

# The LOK range

Packaged Plate Heat Exchangers for Domestic Hot Water Production

Specialist Programming Guide

## Models:

LOK8-50/LOKT8-50

LOK8-100/ LOKT8-100

LOK8-150/ LOKT8-150

LOK8-200/ LOKT8-200

LOK8-250/ LOKT8-250

LOK8-300/ LOKT8-300

LOK8-350/ LOKT8-350

LOK8-400/ LOKT8-400

LOK14-450/ LOKT14-450

LOK14-500/ LOKT14-500

LOK14-550/ LOKT14-550





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# 1/16 DIN PROCESS CONTROLLERS CONCISE PRODUCT MANUAL

**CAUTION:** Installation should be only performed by technically competent personnel. Local Regulations regarding electrical installation & safety must be observed.

## 1.0 SELECT MODE

Select mode is used to access the configuration and operation menu functions.

It can be accessed at any time by holding down and pressing .

In select mode, press or to choose the required mode, press to enter. An unlock code is required to prevent unauthorised entry to Configuration & Setup modes. Press or to enter the unlock code, then press to proceed.

Mode	Upper Display	Lower Display	Description	Default Unlock Codes
Operator	OPtr	SLCt	Normal operation	None
Set Up	SEtP	SLCt	Tailor settings to the application	10
Configuration	ConF	SLCt	Configure the instrument for use	20
Product Info	inFo	SLCt	Check manufacturing information	None
Auto-Tuning	Atun	SLCt	Invoke Pre-Tune or Self-Tune	0

**Note:** The instrument will always return automatically to Operator mode if there is no key activity for 2 minutes.

## 2.0 CONFIGURATION MODE

First select Configuration mode from Select mode (refer to section 2).

Press to scroll through the parameters, then press or to set the required value. Press to accept the change, otherwise parameter will revert to previous value. To exit from Configuration mode, hold down and press to return to Select mode.

Note: Parameters displayed depends on how instrument has been configured. Refer to user guide (available from your supplier) for further details. Parameters marked \* are repeated in Setup Mode.







Parameter	Lower Display	Upper Display	Adjustment range & Description	Default Value
Input Range/Type	inPt		PT100 sensor	PtC
Scale Range Upper Limit	ruL		Scale Range Lower Limit +100 to Range Maximum	100
Scale Range Lower Limit	rLL		Range Minimum to Scale Range Upper Limit -100	0
Decimal point position	dPoS		0 = <b>0000</b> , 1 = <b>000.0</b> , 2 = <b>00.00</b> , 3 = <b>0.000</b> (non-temperature ranges only)	1
Control Type	CtYP	SnGL	Primary only	SnGL
		duAL	Primary & Secondary (e.g. heat & cool)	
Primary Output Control Action	CtrL	rEu	Reverse Acting	rEu
		dir	Direct Acting	
Alarm 1Type	AIA 1	P_Hi	Process High Alarm	P_Hi
		P_Lo	Process Low Alarm	
		dE	Deviation Alarm	
		bAnd	Band Alarm	
		nonE	No alarm	
High Alarm 1 value*	PhA 1		Range Minimum to Range Maximum in display units	Range Max
Low Alarm 1 value*	PLA 1			Range Min
Band Alarm 1 value*	bAL 1		1 LSD to span from setpoint in display units	5
Dev. Alarm 1 value*	dAL 1		± Span from setpoint in display units	5
Alarm 1 Hysteresis*	AHY 1		1 LSD to full span in display units	1

Alarm 2 Type*	ALA 2	Options as Alarm1		P_lo
High Alarm 2 value*	PhA 2			Range Max
Low Alarm 2 value*	PLA2	Options as Alarm1		Range Min
Band Alarm 2 value*	bAL2	Options as Alarm1		5
Dev. Alarm 2 Value*	dAL2	Options as Alarm1		5
Alarm 2 Hysteresis*	AHY2	Options as Alarm1		1
Loop Alarm	LAEn	diSA (disabled) or EnAb (enabled)		diSA
Loop Alarm Time*	Lat 1	1 sec to 99 mins. 59secs		99.59
Alarm Inhibit	Inh 1	nonE	No alarms inhibited	nonE
		ALA1	Alarm 1 inhibited	
		ALA2	Alarm 2 inhibited	
		both	Alarm 1 and alarm 2 inhibited	
Output 1 Usage	USE 1	Pr i	Primary Power	Pr i
		SEc	Secondary Power	
		A1_r	Alarm 1, Direct	
		A1_d	Alarm 1, Reverse	
		A2_r	Alarm 2, Direct	
		A2_r	Alarm 2, Reverse	
		LP_d	Loop Alarm, Direct	
		LP_r	Loop Alarm, Reverse	
		Or_d	Logical Alarm 1 OR 2, Direct	
		Or_r	Logical Alarm 1 OR 2, Reverse	
		Ad_d	Logical Alarm 1 AND 2, Direct	
		AD_r	Logical Alarm 1 AND 2, Reverse	
		rEtS	Retransmit SP Output	
		rEtP	Retransmit PV Output	
Linear Output 1 Range	tYP 1	0_5	0 to 5 V DC output	0_10
		0_10	0 to 10 V DC output	
		2_10	2 to 10 V DC output	
		0_20	0 to 20 mA DC output	
		4_20	4 to 20 mA DC output	
Retransmit Output 1 Scale maximum	Ro1H	-1999 to 9999 (display value at which output will be maximum)		Range max
Retransmit Output 1 Scale minimum	Ro1L	-1999 to 9999 (display value at which output will be minimum)		Range min
Output 2 Usage	USE2	As for output 1		Sec or AI2
Linear Output 2 Range	tYP2	As for output 1		0_10
Retransmit Output 2 Scale maximum	Ro2H	-1999 to 9999 (display value at which output will be maximum)		Range max
Retransmit Output 2 Scale minimum	Ro2L	-1999 to 9999 (display value at which output will be minimum)		Range min
Output 3 Usage	USE3	As for output 1		A1_d
Linear Output 3 Range	tYP3	As for output 1		0_10
Retransmit Output 3 Scale maximum	Ro3H	-1999 to 9999 (display value at which output will be maximum)		Range max
Display Strategy	diSP	1, 2, 3, 4, 5 or 6 (refer to section 8)		1

Serial Communications Protocol	Prot	ASC1	ASCII	Mbn
		Mbn	Modbus with no parity	
		MbE	Modbus with Even Parity	
		Mbo	Modbus with Odd Parity	
Serial Communications Bit Rate	bAud	1.2	1.2 kbps	4.8
		2.4	2.4 kbps	
		4.8	4.8 kbps	
		9.6	9.6 kbps	
		19.2	19.2 kbps	
Comms Address	Addr	1	1 to 255 (Modbus), 1 to 99 (ASCII)	1
Comms Write	CoEn	r_W	Read/Write	r_W
		R_0	Read only	
Digital Input 1 Usage	diG1	diS1	Setpoint 1 / Setpoint 2 select*	diSi
		diAS	Automatic / Manual select	
Digital Input 2 Usage	diG2	diS1	Setpoint 1 / Setpoint 2 select*	dirS
		DiAS	Automatic / Manual select	
		dirS	Remote/Local setpoint select	
Remote Setpoint Input Range	rinP	0_20	0 to 20 mA DC input	0_10
		4_20	4 to 20 mA DC input	
		0_10	0 to 10 V DC input	
		2_10	2 to 10 V DC input	
		0_5	0 to 5 V DC input	
		1_5	1 to 5 V DC input	
		100	0 to 100mV DC input <i>Available on full RSP (Slot B) only</i>	
		Pot	Potentiometer(2K $\Omega$ minimum) <i>Available on full RSP (Slot B) only</i>	
RSP Upper Limit	rSPu	-1999 to 9999	Range max	
RSP Lower Limit	rSPL	-1999 to 9999	Range min	
RSP Offset	rSPo	Constrained within Scale Range Upper & Scale Range Lower limits	0	
Configuration Lock Code	CLoc	0 to 9999	20	

### 3.0 SETUP MODE

**Note: Configuration must be completed before adjusting Setup parameters.**

First select Setup mode from Select mode (refer to section 2). The MAN LED  will light while in Setup mode. Press  to scroll through the parameters, then press  or  to set the required value. To exit from Setup mode, hold down  and press  to return to Select mode.

**Note: Parameters displayed depends on how instrument has been configured.**




Parameter	Lower Display	Upper Display Adjustment Range & Description	Default Value
Input Filter Time Constant	FiLt	OFF or 0.5 to 100.0 secs	2.0
Process Variable Offset	OFFS	$\pm$ Span of controller	0
Primary Power	PPW	Current power levels ( <i>read only</i> )	N/A
Secondary Power	SPW		
Primary Proportional Band	Pb_P	0.0% (ON/OFF) and 0.5% to 999.9% of input span	10.0
Secondary Proportional Band	Pb_S		
Automatic Reset	ArSt	1 sec to 99 mins 59 secs and OFF	5.00



Parameter	Lower Display	Upper Display Adjustment Range & Description	Default Value
(Integral Time)			
Rate (Derivative Time)	rATE	00 secs to 99 mins 59 secs	1.15
Overlap/Deadband	OL	-20 to +20% of Primary and Secondary Proportional Band	0
Manual Reset (Bias)	biAS	0%(-100% if dual control) to 100%	25
Primary ON/OFF Differential	diFP	0.1% to 10.0% of input span centred about the setpoint. (Entered as a percentage of span)	0.5
Secondary ON/OFF Diff.	diFS		
Prim. & Sec. ON/OFF Differential	diFF		
Setpoint Upper Limit	SPuL	Current Setpoint to Range max	R/max
Setpoint Lower limit	SPLL	Range min to Current Setpoint	R/min
Primary Output Power Limit	OPuL	0% to 100% of full power	100
Output 1 Cycle Time	Ct1	0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256 or 512 secs.	32
Output 2 Cycle Time	Ct2		
Output 3 Cycle Time	Ct3		
High Alarm 1 value	PhA1	Range Minimum to Range Maximum	R/max
Low Alarm 1 value	PLA1		R/min
Deviation Alarm 1 Value	dAL1	±Span from SP in display units	5
Band Alarm 1 value	bAL1	1 LSD to span from setpoint	5
Alarm 1 Hysteresis	AHY1	1 LSD to full span in display units	1
High Alarm 2 value	PhA2	Range Minimum to Range Maximum	R/max
Low Alarm 2 value	PLA2		R/min
Deviation Alarm 2 Value	dAL2	±Span from SP in display units	5
Band Alarm 2 value	bAL2	1 LSD to span from setpoint	5
Alarm 2 Hysteresis	AHY2	1 LSD to full span in display units	1
Loop Alarm Time	Lati	1 LSD to full span in display units	99.59
Auto Pre-tune	APt	diSA(disabled) or EnAb (enabled)	diSA
Auto/manual Control selection	PoEn		
Setpoint Select shown in Operator Mode	SSEn		
Setpoint ramp adjustment shown in Operator Mode	SPr		
SP Ramp Rate Value	rP	1 to 9999 units/hour or Off (blank)	OFF

Parameter	Lower Display	Upper Display Adjustment Range & Description	Default Value
Setpoint Value	SP	Scale range upper to lower limits. (when dual or remote setpoint options are used, SP is replaced by SP1 & SP2 or LSP _ or ≡ before the legend indicates the currently active SP)	Scale Range Minimum
Local Setpoint Value	_LSP		
Setpoint 1 Value	_SP1		
Setpoint 2 Value	_SP2		
Setup Lock Code	SLoc	0 to 9999	10

#### 4.0 AUTOMATIC TUNING MODE

First select Automatic tuning mode from Select mode (refer to section 2).

Press  to scroll through the modes, then press  or  to set the required value.

To exit from Automatic tuning mode, hold down  and press , to return to Select mode.

Pre-tune is a single-shot routine and is thus self-disengaging when complete.

If **APt** in Setup mode = **EnAb**, Pre-tune will attempt to run at every power up\*.

Refer to the full user guide (available from your supplier) for details on controller tuning.




Parameter	Lower Display	Upper Display	Default Value
Pre-Tune	Ptun	On or OFF. Indication remains OFF if automatic tuning cannot be used at this time	OFF
Self-Tune	Stun		
Tune Lock	tLoc	0 to 9999	0

**Note:** Automatic tuning will not engage if either proportional band = 0.

Also, Pre-tune will not engage if setpoint is ramping, or the PV is less than 5% of input span from the setpoint.

#### 5.0 PRODUCT INFORMATION

First select Product information mode from Select mode (refer to section 2).

Press  to view each parameter. To exit from Product Information mode, hold down  and press  to return to Select mode.

Parameter	Lower Display	Upper Display	Description
Input type	In_1	Uni	Universal input
Option 1 module type fitted	OPn1	nonE	No option fitted
		rLY	Relay output
		SSr	SSR drive output
		Tri	Triac output
		Lin	Linear DC voltage / current output
Option 2 module type fitted	OPn2		As Option 1
Option 3 module type fitted	OPn3	nonE	No option fitted
		rLY	Relay output
		SSr	SSR drive output
		Lin	Linear DC voltage / current output
		Dc24	Transmitter power supply
Auxiliary Option A module type fitted	OPnA	nonE	No option fitted
		R485	RS485 communications
		diGi	Digital Input*
		rSPi	Remote Setpoint Input (basic)







Auxiliary Option B module type fitted	OPnb	nonE	No option fitted
		rSPi	Remote Setpoint Input ( <i>full</i> ) and Digital Input 2
Firmware type	FW		Value displayed is firmware type number
Firmware issue	ISS		Value displayed is firmware issue number
Product Revision Level	PrL		Value displayed is Product Revision level
Date of manufacture	dOM		Manufacturing date code ( <i>mmyy</i> )
Serial number 1	Sn1		First four digits of serial number
Serial number 2	Sn2		Middle four digits of serial number
Serial number 3	Sn3		Last four digits of serial number

## 6.0 MESSAGES & ERROR INDICATIONS

These messages indicate that an error has occurred or there is a problem with the process variable signal or its wiring.

**Caution:** Do not continue with the process until the issue is resolved.




Parameter	Upper Display	Lower Display	Description
Instrument parameters are in default conditions	Goto	ConF	Configuration & Setup required. This screen is seen at first turn on, or if hardware configuration has been changed. Press  to enter the Configuration Mode, next press  or  to enter the unlock code number, then press  to proceed
Input Over Range	(HH)	Normal	Process variable input > 5% over-range
Input Under Range	(LL)	Normal	Process variable input > 5% under-range
Input Sensor Break	OPEn	Normal	Break detected in process variable input sensor or wiring
RSP Over Range	Normal	(HH)	RSP input over-range
RSP Under Range	Normal	(LL)	RSP input under-range
RSP Break	Normal	OPEn	Break detected in RSP input signal
Option 1 Error	Err	OPn1	Option 1 module fault
Option 2 Error		OPn2	Option 2 module fault
Option 3 Error		OPn3	Option 3 module fault
Option A Error		OPnA	Option A module fault or RSP in both A & B
Option B Error		OPnb	Option B module fault

**\*\* also seen wherever RSP value would be displayed**

## 7.0 OPERATOR MODE

This mode is entered at power on, or accessed from Select mode (see section 2).


Note: All Configuration mode and Setup mode parameters must be set as required before starting normal operations.




Press  to scroll through the parameters, then press  or  to set the required value.

Note: All Operator Mode parameters in Display strategy 6 are read only (see diSP in configuration mode), they can only be adjusted via Setup mode.

Upper Display	Lower Display	Display Strategy and When Visible	Description
PV Value	Active SP Value	1 & 2 (initial screen)	PV and target value of selected SP <i>Local Setpoints are adjustable in Strategy 2</i>
PV Value	Actual SP Value	3 & 6 (initial screen)	PV and actual value of selected SP (e.g. ramping SP value). <i>Read only</i>
PV Value	(Blank)	4 (initial screen)	Process variable only <i>Read only</i>
Active SP Value	(Blank)	5 (initial screen)	Target value of selected setpoint only. <i>Read only</i>
SP Value	SP	1, 3, 4, 5 & 6 if digital input is not diSA and RSP not fitted	Target value of SP <i>Adjustable except in Strategy 6</i>
SP1 Value	_SP1	Digital input = diSA. _ lit if active SP = SP1	Target value of SP1 <i>Adjustable except in Strategy 6</i>
SP2 Value	_SP2	Digital input = diSA.. _ lit if active SP = SP2	Target value of SP2 <i>Adjustable except in Strategy 6</i>
Local SP Value	_LSP	RSP fitted. _ or ≡ lit if the active SP = LSP	Target value of local setpoint <i>Adjustable except in Strategy 6</i>
Remote SP Value	rSP	RSP fitted. _ or ≡ lit if the active SP = rSP	Target value of remote setpoint <i>Read only</i>
diGi, LSP or rSP	SPS	RSP is fitted, digital input is not diSA and SSen is enabled in Setup mode	Selects local/remote active setpoint <b>LSP</b> = local SP, <b>rSP</b> = remote SP <b>diGi</b> = selection via digital input (if configured). Note: selecting <b>LSP</b> or <b>rSP</b> will override digital input, active SP indication changes to ≡ <i>Adjustable except in Strategy 6</i>
Actual SP Value	SPrP	rP is not blank	Actual (ramping) value of selected SP. <i>Read only</i>
Ramp Rate	rP	SPr enabled in Setup mode	SP ramping rate, in units per hour <i>Adjustable except in Strategy 6</i>

## 8.0 MANUAL CONTROL

If **PoEn** is set to **EnAb** in Setup mode, manual control can be selected/de-selected by pressing the  key in Operator mode, or by changing the status of a digital input if **diG1** or **diG2** have been configured for **diAS** in Configuration mode.

While in Manual Control mode, the  indicator will flash and the lower display will show **Pxxx** (where **xxx** is the current manual power level). Switching to/from manual mode is via Bumpless Transfer. Press  or  to set the required output power.

Caution: Manual power level is not restricted by the **OPuL** power limit







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