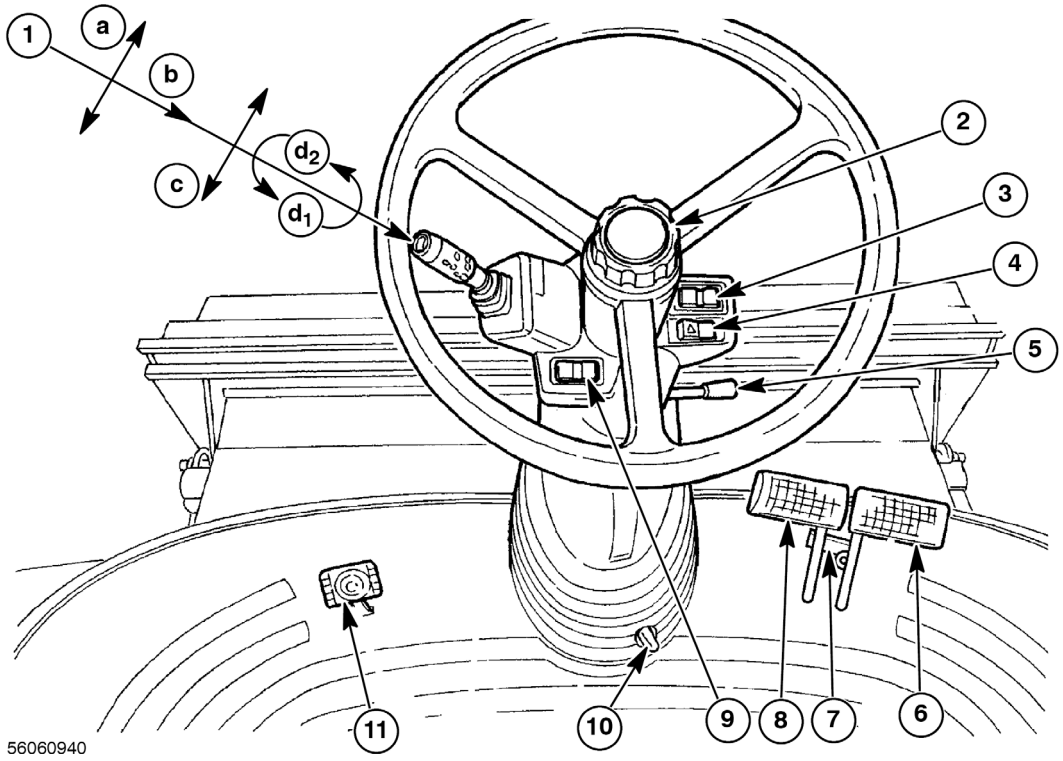
EXERCISE #2 "CAB AND CONTROLS"

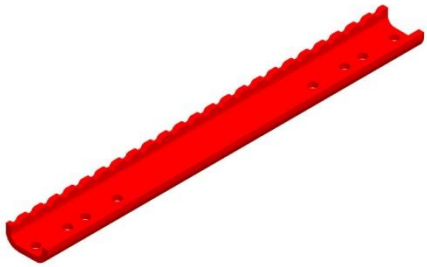
Take your Operators Manual and this exercise and sit in the seat of the AF 7120/8120 Combine that your instructor has assigned. Your mission is to become familiar with all the buttons and knobs that the operator can touch while sitting in the seat. This is your chance to 'play'. Do push the buttons & knobs to see what happens especially if you don't understand the symbols. While investigating, complete the chart below and on the following pages by writing in the FUNCTION that each has.



ID	Function(s)	ID	Function(s)
1A		5	
1B		6	
1C		7	
1D		8	
2		9	
3		10	
4		11	

Feeder

Feeder Chain Slat

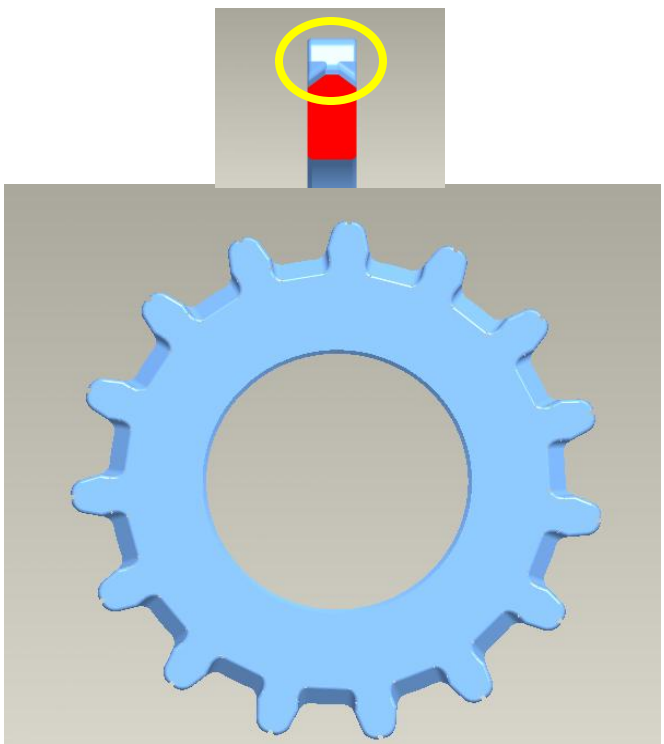


Prior Z-Slat

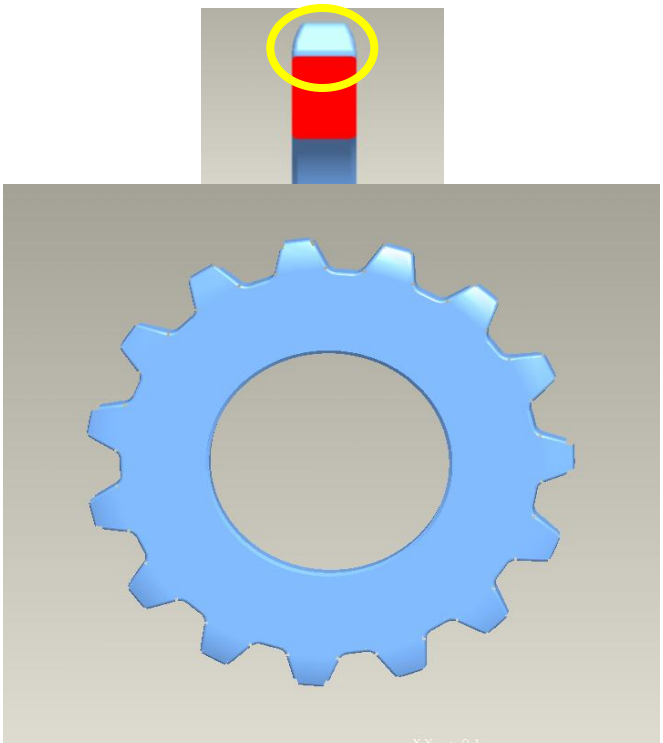
New U-Slat

To enhance the combines feeding capacity and handle today's higher yielding crops and greater volumes of material, the feeder slats have been changed from a Z-slat to a new U-slat. The new profile provides improved strength and durability for each slat. Finite element analysis confirms that the U-shaped slat is stronger under similar loading conditions. The slat is a Grade 80 material and is, 6.35 mm thick.

Top Feeder Chain Sprockets



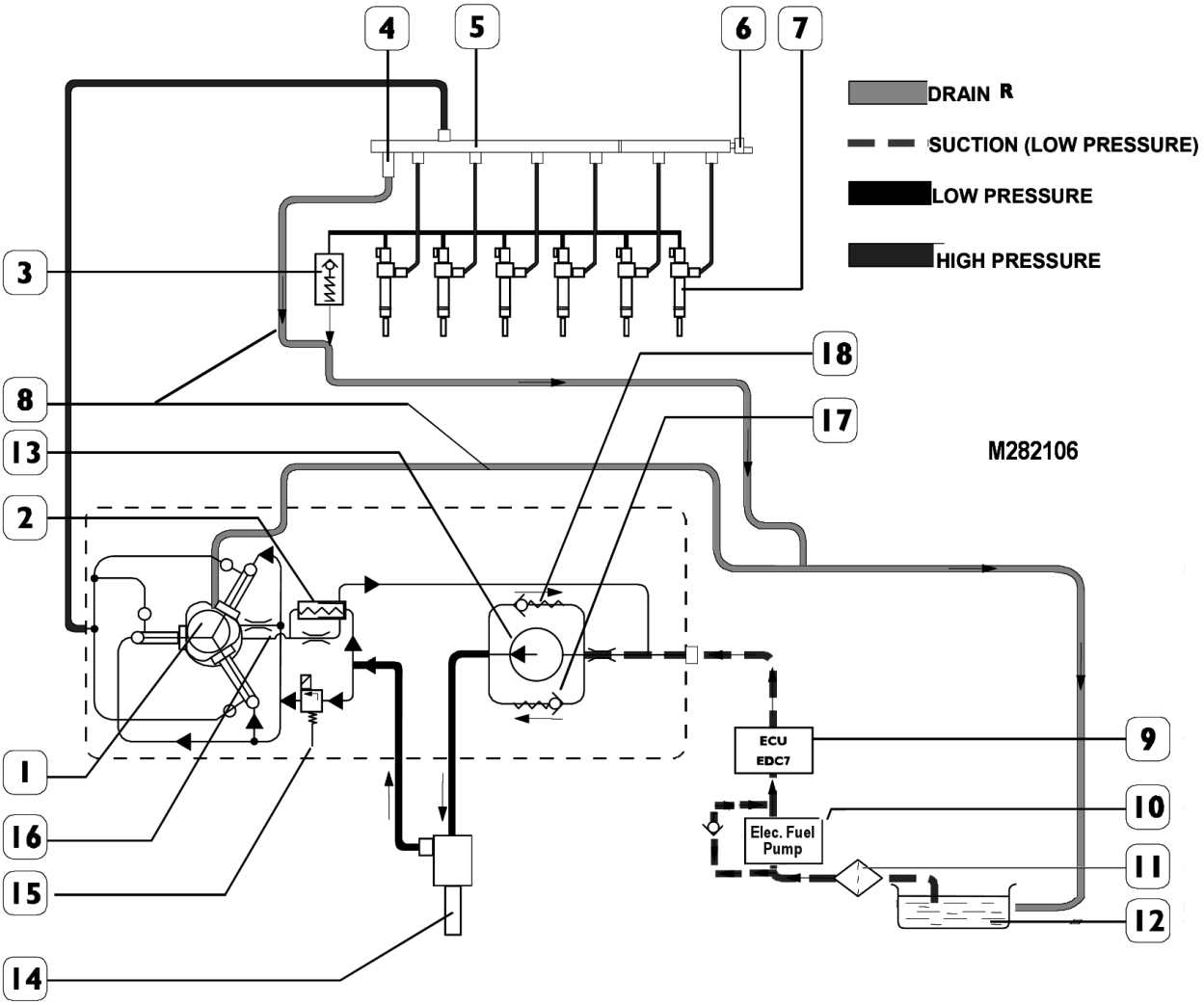
Model Year 2010



Model Year 2009

The sprockets on the top feeder shaft have been enhanced to provide greater gear tooth contact and to include a self cleaning design. The tooth profile on the top shaft sprockets now feature a beveled tooth profile that cleans crop material from the tooth. This will also resist chain jumping by keeping crop material from building up on the tooth profile. The new profile prevents crop from being trapped under the chain. Kit **8422953** is available an, contains the top shaft with new sprockets and strippers and will only service MY09 combines.

FUEL SYSTEM



1.	High Pressure Pump	10.	Electric Transfer Pump and By-Pass
2.	Charge Pump Relief 70 PSI (5 bar)	11.	Water Separator Filter
3.	Return Check 28 PSI (2 bar)	12.	Fuel Tank
4.	High Pressure Relief	13.	Charge Pump
5.	Common Rail (under valve cover)	14.	Final Fuel Filter
6.	Rail High Pressure Sensor	15.	Pressure Regulating Solenoid
7.	Injectors	16.	Returns
8.	Return lines	17.	Electric Pump By-Pass Valve for Air Bleeding
9.	ECU Heat Exchanger Plate	18.	Charge Pump Relief (filter by-pass)

This is a generic drawing of the fuel system; the unit may vary slightly from this layout.

SPECIFICATIONS

Ground speed will vary with different tire and Power Guide Axle combinations. Following is the transmission ratios and examples for the ground speed.

Transmission Speed	Ratio
1st.	9.83
2nd.	5.40
3rd.	4.13
4th.	2.13
Differential	
Planetary & Tracks	20/61
Bull Gear	16/71
Final Drive Ratio	
Planetary	1/13.09
Bull Gear	11/111
Bull Gear (Tracks)	16/107

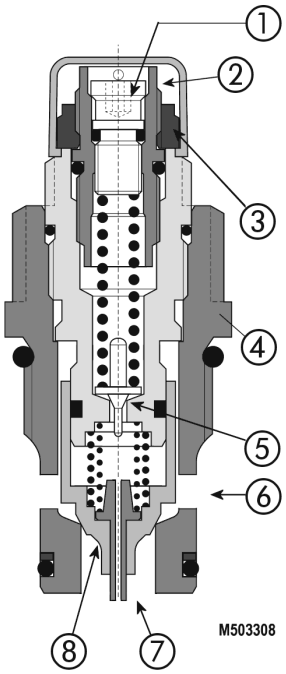
Ground speed when equipped with 900/60R32 tires, speeds are approximate for examples only. Note power guide axle operating position.

Gear	PGA OFF	PGA Optional Low Torque Setting	PGA Standard or High Torque Setting
1st.	4.4	3.7	3.3
2nd.	7.9	6.1	5.0
3rd.	10.4	7.5	5.9
4th.	20.1	N/A	N/A

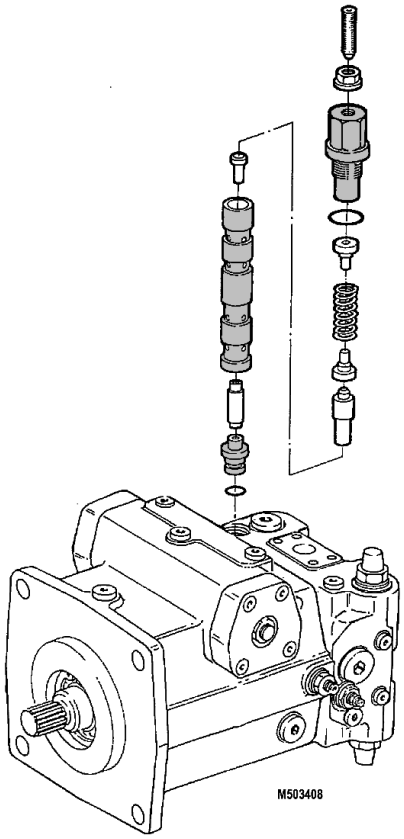
HYDROSTATIC DRIVE PROTECTION OPERATION

HIGH PRESSURE RELIEF VALVE

1	By-Pass Release (Tow Release)
2	Pressure Adjustment
3	Locking Nut
4	Housing
5	Pilot Poppet, (high pressure spring)
6	Charge Inlet Port
7	Drive Pressure Port
8	Secondary Poppet and Orifice, (low pressure spring)

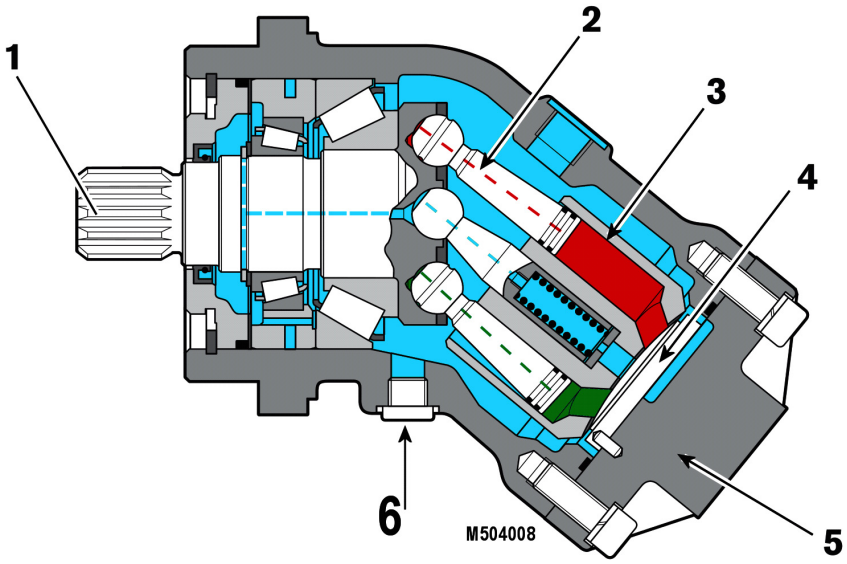


PRESSURE CUT-OFF VALVE

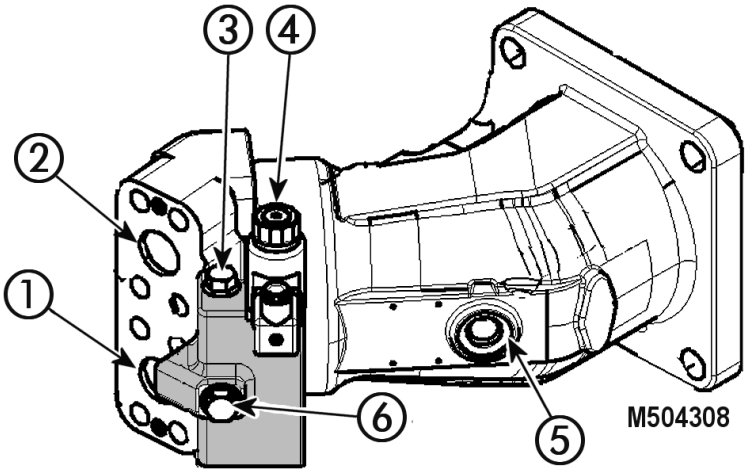


HYDROSTATIC MOTOR COMPONENTS

MOTOR PORT LOCATIONS



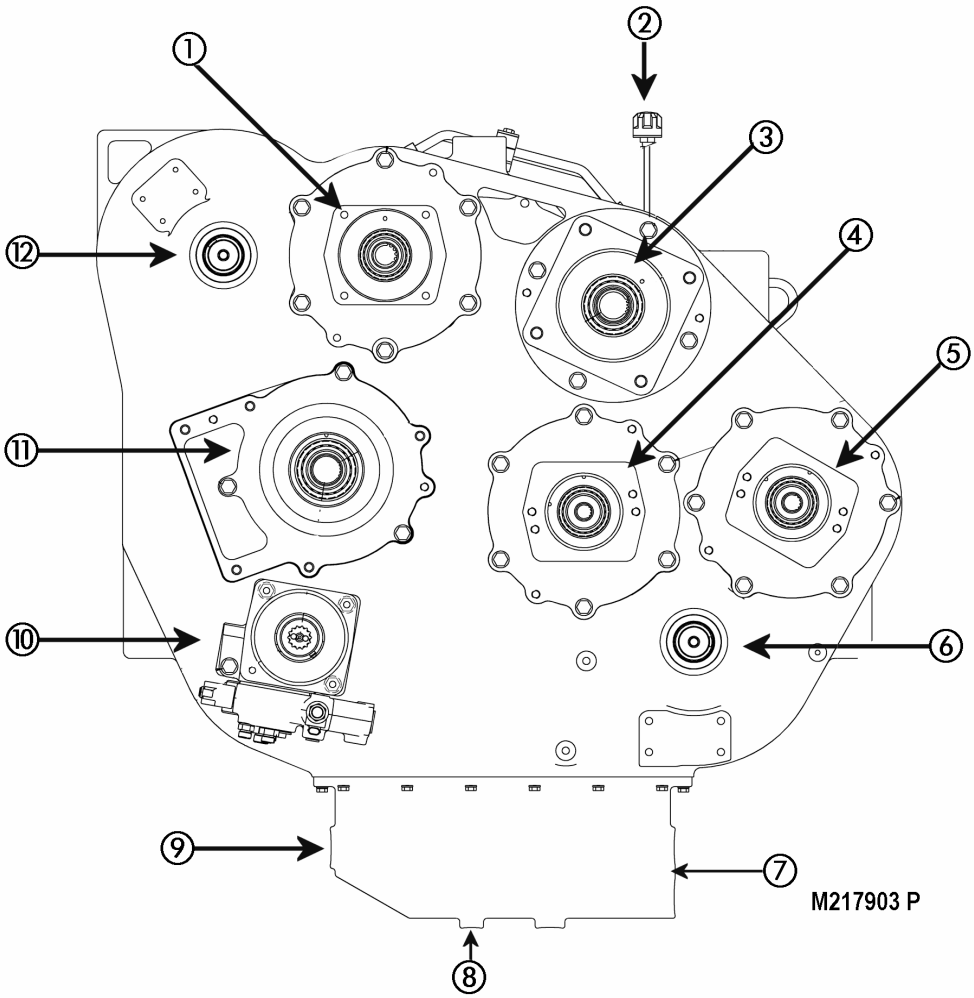
1.	Out Put Shaft
2.	Piston
3.	Barrel – Rotating Housing
4.	Valve Plate
5.	Port Cap



1	Port “A”
2	Port “B”
3	Shuttle Spool
4	Pressure Release Valve
5	Case Drain and Temperature Sensor
6	Flush (Shuttle) Relief Valve

PTO GEARBOX LOCATIONS

PTO GEARBOX FACING OUT

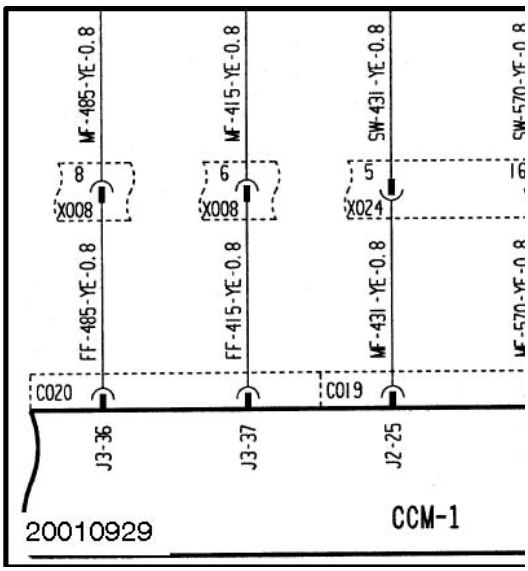


1.	Feeder/Rotor Pump Drive	7.	Supply/Return Port
2.	PTO Gearbox Breather	8.	PTO Gearbox Drain
3.	Ground Drive Hydro Pump	9.	Feeder Drive Drain
4.	Gear Pump Drive	10.	Rotor Drive
5.	PFC Pump Drive	11.	Feeder Drive
6.	Beater/chopper Clutch Drive	12.	Unloader Clutch Drive

Verify that the PTO gearbox dip stick is securely placed into the tube.

HARNESSES

A two digit alpha code is assigned to each harness used on the combine (with the exception of two or three wire jumper harnesses). This label is used on each wire on the schematic to identify which harness any given wire is located in. The harness codes are:

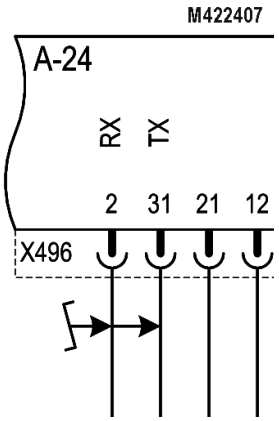


Code	Harness
MF	Main Frame
FF	Front Frame
LF	Lower Frame
CM	Cab Main
RC	Right Hand Console
SC	Steering Column
CR	Cab Roof
OR	Outer Roof
AC	HVAC
FE	Feeder
GT	Grain Tank
GB	Gearbox
EN	Engine

Code	Harness
EX	Expansion
SW	Straw Hood, Front
SH	Straw Hood, Rear
LR	Lower Frame Rear
PF	Precision Farming
AD	Adapter, Display
JP	Jumper
FC	Flip Up Lighting
UL	Under shield Lighting
UE	Under shield Lighting, Engine
CC	Concave Clearance
TL	Unload Tube Light
HH	Header

DATA BUS = CAN CIRCUITS

The data bus circuits, which is a twisted pair of wires, is indicated by the symbol as shown on terminals 2 & 31. The CAN wires are in a sheathed cable, separated from other wires, but included in the complete harness.



HVAC TROUBLESHOOTING

NORMAL SYSTEM VOLTAGE READINGS AT THE ATC CONTROLLER

ATC Controller Connector X397		Function Key Switch In the "RUN" Position	Open Circuit Voltage	Normal Readings
Terminal Location	Wire #			
3	955 YE	Monitors the position of the water valve		Full Heat 7.8 V Full Cold 0.8 V
5	953 YE	Sends a signal voltage to the PWM module		Full Fast 4.0 V Full Slow 0.0 V
11	959-WH	Signal for the cold box actuator		Open=30% Bat+ Closed=50% Bat+
15	911-BL	Provides a power to the compressor clutch relay.		0.0 Volts (AC OFF) 12 Volts (AC Selected)
4 12 17	924 OR	Switched power supply (C2 to D11)		SW 12V
18	954 BK	Ground		Ground
20	923-YE	Display Data		
21	952 BL	Sends a voltage to the Cab Temp. sensor	5 Volts	2.8 at 70°F voltage will drop as the temperature at the sensor increases
22	958-WH	Sends a voltage to the Outlet Temp. sensor	5 Volts	2.3 at 70°F voltage will drop as the temperature at the sensor increases
23	951 BL	Sends a voltage to the Evaporator sensor	5 Volts	2.3 at 70°F voltage will drop as the temperature at the sensor increases
25	920 BK	Sends a voltage to the ATC control button	5 Volts	0.0 Volts with the switch in the Defog position.
26	918 YE	Sends a voltage to the ATC control button	5 Volts	0.0 Volts with the switch in the ATC position.
27	960-WH	Ground for Centigrade		
28	912 YE	Sends a voltage to the blower motor control pot	6 Volts	Full Fast 3.0 V Full Slow 0.0 V
29	914 YE	Sends a voltage to the temp. control pot.	6 Volts	Full Heat 3.0 V Full Cold 0.0 V

PRESSURE SWITCHES OPERATION, TERMINALS 33-36

	Both Open		High Closed Low Open (or reversed)		Both Closed	
	Blue Terminal B	Yellow Terminal A	Blue Terminal B	Yellow Terminal A	Blue Terminal B	Yellow Terminal A
High Pres.	0.0V	B+	3.3V	3.3V	5.2V	5.2V
Low Pres.	B+	0.0V	B+	3.3V	5.2V	5.2V

MODES OF OPERATIONS

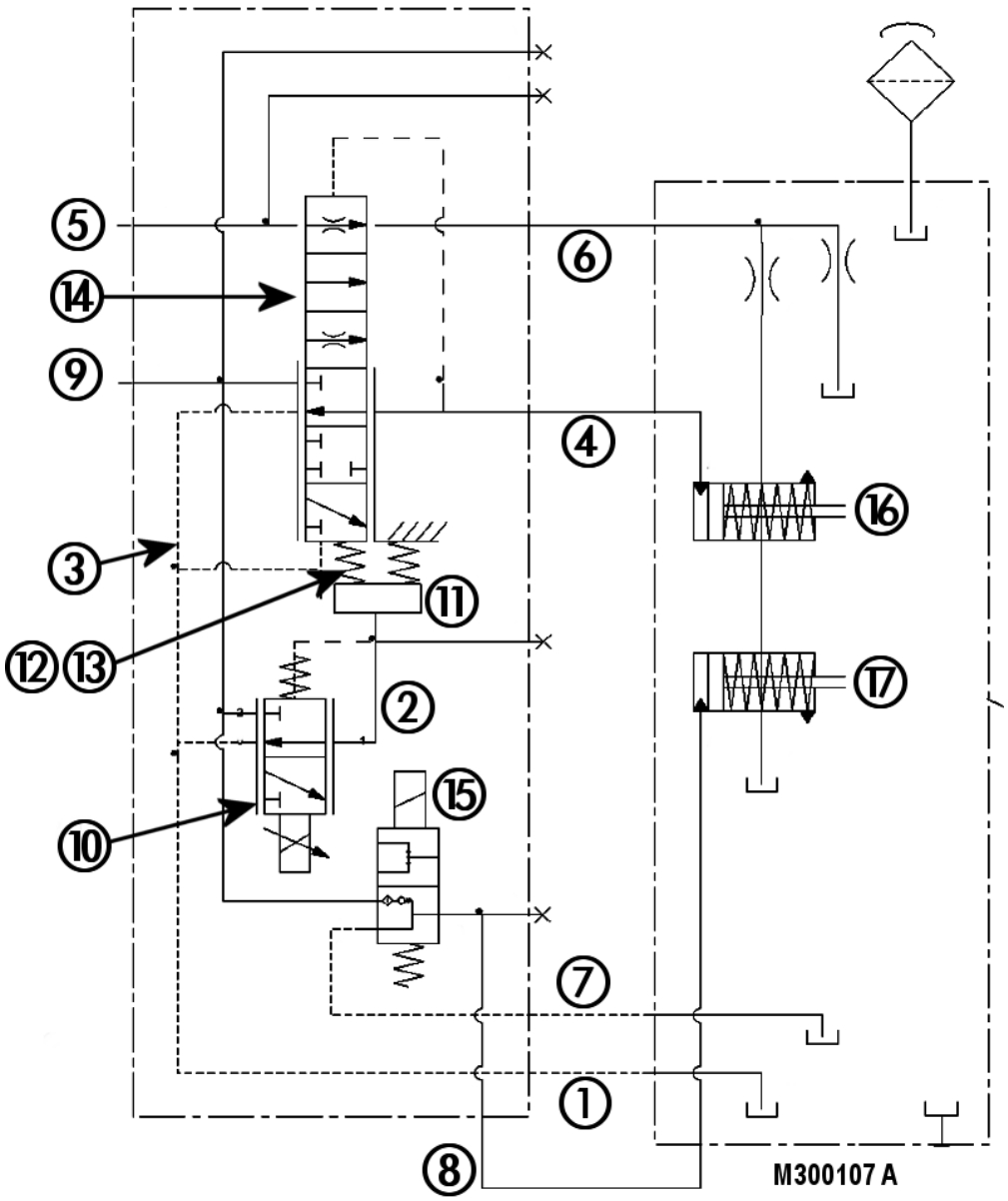
HOW DO I GET STARTED

GENERAL:

1. each new header that is attached for the first time will require defining, review all steps for the MAIN>TOOLBOX>HEADER 1 AND HEADER 2, and if a corn, pickup or grain head MAIN>TOOLBOX>FEEDER for MIN/MAX feeder speed settings..
2. Each new header that is attached to the combine needs to be calibrated to the combine. The operator needs to perform a “GROUND CALIBRAITON”. If pressure float is an installed option and the header is a grain header, the operator needs to perform a pressure float calibration.
3. Set the operating mode(s) and desired cutting height(s).
4. Use RESUME to quickly transition to and between the mode(s) and desired cutting height(s).

POWER PLUS HYDRAULIC CIRCUITS

CONTROL VALVE



Component and Port Identification			
1.	Tank	10.	Engine to Ring Solenoid
2.	Modulation	11.	Modulator Piston
3.	Tank	12.	Preload Spring (outer)
4.	To Engine to Ring Clutch	13.	Modulation Spring
5.	Lube Supply	14.	Modulation Spool
6.	Lube Out	15.	Ring to Frame Solenoid
7.	Tank	16.	Engine to Ring Clutch Pack
8.	To Ring to Frame Clutch	17.	Ring to Frame Clutch Pack
9.	Control Pressure Valve Supply		

REEL OPERATION

REEL POSITION HYDRAULICS

REFERENCE MATERIAL:

General Hydraulic Section for “PFC Pump Operation”
Hydraulic Schematics

KEY COMPONENTS:

Reel Drive Valve, Reel Raise and Lower Valve, Reel Fore/Aft Valve, Signal Valve, PFC Pump

REEL RAISE

When the operator press the reel position switch to RAISE the reel the CCM2 will activated:

- the signal valve to place the PFC pump on HIGH pressure stand-by
- the reel RAISE solenoid to give the oil some where to go

When the reel raise solenoid (12) is activated the valve will shuttle against the return spring and direct full PFC pump flow to the reel lift cylinders. The reel raise speed is controlled by orifice (26) located at the reel MASTER lift cylinder. When raising the flow will hold the check valve (25) on its seat, forcing the flow to go through the orifice plate.

REEL LOWER

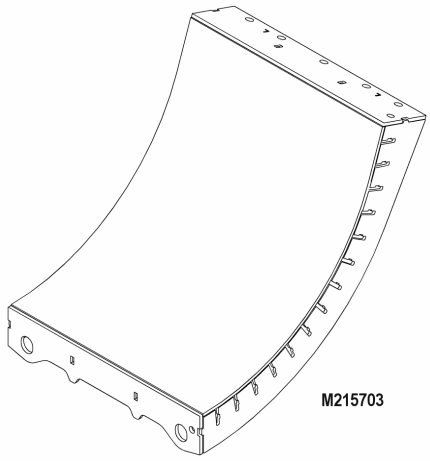
When the operator press the reel position switch to LOWER the reel the CCM2 will activated ONLY the reel LOWER solenoid, the reel is lower by its own weight.

When the reel lower solenoid (4) is activated the valve will shuttle against the return spring, opening the reel MASTER cylinder to the tank port (T). The reel LOWRE speed is controlled by orifice (24 and 26) located at the reel MASTER lift cylinder.

Location: Orifices are located at the header

ROTOR MODULES

MODULE TYPES

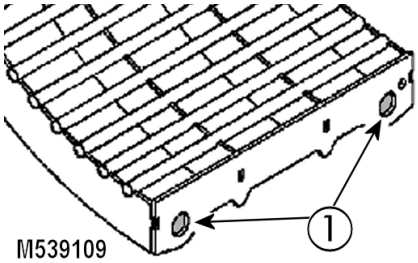


Solid Module

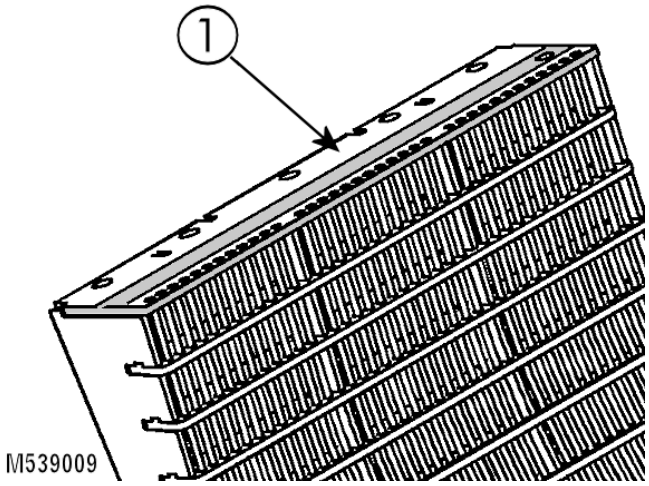
Solid Modules – May be used in very easy threshing and separating crop to prevent excess thrash from over loading the cleaning system.

MODULE MOUNTING

Modules are retained by resting on two dowel bushings in the center of the “H” frame (1) and retaining bolts on the outer edge of the module assembly. Occasionally a module may not rest on the dowel bushings, but may spring up. This can result in incorrect setting of the concave "ZERO" point, poor concave calibration and /or unlevelness of the concave H-frame.



To correct the module positioning, a piece of 12 gauge (0.104" / 2.64mm) flat metal stock (1), 1/2” wide may be tack welded in place as shown. Be sure not to cover the wire removal holes, but keep the metal as close as possible to the holes. The weld must not be higher than the flat metal.



ELECTRICAL CONTROLS

MODES OF OPERATIONS, CON'T

De-slug, con't

The CCM3 will

- Use the power that is being received from the separator switch at terminal J1-17 and provide a PWM power supply out terminal J3-31 to the Rotor Pump (+) solenoid. The solenoid will cause the pump's swash plate to tilt, causing the pump to create flow in the clockwise direction. The solenoid is grounded through the CCM3 terminal J2-10. The current flow on this circuit is monitored by the CCM3 against its known calibration values to assure a smooth engagement.
- Use the power that is being received from the separator switch at terminal J1-17 and provide a PWM power supply out terminal J3-21 to the Rotor Pump (-) solenoid. The solenoid will cause the pump's swash plate to tilt, causing the pump to create flow in the counter clockwise direction. The solenoid is grounded through the CCM3 terminal J2-10. The current flow on this circuit is monitored by the CCM3 against its known calibration values to assure a smooth engagement.

IMPORTANT: When the rotor de-slug mode is used the operator is advised to also activate the feeder reverser.

Wait a Minute… What about the feeder operation? When the separator switch is moved from the ENGAGED position the feeder will be shut down, remember that the feeder has to be engaged AFTER the separator is engaged.

CLEANING SYSTEM

ELECTRICAL SIEVE ADJUSTMENTS, CON'T

IDENTIFYING THE SIEVE ACTUATOR

There are two different sieve actuators used, they will require different software to operate. The original actuator, since 2003, is painted black, for MY09 the part has been sourced from SKF (87711042) and is painted silver. The new unit is exchangeable with the older unit, BUT does require different software and must be setup in the machine configuration (refer to section 42 for machine configuration). The new software will permit the machine to be configured for either unit. The new unit will operate at a slower speed and require less amperage to operate.

CONFIGURATION EXAMPLE:

128	Lower Sieve Spacing	Type 1 & 1 1/8"	Black Unit
		Type 2 & 1 1/8"	SKF (Silver Unit)
		Type 1 & 1 5/8"	Black Unit
		Type 2 & 1 5/8"	SKF (Silver Unit)

IMPORTANT There will be mounting adaptation required between the two units, a service bulletin will be written to outline the mountings.

CALIBRATION: "UPPER SIEVE"

For the electrical sieve control to operate properly they must be calibrated. There are four main steps to perform the calibrations:

1. Using the display configure the machine for the current sieve type that is installed, etc 1 1/8" or 1 5/8".
2. On a wide cleaning system machine, (62" wide) make sure that the linkage connecting the left side to the right side is adjusted properly to synchronize the opening width on both Upper Sieves. Verify by opening the sieve to any setting that is measurable and manually measure the opening for both sides of the sieve. If adjustments are required, adjust the adjusting handle on one of the sieves.
3. Using the display enter the Upper Sieve calibration procedure. The operator will be instructed to MANUALLY set the sieve to a specific opening. REMEMBER to close the sieve and make the adjustment while opening.
4. Using the display press the START button to complete the calibration procedure. The system will learn the potentiometer value for the known position.

Configuration and steps 1 thru 4 would have to be completed for the Lower Sieve also.