
					SHT.

AHU CCV (Option)

Product Nomenclature



Best climate management system.

Enercov (Thailand) Co.,Ltd.
 48/259 Moo 1, Ramkhamhaeng Road,
 Saphansung, Bangkok, Thailand 10240
 Phone : (662) 372-3004-6
 Fax : (662) 372-3007

Enercov (Singapore) PTE LTD
 80 Genting Lane, #06-02 Genting Block,
 Ruby Industrial Complex, Singapore 349565
 Phone : (65) 6744-9528
 Fax : (65) 6744-9214