

## FlexiBowl® 2.0: what changes

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## 1. Electrical Connections

FlexiBowl® 1.0	FlexiBowl® 2.0
<b>AC</b> Power supply 110-220Vac +/-5% Frequency 50/60 Hz Current 230 VAC (6 A)	<b>AC</b> Power supply 110-220Vac +/-5% Frequency 50/60 Hz Current 230 VAC (6 A)
<b>DC</b> power supply 24 VDC (-10%, +5%), 150 W (6 A) supplied by the user.	<b>DC</b> Generated internally
<b>ETHERNET</b> Cat5 cable with RJ45 connector Ethernet port 802.3	<b>ETHERNET</b> Cat5 cable with RJ45 connector Ethernet port 802.3
<b>Safety</b> Disconnect the 24vdc power supply to safely lock the FlexiBowl®	<b>Safety</b> Disconnect the 230 VAC power supply to safely lock the FlexiBowl®

## 2. Pneumatic Connections

FlexiBowl® 1.0	FlexiBowl® 2.0
<p><b>Air pressure:</b> 6 bar</p> <p><b>Air characteristics:</b></p> <ul style="list-style-type: none"> <li>•Filtered</li> <li>•Dried</li> </ul> <p><b>Pressure regulator</b></p> <div data-bbox="165 808 338 976" style="display: inline-block; vertical-align: top;">  </div> <p style="margin-left: 20px;">The force of the impulse is moderated through the compressed air regulator, located on the control panel.</p> <p><b>Pressure indicator:</b> none.</p>	<p><b>Air pressure:</b> 6 bar</p> <p><b>Air characteristics:</b></p> <ul style="list-style-type: none"> <li>•Filtered</li> <li>•Dried</li> </ul> <p><b>Pressure regulator</b></p> <div data-bbox="858 808 1031 976" style="display: inline-block; vertical-align: top;">  </div> <p style="margin-left: 20px;">The force of the impulse is moderated through the compressed air regulator, located on the control panel.</p> <p><b>Pressure indicator:</b> integrated in the control panel.</p> <div data-bbox="858 1077 995 1238" style="display: inline-block; vertical-align: top;">  </div>

### 3. Programming and Control

#### 3.1 Communication protocol

FlexiBowl® 1.0	FlexiBowl® 2.0
FlexiBowl® 1.0 can be managed and programmed in one of the following ways: <ul style="list-style-type: none"> <li>• Programming via UDP protocol.</li> <li>• Programming via digital I/O.</li> </ul>	FlexiBowl® 2.0 can be managed and programmed in one of the following ways: <ul style="list-style-type: none"> <li>• Programming via TCP/IP - UDP protocol.</li> <li>• Programming via digital I/O.</li> <li>• Programming via Ethernet/IP</li> </ul>

#### 3.2 Used communication port

FlexiBowl® 1.0	FlexiBowl® 2.0
The UDP port is 5001	The TCP/IP port is 7776 The UDP port is 7775

### 3.3 Programming and Handling via TCP/IP - UDP ethernet protocol

#### 3.3.1 Program structure

Each string sent to FlexiBowl® must be formatted in the following form:

FlexiBowl® 1.0		FlexiBowl® 2.0		
Body	Footer	Header	Body	Footer
Command (ASCII character vector)	chr(13)	chr(0)	chr(7) Command (ASCII character vector)	chr(13)

#### 3.3.2 Answer from FlexiBowl®

FlexiBowl® 1.0	FlexiBowl® 2.0
<p>For each string sent to the FlexiBowl® 1.0, an ECHO of the command received will be returned in the following form:</p> <ul style="list-style-type: none"> <li>If the sent string is a command that does not return a value, the ECHO will be: "Message_sent{CR}";</li> <li>If the sent string is a command that does return a value, the ECHO will be: "Message_sent{CR}Answer";</li> </ul> <p><b>NOTE:</b> The ASCII decimal value of the character {CR} is 13.</p>	<p>For each string sent to the FlexiBowl® 2.0, an ECHO of the command received will be returned in the following form:</p> <ul style="list-style-type: none"> <li>If the string is interpreted correctly, the ECHO will be "%";</li> <li>If the string is not interpreted correctly, the ECHO will be "?";</li> </ul>

#### 3.3.3 Control strings

FlexiBowl® 1.0		FlexiBowl® 2.0		
Command	Description	Command	Action	Description
servo=1	turns the servo on.	QX2	Move	It moves the FlexiBowl® with the current parameters
light=1	turns the backlight on.	QX3	Move Flip	It moves the FlexiBowl® and activates the Flip during the movement.
forward=1	Moves the Flexibowl® clockwise with the current parameters.	QX4	Move Blow Flip	It moves the FlexiBowl® and activates the Flip and the blow during the movement.
fwd_flip=1	Moves the Flexibowl® clockwise and turns the Flip on during the movement	QX5	Move Blow	It moves the FlexiBowl® and activates the blow during the movement.
fwd_valve2=1	Moves the Flexibowl® clockwise and turns the second valve on during the movement			

fwd_fl_val2=1	Moves the Flexibowl® clockwise and turns the Flip and the second valve on during the movement	QX6	Shake	It moves the FlexiBowl® forward and back with the current parameters.
backward=1	Moves the Flexibowl® anticlockwise with the current parameters.	QX7	LightON	It turns the backlight on.
bwd_fl=1	Moves the Flexibowl® anticlockwise and turns the Flip on during the movement	QX8	LightOFF	It turns the backlight off.
bwd_valve2=1	Moves the Flexibowl® anticlockwise and turns the second valve on during the movement	QX9	Blow	It turns the Blow on with the current parameters
bwd_fl_val2=1	Moves the Flexibowl® anticlockwise and turns the flip and the second valve on	QX10	Flip	It turns the Flip on with the current parameters
shake=1	Shake the Flexibowl® with the current parameters.	QX11	Emptying	It turns on the emptying sequence
flip=1	Turns the Flip on	QX12	Reset Alarm	It resets an alarm and enable the motor
valve2=1	Turns the second valve on.	SO2L	Lifts signal 2	It turns the valve of the Flip on
flip_valve2=1	Turns the Flip and the second valve on at the same time	SO2H	Lifts signal 2	It turns the valve of the Flip off
		SO3L	Lifts signal 3	It turns the valve of the Blow on
		SO3H	Lifts signal 3	It turns the valve of the Blow off
		SO4L	Lifts signal 4	It turns the backlight on
		SO4H	Lowers signal 4	It turns the backlight off

### 3.3.4 Check the state of the FlexiBowl® command

FlexiBowl® 1.0	FlexiBowl® 2.0
To know if the FlexiBowl® 1.0 has finished the command, send string ob[4] {CR}. If the answer is 0, the flexibowl has finished the movement and is ready to accept another command.	To know if the FlexiBowl® 2.0 has finished the command, send string "CHR(0)+CHR(7)+ IO+CHR(13)" and check the state of the least significant bit. If the answer is 1, the Flexibowl has finished the movement and is ready to accept another command.

### 3.3.5 Programming and handling via I/O

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<p>Proceed as follows for programming using the digital I/O:</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Action</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Use the FlexiBowl® utility parameters supplied by ARS to set the default parameters.</td> </tr> <tr> <td>2</td> <td>Place the Ethernet-I/O switch on the control panel on I/O.</td> </tr> <tr> <td>3</td> <td>Turn the FlexiBowl® off and then on again.</td> </tr> <tr> <td>4</td> <td>Wait for the Ready/Fault LED to turn green, after about 2 seconds the FlexiBowl® will be in I/O mode.</td> </tr> </tbody> </table> <p>The operating principle is as follows:</p> <ul style="list-style-type: none"> <li>Apply the command code to be made to Function Bits 0,1,2,3. Logic level 1 is given by applying 24V to the Function Bit.</li> <li>Apply 24V to the Strobe (Pin 5) and the return (Pin 9) for a limited time (about 50ms);</li> <li>The Busy output is available between Pin 3 and 8 of the Output connector.</li> </ul> <p><b>Note:</b> the strobe signal is inhibited until the FlexiBowl has completed the current command.</p> <p><b>Note:</b> The Busy output remains active until the current command has been completed.</p> <p><b>Note:</b> Operation of the second valve (Flip2 / Blow) is established by a variable in the program. This variable can be set from the PC Utility, Flexibowl® parameters. The second valve is set as Blow by default.</p> <table border="1"> <thead> <tr> <th>Function bits</th> <th>Command</th> </tr> </thead> <tbody> <tr><td>0000</td><td>Reset Fault</td></tr> <tr><td>0001</td><td>Servo ON</td></tr> <tr><td>0010</td><td>Servo OFF</td></tr> <tr><td>0011</td><td>Backlight ON</td></tr> <tr><td>0100</td><td>Backlight OFF</td></tr> <tr><td>0101</td><td>Forward</td></tr> <tr><td>0110</td><td>Forward-Flip1</td></tr> <tr><td>0111</td><td>Forward-Valve2</td></tr> <tr><td>1000</td><td>Forward-Flip1-Valve2</td></tr> <tr><td>1001</td><td>Shake</td></tr> <tr><td>1010</td><td>Backward</td></tr> <tr><td>1011</td><td>Backward-Flip1</td></tr> </tbody> </table>	Step	Action	1	Use the FlexiBowl® utility parameters supplied by ARS to set the default parameters.	2	Place the Ethernet-I/O switch on the control panel on I/O.	3	Turn the FlexiBowl® off and then on again.	4	Wait for the Ready/Fault LED to turn green, after about 2 seconds the FlexiBowl® will be in I/O mode.	Function bits	Command	0000	Reset Fault	0001	Servo ON	0010	Servo OFF	0011	Backlight ON	0100	Backlight OFF	0101	Forward	0110	Forward-Flip1	0111	Forward-Valve2	1000	Forward-Flip1-Valve2	1001	Shake	1010	Backward	1011	Backward-Flip1	<p>Proceed as follows for programming using the digital I/O:</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Action</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Use the FlexiBowl® utility parameters supplied by ARS to set the movement parameters.</td> </tr> <tr> <td>2</td> <td>From utility, enable the Enable Digital I/O function</td> </tr> <tr> <td>3</td> <td>Turn the FlexiBowl® off and then on again.</td> </tr> <tr> <td>4</td> <td>Wait for the Ready/Fault LED to turn green, after about 2 seconds the FlexiBowl® will be in I/O mode.</td> </tr> </tbody> </table> <p>The operating principle is as follows:</p> <ul style="list-style-type: none"> <li>Apply 24Vdc to the input relating to the command to be carried out for about 50ms. The Busy output will be ON for the entire duration of the movement.</li> <li>The Busy output is available between Pin 1 and 5 of the Output connector.</li> </ul> <p><b>Important!</b>   Do not send a new movement command until the busy signal is OFF. Otherwise the command will be ignored.</p> <table border="1"> <thead> <tr> <th>PIN</th> <th>Command</th> </tr> </thead> <tbody> <tr><td>1</td><td>Movement</td></tr> <tr><td>2</td><td>Movement with Flip</td></tr> <tr><td>3</td><td>Movement with Flip and Blow</td></tr> <tr><td>4</td><td>Movement with Blow</td></tr> <tr><td>5</td><td>Shake</td></tr> <tr><td>6</td><td>Light ON</td></tr> <tr><td>7</td><td>Light OFF</td></tr> <tr><td>8</td><td>Flip</td></tr> <tr><td>9</td><td>Reset Alarm</td></tr> <tr><td>10</td><td>Emptying</td></tr> <tr><td>11</td><td>Emptying open (read-only)</td></tr> <tr><td>12</td><td>Emptying closed (read-only)</td></tr> </tbody> </table>	Step	Action	1	Use the FlexiBowl® utility parameters supplied by ARS to set the movement parameters.	2	From utility, enable the Enable Digital I/O function	3	Turn the FlexiBowl® off and then on again.	4	Wait for the Ready/Fault LED to turn green, after about 2 seconds the FlexiBowl® will be in I/O mode.	PIN	Command	1	Movement	2	Movement with Flip	3	Movement with Flip and Blow	4	Movement with Blow	5	Shake	6	Light ON	7	Light OFF	8	Flip	9	Reset Alarm	10	Emptying	11	Emptying open (read-only)	12	Emptying closed (read-only)
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1110	Valve2		
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