

INTELLI+控制器 使用手册

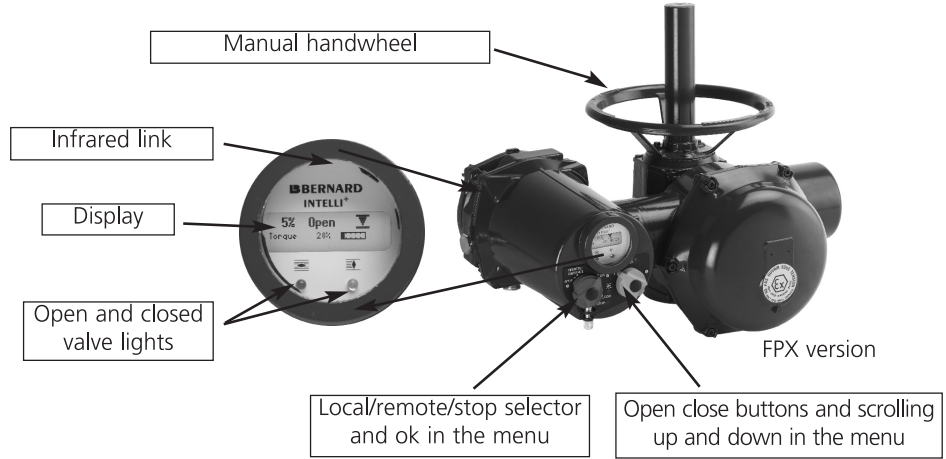


AF-NR 1112 REV CN

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1. 外观



Manual handwheel: 手轮；Infrared link: 红外连接；Display: 显示；Open and closed valve lights: 阀门开启和关闭指示灯；Local/remote/stop selector and ok in the menu: 菜单中的本地/远程/停机选择器和“OK”按钮；Open close buttons and scrolling up and down in the menu: 菜单中的开/关按钮和向上滚动/向下滚动按钮；

2. 开机前检测

ST INTELLI+系列控制单元是多回转式执行器，是多年来致力于远程阀门控制领域的实践结晶。

INTELLI+系统具有执行器设置、监控和控制功能。所有的调节和配置设定均可通过外部单元实现，而无需打开机壳。

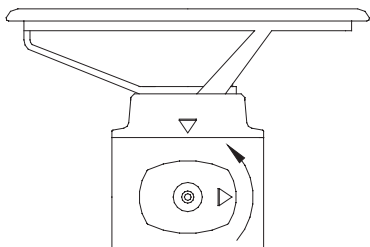
请不要尝试去拆除机盖，以防止水气进入控制系统。唯一一个需要打开的盖板是接线盒盖，当进行与主电源的连接时打开（如图2所示）。

在发货前，已经对所有的INTELLI+执行器进行了测试、配置和检测。对各单元均进行了润滑处理，以延长其使用寿命，并使之可以在任何状态下工作。

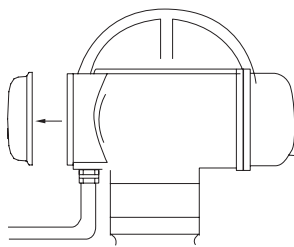
手动控制

ST INTELLI+系列的所有执行器均配备有手动控制所需的手轮，该手轮具有一个优先采用电机驱动的自动离合系统。通常在手轮上标有旋转方向。

ST6型执行器具有一个用来操作手轮的旋钮。要切换到手动模式，需要使旋钮上的箭头与外壳上的三角形标志对准（如图1所示）。要使离合机构松开，可能必须使手轮旋转一定角度。当起动机时，系统会自动切换回电机驱动模式，或者如果需要，也可以切换回手动模式。



(图1)



(图2)

电气接线

a) 根据铭牌上的信息检查电源参数。

由于INTELLI+系统可以自动校正旋转方向，所以对于三相电源，各相的顺序并不重要。

b) 打开端子盒（如图2所示），连接电源和控制电路，并检查接线是否正确。

3. 使用按钮的本地控制及其显示

本地控制装置提供了一种电动执行器的操作方法，而无需使用一个外部控制电路。有一个开关可以用来选择远程控制、本地控制或者控制失效（关闭）模式。本地开启/关闭开关用于在期望的方向上对执行器进行操作。仅通过简单地旋转本地/远程选择器开关，就可以使执行器的运动停止。

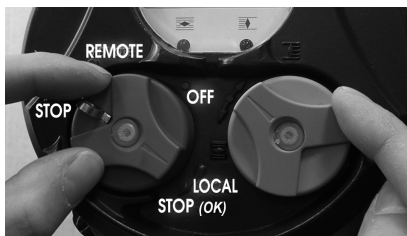
当阀门部分开启时，显示屏以百分比的形式显示阀门的开启度。

当阀门关闭时，显示屏显示“Closed”。

当阀门开启时，显示屏显示“Open”。

也可以配置显示屏，使瞬时力矩以<10%执行器最大力矩的形式来显示，这时表示的是最小力矩值。

可能出现在显示屏上的图符：



20% Open
Closed
Open
Torque 60%

 执行器接收到本地控制发出的拒绝指令（请参见 § 10.2）

ESD 执行器接收到紧急停机指令（请参见 § 10.2）

IR 检测到红外连接（见 § 11）

 闪烁的黑色方块：说明有报警信号（见 § 16.2，报警类型说明）

 如果安装有电池，那么当电池符号闪动时，表明电池电压不足。

0%↑ 该图符表明控制类型为比例控制，并且阀门的输入信号值为百分数形式。

BUS  BUS图符表示有总线通信卡。此图符跟随在一个方块标志之后，以说明通信状况（请参见安装通信总线的专用资料）。

102 1和2表明提供有冗余通信卡（2个信道）。数字跟随在表示每个信道的状态的方块之后（请参见安装总线的专用资料）。

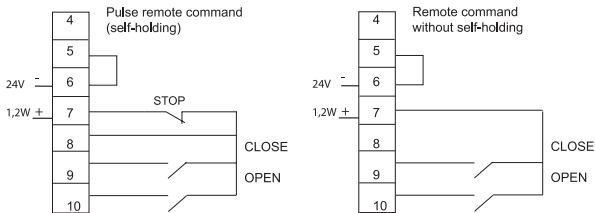
4. 远程控制

可以使用一个外置式电源、或一个集成式电源来操作INTELLI+执行器的远程控制系统。输入电路是完全光线隔离的。

自持式脉冲指令系统要求在客户端子条上连接4条导线：普通线、停机线、开启线和停止线。如果没有使用停止按键，那么不要连接“停机”线。必须提供开启（或停机）接触器，以便操作执行器。

4.1 干式接触控制

如果采用干式接触控制，那么必须在客户端子5和6之间连接一条跨接线。



Pulse remote command (self-holding): 远程脉冲指令（自持式）
Remote command without self-holding: 无自持性的远程指令

4.2 电压控制

远程控制可以使用交流或直流电源。
对于10~55V的低电压，可以使用通用端子5。
对于55~250V的电压，可以使用通用端子4。



To cancel self-holding do not connect terminal 8: 如果要取消自持性，不要连接端子8。

注意：一定不要在通用端子5上连接高于55V的电压。

5. 菜单导航

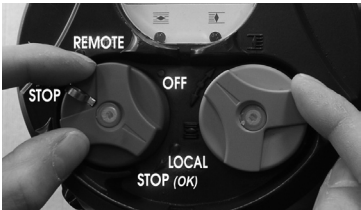
通常，可以使用选择器开关来选择执行器的电机的驱动方式。必须将系统置于菜单模式下，以便进行设置和调节。具体步骤如下：

- 将选择器设置为本地模式
- 将按钮保持在本地停机模式

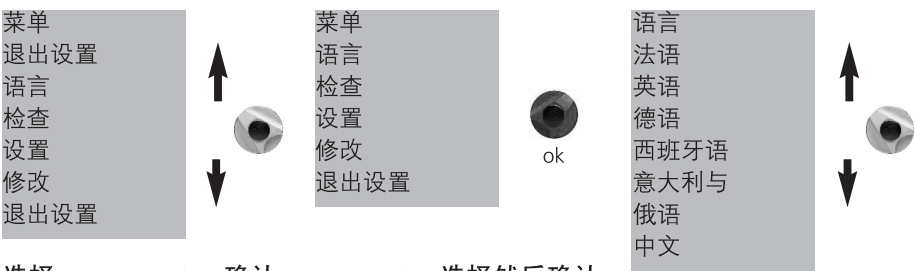
同时向上移动右手按钮，然后再向下移动

显示屏上显示：

菜单
退出设置



要阅读菜单，可以向上或向下旋转蓝色选择器，在显示屏的底部线上滚动查看菜单选项。

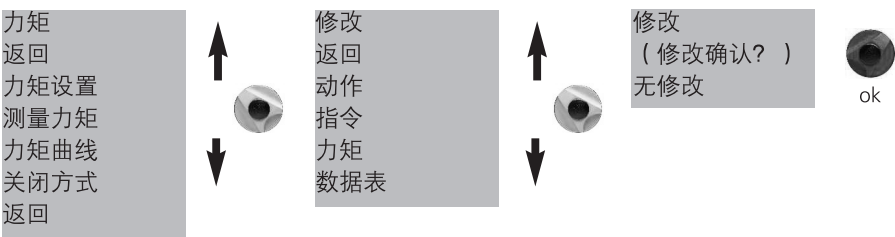


选择 → 确认 → 选择然后确认

当出现需要的选项时，将红色选择器从本地停止位置旋转到OK位置。所选择的选项即以大写字母的形式在第一条线上显示出来，并且在第二线上将显示子菜单。

主菜单选项：

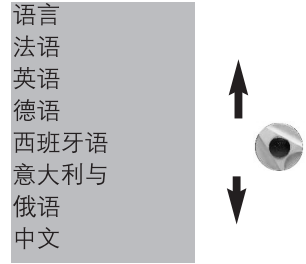
- 语言：**可以用来选择显示所用的语种。
- 检查：**用来查看执行器的所有设置和配置参数，但不能更改任何数据。无需密码即可访问该选项。
- 设置：**用来调节阀门上的执行器。如果设置有密码，则需要使用密码才能进入本选项。
- 修改：**用于改变执行器的配置。如果设置有密码，则需要使用密码才能进入本选项。
- 退出设置：**用户可以在任何时间，通过将红色选择器转到“OFF”位置来退出菜单。但是，为了保存在“修改”菜单项中所做出的修改，必须通过选择返回上一级菜单的方式，依次退出每一级菜单，直到显示屏出现：（修改确认？）



- 选择返回；
- 旋转至“OK”以确认；
- 选择（无修改），并旋转至“OK”以确认，以保存原始值。
- 选择返回；
- 旋转至“OK”以确认；
- 选择“OK”以确认修改模式；

6. 选择显示用语言

在菜单中选择语言种类，并且旋转至“OK”以确认。
选择用户所希望的语言，并且旋转至“OK”以确认。



7. 密码

用户希望进入修改或设置菜单时，需要键入密码。缺省设置为无密码，并且可以通过选择“OK”来修改或设置菜单。

用户也设置密码，以限制其它人来改变菜单。

创建密码

参照第18节“如何创建和修改密码”

输入密码

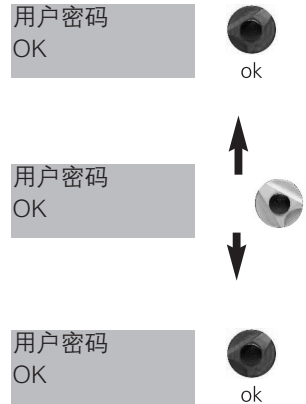
如何利用快捷键CODE来设置密码？

利用蓝色选择器输入第一位数字，并旋转至“OK”以确认。

利用蓝色选择器输入第二位数字，并旋转至“OK”以确认。

利用蓝色选择器输入第三级数字，并旋转至“OK”以确认。

如果访问密码正确，用户就可以继续下一步的操作
选择“OK”以确认。



8. 调节安装在阀门上的执行器

在执行器已经安装到阀门上以后，可以使用设置菜单来设置阀门的开启和关闭位置。

通过选择开启和关闭位置，可以手动或自动进行设置。在自动模式下，执行器可以根据力矩限制器的状态，进行旋转操作或停止在终点位置。

然后INTELLI+执行器将会确定停止位置。如果希望执行器不会根据力矩限制器的状态而停止，或者如果用户自己想选择停止位置，可以进行手动设置。

8.1 手动设置

选择菜单中的设置，旋转至OK以确认。
选择设置菜单中的关闭模式，旋转至OK以确认。
选择阀门是否根据力矩或位置来关闭（也可以根据力矩来设置阀门的开启和关闭动作）。
选择OK以确认。
选择关闭方向，旋转至OK以确认。
表示正常的关闭方向（一般为顺时针方向）。
选择OK以确认。
选择位置设置，旋转至OK以确认。
选择阀门关闭？以进行关闭设置。
旋转至OK以确认。
当显示屏上显示（no）时，旋转至OK以确认。

设置
返回
关闭模式
关闭方向
位置设置
返回





位置设置
返回
阀门关闭？
阀门开启？
自动
返回
利用按钮关闭
阀门
返回=本地停止





显示屏显示：
可以利用手轮或者采用电机控制的方式，在关闭位置对阀门进行设置。
使用与以前同样的关闭模式，即对于力矩式外壳，靠近力矩限制器，对于位置式外壳，无力矩限制器动作。
当阀门处于正确位置时，进行本地停止操作，以返回菜单。

注释：在进行设置操作的本过程中，用于菜单导航的选择器处于有效状态，可以再次实现执行器控制功能。应当按处旋钮不放，直到到达期望的位置。在设置过程中，自持式功能处于无效状态。

当显示（yes）时，旋转至OK以确认。
如果对设置产生怀疑，选择（no）并且重新开始。
显示位置正确（Position Ok）时，旋转至OK以确认。
现在设置阀门开启位置。
当显示阀门开启？（Valve Open？）时，旋转至OK以确认。
当显示（no）时，旋转至OK以确认。
显示屏上将显示：

位置正确





利用按钮开启
返回=本地停止





可以利用手轮或者采用电机控制的方式，在关闭位置对阀门进行设置。
确保执行器不会到达机械限位装置。
当阀门处于正确的位置时，进行本地停止操作，以返回菜单。
当显示（yes）时，旋转至OK以确认。
如果对设置产生怀疑，选择（no）并且重新开始。将会显示位置正确。旋转至Ok以确认和继续。在设置过程的最后，显示屏将会显示行程距离。
旋转至OK以确认，并返回到控制模式。

行程测量值：
19mm





8.2 自动设置

选择菜单中的设置，然后旋转至OK以确认。

选择设置菜单中的关闭模式，旋转至OK以确认。

选择阀门是否根据力矩或位置来关闭（也可以根据力矩来设置阀门的开启和关闭动作）。选择OK以确认。

当显示关闭方向时，旋转至OK以确认。

显示正常的关闭方向（一般为顺时针方向）。

旋转至OK以确认。

当显示位置设置时，旋转至OK以确认。

在位置设置菜单中选择自动。

当用户旋转至OK时，自动设置循环开始。

通过力矩限制器，制动器可以检测到终点位置，并且在到达中间行程时，可以自行定位，以便在行程的两个方向上测试其惯性。

基于关闭模式设置和执行器惯性，INTELLI+会在0~100%行程范围内确定停止位置。

在设置过程的最后，显示屏显示出行程距离。

旋转至OK进行确认，并返回到控制模式。

注释：在自动设置过程中，可以立即停止工作循环。使用本地停止指令以返回菜单。

该操作取消了设置过程。

行程测量值：
19mm



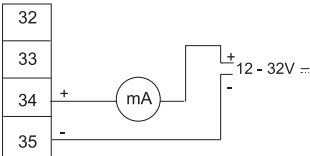
9. 位置信号和定位器

位置信号

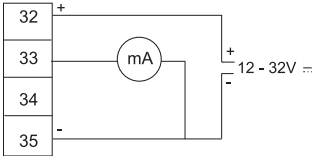
一些执行器的配置中包含了一个模拟位置信号。

由于信号可以在0~100%位置之间自动调节，因此不需要进行优先设置。缺省信号格式为4~20mA（0%时为4mA，100%时为20mA），2线或3线制连接。

对于其他信号的进一步详细内容和信息，请参见第19节。



2线制连接



3线制连接

定位器

一些些执行器的配置，使得它可以根据控制信号（例如4~20mA的信号）来实现控制功能。由于信号可以在0~100%位置之间自动调节，因此不需要进行优先设置。

为了检查就地定位的情况，必须对本地控制进行配置，以便实现从0到100%的比例控制（请参见10.3节）当设置完成时，返回到本地控制模式。显示屏显示阀门的开度位置和指令（指令以百分比的形式表示）。

利用蓝色按钮来上下调节控制值，并且确认执行器是否采用了所要求的位置。

其中一个辅助指令必须设置为自动/开-关模式，以便进行远程操作（请参见10.2节）。当该设置完成以后，执行器将受到定位器的控制。必须采用开-关指令来切换辅助指令。辅助指令用于选择定位器或者远程开-关控制。

要了解更多的详细情况，请参见第20节，特别是关于死区设置的相关信息。

10. 指令

在前面的第4节中，对标准远程指令模式加以了描述。本节对辅助控制方式进行说明。

10.1 利用单接触器的远程控制

可以利用单个外部接触器来控制执行器。

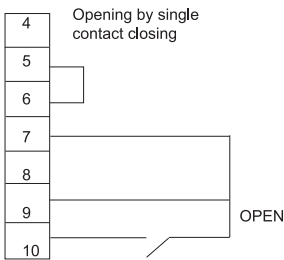
- 接触器闭合：阀门打开
- 接触器断开：阀门关闭

需要对执行器进行配置，使之优先开启（请参见10.6节）。

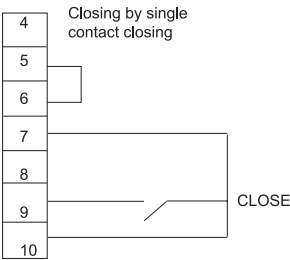
指令可以按照如下方式工作：

- 接触器闭合：阀门关闭
- 接触器断开：阀门开启

在这种情况下，需要对执行器进行配置，使之优先关闭（请参见10.6节）。



Configuration: priority to open



Configuration: priority to close

Opening by single contact closing: 利用单接触器闭合来使阀门开启

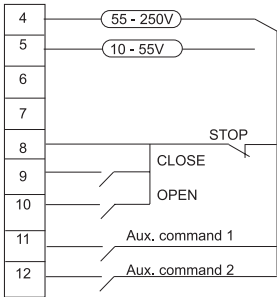
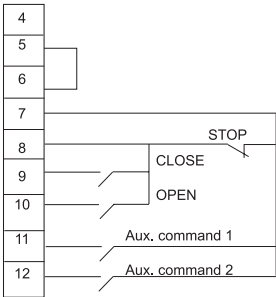
Closing by single contact closing: 利用单接触器闭合来使阀门关闭

Configuration: priority to open: 配置：优先开启

Configuration: priority to close: 配置：优先关闭

10.2 辅助性远程指令

可以使用另外两种远程指令，在安装时可以对其进行配置。



可以为这些指令赋予特定的功能。

选择菜单中的修改，并返回OK以确认。

选择修改菜单中的指令，并返回Ok以确认。

在指令菜单中选择辅助指令1或者辅助指令2，并返回OK以确认。利用蓝色选择器进行指令选择。在缺省情况下，辅助指令1被指定为本地指令禁止，而辅助指令2被指定为ESD关闭。

如果将辅助指令1和辅助指令2设置为紧急停机功能，那么辅助指令2具有优先权。

辅助指令1

(无指派)
(本地/远程)
(本地+远程/远程)
(本地禁止指令)
(开启禁止)
(关闭禁止)
(自动/开-关)
ESD关闭
ESD开启
ESD停止
部分行程



指令说明:

— 本地/远程指令 取代位于执行器上的本地/远程选择开关，用以实现远程控制或本地控制功能。旋转至OK以确认，并且选择接触器的状况，以便执行如下指令：
旋转至OK以确认。

如果用户仅仅希望检查设置而不进行任何更改，则在主菜单中选择检查而不是修改菜单项。



本地/远程指令

接触器（闭合）=远程
接触器（断开）=远程



第一选择：闭合接触器=远程指令

第二选择：断开接触器=远程指令

(actuator terminal: 执行器端子

Aux. command 1: 辅助指令1

Selector local/remote: 选择本地/远程指令)

— **本地+远程/远程**：与相面所述相同，但是这种指令允许同时使用本地和远程模式。

— **本地指令禁止**：本地指令禁止是一种远程指令。这种指令可以超控任何本地发出的开启或关闭指令，并且能够实现远程指令，即使执行器上的本地/远程选择器位于本地也是如此。

旋转至OK以确认，并且可以选择是否保持或者不保持本地停止的功能。标准配置用于就地停止和普通关机。也可以选择本地停止（无）来禁止本地停机。

旋转至OK以确认，然后选择执行该指令的接触器状态（如上文所述）。

旋转至OK以确认。

— **开启 / 关闭禁止**：这种指令用来防止执行器意外开启或关闭。例如，如果一个主阀配备有旁路阀门，那么除非旁路阀门已经打开，那么主阀门不得打开。在这种情况下，除非已经使限位开关处于有效状态，否则不能使用旁路阀门上的限位开关来防止主阀门开启。

本地指令禁止

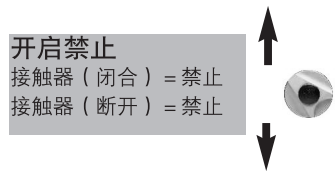
本地关闭（是）
本地关闭（否）

本地指令禁止

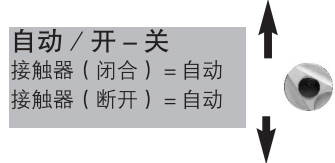
接触器（关闭）
= 禁止
接触器（开启）
= 禁止



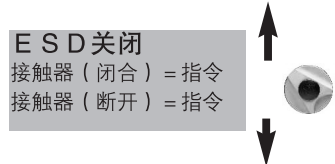
旋转至OK以确认，然后选择执行该指令的接触器状态
（如上文所述）。
旋转至OK以确认。



— **自动 / 开 - 关**：可以采用直流（DC）信号（例如4 - 20 mA）驱动，或者利用开启 / 关闭 / 停止指令来驱动用于控制设备的、具有定位器功能的执行器。自动 / 开 - 关指令提供了一个从一种指令模式切换到另一种模式的方法。
旋转至OK以确认，然后选择执行该指令的接触器状态
（如上文所述）。
旋转至OK以确认。



— **E S D 关闭 / 开启** E S D（紧急停止）指令为紧急停机指令，比其它任何指令均具有优先权。根据阀门的使用情况，紧急指令可以开启或者关闭阀门，或者造成即时停止。
旋转至OK以确认，然后选择执行该指令的接触器状态
（如上文所述）。
旋转至OK以确认。



注释：当本地 / 远程选择器处于关闭位置时，不能执行紧急指令。
递降模式见 10.7 节。

— **部分行程**：部分行程指令是一个用于进行周期性功能测试的指令（请参见 10.8 节）。

10.3 本地指令

在标准配置中，本地指令为自持性指令（要执行一个开启或关闭指令，仅仅需要将控制器按下一次）。
按照下列方法可以实现对该特性的超控，并通过下列操作来保持开启或关闭指令：
在菜单中选择**修改**，旋转至OK以确认。
在修改菜单中选择**指令**，旋转至OK以确认。
在指令菜单中选择**本地指令**，旋转至OK以确认。
选择（**维护**），旋转至OK以确认。
对于从0增加至100%的本地指令，选择（0 - 100%）。
然后指令会采用当前位置值，并且将该值显示在其位置下方。然后可以用右手选择器来修改指令值，每次的增量值为1%。

10.4 本地停止

在标准配置中，即使将其设置为远程控制，制动器也可以在本地停止。当选择器为远程模式时，要取消其本地停止动作，可以在指令菜单中选择**本地停止**，并选择（无）。

10.5 远程停止

在标准配置中，远程停止可以通过断开接触器来实现（然而通过闭合接触器来发出开启或关闭指令）。为了以与开启或关闭动作相同方式来控制远程停止，如开启或关闭行为，在指令菜单中选择远程停止，并且选择接触器（闭合）= 停止。

注释：开启和关闭指令具有比停止指令相比更高的优先权。

10.6 开启或关闭优先权

在标准配置中，开启或关闭指令没有优先权。在执行动作的过程中，如果没有发出停止指令，那么改变行程方向具有较高的优先权。



这种情况下，优先权必须赋予开启和关闭动作。

为旋转方向指配优先权：如果为开启动作指配了优先权，则执行器同时接收开启和关闭指令时，执行器将开启。单个接触器如何发出指令，请参见 10.1 节

选择菜单中的**修改**，旋转至OK以确认。

选择修改菜单中的**指令**，旋转至OK以确认。

选择指令菜单中的**优先权**，旋转至OK以确认。

选择（开启）、（关闭）或者（开启和关闭），旋转至OK以确认。

10.7 递减模式中的ESD

在标准配置中，保护性设备均处于有效状态。一旦出现故障，执行器的工作将被停止。

可以为一些保护性设备提供旁路，以便当紧急指令发出后，确保设备可以在容错状态下工作（请参见辅助指令 1 或 2 的说明）。

选择菜单中的**修改**，旋转至OK以确认。

选择修改菜单中的**指令**，旋转至OK以确认。

选择指令菜单中的**容错ESD**，旋转至OK以确认。



可以选用一些可选项。

当选择一个选项后，括号将会消失，在被选择项的前方将会显示一个星号。旋转至OK以取消选择。

注意：对于防爆型设备，禁止超控热过载保护。

10.8 部分行程

对于不经常使用的阀门，经常对阀门执行电动操作是很有用的，这样可以确保阀门处于良好的使用状态。

当用户提出要求时，INTELLI+有能力对执行器的功能进行测试。这种测试包括使阀门旋转某一行程（如全行程的10%），并且然后返回到原始位置。完成行程距离所使用的时间是受到监控的，如果超出了指定时间，将会报警。

用户可以使用执行器上的辅助输入单元，来给出该指令（请参见10.2节中的配置信息）。测试可以自动进行。需要在两个继电器上配置信号：

- 过程中部分行程；
- 部分行程错误

用户可以确定下列参数：

- 开启或者关闭的起始位置（缺省值：阀门开启）。如果开始位置不是预期值，可以发出一个“部分行程”错误信号。
- 行程百分比（缺省值为10%）；

当执行器的位置变化大于2%时，“部分”行程缺省信号将被清除。

选择菜单中的**修改**，旋转至OK以确认。

选择修改菜单中的**指令**，旋转至OK以确认。

选择指令菜单中的**部分行程**，旋转至OK以确认。

选择部分行程菜单中的**操作时间**，旋转至OK以确认。

检查以确保所显示的操作时间与完全开启或关闭动作的总时间相对应。如果需要，则要进行检查校正。

选择部分行程菜单中的**开始位置**，旋转至OK以确认。

选择开启或关闭。

选择部分行程菜单中的**行程**，旋转至OK以确认。

如果需要，则要对用于测试的部分行程值（以百分比表示）进行校正。

11. 本地红外通信

执行器具有一个用于与便携式计算机或膝上型电脑进行通信的2路式读/书式红外接口。

便携式计算机必须具有红外端口，并且能够运行INTELLIPOCKET软件。如果需要了解任何关于便携式计算机接口兼容性方面的信息，请联系我们。伯纳德公司可以提供供现场使用的、耐用的便携式计算机：可以为防水或者防爆型。提供的计算机上已经预装了软件。

使用INTELLI KIT以实现与膝上型电脑之间的通信。该套件包括一个红外模块和一张带有INTELLISOFT软件的光盘。该红外模块可以安装在执行器的显示窗口上，确保可以容易地进行通信，即使不是正对窗口也是如此。红外模块将与膝上型电脑的RS232接口连接在一起。

配备有一根2米长的电缆（根据需要还可以更长）。

INTELLIPOCKET和INTELLISOFT软件均可以实现所有的INTELLI+功能。早于版本2.0的版本需要更新。

可以即时上传预置的配置，要了解最近的动作，可以查阅力矩/位置曲线。

要了解更多的详细信息，请参见软件使用手册。

如果执行器的菜单系统处于有效状态，则红外接口不能使用。要执行修改或者设置功能，系统必须处于本地模式（即，本地/远程选择器处于本地模式）。在这种情况下，红外接口对于本地控制具有优先权。

一旦建立起通信连接，在执行器显示屏上将显示Ir(红外)图标。

12. 设置和查看力矩值

12.1 关闭方式

在标准配置中，执行器根据位置状况来确定是否关闭。通常在设置菜单中选择根据力矩情况来确定是否关闭，尽管这一操作也可以在修改菜单中实现：

选择菜单中的**修改**，旋转至OK以确认。

选择修改菜单中的**力矩**，旋转至OK以确认。

选择力矩菜单中的**关闭方式**，旋转至OK以确认。

选择**打开（力矩）**，旋转至OK以确认。

（力矩）开/关选项用于确定是否根据力矩的情况来打开和关闭。

12.2 设置力矩

根据订货要求，执行器是与力矩限制系统一起发货的。如果力矩限制器在操作过程中处于有效状态，那么要对下列内容进行检查：

- 阀杆清洁是否，并且进行了恰当的润滑；
- 阀杆没有被阀杆螺栓处卡滞；
- 阀门压盖不太紧。

如果需要增大力矩，首先要得到阀门供应商的许可，然后按照步骤操作：

选择菜单中的**修改**，旋转至OK以确认。

选择修改菜单中的**力矩**，旋转至OK以确认。

选择力矩菜单中的**力矩设置**，旋转至OK以确认。

选择用户所希望的设置，旋转至OK以确认。

使用蓝色选择器来增大或减小数值。最小设置值为40%。

使选择器保持在上或下位置，以便更快速的滚动变化数值。

力矩限制系统说明：

所有力矩值均以百分比的形式显示。

100%对应的是执行器的最大设置值。

该数值在执行器铭牌上有说明，单位Nm。

— **关闭%**：在关闭过程中的限制力矩

— **关闭紧度%**：只有当执行器根据力矩限制值来确定是否关闭时，才会显示该选项。在这种情况下，在关闭运动的过程中，施加在阀座上的力矩可能与力矩限制值不相等。

如果仅仅是检查设置情况，而不做任何改动，那么应当选择菜单中的检查项而不是修改项。

力矩设置

返回

关闭%

关闭紧度%

开启中断%

开启%

返回



- **开启中断%**：只有当执行器根据力矩值来确定是否关闭的情况下，才会显示该选项。在这种情况下，在阀门开启动作的过程中，使阀芯离开阀座的力矩限制值可能力矩限制值不同，一般情况下会更高一些。
如果设置值高于100%，显示屏将显示无限限制（等同于在开启运行开始时，力矩限制器超控）。
- **开启%**：在开启运动中的限制力矩。

关闭%
(100)

↑
↓

注释：在改变了拧紧力矩设置值之后，必须重新设置执行器。

提醒：要保存所做的修改，应当通过选择返回退出菜单，直到提示信息（修改确认？）出现。

12.3 力矩读取和与原始力矩值的比较

所有电机驱动的最大阻力矩值均是可以测量，并且在以后进行查阅的。

运行中的操作力矩值可以存储在存储器中，以使得可以与最近的电机驱动运动的力矩值进行比较。

选择菜单中的**修改**，旋转至**OK**以确认。

选择修改菜单中的**力矩**，旋转至**OK**以确认。

选择力矩菜单中的**力矩测量**，旋转至**OK**以确认。

选择所要求的**力矩值**，旋转至**OK**以确认。

显示屏显示在最近电机驱动运行中的测得的最大力矩值（注释：在进行设置的过程中，不会对运动进行测量）。

如果前一个电机驱动运行的力矩值已经存储在存储器中，那么可以在下一行中查阅这些数据，以供参考。

举例：在本示例中，在初始运行时的力矩示数为12%，在最近运行中的力矩值为18%。比较两个数值，以确定是否需要预防性维护。

存储电机驱动运行中的力矩值

为了保存电机驱动运行中的力矩值，选择菜单中的保存项，然后选择：**力矩=>参考值（是）**。

采用最近电机驱动运行中的力矩值做为参考力矩读数。如果发生故障，选择：**力矩=>参考值（否）**以重新存储参考力矩值。

只有在用户退出修改菜单，并确认（修改确认？）后，数据才能被保存。

如果仅仅是检查设置情况，而不做任何改动，那么应当选择菜单中的检查项而不是修改项。

测量力矩
返回
关闭%
关闭紧度%
开启中断%
开启%
保存
力矩显示
返回

↑
↓

关闭%
18, 参考值12

↑
↓

保存
力矩=>参考值（是）
力矩=>参考值（否）

显示最近电机驱动运行过程中的位置/力矩曲线
选择力矩菜单中的力矩曲线，旋转至OK以确认。
选择开启或关闭动作，旋转至OK以确认。
曲线可以在显示屏上显示，位置范围从0到100%，
力矩范围从0到100%（100%为执行器铭牌上给出的最大力矩值）。



13. 定制状态和控制指示

13.1 本地指示

本地显示可以进行如下配置：

反向显示：可以反向显示（显示内容旋转180度）。选择菜单中的**修改**，然后选择**信号**，再选择**本地**，最后选择**反向显示（是）**。

显示力矩：选择该项，可以使在执行器显示屏上显示的实时力矩值与同一时刻的位置值相对应。

选择菜单中的**修改**，然后选择**信号**，再选择**本地**，最后选择**反向显示（是）**。

本地指示

返回
反向显示
力矩显示
指示灯
返回



力矩60%



指示灯的颜色：在标准设置中，红色指示灯表示阀门处于关闭状态，绿色指示灯表示其处于开启状态。可以更改指定的颜色，使得红色指示灯表示阀门开启，而绿色指示灯表示阀门关闭。

选择菜单中的**修改**，然后选择**信号**，再选择**本地**，最后选择**指示灯：红色=（开启）**。要使指示器上的阀门开启和关闭标识处于正确的位置，用户还必须打开窗口的盖子，并旋转指示显示牌。

远程指示

返回
继电器1
继电器2
继电器...



继电器1

（接触器闭合）
（接触器断开）



继电器1

返回
*阀门开启
（阀门关闭）
（阀门限制开启）
（...）



13.2 远程指示

提供执行器状态数据的信号是通过双稳继电器传输的。每个继电器均可以配置可选项列表。

在标准配置中，INTELLI+具有4个双稳继电器。作为可选项，还可以再增加3个双稳继电器（当电源停止供电时，接触器断开）。

根据订货要求，生产厂家对设备进行了配置。

采用如下步骤进行修改：

选择菜单中的**修改**，旋转至OK以确认。

选择修改菜单中的**信号**，旋转至OK以确认。

选择信号菜单中的**远程**，旋转至**OK**以确认。
选择信号菜单中的**继电器**，旋转至**OK**以确认。
选择**接触器类型**（即有效继电器的状态），旋转至**OK**以确认。

选择功能或要求的功能：
对于单继电器，有几种选项可供选择。
当选择一个选项后，括号将会消失，在被选择项的前方将会显示一个星号。旋转至**OK**以取消选择。

列表	详细信息
*阀门开启	确认阀门开启
（ 阀门关闭 ）	确认阀门关闭
（ 开启用力矩限制器 ）	在开启状态下，力矩限制器工作
（ 关闭用力矩限制器 ）	在关闭状态下，力矩限制器工作
	（ 即使根据力矩限制器的状态，阀门正常关闭时，仍然可以指示力矩限制器的动作 ）
（ 从x%到y% ）	中间行程指示
（ 本地选择器 ）	选择器的状态
（ 远程选择器 ）	选择器的状态
（ 选择器关闭 ）	选择器的状态
（ 运行 ）	运行中的执行器
（ 开启 ）	执行器执行开启动作
（ 关闭 ）	执行器执行关闭动作
（ 紧急停止指令 ）	执行器接收到紧急停止指令
（ 行程中停止 ）	执行器停止（无论是开启或关闭）
（ 通电 ）	执行器正常供电
（ 热过载 ）	电机热继电器跳线
（ 阀门卡滞 ）	由于阻力力矩过大，而导致无法完成动作
ve	力矩
（ 失相 ）	3 相供电中相缺失
（ 信号缺失 ）	4 – 2 0 m A 信号缺失（如果定位器选项有效）
（ 手轮动作 ）	最后一次电动驱动后，使用过手轮；
（ 总线指令 ）	如果安装有现场总线选项，将为该继电器指定一个
外部指令	
（ 电池电量低 ）	如果使用了电池选项，则表示电池需要充电；
（ 部分行程进行中 ）	“部分行程”测试进行中
（ 部分行程错误 ）	在部分行程测试开始之后，出现了部分行程操作错误，或者由于阀门没有处于希望的位置而使得不可能执行测试。

一些选择器具有其它的选项，见下文。

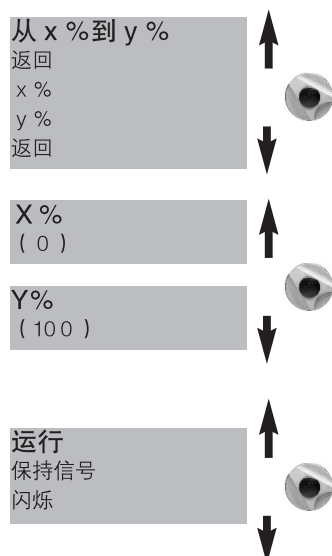
(1) (从 x % 到 y %)
 在旋转至 O K 以确认之后，指定的接触器动作范围：
 选择 x %，并旋转至 O K 以确认。
 使用蓝色选择器来增加或减小数值。
 选择 y %，并旋转至 O K 以确认。
 使用蓝色选择器来增加或降低数值。
 旋转至 O K 以确认。

(2) (运行)
 (开启)
 (关闭)

旋转至 O K 以确认，并且指定以稳定发光或者闪烁方式显示状态。旋转至 O K 以确认。

(3) (总线指令)

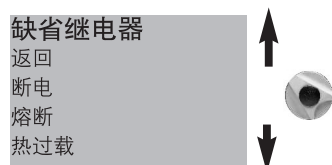
只有当现场总线选项有效时，才可以使用该功能。在这种情况下，继电器可以利用控制间传送来的指令（通过现场总线传输），来控制位于执行器外部的设备，然后利用执行器前向传递（请参见与总线相关的文件）。



14. 用户化的故障继电器

利用切换继电器来发送故障信号，正常情况下，切换继电器处于带电状态。如果出现电源故障，或者执行器无效的情况，继电器将会返回到断开状态。
 可以为该继电器配置有选项列表。
 根据订货要求，生产厂家对设备进行了配置。可以采用如下步骤修改配置：

选择菜单中的**修改**，旋转至 O K 以确认。
 选择修改菜单中的**信号**，旋转至 O K 以确认。
 选择信号菜单中的**远程**，旋转至 O K 以确认。
 选择信号菜单中的**故障继电器**，旋转至 O K 以确认。



包含其它一些故障

所包含的无法修正故障是以无括号的方式显示的。可选项均包括在括号中，并且选项前附有星号标志*。
 再次旋转至 OK，以取消选择。

列表

断电
 熔断
 热过载
 失相
 电机堵塞

详细信息

控制电路失去电源
 熔断器熔断
 热继电器跳线
 3相供电中有相缺失
 电机不能转动

列表

- (阀门卡滞)
- *本地选择器
- *选择器关闭
- (紧急停止指令)
- (超控指令)
- (过行程)
- (信号缺失)

详细信息

由于阻力矩过大，而导致无法完成动作
本地/远程选择器处于本地模式
本地/远程选择器关闭
执行器接收到紧急停止指令
执行器接收到超控指令
在电机关停之后，行程位置超过5%
4-20mA信号缺失 (如果定位器选项有效)

15. 行程动作定时

为INTELLI+提供了一个用于减小执行器的工作速度 (例如，用于保护管线免受压力冲击的损害) 的计时模块。

当传递开启或关闭指令时，计时系统会向电机发出一系列开/关指令。用于操作阀门的时间可能很长。

可以在现场对计时器进行调节。

开启和关闭方向的设置是单独进行的。

也可以在一个行程部分使用计时功能，其剩余部分以正常速度完成。

用户需要指定完成动作所需要的总时间，INTELLI+将计算出开启和关闭的时间。

选择菜单中的修改，旋转至OK以确认。

选择修改菜单中的计时器，旋转至OK以确认。

选择运行时间，旋转至OK以确认。

将显示执行器以正常速度完成动作所需要的时间。

使用蓝色选择器来增大或减小数值。将选择器保持在上限或下限位置，以便快速滚动数值。旋转至OK以确认。

选择计时器开启时间，旋转至OK以确认。

将显示开启阀门所需要的总时间，旋转至OK以确认。

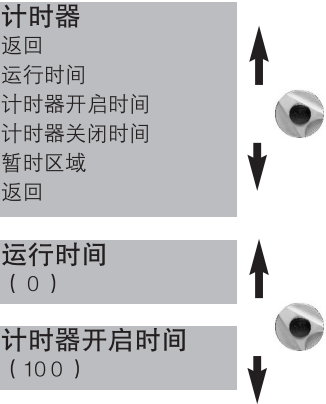
选择计时器关闭时间，旋转至OK以确认。

将显示关闭阀门所需要的总时间，旋转至OK以确认。

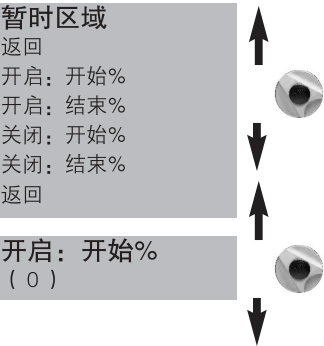
取消计时功能：检查以确保计时器的开启和关闭时间不超过行程时间。

仅在行程的一个阶段应用计时功能：选择需要计时的区域，旋转至OK以确认。

在特定位置启动开启计时器：选择开启：开始%，旋转至OK以确认。使用蓝色选择器以增大或减小数值，直到获得了所要求的、在0与100%之间的位置，然后旋转至OK以确认。



对于其它的阀门，可进行相同的操作，以建立受计时器控制的开启区域和关闭区域。



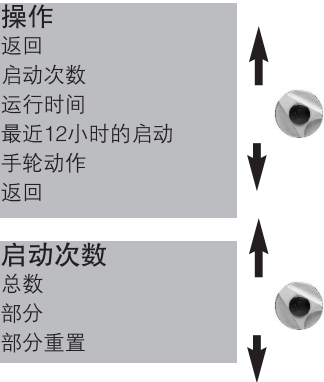
当在完整行程上应用计时器时，要检查阀门缺省值：

开启：开始% (0) 关闭：开始% (100)
开启：结束% (100) 关闭：结束% (0)

16. 查阅执行器的历史记录

16.1 操作

选择菜单中的**修改**，旋转至**OK**以确认。
选择修改菜单中的**操作**，旋转至**OK**以确认。
选择**启动次数**或**运行时间**，来查看从执行器制造出厂以后的全部数据。系统还有一个单独的计数器，用户可以对
该计数器进行复位操作。
选择**总数**以查看执行器的总的启动次数。



要重新设置部分计数器，先选择部分重置，然后选择是或者否（只有在处于修改菜单界面时，本选项才显示）。

启动/12小时：本数据指的是在前12个小时内，执行器启动的次数，它为用户提供了执行器最近的使用情况。当执行模式化工作时，该功能是非常有用的，它可以用来确定是否处于过分使用了执行器。

手轮动作：表示在最后一次使用电机驱动手轮后，是否使用过手轮。（只有超过10%行程，修改才会被记录下来）

16.2 报警

报警用来确定故障源。报警不是永久性的，当故障消除后，报警即可消失。显示屏上会出现一个闪烁的黑色方块标记，用以表示发出了一个报警。要查看报警的相关信息：选择菜单中的**检查**，然后旋转至**OK**以确认。

选择检查菜单中的**报警**，旋转至**OK**以确认。
使用右手选择器，滚动查看处于有效状态的所有报警信息。

报警列表

- 开启方向电机锁止
- 关闭方向电机锁止
- 力矩传感器
- 位置传感器
- 开启方向旋转异常
- 关闭方向旋转异常
- 过行程
- 配置记录
- 操作记录
- 基本记录
- 启动次数过多

- 失相
- 信号缺失
- 热过载
- 泵送
- 24V辅助电源
- 电池电量低
- 无报警

详细信息

- 在阀门的开启方向上，电机被锁止；
- 在阀门的关闭方向上，电机被锁止；
- 力矩传感器故障
- 位置传感器故障
- 开启方向旋转异常
- 关闭方向旋转异常
- 在电机停机之后，行程超过5%
- 存储的配置数据错误
- 存储的操作记录错误
- 基本记录错误
- 启动频率超过了该等级执行器的平均启动次数。执行器的等级，请参见第17节中的标准。本报警从不会导致执行器停止工作。
- 3相供电中缺失相
- 4–20mA信号缺失（如果定位器选项有效）
- 电机热保护开关跳线
- 检测到执行器有震荡行为；
- 供外部电路使用的辅助电源故障（端子6–7）
- 如果使用了电池选项，则表明电池需要充电

17. 访问数据表

选择菜单中的**修改**，旋转至OK以确认。
选择修改菜单中的**数据表**，旋转至OK以确认。

阀门标识号

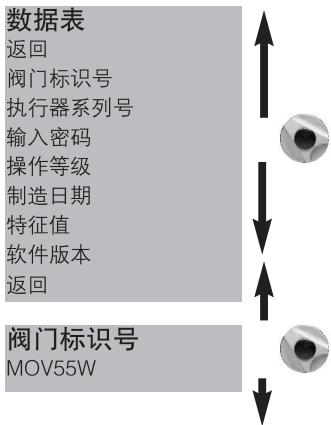
选择阀门标识号，以查阅和记录阀门的ID。
使用蓝色选择器，改变第一个字符，并旋转至OK以确认。
使用同样的方法来修改其余的字符。
在输入了所有的字符后，旋转至OK，然后继续操作，直至再次显示菜单。

执行器系列号：这是执行器的产品系列号。该信息是由制造商提供的，并且仅在检查菜单中可以显示。

输入密码：要输入或修改密码，请参见下文中“创建或修改密码”。

特征值：使执行器能够正确工作的参数设置（详细内容见下页）。

如果仅仅是检查设置情况，而不做任何改动，那么应当选择菜单中的检查项而不是修改项。



只有在检查菜单中才会显示以下参数：

操作等级：表示执行器的设计是否具有开/关操作功能、等级III控制或等级II控制功能。在启动次数超过指定值（启动次数过多报警）的情况下，该项可以用来激活报警。

该数值记录的是前12个小时内的启动次数。不同功能的限制值如下：

开/关操作功能：在前12小时内，启动次数为360次；

等级III控制功能：在前12小时内，启动次数为1200次；

等级II控制功能：在前12小时内，启动次数为21600次；

报警不会导致执行器停止工作。

制造日期：制造厂商给出的产品制造日期。

软件版本：所安装的发行软件的版本。

特征菜单的详细信息

电机：该参数表明电机是否为3相、单相或者DC电源供电（该参数由制造商提供）。

保护：防水或者防爆型设备。对于防爆型设备，禁止在递降模式/指令菜单中对热过载继电器执行超控操作。

锁止电机/s：表明在电源切断后，电机失去能量停止转动所需要的时间。缺省设置：10秒（制造商提供的参数）。

反向延迟/ms：表明在转动方向改变后，执行器停止动作所需要的时间。缺省设置：200ms（制造商提供的参数）。

比例位置系统：表示输出轴和位置传感器之间的齿轮减速比，用于以旋转圈数的方式显示行程（或者以旋转角度的方式表示行程）（制造商提供的参数）

外部减速比 1 /：表示辅助齿轮的减速比。例如，对于一个减速比为1:120的角行程齿轮，需要输入120。然后就可以以角度来表示行程。

线行程，单位mm：表示线性系统许可行程的线性运动范围，其显示单位为毫米，而不是采用旋转的圈数来表示。

行程：表示在调试阀门时，测量的行程值。

特性

返回
电机
锁止电机/s
反向延迟 / ms
比例位置系统
外部减速比 1 /
线行程mm
行程
返回



18. 创建或修改密码

选择菜单中的**修改**，旋转至OK以确认。

选择修改菜单中的**数据表**，旋转至OK以确认。

选择数据表菜单中的**输入密码**，旋转至OK以确认。

利用蓝色按钮输入**第一数字**，旋转至OK以确认。

利用蓝色按钮输入**第二数字**，旋转至OK以确认。

利用蓝色按钮输入**第三数字**，旋转至OK以确认。

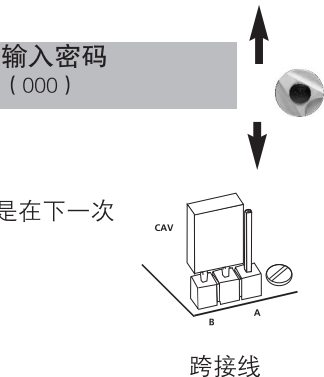
只有在用户退出了修改菜单，并且确认对密码的修改（修改确定？）之后，新密码才有效。用户要确保记住了该密码，以便可以重新进入修改菜单。

如果忘记了密码

关闭系统单元电源，打开控制单元对INTELLI+电路板（用于支持显示）进行操作。

将电路板上的跨接线从位置A移动至位置B，然后重新接通电源。此时密码被重置为零。再将跨接线接回其原位置A。

如果将跨接线留在位置B上，用户则仍可以输入新密码，但是在下一次重新接通电源时，该密码将被复位为零。



19. 使用模拟量位置信号（与设备型号有关）

对于一些型号的产品，执行器可以使用一个模拟信号来向远程设备传送其位置信号（以百分比形式表示，0-100%）。

在执行器行程的整个范围（0-100%）内，输出信号可以自动校准，因此无需对传输的位置信号进行任何调整。

总体而言，被传输的信号与INTELLI+线路是隔离的。

对于该位置信号，要使用经过整流、滤波或者稳定处理的12-32V直流电源。另外也可以使用在端子6（-）和7（+）上连接的内部24V电源。

最大允许负载见下表。

可以使用下列信号：

4-20mA，0-20mA，4-12mA或者12-20mA。

4-20mA、4-12mA或者12-20mA输出可以采用两线式连接，由串接的外部电源供电（请参见执行器电路图）。

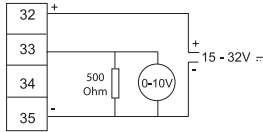
使用一个外部500ohm（或者499ohm 1%）电阻器，可以利用0-20mA输出来获得0-10V信号。电源电压为15到32V。

电源（V）	最大允许负载（欧姆）
1 2	1 5 0
2 4	7 5 0
3 0	1 0 5 0

选择信号变化的方向和类型

选择菜单中的修改，旋转至OK以确认。

选择修改菜单中的位置，旋转至OK以确认。



0 - 1 0 V 位置远程信号

选择位置菜单中的 o p t 位置信号，旋转至 O K 以确认。
选择信号的改变方向，旋转至 O K 以确认。
选择信号类型，旋转至 O K 以确认。

OPT位置信号

信号 ↗ 开启

信号 ↘ 开启

信号 ↗ 开启

(4 - 2 0 m A)

(0 - 2 0 m A) /

(0 - 1 0 V)

(4 - 1 2 m A)

(1 2 - 2 0 m A)

↑

↓

↑

↓

↑

↓

20. 使用模拟量控制信号的定位器（与设备型号有关）

20.1 输入信号

对于一些型号的产品，通过使用比例指令，例如 4 - 2 0 m A 模拟信号，执行器可以作为以定位器使用。
在执行器行程的整个范围（0-100%）内，输出信号可以自动校准，因此无需对执行机构的工作范围进行任何调整。

输入信号与开 / 关指令和远程位置信号是相互隔离的。

利用开启、关闭和停止指令，或者采用比例控制，执行器仍然可以在开 / 关模式下工作。必须采用一个辅助指令来选择这两种控制模式。

在标准配置中，辅助指令被设置为自动 / 开 - 关，以便允许远程选择控制模式：自动 = 比例控制（模拟）或者开 - 关 = 开 / 关控制。要了解更多的配置和指令使用信息，请参见 1 0 . 2 节。

信号	输入阻抗（欧姆）
4 - 2 0 m A	1 6 0
0 - 2 0 m A	1 6 0
4 - 1 2 m A	1 6 0
1 2 - 2 0 m A	1 6 0
0 - 1 0 V	1 1 0 0 0

控制信号

4-20mA，0-20mA，4-12mA或者0 - 1 0 V 。

选择信号的变化方向和类型：

选择菜单中的修改，旋转至 O K 以确认。

选择修改菜单中的定位器，旋转至 O K 以确认。

选择定位器菜单中的信号类型，旋转至 O K 以确认。

选择信号的变化方向，旋转至 O K 以确认。

选择信号类型，旋转至 O K 以确认。

信号范围

信号 ↗ 开启

信号 ↘ 开启

信号 ↗ 开启

(4 - 2 0 m A)

(0 - 2 0 m A) /

(0 - 1 0 V)

(4 - 1 2 m A)

(1 2 - 2 0 m A)

↑

↓

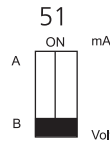
↑

↓

↑

↓

对于 0 - 1 0 V 信号，要求两个接触器切换为OFF状态。接触器位于控制单元内的 I N T E L L I + 电路板（支持显示功能）上。



20.2 死区调节

死区值为无动作发生时，在信号和执行器位置值之间的可允许最大偏差值。

在制造厂中已经完成了该设置，但是可以对之加以调整。

如果死区太窄，执行器可能产生震荡，即在预期的位置周围开启和关闭，而不能达到稳定状态。如果死区太宽，则定位器的动作精度会降低。

死区设置的缺省值为 1 %。

选择定位器菜单中的**死区 %**，旋转至 **OK** 以确认。

使用蓝色选择器以增大或减小数据。旋转至 **OK** 以确认。

20.3 故障保护位置

当使用一个 4 – 20 mA 的输入信号时，如果控制信号缺失，可以设置一个故障保护位置来使用。注意：此项功能不适用于 0 – 20 mA 信号，因为系统不能识别从缺失信号到 0 mA 信号之间的区别。

在标准配置中，此项功能有效，如果信号缺失，执行器将保持在原位置。

用户可以选择开启或者关闭。

选择定位器菜单中的**信号缺失**，旋转至 **OK** 以确认。

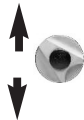
选择所要求的动作，旋转至 **OK** 以确认。

信号缺失

(关闭)

(原位不动)

(开启)



20.4 比例脉冲模式

INTELLI+ 具有一个可考虑执行器的惯性影响的定位模式。如果动作时间太短或如果电机的惯性影响太大，可以通过选择比例脉冲模式来改善定位操作。INTELLI+ 将计算、并校正电机停止点，以便达到预期的位置。并且如果需要，可以对偏差采用脉冲比例。

本模式适用于可以对执行器的惯性影响提供部分补偿、相对稳定的控制动作的场合。与采用标准指令相比，执行器的循环动作更为频繁。

选择定位器菜单中的**比例脉冲**，旋转至 **OK** 以确认。

选择 (是) 或者 (否) ，旋转至 **OK** 以确认。

21. 使用现场总线控制 (与设备型号有关)

现场总线接口用于通过单根线缆来发送指令和数据。

在专门的文件中详细列出了各个执行器的寻址方法，并提供了地址列表，以便访问所有的指令和数据源。

接口类型见菜单。

通信缺失可以用来配置故障保护位置。在标准配置中，该项功能有效。如果通信缺失，执行器将保持在原位置。

用户也可以选择开启或关闭。

选择菜单中的**修改**，旋转至OK以确认。

选择修改菜单中的**总线**，旋转至OK以确认。

选择总线菜单中的**通信缺失**，旋转至OK以确认。

选择所要求的动作，旋转至OK以确认。

总线控制：通常都会选择总线控制。对于也是采用标准硬接线系统的设备，该配置使得用户可以选择指令模式：利用总线或者硬接线均可（请参见4.1和4.2节）。执行器的从地址。所有执行器都具有不同的地址。缺省地址值为2。

要了解现场总线通信的更多详细信息，请参见专门资料。

PROFIBUS

返回

通信缺失

利用现场总线传送的指令

从地址

返回

通信缺失

（关闭）

（原位不动）

（开启）



22. 熔断保护

INTELLI+电源系统包含有一个变压器和一组熔断器。

主保护：6. 3 x 3 2 mm – 0. 5 A快速动作熔断器（位于变压器上）。

辅助保护：自动切断保护的内部线路（无需用户操作）。端子具有自动切断保护功能的2 4 V辅助电源（无需用户操作）。

23. 故障检修

23.1 INTELLI+

如果系统的操作没有任何问题，首先在本地位置设置本地 / 远程选择器，然后操作开启和关闭控制。

故障现象	可能的原因	解决方案
显示屏关闭	执行器电源故障	检查电源电压（对于3相电源，要检查端子L 1、L 2和L 3）。在设备铭牌上给出了电源电压的额定值。
	熔断器熔断	检查熔断器，如需要则更换（熔断器安装在变压器内）。

故障现象	可能的原因	解决方案
无响应	显示屏处于菜单模式	设置本地 / 远程选择器为关闭状态，然后设置为本地状态，以改变指令模式（显示：%位置）。
	I R 连接有效	如果 I R 连接有效（在显示屏上有 I R 图符），使用选择器将不能发出指令。关闭红外连接。
	电机热开关跳线	在显示屏底部中心出现黑色方块，表示有报警处于有效状态。进入菜单 / 检查 / 报警，检查是否有电机过热警报。电机冷却下来后，可以再次启动执行器。
无响应，并且显示钥匙形图符或 E S D 图符	本地超控指令或 E S D 指令有效	检查指令菜单中的可选项：辅助指令 1 或 2，检查是否发出了超控指令或紧急指令，并检查用来执行该远程指令的接触器的状态（断开/闭合）。然后检查客户端子的连接情况，确认其是否对应着超控指令或紧急指令。 例如，如果配置中的设置为辅助指令 1，则本地指令是禁止的，接触器（断开）= 禁止，需要在端子 1 1 上设置一个远程接触器，以取消超控指令。
执行器在本地模式下工作，而不是在远程模式下工作	本地 / 远程选择器处于本地状态或关闭（停止）状态	将本地 / 远程开关切换为远程状态。
	干式接触器控制：端子 6、7 间无电压	确认在客户端子条上的端子 5 和 6 之间有跨接线。 检查是否有一个“2 4 V”辅助报警
	电压控制：电压与输入电压不匹配	检查电压控制连接： 1 0 – 5 5 V：端子 5 5 5 – 2 5 0 V：端子 4

故障现象	可能的原因	解决方案
执行器在远程模式下工作，而不是在本地模式下工作	本地 / 远程选择器处于远程状态或关闭（停止）状态	将本地 / 远程开关切换为本地状态。
	本地超控指令有效（显示屏上出现钥匙形图符），或本地 / 远程选择器处于远程工作模式	检查指令菜单中的可选项：辅助指令 1 或 2，检查是否发出了超控指令，并检查用来执行该远程指令的接触器的状态（断开/闭合）。然后检查客户端子的连接情况，确认其是否对应着超控指令。 例如，如果配置中的设置为辅助指令 1，则本地指令是禁止的，接触器（断开）= 禁止，需要在端子 1 1 上设置一个远程接触器，以取消超控指令。
执行器转动方向错误	配置错误	检查修改菜单下的位置子菜单中的关闭方向，确认关闭动作为顺时针或逆时针。
	电机接线改变，电机反向转动（更换电机时）	更换电机时，要根据电机的接线标记来进行操作。如果存在疑问，检查电机的转动方向是否正确。可以通过变换电机端子条上的接线 2 和 3 来改变电机的转动方向，端子条位于控制箱内部。
不能进入菜单	选择器处于远程状态或关闭状态，或本地超控指令有效	只有当选择器处于本地模式下，即当选择器处于本地状态，并且本地控制无超控指令时，才能进入菜单。将选择器设置为本地状态，并检查上文所述的辅助指令 1 和 2。
菜单设置不能更改	在检查菜单中不能更改设置	进入修改菜单。 某些设置只能查看，不能修改。
更改不能保存	在修改过程中没有进行修改。在保存修改前，必须先确认所做的修改。	在进行改动后，使用返回和 OK 返回菜单，直到显示：（修改确认？）转至 OK 以确认，并保存所做的修改。
执行器出现不平稳的急动	进行了计时设置	用户在计时器菜单中设置此选项，可以增加执行器的动作时间。

故障现象	可能的原因	解决方案
不能检测到手轮动作	在最后一次电机驱动动作之后，检测到手轮一直保持通电状态。系统只会报告超过行程10%的动作。	在正确的条件下重新检测。
显示启动次数过多报警	INTELLI+将监测之前12个小时内的启动次数，并检查该次数与执行器的操作等级要求是否相符。	警报不会限制执行器的工作。它仅仅代表执行器的使用过于频繁。当启动次数与系统应有的启动频率相符后，警报即可解除。

23.2 定位器选项

下表列出了可适用于控制版本的定位模拟信号。

故障现象	可能的原因	解决方案
执行器在本地开启 / 关闭模式，而不是在定位器模式下工作。	本地 / 远程选择器设置为本地模式或关闭	将本地 / 远程选择器切换为远程定位模式，以使用定位器。
	自动 / 开 - 关指令有效，禁止了定位器的使用。	检查指令菜单中的可选项：辅助指令 1 或 2，检查是否发出了超控指令或紧急指令，并检查用来执行该远程指令的接触器的状态（断开/闭合）。然后检查客户端的连接情况，确认其是否对应着开/关指令。 例如，如果配置中的设置为辅助指令 1，（自动/开-关），接触器（闭合）= 自动，需要在端子 1 1 上设置一个远程接触器，以切换到自动指令模式。
执行器在本地开启 / 关闭模式，而不是在定位模式下工作	输入信号的设置不正确	在菜单中检查输入信号的配置，并检查定位器电路板上的位置开关是否断开（请参见 2 0 . 1 节）。
执行器作为本地模式定位器工作，而非远程模式	本地 / 远程选择器设置为本地模式	将选择器切换为远程状态。
	输入信号错误	用串接的毫安表检查设置点信号。
	信号极性不正确	确认信号正极接入端子 3 0 。

24. 维护

为 S T 执行器涂覆了长寿命润滑剂，不需要对之进行专门的维护。
但是，应当定期检查阀杆及其上的螺母的状况，以确保其清洁和具有适当的润滑。
我们建议为很少使用的电机驱动单元安装一个常规动作测试程序。

25. 储存

说明

执行器中包括电子组件和机械零部件，已经为机械零部件涂覆了长寿命润滑剂。尽管设备总成是装纳在一个防水的外壳中，如果存储不当，执行器仍然可能受到氧化，发生堵塞或者在试车过程中被卡住。

储存

执行器必须盖上机盖，储存在清洁、干燥的场合，这样可以防止温度变化造成的伤害。
要避免将其直接放置在地上。如果储存在容易受潮的地方，要采用给执行器通电的方式对其进行干燥。检查以确保电缆进口是密封的。确保对电子组件的机盖和腔室进行了恰当的密封。

储存后要进行的检查：

1. 如果储存时间不超过一年：
 - 目测检查电子元件。
 - 手动操作按钮、选择器等，以确保它们能够正常使用。
 - 手动执行几次动作。
 - 检查油脂的稠度。
 - 执行器试运行。
2. 如果储存时间超过一年：
 - 长期的储存可以引起油脂稠度的变化。在轴或者杆上涂覆的油脂薄层会变干。因此需
要将执行器的机械部件上变干的油脂剥除，然后使用新油脂重新进行装配。
 - 目测检查电子元件。
 - 手动操作按钮、选择器等，以确保它们能够正常使用。
 - 执行器试运行。

26. 检查菜单流程图

Menu：菜单 EXIT SETUP：退出设置 LANGUAGE：语言 CHECK：检查 SET UP：设置 MODIFY：更改 EXIT SETUP：退出设置	RETURN：返回 ACTIVITY：动作 ALARMS：报警 COMMANDS：指令 TORQUE：力矩 DATA SHEET：数据表 POSITION：位置 POSITIONNER：定位器 SIGNALING：信号 TIMER：计时器 FIELDBUS：现场总线	no alarm：无报警 return：返回 Aux command 1：辅助指令1 Aux command 2：辅助指令2 Local command：本地指令 Local stop：本地停止 Remote stop：远程停止 Priority：优先权 Fault Tolerance：容错 Partial Stroke：部分行程 return：返回 Valve tag number：阀门标识号 Actuator number：执行器系列号 Entry code：输入密码 Operating class：操作等级 Manufacture date：制造日期 Characteristics：特性 Software version：软件版本 return：返回 Signal range：信号范围 Deadband %：死区 % Loss of signal：信号缺失 Proport pulse：比例脉冲 return：返回 Operating time：操作时间 Timer open time：计时器开启时间 Timer close time：计时器关闭时间 Temporised zone：暂时区域 return：返回 According to bus interface：根据总线界面	return：返回 Number of starts：启动次数 Running time：运行时间 Starts last 12h：最后12小时内启动次数 Handwheel action：手轮动作 return：返回 Torque setting：力矩设置 Measured torque：测量的力矩 Torque curve：力矩曲线 Closing mode：关闭模式 Sensor model：传感器型号 Return：返回 Close direction：关闭方向 Sensor model：传感器型号 LOCAL INDICATION：本地指示 Return：返回 Opposite display：反向显示 Torque display：力矩显示 Lights：指示灯 REMOTE INDICATION：远程指示 Return：返回 Relay1：继电器1 Relay7：继电器7 Default relay：缺省继电器
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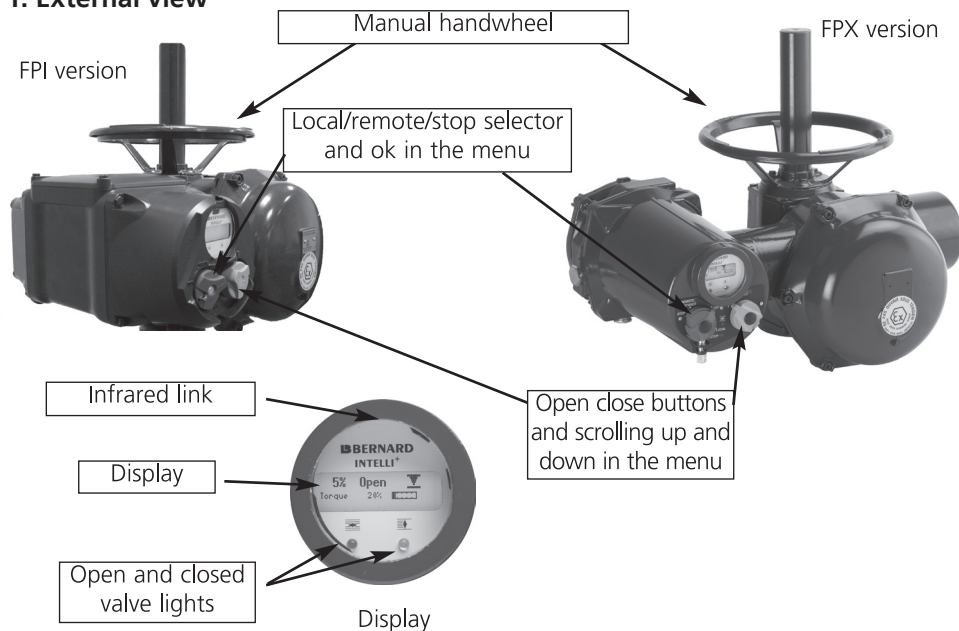
27. 设置和修改菜单流程图

MENU: 菜单	user code 用户密码	RETURN返回	on (position) :
EXIT SETUP:	(change ok?)	CLOSING MODE:	开启 (位置)
退出设置	修改确认?	关闭模式	On (torque) :
LANGUAGE: 语言	(no change)无修改	CLOSING	开启 (力矩)
CHECK: 检查	RETURN: 返回	DIRECTION:	On (torque) o/c:
SET UP: 设置	ACTIVITY: 动作	关闭方向	开启 (力矩) 开/关
CHANGE: 修改	COMMANDS: 指令	POSITION SETTING	(CW) : 顺时针方向
EXIT SET UP:	TORQUE: 力矩	位置设置	(C C W) :
退出设置	DATA SHEET: 数据表	return返回	逆时针方向
	POSITION: 位置	Aux. Command 1:	Valve closed?
	POSITIONER: 定位器	辅助指令1	阀门关闭?
	SIGNALING: 信号	Aux. command 2:	Valve open?阀门开启?
	TIMER: 计时器	辅助指令2	Automatic: 自动
	FIELDBUS: 现场总线	Local command:	Return: 返回
		本地指令	Number of starts:
		Local stop: 本地停止	启动次数
		Remote stop:	Running time:
		远程停止	运行时间
		Priority: 优先权	Starts last 12h: 最后
		Fault tolerance ESD:	12小时内启动次数
		容错ESD	Handwheel action:
		Partial stroke:	手轮动作
		部分行程	Return: 返回
		Return: 返回	Torque setting:
		Valve tag number:	力矩设置
		阀门标识号	Measured torque:
		Entry code: 输入密码	测量的力矩
		Characteristics: 特性	Closing mode:
		Return: 返回	关闭模式
		Signal range:	Return: 返回
		信号范围	Close direction:
		Dead band %: 死区%	关闭方向
		Lost signal: 信号缺失	Opt position signal:
		Proportional pulse:	OPT位置信号
		比例脉冲	LOCAL INDICATION:
		Return: 返回	本地指示
		Operating time: 操作	Return: 返回
		时间	Opposite display:
		Timer open time:	反向显示
		计时器开启时间	Torque display:
		Timer close time:	力矩显示
		计时器关闭时间	Lights: 指示灯
		Temporised zone:	REMOTE
		暂时区域	INDICATION:
		return: 返回	远程指示
		According to bus	Return: 返回
		interface:	Relay1: 继电器1
		根据总线界面	Relay7: 继电器7
			Default relay:
			缺省继电器

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1. External view



2. CHECKS BEFORE SWITCHING ON

ST INTELLI+ series control units are multi-turn actuators resulting from many years of experience in remote valve control applications.

The INTELLI+ system incorporates actuator set-up, monitoring and control functions. All adjustments and configurations settings are performed from the outside of the unit and there is no need to open the housing.

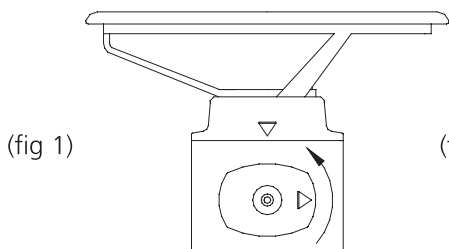
Do not attempt to remove the covers, as this could open allow moisture to enter the control systems. The only cover which needs to be opened is the connection box cover when the unit is connected to the power supply (fig.2, next page).

All ST INTELLI+ actuators are tested, configured and inspected at the factory before shipment. Units are lubricated for life and can operate in any position.

MANUAL CONTROL

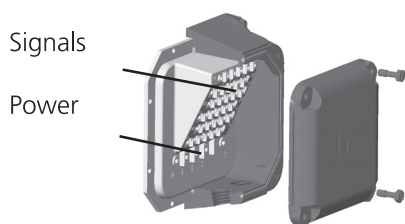
ST INTELLI+ range actuators all incorporate a handwheel for manual control with an automatic clutch system with motor-drive priority. The direction of rotation is normally indicated on the handwheel.

The ST6 actuator has a knob for engaging the handwheel. To change to manual mode, align the arrow on the knob with the triangular mark on the housing (fig.1, next page). It may be necessary to turn the handwheel a few degrees to release the clutch mechanism. The system changes back to motor-drive mode automatically when the motor is started, or it can be changed back manually if required.



(fig 1)

(fig 2)



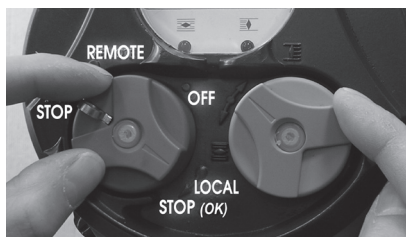
Screw diameters: 3mm for the control and 4mm for the power

ELECTRICAL CONNECTION

- Check the power supply characteristics with respect to the rating nameplate. In 3 phase, the order in phase is not important as the INTELLI+ system corrects the direction of rotation automatically.
- Open the terminal box (fig. 2), connect the power and control circuits (ring tongue not supplied) and check the wiring.

3. LOCAL CONTROL USING BUTTONS AND DISPLAY

The local control facility provides a means of operating the actuator electrically without using an external control circuit. There is a switch for selecting remote control, local control or disabled (off). The local open/close switch is used to operate the actuator in the direction required. Movement can be halted locally by turning the local/remote selector switch briefly.



The display shows the position of the valve as a percentage when it is partially open.

The display shows "Closed" when the valve is closed.

The display shows "Open" when the valve is open.

The display can be configured to show the instantaneous torque demand as a percentage of the maximum actuator

torque value < 10% indicates the minimum torque value.

Symbols that may appear on the display:

The actuator receives a denial of local control (see § 11.2)

The actuator receives an emergency command (see § 11.2)

An infrared link is detected (see § 12)

indicates the presence of an alarm. (see §17.2 to see what type of alarm)

If there is a battery, the icon blinks if the battery voltage is weak.

This icon indicates that the control is proportional and the value of the input signal is indicated in %.

BUS  The BUS marker indicates there is a bus communication card. The marker is followed by a square that shows you the communication status (see specific documentation of the installed bus).

20% Open
Closed
Open
Torque 60%



ESD
IR



0% 

1□2□ 1 and 2 indicate the presence of a redundant communication card (2 communication channels). The number is followed by a square indicating the status of each communications channel (see the specific doc. of the installed bus).

4. REMOTE CONTROL

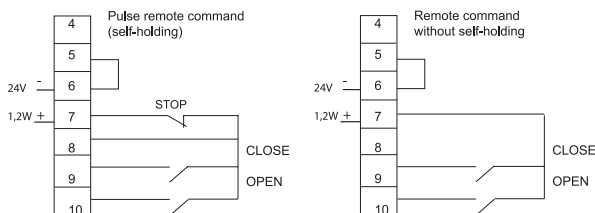
The INTELLI+ actuator's remote control system can be operated using an external or an integral voltage supply.

The input circuits are fully opto-isolated.

The self-hold pulse command system requires four connecting wires on the client terminal strip: Common, stop, open and close. If the stop push-button is not used, do not connect the STOP wire, open (or close) contact must be maintained to operate the actuator.

4.1 Dry contact control

In case of dry contact control, a jumper must be fitted across customer terminal 5-6.

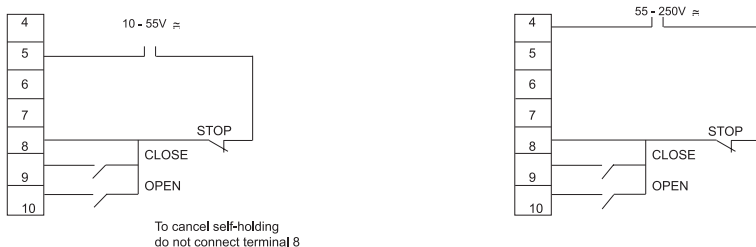


4.2 Voltage control

Remote control can use either in AC or DC voltage.

Use common terminal 5 for low voltages from 10 to 55V.

Use common terminal 4 for voltages from 55 to 250V.



Caution: never connect voltage sources above 55V on common terminal 5.

5. NAVIGATING IN THE MENUS

The selector switches used for operating the actuator's electrical motor drive is also used to navigate into the INTELLI+ menus and thus to have access to the settings.

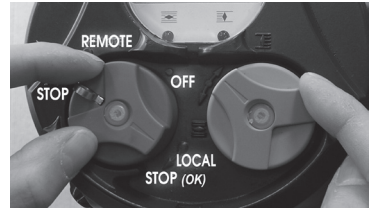
5.1 Selectors

Blue selector (at the right)

- choice selection

Red selector (at the left)

- selector on OK: choice validation
- selector on OFF: exit the menu at any time



5.2 Main menu

- Set the selector on local
- Keep the red selector on local stop and at the same time move the blue selector upwards and then downwards. The display shows:
MENU
exit setup
- Release the selector, it goes to "local" position.

To read the menu, turn the blue selector up or down to scroll through the menu options on the bottom line of the display.

5.3 Selecting a menu or an option

MENU
EXIT SET UP
LANGUAGE
CHECK
SETUP
CHANGE
EXIT SET UP

MENU
language
check
setup
change
exit set up

LANGUAGE
french
english
deutsch
spanish
Portugues
Italian
Russian
chinese

Select (blue selector) → **Confirm (red selector)** → **Select then confirm (red selector then blue selector)**

When the option you want is displayed, turn the red selector from local stop to OK. The option is then displayed in upper-case characters on the first line and sub-menu items can be viewed on the second line.

5.4 Saving the changes

To save changes made in the CHANGE menu, you have to exit each menu in turn by selecting return until the display shows: (change ok?)

TORQUE
return
torque setting
m e a s u r e d
torque
torque curve
closing type
return

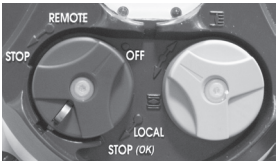
CHANGE
return
activity
commands
torque
data sheet

CHANGE
(change ok?)
no change

Select → **Confirm** → **Select then confirm**

5.5 Exiting the menu at any time

To exit the menu at any time, turn the red selector to the "OFF" position.



5.6 Main menu description

- MENU
- EXIT SET UP
- LANGUAGE
- CHECK
- SETUP
- CHANGE
- EXIT SET UP

Language: to choose the displayed language.
Check: to view all actuator settings and configuration data. No changes can be made and this option can be accessed without a password.
Setup: to adjust the actuator on the valve. A password is needed to access this option if a password has been registered.
Change: to change the actuator configuration. A password is needed to access this option if a password has been registered.

Refer to § 8 to get details about the Check, Setup and Change menus.

6. SELECTING THE DISPLAY LANGUAGE

Select language in the MENU and turn to OK to confirm.
Select the language you want and turn to OK to confirm.

- LANGUAGE
- french
- english
- deutsch
- spanish
- Portugues
- Italian
- Russian
- chinese



7. PASSWORD

Users wishing to access the change or set up menus are prompted to enter a password.
The default setting is no password and the change or set up menus can be accessed by selecting OK.
The user can opt to add a password to restrict access to changes

user code
OK



Create password

Refer to section 19 "How to create or change a password"

Enter password

To enter password at the prompt CODE ?

CODE?
0

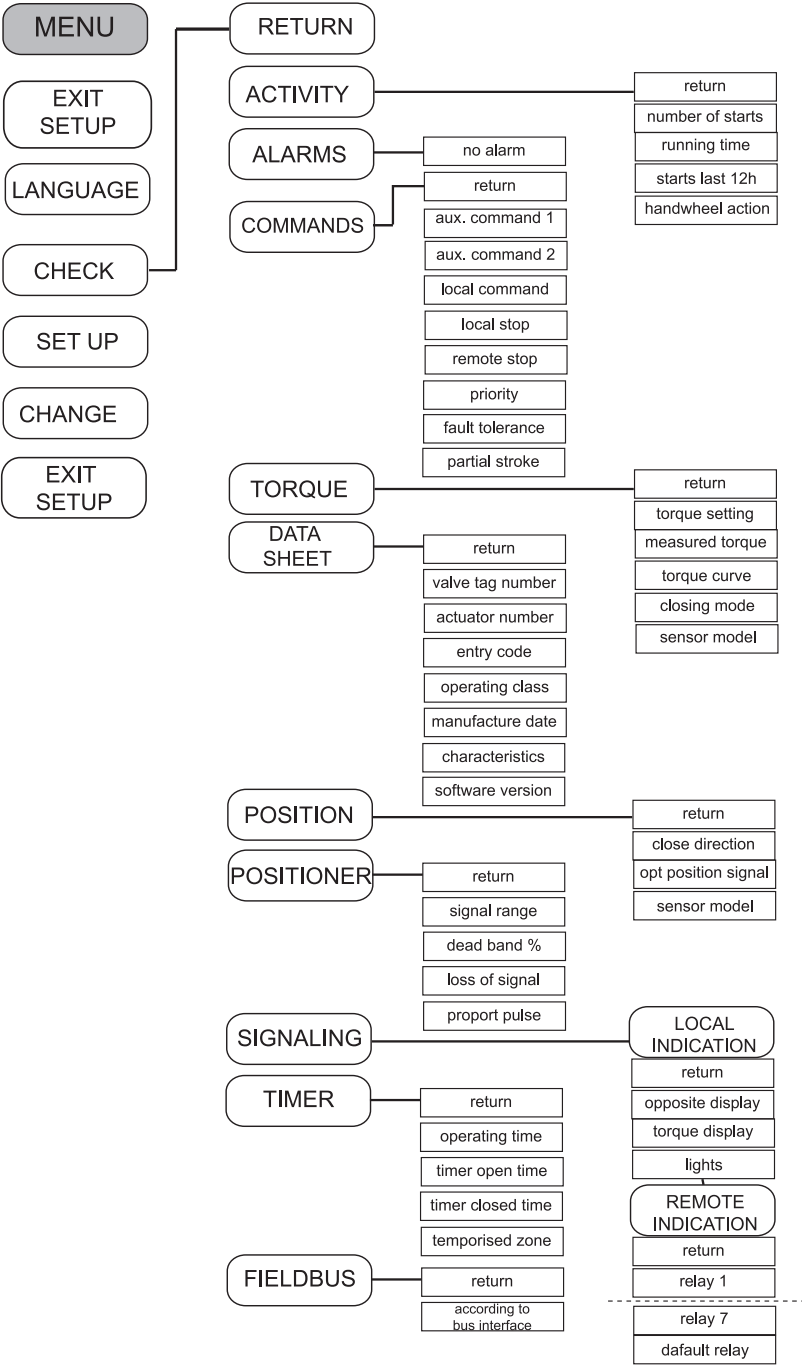


Enter 1st digit with the blue selector and then turn to OK to confirm.
Enter 2nd digit with the blue selector and then turn to OK to confirm.
Enter 3rd digit with the blue selector and then turn to OK to confirm.
The user can continue if the access code is correct.
Select OK to confirm.

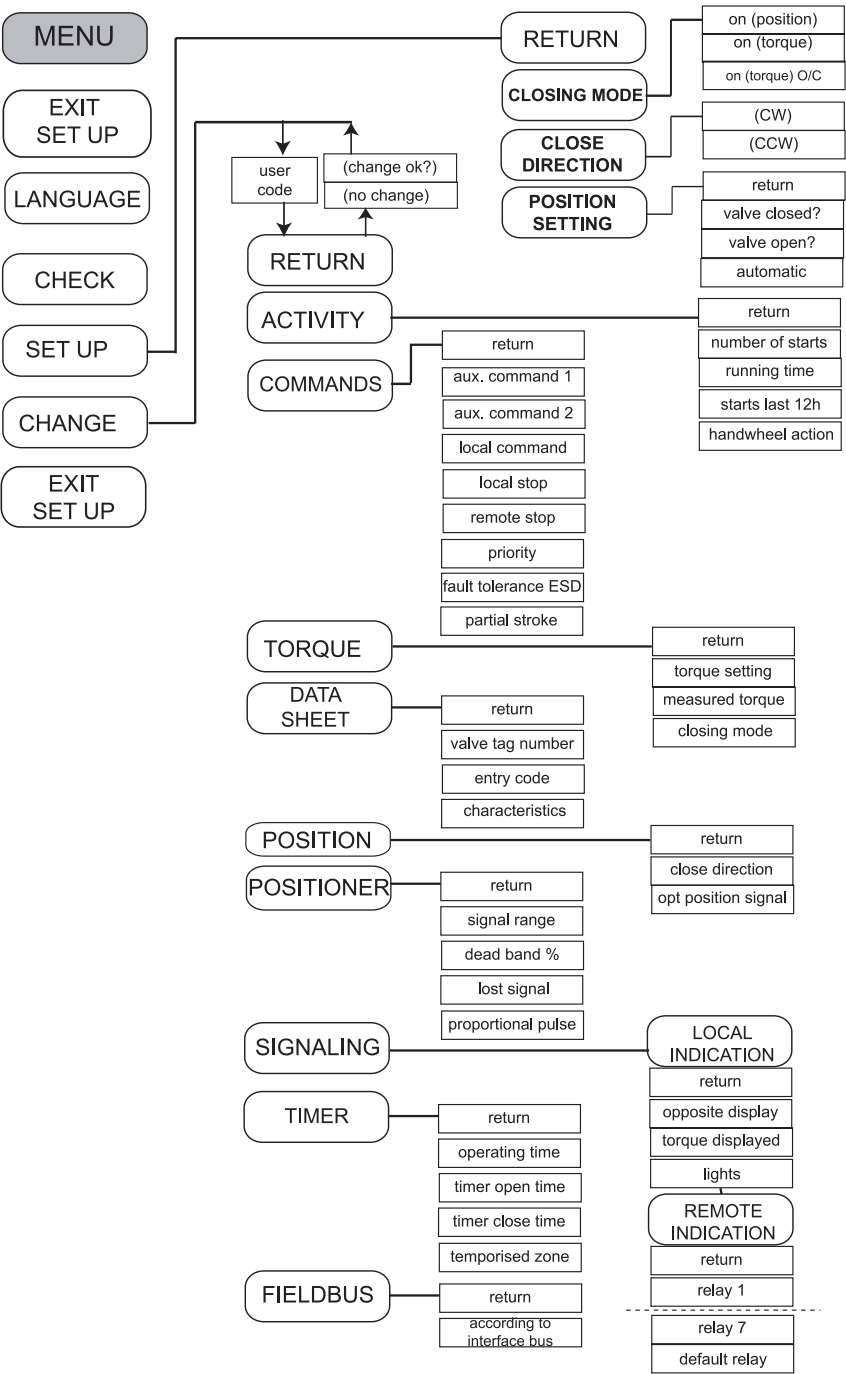
user code
OK



8. CHECK MENU FLOWCHART



SET UP AND CHANGE MENU FLOWCHART



9. ADJUSTING AN ACTUATOR ON A VALVE

The SET UP menu is used to set the open and closed positions when the actuator has been installed on the valve. Settings can be made manually by choosing the open and closed positions, or automatically. In automatic mode, the actuator rotates and halts at the end positions in response to the torque limiter. INTELLI+ then determines the stop positions. Set up manually if you want to avoid having the actuator stop in response to the torque limiter or if you want to choose the stop positions yourself.

9.1 Manual set up

Select **set up** in the MENU and turn to **OK** to confirm.

Select **closing mode** in the SET UP menu and turn to **OK** to confirm.

Select whether valve to close on basis of torque or position (both open and close actions can also be set on torque).

Select **OK** to confirm.

Select **close direction** and turn to **OK** to confirm.

Indicate normal close direction (generally clockwise).

Select **OK** to confirm.

Select **position setting** and turn to **OK** to confirm.

Select **valve closed ?** to make closure setting

Turn to **OK** to confirm. When (no) is displayed, turn to **OK** to confirm.

The display shows:

Set the valve in the closed position either with the handwheel or using the motor control.

Use the same closing mode as previously, i.e.

close to the torque limiter for torque-type closure

and without torque limiter activation for position-type closure When the valve is in the correct position perform **local stop** to return to the menu.

When **(yes)** is displayed, turn to **OK** to confirm.

If in doubt about the setting, select (no) and start again

Position ok is displayed. Turn to **OK** to continue.

Now set the valve open position.

When **valve open?** is displayed turn to **OK** to confirm.

When **(no)** is displayed turn to **OK** to confirm. The display shows:

Set the valve in the closed position either with the handwheel or using the motor control. Ensure that there is no possibility that the actuator will reach the mechanical stop.

When the valve is in the correct position, perform **local stop** to **return to the menu**.

When **(yes)** is displayed turn to **OK** to confirm.

If in doubt about the setting, select (no) and start again **Position ok** is displayed.

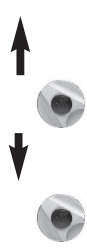
Turn to OK to continue. The display shows the stroke travel distance at the end of the set up process.

Turn to OK to confirm and return to control mode.

SET UP
return
closing mode
closing direction
position setting
return



POSITION SETTING
return
valve closed?
valve open?
automatic
return
close by button
return = local stop



Note: At this stage of the set up operation, the selectors used to navigate through the menu become active for performing actuator control functions again. The knob has to be held until the required position is obtained. The self-hold capability is not active during set up.

position ok



open by button
return = local stop



measured stroke
19 mm



9.2 Automatic set up

Select **set up** in the MENU and turn to **OK** to confirm.

Select **closing mode** in the SET UP menu and turn to **OK** to confirm. Select whether valve to close on basis of torque or position both open and close actions can be set on torque). Turn to **OK** to confirm. When close direction is displayed turn to OK to confirm. Indicate normal close direction (generally clockwise). Turn to OK to confirm.

When **position setting** is displayed turn to **OK** to confirm.

Select **automatic** on POSITION SETTING menu

Warning: during automatic setting the actuator halts on mechanical stops so take care according the type of valves you are commissioning

Note: The cycle can be halted immediately during automatic set up. Use the local stop command to return to the menu . This action cancels the set up procedure.

The automatic setting cycle begins when the user turns to OK.

The actuator detects the end positions by means of the torque limiter and then positions itself at mid-stroke to test its inertia in both directions of travel.

INTELLI+ determines stop positions at 0 and 100% on the basis of the closing mode setting and the actuator inertia.

The display shows the stroke travel distance at the end of the set up process

Turn to OK to confirm and return to control mode.

measured stroke
19 mm

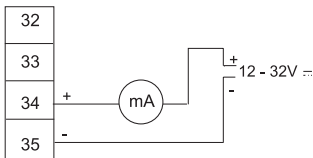


10. POSITION SIGNAL AND POSITIONER

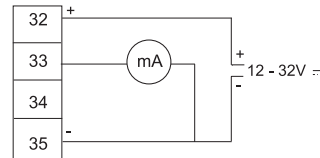
Position signal

Some actuator configurations can incorporate an analogue position signal.

No prior set up is required as the signal is automatically adjusted to the 0 to 100% positions. The default signal is in 4-20 mA format (4 mA at 0% and 20 mA at 100%) 2 or 3-wire connections.



2 wires connection



3 wires connection

See section 20 for further details and information on other signals.

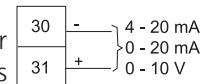
Positioner

Some actuator configurations can perform control functions in response to a control signal (e.g. 4 – 20 mA). No prior set up is required as the signal is automatically adjusted to the 0 to 100% positions.

To check positioning locally, local control has to be configured for proportional control from 0 to 100% (see section 12.3). When this setting has been completed, return to the local control mode.

The display shows the opening position and the command in %.

Adjust the control value up or down with the blue button and ensure that the actuator adopts the position required.



One of the auxiliary commands has to be set to AUTO / ON-OFF to operate remotely (see section 11.2). The actuator is on positioner control when this setting has been completed. The auxiliary command must be switched for On-Off commands. This auxiliary command is used for selecting positioner or on-off control remotely. See section 21 for further details, particularly regarding deadband settings.

11. COMMANDS

Standard remote command modes are described in section 4 above. This section covers additional control methods.

11.1 Remote control via single contact

The actuator can be controlled via a single external contact.

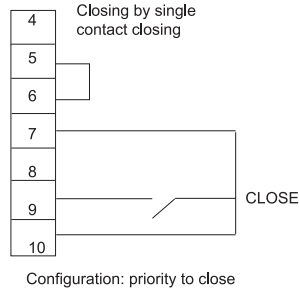
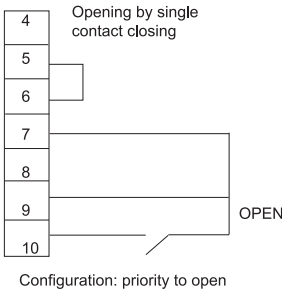
- Contact closed: valve opens
- Contact open: valve closes

The actuator has to be configured for priority to open (see section 11.6)

The command can be made the other way round:

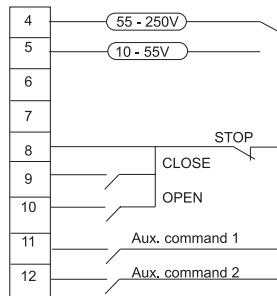
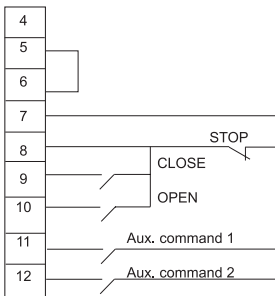
- Contact closed: valve closes
- Contact open: valve opens

In this case, the actuator has to be configured for priority to close (see section 11.6)



11.2 Auxiliary remote commands

Two further remote commands are available and can be configured for the installation.



These commands can be assigned to specific functions.

Select change in the MENU and turn to OK to confirm.
 Select commands in the CHANGE menu and turn to OK to confirm.
 Select aux. command 1 or aux command 2 in the COMMANDS menu and turn to OK to confirm. Select a command with the blue selector.

By default, aux. command 1 is assigned to local command inhibit and aux. command 2 to ESD close.
 If aux. command 1 and aux. command 2 are set to emergency functions, aux. command 2 has priority.

AUX. COMMAND 1
 (no assigned)
 (local/remote)
 (local+remote/remote)
 (local command inhibit)
 (open inhibit)
 (close inhibit)
 (auto / on-off)
 ESD close
 ESD open
 ESD stop
 partial stroke



Description of the commands:

- local/remote replaces local/remote switch on the actuator for enabling remote control or local control from a remote location.

Turn to OK to confirm and then select contact status for performing this command:
 Turn to OK to confirm.

LOCAL / REMOTE
 contact (c) = remote
 contact (o) = remote



If you just want to check settings without making changes, select check instead of change in the main menu.



1st choice: closed contact = remote commands.
 2nd choice: open contact = remote commands

- **local + remote/remote** : same as above, but this command allows local and remote modes to be enabled at the same time.

- **local command inhibit**: local command inhibit is a remote command.

This command overrides any open or close commands made locally and enables remote commands, even if the local/remote selector on the actuator is on local.

Turn to OK to confirm and then choose whether or not to maintain local stop capability. The standard setting is for local stop and general shutdown to remain possible on the actuator. Select local off (no) to inhibit local stop as well.

Turn to OK to confirm and then select contact status for performing this command (as described above) Turn to OK to confirm.

LOC CMD INHIBIT
 local off (yes)
 local off (no)



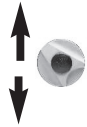
- **open / close inhibit**: this command is used to prevent the actuator from opening or closing. For example, a main valve has a by-pass valve and should not open unless the by-pass valve is already open. In this case, a limit switch on the by-pass valve could be used to prevent the main valve from opening unless the limit switch has been activated.

LOC CMD INHIBIT
 contact (c) = inhibit
 contact (o) = inhibit



Turn to OK to confirm and then select contact status for performing this command (as described above).
Turn to OK to confirm.

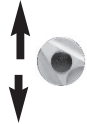
OPEN INHIBIT
contact (c) = inhibit
contact (o) = inhibit



- **auto/on off**: actuators used to control equipment with the positioner function can be a DC signal driven (e.g. 4-20 mA) or via open/close/stop commands. The auto/ on-off command provides a means of switching over from one command mode to the other.

Turn to OK to confirm and then select contact status for performing this command (as described above).
Turn to OK to confirm.

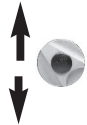
AUTO / ON - OFF
contact (c) = auto
contact (o) = auto



- **ESD close / open**: ESD (Emergency Shut Down) commands are emergency commands and have priority over all other commands. The emergency command may be to open or close the valve or to cause an immediate stop, depending on the use of the valve.

Turn to OK to confirm and then select contact status for performing this command (as described above).
Turn to OK to confirm

ESD CLOSE
contact (c) = command
contact (o) = command



Note: the emergency command cannot be executed when the local / remote selector is on the OFF position.

Degraded mode see section 11.7

- **partial stroke** : partial stroke is a command for performing periodic function tests (see section 11.8).

11.3 Local commands

Local commands are self-held in the standard configuration (The control only needs to be pressed once to perform an open or close command).

Proceed as follows to override this feature and require open or close commands to be held down throughout the action:

Select **change** from the MENU and turn to **OK** to confirm.

Select **commands** in the CHANGE menu and turn to **OK** to confirm.

Select **local command** in the COMMANDS menu and turn to **OK** to confirm.

Select **(maintained)** and turn to **OK** to confirm.

For a local command with increments from 0 to 100%, select (0 – 100%).

The command then takes the value of the current position and is displayed under the position. The right-hand selector can then be used to change the command value in increments of 1%.

11.4 Local stop

The actuator can be stopped locally in the standard configuration, even if it is set on remote control. To disable the local stop action when the selector is on remote, select **local stop** in the COMMANDS menu and then select (no).

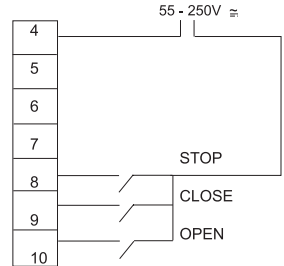
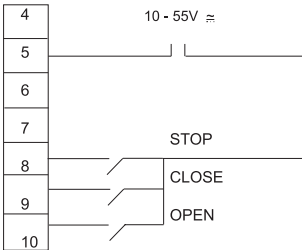
11.5 Remote stop

In the standard configuration, remote stops are performed by opening a contact (whereas the open or close command is made by closing a contact). To control the remote stop in the same way as open or close actions, select **remote stop** in the COMMANDS menu and then select **contact (c)=stop**

Note: The open and close commands have priority over stop.

11.6 Open or close priority

There are no priorities on open or close in the standard configuration. Priorities are used to reverse the direction of travel when an action is in progress without having to give a stop command. In this case, priority must be given to open and close actions.



Assign priority to one direction of rotation: if the opening action is assigned priority and the actuator receives an open and a close command simultaneously, the actuator will open. See section 11.1 for making single contact commands.

Select **change** in the MENU and turn to **OK** to confirm.

Select **commands** in the CHANGE menu and turn to **OK** to confirm.

Select **priority** in the COMMANDS menu and turn to **OK** to confirm.

Select (open), (close) or (open and close) and turn to **OK** to confirm.

11.7 ESD in degraded mode

Protection devices are active in the standard configuration and therefore halt the operation of the actuator if a fault occurs.

Some protection devices can be bypassed to ensure fault-tolerant operation if an emergency command is given (see description of auxiliary commands 1 or 2).

Select **change** in the MENU and turn to **OK** to confirm.

Select **commands** in the CHANGE menu and turn to **OK** to confirm.

Select fault tolerance ESD in the COMMANDS menu and turn to **OK** to confirm.

Several options can be selected.

When an option is selected, the brackets are removed and

FAULT TOLERAN. ESD
return
(no thermal overload)
(100% torque)
return



Caution: thermal overload protection must never be overridden in the explosion-proof version.

11.8 Partial stroke

It may be useful to operate motorised valves which are rarely used from time to time to ensure that they remain available for service.

INTELLI+ has the ability to test actuator functions when requested by the user. This test consists of rotating the valve a certain distance (e.g. 10% of full travel) and then returning it to the original position. The time taken to travel the distance is monitored and an alarm is activated if the specified time is exceeded.

The user gives this command using an auxiliary input on the actuator (see configuration information). The test runs automatically. Signals need to be configured on two relays:

- Partial stroke in progress
- Partial stroke fault

The following parameters can be specified by the user:

- open or closed start position (default: valve open). A "partial stroke" fault signal is activated if the start position is not as expected.
- % of stroke (default: 10%)

The "partial stroke" fault signal is cleared when the actuator position changes more than 2%.

Select **change** in the MENU and turn to **OK** to confirm.

Select **commands** in the CHANGE menu and turn to **OK** to confirm.

Select **partial stroke** in the COMMANDS menu and turn to **OK** to confirm.

Select **operation time** in the PARTIAL STROKE menu and turn to **OK** to confirm.

Check to ensure that the operation time shown corresponds to the total time for a full open or close action. Correct if necessary.

Select start position in the PARTIAL STROKE menu and turn to **OK** to confirm.

Select open or closed.

Select stroke in the PARTIAL STROKE menu and turn to **OK** to confirm.

Correct the partial stroke percentage value for the test, if necessary.

12. LOCAL INFRARED COMMUNICATION

The actuator has a 2-way read/write infrared interface for communicating with a Pocket PC or laptop computer.

The Pocket PC must have an infrared port and be running INTELLIPOCKET software. Contact us for information on Pocket PC interface compatibility. L. Bernard can also supply a rugged Pocket PC for site use: waterproof or explosion-proof versions are available. The device is supplied with the software pre-installed.

Use INTELLI KIT to communicate with a laptop computer. The kit includes an infrared module plus a CR-ROM with the INTELLISOFT software. The infrared module can be attached to the actuator display window to ensure easy communication, even if the window is not facing in the right direction. The infrared module is to be connected to the laptop's RS232 port.

A 2-metre cable is supplied (longer length available as an option).

The INTELLIPOCKET and INTELLISOFT software provides access to all INTELLI+ functions. Versions prior to version 2.0 need to be updated.

Preset configurations can be uploaded instantly and it is also possible to view the torque/position curve for the most recent movement.

See the software handbook for further details.

The infrared interface cannot be used if the actuator menu system is active.

The system must also be in local mode in order to perform CHANGE or SET UP functions (i.e. local / remote selector on local). In this case, the infrared interface has priority over the local controls.

Once communication is established, the Ir (infrared) symbol is shown on the actuator display.

13. SETTING AND VIEWING TORQUE VALUES

13.1 Closing type

The actuator closes on position in the standard configuration. The option to close on torque is normally selected in the SET UP menu, although this can also be done via the CHANGE menu:

Select **change** in the MENU and turn to **OK** to confirm.

Select **torque** in the CHANGE menu and turn to **OK** to confirm.

Select the **closing type** in the TORQUE menu and turn to **OK** to confirm.

Select **on (torque)** and turn to **OK** to confirm.

The (torque) o/c option is for opening **and** closing on torque.

13.2 Setting torque

The actuator is delivered with a torque limiting system set in accordance with the order. Check the following points if the torque limiter is activated during operation:

- valve stem is clean and properly lubricated,
- valve stem not seized in the stem nut,
- valve gland not too tight.

If the torque needs to be increased, first obtain the approval of the valve supplier and then proceed as follows:

Select **change** in the MENU and turn to **OK** to confirm.

Select **torque** in the CHANGE menu and turn to **OK** to confirm.

Select **torque setting** in the TORQUE menu and turn to **OK** to confirm.

Select the setting you want and turn to **OK** to confirm.

Use the blue selector to increase or decrease the value. The minimum setting is 40%.

Hold the selector in the up or down position to scroll through values faster.

To view settings without making changes, select check instead of change in the menu.

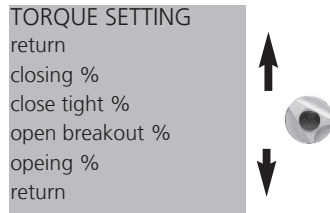
Description of torque limit system:

All torque values are expressed as percentages.

100% corresponds to the maximum setting for the actuator.

This value is shown in Nm on the actuator nameplate.

- **closing %** : limits torque during closing
- **close tight %** : this option is only displayed



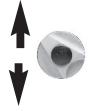
if closing is on torque limit. In this case, the torque applied on the valve seat may be not be the same as the torque limit during the closing movement.

- **open breakout %**: this option is only displayed if closing is on torque. In this case, the torque limit to unseat the valve may be different from - generally higher than - the torque limit during the opening movement.

If the setting is above 100% the display shows no limitation (equivalent to override on the torque limiter at the start of the opening movement).

- **opening %**: limits torque during opening movement.

CLOSING %
(100)



Note: Actuator settings must be made again after making changes to the tight torque setting (valves closing on torque)

Reminder: to save changes, exit menus by selecting return until the (change ok?) message is displayed

To view settings without making changes, select check instead of change in the menu.

13.3 Torque readings and comparison with original torque values

Maximum resistive torque values are measured for all motorised movements and can be viewed later.

Operating torque values for a movement can be stored in memory to allow comparison against torque values for the most recent motorised movement.

Select **change** in the MENU and turn to **OK** to confirm.

Select **torque** in the CHANGE menu and turn to **OK** to confirm.

Select **measured torque** in the TORQUE menu and turn to **OK** to confirm.

Select the **torque value** required and turn to **OK** to confirm.

The display shows the maximum torque value measured during the most recent motorised movement. (note: movements are not measured when settings are being made)

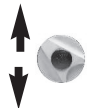
If the torque values for a previous motorised movement have been stored in memory, these values can be viewed in the next line for reference.

Example: in this example, the torque reading on the initial movement was 12% and the torque on the most recent movement is 18%. The two values can be compared to determine whether any preventive maintenance is required.

MEASURED TORQUE
return
closing %
closing tight %
open breakout %
opening %
save
torque display
return



CLOSING%
18
ref.12



Storing motorised movement torque values

To save torque values for a motorised movement, select **SAVE** in the menu and then select: **torque => ref (yes)**.

Reference torque readings take the torque values for the most recent motorised movement. If an error occurs, select: **torque => ref (no)** to restore the existing reference torque values.

Values are only stored in memory when the user exits the CHANGE menu confirms (change ok?)

SAVE
torque => ref (no)
torque => ref (yes)

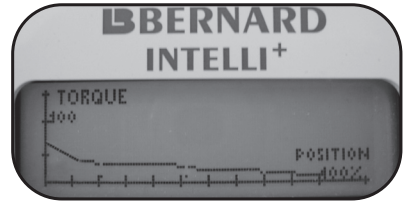


Displaying the position / torque curve for the most recent motorised movement

Select **torque** curve in the torque menu and turn to **OK** to confirm.

Select **open or close movement** and then turn to **OK** to confirm.

The curve is shown on the display screen with position from 0 to 100% and torque from 0 to 100% (100% is the maximum torque value on the actuator nameplate)



14. CUSTOMISING STATUS AND CONTROL INDICATIONS

14.1 Local indication

The local display can be configured as follows:

Invert display: the display can be inverted (rotated 180 degrees). Select Change in the menu, then signaling, then local then invert display (yes).

Display torque: select this option to have the realtime torque value displayed on the actuator display at the same time as the position. Select Change in the menu, then signaling, then local then display torque (yes).

Indicator light colours: in the standard configuration, the red light indicates that the valve is closed and the green light means it is open. The assigned colours can be changes so that the red light indicates that the valve is open and the green one means it is closed.

Select **change** in the menu, then **signaling**, then local then **lights**: Red=(open)

To keep the valve open and valve closed labels in the correct position on the indicator, you must also open the cover with the window and turn round the display indicator plate.

LOC INDICATION
return
opposite display
torque display
lights
return



Torque 60%



14.2 Remote indications

Signals giving actuator status data are transmitted via bistable relays. Each relay can be configured applying a list of available options.

INTELLI+ has four bistable relays in the standard configuration. A further three bistable relays can be added as an option (the contact is open when there is no power).

The equipment is configured at the factory in accordance with the order.

Changes can be made as follows:

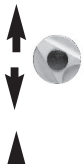
Select **change** in the MENU and turn to **OK** to confirm.

Select **signaling** in the CHANGE menu and turn to **OK** to confirm.

REMOTE INDICATION
return
relay 1
relay 2
relay ...



RELAY 1
(closed contact)
(open contact)



RELAY 1
return
*valve open
(closed valve)
(torque limit open)
(...)



Select **remote** in the SIGNALING menu and turn to **OK** to confirm.
 Select the **relay** in the SIGNALING menu and turn to **OK** to confirm.
 Choose **contact type** (i.e. activated contact status) and turn to **OK** to confirm.

Choose function or functions required:

Several options can be selected for a single relay.
 When an option is selected, the brackets are removed and an asterisk * is displayed in front of the selected item. Turn to OK again to cancel selection.

Liste		Details
*valve open		confirms valve open
(valve closed)		confirms valve closed
(torque limiter on opening)		torque limiter active on opening
(torque limiter on closing)		torque limiter active on closing
		(indicates torque limiter action even if the valve is normally closed on torque limiter)
(from x% to y%)	(1)	intermediate travel indication
(selector on local)		selector status
(selector on remote)		selector status
(selector on off)		selector status
(running)	(2)	actuator in running
(opening)	(2)	actuator performing opening action
(closing)	(2)	actuator performing closing action
(emergency command)		actuator has received an emergency command
(stop mid-travel)		actuator is halted (neither open nor closed)
(power on)		actuator powered normally
(thermal overload)		motor thermal relay tripped
(jammed valve)		movement could not be completed due to excessive torque
(lost phase)		phase missing on 3-phase supply
(lost signal)		4-20 mA signal lost (if positioner option active)
(handwheel action)		handwheel has been used since last motorised movement
(bus command)	(3)	if fieldbus option installed, this relay is assigned to an external command.
(battery low)		f battery option used, the battery needs to be changed
(p.t. in progress)		A "partial stroke" test is in progress.
(p.t. fault)		A partial stroke operating error has occurred following start of partial travel test, or it has not been possible to perform test as the valve was not in the expected position.

Some of the selections have further options, see next page.

(1) (from x% to y%)

Specify contact action range after turning to **OK** to confirm:

Select x% and turn to **OK** to confirm.

Use the blue selector to increase or decrease the value.

Select y% and turn to **OK** to confirm.

Use the blue selector to increase or decrease the value.

Turn to **OK** to confirm.

FROM X% AND Y%
return
x%
y%
return



X%
(0)



Y%
(100)



RUNNING
hold signal
blinked



(2) (running) (opening) (closing)

Turn to **OK** to confirm and then specify whether status to be steady or flashing indication. Turn to **OK** to confirm.

(3) (bus command)

This function is only applicable if the fieldbus option is active. In this case, this relay can be used to control a device located outside the actuator, with commands transmitted from the control room via the fieldbus and then forwarded via the actuator (refer to documentation relating to bus).

15. CUSTOMISING FAULT RELAY

Fault signals are sent via a changeover relay which is normally energised and returns to the break position if power is lost or if the actuator is unavailable.

This relay can be configured applying a list of options.

The equipment is configured at the factory in accordance with the order. Changes can be made as follows:

Select **change** in the MENU and turn to **OK** to confirm

Select **signaling** in the CHANGE menu and turn to **OK** to confirm.

Select **remote** in the SIGNALING menu and turn to **OK** to confirm.

Select **fault relay** in the SIGNALING menu and turn to **OK** to confirm.

DEFAULT RELAY
return
power off
fuse
thermal overload
...



Including additional faults

Included faults which cannot be altered are shown without brackets. Options are in brackets and selections are shown with an asterisk *.

Turn to **OK** again to cancel selection.

List

power off
fuse
thermal overload
lost phase
motor blocked

Details

loss of power on control circuit
blown fuse
thermal relay tripped
phase missing on 3-phase supply
motor immobilised

List

(jammed valve)
* selector on local
* selector on off
(emergency command)
(command override)
(overtavel)
(lost signal)

Details

movement could not be completed due to excessive torque
local / remote selector on local
local / remote selector on off
actuator has received an emergency command
actuator has received command override
position overshoot >5% after motor cut off.
4-20 mA signal lost (if positioner option active)

16. TIMING MOVEMENT TRAVEL

INTELLI+ includes a timing module for reducing the actuator's operating speed (for example to protect a line against pressure surges).

The timing system applies a series of on / off commands to the motor when an open or close command is transmitted. The time spent operating the valve can be very long.

Times can be adjusted in situ.

Settings for the opening and closing directions are separate.

It is also possible to apply timing to just a section of the stroke, with the remainder being completed at normal speed.

The user just has to specify the total time required for the movement and INTELLI+ calculates on and off times.

Select change in the MENU and turn to OK to confirm .

Select timer in the CHANGE menu and turn to OK to confirm.

Select operating time and turn to OK to confirm.

Indicate time to perform movement at normal actuator speed.

Use the blue selector to increase or decrease the value. Hold the selector in the up or down position to scroll through values faster. Turn to **OK** to confirm.

Select **timer open time** and turn to **OK** to confirm.

Indicate the total time in which you want to open the valve and turn to OK to confirm.

Select **timer close time** and turn to **OK** to confirm.

Indicate the total time in which you want to close the valve and turn to OK to confirm.

To cancel the time function: check to ensure timer opening and closure times are not greater than travel time.

To apply timing to one part of travel only:

select temporised zone and turn to OK to confirm.

To start opening timer from a specific position,

select **open: start** % and turn to **OK** to confirm.

Use the blue selector to increase or decrease the value until you obtain the required position between 0 and 100% and then turn to OK to confirm.

TIMER
return
operating time
timer open time
timer close time
temporized zone
return



OPERATING TIME
(0)



TIMER OPEN TIME
(0)



Do the same for the other values to establish a timercontrolled opening zone and a timer-controlled closing zone.

TEMPORIZED ZONE
return
open : start %
open : end %
close : start %
close : end %
return

OPEN : START %
(0)



Check default values when applying timer to entire stroke:

open: start % (0) close: start % (100)
open: end % (100) close: end % (0)

17. VIEWING ACTUATOR HISTORY

17.1 Activity

Select **change** in the MENU and turn to **OK** to confirm.

Select **activity** in the CHANGE menu and turn to **OK** to confirm.

Select **number of starts or running time** to view total figures since the actuator was manufactured.

The system also includes a separate counter which can be reset by the user.

Select **total** to view total number of starts.

ACTIVITY
return
number of starts
running time
starts last 12h
handwheel action
return

NUMBER OF STARTS
total
partial
reset partial



To reset the partial counter, select reset partial and then choose yes or no (this option is only displayed when the user is in the change menu).

starts / 12 hour: this data relates to the number of times the actuator has started during the previous 12 hours and tells the user about recent service. This is particularly useful when trying to establish whether the actuator has been subjected to excessive use when performing modulating actions.

handwheel action: indicates whether the handwheel has been used since the last time a motorised movement was made. (changes are only registered if they exceed 10% of travel).

17.2 Alarms

Alarms are used to pinpoint the source of malfunctions. They are not permanent and are deactivated when the fault is cleared. A blinking black square is shown on the screen to indicate that an alarm has been activated. To read alarms: Select check in the MENU and turn to OK to confirm .

Select **alarms** in the menu CHECK menu and turn to **OK** to confirm.
Use the right-hand selector to scroll through any active alarms.

Liste of alarms

locked motor open
locked motor close
torque sensor
position sensor
direc of rot open
direc of rot close
overtravel
config. memory
activity memory
base memory
excess starts

lost phase
lost signal
thermal overload
pumping
24V auxiliary
battery low
no alarm

Details

Motor immobilised in open direction
Motor immobilised in close direction
Torque sensor fault
Position sensor fault
Opening direction of rotation anomaly
Closing direction of rotation anomaly
Position overshoot >5% after motor cut off
Stored configuration data error
Stored activity data fault
Base memory fault
Start-up rate exceeds average for class of actuator.
See criteria for class in section 17
This alarms never causes the actuator to stop operating.
Phase missing on 3-phase supply
4-20 mA signal lost (if positioner option active)
Motor thermal switch tripped
Actuator hunting action detected
Auxiliary power supply fault for external circuits (terminals 6-7)
If battery option used, the battery needs to be changed.

18. ACCESSING DATA SHEET

Select **change** in the MENU and turn to **OK** to confirm.

Select **data sheet** in the CHANGE menu and turn to OK to confirm.

valve tag number

Select valve tag number to read or write valve ID.

Use the blue selector to change the first character and turn to OK to confirm.

Change remaining characters using the same method. Turn to OK when all of the characters have been entered and continue until the menu is displayed again.

actuator number: this is the actuator's serial number. This information is entered at the factory and is only shown in the CHECK menu.

entry code: for entering or changing a password, see below: "Creating or changing passwords".

characteristics: parameter settings for correct operation of the actuator (see details next page).

To check settings without making changes, select check instead of change in the menu.

DATA SHEET
return
valve tag number
actuator number
entry code
operating class
manufacture date
characteristics
software version
return

VALVE TAG NUMBER
MOV55VV



The following data is only shown in the CHECK menu.

operating class: indicates whether the actuator is designed for on/off operation, class III control or class II control functions. This item can be used to activate an alarm if the number of starts is excessive (excess. starts alarm).

The number is the counted over the previous 12-hour period. Limits are as follows:

On / Off: 360 starts in previous 12 hours

Class III: 1,200 starts in previous 12 hours

Class II: 21,600 starts in previous 12 hours

This alarms never causes the actuator to stop operating.

manufacture date: gives date product shipped from factory

software version: installed software release

Characteristics menu details

motor : this data indicates whether the motor has a 3-phase, single phase or DC power supply (data from manufacturer)

protection: waterproof or explosion-proof version. The explosion-proof version prevents overriding the thermal relay in the degraded mode/commands menu.

locked motor/s: Indicates the time the motor left energised when immobilised before power cut off. Default: 10 seconds (manufacturer's data)

reverse delay/ms: Indicates time actuator halted following change in direction of rotation. Default: 200 ms (manufacturer's data).

ratio position system: indication of gear stepdown ratio between output shaft and position sensor for displaying stroke in number of revolutions (or in degrees for fractions of a revolution) (manufacturer's data).

external gear ratio 1/: indication of gear stepdown ratio for an additional gear. For example, for a quarter-turn gear with a ratio of 1:120, enter 120.

Travel will then be indicated in degrees.

thread in mm: Indication of pitch of a linear system to allow travel to be displayed in mm, rather than in number of revolutions

stroke: Indication of stroke value measured when adjusting valve.

CHARACTERISTICS

return
motor
locked motor/s
reverse delay/ms
ratio position system
ext gear ratio 1/
thread mm
stroke
return



19. CREATING OR CHANGING PASSWORD

Select **change** in the MENU turn to **OK** to confirm.

Select **data sheet** in the CHANGE menu and turn to **OK** to confirm.

Select **entry code** in the DATA SHEET menu and turn to **OK** to confirm.

Enter **1st digit** with the blue button, then turn to **OK** to confirm.

Enter **2nd digit** with the blue button, then turn to **OK** to confirm.

Enter **3rd digit** with the blue button, then turn to **OK** to confirm.

The new code will not be taken into account until the user exits the change menu and confirms the change (change ok?)

Make sure you can remember this code to access the change menu again.

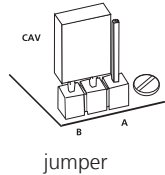
ENTRY CODE
(000)



If you forget your code

Switch off power to the system unit and open the control unity to access the INTELLI+ board (supporting the display)
Move the jumper on the board from position A to position B, then turn the power back on. The password has now been reset to zero.
Place the jumper back in its original position (A).

If you leave the jumper in position B, you will still be able to enter a new password, but it will be reset to zero the next time you switch the unit on.



20. USING ANALOGUE POSITION SIGNAL (DEPENDING ON MODEL)

On some models, the actuator can use an analogue signal to transmit its percentage position (0 - 100%) to a remote device.

The output signals are automatically calibrated on the actuator's stroke (0 - 100%) and so the transmitted position signal does not need any adjustment.

The transmitted signals are totally isolated from the INTELLI+ circuits.

Use a rectified, filtered or stabilised 12 - 32V DC power supply for this position signal.
It is also possible to use the internal 24V power supply on terminals 6(-) and 7(+).

Max. permissible loading is shown on the table.

The following signals can be used:

4-20 mA, 0-20 mA, 4-12 mA or 12-20 mA.

4-20 mA, 4-12 mA or 12-20 mA outputs can be connected with two wires, with the external power supply in series with the signal reading.

(see actuator circuit diagram)

The 0-20 mA output can be used to obtain a 0-10V signal using an external 500 ohm (or 499 ohm 1%) resistor.

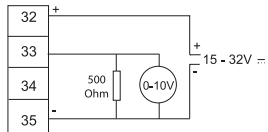
The power supply voltage will be 15 to 32V.

Power supply (volts)	Max. permissible load (ohms)
12	150
24	750
30	1050

To select the signals' direction of variation and type

Select **change** in the MENU and turn to **OK** to confirm.

Select **position** in the CHANGE menu and turn to **OK** to confirm.



0-10V position remote signal

Select **opt. posit. signal** in the POSITION menu and turn to **OK** to confirm.
 Choose signal's direction of variation and turn to OK to confirm.
 Select **signal type** and turn to **OK** to confirm.

OPT POSIT SIGNAL

signal ↗ opening

signal ↘ opening

SIGNAL ↗ OPENING

(4-20 mA)

(0-20 mA) / (0-10V)

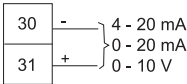
(4-12 mA)

(12-20 mA)

21. USE AS A POSITIONER WITH AN ANALOGUE CONTROL SIGNAL (DEPENDING ON MODEL)

21.1 Input signal

On some models, the actuator can operate as a positioner using a proportional command, such as a 4-20 mA analogue signal. The input signal is automatically calibrated on the actuator's stroke (0 - 100%) and so there is no need to adjust the actuator's operating range. The input signal is isolated from the on/off commands and from the remote position signal. The actuator can still be operated in on/off mode with the open, close and stop commands or using proportional control. One of the auxiliary commands must be used to select between these two control modes. In the standard configuration, auxiliary command is set for AUTO / ON-OFF to allow the control mode to be selected remotely: AUTO = proportional control (analogue) or ON-OFF= on/off control. See section 11.2 for configuration details and information on using this command.



Signal	Input impedance (Ohms)
4-20 mA	160
0-20mA	160
4-12mA	160
12-20mA	160
0-10V	11000

Control signal

4-20 mA, 0-20 mA, 4-12 mA, 12-20 mA or 0-10 V
 To select the signals' direction of variation and type:
 Select **change** in the MENU and turn to **OK** to confirm.
 Select **positioner** in the CHANGE menu and turn to **OK** to confirm.
 Select **signal type** in the POSITIONER menu and turn to **OK** to confirm.
 Choose **signal's direction** of variation and turn to **OK** to confirm.
 Choose signal type and turn to OK to confirm.

SIGNAL RANGE

signal ↗ opening

signal ↘ opening

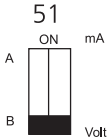
SIGNAL ↗ OPENING

(4-20 mA)

(0-20 mA) / (0-10V)

(4-12 mA)

(12-20 mA)



With 0-10 V signals, two contacts are also switched to OFF. The contacts are located on the INTELLI+ board (supporting the display) inside the control unit.

21.2 Dead band adjustment

The deadband value is the maximum allowable difference between the signal and the actuator position when no action occurs.

This setting is made at the factory, but it is possible to adjust it.

If the deadband is too narrow, the actuator could start hunting, i.e opening and closing around the expected position without being able to stabilise. If the deadband is too wide, positioning actions are less precise.

The default deadband setting is 1%.

Select **dead band** % in the POSITIONER menu and turn to **OK** to confirm.

Use the blue selector to increase or decrease the value. Turn to **OK** to confirm.

21.3 Fail-safe position

When a 4-20 mA input signal is used, it is possible to set up a fail-safe position for use if the control signal is lost. Caution: this function cannot be used with 0-20 mA signals, as the system cannot distinguish between a lost signal and a 0 mA value.

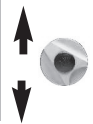
This function is active in the standard configuration, and the actuator remains in position if the signal is lost.

The user can also choose open or close.

Select **lost signal** in the POSITIONER menu and turn to **OK** to confirm.

Select the action required and turn to **OK** to confirm.

LOST SIGNAL
(closing
(stayput)
(opening)



21.4 Proportional pulse mode

INTELLI+ incorporates a positioning mode which takes account of the actuator's inertia. If the movement time is too short or if the motor has excessive inertia, positioning can be improved by selecting proportional pulse mode. INTELLI+ calculates and corrects the motor's stopping point to reach the expected position and then applies pulses proportional to any deviation if necessary.

This mode is used for relatively stable control actions where partial compensation can be made the actuator's inertia. The actuator is cycled more often than with a standard command.

Select **proportional pulse** in the POSITIONER menu and turn to OK to confirm.

Select **(no)** or **(yes)** and turn to OK to confirm.

22. USING FIELDBUS CONTROL (DEPENDING ON MODEL)

The fieldbus interface is used for sending commands and data over a single line. Specific documentation details methods for addressing individual actuator and provides a list of addresses for accessing all commands or data sources.

The type of interface is shown in the menu.

Lost communication can be used to configure the fail-safe position. This function is active in the standard configuration, and the actuator remains in position if communication is lost.

The user can also choose open or close.

Select **change** in the MENU and turn to OK to confirm
Select **bus** in the CHANGE menu and turn to OK to confirm.

Select **lost communication** in the BUS menu and turn to OK to confirm.

Select the action required and turn to OK to confirm.

Bus control: Bus control is normally selected. For equipment which also uses a standard hard-wired system, this configuration allows the user to choose the command mode: either via bus or hard-wired (see sections 4.1 and 4.2)

Slave no. Actuator address. All actuators have to have different addresses.

The default address is 2.

Refer to specific documentation for further details on fieldbus communication.

PROFIBUS
return
lost communication
Cmd by fieldbus
slave number
return

LOST COMMUNIC
(closing)
(stayput)
(opening)



23. USING IN CASE OF POWER SUPPLY LOST (WITH BATTERY DEPENDING ON MODEL)

Depending on the actuator model, the battery option allows to display the position when the power supply is off. When the power supply is off, the actuator goes into standby mode with very low power consumption. Regular tests allow to check the valve position, if the position changed the relays are updated.

- In case of actuator with position feedback the position is updated.

- In cas of fieldbus communication, the fieldbus board is supplied (5sec) to allow the PLC bus controller to read the new position.

When the power supply is off the display can be read but it cannot possible to navigate into the menu.

To wake up the system and illuminate the display, you must act on the command button blue as to give an order to close. The "low battery" information can be read at any time on the display or by remote signalling. The display will be shut down after 30 secondes without activity.

- Battery estimated life time in the actuators:

1/3 of time in storage or without power supply (Includes display of 20 sec / day during this period)

2/3 of time with power supply

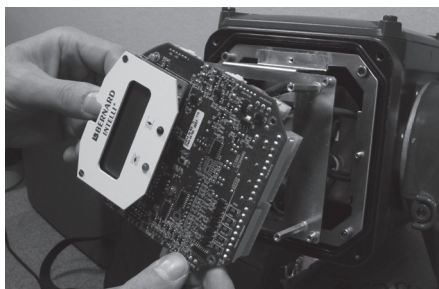
- Temperature: 40°C (For different temperatures (above or below) the life expectancy may be reduced)

- Battery life time: 10 years.

Note: even without the battery the actuator operates without risk of loss or configuration of its position

24. CHANGING THE DIRECTION OF THE DISPLAY

In case of weatherproof version, the display and the buttons can be rotated each 90°. Remove the cover of the display (4 screws) and or move the board in the desired position. Replace the cover in order to put the buttons under the display



25. USING IN SEPARATED BOX

INTELLI+ can be provided in separated box to be removed from the actuator up to 50 meters. L.BERNARD provides weather proof boxes with two weather proof connection boxes: one to be used by the customer, the other to be used to connect INTELLI+ to the actuator.

Explosion proof version is also available.

To plan a power wire and a control wire between the actuator and the box.

The control wire must be armoured. Check the wiring before powering up.

The commissioning is the same as the integrated INTELLI+.

26. FUSE PROTECTION

The INTELLI+ power supply system includes a transformer and a number of fuses.

Primary: 6.3x32 mm - 0.5 A - quick-action fuse (located on the transformer).

Secondary: Internal circuits protected by automatic cut-out (no user action needed)
24V auxiliary power supply on terminal protected by automatic cut-out (no user action needed)

27. MAINTENANCE

ST actuators have life-long lubrication and there need no specific maintenance.

However, the condition of the stem and the stem nut should be checked periodically to ensure that they are clean and properly lubricated.

We recommend establishing a regular programme of test movements on motor drive units which are rarely used.

In the case of the actuator with the battery option

Depending on the actuator configuration, a "Low Battery" message appears on the display or remotely when the battery is too low.

For the explosion proof versions, you must replace the batteries by this type of battery: 2 batteries OMNICEL ER14505HD Lithium Thionyl Chloride (Li-SOCl₂) type.
For the non-explosion proof versions, you should replace the batteries by the battery type shown above or choose an other type with this requirement: AA, 2.2Ah, 3.6V, 400mA, -40°/+85°C.

28. TROUBLESHOOTING

28.1 INTELLI+

If there is any doubt about the operation of the system, first set the local / remote selector in the local position and then operate the open and close controls.

PROBLEM	CAUSE	REMEDY
The display is off	Actuator power supply	Check power supply voltage (terminals L1, L2 and L3 for 3-phase supply). The voltage value is shown on the nameplate.
	Blown fuse	Check fuse and replace if required (the fuse is fitted on the transformer).

PROBLEM	CAUSE	REMEDY
No response	Display in menu mode Set local / remote selector to off and	Set local / remote selector to off and then on local to change to command mode (display: %position)
	IR link active	Commands cannot be made using the selectors if an IR link is active (IR symbol on the display). Turn off the infrared link.
	Motor thermal switch trip	A black square is shown at the bottom centre of the display to indicate that an alarm has been activated. Go to menu / check / alarms to see whether a motor overheating alarm is present. The actuator will be available again when the motor has cooled down
No response and the key or ESD symbol is displayed	Local command override or ESD command active	Check Aux. command 1 or 2 options in the command menu to see whether a command override or emergency command has been set up and check the status (open/closed) of the contact used to perform this remote command. Then check the connection on the client terminal to see whether it corresponds to a command override or emergency command. For example, if the configuration setting is on aux. command 1, loc cmd inhibit and contact (o)= inhibit, a remote contact will have to be established on terminal 11 to cancel the override.
The actuator operates in local mode, but not in remote.	Local / remote selector on local or off (stop)	Switch the local / remote selector to the remote position
	Dry contact control: no voltage between terminals 6 and 7	Ensure there is a jumper between terminals 5 and 6 on the client terminal strip. Check whether a "24V auxiliary" alarm is present
	Voltage control: voltage not adapted to input	Check voltage control connections: 10 - 55 volts: terminal 5 55 to 250 volts: terminal 4

PROBLEM	CAUSE	REMEDY
The actuator operates in remote mode, but not in local	Local / remote selector on remote or off (stop)	Switch the local / remote selector to the local position.
	Local command override active (key symbol displayed) or local /remote selection performed remotely	Check Aux. command 1 or 2 options in the command menu to see whether a command override has been set up and check the status (open/closed) of the contact used to perform this remote command. Then check the connection on the client terminal to see whether it corresponds to a command override. For example, if the configuration setting is on aux. command 1, loc cmd inhibit and contact (o)= inhibit, a remote contact will have to be established on terminal 11 to cancel the override.
The actuator rotates in the wrong direction	Incorrect configuration	Check closing direction in the position sub-menu under change to determine whether closing action clockwise or anti-clockwise.
	Motor wiring changed and motor rotates in reverse direction (when motor replaced)	Comply with wiring tags when changing the motor. If in doubt, check motor rotates the right way. The motor's direction of rotation can be reversed by changing over wires 2 and 3 on the motor terminal strip inside the control box.
Menu cannot be accessed	Selector on remote or off, or local command override active	The menu can only be accessed via the selectors in local mode, i.e. with the selector on local and no override on local control. Set the selector on local and carry out checks on aux. commands 1 & 2 indicated above.
Menu settings cannot be changed	Changes cannot be made in the check menu	Go to the change menu. Some settings are view-only.
Changes made not applied.	No modifications made during change process. Changes have to be confirmed before they are saved	After making changes, run back through the menus using return and OK until the display shows: (change ok?) Turn to OK to confirm and save the changes made
Actuator jerky operation during movement	Timing function settings made	The user sets this option in the timer menu to increase the actuator's movement time.

PROBLEM	CAUSE	REMEDY
Handwheel action not detected	Handwheel action detected since last motorized movement provided actuator remains switched on. The system only reports movements exceeding 10% of travel	Repeat detection under correct conditions.
Excess starts alarm displayed	NTELLI+ monitors the number of starts performed during the previous 12 hours and checks this number against the actuator's operating class.	This alarm does not restrict operation of the actuator. It just indicates that the actuator is being used intensively. The alarm will cleared when the number of starts returns to the intended frequency for the system concerned.

28.2 POSITIONER OPTION

Below are a few additions applicable to the control version by positioner analog signal.

PROBLEM	CAUSE	REMEDY
The actuator operates in local open / close mode, but not in positioner mode	Local / remote selector set to local or off	Switch local / remote selector to remote position to use the positioner.
	An Auto / On-Off command is active and prevents use of positioner	Check Aux. command 1 or 2 options in the command menu to see whether a command override or emergency command has been set up and check the status (open/closed) of the contact used to perform this remote command. Then check the connection on the client terminal to see whether it corresponds to an On/Off command. For example, if the configuration setting is on aux. command 1, (auto / on-off) and contact (c)=auto, a remote contact will have to be established on terminal 11 to change to auto command mode.
The actuator operates in local open / close mode, but not in positioner mode	Input signal not set up correctly	Check input signal configuration in the menu and check position off switches on the positioner board (see section 21.1)
The actuator operates as a positioner in local mode, but not in remote mode	Local / remote selector set to local	Turn the selector to remote
	Input signal fault	Check the setpoint signal with a milliammeter connected in series
	Incorrect signal polarity	Ensure the signal positive (+) goes to terminal 30

29. STORAGE

Introduction

An actuator consists of electrical components plus mechanical parts which have life-long lubrication. Although the assembly is contained in a waterproof housing, the actuators may suffer from oxidation, become clogged or seize during commissioning if it has not been stored correctly.

Storage

Actuators must be stored under cover in a clean, dry place which is protected against variations in temperature.

Avoid storing directly on the ground. If stored in areas subject to damp, apply power to the actuator to dry it out electrically. Check to ensure that the cable entries are sealed. Ensure electrical component covers and compartments are properly sealed.

Inspection following storage

1. If stored for less than one year:

- Visual inspection of electrical parts.
- Operate buttons, selectors, etc. manually to ensure that they can be used without difficulty.
- Perform a few movements manually.
- Check consistency of grease.
- Commission the actuator.

2. If stored for more than one year:

- Long-term storage causes the consistency of the grease to change. Thinly applied grease on shafts or spindles dries out. The mechanical part of the actuator therefore needs to be stripped and then reassembled using fresh grease.
- Visual inspection of electrical parts.
- Operate buttons, selectors, etc. manually to ensure that they can be used without difficulty.

Commission the actuator.

北京伯纳德控制设备有限公司

地址：北京经济技术开发区经海四路15号利达兴工业园A2-1

邮编：100023

电话：+86 10 67892861 传真：+86 10 67892961

网址：<http://www.bernard-actuators.cn>

邮箱：bbce@bernard-actuators.cn