

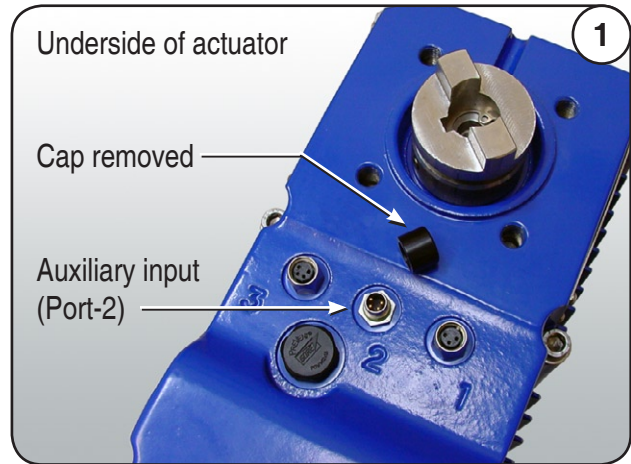
## Introduction

This document describes the installation, commissioning and operation of an auxiliary input signal to the Emech G1 electronic actuator.

For auxiliary signal applications Emech will supply a length of cable with a female M8 connector. The connector will fit the M8 male plug found on the underside of the actuator labelled "2" (see Figure 1).

The loose end of the cable can be wired to a binary switching device such as a flow switch, flow sensor, level switch, manual switch or used with a PLC.

Switching will enable various features of the Emech G1 actuator such as BIGAIN, STANDBY, HOLD, and INVERSE ACTUATOR OPERATION. These features are outlined on page 3 (and Tables 1 to 3 on page 4).



## The G1 Actuator Auxiliary Input (Port-2)

The port-2 input is set to receive a signal from a binary switch, usually a flow switch, or a flow sensor such as a paddle wheel flow meter output.

The Auxiliary input is a 4 pole M8 male connector that accepts a 5-24V configurable active low or high signal to indicate when there is flow.

The 24V output can be used to power the auxiliary port if required. The current draw **MUST NOT EXCEED 100mA**.

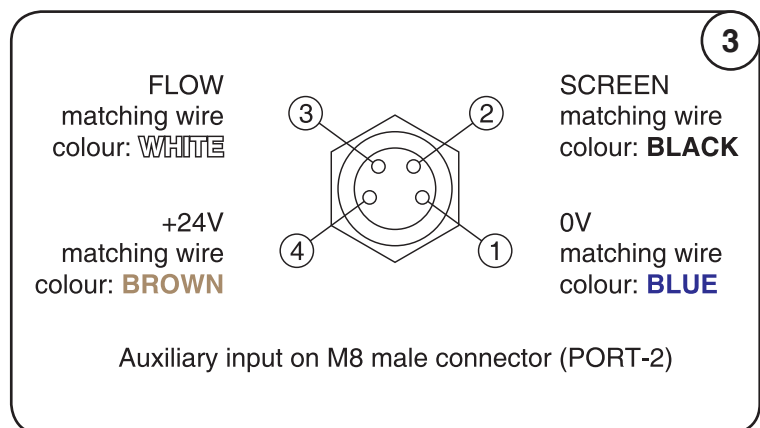
This input can be used in conjunction with the G1 actuator's automatic gain switching feature to allow the actuator to respond appropriately in applications where flow is variable or intermittent.



Image 3 represents the actuator mounted male plug (Port-2) found on the underside of the actuator (see image 1).

The colours indicated in image 3 are the wire colours of the matching cable and connector auxiliary input cable (image 2).

The switching device should be placed between Pin 1 '0V' BLUE and Pin 3 'FLOW' WHITE.



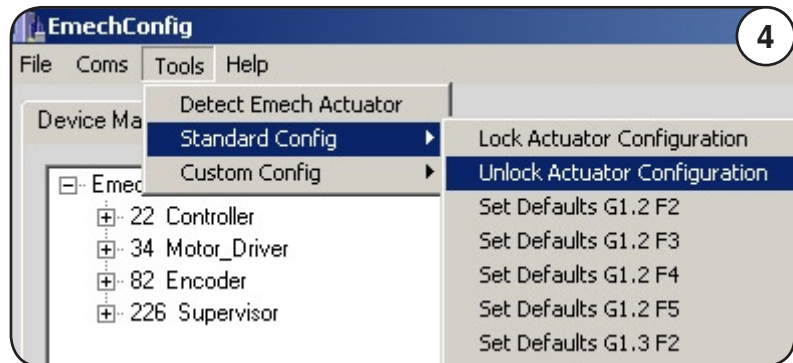
## EmechConfig Software Settings

The auxiliary input functions are configurable through the EmechConfig software supplied with the actuator or available from the Emech web site home page. NOTE: EmechConfigv1.48 or above is required.

To begin custom configuration of the actuator, power on the unit and connect a PC to the actuator via the supplied serial cable. NOTE: Section 5 of the G1 Actuator instruction manual outlines the use of the software.

The latest revision of the config software differs to previous such that upon startup the actuator configuration is locked and an error will occur if an attempt is made to change the parameter values.

Before any changes can be made to the parameters first the actuator must be unlocked, this is achieved by selecting “Unlock Actuator Configuration” from the “Tools > Standard Config” tab (see Figure 4).

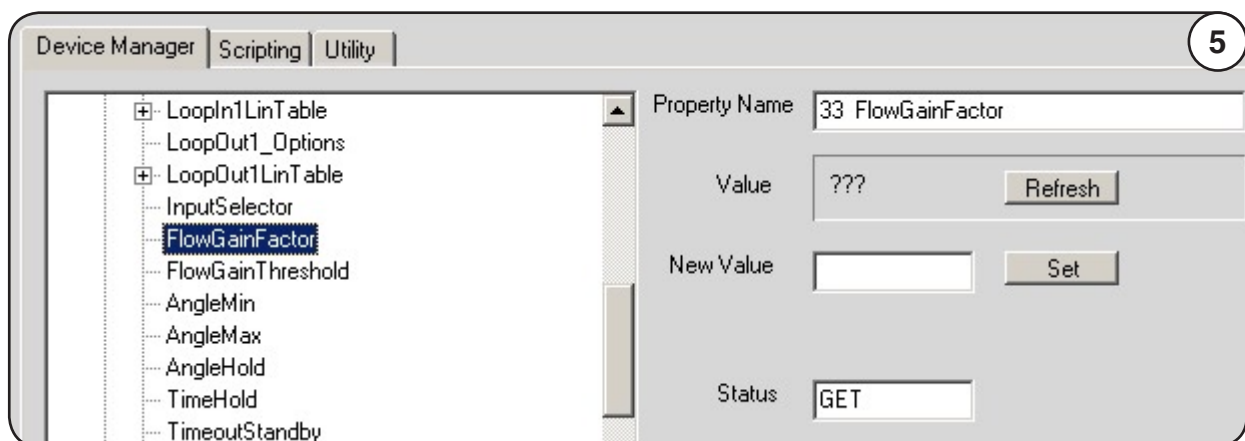


NOTE: when “Set Defaults GX.X FX” is selected the actuator will unlock, configure to standard settings and then lock the configuration when complete.

Clicking on a property from the Device Manager will cause EmechConfig to attempt to read the value of the property from the actuator’s memory. If the read is successful, the value will be displayed in the ‘Value’ box. If the read fails, then ‘???’ will be displayed indicating that the value is not known. To retry, just click on the Property name again, or click on the ‘Refresh’ button.

To enter a new value click inside the New Value text box, enter a value and press the Set button (see Figure 5 for example). Refer to Tables 1 to 3 on page 4 for properties and their corresponding values for various applications.

When the custom configuration is complete lock the configuration by selecting “Lock Actuator Configuration” from the “Tools > Standard Config” tab.



## Uses for Auxiliary Input Signal and Actuator Response

- BiGain Control:** Two control gain settings: useful for normal control and an “other” condition were normal gains do not provide stable flow, especially for conditions around the minimum controllable flow rates for Emech control valves.
- StandBy:** StandBy pauses the response of the actuator after receiving the enable auxiliary signal. The actuator will remain in the paused position until...  
 (Refer Figure 6 below)  
 i) The signal is disabled, in which case the actuator will resume control.  
 ii) The pause time expires (StandByTimeout) then the actuator will move to a “Angle Standby” flow position.
- Hold:** The actuator will stay indefinitely in the StandBy position until...  
 (Refer Figure 6 below)  
 i) The signal is disabled: then the actuator will go to the HOLD position and either timeout (TimeHold) and return to normal control, OR return to the StandBy position after receiving the enabled signal again.
- Inverse Actuator Control Action:** For normal operation the actuator opens counter clockwise from the closed position. Inverse operation implies a clockwise opening direction. This feature is only supported with Emech F4 mixing valves.

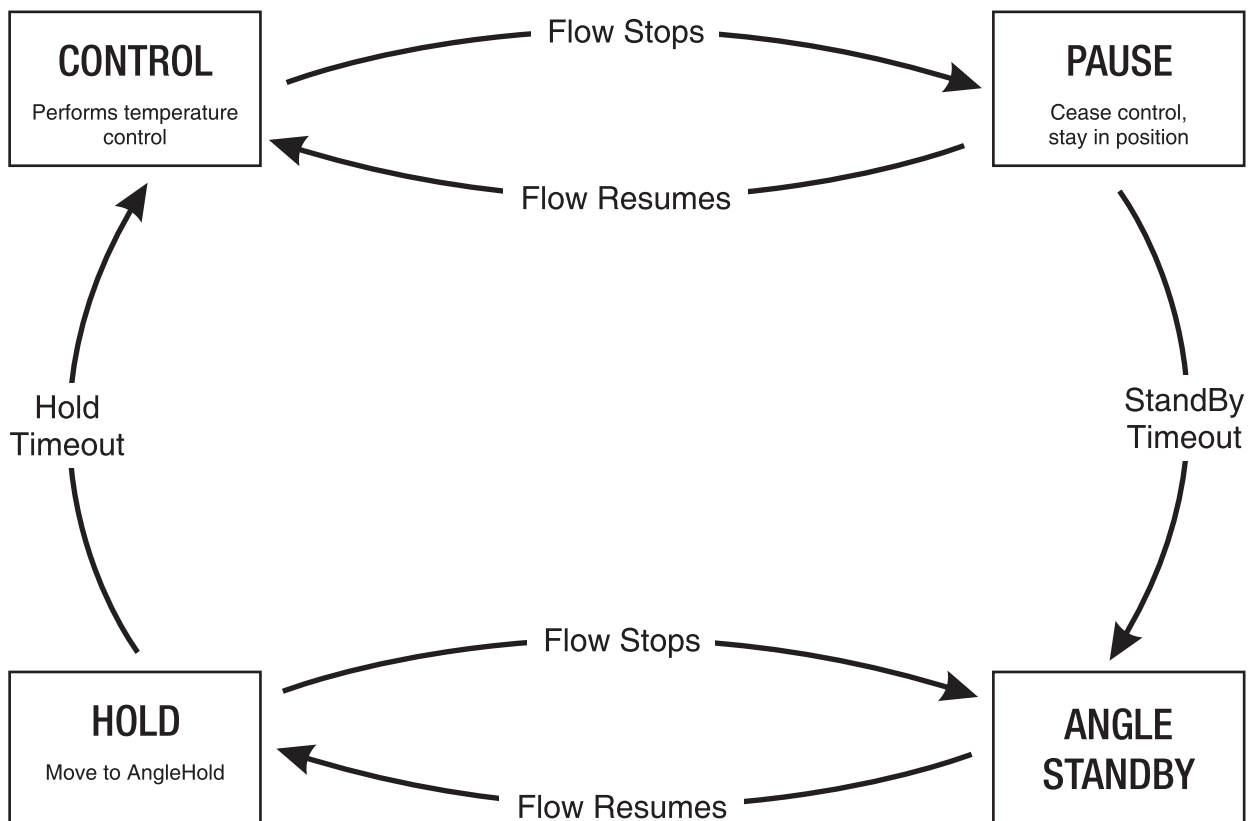


Figure 6: StandBy and Hold control cycle.

### Configuring the Actuator for an auxiliary Input Signal

NOTE: Only applies to G1's with Firmware  $\geq$  v116.

- FlowGainFactor:** This is a positive or negative integer value between “32767” and “1” used to scale the gain settings. A negative value will enable inverse actuator operation. 32767 to 1 can be thought of as a scale factor from 100% (default) to 0.1% of standard control gains. eg: a value of 3277 would REDUCE the gains by 90% (suitable for say a 90% reduction in flow conditions). When set to “0” it will enable the HOLD and STANDBY features of the actuator.
- FlowGainThreshold:** If set to “-1” will invert the auxiliary signal. “0” is default for standard non-inverted signal.
- TimeHold:** Time to hold before returning to control. 75 equates to 1 second. eg: 300 = Hold for 4 seconds. Max value 32767 (~ 7mins and 17seconds).
- TimeoutStandBy:** Time to pause before proceeding to StandBy. 75 equates to 1 second. Max value 32767 (~ 7mins and 17seconds).
- AngleHold:** The angle the actuator will travel to when in HOLD.  
 $VALUE = Angle / 360 \times 200 \times GB$   
 Note: GB is the Gear Box Ratio for the actuator: G1.2 = “74.1” & G1.3 = “61.8”.

Property Name	Default Value	Enable Value	Notes
FlowGainFactor	32767	Integer value between 32767 and 1.	Used as a scaling factor for control Gains. eg. 32767 = 1, 24575 = 0.75, 16384 = 0.5 8192 = 0.25 etc.
FlowGainThreshold	0	0 or -1	A negative value will invert the auxiliary signal.

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FlowGainFactor	32767	Integer value between 32767 and 1.	Used as a scaling factor for control Gains. eg. 32767 = 1, 24575 = 0.75, 16384 = 0.5 8192 = 0.25 etc.
FlowGainThreshold	0	0 or -1	A negative value will invert the auxiliary signal.
TimeHold	0	Integer value between 32767 and 1.	Use any integer value, 75 = 1 second.
TimeoutStandBy	0	Integer value between 32767 and 1.	Use any integer value, 75 = 1 second.
AngleHold	3705 for G1.2 3090 for G1.3	See note	VALUE = Angle / 360 x 200 x GB GB: G1.2 = 74.1, G1.3 = 61.8
AngleStandby	3705 for G1.2 3090 for G1.3	See note	VALUE = Angle / 360 x 200 x GB GB: G1.2 = 74.1, G1.3 = 61.8

Property Name	Default Value	Enable Value	Notes
FlowGainFactor	32767	-32767 Note: a negative value is required to inverse actuator operation.	Used as a scaling factor for control Gains. eg. 32767 = 1, 24575 = 0.75, 16384 = 0.5 8192 = 0.25 etc.
FlowGainThreshold	0	0 or -1	A negative value will invert the auxiliary signal.