SIEMENS

常问问题 • 06/2014

SIMOTION 中轴的转矩限幅功能

SIMOTION、Axis、Torque limit

http://support.automation.siemens.com/CN/view/zh/

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目录

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1 概述

在自动化控制项目中，某些工艺控制需要对轴进行转矩限幅及附加转矩的控制，比如材料收放卷的控制。在 SIMOTION 中如果创建了一个速度轴或位置轴，通过激活工艺数据块，控制器可周期性的将预定义的工艺数据传送到驱动，或从驱动读取工艺数据。

工艺数据以附加报文的方式进行传送。在 SIMOTION 中这些附加字有指定的含义，与驱动中的相关参数自动相关联。

2 配置

2.1 在工艺数据块中分配变量

工艺数据的附加报文的关联关系如表 1 所示：

表 1.

Direction	Word No.	Designation in SIMOTION SCOUT	Designation in the Drive
SIMOTION -> Drive	1	(Axis).DefaultAdditiveTorque	P1511 additional torque 1 P1512 weighting
	2	(Axis).DefaultTorqueLimitPositive	P1522 upper torque limit/motor
	3	(Axis).DefaultTorqueLimitNegative	P1523 lower torque limit/regenerative
Drive -> SIMOTION	1	(Axis).ActualTorque.Value	r80 actual torque value

2.2 变量的规格化

通过 PROFIBUS 总线传送规格化的变量，传送一个系数来代替绝对数值(如，4,000h 代表 100%)。 系数范围为 -200 到 +200%。系数的参考值为电机转矩 P2003。在 SIMOTION SCOUT 中，此值保存在轴的配置数据中 (Axis).TypeOfAxis.SetPointDriverInfo.DriveData.maxTorque，它作为参考转矩，可通过专家列表离线修改，如图 1 所示。

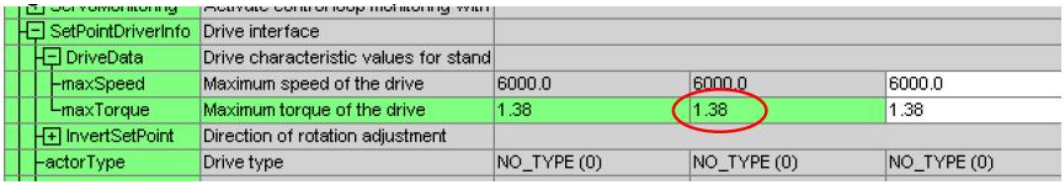

图 1.

为了确保传送数据一致，在驱动中的转矩设定值要与轴中的相同。驱动中的设定值为 P2003，如图 2 所示。

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p1990				Rotor position identification angular comm	0	-
p2000				Reference speed reference frequency	6000.00	rpm
p2001				Reference voltage	1000	V
p2002				Reference current	3.00	A
p2003				Reference torque	1.38	Nm
r2004				Reference power	0.9	kW
r2032			+	Master control, control word effective	0H	-

图 2.

2.3 在配置轴中的工艺数据设置

轴配置完成后，双击轴下面的 Configuration，在右侧画面中点击“ Change”按钮，如图 3 所示。

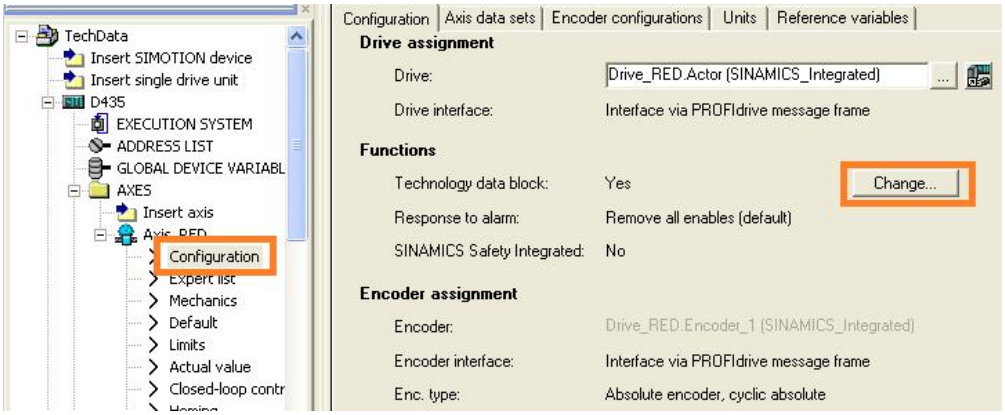

图 3.

在弹出的画面中勾选“ Technology data block”， 如图 4 所示：

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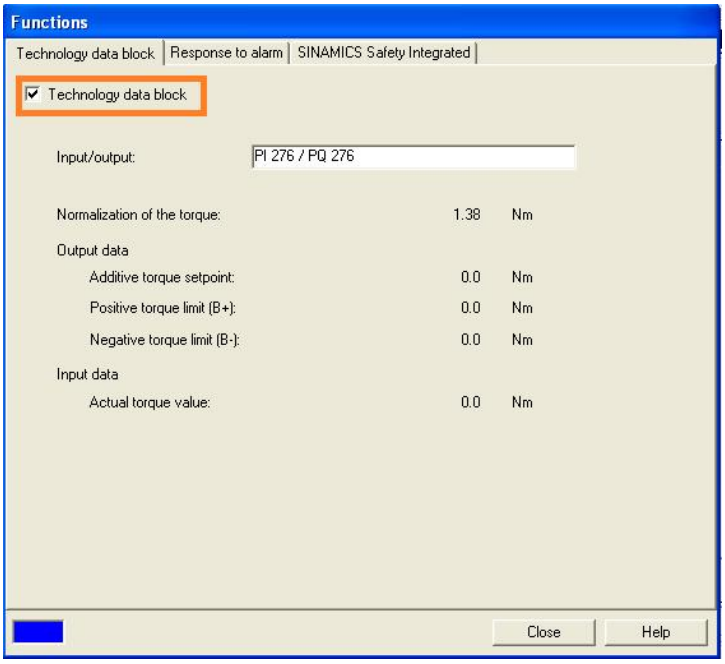

图 4.

在轴的驱动中会自动关联正负转矩限幅、附加转矩及转矩实际值的通讯字，报文也自动进行了扩展，如图 5 所示：

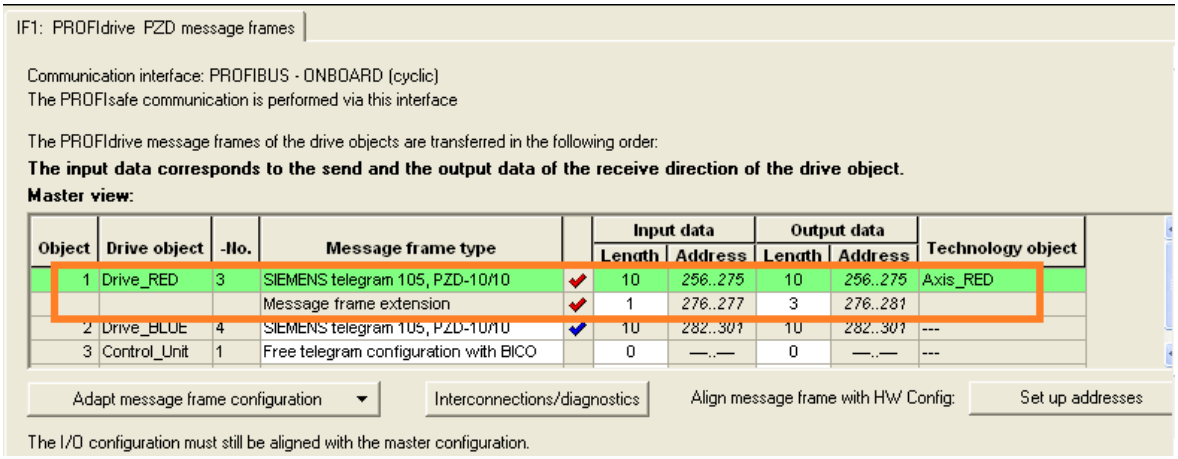

图 5.

自动关连正负转矩限幅及附加转矩，如图 6 所示：

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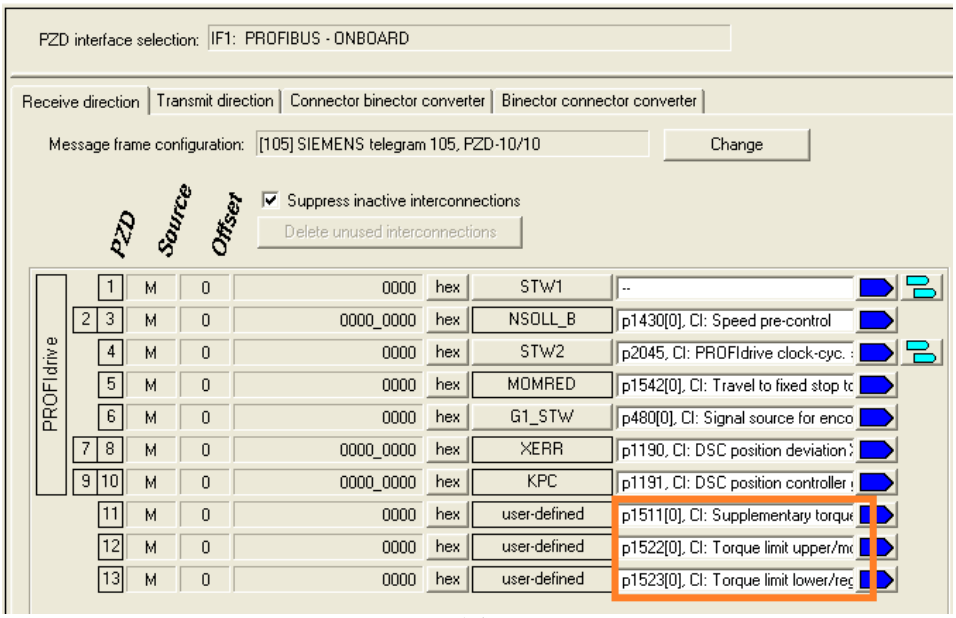

图 6.

自动关连转矩实际值，如图 7 所示：

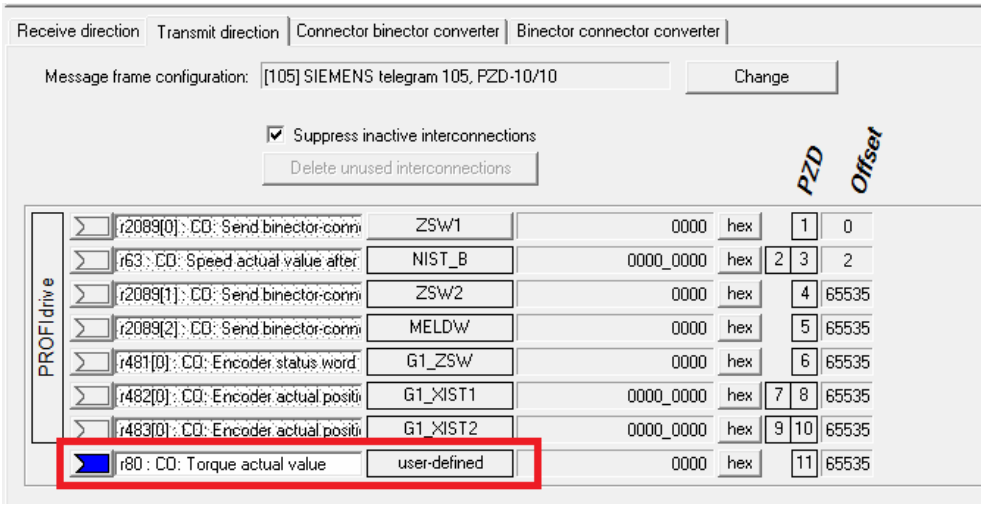

图 7.

将附加转矩的比例因子设置为 100%，如图 8 所示：

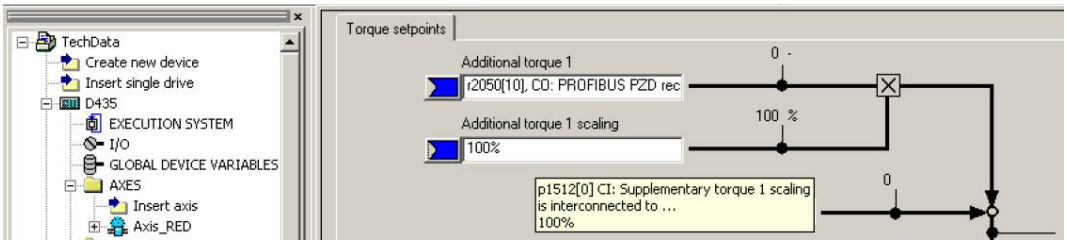

图 8.

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2.4 控制命令

„_enableaxistorquelimitpositive()“ 、„_enableaxistorquelimitnegative()“ 命令使能驱动的正负转矩限幅功能。在转矩限幅下，为了不报堵转报警需设置 P2144=1，或用功能块 _setAxisStw()将 STW2 的 bit 8 置 1(Active travel to fixend stop)。

赋值如下：

```
Axis_RED.DefaultAdditiveTorque          := rAdditiveTorque
Axis_RED.DefaultTorqueLimitNegative     := rTorqueLimitNegative
Axis_RED.DefaultTorqueLimitPositive     := rTorqueLimitPositive
```

下述功能块用于激活/不激活转矩限幅：

_enableAxisAdditiveTorque, _disableAxisAdditiveTorque,
_enableAxisTorqueLimitPositive, _disableAxisTorqueLimitPositive,
_enableAxisTorqueLimitNegative, _disableAxisTorqueLimitNegative

ST 编程示例：

(1) _enableaxisadditivetorque

```
If Axis_RED.AdditiveTorqueIn.State = INACTIVE and
Boenableaxisadditivetorque then
my_Ret_DINT := _enableaxisadditivetorque(
                 axis:=Axis_RED,
   valuereferencetype:=VALUE,
   additivetorquetype:=DEFAULT_VALUE,
         nextcommand:=IMMEDIATELY);
end_if;
```

(2) _enableAxisTorqueLimitPositive

```
my_Ret_DINT := _enableaxistorquelimitpositive(
                  axis:=Axis_RED,
     valuereferencetype:=VALUE,
        torquelimittype:=DEFAULT_VALUE,
            nextcommand:=IMMEDIATELY);
```

(3) _enableAxisTorqueLimitNegative

```
        IF (boTorqueLimitNegative AND
           Axis_RED.TorqueLimitNegativeIn.State = INACTIVE AND
           boErrorTorque = FALSE) THEN
              my_Ret_DINT := _enableaxistorquelimitnegative(
                               axis:=Axis_RED,
                  valuereferencetype:=VALUE,
                torquelimittype:=DEFAULT_VALUE,
                    nextcommand:=IMMEDIATELY);
         end_if;
```

(4) _disableaxisadditivetorque

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```
IF Axis_RED.AdditiveTorqueIn.State = ACTIVE AND bodisableadditivetorque
then
my_Ret_DINT := _disableaxisadditivetorque(
                       axis:=Axis_RED,
                nextcommand:=IMMEDIATELY);
End_IF;
```

(5) _disableAxisTorqueLimitPositive

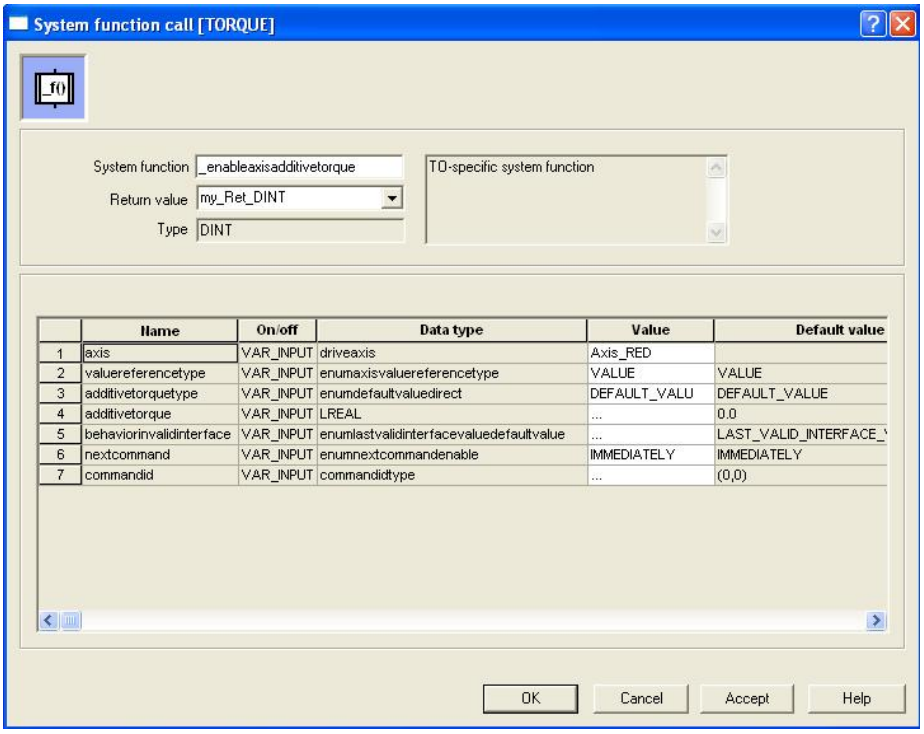
```
IF Axis_RED.TorqueLimitPositiveIn.State = ACTIVE AND ... then
my_Ret_DINT := _disableaxistorquelimitpositive(
                       axis:=Axis_RED,
                nextcommand:=IMMEDIATELY);
```

(6) _disableAxisTorqueLimitNegtive

```
IF Axis_RED.TorqueLimitNegtiveIn.State = ACTIVE AND ... then
my_Ret_DINT := _disableaxistorquelimitnegtive(
                       axis:=Axis_RED,
                nextcommand:=IMMEDIATELY);
```

MCC 编程示例：

(1) 使能附加转矩



	Name	On/off	Data type	Value	Default value
1	axis	VAR_INPUT	driveaxis	Axis_RED	
2	valuereferencetype	VAR_INPUT	enumaxisvaluereferencetype	VALUE	VALUE
3	additivetorquetype	VAR_INPUT	enumdefaultvaluedirect	DEFAULT_VALU	DEFAULT_VALUE
4	additivetorque	VAR_INPUT	LREAL	...	0.0
5	behaviorinvalidinterface	VAR_INPUT	enumlastvalidinterfacevaluedefaultvalue	...	LAST_VALID_INTERFACE_
6	nextcommand	VAR_INPUT	enumnextcommandenable	IMMEDIATELY	IMMEDIATELY
7	commandid	VAR_INPUT	commandidtype	...	(0,0)

(2) 使能正转矩限幅

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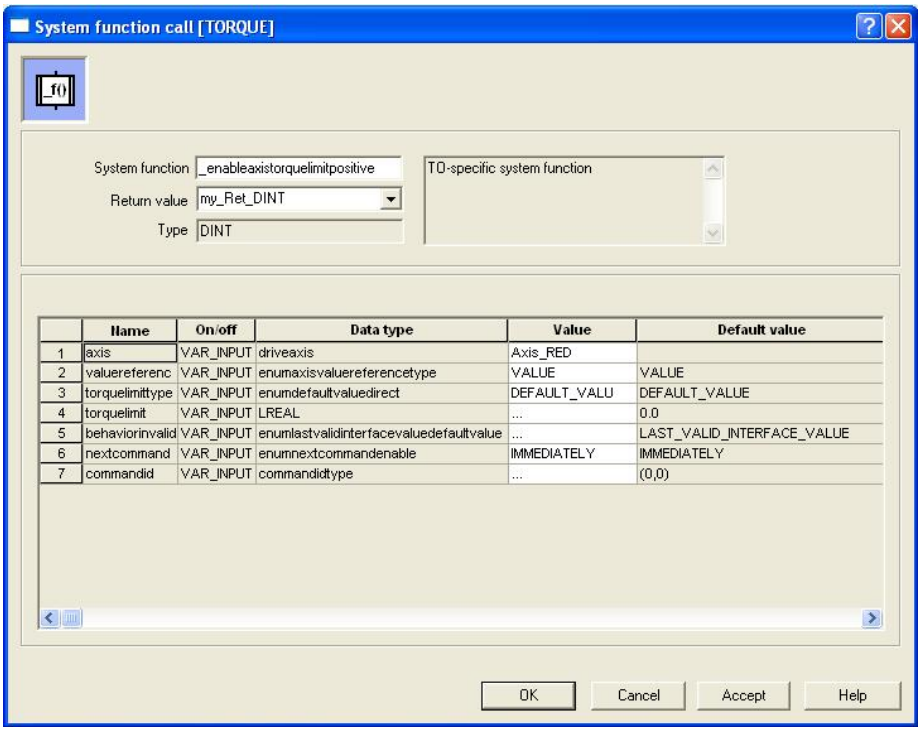
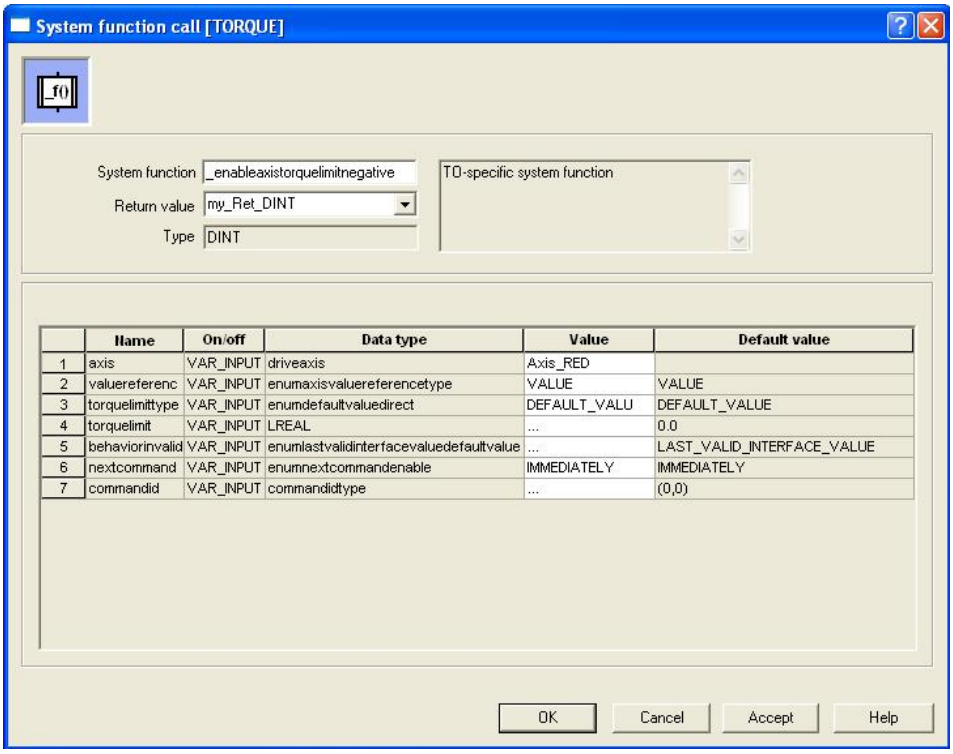


(3) 使能负转矩限幅



(4) 不使能附加转矩

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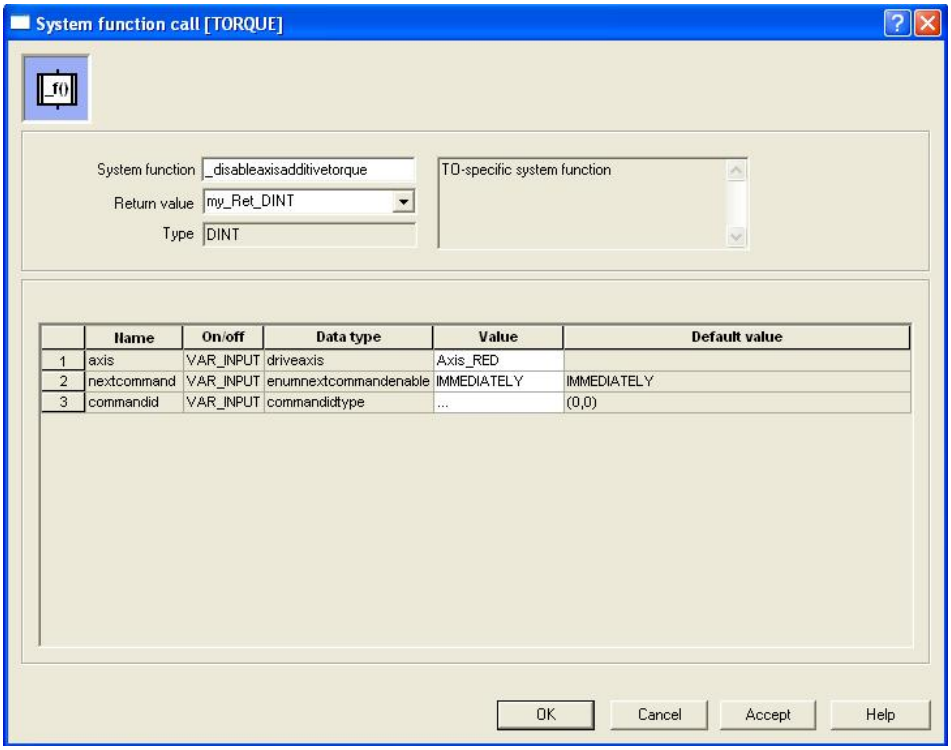
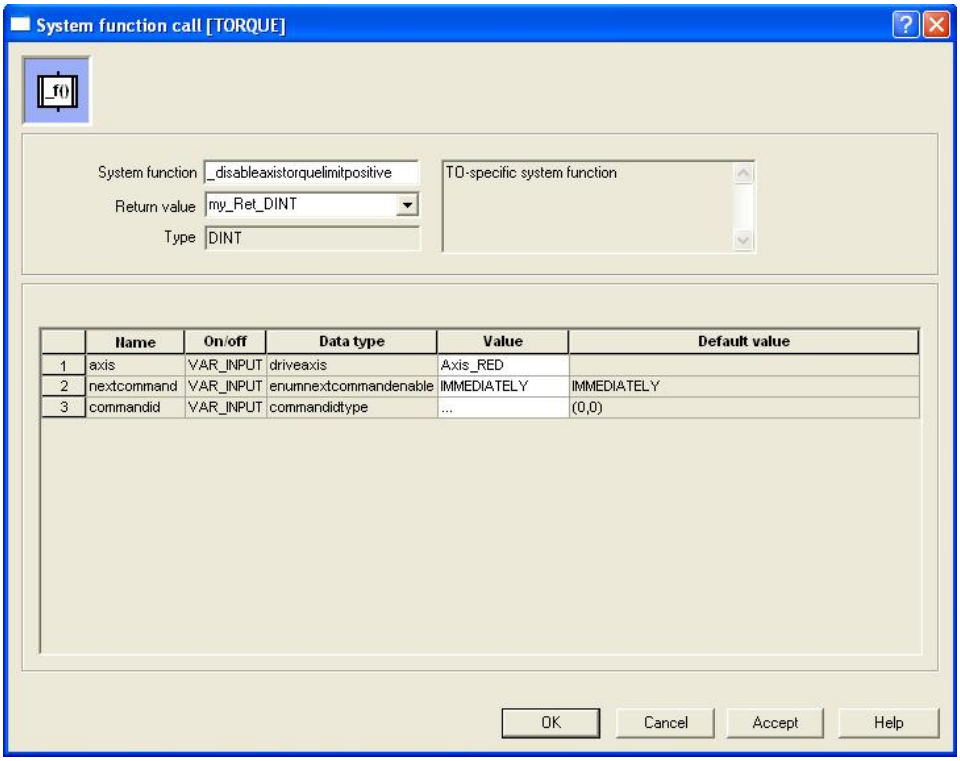


(5) 不使能正转矩限幅



(6) 不使能负转矩限幅

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