Figure 1

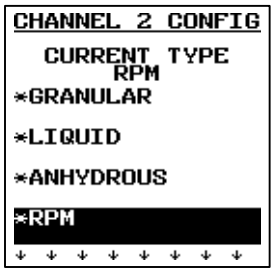


Figure 2

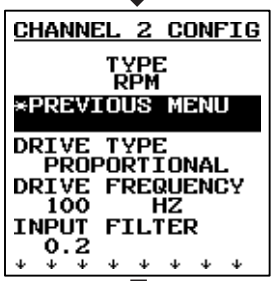
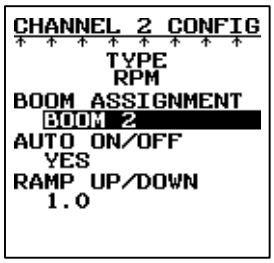


Figure 3



Addendum A

New features with Version 1.4

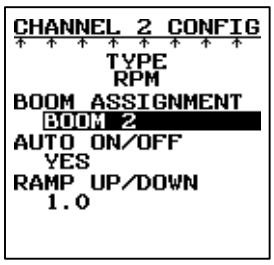
New Software enhancements include:
New channel type RPM.
Enhanced manual ground speed.
New 300 PSI pressure sensor selection.
Application library accumulator reset change.

1 - RPM CHANNEL TYPE

A new channel type has been added to complement the granular, liquid, and anhydrous channel types.

The fourth selection on the channel type screen is RPM as shown in figure 1. This is a time-based control channel that is completely independent of ground speed. The Target Rate and Actual Rate units will be in units of RPM. Boom Section width is irrelevant and should be ignored. This channel type can operate with Servo, Nonlinear Proportional, and Proportional control valves as shown in figure 2. The channel type has a special configuration feature that enables the operator to run the channel without the Master Switch in the operating positions as shown in figure 3. This channel type can only be configured on one channel.

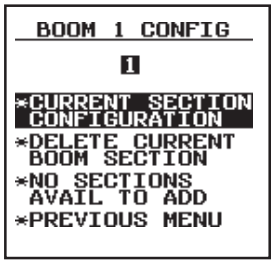
Figure 4



RPM System Descriptions

AUTO ON/OFF: This parameter refers to whether the channel is automatically turned off when the Master Switch is turned off, or when the implement lift input becomes inactive. When this is set to YES, as shown in figure 4, the Master Switch must be in Auto or Manual, the implement lift input must be active, the configured boom section must be active, and the channel must be turned on for the channel to become active and control. When this is set to NO, the requirements for the Master Switch and implement lift are removed. Therefore with this set to NO, the Master Switch can be OFF and as long as a boom section is configured and active, and the channel is on, the channel will run and control to the set RPM.

Figure 5



RAMP UP/DOWN: Specifies the minimum time in seconds for the control valve to open from the full closed position to the full open position. The Ramp Up value will be the value that is entered in this field down to a minimum of 0.1 Seconds. The Ramp Down value will inherently be 3 times the value entered in this field. This value is user changeable due to the high inertia of some devices and this will allow greater flexibility across a range of applications, as shown in figure 4. NOTE: The larger the number, the longer the auto gain calibration will take to complete and this must be set large enough for high inertia devices to spin down to nearly a stop during the calibration process.

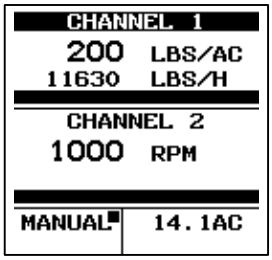
Figure 6

RPM BOOM: The RPM boom type has a different set of rules and configuration. Only one Boom Section can be configured for a RPM type boom as shown in figure 5. In the Section Configuration, the only option that is available is the 12V ON option. The boom input should be connected to a switched voltage that indicates the status of the power source (i.e. hydraulic, electric) for the control channel.

RPM Setup Descriptions

RPM CHANNEL SETUP: The setup menu is different with the RPM channel type configured, as shown in figure 6. The RPM setup parameter CONSTANT is value that represents the number of sensed points (pulses) per revolution of the controlled shaft.

Figure 7



Operating Terms & Conditions

The RPM channel type will always display in units of RPM on the main operate screen as shown in figure 7. Also there will never be a secondary value for a RPM channel type (ex. Liquid Flow has provisions for a pressure reading also). The calculation for application is different from normal area-based control calculations. If k_q is the pulses/revolution constant, and f_q is the sensor frequency, then the equivalent of application rate becomes:

$RPM = f_q / k_q X\ 60$

The product and area accumulators for RPM channels are irrelevant and will always remain 0.0. Even though the boom section does appear to have a width set.

Any time that a RPM channel is configured, there are certain rules that apply that will automatically turn the channel OFF. When the user enters Setup or System the RPM channel will automatically be turned OFF. Anytime the system is turned OFF, upon the next power-up any RPM channels will have their channels turned OFF. It should be noted that when the user enters the System Menu system they should make sure that any RPM channels have completely shut down prior to leaving the System Menu's (Pressing Operate or Setup). When SYSTEM is exited, all of the channels are reinitialized and this will cause an immediate shutdown of all control valves, regardless of any ramp down that may be in progress.

2 - ENHANCED MANUAL GROUND SPEED

Manual ground speed shortcut: Once the manual ground speed is set, (SYSTEM, CONFIGURATION, GROUND SPEED menu) the control can be set to control off of the entered manual ground speed. There are two ways to set manual ground speed. The original way of enabling the manual ground speed was SYSTEM, SERVICE, SYSTEM OVERRIDES, AND GROUND SPEED menu. The additional way to set manual ground speed is to hold the master switch into manual position and press the right green cursor key. The readout on the operate screen will now change to "MANUAL", as in figure 7, and the control will operate off of the set manual ground speed. To disengage the manual ground speed feature from this shortcut mode, turn the master switch to the off position. If the manual ground speed is set through the SYSTEM, SERVICE, SYSTEM OVERRIDES menu the feature can only be disabled through SYSTEM, SERVICE, SYSTEM OVERRIDES menu.

Figure 8

3 - 300 PSI PRESSURE SENSOR

There has been an additional pressure sensor added to the system configuration for liquid pressure sensing. When configuring a liquid pressure channel or second sense, there are now 5 different pressure ranges to choose from 0-60, 0-100, 0-225, 0-300, and 0 -650 as shown in figure 8.

4 - ACCUMULATOR RESET

Manual Channel Configuration Accumulator Reset

If the channel type is changed manually and the basic channel types are the same (i.e. Liquid-Flow to Liquid-Pressure) then none of the accumulators reset. If the basic channel type changes (i.e. Liquid-Flow to Granular-Spreader) on one of the channels, the channel accumulator for that channel will reset. The other channel, if configured, and the system accumulator will retain their accumulator values. When manually changing the channel type the system accumulator will never automatically reset. Selecting the system accumulator and pressing the clear key will reset the system accumulator.

Application Library Channel Configuration Accumulator Reset

If using the application library function and the basic channel type does not change (i.e. Liquid-Flow to Liquid-Pressure) from library to library the channel accumulators will retain their values and the system area will reset. If the basic channel type changes on one channel from library to library (i.e. Liquid-Flow to Granular-Spreader), that channel and the system area will be reset. The other channel, if configured, will retain the accumulator values. If both basic channel types are changed from library to library, then the channel accumulators and the system accumulator will be reset. If both basic channel types are the same from library to library, the channel accumulator will retain their accumulator values and the system accumulator will reset.