Safe Torque Off (STO)
Feature Guide

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What is Safe Torque Off (STO)?

STO is a safety feature implemented in inverter drives to prevent the motor generating any torque so that it is reliably stopped when a safety function is activated. Once the STO is activated, power to the motor is cut off, and the drive ensures that the motor coasts to stop with no additional torque generated.

When is STO Required?

This feature is required in applications where unexpected or unintended motion could pose a safety risk to personnel or equipment. It is left to the engineer to determine whether safe shutdown is required in an application. If an STO function is not present on the inverter, external components such as a contactor or relay can be used to power off the motor in case of a safety event.

How can IMO help?

Simple! All IMO inverters come equipped with STO onboard as a standard feature making the engineer's job easier by ensuring that all IMO inverter-driven motors can be safely shut down.

This also avoids the need for external components which are costly and can themselves be less reliable than onboard electronic STO.

In a production environment where multiple inverters are being used, STO circuits can be daisy-chained to create a single safety circuit that shuts the entire producion line if a single safety point is triggered.

Application of STO

The STO feature is implemented through dedicated terminals on the inverter. External safety devices, such as emergency stop buttons, safety relays, or safety controllers, can be connected to the STO terminals. When a safety event occurs, these safety devices trigger the STO function, activating the Safe Torque Off.

Implementation of Dual Channel STO in IMO Inverters

The STO functionality is managed through two terminals labelled H1 and H2. When STO is not in use, these terminals are shorted to the +24 V supply using a metal jumper as in Figure 1.

When STO is engaged, remove the metal jumper and connect the terminals to external Normally Closed (NC) contacts. These NC contacts serve as a safety measure, switching in case of a safety violation to ensure the effective activation of the STO feature.

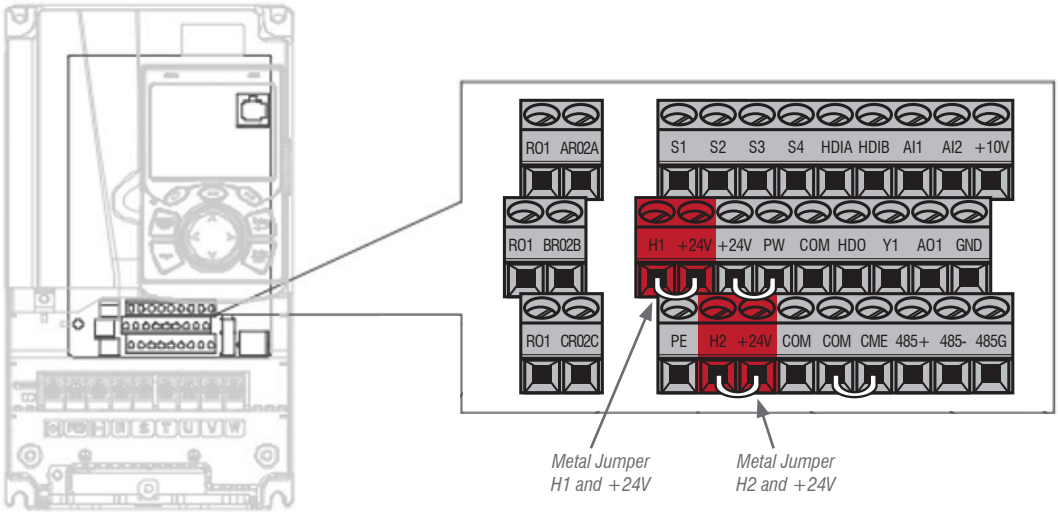

Figure 1: H1 and H2 terminals for STO shorted to +24 Supply

Conforms to standards: IEC 61508-1, IEC 61508-2, IEC 61508-3, IEC 61508-4, IEC 62061, ISO 13849-1, IEC 61800-5-2.