

常问问题 • 03 月/2016

STARTER 调试 DCM

DCM, 调试

<http://support.automation.siemens.com/CN/view/zh/109737894>

目录

1	调试软件介绍.....	3
1.1	软件的下载、安装、使用	3
1.2	调试前提.....	3
2	调试.....	4
2.1	新建项目，上载硬件配置	4
2.2	配置 DDS	6
2.3	优化调试.....	10

1 调试软件介绍

1.1 软件的下载、安装、使用

Starter 软件下载地址:

<https://support.industry.siemens.com/cs/cn/zh/view/26233208/en>

Starter 软件的安装:

- 查看下载文件中名为“readme”的 WORD 文档，确认安装 **Starter** 软件对 PG/PC 的硬件、操作系统的要求
- 解压下载的压缩文件，并将解压后的文件放入一个文件夹内
- 设置 Windows 系统的语言环境为英文

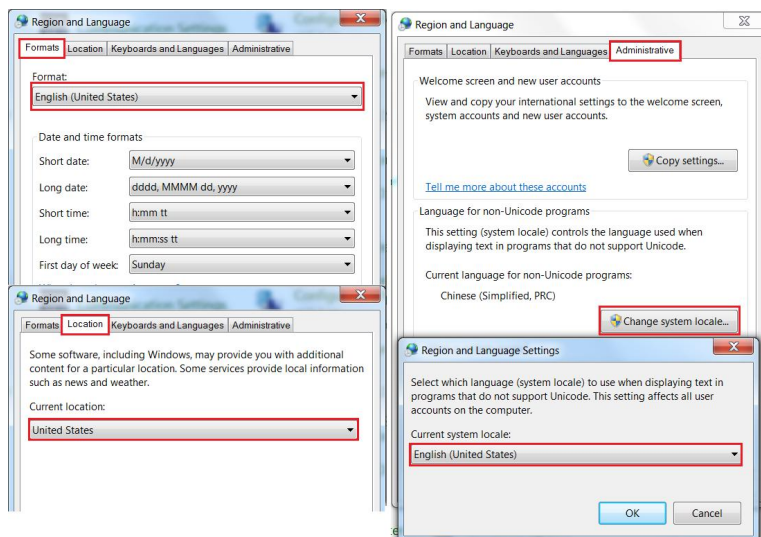


图 1-1 设置系统语言环境

- 安装 **STARTER** 软件，安装完成后可以重新设置 Windows 系统的语言环境。

使用不同的在线方式建立 **PG/PC** 与 **DCM** 的在线连接，请参考以下文档:

<https://support.industry.siemens.com/cs/cn/zh/view/90228691>

1.2 调试前提

- 设备安装完毕、上电正常，电机能转动
- 断电状态下，短接 X177 端子 9、12、13
- 调试电缆

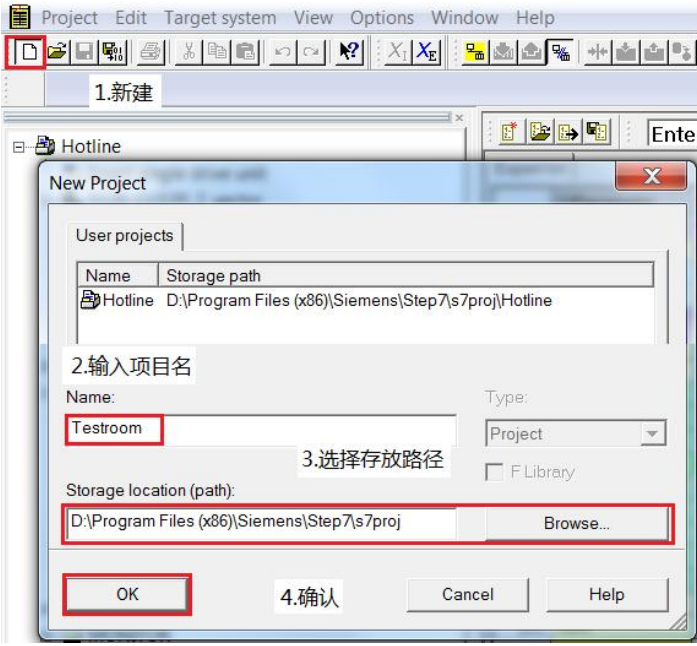
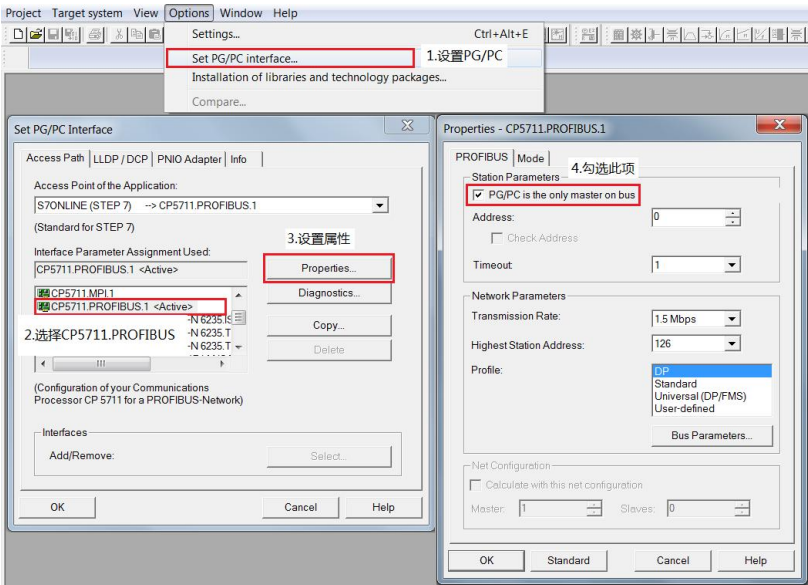
注意：此文档以 CP5711 通过 CUD 板 DP 接口 X126 进行在线调试为例。也可以使用 PC Adapter A2 版电缆调试。

CP5711 订货号： 6GK1571-1AA00

PC Adapter A2 版订货号： 6GK1571-0BA00-0AA0

2 调试

2.1 新建项目，上传硬件配置

序号	图示
1.	<p>新建项目，如下图所示：</p> 
2.	<p>设置 PG/PC： 选择“S7ONLINE(STEP7) CP5711.PROFIBUS”，然后在属性设置中勾选“PG/PC is the only master on bus”选项：</p> 

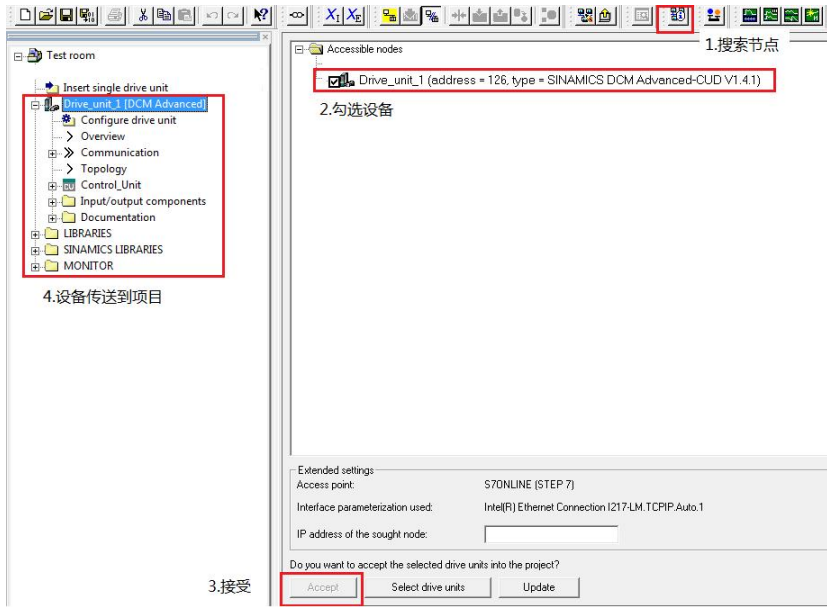
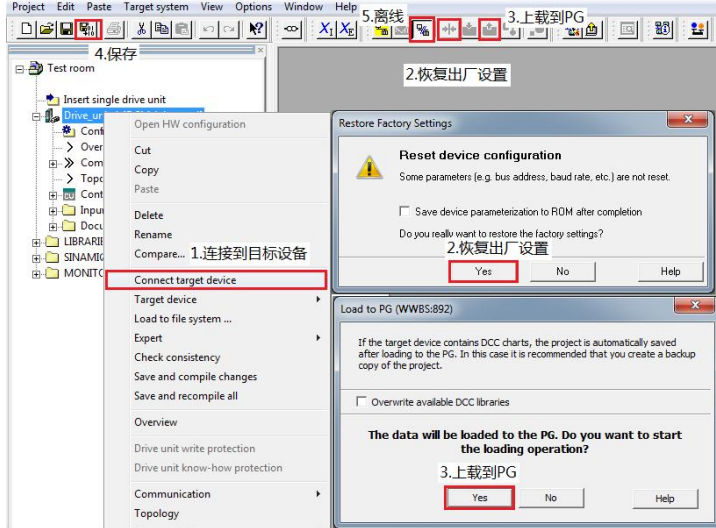
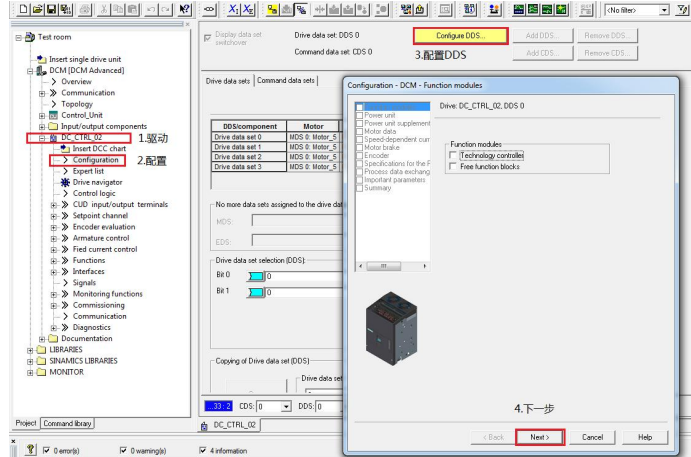
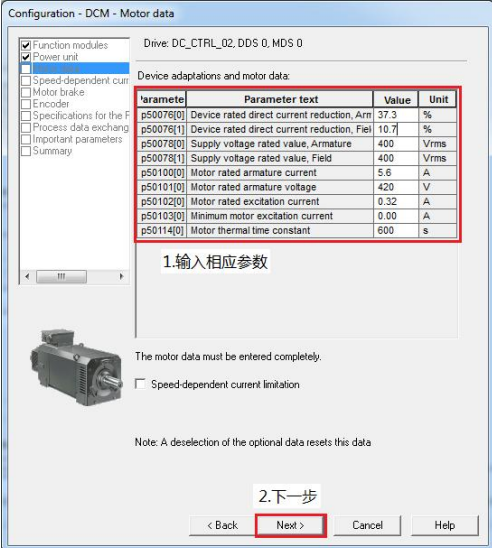
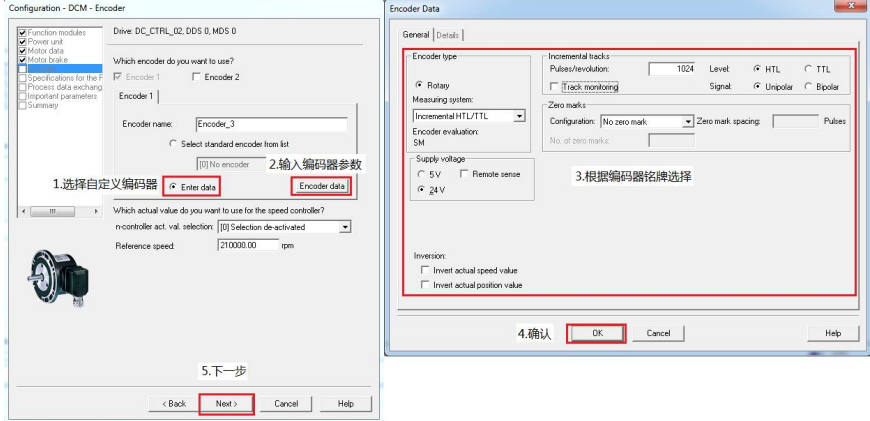
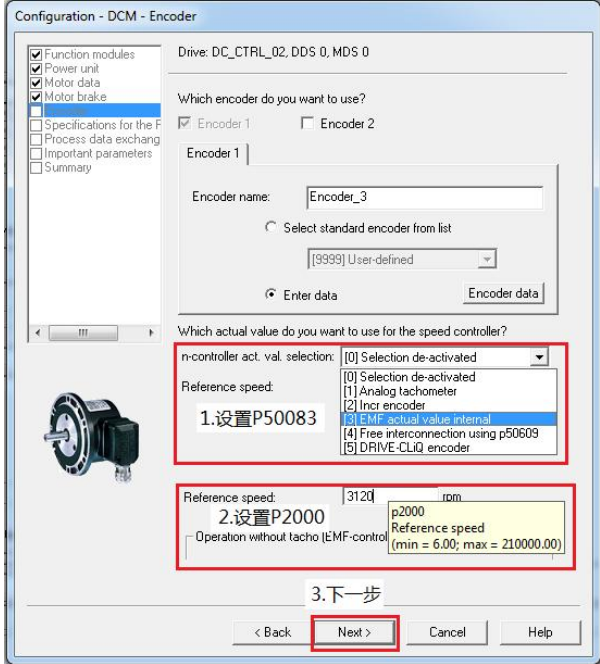
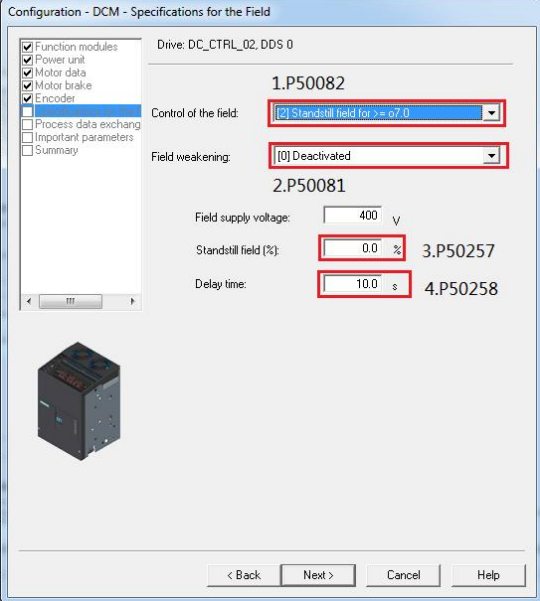
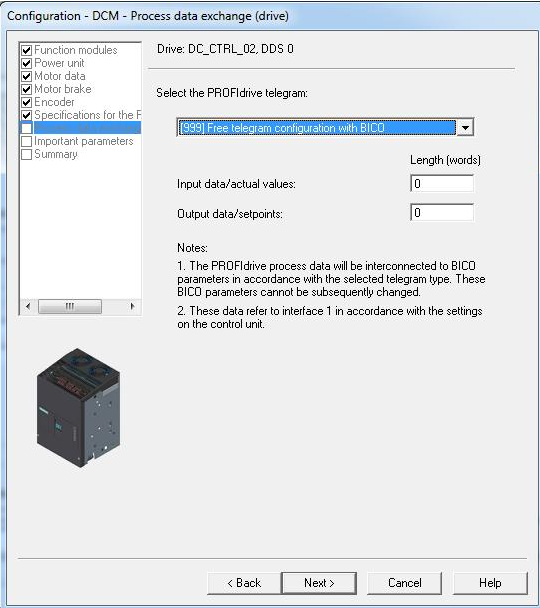
序号	图示
3.	<p>搜索节点、接受搜索到的设备，如下图所示：</p>  <p>1.搜索节点</p> <p>2.勾选设备</p> <p>3.接受</p>
4.	<p>装置恢复出厂设置，上载参数到 PG，保存，离线：</p>  <p>4.保存</p> <p>2.恢复出厂设置</p> <p>3.上载到PG</p> <p>5.离线</p>

表 2-1 新建项目

2.2 配置 DDS

序号	图示																																								
1.	<p>配置 DDS(打开配置界面，工艺控制器、自由功能块激活):</p> 																																								
2.	<p>配置 DDS（电机参数、DCM 参数设置）：</p> <p>P50076[0]=电机电枢额定电流/装置电枢额定电流，当>50%时，可以使用出厂设置值 100%。</p> <p>P50076[1]=电机励磁额定电流/装置励磁额定电流，当>50%时，可以使用出厂设置值 100%。</p> <p>P50078[0]=装置电枢进线电压（1U1 1V1 1W1）</p> <p>P50078[1]=装置励磁进线电压（3U1 3W1）</p> <p>P50100=电机额定电枢电流</p> <p>P50101=电机额定电枢电压</p> <p>P50102=电机额定励磁电流</p>  <table border="1"> <thead> <tr> <th>Parameter</th> <th>Parameter text</th> <th>Value</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>p50076[0]</td> <td>Device rated direct current reduction, Arm</td> <td>37.3</td> <td>%</td> </tr> <tr> <td>p50076[1]</td> <td>Device rated direct current reduction, Field</td> <td>10.7</td> <td>%</td> </tr> <tr> <td>p50078[0]</td> <td>Supply voltage rated value, Armature</td> <td>400</td> <td>Vrms</td> </tr> <tr> <td>p50078[1]</td> <td>Supply voltage rated value, Field</td> <td>400</td> <td>Vrms</td> </tr> <tr> <td>p50100[0]</td> <td>Motor rated armature current</td> <td>5.6</td> <td>A</td> </tr> <tr> <td>p50101[0]</td> <td>Motor rated armature voltage</td> <td>420</td> <td>V</td> </tr> <tr> <td>p50102[0]</td> <td>Motor rated excitation current</td> <td>0.32</td> <td>A</td> </tr> <tr> <td>p50103[0]</td> <td>Minimum motor excitation current</td> <td>0.00</td> <td>A</td> </tr> <tr> <td>p50114[0]</td> <td>Motor thermal time constant</td> <td>600</td> <td>s</td> </tr> </tbody> </table> <p>1.输入相应参数</p> <p>2.下一步</p>	Parameter	Parameter text	Value	Unit	p50076[0]	Device rated direct current reduction, Arm	37.3	%	p50076[1]	Device rated direct current reduction, Field	10.7	%	p50078[0]	Supply voltage rated value, Armature	400	Vrms	p50078[1]	Supply voltage rated value, Field	400	Vrms	p50100[0]	Motor rated armature current	5.6	A	p50101[0]	Motor rated armature voltage	420	V	p50102[0]	Motor rated excitation current	0.32	A	p50103[0]	Minimum motor excitation current	0.00	A	p50114[0]	Motor thermal time constant	600	s
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序号	图示
<p>3.</p>	<p>配置 DDS(编码器配置): 注意, 此处以自定义类型的编码器为例。</p> 
<p>4.</p>	<p>配置 DDS(设置 P50083, P2000):</p> <p>P50083=1, 对应测速机反馈 P50083=2, 对应编码器反馈 P50083=3, 对应 EMF 反馈 P50083=4, 对应自由连接的速度反馈 P50083=5, 对应从 SMC30 接收的速度反馈</p> <p>首次调试, 推荐先设置 P50083=3。待电机转动确认测速信号正确后, 再将 P50083 设置为对应的值。</p> <p>P2000=电机最高转速</p> 

序号	图示
5.	<p>配置励磁（首次调试，建议保持出厂设置值）：</p> <p>P50082=0，禁用励磁。</p> <p>P50082=1，励磁电流根据进线接触器状态来确定是否建立。</p> <p>P50082=2，当装置进入$\geq O 7.0$状态，经过 P50258 设置的时间后，励磁电流从额定励磁电流减小到 P50257 参数设置的静态励磁电流。</p> <p>P50082=3，始终通入额定励磁电流（弱磁区除外）。</p> <p>P50081，是否使能弱磁。</p> 
6.	<p>配置 DDS(通讯报文)：</p> <p>建议先保持出厂设置，待传动调试完毕后再设置通讯。</p> 

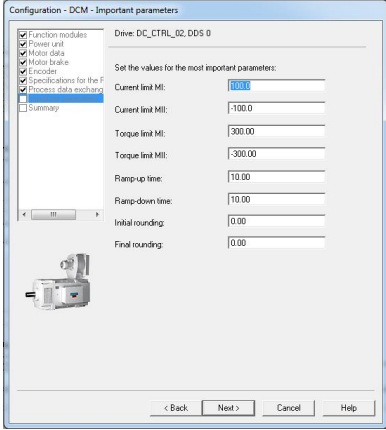
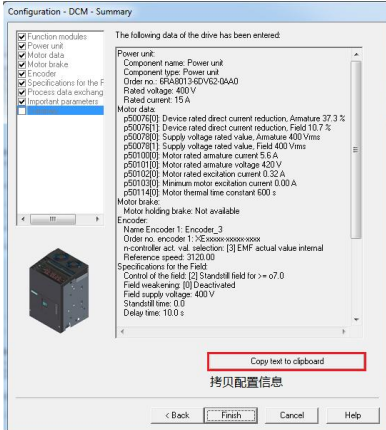
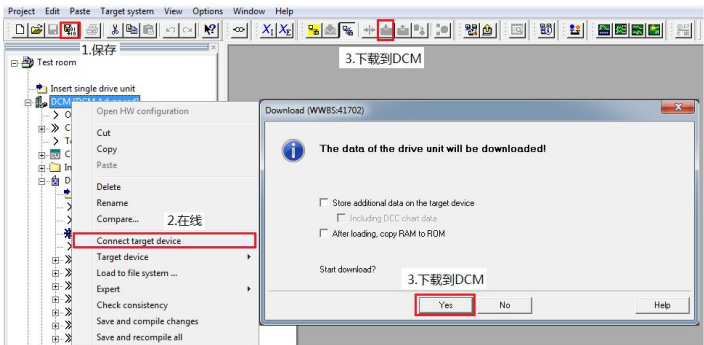
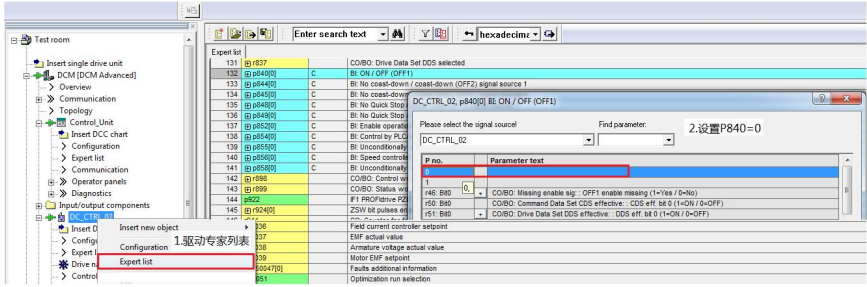
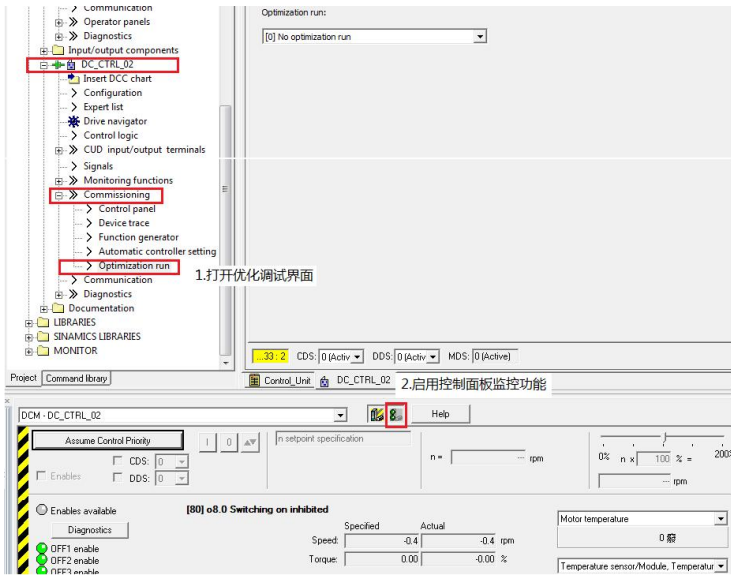
序号	图示
7.	<p>配置 DDS(基本工艺参数): 设置转矩、电流限幅, 斜坡时间。首次调试, 建议保持出厂设置。</p> 
8.	<p>配置 DDS(配置信息汇总): 可使用拷贝功能, 将配置信息导出到文档。</p> 
9.	<p>保存配置好的数据, 并下载到 DCM:</p> 

表 2-2 配置 DDS

2.3 优化调试

序号	图示
<p>1. 设置 P840=0, 使装置进入 O7.1 状态: 出厂设置值 P840=1, 在 X177 端子 9、12、13 短接的情况下, 装置会处于 O8.0 状态, 装置禁止合闸。设置 P840=0, 装置会进入 O7.1 状态, 可以通过 control panel 来启动装置。</p>	 <p>The screenshot shows the 'Expert list' window with a search for 'P840'. The parameter 'P840' is highlighted, and its value is set to 0. A dialog box titled 'Please select the signal source' is open, showing 'DC_CTRL_02' as the selected signal source and '2.设置P840=0' as the parameter text.</p>
<p>2. 进入优化调试界面: 启用 control panel 的监控功能可以查看装置的运行状态、控制字状态、电机转速等信息。</p>	 <p>The screenshot shows the 'Optimization run' window with a dropdown menu set to 'No optimization run'. Below it, the 'Control panel' monitoring interface is shown, with a red box highlighting the 'Control panel' icon in the project tree and another red box highlighting the 'Control panel' icon in the monitoring interface. The monitoring interface displays various parameters such as 'Speed', 'Torque', and 'Motor temperature'.</p>

序号	图示
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3. 励磁电流环优化:

1. 选择励磁电流环优化

2. 激活

3. 获取控制权

4. 连接

5. 合闸, 优化开始

Parameter	Parameter text	Value	Unit
p501120	Field circuit resistance	0.000	ohm
p501160	Field circuit inductance	0.0	mH
p502550	Field current controller P gain	5.00	
p502560	Field current controller integral time	0.200	s
p515070	Field inductance reduction factor	100	%

Parameter	Parameter text	Value	Unit
p501120	Field circuit resistance	747.02	ohm
p501160	Field circuit inductance	17462	mH
p502550	Field current controller P gain	1.50	
p502560	Field current controller integral time	0.063	s
p515070	Field inductance reduction factor	20	%

4. 电枢电流环优化:

注意: 电枢优化过程中, 电机应保持静止。某些电机由于有剩磁, 会发生旋转, 甚至报 F60038 故障。对于这种情况, 要锁住电机。

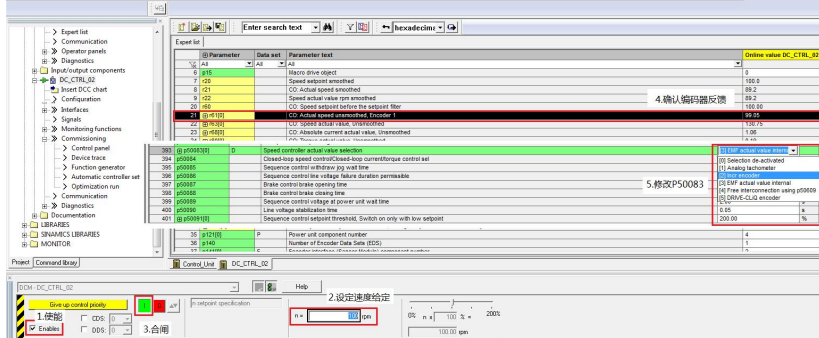
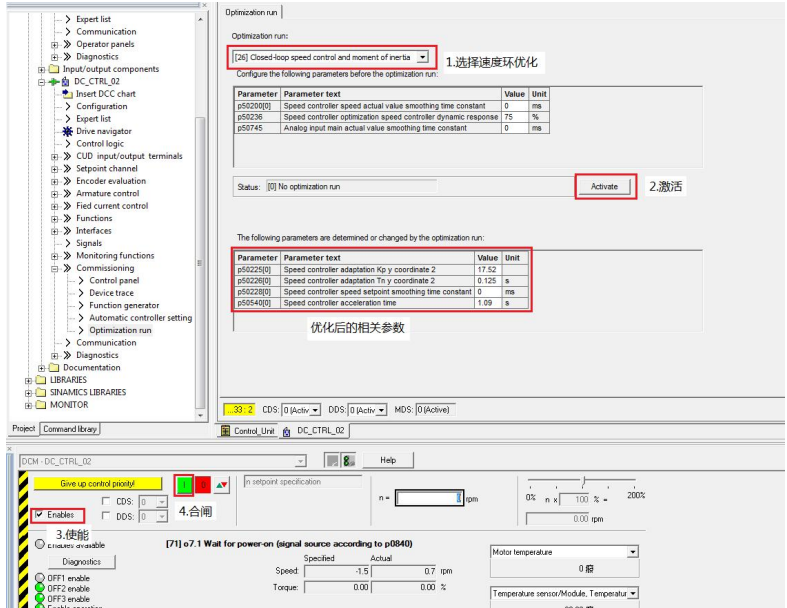
1. 选择电枢电流环优化

2. 激活

3. 使能

4. 合闸

Parameter	Parameter text	Value	Unit
p501100	Armature circuit resistance	7.478	ohm
p501110	Armature circuit inductance	62.635	mH
p515910	Armature inductance reduction factor	90	%
p501550	Closed-loop armature current control P gain	0.06	
p501560	Closed-loop armature current control integral time	0.010	s

序号	图示
<p>5. 确认测速装置工作正常，修改 P50083</p> <p>通过控制面板给定转速，启动电机后，查看 R61（编码器反馈的速度实际值）的参数值。确认极性、速度值与控制面板给定值一致后，修改 P50083=2。</p>	 <p>The screenshot shows the SIMATIC Manager interface. In the 'Expert list' table, parameter p50083 is highlighted with a red box and its value is set to 2. Below the table, the 'Control panel' interface is visible, showing a speed setpoint configuration window with a value of 1000 rpm.</p>
<p>6. 速度环优化:</p> <p>空载情况下优化。带载后可根据特性要求再手动调整速度环 PI 参数</p> <p>P50225=速度环比例系数</p> <p>P50226=速度环积分时间</p>	 <p>The screenshot shows the 'Optimization run' dialog box. The 'Closed-loop speed control and moment of inertia' option is selected. Below, a table lists parameters to be optimized, including p50225 (Speed controller adaptation Kp y coordinate 2) and p50226 (Speed controller adaptation Tn y coordinate 2). The 'Activate' button is highlighted.</p>

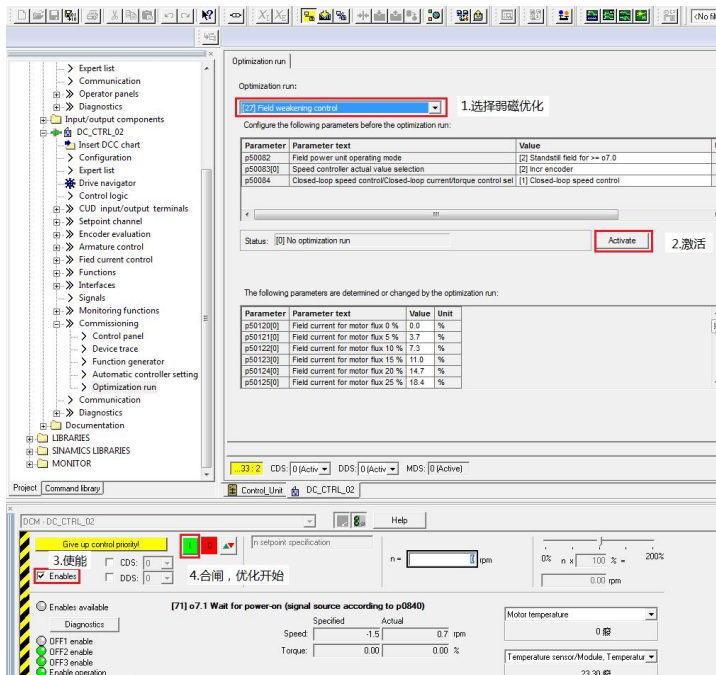
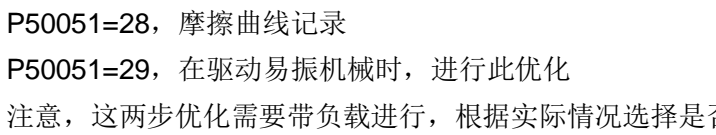
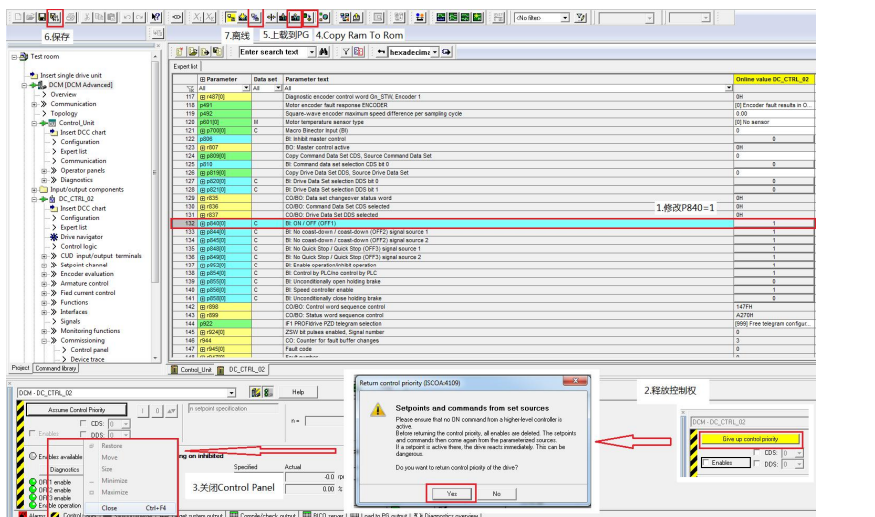
序号	图示																																												
<p>7. 弱磁优化（根据电机实际工作情况选择是否优化） 注意，空载情况下进线弱磁优化；P50083=3 时，不能做弱磁优化。</p>	 <p>The screenshot shows the 'Optimization run' configuration window. The 'Field weakening control' dropdown is set to '1. 选择弱磁优化'. The 'Activate' button is highlighted with a red box and labeled '2. 激活'. Below, a table shows parameters determined by the optimization run:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Parameter text</th> <th>Value</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>p50082</td> <td>Field power unit operating mode</td> <td>2</td> <td>Standstill field for >= e7.0</td> </tr> <tr> <td>p50083(0)</td> <td>Speed controller actual value selection</td> <td>2</td> <td>Incr. encoder</td> </tr> <tr> <td>p50084</td> <td>Closed-loop speed control/Closed-loop current/torque control set</td> <td>1</td> <td>Closed-loop speed control</td> </tr> </tbody> </table> <p>The following parameters are determined or changed by the optimization run:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Parameter text</th> <th>Value</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>p50120(0)</td> <td>Field current for motor flux 0 %</td> <td>0.0</td> <td>%</td> </tr> <tr> <td>p50121(0)</td> <td>Field current for motor flux 5 %</td> <td>3.7</td> <td>%</td> </tr> <tr> <td>p50122(0)</td> <td>Field current for motor flux 10 %</td> <td>7.3</td> <td>%</td> </tr> <tr> <td>p50123(0)</td> <td>Field current for motor flux 15 %</td> <td>11.0</td> <td>%</td> </tr> <tr> <td>p50124(0)</td> <td>Field current for motor flux 20 %</td> <td>14.7</td> <td>%</td> </tr> <tr> <td>p50125(0)</td> <td>Field current for motor flux 25 %</td> <td>18.4</td> <td>%</td> </tr> </tbody> </table>	Parameter	Parameter text	Value	Unit	p50082	Field power unit operating mode	2	Standstill field for >= e7.0	p50083(0)	Speed controller actual value selection	2	Incr. encoder	p50084	Closed-loop speed control/Closed-loop current/torque control set	1	Closed-loop speed control	Parameter	Parameter text	Value	Unit	p50120(0)	Field current for motor flux 0 %	0.0	%	p50121(0)	Field current for motor flux 5 %	3.7	%	p50122(0)	Field current for motor flux 10 %	7.3	%	p50123(0)	Field current for motor flux 15 %	11.0	%	p50124(0)	Field current for motor flux 20 %	14.7	%	p50125(0)	Field current for motor flux 25 %	18.4	%
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<p>8. P50051=28，摩擦曲线记录 P50051=29，在驱动易振机械时，进行此优化 注意，这两步优化需要带负载进行，根据实际情况选择是否优化。</p>	 <p>The screenshot shows the parameter list for the drive. P50051 is set to 28 and 29. The 'Diagnosis' column is checked for both values.</p>																																												
<p>9. COPY RAM TO ROM，上载，保存，调试完成。 端子控制装置启停时，设置 P840=1，X177 端子 9 和 12 之间接入用户设计的控制电路；上位机通讯控制装置启停时，P840 与控制字的 OFF1 位互联，需要设置报文。</p>	 <p>The screenshot shows the parameter list for the drive. P840 is set to 1. A dialog box titled 'Return control priority (SC0A4100)' is open, asking 'Do you want to retain control priority of the drive?' with 'Yes' and 'No' buttons. The 'Yes' button is highlighted with a red box and labeled '2. 保持控制字'.</p>																																												

表 2-3 优化调试