
SECTION F: START UP AND OPERATION

The operating sequence

The sequence of equipment operation is controlled by the Programmable Logic Controller and can be seen on the sequence chart located in the drawing folder in Section K: Machine Reference Drawings. This should be used in conjunction with the machine's electrical connection diagrams to obtain a complete understanding of the operating sequence.



The programmed operating sequence incorporates features which provide for the safe operation of the system.

Under no circumstances should the program be altered or changed in any way. The program has been written to maximize efficiency of the equipment and safety of the operator.

Altering the program in even the smallest manner could jeopardize the efficiency and safety of the equipment.

Fisher Gauge Limited cannot accept responsibility for damage or injury resulting from changes to the programmed operating sequence.

System cycling

In order to cycle the system, the control power (MCR) must be on, and the Setup/Manual/Auto key selector switch must be in the manual or auto position.

Dry cycle

At the beginning of a shift, or after any maintenance, the system should be cycled without injecting any alloy. This is called a “dry cycle”.

1. Turn the control power on.
2. Turn the Setup/Manual/Auto key selector switch to the manual position.

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3. Load the cable to be terminated into the tool.
 4. Using the handle, close the Cable Processor Module and initiate the cycle by depressing the Start push button mounted on the push button station. Once the cycle is initiated, the system will proceed through the sequence of operations. The operator should ensure the system is operating properly throughout the dry cycle.
 5. At the end of the cycle, remove the cable from the tooling.
 6. The dry cycle can be repeated as many times as necessary to ensure that the system is functioning properly.

Production cycle, manual mode

After completing a number of dry cycles to ensure the system is functioning properly, proceed as follows to produce cable terminations:

1. Turn on the torch using the Torch On illuminated push button and ignite the air/gas mixture with a suitable device. A soft, blue flame should envelop the nozzle.
2. Ensure that coolant flow valves are adjusted to allow coolant to flow through the tool.
3. Ensure the Setup/Manual/Auto key selection switch is in the manual mode.
4. Turn the injection on using the Injection On illuminated push button mounted on the push button station.
5. Load the cable to be terminated into the tool.
6. Close the Cable Processor Module and initiate the cycle by depressing the Start push button. Once the cycle is initiated, the system will proceed through the sequence of operations and produce a cable termination. Ensure that the system is operating properly throughout the cycle.



CAUTION!

Although the zinc alloy cools very quickly, the completed termination or assembly will initially be hot. The operator should exercise caution when handling.

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7. Remove the terminated cable or assembly and visually inspect it to ensure it meets specification. Components produced at the start of a production run may exhibit some cold flow. The cold flow should disappear once the tool has reached operating temperature. If cold flow doesn't disappear, refer to Section G5: Troubleshooting.
 8. Return to step 5 to continue production in the manual mode. Production may have to proceed at a reduced rate until the system has reached its operating temperature.

The operator may produce in the manual mode for the duration of the production run or may choose to produce in the automatic mode as described below.

Production cycle, automatic mode

After producing a number of cable terminations in the manual mode, proceed as follows to produce terminations in the automatic mode:

1. Turn on the torch using the Torch On illuminated push button and ignite the air/gas mixture with a suitable device. A soft, blue flame should envelope the nozzle.
2. Ensure that coolant flow valves are adjusted to allow coolant to flow through the tool.
3. Turn the Setup/Manual/Auto key selector switch to the auto position. The injection will turn off as the selector switch moves from one position to the other.
4. Turn on the injection using the Injection On illuminated push button.
5. Load the cable into the tool.
6. Close the Cable Processor Module. The cycle will be initiated when the Cable Processor Module Closed proximity switch and the Cable-In-Place pressure switch closes.

Once the cycle is initiated, the system will proceed through the sequence of operations and produce a cable termination. The operator should ensure that the system is operating properly throughout the cycle.



CAUTION!

Although the zinc alloy cools very quickly, the completed termination or assembly will initially be hot. The operator should exercise caution when handling.

7. Remove the terminated cable.

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8. Return to step 5 to continue production in the auto mode.

The operator may produce in the auto mode for the duration of the production run or may choose to produce in the manual mode following the instructions in the Production Cycle - Manual Mode section.

Note: The injection will turn off as the Setup/Manual/Auto key selector switch passes from one position to the other.

Operator's duties at the beginning of production

1. Turn the coolant on

Using the regulating valves, turn the tool coolant supply and drain on.

2. Turn the machine air supply on

Turn the machine air supply valve on at the back of the machine. The Quick Dump/Soft Start air valve will bleed air to exhaust. The valve can be reset by activating and resetting the E-Stop and then turning the control power on.

3. Replace the ingot feeder float (if used)

Carefully replace the ingot float on the surface of the molten alloy.



ATTENTION!

Failure to replace the ingot feeder float will prevent the ingot feeder from actuating when the melt pot level drops.

Operator's duties during production

1. Replenish the melt pot

The level of the alloy in the melt pot will decrease as the production of terminations or assemblies continues. The rate at which the level decreases depends upon the cycle rate of the system and the amount of alloy injected during each cycle.

The alloy level must be monitored and alloy added as required. The alloy should not be allowed to drop more than 20 mm (0.8 inches) below the full level.

Replenish alloy by removing the rear melt pot cover. Alloy should be added in a small enough quantity so as not to significantly affect the temperature of the alloy in the melt pot.

Alloy bars should be cut into small pieces. If large pieces are used during production, the melt pot temperature may drop too low.

The optimum time to add alloy is at the beginning of any pauses in production resulting from such things as change of shift, meal time, tool changes, break time, etc.

Ensure that the melt pot is not overfilled.



When replenishing alloy, ensure the ingot being added to the melt pot is dry. Splattering of molten alloy may result if fluids get below the top surface of the alloy.

Use proper protective attire when adding alloy to the melt pot as described in Personal Protective Attire and Devices in Section A of this manual.

Systems equipped with an ingot feeder

If the machine is equipped with an ingot feeder, the alloy level will be maintained automatically.

Pay attention to the amount of ingot remaining. When an ingot has been completely used up, the hook must be raised and a replacement bar must be loaded onto the hook.

Once the ingot has been loaded onto the hook, it should be lowered to just touch the molten alloy. The ingot feeder can be manually actuated by pulling the activating chain.

For a detailed description of how the ingot feeder works, turn to Section G1: Machine Maintenance.

2. Clean the tool faces

Debris may accumulate on the tool faces causing the alloy to “flash” between the tool faces. A small fin of alloy at the parting line may be evident. The tool faces must be periodically cleaned during production to ensure the tooling seals properly.

3. Skim the dross from the melt pot

Skim the dross from the surface of the melt pot once per shift. Place the dross in a suitable container until cooled, then discard.

Operator's duties at the end of production

When production is completed, or a shift is complete and a new shift does not immediately follow, the operator should:

1. Turn the coolant off

Using the regulating valves, turn the tool coolant supply and drain off.

2. Turn the melt pot off

If the timer switch is properly set, it will automatically shut the melt pot off at the end of the production shift. In this case, the melt pot does not need to be turned off using the Melt Pot On/Off selector switch.

In the event that production is complete before the end of the shift and the melt pot timer is being used to control the melt pot, the melt pot should be turned off manually using the "hand" button on the melt pot timer.

The timer should be set to turn the melt pot on approximately 2 hours before the start of the next production shift.



ATTENTION!

The alloy should not be left molten for more than two hours without producing terminations or assemblies. Failure to follow this guideline may result in the injection plunger seizing in the injection sleeve.

3. Remove the ingot feeder float (if used)

If the machine is equipped with an automatic ingot feeder, remove the float from the melt pot and store it in the holder on the ingot feeder stand. Also, pull the ingot up from the pot surface by 15-20 mm to avoid strain on the system caused by the shrinkage of alloy during solidification.



CAUTION!

The chain and float are hot. Use protective gloves when removing the float.