



Guidelines to Start-Up a Load Sense Control (LSC) System

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The following procedure is intended to supplement training received for starting up and troubleshooting an LSC System - It is NOT a replacement for the training.

Note:

There will be several Linde Service Bulletins referenced throughout this procedure because it is assumed that the LSC System you are starting up contains all Linde components. The following Linde Service Bulletin is completely valid when using all Linde components in your LSC System. For those LSC Systems containing non-Linde pumps and/or motors, care must be taken when using this Service Bulletin - Only portions of it will be valid.

Tools/Equipment Required:

Prior to starting up the LSC System, make sure that you have the following Linde Service Bulletins available. The tools and equipment needed are summarized in each of the following Linde Service Bulletins. Be sure to have all tools and equipment available prior to starting up the LSC System.

- "HPR-startup" (if using a Linde HPR-02 pump)
- "HMF-startup" (if using a Linde HMF-02 motor)
- "HMF-startup" (if using a Linde HMF-02 motor)
- "HMR-startup" (if using a Linde HMR-02 motor)
- "HPR-STANDBY" (if using a Linde HPR-02 pump)
- "HPR-VD3" (for Linde HPR-02 with load sense and VD3 style control)
- "HPR-LSDA" (for Linde HPR-02 with load sense and pressure comp. control)
- "HPR-MAX" (if using a Linde HPR-02 pump)
- "LSC-RELIEF"
- "HMF-SINGLE" (if using a Linde HMF-02 with integrated crossover relief valves)
- "HMR-RELIEFS" (if using a Linde HMR-02 with integrated crossover relief valves)
- "PCO-2stage" (if using a Linde two-stage PCO)
- "PCO-1stage" (if using a Linde single-stage PCO)
- "PCO-Monoblock" (if using a Linde MW14 or MW18 monoblock)
- "LSC-RB"
- "LSC-FLOW"
- "HMF-MAX" (if using a Linde HMF-02 motor)
- "HMR-MAX" (if using a Linde HMR-02 motor)



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Note:

In addition to the above listed Linde Service Bulletins, other Linde Service Bulletins are available to start-up, tune-in, or troubleshoot individual Linde components that may be used in your LSC System. Please consult the Linde Service Department for a listing of these additional Linde Service Bulletins if those listed above do not include what you are using.

IMPORTANT:

If using Linde components (for example an HPR-01 pump, a BPR pump, or an HMF-02 priority swing motor) other than what is described in this Service Bulletin, please consult the Linde Service Department for information on using the particular components. The Linde Service Department can assist you faster if you have the Linde Serial Number available for the particular component when calling.

If using any Linde Electronic Boxes in your LSC System and you have NOT received any previous training on the Electronic Boxes, please consult the Linde Service or Engineering Department prior to starting up the LSC System.

Guidelines for Starting Up an LSC System:

1. Follow all steps in "HPR-startup" to properly set up the HPR-02 pump. Please note that the information contained in this Service Bulletin is also valid for HPR-01 and BPR pumps.
2. If using an HMF-02 motor in the LSC System, follow all steps in "HMF-startup" to properly set up the HMF-02 motor.

If using an HMF-02 motor in the LSC System, follow all steps in "HMF-startup" to properly set up the HMF-02 motor.

If using an HMR-02 motor in the LSC System, follow all steps in "HMR-startup" to properly set up the HMR-02 motor.
3. Follow all steps in "HPR-STANDBY" to check the standby pressure on the HPR-02 pump. Please note that this Service Bulletin is also valid for HPR-01 and BPR pumps.
4. Follow all steps in "HPR-VD3" to set the load sense margin pressure and the VD3 power mode valve on the pump control. Only use this Service Bulletin if you are using an HPR-02 pump with a load sense and VD3 style pump control.

Follow all steps in the section of "HPR-LSDA" titled *Load Sense "Margin Pressure" Adjustment Procedure* to set the load sense margin pressure on the pump control. Only use this Service Bulletin if you are using an HPR-02 pump with a load sense and pressure compensator style pump control.



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5. If required, follow all steps in "HPR-MAX" to adjust the maximum displacement on the HPR-02 pump.
6. Typically, it is recommended that an LSC System have the following components adjusted in the following order (The order shown below goes from the highest pressure setting to the lowest pressure setting):
 - HPR-02 pressure compensator (only if this style pump control is used); *it should be set to the highest setting it is capable of without endangering hoses and fittings*
 - workport relief valves in each valve section (some valve sections may have anti-cavitation valves instead of workport relief valve; anti-cavitation valves cannot be adjusted)
 - integrated crossover relief valves in the -02 Series motors
 - load sense pressure cut-off (PCO); *there are some occasions when the customer wants the PCO set higher than some of the workport relief valves and/or integrated crossover relief valves, but Linde does not recommend this for system efficiency*
7. If you intend to follow Linde's recommendation and set up your LSC System in the order illustrated above, then do the following in the order shown:
 - a. Loosen the *Seal Nut* and turn the load sense *PCO Adjustment Stud* IN 2-3 turns (do NOT turn it in fully). Use the illustration on the front page of Service Bulletins "PCO-2stage", "PCO-1stage", or "LSC-Monoblock" that corresponds to the component in your LSC System.
 - b. Select one specific LSC valve section (It is recommended that you select an LSC valve section for a cylinder function or for a function that can easily be dead-headed or blocked). Loosen the *Seal Nut* and turn the *Adjustment Stud* IN 2-3 turns (do NOT turn it in fully) on either the "A" side or "B" side workport relief valve. Use the illustration on the front page of Service Bulletin "LSC-RELIEFS".



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- c. Follow all steps in the section of "HPR-LSDA" titled *Pressure Compensator Adjustment* to set the pressure compensator on the pump control. Only use this Service Bulletin if you are using an HPR-02 pump with a load sense and pressure compensator style pump control.
- d. Follow all steps in "LSC-RELIEFS" to adjust each workport relief valve to the desired setting.
- e. Follow all steps in:
 - "HMR-RELIEFS" to set the integrated crossover relief valves on an HMR-02 motor
 - "HMF-SINGLE" to set the integrated crossover relief valves on an HMF-02 motor
- f. Depending on the style of PCO in your LSC System, follow all steps in:
 - "PCO-2stage" to set the PCO on a two-stage PCO
 - "PCO-1stage" to set the PCO on a single-stage PCO
 - "LSC-Monoblock" to set the PCO on a monoblock

8. The LSC valve regulation begin setting should never be lower than 70 psi. It is generally better to change the regulation begin setting on the pilot controller (i.e. foot pedal or joystick) than to change the regulation begin setting on the LSC valve.

If required however, follow all steps in "LSC-RB" to adjust the regulation begin for each valve section. This step typically is NOT necessary. However, if the flow from any valve section does not properly match the movement of the pilot controller, then you may need to adjust the regulation begin for that particular valve section.

9. Follow all steps in "LSC-FLOW" to adjust the desired maximum flow settings for each valve section. If the valve section is supplying flow to either an HMR-02 or HMV-02 motor, make sure that the motor is at maximum displacement when making the adjustments to the flow setting. This will insure that you have a point of reference to base the valve section flow to.
 - Follow all steps in "HMR-MAX" to set the HMR-02 motor to maximum displacement
 - Follow all steps in "HMV-MAX" to set the HMV-02 motor to maximum displacement



*******ATTENTION*******

You have been provided information on conversion, repair and/or service of Linde components. Proper application of the information requires specific training and may require use of specialized tooling and equipment. If you choose to proceed with the conversion, repair and/or service of the Linde component(s) absent the necessary training and/or these specialized tools, you do so at your risk.

Linde Hydraulics Corporation will accept no claim for warranty or other consideration resulting from deficiencies in the conversion, repair and/or service done in accordance with the guidance offered herein when the necessary training has not been conducted and/or required specialized tooling and equipment has not been utilized.

All requests for training must be coordinated through your Linde Account Manager. He can also provide you price and availability of any specialized tooling.

Questions regarding the information provided or this disclaimer should be addressed to the Warranty & Service Department, Linde Hydraulics Corporation.

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