ELKM43

CONTROLLER AND MINI-PROGRAMMER

Quick guide

ELKM43-GB-06-05-B

EL.CO. S.r.l.
Via Lago di Molveno, 20 - 36015 Schio (VI)
ITALY
Tel.: +39 0445 661722 - **Fax:** +39 0445 661792
www.elco-italy.com
e-mail: support@elco-italy.com

PREFACE

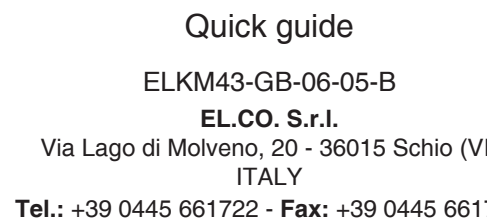
⚠ This manual contains the information necessary for the product to be installed correctly and also instructions for its maintenance and use; we therefore recommend that the utmost attention is paid to the following instructions and to save it.

EL.CO. S.r.l. and its legal representatives do not assume any responsibility for any damage to people, things or animals deriving from violation, wrong or improper use or in any case not in compliance with the instrument features.

⚠ Whenever a failure or a malfunction of the control device may cause dangerous situations for persons, thing or animals, please remember that the plant has to be equipped with additional safety devices.

1. DIMENSIONS AND CUT-OUT (mm)

Controller with non removable terminals



Panel cut-out

Mounting requirements

This instrument is intended for permanent installation, for indoor use only, in an electrical panel which encloses the rear housing, exposed terminals and wiring on the back. Select a mounting location having the following characteristics:

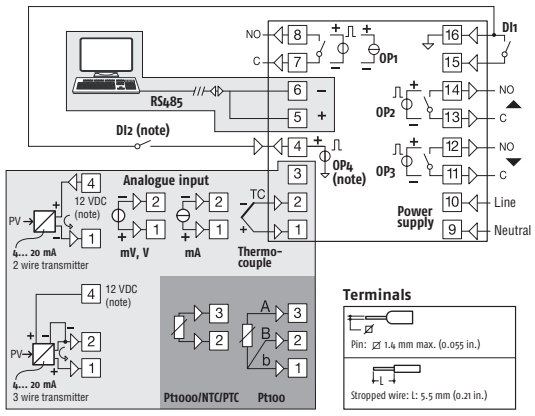
1. It should be easily accessible;
2. There is minimum vibrations and no impact;
3. There are no corrosive gases;
4. There are no water or other fluids (i.e. condensation);
5. The ambient temperature is in accordance with the operative temperature (0... 50°C);
6. The relative humidity is in accordance with the instrument specifications (20... 85%);

The instrument can be mounted on panel with a maximum thickness of 15 mm.

When the maximum front protection (IP65) is desired, the optional gasket must be mounted.

2. ELECTRICAL CONNECTIONS

ELECTRICAL CONNECTIONS



Note: Terminal 4 can be programmed as:

- Digital Input (DI2) connecting a free of voltage contact between terminals 4 and 16;
- 0... 12 V SSR Drive Output (OP4) connecting the load between terminals 4 and 16;
- 12 Vdc (20 mA) transmitter power supply connecting the 2 wire transmitter between terminals 4 and 1; for 3 wire transmitter connect terminal 4 to transmitter power supply input and terminal 1 and 2 to transmitter signal output.

Power supply voltage: 100... 240 Vac/20... 30 Vdc/
18... 28 Vac/24... 240Vac/dc;

Out1 relay: 4 (4) A/250 VAC, SPST;

Out2, 3 relay: 2 (1) A/250 VAC, SPST NA (*);

Out1, 2, 3 SSR: 10 VDC/15 mA;

Linear Out1: 0/4... 20 mA, 0/2... 10 V;

Out4 SSR: 12 VDC/20 mA.

* For ELKM43 servodrive models both Out2 and Out3 are to be selected as "M" in Configuration code; Out2: open, Out3: close.

General notes about wiring

1. Safety regulations require a line switch marked as instrument disconnecting device. This switch must be easily reachable by the operator;
2. Do not run input wires together with power cables;
3. External components (like zener barriers, etc.) connected between sensor and input terminals may cause errors in measurement due to excessive and/or not balanced line resistance or possible leakage currents;
4. When a shielded cable is used, it should be connected at one point only;
5. Pay attention to the line resistance, a high line resistance may cause measurement errors.
6. To avoid electrical shocks, connect power line at last;
7. Before connecting the instrument to the power line, make sure that line voltage is equal to the voltage shown on the identification label;
8. The power supply input is NOT fuse protected. Please, provide an external fuse T type 1A, 250 V.

3. CONFIGURATION PROCEDURES

Setting the parameters

Press the ↵ key for 3 seconds

Insert password (default: 30)

Access to parameters

Key	Editing Mode
↵	Confirm and go to Next parameter
▲	Increase the displayed value or select the next element
▼	Decrease the displayed value or select the previous element
↩	Exit from Operator commands/Parameter setting/Configuration

How to exit the "Configuration mode"

To exit from the Configuration mode, press the ↩ key for 3 seconds.

Code configuration procedure

For ELKM43 version (without timer and programmer) a simplified code configuration method is available. Only essential functions can be set up with code configuration procedure. See the "Engineering User Manual" for more details.

4. LIST OF THE PARAMETERS (PASS: 30)

]inP Group - Main and auxiliary input configuration

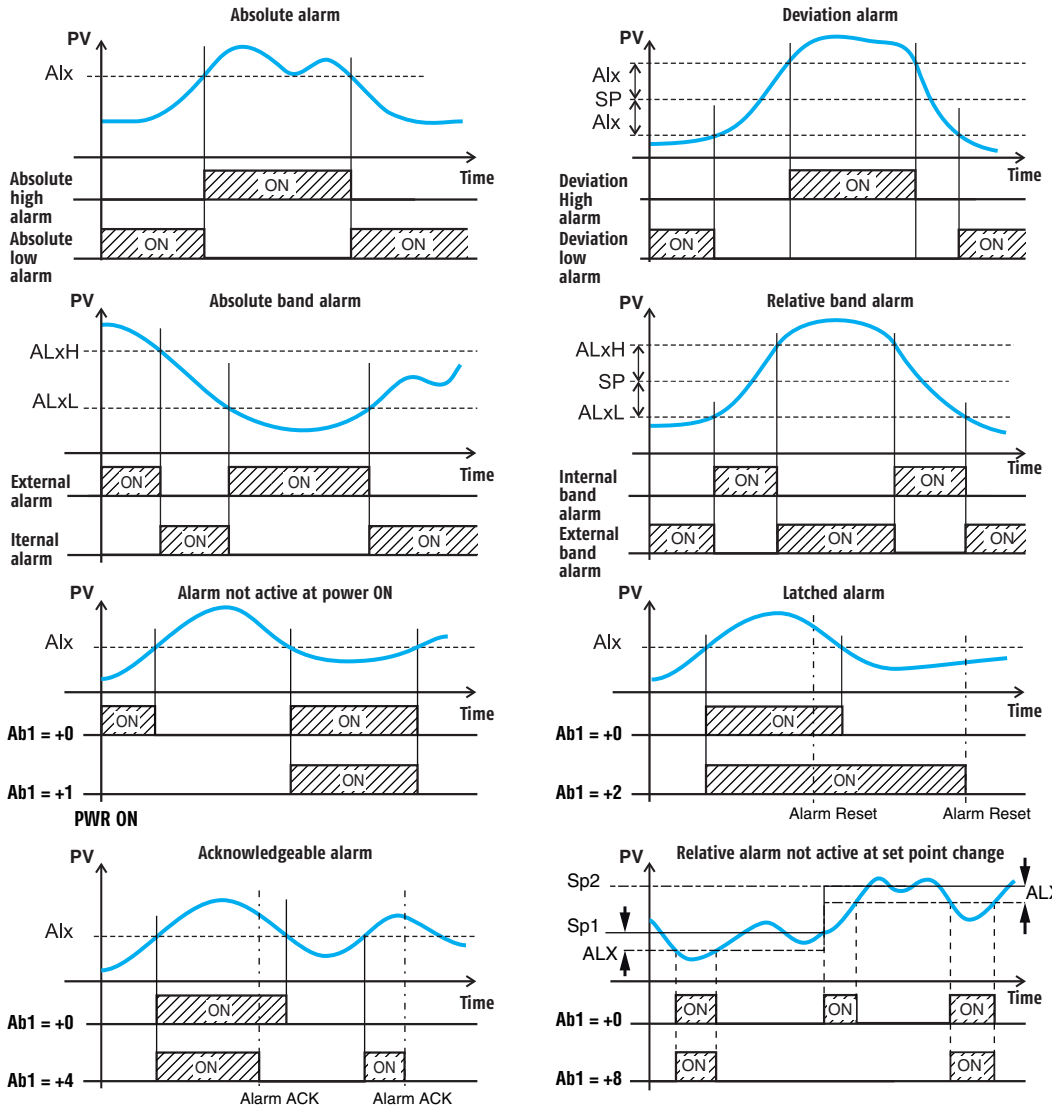
no.	Par.	Description	Dec.	Values	Default	Notes
	SEnS	Model C		J TC J (-50... +1000°C/-58... +1832°F); crAL TC K (-50... +1370°C/-58... +2498°F); S TC S (-50... 1760°C/-58... +3200°F); r TC R (-50... +1760°C/-58... +3200); t TC T (-70... +400°C/-94... +752°F); Ir.J Exergen IRS J(-46... +785°C/-50... +1445°F); Ir.cA Exergen IRS K(-46... +785°C/-50... +1445°F); Pt1 RTD Pt 100(-200... +850°C/-328... +1562°F); Pt10 RTD Pt 1000(-200... +850°C/-328... +1562°F); 0.60 0... 60 mV linear; 12.60 12... 60 mV linear; 0.20 0... 20 mA linear; 4.20 4... 20 mA linear; 0.5 0... 5 V linear; 1.5 1... 5 V linear; 0.10 0... 10 V linear; 2.10 2... 10 V linear.	J	
		Model E		J TC J (-50... +1000°C/-58... +1832°F); crAL TC K (-50... +1370°C/-58... +2498°F); S TC S (-50... 1760°C/-58... +3200°F); r TC R (-50... +1760°C/-58... +3200); t TC T (-70... +400°C/-94... +752°F); Ir.J Exergen IRS J(-46... +785°C/-50... +1445°F); Ir.cA Exergen IRS K(-46... +785°C/-50... +1445°F); Ptc PTC KTY81-121(-55... +150°C/-67... +302°F); ntc NTC 103-AT2 (-50... +110°C/-58... +230°F); 0.60 0... 60 mV linear; 12.60 12... 60 mV linear; 0.20 0... 20 mA linear; 4.20 4... 20 mA linear; 0.5 0... 5 V linear; 1.5 1... 5 V linear; 0.10 0... 10 V linear; 2.10 2... 10 V linear.		
2	dp	Decimal Point Position (linear inputs)	0	0... 3	0	
		Decimal Point Position (non linear inputs)		0/1		
3	SSC	Initial scale read-out for linear inputs	dp	-1999... 9999	0	
4	FSc	Full Scale Readout for linear inputs	dp	-1999... 9999	1000	
5	unit	Engineer unit		°C/°F	°C	
6	Fil	Digital filter on the measured value	1	0 (= OFF)... 20.0 s	1.0	
7	inE	Sensor error reaction to enable the safety output value		or Over range; ur Under range; our Over and under range.	our	
8	oPE	Safety output value (% of the output)		-100... 100	0	
9	IO4.F	I/O 4 function		on Output used as PWS for TX; out4 Output 4 (digital output 4); dG2c Digital input 2 driven by contact; dG2U Digital input 2 driven by voltage.	out4	
9	IO4.F	I/O 4 function		on Output used as PWS for TX; out4 Output 4 (digital output 4); dG2c Digital input 2 driven by contact; dG2U Digital input 2 driven by voltage.	out4	
10	diF1	Digital Input 1 function		oFF Not used; 1 Alarm reset; 2 Alarm acknowledge (ACK); 3 Hold of the measured value; 4 Stand by mode; 5 Manual mode; 6 HEAt with SP1 and CooL with SP2; 7 Timer RUN/Hold/Reset; 8 Timer Run; 9 Timer Reset; 10 Timer Run/Hold; 11 Timer Run/Reset; 12 Timer Run/Reset with lock; 13 Program Start; 14 Program Reset; 15 Program Hold; 16 Program Run/Hold; 17 Program Run/Reset; 18 Sequential SP selection; 19 SP1 - SP2 selection; 20 SP1... SP4 binary selection; 21 Digital inputs in parallel to ▲ / ▼ keys.	oFF	
12	di.A	Digital input action (DI2 only if configured)		0 DI1 direct action, DI2 (if configured) direct action; 1 DI1 inverse action, DI2 (if configured) direct action; 2 DI1 direct action, DI2 (if configured) inverse action; 3 DI1 inverse action, DI2 (if configured) inverse action.	0	

]Out group - Output parameters

no.	Par.	Description	Dec.	Values	Default	Notes
13	o1t	Output 1 type (when Out 1 is a linear output)		0-20 0... 20 mA; 4-20 4... 20 mA; 0-10 0... 10 V; 2-10 2... 10 V.	0-20	
14	o1F	Out 1 function (when Out 1 is a linear output)	0	NonE Output not used; H.rEG Heating output; c.rEG Cooling output; r.inP Measure retransmission; r.Err Error (SP - PV) retransmission; r.SP Set point retransmission; r.SEr Serial value retransmission.	H.reG	
		Out 1 function (when Out1 is a digital output)	0	NonE Output not used; H.rEG Heating output; c.rEG Cooling output; AL Alarm output; t.out Timer output; t.HoF Timer out -OFF in hold; P.End Program end indicator; P.HLd Program hold indicator; P.uit Program wait indicator; P.run Program run indicator; P.Et1 Program Event 1; P.Et2 Program Event 2; or.bo Out of range or burn out indicator; P.FAL Power failure indicator; bo.PF Out of range/burnout/Power failure indicator; St.bY Stand by status indicator; diF.1 The output repeats the digital input 1 status; diF.2 The output repeats the digital input 2 status; on Out 1 always ON; riSP Inspection request.		
15	Ao1L	Initial scale for the analog retransmission	dP	-1999 ... Ao1H	-1999	
16	Ao1H	Full scale for the analog retransmission	dP	Ao1L ... 9999	9999	
17	o1AL	Alarms linked up with the out 1	0	0... 63: +1 Alarm 1; +2 Alarm 2; +4 Alarm 3; +8 Loop break alarm; +16 Sensor Break; +32 Overload on output 4.	1	
18	o1Ac	Out 1 action	0	dir Direct action; rEU Reverse action; dir.r Direct with reversed LED; ReU.r Reverse with reversed LED.	dir	
19	o2F	Out 2 function	0	See O1F - Out 1 function (digital output)	AL	
20	o2AL	Alarms linked up with the out 2	0	See O1AL - Alarms linked up with the out 1	1	
21	o2Ac	Out 2 action	0	See O1Ac - Out 1 action	dir	
22	o3F	Out 3 function	0	See O1F - Out 1 function (digital output)	AL	
23	o3AL	Alarms linked up with the out 3	0	See O1AL - Alarms linked up with the out 1	2	

no.	Par.	Description	Dec.	Values	Default	Notes
24	o3Ac	Out 3 action	0	See O1Ac - Out 1 action	dir	
25	o4F	Out 4 function	0	See O1F - Out 1 function (digital output)	AL	
26	o4AL	Alarms linked up with the out 4	0	See O1AL - Alarms linked up with the out 1	AL1+AL2	
27	o4Ac	Out 4 action	0	See O1Ac - Out 1 action	dir	

Alarm types



]AL1 Group - Alarm 1 parameters

no.	Par.	Description	Dec.	Values	Default	Notes
28	AL1t	Alarm 1 type	0	nonE Alarm not used; LoAb Absolute low alarm; HiAb Absolute high alarm; LHAo Windows alarm in alarm outside the windows; LHAI Windows alarm in alarm inside the windows; SE.br Sensor Break; LodE Deviation low alarm (relative); HidE Deviation high alarm (relative); LHdo Relative band alarm in alarm out of the band; LHdi Relative band alarm in alarm inside the band.	HiAb	
29	Ab1	Alarm 1 function	0	0... 15: +1 Not active at power up; +2 Latched alarm (manual reset); +4 Acknowledgeable alarm; +8 Relative alarm not active at set point change.	0	
30	AL1L	For High/low alarm, AL1 threshold low limit; For band alarm, AL1 low alarm threshold	dp	From -1999 to AL1H (E.U.)	-1999	
31	AL1H	For High/low alarm, AL1 threshold high limit; For band alarm, AL1 high alarm threshold	dp	From AL1L to 9999 (E.U.)	9999	
32	AL1	AL1 threshold	dp	From AL1L to AL1H (E.U.)	0	
33	HAL1	AL1 hysteresis	dp	1... 9999 (E.U.)	1	
34	AL1d	AL1 delay	0	From 0 (oFF) to 9999 (s)	oFF	
35	AL1o	Alarm 1 enabling during Stand-by mode and out of range conditions	0	0 Alarm 1 disabled during Stand by and out of range; 1 Alarm 1 enabled in stand by mode; 2 Alarm 1 enabled in out of range condition; 3 Alarm 1 enabled in stand by and overrange.	0	

]AL2 Group - Alarm 2 parameters

no.	Par.	Description	Dec.	Values	Default	Notes
36	AL2t	Alarm 2 type	0	See AL1t	Loab	
37	Ab2	Alarm 2 function	0	See Ab1	0	
38	AL2L	For High/low alarm, AL2 threshold low limit; For band alarm, AL2 low alarm threshold	dp	See AL1L	-1999	
39	AL2H	For High/low alarm, AL2 threshold high limit; For band alarm, AL2 high alarm threshold	dp	See AL1H	9999	
40	AL2	AL2 threshold	dp	See AL1	0	
41	HAL2	AL2 hysteresis	dp	See HAL1	1	
42	AL2d	AL2 delay	0	See AL1d	oFF	
43	AL2o	Alarm 2 enabling during Stand-by mode and out of range conditions	0	See AL1o	0	

]AL3 Group - Alarm 3 parameters

no.	Par.	Description	Dec.	Values	Default	Notes
44	AL3t	Alarm 3 type	0	See AL1t	nonE	
45	Ab3	Alarm 3 function	0	See Ab1	0	
46	AL3L	For High/low alarm, AL3 threshold low limit; For band alarm, AL3 low alarm threshold	dp	See AL1L	-1999	
47	AL3H	For High/low alarm, AL3 threshold high limit; For band alarm, AL3 high alarm threshold	dp	See AL1H	9999	
48	AL3	AL3 threshold	dp	See AL1	0	
49	HAL3	AL3 hysteresis	dp	See HAL1	1	
50	AL3d	AL3 delay	0	See AL1d	oFF	
51	AL3o	Alarm 3 enabling during Stand-by mode and out of range conditions	0	See AL1o	0	

]LBA Group - Loop break alarm

no.	Par.	Description	Dec.	Values	Default	Notes
52	LbAt	LBA time	0	From 0 (oFF) to 9999 (s)	oFF	
53	LbSt	Deltameasure used by LBA during Softstart	dP	From 0 (oFF) to 9999 (E.U.)	10	
54	LbAS	Delta measure used by LBA	dP	1...9999 (E.U.)	20	
55	LbcA	Condition for LBA enabling	0	uP Active when Pout = 100%; dn Active when Pout = -100%; both Active in both cases.	both	

]rEG Group - Control parameters

no.	Par.	Description	Dec.	Values	Default	Notes
56	cont	Control type	0	Pid PID (heat and/or); On.FA ON/OFF asymmetric hysteresis; On.FS ON/OFF symmetric hysteresis; nr Heat/Cool ON/OFF control with neutral zone; 3Pt Servomotor control.	Pid	
57	Auto	Autotuning selection	0	-4 Oscillating auto-tune with auto-restart at power ON and after all point change; -3 Oscillating auto-tune with manual start; -2 Oscillating tune with auto-start at first power ON only; -1 Oscillating auto-tune with auto-restart at all power ON; 0 Not used; 1 Fast auto tuning with auto-restart at all power ON; 2 Fast auto-tune with auto-start the first power ON only; 3 FAST auto-tune with manual start; 4 FAST auto-tune with automatic restart at power ON and after a set point change; 5 Smart-tune with auto-restart at all power ON; 6 Smart-tune with auto-start at first power ON only; 7 Smart-tune with manual start; 8 Smart-tune with auto-restart at power ON and after a set point change.	7	
58	Aut.r	Manual start of the Autotuning	0	oFF Not active; on Active.	oFF	
59	SELF	Self tuning enabling	0	no The instrument does not perform the self-tuning; YES The instrument performs the self-tuning.	no	
60	HSEt	Hysteresis of the ON/OFF control	dP	0... 9999 (E.U.)	1	
61	cPdt	Time for compressor protection	0	From 0 (oFF) to 9999 (s)	oFF	
62	Pb	Proportional band	dP	1... 9999 (E.U.)	50	
63	ti	Integral time	0	From 0 (oFF) to 9999 (s)	200	
64	td	Derivative time	0	From 0 (oFF) to 9999 (s)	50	
65	Fuoc	Fuzzy overshoot control	2	0.00... 2.00	0.50	
66	tcH	Heating output cycle time	1	0.1... 130.0 (s)	20.0	
67	rcG	Power ratio between heating and cooling action	2	0.01... 99.99	1.00	
68	tcc	Cooling output cycle time	1	0.1... 130.0 (s)	20.0	
69	rS	Manual reset (Integral pre-load)	1	-100.0... +100.0 (%)	0.0	
70	Str.t	Servomotor stroke time	0	5...1000 seconds	60	
71	db.S	Servomotor dead band	0	0...100%	50	
72	od	Delay at power up	2	From 0.00 (oFF) to 99.59 (hh.mm)	oFF	
73	St.P	Maximum power output used during soft start	0	-100... 100 (%)	0	
74	SSt	Soft start time	2	0.00 (oFF); 0.01... 7.59 (hh.mm); inF (always ON).	oFF	
75	SS.tH	Threshold for soft start disabling	dP	-1999... +9999 (E.U.)	9999	

]SP Group - Set point parameters

no.	Par.	Description	Dec.	Values	Default	Notes
76	nSP	Number of used set points	0	1... 4	1	
77	SPLL	Minimum set point value	dP	From -1999 to SPHL	-1999	
78	SPHL	Maximum set point value	dP	From SPLL to 9999	9999	
79	SP	Set point 1	dP	From SPLL to SPLH	0	
80	SP 2	Set point 2	dP	From SPLL to SPLH	0	
81	SP 3	Set point 3	dP	From SPLL to SPLH	0	
82	SP 4	Set point 4	dP	From SPLL to SPLH	0	
83	A.SP	Selection of the active set point	0	From 1 (SP 1) to nSP	1	
84	SP.rt	Remote set point type	0	RSP The value coming from serial link is used as remote set point; trin The value will be added to the local set point selected by A.SP and the sum becomes the operative set point; PErc The value will be scaled on the input range and this value will be used as remote SP.	trin	
85	SPLr	Local/remote set point selection	0	Loc Local; rEn Remote.	Loc	
86	SP.u	Rate of rise for POSITIVE set point change (ramp UP)	2	0.01... 99.99 (inF) engineering units per minute	inF	
87	SP.d	Rate of rise for NEGATIVE set point change (ramp DOWN)	2	0.01... 99.99 (inF) engineering units per minute	inF	

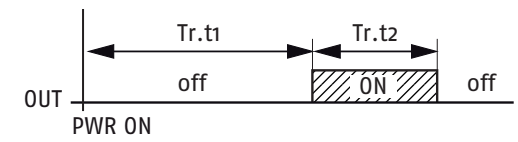
]TIN Group - Timer function parameter

no.	Par.	Description	Dec.	Values	Default	Notes
88	tr.F	Independent timer function	0	NonE Timer not used; i.d.A Delayed start timer; i.uP.d Delayed start at power up; i.d.d Feed-through timer; i.P.L Asymmetrical oscillator with start OFF; i.L.P Asymmetrical oscillator with start ON.	nonE	
89	tr.u	Timer unit	0	hh.nn Hours and minutes; nn.SS Minutes and seconds; SSS.d Second and tenth of seconds.	nn.SS	
90	tr.t1	Time 1	2	When tr.u < 20: 0.01... 99.59	1.00	
			1	When tr.u = 200: 0.1... 995.9		
91	tr.t2	Time 2	2	When tr.u < 2: From 00.00 (oFF) to 99.59 (inF)	1.00	
			1	When tr.u = 2: From 000.0 (oFF) to 995.9 (inF)		
92	tr.St	Timer status	0	rES Timer reset; run Timer run; HoLd Timer hold.	rES	

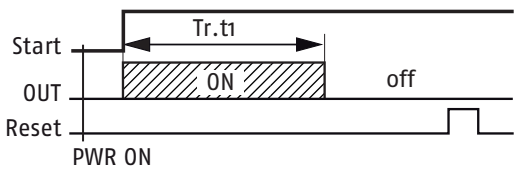
Timer Types (selected by tr.F) (option)

i.dA Delayed ON at Start command

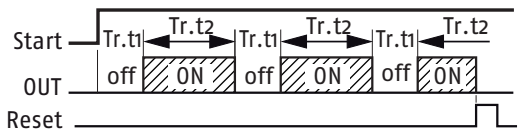
i.uP.d Delayed ON at Power ON



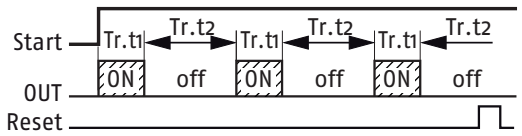
i.d.d At Start command



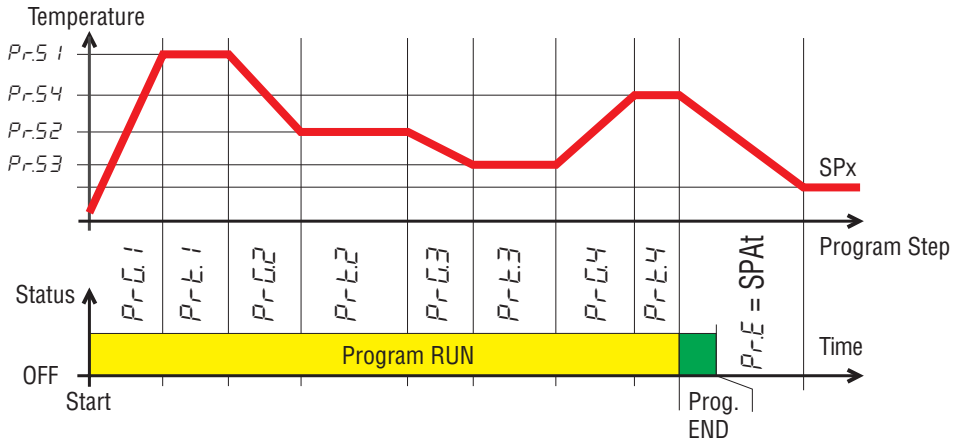
i.P.L Asymmetrical oscillator with start in OFF



i.L.P Asymmetrical oscillator with start in ON



]PRG Group - Programmer function parameters



no.	Par.	Description	Dec.	Values	Default	Notes
93	Pr.F	Program action at power up	0	nonE Programmer not used; S.uP.d Start at power up with a first step in stand-by; S.uP.S Start at power up; u.diG Start at Run command detection only; u.dG.d Start at Run command with a first step in stand-by.	nonE	
94	Pr.u	Time unit of the soaks	2	hh.nn Hours and minutes; nn.SS Minutes and seconds.	hh.nn	
95	Pr.E	Instrument behaviour at the end of the program execution	0	cnt Continue; SPat Go to the set point selected by SPat; St.by Go to stand-by mode.	SPat	
96	Pr.Et	Time of the end program indication	2	From 0.00 (oFF) to 99.59 (inF) minutes and seconds	oFF	
97	Pr.S1	Set point of the first soak	dP	From SPLL to SPHL	0	
98	Pr.G1	Gradient of the first ramp	1	0.1...999.9 Engineering Unit/minute (inF=Step transfer)	inF	
99	Pr.t1	Time of the 1st soak	2	0.00... 99.59 (time unit of the soaks)	0.10	
100	Pr.b1	Wait band of the 1st soak	dP	0 (oFF)/1... 9999 (E.U.)	oFF	
101	Pr.E1	Events of the 1st group	2	00.00... 11.11 (= Event OFF; = Event ON)	00.00	
102	Pr.S2	Set point of the 2nd soak	dP	OFF or from SPLL to SPHL	0	
103	Pr.G2	Gradient of the 2nd ramp	1	0.1...999.9 Engineering Unit/minute (inF=Step transfer)	inF	
104	Pr.t2	Time of the 2nd soak	2	0.00... 99.59 (time unit of the soaks)	0.10	
105	Pr.b2	Wait band of the 2nd soak	dP	0 (oFF)/1... 9999 (E.U.)	oFF	
106	Pr.E2	Events of the 2nd group	2	00.00... 11.11 (= Event OFF; = Event ON)	00.00	
107	Pr.S3	Set point of the 3rd soak	dP	OFF or from SPLL to SPHL	0	
108	Pr.G3	Gradient of the 3rd ramp	1	0.1...999.9 Engineering Unit/minute (inF=Step transfer)	inF	
109	Pr.t3	Time of the 3rd soak	2	0.00... 99.59 (time unit of the soaks)	0.10	
110	Pr.b3	Wait band of the 3rd soak	dP	0 (oFF)/1... 9999 (E.U.)	oFF	
111	Pr.E3	Events of the 3rd group	0	00.00... 11.11 (= Event OFF; = Event ON)	00.00	
112	Pr.S4	Set point of the 4th soak	dP	OFF or from SPLL to SPHL	0	
113	Pr.G4	Gradient of the 4th ramp	1	0.1...999.9 Engineering Unit/minute (inF=Step transfer)	inF	
114	Pr.t4	Time of the 4th soak	2	0.00... 99.59 (time unit of the soaks)	0.10	
115	Pr.b4	Wait band of the 4th soak	dP	0 (oFF)/1... 9999 (E.U.)	oFF	
116	Pr.E4	Events of the 4th group	0	00.00... 11.11 (= Event OFF; = Event ON)	00.00	
117	Pr.St	Program status	0	rES Program reset; run Program start; HoLd Program hold.	rES	

]PAn Group - Operator HMI

no.	Par.	Description	Dec.	Values	Default	Notes
118	PAS2	Level 2 password (limited access level)	0	oFF (Level 2 not protected by password); 1... 200.	20	
119	PAS3	Level 3 password (complete configuration)	0	3... 200	30	
120	PAS4	Level 4 password (CODE configuration level)	0	201... 400	300	
121	uSrb	button function during RUN TIME		nonE No function; tunE Auto-tune/self-tune enabling. A single press (longer than 1 second) starts the auto-tune; oPLo Manual mode. The first pressure puts the instrument in manual mode (oPLo) while a second one puts the instrument in Auto mode; AAc Alarm acknowledge; ASi Alarm reset; chSP Sequential set point selection; St.by Standby mode. The first press puts the instrument in stand by mode while a second one puts the instrument in Auto mode; Str.t Timer run/hold/reset; P.run Program run; P.rES Program reset; P.r.H.r Program run/hold/reset.	tunE	

no.	Par.	Description	Dec.	Values	Default	Notes
122	diSP	Display management		nonE Standard display; Pou Power output; SPF Final set point; Spo Operative set point; AL1 Alarm 1 threshold; AL2 Alarm 2 threshold; AL3 Alarm 3 threshold; Pr.tu - During a soak, the instrument shows the soak elapsed time; - During a ramp the display shows the operative set point. At program end, the instrument alternately displays P.End and the measured value; - When no program is running, the instrument shows the standard display; Pr.td - During a soak, the instrument shows the soak remaining time (count down); - During a ramp the display shows the operative set point. At program end, the instrument alternately displays P.End and the measured value; - When no program is running, the instrument shows the standard display; P.t.tu When the programmer is running, the display shows the total elapsed time. At program end, the instrument alternately displays P.End and the measured value; P.t.td When the programmer is running, the display shows the total remaining time (count down). At program end, the instrument alternately displays P.End and the measured value; ti.uP When the timer is running, the display shows the timer counting up. At count end, the instrument alternately displays t.End and the measured value; ti.du When the timer is running, the display shows the timer counting down. At count end, the instrument alternately displays t.End and the measured value; PErc Percent of the power output used during soft start (when the soft start time is equal to infinite, the limit is always active and it can also be used when ON/OFF control is selected); PoS Valve position (servomotor control).	0	
123	di.cL	Display colour		0 The display colour shows the actual deviation (PV - SP); 1 Display red (fix); 2 Display green (fix); 3 Display orange (fix).	0	
124	AdE	Deviation for display colour management		1... 999 (E.U.)	5	
125	di.St	Display Timeout	2	oFF (display always ON); 0.1... 99.59 (mm.ss).	oFF	
126	fiLd	Filter on the displayed value	1	oFF (filter disabled); From 0.0 (oFF) to 20.0 (E.U.).	oFF	
128	dSPu	Instrument status at power ON		AS.Pr Starts in the same way it was prior to the power down; Auto Starts in Auto mode; oP.0 Starts in manual mode with power output = 0; St.bY Starts in stand-by mode.	AS.Pr	
129	oPr.E	Operative mode enabling		ALL All modes will be selectable by the next parameter; Au.oP Auto and manual (oPLo) mode only will be selectable by the next parameter; Au.Sb Auto and Stand-by mode only will be selectable by the next parameter	ALL	
130	oPEr	Operative mode selection		If oPr.E = ALL: - Auto = Auto mode; - oPLo = Manual mode; - St.bY = Stand by mode; If oPr.E = Au.oP: - Auto = Auto mode; - oPLo = Manual mode; If oPr.E = Au.Sb: - Auto = Auto mode; - St.bY = Stand by mode.	Auto	

]Ser Group - Serial link parameter

no.	Par.	Description	Dec.	Values	Default	Notes
131	Add	Instrument address		oFF; 1... 254.	1	
132	bAud	baud rate		1200 1200 baud; 2400 2400 baud; 9600 9600 baud; 19.2 19200 baud; 38.4 38400 baud.	9600	
133	trSP	Selection of the value to be retransmitted (Master)		nonE Retransmission not used (the instrument is a slave); rSP The instrument becomes a Master and retransmits the operative set point; PErc The instrument becomea Master and it retransmits the power output.	nonE	

]COn Group - Consumption parameters

no.	Par.	Description	Dec.	Values	Default	Notes
134	Co.tY	Count type		oFF Not used; 1 Instantaneous power (kW); 2 Power consumption (kW/h); 3 Energy used during program execution. This measure starts from zero when a program runs end stops at the end of the program. A new program execution will reset the value; 4 Total worked days: number of hours the instrument is turned ON divided by 24; 5 Total worked hours: number of hours that the instrument is turned ON; 6 Total worked days with threshold: number of hours the instrument is turned ON divided by 24, the controller is forced in stand-by when Co.ty value reaches the threshold set in [137] h.Job; 7 Total worked hours with threshold: number of hours that the instrument is turned ON, the controller is forced in stand-by when Co.ty value reaches the threshold set in [137] h.Job; 8 Totalizer of control relay worked days: number of hours the control relay has been in ON condition, divided by 24; 9 Totalizer of control relay worked hours: number of hours the control relay has been in ON condition; 10 Totalizer of control relay worked days with threshold: number of hours the control relay has been in ON condition divided by 24, the controller is forced in stand-by when Co.ty value reaches the threshold set in [137] h.Job; 11 Totalizer of control relay worked hours with threshold: number of hours the control relay has been in ON condition, the controller is forced in stand-by when Co.ty value reaches the threshold set in [137] h.Job.	oFF	
135	UoLt	Nominal Voltage of the load		1... 9999 (V)	230	
136	cur	Nominal current of the load		1... 999 (A)	10	
137	h.Job	Threshold of the working period		oFF Threshold not used; 0... 9999 days (when [134] cotY = 4); 0... 9999 hours (when [134] cotY = 5).	0	
138	t.Job	Worked time (not resettable)		0... 9999 days		

]CAL Group - User calibration group

no.	Par.	Description	Dec.	Values	Default	Notes
139	AL.P	Adjust Low Point		From -1999 to (AH.P - 10) in engineering units	0	
140	AL.o	Adjust Low Offset		-300... +300 (E.U.)	0	
141	AH.P	Adjust High Point		From (AL.P + 10) to 9999 engineering units	9999	
142	AH.o	Adjust High Offset		-300... +300	0	

Note: To access all the instrument features, please see the "Complete configuration procedure" in the "Engineering User Manual".

Complete Configuration and Parameter setting can be easily uploaded from the controller and downloaded to other controllers using the: Configuration Key ELCO: KEY A-01.

Factory reset - Default parameters loading procedure

Sometime, e.g. when you re-configure an instrument previously used for other works or from other people or when you have made too many errors during configuration and you decided to re-configure the instrument, it is possible to restore the factory configuration.

This action allows to put the instrument in a defined condition (the same it was at the first power ON).

The default data are those typical values loaded in the instrument prior to ship it from factory.

To load the factory default parameter set, proceed as follows:

1. Press the ↵ button for more than 5 seconds. The upper display will show PASS while the lower display shows 0;
2. Using ▲ and ▼ buttons set the value -481;
3. Push ↵ button;
4. The instrument will turn OFF all LEDs for a few seconds, then the upper display will show dFLt (default) and then all LEDs are turned ON for 2 seconds. At this point the instrument restarts as for a new power ON.

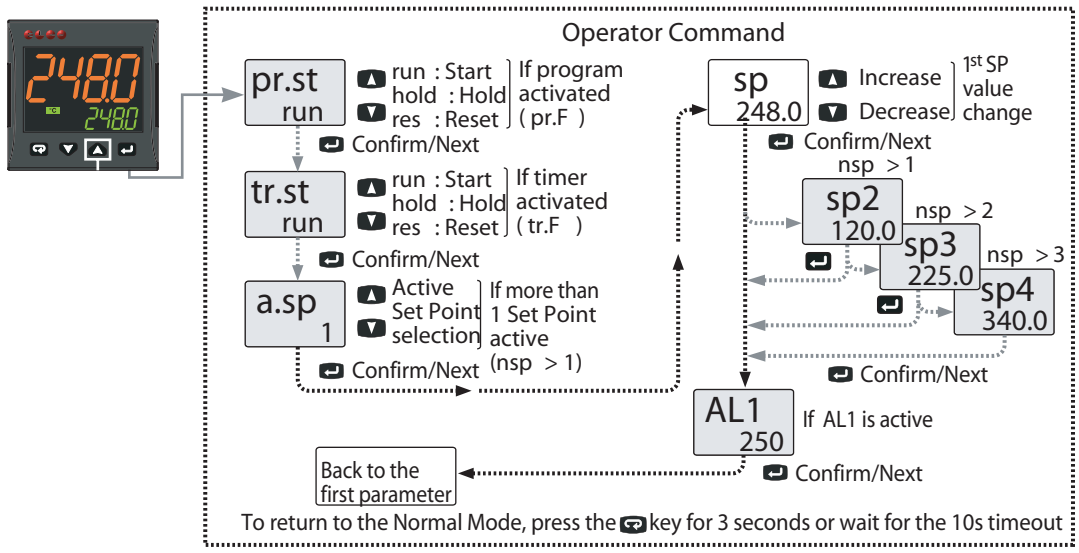
The procedure is complete.

5. OPERATIVE MODES

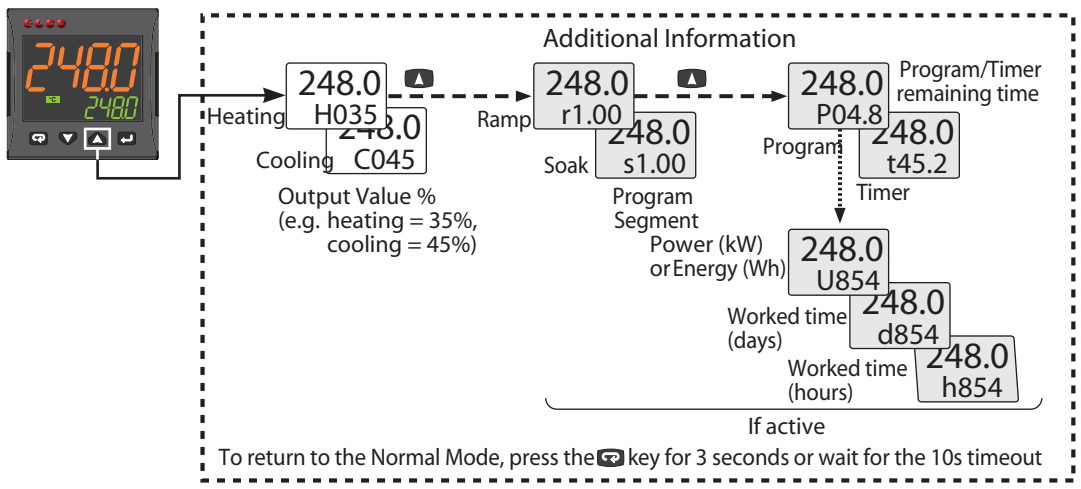
Keyboard function when the instrument is in Auto mode

Key	Operator Mode
↵	Access to: - Operator Commands (Timer, Setpoint selection ...) - Parameters - Configuration
▲	Access to Operator additional information (Output value, running time ...)
▼	Accesso to Set Point
↩	Start programmed function with usrb parameter (Autotune, Auto/Man, Timer ...)

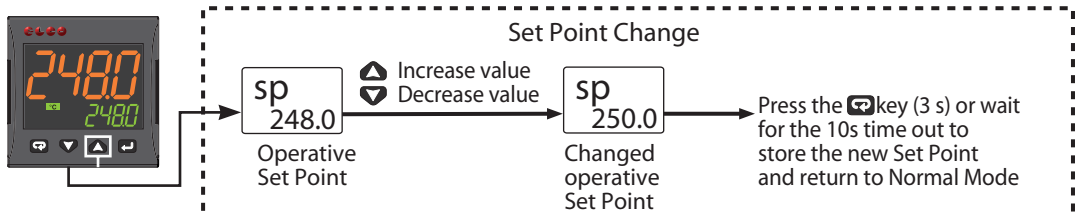
Operator Commands



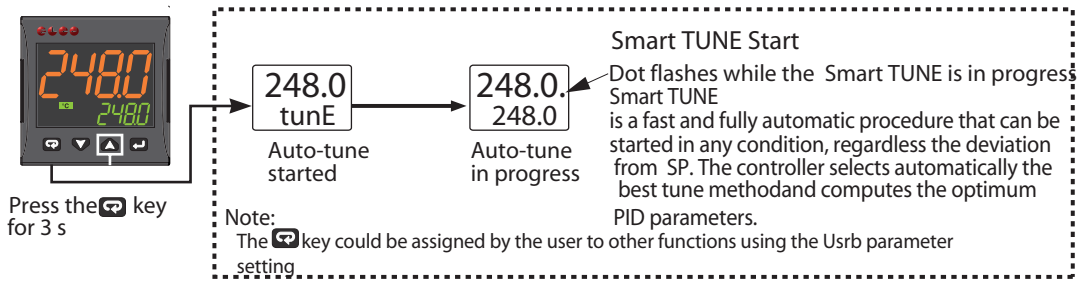
Additional information



Set Point Change



Running the Tuning functions



6. ERROR MESSAGES

Out of range signals

The instrument points out, on the upper display, the OVER-RANGE and UNDER-RANGE conditions using the following indications:

Over-range: 0000

Under-range: U.U.U.U.

The sensor break will be signalled as an out of range: - - - -

Note: When an over-range or an under-range is detected, the alarms operate as in presence of the maximum or the minimum measurable value respectively.

To check the out of span Error condition, proceed as follows:

1. Check the input signal source and the connecting line.
2. Make sure that the input signal is in accordance with the instrument configuration. Otherwise, modify the input configuration (see section 4).
3. If no error is detected, send the instrument to your supplier to be checked.

List of possible errors

ErAT Fast Auto-tune cannot start. The measure value is too close to the set point. Push the ↵ button in order to delete the error message.

ouLd Overload on output 4. The message shows that a short circuit is present on Out 4 when it is used as output or transmitter power supply. When the short circuit disappears the output restarts to operate.

NoAt Auto-tune not finished within 12 hours.

ErEP Possible problem in the instrument memory. The message should automatically disappear, if the error persists, send the instrument to your supplier.

RonE Possible problem of the firmware memory. If this error is detected, send the instrument to your supplier.

Errt Possible problem of the calibration memory. If this error is detected, send the instrument to your supplier.

7. GENERAL NOTES

Proper use

Every possible use not described in this manual must be consider as a improper use.

This instrument is in compliance with EN 61010-1 "Safety requirements for electrical equipment for measurement, control and laboratory use"; for this reason it could not be used as a safety equipment.

Whenever a failure or a malfunction of the control device may cause dangerous situations for persons, thing or animals, please remember that the plant has to be equipped with additional safety devices.

EL.CO. S.r.l. and its legal representatives do not assume any responsibility for any damage to people, things or animals deriving from violation, wrong or improper use or in any case not in compliance with the instrument's features.

Declaration of conformity and Manual retrieval

ELKM43 is a panel mounting, Class II instrument. It has been designed with compliance to the European Directives.

All information about the controller use can be found in the Engineering User Manual available on the download area of our website www.elco-italy.com .

The Declaration of Conformity is available for free on request by our web-ticketing support service on our website.

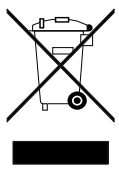
Maintenance

This instrument does not requires periodical recalibration and it have no consumable parts so that no particular maintenance is required.

Sometimes it is advisable to clean the instrument.

1. SWITCH THE EQUIPMENT OFF (power supply, relay output, etc.).
2. Using a vacuum cleaner or a compressed air jet (max. 3 kg/cm^2) remove all deposits of dust and dirt which may be present on the case and on the internal circuits being careful not to damage the electronic components.
3. To clean external plastic or rubber parts use only a cloth moistened with:
   - Ethyl Alcohol (pure or denatured) [C_2H_5OH] or
   - Isopropyl Alcohol (pure or denatured) [$(CH_3)_2CHOH$] or
   - Water (H_2O).
4. Make sure that there are no loose terminals.
5. Before turning ON the instrument make sure it is perfectly dry.
6. Apply the power supply to the instrument.

Disposal



The appliance (or the product) must be disposed of separately in compliance with the local standards in force on waste disposal.

Warranty

This product is under warranty against manufacturing defects or faulty materials that are found within 12 months from delivery date. The warranty is limited to repairs or to the replacement of the instrument.

The tampering of the instrument or an improper use of the product will bring about the immediate withdrawal of the warranty effects.

In the event of a faulty instrument, either within the period of warranty, or further to its expiry, please contact our our support team through the web-ticketing service on our website.

The return policy will be communicated once the request will be accepted and is also available on the "Sales Condition".

8. ORDER CODE

Model
ELKM43 = Controller
ELKM43T = Controller + timer
ELKM43P = Controller + timer + programmer

Power supply
240 = 100... 240 VAC
EV = 24…240 VAC-VDC

Analogue input + Digital input DI1 (standard)
C = J, K, R, S, T, PT100, PT 1000 (2 fili), mA, mV, V
E = J, K, R, S, T, NTC, PTC, mA, mV, V

Output 1
A = 0/4...20 mA, 0/2...10V
R = Relais SPST 4A (resistive load)
S = VDC forSSR

Output 2
- = Not available
2R = Relais SPST 2 A (resistive load)
2S = VDC for SSR
2M= Relais SPST 2 A (servomotor drive)

Output 3
- = Not available
3R = Relais SPST 2 A (resistive load)
3S = VDC forSSR
3M= Relè SPST 2 A (servomotor drive)

Serial communications
- = TTL Modbus
S = RS485 Modbus + TTL Modbus

Note: Add "W" after the product name for white coloured display led's

Note: For servomotor drive, both Output 2 and Output 3 codes must be selected as "M"