

# Beckhoff Servo Drive Error Diagnosis

How to use the Drive Manager tab on System Manager to view historical drive errors on Beckhoff drives

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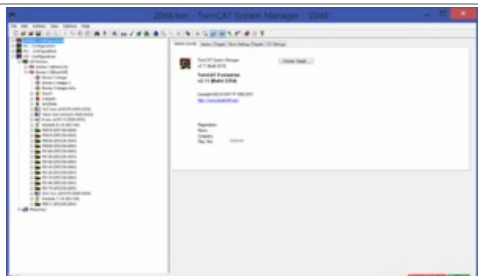
## Drive Errors vs Axis Errors

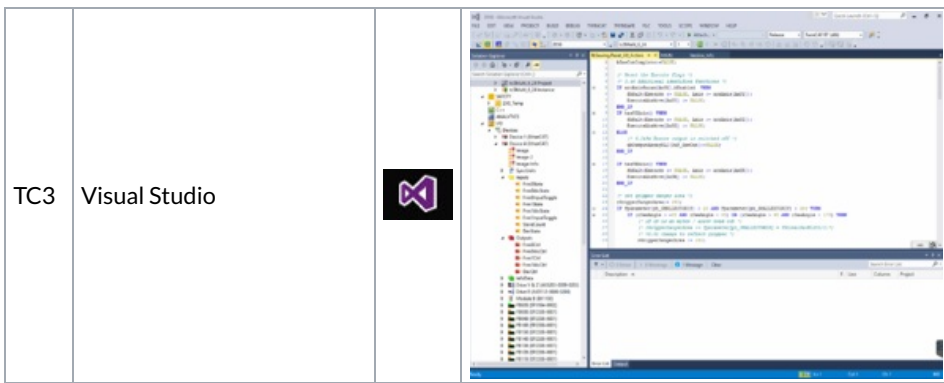
There is a distinct difference between a Drive Error and an Axis Error. The drive will store a history of drive errors internally in the drive itself. Axis errors are reported on the error watch window in system manager

Type	Description	Link to Beckhoff Infosys
Drive Errors	Errors that occur inside the drive electronics, eg <ul style="list-style-type: none"><li>• power overloads,</li><li>• voltage low,</li><li>• wiring issues</li></ul>	<a href="#">Beckhoff Drive Error Codes</a>
Axis Errors	Errors due to the positional control of the axis, eg <ul style="list-style-type: none"><li>• Move beyond limits</li><li>• Speed too fast</li><li>• Following Error</li></ul>	<a href="#">Beckhoff Axis Error Codes</a> <a href="#">Beckhoff Encoder Error Codes</a>

## TwinCAT2 vs TwinCAT3

Both TC2 and TC3 have the same system manager, but getting to the system manager uses a different program

Type	Program Used	Icon	ScreenShot
TC2	TwinCAT2 System Manager		



TC3 puts the system manage inside a TwinCAT3 "Project" which also includes the PLC code

## Connecting to the Correct Project

See Loading TwinCAT Projects

## Drive Errors: Navigate to the Drive Manger Diagnostics


...This part is the same on both TC2 and TC3

The screenshot shows the Drive Manager interface with the following components:

- Solution Explorer (Left):** A tree view of the project structure. A red circle '1' highlights the selected drive 'Drive VY&GX (AX5203-0000-0203)'.
- Drive Manager Tab (Top):** A red circle '2' points to the 'Drive Manager' tab.
- Tree View (Middle-Left):** A red circle '3' points to the 'Channel B' folder, and a red circle '4' points to the 'Error history' sub-folder.
- Error History Table (Middle-Right):** A table showing error records. A red circle '5' highlights the 'ErrorTime' column, and a red circle '6' highlights the 'Operating time drive control' value '16779h 0m 16s'.
- Table (Bottom):** A table with columns: Name, Online, Type, Size, >Addr..., In/Out, User ID, Linked to. It lists 'Drive status word' and 'Position feedba...'. Below it is an 'Error List' section with a search bar and a table with columns: Description, F., Line, Column, Project.

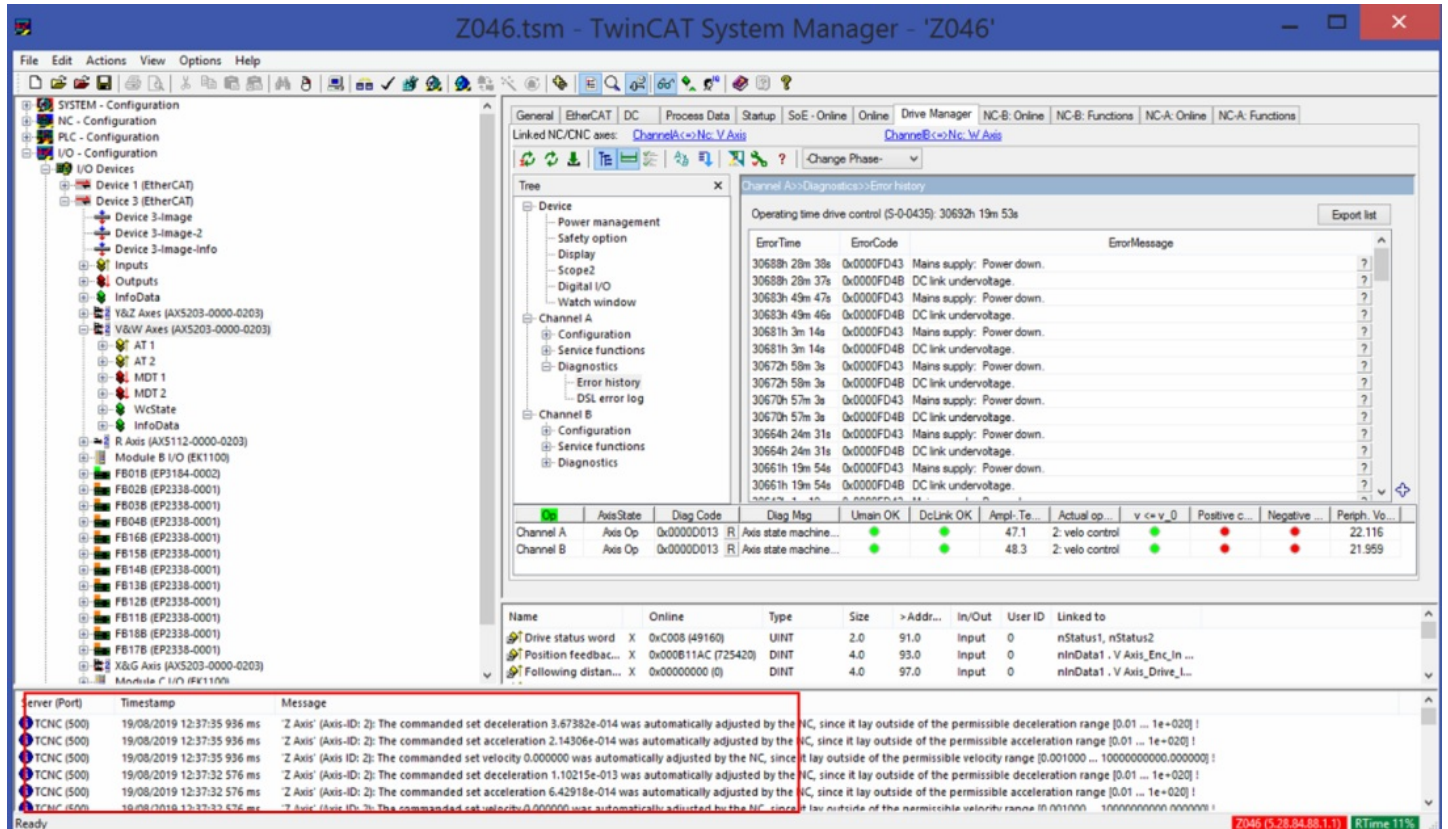
1. Select the drive you want to diagnose (dbl click)
2. Click on the drive manager tab
3. Drives come in 2 variants - Single or Dual. Dual drives have a channel A and B, you should be able to tell from the drive naming which axis is which
4. Click on Error History to view all the stored errors
5. The time of the error is quoted in hours when the drive was first energised. To work out how long ago the error was, you need to subtract this from:-
6. The drive operating time

# Axis Errors: The Error List or Watch Window

 ...This only shows errors from after the app is opened, not historical errors, so System Manager needs to run in the background to capture the error

## TC2

Axis errors are reported at the bottom of the screen. if this window is not available, use View->Show Logger Output



The screenshot shows the TwinCAT System Manager interface for 'Z046'. The 'Error history' window is open, displaying a list of errors for Channel A and Channel B. The errors are related to 'Mains supply: Power down' and 'DC link undervoltage'. The status bar at the bottom shows 'Z046 (5.28.94.88.1.1) RTime 11%'.

ErrorTime	ErrorCode	ErrorMessage
30688h 28m 38s	0x0000FD43	Mains supply: Power down.
30688h 28m 37s	0x0000FD4B	DC link undervoltage.
30683h 49m 47s	0x0000FD43	Mains supply: Power down.
30683h 49m 46s	0x0000FD4B	DC link undervoltage.
30681h 3m 14s	0x0000FD43	Mains supply: Power down.
30681h 3m 14s	0x0000FD4B	DC link undervoltage.
30672h 58m 3s	0x0000FD43	Mains supply: Power down.
30672h 58m 3s	0x0000FD4B	DC link undervoltage.
30670h 57m 3s	0x0000FD43	Mains supply: Power down.
30670h 57m 3s	0x0000FD4B	DC link undervoltage.
30664h 24m 31s	0x0000FD43	Mains supply: Power down.
30664h 24m 31s	0x0000FD4B	DC link undervoltage.
30661h 19m 54s	0x0000FD43	Mains supply: Power down.
30661h 19m 54s	0x0000FD4B	DC link undervoltage.

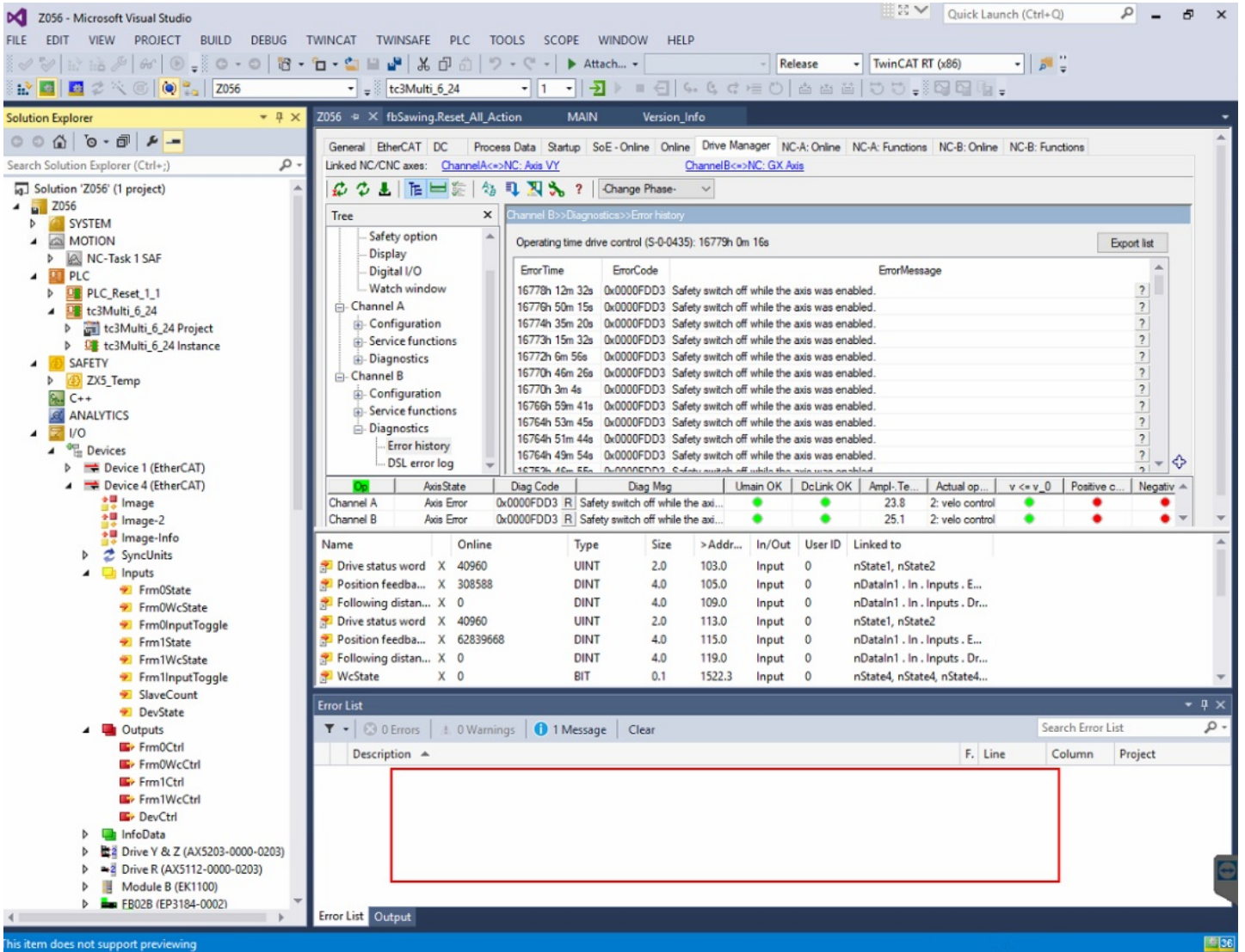
Name	Online	Type	Size	>Addr...	In/Out	User ID	Linked to	
Drive status word	X	0x0008 (49160)	UINT	2.0	91.0	Input	0	nStatus1, nStatus2
Position feedback...	X	0x000B11AC (725420)	DINT	4.0	93.0	Input	0	nInData1, V Axis_Enc_In ...
Following distan...	X	0x00000000 (0)	DINT	4.0	97.0	Input	0	nInData1, V Axis_Drive_L...

Server (Port)	Timestamp	Message
TCNC (500)	19/08/2019 12:37:35 936 ms	Z Axis' (Axis-ID: 2): The commanded set deceleration 3.67382e-014 was automatically adjusted by the NC, since it lay outside of the permissible deceleration range [0.01 ... 1e+020]!
TCNC (500)	19/08/2019 12:37:35 936 ms	Z Axis' (Axis-ID: 2): The commanded set acceleration 2.14306e-014 was automatically adjusted by the NC, since it lay outside of the permissible acceleration range [0.01 ... 1e+020]!
TCNC (500)	19/08/2019 12:37:35 936 ms	Z Axis' (Axis-ID: 2): The commanded set velocity 0.000000 was automatically adjusted by the NC, since it lay outside of the permissible velocity range [0.001000 ... 1000000000.0000000]!
TCNC (500)	19/08/2019 12:37:32 576 ms	Z Axis' (Axis-ID: 2): The commanded set deceleration 1.10215e-013 was automatically adjusted by the NC, since it lay outside of the permissible deceleration range [0.01 ... 1e+020]!
TCNC (500)	19/08/2019 12:37:32 576 ms	Z Axis' (Axis-ID: 2): The commanded set acceleration 6.42918e-014 was automatically adjusted by the NC, since it lay outside of the permissible acceleration range [0.01 ... 1e+020]!
TCNC (500)	19/08/2019 12:37:32 576 ms	Z Axis' (Axis-ID: 2): The commanded set velocity 0.000000 was automatically adjusted by the NC, since it lay outside of the permissible velocity range [0.001000 ... 1000000000.0000000]!

## TC3

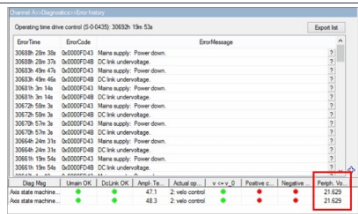
Axis errors are reported at the bottom of the screen. if this window is not available, use View->Error List





# Common Errors, Meanings and Actions

## Drive Errors

Error Code	Error Name	Possible Root Causes	Action
	Peripheral Voltage Low Control Voltage Error: Undervoltage	The 24v supply to the drives is too low. Adjust it to be at least 24v	
	DC Link Undervoltage Mains Supply: Power Down	Mains missing - could be overload relay trip or a phase missing	Reset Trip, check voltages
	Mains Supply U main too high /low	Mains is outside of the normal +/- 10 voltage range (360-440v) You can safely change this on the Power Management parameters U+mg and U-mg to 15% to give a broader range with no ill effect	