Beta ELECTRONICS

Digital Temperature, Pressure & Humidity Controls…

Product Book

May 2007

TEST, INSTRUMENTATION AND CONTROLS

Contents

Beta Electronics are a manufacturing company based in North-Eastern Italy specialising in a very high quality range of digital products for temperature, humidity and pressure measurement & control. These products are designed and manufactured in accordance with the stringent standards associated with their ISO 9001 – "Vision 2000" quality control certification and approval.

Beta Electronics have succeeded in designing and manufacturing a fashionable product range with the ***'ColorLine'*** series (with its ergonomic multifunction push button) and the even more exclusive "***Enco***" System (an Indent item exploiting a digital encoder) in a class of their own, full of classic Italian style whilst focussing on operative functionality and reliability.

Their patented designs represent original and practical design solutions and Hamer Limited are proud to represent one of today's truly *'innovative'* manufacturers and to provide New Zealand's HVAC-R industry with their economic standard and/or customised technical solutions.

'ColorLine' Flush-Panel Mounting Controllers

Technical Specifications:

Housing:	Self-extinguish UL94V0 ABS plastics, black colour
Size:	Frontal 32 x 74 mm; depth 78 mm (incl. terminal cover)
Mounting:	Flush-panel on hole 28 x 70 mm (with "fast-lock" sliding brackets)
Protection:	"*ColorLine*" series = IP 64 for the frontal panel IP 65 available upon request.
Connections:	Screw terminals on board for wires with cross section area < 2.5 mm²
Display:	LED, 2.1/2 /3 digits, 12.5 mm high
Data storing:	On EEP-ROM not volatile memory
Operating temperature:	-5…+65 °C
Stocking temperature:	-30…+75 °C
Relative humidity:	20…85 % (not condensing)
Accuracy:	Better than 0.5% f.s. ± 1 digit
Resolution:	Options 0.1°C or 1°C
Measure range:	Limited only by probe or transducer.
Output:	Generally SPDT 8(3) A 250 Vac relay. However, 16(8) A or 20(10) A available on request.
Power supply:	Options available include 12, 24, 115, 230 Vac.
Analogue input:	Thermostatic probes or Transducer
Access Levels:	**All Beta products have user/manager levels with lockout function for manager level on all models except WH31 series.***

1 – Stage Thermostats

Conceived for refrigeration and heating applications

Electronic Thermostat RD31

Range: -55…+150°C,
Inputs: n° 1 (PTC) – Price excludes probe – see Page 7
Power supply: 230 Vac (unless otherwise indicated)

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE1501	RD31-6001-16A	Outputs: 1 x relay Compressor via 16A SPDT Decimal resolution , defrost by time
BE1502	RD31-6001-10A	Outputs: 1 x relay Compressor via 10A SPDT Decimal resolution, defrost by time
BE1504	RD31-6004	Outputs: 1 x relay Compressor via 8A SPDT Power supply: "Switching Mode" **12/24Vac/dc** Decimal resolution; defrost by time
BE1508	RD31-5901	Outputs: 1 x relay Compressor via 8A SPDT Decimal resolution; **WITHOUT** defrost **Version for use with PTC 300 probe only** Range: -55…+270 Deg. C.

RD31 - PD Models Complete With Alarm Output

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE1503	RD31-6051-16-PD	Outputs: 1 x relay Compressor via 16A SPDT Alarm via 5 Amp SPST Decimal resolution, defrost by time

RT31 – IP65 Frontal Mask Style Instrument

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE5501	RT31-6001-16A	Outputs: 1 x relay Compressor via 16A SPDT Decimal resolution; defrost by time

2 - Stage Thermostats

GR32 (C9 Instrument)

Thermostat with "DEAD BAND" or "TWO STEP" feature.
Range: -55…+150°C
Inputs: n° 1 (PTC) – Price excludes probe – see Page 7
Power supply: 230 Vac

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE1300	GR32-8001	Outputs: 2 x relays 1 x SPDT 8A and 1 x SPST 5A **"DEAD BAND"** Feature for air-conditioning industry Decimal resolution
BE1302	GR32-9001	Outputs: 2 x relays 1 x SPDT 8A and 1 x SPST 5A **"IND. OUTPUTS"** Feature for industrial cooling and/or heating applications Decimal resolution

'Specialist' Milk VAT Controllers

ML32 - 2 Stage Electronic Milk VAT Controller

Range: -55…+150°C,
Inputs: n° 1 (PTC) – Price excludes probe – see Page 7
Power supply: 230 Vac

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE1400	ML32-5001-16A	Outputs: 2 x relay Compressor via 16A SPDT Agitator Via 5A SPST Decimal resolution Agitator managed by time
BE1420	ML32-5050-8A	Outputs: 3 x relay Compressor Agitator & Alarm : 8A SPST Power Supply: **12 Vac/dc** Decimal resolution Agitator managed by time

Refrigeration Controllers

BL32 - Refrigeration Controller

Refrigeration Applications
Conceived for Static Units where fan is not used and managed
Range: -55…+55°C,
Inputs: n° 2 (PTC) Evaporator & Room
– Price excludes probes – see Page 7
Power supply: 230 Vac

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE1100	BL32-2651	Outputs: 3 x relay Compressor via 8A SPST Defrost Heater & Alarm Via 5A SPST 1°C resolution; defrost by time & temp **While stocks last**

BL33 - Refrigeration Controller

Refrigeration Applications
For fan ventilated units where fan is managed
Range: -55…+55°C
Inputs: n° 2 (PTC) Evaporator & Room
– Price excludes probes – see Page 7

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE1200	BL33-2601	Outputs: 3 x relay Compressor via 10A SPST Defrost Heater & Fan Via 5A SPST 1°C resolution; defrost by time & temp Power supply: 230 Vac
BE5200	BL33-2601	Outputs: 3 x relay Compressor via 16A SPST Defrost Heater & Fan Via 5A SPST 1°C resolution; defrost by time & temp Power supply: 230 Vac
BE1110	BL33-2604	Outputs: 3 relay Compressor via 16A SPST Defrost Heater, Fan & Via 5A SPST 1°C resolution; defrost by time & temp Power supply: **9-24 Vac/dc**
BE1202	BL33-2650	Outputs: 3 relay Compressor via 8A SPST Defrost Heater, Fan & Alarm Via 5A SPST 1°C resolution; defrost by time and temp Power supply: 12 Vac/dc

Flush-Panel Mounting LCD's

LI - LCD THERMOMETER

Complete with NTC probe
Range: -35…+108°C,
Inputs: n° 1 (NTC probe included) 3mt
Power supply: 1.5 V (LR44) Battery

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE100	LI00	Outputs: Nil - Indicator Only Case: 28 x 48 mm (flush-panel mounting) Decimal resolution

DIN Rail Mounting Controllers

Technical Specifications:

Housing:	Self-extinguish UL94V0 ABS plastics, white colour
Size:	Frontal 45 x 71 mm; depth 58 mm (4 DIN modules)
Mounting:	DIN rail for panel boards
Protection:	IP 65 for the frontal panel
Connections:	Screw terminals for wires with cross section area < 2,5 mm²
Display:	LED, 3 digits, 12.5 mm high
Data storing:	On EEP-ROM not volatile memory
Operating temperature:	-5…+65 °C
Stocking temperature:	-30…+75 °C
Relative humidity:	20…85 % (not condensing)
Resolution:	1 °C
Accuracy:	Better than 0.5% f.s. ± 1 digit
Measure range:	Limited only by probe or transducer.
Outputs:	Generally SPDT 8(3) A 250 Vac relay. However, (16(8) A available on request.
Power supply:	Options available include 12, 24, 115, 230 Vac.
Analogue inputs:	Thermostatic probes or Transducer

BL43 - Refrigeration Controller

Refrigeration Application
Conceived particularly for low temperature refrigerating fan ventilated units where fan is managed
Range: -55…+55°C,
Inputs: n° 2 (PTC) – Price excludes probes – see Page 7
Power supply: 115/230Vac through built-in transformer

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE2200	BL43-2655-16A	Outputs: 4 x Relay Compressor via SPDT 16A Defrost heater via SPDT 8A Fan & Alarm via SPST 5A. 1°C resolution; defrost by time & temp. Power supply: 115/230 Vac

Multifunction/Step Controllers

YL32 Controller

Refrigeration Applications

The YL 32 is an electronic multifunction controller able to control temperatures in two different rooms through the one instrument.

Range: –55…+55 °C.
Input n°2 (PTC) – Price excludes probes – see Page 7
Power Supply: 230Vac

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE3000	YL32-1601	Outputs: 2 x Relays for two independent compressors or a compressor (8A, SPDT) and a solenoid valve (5A, SPST). The YL 32 operates as an ON/OFF cooling regulator, stopping the compressor/s when set point temperature is reached and restart at a temperature equal to the set point one plus a differential. This feature is made in each room independently, driving 1 or 2 compressors with/without solenoid valve/s. Without alarm. Defrost managed by time.

YL34 Controller

Multipurpose Applications

The YL 34 is a very sophisticated electronic controller able to manage up to 4 compressors in industrial refrigeration plants.

Range -55…+55 C.
Inputs: n°2 (PTC) – Price excludes probes – see Page 7
Power Supply: 12Vac/dc

HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE4000	YL34-0000	Outputs: 4 x Relays (5A, SPST) The YL 34 allows several user selectable control modes a) with 1 set point; b) with 2 independent set points; c) with dependent set points; d) with dead band (with 1 or 2 stages). Compressor running times can be managed through a fixed sequence or through a rotation (step controller). Alarms can be set (absolute or relative to the set point). They can be just visualised or managed through relays (permissible if among the 4 available). "Soft start" feature available!

Pressure & Humidity Controller

RP31 & RH31

The RP 31 (pressure) & RH 31 (humidity) controllers are digital 1-stage electronic controllers with LED display. The large measuring range of 256 units makes them the controller suitable for several applications, particularly in the industrial environment.

RH31 Humidity Controller

Range: 15-90% RH
Input: via 3-18mAdc transducer
- Price excludes transducer – see Page 7
Power Supply: 230Vac

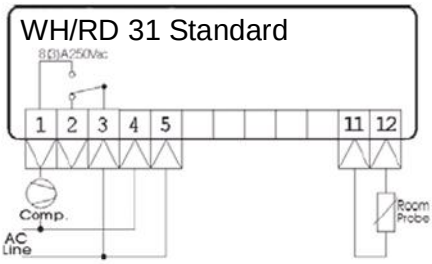
HAMER CODE	CATALOGUE NUMBER	FUNCTIONS OF BETA MODELS
BE6000	RH31-OD51	Outputs: 2 x relay 1 stage humidity control – 8A SPDT Alarm via 5A SPST 1% RH resolution **Version for use with BE9600 Humidity Transducer**

Probes & Accessories

Please note all instruments exclude probe/s

HAMER CODE	CATALOGUE NUMBER	DESCRIPTION
BE9000	S6.R	Type: Resin Treated **PTC** Probe ***Range: -20…+105°C*** Sensor Housing: 6 x 30 mm, Stainless Steel Cable: PVC x 2m Long
BE9001	S6.R	Type: Resin Treated **PTC** Probe ***Range: -20…+105°C*** Sensor Housing: 6 x 30 mm, Stainless Steel Cable: PVC x 6m Long
BE9002	S6.R	Type: Resin Treated **PTC** Probe ***Range: -20…+105°C*** Sensor Housing: 6 x 30 mm, Stainless Steel Cable: PVC x 12m Long
BE9005	S6.P	Type: Resin Treated **PTC** Probe ***Range: -20…+105°C*** Sensor Housing: 7 x 25 mm, Plastic Sensor Cable: PVC x 2m Long **While stocks last**
BE9010	S6.S	Type: Resin Treated **PTC** Probe ***Range: -50…+140°C*** Sensor Housing: 6 x 30 mm, Stainless Steel Cable: Silicon x 2m Long
BE9020	PTC300-S	Type: CH Treated **PTC300** Probe ***Range: -50…+180°C*** Sensor Housing: 6 X 100 mm, Stainless Steel Cable: Silicon x 2m Long
BE9030	PTC300-V	Type: CH Treated **PTC300** Probe ***Range: -40…+270°C*** Sensor Housing: 6 X 100 mm, Stainless Steel Cable: Vecrotex x 2m Long
BE9040	PTC-GLOBO	Wall Mounting **PTC** "Globe" Sensor **Range: -10…+50°C**
BE9500	TF-3	3 VA, 230/12 Vac Transformer
BE9600	RH03	Humidity Transducer for easy installation (already provided with a clip & a A/C 2-wire connecting cable 1.5m long. Output signal 3-18mAdc *Range:* 14-90% RH **Version for use with BE6000 Humidity Controller**

Typical Wiring Diagrams



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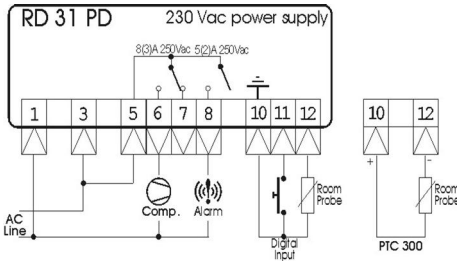

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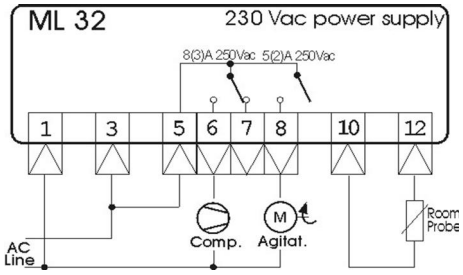

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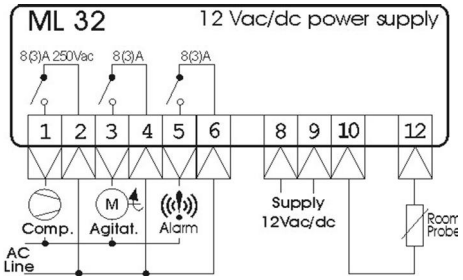

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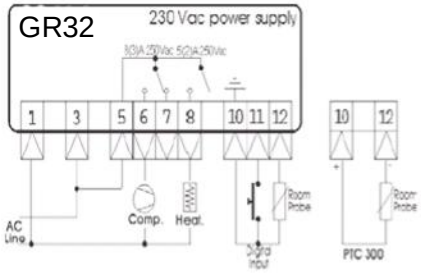

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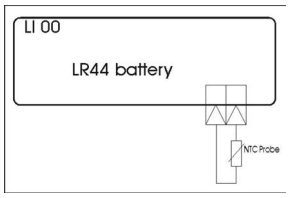

LI00 & LI10
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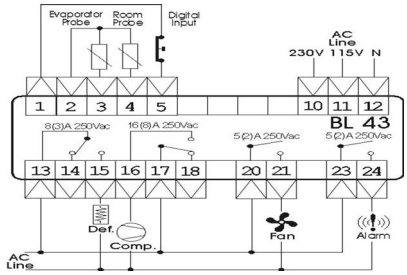

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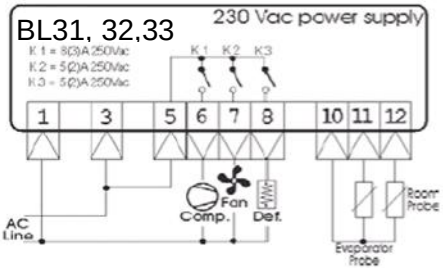

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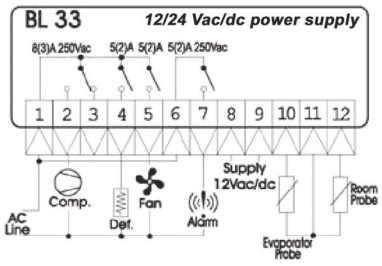

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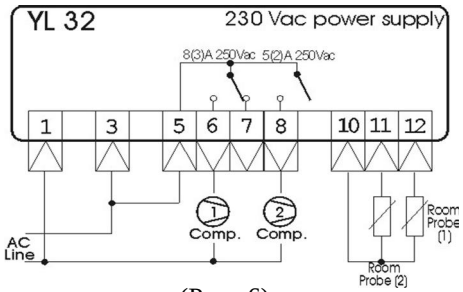

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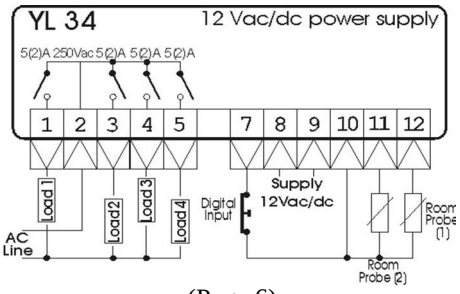

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Features and Parameters for Standard Beta C99 and PD Thermo Instruments

PARAMETERS	CODE	WH31	RD21	RD/RT31	RD41	BL21	BL/RC31	BL41	BL22	BL/RC32	BL42	BL23	BL/RC33	BL43	BL43MS	GR/DC31	BR41	GR/DC32	GR42	YL/SC32	YL42
Set Point	Set	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
2nd Set Point	ST2		ü		ü	ü		ü			ü			ü	ü			ü	ü	ü	ü
Hystersis	HYS	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
2nd Hystersis	HY2														ü			ü	ü		
Min Set Point	LOS	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Max Set Point	HIS	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Alarm min temperature	LOA	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Alarm max temperature	HIA	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Carried out action	ACT	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Alarm operating Modes	ALR	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Temperature Offset	OFS	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Defrost interval	DPT	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Defrost duration	DDT	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
End defrost temperature	DET								ü	ü	ü	ü	ü	ü	ü						
Defrost end optimisation	DEO								ü	ü	ü	ü	ü	ü	ü						
Operating mode during defrost	ODD								ü	ü	ü	ü	ü	ü	ü						
Fan operating mode during defrost pause	FOD											ü	ü	ü	ü						
Fan delay at defrost ON and end	FSD											ü	ü	ü	ü						
Fan start-up set point	FST											ü	ü	ü	ü						
Anticycling time	ACY	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Alarm delay at start up	ADI	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Digital input modes	DIO		ü		ü	ü	ü	ü			ü			ü	ü	ü	ü	ü	ü		
Resolution	RES			ü	ü																
Alarm delay on Duty	ALD		ü		ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Compressor delay after defrost	ADD		ü			ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü		
Display refresh display after defrost	DUD		ü		ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Measure unit	UNT		ü	ü		ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Compressor mode in case of probe failure	CPF		ü			ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Compressor ON time in case of probe failure	CON		ü			ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Compressor OFF time in case of probe failure	COF		ü			ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü
Digital input delay	DID		ü			ü	ü	ü			ü	ü	ü	ü	ü	ü	ü	ü	ü		
Display filter type	UTA		ü			ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü		ü		
Even n/second n	UTD		ü			ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü		ü		
Time scale for defrost pause	TIS		ü			ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü	ü		ü		
Compressor action mode	CAC																			ü	ü

Features and Parameters for C9 Instruments

PARAMETERS	CODE	GR/DC31	GR/DC32-3	GR/DC32-4
Set Point	A1	ü		
	B1		ü	
Main Set Point	C1			ü
2nd Set Point	C3			ü
Dead Band	B4		ü	
Hysteresis	A5	ü		
Direct Action Output (cooling) Hysteresis	B5		ü	
Main Output Hysteresis	C5			ü
Reverse Action Output (heating) Hysteresis	B6		ü	
2nd Output Hysteresis	C6			ü
Lower Set Point Limit	A7	ü		
	B7		ü	
	C7			ü
Upper Set Point Limit	A8	ü		
	B8		ü	
	C8			ü
Anticycling Time	A9	ü		
	B9		ü	
	C9			ü
Alarm Set Point	A10	ü		
	B10		ü	
	C10			ü
Alarm Delay	A11	ü		
	B11		ü	
	C11			ü
Control Action	A13	ü		
Control Action (main output)	C13			ü
Control Action (2nd output)	C14			ü
Offset	A15	ü		
	B15		ü	
	C15			ü
Resolution	A16	ü		
	B16		ü	
	C16			ü
Measure Unit (only temperature)	A17	ü		
	B17		ü	ü
	C17			
Controller Operating Mode In Case Of Probe Failure	A18	ü		
	C18			ü
Output ON Time In Case of Probe Failure	A19	ü		
	C19			ü
Output OFF Time In Case Of Probe Failure	A20	ü		
	C20			ü
Controller Operating Delay At Power On	A21	ü		
	B21		ü	
	C21			ü
Down-Scale Limit	A22	ü		
	B22		ü	
	C22			ü
Full-Scale Limit	A23	ü		
	B23		ü	
	C23			ü

Features and Parameters for YL34 4-Output Step Controller

			SOFTWARE MASK						
#	**MEANING**	**SETTING**	**1s**	**2s**	**3s**	**4s**	**2d**	**4d**	**2i**
-	Main set point	Limits between LoS & HiS							
A0	2dary set point	Limits between LoS & HiS							ü
A1	Dead – Band	0 to 20 units					ü	ü	
A2	Main Differential	1 to 20 units	ü	ü	ü	ü	ü	ü	ü
A3	Differential	Limits 0…8 °C					ü	ü	ü
A4	Control Action set point #1	0: cold - asymmetric band 1: heat - asymmetric band 2: cold - symmetric band 3: heat - symmetric band	ü	ü	ü	ü			ü
A5	Stage #2 control action	0: cold - asymmetric band 1: heat - asymmetric band							ü
A6	Direct action anticycling	Limits 0…99 min	ü	ü	ü	ü	ü	ü	ü
A7	Reverse action anticycling	Limits 0…99 min	ü	ü	ü	ü	ü	ü	ü
A8	Ramp at power on	Limits 0…20 units	ü	ü	ü	ü	ü	ü	ü
A9	Control outputs deactivation mode	0: always OFF 1: always ON		ü	ü	ü		ü	
B0	Alarm set point configuration	0: set points Max and Min as “relative” rate respect to the operating set point 1: set points Max and Min as “absolute” rate within the measurement range	ü	ü	ü	ü	ü	ü	
B1	High alarm	If B0 = 0 Limits 0…50 units If B0 = 1 Limits between the measuring range	ü	ü	ü	ü	ü	ü	ü
B2	Low alarm	If B0 = 0 Limits 0…50 units If B0 = 1 Limits between the measuring range	ü	ü	ü	ü	ü	ü	ü
B3	Alarm histeresys	Limits 0…20 units	ü	ü	ü	ü	ü	ü	ü
B4	Alarm delay on running mode	Limits 0…99 min	ü	ü	ü	ü	ü	ü	ü
C0	Offset of main analog output	Limits –20…20 units	ü	ü	ü	ü	ü	ü	ü
C1	Temperature measuring unit	0 = Celsius 1= Fahrenheit	ü	ü	ü	ü	ü	ü	ü
C2	Display updating time when P.V. increases	Limits 1…99 s	ü	ü	ü	ü	ü	ü	ü
C3	Display updating time when decreases	Limits 1…99 s	ü	ü	ü	ü	ü	ü	ü
C4	Low range of main analog input(only for current/voltage input)	Limits –55…full scale	ü	ü	ü	ü	ü	ü	ü
C5	High range of main analog input(only for current/voltage input)	Limits –99…full scale	ü	ü	ü	ü	ü	ü	ü
D0	Lower set point limit	Limits low-scale…upper set point limit	ü	ü	ü	ü	ü	ü	ü
D1	Upper set point limit	Limits full-scale…lower set point limit (D0)	ü	ü	ü	ü	ü	ü	ü
D2	Set-point during stand-by operating	According with digital input or energy saving operation mode Limits –20…20 units	ü	ü	ü	ü	ü	ü	ü
D3	Cooling compensation	0…9 units of P.v. variation/ 1 unit of set point compensation	ü	ü	ü	ü	ü	ü	ü
D4	Heating compensation	0…9 units of P.v. variation/ 1 unit of set point compensation	ü	ü	ü	ü	ü	ü	ü
D5	Non compensated band	Limits 0…50 units	ü	ü	ü	ü	ü	ü	ü
E0	Digital input	0 = always OFF 1 = like alarm signal 2 = remote ON/OFF signal 3 = normal stand-by contact	ü	ü	ü	ü	ü	ü	ü
E1	Digital input delay	If E0 = 1 limits 0…99 s	ü	ü	ü	ü	ü	ü	ü