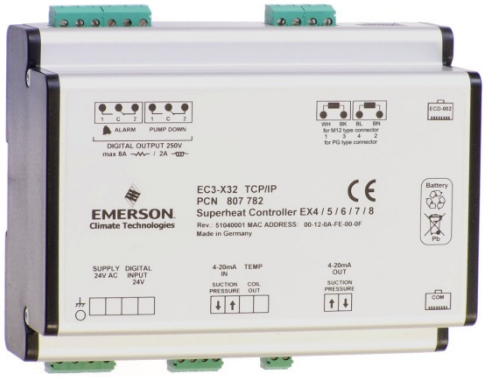
Alco Controls

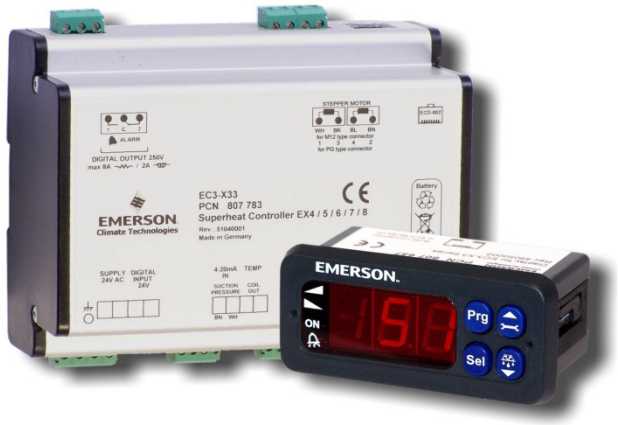
EC3-X32 / -X33 Stand-alone Superheat Controller

Technical Bulletin

EC3-X32 / **-X33** are stand-alone universal superheat controllers for air conditioning, refrigeration and industrial applications such as chillers, industrial process cooling, rooftops, heat pumps, package unit, close control, cold room, food process and air driers.
EC3-X32 offers remote access with built-in TCP/IP Ethernet communications and WebServer functionality. Any standard WebBrowser (e.g. Internet Explorer® or Mozilla Firefox) can be used for monitoring or parameter setting.
EC3-X33 has no network communication.



EC3-X32



EC3-X33 with ECD-002

Features EC3-X33 / EC3-X32

- Superheat control in conjunction with EMERSON stepper motor driven Electrical Control Valves EX4 … EX8
- Limitation of evaporating pressure (MOP)
- Low superheat alarm
- Feed through of 4…20mA signal from evaporator pressure sensor to analogue output. This may also be connected to pressure input of any other controller to avoid need for multiple pressure sensors
- Monitoring of sensors and sensor wiring and detection of sensor and wiring failures
- Intelligent alarm management in order to protect the compressor i.e fail safe operation
- Integral rechargeable battery to close Electrical Control Valve in case of power loss
- Electrical connection via plug-in type screw terminals
- Aluminum housing for DIN rail mounting

Additional Features EC3-X32 only

- High superheat alarm
- Low pressure switch function/alarm
- Freeze protection function/alarm
- Pump down function

Selection Table Controllers and Display Unit

Description	Type	PCN
Superheat Controller	EC3-X33	807 783
Terminal kit EC3-X33	K03-X33	807 645
Superheat Controller	EC3-X32	807 782
Terminal kit EC3-X32	K03-X32	807 644
Display/keypad unit (opt.)	ECD-002	807 657
Connection cable EC3 to ECD-002 (1.0m length)	ECC-N10	807 860
Connection cable EC3 to ECD-002 (3.0m length)	ECC-N30	807 861
Connection cable EC3 to ECD-002 (5.0m length)	ECC-N50	807 862

EC3-X32 / -X33 Stand-alone Superheat Controller

Selection Table Accessories

Description		Type	PCN
Temperature sensor	Cable length 3.0 m	ECN-N30	804 496
	Cable length 6.0 m	ECN-N60	804 497
	Cable length 12.0 m	ECN-N99	804 499

Pressure sensor			
for R22/R124/R134a/R40A/R407C/R507C	0.8…7bar	PT5-07M	802 350
for R410A	0…18bar	PT5-18M	802 351
for R744	0…30bar	PT5-30M	802 352
for intermediate pressure applications	0…18bar	PT5-18M	802 351
Plug and cable assembly for pressure sensor	1.5m cable length	PT4-M15	804 803
	3.0m cable length	PT4-M30	804 804
	6.0m cable length	PT4-M60	804 805

Transformer			
230VAC Input, 24V output, Din rail mounting			
For one set of controller and valve	25VA	ECT-323	804 424
For two sets of controllers and valves	60VA	ECT-623	804 421
Replacement battery kit			807 790

Selection Table Electronic Expansion Valves

Valve	Capacity range kW *	Refrigerant	Capacity regulation
EX4	2 ... 20	**R 22**	10-100%
EX5	5 ... 50		
EX6	12 ... 120		
EX7	35 ... 330		
EX8	90 ... 880		
EX4	2 ... 21	**R 407C**	
EX5	5 ... 53		
EX6	13 ... 126		
EX7	35 ... 347		
EX8	100 ... 925		
EX4	2 ... 15	**R 134a**	
EX5	4 ... 39		
EX6	10 ... 93		
EX7	25 ... 255		
EX8	70 ... 680		
EX4	2 ... 14	**R 404A/ R507**	
EX5	4 ... 35		
EX6	9 ... 84		
EX7	24 ... 230		
EX8	62 ... 613		

Valve	Capacity range kW *	Refrigerant	Capacity regulation
EX4	3 ... 23	**R 410A**	10 to 100%
EX5	6 ... 58		
EX6	14 ... 140		
EX7	40 ... 385		
EX8**	100 ... 1027		
EX4	4 ... 41	**R 744**	
EX5	10 ... 102		
EX6	25 ... 244		
EX7	70 ... 671		
EX8**	180 ... 1789		
EX4	1 ... 11	**R 124**	
EX5	3 ... 28		
EX6	6 ... 67		

*) Nominal rating conditions:

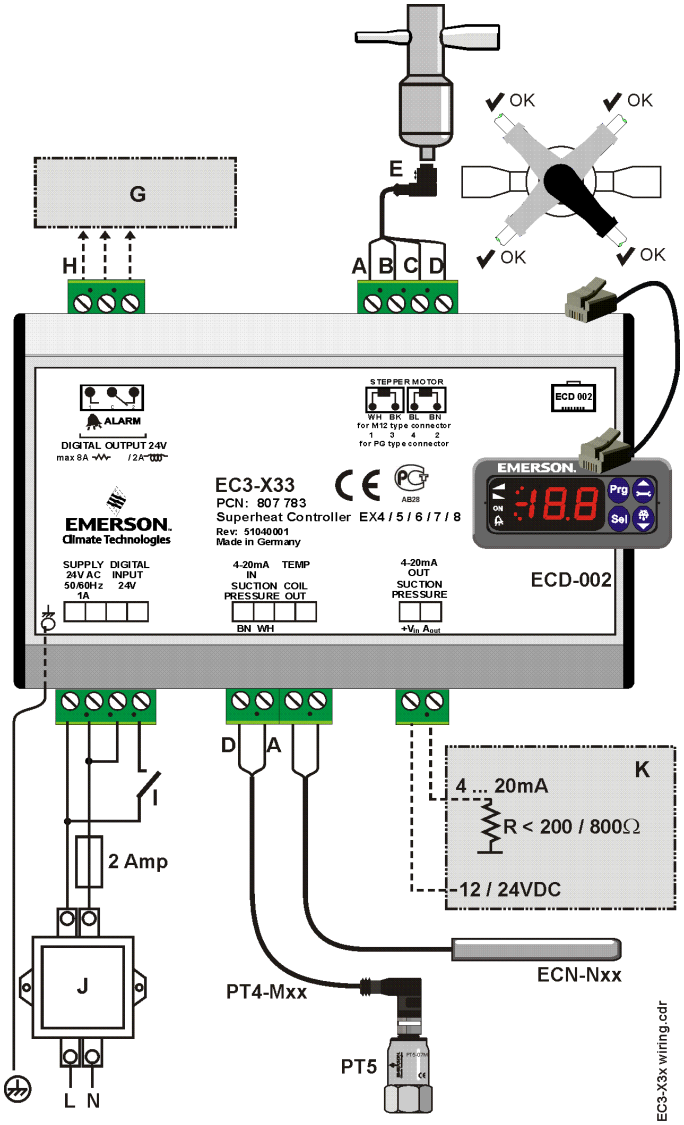
Refrigerant	Evaporating temperature	Condensing temperature
R22, R134a, R404A, R407C, R410A	+4°C	+38°C
R23	-60°C	-25°C
R744	-40°C	-10°C
R124	+20°C	+80°C

**) PS:35bar

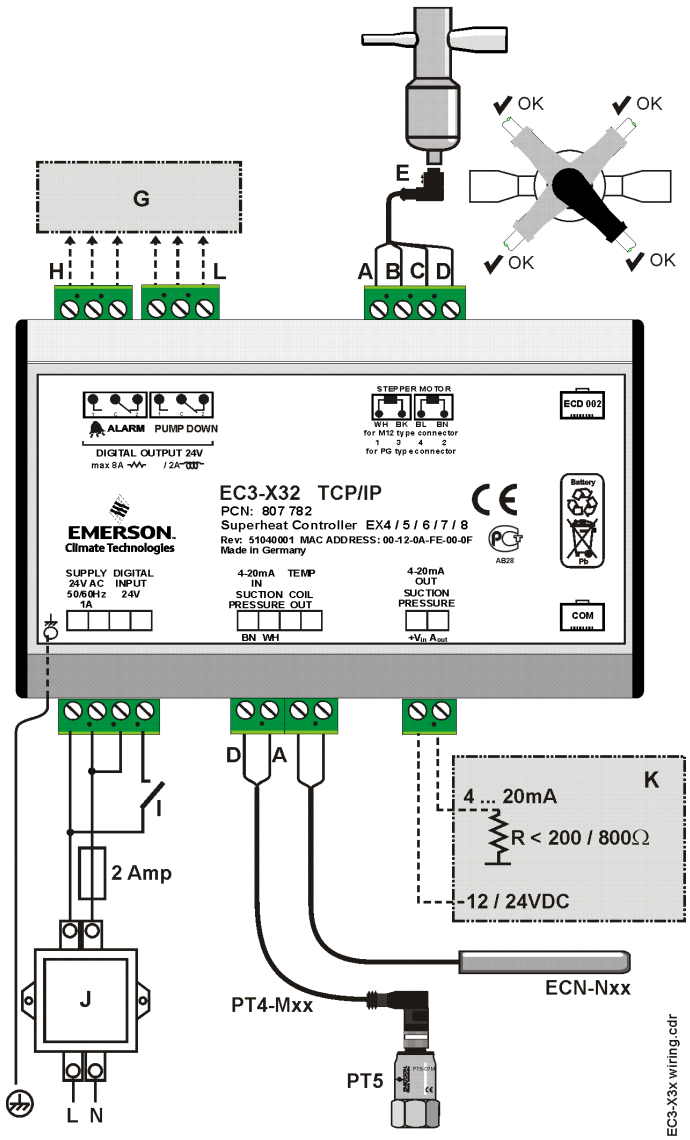
For further details refer to: EX4, EX5, EX6, EX7, EX8 Electrical Control Valves datasheet EX48_35008.pdf .
For selection at other than nominal rating conditions Copeland Select can be downloaded from www.emersonclimate.eu

Wiring Diagram

EC3-X33



EC3-X32



A: White **B**: Black **C**: Blue **D**: Brown wire

E: Plug cable assembly EXV-Mxx for connection to EX4 .. EX8

G: Remote control panel, system controller

H: Alarm relay, dry contact. Relay coil is not energized at alarm condition or power off

⚠ The use of the relay is essential to protect the system in case of power failure if the communications interface or the ECD-002 are not utilized

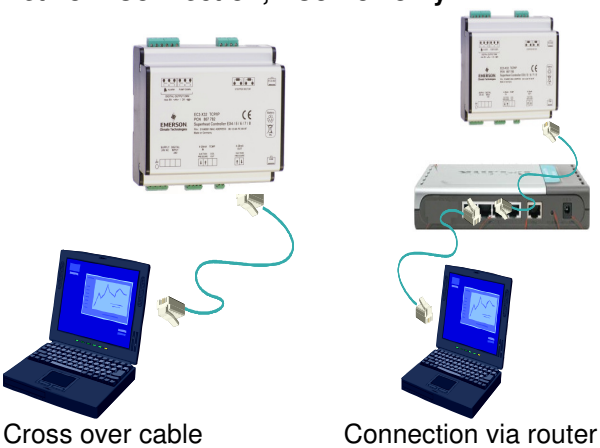
I: Digital input (0V/open = Stop; 24V/closed = Start)

J: Transformer Class II, 24VAC secondary / 25VA

K: Third party controller (can use analog output signal of EC3)

Note: The internal resistor of a third party controller must fulfill the following conditions:
Supply voltage 12VDC: R ≤ 200Ω
Supply voltage 24VDC: R ≤ 800Ω

Network Connection, EC3-X32 only:



Cross over cable

Connection via router

Technical data

EC3-X32 / -X33

Supply voltage	24VAC ±10%, 50/60Hz
Digital input	24 V AC ±10%, 50-60HZ 24 V DC ±10%
Power consumption	25VA max. including connected ECV and display/keyboard
Internal battery charging time	Approximately 2 hours if battery is fully empty
Plug-in connector size	Removable screw version wire size 0.14 … 1.5mm²
Ground connection	6.3mm spade earth connector
Marking	CE
Protection class	IP 20
Vibration	4g, 10-1000Hz
Temperature storage operating	 -20 … +65°C 0 … +60°C 1….+25°C for optimum battery life
Applied directive EMC LVD RoHS	 EN 61326, EN 50081,EN 61000-6-2, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11
Humidity	0 … 80% r.h. non condensing
Weight	~ 800g
Mounting	DIN rail mounted

ECD-002 Display Unit

Supply	From EC3 Series Controller via connecting cable
LED indicators	Valve opening, valve closing, alarm, demand
Display LED	Numeric segmental display, 2½-digits, red, with automatic decimal point between ±19.9, switchable between °C and °F
Connecting cable	ECC-Nxx or standard CAT5 patch cord with RJ45 connectors
Temperature storage operating	 -20 … +65°C 0 … +60°C
Humidity	0 … 80% r.h. non condensing
Protection class	IP 65 (front protection with gasket)
Weight	~ 52g
Mounting	Panel mount (71 x 29 mm cutout)

ECD-002

Input and Output, EC3-X33 Controller

Description	**Specification**
Temperature input	ECN-Nxx 10kΩ @ 25 °C, Range: -50 … 50 °C
Pressure sensor input	PT5-07M/18M/30M 24VDC, 4 … 20mA
Analog output (evaporating pressure fed-through signal) Deviation from input signal	4 … 20mA Requires 12 or 24 VDC ±8% max
Digital input	0 / 24 VAC/DC
Output relay	SPDT contacts, AgCdO , 24VAC/DC Inductive 2Amp, Resistive 8 Amp
Stepper motor output	For EX4 … EX8 Electrical Control Valves
Connection to ECD-002	RJ45

List of Adjustable Parameters EC3-X33 and EC3-X32

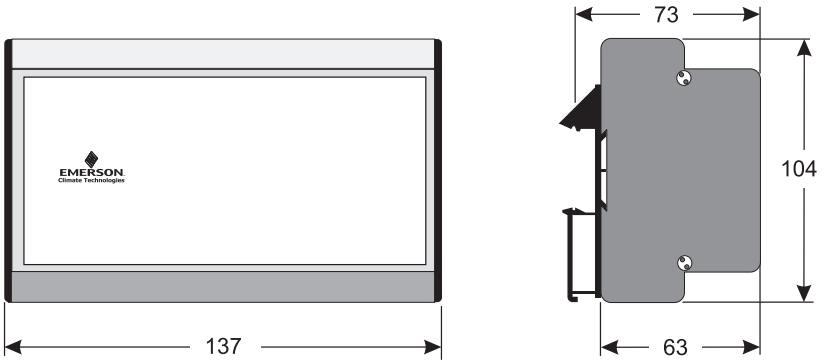
- Superheat set point
- Low superheat function
- MOP function and set point
- Type of refrigerant and required pressure sensor
- Type of Electrical Control Valve
- Valve start opening and duration
- Unit conversion
- Value to display
- Battery error management
- Password

List of Adjustable Parameters EC3-X32 only

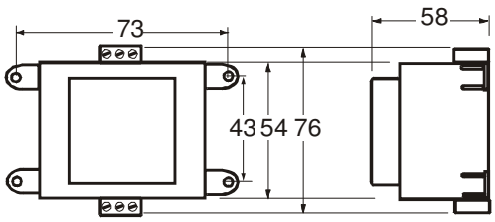
- User name (only via web page)
- Low pressure alarm: cut-out/cut-in and time delay
- Freeze protection alarm: cut-out/cut-in and time delay
- High superheat alarm: Cut-out and time delay
- Pump down cut-out and duration
- Manual control of valve (only via web page)
- TCP/IP configuration (only via web page)
- Others

Dimensions (mm)

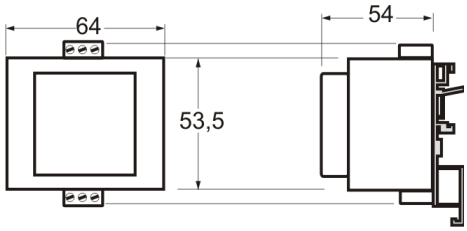
EC3-X33 Controller



ECT-623 Transformer



ECT-323 Transformer



ECD-002 Display Unit