INSTRUCTION BOOKLET FOR

AIR FEEDS WITH MULTI STROKE

MANUFACTURERS OF COIL HANDLING EQUIPMENT
Durant Tool Company

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12/03

ATTENTION: PLANT MANAGER

Thank you for purchasing Durant equipment. Enclosed are very important safety instructions, operating instructions, and setup procedures.

Read all these materials completely and carefully. Please distribute copies to your SAFETY MANAGER, PRODUCTION MANAGER, and MACHINE OPERATORS.

If there is any help required in setup or operation, we will be readily available for your assistance.

Thank you again and we look forward to developing and maintaining a fine relationship with your company.

Sincerely,

DURANT TOOL COMPANY

SAFETY INSTRUCTIONS FOR ALL DURANT EQUIPMENT

The enclosed information and instructions must be forwarded and distributed to the Plant Safety Director, Plant Manager, Production Manager, and all Operators of Durant equipment.

Operators of Durant equipment must have a minimum of (3) three years operating experience with similar Durant press room equipment or a minimum of (3) three years experience with identical equipment manufactured by other press room equipment manufacturers.

WARNING

Never operate, install, or maintain this machine without understanding the complete and safe operation thereof.

It is the employer's responsibility to provide proper safety devices and equipment to safeguard the operator from harm and to safeguard this machine at all times to meet all current government safety codes and standards.

CAUTION

All Durant equipment must be securely fastened to the floor. This will prevent the machine from tipping. Failure to follow the above instructions could cause harm to the operator or machine.

ATTENTION

If any danger points are observed:

1. Immediately stop machine.
2. Do not run machine until danger point is eliminated.
3. Report danger point in writing to your employer.
4. Keep a copy of your report for your records.
5. Do not run machine again until danger point has been corrected.
6. It is your employer's responsibility to safeguard this machine to meet all government safety codes and standards.
7. There are U.S. companies that specifically specialize in safe guarding machines to plant requirements and government codes. The safe guarding companies are located throughout the United States, Canada, and foreign countries. Representatives will visit your site to advise and recommend safe guarding procedures for your company.

IMPORTANT

Before the first use and monthly thereafter, all nuts, screws, and bolts should be checked for tightness. Gears, sprockets, chains, and belts should also be checked for tightness.

Grease and oil fittings and reducers monthly.

Instructions
Repeater Control System

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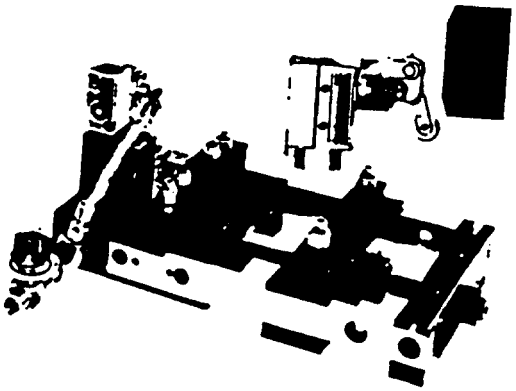
REPEATER CONTROL SYSTEM

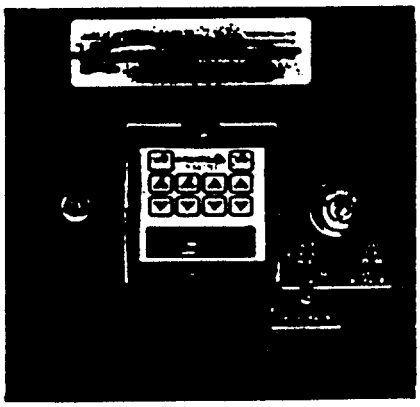
1. DESCRIPTION

The Repeater Control System is used for any special press feeding job that requires stock to be fed in lengths greater that the maximum stroke range of the air feed.

The Repeater Control System, used in combination with a Remote Electric Actuation System, enables the press to operate in an automatic manner, with the air feed making a selected number of strokes to advance the required stock length, before each press cycle is initiated.



Remote Electric Actuation System
Fig. 1



Repeater Control System
Fig. 2

An Electrical schematic of the complete system is shown on Page 10.

Installation of the Remote Electronic Actuation System is described in "Instructions - Remote Actuation System: and installation of the Repeater is described in the next section. After the system is installed, the setup man and press operator must be trained to use the selectable features, and understand the built-in safety features. The lockable selector switch, SS1, in the door of the control panel, is used to select one of three possible modes of press/feed operation.

a). "Repeater Off" - The press is allowed to operate through the control of existing press "Run" buttons, and the entire air feed system remains inoperative while stock is fed by some other means.

b). "Press Control Feed" - The press is allowed to operate through the control of existing "Run" circuit in "continuous" or "single stroke" mode, and the air feed is controlled by the press to advance stock by one feed length for each press stroke cycle. The repeater control, alone, remains inoperative.

c). "Feed Control Press" - The press and feed both operate automatically and continuously, through the control of the repeater system, to feed required stock length with a number of air feed strokes before each press stroke cycle.

Operation in the "Feed Control Press" (repeating) mode, is initiated by first setting the repeater selector switch to Position #3, which is labeled "Feed Control Press".

Then the press control circuit should be set for single stroke operation, and any special switching made, if necessary, to interlock safety or process control devices required for automatic and continuous press operation (e.g., barrier gate switch, presence sensing device, misfit detector, etc.). At this point, if the stock is properly threaded through the air feed clamps, the feed stroke length is accurately set, the required number of feed strokes for press cycle is set on the repeater counter, and the supply air pressure is "On", the system is ready to start.

The Repeater Control System is started by momentarily turning the selector switch, SS1, to Position #4, labeled "Start Counter & Press". The press and air feed will then operate automatically and continuously until the selector switch is turned to "Repeater Off", or one of the interlock switches is opened.

The Repeater has a built-in safety feature that will completely de-energize the control system, if the press does not respond (by actuation of the limit switch) within 3 seconds after completion of the feed count. The cause for failure of the press to operate must be corrected, and the system restarted with the selector switch.

Momentary loss of electrical power will trip the system off, and reset the counter.

2. INSTALLATION

a. *Mounting* - Mount the control panel on the press or other convenient surface near the air feed, for the operator to see and reach the display face. Use the box as a template, if desired, and mark thru the 4 holes in the back of the box. Use (4) 1/4" (6mm) bolts to secure the box to the mounting surface. Provide clearance around the box for interconnecting cable, and opening the door.

b. *Electrical Connection* - Run 3/8" (9.5 mm) flexible oil-tight conduit between the control panel and other interconnecting devices. Punch or drill holes in the side (s) of the box for conduit entry, taking care to protect the electrical components inside from damage by tools or contamination by chips.

Make wiring connections to the control panel terminals as indicated by the electrical drawing.

Make electrical connections in accordance with all applicable regulations, including requirements for grounding and current limitation.

The repeater control must be electrically interconnected with your existing press control network in a manner that provides all safeguarding required for automatic and continuous operation, while the press control is set for single stroke mode. Review the schematic of your press control circuit to determine the best point of connection. Add selector switch contacts or relay contacts if needed. Location of press safety interlocks relative to the repeater control circuit is suggested in the electrical schematic.

c. *Cam Adjustment Considerations* - The repeater control will energize the press clutch ("Run")

circuit by closure of contact CR2 at end of the feed count, and that contact will remain closed until the press opens contact RLS-A (which should normally occur at about 4 o'clock crank position). The repeater counter then resets automatically, during the time that RLS-A contacts remain open - between 4 o'clock and 8 o'clock crank position.

The single stroke press control circuit must also be "latched in" by the time cam switch RLS-A opens. If your existing press control is presently adjusted to require the palm buttons to be held down until the press reaches bottom, for single stroking ("long" single stroke), it may be necessary to readjust it for a shorter duration of run button closure. (Or if you have an extra cam on your rotary limit switch, you may prefer to adjust it for the "short" single stroke and using switching contacts to connect that cam switch into you circuit only for repeater control).

3. Setup ADJUSTMENTS - FEED LENGTH & REPEATER CYCLE SPEED

The Repeater Control Systems extends the range of total stock feed for any air feed, by multiples of its single stroke length.

In general, the stroke length should be adjusted as great as possible, and the fewest number of counts used, to make total feed length with minimum possibility of error accumulation.

An example illustrating the selection of feed count and feed length for a specific job follows.

Example:

a) Assume the maximum stroke length of your air feed is 6" (15.2 mm).

b) You want to feed a total stock length of 25.625" (650.9 mm) per press stroke. (f = 26.625", 650.9 mm).

c) Calculate, 25.625 - 6 = 4.27 and use the next highest whole number for number of counts.
N = 5 (Set the counter to this number).

d) Calculate the required air feed stroke length adjustment.
L = F - N
= 25.625 - 5 (= 650.9 - 5)
L = 5.125" per stroke (= 130.2 mm per stroke)

(Adjust the air feed stroke length to this amount).

The repeater cycle speed is set by adjustment of the "Flasher" (relay TD2, in the middle of the bottom of the Control Panel). It is not set to any particular speed at the factory, and must be set to your requirement. This is done by adjusting the two knobs on the top of the relay.

The objective of setting the repeater cycle speed is to enable your particular air feed and press, which it is controlling, to operate at the highest speed the system is capable of.

The recommended procedure is:

a) <u>Check that the speed adjustment screw on the air feed is set properly.</u> Turn the speed adjustment screw, with a screw driver, clockwise until you feel it close. Then back off the screw, counter-clockwise, 1 turn. With the feed length set to the amount desired for each stroke of the air feed, thread your stock thru the air feed clamps and into the open die. Leave your press control "off" and leave the repeater selector switch "off", but turn the air pressure supply to the air feed "on". Push the manual override button on the solenoid valve (on top of the piston operated valve), and check that the stock is advanced into the die cleanly and as quickly as possible*. If the stock is advancing during the single stroke too slowly, the speed adjustment screw can be turned back out slightly. This operation should be repeated several times to check on accuracy of feed length per stroke. Normally the screw should not be backed out more than a total of 2 turns. If the feed length does not repeat accurately, it may be caused by the speed adjustment screw being open too far, and the screw should be turned in slightly.

* Actual speed of advance depends on a number of things, including the air feed model, the set feed length per stroke, the force required to pull the stock, the air supply (pressure level and line flow capacity), and the setting of the speed adjustment screw.

b) <u>Setting the counter for the desired number of strokes (Counts).</u> Before the counter can be set, the lithium battery that maintains the memory (in case of power failure) should be turned on. This is done by loosening the knurled screw (located below the keypad), lifting the clamp handle, and pulling the counter out of its base socket. Locate the (7) rocker switches on the back side of the keypad panel. Turn the number (6) switch to the "on" position to activate the lithium battery. Now check to be certain that all of the other switch positions match the positions indicated on the switch label. Reinstall the counter into the base socket, clamp, and secure with knurled screw.

To set the count, power must be supplied to the repeater. Press the "set" key. The setpoint, if any, is displayed and the panel keypads become active. The operation of the counting function and the output loads are not affected. For setpoint changes, the "SET" indicator appears on the graphics' panel. The setpoint is changed by pressing the appropriate ▲ or ▼ keypads. Pressing a ▲ key increments the setpoint digit located above the key; the ▼ key decrements the digit located above the key. If the pad is continually depressed, the digit will change every .5 seconds until the pad is released. The display will carry to the digit on the left on the (9) to (0) transition when using the ▲ pads. The display will borrow from the left digit on the (0) to (9) transitions when using the ▼ pads.

When the desired setpoint is reached, touch the "ENT" key.
The new setpoint is entered, all ▲ and ▼ keys become inoperable and "SET" disappears from the graphics' panel. If a new setpoint is entered when the unit is reset, the new setpoint will be in effect upon the next reset.

The setpoint may be displayed at any time without disturbing the counting cycle by pressing "SET". The actual valve is returned by pressing "ENT".

A keypad "lock" is provided on the counter to prevent unauthorized tampering. To initiate the keypad lock, press the work "Signal" in the Eagle Signal Logo for (8) seconds. To disable the lock to change setpoints, remove power from pin (11) and disconnect to turn battery "off". The unit will lose all setpoints and they must be reentered for further operation.

c) <u>Set the adjustable flasher by operating the system first without stock thru the air feed.</u> Remove the stock from the air feed. Turn the two adjustment stems ("on" and "off") of the adjustable flasher to approximately 20% dial setting.

Turn electric power to the repeater "on" and set the counter to (100). This will give you sufficient time for adjustments if necessary. There is no need for the press to operate during this step, but if the electrical interconnections with the repeater require it, make sure that the setup safety procedures are observed. Turn the selector switch SS1 to the start position momentarily.

The air feed will start cycling and the counter will begin to count down. If the air feed has the capability of operating faster than this, its operation will appear to be normal (i.e. the moving feed head will be seen, and heard, hitting the positive stops at both ends of travel). In order to minimize cycle time (maximize production), the two adjustment knobs must be adjusted to shorten the amount of dwell time at each of the productive stops. A minimum dwell time of (.05) sec. is required at both ends of the feed stroke (for proper clamp sequencing) that should be a visible stop of the feed head to your eyes. If the air feed does not make the set stroke length, the two knobs should be increased until the air feed makes complete strokes.

d) <u>Make a trial run with the complete system "on" and stock feed into the press.</u> Set the counter to your desired number. Feed stock thru the air feed and into the die for normal operation. Turn the system "on" and start the repeater. Check for accuracy of your total feed length after one or more complete press cycles. If inaccuracy is found, the flasher, or the feed length, may need further slight adjustments.

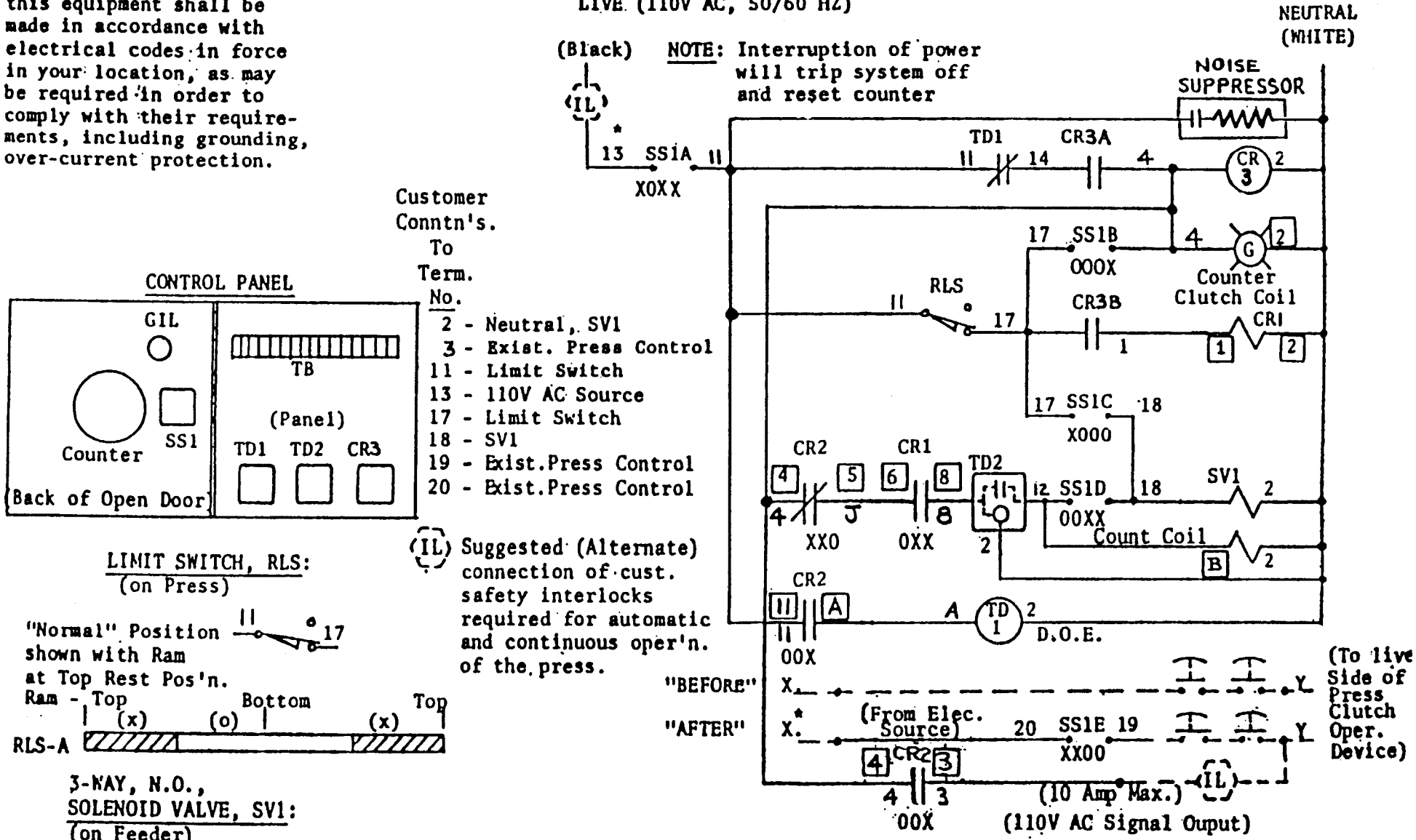
Electrical connections to this equipment shall be made in accordance with electrical codes in force in your location, as may be required in order to comply with their requirements, including grounding, over-current protection.

LIVE (110V AC, 50/60 HZ)

NEUTRAL (WHITE)

(Black)

NOTE: Interruption of power will trip system off and reset counter



CONTROL PANEL

Customer Conntn's. To Term. No.

- 2 - Neutral, SV1
- 3 - Exist. Press Control
- 11 - Limit Switch
- 13 - 110V AC Source
- 17 - Limit Switch
- 18 - SV1
- 19 - Exist.Press Control
- 20 - Exist.Press Control

(IL) Suggested (Alternate) connection of cust. safety interlocks required for automatic and continuous oper'n. of the press.

LIMIT SWITCH, RLS:
(on Press)

3-WAY, N.O.,
SOLENOID VALVE, SV1:
(on Feeder)

REP: SS1

POSITION	LEGEND PLATE MARKED
(L) 1	Press Control Feed
2	Repeater Off
3	Feed Control Press
(R) 4 (mom.)	Start Counter & Press

MODIFICATION TO EXISTING PRESS CONTROL "RUN" CIRCUIT

* Elec.Power for Repeater Control to Originate from same 110V Source Used for Press Control.

□ - indicates pin no. on counter.

ELEC. SCHEM. & INTERCONN. DIAG.
AIR FEED REPEATER SYSTEM