



# MAC Feed Systems

Models 63/1063/2063

## MAC Feed Systems

- ✓ **Efficient and Economical**
- ✓ **Modular Design with Maximum Flexibility**
- ✓ **Meets a Wide Range of Applications**
- ✓ **Precision Manufactured for Quick Assembly**
- ✓ **Handles Bars, Tubes, and Billets**
- ✓ **Diameters from 1/8" to 7 1/2"**
- ✓ **AMFT/PLC Controllers**



MAC' model 2063 Feed System accommodating material from 1" to 7 1/2" diameter, an Echomac® ultrasonic rotary on Dual Pinch Stands and FD-4 electronics with an AMFT Programmable Controller.

## Description

MAC's Feed systems are the ideal way to provide mechanical handling of bars and tubing as they enter and leave a test station.

MAC's long years of working closely with nondestructive test users in manufacturing plants mean these Feed Systems are designed to withstand the hard use of production environments, while still being economical, easy to install and readily adaptable to changing needs.

Precision manufactured, the MAC Feed Systems do not require special skills or equipment to install. The modular design permits quick assembly into many

configurations to handle various lengths of material, and allows for later additions or changes. Both round and hexagonal material can be accommodated.

For many products, automatic operation can be supplied, feeding the material from the incoming racks to the channel roll sections, through the tester, out to the run-out channels, with delivery to the appropriate accept or reject pockets, all without any manual assistance.

To provide rapid, automatic operation, all rolls in the channel sections are generally driven, utilizing one or more AC frequency

controlled motors and a central controller. MAC feed system controls include an automatic/manual feed and throw-off control box (AMFT) and a programmable logic controller (PLC) to regulate and monitor the entire system.

Three basic models; 63, 1063 and 2063 are offered. Each is designed to handle specific size ranges of materials (see Table 1). Complete layout drawings are supplied by MAC for the customer's approval prior to manufacture. MAC can also supply flat roll feed systems (model 203) for special applications.

- ✓ MAC eddy current, flux leakage, and ultrasonic equipment can be fully integrated with MAC feed systems to provide a totally automated line.

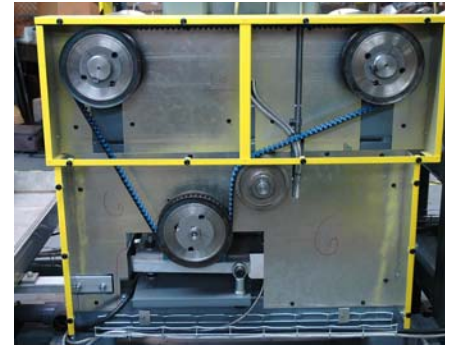


Slide & Elevate Mechanism for an Echomac® UT rotary.

- ✓ MAC also supplies slide and elevate mechanisms for the proper positioning of the test equipment in relation to the feed system and the material under test.
- ✓ The exit side of the testing system is configured to allow automatic sorting of defective material, or of different grades of material. Up to 4 receiving pockets are possible for separation of the material.



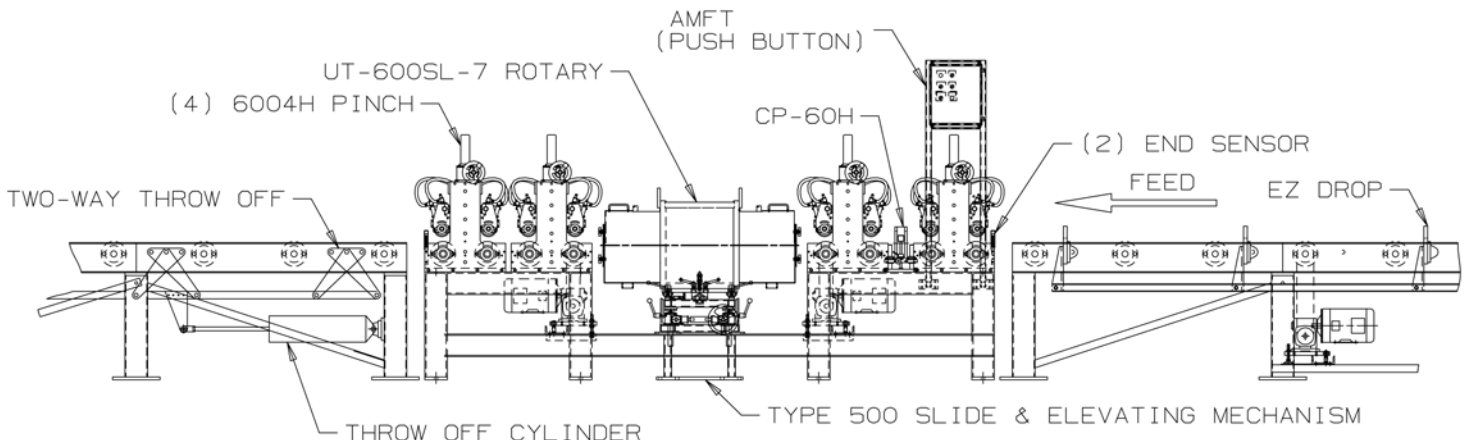
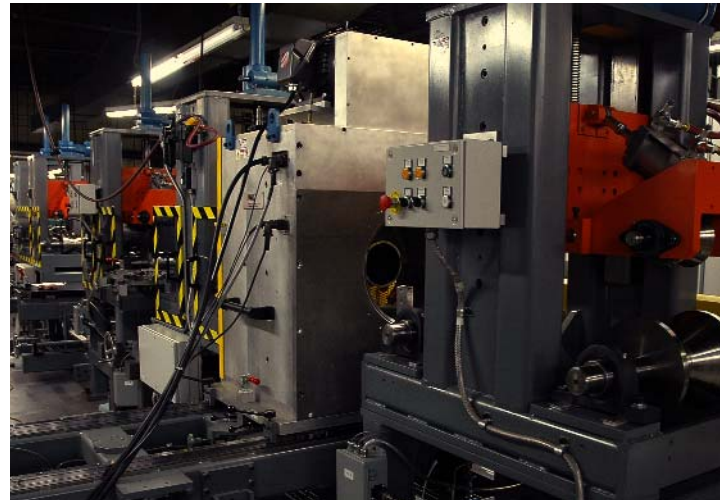
The picture shown above includes MAC's incoming feed rack (top left) with intermitant stop arms and a channel roll conveyor. The center section, which contains a test coil is installed between the incoming and outgoing channel conveyors. The receiving pockets, shown towards the bottom include the easy down hardware.



Belt Drive

- ✓ MAC feed systems may incorporate a belt drive or a chain drive, depending on the application.
- ✓ Conductor control systems incorporated with AMFT and PLC controllers can be networked for real time data analysis and interpretation.

\* Longitudinal and transverse Rotoflux® flux leakage testers, an Echomac® ultrasonic tester, a demagnetizer, all mounted on a slide and elevate mechanism with a dual pitch stand "v" roll test bench and controlled by a Conductor Control System and PLC.



The drawing above demonstrates MAC's easy drop feature and feed, dual pinch roll stands, an Echomac® ultrasonic rotary, and a two way throw off all controlled by the AMFT.

# System Components

## Feed Racks

MAC feed racks consist of a series of welded steel sections braced to accept a standard bundle of material. The racks are usually topped with a 3/4" strip of Herculon®, ultra high molecular weight polyethylene to provide long wear and prevent marking.



Eight foot wide sloping feed rack composed of five six foot sections. Racks are topped with Herculon® strip.

## Intermediate Stop Arms

Stop arms can be installed part way up the feed rack to hold back part of the material, or allow bundles to be broken. The arm is placed in the full "up" position when a bundle of material is placed on the Feed Rack. They are then lowered gradually (controlled by an electrically operated air valve) to allow a limited number of bars or tubes to spread out on the Feed Racks.



Intermediate Stop Arms hold back bars from a bundle that has just been broken out onto the Feed Rack in a bar mill.

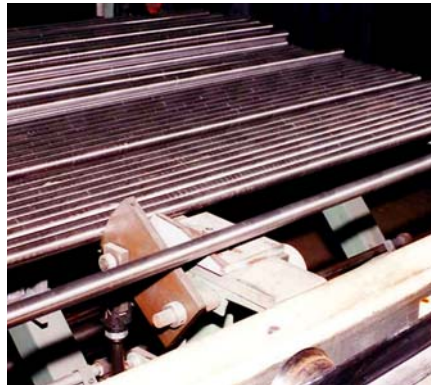
## Pneumatic Release Mechanisms

The release mechanism holds back the material on the rack and releases one piece at a time onto the Channel Roll Sections.



The picture above shows the stop arms on an incoming feed rack which can either hold back bundles or individual tube, bar, and billets based on the application.

The material slides down the feed rack and the release mechanism (shown below) is raised to feed one bar at a time onto the channel roll section.



## Channel Roll Sections

Six foot long (1.89m) Channel Roll sections, each with a series of 120° "V" rolls mounted between the channels, provide the basic unit for feeding the material to and from the tester. Each roll is individually adjustable for vertical and horizontal displacement to allow exact alignment of all the rolls with respect to each other.

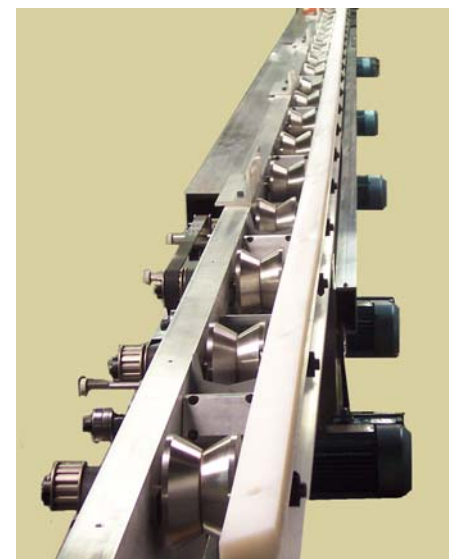
Rolls are available in urethane, steel, or hardened steel,

depending on the application and system specifications. Rolls are belt or chain driven, and chain covers and sprockets are included.

The Channel Roll sections interlock to form a continuous table, supported by Base Units installed at the point of interlock and affixed to the floor. A minimum of two channel roll sections are interlocked for the input and two for the output. The design ensures more than adequate load bearing capacity and rigidity for the application.

## Easy Drop Release

The "Easy-Drop" attachments are mounted between rolls in the incoming channel sections. Separate controls are used to gently place the bar or other material on the V rolls in the Channel Sections from the Feed Rack. This prevents undue wear and misalignment of the rolls when heavy material is being handled. The mechanism consists of a padded V section which catches the bar when initially released, and then folds downward to place the bar on the moving V rolls.



Channel Roll Sections

## Throw-Off Attachments

Throw -Off attachments may be mounted between any two rolls in a Channel Roll section. They consist of two cone-shaped rollers, which are activated independently to throw material in the correct direction. The exact number of Throw-Off attachments used depends on the length of the material being handled. The Throw-Offs are activated by air cylinders which are controlled by the AMFT or PLC which receives signals from the tester's automatic controls.

## Transfer Arms

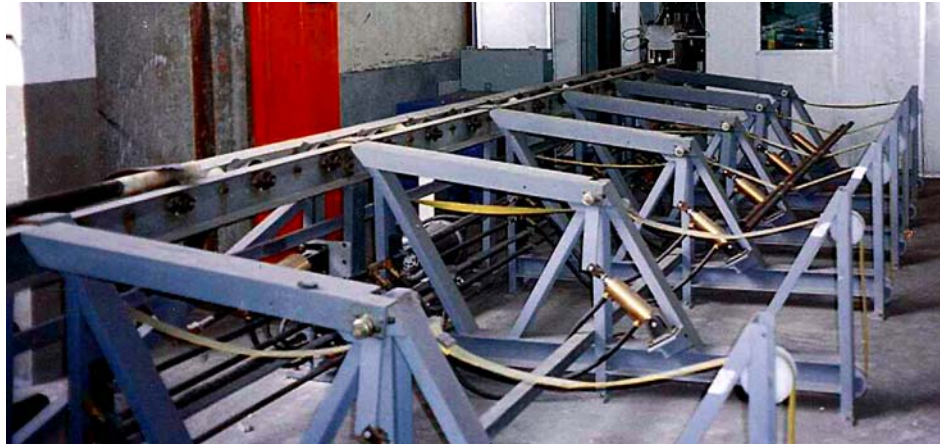
Transfer arms are used where receiving pockets can only be positioned on one side of the line. They lift to permit material to be dropped in the accept/reject pocket, when called for by the instrumentation.

## Receiving Pockets

Receiving Pockets are used to accept material ejected from the Channel Roll Sections. They are made of welded steel channel and can be provided with or without "easy down" hardware to reduce the noise and impact when material is dropped into an empty or partially filled pocket.



Easy Down hardware



Shown above are the exit channels and receiving pockets for a large feed system installed in a tube mill in China. Since both accept and reject pockets are positioned on the same side of the line, transfer arms are used. They are shown in the "down" position. Easy Down straps can be seen in the receiving pockets.

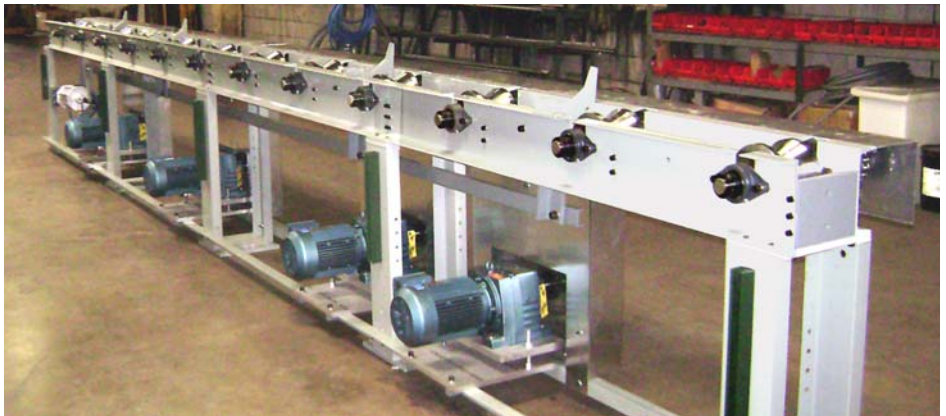
## Easy Down Hardware

The Easy Down Hardware consists of high strength nylon straps attached to heavy duty springs. The springs are available in three tension strengths to match the anticipated load in the pocket.

Controller to adjust speed, push-button forward/off/reverse switch, main disconnect switch, and suitable tensioners, and guards for attachment to the rolls.

Motor Assemblies usually include up to four motors, rated

## Motor Assemblies



Channel Roll Sections with Motors

To provide suitable drive power to MAC Feed System Channel Roll Sections, one or more AC Frequency Controlled chain or belt drive motor assemblies are utilized.

The number and horsepower of the motors is selected on the basis of the weight and length of the material being driven.

Motor Assemblies are packaged combinations of motor(s), gear reducer(s), an A/C Frequency

1, 2, 3, or 5HP, with two speed ranges, providing test speeds up to about 250 fpm in the low range, and up to about 600 fpm in the high range. Speed can be varied in all motors simultaneously over an approximate range of 8: 1.

Electrical service must be 3 phase, 460 Volts. Motor Assemblies for other input power are available at a small additional cost, if specified at time of order. Drawings are available upon request.

# System Controls



Conductor control system and PLC for the control of a MAC multi test system \* Described on back cover

## AMFT/ PLC Programmable Controller

The Automatic/Manual Feed and Throw-Off programmable controller (AMFT) provides for automatic, or automatic/manual, operation of the feed system, when used with appropriate inspection equipment.

In the manual mode, the AMFT provides for push button release of the bar or tube from the Feed Rack to the Channel Roll section, and throw-off in either direction.

In the automatic mode, the AMFT follows a simple flow cycle. Sensors or switches determine when material is in the tester and maintain the release mechanisms and throw-off rolls in the "down" position. When the material leaves the tester, the appropriate set of throw-off rolls and release mechanisms are raised to direct the tested piece into the corresponding receiving pocket, and to release the next piece onto the incoming Channel Roll section. As the next piece enters the tester, the release mechanism resets and the



Conductor Control System

"throw-off" rolls return to the "down" position. Test data is used to preset appropriate inputs and outputs to the AMFT so that the correct set of "throw-off" rolls are raised.

The Programmable Logic Controller (PLC) is designed for multiple inputs and output arrangements, extended temperature ranges, immunity to electrical noise, and resistance to vibration and impact. PLCs are armored for severe conditions (such as dust, moisture, heat, cold) and have the capability to handle extensive input/output (I/O) configurations.

## Conductor Control System

The Conductor Control System is an independent computer with interfaces and software to allow the control of multiple test instruments and pinches. In addition the computer can be used as an interface tool between the test line and plant network so that data can be collected, analyzed, and passed on to the network.

When used to control a test bench, all parameters to be set, can be stored in the computer memory and when a new dimension/test is at hand, the computer loads all information to the test electronics and then changes all the mechanical settings as well as the electronics testing parameters automatically. Only adjustment /changes of sensors must be done manually.

Working with the computer is simple with logical menu structures. If an AMFT/ PLC is being used to control mechanics it too can be given instructions through the Conductor computer.

# Feed System Specifications



Outlet conveyor with accept/reject receiving pockets sorting to the left and the right.



A combined feed system chain driven with easy drop incorporating technology from MAC and its subsidiary MA Nordic in Sweden.

Model №	63	1063	2063
<b>Size Range Of Material (1)</b>	1/8" - 1 1/2" 3.175mm-38.1mm	3/4" - 3 1/2" 19.05mm-88.9mm	1" - 7 1/2" 25.4mm-190.5mm
<b>Channel</b>	4" (101.6mm) wide Aluminum	6" (152.4mm) wide Aluminum	8" (203.2mm) wide Steel
<b>Roll Size</b>	4 1/16" dia. x 1 1/4" wide (105mm x 31mm)	5 1/8" dia x 3 1/8" wide (129mm x 79mm) -or- 5 3/8" dia x 3" wide (137mm x 76mm)	6 5/8" dia x 5" wide (168mm x 127mm)
<b>Roll Material</b>	Urethane, Steel, or Hardened Steel	Urethane, Steel, or Hardened Steel	Urethane, Steel, or Hardened Steel
<b>Channel Sections</b>	6' Long 1.8m	6' Long 1.8m	6' Long 1.8m
<b>Rolls Per Section</b>	3-6	2-4	3
<b>Standard Height (2) Base &amp; channel from floor to apex of roll</b>	33 3/64" 839.39mm	35 3/4" 908.05mm	35 3/4" 908.05mm
<b>Feed Tables</b>	4' 6" or 8' 1.2m, 1.8m, 2.4m Flat or Sloping	4' 6" or 8' 1.2m, 1.8m, 2.4m Flat or Sloping	4' 6" or 8' 1.2m, 1.8m, 2.4m Flat or Sloping
<b>Notes:</b>			
(1) When determining the Model to select, the weight and finish of the material being handled as well as the diameter must be taken into consideration. For example, hot rolled 3 1/2" (89.9mm) diameter steel bars would probably require the 2063 Model rather than the 1063 Model.			
(2) The supporting bases can be designed to a different height to meet the customer's specifications.			
(3) All quotations include a complete engineering drawing of the proposed Feed System.			