



Electronic controllers for small centralised air-conditioning units

General Description

Eliwell, a leading manufacturer for over a decade of control equipment for small and medium-size air conditioning units is proud to present Energy Flex, the new range of compact devices with advanced functions and innovative applications for the HVAC market.

Single-circuit control of centralised air-conditioning systems with 1 or 2 compressors (steps), such as:

- Chillers, Heat Pumps, Close Control:
 - water-air;
 - air-water;
 - water-water;
 - air-air;
- Motorised condensers:
 - air-cooled;
 - water-cooled.

Typical applications:

- Minimarkets
- Industrial plants
- Offices
- Hotels
- Residential buildings.

Technical data:

Energy ST500 and Energy ST700 are available with respectively 6 and 2 models, providing up to 5 relays outputs, one TRIAC output, 2 PWM/Open Collector analogue outputs, one configurable analogue output and one Open Collector digital output for external relay.

All Energy ST500 models come with 5 digital outputs, while all Energy ST700 come with 7 digital outputs.

All Energy ST digital output are voltage free.

All inputs and outputs are independent and configurable, meaning they can be adapted to fit any system. Eliwell's standard 32x74mm format also ensures the utmost flexibility and ease of installation.

Main functions:

- Termoregolazione sulla sonda in ingresso o uscita;
- Temperature control via the input or output probe.
- Integrated boiler or heating control.
- Integrated control of two electrical heaters or heating system.
- Dynamic setpoint.
- Automatic change-over.
- Indoor ventilation control.
- Dynamic defrosting.
- Full diagnostics.
- Modulating water pump control.
- Adaptive function for units with no accumulation.
- Antifreeze function with water pump on external probe.
- Control of non-uniform tandem compressors.
- Power limitation.
- Resources optimized in relation to external temperature.



Summary

Pag.

Models and Technical data

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Energy ST 500



• **ST542/C**
5 DI • 4 DO • 2 AO

5



• **ST543/C**
5 DI • 4 DO • 3 AO

5



• **ST544/C**
5 DI • 4 DO • 4 AO

5



• **ST551/C**
5 DI • 5 DO • 1 AO

6



• **ST552/C**
5 DI • 5 DO • 2 AO

6



• **ST553/C**
5 DI • 5 DO • 3 AO

6

Energy ST 700



• **ST744/C**
7 DI • 4 DO • 3 AO

6



• **ST753/C**
7 DI • 5 DO • 3 AO

6



Accessories

7

- DI • Digital Inputs
- DO • Digital Outputs
- AO • Analogue Outputs



Plus points

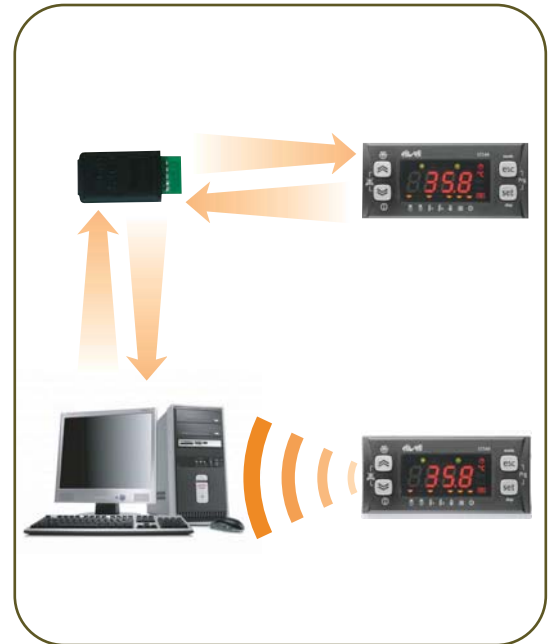
Customisable front panel

The front panel on Energy ST500-ST700 models can be customised with icons, and the manufacturer's name and logo to create brand recognition. The 4-figure, 18-icon (7 of which are configurable) display is also easy-to-read with dedicated units of measure for all values displayed. The 4 keys can be used to scroll each of the various directories making up the menu, access to which can be configured on three levels: end user, service and manufacturer.



Alarm history

By way of the "alarm history" function, the device provides users with details at all times of all alarms generated in the past, making it easier to identify the relative causes of system alarms. All saved data can be easily accessed from a dedicated menu directory or downloaded from a PC.

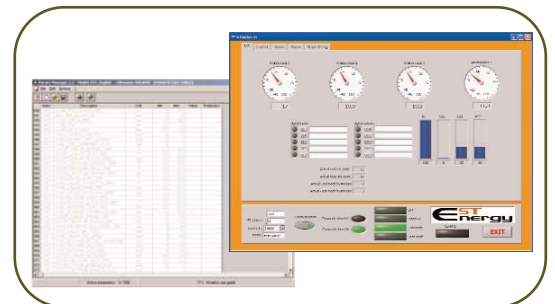


Remote Control

All models have a serial connection to integrate effortlessly with supervision, monitoring and/or control systems of the host plant providing constant, improved system control. The Modbus communication standard can be used to monitor and control all system functions, e.g. varying the operation mode, limiting available power, blocking temperature control and forcing power output, reading all significant system variables, and so forth.

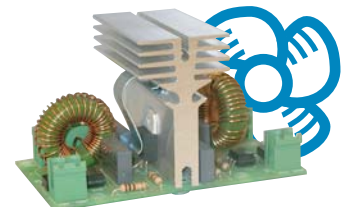
Software Tools

The new software tools VarManager and FWUploader are available with Energy ST. VarManager, compatible with all ST500-ST700 models, can monitor and record system variables in real time, cutting the time required to set-up the system for lab tests. With FWUploader, the controller can be programmed with the most suitable application software at any time, from production through to field installation. What's more, the consolidated ParamManager software can be used to edit all parameters.



Integrated control

Several Energy ST 500-ST700 models feature an integrated phase partializer for modulated piloting of condensation fans up to 500W with no need for external devices, making the system more compact and cutting power board costs. For more powerful fans, Eliwell makes a range of extremely compact modules (FCS) which still make very efficient use of space.



Energy Saving

Thanks to the powerful data processing capacity, Energy ST500-ST700 provides advanced adjustment algorithms, such as dynamic setpoint, dynamic defrost, integrated heat pump control with electric heaters and boiler, thereby dramatically cutting energy consumed by the controlled installation.



Display and LEDs



operating modes and states



Values with units of measure



State of utilities



Icon	Description	Colour	ON	Blinking
⚠	Alarm	Red	Alarm generated	Alarm silenced
☀	Heating	Green	Heating mode	Antifreeze with heat pump Remote Heating mode
❄	Cooling	Green	Cooling mode	Remote Cooling mode
⏻	Stand-by	Green	Stand-by mode	Remote stand-by mode
❄	Defrost	Green	Defrost enabled	Manual defrost enabled
🏠	Economy	Green	Configurable	Configurable
🕒	Clock	Red	View	Programming / View current clock time
°C	Degrees centigrade	Red	/	/
Bar	Pressure (bar)	Red	/	/
%R.H.	Relative humidity	Red	/	/
ABC	Menu	Red	Navigation menu	/
🔽	Utilities	Amber	Configurable	Configurable
🔽	Utilities	Amber	Configurable	Configurable
🔽	Utilities	Amber	Configurable	Configurable
🔽	Utilities	Amber	Configurable	Configurable
🔽	Utilities	Amber	Configurable	Configurable
🔽	Utilities	Amber	Configurable	Configurable
🔽	Utilities	Amber	Configurable	Configurable

Keys

With the 4 keys, you can easily modify the current display, select the operating mode, activate manual defrost and switch the controller on/off, as well as browse the menu arranged in folders.



Models and Specifications

Models available

8 models are available: 3 ST500 models with 5 digital inputs, analogue power output (TRIAC) and 4 relays + 3 models ST500 with 5 digital outputs and 5 relays + 2 ST700 models, 1 with 7 digital inputs, analogue power output (TRIAC) and 4 relays and 1 with 7 digital inputs and 5 relays.
All models have Real Time Clock (RTC).

model	part number	Digital Inputs clean contact (DI1...DI5)	Digital outputs (high voltage) (DO1...DO4) (+ DO6)	Analogue output (high voltage) (TC1)	PWM analogue outputs SELV (§) (AO1-AO2)	Analogue outputs SELV (§) (AO3)	Analogue Inputs SELV (§) (AI)	Digital outputs SELV (§) (DO5)
ST542/C	ST54110411300	5	4	1	1	0	4	1
ST543/C	ST54120411300	5	4	1	2	0	4	1
ST544/C	ST54121411300	5	4	1	2	1	4	1
ST551/C	ST55010411300	5	5	0	1	0	4	1
ST552/C	ST55020411300	5	5	0	2	0	4	1
ST553/C	ST55021411300	5	5	0	2	1	4	1
ST744/C	ST74121411400	7	4	1	2	1	4	1
ST753/C	ST75021411400	7	5	0	2	1	4	1

(§) Safe voltage (SELV - SAFETY EXTRA LOW VOLTAGE)

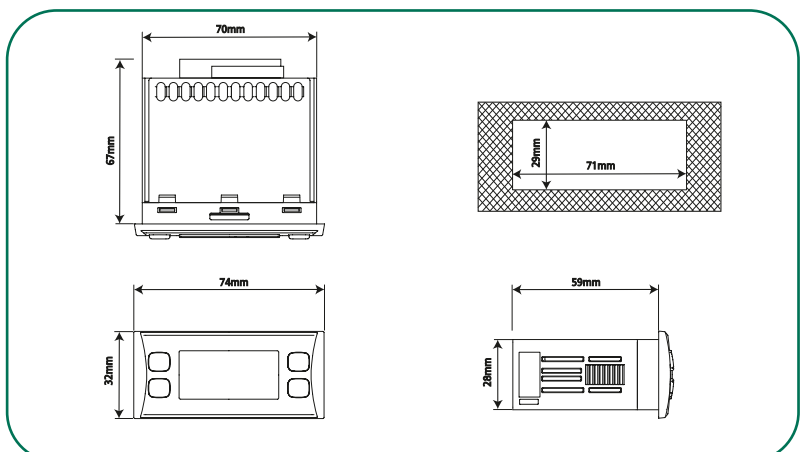
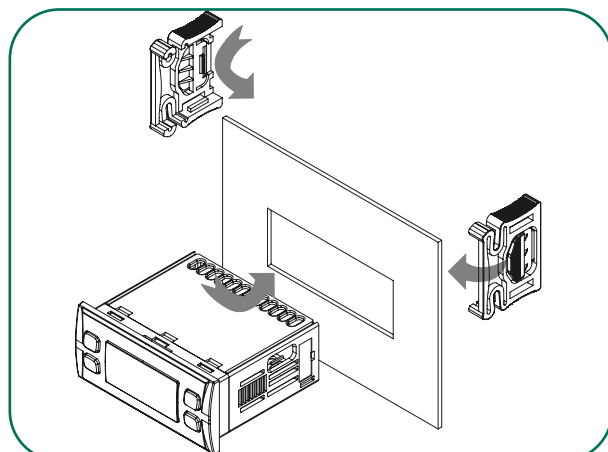
Common features

- Front protection: IP65
- Container: PC+ABS UL94 V-0 resin plastic casing polycarbonate glass, thermoplastic resin keys
- Mounting: panel mounting with 71x29mm +0,2/-0,1mm drilling template;
- Working temperature: -10...60°C;
- Storage temperature: -20...85°C;
- Operating humidity: 10...90%RH;
- Storage humidity: 10...90%RH;
- Power draw: 5VA;
- Power supply: 12V~ 50/60Hz

Circuit Diagram Key

- 12~ Power supply 12V~
 - 5~ Auxiliary 5V~ 20mA max.
 - 12~ Auxiliary 12V~
 - DO1...DO4, DO6 2A 230V~ relay outputs with dangerous voltage
 - N Neutral
 - TC1 TRIAC 2A 230V~ output with dangerous voltage
 - AO1 PWM analogue output with safe voltage (SELV)
 - AO2 PWM analogue output with safe voltage (SELV)
 - AO3 Analogue output with safe voltage (SELV)
0...20mA / 4...20mA / 0...10V
 - DO5 Open Collector output with safe voltage (SELV)
 - DI1...DI7 Digital input with safe voltage (SELV) (°)
 - AI1...AI2 Configurable NTC analogue inputs* / Digital Input
 - AI3...AI4 Configurable NTC analogue inputs / voltage, current** / Digital Input
 - GND Ground
 - KEYB Remote keyboard (KEYBoard)
- *SEMITEC 103AT (10Kohm / 25°C) type
**4...20mA current or 0...5V / 0...10V / 0...1V voltage input or digital input
(°) closing current, ground 0.5mA
SELV - SAFETY EXTRA LOW VOLTAGE

Mechanical Assembly



Features

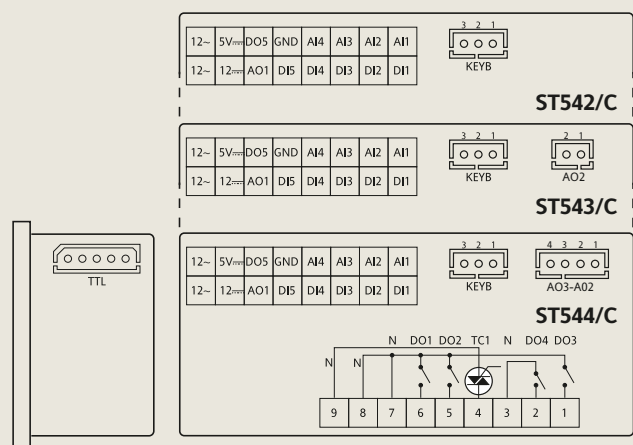
- Dimensions: 74x32x60mm (Lxhxd);
- 5 digital inputs [DI1...DI5]
- 4 2A 230V~ digital outputs with dangerous voltage [DO1, DO2, DO3, DO4]
- 4 analogue inputs [AI1...AI4]
- 1 digital output with safe voltage (SELV) [DO5] Open Collector
- /C RTC
- TTL supplied as standard
- Connection to remote keyboard KEYB

ST 5 DI • 4 DO • 2/3/4 AO /C RTC



Circuit diagrams

ST542/C - ST543/C - ST544/C



ANALOGUE OUTPUTS ACCORDING TO THE MODEL:

ST542/C: 2 analogue outputs:

- 1 analogue outputs with dangerous voltage [TC1] 2A 230V~
- 1 analogue ouput [AO1] PWM/Open Collector

ST543/C: 3 analogue outputs:

- 1 analogue outputs with dangerous voltage [TC1] 2A 230V~
- 2 analogue ouputs [AO1,AO2] PWM/Open Collector

ST544/C: 4 analogue outputs :

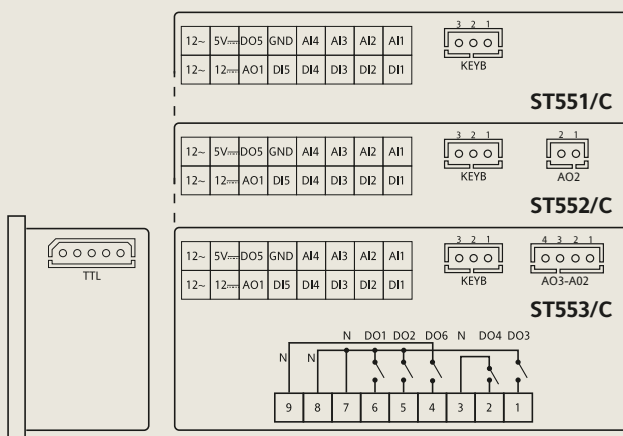
- 1 analogue outputs with dangerous voltage [TC1] 2A 230V~
- 2 analogue ouputs [AO1,AO2] PWM/Open Collector
- 1 analogue output with safe voltage [AO3]

ST 5 DI • 5 DO • 1/2/3 AO /C RTC

Features



Circuit diagrams ST551/C - ST552/C - ST553/C



- Dimensions: 74x32x60mm (Lxhxd);
- 5 digital inputs [DI1...DI5]
- 5 2A 230V~ digital outputs with dangerous voltage [DO1, DO2, DO3, DO4, DO6]
- 4 analogue inputs [AI1...AI4]
- 1 digital output with safe voltage (SELV) [DO5] Open Collector
- /C RTC
- TTL supplied as standard
- Connection to remote keyboard KEYB

ANALOGUE OUTPUTS ACCORDING TO THE MODEL:

ST551/C: 1 analogue output:

- 1 analogue ouput [AO1] PWM/Open Collector

ST552/C: 2 analogue outputs:

- 2 analogue ouputs [AO1] PWM/Open Collector

ST553/C: 3 analogue outputs:

- 2 analogue ouputs [AO1] PWM/Open Collector
- 1 analogue output with safe voltage [AO3]

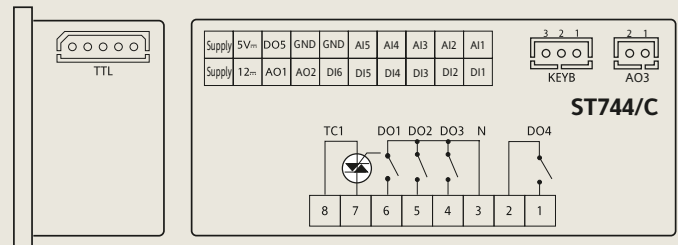
Features

ST 7 DI • 4 DO • 4 AO /C RTC

- Dimensions: 74x32x76mm (Lxhxp);
- 7 digital inputs [DI1...DI7]
- 4 2A 230V~ digital outputs with dangerous voltage [DO1, DO2, DO3, DO4]
- 4 analogue inputs [AI1...AI4]
- 1 digital output with safe voltage (SELV) [DO5] Open Collector
- **4 analogue outputs:**
 - 1 analogue outputs with dangerous voltage [TC1] 2A 230V~
 - 2 analogue outputs [AO1,AO2] PWM/Open Collector
 - 1 analogue output with safe voltage [AO3]
- /C RTC
- TTL supplied as standard
- Connection to remote keyboard KEYB



Circuit diagram ST744/C

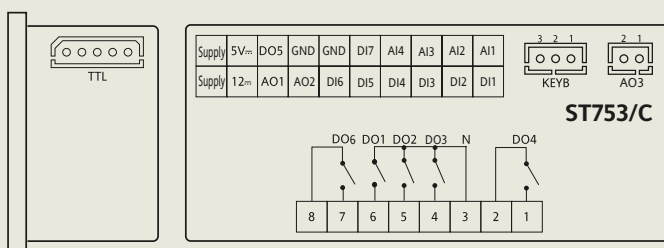


ST 7 DI • 5 DO • 3 AO /C RTC

Features



Circuit diagram ST753/C



- Dimensions: 74x32x76mm (Lxhxp);
- 7 digital inputs [DI1...DI7]
- 5 2A 230V~ digital outputs with dangerous voltage [DO1, DO2, DO3, DO4, DO6]
- 4 analogue inputs [AI1...AI4]
- 1 digital output with safe voltage (SELV) [DO5] Open Collector
- **3 analogue outputs:**
 - 2 analogue outputs [AO1,AO2] PWM/Open Collector
 - 1 analogue output with safe voltage [AO3]
- /C RTC
- TTL supplied as standard
- Connection to remote keyboard KEYB

	Description	Part Number	ST500	ST700
Transformers				
	• 230/12V - 5VA (protected)	TF411200	X	X
Temperature probes				
	• Probe NTC 103AT, 1,5m (plastic cap, 2 wire cable); • Probe NTC 5x20, 1,5m TPE IP68; • Probe NTC 6x40, 1,5m TPE STEEL IP68; • Probe NTC 6x50, 1,5m TPE STEEL IP68; - Other items available	SN691150 SN8T6H1502 SN8T6A1502 SN8T6N1502 Contact Sales Department	X X X X	X X X X
Pressure transducers	- Ratiometric Sensors			
	• EWPA030, Pressure transducer 4..20mA/0..30bar; • EWPA007, Pressure transducer 4..20mA/-0.5..7bar; • EWPA030 R, Ratiometric sensor 0...5V/0..30bar; • EWPA050 R, Ratiometric sensor 0...5V/0..50bar;	Connection male female TD200130 TD200030 TD200107 TD300008 ... TD400030 ... TD400050 Other items available Contact Sales Department	X X X X	X X X X
Pressure switches				
	• HR range (automatic reset) - minimum 100,000 ON/OFF cycles • HL range (manual reset) - minimum 6,000 ON/OFF cycles • HC range (automatic reset) - minimum 250,000 ON/OFF cycles	Various codes available Contact Sales Department	X X X	X X X
Fan modules				
	• CFS: single phase speed regulators for currents from 2A to 9A • CFS05 TANDEM: TRIAC 5A+5A/230V~ • DRV 300: 3 phase 12Ö20A/420V~ (IP22 or IP55)	Various codes available Contact Sales Department	X X X	X X X
Expansion				
	• EXP211: 230V 10A expansion module with base - mounted on DIN rail	MW320100	X	X
Multi-Function Key				
	• Smart key to up/download parameters	CC0500A00M000	X	X
Cables				
	• Connection cable for signal line (low voltage I/O) • Connection cable for high voltage outputs • Connection cable for analogue output • Connection cable for analogue outputs	COLV000000100 COHV000000100 COLV000022100 COLV000042100	X X X X	X
	• Connection cable for signal line (low voltage I/O) • Connection cable for remote keyboard ST SKW	COLV0000E0100 COLV000033200	X X	X X
Interface modules				
	• PCInterface USB • PCInterface RS232	PCI6A3000000 PCI5A3000000	X X	X X
Connectivity				
	• BusAdapter130 TTL-RS485 • BusAdapter150 TTL-RS485 • RadioAdapter TTL/WIRELESS 802.15.4	BA11250N3700 BA10000R3700 Various codes available Contact Sales Department	X X X	X X X
Software Tools				
	• VarManager kit • Firmware Uploader Kit • ParamManager • WebAdapter	STSVAR00000 STSWKFWU00000 SLP05XX000100 WA0ET00X700	X X X X	X X X X



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