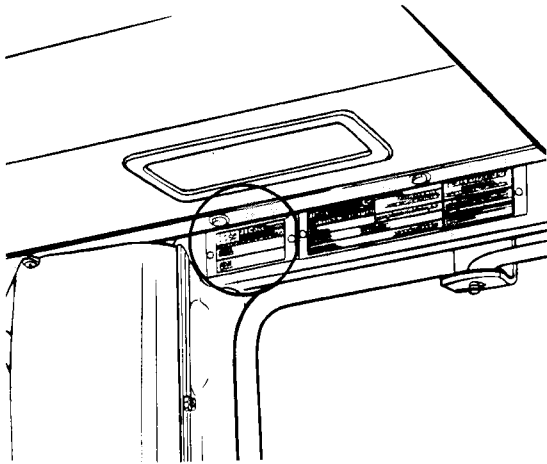


## TABLE OF CONTENTS 4490 AND 4690 TRACTORS

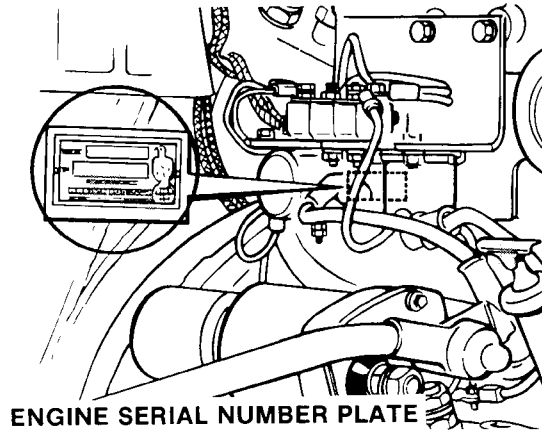
SERIES	SECTION	DESCRIPTION	FORM NUMBER
10		<b>GENERAL</b>	
	1210	General Specifications - 4490 Tractors .....	8-21460
	1211	General Specifications - 4690 Tractors .....	8-21470
	1215	Lubrication - 4490 Tractors .....	8-21481
	1216	Lubrication - 4690 Tractors .....	8-21491
	1220	Engine Specifications .....	8-20841
	1230	Fuel System Specifications .....	8-21520
	1250	Steering System Specifications .....	8-21530
	1260	Power Train Specifications .....	8-21540
	1270	Brake System Specifications .....	8-21550
	1280	Hydraulic System Specifications .....	8-21560
20		<b>ENGINES</b>	
	2110	Engine, Front Axle and Transmission Removal Using Splitting Set .....	8-23071
	2201	Troubleshooting - Engine .....	8-20111
	2202	Engine Tune-Up .....	8-21570
	2210	Engine Removal .....	8-21580
	2215	Cylinder Head, Valve Train and Camshaft .....	8-21590
	2225	Cylinder Block, Sleeves, Pistons and Rods .....	8-21600
	2235	Crankshaft Main Bearings, Flywheel and Oil Seals .....	8-21610
	2245	Lubrication System - Oil Pump, Oil Pan and Heat Exchanger .....	8-21620
	2255	Cooling System .....	8-21631
	2265	Turbocharger - T04B .....	8-21640
	2565	Turbocharger Failure Analysis .....	9-78235
	2275	Air Induction System .....	8-21650
	2290	Reconditioning Engine Cylinder Block .....	8-21170
30		<b>FUEL SYSTEM</b>	
	3210	Fuel System and Filters .....	8-21660
	3212	Robert Bosch Fuel Injection Pumps .....	8-21670
	3213	American Bosch Fuel Injectors .....	8-21680
40		<b>ELECTRICAL</b>	
	4201	Electrical System Troubleshooting .....	8-22580
	4210	Tractor Electrical Wiring Diagram (Prior to P.I.N. 8860450) .....	8-21690
	4210	Tractor Electrical Wiring Diagram (P.I.N. 8860450 and After) .....	8-23370
	4220	Cab Electrical Wiring Diagram (Prior to Cab SN12013067) .....	8-21700
	4220	Cab Electrical Wiring Diagram (Cab SN12013067 and After) .....	8-22890
	4225	Steering Electrical Wiring Diagram .....	8-22470
	4226	Hitch Electrical Wiring Diagram (P.I.N. 8860450 and After) .....	8-23300
	4230	Starting Motors .....	8-21420
	4235	Battery Servicing and Testing .....	8-20291
	4240	Delco-Remy Alternator System .....	8-21430
	4280	Neutral Start Switch Adjustment .....	8-21710

<b>SERIES</b>	<b>SECTION</b>	<b>DESCRIPTION</b>	<b>FORM NUMBER</b>
<b>50</b>		<b>STEERING</b>	
	5201	Troubleshooting Solid State Selective Steering .....	8-22480
	5203	Electronic Steering System .....	8-23700
	5205	Testing Tractor Steering System .....	8-21720
	5210	Steering Column, Pump and Valve .....	8-21730
	5220	Steering Cylinder .....	8-21740
	5230	Steering Lines and Controls .....	8-21750
	5240	Rear Steering Valve .....	8-21760
	5250	Front Steering Priority Valve .....	8-21770
	5260	Rear Steering Priority Valve .....	8-21780
	5265	Rear Steering Check Valve (Prior to P.I.N. 8858086) .....	8-22001
	5265	Rear Steering Check Valve (P.I.N. 8858086 and After) .....	8-26430
	5280	Front and Rear Steering Adjustments .....	8-21790
<b>60</b>		<b>POWER TRAIN</b>	
	6201	Troubleshooting - RPS-34 Power Shift Transmission and PTO .....	8-20370
	6205	Testing RPS-34 Power Shift Transmission and PTO .....	8-21800
	6220	Torque Limiter Clutch .....	8-21810
	6230	RPS-34 Power Shift .....	8-21820
	6235	RPS-34 Control Valve and Linkage .....	8-21830
	6240	Four Speed Transmission .....	8-21840
	6245	Hydraulic PTO .....	8-21850
	6250	Axles and Planetaries .....	8-21860
	6260	Differentials and Drive Shafts .....	8-21871
<b>70</b>		<b>BRAKES</b>	
	7210	Brake Pedal, Master Cylinder, Service and Parking Brake .....	8-21880
<b>80</b>		<b>HYDRAULICS</b>	
	8202	Troubleshooting - Hitch System .....	8-21890
	8203	Electronic Hitch Alignment .....	8-23311
	8205	Testing Tractor Hydraulic System .....	8-21900
	8210	Hydraulic Oil Filters .....	8-21910
	8225	Hydraulic Pump .....	8-21920
	8250	Remote Hydraulic Valves .....	8-21930
	8255	Flow Divider and PTO Control Valve .....	8-21940
	8280	Hitch System .....	8-21950
	8281	Electronic Hitch System .....	8-23240
	8290	Break-Away Couplings and Portable Cylinder .....	8-20640
<b>90</b>		<b>ACCESSORIES</b>	
	9205	Troubleshooting - Air Conditioning System .....	8-21960
	9215	Gauging and Testing Air Conditioning System .....	8-21970
	9225	Compressor Isolation, Removal, Installation and Evacuation - Discharging, Evacuation and Charging the A.C. System .....	8-21980
	9235	Servicing Air Conditioner Components .....	8-21990
	9245	Servicing the Cab Blower .....	8-20690
	9250	Operators Seat Adjustments .....	8-20700
	9260	Removal of Tilting Hood, Grille and Side Panels .....	8-22010
	9280	Safety Decal Location .....	8-22530
<b>100</b>		<b>HOW IT WORKS</b>	
	15201	Tractor Steering System .....	8-22020
	15205	Case Solid State Selective Steering .....	8-22490
	18201	Tractor Hydraulic System .....	8-22030
	18225	Case CON TROL Hydraulics .....	8-21350

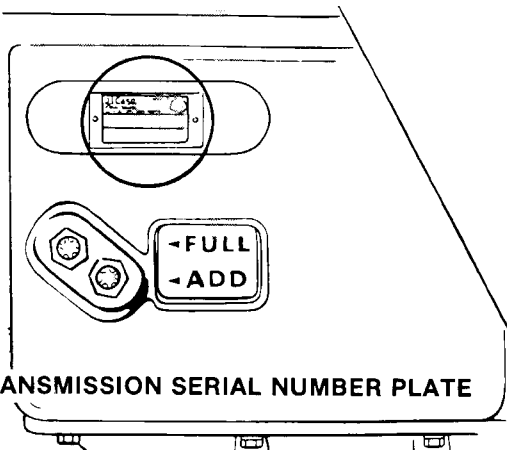
## SERIAL NUMBERS



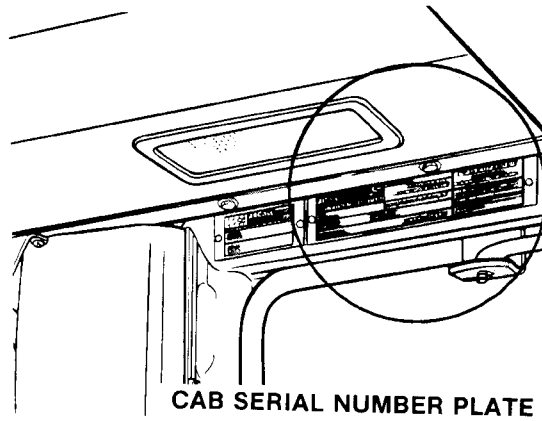
MODEL AND PRODUCT IDENTIFICATION  
NUMBER PLATE



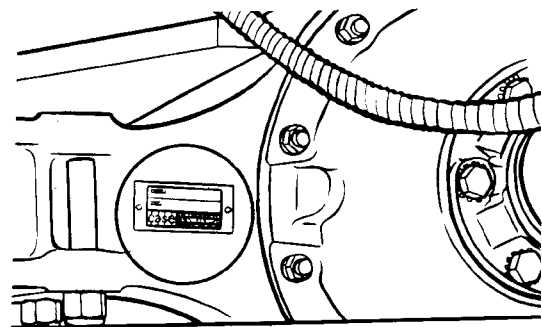
ENGINE SERIAL NUMBER PLATE



TRANSMISSION SERIAL NUMBER PLATE



CAB SERIAL NUMBER PLATE



AXLE SERIAL NUMBER  
PLATE (Front and Rear)

## DIESEL ENGINE SPECIFICATIONS

### General

Type .....	Six Cylinder, Four Stroke Cycle, Turbocharged, Valve in Cylinder Head
Firing Order .....	1-5-3-6-2-4
Bore .....	4-5/8 Inches (117.5 mm)
Stroke .....	5 Inches (127 mm)
Piston Displacement .....	504 Cubic Inches (8 259 cm <sup>3</sup> )
Compression Ratio .....	15.75 to 1
Cylinder Sleeves .....	Wet Type, Can be Removed
Governor Engine Speed Without Load .....	2340 to 2380 RPM
Rated Engine Speed .....	2200 RPM
Engine Idle Speed .....	725 to 775 RPM
Rocker Arm-to-Valve Clearance (Exhaust) .....	0.025 Inch (0.635 mm)
(Intake) .....	0.015 Inch (0.381 mm)

**IMPORTANT:** *Rocker Arm-to-Valve clearance adjustment must be made when the engine is not running.*

### Piston and Rod

Rings Per Piston .....	3
Compression Rings Per Piston .....	2
Oil Rings Per Piston .....	1
Type Piston Pin .....	Full Float
Type Bearings .....	Replacement Bearings Available, Steel Back with Aluminum or Copper and lead liners.

### Main Bearings

Quality of Bearings .....	7
Type of Bearings .....	Replacement Bearings Available, Steel Back With Aluminum or Copper and Lead Liners.

### Engine Lubrication System

Oil Pressure .....	45 to 60 PSI (310 to 414 kPa)(3.1 to 4.14 bar) with Engine Warm and Operating at Rated Speed.
Type System .....	Pressure and Spray with Piston Oil Cooling
Oil Pump .....	Gear Type
Oil Filters (2) .....	Full Flow, Turn on Type, ByPass Valve in Filter Base.
Oil Capacity .....	With Filters, 28 U.S. Quarts (27 litres) Without Filters, 24 U.S. Quarts (23 litres)
Oil Cooler .....	Engine Oil

## Fuel System

Fuel Injection Pump .....	Robert Bosch, Type PES.
Pump Timing .....	25 Degrees (BTC) Before Top Center. <b>IMPORTANT:</b> <i>Do not increase past 25 degrees BTC at any time. The given 25 degrees Gives Minimum Emissions in Tractor Operation and Longer Engine Life.</i>
Fuel Injectors .....	American Bosch, 17 mm.
Fuel Transport Pump .....	Plunger Type, a Part of the Fuel Injection Pump
Governor .....	Variable Speed, Part of the Fuel Injection Pump
First Stage Fuel Filter .....	Full Flow, Turn on Type
Second Stage Fuel Filter .....	Full Flow, Turn on Type
Water Trap and Drain For Fuel Tanks .....	Location is in Bottom of Each Fuel Tank
Fuel Tank Capacity .....	64 U.S. Gallons (242.3 litres) Each Tank, 128 U.S. Gallons (484.6 Litres) Total
Fuel Level Gauge .....	Electric, Location is on Instrument Cluster
Hand Primer Pump .....	Location is on Top of Fuel Transport Pump
Primary Fuel Filter .....	Location is at Bottom of Fuel Transport Pump

## GENERAL TRACTOR SPECIFICATIONS

### Air Intake System

Type .....	Dry Type Air Induction System, Two Stage with Service Indication, Strata Tube.
------------	--

### Cooling System

Capacity .....	48 U.S. Quarts (45.4 litres)
Type .....	Pressure System, Thermostat Controlled, Bypass Impeller Type Pump
Radiator .....	Heavy Duty Fin and Tube Type
Thermostats (2) .....	Start to Open at Approximately 175° F (79 °C), Fully Open at 202° F (94° C)
Pressure Cap .....	10 PSI (69 kPa)(6.9 bar) No Vent
Coolant Level .....	Low Coolant Warning Lamp on Instrument Cluster

## Electrical System

Type of System .....	12 volt, Negative Ground
Batteries .....	Two 12 Volt Batteries Connected in Parallel, AABM Group Size 30H, Rated in 1.255 to 1.265 Specific Gravity. Discharge Rate 300 Amperes at 0°F. Voltage Decrease to 9.2 After 10 Seconds. Voltage Decreases 1.0 Volt per Cell After 5 Minutes.
Alternator .....	12 Volt, 72 Ampere Output, Negative Ground
Voltage Regulator .....	12 Volt, Solid State, Inside Component of Alternator
Starting Motor .....	12 Volt with Solenoid Switch
Headlights (2) .....	12 Volt, 40/60 Watt Sealed Beam High-Low
Floodlights (8 max)(Optional) .....	12 Volt, 50 Watt, Sealed Beam
Flasher Lights (2) With Direction Turn Signals .....	12 Volt, Amber Lens
Rear Flood and Taillight .....	12 Volt, 35 Watt Sealed Beam With Taillight Bulb.
Tractor Electrical System Circuit Breaker .....	12 Volt, Dual 50 Ampere Circuit Breakers Connected in Parallel, 100 Ampere Rating, 80 Ampere Continuing Capacity.
Cab Electrical System Circuit Breaker .....	12 Volt, 20 Ampere
Bulb and Lamp Replacement:	
Instrument Cluster Warning Bulbs .....	No. 168
Instrument Cluster Illumination Bulbs .....	No. 194
Dome Light Bulb .....	No. 93
Console Light Bulb .....	No. 194
Flasher Light Bulbs .....	No. 1156
Headlight Lamps .....	No. 4652
Front and Rear Floodlights .....	No. H7606
Rear Flood and Taillight:	
Lamp .....	No. 4409
Bulb .....	No. 1156
Fuse and Circuit Breaker Replacement:	
Wiper .....	7.5 Ampere
Instrument Panel Lights .....	5.0 Ampere
Headlight Low Beam .....	15 Ampere
Accessories .....	15 Ampere
Blower .....	15 Ampere
Radio .....	3.0 Ampere
Headlight High Beam .....	15 Ampere
Key Switch .....	20 Ampere
Cigarette Lighter .....	15 Ampere
Console Light .....	3.0 Ampere
Rear Floodlights (Optional) .....	20 Ampere
Rear Steering .....	3.0 Ampere
Dome Light .....	3.0 Ampere
Flasher Warning Lights .....	15 Ampere
Front Floodlights (Optional) .....	20 Ampere
Sound Warning for .....	Transmission Filters, Engine Oil Pressure, Coolant Temperature and Hand Brake.

### Tractor Brakes

Type ..... Hydraulic Actuated, Self-Adjusting,  
Several Plate Dry Type.

### Parking Brake

Type ..... Cable Actuated by over center Type Handle Adjustable  
from Operators Seat. Several Plate Type.

### Power Shift Transmission

Type ..... Three Speed Compound Planetary with Hydraulically  
Actuated Clutches and Four Speed Gear Section.  
Gear Selection ..... 12 Speeds Forward and Four Speeds Reverse  
Shift Control ..... Hydraulic Power Shift Controlled by a Mechanical Shifter  
Actuated by Levers on the Instrument Console.  
Oil Cooler ..... Transmission, Hydraulic and Steering Oil  
Oil Type ..... Case PTF Power Transmission Fluid  
Oil Refill Capacity (With PTO and Hitch) ..... \*32 U.S. Quarts (30.3 litres)  
(No PTO) ..... \*30 U.S. Quarts (28.4 litres)  
\*Includes 8 Qts (7.6 litres) for Filter Change.

### Hydrostatic Front Power Steering

Oil Supply ..... Hydraulic Pump, 15 gpm (56.8 litres/min) at 2200 RPM and  
2000 PSI (13 790 kPa)(137.9 bar). 10 gpm (38 litres/min) for  
front steering and 5 gpm (19 litres/min) returns to filters.  
Relief Valve Pressure ..... 2250 PSI (15 414 kPa)(154.1 bar)  
Front Steering Cylinders ..... Two Cylinders with two way action  
Steering Pump ..... Hydrostatic Type, Actuated by the steering wheel

### Rear Power Steering

Oil Supply ..... Hydraulic Pump, 10 gpm (37.85 litres/min) at 2200 RPM  
Relief Valve Pressure ..... 1650 to 1900 PSI (11 377 to 13 101 kPa)  
(113.8 to 131 bars)  
Rear Steering Cylinders ..... Two Cylinders with Two Way Action  
Controls ..... Selective Steering with Automatic rear Steering with  
all Wheels Controlled by steering wheel or rear wheels  
Controlled by a hydraulic-electric servo system with  
three position selection switch and a toggle switch on  
operator console.

### Axle Differential and Planetaries

Front and Rear ..... Spiral Bevel with Planetary Reduction in hub.  
Differential Oil Capacity ..... 19 U.S. Quarts (18 litres) Each Differential  
Planetary Oil Capacity ..... 11 U.S. Quarts (10.4 litres) Each Planetary

## Hitch System

Type Control .....	Hand Lever
Type Valve .....	Three Position - Lift, Hold and Lower
Type Draft Arms .....	Rigid, Swing Type with Manual Float Adjustment
Type Hitch .....	Three Point, Category III
Hitch Coupler (Available) .....	Category III

## Remote Hydraulic System

Pump .....	Axial Piston Pump, Pressure and Flow Compensated
Type Remote Valve .....	Closed Center, Two to Four Sections, Hand Lever Control, Variable Flow Control for Each Section.
Pump Capacity at 2200 RPM .....	31 GPM (117.4 litres/min) at 2000 PSI (13 790 kPa)(137.9 bar).
Max System Pressure .....	2250 PSI (15 503 kPa)(155 bar)
Couplings .....	ASAE R366 Standard, Fast Removal, Break Away Type
Hydraulic Charge Pump .....	43 GPM (162.8 litres/min) at 2200 RPM and 100 PSI (240 kPa)(2.4 bar).
Charge Circuit Relief Valve Pressure .....	35 PSI (241 kPa)(2.41 bar)

## Power Takeoff

Type Clutch .....	Hydraulic Actuated
Rotation .....	Clockwise
Spline Size .....	21 Splines, 1-3/8 inch (34.9 mm) Diameter
Engine Speed 2200 RPM .....	1000 RPM Shaft Speed

## Drawbar

Standard or Yoke Type .....	Full Swing, Roller Mount, Takes a 1-1/2 inch (38.1 mm) Diameter Pin
-----------------------------	--

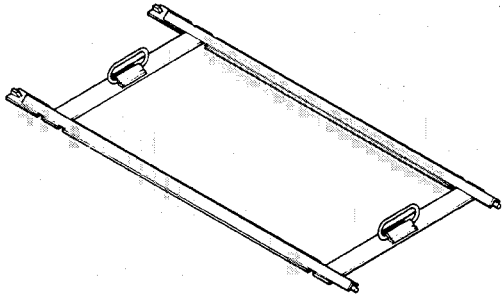


## SPECIAL TORQUES

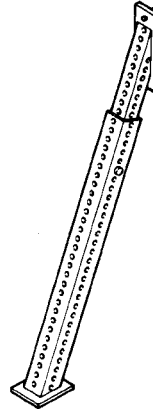
	U.S. Value	Metric Value
Engine To Torque Tube (1/2 inch, Grade 5 Bolts) .....	80 to 96 lb ft	109 to 130 Nm (10.9 to 13.0 kgm)
Engine To Torque Tube (1/2 inch, Grade 8 Bolts) .....	110 to 132 lb ft	149 to 179 Nm (14.9 to 17.9 kgm)
Engine To Torque Tube (3/4 inch, Grade 5 Bolts) .....	270 to 324 lb ft	366 to 439 Nm (36.6 to 43.9 kgm)
Seal Plate Inner Capscrews .....	15 to 20 lb ft	20 to 27 Nm (2.0 to 2.7 kgm)
Seal Plate Outer Capscrews .....	35 to 42 lb ft	48 to 57 Nm (4.8 to 5.7 kgm)
Seal Plate (1/2 inch Bolts) .....	80 to 96 lb ft	109 to 130 Nm (10.9 to 13.0 kgm)
Side Rail Bolts .....	150 to 180 lb ft	203 to 244 Nm (20.3 to 24.4 kgm)
Axle Retaining Bolts (7/8 inch For 70 and 90 Series Tractors) ...	600 to 720 lb ft	814 to 976 Nm (81.4 to 97.6 kgm)
Axle Retaining Bolts (7/8 inch For 94 Series Tractors) .....	400 to 480 lb ft	542 to 651 Nm (54.2 to 65.1 kgm)
Axle Retaining Bolts (1-1/8 inch For 70 and 90 Series Tractors) .....	1,300 to 1,400 lb ft	1 763 to 1 898 Nm (176.3 to 189.8 kgm)
Axle Retaining Bolts (1-1/8 inch For 94 Series Tractors) ....	800 to 880 lb ft	1 085 to 1 193 Nm (108.5 to 119.3 kgm)
Differential Drive Shaft (3/8 inch, Grade 5 Bolts) .....	35 to 42 lb ft	48 to 57 Nm (4.8 to 5.7 kgm)
Differential Drive Shaft (3/8 inch, Grade 8 Bolts) .....	45 to 54 lb ft	61 to 73 Nm (6.1 to 7.3 kgm)
Differential Drive Shaft (1/2 inch, Grade 5 Bolts) .....	80 to 96 lb ft	109 to 130 Nm (10.9 to 13.0 kgm)
Differential Drive Shaft (1/2 inch, Grade 8 Bolts) .....	110 to 132 lb ft	149 to 179 Nm (14.9 to 17.9 kgm)
Rear Transmission Bracket Bolts .....	150 to 180 lb ft	203 to 244 Nm (20.3 to 24.4 kgm)
Front Transmission Spacer Bolts .....	270 to 324 lb ft	366 to 439 Nm (36.6 to 43.9 kgm)
Transmission Oil Manifold Bolts .....	35 to 42 lb ft	48 to 57 Nm (4.8 to 5.7 kgm)
PTO Universal Joint (3/8 inch, Grade 5 Bolts) .....	35 to 42 lb ft	48 to 57 Nm (4.8 to 5.7 kgm)
PTO Universal Joint (3/8 inch, Grade 8 Bolts) .....	45 to 54 lb ft	61 to 73 Nm (6.1 to 7.3 kgm)
Torque Tube Spacer Bolts .....	150 to 180 lb ft	203 to 244 Nm (20.3 to 24.4 kgm)

# SPECIAL TOOLS

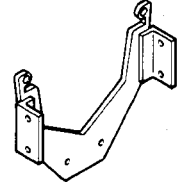
## CAS-10500 FOUR WHEEL DRIVE SPLITTING SET COMPLETE



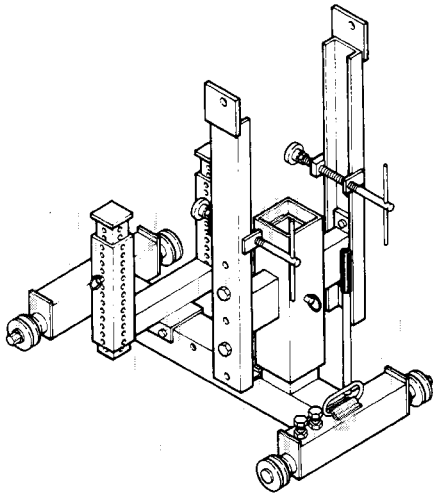
CAS-10500-6 TRACK ASSEMBLY 2 ENDS 3 CENTER  
CAS-10501 ONE SECTION OF CENTER TRACK



ENGINE SAFETY STANDS  
(PART OF COMPLETE SET)



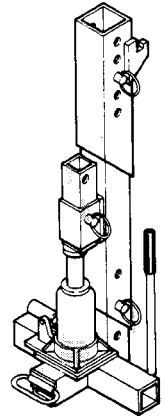
2470 AND 2670 ENGINE YOKE  
(PART OF COMPLETE SET)



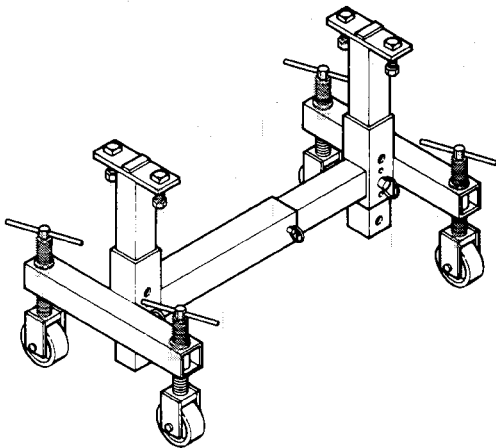
CAS-10500-3 TRANSMISSION CART



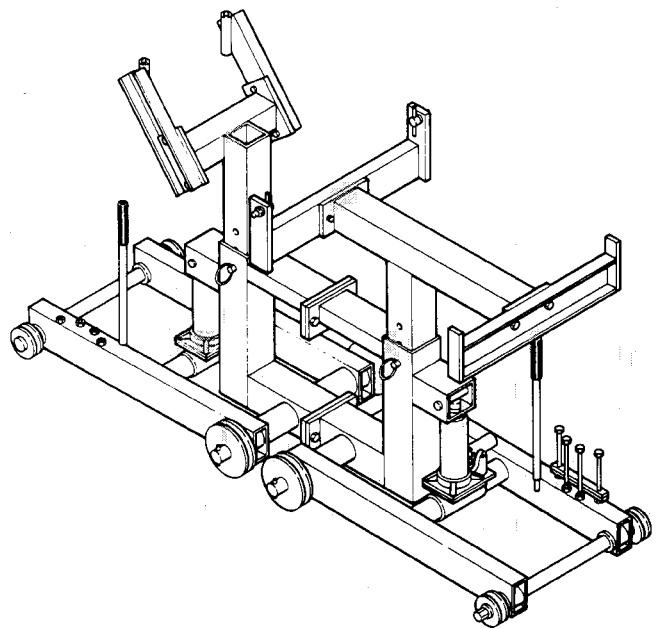
CAS-10500-5 FRAME LOCKS (2)



CAS-10500-1 SIDE FRAME JACKS (2)



CAS-10500-4 AXLE CART



CAS-10500-2 ENGINE CART