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Key Technologies

TECHNOLOGY PROFILE

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To learn more about Toshiba Motors and Drives,
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WHY IS **TOSHIBA**

THE MOST COMMONLY INSTALLED MEDIUM VOLTAGE DRIVE

IN THE CANADIAN PIPELINE AND DISTRIBUTION NETWORK?

ADVANCED TECHNOLOGY

Smaller footprint, reduced component count, and the latest safety technology on the market.



SMALL FOOTPRINT - LARGE SAVINGS

Toshiba's innovative design allows the drive to be easily retrofit and paired with existing motors.



THREE CABLES IN, THREE CABLES OUT

Control and auxiliary power assemblies are not required for internal components (eg. cooling fans). With Toshiba drives, these requirements are integral to the design and installation is simple. 3 cables in, 3 cables out.



1-800-265-1166 (TOLL FREE)
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Toshiba Medium Voltage Drive Systems for Pipeline Lift Stations, Gas Compression, Water/Wastewater Pumping: Explaining Synchronous-Transfer & Capture

Medium Voltage Drives provide the ability to control motors under large loads in pipeline, mining, and processing facilities. Depending on facility horsepower requirements, Medium Voltage solutions start to make economic sense once motor sizes reach the 500 HP to 1000 HP range.

When a Medium Voltage Motor is operating on a Medium Voltage Variable Frequency Drive (VFD), the operation of transferring the Motor from the VFD to Utility power (with seamless transition) is known as closed-transition Sync-Xfer (Synchronous Transfer). Similarly, when the Motor is operating on Utility power and being returned to VFD control (again with seamless transition), this is known as closed-transition Sync-Capture (Synchronous Capture).

Sync-Xfer provides a perfect solution for gas compression, pipeline transmission applications, and water/wastewater pumping. Sync-Xfer allows users to save additional energy when running at full loads, and additionally when starting large motors in weak power systems.

Sync-Xfer:

Sequence of Operations:

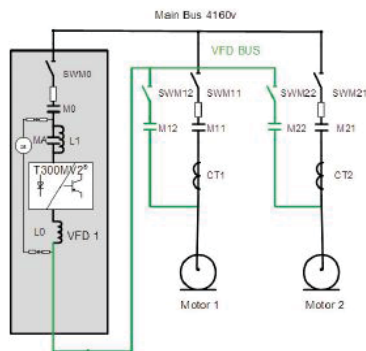


Figure 1: Toshiba T300MV2® Sync-Xfer

The Switch(s) SWM0/12/11/22/21 are closed. The Drive is made operational by closing the M0 contactor and pre-charge MA contactor. When Motor 1 is selected to run from the VFD, M12 is closed and T300MV2® Drive is accelerated to the speed setpoint determined by the user. When Sync-Xfer is requested, the T300MV2® accelerates the motor on a predetermined ramp rate to the Main bus voltage, frequency and phase angle.

The integrated technology within the Toshiba T300MV2® ensures seamless closed-transition Sync-Xfer, however a Sync-Check relay is added to the circuit for a secondary permissive check. When the drive input and output is matched in voltage, frequency and phase, the Toshiba medium voltage drive makes the transition to utility power.

Toshiba includes current monitoring in T300MV2® by using an auxiliary current transducer to determine the current flowing through Motor 1. Once confirmation of current flowing is received, a contactor opens and seamlessly transfers the Motor (M1) to the Main bus.

The Toshiba T300MV2® Sync-Xfer Drive also includes an integral Sync-Xfer Reactor, providing impedance to the Main Bus.

The Toshiba T300MV2® is now ready for Motor 2 (for control or Sync-Xfer), or to Sync-Capture Motor 1.

Sync-Capture:

Sequence of Operations:

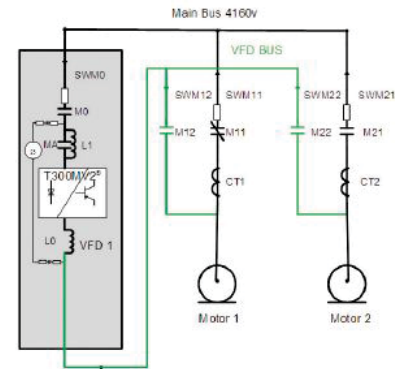


Figure 2: Toshiba T300MV2® Sync-Capture

The Switch(s) SWM0/12/11/22/21 are closed. The Drive is operational, and Motor 1 is running on Main Bus.

When Sync-Capture is requested, the Toshiba medium voltage VFD prepares to gate the output to produce output voltage. As soon as current flows from the drive to Motor 1, Contactor M11 is opened and the VFD has operational control of Motor 1. The Toshiba VFD can now control the speed to the user defined setpoint.

Advantages of Toshiba Sync-Xfer:

Sync-Xfer lowers the system cost in applications where multiple Motors are controlled by one or multiple medium voltage VFDs, and/or the drives can be used for soft-start duty.

Toshiba's Medium Voltage Sync-Xfer drive systems control either multiple motors or soft-start a motor with a single Medium Voltage Variable Frequency Drive. Sync-Xfer systems are designed to ramp up the motor to synchronous line speed and connect the motor to the feeding source smoothly with minimum-to-no torque disturbance.

Toshiba medium voltage VFDs provide a smooth transition during Sync-Xfer and Sync-Capture with proven reliability. When combined with the precision of Toshiba vacuum contactors, vacuum circuit breakers, and an integrated building solution provided by Tundra Process Solutions, system reliability is unparalleled. To-date, over 800 Toshiba medium voltage drives and 150 medium voltage VFD-building-packages have been installed in Western Canada by Tundra Process Solutions.

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