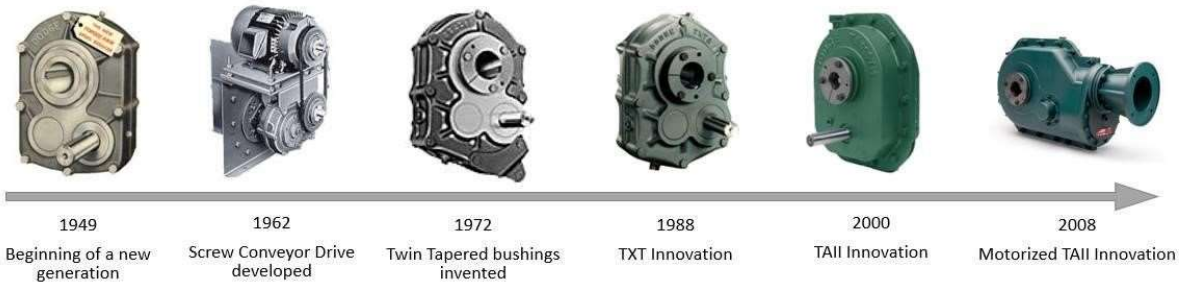
How to Determine if your Torque-Arm Reducer is Straight Bore or Tapered Bushed (TXT only)

The Torque-Arm reducer has been around since the late 1940's. When it was first introduced and through its first 25 years in the market, Torque-Arm reducers (# series and TD) were only a straight bore design. The straight bore design uses a hub that has internal diameter (ID) that is slightly larger than the max bore of the reducer. The straight bore hub has two hub collars (on each end of the reducer) that has two setscrews each that go through holes on the outside diameter (OD) of the hub and lock on the shaft/key of customer's shaft. If the customer is using a smaller shaft than the max bore of the reducer, then two straight bore bushings will fit inside the bore of the output hub and will use longer setscrews to lock to the smaller shaft.

In the mid 1970's, the TDT reducer was released and the tapered bore reducer with twin tapered bushings became available to the market. This tapered bushed reducer uses a hub that has ID tapered sections on each end of the hub for tapered bushings that are installed. On the OD of the hub, a bushing backup plate is installed, and a retaining ring is placed in a groove on the hub to keep this plate on. Hex head bolts are placed through the flange of the bushings and are threaded into holes of the backup plates on each side of the reducer. As the hex head bolts are tightened, the bushings' internal diameter contract and lock on the customer's shaft.

Even though TDT reducer introduced tapered bushed Torque-Arms, they were also still available as a straight bore reducers as well. When torque ratings improved in the mid 1980's, the TXT reducer was introduced and is still a popular reducer today. The TXT reducers are still available as either a tapered bore or straight bore design in most sizes.



Tapered bushed reducers are more common, but many customers still use straight bore reducers in their applications. This whitepaper will show how to look at a reducer or its components and determine if it is straight bore or tapered bushed. Tables 1 and 2 at the end of this whitepaper also lists reducers and whether they were available as straight, tapered, or both.

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The following can be looked at to determine if the reducer is tapered or straight bore:

1. Nameplate (pages 2-3)
2. Look for Tapered Bushings or Straight Bore Collars (pages 4-6)
3. Look for Bushing Backup Plate or Holes in Straight Bore Hub (pages 7-8)
4. Look at Output Hub or Bushings (page 9)
5. Bore availability Tables (pages 10-11)

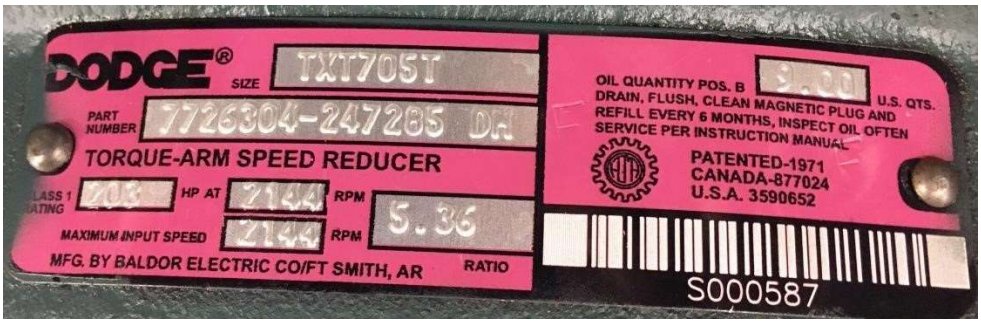
NAMEPLATE:

1. Look at Nameplate and compare six digit part number with what is in Dodge catalog.
2. If it is a TXT reducer, look at the last letter in the description. An “S“ denotes a straight bore and an “T“ denotes a tapered bushed. (i.e. a TXT315CT is a tapered bushed reducer, a TXT905S is a straight bore)
3. If it is an older reducer, look in Table 2 to see what this reducer was offered as. It may have been only a straight bore design.

Tapered Bushed:

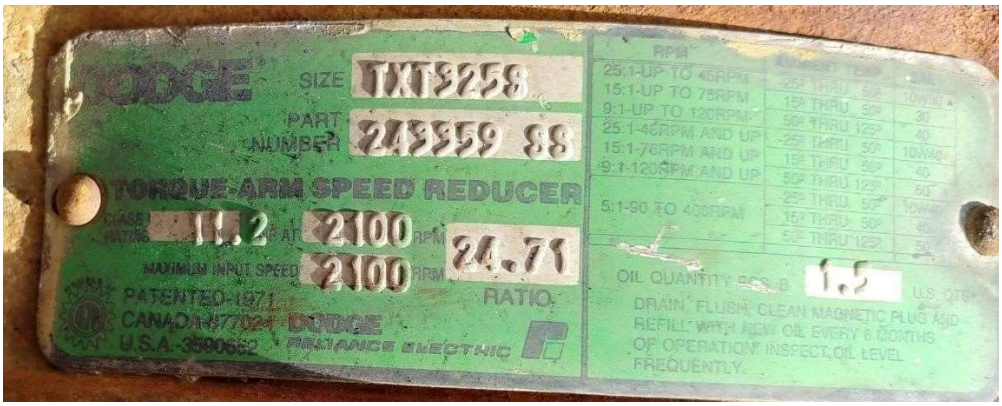
Part Description on below shows TXT325AT. “T“ at the end shows it is a tapered bushed reducer.

Part Description on below shows TXT705T. “T“ at the end shows it is a tapered bushed reducer.



Straight Bore:

Part Description on below shows TXT325S. “S“ at the end shows it is a straight bore reducer.



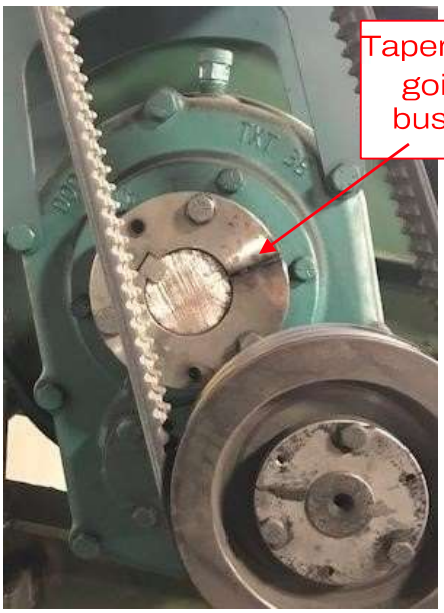
Part Description on below shows TD225. Looking at Table 2 shows that this reducer was only available as a straight bore.

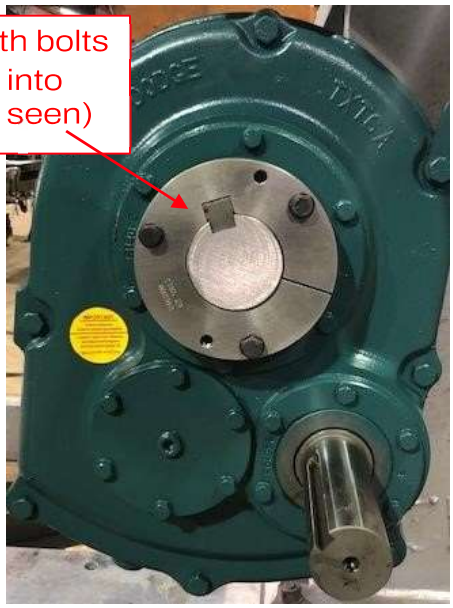
LOOK FOR TAPERED BUSHINGS OR STRAIGHT BORE COLLARS:

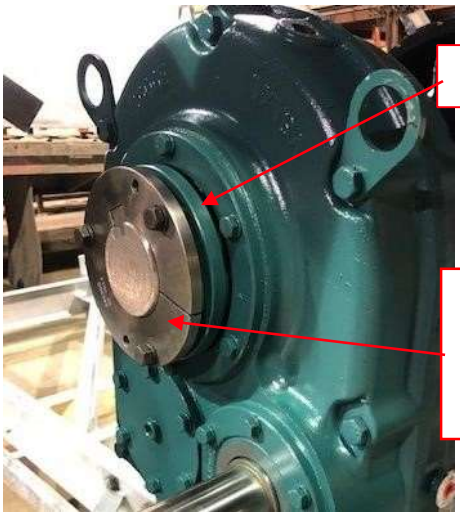
While the nameplate is a great place to start to try and identify the Torque-Arm gearbox. Sometimes, it has fallen off, illegible, or doesn’t differentiate it from tapered or straight (i.e. TDT525). The next step is to look at the output hub and see if you can see if the reducer has tapered bushings or straight bore collars still on the reducer. If they don’t, you will have to look at other features (described later) on the output hub itself.

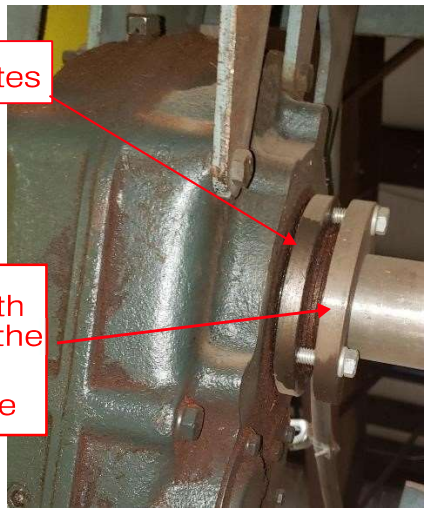
Tapered Bushed:

Pictures below show 3 bolts (sometimes 4) going through tapered bushing flange into bushing backup plate. Will be bushings on both the inboard and outboard sides of the reducer.



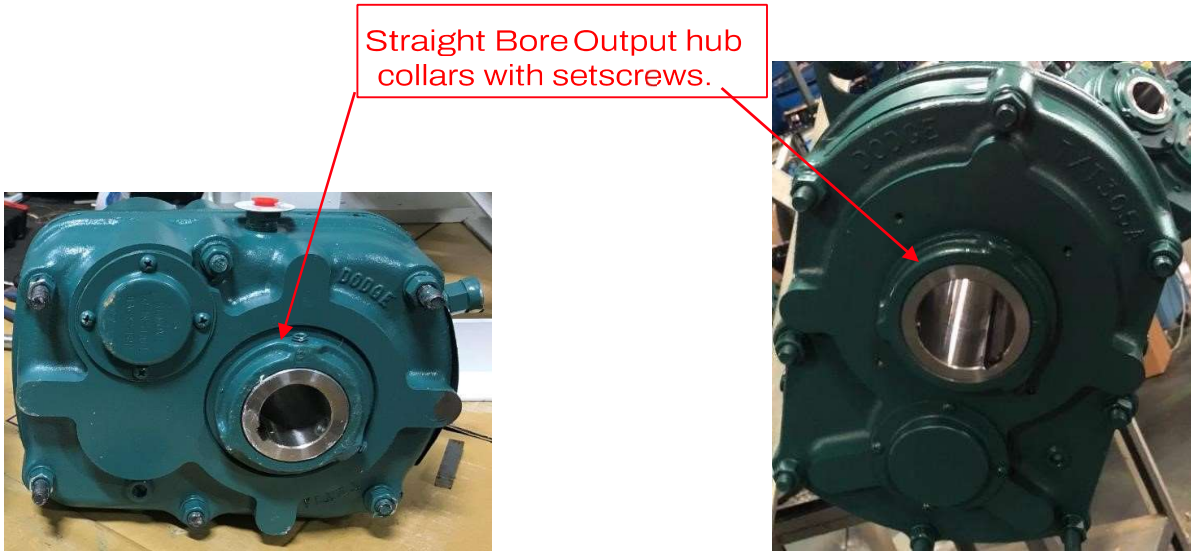






Straight Bore:

Pictures below show hub straight bore collars. They are mounted on the each end of the output hub of the reducer. Setscrews are tightened down onto the shaft and key of the equipment that it is driving. They can be used with or without bushings depending on the shaft size they are mounted on.



Picture of Straight Bore reducer from the field.

More Pictures of Straight Bore reducer from the field.

Straight Bore Output hub collars with setscrews on both sides of the reducer

LOOK FOR BUSHING BACKUP PLATE OR HOLES IN STRAIGHT BORE HUB:

Sometimes when you are trying to determine if a reducer is tapered or straight bore, the bushings or hub collars have been removed from the reducer. You would then look at other features on or about the output hub of the reducer.

Tapered Bushed:

Bushing removed. Still can see bushing backup plate and snap ring Installed on output hub. The ID at the end of the hub has a slight taper.

External Snap

ID Taper

Bushing Backup Plate

Extern Groov

Bushing, backup and snap ring Can see snap groove in OD and in ID of

ID Taper

Straight Bore:

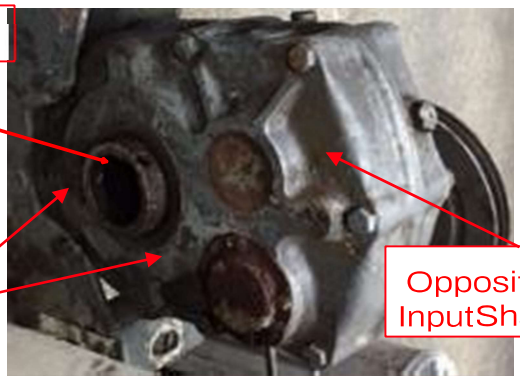
One thing to realize is that a TXT straight bore reducer (that has had its hub collars removed) looks like a SCXT reducer. The SCXT reducer does not have the hub collars and has holes drilled and tapped in the housing (around the output) opposite the input shaft side. These holes are there to bolt the reducer to the screw conveyor adapter to. These holes are not there on a straight bore TXT reducer.

TXT Straight Bore or SCXT

Need to look at more than just the input shaft side to determine what kind of reducer you have.
Is this TXT (straight bore)SCX

TXT Straight Bore Reducer

Input Shaft

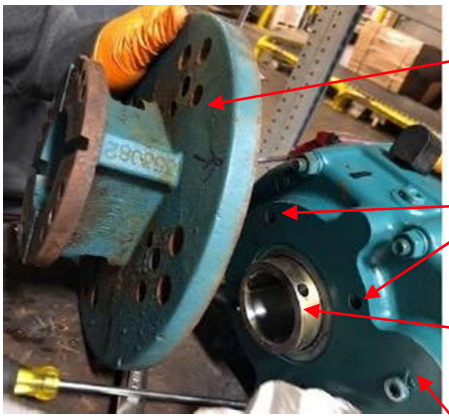


No Hub Collars but holes for setscrews

No Tapped holes around output

Opposite of InputShaft Side

SC XT Reducer



Old Style SC Adapter

Four Tapped holes around output

No Hub Collars but holes for setscrews

Opposite of Input Shaft Side

LOOK FOR OUTPUT HUB OR BUSHINGS:

Sometimes a customer is looking for a replacement output hub or bushings for their reducer. Below are some pictures to help differentiate between the two reducer styles.

Output Hub:

Tapered Bore

ID on each end is tapered

OD on each end has a groove for snap ring

Straight Bore

ID on each end is straight

OD on each end has 6 cross holes for setscrews

Bushings:

Tapered Bore

Has flange that has at least 3 through holes and 2 tapped holes (Similar to QD Bushing)

Has OD taper on thin wall section

Has saw slot

Has 1 or 2 keyways

Straight Bore

No flange

OD and ID are both straight

OD on one end ob bushing has at least 2 cross holes for setscrews

Has 0, 1, or 2 keyways

Reducer	Are Available as Straight, Tapered, or Both
TXT105 or TXT109	Both
TXT115 or TXT125	Both
TXT205 or TXT209	Both
TXT215 or TXT225	Both
TXT305 or TXT309	Both
TXT315 or TXT325	Both
TXT405 or TXT409	Both
TXT415 or TXT425	Both
TXT505 or TXT509	Both
TXT515 or TXT525	Both
TXT605 or TXT609	Both
TXT615 or TXT625	Both
TXT705 or TXT709	Both
TXT715 or TXT725	Both
TXT805	Both
TXT815 or TXT825	Both
TXT905	Both
TXT915 or TXT926	Both
TXT1015 or TXT1024	Both

TXT1215 or TXT1225	Tapered
TDT1325	Tapered
TDT1425	Tapered
TDT1530	Tapered

Table 2: Legacy Models of Torque-Arm Reducers

Reducer	Were Available as Straight, Tapered, or Both	Reducer	Were Available as Straight, Tapered, or Both
#1	Straight	TD015 or TD025	Straight
#2	Straight	TD115 or TD125	Straight
#3	Straight	TD215 or TD225	Straight
#4	Straight	TD315 or TD325	Straight
#5	Straight	TD415 or TD425	Straight
#6	Straight	TD515 or TD525	Straight
#7	Straight	TD615 or TD625	Straight
#8	Straight	TD715 or TD725	Straight
#9	Straight	TD815 or TD825	Straight
#10	Straight	TD915 or TD926	Straight
#11	Straight	TD1015 or TD1024	Straight
#12	Straight	TD1125	Straight
#13	Straight	TD1225	Both
#14	Straight	TD1325	Tapered
#15	Straight	TD1425	Tapered
#16	Straight	TDT115 or TDT125	Both
#17	Straight	TDT215 or TDT225	Both
#18	Straight	TDT315 or TDT325	Both
#19	Straight	TDT415 or TDT425	Both
T11	Both	TDT515 or TDT525	Both

T12	Both		TDT615 or TDT625	Both
T13	Both		TDT715 or TDT725	Both
T14	Both		TDT815 or TDT825	Both
T15	Both		TDT915 or TDT926	Both
T16	Both		TDT1015 or TDT1024	Both
T17	Both		TDT1115 or TDT1125	Tapered
T18	Both		TDT1215 or TDT1225	Tapered
T19	Both		TDT1325	Tapered
			TDT1425	Tapered
			TDT1530	Tapered