

Dodge Torque-Arm Family: Screw Conveyor Driveshafts

Dodge provides SCXT, TAIL, or MTA gearboxes that can be used as drives for screw conveyors. Figure 1 shows the most common setup for a screw conveyor drive. All these gearboxes can be driven by an electric motor (belt driven or direct drive) or some can also be hydraulically driven. In this setup, the gearbox is bolted to an adapter that bolts to the customer's screw conveyor trough end plate. The gearbox not only serves as the screw conveyor drive but also serves as the bearing for the drive side of the screw. A driveshaft is located and secured into the output hub of the gearbox. The other end of driveshaft goes into the screw pipe and is bolted to the screw with coupling bolts. Dodge can provide a driveshaft (that conforms to CEMA standards) that connects the drive to the screw. There are some common questions that come up about these driveshafts. This whitepaper will address these questions.

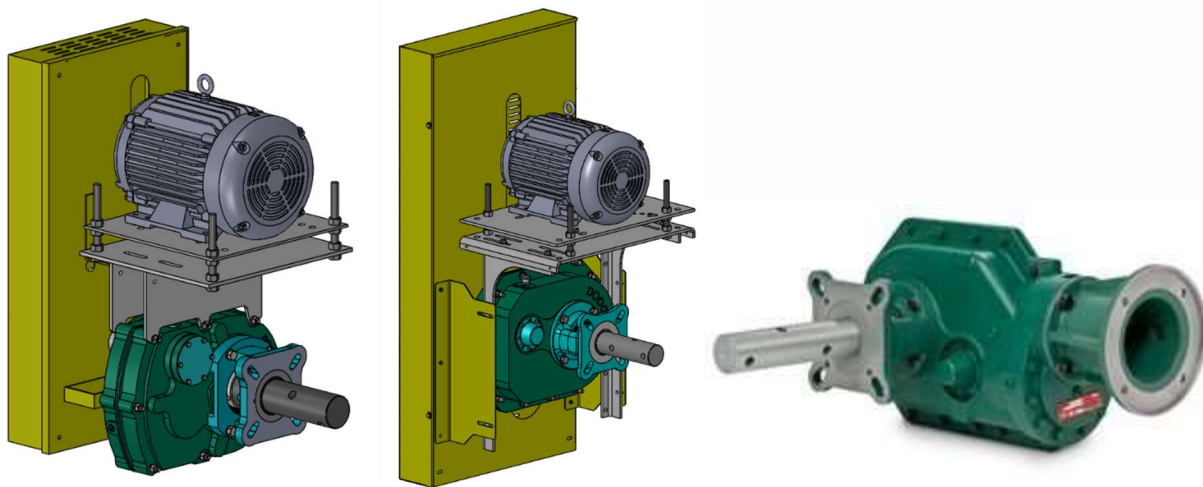


Figure 1: SCXT, TAIL, and MTA Screw Conveyor Drives

SCXT Driveshafts Assembly:

Figure 2 shows the typical assembly of the components for a SCXT assembly. For more detailed instructions, see Dodge Manual MN1611.

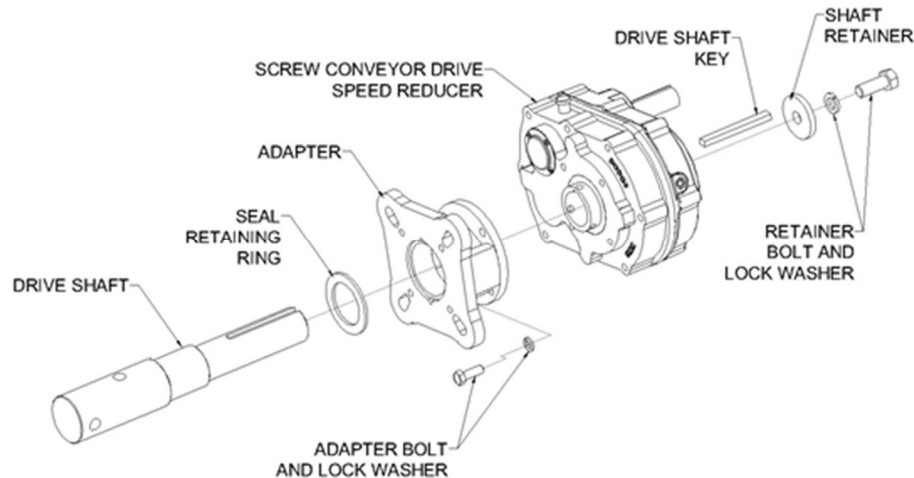


Figure 2: SCXT Assembly

Diameters:

The SCXT driveshaft has three distinct diameters (See Figure 3 – Left to Right):

The first diameter is the diameter that goes into the gearbox. It is a straight diameter that is slightly smaller than the gearbox's output hub bore. It is keyed so that a key can be inserted for driving the drive shaft. This diameter stays the same for each of the driveshafts that are offered for an appropriate gearbox size. It increases as gearbox size increases.

The second diameter is the diameter that goes through the screw conveyor adapter. This diameter is where the seal's lip or adjustable packing rides on. This seal/packing is right next to the trough end plate and its job is to keep the material in the screw. The radial difference between this diameter and the first diameter creates a face that bottoms out on the end of the gearbox's output hub (closest to the screw). This diameter stays the same for each of the driveshafts that are offered for an appropriate gearbox size. It increases as gearbox size increases.

The last diameter is the diameter that goes into the screw to locate inside the pipe of the screw. It has cross drilled holes that connect it to the screw. This diameter/length will correspond to CEMA diameters/lengths. At the writing of this document, Dodge offers driveshafts for 1-1/2", 2", 2-7/16", 3", and 3-7/16". The cross drilled hole sizes and spacing also correspond to CEMA and change as this diameter gets larger. Figure 4 shows the different driveshafts that Dodge offers for a SCXT4.

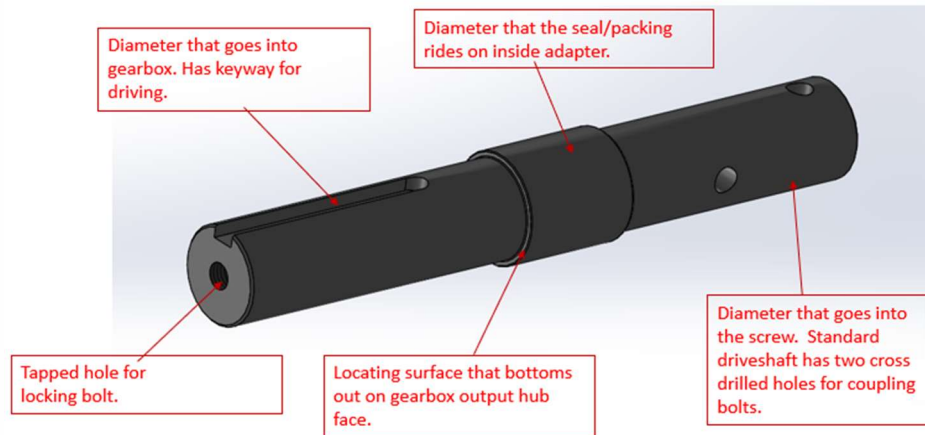


Figure 3: SCXT Driveshaft Diameters



Figure 4: SCXT4 Available Driveshafts

Number of holes to connect to screw:

SCXT driveshafts come standard having a 2 cross hole pattern for connecting to the screw (See Figure 5). Special driveshafts are available that have a 3 cross hole pattern (See Figure 6)

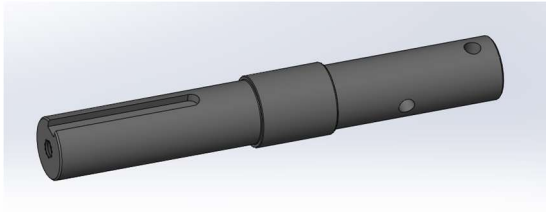


Figure 5: Standard SCXT Driveshaft (2 Hole)
Hole)

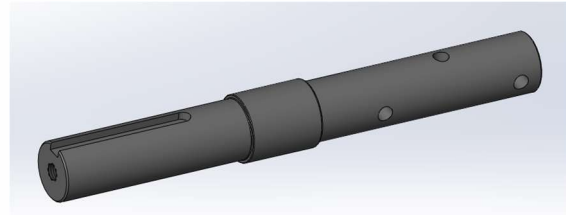


Figure 6: Optional SCXT Driveshaft (3

Materials:

The driveshafts that are used with SCXT reducers are made from either 1141 or 1144 steel for the steel driveshafts and 316 for stainless steel driveshafts. Other materials can be quoted if necessary but will be a longer lead time and higher cost.

Driveshaft Offerings:

For each gearbox size (up through SCXT7), Dodge offers the following:

Standard Steel Driveshaft (2 Cross Drilled Holes)

Optional Stainless Steel Driveshaft (2 Cross Drilled Holes)

Optional Steel Driveshaft (3 Cross Drilled Holes)

Optional Stainless Steel Driveshaft (3 Cross Drilled Holes)

TAII/MTA Driveshafts

Assembly:

Figure 7 shows the typical assembly of the components for a TAI/MTA assembly. The tapered driveshaft and the tapered wedge locate the driveshaft to the output hub of the reducer. For more detailed instructions, see Dodge Manual MN1601 (TAI) or Dodge Manual MN 1695 (MTA).

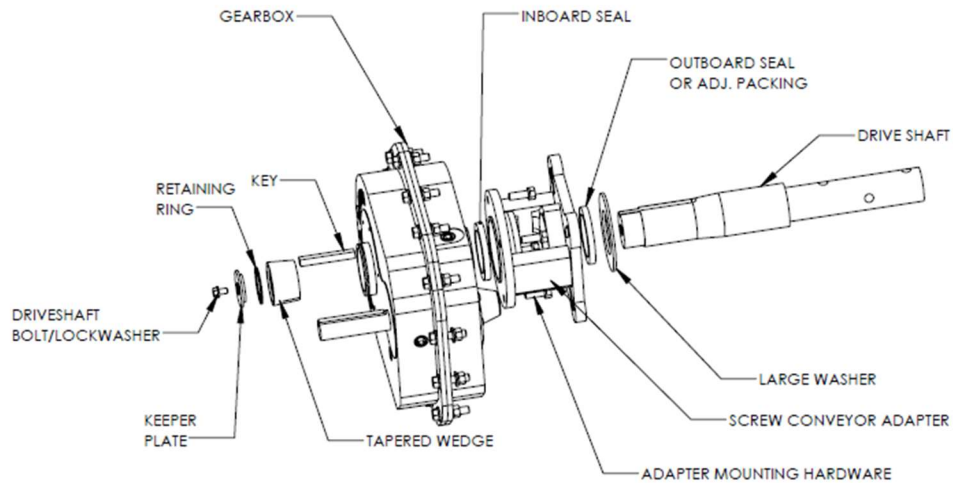


Figure 7: TAIL/MTA Assembly

Diameters:

The TAIL/MTA driveshaft has five distinct sections (See Figure 8 – Right to Left):

The first section is the diameter that goes into the screw to locate inside the pipe of the screw. It has cross drilled holes that connect it to the screw. This diameter/length will correspond to CEMA diameters/lengths. At the writing of this document, Dodge offers driveshafts for 1-1/2", 2", 2-7/16", 3", and 3-7/16". The cross drilled hole sizes and spacing also correspond to CEMA and change as this diameter gets larger. Figure 9 shows the different driveshafts that Dodge offers for a TA4207H/MTA4207H.

The second section is the diameter that goes through the screw conveyor adapter. This diameter is where the seal's lip or adjustable packing rides on. This seal/packing is right next to the trough end plate and its job is to keep the material in the screw. This diameter stays the same for each of the driveshafts that are offered for an appropriate gearbox size. It increases as gearbox size increases.

The next section is a tapered surface that goes from the sealing diameter to the clearance diameter. This tapered surface has a corresponding taper to the gearbox's output hub taper. It axially locates and centers the driveshaft. This tapered surface stays the same for each of the driveshafts that are offered for an appropriate gearbox size. It increases as gearbox size increases.

The fourth section is the clearance diameter that goes through the gearbox. It is a straight diameter that has clearance with the gearbox's output hub bore. This diameter stays the same for each of the driveshafts that are offered for an appropriate gearbox size. It increases as gearbox size increases.

The final section is a stepped down diameter. This is the diameter that the tapered wedge (see Figure 7) grabs as the driveshaft is tightened. This and the fourth section are keyed so that a key can be inserted for driving the drive shaft. This diameter stays the same for each of the driveshafts that are offered for an appropriate gearbox size. It increases as gearbox size increases.

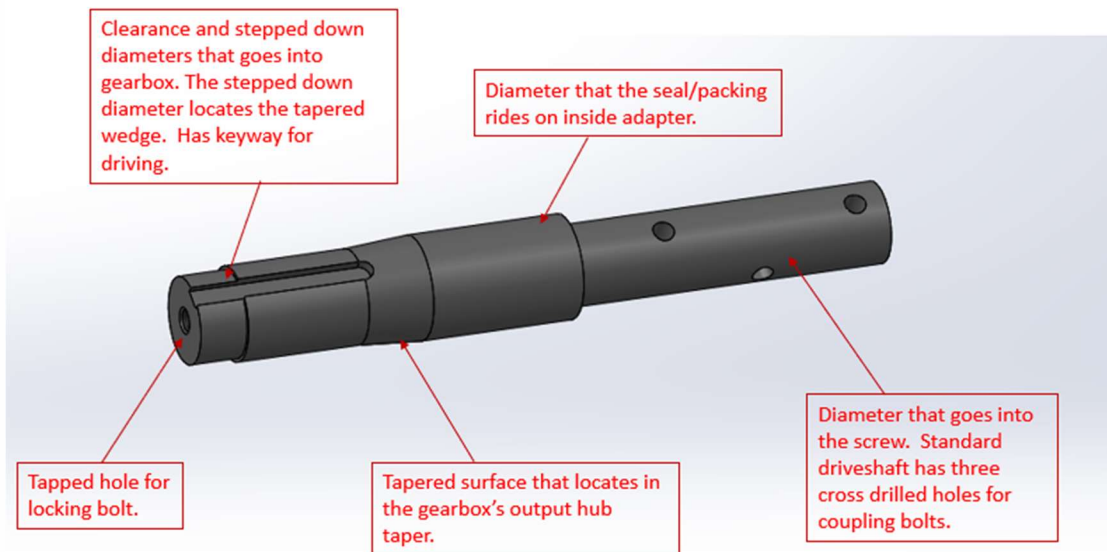


Figure 8: TAIL/MTA Driveshaft Sections



Figure 9: TA4207H/MTA4207H Available Driveshafts

Number of holes to connect to screw:

TAII/MTA driveshafts come standard having a 3 cross hole pattern for connecting to the screw (See Figures 8-9).

If a customer's screw only has 2 holes for connection:

If there is not an obstruction inside the screw, the two holes closest to the gearbox can be used.

If there is an obstruction inside the screw, the customer can cut/modify the driveshaft to accommodate.

Materials:

The driveshafts that are used with TAI/MTA reducers are made from either 1141 or 1144 steel for the steel driveshafts and 316 for stainless steel driveshafts. Other materials can be quoted if necessary but will be a longer lead time and higher cost.

Driveshaft Offerings:

For each gearbox size (up through TA7315H/MTA7315H), Dodge offers the following:

Standard Steel Driveshaft (3 Cross Drilled Holes)

Optional Stainless Steel Driveshaft (3 Cross Drilled Holes)