AKD2G Ethernet IP Command Type 0x08-Velocity Setpoint   Rev. A 11/8/2021

The same command type 0x08-Velocity Setpoint functionality in the AKD1G EIP drive was implemented in the AKD2G EIP as well.

The AKD2G Ethernet IP Communications manual can be downloaded at:
https://www.kollmorgen.com/sites/default/files/public_downloads/AKD2G%20EtherNetIP%20Communications%20Manual%20EN%20REV%20A.pdf

The instructions for implementing this mode is in the following section of the manual (see pages 22-23):

AKD2G EtherNet/IP Communications Manual | 3 Communication Profile

3.2.3.7 Command Type 0x08 - Velocity Setpoint

This command type is used to change the Target Velocity every cyclic cycle. The operation mode must be set to Velocity and the drive enabled, otherwise this command will return an error using Response Assembly Response Type (byte 3 for Axis 1; byte 67 for Axis 2) = 0x14 and Data (bytes 4-7 for Axis 1; bytes 68-71 for Axis 2). The command source must be Fieldbus. The drive will follow commanded velocity while the Load/Start bit is set (level triggered).

> **NOTE**
>
> For this command type, the behavior is different than the other command types. There is no data handshake using the Load/Start bit in the Control Word (byte 0 for Axis 1; byte 64 for Axis 2) in the Command Assembly.

In this mode, when the Load/Start bit is set to High (1), the drive will follow the commanded velocity from Velocity field (bytes 12-15 for Axis 1; bytes 76-79 for Axis 2). When the Load/Start bit is Low (0), the drive will continue to follow the last commanded velocity (ignores changes to the Velocity field) until you change one of the following:

- Hard Stop bit is set to High (1) in the Control Word (byte 0 for Axis 1; byte 64 for Axis 2).
- Smooth Stop bit is set to High (1) in the Control Word (byte 0 for Axis 1; byte 64 for Axis 2).
- Enable bit is cleared (0) in the Control Word (byte 0 for Axis 1; byte 64 for Axis 2).
- Fault occurs.
- Or some other condition that would stop motion occurs (STO, etc.)

Velocity Mode – Command Type 0x8

Enable State
(Status Word 1 Bit 7)

1

0

To test set the Command Source=Fieldbus and Op mode=Velocity for both axes using Workbench:
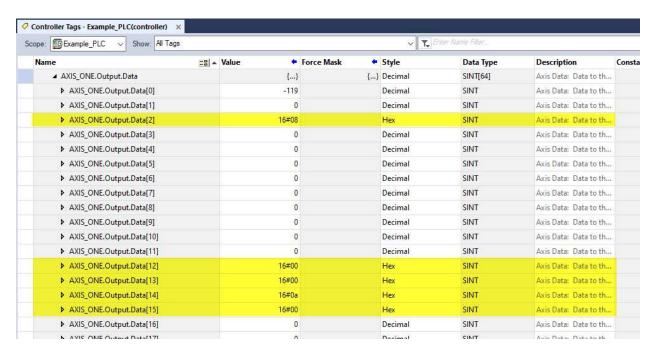

To demonstrate forcing was used. The user will want to write PLC code to control the drive as no AOI exists for this mode.
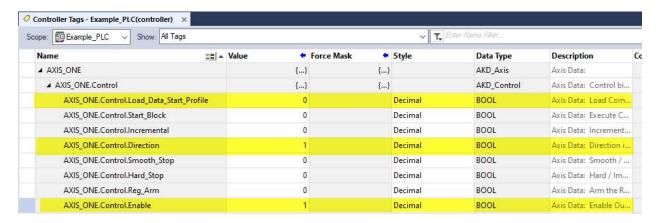
Using AXIS ONE as an example:

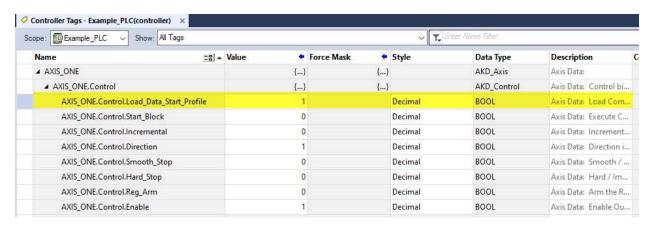Per the instructions set byte 2 of the command assembly (output data) to 0x08.

Set bytes 12-15 to velocity setpoint data (i.e. in this case 0xA0000=655360 which equates to 10 rps or 600 rpm)

Note below the axis is already enabled (i.e. set by the AKD_Enable AOI).
Set the Direction in the Control Word to 1 (positive) to demonstrate.

Name	Value	Force Mask	Style	Data Type	Description	C
▲ AXIS_ONE	{...}	{...}		AKD_Axis	Axis Data:	
▲ AXIS_ONE.Control	{...}	{...}		AKD_Control	Axis Data: Control bi...	
AXIS_ONE.Control.Load_Data_Start_Profile	0		Decimal	BOOL	Axis Data: Load Com...	
AXIS_ONE.Control.Start_Block	0		Decimal	BOOL	Axis Data: Execute C...	
AXIS_ONE.Control.Incremental	0		Decimal	BOOL	Axis Data: Increment...	
AXIS_ONE.Control.Direction	1		Decimal	BOOL	Axis Data: Direction i...	
AXIS_ONE.Control.Smooth_Stop	0		Decimal	BOOL	Axis Data: Smooth / ...	
AXIS_ONE.Control.Hard_Stop	0		Decimal	BOOL	Axis Data: Hard / Im...	
AXIS_ONE.Control.Reg_Arm	0		Decimal	BOOL	Axis Data: Arm the R...	
AXIS_ONE.Control.Enable	1		Decimal	BOOL	Axis Data: Enable Ou...	

Toggle the load/start bit from 0 to 1 to start rotation.

Name	Value	Force Mask	Style	Data Type	Description	C
▲ AXIS_ONE	{...}	{...}		AKD_Axis	Axis Data:	
▲ AXIS_ONE.Control	{...}	{...}		AKD_Control	Axis Data: Control bi...	
AXIS_ONE.Control.Load_Data_Start_Profile	1		Decimal	BOOL	Axis Data: Load Com...	
AXIS_ONE.Control.Start_Block	0		Decimal	BOOL	Axis Data: Execute C...	
AXIS_ONE.Control.Incremental	0		Decimal	BOOL	Axis Data: Increment...	
AXIS_ONE.Control.Direction	1		Decimal	BOOL	Axis Data: Direction i...	
AXIS_ONE.Control.Smooth_Stop	0		Decimal	BOOL	Axis Data: Smooth / ...	
AXIS_ONE.Control.Hard_Stop	0		Decimal	BOOL	Axis Data: Hard / Im...	
AXIS_ONE.Control.Reg_Arm	0		Decimal	BOOL	Axis Data: Arm the R...	
AXIS_ONE.Control.Enable	1		Decimal	BOOL	Axis Data: Enable Ou...	

From Workbench the motor is running 600 rpm (the units were set to rpm for demonstration).

AR Filter	PI Controller	Observer	Source	Status

Velocity Command:	600.000	rpm
Velocity Feedback:	603.768	rpm
Velocity Error:	-0.715	rpm
Current Command:	0.050	Arms

Without changing the control word the velocity setpoint data was changed from 0xA0000 to 0x10000 (1 rps or 60 rpm).

Name	Value	Force Mask	Style	Data Type	Description	Con
▷ AXIS_ONE.Output.Data[0]	-119		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[1]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[2]	16#08		Hex	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[3]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[4]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[5]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[6]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[7]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[8]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[9]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[10]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[11]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[12]	16#00		Hex	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[13]	16#00		Hex	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[14]	16#01		Hex	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[15]	16#00		Hex	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[16]	0		Decimal	SINT	Axis Data: Data to th...	
▷ AXIS_ONE.Output.Data[17]	0		Decimal	SINT	Axis Data: Data to th...	

From Workbench

| AR Filter | PI Controller | Observer | Source | Status |

Velocity Command:	60.000	rpm
Velocity Feedback:	53.259	rpm
Velocity Error:	11.284	rpm
Current Command:	0.033	Arms

With this setup it is also possible to change the Direction bit in the control word from 1 to 0 and the axis ran at -60rpm (on the fly).

Axis 2 works the same way.