

---

# AFX8010 REPAIR MANUAL

## COMPLETE CONTENTS

SECTION 00 - GENERAL INFORMATION .....	2
SECTION 10 - ENGINE .....	3
SECTION 14 - LIVE PTO .....	5
SECTION 21 - TRANSMISSION .....	6
SECTION 25 - FRONT MECHANICAL DRIVE .....	7
SECTION 29 - HYDROSTATIC TRANSMISSION .....	9
SECTION 31 - IMPLEMENT POWER TAKE-OFF .....	12
SECTION 33 - BRAKES AND CONTROLS .....	12
SECTION 35 - HYDRAULIC SYSTEMS .....	14
SECTION 41 - STEERING .....	16
SECTION 50 - CAB CLIMATE CONTROL .....	17
SECTION 55 - ELECTRICAL SYSTEMS .....	19
SECTION 60 - PRODUCT FEEDING .....	53
SECTION 66 - THRESHING .....	55
SECTION 72 - SEPARATION .....	56
SECTION 74 - CLEANING .....	57
SECTION 80 - GRAIN STORAGE .....	60
SECTION 88 - RESIDUE HANDLING .....	62
SECTION 90 - PLATFORM, CAB, BODYWORK, AND DECALS .....	63

The following pages are the collation of the contents pages from each section and chapter of the AFX8010 Repair manual. Complete Repair part # 87543035.

The sections used through out all Case IH product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

The sections listed above are the sections utilized for the AFX8010 Combines.

---

# SECTION 00 - GENERAL INFORMATION

BOOK 1 - 87543036

## Chapter 1 - General Information

### CONTENTS

<b>Section</b>	<b>Description</b>	<b>Page</b>
	Precautionary Statements .....	2
	Safety Requirements for Fluid Power Systems and Components - Hydraulics .....	3
	Accident Prevention .....	3
	Safety Rules .....	3
	Minimum Hardware Tightening Torques .....	6
	Definitions .....	8
	Hydraulic Hoses and Tubes .....	9
	Hydraulic O-Ring Face Seal (ORFS) .....	10
	Product Identification .....	15
	AFX Specifications .....	16

---

# SECTION 10 - ENGINE

BOOK 1 - 87543036

## Chapter 1 - Air Intake System

### CONTENTS

<b>Section</b>	<b>Description</b>	<b>Page</b>
	Sensing System .....	2
	Torque .....	2
	Air Cleaner Restriction .....	3
	Manifold Pressure Sensor .....	3
	Air Temperature Sensor .....	4
	Overhaul .....	5
	Air Cleaner .....	5
	Removal .....	5
	Cleaning .....	7
	Installation .....	9
	Air Cooler .....	12
	Removal .....	12
	Installation .....	13
	Air Cooler Wiper .....	16
	Removal .....	16
	Repair .....	16
	Installation .....	17

---

# SECTION 10 - ENGINE

BOOK 1 - 87543036

## Chapter 2 - Engine Coolant System

### CONTENTS

Section	Description	Page
	Sensing System .....	2
	Coolant Temperature Sensor .....	2
	Overhaul .....	3
	Engine Coolant System .....	3
	Drain Fluid .....	3
	De-aeration Tank .....	5
	Removal .....	5
	Installation .....	6
	Radiator .....	9
	Removal .....	9
	Installation .....	11
	Radiator Wiper .....	15
	Removal .....	15
	Installation .....	17
	Repair .....	19
	Fan and Drive .....	21
	Removal .....	21
	Installation .....	22
	Rotary Screen .....	24
	Removal .....	24
	Installation .....	25
	Adjustment .....	27
	Repair .....	28
	Rotary Screen Motor .....	30
	Replace .....	30
	Repair .....	32
	Coolant Level Sensor .....	39
	Replace .....	39

---

## SECTION 14 - LIVE PTO

BOOK 1 - 87543036

### Chapter 1 - Fixed Coupling

#### CONTENTS

Section	Description	Page
	Specifications .....	2
	Special Tools .....	3
	Overhaul .....	6
	PTO Drive .....	6
	Mounting the PTO Gearbox on a Stand .....	6
	Disassembly .....	7
	Assembly .....	12

## SECTION 14 - LIVE PTO

BOOK 1 - 87543036

### Chapter 2 - Primary Process Drive

#### CONTENTS

Section	Description	Page
	Description and Operation .....	2
	Primary Process Drive .....	2
	Beater/Chopper Clutch .....	2
	Beater/Chopper Clutch Control Valve .....	2
	Special Tools .....	10
	Overhaul .....	10
	Beater/Chopper Clutch Shaft .....	13
	Removal .....	13
	Installation .....	17
	Beater/Chopper Clutch Shaft (Repair) .....	26
	Disassembly .....	26
	Assembly .....	29

---

# SECTION 21 - TRANSMISSION

BOOK 1 - 87543036

## Chapter 1 - Transmission

### CONTENTS

Section	Description	Page
	Specifications .....	2
	Tightening Torques .....	2
	Special Tools .....	3
	Sectional/Exploded Views .....	4
	Transmission Cover (Exploded View) .....	4
	Gearbox Shafts (Sectional View) .....	5
	Shifting Diagram (Sectional View) .....	6
	Shifting Disc/Drive Gear (Sectional View) .....	7
	Shifting Disc/Drive Gear (Exploded View) .....	8
	Differential (Sectional View) .....	9
	Differential (Exploded View) .....	10
	Differential Shafts (Exploded View) .....	11
	Drive Shaft/Cover (Exploded View) .....	12
	Drive Shaft (Sectional View) .....	13
	Drive Shaft (Exploded View) .....	14
	Input Shaft and Bearing Caps (Exploded View) .....	15
	Input Shaft (Sectional View) .....	16
	Input Shaft (Exploded View) .....	17
	Overhaul .....	18
	Transmission .....	18
	Removal .....	18
	Disassembly .....	22
	Assembly .....	38
	Installation .....	52
	Differential .....	57
	Disassembly .....	57
	Assembly .....	59
	Drive Shaft .....	60
	Disassembly .....	60
	Assembly .....	63
	Input Shaft .....	65
	Disassembly .....	65
	Assembly .....	66

---

# SECTION 25 - FRONT MECHANICAL DRIVE

BOOK 2 - 87543037

## Chapter 1 - Final Drive

### CONTENTS

Section	Description	Page
	General Specification – Final Drive .....	3
	Specifications .....	3
	Type I and Type II Final Drive Identification .....	3
	Final Drive – Torque .....	4
	Final Drive – Special tools .....	5
	Final Drive – Sectional View .....	6
	Final Drive – Exploded View .....	8
	Final Drive Reducer, Spur Gear – Sectional View .....	10
	Final Drive Reducer, Spur Gear – Exploded View .....	10
	Final Drive Input Shaft – Exploded View .....	11
	Final Drive Input Shaft – Overview .....	12
	Final Drive Reducer, Satellite and Planetary – Exploded View .....	13
	Overhaul – Type I Final Drive .....	14
	Removal .....	14
	Disassembly .....	15
	Assembly .....	19
	Installation .....	28
	Final Drive Reducer, Spur Gear .....	29
	Disassembly .....	29
	Assembly .....	29
	Final Drive Input Shaft .....	32
	Disassembly .....	32
	Assembly .....	33
	Final Drive Output Shaft .....	34
	Disassembly .....	34
	Assembly .....	35
	Final Drive Reducer, Satellite and Planetary .....	37
	Disassembly .....	37
	Assembly .....	38

---

# SECTION 25 - FRONT MECHANICAL DRIVE

BOOK 2 - 87543037

## Chapter 1 - Final Drive (Continued)

### CONTENTS

Section	Description	Page
	Final Drive Wheel Stud .....	41
	Replacement .....	41
	Overhaul - Type II Final Drive .....	42
	Removal .....	42
	Disassembly .....	43
	Assembly .....	49
	Distance Ring Combinations Table .....	50
	Installation .....	59
	Final Drive Input Shaft .....	60
	Disassembly .....	60
	Assembly .....	61
	Final Drive Output Shaft .....	62
	Disassembly .....	62
	Assembly .....	63
	Final Drive Reducer, Satellite and Planetary .....	65
	Disassembly .....	65
	Assembly .....	66
	Final Drive Wheel Stud .....	69
	Replacement .....	69
	Half-shaft .....	70
	Removal .....	70
	Installation .....	71



---

# SECTION 29 - HYDROSTATIC TRANSMISSION

BOOK 2 - 87543037

## Chapter 1 - Hydrostatic System

### CONTENTS

Section	Description	Page
	Specifications .....	3
	General .....	3
	Pump .....	3
	Motor .....	4
	Component Identification .....	5
	Special Tools .....	9
	Description of Operation .....	10
	Overview .....	10
	Schematics .....	15
	Hydrostatic Transmission System .....	17
	Pump .....	21
	Motor .....	33
	Oil Cooler By-pass .....	36
	Testing .....	37
	Servo Pressure .....	38
	Multifunction Valve - High Pressure .....	39
	Motor Charge Relief Valve .....	40
	Repair .....	41
	Pump .....	41
	Inspection .....	41
	Removal .....	42
	Installation .....	44
	Shaft Removal .....	46
	Shaft Installation .....	48
	Charge Pump Removal .....	51
	Charge Pump Installation .....	53
	Electric Displacement Control (EDC) Valve .....	56
	Removal .....	56
	Inspection .....	57
	Installation .....	58

---

# SECTION 29 - HYDROSTATIC TRANSMISSION

BOOK 2 - 87543037

## Chapter 1 - Hydrostatic System (Continued)

### CONTENTS

Section	Description	Page
	Multifunction Valve .....	59
	Adjustment .....	59
	Removal .....	61
	Installation .....	63
	Pump Charge Pressure Relief Valve .....	64
	Adjustment .....	64
	Removal .....	66
	Installation .....	67
	Motor .....	68
	Inspection .....	68
	Removal .....	69
	Installation .....	70
	Motor Charge Relief Valve .....	73
	Replacement .....	73
	Shuttle Spool Valve .....	75
	Removal .....	75
	Installation .....	76
	Pressure Release Valve Solenoid .....	75
	Removal .....	78
	Installation .....	79
	Pressure Release Valve Spool .....	81
	Removal .....	81
	Installation .....	82
	Filling the Hydrostatic Transmission .....	84

---

# SECTION 29 - HYDROSTATIC TRANSMISSION

BOOK 2 - 87543037

## Chapter 2 - Powered Rear Axle

### CONTENTS

Section	Description	Page
	Specifications .....	2
	Selector Valve .....	2
	Flow Regulator (Optional) .....	3
	Description of Operation .....	4
	2WD-4WD Hydraulic System - Overview .....	4
	2WD-4WD Hydraulic System - Detailed View .....	6
	Selector Valve - Dynamic Description .....	17
	Flow Regulator (Optional) .....	22
	Hydraulic Line - Plumbing Schema PRA Hoses .....	24
	Testing .....	29
	Selector Valve .....	29
	Troubleshooting .....	37
	2WD-4WD Hydraulic System .....	37
	Selector Valve - Electrical .....	39
	Two-speed Valve - Electrical .....	41
	Repair .....	43
	Control Valve .....	43
	Replacement .....	43
	Overhaul .....	44
	Two-speed Valve .....	46
	Replacement .....	46

---

## SECTION 31 - IMPLEMENT POWER TAKE-OFF

BOOK 2 - 87543037

### Chapter 1 - Front PTO

#### CONTENTS

Section	Description	Page
	Front PTO Shaft .....	2
	Removal .....	2
	Installation .....	3
	Universal Joint .....	5
	Replacement .....	5
	Gearbox .....	10
	Removal .....	10
	Installation .....	11
	Disassembly .....	13
	Re-assembly .....	16

## SECTION 33 - BRAKES AND CONTROLS

BOOK 2 - 87543037

### Chapter 1 - Brakes and Controls

#### CONTENTS

Section	Description	Page
	Specifications .....	2
	Tightening Torques .....	2
	Minimum Hardware Tightening Torques .....	3
	Overhaul .....	5
	Brake Pads .....	5
	Replacement .....	5
	Brake Cylinders .....	8
	Bleeding the Brake System .....	9
	Brake Caliper and Brake Disc .....	12
	Removal .....	12
	Installation .....	14

---

# SECTION 33 - BRAKES AND CONTROLS

BOOK 2 - 87543037

## Chapter 1 - Brakes and Controls (Continued)

### CONTENTS

Section	Description	Page
	Parking Brake Caliper .....	16
	Removal .....	16
	Installation .....	17
	Parking Brake Disc .....	17
	Removal .....	17
	Installation .....	18
	Park Brake Override .....	20
	Parking Brake Piston Travel and Adjustment .....	22
	Parking Brake Pads .....	25
	Replacement .....	25
	Bleeding the Hydraulic Parking Brake Caliper .....	26
	Parking Brake Caliper .....	27
	Parking Brake Caliper - Cross Section View .....	27
	Disassembly .....	28
	Assembly .....	30

---

# SECTION 35 - HYDRAULIC SYSTEMS

BOOK 3 - 87543038

## Chapter 1 - Description of Operation

### CONTENTS

Section	Description	Page
	Specifications .....	2
	Description of Operation .....	3
	Basic Principles .....	3
	General Information .....	5
	Main Hydraulics .....	6
	Hydraulic Reservoir .....	8
	Hydraulic Return Filter .....	9
	Cooling .....	9
	Pressure Flow Compensating (PFC) Pump .....	12
	Main Stack Valve .....	21
	Signal Circuits .....	23
	Steering Circuit .....	25
	Regulated Pressure .....	30
	Header Valve .....	33
	Feeder Valve .....	37
	Reel Drive Valve .....	38
	Reel Raise and Lower .....	41
	Reel Fore and Aft .....	47
	Triple Gear Pump .....	53
	Spreader/Rotary Screen Drive .....	55
	Fan Drive .....	56
	Control Pressure Hydraulics .....	57
	Control Pressure Pump .....	61
	Control Pressure Filter .....	62
	Control / Lubrication Pressure Valve .....	63
	Control Pressure Schematic .....	64
	Beater/Chopper Clutch .....	67
	PTO Gearbox Cooling and Lubrication System .....	75

---

# SECTION 35 - HYDRAULIC SYSTEMS

BOOK 3 - 87543038

## Chapter 2 - Hydraulic System Testing

### CONTENTS

Section	Description	Page
	Overview .....	2
	Diagnostic Test Equipment .....	3
	Test Couplers and Hoses .....	4
	Digital Pressure and Temperature Analyzer .....	5
	Digital Pressure Analyzer .....	5
	Hydraulic System Testing Procedures .....	6
	Main Hydraulic System Tests .....	6
	# 1 Low Pressure Standby .....	6
	# 2 High Pressure Standby .....	9
	# 3 Steering Relief Setting .....	11
	# 4 PFC Pump Flow .....	13
	# 5 Regulated Pressure Test .....	14
	# 6 Bench Testing Components .....	15
	# 7 Spreader Pump Flow Test .....	17
	# 8 Fan Pump Flow Test .....	20
	Control Pressure Hydraulic Tests .....	23
	# 1 Control Pressure Test .....	23
	# 2 Control Pressure Pump Flow Test .....	25
	# 3 Control Pressure Flow Loss Test .....	27
	# 4 Ground Drive Hydro Charge Supply Flow Test .....	33
	# 5 Ground Drive Hydro Case Drain Flow Test .....	34
	# 6 Control Pressure Supply Line to PTO Valves Flow Test .....	35
	# 7 PTO or CVT Valve Pressure Test .....	36
	# 8 Feeder Hydro Pump and Motor Case Drain Flow Test .....	37
	# 9 Feeder CVT Pump Drive Pressure Test .....	38
	# 10 Rotor Hydro Pump Charge Supply Flow Test .....	39
	# 11 Rotor Hydro Motor Case Drain Flow Test .....	40
	# 12 Rotor CVT Pump Drive Pressure Test .....	41
	# 13 PTO Gearbox Lubrication Flow Test .....	42
	# 14 PTO Gear Box Lubrication Pressure Test .....	43

---

## SECTION 41 - STEERING

BOOK 3 - 87543038

### Chapter 1 - Steering Pivot (HDASA)

#### CONTENTS

Section	Description	Page
	Overhaul .....	2
	Hub Casting .....	2
	Removal .....	2
	Installation .....	5

## SECTION 41 - STEERING

BOOK 3 - 87543038

### Chapter 2 - Hydrostatic Motor

#### CONTENTS

Section	Description	Page
	Specifications .....	2
	Tightening Torques .....	2
	Description and Operation .....	3
	Rear Axle .....	3
	Hydrostatic Motor - Exploded View .....	4
	Overhaul .....	6
	Bleeding the Rear Axle System .....	6
	Hydrostatic Motor .....	8
	Removal .....	8
	Disassembly .....	10
	Assembly .....	15
	Installation .....	22



---

# SECTION 50 - CAB CLIMATE CONTROL

BOOK 3 - 87543038

## Chapter 1 - Heating, Ventilation and Air-Conditioning

### CONTENTS

Section	Description	Page
	Compressor Tightening Torques .....	3
	Troubleshooting .....	4
	General .....	4
	Fault Codes .....	6
	Testing .....	7
	Problem Solving Pressure Test Results and Temperature/Pressure Chart .....	7
	Air-conditioning Temperature/Pressure Chart .....	7
	Heater Valve .....	9
	Expansion Valve .....	11
	Ventilation System Separator Fan .....	12
	Ventilation System Blower Motor .....	14
	Electrical Control Temperature Control Potentiometer .....	16
	Electrical Control Blower Speed Potentiometer .....	17
	Electrical Control Relay .....	18
	Electronic Hvac Control - Display Data Line .....	20
	Electronic Hvac Control - ATC Control Switch and Mode Control Switch .....	21
	Electronic Hvac Control - ATC Controller Power Supply .....	22
	Sensing System High Pressure Switch .....	23
	Sensing System Low Pressure Switch .....	25
	Sensing System Outlet Temperature Sensor .....	27
	Sensing System Cab Temperature Sensor .....	28
	Sensing System Evaporator Temperature Sensor .....	30
	Description and Operation .....	32
	Compressor .....	32
	Condenser .....	32
	Evaporator .....	32
	Expansion Valve .....	33
	Heater .....	34
	Receiver/Drier .....	35
	Overhaul .....	36
	Evacuating the Refrigerant .....	36
	Pressure Test .....	41
	Leakage Test .....	42

---

# SECTION 50 - CAB CLIMATE CONTROL

BOOK 3 - 87543038

## Chapter 1 - Heating, Ventilation and Air-Conditioning (Continued)

### CONTENTS

Section	Description	Page
	Charging .....	42
	Heater Valve .....	41
	Removal .....	44
	Installation .....	45
	Recirculation Air Filter .....	46
	Removal .....	46
	Installation .....	47
	Separator Air Filter .....	48
	Removal .....	48
	Installation .....	50
	Compressor .....	51
	Removal .....	51
	Disassembly .....	52
	Assembly .....	55
	Installation .....	58
	Condenser .....	59
	Removal .....	59
	Installation .....	59
	Evaporator .....	61
	Removal .....	61
	Installation .....	63
	Expansion Valve .....	67
	Removal .....	67
	Installation .....	67
	Heater .....	69
	Removal .....	69
	Installation .....	72
	Receiver/Drier .....	76
	Removal .....	76
	Installation .....	76
	Ventilation System Motor .....	78
	Removal .....	78
	Installation .....	79

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 4 - 87543039

## Chapter 1 - General Information

### CONTENTS

Section	Description	Page
	Overview .....	3
	Introduction to Troubleshooting .....	6
	Fault Codes and Fault Finding .....	6
	The Digital Multi-Meter .....	9
	General Operation .....	9
	Measuring Voltage (Volts) .....	10
	Measuring Current (Amps) .....	10
	Measuring Resistance (Ohms) .....	10
	Continuity (Buzzer) Test .....	11
	Summary .....	11
	Electrical Test Procedures .....	12
	Electrical Test Procedure 1: Continuity Test - Short to Ground .....	12
	Electrical Test Procedure 2: Voltage Measurement or Short to Positive Supply Volts .....	13
	Electrical Test Procedure 3: Resistance Test for Electrical Parts .....	13
	Electrical Test Procedure 4: Continuity Test - Check for Open Circuits .....	14
	Circuit Components - Basic Description and Testing .....	15
	Fuses .....	15
	Switches .....	16
	Flashers .....	16
	Resistance Devices .....	17
	Fluid Level Sender .....	17
	Potentiometers .....	17
	Potentiometer Adjustment .....	18
	Electromagnetic Devices .....	19
	Relays .....	19
	Solenoids .....	20
	PWM Solenoid Valves .....	21
	Sensors .....	23
	Temperature Sensors .....	23
	Pressure Sender .....	23

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 4 - 87543039

## Chapter 1 - General Information (Continued)

### CONTENTS

Section	Description	Page
	Speed and Position Sensors .....	24
	Sensor Adjustment .....	24
	Electronic Modules (CCM's) .....	25
	Overview .....	25
	CCM Power and Ground Supplies .....	26
	CCM1 Module .....	26
	CCM2 Module .....	27
	CCM3 Module .....	27
	Combine Control Module (CCM) Removal and Installation .....	28
	CCM Identification .....	28
	Instructional Seat Removal .....	28
	Removal of CCM .....	28
	CCM Installation .....	30
	Software Installation .....	30
	Instructional Seat Installation .....	30
	Wiring Harness Repairs .....	31
	Temporary Wiring Harness Repair .....	31
	Harness Wire Replacement .....	32
	Cab Electrical Connectors X002 and X003 .....	34
	Removal of Rear Speaker Panel .....	34
	Connector Locations .....	35
	Installation of Rear Speaker Panel .....	35

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 4 - 87543039

## Chapter 2 - Diagnostic Screens

### CONTENTS

Section	Description	Page
	Universal Display Plus (Below Monitor Firmware Version 31.02.00.00) . . . . .	2
	Introduction . . . . .	2
	The "DIAG" Menu . . . . .	3
	The "ERROR" Menu . . . . .	7
	Error Chart . . . . .	7
	Error Screen Menu Bar . . . . .	9
	Universal Display Plus (Monitor Firmware Version 31.02.00.00 and Above) . . . . .	10
	Introduction . . . . .	10
	The "DIAG" Menu . . . . .	11
	Inputs . . . . .	12
	Outputs . . . . .	16
	The "HISTORY" Menu . . . . .	21
	Fault Menu . . . . .	21
	Alarm Menu . . . . .	21
	Error Menu . . . . .	22
	The "Status" Menu . . . . .	22
	The "Card" Menu . . . . .	22
	DIAG>DIAG Screen - Sub System and Sensor Options Reference . . . . .	23

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 4 - 87543039

## Chapter 3 - Electrical Schematics

### CONTENTS

Section	Description	Page
55 000	Introduction .....	2
	How to Use the Schematics .....	2
	Ground Locations .....	9
	Wire Harness Locations on the Combine .....	10
	Main Frame (MF) Wire Harness .....	10
	Front Frame (FF), Feeder (FE) Grain Tank (GT) and Tube Light (TL) Wire Harnesses .....	11
	Engine (EN), Gearbox (GB) and Straw Hood Front (SW) Wire Harnesses .....	12
	Straw Hood Front (SW) and Straw Hood Rear (SH) Wire Harnesses .....	13
	Expansion (EX), Grain Tank (GT) and Unload Tube Light (TL) Wire Harnesses .....	14
	Cab Main (CM) Wire Harness .....	15
	Lower Frame (LF) and Hvac (AC) Wire Harnesses .....	16
	Outer Roof (OR) and Cab Roof (CR) Wire Harnesses .....	17
	Wiring Schematics .....	18
	Component Index, 2004 Production - SN HAJ105201 to 5700 .....	18
	2004 Production - SN HAJ105201 to 5700 .....	23
	Component Index, 2005 Production - SN HAJ105701 to 6400 .....	71
	2005 Production - SN HAJ105701 to 6400 .....	75
	Component Index, 2006 Production - SN HAJ106401 and Above .....	123
	2006 Production - SN HAJ106401 and Above .....	127

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 5 - 87543040

## Chapter 4 - CAN Data Bus - Diagnostics

### CONTENTS

Section	Description	Page
	Overview .....	2
	Introduction .....	4
	Alarm Messages .....	4
	Troubleshooting .....	5
	Troubleshooting an Individual Module Alarm .....	5
	Troubleshooting Multiple Module Alarms .....	8
	Short Circuit Troubleshooting .....	9
	Open Circuit Troubleshooting .....	12
	Schematics .....	16
	Frame 30 - All Production .....	16
	Frame 31 - Pin HAJ105200 and Below .....	17
	Frame 31 - Pin HAJ105201 and Above .....	18
	Component Locations .....	19

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 5 - 87543040

## Chapter 5 - Engine Systems

### CONTENTS

Section	Description	Page
	Introduction .....	3
	Engine Systems Electrical Diagrams .....	4
	AFX8010 Combines, Pin HAJ105101 to HAJ105700 (Tier 2) .....	4
	AFX8010 Combines, Pin HAJ105701 to HAJ106400 (Tier 2) .....	8
	AFX8010 Combines, Pin HAJ106401 and Above (Tier 3) .....	12
	Description and Operation .....	16
	Starting System .....	16
	Starting System - Schematics .....	17
	Charging System .....	21
	Specifications .....	21
	Grid Heater .....	22
	Grid Heater - Schematics .....	23
	Control Modules .....	24
	Control Modules - Schematic .....	27
	Engine Shutdown Alarms .....	28
	Engine Components .....	29
	Engine Oil Temperature .....	29
	Engine Flywheel RPM Sensor .....	29
	Engine Camshaft RPM Sensor .....	30
	Engine Boost Pressure Sensor .....	30
	Fuel Temperature Sensor .....	31
	Coolant Temperature Sensor .....	31
	Engine Oil Pressure Sensor .....	32
	Air Temperature Sensor .....	32
	Fuel Injectors .....	33
	Fuel Pump .....	34
	Fuel Level Sensor .....	34
	Air Filter Switch .....	35
	Fuel Filter Switch .....	35



---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 5 - 87543040

## Chapter 5 - Engine Systems (Continued)

### CONTENTS

Section	Description	Page
	Troubleshooting .....	36
	Starting System .....	36
	Charging System .....	38
	Grid Heater .....	39
	Testing .....	40
	Engine Starter .....	40
	Power To Key Switch .....	41
	Key Switch .....	42
	Neutral Switch .....	42
	Start Relay .....	43
	Neutral Start Relay .....	43
	24V Start Relay .....	44
	Alternator .....	45
	Cold Start Aid Indicator Lamp .....	46
	Cold Start Aid Relay .....	46
	Cold Start Aid Pre-heating .....	47
	Overhaul .....	48
	Grid Heater .....	48
	Removal .....	48

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 5 - 87543040

## Chapter 6 - Lighting Systems

### CONTENTS

Section	Description	Page
	Description of Operation .....	4
	Introduction .....	4
	Lighting System Schematics .....	8
	Hazard Lights and Turn Signals .....	8
	Marker Lights .....	9
	Brake/Tail and Trailer Lights .....	10
	Light Switch and Road Lights .....	11
	Flip Up Header Lights .....	12
	Under Shield and Service Lights .....	13
	Beacon Lights .....	14
	Work Lights, HID, Mid and Lower .....	15
	Work Lights, Cab Roof and Rear .....	16
	Side Work Lights, Unload Tube and Sieve Lights .....	17
	Head Light Circuit .....	18
	Flip-up Header Lights Circuit .....	19
	Marker Light Circuit .....	21
	Hazard Lights Circuit .....	23
	Left-hand Flasher (Turn Signal) Circuit .....	25
	Right-hand Flasher (Turn Signal) Circuit .....	28
	Brake Lights Circuit .....	30
	Beacon Light Circuit .....	31
	Front Work Light Circuit .....	32
	Rear Work Light Circuit .....	35
	Side Work Light Circuit .....	36
	Under Shield Service Light Circuit .....	38
	Cleaning Shoe Service Light Circuit .....	39
	Engine Service Light Circuit .....	40
	Back Light Circuit .....	41

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 5 - 87543040

### Chapter 6 - Lighting Systems (Continued)

#### CONTENTS

Section	Description	Page
	Repair .....	43
	Headlight .....	43
	Removal .....	43
	Installation .....	45
	Replacement .....	47
	Troubleshooting .....	50
	Testing .....	52
	Head Light Relay .....	52
	Head Light Switch .....	53
	Head Light Wiring Harness .....	54
	Marker Light Wiring Harness .....	55
	Turn/Hazard Light Flasher Unit .....	57
	Turn/Hazard Light Wiring Harness .....	59
	Turn/Hazard Light Hazard Switch .....	62
	Brake Light Relay .....	63
	Brake Light Wiring Harness .....	63
	Beacon Relay .....	64
	Beacon Switch .....	64
	Beacon Wiring Harness .....	65
	Front Work Light Switch .....	66
	Front Work Light Relay .....	66
	Front Work Light Wiring Harness .....	69
	Rear Work Light Relay .....	72
	Rear Work Light Switch .....	72
	Rear Work Light Wiring Harness .....	73
	Side Work Light Relay .....	73
	Side Work Light Wiring Harness .....	74
	Under Shield Service Light Switch .....	75

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 5 - 87543040

### Chapter 6 - Lighting Systems (Continued)

#### CONTENTS

Section	Description	Page
	Under Shield Service Light Wiring Harness .....	75
	Cleaning Shoe Service Light Switch .....	76
	Cleaning Shoe Service Light Wiring Harness .....	76
	Engine Component Service Light Switch .....	77
	Engine Component Service Light Wiring Harness .....	77
	Unloading Tube Light .....	78

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 6 - 87543041

## Chapter 7 - Cab Systems

### CONTENTS

Section	Description	Page
	Description and Operation .....	2
	Power Mirror Circuit .....	2
	Heated Mirror Circuit .....	2
	Wiper System .....	3
	Wiper Circuit .....	4
	Washer Circuit .....	4
	Power Seat System .....	5
	Power Seat System Electrical Schematic .....	6
	Power Mirror Electrical Schematics .....	7
	Troubleshooting .....	10
	Power Mirror .....	10
	Wiper/Washer System Electrical Schematics .....	12
	Wiper System .....	13
	Seat Suspension System .....	14
	Testing .....	15
	Mirror Fuse - Power and Ground .....	15
	Mirror Adjust Switch S-27 .....	17
	Mirror Select Switch S-57 .....	19
	Left Hand Mirror .....	20
	Right Hand Mirror .....	22
	Additional Mirror .....	24
	Mirror Heat Switch S-19 .....	26
	Mirror Heat Circuits .....	27
	Wiper System Relay .....	29
	Wiper System Switch .....	30
	Wiper System Motor .....	31
	Windscreen Washer System .....	32
	Washer System Motor .....	34
	Seat Suspension System .....	35

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 6 - 87543041

## Chapter 8 - Hydraulic System Sensors

### CONTENTS

Section	Description	Page
	Description and Operation .....	2
	Control Pressure Sensor B-35 .....	2
	PTO Gearbox Lube Pressure Sensor B-60 .....	3
	Reservoir Temperature Sensor B-18 .....	4
	Reservoir Level Sensor S-33 .....	5
	Returns Filter Bypass Switch S-32 .....	5
	PTO Gearbox Filter Bypass Switch S-34 .....	6
	Electrical Schematic - Hydraulic Sensors .....	7

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 6 - 87543041

## Chapter 9 - Driveline Systems

### CONTENTS

Section	Description	Page
	Description of Operation .....	2
	Hydrostatic Ground Drive Electrical .....	2
	Overview .....	2
	Calibrations .....	3
	Temperature Control System (TCS) .....	3
	Hydrostatic Ground Drive Fault Codes .....	4
	Ground Speed Potentiometer .....	5
	Neutral Switch .....	6
	Hydrostat Motor Temperature Sensor .....	7
	Ground Speed Sensor .....	8
	Road Mode Switch .....	9
	Back Up Alarm .....	10
	Transmission Gearshifting .....	11
	Overview .....	11
	Shift Position Sensor .....	13
	Pressure Release Valve .....	15
	Transmission Shift Motor .....	16
	Braking Systems .....	17
	Brake Light Switch .....	17
	Brake Wear Switches .....	17
	Brake Fluid Level Switch .....	18
	Park Brake Pressure Sensor .....	19
	Park Brake Solenoid .....	20
	Schematics .....	21
	Ground Drive Inputs, Operator .....	21
	Ground Drive Inputs, Vehicle .....	22
	Gearshifting, Ground Drive Outputs .....	23

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 6 - 87543041

## Chapter 10 - Header Systems

### CONTENTS

Section	Description	Page
	Description and Operation .....	2
	Reel Raise and Lower Switch .....	2
	Reel Fore and Aft Switch .....	3
	Control Valve Reel Raise and Lower .....	4
	Control Valve Reel Fore and Aft .....	6
	Header Type Module .....	8
	Feeder Angle Sensor .....	10
	Lateral Tilt Sensor .....	11
	Header Systems Electrical Schematics .....	12
	AFX Header Height Control .....	16
	Operator Controls .....	16
	Header Height Sensors .....	22
	Setting the HHC Operating Mode and Working Setting .....	23
	RESUME Switch Function .....	24
	RETURN TO CUT (RTC) Mode .....	25
	AUTO HEIGHT Mode .....	27
	PRESSURE FLOAT Mode .....	29
	Header Height Calibration .....	31
	Header Tilt Operation .....	32
	Accumulator .....	37



---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 6 - 87543041

## Chapter 11 - Feeder Systems

### CONTENTS

Section	Description	Page
	Description and Operation .....	2
	Variable Speed Feeder .....	2
	Modes of Operation .....	2
	Fixed Speed Feeder .....	6
	FSF - Modes of Operation .....	6
	Feeder Speed Sensor .....	10
	Emergency Stop Switch .....	11
	Operator Presence System (OPS) Seat Switch .....	12
	Feeder System Electrical Schematics .....	13

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 6 - 87543041

## Chapter 12 - Threshing Systems

### CONTENTS

Section	Description	Page
	Description and Operation .....	2
	Rotor Drive System .....	2
	Modes Of Operation .....	2
	Rotor Drive Power Flow .....	3
	Electrical Components .....	7
	Rotor Speed Sensor .....	10
	Rotor Hydrostat Motor Speed Sensor .....	11
	Rear Ladder Sensor .....	12
	Beater/Chopper Clutch Drive .....	13
	Threshing Drives - Electrical Schematics .....	15
	Concave Clearance Switch .....	17
	Concave Clearance Motor .....	18
	Concave Position Sensor .....	19
	Concave Clearance - Electrical Schematics .....	20
	Concave Positioning System .....	21
	Rotor Grain Loss Sensors .....	23
	Grain Loss Sensors - Electrical Schematic .....	25
	Testing .....	26
	Rotor Grain Loss Left Sensor .....	26
	Rotor Grain Loss Right Sensor .....	26

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

## Chapter 13 - Electrical Connectors

### CONTENTS

Section	Description	Page
	Electrical Connectors .....	11
X001	Console/Cab Main .....	11
X002	Cab Main/Roof .....	12
X003	Cab Main/Roof .....	13
X004	Main Frame/Cab Main .....	14
X005	Main Frame/Cab Main .....	15
X006	HVAC/Cab Main .....	16
X007	Front Frame/Feeder .....	17
X008	Main Frame/Front Frame .....	18
X009	Main Frame/Grain Tank .....	19
X010	Main Frame/Engine .....	20
X011	Main Frame/Gearbox .....	21
X012	CCM-3 J1 .....	22
X013	CCM-3 J2 .....	23
X014	CCM-3 J3 .....	24
X015	CCM-2 J1 .....	25
X016	CCM-2 J2 .....	26
X017	CCM-2 J3 .....	27
X018	CCM-1 J1 .....	28
X019	CCM-1 J2 .....	29
X020	CCM-1 J3 .....	30
X021	Front Frame/Feeder Valve .....	31
X022	Valve Stack .....	32
X023	Front Frame/Lower Frame .....	33
X024	Main Frame/Straw Walker .....	34
X025	Straw Walker/Expansion .....	35
X026	RHM J6 .....	36
X027	RHM J7A .....	37
X028	RHM J7B .....	38
X029	RHM J8A .....	39

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

### Chapter 13 - Electrical Connectors (Continued)

#### CONTENTS

Section	Description	Page
X030	RHM J8B .....	40
X031	Front Frame/Cab Main .....	41
X032	Header/Feeder .....	42
X033	Cab Main/Steering Column .....	43
X034	Expansion A/Main Frame A .....	44
X034A	Expansion A/Main Frame A .....	45
X036	Cab Roof/Outer Roof .....	46
X048	Gear Select .....	47
X055	Separator Engage .....	48
X056	Feeder Engage .....	49
X057	Ground Speed .....	50
X058	Audio Alarm .....	51
X059	Propulsion .....	52
X064	Adapter Display .....	53
X065	Diagnostic and Maintenance .....	54
X066	Cold Start Indicator .....	55
X067	Accessory Socket .....	56
X068	Key Switch .....	57
X069	Lighter .....	58
X070	Lighter Backlight .....	59
X071	Straw Walker/Straw Hood .....	60
X072	Lower Frame Rear/Straw Walker .....	61
X073	Seat Switch .....	62
X074	Seat Pump .....	63
X075	Accessory Outlet .....	64
X076	Accessory Outlet .....	64
X077	Ground .....	65
X081	Lateral Tilt Pot .....	66
X084	LH Brake Pads .....	67
X085	RH Brake Pads .....	68
X087	Ground RPM .....	69

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

### Chapter 13 - Electrical Connectors (Continued)

#### CONTENTS

Section	Description	Page
X088	Shoe Leveling Actuator .....	70
X089	Cleaning Fan RPM .....	71
X091	Hydrostat Motor Temp .....	72
X092	Pressure Release .....	73
X093	Trans Shift Position .....	74
X094	Transmission Shift Motor .....	75
X098	Low Control Pressure .....	76
X100	Ground Speed Hydrostat .....	77
X103	Reservoir Temperature .....	78
X104	Reservoir Level .....	79
X105	Unload Tube Light .....	79
X106	Left Rear Work Light .....	80
X107	3/4 Full Bin Sensor .....	81
X108	Grain Tank Light .....	82
X109	Full Bin Sensor .....	83
X110	Right Rear Work Light .....	84
X111	Left Mirror .....	84
X112	Left Outer Work Light .....	84
X113	Left Beacon Light .....	84
X114	Left Middle Work Light .....	85
X115	Left Inner Work Light .....	85
X116	Wiper Motor .....	85
X117	Right Inner Work Light .....	86
X118	Right Middle Work Light .....	87
X119	Right Beacon Light .....	88
X120	Right Outer Work Light .....	88
X121	Right Mirror .....	88
X122	Right Rear Speaker .....	89
X123	Left Rear Speaker .....	89
X124	Ground .....	90
X125	Tank Extensions Switch .....	91

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

### Chapter 13 - Electrical Connectors (Continued)

#### CONTENTS

Section	Description	Page
X126	Mirror Adjust Switch .....	92
X127	Mirror Heat Switch .....	93
X128	HVAC Control Panel .....	94
X129	Dome Light .....	94
X130	Beacon Light Switch .....	95
X131	Rear Work Light Switch .....	96
X132	Front Work Lights Switch .....	97
X133	Splice Block C .....	98
X134	Washer Switch .....	99
X135	Wiper Switch .....	100
X136	Front Left Speaker .....	101
X137	Door Switch .....	101
X138	Right Console Light .....	101
X139	Front Right Speaker .....	101
X141	Transceiver .....	102
X142	G.P.S. Unit .....	102
X149	Cab Temperature Sensor (ATC only) .....	103
X150	Ambient Temp Sensor (ATC only) .....	103
X151	Water Valve .....	103
X152	Main Blower .....	104
X155	Ground .....	104
X156	High Speed .....	104
X157	Medium Speed .....	105
X158	Low Speed .....	105
X159	Future Option .....	105
X160	Left Front Hazard Light .....	105
X161	Left Front Service Socket .....	106
X163	Left Lower Work Light .....	106
X164	Left Road Light .....	107
X165	Right Front Hazard Light .....	107
X166	Right Front Service Socket .....	108

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

### Chapter 13 - Electrical Connectors (Continued)

#### CONTENTS

Section	Description	Page
X168	Right Lower Work Light .....	108
X169	Right Road Light .....	108
X170	Lateral Inclination Sensor .....	109
X171	Wiper Washer Motor .....	109
X172	Horn .....	110
X173	Brake Pressure .....	110
X174	Feeder Angle .....	111
X175	Front Ground .....	111
X177	Drum RPM .....	112
X178	Mirror Select Switch .....	113
X181	Left Returns RPM .....	114
X182	Clean Grain RPM .....	115
X183	Fuel Pump .....	116
X184	Fuel Level .....	117
X186	Tailing RPM .....	118
X188	RH Rotor Loss .....	119
X189	Concave Position .....	120
X190	Concave Motor .....	121
X191	LH Rotor Loss .....	122
X192	ECU Connector A .....	123
X193	ECU Connector B .....	124
X194	Service Socket .....	125
X195	Covers Closed .....	125
X197	IVECO Engine .....	126
X199	Start Relay Coil .....	127
X200	Start Relay .....	127
X202	Air Filter .....	128
X205	Starter Solenoid .....	128
X211	Grid Heater Relay .....	129
X213	Alternator .....	130
X215	A/C Clutch .....	131

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

### Chapter 13 - Electrical Connectors (Continued)

#### CONTENTS

Section	Description	Page
X216	A/C High Pressure .....	132
X217	A/C Low Pressure .....	133
X218	Flip-Up Kit .....	133
X221	Moisture Sensor .....	134
X222	Sample Motor .....	135
X223	Yield Sensor .....	136
X225	Upper Sieve Adjust .....	137
X226	Lower Sieve Adjust .....	138
X227	Upper Sieve Motor .....	139
X228	Lower Sieve Motor .....	140
X213	Rear Frame Ground 1 .....	141
X232	Sieves Loss .....	142
X233	RWA Solenoid .....	143
X234	Sieve Light .....	143
X235	Chaff Spreader Solenoid .....	144
X236	Left Service Socket .....	144
X237	Sieve Light Switch .....	144
X238	Gearbox Filter Bypass .....	145
X239	Returns Filter Bypass .....	146
X240	Swath Plate Position .....	147
X242	LH Flashing Lamp .....	148
X244	Unload Cradle .....	149
X245	RH Flashing Lamp .....	150
X247	Beacon Light .....	151
X248	Back-Up Alarm .....	152
X251	Rear Ladder .....	153
X252	Right Service Socket .....	153
X255	Flasher Module .....	154
X256	Road Lights Switch .....	155
X257	Turn Indicator .....	155
X258	High Beam/Trailer .....	156



---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

### Chapter 13 - Electrical Connectors (Continued)

#### CONTENTS

Section	Description	Page
X259	Hazard Switch . . . . .	156
X279	Header Lift Pressure . . . . .	157
X284	Feeder RPM . . . . .	158
X285	Trailer Hitch . . . . .	159
X286	24V Start Relay . . . . .	160
X287	German Third Mirror . . . . .	160
X288	Covers Position . . . . .	160
X289	Covers Actuator . . . . .	161
X293	2 Speed Powered Rear Axle . . . . .	161
X294	LH Brake Ground . . . . .	161
X295	RH Brake Ground . . . . .	161
X296	Dome Light Power . . . . .	161
X297	LH Side Work Light . . . . .	162
X298	RH Side Work Light . . . . .	162
X299	LH Brake / Tail Lamp . . . . .	163
X300	LH Brake / Tail Lamp . . . . .	164
X301	LH Rear Flashing Lamp . . . . .	164
X302	RH Rear Flashing Lamp . . . . .	165
X311	Engine Oil Temperature . . . . .	165
X314	Radio . . . . .	166
X315	Radio . . . . .	166
X319	ICDU . . . . .	167
X320	Shaft Speed Monitor . . . . .	168
X321	GPS Antenna . . . . .	169
X322	Unload Tube Work Light . . . . .	170
X327	Brake Fluid Level . . . . .	171
X328	Brake Fluid Level . . . . .	172
X329	Brake Limiting Valve . . . . .	172
X330	Air Filter Resistor . . . . .	172
X331	Flip Up Low Beam Relay . . . . .	173
X332	Flip Up High Beam Relay . . . . .	173

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

### Chapter 13 - Electrical Connectors (Continued)

#### CONTENTS

Section	Description	Page
X333	LH Flip Up Road Light .....	173
X334	RH Flip Up Road Light .....	173
X335	LH Road Light .....	174
X336	RH Road Light .....	174
X337	Engine Oil Pressure .....	174
X338	Fuel Filter Switch .....	175
X339	Left Light Switch .....	176
X340	Engine Light Switch .....	177
X342	Under Shield Lighting .....	178
X343	Engine Lighting .....	179
X345	Left Front Light .....	180
X346	Left Rear Light .....	181
X347	Right Front Light .....	182
X348	Right Rear Light .....	182
X349	Engine Light .....	183
X362	RH License Plate Light .....	183
X363	LH License Plate Light .....	183
X368	Park Brake Pressure .....	184
X369	Engine Flywheel RPM .....	185
X370	Engine Camshaft RPM .....	186
X371	Boost Pressure .....	187
X372	Fuel Temperature .....	188
X373	Coolant Temperature .....	189
X374	Air Temperature .....	190
X375	Engine Brake .....	190
X376	Fuel Actuator .....	190
X377	Fuel Actuator .....	191
X378	Fuel Actuator .....	191
X379	Fuel Actuator .....	192
X380	Fuel Actuator .....	192
X381	Fuel Actuator .....	193

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

### Chapter 13 - Electrical Connectors (Continued)

#### CONTENTS

Section	Description	Page
X383	Spreader .....	194
X386	Front Switch Panel .....	195
X387	Rear Switch Panel .....	196
X388	Engine Throttle .....	197
X396	Blower Speed Control .....	198
X397	ATC Control Module .....	198
X398	ATC Control Module .....	199
X399	PTO Box Lube Pressure .....	199
X400	Feeder Engage Diodes .....	200
X401	Ring Clutch .....	201
X402	Ring Clutch .....	202
X403	Frame Brake .....	203
X404	Header Speed pot .....	204
X405	Resistor Module .....	205
X406	Reel Speed .....	206
X408	Rotor Pump Swash .....	207
X409	Frame Brake .....	208
X410	Ring Clutch .....	209
X411	Chopper RPM .....	201
X412	YMIU Module .....	211
X417	LH HID Field Light .....	211
X418	RH HID Field Light .....	212
X428	Rotor Hydrostat .....	212
X438	YMIU Module .....	213
X0439	Coolant Level Switch .....	213
X442	Precision Farming .....	214
X443	Precision Farming .....	215
X444	Fan Drive Solenoid .....	216
X445	Tailing Volume .....	217
X446	Cab CAN Termination .....	218
X447	Sieve Light Rear .....	218

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 7 - 87543042

### Chapter 13 - Electrical Connectors (Continued)

#### CONTENTS

Section	Description	Page
	X449 Unload Tube Clutch .....	219
	X450 Beater / Chopper Clutch .....	220
	X451 A/C Low PPressure .....	220
	X452 Freeze Switch .....	221
	X453 Freeze Switch .....	221
	X456 Concave Extension Harness .....	222
	X457 Park Brake Disengage .....	223
	X470 Separator Blower .....	224
	X471 Injector Harness .....	225

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 8 - 87543043

### Chapter 14 - CCM1 Fault Codes

#### CONTENTS

Section	Description	Page
	E0001 - Grain Tank Covers Open Sensor .....	3
	E0002 - Spreader Position Sensor .....	8
	E0003 - Unloader Cradled Sensor .....	14
	E0005 - Coolant Level Switch .....	20
	E0006 - Reservoir Oil Filter Restriction Switch .....	22
	E0007 - PTO Filter Restriction Switch .....	24
	E0008 - Left Turn Signal Switch .....	26
	E0009 - Front Work Light Switch .....	28
	E0010 - Rear Work Light Switch .....	31
	E0012 - Right Turn Signal Switch .....	34
	E0013 - Cleaning Fan Speed Sensor .....	36
	E0014 - Feeder Speed Sensor .....	42

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 8 - 87543043

### Chapter 14 - CCM1 Fault Codes (Continued)

#### CONTENTS

Section	Description	Page
	E0015 - Sieve Shaker Speed Sensor .....	48
	E0016 - Clean Grain Elevator Speed Sensor .....	53
	E0018 - Tailings Speed Sensor .....	58
	E0019 - Right Header Height / Tilt Sensor .....	63
	E0020 - Left Header Height / Tilt Sensor .....	72
	E0023 - Hydrostat Motor Temperature Sensor .....	81
	E0024 - Hydraulic Reservoir Temperature Sensor .....	86
	E0026 - Rear Ladder Sensor .....	92
	E0027 - Left Center Header Height Sensor .....	98
	E0029 - Header Tilt Angle Sensor .....	107
	E0030 - Header Lift Pressure Sensor .....	113
	E0031 - Feeder Position Sensor .....	118
	E0032 - Sieve Angle Sensor .....	123
	E0033 - Lateral Inclination Sensor .....	129
	E0034 - Concave Position Sensor .....	133
	E0035 - PTO Lube Pressure Sensor .....	139
	E0036 - Feeder CVT Pump Voltage Supply .....	143
	E0037 - CCM1 J2 5V Reference .....	152
	E0038 - CCM1 8V Reference .....	161
	E0039 - CCM1 J3 5V Reference .....	164
	E0040 - CCM1 Key Switch Voltage .....	169
	E0043 - Sieve Angle Current Sense .....	177
	E0044 - Concave Current Sense .....	182
	E0045 - Covers Current Sense .....	190
	E0046 - CCM1 Battery Voltage .....	198
	E0047 - Feeder ETR Clutch Voltage Supply .....	202
	E0048 - Header Tilt Current Sense .....	210
	E0049 - Header Raise / Lower Current Sense .....	216
	E0050 - Feeder ETR Clutch Current Sense .....	222
	E0052 - Feeder ETR Clutch Valve .....	229
	E0053 - Chaff Spreader Valve .....	232
	E0054 - Cleaning Fan Valve .....	235

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 8 - 87543043

### Chapter 14 - CCM1 Fault Codes (Continued)

#### CONTENTS

Section	Description	Page
	E0055 - Header Lower Valve .....	237
	E0056 - Header Raise Valve .....	240
	E0057 - Header Tilt CCW Valve .....	243
	E0058 - Header Tilt CW Valve .....	246
	E0059 - 2-Speed Front Hydro Valve .....	249
	E0060 - Header Height Accumulator Valve .....	252
	E0063 - Brake Limiting Valve .....	255
	E0065 - Ground Drive Backup Alarm .....	257
	E0066 - 2-Speed Powered Rear Axle Valve .....	260
	E0067 - Feeder RTF Clutch Valve .....	263
	E0068 - Unload Tube Light .....	266
	E0069 - Covers / Concave Select Relay .....	268
	E0070 - Front Work Lights .....	270
	E0071 - Rear Work Lights .....	272
	E0072 - Side Work Lights .....	274
	E0073 - Field Lights .....	276
	E0074 - Feeder CVT Pump Valve .....	279
	E0075 - Leveling Sieve .....	282
	E0078 - Concave Motor .....	287
	E0079 - Grain Tank Covers Motor .....	295
	E0084 - Voting Conflicts Found Contact Your Dealer .....	303
	E0085 - Voting Differences Found and Corrected .....	304
	E0086 - Feeder Reverse Flow Control Voltage Supply .....	305
	E0087 - Feeder Forward Clutch Voltage Supply .....	313
	E0088 - Feeder Forward Clutch Current Sense .....	321
	E0089 - Feeder Forward Clutch Valve .....	328
	E0090 - Feeder Reverse Clutch Valve .....	331
	E0091 - Feeder Reverse Flow Control Valve .....	334

---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 9 - 87543044

## Chapter 15 - CCM2 Fault Codes

### CONTENTS

Section	Description	Page
	E0128 - Trans Shift Position N Sensor .....	3
	E0129 - Trans Shift Position 3 Sensor .....	9
	E0130 - Trans Shift Position 2 Sensor .....	15
	E0131 - Trans Shift Position 1 Sensor .....	21
	E0132 - Trans Shift Position 4 Sensor .....	27
	E0133 - Hydraulic Reservoir Level Sensor .....	33
	E0134 - Service Brake Pressure Sensor .....	35
	E0136 - Beacon Switch .....	37
	E0137 - Grain Tank Covers Switch .....	41
	E0138 - Hazards Switch .....	45
	E0140 - Operator Seat Switch Shorted To Low Source .....	47
	E0142 - Ground Speed Sensor .....	50
	E0143 - Chopper Speed Sensor .....	56
	E0144 - Spreader Speed Sensor .....	61
	E0147 - Tailings Volume Sensor .....	65
	E0148 - Header Type Module .....	71
	E0152 - Coolant Temperature Sensor .....	76
	E0153 - Engine Oil Temperature Sensor .....	79
	E0154 - Fuel Level Sensor .....	86
	E0155 - Park Brake Pressure Sensor .....	91
	E0159 - Grain Tank Full Sensor .....	96
	E0161 - Oil Pressure Sensor .....	102
	E0162 - PTO Control Pressure Sensor .....	109
	E0163 - Air Filter Sensor .....	116
	E0164 - Ground Drive Hydro Voltage Supply .....	122
	E0165 - CCM2 J2 5V Reference .....	131
	E0166 - CCM2 8V Reference .....	141
	E0167 - CCM2 J3 5V Reference .....	144
	E0168 - CCM2 Key Switch Voltage .....	148
	E0169 - Reel Speed Current Sense .....	156

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 9 - 87543044

### Chapter 15 - CCM2 Fault Codes (Continued)

#### CONTENTS

Section	Description	Page
	E0171 – Transmission Shift Current Sense .....	161
	E0174 – CCM2 Battery Voltage .....	166
	E0175 – Beater/Chopper Voltage Supply .....	170
	E0177 – Unloader Current Sense .....	177
	E0178 – Beater/Chopper Current Sense .....	184
	E0179 – Ground Drive Hydro Current Sense .....	191
	E0180 – Beater/Chopper Valve .....	201
	E0181 – Park Brake Valve .....	204
	E0184 – Unloader Valve .....	206
	E0185 – Reel Fore Valve .....	209
	E0186 – Reel Drive Valve .....	212
	E0187 – Reel Raise Valve .....	215
	E0188 – Reel Lower Valve .....	218
	E0189 – Reel Aft Valve .....	221
	E0190 – Jammer Valve .....	224
	E0193 – Unload Tube In Valve .....	227
	E0194 – Unload Tube Out Valve .....	229
	E0195 – Pressure Release Valve .....	231
	E0196 – Grid Heater .....	234
	E0198 – Backlighting .....	236
	E0199 – Brake Lights .....	240
	E0200 – Beacon Light .....	242
	E0201 – ISO/NASO Selection .....	245
	E0202 – Ground Drive Hydro .....	248
	E0203 – Transmission Shift Motor .....	251
	E0204 – Reel Speed Motor .....	256
	E0208 – Engine Configuration .....	261
	E0212 – Deck Plate Current Sense .....	262
	E0213 – Swap Valve Current Sense .....	267
	E0214 – Deck Plate Motor .....	272
	E0215 – Swap Valve .....	277



---

# SECTION 55 - ELECTRICAL SYSTEMS

BOOK 10 - 87543045

## Chapter 16 - CCM3 Fault Codes

### CONTENTS

Section	Description	Page
	E0261 - Lower Sieve Decrease - Rear Switch .....	2
	E0262 - Upper Sieve Decrease - Rear Switch .....	5
	E0263 - Lower Sieve Increase - Rear Switch .....	8
	E0269 - Rotor Speed Sensor .....	11
	E0270 - Rotor Motor Speed Sensor .....	16
	E0282 - Upper Sieve Increase - Rear Switch .....	22
	E0287 - Upper Sieve Position Sensor .....	25
	E0290 - Lower Sieve Position Sensor .....	30
	E0292 - Rotor CVT Pump Voltage Supply .....	34
	E0293 - CCM3 J2 5V Reference .....	41
	E0294 - CCM3 8V Reference .....	44
	E0295 - CCM3 J3 5V Reference .....	46
	E0296 - CCM3 Key Switch Voltage .....	48
	E0300 - Lower Sieve Current Sense .....	56
	E0301 - Upper Sieve Current Sense .....	67
	E0302 - CCM3 Battery Voltage .....	78
	E0303 - Rotor ETR Clutch Voltage Supply .....	82
	E0304 - Rotor CVT Pump Current Sense .....	90
	E0306 - Rotor ETR Clutch Current Sense .....	98
	E0308 - Rotor ETR Clutch Valve .....	105
	E0310 - Bypass Unit .....	109
	E0315 - Rotor RTF Clutch Valve .....	112
	E0325 - Upper / Lower Sieve Select Relay .....	115
	E0330 - Rotor CVT Pump Valve .....	117
	E0334 - Lower Sieve .....	120
	E0335 - Upper Sieve .....	131

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 11 - 87543046

### Chapter 17 - Engine Fault Codes

#### CONTENTS

Section	Description	Page
	E0385 - ECU Defect .....	2
	E0386 - EEPROM Defect .....	7
	E0393 - Main Relay Defect .....	12
	E0394 - Afterrun Not Completed .....	16
	E0397 - Shut-Off Tests .....	21
	E0399 - Coolant Temperature Sens .....	26
	E0400 - Boost Air Temperature .....	30
	E0401 - Fuel Temperature Sensor .....	37
	E0402 - Boost Pressure Sensor .....	41
	E0403 - Ambient Pressure Sensor .....	48
	E0408 - Engine Overspeed .....	51
	E0412 - INK Signal .....	55
	E0413 - SEG Signal .....	59
	E0414 - Cylinder 1 .....	63
	E0415 - Cylinder 4 .....	67
	E0416 - Cylinder 2 .....	71
	E0417 - Cylinder 6 .....	75
	E0418 - Cylinder 3 .....	79
	E0419 - Cylinder 5 .....	83
	E0420 - Battery Voltage .....	87

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 11 - 87543046

### Chapter 18 - RHM Fault Codes

#### CONTENTS

Section	Description	Page
	E0641 - RHM 5V Reference .....	3
	E0642 - Reel Speed Control .....	9
	E0643 - Propulsion Handle Position .....	14
	E0644 - Throttle Control .....	20
	E0645 - Gear Shift Control .....	25
	E0646 - Feeder Reverser Switch .....	32
	E0647 - Vertical Knives Off Switch .....	34
	E0649 - HHC Set #1 Switch .....	36
	E0650 - Vertical Knives On Switch .....	38
	E0651 - Header Speed Control .....	40
	E0654 - Road Mode Switch .....	46
	E0657 - Header Speed Auto Switch .....	49
	E0661 - Reel Speed Auto Switch .....	52
	E0662 - Fan Speed Increase Switch .....	54
	E0663 - Fan Speed Decrease Switch .....	57
	E0664 - Rotor Speed Increase Switch .....	60
	E0665 - Rotor Speed Decrease Switch .....	63
	E0668 - Park Brake On Switch .....	66
	E0669 - Park Brake Off Switch .....	68
	E0670 - Concave Decrease Switch .....	70
	E0671 - Concave Increase Switch .....	73
	E0672 - Upper Sieve Decrease Switch .....	76
	E0673 - Upper Sieve Increase Switch .....	79
	E0674 - Lower Sieve Decrease Switch .....	82
	E0675 - Lower Sieve Increase Switch .....	85
	E0676 - Header Adjust Decrease Switch .....	88
	E0677 - Header Adjust Increase Switch .....	91
	E0678 - Unloader Switches Common .....	94
	E0679 - Reel Position & Emergency Stop Switches Common .....	96
	E0680 - Header Position Switches Common .....	98
	E0682 - Unload Tube Swing Out Switch .....	100

---

## SECTION 55 - ELECTRICAL SYSTEMS

BOOK 11 - 87543046

### Chapter 18 - RHM Fault Codes (Continued)

#### CONTENTS

Section	Description	Page
	E0683 - Unloader Switch .....	103
	E0685 - Unload Tube Swing In Switch .....	106
	E0688 - Reel Fore Switch .....	109
	E0689 - Reel Lower Switch .....	112
	E0690 - Reel Raise Switch .....	115
	E0692 - Reel Aft Switch .....	118
	E0694 - Emergency Stop Switch .....	121
	E0695 - Header Tilt CCW Switch .....	124
	E0696 - Header Lower Switch .....	127
	E0698 - Header Raise Switch .....	130
	E0699 - HHC Resume Switch .....	133
	E0700 - Header Tilt CW Switch .....	136

---

# SECTION 60 - PRODUCT FEEDING

BOOK 12 - 87543047

## Chapter 1 - Feeder Housing

### CONTENTS

Section	Description	Page
	Special Tools .....	3
	Description and Operation .....	5
	Drive System Variable Speed Feeder .....	5
	Modes of Operation .....	5
	Fixed Speed Feeder (FSF) .....	9
	Modes of Operation .....	5
	Overhaul .....	13
	Feeder Housing .....	13
	Removal .....	13
	Installation .....	17
	Top Shaft with Stone Trap .....	23
	Removal .....	23
	Installation .....	25
	Pivot Shaft Less Stone Trap .....	27
	Removal .....	27
	Installation .....	28
	Gearbox .....	30
	Removal .....	30
	Disassembly .....	33
	Assembly .....	42
	Installation .....	51
	Draining Fluid .....	56
	Filling .....	59
	Stone Beater .....	61
	Removal .....	61
	Installation .....	64
	Stone Trap .....	66
	Removal .....	66
	Installation .....	66
	Adjustment .....	67

---

# SECTION 60 - PRODUCT FEEDING

BOOK 12 - 87543047

## Chapter 1 - Feeder Housing (Continued)

### CONTENTS

Section	Description	Page
	Continuously Variable Transmission (CVT) .....	69
	Removal .....	69
	Disassembly .....	71
	Assembly .....	84
	Installation .....	101
	Bevel Gearbox .....	104
	Disassembly .....	104
	Assembly .....	107
	Feed Chain .....	110
	Tension Adjustment .....	110
	Tightening .....	111
	Loosening .....	111
	Replacement .....	112
	Feed Chain Slat Replacement .....	115
	Removal .....	115
	Installation .....	117
	Idler Roller .....	119
	Removal .....	119
	Installation .....	119
	Clearance Adjustment .....	121

---

# SECTION 66 - THRESHING

BOOK 12 - 87543047

## Chapter 1 - Rotor

### CONTENTS

Section	Description	Page
	Specifications .....	2
	Drive System .....	2
	Special Tools .....	3
	Description and Operation .....	5
	Rotor Drive .....	5
	Modes of Operation .....	5
	Hydrostat Power Flow .....	7
	Mechanical Power Flow .....	8
	Combined Power Flow .....	9
	Electrical Components .....	10
	Overhaul .....	12
	Drive System Drive and Gear .....	12
	Removal .....	12
	Disassembly .....	14
	Assembly .....	19
	Leakage Test .....	28
	Installation .....	29
	Continuously Variable Transmission (CVT) .....	32
	Removal .....	32
	Disassembly .....	35
	Assembly .....	47
	Installation .....	63
	Rotor .....	66
	Removal .....	66
	Disassembly .....	72
	Assembly .....	72
	Installation .....	72
	Positioning System .....	77
	Removal .....	77
	Installation .....	80
	Adjustment .....	83
	Electrical Motor .....	85
	Removal .....	85
	Installation .....	85

---

## SECTION 66 - THRESHING

BOOK 12 - 87543047

### Chapter 2 - Rotor Cage

#### CONTENTS

Section	Description	Page
	Overhaul .....	2
	Feeding Transition Cone .....	2
	Removal .....	2
	Installation .....	4
	Threshing Rotor Cage .....	7
	Removal .....	7
	Installation .....	10
	Adjust Vanes .....	12

## SECTION 72 - SEPARATION

BOOK 13 - 87543048

### Chapter 1 - Discharge Beater

#### CONTENTS

Section	Description	Page
	Beater .....	2
	Removal .....	2
	Installation .....	4
	Concave .....	8
	Removal .....	8
	Installation .....	9
	Positioning System .....	10
	Removal .....	10
	Installation .....	11



---

# SECTION 74 - CLEANING

BOOK 13 - 87543048

## Chapter 1 - Cleaning Shoe Frame

### CONTENTS

Section	Description	Page
	Specifications .....	3
	Description of Operation .....	6
	Overhaul .....	9
	Upper Cleaning Shoe .....	9
	Removal .....	9
	Installation .....	13
	Grain Pan .....	19
	Removal .....	19
	Installation .....	19
	Lower Cleaning Shoe .....	20
	Removal .....	20
	Installation .....	21
	Cleaning Shoe Support Arm Bushings .....	23
	Removal .....	23
	Inspection .....	24
	Installation .....	25
	Connecting Arm Pivot Bushings .....	28
	Removal .....	28
	Inspection .....	30
	Installation .....	31
	Drive and Upper Connecting Arm Bushing .....	34
	Removal .....	34
	Inspection .....	37
	Installation .....	37
	Lower Connecting Arm Bushings .....	40
	Removal .....	40
	Inspection .....	42
	Installation .....	42
	Cleaning Shoe Seals .....	45

---

## SECTION 74 - CLEANING

BOOK 13 - 87543048

### Chapter 1 - Cleaning Shoe Frame (Continued)

#### CONTENTS

Section	Description	Page
	Leveling Frame - Pivot Bushing .....	46
	Removal .....	46
	Inspection .....	48
	Installation .....	48
	Leveling Frame - Rear Roller .....	50
	Removal .....	50
	Disassembly .....	51
	Inspection .....	52
	Assembly .....	52
	Installation .....	53
	Adjustment .....	54
	Leveling Frame - Rear Pivot Bearing .....	55
	Removal .....	55
	Disassembly .....	56
	Inspection .....	57
	Assembly .....	57
	Installation .....	58

## SECTION 74 - CLEANING

BOOK 13 - 87543048

### Chapter 2 - Cleaning Shoe Drive

#### CONTENTS

Section	Description	Page
	Description of Operation .....	2
	Overhaul .....	3
	Eccentric Shaft .....	3
	Removal .....	3
	Inspection .....	5
	Installation .....	5

---

## SECTION 74 - CLEANING

BOOK 13 - 87543048

### Chapter 3 - Cleaning Fan

#### CONTENTS

Section	Description	Page
	Specifications .....	2
	Overhaul .....	3
	Fan .....	3
	Removal .....	3
	Disassembly .....	10
	Assembly .....	11
	Installation .....	14

## SECTION 74 - CLEANING

BOOK 13 - 87543048

### Chapter 4 - Tailings Return System

#### CONTENTS

Section	Description	Page
	Overhaul .....	2
	Tailings Return System .....	2
	Removal .....	2
	Disassembly .....	5
	Assembly .....	9
	Installation .....	15
	Cross Auger .....	18
	Removal .....	18
	Installation .....	21

---

# SECTION 80 - GRAIN STORAGE

BOOK 14 - 87543049

## Chapter 1 - Grain Storing

### CONTENTS

Section	Description	Page
	Description and Operation .....	2
	Sensing System .....	2
	Overhaul .....	3
	Bubble-up Auger .....	3
	Removal .....	3
	Installation .....	6
	Bubble-up Auger Drive System Gearbox .....	10
	Disassembly .....	10
	Assembly .....	11
	Clean Grain Cross Auger .....	14
	Removal .....	14
	Installation .....	18
	Grain Elevator .....	23
	Removal .....	23
	Installation .....	27
	Grain Elevator Chain .....	30
	Removal .....	30
	Installation .....	31
	Grain Elevator Housing .....	33
	Disassembly .....	33
	Assembly .....	40

---

# SECTION 80 - GRAIN STORAGE

BOOK 14 - 87543049

## Chapter 2 - Grain Unloading

### CONTENTS

Section	Description	Page
	Special Tools .....	2
	Overhaul .....	5
	Clutch - Replace "In Frame" .....	5
	Unloader Clutch Shaft Replacement .....	5
	Disassembly .....	5
	Assembly/Installation of Clutch Shaft into PTO Gearbox .....	8
	Final Procedure .....	16
	Clutch .....	17
	Disassembly .....	17
	Assembly .....	20
	Clutch Pack Clearance and Clutch Pack Travel Test .....	22
	Drive System .....	25
	Removal .....	25
	Installation .....	27
	Drive System Unload Gearbox .....	30
	Removal .....	30
	Disassembly .....	30
	Assembly .....	35
	Installation .....	42
	Drive System Unloading Tube Gearbox .....	43
	Removal .....	43
	Disassembly .....	43
	Assembly .....	46
	Installation .....	54
	Unloading Auger - Vertical Auger .....	55
	Removal .....	55
	Installation .....	55
	Unloading Auger - Cross Auger .....	57
	Removal .....	57
	Installation .....	62
	Unloading Tube .....	66
	Removal .....	66
	Installation .....	67

---

## SECTION 88 - RESIDUE HANDLING

BOOK 14 - 87543049

### Chapter 1 - Straw Spreader

#### CONTENTS

Section	Description	Page
	Overhaul .....	2
	Straw Spreader .....	2
	Removal .....	2
	Installation .....	3
	Hydraulic Motor .....	5
	Removal .....	5
	Overhaul .....	6
	Installation .....	13

## SECTION 88 - RESIDUE HANDLING

BOOK 14 - 87543049

### Chapter 2 - Straw Chopper

#### CONTENTS

Section	Description	Page
	Overhaul .....	2
	Straw Chopper .....	2
	Removal .....	2
	Installation .....	9
	Counter Knife .....	20
	Removal .....	20
	Installation .....	21

---

# SECTION 90 - PLATFORM, CAB, BODYWORK, AND DECALS

BOOK 14 - 87543049

## Chapter 1 - Cab

### CONTENTS

Section	Description	Page
	Cab Frame .....	2
	Remove Cab Roof Outer Shell .....	2
	Install Cab Roof Outer Shell .....	3
	Cab Suspension System .....	5
	Removal .....	5
	Installation .....	7
	Air Ride Seat .....	8
	Removal .....	8
	Installation .....	10
	Compressor/Bellows .....	12
	Removal .....	12
	Installation .....	14
	Shock Absorber .....	16
	Removal .....	16
	Installation .....	19
	Adjuster .....	21
	Removal .....	21
	Installation .....	24
	Wiper System Motor .....	27
	Removal .....	27
	Installation .....	31
	Steering Column .....	35
	Removal .....	35
	Installation .....	37

---

# SECTION 90 - PLATFORM, CAB, BODYWORK, AND DECALS

BOOK 14 - 87543049

## Chapter 2 - Shielding

### CONTENTS

Section	Description	Page
	Overhaul .....	2
	Side Shield .....	2
	Removal .....	2
	Installation .....	4
	Engine Hood .....	7
	Removal .....	7
	Installation .....	12
	Engine and Radiator Door .....	18
	Removal .....	18
	Installation .....	18



**SECTION 00 - GENERAL INFORMATION**

**Chapter 1 - General Information**

**CONTENTS**

<b>Section</b>	<b>Description</b>	<b>Page</b>
	Precautionary Statements .....	2
	Safety Requirements for Fluid Power Systems and Components - Hydraulics .....	3
	Accident Prevention .....	3
	Safety Rules .....	3
	Minimum Hardware Tightening Torques .....	6
	Definitions .....	8
	Hydraulic Hoses and Tubes .....	9
	Hydraulic O-Ring Face Seal (ORFS) .....	10
	Product Identification .....	15
	AFX Specifications .....	16

# PRECAUTIONARY STATEMENTS

## PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements (“**DANGER**”, “**WARNING**”, and “**CAUTION**”) followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.



**DANGER**



This word “**DANGER**” indicates an immediate hazardous situation that, if not avoided, will result in death or serious injury. The color associated with Danger is RED.

---



**WARNING**



This word “**WARNING**” indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. The color associated with Warning is ORANGE.

---



**CAUTION**



This word “**CAUTION**” indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. The color associated with Caution is YELLOW.

---

**FAILURE TO FOLLOW THE “DANGER”, “WARNING”, AND “CAUTION” INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.**

## MACHINE SAFETY

The precautionary statement (“**IMPORTANT**”) is followed by specific instructions. This statement is intended for machine safety.

**IMPORTANT:** *The word “IMPORTANT” is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.*

## INFORMATION

**NOTE:** *Instructions used to identify and present supplementary information.*

## SAFETY REQUIREMENTS FOR FLUID POWER SYSTEMS AND COMPONENTS - HYDRAULICS (EUROPEAN STANDARD PR EM 982)

Flexible hose assemblies must not be constructed from hoses which have been previously used as part of a hose assembly.

Do not weld hydraulic piping.

When flexible hoses or piping are damaged, replace them immediately.

It is forbidden to modify a hydraulic accumulator by machining, welding or any other means.

Before removing hydraulic accumulators for servicing, the liquid pressure in the accumulators must be reduced to zero.

Pressure check on hydraulic accumulators shall be carried out by method recommended by the accumulator manufacturer.

Care must be taken not to exceed the maximum allowable pressure of the accumulator. After any check or adjustment there must be no leakage of gas.

### ACCIDENT PREVENTION

Most accidents or injuries that occur in workshops are the result of a non compliance to simple and fundamental safety regulations. For this reason, **IN MOST CASES THESE ACCIDENTS CAN BE AVOIDED** by foreseeing possible causes and consequently acting with the necessary caution and care.

Accidents may occur with all types of machines, regardless of how well the machine in question was designed and built.

A careful and informed service technician is the best guarantee against accidents.

Decisive awareness of the most basic safety rule is normally sufficient to avoid many serious accident



**DANGER**



**Shut down the machine, remove key, be sure all moving parts have stopped and all pressure in the systems is relieved before cleaning, adjusting or lubricating the equipment.**

---

### SAFETY RULES

#### General Guidelines

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wrist watches, jewelry, unbuttoned or loose articles of clothing such as: ties, torn clothing, scarves, open jackets or shirts with open zips which may remain entangled in moving parts. It is advised to wear approved safety clothing. For example: non-slip footwear, gloves, safety goggles, helmets, etc.
- Do not carry out repair operations with someone sitting in the driver's seat, unless the person is a trained technician who is assisting with the operation in question.
- Do not operate the machine or use any of the implements from different positions, other than the driver's seat.
- Do not carry out operations on the machine with the engine running, unless specifically indicated.
- Stop the engine and bleed off residual hydraulic pressure before removing components, caps, valves, covers or etc.
- All repair and maintenance operations must be carried out using extreme care and attention.
- Service steps and platforms used in the workshop or elsewhere should be built according to standard accident prevention regulations.
- Disconnect the Power Take Off (PTO) from the machine, and label all controls to indicate that the machine is being serviced. Any parts that are to be raised must be locked in position.
- Brakes are inoperative when manually released for repair or maintenance purposes. Use blocks or similar devices to control the machine in these conditions.
- Only use specified towing points for towing the machine. Connect parts carefully. Make sure that all pins and/or locks are secured in position before applying traction. Never remain near the towing bars, cables or chains that are operating under load.
- When loading or unloading the machine from the trailer (or other means of transport), select a flat area capable of sustaining the trailer or truck wheels. Firmly secure the machine to the truck or trailer and lock the wheels in the position used by the carrier.

## SECTION 00 - GENERAL INFORMATION - CHAPTER 1

---

- Electric heaters, battery-chargers and similar equipment must be powered only by auxiliary power supplies with efficient ground insulation to avoid electrical shock hazards.
- Always use suitable hoisting or lifting devices when raising or moving heavy parts.
- Take extra care if bystanders are present.
- Never use gasoline, diesel oil or other inflammable liquids as cleaning agents. Use non-flammable, non toxic commercially available solvents.
- Wear safety goggles with side guards when cleaning parts with compressed air.
- Reduce tire air pressure according to the local regulations in force.
- Do not run the engine in confined spaces without suitable ventilation.
- Never use open flames for lighting when working on the machine or checking for leaks.
- All movements must be carried out carefully when working under, on or near the machine. Wear protective equipment: helmets, goggles and special footwear.
- When carrying out checks with the engine running, request the assistance of an operator in the driver's seat. The operator must maintain visual contact with the service technician at all times.
- If operating outside the workshop, position the machine on a flat surface and lock in position. If working on a slope, lock the machine in position. Move to a flat area as soon as is safely possible.
- Damaged or bent chains or cables are unreliable. Do not use them for lifting or towing. Always use suitable protective gloves when handling chains or cables.
- Chains should always be safely secured. Make sure that the hitch-up point is capable of sustaining the load in question. Keep the area near the hitch-up point, chains or cables free of all bystanders.
- Maintenance and repair operations must be carried out in a CLEAN and DRY area. Eliminate any water or oil spillage immediately.
- Do not create piles of oil or grease-soaked rags as they represent a serious fire hazard. Always store rags in a closed metal container.
- Before engaging the machine, make sure that there are no persons within the machine or implement range of action.
- Empty your pockets of all objects that may fall accidentally unobserved into the machine inner compartments.
- In the presence of protruding metal parts, use protective goggles or goggles with side guards, helmets, special footwear and gloves.
- When welding, use protective safety devices: tinted safety goggles, helmets, special overalls, gloves and footwear. All persons present in the area where welding is taking place must wear tinted goggles. NEVER LOOK DIRECTLY AT THE WELDING ARC WITHOUT SUITABLE EYE PROTECTION.
- If welding in close proximity to a computer module, then the battery should be disconnected to cut the power, and also the module should be removed from the machine.
- Metal cables tend to fray with repeated use. Always use suitable protective devices (gloves, goggles, etc.) when handling cables.
- Handle all parts carefully. Do not put your hands or fingers between moving parts. Wear suitable safety clothing - safety goggles, gloves and shoes.

### **Machine Start Up**

- Never run the engine in confined spaces that are not equipped with adequate ventilation for exhaust gas extraction.
- Never place the head, body, limbs, feet, hands or fingers near rotating and moving parts.

### **Hydraulic Systems**

- A liquid leaking from a tiny hole may be almost invisible but, at the same time, be powerful enough to penetrate the skin. Therefore, NEVER USE HANDS TO CHECK FOR LEAKS but use a piece of cardboard or wood for this purpose. If any liquid penetrates skin tissue, call for medical aid immediately. Failure to treat this condition with correct medical procedure may result in serious infection or death.
- In order to check the pressure in the system use suitable instruments.

**Wheels and Tires**

- Make sure that the tires are correctly inflated at the pressure specified by the manufacturer. Periodically check the rims and tires for damage.
- Stand away from (at the side of) the tire when checking inflation pressure.
- Do not use parts of recovered wheels as incorrect welding brazing or heating may weaken and eventually cause damage to the wheel.
- Never cut or weld a rim mounted with an inflated tire.
- To remove the wheels, lock all wheels. After having raised the machine, position supports underneath, according to regulations in force.
- Deflate the tire before removing any objects that may be jammed in the tire tread.
- Never inflate tires using inflammable gases, as this may result in explosions and injury to bystanders.

**Removal and Install**

- Lift and handle all heavy parts using suitable hoisting equipment. Make sure that parts are sustained by appropriate hooks and slings. Use the hoisting eyebolts for lifting operations. Extra care should be taken if persons are present near the load to be lifted.
- Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.
- Avoid twisting chains or metal cables. Always wear safety gloves when handling cables or chains.

# MINIMUM HARDWARE TIGHTENING TORQUES

IN NEWTON-METERS (FOOT POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS

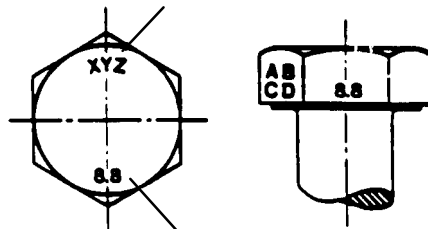
## METRIC NON-FLANGED HARDWARE AND LOCKNUTS

NOMINAL SIZE	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT CL.8 W/CL8.8 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	
M4	1.7 (15)*	2.2 (19)*	2.6 (23)*	3.4 (30)*	3.7 (33)*	4.8 (42)*	2.3 (20)*
M6	5.8 (51)*	7.6 (67)*	8.9 (79)*	12 (102)*	13 (115)*	17 (150)*	7.8 (69)*
M8	14 (124)*	18 (159)*	22 (195)*	28 (248)*	31 (274)*	40 (354)*	19 (169)*
M10	28 (21)	36 (27)	43 (32)	56 (41)	61 (45)	79 (58)	38 (28)
M12	49 (36)	63 (46)	75 (55)	97 (72)	107 (79)	138 (102)	66 (49)
M16	121 (89)	158 (117)	186 (137)	240 (177)	266 (196)	344 (254)	164 (121)
M20	237 (175)	307 (226)	375 (277)	485 (358)	519 (383)	671 (495)	330 (243)
M24	411 (303)	531 (392)	648 (478)	839 (619)	897 (662)	1160 (855)	572 (422)

NOTE: Torque values shown with \* are inch pounds.

### IDENTIFICATION HEX CAP SCREW AND CARRIAGE BOLTS CLASSES 5.6 AND UP

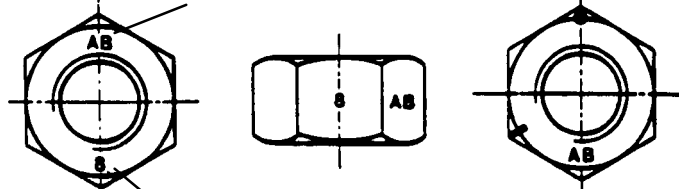
#### MANUFACTURER'S IDENTIFICATION



#### PROPERTY CLASS

### HEX NUTS AND LOCKNUTS CLASSES 05 AND UP

#### MANUFACTURER'S IDENTIFICATION



#### PROPERTY CLASS

#### CLOCK MARKING

# MINIMUM HARDWARE TIGHTENING TORQUES

IN NEWTON-METERS (FOOT POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS

## INCH NON-FLANGED HARDWARE AND LOCKNUTS

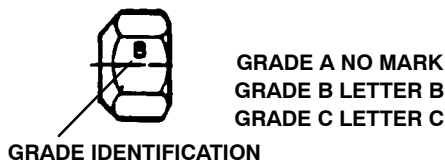
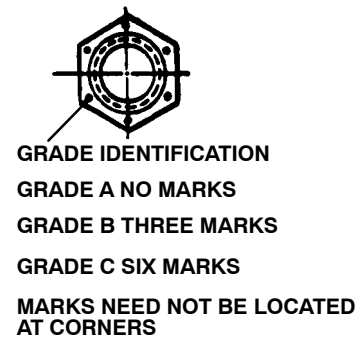
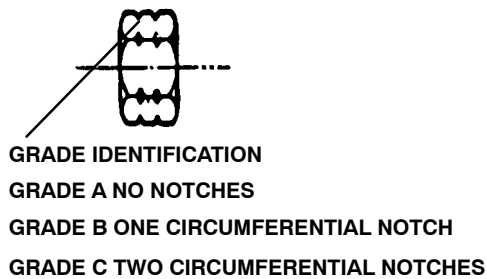
NOMINAL SIZE	SAE GRADE 2		SAE GRADE 5		SAE GRADE 8		LOCKNUTS		NOMINAL SIZE
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	GR.B w/GR5 BOLT	GR.C w/GR8 BOLT	
1/4	6.2 (55)*	8.1 (72)*	9.7 (86)*	13 (112)*	14 (121)*	18 (157)*	8.5 (75)*	12.2 (109)*	1/4
5/16	13 (115)*	17 (149)*	20 (178)*	26 (229)*	28 (250)*	37 (324)*	17.5 (155)*	25 (220)*	5/16
3/8	23 (17)	30 (22)	35 (26)	46 (34)	50 (37)	65 (48)	31 (23)	44 (33)	3/8
7/16	37 (27)	47 (35)	57 (42)	73 (54)	80 (59)	104 (77)	50 (37)	71 (53)	7/16
1/2	57 (42)	73 (54)	87 (64)	113 (83)	123 (91)	159 (117)	76 (56)	108 (80)	1/2
9/16	81 (60)	104 (77)	125 (92)	163 (120)	176 (130)	229 (169)	111 (82)	156 (115)	9/16
5/8	112 (83)	145 (107)	174 (128)	224 (165)	244 (180)	316 (233)	153 (113)	215 (159)	5/8
3/4	198 (146)	256 (189)	306 (226)	397 (293)	432 (319)	560 (413)	271 (200)	383 (282)	3/4
7/8	193 (142)	248 (183)	495 (365)	641 (473)	698 (515)	904 (667)	437 (323)	617 (455)	7/8
1	289 (213)	373 (275)	742 (547)	960 (708)	1048 (773)	1356 (1000)	654 (483)	924 (681)	1

NOTE: Torque values shown with \* are inch pounds.

### IDENTIFICATION CAP SCREWS AND CARRIAGE BOLTS



### LOCKNUTS



**DEFINITIONS**

1. Break Away Torque - Torque measured in the direction of tightening, the moment before the bolt/nut starts to turn.
2. Clamping Force - Force equal to the tension in the fastener that clamps the parts together.
3. Stabilized Torque - Torque measured on a joint that has had a settling time after fastener installation, and the torque is measured in the direction of tightening, the moment after the bolt/nut begins to turn.
4. Proof Load - Safe test load for fasteners, approximately 10% below the yield load.
5. Torque - Force on the wrench handle times the handle length.
6. Torque and Turn - Bolting method utilizing a torque sufficient to close the joint, followed by rotation of a specific angle to obtain the desired bolt stretch.
7. Torque to Yield - Bolting method that tightens the joint until 0.2% yield is detected. Generally requires a computer monitored tightening tool.
8. Target Torque - Torque specified by engineering, generally nominal torque.
9. Ultimate Load - Load when bolt failure occurs.
10. Yield Load - Load when 0.2% deformation occurs.

**NOTE:** Metric cap screws and nuts are identified by the grade number stamped on the head of the cap screw or on the surface of the nuts. U.S. customary cap screws are identified by radial lines stamped on the head of the cap screw.

**NOTE:** Tightening the joint to the proper torque will keep it leak free, and prevent it from damaging the hose or fitting.

**NOTE:** Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original. When replacing cap screws, always use a cap screw of the same measurement and strength as the cap screw being replaced.

**NOTE:** Make sure the fasteners threads are clean, and that thread engagement is started. This will prevent them from failing when being tightened. Assure that joints that utilize threaded fasteners are properly tightened, and that they remain tight during the period of their intended usage.

**NOTE:** Tighten plastic insert or crimped steel-type lock nuts to approximately 50 % of their torque, applied to the nut, not the bolt head. Tighten toothed or serrated type lock nuts to their full torque value.

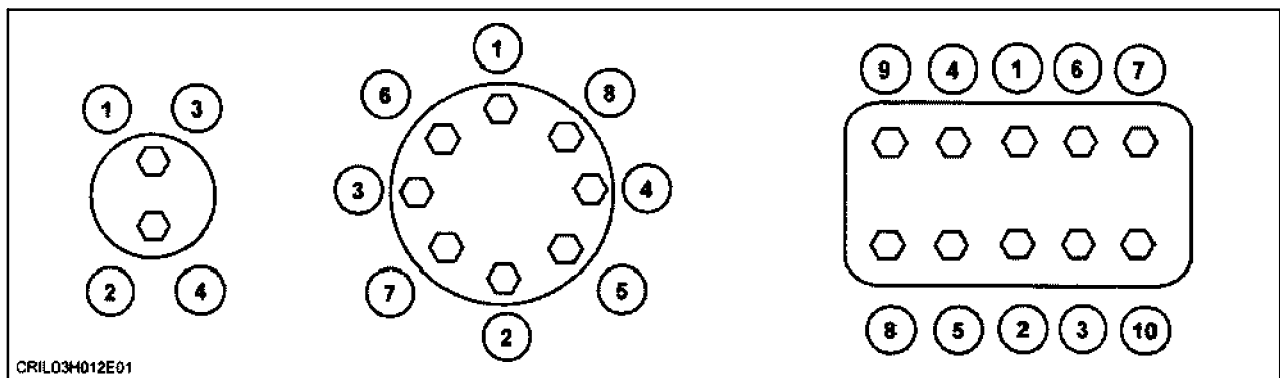
**NOTE:** Always use the torque values listed in the supplied charts in this section when values are not supplied in a procedure.

**NOTE:** DO NOT use these torque values when values are given in a specified procedure.

**NOTE:** Reuse of fasteners. Fasteners that have been tightened above yield point during assembly should not be reused after disassembly. They have been permanently deformed and the elastic range has been shifted closer to the ultimate tensile point.

**NOTE:** Torque and Turn is a recommended procedure for manufacturing and service when sophisticated tools are not available, especially for large diameter fasteners.

**NOTE:** Large diameter fasteners, unless specifically stated, should be tightened in sequence using the related torque chart below, at a low torque that is sufficient until the joint is closed. Each bolt is then rotated 90 degrees in sequence. Each bolt is then rotated another 90 degrees in sequence. The result is a clamp load above the yield point. This procedure results in a consistent clamp load. The fasteners should not be reused after disassembly.



**NOTE:** Shown above is the suggested initial torque tightening sequences for general applications, tighten in sequence from item 1 through to the last item of hardware.



**HYDRAULIC HOSES AND TUBES**

Always replace hoses and tubes with damaged cone ends or the end connections.

When installing a new hose, loosely connect each end and make sure the hose fits its desired location, without kinking or twisting, before tightening the connection. Tighten non-swivel end of hose first if applicable. Tighten the hose clamps enough to hold the hose without chafing but not so tight as to crush the ends.

Keep the hoses and tubes clear of moving parts and replace any hoses and fittings that have moved from their original positions over time. A hose with a chafed outer cover will allow moisture to get into the system. Concealed corrosion of the wire reinforcement will then occur along the hose length and result in hose failure. Ballooning of the hose indicates internal leakage as the hose deteriorates. This condition can rapidly lead to hose failure.

Kinked, crushed, stretched or damaged hoses generally suffer internal structural damage that restricts fluid flow, reduces performance and ultimately causes the hose to fail.

Do not allow free moving, unsupported hoses or tubes to touch each other or related working surfaces. This causes chafing and reduces line life.

**National Pipe Thread (NPT) Fittings**

Before installing and tightening pipe fittings, clean the threads with a cleaning solvent or Loctite® Brand cleaner. Apply the appropriate Loctite® Brand sealant to all fittings including stainless steel, unless as otherwise stated. Generally Loctite® Brand 567 can be used for all fittings including stainless steel. Loctite® Brand 565 is used for most metal fittings. For high filtration/zero contamination systems use Loctite® Brand 545.

**NPT Pipe Fitting Torque Chart**

Thread Size	Torque (Maximum)
1/8 - 27	13 N·m (10 ft-lb)
1/4 - 18	16 N·m (12 ft-lb)
3/8 - 18	22 N·m (16 ft-lb)
1/2 - 14	41 N·m (30 ft-lb)
3/4 - 14	54 N·m (40 ft-lb)

**Pipe Fitting**

Nom. SAE Dash Size	Thread Size	TFFT (Turns For Finger Tight)
-2	1/8 - 27	2.0 - 3.0
-3	1/8 - 27	2.0 - 3.0
-4	1/8 - 27	2.0 - 3.0
-5	1/8 - 27	2.0 - 3.0
-6	1/4 - 18	1.5 - 3.0
-8	3/8 - 18	2.0 - 3.0
-10	1/2 - 14	2.0 - 3.0
-12	3/4 - 14	2.0 - 3.0
-14	3/4 - 14	2.0 - 3.0
-16	1 - 11-1/2	1.5 - 2.5
-20	1-1/4 - 11-1/2	1.5 - 2.5
-24	1-1/2 - 11-1/2	1.5 - 2.5
-32	2 - 11-1/2	1.5 - 2.5

Apply sealant/lubricant to male pipe threads. The first two threads should be left uncovered to avoid system contamination. Screw pipe fitting into female pipe port to the finger tight position. Wrench tighten fitting to the appropriate turns from finger tight (TFFT) shown in table above, making sure the tube end of an elbow or tee fitting is aligned to receive incoming tube or hose fitting.

**Installation of Adjustable Fittings in Straight Thread O Ring Bosses**

1. Lubricate the O ring by coating it with light oil or petroleum jelly. Install the O ring in the groove adjacent to the metal backup washer which is assembled at the extreme end of the groove.
2. Install the fitting into the SAE straight thread boss until the metal backup washer contacts the face of the boss.

**NOTE:** Do not over tighten and distort the metal backup washer.

3. Position the fitting by turning out (counter clockwise) up to a maximum of one turn. Holding the pad of the fitting with a wrench, tighten the locknut and washer against the face of the boss.

**HYDRAULIC O-RING FACE SEAL (ORFS)**

**Using Port Thread Tables 1 & 2**

The "Into Steel" torque values listed are intended for steel connectors into steel ports. This combination will give a minimum port pressure rating of 21 MPa (3046 psi). See individual port specification for maximum pressure rating of the port. The "Into Aluminum" torque values listed are intended for steel connects into aluminum ports with a maximum system pressure of 21 MPa (3046 psi). Due to issues like manifold integrity and impulse frequency, connections into ports larger than M33 or -16 with a pressure greater than 14 MPa (2030 psi) should have application specific testing.

When hose ends or connectors are made of materials other than steel, different torque values may be required.

**Table 1: METRIC PORT THREAD (Port Connector to ORFS Connector)**

Thread Size	Nominal Tube OD	Wrench Size	Assembly Torque	
			Into Steel	Into Aluminum
			mm	mm
M10x1	5	14	20-22	12-14
M12x1.5	6	17	35-39	21-23
M14x1.5	8	19	45-50	27-30
M16x1.5	10	22	55-61	33-36
M18x1.5	12	24	70-77	42-46
M22x1.5	16	27	100-110	60-66
M27x2	20	32	170-187	102-112
M30x2	22	36	215-235	129-141
M33x2	25	41	310-341	186-205
M42x2	32	50	330-363	198-218
M48x2	38	55	420-462	252-277
M60x2	50	65	500-550	300-330

The above Table uses SAE J2244-2/ISO 6149-2 metric straight thread o-ring port connector recommended torque levels for use with SAE J1453/ISO 8434-3 ORFS connectors.

**SECTION 00 - GENERAL INFORMATION - CHAPTER 1**

---

**Table 2: INCH PORT THREAD (Port Connector to ORFS Connector)**

Thread Size	SAE DASH Size	Nominal Tube OD	Wrench Size		Assembly Torque	
			Non-adjustable	Adjustable (w/locknut)	Into Steel	Into Aluminum
		<b>inch</b>	<b>inch</b>	<b>inch</b>	<b>N·m</b>	<b>N·m</b>
3/8-24	-3	3/16	1/2	9/16	10-12	5-7
7/16-20	-4	1/4	9/16	5/8	20-22	9-15
1/2-20	-5	5/16	5/8	11/16	25-28	14-18
9/16-18	-6	3/8	11/16	3/4	33-35	23-34
3/4-16	-8	1/2	7/8	15/16	68-78	34-54
7/8-14	-10	5/8	1	1-1/16	98-110	41-75
1-1/16-12	-12	3/4	1-1/4	1-5/16	170-183	75-108
1-3/16-12	-14	7/8	1-3/8	1-1/2	215-245	108-129
1-5/16-12	-16	1	1-1/2	1-5/8	270-300	115-163
1-5/8-12	-20	1-1/4	1-7/8	1-7/8	285-380	163-224
1-7/8-12	-24	1-1/2	2-1/8	2-1/8	370-490	183-258

The above Table uses SAE J1926-2 inch straight thread o-ring port connector recommended torque levels for use with SAE J1453/ISO 8434-3 ORFS connectors.

**SECTION 00 - GENERAL INFORMATION - CHAPTER 1**

**O Ring Face Seal (ORFS) Fittings**

Observe the following procedures when repairing O ring face seal connections:

1. Release the fittings and separate the hose or tube assembly, then remove and discard the O ring seal from the fitting.
2. Prior to installation, dip a new O ring seal into clean hydraulic fluid or coat with petroleum jelly. Install the o ring into the fitting.
3. Install the new hose or tube and tighten the fitting finger tight while holding the assembly to keep it from turning.
4. Use two suitable wrenches and tighten the fitting to the proper torque based on the chart below.

**Table 3: O RING FACE SEAL (ORFS) CONNECTIONS**

Metric		English				
Nominal Tube OD	Tube Nut Size	Nominal Tube OD	DASH Size	Tube Nut Size	Thread	Assembly Torque
mm	mm	inch		inch		N·m
6 and 8	17	1/4	-4	11/16	9/16-18	14-16(1)
10	22	3/8	-6	13/16	11/16-16	24-27 (1)
12	24	1/2	-8	15/16	13/16-16	43-47 (1)
16	30	5/8	-10	1-1/8	1-14	60-68
20	36	3/4	-12	1-3/8	1-3/16-12	90-95
25	41	1	-16	1-5/8	1-7/16-12	125-135
30	50	1-1/4	-20	1-7/8	1-11/16-12	170-190
38	60	1-1/2	-24	2-1/4	2-12	200-225

(1) Torque level shown is for maximum pressure rating of **.42 MPa (6092 psi)**. The above Table uses SAE J1453/ISO 8434-3 o ring face seal connectors recommended torque levels for O Ring Face Seal (ORFS) tube assemblies, hose assemblies, and connectors.

**SECTION 00 - GENERAL INFORMATION - CHAPTER 1**

**SPLIT FLANGE MOUNTING BOLTS**

<b>Size</b>	<b>Newton meters</b>	<b>in-lb</b>	<b>ft-lb</b>
5/16 - 18	20 to 27	180 to 240	
3/8 - 16	27 to 34	240 to 300	
7/16-14	47 to 61	420 to 540	
1/2 - 13	74 to 88		55 to 65
5/8 - 11	190 to 203		140 to 150

**O RING BOSS END FITTING OR LOCK NUT**

<b>Nom. SAE Dash Size</b>	<b>Thread Size</b>	<b>Newton meters</b>	<b>in-lb</b>	<b>ft-lb</b>
-6	9/16-18	48 to 54	432 to 480	
-8	3/4 - 16	70 to 78	612 to 684	
-10	7/8 - 14	102 to 114		75 to 84
-12	1-1/16-12	142 to 160		105 to 117
-16	1-5/16-12	237 to 254		175 to 187

**37° DEGREE FLARE FITTING (STEEL HYDRAULIC FITTINGS)**

<b>Nom. SAE Dash Size</b>	<b>Tube OD/Hose ID</b>		<b>Thread Size</b>	<b>Newton meters</b>	<b>in-lb</b>	<b>ft-lb</b>
-2			5/16 - 24	8 to 9	72 to 84	
-3			3/8 - 24	11 to 12	96 to 108	
-4	6.4 mm	1/4 inch	7/16 - 20	14 to 16	120 to 144	
-5	7.9 mm	5/16 inch	1/2-20	18 to 21	156 to 192	
-6	9.5 mm	3/8 inch	9/16 - 18	27 to 33	240 to 300	
-8	12.7 mm	1/2 inch	3/4-16	46-56	408 to 504	
-10	15.9 mm	5/8 inch	7/8 - 14	77 to 85	684 to 756	
-12	19.0 mm	3/4 inch	1-1/16-12	107 to 119		79 to 88
-14	22.2 mm	7/8 inch	1-3/16 -12	127 to 140		94 to 103
-16	25.4 mm	1.0 inch	1-5/16-12	131 to 156		97 to 117
-20	31.8mm	1-1/4inch	1-5/8-12	197 to 223		145 to 165
-24	38.1 mm	1-1/2 inch	1-7/8 - 12	312 to 338		230 to 250

SECTION 00 - GENERAL INFORMATION - CHAPTER 1

**37° DEGREE FITTINGS**

TUBE NUTS FOR 37° DEGREE FLARED FITTINGS								O RING BOSS PLUGS ADJUSTABLE FITTING LOCKNUTS, SWIVEL JIC-37 SEATS			
			TORQUE				TORQUE				
Size	Tubing OD		Thread Size	Newton Meters		Foot Pounds		Newton Meters		Foot Pounds	
	mm	in.		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
4	6.4	1/4	7/16-20	12	16	9	12	8	14	6	10
5	7.9	5/16	1/2-20	16	20	12	15	14	20	10	15
6	9.5	3/8	9/16-18	29	33	21	24	20	27	15	20
8	12.7	1/2	3/4-18	47	54	35	40	34	41	25	30
10	15.9	5/8	7/8-14	72	79	53	53	47	54	35	40
12	19.1	3/4	1-1/16-12	104	111	77	82	81	95	60	70
14	22.2	7/8	1-3/16-12	122	136	90	100	95	109	70	80
16	25.4	1	1-5/16-12	149	163	110	120	108	122	80	90
20	31.8	1-1/4	1-5/8-12	190	204	140	150	129	158	95	115
24	38.1	1-1/2	1-7/8-12	217	237	160	175	163	190	120	140
32	50.8	2	2-1/2-12	305	325	225	240	339	407	250	300

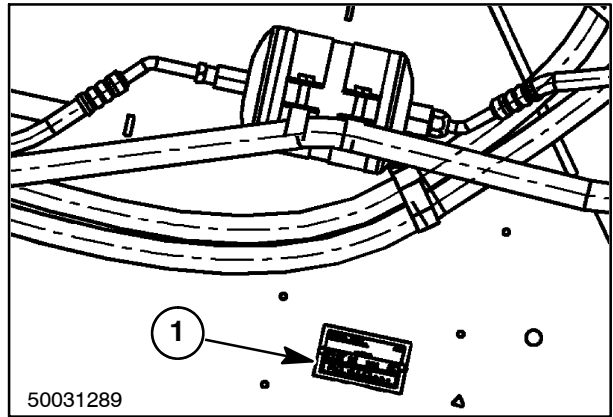
These torques are not recommended for tubes of **12.7 mm (0.5 in)** OD and larger with wall thickness of **0.8899 mm (0.035 in)** or less. The torque is specified for **0.8899 mm (0.035 in)** wall tubes on each application individually. Before installing and torquing 37° degree flared fittings, clean the face of the flare and threads with a cleaning solvent or Loctite® Brand cleaner, and apply hydraulic sealant Loctite® Brand 569 to the 37° degree flare and the threads. Install fitting, and torque to specified torque, loosen fitting and re-torque to specifications.

**PRODUCT IDENTIFICATION**

The product identification number of the combine, the engine and the attachments (heads) can be found at the following locations:

**Base Unit**

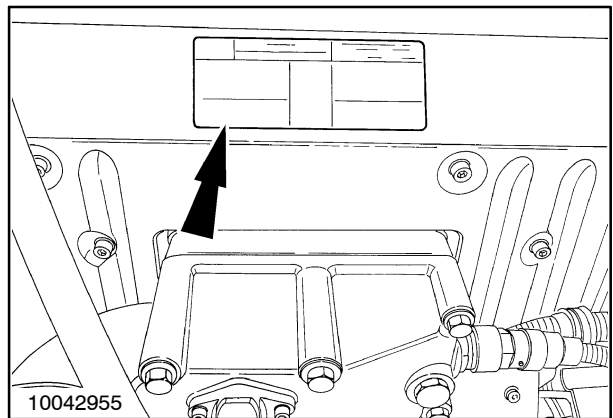
The combine PIN plate, 1, is located below the right side platform, on the side of the platform support.



1

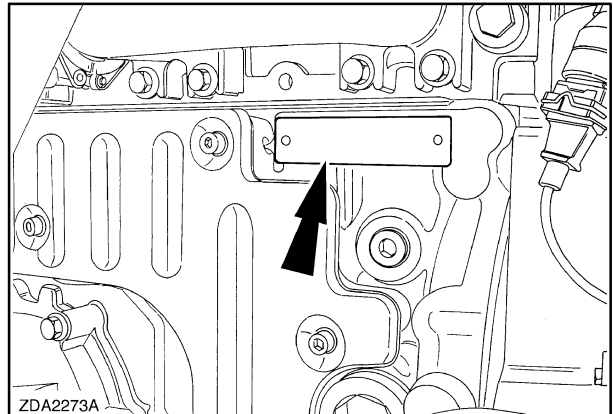
**Engine -10.3L**

On a plate positioned on top of the rocker cover.



2

On a plate located on the side of the engine block.



3

## AFX SPECIFICATIONS

	<b>AFX8010</b>
<b>HEADER</b>	
Grain Header	
Grain Header, 2010	20,25, 30 ft
Grain Header, 2010R	20, 25 ft
Flex Header	
Flex header, 2020	up to 30 ft
Corn Header	
Corn Header, 2400	8R, 12R
Other Headers	
Windrow Pickup, 2016	14, 16 ft
Rigid Draper Header, 2042	30, 36 ft
Rigid Draper Header, 2052	21, 25, 30, 36 ft
Flex Draper Header, 2062	30, 36 ft
<b>FEEDER</b>	
Number of Chains	4
Chain type	557 HD
Number of Slats	22 with rock trap / 26 less rock trap
Rocktrap / Non-Rocktrap	
Slat type	Roll Formed Serrated
Driveline, variable	Gearbox and Shaft-CVT
Feeder Clutch	Radial Pin
Header Lift cylinders, dia.	75 mm (3.0 in)
Reverser System	Hydraulic
Stone Trap (Opt.)	Beater/Sump
<b>THRESHING</b>	
<b>Threshing Drive</b>	
Drive Type	Gearbox and Shaft-CVT
Rotor Speed Range	220 to 1180 rpm
Speed Control	Electronic
<b>Rotor</b>	
Rotor Diameter	762 mm (30 in)
Rotor Length	2612 mm
Length of auger section	497 mm
Length of threshing section	886 mm
Length of separation section	886 mm
Length of discharge section	305 mm



SECTION 00 - GENERAL INFORMATION - CHAPTER 1

	<b>AFX8010</b>
<b>Rotor, Standard</b>	
Number of raspbars	64
High Alloy	No
Number Spiked Rasp Bars	8
Number Helical Separator Bars	2
<b>Rotor, Rice</b>	
Number of raspbars	74
Spiked, High Alloy	Yes
Number Helical Separator Bars	2
<b>Rotor, Extended Wear</b>	
Number of raspbars	64
High Alloy	Yes
Number Straight Separator Bars	4
Number Helical Separator Bars	2
<b>Rotor Modules</b>	
Number of separating sections	4
Number of threshing sections	4
Clearance Range	120 mm (4.7 in)
Wrap Angle	180°
Separation Concept	Centrifugal force
<b>Small Wire Threshing Module</b>	
Number of bars	14
Number of wires	36
Wire Diameter	4.76 mm
Distance between wires	6.1 mm
<b>Large Wire Threshing Module</b>	
Number of bars	14
Number of wires	15 / LSW (large skip wire) 6
Wire Diameter	6.35 mm
Distance between wires	18.4 mm
<b>Slotted Threshing Module</b>	
Slot length	50 mm
Slot width	25 mm
% Open Area	35
<b>Round Bar Threshing Module</b>	
Number of bars	18
Bar diameter	16 mm
Distance between bars	16 mm
<b>Smooth Threshing Module</b>	
<b>Discharge Beater</b>	
Type	3 Blade
Speed	780 rpm
Width	1285 mm
Diameter	454 mm

**SECTION 00 - GENERAL INFORMATION - CHAPTER 1**

	<b>AFX8010</b>	
<b>Beater Concave</b>		
Grate Width	1367 mm	
Wrap Angle	50 degrees	
Grate Type	perforated sheet	
Number of perforations	312 (39 rows of 8)	
Opening size	15 mm x 40 mm	
Setting	Spring loaded	
Drive	3HB belt	
<b>CLEANING SHOE</b>		
Frame Width	1580 mm	
Cleaning Shoe Type	Self leveling	
Drive	1HC belt	
Standard Speed	310 rpm	
<b>Upper Shaker Shoe</b>	<b>Standard</b>	<b>With Enhanced Cleaning</b>
Horizontal Stroke	45 mm (1-3/4 in)	56 mm (2.2 in)
Throwing Angle, front	27 degrees	36 degrees
Throwing Angle, rear	27 degrees	36 degrees
Grain Pan width	1580 mm (62-3/16 in)	1580 mm (62-3/16 in)
Grain Pan length	1570 mm (81.8")	1650 mm (65 in)
Grain Pan + rake surface	2.733 sq. m (4236 sq-in)	2.178 sq. m (3376 sq-in)
Pre-sieve width	1580 mm (62-3/16 in)	1580 mm (62-3/16 in)
Pre-sieve length	901 mm (35-1/2 in)	901 mm (35-1/2 in)
Pre-sieve area (with rake)	1.424 sq. m (2207 sq-in)	1.424 sq. m (2207 sq-in)
Upper sieve width	2 x 790 mm (2 x 31 in)	2 x 790 mm (2 x 31 in)
Upper sieve length	1445 mm (56-7/8 in)	1445 mm (56-7/8 in)
Upper sieve area	2.284 sq. m (3540 sq-in)	2.284 sq. m (3540 sq-in)
Upper sieve grate surface	0.237 sq. m (367 sq-in)	0.237 sq. m (367 sq-in)
Upper sieve wire finger surface	0.253 sq. m (392 sq-in)	0.253 sq. m (392 sq-in)
<b>Lower Shaker Shoe</b>		
Horizontal Stroke	40 mm (1-1/2 in)	45 mm (1-3/4 in)
Throwing Angle	15 degrees	15 degrees
Lower sieve length	1445 mm (56-7/8 in)	1445 mm (56-7/8 in)
Lower sieve width	2 x 790 mm (2 x 31 in)	2 x 790 mm (2 x 31 in)
Lower sieve area	2.284 sq. m (3540 sq-in)	2.284 sq. m (3540 sq-in)
Total sieve area under wind control	6.25 sq. m (9687 sq-in)	6.25 sq. m (9687 sq-in)
<b>CLEANING FAN</b>		
Type	Cross-Flow	Cross-Flow
Drive	Hydraulic	Hydraulic
Fan speed range	300 rpm to 1150 rpm	200 rpm to 1150 rpm
Speed Control	Closed loop	Electrohydraulic
Number of blades	40	40

**SECTION 00 - GENERAL INFORMATION - CHAPTER 1**

	<b>AFX8010</b>
<b>RETURN SYSTEM</b>	
Tailings Return Type	Triple Impellor Crop Processor
Cross auger speed	560 rpm
Bottom impellor speed	560 rpm
Middle impellor speed	510 rpm
Top impellor speed	700 rpm
<b>GRAIN TANK, UNLOAD</b>	
Central filling, folding bubbler	Std
Grain tank capacity	11630 liters (330 US bu)
In-cab control of grain tank covers	not available
Unloading concept	Over the top unloading
Unloading tube length, standard	5.5 m (18 ft)
Unloading tube length w/extension	6.4 m (21 ft)
<b>ENGINE</b>	
Type	Case IH 10.3L
Gross Power (ISO TR14396)	298 kW (400 hp)
Governor	Electronic
Rated Speed	2100 rpm
Low idle speed	1000 rpm
High idle speed	2100 rpm
Cylinder displacement	10.3L (639 cu-in)
Crankcase capacity(w/filters)	32 liters (8.5 US gals.)
Battery	2 x 12V - 950 CCA
Alternator type	185 Ampere (12 volt)
Fuel tank	1000 liters (264 US gals.)
<b>STRAW CHOPPER &amp; SPREADER</b>	
Straw chopper (Opt)	Integral
Rotor type	2-row helix
Number of knives-Standard cut	28
Number of counterknives-Standard cut	21
Number of knives-Fine cut	56
Number of counterknives-Fine cut	42
Speed	780 rpm (LO) or 2800 rpm (HI)
Shift method	Sliding collar
Chaff spreader type	Vertical, twin disc
Chaff spreader drive	Hydraulic
<b>HYDRAULIC SYSTEM</b>	
Reservoir capacity	57 liters (15 US gals.)
Pump type	Closed center load sensing
Pump capacity	0 - 148 l/min (0 - 39 US gpm)
Maximum pressure	207 bar (3000 psi)
Steering Valve	
Maximum pressure	186 bar (2700 psi)

**SECTION 00 - GENERAL INFORMATION - CHAPTER 1**

	<b>AFX8010</b>
<b>HYDROSTATIC SYSTEM</b>	
Pump capacity (cc/rev)	130
Motor capacity (cc/rev)	130
Maximum pressure, forward	420 bar (6090 psi)
Maximum pressure, rearward	420 bar (6090 psi)
<b>CAB</b>	
Cab type	Std/Deluxe opt.
Operator Seat	Air Ride
Instructional Seat	Padded
Air conditioning	Manual/ATC w/ Deluxe
Heating	Std
Power adjust and heated mirrors	opt.
Wipers	Dual
Windshield Washer	opt.
<b>TRACTION</b>	
Transmission	4 speed hydrostatic
Oil capacity	19 liters (5 US gals.)
Differential	20/61
Differential Lock	opt.
Steering axle	Adjustable
Powered Rear Axle type	Cam lobe swivel motor steerable wheel drives
<b>BRAKES</b>	
Services brakes type	Manual dual caliper disc
Park brake type	Spring applied, hydraulically released
<b>FINAL DRIVES</b>	
Type	Planetary
Ratio	1/13.09
<b>WEIGHT (approximate)</b>	
	16488 kg (36,350 lbs)

<b>Wheel Hardware Torque</b>				
<b>Torque</b>	<b>Minimum</b>		<b>Maximum</b>	
	<b>N·m</b>	<b>ft-lb</b>	<b>N·m</b>	<b>ft-lb</b>
Traction Wheel Hardware Torque	710	525	790	580
Steering Wheel Nut Torque (HDASA)	410	302	492	363
Steering Wheel Bolt Torque (PRA)	550	406	610	450

**NOTE:** Check wheel hardware torque after one hour of operation, then after 10 hours of operation for one week and thereafter on a weekly basis.

## SECTION 10 - ENGINE

### Chapter 1 - Air Intake System

#### CONTENTS

Section	Description	Page
	Sensing System .....	2
	Torque .....	2
	Air Cleaner Restriction .....	3
	Manifold Pressure Sensor .....	3
	Air Temperature Sensor .....	4
	Overhaul .....	5
	Air Cleaner .....	5
	Removal .....	5
	Cleaning .....	7
	Installation .....	9
	Air Cooler .....	12
	Removal .....	12
	Installation .....	13
	Air Cooler Wiper .....	16
	Removal .....	16
	Repair .....	16
	Installation .....	17

Thank you so much for reading.  
Please click the “Buy Now!”  
button below to download the  
complete manual.



After you pay.

You can download the most  
perfect and complete manual in  
the world immediately.

Our support email:

[ebooklibonline@outlook.com](mailto:ebooklibonline@outlook.com)