

PRODUCT INFORMATION BULLETIN



PIB Number: 01.1211a

Date: December 11, 2001

Series Impact: H170-360HD

Subject: Hydraulic Control Valve
for Attachments

Since so many attachments for the H170-360HD (F007 & E019) series are sourced locally, rather than supplied by the factory, it is important for sales personnel to understand the hydraulic requirements of attachments to be installed in the field. It is essential that the requirements of the attachment are made known to the factory, by ordering one of the available price list options or by including a SPED quote on your order, so that the proper configuration of valves, levers and switches can be installed.

You should contact Applications Engineering in Berea for assistance in selecting the best hydraulic control option, if you have any questions when ordering a factory-installed attachment.

Before ordering a truck that will have an aftermarket attachment installed at the dealership, you should ALWAYS call Applications Engineering to discuss the hydraulic requirements of that attachment. They can help identify the hydraulic control option from the standard price list that is appropriate for the attachment, or obtain a SPED quote for any special hydraulic control configuration needed.

You should also make it a point, when purchasing an integral attachment from an aftermarket source, to clearly understand who will provide and install the solenoid valves that will be required; you may need to order a Sold Alone valve package to supply to your attachment vendor.

Taking the time to determine correct specifications will avoid the need to make changes in the field, and any related costs to you.

- All trucks in the H170-360HD series are fitted as standard with valve groups for 3-functions – tilt, hoist & one auxiliary. The truck utilizes electro-hydraulic controls with an electronic controller, and *Pulse Width Modulation* to provide proportional hydraulic controls for some functions.

- All functions other than the hoist and tilt are operated through a single auxiliary control valve. Where there is more than one auxiliary function, each function is controlled through an *I/O module* (input/output module), which reads the signal from the lever, switch or joystick. When more than one auxiliary function is needed, solenoid valves are added to the carriage to control each function. The I/O module controls both the auxiliary valve (to provide hydraulic fluid to the attachment) and the solenoid valves (to activate a specific hydraulic function of the attachment.)
- Since the auxiliary functions are controlled by solenoid valves mounted on the carriage, or on the back of an integral attachment, there are only two hydraulic hoses routed over the mast, along with the electric cable which provides the control signal to the solenoid valves.
- A function controlled by a lever, or the joystick, will be *proportional* - the more the lever or joystick is moved the faster the attachment moves. A function controlled by a switch will be *non-proportional* - the function is either active (on) or inactive depending on the switch position.
- Operation of the I/O modules, pulse width modulation, and hydraulic controls are controlled by software, and the system must be configured for the specific requirements of an attachment.

As an example, levers have a priority over switches; if a switch and a lever are activated together – even if the switch is activated first – the controller will react only to the input from the lever until it is returned to the neutral position. As another example, the auxiliary control valve determines the direction of hydraulic flow. You can only operate hydraulic functions simultaneously in the same direction if two levers control the functions. You can activate 2 levers simultaneously, either back or forward, and both functions will work. When two levers are activated together, **but in opposite directions**, the controller will respond to the lever activated first and ignore the input from the other lever until the first lever is returned to the neutral position.

Proper functioning of an attachment can depend on which switch or lever controls each hydraulic function, and on the routing of the hydraulic hoses to the attachment. ***A SPED quote may be needed to provide the proper configuration of hydraulic valves and controls for any dealer installed attachments.***

- Solenoid valves can be configured in series or parallel. When the solenoid valves are in *series*, the functions they activate can only be run one at a time. When the solenoid valves are in *parallel*, and they are controlled by a single lever or switch, two or more functions may be activated simultaneously. Simultaneous movement of the forks in a fork positioner, or the arms of a clamp, is accomplished in this manner. However, since there is a single hydraulic oil supply, the speed at which the functions are carried out may be reduced when multiple functions are operating simultaneously.
- Price list options are available for up to 5-functions (three auxiliary) using levers and switches, or joystick and switches. For clamping attachments, there are special lever arrangements utilizing clamp levers that feature a clamping button and proportional control. The joystick is not suitable for use with clamping attachments. ***A SPED quote will be necessary if more than 5-functions (three auxiliary) are required or if there is a need to configure any combination of the functions to operate simultaneously.***

Some examples of the hydraulic control configurations required for particular attachments are:

1. Factory Dual Function Sideshifting Fork Positioner
Requires 3 levers & 2 rocker switches, 2 I/O modules and 3 solenoid valves in series
Use option 066-07
2. Apron-style Sideshifting Fork Positioner with simultaneous arm movement
Requires 4 functions – either 4 levers or 3 levers & 1 rocker switch, 1 I/O module and 2 solenoid valves in series
Option 066-13 recommended, or option 066-09 if joystick preferred
(Apron-style SSFP with independent arm movement requires 5 functions (option 066-07) with 3 levers & 2 switches, 2 I/O modules, and 3 solenoid valves in series)
3. Non-Sideshifting Fork Positioner with independent arm movement
Requires 4 functions – 2 levers & 2 rocker switches, 1 I/O module and 2 solenoid valves in series
Option 066-12 recommended, or option 066-15 if joystick preferred
(Non- SS FP with simultaneous arm movement requires 3 functions – 3 levers (option 066-02) or 2 levers & 1 switch, with no I/O module or solenoid valves)
4. Simple Aftermarket Clamp without sideshift or rotator
Requires 3 functions with clamping lever, no I/O module or solenoid valves
SPED quote required for correct hydraulic control valves
5. Double Clamp with Integral Sideshifters
Requires 6 functions – 2 clamping levers plus 2 rocker switches, 2 I/O modules and 4 solenoid valves in series
SPED quote required for correct hydraulic control valves
6. Double Clamp with Sideshifter, Rotator, and independent clamp operation
Requires 7 functions – 2 clamping levers (1 clamping lever) plus 3 rocker switches, 2 I/O modules and 4 solenoid valves (3 in series + 1 parallel)
SPED quote required for correct hydraulic control valves

We appreciate your continued support. Thank you in advance for your attention in this complex matter.