WAYNE TRAIL TECHNOLOGIES, INC.

Mechanical/Electrical Instruction Manual

W00102 – ITW CIP

WTTBD-II Transfer System

The purpose of this manual is to instruct everyone involved with the safe application, installation, usage, and care of this machine.

This manual must be used as supplementary information and combined with the Employer's/User's training and supervisory program, which is expected to contain safe and commonly known good work methods that have not been repeated within this manual, for the safe and proper application, installation, usage and care for this machinery.

Only persons who thoroughly understand and comply with this manual are qualified to apply, install, use and care for this machinery.

This manual should always be readily available to all persons involved with this machinery allowing them to maintain familiarity with all warnings and instruction. The machine manufacture assumes no responsibility in connection herewith, nor can it be assumed that all acceptable safety measures are contained in this publication. Other additional safety measures may be required under particular or exceptional circumstances or conditions.

Additional Employer/User responsibilities are specified throughout this entire manual and should be understood and complied with.

We thank you for selecting our product. Our reputation is known for designing and manufacturing safe and productive machinery.

Introduction

The purpose of this manual is to instruct everyone involved with the safe application, installation, usage, and care of this machine.

⚠ DANGER

This manual must be read and thoroughly understood before applying, installing, using, or caring for this machinery. Failure to comply may cause injury to yourself or others.

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IMPORTANT

DEFINITIONS AND RULES FOR SAFE CARE AND USE

THIS SYMBOL POINTS OUT IMPORTANT SAFETY INSTRUCTIONS WHICH, IF NOT FOLLOWED, COULD ENDANGER THE PERSONAL SAFETY OF YOURSELF AND OTHERS. READ AND FOLLOW ALL INSTRUCTIONS AND PRECAUTIONS IN THIS MANUAL BEFORE ATTEMPTING TO CARE FOR OR USE THIS MACHINE.

THIS SYMBOL OF A LIGHTING FLASH WITHIN A TRIANGLE IS INTENDED TO ALERT THE USER TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" WITHIN THE PRODUCTS ENCLOSURE THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.

⚠ CAUTION

Identifies safe practices or indicates unsafe conditions where failure to follow instructions or heed warnings could result in:
PERSONAL INJURY.

⚠ WARNING

Identifies safe practices or indicates unsafe conditions where failure to follow instructions or heed warnings could result in:
SEVERE PERSONAL INJURY.

⚠ DANGER

Identifies safe practices or indicates unsafe conditions where failure to follow instructions or heed warnings could result in:
SEVERE PERSONAL INJURY OR DEATH.

SAFETY INSTRUCTIONS

⚠ DANGER

It is the employer's responsibility to comply with the Occupational Safety & Health Administration's General Industry Standards, Part 1910, Title 29, of the Code of Federal Regulations.

Throughout this manual the word "user" means any individual, partnership, corporation or other form of enterprise which employs, contracts with hires, benefits from, or is responsible for the persons who install, set-up, adjust, operate, service, maintain, repair or work on or around machinery originally manufactured by WTT.

As a user, your company's safety program must involve everyone in your company, from top management and supervisors to operators, service and maintenance personnel, since only as a group can you identify and resolve any operational and safety problems. It is the user responsibility to implement and communicate the information and material contained in this manual to all persons involved with this machinery. Where a language barrier or insufficient training would prevent a person from reading and understanding the content of this manual, the user must either translate this information or have it read or interpreted to the person, with assurance that is understood.

It is the user's responsibility to interpret and explain all safety precautions and signs to persons who do not read or understand English before they are allowed to use and care for this machinery.

⚠ DANGER

Only persons who thoroughly understand and comply with all of the given safety instructions and precautions, are qualified to use or care for this machinery. Make certain these instructions and precautions are applied immediately.

The user must decide what personal protective safety equipment is required to perform each job safely. Items such as, safety glasses, shoes, gloves, helmets, spats, protective sleeves and material handling equipment are common in the metal working industry.

The addition of safeguards is not the sole remedy for accident prevention. To realize maximum protection benefits, the safety precautions in this manual must be incorporated into the user's safety training programs. Persons involved with this machinery must be supervised and tested to determine and continually ensure that all have been adequately instructed by demonstrating with discrete repetition, their awareness and understanding of these safety precautions and instruction and the

Safety Instructions cont'd...

other applicable safety practices, codes, standards and regulations which are not included in this manual.

Many accidents occur because of a supervisor's lack of training. Due to this lack of training, the supervisor is incapable of developing the necessary safety awareness and cannot transfer safe work procedures to others.

The user must make certain that only persons who understand this machinery, its intended use, care and safety requirements and who are able to communicate this knowledge be given the responsibility of instructing, training, and supervising others involved with this machinery. The user should add additional safety precautions against hazards which result from other auxiliary equipment which he or others have combined with this machinery.

SAFETY INSTRUCTIONS - SAFETY HAZARDS

⚠ DANGER

The user of this machine must make certain that final erection and installation has not produced unsafe conditions that could result in personal injury or even death of those involved with this machinery, including third party individuals accessing or within the vicinity of the machinery and its work area.

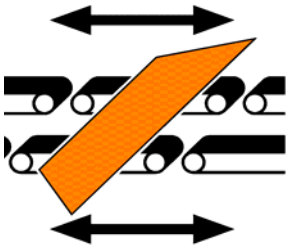
The user of this machinery should be aware of the following principal hazards and apply safeguards and safe work procedures as required.

⚠ DANGER

Hazard Type: Exposure to Electrical Shock

Safeguarding: Electrical enclosures and terminal boxes protect persons from accidentally coming into contact with dangerous voltage. Electrical lockout devices are provided to protect persons when service access to these enclosures is required.

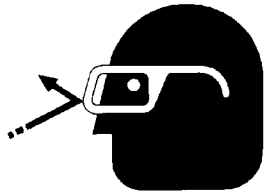
⚠ WARNING



Hazard Type: Part Transfer Hazard Zone Outside Conveyor Edge

Safeguarding: Safety barriers are provided to prevent unsafe access to the hazard zone or blank transfer pathway. Never stand inside these barriers or defeat their interlocks. Be aware that the sharp sheet metal blank edge normally extends beyond the conveyor edges.

⚠ WARNING

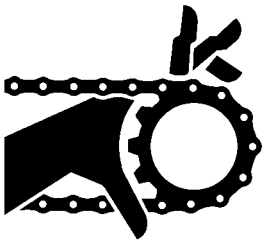


Hazard Type: Eye Hazard

Safeguarding: Always wear safety glasses to protect against airborne particles.

Safety Instructions - Safety Hazards cont'd...

⚠ WARNING



Hazard Type: Sprocket and Chain Hazard

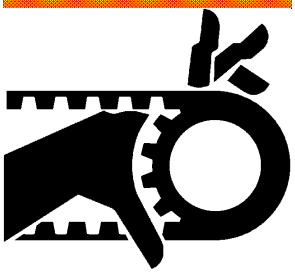
Safeguarding: Do not place, hands, feet, other parts of the body or clothing near sprocket and/or chain. Always tag and lockout before removing safeguards, adjusting or repairing. Always replace all safeguards before returning power.

⚠ WARNING

Hazard Type: Trip and Falling From Elevated Surface

Safeguarding: Always maintain balance and control by using handrails. Look for and only stand upon safe stable surfaces.

⚠ WARNING



Hazard Type: Sprocket and Belt Hazard

Safeguarding: Do not place, hands, feet, other parts of the body or clothing near sprocket and/or drive belts. Always tag and lockout before removing safeguards, adjusting or repairing. Always replace all safeguards before returning power.

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⚠ WARNING

Hazard Type: Airborne Particle/Gas/Exhaust Pressure

Safeguarding: Always relieve and exhaust pressure in a slow and controlled manner while wearing eye glasses, face and body protection.

SAFETY PRECAUTIONS

DANGER

Do not use or care for this machine until you read, understand and comply with all of the following safety precautions.

Never operate this machinery until you understand that it is dangerous equipment if you or others place your hands or any part of your body in hazardous areas. Such action could result in the loss of fingers or limbs, blindness, or even death.

WARNING

It is impossible to foresee all possible uses and applications of this machinery, therefore, it is also impossible to warn you in advance of every possible hazard or to tell you that this machinery will always be absolutely "hazard free". Your best protection against injuries to yourself or others is to always be cautious and remind yourself to think "SAFETY FIRST", before attempting any questionable, unfamiliar or infrequent physical involvement with this machinery that you have not been specifically trained for. When these situations arise, request detailed safety instructions and related training from your management before attempting any such involvement for the care and use of this machinery.

Always maintain a sense of personal safety awareness. Observe all safety warnings and practices. Be on the lookout for hazardous conditions. Report hazards to your supervisor and obtain instruction for controlling the hazard and your safety.

Stay Alert - Do not become careless or over confident. Avoid pre-occupation, inattention, distraction and talking when using and caring for this machine.

Always maintain an orderly work area. Give particular attention to the storage of tools that could be dislodged and fall or roll.

Be sure what machinery safeguards exist, their proper location and operation.

Never operate this machinery with its safeguards removed or missing. Discontinue use until all are replaced and properly functioning.

Never bypass or eliminate any safety device, feature or procedure.

Any employee who adjusts, positions or installs safety equipment, devices, guards or shields, should do so as instructed by the employer.

Always know the location and have quick access to the emergency stop controls.

Always use personal protective equipment and clothing such as, eye, ear and face protection, helmets, gloves, spats, shoes and protective sleeves as required to suit the operation.

Never exceed the maximum machine capacity. Read the entire manual for capacity limitations and additional safety precautions.

SAFETY PRECAUTIONS cont'd...

Be sure all persons are clear of the machinery before it is cycled, especially when multiple workers are present. Do not operate this machinery unless you and every operator and/or helper are protected from hazards by guards or safety devices.

Always use hand tools for feeding or retrieving hazardous material from the point of operation or any other hazardous part of the machine. Never reach through or into the clamp area for any reason.

Always maintain a machine shutdown before and during servicing, repairing, maintaining or cleaning, by tagging and locking out the electrical disconnect switch to prevent other persons from accidentally restarting the machine.

Never pull fuses as a substitute for locking out. Pulling fuses is not a safe substitute for locking out. Removing a fuse is no guarantee the circuit is dead and there is nothing to prevent fuse replacement during your exposure to the machinery's hazards.

Before caring for this machinery, try the machinery controls as a test that the power source is "OFF" and safely controlled

Always tag, lockout, vent and exhaust hydraulic and pneumatic pressure that, as stored or trapped energy, could cause dangerous machinery motion.

Always apply your own power lockout device. Do not depend on other lockouts for protection, particularly when more than one person services, repairs, maintain or cleans this machinery.

Never allow anyone other than qualified electrical, pneumatic, or hydraulic personnel to work on respective circuitry.

Always make certain all machinery components will remain in a safe position during all maintenance and repairs by using adequate physical blocking, restraint and control procedures. Never depend upon the machinery's hydraulic or pneumatic power to hold or maintain any components in a constant position.

Never over-reach, climb or stand on surfaces other than properly designated ladders, steps and walkways.

Never modify, alter or change the design installation or intended use of this machine. If it does not meet your requirements, discontinue use immediately and notify your supervisor.

Directory of Safety Literature, Standards, and Regulations

The following is a list of some of the Federal Regulations and other safety literature which users should obtain and review before operating this machinery. Each publication has been cross referenced to some, but not necessarily all, of the areas in which it is involved. Many other publications exist, such as American National Standards, and can be easily identified in the "Sources of Standards" listed in OSHA Federal Regulations below.

Safety Literature, Standard, or Regulation	Involvement Area
Code of federal Regulations #21 CFR-Subchapter J Health & Safety Act of 1968	• Laser Radiation Prevention & Control
American National Standard for Safe Use of Laser ANSI Z136-1-1993	• Laser Radiation Prevention & Control
"Accident Prevention Manual for Industrial Operations" By National Safety Council - Chicago, IL 60611	• Complete source-book for industrial safety
"Guards - Illustrated - Ideas for Mechanical Safety" By National Safety Council - Chicago, IL 60611	• Machine guarding methods and devices
"Best's Safety Directory" By A. M. Best Company - Ambest Road, Oldwick, NJ 08858	• List of safeguarding manufacturers and suppliers
Code of Federal Regulations #29 CFR OSHA Part 1910 Occupational Safety & Health Standards With Specific Attention Recommended to Following:	• Regulations for Employer's compliance
• 1910 Subpart G - Occupational Health & Environmental Control	• Work area ventilation and noise exposure
• 1910 Subpart I - Personal Protective Equipment	• Eye, ear, face, head, respiratory, hand, foot & body protection
• 1910 Subpart L - Fire Protection	• Electrical apparatus & weld flash
• 1910 Subpart O - Machinery & Machine Guarding	• Point of operation and other safeguards
• 1910 Subpart Q - Welding, Cutting & Brazing	• Installation, care and use of welding machine

Directory of Safety Literature, Standards, and Regulations cont'd...

Safety Literature, Standard, or Regulation	Involvement Area
• 1910 Subpart S - Electrical	• Electrical supply & disconnects, installation, wiring
• 1910 Subpart Z - Toxic & Hazardous Substances	• Air contamination resulting from weld process
Code of Federal Regulations #21 CFR-sub-chapter J & Safety Act of 1968	• Laser Radiation Prevention & Control
American National Standard for Safe use of Lasers ANSI # Z136.1-1993	• Laser Radiation Prevention & Control

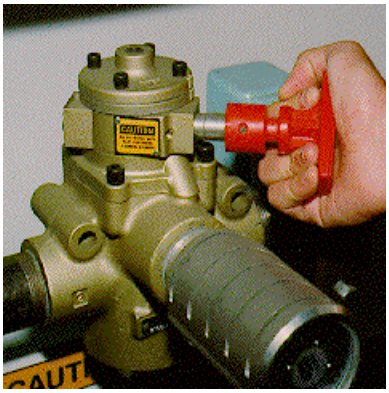
⚠CAUTION

The above directory of safety literature, standards, and regulations is intended to be used as supplementary information. Littell/VIL assumes no responsibility or liability in connection herewith, nor can it be assumed that all necessary and acceptable safety literature has been listed in this directory. Other safety information, requiring additional safeguarding measures, may be required under particular or exceptional circumstances or conditions.

Typical Pneumatic Lockout Procedure

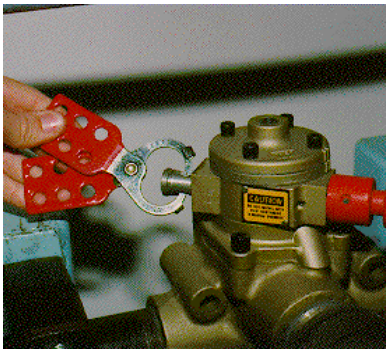
⚠ DANGER

Always apply your own OSHA approved power lockout device. Do not depend on other lockout devices for your protection.



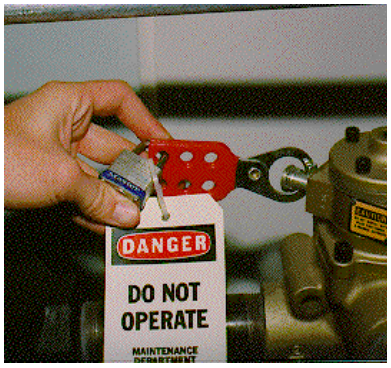
Step 1

Locate the pneumatic lockout valve for the machine or zone you wish to shut down (see safety awareness section for, power lockout and emergency stop locations contained in this manual). Before activating valve, make certain all persons are safely clear from any potential machine movement. Push the red handle fully inward to block supply of air and exhaust downstream air.



Step 2

With the red handle still pushed fully inward, insert your safety lockout device into the hole provided.



Step 3

Secure safety lockout device in place with your own padlock. Never rely on another person's padlock to maintain your safety. Attach your safety tag that informs others you have locked the area out. Before proceeding, verify that the correct machine or zone has been isolated and de-energized. Also check to be sure there is no re-accumulation of pressurized air during service and maintenance activities.

Typical Electrical Lockout Procedure

⚠ DANGER

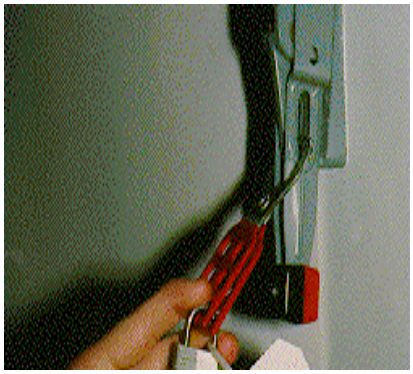
Always apply your own OSHA approved power lockout device. Do not depend on other lockout devices for your protection.

Step 1

Locate the electrical lockout switch for the machine or zone you wish to shut down (see safety awareness section for power lockout and emergency stop locations contained in this manual). Pull the switch handle fully downward to interrupt power supply.

Step 2

With the switch handle still in the fully downward position, insert the safety lockout device into the hole provided.



Step 3

Secure safety lockout device in place with your own padlock. Never rely on another person's padlock to maintain your safety. Attach your safety tag that informs others you have locked the area out. Before proceeding, verify that the correct machine or zone has been isolated and de-energized. Some equipment may store electrical energy indefinitely. This energy must be completely discharged prior to performing service or maintenance activities.

Specifications and Capacities

⚠ CAUTION

Never exceed maximum machine capacities. Failure to comply could damage equipment and result in injury to yourself and others.

Transfer Specifications:

Transfer X-Axis Feed Length (pitch)	0 – 36”
Transfer Y-Axis Feed Length (clamp)	0 – 36”
Transfer Z-Axis Feed Length (lift)	0 – 24”
Transfer Speed (strokes per minute) (Based on 25” pitch / 9” clamp / 3” lift)	25* (based on a 270 degree transfer angle)
Start and finish points of transfer motions (All Axis)	Fully programmable.
Electrical supply	480V-3Ph-60Hz ‘grounded wye’
Air Supply	90 PSI

General Application Specifications:

PRESS	***DIE***
Model: Minster E2-300	Station: TBD
Bed Size: 48” f-b x 108” l-r	Feed Manner: TBD
Stroke: 12”	Maximum Part and Tooling Weight: 200 lbs. Total*

*GENERAL INFORMATION

The transfer speed noted is based solely on the ability of the transfer to move that programmed distance. Die configuration, part configuration, and press motion can affect actual system performance.

Higher speeds may be achieved if, lesser move parameters are required or, larger motors and drives are applied. Prices for these components can be provided upon request.

The permissible movement of an axis can fall anywhere within the listed ranges and programmed accordingly. This movement can functionally be used for an application, but movements other than the values listed for the performance calculations will affect the actual SPM.

Unless otherwise noted, all references to system speed are based on standard slide motion. If a press is provided with link type slide motion, the motion must be reviewed to determine its affect on overall system speed.

Maximium Part and Tooling Weight listed is at maximum speed. Higher loads can be transferred with this system at reduced speeds. Consult Wayne Trail for analysis of system speeds when exceeding this rating.

Mechanical Installation

⚠ DANGER

This manual must be read and thoroughly understood before applying, installing, using, or caring for this machinery. Failure to comply may cause injury to yourself or others.

Receiving

Upon receiving your machine(s) it should be inspected for visual signs of damage. If damage has occurred, you should document all damages that have occurred and take photographs (if possible) and then immediately notify the carrier for claims inspection. Save any damaged packaging to substantiate the claim.

Do not discard any wrapping before looking through them closely for shipping documents, instructions and parts shipped with the machine.

The equipment should remain on the skid until it is moved to approximate its permanent location.

Initial Cleaning

Prior to being placed in its permanent location, the equipment should be thoroughly cleaned to remove any foreign particles (dust, sand, rust-preventive compounds and pieces of packaging, etc.) which may have accumulated during shipment. Use a stiff brush and /or soft lint-free rags. **Do not** use compressed air to blow off the equipment. It may drive the foreign particles into the bearings, machine slides, etc. where they may cause rapid wear or part failure.
To remove rust-preventive compounds use warm kerosene or equivalent. Use of solvents is not recommended. Many solvents are toxic and some are flammable. These characteristics present unnecessary personal hazards. Solvents may also be corrosive and cause damage to the equipment.

Guidelines for Operator Training

It is user's responsibility to provide and evaluate operator training. To assist in developing a program the following guidelines are suggested:

NOTE: The Supervisor must read and thoroughly understand this manual and be qualified before instructing or conducting training.

Have the prospective operator read the instruction manual. The Supervisor should then review the contents of the Manual with the prospective operator answering any questions he/she may have. After they have read and understand the manual ask questions to evaluate his/her understanding of the manual.

Allow the prospective operator to observe an experienced operator or supervisor running the equipment.

Once the above items have been satisfactorily demonstrated to the supervisor, allow the prospective operator to run the equipment under close supervision making recommendations and corrections as necessary.

Before assigning the responsibility to independently operate the equipment to a new operator, the Supervisor must be sure the prospective operator is fully qualified.

The Supervisor should make periodic observations to assure compliance with proper operation procedures and safety guidelines, making as needed corrections immediately.

Keep your operating instruction procedures current. Any revisions should be reviewed with the operator to assure proper and safe operation of the equipment.

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Resolver Mounting Instructions

RESOLVER MOUNTING:

1. Customer to determine the most suitable location for resolver mounting and to provide shaft extenstions/fabrications to allow mounting.
2. Place belts on press crankshaft and resolver pulleys. **NOTE: pulleys and belts to be provided by customer.**
3. Slide resolver assembly to snug belts. Check alignment between press and resolver pulley. Move resolver assembly as required to assure that pulleys are in-line.
4. Transfer hole locations from resolver mounting base to the press. Remove resolver mounting. Drill and tap for (4) ½-13UNC bolts.
5. Insert bolts into resolver base, mount, and torque.
6. Loosely install bolts in resolver mounting plate. Turn tensioning bolt in belt take-up block to snug belt. **Do not tension belt.** Tensioning of belt may result in premature failure of resolver shaft extension bearings. Torque resolver mounting plate bolts.

NOTE: Prior to running, the transfer resolver must be aligned with the press resolver. This is done by loosening the belt and rotating the synchronizer resolver by hand until the resolver readout at the transfer operators interface reads the same as the press resolver readout at the press operators station. Tighten the resolver mounting bracket as described above to secure into this position.

ELECTRICAL INSTALLATION:

1. Move electrical panel into desired position.
2. Assemble electrical connectors to motor (2) each and press mounted resolver. Reference the electrical schematics to assure proper connections. Excess cable can be coiled and placed in bottom of panel. **NOTE:** motor cables are shielded. Regardless, it is good practice to separate the power and encoder cables to reduce the risk of interference.
3. Wire press/transfer interconnects exactly as shown on feed and press schematics. If a wiring change is needed or any questions are encountered please contact Wayne Trail Technologies, Inc. immediately.

PNEUMATIC INSTALLATION

1. Connect pneumatics to existing filtered, lubricated press air system.

Transfer Mounting Instructions

MOUNTING TO PRESS:

1. Install lifting eyes into lifting holes provided on each mounting bracket.
2. Assemble lifting chains/straps to lifting eyes.

WARNING:

ASSURE THAT THE CAPACITY OF ALL LIFTING EYES, STRAPS AND CHAINS EXCEEDS THE WEIGHT BEING LIFTED AND ARE IN GOOD WORKING ORDER. WEIGHT OF TRANSFER MOUNTING ASSEMBLY IS APPROXIMATELY 4500lbs.

3. Lift clamp/lift module into the press uprights up against the mounting pads.
4. Line up and insert mounting bolts through transfer bracket and into press upright mounting pad.
5. Repeat process for opposite end module

WARNING:

DO NOT REMOVE LIFTING CHAINS PRIOR TO SECURELY MOUNTING TRANSFER TO PRESS.

6. Lift pitch drive module and place against press upright.
7. Line up and insert mounting bolts through pitch module bracket and into press upright mounting pads.
8. Install finger bars (if supplied)
9. Connect electricals per instructions (if required).
10. Home all axes.
11. Place a machinist level on the finger bars (right to left) and level accordingly.
12. Place a machinist level across the finger bars (front to back) and level accordingly.
13. Torque all mounting bolts.
14. Ream and dowel pitch drive module and clamp/lift modules to stand-off pads.

Start-Up

⚠ DANGER

This manual must be read and thoroughly understood before start-up of the equipment. Failure to comply may cause severe personal injury or death to yourself or others.

Before applying power to this system:

- Verify correct installation, alignment, and center line location of all WTT equipment.
- Visually inspect all equipment for signs of damage, loosening, or misalignment during transportation.
- Check all gearboxes for proper oil level.
- Check all pneumatic oil level
- Check all chains and belts for proper tension.
- Check all pneumatic gauges for specified, positive pressures (see pneumatic diagrams or nameplates).
- Check all lube points for proper lubrication (see lubrication diagrams).
- Visually inspect all actuators for proper operation.

General Operation

TRANSFER OPERATION

The Wayne Trail Technologies Full Servo Transfer Systems are designed to move parts through die stations within a stamping press. Identical transfer assemblies mount on both the front and rear of the press. Permanent transfer bar holders connect to these assemblies. Quick disconnects are included for pneumatic and electrical devices on both transfer bar holders. Transfer bars (quoted as an option) attach to the transfer bar holders.

Six servomotors are used to control the transfer system. Two servomotors drive each the pitch, lift and clamp axis. All servomotors are electrically "cammed" to a press driven encoder assuring synchronization and accuracy.

The transfer system includes sufficient lift to allow the die to be removed from the press. If further clearance is required see lateral or vertical die access option.

Transfer drive system is designed to be virtually maintenance free. Motor speed reduction is accomplished using precision, low backlash, planetary gear reducers. Rotary motion is converted to linear motion through high precision, helical rack and pinion systems. Helical gears are used to provide smooth operation and minimize gear noise. Lift axis is assisted by a self-contained pneumatic counterbalance system. No balls screws or belts are used in the drive train.

GENERAL CONSTRUCTION

All Wayne Trail Technologies equipment is designed with high-grade structural steel and aluminum alloy components. Low maintenance linear rails and bearings, along with other purchased items, are used when possible. Only specialized items are custom made so that the customer has the advantage of "off the shelf" replacement for maintenance purposes.

CONTROLS

An Indramat controller, drives, and servomotors are used to control the system. A CTC PC based operator interface is utilized to communicate with the transfer system. All servo axis are programmable through this interface. Features include:

- Programmable move distance, start / stop angles, and move profiles.
- Programmable limit switch outputs, programmable through the operator interface. These can be used to control grippers, valves, lubrication, blow-offs or any other auxiliary functions.
- Capacity for storage of 100 part programs.
- Transfer panel is air conditioned to ensure proper operating conditions for drives, PLC, etc.
- Operator interface is password protected so that only qualified individuals can modify part programs. A slope-faced stationary podium is supplied for the mounting of the operator interface. This allows the electrical panel to be mounted away from the press. The podium and main electrical panel must be located within 40' of each other.
- Servo cables are supplied for distances less than 30M. If longer cables are required price can be adjusted accordingly.
- Teach mode provided to allow transfer move positions to be established at the press. Positions and angles can also be entered on the operator interface.
- Virtual Axis Mode allows the transfer to be jogged in sequence, as the system would be run in continuous mode. This allows the part program to be tested without running the press.
- Individual jog functions are provided for all axis. Jog speed can be modified at the operator interface.
- Controlled "E" Stop: Transfer remains cammed to the press during a press "E" stop condition until the press motion is stopped. Then power is dropped to the transfer motors.

General Operation cont'd...

- Motion profiles can be selected from the operator interface in order to optimize part handling.
- Smart interconnect plugs are provided to assure that the correct finger bar tooling has been installed for the part selected from the operator interface.
- Alarm history is stored and available for diagnostic purposes.
- Parts counter is provided. Counter is triggered by sensor in last finger tool.
- Press angle through which part is detected by the sensors in the finger tooling, is programmable from the operator interface. These sensors are functionally checked on every cycle of the press. System configured to use PNP type sensors.
- Standard controls arranged to accommodate a maximum of 12 finger sensors (part in place) and six pneumatic double solenoid valves on each bar. Note: Valves to be supplied with tooling.

PRESS ENCODER

A high-resolution encoder is used to provide press position feedback to the transfer controller. The encoder, as provided, is shock mounted and coupled to a heavy-duty shaft extension. The customer must mount this assembly to the press and belt it to the press crankshaft.

AUTOMATIC LUBRICATION SYSTEM

An automatic lubrication system is provided to assure that each rack and pinion is periodically lubricated. A thin layer of grease is applied to the drive pinions. An individual pump and grease cartridge is supplied for each lube point. Cartridge is sized to last for approximately one year. When empty, cartridge is discarded and replaced with a new, full cartridge. Grease low level switches provided and integrated into the system controls

REMOTE DIAGNOSTICS AND MACHINE SOFTWARE

Remote diagnostic support can be enabled on most Wayne Trail Technologies equipment, provided that a suitable computer, software, connection and access permission exists on the 'customer side' of the installed equipment.

When requested, Wayne Trail can work with our customer's IT department to establish an Internet Connection between Wayne Trail and a customer supplied computer. The customer supplied computer must be connected both to the Internet and Wayne Trail's machine network. The customer must setup their software and network (i.e. a VNC server), and allow access for Wayne Trail to take control of this specified computer via the internet connection. It is assumed that the required remote connection described here can be completed without onsite support from Wayne Trail. Any onsite support that is required for software, hardware or debug of the customer supplied computer or network, will be billed additional to the customer at prevailing service & engineering field rates plus applicable expenses. Note that if programming software was not included as part of the Wayne Trail machine order, the customer is required to supply the required software.

OPERATING PROCEDURES

General Operation cont'd...

Starting the Machine:

- Place the transfer disconnect in the ON position.
- Pull out all press and transfer EMERGENCY STOP buttons.
- Press the MASTER ON/FAULT RESET button to reset the master control relay.
- Reset machine faults.

Simulate Mode:

To cycle the transfer without the press running the following procedure should be followed.

- If running a new part load the part number and build cams.
- Move the press to top dead center.
- Select Simulate mode from the side panel.
- Press MOVE TO START POSITION.
- When all axis are in position, press SIMULATE CYCLE START.
- Select the Simulate Speed in SPM.
- Select JOG FROM SCREEN, or PENDANT
- Press SIMULATE JOG FWD to simulate the press running forward.
- Press SIMULATE JOG REV to simulate the press running reverse.
- Press SIMULATE CYCLE STOP to exit the cycle.

Automatic Mode (Transfer):

To cycle the transfer with the press the following procedure should be followed.

- If running a new part load the part number and build cams.
- Select Auto mode from the side panel.
- If no parts are present in the fingers move the press to top dead center and press and hold MOVE TO START POSITION.
- If parts are present in the fingers press and hold AXES SYNC.
- When all axes are in position or sync'd, press AUTO CYCLE START.
- If starting from the Start Position the transfer will not move until the press angle reaches the Clamp In Angle.
- Run the press in any mode and the transfer will follow.
- Press AUTO CYCLE STOP to exit the cycle.

Programming a New Part:

To program a new part the following procedure should be followed.

- Load an unused recipe number.
- Select Teach mode from the side panel.
- From the screen or the front or rear hand held pendant, jog each module to the start position.
- From the setup screen for each module enter the current position for each axis into the start position.
- Jog each module to the advanced position.
- Calculate and enter the move distance for each axis based on the current position and the start position.
- Enter the desired move angles based on the clearances in the die (move windows must be 20 degrees or greater).
- Go to the PLS Setup screen from the Directory screen.
- Enter the PLS parameters for any used outputs, set all others to zero to disable.
- Go to the Part Sensor Setup screen from the Directory screen.

General Operation cont'd...

- Enter the part sensor parameters.
- Enter the number of stations on each bar
- Enter the proper Smart Bar number.
- Select the desired Cam type for the Pitch, Clamp and Lift.
- Save the job.
- Build Cams.
- Run the transfer in Simulate mode at 1 or 2 SPM to verify moves do not interfere with the lower dies.
- Exit Simulate cycle to adjust parameters and save as needed.
- Rebuild Cams if move windows change.
- Run the transfer in Automatic mode with the press in Inch Mode to verify moves do not interfere with the upper dies.
- Single stroke parts through press to assure proper handling in all die stations.

Die Change Procedure:

When changing dies the following procedure should be followed.

- Select Manual mode from the side panel.
- Press BAR UNLATCH START to remove the tooling bars.
- Press LEFT LATERAL ACCESS START.
- Change the die.
- Press NEW PART NUMBER on the side panel and enter the new part number.
- Press LOAD
- After the part is loaded press BUILD CAMS on the side panel.
- Press LEFT LATERAL RETURN START.
- Press BAR LATCH START to install tooling bars.
- Run the transfer in Simulate mode at 1 or 2 SPM to verify moves do not interfere with the lower dies.
- Run the transfer in Automatic mode with the press in Inch Mode to verify moves do not interfere with the upper dies.
- Single stroke parts through press to assure proper handling in all die stations.

OPERATOR INTERFACE:

Side Bar:

The side bar is viewable at all times on the left hand side of the screen.

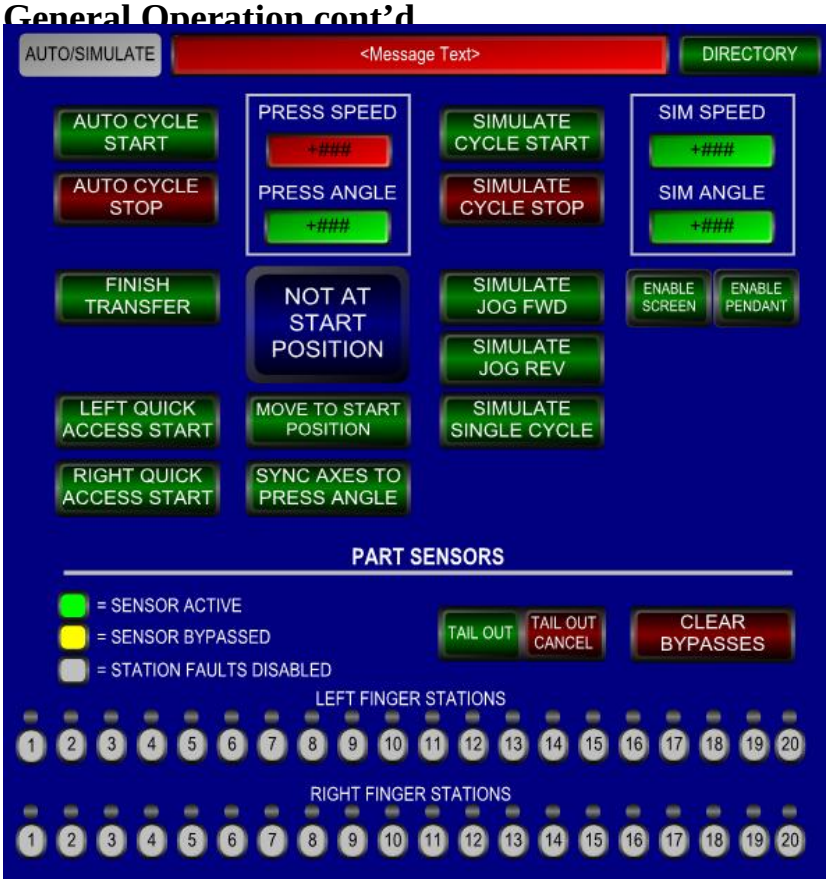
AUTO MODE: Enables Automatic Mode and changes the screen to the Auto/Simulate screen.
SIMULATE MODE: Enables Simulate Mode and changes the screen to the Auto/Simulate screen.
MANUAL MODE: Enables Manual Mode and changes the screen to the Manual screen.
TEACH MODE: Enables Teach Mode and changes the screen to the Teach screen.
BUILD CAMS: Initiates the selected cam builds.
MANUAL HELP: Displays this Operation Manual on the operator interface.

PART COUNTER: Displays the current part count.
COUNTER RESET: Resets the Part Counter to zero.
CLUTCH RELAY NOT OK: Indicates if the clutch permissive interlock relays are on.
TOP STOP RELAY NOT OK: Indicates if the top stop interlock relay to the press is on.
FAULT RESET: Resets active faults.
PITCH MAX SPM: Displays the maximum press speed the pitch axis can run after the cam build is complete.
CLAMP MAX SPM: Displays the maximum press speed the clamp axis can run after the cam build is complete.
LIFT MAX SPM: Displays the maximum press speed the lift axis can run after the cam build is complete.
ACTIVE PART NAME: Allows the user to enter the name of the part number that is currently active.
NEW PART NUMBER: Allows the user to enter the part number to be loaded when the LOAD button is pressed.
ACTIVE PART NUMBER: Displays the part number that is currently active.
LOAD: Loads the parameters from the NEW PART NUMBER into the ACTIVE PART NUMBER.
SAVE: Saves the currently programmed parameters to the ACTIVE PART NUMBER for later retrieval.
LOG ON: Allows the user to log on, different users have access to different functions and screens.

General Operation cont'd...

Directory Screen:

MESSAGE BAR: Displays operator prompts.
AUTO/SIMULATE SCREEN: Displays the Auto/Simulate Screen.
MANUAL SCREEN: Displays the Manual Screen.
TEACH SCREEN: Displays the Teach Screen.
PART NAMES: Displays the Part Name Cross Reference Screen.
LEFT PLS SETUP: Displays the PLS Setup Screen for the left transfer bar.
RIGHT PLS SETUP: Displays the PLS Setup Screen for the right transfer bar.
PLS CONTROL: Displays the PLS Control Screen.
LEFT MODULE SETUP SCREEN: Displays the Left Module Setup Screen.
RIGHT MODULE SETUP SCREEN: Displays the Right Module Setup Screen.
LEFT PART SENSOR SETUP: Displays the Part Sensor Setup Screen for the left transfer bar.
RIGHT PART SENSOR SETUP: Displays the Part Sensor Setup Screen for the right transfer bar.
BAR CHANGE SETUP: Displays the Bar Change Setup Screen.
ALARM HISTORY: Displays the Alarm History Screen.
MAINTENANCE SCREEN: Displays the Maintenance Screen.
ALARM DISPLAY: Displays active and non-cleared machine faults.
RESIZE VEIWER: Resizes the fields of the Alarm Display for better viewing.
ACK: Acknowledges that a fault has been seen.
CLEAR: Clears inactive and acknowledged machine faults.



Automatic/Simulate Screen:

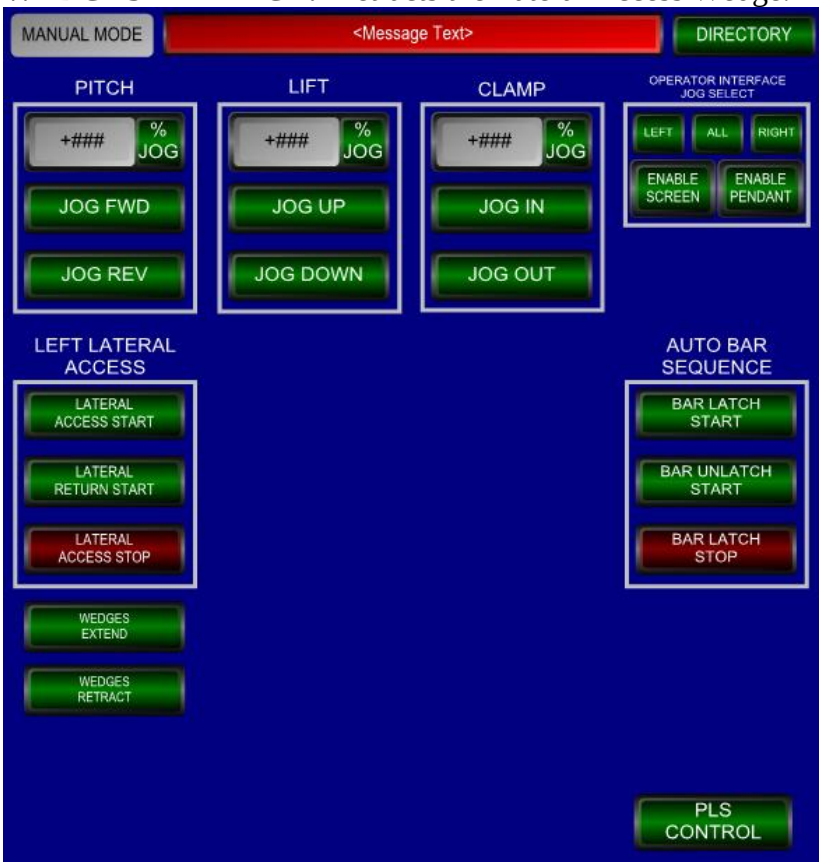
AUTO CYCLE START: Enables the transfer to CAM to the press.
AUTO CYCLE STOP: Stops the Automatic cycle.
PRESS SPEED: Displays the current press speed.
PRESS ANGLE: Displays the current press angle.
FINISH TRANSFER: With the transfer in Automatic Cycle and the press stopped at TDC, allows the transfer to move the parts to the next station and return to the Start Position.
LEFT QUICK ACCESS START: Moves the left transfer unit to the out and up position.
RIGHT QUICK ACCESS START: Moves the right transfer unit to the out and up position.
NOT AT START POSITION: Displays the status of the transfer axes (not at start, at start, or sync'd).
MOVE TO START POSITION: Moves the transfer to its starting position.
SYNC AXES TO PRESS ANGLE: Allows the transfer to sync to the press if parts are present in the fingers.
SIMULATE CYCLE START: Enables the transfer motion to be simulated using jog buttons.
SIMULATE CYCLE STOP: Stops the Simulate cycle.
SIMULATE JOG FWD: Simulates the press moving forward.
SIMULATE JOG REV: Simulates the press running reverse.
SIMULATE SINGLE CYCLE: Simulates a full part transfer and stops.
SIM SPEED: Allows the user to enter the simulated press speed.
SIM ANGLE: Displays the simulated press angle.
ENABLE SCREEN: Allows the transfer to be jogged in Simulate from the jog buttons on the screen.
ENABLE PENDANT: Allows the transfer to be jogged in Simulate from the front pendant.
TAIL OUT: Bypasses the finger stations as the press empties.

TAIL OUT CANCEL: Cancels tail out.
CLEAR BYPASSES: Enables all active finger stations.
PART SENSOR INDICATORS: Display finger sensor inputs.
1-20: Allows the user to bypass finger stations. Bypassed stations will shift with press operation.
DIRECTORY: Displays the Directory screen.

General Operation cont'd...

Manual Screen:

% JOG: Allows the user to enter the percent of max jog speed for the appropriate axes.
JOG FWD: Jogs the selected pitch axes forward to the stop position.
JOG REV: Jogs the selected pitch axes backwards to the start position.
JOG UP: Jogs the selected lift axes up to the stop position.
JOG DOWN: Jogs the selected lift axes down to the start position.
JOG IN: Jogs the selected clamp axes in to the stop position.
JOG OUT: Jogs the selected clamp axes out to the start position.
JOG SELECT BUTTONS: Allows the operator to select the axes that will be jogged from the screen, front pendant and rear pendant.
ENABLE SCREEN: Allows the transfer to be jogged in Manual from the jog buttons on the screen.
ENABLE PENDANT: Allows the transfer to be jogged in Manual from the pendant.
LATERAL ACCESS START: Moves the transfer to the Lateral Access position.
LATERAL RETURN START: Moves the transfer to the Lateral Return position.
LATERAL ACCESS STOP: Stops the Lateral Access or Return Cycle.
WEDGES EXTEND: Extends the Lateral Access Wedge.
WEDGES RETRACT: Retracts the Lateral Access Wedge.

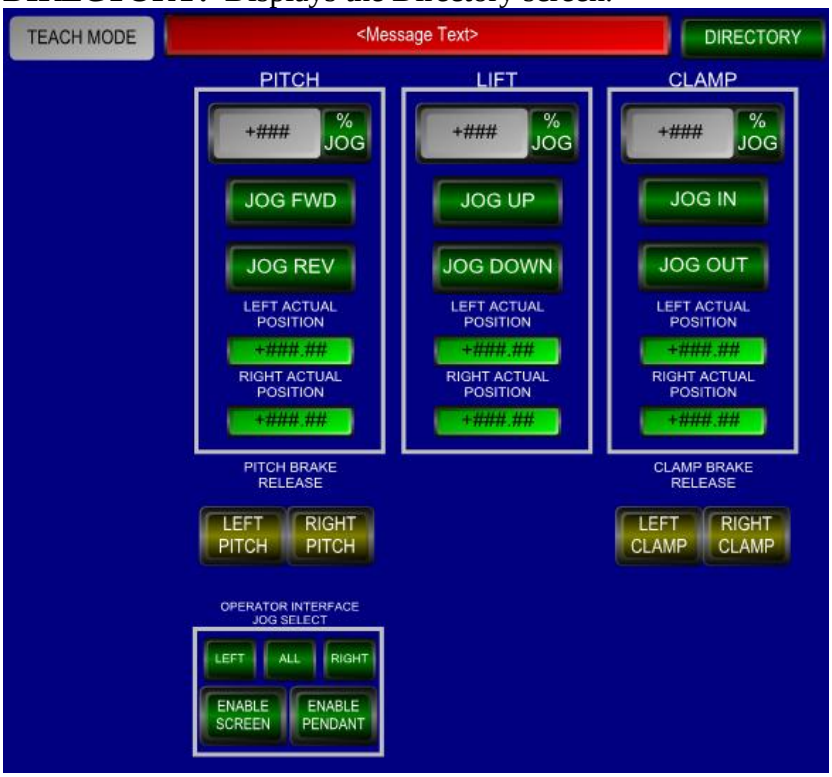


BAR LATCH START: Initiates the Auto Bar Latch Sequence.
BAR UNLATCH START: Initiates the Auto Bar Unlatch Sequence.
BAR LATCH STOP: Stops the Auto Bar Latch or Unlatch Sequence.
PLS CONTROL: Displays the control screen for individual PLS.
DIRECTORY: Displays the Directory screen.

Teach Screen:

General Operation cont'd...

% JOG: Allows the user to enter the percent of max jog speed for the appropriate axes.
JOG FWD (PITCH): Jogs the selected pitch axes to the forward limit.
JOG REV (PITCH): Jogs the selected pitch axes to the reverse limit.
JOG UP: Jogs the selected lift axes to the upper limit.
JOG DOWN: Jogs the selected lift axes to the lower limit.
JOG IN: Jogs the selected clamp axes to the inner limit.
JOG OUT: Jogs the selected clamp axes to the outer limit.
( ) ACTUAL POSITION: Displays the current position of the appropriate axis.
( ) BRAKE RELEASE: Allows the motor brake to be released when the axis is disabled so it can be moved manually.
JOG SELECT BUTTONS: Allows the operator to select the axes that will be jogged from the screen, front pendant and rear pendant.
ENABLE SCREEN: Allows the transfer to be jogged in Teach from the jog buttons on the screen.
ENABLE PENDANT: Allows the transfer to be jogged in Teach from the pendant.
DIRECTORY: Displays the Directory screen.

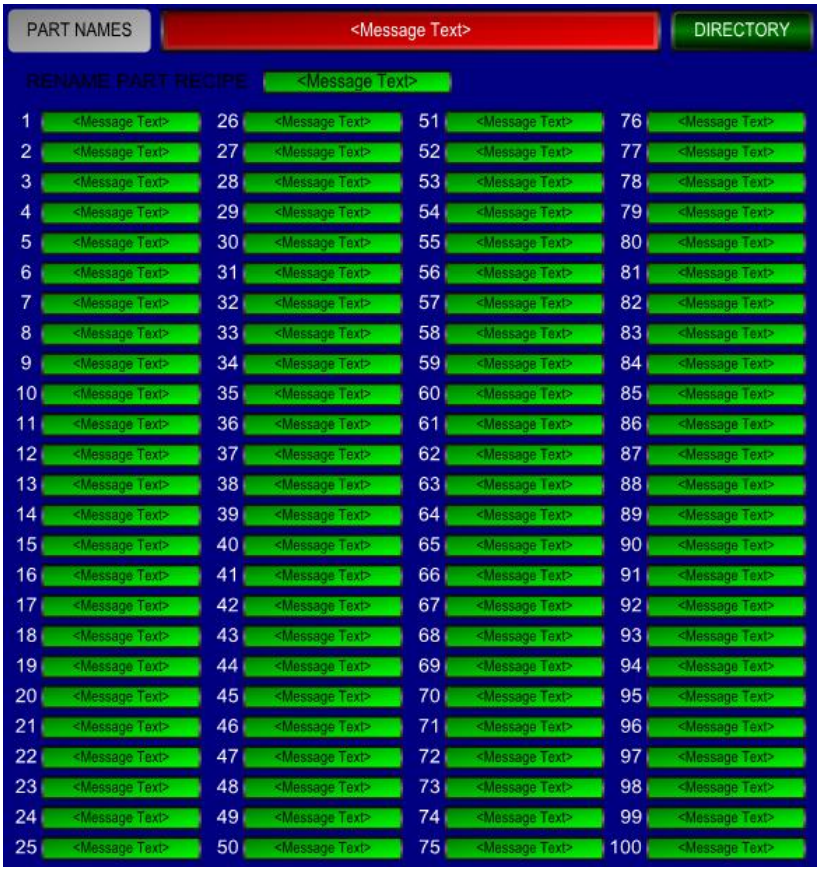


General Operation cont'd...

Part Name Screen:

Displays the alphanumeric part name that corresponds with the part number.

DIRECTORY: Displays the Directory screen.



General Operation cont'd...

PLS Setup Screen:

ON ANGLE: Allows the user to enter the press angle the appropriate PLS output turns on.
OFF ANGLE: Allows the user to enter the press angle the appropriate PLS output turns off.
LEAD TIME: Allows the user to enter the reaction time of the appropriate output device and the controller compensates for the reaction time based on the press speed.
PLS TYPE: Allows the user to select the type of actuatorto be controlled by the PLS channel.
RETRACT/EXTEND SENSOR SELECTION: Allows the user to select if the PLS channel has an extended or retracted sensor.
DIRECTORY: Displays the Directory screen.

General Operation cont'd...

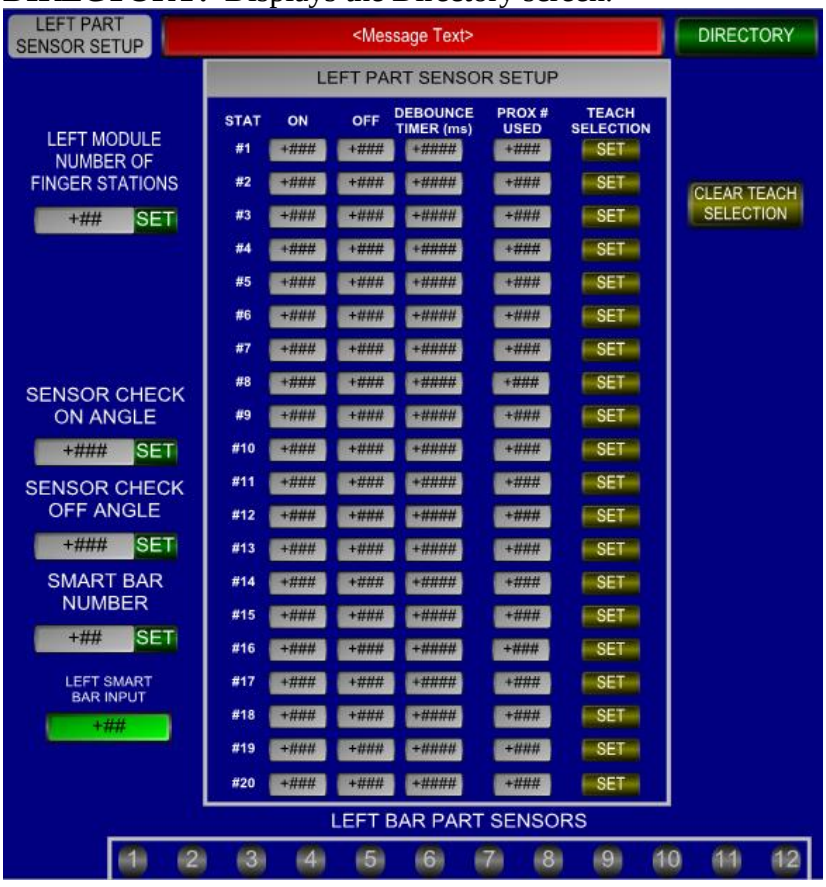
PLS Control Screen:

PLS #( ) ON: Allows the user to turn on the appropriate PLS output in Manual or Teach mode.
PLS #( ) OFF: Allows the user to turn on the appropriate PLS output in Manual or Teach mode.
MANUAL SCREEN: Displays the Manual screen.
DIRECTORY: Displays the Directory screen.

General Operation cont'd...

( )Part Sensor Setup Screen:

( ) MODULE, NUMBER OF FINGER SENSORS: Allows the user to enter the number of finger stations on the appropriate module.
SENSOR CHECK ON ANGLE: Allows the user to enter the press angle the part sensors will start being checked for failure.
SENSOR CHECK OFF ANGLE: Allows the user to enter the press angle the part sensors will stop being checked for failure.
SMART BAR NUMBER: Allows the user to enter the smart bar number to be used.
( ) SMART BAR INPUT: Displays the actual smart bar input from the appropriate bar.
PART SENSOR SETUP, ON ANGLE: Allows the user to enter the press angle the appropriate part sensor will start being checked.
PART SENSOR SETUP, OFF ANGLE: Allows the user to enter the press angle the appropriate part sensor will stop being checked.
PART SENSOR SETUP, DEBOUNCE TIMER : Allows the user to enter an amount of time that the appropriate part sensor can momentarily turn off within the part check window and not generate a fault.
PROX # USED: Allows the user to enter the prox number that will be used for the appropriate station.
TEACH SELECTION: Allows the on and off angles for the selected part sensors to be set automatically by depressing the set buttons then moving the parts in Simulate Mode. The control system records the angle when the sensors turn on and off and then adds or subtracts five degrees from those angles.
CLEAR TEACH SELECTION: Clears all the Teach Selections that are active.
( ) BAR PART SENSORS: Displays the actual part sensor inputs to aid in sensor selection.
CLEAR TEACH SELECTION: Clears all the Teach Selections that are active.
DIRECTORY: Displays the Directory screen.



( ) Transfer Setup Screen:

General Operation cont'd...

PITCH MAX SPM: Displays the maximum press speed the pitch axis of the appropriate module can run after the cam build is complete.

CLAMP MAX SPM: Displays the maximum press speed the clamp axis of the appropriate module can run after the cam build is complete.

LIFT MAX SPM: Displays the maximum press speed the lift axis of the appropriate module can run after the cam build is complete.

CAM TYPE SELECT: Allows the user to select the type of cam for each axis.

MOD SIN CAM: Modified Sine Cam type (medium acceleration, medium velocity).

5TH ORDER CAM: 5th Order Cam type (lower acceleration, higher velocity).

9TH ORDER CAM: 9th Order Cam type (higher acceleration, lower velocity).

FORWARD/UP/IN START ANGLE: Allows the user to enter the press angle the appropriate axis starts its positive motion.

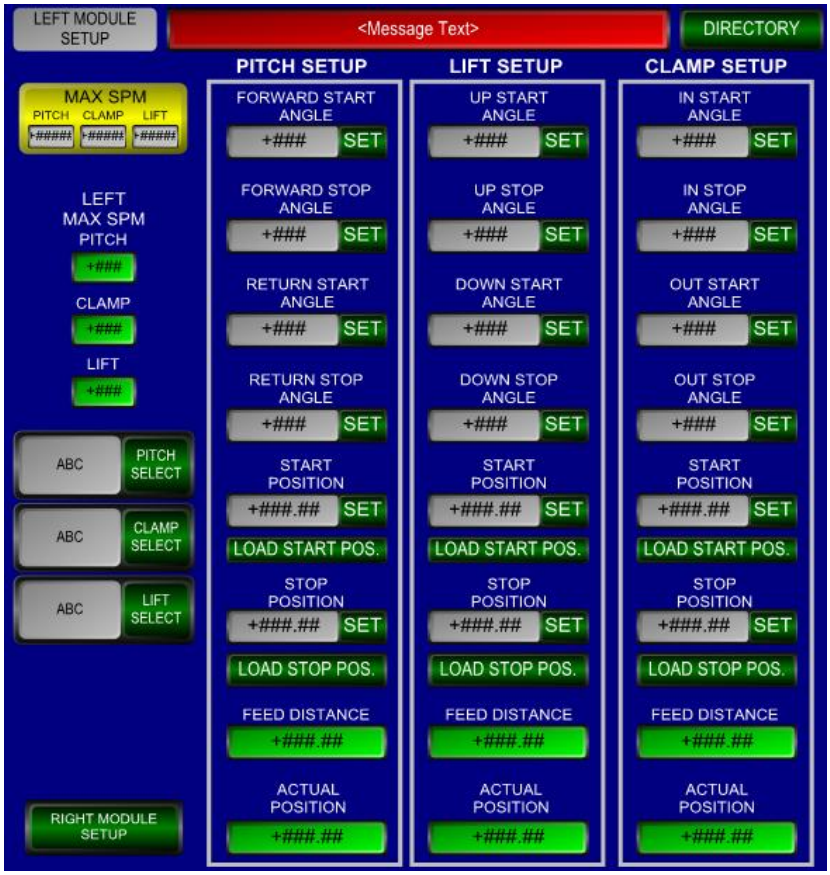
FORWARD/UP/IN STOP ANGLE: Allows the user to enter the press angle the appropriate axis stops its positive motion.

RETURN/DOWN/OUT START ANGLE: Allows the user to enter the press angle the appropriate axis starts its negative motion.

RETURN/DOWN/OUT STOP ANGLE: Allows the user to enter the press angle the appropriate axis stops its negative motion.

START POSITION: Allows the user to enter the start position of the appropriate axis.

LOAD START POSITION: Copies the current actual position of the appropriate axis into the Start Position.



STOP POSITION: Allows the user to enter the stop position of the appropriate axis.

LOAD STOP POSITION: Copies the current actual position of the appropriate axis into the Stop Position.

FEED DISTANCE: Displays the feed distance for the appropriate axis.

ACTUAL POSITION: Displays the actual position of the appropriate axis.

( ) MODULE SETUP: Allow the user to switch between the setup pages for the other modules to compare values.

DIRECTORY: Displays the Directory screen.

General Operation cont'd...

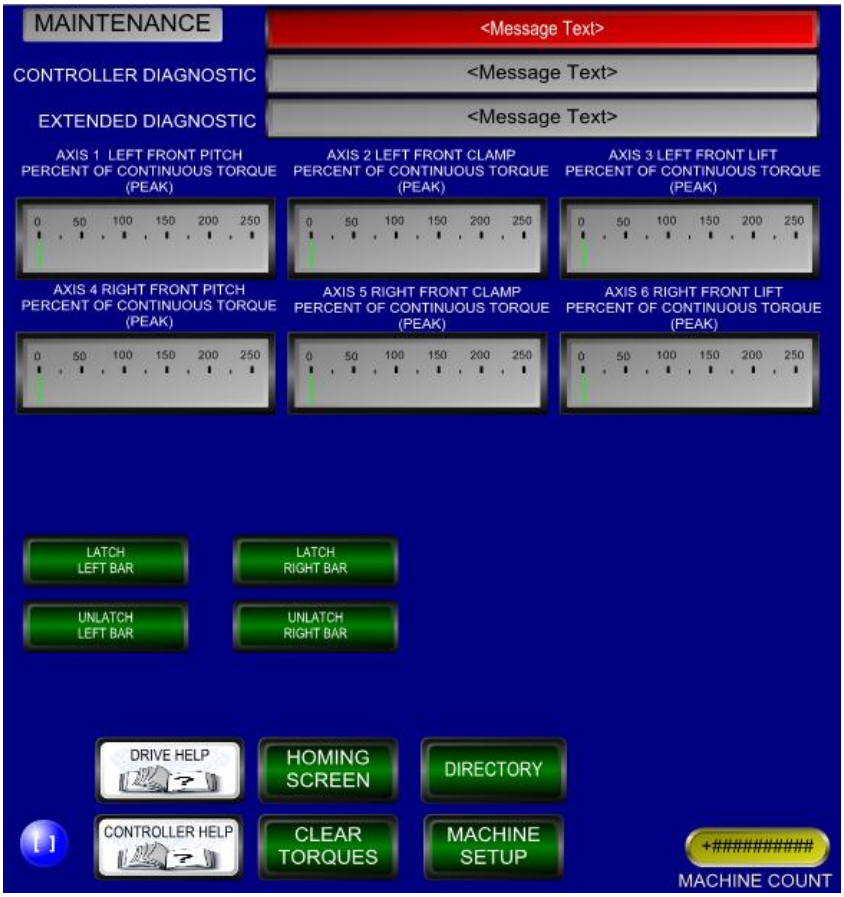
Alarm History Screen:

ALARM HISTORY DISPLAY: Displays past faults from a fault log.
ENABLE LOGGING: Enables fault logging.
RESIZE VEIWER: Resizes the fields of the Alarm History Display for better viewing.
VIEW LOG: Allows the user to select a fault log to view.
MESSAGE TEXT: Displays logging errors.
DIRECTORY: Displays the Directory screen.

General Operation cont'd...

Maintenance Screen:

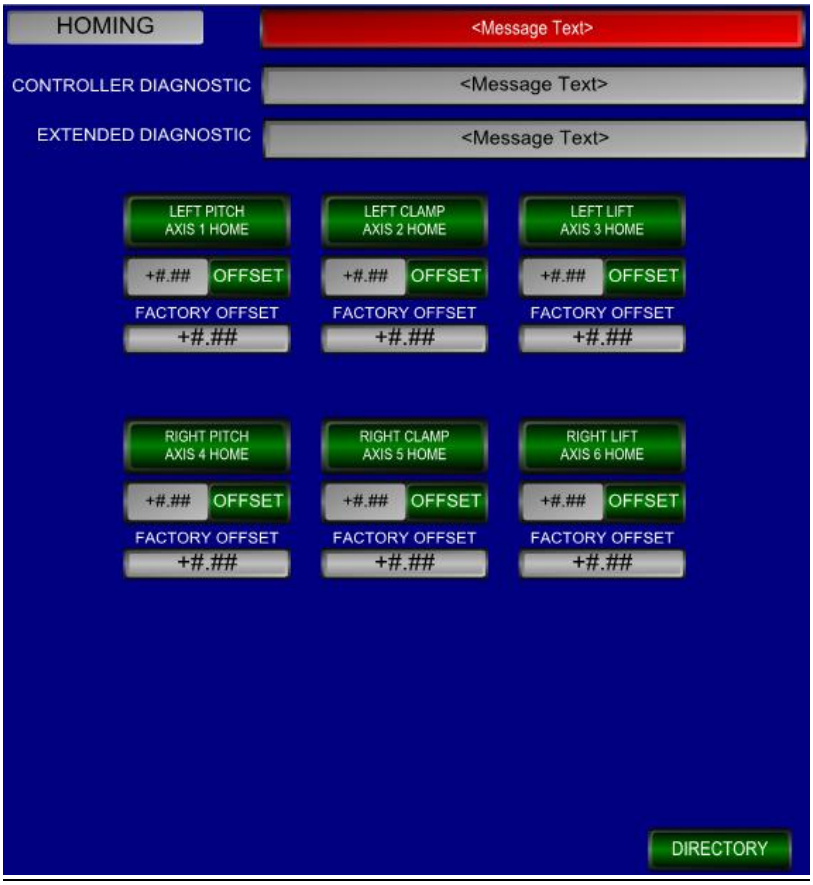
CONTROLLER DIAGNOSTIC: Displays the diagnostic message from the Indramat controller.
EXTENDED DIAGNOSTIC: Displays the extended diagnostic message from the Indramat controller.
( ) PERCENT OF CONTINUOUS TORQUE: Displays the maximum peak torque of the appropriate servo drive as a percentage of the maximum continuous torque of the drive.
[ ]: Minimizes the operator interface runtime screen so the computer can be shutdown.
LATCH ( ) BAR: Allows the operator to manually latch the appropriate auto finger bar coupling.
UNLATCH ( ) BAR: Allows the operator to manually unlatch the appropriate auto finger bar coupling.
DRIVE HELP: Displays the Indramat drive manual.
CONTROLLER HELP: Displays the Indramat controller manual.
HOMING SCREEN: Displays the Homing Screen.
CLEAR TORQUES: Clears the maximum peak torques of all drives.
DIRECTORY: Displays the Directory screen.
MACHINE SETUP SCREEN: Displays the Machine Setup Screen.
MACHINE COUNT: Displays the total number of machine cycles in automatic or simulate modes.



General Operation cont'd...

Homing Screen:

CONTROLLER DIAGNOSTIC: Displays the diagnostic message from the Indramat controller.
EXTENDED DIAGNOSTIC: Displays the extended diagnostic message from the Indramat controller.
OFFSET: Allows the user to enter the location of the negative overtravel switch with respect to the home position of the appropriate axis (a negative number is required).
( ) HOME: Moves the appropriate axis to the negative overtravel switch and redefines the home position based on the offset (homing is only required if a motor is mechanically decoupled from the drive train).
FACTORY OFFSET: Displays initial setting of the home offset.
DIRECTORY: Displays the Directory screen.



General Operation cont'd...

Machine Setup Screen:

All items on this page should be adjusted only by qualified setup personnel.

RESOLVER #( ): Displays the current press angle of the appropriate resolver.

PRESET VALUE: Allows the user to enter a new value to be loaded to the press angle.

LOAD PRESET: Sets the current press angle of the appropriate resolver to the Preset Value.

SIMULATE SINGLE CYCLE: Allows the user to select whether Simulate Single Cycle is active.

TOP DEAD CENTER INTERLOCK BYPASS: Allows the user to bypass the Top Dead Center interlocks. This can be used if the transfer needs to be jogged when the press is not in the Top Dead Center window.

DIRECTORY: Displays the Directory screen.

Preventative Maintenance Schedule

This machine was designed to require minimal maintenance. Inspect the fingers periodically for wear and proper fit. Review the servomotors to assure that oil or lubrication is not running into them. Clean if necessary. An automatic lubricator is supplied for each axis to lubricate the rack and pinions. Lifetime oilers are supplied on all linear rails except the pitch module rails, which require grease monthly.

⚠ WARNING

- **Review, understand and comply with this entire procedure and all safety warnings.**
- **Install your lockouts and tags as previously trained for this equipment.**
- **Use extreme caution when performing inspections and maintenance. Disconnect power to the transfer and press. Lock the disconnects in the off position and tag accordingly.**

Daily

- Check the machine pressure gauge settings. Check System air pressure and verify there are no leaks.
  - Main Air > 70 psi
  - Counterbalance = 40 psi
  - Lateral Access Locking Wedges = 30 psi
- Review machine for loose or broken components.
- Inspect finger tooling.
  - Tighten bolts
  - Inspect vacuum cups for wear (if supplied)
  - Inspect sensor cables for wear or fraying
- Inspect all cables (servo, prox, etc…) to ensure they are properly secured.

Weekly

- Jog all axes to travel extents. This will circulate lubricant to all areas of the gear racks.
- Visually inspect all linear bearing for excessive wear or movement.
- Verify that grease is being circulated to all lube points.

Monthly

- Remove covers and clean excess grease from all linear rails and rack and pinions.
- Apply grease to pitch linear bearing blocks.
- Actuate lubrication flow switches on all automatic gear lubricators using a magnet to verify a fault is displayed.
- Inspect felt lubrication pinions and brushes for wear and functionality.
- Reinstall covers.
- Check and tighten all bolts (see manual sheet SM-08-007 for torque specs).
- Inspect encoder assemblies (bolt torques, resolver connections and belt tensions).
- ***After 3 months of production check torque at all servo motors to gearbox coupling connections.

Preventative Maintenance cont'd…

Yearly

- If any leaks have taken place in the Clamp or Pitch axis gearbox fill with ISO Class VG220 high quality synthetic gear oil, otherwise these gearboxes are filled for life.
- Replace lubrication canisters on all gear lubricators as faults occur.
- Manually push by hand clamp and pitch axes and check for tight or loose spots.
- Inspect electrical cabinet for loose or broken wires/cables.
- Inspect all servo cables for wear and ensure they are properly secured.
- Remove covers and inspect all linear bearings and runner rails for excessive wear.
- Check and tighten main system bolts (see manual sheet SM-08-007 for torque specs).
- Check/Verify all safety functions (E-Stops, Alarms, etc…).
- Inspect jackscrews on vertical die access (is supplied).
- Check auto/manual bar change couplers for wear (if applicable).
- Check air conditioner in main cabinet and replace filter if required.
- Inspect welds on bridges and modules.

Troubleshooting Guide

⚠ DANGER

This manual must be read and thoroughly understood before applying, installing, using, or caring for this machinery. Failure to comply may cause injury to yourself or others.

Prior to performing tool change or maintenance on any portion of this machine, proper lockout-tagout procedures MUST be followed. Serious injury or death may result.

Fault	Description	Corrective Action
System Air Low Pressure Flt	The air pressure of the system was too low.	• Check the incoming air supply. • Check the system regulator setting. • Check pressure switch wiring. • Check the system regulator setting.
Fault	**Description**	**Corrective Action**
Front/Rear C'Bal High Pressure Flt	The air pressure of the front or rear counterbalance was too high high and could not be adjusted by the counterbalance dump valve.	• Check the counterbalance regulator setting. • Check pressure switch and dump valve wiring. • Check pressure switch setting.
Fault	**Description**	**Corrective Action**
Front/Rear C'Bal Low Pressure Flt	The air pressure of the front or rear counterbalance was too low.	• Check system air supply. • Check the counterbalance regulator setting. • Check pressure switch wiring. • Check pressure switch setting.
Fault	**Description**	**Corrective Action**
( ) Lube Low Flt	The lube level of the indicated axis lubrication unit is low.	• Replace the lubrication unit. • Check level switch mounting and wiring.
Fault	**Description**	**Corrective Action**
Servo drive Contactor Flt	The servo drive contactor auxiliary contact did not Switch properly.	• Check contactor coil wiring. • Check auxiliary contact wiring. • Check for proper contact operation.
Fault	**Description**	**Corrective Action**
Clutch Permissive Relay A Flt	The clutch permissive relay A auxiliary contact did not switch properly.	• Check contactor coil wiring. • Check auxiliary contact wiring. • Check for proper contact operation.

Troubleshooting Guide cont'd…

Fault	Description	Corrective Action
Clutch Permissive Relay B Flt	The clutch permissive relay B auxiliary contact did not switch properly.	• Check contactor coil wiring. • Check auxiliary contact wiring. • Check for proper contact operation.

Fault	Description	Corrective Action
Immediate Stop Relay Flt	The immediate stop relay auxiliary contact did not switch properly.	• Check contactor coil wiring. • Check auxiliary contact wiring. • Check for proper contact operation.

Fault	Description	Corrective Action
Smart Bar Mismatch Flt	The smart bar number inputs do not match the selected bar number on the operator interface.	• Install the appropriate bar. • Change the smart bar number on the. operator interface. • Check the smart bar wiring in the Tooling plate connector.

Fault	Description	Corrective Action
Front/Rear Quick AccessTimeout Flt	Moving to the quick access position took longer than the time allowed.	• Check that all axes are free of obstructions.

Fault	Description	Corrective Action
Lateral Access/Return Timeout Flt	Moving to the lateral access/return position took longer than the time allowed.	• Check that all axes are free of obstructions.

Fault	Description	Corrective Action
Lateral Access Wedge Extend/ Retract Flt	The lateral access locking wedges were commanded to extend/retract and the proximity switches were not made.	• Check proximity switch mounting and wiring. • Check valve wiring. • Check system air supply.

Fault	Description	Corrective Action
Lateral Access Run Position Prox Flt	The lateral access run position prox was lost while in Auto or Simulate mode.	• Check proximity switch mounting and wiring.

Fault	Description	Corrective Action
Bar Latch/Unlatch Timeout Flt	Automatic Latching/Unlatching of the bars tool longer than the time allowed.	• Check that all axes are free of obstructions. • Check that the bar connectors are working properly.

Fault	Description	Corrective Action
Front Bar Connector Engage Flt	The front bar connectors were commanded to engage and the smart bar pins were not made.	• Check bar change electrical connector mounting and wiring. • Check valve wiring.

Fault	Description	Corrective Action
Rear Bar Connector	The rear bar connectors were	• Check proximity switch mounting and

Troubleshooting Guide cont'd…

Engage Flt	commanded to engage and the Proximity switches/smart bar pins. were not made.	wiring. • Check valve wiring.

Fault	Description	Corrective Action
Move Window <20 Degrees	A move window of less than 20 degrees was detected when attempting to build cams.	• Adjust move window setting.

Fault	Description	Corrective Action
Build Cam Timeout Flt	Building the cams took longer than the time allowed.	• Check move windows. • Check controller diagnostics message.

Fault	Description	Corrective Action
Heartbeat Flt wiring.	A communication heartbeat bit was not seen in the time allowed.	• Check Devicenet communications • Check controller diagnostics message.

Fault	Description	Corrective Action
Motion Controller Flt	The motion controller is faulted.	• Check controller diagnostics message.

Fault	Description	Corrective Action
Encoder Slip Flt	The primary and secondary encoders on the press do not match.	• Check the encoder belts and couplings. • Check the encoder cables.

Fault	Description	Corrective Action
( ) Axis Fault	The display axis is faulted.	• Check the appropriate drive diagnostics measurement.

Fault	Description	Corrective Action
Part Fell Off Transfer Fault	The indicator finger sensor (bottom of Auto screen) was not made during transfer of parts.	• Remove and bypass misplaced part. • Place part correctly in finger tools. • Check prox switch and wiring. • Check the angles of the part sensors.

Fault	Description	Corrective Action
Station ( ) Part Out Fault	The indicated part sensor was not made during the part check window.	• Remove and bypass misplaced part. • Place part correctly in finger tools. • Check finger sensor mounting and wiring • Check the angles of the part sensors.

Fault	Description	Corrective Action
Station ( ) Part Sensor Fault	The indicated part sensor remained on during the sensor check window.	• Clean any debris/shavings off of end of sensor. • Check finger sensor mounting and wiring • Check the angles of the part sensors.

Fault	Description	Corrective Action
Feed Material Sensor Fault	The feed material sensor was lost.	• Change the feed coil. • Check finger sensor mounting and wiring

Fault	Description	Corrective Action
Auto Advance Top Stop Fault	A top stop signal was issued to the transfer but the press continued	• Check the top stop signal wiring.

Troubleshooting Guide cont'd…

running.

Fault	Description	Corrective Action
( ) Reference Fault	The position of the displayed axis is no longer in reference to actual machine location.	• Home the indicated axis.

Fault	Description	Corrective Action
Straightener Tight Loop Fault	The straightener signaled that a tight loop occurred.	• Check the status of the straightener. • Check the tight loop signal wiring.

Lubricant Recommendations

Application	Recommendation	General Properties
• Centralized Grease System • Manual Grease Fitting • Universal Joint	Mobil Grease Mobilux-1EP N.L.G.I. No. 1EP N.L.G.I. No. 2EP	Pumpable, Homogenized, Multi-Purpose, EP Additive, Corrosion Inhibited, Non-Leaded
• Centralized Oil System • General Hand Oiling	Mobil Vactra Oil, EXTRA HEAVY A.G.M.A. 4EP (SAE 30/40) 630/660 SUS at 100°F	Premium Quality, Corrosion and Oxidation Inhibited, Demulsibility, Minimum VI 90
• Open Gear Teeth (Manually Applied) • Rack and Pinion Exposed Teeth (Manually Applied)	ARCO Jetlube No. 8 A.G.M.A. No. 9 1000/1200 SUS at 210°F	Adhesive and Cohesive, Multi-Purpose, EP Additive
• Drive Housing • Air Line Lubricator	Mobil D.T.E. Oil Light (SAE 10W) 150 SUS at 100°F	Premium Quality, Corrosion and Oxidation Inhibited, Demulsibility, Minimum VI 90
• Automatic Gear Tooth Spray (Centralized System)	Mobil Mobiltac-D 9500 SUS at 210°F	Corrosion and Oxidation Inhibited, Pumpable, Non-Toxic, Adhesive and Cohesive
• Gearcase-Helical or Spiral Gears	Mobilube 46 (SAE 90) Gear Oil 1000 SUS at 100°F	Premium Quality, EP Defoamer Additives, Meets MIL-2105B

Bolt Torque Specifications

NOTE: Loctite adhesive products were applied to all fasteners when this machine was assembled. Re-apply Loctite Adhesive Grade 242 (blue) to all fasteners removed during maintenance or servicing of this machine. Torque all bolts per the tables below (Unless otherwise specified).

SAE Inch Series Grade 5 Hex Head, Socket Head Cap Screw Torque Values (Lubricated)		
Bolt Size	**Ft-Lbs**	**N-m**
#10-24	2.7	3.6
¼-20	6.3	8.5
5/16-18	13	18
3/8-16	23	31
½-13	55	75
5/8-11	110	149
¾-10	200	271
7/8-9	300	407
1.00-8	480	651
1 1/4-7	840	1139

Metric Series Grade 8.8 Hex Head, Socket Head Cap Screw Torque Values (Lubricated)		
Bolt Size	**Ft-Lbs**	**N-m**
M3 x 0.50	9 In-Lb	1
M4 x 0.70	21 In-Lb	2.4
M6 x 1.00	70 In-Lb	7.9
M8 x 1.25	14	19
M10 x 1.50	28	38
M12 x 1.75	49	66
M16 x 2.00	122	165
M20 x 2.50	238	323
M24 x 3.00	412	559
M30 x 3.50	818	1109

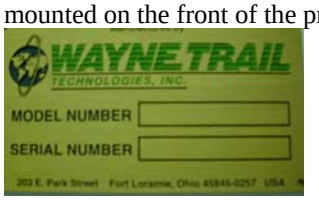
Replacement Parts and Service Assistance

Ordering Replacement Parts:

All Wayne Trail Technologies equipment is custom engineered to fit the particular needs and requirements of each application. For this reason, the WTT serial number is the only way to properly identify your equipment. This number allows our service engineers to locate the complete set of records that was originally used in the engineering and manufacture of your machinery.

From these records, we are able to duplicate any part made for WTT equipment.

The WTT serial number appears as a five-digit number permanently stamped on a WTT plate. This plate is located on the end of the clamp unit mounted on the front of the press.



When placing an order for replacement part, please provide the following information:

1. The WTT serial number.
2. A good description of the part or parts required.
3. The WTT part number that has been assigned to the part.
4. The quantity required.

In the absence of a part number or good description, we ask that you include a drawing, sketch, or even a photograph to help us identify your needs. If this is not convenient, circle or point to the part or parts required on a drawing removed from this instruction manual and forward it with your order. Our service department will send you a new drawing to keep your instruction manual complete.

Obtaining Service Assistance:

WTT service engineers are available worldwide to help you with service problems that you may encounter with your equipment. Service personnel are available to assist you by phone, or arrange for a service call to your location at your convenience.

A request for field service must be confirmed by a written purchase order. We will be pleased to quote field service charges upon request.

WAYNE TRAIL TECHNOLOGIES, INC.

CUSTOMERS · EMPLOYEES · SUPPLIERS
TEAMWORK for SUCCESS

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