



Designing a Heat Pump/Chiller Machine (Drive Centric Solution)

Example architecture and bill of materials

Designing a Heat Pump / Chiller Machine : Drive Centric Solution

Example architecture and bill of materials

Chillers are the most common machine in HVAC and – with heat pumps – are using the classical refrigeration cycle to transform energy from air, ground or water to produce cold or heat respectively and can be air-cooled or water-cooled. They improve comfort and air quality of the environment in offices & buildings by introducing fresh air into the space and sending stale air outside.

The design is based upon the following simple set of optimized, fit for purpose HVAC parts:

- ATV200/600 HVAC or ATV320 drives energy saving and seamless integration
- M172 HVAC, compact, scalable and cost effective logic controller
- HVAC specialized programming software platform
- Dedicated sensors and probes for T°, humidity and pressure, etc
- Multiple BMS connectivity, access to remote displays or web server
- Harmony HMI
- iEM3 Power Meter
- Harmony pushbuttons, selectors and pilot lights

In this example the motors are controlled using a contactor centric solution.

The motor selected for the scroll and screw compressors are respectively 15 kW and 110kW.

The motor used for the pump is a 11kW and fans are 15kW motors.

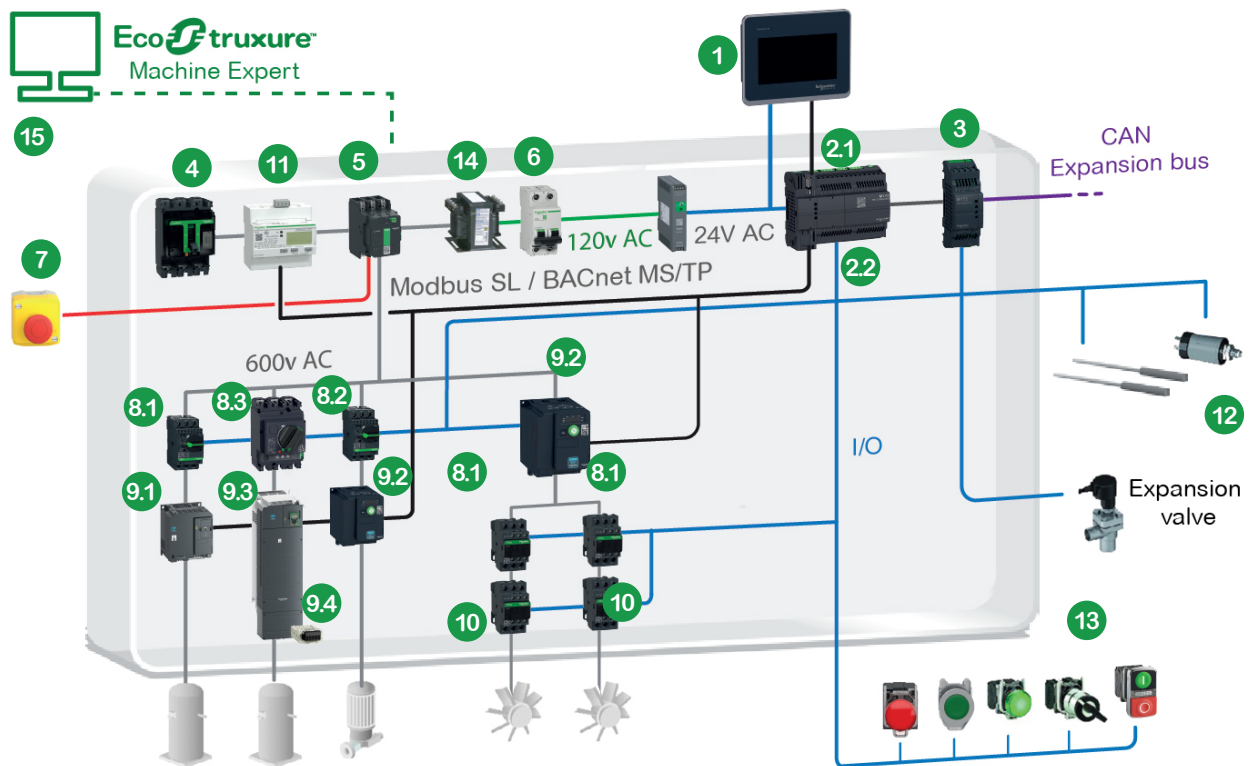
Key differentiators of Heat Pump or Chiller

- Simple economic, reliable and robust architecture allowing a flexible and scalable design
- Improve HVAC equipment efficiencies, increase comfort, lower energy consumption, reduce costs of ownership while ensuring compliance with regulations
- Reduce time to market using a unique HVAC specialized free software, libraries and function blocks
- Easy installation and connectivity on BMS, simplified on-site commissioning

Why choose Schneider for a Heat Pump or Chiller?

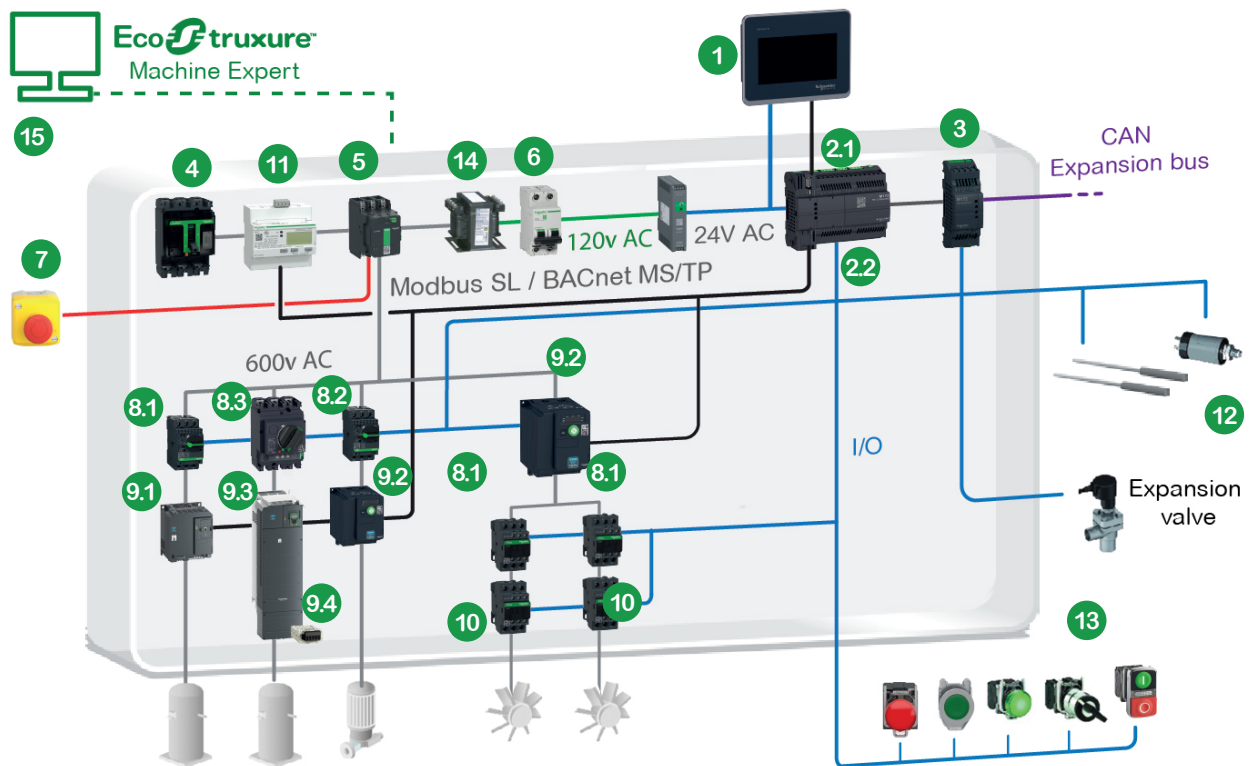
- Peace of mind integration and communication with a complete and optimized HVAC offers portfolio with drives, logic controllers, valves, sensors and probes for T°, humidity and pressure, Power meters... all giving inputs to controller
- A unique HVAC specialized software platform with EcoStrutur Machine Expert – HVAC offers easy navigation in few clicks and simplifies each of the steps in machine design, integration, commissioning and maintenance
- Dedicated libraries and “ready to use” and pre-configured application function blocks (AFBs) simplify each of the steps in machine design and communication, Fan management, Floating high-pressure control with variable-speed drives, Compressor management, Drive communication control, Energy management, PID
- Multiple BMS (Building Management System) connectivity, embedded or as an option
- Easy maintenance and efficient Services with built-in diagnostics
- Multi-standard components available worldwide
- Long lifespan in tough HVAC application thanks to the HVAC dedicated reliable and robust Schneider Electric parts

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Offer list – Chiller machine with drive centric solution	#	Products	Descriptions	Qty
Harmony ST6 – Touch screen panel	1	HMIST6200	Small Touch screen panel to supervise the system 4" W color display, 1 COM (RS-232C or RS-485), 1 Ethernet, USB host & device, 24V DC	1
Modicon M172– Logic Controller	2.1	TM172PDG42RI	24V AC/DC, 42 I/Os (12AI, 6 AO, 12 DI, 12 DO) with possibility for extension, Build-in display, 1 CAN, 1 USB, 2 Modbus/BACnet MS/TP RJ45 Modbus TCP, BACnet IP webserver.	1
Modicon M172 terminal block	2.2	TM172ASCTB42	42 IO, screw, terminal block	1
Modicon M172 – EEV Driver	3	TM172EVEV1U	24V AC/DC 9W or 12VA, CAN bus, Electronic Expansion Valve Driver, unipolar	1
ComPacT NSX100F – Circuit breaker, MA trip unit	4	C10F3MA100	3 poles 3-phases, 100A, Magnetic motor protection, 10kA, 600V AC	1
TeSys Giga – LC1G Contactor	5	LC1G265EHEN	3 pole AC-3 440V AC, 255A contactor, 110V AC coil	1
Multi9 C60N	6	M9F42103	1 pole , 3A - Curve C, 120V AC, 14kA mini circuit breaker 3 pole - 16A	1
Harmony XALK – Control station plastic, yellow cover	7	XALK178E	Control station, yellow cover with 1 emergency switching off function – 1 NO + 1 NC	1
TeSys Power GV2L, GV3L – Motor circuit breaker	8.1	GV2L32	3 pole AC-3, 32A – Magnetic motor circuit breaker, rotary handle	3
	8.2	GV2L22	3 pole AC-3, 25A – Magnetic motor circuit breaker, rotary handle	1
ComPacT NSX250 – circuit breaker	8.3	C25N3MA220	3 pole AC-3, 250A – Complete device, magnetic motor circuit breaker, toggle switch	1
Altivar HVAC ATH600 – variable speed drive	9.1	ATV630D15Y6	15kW / 20HP – 500-690V AC, 3 phase, category C2 EMC filter integrated, Modbus, BACnet MS/TP	1
ATH200 Variable Speed Drives	9.2	ATH230D15S6	15KW 20HP 33A, 500-600V AC, 3-phase, category C3 EMC filter integrated, Modbus, BACnet MS/TP, BACnet/IP	1
Altivar HVAC ATH600 – variable speed drive	9.3	ATV630D90Y6	90KW / 125 HP – 500-690V AC, 3 phase, category C3 EMC filter integrated, Modbus, BACnet MS/TP	1
BACnet MS/TP Card	9.4	VW3A3725		1

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TeSys Deca – LC1D Contactor	10	LC1D32F7	3 pole AC-3, 15kW 440V AC, 32A contactor, 1NO + 1NC auxiliary contacts, 110V AC coil	2
Acti9 – EM3500 series - Energy Meter	11	METSEEM3550	The EM3500 series meters provide the essential measurement capabilities (for example, current, voltage and energy)	1
		ETSECTLV10010U	Current transformer	1
Temperature and Humidity Sensors	12	TM1STNTXXX	Temperature NTC, PT1000	X
		TM1SHXXX	Humidity Sensors, 4-20mA	X
Harmony XB4 – Metal push buttons, Flush mounting	13	XB4FA3311	Ø 22 mm green pushbutton with “I” marking, flush mounting, 1NO contact	1
		XB4FL4322	Ø 22 mm red pushbutton with “O” marking, flush mounting, 1NC contact	1
Harmony XB4 (alternative)		Alternative	Note: For standard mounting, use XB4BA3311 and XB4BA4322 Ø 22 mm double-headed pushbutton with 1 green “I” marking button + 1 red “O” making projecting button + 1 central pilot light white, 1NO + 1NC contacts	1
Transformer	14	9070T50	Type T, 50VA, 1 phase, 240x480V primary, 120V secondary, 55C rise	1
EcoStruxure Machine Expert Software (free license)	15	NA	Simplify machine programming & commissioning using a single environment. Free online download	1