eliwell
by Schneider Electric

Product catalogue

Temperature control and Automation

Rel. 09/14

Product catalogue

Temperature control and Automation

KEY

EO (Environmentally Optimised)
EO (Environmentally Optimised) refers to the new solutions created by Eliwell designers that are highly efficient, eco-system compliant and designed to deliver the clear environmental benefits for users. Devices are developed with new energy saving algorithms that can guarantee immediate, measurable economic returns. Compatible with the new ecological refrigerants R290 and R600, the products have been designed to guarantee lower operating and maintenance costs and have an active packaging recycling program. Design efforts have also enabled us to simplify installation, maintenance and operational use of Eliwell EO products.

MODBUS-RTU
ModBus is a serial communication protocol that allows communication between different devices connected to the same network. ModBus is often used to connect a supervisor computer to a remote terminal unit (RTU) in monitoring control and data acquisition systems.

RS-485
This is the standard that describes the communication interface for serial connection between a network of devices and the computer. The network, normally with 3 wires, makes it possible to cover much longer distances than the RS232 standard. The protocol used for the communication can either be Eliwell, i.e. created according to Eliwell specifications, or ModBus.

COPY CARD
The Copy Card is an accessory that connects to a TTL type serial port and allows the rapid programming of instrument parameters.

TELEVISSYSTEM
Televis**System** is a remote management and monitoring system for industrial and commercial systems, such as supermarkets and hypermarkets. Data can either be printed or extracted and downloaded in a format which is compatible with the most commonly used office automation software. The monitoring system can be accessed remotely via a web browser, using any PC or handheld device connected to the network.

TEMPERATURE PROBES
Thanks to the different materials used in the different models, the temperature probes are capable of covering a very wide temperature range; the sensors used are PTC, NTC, thermocouple, Pt100 and Pt1000. Depending on the kind of sensor, the protective casing (usually cylindrical) can be made of either ABS, Aisi 304/316 stainless steel or Inconel. For additional sensor protection, special materials are used (e.g. resins) between sensor and casing. The cable that transmits the signal to the instrument is made of either PVC, Silicone or Vetrotex and is available in different lengths. The range of use depends on the materials used, as well as on the type of sensor.

KEY

HUMIDITY PROBES
The EWHS series of probes are specially made for connection to humidity measurement instruments. EWHS 280 and EWHS 300 probes have one current output (4...20 mA) proportional to the relative humidity. EWHS 310 probes have two current outputs (0...20 mA), one for humidity and one for temperature.

PRESSURE PROBES
The EWPA series of probes are pressure reading devices that have one 4...20 mA current output for transferring the signal to the measuring instrument. The EWPA 007 probes have an operating range up to 7 bar, whereas the EWPA 030 probes operate up to 30 bar.

PID
The PID function is an alternative to the on-off control for use in situations requiring greater precision and reduced oscillations with regard to the setpoint, in both 'hot' and 'cold' applications. Controllers with the PID function have a further option known as Autotuning, which automatically calculates the parameters necessary for better process control.

SWITCHING POWER SUPPLY
The switching power supply, that switches from either 100...240 V~ or from 12...24 V~/12...36 V~ offers the installer the option of covering most applications, thus reducing the number of models that would be necessary if a transformer-type power supply was used.

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ELECTRONIC CONTROLS

Eliwell supplies products and solutions that are distinguished by high quality and reliability, the fruit of more than 25 years of experience and of collaboration with the leading manufacturers of appliances that need temperature, humidity and pressure regulators.

The vast range of formats that Eliwell has developed always enables the most suitable solution to be found for any specific application requirements.

Eliwell products are characterised by:

- Reliability
- Simplicity
- Energy saving
- Minimum environmental impact

ICPlus 902

32x74 cold/hot thermostats

Codes	Description	Probe	Power supply
ICP11D0750000	ICPlus 902 NTC-PTC 230V	NTC-PTC	230V~
ICP11D0450000	ICPlus 902 NTC-PTC 12/24V~/⎓	NTC-PTC	12...24V~

Applications

ICPlus 902 controllers are one-step electronic devices, used for the control of temperature. They are compatible with Televis**System** and with ModBus protocol monitoring systems.

Common features

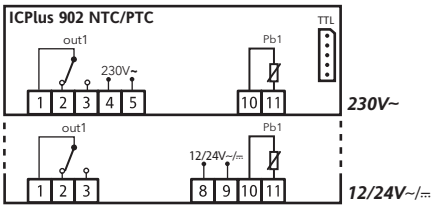
Container	PC+ABS UL94 V-0 plastic resin casing, polycarbonate window, thermoplastic resin keys	**Operating temperature**	-5...55°C
Dimensions	front panel 74x32 mm, depth 59 mm	**Storage temperature**	-30...85°C
Installation	panel mounting with 71x29 mm (+0.2/–0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

Technical data

	ICPlus 902 NTC/PTC
Display range:	• NTC probe: -50.0...110.0°C • PTC probe: -50.0...140.0°C
Display:	no decimal point * 3 and a half digits + sign
Analogue inputs:	1 PTC or NTC *
Digital inputs:	not available
Connections:	TTL port for connection to USB Unicard, TelevisSystem and systems with ModBus protocol
Digital outputs:	1 SPDT 8(4)A 250V~
Measurement range:	from -50 to 140
Accuracy:	better than 0.5% of end of scale+1 digit
Resolution:	0.1 or 1°C
Power consumption:	• 3W for 12…24V~ model • 3W for 230V~ model
Power supply:	• 12V~/12..24V~/24V~ ±10% 50/60Hz • 110...115V~/220...230V~±10% 50/60Hz

* (selectable by parameter).

Wiring diagrams



ICPlus 915

32x74 cold/hot thermostats

Codes	Description	Probe	Power supply
ICP22JI750000	ICPlus 915 J/K PT100 230V	J/K PT100	230V~
ICP22JI450000	ICPlus 915 J/K PT100 12/24V~/⎓	J/K PT100	12...24V~
ICP22DI750000	ICPlus 915 NTC-PTC 230V	NTC-PTC	230V~
ICP22DI450000	ICPlus 915 NTC-PTC 12/24V~/⎓	NTC-PTC	12...24V~
ICP22I0750000	ICPlus 915 V/I 230V	V/I	230V~
ICP22I0450000	ICPlus 915 V/I 12/24V~/⎓	V/I	12...24V~

Applications

ICPlus 915 controllers are two-step electronic devices, either dependent or independent or with neutral zone, used for the control of temperature, relative humidity and pressure. They are compatible with TelevisSystem and with Modbus protocol monitoring systems.

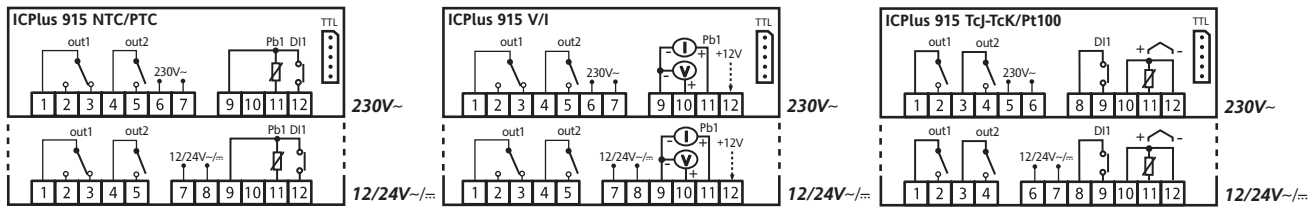
Common features

Container	PC+ABS UL94 V-0 plastic resin casing, polycarbonate window, thermoplastic resin keys	**Operating temperature**	-5...55°C
Dimensions	front panel 74x32 mm, depth 59 mm	**Storage temperature**	-30...85°C
Installation	panel mounting with 71x29 mm (+0.2/-0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

Technical data	ICPlus 915 NTC/PTC	ICPlus 915 V/I	ICPlus 915 TC/Pt100
Display range:	• NTC probe: -50.0...110.0°C • PTC probe: -50.0...140.0°C	• -199...199 * • -199.9...199.9 * • -1999...1999 *	• Pt100 probe: -150...650°C • TcJ probe: -40...750°C • TcK probe: -40...1350°C
Display:	no decimal point * 3 and a half digits + sign	no decimal point * 3 and a half digits + sign	no decimal point * 3 and a half digits + sign
Analogue inputs:	1 PTC or NTC *	1 V-I (0...1V,0...5V,0...10V,0...20mA,4...20mA)*	1 Pt100 or 1 TcJ/TcK
Digital inputs:	1 clean contact at extra low safety voltage	not available	1 clean contact at extra low safety voltage
Connections:	TTL port for connection to USB Unicard, Televis**System** and systems with ModBus protocol	TTL port for connection to USB Unicard, Televis**System** and systems with ModBus protocol	TTL port for connection to USB Unicard, TelevisSystem and systems with ModBus protocol
Digital outputs:	1 SPDT 8(4)A 250V~ + 1 SPST 8(4)A 250V~	1 SPDT 8(4)A 250V~ + 1 SPST 8(4)A 250V~	1 SPST 8(4)A 250V~ + 1 SPST 8(4)A 250V~
Measurement range:	from -50 to 140	from -999 to 1000	from -150 to 1350
Accuracy:	better than 0.5% of end of scale+1 digit	better than 0.5% of end of scale+1 digit	Pt100: 0.5% for whole scale + 1 digit, 0.2% from -150 to 300°C TcJ: 0.4% for whole scale + 1 digit TcK: 0.5% for whole scale + 1 digit, 0.3% from -40 to 800°C
Resolution:	0.1 or 1°C	0.1 or 1°C	Pt100: 0.1°C (0.1°F) up to199.9°C, 1°C (1°F) over TcJ: 0.1°C (0.1°F) up to 199.9°C (1°F) over TcK: 0.1°C (0.1°F)
Power consumption:	• 3W for 12...24V~ model • 3W for 230V~ model	• 3W for 12...24V~ model • 3W for 230V~ model	• 3W for 12...24V~ model • 3W for 230V~ model
Power supply:	• 12V~/12...24V~/24V~ ±10% 50/60Hz • 115V~/230V~ ±10% 50/60Hz	• 12V~/12...24V~/24V~ ±10% 50/60Hz • 115V~/230V~ ±10% 50/60Hz	• 12V~/12...24V~/24V~ ±10% 50/60Hz • 115V~/230V~ ±10% 50/60Hz

* (selectable by parameter).

Wiring diagrams



IC 917/PID (SSR)

PID 32x74 cold/hot thermostats

Codes	Description	Probe*	Power supply
IC12DI0TMD700	IC 917/PID	NTC/PTC	230V~
IC12ZI0TMD700	IC 917/PID	TC/Pt100	230V~
IC1RDI0TMD700	IC 917/PID SSR	NTC/PTC	230V~
IC1RZI0TMD700	IC 917/PID SSR	TC/Pt100	230V~
IC1TZI0TMD700	IC 917/PID SSR/RELÈ	TC/Pt100	230V~

* probe not included

Applications

IC 917/PID controllers are electronic two-step devices, either dependent or independent, with ON/OFF action, PD, PID, Soft Start function and Autotuning.

Common features

Container	PC+ABS UL94 V-0 plastic resin casing, polycarbonate display window, thermoplastic resin buttons	**Operating temperature**	-5...55°C
Dimensions	front panel 74x32 mm, depth 59 mm	**Storage Temperature**	-30...85°C
Installation	panel mounting with 71x29 mm (+0.2/-0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)
		Soft Start Function	present

Technical data

Technical data	IC 917/PID NTC/PTC (SSR)	IC 917/PID TC/Pt100 (SSR)
Display range:	• NTC probe: -50.0...110.0°C • PTC probe: -55.0...140.0°C	• Pt100 probe: -150...650°C • TcJ probe: -40...750°C • TcK probe: -40...1350°C
Display:	3 and a half digits + sign	3 and a half digits + sign
Analogue inputs:	1 PTC or NTC *	1 Pt100 or 1 TcJ/TcK*
Digital inputs:	1 clean contact at extra low safety voltage	1 clean contact at extra low safety voltage
Connections:	TTL port for connection to Copy Card	TTL port for connection to Copy Card
Digital outputs:	1 SPDT 8(3)A 1/2hp 250 V~ • 1 SPST 8(3)A 1/2hp 250 V~ **SSR models: please see wiring diagram**	2 SPST 8(3)A 1/2hp 250 V~ **SSR models: please see wiring diagram**
Measurement range:	from -55 to 140°C	from -150 to 1350°C
Accuracy:	better than 0.5% of end of scale+1 digit	Pt100: 0.5% for whole scale + 1 digit, 0.2% from -150 to 300°C TcJ: 0.4% for whole scale + 1 digit TcK: 0.5% for whole scale + 1 digit, 0.3% from -40 to 800°C
Resolution:	0.1°C (0.1°F) up to 199.9°C, 1°C (1°F) over	Pt100: 0.1°C (0.1°F) up to 199.9°C, 1°C (1°F) over TcJ: 0.1°C (0.1°F) up to 199.9°C, (1°F) over TcK: 0.1°C (0.1°F)
Power consumption:	• 1.5W for 12 V~ model • 3W for 230 V~ model	• 1.5W for 12 V~ model • 3W for 230 V~ model
Power supply:	• 12 V~/⎓ ±10% 50/60 Hz • 230 V~ ±10% 50/60 Hz	• 12 V~/⎓ ±10% 50/60 Hz • 230 V~ ±10% 50/60 Hz
Alarm:	optional	optional

*(selectable by parameter)

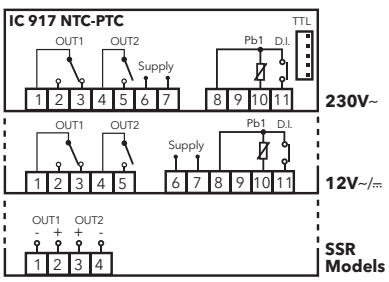
Wiring diagrams

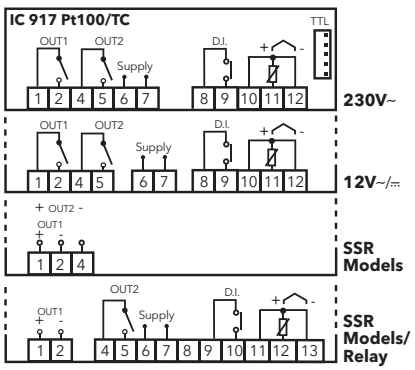
SSR Outputs

Version HV 230V~
1 SSR (500Ω) V_{OUT}= 11.3 V; I_{OUT}= 22.6 mA
(3kΩ) V_{OUT}= 16.2 V; I_{OUT}= 5.4 mA
2 SSR (2x500Ω) V_{OUT}= 10.6 V; I_{OUT}= 21.2 mA
(2x3kΩ) V_{OUT}= 15.8 V; I_{OUT}= 5.3 mA

Version LV 12V⎓
1 or 2 SSR (500Ω) V_{OUT}= 7.7 V; I_{OUT}= 15.4 mA
1 or 2 SSR (3kΩ) V_{OUT}= 9.9 V; I_{OUT}= 3.3 mA

Version LV 12V~
1 or 2 SSR (500Ω) V_{OUT}= 10.7 V; I_{OUT}= 21.4 mA
1 or 2 SSR (3kΩ) V_{OUT}= 13.9 V; I_{OUT}= 4.6 mA





EM300 LX

Temperature, humidity, pressure indicators

Codes	Description	Probe	Power supply
TM10D00X0D700	EM300 LX	NTC	230V~
TM10Z00X0M700	EM300 LX	PT100/TC	230V~
TM10I00X0M700	EM300 LX I	4...20mA	230V~
TM10Z00X0M400	EM300 LX	PT100/TC	12...24V~/12...36V⎓
TM10D00X0D300	EM300 LX	NTC	12V~
TM10I00X0M300	EM300 LX I	4...20mA	12V~

Applications

The EM300 LX is a device for measuring temperature, humidity and pressure in commercial refrigeration and industrial applications.

Common features

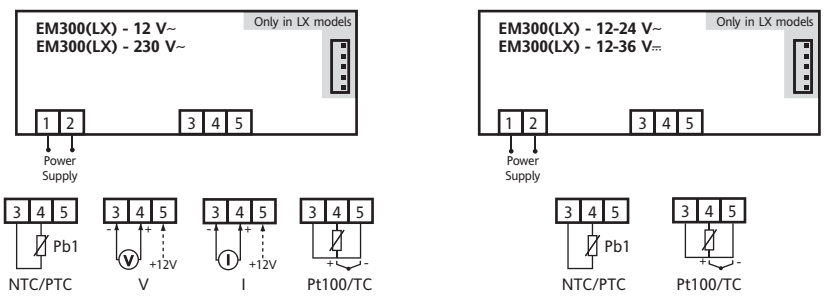
Container	PC+ABS UL94 V-0 plastic resin casing, polycarbonate display window, thermoplastic resin buttons	**Operating temperature**	-5...55°C
Dimensions	front panel 32x74 mm, depth 30 mm (no terminals); 'switching' models: depth 59 mm	**Storage temperature**	-30...85°C
Installation	panel mounting with 71x29 mm (+0.2/-0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

Technical data

Technical data	EM300 LX PTC/NTC	EM300 LX V/I	EM300 LX Pt100/TCJ/TCK
Display range:	• NTC probe: -50.0... 110.0°C • PTC probe: -55.0... 140.0°C	• -99... 100 * • -99.9... 100.0 * • 999... 1000 *	• Pt100 probe: -200...800°C • TCJ probe: -40...760°C • TCK probe: -40...1350°C
Display:	no decimal point * 3 and a half digits + sign	no decimal point * 3 and a half digits + sign	no decimal point * 3 and a half digits + sign
Analogue inputs:	1 NTC or PTC *	1 voltage input (0-1 V, 0-5 V, 0-10 V) 1 current input (0-20 mA, 4-20 mA)	
Measurement range:	from -55 to 140°C	from -999 to 1000	
Accuracy:	better than 0.5% of end of scale + 1 digit	better than 0.5% of end of scale + 1 digit	Pt100: 0.5% / 0.2% from -150 a 300°C TCJ: 0.4% TCK: 0.5% / 0.3% from -40 a 800°C Pt100: 0.1°C up to 199.9, 1°C
Resolution:	1 or 0.1°C	1 or 0.1°C	TCJ and TCK: 1°C • 230 V~ model: 1.8 W max
Power consumption:	• 230 V~ model: 1.8 W max • 12 V~model: 0.5 W max • 12...24 V~model: 3 W max	• 230 V~ model: 1.8 W max • 12 V~model: 0.5 W max	• 12 V~model: 0.5 W max • 12...24 V~model: 3 W max • 230 V~ ±10% 50/60 Hz
Power supply:	• 230 V~ ±10% 50/60 Hz • 12 V~ ±10% 50/60 Hz • 12...24 V~/⎓ ±10% 50/60 Hz	• 230 V~ ±10% 50/60 Hz • 12 V~/⎓ ±10% 50/60 Hz	• 12 V~ ±10% 50/60 Hz • 12...24V~/12...36V⎓ ±10% 50/60Hz
Connections:	TTL port for connection to Copy Card and Televis**System**	TTL port for connection to Copy Card and Televis**System** **	TTL port for connection to Copy Card and Televis**System** **

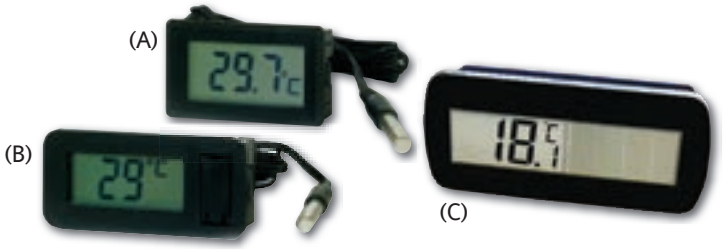
* (selectable by parameter). ** use BusAdapter350

Wiring diagrams



EWTL 300 - EWTL 310 - DST-30

LCD thermometers



Codes		Description	Probe cable length
T1M1BT0100	(A)	EWTL 300	1,5m
T1M1BT0101	(B)	EWTL 310	1,5m
T1M1BT0105	(C)	DTS-30	1m

Applications

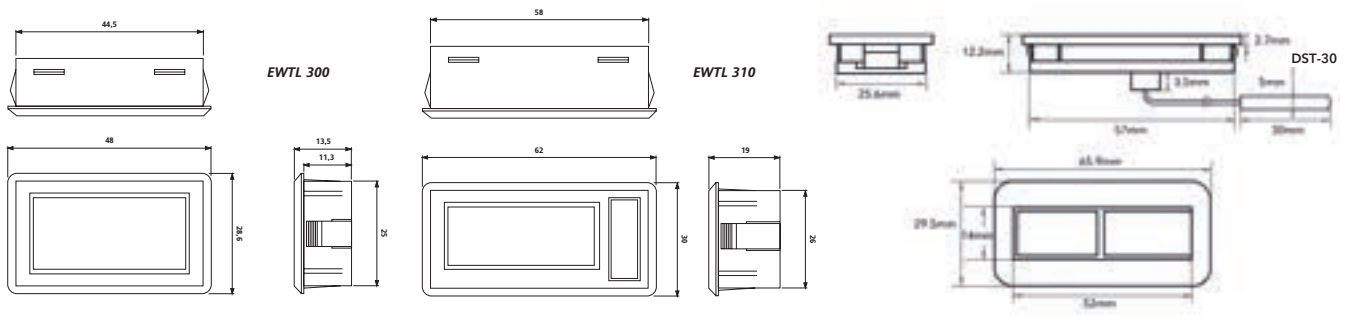
The EWTL 300/310 is a range of LCD digital temperature gauges with temperature probes connected to the instrument via a cable of length 1.5, 2 or 3 metres.
DST-30 is a solar-cell thermometer specifically designed for refrigerated counters and display units.

Common features

Installation	panel-mounted

Technical data	EWTL 300	EWTL 310	DST-30
Display:	LCD with 2 and 1/2 digits	LCD with 2 and 1/2 digits	24x14 mm LCD
Resolution:	1 or 0.1°C	1 or 0.1°C	0.1°C
Accuracy:	±1°C from 0 to 40°C	better than 0.5% of end of scale	±1°C
Probe:	connected to instrument, cable length 1.5 m	connected to instrument, cable length 0.5 m, 1 m, 2 m or 3 m	connected to instrument, cable length 1 m
Updating display:	10 seconds	12 seconds	
Display range:	-20...70°C	-20...70°C	-20...80°C
Dimensions:	front panel 48x28.6 mm depth 13.5 mm	front panel 62x30 mm depth 19 mm	front panel 66x30 mm depth 11.6 mm
Power supply:	one 1.5 V LR 44 battery or equivalent - duration 12 months	one 1.5 V LR 44 battery or equivalent - duration 12 months	integrated solar cells
Enclosure rating:			IP68

Dimensions



EWTS 950 LX - EWTS 990 LX

32x74 timers and counters

Codes	Description	Power supply
ET010I0XTT700	EWTS 950 LX	230 V~
ET020I0XTT700	EWTS 990 LX	230 V~

Applications

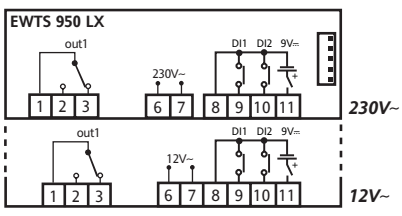
The Eliwell series of digital timers are the ideal measuring solution for use in commercial refrigeration and light industry. The range, which consists of 2 different models, can be used in all applications requiring precision control of processing stages and the management of functions linked to preset time intervals.

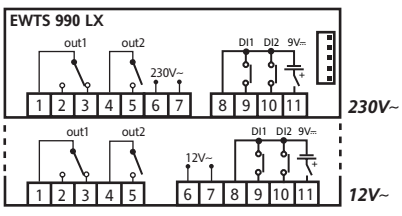
Common features

Container	PC+ABS UL94 V-0 plastic resin casing, polycarbonate display window, thermoplastic resin buttons	**Operating temperature**	-5...55°C
Dimensions	front panel 32x74 mm, depth 59 mm	**Storage Temperature**	-30...85°C
Installation	panel mounting with 71x29 mm (+0.2/–0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

Technical data	EWTS 950 LX	EWTS 990 LX
Display range:	9999 hours / 99 hours and 59 minutes / 99 minutes and 59 seconds / 99 seconds and 99 hundredths of a second	9999 hours / 99 hours and 59 minutes / 99 minutes and 59 seconds / 99 seconds and 99 hundredths of a second
Display:	no decimal point * 4 digits + sign	no decimal point * 4 digits + sign
Digital inputs:	2 clean contacts at extra low safety voltage	2 clean contacts at extra low safety voltage
Connections:	TTL port for connection to Copy Card and Televis**System**	TTL port for connection to Copy Card and Televis**System**
Digital outputs:	1 SPDT 8(3)A 1/2hp 250 V~	1 SPDT 8(3)A 1/2hp 250 V~ 1 SPST 8(3)A 1/2hp 250 V~
Accuracy:	3.6 sec/h	3.6 sec/h
Power consumption:	3 VA max	3 VA max
Power supply:	12 V~/⎓ or 230 V~ ±10% 50/60 Hz	12 V~/⎓ or 230 V~ ±10% 50/60 Hz
External battery:	• power supply 9 V⎓ • battery duration: based on model, with 9 V⎓/10 mA/h battery duration 1h • instrument absorption with power supply from 10 mA battery	• power supply 9 V⎓ • battery duration: based on model, with 9 V⎓/10 mA/h battery duration 1h • instrument absorption with power supply from 10 mA battery

Wiring diagrams





DR4020

Universal DIN controllers

Codes	Description	Probe*	Power supply
E4D12E00BH710	DR4020	Pt100	100...240V~
E4D12A00BD710	DR4020	TCJ	100...240V~
E4D12I00BN710	DR4020	4...20mA	100...240V~
E4D12N00BH710	DR4020	NTC	100...240V~
E4D12V00BN710	DR4020	0...5V	100...240V~
E4D12E00BH410	DR4020	Pt100	12...24V~/⎓
E4D12A00BD410	DR4020	TCJ	12...24V~/⎓
E4D12I00BN410	DR4020	4...20mA	12...24V~/⎓
E4D12N00BH410	DR4020	NTC	12...24V~/⎓
E4D12V00BN410	DR4020	0...5V	12...24V~/⎓

* probe not included

Applications

The new Eliwell thermoregulators in the Universal Controller series are ideal for all industrial applications requiring high precision temperature control.

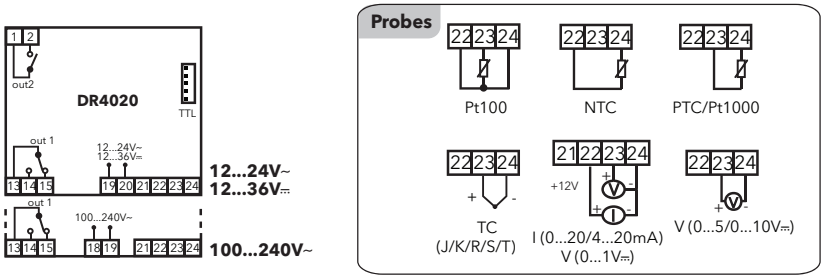
Common features

Container	plastic casing with 4 DIN modules	**Operating temperature**	-5...55°C
Dimensions	front panel 70x85 mm, depth 61 mm	**Storage Temperature**	-20...85°C
Installation	on DIN rail (Omega) or panel mounting, with 70x45 mm (+0.2/-0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

Technical data	DR4020
Display:	no decimal point * 2 4-digit displays + sign
Analogue inputs:	1 input* (see Probes table)
Digital inputs:	not available
Connections:	TTL port for connection to Copy Card and Unicard
Digital outputs:	1 SPDT 8(3)A 250 V~ 1 SPST 8(3)A 250 V~
Analogue output:	not available
Measurement range:	according to probe used
Accuracy:	according to probe used
Resolution:	according to probe used
Power consumption:	4W max
Power supply:	• 12...24 V~/12...36 V⎓ ±10% 50/60 Hz • 100...240 V~ ±10% 50/60 Hz

*(selectable by parameter)

Wiring diagrams



DR4022

Universal DIN controllers with serial port

Codes	Description	Probe*	Power supply
E4D12EASBH710	DR4022	Pt100	100...240V~
E4D12NASBH710	DR4022	NTC	100...240V~
E4D12AASBD710	DR4022	TCJ	100...240V~
E4D12IASBN710	DR4022	4/20ma	100...240V~
E4D12VASBN410	DR4022	0...5V	12...24V~/⎓

* probe not included

Applications

The new Eliwell thermoregulators in the Universal Controller series are ideal for all industrial applications requiring high precision temperature control.

Common features

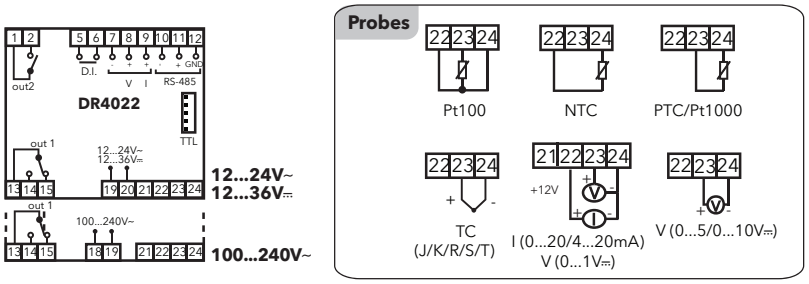
Container	plastic casing with 4 DIN modules	**Operating temperature**	-5...55°C
Dimensions	front panel 70x85 mm, depth 61 mm	**Storage Temperature**	-20...85°C
Installation	on DIN rail (Omega) or panel mounting, with 70x45 mm (+0.2/-0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

Technical data

Technical data	DR4022
Display:	no decimal point * 2 4-digit displays + sign
Analogue inputs:	1 input* (see Probes table)
Digital inputs:	1 clean contact at extra low safety voltage
Connections:	TTL port and internal RS-485 for connection to Copy Card, Unicard, Televis**System** and ModBus protocol systems
Digital outputs:	1 SPDT 8(3)A 250 V~ 1 SPST 8(3)A 250 V~
Analogue output:	V-I: 0...1 V, 0...5 V, 0...10 V / 0...20 mA, 4...20 mA
Measurement range:	according to probe used
Accuracy:	according to probe used
Resolution:	according to probe used
Power consumption:	4W max
Power supply:	• 12...24 V~/12...36 V⎓ ±10% 50/60 Hz
	• 100...240 V~ ±10% 50/60 Hz

*(selectable by parameter)

Wiring diagrams



EW 4820 (SSR)

Universal 48x48 controllers

Codes	Description	Probe*	Power supply
E481BI0XBH700	EW4820	4...20mA	100...240V~
E481SI0XBN700	EW4820 SSR Output	4...20mA	100...240V~
E481BP0PMH700	EW4820	Pt100	100...240V~
E481SP0PMH700	EW4820 SSR Output	Pt100	100...240V~
E481BP0PMH400	EW4820	Pt100	12...24V~/⎓
E481SP0PMH400	EW4820 SSR Output	Pt100	12...24V~/⎓

*probe not included

Applications

The Eliwell thermoregulators in the Universal Controller series are ideal for all industrial applications requiring high precision temperature control, ranging from the moulding of plastic materials and packaging, to raw material transformation process control.

Common features

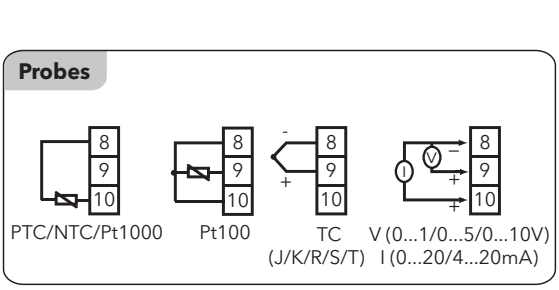
Container	PC+ABS UL94 V-0 resin plastic casing, switch keys with adhesive polycarbonate film	**Operating temperature**	-5...55°C
Dimensions	front panel 48x48 mm, depth 113 mm	**Storage Temperature**	-20...85°C
Installation	panel-mounting, with 45x45 mm (+0.2/-0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

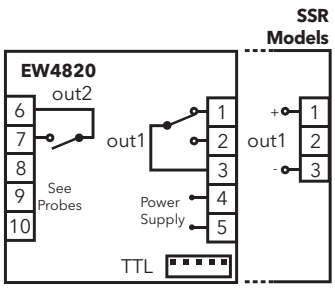
Technical data

Technical data	EW 4820 (SSR)
Display:	no decimal point * 2 4-digit displays + sign
Analogue inputs:	1 input* (see Probes table)
Digital inputs:	not available
Connections:	TTL port for connection to Copy Card or Televis**System**
Digital outputs:	1 SPDT 3A 250 V~ 1 SPST 2A 250 V~
Digital outputs - SSR models:	**Vout = 0...12 V⎓ / Imax = 0...15 mA / Vmin = 7.5 V 1 SPST 2A 250 V~**
Analogue output:	not available
Measurement range:	according to probe used
Accuracy:	according to probe used
Resolution:	according to probe used
Power consumption:	• 2.45W 12...24 V~/12...36 V⎓ model • 2.40W for 100...240 V~model
Power supply:	• 12...24 V~/12...36 V⎓ ±10% 50/60 Hz • 100...240 V~ ±10% 50/60 Hz

*(selectable by parameter)

Wiring diagrams





EW4822 (SSR)

Universal 48x48 controllers with serial port

Codici	Descr.	Sonda*	Alim.	
E481BIISBH700	EW4822 AO 4...20mA		4...20mA	100...240V~
E481BPIQMH700	EW4822 AO 0...20mA		Pt100	100...240V~
E481BPVQMH700	EW4822 AO 0/10V		Pt100	100...240V~
E481SPIQMH700	EW4822 AO 0...20mA SSR Output		Pt100	100...240V~
E481BPIQMH400	EW4822 AO 0...20mA		Pt100	12...24V~/⎓
E481SPIQMH400	EW4822 AO 0...20mA SSR Output		Pt100	12...24V~/⎓

*probe not included

Applications

The Eliwell thermoregulators in the Universal Controller series are ideal for all industrial applications requiring high precision temperature control.

Common features

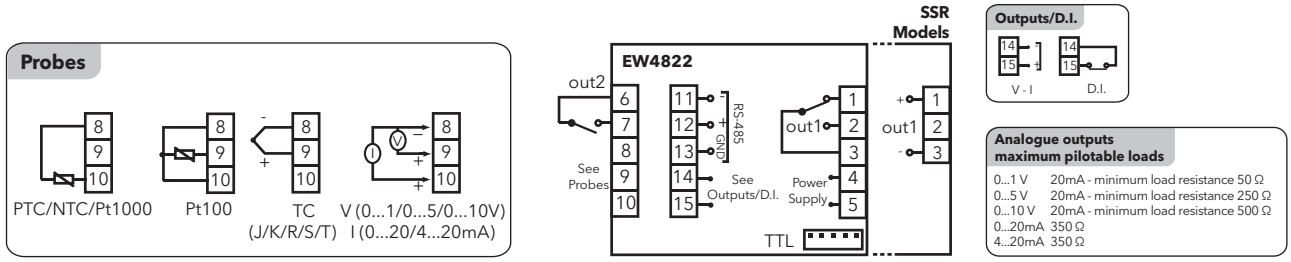
Container	PC+ABS UL94 V-0 resin plastic casing, switch keys with adhesive polycarbonate film	**Operating temperature**	-5...55°C
Dimensions	front panel 48x48 mm, depth 113 mm	**Storage Temperature**	-20...85°C
Installation	panel-mounting, with 45x45 mm (+0.2/-0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

Technical data

Technical data	EW4822 (SSR)
Display:	no decimal point * 2 4-digit displays + sign
Analogue inputs:	1 input* (see Probes table)
Digital inputs:	1 clean contact at extra low safety voltage
Connections:	TTL port for connection to Copy Card or Televis**System** + internal RS-485 for connection to systems with ModBus protocol
Digital outputs:	1 SPDT 3A 250 V~ 1 SPST 2A 250 V~
Digital outputs - SSR models:	**Vout = 0...12 V⎓ / Imax = 0...15 mA / Vmin = 7.5 V 1 SPST 2A 250 V~**
Analogue output:	V: 0...1 V, 0...5 V, 0...10 V or I: 0...20 mA, 4...20 mA maximum pilotable loads: please see wiring diagrams
Measurement range:	according to probe used
Accuracy:	according to probe used
Resolution:	according to probe used
Power consumption:	• 2.80W for 12...24 V~/12...36 V⎓ model • 2.60W for 100...240 V~model
Power supply:	• 12...24 V~/12...36 V⎓ ±10% 50/60 Hz • 100...240 V~ ±10% 50/60 Hz

*(selectable by parameter)

Wiring diagrams



EW7210 - EW7220

Universal 72x72 controllers

Codes	Description	Probe*	Power supply
E7211A0XHD700	EW7210	TC	100...240V~
E7211E0XHD700	EW7210	Pt100	100...240V~
E7211N0XHD700	EW7210	NTC	100...240V~
E7211A0XHD400	EW7210	TC	12...24V~/=
E7211E0XHD400	EW7210	Pt100	12...24V~/=
E7211N0XHD400	EW7210	NTC	12...24V~/=
E7212E0XBH700	EW7220	Pt100	100...240V~
E7212A0XBD700	EW7220	TC	100...240V~
E7212I0XBH700	EW7220	V/I	100...240V~
E7212N0XBD700	EW7220	NTC/PTC/Pt1000	100...240V~
E7212E0XBH400	EW7220	Pt100	12...24V~/⎓
E7212A0XBD400	EW7220	TC	12...24V~/⎓
E7212I0XBH400	EW7220	V/I	12...24V~/⎓
E7212N0XBD400	EW7220	NTC/PTC/Pt1000	12...24V~/⎓

* probe not included

Applications

The Eliwell thermoregulators in the Universal Controller series are ideal for all industrial applications requiring high precision temperature control.

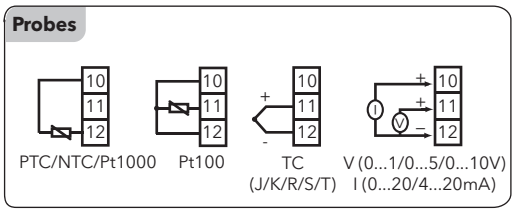
Common features

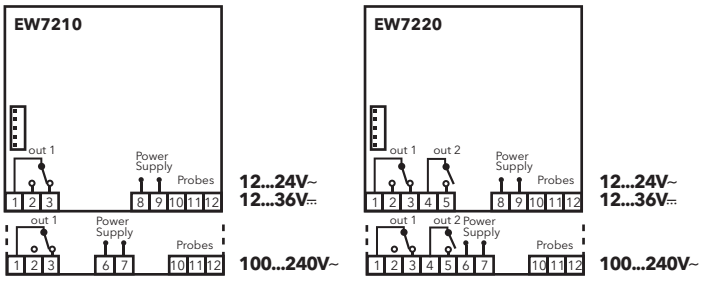
Container	PC+ABS UL94 V-0 resin plastic casing, switch keys with adhesive polycarbonate film	**Operating temperature**	-5...55°C
Dimensions	front panel 72x72 mm, depth 80 mm	**Storage Temperature**	-20...85°C
Installation	panel mounting with 67x67 mm (+0.2/–0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

Technical data	EW7210	EW7220
Display:	no decimal point * 2 4-digit displays + sign	no decimal point * 2 4-digit displays + sign
Analogue inputs:	1 input*(see Probes table)	1 input* (see Probes table)
Digital inputs:	not available	not available
Connections:	TTL port for connection to Copy Card, Televis**System** or systems with ModBus protocol	TTL port for connection to Copy Card, Televis**System** or systems with ModBus protocol
Digital outputs:	1 SPDT 8(3)A 250V~	1 SPDT 8(3)A 250V~ 1 SPST 8(3)A 250V~
Analogue output:	not available	non disponibile
Measurement range:	according to probe used	according to probe used
Accuracy:	according to probe used	according to probe used
Resolution:	according to probe used	according to probe used
Power consumption:	4W max	4W max
Power supply:	• 12...24V~/12...36V⎓ ±10% 50/60Hz • 100...240V~ ±10% 50/60Hz	• 12...24V~/12...36V⎓ ±10% 50/60Hz • 100...240V~ ±10% 50/60Hz

*(selectable by parameter)

Wiring diagrams





EW7221 - EW7222

Universal 72x72 controllers with serial port

Codes	Description	Probe*	Power supply
E7213PAXBH700	EW7221 Univ.	Pt100	100...240V~
E7213IAXBH700	EW7221	4...20mA	100...240V~
E7213PAXBD700	EW7221 Univ. - RS485	Pt100	100...240V~
E7213PAXBH400	EW7221 Univ.	Pt100	12...24V~/⎓
E7213PASBH700	EW7222 Univ.-RS485	Pt100/TC/PTC/NTC/Pt1000	100...240V~
E7213IASBH700	EW7222	Pt100/V/I	100...240V~
E7213PASBH400	EW7222 Univ.-RS485	Pt100/TC/PTC/NTC/Pt1000	12...24V~/⎓

* probe not included

Applications

The Eliwell thermoregulators in the Universal Controller series are ideal for all industrial applications requiring high precision temperature control.

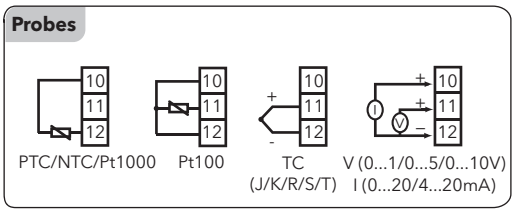
Common features

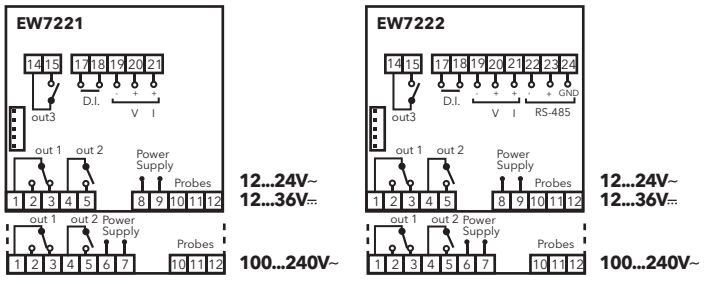
Container	PC+ABS UL94 V-0 resin plastic casing, switch keys with adhesive polycarbonate film	**Operating temperature**	-5...55°C
Dimensions	front panel 72x72 mm, depth 80 mm	**Storage Temperature**	-20...85°C
Installation	panel mounting with 67x67 mm (+0.2/–0.1 mm) drilling template	**Ambient humidity for operation and storage**	10...90% RH (non-condensing)

Technical data	EW7221	EW7222
Display:	no decimal point * 2 4-digit displays + sign	no decimal point * 2 4-digit displays + sign
Analogue inputs:	1 input* (see Probes table)	1 input* (see Probes table)
Digital inputs:	1 clean contact at extra low safety voltage	1 clean contact at extra low safety voltage
Connections:	TTL port for connection to Copy Card, Televis**System** or systems with ModBus protocol	TTL port and internal RS-485 for connection to Copy Card, Televis**System** or systems with ModBus protocol
Digital outputs:	1 SPDT 8(3)A 250V~ 1 SPST 8(3)A 250V~ 1 SPST 5A 250V~	1 SPDT 8(3)A 250V~ 1 SPST 8(3)A 250V~ 1 SPST 5A 250V~
Analogue output:	V-I: 0...1V, 0...5V ,0...10V / 0...20mA, 4...20mA	V-I: 0...1V, 0...5V ,0...10V / 0...20mA, 4...20mA
Measurement range:	according to probe used	according to probe used
Accuracy:	according to probe used	according to probe used
Resolution:	according to probe used	according to probe used
Power consumption:	4W max	4W max
Power supply:	• 12...24V~/12...36V⎓ ±10% 50/60Hz • 100...240V~ ±10% 50/60Hz	• 12...24V~/12...36V⎓ ±10% 50/60Hz • 100...240V~ ±10% 50/60Hz

*(selectable by parameter)

Wiring diagrams





FREE Way

Programmable platform

Applications

Eliwell's new programmable platform
FREE Way: Eliwell's new approach to programmability, giving customers the tools to fi nd their own faster and more effective solutions.

FREE Way is the new programmable platform from Eliwell, consisting of the **FREE Studio** software suite, **FREE Smart**, **FREE Panel** and **FREE Evolution**, the new range of programmable controllers available in various formats to choose from.

The simple and fl exible **FREE Studio** software suite is compatible with the 5 standard programming languages (**IEC61131-3**), and is structured to manage a whole range of controllers of different sizes and with varying levels of complexity, in order to fully satisfy the customer's system customization requirements.

FREE Smart features

- User interface with confi gurable keys
- Available in three formats
  - **FREE Smart SMP*** 32x74mm
  - **FREE Smart SMD*** 4 Din with LED display
  - **FREE Smart SMC*** 4 Din with no display

* Electrical connections compatible with existing Eliwell product platforms (e.g. Energy Flex); versions available 100...240V~

- Can be connected to RS-485, Modbus RTU
- Can be connected to standard Eliwell peripherals and user interfaces

FREE Panel features

- **FREE Panel EVP** system controller, with gateway functions and backlit LCD graphic display
- High connectivity: integrates into industrial systems and BMS
- Connects to standard Eliwell or third-party peripheral devices
- Available for panel or wall mounting

FREE Evolution features

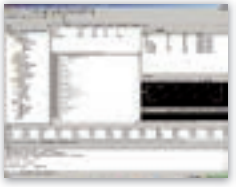
- Fully customizable graphic user interface
- Available in two formats
  - **FREE Evolution EVD** 8 Din with backlit LCD graphic display
  - **FREE Evolution EVC** 8 Din with no display
- High connectivity: integrates into industrial systems, BMS and networks using dedicated plug-in modules
- Connects to standard Eliwell peripheral devices (including **FREE Smart**)
- Connects to standard third-party peripheral devices

FREE Studio features

- Quick and easy programming
- Single software suite
- Complete and effective online help
- Advanced debugging and simulation options
- Protection of the applications and Different levels of use
- Application revision log
- Interfaccia personalizzabile

FREE Studio

Programmable platform


Application


Device


Connection


User Interface

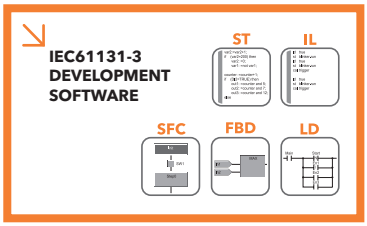

Simulation

Applications

The FREE Studio software suite is compatible with all 5 standard programming languages (IEC61131-3).
Each project may consist of several programs. The developer may use one or more languages in the same project.

Each new programme can be chosen from the 5 programming languages, 2 text and 3 graphic:

- **ST**, **Structured Text**
- **FBD**, **Functional Block Diagram**
- **LD**, **Ladder**
- **IL**, **Instruction List**
- **SFC**, **Sequential Function Chart**



Application
Component for software developers to allow them to develop and modify applications in the 5 standard programming languages

Device
Component dedicated to less skilled users for the management of parameters, application downloads, field tests, etc.

Connection
Network confi guration component, for both field and open networks in order to integrate other systems.

User Interface
Component for developing and personalizing the graphic interface on user terminals.

Simulation
Component for simulating the application on a PC.

FREE Panel

Programmable platform

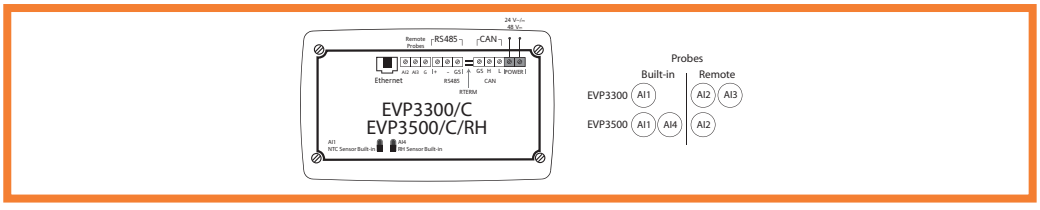
Codes	Description
EVP3300010B00	EVP3300/C
EVP3500010B00	EVP3500/C/RH

Application

FREE Panel (EVP) is the panel solution, with an LCD display that can be used as a system controller, with the function of a gateway, used in association with the other **FREE Evolution** and **FREE Smart** or third-party controllers.
FREE Panel ensures high performance in terms of memory, connectivity and user interface as well as straightforward programming, maintenance and servicing.
FREE Panel is designed for panel mounting: a special backplate, available as an accessory, enables it to be wall mounted. Confidentiality with appropriate protection.

Technical data	EVP3300/C	EVP3500/C/RH
Format:	160x96x10mm panel (°) IP65	160x96x10mm panel (°) IP65
Display:	backlit 128x64 pixel LCD graphic display	backlit 128x64 pixel LCD graphic display
Power supply:	24V~/⎓ - 48V⎓	24V~/⎓ - 48V⎓
Analogue inputs **3**	**AI1** 1 x NTC on board **AI2** 1 x NTC / D.I. remote **AI3** 1 x 4...20 mA / 0-5V / 0-10V remote	**AI1** 1 x NTC on board **AI2** 1 x NTC / D.I. remote **AI4** 1 x %RH on board
Connectivity:	CANOpen / RS485 / ETHERNET	CANOpen / RS485 / ETHERNET
Buzzer:	YES	YES

Wiring diagram



FREE Smart

Programmable platform




Applications

The models are available as a DIN rail-mounted version (SMD with display, SMC with no display), which saves time in terms of wiring, and in the compact 32x74 Eliwell (SMP) size for panel-mounting. Eliwell supplies various expansion modules (SE, SME) and terminals (SKP, SKW) for use in conjunction with the corresponding models in the FREE Smart range. All inputs and outputs are independent and confi gurable, meaning they can be adapted to fi t any system.

Code	Model	Digital outputs (*)	TRIAC outputs (*)	O.C. outputs PWM / PPM (**)	Analogue outputs (**)	Digital inputs (***)	Analogue inputs (**)	O.C. outputs
FREE Smart 12...24V~ • /M models Modbus Master • /S models integrated RS485 •/C indicates that there is an RTC – Real Time Clock								
SMP5500050400	SMP5500/C/S	5	-	2	3	6	5	1
SMP4600050400	SMP4600/C/S	4	1	2	3	6	5	1
SMD550005M400	SMD5500/C/S/M	5	-	2	3	6	5	1
SMD5500050400	SMD5500/C/S	5	-	2	3	6	5	1
SMD4600050400	SMD4600/C/S	4	1	2	3	6	5	1
SMD3600050400	SMD3600/C/S	3	2	1	3	6	5	2
SMC5500050400	SMC5500/C/S	5	-	2	3	6	5	1
SMC4600050400	SMC4600/C/S	4	1	2	3	6	5	1
SMC3600050400	SMC3600/C/S	3	2	1	3	6	5	2
Expansion modules 12...24V~								
SE63020310400	SE632	3	-	2	-	6	3	1
SE64123510400	SE646	4	1	2	3	6	5	1
SE65023510400	SE655	5	-	2	3	6	5	1

Code	Model	Digital outputs (*)	O.C. Outputs: PWM / DI (**)	0-10V Outputs(**)	4..20mA / 0...20mA Outputs (§)	Analogue inputs (**)
FREE Smart 4500 100-240V~ • /M models Modbus Master • /S models integrated RS485 •/C indicates that there is an RTC – Real Time Clock						
SMD450005MH00	SMD4500/C/S/M	4	2	2	1	5
SMD4500050H00	SMD4500/C/S	4	2	2	1	5
SMC4500050H00	SMC4500/C/S	4	2	2	1	5
Expansion module 4500 100-240V~						
SME4500000H00	SME4500	4	2	2	1	5

Code	Model	Mounting	Dimensions	Display	Analogue inputs (**)	Power supply
Terminali						
SKP1000000000	SKP10	panel	74x32x30mm	LED / 4 digit	-	from base board
SKW2200000000	SKW22	wall	137x96.5x31.3mm	LCD	1 integrated NTC	from base board
SKW22L0000000	SKW22L			Backlit LCD	1 NTC/ DI/4...20mA input	
SKP2200000000	SKP22	panel(°)	160x96x10mm	LCD	1 NTC input	from base board
SKP22L0000000	SKP22L			Backlit LCD	1 NTC/ DI/4...20mA input	

(*) high voltage (**) low voltage (SELV: SAFETY EXTRA LOW VOLTAGE)
(***) no voltage • (§) or 0-10V on dedicated model
(°) Contact the Eliwell Sales Office for wall-mounting accessories
PPM Pulse Position Modulation • PWM Pulse Width Modulation
TTL supplied as standard • OC Open Collector
^ check availability with the Eliwell Sales Office

FREE Evolution

Programmable platform

Applications

The models (EVD with display, EVC with no display) are available in the version with 8 DIN rail mounting, with screw terminals that can be disconnected to make installation easier and faster. Eliwell supplies models with relay or SSR outputs. Each model (EVD, EVC) can be connected to 12 expansion modules (EVE) via CANOpen or RS485 serial ports.

Code	Model	Relay outputs (*)	SSR outputs (§)	Analogue outputs (**)	Digital inputs (**)	Digital inputs (***)	Analogue inputs (**)	Integrated RS485 / MPBUS
FREE Evolution with display • /C indicates that there is an RTC – Real Time Clock • CANOpen integrated as standard								
EVD7500060B00	EVD7500/C/U	7	-	5	8	1	6	RS485
EVD7500010B00	EVD7500/C	7	-	5	8	1	6	RS485
EVD75SS060B00	EVD75SS/C/U^	5	2	5	8	1	6	RS485
EVD75SS010B00	EVD75SS/C^	5	2	5	8	1	6	RS485
EVD75MP060B00	EVD75MP/C/U^	7	-	5	8	1	6	MPBUS
EVD75MP010B00	EVD75MP/C^	7	-	5	8	1	6	MPBUS
FREE Evolution without display • /C indicates that there is an RTC – Real Time Clock • CANOpen, integrated as standard								
EVC7500060B00	EVC7500/C/U	7	-	5	8	1	6	RS485
EVC7500010B00	EVC7500/C	7	-	5	8	1	6	RS485
EVC75SS060B00	EVC75SS/C/U^	5	2	5	8	1	6	RS485
EVC75SS010B00	EVC75SS/C^	5	2	5	8	1	6	RS485
EVC75MP060B00	EVC75MP/C/U^	7	-	5	8	1	6	MPBUS
EVC75MP010B00	EVC75MP/C^	7	-	5	8	1	6	MPBUS
Expansion modules • RS485/CANOpen, integrated as standard								
EVE7500000B00	EVE7500	7	-	5	8	1	6	RS485

Code	Model	Mounting	Dimensions	Display	Serial
Terminals					
EVK1000000B00	EVK1000	panel (°)	160x96x10mm	LCD backlit	CANOpen

Code	Model	Output (*)	Mounting	Serial	Notes
Plug-in					
EVS10R2000000	EVS RS232	1x5A 250V~	2DIN	RS232	Power Supply from base board
EVS00R4000000	EVS RS485	-		RS485	
EVS00CA000000	EVS CAN			CANOpen	
EVS00ET000000	EVS ETH			ETHERNET	
EVS00PB000000	EVS Profibus			Profibus DP Slave-V0	

Power supply 24V~/c - 48Vc excluding EVK1000 from the base
(*) high voltage
(**) low voltage (SELV: SAFETY EXTRA LOW VOLTAGE)
(***) voltage free
(°) Contact the Eliwell Sales Office for wall-mounting accessories
(§) SSR Solid State Relay
TTL as standard / OC Open Collector
^ check availability with the Eliwell Sales Office

SUPERVISION AND MONITORING

Eliwell offers a wide range of instruments and components for the monitoring and remote management of a system.

The solutions we propose range from devices for data recording and temperature display in real time to software for the remote management of alarms and graphic display of systems.

Memory 1000

Recording and printing temperature

Codes	Description	Temperature input
M1K04N03D1X00	MEMORY 1040 F*	4
M1K04N03D0X00	MEMORY 1045 F	4
M1K08N03D1X00	MEMORY 1080 F*	8
M1K08N03D0X00	MEMORY 1085 F	8
M1K26N03D1X00	MEMORY 1080 F 2AI*	8
M1K26N03D0X00	MEMORY 1085 F 2AI	8
M1K26N03D1X00	MEMORY 1180/15 F 2AI*	8
M1K26N03D0X00	MEMORY 1185/15 F 2AI	8
RC444444	Thermal paper roll	

* models with printer

Applications

Memory 1000 is available in a wide range of models, combining the capabilities of a monitoring system with the ease-of-use of a data logger in order to meet various customer requirements.

Common features

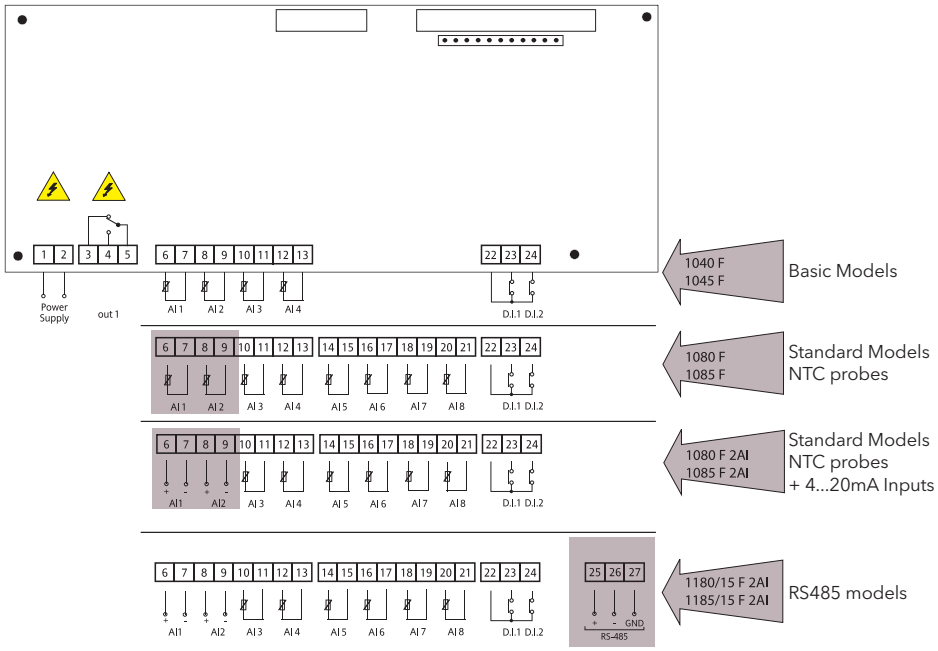
Powerful and easy to use thanks to: • fast data download on SD CARD, without using the PC • soft key to enter the report printing menu directly	Manages all aspects of network controller alarms
	12 months+ data logging capacity
	A wide range of models to fit all application requirements
Compatible with RadioAdapter wireless networks	Up to 10 digital and analogue inputs

Technical data	Memory 1000 with printer	Memory 1000 without printer
User interface:	Backlit graphic LCD 8 polycarbonate keys	Backlit graphic LCD 7 polycarbonate keys
Analogue inputs:	• max 8 NTC / 4 NTC based on model • max 2 4...20 mA (**just for models 2AI**)	• max 8 NTC / 4 NTC based on model • max 2 4...20 mA (**just for models 2AI**)
Digital inputs:	2 fixed D.I. Max 8 / 4 configurable based on model	2 fixed D.I. Max 8 / 4 configurable based on model
Digital outputs:	1 SPDT 5(2)A 250 V~	1 SPDT 5(2)A 250 V~
Connections:	RS-485 port for input expansion via compatible Eliwell Televis controllers RS-232 port for exporting data using Microsoft Windows® software (supplied) SD memory card slot for downloading data	RS-485 port for input expansion via compatible Eliwell Televis controllers RS-232 port for exporting data using Microsoft Windows® software (supplied) SD memory card slot for downloading data
Clock:	present	present
Buzzer:	present	present
Power consumption:	20W max (printer in use)	5W max
Power supply:	230 V~ ±10% 50/60 Hz	230 V~ ±10% 50/60 Hz
Printer:	Integrated thermal printer	-

Accessories

Codes	Description
RC444444	Thermal paper roll

Wiring diagrams



TelevisGo

Monitoring and maintenance systems via web

Codes	Description	Applications
TGOAXE301E00K	KIT Televis**Go** 30*	up to 30 controllers
TGOAXE601E00K	KIT Televis**Go** 60*	up to 60 controllers
TGOAXE2H0E000	KIT Televis**Go** 224*	up to 224 controllers

*contains No.1 **Serial**Adapter + 1.5 m serial cable

Applications

Televis**Go** is a family of devices to monitor, control and manage commercial refrigeration installations remotely. The product is based on a PC Embedded standard platform to offer greater calculation power, data filing space and, thanks to the Microsoft Embedded operating system, easy system expansion using widely available peripherals. Televis**Go** is the monitoring system recommended for supermarkets with 30 or more controllers, up to a maximum of 224.

Features

For the end user
- recording of HACCP temperatures
- information on energy consumption
- complete, easy to use system
- open, expandable system

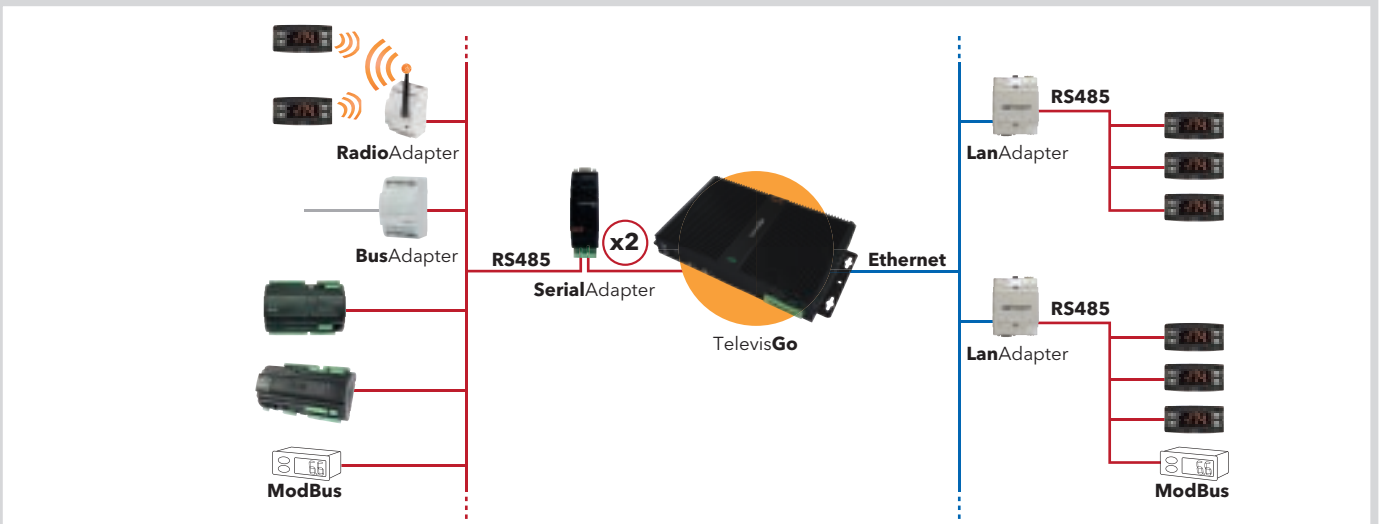
For the maintenance technician
- compact, reliable, ready-to-use system
- intuitive user interface easy to learn
- alarm signalled by e-mail, SMS and configurable priorities
- distance access via web for diagnostics and control
- dedicated maintenance tools: parameters instruments, controls, detailed diagnostics and recording of all operational status
- system fully updatable via web: software, languages, driver controllers
- instruments for off line configuration and fast modification of settings

For chains and system integrators
- solution scalability based on size of plants
- instruments for off line configuration, plant cloning and series modification of configurations
- Compatible with third party ModBus instruments: energy measurement and HVAC controls
- XML protocol open:
  - data sent periodically (push function)
  - sending on occurrence of data and alarms
  - acquisition of real-time data
  - interrogation of historical data and alarm base
- remote execution of controls / modification controller parameters
- SOCKS protocol integrated for routing of TCP and UDP communications

Technical Specifications

	TelevisGo 30 / 60 / 224
User interface:	from web browser
Browsers supported:	• Internet Explorer 7 or later • Mozilla Firefox 3.5 or later • Google Chrome 16.0.x or later
User language interfaces pre-loaded:	IT-EN-ES-DE-FR-RU
Operating System:	MS Windows XP Embedded
Power supply:	12 V⎓ with external power supply 100...240V~ ±10%
Power consumption:	10W max
Connections:	6 USB port 2 RS-232 ports (for analogue modem or GSM) 2 RS-232 ports (for **Serial**Adapter) 1 Ethernet port (LANRJ45) VGA monitor connection PS2 keyboard connector

Connectivity



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Graphic display of the plant

Televis**Go** offers an advanced user interface, for data analysis and full control of plant operations that is accessible from a web browser on a personal computer, tablet and mobile devices.

Televis**Go** also has a graphic interface that the user can customise with a powerful drawing and configuration tool using pre-loaded, freely expandable symbol libraries.

The Televis**Go** web interface makes information and controls easily accessible from a variety of devices.

Graphic interface configuration instrument

Through the **Aggregated items** you can create easily reusable interactive items

A graphic page can be designed for a single controller and assigned to all similar ones

Drawing operations are speeded up by **dragging** and '**copy and paste**' of items

When displayed via the web, **details** of the associated resource are displayed automatically by passing the mouse over them

The intelligent 'copy and paste" of aggregated items makes it possible to quickly create tables with data, controls and parameters

A **symbol library**, with typical supermarket elements is available and is **easy to expand with jpeg, png, gif images, etc**

TelevisIn / TelevisOut

Data acquisition modules and actuators

Codes	Description	Power supply
TAMID152RS700	Televis**In**	100...240 V~
TAMOD602RS700	Televis**Out**	100...240 V~

Applications

Televis**In** and Televis**Out** are data acquisition, alarm signalling and user control modules which can be connected via the ModBus protocol to Televis or third-party systems. The Televis**In** controller, connected to specific probes, enables the acquisition of temperature, humidity and pressure data, and digital signals. It will also calculate dew points. Televis**Out** provides alarm signalling and utility monitoring functions. It can be used to connect warning devices or telephone diallers and, in combination with the supervisor, to deliver energy savings via the management of lights and other utilities.

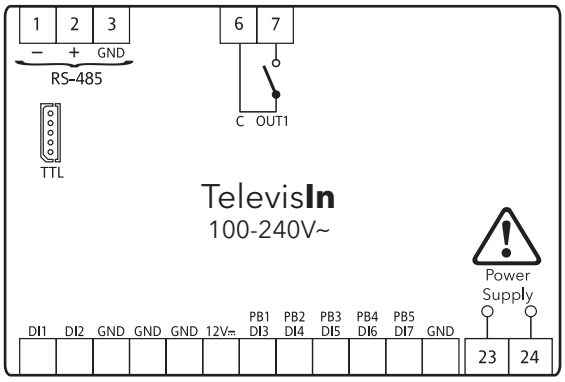
Common features

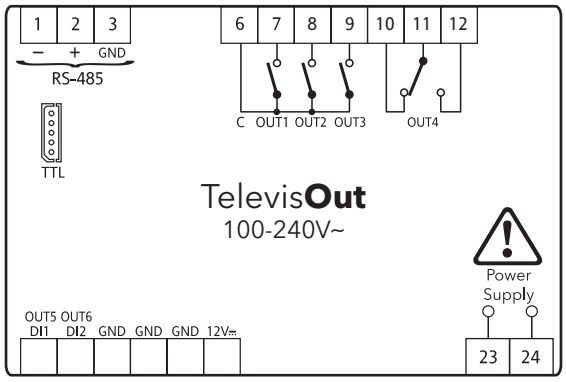
- Compatible with third-party and ModBus systems
- **Up to 8 configurations** for fast installation
- **Two models** to cover all applications
- Removable 'T' connector for fast installation of the RS-485 line

Technical data

	TelevisIn	TelevisOut
Dimensions:	4 DIN modules	4 DIN modules
Mounting:	on DIN Omega bar support	on DIN Omega bar support
Display range:	• NTC probe: -50.0...110.0°C • PTC probe: -55.0...140.0°C • Pt1000 probe: -55.0...400.0°C • Vin probe: 0-1 V, 0-5 V and 0-10 V • Ain probe: 0..20 mA and 4...20 mA	• NTC probe: -50.0...110.0°C • PTC probe: -55.0...140.0°C • Pt1000 probe: -55.0...400.0°C • Vin probe: 0-1 V, 0-5 V and 0-10 V • Ain probe: 0...20 V and 4...20 mA
Analogue inputs:	3 NTC/PTC/Pt1000/DI inputs +1 V (0-1 V / 0-5 V / 0-10 V) input + 1 I (0...20 mA / 4...20 mA) input	-
Digital inputs:	2 digital inputs (DI1 / DI2)	2 clean contact digital inputs (DI1 / DI2) also configurable as analogue outputs with no dangerous voltage
Digital outputs:	1 SPST 2A 250 V~	2 (SELV) Open Collector: PWM 3 SPST 2A 250 V~ 1 SPDT 2A 250 V~
Connectivity:	• 1 RS-485 for connection to Televis**System** monitoring and systems based on ModBus protocol • 1 TTL to connect to Eliwell Unicard USB, Copycard and DMI interface for **Device**Manager	• 1 RS-485 for connection to Televis**System** monitoring and systems based on ModBus protocol • 1 TTL to connect to Eliwell Unicard USB, Copycard and DMI interface for **Device**Manager
Connectors:	Removable screw terminals	Removable screw terminals
Applications:	**AP1**=Temperature; **AP2**=Analogue Inputs; **AP3**=Digital Inputs; **AP4**=Dew Point; **AP5...8**=Free	**AP1**=Alarm signalling; **AP2...8**=Free
Power consumption:	5W	5W
Power supply:	SMPS 100...240 V~ ±10% 50/60 Hz	SMPS 100...240 V~ ±10% 50/60 Hz

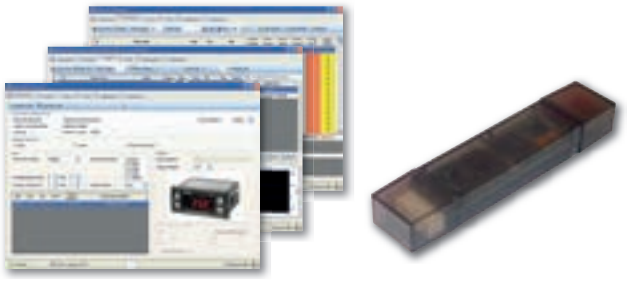
Wiring diagrams





DeviceManager

Controller configuration software



Codes	Description
DMP1000002000	CD DeviceManager
DMI1001002000	DMI 100-1 End User
DMI1002002000	DMI 100-2 Service
DMI1003002000	DMI 100-3 Manufacturer
CO111127	TTL Cable
COLV000016200	USB-A/A extension cable

Applications

DeviceManager is windows based software used to manage and install Eliwell devices. The software can be used to create and save parameter mapping and transfer it to and from the controller.
DeviceManager needs the USB communication interface **Device**Manager Interface (DMI) to communicate directly with controllers. It is compatible with Unicard USB and Multi Function Key to transfer maps, parameters and controller firmware updates.
For information on compatibility and functions for each controller family, please check the compatibility table on **www.eliwell.com**

Features

Graphic interface	Device alarm log management
Eliwell instrument parameter management	Firmware updating
Real-time variable monitoring and management	

Minimum system requirements	DeviceManager
Operating system:	• Windows XP Pro SP2, Italian and English. • Windows XP Home SP2, Italian and English. • Windows 2000 Professional SP4, Italian and English. • Windows 7 Premium, Windows 7 Professional, Windows 7 Ultimate, versions 32bit, Italian-English
Software components required besides operating system:	• .NET Framework 2.0
Minimum hardware:	• graphics resolution 1024x768 • 700 MHz CPU • 256 MB RAM • HD 1 GB • Mouse or equivalent navigation system
Space required on disk:	Approx. 500 MB for normal installation (2 languages, 50 models)

Accessories

Code	Description	Details
CO111127	TTL cable	1 m reinforced cable
COLV000016200	USB-A/A 2MT extension lead	Length 2 m

ACCESSORIES

Eliwell has developed a wide range products, from accessories for connectivity to a wide range of transformers, switches, protections and even memory devices such as Memory Cards for the rapid transfer of the controller parameters.

Eliwell has developed these devices to provide customers with instruments that allow ever increasing quality of performance and a better productive yield.

SerialAdapter - Ethernet LanAdapter - WiFi LanAdapter

Connectivity modules for systems

Codes	Description
SAT1AMM100000	**Serial**Adapter 232
LA0ET00X700	Ethernet **Lan**Adapter
LA0WF00X700	WiFi **Lan**Adapter

Applications

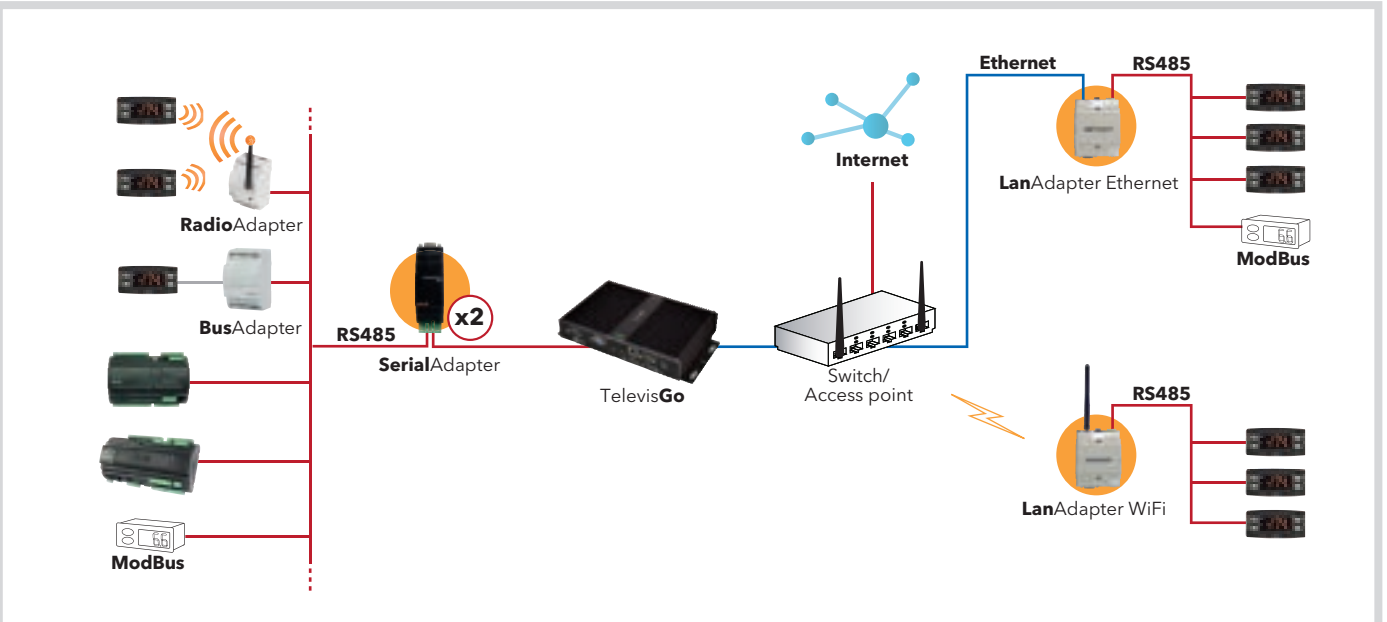
SerialAdapter is a galvanically isolated RS-232/RS-485 adapter for use on networks with Televis**Go**.
LanAdapter is an Ethernet/RS-485 (or TTL) interface module enabling communication between a LAN and a network of instruments compatible with the Televis protocol. In this way, the LAN network monitoring system can manage data, alarms and connected instrument network functions. The **Lan**Adapter can be configured via the web from any PC on the LAN.

Features

RS-232, Ethernet and WiFi connectivity	Multiple networks using existing LAN infrastructures
Up to 2 SerialAdapter networks with TelevisGo	Televis and ModBus protocol compatibility

General technical specifications	SerialAdapter	Ethernet LanAdapter	WiFi LanAdapter
Casing:	plastic, 2 DIN modules	plastic, 4 DIN modules	plastic, 4 DIN modules
Mounting:	on DIN Omega bar support	on DIN Omega bar support	on DIN Omega bar support
Power supply:	12 V⎓ through Televis**Go serial port**	100...240 V~ ±10% 50/60 Hz	100...240 V~ ±10% 50/60 Hz
Power consumption:	-	4W max	4W max
Insulation class:	-	II	II
Ambient operating temperature:	-5...+55°C	0...+55°C	0...+55°C
Ambient storage temperature:	-30...+75°C	-20...+85°C	-20...+85°C
Ambient operation and storage humidity:	10...90% RH (non-condensing)	10...90% RH (non-condensing)	10...90% RH (non-condensing)
Terminals:	screw terminals to connect electric cables with a section of max. 2.5 mm² (one connector per terminal).	screw terminal to connect electric cables with a section of max. 2.5 mm² (one wire per terminal). RJ-45 connector for connection to Ethernet network	screw terminal to connect electric cable with a section of max. 2.5 mm² (one wire per terminal). Antenna (external)
Connectivity:	• RS-485 port for connection to Televis**System**	• RS-485 port for connection to Televis**System** • TTL port for connection to instruments • LAN 10/100 MBps	• RS-485 port for connection to Televis**System** • TTL port for connection to instruments • Standard: IEEE 802.15.4 • Frequency band: ISM 2.400 GHz...2.485 GHz (<100 mW e.i.r.p.) • Selection of channel: manual/automatic

Connectivity



RadioAdapter - RadioAdapter (/S) EXT - RadioKey

Wireless connectivity modules

Codes	Description
BARF0TT00NH00	**Radio**Adapter V2.0
BARF0DT00NH00	**Radio**Adapter/S V2.0
BARF0TT20NH00	**Radio**AdapterEXT V2.0
BARF0DT20NH00	**Radio**Adapter/S EXT V2.0
MD0000003	External antenna kit for EXT
CCA0B0T01Tx00	RadioKey (Televis)
CCA0B0T01Mx00	RadioKey (ModBus RTU)

x = based on setting of ModBus RTU serial:
0: 9600, 8, N, 1 - **1:** 9600, 8, O, 1 - **2:** 9600, 8, E, 1 - **3:** 19200, 8, N, 1
4: 19200, 8, O, 1 - **5:** 19200, 8, E, 1

Applications

RadioAdapter provides a cost-effective, reliable way of building communication networks between monitoring systems and controllers by replacing cables or extending existing networks.
RadioKey is a device needed to configure the network.

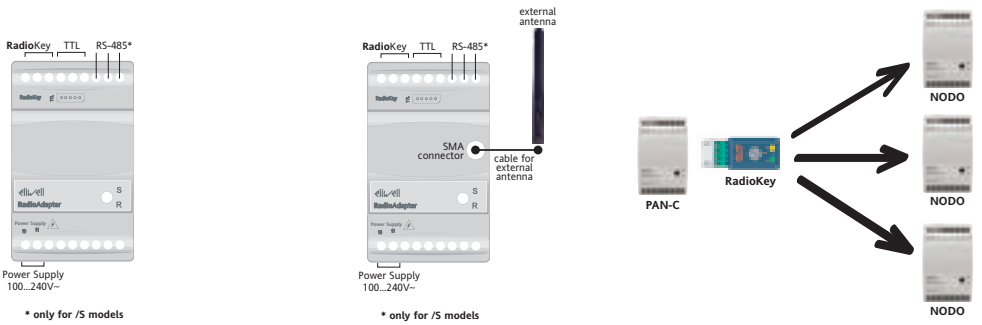
Common features

Frequency band ISM 2.400 GHz…2.485 GHz	Ability to act as a repeater for adjacent nodes
MESH communication technology with automatic directory selection	EC certification for European market
Extensive surface coverage	FCC certification for American market

General technical specifications

	RadioAdapter RadioAdapter/S	RadioAdapter EXT RadioAdapter/S EXT	RadioKey
Casing:	3 DIN modules	3 DIN modules	-
Mounting:	on DIN Omega bar support	on DIN Omega bar support	-
Power supply:	100...240 V~ ±10% 50/60 Hz	100...240 V~ ±10% 50/60 Hz	-
Power consumption:	2W	2W	-
Insulation class:	II	II	-
Ambient operating temperature:	-5...+60°C	-5...+60°C	-
Ambient storage temperature:	-20...+85°C	-20...+85°C	-
Ambient operation and storage humidity:	10...90% RH (non-condensing)	10...90% RH (non-condensing)	10...90% RH (non-condensing)
Operating class:	Class 4, ISA classification SP100.11 (not to be used for safety equipment)	Class 4, ISA classification SP100.11 (not to be used for safety equipment)	-
Type of network:	MESH	MESH	-
Protocol supported:	Televis or ModBus RTU	Televis or ModBus RTU	-
Number of nodes per network:	100 max	100 max	-
Number of controllers per node:	240 max	240 max	-
Radio response time:	800 msec max.	800 msec max.	-
Connectivity:	TTL port for connection to RS-485 serial port devices - **just models /S**	TTL port for connection to RS-485 serial port devices - **just models /S**	-
Antenna:	2 x 4 GHz integrated, multi-directional	external - not included (see Accessories)	-
Accessories/notes:	-	External antenna kit + SMA 90° connector + 1 m cable. To be ordered separately	needed for network configuration. Available for Televis or ModBus RTU networks

Wiring diagrams



BusAdapter 130 - 150 - 350

RS-485 opto-isolated connectivity modules



Codes	Description
BA11250N370x	BusAdapter130
BA10000R370x	BusAdapter150
x=0: cable 1 m; **x**=3: cable 2.5 m	
BA10000R370x	BusAdapter350
x=1: cable 1 m; **x**=4: cable 2.5 m	

Applications

BusAdapter 130-150-350 is a family of devices used to connect Eliwell controllers to wired supervision and monitoring networks in RS-485 mode.

Features

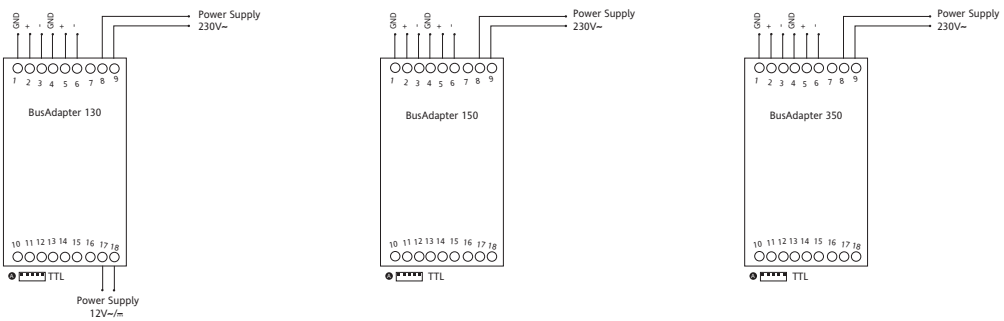
130 models have an auxiliary 12 V (5 VA) output to power the instrument.

150 models are equipped with reinforced electric insulation

350 models are equipped with reinforced electric insulation and should be used with EM300 LX

General technical specifications	BusAdapter 130	BusAdapter 150	BusAdapter 350
Casing:	3 DIN modules	3 DIN modules	3 DIN modules
Mounting:	on DIN Omega bar support	on DIN Omega bar support	on DIN Omega bar support
Power supply:	230 V~ / 115 V~ ±10% 50/60 Hz	230 V~ / 115 V~ ±10% 50/60 Hz	230 V~ / 115 V~ ±10% 50/60 Hz
Power consumption:	6W	1.5W	1.5W
Insulation class:	II	II	II
Ambient operating temperature:	-5...+55°C	-5...+60°C	-5...+60°C
Ambient storage temperature:	-30...+75°C	-30...+75°C	-30...+75°C
Ambient operation and storage humidity:	10...90% RH (non-condensing)	10...90% RH (non-condensing)	10...90% RH (non-condensing)
Terminals:	screw-on terminal block to connect electric cables with a section of max. 2.5 mm^2 (one wire per terminal for power connections)	screw-on terminal block to connect electric cables with a section of max. 2.5 mm^2 (one wire per terminal for power connections)	screw-on terminal block to connect electric cables with a section of max. 2.5 mm^2 (one wire per terminal for power connections)
Connectivity:	• double RS-485 port for connection to Televis**System** • TTL port for connection to instruments	• double RS-485 port for connection to Televis**System** • TTL port for connection to instruments	• double RS-485 port for connection to Televis**System** • TTL port for connection to instruments
Baud rate:	2400...9600 Baud	2400...9600 Baud	2400...9600 Baud
Auxiliary output:	12 V~ / ⎓ ±10% 50/60 Hz	/	/

Wiring diagrams



Modem GSM/GPRS

Modems

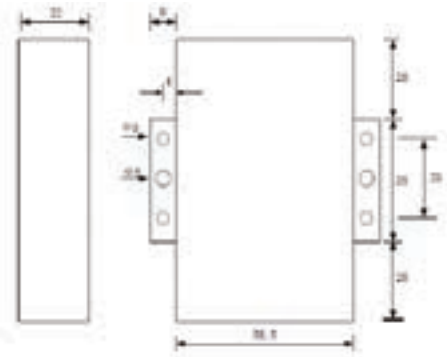
Codes	Description
SAMGPRS35AL00	GSM/GPRS W/ANT PSU MODEM KIT Includes: power supply unit (European 10A plug) + antenna with 1.5 m cable

Applications

The GSM/GPRS modem can be used to send SMS and for backup connectivity.

Technical Specifications	Modem GSM/GPRS
Case:	Metal
Dimensions:	91x58.5x22 mm (BxHxD)
Weight:	195g
Frequency bands:	EGSM900/GSM1800 MHz, GSM850/900/1800
GSM standard:	GSM phase 2/2+
GPRS standard:	class 10 - 85.6Kbps
Transmission power:	GSM850/900: <33dBm; GSM1800: <30dBm
Reception sensitivity:	<-107dBm
Connections:	• DB9 port RS-232 serial port, with 15KV ESD protection • SMA 50 Ohm antenna connection, female connector • connector powering 3-pole jack with protection for overvoltages and inverted polarity • SIM/USIM 3 V/1.8 V slot with 15KV ESD protection
Power supply:	5...35 V⎓ 12 V
Power consumption:	<200 mA (12 V)
Serial configuration:	Speed 110 ... 230400 bps 5, 6, 7, 8 data bit 1, 1.5, 2 stop bit Parity none, even, odd, space, mark
Operating temperature:	-25...+65°C (-13...+149°F)
Storage temperature:	-40...+85°C (-40...+185°F)
Operation and storage humidity:	10...95% RH (non-condensing)

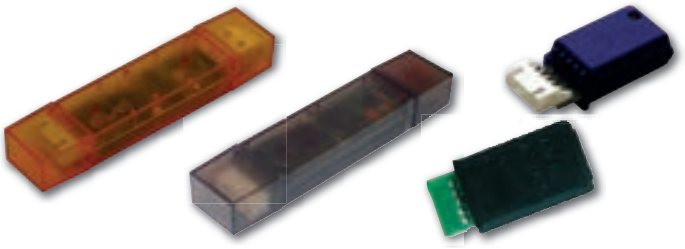
Dimensions



Unit of Measure: mm

Unicard - USB Copy Card - Copy Card - Multi Function Key

Memory for fast configuration and updating of controllers



Codes	Description
CCA0BHT00UU00	UNICARD USB/TTL
CCA0BUI02N000	USB Copy Card
COLV000016200	Extension lead for USB Copy Card
CC0S00A00M000	Standard Copy Card
MKF100T000000	Multi Function Key 100

Applications

The new USB/TTL Unicard is a memory device for rapid parameter configuration/duplication, specifically designed for controllers in the IDPlus family.
By downloading the **Device**Manager software from **www.eliwell.com**, maps for instruments in the ID and IDPlus families can be read and written onto the Unicard device without having to use other interfaces/licences.
Copy Card and USB Copy Card are memory devices for rapid Eliwell controller parameter configuration/duplication. Multi Function Key is used with **Device**Manager to transfer maps, parameters and controller firmware updates.

Common features

Unicard has a **standard USB port** for connection to the most widely-used power supply units and adapters on the market (mains-powered, machine-powered, battery-powered, etc.).
Updating device parameter values
Updating device firmware/applications
Downloading parameter values from the instrument
Downloading alarm log from the instrument

Use	Copy Card	Multi Function key	Unicard	USB Copy Card
IDPlus series	•	-	•	-
EW - EWPlus (EO LVD) series	•	-	•	-
IC series	•	-	-	-
ID series	•	-	-	-
EM300 series	•	-	-	-
DR4020 - DR4022	•	-	•	-
EW4820 - EW4822	•	-	-	-
EW7220 - EW7222	•	-	-	-
EWTS 950 LX - EWTS 990 LX	•	-	-	-
EWRC 300 - EWRC 500 series	•	-	•	-
EWDR series	•	-	-	-
IWC series	•	-	-	-
IWP 750	•	-	•	-
Televis**In** Televis**Out**	•	-	• / F	-
RTN series	-	•	• / F	-
RTX - RTD series	-	•	• / F	-
ID 985/V	•	-	•	-
V800 Pulse EEV driver	-	-	-	•
V910 - XVD Step EEV Driver	-	•	• / F	-
EWCM 8000…9000 EO	-	-	-	• / F / L / D
EWCM 4000	•	•	-	-

KEY •: Reading/writing maps parameters **F**: Updating Firmware **L**: Updating Interface Languages **D**: Download Data/Alarms

Counter power supply examples

power supply
Unicard - controller

Unicard

controller

Field power supply examples

Unicard

controller

power supply
controller

power supply
Unicard

Unicard

controller

Drip protection

Drip protection for 32x74 controllers

Applications

Drip protection for devices in the ID, IC, IDPlus, EW, EWPlus series.
Applied to the rear of the instrument, this product protects electrical connectors against dripping liquid.

Part number	Description
ZZ000270	Drip protection Pack of 20

TF Transformers

Transformers

Applications

TF transformers are resin-coated in plastic containers, equipped with fixing tabs and screw terminals for wires ≤ 2.5 mm².
Models with different power supply voltages are available.

Code	Models	Details
TF511113	TF 100...115...120V	115/12V 3VA - cert. UL
TF111145	TF 100...115...120V	115/12V 3VA
TF11115A	TF 100...115...120V	110-230/12-12-12 o 12 15VA
TF111115	TF 12...24...48V	24/12V 3VA
TF111162	TF 12...24...48V	24/12V 5,6VA
TF111173	TF 200...250V	230/12V 3VA
TF411200	TF 200...250V	230/12V 5VA protected
TF411173	TF 200...250V	230/12V 3VA approved VDE
TF411117	TF 200...250V	240/12V 3VA approved VDE
TF411205	TF 200...250V	230/12V 6VA protected
TF411210	TF 200...250V	230/12V 11VA protected
TF111202	TF 200...250V	230/24V 25VA
TF111205	TF 200...250V	230/24V 35VA

Panel switches for ID and IC series

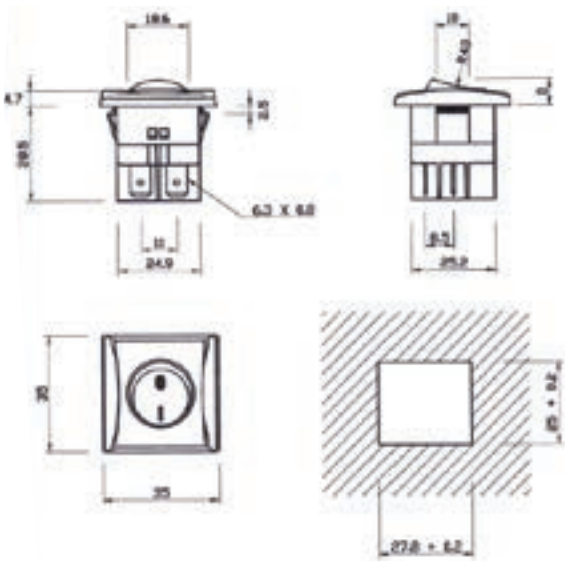
Panel switches for IC - ID - Ammeter transformers

Applications

Switches specifically designed for use in conjunction with the Digifrost Line and Universal Controllers range. Available in different luminous/non-luminous colours or with luminous dot.

Code	Model	Colour	Details
SW22023A000	Bipolar switch	non-luminous grey button	grey frame 220 V serigraphed 0/1
SW22223D000	Bipolar switch	full green light	grey frame 220 V serigraphed 0/1
SW22123D000	Bipolar switch	green luminous dot	grey frame 220 V
SW22223B000	Bipolar switch	full red light	grey frame 220 V serigraphed 0/1
SW22123B000	Bipolar switch	red luminous dot	grey frame 220 V
SW22223E000	Bipolar switch	full yellow light	grey frame 220 V serigraphed 0/1

Dimensions



Unit of Measure: mm

PROBES AND TRANSDUCERS

To complete the range of electronic instruments, Eliwell supplies a series of temperature probes and humidity and pressure transducers that are recognised on the market for their reliability and quality of construction.

NTC

NTC semi-conductor temperature probes

NTC co-moulded with double insulation

Codes	Description	Capsule Material	Size of capsule mm (ØxL)	Cable type	Level of protec-tion	Dielectric strength	Operating range	Length of probe
SN8SAA1502	NTC with double insulation	AISI 304	6x40	silicone	IP67	4000 V	-50...+120°C	1.5 m
SN8PAA1500	NTC with double insulation	AISI 304	6x40	PVC	IP67	4000 V	-30...+105°C	1.5 m

NTC co-moulded with double insulated cable

Codes	Description	Capsule Material	Size of capsule mm (ØxL)	Cable type	Level of protec-tion	Dielectric strength	Operating range	Length of probe
SN8T6H0005	NTC co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber shielded	IP68	2000 V	-50...+110°C	10.0 m
SN8T6H1505	NTC co-moulded with double insulated cable shielded	Thermoplastic rubber	5x20	Thermoplastic rubber	IP68	2000 V	-50...+110°C	1.5 m
SN8DED11502C0	NTC co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000 V	-50...+110°C	1.5 m
SN8DED13002C0	NTC co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000 V	-50...+110°C	3.0 m
SN8DAE11502C0	NTC co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000 V	-50...+110°C	1.5 m
SN8DAE13002C0	NTC co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000 V	-50...+110°C	3.0 m
SN8T6N1502	NTC co-moulded with double insulated cable	AISI 304	6x50	Thermoplastic rubber	IP68	2000 V	-50...+110°C	1.5 m

Special NTC probes - TC

Special NTC semi-conductor temperature probes

NTC special versions

Codes	Description	Capsule Material	Size of capsule mm (ØxL)	Cable type	Level of protec-tion	Dielectric strength	Operating range	Length of probe
SN8DEB21502C0	NTC clamp-on	Thermoplastic rubber	6x20	Thermoplastic rubber (Outer) Polypropylene	IP68	2000 V	-50...+110°C	1.5 m
SN8DEB23002C0	NTC clamp-on	Thermoplastic rubber	6x20	(Inner) Thermoplastic rubber (Outer)	IP68	2000 V	-50...+110°C	3.0 m
SN8DNB11502A0	NTC clamp-on probe IP67 Fast response	Copper	4x16	Polypropylene (Inner) Thermoplastic rubber (Outer)	IP67	1500 V	-50...+110°C	1.5 m
SN8DAC11502AV	NTC probe Fast response	AISI 304	4x40	Polypropylene (Inner)	IP67	2000 V	-50...+110°C	1.5 m
SN8DAC13002AV	NTC probe Fast response	AISI 304	4x40	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP67	2000 V	-50...+110°C	3.0 m

TCK

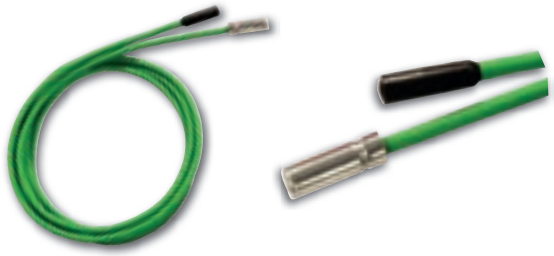
Codes	Description	Capsule Material	Size of capsule mm (ØxL)	Cable type	Level of protec-tion	Dielectric strength	Operating range	Length of probe
SN400000	Tck	AISI 304	6x100	TTS	IP45	-	0...400°C	3.0 m
SN400004	Tck	Inconel 600	6x200	TTS	IP45	-	-40...1150°C	1.0 m

TCJ

Codes	Description	Capsule Material	Size of capsule mm (ØxL)	Cable type	Level of protec-tion	Dielectric strength	Operating range	Length of probe
SN300000	Tcj	AISI 316	6x100	Vetrotex	IP44	-	0...350°C	3.0 m
SN300008	Tcj	AISI 316	6x100	Vetrotex	IP44	-	0...350°C	1.5 m
SN300042	Tcj	AISI 304	6x100	TTS	IP45	-	0...350°C	3.0 m

Pt100 - Pt1000 probes

Pt100 - Pt1000 thermo-resistive temperature probes



Pt100

Code	Description	Capsule Material	Size of capsule mm (ØxL)	Cable type	Level of protec-tion	Operating range	Length of probe
SN200009	Pt100, 3 wires with steel tube	AISI 316	6x100	Vetrotex	IP44	0...+600°C	3 mm
SN206000	Pt100, 3 wires with steel tube	AISI 316	6x100	silicone	IP67	-40...200°C	3 mm
SN2TAE51502C0	P100 with steel tube	AISI 304	6x50	thermoplastic rubber	IP68	-50...+110°C	1.5 mm

Pt1000

Codes	Description	Capsule Material	Size of capsule mm (ØxL)	Cable type	Level of protec-tion	Dielectric strength	Operating range	Length of probe
SN9S0A2500	Pt1000 with two wires	AISI 304	6x40	Silicone	IP67	2000 V	-50...+200°C	2.5 m
SN9DAE11502C6	Pt1000 co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000 V	-50...+110°C	1.5 m
SN9DAE13002C6	Pt1000 co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000 V	-50...+110°C	3.0 m
SN9DED11502C6	Pt1000 co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000 V	-50...+110°C	1.5 m
SN9DED13002C6	Pt1000 co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000 V	-50...+110°C	3.0 m

PTC Probes

PTC semi-conductor temperature probes

Applications

Eliwell temperature probes are devices that provide the instruments to which they are connected with temperature measurement through a physical process.

Common features

Accuracy of temperature measurement: +/- 1%

Codes	Description	Capsule Material	Size of capsule mm (ØxL)	Cable type	Level of protec-tion	Dielectric strength	Operating range	Length of probe
SN7T6A1502	PTC co-moulded with double insula-ted cable	AISI 304	6x40	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110°C	1.5 m
SN7DAE11502C0	PTC co-moulded with double insula-ted cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110°C	1.5 m
SN7DAE13002C0	PTC co-moulded with double insula-ted cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110°C	3.0 m
SN7DED11502C0	PTC co-moulded with double insula-ted cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110°C	1.5 m
SN7DED13002C0	PTC co-moulded with double insula-ted cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110°C	3.0 m
SN6070000	PTC for ambient temperature	Plastic	15x70	-	IP54	-	-40...+120°C	-
SN603008	PTC for piercing, with PVC grip	AISI 316	3x150	Silicone	IP65	-	-20...+110°C	3.0 m

EWPA 007 - 030 - 050

Pressure transducers

Applications

EWPA pressure transducers are sensors with a voltage output through which they transmit the signal to the measurement instruments they are connected to.

Technical data	EWPA 007	EWPA 010	EWPA 030	EWPA 050
Operating range:	-0.5...7.0 bar (relative)	0...10 bar (relative)	0...30 bar (relative)	0...50 bar (relative)
Output signal:	2 wires 4...20 mA	2 wires 4...20 mA	2 wires 4...20 mA	2 wires 4...20 mA
Overload:	2 times pressure range	2 times pressure range	2 times pressure range	2 times pressure range
Power supply:	8...32 Volts	8...32 Volts	8...32 Volts	8...32 Volts
Accuracy:	± 0.5% FS max (linearity, hysteresis, repeatability)	± 0.5% FS max (linearity, hysteresis, repeatability)	± 0.5% FS max (linearity, hysteresis, repeatability)	± 0.5% FS max (linearity, hysteresis, repeatability)
Compensated temperature:	0...50°C	0...50°C	0...50°C	0...50°C
Electrical connections:	2 m cable, wired 2 m cable with PACKARD connector	2 m cable, wired 2 m cable with PACKARD connector	2 m cable wired 2 m cable with PACKARD connector mPm connector	2 m cable, wired 2 m cable with PACKARD connector
Mechanical connections:	male connector/ female connector ¼ SAE (7/16"-20UNF)	male connector/ female connector ¼ SAE (7/16"-20UNF)	male connector/ female connector ¼ SAE (7/16"-20UNF)	male connector/ female connector ¼ SAE (7/16"-20UNF)
Operating temperature:	-40...100°C	-40...100°C	-40...100°C	-40...100°C
Global error at T 0...50°C:	max. ± 1.0% FS	max. ± 1.0% FS	max. ± 1.0% FS	max. ± 1.0% FS
Global error at T -10...80°C:	max. ± 1.5% FS	max. ± 1.5% FS	max. ± 1.5% FS	max. ± 1.5% FS
Response time:	(0...99%) < 5 ms	(0...99%) < 5 ms	(0...99%) < 5 ms	(0...99%) < 5 ms
Material in contact with the environment	AISI 316L Viton outer seal	AISI 316L Viton outer seal	AISI 316L Viton outer seal	AISI 316L Viton outer seal
Enclosure rating:	Packard: IP67 Cable: IP54	Packard: IP67 Cable: IP54	Packard: IP67 mPm plug: IP65 Cable: IP54	Packard: IP67 Cable: IP54

Codes	Description	Connector	Electric connection	IP
TD220030	EWPA 030	1/4 SAE MALE	2 m cable	54
TD240030	EWPA 030	1/4 SAE MALE	2 m cable with Packard connector	67
TD250030	EWPA 030	1/4 SAE MALE	mPm connector	65
TD320030	EWPA 030	1/4 SAE FEMALE	2 m cable	54
TD340030	EWPA 030	1/4 SAE FEMALE	2 m cable with Packard connector	67
TD220050	EWPA 050	1/4 SAE MALE	2 m cable	54
TD240050	EWPA 050	1/4 SAE MALE	2 m cable with Packard connector	67
TD320050	EWPA 050	1/4 SAE FEMALE	2 m cable	54
TD340050	EWPA 050	1/4 SAE FEMALE	2 m cable with Packard connector	67
TD220007	EWPA 007	1/4 SAE MALE	2 m cable	54
TD240007	EWPA 007	1/4 SAE MALE	2 m cable with Packard connector	67
TD320007	EWPA 007	1/4 SAE FEMALE	2 m cable	54
TD340007	EWPA 007	1/4 SAE FEMALE	2 m cable with Packard connector	67
TD320010	EWPA 010	1/4 SAE FEMALE	2 m cable	54
TD340010	EWPA 010	1/4 SAE FEMALE	2 m cable with Packard connector	67

EWPA 010 - 030 - 050

Ratiometric pressure transducers

Codes	Description	Connector	Electric connection
TD420010	EWPA 010	1/4 SAE FEMALE	2 m cable with Packard connector
TD420030	EWPA 030	1/4 SAE FEMALE	2 m cable with Packard connector
TD420050	EWPA 050	1/4 SAE FEMALE	2 m cable with Packard connector

Applications

EWPA ratiometric pressure transducers are sensors capable of transmitting a signal by way of a current output to the measuring instruments with which they are connected. They offer accurate performance across a wide temperature range.

Technical data	EWPA 010	EWPA 030	EWPA 050
Operating range at 0.5...4.5 V:	0...145 psi / 0...10 bar	0...515 psi / 0...35 bar	0...667 psi / 0...46 bar
Output signal:	3 wires 0.5...4.5 V ratiometric	3 wires 0.5...4.5 V ratiometric	3 wires 0.5...4.5 V ratiometric
Overload:	2.5 times pressure range	2.5 times pressure range	2.5 times pressure range
Power supply:	5.0 V⎓ ± 0.5 V	5.0 V⎓ ± 0.5 V	5.0 V⎓ ± 0.5 V
Accuracy:	± 0.25% FS max (linearity, hysteresis, repeatability)	± 0.25% FS max (linearity, hysteresis, repeatability)	± 0.25% FS max (linearity, hysteresis, repeatability)
Energy consumption:	8 mA max	8 mA max	8 mA max
Load resistance:	> 5KΩ	> 5KΩ	> 5KΩ
Electrical connections:	2 m cable with PACKARD connector	2 m cable with PACKARD connector	2 m cable with PACKARD connector
Mechanical connections:	female connector ¼ SAE (7/16"-20UNF)	female connector ¼ SAE (7/16"-20UNF)	female connector ¼ SAE (7/16"-20UNF)
Operating temperature:	-40...125°C	-40...125°C	-40...125°C
Global error at T 0...50°C:	max. ± 1.0% FS	max. ± 1.0% FS	max. ± 1.0% FS
Global error at T -10...80°C:	max. ± 1.5% FS	max. ± 1.5% FS	max. ± 1.5% FS
Response time:	(0...99%) < 5 ms	(0...99%) < 5 ms	(0...99%) < 5 ms
Material exposed to environment:	AISI 316L Viton outer seal	AISI 316L Viton outer seal	AISI 316L Viton outer seal
Enclosure rating:	IP67	IP67	IP67

EWHS 284 - 304 - 314

Humidity probes

EWHS284

EWHS304

EWHS314

Applications

Humidity probes of the EWHS284-304-314 series are intended for connection to humidity and humidity/temperature measuring instruments of superior dependability.

Common features

Ambient humidity:	0...100% RH
Maximum air speed:	20m/s
Polarity inversion protection:	diode

Technical data	EWHS284	EWHS304	EWHS314
Enclosure rating	IP54	IP65	IP65
Installation	Use the clip supplied with the probe	via 2 external slots	via 2 external slots
Electrical connections	PVC two core cable	Screw terminals	Screw terminals
Dimensions	103X25mm	80X80X52mm	80X80X52mm
Power supply	9...28Vm	9...30Vm	15...40Vm or 12...28V-
Current draw	20mA max	20mA max	<50mA max
Ambient temperature	-10...60°C	-40...60°C	-40...60°C (-40...140°F)
Humidity sensor	resistive	HygroMer* IN-1	HygroMer* IN-1
Humidity measurement range	15...90% RH	0...100% RH	0...100% RH
Output current of humidity measurement	4 (0%)...20mA (100%)	4 (0%)...20mA (100%)	4 (0%)...20mA (100%)
Response time in steady state (63%) at 23 °C	60 secs	typically 10 secs	typically 10 secs
Recovery time from saturation	360 secs	depending on air flow rate	depending on air flow rate
Storage temperature	-20...70°C	-50...70°C	-50...70°C
Accuracy of humidity measurement (at 23°C):	±5% RH (in the range 15...90% RH)	±2% RH (in the range 10...95% RH) ±3% RH (for values <10% or >95% RH)	±2% RH
Number of wires per connection	2 (blue: power; brown: output)	2	4
Air filter	metal wire mesh	polyethylene	polyethylene
Temperature sensor	-	-	Pt100B
Temperature range	-	-	-40...60°C (-40...140°F)
Temperature measurement output current	-	-	4 (-30°C)...20mA (70°C)
Accuracy of temperature measurement (at 0 °C and 23 °C)	-	-	±0,3K
Temperature compensation	-	with NTC	with Pt100B
Connection cable	1m or 3m	-	-
Maximum load	250 Ohm	0 Ohm at 6V⎓ and 5V~ 500Ohm at 15V⎓ and 12V~	0 Ohm at 6V⎓ and 5V~ 500Ohm at 15V⎓ and 12V~
Part Number	EWHS284 1m cable: SN5PPN116I3M0 EWHS284-3 3m cable: SN5PPN131I3M0	EWHS304: SN5NPM1A6I4M0	EWHS314: SN0NPM1A6I4M0

Temperature probe tables

Appendices

NTC probe table

Temp. environment	Resistance (Ohm)					
(°C)	102AT	202AT	502AT	103AT	203AT	503AT
-50	24,46	55,66	154,60	329,50	1253	3168
-45	18,68	42,17	116,50	247,70	890,50	2257
-40	14,43	32,34	88,91	188,50	642,00	1632
-35	11,23	26,96	68,19	144,10	465,80	1186
-30	8,834	19,48	52,87	111,30	342,50	872,80
-25	6,998	15,29	41,21	86,43	253,60	646,30
-20	5,594	12,11	32,44	47,77	190,00	484,30
-15	4,501	9,655	25,66	53,41	143,20	364,60
-10	3,651	7,763	20,48	42,47	109,10	277,50
-5	2,979	6,277	16,43	33,90	83,75	212,30
0	2,449	5,114	13,29	27,28	64,88	164,00
5	2,024	4,188	10,80	22,05	50,53	127,50
10	1,684	3,454	8,840	17,96	39,71	99,99
15	1,408	2,862	7,267	14,69	31,36	78,77
20	1,184	2,387	6,013	12,09	24,96	62,56
25	1,000	2,000	5,000	10,00	20,00	50,00
30	0,8486	1,684	4,179	8,313	16,12	40,20
35	0,7229	1,424	3,508	6,940	13,06	32,48
40	0,6189	1,211	2,961	5,827	10,65	26,43
45	0,5316	1,033	2,509	4,911	8,716	21,59
50	0,4587	0,8854	2,137	4,160	7,181	17,75
55	0,3949	0,7620	1,826	3,536	5,941	14,64
60	0,3446	0,6587	1,567	3,020	4,943	12,15
65	0,3000	0,5713	1,350	2,588	4,127	10,13
70	0,2622	0,4975	1,168	2,228	3,464	8,482
75	0,2285	0,4343	1,014	1,924	2,916	7,129
80	0,1999	0,3807	0,8835	1,668	2,468	6,022
85	0,1751	0,3346	0,7722	1,451	2,096	5,105
90	0,1536	0,2949	0,6771	1,266	1,788	4,345
95	-	-	0,5961	1,108	1,530	3,712
100	-	-	0,5265	0,9731	1,315	3,185
105	-	-	0,4654	0,8572	1,134	2,741
110	-	-	0,4128	0,7576	0,9807	2,369

PTC probe table

Temperature environment		Temperature coefficient	KTY81-121			
			Resistance (Ohm)			
(°C)	(°F)	(%/K)	Minimum	Standard	Maximum	Error - temperature
-55	-67	0,99	471	485	500	±3,02
-50	-58	0,98	495	510	524	±2,92
-40	-40	0,96	547	562	576	±2,74
-30	-22	0,93	603	617	632	±2,55
-20	-4	0,91	662	677	691	±2,35
-10	14	0,88	726	740	754	±2,14
0	32	0,85	794	807	820	±1,91
10	50	0,83	865	877	889	±1,67
20	68	0,80	941	951	962	±1,41
25	77	0,79	980	990	1000	±1,27
30	86	0,78	1018	1029	1041	±1,39
40	104	0,75	1097	1111	1125	±1,64
50	122	0,73	1180	1196	1213	±1,91
60	140	0,71	1266	1286	1305	±2,19
70	158	0,69	1355	1378	1402	±2,49
80	176	0,67	1447	1475	1502	±2,80
90	194	0,65	1543	1575	1607	±3,12
100	212	0,63	1642	1679	1716	±3,46
110	230	0,61	1745	1786	1828	±3,83
120	248	0,58	1849	1896	1943	±4,33
125	257	0,55	1900	1950	2000	±4,66
130	266	0,52	1950	2003	2056	±5,07
140	284	0,45	2044	2103	1462	±6,28
150	302	0,35	2124	2189	2254	±8,55

NTC probe table - Extended range

Temp. environment	Resistance (KOhm)		
(°C)	Minimum	Standard	Maximum
-40	321,654	333,562	345,877
-35	233,032	241,072	249,364
-30	170,611	176,082	181,710
-25	126,176	129,925	133,773
-20	94,221	96,807	99454
-15	71,015	72,809	74,640
-10	54,004	55,253	56,525
-5	41,419	42,292	43,179
0	32,028	32,640	33260
5	24,962	25,391	25,824
10	19,601	19,902	20,205
15	15,504	15,713	15,924
20	12,348	12,493	12,639
25	9,900	10,000	10,100
30	7,962	8,055	8,150
35	6,444	6,530	6,616
40	5,247	5,325	5,403
45	4,296	4,367	4,438
50	3,537	3,601	3,665
55	2,928	2,985	3,042
60	2,436	2,487	2,538
65	2,037	2,082	2,127
70	1,711	1,751	1,792
75	1,444	1,480	1,516
80	1,224	1,256	1,288
85	1,042	1,070	1,099
90	0,890	0,916	0,941
95	0,764	0,786	0,810
100	0,658	0,678	0,699
105	0,569	0,587	0,605
110	0,493	0,510	0,526
115	0,429	0,444	0,459
120	0,375	0,388	0,402
125	0,328	0,340	0,353
130	0,289	0,299	0,310
135	0,254	0,264	0,274
140	0,224	0,234	0,243
145	0,199	0,207	0,215
150	0,177	0,184	0,192

Temperature probe tables

Appendices

Pt100 probe table

Temp. environment	Resistance	Temp. environment	Resistance	Temp. environment	Resistance	Temp. environment	Resistance	Temp. environment	Resistance
(°C)	(Ohm)	(°C)	(Ohm)	(°C)	(Ohm)	(°C)	(Ohm)	(°C)	(Ohm)
-200	18,52	20	107,79	230	186,84	440	260,78	650	329,64
-190	22,83	30	11,67	240	190,47	450	264,18	660	332,79
-180	27,10	40	115,54	250	194,10	460	267,56	670	335,93
-170	31,34	50	119,40	260	197,71	470	270,93	680	339,06
-160	35,54	60	123,24	270	201,31	480	274,29	690	342,18
-150	39,72	70	127,08	280	204,90	490	277,64	700	345,28
-140	43,88	80	130,90	290	208,48	500	280,98	710	348,38
-130	48,00	90	134,71	300	212,05	510	284,30	720	351,46
-120	52,11	100	138,51	310	215,61	520	287,62	730	354,53
-110	56,19	110	142,29	320	219,15	530	290,92	740	357,59
-100	60,26	120	146,07	330	222,68	540	294,21	750	360,64
-90	64,30	130	149,83	340	226,21	550	297,49	760	353,67
-80	68,33	140	153,58	350	229,72	560	300,75	770	366,70
-70	72,33	150	157,33	360	233,21	570	304,01	780	369,71
-60	76,33	160	161,05	370	236,70	580	307,25	790	372,71
-50	80,31	170	164,77	380	240,18	590	310,49	800	375,70
-40	84,27	180	168,48	390	243,64	600	313,71	810	378,68
-30	88,22	190	172,17	400	247,09	610	316,92	820	381,65
-20	92,16	200	175,86	410	250,53	620	320,12	830	384,60
-10	96,09	210	179,53	420	253,96	630	323,30	840	387,55
0	100,00	220	183,19	430	257,38	640	326,48	850	390,48
10	103,90								

Pt1000 probe table

Temp. environment	Resistance	Temp. environment	Resistance	Temp. environment	Resistance	Temp. environment	Resistance	Temp. environment	Resistance
(°C)	(Ohm)	(°C)	(Ohm)	(°C)	(Ohm)	(°C)	(Ohm)	(°C)	(Ohm)
-200	185,281	20	1077,936	230	1868,465	440	2608,235	650	3297,246
-190	228,327	30	1116,731	240	1904,843	450	2642,196	660	3328,790
-180	271,029	40	1155,411	250	1941,106	460	2676,042	670	3360,219
-170	313,408	50	1193,976	260	1977,254	470	2709,773	680	3391,533
-160	355,484	60	1232,426	270	2013,287	480	2743,389	690	3422,731
-150	397,277	70	1270,961	280	2049,205	490	2776,889	700	3453,815
-140	432,903	80	1308,981	290	2085,007	500	2810,275	710	3484,783
-130	480,081	90	1347,085	300	2120,695	510	2843,545	720	3515,637
-120	521,127	100	1385,075	310	2156,267	520	2876,701	730	3546,375
-110	561,954	110	1422,949	320	2191,725	530	2909,741	740	3576,998
-100	602,578	120	1460,709	330	2227,067	540	2942,666	750	3607,506
-90	643,012	130	1498,353	340	2262,294	550	2975,476	760	3637,899
-80	683,267	140	1535,882	350	2297,406	560	3008,171	770	3668,177
-70	723,355	150	1573,296	360	2332,403	570	3040,751	780	3698,340
-60	763,286	160	1610,595	370	2367,285	580	3073,216	790	3728,387
-50	903,068	170	1647,779	380	2402,052	590	3105,565	800	3758,320
-40	842,71	180	1684,848	390	2436,703	600	3137,800	810	3788,137
-30	882,218	190	1721,801	400	2471,240	610	3169,919	820	3917,840
-20	921,6	200	1758,640	410	2505,661	620	3201,924	830	3847,427
-10	960,859	210	1795,363	420	2539,968	630	3233,813	840	3876,899
0	1000	220	1831,972	430	2574,159	640	3265,587	850	3906,256
10	1039,025								

Temperature Probe Tables

Appendices

TCJ probe table

Temp.	0°C	-10°C	-20°C	-30°C	-40°C	-50°C	-60°C	-70°C	-80°C	-90°C
-200°C	-7,890	-8,095	-	-	-	-	-	-	-	-
-100°C	-4,633	-5,037	-5,426	-5,801	-6,159	-6,500	-6,821	-7,123	-7,403	-7,659
0°C	0,000	-0,501	-0,995	-1,482	-1,961	-2,431	-2,893	-3,344	-3,786	-4,215
	10°C	**20°C**	**30°C**	**40°C**	**50°C**	**60°C**	**70°C**	**80°C**	**90°C**	**100°C**
0°C	0,000	0,507	1,019	1,537	2,059	2,585	3,116	3,650	4,187	4,726
100°C	5,269	5,814	6,360	6,909	7,459	8,010	8,562	9,115	9,669	10,224
200°C	10,779	11,334	11,889	12,445	13,000	13,555	14,110	14,665	15,219	15,773
300°C	16,327	16,881	17,434	17,986	18,538	19,090	19,642	20,194	20,745	21,297
400°C	21,848	222,400	22,952	23,504	24,059	243610	24,164	25,720	26,276	26,834
500°C	27,393	27,953	28,516	29,080	29,647	30,216	30,788	31,362	31,939	32,519
600°C	33,102	33,689	34,279	34,873	35,470	36,071	36,675	37,284	37,896	38,512
700°C	39,132	39,755	40,382	41,012	41,645	42,281	42,919	43,559	44,203	44,848
800°C	45,494	46,141	46,786	47,431	48,074	48,715	49,353	49,989	50,622	51,251
900°C	51,877	52,500	53,119	53,735	54,347	54,956	55,561	56,164	56,763	57,360
1000°C	57,953	58,545	59,134	59,721	60,307	60,890	61,473	62,054	62,634	63,214
1100°C	63,792	64,370	64,948	65,525	66,102	66,679	67,255	67,831	68,406	68,980
1200°C	69,553	-	-	-	-	-	-	-	-	-

TCK probe table

Temp.	0°C	-10°C	-20°C	-30°C	-40°C	-50°C	-60°C	-70°C	-80°C	-90°C
-200°C	-5,730	-6,035	-6,158	-6,262	-6,344	-6,404	-6,441	-6,458	-	-
-100°C	-3,554	-3,852	-4,138	-4,411	-4,669	-4,913	-5,141	-5,354	-5,550	-5,730
0°C	0,000	-0,392	-0,778	-1,156	-1,527	-1,889	-2,243	-2,587	-2,920	-3,243
	10°C	**20°C**	**30°C**	**40°C**	**50°C**	**60°C**	**70°C**	**80°C**	**90°C**	**100°C**
0°C	0,000	0,397	0,798	1,203	1,612	2,023	2,436	2,851	3,267	3,682
100°C	4,096	4,509	4,920	5,328	5,735	6,138	6,540	6,941	7,340	7,739
200°C	8,138	8,539	8,940	9,343	9,747	10,153	10,561	10,971	11,382	11,795
300°C	12,209	12,624	13,040	13,457	13,874	14,1293	14,713	15,133	15,554	15,975
400°C	16,397	16,820	17,243	17,667	18,091	18,516	18,941	19,366	19,792	20,218
500°C	20,644	21,071	21,497	21,924	22,350	22,776	23,203	23,629	24,055	24,480
600°C	24,905	25,330	25,755	26,179	26,602	27,025	27,447	27,869	28,289	28,710
700°C	29,129	29,548	29,965	30,382	30,798	31,213	31,628	32,041	32,453	32,865
800°C	33,275	33,685	34,093	34,501	34,908	35,313	35,718	36,121	36,524	36,925
900°C	37,326	37,725	38,124	38,522	38,918	39,314	39,708	10,101	40,490	40,885
1000°C	41,276	41,665	42,053	42,440	42,826	43,211	43,595	43,978	44,359	44,740
1100°C	45,119	45,497	45,873	46,249	26,623	46,995	47,367	47,737	48,105	48,473
1200°C	48,838	49,202	49,565	49,926	50,286	50,644	51,000	51,355	51,708	52,060
1300°C	52,410	52,759	53,106	53,451	53,795	54,138	54,479	54,819	-	-

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