

Applied Motion Products, Inc

Using the Ethernet Communication Watchdog

Mike Maroney
7-19-2019



Table of Contents

Functional Description.....	2
Products with Communication Watchdog	2
Usage	2
SCL Commands	4
ZE – Communication Watchdog Enable	4
ZS – Communication Watchdog Timeout.....	5
ZA – Communication Watchdog Action	6

Functional Description

The Communication Watchdog monitors the state of the Ethernet connection. If a break in connectivity is detected and lasts for a certain period (defined by ZS), then an action can be automatically triggered (defined by ZA). This allows a managed shutdown of the drive's motion in the event of communication loss.

After a shutdown event is detected, the drive can execute a Q segment, stop with the AM or DE velocity, and remain enabled or disabled. These options can be defined by the ZA command:

- ZA1~12 Execute a certain Q program from 1~12
- ZA13 Immediately stops with the AM value deceleration and is still enabled
- ZA14 Immediately stops with DE or JL value deceleration and still enables
- ZA15 Immediately stops and disables with the AM value deceleration
- ZA16 Immediately stops and disables with DE or JL value deceleration

Products with Communication Watchdog

Applies to Ethernet versions of the following products:

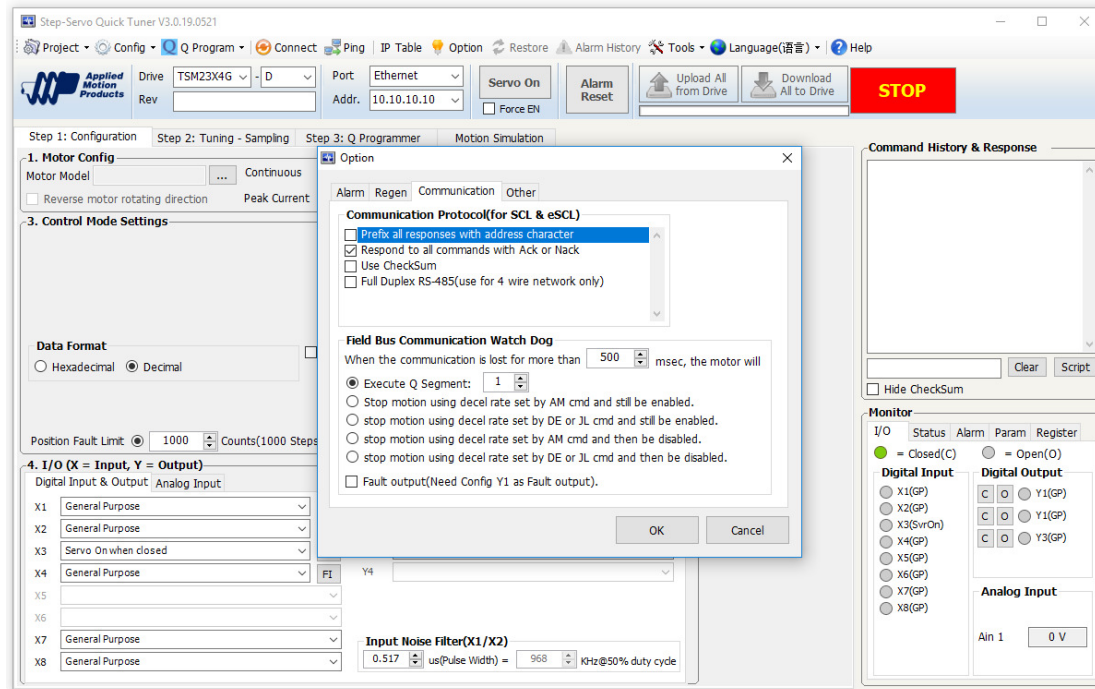
STF, TSM23X, TSM34, TXM34, STM23X (Ethernet versions only)

Note: this functionality may not be supported on older firmware versions. If you can not access this functionality, please [contact](#) our Applications Engineering group for assistance.

Usage

The ZA, ZE, and ZS commands are used to configure and enable the Communication Watchdog. These commands are all buffered and may be sent to the drive using streaming commands, stored in Q programs, or configured in the setup software.

In most cases, the easiest way to configure the Communication Watchdog is in the Configurator software program for the drive ([Step-Servo Quick Tuner](#), [STF Configurator](#), or [ST Configurator](#)). The Communication Watchdog settings can be found in the Option dialog box, under the Communication tab. For STM23X drives, the Communication Watchdog can be found in the Communication Watchdog window under the Drive dropdown menu.



With the exception of EtherNet/IP, the ZE1 command needs to be sent to the drive to enable the Communication Watchdog. Once this function is enabled, the controller must continue to send data to the drive at a frequency faster than the Communication Watchdog Timeout (ZS). After the Communication Watchdog trips, ZE is reset to 0 and must be manually set to 1 in order to reenble once communications are reestablished.

When using EtherNet/IP, the Communication Watchdog is automatically enabled when ZS is nonzero. It is configured using ZA and ZS, or the Configuration software, but ZE is not used.

More information on ZA, ZE, and ZS can be found in the [Host Command Reference](#) and the command listings below.

SCL Commands

ZE – Communication Watchdog Enable

Compatibility: STF, TSM23X, TXM34, TSM34 (Ethernet models only)

Affects: Ethernet Communication

See also: ZS, ZA commands

Arms or disarms the communication watchdog feature. When enabled, the communication is monitored and after the ZS time has elapsed with no communication, the action specified by ZA occurs. After a communication watchdog trigger event, ZE is reset to 0, and must be reset if needed.

Note: When using EtherNet/IP, the watchdog is always active when ZS is nonzero at powerup. The watchdog can be disabled by setting ZS to zero and power cycling the drive.

Command Details:

Structure	ZE{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	NO
Register Access	none

Parameter Details:

Parameter #1	Watchdog Enable
- units	none
- range	0 – 1
Default value	0

Example:

Command	Drive sends	Notes
ZE1	-	Enable communication watchdog
ZE	ZE=1	

ZS – Communication Watchdog Timeout

Compatibility: STF, TSM23X, TXM34, TSM34 (Ethernet models only)

Affects: Ethernet Communication

See also: ZE, ZA commands

Sets timeout for Communication Watchdog. When enabled, the communication is monitored and after the ZS time has elapsed with no communication, the action specified by ZA occurs.

Note: When using EtherNet/IP, ZS is used to determine if the Communication Watchdog is enabled and is only read at powerup. The watchdog can be disabled by setting ZS to zero and power cycling the drive.

Command Details:

Structure	ZS{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	none

Parameter Details:

Parameter #1	Watchdog Timeout
- units	ms
- range	0 – 10000
Default value	500

Example:

Command	Drive sends	Notes
ZS1000	-	Set communication timeout to 1000ms (1s)
ZS	ZS=1000	

ZA – Communication Watchdog Action

Compatibility: STF, TSM23X, TXM34, TSM34 (Ethernet models only)

Affects: Ethernet Communication

See also: ZE, ZA commands

Sets communication loss action for Communication Watchdog. When enabled, the communication is monitored and after the ZS time has elapsed with no communication, the action specified by ZA occurs. Based on the table below, the drive can run a Q Program segment, decelerate with either the AM or DE command, and remain enabled or disabled.

- ZA1~12 Execute a certain Q program from 1~12
- ZA13 Immediately stops with the AM value deceleration and remain enabled
- ZA14 Immediately stops with DE or JL value deceleration and remain enabled
- ZA15 Immediately stops with the AM value deceleration and disable drive
- ZA16 Immediately stops with DE or JL value deceleration and disable drive

Command Details:

Structure	ZA{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	none

Parameter Details:

Parameter #1	Watchdog Action
- units	none
- range	1 - 16
Default value	13

Examples:

Command	Drive sends	Notes
ZA5	-	Run Q Segment 5 after ZS timeout
ZA	ZA=5	
ZA14	-	Stop drive with DE and keep drive enabled after ZS timeout
ZA	ZA=14	

Rev	Description of Change
A	Initial Release – 7/22/2019 – ECO 8294
-	