Parameterize extended safety via terminal control.

SINAMICS G120 CU240x-2

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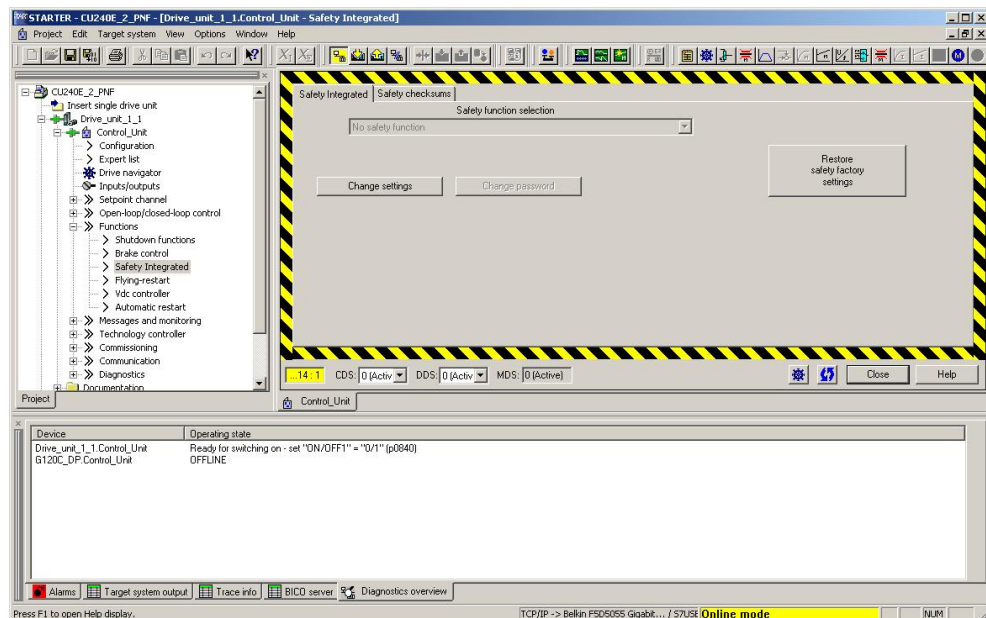SINAMICS G120 CU240x-2: Parameterize extended safety via
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1 Parameterize extended safety via terminal control.

Using Starter to configuring extended safety via terminals when using a SINAMICS G120 CU240x-2.

In this example, we are going to do Safe Stop 1 (SS1) with F-DI-2 (T16 and T17). The other functions we are not using in this example, so we will change them to statically inactive. If you desire different safety functions with different inputs, just configure them as we did SS1.

1. In the starter window, select Functions > Safety integrated.
   The following window will open. Click the "Change Settings" button.
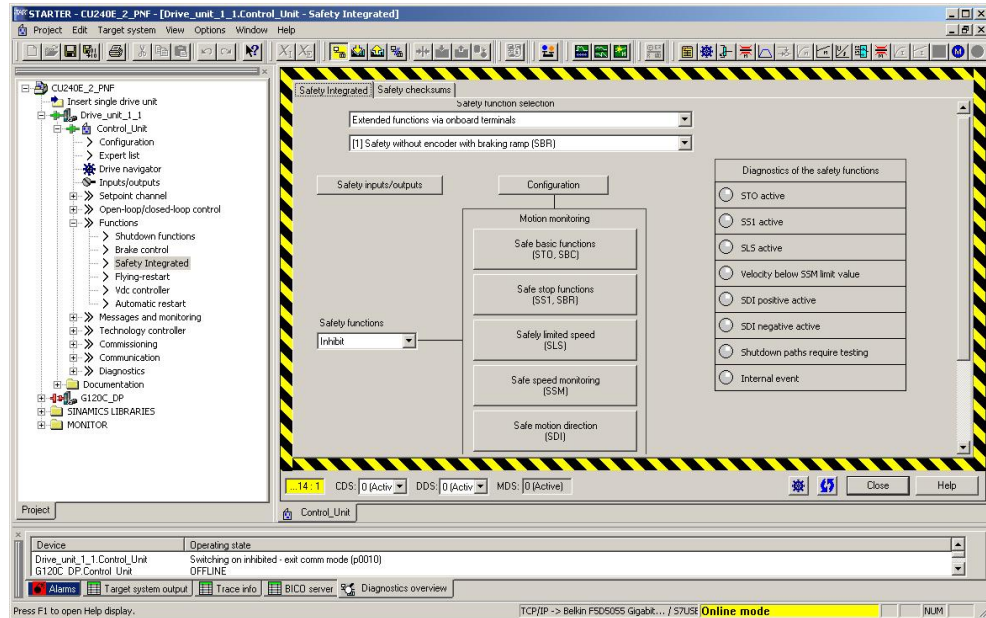
Figure 1   STARTER window, select Safety integrated Functions

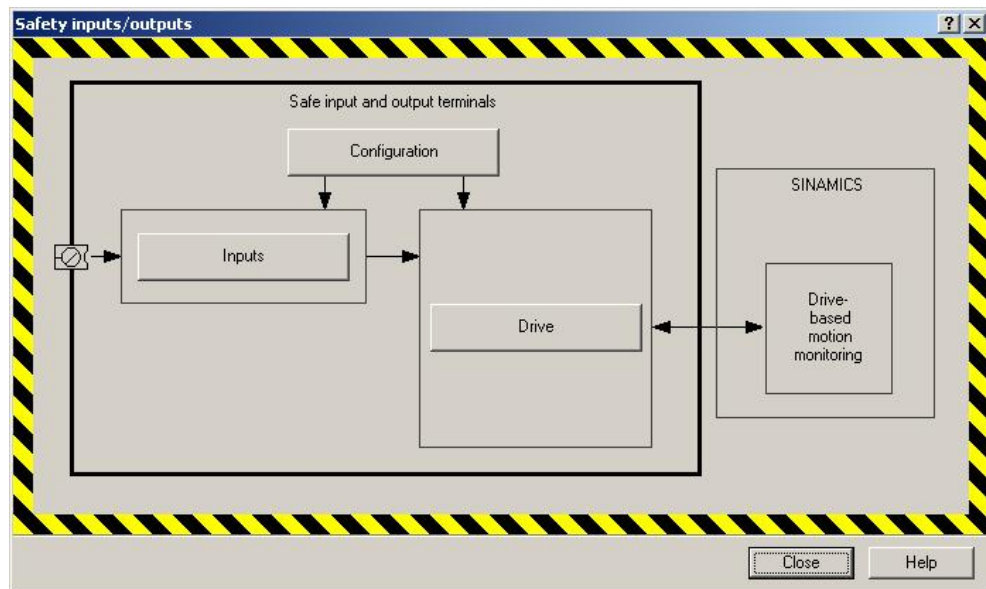2. In the top Drop down choose "extended functions via Onboard terminals"

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Figure 2   STARTER window, select Safety integrated Functions, extended functions

3. Select the "Safety Inputs/Outputs" button.
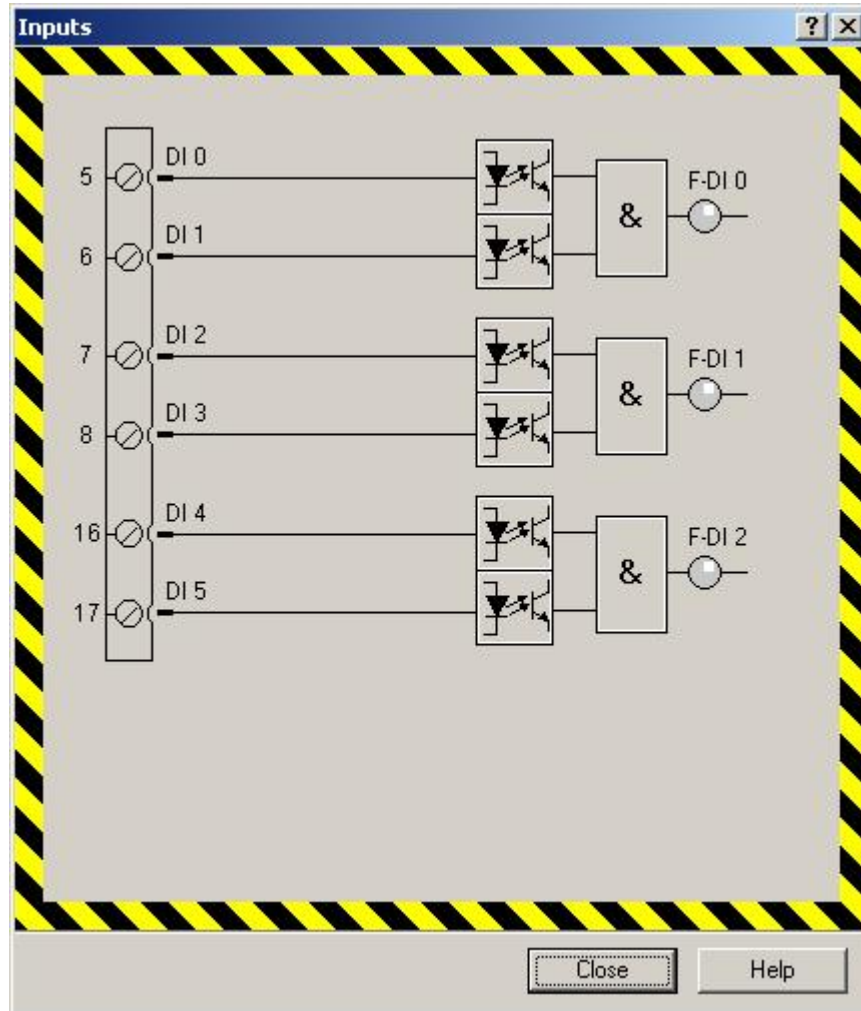   The following window will open

Figure 3   Safety inputs/outputs

4. Click the inputs button.
    You can note the inputs that you are using, and the safety function they
    connect to (F-DI-0, F-DI-1, and F-DI-2).

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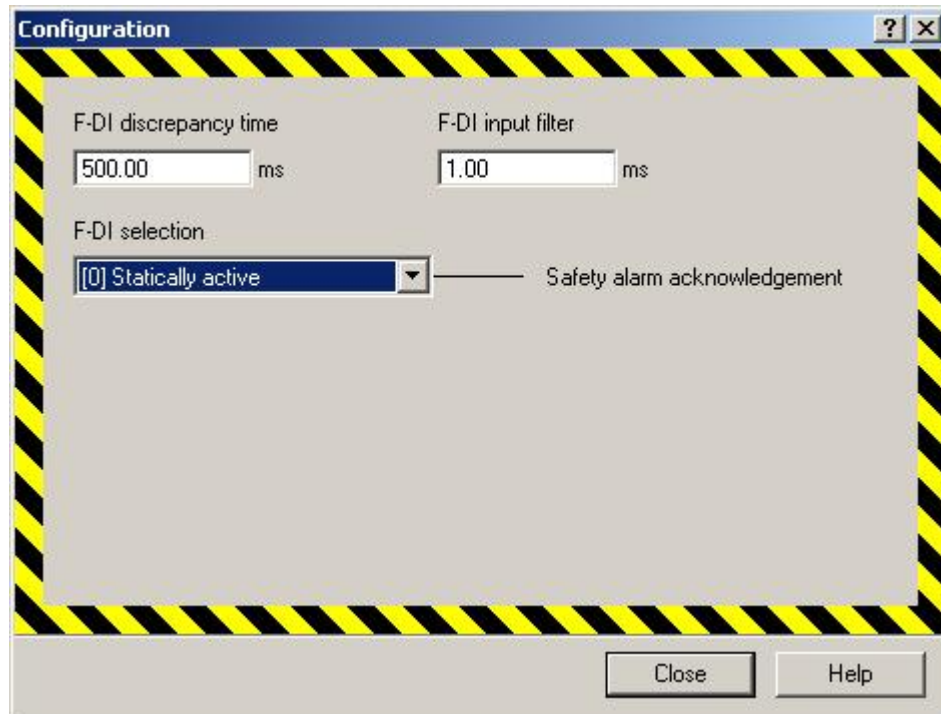terminal control. 105025811

Figure 4　　　　Safety inputs

5. Close the inputs box, and select the "configuration" button.
    Here you can configure the allowable time for the switches to be out of sync
    with each other, as well as the inputs that can acknowledge a safety alarm.

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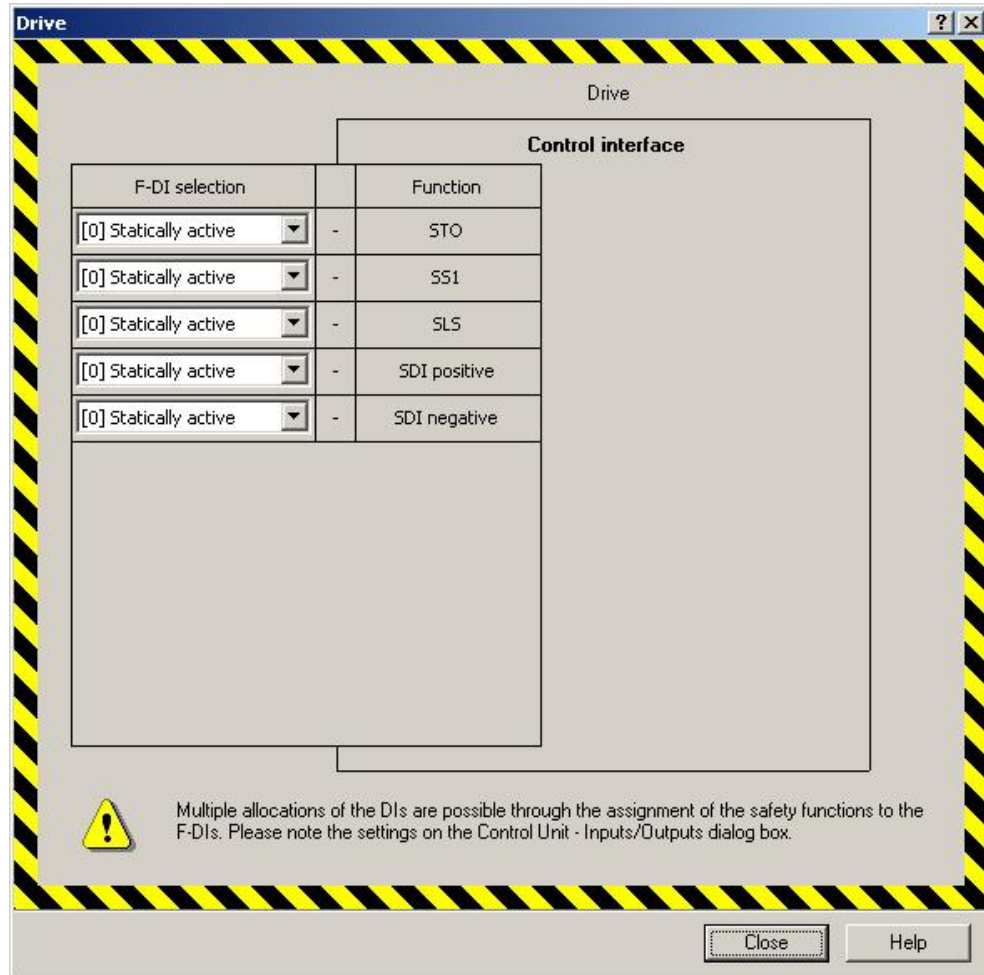terminal control. 105025811

Figure 5   Safety inputs, configuration

6. Close the configuration window, and select the "drive" button.
    The following window will open

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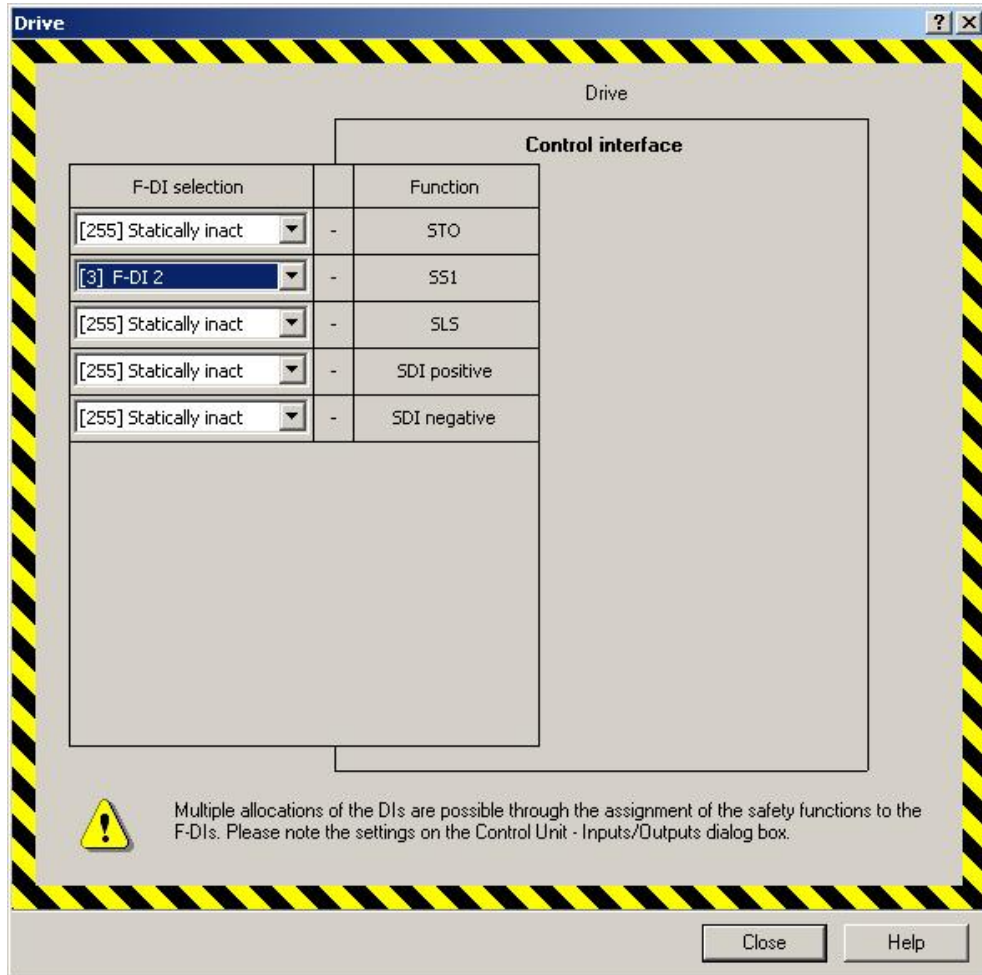terminal control. 105025811

Figure 6   Safety inputs, drive

7. Choose the function that you want to enable on the center, and click on the dropdown to associate it with the F-DI selection that you want to perform the function.

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Figure 7   select safety function, SS1

8. Close the drive window.

   – Now since we are going to configure SS1, click on the SS1 box.

   – SS1 will use the ramp down time programmed for OFF3.
   We will change that time later. As you can see in the window, SS1 will be
   issued, and the drive will ramp down to 10 RPM, based on the ramp down
   time for OFF3 . Then at 10 RPM, STO will be issued.

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Figure 8   SS1 functions
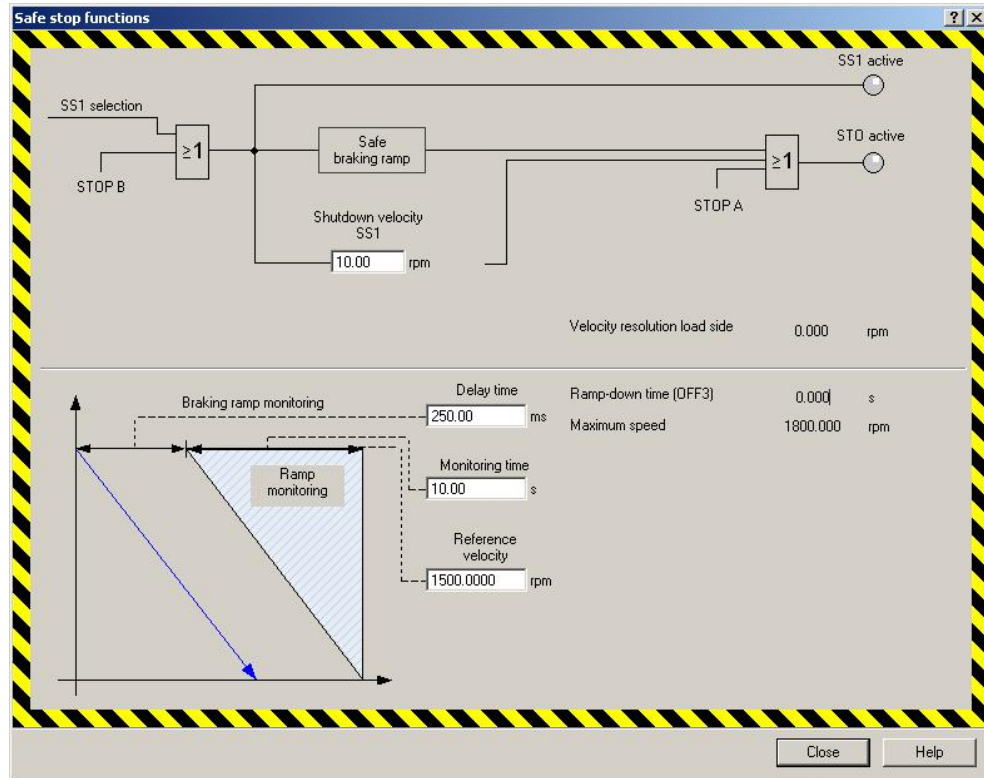
9. Select the configuration tab on the top of the safety integrated page.

    –   We will use DI3 on terminal 8 to acknowledge the A01697 alarm (shutdown paths must be tested) that is generated on a power cycle, or when the time set on this page expires.

    –   Also, set the time for the forced dormant error detection to the value deemed acceptable by the integrator. This time defaults to 8 hours and can be set up to 9000 hours (1 year).

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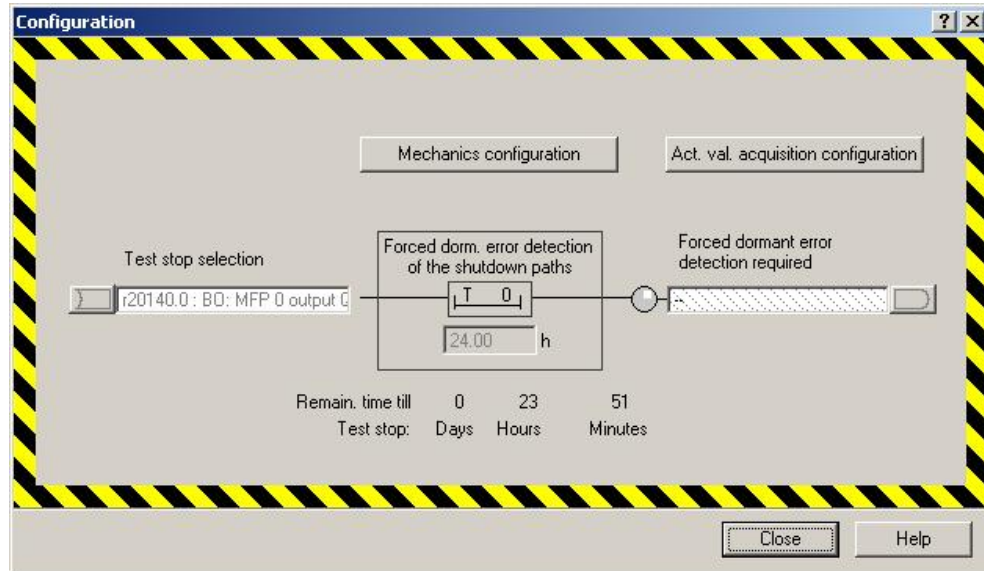Figure 9   SS1 configuration box
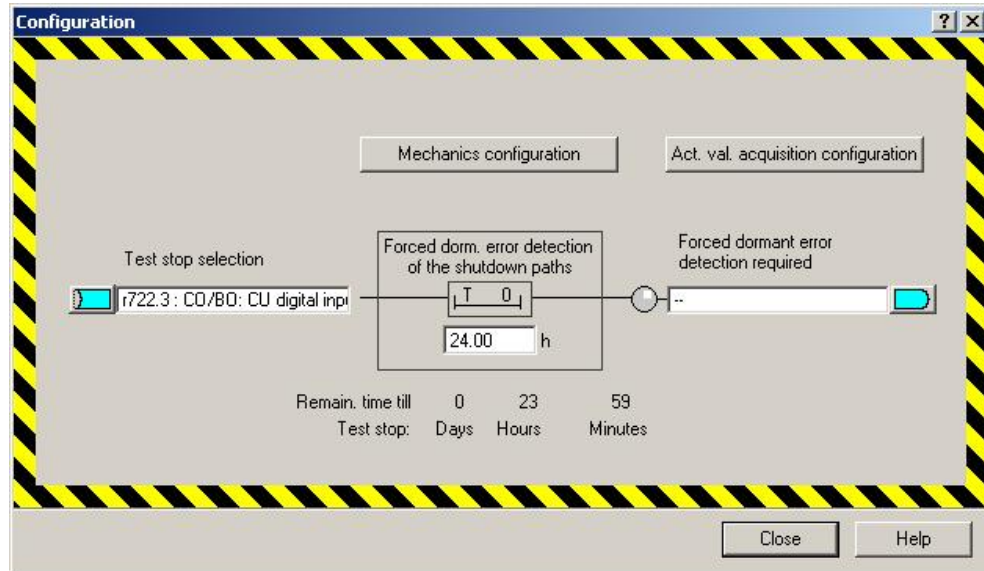
NOTE	As alternate to using a digital input, we can configure the safety function to auto reset this timer when an alarm is issued. This is accomplished using a pulse timer, triggered by the alarm active bit. This option is configured by:

- Set P20138 (MFP pulse timer) to control unit: r2139.7

- Set P20139 MFP pulse duration to 1000 (1 second)

- Set P20140 MFP0 run time group to (5) runtime group 5

- Set the test stop selection in safety integrated to r20140.0
  MFP0 output

This will acknowledge the forced dormant error detection every time an alarm of any type is issued. It is completely up to the integrator to determine if this will cause any violations of their safety standards. We are only providing this as an option.

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Figure 10   SS1 configuration box

10. Close the SS1 configuration box.

   – Set Safety functions to enable.

   – Click on Copy parameters, and then activate settings. You will be
     prompted to change the password.

   – Close this prompt.

   – The default password is 0. If you change it, make sure you document it.
     The password cannot be recovered, and safety cannot be changed or
     reset without the password. If you want to leave it at 0, click cancel.

   – Answer yes to performing a ram to rom save.

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Figure 11   Set Safety functions to enable
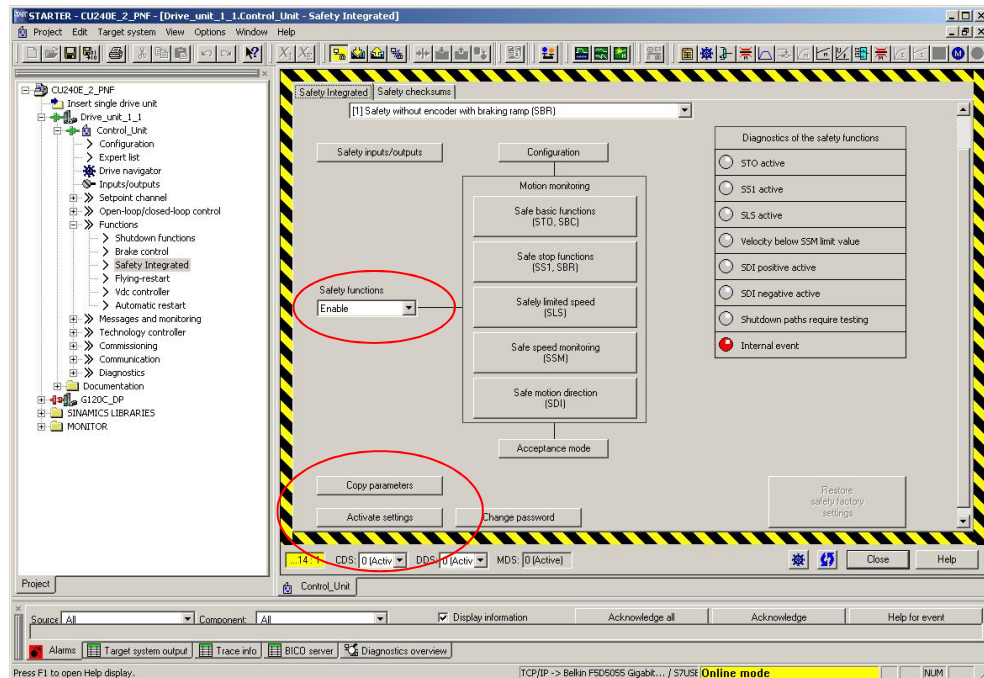
11. Acknowledge the faults in the drive by selecting the "alarms" tab at the bottom
of the page.

  – Click the "acknowledge all" button. You will still have an alarm that a power
    cycle is required to activate safety settings.

  – Upload the parameters to the offline project (select load project to PG on
    the toolbar).

  – After the upload is complete, go offline, and cycle power on the drive to
   activate the safety settings.

NOTE	If you are powering the drive with external 24 volts, this power will have to be cycled also to allow the safety activation.

12. When the drive powers back on, cycle the safety inputs off.
    The SAFE LED on the front of the drive should start blinking Amber.

  – Close the safety inputs and the SAFE LED should be on steady Amber.

13. Set the desired ramp down time for the OFF3 ramp down.

  – Select Functions> Shutdown functions.

  – Set the desired ramp down time at the bottom of the page.
    In this example we set the time to 5.0 seconds.

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Figure 12   Shutdown functions
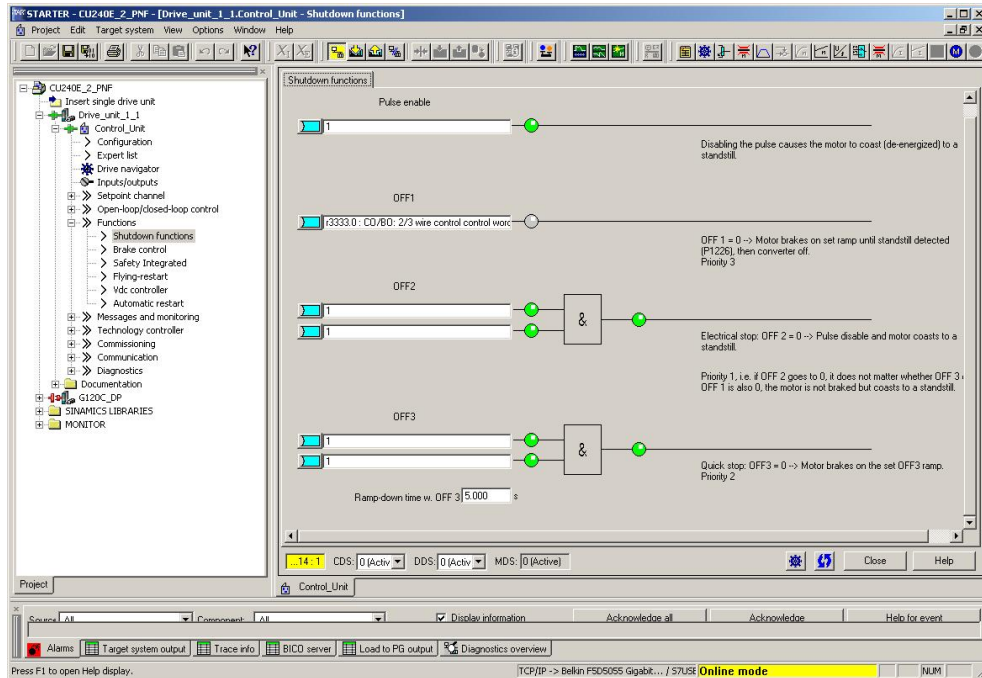
14. Now run the drive and test the functions you have configured.
    When the Safety inputs are on, the SS1, STO, and SLS lights will not be on. If
    the drive is running and the safety inputs are opened, the SS1 light will
    immediately illuminate as the drive ramps down. When the motor stops, the
    STO light and the SS1 light will both be illuminated. They will stay on until the
    safety inputs return to the high state.

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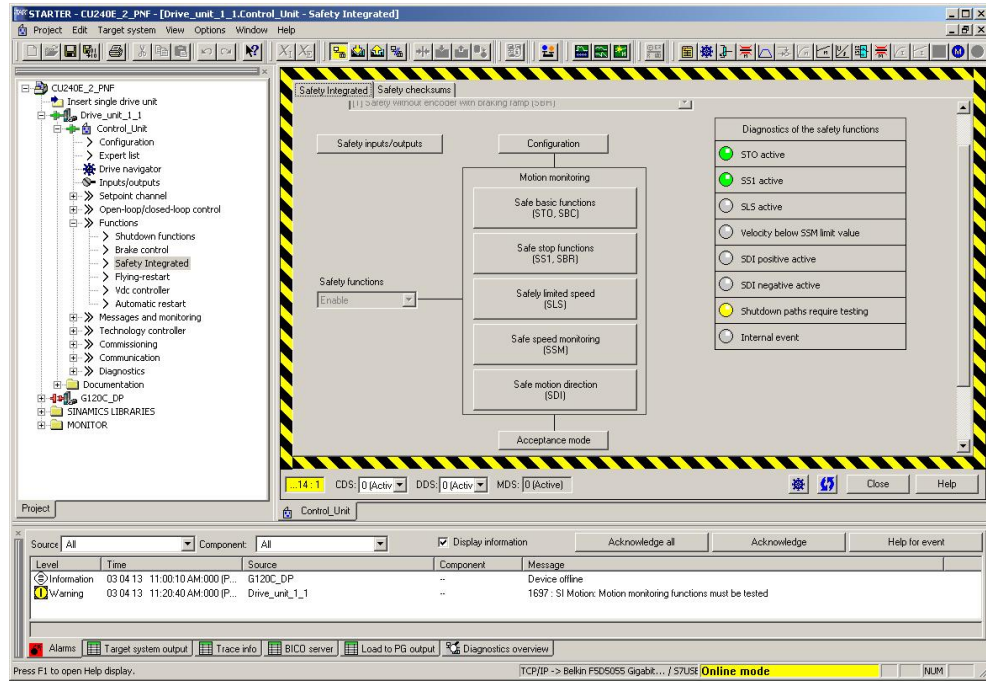terminal control. 105025811

Figure 13   Safety inputs off (safety is active)

Figure 14   Safety inputs on (safety is not active)