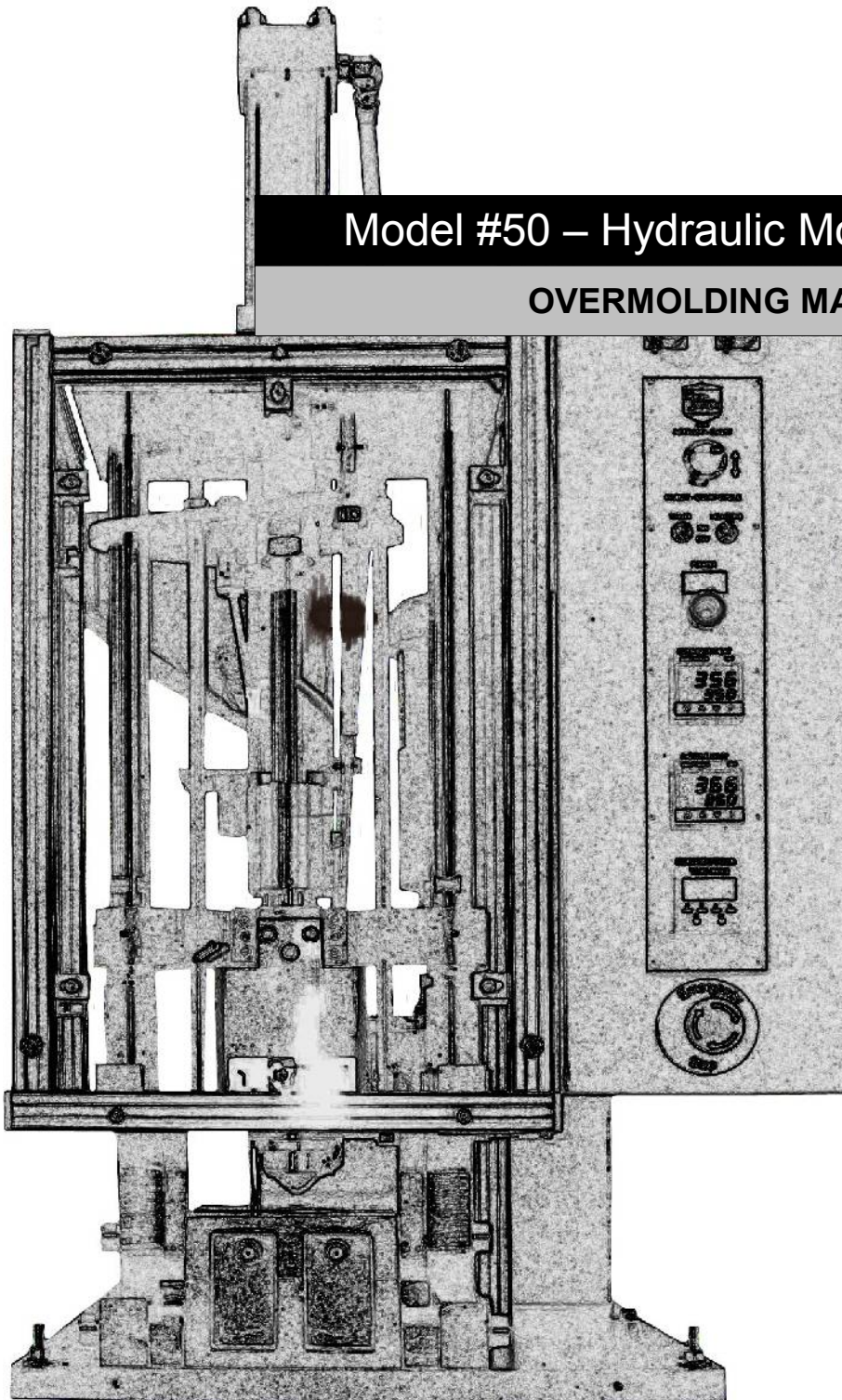


Miniature Plastic Molding

Affordable Injection Molding Machinery

Model #50 – Hydraulic Molding Machine

OVERMOLDING MANUAL



MPM

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Miniature Plastic Molding

Model #50
Overmolding Manual
Version 1.00

OVERVIEW

This manual is a supplement to the provided Operating Manual included with the Model 50 injection molding machine. The information in this manual is in addition to the information provided in the other manuals.

The Model 50 machines have an optional base known as a 'C' frame. The optional base takes the typical machine's 'V' mold base and rotates it 90°. The lower frame of the machine is also shaped so that it leaves the front of the machine open. Thus, operators can perform molding operations on long cables without having to feed the cable through the center of the machine. The option was intended to allow the end-user to repair damaged cable jackets. The purpose of this manual is to explain in more detail how to operate a Model 50 machine with the 'C' frame option.

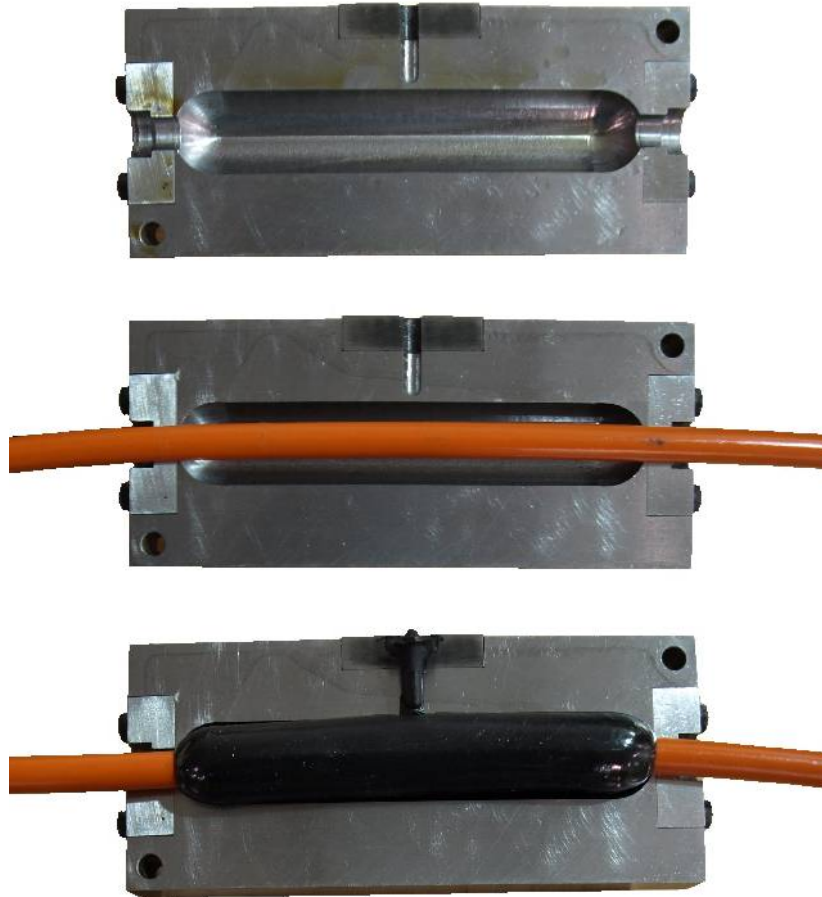
GENERAL SAFETY INFORMATION

- (1) **ALWAYS WEAR SAFETY GLASSES** when running this or other types of machinery or equipment. Make sure that the glasses are constructed of ANSI (American National Standards Institute) approved material.
- (2) Please **READ THE PROVIDED MANUALS** in their complete entirety before beginning any work on the machine. Failure to review the provided manuals may result in damage to the equipment or injury to the operator.
- (3) **NEVER OPERATE THE MACHINE WHILE GUARDS ARE REMOVED OR RENDERED IN-OPERATIVE.** The Model 50 machine does not contain a moving clamping mechanism, but there are moving parts, heater bands, and electrical devices that become potential safety hazards if the guards are removed or the machine is operated in a careless manner.
- (4) **ALWAYS SHUT OFF THE POWER TO THE MACHINE** when performing maintenance tasks. An emergency stop button is provided on the operator's panel that requires re-setting to operate again. This button should not be used for shutting down the machine for maintenance. To shut off power to the machine, use the rotary disconnect located on the main electrical enclosure. The disconnect is also equipped with a lock-out feature for servicing the machine.
- (5) **NEVER REACH INTO THE MACHINE** without taking safety precautions. There are potential pinch points, high temperatures and voltages that would present hazards to the operator if the machine were used in a careless manner.
- (6) **NEVER** have more than one person operating the machine at any time.
- (7) **MAKE SURE THE MACHINE'S STAND IS SECURE BEFORE OPERATING.** The machine typically comes with a stand equipped with casters. Before operating the machine, make sure the pads on the casters have been lowered. Failure to do so could cause the machine to move around in an unsafe manner during operation. If the machine is positioned that permits access to the rear of the unit, additional barrier guarding must be provided to prevent access.
- (8) **NEVER LEAVE THE MACHINE'S HEATERS ON FOR ANY EXTENDED LENGTH OF TIME WHEN THE MACHINE IS NOT BEING OPERATED.** It may overheat the material in the screw barrel, possibly degrading it to the point where it could explode, expelling dangerous gases.

INTRODUCTION

'V' Mold for Overmolding Cables

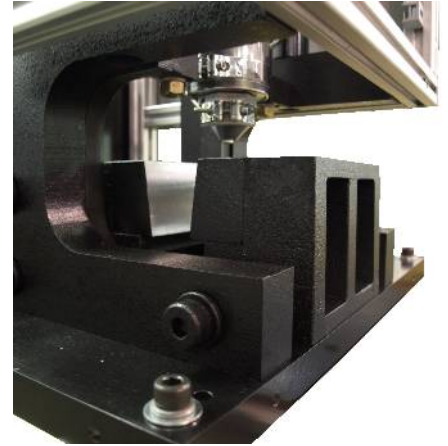
Miniature Plastic Molding offers a 'V' mold designed to overmold damaged jackets on cables. The mold contains a large pocket to surround the damaged area. Either end of the mold contains a groove large enough to hold the cable, but small enough to prevent material from squirting out. The mold shown in the pictures below have interchangeable ends for different sized cables.



INTRODUCTION

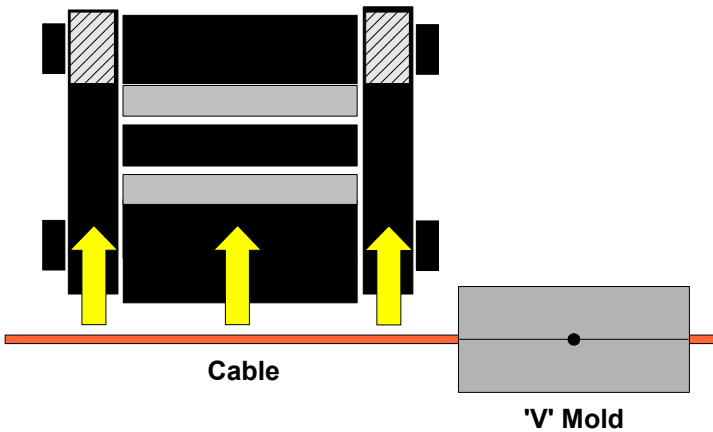
Optional 'C' Frame Base

An option available for the Model 50's is a 'C' frame base. The optional base is similar to the standard base, except it is rotated 90°. The frame has also been modified so that the front of the machine is left open. Thus, a long cable can enter the machine from the front. The 'V' mold is then loaded from the side. Operators can then repair damaged cable jackets faster and easier, versus using a clamping mechanism that would require the operator to feed the cable through.



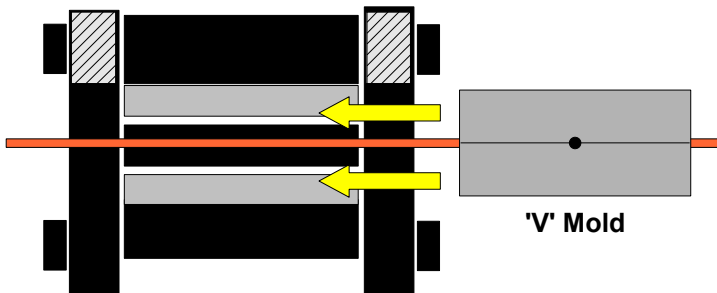
Example of Loading a Mold into the Machine

Overhead View of Base
(Top Assembly Removed)



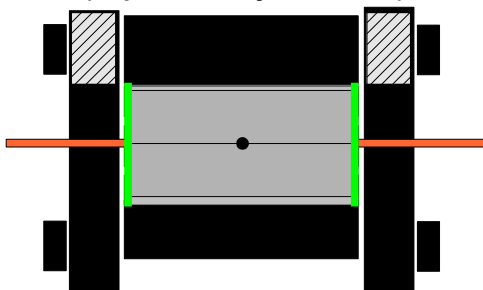
- ① Load cable into machine by entering through the front. A gap exists between the base of the machine and the bottom of the nozzle. Load the cable between this gap.

Overhead View of Base
(Top Assembly Removed)



- ② Move the cable through the center of the machine and load the mold through the side of the machine.

Overhead View of Base
(Top Assembly Removed)



- ③ Center the mold within the base of the machine so that the nozzle aligns with the opening of the mold.

Equipment Setup

Set Barrel Temperatures

The Model 50 machine has two pyrometers to control the temperature of the barrel and nozzle. Set the temperatures to the recommendation of the material's manufacturer. With cable overmolding it may be required to increase the temperature to the upper range of the material. The more the material flows, the better it will wrap around the cable. If the material is too cold, it may push the cable to the bottom of the pocket and not fully protect the cable.



DO NOT leave the material in the barrel for any extended period of time with the heaters running. After a short period of time the material might start to degrade and begin to build gases in the barrel. If left unattended the pressure could build to dangerous levels. Take precautions when purging material that has sat for a period of time at temperature. The release of material could be very violent.

It is recommend to purge the barrel of material and remove heat if the machine will not be in use. Even after a few minutes the material may be too warm to mold with and will need to be purged.

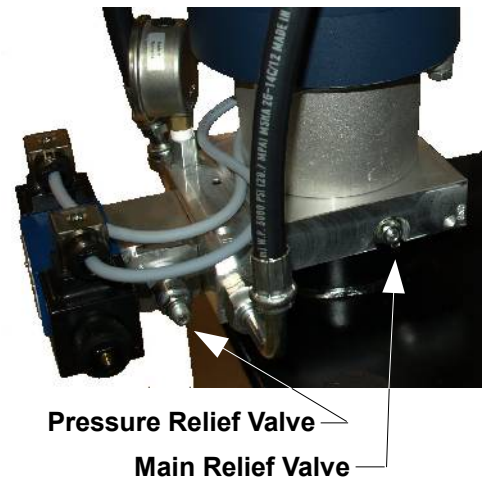
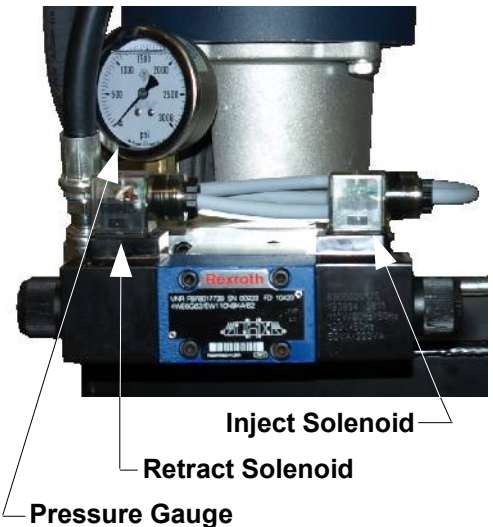
Set Pressure

When overmolding cable it may be required to lower the injection pressure. If too much force is used to push the material into the mold, it may also push the cable to the bottom of the pocket. MPM sets the maximum pressure for the hydraulic system to about 2200 PSI. This maximum is set by the main relief valve.

DO NOT adjust the main relief valve to adjust operating pressure.

Use the pressure relief valve, located under the inject/retract valve, to adjust the injection pressure. A pressure gauge is mounted on the retract port of the valve. Use this gauge to monitor system pressure when the plunger is fully retracted. To adjust the injection pressure have an operator manually retract the plunger and hold it. Another operator can adjust the pressure relief valve while monitoring the pressure gauge. Set the pressure to a desired level. Ideally, the best level is one where the plunger has enough power to move the material into the mold without dislodging the cable.

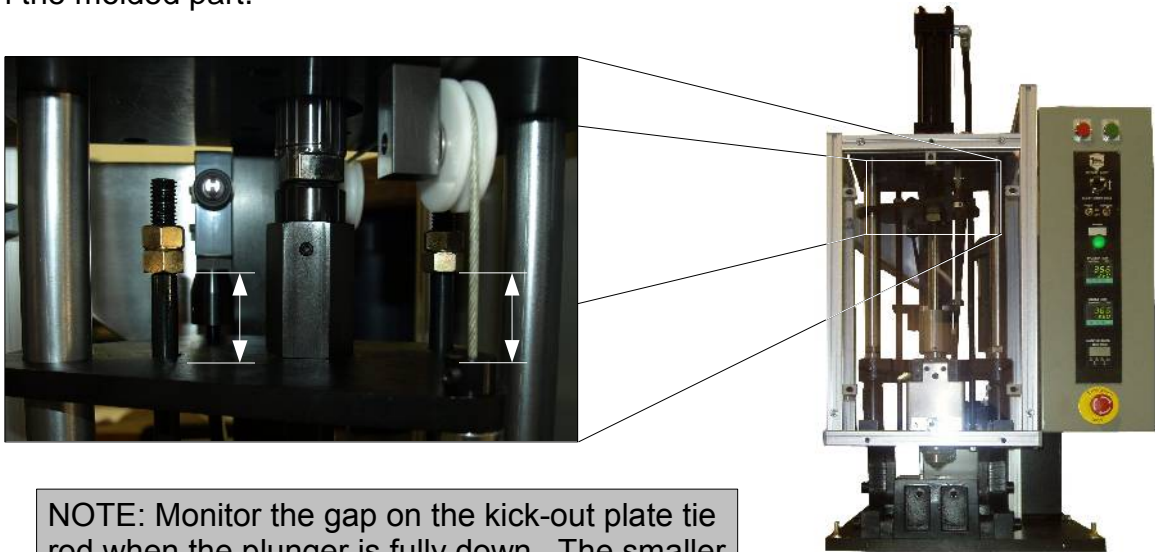
NOTE: Running at higher temperatures will allow the material to flow easier. Thus, less pressure will be required to inject material into the mold. Take care not to exceed recommended temperatures for the material.



Machine Operation

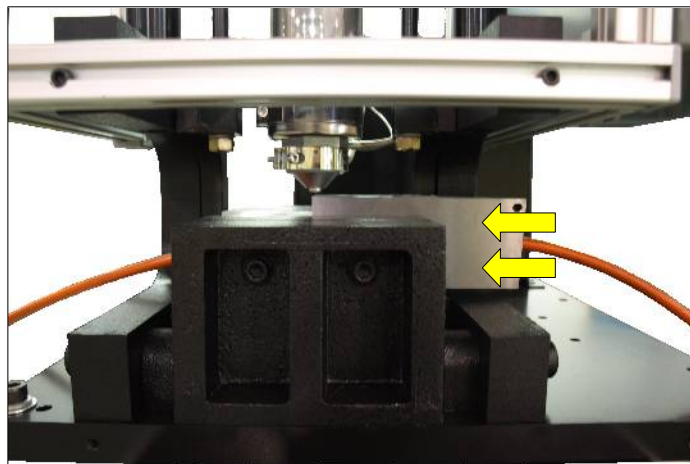
Listed below are recommended steps for cycling the machine. Use these steps as a guideline for operating the machine. Most of the steps shown are also the same steps used in standard molding applications.

(1) The first step is to prepare the shot by filling the barrel with material. When filling the barrel, do not use a mold or purge plate in the 'V' clamp. The nozzle uses a non-drool style tip, which means the tip is shut off when not pressed against a mold. To fill the barrel requires cycling the plunger up and down several times. The non-drool tip will prevent any material from escaping through the nozzle. Additional material is pulled from the hopper by the hopper piston. The hopper piston will push more material into the barrel every time the plunger pushes down. Several cycles of the plunger might be required based on the volume of the shot required. Overmolding of cables usually require a larger shot size to fill the whole chamber in the mold. Gauge the amount of material in the barrel based on the stroke distance of the plunger. As material builds up, the plunger will not stroke down as far. It is better to have more material in the barrel than needed. The extra material will help with the packing process, which removes any voids in the molded part.



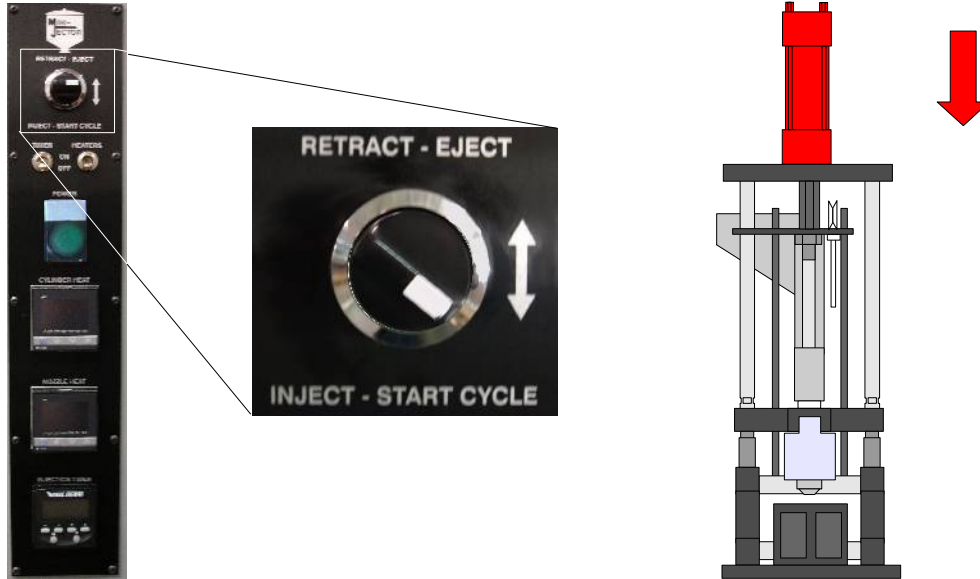
NOTE: Monitor the gap on the kick-out plate tie rod when the plunger is fully down. The smaller the gap, the more material is in the barrel.

(2) When enough material is in the barrel, insert the mold with the cable into the machine. Position the opening to the mold directly underneath the nozzle tip.



Machine Operation

(3) Manually run the plunger down to push material into the mold. The Inject/Start Cycle position is a maintained position, so the operator does not need to hold the switch to keep the plunger from stopping. To run the machine in manual operation, the timer switch is in the off position.



(4) Continue injecting until no movement can be seen on the plunger. The speed at which the plunger moves down will be based on the temperature of the material and the injection pressure. Expect this portion of the cycle to take over one minute before the plunger finishes moving; this is good as the cable is not likely to be displaced.

(5) Once the plunger has stopped moving, continue to run the plunger down to finish the pack on the molded part. Packing will try to fill any remaining voids. If the plunger has not moved in a 3-5 second span, then the packing phase is complete. Running the plunger for a longer period of time will not hurt the plunger. It will draw heat out of the nozzle and into the mold. The mold may become hot to the touch. The use of gloves is recommended. Drawing heat out of the nozzle may require more time between cycles for the heaters to recover.

(6) Once the pack is complete, manually retract the nozzle off of the mold. Make sure to run the plunger all the way up. As the plunger retracts, the kick-out plate underneath the mold will raise the mold out of the 'V' clamp. Remove the move and cable from the machine.

OPTIONAL: Turn the timer switch to the on position to allow automatic operation. Run a few cycles in manual to determine how long to set the timer. When the timer reaches the set time, the nozzle will retract automatically.