JVL Profinet Library Manual

Siemens S7-1200 & S7-1500 PLC Function Block Library for the control of JVL Motors

V1.1   09/2020

Contents

1 Note

Please note that this library has been tested with MacTalk V1.90.0 and JVL Profinet firmware V3.30.

2 Configuration

2.1 Requirements

TIA Portal V14 or higher.

TIA Portal project containing an S7-1200 or S7-1500 PLC.

MacTalk project for the JVL motor configuration.

2.2 Import Library

To import the JVL Profinet Function Block library into TIA Portal, right-click in the Global Libraries section of the Library sidebar in TIA Portal, and select 'Retrieve Library…'. Select the library archive (.zal15_1 file) then choose the destination to save the extracted library files.

When opened with later versions of TIA Portal the library will be updated to the required version automatically.

2.2.1 Add Library Components

2.2.1.1 User data Types (UDTs)

The UDTs are required for the function blocks to be compiled. In the Master Copies folder within the library, drag the 'JVL UDT' group into the PLC's 'PLC data types' folder.

2.2.1.2 Common Function Blocks

The 'JVL Common' function blocks group are blocks that can be used, or are required for, both MIS and MAC devices. This group includes:
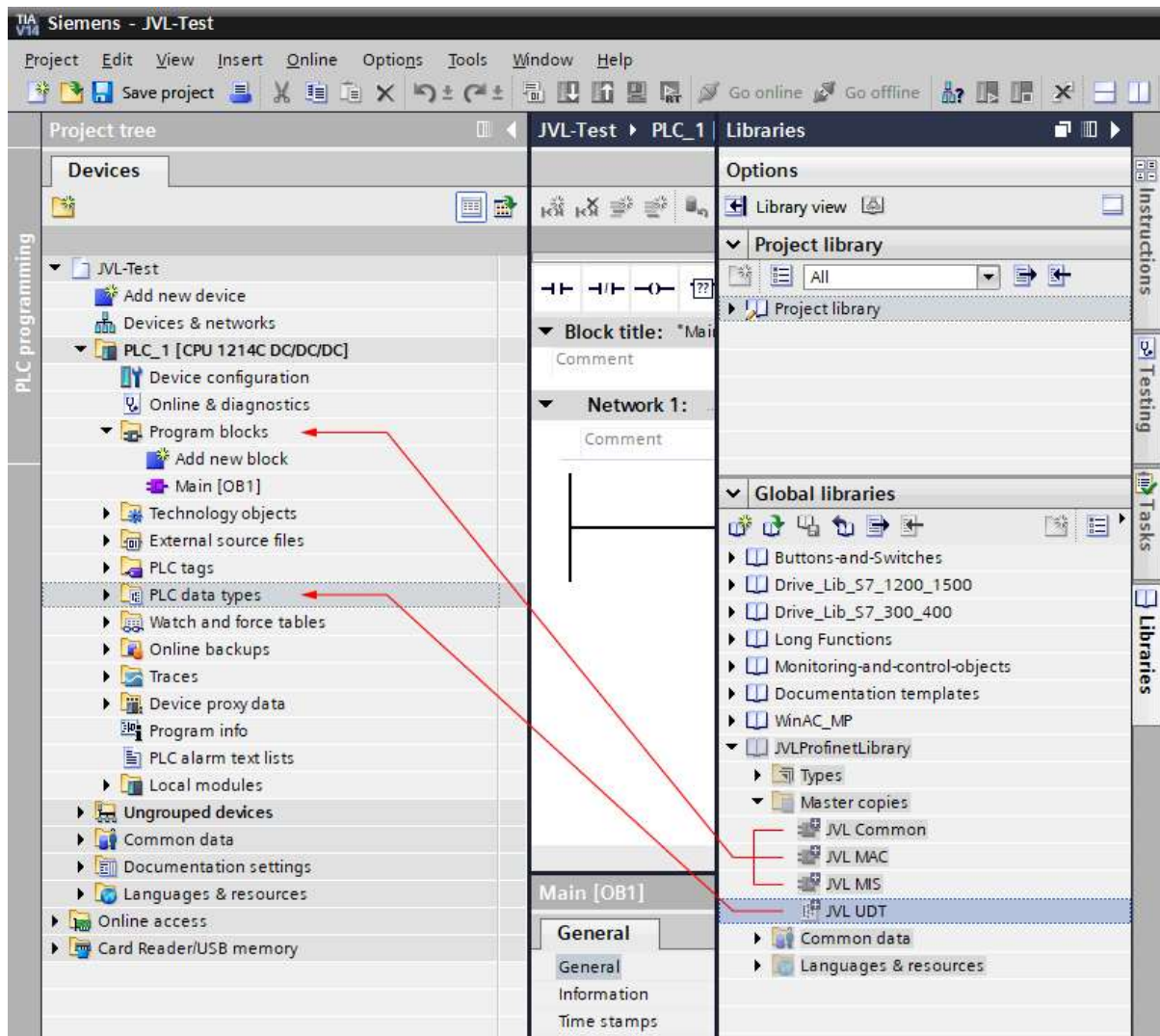
JVL_ReadWriteReg - Function block for reading or writing motor registers.

The 'JVL Common' group should be dragged into the PLC's 'Program blocks' folder.

2.2.1.3 Device Specific Function Blocks

If using a MIS device, drag the 'JVL MIS' group into the PLC's 'Program blocks' folder.

If using a MAC device, drag the 'JVL MAC' group into the PLC's 'Program blocks' folder.

2.3 Device Configuration

2.3.1 Import GSD (General Station Description) File

For each JVL device to be configured, a GSD file must be included in the TIA Portal project. The GSD file can be downloaded from the JVL website [GSD section]. When downloading from the JVL website, please select the 8 register Profinet GSD file. Firstly, the GSD must be installed. Using the Options > Manage general station description files (GSD) menu option. Select the GSD file for installation into TIA Portal. Once the GSD is installed, it can be added to the project from the Hardware Catalog sidebar. It can be found under Other field devices > PROFINET IO > Drives > JVL Industri Elektronik A/S > PNS folder. For each JVL drive/axis, drag a MAC00/MIS-EP GSD into the Devices & Networks window in the TIA Portal project.
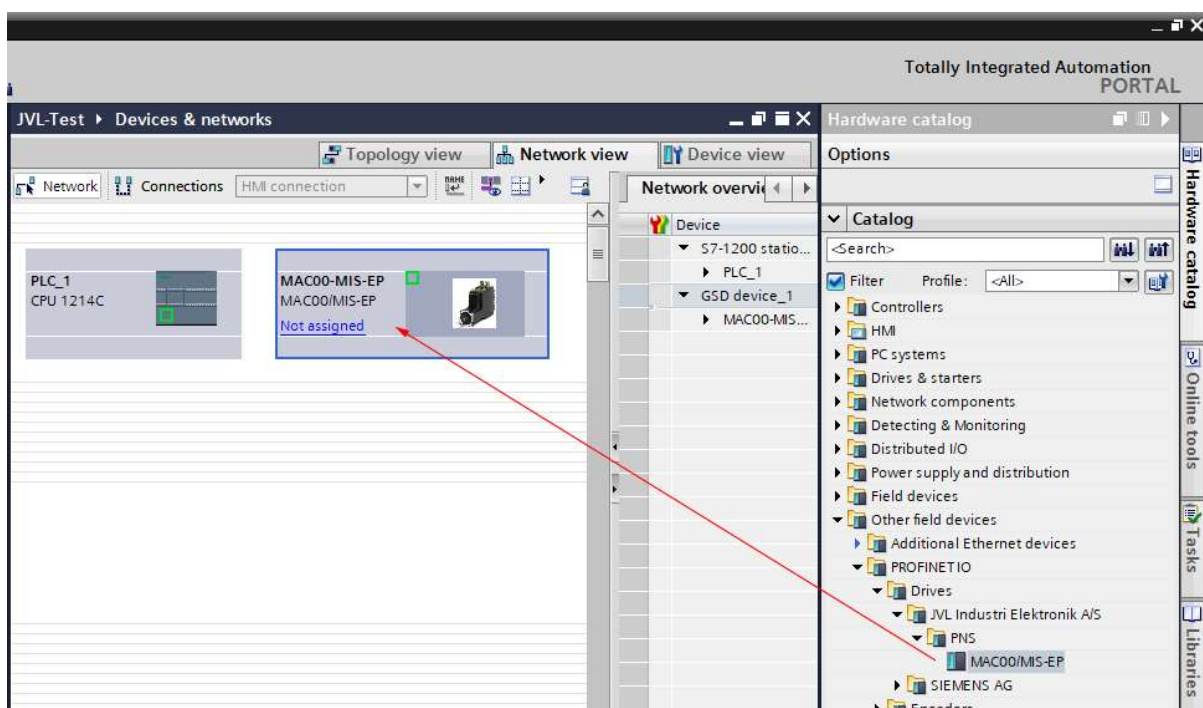
Remember to set the IP and Profinet name of each of the JVL motors and connect them to the PLC's subnet.

2.3.2 Data Blocks

For each JVL device/axis, a data block must be created of the correct type. A data block can be created using the 'Add new block' command, located under the 'Program blocks' PLC folder. For MAC devices, create a data block of type JVL_MAC_Axis.
For MIS devices, create a data block of type JVL_MIS_Axis.
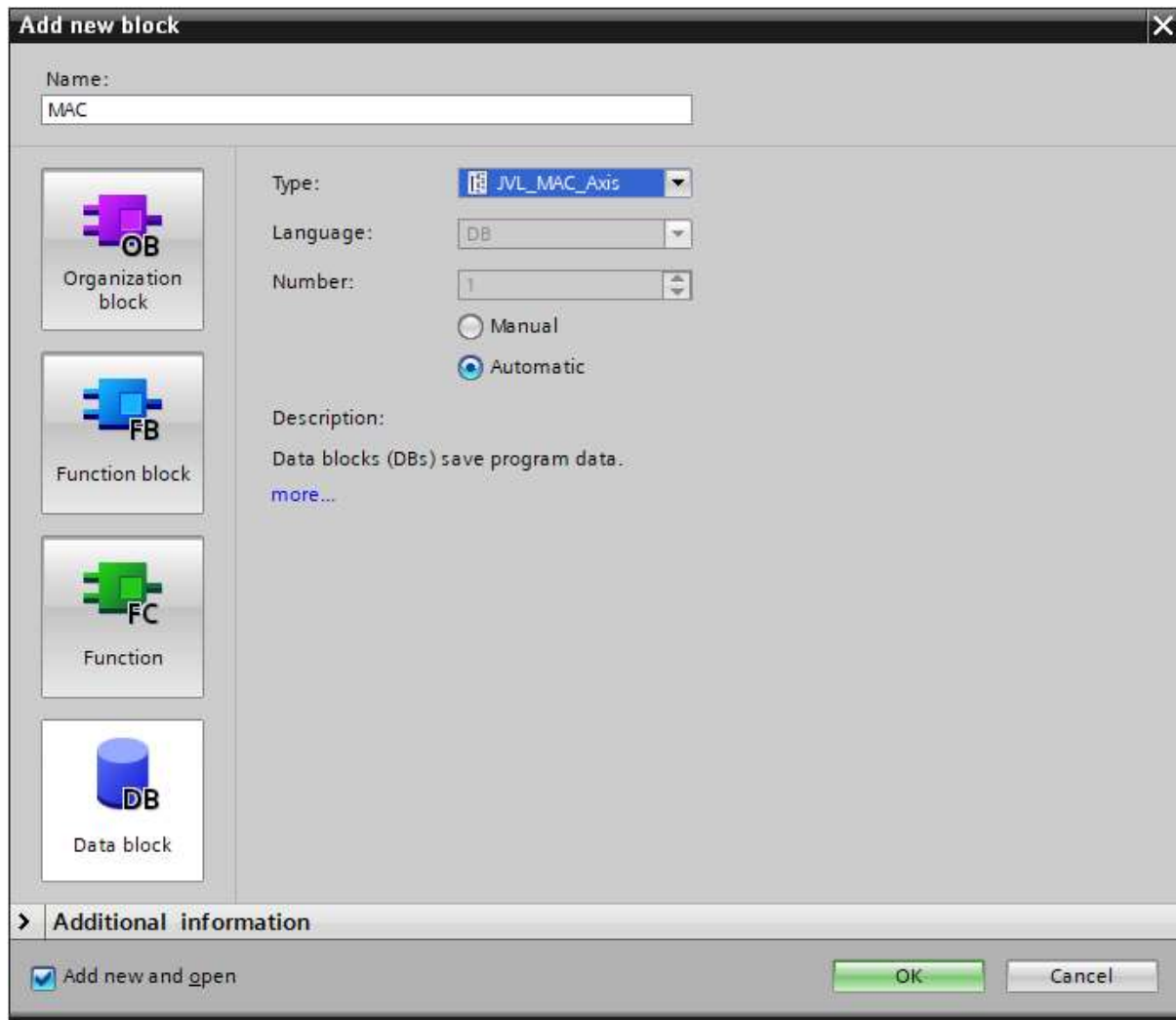
2.3.2.1 Data block Configuration

Each of the axis data blocks must be configured, in order to link the data block to its corresponding JVL motor. The Device > Config section within the data block contains parameters which must be set.

Name	Description
DeviceId	Used to define the main address of the unit, used to perform register reads and writes.
TelegramInputAddress	Used to define the address of the JVL input telegram.
TelegramOutputAddress	Used to define the address of the JVL output telegram.
A_SOLL_CountsPerSample2	Acceleration scaling value. (For MAC motors only)
V_SOLL_CountsPerSample	Velocity scaling value. (For MAC motors only)

The device ID and telegram input and output address values can be found in the PLC Tags > Show All Tags > System Constants section.
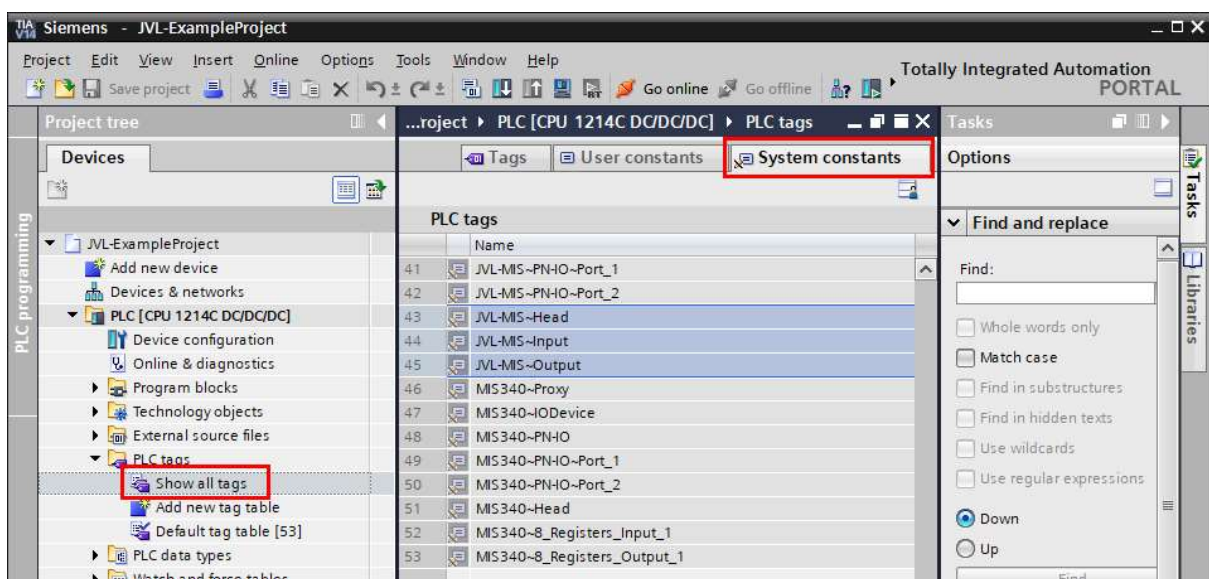
For each JVL motor in the project, you will find a HEAD, INPUT and OUTPUT tags, for example:

Add these 3 tags to the data block Device > Config section.

The acceleration and velocity scaling values depend on the type of JVL being used. Please refer to the following table for the appropriate values. These values are only applicable to MAC JVL motors and are not used when running a MIS motor.

	A_SOLL_CountsPerSample2	V_SOLL_CountsPerSample
MiniMac	0.0040	2.097
MAC400+	0.0037	2.840
MAC800+	0.0036	2.771

Note: Due to the resolution of the acceleration/deceleration setpoint in the telegram (register 6 A_SOLL), a value of **at least** 150 RPM/s should be given, or the motion command will not execute.

These data blocks will be used as the Axis input on all the motion function blocks in this library. For example:
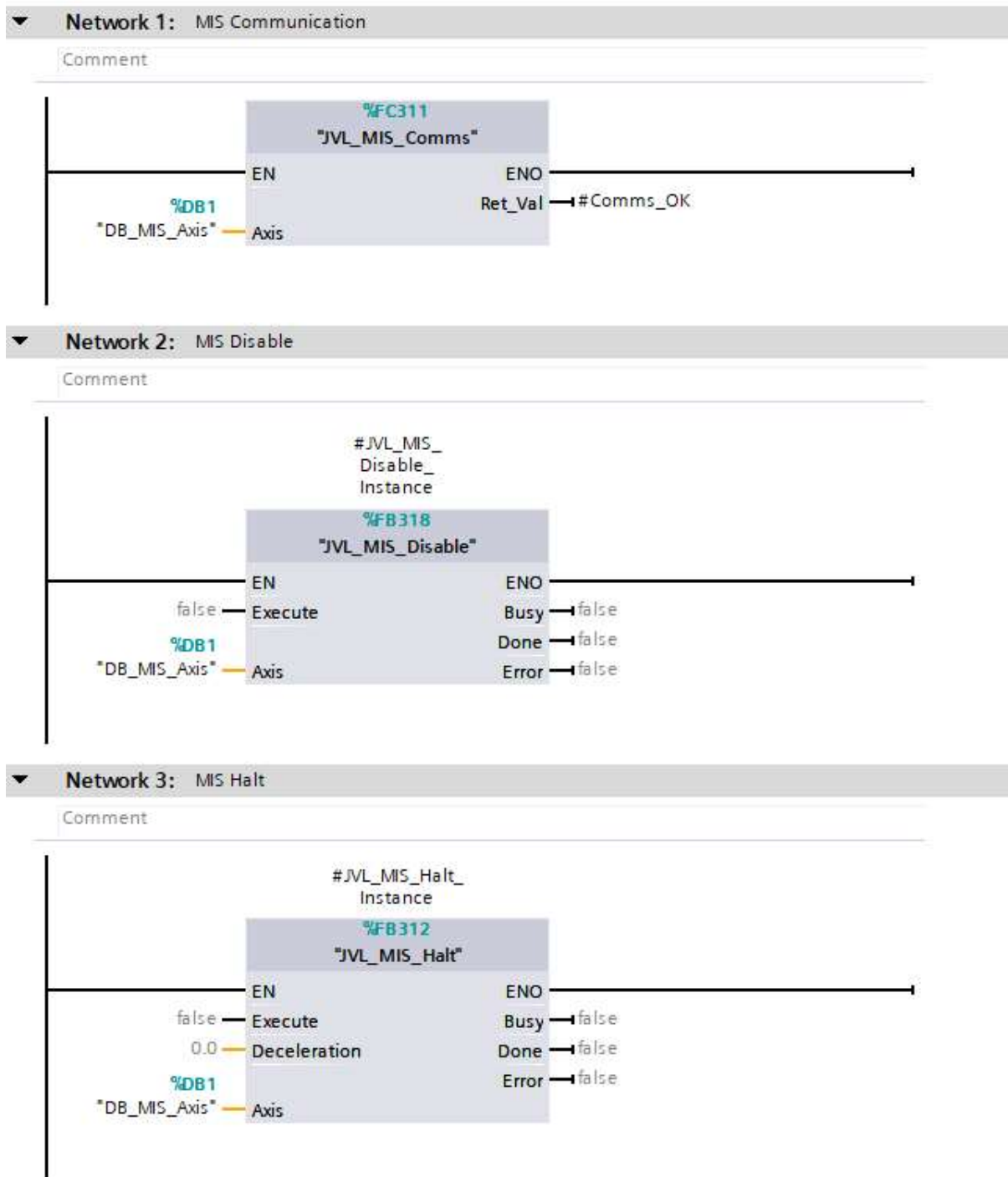
2.4 MacTalk Configuration

In the MacTalk project for your JVL device, a specific telegram must be set in order to communicate with the Profinet library function blocks. The contents of this telegram depend on the type of JVL drive to be used. Use the cyclic data setup section of the MAC00-EP Profinet tab in MacTalk to configure the telegram.

Once configured, please remember to click the Apply and Save button in order to save the telegram configuration in the drive.

2.4.1 For MAC1xx Devices

Word	Register Number	Description
Read Word 1	10	Actual Position
Read Word 2	12	Actual Velocity
Read Word 3	121	Actual Torque
Read Word 4	35	Error Status
Read Word 5	2	Actual Operating Mode
Read Word 6	-	Not used - freely configurable
Read Word 7	-	Not used - freely configurable
Read Word 8	-	Not used - freely configurable
Write Word 1	2	Operating Mode
Write Word 2	3	Requested Position
Write Word 3	5	Velocity
Write Word 4	6	Acceleration
Write Word 5	983040	General Command
Write Word 6	-	Not used - freely configurable
Write Word 7	-	Not used - freely configurable
Write Word 8	-	Not used - freely configurable

2.4.2 For MAC4xx Devices

Word	Register Number	Description
Read Word 1	10	Actual Position
Read Word 2	11	Actual Velocity 16bit
Read Word 3	169	Actual Torque
Read Word 4	35	Error Status
Read Word 5	2	Actual Operating Mode
Read Word 6	-	Not used - freely configurable
Read Word 7	-	Not used - freely configurable
Read Word 8	-	Not used - freely configurable
Write Word 1	2	Operating Mode
Write Word 2	3	Requested Position
Write Word 3	5	Velocity
Write Word 4	6	Acceleration
Write Word 5	983040	General Command
Write Word 6	-	Not used - freely configurable
Write Word 7	-	Not used - freely configurable
Write Word 8	-	Not used - freely configurable

2.4.3 For MIS Devices

Word	Register Number	Description
Read Word 1	2	Actual Operating Mode
Read Word 2	10	Actual Position
Read Word 3	12	Actual Velocity
Read Word 4	25	Status Bits
Read Word 5	36	Warning Bits
Read Word 6	35	Error Bits
Read Word 7	-	Not used - freely configurable
Read Word 8	-	Not used - freely configurable
Write Word 1	2	Operating Mode
Write Word 2	3	Requested Position
Write Word 3	5	Velocity
Write Word 4	6	Acceleration
Write Word 5	174	Deceleration
Write Word 6	983040	General Command
Write Word 7	-	Not used - freely configurable
Write Word 8	-	Not used - freely configurable

3   Common Function Blocks (for MIS & MAC)

3.1   JVL_ReadWriteReg

3.1.1   Description

Read or write a motor register.

This function block performs acyclic read/write of motor registers. Acyclic operations take multiple PLC cycles to complete. Care must be taken to ensure that only one acyclic operation is active on the Profinet network at any one time. For systems with multiple calls of the JVL_ReadWriteReg and other software functions that perform acyclic read/write access it is highly recommended that you implement a resource manager to prevent conflicts.

A resource manager is provided in the Siemens library LAcycCom available for download:

https://support.industry.siemens.com/cs/gb/en/view/109479553

3.1.2   Inputs

Input	Data Type
Execute	Bool
Register	Int
WriteValue	DWord
WriteRegister	Bool
Device	JVL_Device

3.1.2.1   Execute

A rising edge is required to start the read/write command. If the input is given a rising edge whilst a command is currently running, then the current command is overriden/aborted. The input is not required to remain TRUE for the duration of the command. Setting the value of Execute to FALSE during the command will not stop the command.

3.1.2.2   Register

The register number to be read or written to. A full list of register numbers is available in the Ethernet Industrial modules manual appendix 12.2/12.3.

3.1.2.3 WriteValue

The new value of the register to be written.

3.1.2.4 WriteRegister

Choose between reading or writing a register.

Value	Description
TRUE	Write Register
FALSE	Read Register

3.1.2.5 Device

The Device input should be linked to a data block of type JVL_Device. This data block provides axis references to the unit.

Use the axis data block device section for this input.
For example: MIS_AXIS.Device

3.1.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Error	Bool
ReadValue	DWord

3.1.3.1 Error

Error is TRUE when an error occurs during the reading or writing of a register value.

3.1.3.2 Busy

Busy is TRUE whenever the command is in the process of reading or writing to a register and the Error output is FALSE.

3.1.3.3 Done

Done is TRUE when the read/write command has completed successfully.

3.1.3.4 ReadValue

The value of the register after reading.
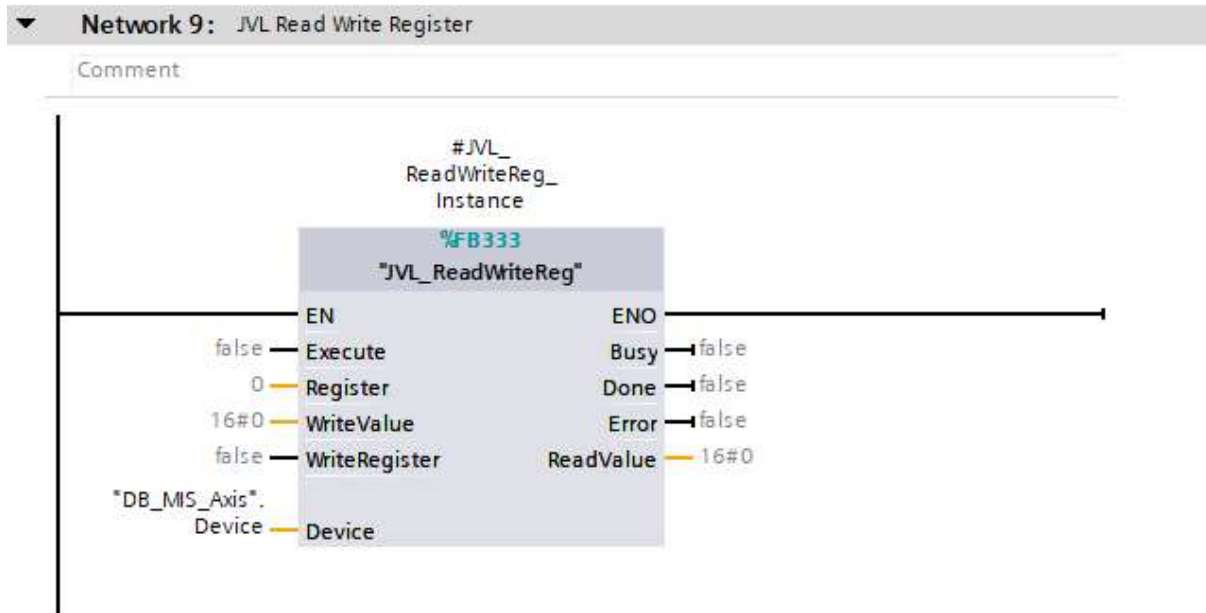
4   MIS Function Blocks

4.1   JVL_MIS_Comms

4.1.1   Description

Performs cyclic Profinet communication. The cyclic telegram data is transferred between PLC input/output area and the axis data block.

This function is required for all other motion control function blocks to operate. A single instance of the JVL_MIS_Comms function must be called once per PLC cycle for every JVL motor in the system.

4.1.2   Inputs

Input	Data Type
Axis	JVL_MIS_AXIS

4.1.2.1   Axis

The axis input should be linked to a data block of type JVL_MIS_Axis. This data block provides axis references to the unit and to its telegram slots.

4.1.3   Return Value

The function returns a TRUE value if the communication is operating without fault.

In the event of a fault (Ret_Val = FALSE) the return values of DPWR_DAT and DPRD_DAT inside this function must be evaluated to determine the cause.
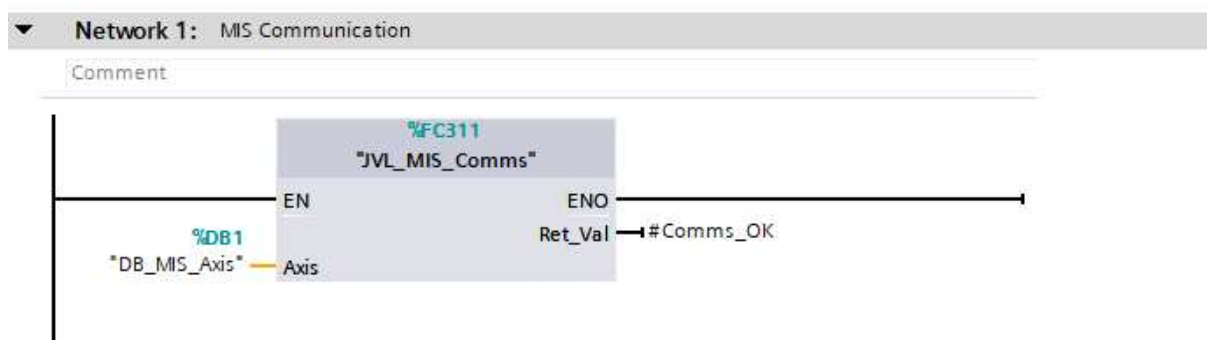
4.2 JVL_MIS_Disable

4.2.1 Description

Place the drive in passive mode, removing all torque from the motor.

If the motor is running then it stops with the configured deceleration of the command that is in progress.

> Caution, this can result in a long stopping distance if the configured deceleration is low. It is recommended that JVL_MIS_Halt is used with suitable deceleration before then executing JVL_MIS_Disable.

4.2.2 Inputs

Input	Data Type
Execute	Bool
Axis	JVL_MIS_AXIS

4.2.2.1 Execute

A rising edge is required to start the motion command. If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overriden/aborted. The input is not required to remain TRUE for the duration of the motion command.

4.2.2.2 Axis

The axis input should be linked to a data block of type JVL_MIS_Axis. This data block provides axis references to the unit and to its telegram slots.

4.2.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Command Aborted	Bool
Error	Bool

4.2.3.1 Busy

Busy is TRUE whenever the motion command is running and the Error output is FALSE.

4.2.3.2 Done

Done is TRUE when the motor has been successfully disabled.

4.2.3.3 Command Aborted

The command was interrupted by the execution of another command.

4.2.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

4.3 JVL_MIS_Halt

4.3.1 Description

Brings the motor to a standstill with defined deceleration.

4.3.2 Inputs

Input	Data Type	Units
Execute	Bool	
Deceleration	LReal	RPM/s
Axis	JVL_MIS_AXIS	

4.3.2.1 Execute

A rising edge is required to start the motion command.

If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overridden/aborted.

The input is not required to remain TRUE for the duration of the motion command. Setting the value of Execute to FALSE during the motion command will not stop the motion command.

4.3.2.2 Deceleration

The target deceleration in RPM/s.

4.3.2.3 Axis

The axis input should be linked to a data block of type JVL_MIS_Axis. This data block provides axis references to the unit and to its telegram slots.

4.3.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Command Aborted	Bool
Error	Bool

4.3.3.1 Busy

Busy is TRUE whenever the motion command is running (both when the motor is accelerating and when 'At Velocty') and the Error output is FALSE.

4.3.3.2 Done

Done is TRUE when the motor has come to a standstill.

4.3.3.3 Command Aborted

The command was interrupted by the execution of another command.

4.3.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

4.4 JVL_MIS_Home

4.4.1 Description

Homes or references the motor position.

4.4.2 Inputs

Input	Data Type	Units
Execute	Bool	
Mode	Int	
Position	LReal	Counts
Velocity	LReal	RPM
VelocityReduced	LReal	RPM
Acceleration	LReal	RPM/s
Deceleration	LReal	RPM/s
TorqueLimit	Real	%
Axis	JVL_MIS_AXIS	

4.4.2.1 Execute

A rising edge is required to start the motion command.
If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overriden/aborted.
The input is not required to remain TRUE for the duration of the motion command.
Setting the value of Execute to FALSE during the motion command will not stop the motion command.

4.4.2.2 Mode

Set the homing method.

Value	Name
0	Set Home Position
1	Home to Sensor
2	Home to Endstop

0 - Set Home Position

The current motor actual position is set to the value of the Position input. The motor does not move. If the motor is running then it is stopped.

1 - Home to Sensor

The motor runs until it reaches the home sensor and then stops. The position of the motor is set relative to the point at which the home sensor was triggered. The exact homing operation is configured in MacTalk.

2 - Home to Endstop

The motor runs until the torque limit is reached. The position of the motor is set relative to the point at which the torque limit was reached.

4.4.2.3 Position

The new axis position, after referencing, in encoder counts. Only effective in homing mode 0.

4.4.2.4 Velocity

The target velocity for the homing move in RPM.

Only effective in homing modes 1 and 2.

4.4.2.5 VelocityReduced

The target velocity for the slow travel while the homing sensor is triggered in RPM. The operation of VelocityReduced depends on the homing configuration in MacTalk.

Only effective in homing mode 1.

4.4.2.6 Acceleration

The target acceleration in RPM/s.

Only effective in homing modes 1 and 2.

4.4.2.7 Deceleration

The target deceleration in RPM/s. If set to 0, the value in Acceleration is used instead.

Only effective in homing modes 1 and 2.

4.4.2.8 TorqueLimit

The torque threshold for the motor to stop and home position to be set in %.

Valid range 0 – 100%. Only effective in homing mode 2.

4.4.2.9 Offset

Relative distance for offset move following home to sensor or home to torque limit in counts. The operation of Offset depends on the homing configuration in MacTalk.

Only effective in homing modes 1 and 2.

4.4.2.10 Axis

The axis input should be linked to a data block of type JVL_MIS_Axis. This data block provides axis references to the unit and to its telegram slots.

4.4.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Command Aborted	Bool
Error	Bool

4.4.3.1 Busy

Busy is TRUE whenever the motion command is running and the Error output is FALSE.

4.4.3.2 Done

Done is TRUE when the homing sequence has completed and the axis has been successfully referenced.

4.4.3.3 Command Aborted

The command was interrupted by the execution of another command.

4.4.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

4.5 JVL_MIS_Jog

4.5.1 Description

Run the motor at the specified velocity. The axis is stopped when the control inputs JogForwards and JogBackwards are reset.

4.5.2 Inputs

Input	Data Type	Units
JogForwards	Bool	
JogBackwards	Bool	
Velocity	LReal	RPM
Acceleration	LReal	RPM/s
Deceleration	LReal	RPM/s
Axis	JVL_MIS_AXIS	

4.5.2.1 JogForwards

When TRUE, the axis runs in the positive direction at the speed set in the Velocity input.

4.5.2.2 JogBackwards

When TRUE, the axis runs in the negative direction at the speed set in the Velocity input.

> Note: If JogForwards and JogBackwards are both set TRUE, the axis will come to a standstill.

4.5.2.3 Velocity

The target velocity in RPM. Giving a negative value will NOT reverse the motor direction.

4.5.2.4 Acceleration

The target acceleration in RPM/s.

4.5.2.5 Deceleration

The target deceleration in RPM/s. If set to 0, the value in Acceleration is used instead.

4.5.2.6 Axis

The axis input should be linked to a data block of type JVL_MIS_Axis. This data block provides axis references to the unit and to its telegram slots.

4.5.3 Outputs

Output	Data Type
Busy	Bool
At Velocity	Bool
Command Aborted	Bool
Error	Bool

4.5.3.1 Busy

Busy is TRUE whenever the motion command is running (both when the motor is accelerating/decelerating and when 'At Velocity') and the Error output is FALSE.

4.5.3.2 At Velocity

At Velocity is TRUE when the drive has reached the motion command target velocity and the Error output is FALSE.

4.5.3.3 Command Aborted

The command was interrupted by the execution of another command or an error on the motor (e.g. position limit reached).

4.5.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

4.6 JVL_MIS_Position

4.6.1 Description

Move the axis to the specified position, or by the specified distance.

4.6.2 Inputs

Input	Data Type	Units
Execute	Bool	
ContinuousUpdate	Bool	
Position	LReal	Counts
Velocity	LReal	RPM
Acceleration	LReal	RPM/s
Deceleration	LReal	RPM/s
AbsolutePositioning	Bool	
Axis	JVL_MIS_AXIS	

4.6.2.1 Execute

A rising edge is required to start the motion command.

If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overriden/aborted.

The input is not required to remain TRUE for the duration of the motion command. Setting the value of Execute to FALSE during the motion command will not stop the motion command.

4.6.2.2 ContinuousUpdate

If ContinuousUpdate is TRUE when the Execute input is set then the Position and Velocity inputs can be changed while the motion command is active and the new values are applied immediately (with the defined acceleration and deceleration).

A change to the ContinuousUpdate input is not effective when the command is running, Execute must be re-triggered to change ContinuousUpdate.

4.6.2.3 Position

The axis target position, or distance to move, in encoder counts. See AbsolutePositioning input and ContinuousUpdate input.

4.6.2.4 Velocity

The target velocity for the positional move in RPM. See ContinuousUpdate input.

A negative velocity does not affect the direction of movement.

4.6.2.5 Acceleration

The target acceleration in RPM/s.

Acceleration is not affected by the ContinuousUpdate input, the value when execute was triggered is used. Execute must be re-triggered to change the acceleration.

4.6.2.6 Deceleration

The target deceleration in RPM/s. If set to 0, the value in Acceleration is used instead. Deceleration is not affected by the ContinuousUpdate input, the value when execute was triggered is used. Execute must be re-triggered to change the deceleration.

4.6.2.7 AbsolutePositioning

Choose between absolute or relative positioning.

Value	Description
TRUE	Absolute Positioning Selected
FALSE	Relative Positioning Selected

4.6.2.8 Axis

The axis input should be linked to a data block of type JVL_MIS_Axis. This data block provides axis references to the unit and to its telegram slots.

4.6.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Command Aborted	Bool
Error	Bool

4.6.3.1 Busy

Busy is TRUE whenever the motion command is running (both when the motor is accelerating and when 'At Velocty') and the Error output is FALSE.

4.6.3.2 Done

Done is TRUE when the positioning command has completed successfully.

4.6.3.3 Command Aborted

The command was interrupted by the execution of another command or an error on the motor (e.g. position limit reached).

4.6.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

4.7 JVL_MIS_Reset

4.7.1 Description

Resets any errors or faults in the drive.

4.7.2 Inputs

Input	Data Type
Execute	Bool
Axis	JVL_MIS_AXIS

4.7.2.1 Execute

A rising edge is required to start the command.

If the input is given a rising edge whilst a command is currently running, then the current command is overriden/aborted.

The input is not required to remain TRUE for the duration of the command.

Setting the value of Execute to FALSE during the command will not stop the command.

4.7.2.2 Axis

The axis input should be linked to a data block of type JVL_MIS_Axis. This data block provides axis references to the unit and to its telegram slots.

4.7.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Command Aborted	Bool

4.7.3.1 Busy

Busy is TRUE whenever the command is in progress.

4.7.3.2 Done

Done is TRUE when the reset command has completed successfully.

4.7.3.3 Command Aborted

The command was interrupted by the execution of another command.

4.8 JVL_MIS_Velocity

4.8.1 Description

Run the motor at the specified velocity.

4.8.2 Inputs

Input	Data Type	Units
Execute	Bool	
ContinuousUpdate	Bool	
Velocity	LReal	RPM
Acceleration	LReal	RPM/s
Deceleration	LReal	RPM/s
Direction	Bool	
Axis	JVL_MIS_AXIS	

4.8.2.1 Execute

A rising edge is required to start the motion command.
If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overriden/aborted.
The input is not required to remain TRUE for the duration of the motion command.
Setting the value of Execute to FALSE during the motion command will not stop the motion command.

4.8.2.2 ContinuousUpdate

If ContinuousUpdate is TRUE when the Execute input is set then the Velocity input can be changed while the motion command is active and the new value is applied immediately (with the defined acceleration and deceleration).

A change to the ContinuousUpdate input is not effective when the command is running, Execute must be re-triggered to change ContinuousUpdate.

4.8.2.3 Velocity

The target velocity in RPM.

Giving a negative value will NOT reverse the motor direction. The Direction input must be used to change the direction of motion.

4.8.2.4 Acceleration

The target acceleration in RPM/s.

Acceleration is not affected by the ContinuousUpdate input, the value when execute was triggered is used. Execute must be re-triggered to change the acceleration.

4.8.2.5 Deceleration

The target deceleration in RPM/s. If set to 0, the value in Acceleration is used instead. Deceleration is not affected by the ContinuousUpdate input, the value when execute was triggered is used. Execute must be re-triggered to change the deceleration.

4.8.2.6 Direction

Set the direction of travel.

Value	Description
TRUE	Positive motor direction (clockwise)
FALSE	Negative motor direction (counter-clockwise)

4.8.2.7 Axis

The axis input should be linked to a data block of type JVL_MIS_Axis. This data block provides axis references to the unit and to its telegram slots.

4.8.3 Outputs

Output	Data Type
Busy	Bool
At Velocity	Bool
Command Aborted	Bool
Error	Bool

4.8.3.1 Busy

Busy is TRUE whenever the motion command is running (both when the motor is accelerating and when 'At Velocty') and the Error output is FALSE.

4.8.3.2 At Velocity

At Velocity is TRUE when the drive has reached the motion command target velocity and the Error output is FALSE.

4.8.3.3 Command Aborted

The command was interrupted by the execution of another command or an error on the motor (e.g. position limit reached).

4.8.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

5 MAC Function Blocks

5.1 JVL_MAC_Comms

5.1.1 Description

Performs cyclic Profinet communication. The cyclic telegram data is transferred between PLC input/output area and the axis data block.

This function is required for all other motion control function blocks to operate. A single instance of the JVL_MAC_Comms function must be called once per PLC cycle for every JVL motor in the system.

5.1.2 Inputs

Input	Data Type
Axis	JVL_MAC_AXIS

5.1.2.1 Axis

The axis input should be linked to a data block of type JVL_MAC_Axis. This data block provides axis references to the unit and to its telegram slots.

5.1.3 Return Value

The function returns a TRUE value if the communication is operating without fault.

In the event of a fault (Ret_Val = FALSE) the return values of DPWR_DAT and DPRD_DAT inside this function must be evaluated to determine the cause.
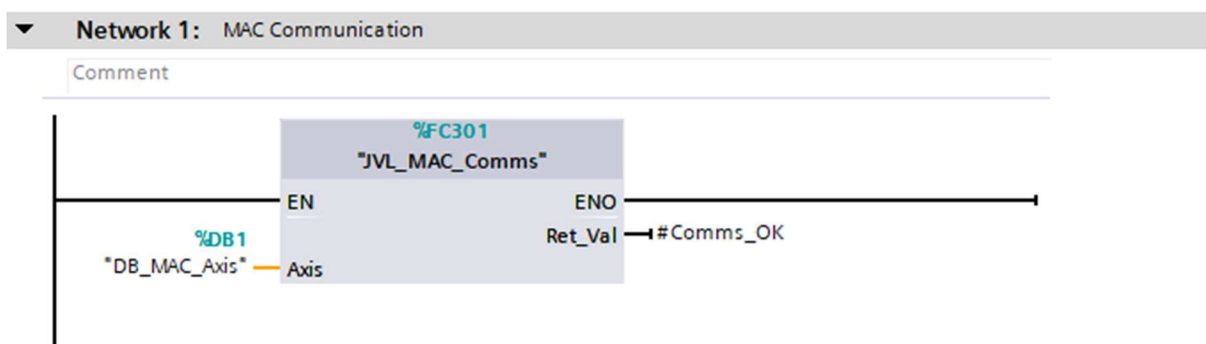
5.2 JVL_MAC_Disable

5.2.1 Description

Place the drive in passive mode, removing all torque from the motor.

If the motor is running then it stops with the configured deceleration of the command that is in progress.

> Caution, this can result in a long stopping distance if the configured deceleration is low. It is recommended that JVL_MAC_Halt is used with suitable deceleration before then executing JVL_MAC_Disable.

5.2.2 Inputs

Input	Data Type
Execute	Bool
Axis	JVL_MAC_AXIS

5.2.2.1 Execute

A rising edge is required to start the motion command. If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overriden/aborted. The input is not required to remain TRUE for the duration of the motion command.

5.2.2.2 Axis

The axis input should be linked to a data block of type JVL_MAC_Axis. This data block provides axis references to the unit and to its telegram slots.

5.2.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Command Aborted	Bool
Error	Bool

5.2.3.1 Busy

Busy is TRUE whenever the motion command is running and the Error output is FALSE.

5.2.3.2 Done

Done is TRUE when the motor has entered passive mode.

> Note, if moving when the disable command was executed, Done = TRUE does not indicate that the motor has stopped. It is recommended that JVL_MAC_Halt is used with suitable deceleration before then executing JVL_MAC_Disable.

5.2.3.3 Command Aborted

The command was interrupted by the execution of another command.

5.2.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of
DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

5.3 JVL_MAC_Halt

5.3.1 Description

Brings the motor to a standstill with defined deceleration.

5.3.2 Inputs

Input	Data Type	Units
Execute	Bool	
Deceleration	LReal	RPM/s
Axis	JVL_MAC_AXIS	

5.3.2.1 Execute

A rising edge is required to start the motion command.

If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overridden/aborted.

The input is not required to remain TRUE for the duration of the motion command. Setting the value of Execute to FALSE during the motion command will not stop the motion command.

5.3.2.2 Deceleration

The target deceleration in RPM/s.

> Note: Due to the resolution of the acceleration/deceleration setpoint in the telegram (register 6 A_SOLL), a value of **at least** 150 RPM/s should be given, or the motion command will not execute.

5.3.2.3 Axis

The axis input should be linked to a data block of type JVL_MAC_Axis. This data block provides axis references to the unit and to its telegram slots.

5.3.3 Outputs

Output	Data Type
Busy	Bool

Done	Bool
Command Aborted	Bool
Error	Bool

5.3.3.1 Busy

Busy is TRUE whenever the motion command is running (both when the motor is accelerating and when 'At Velocty') and the Error output is FALSE.

5.3.3.2 Done

Done is TRUE when the motor has come to a standstill.

5.3.3.3 Command Aborted

The command was interrupted by the execution of another command.

5.3.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

5.4 JVL_MAC140_Home / JVL_MAC400_Home

5.4.1 Description

Homes or references the motor position.

The correct function block must be used for the type of MAC motor.

5.4.2 Inputs

Input	Data Type	Units
Execute	Bool	
Mode	Int	
Position	LReal	Counts
Velocity	LReal	RPM
Acceleration	LReal	RPM/s
TorqueLimit	Real	%
Axis	JVL_MAC_AXIS	

5.4.2.1 Execute

A rising edge is required to start the motion command.
If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overriden/aborted.
The input is not required to remain TRUE for the duration of the motion command.
Setting the value of Execute to FALSE during the motion command will not stop the motion command.

5.4.2.2 Mode

Set the homing method.

Value	Name
0	Set Home Position
1	Home to Sensor
2	Home to Endstop

0 - Set Home Position

The current motor actual position is set to the value of the Position input. The motor does not move. If the motor is running then it is stopped.

1 - Home to Sensor

The motor runs until it reaches the home sensor and then stops. The position of the motor is set relative to the point at which the home sensor was triggered. The exact homing operation is configured in MacTalk.

> Note: Please make sure to use Input AIN on the MAC device as the homing sensor. See MAC operating instructions for details of input wiring.

2 - Home to Endstop

The motor runs until the torque limit is reached. The position of the motor is set relative to the point at which the torque limit was reached.

5.4.2.3 Position

The new axis position, after referencing, in encoder counts. Only effective in homing mode 0.

5.4.2.4 Velocity

The target velocity for the homing move in RPM.

Only effective in homing modes 1 and 2.

5.4.2.5 Acceleration

The target acceleration and deceleration in RPM/s.

Only effective in homing modes 1 and 2.

> Note: Due to the resolution of the acceleration/deceleration setpoint in the telegram (register 6 A_SOLL), a value of **at least** 150 RPM/s should be given, or the motion command will not execute.

5.4.2.6 TorqueLimit

The torque threshold for the motor to stop and home position to be set in %.

Valid range 0 – 100%. Only effective in homing mode 2.

5.4.2.7 Offset

Relative distance for offset move following home to sensor or home to torque limit in counts. The operation of Offset depends on the homing configuration in MacTalk.

Only effective in homing modes 1 and 2.

5.4.2.8 Axis

The axis input should be linked to a data block of type JVL_MAC_Axis. This data block provides axis references to the unit and to its telegram slots.

5.4.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Command Aborted	Bool
Error	Bool

5.4.3.1 Busy

Busy is TRUE whenever the motion command is running and the Error output is FALSE.

5.4.3.2 Done

Done is TRUE when the homing sequence has completed and the axis has been successfully referenced.

5.4.3.3 Command Aborted

The command was interrupted by the execution of another command.

5.4.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

5.5 JVL_MAC_Jog

5.5.1 Description

Run the motor at the specified velocity. The axis is stopped when the control inputs JogForwards and JogBackwards are reset.

5.5.2 Inputs

Input	Data Type	Units
JogForwards	Bool	
JogBackwards	Bool	
Velocity	LReal	RPM
Acceleration	LReal	RPM/s
Axis	JVL_MAC_AXIS	

5.5.2.1 JogForwards

When TRUE, the axis runs in the positive direction at the speed set in the Velocity input.

5.5.2.2 JogBackwards

When TRUE, the axis runs in the negative direction at the speed set in the Velocity input.

> Note: If JogForwards and JogBackwards are both set TRUE, the axis will come to a standstill.

5.5.2.3 Velocity

The target velocity in RPM. Giving a negative value will NOT reverse the motor direction.

5.5.2.4 Acceleration

The target acceleration and deceleration in RPM/s.

> Note: Due to the resolution of the acceleration/deceleration setpoint in the telegram (register 6 A_SOLL), a value of **at least** 150 RPM/s should be given, or the motion command will not execute.

5.5.2.5 Axis

The axis input should be linked to a data block of type JVL_MAC_Axis. This data block provides axis references to the unit and to its telegram slots.

5.5.3 Outputs

Output	Data Type
Busy	Bool
AtVelocity	Bool
Command Aborted	Bool
Error	Bool

5.5.3.1 Busy

Busy is TRUE whenever the motion command is running (both when the motor is accelerating/decelerating and when 'AtVelocty') and the Error output is FALSE.

5.5.3.2 AtVelocity

At Velocity is TRUE when the drive has reached the motion command target velocity and the Error output is FALSE.

5.5.3.3 Command Aborted

The command was interrupted by the execution of another command or an error on the motor (e.g. position limit reached).

5.5.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

5.6 JVL_MAC_Position

5.6.1 Description

Move the axis to the specified position, or by the specified distance.

5.6.2 Inputs

Input	Data Type	Units
Execute	Bool	
ContinuousUpdate	Bool	
Position	LReal	Counts
Velocity	LReal	RPM
Acceleration	LReal	RPM/s
AbsolutePositioning	Bool	
Axis	JVL_MAC_AXIS	

5.6.2.1 Execute

A rising edge is required to start the motion command.
If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overriden/aborted.
The input is not required to remain TRUE for the duration of the motion command.
Setting the value of Execute to FALSE during the motion command will not stop the motion command.

5.6.2.2 ContinuousUpdate

If ContinuousUpdate is TRUE when the Execute input is set then the Position and Velocity inputs can be changed while the motion command is active and the new values are applied immediately (with the defined acceleration and deceleration).

A change to the ContinuousUpdate input is not effective when the command is running, Execute must be re-triggered to change ContinuousUpdate.

5.6.2.3 Position

The axis target position, or distance to move, in encoder counts. See AbsolutePositioning input and ContinuousUpdate input.

5.6.2.4 Velocity

The target velocity for the positional move in RPM. See ContinuousUpdate input.

A negative velocity does not affect the direction of movement.

5.6.2.5 Acceleration

The target acceleration and deceleration in RPM/s.

> Note: Due to the resolution of the acceleration/deceleration setpoint in the
> telegram (register 6 A_SOLL), a value of **at least** 150 RPM/s should be given, or
> the motion command will not execute.

5.6.2.6 AbsolutePositioning

Choose between absolute or relative positioning.

Value	Description
TRUE	Absolute Positioning Selected
FALSE	Relative Positioning Selected

5.6.2.7 Axis

The axis input should be linked to a data block of type JVL_MAC_Axis. This data block
provides axis references to the unit and to its telegram slots.

5.6.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Command Aborted	Bool
Error	Bool

5.6.3.1 Busy

Busy is TRUE whenever the motion command is running (both when the motor is
accelerating and when 'At Velocty') and the Error output is FALSE.

5.6.3.2 Done

Done is TRUE when the positioning command has completed successfully.

5.6.3.3 Command Aborted

The command was interrupted by the execution of another command or an error on the motor (e.g. position limit reached).

5.6.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

5.7 JVL_MAC_Reset

5.7.1 Description

Resets any errors or faults in the drive.

5.7.2 Inputs

Input	Data Type
Execute	Bool
Axis	JVL_MAC_AXIS

5.7.2.1 Execute

A rising edge is required to start the command.

If the input is given a rising edge whilst a command is currently running, then the current command is overriden/aborted.

The input is not required to remain TRUE for the duration of the command.

Setting the value of Execute to FALSE during the command will not stop the command.

5.7.2.2 Axis

The axis input should be linked to a data block of type JVL_MAC_Axis. This data block provides axis references to the unit and to its telegram slots.

5.7.3 Outputs

Output	Data Type
Busy	Bool
Done	Bool
Command Aborted	Bool

5.7.3.1 Busy

Busy is TRUE whenever the command is in progress.

5.7.3.2 Done

Done is TRUE when the reset command has completed successfully.

5.7.3.3 Command Aborted

The command was interrupted by the execution of another command.

5.8 JVL_MAC_Velocity

5.8.1 Description

Run the motor at the specified velocity.

5.8.2 Inputs

Input	Data Type	Units
Execute	Bool	
ContinuousUpdate	Bool	
Velocity	LReal	RPM
Acceleration	LReal	RPM/s
Direction	Bool	
Axis	JVL_MAC_AXIS	

5.8.2.1 Execute

A rising edge is required to start the motion command.
If the input is given a rising edge whilst a motion command is currently running, then the current motion command is overriden/aborted.
The input is not required to remain TRUE for the duration of the motion command.
Setting the value of Execute to FALSE during the motion command will not stop the motion command.

5.8.2.2 ContinuousUpdate

If ContinuousUpdate is TRUE when the Execute input is set then the Velocity input can be changed while the motion command is active and the new value is applied immediately (with the defined acceleration and deceleration).

A change to the ContinuousUpdate input is not effective when the command is running, Execute must be re-triggered to change ContinuousUpdate.

5.8.2.3 Velocity

The target velocity in RPM.
Giving a negative value will NOT reverse the motor direction. The Direction input must be used to change the direction of motion.

5.8.2.4 Acceleration

The target acceleration and deceleration in RPM/s.

> Note: Due to the resolution of the acceleration/deceleration setpoint in the telegram (register 6 A_SOLL), a value of **at least** 150 RPM/s should be given, or the motion command will not execute.

5.8.2.5 Direction

Set the direction of travel.

Value	Description
TRUE	Positive motor direction (clockwise)
FALSE	Negative motor direction (counter-clockwise)

5.8.2.6 Axis

The axis input should be linked to a data block of type JVL_MAC_Axis. This data block provides axis references to the unit and to its telegram slots.

5.8.3 Outputs

Output	Data Type
Busy	Bool
AtVelocity	Bool
Command Aborted	Bool
Error	Bool

5.8.3.1 Busy

Busy is TRUE whenever the motion command is running (both when the motor is accelerating and when 'At Velocty') and the Error output is FALSE.

5.8.3.2 AtVelocity

At Velocity is TRUE when the drive has reached the motion command target velocity and the Error output is FALSE.

5.8.3.3 Command Aborted

The command was interrupted by the execution of another command or an error on the motor (e.g. position limit reached).

5.8.3.4 Error

Error is TRUE if there is an error in the drive while the motion command is running, given by the ANY_ERR signal in the drive status word (DRIVE_DB.Telegram.Input.StatusWord, bit 24 of drive register 35 ERR_STAT).
For more information on the error that occurred, see the value of DRIVE_DB.Telegram.Input.StatusWord (drive register 35 ERR_STAT).

5.8.4 Example Function Diagram