

Thoreson McCosh Inc

# TECH 3 Vacuum Loading System

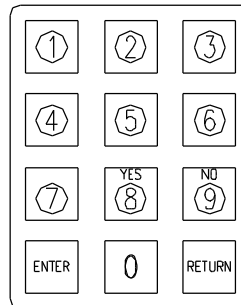
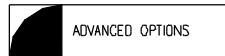
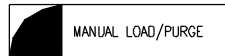
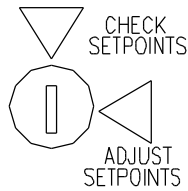
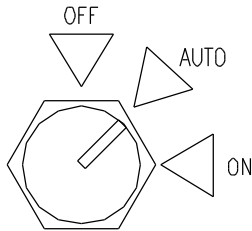
THORESON  
McCOSH INC

TECH3

AUTOMATED INTELLIGENCE

T-M Loading System

STA#	02A	LOADING	VAC=4.5	T= 03/10
STA#	08B	LOADING	VAC=4.7	T= 07/15



## INSTRUCTION MANUAL

IB200402

THORESON-McCOSH INC  
1885 Thunderbird St. Troy MI. 48084  
Phone 1-248-362-0960  
Fax 1-248-362-5270  
[sales@thoresonmccosh](mailto:sales@thoresonmccosh)

# **Thoreson McCosh Inc**

## **FORWARD**

The information contained in this Instruction Manual is provided to you for the maintenance of your Thoreson McCosh equipment.

Also included in this manual are operating instructions, a service parts list, and wiring diagrams. Please file this manual for future use.

For additional information, please contact:

THORESON-McCOSH Inc. 1885 Thunderbird Street Troy, MI 48084 Phone: (248) 362-0960 Facsimile: (248) 362-5270 <a href="mailto:sales@thoresonmccosh.com">sales@thoresonmccosh.com</a>
---

## **CUSTOMER RECORDS**

Upon receipt of your Thoreson McCosh equipment, it is very important that you complete the table below. The information will be needed to best serve you when you call the Thoreson McCosh Service Department with questions or to order replacement parts. The information is located on the Serial Tag on the unit and inside the door of the control box.

Model Name	_____
Serial No.	_____
Wiring Diagram No.	_____
Insert No.	_____
Program No.	_____
Layout No.	_____

## Table of Contents

SECTION 1:	WARRANTY .....	2
SECTION 2:	OPERATION.....	3
2.1:	QUICK START .....	3
SECTION 3:	SYSTEM OPERATION.....	3
3.1:	INTRODUCTION.....	3
3.2:	METHOD OF OPERATION .....	3
3.2.1:	AUTOMATIC MODE OF OPERATION.....	4
3.2.2:	MANUAL MODE OF OPERATION.....	4
3.3:	INSTALLATION AND SETUP .....	4
SECTION 4:	THE TECH 3 INSTRUCTIONS .....	5
4.1:	OPERATOR INTERFACE PANEL .....	5
4.1.1:	THE FIRST SCREEN.....	5
4.1.2:	OFF/AUTO/ON SWITCH .....	6
4.1.3:	KEY ACCESS SWITCH.....	6
4.1.4:	DESCRIPTION OF KEY PAD .....	6
4.1.5:	SYSTEM SELECTOR SWITCH .....	6
4.1.6:	SYSTEM PUMP SELECTOR SWITCH .....	7
4.2:	SYSTEM SETPOINTS.....	9
4.2.1:	MODIFYING THE STATION SETTINGS.....	9
4.2.2:	EDITING THE RATIO PERCENTAGE .....	10
4.2.3:	EDITING THE PURGE VALVE TIME .....	10
4.2.4:	ADVANCED OPTIONS.....	11
4.2.5:	ALARMS .....	12
4.2.6:	ALARM MESSAGES .....	12
SECTION 5:	MAINTENANCE .....	13
5.1:	FILTER MAINTENANCE .....	13
5.2:	PUMP MAINTENANCE .....	13
SECTION 6:	MATERIAL PICK-UP TUBE.....	14
	STANDARD PARTS LIST FOR LOADERS AND RECEIVERS.....	15
	413731-A MAIN CONTROL BOARD .....	16
	TEE VALVE .....	17
	PUMP LAYOUT .....	18
	PUMP PARTS .....	19
	TROUBLESHOOTING COMMON LINES.....	20
	WIRING DIAGRAM .....	

## **SECTION 1: THORESON MCCOSH PRODUCT WARRANTY**

Thoreson McCosh warrants each product of its manufacture to be free from defects in material and workmanship for a period of 12 months from the date of delivery to the original purchaser. Thoreson McCosh's obligation under this warranty is limited to repairing or replacing any part returned to the Thoreson McCosh factory with transportation charges prepaid, and which, on examination by Thoreson McCosh, shall disclose to Thoreson McCosh's satisfaction to have been defective.

The purchaser must notify Thoreson McCosh of such defects and promptly deliver the defective part(s) in accordance with Thoreson McCosh's shipping instructions, delivery prepaid. Parts will be replaced F.O.B. Thoreson McCosh factory, by Thoreson McCosh, and will be invoiced to the purchaser with "credit on return of defective part", if the part is returned within fifteen (15) days after shipment of replacement part. Thoreson McCosh is not liable for installation or cost to install the replacement part or removal of the defective part.

Thoreson McCosh is not responsible for any failure of its product due to improper use, installation, or operation. Thoreson McCosh shall not assume any expense or liability for repairs made to any Thoreson McCosh unit or equipment outside Thoreson McCosh's own factory unless specifically agreed to in writing by Thoreson McCosh.

Equipment and accessories furnished by us, but manufactured by others, are guaranteed to the extent of the original manufacturer's guarantee to Thoreson McCosh, if that guarantee exceeds one (1) year.

It is expressly understood that Thoreson McCosh is not responsible for damage and/or injury caused to buildings, contents, products, or persons by reason of installation or use of any of our products. Thoreson McCosh shall not be liable for loss, damage or expenses arising directly or indirectly from, or being consequential or incidental to, the use of its products or from any other cause.

The above warranty supersedes, and is in lieu of all other warranties expressed or implied; and no person, agent, representative or dealer is authorized to give any warranties on behalf of Thoreson McCosh, not to assume for Thoreson McCosh any other liability in connection with Thoreson McCosh products.

## **SECTION 2: OPERATION**

### **2.1: QUICK START**

1. Uncrate Loading System.
2. Mount receivers on machines and hoppers (see Section 3.3).
3. Mount T-valves above receivers.
4. Mount all external ratio and purge valves.
5. Connect vacuum and material lines (see plant layout if applicable).
6. Connect compressed air to system.
7. Wire the loading system, running all inputs and outputs back to the central loading system control panel (see wiring diagram).
8. Connect 3-phase high power to the pump(s).
9. Check pump motor phasing; change any two wires (L1, L2, L3) if phase is incorrect.
10. Set time setpoints for all stations, ratios, and purging valves. Assign purging valves to stations (See Section 4.2.1).

## **SECTION 3: SYSTEM OPERATION**

### **3.1: INTRODUCTION**

The Thoreson-McCosh Vacuum Loading system is designed to efficiently deliver plastic pellets with a minimum of maintenance.

### **3.2 METHOD OF OPERATION**

The operation of the vacuum loading system is quite simple. The positive displacement air pump creates a "vacuum effect" when the pump is driven. This vacuum results in air flow through the vacuum hose, creating a reduced pressure in the vacuum receiver, which causes the discharge valve on the material outlet of the receiver to close, causing a further reduction in pressure within the receiver. The reduced pressure within the receiver results in air flow through the pick-up tube or material take-off, then through the material delivery tube and into the vacuum receiver. The high velocity of this air flow results in material pickup, and the consequent delivery of a mixture of material and air into the receiver. Once this mixture is delivered to the receiver, the material and air must be separated, and the air pumped out of the receiver to maintain the reduced pressure necessary for conveying. A filter screen in the receiver accomplishes the separation of the air from the material.

If a purging valve is included part of the system, the valve, when activated, will shut off the material flow, and open a second port that only allows air flow. This is designed to move all material in the material delivery tube to be deposited in the receiver. The purging valve is typically located between the material take-off and the material delivery tube. Ratio valves work similarly, except the second port would allow material from a second source to be loaded. Ratio valves can be mounted anywhere, including being an integral part of the receiver.

### **3.2.1 AUTOMATIC MODE OF OPERATION**

When the OFF/AUTO/ON switch is in the AUTO position, all systems will operate automatically, loading each station that is requesting material. The stations load sequentially; when all stations requesting material have been loaded once, the pump will remain running and the VB (Vacuum Break) valve will open and then the blow back sequence will begin. At the end of the blow back sequence, the load cycle will begin again. Each system (consisting of a pump, filter, and receivers) operates independently in the Auto mode. If no receivers call for material for 2 minutes, the pump will shut down.

### **3.2.2 MANUAL MODE OF OPERATION**

When the OFF/AUTO/ON switch is in the ON position, all systems will shut off. The system selected by the System Selector Switch (see Section 4.1.4) can have any of its purge valves, ratio valves, or Tee valves independently powered, giving the user the capability to test or load any station. Selecting the station is done by pressing the “MANUAL LOAD/PURGE” key on the Loading system keypad.

### **3.3 INSTALLATION AND SETUP**

The loading system will perform best when the material and vacuum lines are hooked up in the most direct manner possible with a minimum of bends. Care should be taken to insure that all the couplings are tight in order to minimize air leakage.

The vacuum receiver should be mounted on the lid of the machine hopper over a circular hole and secured to the lid of the machine hopper by bolting through the mounting holes in the receiver flange.

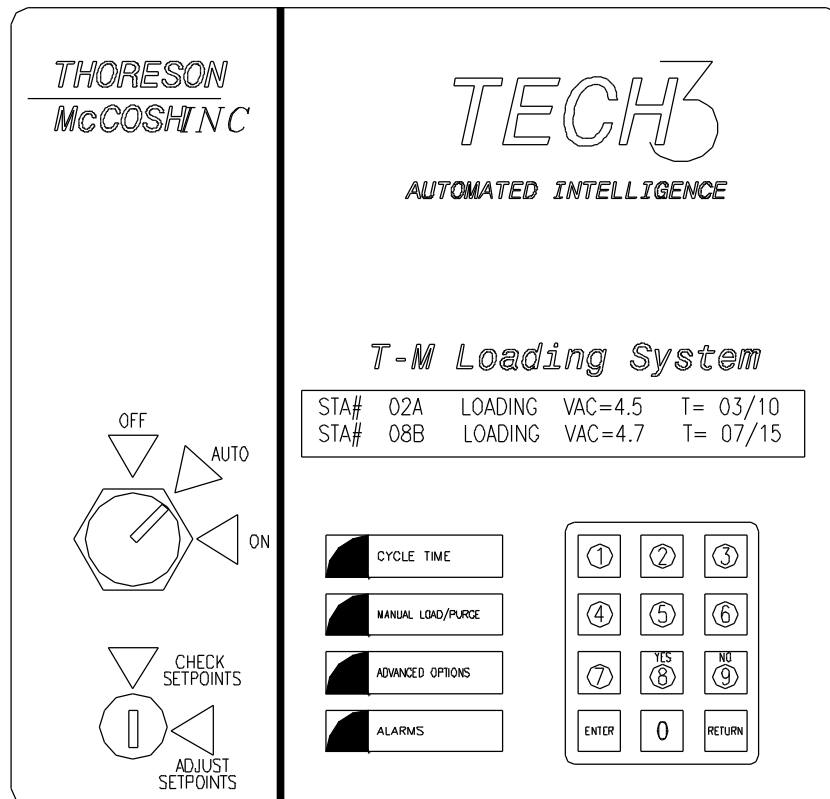
The vacuum line is to be connected from the top of the receiver to the central vacuum line or the inlet on the filter housing. The material line is to be connected from the inlet on the side of the receiver to a central material line or a material pick-up tube. The Sequencing (Tee) valves require compressed air to operate. If a ratio receiver or a purging valve is being used, a source of compressed air is required in order to operate the solenoid. The pressure of the air should be regulated between 60 psi and 90 psi in order to obtain maximum valve operation durability. This regulated air supply should be connected directly to the solenoid valve.

## SECTION 4: TECH 3 INSTRUCTIONS

### 4.1: OPERATOR INTERFACE PANEL

The operator interface panel includes:

- Key switch to lock out access to process setpoints;
- On/Auto/Off switch;
- 16 key keypad;
- Two line by 40 character Vacuum Fluorescent Display.



**FIGURE 4.2 PUMP SELECTION SCREEN**

#### 4.1.1 THE FIRST SCREEN

This screen is what appears when the loading system is started, and is the default screen whenever any changes have been completed (see Section 4.2). The display shows the current condition of the system currently selected by the

System Selector Switch (Section 4.1.4) and the next system in sequential order. If currently loading a station, it will indicate the station number, the inches of mercury of vacuum developed by the pump, the current loading time and the setpoint of the station, and will indicate if there is an alarm on that system.

#### **4.1.2 OFF/AUTO/ON SWITCH**

The three position switch turns the system on (in the On and Auto position), and off in the Off position). When the switch is placed in the Auto position, the system is controlled by the time setpoints (see Section 3.3.1 for setting the time, ratio and purge setpoints). When it is in the ON position, the system can be Manually controlled by the operator, allowing any station to be loaded, purged, or ratio loaded (see Section 3.2.2 for using the Manual System capabilities).

#### **4.1.3: KEY ACCESS SWITCH**

The key access switch provides a security function, locking out the setpoint adjust, while still providing all monitoring capabilities.

#### **4.1.4 DESCRIPTION OF KEYPAD**

The keypad consists of twelve regular function keys, similar to a pocket calculator, and four special keys, that allow checking and adjusting the setpoints.

NOTE: Pressing the “RETURN” key in most cases will abort the current operation and return the display to the First Screen (as displayed in figure 4.1).

NOTE: All the following screens are shown with the key switch in the “ADJUST SETPOINTS” position.

#### **4.1.5 SYSTEM SELECTOR**

The System Selector Switch points to the system whose setpoints can be edited, whose stations can be manually controlled (if the Off/Auto/On switch is in the “On” position). The system values are displayed on the top line of the First Screen and whose alarms can be displayed.



#### 4.1.6 SYSTEM PUMP SELECTION

This is a 3 Pump, 2 System Loader Control, with the capability to have any pump load any system.

To change the pump being used, you must first put the **Off/Auto/On Switch** into the *Off* position.

To display the Pump Selection screen, press the ADVANCED OPTIONS key 2 times.

```
Current Pump Assignments: 1A 2B 3_  
Re-Assign systems to pumps? (Y/N)
```

**FIGURE 4.1 PUMP SELECTION SCREEN**

Press YES (8) to edit the pump assignments.  
Press NO (9) to return to the main screen.

```
Current Pump Assignments: 1A 2B 3_  
Enter systems A=1 B=2 0=0 For pump #1
```

**FIGURE 4.2 PUMP SELECTION SCREEN**

This screen shows that: pump #1 is loading system A  
pump #2 is loading system B  
pump #3 is not assigned

To assign Pump #3 to System A ;  
Press 0 to assign no System to Pump #1,  
Press Enter

```
Current Pump Assignments: 1_ 2B 3_  
Enter systems A=1 B=2 0=0 For pump #1 0
```

**FIGURE 4.3 PUMP SELECTION SCREEN**

You must now assign Pump #2 to System B;  
Press Enter to default Pump #2 to System B,

```
Current Pump Assignments: 1_ 2B 3_  
Enter systems  A=1 B=2 0=0  For pump #2
```

**FIGURE 4.4 PUMP SELECTION SCREEN**

You must now assign Pump #3 to System A;  
Press 1 ,  
Press Enter

```
Current Pump Assignments: 1_ 2B 3_  
Enter systems  A=1 B=2 0=0  For pump #3  1
```

**FIGURE 4.5 PUMP SELECTION SCREEN**

You will now see the updated Current Pump Assignments.

```
Current Pump Assignments: 1_ 2B 3A  
Press return
```

**FIGURE 4.6 PUMP SELECTION SCREEN**

After pressing the return key, the display will go back to the main screen.  
Return the **Off/Auto/On Switch** to the Auto position, and the system will now run with pump #3 loading system A, Pump #2 is loading System B, and Pump #1 is not loading any System and is sitting Idle for maintenance.

In this position, System A & B will load their receivers at the same time. After each load cycle, the VB will open to ambient air, the CB filter will blow back to clean the filter elements.

**NOTE:** If there is a HIGH MOTOR AMP Alarm, You must turn the **Off/Auto/On Switch** to the Off position, Switch to the other Pump, then Clear the alarm.

## **4.2 SYSTEM SETPOINTS**

### **4.2.1 MODIFYING THE STATION SETTINGS**

When the "CYCLE TIME" key is pressed, the display shows the system letter currently selected by the System Selector Switch (see Section 4.1.5) and requests that the user input the station number to be edited (see figure 4.2).

```
System A
Enter Station #:          & press <enter>
```

#### **FIGURE 4.2 SELECTING STATION NUMBER TO BE EDITED**

Once the user inputs the station to be edited, and presses the ENTER key, the screen now displays:

```
Station 01A is ON
Enter 0=OFF 1=ON:
```

#### **FIGURE 4.3 TURNING THE STATION ON OR OFF**

Pressing the "0" key and the "ENTER" key will turn Station 1 of System A off, Pressing the "1" key and the "ENTER" key, will turn Station 1 of System A on and will cause the display to change to the following:

```
Stn 01A Load=22
New load time=          secs,          press <enter>
```

#### **FIGURE 4.4 SETTING THE STATION LOAD TIME**

This displays the current load and purge time (in seconds), and allows the user to enter a new load time.

After entering the load time, press ENTER.

NOTE: Pressing the "ENTER" key before entering a new value will preserve the current value.

#### 4.2.2 EDITING RATIO PERCENTAGE

If your system has the Ratio Option, the next screen will allow you to edit the Ratio setting for that station.

```
Stn 01A Load=22          Regrind=050%
New ratio=      %,       press <enter>
```

#### FIGURE 4.5 EDITING RATIO OPTION

By default, the Ratio percentage is set to 50%. This can vary from 0%, all the way to 100% Regrind. The Ratio percentage is a percent of the load time that regrind material will be loaded.

After entering the new Ratio percentage, press ENTER.

NOTE: Pressing the “ENTER” key before entering a new value will preserve the current value.

#### 4.2.3 EDITING PURGE VALVE TIME

If your system has the Purge Valve Option, the next screen will allow you to edit the Purge Valve time.

```
Stn 01A Load=22          Purge Time= 05
New purge time=      secs  press <enter>
```

#### FIGURE 4.6 EDITING PURGE VALVE OPTION

By default, the Purge Valve time is set to 5 seconds. This is the amount of time that you want the material line to purge before switching to load the next station.

After entering the new Purge Valve value, press ENTER.

NOTE: Pressing the “ENTER” key before entering a new value will preserve the current value.

#### **4.2.4 ADVANCED OPTIONS**

When the “ADVANCED OPTIONS” key is pressed, the display shows the system letter currently selected by the System Selector Switch (see Section 4.1.5) and requests that the user input the advanced option to be edited (see figure 4.5).

```
Sys A Advanced Options: 1=Purge Valve,  
2=Blowback time,      3=Coastdown time
```

#### **FIGURE 4.7 EDITING ADVANCED OPTIONS**

At this point, editing of three options is allowed. However, the coastdown time and blowback time are factory set, and should not need to be modified. The purge valve assignment should only need to be set when first setting up the system. Pressing the “1” key allows you to set a purge valve to a particular station on a system.

#### **PURGE VALVE**

To select a purge valve, Press 1 , then enter the station to be purged.

```
System A  
Enter Station# :01      & press <enter>
```

#### **FIGURE 4.8 ASSIGNING A STATION TO BE PURGED**

After entering the station #, you will be prompted for the Purge Valve #  
Type in the Purge Valve # that you want to assign to the station you selected.  
Then press enter to enter the purge valve # and return to the first screen.

```
Purge Valve is #00  
New purge valve#= 01,      press <enter>
```

#### **FIGURE 4.9 ASSIGNING A PURGE VALVE**

**SECTION 4.2.5 ALARMS**

An indication of an alarm condition is printed on the “First Screen” (figure 4.1). To determine the nature of the alarm, set the System Selector Switch to the system that is alarming and press the “ALARM” key. The screen will then inform the user of the type of alarm and the action needed to clear the alarm. Keep in mind that when ever there is a station alarm, the screen will show a system alarm.

<b>B:1 Sys alarms</b>	<b>03 stations alarming</b>
<b>Details= 1 for System</b>	<b>2 for Stations</b>

**FIGURE 4.10 ALARMS**

Pressing the 2 key will allow you to view the type of alarm and which stations are alarming. Press ENTER to scroll through all of the stations that are alarming. Press YES to clear the individual station alarms. Press RETURN to return to the first screen.

<b>Sta# 02B alarms:</b>	<b>NO LOAD</b>	<b>RET=exit</b>
<b>Press YES to clear station alarms</b>		<b>ENT=next</b>

**FIGURE 4.11 CLEARING ALARMS**

**SECTION 4.2.6 ALARM MESSAGES**

<b>Alarm Message</b>	<b>Definition</b>
No Load	Receiver has failed to change the state of its limit switch after three attempts at loading.
High Amps	The pump has kicked out its Overload (Check Motor)
Global Vars	Memory corruption, all setpoints and settings of any values under “Advanced Options” are suspect, values will be reset to default values. Turn on dip switch #8.
Purge Collision	Two purge valves have been assigned to the same station.

## **GLOBAL VARS**

To clear the GLOBAL VARS alarm, Turn the #8 dipswitch on, press the reset button (green) on the main control board, then follow the directions on the screen.

When a new EPROM chip is installed into the main control board, the GLOBAL VARS will need to be reset to the new default settings in the new chip.

**Write down all station settings before switching chips, because they will all be reset to the default settings.**

## **SECTION 5: MAINTENANCE**

### **5.1: FILTER MAINTENANCE**

- It is recommended that filters be checked periodically for material residue accumulation, and cleaned before the loader's performance is reduced.
- Inspect and clean the filter screen in the receiver hopper at least once a month (more often if dusty materials are being conveyed).
- If a central filter is being used, inspect the filters in the unit at least once a month.
- Inspect the filter on the pump weekly. These are cartridge type filter elements and may be cleaned with compressed air several times before a new element must be installed. When filter material becomes worn, a new filter should be installed. Replacement filters are available from **Thoreson McCosh, Inc.**

### **5.2: PUMP MAINTENANCE**

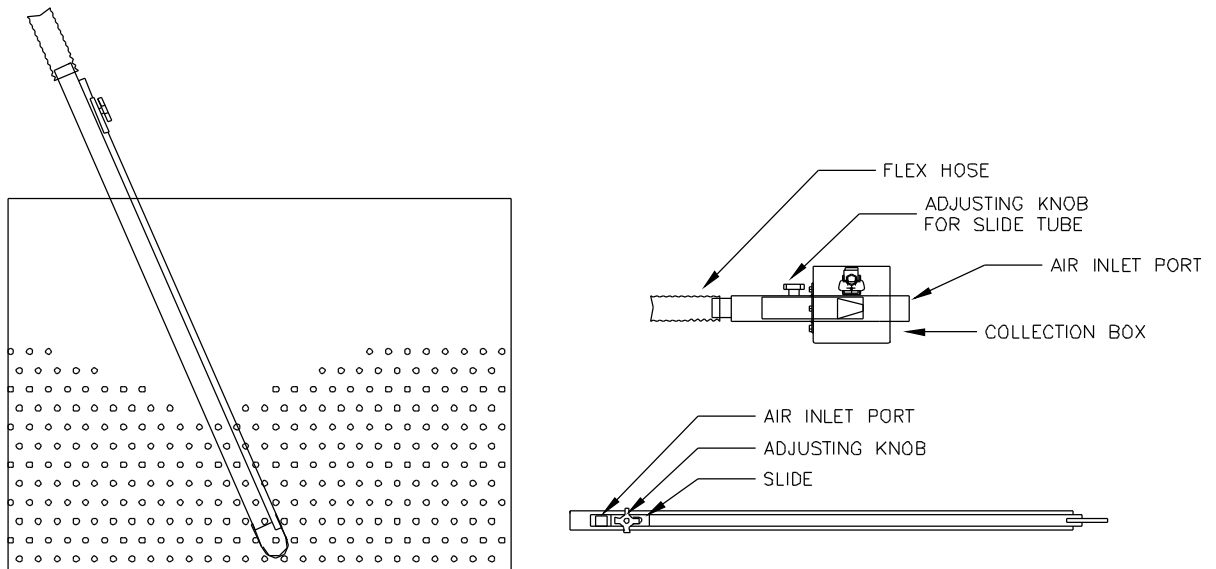
- Add fresh oil to the pump as required to maintain proper oil level. (See pump maintenance manual for correct procedure).
- The gear case of the pump should be drained, flushed and refilled with fresh oil every 1000 hours. Use a good grade of SAE 40 oil.
- The grease fittings on the shaft end of the pump should be charged with a medium type bearing grease weekly.
- Check the belt periodically for tension and wear.

## **SECTION 6: MATERIAL PICK-UP TUBE/ TAKE-OFF**

The material pick-up tube/vacuum take-off has an adjustable slide to regulate the material conveying air. The material is aerated at the bottom of the tube so that various densities of materials can be handled with one pick-up tube/vacuum take off.

The pick-up tube should be positioned at or near the bottom of the container. The loading rate should have a continuous noise of material passing through the conveying pipe as long as the loader is in operation.

If slugging occurs, the slide is incorrectly adjusted. To correct the problem, adjust the slide to let more air pass through the air inlet port.

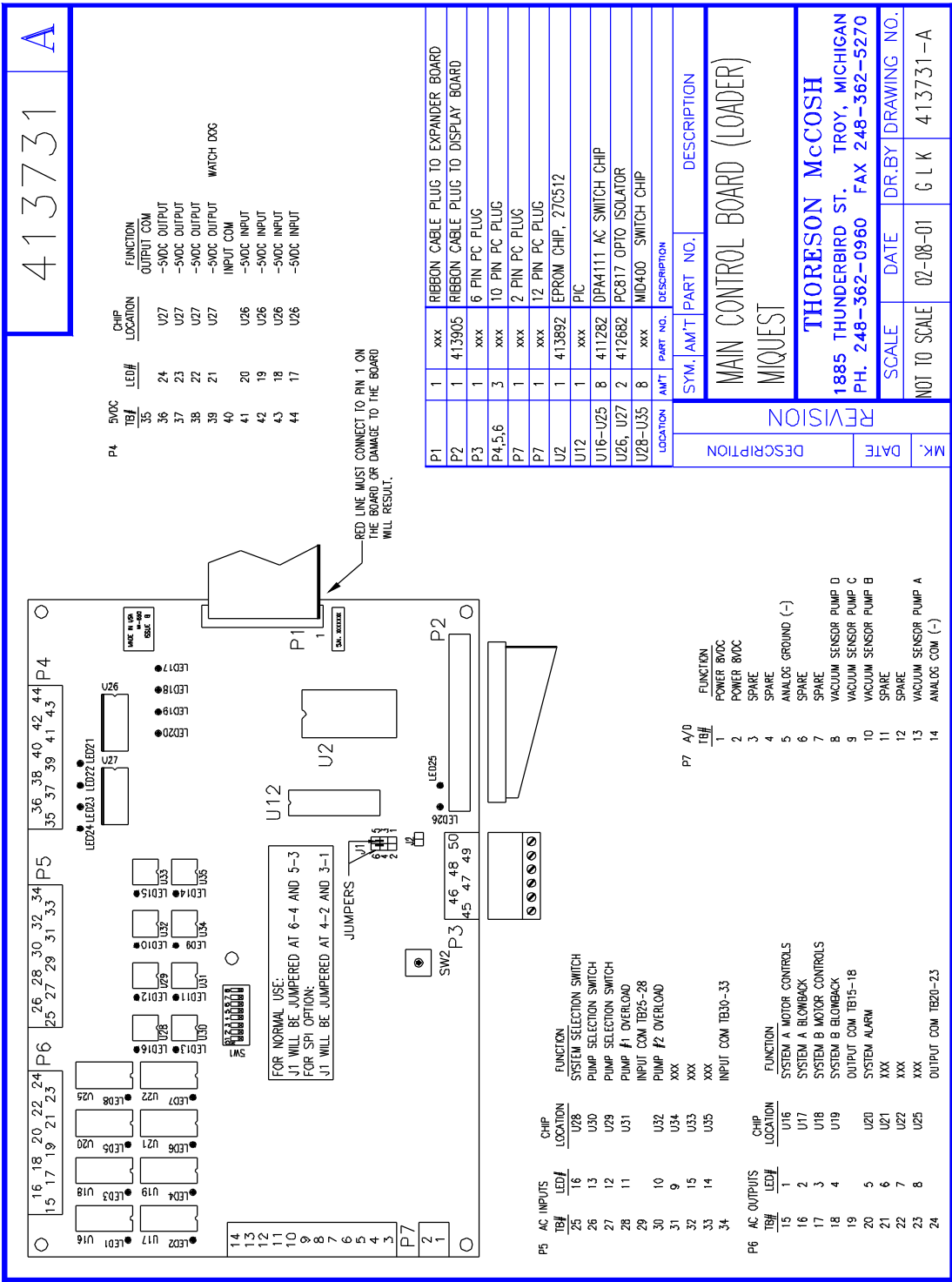




**Thoreson McCosh Inc**

**STANDARD PARTS LIST FOR LOADING SYSTEM & RECEIVERS**

MODEL NUMBER	VACUUM FILTER	SNUBBER FILTER	RECEIVER FILTER	LID SEAL	DOOR SEAL	FINES FILTER	LID CLAMPS
MARK 3	404662	404661		409401			
MARK 4	404662	404661		409401			
MARK 5	404662	404661		409401			
MARK 7	404662	404661		409401			
MARK 7XP	404662	404661		409401			
MARK 10	405897	404365		409401			
7" DIA RECEIVER			413001	412257	412265		411402
10" DIA RECEIVER			407095	409402	413091		405824
15" DIA RECEIVER			409002	409401	413091		407409
RB-1 FILTER	408433 or 414173			409402	413091	407402	
RB-4 FILTER	407009 or 414173			409401	413091	407402	
RB-6 FILTER	405895 or 414173			409401	413091	407402	
CB-1 FILTER	408433 or 414173			409402	413091	407402	
CB-4 FILTER	407009 or 414173			409401	413091	407402	
CB-6 FILTER	405895 or 414173			409401	413091	407402	



LOCATION	AMT	PART NO.	DESCRIPTION
P1	1	xxx	RIBBON CABLE PLUG TO EXPANDER BOARD
P2	1	413905	RIBBON CABLE PLUG TO DISPLAY BOARD
P3	1	xxx	6 PIN PC PLUG
P4,5,6	3	xxx	10 PIN PC PLUG
P7	1	xxx	2 PIN PC PLUG
P7	1	xxx	12 PIN PC PLUG
U2	1	413892	EPROM CHIP, 270512
U12	1	xxx	PIC
U16-U25	8	411282	DPA4111 AC SWITCH CHIP
U26, U27	2	412682	PC817 OPTO ISOLATOR
U28-U35	8	xxx	MD400 SWITCH CHIP

SYM.	AMT	PART NO.	DESCRIPTION
<b>MAIN CONTROL BOARD (LOADER)</b>			
<b>MIQUEST</b>			
<b>THORESON MCCOSH</b>			
1885 THUNDERBIRD ST. TROY, MICHIGAN			
PH. 248-362-0960 FAX 248-362-5270			

SCALE	DATE	DR. BY	DRAWING NO.
NOT TO SCALE	02-08-01	G L K	413731-A

