

Library Reference

1S_FB

Applicable models:

- **CPUs:**
 - Sysmac NJ501-xxxx v1.01+
 - Sysmac NJ301-xxxx v1.01+
 - Sysmac NJ101-xxxx v1.10+
 - Sysmac NX1P2-xxxx V1.13+
 - Sysmac NX701-xxxx V1.10+
 - Sysmac NY5xx-xxxx V1.12+
- **Servo-drive:**
 - 1S-series FW
- **Software:**
 - Sysmac Studio v1.08+

Document Revision History:

| Version | Date | Contents |
|----------------|---------------------------------|----------------------|
| 1S_FB V1.00.00 | 30 th May 2017 | Original Production |
| 1S_FB V1.00.01 | 18 th September 2017 | Bug Fix |
| 1S_FB V1.01 | | Added MC_Restart1S() |
| 1S_FB V1.02 | 27 th November 2017 | Enhance Get1SInfo() |

Note

This manual is a reference that explains the function block functions.

It does not explain the operational limitations of Units, components, or combinations of Units and components. Always read and understand the Operation Manuals for the system's Units and other components before using them.

The Function Block is designed with the utmost care. Omron, however, assumes no responsibility regarding failures from it.

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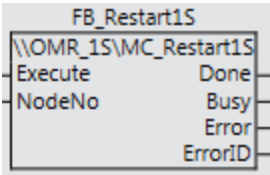
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MC_Restart1S

The MC_Restart1S instruction can be used to restart the 1S ServoDrive via software.

This FB can be used to save in EEPROM parameter which need restart to be saved, and to reset error which needs Restart to be reset (Encoder disconnection)

| Instruction | Name | FB/ FUN | Graphic expression |
|-------------|--------------|------------|--|
| FCL_1S | MC_Restart1S | FB |  |

Variables

Input Variables

| Name | Meaning | Data type | Valid range | Default | Description |
|---------|------------------------------|-----------|---------------|---------|---|
| Execute | Enable FB | BOOL | FALSE TRUE | | The instruction is executed when Execute changes to TRUE. |
| NodeNo | Ethercat Node No of 1S Drive | UINT | 1 to 192 | | Ethercat Node number of 1S Drive |

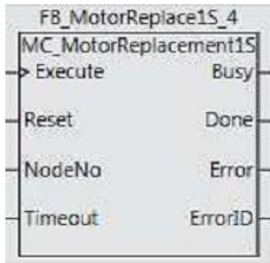
Output Variables

| Name | Meaning | Data type | Valid range | Description |
|---------|------------|-----------|-------------|--|
| Done | Done | BOOL | TRUE/FALSE | TRUE when the instruction is completed. |
| Busy | Executing | BOOL | TRUE/FALSE | TRUE when the instruction is acknowledged. |
| Error | Error | BOOL | TRUE/FALSE | TRUE while there is an error. |
| ErrorID | Error code | WORD | | Contains the error code when an error occurs. A value of 16#0000 indicates normal execution |

MC_MotorReplacement1S

The MC_MotorReplacement1S instruction can be used to clear the error message which appears if a motor on 1S drive has been exchanged.

If 1S Drive is not setup to work as incremental encoder, then all 1S Drive operate with absolute encoder in motor. Using absolute encoder, if motor is exchanged, an error/warning is triggered, which must be confirmed. This is what this FB is used for.

| Instruction | Name | FB/ FUN | Graphic expression |
|-------------|---------------------------|------------|--|
| FCL_1S | MC_MotorReplacem ent1S | FB |  |

Variables

Input Variables

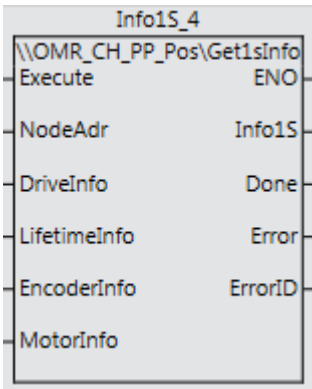
| Name | Meaning | Data type | Valid range | Default | Description |
|---------|------------------------------|-----------|--|---------|--|
| Execute | Enable FB | BOOL | FALSE TRUE | | The instruction is executed when Execute changes to TRUE. |
| Reset | Reset FB | BOOL | FALSE TRUE | | This is to reset FB, when an error appeared inside FB |
| NodeNo | Ethercat Node No of 1S Drive | UINT | 1 to 192 | | Ethercat Node number of 1S Drive |
| Timeout | Timeout SDO communication | UINT | 0: 2.0s 1 to 65535: 0.1 to 6553.5 s | | Timeout for EC_SDO communication in 0.1s units, default 20 -> 2.0s |

Output Variables

| Name | Meaning | Data type | Valid range | Description |
|---------|------------|-----------|-------------|---|
| Done | Done | BOOL | TRUE/FALSE | TRUE when the instruction is completed. |
| Busy | Executing | BOOL | TRUE/FALSE | TRUE when the instruction is acknowledged. |
| Error | Error | BOOL | TRUE/FALSE | TRUE while there is an error. |
| ErrorID | Error code | WORD | | Contains the error code when an error occurs. A value of 16#0000 indicates normal execution |

Get1SInfo

Get1SInfo() function block is used to read advanced information about drive, motor and encoder status of 1S. As this function block trigger a lot of SDO communication, it's recommended to start it only when needed. Or e.g. every minute.

| Instruction | Name | FB/ FUN | Graphic expression |
|-------------|--|------------|--|
| Get1SInfo | Get 1S Information about Motor and Drive | FB |  |

Variables

Input Variables

| Name | Meaning | Data type | Valid range | Default | Description |
|--------------|------------------------------|-----------|---------------|---------|---|
| Execute | Enable FB | BOOL | FALSE TRUE | | The instruction is executed when Execute changes to TRUE. |
| NodeAdr | Ethercat Node No of 1S Drive | UINT | 1 to 192 | | Ethercat Node number of 1S Drive |
| DriveInfo | Get drive information | BOOL | FALSE TRUE | | Activate to read drive information |
| LifetimeInfo | Get Lifetime information | BOOL | FALSE TRUE | | Activate to read lifetime information |
| EncoderInfo | Get encoder information | BOOL | FALSE TRUE | | Activate to read encoder information |
| MotorInfo | Get Motor information | BOOL | FALSE TRUE | | Activate to read motor information see |

Output Variables

| Name | Meaning | Data type | Valid range | Description |
|--------|-------------------------------|-----------|-------------|--|
| Info1S | Advance information structure | sInfo1S | | Structure with information about 1S |
| Done | Done | BOOL | TRUE/FALSE | TRUE when the instruction is completed. |
| Busy | Executing | BOOL | TRUE/FALSE | TRUE when the instruction is acknowledged. |

| Name | Meaning | Data type | Valid range | Description |
|---------|------------|-----------|-------------|---|
| Error | Error | BOOL | TRUE/FALSE | TRUE while there is an error. |
| ErrorID | Error code | WORD | | Contains the error code when an error occurs. A value of 16#0000 indicates normal execution. |

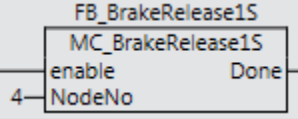
● Data structure slnfo1S

| slnfo1s | | Member Data type | Description |
|--------------|--------------------------------------|------------------------|--|
| Drive | | OMR_1S\sDrive1S | Information about drive 4320hex 1008hex 100Ahex 1009hex 4000hex |
| | MainPowerSupplyPN | DINT | P-N Voltage DC-Voltage |
| | ServoDriveTemperature | DINT | internal temperature of the Servo Drive |
| | ManufacturerDeviceName | STRING[21] | Drive manufacturer name |
| | ManufacturerHardwareVersion | STRING[21] | Drive hardware version |
| | ManufacturerSoftwareVersoin | STRING[21] | Drive software version |
| | ErrorFullcode | DWORD | Gives the error number of an error or warning which occurs in the Servo Drive For example, in the case of Overload Warning (Error No. A0.00), a value of 0x0000A000 hex is given. |
| | Warning | OMR_1S\sWarnings1S | Warnings 4021hex |
| | EthercatCommunications | BOOL | EtherCAT Communications Warning B2 |
| | CommandWarning | BOOL | Command Warning B1 |
| | DataSettingWarning | BOOL | Data Setting Warning B0 |
| | AbsoluteEncoderCounterOverflow | BOOL | Absolute Encoder Counter Overflow Warning AB |
| | EncoderLifeTime | BOOL | Encoder Lifetime Warning A7 |
| | LifetimeInformationCorruption | BOOL | Lifetime Information Corruption Warning A7 |
| | BrakeInterlockOutputRelayLifetime | BOOL | Brake Interlock Output Relay Lifetime Warning A7 |
| | InrushCurrentPreventionRelayLifetime | BOOL | Inrush Current Prevention Relay Lifetime Warning A7 |
| | CapacitorLifetime | BOOL | Capacitor Lifetime Warning A7 |
| | Vibration | BOOL | Motor Vibration Warning A6 |
| | FanRotation | BOOL | Fan Rotation Warning A3 |
| | EncoderCommunication | BOOL | Encoder Communications Warning A4 |
| | RegenerationOverload | BOOL | Regeneration Overload Warning A1 |
| | Overload | BOOL | Overload Warning A0 |
| LifetimeInfo | | OMR_1S\sLifeTimeInfo1S | Lifetime information of drive and motor 4140hex |
| | TotalPowerOnTime_min | DINT | Gives the total power ON time of the Servo Drive (control power supply). |
| | TotalCapacitorOperatingTime_min | DINT | Gives the total operating time of the capacitor |
| | CapacitorOperationTimeRatio_pm | DINT | Gives the ratio of the present operating time to the lifetime of the capacitor. • When the ratio is 100%, the lifetime reaches the end. |

| sInfo1s | | Member Data type | Description |
|-------------|--------------------------------------|-------------------|--|
| | InrushCurrentPreventionRelayON_Count | DINT | Gives the number of times when the inrush current prevention relay is changed to ON. |
| | DynamicBrakeRelayON_Count | DINT | Gives the number of times the command was sent to change the dynamic brake relay contact to ON. This is not the number of deceleration operations performed with the dynamic brake |
| | MotorOperatingTime | DINT | Gives the total time when the motor is not in a stop state. |
| | BrakeInterlockOutputRelayON_Count | DINT | Gives the number of times when the brake interlock output relay is changed to ON. |
| EncoderInfo | | OMR_1S\sEncoder1S | Information about encoder 4510hex |
| | EncoderTemperatue | DINT | Gives the internal temperature of the encoder which is mounted on the motor in °C |
| | SerialNumber | STRING[17] | Gives the encoder serial nu |
| | ElectricAngle | DINT | Gives the electric angle. • In the counterclockwise rotation, 0° indicates the position which is the zero cross point (rising) of the phase-U inductive voltage. • The encoder value increases when the motor rotates counterclockwise, and the display range is from 0 to 359°. |
| | MechanicalAngle | UDINT | Gives the one-rotation data of the encoder as the mechanical angle. • The encoder value increases when the motor rotates counterclockwise, and the display range is from 0 to 359°. |
| | Resolution | DINT | Resolution per Rotation |
| | OneRotationData | UDINT | One-rotation Data [Encoder Unit] |
| | MultiRotationData | DINT | Multi-rotation Data [Rotations] |
| MotorInfo | | OMR_1S\sMotor1S | Information about motor 4410hex |
| | MotorModel | STRING[21] | Gives the model of the motor which is connected to the Servo Drive |
| | SerialNumber | STRING[17] | Gives the serial number of the motor which is connected to the Servo Drive |
| | LastConnectedMotorModel | STRING[21] | Gives the model of the motor which was connected the last time |
| | LastConnectedSerialNumber | STRING[21] | Gives the serial number of the motor which was connected the last time |

MC_BrakeRelease1S

The MC_BrakeRelease1S instruction can be used to lock or release the brake without power on the servo with an SDO command

| Instruction | Name | FB/ FUN | Graphic expression |
|-------------------|-------------------------|------------|---|
| MC_BrakeRelease1S | Release the motor brake | FB |  |
| | | | ST expression |
| | | | FB_BrakeRelease(Enable :=parameter, NodeNo :=parameter, Done =>parameter,); |

Variables

Input Variables

| Name | Meaning | Data type | Valid range | Default | Description |
|---------|------------------------------|-----------|---------------|---------|---|
| Execute | Enable FB | BOOL | FALSE TRUE | | The instruction is executed when Execute changes to TRUE. |
| NodeNo | Ethercat Node No of 1S Drive | UINT | 1 to 192 | | Ethercat Node number of 1S Drive |

Output Variables

| Name | Meaning | Data type | Valid range | Description |
|------|---------|-----------|-------------|---|
| Done | Done | BOOL | TRUE/FALSE | TRUE when the instruction is completed. |