USER MANUAL

Intelligent Line Break Controller

ILB24-A
ILB24-AF

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1 General

This manual covers software version:

Software ID: DLB-SW-001
Software Version: 2.xx

1.1 Safety instructions

For a safe installation of an ILB, the following must be observed. The module must only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this product as well as all instructions in this manual.

The information in this user manual is subject to changes without notice.

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2 Application

The ILB24 from Val Controls is an Intelligent Line Break controller. To be used for pipeline controlling and shutdown. It has an integrated microprocessor with very flexible software, so the controller fits almost any hydraulic and pneumatic, rotary and linear, double acting and spring return actuator on the market.

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3 Interface

3.1 LEDs

LED	Colour	ON	OFF	Blinking
System: Red	Red	System error	-	Calibrating
System: Green	Green	System OK	-	Initializing
ESD	Red	ESD trip	ESD normal	-
Local	Yellow	Local mode	Remote mode	-
Closed [1]	Red	Valve is closed	-	Moving towards close
Open [1]	Green	Valve is open	-	Moving towards open
Pump	Green		-	-
MT	Red	MTControl is locked	-	-
TIP	Yellow		-	-
Fail	Red		-	-
Pass	Green		-	-

[1]) Open/close can be switched in the Interface section in ValConnect

If both System: Red and System: Green is ON, the device is in bootloader mode. Power cycle the device to return to normal operation.

3.2 MTControl

MTControl can be used to operate the AF models without opening the Ex d enclosure. It requires a magnetic pen to "press" the buttons. The magnet must be aimed just beneath the buttons. To unlock MTControl activate → and then ←, the red MT LED will turn off if MTControl is unlocked.

3.3 Buttons - menus

Four menus can be accessed from the main screen by pressing each of the buttons or using MTControl.

3.3.1 Test menu

Test Menu		Description
1	Start PST	Start a Partial Stroke Test

3.3.2 Diagnostic menu

Diagnostic Menu	Description

3.3.3 Control menu

Control Menu		Description
1	Manual	Manual operate the valve

3.3.4 Setup menu

Setup Menu		Description
1	Calibration	
1	Auto calibration	Start the auto calibration
2	End point cal.	Start endpoint calibration
3	Start PST ref.	Start a Partial Stroke reference Test
2	Identification	Software ID, Software version, serial no. and tag no.

3	Live	Current status of digital and analogue signals
4	Event log	The last 10 events
7	Modbus	Configure Modbus
8	Display	Adjust the contrast and backlight

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4 Configuration – ValConnect

All configuration of the ILB must be done through a USB connection to a computer with ValConnect installed. ValConnect can be downloaded at www.valcontrols.com.

Use an update version of ValConnect
Go to Help →Update ValConnect to download the latest version of ValConnect and the DD files.

Pressure sensor
The range of the pressure transmitter
Signal configuration:

Analogue input 2, 0% unit value: 0 bar
Analogue input 2, 100% unit value: 100 bar (Set value from transmitter here)

Analogue input 3, 0% unit value: 0 bar
Analogue input 3, 100% unit value: 100 bar (Set value from transmitter here)

Line breaker limits
A Line breaker section is available in ValConnect with the options related to line breaker minor and major limits.

Digital inputs
For digital inputs ValConnect offers two types of momentary input.

- Short push: Activate the input for 0.5 sec to initiate the function
- Long push: Activate the input for 3 sec to initiate the function

5 Line breaker

The line breaker monitors the pressure in the pipeline.

When an alarm threshold is reached, an event is logged. An emergency threshold is also available and a new event will be logged when it is reached. If the emergency alarm has not been cleared within the timeout the line breaker will shut down. This function is optional.

Alarm thresholds:

- Low pressure
- High pressure
- Rate Of Drop, ROD
- Rate Of Rise, ROR
- Difference pressure
- Movement

5.1 Rate of drop - ROD

Pressure values are saved in a ring buffer. The sample time and number of sample used to calculate the ROD can be configured in ValConnect.

With a sample time of 5 sec and a sample count of 4 the of drop in bar/minis calculated based on the pressure measurements for the last 15 sec.

5.2 Logger

The logger uses a dynamic logging strategy. A log point is stored if one of the following conditions are meet.

- After a configurable maximum sample time

When one of the following values changes more than the preconfigured values.

- Pressure
- ROD
- ROR
- Position

A ring buffer stores 30 samples with a minimum sample time. In case of an event these samples are also saved, along with 30 samples logged with the minimum sample time after the event.

- 30 samples before and after an event

5.3 User levels

The Line Break Controller has four different user levels.

- Observer
- Operator
- Maintenance
- Specialist

Observer:

Read only access.

Operator:
Operate the valve
Set online/offline
Reset after emergency
Set the clock
Standard accesscode: 1001

Maintenance:
Set thresholds
Standard accesscode: 1002

Specialist:
Delete events
Standard accesscode: 1003

5.3.1 Change password

Password can be set for the current user and all levels below except for "Observer" which has no password.

The password is four digits e.g. "1234"

5.4 Storage capacity and transfer times

5.4.1 Storage capacity

Up to 10 years with 8 events per day at one SD card

5.4.2 Transfer time

Data for 1 day: 6.6 minutes
Data for 1 years: 41 hours

Depending on number of events and variation in monitored signals.

6 On demand duty

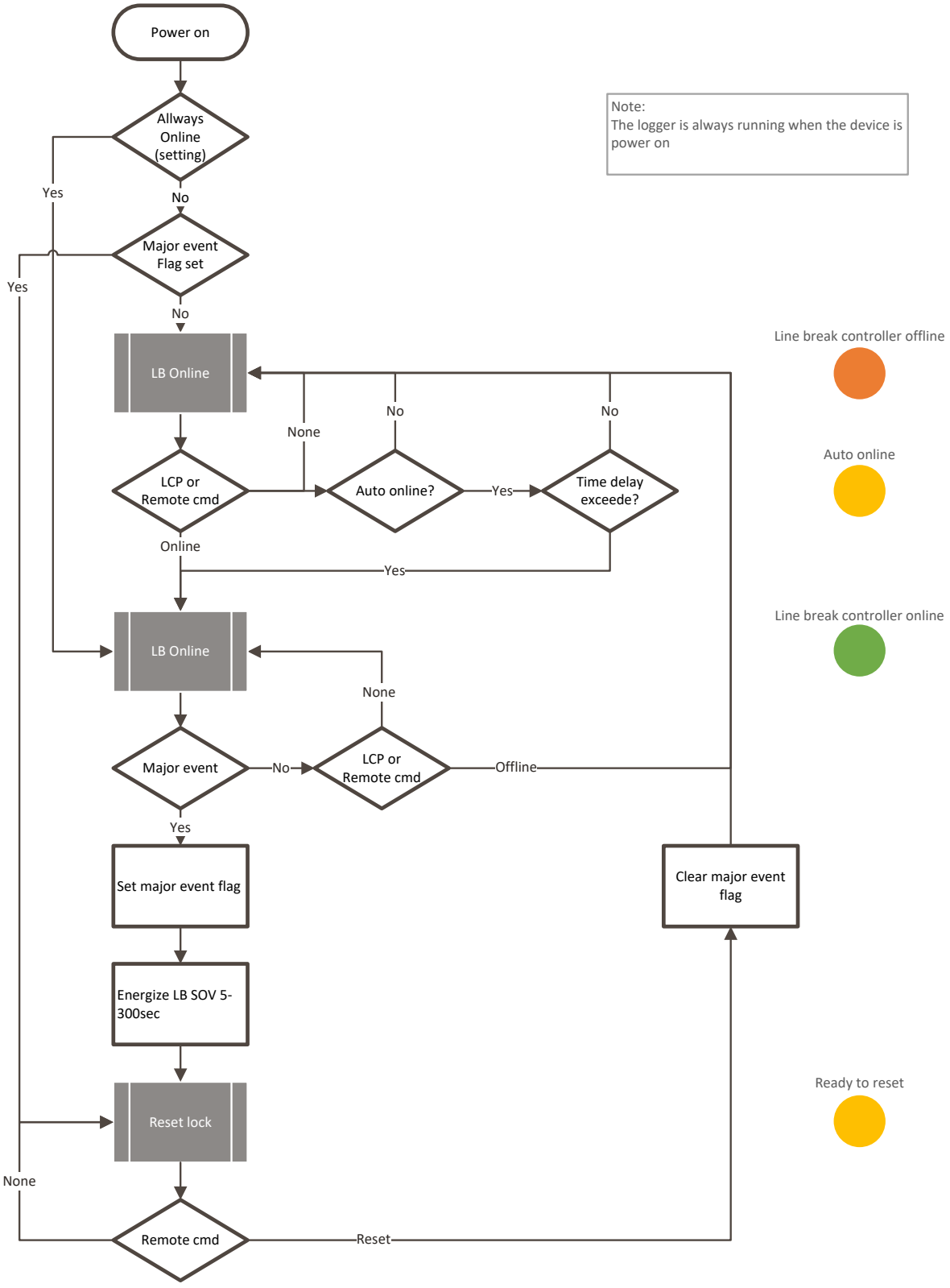

Figure 1: Flow diagram for a line breaker in continuously duty

7 Open/Close

Open and close commands are evaluated independently of the line break controller function.

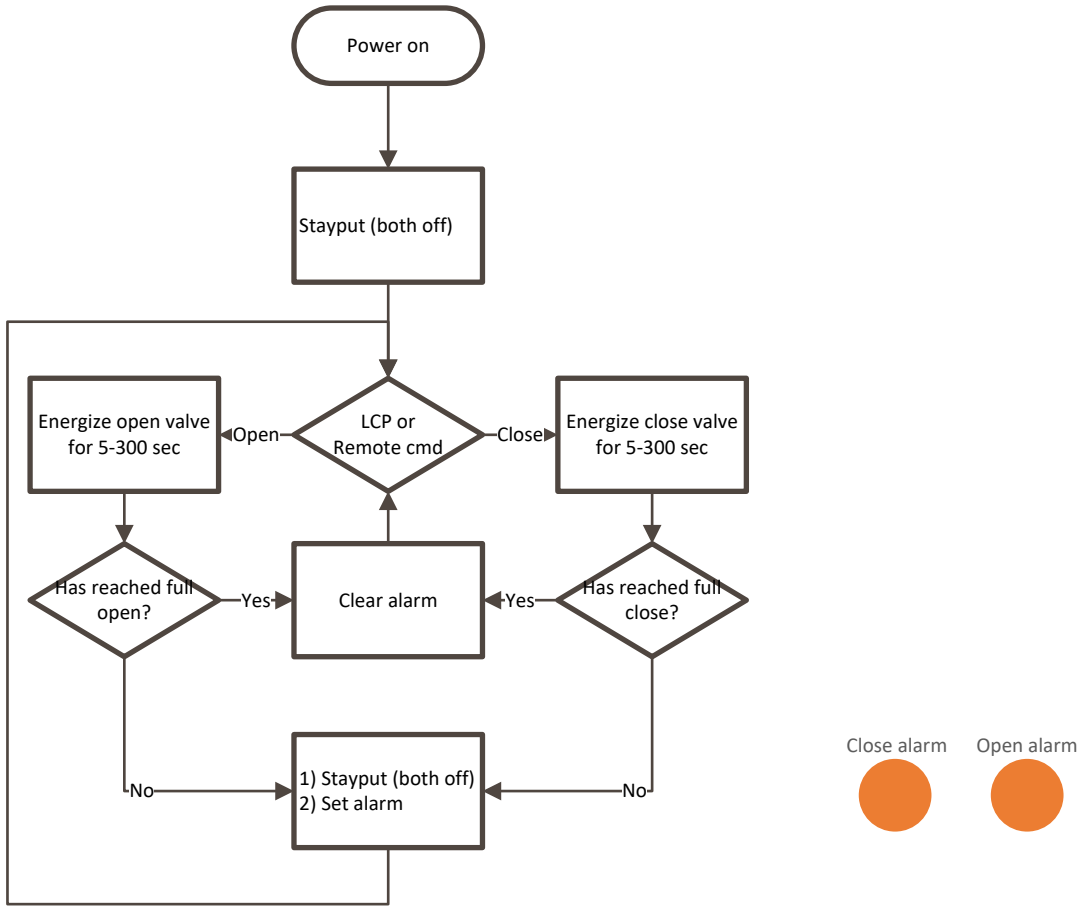

Figure 2: Flow diagram for the open/close action

8 Events

Events are stored to the SD card.

The following data is stored

- Number of event
- Time and data

The time and date is used to get signature from the logged data.

No. 1	**ILB power on**
Description	The ILB is power on

No. 2	**System error**
Description	An error was logged in the system error log.
Argument	System error no.

No. 3	**System error removed**
Description	An error was removed from the system error log
Argument	System error no.

No. 5	**RTC set: Time before change**
Description	The real time clock on the device will change now

No. 6	**RTC set: Time after change**
Description	The real time clock on the device has changed

No. 7	**RTC is behind**
Description	The real time clock on the device is behind the time on the PC

No. 8	**RTC is ahead**
Description	The real time clock on the device is ahead the time on the PC

No. 51	**Operational**
Description	The ILB was set in operational mode

No. 52	Fail position remote
Description	The ILB was set in fail position mode

No. 57	Set in local mode
Description	The ILB was set in local mode

No. 58	Set in remote mode
Description	The ILB was set in remote mode

No. 61	Auto calibration was started
Description	An auto calibration was started

No. 62	Auto calibration finished
Description	An auto calibration finished

No. 63	Auto calibration aborted
Description	An auto calibration was aborted

No. 71	Endpoint calibration was started
Description	An endpoint calibration was started

No. 72	Endpoint calibration finished
Description	An endpoint calibration finished

No. 73	Endpoint calibration aborted
Description	An endpoint calibration was aborted

No. 102	Line breaker online
Description	The line breaker is online and is monitoring the signals

No. 103	Line breaker offline
Description	The line breaker is offline. The signals are not monitored.

No. 110	Line breaker reset
Description	The line breaker is reset after a shutdown

No. 121	Pressure low minor start
Description	The pressure is lower than the alarm threshold

No. 122	Pressure low minor end
Description	The pressure is back within the normal operating range

No. 125	Pressure low major start
Description	The pressure is lower than the emergency threshold

No. 126	Pressure low major end
Description	The pressure is above the emergency threshold

No. 127	Pressure low major shutdown
Description	The pressure was below the emergency threshold longer than the shutdown timeout, and the valve was shutdown

No. 131	Pressure high minor start
Description	The pressure is higher than the alarm threshold

No. 132	Pressure high minor end
Description	The pressure is back within the normal operating range

No. 135	Pressure high major start
Description	The pressure is higher than the emergency threshold

No. 136	Pressure high major end
Description	The pressure is below the emergency threshold

No. 137	Pressure high major shutdown
Description	The pressure was above the emergency threshold longer than the shutdown timeout, and the valve was shutdown

No. 141	ROD high minor start
Description	The ROD is higher than the alarm threshold

No. 142	ROD high minor end
Description	The ROD is back within the normal operating range

No. 145	ROD high major start
Description	The ROD is higher than the emergency threshold

No. 146	ROD high major end
Description	The ROD is below the emergency threshold

No. 147	ROD high major shutdown
Description	The ROD was above the emergency threshold longer than the shutdown timeout, and the valve was shutdown

No. 160	Open alarm
Description	The opening time was too long

No. 161	Open alarm remove
Description	The opening time was within the time limit, after the previous attempt that was too slow.

No. 162	Close alarm
Description	The closing time was too long

No. 163	Close alarm remove
Description	The closing time was within the time limit, after the previous attempt that was too slow.

9 System errors

No. 103	**Position loop is not connected**
Description	Position loop input is detecting less than 3.5 mA
Trouble shooting	Connect a position loop signal to the ILB

No. 115	**Pressure loop is not connected**
Description	Pressure loop input is detecting less than 3.5 mA
Trouble shooting	Connect a pressure loop signal to the ILB

No. 354	**SD card error**
Description	There is a problem with the SD card
Trouble shooting	This error can be caused by: • SD card not inserted • SD card not properly inserted in socket • Faulty SD card It can be solved by: • Insert a SD card • Remove the SD card and insert it again

10 Pump unit errors

No. 601	Pump control: Low level.
Description	The measured level is below the specified value.
Trouble shooting	This error can be caused by: • Low oil level • Mal functioning sensor • High value of Level Low limit It can be solved by: • Refill the tank with oil • Decrease Level Low limit value

No. 602	Pump control: Temperature
Description	The measured temperature is above or below the limit values.
Trouble shooting	This error can be caused by: • Low oil temperature • High oil temperature • Sensor malfunction It can be solved by: • Change oil temperature • Adjust temperature Low limit • Adjust temperature High limit

No. 603	Pump control: Low pressure
Description	The measured pressure is below the limit value
Trouble shooting	This error can be caused by: • Pressure is lower than the low alarm value • Low pressure switch is active It can be solved by: • Let the pump increase the pressure • Adjust pressure Low limit • Check low pressure switch

No. 604	Pump control: High pressure
Description	The measured pressure is above the limit value
Trouble shooting	This error can be caused by: • Pressure is higher than the high alarm value • High pressure switch is active It can be solved by: • Relieve the pressure • Adjust pressure High limit • Check high pressure switch

No. 610	Pump control: Motor safety relay
Description	The motor protection relay is active
Trouble shooting	This error can be caused by: • Motor safety relay has been activated • Motor safety relay malfunction or disconnected

No. 611	Pump control. Max running time
Description	The motor has been running for too long.
Trouble shooting	This error can be caused by: • Digital output to the motor has been On longer than the Max running time It can be solved by: • Investigate what causes the motor to run. Is it not able to get the pressure within the limits? • Increase the Max running time • Disable the Max running time feature