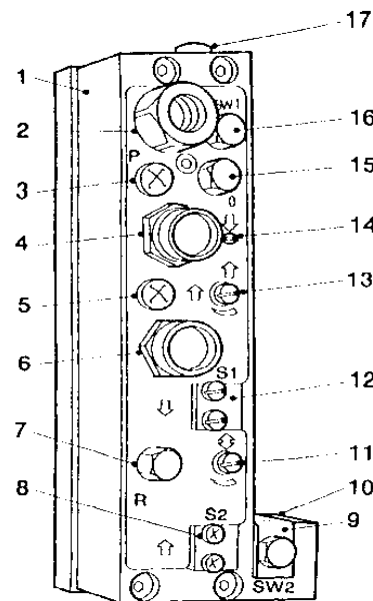


Full Feature Control Block A1 - Forward Feed Air Only, Return Feed Air/Spring or Both



Summary of Ports/Features

- 2 Mains Air Inlet 1/4" BSP adaptor supplied to 1/4" NPT
- 3 P Port tapped M5/10-32, signal port for Pecking/Dwelling
- 4 Manual Retract Button - Red
- 5 1 Port tapped M5/10-32, for remote start air pulse signal
- 6 Manual Start Button - Green
- 7 R Port tapped 1/8" BSP with adaptor to 1/8" NPT supplied supply for air return
- 8 S2 Electric Interface Port, for remote retract using a solenoid valve (24Vdc/110VAC)
- 9 SW2 Electric Interface Port, for electric depth signal through a proximity switch (M8)
- 10 End Stop - to automatically return tool when at depth
- 11 Main Air Regulating Screw
- 12 S1 Electric Interface Port, for remote start using a solenoid valve (24Vdc/110VAC)
- 13 Retract Rate Regulating Screw
- 14 Advance Rate Regulating Screw - **functions on Air Return tools Only**
- 15 0 Port tapped 1/8" BSP with adaptor to 1/8" NPT supplied, remote depth/retract, signal port for Pecking/Dwelling
- 16 SW1 Electric Interface Port, for electric datum signal through a proximity switch (M8)
- 17 M Port tapped M5/10-32, for air signal in datum position - constant

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Electrical Interface Kits – PLC Control	4
Feed Control – HCU's	6
Feed Control – Interrupting Automatic Retract for Dwell/Peck	7
Feed Control – Deep Hole Drilling Air Logic or PLC	8
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Input and Output Signals - NOTE : Remote Electrical Signals Require an Interface Kit

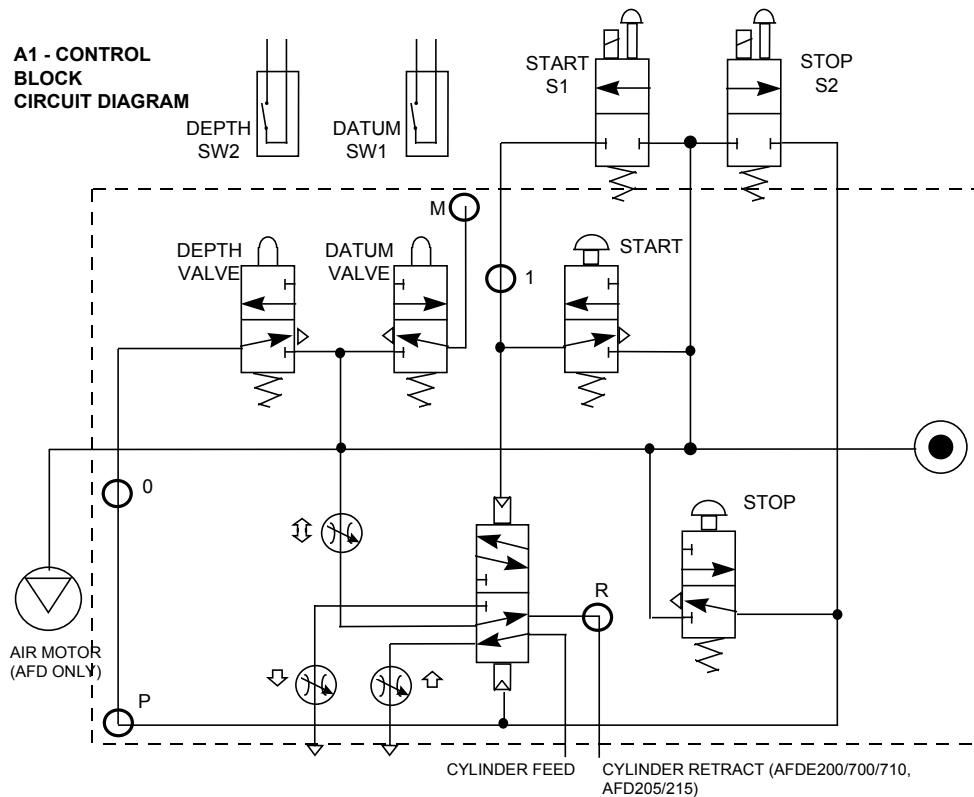
Input Signal	Output Signal	Manual	Remote Air	Remote Electrical (Requires additional kit)	Automatic
	Datum		M Port (17) Constant Air Signal	SW1 (16) Constant Signal Through M5/8 Proximity Switch	
Forward		ST Green Button (4)	1 Port (5) Give Pulse Air Signal	S1 (12) Through Solenoid Valve - Pulse Signal	
	Depth		O Port (15) P Port (3) Constant At Depth	SW2 (9) Constant Signal Through M5/8 Proximity Switch	
Retract		SP Red Button (6)	O Port (15) P Port (3) Give Pulse Air Signal	S2 (8) Through Solenoid Valve - Pulse Signal	End Stop (10)

NOTE: - Main Air Inlet (⊙)

The main air inlet ⊙ (1/4" BSP or NPT) must be connected to an air supply for both the AFD and AFDE tools as the air supply to the tool and block is provided through this port.

Circuit Diagram

The circuit diagram below shows the workings of the control block circuit.

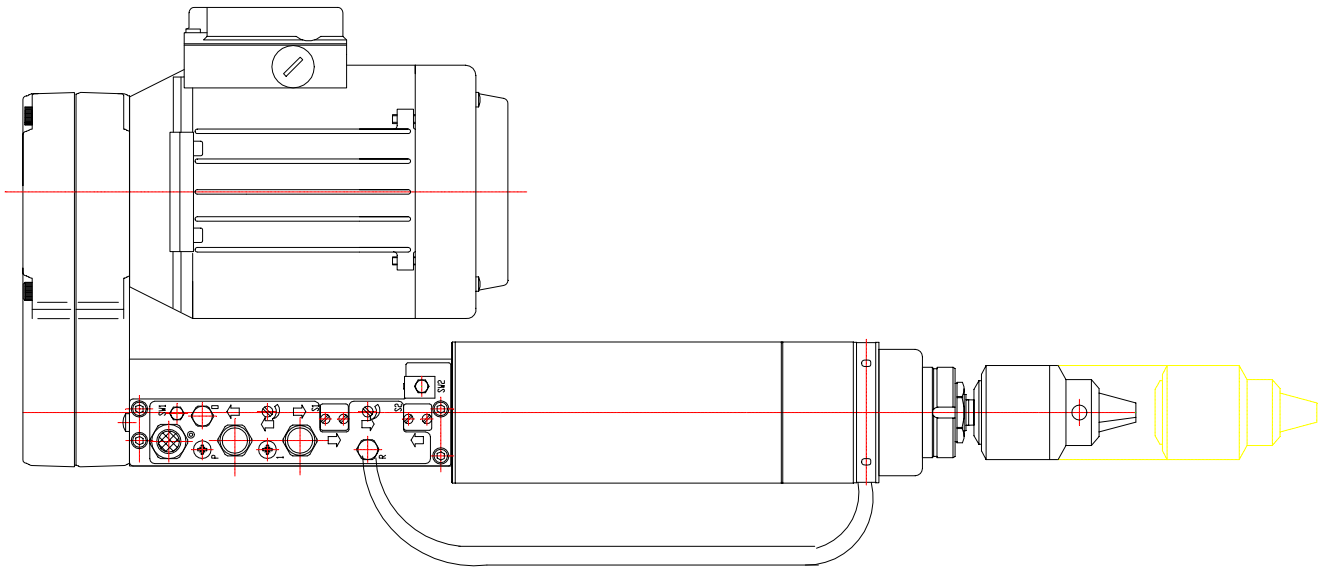


Use of R Port for Faster/Air Assisted Retract**Supplied with AFDE400/600 & AFD425/625 series tools**

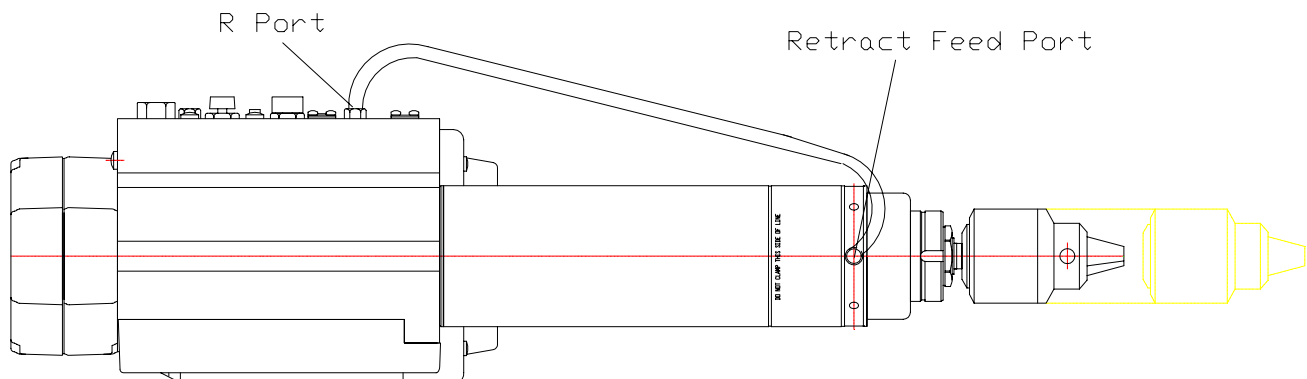
Uses: To speed up retract time
For IP64M Sealing/Protection against dust/coolant

Two 1/8" BSP to 5/32 elbows, 3' of 5/32" tubing
Connect R port on A1 block to Port on Nose of Tool – See Below for Connection

On later models two ports are available on the Nose of the Tool – Choose the one that best suits the machine orientation and Plug the other with the fitting from the R port.



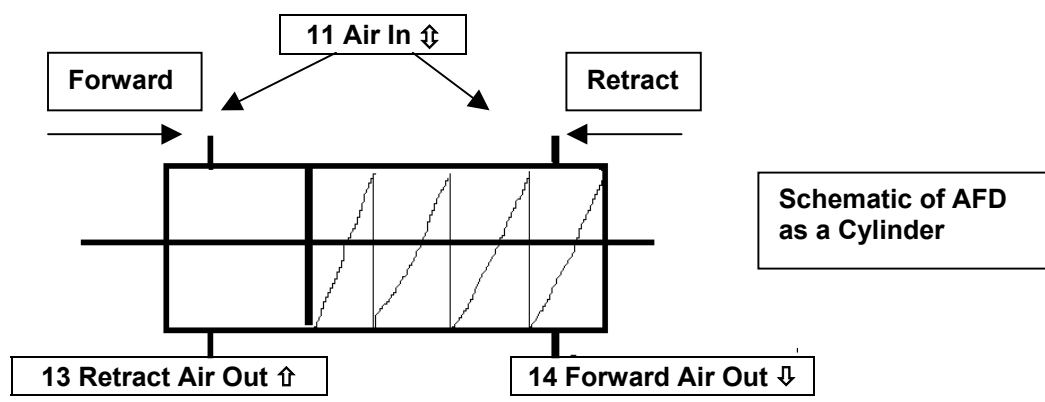
Air Retract Assist Kit 105362





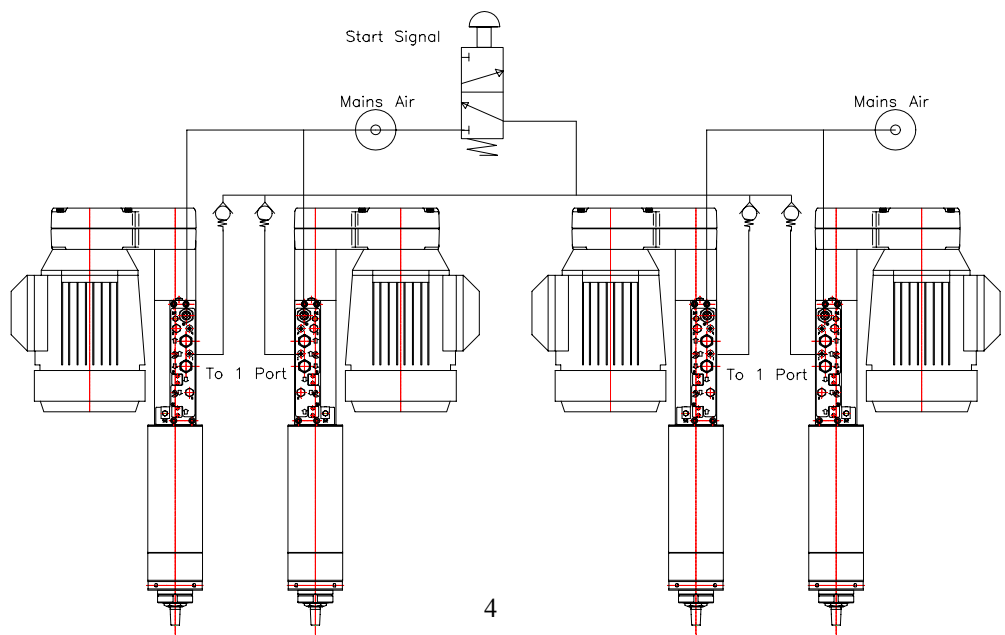
Flow Controls

Tool Type	13 ↑ Step 1	11 ⇕ Step 2	14 ↓ Step 3
AFDE200 AFD205 AFD215	Affects Retract Rate Only	Affects Forward and Retract Rates	Affects Forward Rate Only
AFD415	Affects Retract Rate Only	Affects Forward Rate Only	No Affect
AFDE400/410 AFDE600/610/620	Affects Retract Rate Only	Affects Forward Rate Only	No Affect
AFDE400/410 AFDE600/610/620 AFD425/625 WITH R PORT CONNECTED	Affects Retract Rate Only	Affects Forward and Retract Rates	Affects Forward Rate Only
AFDE700/710	Affects Retract Rate Only	Affects Forward and Retract Rates	Affects Forward Rate Only



Guide to Connecting Tools Together on air logic systems

Tools can be connected in series with common inputs but non return or check valves MUST be used in the supply lines as below. This must be followed for a start signal to the 1 port OR a retract signal to the O or P ports



Electrical Interface Kits

The interface kits are used to control the AFD range using electrical signals to provide start and retract signals and feedback for depth and datum. Generally for use with P.L.C. s (Programmable Logic Controllers) the kits contain solenoid valves and proximity switches of differing types depending on the method of control and on which control block they are being used with. All solenoid valves and proximity switches are of the plug in type.

Supply voltages are 10-30V DC for the proximity switches and commonly 24V DC for the solenoid valve. The proximity switches are supplied in both PNP (most common - sourcing) and NPN (sinking) and are normally open (NO).

The solenoid valves have DIN type connections on the plug and can be normally open (NO) or normally closed (NC - most common).

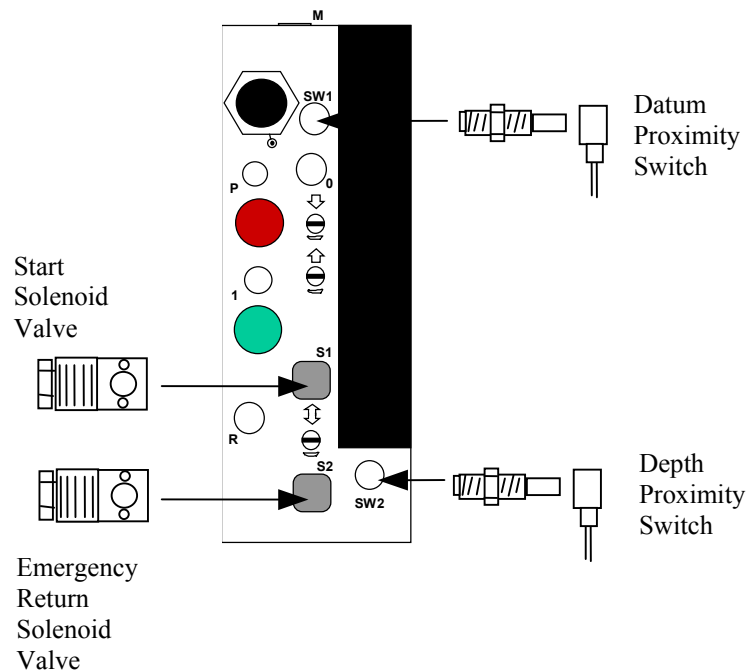
Fitting an Interface Kit to an A1 Control Block

Remove the blanking plates at positions S1 and S2. Fit the 2 solenoid valves ensuring the gasket is fitted correctly between the valve and the control block.

To fit the proximity switches remove the blanking plugs at positions SW1 and SW2.

NOTE: There is a constant air supply from the SW1 port. The proximity switch must seal against this air pressure. There is an air supply from the SW2 port at depth only and again the proximity switch must seal against this air pressure.

With the tool at the datum position fit a proximity switch in SW1 by gently rotating clockwise until a some resistance is felt. Rotate the switch approximately one turn anti-clockwise and make sure the switch is sensing. Similarly with the depth stop depressed insert the other switch in SW2 and follow the same procedure. Make sure the switch is sensing.



Operation of Interface Kits

Input Signals:

Start - For interface kits C10 and C12 - To start the cycle energize the Normally Closed solenoid at position S1 for approximately 0.5 seconds. The tool will cycle automatically.

For kit C11 - The Normally Open solenoid valve is fitted to S2 and so to start cycle energize both solenoids (Note with electric power off and air on air will exhaust around red stop button)

NOTE: External solenoid valve can also be used to give pulse start signal to 1 port.

Emergency Return - For interface kits C10 and C12 - To stop the cycle and return to home energize the Normally Closed solenoid at position S2. For approximately 0.5 seconds. The tool will return to datum.
For kits C11 - The Normally Open solenoid valve fitted to S2 is de-energized to stop the cycle. This also acts as a fail safe should the electrical power fail.

NOTE: External solenoid valve can also be used to give pulse start signal to P or O port.

Output Signals:

Depth - The proximity switch at SW2 will provide a signal upon reaching depth.

Datum - The proximity switch at SW1 will provide a signal when the tool is at datum.

Kit Types for A1 blocks

Code	Part No.	Control Block	Solenoid Valves	Proximity switches
C03	104002	A1 (M8)		2 x M8 PNP + Cables
C05	104842	A1 (M8)		2 x M8 NPN + Cables
C10	438223	A1 (M8)	2 x NC	2 x M8 PNP + Cables
C11	438233	A1 (M8)	1 x NO, 1 x NC	2 x M8 PNP + Cables
C12	438243	A1 (M8)	2 x NC	2 x M8 NPN + Cables

Individual Proximity Switch Part Numbers & Specifications

Proximity Switch Type	Part Number	Operating Voltage	Voltage Drop	Rated Operating Current	Operating Temperature
M8 PNP NO	381223	10-30V	<=2.5V	250mA	-25 to 70 C
PNP Cable	381233				
M8 NPN NO	396183	10-30V	<=2.5V	250mA	-25 to 70 C
NPN Cable	397043				

Cable Connections 24V (Brown) to 24V 0V (Blue) to 0V Output (Black)

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

Solenoid Valve Part Numbers & Specifications (Supplied with DIN style plug – no cable)

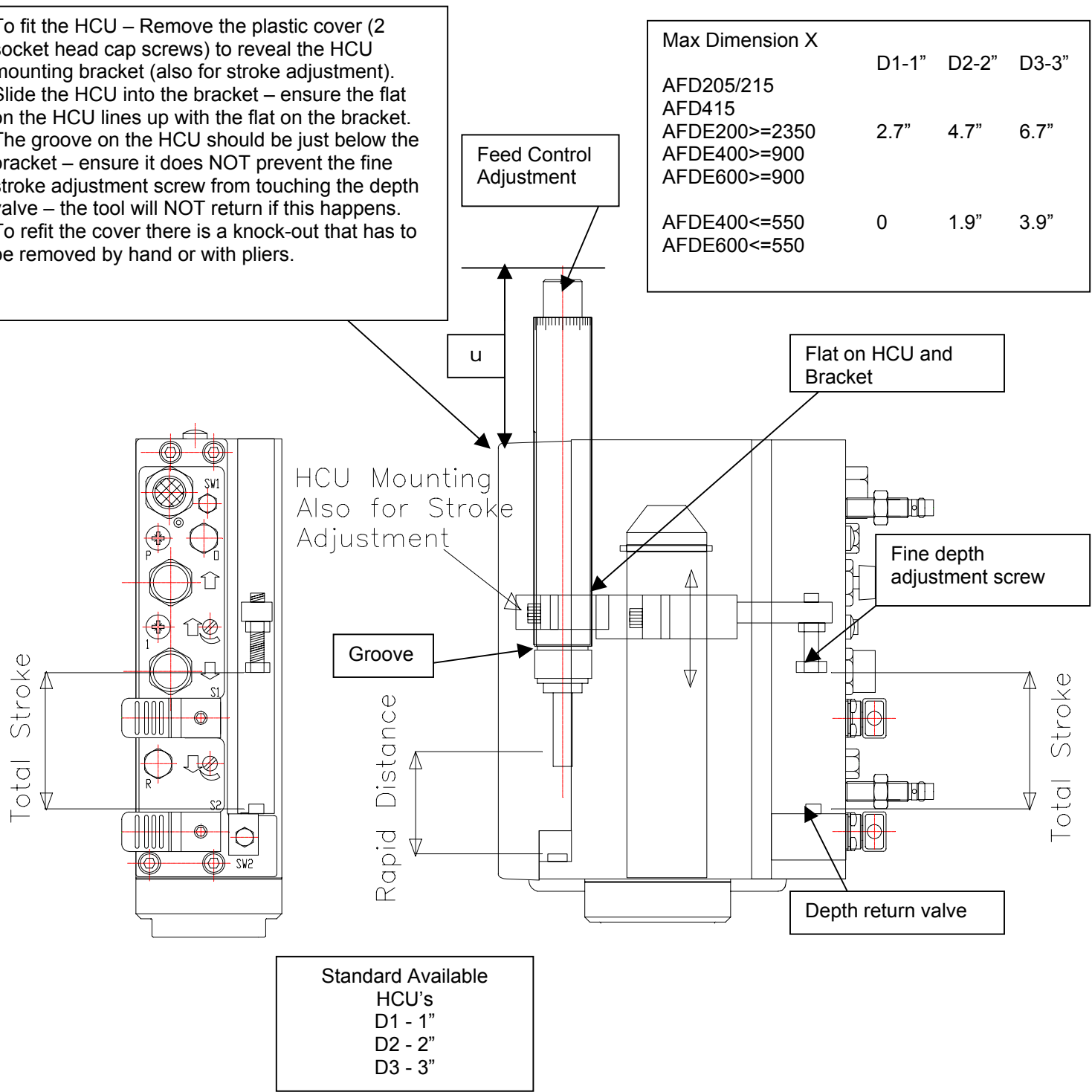
Solenoid Valve Type	Part Number	Rated Voltage	Rated Power
NO	396263	24V	2W
NC	326753	24V	1W

Feed Control - Hydraulic Control Unit (HCU) Mounting and Use

Allow rapid advance under air pressure then a controlled feed up to the stroke of the HCU
 They also reduce burring on the exit side of the hole by preventing the tool from "jumping" through the hole when the drilling pressure is relieved. It also eliminates the possibility of the drill unit stalling as it "breaks through"

To fit the HCU – Remove the plastic cover (2 socket head cap screws) to reveal the HCU mounting bracket (also for stroke adjustment). Slide the HCU into the bracket – ensure the flat on the HCU lines up with the flat on the bracket. The groove on the HCU should be just below the bracket – ensure it does NOT prevent the fine stroke adjustment screw from touching the depth valve – the tool will NOT return if this happens. To refit the cover there is a knock-out that has to be removed by hand or with pliers.

Max Dimension X	D1-1"	D2-2"	D3-3"
AFD205/215			
AFD415			
AFDE200 >= 2350	2.7"	4.7"	6.7"
AFDE400 >= 900			
AFDE600 >= 900			
AFDE400 <= 550	0	1.9"	3.9"
AFDE600 <= 550			

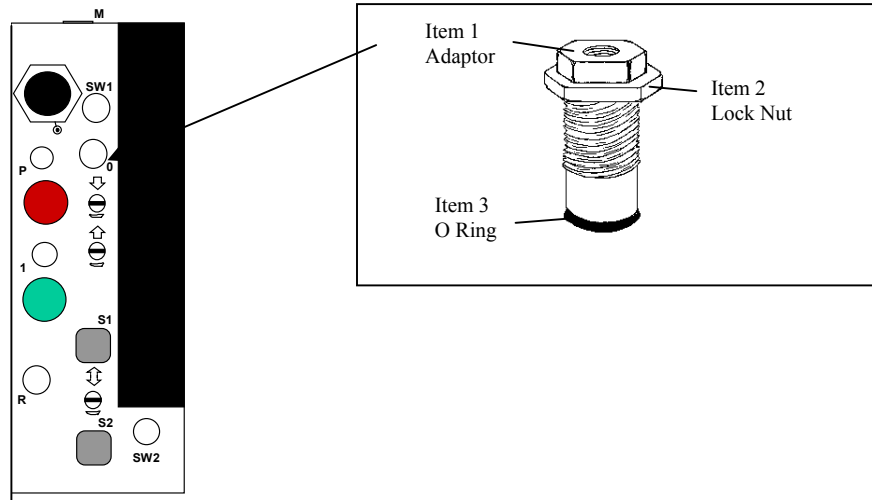


Feed Control – Interrupting Automatic Retract O Port Blanking Kit – for dwell or peck

On an A1 control block the automatic retract signal can be stopped using the O port “Blanking” Kit.

This comprises 3 parts: Adaptor (257023), Lock Nut (257033) and O Ring (250913)

To fit the O port “blanking” kit, screw the locking nut (2) onto the adaptor (1) and fit the O ring (3) into the bottom of the adaptor as shown in fig. 2.

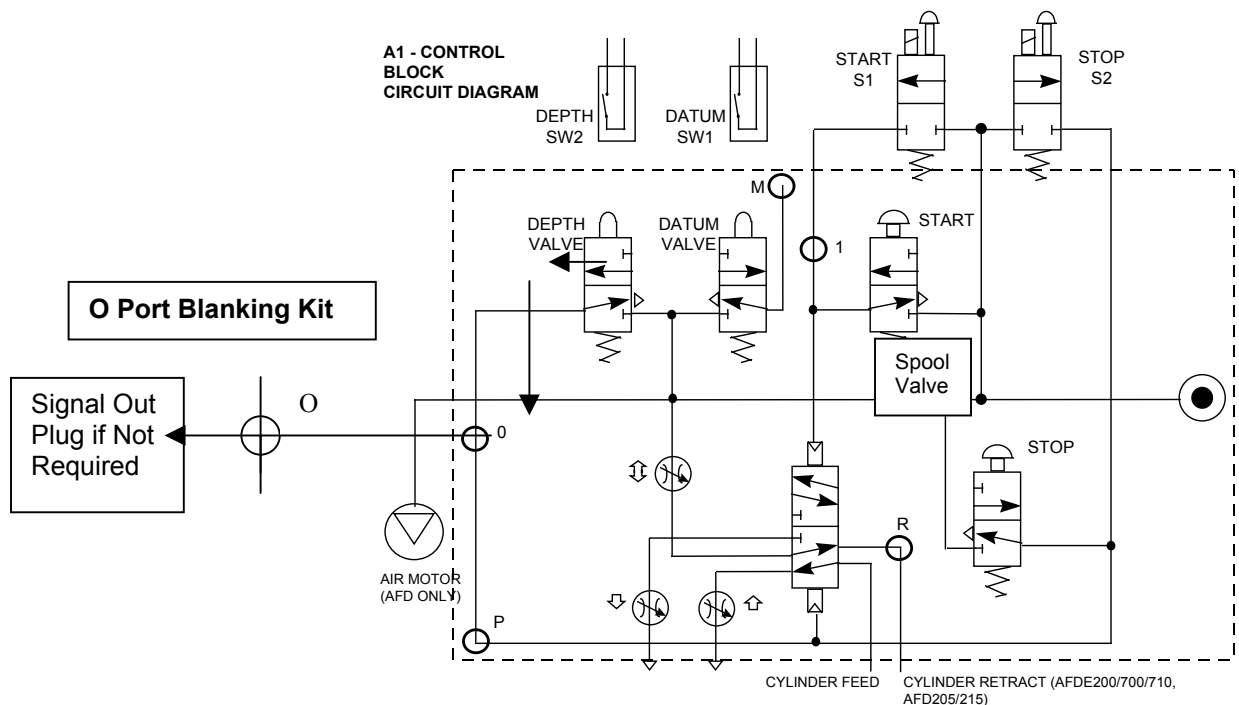
Fig. 2 Adaptor Assembly

Screw the adaptor (1) into the O port securely. Lock in position by tightening the locking nut (2) on to the face of the control block. To check it is fitted correctly and the O ring is sealing remove the plug from the P port. Depress the end stop to imitate the automatic retract signal. Air should blow out of the O port adaptor but NOT from the P port. If air blow from the P port remove the adaptor assembly and refit – also check the condition of the O ring.

Plug the adaptor if required i.e. using external control.

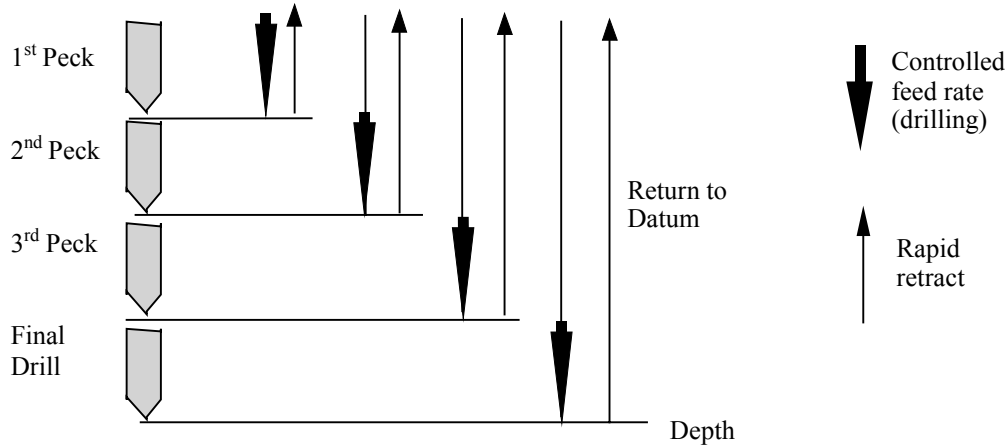
How it works: The circuit diagram for the A1 control block is shown below with the O port blanking kit at the side.

When the depth valve is depressed air travels through the O port to the P port and moving the 2 position spool valve to the retract position. With the O port “blanking” kit fitted this air is interrupted and the tool will not retract until an external signal retracts the tool. The air signal can be taken out of the adaptor if required for signalling or if not required the port should be plugged – the thread is 10-32 (M5).



Feed Control – Deep Hole Drilling

Peck feed controls the sequence by allowing a small depth to be drilled, the tool retracts rapidly, a further depth is drilled, the tool retracts again, etc. until the final depth is reached and the tool returns to datum.



Peck Feed Kits D4 (92282) 1", D5 (92292) 2" D6 (92302) 3"

Basic Operation – Peck Feed Controlled by Time

Remote Start Signal to S on Pecking Module

Tool advances for set time as set on timer valve in pecking module

After set time tool retracts, HCU is held by locking mechanism

At home tool advances again for same set time but will rapid advance to where it left due to the locking unit.

Flow controls should be adjusted to give this rapid advance

This repeats until the depth signal is achieved on the A1 block (O port)

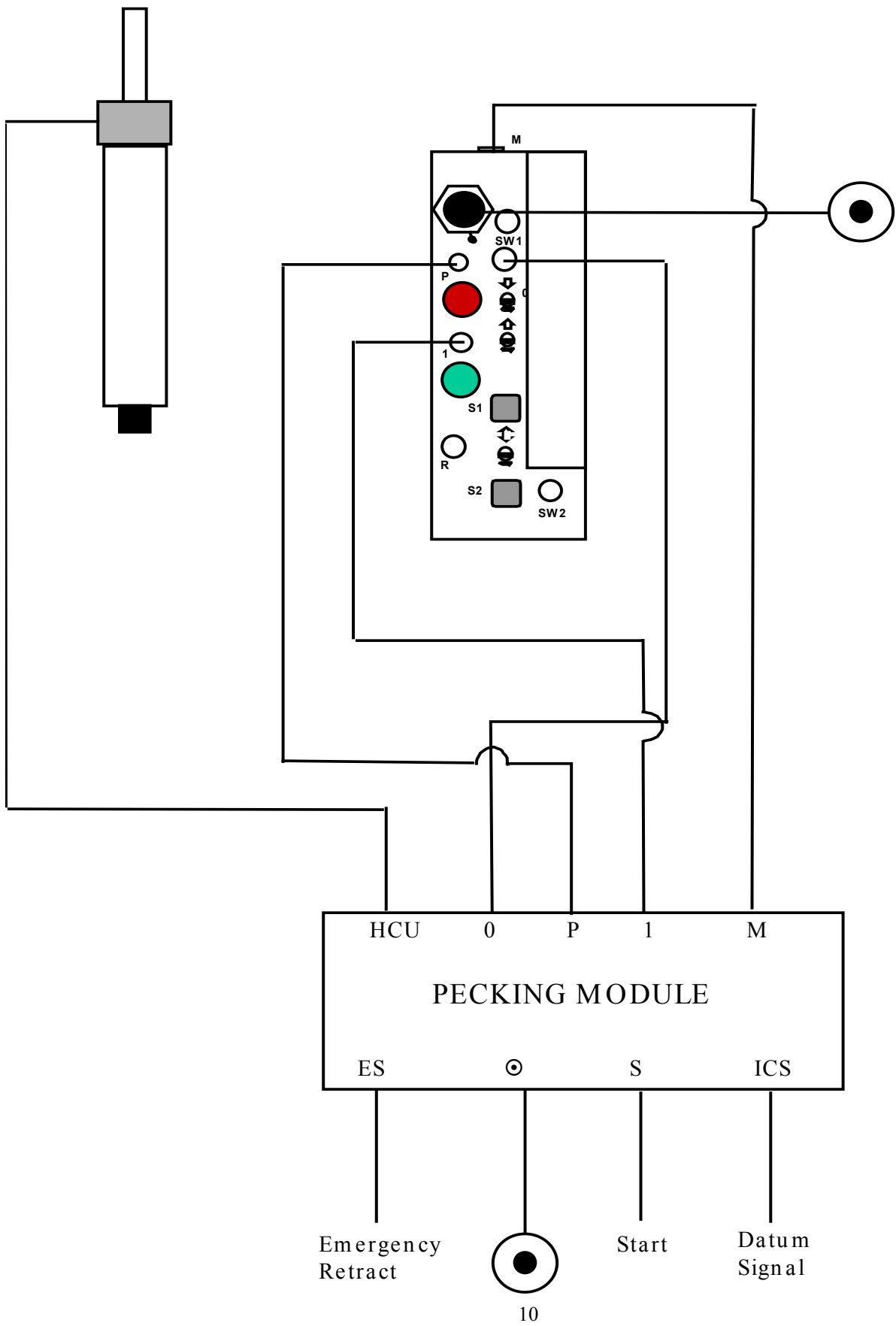
Tool returns home for last time and HCU locking rod is reset through pulse air signal

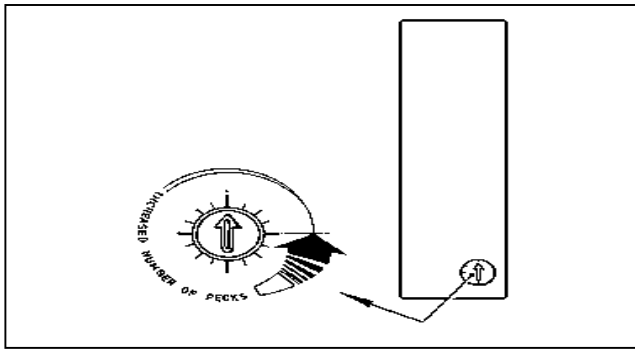
ICS gives cycle complete signal

Complete Parts List

Item	Part No.	Description		Used On	Qty
1	92902	Pecking Module		All	1
2	91972	Check Unit 1"		D4	1
2	91982	Check Unit 2"		D5	1
2	91992	Check Unit 3"		D6	1
3	92002	Locking Unit		All	1
4	62862	Tubing 5/32"		All	30'
5	62392	Stud 10-32- 5/32"		All	4
6	72102	Elbow 10-32- 5/32"		All	1
7	257023	Adaptor	See O Port Blanking Kit	All	1
8	257033	Lock Nut	See O Port Blanking Kit	All	1
9	250913	O Ring	See O Port Blanking Kit	All	1
10	62852	Blanking Plug		All	1

Connection Diagram



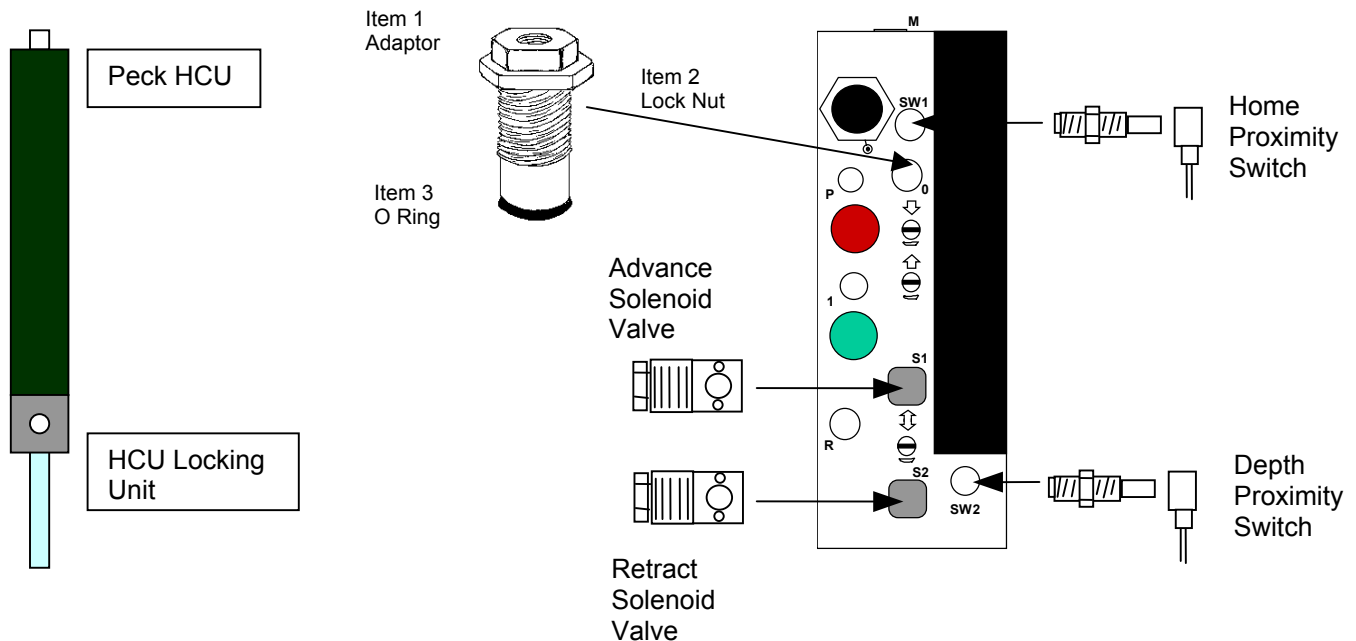


Peck Adjustment

Set up a trial drilling operation and set the feed rate desired first. Then adjust the timer to give the required number of pecks dictated by the component material and the depth of drilling.

To set the pecking timer rotate the adjuster to set the advance time

Peck Feed with PLC Sequencing –Also See Interface Kits above



1. Start signal to PLC.
2. Energize solenoid S1 for 0.5 seconds, tool will feed forward.
3. Set advance time using timer in PLC.
4. Energize solenoid S2 for 0.5 seconds, after set time , tool will retract to datum.
5. Output from SW1 to PLC.
6. Energize solenoid S1 for 0.5 seconds, tool will advance to drilled depth due to HCU brake unit (92002) holding rod at previous depth position.
7. Set advance time using timer in PLC.
8. Energize solenoid S2 for 0.5 seconds, after set time , tool will retract to datum.
9. Repeat pecking until signal from SW2 switch indicates that drill has reached depth.
10. Energize solenoid S2 for 0.5 seconds, tool will retract to datum.
11. Output from SW1, give HCU Locking Unit (10-32 port) pulse air signal through additional solenoid valve controlled by the PLC (Not shown)

Part No.	Description	Part No.	Description
92002	HCU locking unit	91972	Peck feed HCU 25mm (1")
C**	Interface Kits – See Above	91982	Peck feed HCU 50mm (2")
**	O Port Blanking Kit – See Above	91992	Peck feed HCU 75mm (3")

Dwell Control**Without dwell:**

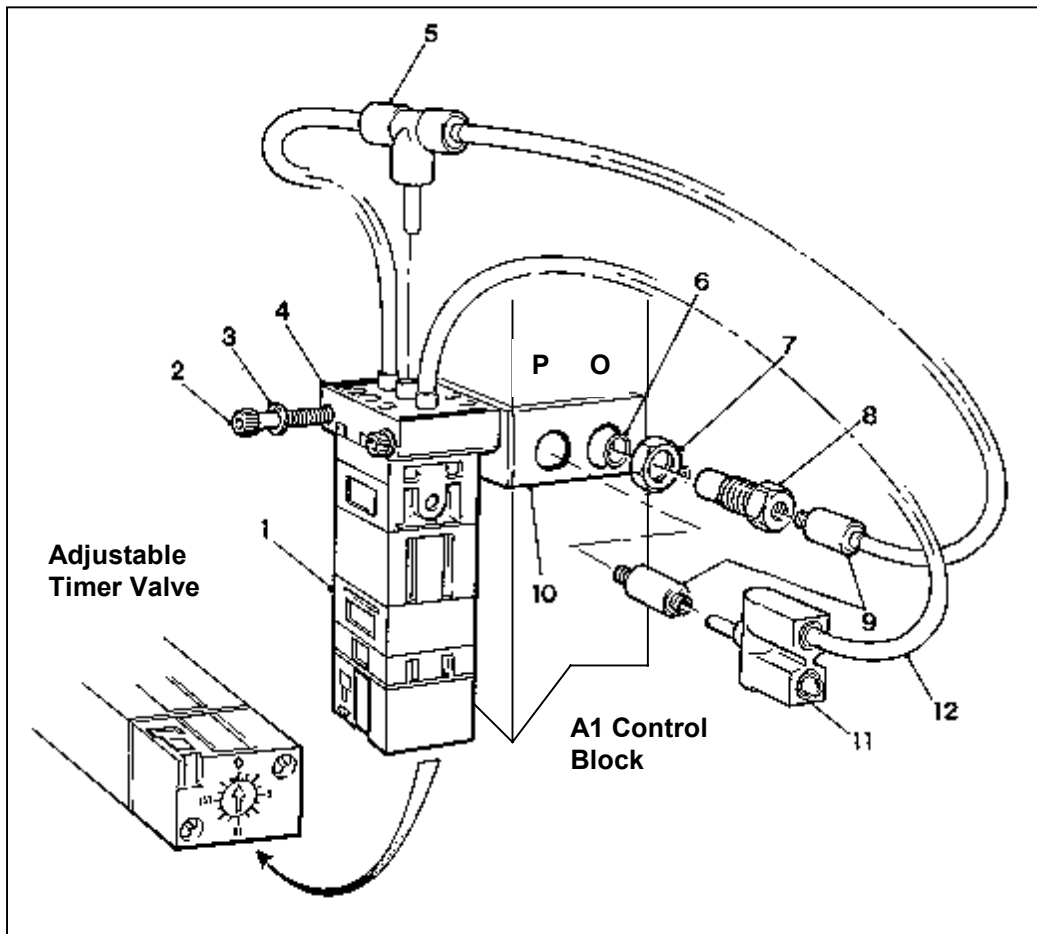
Tool advances based on pulse input signal (manual, air or electric through solenoid valve)

When tool reaches depth, depth valve is actuated allowing the pulse air signal to go across O and P to other side of spool valve and tool will retract. Depth variations can occur due to variation in operation of the depth valve and response of the spool valve.

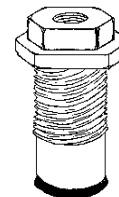
With dwell:

Tool advances based on pulse input signal (manual, air or electric through solenoid valve)

When tool reaches depth, depth valve is actuated allowing the pulse air signal to go to O. The adaptor screwed into the O port stops the signal and takes it out to the timer valve. Tool is still effectively going forwards. After the time set by the timer valve the air signal is put into P the spool valve shifts and tool will retract. Depth variations should be eliminated as tool now goes to hard stop – provided dwell time is high enough.

Dwell Control Kit**Part No. 92372**

PLC Dwell uses the O port blanking kit above along with the interface kits with the dwell time controlled by the PLC – see above.

Item 1
AdaptorItem 2
Lock NutItem 3
O Ring

Skip Check Units are available for speeding up the cycle time on applications where two sections are being drilled separated by a gap.

The ordering codes are
 D1 - Skip (1" total stroke)
 D2 - Skip (2" total stroke)
 D3 - Skip (3" total stroke)

They are based on standard 1', 2" and 3" HCU'S but are custom machined for the particular application. Hence the following application details are required:

Drill Diameter
 Drill Point Angle
 Thickness of first section - with tolerance
 Gap between sections - with tolerance
 Thickness of second section - with tolerance.

