OPERATING INSTRUCTIONS
AFC/PIFCO/TA S/N 61754

Allison Transmission

UBTC 36-48 Batch Transfer Car

2/25/00

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These instructions contain a number of recommendations in regard to safe operating practices. Recommendations are the result of our years of experience in the furnace industry and will minimize accidental failures. They are, however, only recommendations that can be used by intelligent operators to minimize accidents. Their use **DOES NOT GUARANTEE freedom** from accidents. **READ INSTRUCTIONS BEFORE PROCEEDING WITH OPERATION.**

CONTENTS

INTRODUCTION

PROPRIETARY OPERATING MANUAL

AFC/PIFCO/TA claims proprietary rights to the material disclosed herein. This operating manual is issued to Allison Transmission Division in confidence for equipment operating and maintenance information only. It may not be copied or reproduced in whole or part, or used for furnishing information to persons not employed by Allison Transmission Division or for any purpose detrimental to the interests of AFC/PIFCO/TA

PURPOSE OF PROJECT

The equipment for this system consists of one (1) UBQ 36-48-36G Universal Batch System. The system consists of the following:

1. Integral Quench Batch Furnaces.
2. Batch Transfer Car
3. Batch Temper Furnaces.
4. Batch Washer.
5. Scissors Lift & Rotate Tables.
6. Scissors Lift Tables.
7. Stationary Tables w/ Rotate Top.
8. Two Position Powered Load Tables.
9. Two Position Manual Load Tables.
10. Cooling Tables.

The UBTC 36-48 Batch Transfer Car capacity is based on the following:

1. Tray size: 36" x 48"
2. Maximum Tray Loading: 3000#

INTENT OF INSTRUCTIONS

A. These instructions contain a number of recommendations in regard to safe operating practices. These recommendations are the result of years of experience in the furnace industry and will minimize accidental failures. They are, however, only recommendations that can be used by intelligent operators to minimize accidents: THEIR **USE DOES NOT GUARANTEE FREEDOM FROM ACCIDENTS.**

B. The most important factors in minimizing hazards in this type of furnace equipment are:

1. Selection of competent and well-trained operators by User's management.
2. An established maintenance program which provides for periodic testing.

C. Wear safety glasses when looking to check adjustments of the equipment.

D. Always lockout power, fuel, and air before performing any maintenance work on UBTC36-48 Batch Transfer Car.

E. Follow the Operating Instructions. During an emergency, it may be impossible to follow the normal procedures as outlined. In such cases the basic concepts of safety must be exercised with the utmost care and common sense.

F. Operating Instructions should be available at the installation sit and the personnel responsible for the equipment should be thoroughly instructed in its operation and maintenance.

G. DO NOT TOUCH THE HIGH VOLTAGE TERMINALS FOR MOTORS WITH "POWER TO PANEL ON".

H. ALL INSTRUMENT MANUALS MUST BE READ AND UNDERSTOOD BEFORE OPERATING THIS EQUIPMENT.

I. Always lockout ***all*** power before performing any maintenance.

1. Equipment shall be shutdown in accordance with the procedure outlined in this manual.
2. Alert all operators in the area that power is being disconnected.
3. Before starting repair or maintenance work on any motor or power driven equipment, persons performing work shall make sure power is disconnected and any hazardous residual pressure shall be relieved prior to and during such work. Padlocks shall be placed at the point of power disconnect where lockout is required by each person performing the work. In particular, each supervisor will have a set of locks to which he is the only one who has the key, and his lock shall be placed first and his lock shall be removed last, Individual locks shall be used. Keys shall be removed at the time

of the lockout. Before work is started, the equipment shall be tested to insure power is turned off.

4. The supervisor shall remove this padlock when all repairs have been completed and will be responsible for restoring power after a thorough check is made to assure that no one will be exposed to danger. No other person placing a padlock on the power lockout shall remove the supervisor's padlock and restore power.

5. If it is necessary for a machine or installation to be continued by the next shift, those employees in the presence of the oncoming shift shall remove the padlocks of the original employee. The oncoming shift will immediately insert their own padlocks into the disconnect. All concerned personnel including operators, repairman, and supervisors shall be informed.

6. A machine connected to an electrical source by a plug-in cord shall be considered in compliance if the plug is disconnected and tagged. Supervisors are responsible for installing and removing said tags.

7. All gasses, air, liquids, etc. shall be isolated by positive means, which may include, but is not limited to blanking, tagging, and padlocking in the same manner as power described above.

8. A tag may be used as a **TEMPORARY** measure until power and valves can be locked out and/or secured.

INSTALLATION

RECEIVING

Upon receipt of equipment, inspect boxes and crating for obvious mishandling or physical damage. If damage is evident, uncrate and inspect equipment.

> **NOTE:** ANY DAMAGE CAUSED IN TRANSIT MUST BE REPORTED IMMEDIATELY TO THE MOVER SO RECEIVER CAN FILE A CLAIM FOR DAMAGE.

Before moving equipment for installation, prepare space for final location. This space should have all services (air, electric, drains, water, and any other requirements for operation) in close proximity to furnace installation.

> **CAUTION:** THE ELECTRICAL CONTROLS (ESPECIALLY SOLID STATE) FOR THIS UNIT ARE SUBJECT TO FAILURE, OR ERRATIC PERFORMANCE, WHEN EXPOSED TO TEMPERATURES ABOVE 120 DEG. F. IF ELECTRICAL CONTROL EQUIPMENT MUST BE LOCATED IN AN AREA WHERE TEMPERATURE INSIDE CONTROL PANEL MAY EXCEED 120 DEG. F., THE PANEL MUST BE VENTILATED.

UNCRATING

Equipment shipped from AFC/PIFCO/TA is crated and packaged with as much protective material as required for safe shipment. Care must be exercised in removing crating, lumber, braces and cardboard from the equipment.

GENERAL INSPECTION

After the Batch Transfer Car is in final location, remove all packing material. It is essential that a general inspection of equipment be conducted at this time. Check the following:

1. All bolt mounted components for proper tightness.
2. All wiring for terminal tightness.
3. Sensing elements for proper position.

ELECTRIC SERVICE

POWER WIRING

The electrical requirements for the Batch Transfer Car appears on the wiring diagrams, contained in these instructions. Power must be supplied to the Batch Transfer Car at the proper voltage and with wire sized to handle the indicated amperes.

The Transfer Car Control Cabinet disconnect will be pre-assembled and wired as part of the control cabinet. Power must be supplied to the L1, L2, and L3 terminals of the disconnect switch. Size the feeder to accommodate the indicated voltage and amperes.

The Batch Transfer Car has been pre-wired and factory tested prior to shipment. Shipping requirements may have necessitated breakdown of some of the components.

Branch circuit protection and current overload protection is part of the Transfer Car Control Cabinet wiring. Therefore, the main line supply, motor leads, and heater element leads complete the power wiring. The color code of power wiring is black or gray.

This equipment must be grounded in compliance with national and local electrical codes.

> **CAUTION:** **DO NOT** APPLY POWER UNTIL ALL WIRING HAS BEEN COMPLETED, INSPECTED, TESTED, AND ALL REQUIRED ADJUSTMENTS HAVE BEEN ACCOMPLISHED.

CONTROL WIRING

Control wiring is 110 volts unless otherwise indicated on the Power Distribution wiring diagrams. The control wiring appears on the diagrams as a ladder schematic presentation.

The numbers located on the left side of the schematics are line numbers and are used as a reference guide. The numbers appearing on the right side indicate (1) the line location of the contacts of the device that the numbers are adjacent to, (2) the condition of these contacts in a "Power Off " state (i.e. an underlined number (12) would indicate a normally closed contact on line 12, or (14) not underlined would indicate a normally open contact on line 14.

All wires have individual wire numbers that appear under the line, which indicates that particular wire. All component parts appear in symbolic standard and are further identified with a written caption. Component parts which are remote, not mounted in or on the control panel, and must be connected with the use of conduit, appear boxed in broken lines. The ladder follows sequential operation as closely as possible from top to bottom.

The location of components on the door of the control panel and a layout of the components mounted on the subplate, contained within the control panel, appear on the wiring diagrams. All other components are remote and are to be connected with the control circuit by means of the numbered terminal strip, mounted on the subplate. Field connection of remote components should be accomplished with the use of this terminal strip. Control wiring is color coded as follows:

Red	Control power
White	Control neutral
Green	Chassis ground
Blue	D.C. voltage
Yellow	Power from an external source
May require shutoff at a point remote from the Transfer Car Control Cabinet.	

RECOMMENDED SEQUENCE OF INSTALLATION

NOTE: CARE SHOULD BE TAKEN TO MAKE SURE THAT THE BATCH TRANSFER CAR IS INSTALLED IN THE PROPER ORIENTATION FOR DIRECTION OF TRAVEL, (SEE AFC/PIFCO/TA DWG. 61743-F1).

I. INTRODUCTION

The information contained herein is intended to be an aid in the field re-assembly procedures for one Atmosphere Furnace Company (AFC/PIFCO/TA) Universal Batch Transfer Car, UBTC 36-48. The UBTC 36-48 Batch Transfer Car has been disassembled, only so much as necessary, to comply with shipping size restrictions and/or to protect the component parts during shipment. In general, these instructions will apply to all AFC/PIFCO/TA standard batch equipment, but may not always apply to all situations or shipping limitations.

A. Utility Requirements

The following list outlines utility requirements for the Customer and will assist the installation contractors and the Purchaser in determining the size of utility lines.

Electric power.....30 A, 460 Volts, 3 Phase, 60 Hertz

II. INSTALLATION

The Batch Transfer Car will be located as shown on the accompanying AFC/PIFCO/TA Dwg. 61743-F1, Equipment Floor Plan Layout.

While headroom in the area is acceptable, the Batch Transfer Car should be located such that sufficient headroom is provided above the units for installation, and other components.

Install the festoon system, in accordance with the vendor's literature and AFC/PIFCO/TA Dwg. 61754-M4. (**NOTE**: Make sure that there is sufficient clearance between the Batch Transfer Car festoon conduit mast and the exhaust hoods.)

Complete all floor and foundation work, and rail installation in accordance with AFC/PIFCO/TA Dwg. 61743-F1

> **NOTE**: ALL FLOOR AND RAIL ELEVATIONS AND PARALLELISM MUST BE +/- 1/8". CHECK PARRELISM AND ALL ELEVATIONS WITH A TRANSIT TO INSURE COMPLIANCE WITH THESE DIMENSIONS.

III. BATCH TRANSFER CAR ASSEMBLY

Inspect the Batch Transfer Car to insure that all components are correctly installed and secured. Remove any blocking or other foreign materials. After the inspection is complete, proceed with the following:

1. Move the Batch Transfer Car into place on the car rails first, level, and align with the direction of tray travel 90 deg. to the rail direction.

2. Roll the Batch Transfer Car to every equipment position and check dimensions from the top of the tray carrying wheels to the equipment resting surface. Make sure that the minimum hearth elevation dimension is fifty (50) inches for all the equipment. If the minimum measurement is less than specified, shim between the traversing wheel shaft bearings and support steel to obtain the correct dimension. Shim packs are provided at each of the four wheels. Use these as required to level the roller sections in both directions.

> **NOTE**: THE BATCH TRANSFER CAR HAS BEEN LEVELED AND CHECKED FOR ROLLER ELEVATION IN THE AFC/PIFCO/TA SHOP PRIOR TO SHIPPING.

3. Once the car has been leveled in both directions on the track, remove the diamond plate on the operator's platform and install the four locating cams at the corners of the skirt, as shown in Detail "G", on AFC/PIFCO/TA Dwg. 61754-M1. The cam followers are supplied by AFC/PIFCO/TA.

4. Install the diamond plate on the operator's platform, using the nuts, bolts, and lock washers supplied by AFC/PIFCO/TA.

5. Install a 2" rigid conduit mast, mounted vertically from the electrical control cabinet, adequately supported for the festoon system. The conduit will carry electrical power wiring to the control cabinet. The mast should be located on the centerline of the car, with adequate clearances to any exhaust hoods.

6. Connect a source of 460 Volt, 3 Phase, and 60 Hertz power, from the festoon system, to the electrical control cabinet, as indicated on AFC/PIFCO/TA Dwg. 61754-E1.

NOTE: DO NOT ATTEMPT TO TURN ON THE ELECTRICAL POWER UNTIL AN N AFC/PIFCO/TA FIELD SERVICE SUPERVISOR HAS INSPECTED THE SYSTEM.

7. After the operation of the transfer an AFC/PIFCO/TA field service supervisor, run the car in both directions to assure the operation of the car and the festoon system has checked car.

8. Upon completion of assembly and inspection, all equipment is to be cleaned, masked and touched up, as necessary, with paint supplied by AFC/PIFCO/TA.

IV. SAFETY

To insure personnel safety, it is imperative that the safety bumpers are operational at all times, when personnel are working in the rail area.

In addition, all drive guards must be in place at all times, except when removed for maintenance. When any guards are removed, the equipment must be locked out to prevent injury to maintenance personnel.

ADJUSTMENTS

GENERAL

1.	Batch Transfer Car drive speed:	30.6 ft./minute (6.1 inches/second)
	Pusher Dog speed:	25.9 ft/minute (5.2 inches/second)
	Pusher Bar speed	32.4 ft/minute (6.5 inches/second)
2.	UBQ Furnace Load stroke:	7'-3 3/4"
	Others Load stroke:	7'-3 3/4"

MOTORS

AFC/PIFCO/TA tests all mechanical units before shipping. However, since this equipment uses motors to drive the car and load/unload mechanisms, proper rotation is necessary in all cases. **Check all rotations during initial start up.** If rotation is wrong, de-energize the control cabinet main disconnect to the "OFF" position and interchange T1 and T3 on the respective motor. Restart sequence. Record the ampere reading of each phase, on every motor.

CAUTION: ALWAYS DISCONNECT POWER BEFORE ATTEMPTING ELECTRICAL CHANGES.
NOTE: THE DIRECTION THAT THE OPERATOR IS LOOKING, WHILE STANDING ON THE PLATEFORM, WILL BE THE DEFINITION OF THE **"FORWARD"** DIRECTION.

MAINTENANCE

GENERAL

AFC/PIFCO/TA manufactures a variety of industrial heat processing equipment, which employs many different component parts, many of which require specific maintenance procedures.

The purpose of this section is not to elaborate on the details of these maintenance procedures, but to make the customer aware of the need for a preventive maintenance program. The establishment of such a program will greatly increase the serviceability and economical function of your equipment.

We have learned from experience that preventive maintenance is necessary. A rigorous preventive maintenance program will extend equipment life, with a minimum of down time.

It is AFC/PIFCO/TA's policy to obtain the highest quality components for all our equipment. AFC/PIFCO/TA compiles information from the manufacturers of these components and includes copies, located within this manual. Please study the supplied information and use it as a guide for a preventive maintenance program. Manufacturer's warranties extended to customers require certain maintenance procedures. Therefore, it is to the customer's advantage to formulate a preventive maintenance program and maintain the components per their requirements.

MOTORS

Motors should be inspected periodically for physical damage, balance, and freedom of rotation. The following is suggested procedure:

1. Visual inspection.
2. Grease bearings as recommended in the "Lubrication Requirements" section, or as experience dictates.

AFC/PIFCO/TA has learned from experience that preventive maintenance is necessary. A rigorous preventive maintenance program will extend equipment life with a minimum of downtime.

LUBRICATION REQUIREMENTS

NOTE: SEE THE "VENDOR'S LITERATURE MANUAL" FOR COMPLETE LUBRICATION SCHEDULES.

GEAR REDUCERS

a. **Type Of Oil:** Lubricating oils for use in gear units should be high quality well ball, roller, or sleeve bearings; they must be neutral in reaction; free from grit or abrasives; and have good defoaming properties. As they may be subject to high operating temperatures, they must have good resistance to oxidation. For worm gears, additions of 3 to 10% of acidless tallow or similar animal fats are desirable.

b. **Sludge:** It is necessary that the oil is clean and free from sludge at all times to obtain long life from a gear unit. Sludge in gear units may be caused by excessive heat, from dust, dirt, and other contaminants and by the presence of moisture or chemical fumes. Therefore, every precaution should be taken to prevent water and foreign particles from entering the gear case.

c. **Oil Change:** The oil in a new unit should be drained at the end of two weeks' operation and the case thoroughly flushed with light flushing oil. The original oil can be used for refilling if it has been filtered; otherwise, new oil must be used. After this, a change of oil every 2500 hours of operation or every six months, whichever occurs first is recommended for units operating under favorable conditions. Where operating conditions are severe, such as a rapid rise and fall in temperature of the gear case with accompanied sweating of the inside walls and resulting formation of sludge, or where operation is in moist or dusty atmospheres, or in the presence of chemical fumes, it may be necessary to change the oil at intervals of one to three months.

d. **Oil Level:** Reducers are furnished with either a bull's eye type sight glass or a pipe plug to indicate oil level. In either case, an oil level tag is affixed to the unit near the oil level indicator. Oil level should **always** be checked with the unit stopped.

MOTORS

Lubrication: This is a ball bearing motor. The bearings have been given initial lubrication at the factory. No lubricant need be added unless motor has been in storage for over a year. The following lubrication intervals are suggested as a guide for long operating life:

Suggested Lubrication intervals			
Hours of Service Per Year	**NEMA Frame Size**		
	42 to 215T	254 to 326T	465 to 447T
5000 Hrs.	5 yrs	3 yrs	1 yr.
Continuous Normal Application	2 yrs.	1 yr.	9 mos.
Seasonal Service (Motor is idle for 6 months or more)	1 yr. (beginning of season)	1 yr. (beginning of season)	1 yr. (beginning of season)
Continuous high ambients, dirty or moist locations, high vibration, or where shaft end is hot (pumps/fans)	6 months	6 months	6 months

Lubricant: All motors are pre-greased normally with Chevron Oil's "SRI No. 2 Dolium R". Several equivalent greases compatible with the furnished Reliance motors are Shell Oil Company's and Texaco Inc. Premium RB.
Procedure: Overgreasing bearings can cause premature bearing failure. If motor is equipped with Alemite fitting, clean tip of fitting and apply grease gun. Use 1 to 2 full strokes on motors in NEMA 215 frame and smaller. Use 2 to 3 strokes on NEMA 254 through 365 frame. Use 3 to 4 strokes on NEMA 404 frames and larger. On motors having drain plugs, remove grease drain plug and operate motor for 20 minutes before replacing drain plug.

On motors equipped with slotted head grease screw, remove screw and apply grease tube to hole. Insert 2 to 3-inch length of grease string into each hole on motors in NEMA 215 frame and smaller. Insert 3 to 5 inch lengths on larger motors. Motors having grease drain plugs, remove plug, and operate motors for 20 minutes before replacing drain plug.

> **CAUTION:** KEEP GREASE CLEAN. LUBRICATE ALL MOTORS AT STANDSTILL. REMOVE AND REPLACE DRAIN PLUGS AT STANDSTILL. DO NOT MIX PETROLEUM GREASE AND SILICONE GREASE IN MOTOR BEARINGS.

PILLOW BLOCK AND FLANGE BLOCK BEARINGS

Operating Condition	*Bearing Temperature*	*Suggested Greasing Intervals*
Fairly Clean	32 - 120 deg. F.	4 months
	120 - 160 deg. F.	1 to 2 months
	120 - 200 deg. F.	1 to 4 weeks
Moderate to Dirty	32 - 300 deg. F.	1 to 4 weeks

NOTE:

- Frequency of greasing will vary depending on hours of operation, temperature, and surrounding conditions.
- Any unusual noise or vibration change should be immediately investigated.
- For normal operating conditions, lubricate with a grease conforming to NLGI #2 penetration, free from chemical impurities, such as dust, rust, metal particles or abrasives. See manufacturer's specification.
- Dow Corning #44 high temperature grease should be used on high temperature applications.
- Use low pressure gun and avoid over greasing.
- Wipe fittings completely clean.
- Use clean equipment only.

GENERAL INSPECTION AND MAINTENANCE SCHEDULE

We have learned from experience that preventive maintenance is necessary. A rigorous preventive maintenance program will extend equipment life with a minimum of down time.

WEEKLY CHECKLIST

MECHANICAL

- Check pusher dog rails and pusher bar for smooth operation.
- Listen for unusual noises or excessive vibrations.
- Check that all guards, electrical enclosure covers are in their proper places.

MONTHLY CHECKLIST

MECHANICAL

- Check alignment of all sprockets and chain. Adjust if necessary.
- Check all wheels for damage or signs of excessive wear.
- Check the "Tray On Car" limit switch assembly.
- Check all motors for excessive temperature or vibration.
- Check all reducers for proper oil level.
- Check festoon system for proper operation.

ELECTRICAL

- Check all alarm lights and horns for proper operation.
- Check all limit switches for proper alignment and operation.
- Clean any dust buildup from around control panel.

SIX (6) MONTH CHECKLIST

MECHANICAL

- Check the oil in all speed reducers. Refer to manufacturer's maintenance bulletin in the "Vendor's Literature Manual".
- Spray lubricate chains and sprockets.
- Inspect all motors/reducer couplings for proper alignment.
- Grease all bearings. Use caution to avoid over-greasing.
- Grease all motors per manufacturer's specifications.
- Clean out oil drip pan of oil spillage.
- Check festoon system for proper operation.

ELECTRICAL

- Test interlock sequence of all safety equipment. Manually make each interlock fail.

- Take amp readings for each phase of every motor. Record measurements and compare with previous reading to detect a problem.

YEARLY CHECKLIST

- Check all reducers for proper oil level.
- Clean out electrical panel with compressed air.
- Check rail to rail distance of car tracks.
- Clean out oil spillage from car mechanisms and drip pan.

OPERATING PRECAUTIONS

1. **Do not** stand too close to the car while traversing the rail system.

2. **Do not** stand on the car rails during Batch Transfer Car operation.

3. **Do not** exceed the maximum gross tray loading of 3,000 pounds.

4. A face shield should be worn when loading or unloading work in the manual cycle.

5. **Never** perform any maintenance or troubleshooting on this piece of equipment while it is in operation.

STARTUP AND SHUTDOWN PROCEDURES

PRELIMINARY CHECK

1. **General instructions:**
   a. Energize the Transfer Car Control Cabinet by tripping the disconnect switch to the "ON" position.
   b. Check Transfer Car Control Cabinet voltage supply on all 3 phases (L1, L2, and L3). Note voltage variation between phases. If unbalanced voltage is observed, it should be recorded and brought to supervisor's attention.

2. **Start each motor individually:**
   a. Check rotation.
   b. Record ampere reading for each phase of each motor.
   c. Check to see if proper motor overload sizes are installed.

3. Check all gear reducers for proper oil level. Fill reducers with recommended oil per manufacturer's instructions, as required.

MANUAL MODE

STARTUP

1. Energize the Transfer Car Control Cabinet by tripping the disconnect switch to the "ON" position.

2. Press the "MASTER START" green pushbutton/light to energize the controls.
   a. The "MASTER START" green light should come on.

3. Press the "AC DRIVE START" green pushbutton/light to energize the traversing drive.
   a. The "AC Drive Start" green light should come on.

4. Turn the "CYCLE MODE" selector switch to the "MAN" position.
   a. The "Manual Mode" amber light should come on.

> **NOTE**: THE TRANSFER CAR JOYSTICK, LOCATED ON THE CONTROL CABINET, CONTROLS THE "FORWARD" AND "REVERSE" MOTIONS OF THE CAR. THE CAR WILL ACCELERATE AND DECELERATE BETWEEN EACH PIECE OF EQUIPMENT.

5. Locate the car into position by visually lining up the car at each station, then accurately located using the "EXTEND POSITIONER RIGHT" and "EXTEND POSITIONER LEFT" pushbutton/lights.
   a. The "Transfer Car In Position" green light should come on.
   b. When fully extended, the "Extend Positioner Right" and /or "Extend Positioner Left" green light should come on.

6. When the Transfer Car is moving between stations, the yellow Stacklite will be flashing and the "Transfer Car In Motion" Sonealert Alarm will sound.

FOR LOAD/UNLOAD OPERATIONS TO THE "RIGHT" (UBQ FURNACES, TEMPERS, COOLING STATIONS, AND SCISSORS LIFT AND STATIONARY TABLES)

NOTE: THE DIRECTION THAT THE OPERATOR IS LOOKING, WHILE STANDING ON THE TRANSFER CAR PLATFORM, WILL BE USED IN THESE INSTRUCTIONS FOR THE DEFINITION OF "RIGHT" AND "LEFT".

LOADING TO THE "RIGHT"

1. After locating the Transfer Car into position by visually lining up the car at the station and the "Transfer Car In Position" green light comes on, press the "EXTEND POSITIONER RIGHT" amber pushbutton/light.
    a. When the positioner is fully extended, the "EXTEND POSITIONER RIGHT" amber light should come on.

2. While locked into position, turn the "HANDLER" selector switch to the "LOAD" position.

3. Press the "EXTEND HANDLER" amber pushbutton/light. The Handler Pins should go up and the Handler should move the tray to the selected equipment; trip the Gemco Limit Switch mechanism, which should stop the drive.
    a. The "Handler Pins Raised" amber light should go on.
    b. When the Handler is fully extended, the amber light should come on.

4. Press the "RETRACT HANDLER" green pushbutton/light. The Handler Pins should go down and the Handler should return to the Batch Transfer Car; trip the Gemco Limit Switch mechanism, which should stop the drive.
    a. The "Handler Pins Lowered" green light should go on.
    b. When the Handler is fully retracted, the green light should come on.

5. If the Tray Handler should jam and overload during either motion, the "Handler Overcurrent" red light will come on, and the Alarm Horn will sound. Silence the Alarm Horn by pressing the "ALARM SILENCE" black pushbutton. When the cause of the overcurrent is corrected, press the "FAULT RESET" black pushbutton

UNLOADING TO THE "RIGHT"

1. After locating the Transfer Car into position by visually lining up the car at the station and the "Transfer Car In Position" green light comes on, press the "EXTEND POSITIONER RIGHT" amber pushbutton/light.
    a. When the positioner is fully extended, the "EXTEND POSITIONER RIGHT" amber light should come on.

2. While locked into position, turn the "HANDLER" selector switch to the "UNLOAD" position.

3. Press the "EXTEND HANDLER" amber pushbutton/light. The Handler Pins should go up and the Handler should move to and engage the tray; trip the Gemco Limit Switch mechanism, which should stop the drive.
    a. The "Handler Pins Raised" amber light should go on.
    b. When the Handler is fully extended, the amber light should come on.

4. Press the "RETRACT HANDLER" green pushbutton/light. The Handler Pins should go down and the Handler should pull the tray onto the Batch Transfer Car; trip the Gemco Limit Switch mechanism, which should stop the drive.
    a. The "Handler Pins Lowered" green light should go on.
    b. When the Handler is fully retracted, the green light should come on.

5. If the Tray Handler should jam and overload during either motion, the "Handler Overcurrent" red light will come on, and the Alarm Horn will sound. Silence the Alarm Horn by pressing the "ALARM SILENCE" black pushbutton. When the cause of the overcurrent is corrected, press the "FAULT RESET" black pushbutton

FOR LOAD/UNLOAD OPERATION TO THE "LEFT" (WASHERS, SCISSORS LIFT AND STATIONARY TABLES)

NOTE: THE DIRECTION THAT THE OPERATOR IS LOOKING, WHILE STANDING ON THE TRANSFER CAR PLATFORM, WILL BE USED IN THESE INSTRUCTIONS FOR THE DEFINITION OF "RIGHT" AND "LEFT".

LOADING TO THE "LEFT"

1. After locating the Transfer Car into position by visually lining up the car at the station and the "Transfer Car In Position" green light comes on, press the "EXTEND POSITIONER LEFT" amber pushbutton/light.
    a. When the positioner is fully extended, the "EXTEND POSITIONER LEFT" amber light should come on.

2. While locked into position, turn the "HANDLER" selector switch to the "LOAD" position.

3. Press the "EXTEND HANDLER" amber pushbutton/light. The Handler Pins should go up and the Handler should move the tray to the selected equipment; trip the Gemco Limit Switch mechanism, which should stop the drive.
    a. The "Handler Pins Raised" amber light should go on.
    b. When the Handler is fully extended, the amber light should come on.

4. Press the "RETRACT HANDLER" green pushbutton/light. The Handler Pins should go down and the Handler should return to the Batch Transfer Car; trip the Gemco Limit Switch mechanism, which should stop the drive.
    a. The "Handler Pins Lowered" green light should go on.
    b. When the Handler is fully retracted, the green light should come on.

5. If the Tray Handler should jam and overload during either motion, the "Handler Overcurrent" red light will come on, and the Alarm Horn will sound. Silence the Alarm Horn by pressing the "ALARM SILENCE" black pushbutton. When the cause of the overcurrent is corrected, press the "FAULT RESET" black pushbutton

UNLOADING TO THE "LEFT"

1. After locating the Transfer Car into position by visually lining up the car at the station and the "Transfer Car In Position" green light comes on, press the "EXTEND POSITIONER LEFT" amber pushbutton/light.
    a. When the positioner is fully extended, the "EXTEND POSITIONER LEFT" amber light should come on.

2. While locked into position, turn the "HANDLER" selector switch to the "UNLOAD" position.

3. Press the "EXTEND HANDLER" amber pushbutton/light. The Handler Pins should go up and the Handler should move to and engage the tray; trip the Gemco Limit Switch mechanism, which should stop the drive.
    a. The "Handler Pins Raised" amber light should go on.
    b. When the Handler is fully extended, the amber light should come on.

4. Press the "RETRACT HANDLER" green pushbutton/light. The Handler Pins should go down and the Handler should pull the tray onto the Batch Transfer Car; trip the Gemco Limit Switch mechanism, which should stop the drive.
    a. The "Handler Pins Lowered" green light should go on.
    b. When the Handler is fully retracted, the green light should come on.

5. If the Tray Handler should jam and overload during either motion, the "Handler Overcurrent" red light will come on, and the Alarm Horn will sound. Silence the Alarm Horn by pressing the "ALARM SILENCE" black

pushbutton. When the cause of the overcurrent is corrected, press the "FAULT RESET" black pushbutton

AUTOMATIC MODE

TRAVEL

1. When starting the Transfer Car System, the Transfer Car must be stationed at a piece of equipment to enable automatic operation.

2. Reflectors mounted on the various pieces of equipment actuate the Transfer Car position locating switches.

3. When the Transfer Car approaches its destination, the deceleration switch will be actuated, and the Transfer Car will decelerate from "Run" speed to "Low" speed.

4. When the "Transfer Car In Position" switches are actuated, the Transfer Car will stop and the green light should come on.

5. At this time the proper Transfer Car Positioner is extended, which will locate the Transfer Car in the proper position for a reliable tray transfer.

> **NOTE:** IF A POWER LOSS OCCURS, WHILE THE TRANSFER CAR WAS BETWEEN EQUIPMENT, FOLLOW THIS PROCEDURE:
> 1. RESTORE POWER.
> 2. START THE MASTER RELAYS.
> 3. PUT THE TRANSFER CAR BACK INTO THE "AUTO" MODE.

AUTO STARTUP

> **NOTE:** BEFORE STARTING THE "AUTO" CYCLE, CLEAR ALL PREVIOUS CYCLES, BY PRESSING THE "ALARM SILENCE" AND THE "FAULT RESET" BLACK PUSHBUTTONS AT THE SAME TIME. THIS WILL CLEAR ALL TRAY DATA AND RESET ALL PLC CYCLE LATCHES ON THE TRANSFER CAR.

1. Turn the "CYCLE MODE" selector switch to the "AUTO" position.

2. Press the "CYCLE START" green pushbutton/light.
   a. The green light should come on.

3. When the Transfer Car is in automatic, the car will load or unload any station that is in the "AUTO" mode.

FAULT RECOVERY FROM TRAY LOAD FAULTS

1. If the Transfer Car tries to load a station and the Tray Handler does not position the tray in the proper place:
   a. Put the Transfer Car in the Manual Cycle by turning the "CYCLE MODE" selector switch to the "MAN" position.
   b. Using the "Manual" handler controls, finish the loading cycle.
   c. Return the "CYCLE MODE" selector switch to "AUTO" (See the "Auto Startup" section outline above)
   d. The Transfer Car should resume "Automatic" operation.

2. If a load cycle has to be aborted, after the Transfer Car has committed to load a station:
   a. Without a load on the Transfer Car:
      1) Turn the "CYCLE MODE" selector switch to the "MAN" position (See the "Manual Cycle Startup").
      2) When the Transfer Car is put back into "AUTO", it will search by priority the next task to be completed.

   b. With a load on the Transfer Car:
      1) Turn the "CYCLE MODE" selector switch to the "MAN" position (See the "Manual Cycle Startup").
      2) Move the load to where it needs to go and manually load the tray (See the "Manual Mode").
      3) When the Transfer Car is put back into "AUTO," it will search by priority the next task to be completed.

ALARMS AND TROUBLESHOOTING

OBSTACLE DETECTED FAULT

Alarm Notification: The Alarm Horn will sound and the "Obstacle Detected" red light will flash on the Transfer Car Control Cabinet. To silence the horn, press the "ALARM SILENCE" pushbutton.

Cause: This alarm means that an obstacle was detected on the Batch Transfer Car rails. Check both sides of the Batch Transfer Car to see what obstruction is causing the alarm. Press the "MASTER STOP" red pushbutton, before trying to clear the tracks.

Reset: When the fault is corrected, restart the Batch Transfer Car drive, by following the "Startup And Shutdown Procedures" outlined in this manual. When the car is put back into operation, the transfer drive will be able to finish its motion.

HANDLER OVERCURRENT

Alarm Notification: The Alarm Horn will sound and the "Handler Overcurrent" red fault light will flash on the Transfer Car Control Cabinet. To silence the horn, press the "ALARM SILENCE" pushbutton.

Cause: This alarm means that the Batch Transfer Car handler drive went overcurrent. Check the motor overloads and fuses. Check the jam relay is adjusted properly. Check to see if the motor brake is operating properly. Check for a jammed tray on the car, or a mechanical problem with the handler mechanism. Press the "MASTER STOP" red pushbutton, before trying to free the handler mechanism. If necessary, back up the handler drive mechanism, press the "MASTER START" green pushbutton, then press the "EXTEND HANDLER" or "RETRACT HANDLER" pushbutton/lights. If that does not clear the problem, press the "MASTER STOP" red pushbutton, go to the motor/gear box and turn the motor shaft by hand to relieve the handler head pressure from the tray. Restart the handler drive, by following the "Startup And Shutdown Procedures" outlined in this manual.

Reset: When the fault is corrected put the Batch Transfer Car back into operation, the handler drive will be able to finish its motion.

A.C. DRIVE FAULT

Alarm Notification: The Alarm Horn will sound and the "A.C. Drive Fault" red fault light will flash on the Transfer Car Control Cabinet. To silence the horn, press the "ALARM SILENCE" pushbutton.

Cause: This alarm means that the Transfer Car A.C. Variable Speed Drive went overcurrent or has a mechanical problem. Check the motor overloads and fuses. Check to see if the motor brake is operating properly. Check for a mechanical problem with the drive mechanism. Press the "MASTER STOP" red pushbutton, before trying to free the transfer drive mechanism. If necessary, back up the drive mechanism by going to the motor/gear box and turning the motor shaft by hand, to relieve the transfer drive chain tension. Restart the transfer drive by following the "Startup And Shutdown Procedures" outlined in this manual, then use the Transfer Car Joystick to move the Transfer Car forward or reverse.

Reset: When the fault is corrected, restart the system, by following the "Startup And Shutdown Procedures" outlined in this manual. After the Transfer Car is put back into operation, the Transfer Drive will be able to finish its motion.

MECHANICAL FAULT

Alarm Notification: The Alarm Horn, at the Transfer Car Control Cabinet, will sound and the "Mechanical Fault" red light will come on. To silence the Alarm Horn, press the "ALARM SILENCE" black pushbutton.

Cause: This alarm means that the Tray Load/Unload Drive went overcurrent. Check for a mechanical problem with the drive. Turn the "CYCLE MODE" selector switch to the "MAN" position, or press the "MASTER STOP" red pushbutton before trying to free the mechanism. If it is necessary to back up the Tray Load/Unload Drive, go to the motor/gear box and turn the motor shaft by hand to relieve the chain pressure from the reducer. Restart the Tray Load/Unload Drive.

Reset: When the fault is corrected, press the "FAULT RESET" black pushbutton. When the cycle is put back into the Automatic Mode, Tray Load/Unload Drive will finish its motion.

REPLACEMENT PARTS

GENERAL

Many of the components supplied on this equipment could possibly be replaced with other parts. However, these other parts can sometimes generate more problems than they eliminate.

A standardization program allows us to apply the components we choose, and supply with our equipment, within the range of operability; the result of a long usage examination that has been proven on many of our reliable installations. Therefore, if a component should fail, we will suggest a compatible replacement, and also record the incident for consideration on future applications. This information will enable us to continue to supply the most reliable and finest equipment for each application.

Some components are stocked at our manufacturing facility. Reputable vendors stock others. This offers you an efficient source of supply for replacement parts, as well as reliable information.

When ordering replacement parts, please provide us with the following information:

* Equipment serial number (AFC/PIFCO/TA job number).
* Complete part nomenclature.
* AFC/PIFCO/TA part number.
* Part nameplate data, if any.
* Quantity required.
* Requested delivery.
* Purchase Order number.
* Terms of payment.
* Billing address.
* Shipping address.

This information will help us to expedite your order with maximum efficiency.