Leadscrew Tapping Cycle - A7/A8 Block Electric AFTE
Leadscrew tapping uses a fixed mechanical drive and hence the forward feed and retract feed are fixed by the pitch of the leadscrew. It is important that the leadscrew being used is the correct one for the thread that is being tapped.
Leadscrew tappers reverse the motor to withdraw the tap from the hole. On electric AFTE’s their depth and datum signals are given by electric proximity switches on the A7/A8 Block which are to reverse the motor at depth and to stop it at the datum position.
The control for this is SEPARATE and is commonly carried out by machine builders own control circuitry.
The electric leadscrew tappers from Desoutter come equipped with three proximity switches for home/datum, depth and no-hole sensing.

In any Control Circuitry the following are recommended:

- **Cycle Button** When pressed the tool will cycle.
- **Emergency Stop** When pressed the tool will stop.
- **Inch Reverse** Enables inch reversal of the tool when setting up (also used to return tool to datum after emergency stop is pressed or no hole sensed).
- **Inch Forward** Enables the tool to be inched forward when setting up.

**Proximity Switch Types Connections and Use**

<table>
<thead>
<tr>
<th>Block Type</th>
<th>Proximity Switch Type</th>
<th>Operating Voltage</th>
<th>Voltage Drop</th>
<th>Rated Operating Current</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A7</td>
<td>M8 PNP NO</td>
<td>10-30V</td>
<td>&lt;=2.5V</td>
<td>250mA</td>
<td>-25 to 70°C</td>
</tr>
<tr>
<td>A8</td>
<td>M8 NPN NO</td>
<td>10-30V</td>
<td>&lt;=2.5V</td>
<td>250mA</td>
<td>-25 to 70°C</td>
</tr>
</tbody>
</table>

The output is short circuit protected (pulsed). After elimination of the short circuit the switch is ready again for operating.

Datum should be used to sense home position and hence to stop the motor at the end of a cycle.
Datum - 24V (Brown) to 24V
0V (Blue) to 0V
Output (Black) to STOP the motor

Depth should be used to sense end of stroke position and hence to actuate the reverse of the motor.
Depth - 24V (Brown) to 24V
0V (Blue) to 0V
Output (Black) to REVERSE the motor

No -Hole should be used to sense a component with no hole - the output should be used to stop the motor.
No Hole - 24V (Brown) to 24V
0V (Blue) to 0V
Output (Black) to STOP the motor

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AFTE showing Home, Depth and No Hole Sensors on A7(PNP) A8 (NPN) Control Blocks
Electric Motor Connection

The electric motor used on the AFTE’s are 3 phase mechanical brake motors and can be connected to into both 440-480 volts or 220-240 volts at 60Hz by changing the connections to the motor as shown below.

The motors must be connected to a 3 phase supply in accordance to the Voltage Charts in the relevant service sheet and provided with a starter fitted with an overload protection.
Recommended overload settings and the connection type.

<table>
<thead>
<tr>
<th>Tool Series (Motor Part No.)</th>
<th>Speeds (50Hz)</th>
<th>Voltage /V</th>
<th>Frequency /Hz</th>
<th>Motor Connection</th>
<th>Power /hp</th>
<th>Full Load Current /A</th>
<th>Recommended Overload Setting /A</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFTE270  (381253)</td>
<td>1100-2950</td>
<td>220/260</td>
<td>60</td>
<td>Delta</td>
<td>0.28</td>
<td>1.0</td>
<td>1.0-1.2</td>
</tr>
<tr>
<td>AFTE470  (310373)</td>
<td>180-1450</td>
<td>220/260</td>
<td>60</td>
<td>Delta</td>
<td>0.6</td>
<td>2.0</td>
<td>2.0-2.2</td>
</tr>
<tr>
<td>AFTE480  (380433)</td>
<td>180-1450</td>
<td>220/260</td>
<td>60</td>
<td>Delta</td>
<td>1.2</td>
<td>3.8</td>
<td>3.8-4.0</td>
</tr>
</tbody>
</table>

When connecting the motor ensure that the motor rotation is correct. Remove the belt from the pulley’s and view the motor from the shaft end of the motor. For right hand threads the rotation should be clockwise and anti clockwise for left hand threads.

To reverse the motor interchange U1 and V1 connections.

**NOTE:** Before cycling a leadscrew tapper check the following:-

1. Electric Motor is running in the correct direction.
2. Proximity switches are fitted correctly i.e. are sensing datum and depth and that the logic of the control circuitry is functioning correctly:- i.e. Depth reverses the direction of the electric motor. Datum stops the electric motor.
Operation of AFTE Tapper using a Programmable Controller

Electrical connections to AFTE270/470/480:
Consult tool service sheet for correct wiring of motor and proximity switches.

Control circuit:

<table>
<thead>
<tr>
<th>INPUT</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start signal NO X1</td>
<td>Y1 Motor relay forward output</td>
</tr>
<tr>
<td>Stop signal NC X2</td>
<td>Y2 Motor relay reverse output</td>
</tr>
<tr>
<td>SW2 depth signal X3</td>
<td>Programmable controller (PLC)</td>
</tr>
<tr>
<td>SW1 datum signal X4</td>
<td>Y3 Ready indicator output</td>
</tr>
<tr>
<td>Inch forward NO X5</td>
<td>Y4 No Hole indicator output</td>
</tr>
<tr>
<td>Inch reverse NO X6</td>
<td>Y5 Power indicator</td>
</tr>
<tr>
<td>SW3 No Hole signal X7</td>
<td>Y6</td>
</tr>
<tr>
<td>Motor cutout NC X8</td>
<td></td>
</tr>
</tbody>
</table>

Motor Switching Circuit:

3 off Fuses
L1
L2
L3
Solid state motor reversing contactor
U1
V1
W1
Motor

Note*: Ultra-fast fuses must be used. The fuses must have an $I^2T$ rating lower than the contactor. Fuse size 10 x 38mm.
Motor rotation test must be carried out as described in AFTE service sheet before operating the tool.

Desoutter recommends that the SRC3D Solid State Relay from Intercable Danmark is used in the circuit.

Warning:
Customer is responsible for ensuring the safe installation and operation of the control equipment.
Ladder Diagram:

START

TAPPER CONTROL SSR2.DIA

X001 DIFON X004 Datum

C0110 X008 X002 Y004 C0100

C0100

C0100 X003 Y002 Y004 C0165

C0167 X006 InchRev

X005 InchFwd C0167

C0165 X008 X002 X004 Y001 FwdCon

X005 InchFwd X006 X004 Datum

C0130

X003 C0150

Depth

X003 DIFON X004 X008 X002 C0150

Datum TCutout Stop

C0150

C0140 C0130

C0140 C0110

C0110 X008 X002 X004 X002 C0120

C0120

C0120 C0160 C0161 Y001 X004 C0166 FwdCon Datum

C0168 X005 InchFwd C0100

X006 InchRev C0168