MELSERVO J4
MR-J4-TM-PNT Positioning Function Block for S7-1200

Mitsubishi Electric Europe
Polish Branch

Revisions

Date	Version	Revision
January, 2020	V001	First edition

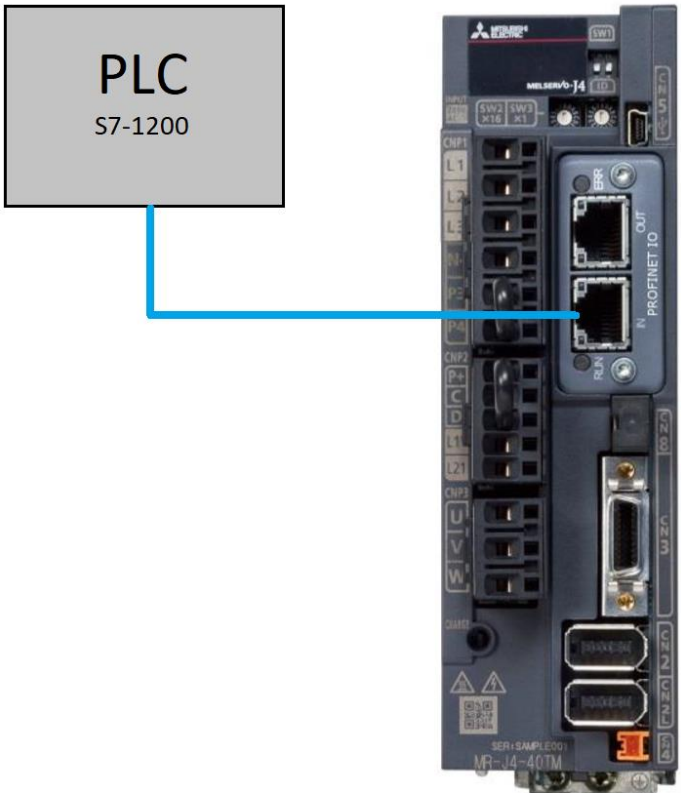
Table of contents

1. Overview of document

1.1. Overview of FB's library

The purpose of this library is to provide Function Block for control MELSERVO MR-J4-TM via PROFINET using S7-1200 PLC. Function Block provides operation modes: homing, positioning, speed control and torque control.

1.2. Example of system configuration



1.3. Contents of library

Name	Description
MR_J4_TM_CONTROL	Main FB for Servo drive control

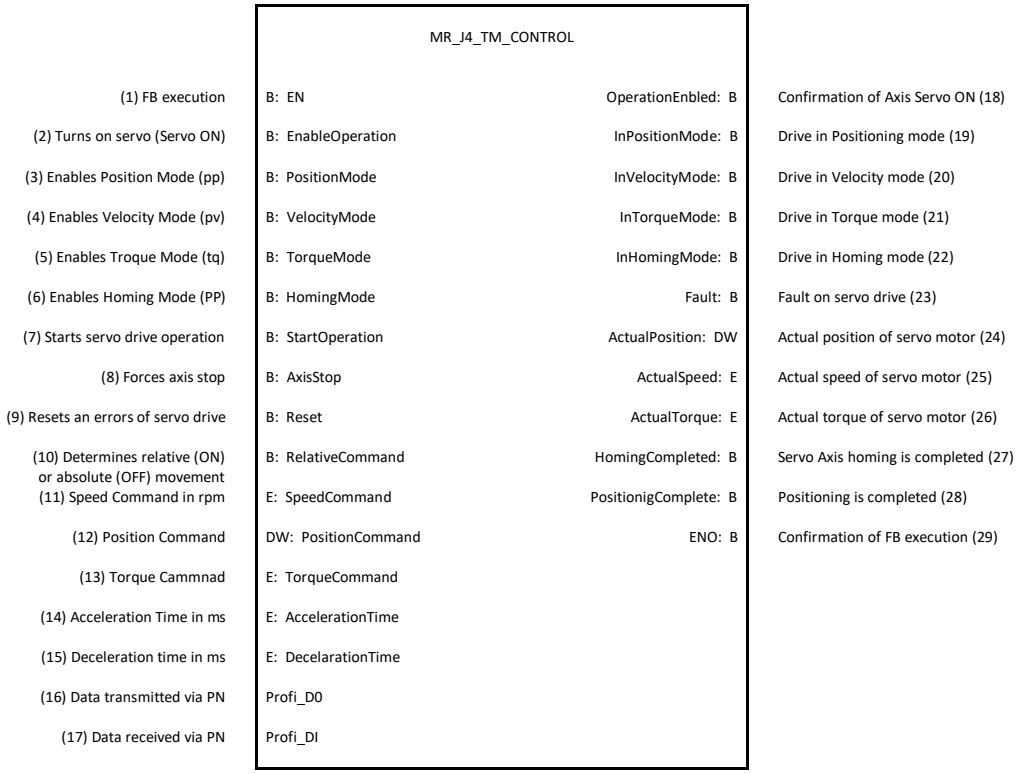
2. Details of library

2.1. Function block

Name

MR_J4_TM_CONTROL

Overview

Item	Description
Overview	A FB to control MELSERVO J4 TM using telegram 102 via PROFINET
Symbol	

Labels

● Input labels

No.	Name	Label name	Data type	Range	Description
(1)	FB execution	EN	Bit	ON,OFF	FB is executed when ON
(2)	Turns on servo (Servo ON)	EnableOperation	Bit	ON,OFF	Turns the servo ON
(3)	Enable Position Mode (pp)	PositionMode	Bit	ON,OFF	Enables profile position mode (pp)
(4)	Enable Velocity Mode (pv)	VelocityMode	Bit	ON,OFF	Enables profile velocity mode (pv)
(5)	Enable Troque Mode (tq)	TorqueMode	Bit	ON,OFF	Enables profile torque mode (tq)
(6)	Enable Homing Mode (hm)	HomingMode	Bit	ON,OFF	Enables homing mode (hm)
(7)	Servo drive operation start	StartOperation	Bit	ON,OFF	Start operation in selected mode
(8)	Axis stop	AxisStop	Bit	ON,OFF	Stop movement of the axis, servo remains ON
(9)	Error reset of servo drive	Reset	Bit	ON,OFF	Reset error of servo drive
(10)	Relative or absolute movement	RelativeCommand	Bit	ON,OFF	ON: relative (incremental) position command OFF: absolute position command
(11)	Speed Command in rpm	SpeedCommand	Real	0.01 to maximal motor speed	Command speed during movement (pp, pv), speed limit value (tq). Unit 0.01rpm

No.	Name	Label name	Data type	Range	Description
(12)	Position Command	PositionCommand	DInt	-999999 to 999999	Command position in position profile mode In degrees range is limited to -360000 to 360000
(13)	Torque Command	TorqueCommand	Real	0.1 to 300.0	Torque command used in the profile torque mode. Unit 0.1% rated torque
(14)	Acceleration time	AccelerationTime	Real	0 to 20000 (pp) 0 to 50000 (pv)	Acceleration at start of movement to target Position. Unit: ms
(15)	Deceleration time	DecelarationTime	Real	0 to 20000 (pp) 0 to 50000 (pv)	Deceleration at arrival at target position Unit: ms
(16)	Data transmitted via Profinet	Profi_D0	Structure		Structure that stores data to be send via network to the servo drive.
(17)	Data received via Profinet	Profi_DI	Structure		Structure that stores data received by network from servo drive.

● Output labels

No.	Name	Label name	Data type	Range	Description
(18)	Confirmation of Axis Servo ON	OperationEnbled	Bit	ON,OFF	ON: servo is ON
(19)	Drive in Positioning mode	InPositionMode	Bit	ON,OFF	ON: servo is in profile position mode (pp)
(20)	Drive in Velocity mode	InVelocityMode	Bit	ON,OFF	ON: servo is in profile velocity mode (pv)
(21)	Drive in Torque mode	InTorqueMode	Bit	ON,OFF	ON: servo is in profile torque mode (tq)
(22)	Drive in Homing mode	InHomingMode	Bit	ON,OFF	ON: servo is in homing mode (hm)
(23)	Fault on servo drive	Fault	Bit	ON,OFF	ON: servo has an error
(24)	Actual servo position	ActualPosition	DInt		Current position. Unit: Pos. units
(25)	Actual servo speed	ActualSpeed	Real		Current speed. Unit: 0.01 rpm
(26)	Actual servo torque	ActualTorque	Real		Current torque. Unit: 0.1% of rated torque
(27)	Homing is completed	HomingCompleted	Bit	ON,OFF	ON: homering is completed (positioning can be executed)
(28)	Positioning is completed	PositionigComplete	Bit	ON,OFF	ON: positioning is completed
(29)	FB execution	ENO	Bit	ON,OFF	ON: Fb is executed

FB/FUN details

Item	Description	
Available device	CPU module	S7-1200
	Engineering tool	TIA Portal v15
Language	ST	

Item	Description
Processing	▪ Input EN activates FB ▪ Input *OperationEnable* turns the servo on. If succeeded output *OperationEnabled* turns on. ▪ By turning on one of inputs *PositionMode*, *VelocityMode*, *TorqueMode* or *HomingMode* selected mode can be activated. Just one of those inputs should be on at the same time. Activated mode of operation is indicated by the outputs *InPositionMode*, *InVelocityMode*, *InTorqueMode* or *InHomingMode*. ▪ If profile position mode is selected assign *CommandSpeed*, *CommandPosition*, *AccelerationTime* and *DecelerationTime*. By input *RelativeCommand* specify absolute or relative movement specification. Turning on *StartOperation* activates movement. ▪ If profile velocity mode is selected assign *CommandSpeed*, *AccelerationTime* and *DecelerationTime*. Turning on *StartOperation* activates movement. Turning off *StartOperation* stopes movement. ▪ If profile torque mode is selected assign *CommandSpeed* (speed limit value) and *CommandTorque*. Turning on *StartOperation* activates movement. Turning off *StartOperation* stopes movement. ▪ If homing mode is selected turn on *StartOperation* to execute homing. When succeeded output *HomingCompleted* turns on. ▪ Execute homing before positioning operation. Otherwise servo warning will be generated and positioning won't start. ▪ By turning on *AxisStop* axis decelerates to stop and can't be started. By tuning off *AxisStop* when *StartOperation* is on movement will be continued (temporary stop) otherwise axis remains stopped. ▪ Servo error, indicated by Fault output, can be reset by turning on Reset input. Not all servo errors can be reset by PLC. For details refer to servo trouble shouting manual. ▪
Restrictions or precautions	Before using function block establish Profinet connection between servo drive and PLC using telegram 102. Define global tags with data type *Telegram_102_read* and *Telegram_102_write* to assign data exchanged with servo drives.

2.2. Structured data types

Telegram_102_read	Structure to store data received from servo drive via PROFINET compliant with telegram 102. It is necessary to define Tag base on this structure to access data received form the servo drive and pass it to the Function Block.
Telegram_102_write	Structure to store data that will be sent to servo drive via PROFINET compliant with telegram 102. It is necessary to define Tag base on this structure to access data transmitted to the servo drive and pass it from the Function Block.