Product Brochure

Controlled start transmission

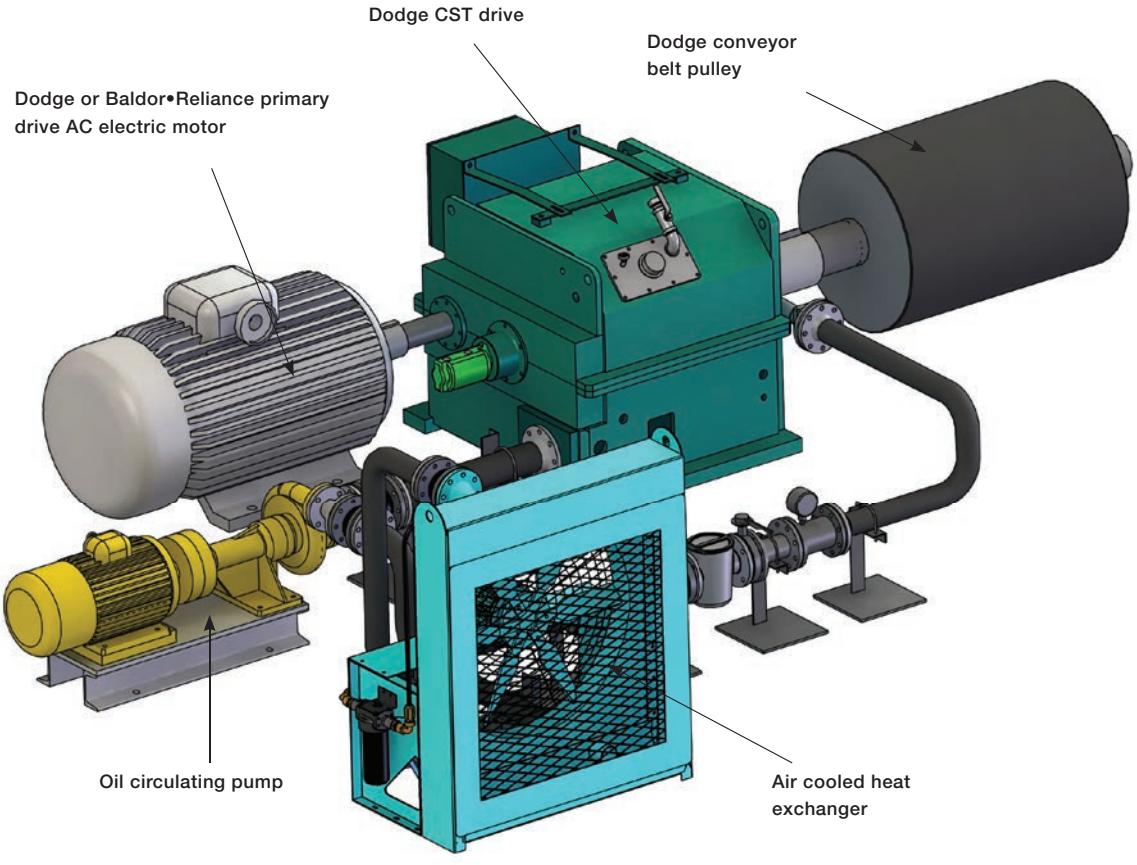
DODGE

What CST does…

The Dodge® CST (Controlled Start Transmission) is a 2 in 1 gearbox which combines a planetary gear reducer with an integral wet clutch system. When coupled to an AC induction motor the CST gearbox converts the motor's high-speed, low-torque input to a low-speed, high-torque output, suitable for direct coupling to a high inertia load, such as a conveyor belt pulley.

The Dodge CST drive package is a very cost effective solution, engineered specifically to deliver total control of the most difficult high inertia loads such as long conveyor belts and conveyors with multiple synchronized drives. The CST drive provides efficient transmission of motor power and torque with consistent smooth start-up and shut-down, regardless of varying loads on the conveyor or ambient conditions.

CST load sharing performance is unsurpassed even when a system requires multiple drive stations such as tripper drives.

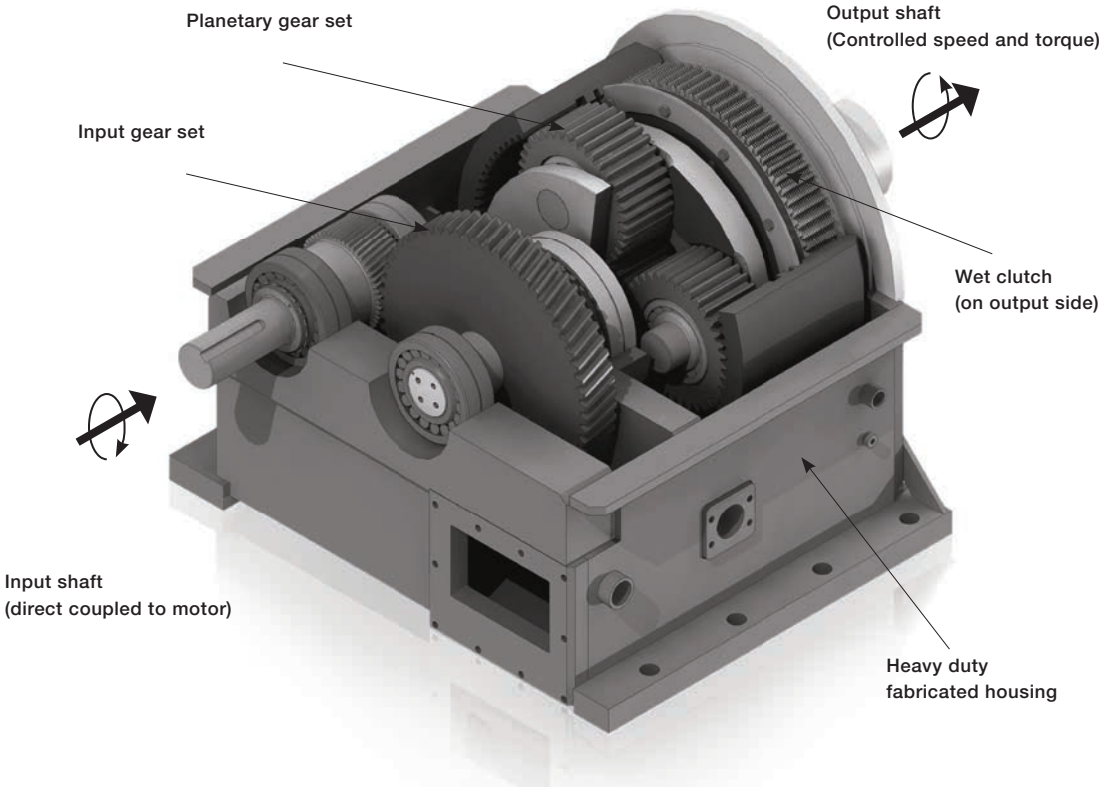


How CST works…

The Dodge® CST incorporates a wet clutch system that is located on the output shaft side of the gearbox, allowing the motor to be started under no-load conditions. The clutch system comprises a set of rotating friction plates and opposing stationary plates, an oil pressure activated piston for engagement, and a spring mechanism for clutch release. Oil is circulated between the plates by a closed circuit pump and cooled through a heat exchanger.

When hydraulic oil pressure is applied to the piston, the clutch plates engage, causing the output shaft to rotate and gradually accelerate to driving speed in predetermined controlled time.

Drive control and feedback equipment is mounted on the gearcase and is comprised of a hydraulic manifold, proportional valve, pressure adjusting valve, filters, gauges, and sensors. These are interfaced via hard-wiring or data-network with a PLC based CST controller which can control up to four CST units for multi-drive synchronized applications.



More than soft start…

Dodge® CST delivers a range of benefits not available from electronic soft-start motor control alone.

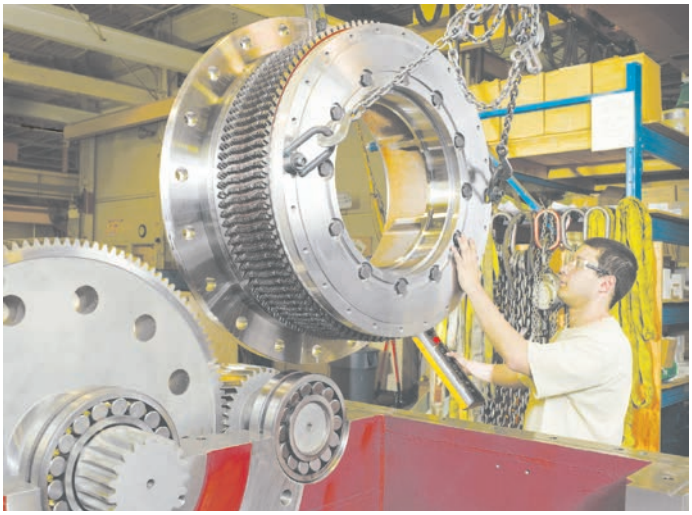
CST delivers excellent motor load sharing to minimize the loads and stresses on all conveyor components. Maximum motor power is available throughout the controlled speed profile, and the clutch unit absorbs shock loads, protects the motor, gearbox, bearings, belt idlers, pulleys, conveyor belts and splices.

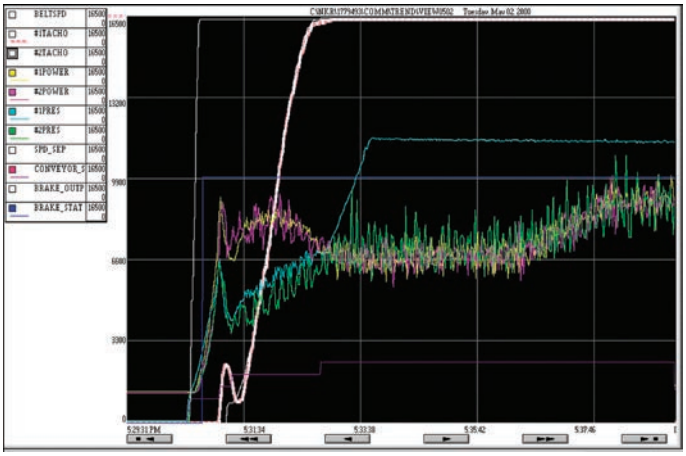
The CST control system delivers an S-curve acceleration ramp. After the drive motor is up to full speed, a pretension torque is applied to the belt to the point of initial belt movement. When the transient belt waves have stabilized, additional torque is applied to accelerate the system to full speed.

This acceleration ramp can be several minutes in length as required by the conveyor system and is consistent regardless of the loading conditions.

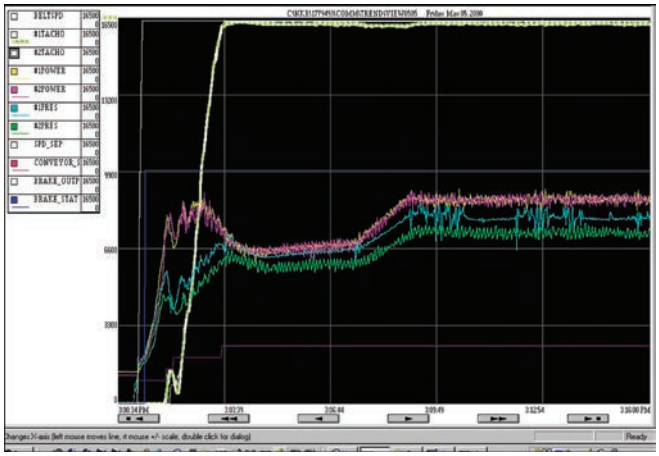
Advantages include reduction in:

Peak motor demand, potential slippage between drive pulley and belt; belt transient stress waves, and shock and surge loads on conveyor components.





Trend analysis shows the motor experiencing heavy load surges with typical drives.



Trend analysis shows load shocks on the motor substantially smoothed when CST clutch is programmed for soft start. The clutch absorbs shocks and load surges, delivering superior drive performance and overall component reliability…Controlled acceleration ramp delivers significantly reduced shock loadings and peak stress…

The power of CST…

While the unique clutch design of the Dodge® CST delivers the smooth speed and load control during start-up and shut-down, the precision engineered planetary gear train converts the high-speed, low-torque input from the AC motor, to a low-speed, high torque output efficiently and safely.

With a CST drive, the motor starts unloaded and comes up to full speed with no load. In addition, when multiple drive motors are utilized, they can be brought up to full speed independently prior to applying any load. Starting the motors in this manner limits the demand on the power grid because the motors are at full speed before applying load; the available starting torque is not limited to the motor pull up torque as for most drives. In fact the full breakdown torque of the motor is available, if required, without over sizing the system.

Model CST G750K

Model CST G1500K

Model CST 2500K

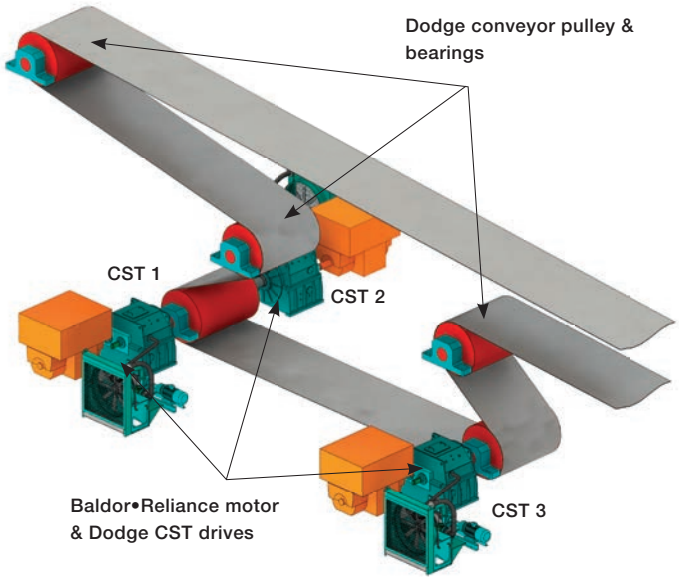
Synchronized Control…

The Dodge® CST control system executes synchronized soft start and load sharing control of up to four CST drives per drive station, and can be interfaced with plant remote supervisory systems, interlocks and safety equipment via hard-wiring or over a data-network.

Standard interface is Ethernet, alternative connectivity is available including:

➟ DH+ ➟ Profibus ➟ Modbus ➟ DeviceNet

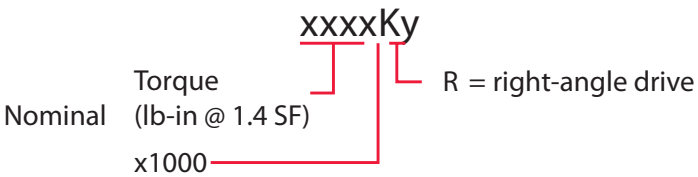
NEMA-4 CST controler

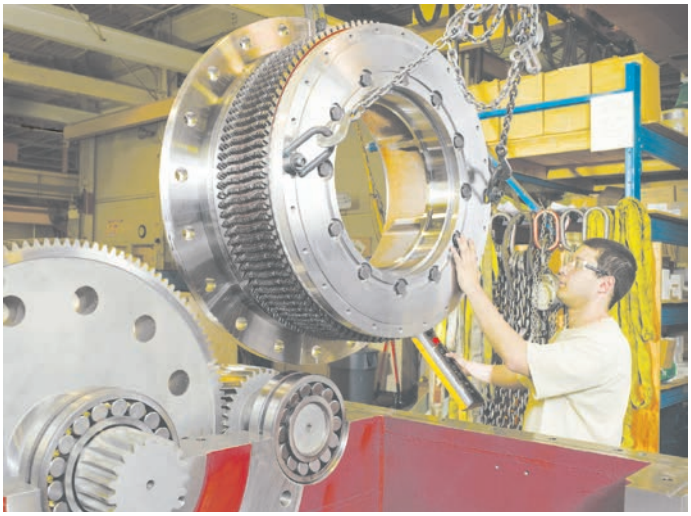


CST nomenclature…

The basic CST description is based on the nominal torque rating in lb-in at a 1.4 service factor. For example a 1000K CST has a nominal rating of 158144 Nm (1,400,000 lb-in) of torque. All models are available in offset parallel configuration and some are available on a right angle model. The right angle versions are indicated by an “R” suffix.

Dodge® CST drive model designation





Models and specifications of Dodge CST drives

CST model (K = 1000 lb-in Torque)		Max. HP on Input shaft at 1780 rpm service factor = 1.4		Gear ratio	Output speed (@ 1780 rpm Input) RPM
lb-in	Nm	HP	kW		
280K	31628	400	300	15,3750 - 38,1563	115,8 - 46,7
280KR	31628	400	300	15,2190 - 57,2128	117,0 - 31,1
420K	47443	600	450	16,8636 - 38,3478	105,6 - 46,4
420KR	47443	565	420	16,7334 - 57,2197	106,4 - 57,2
630K	71165	900	670	16,6250 - 38,3333	107,1 - 46,4
G750K	84720	1414	1050	15,6214 - 38,9118	113,9 - 45,7
G750KR	84720	1431	1067	15,4339 - 40,3946	115,3 - 44,1
G1000K	112960	1749	1300	12,0582 - 38,5110	124,2 - 46,2
G1000KR	112960	1749	1300	12,5528 - 55,5909	141,8 - 32,0
1120K	126515	1500	1118	17,0769 - 34,9091	104,2 - 51,0
1120KR	126515	1249	930	16,8587 - 57,6261	105,6 - 30,9
G1500K	169440	2375	1771	12,3673 - 34,9091	111,6 - 51,0
G1500KR	169440	2375	1771	12,2609 - 57,6261	145,2 - 25,7
1950K	220272	2500	1864	17,1000 - 38,3727	104,1 - 46,4
2500K	282400	2900	2162	17,1000 - 38,3727	104,1 - 46,4

The CST package...

Baldor can supply your complete drive package with our proven products.

Get a complete engineered system including:

- Dodge CST
- Dodge or Baldor•Reliance motor
- Drive base
- Dodge couplings
- Flywheels
- Dodge conveyor pulleys
- Dodge mounted bearings
- PLC control system

The reliability of CST...

Dodge CST design and manufacturing is based on reliability in difficult environments. Utilization of CSTs for starting and load sharing in complex bulk materials handling applications affords the precise control required with a simple yet reliable solution.

The rugged construction and simplicity of a mechanical soft start and load sharing drive make CST a great choice for demanding applications where high availability is a must. The design incorporates a rugged gear train and many other standard features to assure a long life of trouble free performance. The superior sealing system, incorporating tandem lip seals with a grease purge cavity, provides taconite protection with the added benefit of the excluder lip seal preventing contamination within the grease cavity.

Testimony to the durability of CST systems is evidenced by the fact that many CST systems have been in service for decades around the globe. Serviceability is also a key factor in selection of a drive system. CST systems are simple to operate and maintain without the high degree of technical expertise required by more complex control packages. This is especially important in the remote locations relying on local resources for service and maintenance.

CST is a simple, reliable solution for high availability and lower cost of ownership.

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