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INTERNATIONAL
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# SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J772

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Submitted for recognition as an American National Standard

## Clearance Envelopes for Six-Bolt, Eight-Bolt, and Rear Truck Transmission Mounted Power Takeoffs

*1.* ***Scope—***This SAE Recommended Practice is intended as a guide toward standard practice but may be subject to frequent change to keep pace with experience and technical advances.

**1.1 Purpose—**The purpose of this document is to provide dimensions of clearance envelopes for various types of six-bolt regular-duty, eight-bolt heavy-duty, and side- and rear-mounted truck transmission power takeoffs. These envelopes are applicable to the clearance required immediately adjacent to the power takeoff openings on truck transmissions. Clearance envelopes are provided for the purpose of documenting current practice. It must be recognized that many current designs do not provide these clearances in all orientations and variations. New transmission and power takeoff designs should attempt to adhere to these envelopes where practical, but they should not be construed to be design restrictive; ultimately, the actual power takeoff clearance must be established for each application. In order to provide realistic envelope sizes, there are seven basic "types" of side-mounted P.T.O. envelopes and rear-mounted envelopes as shown in Table 1.

All envelopes shown are basic and can be reversed for output to the front or rear of the vehicle. On Types II, III, IV, and VI, output shaft locations can additionally be reversed from that shown to the opposite side of the P.T.O. opening centerline. Driveline envelopes, front or rear, above or below centerline of opening as required, must be a cylinder of the minimum diameter shown and fall within the 15 degree maximum half-cone extending vertically up and down and horizontally outward from the driveline cone apex, for a distance equivalent to that required to bring the P.T.O. driveline beyond points of interference so that auxiliary equipment can be driven.

Clearance should be provided on six-bolt openings on mechanical transmissions for Types I, II, and III with Types I and II being a minimum requirement. Clearance should be provided on automatic transmissions for Types IV and VI depending on six- or eight-bolt P.T.O. openings. Mechanical transmissions with eight-bolt openings should have Type V and VI clearances provided.

Direct mount hydraulic pump clearance envelopes are included as an option, and are commonly used with Types II, IV, and VI P.T.O. envelopes. If pump clearance is restricted it should be evaluated on a specific basis. If specific pump sizes are not available, direct mount pump clearance envelopes should be used as shown in Table 2.

*2.* ***References—***There are no referenced publications specified herein.

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**TABLE 1—SIX BASIC TYPES OF SIDE-MOUNTED P.T.O. ENVELOPES AND ONE REAR-MOUNTED P.T.O. ENVELOPE (SEE FIGURES 1 TO 7, dimensions are mm [in])**

| Envelope Type | Power Takeoff Types Included | Typical Usage |
|---|---|---|
| I | Single Gear, Six-Bolt P.T.O. | Remote mounted hydraulic pumps up to 57.4 ccd(1) (3.5 $in^3$/rev); light-duty mechanical loads. |
| II | 2-Gear, Single Speed, Six-Bolt P.T.O. | Remote or direct mounted hydraulic pumps up to 131.1 ccd(1) (8.0 $in^3$/rev); medium-duty mechanical loads. |
| III | Multiple Speed, Six-Bolt P.T.O. | Mechanical winches; transfer pumps. |
| IV | 2-Gear, Single Speed, Six-Bolt P.T.O. Automatic Transmissions | Remote or direct mount hydraulic pumps up to 57.4 ccd(1) (8.0 $in^3$/rev); medium-duty mechanical loads. |
| V | Single Gear, Eight-Bolt P.T.O. | Large remote mounted hydraulic pumps; high mechanical loads. |
| VI | 2-Gear, Single Speed and Multiple Speed Eight-Bolt | Large direct or remote mounted pumps; high mechanical loads, large mechanical winches. |
| VII | Rear Mounted P.T.O. | Remote or direct mount hydraulic pumps up to 57.4 ccd(1) (8.0 $in^3$/rev); medium-duty mechanical loads. |

1. Cubic centimeters displacement

**TABLE 2—DIRECT MOUNT PUMP ENVELOPE (SEE FIGURE 8, dimensions are mm [in])**

| P.T.O. Envelope Type | Direct Mount Pump Envelope |
|---|---|
| II, IV, VII | 203 mm x 305 mm (8 in diameter x 12 in) long centered on driveline cylinder flush to P.T.O. envelope at pump flange face |
| VI | 254 mm x 356 mm (10 in diameter x 14 in) long centered on driveline cylinder flush to P.T.O. envelope at pump flange face |

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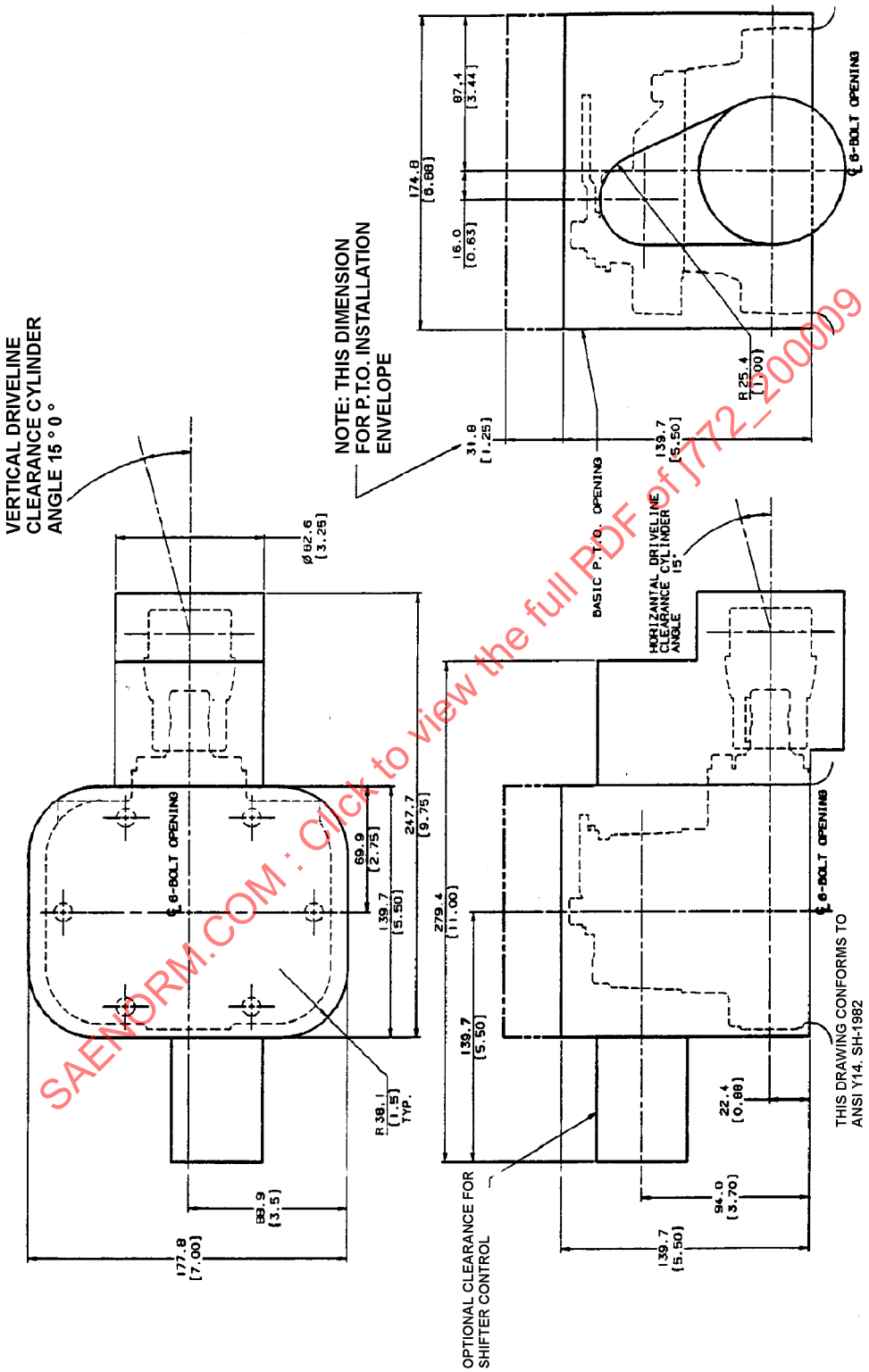


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FIGURE 1—TYPE I—SIX-BOLT, SINGLE GEAR P.T.O.

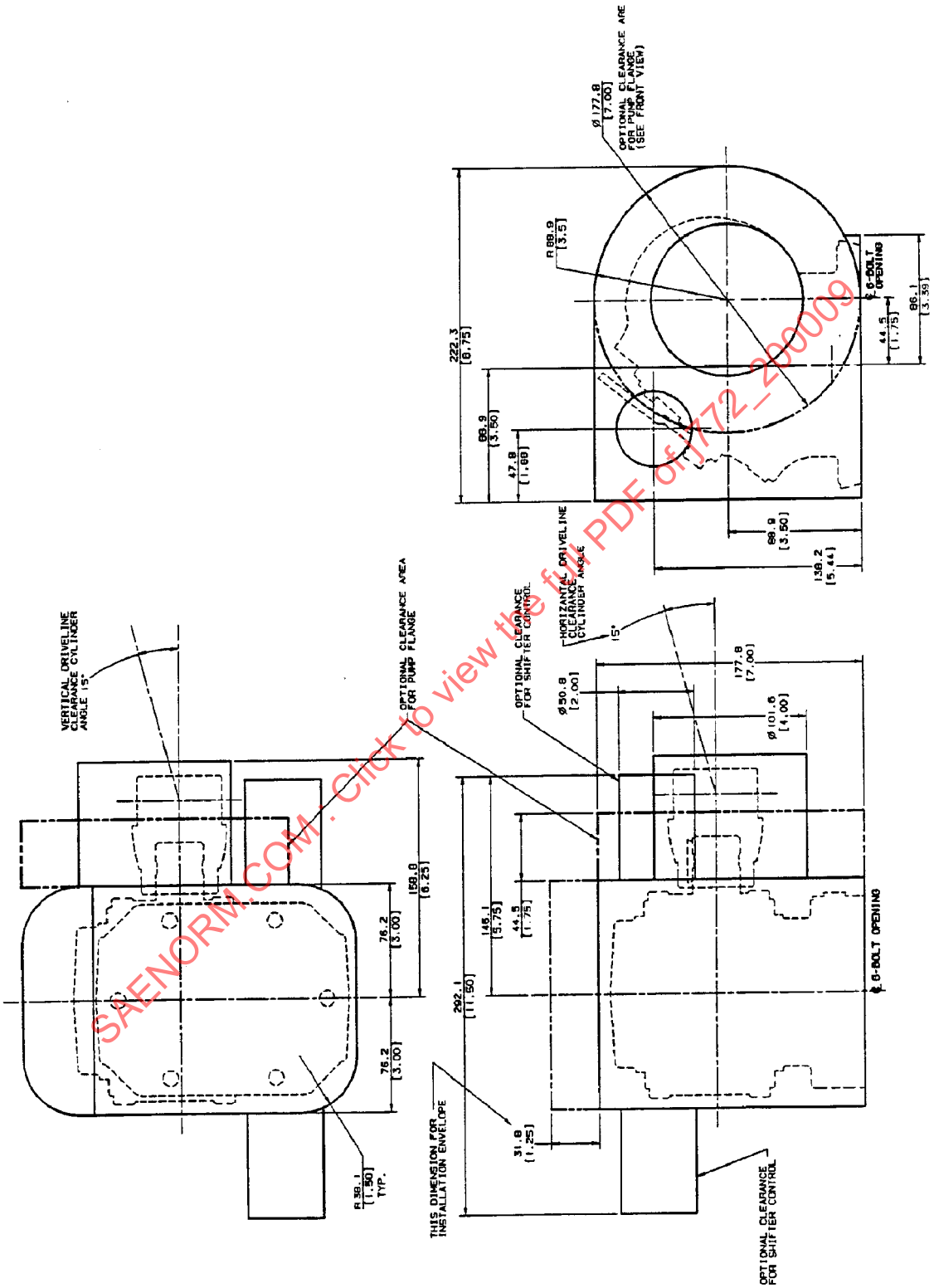


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FIGURE 2—TYPE II—SIX-BOLT P.T.O., 2-GEAR, SINGLE SPEED

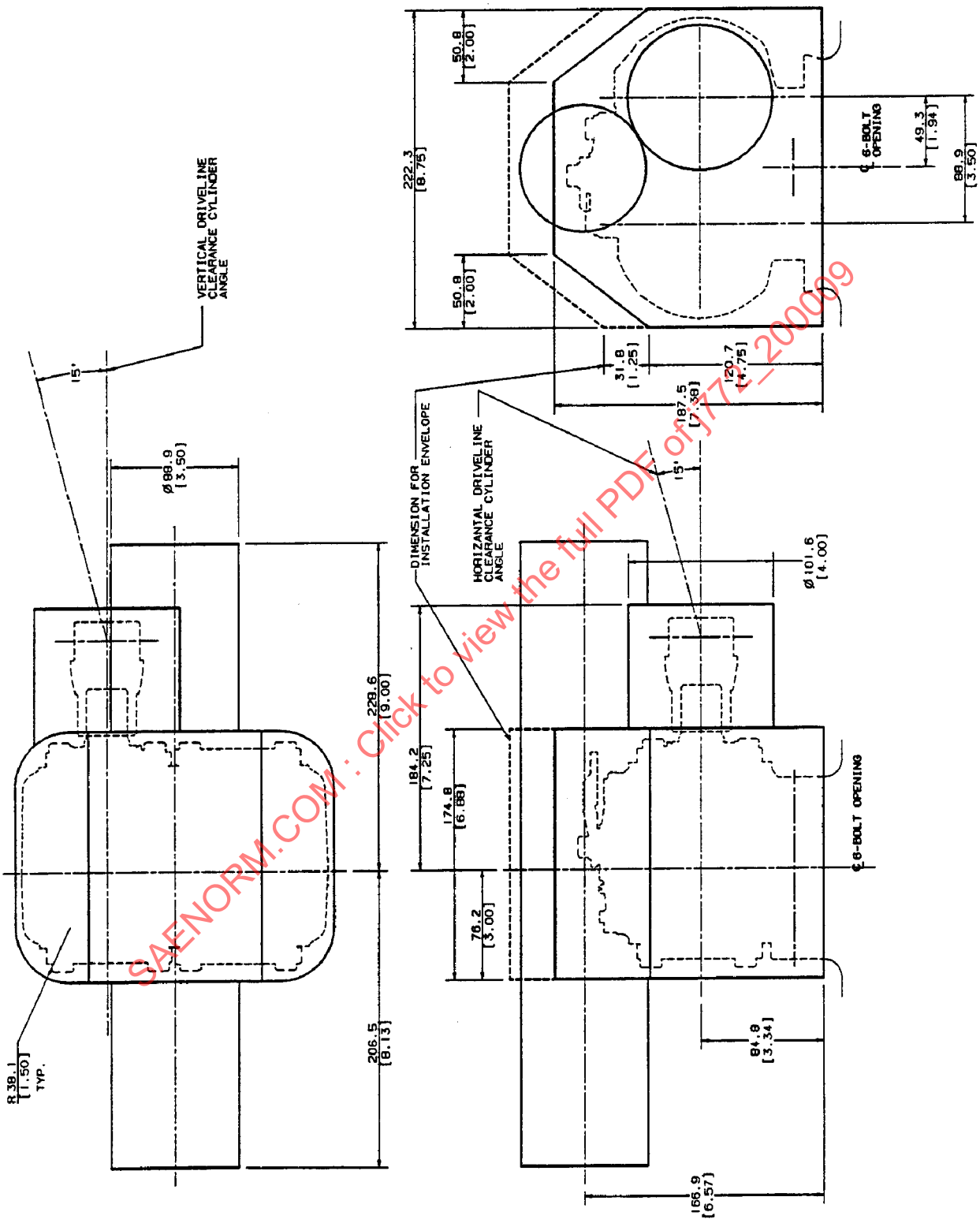


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FIGURE 3—TYPE III—MULTIPLE SPEED, SIX-BOLT P.T.O.

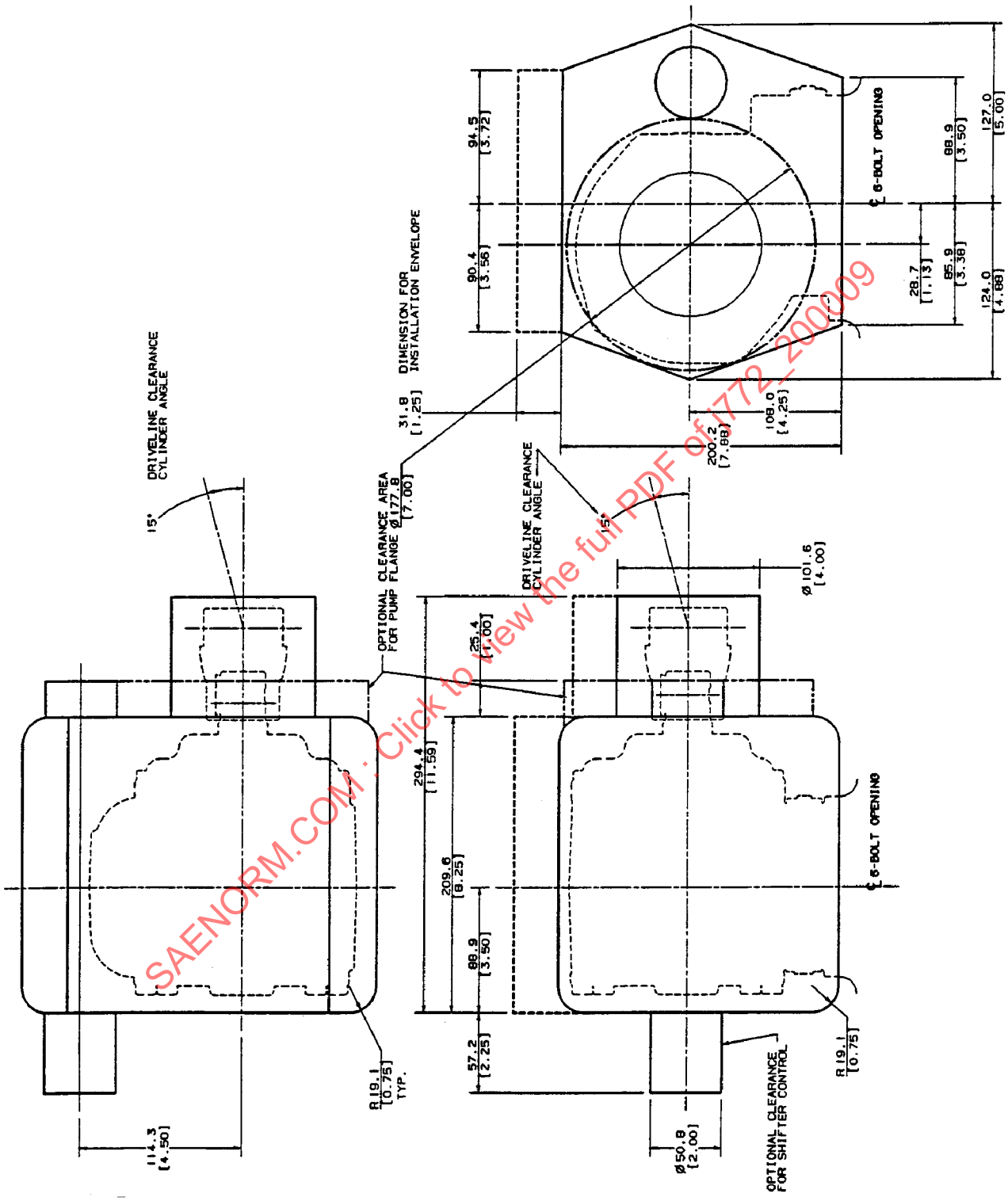


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FIGURE 4—TYPE IV—SIX-BOLT P.T.O.—HEAVY-DUTY FOR AUTOMATIC TRANSMISSION

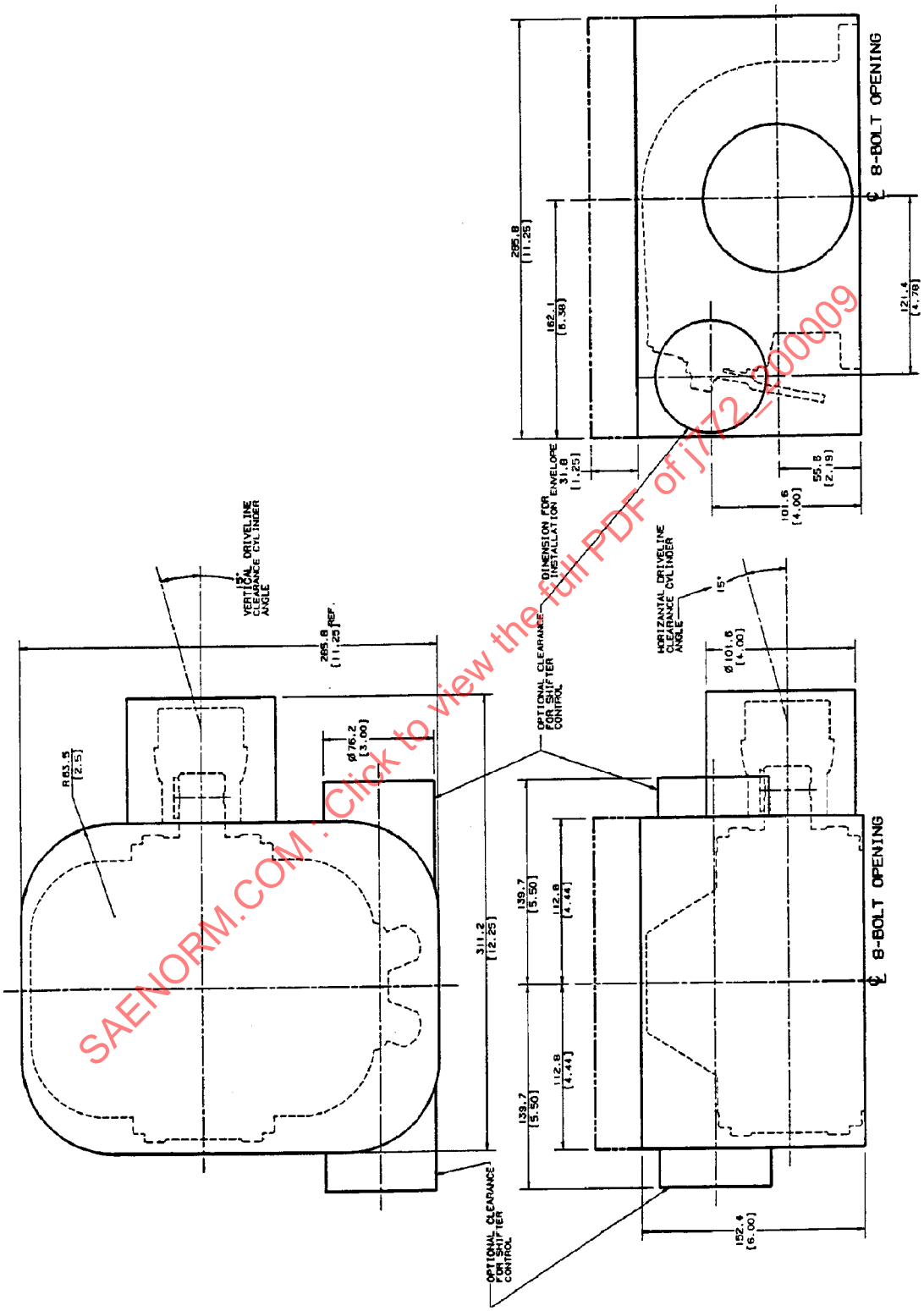


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FIGURE 5—TYPE V—SINGLE GEAR, EIGHT-BOLT P.T.O.

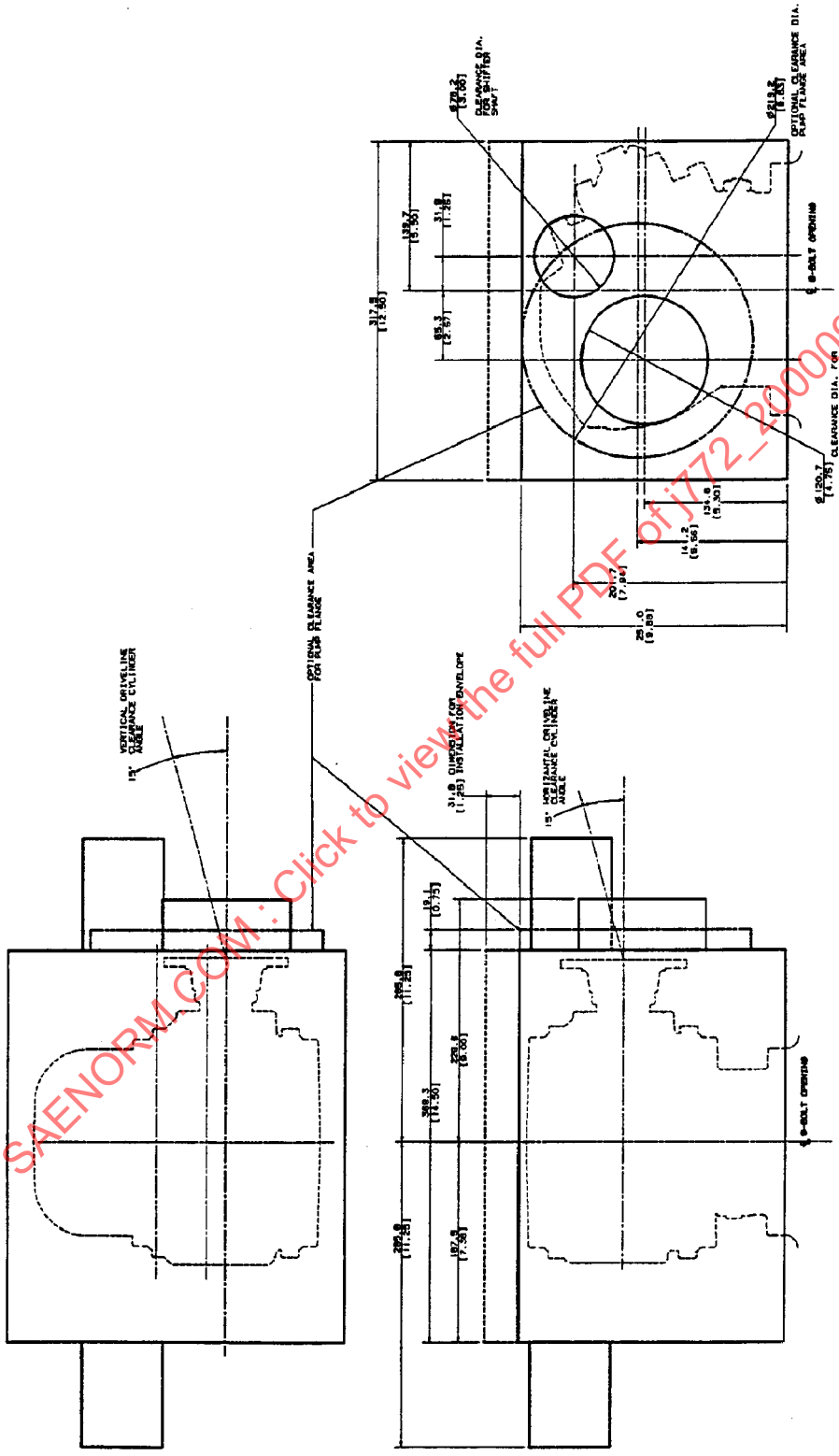

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FIGURE 6—TYPE VI—2-GEAR, EIGHT-BOLT P.T.O., SINGLE SPEED AND MULTIPLE SPEED