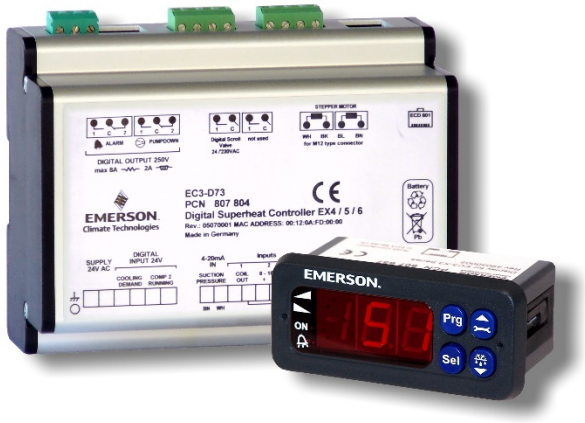
EC3-D72/ D73 Superheat & Digital Scroll Controller

Technical Bulletin

The EC3-D7x series is a stand-alone universal superheat controller with a built-in synchronization control for the Copeland Digital Scroll. It is suitable 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.
The EC3-D72 offers remote access with built-in TCP/IP Ethernet communications and WebServer functionality. Any standard Webbrowser (e.g. Microsoft Internet Explorer® or Mozilla Firefox) can be used for monitoring or parameter setting.
The EC3-D73 is exactly the same in its functionality but has no network communications.



EC3-D72/ D73

Features Controller

- Superheat control in conjunction with EMERSON Controls stepper motor driven Electrical Control Valves EX4...EX6
- Synchronization of the PWM solenoid valve used for variable capacity control of the Copeland Scroll Digital
- Limitation of evaporating pressure (MOP)
- Low and high superheat alarm
- Low pressure switch function/alarm
- Freeze protection function/alarm
- Pump down function
- Feed through of 4…20 mA signal from the 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 the Electrical Control Valve in case of power loss
- Electrical connection via plug-in type screw terminal
- Aluminum housing for DIN rail mounting

Features ECD-002 Display Unit

- Front panel mounted interface for parameter and status readout and controller setup via keypad
- Indicator LEDs for valve opening/closing, external ON and alarm

Temporary for set-up, start-up and service

Direct connection via cross over cable

Connection via Router

Selection table Controller

Description	Type	Part No.
Superheat Controller EX4-6		
Stand alone Controller	**EC3-D73**	**807804**
Stand alone Controller Kit*	**EC3-D73 Contr. Kit**	**808041**
Stand alone (24V)	**EC3-D73**	**807809**
Controller with TCP/IP communication	**EC3-D72**	**807805**
Controller with TCP/IP communication Kit*	**EC3-D72 Contr. Kit**	**808042**
Controller with TCP/IP communication (24V)	**EC3-D72**	**807808**
Terminal Kit EC3-D7x	**K03-331**	**807648**

Note: *) Kits contain terminal kit, pressure transmitter PT5N-07M with cable assembly, NTC sensor TP1-NP6, transformer ECT-623

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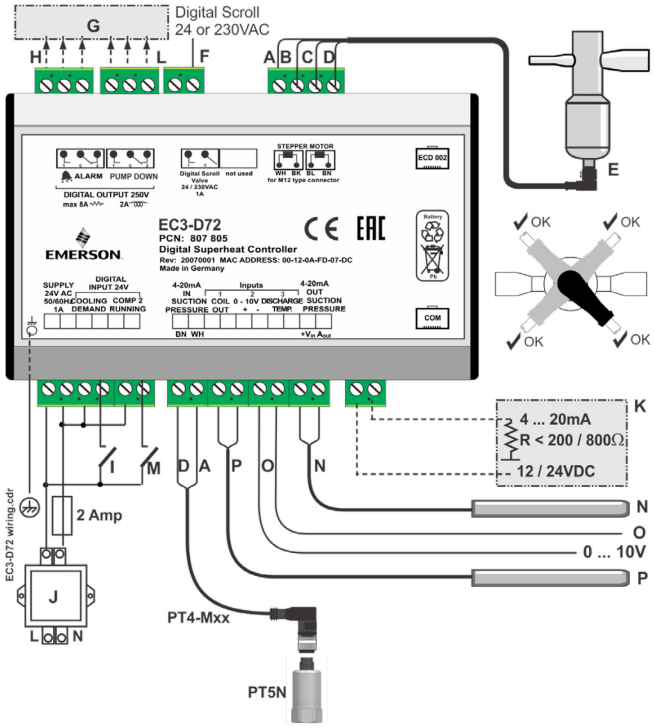
Selection table Accessory

Description	Type	Part No.	Picture
Optional Display Unit	**ECD-002**	**807657**	
Connection cable EC3 to ECD-002 (1.0m length)	**ECC-N10**	**807860**	
Connection cable EC3 to ECD-002 (3.0m length)	**ECC-N30**	**807861**	
Connection cable EC3 to ECD-002 (5.0m length)	**ECC-N50**	**807862**	
Temperature Sensors NTC			
Cable length 3.0 m	**TP1-NP3**	**804489**	
Cable length 6.0 m	**TP1-NP6**	**804490**	
Cable length 12.0 m	**TP1-NP12**	**804491**	
Pressure Sensors			
Sensing pressure range -0.8…7 bar (7/16-20UNF connection)	**PT5N-07M**	**805350/M**	
Sensing pressure range 0…18 bar (7/16-20UNF connection)	**PT5N-18M**	**805351/M**	
Sensing pressure range 0…30 bar (7/16-20UNF connection)	**PT5N-30M**	**805352/M**	
Sensing pressure range -0.8…7 bar (brazing connection)	**PT5N-07T**	**805380/M**	
Sensing pressure range 0…18 bar (brazing connection)	**PT5N-18T**	**805381/M**	
Sensing pressure range 0…30 bar (brazing connection)	**PT5N-30T**	**805382/M**	
Plug and cable assembly for pressure sensor			
Cable length 1.5 m	**PT4-M15**	**804803/M**	
Cable length 3.0 m	**PT4-M30**	**804804/M**	
Cable length 6.0 m	**PT4-M60**	**804805/M**	
Transformers 230VAC Input, 24V output, Din rail mounting			
For one set of controller and valve 25 VA	**ECT-323**	**804424**	
For two sets of controllers and valves 60 VA	**ECT-623**	**804421**	
Others			
Replacement Battery Kit.	**EC3-Bat**	**807790**	

Note: M = Multipack, PT5N-xxx- 25 pcs., PT4-Mxx – 20pcs.

Wiring Diagram



A: White wire **B**: Black wire
C: Blue wire **D**: Brown wire
E: Plug cable assembly EXV-Mxx for connection to EX4-6
F: 24/230V Triac output for Copeland Digital Scroll solenoid valve
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 1: "Cooling demand"; Digital Scroll compressor is running: 0V/open = Stop; 24V/closed = Start)
J: Transformer Class II, 24VAC secondary / 25VA
K: Third party controller (can use the analog output signal from EC3)

⚠ The internal resistor of third-party controller must fulfill the following conditions:
R ≤ 200 Ω if the supply voltage is 12VDC
R ≤ 800 Ω if the supply voltage is 24VDC

L: Pump down relay, dry contact. Relay is energized during normal operation
M: Digital input 2: "Comp. 2 running"; 0V/open = Comp2 stop; 24V/closed = Comp2 running.
N: Discharge Temp. Sensor
O: 0-10V Digital Scroll capacity demand signal from system controller
P: TP1-NP… Coil out sensor

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Technical Data EC3-D72/D73

Supply voltage	24 VAC ±10%, 50/60 Hz, 1 A
Digital input	24 VAC ±10%, 50-60 Hz 24 VDC ±10%
Power consumption	25 VAC 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 … 1.5 mm²
Ground connection	6.3 mm spade earth connector

Applied directives 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
Temperature storage operating	 -20…+65 °C 0…+60 °C 1...+25 °C for optimum battery life
Humidity	0…80% r.h. non-condensing
Mounting	DIN rail mounted
Weight	~ 800 g
Markings	CE, EAC

Inputs and Outputs EC3-D72/D73

Description	**Specification (24/230V)** Part No. 807805, 807804	**Specification (24V)** Part No. 807808, 807809
NTC Temperature input	TP1-NPx 10kΩ at 25 °C	
Pressure sensor input	PT5N-07x/18x/30x 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 Max. rating: Inductive 2 A, Resistive 8 A	SPDT contacts, AgCdO, Max. rating: Inductive 2 A, Resistive 8 A
Output Digital Scroll Triac	24 V or 230 V AC output to activate PWM valve on Digital Scroll	24 V AC output to activate PWM valve on Digital Scroll
Stepper motor output	for EX4-6 Electrical Control Valves	
Connection to ECD-002	RJ45	
TCP/IP communication	RJ45 (EC3-D72 only)	

Technical Data ECD-002 Display Unit

Supply	From EC3 Series Controller via connecting cable
LED indicators Display LED	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
Protection class	IP 65 (front protection with gasket)
Humidity	0 … 80% r.h. non-condensing
Mounting	Panel mount (71 x 29 mm cutout)
Weight	~ 52 g
Markings	CE

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Dimensions (mm)

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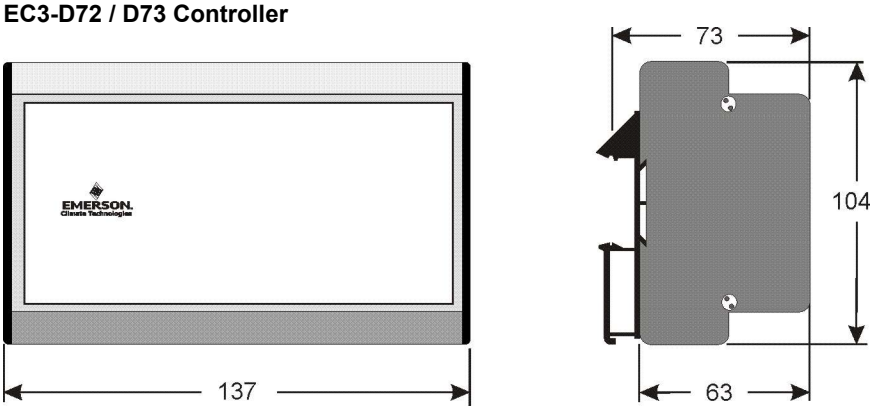
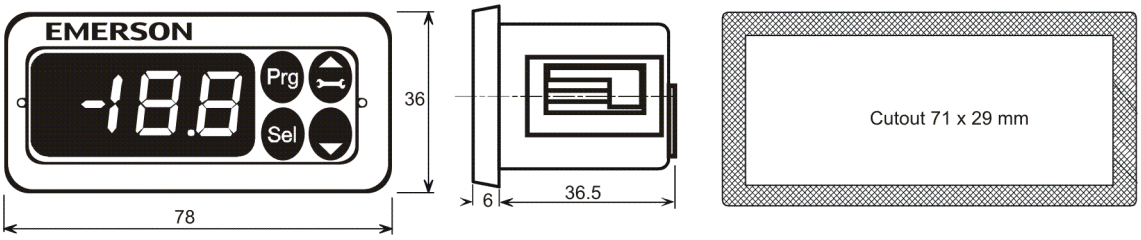


ECD-002 Display Unit



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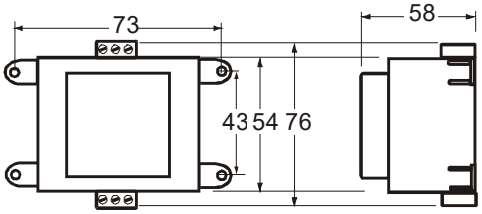

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