

LMC 301 lubrication system software manual

Models 086500 and 086501

Date of issue	November 2023
Form number	404621
Version	2



Contents

Safety	3
Explanation of signal words for safety	3
PC requirements	4
Software installation	4
Controller preparation	4
Terminology and system configuration	5
Analog and sensor input types supported by LMC 301	6
Configuration interface overview	7
Controller configuration	8
Menu bar	8
Status lights	9
Left side menu.	9
General	9
Settings	9
Pump	11
$Pump \rightarrow Filling/Low Level \rightarrow Low Level Detection.$	12
$Pump \rightarrow Filling/Low Level \rightarrow Low Level Detection \rightarrow Inputs \dots \dots$	13
Pump \rightarrow Filling/Low Level \rightarrow Low Level Detection \rightarrow Timings	14
Pump → Filling/Low Level → Auto Filling	15
$Pump \rightarrow Filling/Low Level \rightarrow Auto Filling \rightarrow Inputs$	17
Pump \rightarrow Filling/Low Level \rightarrow Auto Filling \rightarrow Timings	18
Pump → Temperature Monitoring	19
Pump → Motor Protection	20
Zone \rightarrow Cycle Control for Time	21
Zone \rightarrow Cycle Control for Counter	22
$Zone \rightarrow Lube Control.$	23
Zone → Post Sprayer	24
Single Line Pump \rightarrow Lube Control	25
Single Line Pump \rightarrow Relief Control	26
Single Line Zone \rightarrow Alarms	27
Single Line Zone → Sensors *	28
Settings → Fill pump	29
Fillina/Low Level (Auto Fillina) → Inputs	30
Progressive Pump \rightarrow Lube Control *	31
Dual Line → Pump.	34
Dual Line \rightarrow Lube Control	35
Dual Line \rightarrow Lube Control \rightarrow Lube Control Ext	36
Dual Line \rightarrow Pump \rightarrow Relief Control	37
Dual line \rightarrow 7 one \rightarrow lube Control	38
Dual Line \rightarrow Zone \rightarrow Lube Control \rightarrow Inputs	39
Diagnose → Error History	40
Diagnose \rightarrow Lube Event History	40
Diagnose → Lube Event Counter	41
Network → I/O Board Addrx	42
Firmware update	43
Warranty	44
	•••

* Indicates change.

Safety

Carefully read and observe operating instructions before installing and operating controller.

Explanation of signal words for safety

NOTE

Emphasizes useful hints and recommendations as well as information to prevent property damage and ensure efficient trouble-free operation.

▲ CAUTION

Indicates a dangerous situation that can lead to light personal injury if precautionary measures are ignored.

A WARNING

Indicates a dangerous situation that could lead to death or serious injury if precautionary measures are ignored.

A DANGER

Indicates a dangerous situation that will lead to death or serious injury if precautionary measures are ignored.

A WARNING

Do not attempt to install or use controller until all safety and operational instructions within service manual are fully understood. Controller must only be used and maintained by persons familiar with operating instructions.

Failure to follow warnings and instructions may result in serious injury.

NOTE

Local safety regulations regarding installation, use, and maintenance must be followed.

PC requirements

- **1** 800 x 600 display (1024 x 768 recommended)
- 2 Keyboard and mouse (or other pointing device)
- 3 USB 2.0 port and standard cable with full size B type connector
- 4 Microsoft .Net Framework 4.0 client installed
- **5** 50MB of available hard drive space (with . Net Framework 4.0 client installed)

NOTE

If PC does not have Microsoft .Net Framework 4.0 client installed, confirm PC meets requirements before downloading .Net 4.0 client to PC:

- Processor: 1 GHz
- Memory: 512 MB
- Hard drive: 1.5 GB
- Operating systems:
 - Windows 7
 - Windows 8
 - Windows 10

If PC meets requirements, visit http:// www.microsoft.com/en-us/download/ details.aspx?id=17851 and install .Net software before proceeding.

NOTE

Software needs 32-bit version of .Net framework to function.

32-bit version of .Net will operate on 64-bit PC operating systems.

Software installation

- 1 Visit http://www.skf.com/LMC301 and click on link labelled LMC 301 PC Software.
- 2 Download PC software installation files from website.
- **3** Follow on-screen installation instructions.

NOTE

Software can only be used on PC that meets requirements.

Software is not intended to run

directly from server operating system.

Controller preparation

NOTE

LMC 301 software must be installed on PC with available USB port prior to proceeding in this section.

- **1** Disconnect power supply to LMC 301.
- 2 Open or remove LMC 301 cover to expose main control board.
- 3 Connect USB cable to PC.
- 4 Connect USB-B port to main control board attached to underside of controller lid (\rightarrow Fig. 1). Green light on opposite side of main control board will shine and LCD screen on outer cover will illuminate.
- 5 On PC desktop, double-click LMC 301 software icon.
- 6 Follow instructions in Controller configuration section on page 6 to configure and customize controller settings.

NOTE

When configuration is complete, always save settings to PC prior to removing USB cable from controller or closing software.

Always close controller cover before returning to normal service.



Terminology and system configuration



A Controller PCB

B I/O Board 1

- C Board 2
- **D** RS485 Communication cable

One controller can operate up to eight I/O boards. Software denotes different I/O board inputs and outputs by first addressing board number and then requested input or output number as shown in example.

	Fig. 3
Switch input types supported by LMC 301:	
Normally Closed: Switch considered active when contact opens	
Switch Counter = \bigcirc $ -$	
Normally Open: Switch considered active when contact closes	
Switch = Switch Closed Switch = Switch Open	
Counter: Switch considered active when contact closes (For higher frequency switch operation)	
Switch =	

Analog sensor input types supported by LMC 301

0 - 10	Volt
--------	------

- 2 10 Volt
- 1 6 Volt
- 0 20 mA
- 4 20 mA

When considering any analog sensor types LMC 301 requests minimum and maximum value for sensor. Request for minimum and maximum value refers to highest and lowest value sensor is designed to measure. Following is an example of proper configuration for 4-20 mA analog pressure transducer designed to measure from 0 to 6 000 PSI.

Туре:	4 - 20mA	•	
Input:	1.02	•	
Min. value:	0	psi	
Max. value:	6000	psi	
Operation Pressure:	3500	psi	
Vent Pressure:	900	nsi	



Configuration interface overview



Controller configuration

		Fig. 7
EMC301 V0.0.3.2		
File Language Target		
SKE		Not Connected
General	General Information Password:	Connect Disconnect

NOTE

LMC 301 can only be configured via USB cable on PC that meets requirements listed in **PC requirements** section on **page 4**.

- 1 From main screen, enter password in **Password:** field. Supervisor password default: **2020.**
- 2 Click Connect button.
- 3 In Connect device popup window, click Yes.

Menu bar

This section provides summary descriptions of options available in menu bar (**Fig. 2**).

On menu bar, across top of window, three options are displayed - **File**, **Language and Target**.

File displays following options: **Open** displays window that allows user to select existing LMC 301 configuration files stored on PC.

Save creates and/or saves settings for LMC 301 controller settings currently connected to PC.

Save As allows user to save controller settings under new filename or rename file.

Exit disconnects interface between application and controller, and closes software window.

Connect de	evice
?	Connect to device? Current Settings will be lost!
	Yes No

NOTE

There are two types of users: supervisors and users. **Users** are limited to changing system timing. **Supervisors** can change all settings. Fia. 8

Language displays language options. **Target** displays following options:

Offline mode closes connection to attached controller (if attached) and permits user to apply settings that can only be saved to file on PC. Any settings established in offline mode will not be applied to attached

controller.

between PC and attached controller. **Disconnect Device** closes connection to attached controller.

Read device configuration allows software to import settings from controller into software.

NOTE

When performing updates to controller, clicking **Yes** will erase all current settings in PC software.

Highly recommended to save configuration files to PC each time new or modified controller is put into service.

NOTE

Selecting **Exit** option before saving discards any changes. Save any changes before selecting option.

Write device configuration allows user to overwrite controller settings with current PC settings. Read device Error History displays

all errors recorded by controller. Read device diagnose reads diagnostic data.

Clear device lube event history

clears diagnostic history for lube events.

Clear device Error History clears all errors recorded by controller. **Firmware Update** allows update of code running on controller (only available if controller is disconnected).

Status lights

Error state occurs when software cannot detect any pumps attached to controller, causing light to blink red. If no error is detected, light will remain gray.

Connected/Not Connected occurs when software is interacting with controller, causing **Connected** to display with steady green light. If software is not interacting with controller, **Not Connected** will display with steady red light.

Left side menu

General

Clicking on **General** will display outputs on right side of window that allow for reading basic information for controller.

Serial allows user to read serial number assigned to controller.

HW Version lists controller's hardware version.

FW Version lists controller's firmware version.

Operating Hours lists number of hours controller has been in operation. **Control Mode** displays controller operating modes.

Pump (#) identifies pump, along with system type, and number of operating zones.

Language Target			
KF.	Erro	r state 🖉	Connected as master
General	General Information		
Settings	Password:	F32D	Connect Disconnect
in Single Line			
Pump	Serial:	0000000	
Lube Control			
Filling/Low Level	HW Version:	1.10	
Temperature Monitoring	EW/Maraian:	0.46	
⊡-Zone1	r w version.	0.46	
- Cycle Control			
- Lube Control			
Alarm	Operating Hours:	000109:04:00	
Sensors	Control Mode:	USBConfiguration	
Cvcle Control			
Lube Control	Pumpi	Cingle Line	
- Post Sprayer	System.	Single Line	
Sensors	Zones:	27ones	
Diagnose			

■ LMC301 V0.0.3.2		_ D X
File Language Target		
SKE	Error state	Connected as master
General	Settings	
E Settings	Config Change 01/01/00 M Time Stamp: 00:00:00 h	/M/DD/YY ih:mm:ss
	User Password: 1234	Read Write
	Supervisor Password: 8888	Read Write
	Restore default System Parameter	
	Restore factory settings	
	Operating Hours: 000109:04:00	Clear
	Date: 10 / 20 / 20	16 Read
	Time: 13 h 36 m 21	s Write
	Read Cycl: System Time	
	Control Mode: USBConfiguration	
	Stop LMC301 Start LMC301	
	Language: English	-
	Unit imperial	•
	Pumps: 1 Pump	-
	Amount of IO Boards: 1	•
Connected as master		

Settings

Clicking on **Settings** will display inputs on right side of window that allow for reading and editing basic settings for controller.

User Password defines password for non-supervisors that periodically require access to system.

Supervisor Password defines password for supervisory permission to configure system.

Operating Hours lists number of hours that controller has been in operation.

Restore default System Parameter

Single Line 1 Zone 3/2 Way Valve Restore factory settings default System Parameter User Password: 1000 Supervisor Password: 2020

NOTE

Supervisor can change all configuration options. **User** can change only timing fields that require tuning for precise system operation.

NOTE

If **User Password** is changed and forgotten, password can be restored with **Supervisor Password**. If **Supervisor Password** is changed and forgotten, call SKF service with serial number for assistance. **Date** displays month/date/year format. Text fields can be edited or automatically populated by clicking **System Time** button.

Time displays hour/minute/second format. Text fields can be edited or automatically populated by clicking **System Time** button.

NOTE

Manual input of internal clock is not recommended.

Read Cycl automatically updates time parameter in software. Clear removes operating hours. Read/write manually updates time parameter in control/software. Control Mode displays systems current mode. Stop LMC 301 stops operation of control during troubleshooting. Start LMC 301 starts operation of control during troubleshooting. Language assigns language for software interface as English or German. Unit defines unit of measure software will use - Imperial or Metric.

Pumps defines number of pumps controlled (up to three).

NOTE

Hovering mouse over fields and menu options will display Tool Tips that clarify functions.

NOTE

Options on left side will change, based on settings chosen for controller.

Pump

Pump type defines **System** and control settings.

System drop menu displays only current option of system supported, Single Line. Zones allows for pump activity to vary at different points during use and each zone can be independently controlled. Software supports up to three zones per pump. Valve type displays types of valves used for zone control:

> 3/2 Way Valve 2/2 Way Valve NC 2/2 Way Valve NO

				Fig. 11
EMC301 V0.0.3.2			_ 0	X
File Language Target				
SKE	Err	or state 🔍	Connected as master 🔘	
General Settings Pump1 Single Line Diagnose	Pump1 System:	Single Line	▼	
	Zones:	2 Zones	•	
	Valve type:	2/2 Way Valve NC	•	

e Language Target		
SKF.	Error state	Connected as master
General Settings Pump1 Dup Pump Lube Control Relief Control Filing/Low Level Inputs	Filling/Low Level Pump1 Filling Monitoring control type Monitoring Type: Low Level [Detection 👻
G-Diagnose	Low Level lube limitted by: Filling/LL Alarm Output	me 🔻
	Type: normally o	open 👻
	Output: 1.04	

NOTE

Enabling option in **Monitoring Type** drop menu in **Fig. 9 (Low Level Detection or Auto Filling)** changes options available under **Inputs** and **Timings** menu items.

Pump → Filling/Low Level → Low Level Detection

Filling Monitoring Control Type

Monitoring Type displays following options:

Disabled does not use level monitoring.

Low Level Detection monitors level by input sensor and notifies user. Auto Filling monitors level by input sensor and refills tank automatically.

Low Level lube limited by displays following options:

Disabled causes system to stop pump operation immediately after fault is detected.

LL Lube Cycles limits lubrication by predetermined cycles after fault is detected.

LL Pump Time limits lubrication by time settings after fault is detected. Filling/LL Alarm Output Setting Type

configures alarm relay for filling/LL.

NOTE

Values in **Filling/LL Alarm Output** drop menu correspond to available numbered output ports on I/O board of controller.

This prevents assigning one I/O port multiple times.

NOTE

Screen items displayed reflect options reviously selected.

		Fig. 13
EMC301 V0.0.3.2		
File Language Target		
SKE	Error state 🖉	Connected as master
General Settings Pump1 Single Line Pump Lube Control Relief Control Filling/Lov Level Inputs Timings Temperature Monitoring Motor Protection Zone1 Zone2 Diagnose	Filling Input Settings Pump1	~
	Max. value: 100	%
	Full Value: 80	%
	Empty Value: 15	%

Pump \rightarrow Filling/Low Level \rightarrow Low Level Detection \rightarrow Inputs

Low Level Input Type configures input for tank level sensor or switch. Includes percentages defining tank levels and warning values.

NOTE

Screen items displayed reflect options previously selected.

NOTE

Values in Input drop menu correspond to available numbered input ports on I/O board of controller.

Prevents assigning one I/O port multiple times.

NOTE

If selecting voltage/current, additional input boxes will display.



Pump \rightarrow Filling/Low Level \rightarrow Low Level Detection \rightarrow Timings

Low Level Detection Time allows for setting detection time.

Lube with LL Cycle Count defines count time that needs to be reached before tank is refilled.

NOTE

Screen items displayed reflect options previously selected.

Lube with LL Pump Time defines time that pump can run while system is in low level alarm state.

NOTE

If Low Level Lube Limited By drop menu on Filling/Low Level Menu (→ fig. 10, fig. 13) is set to LL Pump Time, option 2 above will be Lube with LL pump time (→ fig. 13).



Pump → Filling/Low Level → Auto Filling

Filling Monitoring Control Type

 Monitoring Type displays following options:
 Disabled does not use level monitoring.
 Low Level Detection monitors level by input sensor and notifies user.
 Auto Filling monitors level by input sensor and refills tank automatically.

When chosen, fill pump screen is populated and requires configuration.

NOTE

Screen items displayed reflect options previously selected.



Filling/LL Alarm Output Setting configures alarm relay for filling/LL. Use Fill Pump displays following options: Disabled does not use fill pump. Enabled uses fill pump used.

Fill Pump Output Type configures fill pump output relay.

NOTE

Screen items displayed reflect options previously selected.



Pump → Filling/Low Level → Auto Filling → Inputs

Fill Pump output configures fill pump output relay.

Pump → Filling/Low Level → Auto Filling → Timings

Filling Timeout allows for setting of max fill time.

Low Level Detection Time displays length of time low level signal must be present to be considered valid.

High Level Detection Time displays length of time high level signal must be present to be considered valid.

le Language Target		
SKF.	Error state 🔍	Connected as master
General ⊟-Settings Fill Pump	Filling Timing Settings Pump1	
-Pump -Single Line -Pump -Lube Control -Relief Control -Relief Control -Inputs -Timings -Temperature Monitoring Motor Protection -Zone1 -Cycle Control -Lube Control -Dost Sprayer -Alarm -Sensors -Zone2 -Cycle Control -Lube Control -Lube Control -Cycle Control -Lube Control -Cycle Control -Lube Control -Cycle	Filling Timing settings Filling Timeout 0001 h 00 Low Level 0000 h 00 Detection Time: 0000 h 00 High Level 0000 h 00 Detection Time: 0000 h 00) m 00 s) m 10 s) m 10 s

Language Target		
ike	Error state 🌑	Connected as master 🔘
General Settings Fill Pump	Temperature Control Pump1	
⊡ Single Line ⊡ Pump	Internal Sensor	
Lube Control Relief Control	Type: enabled	•
Filling/Low Level	IO Device: 1	•
Temperature Monitoring Motor Protection	External Sensor	
- Cycle Control - Luba Control	Type: 4 - 20mA	-
- Post Sprayer - Alarm	Input: 1.01	•
Sensors	Min. value: -4	۴
Cycle Control Lube Control	Max. value: 390	°F
– Post Sprayer – Alarm	Temperature Limits	
Sensors	Over Temperature: 160	°F

Pump → Temperature Monitoring

Internal Sensor Type displays following options:

Disabled does not use sensor.

Enabled does use sensor.

I/O Device selects one through eight, based on maximum number of I/O boards that can be connected.

External Sensor adjusts settings in fields based on sensor specifications.

External Sensor Input assigns available I/O port for sensor.

Temperature Limits adjusts settings in fields based on pump specifications.

NOTE

Screen items displayed reflect options previously selected.

NOTE

Values in **Input** drop menu correspond to **available** numbered input ports on

I/O board of controller.

Prevents assigning one I/O port multiple times.

NOTE

If selecting voltage/current, additional input boxes will display.



Pump → Motor Protection

Motor Protection Type adjusts settings in fields based on sensor specifications. Motor Protection Input assigns available I/O port for sensor.

NOTE

Screen items displayed reflect options previously selected.

NOTE

Values in **Input** drop menu correspond to **available** numbered input ports on I/O board of controller.

Prevents assigning one I/O port

multiple times.



Zone → Cycle Control for Time

Cycle control type displays following options:

Time controls cycles by time.

Counter controls cycles by count. Normal lube cycle time defines time length

of normal lube cycle.

Heavy lube cycle time defines time length of heavy lube cycle.

Lube Load Type displays following options: Normal defines zone as normal lube load. Heavy defines zone as heavy lube load.

Release/Count

Release allows configuration of input that pauses operation of specific zone while input is active.

Count allows for configuration of counter input port.

Lube Load Input Type allows for system to have normal operating frequency and heavy operating frequency. System will switch between modes according to input valve of Lube Load Input.

NOTE

Values in **Input** drop menu correspond to **available** numbered input ports on I/O board of controller. Prevents assigning one I/O port

multiple times.

NOTE

Lube load **heavy** or **normal** allows for cycles to be run more or less frequently based on machinery needs.

Can be controlled by switch attached to lube load input.

NOTE

Screen items displayed reflect options previously selected.



Zone \rightarrow Cycle Control for Counter

NOTE

Screen items displayed reflect options previously selected.

Cycle control Type displays following options:

Time controls cycles by time.

Counter controls cycles by count. **Normal lube cycle count** defines number of normal lube cycles.

Heavy lube cycle count defines number of heavy lube cycles.

Lube Load Type default Lube Load

Normal defines zone as normal lube load.

Heavy defines zone as heavy lube load.

Release/Count

Release allows configuration of input that pauses operation of specific zone while input is active. **Count** allows for configuration of

counter input port.

Lube Load Input Type allows for system to have normal operating frequency and heavy operating frequency. System will switch between modes according to input valve of Lube Load Input.

NOTE

Values in Input drop menu correspond to **available** numbered input ports on I/O board of controller. Prevents assigning one I/O port multiple times.

Language Target				
IKF.	Erro	orstate 🖉	Connected as	s master 🔘
General	Lube Control Settings	Pump1 Zone1		
- Settings Fill Pump	Pressure Sensor at	EOL		
⊡-Pump1 ⊡-Single Line	Type:	4 - 20mA	-	
⊢ Pump Lube Control	Input:	1.01	•	
	Min. value:	0	psi	
- Inputs Timings	Max. value:	0	psi	
Motor Protection	Operation	0	psi	
- Zone 1 - Cycle Control - Lube Control - Lube Control	Vent Pressure:	0	psi	
Post Sprayer Alarm Sensors Zone2 Cycle Control Lube Control Dost Sprayer	Monitoring Time:	0000 h 01 m	n 00 s	
- Alarm	Valve Output Setting)		
Diagnose	Output setting			
-	Type:	normally closed	•	
	Output	1.06	•	

Zone → Lube Control

Pressure Sensor at EOL Type configures pressure switch of sensor specifically for zone.

Pressure Sensor at EOL Input assigns available I/O port for sensor.

Various PSI settings assigns sensor values. Monitoring Time defines time length of sensor monitored for end of cycle condition before triggering alarm.

Valve Output Setting Type controls valve configuration by zone.

Valve Output assigns available I/O port for sensor.

Holding Time defines time system holds in vector pressure at required level before relieving system pressure.

NOTE

If selecting voltage/current, additional input boxes will display.

NOTE

Values in **Input** drop menu correspond to **available** numbered input ports on I/O board of controller. Prevents assigning one I/O port multiple times.

NOTE

Screen items displayed reflect options previously selected.



Zone \rightarrow Post Sprayer

Post Sprayer activates sprayer for given time after lube cycle is completed.

Post Spray Time defines time length of each spray.

NOTE

Screen items displayed reflect options previously selected.

NOTE

Values in **Input** drop menu correspond to **available** numbered input ports on I/O board of controller. Prevents assigning one I/O port multiple times.



Single Line Pump → Lube Control

Lube control mode displays following options:

Time points control lubrication cycles. **Pressure** sensors input control lubrication cycles.

Pressure Sensor at Pump Type adjusts settings in fields based on sensor specifications.

Pressure Sensor Input assigns available I/O port for sensor.

Output Pump configures pump output relay. **Remote Manual Lube** assigns input that will allow manual lube cycles when activated by system switch.

NOTE

Screen items displayed reflect options previously selected.





NOTE Values in Output drop menu correspond

to **available** numbered input ports on I/O board of controller. Prevents assigning one I/O port multiple times. Input/Output Assignment



Single Line Pump → Relief Control

Output relief valve works independently to vent relief valve control output. **Relief** displays following options:

Disabled does not use relief control. Enabled allows for relief to be controlled by time parameters input in Pump Relief time and Zone Relief time fields. Pump Relief time allows for venting pressure from pump feed lines with pump pausing between cycles at minimum time.

Zone Relief time allows for venting pressure from one feed line with zone pausing between cycles at minimum time.

NOTE

Screen items displayed reflect options previously selected.



Single Line Zone → Alarms

Alarm Output configures alarm output specifically for errors associated with zone. **Alarm Output** assigns available I/O for zone alarm.

NOTE

Screen items displayed reflect options previously selected.

NOTE

Values in **Output** drop menu correspond to **available** numbered ouput ports on I/O board of controller.

Prevents assigning one I/O port multiple times.

e Language Target		
SKF.	Error state Connected as superv	isor 🔘
General	Sensors Pump1 Zone1	
Settings	Amount of 3 ~	
⊟ Single Line ⊟ Pump	Error Handling: fatal ~	
Lube Control Relief Control	Retries before 1	
illing/Low Level Inputs Timings	Sensor Mode: Flow Sensor ~	
Temperature Monitoring Motor Protection	Sensor 1 Settings	^
⊡- Zone1 Cycle Control	Type: normally open ~	
Lube Control Post Sprayer	Input: 1.01 ~	
Alam	Counts: 0	
Diagnose	Monitoring time: 00 m 00 s	
	Sensor 2 Settings	
	Type: disabled ~	
	Counts: 0	
	Monitoring time: 00 m 00 s	
	Sensor 3 Settings	

Single Line Zone → Sensors *

Sensors displays up to ten assignable sensors.

NOTE

Each configured input will require activation from monitoring flow sensor each time lube cycle is run on zone. Failure to do so will result in zone alarm.

NOTE

Values in **Input** drop menu correspond to **available** numbered ouput ports on I/O board of controller.

Prevents assigning one I/O port multiple times.

Sensor Mode is a type of monitoring sensor. If flow sensor is set, there is a **Counts** option displayed for each sensor. This sets the number of edges counted during the lubrication cycle within the monitoring time.

Error handling shows how to react when monitoring sensor conditions are not met.

Fatal displays when an error is shown and system will stop

Non Fatal displays when a warning is shown and system will continue working

Retries Before Error represents the number of continuous failed monitoring cycles before triggering an error condition.

* Indicates change.

LMC301 V0.0.3.2				
ile Language Target				
SKF		Error state 🖉	Connected as mast	ter 🔘
General Settings - Fill Pump - Pump - Cube Control - Relief Control - Filling/Low Level - Inputs - Timings - Temperature Monitoring	Fill Pump Setting	js		
Motor Protection	Filling Pump O	utput		
Cycle Control Lube Control	Type:	normally open	•	
	Output	1.01	*	

Settings \rightarrow Fill pump

Filling Pump Output assigns tank auto fill pump.

301 V0.0.3.2			
Language Target			
CF.		Error state	Connected as master
eneral	Filling Input Settin	igs Pump1	
ttings			
Fill Pump			
Pump I			
Lube Control		+	
Relief Control	Low Level inpu		
Filling/Low Level	Type:	normally open	•
Inputs			
Temperature Monitoring	Input:	1.04	-
Motor Protection			
Zone1			
- Cycle Control	Low Level	steady	•
- Lube Control	Detection		
- Post Sprayer			
Sensors	High Lovo	Unput	
Zone2	i ligit Leve	in par	
Cycle Control	Type:	normally open	-
- Lube Control			
- Post Sprayer	Input	1.01	▼
Alarm			

Filling/Low Level (Auto Filling) → Inputs

Input Settings displays following options: Low Level Input causes activation of auto fill pump.

High Level Input turns auto fill pump off. Low Level Detection displays constant

signal for both low level and not low level. Intermitting LL signifies low level. Intermitting no LL signifies not low level.

le Language Target				
SKE	End	orstate 🥥	Connected as supervisor	0
General	Lube Control Pump 1	1		
Settings	Pressure sensor a	at Pump		^
- Pump 1	Туре:	4 - 20mA	~	
Pump	Input:	1.01		
⊢ Filling/Low Level	Min. value:	0	psi	
Timings	Max. value:	5800	psi	
Motor Protection	Value:	3500	psi	
	Control type:	System Pressure	~	
Lube Control Post Sprayer Alarm	Pump Output			
Cycle Control	Type:	normally open	~	
Lube Control Post Sprayer	Output:	1.01	~	
li Alam ⊡ · Zone3	Pump working mode:	pulsed	~	
Cycle Control Sensors	max. Pump run Time	0000 h 00	m 00 s	
- Post Sprayer	Cooling Time	0000 h 00	m 00 s	
⊡ Diagnose	Remote Manual L	ube		
	Tupo:	disabled		

Progressive Pump → Lube Control *

Pressure Sensor at Pump limits pressure generated by pump. Adjust settings in fields based on sensor specifications.

Pump Output configures pump output relay. Pump working mode displays mode of

operation during active pump cycle. **Steady** pump remains on for entire

pump cycle.

Pulsed pump transitions on and off for four second cycle rate.

Max. Pump Run Time displays maximum pump running time to prevent overheating.

* Indicates change.

e Language Target			
ikf	Error	state 🕘 Connect	ed as supervisor 🔘
General Settings Fill Pump Pump 1 Progressive Pump Lube Control Filling/Low Level Inputs Timings	Sensors Pump1 Zone Amount of Sensors Error Handling: Retries before Error:	1 3 ~ 1	
Temperature Monitoring Motor Protection	Sensor 1 Settings		^
- Zone 1	Туре:	counter	1
Sensors Lube Control	Input:	1.01 ~]
Post Sprayer	Type:	controlling ~	1
- Zone2 - Cycle Control	Monitoring time:	00 m 00	9
Sensors Lube Control	Counts:	0	
Post Sprayer Alarm	Sensor 2 Settings		
Cycle Control	Type:	normally open ~]
Sensors Lube Control	Input:	1.01 ~]
- Post Sprayer	Type:	Monitoring ~	1
⊡- Diagnose	Monitoring time	00 m 00	8

Amount of sensors displays number of proximity switches in zone. **Error Handling** shows how to react when

monitoring sensor conditions are not met. **Fatal** displays when an error is

shown and system will stop Non Fatal displays when a warning is shown and system will continue working

Retries Before Error represents the number of continuous failed monitoring cycles before triggering an error condition.

Settings Sensor 1

Input assigns available I/O port to switch.

Туре

Controlling stops cycle stops when required proximity switch count is reached by switch input. **Only one per zone**.

Monitoring verifies switching activity during zone cycle, but does not control end of cycle.

Monitoring time displays time allotted for required switch count to be reached. Counts displays switch count required to end cycle.

Language Target		
KF.	Error state	Offline Mode 🖉
General Settings - Pump1 - Single Line - Lube Control - Relief Control - Filling/Low Level - Temperature Monitoring - Motor Protection - Zone1 - Cycle Control - Lube Control - Dest Sprayer - Alarm - Sensors	Lube Control Settings Pump1 Zone1	
	Lube Time: 0000 h 00 m 00	S
	Output setting	
	Type: normally open	•
	Output 1.01	•

Valve Output Setting is setup for zoning valve output relay.



Dual Line \rightarrow Pump

System configures system for **Dual Line** operation.

Valve Type specifies zone valve used. Self ChangeOver represents D3DU1. This CO unit changes pipes automatic from A to B, and vice versa, when corresponding pressure in system is reached. Changeover process is signaled by means of limit switch on changeover to LMC301.

MA/MP determines whether CO unit will supply pipe A or B. If coil is energized, unit supplies pipe B, and if not energized, unit supplies pipe A.

EMU2 includes two control inputs. If terminal 4 is energized, CO unit will supply pipe A. If terminal 3 is energized, unit will supply pipe B.

EMU3 displays third input M. If input is energized, pipe A and B move to relief position. EMU3 has additional 3 signaling outputs if position A, B, or relief is reached. **3/2 Way Valve** assigns every pipe separate valve.

Erro	r state	Connected as master
Lube Control Pump1	Pump	
Type: Input Min. value: Max. value:	4 - 20mA 1.03 0 5800	▼ ▼ psi psi
Operation Pressure:	2500	psi
Pump Output setting		
Туре:	normally open	•
Output:	1.01	•
Remote Manual Lub	e	
	Input: Min. value: Max. value: Operation Pressure: Pump Output setting Type: Output Remote Manual Lub	Input IO3 Min. value: 0 Max. value: 5800 Operation 2500 Pressure: 2500 Pump Output setting Type: normally open Output: 1.01

Dual Line → Lube Control

Pressure Sensor at Pump Type adjusts

settings in fields based on sensor specifications.

Max value uses pump pressure transducer to limit system pressure only. If max is met or exceeded, controller will pause pump operation to let pressure dissipate into system. Pump operation will resume once pressure has fallen to acceptable level at pump.

Sensor Input assigns available I/O port for sensor.

Output Pump configures pump output relay.

Remote Manual Lube assigns input that will allow manual lube cycles when activated by system switch.



Dual Line \rightarrow Lube Control \rightarrow Lube Control Ext

Pump 2nd Output functions as standby system if working pump has error. **Working Pump** allows for choice of second standby pump.

e Language Target				
ikf:		Error state	Connected as mas	ster 🔘
General]- Settings	Relief Settings F	Pump1		
i Pump1 ☐ Pump1 ☐ Dual Line	Relief Valve 0	utput setting		
ー Pump	Type:	normally open	▼	
 → Filling/Low Level → Inputs → Timings → 2nd Filling/Low Level → Temperature Monitoring → Motor Protection 	2nd Relief Val	ve Output setting		
– Zone1 ─ Cycle Control	Type:	normally closed	-	
i⊒-Lube Control I Inputs Alarm	Output:	1.01	-	

Dual Line \rightarrow Pump \rightarrow Relief Control

Relief Valve Output configures relief valve for pump 1.

2nd Relief Valve Output configures relief valve for pump 2. If main and reserve pump is available, relief valve must switch relief pipe to pump that is in operation.



Dual Line \rightarrow Zone \rightarrow Lube Control

Change over input communicates to controller change over has occurred. **Monitoring Time** displays amount of time that switch has to activate or will show error.

ile Language Target				
SKE		Error state 🥥	Connected as master	0
General Settings Fill Pump Dual Line Lube Control Lube Control Ext	Lube control in	put settings Pump1 Zone1		
Filling/Low Level	Pressure Se	nsor at EOL		
- Inputs Timings	Туре:	normally open	-	
2nd Filling/Low Level Temperature Monitoring Motor Protection	Input A:	1.01	•	
-Zone1	Input B:	1.01	•	

Dual Line → Zone → Lube Control → Inputs

Pressure switches determines settings for zone depending on selected valves. Each pipe in dual line system needs pressure switch or pressure transducer.

Pressure sensor at EOL Type configures pressure switch of sensor specifically for zone.

Pressure sensor at EOL Input assigns available I/O port for sensor. Various PSI settings assign sensor values.

If pressure sensor is available, must define minimum and maximum absolute and different pressure. System will learn optimum settings in **Adaptive Mode**.

ikf.	Error s	tate 🖉	Connected a	s master 🔘
General Settings Fill Pump Pump1 Dual Line Pump ↓ Lube Control	Lube control input setting	s Pump1 Zone1		
Lube Control Ext Relief Control Filling/Low Level Inputs Timings	Pressure Sensor at EC	4 - 20mA	•	
	Input A:	1.01	•	
□-Zone1	Input B:	1.01	•	
Lube Control	Min. value:	0	psi	
Alarm Sensors	Max. value:	0	psi	
Diagnose	Max. abs. pressure:	0	psi	
	Min. abs. pressure:	0	psi	
	Max dif pressure:	0	nsi	

KE		Error state	Connected as master
General Settings Diagnose Error History Lube Event History Lube Event Counter	Error History No of Errors:	11	
	No.011 occd. clrd.	E155 109:04:00 02/16/16 12:39:06 :-: IO Board1 offline	P1Z1
	No.010 occd. cIrd.	E155 109:04:00 02/16/16 12:05:46 109:04:00 02/16/16 12:39:06 IO Board1 offline	P1Z1
	No.009 occd. cIrd.	E155 109:04:00 02/16/16 12:05:38 109:04:00 02/16/16 12:05:46 IO Board1 offline	P1Z1
	No.008 occd. clrd.	E155 109:04:00 02/16/16 12:05:34 -:-:	P1Z2
	No.007 occd. clrd.	E155 109:04:00 02/16/16 12:05:34 109:04:00 02/16/16 12:05:38 IO Board1 offline	P1Z1
	No.006 occd. clrd.	E155 109:04:00 02/11/16 14:29:39 109:04:00 02/16/16 12:05:34 IO Board1 offline	P1Z1

Diagnose → Error History

Error History

No of Errors displays total number of errors logged.

Error log display displays line item information on logged errors.

Diagnose → Lube Event History

Lube Event History

Lube Events displays total number of lube events in record. Lube events display displays line item information on lube events.

		Fig. 41
File Language Target		
SKE	Error state	Connected as master
General Settings Diagnose Error History Lube Event History Lube Event Counter	Lube Event History Lube Events: 0	
	LubeEvent history empty!	A

LMC301 V0.0.3.2		
File Language Target		
SKE	Error state	Connected as master
General Settings Diagnose Error History Lube Event History Lube Event Counter	Lube Event Counter Pump1 Zone1: 0 Zone2: 0 Zone3: 0 Pump2 Zone1: 0 Zone2: 0 Zone2: 0 Zone3: 0	
	Pump3	
	Zone1: 0	
	Zone2 [.] 0	
	Zone3: 0	

Diagnose → Lube Event Counter

Lube Event Counter

Pump/Zone displays total number of lube events by pump and zone since last memory clear.

Network displays total number of lube events by pump and zone since last memory clear.

MC301 V0.0.3.0		
e Language Target		
SKF	Error state	Connected as supervisor
	IOBoard Addr1	
	Serial: 00000025	
	HW Version: 1.40	
	FW Version: 0.55	

Network →IO Board AddrX

IO Board Addr X displays serial number, hardware revision and firmware revision of selected I/O Board.

MC301 V0.0.3.2			
	Error state	Offline Mode	
General Settings	Firmware Update		
bidghose	1) Select device:	DAYX4G1V Refresh	
	2) Select Firmware File:	load BIN-File	
	Ī	No file selected	
	3) Programm:	Program	
	3) Programm:	Program	

Firmware update

- 1 Save device backup configuration to file by selecting File>Save.
- 2 Reload configuration saved prior to beginning procedure File>Open.
- ${\bf 3}$ Send configuration to controller ${\bf Target}$

Firmware update window indicates update procedure is working properly.

NOTE

Do not interrupt update procedure before completion.

NOTE

Firmware update can only be run while system is in **disconnect** mode.

Select device displays all controllers connected to computer. Only one can be updated at a time.

Refresh updates list of connected controllers.

Select Firmware File displays selected firmware file.

Load BIN-File opens Windows Explorer so that proper software file can be chosen. Programm executes update procedure. Reset controller power when update is complete.



Warranty

The instructions do not contain any information on the warranty. This can be found in the General Conditions of Sales, available at: www.lincolnindustrial.com/technicalservice or www.skf.com/lubrication.

skf.com | lincolnindustrial.com

® SKF and Lincoln are registered trademarks of the SKF Group.

© SKF Group 2023 The contents of this publication are the copyright of the publisher and may not be reproduced (even extracts) unless prior written permission is granted. Every care has been taken to ensure the accuracy of the information contained in this publication but no liability can be accepted for any loss or damage whether direct, indirect or consequential arising out of the use of the information contained herein.

November 2023 · Form 404621 Version 2

Microsoft is the registered trademark of Microsoft Corporation.