TB0452 Ecoline using RSAutomation EtherCAT setup notes

The Climatec Ecoline is the first to use RS Automation EtherCAT drives. This document is to record the issues raised by the transfer of the parameters and functions from one to another.

Contents

Technical Bulletin

TB Number:	0452
Originator:	Gareth Green
Machine:	Ecoline with winMulti
Date:	23/07/19
Circulate to:	Service;
Title:	Ecoline using RSAutomation EtherCAT setup notes

Overview

The Climatec Ecoline is the first to use RS Automation EtherCAT drives. This document is to record the issues raised by the transfer of the parameters and functions from one to another

Operation Mode

0x6060	Modes of Operation					ALL	
Setting Range	Size (Data Type)	Unit	Access	PDO Map	Attribute	Init Value	Ft-no
-128 ~ 127	1 byte(SINT)	-	RW	RxPDO	-	0	-

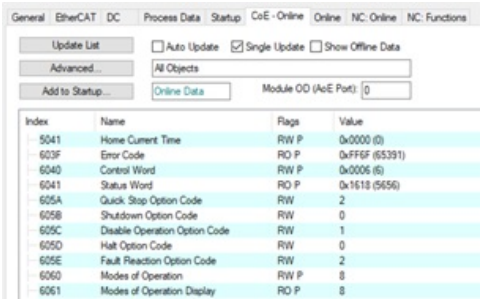
- This object set the mode of operation.
- Since the initial value is not set for the mode, it is necessary to set the operation mode after turning on the power of the drive
- E.205 (Unsupported operation mode) occurs when 'Operation enabled' state is set to '0'.

Table 92 Modes of Operation Mode

Operation Mode		Value	Support
No Operation Mode	-	0	-
Cyclic Synchronous Position	CSP	8	Supported
Cyclic Synchronous Velocity	CSV	9	Not supported
Cyclic Synchronous Torque	CST	10	Supported
Homing Mode	HM	6	Supported
Profile Position	PP	1	Not supported

The drive needs to be set to mode 8. This is done by entering CoE Online tab for the drive and searching for 0x6060.

1. Highlight it and click “Add to Startup”
2. In the Data (hexbin) space, type “08”
3. Click OK
4. Repeat for all drives
5. Activate configuration
6. Check this is set correctly by checking the “Modes of Operation” output from drive



Input Mains

• Error 037 AC Line loss

Seems like the drives need 3 phase because they are over 400W. This conflicts with what the flowline drives are set up to, which work fine with just L1 and L2 wired.

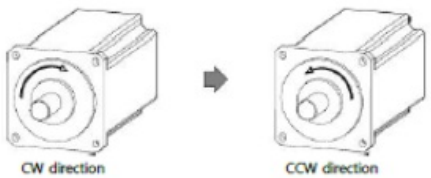
> ⚠ Running on 3 phase blew up the drive! So stick to single phase

Problem was in the drive setup parameter for AC line loss – needs to be changed from enabled to “Single Phase” (using RSWare).
This is also available on CoE parameter 0x2002:04 value =2 . This can be added to startup

Rotation Direction

0x2002	Selection of Basic Mode					CSP	
Sub-Index 3	Rotation Direction for External Command						
Setting Range	Size (Data Type)	Unit	Access	PDO Map	Attribute	Init Value	Ft-no
0~1	1 byte(USINT)	-	RW	-	Servo Off	0	Ft-0.02[D2]

Ft-0.02[D2]	Selection of Rotation Direction for External Command
Description	It set the rotation direction. 0 : Forward rotation is set as the CW direction. 1 : Forward rotation is set as the CCW direction.



In Summary – set 0x2002:03 to 1 to reverse the direction. This can be added to startup

Following Errors

The drives have a default following error of

0x2314	Following Error Limit					CSP	
Setting Range	Size (Data Type)	Unit	Access	PDO Map	Attribute	Init Value	Ft-no
0~2147483647	4 byte(UDINT)	pulse	RW	-	Always	655360	Ft-3.20

- RSWare : Drive - Faults - Following Error Limit
- It set the allowable range of position error. If the position error is bigger than this set value, the E.019 (Position Error Limit Exceeded : E.PoSEr) fault occurs.

This needs to be scaled and set to the correct following error for each axis:

Axis	Scale	Fol Error (mm)	Value for 0x2314
X	157129	10	1571290
Y	839113	5	4195565
Z	839113	5	4195565
G	1678226	5	8391130
V	839113	5	4195565
R		5	

Gains

1. Run axis in reversing mode to check for resonance at various speeds
2. In RSWare, adjusted inertia ratio (Parameter 0.04) to improve resonance
3. Fine tuned resonance with P-Gain (1.02) and I-Gain (1.03)
4. Removed following error by increasing Positional feed forward gain (3.02) from 0 to 100%. Seems too easy!

Homing

Homing directions all wrong to start with. Same reversal procedure as normal beckhoff on the Axis->Enc->Parameters->Homing set.