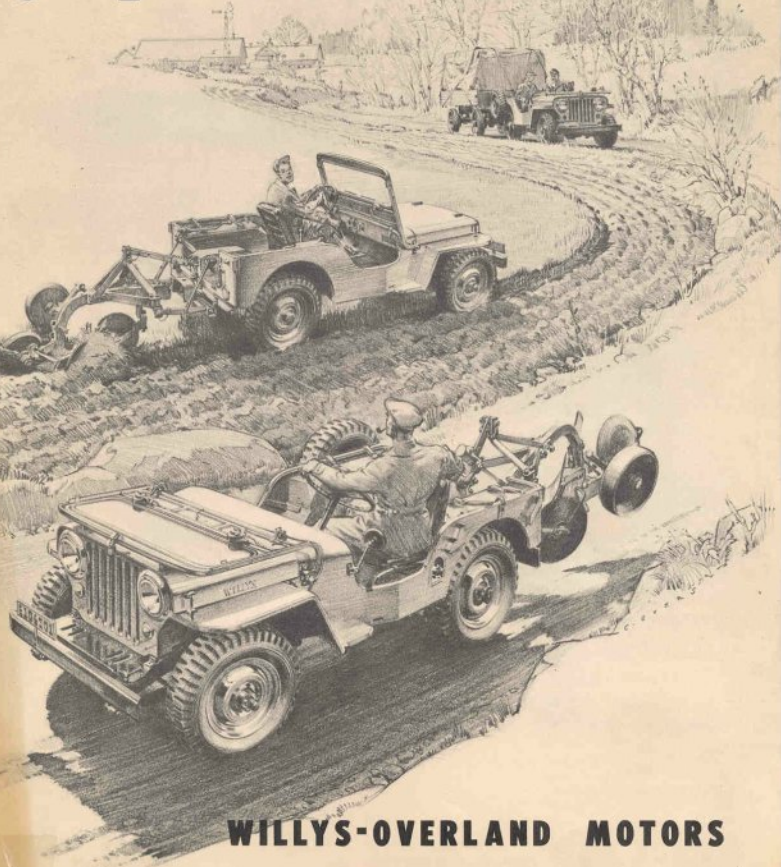


# 'Jeep' OPERATION DATA



**WILLYS-OVERLAND MOTORS**

# The Universal 'Jeep'



In Industry and on the Nation's Farms, "Jeep working" is coming to mean "BETTER WORKING" and "MORE EFFICIENT WORKING"

# 'Jeep' USES ARE COUNTLESS

TOW AIRPLANES  
SWEEP RUNWAYS

SAWING WOOD

TOW TRUCK

SERVICE CAR

SHRUBBERY CARRIER

CARPENTER TOOLS  
AND EQUIPMENT

CEMETERY  
MAINTENANCE

PLOWING SNOW

CONTRACTOR'S AIR  
COMPRESSOR

PERSONNEL  
TRANSPORTATION

MILKING MACHINE  
POWER

HAUL MILK CANS

HERDING

RURAL BAKERY  
DELIVERY

DRUG STORE  
DELIVERY SERVICE

GROCERY STORE  
DELIVERY

PHOTO PICK-UP  
AND DELIVERY

RURAL DOCTORS  
COUNTY NURSES

ELECTRICIANS TOOLS  
AND EQUIPMENT

ESTATE MAINTENANCE

POWER FOR LIGHTING  
PLOWING

CULTIVATING

DISCING

SPREADING MANURE

SPRAYING ORCHARDS

GAS COMPANY  
REPAIR AND  
SERVICE

CONSERVATION  
DEPARTMENT  
RECONNAISSANCE

FIRE FIGHTING  
EQUIPMENT

FORESTRY FIRE  
PROTECTION



FOREST PATROL  
 HIGHWAY DEPART-  
 MENT WRECKER  
 PARK MAINTENANCE  
 TRAFFIC CONTROL  
 HAULING FEED FOR  
 HATCHERIES  
 HUNTING CLUB  
 UTILITY CAR  
 KENNEL SERVICE  
 POWER CO.  
 EMERGENCY CAR  
 POWERING SMALL  
 SAWMILL  
 MACHINE SHOP  
 DELIVERY  
 RURAL MAIL SERVICE  
 PULLING SMALL ORE  
 CARS IN QUARRY  
 NURSERY  
 MAINTENANCE  
 OIL FIELD TOOLS  
 AND EQUIPMENT  
 AIR COMPRESSOR  
 FOR QUARRY  
 CARRY DYNAMITE  
 EMERGENCY POWER

CARRY RADIO  
 BROADCAST  
 EQUIPMENT  
 FENCE REPAIR ON  
 RANCHES  
 RIDING ACADEMY  
 UTILITY  
 SEWER CLEANER  
 TOOLS AND  
 EQUIPMENT  
 SHIPYARD RUNABOUT  
 WELDING EQUIPMENT  
 SURVEYORS  
 TRANSPORTATION  
 RURAL TEACHERS  
 PHONE CO.  
 EMERGENCY CAR  
 LINEMENS FIELD WORK  
 TRAILER PULLING  
 CHECKING RR  
 TELEGRAPH LINES  
 SWITCHING  
 FREIGHT CARS  
 TOW OR OPERATE  
 ICE CUTTER  
 HAULING ICE CAKES  
 FROM WATER

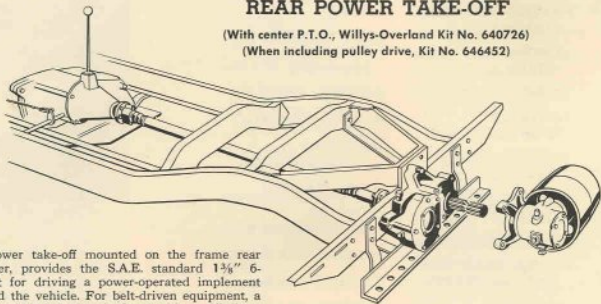


# The 'Jeep' can be tailored

## REAR POWER TAKE-OFF

(With center P.T.O., Willys-Overland Kit No. 640726)

(When including pulley drive, Kit No. 646452)



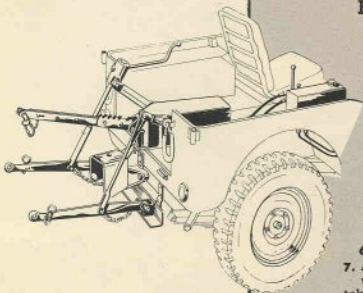
The rear power take-off mounted on the frame rear cross member, provides the S.A.E. standard  $1\frac{3}{4}$ " 6-splined shaft for driving a power-operated implement towed behind the vehicle. For belt-driven equipment, a pulley-drive unit is bolted to it, fitted with an 8" diameter pulley with speeds ranging from 255 to 2674 r.p.m., governor controlled.

(Pulley Drive only - W.O. Kit No. 644193)

## HYDRAULIC IMPLEMENT LIFT

The "Monroe" hydraulic implement lift now made available by Willys-Overland Motors is the culmination of years of development and experience. It embodies many special features including:

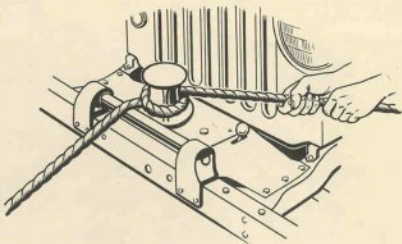
1. Ease of attachment of implements, "3-point system" is used.
2. Quick upward or downward action.
3. Double action hydraulic cylinder for either up or down pressure on the implement. Fingertip control at driver's seat.
4. Good "trailing" or following of plows and other implements.
5. Simplicity and ease of adjustment which can be made from the driver's seat.
6. Easy installation or removal of the lift on the 'Jeep'.
7. Accessibility of all working parts and non-interference with other standard 'Jeep' accessories such as the power take-off and tow bar hitch.



# for EVERY job!

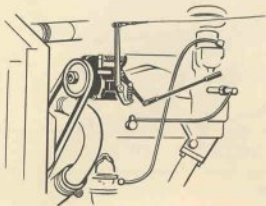
## FRONT POWER TAKE-OFF

The front power take-off drives from the front end of the crankshaft directly off the engine and provides plenty of war-proven 'Jeep' power for such useful implements as the capstan or drum winch, suction pumps, booster pumps.



## CENTRIFUGAL-TYPE GOVERNOR

(Willys-Overland Kit No. 645313)

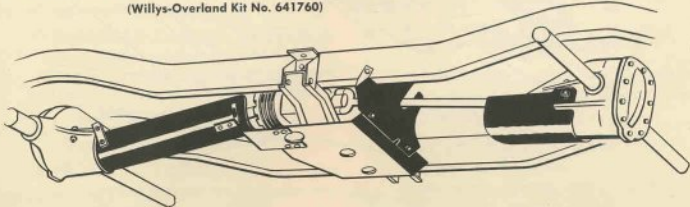


Many farm and industrial operations demand a governor to give precision control of engine speeds. Unit is controlled from driver's seat by control on dash with nine notched positions. Lowest speed is approximately 1000 R.P.M. and each successive notch increases engine speed by 200 R.P.M. until the limit is reached at 2600 R.P.M. These nine different engine speeds in connection with the various transmission and transfer case gear ratios allow 54 controlled forward vehicle speeds.

Definite and valuable protection is gained when these propeller shaft guards are used. Easy to attach, they reduce the chance of grass, hay or weeds matting and bunching up on the forward and rear propeller shafts to cause fire or damage to oil seals. Kit includes full length guard for rear shaft, necessary-length guard for forward shaft and baffle plate.

## PROPELLER SHAFT BRUSH GUARDS

(Willys-Overland Kit No. 641760)



## CANVAS TOP

For CJ-2A—Top Front W.O. Kit No. 667888.  
Top Rear (to be used with Front Top only) W.O.  
Kit No. 667826.

For CJ-3A—Top Front W.O. Kit No. 671595.  
Top Rear (to be used with Front Top only) W.O.  
Kit No. 671619.

Providing adequate protection from the weather for most climates, the W-O Canvas Top is made of 10 oz. solderized duck, with all seams double-sewn for added wear. Duck has been treated to be mildew-resistant. The top is light and when installed on 'Jeep' has practically no effect on the center of gravity of the 'Jeep' or on the load-carrying ability. Can be easily erected or removed in a few minutes by one person.



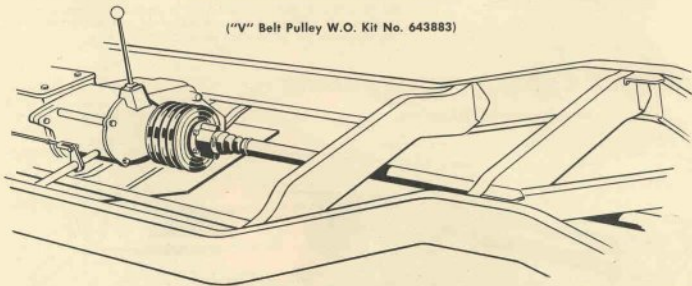
## CENTER POWER TAKE-OFF

The center power take-off on the rear of the transfer case can be equipped with a pulley for a V-belt drive of from one to four belts. Air compressors, electric welders, generators, other similar equipment can be powered at this location.



(Center Power Take-Off W.O. Kit No. 640725)

("V" Belt Pulley W.O. Kit No. 643883)



# DRAW BAR PULL

The power plant of the Universal 'JEEP' is particularly adapted to the 'Jeep's' great variety of applications. For highway use, at high speeds, the full engine power is available; for the power take-off shaft and pulley drive the full engine torque is available; however, for continuous agricultural work the maximum draw bar pull should be limited to 1,200 pounds, which is the equivalent of two 12-inch plows.

Draw bar pull is the force exerted by a vehicle to tow a trailed load and is expressed in pounds.

Maximum draw bar pulls are encountered in plowing, disking, and harrowing, and it is in these applications where the user of the 'Jeep' should be guided by the following charts of draw bar pull. We have to expect, either on account of soil conditions or implement adjustment, these draw bar pulls will be exceeded. In these instances, natural safeguard in the tire tread slippage takes place.

The Universal 'JEEP' is capable of a much higher draw bar pull which can be used for starting loads or towing loads for short periods on good ground in which case a draw bar pull as high as 1,800 pounds can be used.

## SOILS ARE CLASSIFIED AS FOLLOWS:

### Soft . . .

- Sandy soil with light sod
- Sandy soil with stubble
- Sandy loam without cover.

### Medium . . .

- Sandy loam with sod or stubble
- Sandy clay loam without cover.

### Hard . . .

- Sandy clay loam with sod and stubble
- Clay loam with light sod.

## DRAW BAR PULL AND PLOWING DEPTH FOR 18" SINGLE AND 12" AND 14" DOUBLE PLOWS

DEPTH IN INCHES	18" SINGLE			12" DOUBLE			14" DOUBLE		
	Soft	Med.	Hard	Soft	Med.	Hard	Soft	Med.	Hard
5.....	570	680	960	740	800	1120	830	900	1200
5½....	630	750	1050	810	870	1220	920	990	1310
6.....	690	820	1150	9900	960	1340	1000	1080	1430
6½....	750	890	1240	960	1030	1450	1080	1170	1550
7.....	800	950	1340	1030	1110	1560	1160	1260	
7½....	860	1020	1430	1100	1190		1240	1350	
8.....	920	1090	1530	1180	1270		1330	1440	
8½....	980	1160		1250	1350		1410	1530	
9.....	1030	1220		1320	1430		1500		

## DRAW BAR PULL OF SPRING TOOTH AND SPIKE TOOTH HARROWS

DEPTH IN INCHES	SPRING TOOTH HARROW 3-Section-25 Teeth-8' 6" Wide			SPIKE TOOTH HARROW 3-Section-90 Teeth-13' Wide	
	Previously DISKED	Winter Fetched	Hard	Previously Disked	
				Average	Average
2.....	400	450	450	175	
2½....	550	670	750	280	
3.....	680	870	1040	380	
3½....	800	1060	1280	460	
4.....	880	1210	1500	540	
4½....	940	1340	1700	600	
5.....	1000	.....	.....	660	

## A 'JEEP' IS EASY TO



Will he remember your caution of things to do and not to do?

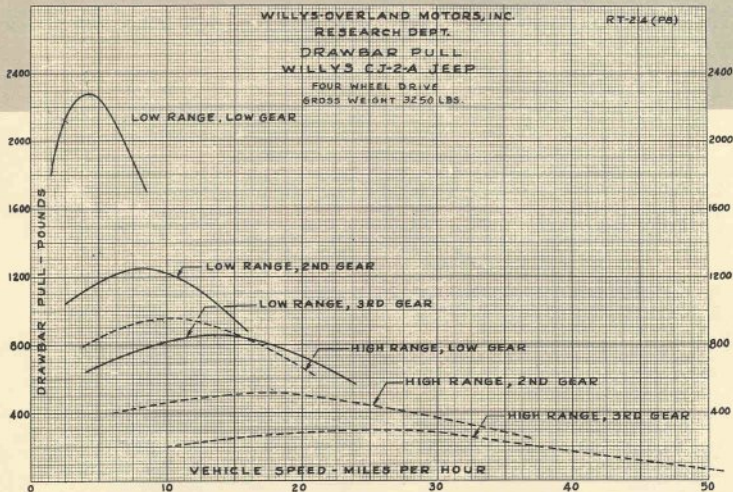


Conventionally operated  
spell **GREATER**



WILLYS-OVERLAND MOTORS, INC.  
 RESEARCH DEPT.  
 DRAWBAR PULL  
 WILLYS C.J.-2-A JEEP  
 FOUR WHEEL DRIVE  
 GROSS WEIGHT 3250 LBS.

RT-214 (PB)



**DRAW BAR PULL AND DEPTH FOR 6, 7 AND 8-FT. TANDEM DISK HARROWS**

These tests have been run with a 6-ft. harrow having 24 disks of 16" diameter, a 7-ft. harrow having 28 disks of 15" diameter and an 8-ft. harrow having 32 disks of 15" diameter.

The asterisks (\*) indicates the depth which gives best results.

DISK SIZE	6-FOOT		7-FOOT		8-FOOT				
	Previously Disked	Winter Packed	Previously Disked	Winter Packed	Previously Disked	Winter Packed			
SOIL CONDITION	Avg.	Hard	Hard	Avg.	Hard	Hard	Avg.	Hard	Hard
DEPTH IN INCHES									
2.....	300	350	350	260	300	400	300	360	600
2½.....	340	400	500	280	330	460	400	470	660
3.....	390	450	600	320	370	590	510	590	790
3½.....	460	520	700*	410	460	730	640	720	950
4.....	510	600	800	510	600	920*	825	970	1120*
4½.....	560	700*	900	600	750	1100	950*	1190	1300
5.....	620	800	1000	700	900*	1200	1160*	1490	1500
5½.....	680	900	1100	800*	1060		1400	1850	
6.....	725	1000	1200	900	1240		1640	2260	

**OPERATE!**



Anyone who drives a car can drive a 'Jeep'!

**four-wheel brakes**  
**SAFETY for the driver**



# Computation of DRAW BAR PULL REQUIRED FOR PLOWING

The data given in the draw bar pull tables represents actual practice figures. The following information will facilitate computation of problems in specific conditions for general use.

The draw bar pull varies with the size and number

2 plows x 12" width x 8" depth x 6 (soil factor)—1152 pounds  
1 plow x 18" width x 9" depth x 4 (soil factor)—648 pounds

The approximate soil factor may be taken from below:

Sandy soil—3  
Sandy loam—moist—3-4  
Sandy loam—dry—4-6  
Sandy clay loam—moist—5-6  
Sandy clay loam—dry—6-7

Clay loam—moist—6-7  
Clay loam—dry—7-8  
Heavy clay—dry—9-10  
Heavy clay sod—10-11  
Virgin prairie land—clay moist—12-13

Virgin prairie land—clay dry—14-15  
Gumbo—moist—16-18  
Gumbo—dry—16-20  
Dry adobe—20-25

Presence of cover crop will raise the factor to the next higher factor value.

## TIRE SLIPPAGE AND TRACTION

Tire slippage limits the useful work which a vehicle can perform and depends on many factors of which the road or soil condition and vehicle weight are of greatest importance.

The road or soil condition permits only a certain percentage of the vehicle weight to be used for traction, as follows:

On Concrete road approximately ..... 70%  
On Dry Clay approximately ..... 57%  
On Sandy Loam approximately ..... 54%  
On Dry Sand approximately ..... 39%  
On Green Alfalfa approximately ..... 38%

Increased vehicle weight will reduce tire slippage, but the balanced design of the Universal JEEP makes this unnecessary as explained under the heading, "Front Bumper Weight".

In the table, "Tire Slippage in Percent" is shown how tire slippage is affected by tire tread design, air pressure and surface conditions.

Tire slippage on highways should not exceed 5% and on soils 16%. This slippage table, which is based on many tests shows that the standard, "All-Service" tire fulfills these conditions and that nothing is gained by other tread designs.

Tire slippage can be easily measured by marking one of the tires and counting the revolutions while

### TIRE SLIPPAGE IN PER CENT

SOIL OR ROAD SURFACE	AIR PRESS. (PSI)	TREAD DESIGN	DRAW BAR PULL (Pounds)							
			200	400	600	800	1000	1200	1400	
Plowed Field...	20	A.S.	7.5	9.5	11	13	16			
Plowed Field...	20	CH.R.	5	7	9	8.5	14			
Stubble & Grass	20	A.S.	3.5	4.5	6	7	8.5	10	13.5	
Stubble & Grass	28	A.S.	5	6	6.5	7	8	11	18	
Stubble & Grass	20	CH.R.	4.5	5.5	6.5	7.5	9.5	13	20	
Stubble & Grass	20	CH.	6	7	8	9	10.5	11.5	13.5	
Stubble & Grass	20	D.	5.5	6.5	7	8	9	10	11.5	
Gravel Road...	28	A.S.	1.5	2	3	5.5	12.5			
Gravel Road...	28	CH.R.	2	3.5	4.5	10	23			
Paved Road...	28	A.S.	1	1.5	2	2.5	3	3.5	4.5	
Paved Road...	28	CH.R.	1	2	2.5	3.5	4.5	4.5	6	

Abbreviations: A.S. All Service  
CH.R. Chevron Design with Center Rib.  
CH. Chevron Design without Center Rib.  
D. Diamond Design without Center Rib.  
P.S.I. Pounds per Square Inch.

of plows, the depth of the furrow, and soil conditions. With all of these factors known, the draw bar pull can be calculated. As an example, the draw bar pull of two 12" plows working to a depth of 8" in sandy, moist clay loam will be as follows:

traveling a distance of 184 feet. Twenty-five revolutions indicate that there is no slippage, 25½ revolutions indicate 2% slippage, 26 revolutions 4%, 27 revolutions 8%, etc. These figures are given for 20 pounds tire inflation for agricultural use. Twenty-eight pound inflation is recommended on highways, and the measured distance should be 180 feet for 25 revolutions with the same percentages as above. The slippage table also reveals that in general the draw bar pull permissible under normal slippage is well in balance with the draw bar pull required for various implements. For example, when plowing a stubble field a 1,200-pound draw bar pull is equivalent to 10% slippage. In loose ground, 800 pounds draw bar pull is equivalent to 16% slippage. When consulting the implement tables, it will be found that these draw bar pulls are sufficient for the recommended applications.

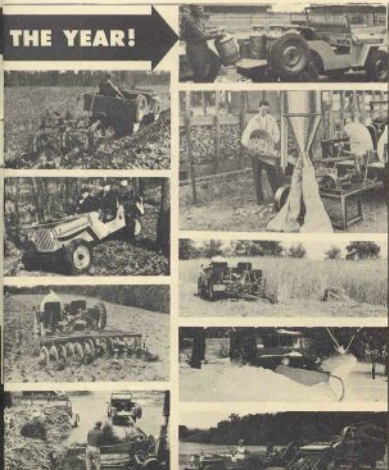
## A 'JEEP' WORKS THROUGHOUT



# OPERATION TABLE

SPEED IN MILES PER HOUR														
Implement	Width of Cut	2½	2¾	3	3¼	3½	3¾	4	4¼	4½	4¾	5	5½	6
APPROXIMATE ACRES PER 10-HOUR DAY														
Single Bottom Plow	12 in.	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.50	6.00
	14 in.	2.91	3.30	3.49	3.78	4.07	4.36	4.65	4.95	5.24	5.54	5.82	6.40	6.98
	16 in.	3.33	3.66	3.99	4.33	4.66	4.99	5.33	5.66	5.99	6.33	6.66	7.32	7.98
	18 in.	3.75	4.13	4.50	4.88	5.25	5.63	6.00	6.38	6.75	7.13	7.50	8.75	9.00
	20 in.	4.17	4.59	5.01	5.43	5.84	6.26	6.68	7.10	7.57	7.93	8.35	9.18	10.01
Double Bottom Plow	24 in.	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	11.00	12.00
	28 in.	5.82	6.41	6.99	7.57	8.15	8.73	9.32	9.90	10.48	11.08	11.65	12.83	13.99
Disk	7 ft.	17.50	19.25	21.00	22.75	24.50	26.25	28.00	29.75	31.50	33.25	35.00	38.50	42.00
	8 ft.	20.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	36.00	38.00	40.00	44.00	48.00
	10 ft.	25.00	27.50	30.00	32.50	35.00	37.50	40.00	42.50	45.00	47.50	50.00	55.00	60.00
Harrow	14 ft.	35.00	38.50	42.00	45.50	49.00	52.50	56.00	59.50	63.00	66.50	70.00	73.50	84.00
	15 ft.	37.50	41.25	45.00	48.75	52.50	56.25	60.00	63.75	67.50	71.25	75.00	82.50	90.00
	20 ft.	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00	100.00	110.00	120.00
Cultivator	5 ft.	12.50	13.75	15.00	16.25	17.50	18.75	20.00	21.25	22.50	24.75	25.00	27.50	30.00
	6 ft.	15.00	15.70	18.00	19.50	21.00	22.50	24.00	25.50	27.00	28.50	30.00	33.00	36.00

## THE YEAR!



The table given above shows the work which can be accomplished in ten hours at various speeds. This data is computed by multiplying the width of the cut (in feet) by the speed of the implement (in miles per hour), giving the approximate number of acres which can be worked in a ten-hour day. Due consideration is given to lost time for the customary stops and turns at the headlands.

# Vehicle Miles on Highway per Gallon of Fuel

(High Gear...Level Road...3250 Gross Weight...Tire pressure, 28 Pounds)

DRIVE	2 or 4			2 or 4			2			4		
TOWED LOAD	NONE			2000 lbs.			4000 lbs.			4000 lbs.		
TYPE ROAD	PAVED	GRAVEL	SAND	PAVED	GRAVEL	SAND	PAVED	GRAVEL	SAND	PAVED	GRAVEL	SAND
Miles per Hr.												
10	23.4	19.9	19.2	19.9	17.2	16.3	18.4	15.2	13.3	18.7	15.7	13.7
20	22.1	19.2	18.4	19.0	16.0	15.0	17.8	14.2	12.3	18.3	14.5	12.6
30	19.8	17.5	16.6	17.0	14.0	13.0	16.1	12.4	10.3	16.9	12.9	11.7
40	16.7	14.8	13.8	13.7	11.2	10.2	12.8	9.0	7.8	14.0	9.6	8.1
50	12.9	11.0	9.8	9.3			7.8			8.6		
60	8.8											

## FUEL CONSUMPTION

A 'JEEP' HUGS THE



High seat,  
high wheels...



CONNECTED: YES  NO

WILLYS-OVERLAND MOTORS, INC.  
RESEARCH DEPT.

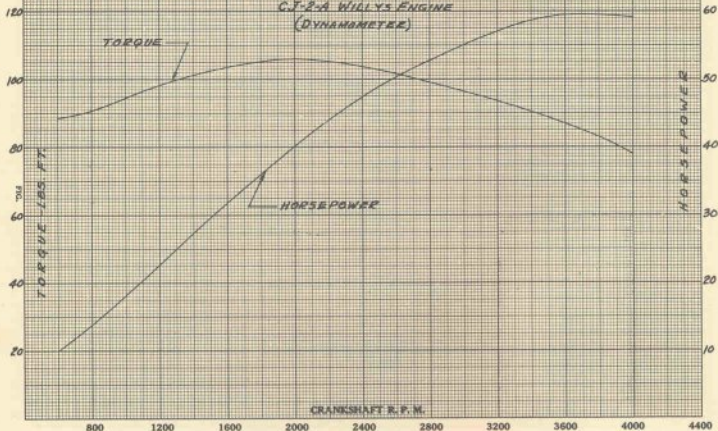
DATE 8-23-45

RE: 752

ENGINE 277277

RUN 110

ENGINE PERFORMANCE  
CJ-2A WILLYS ENGINE  
(DYNAMOMETER)



# HORSEPOWER and TORQUE

THE 'JEEP' HAS FIELD



*"Yes, sir,  
it's still raining  
...the job must wait!"*

...UNLESS A UNIVERSAL

# ROLLING RESISTANCE AND GRADEABILITY

Moving a trailer over a highway or a field requires a draw bar pull corresponding to the trailer weight plus rolling resistance. Rolling resistance consists of vehicle friction in the form of bearings, gears, etc., plus the resistance of the vehicle to move over the road. The rolling resistance for various road conditions are as follows:

Hard surfaced road . . . . .	30 lbs. per ton
Rutty roads . . . . .	75 lbs. per ton
Sandy roads . . . . .	75 lbs. per ton
Mud roads . . . . .	250 lbs. per ton
2" of snow . . . . .	50 lbs. per ton

4" of snow . . . . .	75 lbs. per ton
Grass meadow . . . . .	110 lbs. per ton
Soy bean stubble . . . . .	200 lbs. per ton
Tilled fields . . . . .	250 lbs. per ton

Dividing the permissible draw bar pull of 1,200 pounds, by the rolling resistance per ton, gives the trailer tonnage which can be moved by the vehicle on level terrain.

## GRADE ABILITY CHART

Percent Grade Which Can Be Negotiated

MILES PER HOUR	GEAR RATIO			
	HIGH		LOW-LOW	
	*3250 Lbs.	*9000 Lbs.	*3250 Lbs.	*9000 Lbs.
PERCENT GRADE ABILITY				
2			59%	21%
3			66%	24%
4			70%	26%
5			70%	25%
6			64%	23%
7			57%	21%
8			53%	20%
9			52%	19%
10	6.5%	2.4%		
15	8%	2.9%		
20	9%	3.2%		
25	9.2%	3.4%		
30	9%	3.2%		
35	7.5%	2.7%		
40	5.5%	2%		
45	3.5%	1.2%		
50	2%	.7%		

\*3250 pounds represents the gross weight of this particular vehicle.  
 \*9000 pounds represents the gross weight of the vehicle with the front bumper weight and a 3500 pound trailed load.  
 Note: Air resistance is disregarded. The value of any other gear combination will stand between the above figures.  
 Note: 100 percent grade is 45 degree incline.

**COMFORT!**

*Here's Why:*

1. Shock absorbers
2. Springs
3. Seat and back rest...



"JEEP", WITH TOP, AND DOORS, TOO, IS DOING YOUR WORK FOR YOU!

# POWER TAKE-OFF

CJ-2A POWER TAKE-OFF SHAFT SPEEDS (R.P.M.) AND VEHICLE GROUND SPEEDS (M.P.H.)

## POWER TAKE-OFF GEAR RATIOS

Governor Control Positions	Transfer	POWER TAKE-OFF GEAR RATIOS 20-24						POWER TAKE-OFF GEAR RATIOS 20-24						Engine Speed
		Transmission Gear In						Transmission Gear In						
		Low		Intermediate		High		Low		Intermediate		High		
		Take-Off Shaft R.P.M.	Vehicle Speed M.P.H.	Take-Off Shaft R.P.M.	Vehicle Speed M.P.H.	Take-Off Shaft R.P.M.	Vehicle Speed M.P.H.	Take-Off Shaft R.P.M.	Vehicle Speed M.P.H.	Take-Off Shaft R.P.M.	Vehicle Speed M.P.H.	Take-Off Shaft R.P.M.	Vehicle Speed M.P.H.	
1	Low	298	2.22	537	4.01	833	6.22	428	2.22	773	4.01	1200	6.22	1000
	High	298	5.40	537	9.75	833	15.13	428	5.40	773	9.75	1200	15.13	
2	Low	357	2.67	644	4.81	1000	7.47	514	2.67	928	4.81	1440	7.47	1200
	High	357	6.48	644	11.71	1000	18.15	514	6.48	928	11.71	1440	18.15	
3	Low	417	3.11	752	5.62	1166	8.72	600	3.11	1083	5.62	1680	8.72	1400
	High	417	7.56	752	13.66	1166	21.17	600	7.56	1083	13.66	1680	21.17	
4	Low	476	3.56	859	6.42	1333	9.96	685	3.56	1237	6.42	1920	9.96	1600
	High	476	8.65	859	15.61	1333	24.20	685	8.65	1237	15.61	1920	24.20	
5	Low	536	4.00	967	7.22	1500	11.30	771	4.00	1392	7.22	2160	11.30	1800
	High	536	9.73	967	17.56	1500	27.22	771	9.73	1392	17.56	2160	27.22	
6	Low	595	4.44	1074	8.02	1666	12.45	857	4.44	1547	8.02	2400	12.45	2000
	High	595	10.81	1074	19.51	1666	30.25	857	10.81	1547	19.51	2400	30.25	
7	Low	655	4.89	1182	8.83	1833	13.70	942	4.89	1702	8.83	2640	13.70	2200
	High	655	11.89	1182	21.46	1833	33.27	942	11.89	1702	21.46	2640	33.27	
8	Low	714	5.34	1289	9.63	2000	14.94	1028	5.34	1856	9.63	2880	14.94	2400
	High	714	12.97	1289	23.41	2000	36.31	1028	12.97	1856	23.41	2880	36.31	
9	Low	774	5.78	1396	10.43	2166	16.19	1114	5.78	2011	10.43	3120	16.19	2600
	High	774	14.05	1396	25.36	2166	39.33	1114	14.05	2011	25.36	3120	39.33	

CJ-2A PULLEY SPEEDS (R.P.M.)—8" PULLEY POWER TAKE-OFF GEAR RATIOS.

Governor Control Positions	POWER TAKE-OFF GEAR RATIOS 24-20			POWER TAKE-OFF GEAR RATIOS 24-20			Engine Speeds
	TRANSMISSION			TRANSMISSION			
	Low	Intermediate	High	Low	Intermediate	High	
1	355	460	714	367	663	1028	1000
2	306	552	857	440	795	1234	1200
3	357	645	1000	514	928	1440	1400
4	408	737	1143	587	1061	1645	1600
5	459	829	1285	660	1193	1851	1800
6	510	921	1428	734	1326	2057	2000
7	561	1013	1571	807	1458	2262	2200
8	612	1105	1714	881	1591	2468	2400
9	663	1197	1857	954	1723	2674	2600

To satisfactorily operate most power driven equipment, the operator should know the speed of the power take-off shaft or the belt pulley as well as the vehicle ground speed. A great variety of speeds are made available by the manual governor control, the gear ratios in the transmission and transfer case and by interchanging the gears in the power take-off housing.

The tables above indicate the speeds for each of the nine positions of the manual governor control. Note that the shaft speeds are all computed with the vehicle in four wheel drive, and that of the belt pulley in the transmission drive only. Reference to these tables will be of material assistance especially in the operation of a farm combine or grain separator.

## ALL FOUR 'JEEP' WHEELS



ARE YOU  
CLIMBING HILLS  
"ON THE LEVEL"



# and VEHICLE SPEEDS

CJ-3A POWER TAKE-OFF SHAFT SPEEDS (R.P.M.) AND VEHICLE GROUND SPEEDS (M.P.H.)							
POWER TAKE-OFF GEAR RATIO 22-22							
Governor Control Position	Trans-fer In	Transmission Gear In				Engine Speed	
		Low		High			
		Take-Off Shaft R.P.M.	Vehicle Speed M.P.H.	Take-Off Shaft R.P.M.	Vehicle Speed M.P.H.		
1	Low	358	2.22	644	4.01	1000	6.22
	High	358	5.40	644	9.75	1000	15.13
2	Low	428	2.67	773	4.81	1200	7.47
	High	428	6.48	773	11.71	1200	18.15
3	Low	500	3.11	902	5.62	1400	8.72
	High	500	7.56	902	13.66	1400	21.17
4	Low	571	3.56	1031	6.42	1600	9.96
	High	571	8.65	1031	15.61	1600	24.20
5	Low	643	4.00	1160	7.22	1800	12.08
	High	643	9.73	1160	17.56	1800	27.22
6	Low	714	4.44	1289	8.02	2000	12.45
	High	714	10.81	1289	19.51	2000	30.25
7	Low	786	4.89	1418	8.83	2200	13.70
	High	786	11.89	1418	21.46	2200	33.27
8	Low	857	5.34	1547	9.63	2400	14.94
	High	857	12.97	1547	23.41	2400	36.31
9	Low	929	5.78	1675	10.43	2600	16.19
	High	929	14.05	1675	25.36	2600	39.33

CJ-3A PULLEY SPEEDS (R.P.M.)—8" (20. 3CM.) PULLEY POWER TAKE-OFF GEAR RATIOS				
Governor Control Positions	22-22 Ratio TRANSMISSION			Engine Speeds
	Low	Inter.	High	
1	306	552	857	1000
2	367	662	1028	1200
3	428	774	1200	1400
4	490	884	1372	1600
5	551	995	1542	1800
6	612	1105	1714	2000
7	673	1237	1885	2200
8	734	1326	2057	2400
9	796	1436	2228	2600

V-TYPE PULLEY DRIVE AT REAR OF POWER TAKE-OFF FRONT UNIT					
BELT SPEED F.P.M.	PULLEY SPEED R.P.M.	HORSEPOWER RATINGS			
		1 BELT	2 BELTS	3 BELTS	4 BELTS
1667	1000	3.1	6.2	9.3	12.4
2000	1200	3.7	7.4	11.1	14.8
2333	1400	4.2	8.4	12.6	16.8
2667	1600	4.7	9.4	14.1	18.8
3000	1800	5.1	10.2	15.3	20.4
3333	2000	5.4	10.8	16.2	21.6
3667	2200	5.7	11.4	17.1	22.8
4000	2400	5.9	11.8	17.7	23.6
4333	2600	6.0	12.0	18.0	24.0



The four-wheel driven "Jeep" uses all of its uniformly distributed weight for tractive effort. None of the "Jeep's" weight is "dead-weight" since all weight contributes to the tractive effort of the drive wheels beneath it.

The pulley drive at the rear of the power take-off front unit is used to drive compressors, generators, etc., mounted in the body to the right and behind the driver's seat. The pulley is a four-grooved, 6" pitch diameter pulley which will deliver up to 24 HP.

Tabulated above are the belt speeds in feet per minute, the drive pulley speeds in revolutions per minute and the horsepower ratings of the pulley drive for one, two, three and four belts for speeds from 1000 to 2600 RPM, which range coincides with the governor controlled speeds obtained and with the transmission gear in high gear (direct).



# POWER TAKE-OFF and PULLEY DATA

## FRONT POWER TAKE OFF

Provision has been made for power take off at the front of the engine, to run at engine speed.

## CENTER POWER TAKE OFF

(Willys-Overland Kit No. 640725)

A belt pulley drive (Willys-Overland Kit No. 643883) is available and may be installed behind the transmission, either alone or in connection with the rear P.T.O. Drive will operate at engine speed or through 1.55 or 2.80 transmission reduction and transmit a maximum of 33 H.P.

## REAR POWER TAKE OFF

(Willys-Overland center and rear P.T.O. Kit No. 640726)

(Willys-Overland rear P.T.O. Kit No. 640869)

The 1 1/8" dia. spline shaft (see cut) will run at 536 R.P.M. (clockwise when viewed from the rear) and deliver, with the vehicle in motion, either 26 H.P. at 4.00 M.P.H. (20-24 ratio), 21 H.P. at 3.33 M.P.H. (22-22 ratio) or 17 H.P. at 2.75 M.P.H. (24-20 ratio). Other engine and road speeds are shown below.

## BELT PULLEY—REAR

(Willys-Overland Kit No. 644193)

The 8" dia. pulley at 3100 F.P.M. belt speed will deliver 33 H.P. (20-24 ratio), 29 H.P. (22-22 ratio) or 23 H.P. (24-20 ratio) in high transmission gear with vehicle stationary.

### REAR POWER TAKE-OFF FUEL CONSUMPTION

OPERATING PULLEY DRIVE AT  
1500 PULLEY R.P.M.

CJ-2A 2100 ENGINE R.P.M. . . . 3100 F.P.M. BELT SPEED  
20-24 P.T.O. RATIO . . . HIGH TRANS. GEAR

CJ-3A 1750 ENGINE R.P.M. . . . 3100 F.P.M. BELT SPEED  
22-22 P.T.O. RATIO . . . HIGH TRANS. GEAR

HORSEPOWER	GALLONS PER HOUR	GALLONS PER HORSEPOWER-HOUR
5	1.36	.272
10	1.60	.161
15	1.87	.127
20	2.22	.111
25	2.75	.111
30	3.31	.113

GOVERNED ENGINE R.P.M.	VEHICLE SPEED M.P.H.*	DRAW-BAR H.P.†	VEHICLE STATIONARY	H.P. AT P.T.O. SPLINE SHAFT				
				3500# VEHICLE MOVING WITH				
				0# D.B.P.	300# D.B.P.	600# D.B.P.	900# D.B.P.	1200# D.B.P.
1000	2.2	7.18	15.4	12.8	11.0	9.3	7.5	5.7
1200	2.7	8.62	19.3	16.2	14.0	12.0	9.8	7.6
1400	3.1	10.06	23.3	19.6	17.1	14.7	12.1	9.6
1600	3.6	11.49	27.1	22.9	20.1	17.4	14.4	11.5
1800	4.0	12.93	30.9	26.3	23.0	19.9	16.7	13.5
2000	4.5	14.38	33.0‡	29.1	25.5	21.9	18.4	14.8
2200	4.9	15.80	33.0‡	31.7	27.8	23.8	20.0	16.0
2400	5.4	17.24	33.0‡	33.0‡	29.7	25.5	21.1	16.9
2600	5.8	18.68	33.0‡	33.0‡	31.4	26.7	22.1	17.5

\*Vehicle speed in low transmission and transfer case ratios.

†Based on maximum recommended draw bar pull for continuous service—1200#.‡

‡limited to 33 H.P. by the capacity of the bearings in the P.T.O.

# SPECIFICATIONS . . . . .

## GENERAL

Wheelbase	80"	(2,032 m.)
Tread—Front and Rear	48½"	(1,226 m.)
Overall Length	123½"	(3,127 m.)
Width Bumper		
Width (Max.)	57½"	(1,451 m.)
Height Loaded (Over Windshield)	CJ-2A-64" CJ-3A-66½"	(1,625 m.) (1,219 m.)
Road Clearance—Front	8½"	(203 m.)
—Rear	8"	

## ENGINE AND CLUTCH

Number of Cylinders	4	
Valve Arrangement	"I" Head	
Bore	3¼"	(79.375 mm.)
Stroke	4¾"	(111.125 mm.)
Piston Displacement	134.2 Cu. In.	(2,199 Lts.)
Compression Ratio	6.48 to 1	
SAE Horsepower	15.63	
Max. Brake HP	60 at 4000 RPM	
Max. Torque lb. ft.	106 at 2000 RPM	

## Crankshaft

Bearing Length		
Front	1.92"	(48.768 mm.)
Center	1.81"	(45.974 mm.)
Rear	1.75"	(44.450 mm.)
Bearing Diam. All	2.33"	(59.182 mm.)
End Play	.004-.006	(.1016-.1524 mm.)

## Connecting Rod

Length—Center to Center	9 3/8"	(233.36 mm.)
Crank Pin Journal		
Diameter	1 1/8"	(49.276 mm.)
Length	1 1/8"	(33.020 mm.)

## Pistons, Pins and Rings

Piston Material	Cast Aluminum	
Piston Surface Treatment	Tin or Brass Plated	
Compression Rings— Number and Width	2 — 3/8"	(2.381 mm.)
Oil Rings—No. and Width	1 — 1 1/8"	(4.762 mm.)
Piston Pin Type	Locked in rod	
Piston Pin Diam.	.8118	(20.620 mm.)

## Lubricating System

Oil System Capacity (refill)	4 qts.	(3.785 lts.)
Normal Oil Pressure	35 lbs. at 2000 RPM	
Oil Filter Make	Purulator P713 or From No. F3W	

## Fuel System

Carburetor		
Make	Carter	
Model No.	WQ-5965	
Type	Downdraft	
Single or Dual	Single	
Size	1" SAE	(25.40 mm.)
Fuel Tank Capacity	10½ gal.	(39.75 lts.)

## Valves

Head Diam.		
Inlet	1 1/8"	(38.894 mm.)
Exhaust	1 1/8"	(37.306 mm.)
Stem Diam.		
Inlet	.37225"-.373"	(9.455-9.474 mm.)
Exhaust	.371-.372"	(9.423-9.449 mm.)
Stem Clearance		
Inlet	.0015"-.00225"	(.038-.083 mm.)
Exhaust	.0025"-.0045"	(.064-.114 mm.)
Lift—Inlet and Exhaust	.351"	(8.915 mm.)
Seat Angle		
Inlet and Exhaust	45°	
Tapet Clearance — Hot or Cold — Inlet and Exhaust	.014"	(.356 mm.)

## Camshaft

Material	Cast Steel
Number of Bearings	4
Bearing Material (Front)	Steel Backed Babbitt
Drive—Type	Gear
—Adjustable	No

## Clutch

No. of driven plates	1	
No. of facings	2	
Diam. of driven plate	8 1/2"	(215.900 mm.)
Frictional Area	72 Sq. In.	(464.5 sq. cm.)
Torque Capacity	144 lb. ft.	

## TOTAL ALLOWABLE GROSS WEIGHT

Max. Total Gross	
Vehicle Weight	3500 lbs.
Max. Front	1600 lbs.
Max. Rear	2000 lbs.
	(1588 kg.)
	(726 kg.)
	(1043 kg.)

## TRANSMISSION RATIO

First	2.798 to 1
Second	1.551 to 1
Third	1.00 to 1
Reverse	3.798 to 1

## TRANSFER CASE RATIO

Normal	1 to 1
Underdrive	2.43 to 1

## LUBRICANT CAPACITY

Transmission	3 pts.	(1.42 lts.)
Transfer Case	4 pts.	(1.89 lts.)

## REAR AXLE

Type	Semi-Floating, Hypoid	
Ratio	5.38 to 1	
Lubricant Capacity	2½ pts.	(1.30 lts.)

## FRONT AXLE

Type	Full-Floating, Hypoid	
Toe-in	3/16"-.3/16"	(1.19-2.38 mm.)
3"		
Caster in Degrees	3°	
Comber in Degrees	1 1/2°	
Kingpin — Crosswise Inclination	3°	
Lubricant Capacity	2½ pts.	(1.18 lts.)

# CJ-2A, CJ-3A UNIVERSAL 'JEEPS'

## SPRING — FRONT

Type	Semi-Elliptic	
Length	36¼"	(.921 m.)
Width	1½"	(44.45 mm.)
No. of Leaves — Pack Thickness	10 — 2.048"	(52.019 mm.)
Rate	225 lb./in.	(40.2 kg./cm.)

## SPRING — REAR

Type	Semi-Elliptic	
Length	42"	(1.067 m.)
Width	1½"	(44.45 mm.)
No. of Leaves — Pack Thickness — Standard	9 — 1.973"	(50.11 mm.)
— Heavy Duty	11 — 2.409"	(61.14 mm.)
Rate — Standard	190 lb./in.	(33.9 kg./cm.)
— Heavy Duty	225 lb./in.	(40.2 kg./cm.)

## FRAME

Max. Depth Channel	4½"	(104.775 mm.)
Max. Width Channel	13½"	(49.213 mm.)
Stack Thickness	.1495"	(3.797 mm.)
Section Modulus (including Reinforcing Strips)	1.449 in <sup>3</sup>	

## STEERING

Turning Dia.—Left & Right	36'	(10.973 m.)
Steering Wheel Diam.	17¼"	(438 mm.)
Steering Ratio	14-12-14 to 1	
Steering Gear Type	Cam and Lever	

## TIRES AND WHEELS

Tire Size — Standard	6.00-16" — 4 ply	
— Optional	7.00-15" — 4 ply	
Rim Size — Standard	4.50E-16"	
— Optional	4.50E-15"	
Bolt Circle Diam.	5½"	(139.7 mm.)
No. of Bolts per Wheel	5	
Bolt Dia. & No. of Thread	½" - 20	(12.70)

## BRAKES — SERVICE

Drum Dia. — Front & Rear	9"	(.229 m.)
Linings — Length per Wheel Front and Rear	16½"	(.427 m.)
— Width per Wheel, Front and Rear	1½"	(44.45 mm.)
Thickness—Front and Rear	.206-.216"	(5.232-5.486 mm.)
Total Braking Area	117½" sq. in.	(759.7 sq. cm.)
Master Cylinder—Dia. and Stroke	1" x 1½"	(25.40x28.58 mm.)
Wheel Cylinder—Dia.—Rear	¾"	(19.05 mm.)
Front	1"	(25.40 mm.)

## ELECTRICAL SYSTEM — All Electric Auto-Lite, unless other Specified.

### Generator

Model No. and if Ventilated	Model GDZ—Yes
-----------------------------	---------------

### Starting Motor

Model No.	Model MZ
-----------	----------

### Distributor

Model	Model IGW (Dustproof)
Spark Advance—Flywheel Deg.—Centrifugal	20°-24°
Point Gap	.020" (.508 mm.)
Timing — Points Open	5° B.T.C.
Firing Order	1 — 3 — 4 — 2

### Spark Plugs

Model	AN-7 or J-9
Thread	14 mm.
Gap	.030" (.762 mm.)

### Battery

Model	PA-15	
Capacity at 20 hour rate	100 amp. hrs.	
Voltage	6 Volts	
No. of Plates	15 Plates	
Case Length	9½"	(230.987 mm.)
Case Width	7¼"	(181.0 mm.)
Height over Terminals	8¾"	(219.1 mm.)
Terminal Grounded	Negative	

### Power of Bulbs

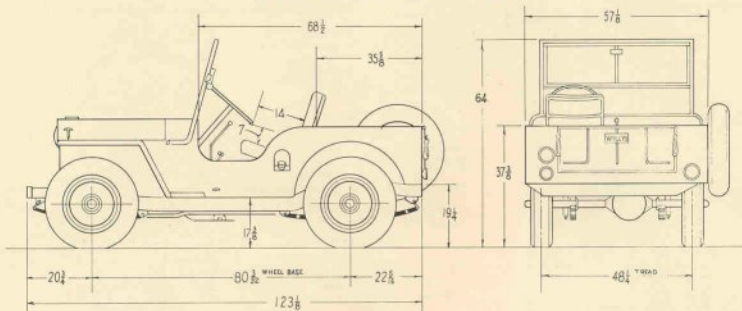
Head Lamps	45-35 Watts
Parking Lamps	3 C.P.
Tail and License Lamp	3 C.P.
Stop Lamp	21 C.P.
Instrument Lamp	3 C.P.
Tail Tail Lamp	1 C.P.
Fuse (Thermal Type) On Light Switch	30 Amp. Capacity

### COOLING SYSTEM

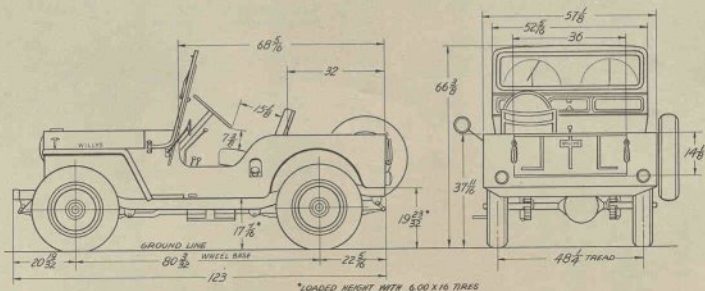
Radiator Core — Type	Heavy Duty	
— Thickness 2"		
— Area	364 sq. in. (50.800 mm.)	
Fan Blade — Diameter	15"	(2348 sq. cm.)
— No. of Blades	4	(.381 m.)
Fan Belt — Length Outside	42½"	(1.089 m.)
Cooling Capacity	11 qt.	(10.41 lts.)

# BODY-BUILDER'S DIMENSION DRAWINGS

## UNIVERSAL 'JEEP' CJ-2A



## UNIVERSAL 'JEEP' CJ-3A

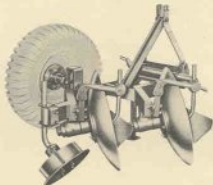


# BASIC FARM IMPLEMENTS

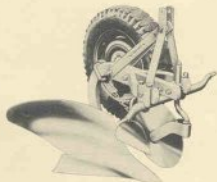
DESIGNED FOR USE WITH THE UNIVERSAL 'JEEP'



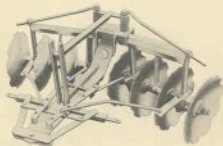
2-BOTTOM 12" GENERAL PURPOSE  
MOULDBOARD FLOW



2-26" DISC PLOW



SINGLE BOTTOM 16"  
MOULDBOARD PLOW



BUSH & BOG HARROW



TANDEM DISC HARROW



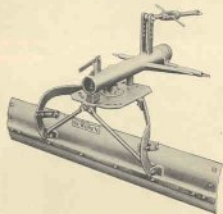
8½' SPRINGTOOTH HARROW



6' FIELD AND PASTURE  
CULTIVATOR



6' FARM MOWER

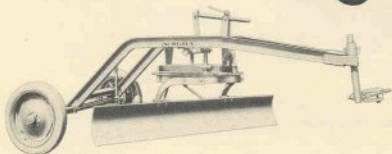


TERRACING BLADE

# BASIC INDUSTRIAL TOOLS

DESIGNED FOR USE WITH THE UNIVERSAL 'JEEP'

HYDRO-GRADER AND TERRACER



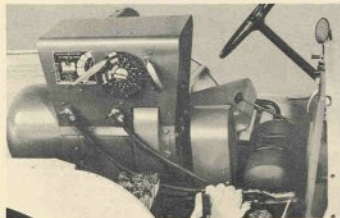
LIFT-TYPE OVERLAND SCRAPER



105 C.F.M. COMPRESSOR



60 C.F.M. COMPRESSOR



12.5 K.V.A. GENERATOR



300 AMP. D.C. ARC WELDER