Do-It-Yourself PTO Drive Assembly for ZENA® Welding System

For do-it-yourself (and even factory built) PTO drive systems we recommend building a simple transmission made up of a frame assembly cradling two shafts -- one with a PTO spline on one end and the other a plain shaft.

The two shafts are mounted on pillow blocks -- with the splined one holding a single large diameter double 1/2" V or serpentine pulley (serpentine pulley drive, although a bit more complicated and expensive, is recommended for OEM applications).

The plain shaft mounts parallel to the splined shaft and holds two 1/2" double V pulleys, one large and one small -- with the small one being driven by the large pulley on the splined shaft.

The small pulley on the plain shaft drives the ZENA welding power generator.

Optionally, one can use a spring-loaded belt tensioner to insure proper belt tension and to avoid the necessity of moving pillow block/pulley shaft position. Spring-loaded tensioners will work for both serpentine and for V belts (though the type of pulley fitted to the tensioner will differ).

Note that if spring loaded belt tensioning is NOT used in the design (required for serpentine belt drive -- optional for V Belt drive) some mechanical means should be included in the design to allow the position of the two shafts to be adjusted for belt tensioning,

By adjusting pulley diameters -- we can easily have the generator turning at our target speed for welding (between 6500 and 7500 rpm) with the tractor engine running at a speed at or near its PTO speed.

For example, below we show suggested pulley sizes for a drive system that will allow the generator to reach welding speed when he tractor PTO shaft is rotating at about 500 rpm. When this same pulley set is used on a tractor with a high speed (1080 PTO), and a reasonable amount of available power at lower engine speeds, the engine speed necessary to drive the unit is lower.

Other ratios are possible -- giving the ability to have the welding power generator tuning at its operating speed at virtually any tractor engine speed desired.

The specific V pulleys that we would use for the example above when driving a 200 amp generator factory fitted with our standard dual 2.8" V pulley would be:

two double bushing bore 1/2" V pulleys 11.35" OD (pitch diameter 10.6" when used with 1/2" belts)

one double bushing bore 1/2" V pulleys 3.75" OD (pitch diameter 3" when used with 1/2" belts)

These pulleys yield a drive ratio of approximately 13.37:1 -- driving the generator to 7000 rpm when the tractor engine is running fast enough to produce a 523 rpm PTO speed.

Most of the parts needed for a unit as described above -- other than a quantity of 5/16 and/or 3/8" angle for building brackets and pillow block mounts onto a carry-all -- are available from Agri-Supply and McMaster Carr. See list on next page:

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Major Components -- Do-It-Yourself PTO Drive Assembly for ZENA® Welding System

Item Name/Num	Description	Unit Cost	Qty	Total
AS 65060	3 Pt Hitch Carry-All Fork Attachment	109.95	1	109.95
AS 18151	1-3/8" X 6" X 12" Shaft with Spline End	47.49	1	47.49
AS 17955	1-3/8 " Cast Iron Pillow Block Bearing	14.49	2	28.98
AS 14562	1-3/8" SHAFT SET COLLAR	2.99	4	11.96
Mc 1497K601	Keyed Steel Drive Shaft, 1-3/8" OD, 5/16"	51.14	1	51.14
Mc 6361K42	Iron Pillow Block w/HS Steel Ball Bearings	70.66	2	141.32
Mc 6209K135	11.35" OD SK Bushing-Bore 1/2" V-Pulley	58.45	2	116.90
Mc 6086K522	1-3/8" Bore, SK Bushing	30.35	2	60.70
Mc 6209K111	3.75" OD SH Bushing-Bore Dual V-Pulley	26.40	1	26.40
Mc 6086K32	1-3/8" Bore SH	16.73	1	16.73

AS = Agri-Supply 800-345-0169

Mc = McMaster-Carr (404) 346-7000