

ECH 400/600 FAMILY

Chiller-Heat Pump Controllers 2 circuits- 4/6 compressors



Description

ECH 400/600 family is a range of compact devices that permit to control air conditioning units and heat pump of the following types:

- air-water
- water-water
- air-air
- condensing units.

The controllers can manage units with up to four (**ECH 400**) or six (**ECH 600**) power stages distributed in a maximum of 2 cooling circuits (for example, 2 circuits, with 2 or 3 compressors per circuit).

The Main characteristics are:

All Models

- Inlet or Outlet water temperature control
- Proportional condensation control on temperature or pressure (through relay, analog signal, PWM signal for cutting-phase devices)
- Dynamic set point
- up to three 4-20 mA outputs
- Control of 1...4 compressors or multistage compressors
- Control of 1, 2, 3, or 4 compressors or multistage compressors
- Copy card for uploading and downloading parameters
- Interface menu and inputs/outputs may be fully programmed with a PC
- Remote keyboard (100 m) which may be connected up directly without serial interfaces
- Modbus protocol • Televis protocol.

ECH420F

- Water Free-cooling. With optimal outdoor conditions, thanks to this function it is possible to cool a room without compressors with remarkable energy saving.

ECH620

- Control of 1...6 compressors
- Management of fans with duty cycle output for static relays

ECH420SR - ECH420SRD

- Dynamic Defrost
- Semi-hermetic compressor or "screw compressor" management with complete diagnostic
- Pump down management
- Heat recovery management
- Management of 2 pumps

ECH420SRD

- Adaptive
 - Pressure transducers extended range (for R410A)
 - Antifreeze Function with Water Pump on External Probe
- Using a personal computer, with our PARAM MANAGER, the user has very helpful software tool that guides the configuration of the controller easily and quickly using simple icons or default configuration.

Models

More models and optional DEVICES are available to cover a wide range of different applications and installations.



ECH420(V)

Chiller and heat pump with 2 circuits up to 4 compressors



ECH420F(V)

Chiller and heat pump with 2 circuits up to 4 compressors + Water Free-Cooling



ECH420SR(V) - ECH420SRB**(V)

Chiller and heat pump with 2 circuits up to 4 compressors + heat recovery + management of semi-hermetic compressor ("screw compressor") + **Modbus****



ECH420SRD(V) - ECH420SRBD**(V)

As above ECH420SR + Adaptive + R410A + Antifreeze Function with Water Pump on External Probe + **Modbus****



ECH620

Chiller and heat pump with 2 circuits up to 6 compressors + fan management with static relays



Suffix /V means with removable screw connectors (Ex: ECH420/V)

**** ModBUS available only on "B" models**



Keyboards

EKP400/600

Panel mounting keyboard for Ech 400 (32x74)



EKW400/600 BLK

Wall mounting keyboard for Ech 400



Expansion(s)

EXP402

Expansion module for Ech 400 (2 relays + 4 DI)



EXP405 (only ECH 400S/600)

Expansion module for Ech 400 (5 relays + 2 AI + 4 DI)



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Invensys Controls Europe
An Invensys Company

Features

Model	ECH420(/V)	ECH420F	ECH620	ECH420SR	ECH420SRD
Part Number	MW324000	MW324003	MW324020	MW324011	MW324017
Part Number (B models)	-	-	-	(MW324015)	(MW324041)
Part Number /V models	MW324007	MW324008	-	MW324013	-
Part Number (B/V model)	-	-	-	(MW324016)	-
Application					
Chiller	••	••	••	••	••
Chiller/Heat Pump	••	••	••	••	••
Condensing Unit	••	••	••	•	••
Packaged Unit	•	•	•	•	•
Ducted Split	•	•	•	•	•
Configuration					
Circuits	2	2	2	2	2
Evaporators	2	2	2	2	2
Compressors	4	4	6	4	4
Compressors Stages	3	3	3	3	3
Continuous Fan	•	•	•	•	•
Water Pumps	1	1	1	2	1
Electric Heaters	2	2	2	2	2
Input/Output					
Digital Inputs	11	11	11	11	11
Temperature Probes	4	4	4	4	4
Configurable Probes (Temperature/Pressure)	2	2	2	2	2
Relays	8	8	8	8	8
PWM Outputs (for Fan Speed)	2	2	2	2	2
4...20 mA Outputs (for Fans or Free Cooling)	2	3	2	2	2
Functions					
Water Economizer (Free Cooling)		•			
Fan Management with static relays			•		
Pump Down				•	•
Heat Recovery				•	•
Compressor Rack Controller				•	•
Semi-hermetic				•	•
Screw Compressor				•	•
Dynamic Defrost				•	•
Antifreeze Function with Water Pump on Ext. Probe					•
Adaptive					•
Expansioni					
EXP402					
MW324100					
EXP405*					
MW324110					
* solo					
ECH400SR-SRD, 600					
402/405					
4/4					
-/2					
-/-					
2/5					
-/-					
-/-					
• compatible					
•• recommended					
keyboard Model	EKP400	EWV400 BLK	EKP600	EWV600	
Part Number	MW324650	MW324600	MW324670	MW324620	

Features common to all models

Functions

Heat Pump
Balancing Compressor Hours
Standard Defrost
Dynamic Set Point
Condensing Pressure Control
Remote Change Over
Remote ON-OFF

Diagnostic

Faulty Sensor
High Pressure circuit
Low Pressure circuit
Thermal Compressor Protection
Thermal Fan Protection
Water Flow Protection
Antifreeze Alarm
High Input Temperature

Connectivity

TTL
Modbus
Mechanical
Panel Mounting
Plastic Box
Fast Connectors
(except /V models)

User Interface



DOWN key
Reset Alarms/Switch ON-OFF/DOWN or SCROLL DOWN

KEYS



UP key for change mode (e.g. standby-cool-heat-standby/UP or SCROLL UP)



UP/DOWN keys press together
one level UP/DOWN



LED circuit 1 (ECH 620)

ON one compressor of circuit 1 active/OFF inactive/BLINK timing count



LED circuit 2 (ECH 620)

ON compressor circuit 2 active/OFF inactive/BLINK timing count



LED compressor 1 (ECH 420)

ON if compressor 1 active/OFF inactive/BLINK timing count



LED compressor 2 (ECH 420)

ON if compressor 2 active/OFF inactive/BLINK timing count



LED compressor 3 (ECH 420)

ON if compressor 1 active/OFF inactive BLINK timing count



LED compressor 4 (ECH 420)

ON if compressor 1 active/OFF inactive/BLINK timing count



LED cooling ON if device in cooling mode



LED heating ON if device in heating mode



LED anti-freeze



ON if antifreeze-heater-boiler active/OFF if inactive

LED

Accessories

Transformers

TF411210: 230/12V - 11VA for ECH400 (protected)

TF411215: 230/12V - 20VA for ECH400 (protected)

PROBES

NTC probe 103AT, 1,5m (plastic cap, 2wires cable)

NTC probe 6x40, 1,5m (metal cap, silicon or PVC cable)

NTC probe 6x40, 1,5m (plastic cap, PVC cable)

EWPA030, Pressure transducer 4...20mA/0...30bar

Different lengths are available on request

Fan Speed Controls

- CFS: single phase fan speed regulators for currents from 2A to 9A

- CF-REL: relay 6A/230V~

- DRV 300: 3 phases 12...20A/420V~ (IP22 or IP55)

OTHERS

COLV0100 - Connecting cable for signal (inputs or low voltage outputs)

Copy Card: To copy configuration between devices

Technical Data

	Typ.	Min.	Max.
Power supply voltage	12 V~	10 V~	14 V~
Power supply frequency	50/60 Hz		
Power consumption		11 VA	18VA
Insulation class	1		
Operating temperature	25 °C	-10 °C	60 °C
Operating humidity*	30%	10%	90%
Storage temperature	25 °C	-20 °C	85 °C
Storage humidity *	30%	10%	90%

*(non condensing)

Digital Outputs

n° 8 Relays 2(2)A – 250V~ (1/4hp 230V~, 1/8hp 120V~)

On EXP402 n° 2 Relays 2(2)A – 250V~ (1/4 hp 230V~, 1/8 hp 120V~)

On EXP405 n° 5 Relays: n° 2 Relays 2(2)A – 250V~ (1/4 hp 230V~, 1/8 hp 120V~) + n° 3 Relays SPDT 5(3)A – 250V~ (1/2 hp 230V~, 1/4 hp 120V~)

Analogue outputs

n° 2 PWM output

n° 2 4...20 mA outputs - n° 3 4...20 mA outputs (**ECH420F**)

Analogue inputs

n° 4 Temperature sensors

n° 2 Configurable input: 4...20mA pressure transducer or temperature sensor

n° 2 Temperature sensors. **On EXP405**

Temperature resolution: 0,1 K

Temperature accuracy: 0,8 K in the range 0...35 °C

Pressure resolution: 0,1bar

Pressure accuracy: 1% end scale

Digital inputs

n° 11 Voltage free digital inputs

n° 4 Voltage free digital inputs. **On EXP402 and EXP405**

Serial output

n° 1 TTL output for PC, network connection or Copy Card

Terminal and connectors

n°1 9-pin remov. screw connector for high voltage output

n°2 quick coupling 16-pin connector or (**/V models**) n°8 quick coupling 4-pin connectors for low voltage signals

n°1 5-pin connector for serial output or copy card

n°1 3 ways screw terminal for remote keyboard

n°1 20 connector block for expansion modules

Installation

ECH420

Dimensions: 108x107mm

Protection grade: IP00

Assembly: Open Board

EKP400

Dimensions: Front panel

76x34 mm, depth 58mm

Housing: PC+ABS plastic resin with V0 extinguishing class

Assembly: panel, on 71x29mm hole

EKW400 BLK

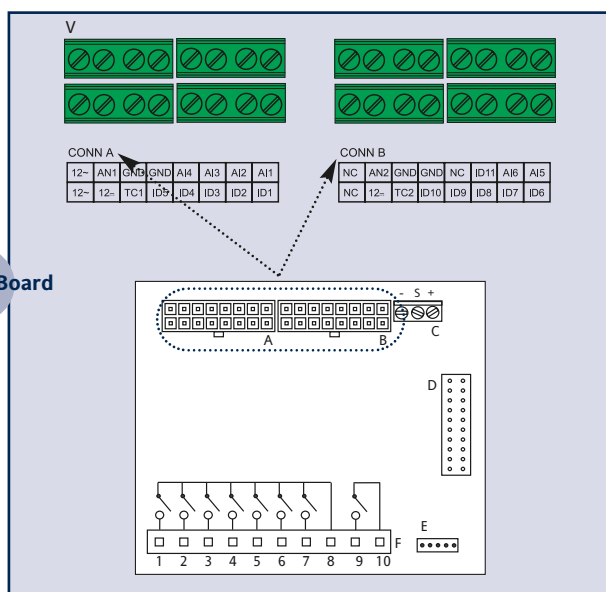
Dimensions: Front panel 124x80mm; Depth 25mm

Housing: PC+ABS plastic resin with V0 extinguishing class

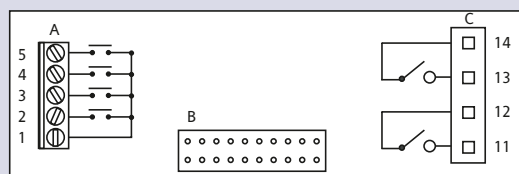
Assembly: Wall Mounting

Wiring Diagram & Description

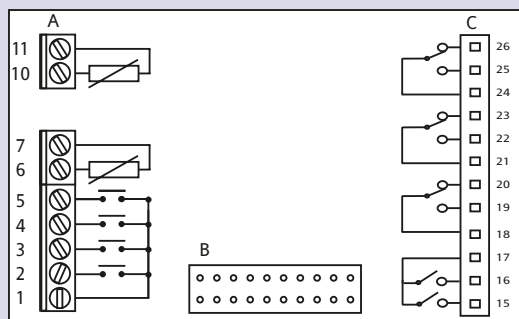
Power Board



EXP 402



EXP 405



Power Board

A/B - CONN A/B*

V - screw connectors*

*

IAx Analogue Input x

IDx Digital Input x

12 12 V_{cc}

GND ground

ANx 4...20 M output for control of fan in circuit x

TCx Output for external fan modules circuit x

NC not connected

C - connection to remote keyboard

D - connection to Expansion Module

E - serial

F - N.O. relay outputs**

**

1 relay 1 compressor

2...7 relay 2...7 configuration

8 common

9 alarm relay

10 common alarm relay

Expansion Board 402

(EXP402)

A - screw connectors*

B - connection to Base Module

C - N.O. relay outputs**

*

1 D.I. common

2 Digital Input 12

3 Digital Input 13

4 Digital Input 14

5 Digital Input 15

**

11 relay 9 config,

13 relay 10 config,

12-14 common

Expansion Board 405

(EXP405)

A - screw connectors*

*

1 D.I. common

2 Digital Input 12

3 Digital Input 13

4 Digital Input 14

5 Digital Input 15

6-7 NTC probe

10-11 NTC probe

B - connection to Base Module

C - relay outputs**

**

15 relay 9 config,

16 relay 10 config,

17 common

18...20 relay 11 config,

21...23 relay 12 config,

24...26 relay 13 config,

Regulations

The product meets the following CEE Directives:

- 73/23/CEE Council directive and subsequent modifications

- 89/336/CEE Council directive and subsequent modifications and meets the requirements of the following Armonised regulations:

- LOW VOLTAGE: EN60730 • EMISSION: EN50081-1 (EN55022)

- IMMUNITY: EN50082-2 (IEC 1000-4-2/3/4/5)

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