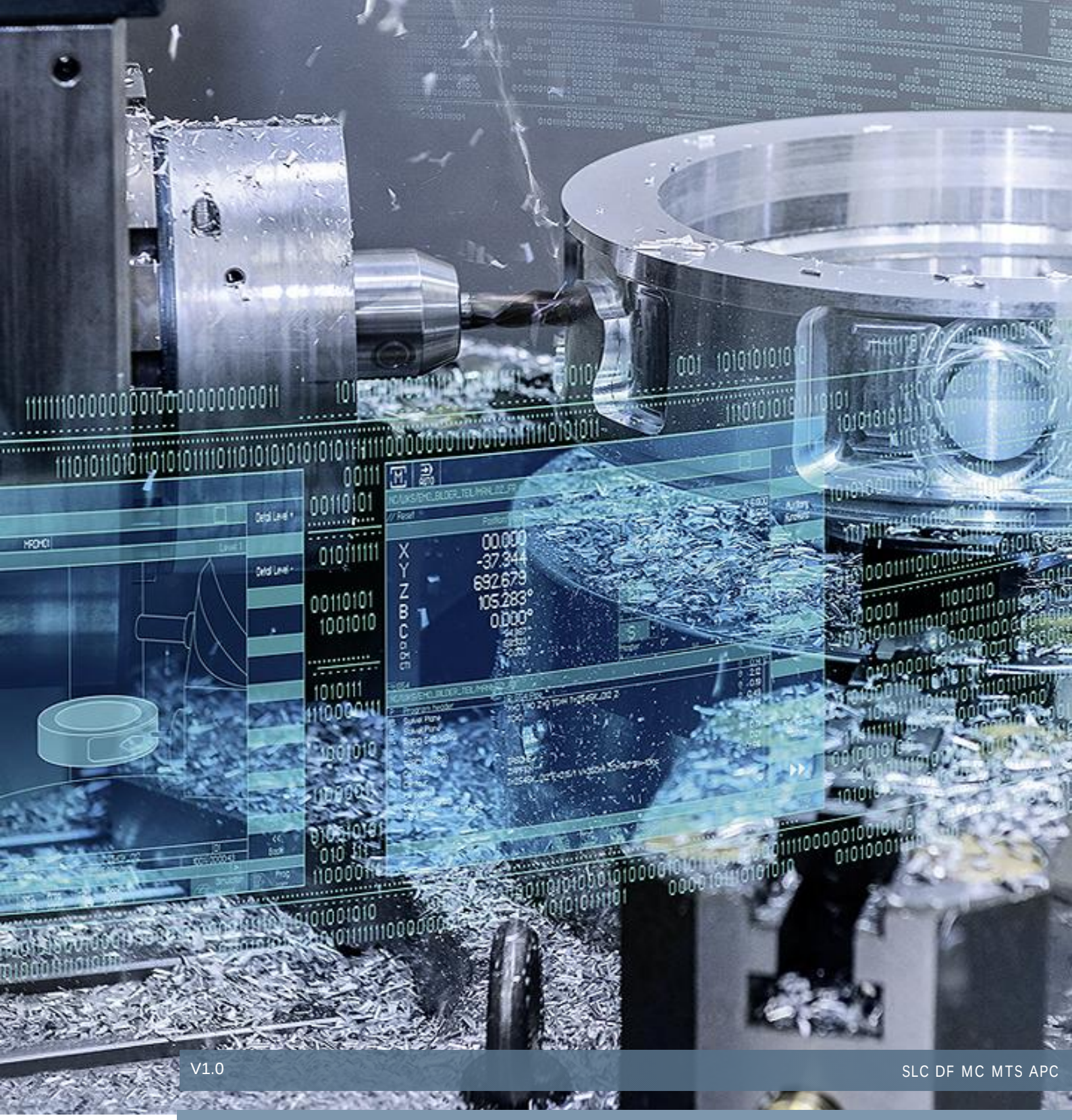

V1.0

SLC DF MC MTS APC

V4.7 通过 NC_VAR 读主轴刀号

SINUMERIK 828D

PLC 读刀号 (T number), 含第二通道

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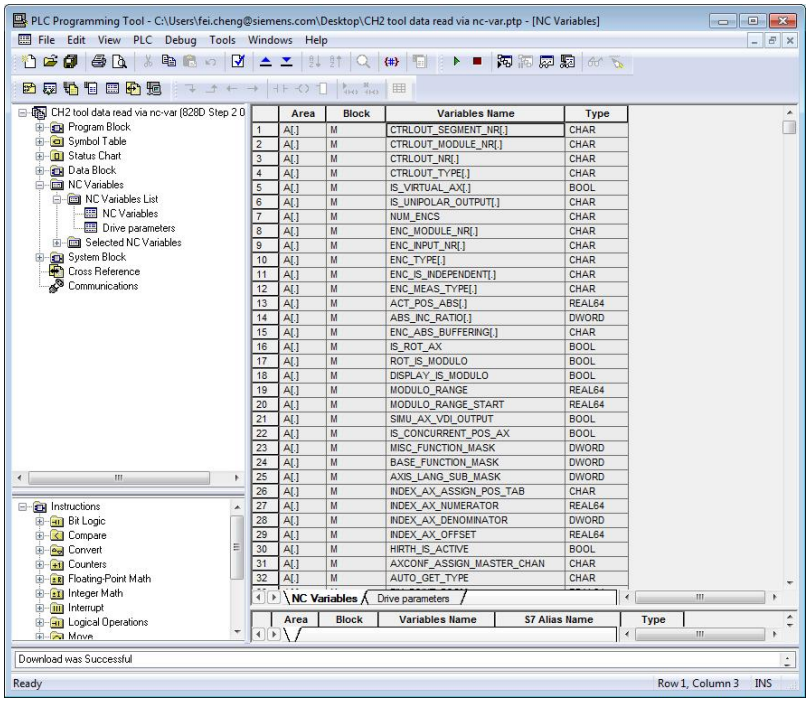
MTS APC

1 概述

828D 通过 NC_VAR 功能可以读/写 NC、驱动数据，NC_VAR 功能与 840DsI 类似，也是通过变量选择生成固定 PLC 数据块的方式进行。828D 生成的数据块固定为 DB9910。本文主要介绍通过 NC_VAR 功能读取刀号。



2 要求

2.1 硬件要求

	硬件			
工艺	PPU24x/NCU710	PPU26x/NCU720	PPU28x/NCU730	PPU28x.Advance
车床	•	•	•	•
铣床	•	•	•	-
磨床	•	•	•	•

2.2 软件版本要求

系统软件版本 >= V4.7；

PLC Programming tool 软件版本需支持 NC Variables 功能，本文使用的软件版本为

2.3 其他要求

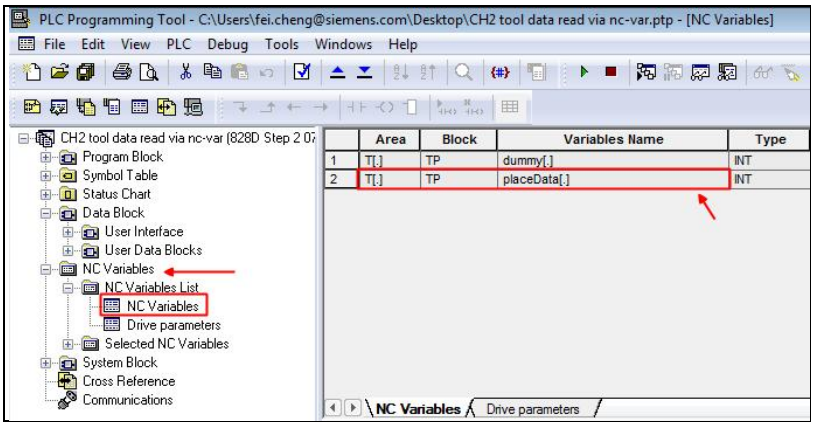
3 调试或使用步骤

NC-VAR **变量选择**

3.1 刀具变量PLACEDATA

在 PLC Programming Tool 软件中，选择【NC Variables】目录

找到【placeData[.]】（Area = T； Block = TP）



3.2 选择变量

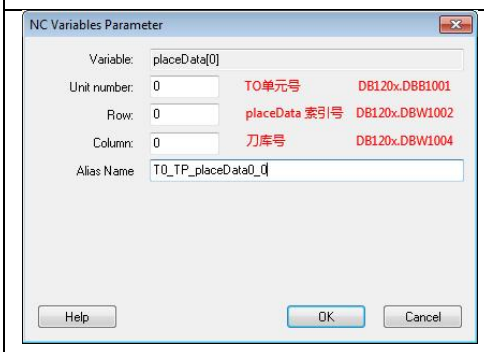
双击 placeData[.]可添加该 NC 变量至读取列表；在 Unit number / Row / Column 栏中均填写 0；

- 0 代表变量输入，对应相应 PLC 信号接口，可在 PLC 程序中赋值;
- 若在 Unit number / Row / Column 中写入固定数值，则为常量读写方式，PLC 赋值无效;
- 如读取第二通道主轴上刀具号，则需要读取 TO Unit 2，刀库 9998，位置 1 上的刀具号;

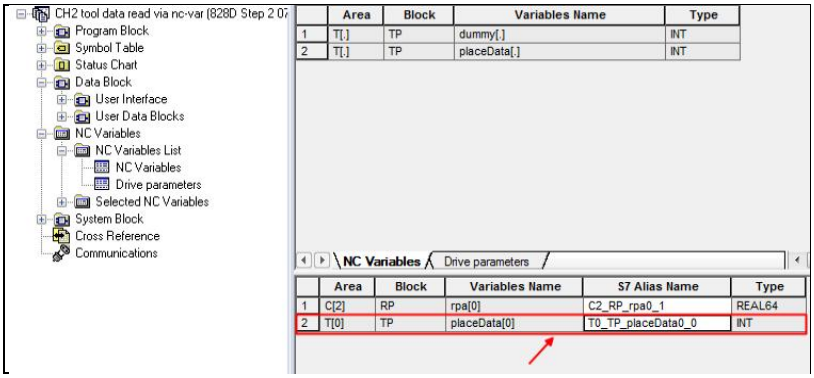
注：placeData 中刀号变量 $TC_MPP6[]对应索引号（刀位号 - 1）* 11+3。

如上，读取第二通道主轴刀具号，

- Unit number =2（第二通道 TO 号）
- Row =3（主轴对应刀位号为 1，代入公式（1-1）* 11+3 = 3）
- Column =9998（主轴对应刀库号 9998）

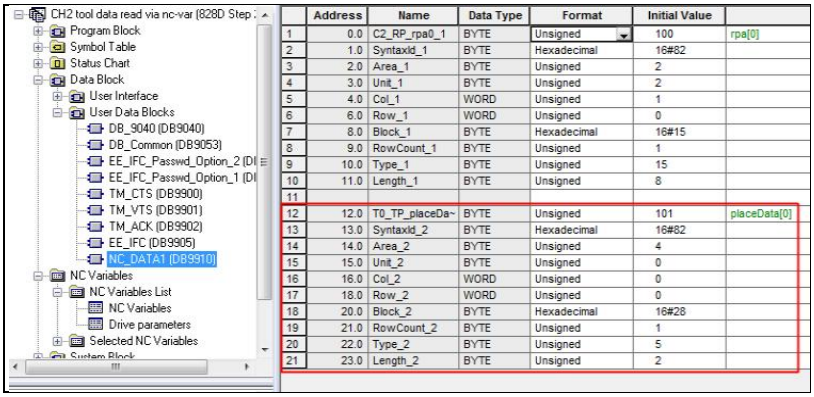
变量方式	常量方式
	

点击【OK】完成变量选择，点击【编译】

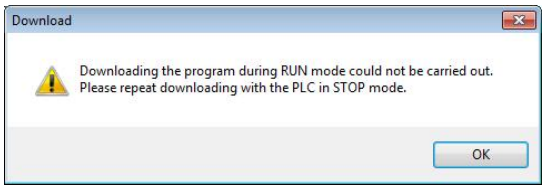


3.3 编译生成或更新DB9910

PLC 完成编译后，会自动生成 DB9910 系统数据块；重新下载 PLC 后该数据块生效。



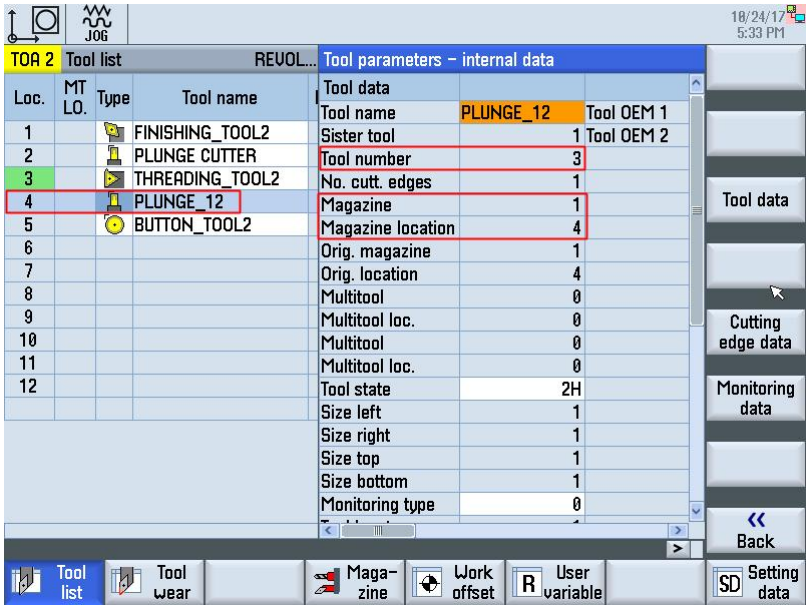
注：修改/新建数据块后需在停止模式下下载 PLC。否则有如下提示：



4 应用举例

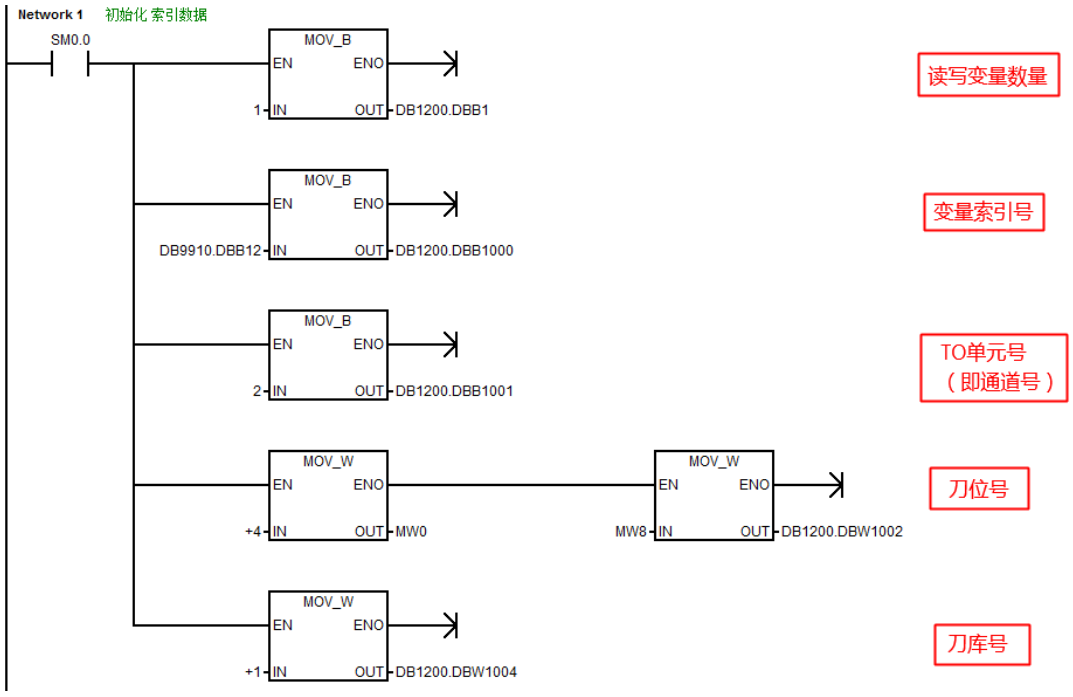
4.1 读第二通道刀库1位置4的刀具号

4.1.1 刀具信息



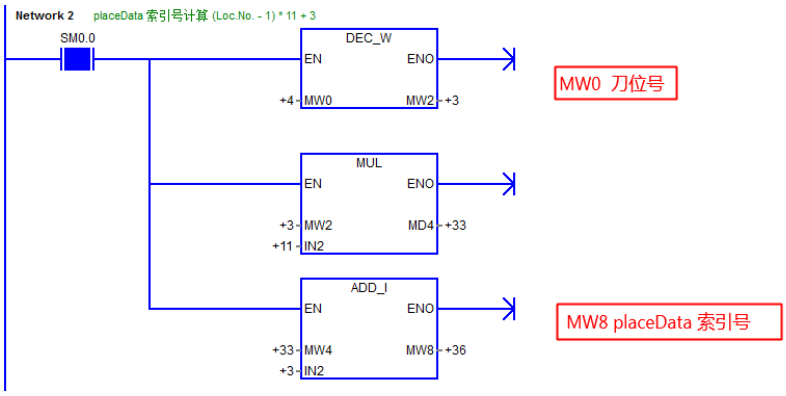
4.1.2 示例：PLC 程序（仅供参考）

初始化读取参数

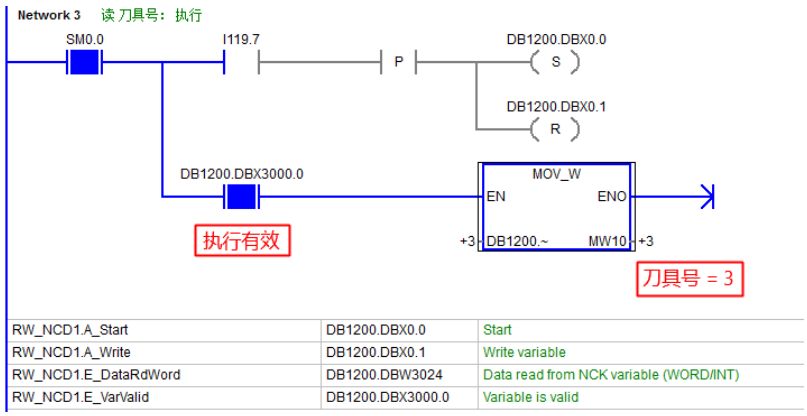


NC_DATA1.T0_TP_placeData0_0	DB9910.DBB12	placeData[0]
RW_NCD1.A_Area	DB1200.DBB1001	Area number
RW_NCD1.A_RowIdx	DB1200.DBW1002	Row index of NCK variable
RW_NCD1.A_VarCnt	DB1200.DBB1	Number of variables
RW_NCD1.A_VarIdx	DB1200.DBB1000	Variable index

PlaceData 索引号转换

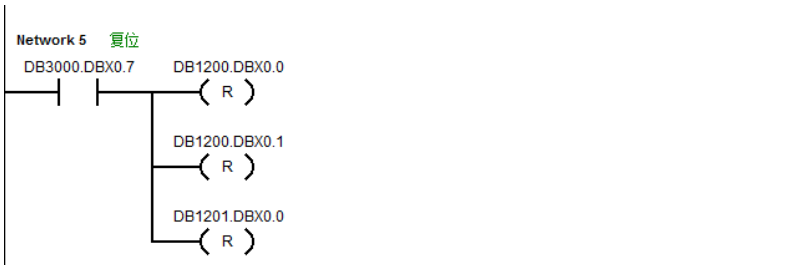


执行：读刀号



RW_NCD1.A_Start	DB1200.DBX0.0	Start
RW_NCD1.A_Write	DB1200.DBX0.1	Write variable
RW_NCD1.E_DataRdWord	DB1200.DBW3024	Data read from NCK variable (WORD/INT)
RW_NCD1.E_VarValid	DB1200.DBX3000.0	Variable is valid

复位



RW_NCD1.A_Start	DB1200.DBX0.0	Start
RW_NCD1.A_Write	DB1200.DBX0.1	Write variable
TO_BAG1.A_MGReset	DB3000.DBX0.7	Mode group reset

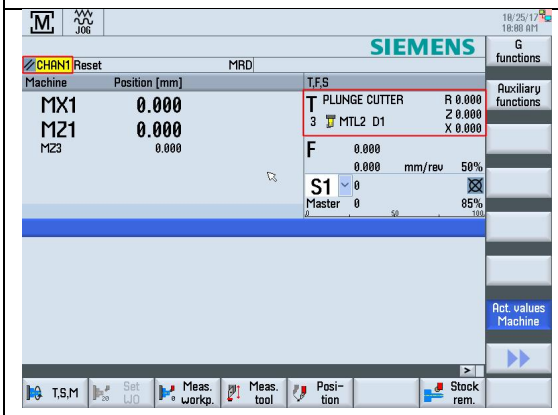
4.1.3 相应 PLC 接口信号

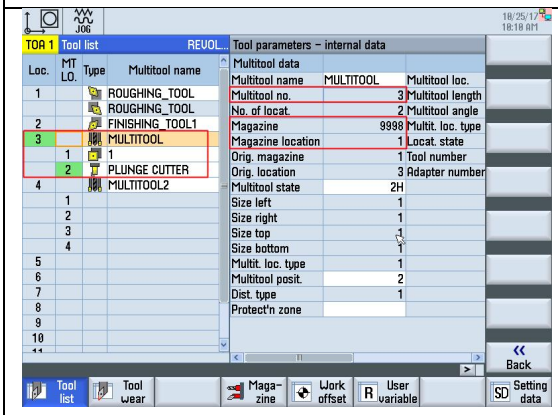
	Address	Format	Current Value	~	
1	DB1200.DBB1000	Unsigned	101		NC-VAR 变量索引号
2	DB1200.DBB1	Unsigned	1		读写变量数量
3	DB1200.DBB1001	Unsigned	2		TO 单元号
4	DB1200.DBW1004	Signed	+1		刀库号
5	DB1200.DBW1002	Signed	+36	☐	（刀位号-1）*11+3
6	DB1200.DBB3000	Unsigned	1		执行完成反馈
7	DB1200.DBD3020	Signed	+0		
8	DB1200.DBW3024	Signed	+3		读取刀号结果（整数）
9	DB1200.DBW3026	Signed	+0		
10	DB1200.DBB3027	Unsigned	0		

4.2 读主轴上刀具号（两个通道）

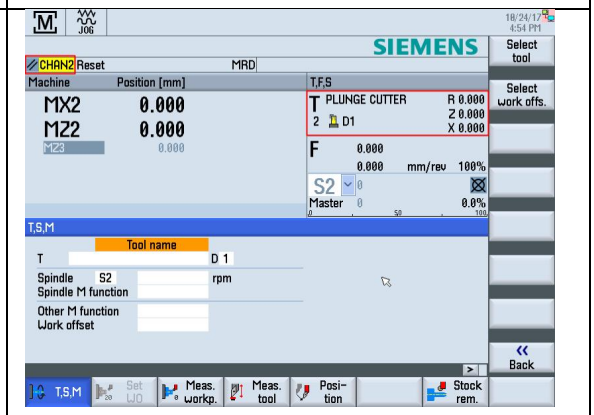
4.2.1 主轴刀具信息

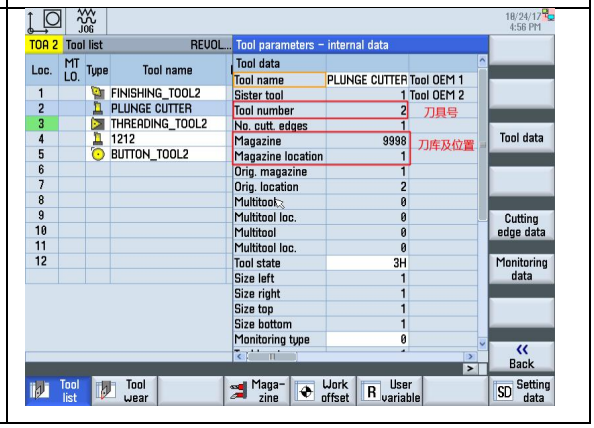
第一通道





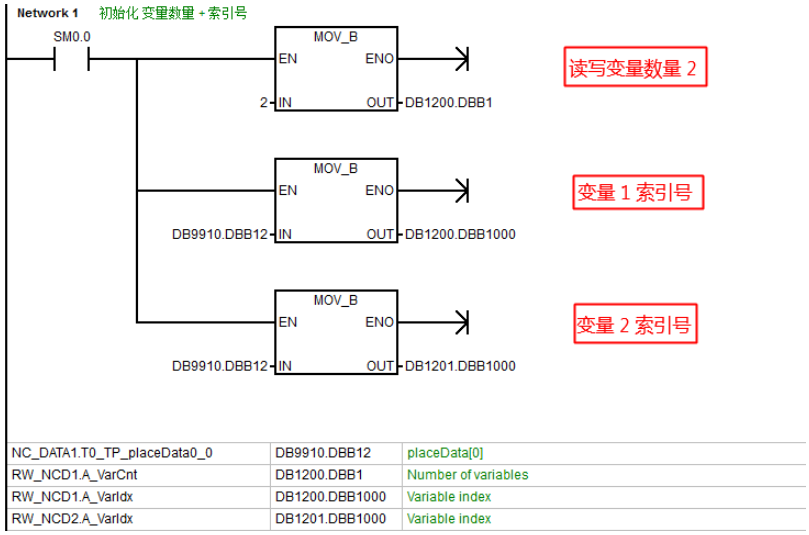
第二通道



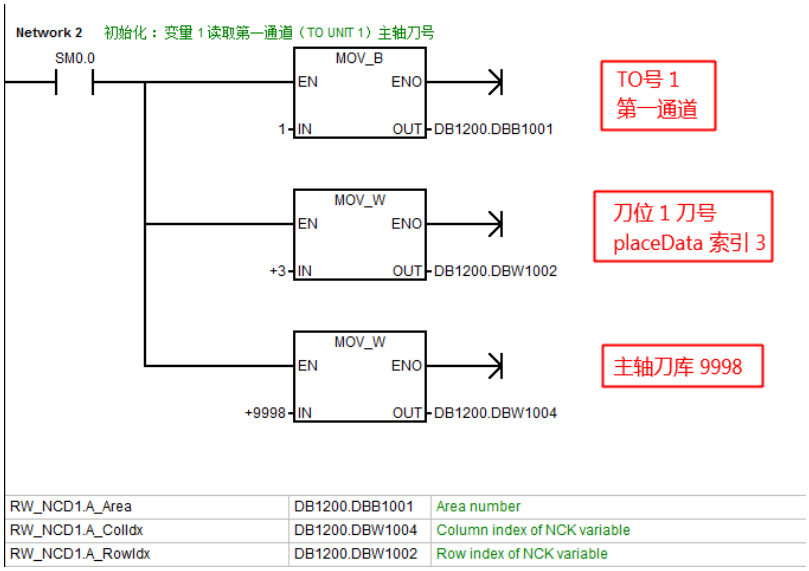


4.2.2 示例：读主轴刀具号（仅供参考）

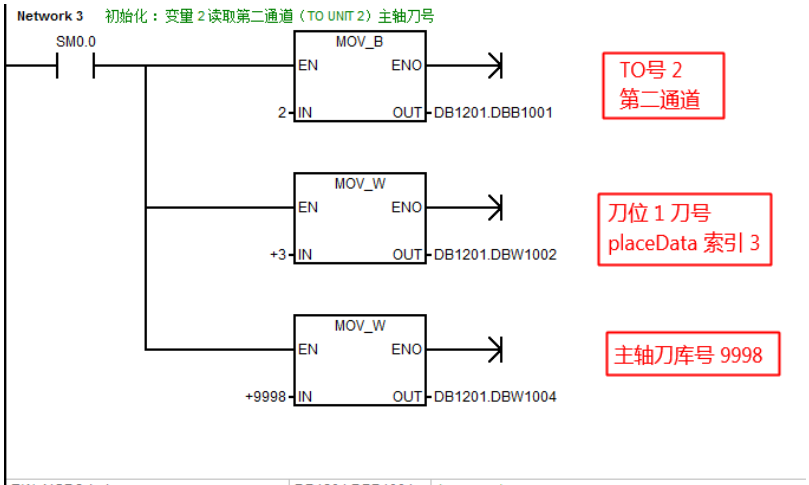
初始化变量数量、NC_VAR 索引号



初始化：第一通道主轴刀号

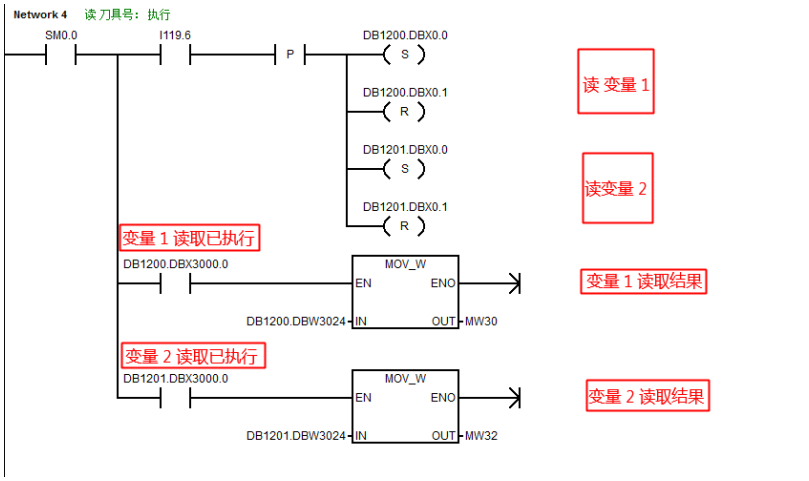


初始化：第二通道主轴刀号



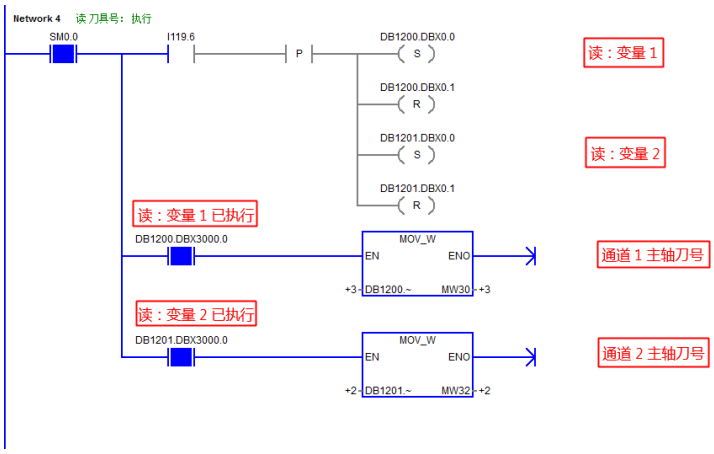
RW_NCD2.A_Area	DB1201.DBB1001	Area number
RW_NCD2.A_ColIdx	DB1201.DBW1004	Column index of NCK variable
RW_NCD2.A_RowIdx	DB1201.DBW1002	Row index of NCK variable

执行：读变量

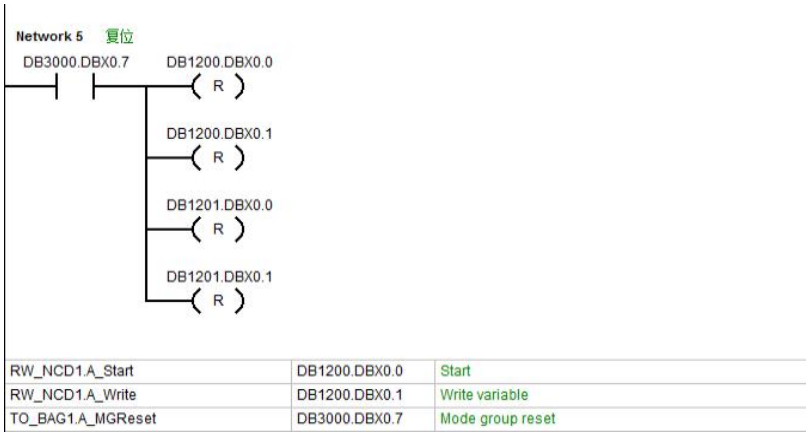


RW_NCD1.A_Start	DB1200.DBX0.0	Start
RW_NCD1.A_Write	DB1200.DBX0.1	Write variable
RW_NCD1.E_DataRdWord	DB1200.DBW3024	Data read from NCK variable (WORD/INT)
RW_NCD1.E_VarValid	DB1200.DBX3000.0	Variable is valid
RW_NCD2.E_DataRdWord	DB1201.DBW3024	Data read from NCK variable (WORD/INT)
RW_NCD2.E_VarValid	DB1201.DBX3000.0	Variable is valid

在线



复位



4.2.3 相应 PLC 接口信号

	Address	Format	Current Value	New Value
1	DB1200.DBB0	Unsigned	1	读变量
2	DB1200.DBB1	Unsigned	2	变量数量：2
3		Signed		
4	DB1200.DBB1000	Unsigned	101	
5	DB1200.DBB1001	Unsigned	2	TO单元号：2 通道2
6	DB1200.DBW1004	Signed	+9998	
7	DB1200.DBW1002	Signed	+3	
8	DB1200.DBB3000	Unsigned	1	反馈：执行完成
9	DB1200.DBB3001	Unsigned	0	
10	DB1200.DBD3020	Signed	+0	
11	DB1200.DBW3024	Signed	+2	通道2主轴刀具号
12	DB1200.DBW3026	Signed	+0	
13	DB1200.DBB3027	Unsigned	0	
14		Signed		
15	DB1201.DBB1000	Unsigned	101	
16	DB1201.DBB1001	Unsigned	1	TO单元号：1 通道1
17	DB1201.DBW1004	Signed	+9998	
18	DB1201.DBW1002	Signed	+3	
19	DB1201.DBB3000	Unsigned	1	反馈：执行完成
20	DB1201.DBB3001	Unsigned	0	
21	DB1201.DBD3020	Signed	+0	
22	DB1201.DBW3024	Signed	+3	通道1主轴刀具号
23	DB1201.DBW3026	Signed	+0	
24	DB1201.DBB3027	Unsigned	0	

5 附录

5.1 附录：

5.1.1 附录 1：placeData 变量说明

placeData	Magazine location data	diverse, siehe Variablenbeschreibung
P1: Place type (read-only access) ($TC_MPP1) P2: Place type (read-only access) ($TC_MPP2) P3: T number of the tool at this place ($TC_MPP6) P4: Consider adjacent place On/Off ($TC_MPP3) P5: Place state (bit array) ($TC_MPP4)		

P6: Physical magazine reference (read-only access) P7: Place type index (numbering of a place type) ($TC_MPP5) P8: Number of the adapter at the magazine place ($TC_MPP7) P9: Mag-Place-ToolNo-Reserver-For ($TC_MPP66) P10: Number of the spindle assigned to the buffer magazine place ($TC_MPP_SP) Only of significance if - tool holders are used ($MC_TOOLHOLDER_MANAGEMENT > 0) - the magazine place "m" belongs to a buffer magazine "n" - the magazine place describes a tool holder ($TC_MPP1[n,m]=2) In this case the system variable contains the spindle number, the speed of which is to be monitored for maximum tool speed. If no tool holders are used ($MC_TOOLHOLDER_MANAGEMENT = 0), the variable contains the value of the spindle index from $TC_MPP5 If magazine place "n,m" does not use a buffer magazine place for a spindle or tool holder, this variable contains the value = 0. P11: Type of T no. (tool or MT) ($P_TMNOIS) colIndex: Tool magazine number Notice! This variable is referred to as "dummy" in the non-Windows HMI and the PLC.				
Type	Unit	Default Value	Minimum Value	Maximum Value
TYPE_UWORD	No unit			

The variable is an array, containing elements addressed with the line index:

meaning of the line index: (LocationNo - 1) * numMagPlaceParams + ParameterNo

5.1.2 附录 2：

DB1200	PLC -> NCK							
Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DBB0							0：读 1：写	启动 （上升沿触发）
DBB1	一次读/写的变量数量							
DB1200-1207	PLC -> NCK							
DBB1000	变量索引号（DB9910.DBB0、DB9910.DBB12...）							
DBB1001	Area number（TO 单元号）							
DBW1002	Row index of NCK variable（placeData 索引号）							
DBW1004	Column index of NCK（刀库号）							

DBD1016	写：Real 类型							
DBD1020	写：DWORD / DINT 类型							
DBD1024	写：WORD / INT 类型							
DBD1026	写：BYTE 类型							
DB1200-1207	NCK -> PLC							
DBD3016	读：Real 类型							
DBD3020	读：DWORD / DINT 类型							
DBD3024	读：WORD / INT 类型							
DBD3026	读：BYTE 类型							
Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DBB3000							错误	变量有效
DBB3001	访问结果：0：无故障；1：不正确的访问对象；5：无效地址；10：对象不存在							

6 参考文献

1. 《通过 NC_VAR 变量 placeData 读取刀号》，GuXiangQing

7 作者/联系人

Chengfei

25/10/2017

8 版本信息

版本	日期	修改内容
V1.0	25/10/2017	第一版